

Submitted to: Sir Mahaz Khan



AIR UNIVERSITY, ISLAMABAD

Department of Cyber Security

Secure Software Design & Development Lab (CY- 256L)

Assignment-3

Submitted to: Sir Mahaz Khan

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CLASS: BSCYS-4 A

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Docker:

What is Docker?

Docker is an open-source platform that allows you to develop, ship, and run applications inside lightweight, portable containers.

- A Docker container is a standardized unit that packages your code, runtime, system tools, libraries, and settings—everything the app needs to run.
- Containers are isolated from each other and the host system, but they share the OS kernel, making them faster and more efficient than virtual machines (VMs).

How Docker Works

1. **Dockerfile:** You write a file that defines what goes into the container (like a recipe).
2. **Image:** Docker builds an image from the Dockerfile.
3. **Container:** You run an image to create a container (an instance of the image).

Uses of Docker

1. **Development Consistency**
 - Developers can run the same code on any machine without worrying about dependencies or environment setup issues.
 - “It works on my machine” problems are eliminated.
2. **Microservices Architecture**
 - Each microservice can run in its own container with its own dependencies.
 - Easy to scale and manage.
3. **CI/CD Pipelines**
 - Integrates seamlessly into Continuous Integration/Continuous Deployment workflows.
 - Automated testing, building, and deployment are simplified.
4. **Environment Replication**
 - Easily replicate production-like environments for testing or staging.
5. **Isolation and Security**
 - Containers isolate applications from each other and from the host system.
6. **Portability**

- Docker containers can run on any system that supports Docker: Linux, Windows, cloud providers (AWS, Azure, GCP), and even your laptop.

7. Resource Efficiency

- Containers are more lightweight than VMs and use fewer system resource

Docker Setup:

Step 1: Install Prerequisites

First, let's make sure your system is up to date and install required dependencies:

```
Hit:1 https://packages.wazuh.com/4.x/apt stable InRelease
Get:2 https://download.docker.com/linux/ubuntu noble InRelease [48.8 kB]
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Get:4 https://download.docker.com/linux/ubuntu noble/stable amd64 Packages [24.0 kB]
Hit:5 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:6 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:7 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Fetched 72.8 kB in 1s (52.2 kB/s)
Reading package lists... Done
```

Step 2: Add Docker's Official GPG Key

Now let's install Docker and related components:

```
Setting up docker-compose-plugin (2.35.1-1~ubuntu.24.04~noble) ...
Setting up docker-ce-cli (5:28.1.1-1~ubuntu.24.04~noble) ...
Setting up libslirp0:amd64 (4.7.0-1ubuntu3) ...
Setting up pigz (2.8-1) ...
Setting up git-man (1:2.43.0-1ubuntu7.2) ...
Setting up docker-ce-rootless-extras (5:28.1.1-1~ubuntu.24.04~noble) ...
Setting up slirp4netns (1.2.1-1build2) ...
Setting up docker-ce (5:28.1.1-1~ubuntu.24.04~noble) ...
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /usr/lib/systemd/system/docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /usr/lib/systemd/system/docker.socket.
Setting up git (1:2.43.0-1ubuntu7.2) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.4) ...
root@Ubuntu-Vbox: /home/ubuntu#
```

Step 3: Verify Docker Installation

Let's make sure Docker is installed correctly by running the hello-world image:

```
root@Ubuntu-Vbox:/home/ubuntu# sudo docker run hello-world

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.
```

Step 4: Working with Busybox

```
root@Ubuntu-Vbox:/home/ubuntu# docker pull busybox
Using default tag: latest
latest: Pulling from library/busybox
Digest: sha256:3308bdfbc80b8e960219232df14f233a3c56979f392f56b0d9a8bc290c7dfd76
Status: Image is up to date for busybox:latest
docker.io/library/busybox:latest
root@Ubuntu-Vbox:/home/ubuntu# docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
hello-world	latest	74cc54e27dc4	4 months ago	10.1kB
busybox	latest	6d3e4188a38a	7 months ago	4.28MB

```
root@Ubuntu-Vbox:/home/ubuntu#
```

```
root@Ubuntu-Vbox:/home/ubuntu# docker run busybox echo "hello from busybox"
hello from busybox
root@Ubuntu-Vbox:/home/ubuntu#
```

```
root@Ubuntu-Vbox:/home/ubuntu# docker run -it busybox sh
/ # ls
bin    etc    lib    proc   sys    usr
dev    home   lib64  root   tmp    var
/ # uptime
04:20:25 up 19 min,  0 users,  load average: 0.37, 0.45, 0.81
/ #
```

Step 5: Exiting Docker:

```
root@Ubuntu-Vbox:/home/ubuntu# docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
3e0b28b8e1be	busybox	"sh"	2 minutes ago	Exited (0)
7 seconds ago		elated_jones		
bd2ffe1bef8e	busybox	"echo 'hello from bu..."	2 minutes ago	Exited (0)
2 minutes ago		inspiring_hodgkin		
6e8e3fff292e	busybox	"sh"	5 minutes ago	Exited (0)
4 minutes ago		vigorous_noyce		
fadbe7777371	busybox	"echo 'hello from bu..."	5 minutes ago	Exited (0)
5 minutes ago		crazy_archimedes		
e32d85d37528	hello-world	"/hello"	7 minutes ago	Exited (0)
7 minutes ago		bold_mclaren		
d69f93f46519	hello-world	"/hello"	7 minutes ago	Exited (0)
7 minutes ago		happy_bose		

```
root@Ubuntu-Vbox:/home/ubuntu#
```

Step 6: Deleting a container:

```
root@Ubuntu-Vbox:/home/ubuntu# docker ps -a
```

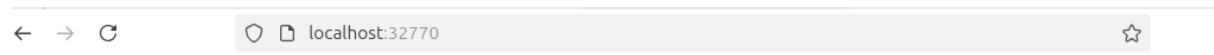
CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
3e0b28b8e1be	busybox	"sh"	6 minutes ago	Exited (0) 4 minutes ago
bd2ffe1bef8e	busybox	"echo 'hello from bu..."	6 minutes ago	Exited (0) 6 minutes ago
odgkin				
6e8e3fff292e	busybox	"sh"	9 minutes ago	Exited (0) 8 minutes ago
yce				
fadbe7777371	busybox	"echo 'hello from bu..."	9 minutes ago	Exited (0) 9 minutes ago
medes				
e32d85d37528	hello-world	"/hello"	11 minutes ago	Exited (0) 11 minutes ago
n				

```
root@Ubuntu-Vbox:/home/ubuntu# docker rm 3e0b28b8e1be
3e0b28b8e1be
root@Ubuntu-Vbox:/home/ubuntu#
```

Step 7: Running a Web Application

Let's try running a simple web application in a container:

```
root@Ubuntu-Vbox:/home/ubuntu# docker run -d -p 8080:80 --name my-site nginx
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
61320b01ae5e: Pull complete
670a101d432b: Pull complete
405bd2df85b6: Pull complete
cc80efff8457: Pull complete
2b9310b2ee4b: Pull complete
6c4aa022e8e1: Pull complete
abddc69cb49d: Pull complete
Digest: sha256:fb39280b7b9eba5727c884a3c7810002e69e8f961cc373b89c92f14961d903a0
Status: Downloaded newer image for nginx:latest
66cbab800dfa34eef79a6f8924e8731384c4bd51f13565b1276d3ac00bd69cd7
root@Ubuntu-Vbox:/home/ubuntu#
```

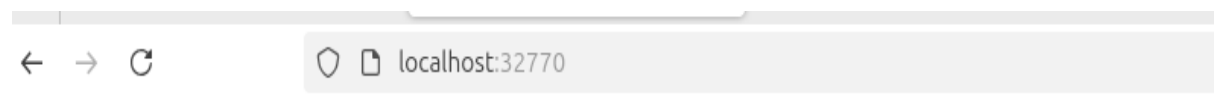


Hello Docker!

This is being served from a **docker** container running Nginx.

We can also specify a custom port to which the client will forward connections to the container.

```
443/tcp -> [::]:32771
root@Ubuntu-Vbox:/home/ubuntu# docker run -p 8888:80 prakhar1989/static-site
Nginx is running...
█
```



Hello Docker!

This is being served from a **docker** container running Nginx.

Stopping my website and deleting the docker container

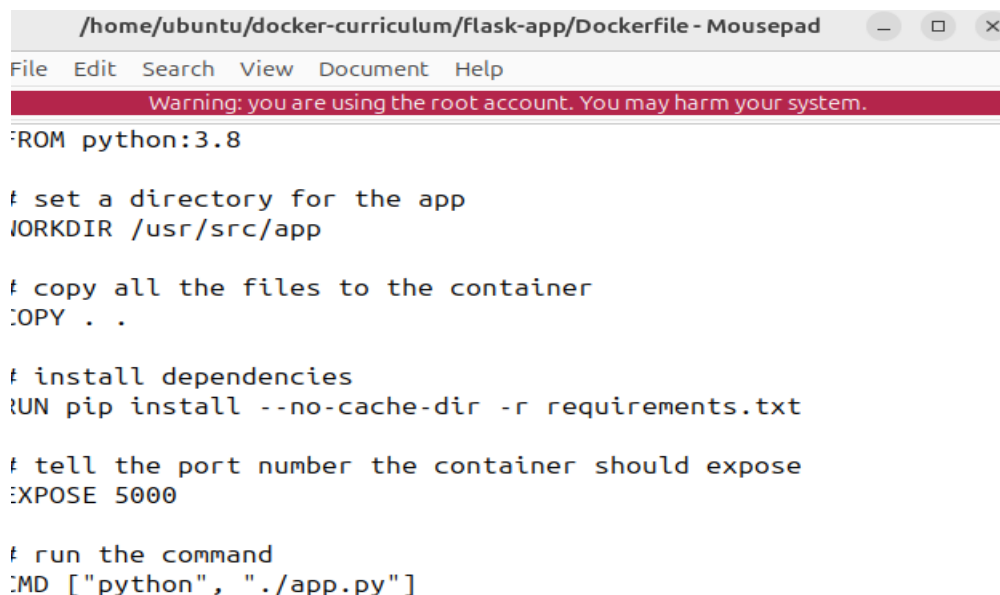
```
root@Ubuntu-Vbox:/home/ubuntu# docker stop static-site
static-site
root@Ubuntu-Vbox:/home/ubuntu#
```

```
root@Ubuntu-Vbox:/home/ubuntu# docker ps -a
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS
NAMES
0742006d3ca4   prakhar1989/static-site            "./wrapper.sh"          3 minutes ago   Exited
fervent_panini
116e39dfd6cf   prakhar1989/static-site            "./wrapper.sh"          9 minutes ago   Exited
static-site
bd2ffe1bef8e   busybox                            "echo 'hello from bu..." 33 minutes ago   Exited
inspiring_hodgkin
6e8e3fff292e   busybox                            "sh"                    35 minutes ago   Exited
vigorous_noyce
fadbe7777371   busybox                            "echo 'hello from bu..." 35 minutes ago   Exited
crazy_archimedes
e32d85d37528   hello-world                        "/hello"                 37 minutes ago   Exited
bold_mclaren
root@Ubuntu-Vbox:/home/ubuntu# docker rm 0742006d3ca4
0742006d3ca4
root@Ubuntu-Vbox:/home/ubuntu#
```

Step 8: Creating Your Own Image

```
root@Ubuntu-Vbox:/home/ubuntu# git clone https://github.com/prakhar1989/docker-curriculum.git
Cloning into 'docker-curriculum'...
remote: Enumerating objects: 1737, done.
remote: Counting objects: 100% (71/71), done.
remote: Compressing objects: 100% (54/54), done.
remote: Total 1737 (delta 57), reused 17 (delta 17), pack-reused 1666 (from 3)
Receiving objects: 100% (1737/1737), 9.13 MiB | 90.00 KiB/s, done.
Resolving deltas: 100% (961/961), done.
root@Ubuntu-Vbox:/home/ubuntu# cd docker-curriculum/flask-app
```

With that, our Docker file is now ready. This is how it looks



```
/home/ubuntu/docker-curriculum/flask-app/Dockerfile - Mousepad
File Edit Search View Document Help
Warning: you are using the root account. You may harm your system.
FROM python:3.8

# set a directory for the app
WORKDIR /usr/src/app

# copy all the files to the container
COPY . .

# install dependencies
RUN pip install --no-cache-dir -r requirements.txt

# tell the port number the container should expose
EXPOSE 5000

# run the command
CMD ["python", "./app.py"]
```


Now that we have our Dockerfile, we can build our image. The docker build command does the heavy-lifting of creating a Docker image from a Dockerfile.

```
FROM python:3.8

RUN pip install flask

COPY . /opt/

EXPOSE 5000

WORKDIR /opt

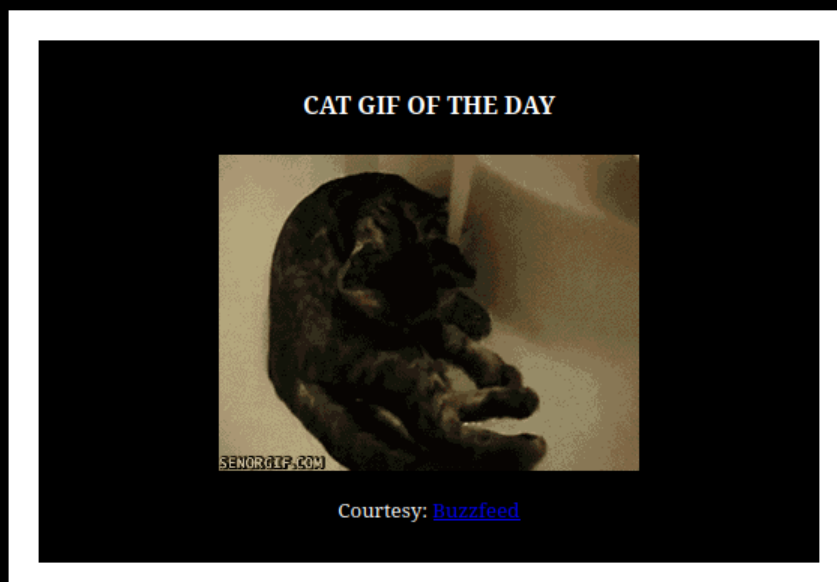
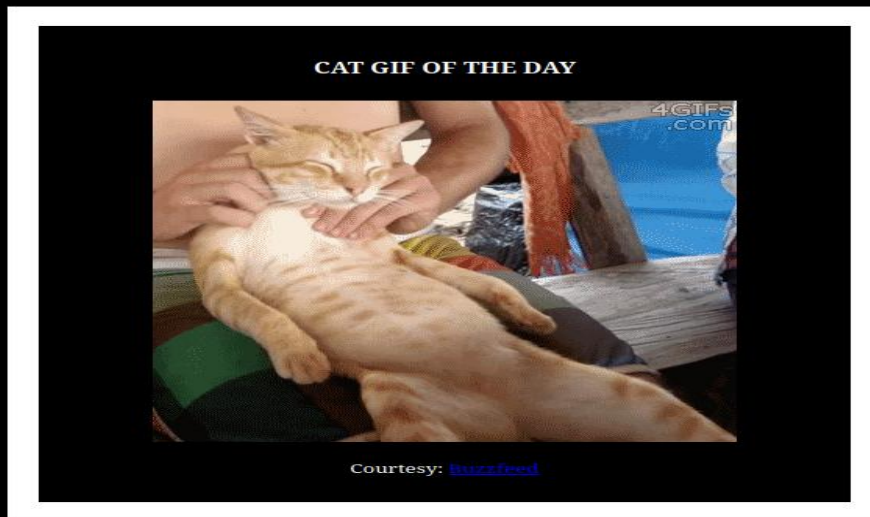
ENTRYPOINT ["python"]
CMD ["app.py"]
```

Step 9: Building Image:

```
root@Ubuntu-Vbox:/home/ubuntu/docker-curriculum/flask-app# docker build -t root/catnip .
[+] Building 190.7s (9/9) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 154B
=> [internal] load metadata for docker.io/library/python:3.8
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [1/4] FROM docker.io/library/python:3.8@sha256:d411270700143fa2683cc8264d9fa5d3279fd3b6afff62ae81ea2f9d0
=> => resolve docker.io/library/python:3.8@sha256:d411270700143fa2683cc8264d9fa5d3279fd3b6afff62ae81ea2f9d0
=> => sha256:3ea6eaad4f175bd42f39dae10098b1820ee522628ff04670b3ac8b89fe00c1c8 5.97kB / 5.97kB
=> => sha256:d411270700143fa2683cc8264d9fa5d3279fd3b6afff62ae81ea2f9d070e390c 10.35kB / 10.35kB
=> => sha256:7aa279fb41dad2962d3c915aa6f6615134baa412ab5aafa9d4384dcaaa0af15d 2.32kB / 2.32kB
=> => sha256:cdd62bf39133c498a16f7a7b1b6555ba43d02b2511c508fa4c0a9b1975ffe20e 49.56MB / 49.56MB
=> => sha256:a173f2aee8e962ea19db1e418ae84a0c9f71480b51f768a19332dfa83d7722a5 64.39MB / 64.39MB
=> => sha256:a47cff7f31e941e78bf63ca19f0811b675283e2c00ddea10c57f78d93b2bc343 24.05MB / 24.05MB
=> => sha256:01272fe8adbacc44afd2b92994b31c40a151f4324ca392050d9e8d580927dd32 211.27MB / 211.27MB
=> => sha256:cddc73e4e6c704bfa2325e53c32ddb3553c8fc3a91dab6c092bb353f82098b09 6.16MB / 6.16MB
=> => extracting sha256:cdd62bf39133c498a16f7a7b1b6555ba43d02b2511c508fa4c0a9b1975ffe20e
=> => extracting sha256:a47cff7f31e941e78bf63ca19f0811b675283e2c00ddea10c57f78d93b2bc343
=> => extracting sha256:a173f2aee8e962ea19db1e418ae84a0c9f71480b51f768a19332dfa83d7722a5
=> => sha256:cc48f13b5f0f44b2e298de83a94a99fe7abdfb3335fe9b7811b8f764abb1a4ac 18.06MB / 18.06MB
=> => sha256:5a98c896c047f960c5fd29d44fa778899a68e7ebfb6a6a4f2a3fbf7baa902f6a 249B / 249B
=> => extracting sha256:01272fe8adbacc44afd2b92994b31c40a151f4324ca392050d9e8d580927dd32
=> => extracting sha256:cddc73e4e6c704bfa2325e53c32ddb3553c8fc3a91dab6c092bb353f82098b09
=> => extracting sha256:cc48f13b5f0f44b2e298de83a94a99fe7abdfb3335fe9b7811b8f764abb1a4ac
=> => extracting sha256:5a98c896c047f960c5fd29d44fa778899a68e7ebfb6a6a4f2a3fbf7baa902f6a
=> [internal] load build context
=> => transferring context: 3.23kB
=> [2/4] RUN pip install flask
=> [3/4] COPY . /opt/
=> [4/4] WORKDIR /opt
```


Step 10: Running Image:

```
root@Ubuntu-Vbox:/home/ubuntu/docker-curriculum/flask-app# docker run -p 8888:5000 root/catnip
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI serv
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://172.17.0.2:5000
Press CTRL+C to quit
```



Docker push

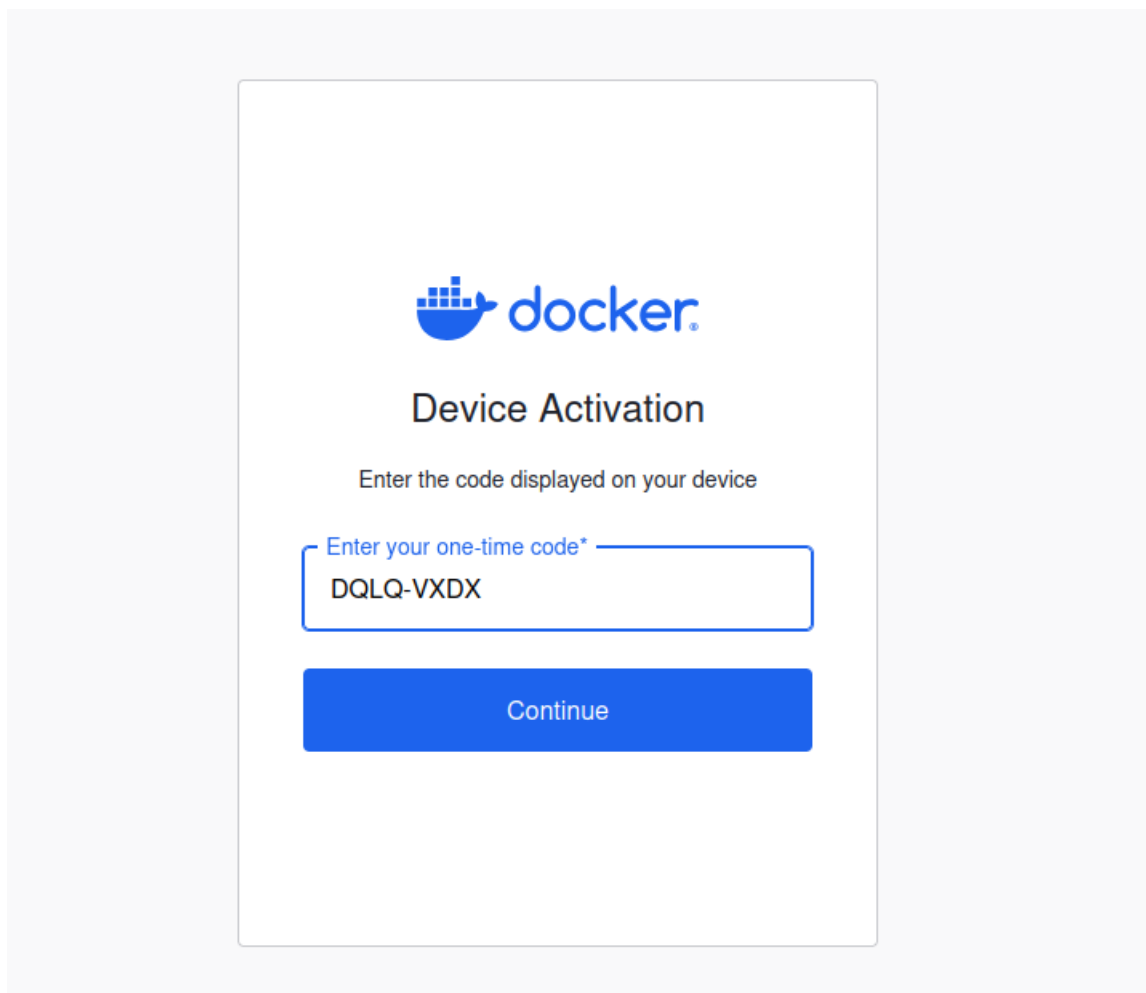
```
ubuntu@Ubuntu-Vbox:~$ sudo su
[sudo] password for ubuntu:
root@Ubuntu-Vbox:/home/ubuntu# docker login

USING WEB-BASED LOGIN

Info → To sign in with credentials on the command line, use 'docker login -u <username>'

Your one-time device confirmation code is: DQLQ-VXDX
Press ENTER to open your browser or submit your device code here: https://login.docker.com/activate

Waiting for authentication in the browser...
█
```



Security Checks

- Run the commands given in Rule 2, Rule 3, Rule 8 to see if they work fine.

Check that containers can't access host processes (Rule 2)

```
root@Ubuntu-Vbox:/home/ubuntu/docker-curriculum/flask-app# docker run --rm ubuntu ps aux
USER          PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  7.1  0.0  7888  3776 ?        Rs    05:22   0:00 ps aux
root@Ubuntu-Vbox:/home/ubuntu/docker-curriculum/flask-app#
```

Check user namespace isolation (Rule 3)

```
root@Ubuntu-Vbox:/home/ubuntu/docker-curriculum/flask-app# docker run --rm ubuntu cat /proc/self/uid_map
0          0 4294967295
root@Ubuntu-Vbox:/home/ubuntu/docker-curriculum/flask-app#
```

Check for container resource limits (Rule 8)

- In Rule 9 tools are suggested to detect containers with known vulnerabilities - scan images.
- Use any of these free tools (preferably Trivy) to test the image you have created above in the task or any other docker image.

uration injectable in repo revision							when installing via p
ip							https://avd.aquasec.c
om/nvd/cve-2023-5752							
setuptools (METADATA)	CVE-2022-40897	HIGH		57.5.0	65.5.1	pypa-setuptools: Regu	
lar Expression Denial of Service						(ReDoS) in package_in	
dex.py						https://avd.aquasec.c	
om/nvd/cve-2022-40897							
	CVE-2024-6345				70.0.0	pypa/setuptools: Remo	
te code execution via download						functions in the pack	
age_index module in...						https://avd.aquasec.c	
om/nvd/cve-2024-6345							
	CVE-2025-47273				78.1.1	setuptools: Path Trav	
ersal Vulnerability in setuptools						PackageIndex	
						https://avd.aquasec.c	
om/nvd/cve-2025-47273							

wget	CVE-2024-38428	CRITICAL	fixed	1.21.3-1+b2	1.21.3-1
deb12u1	wget: Misinterpretation of input may lead to improper behavior				
	https://avd.aquasec.com/nvd/cve-2024-38428				
	CVE-2021-31879	MEDIUM	fix_deferred		
	wget: authorization header disclosure on redirect				
	https://avd.aquasec.com/nvd/cve-2021-31879				
	CVE-2024-10524		affected		
	wget: GNU Wget is vulnerable to an SSRF attack when accessing partially-user-controlled...				
	https://avd.aquasec.com/nvd/cve-2024-10524				
xz-utils	CVE-2025-31115	HIGH	fixed	5.4.1-0.2	5.4.1-1
	xz: XZ has a heap-use-after-free bug in threaded .xz decoder				
	https://avd.aquasec.com/nvd/cve-2025-31115				
zlib1g	CVE-2023-45853	CRITICAL	will_not_fix	1:1.2.13.dfsg-1	
	zlib: integer overflow and resultant heap-based buffer overflow in zipOpenNewFileInZip4_6				

What is Jenkins?

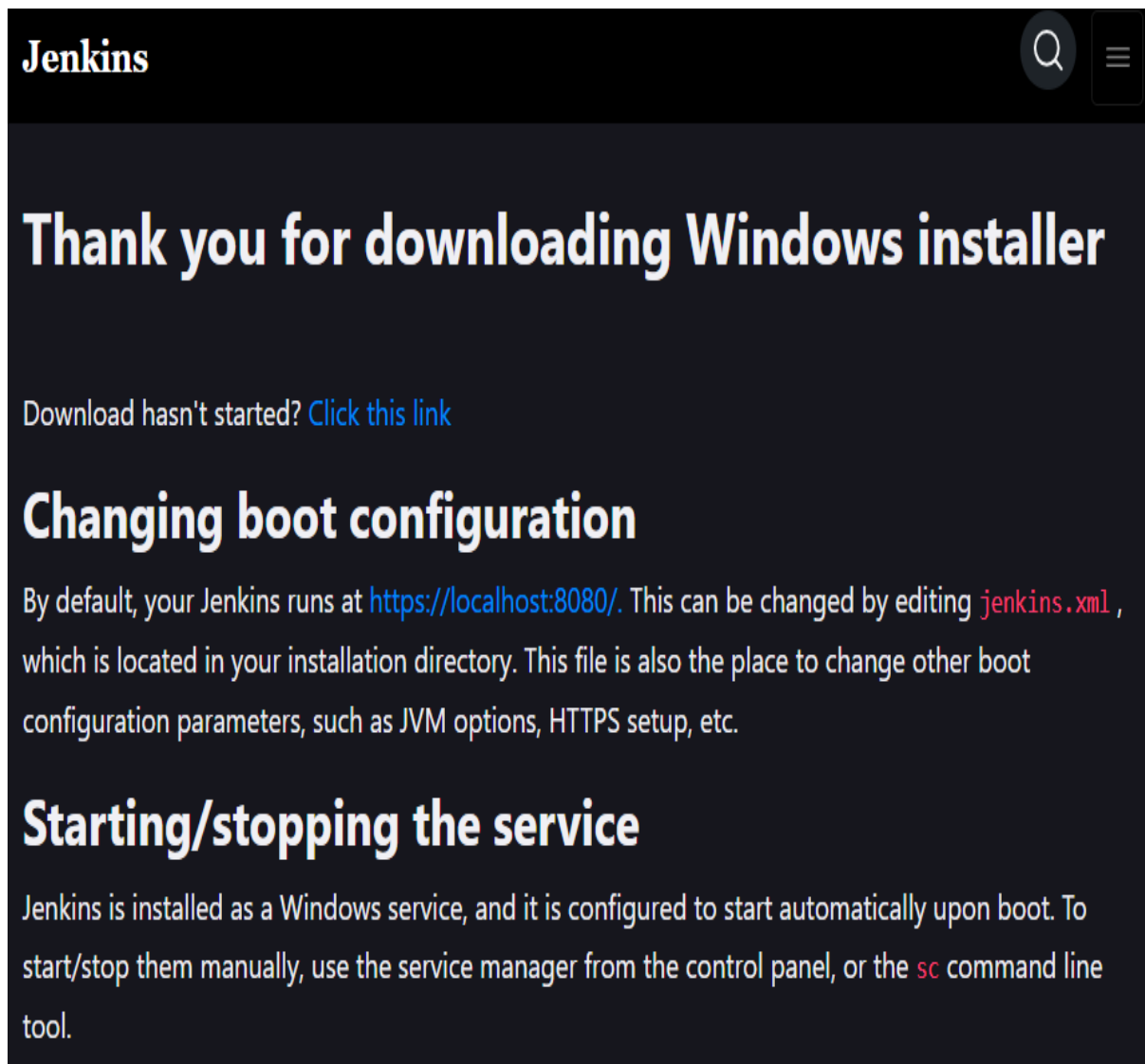
Jenkins is a powerful application that allows continuous integration and continuous delivery of projects, regardless of the platform you are working on. It is a free source that can handle any kind of build or continuous integration. You can integrate Jenkins with a number of testing and deployment

Pre requisites:

Java should be installed on your machine.

```
C:\Users\Shaheer Baig>java -version
openjdk version "21.0.7" 2025-04-15 LTS
OpenJDK Runtime Environment Temurin-21.0.7+6 (build 21.0.7+6-LTS)
OpenJDK 64-Bit Server VM Temurin-21.0.7+6 (build 21.0.7+6-LTS, mixed mode, sharing)
```

Download Jenkins:



Starting Jenkins

Open the command prompt. From the command prompt, browse to the directory where the `jenkins.war` file is present. Run the following command

```
D:\ -jar Jenkins.war
```

```
D:\Downloads>Java -jar jenkins.war
Running from: D:\Downloads\jenkins.war
webroot: C:\Users\Shaheer Baig\.jenkins\war
2025-05-30 04:49:05.384+0000 [id=1] INFO winstone.Logger#logInternal:
Beginning extraction from war file
2025-05-30 04:49:06.595+0000 [id=1] WARNING o.e.j.ee9.nested.ContextHand
ler#setContextPath: Empty contextPath
2025-05-30 04:49:06.657+0000 [id=1] INFO org.eclipse.jetty.server.Ser
ver#doStart: jetty-12.0.21; built: 2025-05-09T00:32:00.688Z; git: 1c4719601e
31b05b7d68910d2edd980259f1f53c; jvm 21.0.7+6-LTS
2025-05-30 04:49:12.723+0000 [id=1] INFO o.e.j.e.w.StandardDescriptor
Processor#visitServlet: NO JSP Support for /, did not find org.eclipse.jetty
.ee9.jsp.JettyJspServlet
2025-05-30 04:49:12.784+0000 [id=1] INFO o.e.j.s.DefaultSessionIdMana
ger#doStart: Session workerName=node0
2025-05-30 04:49:13.256+0000 [id=1] INFO hudson.WebAppMain#contextIni
tialized: Jenkins home directory: C:\Users\Shaheer Baig\.jenkins found at: $
user.home/.jenkins
2025-05-30 04:49:13.363+0000 [id=1] INFO o.e.j.s.handler.ContextHandl
er#doStart: Started oeje9n.ContextHandler$CoreContextHandler@3051e0b2{Jenkin
s v2.512,/ ,b=file:///C:/Users/Shaheer%20Baig/.jenkins/war/,a=AVAILABLE,h=oej
e9n.ContextHandler$CoreContextHandler$CoreToNestedHandler@1f52eb6f{STARTED}}
2025-05-30 04:49:13.413+0000 [id=1] INFO o.e.j.server.AbstractConnect
or#doStart: Started ServerConnector@6f19d20d{HTTP/1.1, (http/1.1)}{0.0.0.0:8
080}
```

After the command is run, various tasks will run, one of which is the extraction of the war file which is done by an embedded webserver called winstone.

Once the processing is complete without major errors, the following line will come in the output of the command prompt.

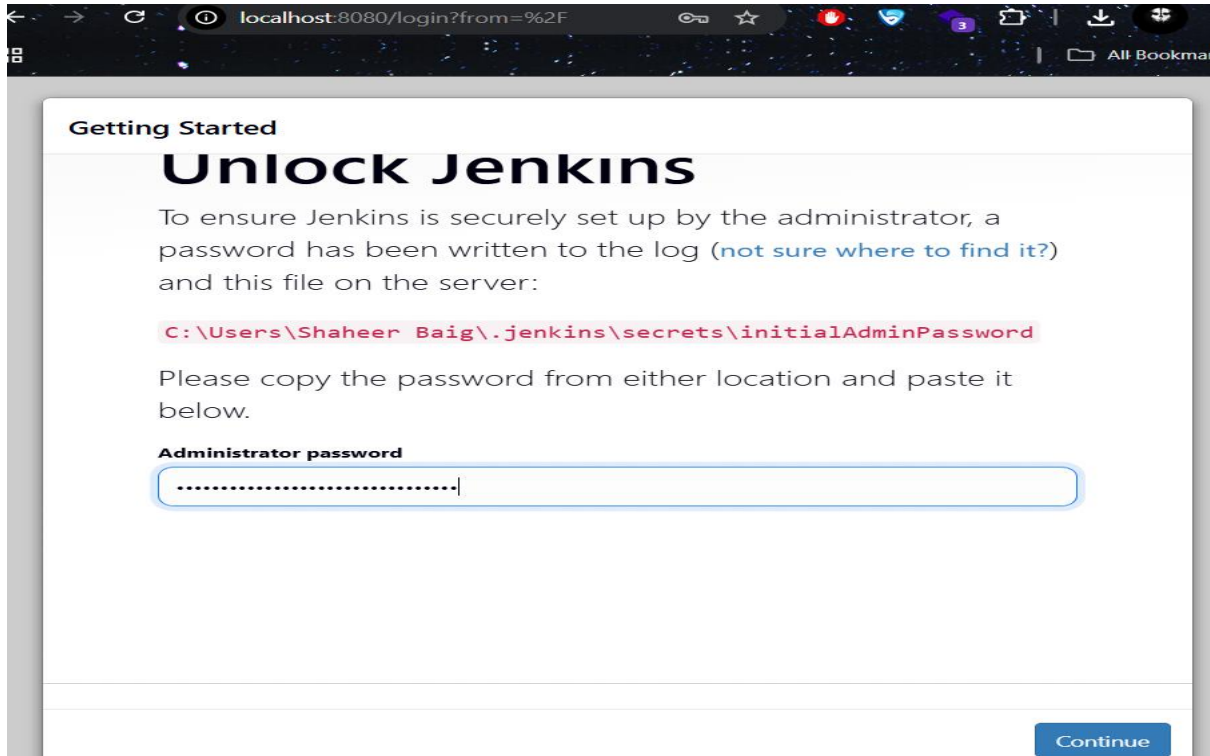
Copy the password and save it somewhere for later use.

Accessing Jenkins

Once Jenkins is up and running, one can access Jenkins from the

link – <http://localhost:8080>

This link will bring up the Jenkins dashboard. Write password that you saved previously.



Getting Started

Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:

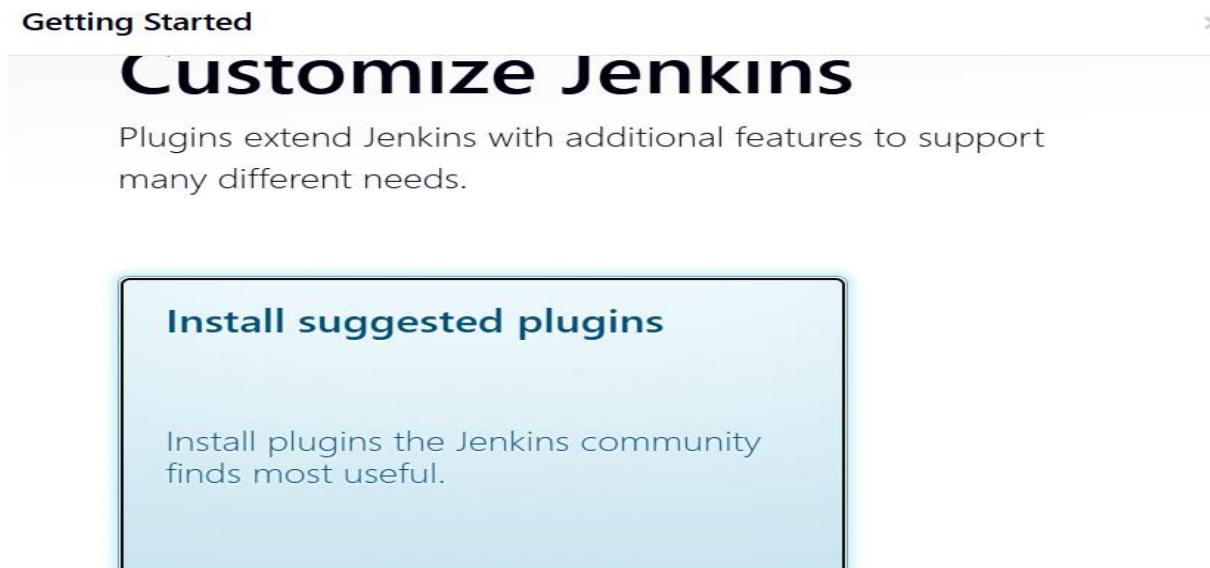
`C:\Users\Shaheer Baig\.jenkins\secrets\initialAdminPassword`

Please copy the password from either location and paste it below.

Administrator password

Continue

Select and install suggested plugins.



Getting Started

Customize Jenkins

Plugins extend Jenkins with additional features to support many different needs.

Install suggested plugins

Install plugins the Jenkins community finds most useful.

Getting Started

<input checked="" type="checkbox"/> Folders	<input checked="" type="checkbox"/> OWASP Markup Formatter	<input type="checkbox"/> Build Timeout	<input type="checkbox"/> Credentials Binding
<input type="checkbox"/> Timestamper	<input type="checkbox"/> Workspace Cleanup	<input type="checkbox"/> Ant	<input type="checkbox"/> Gradle
<input type="checkbox"/> Pipeline	<input type="checkbox"/> GitHub Branch Source	<input type="checkbox"/> Pipeline: GitHub Groovy Libraries	<input type="checkbox"/> Pipeline Graph View
<input type="checkbox"/> Git	<input type="checkbox"/> SSH Build Agents	<input type="checkbox"/> Matrix Authorization Strategy	<input type="checkbox"/> LDAP
<input type="checkbox"/> Email Extension	<input type="checkbox"/> Mailer	<input type="checkbox"/> Dark Theme	

** Ionicons API

Folders

OWASP Markup Formatter

** ASM API

** JSON Path API

** Structs

** Pipeline: Step API

** Token Macro

Build Timeout

** - required dependency

Username

Thunder_31

❗ User name must only contain alphanumeric characters, underscore and dash

Password

.....

Confirm password

.....

Full name

Mirza Shaheer Baig

E-mail address

231330@students.au.edu.pk

Getting Started

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.

Jenkins 2.512

Not now

Save and Finish

Getting Started

Jenkins is ready!

Your Jenkins setup is complete.

[Start using Jenkins](#)

Jenkins 2.512



Jenkins



+ New Item

Build History

Build Queue



No builds in the queue.

Build Executor Status

0/2

Add description

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

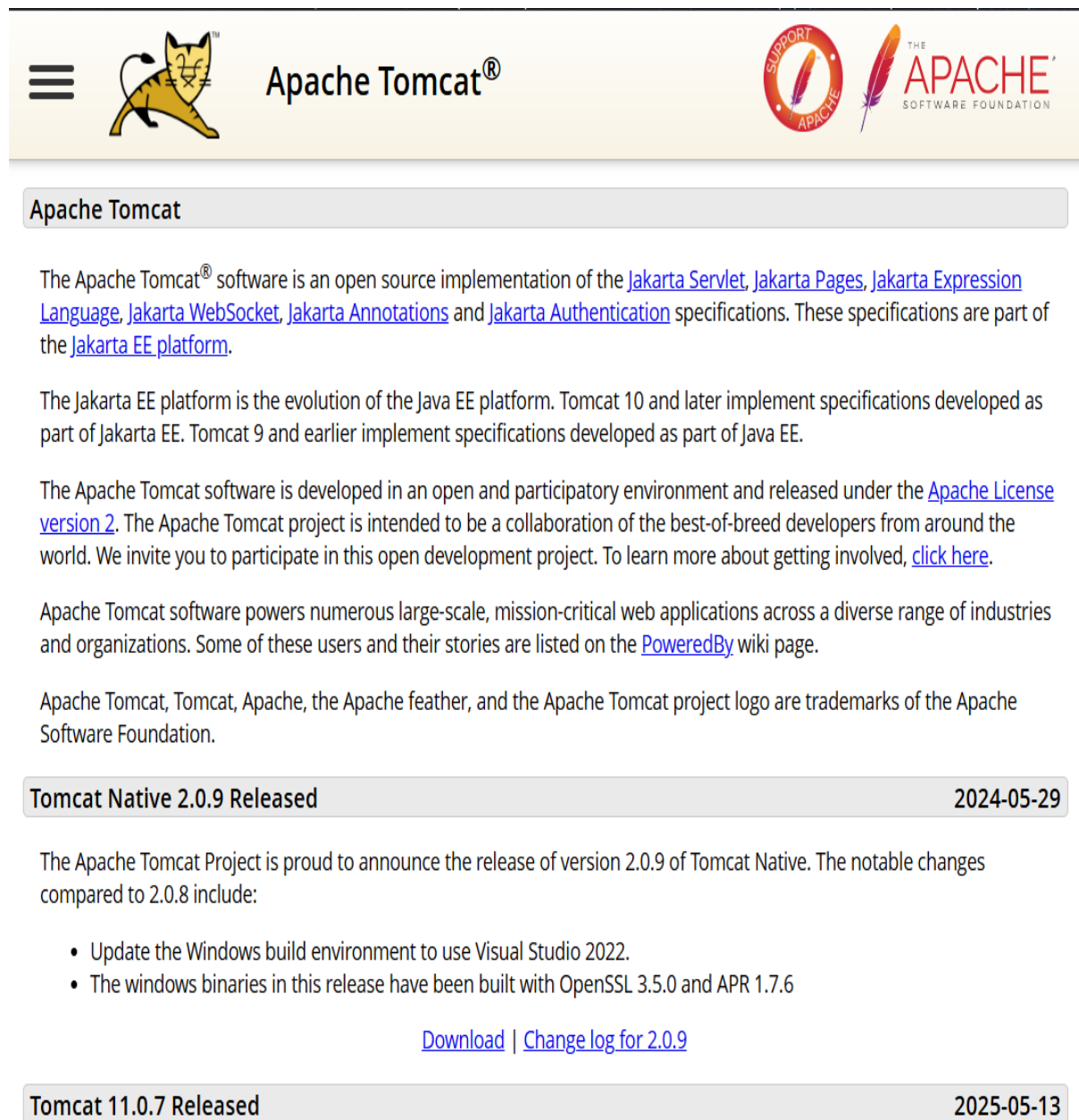


What is Tomcat?

Tomcat is an open-source web server and servlet. The Apache Software Foundation has developed it. It is used widely for hosting Java-based applications on the web. It is built on Java technologies and implements the Java Servlet and JavaServer Pages (JSP) specifications. Tomcat acts as a bridge between web servers and Java-based applications, facilitating the execution of dynamic content and processing client requests.

Download Tomcat

The official website for tomcat is Tomcat. If you click the given link, you can get the home page of the tomcat official website as shown below.



The screenshot shows the Apache Tomcat website. At the top, there is a navigation bar with a hamburger menu icon, the Tomcat logo (a yellow cat), the text "Apache Tomcat®", and the Apache Software Foundation logo. Below the navigation bar, the main content area has a heading "Apache Tomcat". The text describes Tomcat as an open-source implementation of Jakarta EE specifications. It mentions that Tomcat 10 and later implement specifications developed as part of Jakarta EE, while Tomcat 9 and earlier implement specifications developed as part of Java EE. It also states that the software is developed in an open and participatory environment and released under the Apache License version 2.0. A section titled "Tomcat Native 2.0.9 Released" with the date "2024-05-29" is highlighted. Below this, it says "The Apache Tomcat Project is proud to announce the release of version 2.0.9 of Tomcat Native. The notable changes compared to 2.0.8 include:" followed by a bulleted list: "Update the Windows build environment to use Visual Studio 2022." and "The windows binaries in this release have been built with OpenSSL 3.5.0 and APR 1.7.6". Below the list are links for "Download" and "Change log for 2.0.9". At the bottom, another section titled "Tomcat 11.0.7 Released" with the date "2025-05-13" is highlighted.

Apache Tomcat®

The Apache Tomcat® software is an open source implementation of the [Jakarta Servlet](#), [Jakarta Pages](#), [Jakarta Expression Language](#), [Jakarta WebSocket](#), [Jakarta Annotations](#) and [Jakarta Authentication](#) specifications. These specifications are part of the [Jakarta EE platform](#).

The Jakarta EE platform is the evolution of the Java EE platform. Tomcat 10 and later implement specifications developed as part of Jakarta EE. Tomcat 9 and earlier implement specifications developed as part of Java EE.

The Apache Tomcat software is developed in an open and participatory environment and released under the [Apache License version 2](#). The Apache Tomcat project is intended to be a collaboration of the best-of-breed developers from around the world. We invite you to participate in this open development project. To learn more about getting involved, [click here](#).

Apache Tomcat software powers numerous large-scale, mission-critical web applications across a diverse range of industries and organizations. Some of these users and their stories are listed on the [PoweredBy](#) wiki page.

Apache Tomcat, Tomcat, Apache, the Apache feather, and the Apache Tomcat project logo are trademarks of the Apache Software Foundation.

Tomcat Native 2.0.9 Released 2024-05-29

The Apache Tomcat Project is proud to announce the release of version 2.0.9 of Tomcat Native. The notable changes compared to 2.0.8 include:

- Update the Windows build environment to use Visual Studio 2022.
- The windows binaries in this release have been built with OpenSSL 3.5.0 and APR 1.7.6

[Download](#) | [Change log for 2.0.9](#)

Tomcat 11.0.7 Released 2025-05-13

Browse to the link <https://tomcat.apache.org/download-70.cgi> to get the download for tomcat.

10.1.41

Please see the [README](#) file for packaging information. It explains what every distribution contains.

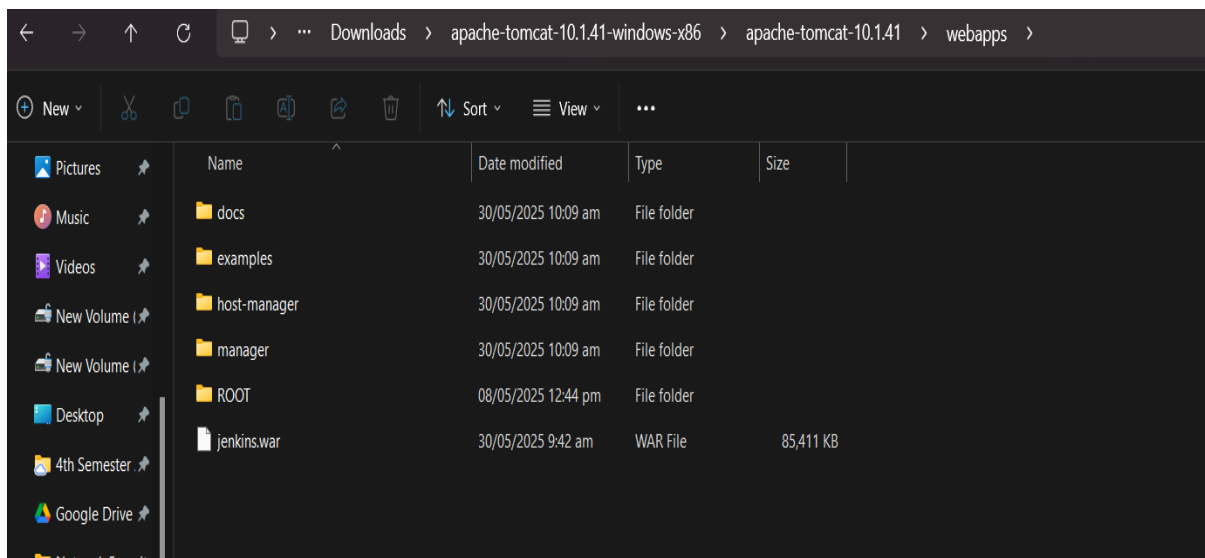
Binary Distributions

- Core:
 - [zip \(pgp, sha512\)](#)
 - [tar.gz \(pgp, sha512\)](#)
 - [32-bit Windows zip \(pgp, sha512\)](#)
 - [64-bit Windows zip \(pgp, sha512\)](#)
 - [32-bit/64-bit Windows Service Installer \(pgp, sha512\)](#)
- Full documentation:
 - [tar.gz \(pgp, sha512\)](#)
- Deployer:
 - [zip \(pgp, sha512\)](#)
 - [tar.gz \(pgp, sha512\)](#)
- Embedded:
 - [tar.gz \(pgp, sha512\)](#)
 - [zip \(pgp, sha512\)](#)

Source Code Distributions

- [tar.gz \(pgp, sha512\)](#)
- [zip \(pgp, sha512\)](#)

Go to the 'Binary Distributions' section. Download the 32-bit Windows zip file. Then unzip the contents of the downloaded zip file.



Jenkins and Tomcat Setup

Copy the Jenkins.war file which was downloaded from the previous section and copy it to the webapps folder in the tomcat folder.

Now open the command prompt. From the command prompt, browse to the directory where the tomcat7 folder is location. Browse to the bin directory in this folder and run the start.bat file

```
E:\Apps\tomcat7\bin>startup.bat
```

```
08/05/2025 12:44 pm <DIR> WORK
7 File(s) 122,106 bytes
9 Dir(s) 269,982,982,144 bytes free

D:\Downloads\apache-tomcat-10.1.41-windows-x86\apache-tomcat-10.1.41>cd bin

D:\Downloads\apache-tomcat-10.1.41-windows-x86\apache-tomcat-10.1.41\bin>start
rtup.bat
```

```
Tomcat
30-May-2025 10:23:03.667 INFO [main] org.apache.catalina.startup.HostConfig.deployDirectory Deployment of web applicatio
n directory [D:\Downloads\apache-tomcat-10.1.41-windows-x86\apache-tomcat-10.1.41\webapps\host-manager] has finished in
[72] ms
30-May-2025 10:23:03.674 INFO [main] org.apache.catalina.startup.HostConfig.deployDirectory Deploying web application di
rectory [D:\Downloads\apache-tomcat-10.1.41-windows-x86\apache-tomcat-10.1.41\webapps\manager]
30-May-2025 10:23:03.753 INFO [main] org.apache.catalina.startup.HostConfig.deployDirectory Deployment of web applicatio
n directory [D:\Downloads\apache-tomcat-10.1.41-windows-x86\apache-tomcat-10.1.41\webapps\manager] has finished in [82]
ms
30-May-2025 10:23:03.754 INFO [main] org.apache.catalina.startup.HostConfig.deployDirectory Deploying web application di
rectory [D:\Downloads\apache-tomcat-10.1.41-windows-x86\apache-tomcat-10.1.41\webapps\ROOT]
30-May-2025 10:23:03.811 INFO [main] org.apache.catalina.startup.HostConfig.deployDirectory Deployment of web applicatio
n directory [D:\Downloads\apache-tomcat-10.1.41-windows-x86\apache-tomcat-10.1.41\webapps\ROOT] has finished in [57] ms
30-May-2025 10:23:03.818 INFO [main] org.apache.coyote.AbstractProtocol.start Starting ProtocolHandler ["http-nio-8080"]
30-May-2025 10:23:03.831 INFO [pool-7-thread-3] jenkins.InitReactorRunner$1.onAttained Started initialization
30-May-2025 10:23:03.877 INFO [main] org.apache.catalina.startup.Catalina.start Server startup in [19268] milliseconds
30-May-2025 10:23:04.186 INFO [pool-7-thread-3] jenkins.InitReactorRunner$1.onAttained Listed all plugins
30-May-2025 10:23:11.673 INFO [pool-7-thread-4] jenkins.InitReactorRunner$1.onAttained Prepared all plugins
30-May-2025 10:23:11.719 INFO [pool-7-thread-6] jenkins.InitReactorRunner$1.onAttained Started all plugins
30-May-2025 10:23:11.736 INFO [pool-7-thread-3] jenkins.InitReactorRunner$1.onAttained Augmented all extensions
30-May-2025 10:23:12.795 INFO [GitSCM.onLoaded] hudson.plugins.build_timeout.global.GlobalTimeOutConfiguration.load glob
al timeout not set
30-May-2025 10:23:14.988 INFO [pool-7-thread-3] jenkins.InitReactorRunner$1.onAttained System config loaded
30-May-2025 10:23:14.988 INFO [pool-7-thread-3] jenkins.InitReactorRunner$1.onAttained System config adapted
30-May-2025 10:23:15.068 INFO [pool-7-thread-7] jenkins.InitReactorRunner$1.onAttained Loaded all jobs
30-May-2025 10:23:15.094 INFO [pool-7-thread-7] jenkins.InitReactorRunner$1.onAttained Configuration for all jobs update
d
30-May-2025 10:23:15.178 INFO [pool-7-thread-5] jenkins.InitReactorRunner$1.onAttained Completed initialization
30-May-2025 10:23:15.241 INFO [Jenkins initialization thread] hudson.lifecycle.Lifecycle.onReady Jenkins is fully up and
running
```

Submitted to: Sir Mahaz Khan

Open the browser and go to the link – **http://localhost:8080/jenkins**.

Jenkins will be up and running on tomcat.



Sign in to Jenkins

Username

Password

☐ Keep me signed in

Sign in

Jenkins - Git Setup

For this exercise, you have to ensure that Internet connectivity is present from the machine on which Jenkins is installed. In your Jenkins Dashboard (Home screen), click the Manage Jenkins option on the left hand side.

Jenkins / Manage Jenkins

Manage Jenkins

It appears that your reverse proxy set up is broken. [More Info](#) [Dismiss](#)

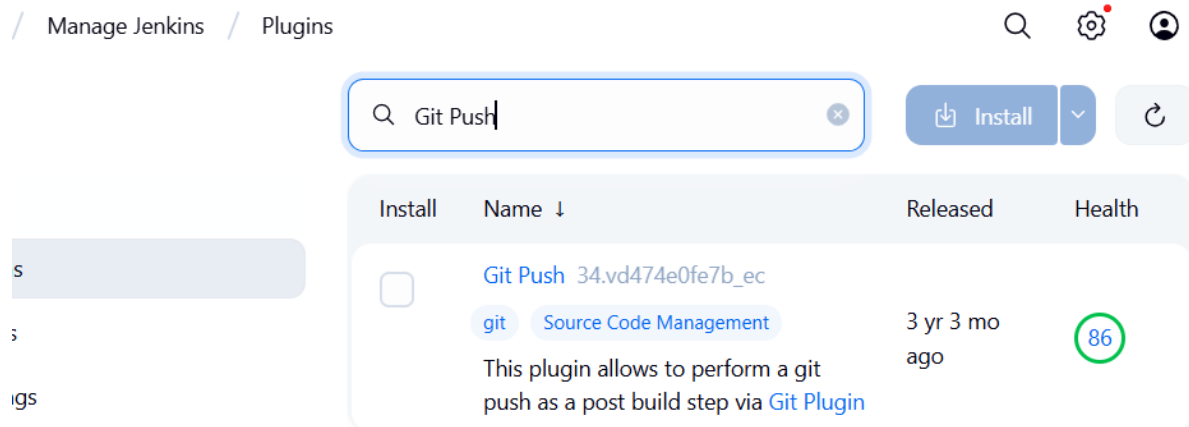
Building on the built-in node can be a security issue. You should set up distributed builds. See [the documentation](#). [Set up agent](#) [Set up cloud](#) [Dismiss](#)

System Configuration

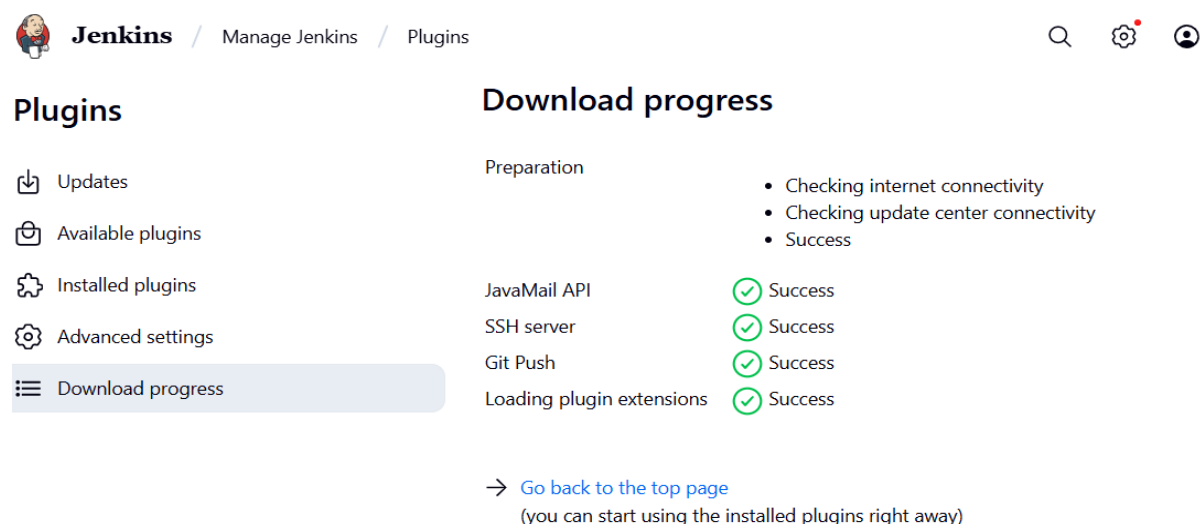
- System**
Configure global settings and paths.
- Plugins**
Add, remove, disable or enable plugins that can extend the functionality of Jenkins.
- Clouds**
Add, remove, and configure cloud instances to provision agents on-demand.
- Tools**
Configure tools, their locations and automatic installers.
-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

In the next screen, click the 'Plugins' option.

In the next screen, click the Available tab. This tab will give a list of plugins which are available for downloading. In the 'Filter' tab type 'Git Push'







The installation will then begin and the screen will be refreshed to show the status of the download.



Once all installations are complete, restart Jenkins by issue the following command in the

browser. `http://localhost:8080/jenkins/restart`

 **Jenkins** / All / New Item




New Item


Enter an item name

Shaheer-Job


Select an item type




Freestyle project
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.



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


OK


Jenkins - Setup Build Jobs


For this exercise, we will create a job in Jenkins which picks up a simple HelloWorld application, builds and runs the java program.





Configure


 General

 **Source Code Management**

 Triggers

 Environment

 Build Steps

 Post-build Actions

Source Code Management

Connect and manage your code repository to automatically pull the latest code for your builds.

☒ None

☐ Git ?

Triggers

Set up automated actions that start your build based on specific events, like code changes or scheduled times.

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

☐ Build after other projects are built ?

☐ Build periodically ?

☐ GitHub hook trigger for GITScm polling ?

☐ Poll SCM ?

Environment

The following screen will come up in which you can specify the details of the job.

General

Enabled

Description

Basic Java Hello World

Plain text [Preview](#)

☐ Discard old builds ?

☒ GitHub project

Project url ?

https://github.com/LuisJoseSanchez/hello-world-java/

Advanced

☐ This project is parameterized ?

☐ Throttle builds ?

We need to specify the location of files which need to be built. If you repository is hosted on Github, you can also enter the url of that repository here:

☐ Discard old builds ?

☒ GitHub project

Project url ?

https://github.com/LuisJoseSanchez/hello-world-java/blob/master/HelloWorld.java

Advanced

☐ This project is parameterized ?

☐ Throttle builds ?

Submitted to: Sir Mahaz Khan

Now go to the Build section and click on Add build step → Execute Windows batch command

Build Steps

Automate your build process with ordered tasks like code compilation, testing, and deployment.

≡

Execute Windows batch command ?

✕

Command


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




```
javas HelloWorld.java
Java HelloWorld
```

Advanced ▾

Add build step ▾

Once saved, you can click on the Build Now option to see if you have successfully defined the job.

 Jenkins / Shaheer-Job

Status

Changes

Workspace

Build Now

Configure

Delete Project

GitHub

Rename

✓ Shaheer-Job

Basic Java Hello World

Permalinks

- [Last build \(#7\), 31 sec ago](#)
- [Last stable build \(#7\), 31 sec ago](#)
- [Last successful build \(#7\), 31 sec ago](#)
- [Last completed build \(#7\), 31 sec ago](#)

Builds

Filter

Edit description

Pre requisites:

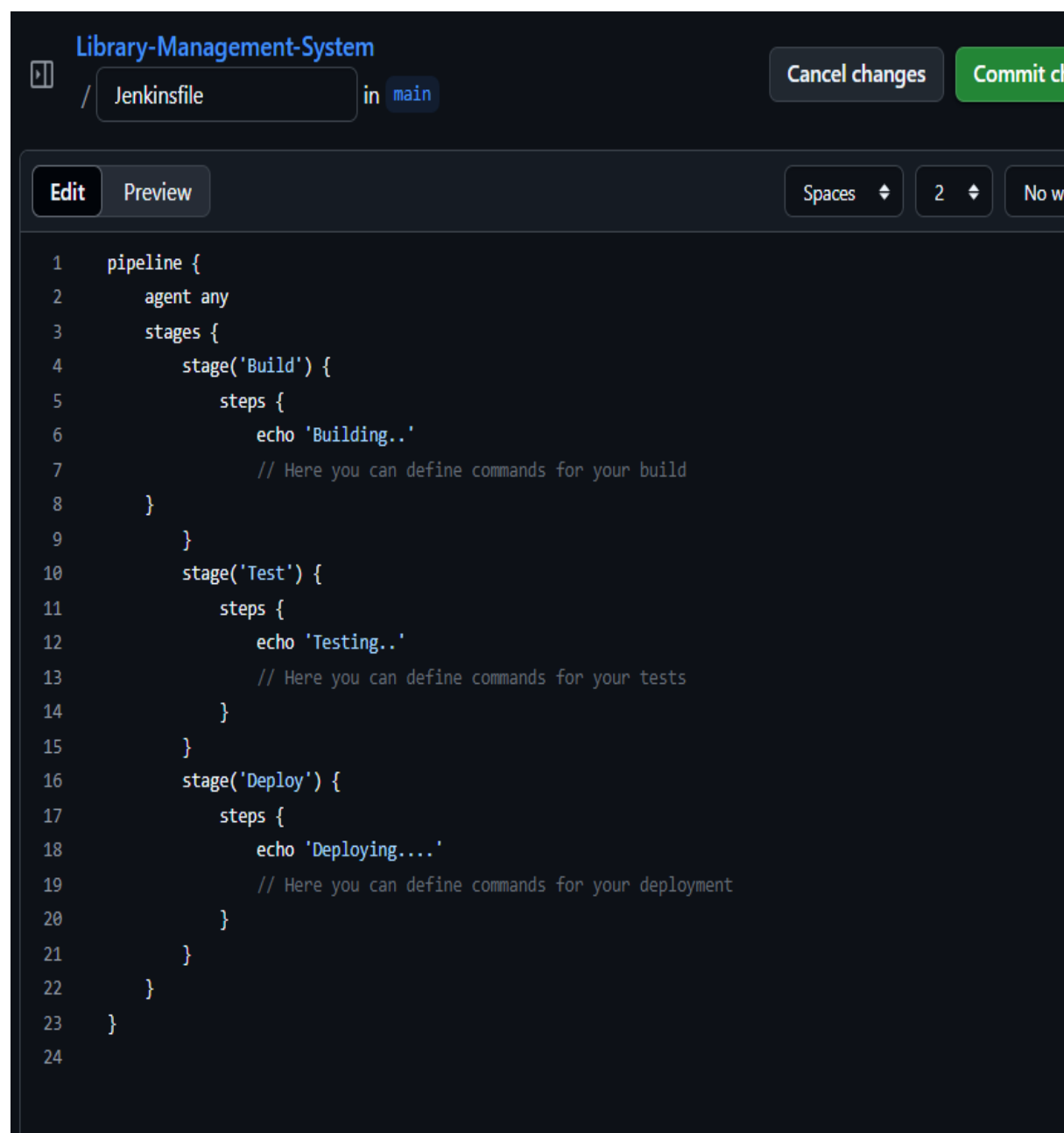
Jenkins should be installed and configured on your machine.

Now you can begin with setting up the pipeline:

What is Jenkins File?

A Jenkins file is a script written in the Groovy programming language that defines the steps to be executed by a Jenkins pipeline. The pipeline is a series of steps executed in a particular order.

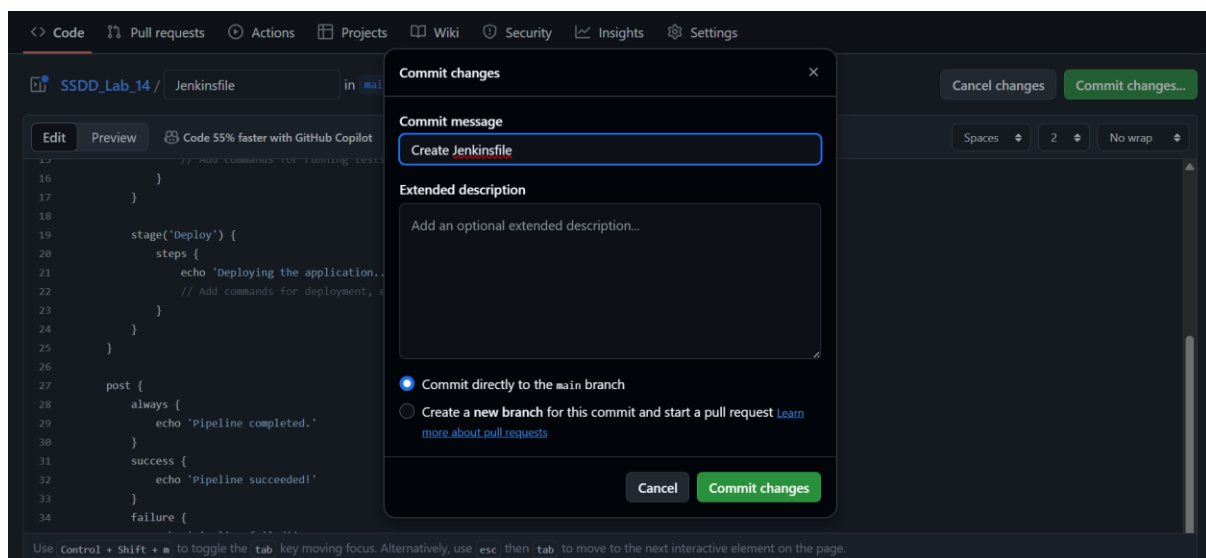
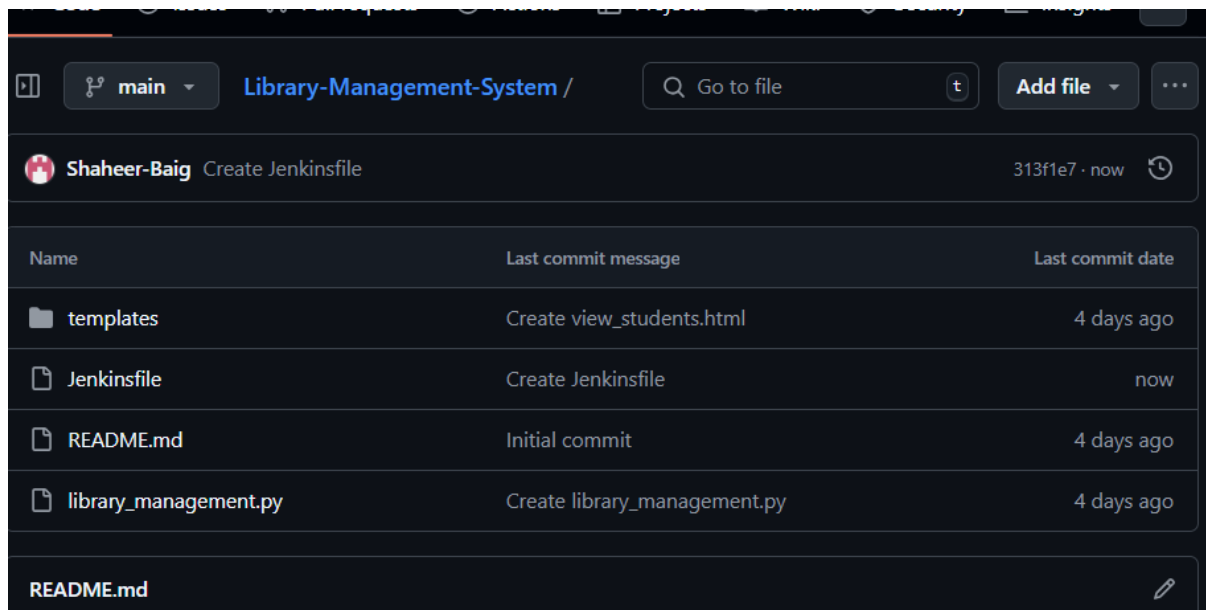
Make a new file named Jenkinsfile in any of your existing GitHub repository and paste the code



```
1 pipeline {
2   agent any
3   stages {
4     stage('Build') {
5       steps {
6         echo 'Building..'
7         // Here you can define commands for your build
8       }
9     }
10    stage('Test') {
11      steps {
12        echo 'Testing..'
13        // Here you can define commands for your tests
14      }
15    }
16    stage('Deploy') {
17      steps {
18        echo 'Deploying....'
19        // Here you can define commands for your deployment
20      }
21    }
22  }
23 }
24
```

Submitted to: Sir Mahaz Khan

- Click on Commit Changes
- The file will appear in your repository:



Create Pipeline:

Now start Jenkins

- Go to Jenkins dashboard.

Click on new item.

Add name of your pipeline as **myfirstpipeline**.



Jenkins / All / New Item

New Item

Enter an item name

Shaheer-Pipeline

Select an item type



Freestyle project

Select multibranch pipeline option:

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

- A new pipeline will be created:



Configuration

General

Enabled

General

Branch Sources

Build Configuration

Scan Multibranch Pipeline Triggers

Orphaned Item Strategy

Appearance

Health metrics

Properties

Display Name ?

Description

Plain text [Preview](#)

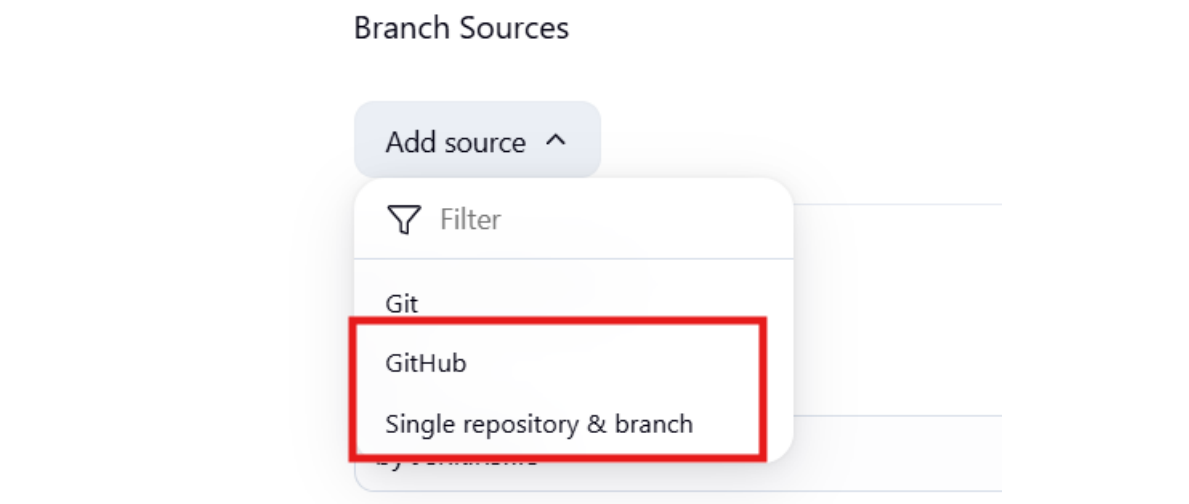
Branch Sources

Add source ▾

Build Configuration

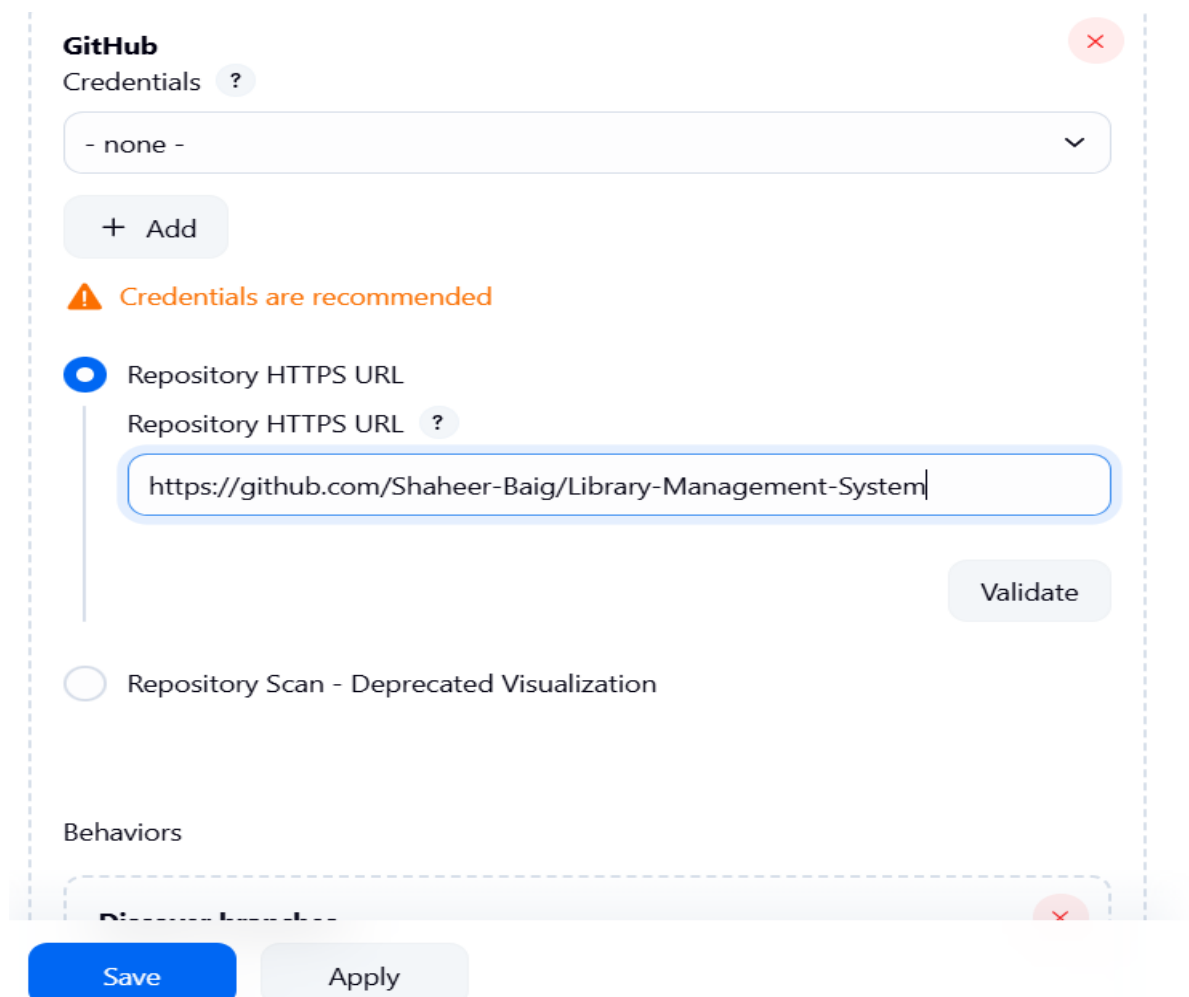
Save Apply

- Now click on add source option:



- Paste the link of your github repository where you created the JenkinsFile

Validate URL:



Validate the link to see if it is correct.

And click on **save**.

- It will start scanning the repository.
- It will scan all the branches one by one to look for Jenkinsfile
- When it is found, the scanning stops and the exits successfully.

Scan Repository Log

Started by user [Mirza Shaheer Baig](#)

[Fri Jun 13 20:44:53 PKT 2025] Starting branch indexing...

20:44:54 Connecting to <https://api.github.com> with no credentials,
anonymous access

Examining [Shaheer-Baig/Library-Management-System](#)

Checking branches...

Getting remote branches...

Checking branch [main](#)

Getting remote pull requests...

'Jenkinsfile' found


Met criteria




Scheduled build for branch: main


1 branches were processed


Checking pull-requests...


0 pull requests were processed


 Jenkins / Shaheer-Pipeline / main / #2


  


 Status


 Changes


 Console Output


 Edit Build Information


 Timings

 Pipeline Overview



 Replay

 Pipeline Steps

 Workspaces

 Previous Build

✓ Console Output

 Download  Copy View as plain text

Started by user [Mirza Shaheer Baig](#)

22:13:23 Connecting to <https://api.github.com> with no credentials, anonymous access

22:13:24 Jenkins-Imposed API Limiter: Current quota for Github API usage has 51 remaining (1 over budget). Next quota of 60 in 57 min. Sleeping for 4 min 50 sec.

22:13:24 Jenkins is attempting to evenly distribute Github API requests. To configure a different rate limiting strategy, such as having Jenkins restrict Github API requests only when near or above the Github rate limit, go to "Github API usage" under "Configure System" in the Jenkins settings.

22:16:25 Jenkins-Imposed API Limiter: Still sleeping, now only 1 min 47 sec remaining.

22:18:15 Jenkins-Imposed API Limiter: Current quota for Github API usage has 48 remaining (1 over budget). Next quota of 60 in 53 min. Sleeping for 4 min 35 sec.

22:18:15 Jenkins is attempting to evenly distribute Github API requests. To configure a different rate limiting strategy, such as having Jenkins restrict Github API requests only when near or above the Github rate limit, go to "Github API usage" under "Configure System" in the Jenkins settings.

22:21:17 Jenkins-Imposed API Limiter: Still sleeping, now only 1 min 32 sec remaining.

22:22:52 Jenkins-Imposed API Limiter: Current quota for Github API usage has 45 remaining (1 over budget). Next quota of 60 in 48 min. Sleeping for 4 min 36 sec.

22:22:52 Jenkins is attempting to evenly distribute Github API requests. To configure a different rate limiting strategy, such as having Jenkins restrict Github API requests only when near or above the Github rate limit, go to "Github API usage" under "Configure System" in the Jenkins settings.

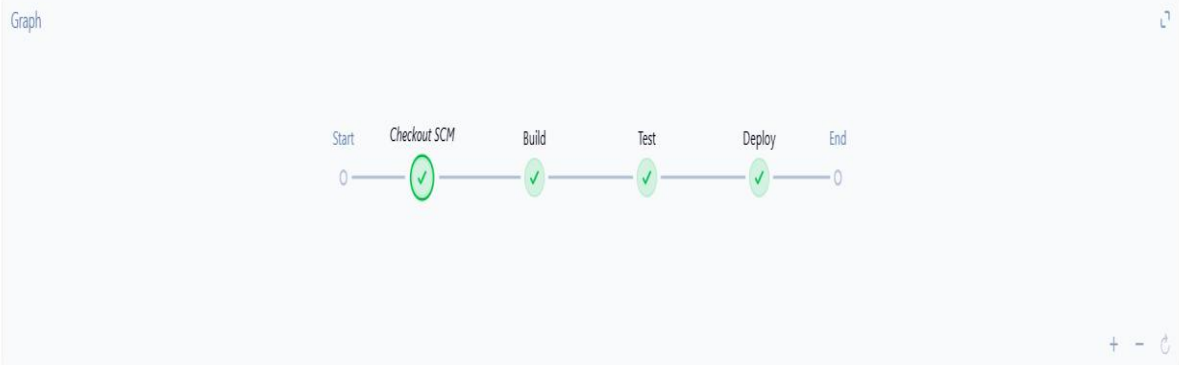



22:25:54 Jenkins-Imposed API Limiter: Still sleeping, now only 1 min 33 sec remaining.

22:27:30 Jenkins-Imposed API Limiter: Current quota for Github API usage has 42 remaining (1 over budget). Next quota of 60 in 43 min. Sleeping for 4 min 35 sec.

22:27:30 Jenkins is attempting to evenly distribute Github API requests. To configure a different rate limiting strategy, such as having Jenkins restrict Github API requests only when near or above the Github rate limit, go to "Github API usage" under "Configure System" in the

Stages:

✓ #2

 Rerun  main  d101546  Manually run by Mirza Shaheer Baig  Started 21 min ago  Queued 3 ms  Took 18 min Search ✓ Checkout SCM 3.3 sec  Started 2 min 57 sec ago  Jenkins 

✓ Checkout SCM 3.3 sec

✓ Check out from version control  3.2 sec

✓ Build 91 ms

✓ Test 55 ms

✓ Deploy 41 ms



Post Build Actions:

```
1 pipeline {
2   agent any
3
4   stages {
5     stage('Build') {
6       steps {
7         echo 'Building...'
8         // Add your build steps here
9       }
10    }
11    stage('Test') {
12      steps {
13        echo 'Testing...'
14        // Add your test steps here
15      }
16    }
17    stage('Deploy') {
18      steps {
19        echo 'Deploying...'
20        // Add your deploy steps here
21      }
22    }
23  }
24
25  post {
26    success {
27      echo 'Build succeeded!'
28    }
29    failure {
30      echo 'Build failed! Notifying the team...'
31      // Add failure-specific steps here, e.g., sending an email or Slack notification
32    }
33    always {
34      echo 'Cleaning up workspace...'
35      cleanWs() // Cleans up the workspace after the build
36    }
37  }
38 }
```

Commit changes

Commit message

Update Jenkinsfile

Extended description

Add an optional extended description...

☒ Commit directly to the main branch

☐ Create a new branch for this commit and start a pull request [Learn more about pull requests](#)

Cancel

Commit changes

Build Again:

✓ Console Output

Download

Copy

Started by user Mirza Shaheer Baig

22:36:44 Connecting to https://api.github.com with no credentials, anonymous access

Obtained Jenkinsfile from 9f3bb0f8f853f50ae4527f53cef9c9b24127e6d4

[Pipeline] Start of Pipeline

[Pipeline] node

Running on Jenkins in C:\Users\Shaheer Baig\.jenkins\workspace\Shaheer-Pipeline_main

[Pipeline] {

[Pipeline] stage

[Pipeline] { (Declarative: Checkout SCM)

[Pipeline] checkout

Selected Git installation does not exist. Using Default

The recommended git tool is: NONE

No credentials specified

> C:\Program Files\Git\bin\git.exe rev-parse --resolve-git-dir C:\Users\Shaheer Baig\.jenkins\workspace\Shaheer-Pipeline_main\.git # timeout=10

Fetching changes from the remote Git repository

> C:\Program Files\Git\bin\git.exe config remote.origin.url https://github.com/Shiheer-Baig/hello-world.git # timeout=10

Fetching without tags

Fetching upstream changes from https://github.com/Shiheer-Baig/hello-world.git

> C:\Program Files\Git\bin\git.exe --version # timeout=10

> git --version # 'git version 2.49.0.windows.1'

> C:\Program Files\Git\bin\git.exe fetch --no-tags --force --progress -- https://github.com/Shiheer-Baig/hello-world.git +refs/heads/main:refs/remotes/origin/main # timeout=10

Checking out Revision 9f3bb0f8f853f50ae4527f53cef9c9b24127e6d4 (main)

> C:\Program Files\Git\bin\git.exe config core.sparsecheckout # timeout=10

> C:\Program Files\Git\bin\git.exe checkout -f 9f3bb0f8f853f50ae4527f53cef9c9b24127e6d4 # timeout=10

Commit message: "Update Jenkinsfile"

> C:\Program Files\Git\bin\git.exe rev-list --no-walk d10154676203c10c4aba8c30f917333bfbdb665cb # timeout=10

Stages:

Jenkins / Shaheer-Pipeline / main / #3 / Pipeline Overview

Q

🔔

👤

✓ < #3

Rerun

⋮

🔗 main → 9f3bb0f 🧑 Manually run by Mirza Shaheer Baig ⌚ Started 1 min 24 sec ago ⌚ Queued 1 ms ⌚ Took 7.6 sec <> Changes

Graph

Start

Checkout SCM

Build

Test

Deploy

Post Actions

End

0

✓

✓

✓

✓

✓

0

+

-

🔄

Q Search

☰

✓ Checkout SCM

⌚ 2.3 sec ⌚ Started 1 min 21 sec ago 🖥 Jenkins ⋮

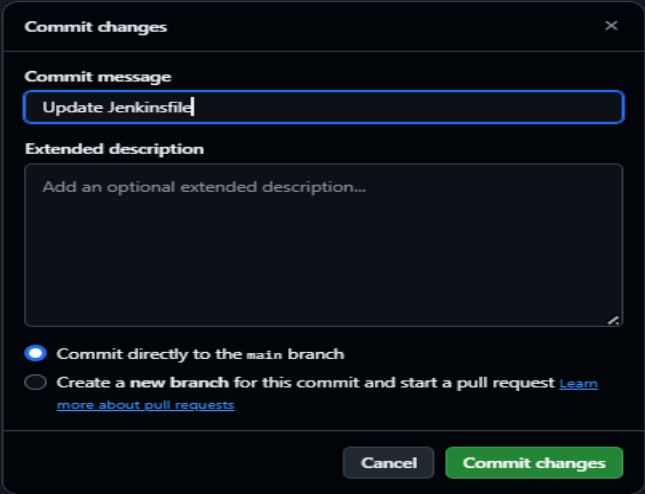
Define Conditionals for each stage:

```
pipeline {
    agent any

    stages {
        stage('Build') {
            steps {
                echo 'Building...'
                bat 'echo Build process completed!'
            }
        }

        stage('Test') {
            when {
                allOf {
                    expression { env.BRANCH_NAME == 'main' }
                    not {
                        expression { env.SKIP_TESTS == 'true' }
                    }
                }
            }
            steps {
                echo 'Testing...'
                bat 'echo Running test cases!'
            }
        }

        stage('Deploy') {
            steps {
                echo 'Deploying...'
                bat 'echo Deployment process completed!'
            }
        }
    }
}
```



Commit changes

Commit message

Update Jenkinsfile

Extended description

Add an optional extended description...

☒ Commit directly to the main branch

☐ Create a new branch for this commit and start a pull request [Learn more about pull requests](#)

Cancel Commit changes

Build Again:

/ main / #5

Console Output

Download

Copy

View

Started by user Mirza Shaheer Baig

22:43:19 Connecting to https://api.github.com with no credentials, anonymous access

Obtained Jenkinsfile from c9bde89fa48fb92c4d7857a0b408f977fc0d991f

[Pipeline] Start of Pipeline

[Pipeline] node

Running on Jenkins in C:\Users\Shaheer Baig\.jenkins\workspace\Shaheer-Pipeline_main

[Pipeline] {

[Pipeline] stage

[Pipeline] { (Declarative: Checkout SCM)

[Pipeline] checkout

Selected Git installation does not exist. Using Default

The recommended git tool is: NONE

No credentials specified

> C:\Program Files\Git\bin\git.exe rev-parse --resolve-git-dir C:\Users\Shaheer Baig\.jenkins\workspace\Shaheer-Pipeline_main\.git # timeout=10

Fetching changes from the remote Git repository

> C:\Program Files\Git\bin\git.exe config remote.origin.url https://github.com/Shiheer-Baig/hello-world.git # timeout=10

Fetching without tags

Fetching upstream changes from https://github.com/Shiheer-Baig/hello-world.git

> C:\Program Files\Git\bin\git.exe fetch --no-tags --progress -- https://github.com/Shiheer-Baig/hello-world.git +refs/heads/main:refs/remotes/origin/main # timeout=10

Checking out Revision c9bde89fa48fb92c4d7857a0b408f977fc0d991f (main)

> C:\Program Files\Git\bin\git.exe config core.sparsecheckout # timeout=10

> C:\Program Files\Git\bin\git.exe checkout -f c9bde89fa48fb92c4d7857a0b408f977fc0d991f # timeout=10

Commit message: "Update Jenkinsfile"

> C:\Program Files\Git\bin\git.exe rev-list --no-walk 9f3bb0f8f853f50ae4527f53cef9c9b24127e6d4 # timeout=10

[Pipeline] }

[Pipeline] // stage

[Pipeline] withEnv

[Pipeline] {

[Pipeline] stage

Stages:

✓ < #5

Run

...

main

c9bde89

Manually run by Mirza Shaheer Baig

Started 43 sec ago

Queued 2 ms

Took 11 sec

Changes

Graph

Start

Checkout SCM

Build

Test

Deploy

End

Search

✓ Checkout SCM 4.6 sec Started 42 sec ago Jenkins

✓ Checkout from version control 4.6 sec

✓ Build 1.4 sec


✓ Test 1.3 sec

✓ Deploy 0.7 sec

↑


↓

Environment Variables:

 **Jenkins**

Manage Jenkins

System Information



System Information

System Properties

Environment Variables

Plugins

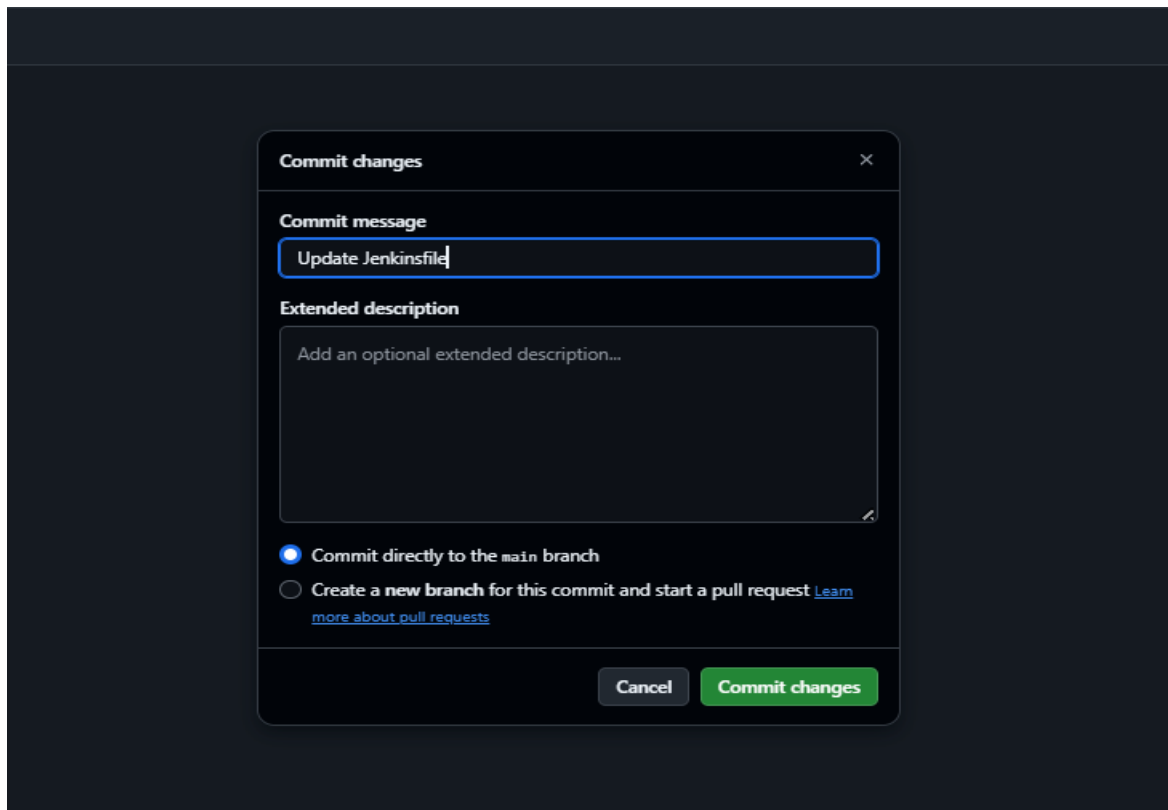
Memory Usage

Thread Dumps

Show values

Name ↓	Value
catalina.base	<div>Hidden value, click to show this value</div>
catalina.home	<div>Hidden value, click to show this value</div>
catalina.useNaming	<div>Hidden value, click to show this value</div>
common.loader	<div>Hidden value, click to show this value</div>
file.encoding	<div>Hidden value, click to show this value</div>
file.separator	<div>Hidden value, click to show this value</div>
java.class.path	<div>Hidden value, click to show this value</div>
java.class.version	<div>Hidden value, click to show this value</div>

```
4 // Define custom environment variables
5 environment {
6     APP_VERSION = '1.0.3' // Example application version
7     DEPLOY_ENV = 'staging' // Deployment environment
8     AUTHOR_NAME = 'Shaheer Baig' // Example author name
9 }
10
11 stages {
12     stage('Build') {
13         steps {
14             echo "Building version: ${env.APP_VERSION}"
15             echo "Author: ${env.AUTHOR_NAME}"
16             // Your build logic here
17             bat 'echo Build successful'
18         }
19     }
20
21     stage('Test') {
22         steps {
23             echo "Running tests for version: ${env.APP_VERSION}"
24             // Your test logic here
25             bat 'echo All tests passed'
26         }
27     }
28
29     stage('Deploy') {
30         steps {
31             echo "Deploying version: ${env.APP_VERSION} to environment: ${env.DEPLOY_ENV}"
32             // Your deployment logic here
33             bat 'echo Deployment done'
34         }
35     }
36 }
37 }
38 SS
```



Built Again:

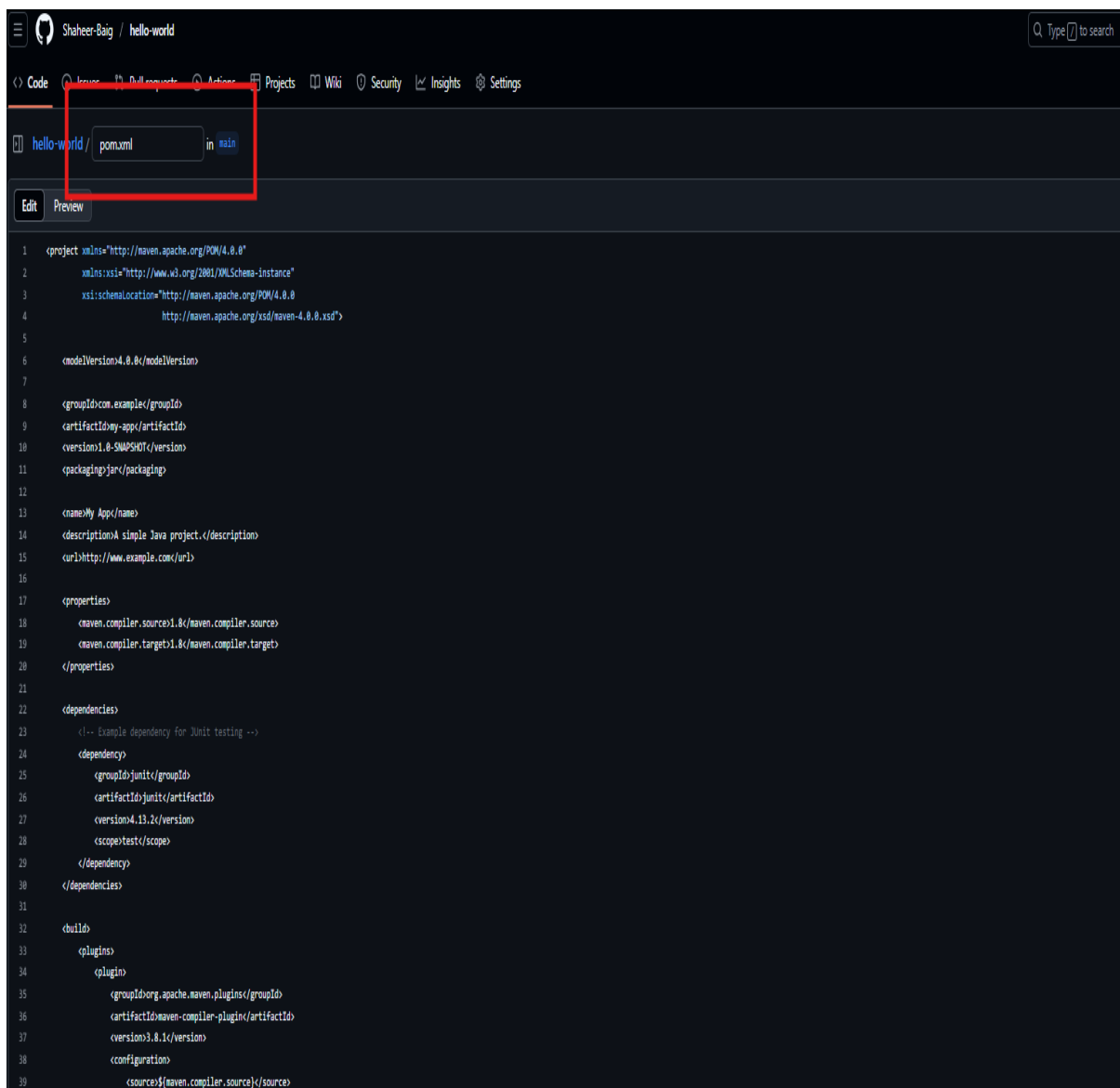
```
[Pipeline] echo
Testing...
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy)
[Pipeline] echo
Deploying...
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Declarative: Post Actions)
[Pipeline] echo
Cleaning up workspace...
[Pipeline] cleanWs
[WS-CLEANUP] Deleting project workspace...
[WS-CLEANUP] Deferred wipeout is used...
[WS-CLEANUP] done
[Pipeline] echo
Build succeeded!
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Tools attribute for build tools:

```
1 pipeline {
2   agent any
3
4   tools {
5     // Use the exact name of your Maven configuration as defined in Jenkins Global Tool Configuration
6     maven 'Maven'
7   }
8
9   environment {
10    // Define any environment variables you may need
11    APP_VERSION = '1.0.3'
12  }
13
14  stages {
15    stage('Setup') {
16      steps {
17        echo "Setting up environment for Maven..."
18      }
19    }
20
21    stage('Build') {
22      steps {
23        // For Windows, use 'bat' instead of 'sh'
24      }
25    }
26  }
27 }
```

Use **Control + Shift + n** to toggle the **tab** key moving focus. Alternatively, use **esc** then **tab** to move to the next interactive element on the page.

Create pom.xml:



```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <project xmlns="http://maven.apache.org/POM/4.0.0"
3   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
4   xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
5     http://maven.apache.org/xsd/maven-4.0.0.xsd">
6
7   <modelVersion>4.0.0</modelVersion>
8
9   <groupId>com.example</groupId>
10  <artifactId>my-app</artifactId>
11  <version>1.0-SNAPSHOT</version>
12  <packaging>jar</packaging>
13
14  <name>My App</name>
15  <description>A simple Java project.</description>
16  <url>http://www.example.com</url>
17
18  <properties>
19    <maven.compiler.source>1.8</maven.compiler.source>
20    <maven.compiler.target>1.8</maven.compiler.target>
21  </properties>
22
23  <dependencies>
24    <!-- Example dependency for JUnit testing -->
25    <dependency>
26      <groupId>junit</groupId>
27      <artifactId>junit</artifactId>
28      <version>4.13.2</version>
29      <scope>test</scope>
30    </dependency>
31  </dependencies>
32
33  <build>
34    <plugins>
35      <plugin>
36        <groupId>org.apache.maven.plugins</groupId>
37        <artifactId>maven-compiler-plugin</artifactId>
38        <version>3.8.1</version>
39        <configuration>
40          <source>${maven.compiler.source}</source>
```

Commit changes

Commit message

Create pom.xml

Extended description

Add an optional extended description...

☒ Commit directly to the main branch

☐ Create a new branch for this commit and start a pull request [Learn more about pull requests](#)

Cancel

Commit changes

Build Again:

Shaheer-Pipeline / main / #7

Console Output

Download

Copy

View as plain text

Started by user Mirza Shaheer Baig

22:52:32 Connecting to https://api.github.com with no credentials, anonymous access

Obtained Jenkinsfile from 96275d51604820cc83e280c7b3086d449702791c

[Pipeline] Start of Pipeline

[Pipeline] node

Running on Jenkins in C:\Users\Shaheer Baig\jenkins\workspace\Shaheer-Pipeline_main

[Pipeline] {

[Pipeline] stage

[Pipeline] { (Declarative: Checkout SCM)

[Pipeline] checkout

Selected Git installation does not exist. Using Default

The recommended git tool is: NONE

No credentials specified

> C:\Program Files\Git\bin\git.exe rev-parse --resolve-git-dir C:\Users\Shaheer Baig\jenkins\workspace\Shaheer-Pipeline_main\git # timeout=10

Fetching changes from the remote Git repository

> C:\Program Files\Git\bin\git.exe config remote.origin.url https://github.com/Shaheer-Baig/hello-world.git # timeout=10

Fetching without tags

Fetching upstream changes from https://github.com/Shaheer-Baig/hello-world.git

> C:\Program Files\Git\bin\git.exe --version # timeout=10

> git --version # 'git version 2.49.0.windows.1'

> C:\Program Files\Git\bin\git.exe fetch --no-tags --force --progress -- https://github.com/Shaheer-Baig/hello-world.git +refs/heads/main:refs/remotes/origin/main # timeout=10

Checking out Revision 96275d51604820cc83e280c7b3086d449702791c (main)

> C:\Program Files\Git\bin\git.exe config core.sparsecheckout # timeout=10

> C:\Program Files\Git\bin\git.exe checkout -f 96275d51604820cc83e280c7b3086d449702791c # timeout=10

Commit message: "Update Jenkinsfile"

> C:\Program Files\Git\bin\git.exe rev-list --no-walk c9bde09fa48f92c4d7057a0b408f977fcd991f # timeout=10

[Pipeline] }

[Pipeline] // stage

[Pipeline] withEnv

[Pipeline] {

[Pipeline] withEnv

Stages:

< #7

main

96275d5

Manually run by Mirza Shaheer Baig

Started 35 sec ago

Queued 7 ms

Took 7.4 sec

</> Changes

Run

...

Graph

Start

Checkout SCM

Build

Test

Deploy

End

Search

Checkout SCM 2.4 sec

Build 0.7 sec

Test 0.35 sec

Deploy 0.7 sec

Test

0.35 sec

Started 30 sec ago

Jenkins

...

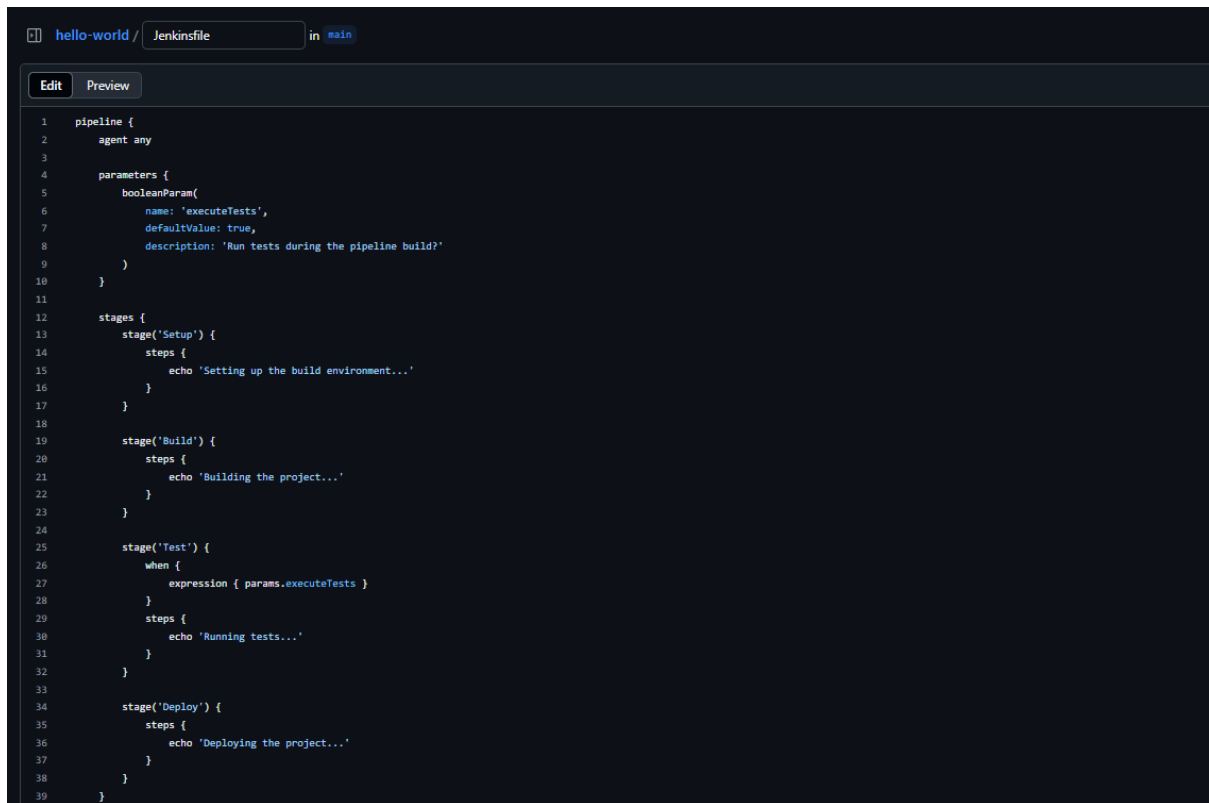
Running tests for version: 1.0.3

17 ms

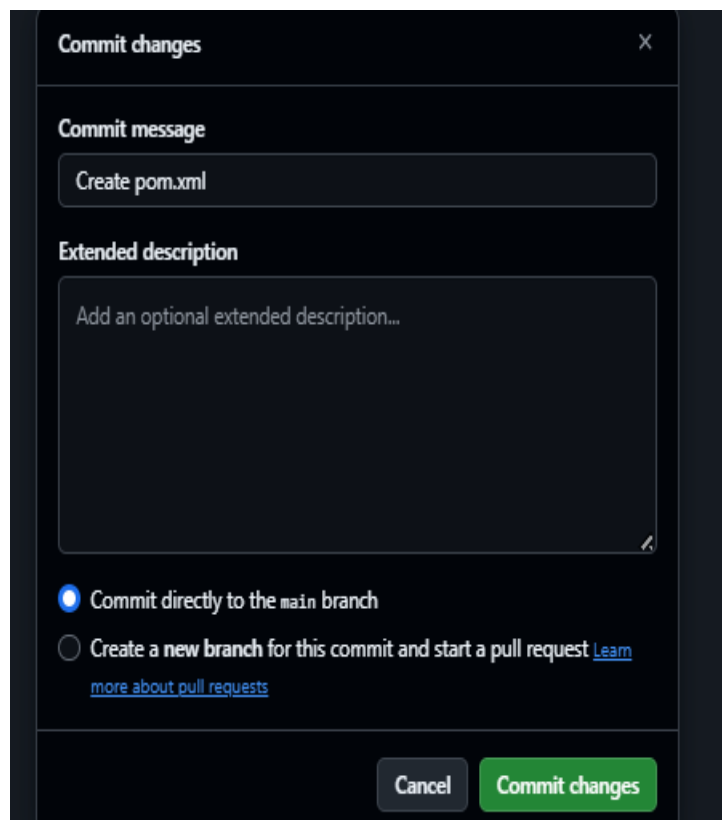
Windows Batch Script echo All tests passed

0.3 sec

Parameters in Jenkins:



```
1 pipeline {
2   agent any
3
4   parameters {
5     booleanParam(
6       name: 'executeTests',
7       defaultValue: true,
8       description: 'Run tests during the pipeline build?'
9     )
10  }
11
12  stages {
13    stage('Setup') {
14      steps {
15        echo 'Setting up the build environment...'
16      }
17    }
18
19    stage('Build') {
20      steps {
21        echo 'Building the project...'
22      }
23    }
24
25    stage('Test') {
26      when {
27        expression { params.executeTests }
28      }
29      steps {
30        echo 'Running tests...'
31      }
32    }
33
34    stage('Deploy') {
35      steps {
36        echo 'Deploying the project...'
37      }
38    }
39  }
```



Commit changes [X]

Commit message

Create pom.xml

Extended description

Add an optional extended description...

☒ Commit directly to the main branch

☐ Create a new branch for this commit and start a pull request [Learn more about pull requests](#)

Build Again:

✓ Console Output

Download

Copy

View as plain text

Started by user Mirza Shaheer Baig

22:55:19 Connecting to https://api.github.com with no credentials, anonymous access

22:55:21 Jenkins is restricting GitHub API requests only when near or above the rate limit. To configure a different rate limiting strategy, such as having Jenkins attempt to evenly distribute GitHub API requests, go to "GitHub API usage" under "Configure System" in the Jenkins settings.

22:55:21 Jenkins-Imposed API Limiter: Current quota for GitHub API usage has 14 remaining (1 over budget). Next quota of 60 in 15 min. Sleeping until reset.

22:58:22 Jenkins-Imposed API Limiter: Still sleeping, now only 13 min remaining.

23:01:24 Jenkins-Imposed API Limiter: Still sleeping, now only 10 min remaining.

23:04:25 Jenkins-Imposed API Limiter: Still sleeping, now only 7 min 14 sec remaining.

23:07:27 Jenkins-Imposed API Limiter: Still sleeping, now only 4 min 12 sec remaining.

23:10:29 Jenkins-Imposed API Limiter: Still sleeping, now only 1 min 10 sec remaining.

Obtained Jenkinsfile from 3057e3287b7b6be73058994f614d290ec40a897a

[Pipeline] Start of Pipeline

[Pipeline] node

Running on Jenkins in C:\Users\Shaheer Baig\.jenkins\workspace\Shaheer-Pipeline_main

[Pipeline] {

[Pipeline] stage

[Pipeline] { (Declarative: Checkout SCM)

[Pipeline] checkout

Selected Git installation does not exist. Using Default

The recommended git tool is: NONE

No credentials specified

> C:\Program Files\Git\bin\git.exe rev-parse --resolve-git-dir C:\Users\Shaheer Baig\.jenkins\workspace\Shaheer-Pipeline_main\.git # timeout=10

Fetching changes from the remote Git repository

> C:\Program Files\Git\bin\git.exe config remote.origin.url https://github.com/Shiheer-Baig/hello-world.git # timeout=10

Fetching without tags

Fetching upstream changes from https://github.com/Shiheer-Baig/hello-world.git

> C:\Program Files\Git\bin\git.exe --version # timeout=10

> git --version # 'git version 2.49.0.windows.1'

> C:\Program Files\Git\bin\git.exe fetch --no-tags --force --progress -- https://github.com/Shiheer-Baig/hello-world.git +refs/heads/main:refs/remotes/origin/main # timeout=10

Checking out Revision 3057e3287b7b6be73058994f614d290ec40a897a (main)

> C:\Program Files\Git\bin\git.exe config core.sparsecheckout # timeout=10

> C:\Program Files\Git\bin\git.exe checkout -f 3057e3287b7b6be73058994f614d290ec40a897a # timeout=10

Commit message: "Update Jenkinsfile"

> C:\Program Files\Git\bin\git.exe rev-list --no-walk 96375d51604820cc83e280c7b3086d449702791c # timeout=10

> C:\Program Files\Git\bin\git.exe rev-list --no-walk 96375d51604820cc83e280c7b3086d449702791c # timeout=10

Commit message: "Update Jenkinsfile"

> C:\Program Files\Git\bin\git.exe rev-list --no-walk 96275d51604820cc83e280c7b3086d449702791c # timeout=10

[Pipeline] }

[Pipeline] // stage

[Pipeline] withEnv

[Pipeline] {

[Pipeline] stage

[Pipeline] { (Setup)

[Pipeline] echo

Setting up the build environment...

[Pipeline] }

[Pipeline] // stage

[Pipeline] stage

[Pipeline] { (Build)

[Pipeline] echo

Building the project...

[Pipeline] }

[Pipeline] // stage

[Pipeline] stage

[Pipeline] { (Test)

[Pipeline] echo

Running tests...

[Pipeline] }

[Pipeline] // stage

[Pipeline] stage

[Pipeline] { (Deploy)

[Pipeline] echo

Deploying the project...

[Pipeline] }

[Pipeline] // stage

[Pipeline] }

[Pipeline] // withEnv

[Pipeline] }

[Pipeline] // node

[Pipeline] End of Pipeline

Finished: SUCCESS

Stages:

✓ #8

Run

main

3057e32

Manually run by Mirza Shaheer Baig

Started 21 min ago

Queued 2 ms

Took 16 min

Changes

Graph

Start Checkout SCM Setup Build Test Deploy End

Q Search

Deploy 33 ms Started 5 min 15 sec ago Jenkins

Checkout SCM 2 sec

Setup 44 ms

Build 44 ms

Test 78 ms

Deploy 33 ms

Deploying the project... 7 ms