JENKINS

What is Jenkins?

Jenkins is an open-source automation server used for continuous integration and continuous delivery (CI/CD). It helps automate software development processes such as building, testing, and deploying applications. Jenkins port number is 8080.

What is the Use of Jenkins?

- Automates software development tasks.

- Integrates with various version control systems like Git.

- Supports Continuous Integration (CI) and Continuous Deployment (CD).

- Provides plugins for extensibility.

- Enables efficient monitoring of project builds and deployments.

What is Continuous Integration (CI)?

Continuous Integration (CI) is a development practice where developers frequently integrate code into a shared repository. Each integration is verified by automated builds and tests to detect issues early.

What is CI/CD?

CI/CD (Continuous Integration/Continuous Deployment) is a set of practices that automates software delivery:

- **Continuous Integration (CI):** Automates code integration and testing.

- **Continuous Delivery (CD):** Ensures that code is ready for deployment at any time.

- **Continuous Deployment:** Automatically deploys code to production after passing tests.

Need for CI/CD

- Reduces integration and deployment time.

- Enhances software quality and reliability.

- Facilitates rapid feedback loops.

- Minimizes manual intervention and deployment errors.

Difference Between Continuous Delivery and Continuous Deployment

Aspect	Continuous Delivery	Continuous Deployment
Automation Level	Code is automatically tested and prepared for deployment but requires manual approval.	Code is automatically deployed to production without manual intervention.
Deployment Control	Requires manual intervention.	Fully automated deployment.
Risk Factor	Lower risk since deployment is controlled.	Higher risk due to automatic deployment.

Types of Jobs in Jenkins

1. **Freestyle Jobs** – Simple job configurations that allow users to define build steps and post-build actions.

2. **Pipeline Jobs** – Advanced job configuration that defines the entire build process as code using Jenkins Pipeline syntax.

Jenkins Architecture

Jenkins follows a **Master-Slave (Controller-Agent)** architecture:

- **Master (Controller):** Manages job scheduling, builds, and reports.

- **Slave (Agent):** Executes jobs assigned by the master, enabling distributed builds.

Components of Jenkins

- **Jenkins Master:** The core Jenkins server that manages jobs.

- **Build Nodes (Slaves):** Execute jobs assigned by the master.

- **Job Builder:** Creates and configures jobs.

- **Executors:** Run jobs on master or slaves.

- **Plugins:** Extend Jenkins functionalities.

- **Jenkins Pipeline:** Defines the build process as code.

Jenkins Directories

- **Jenkins Home Directory:** /var/lib/jenkins/

- **Installed Plugins Directory:** /var/lib/jenkins/plugins/

- **Created Jobs Directory:** /var/lib/jenkins/jobs/

Various Environments

1. **Development (Dev)** – Developers write and test code.

2. **Quality Assurance (QA)** – Testers validate software functionality.

3. **User Acceptance Testing (UAT)** – Final validation before production.

4. **Production (Prod)** – Live environment for end-users.

Need for Environments

- Ensures software stability and quality.

- Isolates different stages of testing.

- Prevents production failures.

- Allows thorough testing before deployment.

Jenkins Installation Process

Follow these steps to install Jenkins on Amazon Linux:

1. **Install Java**

   sudo yum install java-1.8.0-amazon-corretto.x86_64

   java -version

2. **Install Git and Maven**

   sudo yum install git -y

   sudo yum install maven -y

   mvn -version

3. **Add Jenkins Repository**

   sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo

sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key

4. **Update System and Install Jenkins**

sudo yum update -y

sudo yum install jenkins -y

5. **Start and Enable Jenkins Service**

sudo systemctl start jenkins

sudo systemctl enable jenkins

sudo systemctl status jenkins

6. **Install Additional Dependencies**

sudo amazon-linux-extras install epel -y

7. **Verify Jenkins Installation**

service jenkins start

jenkins --version

sudo systemctl status jenkins

8. **Retrieve Initial Admin Password**

cat /var/lib/jenkins/secrets/initialAdminPassword