

Flow of DevOps

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Flow of AWS

Introduction to IT Resources

- IT Resources
- Types of IT Resources
- Problems with Traditional IT Resources

Introduction to Cloud Computing

- What is Cloud Computing
- Types of Cloud Computing
- Advantages of Cloud Computing
- Top Cloud Service Providers

Introduction to AWS

- AWS
- History of AWS
- Features of AWS
- Economic Models
- Different Ways to use AWS
- AWS Global Infrastructure (Regions, Availability Zones , Edge Locations, Regional Edge Locations)
- Explain AWS Management Console

EC2 (Elastic Compute Cloud)

- Introduction to EC2
- Components in EC2
- Sizing & configuration Options in EC2
- Types of Instances
- Features of EC2
- Pricing for EC2
- Hands On Creation of EC2 Instance (Linux)
- AMI (Amazon Machine Images)
- Creation of Windows Instances
- EBS (Elastic Block Store) Volumes & Creations
- EC2 Auto Scaling
- Elastic Load Balancing (ELB)

S3 (Simple Storage Service)

- Drawbacks of EBS volumes
- Introduction to S3
- Use Cases of S3

- S3 Buckets
- S3 Objects
- Bucket Creation
- Static Web Hosting
- Storage Classes
- Accessing S3 using EC2 (includes IAM service)

IAM(Identity & Access Management)

- Introduction to IAM
- Components in IAM- Roles, Permission Policies
- Creation of Role & Permission Policies
- IAM Users

VPC(Virtual Private Cloud)

- Introduction to VPC
- Why we need VPC
- Components in VPC
- IP Address - IPv4 & IPv6
- Security Groups
- Hands on VPC Creation

Lambda

- Introduction to Lambda
- Difference between EC2 & Lambda
- Features of Lambda
- Pricing in Lambda
- Structure of Lambda
- Types of Event Source
- Creation of Functions
- Author from Scratch (4 scripts)
- Author from Scratch (Get S3 Objects)
- Blueprint (Canary, Get S3 Objects)

SNS(Simple Notification Service)

- Introduction to SNS
- Creation of Topics
- Creation Of Subscriptions
- Using SNS with S3 as Event Source

CloudWatch

- Introduction to CloudWatch
- Components of CloudWatch

- Explain Metrics
- Create Dashboards (at least 2 dashboards)
- Create Alarms for EC2

Amazon Route 53

- Introduction to Route 53
- Domain Name System (DNS)
- Route 53 Hosted Zones
- Hands-on Route 53

Amazon RDS

- Intro to AWS Databases
- Relational vs Non-Relational
- Amazon RDS
- Hands-on practice

Amazon CLI

- Intro to CLI
- Explain Commands
- Hands-on practice

AWS account & Billing

- AWS Billing
- AWS Payments
- AWS Free tier Status

Tasks

- Include EC2, S3, IAM, Lambda, Cloudwatch, SNS services

Flow of GIT

VCS (Version Control System)

- Example for VCS
- Types of VCS & Explanation

GIT (Global Information Tracker)

- Introduction to GIT
- History of GIT
- Features of GIT
- Working Stages of GIT
- Workflow of GIT
- Basic Commands & Hands On

GitHub

- Introduction to GitHub
- Account Creation
- Push & Pull into Remote Repository

Branching

- Introduction to Branching
- Types of Branching
- Branching Commands & hands On

Merging

- Merging Commands
- Hands On
- Merge Conflict
- Resolving Merge Conflicts

Undoing Changes & Extra Commands

- Undoing Changes
- Additional Commands

Tasks

- Collaboration
- Branching
- Multiple Folders & merging

Flow of LINUX

Software

- What is Software
- Types of Software

Operating System

- Introduction to OS
- Architecture of OS
- Functionality of OS

Installation

- Installing Oracle Virtual Box
- Setting up Ubuntu (Jammy Jellyfish)

Linux

- Introduction to Linux OS
- History of LinuxOS
- Flavours/ Distribution of LinuxOS
- Features of LinuxOS
- Architecture of LinuxOS
- Difference between LinuxOS & Windows OS
- Basic Commands on Linux

File Management

- Types of path
- Commands in File Management

User Management

- Types of User
- Commands in user management

Group Management

- Commands in Group Management

File permissions

- Commands in File permissions
- Permissions using alphabet series
- Permissions using number series

File Compressions

- Types of Compression

File Systems

- Types of File systems

File Directories

Networking Commands

Extra Commands

Tasks

- Directories task (India & States)
- File permissions
- GIT & Linux (teach tokens)
- Create Users in Linux EC2 and give access to Students

Flow of Shell

Recap of Architecture Of Linux

Shell

- What is Shell?
- Types of Shell

Shell Scripting

- What is Shell Scripting?
- Features
- Commands to check shell
- Creation of shell script file

Input & Output Commands

- echo
- read.

Variables

- Declaring variable
- Utilising the value of a variable "\$".

Operator & Its Types

- Arithmetic Operators
- Relational Operators
- Logical Operators
- String Operators
- File Operators

Conditional Statements

- if
- if-else
- elif
- nested condition

Looping Statements

- For loop
- While loop
- Until loop

Tasks (Repo)

Flow of Maven

Recap of Traditional Approach

Build

- What is Build?
- Build Process:- Processes involved in developing the builds
- Why we need build tools

List of Build Tools (with description)

- Ant
- Gradle
- Pybuilder
- MSBuild
- npm
- Maven

Introduction to Maven

- What is Maven?
- History of Maven
- Features of Maven
- What is Pom.xml ?

Types of Repositories

- Local Repository
- Central Repository
- Remote Repository

Maven Phases

- Explain 8 phases(with the commands)

Maven Lifecycles

- Clean Lifecycle
- Default Lifecycle
- Site Lifecycle

Hands On

- Installation of JDK
- Installation of Maven
- Executing Commands

Flow of Jenkins

Traditional Build & Release Process

Introduction to Jenkins

- What is Jenkins
- What is CI, CD & CD
- History of Jenkins

Alternative Tools

- GitHub Actions
- GitLab
- Circle CI
- Travis CI

Why Jenkins

- Features of Jenkins

Installation & Setup (Windows)

Explain Jenkins Dashboard

Role Based Authorization

- What is Plugin
- Role Based Strategy Plugin
- How to enable Role Based Authorization

Jobs & its Types

- What is a Job?
- Job 1 :- Run Windows Batch Commands (Freestyle Job)
- Job 2 :- Run Java file from GitHub (Freestyle Job)
- Job 3 :- Run Maven commands (Freestyle Job)
- Job 4 :- Using Maven plugin, create maven project (Maven Job)

Build Triggers

- Build Periodically
- Poll SCM

Installation & Setup (Linux)

Create Jobs in Linux

- Job 1 :- Run Shell Commands (Freestyle Job)
- Job 2 :- Run Java file from GitHub (Freestyle Job)
- Job 3 :- Run Maven commands (Freestyle Job)
- Job 4 :- Using Maven plugin, create maven project (Maven Job)

Pipeline & its Types

- What is Pipeline
- Types of Pipeline :- Declarative Pipeline & Scripted Pipeline
- Explain Syntax (Declarative & Scripted)
- Hands-on practice

Master Slave Architecture

- What is master-slave architecture? Explain with diagram
- Locally Creation of master slave architecture (Windows)
- Remote Host of master-slave architecture (Linux)

Tasks

- Pipelines
- Master- slave

Flow of Docker

Application Architecture

- Monolithic
- Microservices
- 3-tier Architecture
- Give examples for above

Why we need Docker

Introduction to Containers

- What are containers?
- Containers vs Virtual Machines

Introduction to Docker

- Tools available for containerization.
- History of Docker
- Features of Docker
- Architecture of Docker
- Components of Docker

Introduction to Docker Hub

- Create Account in Docker hub

Installation

- Install on Windows(to know why windows is not suitable for docker)
- Drawbacks are there while using docker in windows
- Install on Linux

Docker File

- Explain Syntax of Dockerfile
- Create Dockerfile

Basic Commands in Docker

- Dockerfile to Docker Image
- List Docker Images
- Docker Image to Docker Container
- List Docker Containers
- Stop & Delete Container
- Delete Docker images
- Push & Pull the Docker Images from Docker hub
- Copying files from host to container and vice versa

Advanced Concepts

- Multi stage Docker
- Docker Volume
- Docker Networking
- Intro to YAML
- YAML vs JSON
- Docker Compose (Need understanding of YAML file)

Hands On

- Linux Docker
- Windows Docker
- Integrate Jenkins with Docker (Pipeline)
- Take the Github repository to convert it into an image.

Tasks

- Dockerfile for a Repo
- Docker x Jenkins Pipeline

Flow of KUBERNETES

Problems with Containers

Container Orchestration

- What is container orchestration
- Container Orchestration tools

Kubernetes

- What is Kubernetes?
- History & Features of Kubernetes
- Kubernetes Architecture
- Components of Kubernetes
- Creation of Pod in Kuberenetes cluster

YAML in Kubernetes

- What is YAML?
- Components of YAML
- Creation of pod using YAML

Replication Controllers

- What is replica?
- Why do we need replica?
- Creating replication controller

ReplicaSet

- What is replicaset?
- Creation of replicaset

Deployment

- What is deployment?
- Creating Deployment

Kubernetes Services

- What is Kubernetes services?
- Types of Kubernetes Services
 - ClusterIP Service
 - NodePort Service
 - LoadBalancer Service
- Creating service.yml

Installation of Kubernetes

Flow of TERRAFORM

Introduction

- Introduction to Infrastructure as a code
- Why we need Infrastructure as a Code

Terraform

- What is Terraform?
- Terraform Architecture
- History
- Lifecycle (init, plan, apply, destroy)
- Installation
- Hands-on practice

Flow of Ansible

Introduction

- What is Configuration Management
- Uses of Configuration Management
- Types of Configuration Management
- Introduction to Ansible
- Installation Process
- Ansible Commands
- Ansible Playbooks

PROJECTS

1. Hosting a WebApp into EC2 instance
2. Hosting a WebApp into EC2 instance by Jenkins Pipeline
3. Docker Voting App
4. Containerize the Application (Github repo) in EC2 instance by using Jenkins
5. Providing Infrastructure in AWS by Terraform
6. Deploying Application in AWS with Terraform