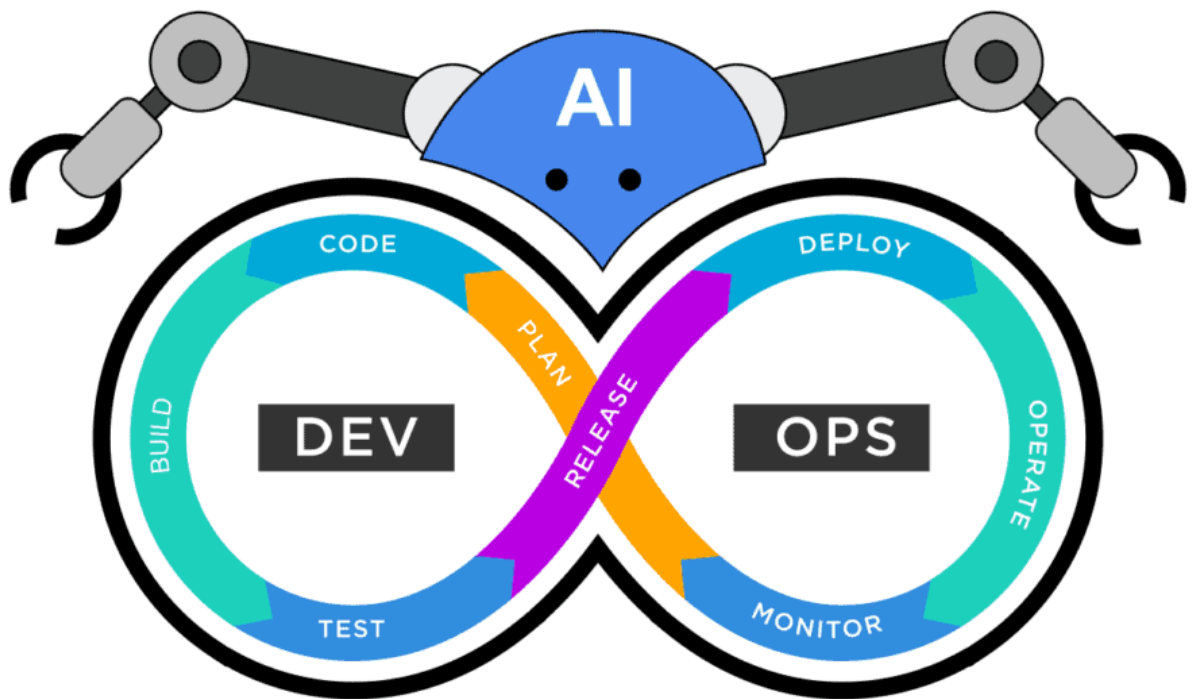


Vyas IT



AI Enabled DevOps with AWS Course

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LINUX (Basics)

VIRTUALIZATION PLATFORMS

- **Vagrant**
- **Docker, Docker Swarm**
- **Kubernetes**

VERSION CONTROLLING

- **GIT**

CONTINUOUS INTEGRATION

- **Jenkins**

CONFIGURATION MANAGEMENT TOOLS

- **Ansible**

BUILD TOOLS

- **ANT**
- **Maven**

MONITORING

- **Nagios**
- **Prometheus**
- **Grafana**

CLOUD

- **AWS**
- **Terraform**

SCRIPTING LANGUAGE

→ **Python**

LINUX [BASICS]

- ❖ Basic Commands
- ❖ File Operations
- ❖ Redirection
- ❖ Piping
- ❖ Permissions
- ❖ User Controls

VAGRANT

Introduction to Vagrant

- ❖ Introduction & Installing vagrant
- ❖ The vagrant file & Boxes
- ❖ Communicating with Vagrant Box
- ❖ Network Access

Deploying your Vagrant Machine

- ❖ Deploying a Complete Environment
- ❖ Setting Environment
- ❖ Finalizing the Environment
- ❖ Vagrant File

DOCKER

Docker Introduction

- ❖ Installing Docker
- ❖ Docker Introduction
- ❖ Virtualization and Containerization
- ❖ Code or Text Editor for Docker and compose files
- ❖ Terminal Emulator and shell for Docker

Creating and Using Containers

- ❖ Starting Application Server, Databases and Operating Systems as Containers

- ❖ What happens when we run a container
- ❖ Container vs VM
- ❖ Manage Multiple Containers
- ❖ CLI Process Monitoring
- ❖ Linking of Containers
- ❖ Docker Volumes
- ❖ Reusable Volumes
- ❖ Getting a shell inside Containers: no need for SSH
- ❖ Package Management Basics: apt, yum, dnf, pkg
- ❖ Docker Networks: Concepts for Private & Public
- ❖ Docker's --format option for filtering CLI Output

Container Images

- ❖ What's in an Image
- ❖ Official Docker Image Specification
- ❖ The Mighty Hub: Using Docker Hub Registry Images
- ❖ List of Official Docker Images
- ❖ Images and Their Layers: Discover the Image Cache
- ❖ Images and Containers from Docker Docs
- ❖ Image Tagging and Pushing to Docker Hub
- ❖ Building Images: The Docker file and Docker Commit
- ❖ Building Images: Running Docker Builds
- ❖ Building Images: Extending Official Images

Docker Compose: The Multi-Container Tool

- ❖ Docker Compose and the docker-compose.yml file
- ❖ The YAML Format: Sample Generic YAML File
- ❖ Compose File Version Differences (Docker Docs)
- ❖ Compose file for creating Development and QA Environment
- ❖ Setting CI-CD Environment for Jenkins Using Docker
- ❖ Setting up LAMP Architecture using docker compose

Docker Swarm

- ❖ Container Orchestration
- ❖ Load balancing using Swarm
- ❖ Scaling using swarm
- ❖ Handling fail over scenarios using swarm
- ❖ Rolling updates using swarm
- ❖ Handling fail over scenarios using Swarm
- ❖ Docker Stack

KUBERNETES

Kubernetes Overview:

- ❖ Introduction
- ❖ Kubernetes Architecture

Setup Kubernetes

- ❖ Kubernetes setup -kubeadm
- ❖ Managed K8s Setup: EKS, GKE, AKS
- ❖ Self-managed K8s Setup: KOPS, KIND

Kubernetes Concepts

- ❖ PODs
- ❖ Replica Set
- ❖ Replication Controllers
- ❖ Deployments
- ❖ Stateful sets
- ❖ Ingress, Ingress Controller
- ❖ Service Objects
- ❖ Secret Objects
- ❖ Volumes

Kubernetes Concepts – PODs, Replica Sets, Deployments

- ❖ Introduction to YAML
- ❖ PODs with YAML
- ❖ Replication Controllers and ReplicaSets using YAML
- ❖ Container Orchestration in Kubernetes
- ❖ Load Balancing using Kubernetes
- ❖ High availability using Kubernetes
- ❖ Scaling in Kubernetes
- ❖ Performing Rolling Updates and Rollback
- ❖ Handling fail over scenarios
- ❖ Deployments
- ❖ Deployments – update and Rollback
- ❖ Statefulsets
- ❖ Persistent Volumes and Persistent Volume Claims
- ❖ RBAC (Role, Role Bindings, Cluster Role)
- ❖ HELM Package Management

Networking in Kubernetes

- ❖ Basics of Networking in Kubernetes
- ❖ Service Object (Cluster IP, Node Port, Load Balancer, headless)
- ❖ Networking using Ingress

Services

- ❖ In-depth definition files on Service Objects
- ❖ Microservices Architecture

Microservices Application

- ❖ Deploying Microservices Application Kubernetes Cluster
- ❖ Voting Application Deployment
- ❖ Using Compose to convert from Docker to Kubernetes

VERSION CONTROLLING(GIT)

- ❖ Centralized and Distributed Version Controlling
- ❖ Git Local repo and GIT Hub
- ❖ Configuration
- ❖ Basic Commands
- ❖ Branches
- ❖ Push and Pull from GIT Hub
- ❖ Git Squash and Stash
- ❖ Git Ignore
- ❖ Git Tags
- ❖ Git Rebase
- ❖ Git Amend and Revert
- ❖ Git Log and Git reflog
- ❖ Git Merging and Rebasing
- ❖ Cherry picking
- ❖ Git reset and Git Revert
- ❖ Git Amend

JENKINS

Getting Started with Jenkins

- ❖ Getting Started with Jenkins
- ❖ Introduction to Continuous Integration
- ❖ Install Jenkins on windows and LINUX
- ❖ Setup of Dev Environment, QA Environment, Prod Environment for Jenkins
- ❖ Jenkins Architecture and Terms of Jenkins
- ❖ Jenkins UI: Dashboard and Menus
- ❖ Create Our First Jenkins Job

Understanding Stages of CI-CD

- ❖ Continuous Download
- ❖ Continuous Build
- ❖ Continuous Deployment
- ❖ Continuous Testing
- ❖ Continuous Delivery

Continuous Integration with Jenkins

- ❖ Continuous Integration with Jenkins
- ❖ Install Git and Jenkins GitHub plug-in
- ❖ Install Maven on Our local box
- ❖ Configure Jenkins to work with Java, Git and Maven
- ❖ Create our Jenkins Project
- ❖ Trouble Shooting: Create our First Jenkins Project
- ❖ Run Our First Jenkins Build and Jenkins Workspace
- ❖ Source Control polling in Jenkins
- ❖ Other Build Triggers of Jenkins
- ❖ Jenkins Shell Scripts
- ❖ Archive Build Artifacts
- ❖ Install and configure Tomcat as the Staging Environment
- ❖ Deploy to staging Environment
- ❖ Jenkins Build Pipeline
- ❖ Parallel Jenkins Build
- ❖ Deploy to Production
- ❖ Trouble shooting: Deploy to Production

Distributed Builds

- ❖ Introduction to Distributed Jenkins Build
- ❖ Creating Master Slave Setup
- ❖ Install Jenkins Master Node in the Cloud
- ❖ Install Jenkins Slave Agents in the Cloud
- ❖ Concurrent Jenkins Build and Label Jenkins Build
- ❖ Continuous Delivery with Jenkins
- ❖ Code as Pipeline
- ❖ CI-CD using Jenkins file
- ❖ Groovy Scripting

Pipeline

- ❖ Scripted Pipeline
- ❖ Declarative Pipeline

- ❖ Multibranch Pipeline
- ❖ Creating Shared Libraries Using Environment Variables

ANSIBLE

Ansible Introduction & Setup

- ❖ Configuration management & Orchestration
- ❖ Set Up of Ansible
- ❖ Set Up of Controller & Managed Nodes

Foundation

- ❖ Inventory
- ❖ Host Selection
- ❖ Tasks
- ❖ Plays
- ❖ Playbook Execution
- ❖ Ansible.cfg

Modules and Ad-hoc Commands

- ❖ Firewall
- ❖ Uri
- ❖ Get_url
- ❖ APT/YUM
- ❖ Service
- ❖ User
- ❖ Command
- ❖ Shell
- ❖ Copy
- ❖ Fetch
- ❖ Archive / Unarchive
- ❖ File
- ❖ Setup
- ❖ Debug
- ❖ Include
- ❖ Stat
- ❖ Git
- ❖ Docker_Container
- ❖ Docker_image
- ❖ Docker_login
- ❖ Etc...,

YML Scripting

- ❖ Basics of YML
- ❖ How to write & test YML scripts
- ❖ YML Scripting for writing Playbook

Playbook for CM Automation

- ❖ Writing playbooks
- ❖ Execution of playbooks
- ❖ Playbooks for configuring Tomcat, Apache, FTP, Docker etc.,
- ❖ Playbook Notification
- ❖ Playbook tags & handlers
- ❖ Exception handling

Roles

- ❖ Roles Overview
- ❖ Converting to Roles
- ❖ Using roles for implementing tomcat, apache, etc.,
- ❖ External Roles & Galaxy

Advanced Execution

- ❖ When Conditions
- ❖ Loops(with items, with sequence)
- ❖ Removing Unnecessary Steps
- ❖ Extracting Repetitive Tasks
- ❖ Limiting Execution by Hosts

ANT

- ❖ Introduction
- ❖ Configuring ANT
- ❖ Using Build.xml
- ❖ ANT Build Stages
- ❖ Run the code through Build.xml
- ❖ Integrating ANT with Jenkins

MAVEN

- ❖ Introduction
- ❖ Understanding Build Process
- ❖ Creating Maven from command Prompt
- ❖ Maven Dependencies
- ❖ Maven Stages
- ❖ Maven repositories
- ❖ Maven plugins
- ❖ Integrating Maven with Jenkins

NAGIOS

- ❖ Installation of Nagios
- ❖ Configuring Nagios
- ❖ Monitoring with Nagios
- ❖ Triggering Alerts
- ❖ Environment Setup in AWS

PROMETHEUS & GRAFANA

- ❖ Installation of Prometheus and Grafana
- ❖ Configuring Prometheus and Grafana using HELM
- ❖ Monitoring with Prometheus and Grafana
- ❖ Triggering Alerts

PYTHON

- ❖ Basic Scripting
- ❖ Understanding Methods, Classes and Objects
- ❖ Creating Customized Modules
- ❖ Using Python to Automate Docker
- ❖ Using Python Scripts to Automate Jenkins

AWS

- ❖ Cloud Deployment Scenarios in AWS
- ❖ Continuous Delivery in AWS
- ❖ Using Vagrant in AWS
- ❖ Using Docker containers in AWS
- ❖ Amazon Elastic Compute Cloud (EC2)
- ❖ Amazon Simple Storage Service (S3)
- ❖ Auto Scaling
- ❖ VPC
- ❖ Route 53
- ❖ Elastic Kubernetes Service (EKS)
- ❖ Elastic Container Registry (ECR)

TERRAFORM

- ❖ Introduction to Terraform
- ❖ Terraform Local Setup and AWS integrations
- ❖ Automating AWS
- ❖ Terraform Core Concepts
 - a) AWS providers Devops Course Content
 - b) Resources for VPC, Subnets, ec2 instances
 - c) Data Sources
 - d) Terraform State
 - e) Variables in Terraform

Terraform Project

- ❖ Setup of Git repo for Terraform project
- ❖ Setup AWS vpc's and subnets
- ❖ Route table and Internet gateway setups
- ❖ Associating Subnets with Route table e)
- ❖ Creating Security Groups
- ❖ Creating ec2 instances
- ❖ Creating ssh key pairs

- ❖ Configuring ec2 server to run entry script and run a Docker container

Provisioners in Terraform

Terraform Modules

- Introduction to Modules
- Creating Local Modules
- Module Outputs
- Using in-built Modules from Terraform Registry
- Modularize the entire Terraform Project
- Remote State in Terraform

AI

- ❖ Role of AI in Devops
- ❖ Practical implementation of AI on Devops tools
- ❖ →Generating docker and Kubernetes files using AI
- ❖ AI for Ansible playbooks and roles

