



UMD DATA605 - Big Data Systems

Lesson 3.2: Docker

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Containerizing an App

- **Containerizing an app** means creating a container with your app inside
- Develop application code with dependencies
 - Install dependencies
 - Inside a container
 - Inside a virtual env
- Create a Dockerfile describing:
 - App
 - Dependencies
 - How to run it
- Build image with `docker image build`
- (Optional) Push image to Docker image registry
- Run/test container from image
- Distribute app as a container (no installation required)

Building a Container

- **Dockerfile**
 - Describe how to create a container
- **Build context**
 - `docker build -t web:latest .` where `.` is the build context
 - Send directory containing the application to Docker engine to build the application
 - Typically the Dockerfile is in the root directory of the build context

Dockerfile: Example

```
FROM python:3.8-slim-buster
```

```
LABEL maintainer="gsaggese@umd.edu"
```

```
WORKDIR /app
```

```
COPY requirements.txt requirements.txt
```

```
RUN pip3 install -r requirements.txt
```

```
COPY . .
```

```
CMD ["python3", "-m", "flask", "run", "--host=0.0.0.0"]
```

Docker: Commands

- Show all the available images

```
> docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
counter_app-web-fe	latest	4bf6439418a1	17 minutes ago	54.7MB
...				

- Show a particular image

```
> docker images counter_app-web-fe
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
counter_app-web-fe	latest	4bf6439418a1	17 minutes ago	54.7MB
...				

- Delete an image

```
> docker rmi ...
```

- Show the running containers

```
> docker container ls
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
505541bcfe8b	counter_app-web-fe	"python app.py"	7 minutes ago	Up 7 minutes	0.0.0.0:5001->5000/tcp	counter_app
c1889540cfd2	redis:alpine	"docker-entrypoint.sh"	7 minutes ago	Up 7 minutes	6379/tcp	counter_app

Docker: Commands

- Show running containers

```
> docker container ls
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
281d654f6b8d	counter_app-web-fe	"python app.py"	5 minutes ago	Up 5 minutes
0.0.0.0:5001->5000/tcp	counter_app-web-fe-1			
de55ae4104da	redis:alpine	"docker-entrypoint.s..."	5 minutes ago	Up 5 minutes
6379/tcp	counter_app-redis-1			

- Show volumes and networks

```
> docker volume ls
```

DRIVER	VOLUME NAME
local	counter_app_counter-vol

```
> docker network ls
```

NETWORK ID	NAME	DRIVER	SCOPE
b4c1976d7c27	bridge	bridge	local
33ff702253b3	counter-app_counter-net	bridge	local

Docker: Delete State

- Commands:

```
> docker container ls
> docker container rm $(docker container ls -q)

> docker images
> docker rmi $(docker images -q)

> docker volume ls
> docker volume rm $(docker volume ls -q)

> docker network ls
> docker network rm $(docker network ls -q)
```

Docker Tutorial

- [Docker tutorial](#)