St. Francis Institute of Technology, Mumbai-400 103

Department Of Information Technology

A.Y. 2024-2025

Class: TE-ITA/B, Semester: V

Subject: **DevOps Lab**

Experiment – 6: To understand master-slave architecture and scale your Jenkins standalone implementation by implementing slave nodes.

1. **Aim:** To understand master-slave architecture and scale your Jenkins standalone implementation by implementing slave nodes
2. **Objectives:** Aim of this experiment is that, the students will be able to do
   - Jenkins management
   - Adding a slave node to Jenkins
3. **Outcomes:** After study of this experiment, the students will be able
   - To understand the importance of Jenkins to Build and deploy Software Applications on server environment.
4. **Prerequisite:** Knowledge of Computer Networks concept of Master-slave architecture
5. **Requirements:** Jenkins, JDK, python, Personal Computer, Windows operating system, browser, Internet Connection, Microsoft Word.
6. **Pre-Experiment Exercise:**
   Brief Theory: Refer shared material
7. **Laboratory Exercise**
   A. **Procedure:**
      a. **Answer the following:**
   - Explain the architecture of Jenkins with a diagram.
   - Explain the distributed architecture of Jenkins with diagram

      b. **Execute following (Refer the shared material) and attach screenshots:**
   - Create a slave node and connect it to master
   - Use an existing project or a new project to run in the slave node
   - Apply cron command on a project

8. **Post-Experiments Exercise**
   A. **Extended Theory:**
      Nil
   B. **Questions:**
      - What are the ways to configure Jenkins node agent to communicate with Jenkins master?
      - Which architecture is recommended for a scalable Jenkins environment?
   C. **Conclusion:**
      - Write what was performed in the experiment.
      - Write the significance of the topic studied in the experiment.
   D. **References:**

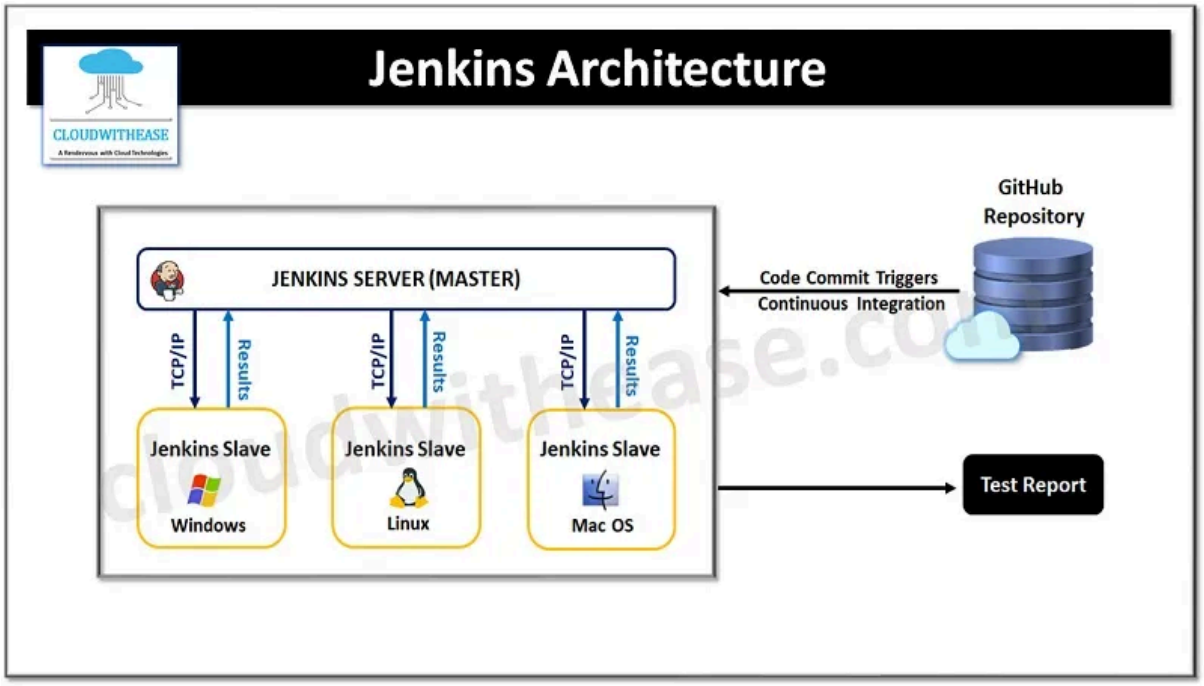
https://jenkins.io/doc/
https://www.slideshare.net/abediaz/introduction-to-jenkins
https://www.studytonight.com/jenkins/jenkins-master-slave-configuration
https://www.edureka.co/blog/jenkins-master-and-slave-architecture-a-complete-guide/

 # Answer the following:
Q) Explain the architecture of Jenkins with a diagram.
Jenkins Architecture

Here's how Jenkins elements are put together and interact:

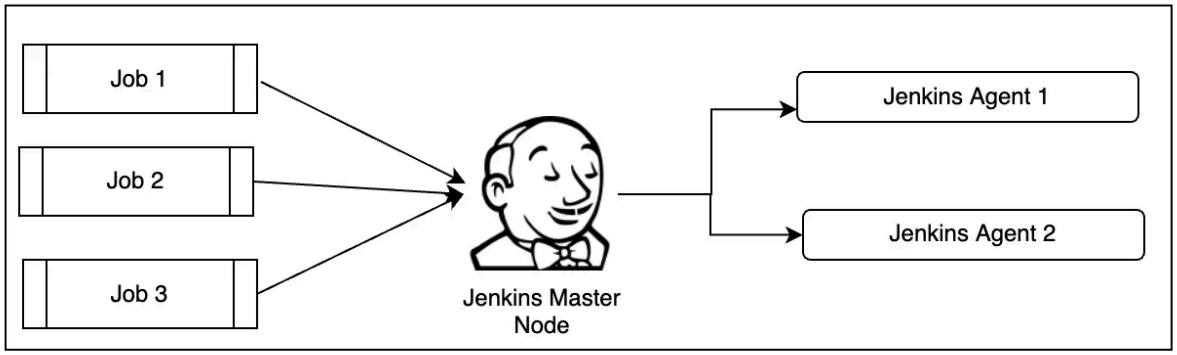
- Developers commit changes to the source code, found in the repository.
- The Jenkins CI server checks the repository at regular intervals and pulls any newly available code.
- The Build Server builds the code into an executable file. In case the build fails, feedback is sent to the developers.
- Jenkins deploys the build application to the test server. If the test fails, the developers are alerted.
- If the code is error-free, the tested application is deployed on the production server.

The files can contain different code and be very large, requiring multiple builds. However, a single Jenkins server cannot handle multiple files and builds simultaneously; for that, a distributed Jenkins architecture is necessary.



Q)Explain the distributed architecture of Jenkins with diagram

- The Jenkins distributed architecture uses a **Master-Agent model** to streamline task management across multiple nodes and efficiently handle build processes in various environments.
- In this model, the **Jenkins Master** coordinates the CI/CD pipeline by managing configurations, user roles, and plugins, as well as delegating tasks to agents and aggregating their build results.
- Each **Agent node** executes the specific tasks assigned by the master.
- Agents can be configured with tailored environments, tools, and libraries to handle different jobs across various operating systems and platforms, allowing Jenkins to achieve parallel execution and scalability.



9. Laboratory Exercise

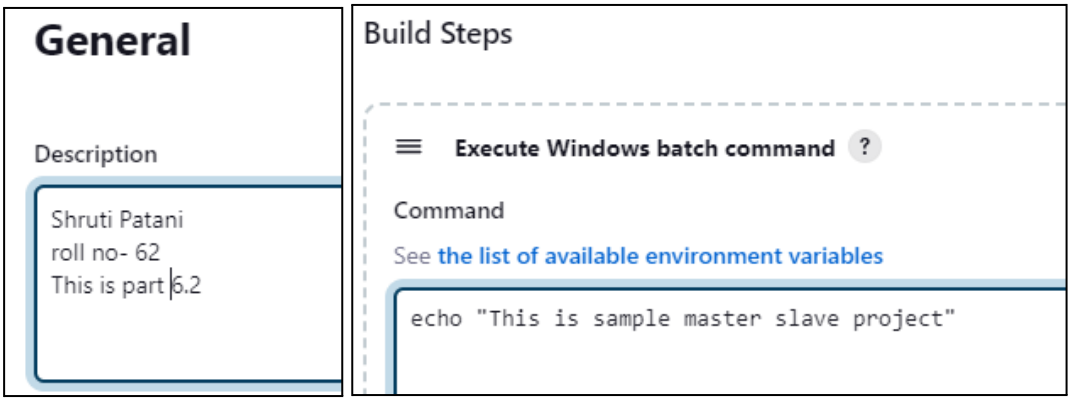
B. Procedure:

a. Answer the following:

- Explain the architecture of Jenkins with a diagram.
- Explain the distributed architecture of Jenkins with diagram

b. Execute following (Refer the shared material) and attach screenshots:

- Create a slave node and connect it to master



- Use an existing project or a new project to run in the slave node
- Apply cron command on a project