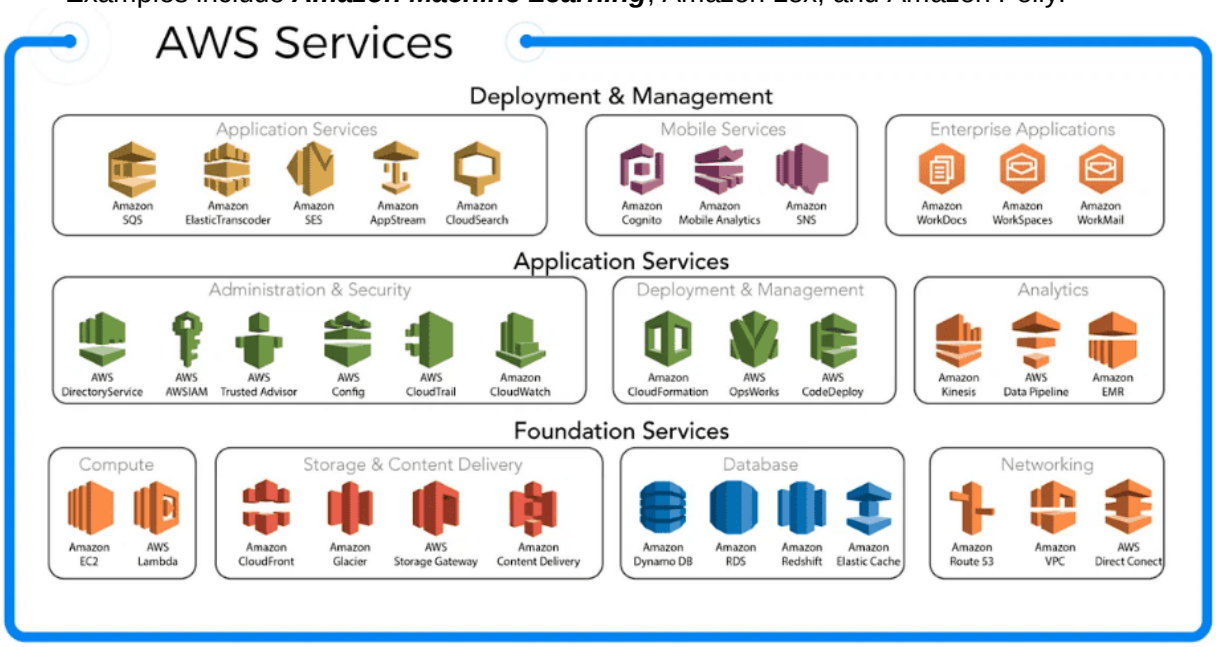
AWS Introduction

AWS is a ***cloud computing platform*** that provides various services that can be used to ***build and deploy applications on the Internet***. AWS allows users to access these services through ***web-based interfaces***, ***command-line tools, or software development kits (SDKs).*** Users can choose from a wide range of services that cover different aspects of cloud computing, such as:

- ***Compute*****:** Services that provide processing power for running applications and workloads. Examples include Amazon ***EC2***, ***Lambda***, and Amazon Elastic Container Service ***(ECS).***
- ***Storage:*** Services that provide online storage space for data and objects. Examples include Amazon ***S3***, Amazon Elastic Block Store ***(EBS)***, and ***Amazon Glacier***.
- ***Networking:*** Services that enable users to connect their applications and resources across different regions and locations. Examples include Amazon Virtual Private Cloud ***(VPC)***, Amazon ***Route 53***, and AWS ***Direct Connect.***
- ***Middleware:*** Services that provide common functionality and features for applications. Examples include Amazon Simple Queue Service ***(SQS)***, Amazon Simple Notification Service ***(SNS)***, and Amazon Relational Database Service ***(RDS).***
- ***IOT:*** Services that enable users to connect and manage devices and sensors on the internet. Examples include **AWS IoT Core, IoT Greengrass, and IoT Analytics.**
- ***Other:*** Services that provide specialized capabilities for specific use cases or domains. Examples include ***Amazon Machine Learning***, Amazon Lex, and Amazon Polly.



AWS Global Infrastructure

Amazon operates from many global geographical regions including seven in North America. Each ***region consists of multiple isolated locations called availability zones (AZs), which are connected by low-latency links.*** Each AZ contains one or more data centers that house the servers and hardware that run the AWS services. Users can choose which region and AZ they want to use for their applications and data, depending on factors such as **latency, cost, compliance, and redundancy**. Users can also leverage services such as Amazon CloudFront and Global Accelerator to distribute their content and traffic across multiple regions.

AWS Region

An ***AWS region is a physical location*** in the world where **Amazon has multiple AZs**. Each region has a name that indicates its geographic areas, such as us-east-1 (US East N. Virginia) or eu-west-1 (EU Ireland). Users can select the region that best suits their needs based on factors such as proximity to their customers or users, regulatory requirements, or pricing differences. Users can also use multiple regions for disaster recovery or high availability purposes

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AWS Availability Zones

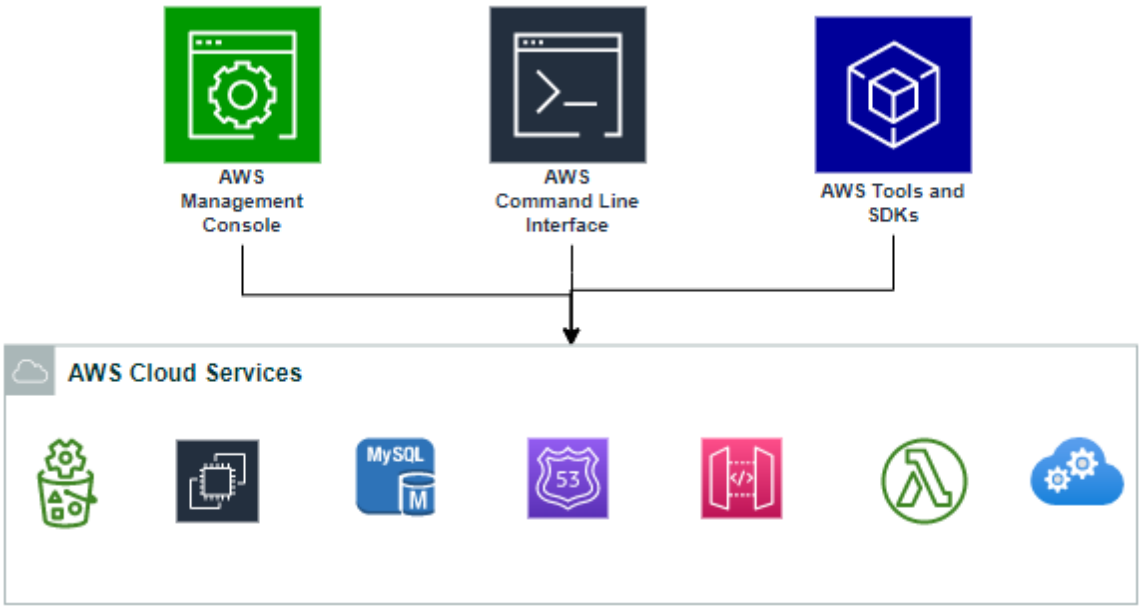
In an AWS area, an ***availability zone (AZ) is one or more separate data centers with redundant power***, networking, and connectivity. Each AZ is designed to be isolated from other AZ failures. Users can launch their resources in one or more AZs within a region to achieve fault tolerance and high availability. For example, users can launch their EC2 instances in two different AZs within the same region and use a load balancer to distribute traffic between them.

Ways To Access Services

There are a few different ways to access AWS services. One way is to use the ***AWS Management Console***, which is a web-based interface that provides access to each service console and offers a single place to access the information you need to perform your AWS-related tasks. You can also customize the Console Home page by adding, removing, and rearranging widgets, such as recently visited, AWS Health, Trusted Advisor, and more.

Another way is to use the ***AWS Command Line Interface (CLI)***, which is a tool that allows you to interact with AWS services from a command prompt. You can use the AWS CLI to automate common tasks and scripts, as well as to access advanced features that are not available in the console. The AWS CLI supports multiple platforms, such as Windows, Linux, and macOS.

A third way is to use ***Amazon Software Development Kits (SDKs)***, which are libraries that enable you to integrate AWS services into your applications using your preferred programming language. Amazon SDKs provide high-level APIs that simplify common tasks, such as authentication, request signing, and error handling. Amazon SDKs are available for various languages, such as Java, Python, Ruby, .NET, Node.js, and more.



Advantages

Amazon Web Services offers many advantages for users who want to leverage cloud computing for their applications and workloads. Some of these advantages are:

- ***Scalability:*** Amazon allows you to scale your resources up or down according to your demand and pays only for what you use. You can also use services such as **Amazon EC2 Auto Scaling** and **Amazon Elastic Load Balancing** to automatically adjust your capacity and distribute your traffic across multiple instances.

- ***Reliability:*** Amazon provides high **availability and durability** for your data and applications by using multiple AZs within each region and replicating your data across them. You can also use services such as Amazon S3 and Amazon Glacier to store your data with 99.999999999% durability.

- ***Security:*** Amazon provides various features and tools to help you secure your resources and data on the cloud. You can use services such as **Amazon VPC, Amazon Identity and Access Management (IAM), Amazon Key Management Service (KMS),** and Amazon Shield to control access, encrypt data, manage keys, and protect against DDoS attacks.

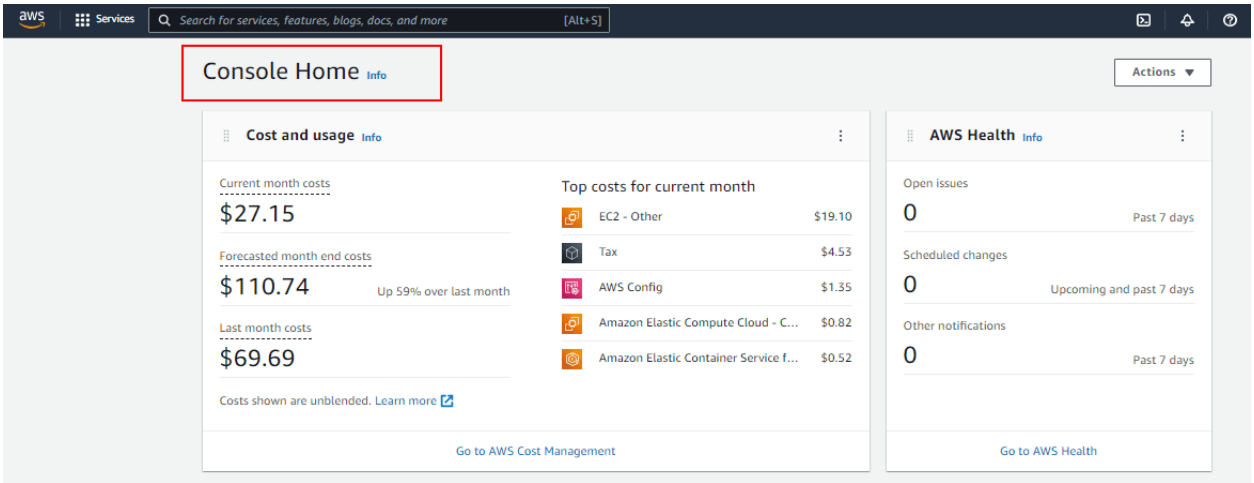
- ***Cost-effectiveness:*** Amazon allows you to reduce your capital expenditure and operational costs by eliminating the need for upfront investments in hardware and software. You can also benefit from economies of scale and pay lower prices as your usage increases. You can also use services such as **Amazon Cost Explorer and Amazon Budgets to monitor and optimize** your spending.

What is AWS Console

Console AWS Amazon is a browser-based graphical user interface for Amazon Web Services (AWS). The AWS Management Console is written in client-side languages such as Javascript, CSS, and HTML. AWS console is a web browser interface to Amazon Web Services.

AWS Management Console

The Amazon Management console comprises a broad collection of services for managing Amazon Web Services. When you first sign in, you see the Management console home page.



In the console you will find tools for working with Amazon S3 buckets, launching and connecting to Amazon EC2 instances, setting Amazon CloudWatch alarms, and getting information about your account and about billing.

Amazon Console Login

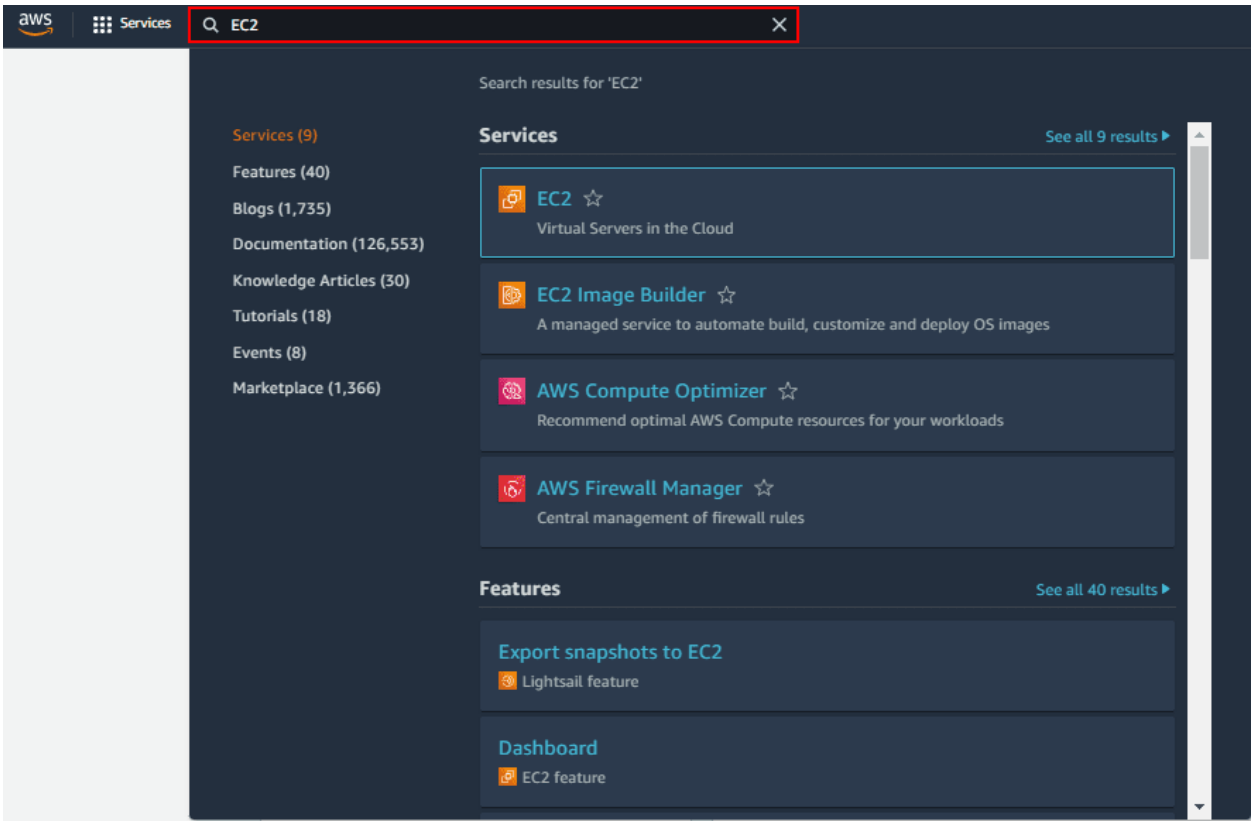
AWS offers a number of ways to sign in to the AWS Management Console:

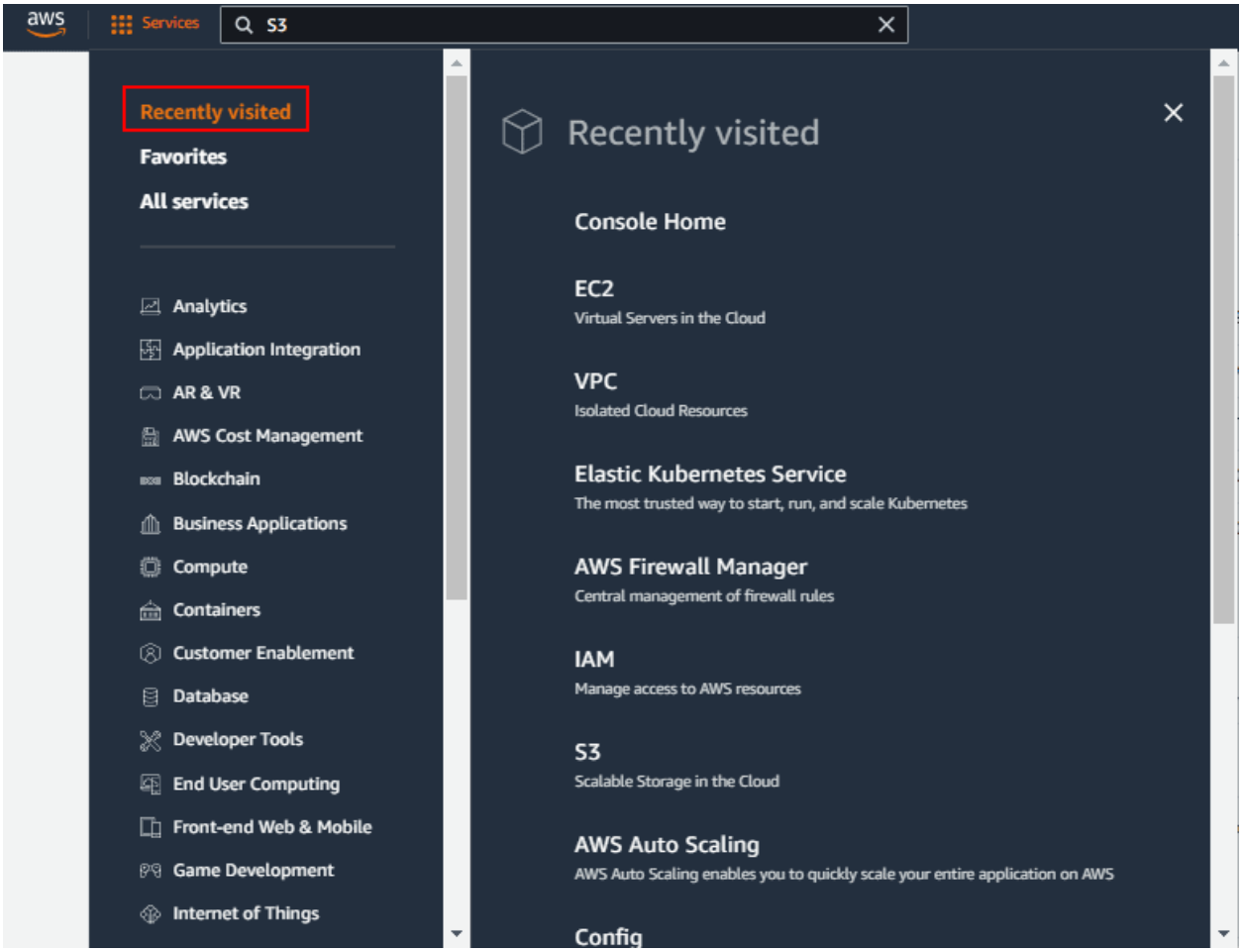
- Signing in as the AWS account root user
- Signing in with another IAM user
- Signing in as the AWS Identity and Access Management (IAM)
-

How to access AWS Services?

To open a console for a service, you have three ways to achieve this

1. Enter the name of the service in the search box. Then choose the service that you want from the list of search results.


aws
Services
EC2
Search results for 'EC2'
Services (9)
Features (40)
Blogs (1,735)
Documentation (126,553)
Knowledge Articles (30)
Tutorials (18)
Events (8)
Marketplace (1,366)
Services
See all 9 results
EC2
Virtual Servers in the Cloud
EC2 Image Builder
A managed service to automate build, customize and deploy OS images
AWS Compute Optimizer
Recommend optimal AWS Compute resources for your workloads
AWS Firewall Manager
Central management of firewall rules
Features
See all 40 results
Export snapshots to EC2
Lightsail feature
Dashboard
EC2 feature



Create AWS Free Trial Account

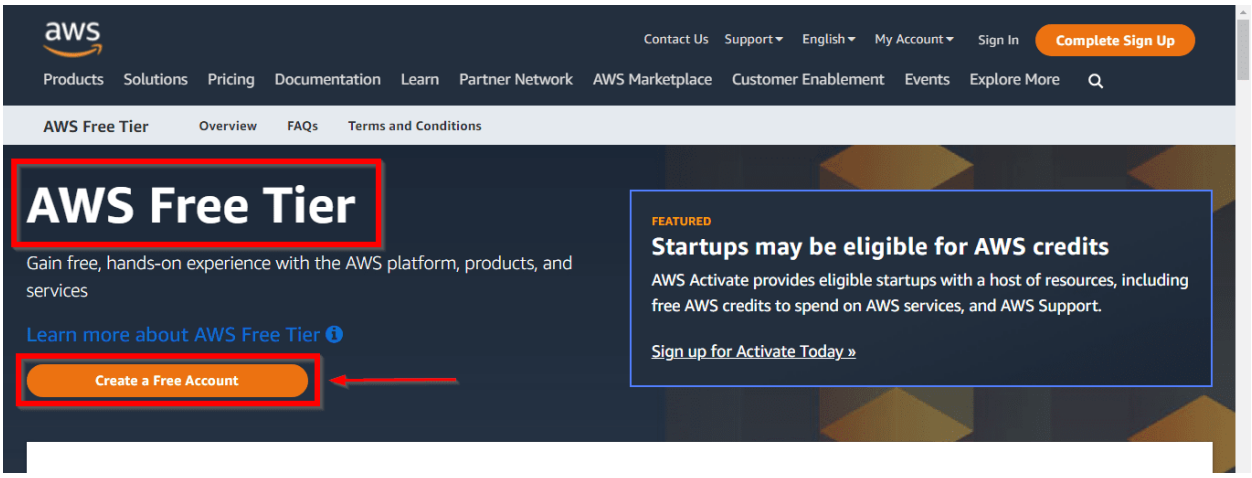
Amazon Web Services (AWS) is providing a free trial account for 12 months to new subscribers to get hands-on experience with all the services that AWS provided. Amazon is giving no. of different services that we can use with some of the limitations to get hands-on practice and achieve more knowledge on AWS Cloud services as well regular business use.

With the AWS Free Tier account, all the services offered have limited usage on what we can use without being charged. Here, we will look at how to register for an AWS FREE Tier Account.

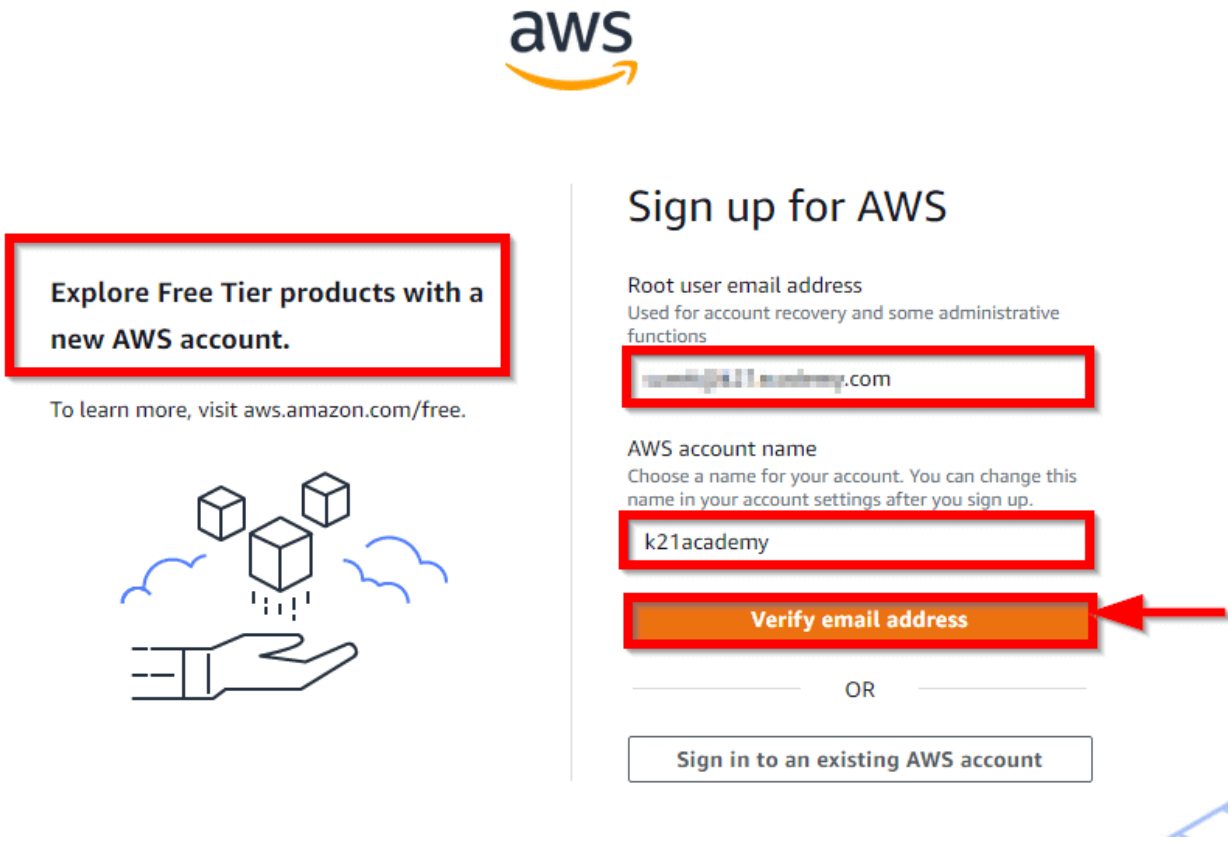
AWS Free Tier account, Amazon is giving no. of different services used with some of the limitations to get hands-on practice and more knowledge on AWS Cloud services as well as regular business use. The AWS Free Tier is mainly designed to give hands-on experience with AWS Cloud Services for customers free of cost for a year. With the AWS Free Tier account, all the services offered have a limit on what we can use without being charged.

REGISTER FOR AWS FREE-TIER ACCOUNT

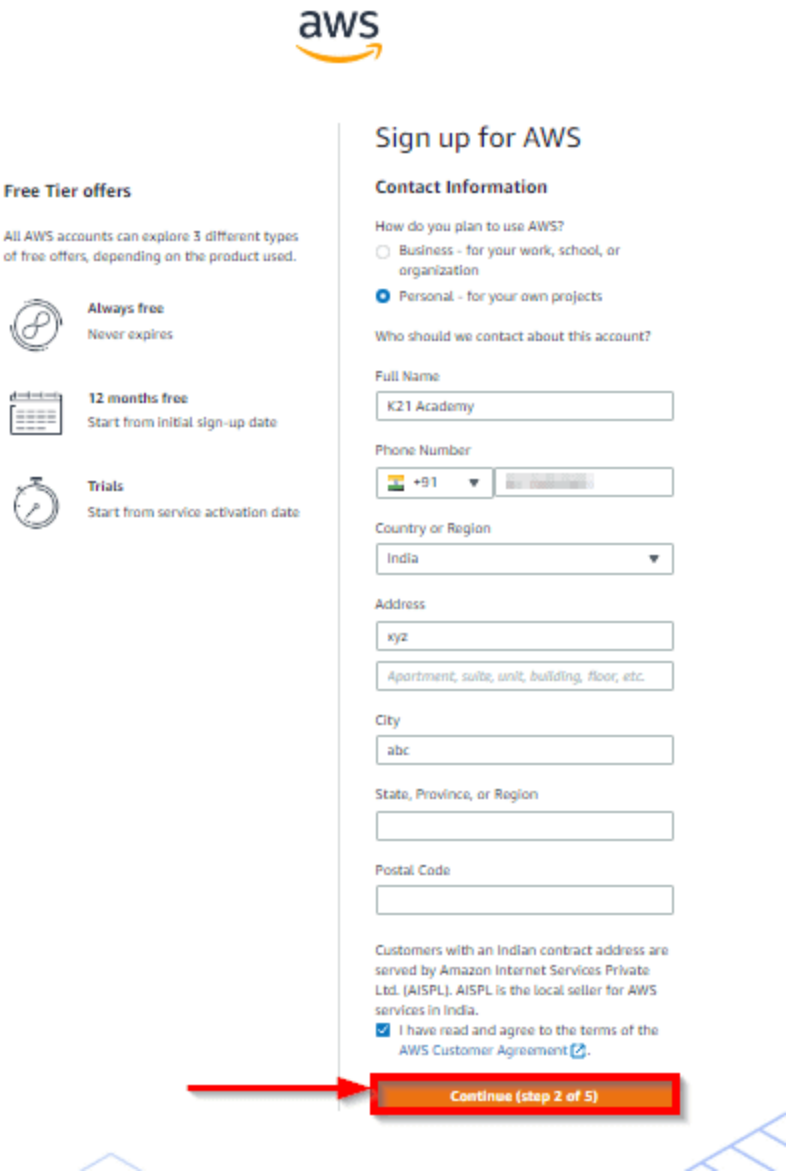
1. First Open your web browser and navigate to **AWS Free Tier Page**
2. On middle click of Create a Free Account



. Issue the details which you want to use to log in to your AWS account and click on Continue
• **Email address:** Provide the mail id which hasn't been registered yet with Amazon AWS.
• **Password:** Type your password.
• **Confirm password:** Authenticate the password.
• **AWS Account name:** Choose a name for your account. You can change this name in your account settings after you sign up.

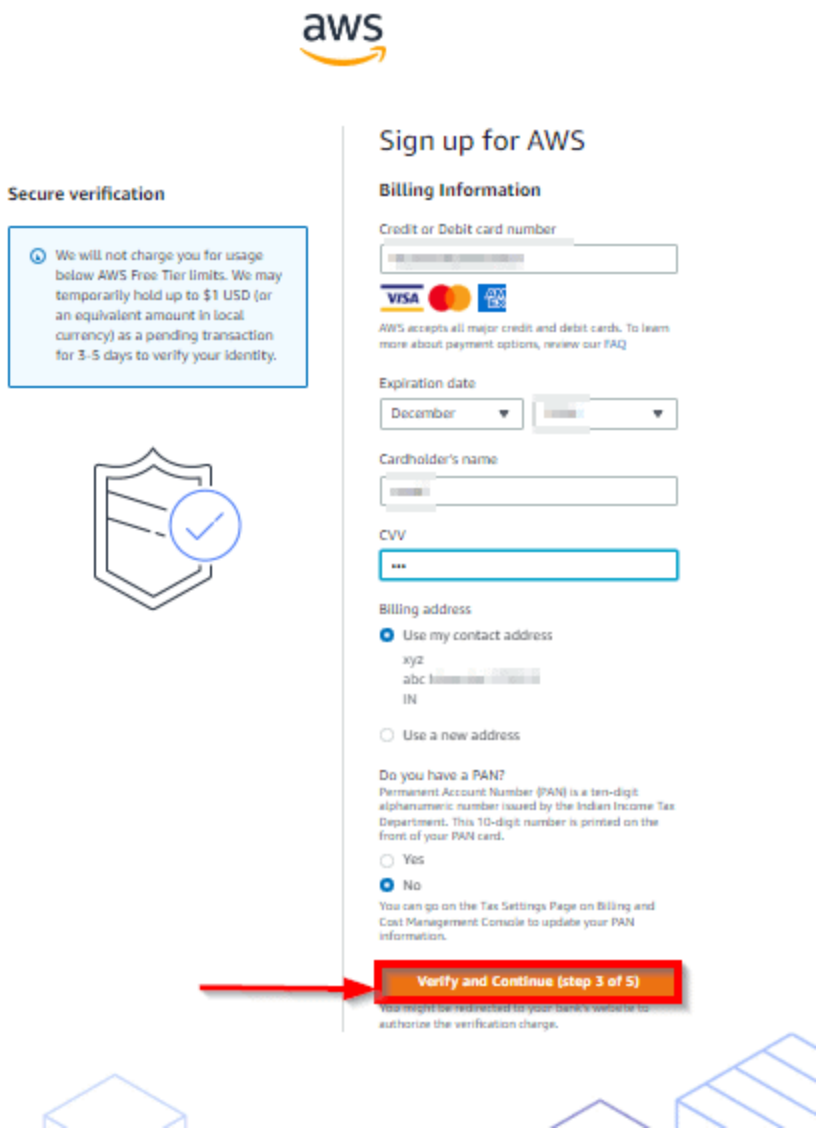


4. Contact Information
Select your AWS type (Profesional/ Personal) Fill in the correct information to validate your account if you're going to create personal use then click on "Personal Account" else use "Company Account", Accepts the Terms and
condition and then click on Create Account and Continue

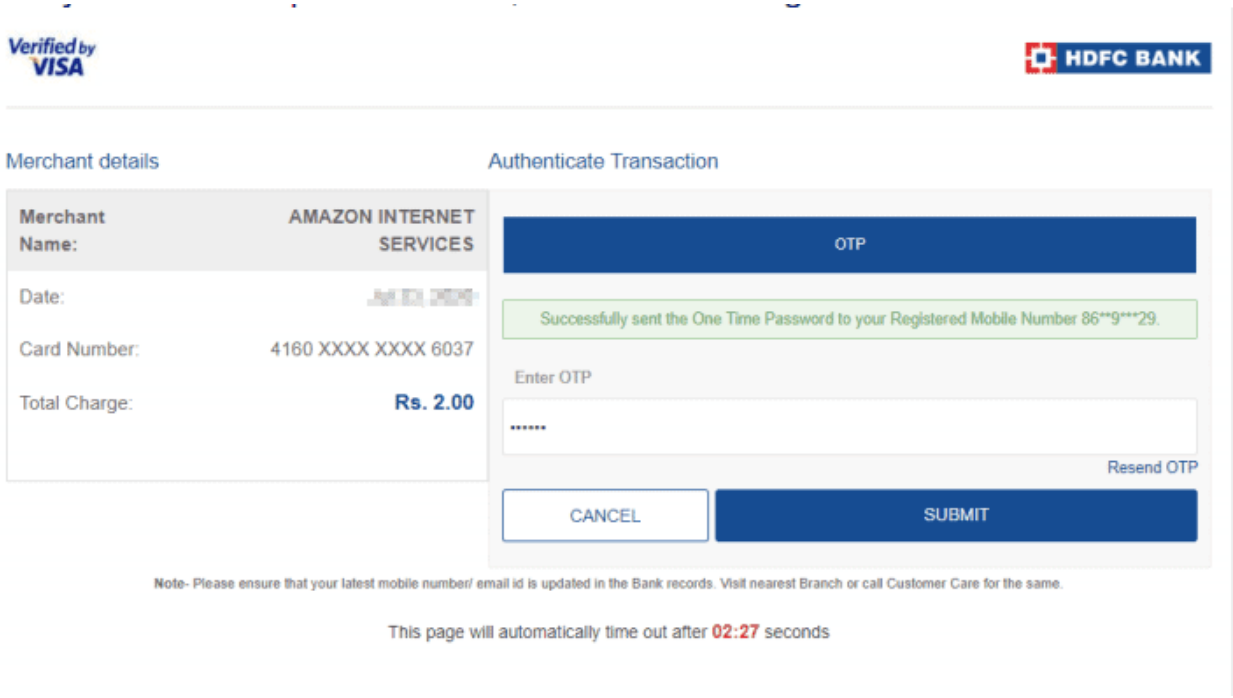


Note: Make sure to provide proper contact details and mobile number to get the Verification code from AWS.

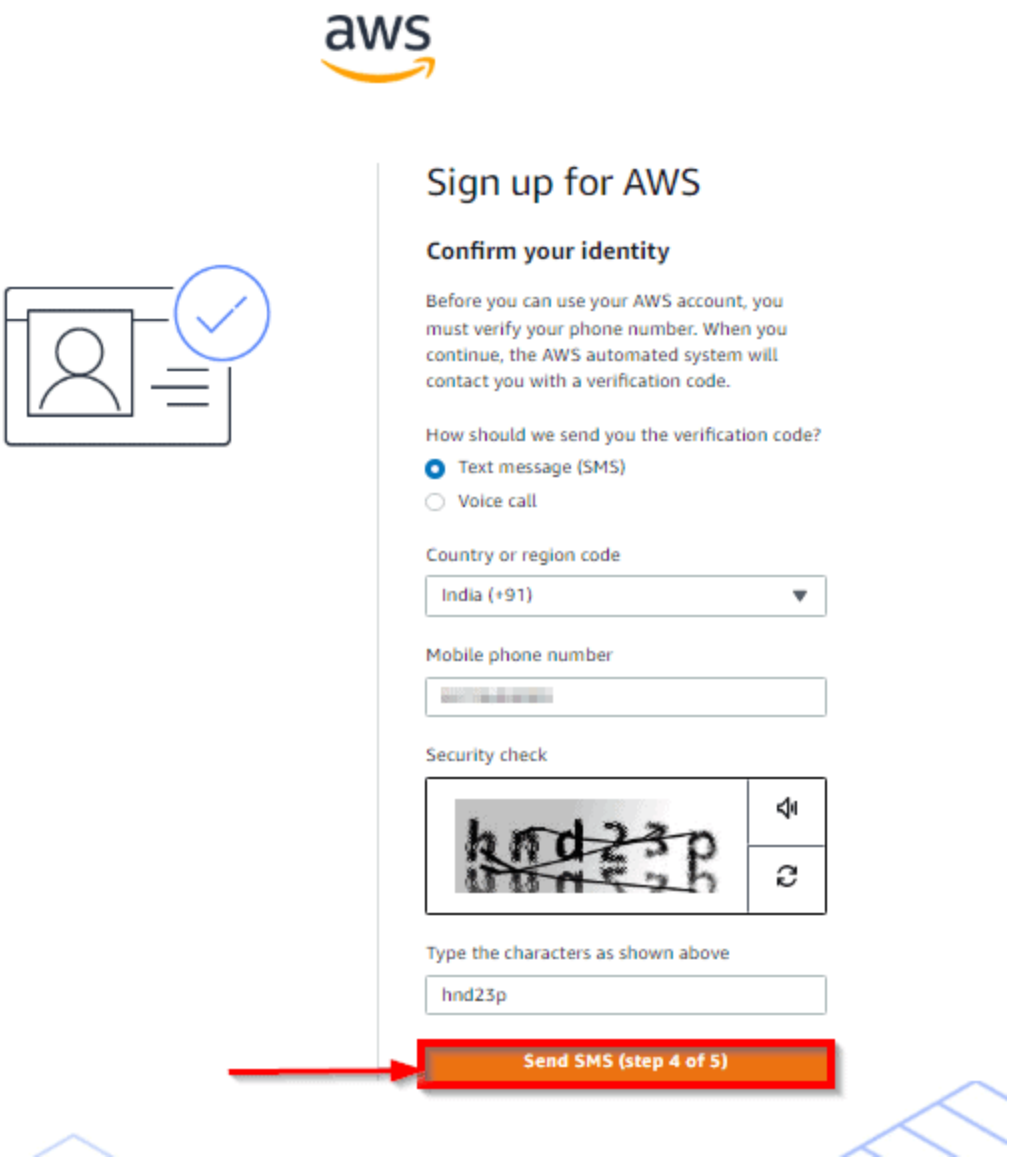
5. Payment and PAN information: In this step, you must fill in your credit card /Debit Card info and billing address and click on Secure Submit.



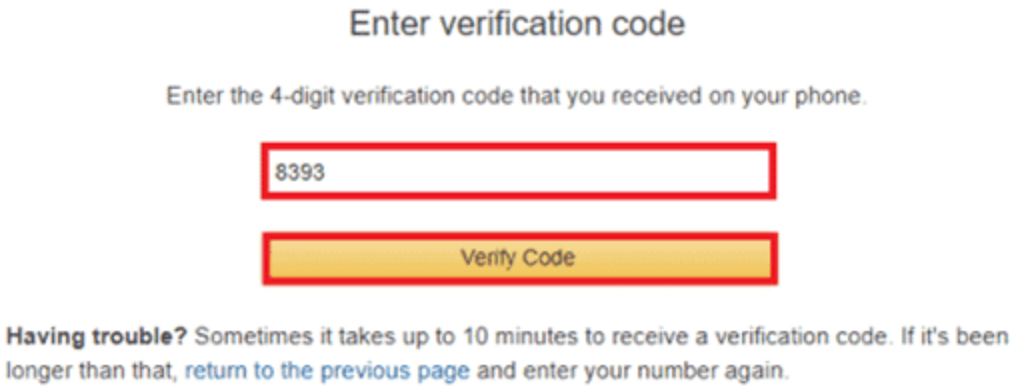
6. In this step, it will take you to the payment gateway to validate your payment information and for your credit card verification, Amazon will charge the minimum price based on Country. Here I have provided India, so Amazon charged 2 INR.



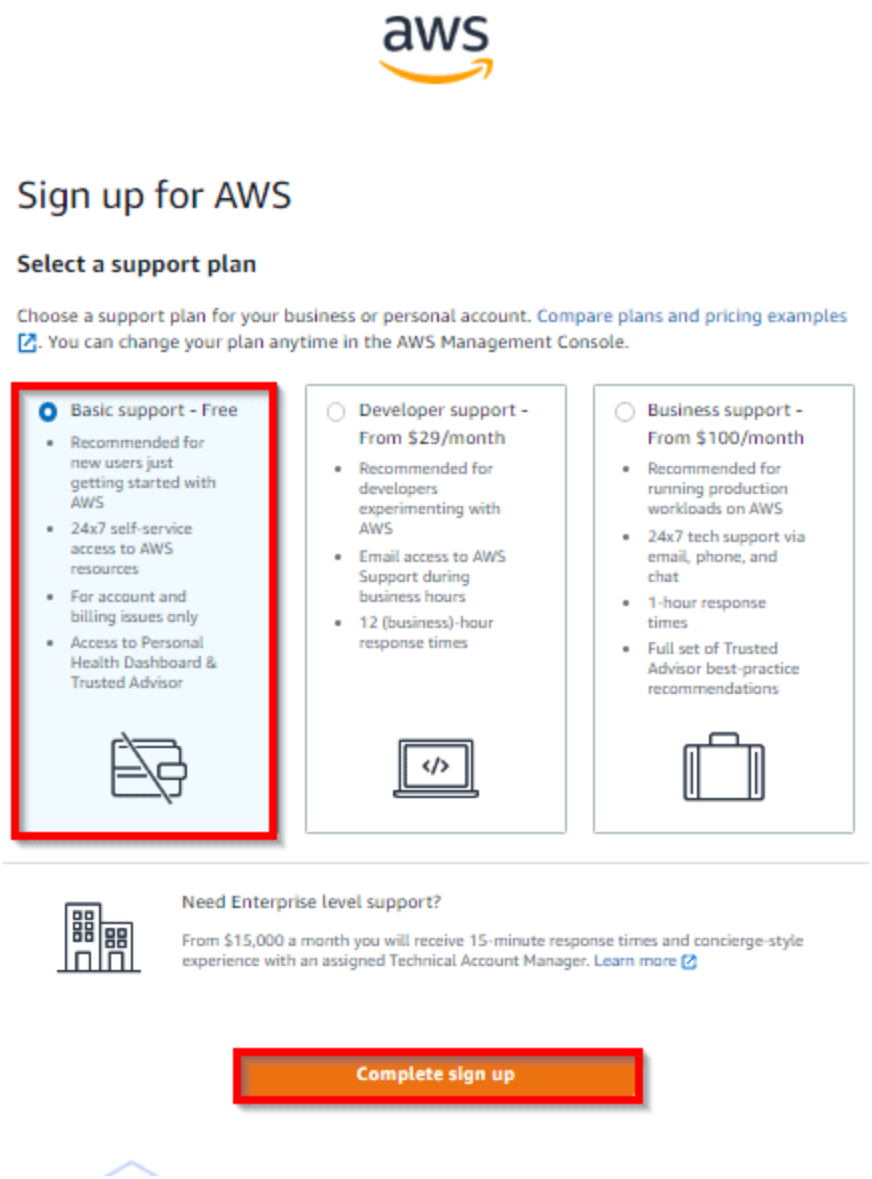
7. Phone verification: Here you will be taken to an identity verification page that will already have your phone number, so you just have to select either “Text message or Voice call” Provide a valid phone number, Solve the captcha, and then click on Send SMS or Call Me Now(depending upon your selection).



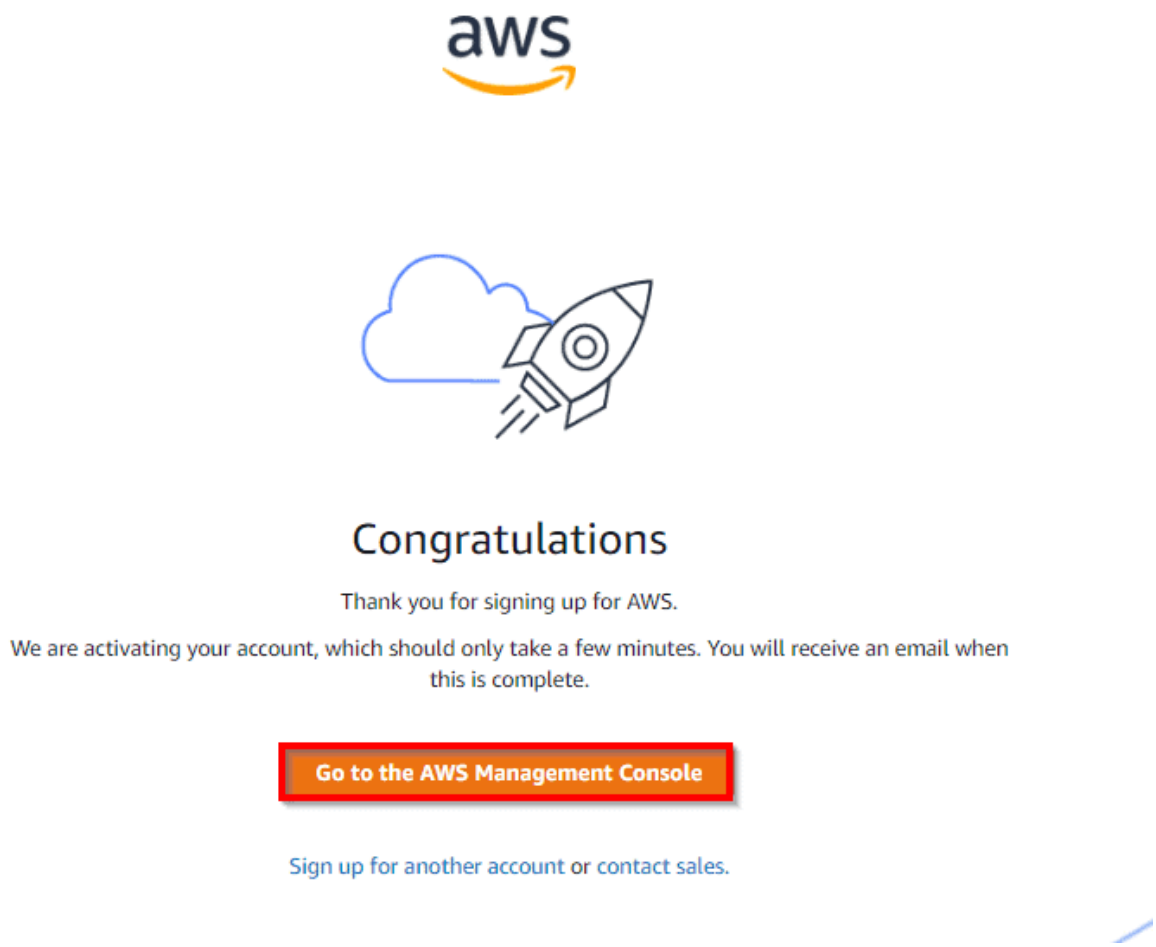
8. After clicking on Send SMS or Call me Now, you will immediately receive a call or SMS from Amazon, for verification code, Enter your code then click on Verify Code.



9. Support plan: AWS support offers a selection of plans to meet your business needs. Select your suitable plan then click continue.



Note: All customers receive free basic support.
10. Registration Confirmation page.
Once you completed all the above steps and processes. You'll get the confirmation page as below. Now your account will be processed for activation. It may take somewhere between 30 minutes to 1 hour for you to receive an email confirmation that your Amazon Cloud Services account has been activated.



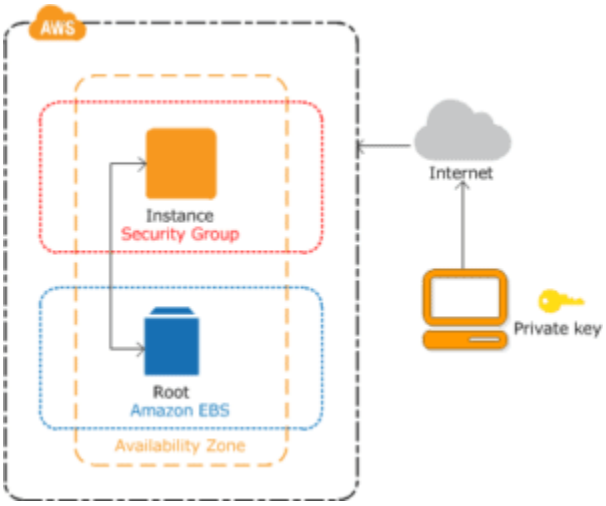
Activity Guide II: CloudWatch: Create billing & service limits

We can enable the AWS billing alerts through Amazon CloudWatch. CloudWatch is an AWS service dedicated to monitoring all of your activities across your AWS account. In addition to billing alerts, CloudWatch also provides the infrastructure for monitoring applications, logs, metrics collections, and other service metadata, and detecting the activity in your AWS account usage.

The AWS CloudWatch provides a variety of metrics by which you can schedule your alarms. For example, you could create an alarm to notify you when the CPU or memory Utilization of a running instance goes beyond 90% or when the billing amount goes over $100, In an AWS free tier account, we get 10 alarms and 1,000 email notifications per month.

Create & connect to Amazon EC2 Machine

Amazon EC2 presents represents a true virtual computing environment, allowing you to use the console interfaces to launch instances with a variety of operating systems, load them with your custom desired application environment, manage your network's access permissions, and run the image using as many or few systems as you desire.



Install & Configure AWS CLI, setup GIT, Node JS & SDK

The AWS Command Line Interface is an open-source and unified tool that enables you to interact with AWS services/resources using commands in your command-line shell. With minimum configuration, AWS CLI also enables you to start running commands that implement functionality equivalent to that provided by the browser-based AWS Management Console from the command prompt in your favourite terminal program.

Activity Guide V: AWS Identity & Access Management(IAM)

AWS Identity and Access Management is a service provided by AWS that helps you to securely control the access to AWS resources. You can use the IAM service to control the user, who is authenticated (signed in) and authorized (has permissions) to use service/resources.

When you first create an AWS account and you begin with a single sign-in identity that has complete access to all AWS services/resources in the account. This identity is called the AWS Root user and is accessed by signing in with the email and password that you used to create the account. Here we strongly recommend you do not use the root user for your daily tasks, even the administrative ones. Instead, adhere to the best practice of using your root user only to create the IAM user and for billing purposes only and then securely lock away your root account credentials and use that account to perform only a few service management tasks.

Enable Multi-Factor Authentication (MFA)

AWS Multi-Factor Authentication is a simple best practice that adds an additional layer of protection on top of your user name and password. With the enabled MFA, when a user signs in to an AWS Console, they will be prompted for their user name and password (First authentication), as well as for an authentication code (Second Authentication) from their AWS MFA device. These details are Taken together to increase security for your AWS account settings and resources.

You can enable MFA for your AWS account as well as for an individual IAM user you have created under your root account. MFA is also used to control access to AWS service APIs. AWS does not charge any additional cost for using the MFA.

AWS KMS Create & Use

The AWS Key Management Service (KMS) makes it easy for you to create and manage cryptographic keys and use them across a wide range of AWS services and in your applications. AWS KMS is a resilient and secure service that uses the hardware security modules that have been validated under FIPS 140-2, or are in the process of being validated, to protect your keys. AWS KMS is integrated with an AWS CloudTrail to provide you with the logs of all key usage to help meet your regulatory and compliance needs.

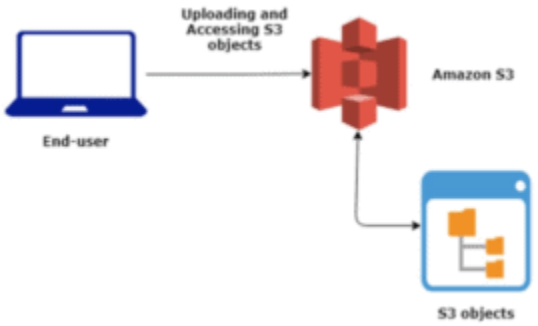
IAM Power User

The Power User is the IAM user who has full access to the AWS services and resources but does not allow management of IAM Users and IAM groups. The power to manage users is the highest privilege operation in AWS thus it is provided to the administrative access policy only. Power-user is just one step below the admin access and has all the privileges but does not have the ability to manage IAM users.

Create S3 Bucket, Upload & Access a File, And Host Website

Amazon Simple Storage Service (S3) is an object storage service that offers scalability, durability, data availability, and performance to your data. This means customers of all sizes and industries can use the S3 to store and protect any amount of data for a range of use cases, such as mobile applications, backup & restore, website hosting, archive, enterprise applications, IoT devices, and big data analytics. Amazon S3 is a service that provides easy-to-use management features so you can organize your data and configure finely-tuned access controls to meet your specific business, organizational and compliance requirements.

Amazon S3 is designed for 99.999999999% (11 9's) of durability, and stores data for millions of applications for companies all around the world.

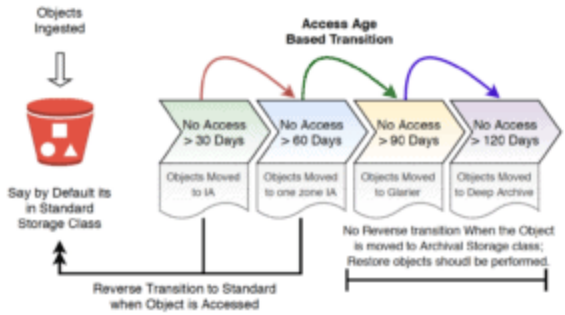


S3 Cross-Region Replication

S3 Cross-Region Replication (CRR) is used to copy the objects across Amazon S3 buckets from one region to another in different AWS Regions. Buckets that are configured for object replication can be owned by the same AWS account or they can be different accounts.

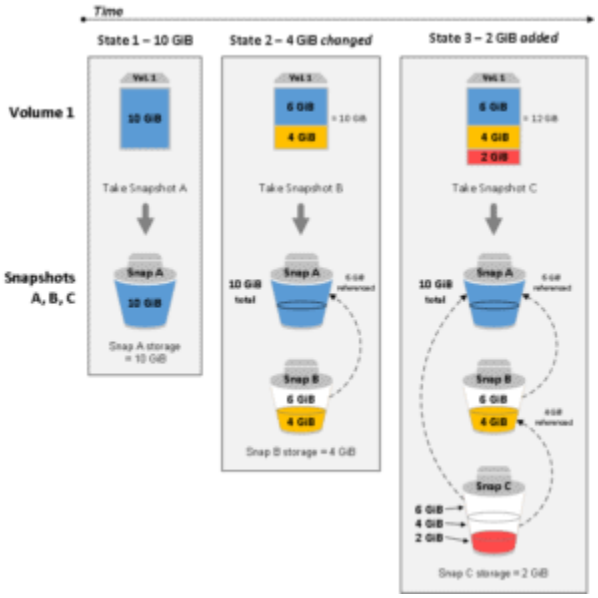
S3 Lifecycle Management on S3 Bucket

An **S3 Lifecycle** configuration is a set of rules and policies that define actions that Amazon **S3** applies to a group of objects. To manage your files so that they can store in a cost-effective manner throughout their lifecycle, configure their Amazon S3 Lifecycle.



Create & Manage EBS Volumes & Snapshots

Amazon Elastic Block Store (AWS EBS) is a raw block storage service that is designed to be used with Amazon EC2 instances. When mounting to an Amazon EC2 instance, Amazon EBS volumes can be used like any other raw block device: they can be formatted with a specific file system, host operating systems, and applications, and have snapshots or clones made from them.

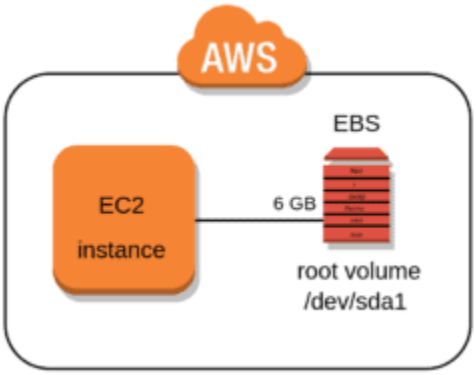


Attach & Mount EBS Volume to EC2 Instance

Amazon Elastic Block Store (Amazon EBS) provides block-level storage volumes for use with EC2 instances. EBS volumes behave like raw, unformatted block devices. You can mount these volumes as a device on your EC2 instances. EBS volumes that are attached to an instance are exposed as storage volumes that persist independently from the life of the instance. You can create a file system

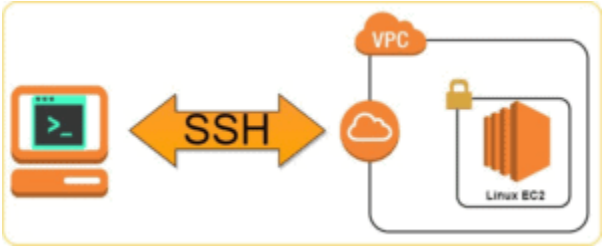
on top of these EBS volumes, or use them in such a way that you use a block device (such as a hard drive). Also, you can change the configuration of a volume attached to an instance dynamically.

AWS allows you to create multiple EBS volumes and you can attach them to the instances for extra storage. However, to make the EBS volume usable as storage inside the instance, you need to mount it to a specific folder.



SSH into EC2 Linux Instance via Username & Password

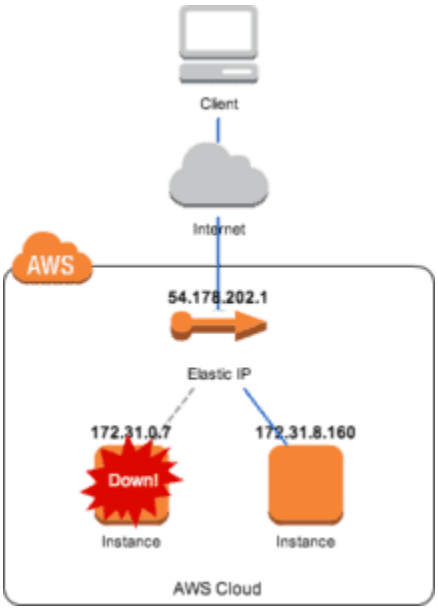
A password authentication against SSH isn't bad but creating a long and complicated password may also encourage you to store it in an unsecured manner. Using encryption keys to authenticate SSH connections is a more secure alternative.



AWS Elastic IP

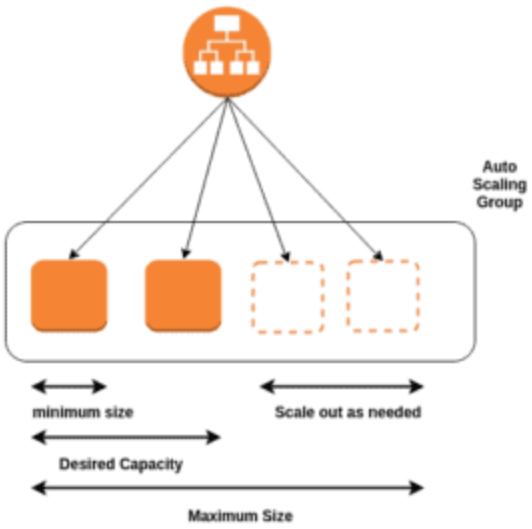
The Elastic IP is an address that has a static IPv4 address designed for dynamic cloud computing. An Elastic IP address is allocated to your AWS account until you release it. If you use an Elastic IP address, you can mask the failure of an instance or software by rapidly remapping the address to another instance of your account.

With the use of Elastic IP addresses, the AWS imposes a small hourly charge if an Elastic IP address is not associated with a running EC2 instance, or if it is associated with a stopped instance or an unattached network interface. While your instance is running, you are not charged for one Elastic IP address associated with the instance, but you are charged for any additional Elastic IP addresses associated with the instance.



Create Elastic Load Balancer & AutoScaling

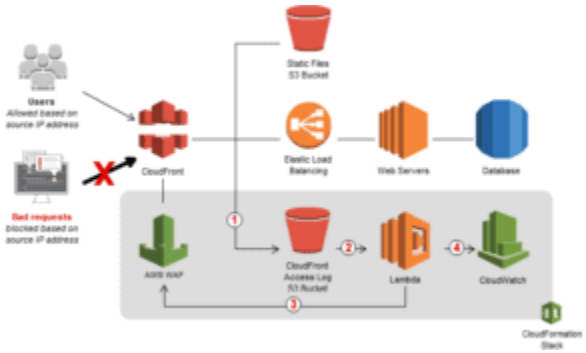
Elastic Load Balancing is used to automatically distribute your incoming traffic across multiple EC2 instances that you are running. You use Auto-scaling in combination to increase and decrease the capacity to handle requests depending on the requirement.



Block Web Traffic with WAF in AWS

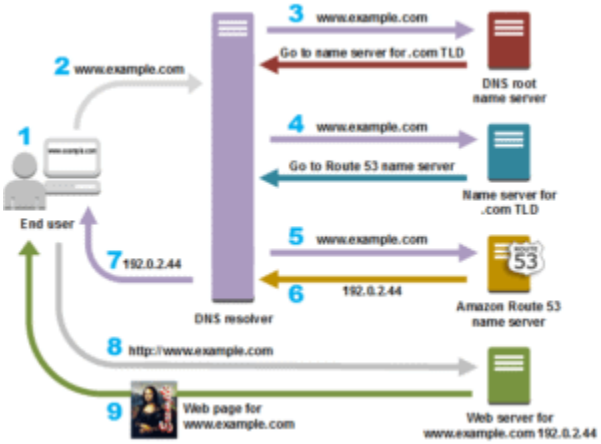
AWS Web Application Firewall is a firewall that helps you to protect your web application server against common web exploits that might affect the availability and compromise the security concerns of your application. The AWS WAF also gives you control over the traffic that it reaches to your applications by enabling you to create security rules that block common attack patterns like SQL injection and cross-site scripting.

The Users can create their own rules/policies and specify the conditions that AWS WAF searches for in incoming web requests, and the AWS cost for using the WAF is only for what you use.



Register a Domain Name For Free

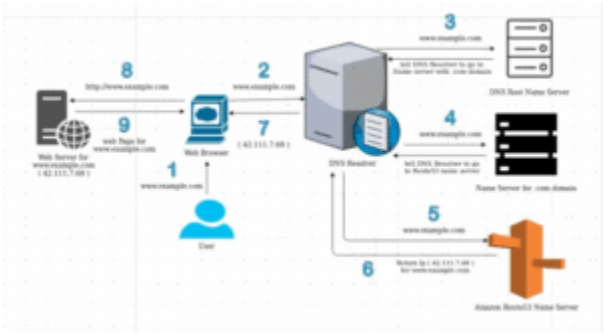
All computers on the Internet, from your smartphone, laptop/PC to the servers that serve content for massive retail websites, can be found and communicate with one another by using numbers. These numbers are called IP addresses. When you go visit a website through your browser, you don't have to remember and enter a long number. Instead, you can enter a DNS name (domain) like example.com.



Map DNS Using Route 53

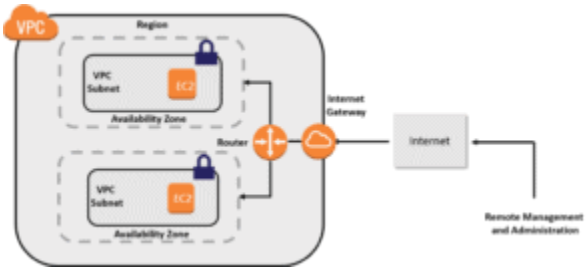
Route 53 is a highly available, and scalable cloud Domain web service. It is designed to give developers/businesses an extremely reliable and cost-effective way to route end users to Internet applications by translating the names like www.mydns.com into the numeric IP addresses like 192.0.3.7 that computers use to connect and communicate to each other. Route 53 is fully compliant with IPv6 IP addresses as well.

Route 53 effectively connects user requests to infrastructure running in AWS – such as Amazon EC2 instances, Elastic load balancers, S3 buckets – and can also be used to route users to infrastructure outside of AWS.



Create Custom Virtual Private Cloud

Amazon Virtual Private Cloud (Amazon VPC) is a service by AWS where you equipped a logically outlying section of the AWS cloud where you can launch your AWS resources in a virtual network that you specify. You have complete control over your VPC environment, including a selection of your own IP address range, the creation of your own subnets, and the configuration of route tables and network gateways are all in your hand.



Configure Amazon CloudWatch to Notify Change in EC2 CPU Utilization

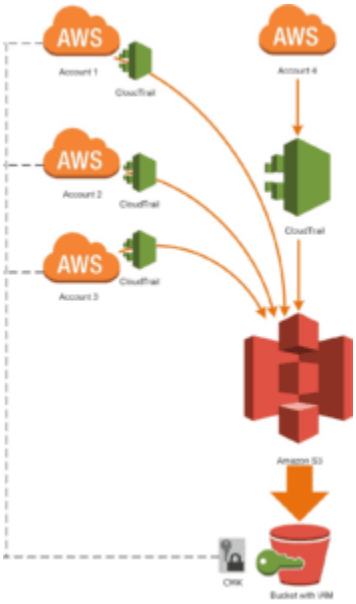
Amazon CloudWatch is a monitoring service built for DevOps engineers, IT engineers, and developers. CloudWatch provides you with data and actionable insights to monitor your own applications and resources, respond to system-wide performance changes, optimize resource utilization, and get a unified view of operational health.

With CloudWatch, you can access and collect all your performance and operational data in form of logs and metrics from a single platform.

Enable CloudTrail and Store Logs In S3

AWS CloudTrail is a service by AWS that enables governance, compliance, operational & risk auditing of your AWS account/services. With CloudTrail log, you can continuously monitor, and retain account activity related to actions across your AWS infrastructure.

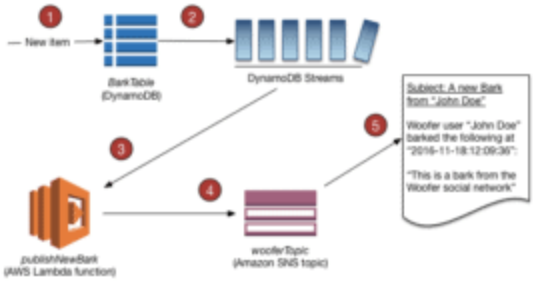
CloudTrail provides event history of your AWS account activity, including actions taken through the AWS Management Console, AWS SDKs, AWS CLI, and other AWS services.



Create & Query with Amazon DynamoDB

DynamoDB is a service by AWS which provides a fully managed Key-Value database service by AWS which provides fast and predictable performance with compatible scalability. DynamoDB unloads the administrative burdens of operating, managing, and scaling a distributed database so that you don't have to worry about hardware that you provisioned, setup, and configuration, replication, software patching, or cluster scaling.

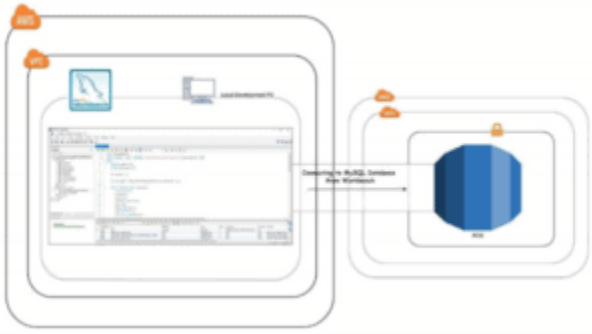
With DynamoDB, you can create database tables in which you can store and retrieve any amount of data and serve at any level. It allows you to create a full backup of your tables for long-term retention and archival for perspective compliance needs.



Configure a MySQL DB Instance via Relational Database Service (RDS)

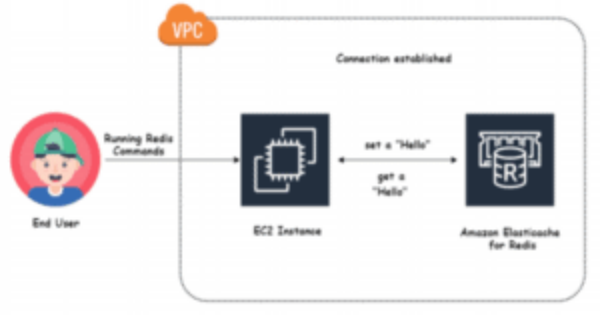
Amazon Relational Database Service by AWS makes it easy to set up a database, operate, and scale a relational database in the cloud. The RDS provides a cost-efficient and resizable capacity while automating time-consuming administration tasks such as patching, database setup, hardware provisioning, and backups. It frees your burden to focus on your applications so you can give them fast performance, high availability, compatibility, and security

Amazon RDS is available on several database instance types – optimized for memory, performance, or I/O – and provides you with six familiar database engines to choose from, including MySQL, Amazon Aurora, PostgreSQL, MariaDB, SQL Server, and Oracle Database. You can use the AWS Database Migration Service to easily migrate or replicate your existing databases to Amazon RD.



Create A Redis Cache & Connect It To EC2 Instance

Redis is a database service offered by AWS which stands for **Re**mote **Di**ctionary **S**erver. Redi is a fast, open-source, in-memory key-value data store for use as a database, cache, message broker, and queue. Redis is a favored choice for caching, gaming, real-time analytics, session management, leaderboards, geospatial, ride-hailing, chat & messaging media streaming, and pub/sub-applications. All of the data are resides in-memory, in contrast to databases that store data on disk or SSDs.



Event-Driven Architectures Using AWS Lambda, SES, SNS, and SQS

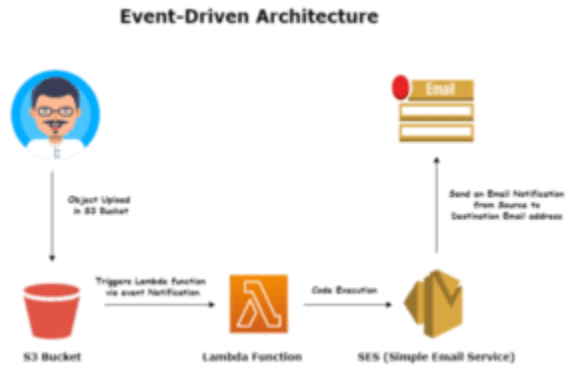
AWS Lambda is a service by AWS which lets you run your code without managing the servers, you pay only for the compute time you consume. With Lambda service, you can run code for virtually any type of app or backend services, all with zero administration. here you just have to upload your code and Lambda takes care of everything required to run and scale your code with high availability and durability. Also, you can set up your code to automatically trigger from other AWS services or call it directly from any web or mobile application.

Amazon SQS is a fully configured message queue service that enables you to decouple and scale multiple microservices, distributed systems, and server-less applications. Using the SQS, you can send, receive, and store messages between the software components at any volume, without losing messages or requiring other services to be available.

Amazon SNS is a fully managed messaging service for both types of communication application-to-application (A2A) and application-to-person (A2P).

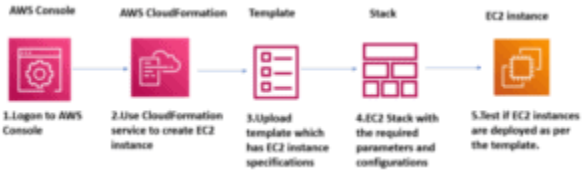
An event-driven architecture uses events to trigger and communicate between decoupled services and it acts as common modern applications built with microservices. An event is a change in state, like an item being placed in a shopping cart on an e-commerce website. Events can either carry a state or events can be identifiers.

It has three key components: event producers, event routers, and event consumers. A producer publishes an event to the router, which filters and pushes the events to users. Producer services and consumer services are decoupled, which allows users to scale, update, and deploy independently.



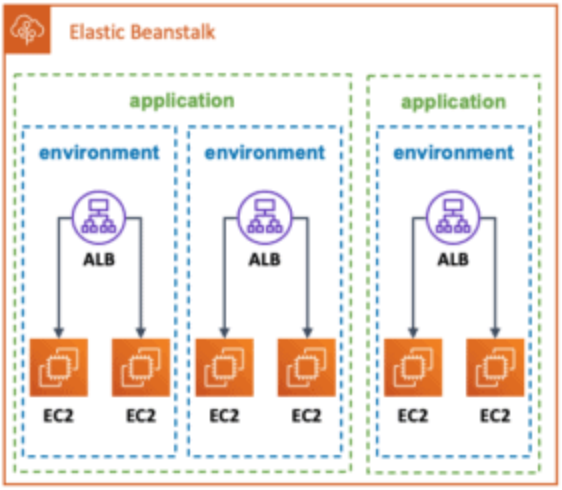
Create and Update Stacks Using CloudFormation

AWS CloudFormation is a service that gives you an easy way to model a collection of related AWS and third-party resources, provision them quickly and consistently, and manage them throughout their lifecycles, by treating infrastructure as code and it allows you to model your entire cloud environment in text files. You can use open-source declarative languages, such as JSON or YAML, to describe what AWS resources you want to create and configure. If you prefer to design visually, you can use AWS CloudFormation Designer to help you get started with AWS CloudFormation template



Deploy a Web Application Using Elastic Beanstalk

AWS Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS. Using elastic beanstalk simply upload your code and Elastic Beanstalk will automatically handle the deployment from capacity provisioning, load balancing, and auto-scaling to application health monitoring. At the same time, users retain full control over the AWS resources powering their application and they can access the underlying resources at any time. There will be no additional charge for using the Elastic Beanstalk else you pay only for the AWS resources needed to store and run your applications.


Elastic Beanstalk
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