

# Azure DevOps Course

Unlock your future with our comprehensive course in Azure Cloud Administration and DevOps Toolchain! Designed for those looking to switch careers or start fresh as a DevOps/SRE Engineer, this course combines essential theory with hands-on practice to equip you with the skills needed for today's tech industry.

Dive deep into Infrastructure as a Service (IaaS) on Azure Cloud and gain valuable experience with cutting-edge tools and technologies including Git, Linux, Azure Services, Azure DevOps, Azure Repos, Azure Pipelines, Azure Artifacts, SonarQube, Terraform, Bicep, Ansible, Logging, Monitoring, Docker, and Kubernetes.

Our course not only provides you with in-depth knowledge but also prepares you for real-world challenges, setting you up for success in a DevOps role. By the end of the program, you'll have the practical experience and expertise needed to stand out in the job market. Take the next step in your career journey with us and become a highly skilled DevOps professional ready to seize exciting job opportunities in the cloud industry!

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## DEVOPS:

- Introduction to DevOps
- Overview of DevOps Tools
- Legacy system before DevOps
- DevOps Lifecycle

- Waterfall Model
- Agile Model

## LINUX SCRIPT:

- Datacenter Overview
- WSL Overview

### Linux Installation (Optional)

- Physical Machine
- Virtual Machine
- Cloud Services

### Basic Commands

#### *User Management*

- Types of Users in Linux
- Creating and deleting Users and Groups
- Modifying Users profile
- Adding Users into the Groups
- Important system files related to User & Group administration
- The Privileges of Root
- Delegating Root Privileges with Sudo

#### *Package Management*

- Description of a Repository
- Difference between RPM and YUM
- Configuration of YUM server
- Installing and deleting software packages
- Querying and updating software packages

#### *Backup and Recovery*

- Introduction to various types of backup media
- Backup and restoring using tar commands

#### *File Permissions*

- Importance of Permissions
- Types of Permissions
- User level Permissions
- Group level Permissions
- Setting Access Level Permissions on Users & Groups

#### *SSH & SCP*

- SSH Introduction
- Installation and Configuration
- Different ways to login using SSH
- SCP file Transfer

- Different ways to Copy files

### *Scripting Introduction*

- Shell Basics Fundamentals
- Searching and Replacing Techniques in files and Folders using grep,find sed,awk etc
- Bash Shell Syntax Overview
- Using Variables and Loops
- Automation techniques on Manual process

## **GIT**

- Introduction to GIT
- Types of Version Control
- GIT Architecture
- GIT Setup
- Local and Remote Repositories
- GIT and GITHUB integration
- GITHUB Activities
- Webhooks and Pull Request
- GIT Basics and Advanced Commands
- GIT Branching and Merging Strategies
- GIT Real Time Scenarios
- GitHub account creation
- GitHub Public Repo
- GitHub Private Repo
- GitHub Branching strategies

## **Cloud Engineering – AZURE**

### *Introduction to Azure Cloud Computing*

- **Explanation about Global Infrastructure**

### *Azure Networking*

- Virtual Network
- Subnets
- Virtual Network NAT
- Defined tables
- Network Security Group
- Static IP Address

### *Azure Compute*

- Azure Virtual Machines creation
- Managed disks
- Snapshots
- ARM

## Azure Load Balancers

- Application Gateway
- Load Balancer

## Azure Virtual Machine scale set & App service Auto scale

## Azure Identities and Governance

- IAM users
- IAM groups
- IAM roles and policies

## Azure Storage

- Blob Storage
- File Storage

## Azure DNS

- Domain Name space Registration
- Hosting Website
- DNS Records

# Azure DevOps

## Introduction to Azure DevOps

- What is Azure DevOps?
- Key features and services
- Comparison with other DevOps tools

## Getting Started with Azure DevOps

- Setting Up an Azure DevOps Organization:
- Creating an Azure DevOps account
- Navigating the Azure DevOps portal

## Understanding Azure DevOps Services:

- Azure Boards
- Azure Repos
- Azure Pipelines
- Azure Test Plans
- Azure Artifacts

## Azure Boards

### Work Items:

- Creating and managing work items
- Types of work items (Epics, Features, User Stories, Tasks, Bugs)

### Boards and Backlogs:

- Configuring boards and backlogs

- Managing sprints and iterations

#### Queries and Reporting:

- Creating and managing queries
- Dashboards and reporting

## Azure Repos

#### Version Control:

- Introduction to Git and TFVC
- Creating and managing repositories

#### Branching and Merging:

- Branch strategies (feature branching, release branching)
- Pull requests and code reviews

#### Repository Management:

- Setting up policies and permissions
- Managing code quality

## Azure Pipelines

#### CI/CD Fundamentals:

- Concepts of Continuous Integration and Continuous Deployment

#### Creating Build Pipelines:

- YAML vs Classic Editor
- Tasks and steps in a pipeline

#### Creating Release Pipelines:

- Environments and approvals
- Continuous Deployment

#### Pipeline Integrations:

- Integrating with external tools and services
- Managing pipeline variables and secrets
- Multistage pipelines
- Deployment strategies (BlueGreen, Canary)
- HandsOn Projects

## Azure Test Plans

#### Introduction to Test Plans:

- Overview of testing in Azure DevOps

#### Creating and Managing Test Cases:

- Creating test plans, test suites, and test cases



## **Azure Artifacts**

Introduction to Package Management:

- Overview of Azure Artifacts

Creating and Managing Feeds:

- Publishing and consuming packages

Integrating with Pipelines:

- Using artifacts in build and release pipelines

## **MAVEN – Build Tool**

- Introduction with Maven
- Installation of Maven
- Maven Configuration
- Creating Projects from Scratch

## **Jenkins (UI) Continuous Integration Tool**

- Introduction to Jenkins
- Jenkins Installation
- Tools Installation and Configuration
- Job Creation and Builds Setup
- Master – Slave Setup
- Build & Delivery PipelineSetup

## **NEXUS Artifactory Management**

- Introduction to Nexus
- Installation and Configuration
- Repository Management

## **SonarQube**

- Introduction to SonarQube
- Installation and Configuration
- Understanding of Static code Analysis,PMD, Check style
- Generating Token
- Walkthrough Administration tasks
- Integration with Azure DevOps
- Running Sonar from Azure DevOps CI Pipelines

# **Docker**

Docker Installation and Configuration

- What is Docker?
- Benefits of Containerization
- Container vs Virtual

## Docker Installation and Configuration

- Installing Docker on Different Platforms (Windows, macOS, Linux)
- Post-installation Steps and Docker CLI Configuration
- Docker Desktop vs. Docker Engine
- Troubleshooting Installation Issues

## Docker Basics Syntax and Advanced Commands

- Basic Docker Commands (docker run, docker ps, docker stop, docker rm, docker logs)
- Docker Networking Basics (docker network)
- Advanced Docker Commands (docker exec, docker attach, docker-compose, docker swarm)
- Working with Docker CLI vs. Docker Compose

## Docker Images

- Understanding Docker Images and Layers
- Creating Docker Images
- Managing Docker Images (docker pull, docker tag, docker rmi)
- Image Optimization and Best Practices

## Docker Containers

- Lifecycle of Docker Containers
- Managing Containers (docker start, docker stop, docker restart)
- Container Networking and Ports
- Container Health Checks and Logging

## Dockerfile Instructions and Dockerfile Creation

- Dockerfile Syntax and Structure
- Common Instructions (FROM, RUN, COPY, ENTRYPOINT, CMD)
- Building Docker Images from Dockerfiles
- Multi-stage Builds and Advanced Dockerfile Techniques

## Docker Registries and Docker Hub

- Introduction to Docker Registries
- Docker Hub Overview and Usage
- Private Registries and Docker Registry Setup
- Pushing and Pulling Images from Registries

## Docker Volumes

- Introduction to Docker Volumes
- Creating and Managing Volumes (docker volume create, docker volume inspect)
- Volume Types: Named vs. Anonymous Volumes
- Data Persistence and Backup Strategies

## Docker – Project 1

- Create custom Docker Image in Local Machine and run docker containers locally

## Docker – Project 2

- Create custom Docker Image and upload to Azure Container Registry and run docker containers

## Docker – Project 3

- Create custom Image and upload to Azure Container Registry using Azure DevOps CI-CD and run docker containers

# Kubernetes

## Introduction to Kubernetes

- What is Kubernetes?
- Definition and Purpose
- Brief History and Evolution
- Kubernetes vs. Traditional Deployment Models

## Kubernetes Architecture

- Master Node vs. Worker Nodes
- Components of the Master Node (API Server, Scheduler, Controller Manager)
- Components of the Worker Node (Kubelet, Kube Proxy, Container Runtime)
- etcd and its Role

## Key Kubernetes Concepts

- Pods
- ReplicaSets
- Namespaces
- Labels and Selectors
- ConfigMaps and Secrets

## Kubernetes Terminology

- Cluster
- Node
- Deployment
- Service
- Volume
- Namespace

## Azure Kubernetes Service (AKS) Cluster Creation

- Introduction to AKS
- Overview of AKS
- Benefits of Using AKS
- Comparison with Other Kubernetes Services

## *Prerequisites*

- Azure Account Setup

- Azure CLI Installation
- kubectl Installation

### *Creating an AKS Cluster*

- Using Azure Portal (Step-by-Step Walkthrough)
- Using Azure CLI (Commands and Parameters)
- Configuration Options (Scaling, Networking, Security)

### Connecting to Your AKS Cluster

- Configuring kubectl
- Verifying Connection

### Kubernetes Workloads

#### *Understanding Workloads*

- Definition and Purpose
- Types of Workloads

#### *Pods*

- Creating and Managing Pods
- Pod Lifecycle
- Multi-container Pods

#### *ReplicaSets*

- Purpose and Functionality
- Creating and Managing ReplicaSets

#### *Deployments*

- Deployment Strategies
- Rolling Updates and Rollbacks
- Creating and Managing Deployments

#### *StatefulSets*

- Purpose and Use Cases
- Differences from Deployments
- Managing StatefulSets

#### *DaemonSets*

- Purpose and Use Cases
- Creating and Managing DaemonSets

#### *Jobs and CronJobs*

- Running Batch Jobs
- Scheduling Jobs with CronJobs

### Kubernetes Services

#### *Introduction to Services*

- Purpose of Services

- Types of Services
- ClusterIP Service
- NodePort Service
- LoadBalancer Service

### **Kubernetes – Project 1**

- Minikube setup for local Kubernetes Cluster

### **Kubernetes – Project 2**

- Deploying 2 Tier Architecture in AKS Cluster

## **Terraform**

### **Introduction**

- Intro
- Installation & Setup
- Commands

### **Terraform- Project 1**

- Terraform project on Docker resources provision

### **Terraform- Project 2**

- Terraform project on Azure resources provision

### **Terraform- Project 3**

- Terraform HCP project on Azure resources provision using Terraform Cloud

## **BICEP**

### **Introduction**

- Intro
- Installation & Setup
- Commands

### **BICEP- Project 1**

- BICEP to create Azure resources automatically in Azure DevOps CI-CD

## **ANSIBLE - Configuration Management Tool**

### **Introduction to Ansible**

#### *Types of Configuration Management tools*

- Ansible, Chef, Puppet

### **Ansible Setup**

- Installation and Configuration
- Ansible installation Repo
- Different ways to install Ansible

## SSH Configuration and Root Privileges

- SSH Key Generate
- Password less Connection Setup
- Providing Ansible user Sudo Privileges
- Understanding Sudo Configuration & Inventory Management
- Default Inventory
- Inventory Structure and Hierarchy

## Implementing Playbooks

- Basic Playbook Structure
- Running Playbook
- Modules in Ansible
- Managing Multiple Tasks in Playbook
- Ansible Roles

## Ansible – Project 1

- Creation of Azure Resources using Ansible Azure Playbook

## Ansible – Project 2

- Managing Azure Resources using Ansible Azure Playbooks

# Comprehensive Logging, Alerting, and Monitoring

## Introduction to Logging, Alerting, and Monitoring

- Overview and Importance
- Definitions and Key Concepts
- The Role of Logging, Alerting, and Monitoring in IT Operations
- Benefits of Effective Monitoring and Alerting

## Key Components

- Logs
- Metrics
- Traces
- Alerts

## Azure Monitoring Tools

### Azure Insights

- Overview of Azure Insights
- Setting Up Azure Insights
- Key Features and Benefits

### Azure Log Monitor

- Introduction to Azure Log Monitor
- Configuring Log Monitor for Data Collection

- Integrating with Azure Services

### Azure Log Analytics Workspace

- Overview of Azure Log Analytics
- Creating and Configuring Log Analytics Workspace
- Querying Logs with Kusto Query Language (KQL)
- Visualizing Data and Creating Dashboards

### Azure Monitoring

- Using Azure Monitor for Alerts
- Configuring Alerts in Azure Monitor
- Setting Up Action Groups and Notifications
- Alert Rules and Automation

## Prometheus and Grafana

### Introduction to Prometheus

- Overview of Prometheus
- Key Features and Architecture
- Installing and Configuring Prometheus

### Prometheus Metrics Collection

- Configuring Metric Scraping
- Using Prometheus Query Language (PromQL)
- Visualizing Metrics with Prometheus Web UI

### Introduction to Grafana

- Overview of Grafana
- Key Features and Integration with Prometheus
- Installing and Configuring Grafana

### Creating Dashboards in Grafana

- Building and Customizing Dashboards
- Using Grafana Panels for Visualization
- Setting Up Alerts in Grafana

## Application Performance Monitoring (APM) Tools

### New Relic

- Introduction to New Relic
- Setting Up New Relic for Application Monitoring
- Key Features: APM, Infrastructure Monitoring, and Synthetic Monitoring
- Creating Dashboards and Alerts in New Relic

### Datadog

- Overview of Datadog
- Setting Up Datadog for Comprehensive Monitoring

- Key Features: APM, Log Management, Infrastructure Monitoring
- Creating Dashboards, Alerts, and Monitors in Datadog

## **Incident Management and Alerting**

### PagerDuty

#### *Introduction to PagerDuty*

- Overview of PagerDuty
- Configuring PagerDuty for Incident Management
- Integrating PagerDuty with Monitoring Tools
- Setting Up Alerting Policies
- Creating and Managing Alerting Rules
- Configuring On-Call Schedules and Escalation Policies
- Incident Response and Resolution Workflow

## **Troubleshooting Issues**

- Pipeline Issues
- Deployment (CI-CD) Issues
- Networking Issues
- Cluster Issues
  - Pod Restarting
  - Crashloop back errors
- Configuration issues
- Best Practices

## **Projects:**

**Project -1: GIT + Scripting + Azure + Azure DevOps + CI-CD + Prometheus + Grafana + Container Insights + Azure Container Registry + BICEP**

**Project -2: Automated CI-CD Multi-Environment Deployment**

**Project -3: Migration Project**

## **Interview**

- AI Based Interview Prep
- AI based Resume Prep
- Resume Preparation
- Interview Realtime Scenarios
- Interview Questions
- SelfIntroduction preparation
- Technical Rounds preparation
- HR Round Salary Negotiation techniques
- Grooming for moving from nontechnical to technical



- Background
- Grooming on Behavioral Skills and Mind Set Change

## **Additional sharing with Students:**

- Running Notes
- Diagrams
- Documentations
- Recorded Videos
- Scenario based Notes
- Interview Preparation Notes
- Fresher and Experience reference Resume