

St. Francis Institute of Technology, Mumbai-400 103

Department Of Information Technology

A.Y. 2023-2024

Class: TE-ITA/B, Semester: V

Subject: **DevOps Lab**

Experiment – 4: To understand Continuous Integration, install and configure Jenkins with Maven/Ant/Gradle to setup a build Job.

1. **Aim:** To understand Continuous Integration, install and configure Jenkins with Maven
2. **Objectives:** Aim of this experiment is that, the students will be able
 - To Integrate and deploy tools like Jenkins and Maven, which is used to build applications in DevOps environment
3. **Outcomes:** After study of this experiment, the students will be able
 - To understand the importance of Jenkins to Build and deploy Software Applications on server environment.
 - Learn about Jenkins (With Architecture)
 - To have introduction to Maven / Gradle / Ant
4. **Prerequisite:** Knowledge of software engineering concept of integration
5. **Requirements:** Jenkins, JDK, python, ANT, Personal Computer, Windows operating system, browser, Internet Connection, Microsoft Word.
6. **Pre-Experiment Exercise:**
Brief Theory: Refer shared material
7. **Laboratory Exercise**

A. Procedure:

a. Answer the following:

- What is Jenkins?
Jenkins is an open-source automation server that helps streamline and automate various tasks related to software development and deployment. It provides a platform for continuous integration (CI) and continuous delivery (CD), allowing teams to automate the building, testing, and deployment of software applications. Jenkins is highly extensible through plugins, making it a popular choice for automating and managing various aspects of the software development lifecycle.
- Why use Jenkins?
Jenkins is used to:
Automate Tasks: Streamline and automate repetitive tasks in software development and deployment, saving time and reducing manual errors.
Continuous Integration: Enable continuous integration, allowing developers to integrate their code changes frequently, ensuring early bug detection.
Continuous Delivery: Facilitate continuous delivery by automating the building, testing, and deployment of applications, making releases more reliable and efficient.
Extensibility: Benefit from a vast ecosystem of plugins to customize and extend Jenkins to suit specific project needs.

Open Source: Jenkins is open-source, making it cost-effective and accessible to a wide range of development teams.

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

- Install Jenkins
- Configure Jenkins with Maven and ANT
- Build 4 basic projects in Jenkins

8. Post-Experiments Exercise

A. Extended Theory:

Nil

B. Questions:

- What are the system requirements to install Jenkins?
- Give some important plugins in Jenkins.
- What is Maven and ANT?

C. Conclusion:

- Write what was performed in the experiment.
- Write the significance of the topic studied in the experiment.

D. References:

<https://jenkins.io/doc/>

<https://www.cloudbees.com/jenkins/what-is-jenkins>

<https://vmokshagroup.com/blog/what-is-jenkins/>

<https://www.infoworld.com/article/3239666/what-is-jenkins-the-ci-server-explained.html>

<https://hackr.io/blog/jenkins-interview-questions>

<https://www.edureka.co/blog/interview-questions/jenkins-interview-questions/>

SS :-

7b :- Install Jenkins:

Downloading Jenkins

Jenkins is distributed as WAR files, native packages, installers, and Docker images. Follow these installation

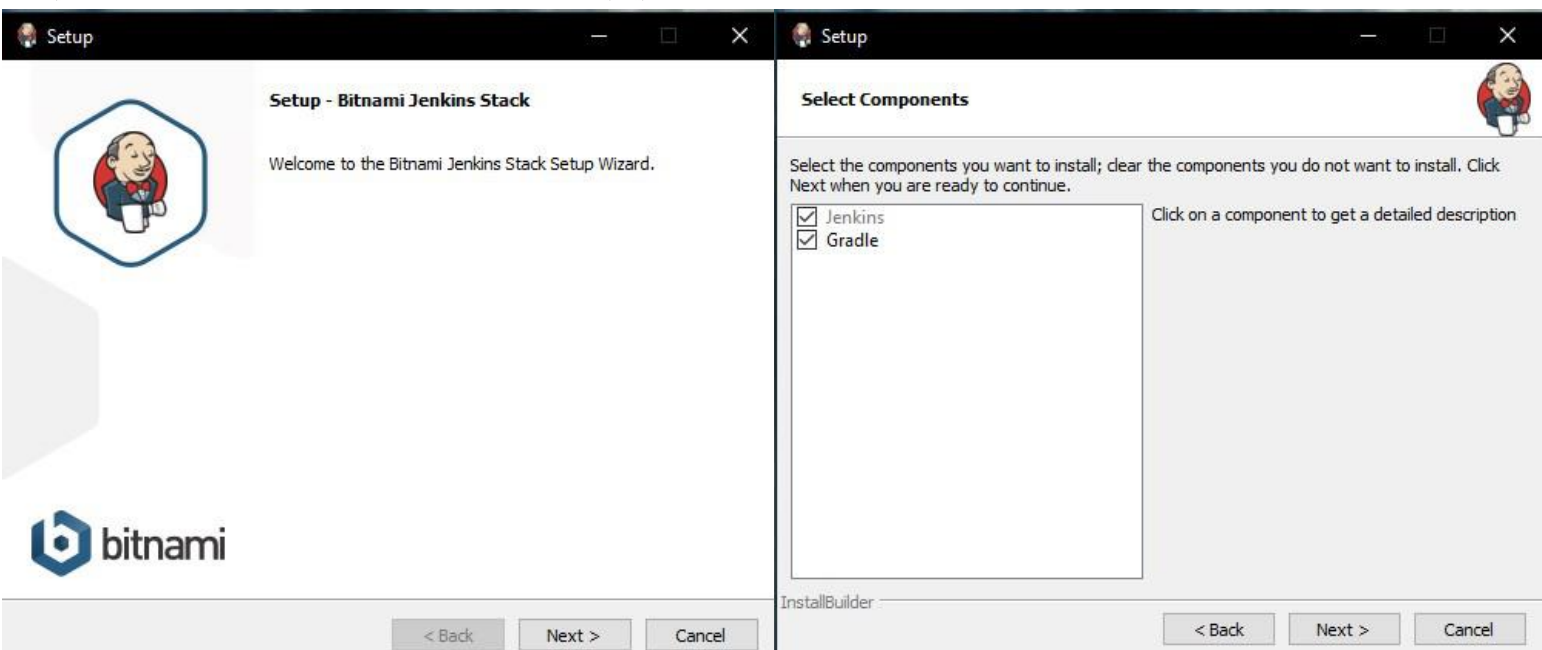
1. Before downloading, please take a moment to review the [Hardware and Software requirements](#) section.
2. Select one of the packages below and follow the download instructions.
3. Once a Jenkins package has been downloaded, proceed to the [Installing Jenkins](#) section of the User Guide.
4. You may also want to verify the package you downloaded. [Learn more about verifying Jenkins downloads](#).

Download Jenkins 2.263.2 LTS for:

Generic Java package (.war) SHA-256: 89d054193d541b8d542f61e13262da7842b13fd5c04bdfdc52765c70346f0878e
Docker
Ubuntu/Debian
CentOS/Fedora/Red Hat
Windows
openSUSE
FreeBSD
Gentoo

Download Jenkins 2.275 f

Generic Java package (.war) SHA-256: 2db5deb9f119bc955ba0922b7c
Docker
Ubuntu/Debian
CentOS/Fedora/Red Hat
Windows
openSUSE
Arch Linux
FreeBSD



Setup

Create Admin account

Bitnami Jenkins Stack admin user creation

Your real name

Email Address

Login

Password

Please confirm your password

InstallBuilder


< Back Next > Cancel

Setup

Completing the Bitnami Jenkins Stack Setup Wizard

Setup has finished installing Bitnami Jenkins Stack on your computer.

☒ Launch Bitnami Jenkins Stack now?

 bitnami

< Back Finish Cancel



Awesome! Jenkins is now installed.

Access Jenkins

You just installed Jenkins using Bitnami - the fastest, easiest and most secure way to deploy your favorite app.



- Visit the Bitnami Jenkins [documentation page](#) for more information on managing your installation.
- Find answers to common questions or pose a new question on our [community forum](#).

Thanks for using Bitnami!



Welcome to Jenkins!

Sign in

☐ Keep me signed in

Getting Started

Getting Started

Folders	OWASP Markup Formatter	Build Timeout	Credentials Binding	** Trilead API
Timestampers	Workspace Cleanup	Ant	Gradle	
Pipeline	GitHub Branch Source	Pipeline: GitHub Groovy Libraries	Pipeline: Stage View	
Git	Subversion	SSH Build Agents	Matrix Authorization Strategy	
PAM Authentication	LDAP	Email Extension	Mailer	
				** - required dependencies

Jenkins 2.204.1

Instance Configuration

Jenkins URL:

The Jenkins URL is used to provide the root URL for absolute links to various Jenkins resources. That means this value is required for proper operation of many Jenkins features including email notifications, PR status updates, and the BUILD_URL environment variable provided to build steps.

The proposed default value shown is not saved yet and is generated from the current request, if possible. The best practice is to set this value to the URL that users are expected to use. This will avoid confusion when sharing or viewing links.

Not now

Save and Finish

127.0.0.1/jenkins/user/admin/

Jenkins

admin


People

Status

Builds

Configure

My Views

 admin

Jenkins User ID: admin

Configure Jenkins with Maven/Ant/Gradle – Global tool configuration, manage plugins

Maven

Maven installations

List of Maven installations on this system

Add Maven

Maven Name

maven

MAVEN_HOME

C:\apache-maven-3.9.4-bin\apache-maven-3.9.4

☐ Install automatically ?

Add Maven

Save Apply

Gradle

Gradle installations

List of Gradle installations on this system

Add Gradle

name ?

gradle

☒ Install automatically ?

Install from Gradle.org

Version

Gradle 8.3

Add Installer

Add Gradle

Save Apply

Ant

Ant installations

List of Ant installations on this system

Add Ant

Ant Name

ANT

ANT_HOME

C:\apache-ant-1.10.14

☐ Install automatically ?

Add Ant

Save Apply

LianDabre 18 DevOps_4

- Build jobs in Jenkins

1. Freestyle project (Simple Windows batch command) – echo

The image displays two screenshots of the Jenkins web interface, illustrating the process of creating a new Freestyle project.

Top Screenshot: Enter an item name

- The browser address bar shows `localhost:8080/view/all/newJob`.
- The Jenkins logo and navigation bar are visible at the top.
- The "Enter an item name" dialog is open, with the text input field containing `devops_exp4`.
- Below the input field, it says "» Required field".
- Three project types are listed: Freestyle project, Pipeline, and Multi-configuration project.
- The "Freestyle project" option is selected, with a 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."
- A "Multi-configuration project" option is also visible, with a description: "Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds,".
- An "OK" button is present at the bottom of the dialog.

Bottom Screenshot: Configure job

- The browser address bar shows `localhost:8080/job/devops_exp4/configure`.
- The Jenkins logo and navigation bar are visible at the top.
- The breadcrumb navigation shows "Dashboard > devops_exp4 >".
- The "General" tab is selected in the configuration menu.
- The "Post-build Actions" section is expanded.
- The "Description" field is visible, containing the text: "Name : Lian Dabre" and "Roll No: 18".
- A "[Plain text] Preview" link is located below the description field.
- At the bottom, there are "Save" and "Apply" buttons.

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The screenshot shows the Jenkins configuration page for a job named 'devops_exp4'. The 'Build' tab is selected, and a new build step is being added: 'Execute Windows batch command'. The command entered is 'echo "Hello World"'. Below the command field, there is an 'Advanced...' button and an 'Add build step' button. At the bottom, there are 'Save' and 'Apply' buttons. The breadcrumb navigation shows 'Dashboard > devops_exp4 >'.

The screenshot shows the Jenkins console output for build #1 of the 'devops_exp4' job. The left sidebar contains a list of links: 'Back to Project', 'Status', 'Changes', 'Console Output' (which is highlighted), 'View as plain text', 'Edit Build Information', and 'Delete build '#1''. The main area displays the console output with a green checkmark icon and the title 'Console Output'. The output text is as follows:

```
Started by user admin
Running as SYSTEM
Building in workspace C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4
[devops_exp4] $ cmd /c call C:\Windows\TEMP\jenkins3221384218050183021.bat

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4>echo "Hello World"
"Hello World"

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4>exit 0
Finished: SUCCESS
```

2 Freestyle parameterized project (Windows batch command) –string, Boolean and choice parameters with echo

LianDabre 18 DevOps_4

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/devops_exp4_1/configure

devops_exp4_1/configure

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

String Parameter ?

Name ?
str_1

Default Value ?

Description ?
Enter Your First Name :

[Plain text] Preview

☐ Trim the string ?

String Parameter ?

Name ?
str_2

Default Value ?

Description ?
Enter Your Last Name :

[Plain text] Preview

☐ Trim the string ?

Boolean Parameter ?

Name ?

Default Value ?

Description ?

[Plain text] Preview

☐ Trim the string ?

Save

Apply

Lab x DevOps Exp 4.doc x Jenkins.pdf - Google x live 4k wallpapers x devops_exp4_1 Co x devops 4 - Google x Wallpaper Abyss x

/devops_exp4_1/configure

devops_exp4_1/configure

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

Boolean Parameter ?

Name ?
stud

☐ Set by Default ?

Description ?
Are You a Student ?

[Plain text] Preview

Choice Parameter ?

Name ?
car

Choices ?
Audi
Toyota
Tata
Hyundai
Tesla

Save

Apply

Lab x DevOps Exp 4.doc x Jenkins.pdf - Google x live 4k wallpapers x devops_exp4_1 Co x devops 4 - Google x Wallpaper Abyss x

devops_exp4_1/configure

devops_exp4_1/configure

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

Build

Execute Windows batch command ?

Command
See [the list of available environment variables](#)
echo "Your First Name is" %str_1%
echo "Your Last Name is" %str_2%
echo "Are you a Student" %stud%
echo "Best Car Brand" %str_1%

Advanced...

Add build step

Post-build Actions

Save

Apply

Windows taskbar icons: Start menu, Search, File Explorer, Microsoft Edge, Task View, and other system icons.

LianDabre 18 DevOps_4

Dashboard > devops_exp4_1 >

↑ Back to Dashboard

📄 Status

🔗 Changes

📁 Workspace

🎮 Build with Parameters

⚙️ Configure

🗑️ Delete Project

✏️ Rename

⚙️ Build History trend

🔍 Filter builds...

No builds

📡 Atom feed for all

📡 Atom feed for failures

Project devops_exp4_1

This build requires parameters:

str_1

Enter Your First Name :

Lian

str_2

Enter Your Last Name :

Dabre

✔️ stud

Are You a Student ?

car

Select Best Car Brand :

Roll Royce

Build

Jenkins 2.342

Dashboard > devops_exp4_1 > #1

↑ Back to Project

📄 Status

🔗 Changes

📄 Console Output

📄 View as plain text

⚙️ Edit Build Information

🗑️ Delete build '#1'

📄 Parameters

✔️ Console Output

Started by user [admin](#)

Running as SYSTEM

Building in workspace C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_1

[devops_exp4_1] \$ cmd /c call C:\Windows\TEMP\jenkins1336353314936654751.bat

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_1>echo "Your First Name is" Lian

"Your First Name is" Lian

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_1>echo "Your Last Name is" Dabre

"Your Last Name is" Dabre

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_1>echo "Are you a Student" true

"Are you a Student" true

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_1>echo "Best Car Brand" Lian

"Best Car Brand" Lian

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_1>exit 0

Finished: SUCCESS

Java freestyle project -Hello world

The image shows two screenshots of the Jenkins web interface. The top screenshot displays the configuration page for a job named 'devops_exp4_2'. The 'Build' tab is selected, showing a 'Command' field with the following text:

```
cd C:\LIAN_DABRE\exp4 & javac Main.java
java Main
```

Below the command field is an 'Advanced...' button. At the bottom of the configuration section are 'Add build step' and 'Add post-build action' buttons. The 'Post-build Actions' section is currently empty. At the bottom of the configuration page are 'Save' and 'Apply' buttons.

The bottom screenshot shows the 'Console Output' for build #3 of the 'devops_exp4_2' job. The output is as follows:

```
Started by user admin
Running as SYSTEM
Building in workspace C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_2
[devops_exp4_2] $ cmd /c call C:\Windows\TEMP\jenkins6685442273415025798.bat

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_2>cd C:\LIAN_DABRE\exp4

C:\LIAN_DABRE\exp4>javac Main.java

C:\LIAN_DABRE\exp4>java Main
Hello World

C:\LIAN_DABRE\exp4>exit 0
Finished: SUCCESS
```

The left sidebar of the Jenkins console output view includes links for 'Back to Project', 'Status', 'Changes', 'Console Output' (which is selected), 'View as plain text', 'Edit Build Information', 'Delete build '#3'', and 'Previous Build'.

Java freestyle project (parameterized) – 2 String parameter

LianDabre 18 DevOps_4

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localhost:8080/view/LianDabre_18/job/devops_exp4_3/configure

Dashboard > LianDabre_18 > devops_exp4_3 >

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

☒ This project is parameterized ?

String Parameter ?

Name ?

str_1

Default Value ?

Description ?

Enter Your First Name :

[Plain text] [Preview](#)

Save Apply

St. Francis x DevOps L x DevOps E x Jenkins.pd x live 4k wa x devops_e x devops 4 x Online Ja x libaas lyr x Libaas Lyr x Libaas Lyr x +

localhost:8080/view/LianDabre_18/job/devops_exp4_3/configure

Dashboard > LianDabre_18 > devops_exp4_3 >

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

String Parameter ?

Name ?

str_2

Default Value ?

Description ?

Enter Your Surname :

[Plain text] [Preview](#)

☐ Trim the string ?

Save Apply

LianDabre 18 DevOps_4

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y/LianDabre_18/job/devops_exp4_3/configure

localhost:8080/view/LianDabre_18/job/devops_exp4_3/1/console

devops_exp4_3

Dashboard > LianDabre_18 > devops_exp4_3 > #1

General Source Code Management Build Triggers

Build

Execute Windows batch command ?

Command

See [the list of available environment variables](#)

cd C:\LIAN_DABRE\exp4
javac A.java
java A %str_1% %str_2%

Advanced...

Add build step

Save

Apply

Back to Project

Status

Changes

Console Output

View as plain text

Edit Build Information

Delete build '#1'

Parameters

Console Output

Started by user [admin](#)

Running as SYSTEM

Building in workspace C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_3

[devops_exp4_3] \$ cmd /c call C:\Windows\TEMP\jenkins4763984603705540122.bat

C:\ProgramData\Jenkins\.jenkins\workspace\devops_exp4_3>cd C:\LIAN_DABRE\exp4

C:\LIAN_DABRE\exp4>javac A.java

C:\LIAN_DABRE\exp4>java A Lian Dabre

Your Name is Lian

Your Surname is Dabre

C:\LIAN_DABRE\exp4>exit 0

Finished: SUCCESS

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localhost:8080/view/LianDabre_18/job/devops_exp4_3/build?delay=0sec

Incognito

Dashboard > LianDabre_18 > devops_exp4_3

Back to Dashboard

Status

Changes

Workspace

Build with Parameters

Configure

Delete Project

Rename

Build History

trend

Filter builds...

#1 Aug 25, 2023 11:41 AM

Atom feed for all Atom feed for failures

Project devops_exp4_3

This build requires parameters:

str_1

Enter Your First Name :

Lian

str_2

Enter Your Surname :

Dabre

Build

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29°C Mostly cloudy

Search

ENG IN

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