Application

- An **application** is a **computer program** that is **designed for a particular task** typically to be used by end-users.

SDLC - Software/System/Application Development Life Cycle

- Software development life cycle (SDLC), also referred to as the application development life-cycle, is a **process for planning, creating, testing, and deploying an Application(LMS / Myntra / Hotstar / etc)**.

Development

- **Development** : It's more about creating software products or applications. This domain can have roles like Software Architects, Software Developers, UI Developers, QA Engineers etc.

- The Software Development team will create/design/code the applications.

- **Example**: doing coding in HTML / Java / Python etc is development

Operations

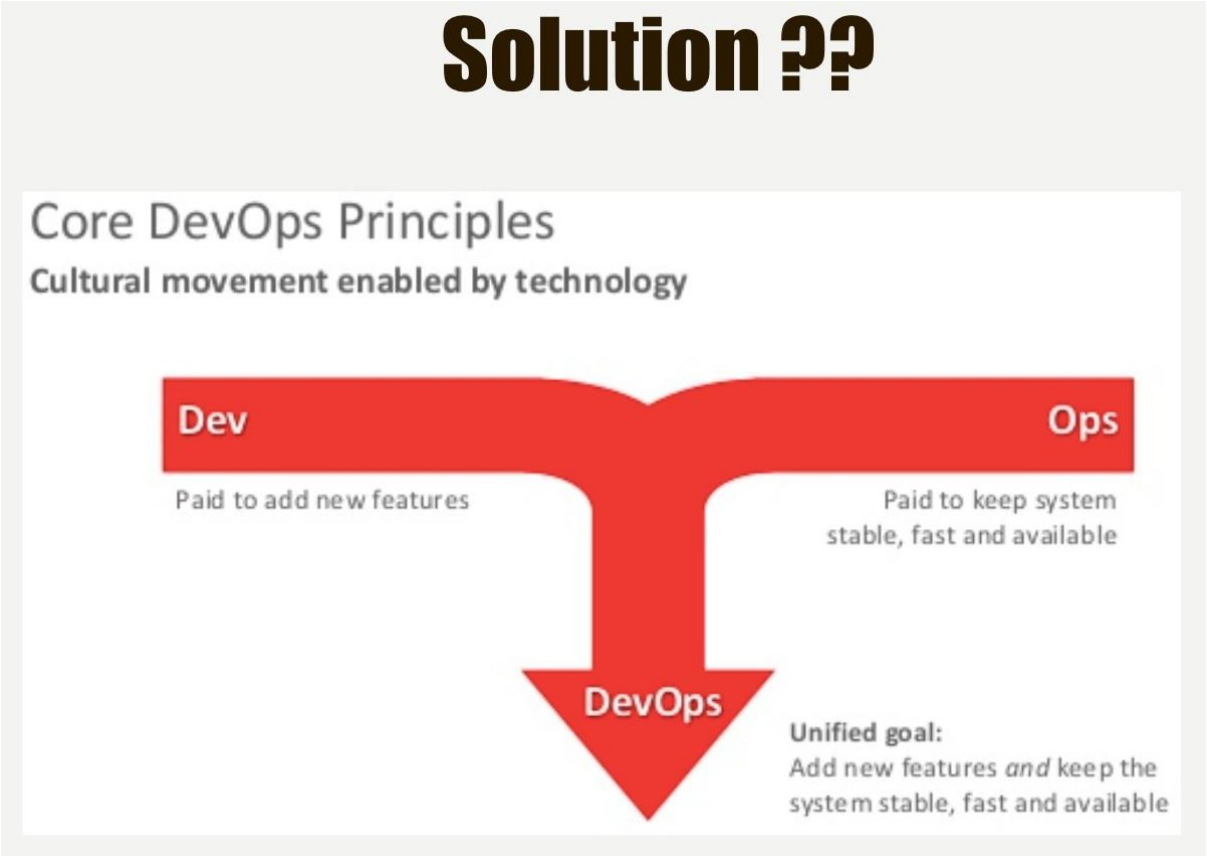
- **Operations** : It's more about providing required infrastructure necessary for running software products or applications.

- This domain can have roles like System Administrators, Network Administrators, Security Team, Help desk engineers etc.

- **Example** : Setting up a Network, Creating New Servers, OS Installations, Setup and Manage Web Servers, Application Servers, Databases Servers, Load Balancers, Firewalls etc.

- Development - COOKING
- Operations - SERVING

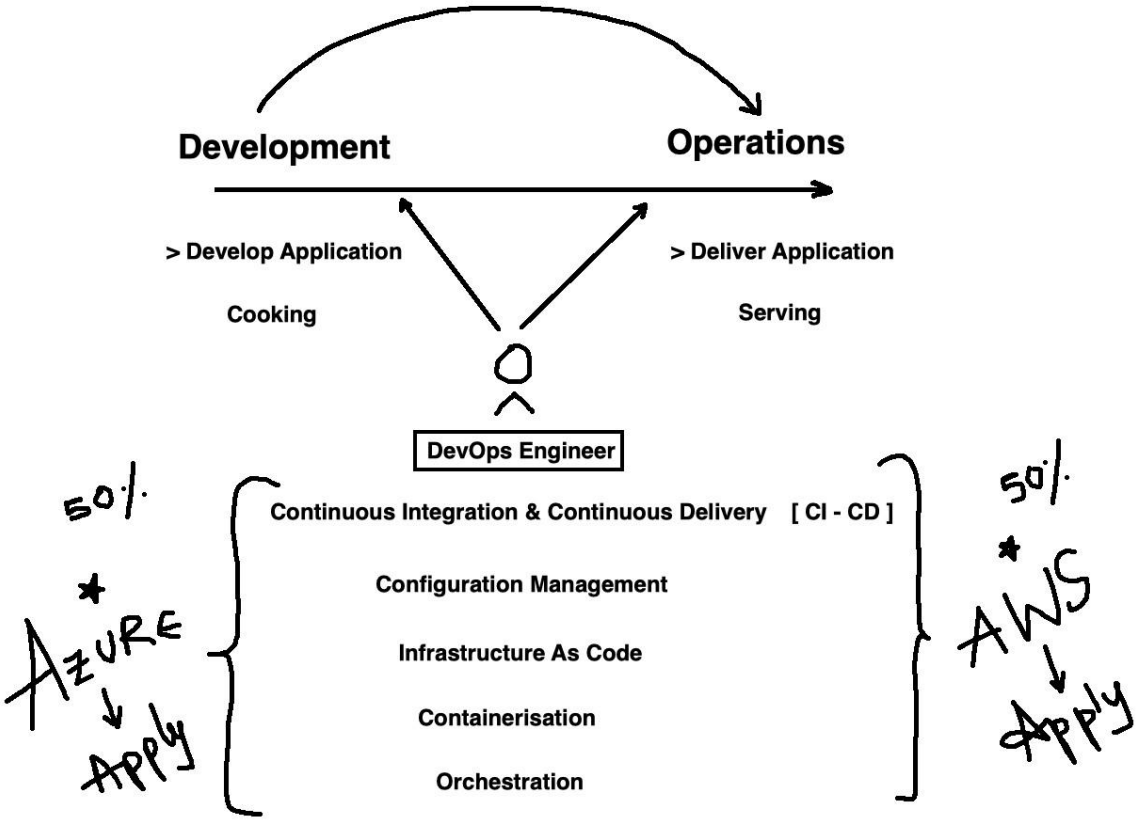
Solution ??


Core DevOps Principles
Cultural movement enabled by technology
Dev
Ops
Paid to add new features
Paid to keep system stable, fast and available
DevOps
Unified goal:
Add new features and keep the system stable, fast and available

DevOps

- **DevOps** is a set of **practices** that works to automate and integrate the processes between software development and IT(Operations) teams, **so they can build, test, and deploy software faster and more reliably**.

DevOps [Practices + Tools]



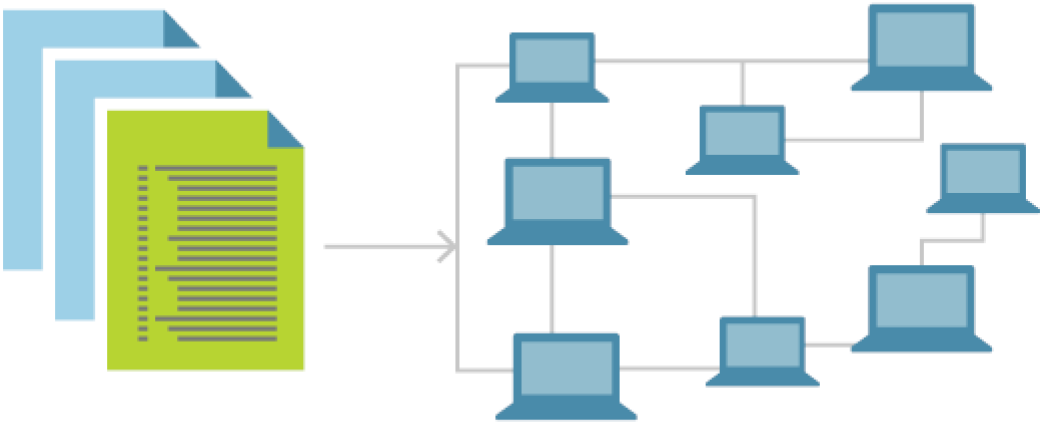
Continuous Integration & Continuous Deployment [CI - CD]

- CI/CD is a method to frequently deliver apps to customers by **introducing automation into the stages of app development**.

- **Jenkins** - an open source **automation server** which enables developers around the world to reliably build, test, and deploy their software.

Infrastructure As Code - IaC

- Infrastructure as code is the **process of managing and provisioning computer data centers** through CODE.



- Terraform is an **Infrastructure As Code [IaC]**

DevOps Learning Curve

Operations

Operations

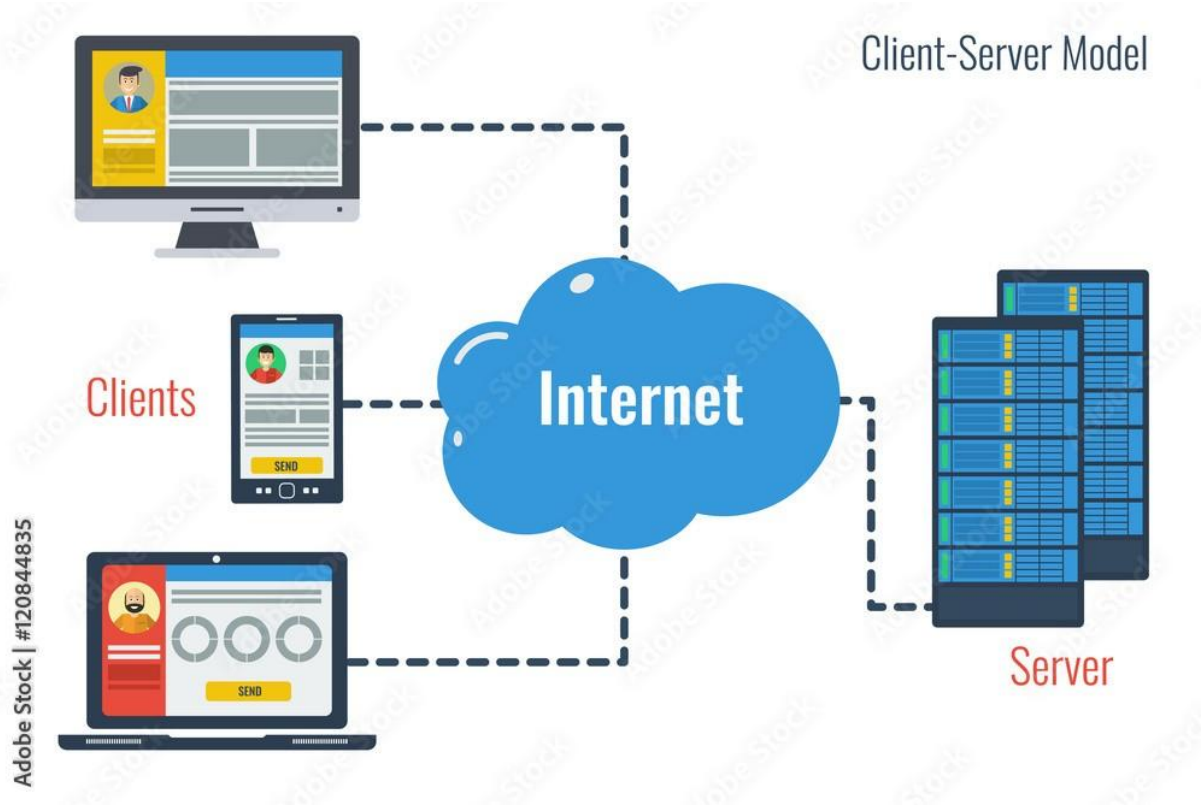
> Cloud Infra - Manage Servers

> Linux - CLI
{ command line interface - 100 % AUTOMATION }

> Application Stack

> Forntend Tier
> App Tier
> DB Tier
> web server / app server / db server

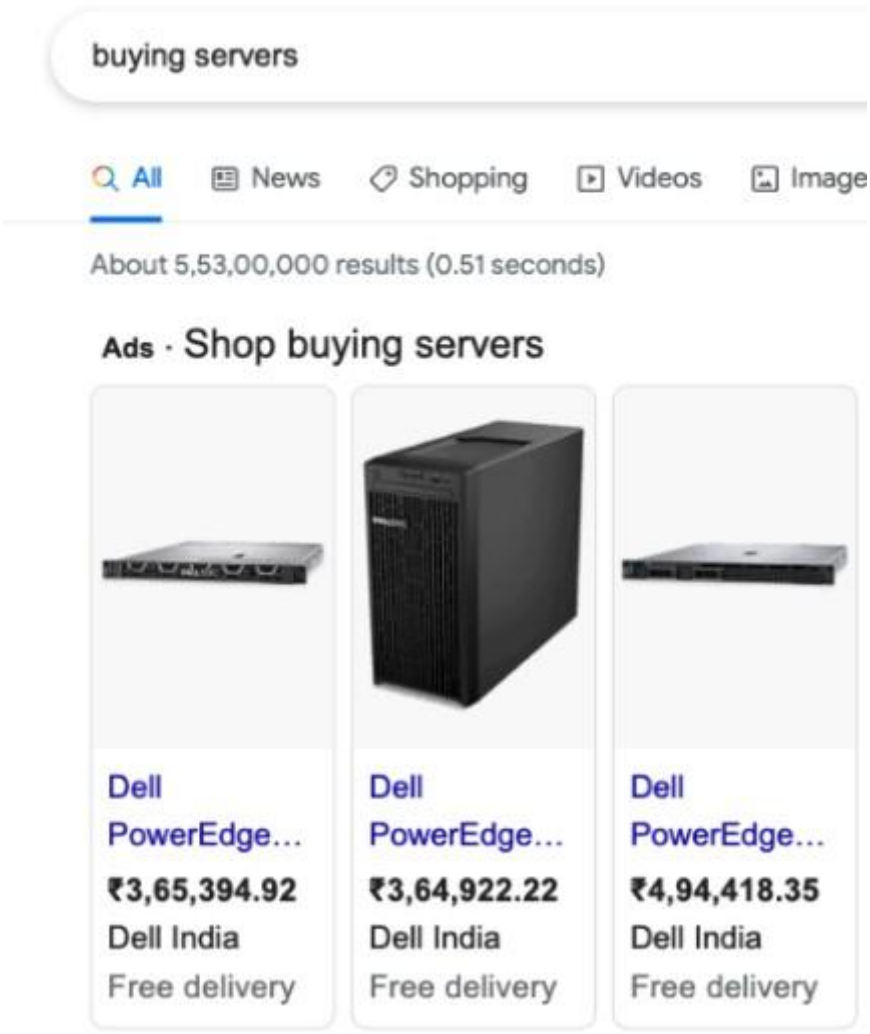
Server



A server is a computer program or device that provides functionality for other programs or devices, called "clients". Servers can provide various functionalities, such as sharing data, managing network traffic, or running complex applications.

Buying Servers ?

- Okay, as we got to know what servers are, now to work with them we need to **BUY SERVERS**.



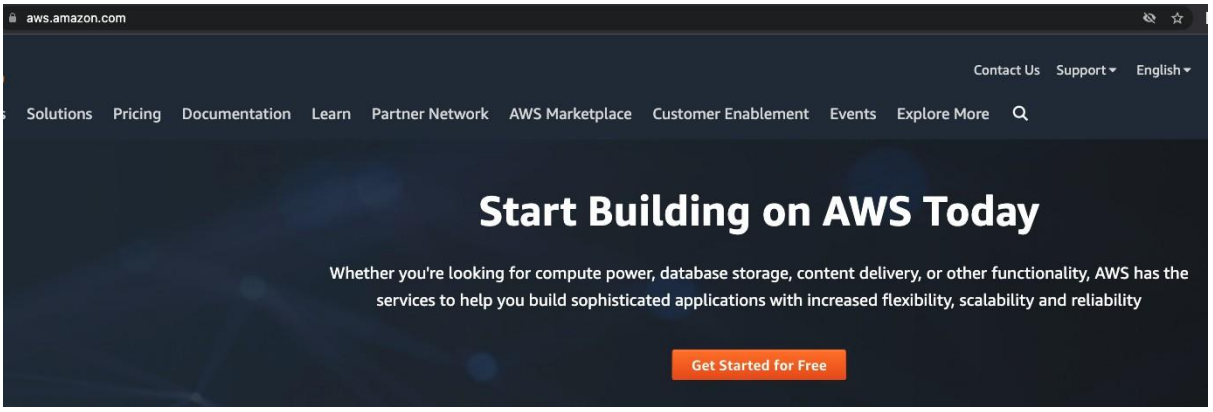
- Now instead of buying servers, will **RENT SERVERS** on **CLOUD**.

Cloud Computing

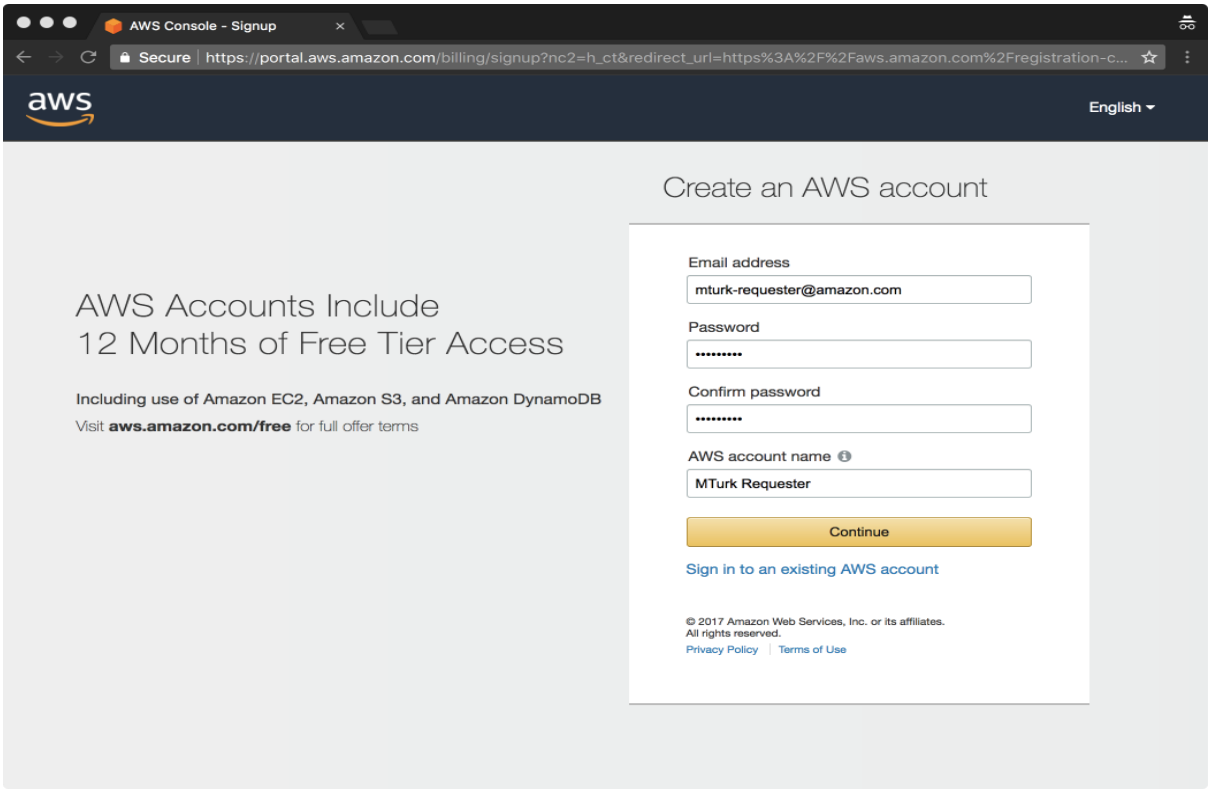
- '**The Cloud**' can also refer to **Cloud computing** is the **on-demand availability** of compute power(**Servers**), database storage, applications, and other IT resources through a **cloud services platform (AWS, AZURE etc)** via the **internet** with **pay-as-you-go pricing**.

AWS Account Setup

- Visit - https://aws.amazon.com/free

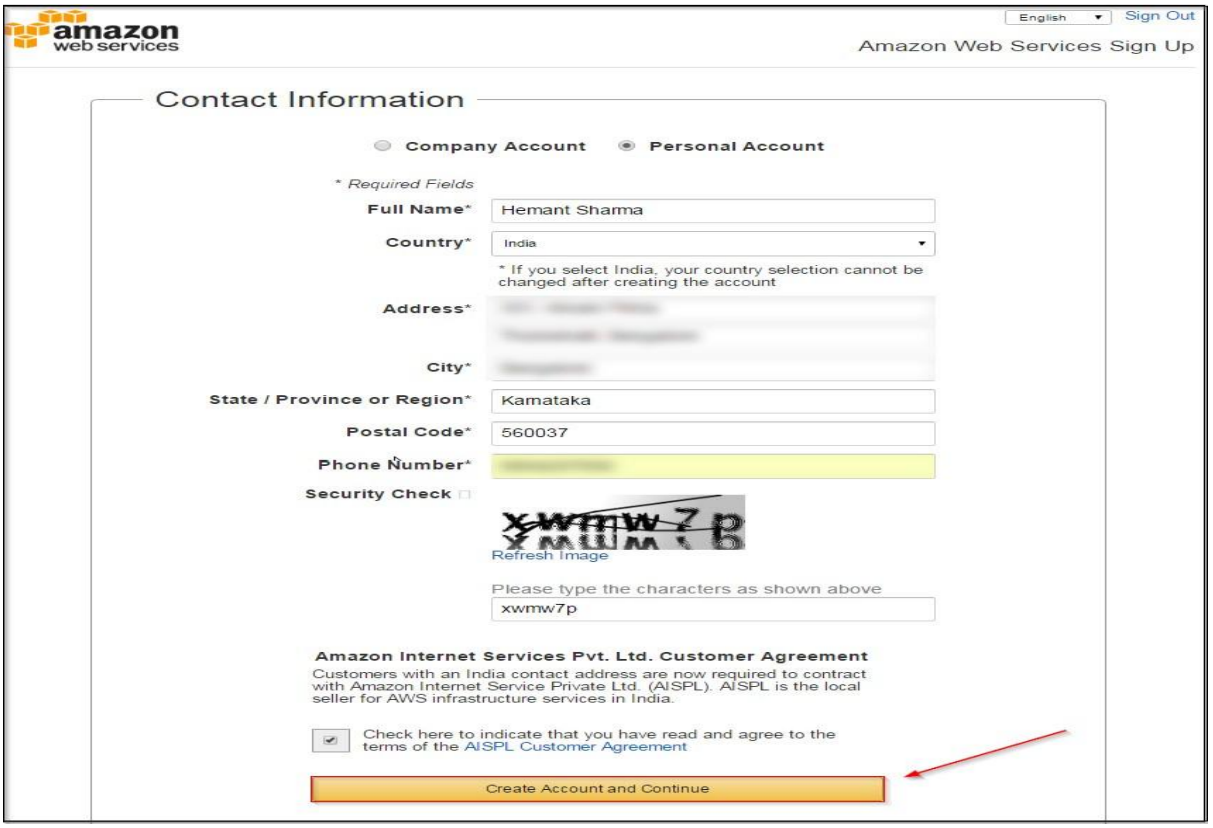


- The AWS Free Tier enables you to gain free, hands-on experience with the AWS platform, products, and services.
- These free tier offers are only available to new AWS customers, and are available for 12 months following your AWS sign-up date.
- FREE TIER FEATURES and you can register an account in same page
- Visit
- Click the button to "**Create an AWS Account**"
- On the next page, provide your Email Address, Password, and AWS Account Name (you can change this name in your account settings after sign up).
- Click "**Continue**" to proceed



- Next, you'll provide your contact information. If you're registering as an individual, select "**Personal**" and if you're using any business, select "Company"

- Complete the remaining fields with your information. Then click "Create Account and Continue" to proceed.

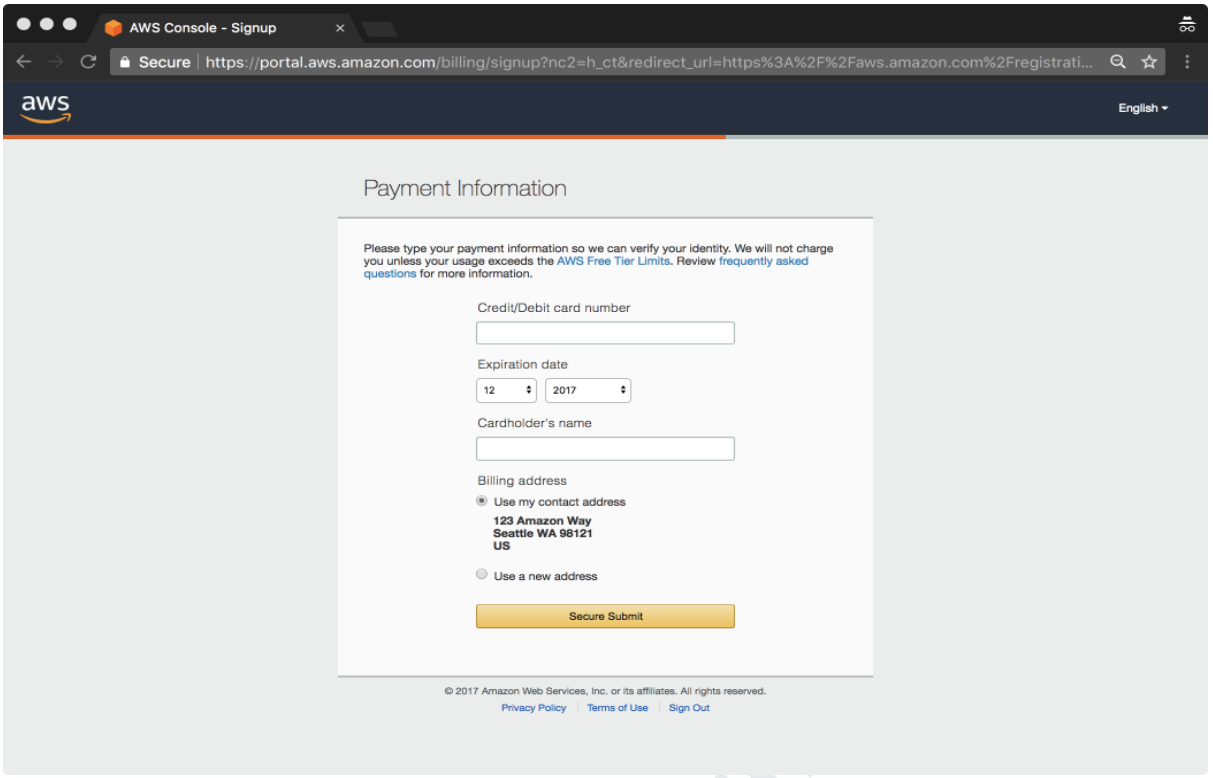


- Next, you'll be asked to provide a credit card for your AWS Account.

- Once you've completed this information, click the "Secure Submit" button to proceed.

- Next, you'll be asked to complete a brief phone verification step. Here, you are asked to provide a phone number where you can be reached, and to click the "Call Me Now" button to receive an automated phone call.

- Once you receive the call, you'll input the number shown on your screen using your dial-pad


AWS Console - Signup
Secure
https://portal.aws.amazon.com/billing/signup?nc2=h_ct&redirect_url=https%3A%2F%2Faws.amazon.com%2Fregistrati...
aws
English
Payment Information
Please type your payment information so we can verify your identity. We will not charge you unless your usage exceeds the AWS Free Tier Limits. Review frequently asked questions for more information.
Credit/Debit card number
Expiration date
12
2017
Cardholder's name
Billing address
Use my contact address
123 Amazon Way
Seattle WA 98121
US
Use a new address
Secure Submit
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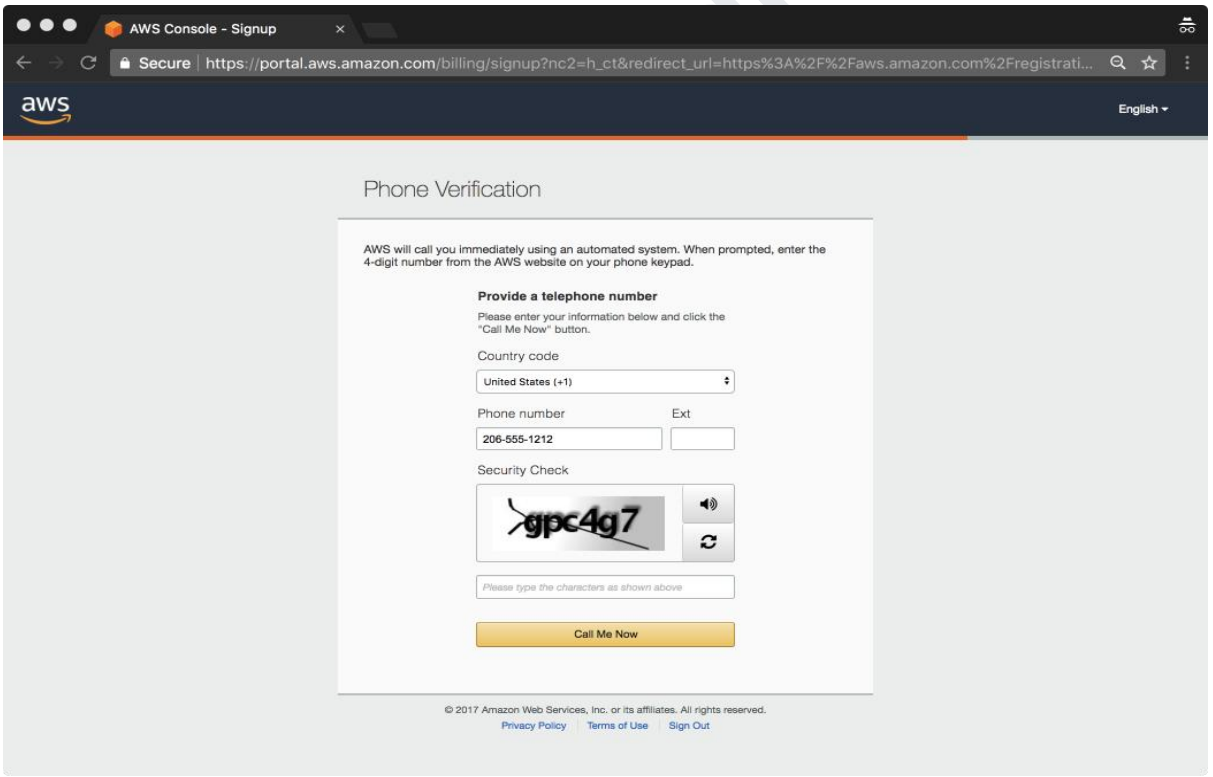
AWS Console - Signup
Secure
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aws
English
Phone Verification
AWS will call you immediately using an automated system. When prompted, enter the 4-digit number from the AWS website on your phone keypad.
Provide a telephone number
Please enter your information below and click the "Call Me Now" button.
Country code
United States (+1)
Phone number
Ext
206-555-1212
Security Check
gpc4g7
Please type the characters as shown above
Call Me Now
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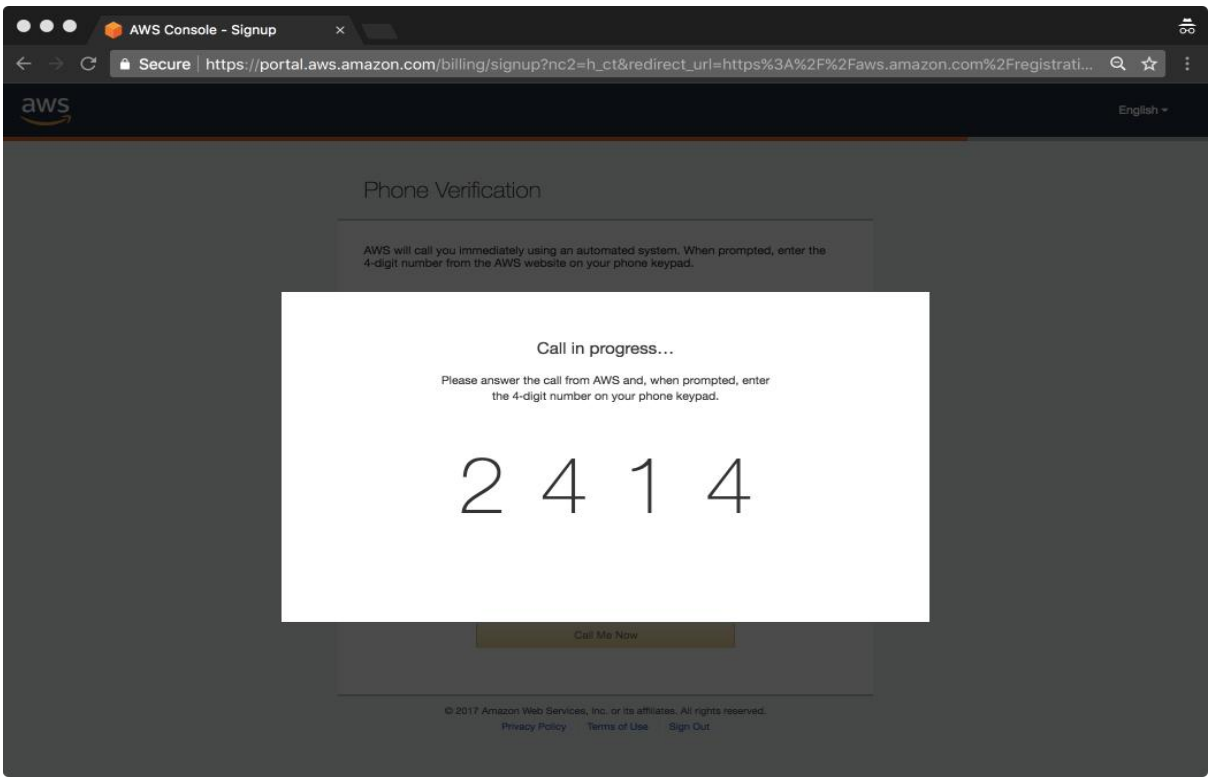
AWS Console - Signup
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aws
English
Phone Verification
AWS will call you immediately using an automated system. When prompted, enter the 4-digit number from the AWS website on your phone keypad.
Call in progress...
Please answer the call from AWS and, when prompted, enter the 4-digit number on your phone keypad.
2 4 1 4
Call Me Now
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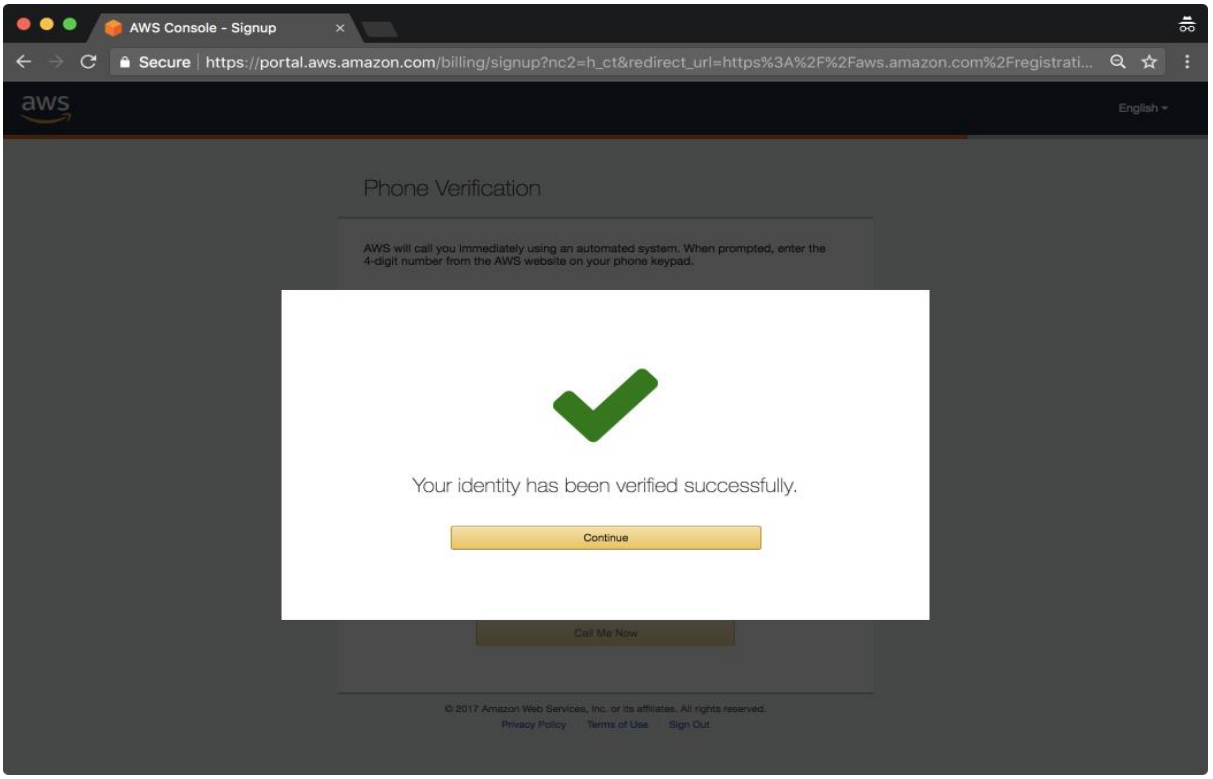
Terms of Use
Sign Out


AWS Console - Signup
Secure
https://portal.aws.amazon.com/billing/signup?nc2=h_ct&redirect_url=https%3A%2F%2Faws.amazon.com%2Fregistrati...
aws
English
Phone Verification
AWS will call you immediately using an automated system. When prompted, enter the 4-digit number from the AWS website on your phone keypad.
Your identity has been verified successfully.
Continue
Call Me Now
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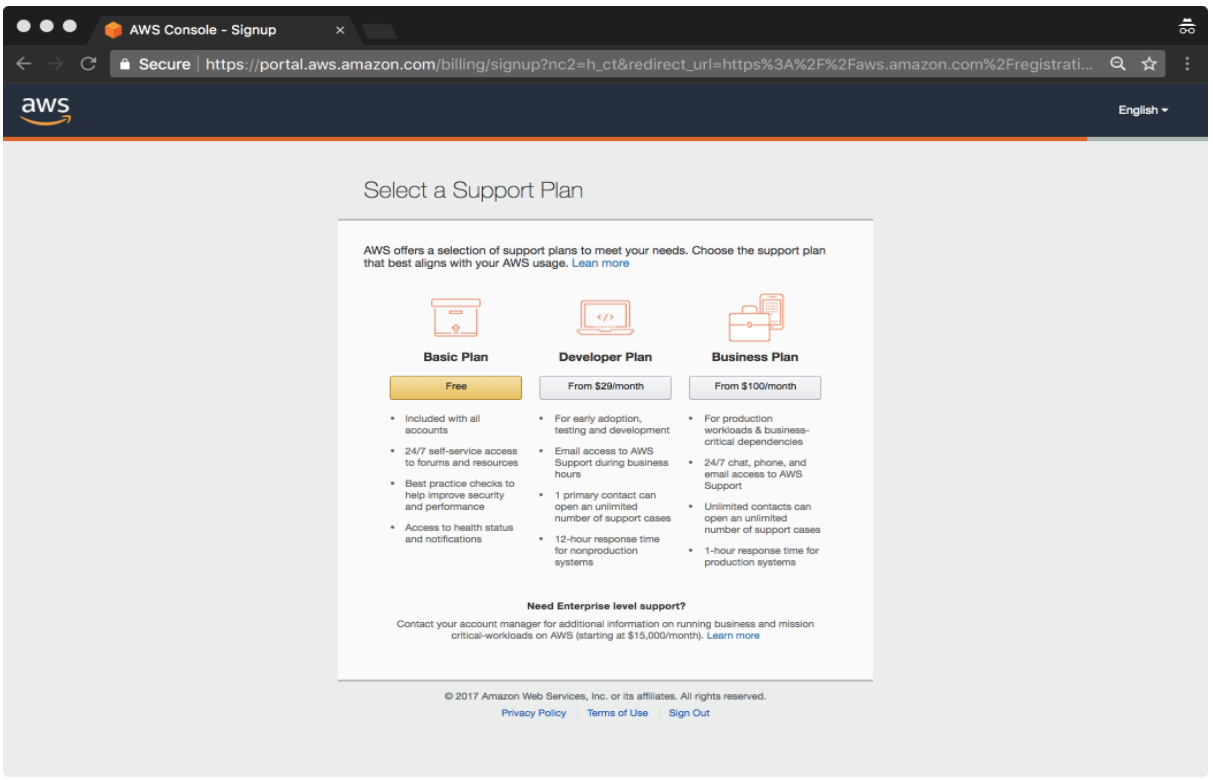
Privacy Policy
Terms of Use
Sign Out


AWS Console - Signup
Secure https://portal.aws.amazon.com/billing/signup?nc2=h_ct&redirect_url=https%3A%2F%2Faws.amazon.com%2Fregistrati...
aws
English
Select a Support Plan
AWS offers a selection of support plans to meet your needs. Choose the support plan that best aligns with your AWS usage. Lean more
Basic Plan
Free
Included with all accounts
24/7 self-service access to forums and resources
Best practice checks to help improve security and performance
Access to health status and notifications
Developer Plan
From $29/month
For early adoption, testing and development
Email access to AWS Support during business hours
1 primary contact can open an unlimited number of support cases
12-hour response time for nonproduction systems
Business Plan
From $100/month
For production workloads & business-critical dependencies
24/7 chat, phone, and email access to AWS Support
Unlimited contacts can open an unlimited number of support cases
1-hour response time for production systems
Need Enterprise level support?
Contact your account manager for additional information on running business and mission critical-workloads on AWS (starting at $15,000/month). Learn more
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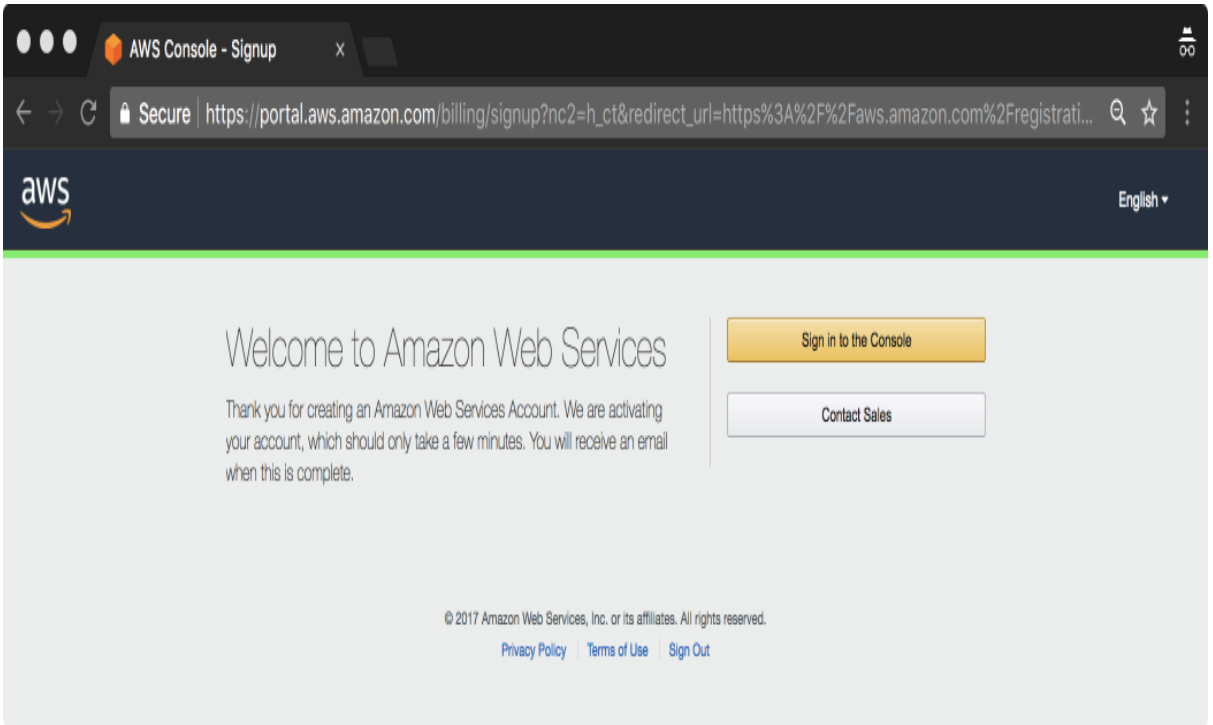
AWS Console - Signup
Secure https://portal.aws.amazon.com/billing/signup?nc2=h_ct&redirect_url=https%3A%2F%2Faws.amazon.com%2Fregistrati...
aws
English
Welcome to Amazon Web Services
Thank you for creating an Amazon Web Services Account. We are activating your account, which should only take a few minutes. You will receive an email when this is complete.
Sign in to the Console
Contact Sales
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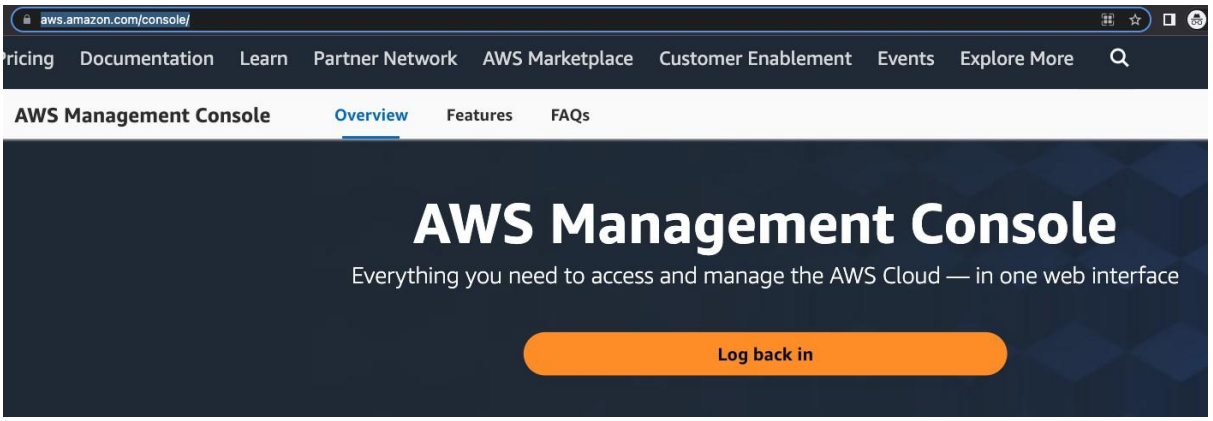
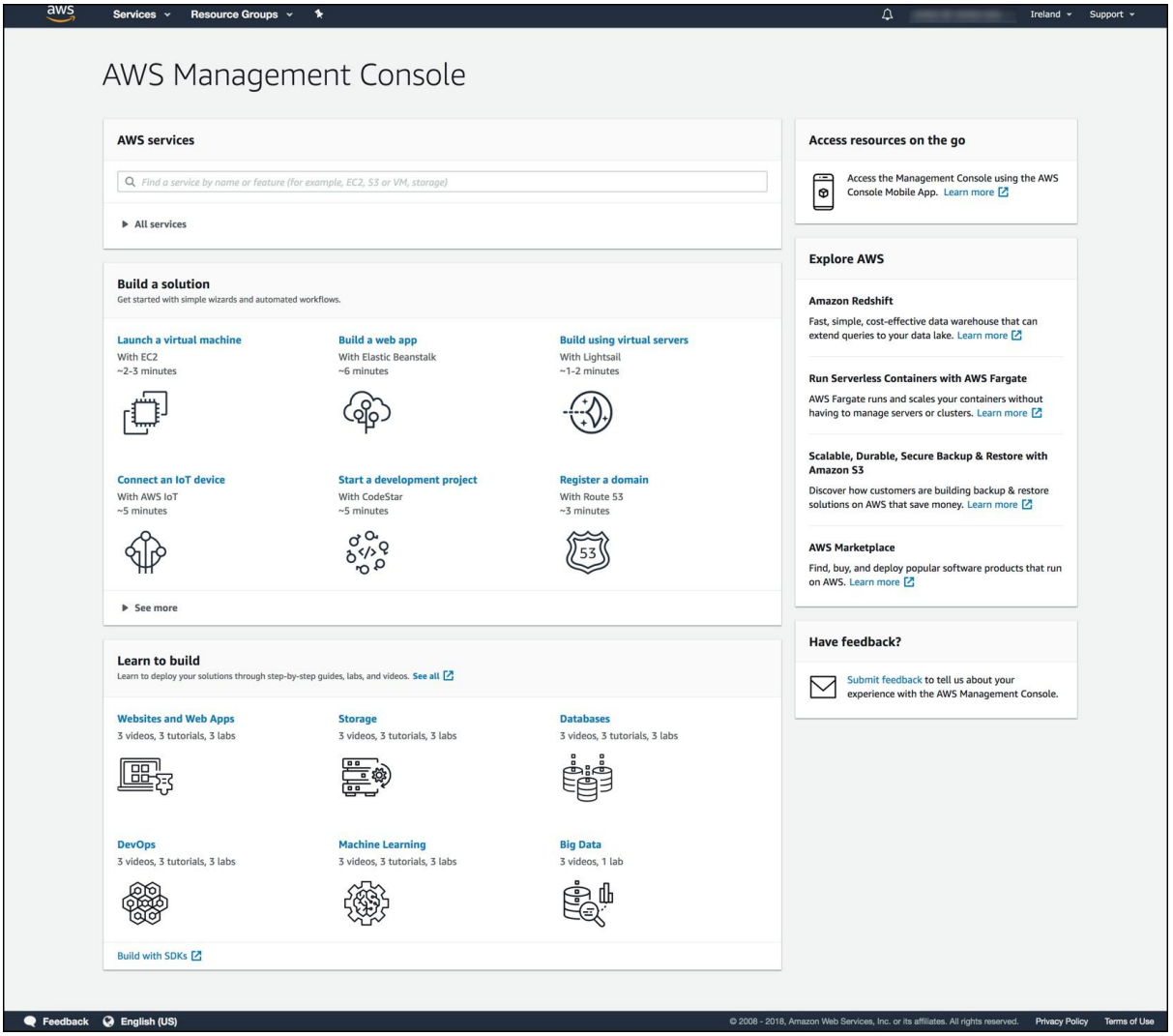
AWS Management Console



- Visit - https://aws.amazon.com/console/
- The AWS Management Console is a web application that comprises and refers to a broad collection of services(Servers, Databases etc) for managing Amazon Web Services.
- When you first sign in, you see the console home page.


Services
Resource Groups
Ireland
Support
AWS Management Console
AWS services
Find a service by name or feature (for example, EC2, S3 or VM, storage)
All services
Build a solution
Get started with simple wizards and automated workflows.
Launch a virtual machine
With EC2
~2-3 minutes
Build a web app
With Elastic Beanstalk
~6 minutes
Build using virtual servers
With Lightsail
~1-2 minutes
Connect an IoT device
With AWS IoT
~5 minutes
Start a development project
With CodeStar
~5 minutes
Register a domain
With Route 53
~3 minutes
See more
Learn to build
Learn to deploy your solutions through step-by-step guides, labs, and videos. See all
Websites and Web Apps
3 videos, 3 tutorials, 3 labs
Storage
3 videos, 3 tutorials, 3 labs
Databases
3 videos, 3 tutorials, 3 labs
DevOps
3 videos, 3 tutorials, 3 labs
Machine Learning
3 videos, 3 tutorials, 3 labs
Big Data
3 videos, 1 lab
Build with SDKs
Access resources on the go
Access the Management Console using the AWS Console Mobile App. Learn more
Explore AWS
Amazon Redshift
Fast, simple, cost-effective data warehouse that can extend queries to your data lake. Learn more
Run Serverless Containers with AWS Fargate
AWS Fargate runs and scales your containers without having to manage servers or clusters. Learn more
Scalable, Durable, Secure Backup & Restore with Amazon S3
Discover how customers are building backup & restore solutions on AWS that save money. Learn more
AWS Marketplace
Find, buy, and deploy popular software products that run on AWS. Learn more
Have feedback?
Submit feedback to tell us about your experience with the AWS Management Console.
Feedback
English (US)
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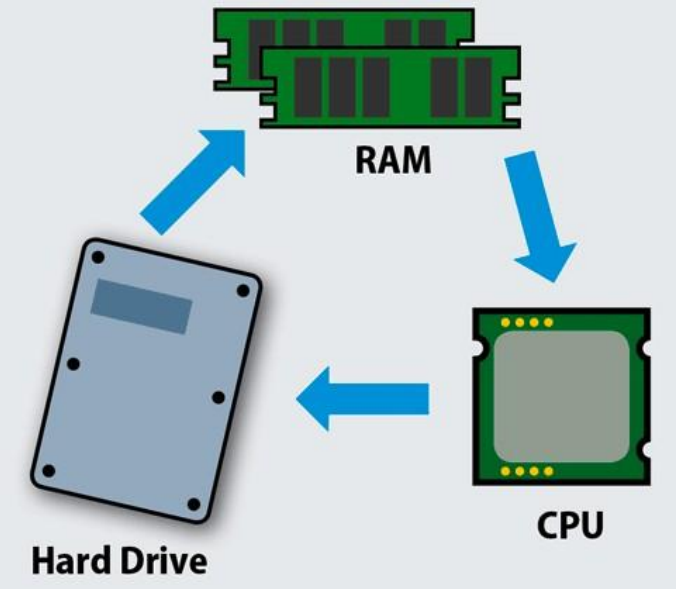
Azure VMS (Virtual Machines)

- I want you to **picture an AZURE VM like a computer**, and the components that make it up like OS, CPU, HDD, NW, Firewall, RAM etc.



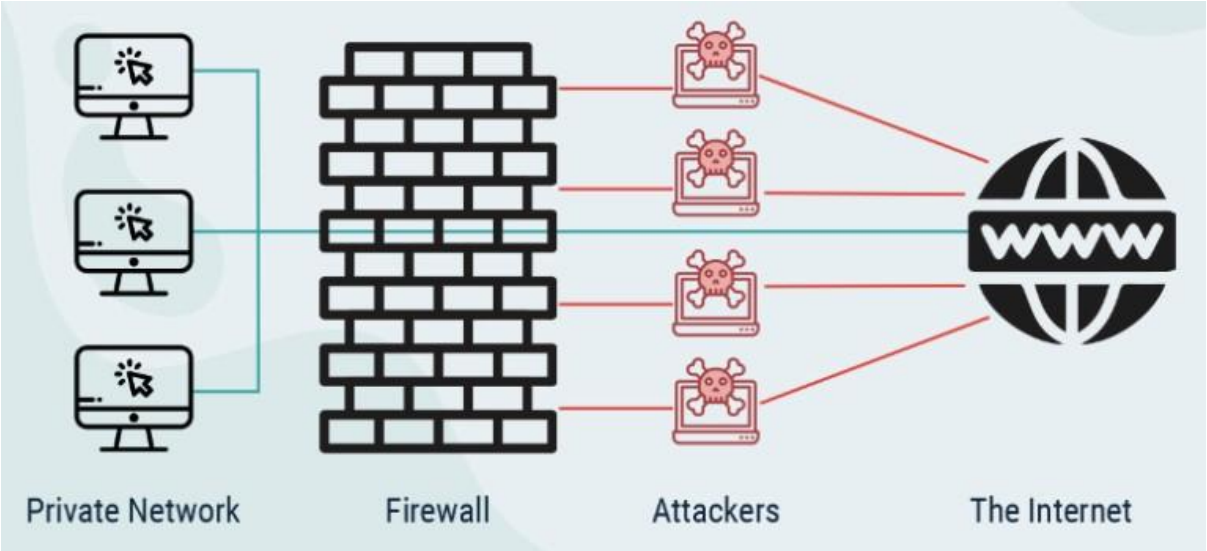
- A data centre

Networking Security

Configure Firewalls to secure the application

- A firewall can be defined as a special type of network security device or a software program that monitors and filters incoming and outgoing network traffic based on a defined set of security rules.

- The **primary purpose of a firewall is to allow non-threatening traffic and prevent malicious or unwanted data traffic for protecting the computer from viruses and attacks**.

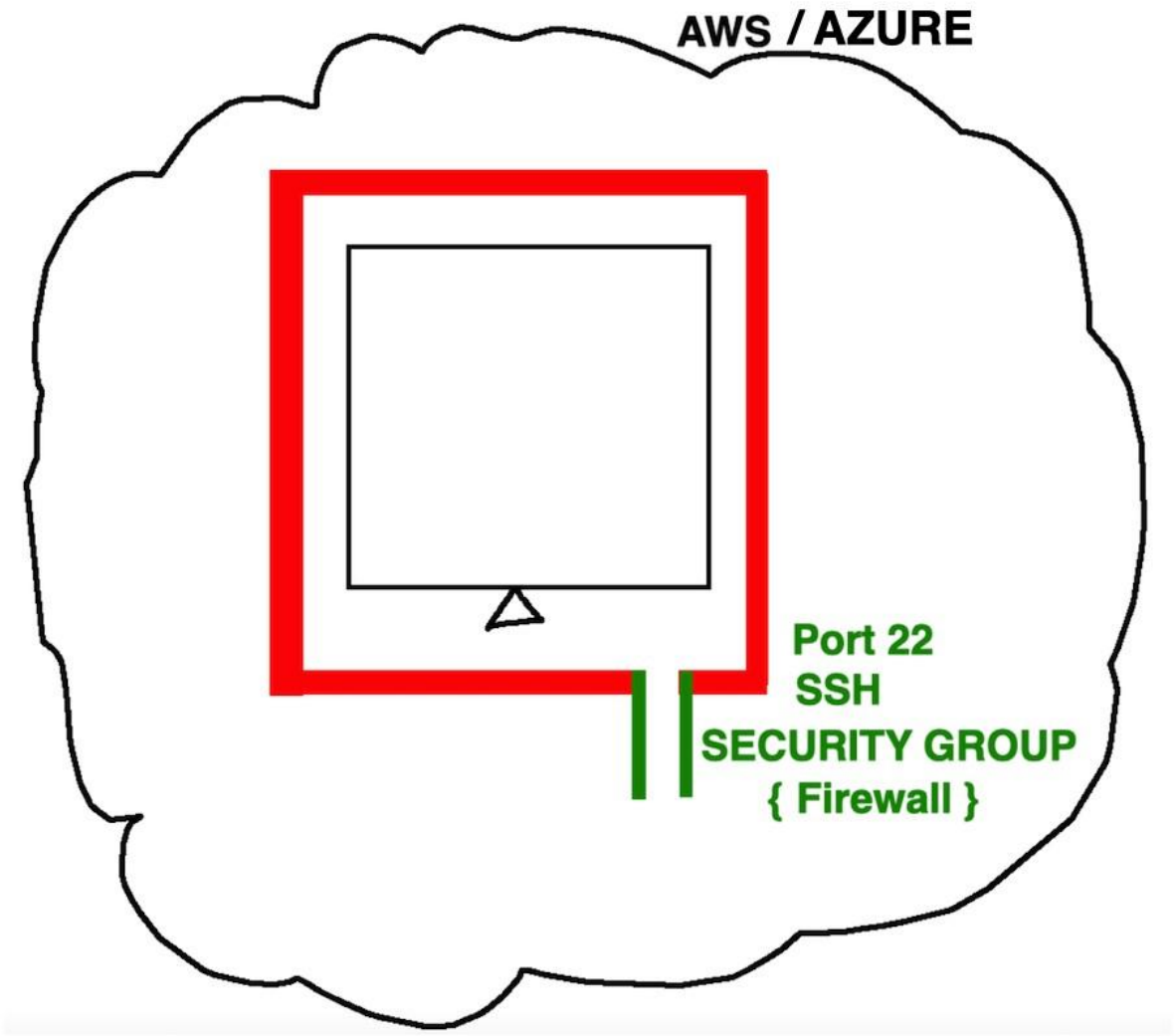


AWS Security Group vs Azure Network Security Group

- When it comes to cloud computing, security is a top priority for businesses. Two of the most popular cloud service providers, Amazon Web Services (AWS) and Microsoft Azure, offer similar security features, but with different terminology.

- One of the key components of cloud security is the ability to control network access. This is where **AWS Security Groups** and **Azure Network Security Groups** come into play.

- Both **AWS Security Groups and Azure Network Security Groups** are vital components of cloud security. They provide granular control over network access, making it possible to secure your cloud infrastructure and **protect your business from data breaches and cyber attacks**.


AWS / AZURE
Port 22
SSH
SECURITY GROUP
{ Firewall }

Protocols & Ports

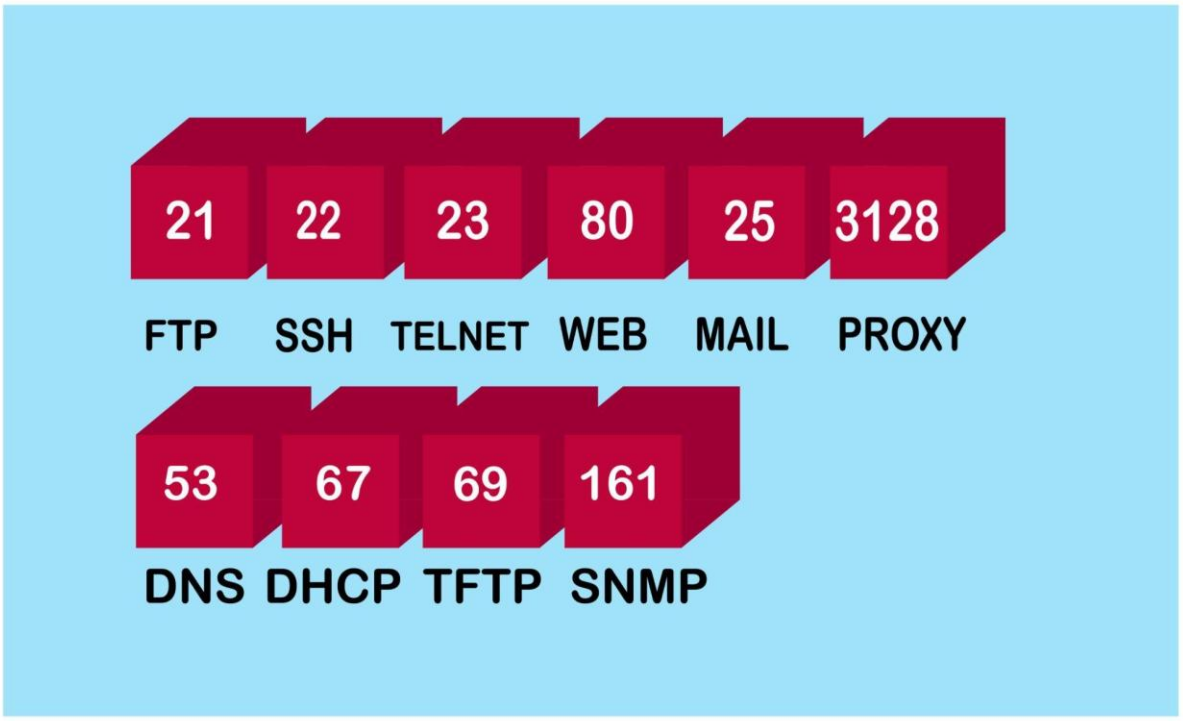
- Protocols and ports are two critical components of network communication. A protocol refers to a set of rules that guide data transmission in a network. These rules ensure that data packets are transmitted correctly from the sender to the receiver. Examples of protocols include TCP, IP, and HTTP.

- On the other hand, a port is a communication endpoint in a network. Ports enable different applications running on a device to communicate with each other. They also allow multiple applications to run on the same device without interfering with each other. Commonly used ports include Port 80 for HTTP, Port 443 for HTTPS and Port 25 for SMTP.

What are the different port numbers?

There are **65,535** possible port numbers, although not all are in common use. Some of the **most commonly used ports**, along with their associated networking protocol, are:

- **Ports 20 and 21**: File Transfer Protocol (FTP). FTP is for transferring files between a client and a server.
- **Port 22**: Secure Shell (SSH). SSH is one of many tunneling protocols that create secure network connections.
- **Port 25**: Simple Mail Transfer Protocol (SMTP). SMTP is used for email.
- **Port 53**: Domain Name System (DNS). DNS is an essential process for the modern Internet; it matches human-readable domain names to machine-readable IP addresses, enabling users to load websites and applications without memorizing a long list of IP addresses.
- **Port 80**: Hypertext Transfer Protocol (HTTP). HTTP is the protocol that makes the World Wide Web possible.
- **Port 443**: HTTP Secure (HTTPS). HTTPS is the secure and encrypted version of HTTP. All HTTPS web traffic goes to port 443. Network services that use HTTPS for encryption, such as DNS over HTTPS, also connect at this port.
- **Port 3389**: Remote Desktop Protocol (RDP). RDP enables users to remotely connect to their desktop computers from another device.



- Understanding protocols and ports is essential for anyone involved in network communication. It helps to ensure that data is transmitted efficiently, accurately, and securely.

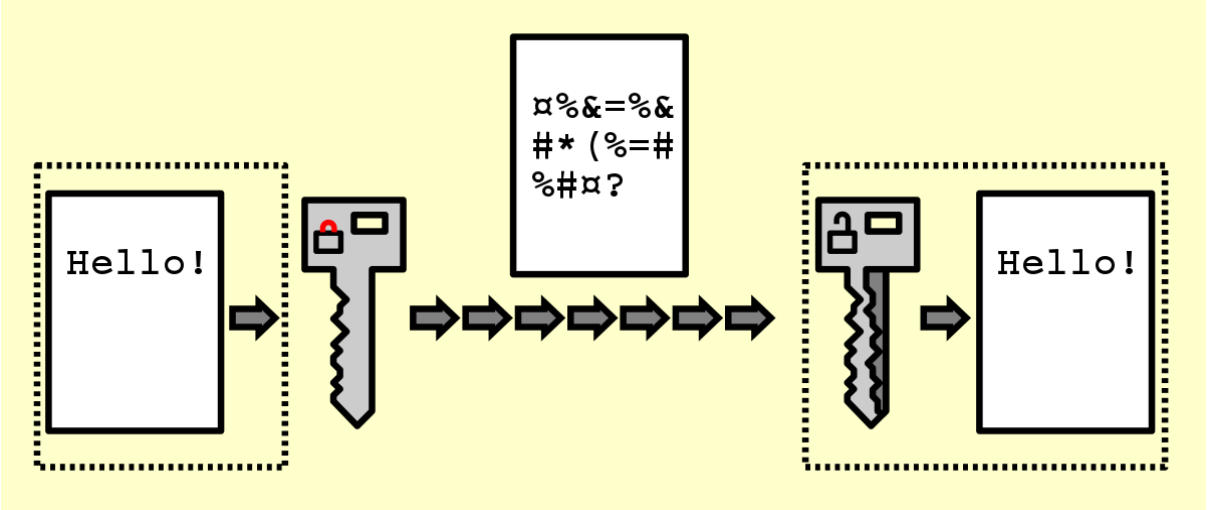
SSH - Secure Shell

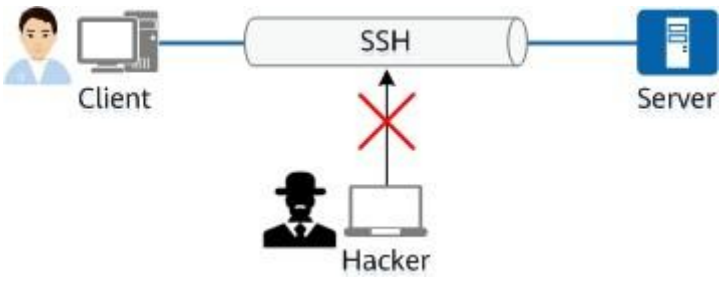
Secure Shell (SSH) is a cryptographic network protocol that ensures secure data communication between two computers. It is typically used to enable remote login to a server or computer securely, with the data transfer being encrypted.

At its most basic level, encryption is the process of protecting information or data by using mathematical models to scramble it in such a way that only the parties who have the key to unscramble it can access it.

Google
https://cloud.google.com › learn › what-is-encryption

What is encryption and how does it work? - Google Cloud





SSH Clients

- An **SSH client** is **a software program which uses the secure shell protocol to connect to a remote computer(AZURE/AWS server)**.
- Examples - **GitBash** / **Putty** / **Terminal** (Visual Studio Code) etc
- NOTE - If you have a **Mac** **or** **Linux**, you will then **already have** **TERMINAL** **installed**.

SSH Command

One way to remotely access a computer is through the use of SSH, or Secure Shell. To do this, you can enter the command "**ssh**" followed by the username and the public IP address of the computer you wish to connect to. This allows you to securely log in to the remote computer and execute commands as if you were sitting in front of it. Keep in mind that you may need to configure your firewall settings to allow incoming SSH connections for this to work properly.

SSH with PASSWORD

```
ssh username@public-ip-address
```

To connect remotely to a server via SSH, you can use the following command: `ssh username@public-ip-address`. This command initiates a secure shell connection to the server, allowing you to execute various commands and interact with the server's file system. You may need to provide additional authentication credentials, such as a password or private key, depending on the server's configuration. It is important to ensure that you are connecting to the correct server and verifying the server's identity before providing any

sensitive information. Additionally, you should always use strong passwords and keep your private key secure to prevent unauthorised access to the server.

- control + c = Cancel Operation

```
uname
uname -a
```

The **uname** command is a useful utility that provides various information about a system. It stands for "Unix Name" and is commonly used in Unix and Unix-like(Linux) operating systems. The **uname** command can be used to obtain details such as the name of the operating system, the version, release, hardware architecture, and more. This information can be extremely useful for system administrators, developers, and users alike.

```
cat /etc/os-release
```

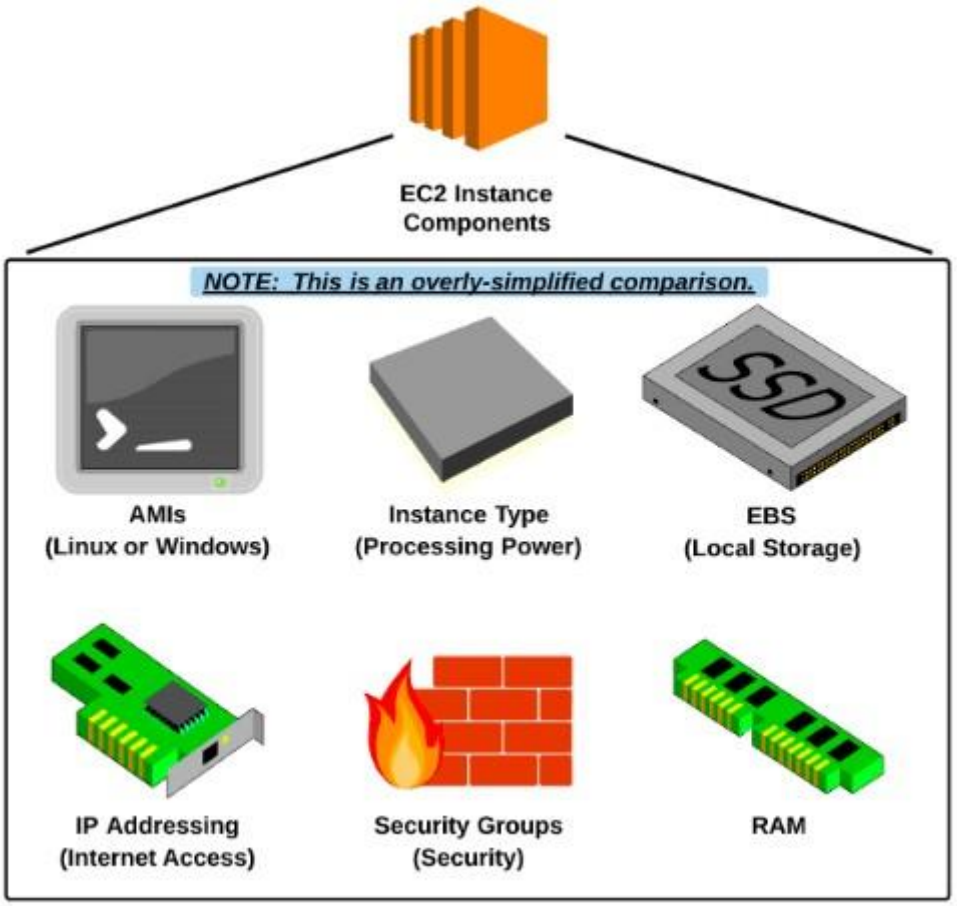
When running the command "cat /etc/os-release" on a Unix-like system, the system will display information about the operating system installed on the machine. This information includes the name of the operating system, the version number, the ID of the operating system, the ID of the distributor, and the release number. This command is often used by system administrators to troubleshoot and diagnose issues with the operating system, as well as to gather information about the system for maintenance or upgrade purposes.

```
logout
```

The "**logout**" command in Linux is a simple yet powerful tool that allows users to end their session and log out of the system. By using this command, users can ensure that their session is ended properly

AWS EC2 (Elastic Compute Cloud)

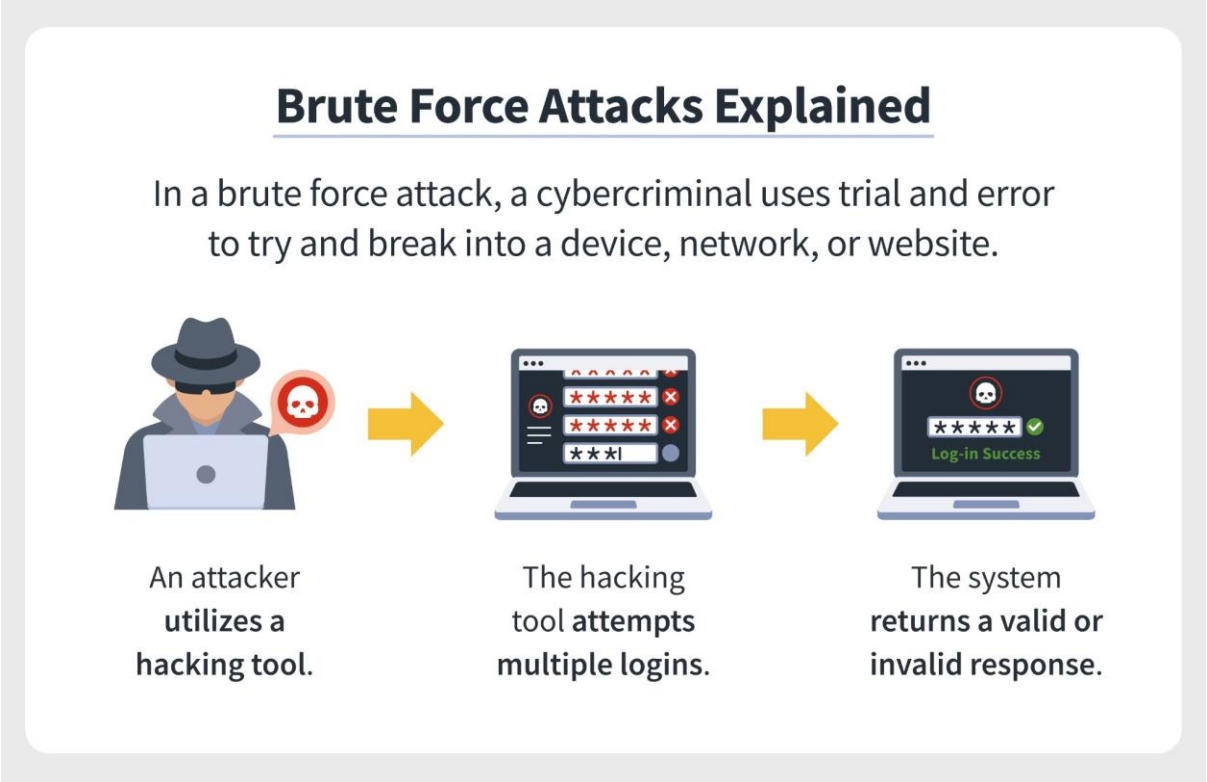
- **Amazon Elastic Compute Cloud** is a part of Amazon.com's cloud-computing platform, Amazon Web Services, that **allows users to rent virtual computers(Servers/Machines) on which to run their own computer applications**.


EC2 Instance
Components
NOTE: This is an overly-simplified comparison.
SSD
AMIs
(Linux or Windows)
Instance Type
(Processing Power)
EBS
(Local Storage)
IP Addressing
(Internet Access)
Security Groups
(Security)
RAM

AWS EC2 Instance Setup

- NOTE : AWS Supports Only **KEY BASED AUTHENTICATION**

Brute Force Attack



Key Pair

- A key pair, consisting of a **public key** and a **private key**, is a set of **security credentials** that you use **to prove your identity** when connecting to a Server.

SSH without PASSWORD (Key Based Authentication)

- One way to secure a file is by changing its permissions using the chmod command. The command "chmod 400" is used to set the file's permission to be readable only by the owner of the file. This means that no other user can read, write, or execute a file.

```
ssh -i private-key.pem username@public-ip-address
```

To connect to an instance using SSH, you will need to use a command in the terminal. The command is in the format **`ssh -i file.pem username@public-ip-address`**, where **`file.pem`** is the name of your private key file, **`username`** is the user name used to connect to the instance, and **`public-ip-address`** is the public IP address of the instance.

Before connecting, make sure you have the correct permissions for the private key file by running **`chmod 400 file.pem`**. Once you have successfully connected to the instance, you can perform various tasks such as editing files, installing software, and running scripts.