AWS - Overview

- Fundamentals of Datacenter
- Fundamentals of Servers
- Fundamentals of Cloud Computing
- Cloud Providers - AWS vs AZURE vs GCP
- Use Case Of Applications On Cloud
- AWS - Cloud Terminologies
- AWS - Security
- AWS - High Availability
- AWS - Fault Tolerance
- AWS - Scalability
- Walk through AWS Free Tier Account
- AWS Management Console
- Cloud Offerings - IAAS vs PAAS vs SAAS
- IAAS - Infrastructure As A Service
- PAAS - Platform As A Service
- SAAS - Software As A Service

AWS - Global Infra

- AWS Global Footprint
- Overview of AWS Services
- AWS Regions
- AWS Availability Zones
- AWS Edge Locations

AWS - VPC

- Networking Layer
- Traditional Networking Components
- Logical Data Centers
- Understanding Requirements From Client
- Amazon VPC Features & Benefits

- Amazon VPC Components Overview
- Networking Basics - Protocol - Port - Firewall
- Understanding Default VPC
- Designing Custom VPC - Client Requirement
- VPC Routing Basics
- AWS Internet Gateway
- VPC Subnetting
- VPC Public Subnets
- VPC Private Subnets
- VPC Route Tables
- VPC NACL's
- VPC Security Groups

Hands On

- Creating Custom VPC
- Creating Subnets
- Creating Internet Gateways
- Creating Route Tables
- Creating Security Group
- Creating Network ACL

AWS - Ec2

- Fundamentals of Virtualization
- Desktops vs Servers
- Amazon EC2 Features
- Amazon EC2 Components
- Amazon EC2 Instance Types
- Amazon EC2 Purchase Options
- Amazon Machine Images (AMI)
- Aws Custom Ami
- Aws Golden Ami
- EC2 IP Address Types Private vs Public vs Elastic
- Amazon EC2 Userdata
- Amazon EC2 Metadata

- Launch and Connect to an EC2 instance
- Work with SSH Key Pairs
- SSH Softwares - GitBash & Putty & Terminal
- Deploying Web Applications On EC2 Instance
- Setup Elastic IP For EC2 Instance
- Deploying Web Application Using Userdata
- Fetching Metadata for Dynamic Scripts
- Design Dynamic Scripts Using Userdata & Metadata

Application Stack

- Introduction to Application Stack
- Understand Different components of an application
- Understand Frontend Tier - Presentation Layer
- Understand Backend Tier - Business Logic
- Understand Database Tier - Data Layer
- Installing and Configuring Nginx HTTP Server
- Deploying Frontend Application, Using Nginx HTTP Server
- High Availability Concepts For Production Scenario
- Load Balancing with AWS Load Balancer
- Nodejs Setup For Deploying Backend Tier
- Creation of RDS instances in AWS for application stack
- Understand the architecture of an application
- Integration of Web, Application and Database to work as a stack
- Setting Up Web Application - Presentation + Business + Data

AWS - EBS - Elastic Block Storage

- Amazon EBS Features
- EBS ROOT Volume
- EBS ADDITIONAL Volume
- EBS Volume Types
- EBS Volumes Limitations
- EBS Volume Backups - SNAPSHOTS

- Disaster Recovery with SNAPSHOTS
- Custom Amazon Machine Images
- Creating EBS Volumes
- Attaching EBS Volumes
- Create an Custom AMI
- Copy AMI To Other Regions
- Backing Up Volumes - EBS Snapshots
- Recovering Volumes - EBS Snapshots
- Copy Snapshots to other regions

AWS - EFS - Elastic File System

- Shared File Systems - NFS
- Amazon EFS Features
- EFS Fully Managed
- EFS Use Cases
- EFS Storage Classes
- EFS Mount Points
- EBS vs EFS
- Provision EFS File System
- Configuring Firewalls For EFS Access
- Shared File Access across Multiple Instances
- Shared File Access across Multiple Availability Zones

AWS - S3 - Simple Storage Service

- Online Data Storage
- Amazon S3 Features
- EBS vs EFS vs S3
- Use Case - What Storage To Opt - Client Req
- Amazon S3 Buckets

- Amazon S3 Objects
- Amazon S3 Access ACL's
- Amazon S3 Access Bucket Policy
- Amazon S3 Storage Classes
- Amazon S3 Lifecycle Policy
- Amazon S3 Versioning
- Amazon S3 Web Hosting
- Create S3 Buckets
- Uploading S3 Objects
- Control Access Permissions On S3 Buckets
- Control Access Permissions On S3 Objects
- S3 Storage Classes - Lifecycle Management
- S3 Versioning
- S3 Web Hosting
- S3 Pre assigned Urls
- S3 Access Logs

AWS - IAM - Identity and access management

- Account & Services Layer
- IAM Overview
- Root User vs IAM User
- IAM Access Ways
- IAM Policies
- IAM Groups
- IAM Roles
- Creating an IAM User
- Creating an IAM Group
- Creating an IAM Policy
- Creating an IAM Role

AWS - CLI

- Graphical Interface vs Command Line Interface
- AWS CLI Features
- AWS CLI Configurations
- Understanding CLI Reference
- AWS CLI on Amazon Linux
- Install AWS CLI on CentOS
- Configure AWS CLI
- Using Multiple CLI profiles
- Creating a Custom VPC Using AWS CLI

AWS - IAC - Infra As a Code

- Graphical vs Command Line Interface vs Code
- Infrastructure Challenges
- Infrastructure As Code - IaC
- AWS Cloud Formation Features
- AWS Cloud Formation Templates
- AWS CloudFormation vs Terraform
- CloudformationTemplate JSON
- Cloudformation Template YAML
- Creating a Custom VPC Using Cloudformation
- Configure Reusable Infrastructure Using Cloudformation

Advanced VPC Techniques

- VPC Peering
- Bastion Hosts
- Nat Gateway

AWS - Databases - RDS

- Database Concepts
- Databases & Tables
- IAAS Database - MySQL
- PAAS Database - MySQL
- IAAS vs PAAS
- Relational Database Service (RDS) - Features
- RDS Read Replica
- RDS Multi AZ Failover
- Create IAAS MySQL Database
- Setup Java Web Application - IAAS MySQL
- Create PAAS MySQL Database
- Setup Java Web Application - PAAS MySQL
- Create RDS Read Replicas - PAAS MySQL
- Create Multi AZ Failover For Production Setup

AWS - Beanstalk

- Elastic Beanstalk Features
- Server Setup - PAAS
- Apache Tomcat Use Case

  Hands On

- Create Beanstalk Environment - Tomcat
- Deploying Java Web Application
- Connecting Web Application to RDS Instance
- Checking High Availability & Fault Tolerance

AWS - Monitoring and Feedback

- Simple Notification Service - SNS
- SNS Topics
- SNS Subscriptions

- SNS Publishers
- Monitoring - Cloudwatch
- Cloudwatch Dashboards
- Cloudwatch Alarms
- Create SNS Topic
- Create SNS Subscriptions
- Create Cloudwatch Dashboard
- Create Cloudwatch Alarm
- Configure SNS Email For High CPU Usage

AWS - High Availability

- Designing Highly Available VPC
- Introduction to Load Balancing
- Classic Load Balancer
- Network Load Balancer
- Application Load Balancer
- Implementing Network Load Balancer
- Implementing Application Load Balancer

AWS - Fault Tolerance

- Introduction to Fault Tolerance
- Introduction to Scalability
- Launch Templates
- Auto Scaling Groups
- Create Launch Templates
- Create Auto Scaling Group
- Creating UpScale Policy
- Creating DownScale Policy
- Attach Load Balancer to Auto Scaling

Aws - Route 53

DEVOPS

Topics Covered - Git/GitHub

- **Introduction to Version Control System**
- **Centralized Version Control System**
- **Distributed Version Control System**
- **Git Introduction**
- **Git Architecture**
- **Git Workflow**
- **Git Branching Model**
- **Git Merging Branches**
- **Detached Head For Retroscoping**
- **Undoing Changes**
- **Git Ignore**
- **GitHub For Remote Repositories**
- **Using existing GIT Repositories With Clone**
- **Pull Requests**
- **Tagging**

Topics Covered - Maven

- **Introduction to Build Management**
- **Introduction to Maven**
- **Maven Lifecycle Phases**
- **Maven Plugins**
- **Building Java Applications**

Topics Covered - SonarQube

- **Introduction To Unit Testing**
- **Perform White Box Testing**
- **Analyzing Bugs and Vulnerabilities**
- **Integration Of SonarQube with Maven**

Topics Covered - Nexus

- **Introduction To Binary Repository Manager**
- **Introduction to Nexus**
- **Setup Nexus**
- **Understand different types of repositories**
- **Managing Releases**
- **Pushing Artifacts to Nexus**

Topics Covered - Jenkins

- **Introduction To Continuous Integration**

- Introduction To Continuous Delivery
- Best Practices of CI-CD
- Overview of Jenkins
- Setting Up Jenkins
- Setting Up Build Jobs
- Build Parameters
- Build Triggers
- Jenkins Plugins
- Using GitHub Webhooks
- Automatically Build Binaries Using Maven On Code Changes
- Distributed Builds Master - Slave Configuration
- Code Quality Integration With SonarQube to test development code
- Automated Releases Using Nexus Integration
- Continuous Deployments
- CI - CD Pipeline
- Pipeline As Code

Preface : Configuration Management

- Configuration management is important in DevOps because it helps you automate tedious tasks or take away complexity.
- Without automation, building and maintaining large-scale modern IT systems can be resource-intensive and can lead to increased risk due to manual error.

- **Configuration management is important because it gives you consistency of systems and software enables the ability to scale infrastructure and software systems without having to correspondingly scale administrative staff to manage those systems.**

Topics Covered - Ansible

- Complexity in Infrastructure Management
- Introduction to Configuration Management Tools
- PULL vs PUSH Based Configuration Management
- Introduction To Ansible
- Ansible Setup
- Ansible Inventory
- Ansible Modules
- Ansible Ad-Hoc Commands
- Introduction To YAML
- Ansible Playbooks
- Ansible Handlers
- Ansible Facts & Variables
- Ansible Templates
- Ansible Roles

Preface : Containerization

- **Nowadays it's critical to get your releases out fast, which requires having an automated CI/CD pipeline that takes your code from text to binaries to a deployed environment.**
- **Implementing an automated pipeline in the past has been challenging, especially when dealing with legacy applications. This is where Dockers and Kubernetes come in.**
- **Kubernetes has revolutionized the way we deploy and manage our containerized applications.**
- **Using Kubernetes, you gain simplified application deployment. Kubernetes is one of modern DevOps tools which reduces the deployments from days to minutes.**
- **We are going to discuss containerization technologies and the basics of Docker. Then we are going to talk on kubernetes, where we will implement the Kubernetes Production Cluster and deploy the applications on the Production Cluster.**

Topics Covered - Docker

- **Introduction to Virtualization**
- **Introduction to Containerization**
- **Monolithic Architecture**
- **Microservices Architecture**
- **Virtualization Vs Containerization**
- **Introduction to Docker**
- **Docker Architecture**
- **Setting up Docker**
- **Docker Registry**
- **Docker Images Vs Docker Containers**
- **Running Docker Containers**
- **Data Persistency**

- Docker Volumes
- Containerize Applications
- Building Custom Docker Images with Dockerfile
- Pushing Docker Images To Registry
- Docker Compose

Topics Covered - Kubernetes

- Introduction to Container Orchestration
- Introduction to Kubernetes
- Kubernetes Architecture
- Setup Kubernetes Production Grade Cluster - AWS
- KOPS
- Imperative vs Declarative
- PODS
- Replica Sets
- Deployments
- Services