



AWS Session

Summary – 24-3-2023

- Wherever EFS System running that is called Target or mount target.
- To provide same data we give centralized storage.
- Any storage if we want to access then we have to always mount.
- Now create an EFS filesystem.

The image shows two screenshots from the AWS Management Console. The top screenshot is a modal dialog titled 'Create file system'. It contains the following fields and options:

- Name - optional:** A text input field with the value 'sharedstoragebyEFS'. Below it, a note states: 'Name can include letters, numbers, and +-=,./ symbols, up to 256 characters.'
- Virtual Private Cloud (VPC):** A dropdown menu showing 'vpc-020f3272f192ea4ff default'. A note above it says: 'Choose the VPC where you want EC2 instances to connect to your file system.'
- Storage class:** Two radio button options: 'Standard' (selected, with description 'Stores data redundantly across multiple AZs') and 'One Zone' (with description 'Stores data redundantly within a single AZ').
- Buttons at the bottom: 'Cancel', 'Customize', and 'Create'.

The bottom screenshot shows the 'Additional settings' section of the 'Create file system' page. It includes:

- Performance mode:** A section with the instruction 'Set your file system's performance mode based on IOPS required.' It contains two radio button options: 'General Purpose (Recommended)' (selected, with description 'Ideal for a variety of diverse workloads, including high performance and latency-sensitive applications') and 'Max I/O' (with description 'Designed for highly parallelized workloads that can tolerate higher latencies').
- Tags - optional:** A section with a plus icon and the text 'Tags - optional'.
- Buttons at the bottom right: 'Cancel' and 'Next'.

File system (fs-07d83a1472e8d09a1) is available

Amazon EFS > File systems

File systems (2)

Filter by property values

Name	File system ID	Encrypted	Total size	Size in Standard / One Zone	Size in Standard-IA One Zone-IA
sharedstorage	fs-07d83a1472e8d09a1	Encrypted	6.00 KiB	6.00 KiB	0 Bytes
mysharedstorage	fs-0933c1ff8c9084910	Encrypted	12.00 KiB	12.00 KiB	0 Bytes

Since we wanted both web servers to launch same website.

Now before mounting we will create edit rule.

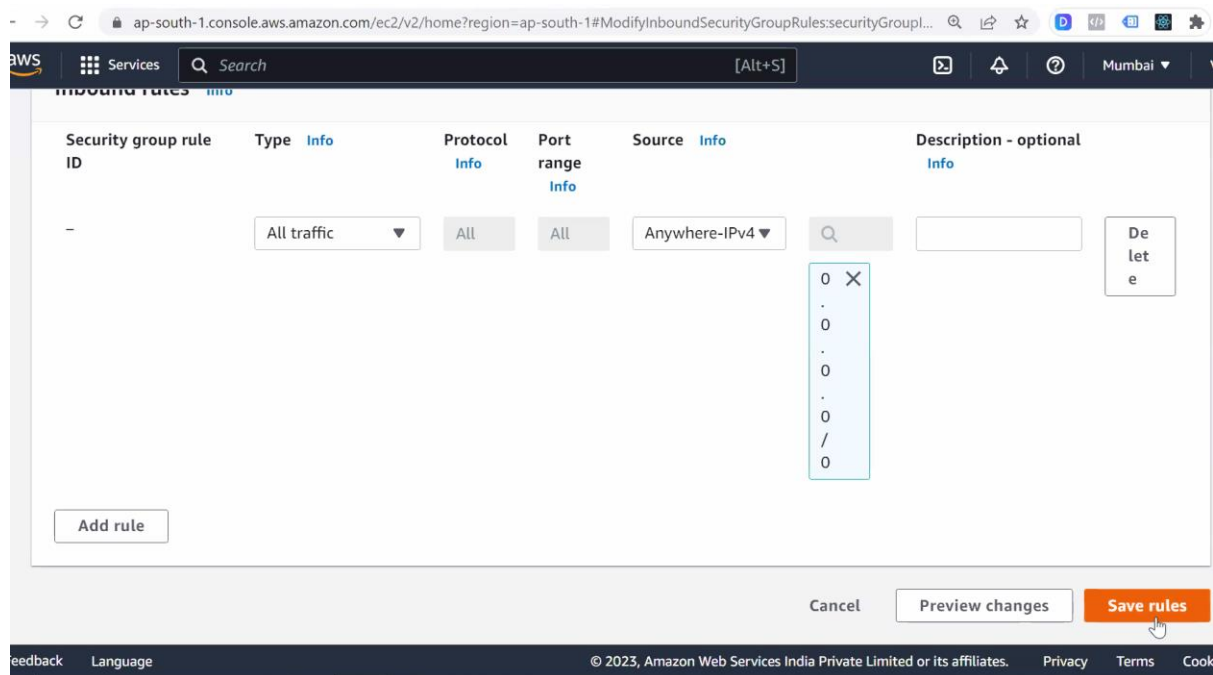
You can now check network connectivity with Reachability Analyzer

Run Reachability Analyzer

Inbound rules (1/1)

Filter security group rules

Name	Security group rule ID	IP version	Type
-	sgr-03eedb5c297684a0f	-	All traffic



```

Last login: Wed Mar 22 15:51:39 2023 from 13.233.177.4
[ec2-user@ip-172-31-35-241 ~]$ sudo su - root
Last login: Wed Mar 22 15:51:52 UTC 2023 on pts/0
[root@ip-172-31-35-241 ~]# mkdir /data
[root@ip-172-31-35-241 ~]# mount fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ /data
mount.nfs: Connection timed out
[root@ip-172-31-35-241 ~]#
[root@ip-172-31-35-241 ~]#
[root@ip-172-31-35-241 ~]# mount fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ /data
[root@ip-172-31-35-241 ~]#
[root@ip-172-31-35-241 ~]# mount fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ /data
[root@ip-172-31-35-241 ~]#
[root@ip-172-31-35-241 ~]#
[root@ip-172-31-35-241 ~]# mount fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ /data
[root@ip-172-31-35-241 ~]# df -hT
Filesystem                                Type      Size  Used Avail Use% Mounted on
devtmpfs                                 devtmpfs  4.0M   0    4.0M   0% /dev
tmpfs                                    tmpfs     482M   0    482M   0% /dev/shm
tmpfs                                    tmpfs     193M   2.9M  190M   2% /run
/dev/xvda1                               xfs       8.0G   1.6G   6.4G   20% /
tmpfs                                    tmpfs     482M   0    482M   0% /tmp
tmpfs                                    tmpfs     97M    0    97M    0% /run/user/1000
fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ nfs4      8.0E   0    8.0E   0% /data
[root@ip-172-31-35-241 ~]#
[root@ip-172-31-35-241 ~]#
[root@ip-172-31-35-241 ~]# rpm -qa | grep nfs
libnfsidmap-2.5.4-2.rc3.amzn2023.0.3.x86_64
nfs-utils-2.5.4-2.rc3.amzn2023.0.3.x86_64
[root@ip-172-31-35-241 ~]# rpm -q nfs-utils
nfs-utils-2.5.4-2.rc3.amzn2023.0.3.x86_64
[root@ip-172-31-35-241 ~]# rpm -q efs-utils
package efs-utils is not installed
[root@ip-172-31-35-241 ~]#

```

- To connect the NFS server we need NFS Driver.
- To share data in multiple computers we use EFS.

[AWS]

- We can also create replication in EFS. Geo-replication can be done by EFS

```
[root@ip-172-31-35-241 ~]# history
1  mkdir /data
2  mount fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ /data
3  df -hT
4  rpm -qa
5  rpm -qa | grep nfs
6  rpm -q nfs-utils
7  rpm -q efs-utils
8  history

8 history
[root@ip-172-31-35-241 ~]# umount /data
[root@ip-172-31-35-241 ~]# df -hT
Filesystem      Type      Size  Used Avail Use% Mounted on
devtmpfs        devtmpfs  4.0M   0    4.0M   0% /dev
tmpfs           tmpfs     482M   0    482M   0% /dev/shm
tmpfs           tmpfs     193M   2.9M  190M   2% /run
/dev/xvda1      xfs       8.0G   1.6G   6.4G  20% /
tmpfs           tmpfs     482M   0    482M   0% /tmp
tmpfs           tmpfs     97M    0     97M   0% /run/user/1000
[root@ip-172-31-35-241 ~]# mount fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ /var/www/html/
[root@ip-172-31-35-241 ~]# df -hT
Filesystem      Type      Size  Used Avail Use% Mounted on
devtmpfs        devtmpfs  4.0M   0    4.0M   0% /dev
tmpfs           tmpfs     482M   0    482M   0% /dev/shm
tmpfs           tmpfs     193M   2.9M  190M   2% /run
/dev/xvda1      xfs       8.0G   1.6G   6.4G  20% /
tmpfs           tmpfs     482M   0    482M   0% /tmp
tmpfs           tmpfs     97M    0     97M   0% /run/user/1000
fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ nfs4   8.0E   0    8.0E   0% /var/www/html
[root@ip-172-31-35-241 ~]#
```

Now login to the instance named web2

The screenshot shows the AWS Management Console interface. At the top, there's a navigation bar with 'Services' and a search bar. Below that, the 'Instances (1/4)' section is visible, showing a table of EC2 instances. The table has columns for Name, Env, Instance ID, and Instance state. Two instances are listed: 'web1' and 'web2'. The 'web2' instance is selected, and its details are shown in the 'Instance: i-0ecaa9499d2844376 (web2)' panel. The 'Details' tab is selected, showing the 'Instance summary' with fields for Instance ID, Public IPv4 address, and Private IPv4 addresses.

Name	Env	Instance ID	Instance state
web1	-	i-0698f320fee20a7fb	Running
web2	-	i-0ecaa9499d2844376	Running

Instance: i-0ecaa9499d2844376 (web2)

Details | Security | Networking | Storage | Status checks | Monitoring | Tags

Instance summary Info

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0ecaa9499d2844376	172.31.35.241	172.31.35.241

[AWS]

```
Last login: Wed Mar 22 15:52:33 UTC 2023 on pts/0
[root@ip-172-31-44-233 ~]# mount fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ /var/www/html
[root@ip-172-31-44-233 ~]# df -hT
Filesystem                                Type      Size  Used Avail Use% Mounted on
devtmpfs                                  tmpfs     4.0M   0    4.0M   0% /dev
tmpfs                                     tmpfs     482M   0    482M   0% /dev/shm
tmpfs                                     tmpfs     193M   2.9M  190M   2% /run
/dev/xvda1                                xfs       8.0G   1.6G   6.4G  20% /
tmpfs                                     tmpfs     482M   0    482M   0% /tmp
tmpfs                                     tmpfs     97M    0    97M    0% /run/user/1000
fs-07d83a1472e8d09a1.efs.ap-south-1.amazonaws.com:/ nfs4      8.0E   0    8.0E   0% /var/www/html
[root@ip-172-31-44-233 ~]# cd /var/www/html/
[root@ip-172-31-44-233 html]# ls
[root@ip-172-31-44-233 html]# cat > index.html
first line
[root@ip-172-31-44-233 html]# pwd
/var/www/html
[root@ip-172-31-44-233 html]# ls
index.html
[root@ip-172-31-44-233 html]# cat index.html
first line
[root@ip-172-31-44-233 html]#
```

```
[root@ip-172-31-35-241 html]# cat index.html
first line
sec lone
[root@ip-172-31-35-241 html]#
```

Now checking the webserver.

← → ↻ ⚠ Not secure | 13.233.95.176 🔍 📄 ⭐ 📱 📺 📺 📺 📺

first line sec lone nnnnnn

PERFORMANCE

- Using storage (AFS, EBS, S3) is complex as a cloud engineer, we need to plan about cost and performance.
- In System design we should increase performance and decrease cost.
- Performance storage – IOPS, Throughput.
- HDD Hard disk
Every platter is divided into tracker and every tracker divided into sector. Header will create holes in HD, faster the header rotates faster will be the read and write.
- In HD we write or read something is called I/O operation, depends on how fast that needle rotates called RAM Speed.
- Challenge in HDD is that they read in one direction, very slow in random read and write.
- Electronic HD has no kind of rotation it is a kind of chip/flash drive. Great in random read/write.
- If application has to read/write called I/O Operation and it do everything randomly so for that we use SSD HD.

- In 1 second there are 1000 IOPS. More IOPS faster the jumps and faster data can be read. Therefore, more IOPS, better will be the performance. But for more HD we have to buy a quality HD so this will increase the cost.
- Throughput is at one point of time how bigger chunk of data can be read. Bigger chunk and faster read operation is called throughput.
- If we have to read random data for that we use IOPS, but if data to be read continuously and read/write fast then we use Throughput.
- File system mostly used for data like log files, videos, and images.

The image displays two screenshots of the AWS Volume settings page, illustrating the configuration of a General Purpose SSD (gp2) and a General Purpose SSD (gp3).

Top Screenshot (gp2):

- Volume type:** General Purpose SSD (gp2)
- Size (GiB):** 100 (Min: 1 GiB, Max: 16384 GiB. The value must be an integer.)
- IOPS:** 300 / 3000 (Baseline of 3 IOPS per GiB with a minimum of 100 IOPS, burstable to 3000 IOPS.)
- Throughput (MiB/s):** Not applicable
- Availability Zone:** ap-south-1a
- Snapshot ID:** optional

Bottom Screenshot (gp3):

- Volume type:** General Purpose SSD (gp3)
- Size (GiB):** 1 (Min: 1 GiB, Max: 16384 GiB. The value must be an integer.)
- IOPS:** 2000 (Warning: IOPS must be between 3000 and 3000. Min: 3000 IOPS, Max: 16000 IOPS. The value must be an integer.)
- Throughput (MiB/s):** 125 (Min: 125 MiB, Max: 1000 MiB. Baseline: 125 MiB/s.)
- Availability Zone:** ap-south-1a

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aws Services Search [Alt+S] Mumbai Vimal Daga

Volume type Info
Provisioned IOPS SSD (io1)

Size (GiB) Info
10
Min: 4 GiB, Max: 16384 GiB. The value must be an integer.

IOPS Info
5
⚠ IOPS must be between 100 and 500.
Min: 100 IOPS, Max: 500 IOPS (up to 50 IOPS per GiB)

Throughput (MiB/s) Info
Not applicable

Availability Zone Info
ap-south-1a

Snapshot ID - optional Info
Don't create volume from a snapshot

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Volume type Info
Provisioned IOPS SSD (io1)

Size (GiB) Info
10
Min: 4 GiB, Max: 16384 GiB. The value must be an integer.

IOPS Info
500
Min: 100 IOPS, Max: 500 IOPS (up to 50 IOPS per GiB)

Throughput (MiB/s) Info
Not applicable

Availability Zone Info
ap-south-1a

Snapshot ID - optional Info
Don't create volume from a snapshot

← → ↻ ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#CreateVolume: aws Services Search [Alt+S] Mumbai Vimal Daga

Volume type Info
Provisioned IOPS SSD (io1)

Size (GiB) Info
10
Min: 4 GiB, Max: 16384 GiB. The value must be an integer.

IOPS Info
9
⚠ IOPS must be between 100 and 500.
Min: 100 IOPS, Max: 500 IOPS (up to 50 IOPS per GiB)

Throughput (MiB/s) Info
Not applicable

Availability Zone Info
ap-south-1a

Snapshot ID - optional Info
Don't create volume from a snapshot

aws Services Search [Alt+S] Mumbai Vimal Daga

Volume type [Info](#)

Provisioned IOPS SSD (io1) ▼

Size (GiB) [Info](#)

10

Min: 4 GiB, Max: 16384 GiB. The value must be an integer.

IOPS [Info](#)

600

⚠ Maximum allowed IOPS for a size 10 GiB volume is 500.
Min: 100 IOPS, Max: 500 IOPS (up to 50 IOPS per GiB)

Throughput (MiB/s) [Info](#)

Not applicable

Availability Zone [Info](#)

ap-south-1a ▼

Snapshot ID - optional [Info](#)

Don't create volume from a snapshot ▼ ↻

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ⓘ Provisioned IOPS SSD (io2) volumes with a size greater than 16 TiB, IOPS greater than 64,000, or IOPS:GiB ratio greater than 500:1 are supported only with instance types that support **io2 Block Express**.

Size (GiB) [Info](#)

16384

Min: 4 GiB, Max: 65536 GiB. The value must be an integer.

IOPS [Info](#)

3000

Min: 100 IOPS, Max: 256000 IOPS (up to 1000 IOPS per GiB)

Throughput (MiB/s) [Info](#)

Not applicable

Availability Zone [Info](#)

ap-south-1a ▼

Snapshot ID - optional [Info](#)

Don't create volume from a snapshot ▼ ↻

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AWS > Documentation > Amazon EC2 > User Guide for Linux Instances Feedback Preferences

EBS volume types

- General Purpose SSD volumes
- Provisioned IOPS SSD volumes
- Throughput Optimized HDD and Cold HDD volumes
- Size and configuration constraints
- Create a volume
- Attach a volume to an instance
- Attach a volume to multiple instances
- Make a volume available for use
- View volume details

following is a summary of the use cases and characteristics of SSD-backed volumes.

General Purpose SSD volumes		Provisioned IOPS SSD volumes		
gp3	gp2	io2 Block Express ‡	io2	io1
99.8% - 99.9% durability (0.1% - 0.2% annual failure rate)		99.9999% durability (0.001% annual failure rate)		99.8% - 99.9% durability (0.1% - 0.2% annual failure rate)
<ul style="list-style-type: none">Transactional workloadsVirtual database		Workloads that require: <ul style="list-style-type: none">Sub-		<ul style="list-style-type: none">Workloads that require sustained IOPS performance or

On this page ✕

Solid state drive (SSD) volumes

- Hard disk drive (HDD) volumes
- Previous generation volumes

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docs.aws.amazon.com/AWSEC2/latest/UserGuide/ebs-volume-types.html

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EBS volume types

General Purpose SSD volumes

Provisioned IOPS SSD volumes

Throughput Optimized HDD and Cold HDD volumes

Size and configuration constraints

Create a volume

Attach a volume to an instance

Attach a volume to multiple instances

Make a volume available for use

View volume details

	Throughput Optimized HDD volumes	Cold HDD volumes
Volume type	st1	sc1
Durability	99.8% - 99.9% durability (0.1% - 0.2% annual failure rate)	
Use cases	<ul style="list-style-type: none">• Big data• Data warehouses• Log processing	<ul style="list-style-type: none">• Throughput-oriented storage for data that is infrequently accessed• Scenarios where the lowest storage cost is important
Volume size	125 GiB - 16 TiB	
Max IOPS per volume (1 MiB I/O)	500	250

On this page

Solid state drive (SSD) volumes

Hard disk drive (HDD) volumes

Previous generation volumes

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Amazon Elastic Block Store

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Amazon EBS Volumes

With Amazon EBS, you pay only for what you provision. The pricing for Amazon EBS volumes is listed below.

Volume Type	Price
General Purpose SSD (gp3) - Storage	\$0.08/GB-month
General Purpose SSD (gp3) - IOPS	3,000 IOPS free and \$0.005/provisioned IOPS-month over 3,000
General Purpose SSD (gp3) - Throughput	125 MB/s free and \$0.040/provisioned MB/s-month over 125
General Purpose SSD (gp2) Volumes	\$0.10 per GB-month of provisioned storage
Provisioned IOPS SSD (io2) - Storage	\$0.125/GB-month
Provisioned IOPS SSD (io2) - IOPS	\$0.065/provisioned IOPS-month up to 32,000 IOPS
	\$0.046/provisioned IOPS-month from 32,001 to 64,000 IOPS
	\$0.032/provisioned IOPS-month for greater than 64,000 IOPS
Provisioned IOPS SSD (io1) Volumes	\$0.125 per GB-month of provisioned storage AND \$0.065 per provisioned IOPS-month