

Working with EBS

Version 5.1.3 (spl2)

Lab Overview



This lab focuses on Amazon Elastic Block Store (Amazon EBS), a key underlying storage mechanism for Amazon EC2 instances. In this lab, you will learn how to create an Amazon EBS volume, attach it to an instance, apply a file system to the volume, and then take a snapshot backup.

Topics covered

By the end of this lab, you will be able to:

- Create an Amazon EBS volume
- Attach and mount your volume to an EC2 instance
- Create a snapshot of your volume
- Create a new volume from your snapshot
- Attach and mount the new volume to your EC2 instance

Lab Pre-requisites

To successfully complete this lab, you should be familiar with basic Amazon EC2 usage and with basic Linux server administration. You should feel comfortable using the Linux command-line tools.

Other AWS Services

Other AWS Services than the ones needed for this lab are disabled by IAM policy during your access time in this lab. In addition, the capabilities of the services used in this lab are limited to what's required by the lab and in some cases are even further limited as an intentional aspect of the lab design. Expect errors when accessing other services or performing actions beyond those provided in this lab guide.

What is Amazon Elastic Block Store?

Amazon Elastic Block Store (Amazon EBS) offers persistent storage for Amazon EC2 instances. Amazon EBS volumes are network-attached and persist independently from the life of an instance. Amazon EBS volumes are highly available, highly reliable volumes that can be leveraged as an Amazon EC2 instances boot partition or attached to a running Amazon EC2 instance as a standard block device.

When used as a boot partition, Amazon EC2 instances can be stopped and subsequently restarted, enabling you to pay only for the storage resources used while maintaining your instance's state. Amazon EBS volumes offer greatly improved durability over local Amazon EC2 instance stores because Amazon EBS volumes are automatically replicated on the backend (in a single Availability Zone).

For those wanting even more durability, Amazon EBS provides the ability to create point-in-time consistent snapshots of your volumes that are then stored in Amazon Simple Storage Service (Amazon S3) and automatically replicated across multiple Availability Zones. These snapshots can be used as the starting point for new Amazon EBS volumes and can protect your data for long-term durability. You can also easily share these snapshots with co-workers and other AWS developers.

This lab guide explains basic concepts of Amazon EBS in a step-by-step fashion. However, it can only give a brief overview of Amazon EBS concepts. For further information, see the [Amazon EBS documentation](#).

Amazon EBS Volume Features

Amazon EBS volumes deliver the following features:

- **Persistent storage:** Volume lifetime is independent of any particular Amazon EC2 instance.
- **General purpose:** Amazon EBS volumes are raw, unformatted block devices that can be used from any operating system.
- **High performance:** Amazon EBS volumes are equal to or better than local Amazon EC2 drives.
- **High reliability:** Amazon EBS volumes have built-in redundancy within an Availability Zone.
- **Designed for resiliency:** The AFR (Annual Failure Rate) of Amazon EBS is between 0.1% and 1%.
- **Variable size:** Volume sizes range from 1 GB to 16 TB.
- **Easy to use:** Amazon EBS volumes can be easily created, attached, backed up, restored, and deleted.

Duration

This lab takes approximately **45 minutes** to complete.

Accessing the AWS Management Console

1. At the top of these instructions, click ► **Start Lab** to launch your lab.

Tip: If you need more time to complete the lab, then restart the timer for the environment by choosing the ► **Start Lab** button again.

2. Lab resources will be displayed on the top left corner.

Example:

- **AWS** ● indicates that AWS lab resources are currently getting created.
- **AWS** ● indicates that AWS lab resources are ready.

Please wait for the lab to be ready, before proceeding.

3. At the top of these instructions, click **AWS** ●

This will open the AWS Management Console in a new browser tab. The system will automatically log you in.

Tip: If a new browser tab does not open, there will typically be a banner or icon at the top of your browser indicating that your browser is preventing the site from opening pop-up windows. Click on 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 will be able to see both browser tabs at the same time, to make it easier to follow the lab steps.

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

Task 1: Create a New EBS Volume

In this task, you will create and attach an Amazon EBS volume to a new Amazon EC2 instance.

5. In the AWS Management Console, select the ☰ **Services** menu, and then select **EC2** under **Compute**.
6. In the left navigation pane, click **Instances**.

An Amazon EC2 instance named **Lab** has already been launched for your lab.


7. Note the **Availability Zone** of the instance. It will look similar to *us-west-2a*.
8. In the left navigation pane, click **Volumes**.

You will see an existing volume that is being used by the Amazon EC2 instance. This volume has a size of 8 GiB, which makes it easy to distinguish from the volume you will create next, which will be 1 GiB in size.

9. Click **Create Volume** then configure:
 - **Volume Type:** *General Purpose SSD (gp2)*
 - **Size (GiB):** 1. **NOTE:** You may be restricted from creating large volumes.
 - **Availability Zone:** Select the same availability zone as your EC2 instance.
 - Click **Add Tag**
 - In the Tag Editor, enter:


- **Key:**
- **Value:**

10. Click **Create Volume** then click **Close**

Your new volume will appear in the list, and will move from the *creating* state to the *available* state.
You may need to click **refresh**  to see your new volume.

Task 2: Attach the Volume to an Instance

You can now attach your new volume to the Amazon EC2 instance.

11. Select  **My Volume**.
12. In the **Actions** menu, click **Attach Volume**.
13. Click in the **Instance** field, then select the instance that appears (Lab).

Note that the **Device** field is set to `/dev/sdf`. You will use this device identifier in a later task.

14. Click **Attach**

The volume state is now *in-use*.

Task 3: Connect to Your Amazon EC2 Instance



Windows Users: Using SSH to Connect

💡 These instructions are for Windows users only.

If you are using macOS or Linux, [skip to the next section](#).

15. Read through the three bullet points in this step before you start to complete the actions, because you will not be able to see these instructions when the Details panel is open.

- Click on **i AWS Details** above these instructions you are currently reading. A *Details* window will open.
- Click on the **Download PPK** button and save the **labsuser.ppk** file. Typically your browser will save it to the Downloads directory.
- Then exit the Details panel.

16. Download needed software.

- You will use **PuTTY** to SSH to Amazon EC2 instances. If you do not have PuTTY installed on your computer, [download it here](#).

17. Open **putty.exe**

18. Configure PuTTY to not timeout:

- Click **Connection**
- Set **Seconds between keepalives** to

This allows you to keep the PuTTY session open for a longer period of time.

19. Configure your PuTTY session:

- Click **Session**
- **Host Name (or IP address)**: Copy and paste the **Public IPv4 address** for the instance. To find it, return to the EC2 Console and click on **Instances**. Check the box next to the instance and in the *Description* tab copy the **IPv4 Public IP** value.
- Back in PuTTY, in the **Connection** list, expand **SSH**
- Click **Auth** (don't expand it)
- Click **Browse**
- Browse to and select the `labsuser.ppk` file that you downloaded
- Click **Open** to select it
- Click **Open**

20. Click **Yes**, to trust the host and connect to it.

21. When prompted **login as**, enter: `ec2-user`

This will connect you to the EC2 instance.

22. [Windows Users: Click here to skip ahead to the next task.](#)

macOS and Linux Users

These instructions are for Mac/Linux users only. If you are a Windows user, [skip ahead to the next task](#).

23. Read through all the instructions in this one step before you start to complete the actions, because you will not be able to see these instructions when the Details panel is open.

- Click on **i AWS Details** above these instructions you are currently reading. A *Details* window will open.
- Click on the **Download** button and save the **labsuser.pem** file.
- Then exit the Details panel.

24. Open a terminal window, and change directory `cd` to the directory where the `labsuser.pem` file was downloaded.

For example, run this command, if it was saved to your Downloads directory:

```
cd ~/Downloads
```

25. Change the permissions on the key to be read only, by running this command:

```
chmod 400 labsuser.pem
```

26. Return to the AWS Management Console, and in the EC2 service, click on **Instances**.

The **Lab** instance should be selected.

27. In the *Details* tab, copy the **IPv4 Public IP** value.

28. Return to the terminal window and run this command (replace **<public-ip>** with the actual public IP address you copied):

```
ssh -i labsuser.pem ec2-user@<public-ip>
```

29. Type `yes` when prompted to allow a first connection to this remote SSH server.

Because you are using a key pair for authentication, you will not be prompted for a password.

Task 4: Create and Configure Your File System

In this task, you will add the new volume to a Linux instance as an ext3 file system under the `/mnt/data-store` mount point.

i If you are using PuTTY, you can paste text by right-clicking in the PuTTY window.

30. View the storage available on your instance:

```
df -h
```

You should see output similar to:

Filesystem	Size	Used	Avail	Use%	Mounted on
devtmpfs	488M	60K	488M	1%	/dev
tmpfs	497M	0	497M	0%	/dev/shm
/dev/xvda1	7.8G	982M	6.7G	13%	/

This is showing the original 8GB disk volume. Your new volume is not yet shown.

31. Create an ext3 file system on the new volume:

```
sudo mkfs -t ext3 /dev/sdf
```

32. Create a directory for mounting the new storage volume:

```
sudo mkdir /mnt/data-store
```

33. Mount the new volume:

```
sudo mount /dev/sdf /mnt/data-store
```

To configure the Linux instance to mount this volume whenever the instance is started, you will need to add a line to `/etc/fstab`.

```
echo "/dev/sdf /mnt/data-store ext3 defaults,noatime 1 2" | sudo tee -a /etc/fstab
```

34. View the configuration file to see the setting on the last line:

```
cat /etc/fstab
```

35. View the available storage again:

```
df -h
```

The output will now contain an additional line - `/dev/xvdf`:

Filesystem	Size	Used	Avail	Use%	Mounted on
devtmpfs	488M	60K	488M	1%	/dev
tmpfs	497M	0	497M	0%	/dev/shm
/dev/xvda1	7.8G	982M	6.7G	13%	/
/dev/xvdf	976M	1.3M	924M	1%	/mnt/data-store

36. On your mounted volume, create a file and add some text to it.

```
sudo sh -c "echo some text has been written > /mnt/data-store/file.txt"
```


37. Verify that the text has been written to your volume.

```
cat /mnt/data-store/file.txt
```

Task 5: Create an Amazon EBS Snapshot

In this task, you will create a snapshot of your EBS volume.

You can create any number of point-in-time, consistent snapshots from Amazon EBS volumes at any time. Amazon EBS snapshots are stored in Amazon S3 with high durability. New Amazon EBS volumes can be created out of snapshots for cloning or restoring backups. Amazon EBS snapshots can also be easily shared among AWS users or copied over AWS regions.

38. In the **AWS Management Console**, click on **Volumes** and select  **My Volume**.

39. In the **Actions** menu, click **Create Snapshot**.

40. Click **Add Tag** then configure:

- **Key:** `Name`
- **Value:** `My Snapshot`
- Click **Create Snapshot** then click **Close**

Your snapshot will be listed in the **Snapshots** console.

41. In the left navigation pane, click **Snapshots**.

Your snapshot is displayed. It will start with a state of *pending*, which means that the snapshot is being created. It will then change to a state of *completed*. Only used storage blocks are copied to snapshots, so empty blocks do not take any snapshot storage space.

42. In your remote SSH session, delete the file that you created on your volume.

```
sudo rm /mnt/data-store/file.txt
```

43. Verify that the file has been deleted.



```
ls /mnt/data-store/
```

Your file has been deleted.

Task 6: Restore the Amazon EBS Snapshot


If you ever wish to retrieve data stored in a snapshot, you can **Restore** the snapshot to a new EBS volume.

Create a Volume Using Your Snapshot

44. In the **AWS Management Console**, select  **My Snapshot**.
45. In the **Actions** menu, click **Create Volume**.
46. For **Availability Zone** Select the same availability zone that you used earlier.
47. Click  then configure:
 - **Key:** Name
 - **Value:** Restored Volume
 - Click **Create Volume**
 - Click **Close**

When restoring a snapshot to a new volume, you can also modify the configuration, such as changing the volume type, size or Availability Zone.

Attach the Restored Volume to Your EC2 Instance

48. In the left navigation pane, click **Volumes**.
49. Select  **Restored Volume**.
50. In the **Actions** menu, click **Attach Volume**.
51. Click in the **Instance** field, then select the instance that appears (Lab).

Note that the **Device** field is set to `/dev/sdg`. You will use this device identifier in a later task.

52. Click **Attach**

The volume state is now *in-use*.

Mount the Restored Volume

53. Create a directory for mounting the new storage volume:

```
sudo mkdir /mnt/data-store2
```


54. Mount the new volume:


```
sudo mount /dev/sdg /mnt/data-store2
```

55. Verify that volume you mounted has the file that you created earlier.

```
ls /mnt/data-store2/
```


You should see file.txt.

Conclusion

 Congratulations! You now have successfully:

- Created an Amazon EBS volume
- Attached the volume to an EC2 instance
- Created a file system on the volume
- Added a file to volume
- Created a snapshot of your volume
- Created a new volume from the snapshot
- Attached and mounted the new volume to your EC2 instance
- Verified that the file you created earlier was on the newly created volume

Lab Complete

 Congratulations! You have completed the lab.

56. 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.*

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