AWS - Amazon Web Services : Part 01

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AWS - Amazon Web Services: Introduction

AWS stands for Amazon Web Services which uses distributed IT infrastructure to provide different IT resources on demand.

This AWS notes includes all the topics such as introduction, history of AWS, global infrastructure, features of AWS, IAM, Storage services, Database services, etc.

What is AWS?

- AWS stands for Amazon Web Services.
- The AWS service is provided by the Amazon that uses distributed IT infrastructure to provide different IT resources available on demand. It provides different services such as infrastructure as a service (IaaS), platform as a service (PaaS) and packaged software as a service (SaaS).
- Amazon launched AWS, a cloud computing platform to allow the different organizations to take advantage of reliable IT infrastructure.

Uses of AWS

- A small manufacturing organization uses their expertise to expand their business by leaving their IT management to the AWS.
- A large enterprise spread across the globe can utilize the AWS to deliver the training to the distributed workforce.
- An architecture consulting company can use AWS to get the high-compute rendering of construction prototype.
- A media company can use the AWS to provide different types of content such as ebox or audio files to the worldwide files.

Pay-As-You-Go

- Based on the concept of Pay-As-You-Go, AWS provides the services to the customers.

AWS provides services to customers when required without any prior commitment or upfront investment. Pay-As-You-Go enables the customers to procure services from AWS.

- Computing
- Programming models
- Database storage
- Networking

Advantages of AWS

1) Flexibility

- We can get more time for core business tasks due to the instant availability of new features and services in AWS.
- It provides effortless hosting of legacy applications. AWS does not require learning new technologies and migration of applications to the AWS provides the advanced computing and efficient storage.
- AWS also offers a choice that whether we want to run the applications and services together or not. We can also choose to run a part of the IT infrastructure in AWS and the remaining part in data centres.

2) Cost-effectiveness

AWS requires no upfront investment, long-term commitment, and minimum expense when compared to traditional IT infrastructure that requires a huge investment.

3) Scalability/Elasticity

Through AWS, autoscaling and elastic load balancing techniques are automatically scaled up or down, when demand increases or decreases respectively. AWS techniques are ideal for handling unpredictable or very high loads. Due to this reason, organizations enjoy the benefits of reduced cost and increased user satisfaction.

4) Security

- AWS provides end-to-end security and privacy to customers.
- AWS has a virtual infrastructure that offers optimum availability while managing full privacy and isolation of their operations.
- Customers can expect high-level of physical security because of Amazon's several years of experience in designing, developing and maintaining large-scale IT operation centers.
- AWS ensures the three aspects of security, i.e., Confidentiality, integrity, and availability of user's data.

History of AWS

History of AWS

- 2003: In 2003, Chris Pinkham and Benjamin Black presented a paper on how Amazon's own internal infrastructure should look like. They suggested to sell it as a service and prepared a business case on it. They prepared a six-page document and had a look over it to proceed with it or not. They decided to proceed with the documentation.
- 2004: SQS stands for "Simple Queue Service" was officially launched in 2004. A team launched this service in Cape Town, South Africa.
- 2006: AWS (Amazon Web Services) was officially launched.
- 2007: In 2007, over 180,000 developers had signed up for the AWS.
- 2010: In 2010, amazon.com retail web services were moved to the AWS, i.e., amazon.com is now running on AWS.
- 2011: AWS suffered from some major problems. Some parts of volume of EBS (Elastic Block Store) was stuck and were unable to read and write requests. It took two days for the problem to get resolved.
- 2012: AWS hosted a first customer event known as re:Invent conference. First re:invent conference occurred in which new products were launched. In AWS, another major problem occurred that affects many popular sites such as Pinterest, Reddit, and Foursquare.
- 2013: In 2013, certifications were launched. AWS started a certifications program for software engineers who had expertise in cloud computing.
- 2014: AWS committed to achieve 100% renewable energy usage for its global footprint.
- 2015: AWS breaks its revenue and reaches to $6 Billion USD per annum. The revenue was growing 90% every year.
- 2016: By 2016, revenue doubled and reached $13Billion USD per annum.
- 2017: In 2017, AWS re: invent releases a host of Artificial Intelligence Services due to which revenue of AWS doubled and reached $27 Billion USD per annum.
- 2018: In 2018, AWS launched a Machine Learning speciality Certs. It heavily focused on automating Artificial Intelligence and Machine learning.

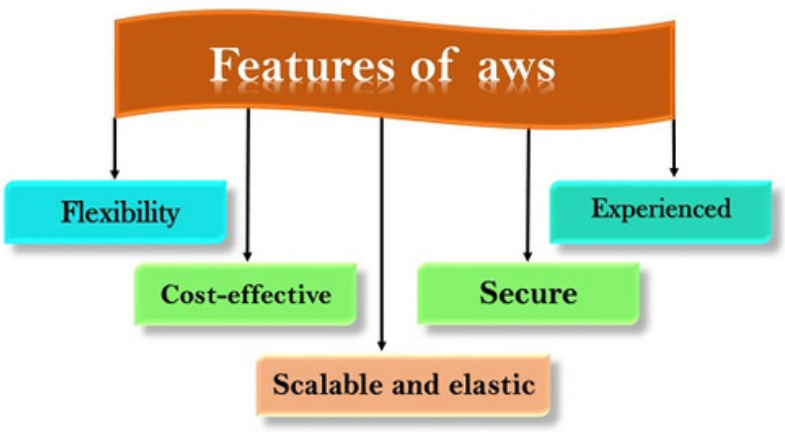
Features of AWS

The following are the features of AWS:

- Flexibility
- Cost-effective
- Scalable and elastic
- Secure
- Experienced

1) Flexibility

- The difference between AWS and traditional IT models is flexibility.
- The traditional models used to deliver IT solutions that require large investments in a new architecture, programming languages, and operating system. Although these investments are valuable, it takes time to adopt new technologies and can also slow down your business.
- The flexibility of AWS allows us to choose which programming models, languages, and operating systems are better suited for their project, so we do not have to learn new skills to adopt new technologies.
- Flexibility means that migrating legacy applications to the cloud is easy, and cost-effective. Instead of re-writing the applications to adopt new technologies, you just need to move the applications to the cloud and tap into advanced computing capabilities.
- Building applications in aws are like building applications using existing hardware resources.
- The larger organizations run in a hybrid mode, i.e., some pieces of the application run in their data center, and other portions of the application run in the cloud.
- The flexibility of aws is a great asset for organizations to deliver the product with updated technology in time, and overall enhancing the productivity.



(Features of AWS)

2) Cost-effective

- Cost is one of the most important factors that need to be considered in delivering IT solutions.
- For example, developing and deploying an application can incur a low cost, but after successful deployment, there is a need for hardware and bandwidth. Owing our own infrastructure can incur considerable costs, such as power, cooling, real estate, and staff.
- The cloud provides on-demand IT infrastructure that lets you consume the resources what you actually need. In aws, you are not limited to a set amount of resources such as storage, bandwidth or computing resources as it is very difficult to predict the requirements of every resource. Therefore, we can say that the cloud provides flexibility by maintaining the right balance of resources.
- AWS provides no upfront investment, long-term commitment, or minimum spend.
- You can scale up or scale down as the demand for resources increases or decreases respectively.
- An aws allows you to access the resources more instantly. It has the ability to respond the changes more quickly, and no matter whether the changes are large or small, means that we can take new opportunities to meet the business challenges that could increase the revenue, and reduce the cost.

3) Scalable and elastic

- In a traditional IT organization, scalability and elasticity were calculated with investment and infrastructure while in a cloud, scalability and elasticity provide savings and improved ROI (Return On Investment).
- Scalability in aws has the ability to scale the computing resources up or down when demand increases or decreases respectively.
- Elasticity in aws is defined as the distribution of incoming application traffic across multiple targets such as Amazon EC2 instances, containers, IP addresses, and Lambda functions.
- Elasticity load balancing and scalability automatically scale your AWS computing resources to meet unexpected demand and scale down automatically when demand decreases.
- The aws cloud is also useful for implementing short-term jobs, mission-critical jobs, and the jobs repeated at the regular intervals.

4) Secure

- AWS provides a scalable cloud-computing platform that provides customers with end-to-end security and end-to-end privacy.
- AWS incorporates the security into its services, and documents to describe how to use the security features.
- AWS maintains confidentiality, integrity, and availability of your data which is the utmost importance of the aws.

Physical security: Amazon has many years of experience in designing, constructing, and operating large-scale data centers. An aws infrastructure is incorporated in AWS controlled data centers throughout the world. The data centers are physically secured to prevent unauthorized access.
Secure services: Each service provided by the AWS cloud is secure.
Data privacy: A personal and business data can be encrypted to maintain data privacy.

5) Experienced

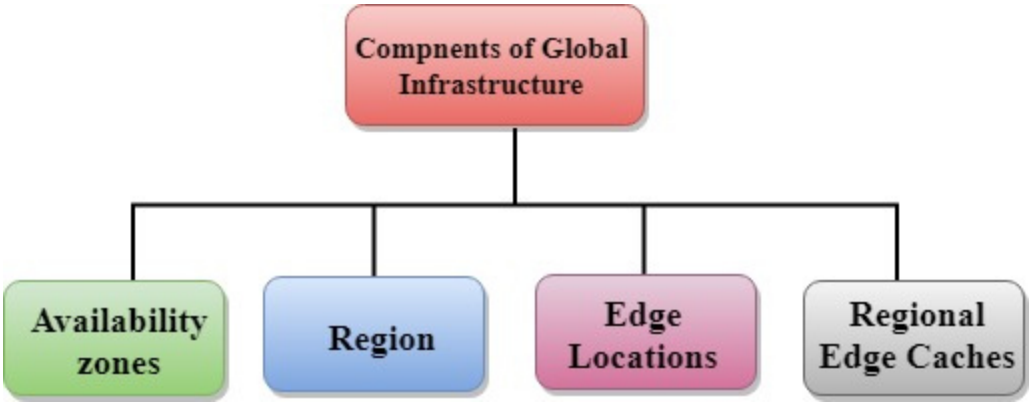
- The AWS cloud provides levels of scale, security, reliability, and privacy.
- AWS has built an infrastructure based on lessons learned from over sixteen years of experience managing the multi-billion dollar Amazon.com business.
- Amazon continues to benefit its customers by enhancing their infrastructure capabilities.
- Nowadays, Amazon has become a global web platform that serves millions of customers, and AWS has been evolved since 2006, serving hundreds of thousands of customers worldwide.

AWS Global Infrastructure

- AWS is a cloud computing platform which is globally available. Global
- infrastructure is a region around the world in which AWS is based. Global infrastructure is a bunch of high-level IT services which is shown below:
- AWS is available in 19 regions, and 57 availability zones in December 2018 and 5 more regions 15 more availability zones for 2019.

The following are the components that make up the AWS infrastructure:

- Availability Zones
- Region
- Edge locations
- Regional Edge Caches

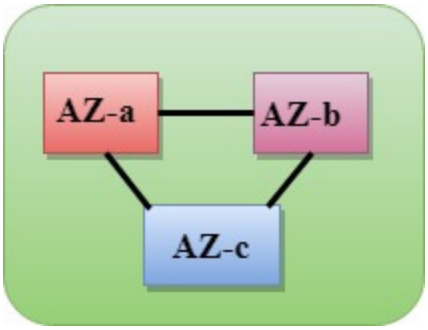


Availability zone as a Data Center

- An availability zone is a facility that can be somewhere in a country or in a city. Inside this facility, i.e., Data Centre, we can have multiple servers, switches, load balancing, firewalls. The things which interact with the cloud sits inside the data centers.
- An availability zone can be a several data centers, but if they are close together, they are counted as 1 availability zone.

Region

- A region is a geographical area. Each region consists of 2 more availability zones.
- A region is a collection of data centers which are completely isolated from other regions.
- A region consists of more than two availability zones connected to each other through links.



(Availability zones are connected through redundant and isolated metro fibers.)

Edge Locations

- Edge locations are the endpoints for AWS used for caching content. Edge
- locations consist of CloudFront, Amazon's Content Delivery Network (CDN).
- Edge locations are more than regions. Currently, there are over 150 edge locations.
- Edge location is not a region but a small location that AWS have. It is used for
- caching the content. Edge locations are mainly located in most of the major cities to distribute the content to end users with reduced latency.
- For example, some user accesses your website from Singapore; then this request would be redirected to the edge location closest to Singapore where cached data can be read.

Regional Edge Cache

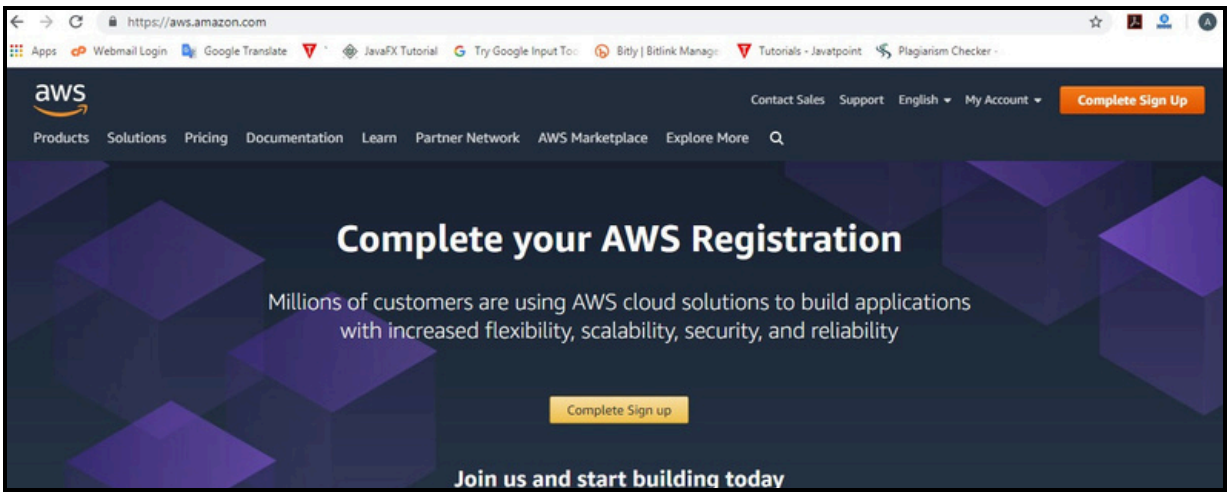
- AWS announced a new type of edge location in November 2016, known as a Regional Edge Cache. Regional Edge cache lies between CloudFront Origin
- servers and the edge locations.
- A regional edge cache has a large cache than an individual edge location.
- Data is removed from the cache at the edge location while the data is retained at
- the Regional Edge Caches.
  When the user requests the data, then data is no longer available at the edge location. Therefore, the edge location retrieves the cached data from the Regional edge cache instead of the Origin servers that have high latency.

AWS Free Tier

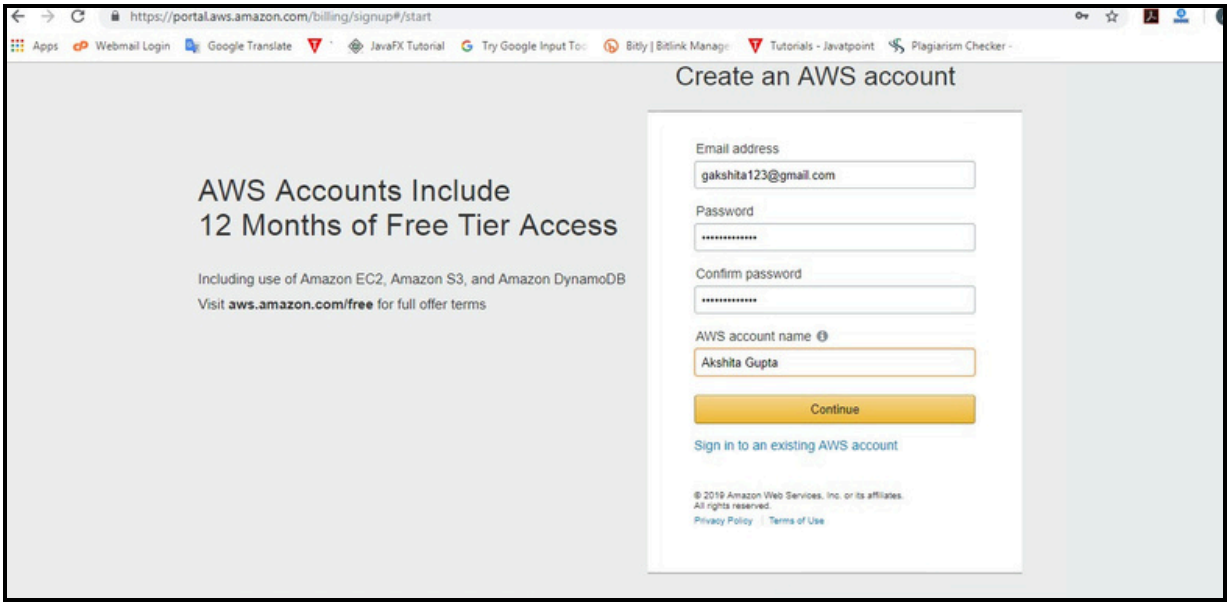
AWS Free Tier

How to SignUp to the AWS platform

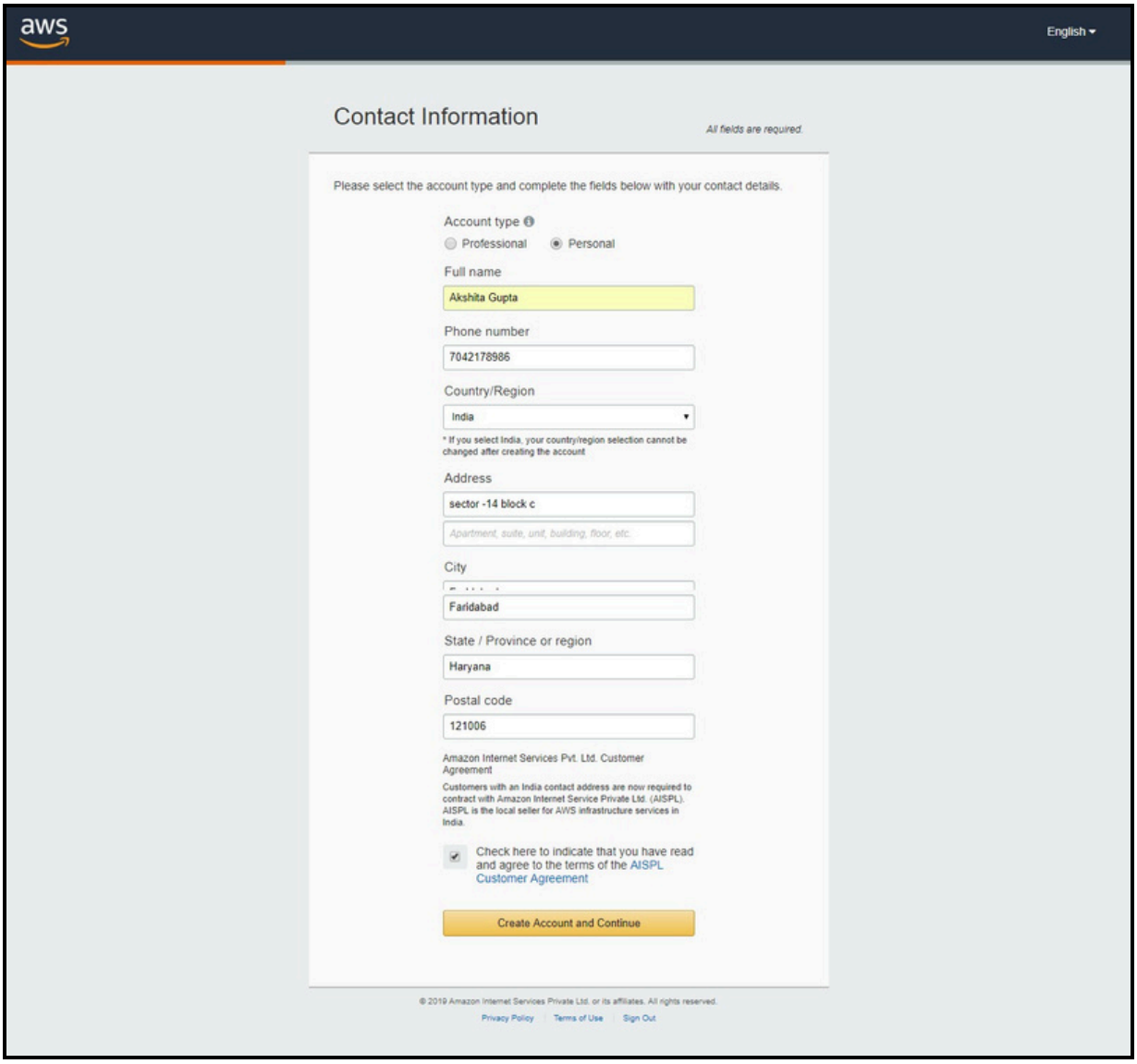
- Firstly visit the website https://aws.amazon.com. The following screen
- appears after opening the website, then click on the Complete Sign Up to create an account and fill the required details.



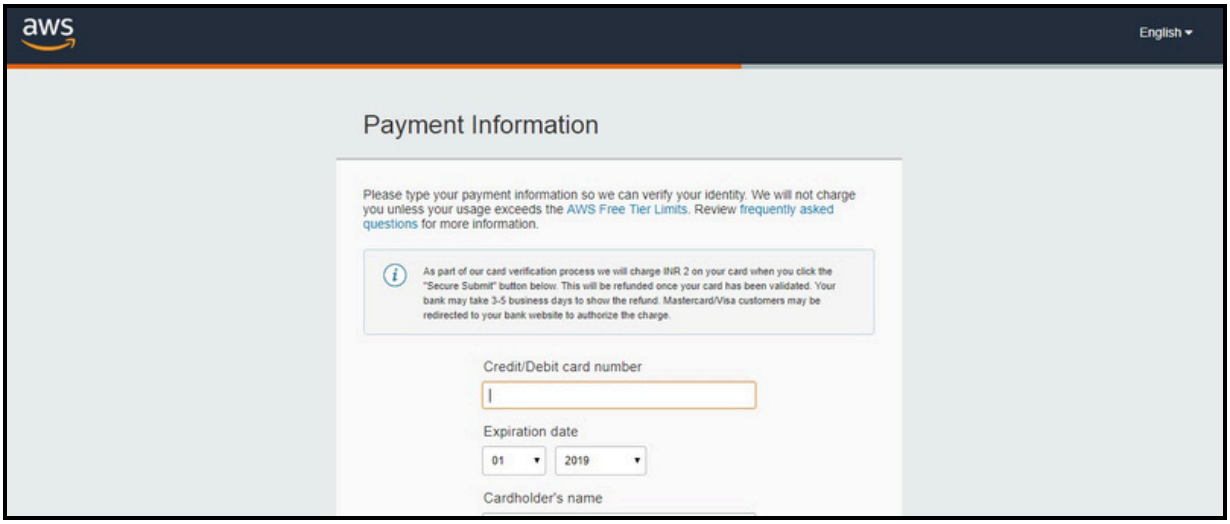
- The following screen appears after clicking on the "Complete Sign Up" button. If you are an already existing user of an AWS account, then enter the email address of your AWS account otherwise "create an aws account".
- On clicking on the "create an aws account" button, the following screen appears that requires some fields to be filled by the user.



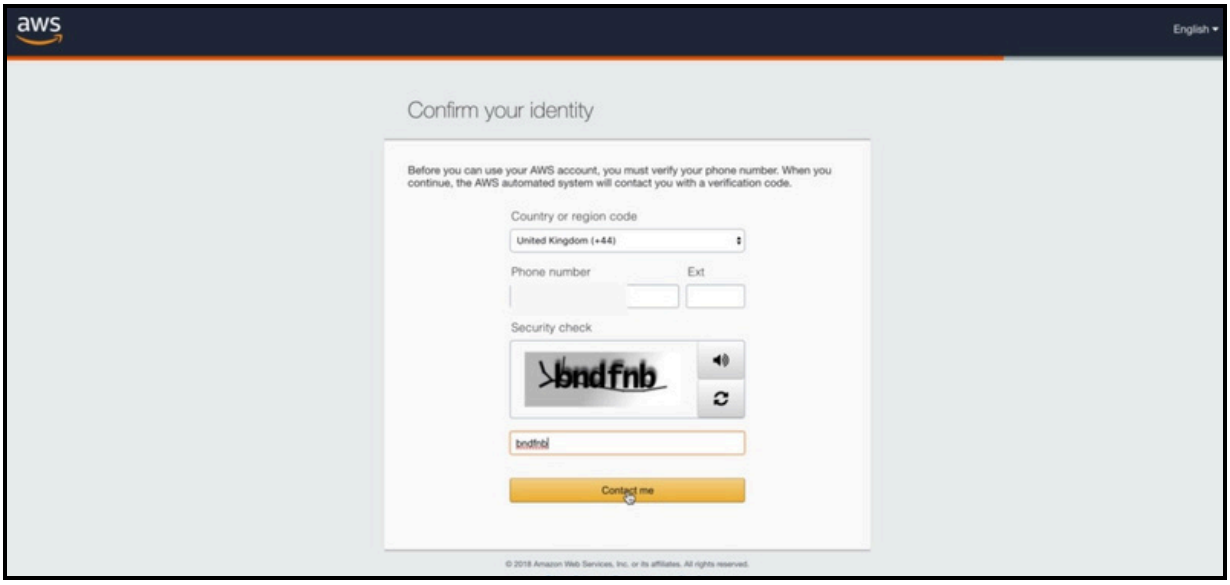
- Now, fill your contact information.



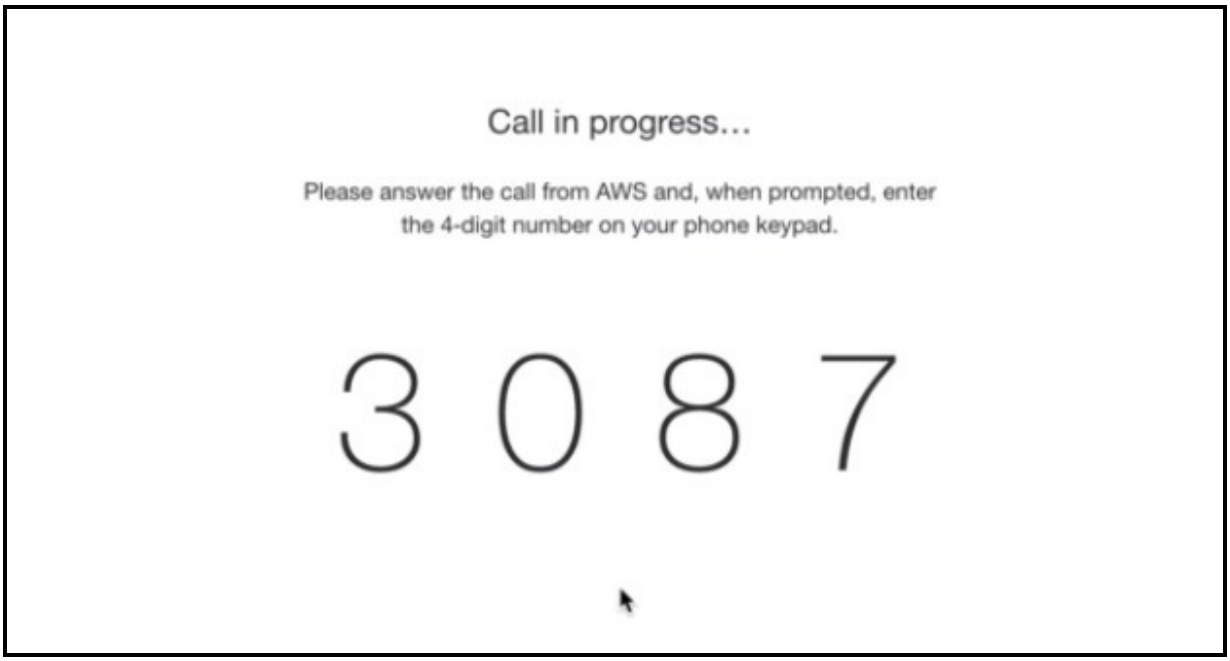
- After providing the contact information, fill your payment information.



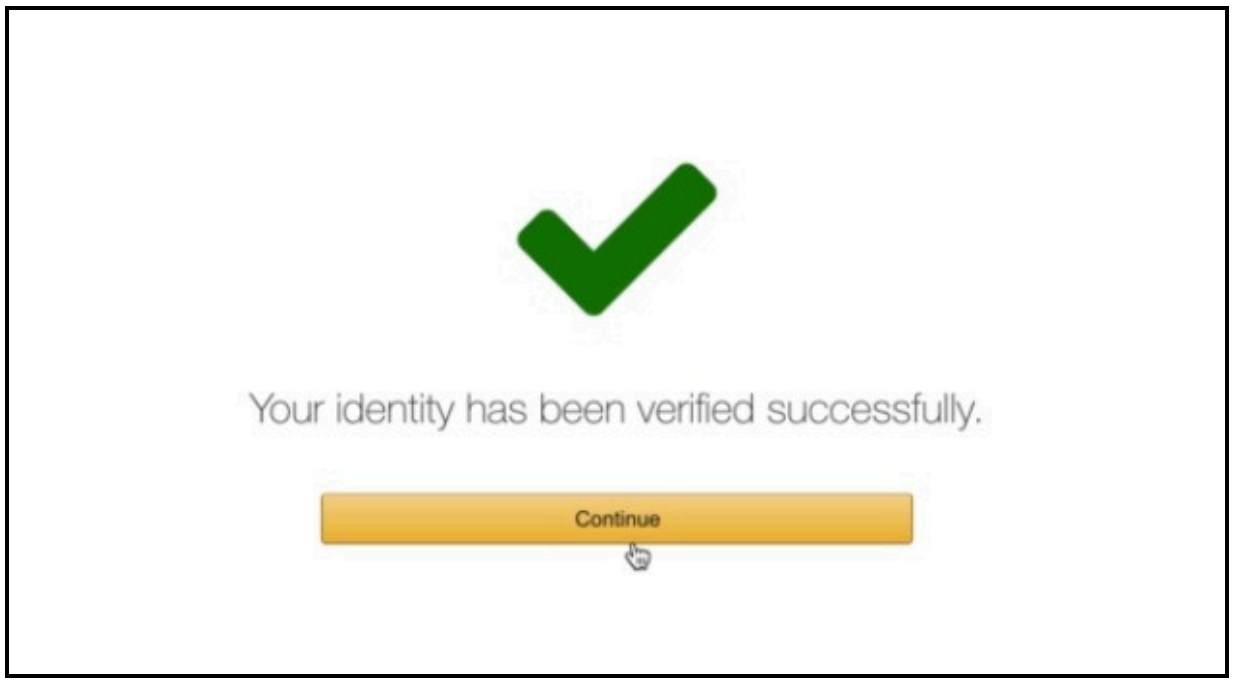
- After providing your payment information, confirm your identity by entering your phone number and security check code, and then click on the "Contact me" button.



- AWS will contact you to verify whether the provided contact number is correct or not.



- When number is verified, then the following message appears on the screen.

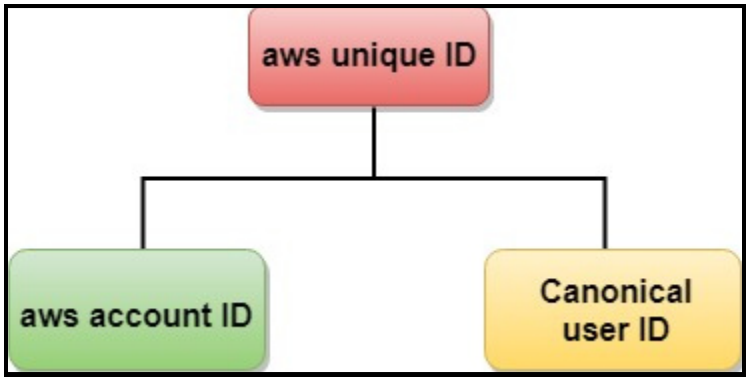


- The final step is the confirmation step. Click on the link to log in again; it redirects you to the "Management Console".

AWS Account Identifiers

AWS assigns two types of unique ID to each user's account:

- An AWS account ID
- A canonical user ID



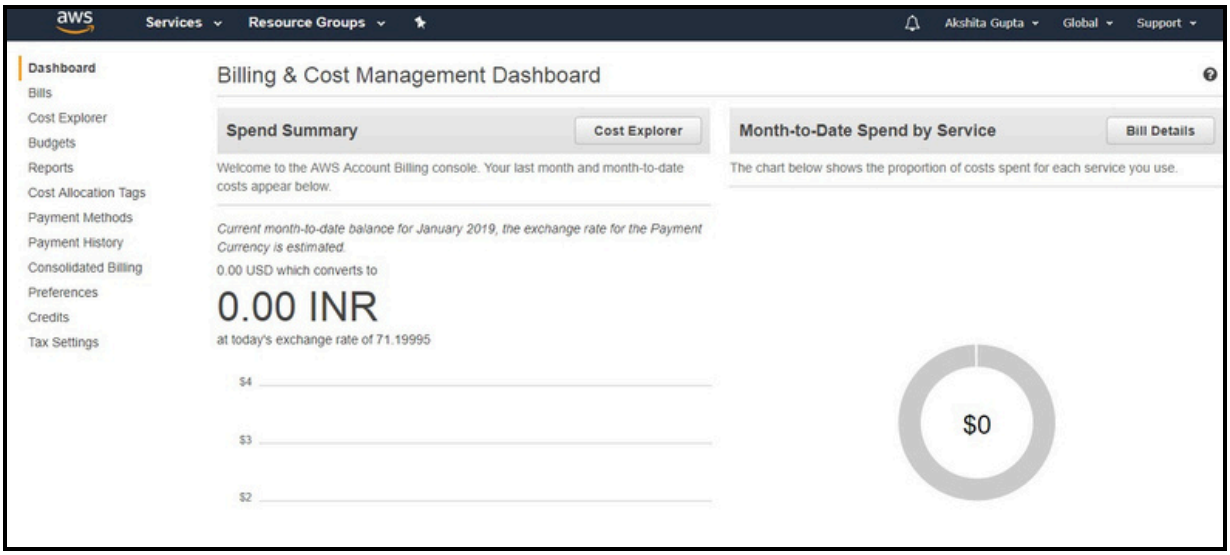
AWS account ID

AWS account ID is a 12-digit number such as 123456780123 which can be used to construct Amazon Resource Names (ARNs). Suppose we refer to resources such as an IAM user, the AWS account ID distinguishes the resources from resources in other AWS accounts.

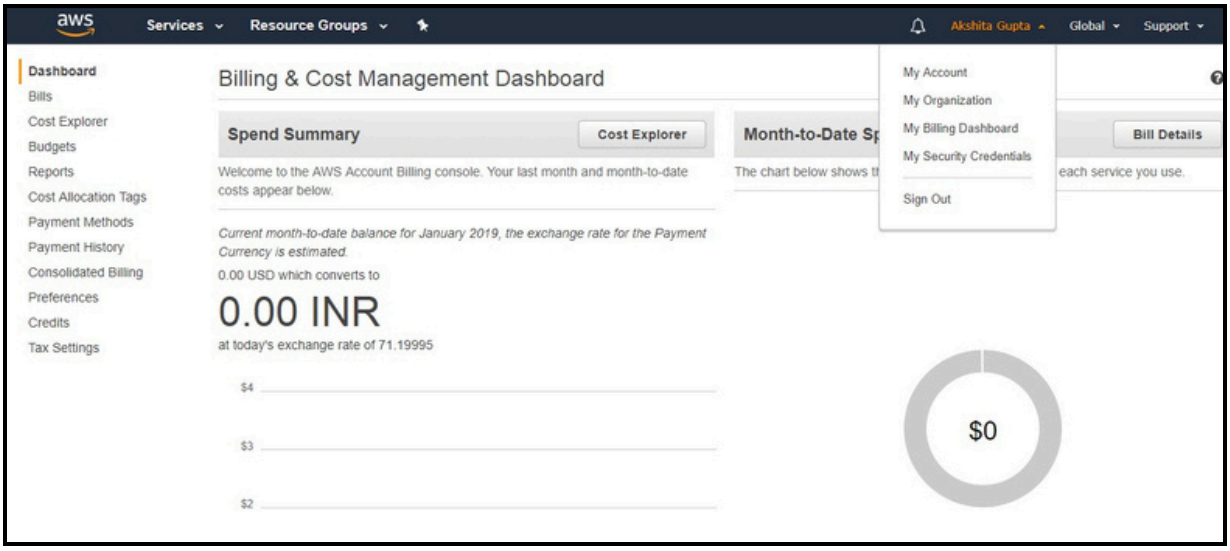
Finding the AWS account ID

We can find the AWS account ID from AWS Management Console. The following steps are taken to view your account ID:

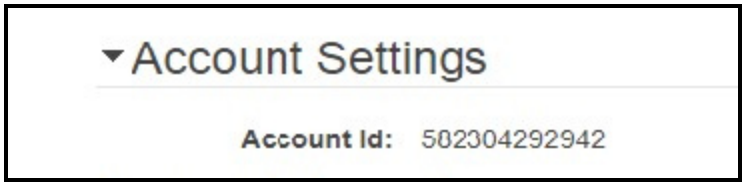
- Login to the aws account by entering your email address and password, and then you will move to the management console.



- Now, click on the account name, a dropdown menu appears.



- Click on "My Account" in the dropdown menu of account name to view your account ID.

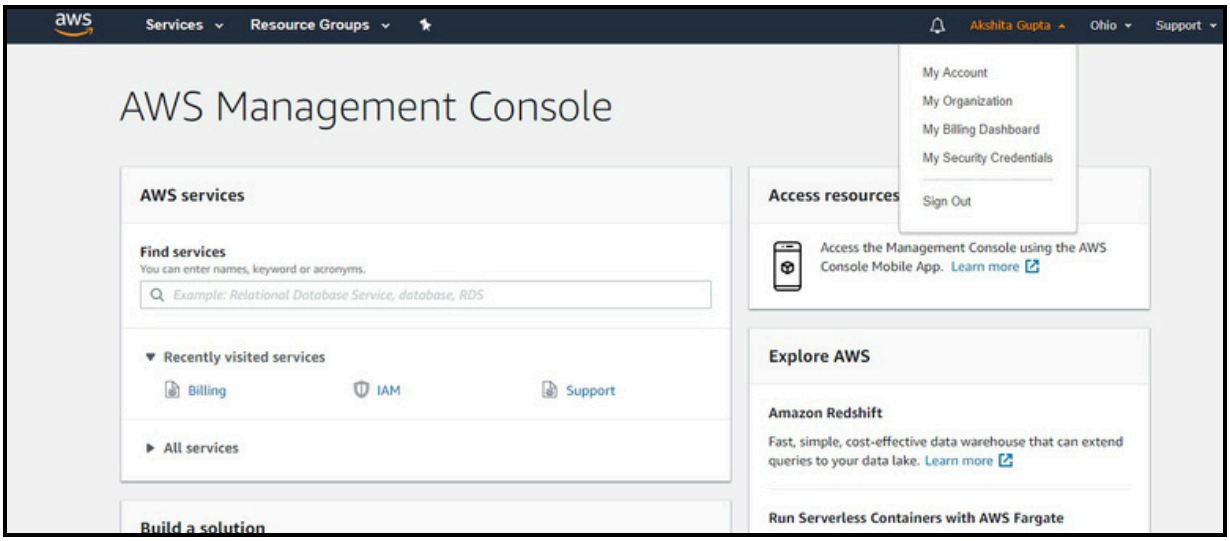


Canonical User ID

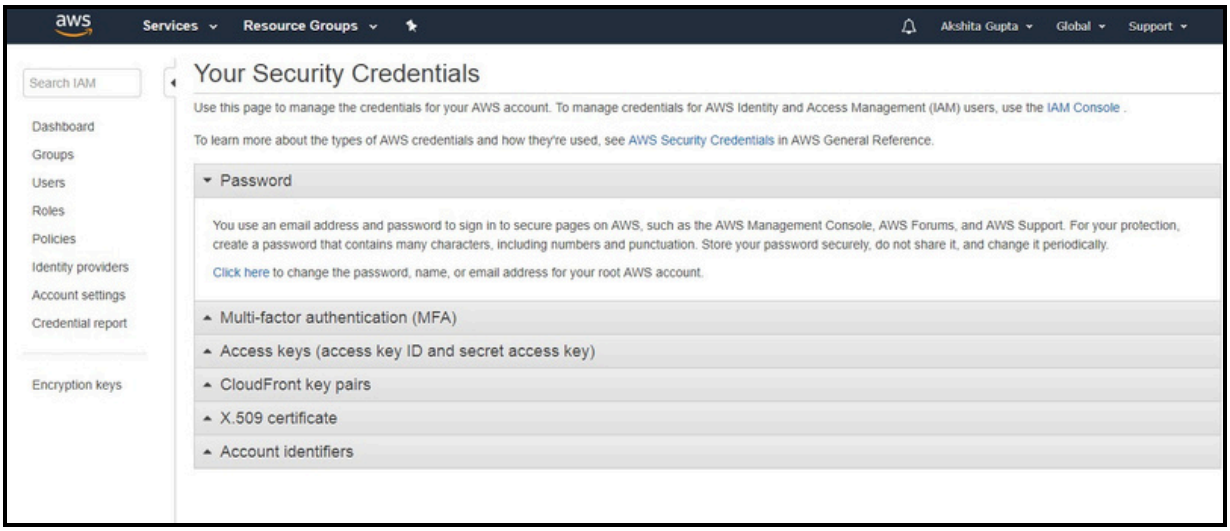
- A Canonical user ID is 64-digit hexadecimal encoded a 256-bit number.
- A canonical user ID is used in an Amazon S3 bucket policy for cross-account access means that AWS account can access the resources in another AWS account. For example, if you want AWS account access to your bucket, you need to specify the canonical user ID to your bucket's policy.

Finding the canonical user ID

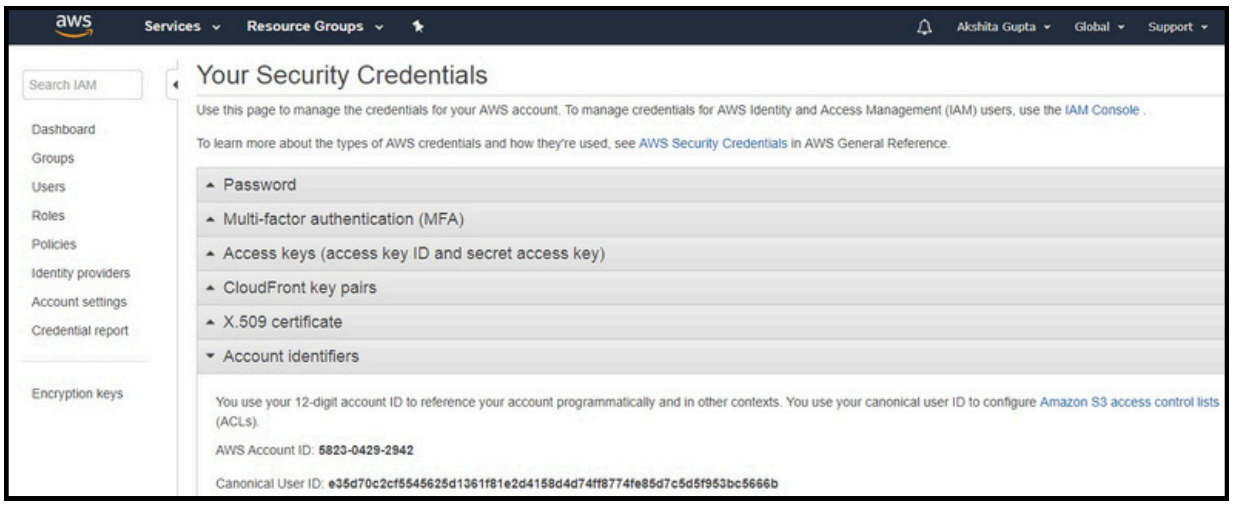
- Firstly, visit the website https://aws.amazon.com, and log in to the aws account by entering your email address and password.
- From the right side of the management console, click on the account name.



- Click on the "My Security Credentials" from the dropdown menu of the account name. The screen appears which is shown below:



- Click on the Account identifiers to view the Canonical user ID.


aws
Services
Resource Groups
Akshita Gupta
Global
Support
Search IAM
Dashboard
Groups
Users
Roles
Policies
Identity providers
Account settings
Credential report
Encryption keys
Your Security Credentials
Use this page to manage the credentials for your AWS account. To manage credentials for AWS Identity and Access Management (IAM) users, use the IAM Console .
To learn more about the types of AWS credentials and how they're used, see AWS Security Credentials in AWS General Reference.
Password
Multi-factor authentication (MFA)
Access keys (access key ID and secret access key)
CloudFront key pairs
X.509 certificate
Account identifiers
You use your 12-digit account ID to reference your account programmatically and in other contexts. You use your canonical user ID to configure Amazon S3 access control lists (ACLs).
AWS Account ID: 5823-0429-2942
Canonical User ID: e35d70c2cf5545625d1361f81e2d4158d4d74ff8774fe85d7c5d5f953bc5666b