



# UNIVERSIDAD TECNOLÓGICA DEL NORTE DE GUANAJUATO

Tecnologías de la Información y Comunicación  
**Programa educativo:**

TSU en Infraestructura de Redes Digitales  
**Área académica:**

Programación de Redes  
**Asignatura:**

**Unidad II:** Programación de dispositivos IdC

**Grupo:** GIR0441

Docker and Python  
**Tarea:**

Isidro Lara Lopez  
**Alumno:**

Gabriel Barrón Rodríguez  
**Docente:**

Dolores Hidalgo, C.I.N., Gto., lunes 21 de Noviembre de 2022  
**Lugar y fecha:**



# Docker and Python

```
ilara@LPI: ~/docker1
Archivo  Editar  Ver  Buscar  Terminal  Ayuda
ilara@LPI:~$ mkdir docker1
ilara@LPI:~$ cd docker1/
ilara@LPI:~/docker1$ python3 -m venv .venv
The virtual environment was not created successfully because ensurepip is not
available. On Debian/Ubuntu systems, you need to install the python3-venv
package using the following command.

    apt install python3.10-venv

You may need to use sudo with that command. After installing the python3-venv
package, recreate your virtual environment.

Failing command: ['/home/ilara/docker1/.venv/bin/python3', '-Im', 'ensurepip', '--upgrade', '--default-pip']

ilara@LPI:~/docker1$ python3.10 -m venv .venv
The virtual environment was not created successfully because ensurepip is not
available. On Debian/Ubuntu systems, you need to install the python3-venv
package using the following command.

    apt install python3.10-venv

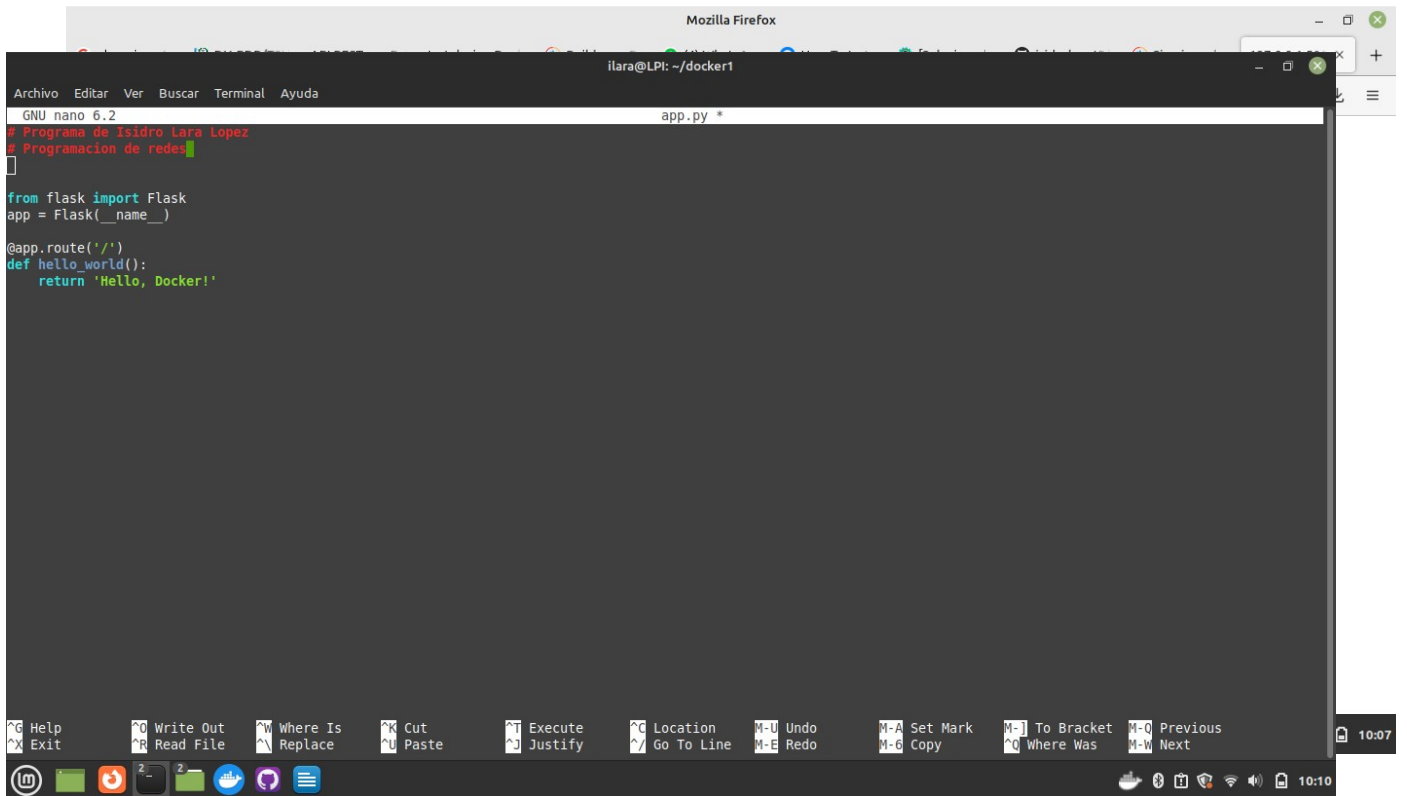
You may need to use sudo with that command. After installing the python3-venv
package, recreate your virtual environment.

Failing command: ['/home/ilara/docker1/.venv/bin/python3.10', '-Im', 'ensurepip', '--upgrade', '--default-pip']

ilara@LPI:~/docker1$ apt install python3.10-venv
[sudo] password for ilara:
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias... Hecho
Leyendo la información de estado... Hecho
Se instalarán los siguientes paquetes adicionales:
python3-pip-whl python3-setuptools-whl
Se instalarán los siguientes paquetes NUEVOS:
python3-pip-whl python3-setuptools-whl python3.10-venv
0 actualizados, 3 nuevos se instalarán, 0 para eliminar y 98 no actualizados.
Se necesita descargar 2 473 kB de archivos.
Se utilizarán 2 882 kB de espacio de disco adicional después de esta operación.
¿Desea continuar? [S/n] s
Reading http://archive.ubuntu.com/ubuntu/pool/main/p/python3.10/python3.10-venv_3.10.0-2ubuntu1~20.04.1_amd64.deb
Unpacking python3.10-venv (3.10.0-2ubuntu1~20.04.1) ...
Setting up python3.10-venv (3.10.0-2ubuntu1~20.04.1) ...
ilara@LPI:~/docker1$
```

```
ilara@LPI: ~/docker1
Archivo Editar Ver Buscar Terminal Ayuda
ilara@LPI:~/docker1$ python3 -m venv .venv
ilara@LPI:~/docker1$ source .venv/bin/activate
(.venv) ilara@LPI:~/docker1$ python3 -m pip install Flask
Collecting Flask
  Downloading Flask-2.2.2-py3-none-any.whl (101 kB)
    101.5/101.5 KB 640.0 KB/s eta 0:00:00
Collecting itsdangerous==2.0
  Downloading itsdangerous-2.1.2-py3-none-any.whl (15 kB)
Collecting Werkzeug==2.2.2
  Downloading Werkzeug-2.2.2-py3-none-any.whl (232 kB)
    232.7/232.7 KB 801.4 KB/s eta 0:00:00
Collecting click==8.0
  Downloading click-8.1.3-py3-none-any.whl (96 kB)
    96.6/96.6 KB 909.0 KB/s eta 0:00:00
Collecting Jinja2==3.0
  Downloading Jinja2-3.1.2-py3-none-any.whl (133 kB)
    133.1/133.1 KB 1.3 MB/s eta 0:00:00
Collecting MarkupSafe==2.0
  Downloading MarkupSafe-2.1.1-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (25 kB)
Installing collected packages: MarkupSafe, itsdangerous, click, Werkzeug, Jinja2, Flask
Successfully installed Flask-2.2.2 Jinja2-3.1.2 MarkupSafe-2.1.1 Werkzeug-2.2.2 click-8.1.3 itsdangerous-2.1.2
(.venv) ilara@LPI:~/docker1$ python3 -m pip freeze > requirements.txt
(.venv) ilara@LPI:~/docker1$ cat requirements.txt
click==8.1.3
Flask==2.2.2
itsdangerous==2.1.2
Jinja2==3.1.2
MarkupSafe==2.1.1
Werkzeug==2.2.2
(.venv) ilara@LPI:~/docker1$ touch app.py
(.venv) ilara@LPI:~/docker1$ ls
app.py requirements.txt
(.venv) ilara@LPI:~/docker1$ nano app.py
(.venv) ilara@LPI:~/docker1$ python3 -m flask run
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
^C(.venv) ilara@LPI:~/docker1$ python3 -m flask run
```

```
ilara@LPI: ~/docker1
Archivo Editar Ver Buscar Terminal Ayuda
  Downloading itsdangerous-2.1.2-py3-none-any.whl (15 kB)
Collecting Werkzeug==2.2.2
  Downloading Werkzeug-2.2.2-py3-none-any.whl (232 kB)
    232.7/232.7 KB 801.4 KB/s eta 0:00:00
Collecting click==8.0
  Downloading click-8.1.3-py3-none-any.whl (96 kB)
    96.6/96.6 KB 909.0 KB/s eta 0:00:00
Collecting Jinja2==3.0
  Downloading Jinja2-3.1.2-py3-none-any.whl (133 kB)
    133.1/133.1 KB 1.3 MB/s eta 0:00:00
Collecting MarkupSafe==2.0
  Downloading MarkupSafe-2.1.1-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (25 kB)
Installing collected packages: MarkupSafe, itsdangerous, click, Werkzeug, Jinja2, Flask
Successfully installed Flask-2.2.2 Jinja2-3.1.2 MarkupSafe-2.1.1 Werkzeug-2.2.2 click-8.1.3 itsdangerous-2.1.2
(.venv) ilara@LPI:~/docker1$ python3 -m pip freeze > requirements.txt
(.venv) ilara@LPI:~/docker1$ cat requirements.txt
click==8.1.3
Flask==2.2.2
itsdangerous==2.1.2
Jinja2==3.1.2
MarkupSafe==2.1.1
Werkzeug==2.2.2
(.venv) ilara@LPI:~/docker1$ touch app.py
(.venv) ilara@LPI:~/docker1$ ls
app.py requirements.txt
(.venv) ilara@LPI:~/docker1$ nano app.py
(.venv) ilara@LPI:~/docker1$ python3 -m flask run
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
^C(.venv) ilara@LPI:~/docker1$ python3 -m flask run
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
127.0.0.1 - - [27/Oct/2022 09:55:05] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [27/Oct/2022 09:55:05] "GET /favicon.ico HTTP/1.1" 404 -
```



The image shows a terminal window titled 'ilara@LPI: ~/docker1' with a nano 6.2 editor open to a file named 'app.py'. The code in the file is a simple Flask application. The terminal window is overlaid on a desktop environment with a taskbar at the bottom containing icons for various applications and system status. A Mozilla Firefox window is also visible in the background.

```
GNU nano 6.2 app.py *
# Programa de Isidro Lara Lopez
# Programacion de redes
[
from flask import Flask
app = Flask(__name__)

@app.route('/')
def hello_world():
    return 'Hello, Docker!'

Help      Write Out  Where Is   Cut        Execute    Location   M-U      M-A        M-]      M-Q
Exit      Read File  Replace    Paste      Justify    Go To Line Redo      Copy      Where Was Previous
10:07
```

Run your image as a container:

```
ilara@LPI: ~/Documentos/test-docker
Archivo Editar Ver Buscar Terminal Ayuda
ilara@LPI:~/Documentos/test-docker$ docker build --tag python-docker .
[+] Building 206.1s (14/14) FINISHED
=> [internal] load build definition from Dockerfile 0.5s
=> => transferring dockerfile: 257B 0.1s
=> [internal] load .dockerignore 0.4s
=> => transferring context: 2B 0.1s
=> resolve image config for docker.io/docker/dockerfile:1 5.2s
=> docker-image://docker.io/docker/dockerfile:1@sha256:9ba7531bd80fb0a858632727cf 106.1s
=> => resolve docker.io/docker/dockerfile:1@sha256:9ba7531bd80fb0a858632727cf7a112f 0.2s
=> => sha256:9ba7531bd80fb0a858632727cf7a112fbd19b17e94c4e84ced81e 2.00kB / 2.00kB 0.0s
=> => sha256:ad87fb83593d1b71f9alcfc1486c4aafcb253b1dabebf569768d6e166 528B / 528B 0.0s
=> => sha256:1e8a16826fd1c80a63fa6817a9c7284c94e40cded14a9b0d0d3722 2.37kB / 2.37kB 0.0s
=> => sha256:1328b32c40fca9bcf9d70d8eccb72eb873d1124d72dadce04db8 9.94MB / 9.94MB 104.8s
=> => extracting sha256:1328b32c40fca9bcf9d70d8eccb72eb873d1124d72dadce04db8badbe7b 0.3s
=> [internal] load .dockerignore 0.0s
=> [internal] load build definition from Dockerfile 0.0s
=> [internal] load metadata for docker.io/library/python:3.8-slim-buster 2.7s
=> [1/5] FROM docker.io/library/python:3.8-slim-buster@sha256:db90d6607a1c2ccb9bbc 72.9s
=> => resolve docker.io/library/python:3.8-slim-buster@sha256:db90d6607a1c2ccb9bbc 0.3s
=> => sha256:db90d6607a1c2ccb9bbc8a6fdf286d183c44bf8e9c92193ecd423254e8 988B / 988B 0.0s
=> => sha256:77c3488ce5476695aa0b018e6dcfe6c4a2bf2e5d1e4781a5e20ae0 1.37kB / 1.37kB 0.0s
=> => sha256:5cc94b67760dc542cb56567c7d7f5d9d19d9ec4b76d1b5494fc7a6 7.53kB / 7.53kB 0.0s
=> => sha256:6563993b0507bc602c27e376c26abd7766a8c8fa094da83beac1c8 2.78MB / 2.78MB 4.5s
=> => sha256:32820e52a00eb22dc76d70d992be7082cd24b636cfb597ff395 27.14MB / 27.14MB 66.0s
=> => sha256:eae6fe00ee3c3d4a62faa08362ff949fcf2fcb418bcc5ff932c 11.29MB / 11.29MB 41.0s
=> => sha256:bbc4b417983bad30835c8d28bae1dbca13f8e7636def13e2d090caec6 234B / 234B 5.2s
=> => sha256:b2f1e8a99da34fd5fdbc38fcf88bd78ab7d248f3d2feafa68b537 3.18MB / 3.18MB 15.5s
=> => extracting sha256:32820e52a00eb22dc76d70d992be7082cd24b636cfb597ff3951d29a821 1.7s
=> => extracting sha256:6563993b0507bc602c27e376c26abd7766a8c8fa094da83beac1c8cfcc8 0.3s
=> => extracting sha256:eae6fe00ee3c3d4a62faa08362ff949fcf2fcb418bcc5ff932c43613a11 0.6s
=> => extracting sha256:bbc4b417983bad30835c8d28bae1dbca13f8e7636def13e2d090caec61 0.0s
=> => extracting sha256:b2f1e8a99da34fd5fdbc38fcf88bd78ab7d248f3d2feafa68b5375dfb5f 0.3s
=> [internal] load build context 0.5s
=> => transferring context: 882B 0.1s
=> [2/5] WORKDIR /app 1.6s
=> [3/5] COPY requirements.txt requirements.txt 0.4s
=> [4/5] RUN pip3 install -r requirements.txt 12.3s
=> [5/5] COPY . . 0.7s
=> exporting to image 1.5s
```

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them

```
ilara@LPI:~/Documentos/test-docker$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
python-docker latest 5fa5ad997440 About a minute ago 128MB
ilara@LPI:~/Documentos/test-docker$ docker tag python-docker:latest python-docker:v1.0.0
ilara@LPI:~/Documentos/test-docker$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
python-docker latest 5fa5ad997440 2 minutes ago 128MB
python-docker v1.0.0 5fa5ad997440 2 minutes ago 128MB
ilara@LPI:~/Documentos/test-docker$ docker rmi python-docker:v1.0.0
Untagged: python-docker:v1.0.0
ilara@LPI:~/Documentos/test-docker$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
python-docker latest 5fa5ad997440 4 minutes ago 128MB
ilara@LPI:~/Documentos/test-docker$
```

```
ilara@LPI: ~/Documentos/test-docker
Archivo  Editar  Ver  Buscar  Terminal  Ayuda
ilara@LPI:~/Documentos/test-docker$ docker run --publish 8000:5000 python-docker
python-docker      python-docker:latest
ilara@LPI:~/Documentos/test-docker$ docker run --publish 8000:5000 python-docker
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* 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
^Cilara@LPI:~/Documentos/test-docker$
ilara@LPI:~/Documentos/test-docker$ docker run -d -p 8000:5000 python-docker
python-docker      python-docker:latest
ilara@LPI:~/Documentos/test-docker$ docker run -d -p 8000:5000 python-docker
aec49cb2a4ebd66787e3cb2b9f1edb03ab99400629c916838b38efdd9c6019bb
ilara@LPI:~/Documentos/test-docker$ curl localhost:8000
Hello, Docker!ilara@LPI:~/Documentos/test-docker$
ilara@LPI:~/Documentos/test-docker$ docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                    NAMES
aec49cb2a4eb   python-docker  "python3 -m flask ru..." 38 seconds ago Up 36 seconds  0.0.0.0:8000->5000/tcp   adoring_margulis
ilara@LPI:~/Documentos/test-docker$ docker stop adoring_margulis
adoring_margulis
ilara@LPI:~/Documentos/test-docker$
ilara@LPI:~/Documentos/test-docker$ docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                    NAMES
aec49cb2a4eb   python-docker  "python3 -m flask ru..."  About a minute ago  Exited (137) 18 seconds ago          adoring_margulis
65dcfd839f74   python-docker  "python3 -m flask ru..."  About a minute ago  Exited (0) About a minute ago        compassionate_clarke
2e8611e1bf67   python-docker  "python3 -m flask ru..."  4 minutes ago      Exited (0) 3 minutes ago             vibrant_chaum
afa9532337e2   python-docker  "python3 -m flask ru..."  7 minutes ago      Exited (0) 4 minutes ago             trusting_morse
1ef3d6cc5821   python-docker  "python3 -m flask ru..."  11 minutes ago     Exited (0) 7 minutes ago             zealous_mirzakhani
5440ea45fc6e   python-docker  "python3 -m flask ru..."  12 minutes ago     Exited (0) 12 minutes ago             mystifying_diffie
ilara@LPI:~/Documentos/test-docker$ docker restart adoring_margulis
adoring_margulis
ilara@LPI:~/Documentos/test-docker$ docker ps -all
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                    NAMES
aec49cb2a4eb   python-docker  "python3 -m flask ru..."  About a minute ago  Up 7 seconds  0.0.0.0:8000->5000/tcp   adoring_margulis
ilara@LPI:~/Documentos/test-docker$ docker stop adoring_margulis
adoring_margulis
ilara@LPI:~/Documentos/test-docker$ docker ps -all
```

```

ilara@LPI:~/Documentos/test-docker$ docker restart adoring_margulis
adoring_margulis
ilara@LPI:~/Documentos/test-docker$ docker ps -all
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
aec49cb2a4eb   python-docker  "python3 -m flask ru..." About a minute ago Up 7 seconds   0.0.0.0:8000->5000/tcp   adoring_margulis
ilara@LPI:~/Documentos/test-docker$ docker stop adoring_margulis
adoring_margulis
ilara@LPI:~/Documentos/test-docker$ docker ps -all
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
aec49cb2a4eb   python-docker  "python3 -m flask ru..." 2 minutes ago   Exited (137) 3 seconds ago                                adoring_margulis
ilara@LPI:~/Documentos/test-docker$ docker rm adoring_margulis compassionate_clarke vibrant_chaum trusting_morse zealous_mirzakhani mystifying_diffie
adoring_margulis
compassionate_clarke
vibrant_chaum
trusting_morse
zealous_mirzakhani
mystifying_diffie
ilara@LPI:~/Documentos/test-docker$ docker ps -all
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
ilara@LPI:~/Documentos/test-docker$ docker run -d -p 8000:5000 --name rest-server python-docker
9e455e86fac2971a9d9b20b8344f3469aa8694ec830e82cabe7d554402c7c064
ilara@LPI:~/Documentos/test-docker$

```