



AWS Cloud Practitioner

Training Course



AWS Cloud Practitioner Training

Week-1 **AWS Cloud Practitioner Course - CLF-C01**

- **Cloud Concept**
- **Introduction to Cloud Computing**
- **Benefits of Cloud Computing**
- **Type of Cloud Computing**
- **Cloud Model**
- **AWS Global Infrastructure**

Week-1 Cloud Concepts

- What is Cloud Computing
 - Using a network of remote servers over the internet to manage and process data, rather than a local server or personal computer.
- Benefits of Cloud computing
- Type of Cloud computing
- Cloud Computing Models



On-Premise Network	AWS Cloud Network
You own the servers	AWS Owns the server hardware
You hire the IT People	AWS hires the IT People for the Datacenters
You lease the real-estate	AWS purchases or leases the real-estate
You take all risks	You are responsible for configuring services and codes, AWS takes care of the rest.



Legacy IT

Self Managed systems within a company's Datacenter

Equipment are typically purchased

Managed by the IT Teams

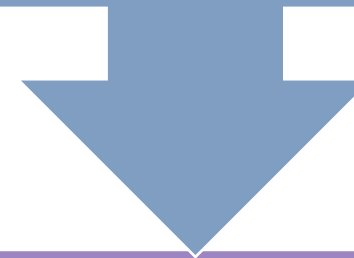
Purchase/lease for the data center location

Software licensing

Maintenance and support contracts with other vendors

Introduction to Cloud Computing

Cloud computing is basically renting the resources like computing, Storage, CPU over the internet with pay-as-you-go from a public Cloud Provider (AWS, Azure, Google).



Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, databases, etc., on demand from a Cloud provider.

Computing:

- MS Windows Server, Linux Servers, Web Applications

Storage

- For storing data objects, web sites data,

Networking:

- Secure connection between the Cloud and your company network.

Serverless Databases:

- Like SQL, MySQL, Oracle, MariaDB, etc

Benefits of Cloud computing

Cost Saving:

- Pay-as-you-go
- No hardware to purchase/manage for your business datacenter.
- Secure connection between the Cloud and your company network.

Scalable/Deploy In minutes:

- You can increase and decrease resource based on workload. (CPU, memory)
- Deploy your app server within minutes
- Use automation to deploy multiple resources at once

Elastic and High Availability

- Automatically add/remove resources based on the usage.
- Highly available in multi location

Maintenance: (AWS Responsibility)

- No need to setup hardware (app server, web server, etc)
- No need to upgrade hardware every 3-4 years
- No need to apply software patches
- Stop guessing capacity

Type of Cloud Computing

- SaaS
- PaaS
- IaaS



Software as a Service (SaaS):

(For Customers) i.e: Google Docs, Office 365, Gmail, Hotmail



Platform as Service (PaaS):

(For Developers)
i.e: Google App Engine



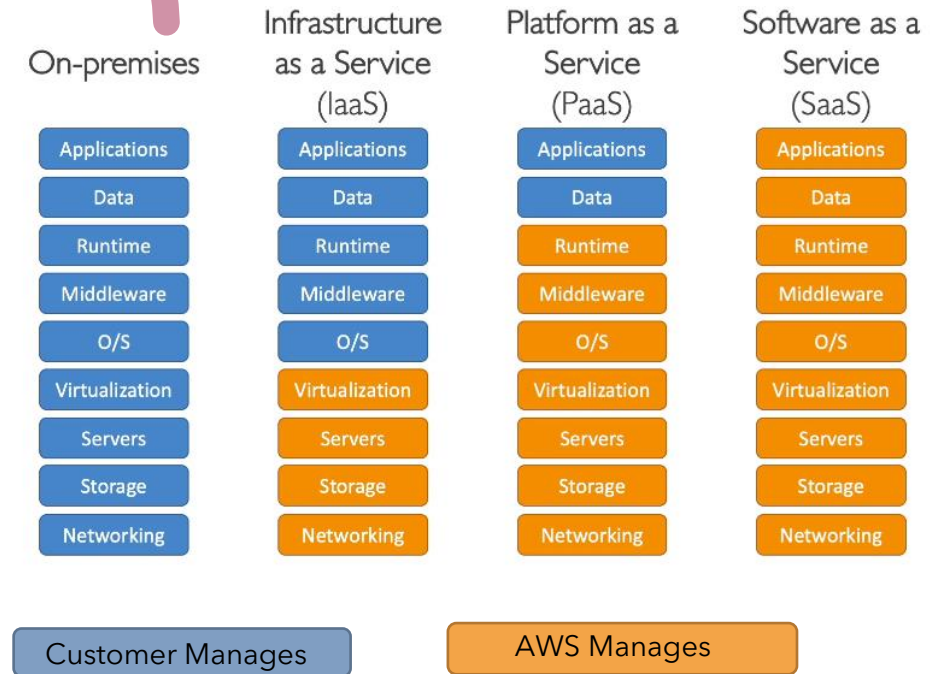
Infrastructure as a Service (IaaS):

(For Admins)
i.e: AWS, MS Azure, Google Cloud


Don't worry about IT Staff, data centers and hardware

Cloud Computing Types

- Responsibilities by the Cloud Computing type.



Cloud Computing Models

- **Public Cloud**
 - Services are shared among different customers.
 - AWS/Azure/Google
 - Type of Cloud "IaaS"
 - **Private Cloud**
 - Not shared with any organization
 - Only used for your own organization
 - Your company Datacenter, on-premises
 - Disaster Recovery location
 - **Hybrid Cloud**
 - Using both on-premise and Cloud
 - **Multi-Cloud**
 - Public, private, app vendor cloud
 - Organization uses all sorts of Cloud
- 

Public Cloud Providers

Three Major Cloud Providers:

1. Amazon Web Services (AWS)

- Provides all 3 Cloud Types

2. Microsoft Azure Cloud

3. Google Cloud



AWS Global Infrastructure

Map overview

Regions

Availability Zones

Edge Locations

GovCloud Regions

AWS Global Infrastructure

<https://infrastructure.aws/>

- **Map Overview**
<https://infrastructure.aws/>
- <https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/using-regions-availability-zones.html>
- **Region:**
 - A geographic location where AWS Infrastructure is located.
 - AWS largest region is US-EAST (North Virginia), all services available and billing information.
 - 24 Regions Worldwide.
 - Consists of 2 or more Availability Zones (AZ).
 - 1 Region in Canada with 2 Azs, located in Montreal, QC, launched in 2016.
 - Region code example: **ca-central-1** is for Canada Region.
 - More Info: https://aws.amazon.com/about-aws/global-infrastructure/regions_az/
- **Availability Zone (AZ):**
 - One or more physical data centers isolated from each other inside the region.
 - Each regions has at least 2 Azs.
 - Azs are represented by a Region code, followed by a letter, eg: ca-central-1**a** and ca-central-1**b** (Aza in Canada)
 - 77 Availability Zones.
 - Location into which you launch resources, such as virtual servers, storage etc.
 - For High Availability purpose
 - <10ms latency between Azs

<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/using-regions-availability-zones.html>

https://aws.amazon.com/about-aws/global-infrastructure/regions_az/

US East (N. Virginia) us-east-1
US East (Ohio) us-east-2
US West (N. California) us-west-1
US West (Oregon) us-west-2

Africa (Cape Town) af-south-1

Asia Pacific (Hong Kong) ap-east-1
Asia Pacific (Mumbai) ap-south-1
Asia Pacific (Seoul) ap-northeast-2
Asia Pacific (Singapore) ap-southeast-1
Asia Pacific (Sydney) ap-southeast-2
Asia Pacific (Tokyo) ap-northeast-1

Canada (Central) ca-central-1

Europe (Frankfurt) eu-central-1
Europe (Ireland) eu-west-1
Europe (London) eu-west-2
Europe (Milan) eu-south-1
Europe (Paris) eu-west-3
Europe (Stockholm) eu-north-1

Middle East (Bahrain) me-south-1

South America (São Paulo) sa-east-1


AWS Global Infrastructure

(cont'd)

- **Edge Locations:**

- An Edge location is a datacenter owned by a trusted partner of AWS worldwide which has direct connection to the AWS network.
- Cache the application
- Low latency
- More info: <https://aws.amazon.com/cloudfront/faqs/>

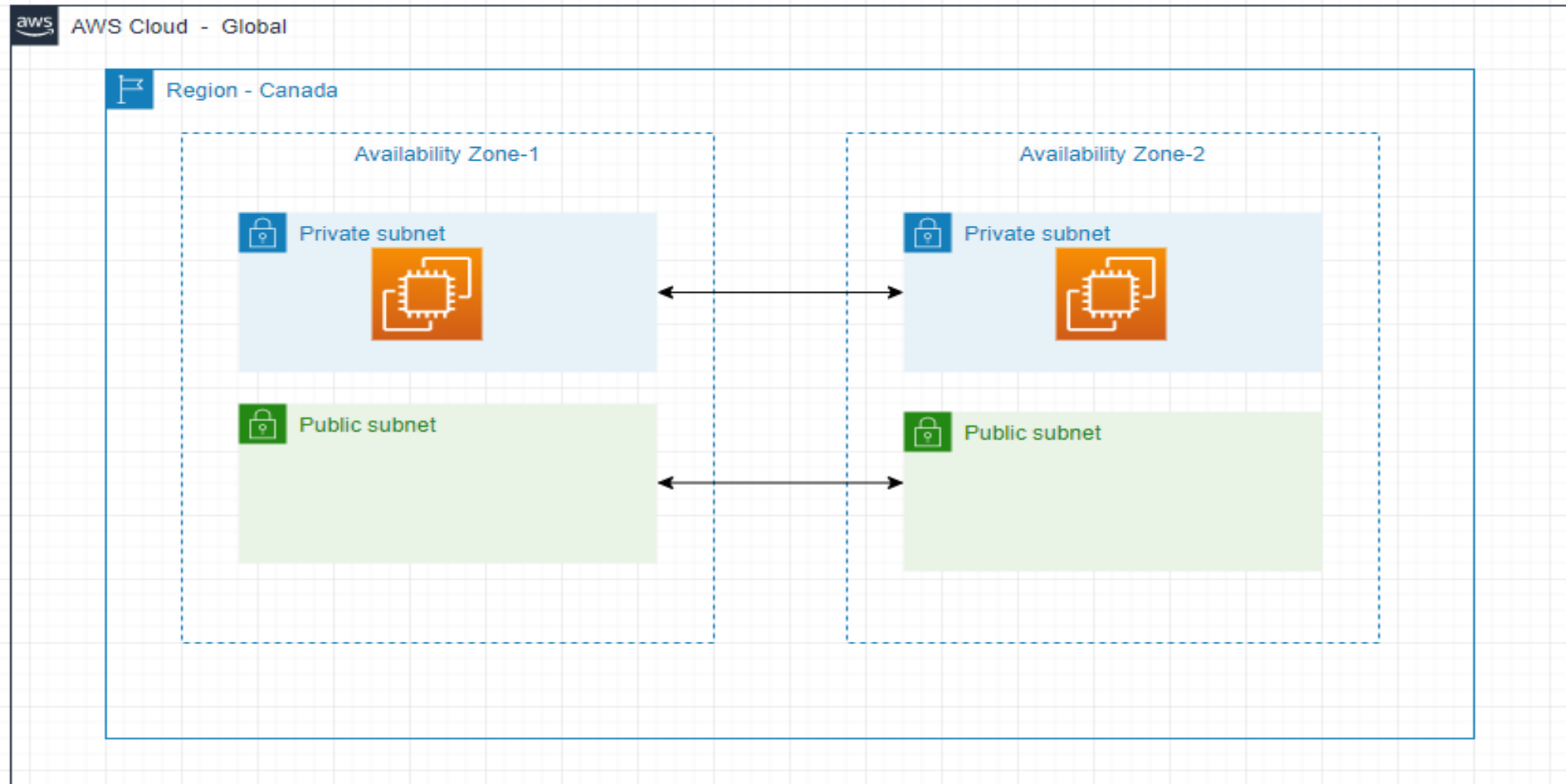
- **GovCloud(US)**

- Host Sensitive data and other types of regulated workloads.
 - Only accessible to US entities.
 - Only operated by employee who are US Citizen on US soil.
 - More info: <https://aws.amazon.com/govcloud-us/faqs/>
- 

Example of Region and Availability Zone

This example is the Region in Canada, there is only AWS Region with AZs.

Canada Region Name: ca-central-1



Your Subscription to Cloud Services

You've been using some Cloud services



Gmail

- E-mail cloud service
- Pay for **ONLY** your emails stored (no infrastructure, etc.)



Dropbox

- Cloud Storage Service
- Originally built on AWS

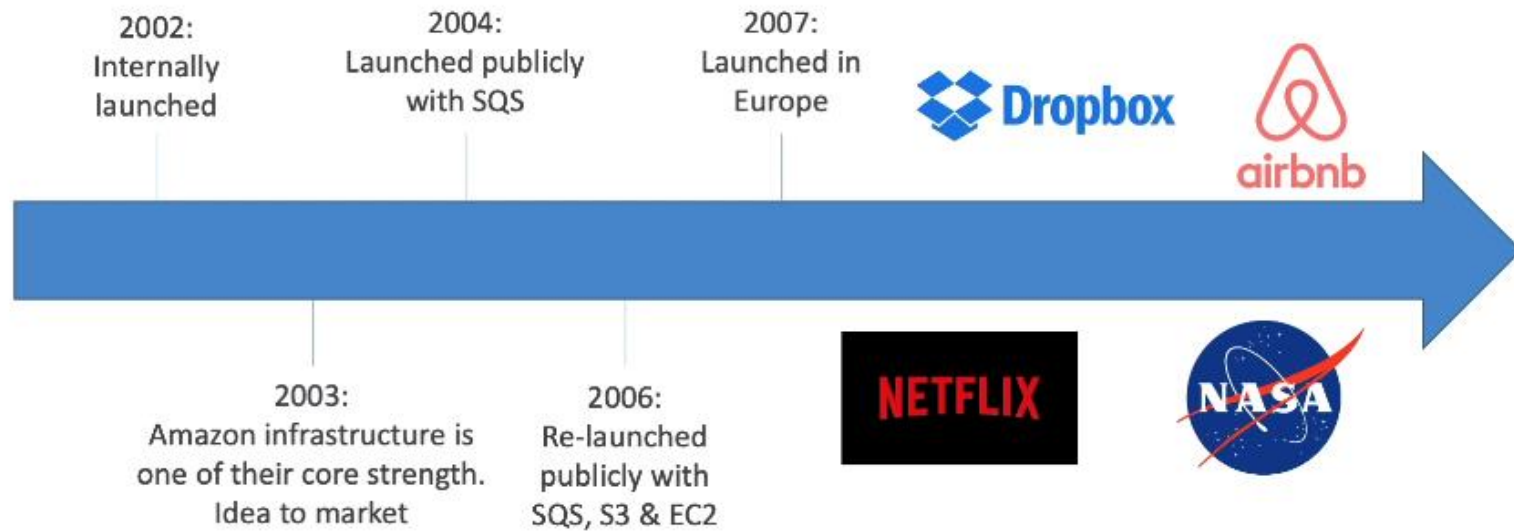


Netflix

- Built on AWS
- Video on Demand

AWS History

AWS Cloud History



Magic Quadrant for Cloud Infrastructure Worldwide

- <https://aws.amazon.com/blogs/aws/aws-named-as-a-leader-in-gartners-infrastructure-as-a-service-iaas-magic-quadrant-for-the-9th-consecutiveyear/>

AWS Cloud Practitioner Training

Week-2 (Amazon Web Services Cloud)

AWS Cloud Practitioner Course - CLF-C01

- AWS free Tier help or Questions
- AWS certification Info
- AWS Services
 - This course covers about 40 AWS services out of over 200.
- Working with the root User
- Identity Access and Management (IAM)
- Lab for IAM
- AWS Costs for Compute



AWS account and Root User

- **Creating an AWS Account - Free Tier**

- <https://aws.amazon.com/free/?all-free-tier.sort-by=item.additionalFields.SortRank&all-free-tier.sort-order=asc>

- **AWS Root User**

- Root User is your email address that you use to create your AWS account, created by default
- AWS recommends NOT to use root user for day to day use and enable 2nd layer security (MFA) for your root account.
- Create a new user with admin access for your day to day tasks.



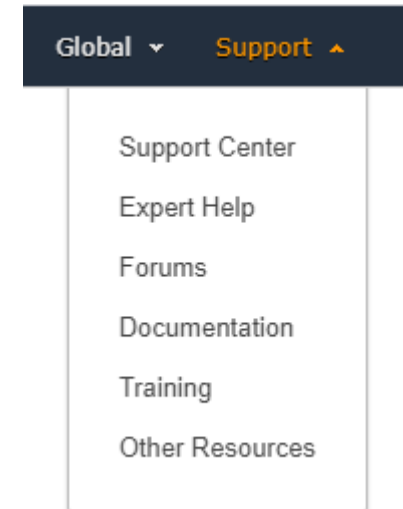
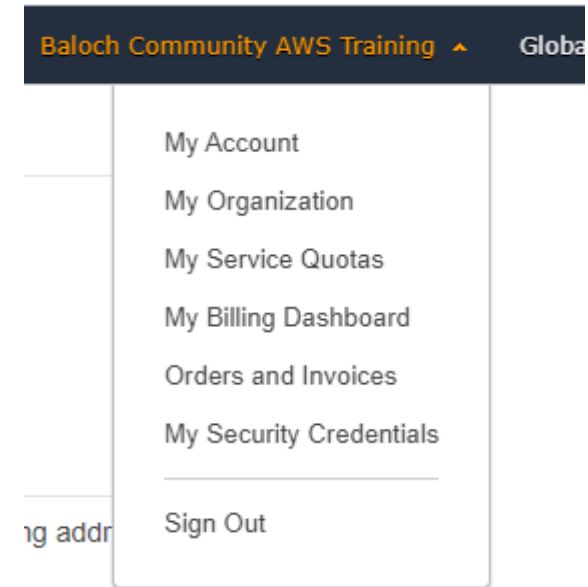
AWS Account & Support Info:

- **AWS Account**

- All information about your account
- Check the billing
- Close your account, etc

- **Support**

- Support Center to create support cases online
- Training Materials
- Documentation library for all AWS services
- Forums, etc



AWS Acceptable Use Policy

- No Security Violations
- No Illegal, Offensive Use or content
- This may come up in the exam

<https://aws.amazon.com/aup/>

AWS Certification

Professional

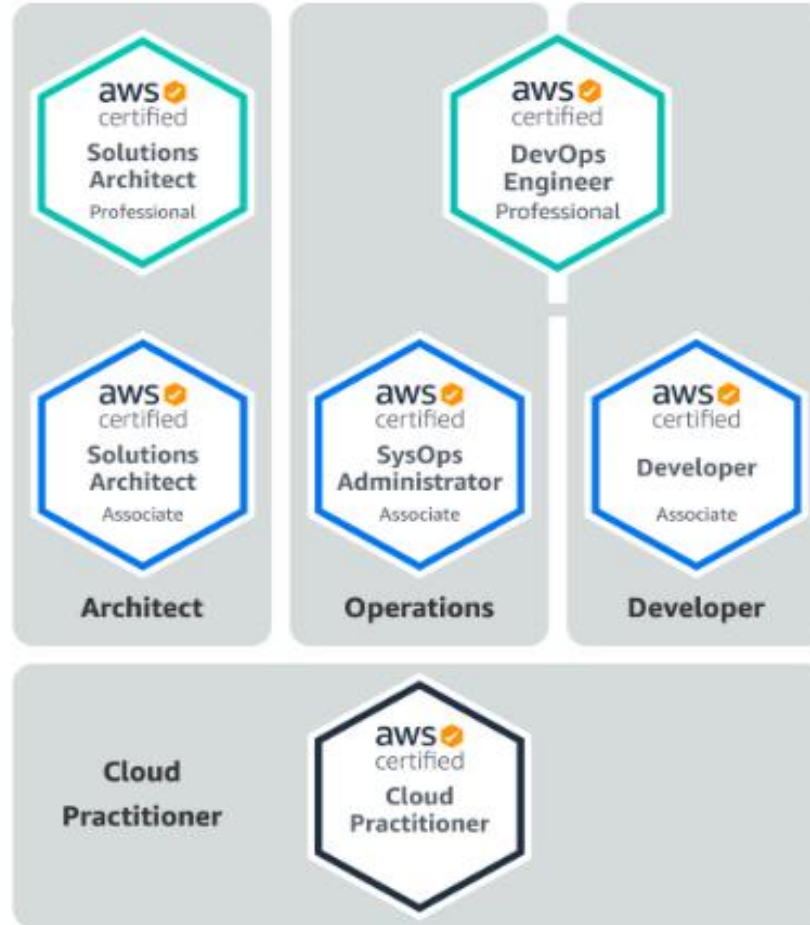
Two years of comprehensive experience designing, operating, and troubleshooting solutions using the AWS Cloud

Associate

One year of experience solving problems and implementing solutions using the AWS Cloud

Foundational

Six months of fundamental AWS Cloud and industry knowledge



Specialty

Technical AWS Cloud experience in the Specialty domain as specified in the exam guide



AWS Service Types

- **AWS Global Services**

- Identity and Access Management (IAM)
- Route 53 (DNS Service)
- CloudFront (Content Delivery Network)
- S3 Storage called S3 bucket

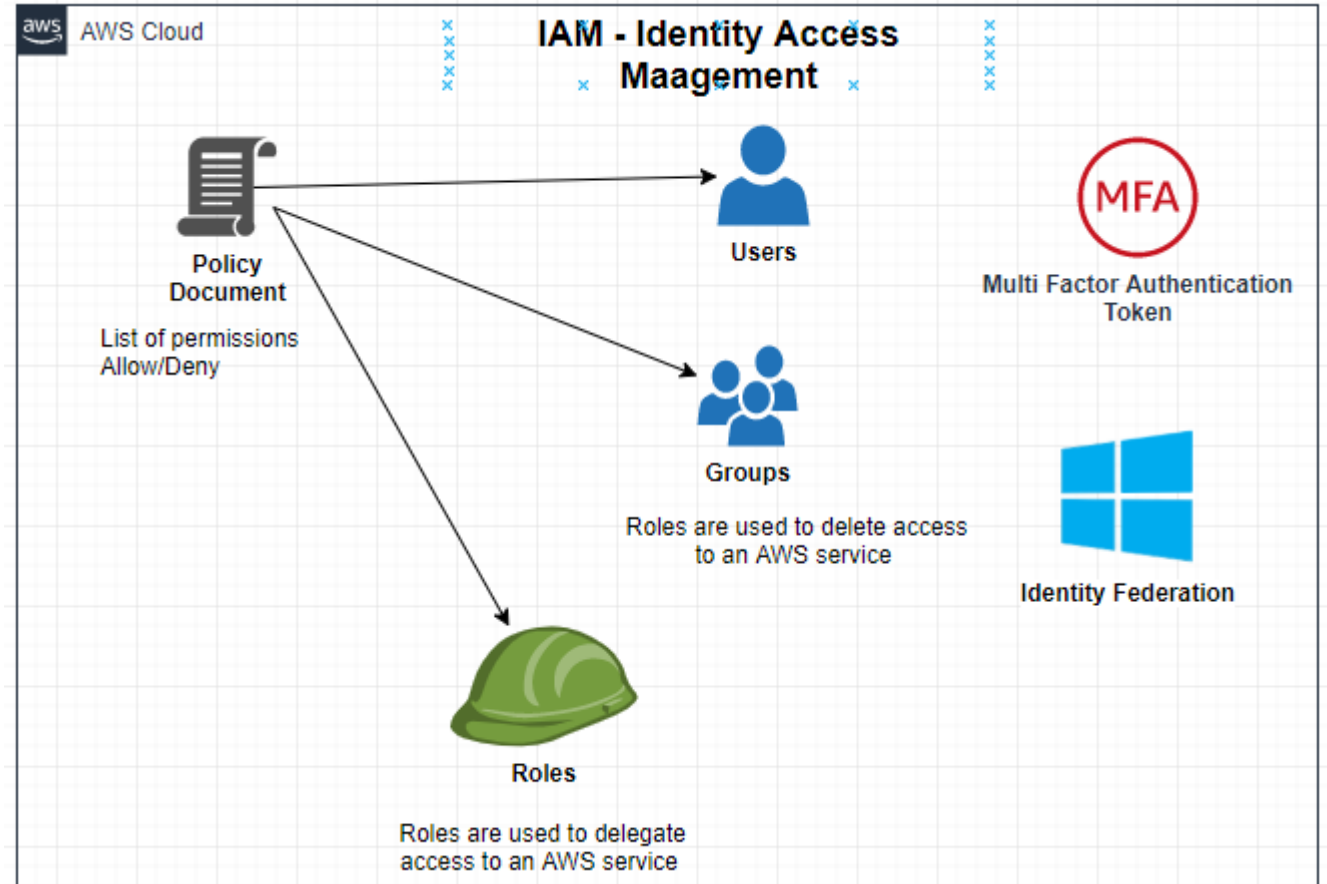
- **AWS Region-based Services**

- AWS EC2 (Compute)
- AWS Elastic Beanstalk: *(For deploying & scaling web apps developed with Java, Python, PHP, etc)*
- AWS Lambda: *(a serverless service automatically runs code without managing any servers)*
- AWS Rekognition: *(use to add images to your application)*
- Services availability by Region:

<https://aws.amazon.com/about-aws/global-infrastructure/regional-product-services/>

Identity Access and Management (IAM)

- IAM = Manage access to AWS Services and resources securely.
 - No additional cost using IAM
 - Using policy, groups and roles to allow/deny access to other users
- **User**
 - Represent a person
 - 5000 user per account
- **Groups**
 - Contains only users and have policies attached to them
- **Policy documents**
 - Define permissions for users, groups or roles.
 - Can be applied to users, groups or roles.
 - Written in JSON format (Java Script Object Notation)
- **MFA**
 - Multi Factor Authentication
 - Additional layer of Account Security
- **Roles** - used by AWS services to authentication
- **Identity Federation**
 - Single Sign-On to AWS Console (SSO) using Microsoft Active Directory (AD)
 - Integrate AD to authenticate to AWS



IAM Policy Example

- IAM Policy is based on Key and Value in **JSON** document.
- Policy define the permissions of users or services.
- You can create/generate custom policy using online **policy generator** <https://awspolicygen.s3.amazonaws.com/policygen.html>
- AWS has managed policies. You can use the AWS managed policy.

Following custom policy will allow a user to Stop/Start an EC2 instance.

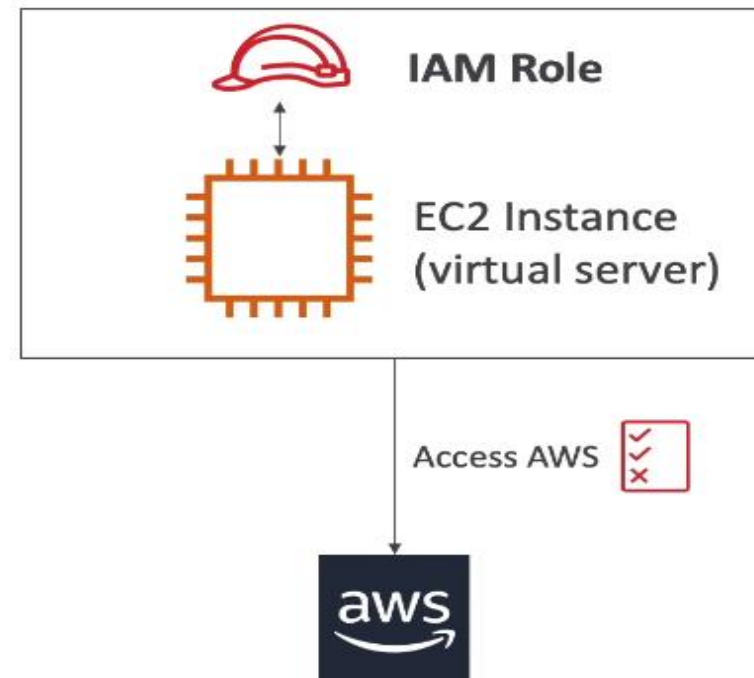
```
{
  "Version": "2012-10-17",
  "Statement": [{
    "Effect": "Allow",
    "Action": [
      "ec2:StartInstances",
      "ec2:StopInstances"
    ],
    "Resource": "*"
  }
]
```

IAM Roles

- IAM Roles are used to grant permission to an AWS Service such to EC2, S3, Lambda etc.

IAM Roles for Services

- Some AWS service will need to perform actions on your behalf
- To do so, we will assign permissions to AWS services with IAM Roles
- Common roles:
 - EC2 Instance Roles
 - Lambda Function Roles
 - Roles for CloudFormation



Hands on - IAM

- **Change IAM Users Sign-in Link**

- Change URL to a friendly name

https://docs.aws.amazon.com/IAM/latest/UserGuide/console_account-alias.html#CreateAccountAlias

- Lab Exercise - IAM

- **Activate MFA** (Multi-Factor Authentication) on Root Account.

- Additional Security for your root account
- Need **Google Authenticator** or **Authy** app on your phone.
- Lab Exercise

- **Create IAM Users, Groups and Roles**

- Lab Exercise

- **Set Password Policy**

- Strong password
- Lab Exercise

https://docs.aws.amazon.com/IAM/latest/UserGuide/id_credentials_passwords_account-policy.html#IAMPasswordPolicy

- **Security Tool**

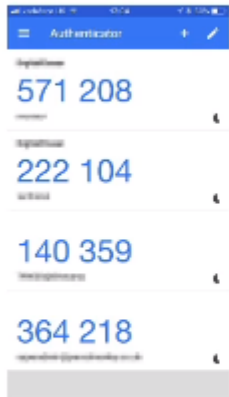
- Credential Report

https://docs.aws.amazon.com/IAM/latest/UserGuide/id_credentials_getting-report.html#getting-credential-reports-console

Multi Factor Authentication (MFA)

Additional Security for your account
Need Google authenticator app on your phone

Virtual MFA device



Google Authenticator
(phone only)



Authy
(multi-device)

Multi Factor Authentication - MFA



- Users have access to your account and can possibly change configurations or delete resources in your AWS account
- You want to protect your Root Accounts and IAM users
- MFA = password *you know* + security device *you own*



Alice

Password

+



=>

Successful login

- Main benefit of MFA:
if a password is stolen or hacked, the account is not compromised

Shared Responsibility Model for IAM

Shared Responsibility Model for IAM



- Infrastructure (global network security)
- Configuration and vulnerability analysis
- Compliance validation




You

- Users, Groups, Roles, Policies management and monitoring
- Enable MFA on all accounts
- Rotate all your keys often
- Use IAM tools to apply appropriate permissions

AWS Best Practices

Exam Related

- Don't use the root account for day to day tasks
 - Create groups, assign policy to groups and add users to groups
 - Enable MFA for additional layer of root user security
 - Create strong password for users
 - Use Roles to assign permission to AWS Services
 - Audit permission of user accounts with IAM Credential Report
 - Grant least access to AWS resources
 - Rotate credential regularly
 - Remove un-necessary credential
- 

Identity and Access Management (IAM)

Hand-on Lab

Free IAM Lab by QWIKLABS:

All steps are provided with the lab.

1. Launch <https://www.qwiklabs.com/focuses/10408?parent=catalog>
2. Click **Join**
3. Login with google account or create account.
4. Click **Start Lab** (this will create a temporary AWS account and provision the lab to practice for 45 minutes)

Question-1

What is an availability zone composed of?

- a) A collection of edge locations
- b) A collection of VPCs
- c) One or more datacenter in a location
- d) One or more regions

Question-2

- What is pricing model of cloud computing?
 - Discounts overt time
 - Pay-as-you-go-pricing
 - Pay once a year

Question-3

- Which of the following is the an IAM Security Tool?
 - IAM Credential report
 - IAM Root Account Manager
 - IAM Service Report

Question-4

- What is the definition of IAM Roles?
 - Permission assigned to users to perform actions
 - Defines a set of permissions for AWS services
 - A Password policy

Question-5

- **Which answer is INCORRECT regarding IAM Users?**

- IAM Users can belong to multiple IAM groups
- IAM users can have policies assigned to them
- IAM users access AWS with the root account credentials
- IAM users don't have to belong to an IAM group

Question-5

- **What are IAM Policies?**

- AWS rules to set up a password for IAM users
- JSON documents to define users, groups or roles permissions
- Use for AWS services permission only

Question-6

- **What should you do to increase your root account security?**
 - Enable MFA
 - Remove permission from the root account
 - Use root account for day to day tasks

AWS Costs for Compute

- **On-Demand Instances**

- Used for compute and database capacity
- You will be charged based on Pay-as-you-go
- No long-term commitment.
- Back-end hardware is shared with multiple customers
- On-demand is the best option when you need the most flexibility.
- There are no long-term commitments or upfront payments.

- **Dedicated Instance**

- Back-end hardware is dedicated to a single customer
- Some customer has security/compliance reason to use to this type instance
- It is costly

- **Spot Instances**

- These can be purchased with no commitment
- Great discount from hourly rates

- **Reserved Instances**

- Up to 75% discount with a commitment
- Options are 1 year or 3 years commitment (lease)
- Options to pay
 - No upfront
 - Partial upfront
 - All upfront

AWS Billing Alarm

- Allow you to receive billing alerts via email or text message.
- Lab Exercise
 - Billing Preferences
 - Budgets
 - Setup Alarms
 - https://docs.aws.amazon.com/AmazonCloudWatch/latest/monitoring/gs_monit_or_estimated_charges_with_cloudwatch.html

AWS Pricing

<https://aws.amazon.com/pricing/>

- Compute

- Amazon EC2
- Amazon RDS
- Amazon ECS
- Amazon EMR
- Amazon Lambda

- On-demand is the best option when you need the most flexibility. There are no long-term commitments or upfront payments.

- Storage

- Amazon S3
- Amazon S3 Glacier
- Amazon EFS
- Amazon EBZ

- Outbound Data Charge:

- Any data that's coming out of AWS network, you will get charge for it.
- Moving data from Aws storage to your on-premises network or to your Computer
- You have website running on EC2 server , you are accessing via internet, that's Outbound data.
- Any data that you migrate from your network to AWS is free.
- You move data from one AZ to another AZ within is free

Exam Topics

- **AWS Region**

- An AWS region is a geographical area
- Each region consists of 2 or more availability zones
- Every Region is completely isolated from the other AWS Regions Worldwide
- Canadian region is called: **ca-central-1** located in Montreal.

- **Availability Zones**

- Azs are locations into which you launch resources such Amazon EC2, Database, etc.
- Azs are designed for high availability (HA), if there is a power outage or some failure in one AZ, it does not impact the other AZ.
- Azs are physically separated from each other, but they are in same region and they have network connection between each other.
- Azs in a region are within 100KM of each other.
- 3 Azs in Canada
 - AZ1 is called: ca-central-1a
 - AZ2 is called: ca-central-1b
 - AZ3 is called: ca-central-1c

Question 3

- What are the three fundamentals of AWS pricing?
 - a) compute, storage and inbound data transfer
 - b) Compute, database and internet connectivity
 - c) Compute, storage and outbound data transfer

Question 4

- What is an AWS Region? (Choose two)
 - Composed of two or more availability zones
 - Composed of at least one Availability Zone
 - A geographical location in a country
 - Collection of Amazon EC2 instances

Practice Question-1

- The use of what AWS feature or service allows companies to track and categorize spending on a detailed level?
 - A. Cost allocation tags
 - B. Consolidated billing
 - C. AWS Budgets
 - D. AWS Marketplace

Practice Question-2

- Which service stores objects, provides real-time access to those objects, and offers versioning and lifecycle capabilities?
- A. Amazon Glacier
- B. AWS Storage Gateway
- C. Amazon S3
- D. Amazon EBS

Practice Question-3

- Distributing workloads across multiple Availability Zones supports which cloud architecture design principle?
 - A. Implement automation.
 - B. Design for agility.
 - C. Design for failure.
 - D. Implement elasticity.

Useful Links

- Free AWS Certification Resources

<https://digitalcloud.training/amazon-aws-free-certification-training-cloud-practitioner/>

- AWS FAQs:

<https://aws.amazon.com/faqs/>

- Lab

- https://amazon.qwiklabs.com/users/sign_up

AWS Security Access

- Security Group
- NACL - Network Access Control List