

Practical Worksheet 7

Create an EC2 instance

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with links like EC2 Dashboard, EC2 Global View, Events, Tags, Limits, Instances (selected), Instances (New), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances (New), Dedicated Hosts, Capacity Reservations, Images, Elastic Block Store, and Network & Security. The main content area has a search bar and filters for Instance state (running) and Key name (23344153-key). It lists one instance: i-08d5816b8aafbbc77, which is Running, t2.micro, and has 2/2 checks passed. Below this, the 'Instance: i-08d5816b8aafbbc77' details page is shown with tabs for Details, Security, Networking, Storage, Status checks, Monitoring, and Tags. The Details tab shows the instance summary with fields for Instance ID (i-08d5816b8aafbbc77), Public IPv4 address (3.24.178.138), Private IPv4 addresses (172.31.40.37), IPv6 address (-), Instance state (Running), Hostname type (IP name: ip-172-31-40-37.ap-southeast-2.compute.internal), and Private IP DNS name (ip-172-31-40-37.ap-southeast-2.compute.internal).

Install and configure Fabric

Install fabric.

```
(venv) >_ Labs/lab7 $ pip install fabric
Defaulting to user installation because normal site-packages is not writeable
Collecting fabric
  Using cached fabric-2.7.1-py2.py3-none-any.whl (53 kB)
Requirement already satisfied: invoke<2.0,>=1.3 in /Users/kaiqiliang/Library/Python/3.9/lib/python/site-packages (from fabric (1.7.1))
Requirement already satisfied: pathlib2 in /Users/kaiqiliang/Library/Python/3.9/lib/python/site-packages (from fabric (2.3.7.post1))
Requirement already satisfied: paramiko>=2.4 in /Users/kaiqiliang/Library/Python/3.9/lib/python/site-packages (from fabric (2.11.0))
Requirement already satisfied: cryptography>=2.5 in /Users/kaiqiliang/Library/Python/3.9/lib/python/site-packages (from paramiko>=2.4->fabric) (38.0.1)
Requirement already satisfied: pynacl>=1.0.1 in /Users/kaiqiliang/Library/Python/3.9/lib/python/site-packages (from paramiko>=2.4->fabric) (1.5.0)
Requirement already satisfied: six in /Applications/Xcode.app/Contents/Developer/Library/Frameworks/Python3.framework/Versions/3.9/lib/python3.9/site-packages (from paramiko>=2.4->fabric) (1.15.0)
Requirement already satisfied: bcrypt>=3.1.3 in /Users/kaiqiliang/Library/Python/3.9/lib/python/site-packages (from paramiko>=2.4->fabric) (4.0.0)
Requirement already satisfied: cffi>=1.12 in /Users/kaiqiliang/Library/Python/3.9/lib/python/site-packages (from cryptography>=2.5->paramiko>=2.4->fabric) (1.15.1)
Requirement already satisfied: pycparser in /Users/kaiqiliang/Library/Python/3.9/lib/python/site-packages (from cffi>=1.12->cryptography>=2.5->paramiko>=2.4->fabric) (2.21)
Installing collected packages: fabric
  WARNING: The script fab is installed in '/Users/kaiqiliang/Library/Python/3.9/bin' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed fabric-2.7.1
```

Create a config file in `~/.ssh` and test fabric from the command line.

```
(venv) >_ Labs/lab7 $ vi ~/.ssh/config
(venv) >_ Labs/lab7 $ cat $_ | tail -3
Host ec2
HostName 3.24.178.138
User ubuntu
(venv) >_ Labs/lab7 $ python
Python 3.9.6 (default, Aug 5 2022, 15:21:02)
[Clang 14.0.0 (clang-1400.0.29.102)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> from fabric import Connection
>>> conn = Connection('ec2')
>>> res = conn.run('uname')
Linux
```

Write a python script to automate the installation of nginx

```
...
lab7.py
...
from fabric import Connection
conn = Connection('ec2')

res = conn.sudo('apt-get update')
res = conn.sudo('apt-get upgrade')
res = conn.sudo('apt install nginx')
res = conn.put('default', 'default')
res = conn.sudo('mv default /etc/nginx/sites-enabled/default')
res = conn.sudo('service nginx restart')
```

Create a **default** file to be copied to the EC2 instance to replace the **/etc/nginx/sites-enabled/default** file.

```
(venv) >_ Labs/lab7 $ cat default
server {
    listen 80 default_server;
    listen [::]:80 default_server;

    location / {
        proxy_set_header X-Forwarded-Host $host;
        proxy_set_header X-Real-IP $remote_addr;

        proxy_pass http://127.0.0.1:8000;
    }
}
```

Run **lab7.py**.

```
(venv) >_ Labs/lab7 $ python lab7.py
Hit:1 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [114 kB]
Get:3 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [99.8 kB]
Get:4 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:5 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:6 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:7 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:8 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:9 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:10 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 kB]
Get:11 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [598 kB]
Get:12 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [141 kB]
Get:13 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [8632 kB]
Get:14 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [330 kB]
Get:15 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [51.3 kB]
Get:16 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [422 kB]
Get:17 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [106 kB]
Get:18 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [4404 kB]
Get:19 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [7220 kB]
```

Update the python script to install Django app

```
...
lab7.py
...
from fabric import Connection
conn = Connection('ec2')

res = conn.sudo('apt-get update')
res = conn.sudo('apt-get upgrade')
res = conn.sudo('apt install nginx')
res = conn.put('default', 'default')
res = conn.sudo('mv default /etc/nginx/sites-enabled/default')
res = conn.sudo('service nginx restart')

res = conn.sudo('apt install python3-pip')
res = conn.sudo('pip install django')
res = conn.sudo('mkdir -p /opt/wwc/mysites')
res = conn.put('lab.tar', 'lab.tar')
res = conn.sudo('tar xf lab.tar -C /opt/wwc/mysites/')
res = conn.run('cd /opt/wwc/mysites/lab; sudo python3 manage.py runserver 8000')
```

Set up **django** locally and create a tar file of the entire app.

```
(venv) >_ Labs/lab7 $ pip install django
Defaulting to user installation because normal site-packages is not writeable
Collecting django
  Downloading Django-4.1.1-py3-none-any.whl (8.1 MB)
     ━━━━━━━━━━━━━━━━ 8.1/8.1 MB 6.5 MB/s eta 0:00:00
Collecting sqlparse>=0.2.2
  Downloading sqlparse-0.4.2-py3-none-any.whl (42 kB)
     ━━━━━━━━━━━━━━ 42.3/42.3 kB 1.4 MB/s eta 0:00:00
Collecting asgiref<4,>=3.5.2
  Downloading asgiref-3.5.2-py3-none-any.whl (22 kB)
Installing collected packages: sqlparse, asgiref, django
  WARNING: The script sqlformat is installed in '/Users/kaiqiliang/Library/Python/3.9/bin' which is
not on PATH.
    Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-
script-location.
  WARNING: The script django-admin is installed in '/Users/kaiqiliang/Library/Python/3.9/bin' which
is not on PATH.
    Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-
script-location.
Successfully installed asgiref-3.5.2 django-4.1.1 sqlparse-0.4.2
(venv) >_ Labs/lab7 $ python -m django startproject lab
(venv) >_ Labs/lab7 $ cd lab
(venv) >_ lab7/lab $ python manage.py startapp polls
(venv) >_ lab7/lab $ vi lab/urls.py
(venv) >_ lab7/lab $ cd polls
(venv) >_ lab/polls $ vi views.py
(venv) >_ lab/polls $ vi urls.py
(venv) >_ lab/polls $ cd ..
(venv) >_ lab7/lab $ python manage.py runserver 8000
Watching for file changes with StatReloader
Performing system checks...
```

```
System check identified no issues (0 silenced).
```

```
You have 18 unapplied migration(s). Your project may not work properly until you apply the migration
s for app(s): admin, auth, contenttypes, sessions.
Run 'python manage.py migrate' to apply them.
September 23, 2022 - 13:30:10
Django version 4.1.1, using settings 'lab.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
[23/Sep/2022 13:30:14] "GET /polls/ HTTP/1.1" 200 13
(venv) >_ lab7/lab $ cd ..
(venv) >_ Labs/lab7 $ tar cvf lab.tar lab
a lab
a lab/lab
a lab/db.sqlite3
a lab/polls
a lab/manage.py
a lab/polls/migrations
a lab/polls/models.py
a lab/polls/__init__.py
a lab/polls/apps.py
a lab/polls/admin.py
a lab/polls/tests.py
a lab/polls/urls.py
a lab/polls/views.py
a lab/polls/migrations/__init__.py
a lab/lab/asgi.py
a lab/lab/__init__.py
a lab/lab/settings.py
a lab/lab/urls.py
a lab/lab/wsgi.py
```

Run the updated `lab7.py` to install `django` and run the server on the EC2 instance.

```
Reading package lists...
Building dependency tree...
Reading state information...
nginx is already the newest version (1.18.0-6ubuntu14.2).
0 upgraded, 0 newly installed, 0 to remove and 13 not upgraded.
Collecting django
  Downloading Django-4.1.1-py3-none-any.whl (8.1 MB)
    ━━━━━━━━━━━━━━━━ 8.1/8.1 MB 32.8 MB/s eta 0:00:00
Collecting asgiref<4,>=3.5.2
  Downloading asgiref-3.5.2-py3-none-any.whl (22 kB)
Collecting sqlparse>=0.2.2
  Downloading sqlparse-0.4.2-py3-none-any.whl (42 kB)
    ━━━━━━━━━━━━━━ 42.3/42.3 KB 6.6 MB/s eta 0:00:00
Installing collected packages: sqlparse, asgiref, django
Successfully installed asgiref-3.5.2 django-4.1.1 sqlparse-0.4.2
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour w
ith the system package manager. It is recommended to use a virtual environment instead: https://pip.
pypa.io/warnings/venv
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).

You have 18 unapplied migration(s). Your project may not work properly until you apply the migration
s for app(s): admin, auth, contenttypes, sessions.
Run 'python manage.py migrate' to apply them.
September 23, 2022 - 13:52:08
Django version 4.1.1, using settings 'lab.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

Go to a browser and enter the public IP address of the ec2 instance.

