

**Project in AWS
Practice Lab**

Reduce Storage Costs with EFS

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ABOUT THIS LAB

Amazon Elastic File System (Amazon EFS) provides a simple, serverless elastic file system that lets you share file data without provisioning or managing storage. In this lab, we modify three existing EC2 instances to use a shared EFS storage volume instead of duplicated Elastic Block Store volumes. This reduces costs significantly, as we only need to store data in one location instead of three. By the end of this lab, you will understand how to create EFS volumes and attach them to an EC2 instance. Make sure you're in the N. Virginia (us-east-1) region throughout the lab.

LEARNING OBJECTIVES

- Create an EFS File System
- Mount the EFS File System and Test It
- Remove Old Data

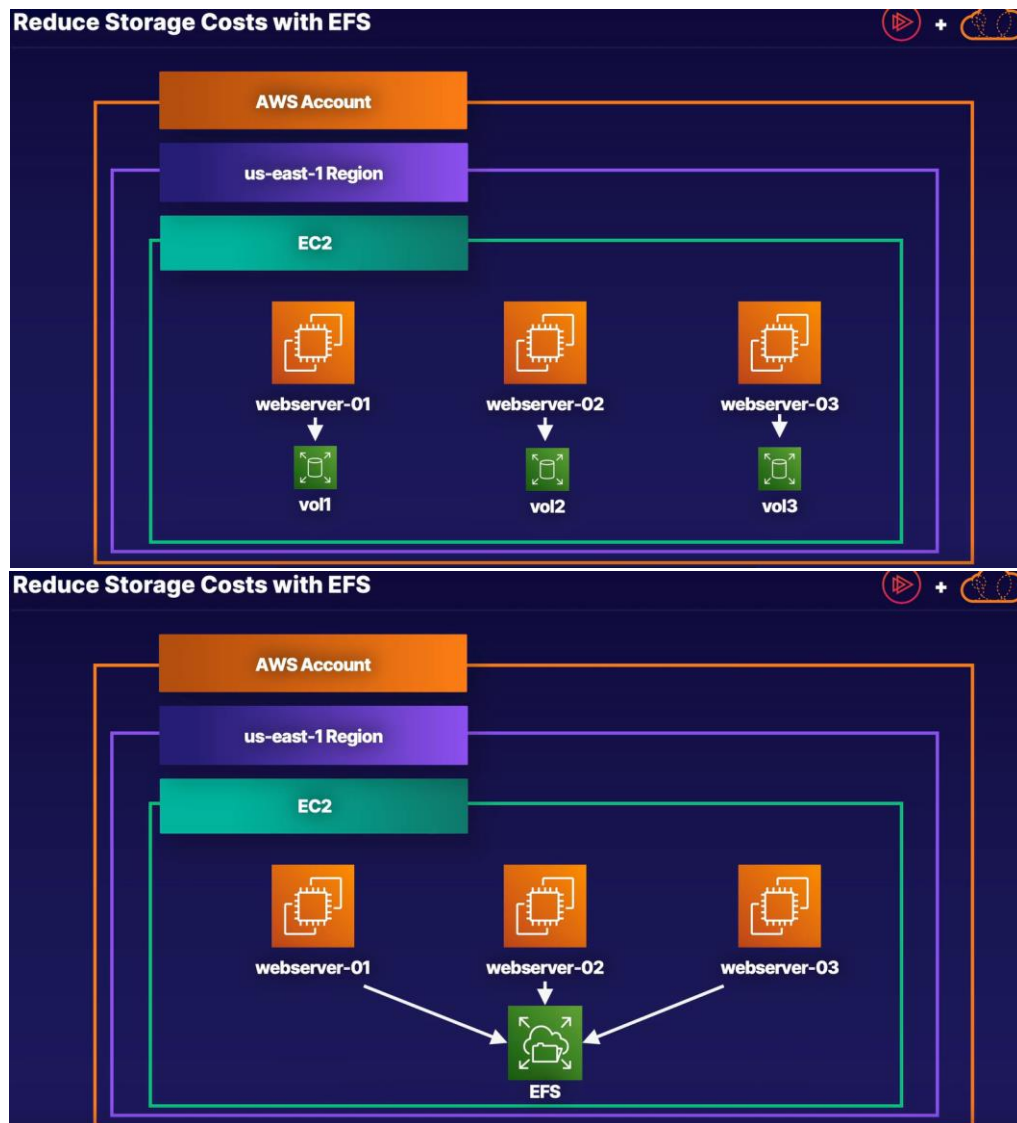
AWS Documentation about EFS: <https://aws.amazon.com/efs/faq/>

Source: <https://learn.acloud.guru/course/certified-solutions-architect-associate/>

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Lab Diagrams



We have the AWS account in **us-east-1** Region, and we have 3 EC2 instances (3 web servers) that are all using a 10 GiB EBS volume per instance to store the same website data. Since the website data is the same across all 3 instances, we will attach a single EFS volume (shared EFS volume) and copy our data from the EBS volume to the EFS volume, and then unmount the EBS volumes and mount the **/data** file system to the new EFS volume.

We will repeat this on all 3 servers and delete the EBS volumes on the servers to save on storage costs.

Log in to your AWS account



Sign in as IAM user

Account ID (12 digits) or account alias

Type Account ID

IAM user name

Type IAM user name

Password

☐ Remember this account

Sign in

Sign in using root user email

[Forgot password?](#)



1. Create an EFS File System

1.1. Review Your Resources

1. Once you are logged in to the AWS Management Console, navigate to **EC2** → **Instances**.

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
<input type="checkbox"/>	webserver-03	i-0f	13	t3.micro	3/3 checks passed	View alarms +	us-east-1a
<input type="checkbox"/>	webserver-01	i-03	c2	t3.micro	3/3 checks passed	View alarms +	us-east-1a
<input type="checkbox"/>	webserver-02	i-0f	15	t3.micro	3/3 checks passed	View alarms +	us-east-1a

2. Click the checkbox next to **webserver-01**. The instance details display below.
3. Select the **Storage** tab and note the 10 GiB disk attached to the volume. This is the same configuration used for **webserver-02** and **webserver-03**.

Instances (1/3) [Info](#)

Find Instance by attribute or tag (case-sensitive) All states

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
<input type="checkbox"/> webserver-03	i-...	Running	t3.micro	3/3 checks pass	View alarms +	us-east-1a	ec2...	om...	5
<input checked="" type="checkbox"/> webserver-01	i-...	Running	t3.micro	3/3 checks pass	View alarms +	us-east-1a	ec2...	mp...	3
<input type="checkbox"/> webserver-02	i-...	Running	t3.micro	3/3 checks pass	View alarms +	us-east-1a	ec2...	om...	0

i-03 :2 (webserver-01)

Details | Status and alarms | Monitoring | Security | Networking | **Storage** | Tags

▼ Root device details

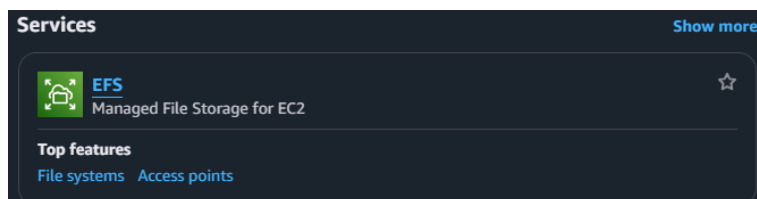
Root device name /dev/sda1	Root device type EBS	EBS optimization disabled
-------------------------------	-------------------------	------------------------------

▼ Block devices

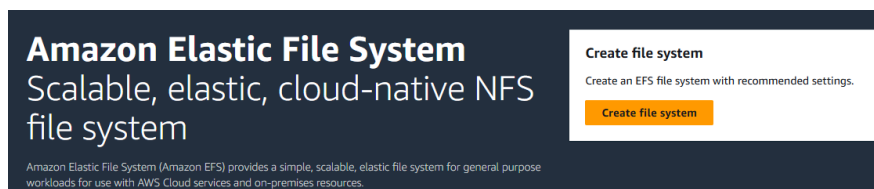
Volume ID	Device name	Volume size (GiB)	Volume State	Attachment status	Attachment time	Encrypted	KMS key ID
<input type="checkbox"/> vol-0i...	/dev/sda1	20	In-use	Attached	2025/04/21 17:05 GMT+3	No	-
<input checked="" type="checkbox"/> vol-0j...	/dev/sdf	10	In-use	Attached	2025/04/21 17:05 GMT+3	No	-

1.2. Create an EFS Volume

1. In a new browser tab, navigate to **EFS**.



2. On the right, click **Create file system**.



3. Fill in the file system details:
 - a. **Name:** In the text box, enter *SharedWeb*.
 - b. **Virtual Private Cloud (VPC):** Use the dropdown to select the provided VPC.
4. Click **Customize**.

Create file system

×

Create a file system with the recommended settings shown below by choosing Create file system. To view all settings or to customize your file system, choose Customize. [Learn more](#)

Name - optional
Name your file system.

SharedWeb

Name can include letters, numbers, and +-=._/ symbols, up to 256 characters.

Virtual Private Cloud (VPC)
Choose the VPC where you want EC2 instances to connect to your file system.

vpc-ib

Recommended settings

Your file system is created with the following recommended settings unless you choose to customize the file system. You will be charged for storage and throughput. We recommend reviewing pricing for these features using the [AWS Pricing Calculator](#).

Setting	Value	Editable after creation
Throughput mode Learn more	Elastic	Yes
Transition into Infrequent Access (IA)	30 day(s) since last access	Yes
Transition into Archive	90 day(s) since last access	Yes
Transition into Standard	None	Yes
Automatic backups	Enabled	Yes
Encryption	Enabled	No

Cancel

Customize

Create file system

- For **file system type**: Select **One Zone**.
 - For **Availability Zone**: Leave **us-east-1a** selected.
5. In **Lifecycle management**, under **Transition into Archive** click on the dropdown and make sure **None** is selected.

Amazon EFS > File systems > Create

Step 1
File system settings

Step 2
Network access

Step 3 - optional
File system policy

Step 4
Review and create

File system settings

General

Name - optional

Name your file system.

SharedWeb

File system type

Choose to either store data across multiple Availability Zones or within a single Availability Zone. [Learn more](#)

☐ Regional

Offers the highest levels of availability and durability by storing file system data across multiple Availability Zones within an AWS Region.

☒ One Zone

Provides continuous availability to data within a single Availability Zone within an AWS Region.

Availability Zone

Choose the Availability Zone where you want to create your file system

us-east-1a

Automatic backups

Automatically backup your file system data with AWS Backup using recommended settings. Additional pricing applies. [Learn more](#)

☒ Enable automatic backups

Lifecycle management

Automatically save money as access patterns change by moving files into the Infrequent Access (IA) or Archive storage class. [Learn more](#)

Transition into Infrequent Access (IA)

Transition files to IA based on the time since they were last accessed in Standard storage.

None

Transition into Archive

Transition files to Archive based on the time since they were last accessed in Standard storage.

None

Transition into Standard

Transition files back to Standard storage based on when they are first accessed in IA or Archive storage.

None

Valid only when you have enabled lifecycle management to transition files into IA or Archive storage.

6. Click **Next** → **Next** → **Next** → **Create** to create the file system.

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7. After the file system is successfully created, click **View file system** in the top right corner.



8. Select the **Network** tab and wait for the created network to become available.

Note: You may need to refresh the Network details to see an updated mount target status.

The screenshot shows the Amazon EFS console for a file system named "SharedWeb (fs-0e1b3)". The "Network" tab is selected. A table lists the network configuration, including availability zone, mount target ID, subnet ID, and mount target state. The "Mount target state" column shows "Creating", which is highlighted with a red box. A "Manage" button is also visible in the top right of the network section.

Availability zone (AZ-ID)	Mount target ID	Subnet ID	Mount target state	IP address	Network interface ID	Security groups
us-east-1a (use1-az4)	fsmt-043	subnet-06af1a	Creating	10.4	eni-0x3fc7	-

9. After the mount target state is available, click **Manage** on the right.

This screenshot shows the same Amazon EFS console page, but the "Mount target state" is now "Available", also highlighted with a red box. The "Manage" button in the top right is also highlighted with a red box.

Availability zone (AZ-ID)	Mount target ID	Subnet ID	Mount target state	IP address	Network interface ID	Security groups
us-east-1a (use1-az4)	fsmt-0	subnet-06af1a	Available	10.4	eni-0	sg-0e11 (default)

10. Under **Security groups**, remove the currently attached default security group and then use the dropdown menu to select the **EC2SecurityGroup** group (not the default group).

11. Click **Save**.

Amazon EFS > File systems > fs-0 > ib3 > Network access

Network

Virtual Private Cloud (VPC)
Choose the VPC where you want EC2 instances to connect to your file system.
vpc-01 ib

You must delete all existing mount targets in order to change the VPC of your file system.

Mount targets
A mount target provides an NFSv4 endpoint at which you can mount an Amazon EFS file system. We recommend creating one mount target per Availability Zone. [Learn more](#)

Availability zone us-east-1a **Subnet ID** subnet-0f 4a **IP address** 10." " 4

Security groups
Choose security groups [Remove](#)

☒ sg-0e cfst-37*** [ib3ec9-](#)
EC2SecurityGroup-R3UpszaTwij

☐ sg-0f default 31

[Add mount target](#)
You can only create one mount target per Availability Zone.

[Cancel](#) [Save](#)

1.3. Configure the Security Groups

1. Navigate back to the **EC2** browser tab.
2. In the sidebar menu, select **Security Groups**.
3. Click the checkbox next to the **non-default security group** to show the security group details.
4. Select the **Inbound rules** tab and then click **Edit inbound rules** on the right.

▼ Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations

▼ Images
AMIs
AMI Catalog

▼ Elastic Block Store
Volumes
Snapshots
Lifecycle Manager

▼ Network & Security
Security Groups 1
Elastic IPs
Placement Groups

Security Groups (1/2) info

Find resources by attribute or tag

Name	Security group ID	Security group name	VPC ID	Description	Owner	Inbound rules
<input checked="" type="checkbox"/> -	sg-	13	cfst-3	vpc-01	ib3	2 Permission ent
<input type="checkbox"/> -	sg-	1	default	vpc-01	ib3	1 Permission ent

sg-13 - cfst-3: -EC2SecurityGroup-R3UpszaTwij

Details **Inbound rules** Outbound rules Sharing - new VPC associations - new Tags

Inbound rules (2) [Manage tags](#) [Edit inbound rules](#)

Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
<input type="checkbox"/> -	sg-r-0	1	IPv4	HTTP	TCP	80	0.0.0.0/0
<input type="checkbox"/> -	sg-r-0	12	IPv4	SSH	TCP	22	0.0.0.0/0

5. Click **Add rule** and configure the rule:
 - a. **Type:** Use the dropdown to select **NFS**.
 - b. **Source:** Use the text box to select **0.0.0.0/0**.
6. Click **Save rules**.

Edit inbound rules [Info](#)

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules [Info](#)

Security group rule ID	Type	Protocol	Port range	Source	Description - optional	
sgr-1	HTTP	TCP	80	Custom	0.0.0.0/0	Delete
sgr-1	SSH	TCP	22	Custom	0.0.0.0/0	Delete
-	NFS	TCP	2049	Anywhere...	0.0.0.0/0	Delete

1 Add rule **2** **3** **4**

Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Cancel Preview changes **Save rules**

7. In the sidebar menu, select **EC2 Dashboard** and then select **Instances (running)**.

8. With *webserver-01* selected, click **Connect** along the top right.

EC2 > Instances

Instances (1/3) [Info](#)

Find Instance by attribute or tag (case-sensitive) All states

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Publ
<input type="checkbox"/>	webserver-03	i-1	3	Running	t3.micro	3/3 checks passed	us-east-1a	ec	..
<input checked="" type="checkbox"/>	webserver-01	i-1	2	Running	t3.micro	3/3 checks passed	us-east-1a	ec	..
<input type="checkbox"/>	webserver-02	i-1	5	Running	t3.micro	3/3 checks passed	us-east-1a	ec	..

Connect

9. Click **Connect**.

Connect [Info](#)

Connect to an instance using the browser-based client.

EC2 Instance Connect Session Manager SSH client EC2 serial console

Instance ID i-0...b (webserver-01)

Connection Type

☒ Connect using a Public IP
Connect using a public IPv4 or IPv6 address

☐ Connect using a Private IP
Connect using a private IP address and a VPC endpoint

Public IPv4 address 3.18...
IPv6 address -

Username
Enter the username defined in the AMI used to launch the instance. If you didn't define a custom username, use the default username, ubuntu.
Q ubuntu X

Note: In most cases, the default username, ubuntu, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

Cancel **Connect**

10. This should take you to a new terminal showing your EC2 instance in a new browser tab or window.

2. Mount the EFS File System and Test It

2.1. Mount the File System

1. Click In the terminal, list your block devices: **lsblk**
2. View the data inside the 10 GiB disk mounted to **/data**: **ls /data**
3. You should see *file.01-file.10* listed.

```
ubuntu@ip-10-0-1-10:~$ lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0       7:0      0   24.4M 1 loop /snap/amazon-ssm-agent/6312
loop1       7:1      0   25.1M 1 loop /snap/amazon-ssm-agent/5656
loop2       7:2      0   104M 1 loop /snap/core/16928
loop3       7:3      0  104.2M 1 loop /snap/core/17200
loop4       7:4      0   55.4M 1 loop /snap/core18/2846
loop5       7:5      0  111.1M 1 loop /snap/lxd/33246
loop6       7:6      0   63.7M 1 loop /snap/core20/2434
loop8       7:8      0   73.9M 1 loop /snap/core22/1722
loop10      7:10     0  110.2M 1 loop /snap/lxd/31820
loop11      7:11     0   44.5M 1 loop /snap/snapd/23771
loop12      7:12     0   66.8M 1 loop /snap/core24/888
loop13      7:13     0   73.9M 1 loop /snap/core22/1908
loop14      7:14     0   55.4M 1 loop /snap/core18/2855
loop15      7:15     0   63.8M 1 loop /snap/core20/2501
nvme1n1     259:0    0    10G 0 disk /data
nvme0n1     259:1    0    20G 0 disk 
└─nvme0n1p1 259:2    0    20G 0 part /
```

ubuntu@ip-10-0-1-10:~\$ ls /data/

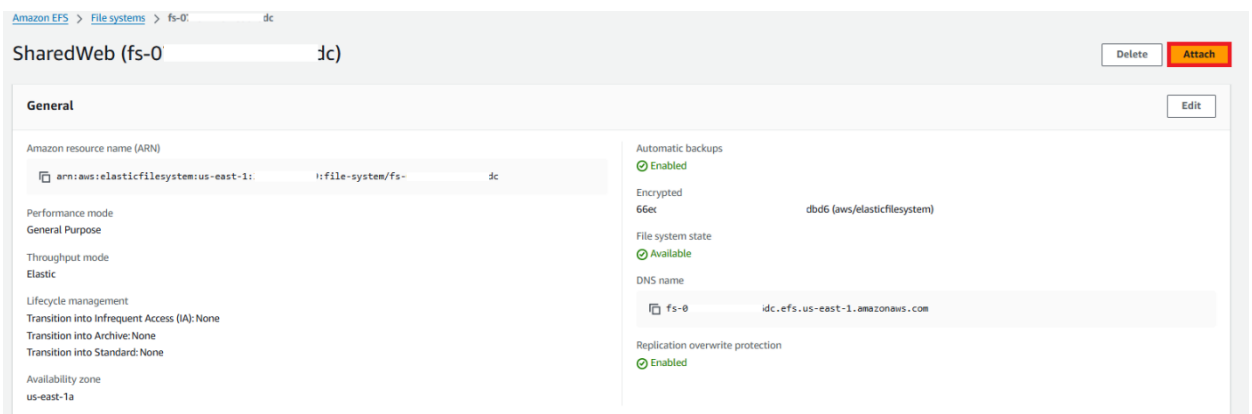
```
file.01 file.02 file.03 file.04 file.05 file.06 file.07 file.08 file.09 file.10
```

ubuntu@ip-10-0-1-10:~\$

4. Create a directory (mount point) to attach your EFS volume: **sudo mkdir /efs**

```
ubuntu@ip-10-0-1-10:~$ sudo mkdir /efs
ubuntu@ip-10-0-1-10:~$
```

5. Navigate back to the **EFS** tab showing the SharedWeb file system details.
6. In the top right, click **Attach**.



7. In the dialog, select **Mount via IP**.
8. Copy the provided NFS command to your clipboard. We will do a tiny change.

Attach

Mount your Amazon EFS file system on a Linux instance. [Learn more](#)

☐ Mount via DNS
 ☒ Mount via IP

Availability zone
us-east-1a

Using the NFS client:

copied

`sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsiz=1048576,hard,timeo=600,retrans=2,noresvport [REDACTED] /efs`

See our user guide for more information. [Learn more](#)

Close

9. Navigate back to the terminal and paste in the command.
10. Edit the mount point by changing **efs** to **/efs** in the command: **sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsiz=1048576,hard,timeo=600,retrans=2,noresvport [Your EFS Volume IP Here]:/efs**
11. Press **Enter** to run the command.

```
ubuntu@ip-10-0-1-10:~$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsiz=1048576,hard,timeo=600,retrans=2,noresvport [REDACTED]:/efs
ubuntu@ip-10-0-1-10:~$
```

2.2. Test the File System

1. View the newly mounted EFS volume: **ls /efs**
2. Nothing will be returned, but that shows that the EFS volume is mounted.

```
ubuntu@ip-10-0-1-10:~$ ls /efs
ubuntu@ip-10-0-1-10:~$
```

3. List the block devices again: **lsblk**
4. Your NFS mount is not yet listed.

```
ubuntu@ip-10-0-1-10:~$ lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0       7:0    0   24.4M  1 loop /snap/amazon-ssm-agent/6312
loop1       7:1    0   25.1M  1 loop /snap/amazon-ssm-agent/5656
loop2       7:2    0    104M  1 loop /snap/core/16928
loop3       7:3    0  104.2M  1 loop /snap/core/17200
loop4       7:4    0   55.4M  1 loop /snap/core18/2846
loop5       7:5    0  111.1M  1 loop /snap/lxd/33246
loop6       7:6    0   63.7M  1 loop /snap/core20/2434
loop8       7:8    0   73.9M  1 loop /snap/core22/1722
loop10      7:10   0  110.2M  1 loop /snap/lxd/31820
loop11      7:11   0   44.5M  1 loop /snap/snapd/23771
loop12      7:12   0   66.8M  1 loop /snap/core24/888
loop13      7:13   0   73.9M  1 loop /snap/core22/1908
loop14      7:14   0   55.4M  1 loop /snap/core18/2855
loop15      7:15   0   63.8M  1 loop /snap/core20/2501
nvme1n1     259:0    0    10G  0 disk /data
nvme0n1     259:1    0    20G  0 disk 
--nvme0n1p1 259:2    0    20G  0 part /
```

5. View the mounts: **mount**
6. Toward the bottom, you should see that your NFS share is mounted on **/efs**.

```
ubuntu@ip-10-0-1-10:~$ mount
```

```

/dev/nvme1n1 on /data type xfs (rw,relatime,attr2,inode64,logbufs=8,logbsize=32k,sunit=8,swidth=8,noquota)
/var/lib/snapd/snap/snapd/23771.snap on /snap/snapd/23771 type squashfs (ro,nodev,relatime,errors=continue,x-gdu.hide)
/var/lib/snapd/snap/snapd/core24/888.snap on /snap/core24/888 type squashfs (ro,nodev,relatime,errors=continue,x-gdu.hide)
/var/lib/snapd/snap/snapd/core22/1908.snap on /snap/core22/1908 type squashfs (ro,nodev,relatime,errors=continue,x-gdu.hide)
/var/lib/snapd/snap/snapd/core18/2855.snap on /snap/core18/2855 type squashfs (ro,nodev,relatime,errors=continue,x-gdu.hide)
/var/lib/snapd/snap/snapd/core20/2501.snap on /snap/core20/2501 type squashfs (ro,nodev,relatime,errors=continue,x-gdu.hide)
/var/lib/snapd/snap/snapd/lxd/33246.snap on /snap/lxd/33246 type squashfs (ro,nodev,relatime,errors=continue,x-gdu.hide)
nfs on /run/snapd/na/lxd.mnt type nfs (rw)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=95156k,mode=700,uid=1000,gid=1000,inode64)
# on /efs type nfs4 (rw,relatime,vers=4.1,rsize=1048576,wsize=1048576,namlen=255,hard,noreportproto=tc,timeout=600,retrans=2,sec=sys,clientaddr=,local_lock=none,addr=)
ubuntu@ip-:~$

```

7. View file system mounts: **df -h**
8. Again, you should see that your NFS share is mounted on **/efs**.

```

ubuntu@ip-:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        20G   4.0G   16G   21% /
devtmpfs         457M    0   457M    0% /dev
tmpfs            93M    0    93M    0% /dev/shm
tmpfs            93M    0    93M    0% /run
tmpfs            5.0M    0    5.0M    0% /run/lock
tmpfs            465M    0   465M    0% /sys/fs/cgroup
/dev/loop1       26M    26M    0 100% /snap/amazon-ssm-agent/5656
/dev/loop0       25M    25M    0 100% /snap/amazon-ssm-agent/6312
/dev/loop2      104M   104M    0 100% /snap/core/16928
/dev/loop3      105M   105M    0 100% /snap/core/17200
/dev/loop8       74M    74M    0 100% /snap/core22/1722
/dev/loop4       56M    56M    0 100% /snap/core18/2846
/dev/loop6       64M    64M    0 100% /snap/core20/2434
/dev/loop10     111M   111M    0 100% /snap/lxd/31820
/dev/nvme1n1     10G   105M   9.9G    2% /data
/dev/loop11      45M    45M    0 100% /snap/snapd/23771
/dev/loop12      67M    67M    0 100% /snap/core24/888
/dev/loop13      74M    74M    0 100% /snap/core22/1908
/dev/loop14      56M    56M    0 100% /snap/core18/2855
/dev/loop15      64M    64M    0 100% /snap/core20/2501
/dev/loop5      112M   112M    0 100% /snap/lxd/33246
tmpfs            93M    0    93M    0% /run/user/1000
#:/             8.0E    0   8.0E    0% /efs
ubuntu@ip-:~$

```

9. Move all files from **/data** to the **/efs** file system (-r = recursive, -a = to retain permissions, -v = verbose): **sudo rsync -rav /data/* /efs**
10. View the files now in the **/efs** file system: **ls /efs**
11. This time, a list should be returned.

```

ubuntu@ip-:~$ sudo rsync -rav /data/* /efs
sending incremental file list
file.01
file.02
file.03
file.04
file.05
file.06
file.07
file.08
file.09
file.10

sent 46,659 bytes  received 206 bytes  93,730.00 bytes/sec
total size is 46,080  speedup is 0.98
ubuntu@ip-:~$ ls /efs
file.01 file.02 file.03 file.04 file.05 file.06 file.07 file.08 file.09 file.10
ubuntu@ip-:~$

```

The files were copied from /data to /efs

3. Remove Old Data

3.1. Remove Data from **webserver-01**

1. Unmount the partition: **sudo umount /data**

```
ubuntu@ip-10-0-1-10:~$ sudo umount /data
ubuntu@ip-10-0-1-10:~$
```

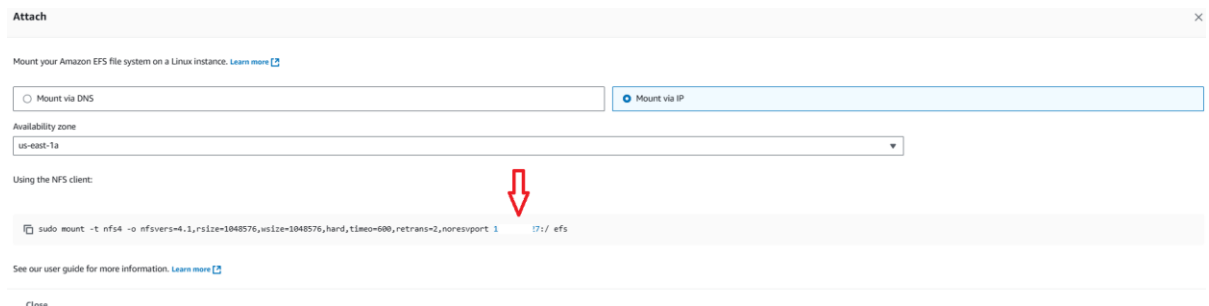
2. Now we need to edit our fstab so that the system doesn't try to mount this file system on reboot. Open the **/etc/fstab** file in an editor: **sudo vi /etc/fstab**

```
ubuntu@ip-10-0-1-10:~$ sudo vi /etc/fstab
```

3. Press "i" for INSERT.
4. Remove the line starting with **UUID**.

```
LABEL=cloudimg-rootfs / ext4 defaults,discard 0 0
UUID="0a22ebd9-0000-0000-0000-000000000000" /data xfs defaults,nofail 0 2
```

5. Build a new mount point:
 - a. Navigate back to the **EFS** tab and ensure the **Attach** dialog is still open from the previous objective.
 - b. Copy the IP address listed in the provided command.



Attach

Mount your Amazon EFS file system on a Linux instance. [Learn more](#)

☐ Mount via DNS ☒ Mount via IP

Availability zone: us-east-1a

Using the NFS client:

```
sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport 172.17.0.1 /efs
```

See our user guide for more information. [Learn more](#)

Close

- c. Navigate back to the terminal and paste your copied IP address and append **:/**.
- d. Press **Tab** twice so your cursor aligns with the **/** on the first line, and then add **/data**.
- e. Press **Tab** and then **Space** once so your cursor aligns with **ext4** on the first line, and then add **nfs4**.
- f. Navigate back to the **EFS** tab and copy the options from the command (starting with **nfsvers** and ending with **noresvport**).

```
LABEL=cloudimg-rootfs / ext4 defaults,discard 0 0
172.17.0.1:/data nfs4
```

Attach

Mount your Amazon EFS file system on a Linux instance. [Learn more](#)

☐ Mount via DNS
 ☒ Mount via IP

Availability zone

us-east-1a

Using the NFS client:

```
sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsiz=1048576,hard,timeo=600,retrans=2,noresvport <IP> /efs
```

See our user guide for more information. [Learn more](#)

Close

- g. Navigate back to the terminal and paste your copied options so they align with *defaults*, *discard* on the first line.
- h. Press **Tab** and then add **0 0** to the end of your mount point entry.
- i. Your mount point should now look like this:
- j. <EFS MOUNT IP>:/ /data nfs4 <OPTIONS> 0 0

```
ABEL=cloudimg-rootfs / ext4 defaults,discard 0 0
:/ /data nfs4 nfsvers=4.1,rsize=1048576,wsiz=1048576,hard,timeo=600,retrans=2,noresvport 0 0
```

6. Press “**esc**” and “**:wq**” to save your changes.
 7. Unmount the **/efs** to confirm your edits were successful: **sudo umount /efs**
- Note: If you receive an error message, wait about a minute and then run the command again.
8. View the file systems: **df -h**
 9. You should see that you don't have **/data** or **/efs** mounted.

```
ubuntu@ip-10-0-10-10:~$ sudo umount /efs
ubuntu@ip-10-0-10-10:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        20G   4.0G   16G   21% /
devtmpfs         457M    0   457M    0% /dev
tmpfs            465M    0   465M    0% /dev/shm
tmpfs             93M   888K    93M    1% /run
tmpfs            5.0M    0    5.0M    0% /run/lock
tmpfs            465M    0   465M    0% /sys/fs/cgroup
/dev/loop2       104M   104M    0 100% /snap/core/16928
/dev/loop1        26M    26M    0 100% /snap/amazon-ssm-agent/5656
/dev/loop0        25M    25M    0 100% /snap/amazon-ssm-agent/6312
/dev/loop4        64M    64M    0 100% /snap/core20/2434
/dev/loop8        74M    74M    0 100% /snap/core22/1722
/dev/loop3       105M   105M    0 100% /snap/core/17200
/dev/loop5        56M    56M    0 100% /snap/core18/2846
/dev/loop10       111M   111M    0 100% /snap/lxd/31820
/dev/loop11       45M    45M    0 100% /snap/snapd/23771
/dev/loop12       67M    67M    0 100% /snap/core24/888
/dev/loop13       64M    64M    0 100% /snap/core20/2501
/dev/loop6        56M    56M    0 100% /snap/core18/2855
/dev/loop14       74M    74M    0 100% /snap/core22/1908
/dev/loop7       112M   112M    0 100% /snap/lxd/33246
tmpfs             93M    0    93M    0% /run/user/1000
ubuntu@ip-10-0-10-10:~$
```

10. Try and mount everything that is not already mounted: **sudo mount -a**
11. View the file systems again and check if <EFS MOUNT IP>:/ is mounted: **df -h**
12. You should see the NFS share is now mounted on **/data**.

13. View the contents of /data: **ls /data**
14. You should see *file.01-file.10* listed.

```

ubuntu@ip-10.10.10.10:~$ sudo mount -a
ubuntu@ip-10.10.10.10:~$ df -h
Filesystem                Size      Used Avail Use% Mounted on
/dev/root                  20G       4.0G    16G   21% /
devtmpfs                  457M         0   457M    0% /dev
tmpfs                     465M         0   465M    0% /dev/shm
tmpfs                     93M       888K    93M    1% /run
tmpfs                     5.0M         0   5.0M    0% /run/lock
tmpfs                     465M         0   465M    0% /sys/fs/cgroup
/dev/loop2                104M      104M    0 100% /snap/core/16928
/dev/loop1                 26M       26M    0 100% /snap/amazon-ssm-agent/5656
/dev/loop0                 25M       25M    0 100% /snap/amazon-ssm-agent/6312
/dev/loop4                 64M       64M    0 100% /snap/core20/2434
/dev/loop8                 74M       74M    0 100% /snap/core22/1722
/dev/loop3                105M      105M    0 100% /snap/core/17200
/dev/loop5                 56M       56M    0 100% /snap/core18/2846
/dev/loop10               111M      111M    0 100% /snap/lxd/31820
/dev/loop11               45M       45M    0 100% /snap/snapd/23771
/dev/loop12               67M       67M    0 100% /snap/core24/888
/dev/loop13               64M       64M    0 100% /snap/core20/2501
/dev/loop6                 56M       56M    0 100% /snap/core18/2855
/dev/loop14               74M       74M    0 100% /snap/core22/1908
/dev/loop7               112M      112M    0 100% /snap/lxd/33246
tmpfs                     93M       93M    0 100% /snap/lxd/33246
rootfs                    8.0E         0   8.0E    0% /data
ubuntu@ip-10.10.10.10:~$ ls /data
file.01 file.02 file.03 file.04 file.05 file.06 file.07 file.08 file.09 file.10

```

Now that we don't need our 10 GiB volume on this server anymore, let's delete that EBS volume on EC2 (because it will use the EFS share).

3.2. Remove the EBS Volume Attached to **webserver-01**

1. Navigate back to **EC2** tab showing the **Connect** to instance page.
2. Use the breadcrumb along the top of the page to select **EC2**.
3. In the **Resources** section of the main pane, click **Volumes**.

EC2

Dashboard

EC2 Global View

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

AMI Catalog

Elastic Block Store

Volumes

Snapshots

Volumes (6)

Saved filter sets

Choose filter set

Q Search

	Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot ID	Created	Availability Zone	Volume state	Alarm status	Attached res
	-	vol-c	6 gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i4
	-	vol-c	i standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i4
	-	vol-c	i standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i4
	-	vol-c	f standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i4
	-	vol-c	7 gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i4
	-	vol-c	15 gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i4

Fault tolerance for all volumes in this Region

Snapshot summary

Last updated on Wed, Apr 23, 2025, 04:38:23 PM (GMT+03:00)

4. Scroll to the right and expand the **Attached resources** column to find the 10 GiB volume attached to *webserver-01*.

5. Click the checkbox next to the 10 GiB volume attached to *webserver-01*.

Volumes (1/6) info

Save filter sets Choose filter set Search

	Type	Size	IOPS	Throughput	Snapshot ID	Created	Availability Zone	Volume state	Alarm status	Attached resources
273fe6	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i-02 z (webserver-02): /dev/sdf (attached)
32b5b	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-02 i (webserver-03): /dev/sda1 (attached)
ac764	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-02 z (webserver-02): /dev/sda1 (attached)
3e05ff	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-01 i (webserver-01): /dev/sda1 (attached)
5dc2c7	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i-01 i (webserver-01): /dev/sdf (attached)
450915	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i-02 i (webserver-03): /dev/sdf (attached)

6. In the top right, use the **Actions** dropdown to select **Detach volume**.

Volumes (1/6) info

Save filter sets Choose filter set Search

	Type	Size	IOPS	Throughput	Snapshot ID	Created	Availability Zone	Volume state	Alarm status	Attached resources
273fe6	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i-02 z (webserver-02): /dev/sdf (attached)
32b5b	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-02 i (webserver-03): /dev/sda1 (attached)
ac764	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-02 z (webserver-02): /dev/sda1 (attached)
3e05ff	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-01 i (webserver-01): /dev/sda1 (attached)
5dc2c7	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i-01 i (webserver-01): /dev/sdf (attached)
450915	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i-02 i (webserver-03): /dev/sdf (attached)

Actions dropdown menu:

- Modify volume
- Create snapshot
- Create snapshot lifecycle policy
- Delete volume
- Attach volume
- Detach volume
- Force detach volume
- Manage auto-enabled I/O
- Manage tags
- Fault injection

7. Click **Detach** to confirm your choice.

Detach vol- ? ✕

After you detach a volume, you might still be charged for volume storage. If you no longer need the volume, delete it to stop incurring charges.

Are you sure that you want to detach volume vol-0-7777777777?

Cancel Detach

8. When the volume is detached, it will show as **Available**. You may need to refresh the page.

9. After the volume is detached, click the checkbox next to the same volume again.

10. In the top right, use the **Actions** dropdown to select **Delete volume**.

Volumes (1/6) info

Save filter sets Choose filter set Search

	Type	Size	IOPS	Throughput	Snapshot ID	Created	Availability Zone	Volume state	Alarm status	Attached resources
273fe6	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i-02 z (webserver-02): /dev/sdf (attached)
32b5b	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-02 i (webserver-03): /dev/sda1 (attached)
ac764	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-02 z (webserver-02): /dev/sda1 (attached)
3e05ff	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i-01 i (webserver-01): /dev/sda1 (attached)
5dc2c7	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	Available	No alarms	+ i-01 i (webserver-01): /dev/sdf (attached)
450915	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i-02 i (webserver-03): /dev/sdf (attached)

Actions dropdown menu:

- Modify volume
- Create snapshot
- Create snapshot lifecycle policy
- Delete volume
- Attach volume
- Detach volume
- Force detach volume
- Manage auto-enabled I/O
- Manage tags
- Fault injection

11. Click **Delete** to confirm your choice.

Delete vol- ? ✕

After you delete a volume, its data is permanently deleted and the volume can no longer be attached to an instance.

Are you sure that you want to delete vol-0-7777777777?

To confirm deletion, type *delete* in the field.

Cancel Delete

3.3. Remove Data from **webserver-02** and **webserver-03**

1. In the **EC2** sidebar menu, select **Instances**.
2. Click the checkbox next to **webserver-02**.
3. Along the top of the page, click **Connect**.

Instances (1/3) [Info](#) Find Instance by attribute or tag (case-sensitive) All states ▾ Ⓢ **Connect**

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv6 DNS
<input type="checkbox"/>	webserver-01	i-70	Running	t3.micro	3/3 checks passed	View alarms +	us-east-1a		
<input type="checkbox"/>	webserver-03	i-3	Running	t3.micro	3/3 checks passed	View alarms +	us-east-1a		
<input checked="" type="checkbox"/>	webserver-02	i-2	Running	t3.micro	3/3 checks passed	View alarms +	us-east-1a		

4. Click **Connect**.

Connect [Info](#)
Connect to an instance using the browser-based client.

EC2 Instance Connect | Session Manager | SSH client | EC2 serial console

Instance ID: **i-2** (webserver-02)

Connection Type

☒ Connect using a Public IP
Connect using a public IPv4 or IPv6 address

☐ Connect using a Private IP
Connect using a private IP address and a VPC endpoint

Public IPv4 address
☒ Public IPv4 address
☐ IPv6 address

Username
Enter the username defined in the AMI used to launch the instance. If you didn't define a custom username, use the default username, ubuntu.

Note: In most cases, the default username, ubuntu, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

[Cancel](#) [Connect](#)

This should launch a terminal in a new browser window or tab.

5. Navigate to the **webserver-01** terminal and view the contents of **/etc/fstab**: **cat /etc/fstab**
6. Copy the mount point on the second line (starting with an IP) to your clipboard:

<EFS MOUNT IP>:/data nfs4 <OPTIONS> 0 0

```
ubuntu@ip-10-0-1-10:~$ cat /etc/fstab
LABEL=cloudimg-rootfs / ext4 defaults,discard 0 0
<EFS MOUNT IP>:/data nfs4 nfsvers=4.1,rsize=1048576,wsz=1048576,hard,timeo=600,retrans=2,noresvport 0 0
ubuntu@ip-10-0-1-10:~$
```

7. Navigate back to the terminal you launched for **webserver-02**.
8. Unmount the **/data** partition: **sudo umount /data**
9. Open the **/etc/fstab** file in an editor: **sudo vi /etc/fstab**

```
ubuntu@ip-10-0-1-10:~$ sudo umount /data
ubuntu@ip-10-0-1-10:~$ sudo vi /etc/fstab
```

10. Edit **/etc/fstab**:
 - a. Press “i” for INSERT.

- b. Remove the line starting with **UUID** like we did in *webserver-01*.
- c. Paste in the line from your clipboard and reformat it so it aligns with the line above (it should look the same as in *webserver-01*, so keep the same IP).
- d. Press “**esc**” and “**:wq**” to save your changes.

```

LABEL=cloudimg-rootfs / ext4 defaults,discard 0 0
:/ /data nfs4 nfsvers=4.1,rsize=1048576,wsiz=1048576,hard,timeo=600,retrans=2,noresvport 0 0

```

11. Mount the partition: **sudo mount -a**
12. View the file systems: **df -h**
13. View the contents of **/data**: **ls /data**
14. You should see *file.01* through *file.10*, indicating you are using the shared EFS volume.

```

ubuntu@ip-10.0.0.10:~$ sudo mount -a
ubuntu@ip-10.0.0.10:~$ df -h

```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/root	20G	4.0G	16G	21%	/
devtmpfs	457M	0	457M	0%	/dev
tmpfs	465M	0	465M	0%	/dev/shm
tmpfs	93M	892K	93M	1%	/run
tmpfs	5.0M	0	5.0M	0%	/run/lock
tmpfs	465M	0	465M	0%	/sys/fs/cgroup
/dev/loop0	26M	26M	0	100%	/snap/amazon-ssm-agent/5656
/dev/loop1	25M	25M	0	100%	/snap/amazon-ssm-agent/6312
/dev/loop8	74M	74M	0	100%	/snap/core22/1722
/dev/loop2	104M	104M	0	100%	/snap/core/16928
/dev/loop7	64M	64M	0	100%	/snap/core20/2434
/dev/loop3	105M	105M	0	100%	/snap/core/17200
/dev/loop5	56M	56M	0	100%	/snap/core18/2846
/dev/loop10	111M	111M	0	100%	/snap/lxd/31820
/dev/loop11	45M	45M	0	100%	/snap/snapd/23771
/dev/loop12	67M	67M	0	100%	/snap/core24/888
/dev/loop13	74M	74M	0	100%	/snap/core22/1908
/dev/loop14	56M	56M	0	100%	/snap/core18/2855
/dev/loop15	64M	64M	0	100%	/snap/core20/2501
/dev/loop4	112M	112M	0	100%	/snap/lxd/33246
tmpfs	93M	0	93M	0%	/run/user/1000
:/	8.0E	0	8.0E	0%	/data

```

ubuntu@ip-10.0.0.10:~$ ls /data/
file.01 file.02 file.03 file.04 file.05 file.06 file.07 file.08 file.09 file.10
ubuntu@ip-10.0.0.10:~$

```

15. Repeat this entire process for *webserver-03*.

3.4. Remove EBS Volumes Attached to EC2

1. Navigate back to the **EC2** tab showing the **Connect to instance** page.
2. Use the breadcrumb along the top of the page to select **EC2**.
3. In the **Resources** section, select **Volumes**.

Dashboard
EC2 Global View
Events

Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations

Images
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Elastic Block Store
Volumes
Snapshots

Volumes (5) Info

Saved filter sets
Choose filter set

Q Search

Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot ID	Created	Availability Zone	Volume state	Alarm status	Attached resources
z273fe6	gp2	10 GiB	100	-	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i4 (webserver-02); /dev/df (attached)
b2b5b	standard	20 GiB	-	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i4 (webserver-03); /dev/sda1 (attached)
bac764	standard	20 GiB	-	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i4 (webserver-02); /dev/sda1 (attached)
6e05ff	standard	20 GiB	-	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ i4 (webserver-01); /dev/sda1 (attached)
3450915	gp2	10 GiB	100	-	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	No alarms	+ i4 (webserver-03); /dev/df (attached)

Fault tolerance for all volumes in this Region

Snapshot summary

Last updated on Wed, Apr 23, 2025, 04:45:25 PM (GMT+03:00)

- Check the checkboxes for both of the **10 GiB** volumes.
- Use the **Actions** dropdown to select **Detach volume**.

Volumes (2/5) Info

Saved filter sets
Choose filter set

Q Search

Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot ID	Created	Availability Zone	Volume state	Actions
-	vol-i	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	Detach volume
-	vol-i	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	
-	vol-i	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	
-	vol-i	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	
-	vol-i	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	In-use	

Last updated 24 minutes ago

Modify volume

Create snapshot

Create snapshot lifecycle policy

Delete volume

Attach volume

Detach volume

Force detach volume

Manage auto-enabled I/O

Manage tags

Fault injection

- Type **detach** into the text box to confirm your choice, and then click **Detach**.

Detach 2 volumes?

After you detach a volume, you might still be charged for volume storage. If you no longer need the volume, delete it to stop incurring charges.

Are you sure that you want to detach the following volumes?

- vol-i 15
- vol-i 6

To confirm detachment, type **detach** in this field.

detach

Cancel Detach

- After both volumes are detached (volume state: Available), select them again using the checkboxes.
- Use the **Actions** dropdown to select **Delete volume**.

Volumes (2/5) Info

Saved filter sets
Choose filter set

Q Search

Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot ID	Created	Availability Zone	Volume state	Actions
-	vol-i	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	Available	Delete volume
-	vol-i	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	
-	vol-i	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	
-	vol-i	standard	20 GiB	-	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	
-	vol-i	gp2	10 GiB	100	-	-	2025/04/23 13:43 GMT+3	us-east-1a	Available	

Last updated less than a minute ago

Modify volume

Create snapshot

Create snapshot lifecycle policy

Delete volume

Attach volume

Detach volume

Force detach volume

Manage auto-enabled I/O

Manage tags

Fault injection

- Type **delete** into the text box to confirm your choice, and then click **Delete**.

Delete 2 volumes?



⚠ After you delete a volume, its data is permanently deleted and the volume can no longer be attached to an instance.

Are you sure that you want to delete the following volumes?

- vol-5
- vol-5

To confirm deletion, type *delete* in the field.

Cancel

Delete

Successfully deleted 2 volumes

Volumes (3) Info

Last updated 1 minute ago Actions Create volume

Choose filter set Search

Volume ID	Type	Size	IOPS	Snapshot ID	Created	Availability Zone	Volume state	Alarm status	Attached resources
vol- <input type="text" value="c"/> 5	standard	20 GiB	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ <input type="text" value="webserver-03"/> /dev/sda1 (attach
vol- <input type="text" value="c"/> 5	standard	20 GiB	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ <input type="text" value="webserver-02"/> /dev/sda1 (attach
vol- <input type="text" value="c"/> 5	standard	20 GiB	-	snap-045597a...	2025/04/23 13:44 GMT+3	us-east-1a	In-use	No alarms	+ <input type="text" value="webserver-01"/> /dev/sda1 (attach

We have successfully converted our 3 servers to use a shared EFS volume and deleted the 10 GiB storage volumes that were attached to those servers. This is a great cost-saving measure.