

University of Seville
School of Computer Engineering
Dockerize a War+MySQL project



Software engineering
Design and testing 2
2018-2019
06/06/2019

Group 26



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What is Docker?

Docker is a tool designed to facilitate the creation, implementation and execution of applications with containers. Containers allow a developer to package an application with all the parts it needs, such as libraries and other dependencies, and send everything in a single package.

Containers allow a developer to package an application with all the parts it needs, such as libraries and other dependencies, and ship everything in one package. They are designed to facilitate the provision of a consistent experience as developers and system administrators move code from development environments to production in a fast and replicable manner.

Steps to dockerize our project

Step 1: Generate a Dockerfiles for Tomcat and MySQL

Dockerfile is a text document that contains all the commands a user could call on the command line to assemble an image. We must specify a Dockerfile per dependency in our application. In this case, a Dockerfile for Tomcat (v7.0) and MySQL (v5.5).

```
FROM tomcat:7  
  
COPY Acme-Packages.war /usr/local/tomcat/webapps/
```

1. Dockerfile for Tomcat

```
FROM mysql:5.5  
  
ADD my.cnf /etc/mysql/my.cnf  
  
ENV MYSQL_ALLOW_EMPTY_PASSWORD="yes"  
  
COPY Create-Acme-Packages.sql /docker-entrypoint-initdb.d
```

2. Dockerfile for MySQL

With **FROM** directive, we indicate the base image to build. In this case, as mentioned before, we use version 7 of Tomcat. This directive must be in every Dockerfile, and it's necessary to place it in first line, because Dockerfiles are executed by order.

With **COPY** directive we indicate that Acme-Packages.war must be copied into /webapps directory.

In the case of MySQL, we must take into account that lower_case_table_names variable in my.cnf configuration file must be set to 1, so that way tables will be stored in lowercase on disk. This can be done by copying my.cnf file with that variable already changed, because there's no instruction that allows us to edit a part of a file. So, the only option we have is to overwrite the file. Of course, we also must copy our script to create the database.

ADD directive is used to overwrite my.cnf file as mentioned before. The second parameter that this directive takes is the path for the file.

Step 2: Generate Docker Compose file

When we are done creating the Dockerfiles with every dependency, we need create a file called "docker-compose.yml". In this file, we specify all services our application needs and how they will interact between them and the application itself.

```
version: '3.2'
services:
  mysql:
    build:
      context: ./DB
      dockerfile: Dockerfile
    container_name: acme_db
    restart: always
    networks:
      acme_network:
        aliases:
          - AcmePackageDB
    volumes:
      - acme_data:/var/lib/mysql
  tomcat:
    build:
      context: ./tomcat
      dockerfile: Dockerfile
    container_name: tomcat
    restart: always
    networks:
      acme_network:
        aliases:
          - tomcat
    ports:
      - target: 8080
        published: 80
        protocol: tcp
        mode: host
volumes:
  acme_data:
networks:
  acme_network:
    driver: bridge
```

3. Docker-compose.yml

Step 3: Change data.xml in our project

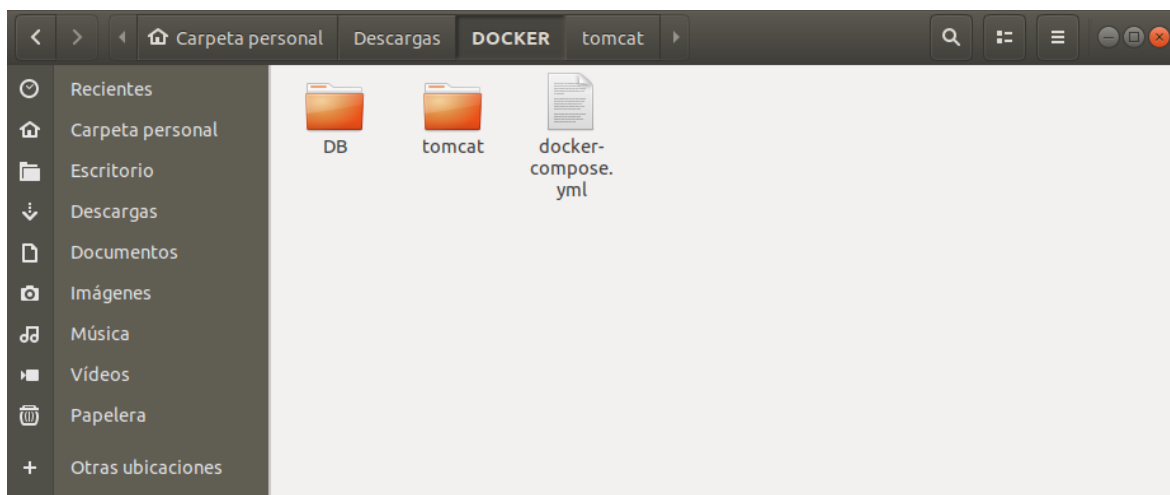
```
<bean id="dataSource" class="com.mchange.v2.c3p0.ComboPooledDataSource" destroy-method="close">
  <property name="driverClass" value="com.mysql.jdbc.Driver" />
  <property name="jdbcUrl" value="jdbc:mysql://AcmePackageDB:3306/Acme-Packages" /><!-- -->
  <property name="user" value="acme-user" />
  <property name="password" value="ACME-Us3r-P@ssw0rd" />
  <property name="minPoolSize" value="1" />
  <property name="maxPoolSize" value="5" />
</bean>
```

Step 4: Deployment with Docker

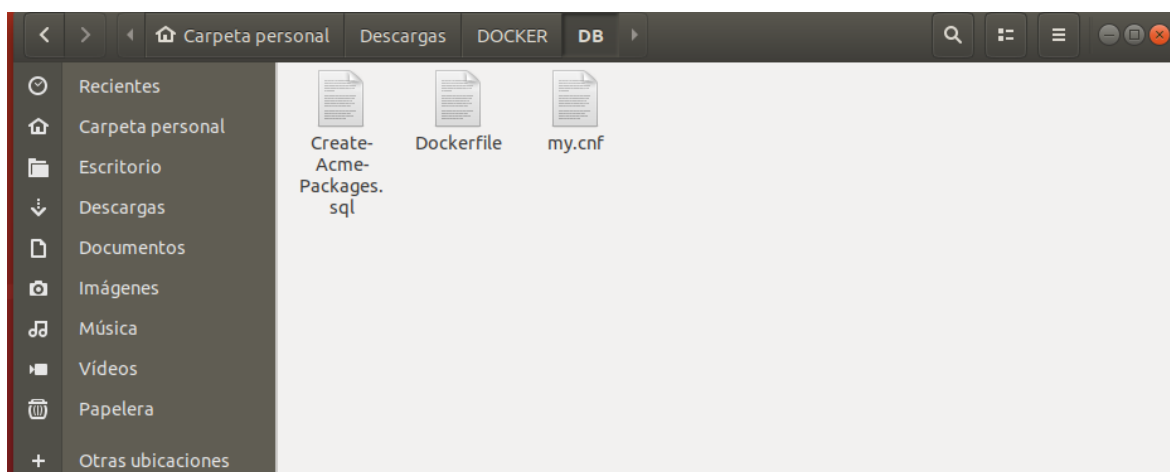
We will use an Ubuntu system to deploy our container.

Open a terminal in the folder where we have 2 folders and the docker-compose.yml

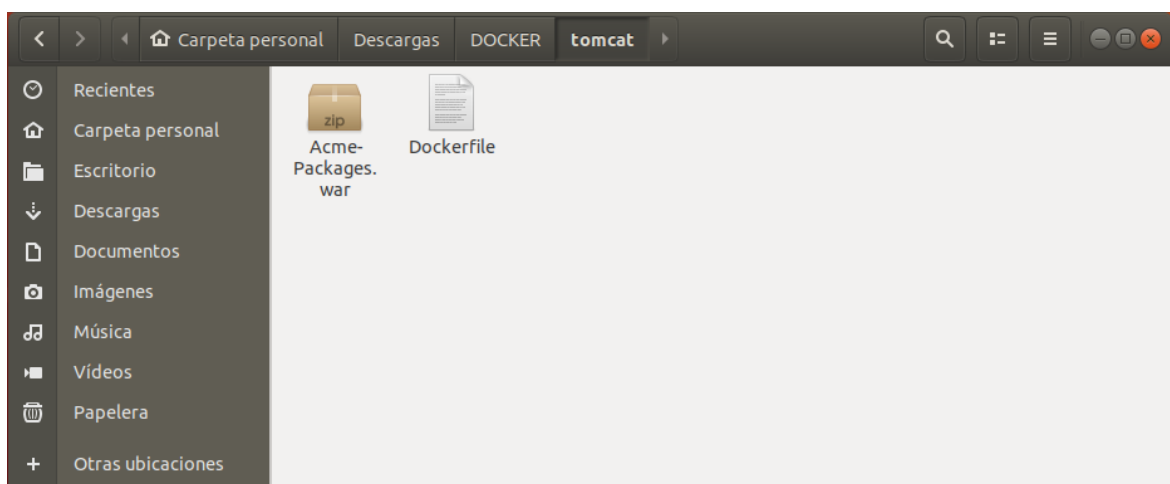
The folder will contain the following files and subfolders:



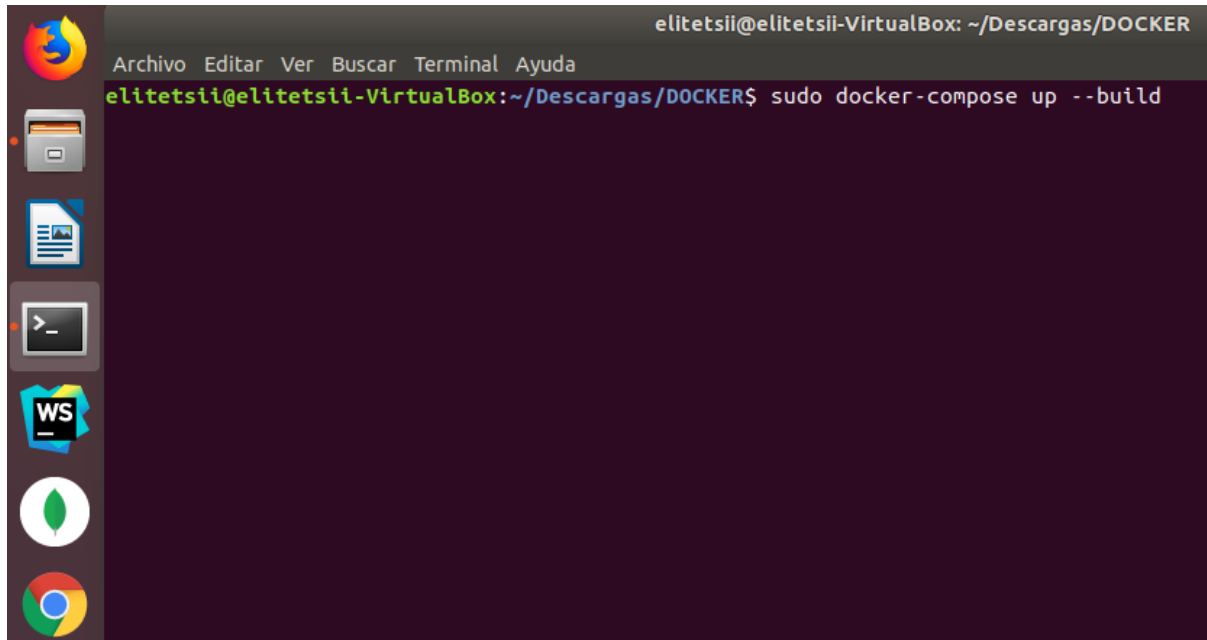
4. Folder where open the terminal



5. Folder DB

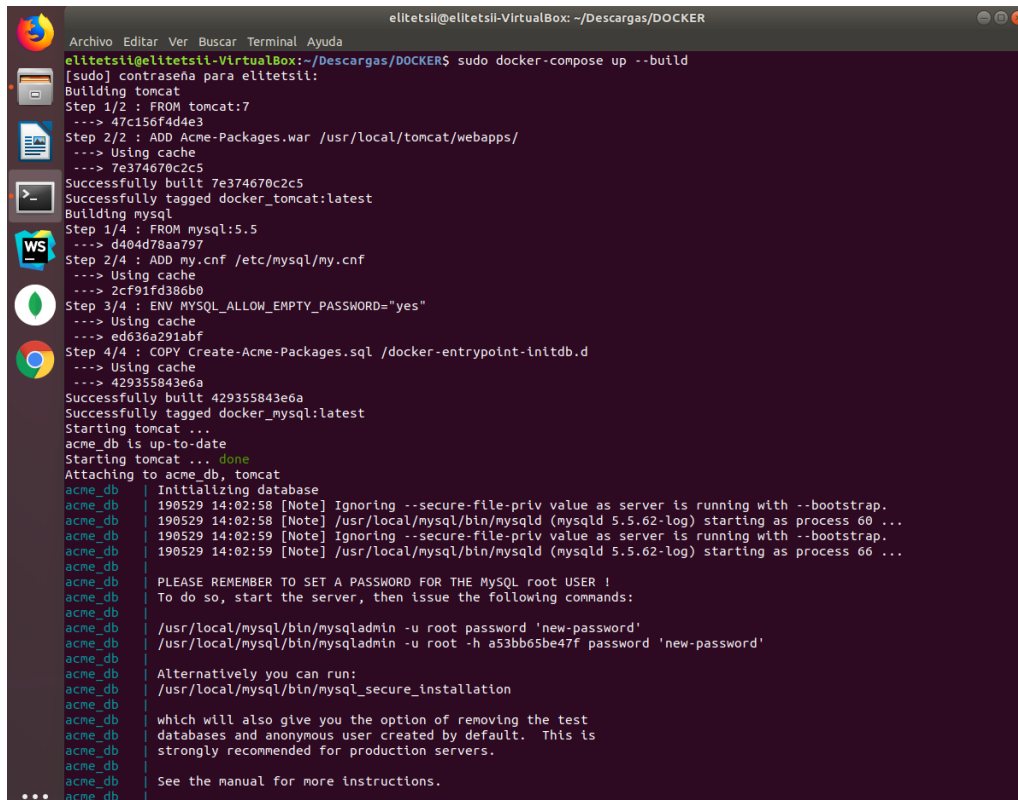


6. Folder tomcat



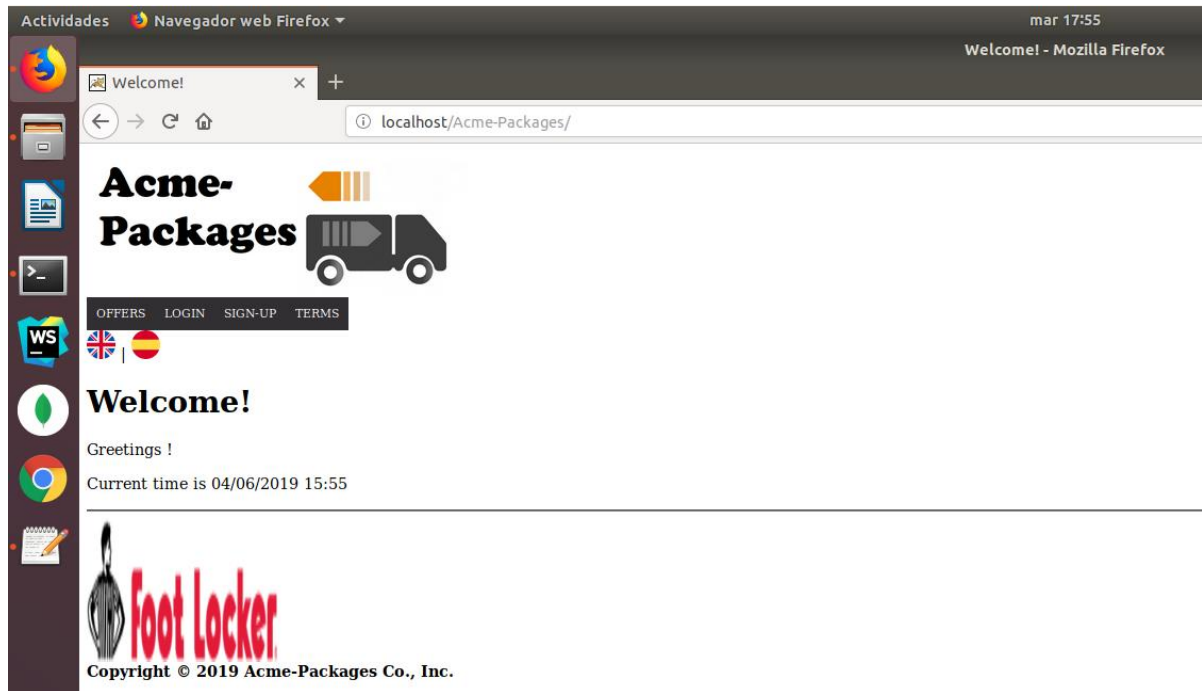
```
elitetsii@elitetsii-VirtualBox: ~/Descargas/DOCKER
Archivo Editar Ver Buscar Terminal Ayuda
elitetsii@elitetsii-VirtualBox:~/Descargas/DOCKER$ sudo docker-compose up --build
```

7. Execute "sudo docker-compose up --build"



```
elitetsii@elitetsii-VirtualBox: ~/Descargas/DOCKER
Archivo Editar Ver Buscar Terminal Ayuda
elitetsii@elitetsii-VirtualBox:~/Descargas/DOCKER$ sudo docker-compose up --build
[sudo] contraseña para elitetsii:
Building tomcat
Step 1/2 : FROM tomcat:7
--> 47c156f4d4e3
Step 2/2 : ADD Acme-Packages.war /usr/local/tomcat/webapps/
--> Using cache
--> 7e374670c2c5
Successfully built 7e374670c2c5
Successfully tagged docker_tomcat:latest
Building mysql
Step 1/4 : FROM mysql:5.5
--> d404d78aa797
Step 2/4 : ADD my.cnf /etc/mysql/my.cnf
--> Using cache
--> 2cf91fd386b0
Step 3/4 : ENV MYSQL_ALLOW_EMPTY_PASSWORD="yes"
--> Using cache
--> ed636a291abf
Step 4/4 : COPY Create-Acme-Packages.sql /docker-entrypoint-initdb.d
--> Using cache
--> 429355843e6a
Successfully built 429355843e6a
Successfully tagged docker_mysql:latest
Starting tomcat ...
acme_db is up-to-date
Starting tomcat ... done
Attaching to acme_db, tomcat
acme_db | Initializing database
acme_db | 190529 14:02:58 [Note] Ignoring --secure-file-priv value as server is running with --bootstrap.
acme_db | 190529 14:02:58 [Note] /usr/local/mysql/bin/mysqld (mysqld 5.5.62-log) starting as process 60 ...
acme_db | 190529 14:02:59 [Note] Ignoring --secure-file-priv value as server is running with --bootstrap.
acme_db | 190529 14:02:59 [Note] /usr/local/mysql/bin/mysqld (mysqld 5.5.62-log) starting as process 66 ...
acme_db |
acme_db | PLEASE REMEMBER TO SET A PASSWORD FOR THE MySQL root USER !
acme_db | To do so, start the server, then issue the following commands:
acme_db |
acme_db | /usr/local/mysql/bin/mysqladmin -u root password 'new-password'
acme_db | /usr/local/mysql/bin/mysqladmin -u root -h a53bb65be47f password 'new-password'
acme_db |
acme_db | Alternatively you can run:
acme_db | /usr/local/mysql/bin/mysql_secure_installation
acme_db |
acme_db | which will also give you the option of removing the test
acme_db | databases and anonymous user created by default. This is
acme_db | strongly recommended for production servers.
acme_db |
acme_db | See the manual for more instructions.
```

8. Deployment in progress



9. Deployment completed