Module 1- AWS Cloud

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Instructor

- 5x AWS Certified
- (AWS Certified Solution Architect Professional)
- Worked with MNCs, Startups, Mid-size
- Published Over 10+ Research Papers
- Corporate Trainer

Course Plan

- Prepare for Market
- Q/A
- Interview Based Prep
- AWS certification POV
- Will give practical based scenarios

Module 1: AWS Cloud (32 Hours + 8 Hours Q&A)

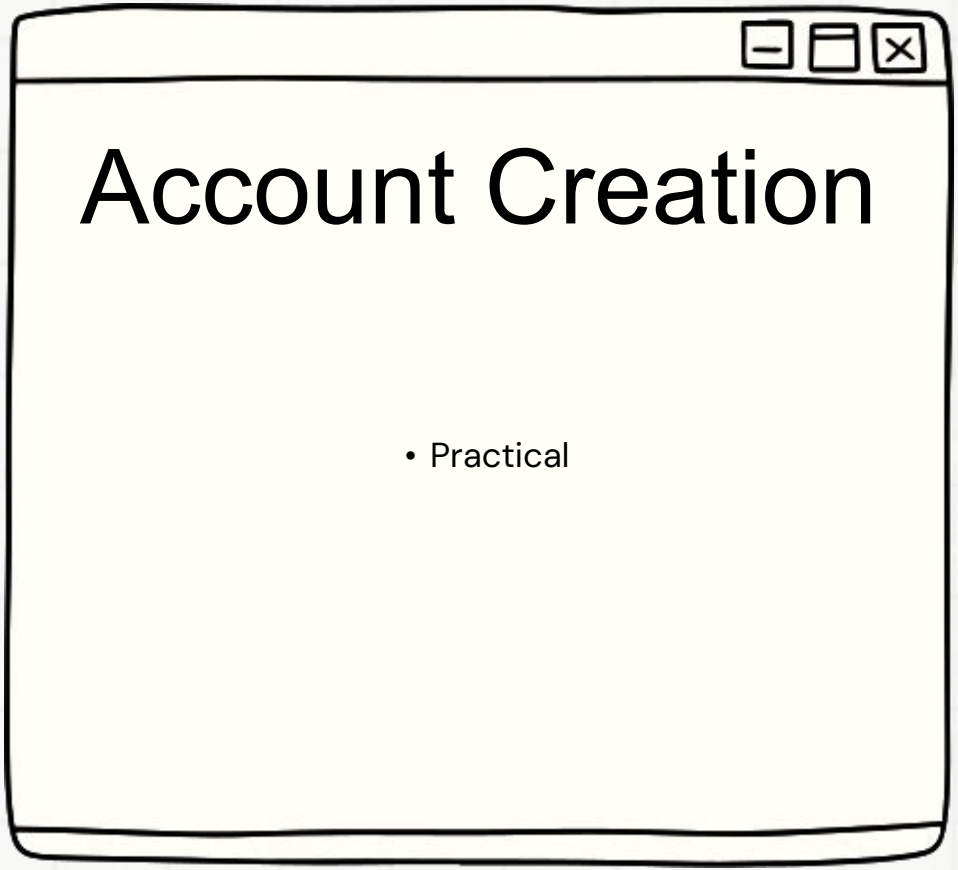
1. Understanding of Physical and Virtual Servers
2. Overview of Public/Private Cloud Computing
3. Overview of AWS/Azure/GCP
4. Benefits of Cloud Computing
5. Pricing and Usage Policy
6. IAM - Identity and Access Management Service
7. Elastic Compute and Storage Volumes
8. Load Balancing, Autoscaling and DNS
9. Virtual Private Cloud
10. Storage – Simple Storage Service (S3)
11. RDS - Databases and In-Memory Data Stores
12. Resource Management and Monitoring Services
13. Automation and Configuration management
14. AWS Cloud Migration Services
15. Elastic IP, CloudFront and ELB
16. Container Services - ECS, ECR, EKS

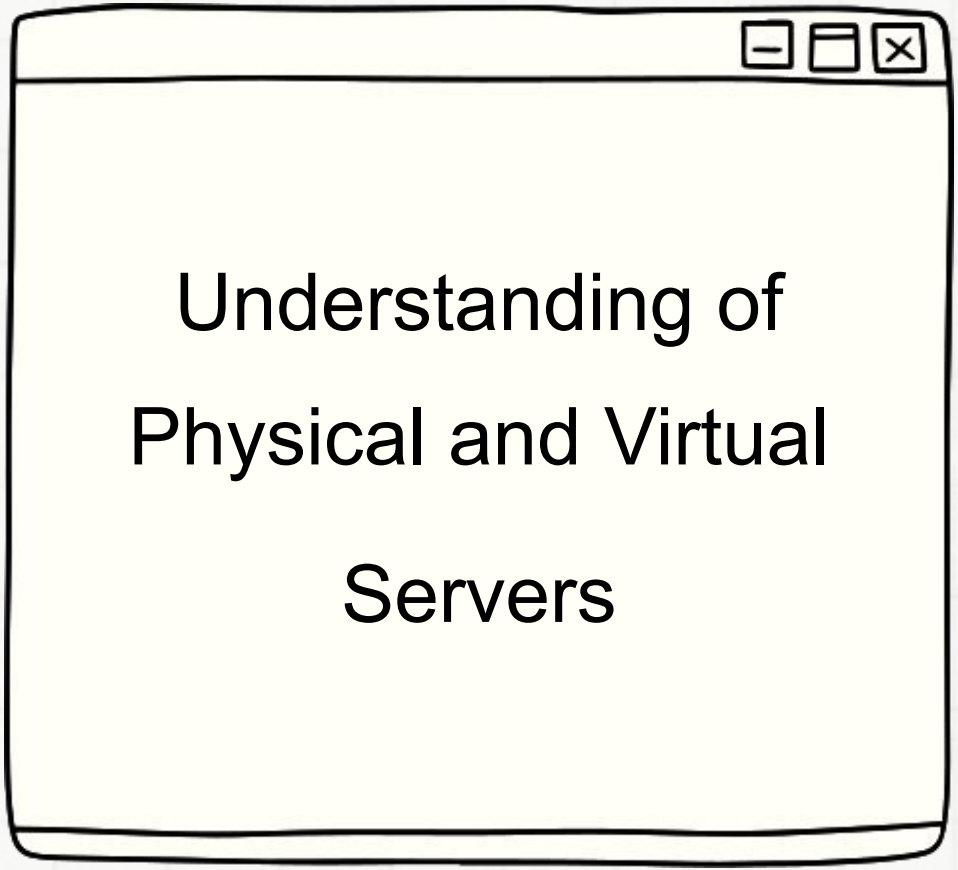
Module 1 Practical's

- AWS Free Tier Account Creation
- IAM User Creation
- EC2 Instance Creation
- Security Group Configuration
- Creation of database using RDS
- Connecting EC2 Instance
- Connecting database
- Creation of S3 storage

Account Creation

- 12 months free – Limited
- Will cost if used excessively


Account Creation
• Practical


Understanding of
Physical and Virtual
Servers


aws

What is Server?

- Normal computer or device who hosts website can be considered server.
- Including data centers, offices

Problems in Traditional

- **Cost of physical assets**
- **Requirement of power supply, place, cooling, maintenance**
- **Manpower needed**
- 24*7 monitoring
- **Rent of office, data centers**
- **Issue in scaling**
- **Disaster issues**

Rise of Cloud Computing

- **On demand delivery**
- **Pay as u go**
- **Choose your preference of machine**
- Instant
- **Go global**
- **One click**

Some services you already use

- **Gmail**
- **Hotstar**
- **Netflix**
- Dropbox

Types of Cloud

Public

That is available for everyone.

AWS, AZURE, GCP

Private

- Not exposed to everyone
- Complete control in ur hand
- Security specific

Hybrid

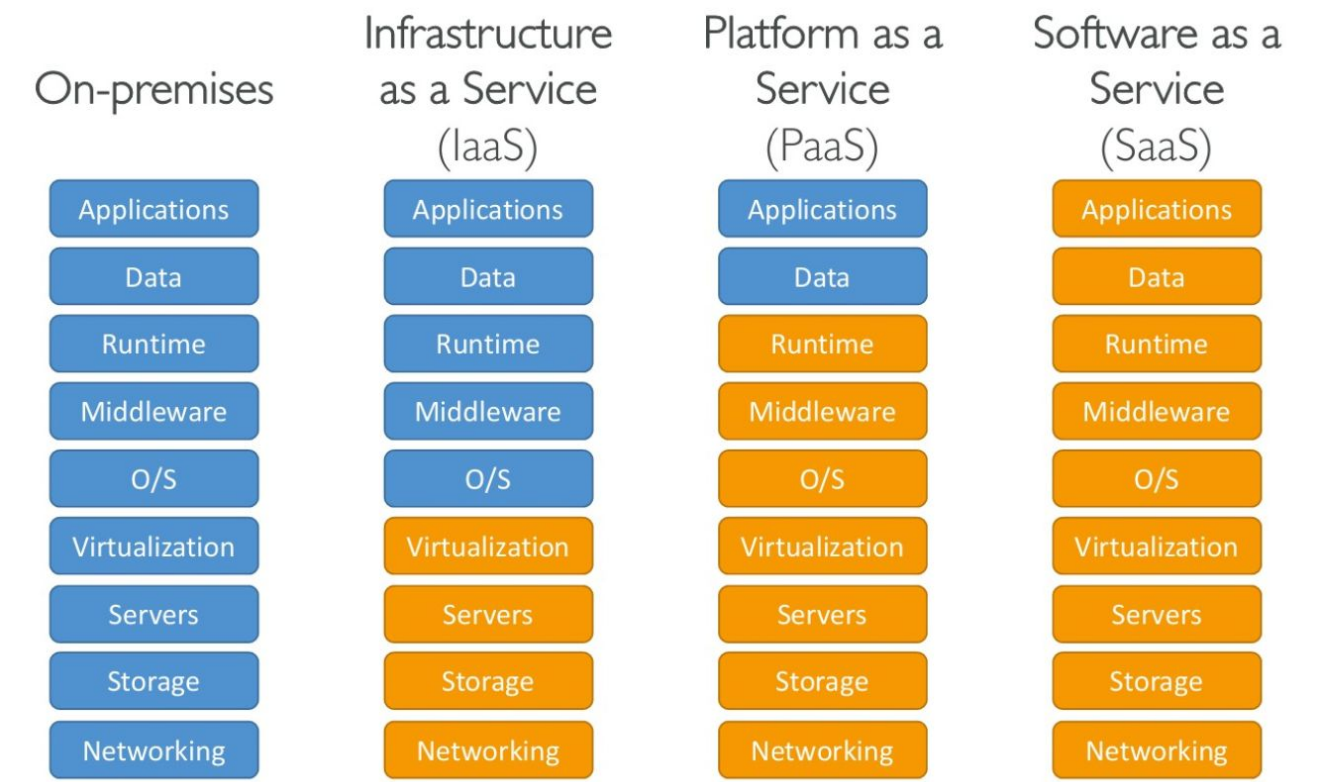
Public + Private

- Sensitive info in private

Need/Benefits of Cloud

- **Flexibility**
- **Scalability**
- **Cost Effective**
- Elasticity
- **High Availability**

Cloud Computing Model



Examples of Each

- IaaS
  - EC2
- PaaS
  - Elastic Beanstalk
- SaaS
  - DropBox, Gmail

Aws Global Infra

- AWS Regions
- AWS AZ
- AWS Data Centers
- Edge Locations

AWS Region

- What are these
- How to select region

AWS AZ

- What are AZ

AWS DC

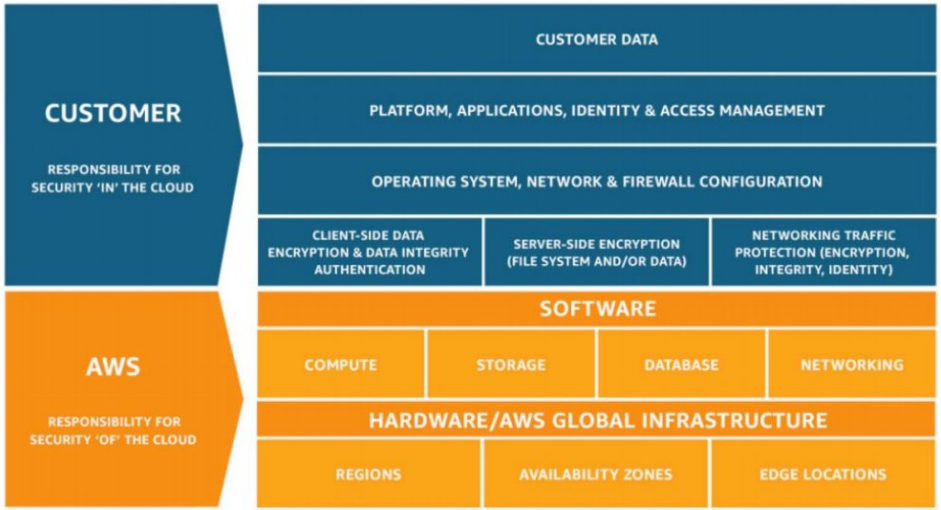
-

Shared Responsibility Model

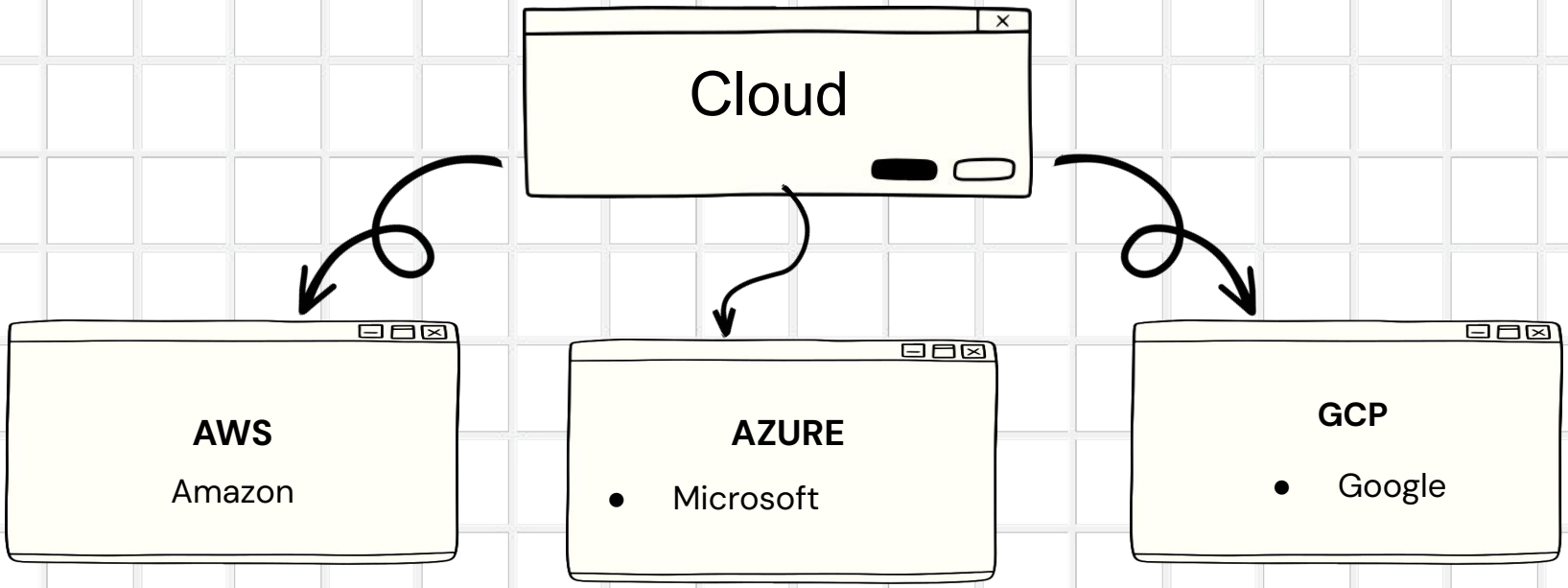
Shared Responsibility Model diagram

CUSTOMER = RESPONSIBILITY FOR THE SECURITY **IN** THE CLOUD

AWS = RESPONSIBILITY FOR THE SECURITY **OF** THE CLOUD



AWS vs Azure vs GCP



AWS vs Azure vs GCP

- https://cloud.google.com/docs/get-started/aws-azure-gcp-service-comparison
- In 2019, AWS – 35$ BILLION revenue
- 47% aws, 22%azure

Pricing

- On aws account
- Cost calculator
- Billing
- budgets
-

Regional vs Global service

- Global –
  - IAM
  - Organisations
  - Route 53
  - ACM
  - Cloudfront

IAM

- Identity and Access Management

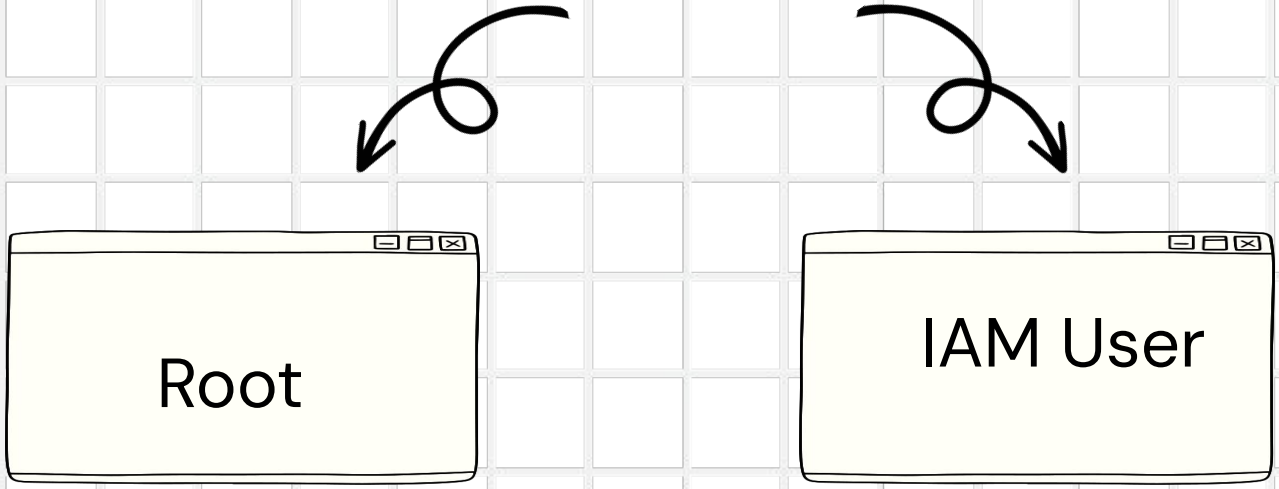
What is IAM

- •Fine-grained control of who can do what
- Eg -user Bob can launch server

IAM Characteristics

- free
- centralized AWS service
- default scope is AWS account
- deny by default

IAM Users



Root User

- Root User
  - the identity used to create AWS account
  - complete access

- Best practices
  - don’t use this account for the everyday
  - setup physical MFA and lock it away
  - don’t use your Amazon.com shopping account

IAM User

- IAM Users
  - an identity with assigned permissions
  - can have username/password access to AWS console
  - can have (secret) key-based access to AWS APIs

- Best Practices
  - rotate credentials (keys, passwords)
  - MFA
  - password policy

IAM Groups

- collection of IAM users
- operates like you'd think
- Best practices
  - manage permissions with groups
  - i.e., assign policies to groups instead of users

IAM Policies

- set of permissions to be granted or denied
- JSON documents
- can be assigned directly to IAM users

```
{
  "Version": "2012-10-17",
  "Statement": [ {
    "Effect": "Allow",
    "Action": "s3:ListAllMyBuckets",
    "Resource": "arn:aws:s3:::*"
  }, {
    "Effect": "Allow",
    "Action": [
      "s3:ListBucket",
      "s3:GetBucketLocation"],
    "Resource":
     "arn:aws:s3:::EXAMPLE-BUCKET-NAME"
  }, {
    "Effect": "Allow",
    "Action": [
      "s3:PutObject",
      "s3:GetObject",
      "s3:DeleteObject" ],
    "Resource":
      "arn:aws:s3:::EXAMPLE-BUCKET-NAME/*"
  } ] }
```

IAM Role

- a 2nd type of AWS identity
  - also has assigned permissions
  - similar to IAM users
- designed to be temporarily assumed
  - e.g. by an EC2 instance
- no associated credentials
- Instance Profiles
  - assigned to EC2 instance
  - container for one or more IAM roles

Best Practice

- **Users** – Create individual users.
- **Permissions** – Grant least privilege.
- **Groups** – Manage permissions with groups.
- **Conditions** – Restrict privileged access further with conditions.
- **Password** – Configure a strong password policy.
- **Rotate** – Rotate security credentials regularly.
- **MFA** – Enable MFA for privileged users.
- **Roles** – Use IAM roles for Amazon EC2 instances.
- **Root** – Reduce or remove use of root.

EC2

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud.

Access reliable, scalable infrastructure on demand. Scale capacity within minutes with SLA commitment of 99.99% availability.

Benefits of EC2

* **Scalability:** Easily **scale up or down** resources based on demand.

* **Flexibility:** Choose from various **instance types** optimized for different workloads (compute, memory, GPU).

* **Cost-effectiveness: Pay-as-you-go** pricing model for only the resources you use.

* **Global Availability:** Available in multiple **AWS regions** worldwide.

Different types of EC2

https://aws.amazon.com/ec2/instance-types/

Size n Conf of EC2

- OS
- CPU
- RAM
- Space
- Network Card
- Firewall

Use Cases of EC2

* Hosting websites and applications.
* Running batch jobs.
* Building and deploying cloud-native applications.
* Setting up development, testing, and staging environments.

Key Pair

- AWS uses public-key cryptography to encrypt and decrypt login information.
- AWS only stores the public key, and the user stores the private key.

Generate Key Pair

1. Open the Amazon EC2 console at http://console.aws.amazon.com/ec2/
2. On the navigation bar select region for the key pair
3. Click **Key Pairs** in the navigation pane to display the list of key pairs associated with the account
4. Click **Create Key Pair**
5. Enter a name for the key pair in the **Key Pair Name** field of the dialog box and click **Create**
6. The private key file, with .pem extension, will automatically be downloaded by the browser.

Steps of creating EC2

Step 1: Sign up for Amazon EC2

Step 2: Create a key pair

Step 3: Launch an Amazon EC2 instance

Step 4: Connect to the instance

Step 5: Customize the instance

Step 6: Terminate instance and delete the volume created

Connecting to EC2

- There are several ways to connect to an EC2 instance once it’s launched.
- **Remote Desktop Connection** is the standard way to connect to Windows instances.
- An **SSH client** (standalone or web-based) is used to connect to Linux instances.

Intro to SG

A security group in the context of Amazon EC2 is essentially a virtual firewall that controls the traffic for one or more instances.

It acts as a virtual firewall for your EC2 instances to control incoming and outgoing traffic.

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Key Points – SG

1. Traffic Control
2. Stateful
3. Flexible rule
4. Layer of Defense
5. Only allowed rules

EC2 Purchasing Option

1. On-Demand
2. Reserved
3. Spot
4. Dedicated

EC2 Purchasing Option

- On-Demand

EC2 Purchasing Option

- Reserved

EC2 Purchasing Option

- spot

EC2 Purchasing Option

- dedicated