Grau Bioinformàtica
Curs 2024-2025
Distributed systems and web development
Django lab – AWS Elastic Beanstalk
Based in AWS Deploying a Django application with Elastic Beanstalk

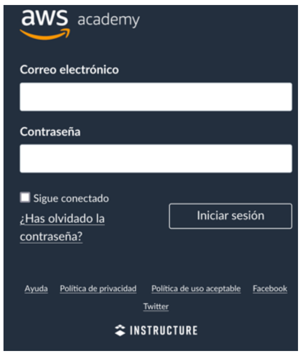
https://docs.aws.amazon.com/elasticbeanstalk/latest/dg/create-deploy-python-django.html

1. Work environment preparation

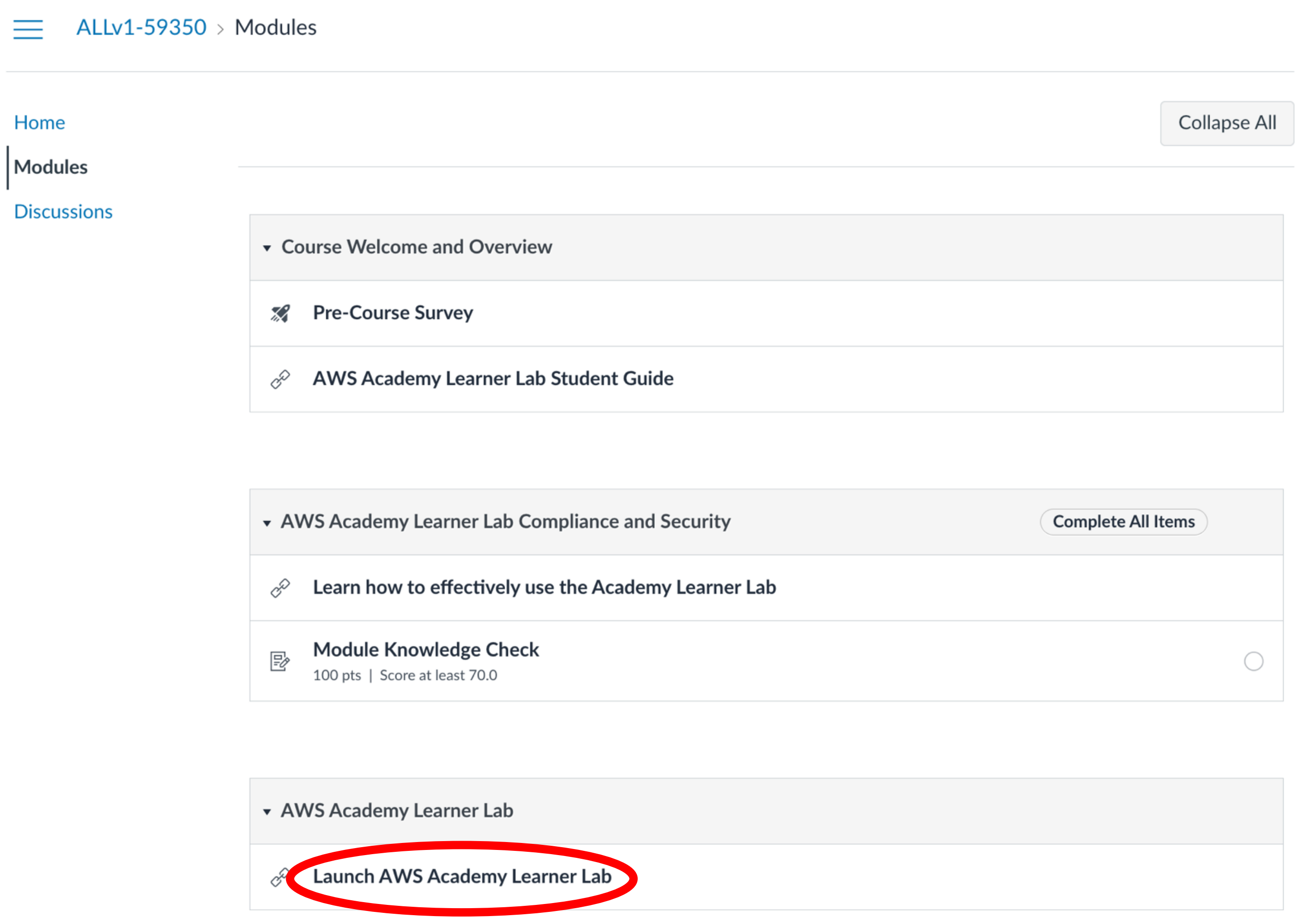
This tutorial will help you to create a simple Django website and run it in a cloud AWS Elastic Beanstalk environment running Python. We are going to create a local application and then deploy it in an AWS cloud service.

Check your inbox to find an invitation for AWS Academy courses. You will need to set up a canvas account, then you can login to AWS Academy services by using your e-mail and password:

https://awsacademy.instructure.com/login/canvas



Enter the AWS Academy Learner Lab course and go to modules option in the left menu:


ALLv1-59350 > Modules

Home
Modules
Discussions

Collapse All

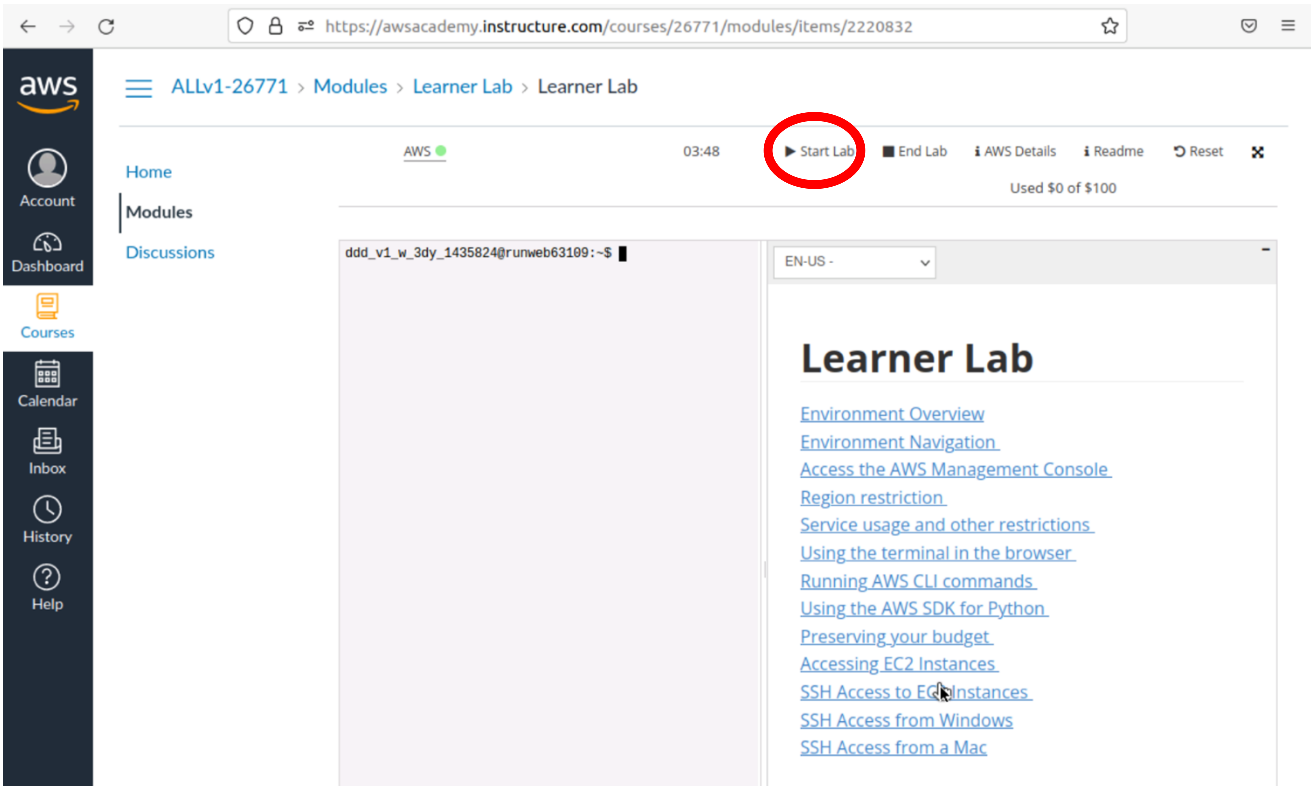
Course Welcome and Overview
- Pre-Course Survey
- AWS Academy Learner Lab Student Guide

AWS Academy Learner Lab Compliance and Security — Complete All Items
- Learn how to effectively use the Academy Learner Lab
- Module Knowledge Check
  100 pts | Score at least 70.0

AWS Academy Learner Lab
- Launch AWS Academy Learner Lab

Scroll down to the bottom of the list of modules until you find the AWS Academy Learner Lab and open it. You will see a welcome page to Learner Lab Sandbox environment overview.

Agree with the terms and your lab environment Lab should be ready to be used. You just need to start it.

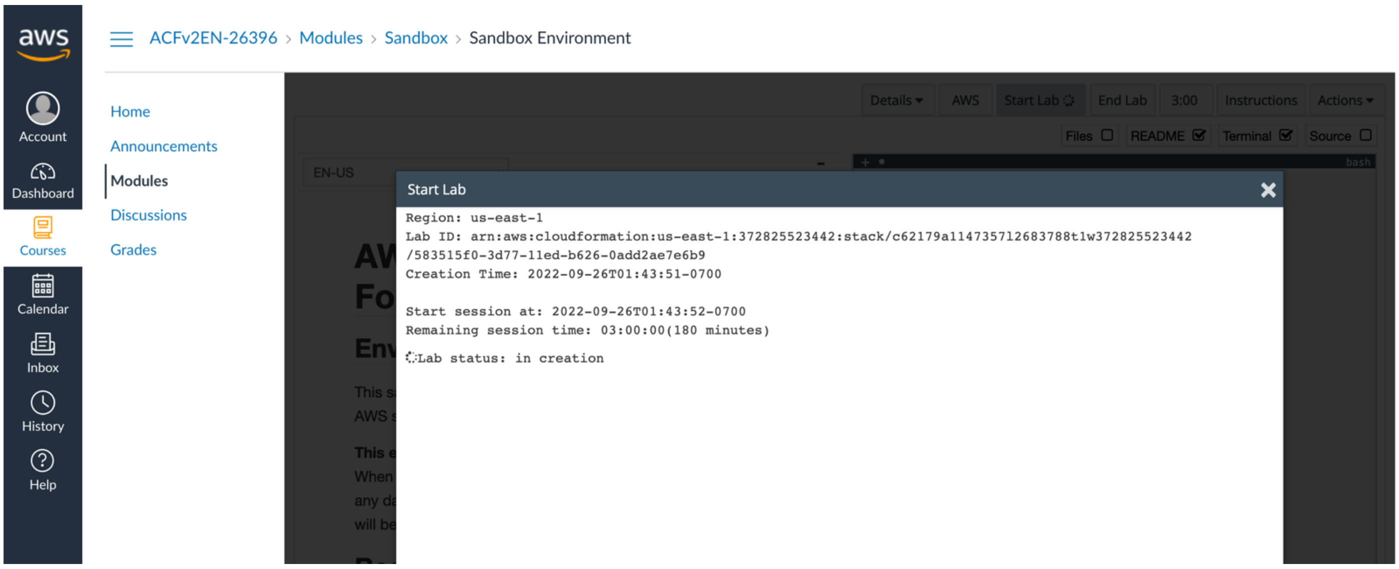


```
ddd_v1_w_3dy_1435824@runweb63109:~$
```

Learner Lab

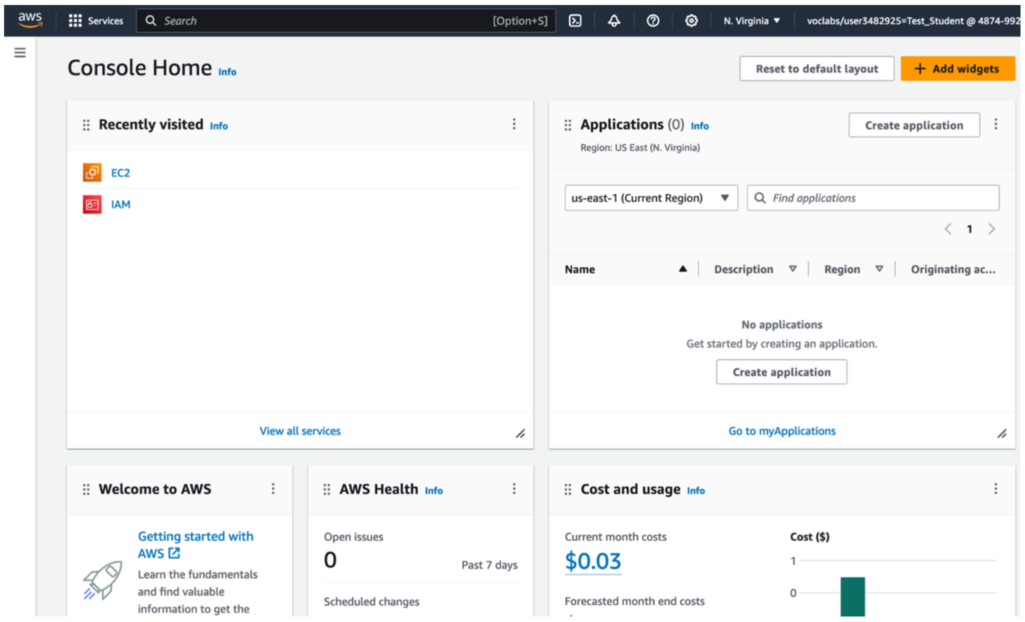
- Environment Overview
- Environment Navigation
- Access the AWS Management Console
- Region restriction
- Service usage and other restrictions
- Using the terminal in the browser
- Running AWS CLI commands
- Using the AWS SDK for Python
- Preserving your budget
- Accessing EC2 Instances
- SSH Access to EC2 Instances
- SSH Access from Windows
- SSH Access from a Mac

Use the Start lab button and wait for AWS infrastructure to be built (some minutes). AWS lab color will change from red to green. You will see that there is a timer set at 4:00 hours.



```
Region: us-east-1
Lab ID: arn:aws:cloudformation:us-east-1:372825523442:stack/c62179a1147357l2683788t1w372825523442
/583515f0-3d77-11ed-b626-0add2ae7e6b9
Creation Time: 2022-09-26T01:43:51-0700

Start session at: 2022-09-26T01:43:52-0700
Remaining session time: 03:00:00(180 minutes)
Lab status: in creation
```

Use the AWS green bullet to enter the AWS services console home:



Console Home Info

Reset to default layout | + Add widgets

Recently visited Info

- EC2
- IAM

View all services

Applications (0) Info | Create application

Region: US East (N. Virginia)

us-east-1 (Current Region) | Find applications

Name	Description	Region	Originating ac...

No applications

Get started by creating an application.

Create application

Go to myApplications

Welcome to AWS

Getting started with AWS

Learn the fundamentals and find valuable information to get the

AWS Health Info

Open issues

0 Past 7 days

Scheduled changes

Cost and usage Info

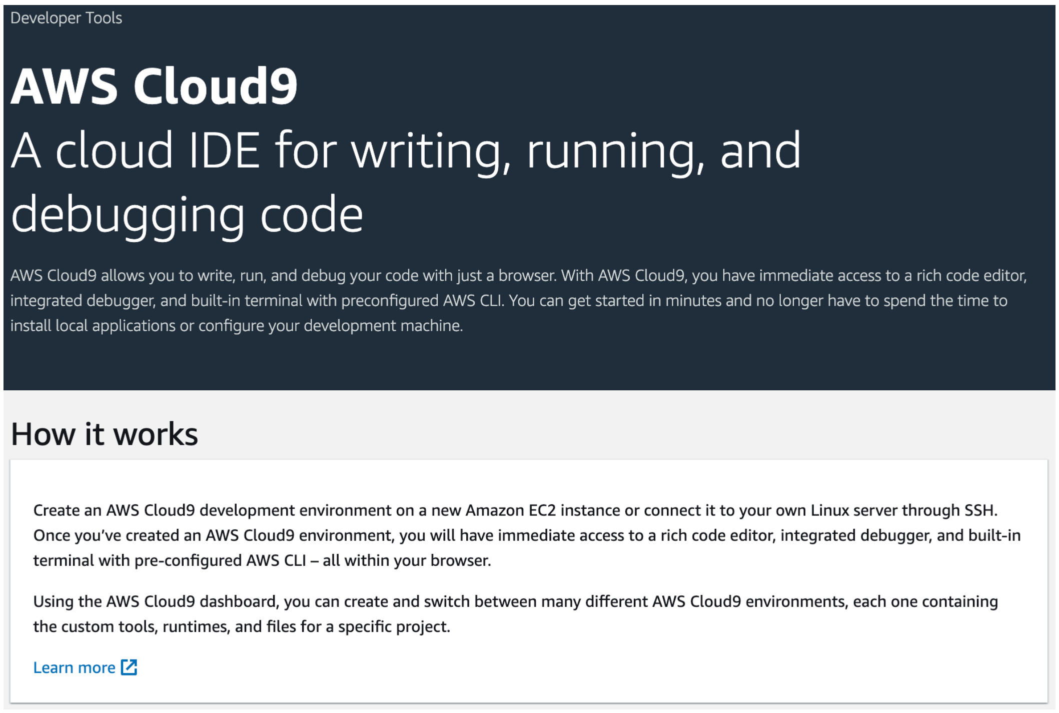
Current month costs

$0.03

Forecasted month end costs

Cost ($)

Now you must search for cloud9 IDE environment to access AWS Cloud9:



Developer Tools

AWS Cloud9

A cloud IDE for writing, running, and debugging code

AWS Cloud9 allows you to write, run, and debug your code with just a browser. With AWS Cloud9, you have immediate access to a rich code editor, integrated debugger, and built-in terminal with preconfigured AWS CLI. You can get started in minutes and no longer have to spend the time to install local applications or configure your development machine.

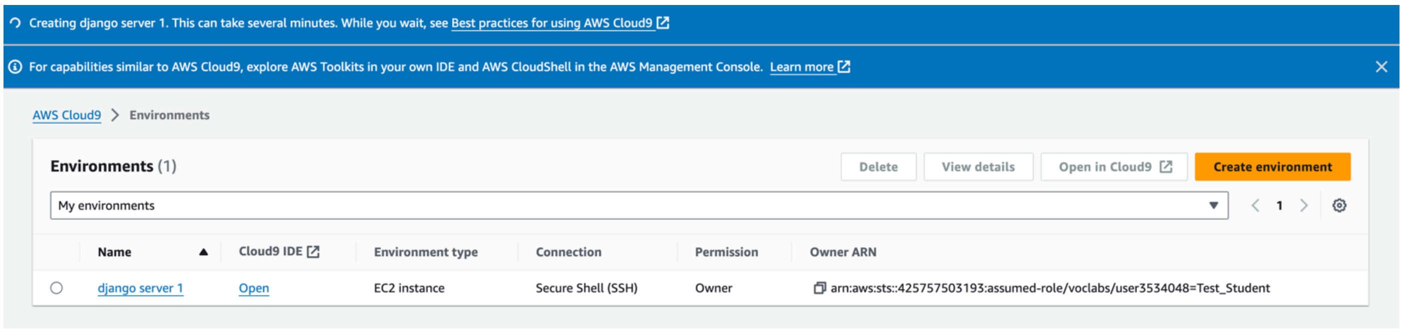
How it works

Create an AWS Cloud9 development environment on a new Amazon EC2 instance or connect it to your own Linux server through SSH. Once you've created an AWS Cloud9 environment, you will have immediate access to a rich code editor, integrated debugger, and built-in terminal with pre-configured AWS CLI – all within your browser.

Using the AWS Cloud9 dashboard, you can create and switch between many different AWS Cloud9 environments, each one containing the custom tools, runtimes, and files for a specific project.

Learn more

Find "Create environment" yellow button and use it to create a new working environment providing a name: "django server 1" and selecting "secure shell (SSH)" option in Network settings and then clicking on create button.


Creating django server 1. This can take several minutes. While you wait, see Best practices for using AWS Cloud9

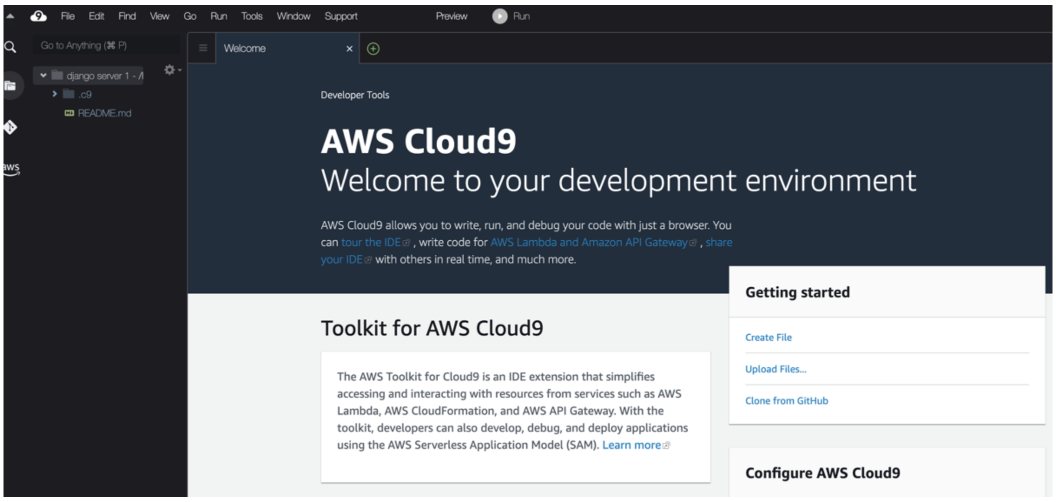
For capabilities similar to AWS Cloud9, explore AWS Toolkits in your own IDE and AWS CloudShell in the AWS Management Console. Learn more

AWS Cloud9 > Environments

Environments (1)

	Name	Cloud9 IDE	Environment type	Connection	Permission	Owner ARN
○	django server 1	Open	EC2 instance	Secure Shell (SSH)	Owner	arn:aws:sts::425757503193:assumed-role/voclabs/user3534048=Test_Student

After some minutes of creation and configuration, we will have our new Django server environment. To open it, use "Open in Cloud9" button. A new IDE welcome page will be opened



Developer Tools

AWS Cloud9

Welcome to your development environment

AWS Cloud9 allows you to write, run, and debug your code with just a browser. You can tour the IDE, write code for AWS Lambda and Amazon API Gateway, share your IDE with others in real time, and much more.

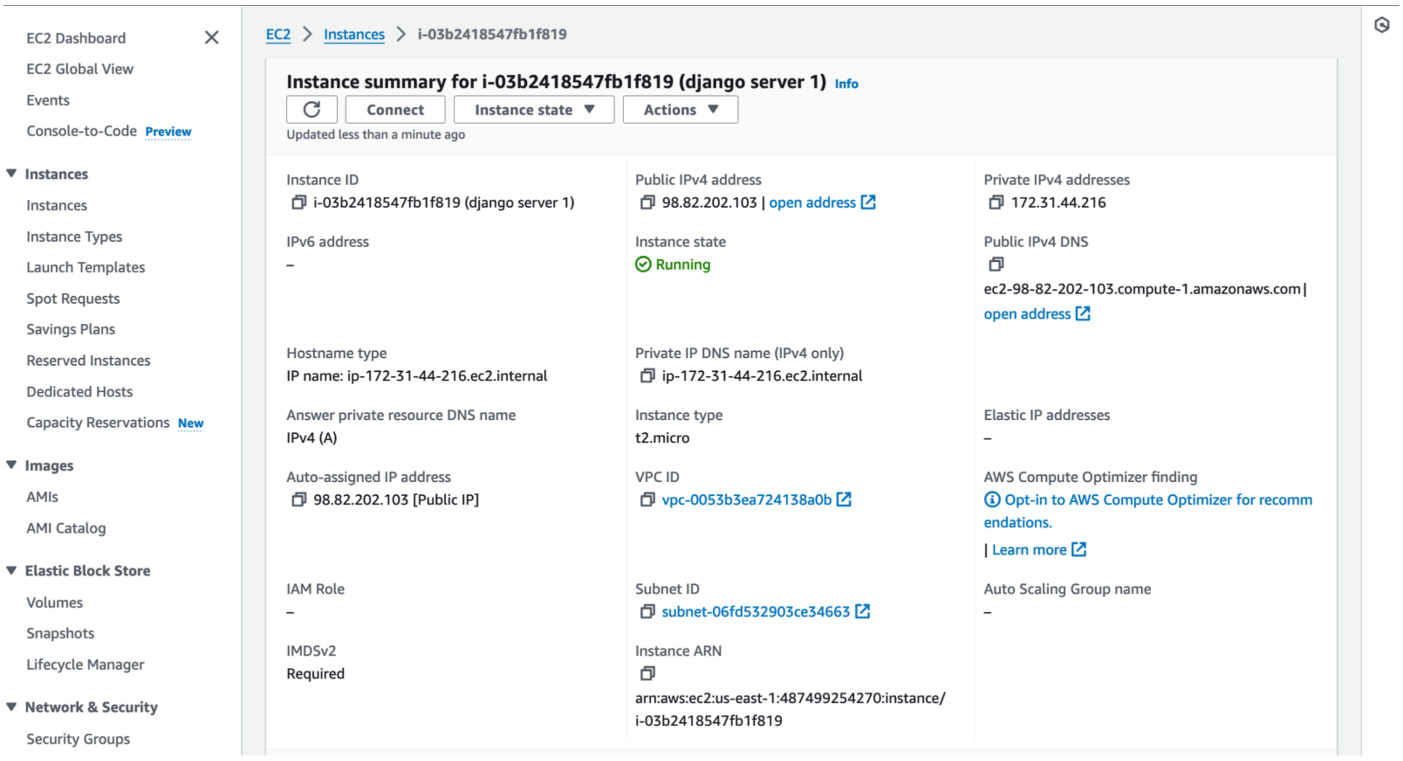
Getting started

Toolkit for AWS Cloud9

The AWS Toolkit for Cloud9 is an IDE extension that simplifies accessing and interacting with resources from services such as AWS Lambda, AWS CloudFormation, and AWS API Gateway. With the toolkit, developers can also develop, debug, and deploy applications using the AWS Serverless Application Model (SAM). Learn more

Configure AWS Cloud9

Go back to AWS services console home and search for **EC2** instances. You will find a new instance that is running. Please click on instance ID blue link to review its details:



EC2 > Instances > i-03b2418547fb1f819

Instance summary for i-03b2418547fb1f819 (django server 1) Info

Updated less than a minute ago

Instance ID: i-03b2418547fb1f819 (django server 1)

Public IPv4 address: 98.82.202.103 | open address

Private IPv4 addresses: 172.31.44.216

IPv6 address: –

Instance state: Running

Public IPv4 DNS: ec2-98-82-202-103.compute-1.amazonaws.com | open address

Hostname type: IP name: ip-172-31-44-216.ec2.internal

Private IP DNS name (IPv4 only): ip-172-31-44-216.ec2.internal

Answer private resource DNS name: IPv4 (A)

Instance type: t2.micro

Elastic IP addresses: –

Auto-assigned IP address: 98.82.202.103 [Public IP]

VPC ID: vpc-0053b3ea724138a0b

AWS Compute Optimizer finding: Opt-in to AWS Compute Optimizer for recommendations. | Learn more

IAM Role: –

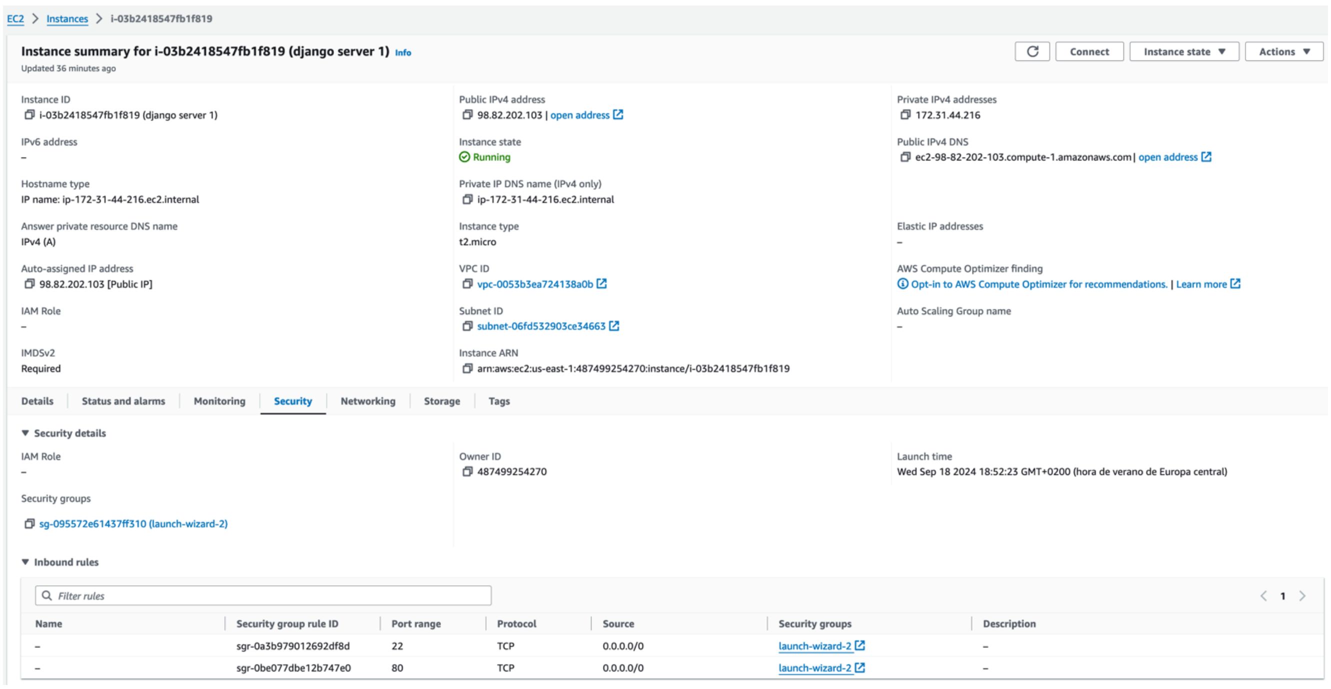
Subnet ID: subnet-06fd532903ce34663

Auto Scaling Group name: –

IMDSv2: Required

Instance ARN: arn:aws:ec2:us-east-1:487499254270:instance/i-03b2418547fb1f819

Please write down your public IPv4 address for later use. In our example this address is 98.82.202.103. Now, we need to create an inbound rule to allow web traffic coming in. Click on the **Security** tab, then in **Security groups**


EC2 > Instances > i-03b2418547fb1f819

Instance summary for i-03b2418547fb1f819 (django server 1) Info
Updated 36 minutes ago

Instance ID i-03b2418547fb1f819 (django server 1)	Public IPv4 address 98.82.202.103 | open address	Private IPv4 addresses 172.31.44.216
IPv6 address –	Instance state Running	Public IPv4 DNS ec2-98-82-202-103.compute-1.amazonaws.com | open address
Hostname type IP name: ip-172-31-44-216.ec2.internal	Private IP DNS name (IPv4 only) ip-172-31-44-216.ec2.internal	
Answer private resource DNS name IPv4 (A)	Instance type t2.micro	Elastic IP addresses –
Auto-assigned IP address 98.82.202.103 [Public IP]	VPC ID vpc-0053b3ea724138a0b	AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations. | Learn more
IAM Role –	Subnet ID subnet-06fd532903ce34663	Auto Scaling Group name –
IMDSv2 Required	Instance ARN arn:aws:ec2:us-east-1:487499254270:instance/i-03b2418547fb1f819	

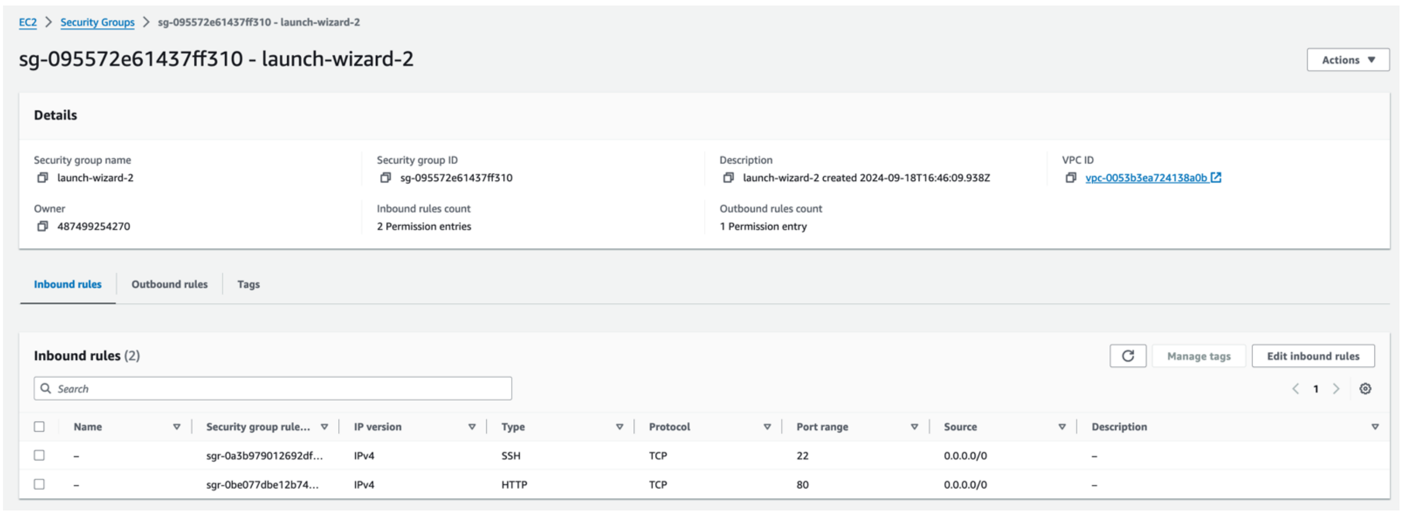
Security details

IAM Role –	Owner ID 487499254270	Launch time Wed Sep 18 2024 18:52:23 GMT+0200 (hora de verano de Europa central)
Security groups sg-095572e61437ff310 (launch-wizard-2)		

Inbound rules

Name	Security group rule ID	Port range	Protocol	Source	Security groups	Description
–	sgr-0a3b979012692df8d	22	TCP	0.0.0.0/0	launch-wizard-2	–
–	sgr-0be077dbe12b747e0	80	TCP	0.0.0.0/0	launch-wizard-2	–

Click on **Edit inbound rules** box


EC2 > Security Groups > sg-095572e61437ff310 - launch-wizard-2

sg-095572e61437ff310 - launch-wizard-2

Details

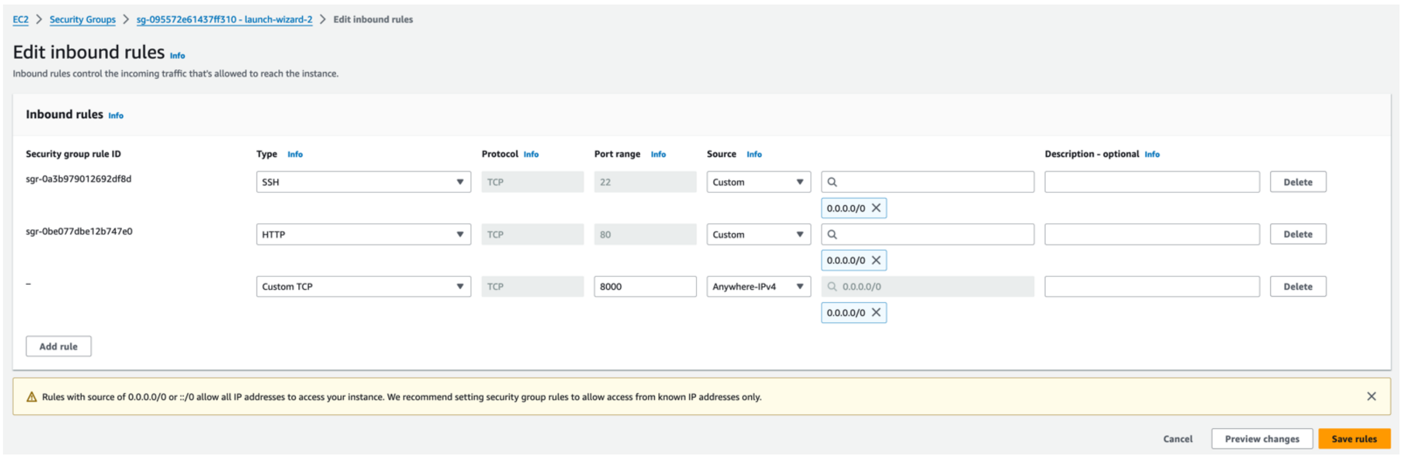
Security group name launch-wizard-2	Security group ID sg-095572e61437ff310	Description launch-wizard-2 created 2024-09-18T16:46:09.938Z	VPC ID vpc-0053b3ea724138a0b
Owner 487499254270	Inbound rules count 2 Permission entries	Outbound rules count 1 Permission entry	

Inbound rules (2)

Name	Security group rule...	IP version	Type	Protocol	Port range	Source	Description
–	sgr-0a3b979012692df...	IPv4	SSH	TCP	22	0.0.0.0/0	–
–	sgr-0be077dbe12b74...	IPv4	HTTP	TCP	80	0.0.0.0/0	–

Now **Add a new Custom TCP rule** with the following parameters,
Type: Custom TCP
Port range: 8080
Source: Anywhere-IPv4, 0.0.0.0/0

and then press **Save rules**



EC2 > Security Groups > sg-095572e61437ff310 - launch-wizard-2 > Edit inbound rules

Edit inbound rules Info

Inbound rules control the incoming traffic that's allowed to reach the instance.

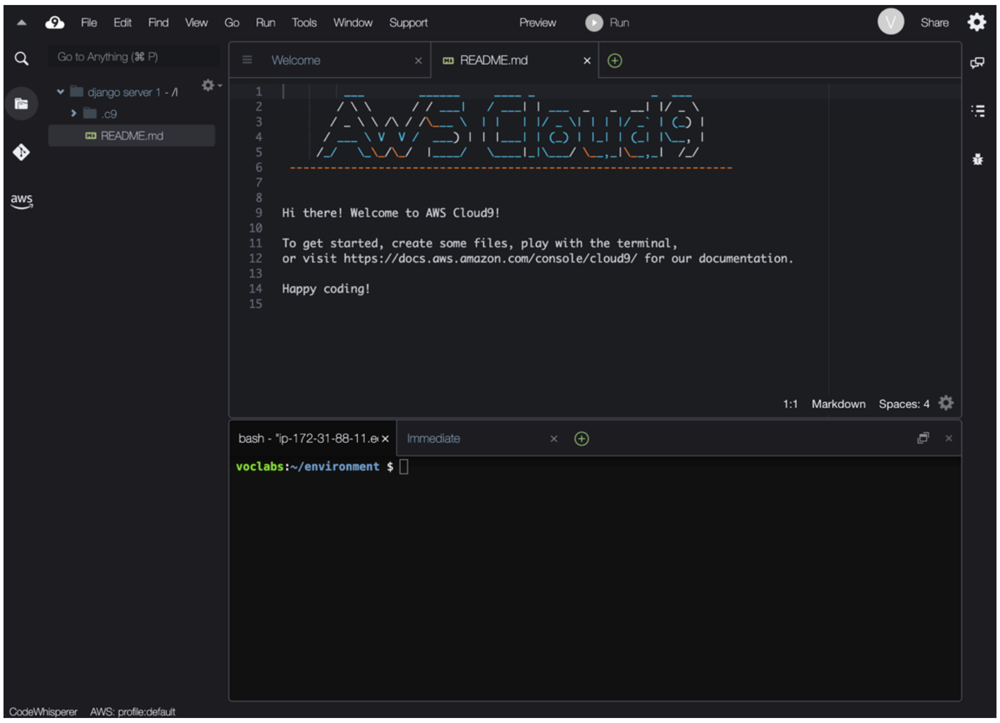
Inbound rules Info

Security group rule ID	Type	Protocol	Port range	Source		Description - optional
sgr-0a3b979012692df8d	SSH	TCP	22	Custom	0.0.0.0/0	
sgr-0be077dbe12b747e0	HTTP	TCP	80	Custom	0.0.0.0/0	
–	Custom TCP	TCP	8000	Anywhere-IPv4	0.0.0.0/0	

⚠ Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

2. Django environment creation

Go back to your AWS Cloud 9 development environment tab in your browser to create a new Django application. Check that the browser window has a file navigation, a file viewer and a console window in the bottom



```
Hi there! Welcome to AWS Cloud9!

To get started, create some files, play with the terminal,
or visit https://docs.aws.amazon.com/console/cloud9/ for our documentation.

Happy coding!
```

```
voclabs:~/environment $
```

To use Django, we first need to install Python and then install Django 2.2 distribution using pip installer. In our case we are going to use a Cloud9 environment Linux system. Use the bottom terminal and type the commands to create a Django application environment:

```
cd /home/ec2-user/environment
sudo yum install python-is-python3 -y
sudo yum install pip -y
pip install virtualenv
```

In any case, you should install AWS terminal client:

```
pip install awsebcli
```

Second step: prepare a new Python application virtual environment. In this case, it will be named eb-virt:

```
virtualenv eb-virt

source eb-virt/bin/activate

pip install django==2.2
```

Finally, we create a new local Django application using the templates

```
django-admin startproject ebdjango

results are standard django site name ebdjango with this structure:
/home/alumno/ebdjango
  |-- ebdjango
  |    |-- __init__.py
  |    |-- settings.py
  |    |-- urls.py
  |    `-- wsgi.py
  `-- manage.py
```

Open ebdjango/ebdjango/settings.py file in Cloud9 IDE and edit ALLOWED_HOSTS line so that it contains this configuration:

```
ALLOWED_HOSTS = ['*',]
```

So, let's run our local server and check that everything is working fine

```
cd /home/ec2-user/environment/ebdjango

python manage.py runserver 0:8080
Django version 2.2, using settings 'ebdjango.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
[07/Sep/2018 20:14:09] "GET / HTTP/1.1" 200 16348
```

Start a web browser and open **http://<your ip here>:8080** to view the created site.

Use Ctrl+C in terminal to stop the web server and return to your virtual environment.

3. Configuration of Django application for AWS Elastic Beanstalk

Our application is ready to be executed in the cloud. AWS has a special service for running Django applications that will start a list of services that our application needs, then we will send our application code so that it is available for the users.

```
cd /home/ec2-user/environment/ebdjango
pip freeze > requirements.txt
```

Create a new directory named `.ebextensions` and create a new `django.config` file inside it.

```

mkdir .ebextensions
cd .ebextensions
```

This file sets WSGIPath, which specifies the location of the WSGI script that Elastic Beanstalk will use to start the application.

Create a new file:

/home/ec2-user/environment/ebdjango/.ebextensions/django.config.

Please follow the text indenting of the example and do not use TAB, just blank spaces

```
nano /home/ec2-user/environment/ebdjango/.ebextensions/django.config

option_settings:
  aws:elasticbeanstalk:container:python:
    WSGIPath: ebdjango.wsgi:application
```

Finally, we deactivate the virtual environment as we have finished the configuration steps

```
deactivate
```

We will need to activate this environment again if we need to add changes to our application or run it locally.

4. AWS Elastic Beanstalk deployment with EB CLI

Your **ebdjango** application directory should look like this:

```
cd /home/ec2-user/environment/ebdjango
ls -la

/home/alumno/ebdjango/
|-- .ebextensions
|   `-- django.config
|-- ebdjango
|   |-- __init__.py
|   |-- settings.py
|   |-- urls.py
|   `-- wsgi.py
|-- db.sqlite3
|-- manage.py
`-- requirements.txt
```

Now we are going to use a command line interface *(eb)* to create a new cloud application environment and then deploy our application to run in the cloud with Elastic Beanstalk. If you make a mistake in the configuration you will have to eliminate the environment (step 7) and start again.

1. Initialize your EB CLI repository with **eb init** command in your local terminal:

```
eb init -i

Select a default region
1) us-east-1 : US East (N. Virginia)
2) us-west-1 : US West (N. California)
3) us-west-2 : US West (Oregon)
4) eu-west-1 : Europe (Ireland)
5) eu-central-1 : Europe (Frankfurt)
6) ap-south-1 : Asia Pacific (Mumbai)
7) ap-southeast-1 : Asia Pacific (Singapore)
...
(default is 3): 1

Enter Application Name:
(default is "ebdjango"):
```

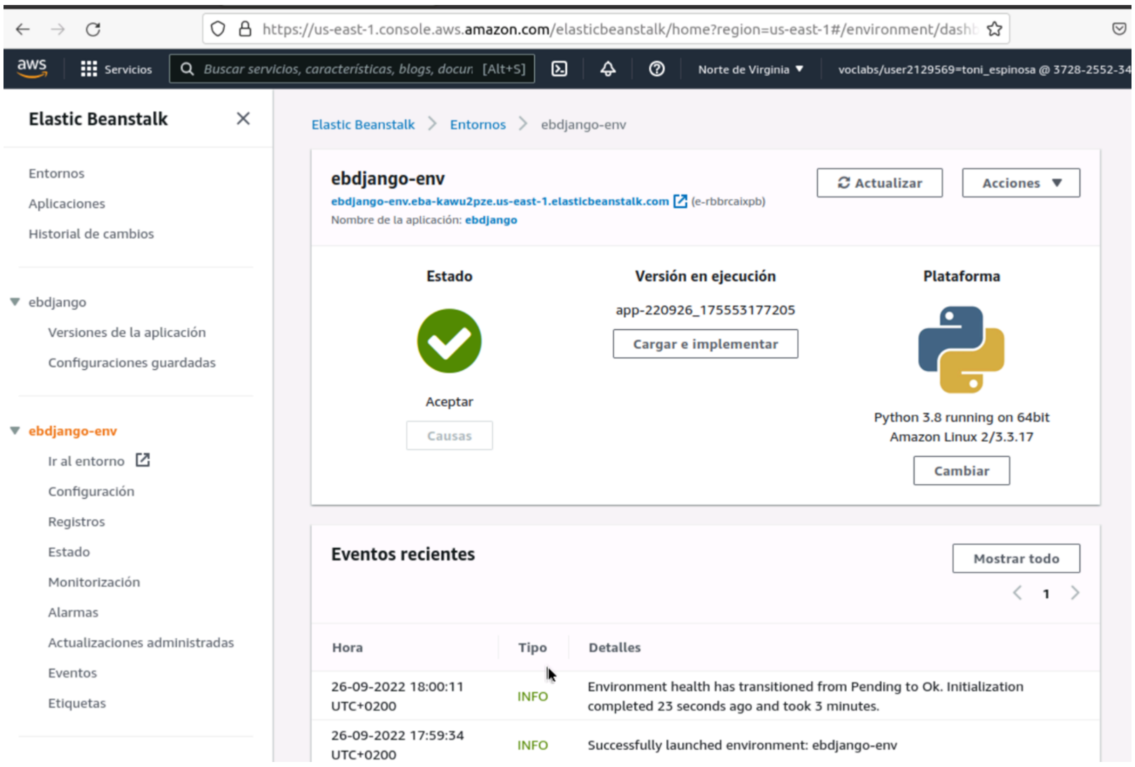
```
It appears you are using Python. Is this correct?
(y/n): y

Select a platform branch.
1) Python 3.11 running on 64 bit Amazon Linux 2023
2) Python 3.9 running on 64 bit Amazon Linux 2023
3) Python 3.8 running on 64 bit Amazon Linux 2
4) Python 3.7 running on 64 bit Amazon Linux 2 (Deprecated)
Linux (Deprecated)
(default is 1): 3

Do you want to set up SSH for your instances?
(y/n): y

Select a keypair.
1) vockey
2) [ Create new KeyPair ]
(default is 1): 1
```

2. Create an environment and deploy your application with eb create

```
eb create ebdjango-env --service-role LabRole -ip LabInstanceProfile
--max-instances 1
```

This command creates a load-balanced Elastic Beanstalk environment named **django-env**. Creating an environment takes about 5 minutes. As Elastic Beanstalk creates the resources needed to run your application, it outputs informational messages that the EB CLI relays to your terminal.

Please wait for your environment to be created. You can also use your AWS Dashboard to check **Elastic Beanstalk services state**. Use AWS button from your sandbox application.


https://us-east-1.console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1#/environment/dash
aws
Servicios
Buscar servicios, características, blogs, docum [Alt+S]
Norte de Virginia ▼
voclabs/user2129569=toni_espinosa @ 3728-2552-34
Elastic Beanstalk
Entornos
Aplicaciones
Historial de cambios
ebdjango
Versiones de la aplicación
Configuraciones guardadas
ebdjango-env
Ir al entorno
Configuración
Registros
Estado
Monitorización
Alarmas
Actualizaciones administradas
Eventos
Etiquetas
Elastic Beanstalk > Entornos > ebdjango-env
Actualizar
Acciones ▼
Cargar e implementar
Causas
Cambiar
Mostrar todo

ebdjango-env
ebdjango-env.eba-kawu2pze.us-east-1.elasticbeanstalk.com (e-rbbrcaixpb)
Nombre de la aplicación: ebdjango

Estado: Aceptar
Versión en ejecución: app-220926_175553177205
Plataforma: Python 3.8 running on 64bit Amazon Linux 2/3.3.17

Eventos recientes

Hora	Tipo	Detalles
26-09-2022 18:00:11 UTC+0200	INFO	Environment health has transitioned from Pending to Ok. Initialization completed 23 seconds ago and took 3 minutes.
26-09-2022 17:59:34 UTC+0200	INFO	Successfully launched environment: ebdjango-env

3. When the environment creation process completes, find the domain name of your new environment by running eb status.

```
eb status
Environment details for: django-env
  Application name: django-tutorial
  ...
Status: Ready
Health: Green
```

Your environment's domain name is the value of the CNAME property. You can also search your AWS services for Elastic Beanstalk environments.

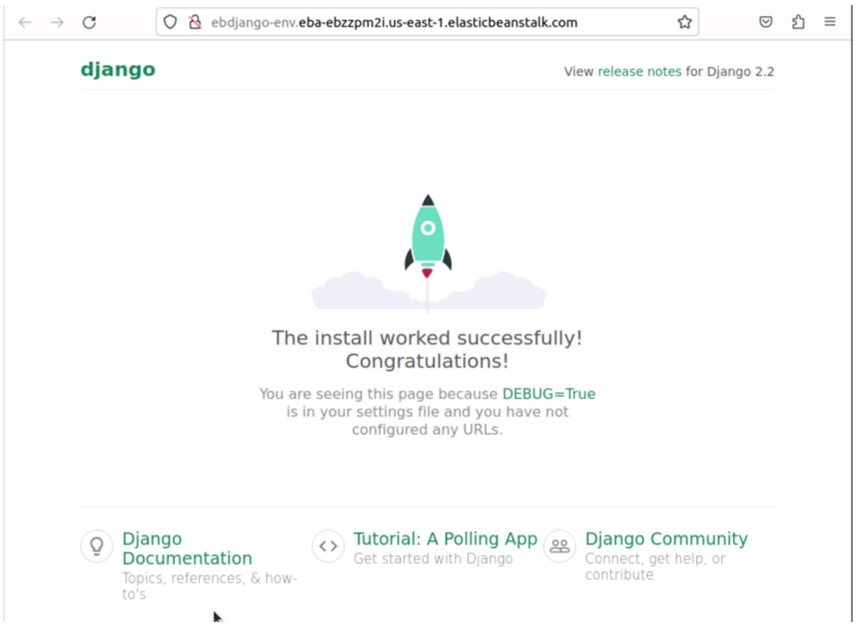
4. Save the file, and then deploy your application by running eb deploy. When you run **eb deploy**, the EB CLI bundles up the contents of your project directory and deploys it to your environment.

```
eb deploy
Creating application environment...
...
INFO Environment update completed succesfully.
```

5. When the environment update process is finished, you can open your website with **eb open**

```
eb open
```

6. When everything works, you should see the welcome to django page


ebdjango-env.eba-ebzzpm2i.us-east-1.elasticbeanstalk.com

django

View release notes for Django 2.2

The install worked successfully! Congratulations!

You are seeing this page because DEBUG=True is in your settings file and you have not configured any URLs.

Django Documentation
Topics, references, & how-to's

Tutorial: A Polling App
Get started with Django

Django Community
Connect, get help, or contribute

7. When you finish, to clean up the system, terminate your Elastic Beanstalk with eb terminate

```
eb terminate ebdjango-env
```

and wait for the environment to close with the message

terminateEnvironment completed successfully

5. Task: deploy your polls app

Can you deploy your django polls application from the previous tutorial into AWS Elastic Beanstalk following the same steps described in section 4?

You will need to prepare polls application first:

- Create and activate your *mysite* environment from the *polls* tutorial
- Generate *requirements.txt* file for your *mysite* project
- Create .ebextensions/django.config file:

```
option_settings:
  aws:elasticbeanstalk:container:python:
    WSGIPath: polls.wsgi:application
```

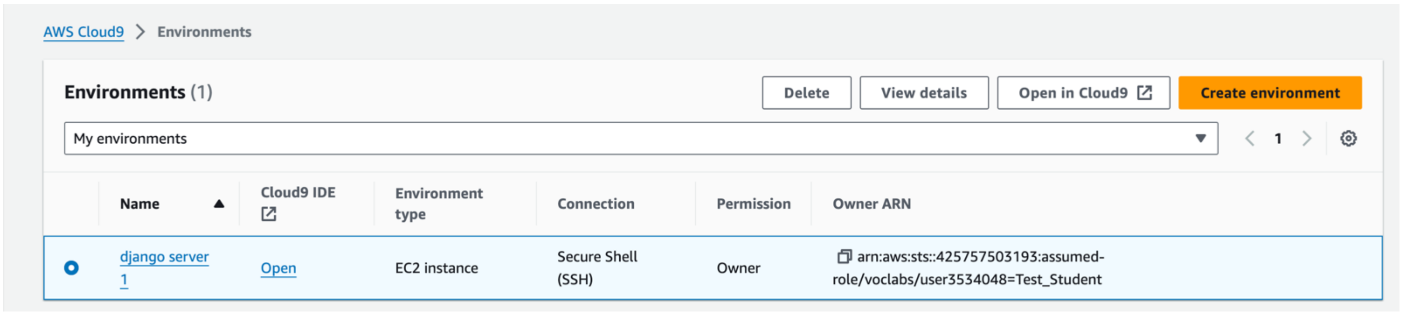
Deployment errors can be checked in file: **web.stdout.log**. This file can be downloaded from AWS Console, Elastic Beanstalk service, polls-env environment logs.

6. Cleaning the environment and closing the Sandbox session

Please remember to eliminate *polls-env* environment with the command:

```
eb terminate polls-env
```

And close your AWS Cloud9 environment before you finish. Select your environment in the AWS services console and press the **Delete option**



AWS Cloud9 > Environments

Environments (1)

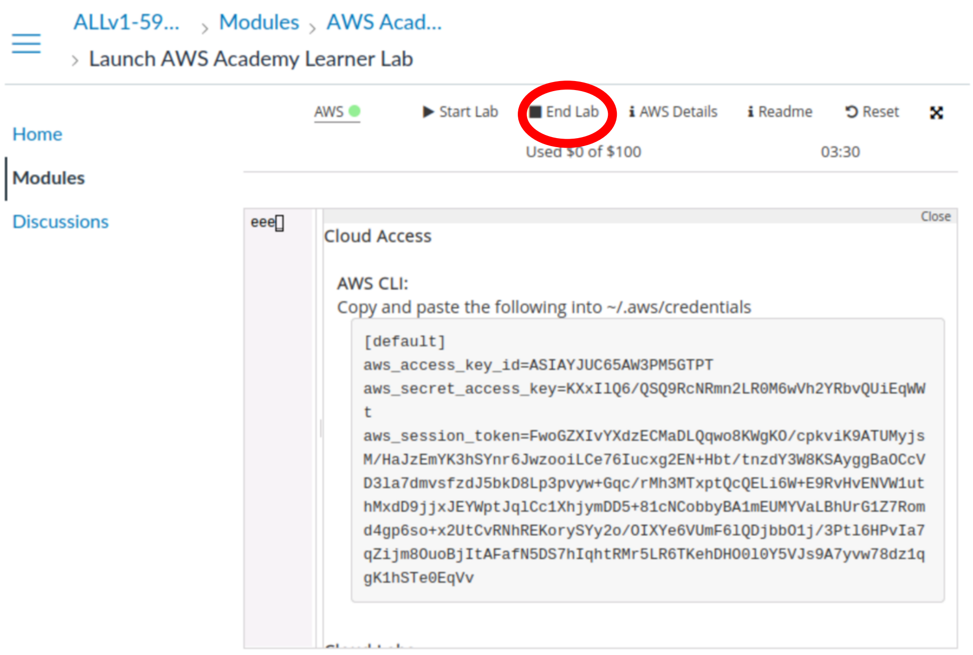
Delete | View details | Open in Cloud9 | Create environment

My environments

	Name	Cloud9 IDE	Environment type	Connection	Permission	Owner ARN
●	django server 1	Open	EC2 instance	Secure Shell (SSH)	Owner	arn:aws:sts::425757503193:assumed-role/voclabs/user3534048=Test_Student

Then, type **Delete** and click on the delete option to remove the environment.

Now, you need press **End Lab** in the AWS Academy learner lab and logout of AWS Academy portal.



ALLv1-59... > Modules > AWS Acad... > Launch AWS Academy Learner Lab

Cloud Access

AWS CLI:
Copy and paste the following into ~/.aws/credentials

```
[default]
aws_access_key_id=ASIAYJUC65AW3PM5GTPT
aws_secret_access_key=KXxIlQ6/QSQ9RcNRmn2LR0M6wVh2YRbvQUiEqWW
t
aws_session_token=FwoGZXIvYXdzECMaDLQqwo8KWgKO/cpkviK9ATUMyjs
M/HaJzEmYK3hSYnr6JwzooiLCe76Iucxg2EN+Hbt/tnzdY3W8KSAyggBaOCcV
D3la7dmvsfzdJ5bkD8Lp3pvyw+Gqc/rMh3MTxptQcQELi6W+E9RvHvENVW1ut
hMxdD9jjxJEYWptJqlCc1XhjymDD5+81cNCobbyBA1mEUMYVaLBhUrG1Z7Rom
d4gp6so+x2UtCvRNhREKorySYy2o/OIXYe6VUmF6lQDjbbO1j/3Ptl6HPvIa7
qZijm8OuoBjItAFafN5DS7hIqhtRMr5LR6TKehDHO0l0Y5VJs9A7yvw78dz1q
gK1hSTe0EqVv
```