Create an EC2 instance using awscli

[1] Create a security group

aws ec2 create-security-group --group-name 22994257-sg --description "security group for development environment"

```
mjieli@mjieli-VirtualBox:~$ aws ec2 create-security-group --group-name 22994257-sg --descri
ption "security group for development environment"
{
    "GroupId": "sg-0815a4512c779763f"
}
```

[2] Authorise inbound traffic for ssh

aws ec2 authorize-security-group-ingress --group-name 22994257-sg --protocol tcp --port 22 --cidr 0.0.0.0/0

```
mjieli@mjieli-VirtualBox:~$ aws ec2 authorize-security-group-ingress --group-name 22994257-
sg --protocol tcp --port 22 --cidr 0.0.0.0/0
{
    "Return": true,
    "SecurityGroupRules": [
        {
            "SecurityGroupRuleId": "sgr-0fe1ba68a50cf81f4",
            "GroupId": "sg-0815a4512c779763f",
            "GroupOwnerId": "523265914192",
            "IsEgress": false,
            "IpProtocol": "tcp",
            "FromPort": 22,
            "ToPort": 22,
            "CidrIpv4": "0.0.0.0/0"
        }
    ]
}
```

[3] Create a key pair that will allow you to ssh to the EC2 instance

aws ec2 create-key-pair --key-name 22994257-key --query 'KeyMaterial' --output text > 22994257-key.pem

```
mjieli@mjieli-VirtualBox:~$ aws ec2 create-key-pair --key-name 22994257-key --query 'KeyMat
erial' --output text > 22994257-key.pem
```

```
mjieli@mjieli-VirtualBox:~$ ls
22994257-key.pem  Documents  lab1   Pictures  snap       Videos
Desktop           Downloads  Music  Public    Templates
```

chmod 400 22994257-key.pem

```
mjieli@mjieli-VirtualBox:~$ cp 22994257-key.pem ~/.ssh
mjieli@mjieli-VirtualBox:~$ cd ~/.ssh
mjieli@mjieli-VirtualBox:~/.ssh$ ls
22994257-key.pem
mjieli@mjieli-VirtualBox:~/.ssh$ chmod 400 22994257-key.pem
```

[4] Create the instance and note the instance id

aws ec2 run-instances --image-id ami-d38a4ab1 --security-group-ids 22994257-sg --count 1 --instance-type t2.micro --key-name 22994257-key --query 'Instances[0].InstanceId'

```
mjieli@mjieli-VirtualBox:~/.ssh$ aws ec2 run-instances --image-id ami-d38a4ab1 --security-g
roup-ids 22994257-sg --count 1 --instance-type t2.micro --key-name 22994257-key --query 'In
stances[0].InstanceId'
"i-034ed977bb1ce09c3"
```

[5] Get the public IP address

aws ec2 describe-instances --instance-ids i-034ed977bb1ce09c3 --query 'Reservations[0].Instances[0].PublicIpAddress'

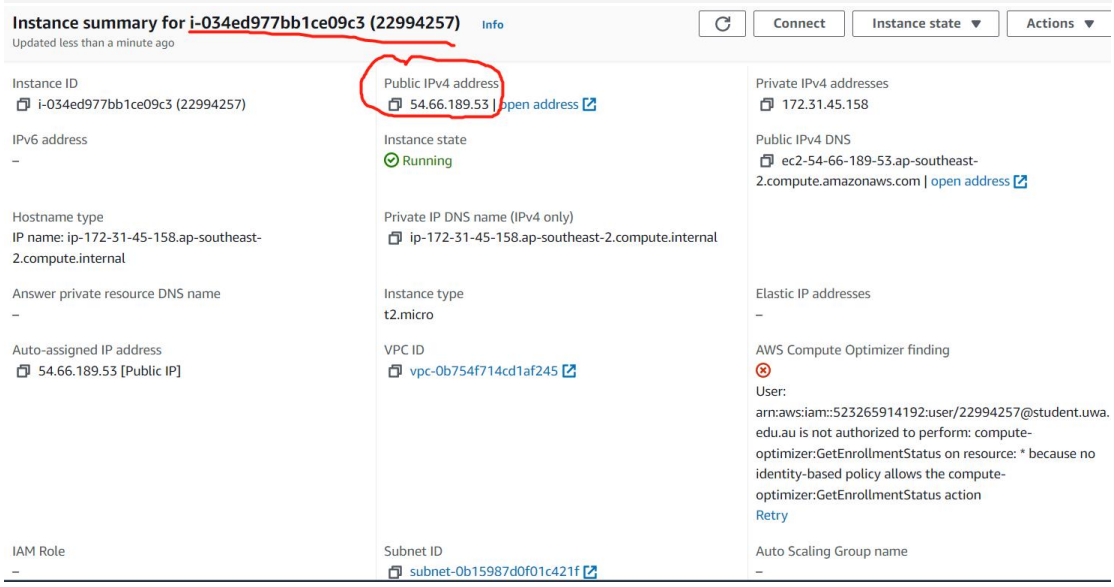
```
mjieli@mjieli-VirtualBox:~/.ssh$ aws ec2 describe-instances --instance-ids i-034ed977bb1ce0
9c3 --query 'Reservations[0].Instances[0].PublicIpAddress'
"54.66.189.53"
```

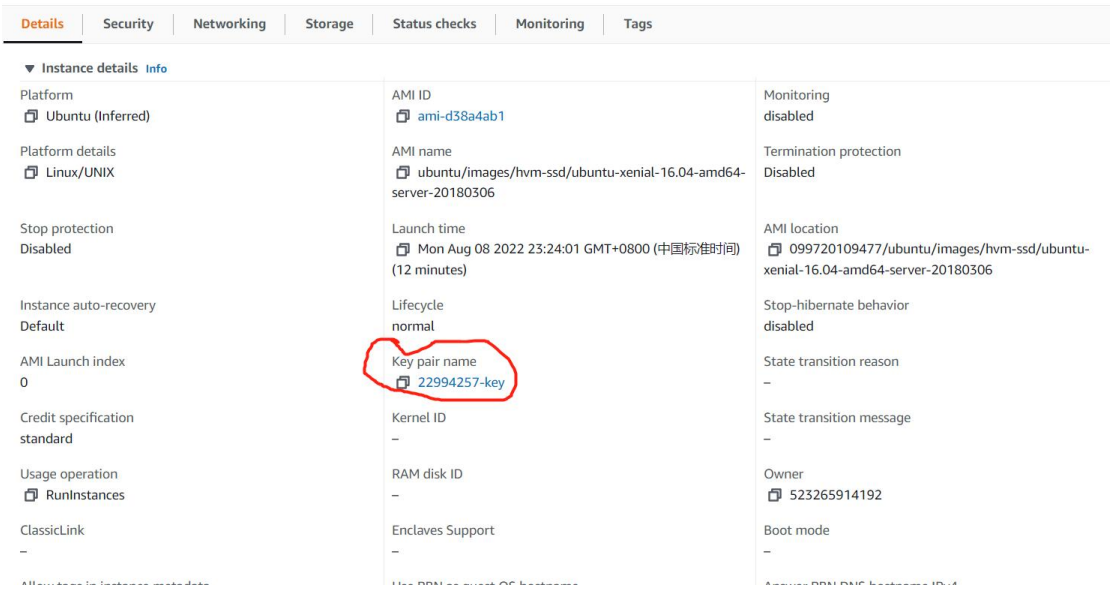
[6] Connect to the instance

ssh -i 22994257-key.pem ubuntu@54.66.189.53

```
mjieli@mjieli-VirtualBox:~/.ssh$ ssh -i 22994257-key.pem ubuntu@54.66.189.53
Welcome to Ubuntu 16.04.4 LTS (GNU/Linux 4.4.0-1052-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  Get cloud support with Ubuntu Advantage Cloud Guest:
    http://www.ubuntu.com/business/services/cloud

0 packages can be updated.
0 updates are security updates.



The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

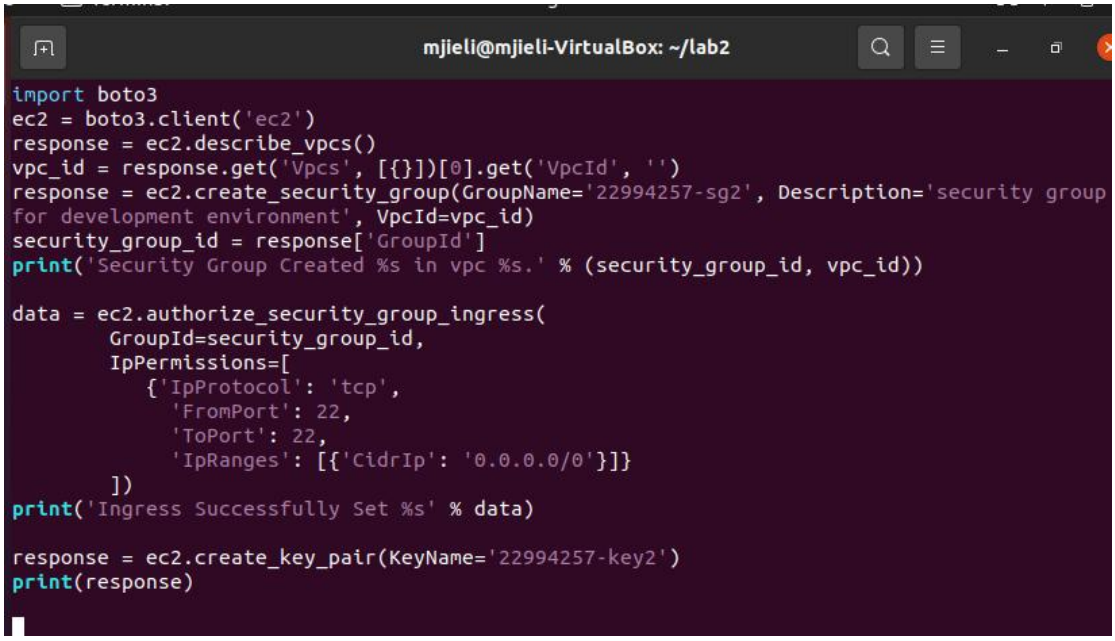
[7] Look at the instance using the AWS console





Create an EC2 instance Python Boto script

[1][2][3] Repeat the step1-3 using boot



```
mjieli@mjieli-VirtualBox:~/lab2$ python3 a.py
Security Group Created sg-0327937a1ee1b26fd in vpc vpc-0b754f714cd1af245.
Ingress Successfully Set {'Return': True, 'SecurityGroupRules': [{'SecurityGroupRuleId': 's
gr-05748635c9f0da6d2', 'GroupId': 'sg-0327937a1ee1b26fd', 'GroupOwnerId': '523265914192', '
IsEgress': False, 'IpProtocol': 'tcp', 'FromPort': 22, 'ToPort': 22, 'CidrIpv4': '0.0.0.0/0
'}], 'ResponseMetadata': {'RequestId': 'bf5da00e-ee71-4a51-83a0-7732ca74fe4e', 'HTTPStatusC
ode': 200, 'HTTPHeaders': {'x-amzn-requestid': 'bf5da00e-ee71-4a51-83a0-7732ca74fe4e', 'cac
he-control': 'no-cache, no-store', 'strict-transport-security': 'max-age=31536000; includeS
ubDomains', 'content-type': 'text/xml;charset=UTF-8', 'content-length': '719', 'date': 'Mon
, 08 Aug 2022 16:46:43 GMT', 'server': 'AmazonEC2'}, 'RetryAttempts': 0}}
{'KeyFingerprint': '9e:d0:5a:17:2f:ff:56:d8:0f:9f:2e:79:3f:9b:be:7c:97:4f:df:84', 'KeyMater
ial': '-----BEGIN RSA PRIVATE KEY-----\nMIIEogIBAAKCAQEApV/c2UGg9hOrgW0DB15ezWMZM39tzQ8sxzo
BMYkCgE35YI4n\nbXp2cskFm51x1pBgLuJB3Z2F7NqsA+94v9s9lP6hUKhgNUlyiEqNb2ujP1jBLmAx\nd5PYWCmHa7
lxtS/H8y7UD4/crv9xX3i6CrYWpbxzuSkRHRcfUFi/HxnQ+tlIZvAN\nqVKOhejk57WdY86Gk1aazE3Xz4Ruyg+Akvl
6KXCq0NWousKokvpVpEWDjPd/lz9K\nrVmVsYD7zJsEQCNZVslCJ7FzaII3FyNEu1riqGvXeVy701axN4Lqqyowh Zj2
AVoh\nXKDrDkMQiFuRxJsjnYcktq/S7nGHWvT2ChsULwIDAQABAoIBAEN3rZEQ/ksGUVT3\nFWI/NOwT/ucMmM4s37b
TykLcQ6H2rcOfmyRF7ub7bgdDn3rK4gKemgKAzm+H8t+U\nJi4XkrMjgsp2NvHmagyCZdtMDYi9e+qgoe3H6l5lavMe
7+3cdXWX6DoFFiJq4mTx\nyuytxuWM0aV7xJiao1LTMf3NOX3s2V8Cl4P2fmDEeXIIj/s0gcL7w1t+KHhMcCIu\nlrm
0XIwDnl/Km6YKIipbp+z1e3QTrwkhWr8TLTPDWKwGkta76hYTsXsT6+xZ4Ykx\n/8oskSvFOHI5AIs1MWIjY7eoOKMA
/QlJ+x2bOJkyOf1vE3456F5w8XooDcesFukT\nJZoUqZECgYEA1lXLVEl9QJAO1OyQdotjJWGn5EZW+ZeOq7vEo34IM
XMTRVlq6oqU\nxA7SQftYV0owsWktObt68JIVeX1ww/yBMJi7OFDn0RxdULVXkpXTYplwK0lspuSJ\nZQ38trdsplYw
DwsDpTBchtUF1YKEnX7NfOuSe4sL5dMZLEfc+3YQRRkCgYEAxYWV\nEbSlb+Z8WjMZkO+RByOOAJw4fmPhWC0zzvmzl
26tV340pDI2EUh1r92wYP5CJW1F\nDYqqDFu09loCyQRxRa/bi6LvwEOHW653Ew0LErYxVkTQ6Jv7n8GSyRj1QJ7JbM
HR\n93iLwnukSCJGqdhjjDVCw0ekMeT4red2A/gMRIcCgYATBVoeCMeMyzwFuVi4rHYI\nAzqbD4L4c3K92tQAjla7z
LKRHPZYCiRZodcW8+9LD9JybBsPXIv0fYJaXb98JRRx\n85vpy4RHEnVVjEJRR+qSfXtu2/1AclefGDatIGoL+Ooa66
dPKZOMg6sY35RVRcOG\nqoE9ZYGQy8MYIuiBiGC5QQKBgAuz9XgeFutBYb7KZkpjF1mv7pr0ppg+fLyHuRkb\nTFu9k
AGuFZpg6zks7OQlo2yrw+mJxtydiaO/z0IFZULZw4hYeg6U8dWXaq6w8Jct\nX6mVJ+kvnJ0bmNYHVxYZJ3bTsaWC+l
jKSKWWQ86OUVeA3a0R/smpNf5Kzb0oCKMF\nkFyDAoGAXIWavEwn1NBl4aQdHuv1qeAaPXdafCZcqxkV4ERVP8KobpB
UdqixqOIr\nM9e+cgja27whNESYhTG5B/tfr17WBsp8asPyBhG1deJy++RHhI+f4GOnsHwyi+cf\nQAOq26IW0QG0bV
q6i8VZAwC+TdzQsqSxLlTZLYT6xLRlov5zWog=\n-----END RSA PRIVATE KEY-----', 'KeyName': '2299425
7-key2', 'KeyPairId': 'key-0600cb287a9961cf9', 'ResponseMetadata': {'RequestId': 'dde8d8d4-
765d-4186-bb02-e0af8960b748', 'HTTPStatusCode': 200, 'HTTPHeaders': {'x-amzn-requestid': 'd
de8d8d4-765d-4186-bb02-e0af8960b748', 'cache-control': 'no-cache, no-store', 'strict-transp
ort-security': 'max-age=31536000; includeSubDomains', 'vary': 'accept-encoding', 'content-t
ype': 'text/xml;charset=UTF-8', 'content-length': '2090', 'date': 'Mon, 08 Aug 2022 16:46:4
3 GMT', 'server': 'AmazonEC2'}, 'RetryAttempts': 0}}
```

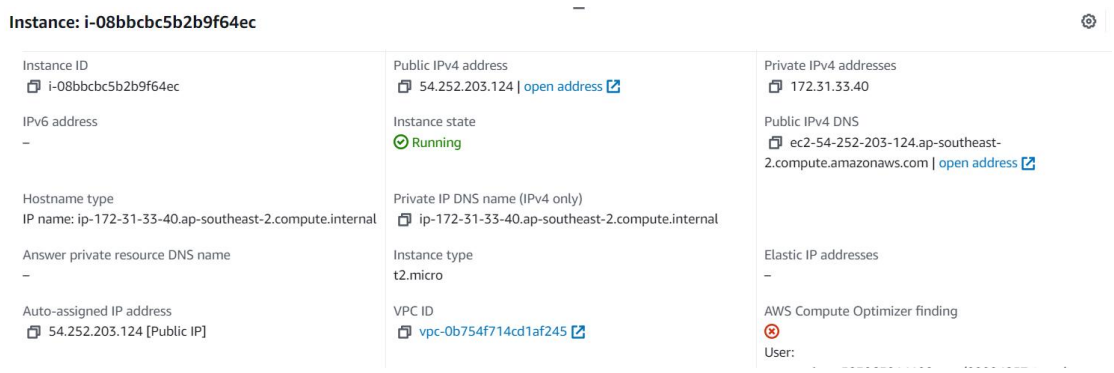
Security Group Created sg-0327937a1ee1b26fd in vpc vpc-0b754f714cd1af245

[4] Repeat the step4 to create the instance

```
import boto3
ec2 = boto3.client('ec2')

instance = ec2.run_instances(
    ImageId='ami-d38a4ab1',
    MaxCount=1,
    MinCount=1,
    InstanceType='t2.micro',
    SecurityGroupIds=[
        'sg-0327937a1ee1b26fd',
    ],
    KeyName='22994257-key'
)

print(instance)
~
```

```
mjieli@mjieli-VirtualBox:~/lab2$ python3 b.py
{'Groups': [], 'Instances': [{'AmiLaunchIndex': 0, 'ImageId': 'ami-d38a4ab1', 'InstanceId':
 'i-08bbcbc5b2b9f64ec', 'InstanceType': 't2.micro', 'KeyName': '22994257-key', 'LaunchTime'
: datetime.datetime(2022, 8, 8, 17, 4, 30, tzinfo=tzutc()), 'Monitoring': {'State': 'disabl
ed'}, 'Placement': {'AvailabilityZone': 'ap-southeast-2b', 'GroupName': '', 'Tenancy': 'def
ault'}, 'PrivateDnsName': 'ip-172-31-33-40.ap-southeast-2.compute.internal', 'PrivateIpAddr
ess': '172.31.33.40', 'ProductCodes': [], 'PublicDnsName': '', 'State': {'Code': 0, 'Name':
 'pending'}, 'StateTransitionReason': '', 'SubnetId': 'subnet-0b15987d0f01c421f', 'VpcId':
'vpc-0b754f714cd1af245', 'Architecture': 'x86_64', 'BlockDeviceMappings': [], 'ClientToken'
: 'f59bd43e-d177-4525-a23d-d1ac2de284df', 'EbsOptimized': False, 'EnaSupport': True, 'Hyper
visor': 'xen', 'NetworkInterfaces': [{'Attachment': {'AttachTime': datetime.datetime(2022,
8, 8, 17, 4, 30, tzinfo=tzutc()), 'AttachmentId': 'eni-attach-0e2eeb42c16a1991d', 'DeleteOn
Termination': True, 'DeviceIndex': 0, 'Status': 'attaching', 'NetworkCardIndex': 0}, 'Descr
iption': '', 'Groups': [{'GroupName': '22994257-sg2', 'GroupId': 'sg-0327937a1ee1b26fd'}],
'Ipv6Addresses': [], 'MacAddress': '06:84:dd:76:6d:b0', 'NetworkInterfaceId': 'eni-0fe3b585
03876caa7', 'OwnerId': '523265914192', 'PrivateDnsName': 'ip-172-31-33-40.ap-southeast-2.co
mpute.internal', 'PrivateIpAddress': '172.31.33.40', 'PrivateIpAddresses': [{'Primary': Tru
e, 'PrivateDnsName': 'ip-172-31-33-40.ap-southeast-2.compute.internal', 'PrivateIpAddress':
 '172.31.33.40'}], 'SourceDestCheck': True, 'Status': 'in-use', 'SubnetId': 'subnet-0b15987
d0f01c421f', 'VpcId': 'vpc-0b754f714cd1af245', 'InterfaceType': 'interface'}], 'RootDeviceN
ame': '/dev/sda1', 'RootDeviceType': 'ebs', 'SecurityGroups': [{'GroupName': '22994257-sg2'
, 'GroupId': 'sg-0327937a1ee1b26fd'}], 'SourceDestCheck': True, 'StateReason': {'Code': 'pe
nding', 'Message': 'pending'}, 'VirtualizationType': 'hvm', 'CpuOptions': {'CoreCount': 1,
'ThreadsPerCore': 1}, 'CapacityReservationSpecification': {'CapacityReservationPreference':
 'open'}, 'MetadataOptions': {'State': 'pending', 'HttpTokens': 'optional', 'HttpPutRespons
eHopLimit': 1, 'HttpEndpoint': 'enabled', 'HttpProtocolIpv6': 'disabled', 'InstanceMetadata
Tags': 'disabled'}, 'EnclaveOptions': {'Enabled': False}, 'PrivateDnsNameOptions': {'Hostna
meType': 'ip-name', 'EnableResourceNameDnsARecord': False, 'EnableResourceNameDnsAAAARecord
': False}, 'MaintenanceOptions': {'AutoRecovery': 'default'}}], 'OwnerId': '523265914192',
'ReservationId': 'r-0e8c06779a18e2b01', 'ResponseMetadata': {'RequestId': '7f21ab67-d12b-4a
02-b24d-c9d774e7664d', 'HTTPStatusCode': 200, 'HTTPHeaders': {'x-amzn-requestid': '7f21ab67
-d12b-4a02-b24d-c9d774e7664d', 'cache-control': 'no-cache, no-store', 'strict-transport-sec
urity': 'max-age=31536000; includeSubDomains', 'vary': 'accept-encoding', 'content-type': '
text/xml;charset=UTF-8', 'content-length': '5570', 'date': 'Mon, 08 Aug 2022 17:04:29 GMT',
 'server': 'AmazonEC2'}, 'RetryAttempts': 0}}
```

Instance ID is i-08bbcbc5b2b9f64ec



[5] Return the public IP of the instance

```
import boto3

ec2 = boto3.client('ec2')
response = ec2.describe_instances(
    InstanceIds=[
        'i-08bbcbc5b2b9f64ec',
    ]
)
print(response['Reservations'][0]['Instances'][0]['PublicIpAddress'])
```

```
mjieli@mjieli-VirtualBox:~/lab2$ vi c.py
mjieli@mjieli-VirtualBox:~/lab2$ python3 c.py
54.252.203.124
```

Public address is 54.252.203.124

Using Docker

[1] Install Docker and check the version

```
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for systemd (245.4-4ubuntu3.17) ...
mjieli@mjieli-VirtualBox:~$ sudo systemctl start docker
mjieli@mjieli-VirtualBox:~$ sudo systemctl enable docker
mjieli@mjieli-VirtualBox:~$ docker --version
Docker version 20.10.12, build 20.10.12-0ubuntu2~20.04.1
```

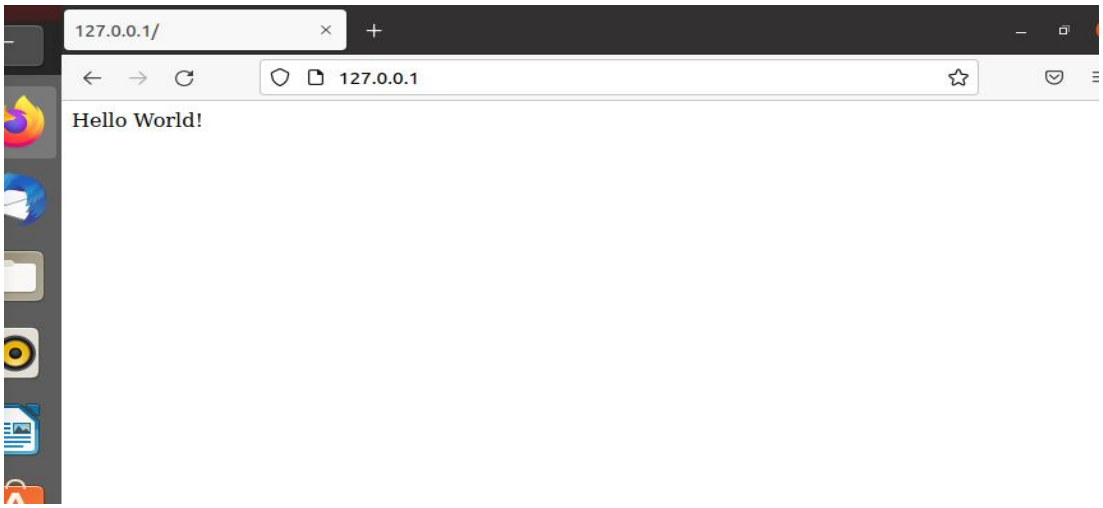
[2] Build the docker image

```
mjieli@mjieli-VirtualBox:~$ docker build -t my-apache2 .
Sending build context to Docker daemon  367.5MB
Step 1/2 : FROM httpd:2.4
2.4: Pulling from library/httpd
1efc276f4ff9: Pull complete
aed046121ed8: Pull complete
4340e7be3d7f: Pull complete
80e368ef21fc: Pull complete
80cb79a80bbe: Pull complete
Digest: sha256:343452ec820a5d59eb3ab9aaa6201d193f91c3354f8c4f29705796d9353d4cc6
Status: Downloaded newer image for httpd:2.4
 ---> f2a976f932ec
Step 2/2 : COPY ./html/ /usr/local/apache2/htdocs/
 ---> 59eed977c60c
Successfully built 59eed977c60c
Successfully tagged my-apache2:latest
```

[3] Run the image

```
mjieli@mjieli-VirtualBox:~$ docker run -p 80:80 -dit --name my-app my-apache2
2995dbdd44f05c1f12cec2b341b91a6719bd12d626110eecd1d4c25ae32a3f4a
```

[4]get Hello World!



[5] Other commands

```
mjieli@mjieli-VirtualBox:~$ docker ps -a
CONTAINER ID   IMAGE        COMMAND              CREATED         STATUS         PORTS
                     NAMES
2995dbdd44f0   my-apache2   "httpd-foreground"   2 minutes ago   Up 2 minutes   0.0.0.0:80-
>80/tcp, :::80->80/tcp   my-app
mjieli@mjieli-VirtualBox:~$ docker stop my-app
my-app
mjieli@mjieli-VirtualBox:~$ docker rm my-app
my-app
```