

```
jegan@tektutor:~/Downloads
```

```
jegan@tektutor:~
```

```
jegan@tektutor.org:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; preset: enabled)
   Active: active (running) since Mon 2023-11-20 15:54:04 IST; 2 days ago
     TriggeredBy: ● docker.socket
     Docs: https://docs.docker.com
 Main PID: 22295 (dockerd)
   Tasks: 183
    Memory: 1.7G
      CPU: 2min 14.747s
     CGroup: /system.slice/docker.service
             └─ 22295 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
               ├ 85130 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8001 -container-ip 172.17.0.2 -container-port 80
               ├ 85144 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8001 -container-ip 172.17.0.2 -container-port 80
               ├ 85174 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2001 -container-ip 172.17.0.2 -container-port 22
               ├ 85180 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2001 -container-ip 172.17.0.2 -container-port 22
               ├ 85314 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8002 -container-ip 172.17.0.3 -container-port 80
               ├ 85326 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8002 -container-ip 172.17.0.3 -container-port 80
               ├ 85350 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2002 -container-ip 172.17.0.3 -container-port 22
               ├ 85356 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2002 -container-ip 172.17.0.3 -container-port 22
               ├ 104522 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
               ├ 104537 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
               ├ 104564 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
               ├ 104572 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
               ├ 187610 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8003 -container-ip 172.17.0.5 -container-port 80
               ├ 187626 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8003 -container-ip 172.17.0.5 -container-port 80
               ├ 187652 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2003 -container-ip 172.17.0.5 -container-port 22
               ├ 187658 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2003 -container-ip 172.17.0.5 -container-port 22
               ├ 187789 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8004 -container-ip 172.17.0.6 -container-port 80
               ├ 187804 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8004 -container-ip 172.17.0.6 -container-port 80
               ├ 187835 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2004 -container-ip 172.17.0.6 -container-port 22
               ├ 187842 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2004 -container-ip 172.17.0.6 -container-port 22
Nov 22 17:34:33 tektutor.org dockerd[22295]: time="2023-11-22T17:34:33.513205521+05:30" level=info msg="ignoring event" container=62bf6b7e8c71dc7b7441a9...
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.061135025+05:30" level=info msg="ignoring event" container=ae41d92bf5b22139f8862b...
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.502544509+05:30" level=info msg="ignoring event" container=959d8443b897e0473a6e57...
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.716872637+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92...
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.733081463+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92...
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.749733875+05:30" level=info msg="Layer sha256:bsf1f870fc9657e35148766e458e8375d92...
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163102409+05:30" level=error msg="Container failed to exit within 10s of kill - t...
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163210272+05:30" level=error msg="Container failed to exit within 10s of kill - t...
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.311242890+05:30" level=info msg="ignoring event" container=09c666749b04362f7fd4bf...
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.312268491+05:30" level=info msg="ignoring event" container=a5b26062b000a51953c80a...
jegan@tektutor.org:~$
```

Day4

Launching Jenkins Build Server

```
cd ~/Downloads
java -jar ./jenkins.war --enable-future-java
```

Expected output

```
jegan@tektrtor.org:~/Downloads$ pwd
/home/jegan/Downloads
jegan@tektrtor.org:~/Downloads$ java -jar ./jenkins.war
Running from: /home/jegan/Downloads/jenkins.war
webroot: /home/jegan/.jenkins/war
2023-11-23 06:20:52.390+0000 [id=1] INFO  winstone.Logger#logInternal: Beginning extraction from war file
2023-11-23 06:20:52.777+0000 [id=1] WARNING o.e.j.s.handler.ContextHandler#setContextPath: Empty contextPath
2023-11-23 06:20:52.803+0000 [id=1] INFO  org.eclipse.jetty.server.Server#doStart: jetty-10.0.17; built: 2023-10-02T04:04:10.314Z; git: a0f5f05abaa
6c3aab7c3d35f10a6f412ab8b05f; jvm 17.0.9-ea+6-Ubuntu-1
2023-11-23 06:20:52.907+0000 [id=1] INFO  o.e.j.w.StandardDescriptorProcessor#visitServlet: NO JSP Support for /, did not find org.eclipse.jetty.js
p.JettyJspServlet
2023-11-23 06:20:52.926+0000 [id=1] INFO  o.e.j.s.s.DefaultSessionIdManager#doStart: Session workerName=node0
2023-11-23 06:20:53.114+0000 [id=1] INFO  hudson.WebAppMain#contextInitialized: Jenkins home directory: /home/jegan/.jenkins found at: $user.home/.
jenkins
2023-11-23 06:20:53.200+0000 [id=1] INFO  o.e.j.s.handler.ContextHandler#doStart: Started w.@7428de63[Jenkins v2.426.1.,/file:///home/jegan/.jenkin
s/war/,AVAILABLE]{/home/jegan/.jenkins/war}
2023-11-23 06:20:53.207+0000 [id=1] INFO  o.e.j.server.AbstractConnector#doStart: Started ServerConnector@1acaf3d[HTTP/1.1, (http/1.1)]{0.0.0.0:808
0}
2023-11-23 06:20:53.212+0000 [id=1] INFO  org.eclipse.jetty.server.Server#doStart: Started Server@662706a7[STARTING][10.0.17,st0=0] @1059ms
2023-11-23 06:20:53.213+0000 [id=42] INFO  winstone.Logger#logInternal: Winstone Servlet Engine running: controlPort=disabled
2023-11-23 06:20:53.292+0000 [id=50] INFO  jenkins.InitReactorRunner$1#onAttained: Started initialization
2023-11-23 06:20:53.297+0000 [id=71] INFO  jenkins.InitReactorRunner$1#onAttained: Listed all plugins
2023-11-23 06:20:53.611+0000 [id=79] INFO  jenkins.InitReactorRunner$1#onAttained: Prepared all plugins
2023-11-23 06:20:53.613+0000 [id=88] INFO  jenkins.InitReactorRunner$1#onAttained: Started all plugins
2023-11-23 06:20:53.616+0000 [id=90] INFO  jenkins.InitReactorRunner$1#onAttained: Augmented all extensions
2023-11-23 06:20:53.693+0000 [id=50] INFO  jenkins.InitReactorRunner$1#onAttained: System config loaded
2023-11-23 06:20:53.694+0000 [id=58] INFO  jenkins.InitReactorRunner$1#onAttained: System config adapted
2023-11-23 06:20:53.694+0000 [id=65] INFO  jenkins.InitReactorRunner$1#onAttained: Loaded all jobs
2023-11-23 06:20:53.695+0000 [id=65] INFO  jenkins.InitReactorRunner$1#onAttained: Configuration for all jobs updated
2023-11-23 06:20:53.704+0000 [id=108] INFO  hudson.util.Retrier#start: Attempt #1 to do the action check updates server
2023-11-23 06:20:53.883+0000 [id=65] INFO  jenkins.install.SetupWizard#init:

*****
***** Jenkins initial setup is required. An admin user has been created and a password generated.
Please use the following password to proceed to installation:
6c8569cca78d4f0f8123c5658ea1cece
This may also be found at: /home/jegan/.jenkins/secrets/initialAdminPassword
*****
```

```
jegan@tektrtor.org:~/Downloads$ pwd
/home/jegan/Downloads
jegan@tektrtor.org:~/Downloads$ java -jar ./jenkins.war
Running from: /home/jegan/Downloads/jenkins.war
webroot: /home/jegan/.jenkins/war
2023-11-23 06:20:52.803+0000 [id=1] INFO  org.eclipse.jetty.server.Server#doStart: jetty-10.0.17; built: 2023-10-02T04:04:10.314Z; git: a0f5f05abaa
6c3aab7c3d35f10a6f412ab8b05f; jvm 17.0.9-ea+6-Ubuntu-1
2023-11-23 06:20:52.907+0000 [id=1] INFO  o.e.j.w.StandardDescriptorProcessor#visitServlet: NO JSP Support for /, did not find org.eclipse.jetty.js
p.JettyJspServlet
2023-11-23 06:20:52.926+0000 [id=1] INFO  o.e.j.s.s.DefaultSessionIdManager#doStart: Session workerName=node0
2023-11-23 06:20:53.114+0000 [id=1] INFO  hudson.WebAppMain#contextInitialized: Jenkins home directory: /home/jegan/.jenkins found at: $user.home/.
jenkins
2023-11-23 06:20:53.200+0000 [id=1] INFO  o.e.j.s.handler.ContextHandler#doStart: Started w.@7428de63[Jenkins v2.426.1.,/file:///home/jegan/.jenkin
s/war/,AVAILABLE]{/home/jegan/.jenkins/war}
2023-11-23 06:20:53.207+0000 [id=1] INFO  o.e.j.server.AbstractConnector#doStart: Started ServerConnector@1acaf3d[HTTP/1.1, (http/1.1)]{0.0.0.0:808
0}
2023-11-23 06:20:53.212+0000 [id=1] INFO  org.eclipse.jetty.server.Server#doStart: Started Server@662706a7[STARTING][10.0.17,st0=0] @1059ms
2023-11-23 06:20:53.213+0000 [id=42] INFO  winstone.Logger#logInternal: Winstone Servlet Engine running: controlPort=disabled
2023-11-23 06:20:53.292+0000 [id=50] INFO  jenkins.InitReactorRunner$1#onAttained: Started initialization
2023-11-23 06:20:53.297+0000 [id=71] INFO  jenkins.InitReactorRunner$1#onAttained: Listed all plugins
2023-11-23 06:20:53.611+0000 [id=79] INFO  jenkins.InitReactorRunner$1#onAttained: Prepared all plugins
2023-11-23 06:20:53.613+0000 [id=88] INFO  jenkins.InitReactorRunner$1#onAttained: Started all plugins
2023-11-23 06:20:53.616+0000 [id=90] INFO  jenkins.InitReactorRunner$1#onAttained: Augmented all extensions
2023-11-23 06:20:53.693+0000 [id=50] INFO  jenkins.InitReactorRunner$1#onAttained: System config loaded
2023-11-23 06:20:53.694+0000 [id=58] INFO  jenkins.InitReactorRunner$1#onAttained: System config adapted
2023-11-23 06:20:53.694+0000 [id=65] INFO  jenkins.InitReactorRunner$1#onAttained: Loaded all jobs
2023-11-23 06:20:53.695+0000 [id=65] INFO  jenkins.InitReactorRunner$1#onAttained: Configuration for all jobs updated
2023-11-23 06:20:53.704+0000 [id=108] INFO  hudson.util.Retrier#start: Attempt #1 to do the action check updates server
2023-11-23 06:20:53.883+0000 [id=65] INFO  jenkins.install.SetupWizard#init:

*****
***** Jenkins initial setup is required. An admin user has been created and a password generated.
Please use the following password to proceed to installation:
```

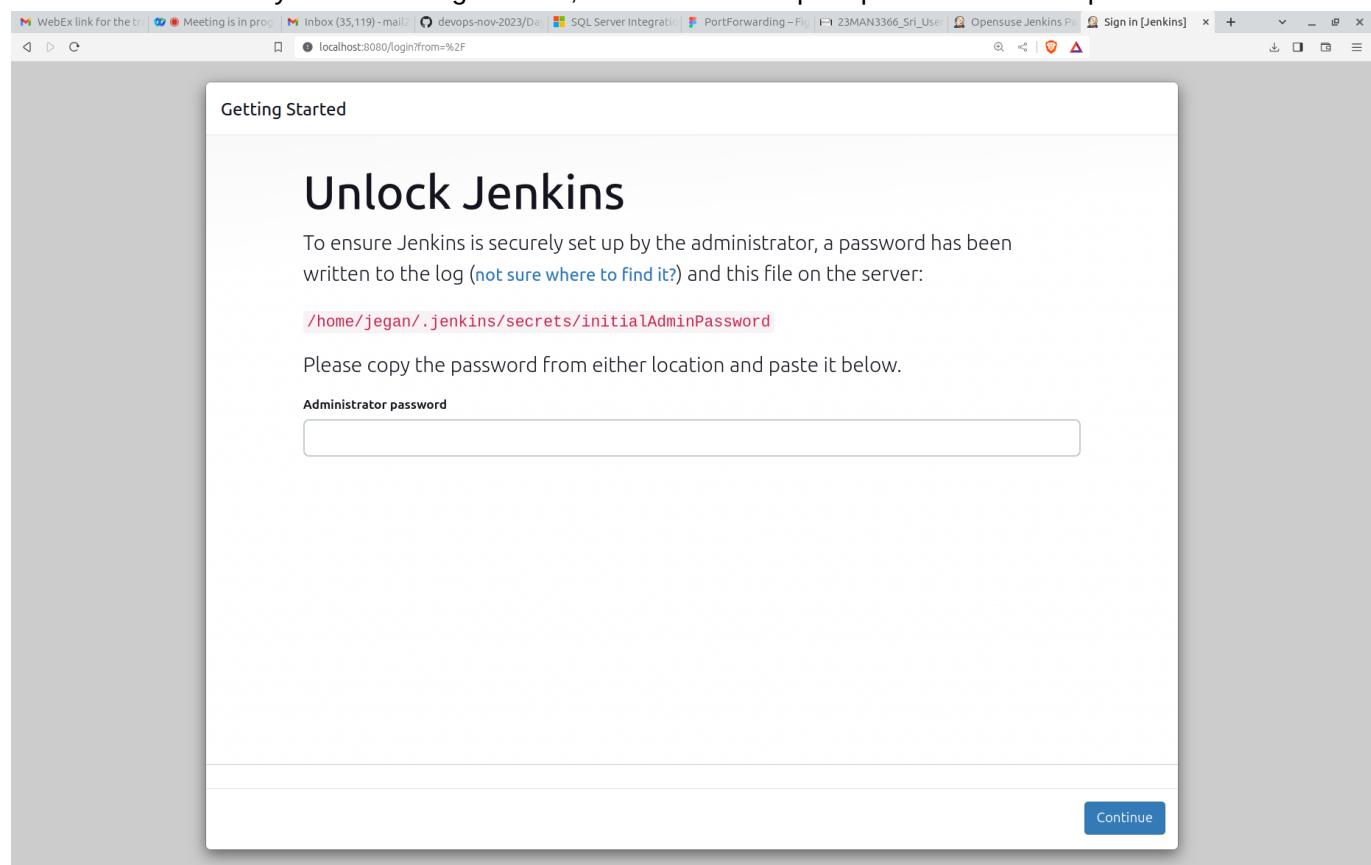
```
6c8569cca78d4f0f8123c5658ea1cece
This may also be found at: /home/jegan/.jenkins/secrets/initialAdminPassword
*****
```

```
2023-11-23 06:21:01.501+0000 [id=65] INFO  jenkins.InitReactorRunner$1#onAttained: Completed initialization
2023-11-23 06:21:01.521+0000 [id=34] INFO  hudson.lifecycle.Lifecycle#onReady: Jenkins is fully up and running
2023-11-23 06:21:02.420+0000 [id=108] INFO  h.m.DownloadService$Downloadable#load: Obtained the updated data file for hudson.tasks.Maven.MavenInstal
ler
2023-11-23 06:21:02.421+0000 [id=108] INFO  hudson.util.Retrier#start: Performed the action check updates server successfully at the attempt #1
```

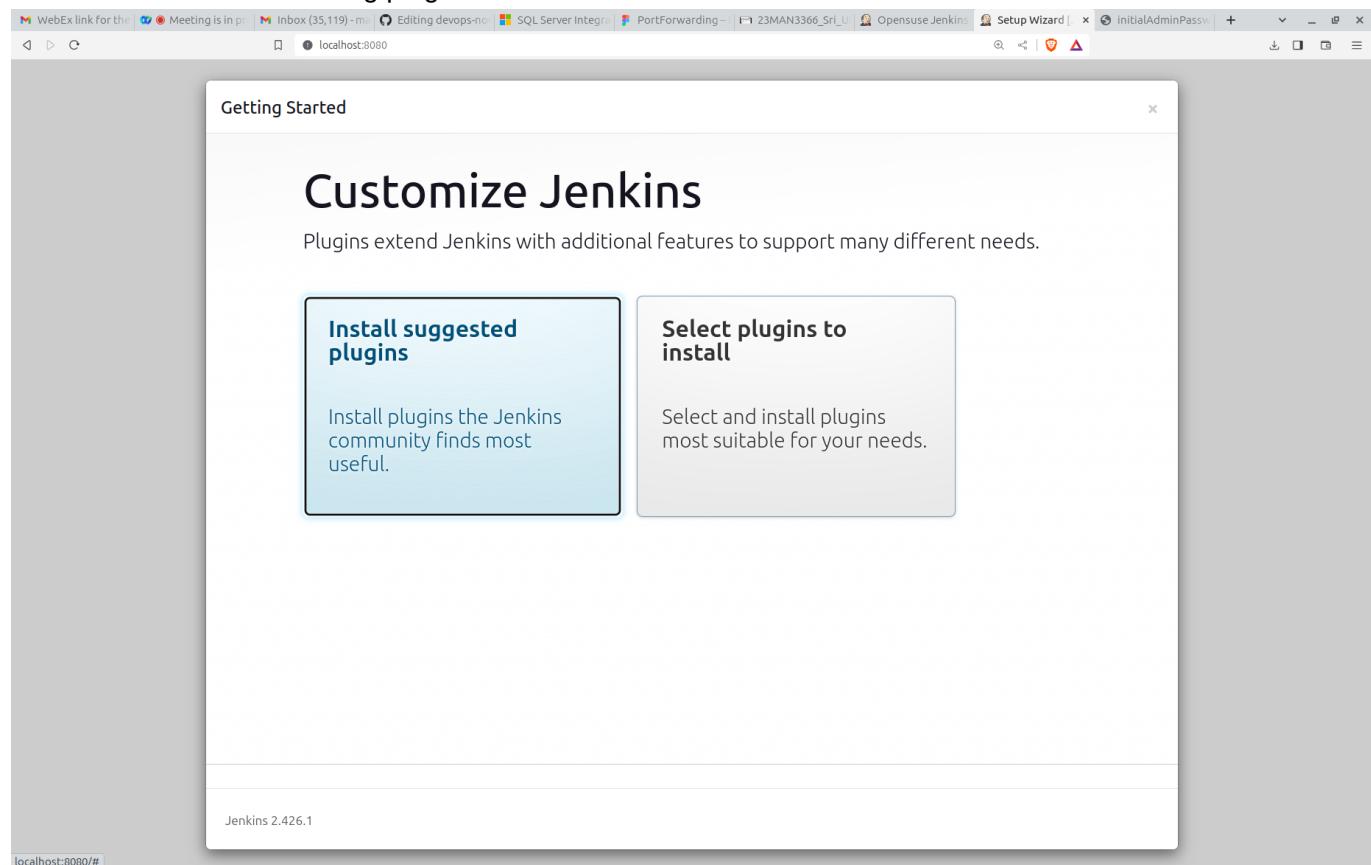
Accessing the Jenkins Dashboard on your web browser

<http://localhost:8080>

If this is the first time you are starting Jenkins, then Jenkins will prompt for initial admin password



It would then ask for installing plugins



Let's select "Install Suggested Plugins"

The screenshot shows the Jenkins 'Getting Started' page. In the top right corner, there is a 'Setup Wizard' button. Below it, a table lists several Jenkins modules with checkboxes:

✓ Folders	✓ OWASP Markup Formatter	✓ Build Timeout	✓ Credentials Binding
⌚ Timestamper	⌚ Workspace Cleanup	⌚ Ant	⌚ Gradle
⌚ Pipeline	⌚ GitHub Branch Source	⌚ Pipeline: GitHub Groovy Libraries	⌚ Pipeline: Stage View
⌚ Git	⌚ SSH Build Agents	⌚ Matrix Authorization Strategy	⌚ PAM Authentication
⌚ LDAP	⌚ Email Extension	⌚ Mailer	

A tooltip for the 'Credentials Binding' row is displayed on the right side of the table, listing various Jenkins API components:

- ** Ionicons API
- Folders
- OWASP Markup Formatter
 - ** Structs
 - ** bouncycastle API
 - ** Instance Identity
 - ** JavaBeans Activation Framework (JAF) API
 - ** JavaMail API
 - ** Pipeline: Step API
 - ** Token Macro
- Build Timeout
 - ** Credentials
 - ** Plain Credentials
 - ** Trilead API
 - ** SSH Credentials
- Credentials Binding
 - ** SCM API

At the bottom of the table, a note says: ** - required dependency.

Jenkins 2.426.1

The screenshot shows the Jenkins 'Getting Started' page. In the top right corner, there is a 'Setup Wizard' button. Below it, a table lists several Jenkins modules with checkboxes:

✓ Folders	✓ OWASP Markup Formatter	✓ Build Timeout	✓ Credentials Binding
✓ Timestamper	✓ Workspace Cleanup	✓ Ant	✓ Gradle
⌚ Pipeline	⌚ GitHub Branch Source	⌚ Pipeline: GitHub Groovy Libraries	⌚ Pipeline: Stage View
⌚ Git	⌚ SSH Build Agents	⌚ Matrix Authorization Strategy	⌚ PAM Authentication
⌚ LDAP	⌚ Email Extension	✓ Mailer	

A tooltip for the 'Mailer' row is displayed on the right side of the table, listing various Jenkins API components:

- ** Plugin Utilities API
- Font Awesome API
- Bootstrap 5 API
- jQuery3 API
- Echarts API
- Display URL API
- Checks API
- JUnit
- Matrix Project
- Resource Disposer
- Workspace Cleanup
- Ant
 - ** Durable Task
 - ** Pipeline: Nodes and Processes
 - ** Pipeline: SCM Step
 - ** Pipeline: Groovy
 - ** Pipeline: Job
 - ** Jakarta Activation API
 - ** Jakarta Mail API
 - ** Apache HttpComponents Client 4.x API
- Mailer
 - ** Pipeline: Basic Steps
- Gradle
 - ** Pipeline: Milestone Step
 - ** Pipeline: Build Step
 - ** Variant

At the bottom of the table, a note says: ** - required dependency.

Jenkins 2.426.1

Then you will get the below page

Getting Started

Create First Admin User

Username

Password

Confirm password

Full name

E-mail address

Jenkins 2.426.1

Skip and continue as admin

Save and Continue

Getting Started

Create First Admin User

Username

jegan

Password

Confirm password

Full name

Jeganathan Swaminathan

E-mail address

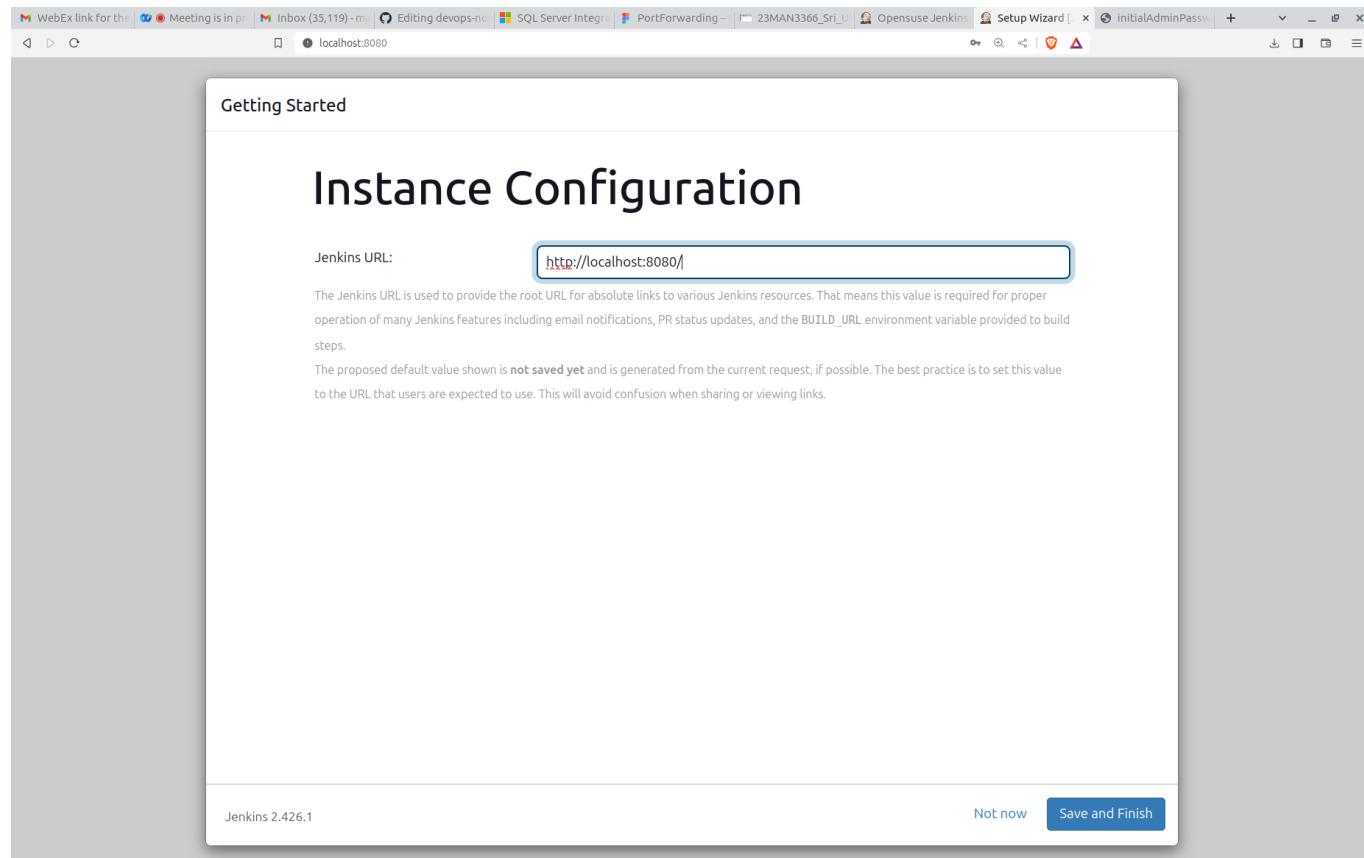
jegan@tektutor.org

Jenkins 2.426.1

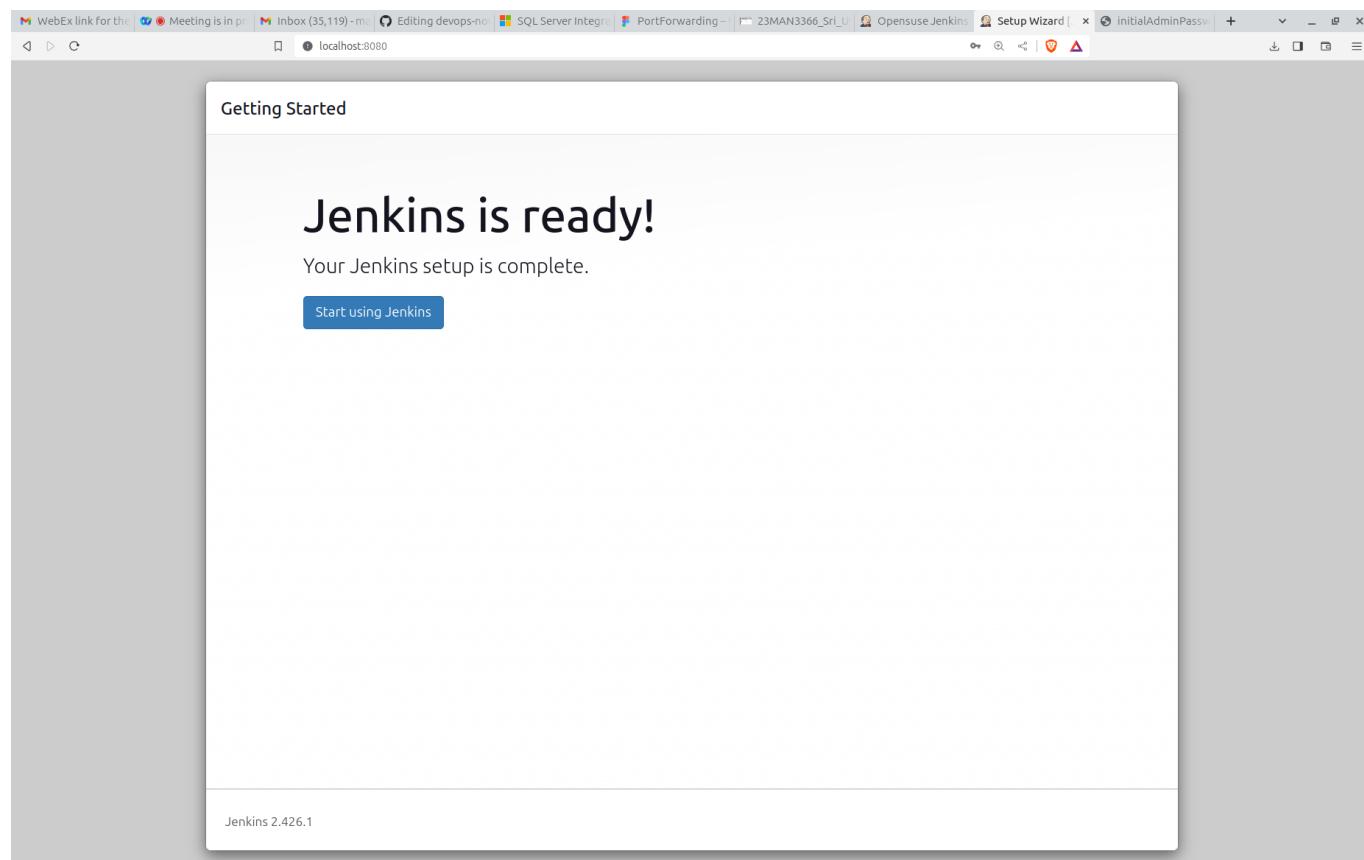
Skip and continue as admin

Save and Continue

Click on "Save and Continue" button



Click on "Save and Finish" button



Click on "Start using Jenkins" button

Welcome to Jenkins!

This page is where your Jenkins jobs will be displayed. To get started, you can set up distributed builds or start building a software project.

Start building your software project

Create a job +

Set up a distributed build

- Set up an agent
- Configure a cloud
- Learn more about distributed builds

Build Queue ▾
No builds in the queue.

Build Executor Status ▾
1 Idle
2 Idle

REST API Jenkins 2.426.1

We need to install few additional plugins, hence let's click on "Manage Jenkins" link on the left side of Jenkins Dashboard

Manage Jenkins

Building on the built-in node can be a security issue. You should set up distributed builds. See the [documentation](#).

System Configuration

- System**: Configure global settings and paths.
- Tools**: Configure tools, their locations and automatic installers.
- Plugins**: Add, remove, disable or enable plugins that can extend the functionality of Jenkins.
- Nodes**: Add, remove, control and monitor the various nodes that Jenkins runs jobs on.
- Clouds**: Add, remove, and configure cloud instances to provision agents on-demand.

Security

- Security**: Secure Jenkins; define who is allowed to access/use the system.
- Credentials**: Configure credentials.
- Credential Providers**: Configure the credential providers and types.

Users

localhost:8080/manage /

Let's click on "Plugins"

The screenshot shows the Jenkins 'Plugins' management interface. On the left, a sidebar menu includes 'Updates', 'Available plugins' (which is selected), 'Installed plugins', 'Advanced settings', and 'Download progress'. The main content area has a search bar at the top labeled 'Search plugin updates'. Below it, a message says 'No updates available' with a checkmark icon. A note at the bottom states: 'Disabled rows are already upgraded, awaiting restart. Shaded but selectable rows are in progress or failed.' At the bottom right, there are links for 'REST API' and 'Jenkins 2.426.1'.

Let's click on "Available Plugins", Search for Docker and select the checkbox

The screenshot shows the Jenkins 'Available plugins' page for the 'Docker' search term. The sidebar on the left is identical to the previous screenshot. The main area shows a table of results for the 'Docker' plugin. The first result, 'Docker 1.5', has its checkbox checked. The table columns are 'Install', 'Name', and 'Released'. The 'Docker 1.5' row includes a description: 'This plugin integrates Jenkins with Docker'. Other results listed are 'Docker Commons', 'Docker Pipeline', 'Docker API', and 'docker-build-step'. A yellow callout box highlights the 'Docker API' entry with the text: 'This plugin is up for adoption! We are looking for new maintainers. Visit our [Adopt a Plugin](#) initiative for more information.' At the bottom of the table, there is a note: 'This plugin allows to add various docker commands to your job as build steps.'

REST API Jenkins 2.426.1

The screenshot shows the Jenkins Plugins page with a search bar containing "Ansible". The results table has columns for "Install", "Name", and "Released". Three plugins are listed:

- Docker 1.5** (Cloud Providers, Cluster Management, docker) - Released 2 months 19 days ago. Description: This plugin integrates Jenkins with Docker.
- Ansible 285.v2f044b_eb_7a_3e** (pipeline, External Site/Tool Integrations, DevOps, Build Tools, Deployment) - Released 8 days 19 hr ago. Description: Invoke Ansible Ad-Hoc commands and playbooks.
- Ansible Tower 0.16.0** - Released 3 years 5 months ago. Description: This plugin connects Jenkins with Ansible Tower.

REST API Jenkins 2.426.1

The screenshot shows the Jenkins Plugins page with a search bar containing "Maven Inte". The results table has columns for "Install", "Name", and "Released". Four plugins are listed:

- Docker 1.5** (Cloud Providers, Cluster Management, docker) - Released 2 months 19 days ago. Description: This plugin integrates Jenkins with Docker.
- Ansible 285.v2f044b_eb_7a_3e** (pipeline, External Site/Tool Integrations, DevOps, Build Tools, Deployment) - Released 8 days 19 hr ago. Description: Invoke Ansible Ad-Hoc commands and playbooks.
- Maven Integration 3.23** (Build Tools) - Released 3 months 20 days ago. Description: This plugin provides a deep integration between Jenkins and Maven. It adds support for automatic triggers between projects depending on SNAPSHOTs as well as the automated configuration of various Jenkins publishers such as Junit.
- Pipeline Maven Integration 1362.vee39a_d4b_02b_1** (pipeline, Maven) - Released 11 days ago. Description: This plugin provides integration with Pipeline, configures maven environment to use within a pipeline job by calling sh mvn or bat mvn. The selected maven installation will be configured and prepended to the path.

The screenshot shows the Jenkins plugin manager interface. On the left, a sidebar menu includes 'Updates', 'Available plugins' (which is selected and highlighted in blue), 'Installed plugins', 'Advanced settings', and 'Download progress'. The main content area is titled 'Build Pip' and shows the 'Available' tab. It lists several plugins:

- Docker 1.5**: Released 2 mo 19 days ago. This plugin integrates Jenkins with Docker.
- Ansible 285.v2f044b_eb_7a_3e**: Released 8 days 19 hr ago. Invoke Ansible Ad-Hoc commands and playbooks.
- Maven Integration 3.23**: Released 3 mo 20 days ago. This plugin provides a deep integration between Jenkins and Maven.
- Build Pipeline 2.0.1**: Released 1 day 6 hr ago. User Interface, Build Tools, Other Post-Build Actions. This plugin renders upstream and downstream connected jobs that typically form a build pipeline. It offers the ability to define manual triggers for jobs that require intervention prior to execution, e.g. an approval process outside of Jenkins. A warning message states: "Warning: This plugin version may not be safe to use. Please review the following security notices: • Stored XSS vulnerability".

A yellow box at the bottom right of the list area says: "This plugin is up for adoption! We are looking for new maintainers. Visit our [Adopt a Plugin](#) initiative for more information."

Click on Install

Make sure the "Restart option" is select,

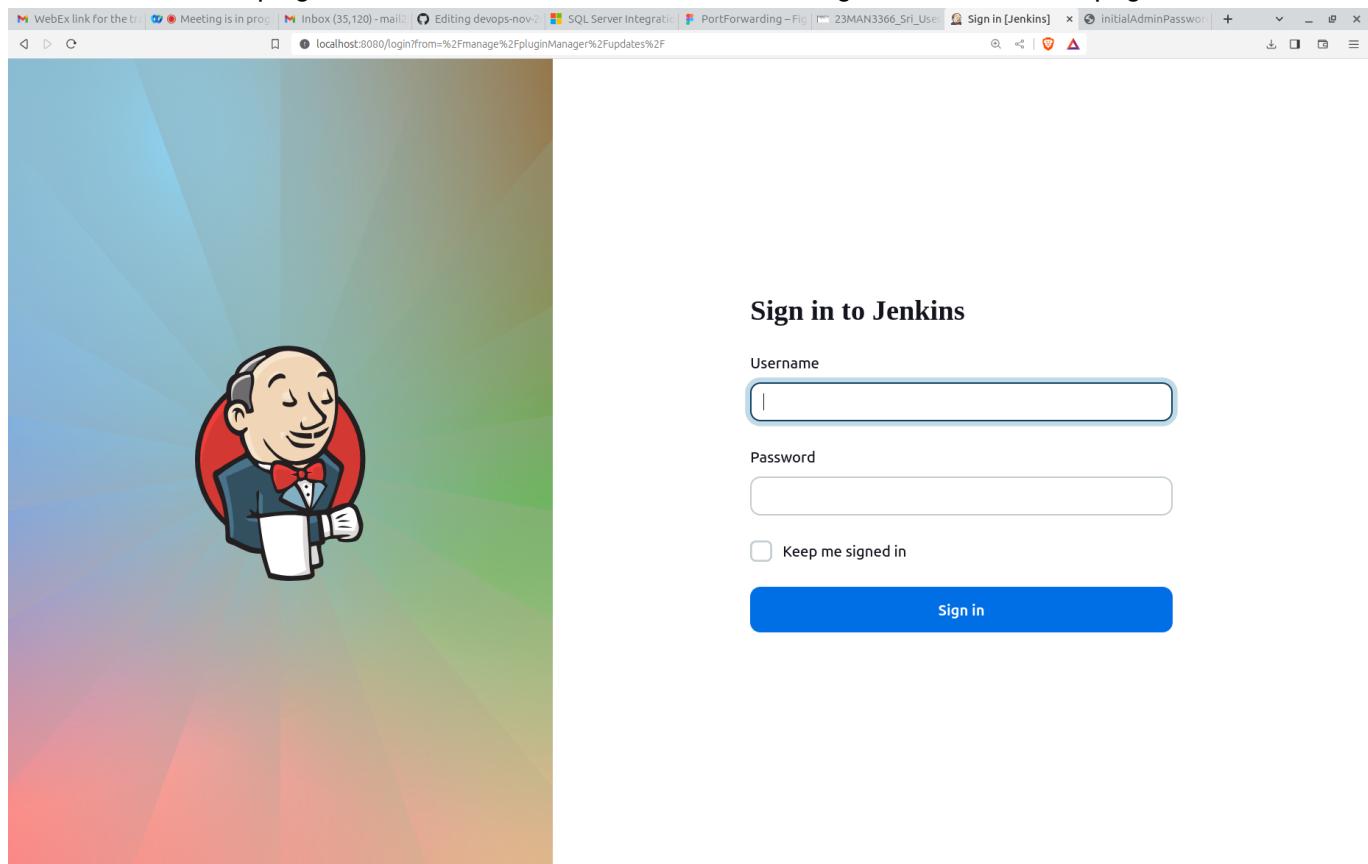
The screenshot shows the Jenkins plugin manager interface. On the left, a sidebar menu includes 'Dashboard', 'Manage Jenkins', and 'Plugins'. The main content area is titled 'Updates' and shows a list of pending installations:

Plugin	Status
Mailer	Success
Loading plugin extensions	Success
Cloud Statistics	Success
Authentication Tokens API	Success
Docker Commons	Pending
Apache HttpComponents Client 5.x API	Pending
Docker API	Pending
Docker	Pending
Ansible	Pending
Javadoc	Pending
JSch dependency	Pending
Maven Integration	Pending
Parameterized Trigger	Pending
Oracle Java SE Development Kit Installer	Pending
SSH server	Pending
Command Agent Launcher	Pending
jQuery	Pending
Build Pipeline	Pending
Loading plugin extensions	Pending
Restarting Jenkins	Pending

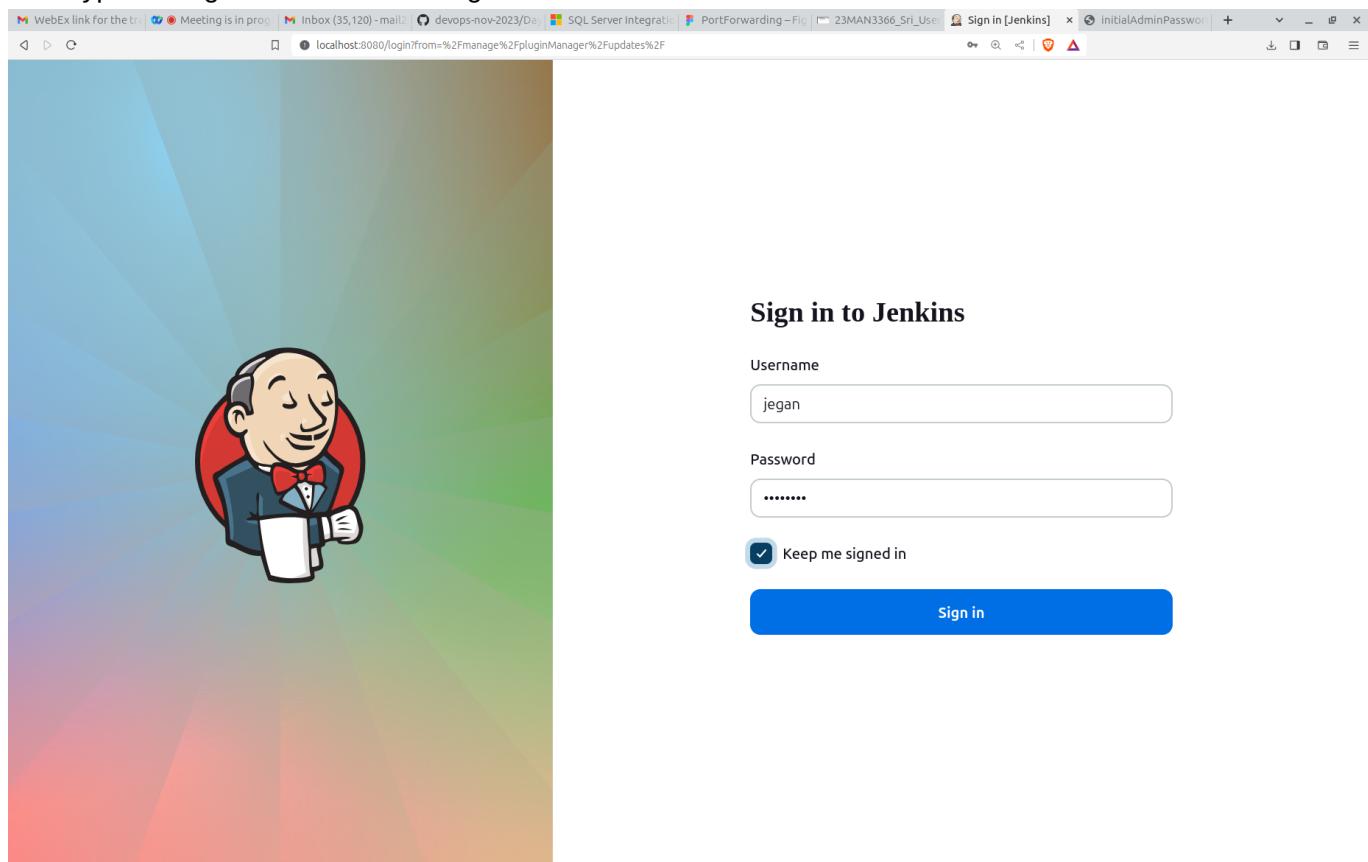
Below the table, there are two options:

- [Go back to the top page](#) (you can start using the installed plugins right away)
- **Restart Jenkins when installation is complete and no jobs are running**

Once the additional plugins are installed and Jenkins is restart, we get to see the below page



Let's type the login credentials and sign in



Let's go to "Manage Jenkins --> Tools"

The screenshot shows the Jenkins Manage Jenkins interface. On the left, there's a sidebar with links like 'New Item', 'People', 'Build History', 'Manage Jenkins' (which is highlighted), and 'My Views'. Below that is a 'Build Queue' section with a note about no builds in the queue. The main area is titled 'System Configuration' and contains sections for 'System', 'Nodes', 'Tools', 'Clouds', and 'Plugins'. Under 'System', it says 'Configure global settings and paths.' Under 'Nodes', it says 'Add, remove, control and monitor the various nodes that Jenkins runs jobs on.' Under 'Tools', it says 'Configure tools, their locations and automatic installers.' Under 'Clouds', it says 'Add, remove, and configure cloud instances to provision agents on-demand.' Under 'Plugins', it says 'Add, remove, disable or enable plugins that can extend the functionality of Jenkins.' A warning message at the top right says: 'Building on the built-in node can be a security issue. You should set up distributed builds. See [the documentation](#)' with buttons for 'Set up agent', 'Set up cloud', and 'Dismiss'.

The screenshot shows the Jenkins Tools configuration page. At the top, there are tabs for 'Security', 'Credentials', and 'Credential Providers'. The main content area is titled 'Tools' and contains sections for 'Maven Configuration', 'JDK installations', and 'Git installations'. In 'Maven Configuration', there are dropdowns for 'Default settings provider' (set to 'Use default maven settings') and 'Default global settings provider' (set to 'Use default maven global settings'). In 'JDK installations', there's a 'Add JDK' button. In 'Git installations', there's a form with a 'Name' field and 'Save' and 'Apply' buttons. The top navigation bar includes the Jenkins logo, user info ('Jeganathan Swaminathan'), and a 'log out' link.

Let's add JDK configuration by clicking "Add JDK" button

The screenshot shows the Jenkins 'Tools' configuration page with the 'Add JDK' button highlighted. The 'JDK' section is expanded, showing fields for 'Name' (a required input) and 'Install automatically'. A sub-section for 'Install Oracle Java SE Development Kit from the website' is also visible, containing fields for 'Version' (set to 'Java SE Development Kit 9.0.4') and 'License Agreement' (checkbox checked). A note about Oracle account requirements and a warning about Oracle Java SE 11+ availability are present. Below the sub-section is a dropdown menu for 'Add Installer'.

Add JDK

JDK

Name

! Required

Install automatically ?

Install Oracle Java SE Development Kit from the website ?

Version

I agree to the Java SE Development Kit License Agreement

! Installing JDK requires Oracle account. Please enter your username/password

⚠ Oracle Java SE 11+ is not available for business, commercial or production use without a commercial license.
Public updates for Oracle Java SE 8 released after January 2019 will not be available for business, commercial or production use without a commercial license.
[Oracle Java SE Licensing FAQ](#)

Add Installer ▾

Save **Apply**

Let's uncheck the "Install JDK" checkbox to get the below screen

The screenshot shows the Jenkins 'Tools' configuration page with the 'Add JDK' button highlighted. The 'JDK' section is expanded, showing fields for 'Name' (a required input) and 'JAVA_HOME'. The 'Install automatically' checkbox is unchecked. Below the section is a 'Git installations' section, which is partially visible.

Add JDK

JDK

Name

! Required

Install automatically ?

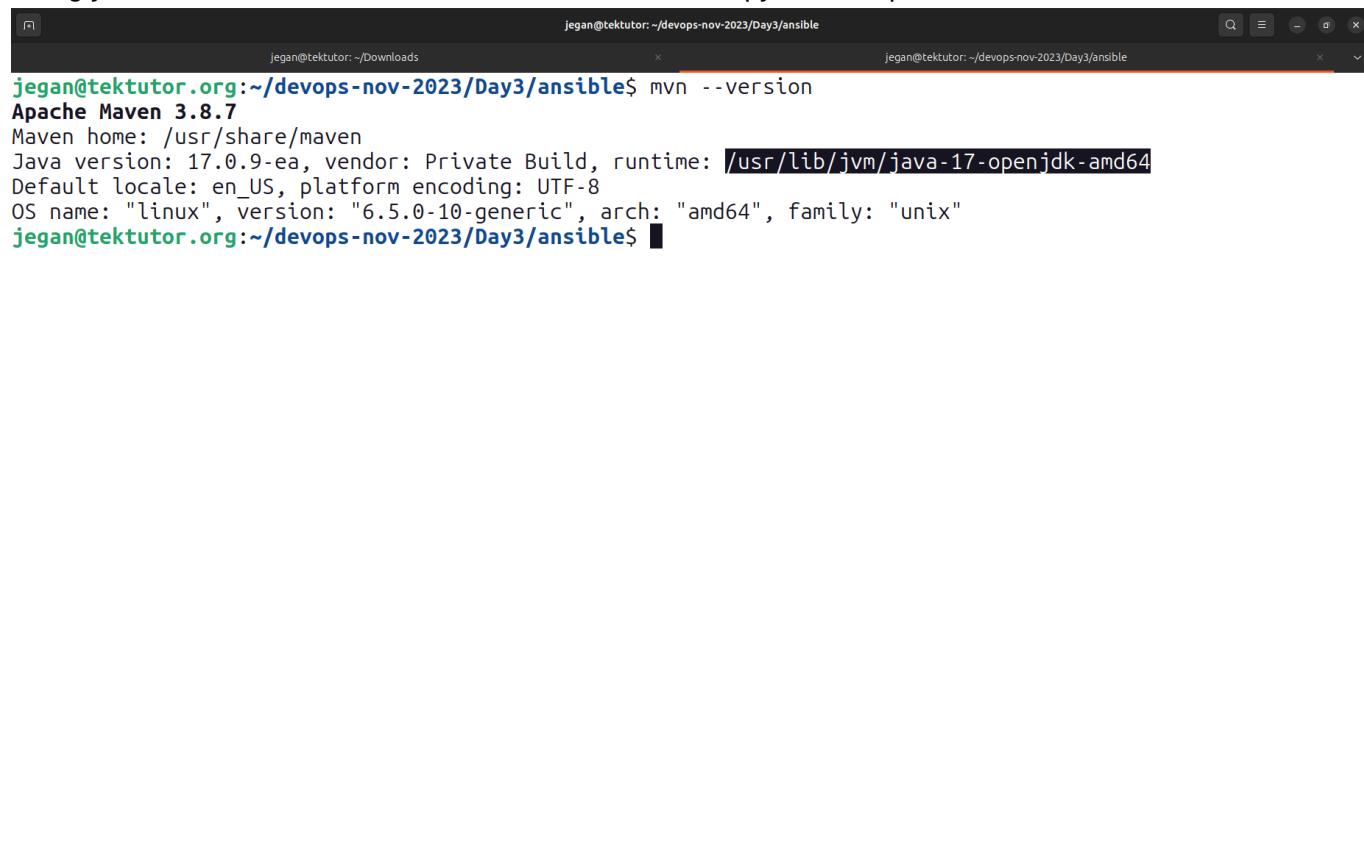
Git installations

Git

Name

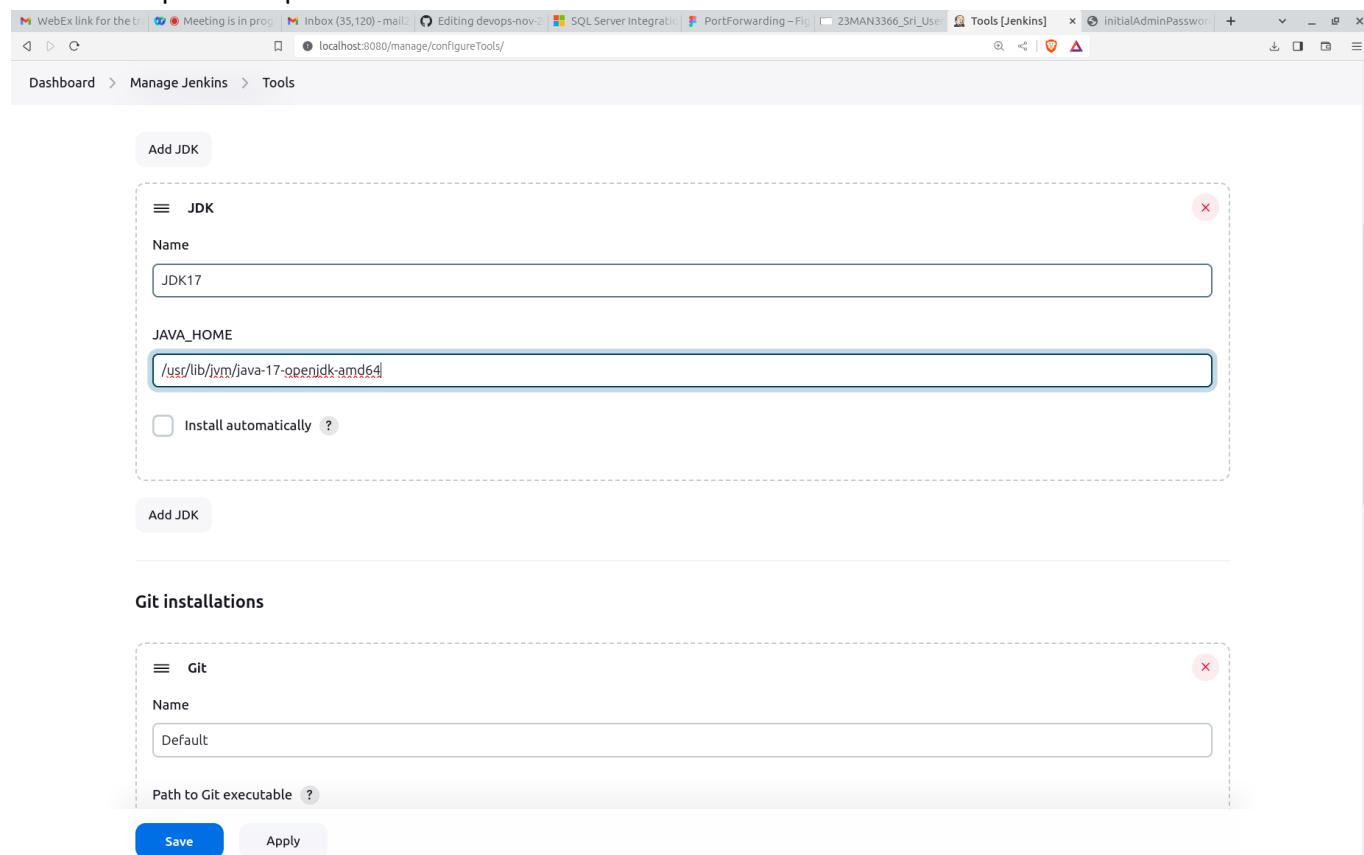
Save **Apply**

Using your Ubuntu terminal, check the maven version to copy the JDK path



```
jegan@tektutor:~/Downloads          jegan@tektutor:~/devops-nov-2023/Day3/ansible
jegan@tektutor.org:~/devops-nov-2023/Day3/ansible$ mvn --version
Apache Maven 3.8.7
Maven home: /usr/share/maven
Java version: 17.0.9-ea, vendor: Private Build, runtime: /usr/lib/jvm/java-17-openjdk-amd64
Default locale: en_US, platform encoding: UTF-8
OS name: "linux", version: "6.5.0-10-generic", arch: "amd64", family: "unix"
jegan@tektutor.org:~/devops-nov-2023/Day3/ansible$
```

We need to paste the path in Jenkins as shown below



The screenshot shows the Jenkins management interface for adding tools. The URL is `localhost:8080/manage/configureTools`. The 'Tools' tab is selected. A 'JDK' section is highlighted, showing fields for 'Name' (set to 'JDK17') and 'JAVA_HOME' (set to `/usr/lib/jvm/java-17-openjdk-amd64`). A checkbox for 'Install automatically' is present but unchecked. Below this, there's another 'Add JDK' button.

JDK

Name: JDK17

JAVA_HOME: /usr/lib/jvm/java-17-openjdk-amd64

Install automatically

Add JDK

Git installations

Git

Name: Default

Path to Git executable: ?

Save **Apply**

Let us scroll down to "Maven Installations"

The screenshot shows the Jenkins 'Tools' configuration page. It includes sections for 'Ant installations', 'Maven installations', 'Ansible installations', and 'Docker installations'. Each section has a 'Add [Tool]' button. Below the sections are 'Save' and 'Apply' buttons.

Ant installations

Maven installations

Ansible installations

Docker installations

Save Apply

Jenkins 2.426.1

Click on "Add Maven" button

The screenshot shows the 'Add Maven' configuration dialog. It has fields for 'Name' (marked as required) and 'Version' (set to 3.9.5). A checkbox for 'Install automatically' is checked. There is also an 'Add Installer' dropdown.

Maven

Name

Required

Install automatically

Install from Apache

Version

3.9.5

Add Installer

Add Maven

Ansible installations

Add Ansible

Save Apply

Uncheck the "Install automatically" check box

The screenshot shows the Jenkins 'Tools' configuration page. Under the 'Maven' section, there are fields for 'Name' (with a red 'Required' validation message) and 'MAVEN_HOME'. Below these is a checkbox labeled 'Install automatically'. At the bottom of the section is a 'Save' button.

Maven

Name

MAVEN_HOME

Install automatically ?

Add Maven

Ansible installations

Add Ansible

Docker installations

Add Docker

Save **Apply**

From your ubuntu terminal, copy the mvn home path

```
jegan@tektutor.org:~/devops-nov-2023/Day3/ansible$ mvn --version
Apache Maven 3.8.7
Maven home: /usr/share/maven
Java version: 17.0.9-ea, vendor: Private Build, runtime: /usr/lib/jvm/java-17-openjdk-amd64
Default locale: en_US, platform encoding: UTF-8
OS name: "linux", version: "6.5.0-10-generic", arch: "amd64", family: "unix"
jegan@tektutor.org:~/devops-nov-2023/Day3/ansible$
```

Maven

Name: MAVEN387

MAVEN_HOME: /usr/share/maven

Install automatically

Ansible installations

Docker installations

Add Docker

Save Apply

Click on "Save" button

Jenkins

Dashboard > Manage Jenkins

Manage Jenkins

New Item

People

Build History

Manage Jenkins

My Views

Build Queue

No builds in the queue.

Build Executor Status

1 Idle

2 Idle

System Configuration

System: Configure global settings and paths.

Tools: Configure tools, their locations and automatic installers.

Nodes: Add, remove, control and monitor the various nodes that Jenkins runs jobs on.

Clouds: Add, remove, and configure cloud instances to provision agents on-demand.

Plugins: Add, remove, disable or enable plugins that can extend the functionality of Jenkins.

Let's navigate to "Manage Jenkins --> Clouds"

The screenshot shows the Jenkins Manage Jenkins interface. On the left, there is a sidebar with links like 'New Item', 'People', 'Build History', 'Manage Jenkins' (which is highlighted), and 'My Views'. Below this is a 'Build Queue' section indicating 'No builds in the queue.' To the right, under 'System Configuration', there are sections for 'System', 'Tools', 'Nodes', and 'Clouds'. The 'Clouds' section contains a sub-section titled 'Security' with tabs for 'Security', 'Credentials', and 'Credential Providers'. At the bottom of the page, there is a 'Clouds' section with options to 'New cloud', 'Install a plugin', and 'Learn more about distributed builds'.

The screenshot shows the Jenkins Clouds management interface. The top navigation bar includes the Jenkins logo, a search bar, and user information for 'Jeganathan Swaminathan'. The main content area is titled 'Clouds' and displays the message 'There are no clouds currently setup, create one or install a plugin for more cloud options.' Below this are three buttons: 'New cloud' (with a plus sign icon), 'Install a plugin' (with a gear icon), and 'Learn more about distributed builds' (with a question mark icon). At the bottom right, it says 'Jenkins 2.426.1'.

Click on "New cloud"

The screenshot shows the Jenkins interface for creating a new cloud. At the top, there are several browser tabs open, including 'New cloud [Jenkins]', 'initial/AdminPassword', and others. The main window title is 'Jenkins'. The URL in the address bar is 'localhost:8080/manage/cloud/new'. The page has a header 'New cloud' with a search bar and a user icon. Below the header, the 'Cloud name' field is empty. The 'Type' section shows a radio button for 'Docker' which is selected. A blue 'Create' button is at the bottom left.

New cloud

Cloud name

Type

Docker

Create

Jenkins 2.426.1

This screenshot is identical to the one above, but the 'Cloud name' field now contains the text 'docker-slave'. All other elements, including the 'Docker' radio button and the 'Create' button, remain the same.

New cloud

Cloud name

Type

Docker

Create

Jenkins 2.426.1

Click on "Create" button

The screenshot shows the Jenkins 2.426.1 interface. The user is on the 'New cloud' creation page. The 'Name' field contains 'docker-slave'. There are two dropdown menus: 'Docker Cloud details' and 'Docker Agent templates', both currently set to their default values. At the bottom is a blue 'Save' button.

Jenkins 2.426.1

Click on "Docker cloud details"

The screenshot shows the 'Docker Cloud details' configuration page for the 'docker-slave' cloud. It includes fields for 'Docker Host URI' (empty), 'Server credentials' (set to '- none -'), 'Advanced' settings (with 'Enabled' checked and a note 'Note: Disabled.'), 'Error Duration' (set to 300), and 'Expose DOCKER_HOST' (unchecked). A 'Test Connection' button is located on the right. At the bottom is a blue 'Save' button.

We need to configure the Docker Service to support REST API access for remote docker clients and for third-party application like Jenkins to interact with Docker service.

Let's launch the ubuntu terminal and type the below command

```
sudo systemctl status docker
```

Expected output

```
jegan@tektutor.org:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
  Loaded: loaded (/lib/systemd/system/docker.service; enabled; preset: enabled)
  Active: active (running) since Mon 2023-11-20 15:54:04 IST; 2 days ago
TriggeredBy: ● docker.socket
  Docs: https://docs.docker.com
 Main PID: 22295 (dockerd)
    Tasks: 183
   Memory: 1.7G
      CPU: 2min 14.747s
 CGroup: /system.slice/docker.service
         └─ 22295 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
             ├ 85130 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8001 -container-ip 172.17.0.2 -container-port 80
             ├ 85144 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8001 -container-ip 172.17.0.2 -container-port 80
             ├ 85174 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2001 -container-ip 172.17.0.2 -container-port 22
             ├ 85180 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2001 -container-ip 172.17.0.2 -container-port 22
             ├ 85314 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8002 -container-ip 172.17.0.3 -container-port 80
             ├ 85326 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8002 -container-ip 172.17.0.3 -container-port 80
             ├ 85350 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2002 -container-ip 172.17.0.3 -container-port 22
             ├ 85356 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2002 -container-ip 172.17.0.3 -container-port 22
             ├ 104522 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
             ├ 104537 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
             ├ 104564 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
             ├ 104572 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
             ├ 187610 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8003 -container-ip 172.17.0.5 -container-port 80
             ├ 187626 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8003 -container-ip 172.17.0.5 -container-port 80
             ├ 187652 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2003 -container-ip 172.17.0.5 -container-port 22
             ├ 187658 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2003 -container-ip 172.17.0.5 -container-port 22
             ├ 187789 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8004 -container-ip 172.17.0.6 -container-port 80
             ├ 187804 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8004 -container-ip 172.17.0.6 -container-port 80
             ├ 187835 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2004 -container-ip 172.17.0.6 -container-port 22
             └ 187842 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2004 -container-ip 172.17.0.6 -container-port 22

Nov 22 17:34:33 tektutor.org dockerd[22295]: time="2023-11-22T17:34:33.513205521+05:30" level=info msg="ignoring event" container=62bf6b7e8c71dc7b7441a9>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.061135025+05:30" level=info msg="ignoring event" container=ae41d92bf5b22139f8862b>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.502544509+05:30" level=info msg="ignoring event" container=959d8443b897e0473a6e57>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.716872637+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.733081463+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.749733875+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163102409+05:30" level=error msg="Container failed to exit within 10s of kill - t>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163210272+05:30" level=error msg="Container failed to exit within 10s of kill - t>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.311242890+05:30" level=info msg="ignoring event" container=09c666740b04362f7fd4bf>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.312268491+05:30" level=info msg="ignoring event" container=a5b26062b000a51953c80a>
jegan@tektutor.org:~$
```

From the above screen, you may copy the path of docker service configuration file

```
jegan@tektutor.org:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
  Loaded: loaded (/lib/systemd/system/docker.service; enabled; preset: enabled)
  Active: active (running) since Mon 2023-11-20 15:54:04 IST; 2 days ago
TriggeredBy: ● docker.socket
  Docs: https://docs.docker.com
 Main PID: 22295 (dockerd)
    Tasks: 183
   Memory: 1.7G
      CPU: 2min 14.747s
 CGroup: /system.slice/docker.service
         └─ 22295 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
             ├ 85130 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8001 -container-ip 172.17.0.2 -container-port 80
             ├ 85144 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8001 -container-ip 172.17.0.2 -container-port 80
             ├ 85174 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2001 -container-ip 172.17.0.2 -container-port 22
             ├ 85180 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2001 -container-ip 172.17.0.2 -container-port 22
             ├ 85314 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8002 -container-ip 172.17.0.3 -container-port 80
             ├ 85326 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8002 -container-ip 172.17.0.3 -container-port 80
             ├ 85350 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2002 -container-ip 172.17.0.3 -container-port 22
             ├ 85356 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2002 -container-ip 172.17.0.3 -container-port 22
             ├ 104522 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
             ├ 104537 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
             ├ 104564 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
             ├ 104572 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
             ├ 187610 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8003 -container-ip 172.17.0.5 -container-port 80
             ├ 187626 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8003 -container-ip 172.17.0.5 -container-port 80
             ├ 187652 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2003 -container-ip 172.17.0.5 -container-port 22
             ├ 187658 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2003 -container-ip 172.17.0.5 -container-port 22
             ├ 187789 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8004 -container-ip 172.17.0.6 -container-port 80
             ├ 187804 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8004 -container-ip 172.17.0.6 -container-port 80
             ├ 187835 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2004 -container-ip 172.17.0.6 -container-port 22
             └ 187842 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2004 -container-ip 172.17.0.6 -container-port 22

Nov 22 17:34:33 tektutor.org dockerd[22295]: time="2023-11-22T17:34:33.513205521+05:30" level=info msg="ignoring event" container=62bf6b7e8c71dc7b7441a9>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.061135025+05:30" level=info msg="ignoring event" container=ae41d92bf5b22139f8862b>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.502544509+05:30" level=info msg="ignoring event" container=959d8443b897e0473a6e57>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.716872637+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.733081463+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.749733875+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163102409+05:30" level=error msg="Container failed to exit within 10s of kill - t>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163210272+05:30" level=error msg="Container failed to exit within 10s of kill - t>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.311242890+05:30" level=info msg="ignoring event" container=09c666740b04362f7fd4bf>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.312268491+05:30" level=info msg="ignoring event" container=a5b26062b000a51953c80a>
jegan@tektutor.org:~$
```

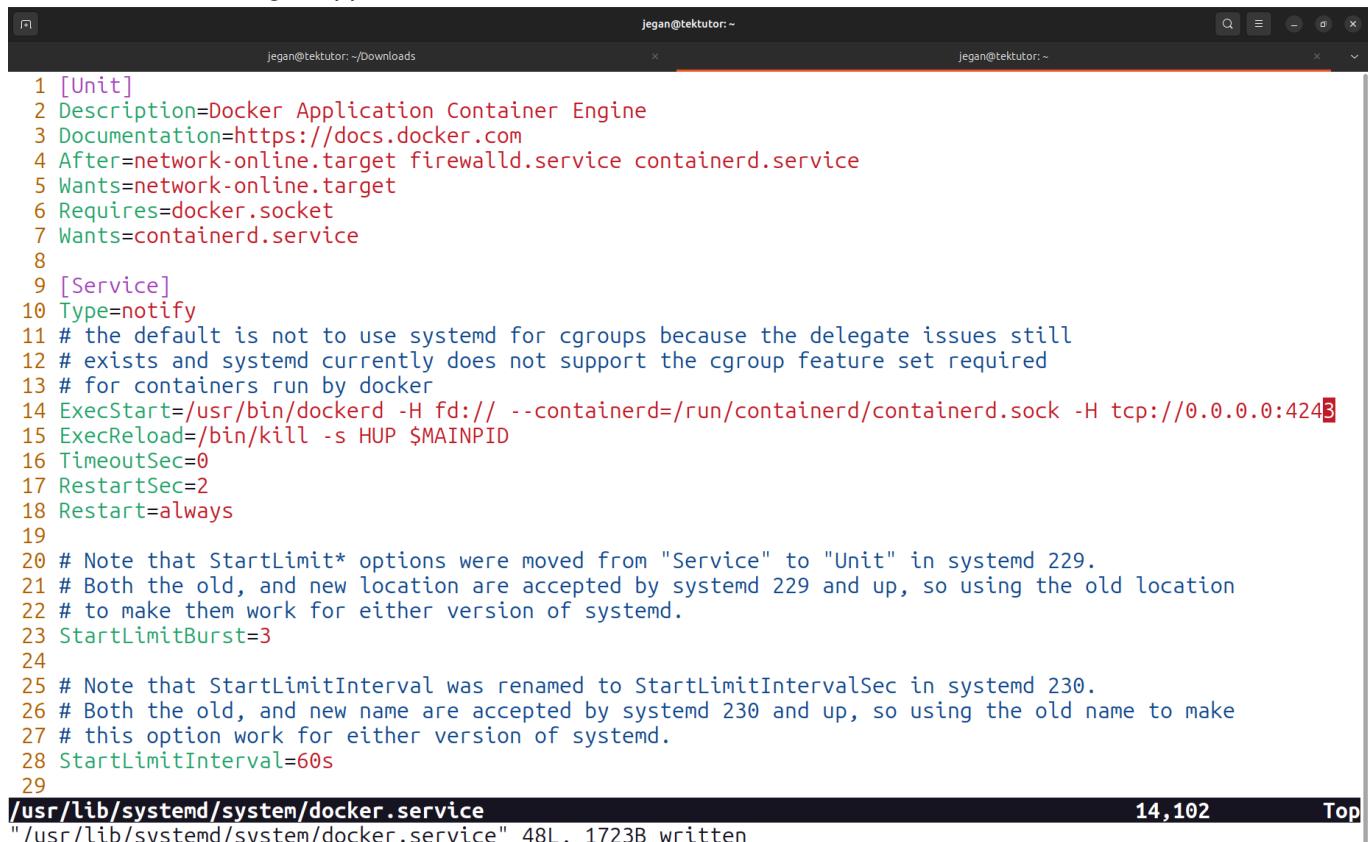
Then, let's edit the file `/lib/systemd/system/docker.service` as an administrator

```
sudo vim /lib/systemd/system/docker.service
```

In the above file at line number 14 we need to append the below string

```
-H tcp://0.0.0.0:4243
```

Once the above string is appended it should look as shown below



The screenshot shows a terminal window with two tabs open. The current tab displays the contents of the `/lib/systemd/system/docker.service` file. The file is a systemd service configuration with several sections and options. Line 14 contains the new addition: `-H tcp://0.0.0.0:4243`. The terminal window has a dark theme and shows the command `sudo vim /lib/systemd/system/docker.service` at the bottom.

```
1 [Unit]
2 Description=Docker Application Container Engine
3 Documentation=https://docs.docker.com
4 After=network-online.target firewalld.service containerd.service
5 Wants=network-online.target
6 Requires=docker.socket
7 Wants=containerd.service
8
9 [Service]
10 Type=notify
11 # the default is not to use systemd for cgroups because the delegate issues still
12 # exists and systemd currently does not support the cgroup feature set required
13 # for containers run by docker
14 ExecStart=/usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock -H tcp://0.0.0.0:4243
15 ExecReload=/bin/kill -s HUP $MAINPID
16 TimeoutSec=0
17 RestartSec=2
18 Restart=always
19
20 # Note that StartLimit* options were moved from "Service" to "Unit" in systemd 229.
21 # Both the old, and new location are accepted by systemd 229 and up, so using the old location
22 # to make them work for either version of systemd.
23 StartLimitBurst=3
24
25 # Note that StartLimitInterval was renamed to StartLimitIntervalSec in systemd 230.
26 # Both the old, and new name are accepted by systemd 230 and up, so using the old name to make
27 # this option work for either version of systemd.
28 StartLimitInterval=60s
29
/usr/lib/systemd/system/docker.service 14,102 Top
"/usr/lib/systemd/system/docker.service" 48L, 1723B written
```

To apply the service configuration changes, we need to restart the docker service

```
sudo systemctl daemon-reload
sudo systemctl restart docker
sudo systemctl status docker
```

Expected output

```
jegan@tektutor.org:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; preset: enabled)
   Active: active (running) since Thu 2023-11-23 12:51:19 IST; 12s ago
     TriggeredBy: ● docker.socket
       Docs: https://docs.docker.com
    Main PID: 196346 (dockerd)
      Tasks: 30
     Memory: 28.7M
        CPU: 433ms
      CGroup: /system.slice/docker.service
              └─196346 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock -H tcp://0.0.0.0:4243

Nov 23 12:51:18 tektutor.org dockerd[196346]: time="2023-11-23T12:51:18.334885130+05:30" level=info msg="[graphdriver] using prior>
Nov 23 12:51:18 tektutor.org dockerd[196346]: time="2023-11-23T12:51:18.348241450+05:30" level=info msg="Loading containers: start>
Nov 23 12:51:18 tektutor.org dockerd[196346]: time="2023-11-23T12:51:18.984164303+05:30" level=info msg="Default bridge (docker0) >
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.105110966+05:30" level=info msg="Loading containers: done."
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.117795057+05:30" level=warning msg="WARNING: API is accessi>
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.117842295+05:30" level=info msg="Docker daemon" commit=24.>
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.117889759+05:30" level=info msg="Daemon has completed init>
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.148286285+05:30" level=info msg="API listen on [::]:4243"
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.148368575+05:30" level=info msg="API listen on /run/docker.sock"
Nov 23 12:51:19 tektutor.org systemd[1]: Started docker.service - Docker Application Container Engine.

jegan@tektutor.org:~$ █
```

Now you may proceed with Jenkins configuration

The screenshot shows the Jenkins 'New cloud' configuration page. The 'Docker Host URI' field contains 'tcp://localhost:4243'. The 'Server credentials' dropdown is set to '-none-'. Under 'Advanced', the 'Enabled' checkbox is checked. The 'Error Duration' field is set to 'Default = 300'. The 'Expose DOCKER_HOST' checkbox is checked. The 'Container Cap' field is set to '100'. A 'Save' button is at the bottom.

Let's test if Jenkins is able to communicate with Docker Server by clicking on "Test Connection" button

Docker Host URI ?
tcp://localhost:4243

Server credentials
- none -
+ Add ▾

Advanced ▾
Version = 24.0.5, API Version = 1.43

Enabled ?

Error Duration ?
Default = 300

Expose DOCKER_HOST ?

Container Cap ?
100

Save

Jenkins

Search (CTRL+K)

Dashboard > Manage Jenkins > Clouds > docker-slave > Configure

Status

Configure

Delete Cloud

Cloud Statistics

Cloud docker-slave Configuration

Name ?
docker-slave

Docker Cloud details ▾ Edited

Build Executor Status ▾

Docker Agent templates ▾

Save

Apply

Let's click on "Docker Agent Templates"

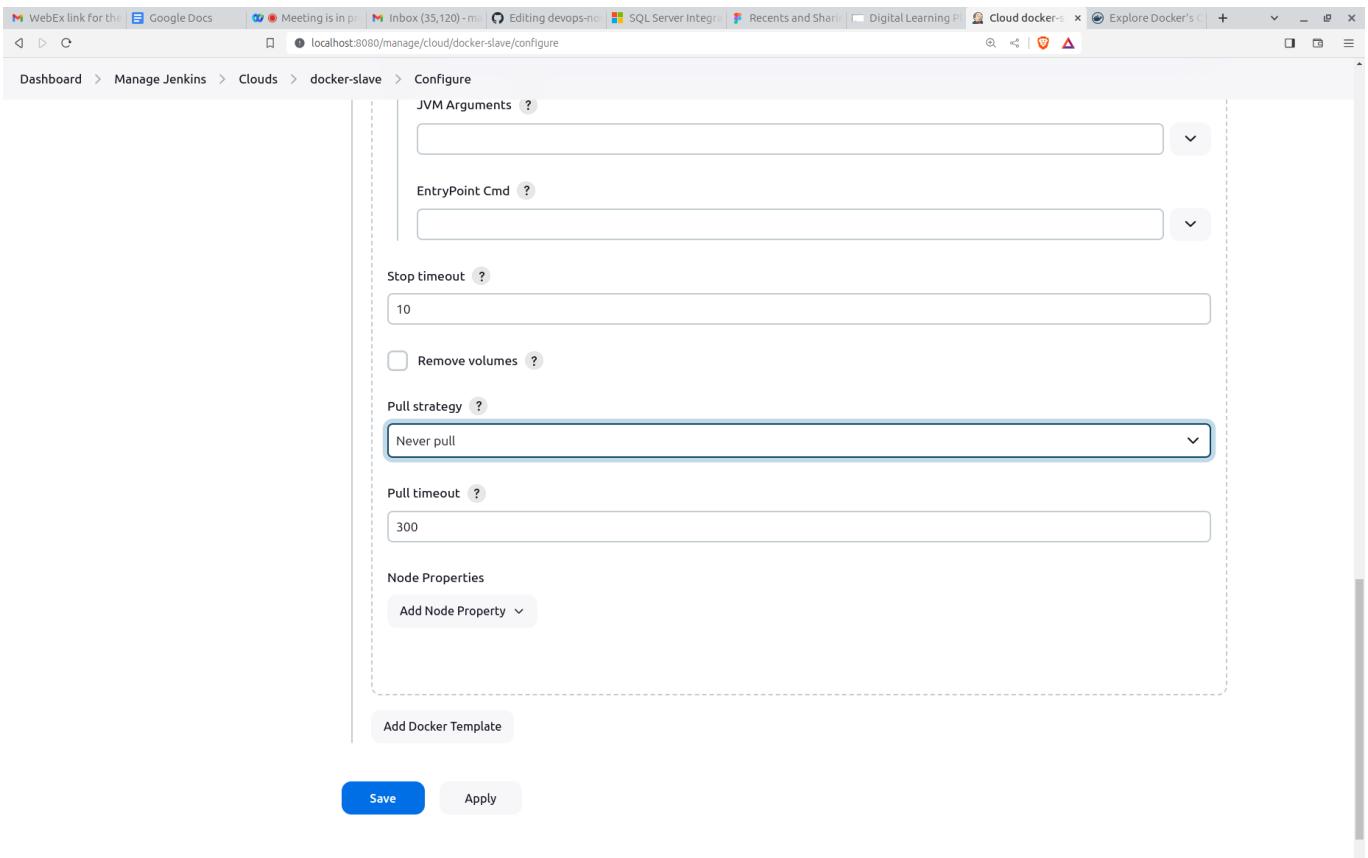
The screenshot shows the Jenkins interface for configuring a Docker slave. The main title is "Cloud docker-slave Configuration". On the left, there's a sidebar with "Status", "Configure" (which is selected and highlighted in grey), "Delete Cloud", and "Cloud Statistics". Below the sidebar, there are two dropdown menus: "Build Executor Status" and "Docker Agent templates". The "Docker Agent templates" menu is currently active. Under "Docker Agent templates", it says "List of Images to be launched as agents" and has a button "Add Docker Template". At the bottom of the configuration area are "Save" and "Apply" buttons. In the top right corner of the browser window, it says "Jenkins 2.426.1".

Click on "Add Docker Template"

The screenshot shows the "Docker Agent templates" configuration dialog. It has a header "Docker Agent templates" and a sub-header "List of Images to be launched as agents". Inside the dialog, there's a section titled "Docker Agent templates" with a "Labels" field (empty), an "Enabled" checkbox (unchecked), and a note "⚠ Note: Disabled.". Below that is a "Name" field (empty). Further down are fields for "Docker Image" (empty), "Registry Authentication" (dropdown menu), "Container settings" (dropdown menu), and "Instance Capacity" (empty). At the bottom of the dialog are "Save" and "Apply" buttons. The browser title bar indicates the page is "localhost:8080/manage/cloud/docker-slave/configure".

The screenshot shows the 'Docker Agent templates' configuration page in Jenkins. It includes fields for Labels (docker-slave), Enabled (checked), Name (docker-slave), Docker Image (tektutor/maven:latest), Registry Authentication, Container settings, Instance Capacity, and Remote File System Root. Buttons for Save and Apply are at the bottom.

The screenshot shows the continuation of the 'Docker Agent templates' configuration page. It includes fields for Registry Authentication, Container settings, Instance Capacity, Remote File System Root (/tmp), Usage (Only build jobs with label expressions matching this node), Idle timeout (10), Connect method (Attach Docker container), and Prerequisites (Java installed). A note at the bottom states: 'The Jenkins remote agent code will be copied into the container and then run using the Java that's installed in the container. See docker container [jenkins/agent](#) and/or source [jenkinsci/docker-agent](#) as an example.' Buttons for Save and Apply are at the bottom.



Click on "Save" button

What is Jenkins?

- is a build automation server
- used mainly for CI/CD Builds
- this was developed in Java by Kohsuke Kawaguchi, former employee of Sun Microsystems
- Initially it was developed as Hudson is an opensource project
- Then Oracle acquired Sun Microsystems, then part of Hudson including Kohsuke Kawaguchi had quit
- Oracle created a new branch from Hudson called Jenkins
- The other part of the Hudson team they continue to develop the product as Hudson
- There is lot common code between Hudson and Jenkins
- More than 10000 active contributors are there for Jenkins
- Many other software vendors got inspired by Jenkins similar products came out in market like Bamboo, Team City, Microsoft TFS, etc.,
- Jenkins supports CI/CD build for products built in any software stack

What is Cloudbees?

- Cloudbees is the enterprise paid variant of Jenkins
- Feature wise Jenkins and Cloudbees pretty much they are same
- We get support for Cloudbees while we only get community support for Jenkins
- Cloudbees is more stable as it is a paid version

Jenkins Alternatives

- Bamboo
- Team City

- Cloudbees
- Microsoft Team Foundation Server (TFS)

Lab - Creating a Maven Jenkins Job to setup CI for one of our Maven project

For navigate to jenkins Dashboard

The screenshot shows the Jenkins dashboard at localhost:8080. The main header says "Welcome to Jenkins!". Below it, there's a section titled "Start building your software project" with links to "Create a job", "Set up a distributed build", "Set up an agent", "Configure a cloud", and "Learn more about distributed builds". On the left, there are links for "New Item", "People", "Build History", "Manage Jenkins", and "My Views". A "Build Queue" section shows "No builds in the queue.". Under "Build Executor Status", there are 1 idle executor. At the bottom right, there are links for "REST API" and "Jenkins 2.414.1".

Click on "Create a Job" and select Maven style job

The screenshot shows the "Create a Job" configuration page. The title is "Enter an item name" with the value "HelloMavenJob". Below it, there are several project types listed: "Freestyle project", "Maven project", "Pipeline", "Multi-configuration project", "Folder", "Multibranch Pipeline", and "Organization Folder". The "Freestyle project" option is selected. The "Multibranch Pipeline" option is highlighted with a blue border. At the bottom, there is a blue "OK" button.

General section

The screenshot shows the Jenkins configuration interface for a job named "HelloMavenJob". The left sidebar lists various configuration sections: General, Source Code Management, Build Triggers, Build Environment, Pre Steps, Build, Post Steps, Build Settings, and Post-build Actions. The "General" section is currently selected. It contains a "Description" field with the text: "This Maven style Jenkins job will setup a Continuous Integration build every time some code is committed in our training [github](#) repository." Below this is a "Plain text" link and a "Preview" link. A list of checkboxes follows, including: "Commit agent's Docker container", "Define a Docker template", "Discard old builds", "GitHub project", "This project is parameterized", "Throttle builds", and "Execute concurrent builds if necessary". A "Save" button is located at the bottom of the "General" section.

Source Code Management

The screenshot shows the "Source Code Management" section of the Jenkins configuration. The left sidebar shows the "General" section is selected. In the main area, there is a "Source Code Management" tab. Under this tab, a radio button is selected for "Git". Below this, there is a "Repositories" section with a "Repository URL" input field containing "https://github.com/tektutor/devops-dec-2023.git" and a "Credentials" dropdown menu showing "- none -". At the bottom of the "Source Code Management" section are "Save" and "Apply" buttons.

Configure

Build Triggers

Branches to build

Branch Specifier (blank for 'any')
/*main

Repository browser
(Auto)

Additional Behaviours

Add

Build Triggers

Save Apply

Build Triggers

Configure

Build Triggers

Build whenever a SNAPSHOT dependency is built

Trigger builds remotely (e.g., from scripts)

Build after other projects are built

Build periodically

GitHub hook trigger for GitScm polling

Poll SCM

Schedule
H/02 * * * *

Would last have run at Monday, December 11, 2023 at 11:56:28 AM India Standard Time; would next run at Monday, December 11, 2023 at 11:58:28 AM India Standard Time.

Ignore post-commit hooks

Build Environment

Delete workspace before build starts

Use secret text(s) or file(s)

Add timestamps to the Console Output

Inspect build log for published build scans

Save Apply

Build

The screenshot shows the Jenkins configuration page for a job named "HelloMavenJob". The left sidebar lists various configuration sections: General, Source Code Management, Build Triggers, Build Environment, Pre Steps (selected), Post Steps, Build Settings, and Post-build Actions. The main content area is titled "Pre Steps" and contains fields for "Root POM" (set to "RootPOM/pom.xml") and "Goals and options" (set to "test"). Below this is a section for "Post Steps" with three radio button options: "Run only if build succeeds", "Run only if build succeeds or is unstable", and "Run regardless of build result" (which is selected). At the bottom are "Save" and "Apply" buttons.

Save

The screenshot shows the Jenkins configuration page for a job named "HelloMavenJob". The left sidebar lists various configuration sections: General, Source Code Management, Build Triggers, Build Environment, Pre Steps, Post Steps (selected), Build Settings, and Post-build Actions. The main content area is titled "Post Steps" and contains three radio button options: "Run only if build succeeds", "Run only if build succeeds or is unstable", and "Run regardless of build result" (which is selected). A note below states "Should the post-build steps run only for successful builds, etc." Below this is a "Build Settings" section with a checkbox for "E-mail Notification". At the bottom are "Save" and "Apply" buttons.

This screenshot shows the Jenkins dashboard for a Maven project named "HelloMavenJob". The main title is "Maven project HelloMavenJob". A status bar at the top indicates "Changes" and "Workspace". On the left, there's a sidebar with options like "Changes", "Workspace", "Build Now", "Configure", "Delete Maven project", "Modules", "Git Polling Log", and "Rename". The "Build History" tab is selected, showing a message "No builds". At the bottom right, it says "REST API Jenkins 2.414.1".

Build History (within 2 minutes it will automatically start the build)

This screenshot shows the Jenkins dashboard for the same Maven project. The "Build History" section now displays a single build entry: "Dec 11, 2023 12:06 PM". The rest of the interface is identical to the first screenshot, including the sidebar options and the REST API information at the bottom right.

The screenshot shows the Jenkins interface with the job 'HelloMavenJob' and build '#1'. The 'Console Output' tab is selected. The log output is as follows:

```

Started by an SCM change
Running as SYSTEM
Building in workspace /home/jegan/.jenkins/workspace/HelloMavenJob
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/tektutor/devops-dec-2023.git
> git init /home/jegan/.jenkins/workspace/HelloMavenJob # timeout=10
Fetching upstream changes from https://github.com/tektutor/devops-dec-2023.git
> git --version # timeout=10
> git --version # 'git version 2.40.1'
> git fetch --tags --force --progress -- https://github.com/tektutor/devops-dec-2023.git +refs/heads/*:refs/remotes/origin/*
> git config remote.origin.url https://github.com/tektutor/devops-dec-2023.git # timeout=10
> git config remote.origin.fetch +refs/heads/*:refs/remotes/origin/*
> git config core.sparsecheckout # timeout=10
> git checkout -f c0c60827a6851a26f642063840729a8ae461072d (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -f c0c60827a6851a26f642063840729a8ae461072d # timeout=10
Commit message: "Update README.md"
First time build. Skipping changelog.
Parsing POMs
Discovered a new module org.tektutor:crm crm
Discovered a new module org.tektutor:fe fe
Discovered a new module org.tektutor:bl bl
Discovered a new module org.tektutor:dal dal
Discovered a new module org.tektutor:main main
Modules changed, recalculating dependency graph
Established TCP socket on 41069

```

The screenshot shows the Jenkins interface with the job 'HelloMavenJob' and build '#1'. The 'Console Output' tab is selected. The log output is as follows:

```

[INFO] Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
[INFO] Running org.tektutor.MainTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.034 s -- in org.tektutor.MainTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[JENKINS] Recording test results
[INFO] -----
[INFO] Reactor Summary for CRM 1.0.0:
[INFO] -----
[INFO] CRM ..... SUCCESS [ 0.066 s]
[INFO] DAL ..... SUCCESS [ 2.463 s]
[INFO] BL ..... SUCCESS [ 0.669 s]
[INFO] FE ..... SUCCESS [ 0.651 s]
[INFO] MAIN ..... SUCCESS [ 0.655 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 7.211 s
[INFO] Finished at: 2023-12-11T12:06:21+05:30
[INFO] -----
Waiting for Jenkins to finish collecting data
[JENKINS] Archiving /home/jegan/.jenkins/workspace/HelloMavenJob/Day1/multi-module-project/main/pom.xml to org.tektutor/main/1.0.0/main-1.0.0.pom
[JENKINS] Archiving /home/jegan/.jenkins/workspace/HelloMavenJob/Day1/multi-module-project/fe/pom.xml to org.tektutor/fe/1.0.0/fe-1.0.0.pom
[JENKINS] Archiving /home/jegan/.jenkins/workspace/HelloMavenJob/Day1/multi-module-project/pom.xml to org.tektutor/crm/1.0.0/crm-1.0.0.pom
[JENKINS] Archiving /home/jegan/.jenkins/workspace/HelloMavenJob/Day1/multi-module-project/dal/pom.xml to org.tektutor/dal/1.0.0/dal-1.0.0.pom
[JENKINS] Archiving /home/jegan/.jenkins/workspace/HelloMavenJob/Day1/multi-module-project/bl/pom.xml to org.tektutor/bl/1.0.0/bl-1.0.0.pom
channel stopped
Finished: SUCCESS

```

The screenshot shows the Jenkins dashboard. At the top, there's a search bar and several notifications. Below the header, a table lists a single job: HelloMavenJob. The table columns include Status (S), Work (W), Name, Last Success, Last Failure, and Last Duration. The job has a green circle icon, a yellow sun icon, and the name 'HelloMavenJob'. The 'Last Success' timestamp is '3 min 17 sec' with a '#2' link. 'Last Failure' is marked as 'N/A'. The 'Last Duration' is '9.8 sec'. Below the table, there are links for 'Icon legend', 'Atom feed for all', 'Atom feed for failures', and 'Atom feed for just latest builds'. On the left, there are links for 'New Item', 'People', 'Build History', 'Project Relationship', 'Check File Fingerprint', 'Manage Jenkins', and 'My Views'. A 'Build Queue' section shows 'No builds in the queue.' A 'Build Executor Status' section shows '1 Idle' and '2 Idle'. At the bottom right, it says 'REST API' and 'Jenkins 2.414.1'.

Jenkins workspace folder

```

(jegan@tektutor.org)-[~/.jenkins]
$ ls
cache
config.xml
fingerprints
hudson.model.UpdateCenter.xml
hudson.plugins.git.GitTool.xml
hudson.plugins.gradle.Gradle.xml
hudson.tasks.Ant.xml
hudson.tasks.Maven.xml
identity.key.enc
jenkins.install.InstallUtil.lastExecVersion
jenkins.install.UpgradeWizard.state
jenkins.model.JenkinsLocationConfiguration.xml
jenkins.mvn.GlobalMavenConfig.xml
jenkins.telemetry.Correlator.xml
jobs
nodeMonitors.xml

nodes
org.jenkinsci.plugins.ansible.An ansibleInstallation.xml
org.jenkinsci.plugins.docker.commons.tools.DockerTool.xml
org.jenkinsci.plugins.gitclient.JGitApacheTool.xml
org.jenkinsci.plugins.gitclient.JGitTool.xml

plugins
queue.xml
queue.xml.bak
secret.key
secret.key.not-so-secret
secrets
updates
userContent
users
war
workspace

(jegan@tektutor.org)-[~/.jenkins]
$ cd workspace

(jegan@tektutor.org)-[~/.jenkins/workspace]
$ ls
HelloMavenJob

(jegan@tektutor.org)-[~/.jenkins/workspace]
$ cd HelloMavenJob

```

jegan@tektutor: ~/jenkins/workspace/HelloMavenJob/Day1/multi-module-project
\$ cd Day1/multi-module-project
jegan@tektutor: ~/Downloads
jegan@tektutor: ~/devops-dec-2023
jegan@tektutor: ~/jenkins/workspace/HelloMavenJob/Day1/multi-module-project
\$ ls
bl dal fe main pom.xml
jegan@tektutor: ~/Downloads
jegan@tektutor: ~/devops-dec-2023
jegan@tektutor: ~/jenkins/workspace/HelloMavenJob/Day1/multi-module-project
\$ tree
.
+-- bl
| +-- pom.xml
| +-- src
| +-- main
| +-- java
| +-- org
| +-- tektutor
| +-- BusinessLayer.java
| +-- test
| +-- java
| +-- org
| +-- tektutor
| +-- BusinessLayerTest.java
+-- target
 +-- classes
 +-- org
 +-- tektutor
 +-- BusinessLayer.class

jegan@tektutor: ~/jenkins/workspace/HelloMavenJob/Day1/multi-module-project
jegan@tektutor: ~/Downloads
jegan@tektutor: ~/devops-dec-2023
jegan@tektutor: ~/jenkins/workspace/HelloMavenJob/Day1/multi-module-project
\$ tree
+-- org
 +-- tektutor
 +-- BusinessLayerTest.java
+-- target
 +-- classes
 +-- org
 +-- tektutor
 +-- BusinessLayer.class
 +-- generated-sources
 | +-- annotations
 +-- generated-test-sources
 +-- test-annotations
 +-- maven-status
 +-- maven-compiler-plugin
 +-- compile
 +-- default-compile
 +-- createdFiles.lst
 +-- inputFiles.lst
 +-- testCompile
 +-- default-testCompile
 +-- createdFiles.lst
 +-- inputFiles.lst
 +-- surefire-reports
 +-- org.tektutor.BusinessLayerTest.txt
 +-- TEST-org.tektutor.BusinessLayerTest.xml
 +-- test-classes
 +-- org
 +-- tektutor
 +-- BusinessLayerTest.class

Lab - Creating a Free style job in Jenkins

From Jenkins Dashboard, click on "New Item" menu on the left side

```

jegan@tektutor:~/devops-dec-2023          jegan@tektutor:~/Downloads          jegan@tektutor:~/devops-dec-2023/Day3/ansible          jegan@tektutor:~/jenkins/workspace/HelloMavenJob/Day1/multi-module-project
└── org
    └── tektutor
        └── BusinessLayerTest.java
target
└── classes
    └── org
        └── tektutor
            └── BusinessLayer.class
generated-sources
└── annotations
generated-test-sources
└── test-annotations
maven-status
└── maven-compiler-plugin
    └── compile
        └── default-compile
            ├── createdFiles.lst
            └── inputFiles.lst
    └── testCompile
        └── default-testCompile
            ├── createdFiles.lst
            └── inputFiles.lst
surefire-reports
└── org.tektutor.BusinessLayerTest.txt
TEST-org.tektutor.BusinessLayerTest.xml
test-classes
└── org
    └── tektutor
        └── BusinessLayerTest.class

```

Click on Ok

Dashboard > All >

Enter an item name

HelloFreeStyleJob Required field

Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

Maven project
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

Pipeline
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

Multi-configuration project
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

Folder
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

Multibranch Pipeline
Creates a set of Pipeline projects according to detected branches in one SCM repository.

Organization Folder
Creates a set of multibranch project subfolders by scanning for repositories.

OK Create a new item from other existing, you can use this option:

General section

The screenshot shows the Jenkins configuration interface for a 'HelloFreeStyleJob'. The 'General' tab is selected. In the 'Description' field, the text 'This Freestyle Jenkins job will setup a CI build for one of our maven project in our TekTutor's training code repository' is entered. Below the description, there are several checkboxes for build steps: 'Commit agent's Docker container', 'Define a Docker template', 'Discard old builds', 'GitHub project', 'This project is parameterized', 'Throttle builds', and 'Execute concurrent builds if necessary'. The 'Enabled' switch is turned on. At the bottom are 'Save' and 'Apply' buttons.

Source Code Management

The screenshot shows the Jenkins configuration interface for the 'Source Code Management' section of the 'HelloFreeStyleJob'. Under the 'Git' tab, a repository URL 'https://github.com/tektutor/devops-dec-2023.git' is specified. The 'Credentials' dropdown is set to '- none -'. At the bottom are 'Save' and 'Apply' buttons.

Configure

General

Source Code Management

Build Triggers

Build Environment

Build Steps

Post-build Actions

Advanced

Add Repository

Branches to build ?

Branch Specifier (blank for 'any') ?

*/*main

Add Branch

Repository browser ?

(Auto)

Additional Behaviours

Save Apply

Build Triggers

Configure

General

Source Code Management

Build Triggers

Trigger builds remotely (e.g., from scripts) ?

Build after other projects are built ?

Build periodically ?

GitHub hook trigger for GITScm polling ?

Poll SCM ?

Schedule ?

H/02 * * * *

Would last have run at Monday, December 11, 2023 at 12:22:03 PM India Standard Time; would next run at Monday, December 11, 2023 at 12:22:03 PM India Standard Time.

Ignore post-commit hooks ?

Build Environment

Save Apply

Build Steps

The screenshot shows the Jenkins configuration interface for a job named "HelloFreeStyleJob". The left sidebar has a "Build Environment" tab selected. The main area displays several configuration sections:

- Build Environment**: Contains checkboxes for workspace cleanup, secret text usage, timestamps, build log inspection, stuck build termination, and Ant script execution.
- Build Steps**: A button labeled "Add build step ▾".
- Post-build Actions**: A button labeled "Add post-build action ▾".

At the bottom are "Save" and "Apply" buttons. The status bar at the bottom right indicates "REST API Jenkins 2.414.1".

Select "Execute Shell"

This screenshot shows the same Jenkins configuration interface, but the "Build Steps" section is now active. The "Add build step ▾" dropdown menu is open, and the "Execute shell" option is highlighted. Other options listed include "Execute Windows batch command", "Invoke Ansible Ad-Hoc Command", "Invoke Ansible Playbook", "Invoke Ansible Vault", "Invoke Ant", "Invoke Gradle script", "Invoke top-level Maven targets", "Run with timeout", "Set build status to 'pending' on GitHub commit", "Start/Stop Docker Containers", and "Trigger/call builds on other projects". The status bar at the bottom right indicates "REST API Jenkins 2.414.1".

The screenshot shows the Jenkins configuration interface for a job named "HelloFreeStyleJob". The left sidebar has "Build Environment" selected. Under "Build Environment", there are several checkboxes: "Delete workspace before build starts", "Use secret text(s) or file(s)", "Add timestamps to the Console Output", "Inspect build log for published build scans", "Terminate a build if it's stuck", and "With Ant". Below this is a section titled "Build Steps". A single step is defined: "Execute shell" with the command "cd Day1/multi-module-project; mvn clean test". At the bottom are "Save" and "Apply" buttons.

The screenshot shows the Jenkins configuration interface for the same job. The left sidebar has "Post-build Actions" selected. There is one action listed: "Add post-build action". Below this is a section titled "Post-build Actions". At the bottom are "Save" and "Apply" buttons.

Click on Save button

The screenshot shows the Jenkins interface for the 'HelloFreeStyleJob' project. On the left, a sidebar lists project management options: Status, Changes, Workspace, Build Now, Configure, Delete Project, Git Polling Log, and Rename. The main content area is titled 'Project HelloFreeStyleJob' and contains a message: 'This Freestyle Jenkins job will setup a CI build for one of our maven project in our TekTutor's training code repository'. Below this is a 'Permalinks' section with links to Atom feeds for all and failures. At the bottom, there are links for REST API and Jenkins 2.414.1. A status bar at the top shows multiple browser tabs and the Jenkins logo.

Build History

The screenshot shows the Jenkins interface for the 'HelloFreeStyleJob' project. The build history section is visible, showing a single build entry: '#11 Dec 11, 2023, 12:28 PM'. The rest of the page content is identical to the previous screenshot, including the sidebar, main project information, and status bar.

A screenshot of a web browser window. The address bar shows 'localhost:8080/job>HelloFreeStyleJob/1/console'. The page content is the Jenkins console output for build #1 of the 'HelloFreeStyleJob'. The output includes several lines of text, some of which are redacted with ellipses (...). The Jenkins logo is visible in the top left corner of the page area.

Console Output

```
Started by an SCM change
Running as SYSTEM
Building in workspace /home/jegan/.jenkins/workspace/HelloFreeStyleJob
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/tektutor/devops-dec-2023.git
> git init /home/jegan/.jenkins/workspace/HelloFreeStyleJob # timeout=10
Fetching upstream changes from https://github.com/tektutor/devops-dec-2023.git
> git --version # timeout=10
> git --version # git version 2.40.1'
> git fetch --tags --force --progress -- https://github.com/tektutor/devops-dec-2023.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git config remote.origin.url https://github.com/tektutor/devops-dec-2023.git # timeout=10
> git config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
> git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision dfb65089edf6f805268562420cabbc42232102df7 (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -f dfb65089edf6f805268562420cabbc42232102df7 # timeout=10
Commit message: "Update README.md"
First time build. Skipping changelog.
[HelloFreeStyleJob] $ /bin/sh -xe /tmp/jenkins3985838094878946680.sh
+ cd Day1/multi-module-project
+ mvn clean test
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
[INFO] Scanning for projects...
[INFO] -----
[INFO] Reactor Build Order:
[INFO] -----
```

```
[WARNING] File encoding has not been set, using platform encoding UTF-8. This is platform dependent!
[INFO] Compiling 1 source file with javac [debug target 1.8] to target/test-classes
[WARNING] bootstrap class path not set in conjunction with -source 8
[INFO]
[INFO] --- surefire:3.2.2:test (default-test) @ main ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit4.JUnit4Provider
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=true -Dswing.aatext=true
[INFO] Running org.tektutor.MainTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.037 s -- in org.tektutor.MainTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] Reactor Summary for cmm 1.0.0:
[INFO]
[INFO] cmm ..... SUCCESS [ 0.124 s]
[INFO] dal ..... SUCCESS [ 1.132 s]
[INFO] bl ..... SUCCESS [ 0.268 s]
[INFO] fe ..... SUCCESS [ 0.263 s]
[INFO] main ..... SUCCESS [ 0.251 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time:  2.129 s
[INFO] Finished at: 2023-12-11T12:28:13+05:30
[INFO] -----
Finished: SUCCESS
```

REST API Jenkins 2.414.1

Lab - Invoking Ansible Playbook from Jenkins based on Code commit in GitHub(CI)

Navigate to Jenkins Dashboard

The screenshot shows the Jenkins dashboard with the following elements:

- Top Bar:** Shows multiple open tabs including "OpenShift w", "Meeting is in PLAYING", "Inbox (7,140)", "Editing devo", "Untitled - Fi", "Digital Learn", "Dashboard", "23MAN3485", "Crontab.guru", "devops-dec", "JFrog", and "JFrog".
- Header:** Displays the Jenkins logo, user name "Jeganathan Swaminathan", and a "log out" button.
- Left Sidebar:** Includes links for "New Item", "People", "Build History", "Project Relationship", "Check File Fingerprint", "Manage Jenkins", and "My Views".
- Job List:** A table showing two jobs:

S	W	Name	Last Success	Last Failure	Last Duration
✓	☀️	HelloFreeStyleJob	9 min 54 sec #2	N/A	4.4 sec
✓	☀️	HelloMavenJob	9 min 59 sec #7	N/A	9.3 sec
- Build Queue:** Shows "No builds in the queue."
- Build Executor Status:** Shows "1 Idle" and "2 Idle".
- Bottom Right:** Links for "REST API" and "Jenkins 2.414.1".

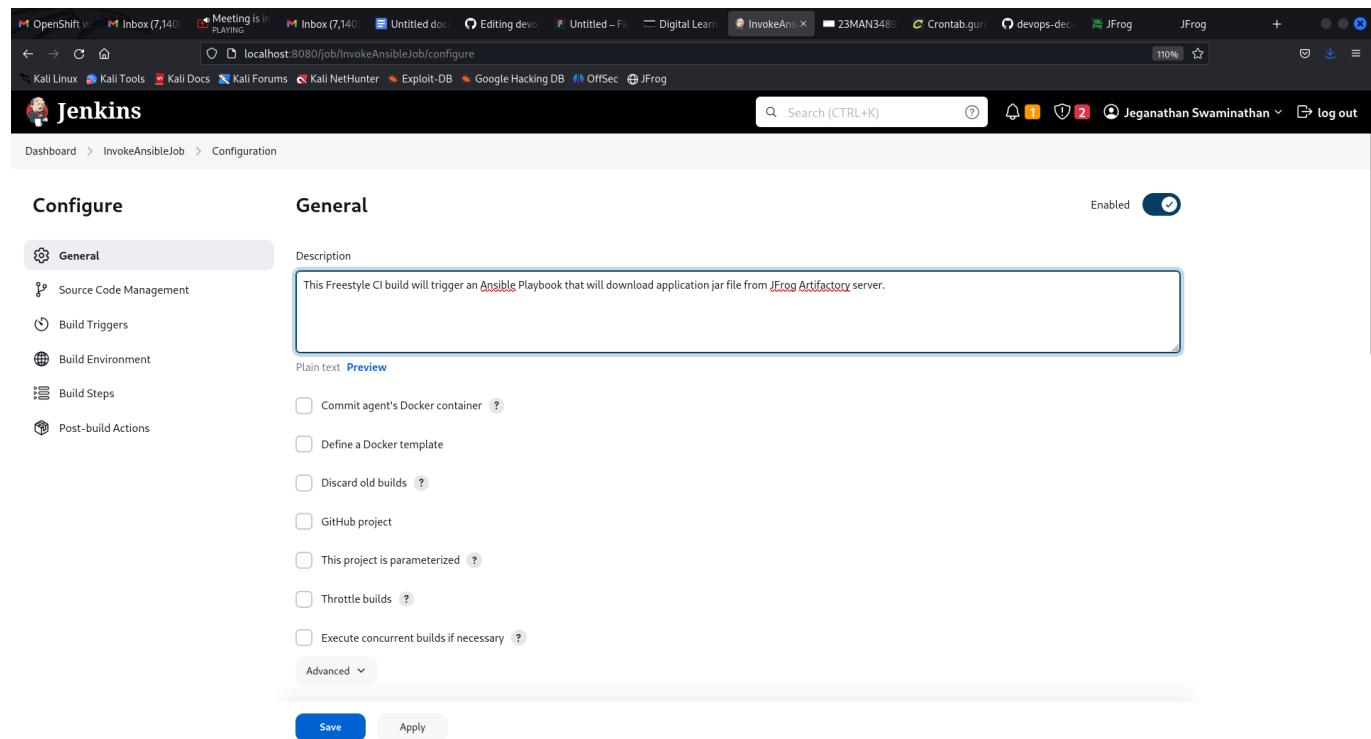
Click on "New Item" on the left side menu (Free style job)

The screenshot shows the "Enter an item name" dialog with the following content:

- Input Field:** "InvokeAnsibleJob" (marked as a required field).
- Project Types:**
 - Freestyle project:** Description: "This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build." (selected)
 - Maven project:** Description: "Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration."
 - Pipeline:** Description: "Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type."
 - Multi-configuration project:** Description: "Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc."
 - Folder:** Description: "Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders."
 - Multibranch Pipeline:** Description: "Creates a set of Pipeline projects according to detected branches in one SCM repository."
- Buttons:** "OK" (highlighted in blue) and "Cancel".

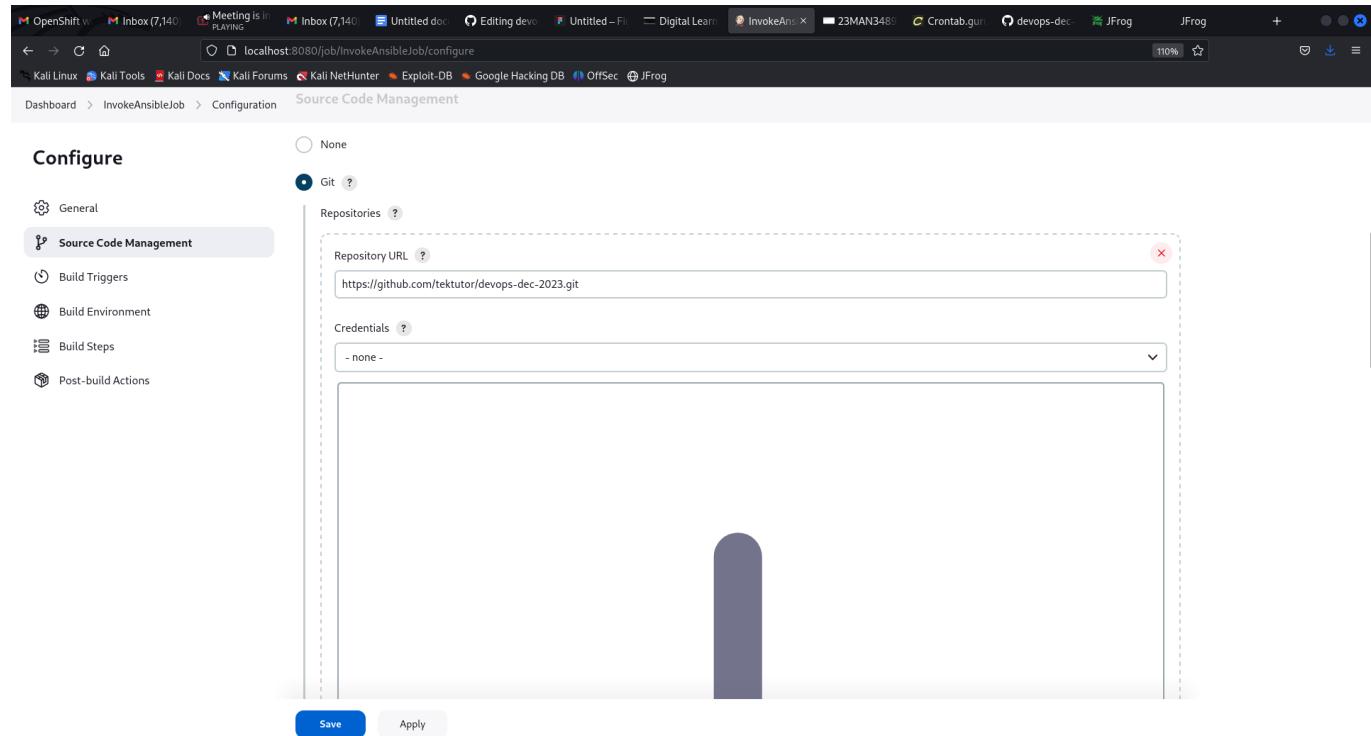
Click on "Ok" button

General Section



The screenshot shows the Jenkins General configuration page for a job named "InvokeAnsibleJob". The "General" tab is selected. The "Enabled" switch is turned on. The "Description" field contains the text: "This Freestyle CI build will trigger an Ansible Playbook that will download application jar file from JFrog Artifactory server." Below the description, there are several checkboxes for build options: Commit agent's Docker container, Define a Docker template, Discard old builds, GitHub project, This project is parameterized, Throttle builds, and Execute concurrent builds if necessary. At the bottom are "Save" and "Apply" buttons.

Source Code Management



The screenshot shows the Jenkins Source Code Management configuration page for the same job. The "Source Code Management" tab is selected. The "Git" option is chosen. Under "Repositories", the "Repository URL" is set to "https://github.com/tektutor/devops-dec-2023.git" and the "Credentials" dropdown is set to "- none -". At the bottom are "Save" and "Apply" buttons.

Configure

- General
- Source Code Management
- Build Triggers**
- Build Environment
- Build Steps
- Post-build Actions

Advanced

Add Repository

Branches to build ?

Branch Specifier (blank for 'any') ?

/main

Add Branch

Repository browser ?

(Auto)

Additional Behaviours

Save Apply

Build Triggers

Configure

- General
- Source Code Management
- Build Triggers**
- Build Environment
- Build Steps
- Post-build Actions

Build Triggers

Trigger builds remotely (e.g., from scripts) ?

Build after other projects are built ?

Build periodically ?

GitHub hook trigger for GITScm polling ?

Poll SCM ?

Schedule ?

H/02 * * * *

Ignore post-commit hooks ?

Build Environment

Delete workspace before build starts

Save Apply

Build Steps

The screenshot shows the Jenkins configuration interface for a job named 'InvokeAnsibleJob'. The left sidebar has a 'Build Environment' section selected. The main area contains sections for 'Build Environment', 'Build Steps', and 'Post-build Actions'. A 'Save' button is at the bottom.

Build Environment

- General
- Source Code Management
- Build Triggers
- Build Environment** (selected)
- Build Steps
- Post-build Actions

Build Environment

- Delete workspace before build starts
- Use secret text(s) or file(s) ?
- Add timestamps to the Console Output
- Inspect build log for published build scans
- Terminate a build if it's stuck
- With Ant ?

Build Steps

Add build step ▾

Post-build Actions

Add post-build action ▾

Buttons

Save Apply

REST API Jenkins 2.414.1

Add Build Step --> Select "Invoke Ansible Playbook"

The screenshot shows the Jenkins configuration interface for a job named 'InvokeAnsibleJob'. The left sidebar has 'Build Steps' selected. In the main area, under 'Build Environment', several checkboxes are listed:

- Delete workspace before build starts
- Use secret text(s) or file(s) ?
- Add timestamps to the Console Output
- Inspect build log for published build scans
- Terminate a build if it's stuck
- With Ant ?

Below this is the 'Build Steps' section. A dropdown menu titled 'Add build step' is open, showing a list of available steps. The 'Invoke Ansible Playbook' option is highlighted.

The screenshot shows the Jenkins configuration interface for the same job. The left sidebar has 'Build Steps' selected. In the main area, under 'Build Steps', there is a single step defined:

Invoke Ansible Playbook

Playbook path ?
Day3/ansible/download-artifacts-from-jfrog-artifactory-using-playbook-with-vault.yml

Inventory

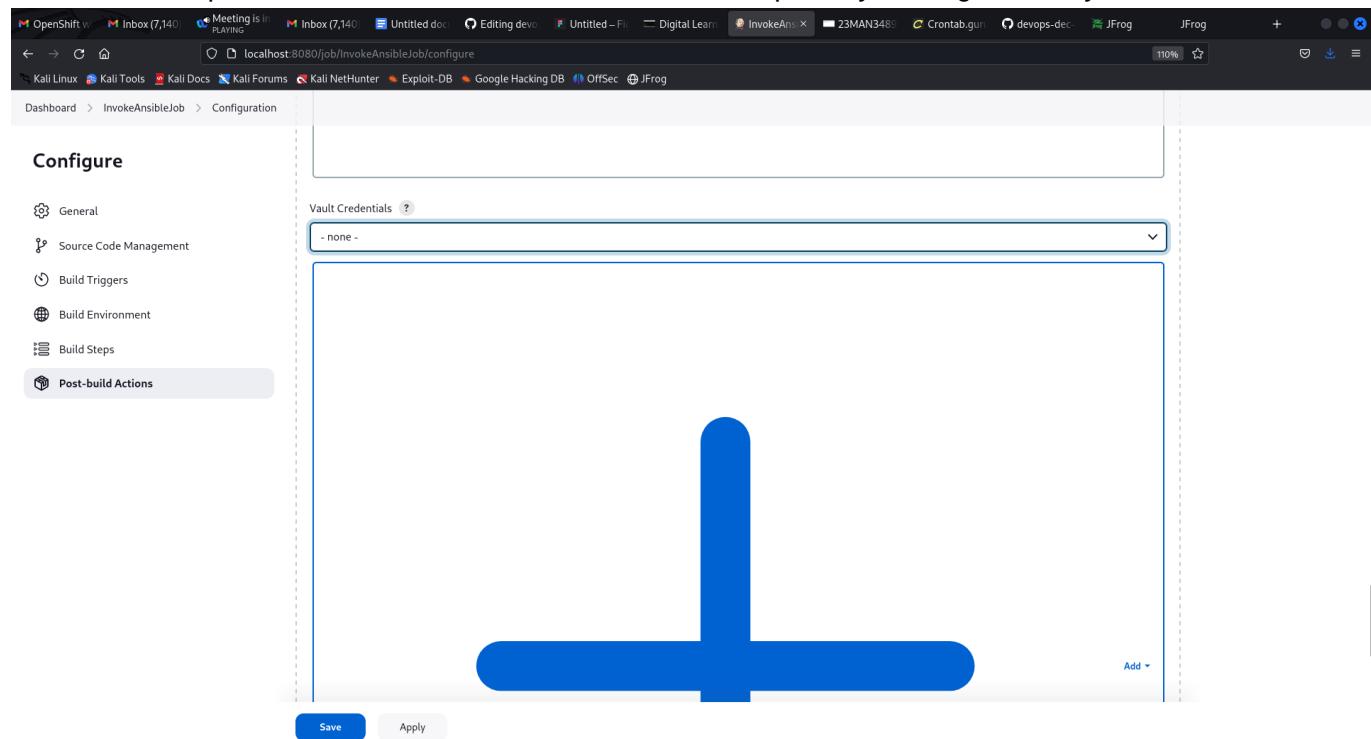
Do not specify Inventory
 File or host list
File path or comma separated host list ?
Day3/ansible/inventory

Host subset ?

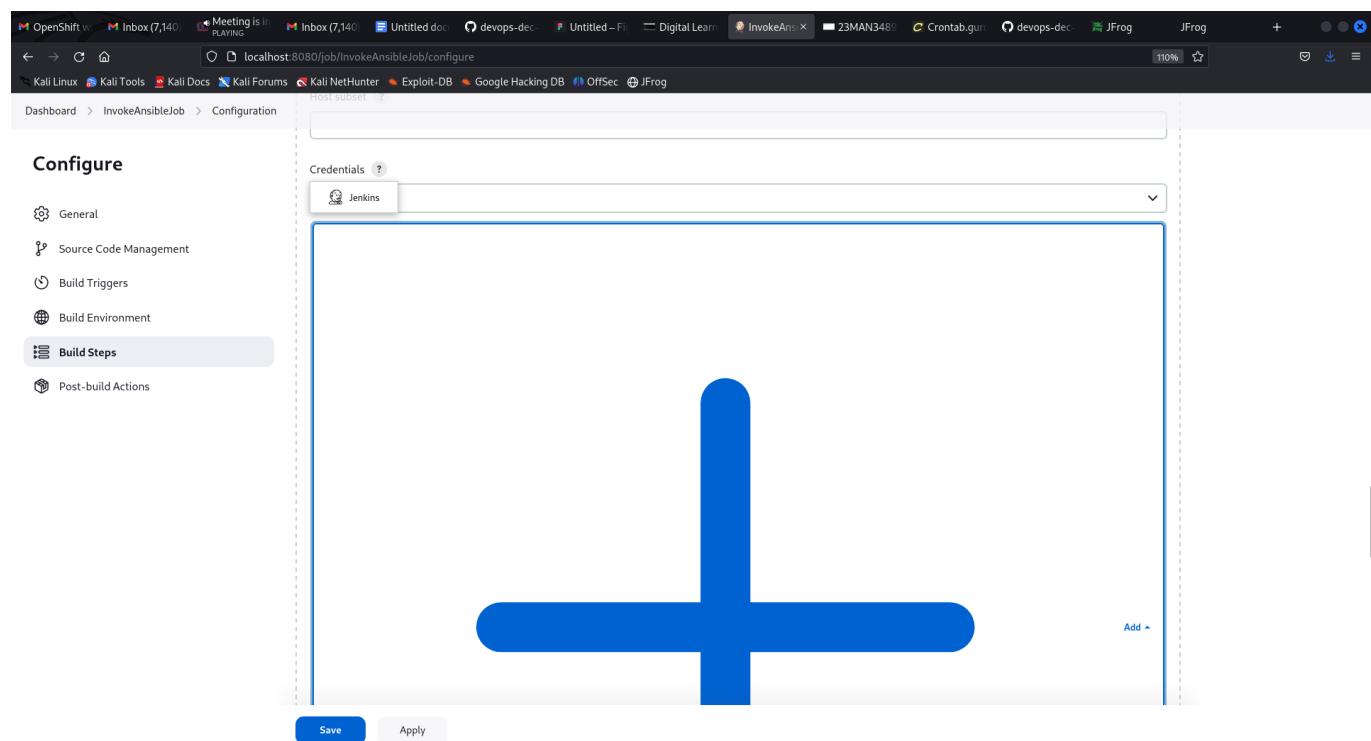
Credentials ?

Save **Apply**

Under Build Steps -> Vault Credentials section Click on Add option by clicking the "+" symbol



click on "Jenkins"



Type "secret text" as "root@123" without quotes as the Vault password to decrypt and access the Ansible vault protected data.

The screenshot shows the Jenkins configuration interface. A modal dialog titled "Jenkins Credentials Provider: Jenkins" is open, specifically the "Add Credentials" section. The "Domain" dropdown is set to "Global credentials (unrestricted)". The "Kind" dropdown is set to "Secret text". The "Scope" dropdown is set to "Global (Jenkins, nodes, items, all child items, etc)". The "Secret" field contains "AnsibleVaultPassword". The "ID" field is "AnsibleVaultPassword". The "Description" field is "Ansible Vault Password". At the bottom of the dialog are "Save" and "Apply" buttons.

Click on "Add" button to save the vault credentials in Jenkins

This screenshot is identical to the one above, showing the "Add Credentials" dialog in Jenkins. The "Add" button at the bottom left of the dialog is highlighted with a blue border, indicating it is the next step to save the credentials.

Select the Ansible vault credential we just now saved

The screenshot shows the Jenkins job configuration interface. On the left, there's a sidebar with various build configurations like General, Source Code Management, Build Triggers, Build Environment, Build Steps, and Post-build Actions. The 'Post-build Actions' section is currently selected and expanded. Inside this section, there's a 'Vault Credentials' dropdown menu which is currently set to '- none -'. At the bottom of the configuration area, there are two buttons: 'Save' and 'Apply'.

This screenshot is similar to the one above, but it shows a different state. The 'Vault Credentials' dropdown now contains the option 'Ansible Vault Password'. Below the dropdown, there's a large blue placeholder icon with a cross shape, indicating where the password would be entered. At the bottom of the configuration area, there are two buttons: 'Save' and 'Apply'.

Click on Save button to save the Jenkins job configurations done.

Lab - Configure Docker plugin to provision a jenkins slave container on demand

Let's navigate to "Manage Jenkins --> Clouds"

The screenshot shows the Jenkins Manage Jenkins interface. On the left, there is a sidebar with links like 'New Item', 'People', 'Build History', 'Manage Jenkins' (which is highlighted), and 'My Views'. Below this is a 'Build Queue' section indicating 'No builds in the queue.' To the right, under 'System Configuration', there are sections for 'System', 'Tools', 'Nodes', and 'Clouds'. The 'Clouds' section is expanded, showing its sub-options: 'Security', 'Credentials', and 'Credential Providers'. At the top right, there are buttons for 'Set up agent', 'Set up cloud', and 'Dismiss'.

The screenshot shows the Jenkins Clouds management page. The header includes the Jenkins logo, a search bar, and user information. The main content area has a heading 'Clouds' and a message stating 'There are no clouds currently setup, create one or install a plugin for more cloud options.' Below this are three buttons: 'New cloud' (with a plus sign icon), 'Install a plugin' (with a gear icon), and 'Learn more about distributed builds' (with a question mark icon). At the bottom right, it says 'Jenkins 2.426.1'.

Click on "New cloud"

The screenshot shows the Jenkins interface for creating a new cloud. At the top, there are several browser tabs open, including 'New cloud [Jenkins]', 'initial/AdminPassword', and others. The main window title is 'Jenkins'. The URL in the address bar is 'localhost:8080/manage/cloud/new'. The page has a header 'New cloud' with a search bar and user information. Below the header, there are fields for 'Cloud name' (empty), 'Type' (radio button for 'Docker' is selected), and a 'Create' button.

New cloud

Cloud name

Type

Docker

Create

Jenkins 2.426.1

This screenshot is identical to the one above, but the 'Cloud name' field now contains the value 'docker-slave'. All other elements, including the 'Type' selection and the 'Create' button, remain the same.

New cloud

Cloud name

Type

Docker

Create

Jenkins 2.426.1

Click on "Create" button

The screenshot shows the Jenkins 2.426.1 interface. The user is on the 'New cloud' creation page. The 'Name' field contains 'docker-slave'. There are two dropdown menus: 'Docker Cloud details' and 'Docker Agent templates', both currently set to their default values. At the bottom is a blue 'Save' button.

Jenkins 2.426.1

Click on "Docker cloud details"

The screenshot shows the 'Docker Cloud details' configuration page for the 'docker-slave' cloud. It includes fields for 'Docker Host URI' (empty), 'Server credentials' (set to '- none -'), 'Advanced' settings (with 'Enabled' checked and a note 'Note: Disabled.'), 'Error Duration' (set to 300), and 'Expose DOCKER_HOST' (unchecked). A 'Test Connection' button is located on the right. At the bottom is a blue 'Save' button.

We need to configure the Docker Service to support REST API access for remote docker clients and for third-party application like Jenkins to interact with Docker service.

Let's launch the ubuntu terminal and type the below command

```
sudo systemctl status docker
```

Expected output

```
jegan@tektutor.org:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
  Loaded: loaded (/lib/systemd/system/docker.service; enabled; preset: enabled)
  Active: active (running) since Mon 2023-11-20 15:54:04 IST; 2 days ago
TriggeredBy: ● docker.socket
  Docs: https://docs.docker.com
 Main PID: 22295 (dockerd)
    Tasks: 183
   Memory: 1.7G
      CPU: 2min 14.747s
 CGroup: /system.slice/docker.service
└─ 22295 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
   ├ 85130 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8001 -container-ip 172.17.0.2 -container-port 80
   ├ 85144 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8001 -container-ip 172.17.0.2 -container-port 80
   ├ 85174 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2001 -container-ip 172.17.0.2 -container-port 22
   ├ 85180 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2001 -container-ip 172.17.0.2 -container-port 22
   ├ 85314 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8002 -container-ip 172.17.0.3 -container-port 80
   ├ 85326 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8002 -container-ip 172.17.0.3 -container-port 80
   ├ 85350 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2002 -container-ip 172.17.0.3 -container-port 22
   ├ 85356 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2002 -container-ip 172.17.0.3 -container-port 22
   ├ 104522 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
   ├ 104537 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
   ├ 104564 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
   ├ 104572 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
   ├ 187610 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8003 -container-ip 172.17.0.5 -container-port 80
   ├ 187626 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8003 -container-ip 172.17.0.5 -container-port 80
   ├ 187652 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2003 -container-ip 172.17.0.5 -container-port 22
   ├ 187658 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2003 -container-ip 172.17.0.5 -container-port 22
   ├ 187789 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8004 -container-ip 172.17.0.6 -container-port 80
   ├ 187804 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8004 -container-ip 172.17.0.6 -container-port 80
   ├ 187835 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2004 -container-ip 172.17.0.6 -container-port 22
   └ 187842 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2004 -container-ip 172.17.0.6 -container-port 22

Nov 22 17:34:33 tektutor.org dockerd[22295]: time="2023-11-22T17:34:33.513205521+05:30" level=info msg="ignoring event" container=62bf6b7e8c71dc7b7441a9>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.061135025+05:30" level=info msg="ignoring event" container=ae41d92bf5b22139f8862b>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.502544509+05:30" level=info msg="ignoring event" container=959d8443b897e0473a6e57>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.716872637+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.733081463+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.749733875+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163102409+05:30" level=error msg="Container failed to exit within 10s of kill - t>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163210272+05:30" level=error msg="Container failed to exit within 10s of kill - t>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.311242890+05:30" level=info msg="ignoring event" container=09c666740b04362f7fd4bf>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.312268491+05:30" level=info msg="ignoring event" container=a5b26062b000a51953c80a>
jegan@tektutor.org:~$
```

From the above screen, you may copy the path of docker service configuration file

```
jegan@tektutor.org:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
  Loaded: loaded (/lib/systemd/system/docker.service; enabled; preset: enabled)
  Active: active (running) since Mon 2023-11-20 15:54:04 IST; 2 days ago
TriggeredBy: ● docker.socket
  Docs: https://docs.docker.com
 Main PID: 22295 (dockerd)
    Tasks: 183
   Memory: 1.7G
      CPU: 2min 14.747s
 CGroup: /system.slice/docker.service
└─ 22295 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
   ├ 85130 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8001 -container-ip 172.17.0.2 -container-port 80
   ├ 85144 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8001 -container-ip 172.17.0.2 -container-port 80
   ├ 85174 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2001 -container-ip 172.17.0.2 -container-port 22
   ├ 85180 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2001 -container-ip 172.17.0.2 -container-port 22
   ├ 85314 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8002 -container-ip 172.17.0.3 -container-port 80
   ├ 85326 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8002 -container-ip 172.17.0.3 -container-port 80
   ├ 85350 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2002 -container-ip 172.17.0.3 -container-port 22
   ├ 85356 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2002 -container-ip 172.17.0.3 -container-port 22
   ├ 104522 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
   ├ 104537 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8082 -container-ip 172.17.0.4 -container-port 8082
   ├ 104564 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
   ├ 104572 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8081 -container-ip 172.17.0.4 -container-port 8081
   ├ 187610 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8003 -container-ip 172.17.0.5 -container-port 80
   ├ 187626 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8003 -container-ip 172.17.0.5 -container-port 80
   ├ 187652 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2003 -container-ip 172.17.0.5 -container-port 22
   ├ 187658 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2003 -container-ip 172.17.0.5 -container-port 22
   ├ 187789 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8004 -container-ip 172.17.0.6 -container-port 80
   ├ 187804 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8004 -container-ip 172.17.0.6 -container-port 80
   ├ 187835 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 2004 -container-ip 172.17.0.6 -container-port 22
   └ 187842 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 2004 -container-ip 172.17.0.6 -container-port 22

Nov 22 17:34:33 tektutor.org dockerd[22295]: time="2023-11-22T17:34:33.513205521+05:30" level=info msg="ignoring event" container=62bf6b7e8c71dc7b7441a9>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.061135025+05:30" level=info msg="ignoring event" container=ae41d92bf5b22139f8862b>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.502544509+05:30" level=info msg="ignoring event" container=959d8443b897e0473a6e57>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.716872637+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.733081463+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 22 17:34:34 tektutor.org dockerd[22295]: time="2023-11-22T17:34:34.749733875+05:30" level=info msg="Layer sha256:b5f1f870fc9657e35148766e458e8375d92>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163102409+05:30" level=error msg="Container failed to exit within 10s of kill - t>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.163210272+05:30" level=error msg="Container failed to exit within 10s of kill - t>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.311242890+05:30" level=info msg="ignoring event" container=09c666740b04362f7fd4bf>
Nov 23 10:57:40 tektutor.org dockerd[22295]: time="2023-11-23T10:57:40.312268491+05:30" level=info msg="ignoring event" container=a5b26062b000a51953c80a>
jegan@tektutor.org:~$
```

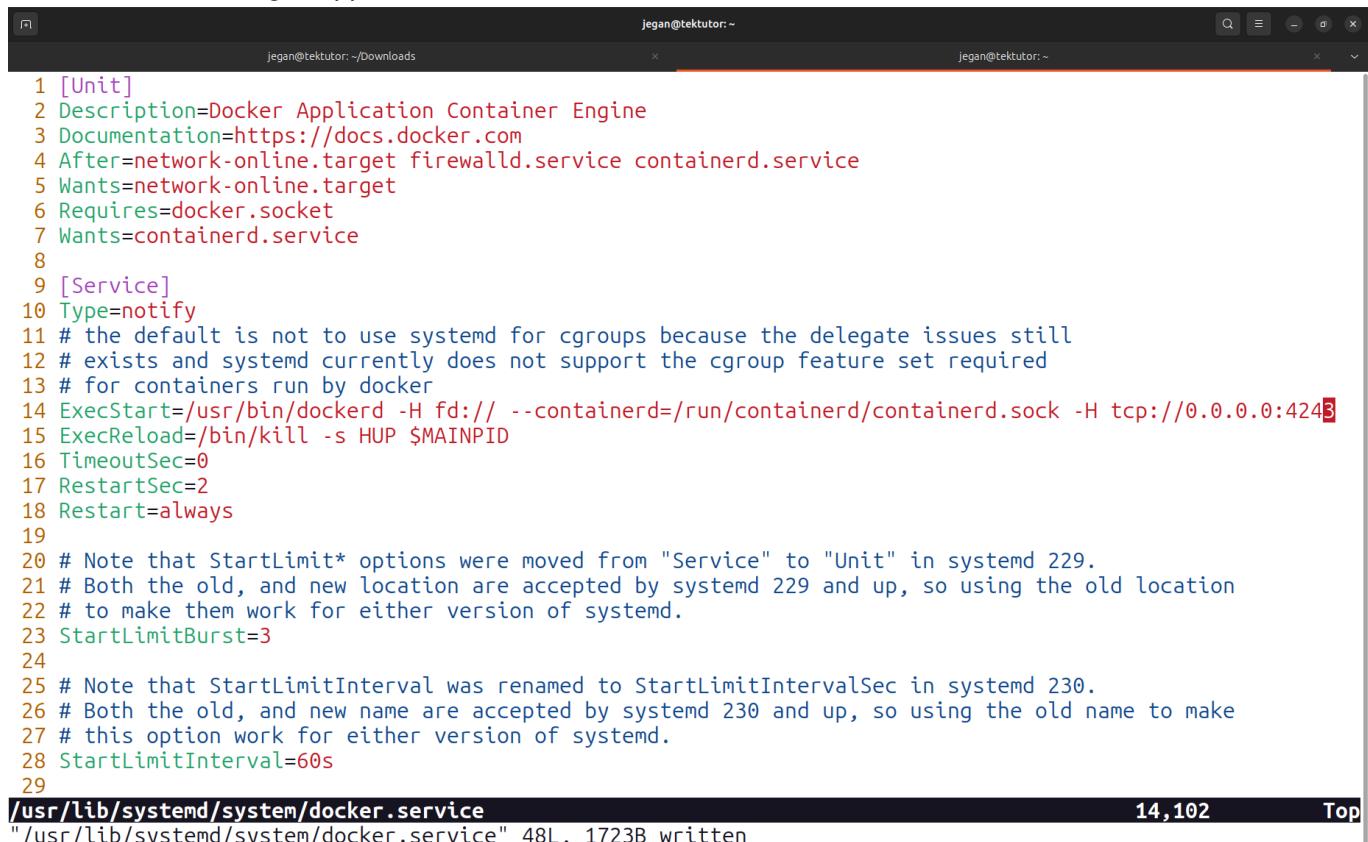
Then, let's edit the file `/lib/systemd/system/docker.service` as an administrator

```
sudo vim /lib/systemd/system/docker.service
```

In the above file at line number 14 we need to append the below string

```
-H tcp://0.0.0.0:4243
```

Once the above string is appended it should look as shown below



The screenshot shows a terminal window with two tabs open. The current tab is titled "jegan@tektutor: ~" and contains the code for the `docker.service` file. The code is color-coded to highlight syntax. Line 14 has been modified to include the `-H` option. The bottom status bar shows the file path as `/usr/lib/systemd/system/docker.service`, 48L, 1723B written, and the word "Top".

```
1 [Unit]
2 Description=Docker Application Container Engine
3 Documentation=https://docs.docker.com
4 After=network-online.target firewalld.service containerd.service
5 Wants=network-online.target
6 Requires=docker.socket
7 Wants=containerd.service
8
9 [Service]
10 Type=notify
11 # the default is not to use systemd for cgroups because the delegate issues still
12 # exists and systemd currently does not support the cgroup feature set required
13 # for containers run by docker
14 ExecStart=/usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock -H tcp://0.0.0.0:4243
15 ExecReload=/bin/kill -s HUP $MAINPID
16 TimeoutSec=0
17 RestartSec=2
18 Restart=always
19
20 # Note that StartLimit* options were moved from "Service" to "Unit" in systemd 229.
21 # Both the old, and new location are accepted by systemd 229 and up, so using the old location
22 # to make them work for either version of systemd.
23 StartLimitBurst=3
24
25 # Note that StartLimitInterval was renamed to StartLimitIntervalSec in systemd 230.
26 # Both the old, and new name are accepted by systemd 230 and up, so using the old name to make
27 # this option work for either version of systemd.
28 StartLimitInterval=60s
29
```

To apply the service configuration changes, we need to restart the docker service

```
sudo systemctl daemon-reload
sudo systemctl restart docker
sudo systemctl status docker
```

Expected output

```
jegan@tektutor.org:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; preset: enabled)
   Active: active (running) since Thu 2023-11-23 12:51:19 IST; 12s ago
     TriggeredBy: ● docker.socket
       Docs: https://docs.docker.com
    Main PID: 196346 (dockerd)
      Tasks: 30
     Memory: 28.7M
        CPU: 433ms
      CGroup: /system.slice/docker.service
              └─196346 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock -H tcp://0.0.0.0:4243

Nov 23 12:51:18 tektutor.org dockerd[196346]: time="2023-11-23T12:51:18.334885130+05:30" level=info msg="[graphdriver] using prior>
Nov 23 12:51:18 tektutor.org dockerd[196346]: time="2023-11-23T12:51:18.348241450+05:30" level=info msg="Loading containers: start>
Nov 23 12:51:18 tektutor.org dockerd[196346]: time="2023-11-23T12:51:18.984164303+05:30" level=info msg="Default bridge (docker0) >
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.105110966+05:30" level=info msg="Loading containers: done."
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.117795057+05:30" level=warning msg="WARNING: API is accessi>
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.117842295+05:30" level=info msg="Docker daemon" commit=24.>
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.117889759+05:30" level=info msg="Daemon has completed init>
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.148286285+05:30" level=info msg="API listen on [::]:4243"
Nov 23 12:51:19 tektutor.org dockerd[196346]: time="2023-11-23T12:51:19.148368575+05:30" level=info msg="API listen on /run/docker.sock"
Nov 23 12:51:19 tektutor.org systemd[1]: Started docker.service - Docker Application Container Engine.

jegan@tektutor.org:~$ █
```

Now you may proceed with Jenkins configuration

The screenshot shows the Jenkins 'New cloud' configuration page. The 'Docker Host URI' field is set to 'tcp://localhost:4243'. The 'Server credentials' dropdown is set to '-none-'. Under 'Advanced', the 'Enabled' checkbox is checked. The 'Error Duration' field is set to 'Default = 300'. The 'Expose DOCKER_HOST' checkbox is checked. The 'Container Cap' field is set to '100'. A 'Save' button is at the bottom.

Let's test if Jenkins is able to communicate with Docker Server by clicking on "Test Connection" button

Docker Host URI ?
tcp://localhost:4243

Server credentials
- none -
+ Add ▾

Advanced ▾
Version = 24.0.5, API Version = 1.43

Test Connection

Enabled ?

Error Duration ?
Default = 300

Expose DOCKER_HOST ?

Container Cap ?
100

Save

Jenkins

Search (CTRL+K)

Dashboard > Manage Jenkins > Clouds > docker-slave > Configure

Status

Configure

Delete Cloud

Cloud Statistics

Cloud docker-slave Configuration

Name ?
docker-slave

Docker Cloud details ▾ Edited

Build Executor Status ▾

Docker Agent templates ▾

Save

Apply

Let's click on "Docker Agent Templates"

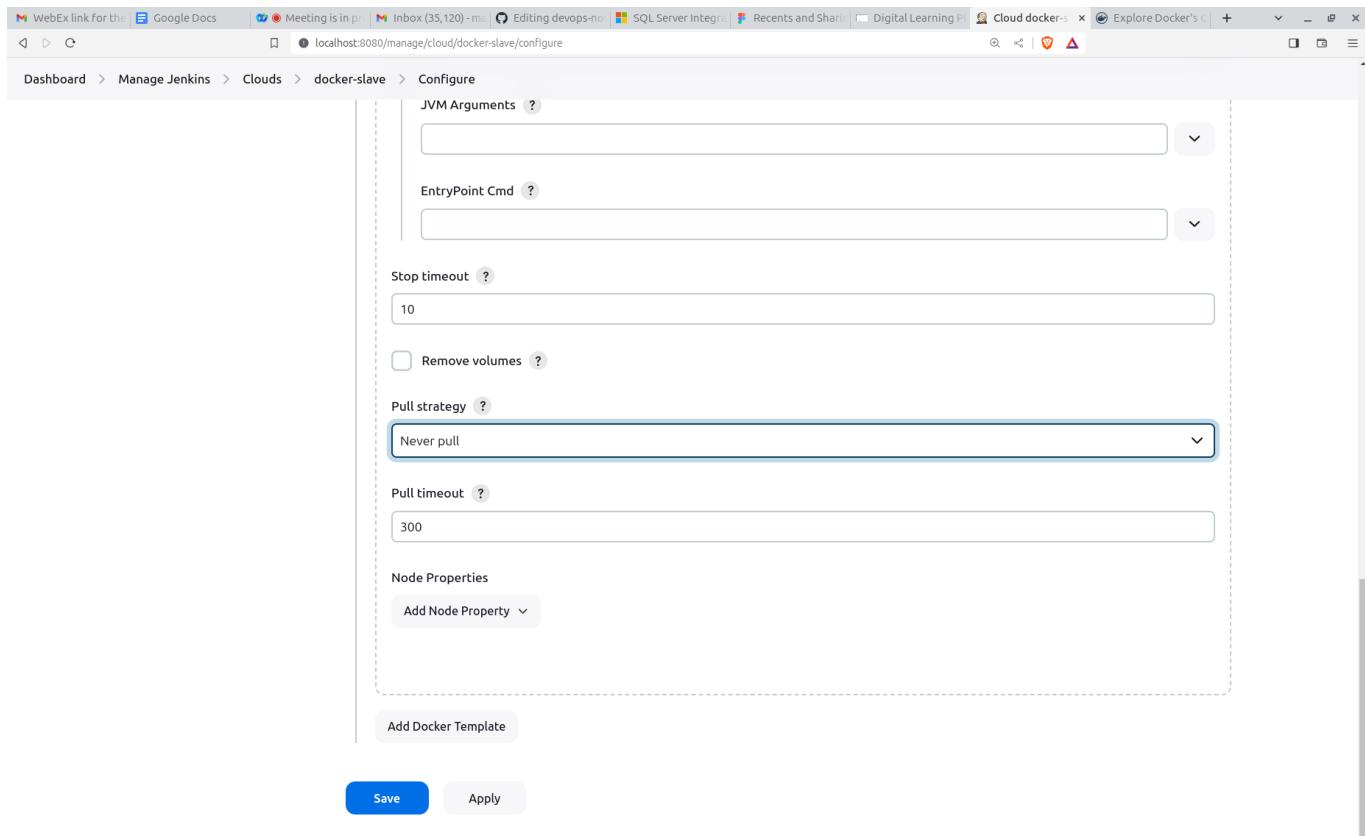
The screenshot shows the Jenkins interface for configuring a Docker slave. The main title is "Cloud docker-slave Configuration". On the left, there's a sidebar with "Status", "Configure" (which is selected and highlighted in grey), "Delete Cloud", and "Cloud Statistics". Below the sidebar, there are two dropdown menus: "Build Executor Status" and "Docker Agent templates". The "Docker Agent templates" menu is expanded, showing a sub-section titled "Docker Agent templates" with the sub-instruction "List of Images to be launched as agents". A "Add Docker Template" button is visible. At the bottom of the configuration area are "Save" and "Apply" buttons. In the top right corner of the browser window, it says "Jenkins 2.426.1".

Click on "Add Docker Template"

The screenshot shows the "Docker Agent templates" configuration dialog. It has a header "Docker Agent templates" and a sub-instruction "List of Images to be launched as agents". The dialog is divided into several sections: "Labels" (with an empty input field), "Enabled" (with a checked checkbox and a note "Note: Disabled."), "Name" (with an empty input field), "Docker Image" (with an empty input field), "Registry Authentication" (a dropdown menu), "Container settings" (a dropdown menu), and "Instance Capacity" (with an empty input field). At the bottom are "Save" and "Apply" buttons. The Jenkins version "Jenkins 2.426.1" is visible in the top right corner.

The screenshot shows the 'Docker Agent templates' configuration page in Jenkins. It includes fields for Labels (docker-slave), Enabled (checked), Name (docker-slave), Docker Image (tektutor/maven:latest), Registry Authentication, Container settings, Instance Capacity, and Remote File System Root. Buttons for Save and Apply are at the bottom.

The screenshot shows the continuation of the 'Docker Agent templates' configuration page. It includes fields for Registry Authentication, Container settings, Instance Capacity, Remote File System Root (/tmp), Usage (Only build jobs with label expressions matching this node), Idle timeout (10), Connect method (Attach Docker container), and Prerequisites (Java installed). A note at the bottom states: 'The Jenkins remote agent code will be copied into the container and then run using the Java that's installed in the container. See docker container [jenkins/agent](#) and/or source [jenkinsci/docker-agent](#) as an example.' Buttons for Save and Apply are at the bottom.



Click on "Save" button

Lab - Building a Custom Docker Image to use it in your Jenkins Docker cloud configuration

```
cd ~/devops-dec-2023
git pull
cd Day4/CustomDockerImages
docker build -t tektutor/maven:latest .
```

Expected output

```
jegan@tektutor: ~/devops-dec-2023/Day4/CustomDockerImages
jegan@tektutor: ~/Downloads
jegan@tektutor: ~/devops-dec-2023/Day3/ansi...
jegan@tektutor: ~/devops-dec-2023/Day4/Cust...
jegan@tektutor: ~/jenkins/workspace/InvokeA...
(jegan@tektutor.org)-[~/devops-dec-2023/Day4/CustomDockerImages]
$ ls
Dockerfile

(jegan@tektutor.org)-[~/devops-dec-2023/Day4/CustomDockerImages]
$ docker build -t tektutor/maven:latest .
Sending build context to Docker daemon 2.048kB
Step 1/4 : FROM ubuntu:latest
--> b6548eacb063
Step 2/4 : MAINTAINER Jeganathan Swaminathan <jegan@tektutor.org>
--> Using cache
--> e046742030a9
Step 3/4 : RUN apt update && apt install -y openjdk-17-jdk
--> Running in c7ab6742016a

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

Get:1 http://archive.ubuntu.com/ubuntu jammy InRelease [270 kB]
Get:2 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Get:5 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [1036 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [17.5 MB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [1282 kB]
Get:8 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [44.0 kB]
Get:9 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [1512 kB]
Get:10 http://archive.ubuntu.com/ubuntu jammy/main amd64 Packages [1792 kB]
Get:11 http://archive.ubuntu.com/ubuntu jammy/restricted amd64 Packages [164 kB]
```

```
jegan@tektutor:~/devops-dec-2023/Day4/CustomDockerImages
jegan@tektutor:~/Downloads
jegan@tektutor:~/devops-dec-2023/Day3/ansi...
jegan@tektutor:~/devops-dec-2023/Day4/Cust...
jegan@tektutor:~/jenkins/workspace/InvokeA...
Setting up libper15.34:amd64 (5.34.0-3ubuntu1.3) ...
Setting up libcommons-io-java (2.11.0-2) ...
Setting up libcurl3-gnutls:amd64 (7.81.0-1ubuntu1.15) ...
Setting up libguice-java (4.2.3-2) ...
Setting up perl (5.34.0-3ubuntu1.3) ...
Setting up libjansi-java (1.18-1) ...
Setting up libmaven-shared-utils-java (3.3.0-1) ...
Setting up libmaven3-core-java (3.6.3-5) ...
Setting up maven (3.6.3-5) ...
update-alternatives: using /usr/share/maven/bin/mvn to provide /usr/bin/mvn (mvn) in auto mode
Setting up liberror-perl (0.17029-1) ...
Setting up git (1:2.34.1-1ubuntu1.10) ...
Processing triggers for libc-bin (2.35-0ubuntu3.4) ...
Removing intermediate container 608c6e109fd0
 -> 95d4712c0696
Successfully built 95d4712c0696
Successfully tagged tektutor/maven:latest

[jegan@tektutor.org]-[~/devops-dec-2023/Day4/CustomDockerImages]
$ docker images
REPOSITORY          TAG      IMAGE ID      CREATED       SIZE
tektutor/maven      latest   95d4712c0696  About a minute ago  826MB
tektutor/ansible-centos-node  latest   833be4f773b8  3 days ago    488MB
tektutor/ansible-ubuntu-node  latest   91cae68762a9  3 days ago    234MB
ubuntu              latest   b6548eacb063  10 days ago   77.8MB
tektutor/hello-microservice  v2      fd0985e6a33e  10 days ago   408MB
tektutor/hello-microservice  v1      3a8b73745255  10 days ago   408MB
tektutor/openshift-maven    latest   11f8b18e433e  11 days ago   408MB
bitnami/postgresql      latest   54c74bafb64f  13 days ago   274MB
```

Lab - Configuring HelloFreeStyle Job to delete the build onto docker container

1. Whenever code is committed to TekTutor GitHub repository devops-dec-2023, the Jenkins built-in node will trigger the FreeStyleJob Jenkins job.
 2. Since the FreeStyleJob is configured to run on a docker container based 'docker-slave' label configuration, Jenkins slave will request the Jenkins built-in node for a container.
 3. Jenkins built-in node then will request the Docker Server to create container using tektutor/maven:latest image

4. Once Jenkins built-in(master) node gets a notification from Docker server that it has created the required container, Jenkins master node will then notify the Jenkins Free Style job to run in the newly provisioned docker container.
5. Once the build starts within the container, Jenkins slave (remoting.jar) within the container will clone the GitHub repo <https://github.com/tektutor/devops-dec-2023.git> and then it will build the maven job.
6. Jenkins master node will keep monitoring the status of the build and it gives the build report on the master node in a convenient way.

The HelloFreeStyle Job General section must be configured as shown below

Configure

General

- Define a Docker template
- Discard old builds ?
- GitHub project
- This project is parameterized ?
- Throttle builds ?
- Execute concurrent builds if necessary ?
- Restrict where this project can be run ?

Label Expression ?

docker-slave

Advanced

Save **Apply**

Make sure, you saved it.

Build status shows as below

Jenkins

Search (CTRL+K)

1 2 Jeganathan Swaminathan log out

Dashboard > HelloFreeStyleJob > #14 > Console Output

Status **Console Output** Progress:

Changes

Console Output

View as plain text

Edit Build Information

Polling Log

Built on Docker

Git Build Data

Previous Build

```

Started by an SCM change
Running as SYSTEM
Building remotely on docker-slave-00068bxi7sij6 on docker-slave (docker-slave) in workspace /tmp/workspace/HelloFreeStyleJob
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
  Cloning repository https://github.com/tektutor/devops-dec-2023.git
    > git init /tmp/workspace/HelloFreeStyleJob # timeout=10
  Fetching upstream changes from https://github.com/tektutor/devops-dec-2023.git
    > git --version # timeout=10
    > git --version # 'git version 2.34.1'
    > git fetch --tags --force --progress -- https://github.com/tektutor/devops-dec-2023.git +refs/heads/*
      > git config remote.origin.url https://github.com/tektutor/devops-dec-2023.git # timeout=10
      > git config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
  Avoid second fetch
    > git rev-parse refs/remotes/origin/main^{commit} # timeout=10
  
```

The screenshot shows a Jenkins console output page for a job named "HelloFreeStyeJob". The build number is #14. The page title is "Console Output" and it indicates the test is running: "Running org.tektutor.MainTest". The status bar at the top right shows "Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.041 sec". The main content area displays the build logs:

```
Results :  
  
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0  
  
[[1;34mINFO[m] [1m-----[m  
[[1;34mINFO[m] [1mReactor Summary for crm 1.0.0:[m  
[[1;34mINFO[m]  
[[1;34mINFO[m] crm ..... [1;32mSUCCESS[m [ 1.142 s]  
[[1;34mINFO[m] dal ..... [1;32mSUCCESS[m [ 5.119 s]  
[[1;34mINFO[m] bl ..... [1;32mSUCCESS[m [ 0.230 s]  
[[1;34mINFO[m] fe ..... [1;32mSUCCESS[m [ 0.222 s]  
[[1;34mINFO[m] main ..... [1;32mSUCCESS[m [ 0.225 s]  
[[1;34mINFO[m] [1m-----[m  
[[1;34mINFO[m] [1;32mBUILD SUCCESS[m  
[[1;34mINFO[m] [1m-----[m  
[[1;34mINFO[m] Total time: 7.026 s  
[[1;34mINFO[m] Finished at: 2023-12-11T11:48:44Z  
[[1;34mINFO[m] [1m-----[m  
Finished: SUCCESS
```

REST API

Jenkins 2.414.1