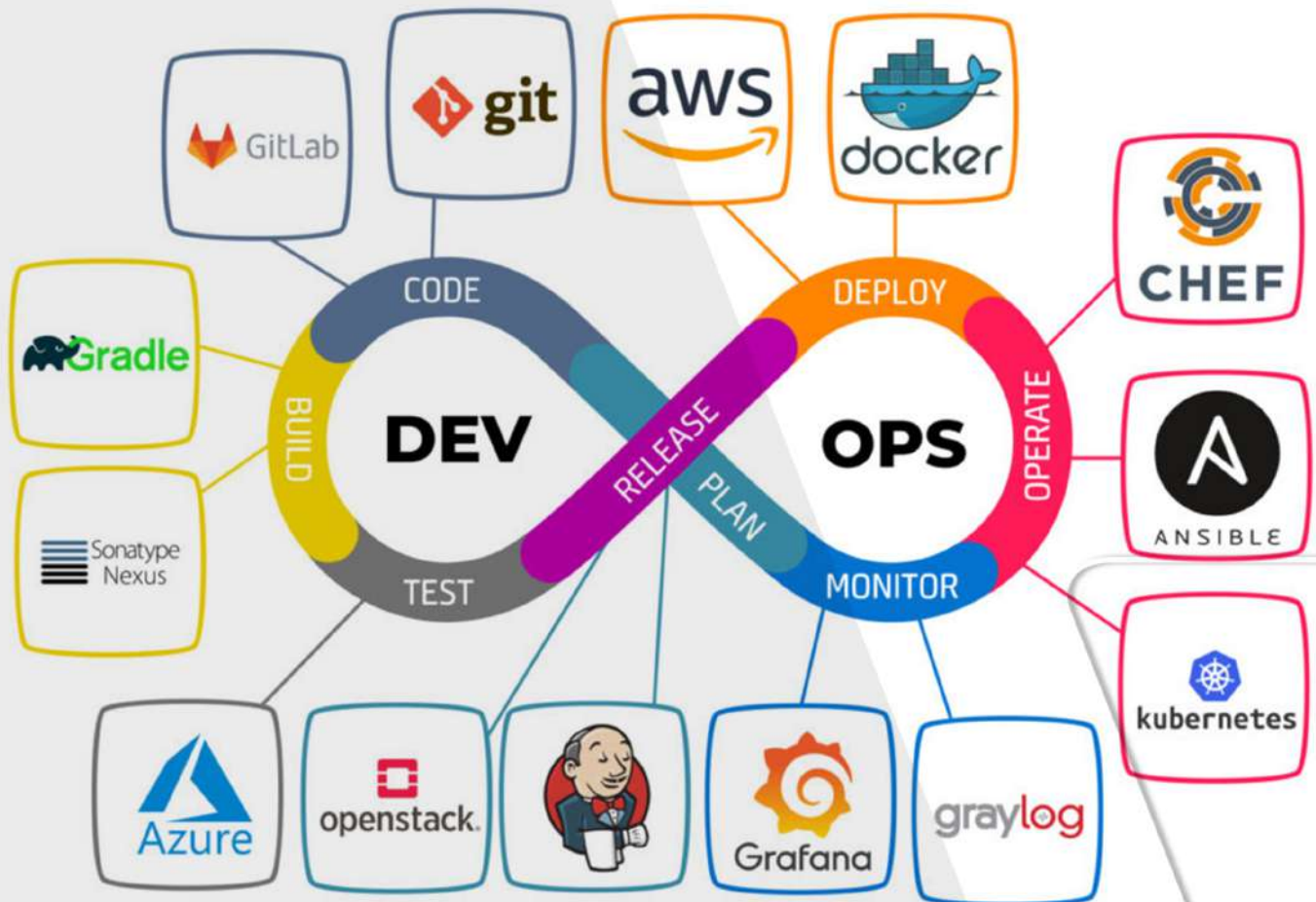




DevOps

SYLLABUS & CONTENTS





PREREQUISITES

1. AWS Free-tier account
URL: <https://aws.amazon.com>
2. Github account (or) Git bash installation
GitHub: <https://github.com>
Git bash download: <https://git-scm.com/downloads>
3. Dockerhub account
<https://hub.docker.com>
4. Putty (or) mobaXterm
To download Putty:
URL: <https://www.putty.org>
To download mobaXterm:
URL: <https://mobaXterm.mobatek.net>

DEVOPS

LIFE CYCLE

✓ Development

✓ Integration

✓ Testing

✓ Monitoring

✓ Feedback

✓ Deployment

✓ Operations



i). Development

This is the first stage of DevOps lifecycle in which development of application takes place constantly. The entire development process is broken down into small steps or development cycles. As a result of this, the speed of software development and delivery is increased.

ii). Testing

Selenium like testing tools is used to speed up the overall testing process by quick identification of errors and fixing the bugs.

iii). Integration

New functionalities are integrated with the prevailing code, and testing of new code takes place. Continuous integration and testing help in the continuous development process.

iv). Deployment

Continuous deployment is the part of DevOps lifecycle. When it is performed in the right way, then it can affect the overall functioning of a high traffic website.

v). Monitoring

Inappropriate system behavior is managed by monitoring. Through proper monitoring, the bugs are found and fixed in a hassle-free way.

These are the building blocks for any DevOps application. As per DevOps culture, a group of Engineers is responsible for each stage of DevOps application development, including developer, system admin, testing, and others.

DEVOPS IMPLEMENTATION

1. Kickstarting DevOps Culture



3. Using Containerization Technology



5. Alignment between QA & Development process



2. Building CI/CD process



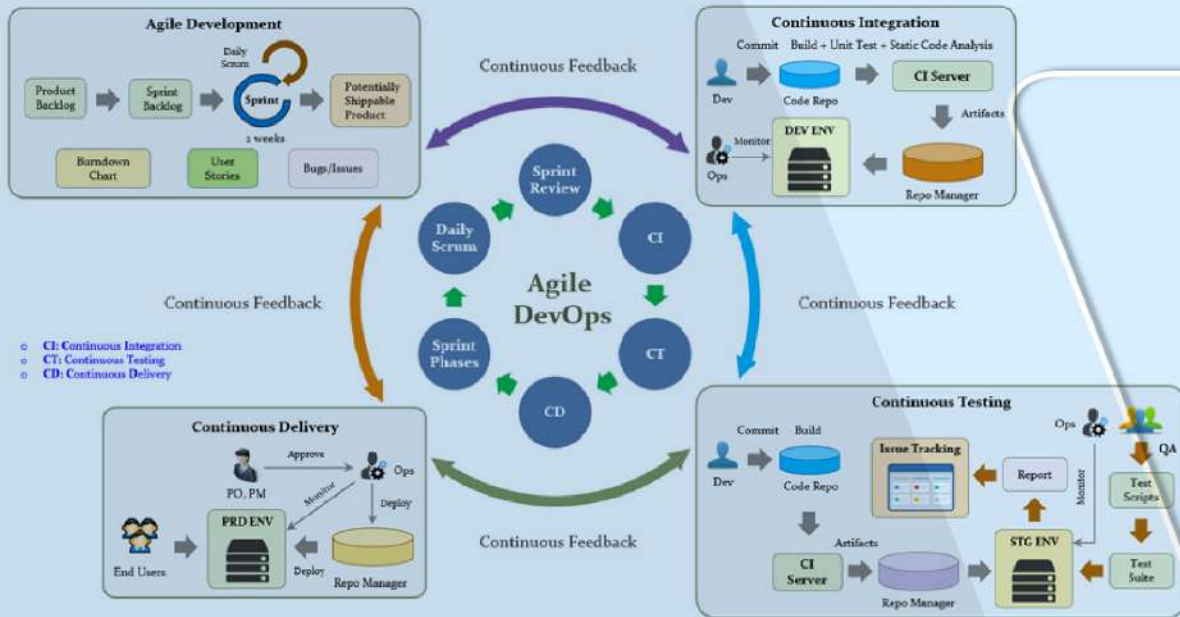
4. Integrate Powerful DevOps Tools



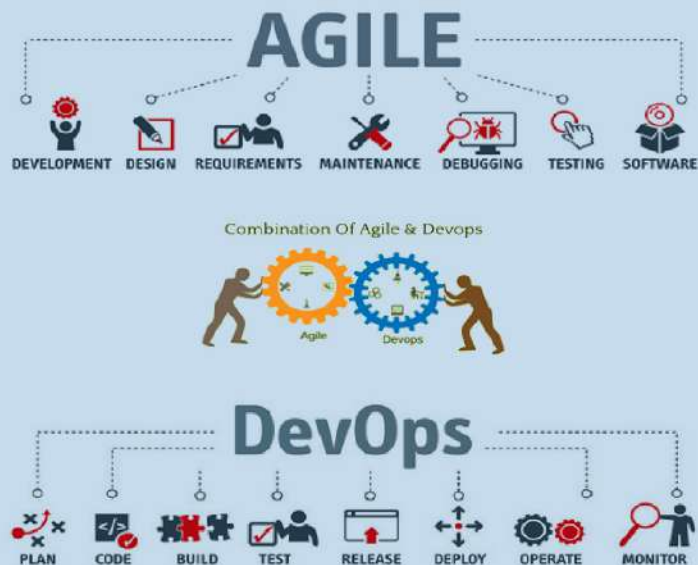
6. Monitor application performance



DevOps Methodology and Process



How Agile & DevOps is connected ?



DevOps Tools



UNIX/LINUX (OS)

Introduction to Linux/Unix
Overview about client and server operating systems
Installation Red Hat Enterprise Linux
File system Hierarchy
Terminal Overview
Basic Commands
VIM Editor
Files (hard & soft)
File Permissions
User and Group Administration
Package/Soft Management
Job Automation(crontab)

GIT (SCM/VCS)

What is GIT?
Installing Git for Windows
Installing Git for Linux
Basic Commands Overview
Diff b/w Git and SVN
Git global configurations
.gitignore concept
Git Diff
Log management
Git stages
Creating Branches
Git merge
Git Rebase
Backing Out Changes
Git HEAD
Undo's from working, staging, and committing areas
Renaming and Moving Files & Deleting Files
Git Repository Setup
Rewriting The commit messages
Git push, pull and fetch
Git Stash
Git Conflicts
Git fetch
Git Tags

Git cherry pick
Bisect

GITHUB (ORS)

What is GitHub/Bitbucket/Gitlab
Overview of GitHub
Installation of ORS tools
creating repositories
pushing repositories to remotely
cloning repositories from remote to local
Managing tags remotely
fetch and pull differences
pull request
Deleting Repos
Forking Repos

ANT/MAVEN (BUILD TOOL)

Over view of Maven
Diff b/w Maven and Ant
Diff b/w Maven and Other build tools
How to install Maven in Windows
How to install Maven in Linux
Maven Architecture
Maven Phases/Goals
Default Life Cycle
Standard Directory Layout
GAV
Maven local and remote repositories
Packages and their types
Sample Maven Projects
One by one goals executions
Build in and custom plugins
POM File
Maven SNAPSHOT
Maven profiles
Maven dependency
How Install phase works
How to Deploy Executable files in Application Servers

JENKINS (CI/CD)

- What is CI/CD
- Introduction to Jenkins
- History of Jenkins/Hudson
- How to install Jenkins in Windows and Linux
- How to create Jobs
- Diff types of jobs
- Integrating with GitHub
- Integrating with Build tools
- Build from GitHub Project
- Managing Remote Systems with Jenkins
- Parameterized Builds
- Securing Jenkins
- How to install plugins in Jenkins
- Scheduling Builds
- Setting up Different Types of Automated Builds
- How to configure one job to another job
- Configure Global Security Jenkins Administration
- How to create maven type job
- How to create ant type job
- Jenkins pipeline
- Jenkins Backup
- How to deploy code in servers
- Authentication and Authorization
- How to create Nodes in diff Servers
- Build pipeline view
- Most useful 20 plugins

SONARQUBE (CODE QUALITY TESTING)

- What is SonarQube
- How to Install SonarQube
- Analyzing with SonarQube scanner for Maven
- Integrate SonarQube with Maven
- Integrate SonarQube with Jenkins
- Generating final report in sonar dashboard

TOMCAT (APPLICATION SERVERS)

- Introduction to Apache Tomcat server

How to install Tomcat in windows
How to install Tomcat in Linux
Manual Deployment
Continuous Deployment using Jenkins jobs
Deploying sample web application (sample. War)

ANSIBLE (CONFIGURATION MANAGEMENT)

Introduction to CM
How to setup Ansible
Understanding Ansible architecture & Execution
Ansible documentation
Installing packages by using Ansible
Writing playbook
Workflow of Chef
Workflow of Ansible
What is diff b/w Ansible and Chef?
How to install Ansible in Linux and Windows
What is Work-station, Chef-Server, Nodes
Servers and Nodes concept
Chef Configuration Concepts
Workstation Setup
Creating Cookbooks and uploading into server
How to use Ruby in Chef
About Bootstrap
Package/service actions
Installing Multiple packages at one time
How to manage Chef-Servers
Create roles & Add Roles to organization
How to Add Run list to Node
Check node Details
How to create Data bags
Add Database to organization
Create a server and add to organization
Check node details using knife
Create organization and Environments
Add yourself and node to organization
Adding nodes to Chef-Server
Most useful Playbooks
What is Ansible & its features

JFROG/NEXUS (ARTIFACTORY STORAGE)

- Introduction to Artifacts
- Installation and configuration
- Integrating with Jenkins
- Generating final report in Jfrog dashboard

VIRTUALIZATION

- Introduction to virtual machines
- Creating multiple VM's
- Guest and host operating systems
- Hypervisors
- VM Ware
- Virtual Box
- Diff b/w containers and virtual machines

DOCKER

- Learning the Basics of Docker
- Introduction to Docker
- Containers vs Virtual Machines
- Docker Architecture and Hub
- Docker Installation
- Creating Our First Image
- Working with Multiple Images
- Packaging a Customized Container
- Running Container Commands with Docker
- Managing and Removing Base Images
- Pushing to Docker Hub
- Creating Shared volume groups
- Create own images
- Docker Networking
- Docker file for user
- Volume management
- Docker Link and Docker Compose

KUBERNETES

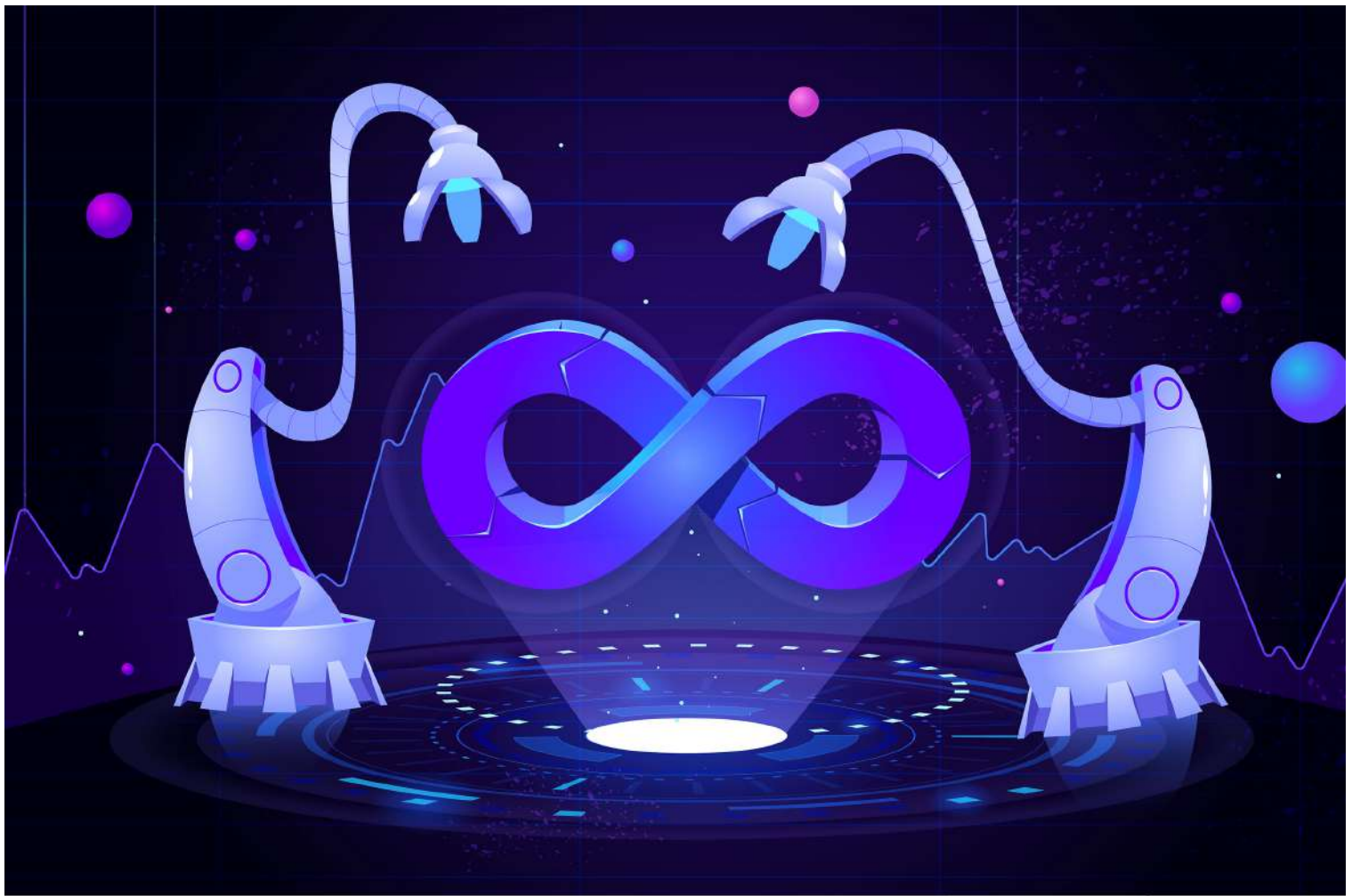
- Introduction
- Why and what Kubernetes

Installation
Kubernetes Objects
Kubernetes Architecture
Pods, Service, Volume , Namespace, Replica Set
Deployment
Stateful Set
Daemon set
Job
Create a Cluster using Kubeadm ,Minikube
Using kubectl to Create a Deployment
Using a Service to Expose Your App
Scale Your App
KUBEADM ON AWS
Using kubeadm to Create a Cluster
Pod deletes

AWS CLOUD

Traditional Infrastructure Scalling
Cloud Computing
Cloud Computing Providers(Vendors)
Cloud Service Models
Introduction to AWS
Why AWS?
AWS Global infra
Free Tier account creation
Putty / MobaExterm / Multi-factor authentication (MFA)
EC2 , EBS , VPC
ELB
Auto scaling Group
IAM
AMI
Snapshots
Elastic Ip
S3





Assessment and Evaluation:

- Quizzes and exams
- Class participation and discussion
- Assignments and Projects
- Final Project

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