



AWS
re:Start
LAB

Static and Dynamic IP addresses



WEEK 3





Overview

Customer scenario

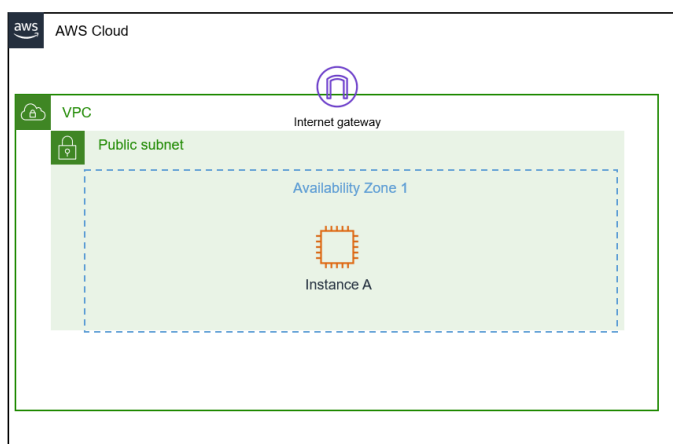
Your role is a cloud support engineer at Amazon Web Services (AWS). During your shift, a customer from a Fortune 500 company requests assistance regarding a networking issue within their AWS infrastructure. The email and an attachment of their architecture is below.

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



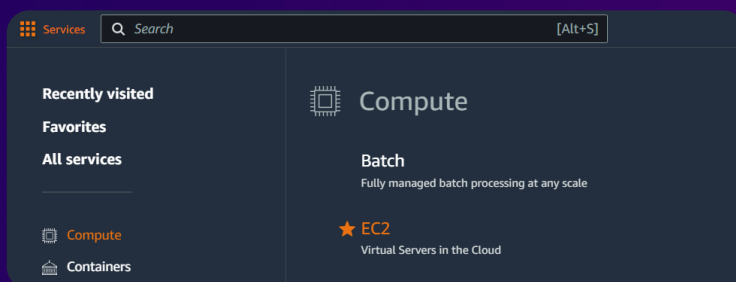


Task 1

Investigate the customer's environment

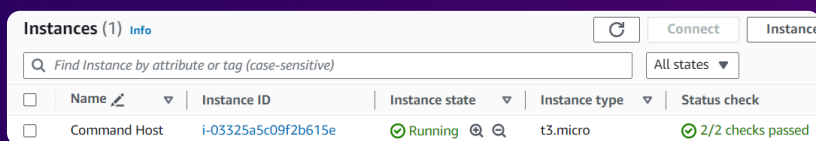
Step 1: Access the AWS Management Console

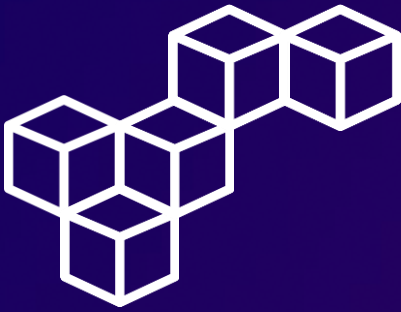
Open the AWS Management Console, and select EC2.



Step 2: List the EC2 instances

In the Amazon EC2 dashboard, navigate to Instances. You should see one EC2 instance listed.





Task 1

Investigate the customer's environment

Step 3: Launch a test instance

Launch a new EC2 instance using the Launch Instance Wizard. Select the specified settings and then choose [Launch instance](#).

Name and tags [Info](#)

Name

test instance

Instance type [Info](#) | [Get advice](#)

Instance type

t3.micro
Family: t3 2 vCPU 1 GiB Memory
Current generation: true
On-Demand SUSE base pricing: 0.0104 USD per Hour
On-Demand Windows base pricing: 0.0196 USD per Hour
On-Demand RHEL base pricing: 0.0704 USD per Hour
On-Demand Linux base pricing: 0.0104 USD per Hour

Configure storage [Info](#) [Advanced](#)

1x 8 GiB gp3 Root volume

Key pair (login) [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required

vockey

Create new key pair

Amazon Machine Image (AMI)

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type Free tier eligible
ami-089313d40efd067a9 (64-bit (x86)) / ami-08d93ffc25e0a3513 (64-bit (Arm))
Virtualization: hvm ENA enabled: true Root device type: ebs

Description
Amazon Linux 2 Kernel 5.10 AMI 2.0.20240329.0 x86_64 HVM gp2

Architecture

AMI ID

64-bit (x86)

ami-089313d40efd067a9

Verified provider

Network settings [Info](#)

VPC - required [Info](#)

vpc-0cd748a3b85693266 (Lab VPC)
10.0.0.0/16

Subnet [Info](#)

subnet-05d4fee8402aa33b2 Public Subnet 1
VPC: vpc-0cd748a3b85693266 Owner: 211125451688
Availability Zone: us-west-2a IP addresses available: 250 CIDR: 10.0.10.0/24

Auto-assign public IP [Info](#)

Enable

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group

Select existing security group

Common security groups [Info](#)

Select security groups

c117085a279001016429468t1w211125451688-LinuxInstanceSG-qs99xh43MU2K
sg-02f15c649fe075c4f
VPC: vpc-0cd748a3b85693266

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.



Task 1

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Step 4: Review the test instance

Return to the EC2 dashboard and review the test instance that was just created. The 2 status checks have passed. Observe and make note of the Public IPv4 address and the Private IPv4 address.

Instances (2) Info							
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>				All states ▾		< 1 > ⚙	
<input type="checkbox"/>	Name ↗	Instance ID	Instance state ▾	Status check	Public IPv4 address ▾	Elastic IP	Private IP address ▾
<input type="checkbox"/>	test instance	i-0fba7b808b6a6a718	🟢 Running 🔍 🔍	🟢 2/2 checks passed	34.222.32.88	–	10.0.10.208
<input type="checkbox"/>	Command Host	i-03325a5c09f2b615e	🟢 Running 🔍 🔍	🟢 2/2 checks passed	35.93.156.153	–	10.0.10.237

Step 5: Stop the test instance

Stop the test instance. Observe the Public IPv4 address and the Private IPv4 address.

Instances (2) Info							
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>				All states ▾		< 1 > ⚙	
<input type="checkbox"/>	Name ↗	Instance ID	Instance state ▾	Status check	Public IPv4 address ▾	Elastic IP	Private IP address ▾
<input type="checkbox"/>	test instance	i-0fba7b808b6a6a718	⏸ Stopped 🔍 🔍	–	–	–	10.0.10.208
<input type="checkbox"/>	Command Host	i-03325a5c09f2b615e	🟢 Running 🔍 🔍	🟢 2/2 checks passed	35.93.156.153	–	10.0.10.237



Task 1

Investigate the customer's environment

Step 6: Restart the test instance

Restart the test instance and make note of the Public IPv4 address and the Private IPv4 address. Note that the Public IPv4 address changes after restarting the instance, as it uses a dynamic IP address.

Instances (2) Info							
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>				All states ▾		< 1 > ⚙	
<input type="checkbox"/>	Name ▾	Instance ID	Instance state ▾	Status check	Public IPv4 address ▾	Elastic IP	Private IP address ▾
<input type="checkbox"/>	test instance	i-0fba7b808b6a6a718	Running 🔍	2/2 checks passed	34.217.109.21	–	10.0.10.208
<input type="checkbox"/>	Command Host	i-03325a5c09f2b615e	Running 🔍	2/2 checks passed	35.93.156.153	–	10.0.10.237

Step 7: Allocate an Elastic IP address

In the **Network and Security** menu, select Elastic IPs. If there are no EIPs, create one by selecting [Allocate Elastic IP address](#).

Elastic IP addresses (1)					
<input type="text" value="Find resources by attribute or tag"/>				< 1 > ⚙	
<input type="checkbox"/>	Name	Allocated IPv4 address ▾	Type	Allocation ID	Reverse DNS record ▾
<input type="checkbox"/>	–	52.24.93.76	Public IP	eipalloc-094b0dd194710bf2a	–



Task 1

Investigate the customer's environment

Step 8: Select the Elastic IP

Select the Elastic IP address you just created. Then, click on the button [Associate Elastic IP address](#).

52.24.93.76

Actions ▼Associate Elastic IP address

Summary

Allocated IPv4 address 52.24.93.76	Type Public IP	Allocation ID eipalloc-094b0dd194710bf2a	Reverse DNS record -
Association ID -	Scope VPC	Associated instance ID -	Private IP address -
Network interface ID -	Network interface owner account ID -	Public DNS -	NAT Gateway ID -
Address pool Amazon	Network border group us-west-2		

Step 9: Associate the Elastic IP address

Leave the resource type as Instance and select the test instance. Then, click on the [Associate](#) button.

Associate Elastic IP address

Choose the instance or network interface to associate to this Elastic IP address (52.24.93.76)

Elastic IP address: 52.24.93.76

Resource type

Choose the type of resource with which to associate the Elastic IP address.

☒ Instance

☐ Network interface

Instance

Q

i-0fba7b808b6a6a718

X

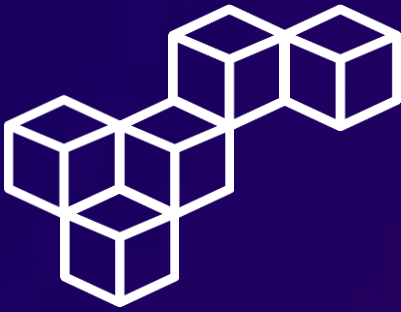
Reassociation

Specify whether the Elastic IP address can be reassociated with a different resource if it already associated with a resource.

☐ Allow this Elastic IP address to be reassociated

Cancel

Associate



Task 1

Investigate the customer's environment

Step 10: Review the associated Elastic IP

Navigate back to the **Instances** page. Take note of the Public IPv4 address. Notice that the Elastic IP address is now the Public IP address.

Instances (2) Info							
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>				All states ▾		< 1 > ⚙	
<input type="checkbox"/>	Name ↗ ▾	Instance ID	Instance state ▾	Status check	Public IPv4 address ▾	Elastic IP	Private IP address ▾
<input type="checkbox"/>	test instance	i-0fba7b808b6a6a718	🟢 Running 🔍	🟢 2/2 checks passed	52.24.93.76	52.24.93.76	10.0.10.208
<input type="checkbox"/>	Command Host	i-03325a5c09f2b615e	🟢 Running 🔍	🟢 2/2 checks passed	35.93.156.153	–	10.0.10.237

Step 11: Test the Elastic IP

Stop and restart the test instance, and you'll notice that its Public IPv4 address remains the same this time. This is because the instance now has a static IP address.

Instances (2) Info							
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>				All states ▾		< 1 > ⚙	
<input type="checkbox"/>	Name ↗ ▾	Instance ID	Instance state ▾	Status check	Public IPv4 address ▾	Elastic IP	Private IP address ▾
<input type="checkbox"/>	test instance	i-0fba7b808b6a6a718	⏸ Stopped 🔍	–	52.24.93.76	52.24.93.76	10.0.10.208
<input type="checkbox"/>	Command Host	i-03325a5c09f2b615e	🟢 Running 🔍	🟢 2/2 checks passed	35.93.156.153	–	10.0.10.237

Instances (2) Info							
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>				All states ▾		< 1 > ⚙	
<input type="checkbox"/>	Name ↗ ▾	Instance ID	Instance state ▾	Status check	Public IPv4 address ▾	Elastic IP	Private IP address ▾
<input type="checkbox"/>	test instance	i-0fba7b808b6a6a718	🟢 Running 🔍	🟢 2/2 checks passed	52.24.93.76	52.24.93.76	10.0.10.208
<input type="checkbox"/>	Command Host	i-03325a5c09f2b615e	🟢 Running 🔍	🟢 2/2 checks passed	35.93.156.153	–	10.0.10.237



Task 2

Send the Response to the customer

Submit your findings

Dear Bob,

The issue you're encountering with your EC2 instance is because on-demand EC2 instances are designed to have dynamic IP addresses by default, which change each time the instance is started or stopped. This can lead to disruptions in your services as they rely on a static IP address for consistency and accessibility.

To address this, I conducted tests where an Elastic IP address (EIP) was created and associated with a test instance. An Elastic IP provides a static public IP address that remains consistent even if the underlying EC2 instance is stopped and started. By assigning an Elastic IP to your instance, you can ensure that it retains the same IP address regardless of its state, thus avoiding the issue of changing IPs and maintaining service continuity.

I recommend implementing this solution by creating an Elastic IP for your EC2 instance, as it will provide the stability and consistency you need for your services.

If you need further assistance, please let me know.

Cristhian

Cloud Support Engineer



Conclusions

Static IP addresses

Static IP addresses provide a consistent and unchanging identifier for devices within a network, ensuring predictable connectivity and simplified management of network resources.

Dynamic IP addresses

Dynamic IP addresses are automatically assigned to devices by a DHCP server and can change over time, offering flexibility in address allocation but requiring mechanisms for tracking and managing changing IP assignments.

Elastic IP addresses

Elastic IP addresses in cloud environments, such as AWS, are static IP addresses that can be easily associated and disassociated from instances, providing a way to maintain consistent public-facing addresses while enabling flexibility in instance management.

Troubleshooting IP addressing issues

Troubleshooting IP addressing issues involves diagnosing and resolving problems related to IP assignment, conflicts, subnet configurations, DNS resolution, and ensuring proper routing within the network to maintain connectivity and address stability.



Cristhian Becerra



[cristhian-becerra-espinoza](#)



+51 951 634 354



cristhianbecerra99@gmail.com



Lima, Peru

