

## DevOps

### Introduction to DevOps

- Understand DevOps
- Roles and responsibilities
- Understand the infrastructure layouts and its challenges
- Important terminology
- Continuous Integration and Deployment
- Introduction to multi-tier architecture Application
- Software Development Life Cycle
- DevOps Tools
- Traditional Models for SDLC

### AWS: Cloud Computing

- Types and Service models of cloud computing
- Understanding AWS Architecture
- About EC2 and types , Pricing
- EIP ( Elastic IP address), Allocating, associating , releasing
- Launch Linux Instances in AWS
- Connecting Linux instances from windows desktop and Linux machines

### Module 01 - Infrastructure Setup

- Ec2 Walkthrough
- Installation of DevOps Tools on cloud
  - Git
  - Docker
  - Selenium
  - Maven
  - Jenkins
  - Puppet
  - Ansible
  - Kubernetes
  - Nagios

### Module 02 - Continuous Testing

- What is Continuous Testing?
- What is Maven?
- Running Test Cases on Chromium Web Driver
- What is Headless Mode?

### Hands-on Exercise –

- Using Maven to import dependencies in Eclipse
- Implementing a headless test using Chrome WebDriver?

## **Module 04 - Continuous Integration using Jenkins**

- Introduction to Continuous Integration
- Jenkins Master Slave Architecture
- Understanding CI/CD Pipelines
- Creating an end to end automated CI/CD Pipeline

### **Hands-on Exercise –**

- Creating a Jenkins Master Slave on AWS
- Installing Plug-ins in Jenkins
- Creating Jenkins Builds
- Creating Scheduled Builds
- Triggering Jobs using Git Web Hooks
- Using the Pipeline Plugin In Jenkins

## **Module 05 - Software Version Control**

- What is Version Control
- Types of Version Control System
- Introduction to SVN
- Introduction to Git
- Git Lifecycle
- Common Git Commands
- Working with Branches in Git
- Merging Branches
- Resolving Merge Conflicts
- Git Workflow

### **Hands-on Exercise –**

- Git Life cycle Commands
- Pushing Code to Github
- Stashing Code in git
- Creating, Deleting Git Branches
- Reverting a Push to GitHub
- Merging branches using git merge
- Merging branches using git rebase.
- Resolving merge conflicts using git merge tool

## **Module 06 - Continuous Deployment: Containerization with Docker**

- Introduction to Docker
- Understanding Docker Lifecycle
- Components of Docker Ecosystem
- Common Docker Operations

- Creating a DockerHub Account
- Committing changes in a Container
- Pushing a Container Image to DockerHub
- Creating Custom Docker Images using Dockerfile

## **Hands-on Exercise –**

- Common Docker Operations
- Creating a DockerHub Account
- Committing Changes to a Container
- Pushing container to DockerHub
- Creating Local Image Repository
- Building an Image using Dockerfile

## **Module 07 - Containerization with Docker: Ecosystem and Networking**

- What are Docker Volumes
- Deploying a Multi-Tier Application using Docker Network
- Using Docker Compose to deploy containers
- What is Container Orchestration
- Container Orchestration Tools
- Introduction to Docker Swarm
- Deploying a 2-Node Cluster using Docker Swarm

## **Hands-on Exercise –**

- Creating Docker Volumes
- Using Docker Compose to deploy multiple containers
- Deploying a Multi Node Cluster using Docker Swarm
- Deploying a multi-service app on Docker Swarm

## **Module 08 - Configuration Management using Puppet**

- Need of Configuration Management
- Configuration Management Tools
- What is Puppet
- Puppet Architecture
- Setting up Master Slave using Puppet
- Puppet Manifests
- Puppet Modules
- Applying configuration using Puppet
- Puppet File Server

## **Hands-on Exercise –**

- Setting up Master Slave on AWS
- Testing Connection of nodes with Puppet
- Creating a Manifest
- Deploying Manifest on Node

- Creating a Module
- Deploying sample software on nodes using Puppet Modules and Manifests
- Implementing a File Server Module on Puppet

## **Module 09 - Configuration Management using Ansible**

- What is Ansible?
- Ansible vs Puppet
- Ansible Architecture
- Setting up Master Slave using Ansible
- Ansible Playbook
- Ansible Roles
- Applying configuration using Ansible

### **Hands-on Exercise –**

- Installing Ansible on AWS
- Creating a Playbook using YAML
- Creating an Ansible Role
- Using Roles in Playbook

## **Module 10 - Continuous Orchestration using Kubernetes**

- Introduction to Kubernetes
- Docker Swarm vs Kubernetes
- Kubernetes Architecture
- Deploying Kubernetes using Kubeadms
- Alternate ways of deploying Kubernetes
- YAML Files
- Creating a Deployment in Kubernetes using YAML
- Services in Kubernetes
- Ingress in Kubernetes
- Case Study – Kubernetes Architecture

### **Hands-on Exercise –**

- Setting up Kubernetes using kubeadm
- Installing Kubernetes using kops and GCK
- Creating a Deployment
- Creating Services
- Creating an Ingress
- Demonstrating the use of Ingress, services and deployments together

## **Module 11 - Continuous Monitoring using Nagios**

- What is Continuous Monitoring
- Introduction to Nagios
- Nagios Architecture
- Monitoring Services in Nagios



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- What are NRPE Plugins
- Monitoring System Info using NRPE plugins

## **Hands-on Exercise –**

- Installing Nagios
- Monitoring of different servers using Nagios

## **Module 12 - Terraform Modules & Workspaces**

- What is Infrastructure as a code
- Iac vs Configuration Management
- Introduction to Terraform
- Installing Terraform on AWS
- Basic Operations in terraform
- Init
- Plan
- Apply
- Destroy
- Terraform Code Basics
- Deploying and end-to-end architecture on AWS using Terraform

## **Hands-on Exercise –**

- Installing Terraform
- Initializing AWS Terraform Provider
- Creating an EC2 instance using Terraform
- Updating changes to EC2 using Terraform
- Destroying EC2 using Terraform
- Deploying EC2 inside a custom VPC using Terraform

**DEVOPS PROJECTS COVERED- CREATING CI/CD PIPELINE TO BUILD AND TEST A WEBSITE CREATING A CI/CD PIPELINE TO INTEGRATE DEVOPS TOOLS LIKE GIT, DOCKER, JENKINS, PUPPET AND SELENIUM.**

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