Lab 262

Internet Protocols - Static and Dynamic Addresses

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Internet Protocols - Static and Dynamic Addresses

Scenario

Your role is a cloud support engineer at Amazon Web Services (AWS). During your shift, a customer from a Fortune 500 company requests assistance regarding a networking issue within their AWS infrastructure. The email and an attachment of their architecture is below:

Ticket from your customer

Hello Cloud Support!

We are having issues with one of our EC2 instances. The IP changes every time we start and stop this instance called Public Instance. This causes everything to break since it needs a static IP address. We are not sure why the IP changes on this instance to a random IP every time. Can you please investigate? Attached is our architecture. Please let me know if you have any questions.

Thanks! Bob, Cloud Admin

Architecture diagram

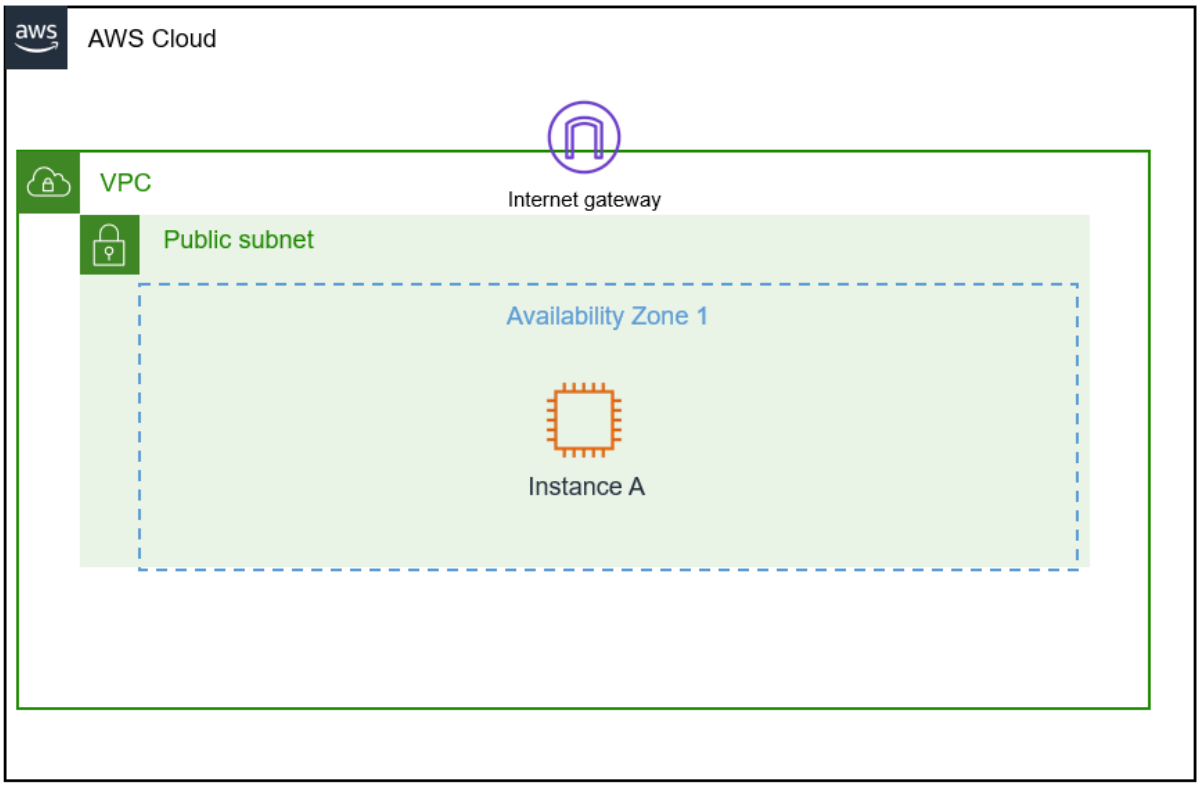


Figure: Customer VPC architecture, which includes one public subnet and one EC2 instance

Objectives

In this lab, you will:

- Summarize the customer scenario
- Analyze the difference between a statically and dynamically assigned IP addresses using EC2 instances
- Assign a persistent (static) IP to an EC2 instance
- Develop a solution to the customers issue found within this lab; after developing a solution, summarize and describe your findings

AWS service restrictions

In this lab environment, access to AWS services and service actions might be restricted to the ones that are needed to complete the lab instructions. You might encounter errors if you attempt to access other services or perform actions beyond the ones that are described in this lab.

Accessing the AWS Management Console

1. At the upper-right corner of these instructions, choose **Start Lab**

   Troubleshooting tip: If you get an **Access Denied** error, close the error box, and choose **Start Lab** again.

2. The lab status can be interpreted as follows:
   - A red circle next to AWS ● at the upper-left corner of this page indicates the lab has not been started.
   - A yellow circle next to AWS ● at the upper-left corner of this page indicates the lab is starting.
   - A green circle next to AWS ● at the upper-left corner of this page indicates the lab is ready.

   Wait for the lab to be ready before proceeding.

3. At the top of these instructions, choose the green circle next to AWS ●

   This option opens the AWS Management Console in a new browser tab. The system automatically sign you in.

Tip: If a new browser tab does not open, a banner or icon at the top of your browser will indicate that your browser is preventing the site from opening pop-up windows. Choose the banner or icon, and choose **Allow pop-ups**.

4. Arrange the AWS Management Console tab so that it displays along side these instructions. Ideally, you should be able to see both browser tabs at the same time so that you can follow the lab steps.

   Do not change the lab Region unless specifically instructed to do so.

   It takes a few minutes to provision the resources necessary to complete this lab.

Task 1: Investigate the customer's environment

Recall what you've learned about static and dynamic IP addresses. Which type of IP address do you think Bob assigned his EC2 instance if it constantly changes when it is stopped and started again? You will test this theory by launching one EC2 instance in the AWS lab environment. You will start with how the customer has his configured and troubleshoot the issue from there.

For task 2, you will understand the customer's environment and replicate their issue.

In the scenario, Bob, who is the customer requesting assistance, is having issues with his EC2 instance constantly changing IP addresses every time he stops and starts his instance. He cannot leave his instance on because it is very expensive for him to do so, and he requires this IP address to be set at a static IP address or else it breaks his other resources attached to it.

5. At the upper-right of these instructions, choose **AWS**. The AWS Management Console opens in a new tab.

6. Once you are in the AWS console, type and search for **EC2** in the search bar on the top-left corner. Select EC2 from the list.

Tip: Alternatively, You can also find EC2 under **Services** - **Compute** in the top left corner

Figure: AWS Management Console search bar.

7. You are now in the Amazon EC2 dashboard. In the left navigation menu, choose **Instances**. This option takes you to your current EC2 instances. You should currently see one EC2 instance, which you can ignore for now. We will not use that instance since we will launch our own for **task 1**.

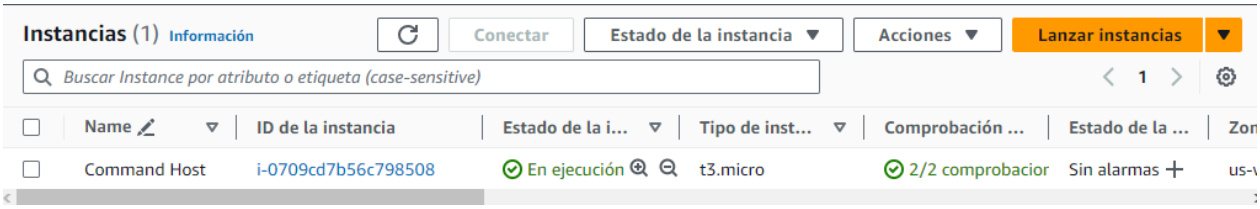


Figure: This is the EC2 dashboard where you can create instances and see an overall snapshot of current instances.

8. From the top right corner, select **Launch instances**. This is how you will launch EC2 instances from the console.

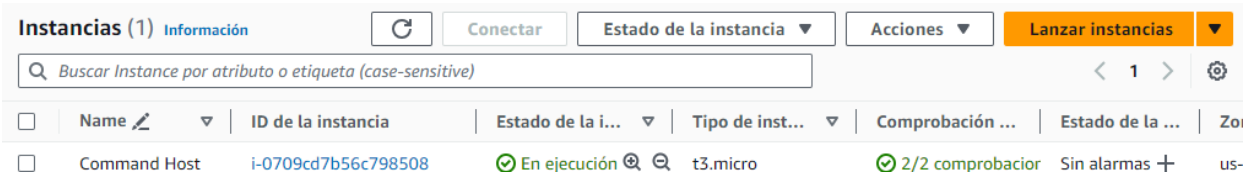


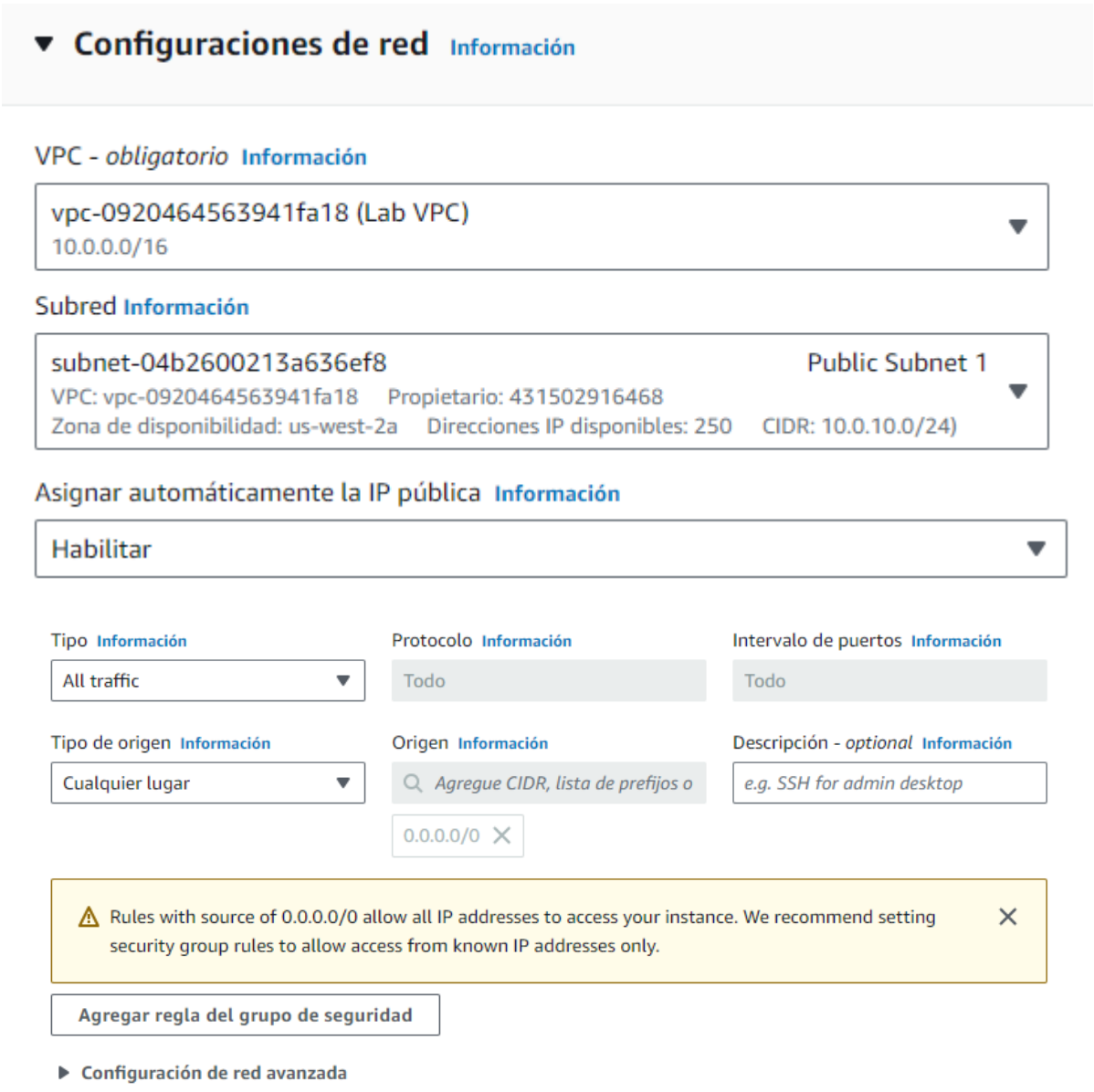
Figure: Launch EC2 instances by selecting the button at the top right corner.

9. Follow the steps below to complete the creation of an Amazon EC2 instance:

- **Step 1: Choose an Amazon Machine Image (AMI):**
  - Select the first entry for **Amazon Linux 2 AMI (HVM)** An AMI is a template that contains the OS and configuration of the EC2 instance.

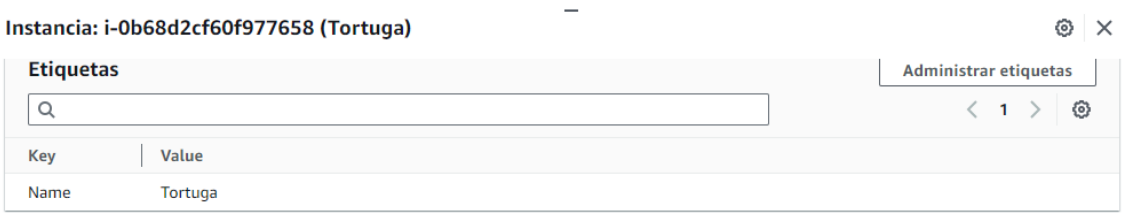
- **Step 2: Choose an Instance Type:**
  - Select **t3.micro** and navigate to the bottom of the window and click the button **Next: Configure Instance Details**

- **Step 3: Configure Instance Details:**
  - Network: Choose vpc-xxxxxxxx | Lab VPC
  - Subnet: Choose subnet-xxxxxx | Public Subnet 1
  - Auto-assign Public IP: Set to enable Leave everything else as default and select **Next: Add Storage** Add Storage in the bottom right corner.

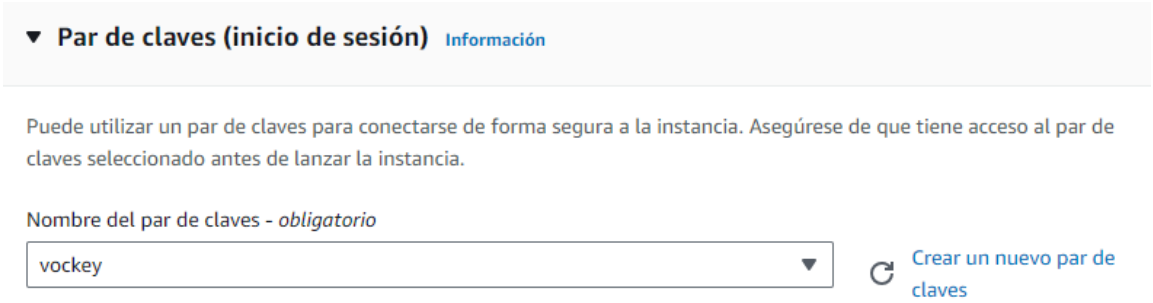


- **Step 4: Add Storage**: Leave as default and navigate to the bottom right of the window and select **Next: Add Tags**.
- **Step 5: Add Tags**:
  - Select Add Tag and under **Key** enter `Name` and under **Value** enter `test instance`

- Navigate to the bottom right of the window and select **Next: Configure Security Group**



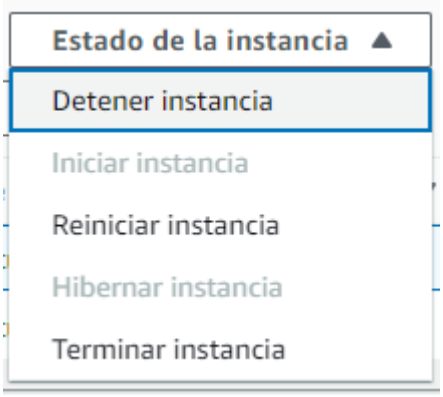
- **Step 6: Configure Security Group**:
  - Under **Assign a security group**, select the **Select an existing security group** radio button and select the security group with the name **Linux Instance SG**. Then navigate to the bottom of the window and hit **Review and Launch**.
- **Step 7: Review Instance Launch**:
  - Navigate to the bottom of the window and hit **Launch**.
- A pop-up window asks you to select an existing key pair or create a new key pair.
  - In the first drop down, keep **Choose an existing key pair**.
  - In the second drop down, select the key pair **vockey | RSA**.
  - Check the box underneath the second drop down. Once checked, select **Launch Instances**.



10. Once complete, you will return to the EC2 dashboard and see the EC2 instance that was just created. Select **test instance**. Under the Instance state, you will see **Initializing**. Wait until it says **2/2** before continuing.

Figure: Instances go through states, just like when a computer is booting up. When it is ready to use, the state will say "running" and you will be able to use it for services like SSH.

11. Select the checkbox of your **test instance**. At the bottom, select the **Networking** tab. In this tab, observe and note the Public IPv4 address and the Private IPv4 address. Once noted, navigate to the top right of the window, select the **Instance state** drop-down button, and select **Stop instance**. Once the **Instance state** changes to **Stopped**, navigate back down to the tabs and observe the Public and Private IPv4 address.



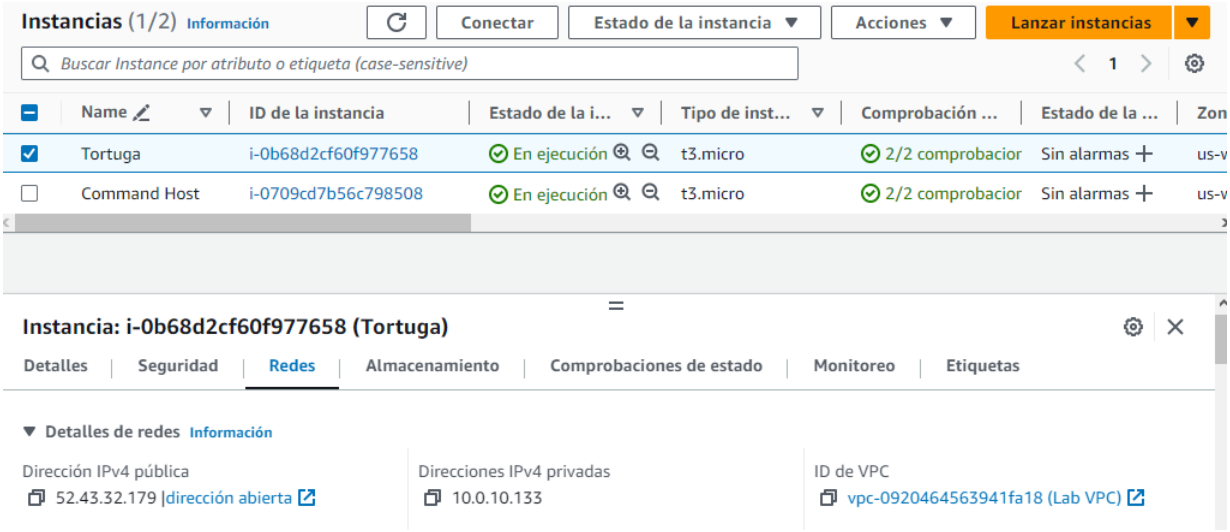


Figure: This is the networking tab for instances. This shows any networking configurations related to the instance such as public and private IPv4 addresses and public and private IPv4 DNS.

Figure: To start, stop, or terminate an instance, navigate to the top of the EC2 dashboard and select the "Instance state" button.

12. Now restart the **test instance** by navigating to the top window and selecting the **Instance state** and **Start instance**. Wait until the **Instance state** changes to **Running**. Take note of the Public and Private IPv4 addresses. What did you notice between the public and private IP addresses when you stopped and started the EC2 instance? Would you consider this the Public IP a static or dynamic IP address? What would you consider the Private IP address for the EC2 instance? Do you think we have replicated the customer's issue?

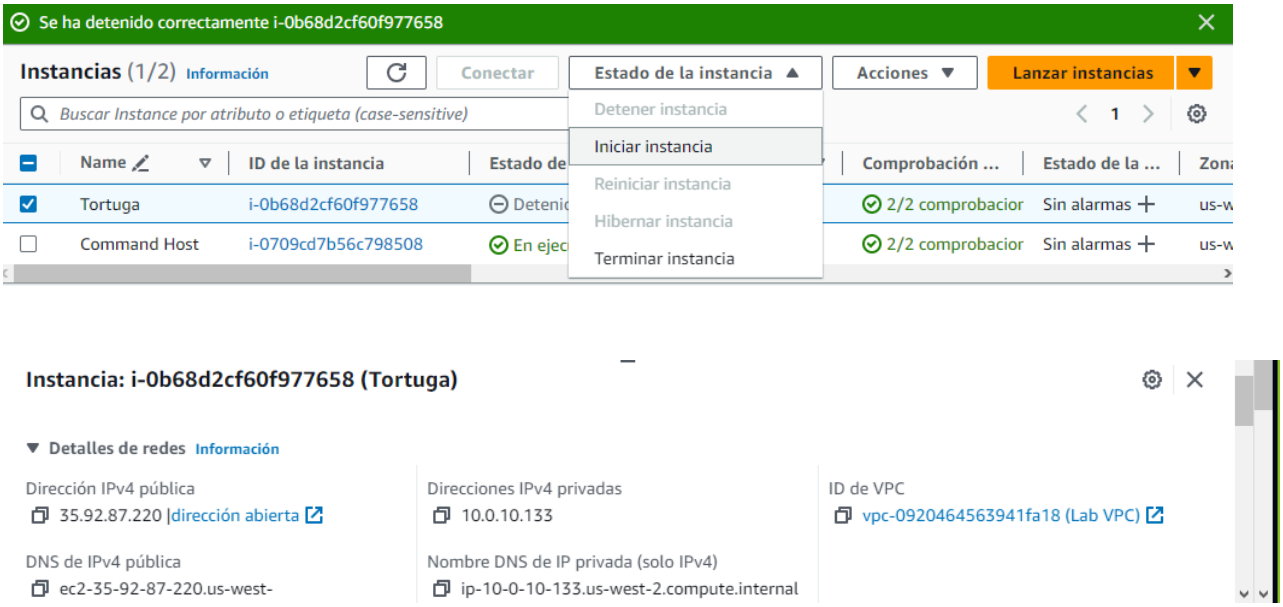


Figure: By starting the instance, you can see the details populate in the Networking tab.

13. We still haven't solved the customer's issue. Bob needs a permanent Public IP address that doesn't change when he stops and restarts his instance. AWS does have a solution that allocates a persistent public IP address to an EC2 instance, called an Elastic IP (EIP).

    From the EC2 dashboard, navigate to **Network and Security** on the left navigation and select **Elastic IPs**. Notice that there are no EIPs. Create one by selecting the

button **Allocate Elastic IP address** in the top right. Keep everything as default and hit **Allocate**. Take note of the EIP address.

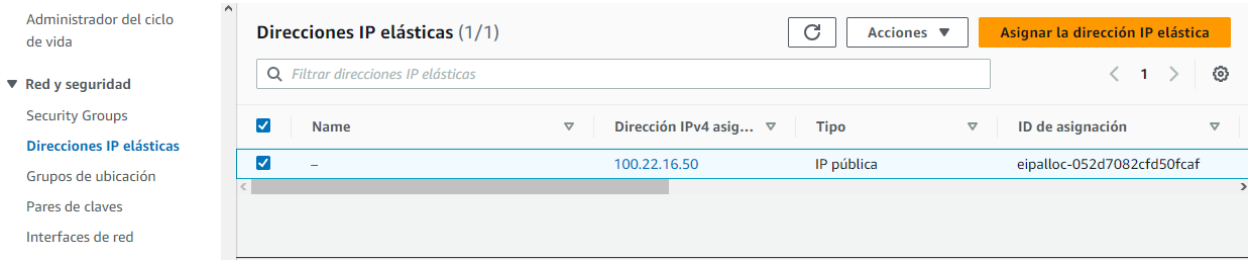


Figure: Within the EC2 dashboard, under "Network and Security" in the left navigation, select "Elastic IPs".

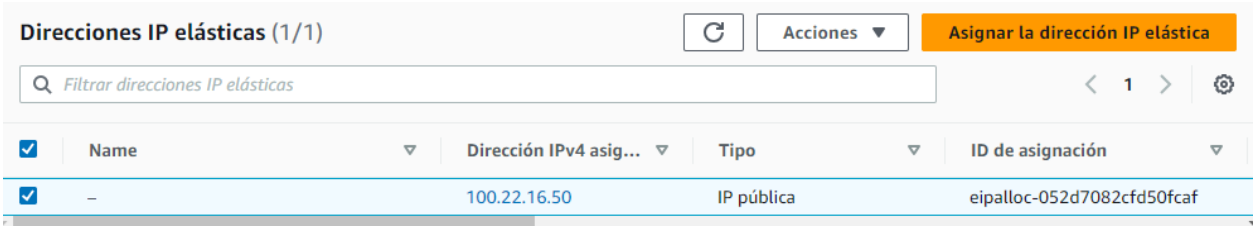


Figure: Allocate an EIP by selecting the Allocate Elastic IP address button.

14. Select the EIP you just created by selecting the checkbox. Now attach this permanent, public IP address to the **dynamic instance** by navigating to the top right and navigating to **Actions** and **Associate Elastic IP address**.

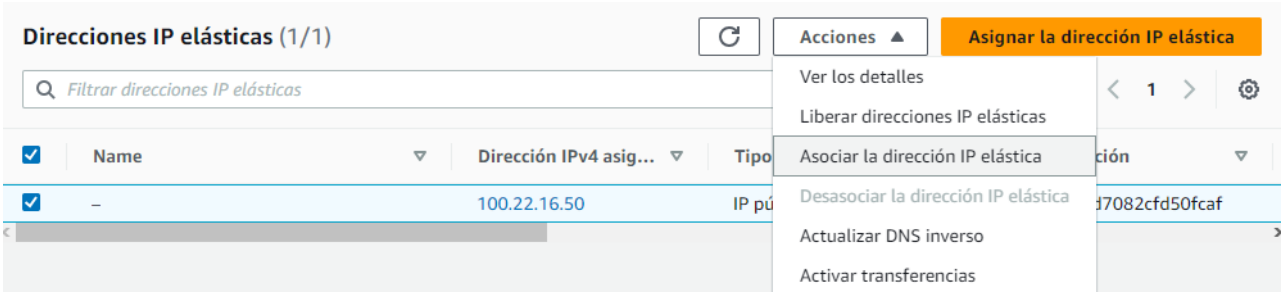


Figure: The EIP created will now be associated to the EC2 instance by going to the actions menu and selecting "Associate Elastic IP address".

15. Leave the resource type as Instance, and select **test instance** from the **Choose an Instance** drop down menu. Under **Private IP address**, select the empty box. The Private IP associated with that instance is selected. Click the **Associate** button.

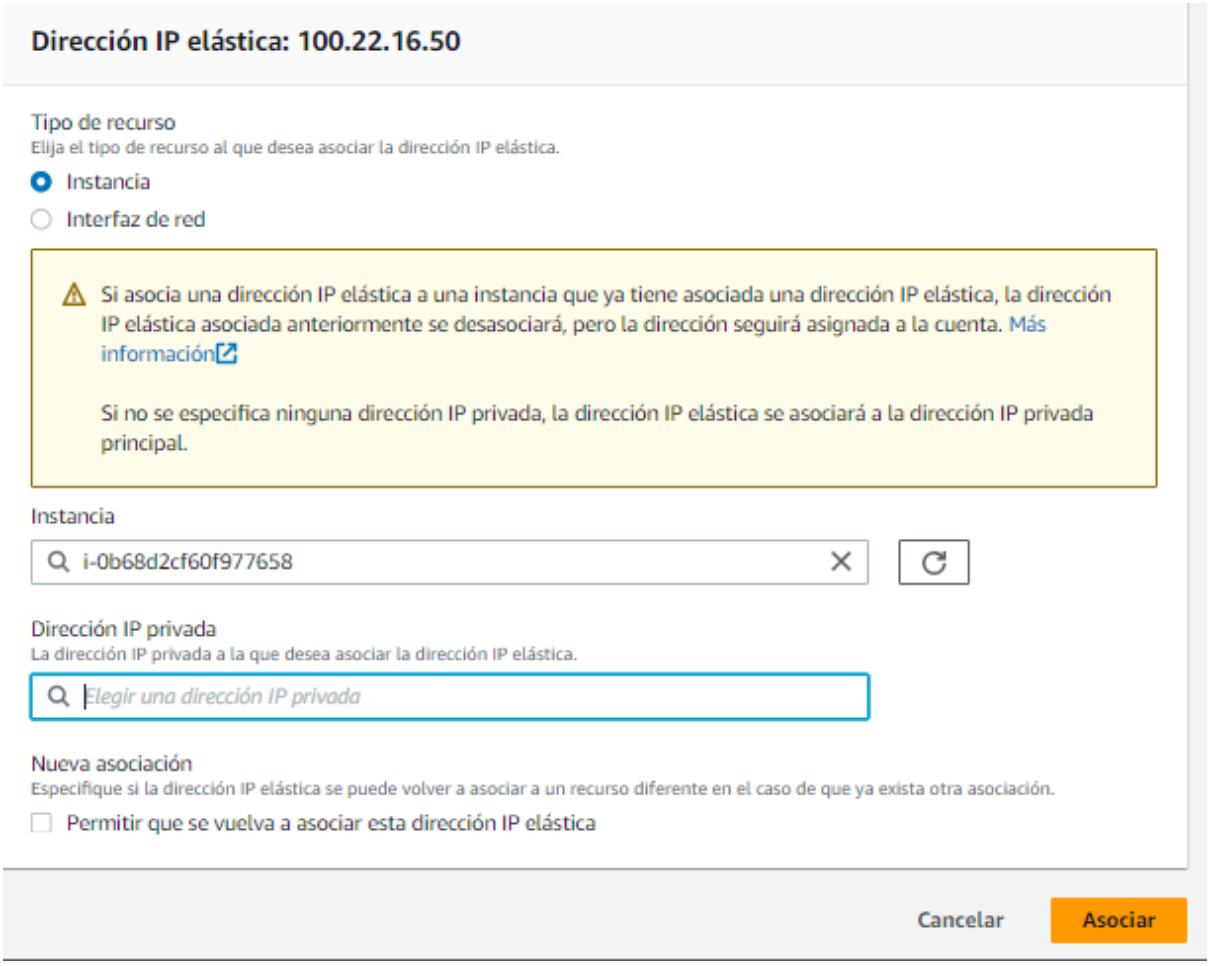
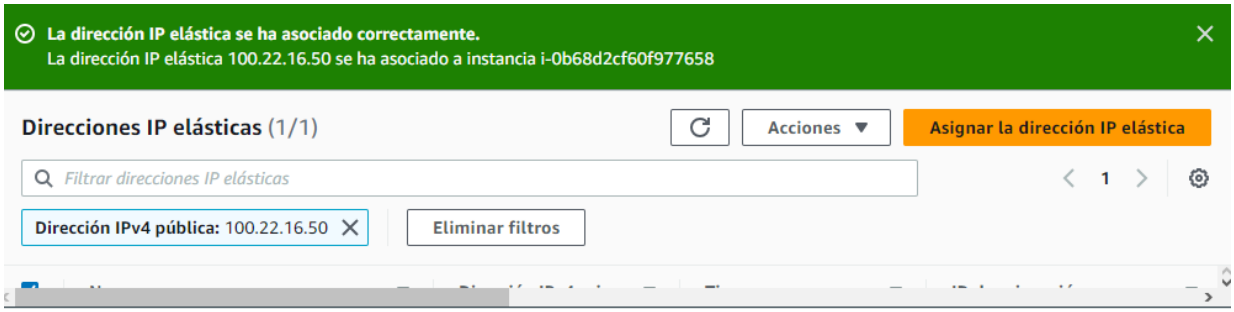


Figure: Associate the EIP to the test instance.



16. Navigate back to the **Instances** page using the left navigation pane. Select the checkbox for the **test instance** and navigate to the **Networking** tab. Take note of the Public IPv4 address. Did you notice that the EIP address is now the Public IP address? Now stop and start the instance and observe the differences. What did you observe? Is this a static or dynamic IP address? Did you solve the customer's issue? Why or why not?

Task 2: Send the Response to the customer (Group Activity)

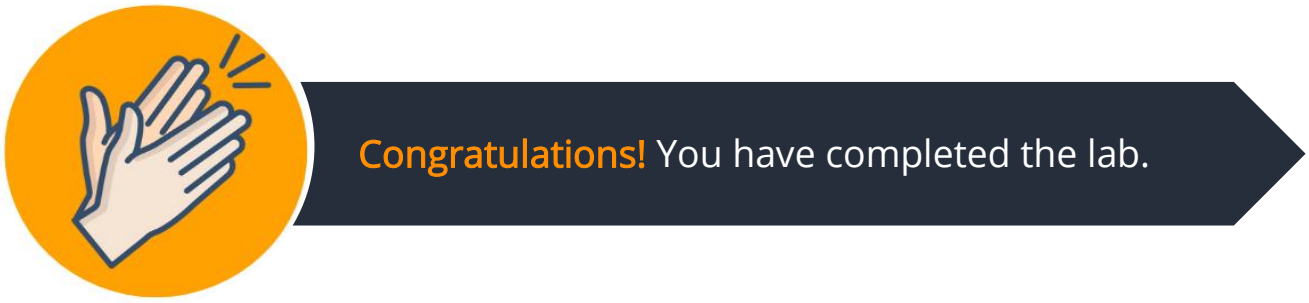
Within your group, submit your findings.

Person 1 will act as Bob the customer, while Person 2 will act as the Cloud Support Engineer. Person 2 will talk over their findings to Person 1.

Note

This task should only take 5-10 minutes. Walk through your findings to the class.

Lab Complete



17. Choose **End Lab** at the top of this page, and then select Yes to confirm that you want to end the lab.

    A panel indicates that *DELETE has been initiated... You may close this message box now.*

18. A message *Ended AWS Lab Successfully* is briefly displayed, indicating that the lab has ended.

    X in the top right corner to close the panel.

Recap

In this lab, you have investigated the customer's environment and applied troubleshooting techniques that allowed you to resolve the customers' issue. Within the scenario, you discovered that the customer Amazon EC2 instance (public instance) had a dynamic IP address which caused it to constantly change IPs when the instance was stopped and started. In order to fix this issue, you suggested attaching an EIP in order for the IP to become persistent (static). This was tested by SSHing into the test instance and starting and stopping it with a dynamic IP address.