Software Engineering & Project Management Lab Experiment No: - 04

Aim: To understand Continuous Integration, install, and configure Jenkins with Maven/Ant/Gradle to set up a build job.

Theory:

Continuous Integration (CI):

Continuous Integration is a software development practice where code changes are automatically built, tested, and integrated into a shared repository on a frequent basis. The primary goal of CI is to detect and address integration issues early in the development process, ensuring that the codebase remains stable and reliable. This approach allows teams to deliver high-quality software more efficiently and with greater confidence.

Key Concepts of Continuous Integration:

- Version Control System (VCS):

CI relies on a VCS (e.g., Git, SVN) to manage and track changes in the codebase. Developers commit their changes to the repository, triggering the CI process.

- Automated Build:

CI systems automate the process of compiling source code into executable artifacts. This ensures consistency and eliminates manual errors in the build process.

- Automated Testing:

CI includes automated testing to validate that code changes do not introduce new bugs or break existing functionality. Common types of tests include unit tests, integration tests, and acceptance tests.

- Build Server:

A CI server, like Jenkins, is responsible for orchestrating the CI process. It monitors the VCS for changes, triggers builds, runs tests, and provides feedback to developers.

Installing and Configuring Jenkins with Maven/Ant/Gradle:

1. Install Jenkins:
   Download and install Jenkins from the official website.
   Start the Jenkins service.
2. Configure Jenkins:
   Open Jenkins in a web browser and follow the initial setup wizard.
   Install necessary plugins, including the ones for Maven, Ant, or Gradle integration.
3. Create a Jenkins Job:
   Click on "New Item" to create a new job.
   Choose the type of project (e.g., Freestyle project or Pipeline).
   Configure the job settings, such as source code repository, build triggers, and post-build actions.
4. Configure Build Tool:
   If using Maven, specify the path to the Maven executable and configure Maven goals (e.g., clean install).
   For Ant or Gradle, configure the respective build tool settings.

5. Save and Build:
   Save the job configuration and manually trigger the build to test the setup.
   Observe the build console output for any errors or issues.

Continuous Integration Benefits:

- ❖ Early Detection of Bugs:

CI ensures that code changes are continuously tested, allowing for the early detection and resolution of bugs.

- ❖ Consistent Builds:

Automated builds eliminate variations caused by manual processes, ensuring that each build is consistent and reproducible.

- ❖ Integration Testing:

CI helps in integrating code changes frequently, reducing the likelihood of integration issues that arise when merging changes from multiple developers.

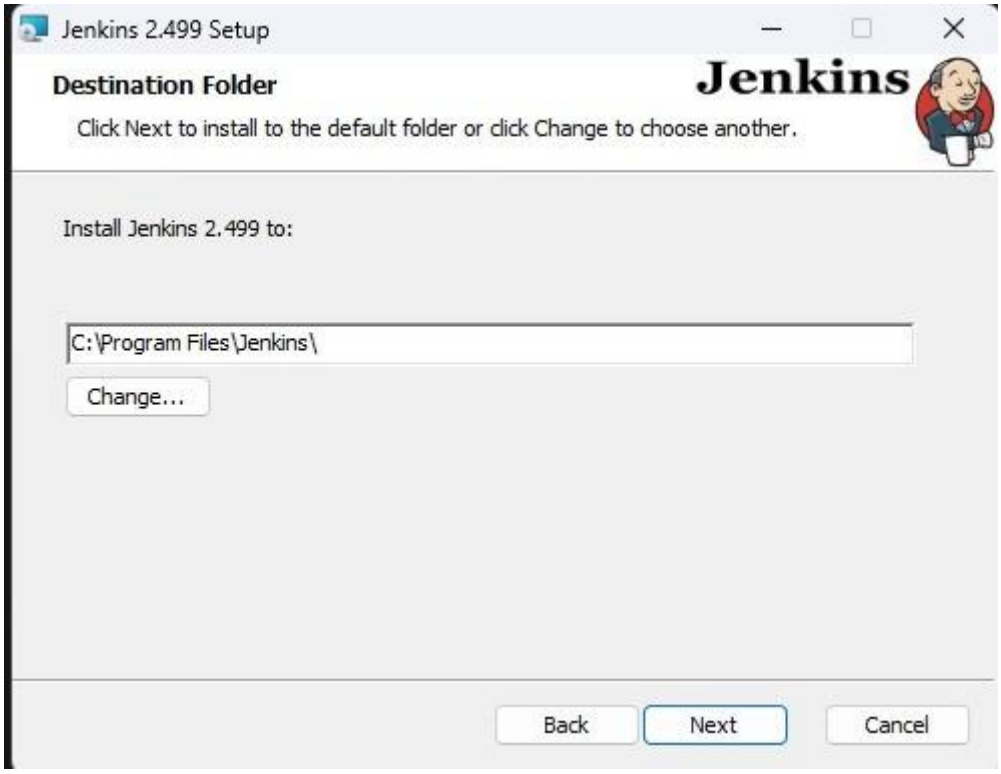
- ❖ Rapid Feedback:

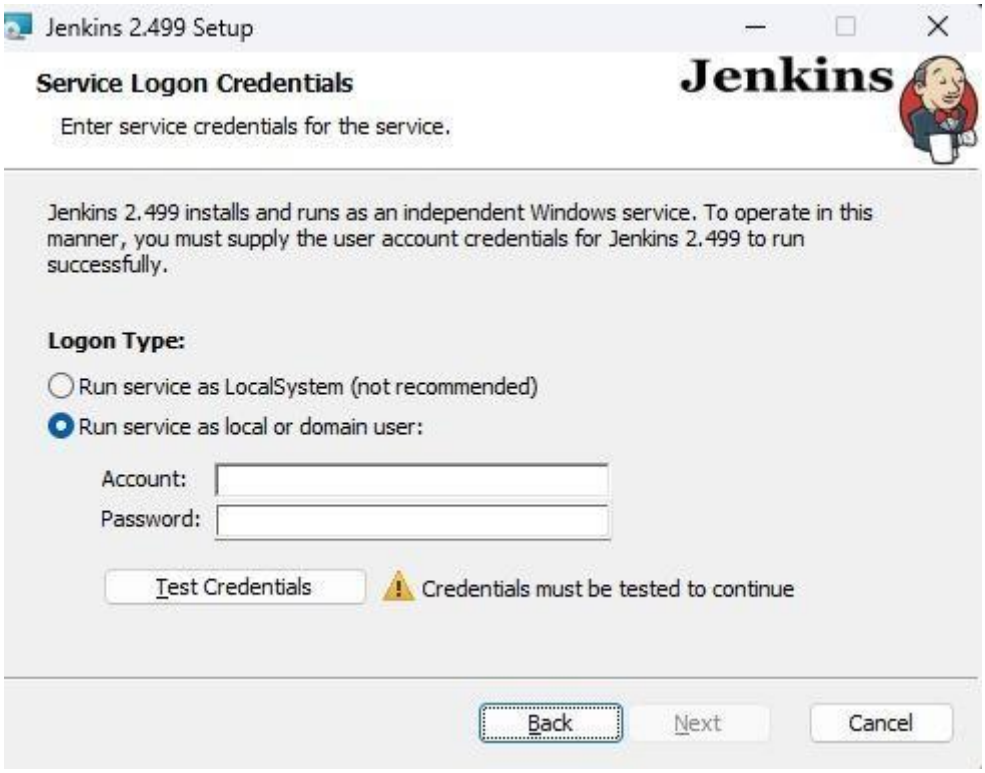
Developers receive rapid feedback on the quality of their code through automated tests and build reports, enabling them to address issues promptly.

- ❖ Improved Collaboration:

CI promotes collaboration by providing a central platform where developers can share and integrate their work regularly.

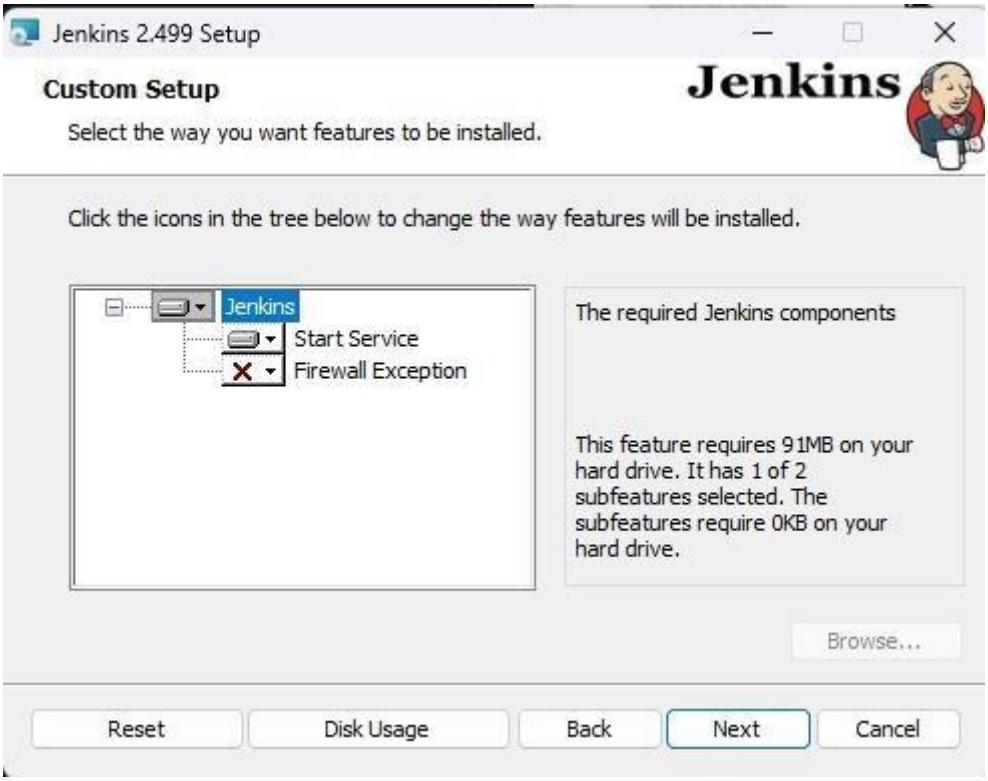
Implementation:

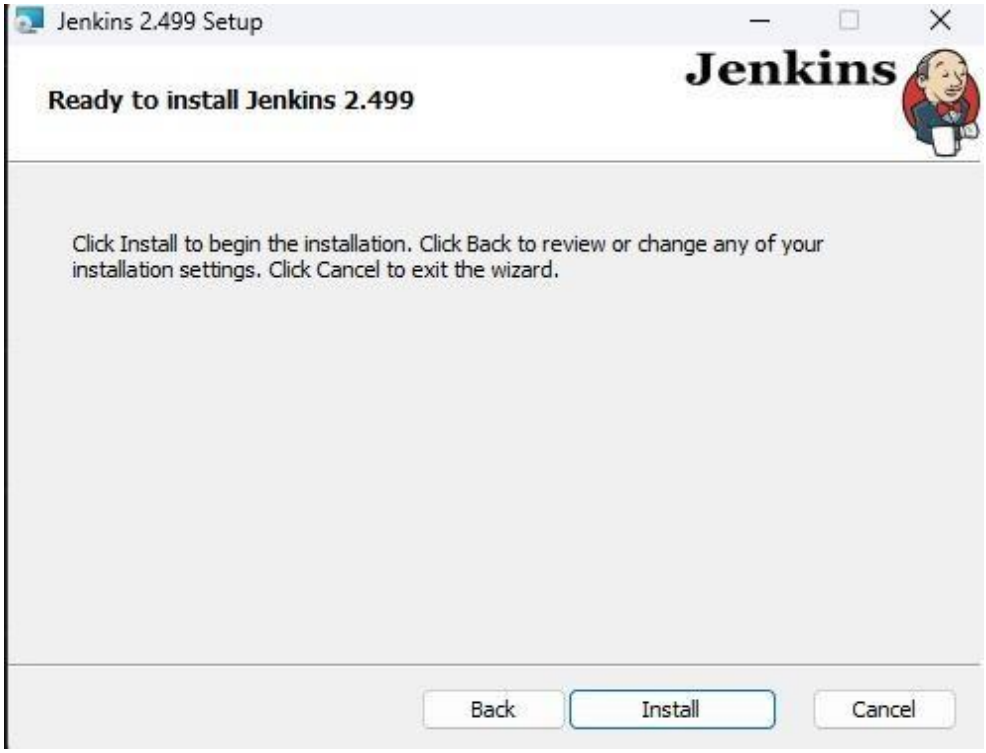

Jenkins 2.499 Setup
Destination Folder
Click Next to install to the default folder or click Change to choose another.
Jenkins
Install Jenkins 2.499 to:
C:\Program Files\Jenkins\
Change...
Back
Next
Cancel

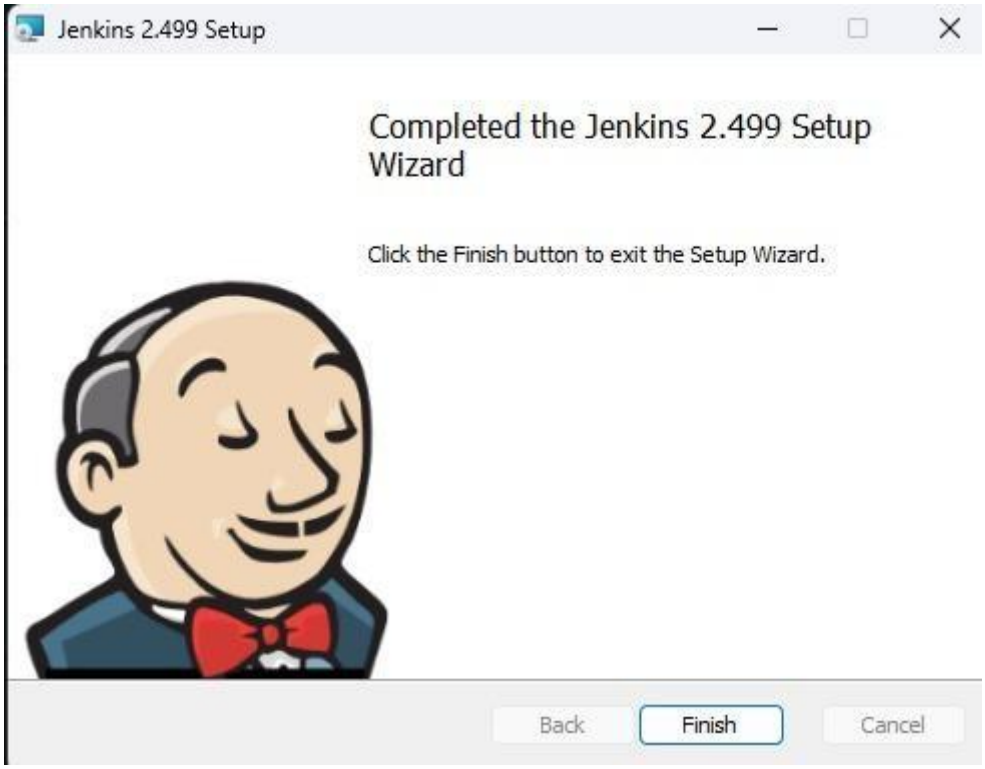

Jenkins 2.499 Setup
Service Logon Credentials
Enter service credentials for the service.
Jenkins
Jenkins 2.499 installs and runs as an independent Windows service. To operate in this manner, you must supply the user account credentials for Jenkins 2.499 to run successfully.
Logon Type:
Run service as LocalSystem (not recommended)
Run service as local or domain user:
Account:
Password:
Test Credentials
Credentials must be tested to continue
Back
Next
Cancel

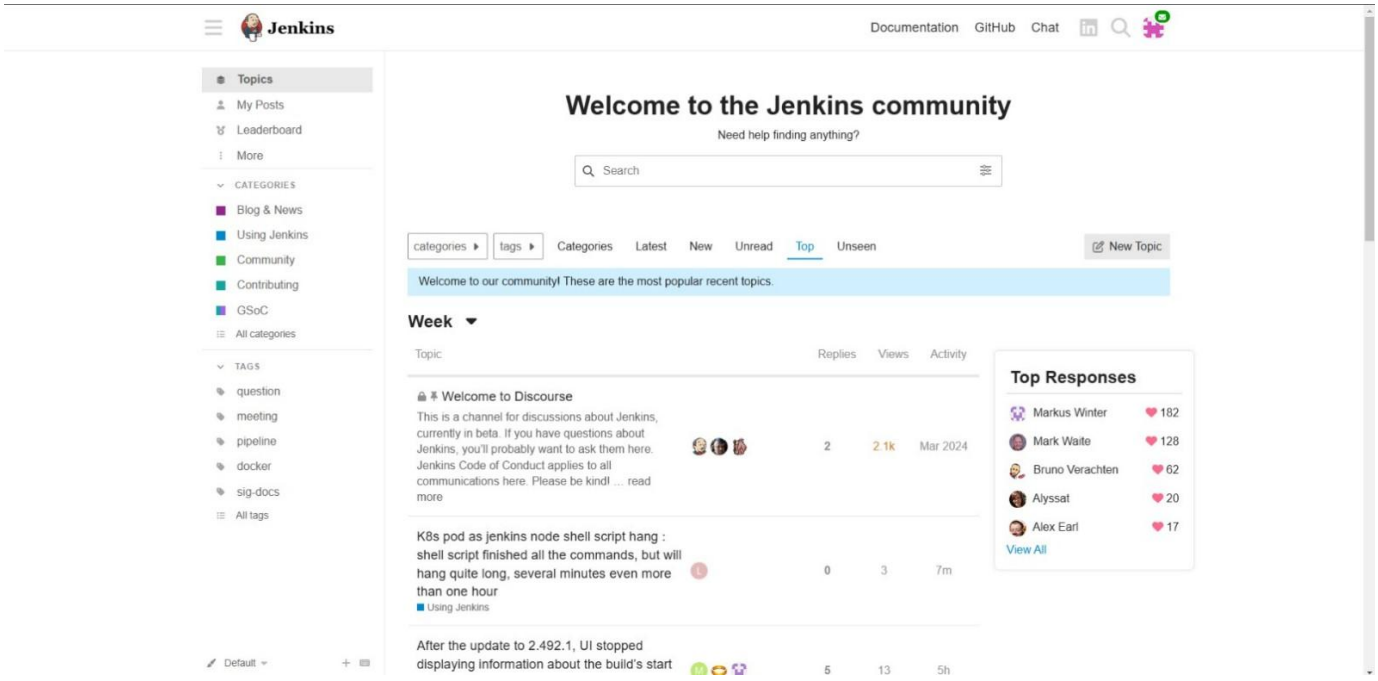

Jenkins 2.499 Setup
Port Selection
Choose a port for the service.
Jenkins
Please choose a port.
Port Number (1-65535):
4500
Test Port
It is recommended that you accept the selected default port.
Back
Next
Cancel

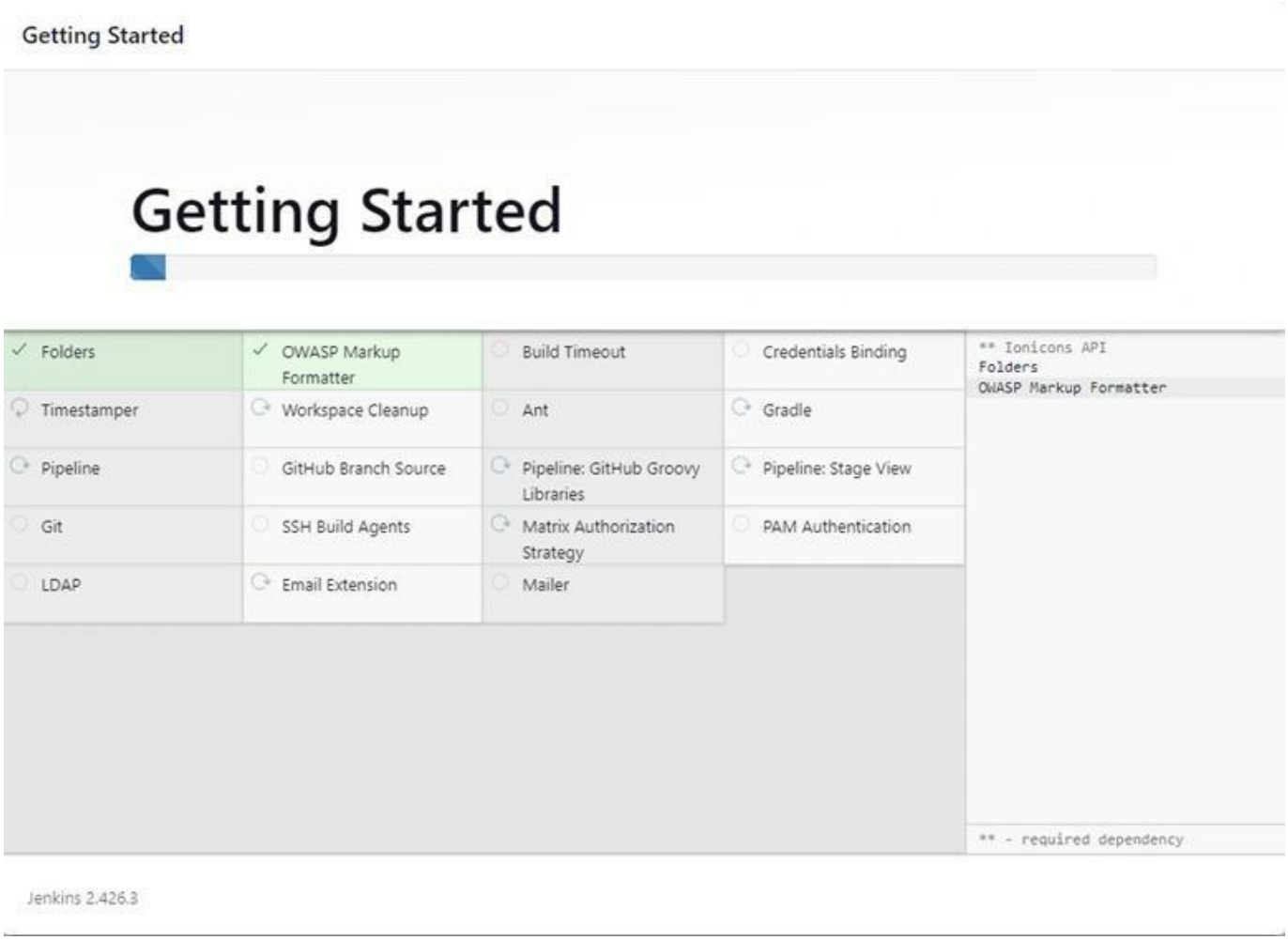

Jenkins 2.499 Setup
Jenkins 2.499 Setup
Select Java home directory (JDK or JRE)
Jenkins
Please select the path of a Java Development Kit or Java Runtime Environment.
Only Java 17 and 21 are supported by Jenkins.
C:\Program Files\
Change...
Back
Next
Cancel

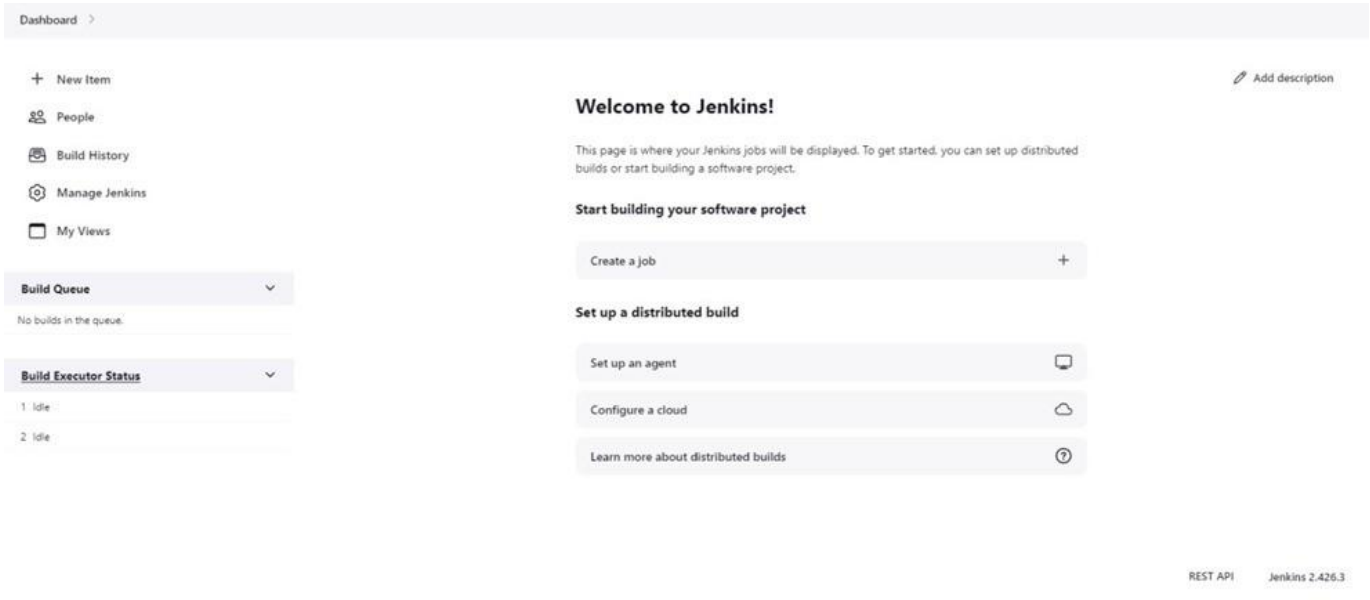

Jenkins 2.499 Setup
Custom Setup
Select the way you want features to be installed.
Jenkins
Click the icons in the tree below to change the way features will be installed.
Jenkins
Start Service
Firewall Exception
The required Jenkins components
This feature requires 91MB on your hard drive. It has 1 of 2 subfeatures selected. The subfeatures require 0KB on your hard drive.
Browse...
Reset
Disk Usage
Back
Next
Cancel


Jenkins 2.499 Setup
Ready to install Jenkins 2.499
Jenkins
Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.
Back
Install
Cancel


Jenkins 2.499 Setup
Completed the Jenkins 2.499 Setup Wizard
Click the Finish button to exit the Setup Wizard.
Back
Finish
Cancel


Jenkins
Documentation
GitHub
Chat
Topics
My Posts
Leaderboard
More
CATEGORIES
Blog & News
Using Jenkins
Community
Contributing
GSoC
All categories
TAGS
question
meeting
pipeline
docker
sig-docs
All tags
Welcome to the Jenkins community
Need help finding anything?
Search
categories
tags
Categories
Latest
New
Unread
Top
Unseen
New Topic
Welcome to our community! These are the most popular recent topics.
Week
Topic
Replies
Views
Activity
Welcome to Discourse
This is a channel for discussions about Jenkins, currently in beta. If you have questions about Jenkins, you'll probably want to ask them here. Jenkins Code of Conduct applies to all communications here. Please be kind! ... read more
2
2.1k
Mar 2024
K8s pod as jenkins node shell script hang : shell script finished all the commands, but will hang quite long, several minutes even more than one hour
Using Jenkins
0
3
7m
After the update to 2.492.1, UI stopped displaying information about the build's start
5
13
5h
Top Responses
Markus Winter 182
Mark Waite 128
Bruno Verachten 62
Alyssat 20
Alex Earl 17
View All
Default





Conclusion: Thus, we have successfully understood Continuous Integration, installation, and configuration of Jenkins with Maven/Ant/Gradle to set up a build job.

LO Mapping: *LO3 is mapped.*