Course Content

Introduction to Amazon Web Services (AWS) & the Cloud

- Introduction to Cloud Computing
- Why Cloud Computing?
- Benefits of Cloud Computing
- AWS Architecture and Terminology, AWS Regions and Availability Zones
- Understanding How AWS is Physically Set Up
- Understanding AWS, Understanding EC2 , Understanding Amazon Elastic Block Store (EBS) & Amazon Simple Storage Service (S3)
- Understanding VPCs, Understanding RDS
- Selecting the appropriate AWS service based on compute, data, or security requirements
- Cloud Service Models, Essential Characteristics & Cloud Computing Deployment Models
- Introduction to the AWS Management Console
- LAB – Subscription to AWS and Navigating the AWS Management Console

AWS Elastic Compute Cloud- AWS EC2

- Regions and Availability Zones – Choose the right Region
- Amazon Machine Images (AMI), Working with AMIs, Choosing the right AMI, Deciding what goes into an AMI and Finding the right AMI
- Pricing model in EC2 instances
- On-demand, Reserved, Scheduled, Spot instances, Dedicated Hosts
- EC2 Reserved Instance Marketplace
- Importing and Exporting Instances
- Understanding EC2 Instance Types, The Lifecycle of Instances
- Storage Options for EC2 Instances & Advanced EC2 Features
- Building an EC2 Windows instance & Linux Instance , Boot strapping with user-data, Setting up security, Security with Key Pairs
- Working with the Security Group
- Different IPs assigned to an EC2 , Assigning Elastic IPs
- Login/Access to the instance
- Creating your own custom AMI, Registering & Granting access to the AMI
- Placement groups
- EC2 instance protection
- Instance Roles
- Importing and Exporting Instances
- Elastic Network Interfaces(ENIs)
- Resources and Tags
- Accessing Meta-Data & use cases

- LAB- Deploying an EC2 Linux and EC2 Windows Instance, Security Groups, Monitoring and Reporting

AWS Storage Fundamentals

- High Level view of AWS Storage Solutions
- Amazon Simple Storage Service (S3), Amazon Glacier, Amazon Elastic Block Store (EBS), Amazon Cloudfront & AWS Storage Gateway
- EBS Volume Types, EBS Encryption and EBS Performance
- Instance Store volumes, Instance Stores Available on Instance Types and Instance Store Usage Scenarios
- Adding Instance Store Volumes to an AMI
- Optimizing Disk Performance
- Creating and deleting volumes
- Attaching and detaching volumes
- Resizing the volume size
- Creating snapshots
- Creating Volumes & AMIs from Snapshots
- Cross-Region snapshot copy & use cases
- Managing Instance Volumes Using EBS, EBS Snapshots and Replication
- LAB- AWS EBS- Creating and Deleting EBS Volume, Attaching & Detaching EBS Volume and Creating Snapshot etc.

AWS Simple Storage Service (S3)

- AWS Simple Storage Service (S3) Essentials, S3 Bucket/Object Versioning And LifeCycle Policies
- Moving Objects Into S3, Handling Bucket And Object Permissions, Accessing S3 Objects, Protecting Data In S3
- AWS S3 Concepts & Advanced S3 Features, Hosting A Website In S3
- Amazon Simple Storage Service (S3), Amazon Elastic Block Store (EBS) and Amazon CloudFront storage solutions
- Amazon Glacier – Archives, Vaults, Vaults Locks & Data Retrieval
- Amazon Glacier versus Amazon Simple Storage Service (Amazon S3)
- LifeCycling with S3 and Glacier
- Getting Data into AWS – Snowball and Transfer Acceleration
- Introduction to CloudFront
- CORS, Bucket Policies, ACLs, and Encryption
- LAB- S3 Bucket Policy and Versioning
- LAB- Enabling S3's LifeCycle feature – Lifecycle Policies
- LAB- Creating A Static Hosting Website With S3

Amazon IAM (Identity And Access Management)

- Understand the security measures AWS provides and key concepts of AWS Identity and Access Management (IAM)
- IAM Best Practices For New Accounts, Building IAM Policies & Using IAM Roles with EC2

- Creation of user accounts, Setting up multi factor Authentication (MFA)
- Roles in IAM, Groups in IAM
- Delegation of permissions for users
- Creation of custom policies for delegation
- Using Identity Providers
- Cross-Account Access
- Account settings
- Credential Report
- Encryption – Key Management Service (KMS)
- LAB- IAM – Creating and Managing User Access, Creating Users, Roles, and Groups
- LAB- Logging IAM events on CloudTrail

Amazon VPC (Virtual Private Cloud) And Networking

- Introduction To VPC And AWS Networking, AWS Networking Architecture
- Building Your Own Custom VPC
- Subnets, Route Tables & Association, Internet Gateways (IGW)
- NATs Versus Bastion Hosts
- Network Access Control Lists (ACLs)
- Dynamic Host Configuration Protocol (DHCP) Option Sets
- Elastic IP Addresses (EIPs), Elastic Network Interfaces (ENIs)
- Endpoints & VPC Peering
- Security Groups, Network Access Control Lists (ACLs)
- Network Address Translation (NAT) Instances and NAT Gateways
- VPC Peering & VPC Flow Logs
- Virtual Private Gateways (VPGs), Customer Gateways (CGWs), and Virtual Private Networks (VPNs)
- VPC Networking, VPC Security
- VPC Access Methods & VPC Configuration, Extending The VPC To On-Premise Networks
- Integrate the VPC with On-Premise-Networks
- VPN overview & components
- LAB- Building a Virtual Private Cloud from Scratch & Securing Your VPC
- LAB- Creating a NAT Instance in a VPC
- LAB- Configuring VPC Peering & Routing Between VPCs

AWS Security Fundamentals

- Understanding AWS Security Measures
- AWS Shared Responsibility Model
- AWS Compliance Program
- AWS Global Infrastructure Security
- Physical and Environmental Security
- Layered Security, Security Groups & Network ACLs
- AWS Reports, Certifications, and Third-Party Attestations
- AWS Account Security Features
- AWS Credentials, Passwords

- Cloud Security Considerations & Security Best Practices for Clouds
- LAB- Security Group and Network ACLs
- LAB- Encrypting & Controlling Access to S3; Logging and Auditing Access and Actions

Securing Data on AWS

- Shared Responsibility Model
- Protecting Data at Rest
- Protecting Data in Transit
- Securing Your Operating Systems and Applications
- How to use IAM to keep your data secure
- AWS Multi-Factor Authentication (AWS MFA)
- LAB- MFA (Multifactor Authentication) on Amazon Web Services

Database Fundamentals for AWS

- Amazon RDS (Relational Database Service) Overview, Working With RDS
- Relational Database Service (RDS): Structure, Understanding RDS Multi-AZ Failover
- RDS Security Groups, Read Replicas with MySQL RDS Across Regions
- DB Instances, Selecting the DB-Engine, Configuring the Database Server and Creating your Database
- Setting up automatic backups, snapshots & restores
- Authorizing access to the DB with RDS Security Groups
- DB Instance Replication
- Security: Using IAM to Manage Access to Amazon RDS Resources
- RDS Limits
- DB Instance Life Cycle: Renaming a DB Instance
- Deleting or Rebooting a DB Instance
- Working with Storage Types
- Upgrading a DB Instance
- Working with Option Groups & DB Parameter Groups
- Working with Reserved DB Instances
- Monitoring
- Database Log Files
- DyamoDB and NoSQL, DynamoDB vs Amazon RDS Database
- LAB- Setting Up RDS, Multi-AZ, Backups, and Read Replicas

- LAB – Creating DynamoDB Tables

Understanding Backup Options

- Overview of Backup Services on AWS and Services that Include Backups
- Managing Backup And Disaster Recovery Processes,
- Quickly Recovering from Disasters
- S3 and RDS Backup Options, EBS Options, EC2 Backup Strategies
- LAB- S3, RDS Backup & EBS Options

Load Balancing with Elastic Load Balancing (ELB)

- Introduction to ELB, Basic ELB concepts
- Internet-facing ELBs & VPC-facing ELBs
- Classic & App ELB types.
- Creating load balancer
- Load balancing protocols
- Listener Configuration

- Attach & Detach Subnets
- Security groups for the load balancer
- Configure health check for the load balancer
- Adding multiple instance in multiple availability zone (multi-AZ) to the load balancer
- LAB- Elastic Load Balancer Configurations for high availability
- LAB- SSL on Elastic Load Balancer

Auto Scaling

- What is auto scaling
- Auto scaling components
- Benefits of auto scaling
- Creating launch configuration, and its prerequisites.
- Auto-scaling policies
- Creating Auto Scaling Groups (ASG)
- Attach & Detach EC2 Instances in ASG
- On-demand scaling
- Using Auto scaling with Elastic Load balancer (ELB).
- Temporarily Removing Instances
- Shut Down Your Auto Scaling Process
- Monitoring Your Auto Scaling Instances
- Health Checks
- Getting Notifications When Your Auto Scaling Group Changes
- LAB- Configuration of auto scaling policies based on the Load on EC2 instances.

AWS's Domain Name System

- Amazon Route 53 Overview
- Configuring Amazon Route 53 as Your DNS Service
- Domain Name System (DNS) & Concepts
- Steps Involved in Domain Name System (DNS) Resolution
- Record Types & Supported Record Types
- Registering a Domain Name and Configuring Amazon Route 53 as the DNS Service
- Domain Name System (DNS) Service
- Migrating DNS Service for an Existing Domain to Amazon Route 53

- Creating a Subdomain That Uses Amazon Route 53 without Migrating the Parent Domain
- Working with Public Hosted Zones
- Working with Private Hosted Zones
- Working with Resource Record Sets
- Health Checks and DNS Failover
- Creating, Updating, and Deleting Health Checks
- Amazon Route 53 Enables Resiliency
- Domain name management, Route 53 Web Request Handling, Route53 and DNS Failover
- Simple Routing Example
- Weighted and Latency-Based Routing
- Failover and Geo-Based Routing

- LAB- Configuring Route 53 from the AWS Management Console
- LAB- Route 53 Complex Configurations

CloudWatch

- Debugging cloud related issues
- Monitoring the AWS Service Health Dashboard
- Monitoring with Cloud watch
- Getting statistics for a specific EC2 instance
- Getting aggregated statistics
- Metrics for other AWS Services and related namespaces
- Setting up notifications
- LAB- Monitoring Events With CloudWatch

Working with Amazon CloudFront

- Amazon CloudFront Key Concepts And Overview
- Working with Web Distributions
- Working with Objects
- Request and Response Behaviour
- Serving Private Content through CloudFront
- Using an HTTPS Connection to Access Your Objects
- Using IAM to Control Access to CloudFront Resources
- CloudFront architectural considerations, Dynamic Content With CloudFront, Streaming Media With CloudFront
- Monitoring CloudFront with CloudWatch
- LAB- Creating A Multi-Region CloudFront Solution

Understand AWS Management Tools

- Amazon CloudWatch and AWS Trusted Advisor
- Monitoring with Amazon CloudWatch and Trusted Advisor
- LAB- Configuring CloudWatch from the AWS Management Console

High Availability And Fault Tolerant Systems on AWS

- Designing highly available, cost -efficient, fault-tolerant, scalable systems, Disaster Recovery And Fail-over Strategies
- Implement DR fore systems based on RPO and RTO
- Implement Elasticity
- Scaling Vertically & Horizontally
- AutoScaling vs. Resizing
- Applying Auto Scaling And ELB To Create High Availability And Fault Tolerance
- Deploying, managing, and operating scalable, highly available, and fault tolerant systems on AWS
- LAB- Elastic Load Balancer With High Availability Hands On
- LAB- Configuring an Auto Scaling Application

Monitoring Performance and Availability

- Creating CloudWatch Alarms to Monitor Amazon EC2 Instances & EBS for Performance and Availability
- Creating CloudWatch Alarms to Monitor the Elastic Load Balancer for Performance and Availability
- Creating CloudWatch Alarms to Monitor the RDS for Performance and Availability

Troubleshooting

- EC2 Troubleshooting Scenarios
- VPC Troubleshooting Scenarios
- ELB Troubleshooting Scenarios
- Auto Scaling Troubleshooting Scenarios
- LAB- Troubleshooting Connectivity Issues

Application Services

- Introduction to the Simple Queue Service (SQS)
- Introduction to the Simple Notification Service (SNS)
- Hands-on with SNS
- Example of Using SQS and SNS
- Introduction to the Simple Workflow Service (SWF)