

JENKINS LAB3

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Track: System Administration

Branch: Aswan

1-what is the benefit of using master-slave architecture rather than building on master only ?

- **Resource Isolation:**
Offloading builds to agent nodes prevents the master from being overloaded. This keeps the master responsive and available for administrative tasks.
- **Scalability:**
You can add as many agents as needed, allowing builds to run concurrently. This improves overall throughput and shortens build times.
- **Environment Specialization:**
Agents can be tailored with specific software, OS versions, or hardware configurations required by different projects. This helps test across multiple environments without affecting the master.
- **Security & Stability:**
Isolating build environments minimizes the risk of a faulty build affecting the master. It also helps contain security issues by limiting the exposure of the master node.
- **Maintenance Flexibility:**
Agents can be updated, restarted, or replaced independently from the master. This improves maintenance without impacting the entire CI/CD pipeline.

2-try to make new agent as container using docker plugin and configure master to use it and build pipeline on this agent

```
k8s / Clouds / New cloud
serverb@192:~ — sudo vi /lib/systemd/system/docker.service

[Unit]
Description=Docker Application Container Engine
Documentation=https://docs.docker.com
After=network-online.target nss-lookup.target docker.socket firewalld.service containerd.service time-set.target
Wants=network-online.target containerd.service
Requires=docker.socket

[Service]
Type=notify
# the default is not to use systemd for cgroups because the delegate issues still
# exists and systemd currently does not support the cgroup feature set required
# for containers run by docker
ExecStart=/usr/bin/dockerd -H tcp://0.0.0.0:4243 -H unix:///var/run/docker.sock --containerd=/run/containerd/containerd.sock
ExecReload=/bin/kill -s HUP $MAINPID
TimeoutStartSec=0
RestartSec=2
Restart=always

# Note that StartLimit* options were moved from "Service" to "Unit" in systemd 229.
# Both the old, and new location are accepted by systemd 229 and up, so using the old location
# to make them work for either version of systemd.
StartLimitBurst=3

# Note that StartLimitInterval was renamed to StartLimitIntervalSec in systemd 230.
# Both the old, and new name are accepted by systemd 230 and up, so using the old name to make
# this option work for either version of systemd.

-- INSERT --
```

```
serverb@192:~$ curl http://localhost:4243/version
{"Platform":{"Name":"Docker Engine - Community"},"Components":[{"Name":"Engine","Version":"28.0.4","Details":{"ApiVersion":"1.48","Arch":"amd64","BuildTime":"2025-03-25T15:07:53.000000000+00:00","Experimental":"false","GitCommit":"6430e49","GoVersion":"go1.23.7","KernelVersion":"5.14.0-503.11.1.el9_5.x86_64","MinAPIVersion":"1.24","Os":"linux"}},{"Name":"containerd","Version":"1.7.27","Details":{"GitCommit":"05044ec0a9a75232cad458027ca83437aae3f4da"},"Name":"runc","Version":"1.2.5","Details":{"GitCommit":"v1.2.5-0-g59923ef"},"Name":"docker-init","Version":"0.19.0","Details":{"GitCommit":"de40ad0"}}],"Version":"28.0.4","ApiVersion":"1.48","MinAPIVersion":"1.24","GitCommit":"6430e49","GoVersion":"go1.23.7","Os":"linux","Arch":"amd64","KernelVersion":"5.14.0-503.11.1.el9_5.x86_64","BuildTime":"2025-03-25T15:07:53.000000000+00:00"}
serverb@192:~$
```

Dashboard > Manage Jenkins > Clouds > New cloud

Name ?
lab3_q2

Docker Cloud details ⌵ Edited

Docker Host URI ?
tcp://192.168.159.133:4243

Server credentials
- none - ⌵

+ Add

Advanced ⌵

Version = 28.0.4, API Version = 1.48

☒ Enabled ?

Test Connection

Home

serverb_gui

ActivitiesFirefox

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lab3_q3 #2 PipelineDashboard [Jenkins]lab3_q2 Config [Jenkins]Docker hosts [Jenkins]Docker hosts [Jenkins]Cloud lab3_q2 Config [Jenkins]Manage Jenkins [Jenkins]Your Packages

192.168.159.133:8080/job/lab3_q2/configure

Customer PortalRed HatRed Hat Products Doc...Red Hat Enterprise Lin...Red Hat Developer Por...Red Hat Container Cat...Red Hat Hybrid Cloud ...

Dashboard > lab3_q2_2 > Configuration

Configure

GeneralTriggersPipelineAdvanced

Pipeline

Define your Pipeline using Groovy directly or pull it from source control.

Definition

Pipeline script

Script

```
1 pipeline {
2   agent { label 'docker_test' }
3
4   stages {
5     stage('Hello') {
6       steps {
7         echo "Hello from inside the Docker agent"
8       }
9     }
10    stage('Build') {
11      steps {
12        sh 'echo "This is a build step on the Docker agent"'
13        sleep 60
14      }
15    }
16  }
17 }
```

☒ Use Groovy Sandbox

[Pipeline Syntax](#)

Jenkins

Search

Notifications

Help

Log out

Mohamed Mostafa Esmail

Dashboard > Manage Jenkins > Docker

Back to Dashboard

Docker Server

Running Containers

Container Id	Image	Command	Created	Status	Ports	
660d3abeab7b9cdf52ef5ed837685bcf22a09b6e12b3d55ec4772bae309a52b6	jenkins/inbound-agent:latest	/usr/local/bin/jenkins-agent /bin/sh	Mon Mar 17 21:06:44 EET 2025	Up 46 seconds		<button>stop</button>

Images

Tag	Image Id	Created	Virtual Size
	sha256:f0a71b494f08b7fdd5cbafea1f85a582cc30c1ce95a00f29bb0d500c1927d92	Mon Mar 17 21:08:39 EET 2025	
	sha256:35d0175ef0cea660e58a9eb88d8addf544eabe3282553ab6385463c0dd27ccc4	Mon Mar 17 21:10:15 EET 2025	
	sha256:e53e4c1d788b14080bac22aa68d53f8109c52f4e56515097f117a8e2a7fd7b81	Mon Mar 17 21:10:15 EET 2025	
	sha256:e04938d9b463e11d7d1b950492234b6b48e2a09a452fe69e215e2f576fec5cb	Mon Mar 17 21:13:09 EET 2025	

Dashboard > lab3_q2_2 > #6

Status

Changes

Console Output

Edit Build Information

Timings

Pipeline Overview

Pipeline Console

Thread Dump

Pause/resume

Replay

Pipeline Steps

Workspaces

Previous Build

Console Output

DownloadCopyView as plain text

Started by user Mohamed Nostafa Esmael
[Pipeline] Start of Pipeline
[Pipeline] node
Running on docker_test-00001340ac993 on lab3_q2 in /home/jenkins/workspace/lab3_q2_2
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Hello)
[Pipeline] echo
Hello from inside the Docker agent
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Build)
[Pipeline] sh
+ echo This is a build step on the Docker agent
This is a build step on the Docker agent
[Pipeline] sleep
Sleeping for 1 min 0 sec
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS

Build #6

RebuildOverviewConfigure

Success 1 min 57 sec ago in 1 min 15 sec

Hello

Build

Stage 'Build'

Started 1 min 46 sec ago

Queued 0 ms

Took 1 min 4 sec

Success

Running on docker_test-00001340ac993

View as plain text

echo "This is a build step on the Docker agent"

Shell Script

3.9 sec

60

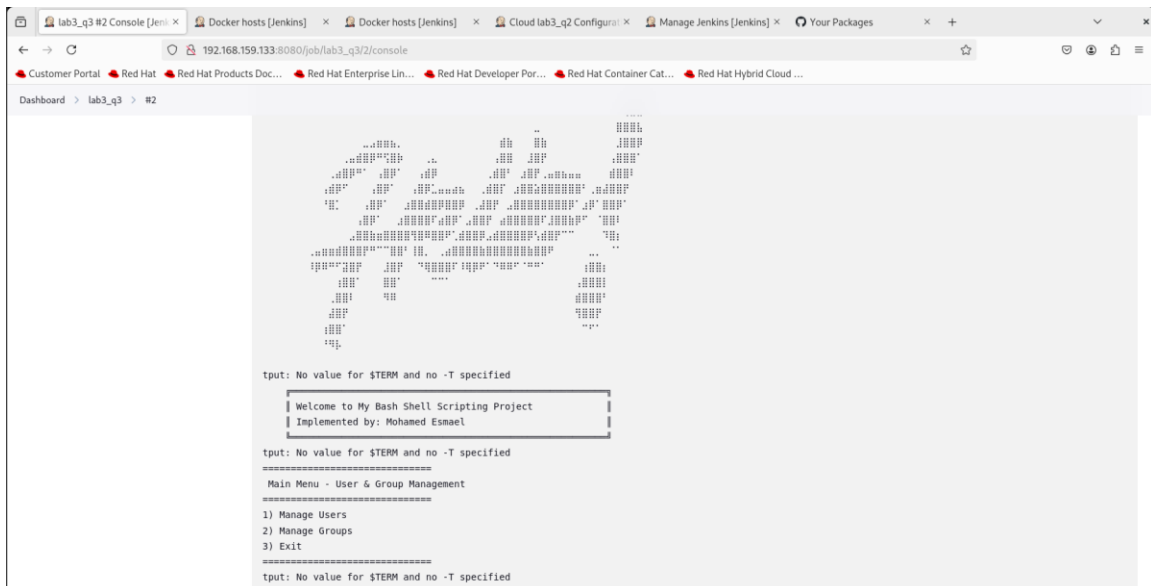
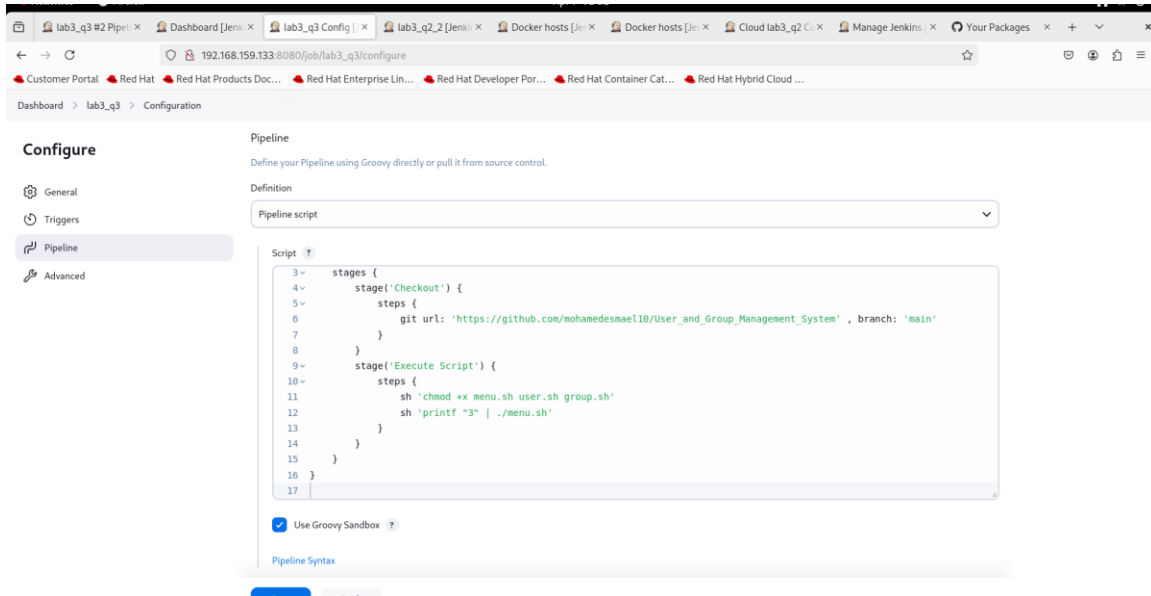
Sleep

1 min 0 sec

0

Sleeping for 1 min 0 sec

3-run pipeline to run bash script located on github repo



Jenkins

Dashboard > lab3_q3 > #2

Status

Changes

Console Output

Edit Build Information

Timings

Pipeline Overview

Pipeline Console

Thread Dump

Pause/resume

Replay

Pipeline Steps

Workspaces

Previous Build

Console Output

DownloadCopyView as plain text

Started by user Mohamed Mostafa Esmael

[Pipeline] Start of Pipeline

[Pipeline] node

Running on docker_test-00001pma0ufv on lab3_q2 in /home/jenkins/workspace/lab3_q3

[Pipeline] {

[Pipeline] stage

[Pipeline] { (Checkout)

[Pipeline] git

The recommended git tool is: NONE

No credentials specified

Cloning the remote Git repository

Cloning repository https://github.com/mohamedesmael10/User_and_Group_Management_System

> git init /home/jenkins/workspace/lab3_q3 # timeout=10

Fetching upstream changes from https://github.com/mohamedesmael10/User_and_Group_Management_System

> git --version # timeout=10

> git --version # 'git version 2.39.5'

> git fetch --tags --force --progress -- https://github.com/mohamedesmael10/User_and_Group_Management_System +refs/heads/*:refs/remotes/origin/* # timeout=10

> git config remote.origin.url https://github.com/mohamedesmael10/User_and_Group_Management_System # timeout=10

> git config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10

Avoid second fetch

Checking out Revision 7c5cd04631f3dfa512f292bb856e09a4b6ecb6f (refs/remotes/origin/main)

> git rev-parse refs/remotes/origin/main^{commit} # timeout=10

> git config core.sparsecheckout # timeout=10

lab3_q3 #2 Console [Jeni...]

Docker hosts [Jenkins]

Docker hosts [Jenkins]

Cloud lab3_q2 Configurati...

Manage Jenkins [Jenkins]

Your Packages

192.168.159.133:8080/job/lab3_q3/2/console

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Dashboard > lab3_q3 > #2

tput: No value for \$TERM and no -T specified

Welcome to My Bash Shell Scripting Project
Implemented by: Mohamed Esmael

tput: No value for \$TERM and no -T specified

=====

Main Menu - User & Group Management

=====

1) Manage Users

2) Manage Groups

3) Exit

=====

tput: No value for \$TERM and no -T specified

tput: No value for \$TERM and no -T specified

Choose an option: tput: No value for \$TERM and no -T specified

Goodbye \(-.-) (-.-)/

[Pipeline] }

[Pipeline] // stage

[Pipeline] }

Agent docker_test-00001pma0ufv was deleted, but do not have a node body to cancel

[Pipeline] // node

[Pipeline] End of Pipeline

Finished: SUCCESS

Jenkins

Dashboard > lab3_q3 > #2 > Pipeline Steps

Status

Changes

Console Output

Edit Build Information

Delete build '#2'

Timings

Git Build Data

Pipeline Overview

Pipeline Console

Restart from Stage

Replay

Pipeline Steps

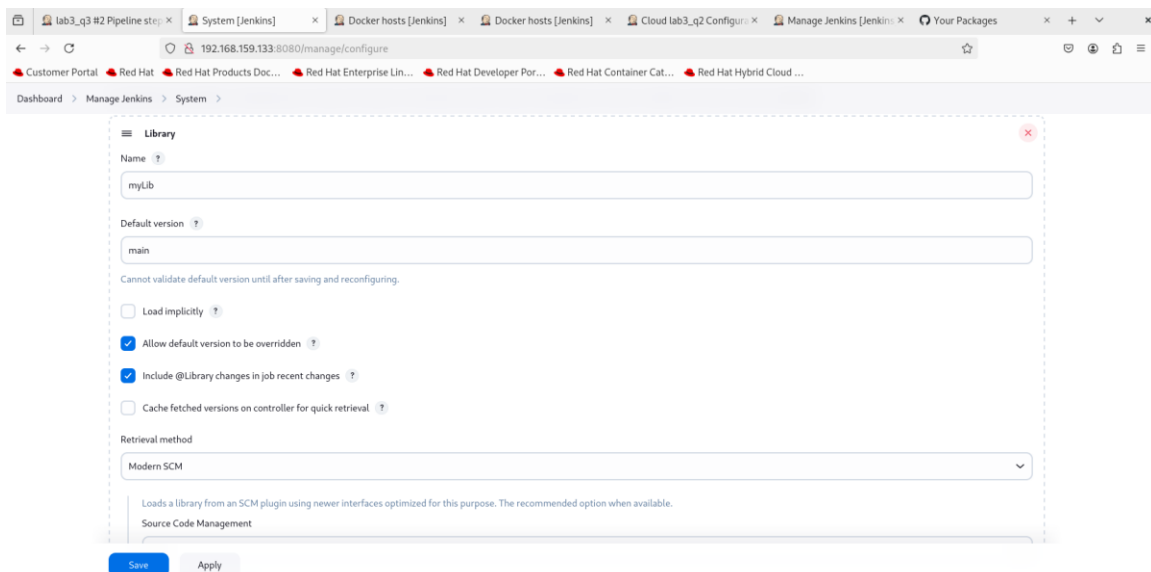
Workspaces

Previous Build

Step	Arguments	Status
Start of Pipeline - (35 sec in block)		✓
node - (34 sec in block)		✓
node block - (27 sec in block)		✓
stage - (24 sec in block)	Checkout	✓
stage block (Checkout) - (24 sec in block)		✓
git - (24 sec in self)		✓
stage - (2.2 sec in block)	Execute Script	✓
stage block (Execute Script) - (2.2 sec in block)		✓
sh - (1.4 sec in self)	chmod +x menu.sh user.sh group.sh	✓
sh - (0.77 sec in self)	printf "3" ./menu.sh	✓

4-run new pipeline using jenkins shared library to build, push dockerfile existed on github repo

GITHUB Repo: <https://github.com/mohamedesmael10/jenkins-shared-library>



The screenshot shows the Jenkins 'Library' configuration page. The browser tabs include 'lab3_q3 #2 Pipeline step...', 'System [Jenkins]', 'Docker hosts [Jenkins]', 'Docker hosts [Jenkins]', 'Cloud lab3_q2 Configur...', 'Manage Jenkins [Jenkins]', and 'Your Packages'. The address bar shows '192.168.159.133:8080/manage/configure'. The breadcrumb trail is 'Dashboard > Manage Jenkins > System >'. The 'Library' form has a red close button in the top right corner. The 'Name' field contains 'myLib'. The 'Default version' field contains 'main'. Below these fields is a note: 'Cannot validate default version until after saving and reconfiguring.' There are four checkboxes: 'Load implicitly' (unchecked), 'Allow default version to be overridden' (checked), 'Include @Library changes in job recent changes' (checked), and 'Cache fetched versions on controller for quick retrieval' (unchecked). The 'Retrieval method' dropdown is set to 'Modern SCM'. At the bottom are 'Save' and 'Apply' buttons.

lib3_q3 #2 Pipeline step... System [Jenkins] Docker hosts [Jenkins] Docker hosts [Jenkins] Cloud lab3_q2 Configur... Manage Jenkins [Jenkins] Your Packages

192.168.159.133:8080/manage/configure

Customer Portal Red Hat Red Hat Products Doc... Red Hat Enterprise Lin... Red Hat Developer Por... Red Hat Container Cat... Red Hat Hybrid Cloud ...

Dashboard > Manage Jenkins > System >

Library

Name [?]

myLib

Default version [?]

main

Cannot validate default version until after saving and reconfiguring.

☐ Load implicitly [?]

☒ Allow default version to be overridden [?]

☒ Include @Library changes in job recent changes [?]

☐ Cache fetched versions on controller for quick retrieval [?]

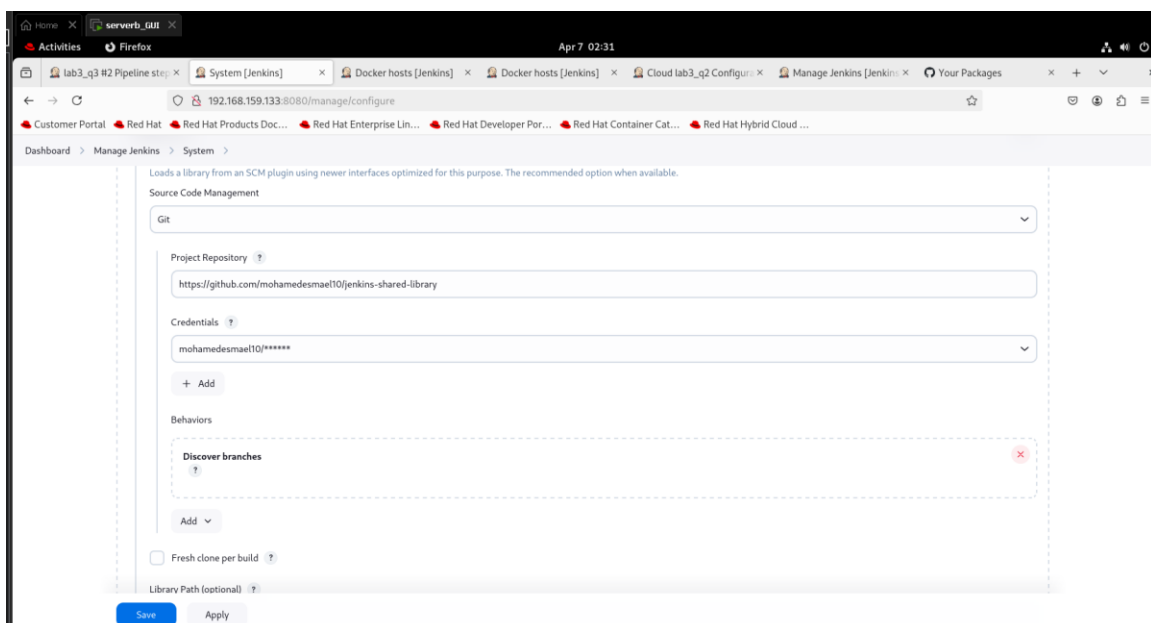
Retrieval method

Modern SCM

Loads a library from an SCM plugin using newer interfaces optimized for this purpose. The recommended option when available.

Source Code Management

Save Apply



The screenshot shows the Jenkins 'Source Code Management' configuration page. The browser tabs are the same as the previous image. The address bar is the same. The breadcrumb trail is 'Dashboard > Manage Jenkins > System >'. The 'Source Code Management' form has a red close button in the top right corner. The 'Source Code Management' dropdown is set to 'Git'. The 'Project Repository' field contains 'https://github.com/mohamedesmael10/jenkins-shared-library'. The 'Credentials' dropdown is set to 'mohamedesmael10*****'. There is an '+ Add' button. The 'Behaviors' section has a 'Discover branches' behavior selected. At the bottom are 'Save' and 'Apply' buttons.

home x serverb GUI x

Activities Firefox

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lab3_q3 #2 Pipeline step... System [Jenkins] Docker hosts [Jenkins] Docker hosts [Jenkins] Cloud lab3_q2 Configur... Manage Jenkins [Jenkins] Your Packages

192.168.159.133:8080/manage/configure

Customer Portal Red Hat Red Hat Products Doc... Red Hat Enterprise Lin... Red Hat Developer Por... Red Hat Container Cat... Red Hat Hybrid Cloud ...

Dashboard > Manage Jenkins > System >

Loads a library from an SCM plugin using newer interfaces optimized for this purpose. The recommended option when available.

Source Code Management

Git

Project Repository [?]

https://github.com/mohamedesmael10/jenkins-shared-library

Credentials [?]

mohamedesmael10*****

+ Add

Behaviors

Discover branches [?]

Add

☐ Fresh clone per build [?]

Library Path (optional) [?]

Save Apply

270a1170e7e3: Layer already exists
b2d6174abbec: Layer already exists
2dda4f470900a: Layer already exists
v100: digest: sha256:16977c2462a3a4c0e23126070614ffed2f2763e78e575b2355b51039bca0bf size: 947
[Pipeline] sh
+ docker push mohamedesmael/jenkins_lab1:latest
The push refers to repository [docker.io/mohamedesmael/jenkins_lab1]
2dda4f470900a: Preparing
b2d6174abbec: Preparing
270a1170e7e3: Preparing
b2d6174abbec: Layer already exists
2dda4f470900a: Layer already exists
270a1170e7e3: Layer already exists
latest: digest: sha256:16977c2462a3a4c0e23126070614ffed2f2763e78e575b2355b51039bca0bf size: 947
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // script
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS

Pipeline script

Script ?

```

4  agent any
5
6  environment {
7      DOCKER_IMAGE = 'mohamedesmael/jenkins_lab1'
8      DOCKER_TAG    = 'v100'
9      REPO_URL      = 'https://github.com/mohamedesmael10/Jenkins_lab2.git'
10     BRANCH        = 'main'
11 }
12
13 stages {
14     stage('Build and Push Docker Image') {
15         steps {
16             script {
17                 buildAndPushDocker(env.DOCKER_IMAGE, env.DOCKER_TAG, env.REPO_URL, env.BRANCH)
18             }
19         }
20     }
21 }

```

☒ Use Groovy Sandbox ?

```

1 // vars/buildAndPushDocker.groovy
2
3 def call(String imageName, String tag, String repoUrl, String branch) {
4     stage('Checkout') {
5         checkout([class: 'GitSCM',
6             branches: [[name: branch]],
7             userRemoteConfigs: [[
8                 url: repoUrl,
9                 credentialsId: 'mohamedesmael10'
10            ]]]
11     )
12 }
13
14 stage('Docker Login') {
15     withCredentials([usernamePassword(
16         credentialsId: 'mohamedesmael_dockerhub',
17         usernameVariable: 'DOCKER_USER',
18         passwordVariable: 'DOCKER_PASS'
19     )]) {
20         sh "echo \"\$DOCKER_PASS\" | docker login -u \"\$DOCKER_USER\" --password-stdin"
21     }
22 }
23
24 stage('Build Image') {
25     sh "docker build -t \$imageName:\$tag ."
26 }
27
28 stage('Tag Image') {
29     sh "docker tag \$imageName:\$tag \$imageName:latest"
30 }
31
32 stage('Push Image') {

```

latest

Last pushed 19 minutes by mohamedesmael

docker pull mohamedesmael/jenkins_lab1:latest

Copy

Digest	OS/ARCH	Last pull	Compressed size
16977c2462a3	linux/amd64	less than 1 day	48.84 MB

v100

Last pushed 19 minutes by mohamedesmael

docker pull mohamedesmael/jenkins_lab1:v100

Copy

Digest	OS/ARCH	Last pull	Compressed size
16977c2462a3	linux/amd64	less than 1 day	48.84 MB