Immersion Day

Working with Elastic Block Store (EBS) volumes

Table of Contents

Overview

The purpose of this AWS Immersion Day hands-on lab is to familiarize you with the Amazon Elastic Block Store (EBS) service. EBS is a block storage service that enables you to create volumes, and attach / detach them to Elastic Compute Cloud (EC2) instances. You can create EBS volumes with different volume types, such as: Provisioned IOPS (io1), General Purpose Solid State (gp2), Throughput Optimized HDD (st1), or Cold HDD (sc1), depending on the performance characteristics of your application. Once an EBS volume has been created, you can switch between different volume types, using the **ModifyVolume** API. Keep in mind that EBS volume modifications are limited to once every six (6) hours.

During this lab, you'll create an EBS volume, attach it to an EC2 instance, format and mount the volume, generate some ongoing disk activity, and then modify the volume attributes to increase its performance.

For more information about EBS volume types, pricing, and links to service documentation, please visit the EBS Pricing Page. Visit the announcement about EBS Elastic Volumes, enabling EBS volume attributes to be modified on-the-fly.

Prerequisites

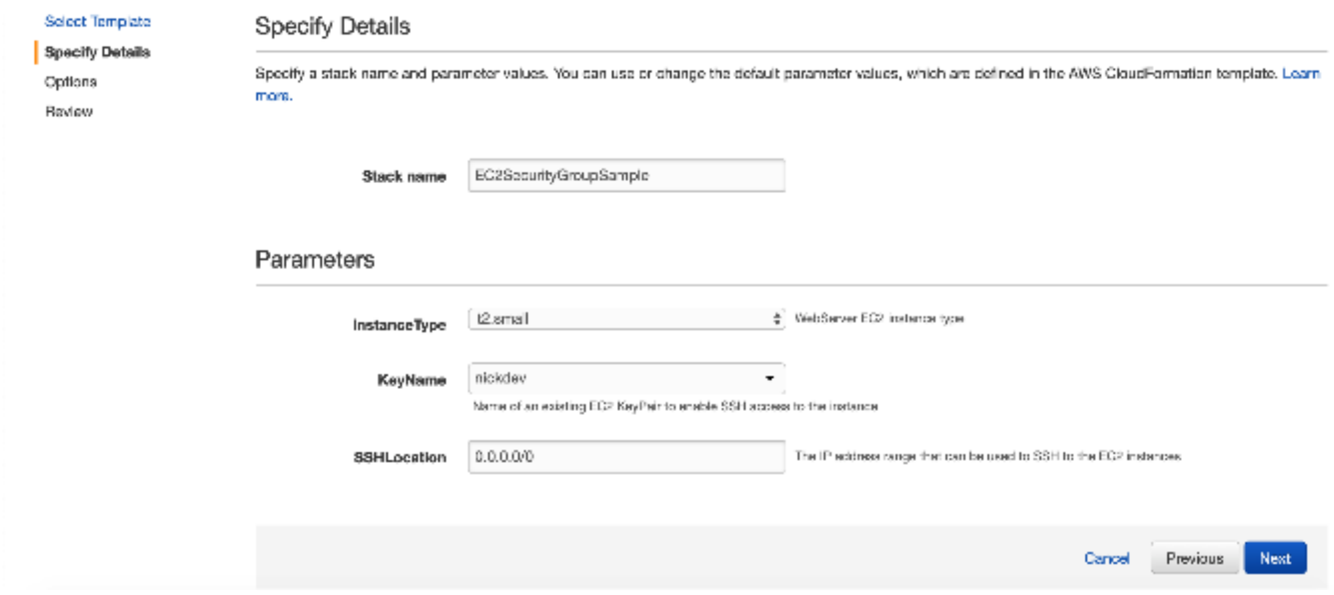
In order to complete this lab, you will need an AWS account with the ability to launch CloudFormation templates, create EC2 instances and modify EBS volumes.

Lab Steps

1. Create and attach an EBS volume
2. Run a disk-heavy workload
3. Modify EBS volume attributes
4. Optional: Create a snapshot

Create and attach an EBS Volume

1. Please create a key pair in the region where the EC2 instances will be launched. Refer to this: https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-key-pairs.html#having-ec2-create-your-key-pair
2. This Cloudformation template will launch an EC2 instance with the keypair that you've created. [Please make sure you have the default vpc in the region otherwise this will fail]



Specify Details

Specify a stack name and parameter values. You can use or change the default parameter values, which are defined in the AWS CloudFormation template. Learn more.

Stack name: EC2SecurityGroupSample

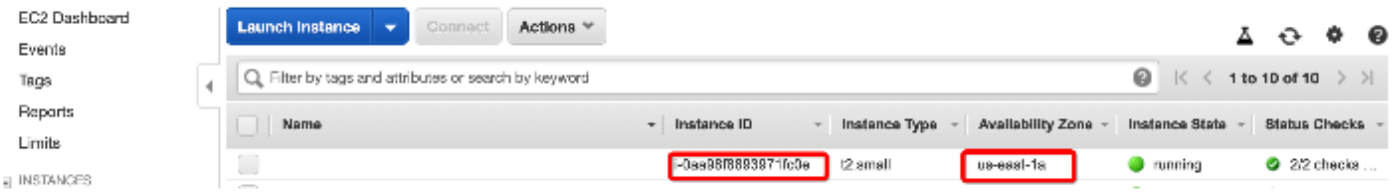
Parameters

InstanceType: t2.small — WebServer EC2 instance type

KeyName: nickdev — Name of an existing EC2 KeyPair to enable SSH access to the instance

SSHLocation: 0.0.0.0/0 — The IP address range that can be used to SSH to the EC2 instances

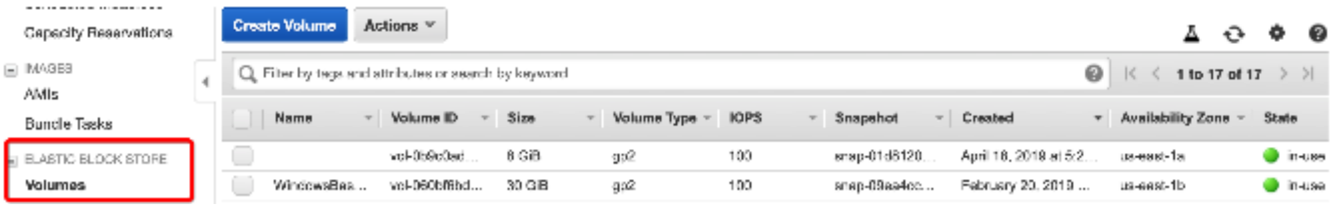
3. Navigate to the **Amazon EC2** service and click on **Instances**



Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
	-0aa98f8883871fc0e	t2.small	us-east-1a	running	2/2 checks ...

4. Note the **InstanceID** and **Availability Zone** of your EC2 instance; you'll need this in a moment

5. Under the **Elastic Block Store** heading, click **Volumes**



Capacity Reservations

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Create Volume | Actions

Filter by tags and attributes or search by keyword

1 to 17 of 17

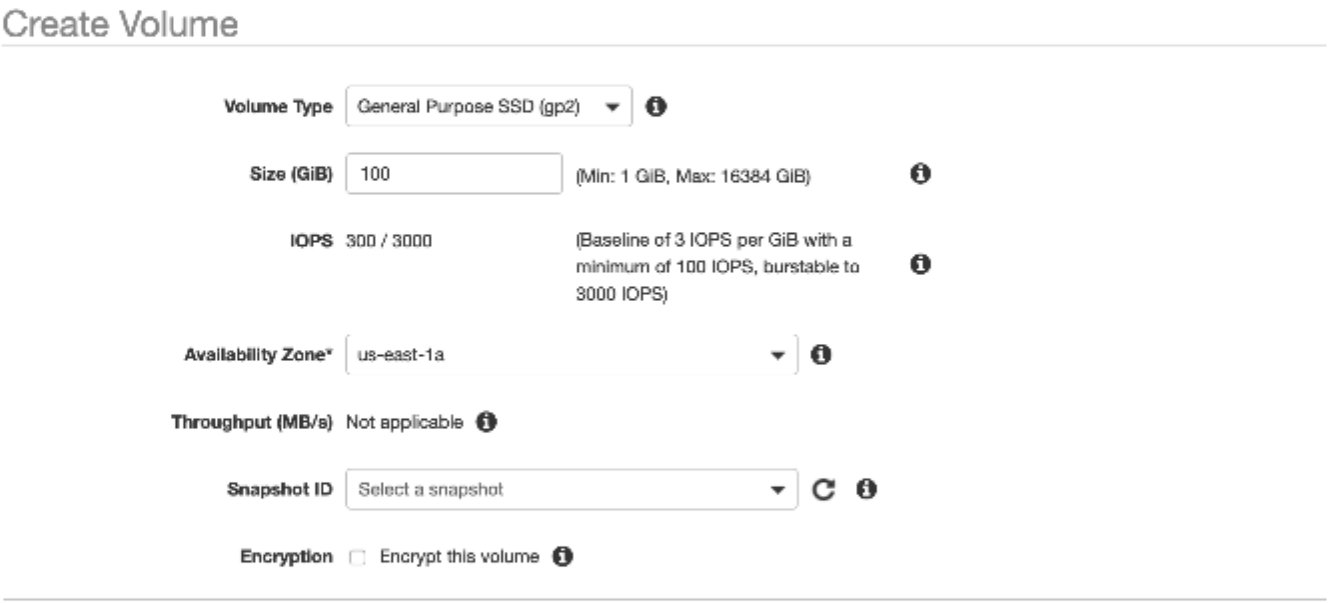
	Name	Volume ID	Size	Volume Type	IOPS	Snapshot	Created	Availability Zone	State
□		vol-0b9c0ad...	8 GiB	gp2	100	snap-01d8120...	April 18, 2018 at 5:2...	us-east-1a	● in-use
□	WindowsBas...	vol-060bf6bd...	30 GiB	gp2	100	snap-09aa4cc...	February 20, 2019 ...	us-east-1b	● in-use

6. Click on the **Create Volume** button

7. Choose Volume Type: **General Purpose SSD (gp2)**

8. Size: **100 GB**

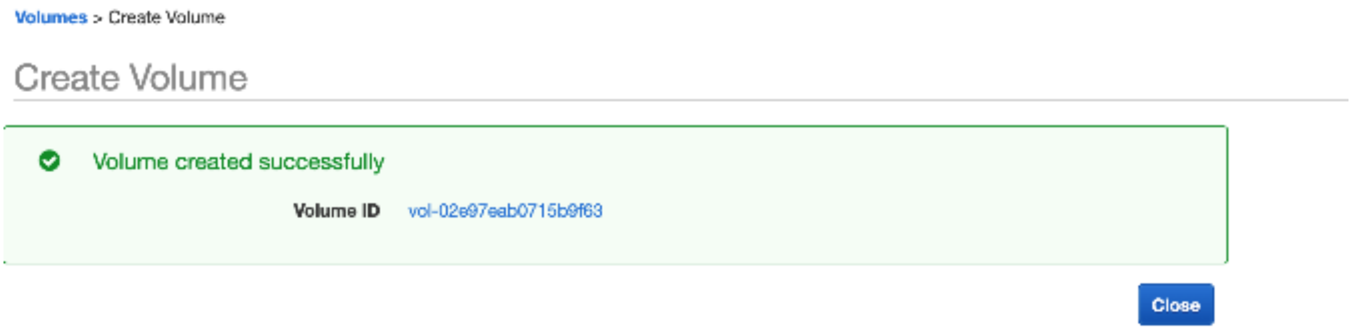
9. Availability Zone: Use the Availability Zone noted in **Step #4**



Create Volume

Volume Type	General Purpose SSD (gp2)	
Size (GiB)	100	(Min: 1 GiB, Max: 16384 GiB)
IOPS	300 / 3000	(Baseline of 3 IOPS per GiB with a minimum of 100 IOPS, burstable to 3000 IOPS)
Availability Zone*	us-east-1a	
Throughput (MB/s)	Not applicable	
Snapshot ID	Select a snapshot	
Encryption	□ Encrypt this volume	

10. **Click the link** containing the new EBS VolumeId



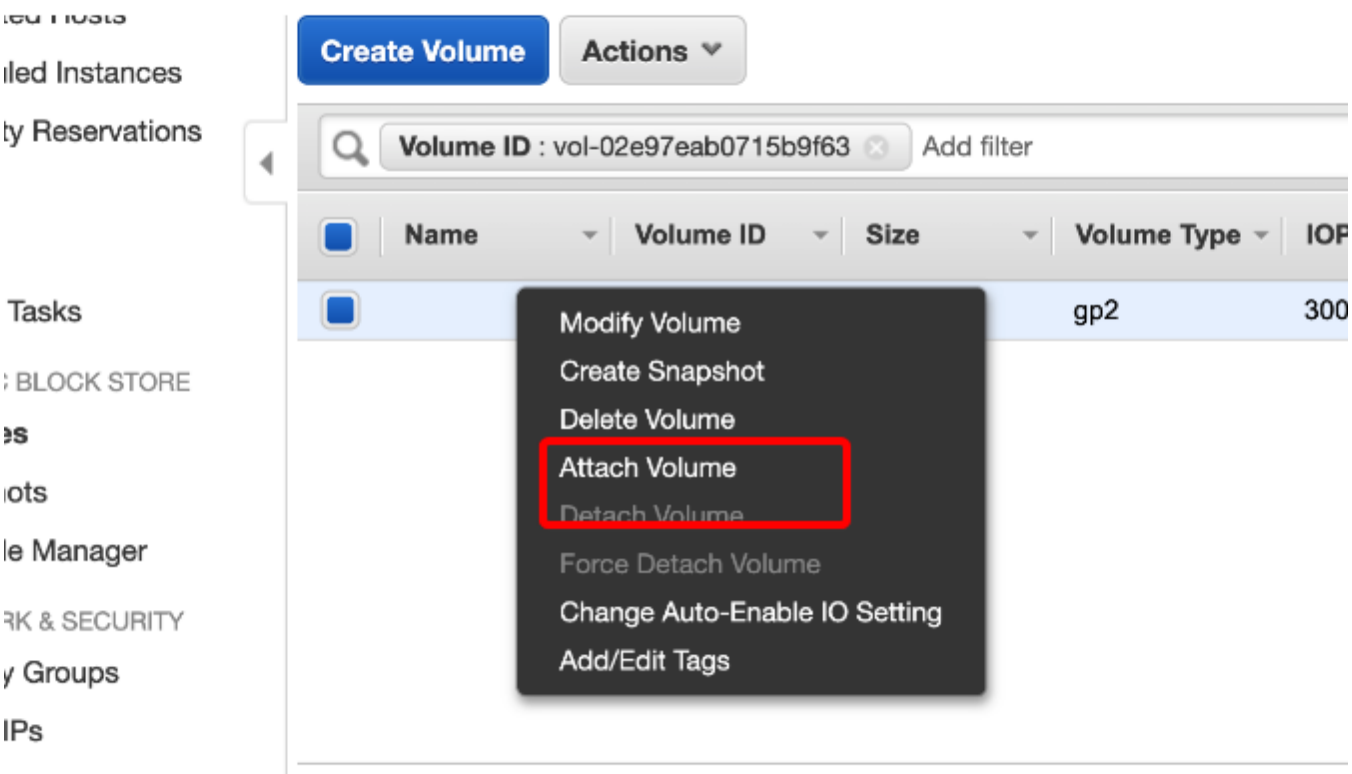
Volumes > Create Volume

Create Volume

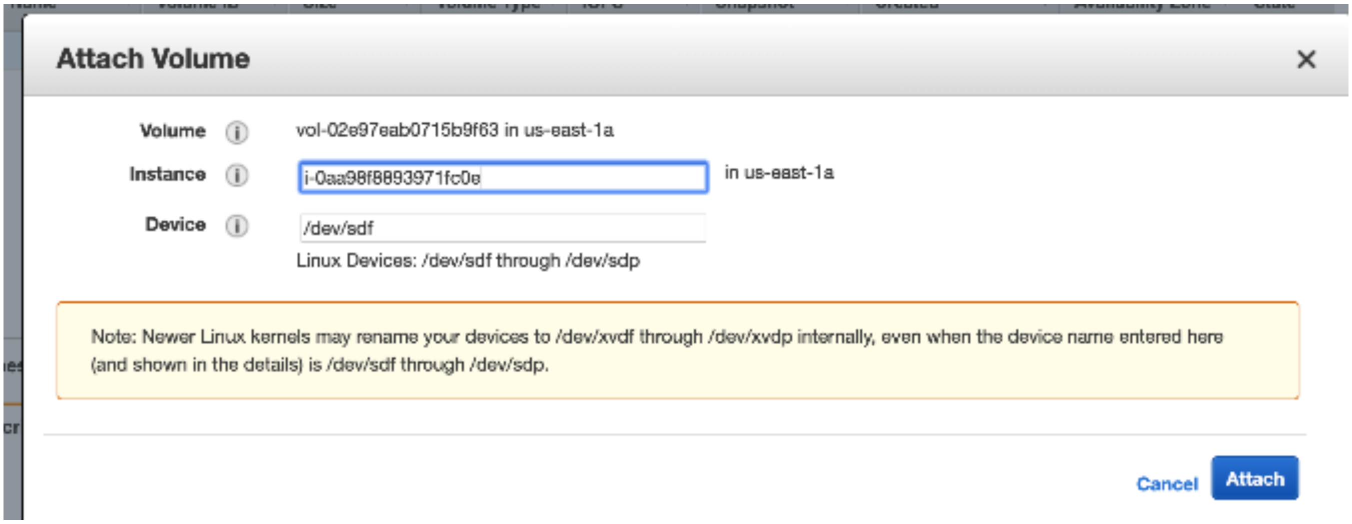
Volume created successfully

Volume ID vol-02e97eab0715b9f63

11. Right-click the new volume and click **Attach Volume**



12. Search for the **InstanceID from step #4**
13. Click the **Attach** button



Attach Volume

Volume: vol-02e97eab0715b9f63 in us-east-1a

Instance: i-0aa98f8893971fc0e in us-east-1a

Device: /dev/sdf

Linux Devices: /dev/sdf through /dev/sdp

Note: Newer Linux kernels may rename your devices to /dev/xvdf through /dev/xvdp internally, even when the device name entered here (and shown in the details) is /dev/sdf through /dev/sdp.

At this point, your new EBS volume should be created and attached to your EC2 instance.

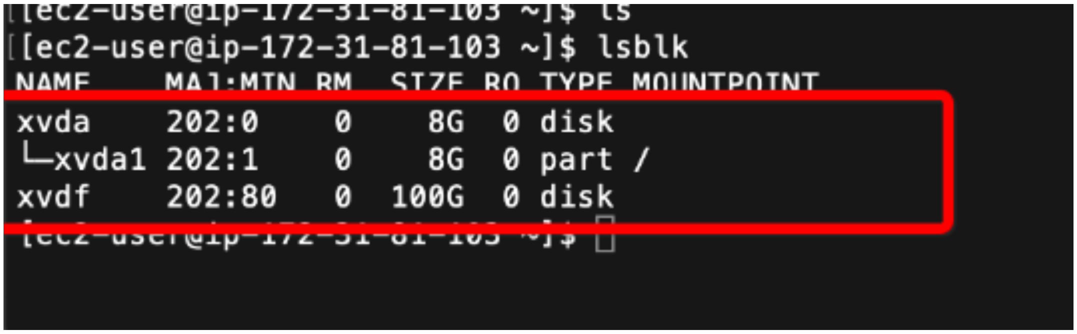
Run a Disk-heavy Workload

Now that you've created an EBS volume, and attached it to an EC2 instance, you'll generate some ongoing disk activity. In the steps below, you'll log into your EC2 instance, create a filesystem on the EBS volume, mount the volume, and then initiate some disk activity.

1. Log into the EC2 instance via SSH:

   ssh -i ~/<privatekey.pem> ec2-user@ipaddress

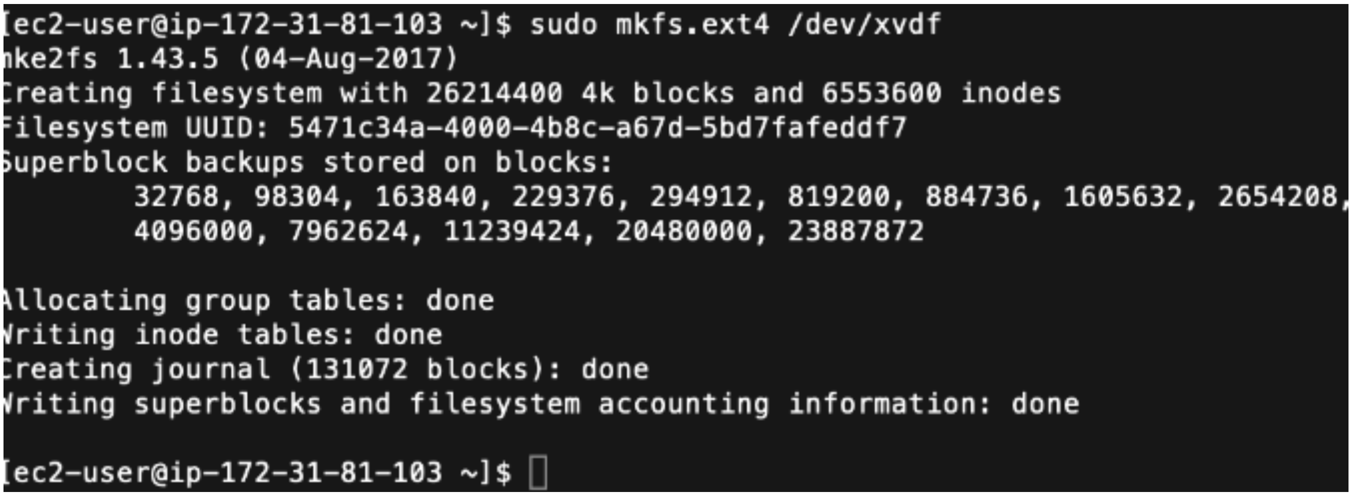
2. Find the disk device using the **lsblk** command



```
[ec2-user@ip-172-31-81-103 ~]$ ls
[ec2-user@ip-172-31-81-103 ~]$ lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
xvda    202:0    0    8G  0 disk
└─xvda1 202:1    0    8G  0 part /
xvdf    202:80   0  100G  0 disk
[ec2-user@ip-172-31-81-103 ~]$ 
```

3. Create a filesystem on the disk, using the device name from step #2:

   sudo mkfs.ext4 /dev/xvdf



```
[ec2-user@ip-172-31-81-103 ~]$ sudo mkfs.ext4 /dev/xvdf
mke2fs 1.43.5 (04-Aug-2017)
Creating filesystem with 26214400 4k blocks and 6553600 inodes
Filesystem UUID: 5471c34a-4000-4b8c-a67d-5bd7fafeddf7
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000, 7962624, 11239424, 20480000, 23887872

Allocating group tables: done
Writing inode tables: done
Creating journal (131072 blocks): done
Writing superblocks and filesystem accounting information: done

[ec2-user@ip-172-31-81-103 ~]$
```

4. Mount the filesystem using the mount command:

   mkdir ~/ebstest; cd ~/ebstest; sudo mount /dev/xvdf ~/ebstest

5. Run this Bash command to generate disk activity:

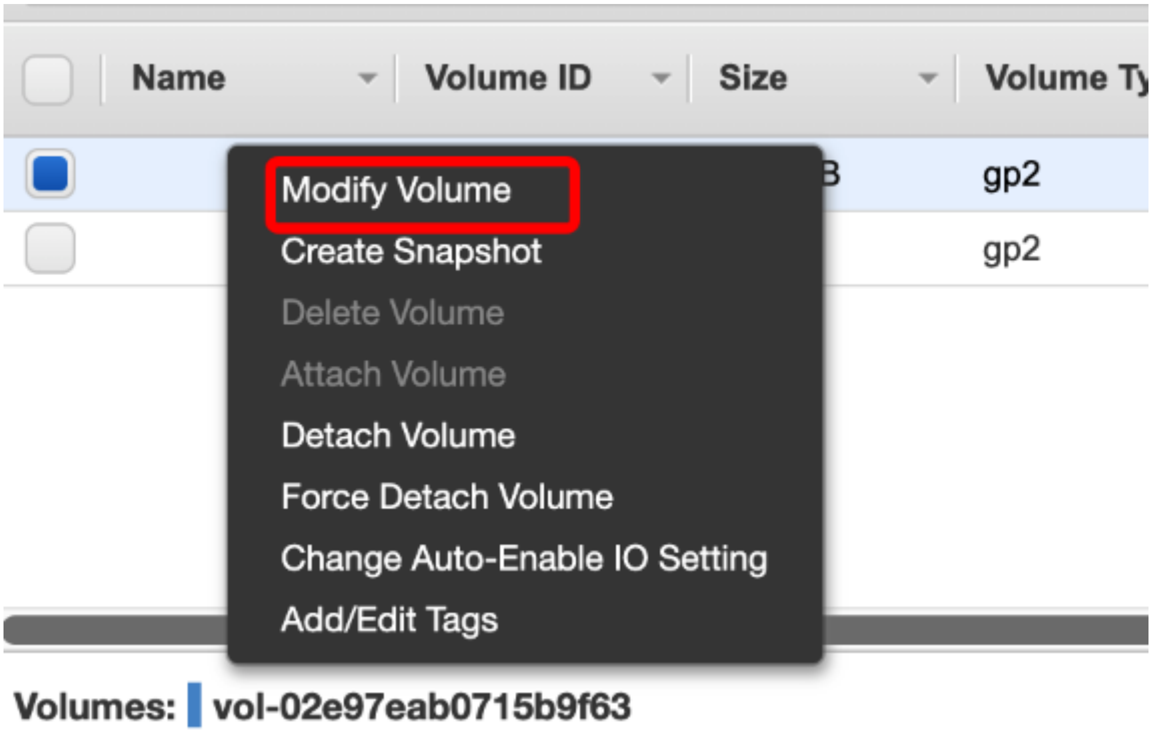
   while [true]; do uuid=$(uuidgen); echo $uuid | sudo tee $uuid.json > /dev/null; done;

The Bash script will write some random JSON files to the disk drive. Let the previous Bash command run while you move onto the next step.

Modify EBS Volume Attributes

While the Bash script is still running on your EC2 instance, generating new data, you'll modify the attributes of the Elastic Block Store (EBS) volume, to scale it up to a different volume type and increase its IOPS.

1. Open the AWS Management Console
2. Navigate to the **Amazon EC2** service
3. Under the **Elastic Block Store** heading, click **Volumes**
4. Right-click your volume and click **Modify Volume**



Volumes: vol-02e97eab0715b9f63

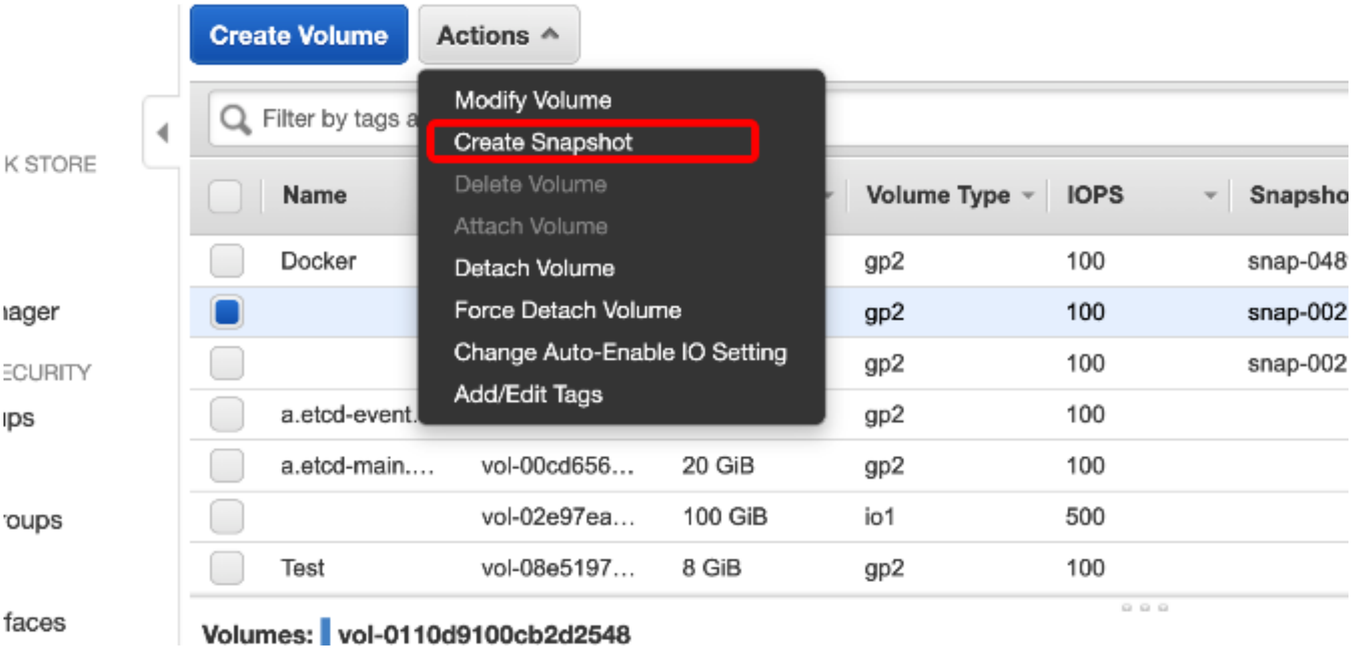
5. For **Volume Type**, choose **Provisioned IOPS SSD (IO1)**
6. For **Iops**, type **5000**
7. Click the **Modify** button, then **Yes** to confirm

Your volume will take some time to change its attributes to the newly specified volume type and IOPS performance level. Notice that the disk activity on your Linux EC2 instance continues to run while the EBS volume is being modified.

Optional: Create a Snapshot

An EBS snapshot is used to create a point-in-time, incremental backup of an EBS volume. Snapshots are stored in Amazon S3 and can be used at any time to create new EBS volumes. In the steps below, you will create a snapshot of your EBS volume.

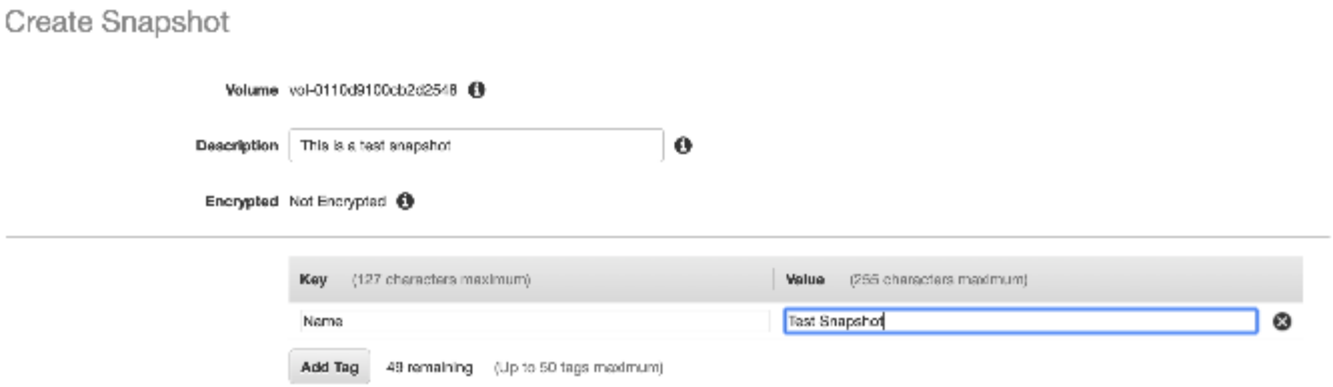
1. Navigate to the **Amazon EC2** service
2. Under the **Elastic Block Store** heading, click **Volumes**
3. Right-click your volume and click **Create Snapshot**



Name			Volume Type	IOPS	Snapsho
Docker			gp2	100	snap-048
			gp2	100	snap-002
			gp2	100	snap-002
a.etcd-event.			gp2	100	
a.etcd-main.…	vol-00cd656…	20 GiB	gp2	100	
	vol-02e97ea…	100 GiB	io1	500	
Test	vol-08e5197…	8 GiB	gp2	100	

Volumes: vol-0110d9100cb2d2548

4. Enter a **description** and **add a tag**


Create Snapshot

Volume vol-0110d9100cb2d2548

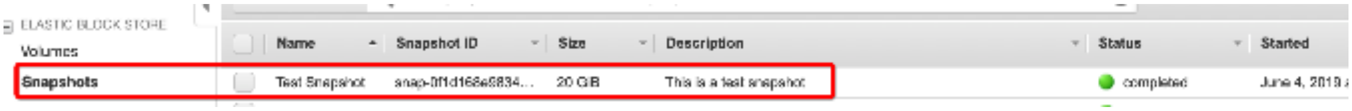
Description This is a test snapshot

Encrypted Not Encrypted

Key (127 characters maximum)	Value (255 characters maximum)
Name	Test Snapshot

Add Tag 49 remaining (Up to 50 tags maximum)

5. Once the snapshot is created you can navigate to the **Snapshots section to view the snapshot**



Name	Snapshot ID	Size	Description	Status	Started
Test Snapshot	snap-0f1d168e8834…	20 GiB	This is a test snapshot	● completed	June 4, 2019 a

Cleanup

After completing this lab, make sure you clean up any resources that you created during execution of the lab steps.

1. Detach the EBS volume from the EC2 instance
2. Delete the EBS volume
3. If you created a snapshot from the EBS volume, delete the snapshot
4. Delete the CloudFormation stack

Conclusion

After completing this lab, you should be familiar with the essentials of the Amazon Elastic Block Store (EBS) service. You've learned how to create a new EBS volume and attach it to an EC2 instance. Next, you logged into your EC2 instance and partitioned and mounted the disk, and generated some mock disk activity. Finally, you used the AWS Management Console to reconfigure the EBS volume's attributes to change the volume type and increase its performance.

To learn more about Amazon Elastic Block Store, visit the service documentation.