

Section 10 - Docker Compose

2 Docker Compose - Basic Commands

Docker Compose - Installation

- On desktop systems like Docker Desktop for Mac and Windows, Docker Compose is included as part of those desktop installs
- Docker Compose is NOT included in the Docker Linux installation packages
- Docker Compose installation instructions for Linux are available [here](#)

Notes:

1. *Docker Compose* relies on Docker Engine to work, so make sure you have Docker Engine installed before you start using the *Docker Compose* tool.
2. *Docker Compose* is not a production-grade tool but is ideal for local development and test



Docker Compose - Common commands

- The most common commands are:

```
$ docker-compose up  
$ docker-compose down
```

- The **docker-compose up** => create volumes/networks and start all containers
- The **docker-compose down** => stop and remove all containers, remove all networks

Notes:

- Volumes are NOT deleted with the **docker-compose down** command
- To delete the volumes use the **docker-compose down --volumes** command

Docker Compose - Example - Start the Services (1)

- Use the `docker-compose up` to start the services defined in the compose file available in the `resources/compose-sample-2/` directory

```
# cd resources/compose-sample-2/
# docker-compose up
Creating network "compose-sample-2_net-db" with the default driver
Creating volume "compose-sample-2_db-data" with default driver
Creating compose-sample-2_postgres10_1 ... done
Creating compose-sample-2_pgadmin4_1 ... done
Attaching to compose-sample-2_postgres10_1, compose-sample-2_pgadmin4_1
...
postgres10_1 | 2019-09-30 08:57:05.364 UTC [1] LOG: database system is ready to accept connections
pgadmin4_1 | NOTE: Configuring authentication for SERVER mode.
...
```

Docker Compose - Example - Start the Services (2)

- From the output of the `docker-compose up` command we can see the networks, the volumes and the containers that are created
- From a web browser we can access the `<DOCKER_HOST>:8080` to verify the the pgAdmin web application is running and that we can connect to te postgres DB.
- After the initial phase the logs of all the containers defined in the `docker-compose.yml` file are displayed

Docker Compose - Example - Start the Services (2)

- The command is running in the foreground. We can press **Ctrl-C** to stop all the containers and regain control of the shell prompt

```
...
postgres10_1 | 2019-09-30 08:57:05.364 UTC [1] LOG: database system is ready to accept connections
pgadmin4_1    | NOTE: Configuring authentication for SERVER mode.
...
pgadmin4_1    | [2019-09-30 08:59:12 +0000] [79] [INFO] Booting worker with
Gracefully stopping... (press Ctrl+C again to force)
Stopping compose-sample-2_postgres10_1 ... done
Stopping compose-sample-2_pgadmin4_1    ... done
...
```

Docker Compose - Example - Detached mode

- Use the `docker-compose up --detach` or `docker-compose up -d` to start the services in the background

```
# docker-compose up -d
Starting compose-sample-2_postgres10_1 ... done
Starting compose-sample-2_pgadmin4_1    ... done
#
```

Docker Compose - Example - logs

- The `docker-compose logs -f` to display the logs from the containers

```
# docker-compose logs -f
...
postgres10_1 | 2019-09-30 09:23:06.825 UTC [1] LOG:  database system is ready to accept connections
...
pgadmin4_1    | [2019-09-30 09:23:08 +0000] [76] [INFO] Booting worker with...
```

Notes:

In this example we have specified the `-f`, `--follow` option to continuously tail the log messages Press to stop displaying the log messages

Docker Compose - Example - Help

- Many of the commands used from the Docker CLI can be also used with the **Docker Compose** tool.
- Use the **docker-compose --help** to display all commands that can be used

```
# docker-compose --help
...
Commands:
  build      Build or rebuild services
  bundle     Generate a Docker bundle from the Compose file
  config     Validate and view the Compose file
  create     Create services
  down       Stop and remove containers, networks, images, and volumes
  ...
```

Docker Compose - Example - common commands

- Some of the most common commands used with **Docker Compose** are:
 1. **docker-compose ps** => List containers
 2. **docker-compose top** => Display the running processes

```
# docker-compose ps
```

Name	Command	State	Ports
pgadmin4_1	/entrypoint.sh	Up	443/tcp, 0.0.0.0:80
postgres10_1	docker-entrypoint.sh postgres	Up	5432/tcp

```
...
```

```
# docker-compose top
```

```
...
```

Docker Compose - Example - Project name

- Compose uses the current directory name as the project name.
- The project name is used as prefix name for all containers, networks and volumes created from the `docker-compose.yml` file

```
# docker container ls
... IMAGE                ... NAMES
... postgres:10          ... compose-sample-2_postgres10_1
... dpage/pgadmin4:4.6    ... compose-sample-2_pgadmin4_1

# docker network ls
NETWORK ID          NAME                                DRIVER  SCOPE
...
91e9ac3cccf0        compose-sample-2_net-db            bridge  local
...

# docker volume ls
DRIVER  VOLUME NAME
local   compose-sample-2_db-data
```

Docker Compose - Example - down

- Use the **docker-compose down** command to stop and remove containers, networks and volumes created by **up**

```
# docker-compose down
Stopping compose-sample-2_postgres10_1 ... done
Stopping compose-sample-2_pgadmin4_1    ... done
Removing compose-sample-2_postgres10_1  ... done
Removing compose-sample-2_pgadmin4_1    ... done
Removing network compose-sample-2_net-db
```

Note By default volumes are not removed

Docker Compose - Example - down --volumes

- Use the `docker-compose down --volumes` to remove also named volumes declared in the `volumes` section of the Compose file and anonymous volumes attached to containers.

```
# docker-compose down -v
...
Removing volume compose-sample-2_db-data
...
```

Docker Compose - Example [cmd summary]

```
# cd resources/compose-sample-2/
# docker-compose up
* access the <DOCKER_HOST>:8080
* Ctrl-C
# docker-compose up -d
# docker-compose logs -f
# docker-compose --help
# docker-compose ps
# docker-compose top
# docker container ls
# docker network ls
# docker volume ls
# docker-compose down -- Note By default volumes are not removed
# docker-compose down -v
```

Docker Compose - Build (1)

- **Docker Compose** can be used also to build our custom Docker images
- I have seen how to build a custom Docker image using a **Dockerfile**
- Now will see how to use the **Docker compose** and the **Dockerfile** together to build and run our custom Docker images

Docker Compose - Build (2)

- In the following example we see the **build** section of a **docker-compose.yml** file:

```
version: "3.7"
services:
  webapp:
    build:
      context: ./dir
      dockerfile: Dockerfile-alternate
  ...
```

Notes

- **context:** => Is the relative path of the Docker build context
- **dockerfile:** => Is the name of the Docker File to use for the build process (optional needed only if != default name)
- The **docker-compose.yml** file, **Dockerfile** and the files related to the build context must be located on the same directory

Docker Compose - Build (3)

- Use the `docker-compose up` to build and start the services defined in the compose file
- Use the `docker-compose build` to build all the custom Docker images defined in the compose file

Notes:

- The first time the build process will take place to create the custom Docker images.
- After that the custom Docker images will be available in the local cache.
- The build process will take place again only if the local cache is invalidated

Docker Compose - Build (4)

- To force the re-build process to recreate the custom Docker image we must use the `docker-compose build` or `docker-compose up --build` command.

Notes

- Documentation Reference available [here](#)

Docker Compose vs other CM tools

- We can see how **Docker Compose** can replace more complicated CM tools such as Vagrant and others
- Avoid the complexity of managing a virtual machine environment with multiple VMs
- With **Docker Compose** we have easier way to setup the development environment. The steps required to setup the development environment could be:
 1. Checkout the code **git clone <repo>**
 2. Use the **docker-compose up** to start all services required for the development

LAB

- Ref:
- [D S10 L02 Docker Compose Basic Commands LAB.md](#)