DevOps with Multi Cloud

DEVELOPMENT   OPERATIONS
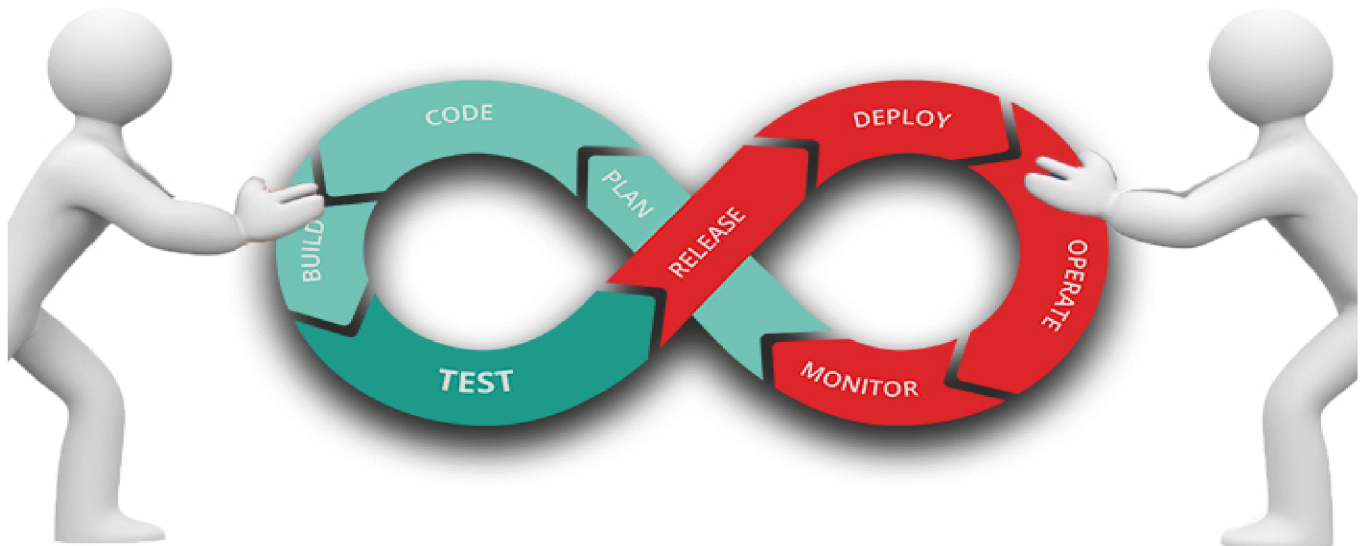
Version control	git	GitHub	
Continuous integration	circleci	Jenkins	Bamboo
Automation	Terraform	ANSIBLE	puppet labs CHEF
Deployment	Jenkins	Octopus Deploy	AWS CodePipeline
Containerisation	docker	LXC / LXD Linux Containers	
Orchestration	kubernetes	openstack	MESOS
Monitoring	Prometheus	DATADOG	graylog Grafana
Cloud	aws	Google Cloud	Microsoft Azure

DevOps Tools

Introduction to DevOps

- ➤ **What is Devops ?**
- ➤ **History of Devops**
- ➤ **Devops definition**
- ➤ **DevOps Culture**
- ➤ **DevOps Main Objectives**
- ➤ **DevOps and Software Development Life Cycle**
  - • **Waterfall Model**
  - • **Agail Model**
  - • **CICD Process**
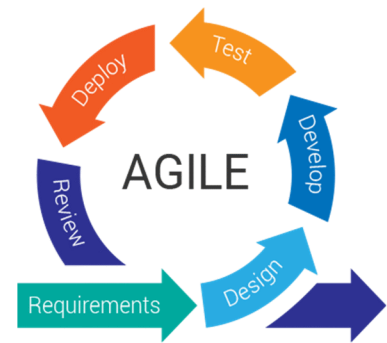
HA-Proxy (High Availability Proxy)

- ➤ **HA Proxy Installation**
- ➤ **HA Proxy Configuration(haproxy.cfg)**
- ➤ **Backend Servers & Ports**
- ➤ **Load Balancing Algorithm**
- ➤ **Multiple HA Proxy Configuration**

VERSION CONTROL - GIT

- ➤ **Version Control System**
- ➤ **Centralized and Distributed Systems**
- ➤ **GIT**
  - • **GIT Features**
  - • **GIT - Clone /Commit / Push**
  - • **GIT Hub Projects**
  - • **GIT Hub Management**
  - • **GIT Rebase & Merge**
  - • **GIT Stash, Reset , Checkout**
  - • **GIT Clone, Fetch , Pull**
  - • **GIT Branch Strategy**
  - • **GIT Branch Management**
  - • **GIT Hard & Soft reset**

BUILD TOOLS

- Maven Installation
- Maven Build requirements
- Maven POM Builds (pom.xml)
- Maven Build Life Cycle
- Maven Local Repository (.m2)
- Maven Global Repository
- Group ID, Artifact ID, Snapshot
- Maven Dependencies

GIT Lab

- GIT Lab Installation
- GIT Lab Configuration
- Managing Projects in GIT Lab
- Creating Private Repository
- Repository Maintenance
- Set up key for Repository
- Deleting Repository

NEXUS

- Sonatype nexus download
- Nexus Configuration
- Configure settings.xml & pom.xml files
- Managing Nexus Releases and Snapshots
- Repository Maintenance
- Nexus user management

PROMETHEUS

- Introduction to Prometheus
- Installation of Prometheus
- Monitoring container metrics with Prometheus
- Altering rules in Prometheus
- Monitoring Kubernetes Cluster with Prometheus
- Grafana dashboard for Prometheus metrics

CONTINUOUS INTEGRATION- JENKINS

- ➤ **Introduction to Jenkins**
- ➤ **Continuous Integration with Jenkins**
- ➤ **Configure Jenkins**
- ➤ **Scheduling build Jobs**
    - • **POLL SCM**
    - • **Build Periodically**
- ➤ **Maven Build Scripts**
- ➤ **Support for the GIT version control System**
- ➤ **Jenkins Build Pipe Line**
- ➤ **Jenkins Master & Slave Node Configuration**
- ➤ **Jenkins Workspace Management**
- ➤ **Securing Jenkins**
    - • **Authentication**
    - • **Authorization**
    - • **Confidentiality**
    - • **Creating Users**
- ➤ **Jenkins Plugins**
    - • **Installing Jenkins Plugins**
    - • **SCM plugin**
    - • **Build and test**

TERRAFORM

- ➤ **Introduction to Terraform**
- ➤ **Terraform Installation**
- ➤ **Terraform Providers**
- ➤ **Resources and Data Sources**
- ➤ **Change and Destroy terraform resources**
- ➤ **Terraform state commands**
- ➤ **Variables in terraform**
- ➤ **Terraform CLI - Console.**
- ➤ **Building AWS Infrastructure - Getting Started**
- ➤ **Building AWS Infrastructure —EC2 Instance**
- ➤ **Automate Provisioning of EKS clusters on AWS**
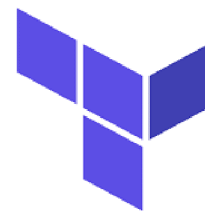
ANSIBLE

- Introduction to Ansible
- Ansible Server Configuration
- ansible.cfg configuration
- Infrastructure Management
- SSH Connection in Ansible Master
- YAML Scripts
- YAML Data types
- Host Inventory
- Ad-hoc Commands
- Playbooks
- Modules and Templates
- Ansible Roles
- Ansible Role Directory Structure

DOCKER

- How to get Docker Image ?
- What is Docker Image
- Docker Installation
- Working with Docker Containers
- Docker Command Line Interphase
- Docker Compose
- Docker Trusted Registry
- Docker swarm
- Docker attach
- Docker File & Commands
- Networking in Docker swarm
- Deploying multiple containers on swarm cluster via Docker compose
- Building Docker image from Jenkins job
- Pushing own images to Docker hub
- Deploying Micro service app with Docker compose
- Configuring volumes with compose file
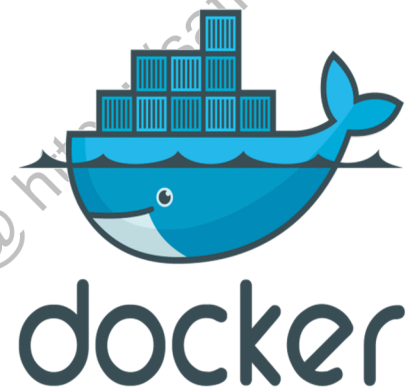
KUBERNETES

- ➤ **Kubernetes intro and Architecture**
- ➤ **Kubernetes Setup**
- ➤ **Running Docker containers on Kubernetes**
- ➤ **Kubectl ,kubeadm , kubelet**
- ➤ **Pod, Service, Controller and Deployment**
- ➤ **Difference between Docker Swarm and Kubernetes Orchestration**
- ➤ **Service running on manage node and minions**
- ➤ **Deploying the application through PODs**
- ➤ **Building multiple pods with high availability**
- ➤ **Create Kubernetes cluster on AWS with EKS**
- ➤ **Eksctl command line tool**
- ➤ **Configuring Auto Scaling EKS cluster on AWS**
- ➤ **Deploy application on EKS cluster from Jenkins**
- ➤ **Complete CI/CD pipeline on EKS cluster on AWS from Docker hub**

Linux Admin Commands and Shell scripting

- ➤ **Introduction**
- ➤ **Variables and Flow Controls**
- ➤ **Loops and Functions**
- ➤ **Manipulating Strings**
- ➤ **Reading and Writing Files**
- ➤ **Positional Parameters**

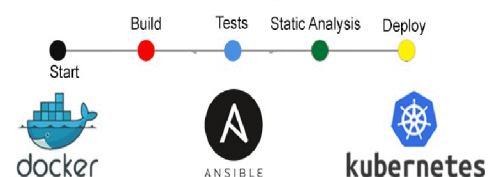## PROJECTS and INTERVIEW

1. GIT – MAVEN – NEXUS - JENKINS CI/CD

2. JENKINS – ANSIBLE – DOCKERProject

3. JENKINS – DOCKER – KUBERNETES Project

4. DevOps Resume Demo

5. Interview Preparation

6. DevOps FAQ's Discussion

Multi Cloud Services

Cloud Computing

- ➢ Evolution of Cloud Computing
- ➢ IAAS (Infrastructure as a Service)
- ➢ SAAS (Software as a Service)
- ➢ PAAS (Platform as a Service)
- ➢ Private, Public and Hybrid Cloud
- ➢ Public Clouds
    - • Amazon Web Services
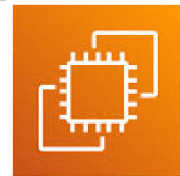   - • Azure Cloud Services
    - • Google Cloud Services

AWS (Amazon Web Services)

- ➢ Subscription to AWS
- ➢ Introduction to the AWS Management Console
- ➢ EC2 Essentials & Build EC2 Instances
- ➢ Security Groups

Elastic Compute Cloud(EC2) Instances

- ➢ Regions and Availability Zones
- ➢ Amazon Machine Images(AMI)
- ➢ EC2 Reserved Instance Market Place
- ➢ EC2 Instance Creation

Identity and Access Management (IAM)

- ➢ Creation of Users Accounts
- ➢ Roles in IAM and Groups in IAM
- ➢ Account Settings and Creating Permissions for Users

Virtual Private Cloud (VPC)

- ➢ Creating a Custom VPC
- ➢ Security Groups
- ➢ Creating Identity Gate Way (IGW)
- ➢ Subnets and Route Tables
- ➢ VPN Components

Elastic Load Balancer (ELB)

- ➢ **What is Elastic Load Balancing**
- ➢ **How Elastic Load Balancing Works**
- ➢ **Creating Load Balancer**
- ➢ **Attach & Detach Subnets**
- ➢ **Adding Instances to Load Balancer**
- ➢ **Monitoring and Logging**

Auto Scaling

- ➢ **What is Auto Scaling**
- ➢ **Auto Scaling Components**
- ➢ **Advantages of Auto Scaling**
- ➢ **Auto Scaling Groups (ASG)**
- ➢ **Attach and Detach EC2 Instances in ASG**
- ➢ **Monitoring Auto Scaling Instances**
- ➢ **Health Checks**

Simple Storage Services (S3)

- ➢ **Creating and Deleting Buckets**
- ➢ **Adding Objects to Buckets**
- ➢ **Deleting Objects**
- ➢ **Uses of S3 storage**

Amazon Cloud Watch

- ➢ **List of services monitored by Cloud Watch**
- ➢ **Collect and track metrics**
- ➢ **Monitoring memory and disk Metrics**
- ➢ **Monitoring logs, Graphs**
- ➢ **Set Alarms**

Amazon Simple Notification Service (SNS)

> ➤ Simple Notification Service overview

> ➤ Publishers and subscribers

> ➤ Creation of a topic

> ➤ Subscribing to topic via Email

> ➤ Setting notification for EC2 instance changes

Route 53

> ➤ Configuring Amazon Route 53

> ➤ Public Hosted Zones

> ➤ Private Hosted Zones

> ➤ Resource Record Sets

> ➤ Managing Health Checks

> ➤ Working with Public and Private Hosted Zones

Elastic Block Store(EBS)

> ➤ Instance Store Volumes

> ➤ Optimizing Disk Performance

> ➤ Creating and Deleting Volumes

> ➤ Attach and Detach Volumes

> ➤ Mount and Un-mounting Volumes

Relational Database Services (RDS)

> ➤ Data Base Instances

> ➤ Data Base Engine

> ➤ Creating Data Base

> ➤ RDS Limits

> ➤ Working with Storage Types

Cloud Formation

> ➤ Building AWS infrastructure as a code

> ➤ Design a template

> ➤ Create a Stack

> ➤ Create a Template from your Existing Resources

AWS Cloud Build

- ➢ **What is AWS Code Build?**
- ➢ **Creating First Code Build Project**
- ➢ **Creating Pipeline with Build Stage**
- ➢ **Creating Build Spec file for your build**
- ➢ **Triggering the pipeline with code commit changes**

AWS Code Deploy

- ➢ **What is AWS Code Deploy?**
- ➢ **Deployments on EC2 instances using Code Deploy**
- ➢ **Creating an AppSpec file for deployments on EC2**
- ➢ **Creating Deployment group with autoscaling and Load Balancer**

Create and Manage AZURE Virtual Machines:

- ➢ **Configuring Virtual Machines**
- ➢ **Managing and monitoring Azure Virtual Machines**
- ➢ **Addition of managed disks to an existing cloud server.**
- ➢ **Expansion of managed disk for cloud servers.**
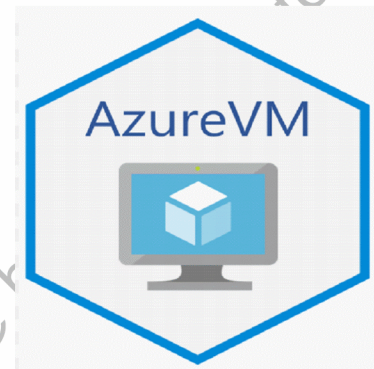
Create Storage Accounts and Store the Files:

- ➢ **What is storage account**
- ➢ **Different types of replications in storage accounts**
- ➢ **Different types of Blob(Page , Append & Block blob)**
- ➢ **Cloud storage services**
- ➢ **Create blob container.**

Implementing and Managing Azure Networking:

- ➢ **Overview of Azure networking**
- ➢ **Implementing and managing Azure virtual networks**
- ➢ **Configuring Azure virtual networks**
- ➢ **Configuring Azure virtual network connectivity**

Implementing Azure App Services (PAAS):

- ➢ **Planning app deployment in App Service**
- ➢ **Implementing and maintaining web apps**
- ➢ **Create the .NET/Java/PHP web apps**
- ➢ **Implementation of Apps for serverless concepts**
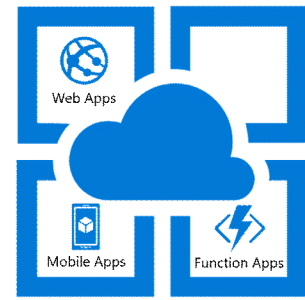
Planning and deploying Azure SQL Database

- ➢ **Implementing and managing Azure SQL Database**
- ➢ **Managing Azure SQL Database security**
- ➢ **Planning and deployment of SQL DB's in Azure cloud computing with real time scenarios.**

Configuring Alert and Metrics for VMs using Azure Monitor

- ➢ **Implementation, and Configuration of Azure Monitor.**
- ➢ **Setting up Alert rules, Metrics, Actions and Action groups in Azure monitor for**
- ➢ **different Azure resources deployed in cloud computing.**
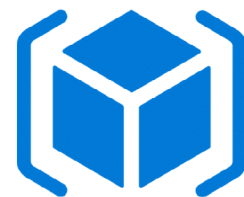- ➢ **Deploying an Alerts for Cloud App Service and workload**
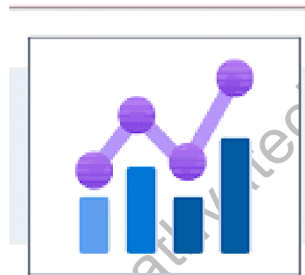
Implementing Azure Active Directory:

- ➢ **Deep dive of Azure Active Directory**
- ➢ **Different license offering of Azure Active Directory.**
- ➢ **On boarding Groups and users in Azure AD groups.**

Manage Resource Groups:

- ➢ **Migration of Resources Groups**
- ➢ **Configure resource locks and security standards for RG**
- ➢ **Identify auditing requirements.**
- ➢ **Removing/Deleting resource groups for cost savings**

for **DevOps** *online classes please do visit :* **www.sathyatech.com**

Thank you!