

## Containerize the App

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Team ID	PNT2022TMID02676
Project Name	Inventory Management System for Retailers

### Containerize your Flask application

- In your project directory, create a file named "Dockerfile." *Suggestion: Name your file exactly "Dockerfile," nothing else.*



A "Dockerfile" is used to indicate to Docker a base image, the Docker settings you need, and a list of commands you would like to have executed to prepare and start your new container.

- In the file, paste this code:

```

• FROM python:2.7
• LABEL maintainer="Kunal Malhotra, kunal.malhotra1@ibm.com"
•• RUN apt-get update
•• RUN mkdir /app
•• WORKDIR /app
• COPY . /app
• RUN pip install -r requirements.txt
  EXPOSE 5000
  ENTRYPOINT [ "python" ]
  CMD[ "app.py" ]

```

## Explanation and breakdown of the above Dockerfile code

1. The `FROM python:2.7` first part of the code above is:
- 2.

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Because this Flask application uses Python 2.7, we want an environment that supports it and already has it installed. Fortunately, DockerHub has an official image that's installed on top of Ubuntu. In one line, we will have a base Ubuntu image with Python 2.7, virtualenv, and pip. There are tons of images on DockerHub, but if you would like to start off with a fresh Ubuntu image and build on top of it, you could do that.

3. Let's look at the next part of the code:
4. `LABEL maintainer="Jayanth C R, jayanth@ibm.com"`
5. `RUN apt-get update`

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6. Note the maintainer and update the Ubuntu package index. The command is `RUN`, which is a function that runs the command after it.

7. `RUN mkdir /app`
8. `WORKDIR /app`
9. `COPY . /app`

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10. Now it's time to add the Flask application to the image. For simplicity, copy the application under the `/app` directory on our Docker Image.

`WORKDIR` is essentially a `cd` in bash, and `COPY` copies a certain directory to the provided directory in an image. `ADD` is another command that does the same thing as `COPY`, but it also allows you to add a repository from a URL. Thus, if you want to clone your git repository instead of copying it from your local repository (for staging and production purposes), you can use that. `COPY`, however, should be used most of the time unless you have a URL.

11. Now that we have our repository copied to the image, we will install all of our dependencies,

```
RUN pip install --no-cache-dir -r requirements.txt
```

which is defined in the `requirements.txt` part of the code.

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13.

We  
want `EXPOSE 5000`

to expose the port(5000) the Flask application runs on, so we use `EXPOSE`.

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15. `ENTRYPOINT` specifies the entrypoint of your application.

16. `ENTRYPOINT [ "python" ]`

17. `CMD [ "app.py" ]`

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## Build an image from the Dockerfile

Open the terminal and type this command to build an image from your

Dockerfile: `docker build -t <image_name>:<tag> .` (note the period to indicate we're in our apps top level directory). For example: `docker build -t app:latest .`

```
kunals-mbp:web kunalmalhotra$ docker build -t app:latest .
Sending build context to Docker daemon 348.2kB
Step 1/8 : FROM python:2.7
--> 6c76e39e7cfe
Step 2/8 : LABEL maintainer="Kunal Malhotra, kunal.malhotra@ibm.com"
--> Using cache
--> d8b57d41591c
Step 3/8 : RUN apt-get update
--> Using cache
--> 632a134e40e
Step 4/8 : COPY ./app
--> f07f7377099f
Step 5/8 : WORKDIR /app
Removing intermediate container f9010b99d2fe
--> 0bcca6f20b3d
Step 6/8 : RUN pip install -r requirements.txt
--> Running in 8153040b00b7
Collecting click==6.7 (from -r requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/34/c1/8806f99713dd993c5366c362b2f908f18269f8d792aff1abfd700775a77/click-6.7-py2.py3-none-any.whl (71kB)
Collecting Flask==1.0.2 (from -r requirements.txt (line 2))
  Downloading https://files.pythonhosted.org/packages/7f/47/08578774ed4536d3242b14d0cb4696386634607af824ed997202ca0ed4b/Flask-1.0.2-py2.py3-none-any.whl (91kB)
Collecting itsdangerous==0.24 (from -r requirements.txt (line 3))
  Downloading https://files.pythonhosted.org/packages/dc/b4/a60cb0945c00f6d608d8975131ab3f25b22f2bcfe1ddab221165194b2d4/itsdangerous-0.24.tar.gz (46kB)
Collecting Jinja2==2.10 (from -r requirements.txt (line 4))
  Downloading https://files.pythonhosted.org/packages/7f/1f/9e64bacdfc95f27a016a7bed8e8686763ba4d277a78ca76f32659228a731/jinja2-2.10-py2.py3-none-any.whl (126kB)
Collecting MarkupSafe==1.0 (from -r requirements.txt (line 5))
  Downloading https://files.pythonhosted.org/packages/4d/de/32d741db316d8fdb7688822d37001ef7044825de9699ab4bfcdbf4172b/MarkupSafe-1.0.tar.gz
Collecting Werkzeug==0.14.1 (from -r requirements.txt (line 6))
  Downloading https://files.pythonhosted.org/packages/20/c4/12e3e56473e52375aa29c4764e70d1b8f3efa6682bef8d0aae04fe335243/Werkzeug-0.14.1-py2.py3-none-any.whl (322kB)
Building wheels for collected packages: itsdangerous, MarkupSafe
Running setup.py bdist_wheel for itsdangerous: started
Running setup.py bdist_wheel for itsdangerous: finished with status 'done'
Stored in directory: /root/.cache/pip/wheels/2c/4a/61/5599631c1554768c6290b08c02c7d7317910374ca602ff1e5
Running setup.py bdist_wheel for MarkupSafe: started
Running setup.py bdist_wheel for MarkupSafe: finished with status 'done'
Stored in directory: /root/.cache/pip/wheels/33/36/20/ebef9a5cd127ffe1c5a632146b16596f9e6467676861e4e46
Successfully built itsdangerous MarkupSafe
Installing collected packages: click, itsdangerous, MarkupSafe, Jinja2, Werkzeug, Flask
Successfully installed Flask-1.0.2 Jinja2-2.10 MarkupSafe-1.0 Werkzeug-0.14.1 click-6.7 itsdangerous-0.24
Removing intermediate container 8153040b00b7
--> 6d683609bc
Step 7/8 : ENTRYPOINT [ "python" ]
--> Running in bd1c83815e1
Removing intermediate container bd1c83815e1
--> 73cfc38ac1c
Step 8/8 : CMD [ "app.py" ]
--> Running in a784d430dd6f
Removing intermediate container a784d430dd6f
--> d8b6b83763a5
Successfully built d8b6b83763a5
Successfully tagged app:latest
kunals-mbp:web kunalmalhotra$
```

## Run your container locally and test

After you build your image successfully, type: `docker run -d -p 5000:5000 app`

This command will create a container that contains all the application code and dependencies from the image and runs it locally.

