Amazon Web Services

AWS Cloud Computing Overview

Learning Objective

- **Understanding of Cloud Computing and AWS Overview.**

Topics Covered

- What is Cloud Computing
- History & a comparison with Client Server computing
- Advantages of Cloud Computing
- Why AWS is different from other vendors.
- Future of Cloud
- Service Model of Cloud
  - IAAS
  - PAAS
  - SAAS
- Deployment Model of Cloud
  - Private
  - Public
  - Hybrid
- Parts of Cloud
  - Frontend
  - Backend
- AWS Fundamentals
- AWS Certifications
- AWS Regions and Services
- AWS Domain and Services
- Accessing AWS
  - Management Console
  - AWS CLI
  - AWS SDK

AWS Architect Design

Learning Objective

- **Introduction to AWS Solution Architect**
- **Planning and Designing Cloud Services**
- **Designing Highly Available, Scalable, Cost-efficient Systems**
- **Important Cost planning and Optimization techniques a Solutions Architect should consider**
- **Knowing and adopting Best Practices for AWS Security and Costing**
- **Monitoring and Logging in AWS**

AWS Elastic Compute Cloud in Compute Domain

Learning Objective

- **Understanding EC2 compute service of AWS and Launch Instance and types with Volumes, and Images.**
- **Mastering Elastic Compute Cloud**
- **Mastering Amazon Machine Image**
- **Mastering EC2 Pricing**
- **Mastering Instance types**

Topics Covered:

- Launching EC2 Instance and Connect
  - Windows Instance
  - Linux Instance
- EC2 Types
  - General Purpose
  - Compute Optimise
  - Memory Optimise
  - Storage Optimise
  - GPU Optimise
- EC2 Instance Pricing Options

- On-Demand
- Scheduled
- Spot
- Reserved
- Shared
- Dedicated Instance
- Dedicated Host
- Capacity Reservation
- Saving Planes

- Types of AMIs to Launch EC2 Instance
  - AWS Published
  - AWS Marketplace
  - Creating from existing Instance
  - Upload Virtual Services
- AWS Service Limits and Support Plans
- Summary of EC2 Services
- Exam Essentials

Hand-on Lab:

- Launch EC2 Instance (Windows) with Standard SSD Storage, Connect to Windows Instance with Remote Desktop Protocol, and make Web Server.
- Launch EC2 Instance (Linux) with Standard SSD Storage, Connect to Linux instance with Secure Shell via Putty software and make Web Server.
- Create Custom AMI using existing Windows Instance to Launch a new Preconfigured Windows Web Server.
- Create Custom AMI using existing Linux Instance to Launch a new Preconfigured Linux Web Server.

AWS Storage Service (Block Storage)

Learning Objective

- **Understanding Cloud Storage**

- **Advantages of Cloud Storage**
- **Mastering AWS Cloud Storage**
- **Mastering EBS Volumes**
  - **Data Volumes**
  - **Root Volumes**
- **Mastering EBS Volumes Snapshots**
- **Mastering RAID Concepts**

Topics Covered

- Understanding Cloud Storage
- Advantages of Cloud Storage
- Understanding Terminologies of Cloud Storage
  - Physical Hard Disk
  - Virtual Hard Disk
  - Volume
  - HDD/SSD
  - IOPS
  - Disk I/O
  - Storage Memory in GiB, MiB, KiB
- AWS Elastic Block Store
- EBS Volumes and Types
- EBS Snapshots
- AMIs using EBS Snapshots
- EBS Snapshot LifeCycle Manager
- Summary of Cloud and EBS Storage
- Exam Essentials

Hands-On

- Launch Windows EC2 Instance with Root EBS Volume (Default Size), and later Increase the size of EBS Volume (10GiB)
- Launch Linux EC2 Instance with Root EBS Volume (Default Size), and later increase the size of EBS Volume (5GiB)
- Create and Attach new EBS Data Volumes to Windows and Linux EC2 Instances for External Storage.
- Implement RAID Configuration in Windows for Data and Application Backup using Disk Management.

AWS Storage Services (File and Object)

Learning Objective

- **Understanding File storage using NFS**
- **Understanding Object Storage**
- **Mastering File Storage with Elastic File System**
- **Mastering Object storage with Simple Storage Services**
- **Creating and Managing S3 Buckets**
- **Mastering S3 Bucket Permissions**
- **Mastering S3 Bucket Features**
- **Build a static website using S3**
- **Mastering Storage Classes**
- **Mastering Bucket Management**
- **Mastering S3 Glacier**

Topics Covered

- AWS File Storage using Elastic File System
- Create and Mount File Share in EFS
- Object vs Block vs File Storage
- AWS Simple Storage Service (S3)
- S3 Basics and Benefits
- S3 Pricing
- S3 Bucket Permissions
  - Block Public Settings
  - ACL
  - Policy
  - CORS
- S3 Bucket Features
  - Versioning
  - Server and Object access Logging
  - Static Web Hosting
  - Object lock and Tags
  - Event and Encryption
- S3 Storage Classes
  - Standard

        - ❏ Standard-IA
        - ❏ One-Zone IA
        - ❏ Reduced Redundancy
    - ❏ S3 Bucket Management
        - ❏ LifeCycle Policy
        - ❏ Replication
        - ❏ Metrics
        - ❏ Analytics
    - ❏ S3 Glacier and Vault
    - ❏ Summary and Exam Essentials

Hands-On

- ❏ Create EFS file Share and mount in 2 Linux EC2 instances.
- ❏ Create your own S3 Bucket and use of Bucket Policies and Control List to Public Access
- ❏ Create your own Static Website
- ❏ Create Bucket enable Versioning and Server access Logging.
- ❏ Create Bucket with Lifecycle Policies and Cross Region Replication

AWS Virtual Private Cloud

Learning Objective

- ❖ **Create your own Private Cloud and manage infrastructure in the cloud.**
- ❖ **Mastering Network Basics**
    - ➢ **IP addressing**
    - ➢ **LAN and WAN**
    - ➢ **Subnetting**
    - ➢ **Devices**
    - ➢ **Ping**
    - ➢ **Tracert**
- ❖ **Designing a Local Area Network**
- ❖ **Mastering LAN concepts**
- ❖ **Understanding Networking in AWS Cloud**
- ❖ **Mastering Virtual Private Cloud**
- ❖ **Designing a secure Private Network in AWS cloud**
    - ➢ **Security Group**

- ➢ **Network Access Control List**

- ❖ **Connecting two different regions**
- ❖ **Implement NAT for Private Networks**
- ❖ **Implement VPN for On-premises**
- ❖ **Troubleshooting Network Problems**

Topics Covered

- ❏ Virtual Private Cloud Basics
- ❏ Subnets
- ❏ Route Tables
- ❏ Internet Gateway
- ❏ Security Groups and Network ACLs
- ❏ Nat Instance and Nat Gateways
- ❏ EIP and E-NICs
- ❏ Virtual Private Gateway,
- ❏ Customer Gateway
- ❏ Virtual Private Network
- ❏ VPC Peering
- ❏ AWS Direct Connect
- ❏ Summary
- ❏ Exam Essentialss

Hands-On

- ❏ Create VPC, Public Subnets and Route Table and Launch EC2 Instance.
- ❏ Create VPC Public and Private Subnets, Route table and Launch EC2 instance Windows in Public and Linux in Private.
- ❏ Create Nat Gateway and allow internet access to Private Subnet.
- ❏ Create two different VPC in different regions and use VPC Peering Connection to Connect.
- ❏ Build Network and Instance Security Between Instances using Security Group and Network ACL
- ❏ Create Customer and VPN Gateway to describe VPN Connection.

AWS Route53

Learning Objective

- **Understanding Name Resolution, DNS and Amazon Route 53**
- **Mastering DNS Name Resolution**
- **Mastering DNS records**
  - **Name Server**
  - **Start of Authority**
  - **Host**
  - **Alias**
  - **Mail Exchanger**
- **Understanding Domain Registration**
  - **Domain Registrar**
  - **Domain Names**
  - **Subdomain Names**
- **Mastering Route53**

Topics Covered

- Domain Name Service
- AWS Route53
- Domain Registration
- Hosted Zones
- Record Sets
- Routing Policies
- DNS Failover with S3 and CDN
- Summary
- Exam Essentials

Hands-On

- Route53, Routing Policy and DNS Failover
- Implement Name Resolution for two different VPC to access web pages.

AWS CloudFront

Learning Objective

- **Understanding Content Delivery Network for Videos and media files.**

Topics Covered

- Content Delivery Network
- AWS Edge Locations
- Distributions
- CloudFront
- Summary
- Exam Essentials

Hands-On

- Create S3 Bucket and upload Video files and make public.
- Create distribution in CloudFront to distribute videos to all Edge locations.

AWS Management Tools

Learning Objective

- **Learn how to Monitor and Audit AWS services using CloudWatch**
- **Understanding CloudWatch basic monitoring**
- **Understanding CloudWatch detailed monitoring**
- **Setting CloudWatch Alarms on EC2 instance**
- **Understanding CloudTrail.**
- **Create and Logs all events using CloudTrail**
- **Learn how to set a budget for Cost Management, Cost Explore.**
- **Learn how to get notification for any activity that happens in AWS Resources.**
- **Learn how to build AWS Stack to using Cloud Formation.**

Topics Covered

- ❏ CloudWatch
- ❏ CloudWatch Metrics
- ❏ Monitor EC2 Instance
- ❏ Create Alarm on EC2
- ❏ Monitor VPC Flow Logs
- ❏ CloudWatch Logs
- ❏ CloudWatch Rules
- ❏ CloudWatch Billing Alerts
- ❏ Cost Management
- ❏ AWS Organizations
- ❏ CloudTrail
- ❏ CloudTrail Logs in S3 Bucket for all API Calls
- ❏ Simple Notification Service
- ❏ Cloud Formation
- ❏ Summary
- ❏ Exam Essentials

Hands-on

- ❏ Monitor EC2 instance with Detailed Monitoring
- ❏ Monitor VPC flow logs using CloudWatch Logs
- ❏ Audit event cloudtrail for 90 days
- ❏ Create Trail to log all events
- ❏ Create SNS Topic and Subscribe Email to get Notifications
- ❏ Build a Cloud Formation stack using designer and templates

Load Balancing and Auto Scaling of EC2 Instance and Traffic

Learning Objective

- ❖ **Understanding High Availability**
- ❖ **Use load balancing in the creation of highly available systems.**

- **Understanding Scaling AWS Resources**
  - **Manual**
  - **Scheduled**
  - **Dynamic**
- **Learn scaling Applications/Systems with AutoScaling and its use in Building Fault Tolerant Networks.**
- **Understanding components of AutoScaling**
  - **Launch Configuration**
  - **Autoscaling Group**

Topics Covered

- Target Groups
- Load Balancer
- Load Balancers Types
- Application
- Network
- Load Balancer Configuration
- Service Health Check
- Launch Configurations
- Scaling Groups
- Scaling Policies
- Building Fault Tolerant and Highly Available Applications
- Summary of Auto Scaling and Load Balancers
- Exam Essentials

Hands-On

- Create Target Group and Register Servers
- Attach a Load balancer to VPC and Launching Instance
- Launch EC2 instances and use Auto Scaling Group to build High Available Applications.

AWS Command Line Interface, Identity and Access Management

Learning Objective

- **Understanding AWS Command Line Tool**
- **Install AWS Command Line Tool**
- **AWS CLI Configuration**
- **Launch AWS Resources using CLI Tool**
- **Understanding Fundamentals of AWS IAM**
- **Understanding IAM Principles**
- **Build Secure Administration using IAM Components**
  - **Users**
  - **Groups**
  - **Policies**
  - **Roles**

Topics Covered

- Install and Configure AWS CLI
- AWS CLI Reference
- Build AWS Resources using AWS CLI
- IAM Principles
- Creating Users
- Creating Groups
- Understanding Policies
- Understanding Console and Programmatic Access
- Access Keys and Secret Key
- IAM Roles
- Security and Policies
- Summary
- Exam Essentials

Hands-On

- Create Users and allow EC2 Read-Only

- ❏ Create Users and allow S3 Bucket Read-only
- ❏ Allow Specific bucket to Access Fully
- ❏ Create user access AWS Resources CLI
- ❏ Create and assign Roles to Resource

Database Services

Learning Objective

- ❖ **Understanding Data**
- ❖ **Understanding Database**
- ❖ **Understanding DBMS**
- ❖ **Understanding Relational Database Services**
- ❖ **Understanding AWS Database services and their use case**
- ❖ **Build LAMP stack using AWS RDS (online application)**

Topics Covered

- ❏ AWS RDS
- ❏ Read Replica
- ❏ Snapshots
- ❏ Restoring Snapshots
- ❏ Multi-AZ Deployment
- ❏ LAMP Stack
- ❏ Summary of Database services
- ❏ Exam Essentials

Hands-On

- ❏ Create MySql Database to implement LAMP Stack.

Directory Services and Workspaces

Learning Objective

- **Understanding Active Directory**
- **Install and Configure Windows Active Directory**
- **Mastering Windows Active Directory**
  - **Installing**
  - **Configuration**
  - **Domain**
  - **Domain Controller**
  - **Domain Members**
  - **DNS in Domain**
  - **Dynamic DNS**
- **Understanding Directory Services in AWS**
- **Mastering Simple Directory Services in AWS**

Topics Covered

- Authentication and Authorization
- Workgroup and Domain Model
- Windows Active Directory
- Directory Services
- Types of Directory Services in AWS
- Virtual Desktop Infrastructure
- AWS Workspaces
- Summary
- Exam Essentials

Hands-On

- Install and Configure Windows Active Directory
- Create Simple AWS Managed Directory and add Windows Client
- Use DHCP Options Set to set Configuration
- Create and Launch Workspace to know how to implement VDI