

Devops Day 2

Docker Installation & Components

Docker Image:

A packaged application with its dependencies.

Commands: `docker images`, `docker pull <image_name>`, `docker rmi <image_id>`

Docker Container:

A running instance of a Docker Image.

Commands: `docker run -it <image_name>`, `docker ps`, `docker stop <container_id>`, `docker rm <container_id>`

Dockerfile:

A script to build a Docker Image.

Example: A Node.js app using FROM node:14, COPY, RUN npm install, and CMD ["node", "server.js"]

Docker Volumes:

Used for persistent storage.

Commands: `docker volume create <volume_name>`, `docker volume ls`, `docker run -v <volume>:/path -it ubuntu`

Example Project: Python "Hello, World!" in Docker

Install Docker and Docker Compose.

Create a Flask application (app.py).

Write a Dockerfile for packaging the app.

Define services in docker-compose.yml.

Build and run using `docker-compose build` and `docker-compose up -d`.

Test at `http://localhost:5000`.

Jenkins-Github-Docker-App-Demo

GitHub Setup

Generate a Personal Access Token (PAT) for GitHub access.

Upload the Jenkinsfile to the GitHub repository.

Use git fetch, git pull, git status, git add, git commit, and git push to manage repository updates.

If an error occurs during git push, use:

```
git push https://<username>:<PAT>@github.com/<user-name>/<repo-name>.git
```

Jenkins Configuration

```
groups Jenkins
```

```
sudo usermod -aG docker Jenkins
```

```
sudo systemctl restart Jenkins
```

DockerHub Integration

- Ensure correct Docker Hub username and credentials ID are configured in Jenkins.
- Example placeholders:
 1. docker-hub-credentials: Jenkins credential ID for Docker Hub.
 2. github-padma: Jenkins credential ID for GitHub.
 3. PadmavathyNarayanan: GitHub username.
 4. jenkins-docker-demo: GitHub repository name

Final Deployment

1. After a successful build, the Docker image is pushed to DockerHub.
2. The image can be accessed at
`https://hub.docker.com/repository/docker/<user-name>`

Screenshots

```
connectivity to remote repository. Please see https://docs.github.com/setting-up-your-github-accounting
Your name and email address were configured automatically based
on your username and hostname. Please check that they are accurate.
You can suppress this message by setting them explicitly. Run the
following command and follow the instructions in your editor to edit
your configuration file:

    git config --global --edit

After doing this, you may fix the identity used for this commit with:

    git commit --amend --reset-author

4 files changed, 34 insertions(+)
 create mode 100644 Dockerfile
 create mode 100644 app.py
 create mode 100644 docker-compose.yml
 create mode 100644 requirements.txt
vboxuser@Ubuntu:~/docker-python-app/Devops_$ git push
Username for 'https://github.com': sivakulanthaisamy
Password for 'https://sivakulanthaisamy@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-repo
r information on currently recommended modes of authentication.
fatal: Authentication failed for 'https://github.com/sivakulanthaisamy/Devops_/'
vboxuser@Ubuntu:~/docker-python-app/Devops_$ git push
Username for 'https://github.com': git push https://sivakulanthaisamy:https://drive.google.com/dr
^C
vboxuser@Ubuntu:~/docker-python-app/Devops_$ git push https://sivakulanthaisamy:ghp_vJGPYaPvqS37X
sivakulanthaisamy/Devops_
Enumerating objects: 7, done.
Counting objects: 100% (7/7), done.
Compressing objects: 100% (5/5), done.
Writing objects: 100% (6/6), 919 bytes | 919.00 KiB/s, done.
Total 6 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/sivakulanthaisamy/Devops_
 5341f03..c27de0e  main -> main
vboxuser@Ubuntu:~/docker-python-app/Devops_$ █

vboxuser@Ubuntu:~/docker-python-app$ sudo docker build -t test .
[sudo] password for vboxuser:
Sorry, try again.
[sudo] password for vboxuser:
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
            Install the buildx component to build images with BuildKit:
            https://docs.docker.com/go/buildx/

Sending build context to Docker daemon   5.12kB
Step 1/7 : FROM python:3.11
3.11: Pulling from library/python
7cd785773db4: Already exists
091eb8249475: Already exists
255774e0027b: Already exists
353e14e5cc47: Already exists
963091970bc2: Already exists
e7235c43f7e3: Already exists
7f221c50e407: Already exists
Digest: sha256:ebfa8696e47a68cffe5bb31e370a93ce57c01bc753f246ceaaef72801d1661351
Status: Downloaded newer image for python:3.11
--> 18c0f2265fd9
Step 2/7 : WORKDIR /app
--> Running in c91cda36c106
--> Removed intermediate container c91cda36c106
--> 629d2b6c177a
Step 3/7 : COPY requirements.txt .
--> 99bd4d5acee6
Step 4/7 : RUN pip install --no-cache-dir -r requirements.txt
--> Running in 10e50cf5de7f
Collecting flask (from -r requirements.txt (line 1))
  Downloading flask-3.1.0-py3-none-any.whl.metadata (2.7 kB)
Collecting Werkzeug>=3.1 (from flask->-r requirements.txt (line 1))
  Downloading werkzeug-3.1.3-py3-none-any.whl.metadata (3.7 kB)
Collecting Jinja2>=3.1.2 (from flask->-r requirements.txt (line 1))
  Downloading jinja2-3.1.6-py3-none-any.whl.metadata (2.9 kB)
Collecting itsdangerous>=2.2 (from flask->-r requirements.txt (line 1))
  Downloading itsdangerous-2.2.0-py3-none-any.whl.metadata (1.9 kB)
```

```

vboxuser@Ubuntu:~/docker-python-app$ sudo docker-compose build
sudo docker-compose up -d
WARN[0000] /home/vboxuser/docker-python-app/docker-compose.yml: the attribute 'version' is obsolete, it will be ignored, please
ve it to avoid potential confusion
Compose can now delegate builds to bake for better performance.
To do so, set COMPOSE_BAKE=true.
[+] Building 139.6s (11/11) FINISHED                                docker:default
=> [app internal] load build definition from Dockerfile              0.1s
=> => transferring dockerfile: 453B                                0.0s
=> [app internal] load metadata for docker.io/library/python:3.11    2.3s
=> [app internal] load .dockerignore                                0.0s
=> => transferring context: 2B                                       0.0s
=> [app 1/5] FROM docker.io/library/python:3.11@sha256:ebfa8696e47a68c 119.9s
=> => resolve docker.io/library/python:3.11@sha256:ebfa8696e47a68cfebb3 0.2s
=> => sha256:18c0f2265fd94d4d17a0a465d6053f18dd19fdc89a9 6.18kB / 6.18kB 0.0s
=> => sha256:7cd785773db44407e20a679ce5439222e505475e 48.47MB / 48.47MB 34.8s
=> => sha256:091eb8249475f42de217265c501e0186f0a3ea749 24.01MB / 24.01MB 8.9s
=> => sha256:ebfa8696e47a68cfebb31e370a93ce57c01bc753f2 9.08kB / 9.08kB 0.0s
=> => sha256:53218a9ae69d30aedef8f402e9a544862d3aee80b1e 2.33kB / 2.33kB 0.0s
=> => sha256:255774e0027b72d2327719e78dbad5ad8c9cf446 64.40MB / 64.40MB 18.4s
=> => sha256:353e14e5cc47664fba714a7da288001d90427c 211.35MB / 211.35MB 90.2s
=> => sha256:963091970bc2ac7e8b231ef98df8c29a8cb44ac28a 6.16MB / 6.16MB 22.4s
=> => sha256:e7235c43f7e31b18eb2e528d9c2e6b7935d99979 24.31MB / 24.31MB 32.8s
=> => sha256:7f221c50e407e12492524c32985601495973634af6da33 250B / 250B 34.2s
=> => extracting sha256:7cd785773db44407e20a679ce5439222e505475eed5b99f 15.8s
=> => extracting sha256:091eb8249475f42de217265c501e0186f0a3ea7490ef7f5 10.4s
=> => extracting sha256:255774e0027b72d2327719e78dbad5ad8c9cf446d055e45 28.0s
=> => extracting sha256:353e14e5cc47664fba714a7da288001d90427c705494847 23.8s

vboxuser@Ubuntu:~/docker-python-app$ ls
app.py  Devops_  docker-compose.yml  Dockerfile  requirements.txt
vboxuser@Ubuntu:~/docker-python-app$ mv app.py docker-compose.yml Dockerfile requirement.txt Devops_
vboxuser@Ubuntu:~/docker-python-app$ mv app.py docker-compose.yml Dockerfile requirements.txt Devops_
mv: cannot stat 'app.py': No such file or directory
mv: cannot stat 'docker-compose.yml': No such file or directory
mv: cannot stat 'Dockerfile': No such file or directory
vboxuser@Ubuntu:~/docker-python-app$ ls
Devops_
vboxuser@Ubuntu:~/docker-python-app$ cd Devops_
vboxuser@Ubuntu:~/docker-python-app/Devops_$ ls
app.py  docker-compose.yml  Dockerfile  README.md  requirements.txt
vboxuser@Ubuntu:~/docker-python-app/Devops_$ cd ..
vboxuser@Ubuntu:~/docker-python-app$ cd Devops_
vboxuser@Ubuntu:~/docker-python-app/Devops_$ ls
app.py  docker-compose.yml  Dockerfile  README.md  requirements.txt
vboxuser@Ubuntu:~/docker-python-app/Devops_$ git add --all
vboxuser@Ubuntu:~/docker-python-app/Devops_$ git commit -m "first commit"
[main c27de0e] first commit
  Committer: vboxuser <vboxuser@Ubuntu.myguest.virtualbox.org>
  Your name and email address were configured automatically based
  on your username and hostname. Please check that they are accurate.
  You can suppress this message by setting them explicitly. Run the
  following command and follow the instructions in your editor to edit
  your configuration file:

      git config --global --edit

After doing this, you may fix the identity used for this commit with:

      git commit --amend --reset-author

4 files changed, 34 insertions(+)
create mode 100644 Dockerfile
create mode 100644 app.py
create mode 100644 docker-compose.yml
create mode 100644 requirements.txt

```

```

vboxuser@Ubuntu:~/docker-python-app$ nano app.py
vboxuser@Ubuntu:~/docker-python-app$ nano requirements.txt
vboxuser@Ubuntu:~/docker-python-app$ nano Dockerfile
vboxuser@Ubuntu:~/docker-python-app$ nano docker-compose.yml
vboxuser@Ubuntu:~/docker-python-app$ sudo docker-compose build
---> 81d5a890d1cb
Successfully built 81d5a890d1cb
Successfully tagged test:latest
vboxuser@Ubuntu:~/docker-python-app$ sudo docker run -p 5000:5000 test
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production
* 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
172.17.0.1 - - [19/Mar/2025 05:18:40] "GET / HTTP/1.1" 200 -
172.17.0.1 - - [19/Mar/2025 05:18:41] "GET /favicon.ico HTTP/1.1" 404 -
^Cvboxuser@Ubuntu:~/docker-python-app$ git status
fatal: not a git repository (or any of the parent directories): .git
vboxuser@Ubuntu:~/docker-python-app$ ^C
vboxuser@Ubuntu:~/docker-python-app$ git init
hint: Using 'master' as the name for the initial branch. This default branch name
hint: is subject to change. To configure the initial branch name to use in all
hint: of your new repositories, which will suppress this warning, call:
hint:
hint:   git config --global init.defaultBranch <name>
hint:
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this command:
hint:
hint:   git branch -m <name>
Initialized empty Git repository in /home/vboxuser/docker-python-app/.git/
vboxuser@Ubuntu:~/docker-python-app$ ls
app.py  docker-compose.yml  Dockerfile  requirements.txt
vboxuser@Ubuntu:~/docker-python-app$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)

```

✓ Console Output

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```
Started by user siva kulanthaisamy
Obtained Jenkinsfile from git https://github.com/sivakulanthaisamy/Devops_
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/Devops_Task2
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Checkout SCM)
[Pipeline] checkout (hide)
Selected Git installation does not exist. Using Default
The recommended git tool is: NONE
using credential git_101
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/Devops_Task2/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/sivakulanthaisamy/Devops_ # timeout=10
Fetching upstream changes from https://github.com/sivakulanthaisamy/Devops_
> git --version # timeout=10
> git --version # 'git version 2.34.1'
using GIT_ASKPASS to set credentials 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
> git fetch --tags --force --progress -- https://github.com/sivakulanthaisamy/Devops_ +refs/
```

[Dashboard](#) >[+ New Item](#)[Add description](#)[Build History](#)[All](#) +[Project Relationship](#)[Check File Fingerprint](#)[Manage Jenkins](#)[My Views](#)**Build Queue** ▾

No builds in the queue.

Build Executor Status

0/2 ▾

S	W	Name ↓	Last Success	Last Failure	Last Duration	
✓	☁	Devops_Task2	2 min 36 sec #17	3 hr 0 min #16	1 min 13 sec	▶
✓	☁	DevopsD1	1 day 20 hr #6	1 day 20 hr #5	0.1 sec	▶

Icon: S M L

...

[REST API](#)

Jenkins 2.492.2

```

GNU nano 6.2 Jenkinsfile
pipeline {
  agent any
  environment {
    DOCKER_IMAGE = "siva182004/docker-app:latest" // Docker image name
    CONTAINER_NAME = "docker-running-app"
    REGISTRY_CREDENTIALS = "docker-hub-credentials" // Jenkins credentials ID for Docker Hub
  }

  stages {
    stage('Checkout Code') {
      steps {
        withCredentials([usernamePassword(credentialsId: 'demo', usernameVariable: 'GIT_USER', passwordVariable: 'GIT_TOKEN',
          git url: "https://$GIT_USER:$GIT_TOKEN@github.com/Surya-2k4/Jenkins-Docker-Demo.git", branch: 'main'
        )])
      }
    }

    stage('Build Docker Image') {
      steps {
        script {
          sh 'docker build -t ${DOCKER_IMAGE} .' // Ensure the image is built with the correct tag
        }
      }
    }

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

```


Activities Terminal Mar 19 19:25 vboxuser@Ubuntu: ~/docker-python-app/Devops_

```


vboxuser@Ubuntu:~$ docker --version
Docker version 26.1.3, build 26.1.3-0ubuntu1~22.04.1
vboxuser@Ubuntu:~$ jenkins --version
2.492.2
vboxuser@Ubuntu:~$ ls
Desktop Documents Music Public Templates
docker-python-app Downloads Pictures snap Videos
vboxuser@Ubuntu:~$ cd docker-python-app
vboxuser@Ubuntu:~/docker-python-app$ ls
Devops_
vboxuser@Ubuntu:~/docker-python-app$ cd Devops_
vboxuser@Ubuntu:~/docker-python-app/Devops_$ ls
app.py Dockerfile README.md
docker-compose.yml Jenkinsfile requirements.txt
vboxuser@Ubuntu:~/docker-python-app/Devops_$ nano Jenkinsfile
vboxuser@Ubuntu:~/docker-python-app/Devops_$ sudo usermod -aG docker jenkins
[sudo] password for vboxuser:
vboxuser@Ubuntu:~/docker-python-app/Devops_$ sudo systemctl restart jenkins
vboxuser@Ubuntu:~/docker-python-app/Devops_$

```



← → ↻ https://github.com/sivakulanthaisamy/Devops_ ☆ 🔒 🔍 📄 📁 📄 📄 📄

☰  sivakulanthaisamy / Devops_ 🔍 Type to search 📄 + 🔍 📄 📄 📄 📄

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 **kasryan** third commit c1953a - 4 hours ago 5 Commits

📄 Dockerfile	first commit	8 hours ago
📄 Jenkinsfile	third commit	4 hours ago
📄 README.md	Create README.md	9 hours ago
📄 app.py	first commit	8 hours ago
📄 docker-compose.yml	first commit	8 hours ago
📄 requirements.txt	first commit	8 hours ago

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No description, website, or topics provided.

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☆ 0 stars
👁 1 watching
🍴 0 forks

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← → ↻ 🛡 📄 localhost:5001

Hello, Flask is running in Docker!