

Surge Pricing Ad. Demo Installation

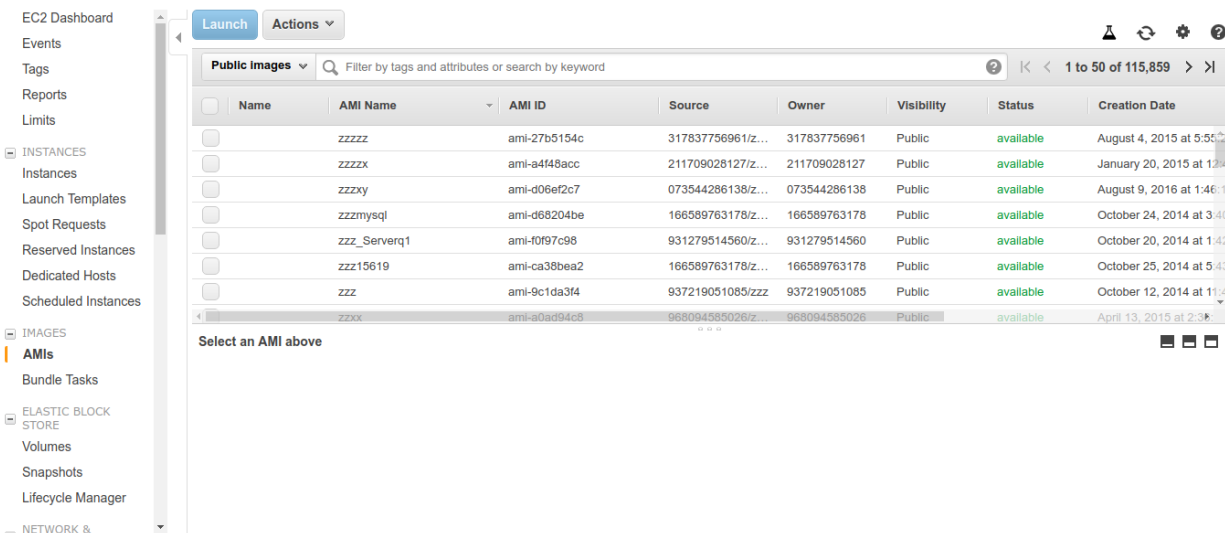
This document guides you through the setup of an EC2 instance which has been created for Surge Pricing Systems. The following services have already been installed in the EC2 instance:

1. Java 1.8
2. Zookeeper
3. Elasticsearch
4. Kibana
5. MySQL

You don't need to install all the above services again. You just have to install the OS image into your EC2 instance published as a public AMI.

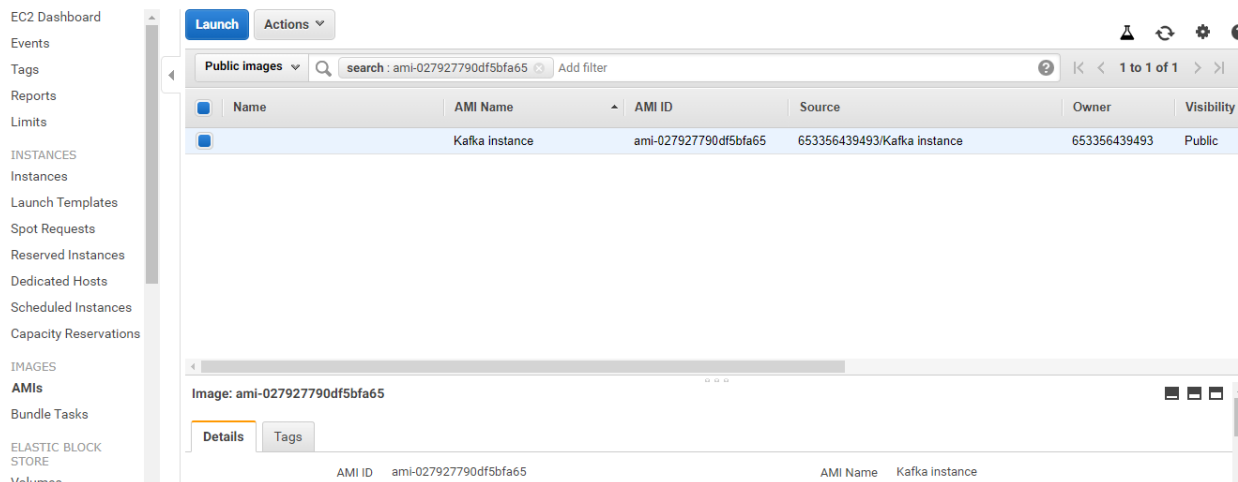
The steps to install the EC2 instance are as follows:

- Go to your EC2 instance page on the AWS website and click on **AMIs** and select **Public Image** as shown below.



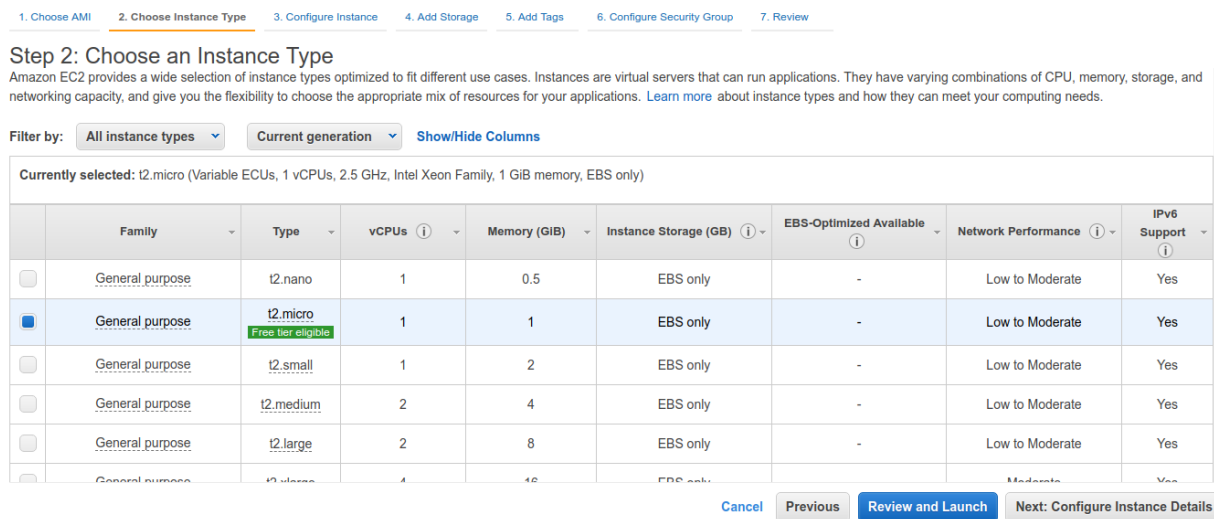
Name	AMI Name	AMI ID	Source	Owner	Visibility	Status	Creation Date
	zzzzz	ami-27b5154c	317837756961/z...	317837756961	Public	available	August 4, 2015 at 5:55:22
	zzzzx	ami-a4f48acc	211709028127/z...	211709028127	Public	available	January 20, 2015 at 12:04:11
	zzzxy	ami-d06ef2c7	073544286138/z...	073544286138	Public	available	August 9, 2016 at 1:46:11
	zzzmysql	ami-d68204be	166589763178/z...	166589763178	Public	available	October 24, 2014 at 3:40:11
	zzz_Serverq1	ami-f0f97c98	931279514560/z...	931279514560	Public	available	October 20, 2014 at 1:42:11
	zzz15619	ami-ca38bea2	166589763178/z...	166589763178	Public	available	October 25, 2014 at 5:43:11
	zzz	ami-9c1da3f4	937219051085/zzz	937219051085	Public	available	October 12, 2014 at 11:14:11
	zzzx	ami-a0ad94c8	968094585026/z...	968094585026	Public	available	April 13, 2015 at 2:38:11

- In the **Public Image** search box, search for the “ami-027927790df5bfa65” AMI id.



The screenshot shows the AWS Management Console interface. On the left, there is a navigation menu with options like EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES, AMIs, and ELASTIC BLOCK STORE. The main content area displays the 'Public Images' search results. A search bar at the top contains the text 'ami-027927790df5bfa65'. Below the search bar, a table lists the search results. The first result is 'Kafka instance' with AMI ID 'ami-027927790df5bfa65'. Below the table, there is a section for the selected image, showing details and tags. The details section shows the AMI ID 'ami-027927790df5bfa65' and the AMI Name 'Kafka instance'.

- Once you find the EC2 instance having the desired AMI ID, click on the check-box against it and then click on the **Launch** button after which you should get the following page.



The screenshot shows the 'Choose an Instance Type' step in the AWS Management Console. At the top, there is a progress bar with steps: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage, 5. Add Tags, 6. Configure Security Group, and 7. Review. Below the progress bar, there is a section titled 'Step 2: Choose an Instance Type'. It explains that Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Below this, there is a filter section with options: 'All instance types', 'Current generation', and 'Show/Hide Columns'. The main content area displays a table of instance types. The table has columns: Family, Type, vCPUs, Memory (GiB), Instance Storage (GiB), EBS-Optimized Available, Network Performance, and IPv6 Support. The 'Currently selected' row is 't2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)'. Below this, there is a table with the following data:

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Low to Moderate	Yes

At the bottom of the table, there are buttons: 'Cancel', 'Previous', 'Review and Launch', and 'Next: Configure Instance Details'.

- Choose the **General purpose m4.large** type EC2 instance as shown in the image below.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 2: Choose an Instance Type

<input type="checkbox"/>	General purpose	m5.xlarge	4	16	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5.2xlarge	8	32	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5.4xlarge	16	64	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5.12xlarge	48	192	EBS only	Yes	10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5.24xlarge	96	384	EBS only	Yes	25 Gigabit	Yes
<input checked="" type="checkbox"/>	General purpose	m4.large	2	8	EBS only	Yes	Moderate	Yes
<input type="checkbox"/>	General purpose	m4.xlarge	4	16	EBS only	Yes	High	Yes
<input type="checkbox"/>	General purpose	m4.2xlarge	8	32	EBS only	Yes	High	Yes
<input type="checkbox"/>	General purpose	m4.4xlarge	16	64	EBS only	Yes	High	Yes
<input type="checkbox"/>	General purpose	m4.10xlarge	40	160	EBS only	Yes	10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m4.16xlarge	64	256	EBS only	Yes	25 Gigabit	Yes

Cancel Previous **Review and Launch** Next: Configure Instance Details

- Click on the **Next: Configure Instance Details** button after which you will be directed to the **Configure Instance Details** page, as shown in the image below.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances ⓘ [Launch into Auto Scaling Group ⓘ](#)

Purchasing option ⓘ ☐ Request Spot instances

Network ⓘ [Create new VPC](#)

Subnet ⓘ [Create new subnet](#)

Auto-assign Public IP ⓘ

Placement group ⓘ ☐ Add instance to placement group.

IAM role ⓘ [Create new IAM role](#)

Shutdown behavior ⓘ

Enable termination protection ⓘ ☐ Protect against accidental termination

Monitoring ⓘ ☐ Enable CloudWatch detailed monitoring

Cancel Previous **Review and Launch** Next: Add Storage

- Leave this page as it is and then click on the **Next: Add Storage** button. You will be directed to the **Add Storage** page where you need to enter the volume size as **30 GiB** and volume type as **Magnetic (standard)**, as shown in the image below.

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type ⁱ	Device ⁱ	Snapshot ⁱ	Size (GiB) ⁱ	Volume Type ⁱ	IOPS ⁱ	Throughput (MB/s) ⁱ	Delete on Termination ⁱ	Encrypted ⁱ
Root	/dev/xvda	snap-0e3b13f501e33ecc0	30	Magnetic (standard)	N/A	N/A	<input checked="" type="checkbox"/>	Not Encrypted

Add New Volume

General Purpose (SSD) volumes provide the ability to burst to 3000 IOPS per volume, independent of volume size, to meet the performance needs of most applications and also deliver a consistent baseline of 3 IOPS/GiB. [Set my root volume to General Purpose \(SSD\)](#).

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

Cancel Previous **Review and Launch** Next: Add Tags

- Click on the **Next: Add Tags** button after which you will be directed to the **Add Tags** page. You may add the name tag if you wish else you can skip this page and jump on to the **Configure Security Page** where you need to make the following changes:
 - Click on **Create a new security group** radio button.
 - Give the security group name as **security-group-kafka** (you may give any other group name as well.)
 - Give the group description as anything as you like. For example, “**This security group is exclusively for Kafka.**”
 - Then, by clicking on the **Add Rule** button configure the security group as shown in the images below.
- Open port 22,2181,9092,3306,5601,8080,9200,7077

Note: This is a very important step.

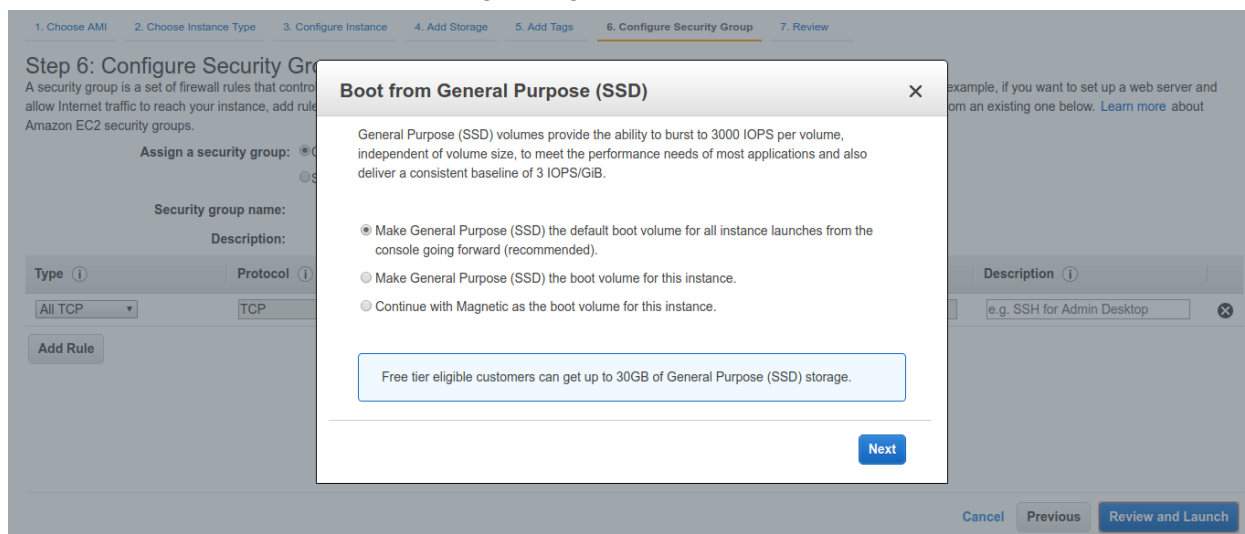
Step 6: Configure Security Group

Security group name: security-group-kafka
Description: This security group is exclusively for Kafka

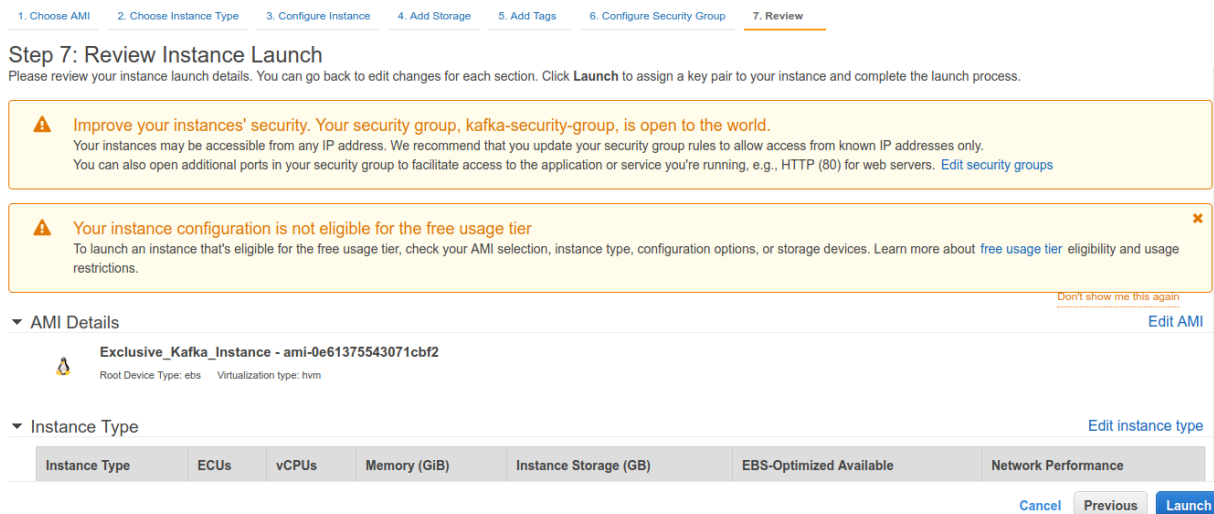
Type ⁱ	Protocol ⁱ	Port Range ⁱ	Source ⁱ	Description ⁱ	
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop	✕
Custom TCP F	TCP	2181	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop	✕
Custom TCP F	TCP	9092	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop	✕
Custom TCP F	TCP	9200	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop	✕
Custom TCP F	TCP	5601	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop	✕
Custom TCP F	TCP	8080	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop	✕
Custom TCP F	TCP	7077	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop	✕
MySQL/Aurora	TCP	3306	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop	✕

Cancel Previous **Review and Launch**

- After making the required changes, click on the **Review and Launch** button. You may be prompted with the following dialogue box.



- Click on the “Continue with Magnetic as the boot volume for this instance.” radio box and then click on the **Next** button after which you should see the following page.



- Review your instance and after verifying all the details, click on the **Launch** button. You will be prompted to either create a new key-pair or choose an existing key-pair. Select the former option if you don't have an existing key-pair **PEM** file else select the latter option. Then, click on the **Launch Instances** button as shown below.

Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Choose an existing key pair

Select a key pair


RHEL

☒ I acknowledge that I have access to the selected private key file (RHEL.pem), and that without this file, I won't be able to log into my instance.


Cancel
Launch Instances

- You will get a confirmation page showing the launch status for your instance.

Launch Status


Your instances are now launching

The following instance launches have been initiated: i-09b52ad9a29b0efaf
View launch log


Get notified of estimated charges

Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click **View Instances** to monitor your instances' status. Once your instances are in the **running** state, you can **connect** to them from the Instances screen. [Find out](#) how to connect to your instances.

Here are some helpful resources to get you started

How to connect to your Linux instance

Amazon EC2: User Guide

Learn about AWS Free Usage Tier

Amazon EC2: Discussion Forum

While your instances are launching you can also

Create status check alarms to be notified when these instances fail status checks. (Additional charges may apply)

- Click on the **View Instances** button to see your newly created instance.

EC2 Dashboard

Launch Instance
Connect
Actions

Name: Kafka
Add filter

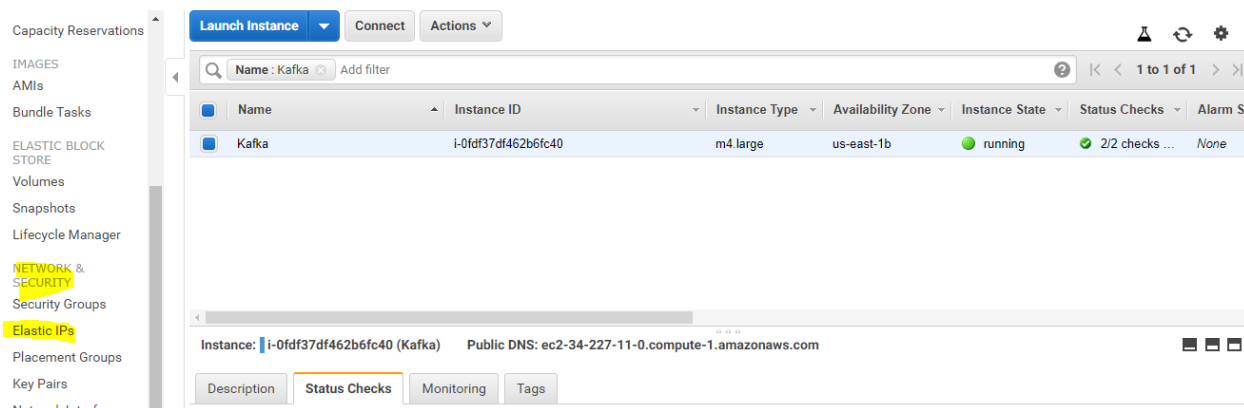
Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status
Kafka	i-0fd37df462b6fc40	m4.large	us-east-1b	running	2/2 checks ...	None

Elastic IP Creation Instructions

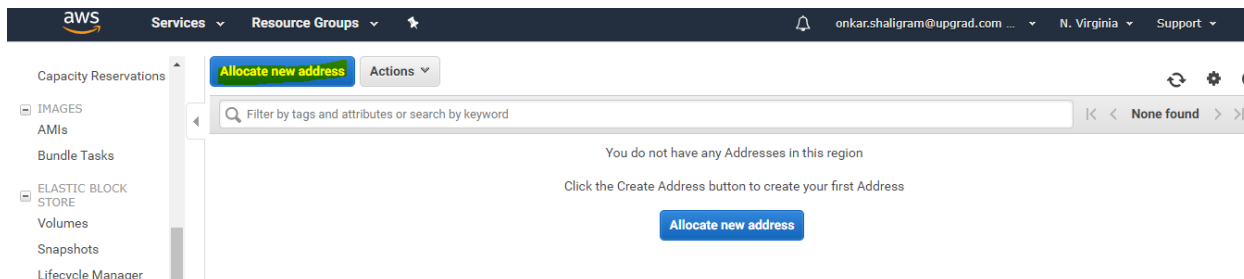
Whenever you start an EC2 instance, it generates a new IPv4 public IP. To keep the public IP constant, an elastic IP is required. A constant public IP is crucial in Kafka as you are required to create Kafka producers and consumers by writing a code. You will understand the significance of having a constant IP when you will actually write the codes.

To create an elastic IP, do the following:

- Go to your EC2 instance page and find the **Network and Security** tab under which you will see the **Elastic IPs** link, as shown in the image below.



- Click on the **Elastic IPs** link. You will be directed to a new page as shown below.



- Click on the **Allocate new address** button. You will be redirected to a new page as shown below.

[Addresses](#) > Allocate new address

Allocate new address

Allocate a new Elastic IP address by selecting the scope in which it will be used

Scope ☒ VPC

IPv4 address pool ☒ Amazon pool ☐ Owned by me

* Required

[Cancel](#) [Allocate](#)

Click on Allocate and then click on close.

[Addresses](#) > Allocate new address

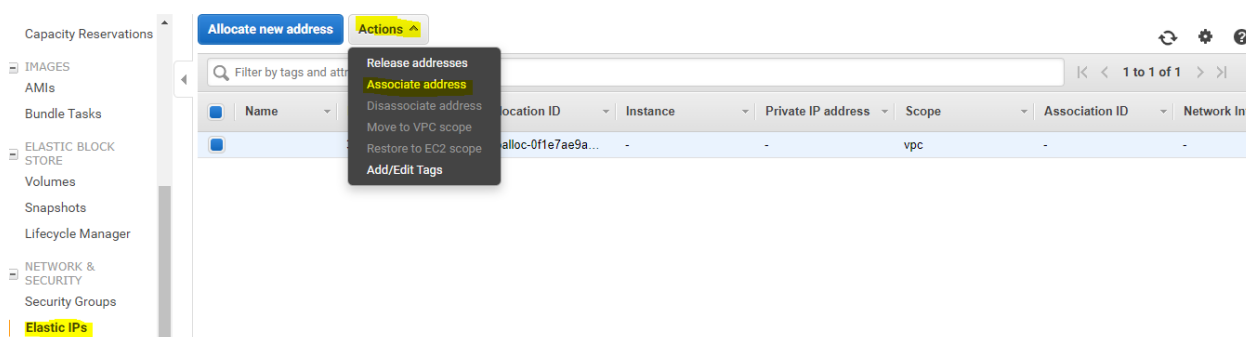
Allocate new address

✓ New address request succeeded

Elastic IP 3.211.221.113

Close

- Click on the checkbox against your newly created elastic IP. Then, click on the **Actions** button, you will get a drop-down list, as shown below.



- In the drop-down list, click on the **Associate address** link. A new page will appear as shown below.

Associate address

Select the instance OR network interface to which you want to associate this Elastic IP address (3.211.221.113)

Resource type ☒ Instance **i**
☐ Network interface

Instance **↻**

Private IP **↻** **i**

Reassociation ☐ Allow Elastic IP to be reassociated if already attached **i**

- Click inside the **Instance** text box, you will get a list of available instances as shown below. Please select your kafka instance.

[Addresses](#) > Associate address

Associate address

Select the instance OR network interface to which you want to associate this Elastic IP address (3.211.221.113)

Resource type ☒ Instance ☐ Network interface

Instance

Private IP

Reassociation ☐ Allow Elastic IP to be reassociated if already attached

Instance ID	Name	State
i-0b37fd6f1dbe361e7	CDH	stopped
i-05a9c053972eb801a	Shardha	stopped
i-0fdf37df462b6fc40	Kafka	running
i-0b943b6522fc3830b	AWS INS	stopped

Warning

If you associate an Elastic IP address with your instance, your current public IP address is released. [Learn more.](#)

* Required

[Cancel](#) [Associate](#)

- From the list, choose the EC2 instance with which you want to attach the elastic IP. The **Instance ID** of that EC2 instance will appear in the text box as shown in the example below and assign the automatically **Private ip address** and then click on **Associate**.

[Addresses](#) > Associate address

Associate address

Select the instance OR network interface to which you want to associate this Elastic IP address (3.211.221.113)

Resource type ☒ Instance ☐ Network interface

Instance

Private IP

Reassociation ☐ Allow Elastic IP to be reassociated if already attached

Warning

If you associate an Elastic IP address with your instance, your current public IP address is released. [Learn more.](#)

* Required

[Cancel](#) [Associate](#)

- You will be navigated to a new page where you will have confirmation that the elastic IP has been attached to your desired EC2 instance, as shown below and click on close.

[Addresses](#) > Associate address

Associate address

Associate address request succeeded

[Close](#)

- Now, go to the **Instances** page and click on the tick box against the EC2 instance with which you associated the elastic IP. You will see that the elastic IP has been attached to the EC2 instance, as shown below.

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

Scheduled Instances

Capacity Reservations

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Launch Instance

Connect

Actions

Search

Name: CDH

Name: Kafka

Add filter

1 to 2 of 2

<input type="checkbox"/>	Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm
<input type="checkbox"/>	CDH	i-0b37fd6f1dbe361e7	m4.xlarge	us-east-1b	stopped		None
<input checked="" type="checkbox"/>	Kafka	i-0fd37df462b6fc40	m4.large	us-east-1b	running	2/2 checks ...	None

Instance: i-0fd37df462b6fc40 (Kafka)

Elastic IP: 3.211.221.113

Description

Status Checks

Monitoring

Tags

Instance ID	i-0fd37df462b6fc40	Public DNS (IPv4)	ec2-3-211-221-113.compute-1.amazonaws.com
Instance state	running	IPv4 Public IP	3.211.221.113
Instance type	m4.large	IPv6 IPs	-

- ```
ec2-user@ip-172-31-16-40:~/downloads
┌ login as: ec2-user
└ Authenticating with public key "imported-openssh-key"
last login: Tue Oct 15 16:39:31 2019 from 139.5.242.145

 | _|_)
 | (_|_/
 ||_||_|| Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
package(s) needed for security, out of 82 available
run "sudo yum update" to apply all updates.
ec2-user@ip-172-31-16-40 ~]$ ls
data sparklogs logs spark.sh
ec2-user@ip-172-31-16-40 ~]$ cd downloads/
ec2-user@ip-172-31-16-40 downloads$ ls
kafka-sparkdemo-0.4.1-ubuntu-amd64.jar kafka-2.11-2.5.0-ubuntu-amd64.jar kafka-sparkdemo-0.0.3-SNAPSHOT-jar-with-dependencies.jar kibana-6.4.1-linux-x86_64 spark-2.3.2-bin-hadoop3 zookeeper-3.4.10
ec2-user@ip-172-31-16-40 downloads$
```

- Now you will have to delete the Kafka instance installed on your EC2 instance. For this follow the following steps -

```
cd downloads/
rm -r kafka_2.12-2.0.0/
```

```
[ec2-user@ip-172-31-69-194 downloads]$ ls
KafkaSparkDemo-0.0.3-SNAPSHOT-jar-with-dependencies.jar kafka_2.12-2.0.0 spark-2.3.2-bin-hadoop2.7
elasticsearch-6.4.1 kibana-6.4.1-linux-x86_64 zookeeper-3.4.12
[ec2-user@ip-172-31-69-194 downloads]$ rm -r kafka_2.12-2.0.0/
[ec2-user@ip-172-31-69-194 downloads]$ ls
KafkaSparkDemo-0.0.3-SNAPSHOT-jar-with-dependencies.jar elasticsearch-6.4.1 kibana-6.4.1-linux-x86_64 spark-2.3.2-bin-hadoop2.7 zookeeper-3.4.12
```

- Download the kafka binaries with the following command

```
wget https://archive.apache.org/dist/kafka/2.3.0/kafka_2.12-2.3.0.tgz
```

```
[ec2-user@ip-172-31-69-194 downloads]$ wget https://archive.apache.org/dist/kafka/2.3.0/kafka_2.12-2.3.0.tgz
--2021-04-12 14:04:43-- https://archive.apache.org/dist/kafka/2.3.0/kafka_2.12-2.3.0.tgz
Resolving archive.apache.org (archive.apache.org)... 138.201.131.134, 2a01:4f8:172:2ec5::2
Connecting to archive.apache.org (archive.apache.org)|138.201.131.134|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 57215197 (55M) [application/x-gzip]
Saving to: 'kafka_2.12-2.3.0.tgz'

100%[=====] 57,215,197 2.87MB/s in 16s

2021-04-12 14:04:59 (3.50 MB/s) - 'kafka_2.12-2.3.0.tgz' saved [57215197/57215197]
```

- Extract the kafka file with the following command -

```
tar -xzf kafka_2.12-2.3.0.tgz
```

- Go into the root user and then run the following commands to install pip

```
sudo -i
yum install epel-release
yum install python-pip
```

```
[root@ip-172-31-60-194 ~]# yum install python-pip
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
https://sbt.bintray.com/rpm/repodata/repomd.xml: [Errno 14] HTTPS Error 403 - Forbidden
Trying other mirror.
39 packages excluded due to repository priority protections
Resolving Dependencies
--> Running transaction check
--> Package python2-pip.noarch 0:9.0.3-1.amzn2.0.2 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

===== Package
ository Size
=====Installing:
python2-pip noarch 9.0.3-1.amzn2.0.2 amzn2-core 1.9 M

Transaction Summary
=====Install 1 Package

Total download size: 1.9 M
Installed size: 8.3 M
Is this ok [y/d/N]: y
Downloading packages:
python2-pip-9.0.3-1.amzn2.0.2.noarch.rpm | 1.9 MB 00:00:00
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
 Installing : python2-pip-9.0.3-1.amzn2.0.2.noarch 1/1
 Verifying : python2-pip-9.0.3-1.amzn2.0.2.noarch 1/1

Installed:
 python2-pip.noarch 0:9.0.3-1.amzn2.0.2

Complete!
```

- Next, install Kafka and PySpark with pip using with following commands -

```
pip install kafka
pip install pyspark==3.0.1
```

- Now, go back to ec2-user with the 'exit' command and then make a new directory where you will put the files for the advanced demo. Also, make sure that you transfer the files by downloading the zip file from the platform, extracting it, and then using WinSCP to transfer the files to the directory that you just created.