DEVOPS Tools and Modules

1) DevOps Introduction

- Software Development Life Cycles (SDLC)
  - Waterfall Model
- Agile Methodology
  - Scrum Model
  - Sprint/ Iteration
- What is DevOps?
- Why DevOps?
- DevOps Importance
- DevOps Model
- DevOps Life cycle
- Market Trend and Career Scope for DevOps
- DevOps Tools

2) Linux

- Introduction of Linux Operation System
- Installing Pre-requisite Software's (SSH Tools and FTP Tools) in Desktop/Laptop.
- Create an account in AWS.
- Create an EC2 Instance in AWS.
- Linux File/Directory structure.
- Linux Commands.

mkdir	cat	service	userdel	uname
ls	head	uptime	groupdel	cat /etc/*releases
tree	tail	last	crontab	watch
cd	more	ps	ssh	netstat
pwd	less	kill	scp	exit/logout/ctrl+d
rmdir	sort	top	rsync	yum
touch	tr	sar	ssh-keygen	read
find	sed	zip	ssh-cpy-id	restart
umask	grep	unzip	awk	reboot
chmod	who	tar	cut	shutdown
chown	w	useradd	free	
chgrp	whoami	passwd	dmidecode	

cp	whereis	chage	mail	
mv	date	groupadd	clear	
rm	df	usermod	cal	
file	du	id	wget	
wc	hostname	lid	tee	

ln	ipconfig	su	script	
vim	man	sudo	ping	
nano	help	users	telnet	
echo	info	groups	history	

3) Shell Scripting

- Introduction
- What is Shell?
- Types of Shells
- What is Shell Scripting?
- First Shell Script program
- File Naming Conventions
- Comments
- Variables
- Command line Arguments
- Escape Characters
- String
- Arithmetic Operations
- User Interaction using read command
- Input and Output Redirection
- Control commands – if
- Control commands – for
- Control commands – while loop
- Control commands – Switch case
- Functions
- Pipe

4) Git

- Account Creation in GitHub
- What is git?
- What is the VCS?
- What is SCM?
- What is Branch?
- What is Tag?

- Git Administration.
- Git commands
- Working with git as a Developer perspective
- SSH Key generation
- PAT creation
- Cloning Repositories
- Merging Branches
- Pull Requests
- Cloning Remote Repo

- Forking Repo
- Branching strategy
- Best practices for Releases/Code commits in any VCS

5) Maven

- Introduction
- Features & Benefits of Maven
- Installation (Maven Environment Setup)
- Directory Structure
- Content of pom.xml
- Maven Repositories
- Maven Life Cycles
- Executing some Examples
- Maven Multi Modules
    - Parent pom
    - Child pom

6) Tomcat

- Introduction
- Difference between App server and Web server
- Understating of Web Servers, App Servers and Database Servers
- Installation (In Windows - Extraction, In Linux Installation)
- Directory structure
- Start the Tomcat server
- Stop the server
- Users creation
- Roles
- Port number change
- Application Deployment
    - Through Admin Console
    - Copy artifact into webapps folder
- Tomcat Tuning

7) Apache HTTP Server

- Introduction
- Installation
- Directory Structure
- Start the HTTP server
- Deploy the web static application.

8) SonarQube

- Introduction
- Pre-Requisites
- Architecture
- Installation
- Change the Port Number
- Execution
- Administration
    - Users Creation (Normal User and Administrator)

- Project Creation
- Project deletion
- Token Generation
- Create Quality Profiles
- Create Quality Gates
- Configure Email settings

9) Nexus

- Introduction
- Installation
  - Password and Email change for Admin User
  - Email server Configuration
  - Port Number Change
  - Context root change
- Nexus Directory structure
- Create the Repositories (maven2hosted, maven2proxy, maven2group and docker..)
- Integrate the Maven with Nexus
- Create Users
- Nexus API

10) Jenkins

- **Introduction**
  - Continuous Integration (CI)
  - Continuous Delivery (CD)
  - Continuous Deployment (CD)

- **Installation**
  - In Linux Server

- **Create the Maven Project using Freestyle Project type**
  - Integrate Maven software if not done.
  - Integrate Nexus with Jenkins
  - Integrate SonarQube with Jenkins
  - Deploy the App into Tomcat
  - Through “Deploy to container” plugin
  - Through Script – SSH Agent Plugin
  - Configure Email Functionality
  - Poll SCM
  - Build Periodically
  - Git Web Hooks
  - Discard Old Build
  - Disable this project
  - Delete workspace before build starts
  - Add timestamps to the Console Output
  - JACOCO plugin

- **Jenkins Directory structure**

- **Create the Maven Project using Maven Project type**

- **Plugin Management**
  - Safe Restart

    - Next Build Number
    - Email Extension
    - SonarQube Scanner
    - Schedule Build
    - Artifactory Plugin
    - Cloud Foundry
    - Blue Ocean
    - Deploy to container
    - Deploy WebLogic
    - WebSphere Deployer
    - Maven Integration
    - JaCoCo
    - SSH Agent
    - Publish Over SSH
    - Thin Backup
    - Build Name Setter
    - Convert To Pipeline
- **External Plugins Installation**
    - Urban Code Deploy
- **Port Number Change**
- **Build with parameters**
- **Create View**
- **Jenkins Security**
    - Create Users (Default Admin)
    - Provide the specific access Jenkins
    - Provide the access to specific access to specific projects
- **Create the Pipeline Project Jobs (Scripted way and Declarative way)**
- **Create the Multibranch Pipeline Project Jobs**
- **Create Master/Slave**
- **Jenkins Backup**
- **Jenkins Migration**
- **CICD Implementation for Node JS Project**
- **Jenkins Shared Libraries**

Jenkins CLI

- **Optional Topics**
    - Jenkins Home Directory Change in RHEL 7.5 Version
    - Integrate the Urban Code Deploy server with Jenkins
    - Deploy the App into IBM Cloud
    - Slack integration

****** 5 Ways of Deploying application into Production Environment ******

11) Docker

- Docker Introduction
- Containerization Vs Virtualisation
- Docker Vs Virtual Machine
- Docker Installation
- Dockerfile
- Dcoker Image
- Docker Container
- Docker Adhoc Commands
- Docker Networks
- Docker Volumes
- Docker Keywords
- Dockerfile Creation
- Docker Images creation
- Docker Images save to Dockerhub
- Docker Compose
- Docker Swarm

12) Kubernetes

- Kubernetes Introduction
- Architecture
- Kubernetes Cluster (Self-Managed) Setup Using Kubeadm.
- Kubernetes Namespace
- Kubernetes Objects
- POD Replication Controller
- Replica Set
- Daemon Set
- Deployment Set
- Rolling Update
- Recreate
- Stateful Set
- Service
- Volumes Persistent
- Volume Persistent Volume Claim
- Dynamic Volumes Config Maps & Secrets
- HPA & Metrics Server
- Kubernetes Cluster Setup in AWS Using KOPS
- EKS Kubernetes Cluster Setup Using Terraform
- Load balancer Service
- Ingress Controller & Resource
- Liveness & Readiness probes
- Kubernetes RBAC
- Kubernetes & Jenkins Integration
- Kubernetes Dashboard Setup
- Helm
- Monitor Kubernetes Using Prometheus And Grafana.

- Log aggregation Using EFK

13) Ansible

- Introduction
- Architecture
- ssh-key generation
    - Copy SSH Key
- Ansible adhoc Commands
- Ansible Playbooks
- Execution of Ansible Playbooks
- Ansible Modules
- Roles
- Ansible Vault
- Ansible Galaxy

14) AWS

- Elastic Compute Cloud (EC2)
    - Introduction to Amazon EC2
    - Launch Our First EC2 Instance - Part 1
    - Launch Our First EC2 Instance - Part 2
    - How to use Putty (Windows Users Only)
    - Security Groups
    - Volumes vs Snapshots
    - EC2 Instance Meta-data
        - EFS Service
    - Summary of EC2 Section
    - Amazon Machine Instance (AMI)

- Elastic Block Store (ELB)
    - What is ELB and its uses
    - ELB Policies and it’s benefits
    - How to launch ELB with N nodes and other concepts on ELB.
- Auto Scaling
    - Elastic IP (EIP)
- Virtual Private Cloud (VPC)
    - VPC Overview
    - Building our own custom VPC
    - Build A Custom VPC - Part 2
    - Network Address Translation (NAT)
    - Access Control Lists (ACLs)
    - Custom VPC's
    - Direct Connect and it’s benefits and limitations
    - VPC Clean Up
    - VPC Summary

- Simple Storage Service (S3)
    - S3 Essentials
    - Creating a S3 Bucket Using the Console
    - S3 Storage Options and Types
    - Create a S3 Website

- S3 Version Control
- Cross Region Replication
- S3 Lifecycle Management & Glacier
- Cloud Front Overview
- Create a CDN
- S3 - Security
- Snowball
- S3 Summary
- Elastic Volumes, Instance stores,

- Elastic Load Balancer (ELB)
- Identity Access Management (IAM)
  - Introduction of IAM
  - Users
  - Groups
  - Roles
  - Policies
  - Permissions
  - Security Measures like MFA etc.
- AWS CLI
- AWS Elastic IP

15) Monitoring Tools (New Relic/Grafana, Prometheus)

16) Resume Preparation and Agile Topics

- Resume Preparation
- DevOps Engineer Daily Activities
- Process flow of Scrum Methodologies
- Scrum Meeting
- Sprint Planning
- Retrospective Meeting
- Release Management
