Day-2 DevOps-Training

step-by-step guide to setting up a simple Python "Hello, Docker!" Flask application using Docker and Docker Compose.

---

1. Install Docker

First, install Docker to get the Docker engine running on your system:

```
sudo apt install -y docker.io
```

- **Explanation:** Installs Docker on your system using the apt package manager. The -y flag auto-confirms any prompts.

---

2. Start and Enable Docker Service

Start the Docker service and enable it to start automatically at boot time:

```
sudo systemctl start docker
```

```
sudo systemctl enable docker
```

- **Explanation:** The start command starts the Docker daemon, and enable ensures Docker runs on startup.

---

3. Verify Docker Installation

Verify that Docker was installed correctly by checking its version:

```
docker --version
```

- **Explanation:** Displays the installed Docker version to confirm the installation.

---

4. Install Docker Compose

Now, install Docker Compose, a tool to define and manage multi-container Docker applications:

```
sudo curl -L "https://github.com/docker/compose/releases/latest/download/docker-compose-$(uname -s)-$(uname -m)" -o /usr/local/bin/docker-compose
```

```
sudo chmod +x /usr/local/bin/docker-compose
```

- **Explanation:** The first command downloads the latest Docker Compose binary, and the second command makes it executable.

---

5. Verify Docker Compose Installation

Check the installed version of Docker Compose:

```
docker-compose --version
```

- **Explanation:** Displays the installed Docker Compose version to verify the installation.

---

6. Create Project Directory

Create a directory for your project and navigate into it:

```
mkdir ~/docker-python-app
```

```
cd ~/docker-python-app
```

- **Explanation:** Creates a directory for your project and navigates into it.

---

7. Create the app.py file

Create a Python file app.py for the Flask application:

```
nano app.py
```

Paste the following Flask application code:

```
from flask import Flask

app = Flask(__name__)

@app.route('/')
def hello_world():
    return 'Hello, world Running inside the docker!'

if __name__ == '__main__':
    app.run(host='0.0.0.0', port=5000)
```

- **Explanation:** A simple Flask app with one route (/) that returns a greeting message. The Flask server listens on all interfaces (0.0.0.0) and port 5000.

---

8. Create requirements.txt

Create a requirements.txt file to list Python dependencies:

```
nano requirements.txt
```

Add the following content:

```
flask
```

- **Explanation:** Lists the Flask library as the required dependency for your project.

---

9. Install pip (if not already installed)

Ensure pip is installed to handle Python package installations:

```
sudo apt update
```

```
sudo apt install python3-pip
```

- **Explanation:** Updates the package list and installs pip to handle Python packages.

---

10. Create Dockerfile

Create a Dockerfile that defines how the Docker image should be built:

```
nano Dockerfile
```

Add the following content:

```
# Use the official Python image from Docker Hub
FROM python:3.9-slim

# Set the working directory inside the container
WORKDIR /app

# Copy the current directory contents into the container at /app
COPY . /app

# Install any needed packages specified in requirements.txt
RUN pip install --no-cache-dir -r requirements.txt

# Make port 5000 available to the world outside the container
EXPOSE 5000

# Define the environment variable for Flask to run in production mode
ENV FLASK_ENV=production
```

```
# Run app.py when the container launches
CMD ["python", "app.py"]
```

- **Explanation:** This Dockerfile defines the Python environment, installs dependencies, exposes port 5000, and starts the Flask app inside the container.

---

11. Create docker-compose.yml

Create a docker-compose.yml file to manage the application's services:

```
nano docker-compose.yml
```

Add the following content:

```
version: '3.8'
services:
  web:
    build: .
    ports:
      - "5000:5000"
    environment:
      - FLASK_ENV=development
    volumes:
      - .:/app
    restart: always
```

- **Explanation:** This Compose file:
  - Defines the web service.
  - Builds the image from the current directory.
  - Maps port 5000 from the host to the container.
  - Mounts the current directory (.) into the container to enable live code reloading.
  - Restarts the container if it crashes.

---

12. Add User to Docker Group (if needed)

To avoid using sudo with Docker commands, add your user to the Docker group:

```
sudo usermod -aG docker $USER
```

```
newgrp docker
```

- **Explanation:** The first command adds your user to the Docker group, and the second command applies the changes to your current session.

---

13. Build and Run the Application

Now, you can build and start the Flask app container using Docker Compose:

```
docker-compose up --build
```

- **Explanation:** This command builds the Docker image and starts the container based on the docker-compose.yml configuration. The --build flag forces a rebuild of the Docker image.

---

14. Access the Application

Once the container is running, open your browser and navigate to:

```
http://localhost:5000
```

You should see the message: **"Hello, Docker Python App!"**

Summary of Commands

1. Install Docker:
2. sudo apt install -y docker.io
3. Start and enable Docker service:
4. sudo systemctl start docker
5. sudo systemctl enable docker
6. Install Docker Compose:
7. sudo curl -L "https://github.com/docker/compose/releases/latest/download/docker-compose-$(uname -s)-$(uname -m)" -o /usr/local/bin/docker-compose
8. sudo chmod +x /usr/local/bin/docker-compose
9. Create project directory:
10. mkdir ~/docker-python-app
11. cd ~/docker-python-app
12. Create app.py with Flask code.
13. Create requirements.txt with flask.

14. Install pip (if needed):

15. sudo apt update

16. sudo apt install python3-pip

17. Create Dockerfile with the configuration.

18. Create docker-compose.yml with service definition.

19. Add your user to the Docker group (if necessary):

20. sudo usermod -aG docker $USER

21. newgrp docker

22. Build and run the app:

23. docker-compose up --build

Now your "Hello, Docker!" Flask app should be running inside a Docker container, accessible at http://localhost:5000.

```
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git config --global user.name "viratpk18"
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git commit -m "Jenkin-Docker Created"
[main 395d204] Jenkin-Docker Created
 4 files changed, 38 insertions(+)
 create mode 100644 Dockerfile
 create mode 100644 app.py
 create mode 100644 docker-compose.yml
 create mode 100644 requirements.txt
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git branch -M main
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git remote add origin https://github.com/viratpk18/Jenkins-Docker
error: remote origin already exists.
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git push -u origin main
Username for 'https://github.com': viratpk18
Password for 'https://viratpk18@github.com':
remote: Support for password authentication was removed on August 13, 2021.
remote: Please see https://docs.github.com/get-started/getting-started-with-git/about-remote-repositories#cloning-with-https-urls for information on currently recommended m
odes of authentication.
fatal: Authentication failed for 'https://github.com/viratpk18/Jenkins-Docker/'
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git push -u origin main
Username for 'https://github.com': viratpk18
Password for 'https://viratpk18@github.com':
remote: Support for password authentication was removed on August 13, 2021.
remote: Please see https://docs.github.com/get-started/getting-started-with-git/about-remote-repositories#cloning-with-https-urls for information on currently recommended m
odes of authentication.
fatal: Authentication failed for 'https://github.com/viratpk18/Jenkins-Docker/'
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git push -u origin main
Username for 'https://github.com': viratpk18
Password for 'https://viratpk18@github.com':
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git push https://viratpk18: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@github.com/viratpk18/https://githu
b.com/viratpk18/Jenkins-Docker.git
remote: Not Found
fatal: repository 'https://github.com/viratpk18/https://github.com/viratpk18/Jenkins-Docker.git/' not found
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git push https://viratpk18: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@github.com/viratpk18/Jenkins-Docke
r.git
Enumerating objects: 7, done.
Counting objects: 100% (7/7), done.
Delta compression using up to 12 threads
Compressing objects: 100% (5/5), done.
Writing objects: 100% (6/6), 883 bytes | 58.00 KiB/s, done.
Total 6 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/viratpk18/Jenkins-Docker.git
   905c366..395d204  main -> main
```

```
C:\Users\Praveenkumar>wsl.exe -d Ubuntu
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ sudo apt update
[sudo] password for pk:
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Get:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Ign:4 https://pkg.jenkins.io/debianstable binary/ InRelease
Hit:5 https://ppa.launchpadcontent.net/openjdk-r/ppa/ubuntu noble InRelease
Err:6 https://pkg.jenkins.io/debianstable binary/ Release
  404  Not Found [IP: 151.101.158.133 443]
Hit:7 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [921 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1040 kB]
Reading package lists... Done
E: The repository 'https://pkg.jenkins.io/debianstable binary/ Release' does not have a Release file.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ sudo apt install -y docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base iptables libip4tc2 libip6tc2 libnetfilter-conntrack3
  libnfnetlink0 libnftables1 libnftnl11 nftables pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools btrfs-progs cgroupfs-mount | cgroup-lite debootstrap docker-buildx docker-compose-v2 docker-doc
  rinse zfs-fuse | zfsutils firewalld
The following NEW packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base docker.io iptables libip4tc2 libip6tc2 libnetfilter-conntrack3
  libnfnetlink0 libnftables1 libnftnl11 nftables pigz runc ubuntu-fan
0 upgraded, 16 newly installed, 0 to remove and 0 not upgraded.
Need to get 79.6 MB of archives.
After this operation, 306 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/universe amd64 pigz amd64 2.8-1 [65.6 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/main amd64 libip4tc2 amd64 1.8.10-3ubuntu2 [23.3 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble/main amd64 libip6tc2 amd64 1.8.10-3ubuntu2 [23.7 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble/main amd64 libnfnetlink0 amd64 1.0.2-2build1 [14.8 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble/main amd64 libnetfilter-conntrack3 amd64 1.0.9-6build1 [45.2 kB]
```

```
update-alternatives: using /usr/sbin/arptables-nft to provide /usr/sbin/arptables (arptables) in auto mode
update-alternatives: using /usr/sbin/ebtables-nft to provide /usr/sbin/ebtables (ebtables) in auto mode
Setting up docker.io (26.1.3-0ubuntu1~24.04.1) ...
info: Selecting GID from range 100 to 999 ...
info: Adding group `docker' (GID 109) ...
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 dnsmasq-base (2.90-2build2) ...
Setting up ubuntu-fan (0.12.16) ...
Created symlink /etc/systemd/system/multi-user.target.wants/ubuntu-fan.service → /usr/lib/systemd/system/ubuntu-fan.service.
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for dbus (1.14.10-4ubuntu4.1) ...
Processing triggers for libc-bin (2.39-0ubuntu8.4) ...
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ sudo systemctl enable docker
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ sudo systemctl start docker
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ docker --version
Docker version 26.1.3, build 26.1.3-0ubuntu1~24.04.1
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ sudo curl -L "https://github.com/docker/compose/releases/latest/download/docker-compose-$(uname -s)-$(uname -m)"
-o /usr/local/bin/docker-compose
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
100 71.4M  100 71.4M    0     0  1595k      0  0:00:45  0:00:45 --:--:-- 2230k
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ sudo chmod +x /usr/local/bin/docker-compose
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ docker-compose --version
Docker Compose version v2.34.0
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ mkdir docker-python
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ ls
 AppData            Microsoft                                                                        Postman           docker-python
'Application Data'  Music                                                                            PrintHood         eclipse
 Contacts          'My Documents'                                                                    Recent            eclipse-workspace
 Cookies            NTUSER.DAT                                                                      'Saved Games'      node_modules
 Documents          NTUSER.DAT{c7b182e0-be13-11ef-9689-8f535641f038}.TM.blf                          Searches          ntuser.dat.LOG1
 Downloads          NTUSER.DAT{c7b182e0-be13-11ef-9689-8f535641f038}.TMContainer00000000000000000001.regtrans-ms   SendTo   ntuser.dat.LOG2
 FakeNewsDetection  NTUSER.DAT{c7b182e0-be13-11ef-9689-8f535641f038}.TMContainer00000000000000000002.regtrans-ms  'Start Menu'  ntuser.ini
 Favorites          NetHood                                                                          Templates         package-lock.json
 Links              OneDrive                                                                         Videos            package.json
'Local Settings'    Oracle                                                                          'VirtualBox VMs'
pk@PraveenKumar:/mnt/c/Users/Praveenkumar$ cd docker-python
```

```
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git add .
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git commit -m "Jenkinsfile created"
[main c93ce10] Jenkinsfile created
 1 file changed, 67 insertions(+)
 create mode 100644 Jenkinsfile
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git push
Username for 'https://github.com': viratpk18
Password for 'https://viratpk18@github.com':
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ git push https://viratpk18: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@github.com/viratpk18/Jenkins-Docke
r.git
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 990 bytes | 61.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/viratpk18/Jenkins-Docker.git
   395d204..c93ce10  main -> main
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ sudo systemctl restart jenkins
[sudo] password for pk:
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ sudo systemctl enable jenkins
Synchronizing state of jenkins.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable jenkins
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ sudo usermod -aG docker jenkins
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ sudo systemctl restart jenkins
pk@PraveenKumar:/mnt/c/Windows/System32/docker-python/Jenkins-Docker$ sudo systemctl restart docker
```

```
nisanth@LAPTOP-G3U57BJM:~/docker-app$ sudo docker ps
CONTAINER ID   IMAGE                  COMMAND           CREATED        STATUS          PORTS                                       NAMES
a9a9d9673cb3   docker-python-app-web  "python app.py"   14 hours ago   Up 26 minutes   0.0.0.0:5000->5000/tcp, :::5000->5000/tcp   docker-python-app-web-1
```

Jenkins Pipeline Through Git Token - Setup Procedure

Step 1: Generate a Git Personal Access Token

Before configuring the Jenkins pipeline, you need to generate a **Personal Access Token (PAT)** from your Git service.

GitHub (Example)

1. **Log in to GitHub** and navigate to your profile.
2. Go to **Settings** > **Developer Settings** > **Personal Access Tokens**.
3. Click **Generate New Token**.
4. Select the necessary permissions for the token. For example, to clone repositories, select:
    - repo (full control of private repositories)
    - read:org (for organization repository access)
5. Generate the token and **copy it**. This token will act as the password when Jenkins connects to GitHub.

GitLab (Example)

1. **Log in to GitLab** and go to **Profile Settings** > **Access Tokens**.
2. Generate a new token with appropriate scopes (e.g., read_repository).
3. **Save the token** to use in Jenkins.

Bitbucket (Example)

1. **Log in to Bitbucket** and go to **Personal Settings** > **App Passwords**.
2. Create an app password with necessary permissions (like repository read).
3. **Save the password** to use in Jenkins.

Step 2: Store Git Token in Jenkins Credentials

Once you've generated the Git token, the next step is to store it securely in Jenkins.

1. **Log in to Jenkins** and navigate to the Jenkins dashboard.

2. In the left menu, click on **Manage Jenkins**.
3. Click on **Manage Credentials**.
4. Select the appropriate **scope** (e.g., (Global)).
5. Click on **Add Credentials**.
6. In the **Kind** dropdown, select **Username with password**.
7. In the **Username** field, enter your Git username (e.g., your-username for GitHub).
8. In the **Password** field, paste the **Git token** you generated.
9. Optionally, give it an ID (e.g., git-token-jenkins).
10. Click **OK** to save the credentials.

Step 3: Configure Jenkins Pipeline

Now that the Git token is securely stored in Jenkins, you can configure a Jenkins pipeline to use it for Git interactions.

Example Pipeline Script (Declarative Pipeline)

You'll now set up a pipeline that uses Git for the source code. Here's an example using a declarative pipeline.

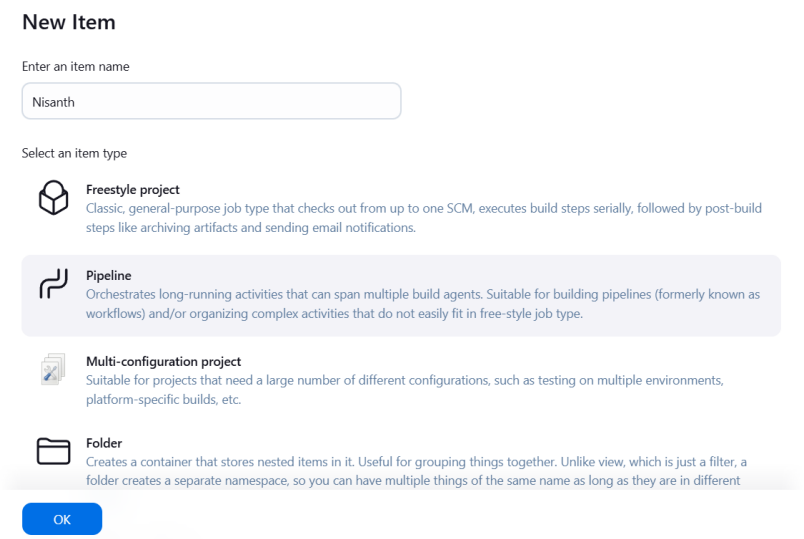
1. **Create a New Pipeline Job**:
    - Go to Jenkins Dashboard.
    - Click **New Item**, select **Pipeline**, and name your pipeline (e.g., Git-Pipeline).
    - Click **OK**.
2. **Configure the Pipeline**:
    - In the pipeline configuration, scroll to the **Pipeline** section.
    - Choose **Pipeline script from SCM**.
    - Set the **SCM** dropdown to **Git**.
    - In the **Repository URL** field, enter your repository URL (e.g., https://github.com/yourusername/your-repository.git).
    - Select **Credentials**. Choose the credentials you created earlier (e.g., git-token-jenkins).

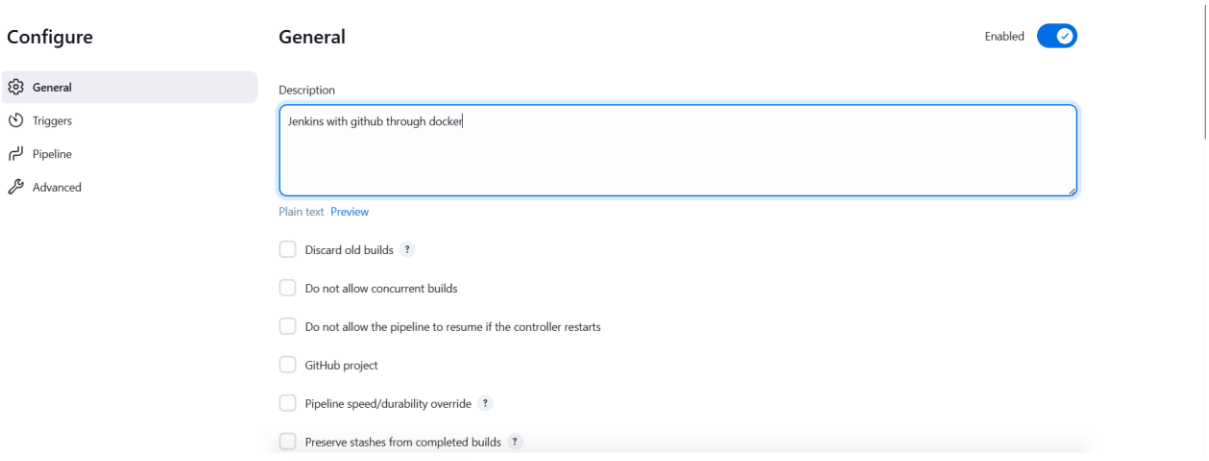
Step 4: Run the Jenkins Pipeline

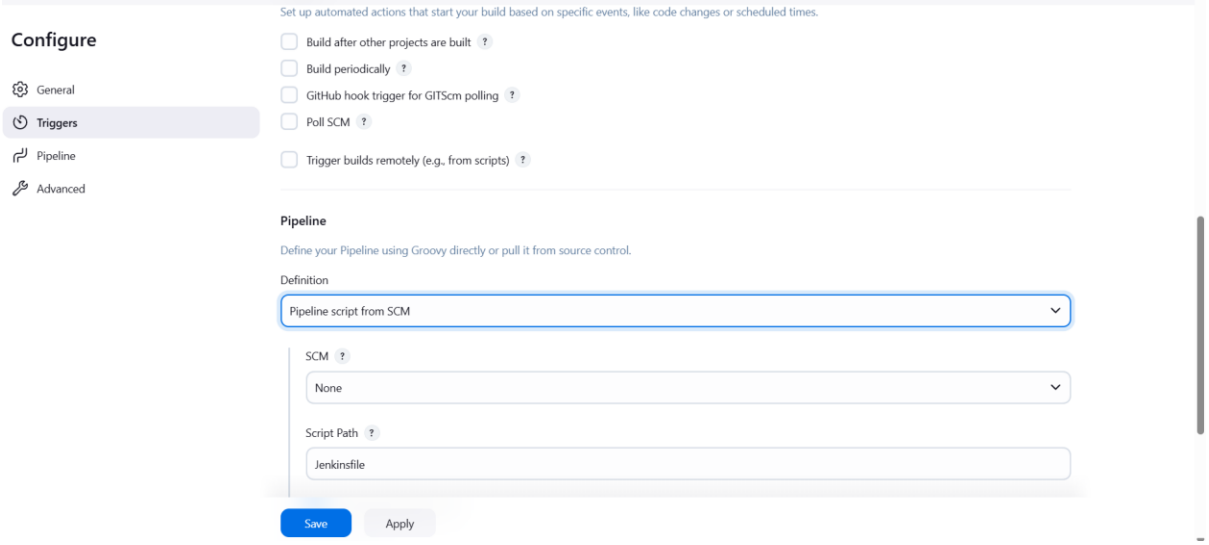
- After configuring the pipeline, click **Save** and then **Build Now** to run the pipeline.
- Jenkins will use the credentials you provided to authenticate with Git, clone the repository, and run the pipeline steps.

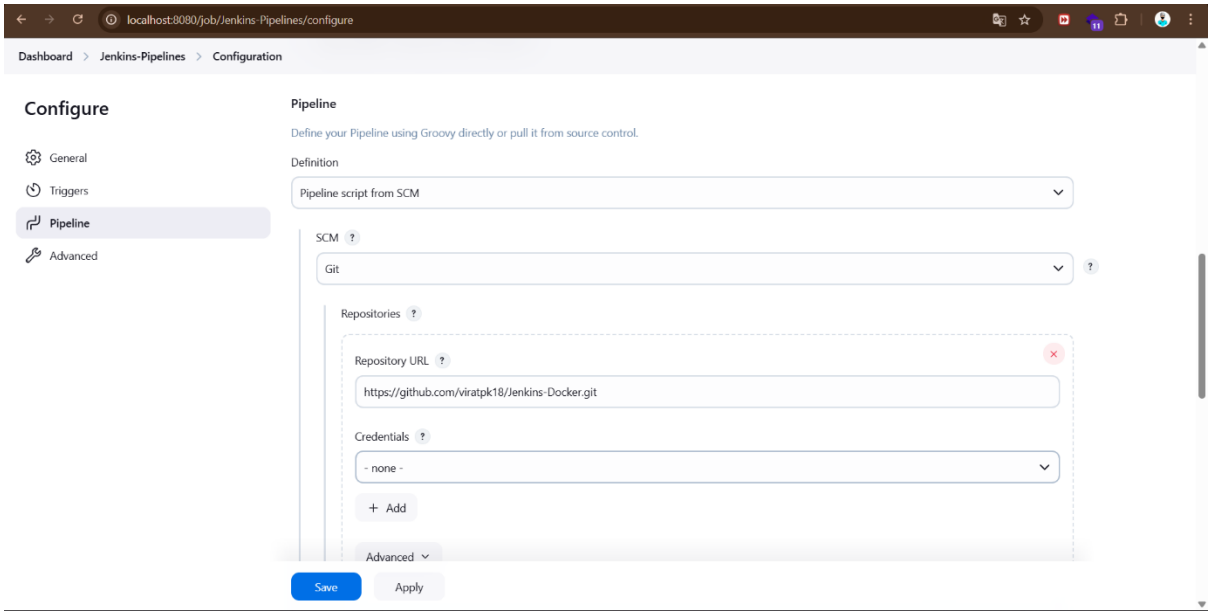
Step 5: Monitor and Troubleshoot

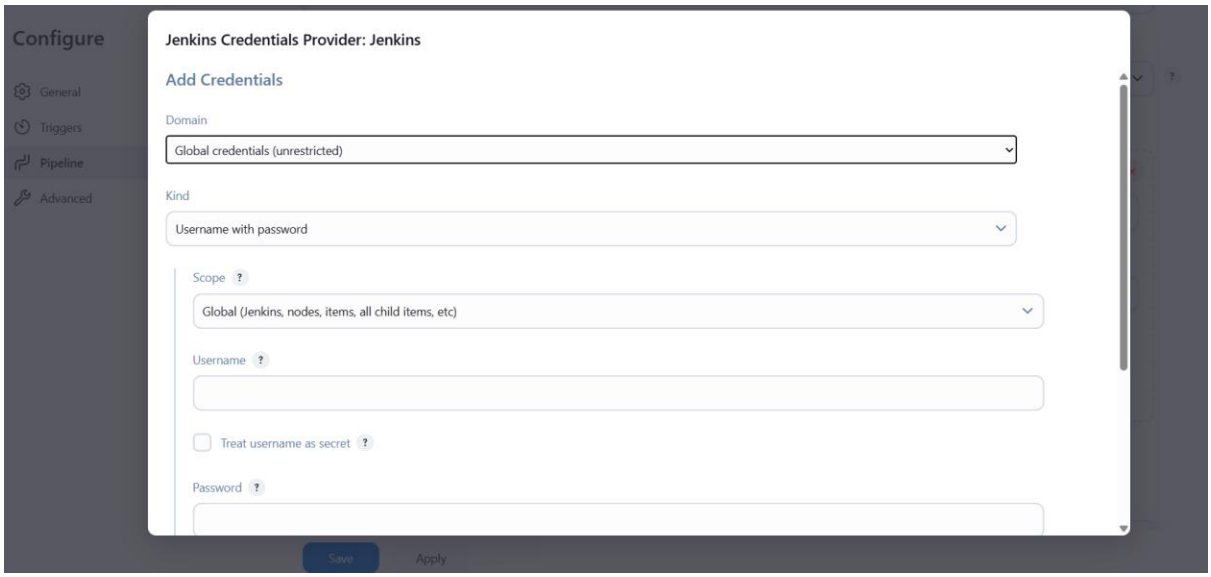
- If the pipeline fails, check the Jenkins job's **Console Output** for debugging information. Common issues can be due to incorrect credentials, Git URL, or permission issues.

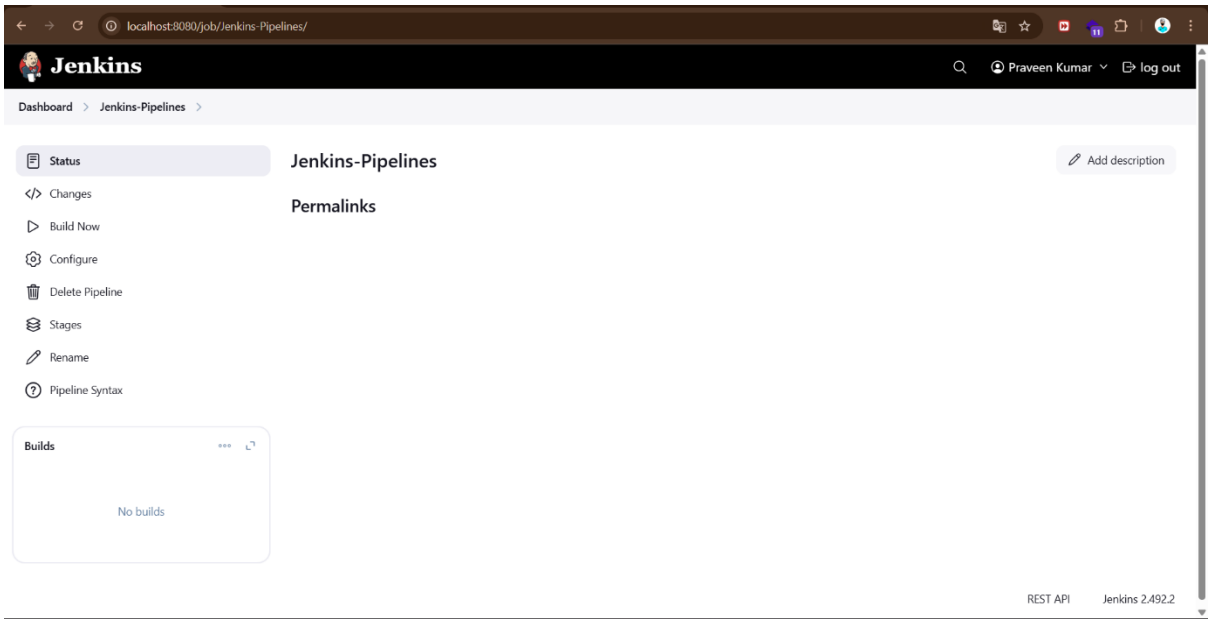


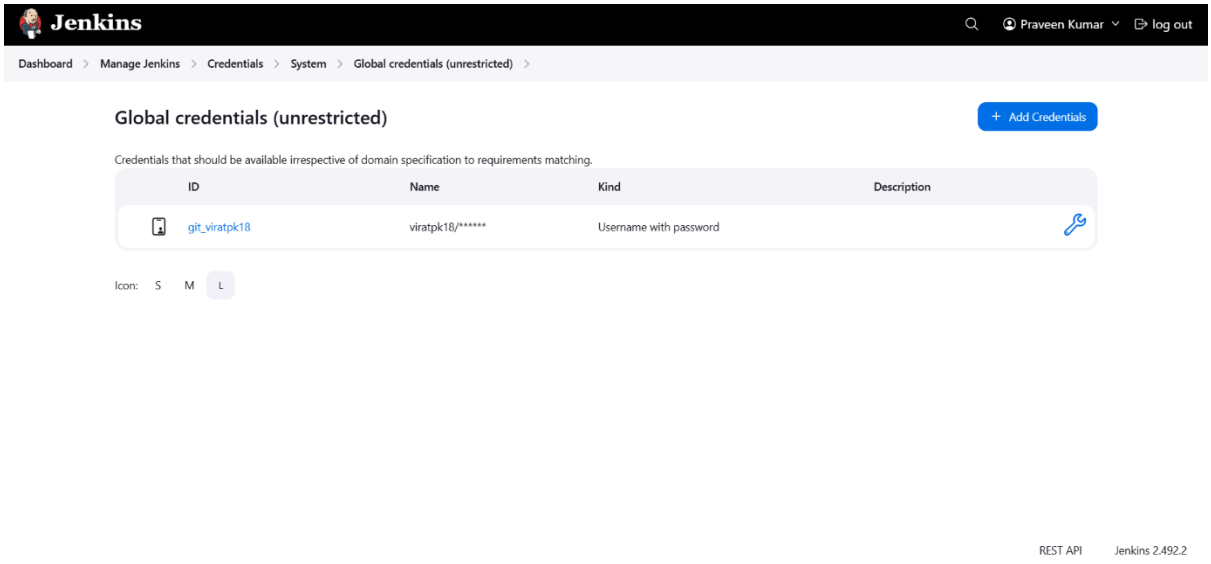





localhost:8080/job/Jenkins-Pipelines/configure
Dashboard > Jenkins-Pipelines > Configuration
Configure
General
Triggers
Pipeline
Advanced
Pipeline
Define your Pipeline using Groovy directly or pull it from source control.
Definition
Pipeline script from SCM
SCM
Git
Repositories
Repository URL
https://github.com/viratpk18/Jenkins-Docker.git
Credentials
- none -
+ Add
Advanced
Save
Apply


Configure
General
Triggers
Pipeline
Advanced
Jenkins Credentials Provider: Jenkins
Add Credentials
Domain
Global credentials (unrestricted)
Kind
Username with password
Scope
Global (Jenkins, nodes, items, all child items, etc)
Username
Treat username as secret
Password
Save
Apply


localhost:8080/job/Jenkins-Pipelines/
Jenkins
Praveen Kumar
log out
Dashboard > Jenkins-Pipelines >
Status
Changes
Build Now
Configure
Delete Pipeline
Stages
Rename
Pipeline Syntax
Builds
No builds
Jenkins-Pipelines
Add description
Permalinks
REST API
Jenkins 2.492.2



Jenkins Pipeline for Dockerized Application Deployment

This document provides a step-by-step guide on how the Jenkins pipeline automates the process of fetching the code from GitHub, building a Docker image, pushing it to a container registry, and deploying the application in a running Docker container.

Pipeline Overview

The pipeline follows these key steps:

1. **Checkout Code** - Fetch the latest code from the GitHub repository.
2. **Build Docker Image** - Create a Docker image for the application.
3. **Login to Docker Registry** - Authenticate to the container registry.
4. **Push to Container Registry** - Upload the built image to a Docker registry.
5. **Stop & Remove Existing Container** - Stop and remove any existing container with the same name.
6. **Run Docker Container** - Deploy a new container with the updated image.
7. **Post Actions** - Handle success or failure messages.

Step-by-Step Execution

1. Checkout Code

- Uses Jenkins credentials to authenticate and fetch the latest code from GitHub.

- Ensures secure access using stored credentials instead of exposing raw tokens.

Implementation:

```
stage('Checkout Code') {
    steps {
        withCredentials([usernamePassword(credentialsId: 'github-nisanthg1010', usernameVariable: 'GIT_USER', passwordVariable: 'GIT_TOKEN')]) {
            git url: "https://$GIT_USER:$GIT_TOKEN@github.com/nisanthg1010/Devops_Nisanth.git", branch: 'main'
        }
    }
}
```

2. Build Docker Image

- Builds the Docker image using the Dockerfile present in the repository.
- Tags the image with the latest version.

Implementation:

```
stage('Build Docker Image') {
    steps {
        sh 'docker build -t $DOCKER_IMAGE .'
    }
}
```

3. Login to Docker Registry

- Uses stored Jenkins credentials to log in securely to the Docker registry.
- Prevents exposing login credentials in the script.

Implementation:

```
stage('Login to Docker Registry') {
    steps {
        withCredentials([usernamePassword(credentialsId: 'docker_nisanth', usernameVariable: 'DOCKER_USER', passwordVariable: 'DOCKER_PASS')]) {
            sh 'echo $DOCKER_PASS | docker login -u $DOCKER_USER --password-stdin'
        }
```

```
    }
}
```

4. Push to Container Registry

- Pushes the newly built Docker image to the specified container registry.
- Ensures the latest version of the application is stored and accessible.

Implementation:

```
stage('Push to Container Registry') {
    steps {
        sh 'docker push $DOCKER_IMAGE'
    }
}
```

5. Stop & Remove Existing Container

- Stops and removes the running container if it exists.
- Prevents conflicts when deploying the new version.

Implementation:

```
stage('Stop & Remove Existing Container') {
    steps {
        script {
            sh '''
            if [ "$(docker ps -aq -f name=$CONTAINER_NAME)" ]; then
                docker stop $CONTAINER_NAME || true
                docker rm $CONTAINER_NAME || true
            fi
            '''
        }
    }
}
```

6. Run Docker Container

- Starts a new Docker container with the updated image.
- Maps the internal application port 5000 to 5001 on the host machine.

Implementation:

```
stage('Run Docker Container') {
    steps {
        sh 'docker run -d -p 5001:5000 --name $CONTAINER_NAME $DOCKER_IMAGE'
    }
}
```

7. Post Actions

- If successful, displays a success message.
- If failed, displays an error message.

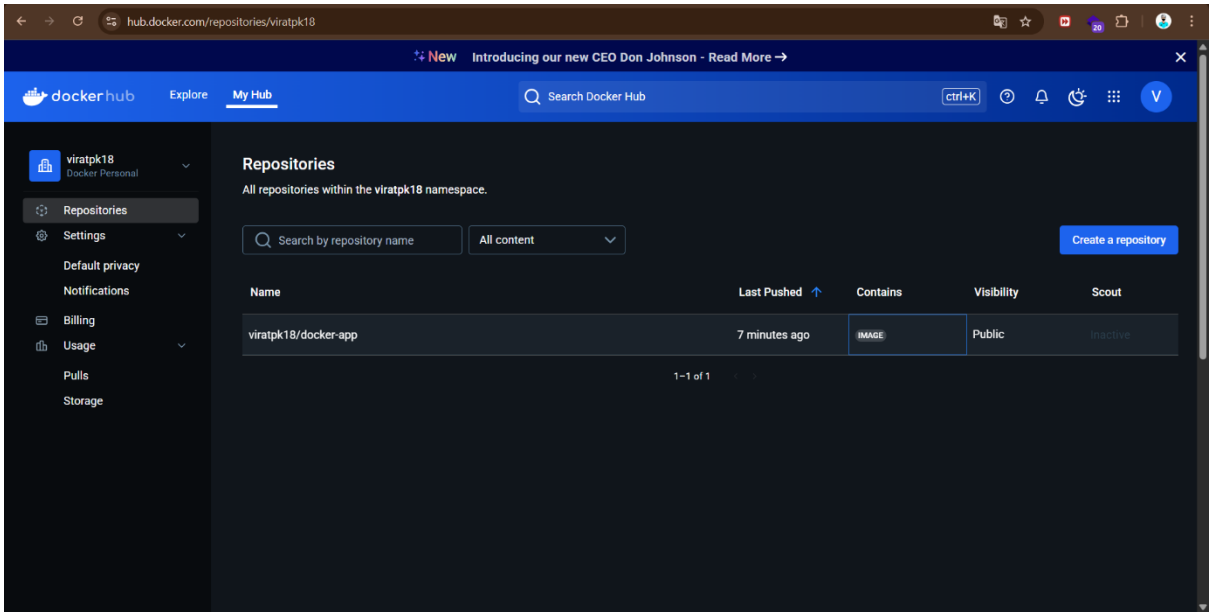
Implementation:

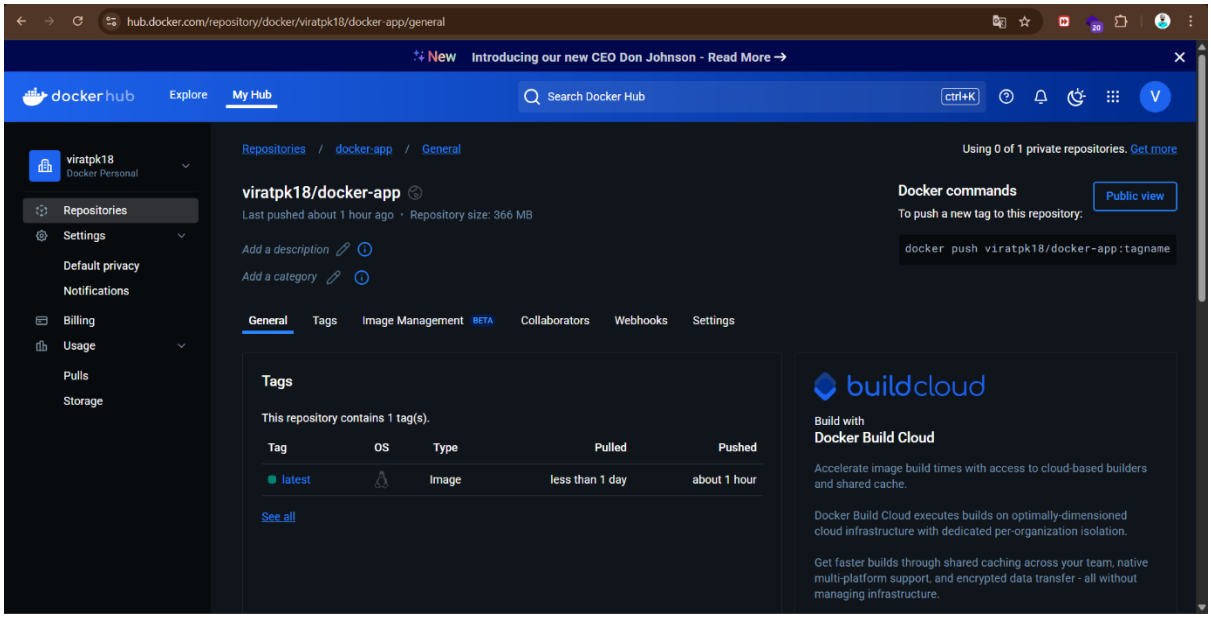
```
post {
    success {
        echo "Build, push, and container execution successful!"
    }
    failure {
        echo "Build or container execution failed."
    }
}
```

Conclusion

This Jenkins pipeline automates the entire process of fetching the code, building a Docker image, pushing it to a registry, and deploying the container. It ensures a seamless CI/CD workflow, making application updates smooth and efficient. 🚀

Hello, Docker Python App!


hub.docker.com/repositories/viratpk18
New Introducing our new CEO Don Johnson - Read More →
docker hub
Explore
My Hub
Search Docker Hub
ctrl+K
viratpk18
Docker Personal
Repositories
Settings
Default privacy
Notifications
Billing
Usage
Pulls
Storage
Repositories
All repositories within the viratpk18 namespace.
Search by repository name
All content
Create a repository
Name
Last Pushed
Contains
Visibility
Scout
viratpk18/docker-app
7 minutes ago
IMAGE
Public
Inactive
1–1 of 1


hub.docker.com/repository/docker/viratpk18/docker-app/general
New Introducing our new CEO Don Johnson - Read More →
docker hub
Explore
My Hub
Search Docker Hub
ctrl+K
viratpk18
Docker Personal
Repositories
Settings
Default privacy
Notifications
Billing
Usage
Pulls
Storage
Repositories / docker-app / General
Using 0 of 1 private repositories. Get more
viratpk18/docker-app
Last pushed about 1 hour ago • Repository size: 366 MB
Add a description
Add a category
Docker commands
Public view
To push a new tag to this repository:
docker push viratpk18/docker-app:tagname
General
Tags
Image Management BETA
Collaborators
Webhooks
Settings
Tags
This repository contains 1 tag(s).
Tag
OS
Type
Pulled
Pushed
latest
Image
less than 1 day
about 1 hour
See all
buildcloud
Build with
Docker Build Cloud
Accelerate image build times with access to cloud-based builders and shared cache.
Docker Build Cloud executes builds on optimally-dimensioned cloud infrastructure with dedicated per-organization isolation.
Get faster builds through shared caching across your team, native multi-platform support, and encrypted data transfer - all without managing infrastructure.