

AWS Solutions Architect and DevOps Training Program

Duration of the training: 132.5 Hours (106 Hours Contents + 26.5 Hours Q&A)

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

➤ Introduction to Cloud Computing

- What is Cloud Computing
- Advantages of Cloud Computing
- Types of Cloud Computing Based on Service and Deployment Models
- Overview of AWS
- Regions and Availability Zones
- Global Infrastructure

➤ Computer Service Overview

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- The diagram illustrates the DevOps cycle as a continuous loop. It features two main circles: one labeled 'Dev' (Development) and another labeled 'Ops' (Operations). The 'Dev' circle has segments for 'code', 'plan', and 'test'. The 'Ops' circle has segments for 'deploy', 'operate', and 'monitor'. A large green arrow points from the 'test' segment of the Dev circle to the 'deploy' segment of the Ops circle, representing the flow of code from development to deployment.
- Introduction to Amazon EC2 Amazon EC2
 - Part Console Demonstration
 - Features of EC2
 - AMI Instance Type
 - Instance Purchasing Options
 - Public IP, Private IP, Elastic IP
 - Instance Lifecycle
 - Placement Groups
 - Security Groups
 - Key Pair
 - EC2 Product Demonstration (LAB)
 - Knowledge Check

➤ Elastic Block Stores

- Introduction to EBS
- Benefits of Having EBS EBS Volume types
- Encryption (Data Security)
- Root and Data Volumes Life Cycle Manager
- AMI vs. Snapshots
- EBS Product Demonstration (LAB)
- Knowledge Check

Note: Practical sessions are integrated with each module for hands-on learning

➤ **Elastic File System**

- Introduction to EFS
- Comparison between EBS and EFS
- Mount Targets
- Supporting Operating Systems
- Performance and Throughput in EFS
- Benefits of having EFS
- EFS Product Demonstration (LAB)
- Knowledge Check

➤ **Simple Storage Service**

- Introduction to S3
- Bucket and Object
- Object Versioning
- Server Access Logging
- Multipart Upload
- Object Lock
- Data Encryption
- Static Website Hosting
- Understanding S3 Durability and Availability
- Storage Classes
- Types of Storage Classes
- Life Cycle Management
- Cross Region and Same Region Replication
- Introduction to Cloud Front
- S3 Product Demonstration (LAB)
- Knowledge Check

➤ **Virtual Private Cloud**

- Introduction to VPC
- Understanding CIDR
- Default and Non-default VPC
- Components of VPC
- VPC and Subnet Sizing
- Security in Amazon VPC
- VPC Flow Logs
- Security Groups
- Network Access Control Lists (NACL)
- Route Tables

Note: Practical sessions are integrated with each module for hands-on learning

- Internet Gateway
- Network Address Translation
- VPC Peering
- Introduction to VPN and Direct Connect
- VPC Product Demonstration (LAB)
- Knowledge Check

➤ **Database Services**

- Introduction to RDS
- Types of Database Engines in RDS Database Subnet Group
- Database Read Replicas
- Manual and Automatic Snapshots
- Multi-AZ Deployment
- Alternative to RDS
- RDS Product Demonstration (LAB) Introduction to DynamoDB
- Durability and Performance
- Dynamo DB Basic Components Introduction to Elastic Cache Introduction to Redshift
- Data Security & Performance
- Knowledge Check

➤ **Route 53**

- Introduction to Route 53 Domain
- Registration
- Public and Private Hosted Zone
- Routing Policies
- Types of DNS Servers
- Types of DNS Queries
- Global Accelerator
- Knowledge Check

➤ **Identity and access management**

- Introduction to IAM
- IAM Features
- Protect your AWS by different authentication system
- AWS User Account and Groups in detail Associating policies to the user and groups
Introduction about Roles and its Use
- Multi Factor Authentication AWS Organization
- IAM Product Demonstration (LAB)
- Knowledge Check

➤ AWS Security Management

- Well Architected Framework – The 5 pillars of AWS
- Describing Trusted Advisor Importance of Cloud Trail
- How Cloud Trail Works
- Cloud Trail Concepts
- Insights Events
- Cloud Trail Event History
- Validating Cloud Trail log file Integrity
- Cloud Watch (Monitoring Service)
- Introduction to Cloud Watch
- How Cloud Watch Works
- Cloud Watch Concepts
- Knowledge Check

➤ Application Integration Service

- Introduction to SNS
- How SNS works
- Topic
- Publishers
- Subscribers
- Introduction to SQS
- Life Cycle of an SQS Message
- SQS Limits
- SQS Retention Period
- Types of Message Queues FIFO Queue
- Standard Queue
- Benefits
- How SQS is different from SNS
- SNS & SQS Product Demonstration (LAB)
- Knowledge Check



➤ Elastic Load Balancer and Auto Scaling

- Introduction to ELB
- Necessity of Load Balancer
- Features of Load Balancer
- Availability Zones and Load Balancer nodes
- Internal and Internet Load Balancer
- Cross Zonal Load Balancer
- DNS setup for ELB

Note: Practical sessions are integrated with each module for hands-on learning

- Introduction to Auto Scaling
- Entities of Auto Scaling
- Auto Scaling Groups
- Manual and Dynamic Scaling
- ELB & ASG Product Demonstration (LAB)
- Knowledge Check

➤ **Other Services**

- Lambda
- FSx
- Cloud Formation
- Migration Services
- Data Migration
- Snowball
- Snowball Edge
- Snow Mobile
- Database Migration
- Storage Gateway
- File Gateway
- Volume Gateway
- Tape Gateway
- Certificate Manager

Module 2: Linux Fundamentals (6 Hours + 1.5 Hours Q&A)

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graph TD
 subgraph Dev [Dev]
 direction TB
 D1[Code] --> D2[Plan]
 D2 --> D3[Release]
 D3 --> D4[Test]
 D4 --> D1
 end
 subgraph Ops [Ops]
 direction TB
 O1[Deploy] --> O2[Operate]
 O2 --> O3[Monitor]
 O3 --> O4[Plan]
 O4 --> O1
 end
 D4 --> O1
 style Dev fill:#d3d3d3,stroke:#333,stroke-width:2px
 style Ops fill:#d3d3d3,stroke:#333,stroke-width:2px

```
- Overview of Linux
  - Linux Architecture
  - Linux Distributions
  - Basic Linux Commands
  - File Permission Management
  - User Creation
  - Shell Scripts
  - SSH and VI Utility

➤ **Practical's**

- Creation of User
- Establishing SSH Connection to the Server
- File creation and Manipulation using the VI editor
- Managing permissions
- Basic commands execution
- Writing Shell Scripts Program

**Note:** Practical sessions are integrated with each module for hands-on learning

### Module 3: DevOps Overview (4 Hours + 1 Hour Q&A)

- Evolution of Waterfall, Agile, and DevOps
- What is DevOps
- Why DevOps
- Benefits of DevOps
- DevOps Stages
- DevOps Lifecycle
- Various Automation in DevOps
- Overview of CICD

### Module 4: DevOps on Cloud (AWS) (4 Hours + 1 Hour Q&A)

- Overview of AWS DevOps and Azure DevOps
- Code Build
- Code Commit
- Code Deploy
- Code Pipeline
- Overview of Cloud Formation

### Module 5: Managing Source Code – Git and GitHub (10 Hours + 2.5 Hours Q&A)

- Overview of Version Control System
- Central vs Distributed Version Control System
- Introduction to Git
- Installation and Setting-up Git
- Important Git Commands
- Creating and Managing git Repositories
- Git File Workflow
- GIT - IGNORE
- GIT Misc Commands
- Reverting and Resetting
- GIT Branching Strategies
- Working with GIT Branching
- Branching, Merging
- Rebase and Squash
- GIT Stash
- Introduction to GitHub
- Managing Remote Repositories
- Handling GitHub repositories using Visual Studio Code

**Note:** Practical sessions are integrated with each module for hands-on learning

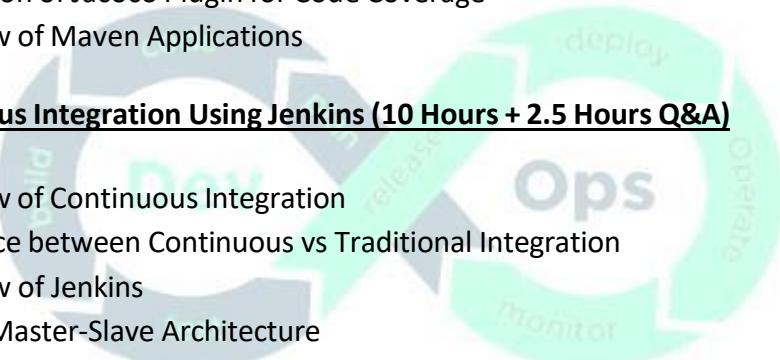
➤ **Practical's**

- Installation and Configuration of Git
- Creating Git Repositories
- Demonstrating Various Git Repositories
- Merging Branches and Managing Merge Conflicts
- Stashing, Reverting, Rebasing and Resetting
- Collaborating Local and Remote Repositories

**Module 6: Understanding and Using Build Tools (2 Hours + 0.5 Hour Q&A)**

- Overview of Various Build Tools
- What is Maven
- Maven Architecture
- Maven Plugins
- Maven Archetypes
- Maven Commands
- Integration of Jacoco Plugin for Code Coverage
- Overview of Maven Applications

**Module 7: Continuous Integration Using Jenkins (10 Hours + 2.5 Hours Q&A)**

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- Overview of Continuous Integration
  - Difference between Continuous vs Traditional Integration
  - Overview of Jenkins
  - Jenkins Master-Slave Architecture
  - Jenkins Installation and Configuration
  - Jenkins Plugins
  - Jenkins Management
  - Jenkins Freestyle and Pipeline Jobs
  - Scripted and Declarative Pipelines
  - Configuring Slave Node to Jenkins
  - Configure Tomcat Server
  - Integrate and Deploy to Tomcat Server using Jenkins
  - Jenkins Build Triggers
  - Enable Email Notifications

➤ **Practical's**

- Installation and Configuration of Jenkins
- Configuration of Tools
- Configuration of Plugins

**Note:** Practical sessions are integrated with each module for hands-on learning

- Creation of Freestyle Jobs, Scripted and Declarative Pipeline Jobs
- Demonstrate Pipeline Triggering Using GitHub Webhooks
- Scripted and Declarative Pipelines
- Integration of Code Coverage Tools and Static Code Analysis Tools
- Triggering Pipelines Using Git Webhooks
- Creation of CICD Pipelines
- Adding Slave Node to Jenkins

### **Module 8: Containerization, Docker, and Docker Hub (7 Hours + 1.5 Hours Q&A)**

- Introduction to Virtualization and Containerization
- What is Containerization
- Docker Architecture
- Overview of Docker Hub
- Docker Installation
- Docker Commands
- Container Modes
- Port Binding
- Docker file
- Managing Docker Images
- Running and Managing Containers
- Docker Volume
- Docker Compose
- Overview of Docker Swarm

➤ **Practical's**

- Installation of Docker and Docker Compose on AWS EC2
- Running Docker Commands
- Writing Docker Files for various applications
- Building Docker Images
- Pushing Images to Docker Hub
- Running Docker Containers
- Container Port Binding
- Running Multiple Containers Using Docker Compose file
- Initialize a Docker Swarm and Demonstrate Workload Deployments

**Note: Practical sessions are integrated with each module for hands-on learning**

## Module 9: Container Orchestration Tool - Kubernetes (8 Hours + 2 Hours Q&A)

- Overview of Container Orchestration
- Difference between Docker Swarm and Kubernetes Cluster
- Kubernetes Architecture
- Installation of Kubernetes - Minikube and EKS
- Kubernetes Nodes
- Kubernetes Pods
- Kubernetes Deployments
- Rolling updates and Rollbacks
- Scaling up and Down of the Application
- Services in Kubernetes
- Kubernetes Host Path Volume
- Namespaces

### ➤ Practical's

- Installation and Configuration of Kubernetes Minikube
- Creation of Pods and Deployments using Ad-Hoc Commands
- Creation of Pods and Deployments using YAML files
- Scaling up and Scaling Down of the Application
- Rolling out Deployments and Rolling Back
- Creation of Services

## Module 10: Configuration Automation using Ansible (5 Hours + 1.5 Hours Q&A)

- Overview of Configuration Automation
- Introduction to Ansible
- Ansible Architecture
- Components of Ansible
- Installation and Configuration of Ansible
- Ansible Ad-Hoc Commands
- Ansible Playbooks
- Ansible Variables
- Ansible Handlers
- Ansible Role using Ansible Galaxy

### ➤ Practical's

- Installation and Configuration Ansible
- Running Ansible Ad-Hoc Commands
- Writing Ansible Playbooks to Configure Servers
- Creating Ansible Roles

**Note: Practical sessions are integrated with each module for hands-on learning**

## Module 11: Terraform Overview (4 Hours + 1 Hour Q&A)

- Introduction to Terraform
- Terraform vs. Ansible
- Terraform Architecture
- Terraform Configuration
- Terraform Commands
- Managing Terraform Resources
- Terraform End to End Project

➤ **Practical's**

- Installation of Terraform on AWS EC2 Instance
- Writing Terraform Configuration
- Creation of AWS EC2 instance using Terraform
- Managing AWS Resources using Terraform
- End to End Infrastructure Creation Project

## Module 12: Continuous Monitoring using Prometheus and Grafana (4 Hours + 1 Hour Q&A)

- Overview of Continuous Monitoring
- Continuous Monitoring tools in DevOps
- Installation and Configuration of Prometheus and Grafana
- Prometheus Architecture
- Monitoring using Prometheus
- Dashboard Visualization using Grafana

## Module 13: DevOps with AI (6 Hours + 1.5 Hour Q&A)

- Introduction to AI and ML
- Role of AI in Cloud Services and DevOps
- AI-Driven Automation Benefits in Cloud and DevOps Workflows
- AI Tools Overview - Generative AI
- AI Tools Overview - Predictive Analysis
- AI Tools Overview - Code Quality and Troubleshooting
- AI for Continuous Monitoring and Anomaly Detection
- Review insights on Potential Optimizations and Security Vulnerabilities
- Fundamentals of K8sGPT to Monitoring, Troubleshooting, and Optimizing Kubernetes Workloads

## Module 14: Capstone Projects (4 Hours + 1 Hour Q&A)

### **1. Deployment of 3-Tier Applications Using AWS Services**

**Domain:** Cloud Computing and DevOps

### **2. Deployment of Online Ticketing and Event Management Applications and Infrastructure**

**Domain:** E-Commerce and Entertainment

**Note:** Practical sessions are integrated with each module for hands-on learning

### 3. Deployment of Online Food Ordering and Delivery Application

Domain: Food Delivery and E-Commerce

#### Overview of Python (Online Self Learning)

*"Self-Learning" module videos are available on the LMS dashboard throughout the training course, allowing you to learn at your own pace and convenience.*

- Overview of Python
- Features, Benefits, Uses of Python
- Installation and Setup of Python Environment
- Various Types of Sequences in Python
- File Operations
- Python Functions
- OOPs Concepts
- Modules
- Errors and Exception Handling
- Python Console based application and Web Application using Flask
- Deploying and Consuming Python Applications

#### Practical's



- Create a Console based Python Application
- Create a Web Application Using Flask
- Create Python Applications Demo Covering Various Concepts

#### Microsoft Azure Fundamentals (Online Self Learning)

*"Self-Learning" module videos are available on the LMS dashboard throughout the training course, allowing you to learn at your own pace and convenience.*

- Azure Cloud Concepts
- Azure Cloud Service Types
- Azure Architecture and Services
- Core Architectural Components of Azure
- Azure Compute and Networking Services
- Azure Storage Services
- Azure Identity, Access, and Security
- Cost Management in Azure
- Features and Tools for Governance and Compliance in Azure
- Tools for Managing and Deploying Azure Resources
- Monitoring Tools in Azure

**Note:** Practical sessions are integrated with each module for hands-on learning