

# Elastic File System (EFS)

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## Table of Contents

### [1. Elastic File System](#)

#### [1.1. Overview of Network File System\(NFS\)](#)

#### [1.2. Overview of EFS](#)

#### [1.3. EFS Pricing](#)

#### [1.4. Creating EFS File System](#)

#### [1.5. Create Security Group to Mount EFS on ec2 instances.](#)

#### [1.6. Mounting the EFS on Linux ec2 instances.](#)

## 1. Elastic File System

### 1.1. Overview of Network File System(NFS)

Network File System (NFS) is a distributed file system protocol originally developed by Sun Microsystems (Sun) in 1984, allowing a user on a client computer to access files over a computer network much like local storage is accessed.

### 1.2. Overview of EFS

Amazon Elastic File System (Amazon EFS) provides a simple, serverless, set-and-forget elastic file system for use with AWS Cloud services and on-premises resources. It is built to scale on demand to petabytes without disrupting applications, growing and shrinking automatically as you add and remove files, eliminating the need to provision and manage capacity to accommodate growth. Amazon EFS has a simple web services interface that allows you to create and configure file systems quickly and easily. The service manages all the file storage infrastructure for you, meaning that you can avoid the complexity of deploying, patching, and maintaining complex file system configurations.

Amazon EFS supports the Network File System version 4 (NFSv4.1 and NFSv4.0) protocol, so the applications and tools that you use today work seamlessly with Amazon EFS.

Multiple compute instances, including Amazon EC2, Amazon ECS, and AWS Lambda, can access an Amazon EFS file system at the same time, providing a common data source for workloads and applications running on more than one compute instance or server.

With Amazon EFS, you pay only for the storage used by your file system and there is no minimum fee or setup cost. Amazon EFS offers a range of storage classes designed for different use cases.

**Standard storage classes:** EFS Standard and EFS Standard-Infrequent Access (Standard-IA), which offer multi-AZ resilience and the highest levels of durability and availability.

#### *EFS Standard Storage Class*

This is designed for active file system workloads, and you pay only for the amount of file system storage you use per month. Data is stored regionally within and across multiple Availability Zones

(AZs).

### *EFS Standard-Infrequent Access Storage Class*

This is cost-optimized for files accessed less frequently. Data stored on the EFS Standard-IA storage class costs less than EFS Standard storage class, and you will pay a fee each time you read from or write to a file. Data is stored regionally within and across multiple Availability Zones (AZs).

**One Zone storage classes:** EFS One Zone and EFS One Zone-Infrequent Access (EFS One Zone-IA), which offer customers the choice of additional savings by choosing to save their data in a single AZ'

### *One Zone Storage Class*

The EFS One Zone storage class is designed for active file system workloads, and you pay only for the amount of file system storage you use per month. Data is stored within a single Availability Zone. Standard data transfer fees apply for inter-AZ or inter-region access to file systems

**One Zone-Infrequent Access Storage Class:** The EFS One Zone-Infrequent Access storage class (EFS One Zone-IA) is cost-optimized for files accessed less frequently. Data stored on the EFS One Zone-IA storage class costs less than the One Zone storage class, and you will pay a fee each time you read from or write to a file. Data is stored within a single Availability Zone. Standard data transfer fees apply for inter-AZ or inter-region access to file systems.

Read more on [EFS Storage Classes](#)

## **1.3. EFS Pricing**

AWS charges you only for the amount of EFS storage you use. There is no minimum fee and there are no set-up charges.

Read more on [EFS Pricing](#)

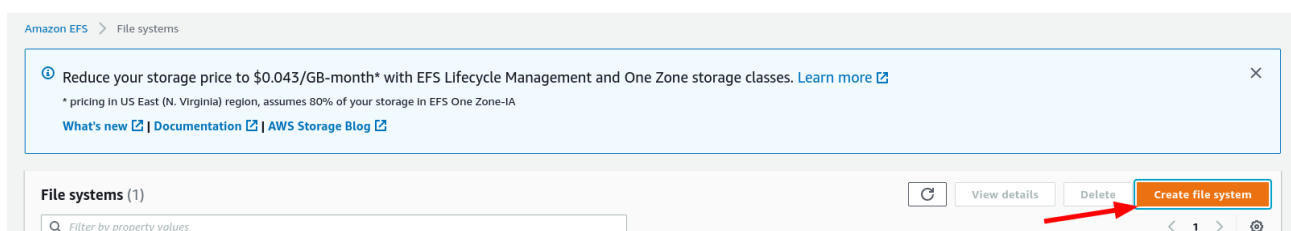
## **1.4. Creating EFS File System**

As EFS is a fully managed file system, it's very easy to create and use EFS File Share.

A File Share is a unit of EFS which can be bounded on any number of compute instances.

OB Follow the below steps to create EFS File Share:

1. Go to Services → Click On EFS



1. Click on Create file System and add the below details  
a. Name of the File Share (optional).  
b. Specify the VPC - the VPC where your ec2 instances that will consume the EFS file share reside.  
c. Choose Regional or One Zone - If your compute instances are spread across multiple

AZs choose Regional.

d. Click on Create.

**Create file system**

Create an EFS file system with service recommended settings. [Learn more](#)

**Name - optional**  
Name your file system.  
efsdemo  
Name must not be longer than 256 characters, and must only contain letters, numbers, and these characters: + - = . \_ : /

**Virtual Private Cloud (VPC)**  
Choose the VPC where you want EC2 instances to connect to your file system. [Learn more](#)

vpc-86b20dfb default  
vpc-86b20dfb default  
vpc-078343a5084ef8951 cloudops-vpc

**Storage classes. Choose One**

☒ **Regional**  
Stores data redundantly across multiple AZs

☐ **One Zone**  
Stores data redundantly within a single AZ

Cancel Customize Create

1. Now your EFS is created and you should see it under your File Shares

Amazon EFS > File systems

Reduce your storage price to \$0.043/GB-month\* with EFS Lifecycle Management and One Zone storage classes. [Learn more](#)

\* pricing in US East (N. Virginia) region, assumes 80% of your storage in EFS One Zone-IA

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**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	Provisioned Throughput (MiB/s)	File system state	Creation time	Availability Zone
efsdemo	fs-c8905a7c	Encrypted	0 Bytes	0 Bytes	0 Bytes	-	Creating	Mon, 26 Apr 2021 15:25:17 GMT	Regional

1. Click on the File share and click on Network. You will see the Mount points for each Availability Zone where you have subnets.

Availability zone	Mount target ID	Subnet ID	Mount target state	IP address	Network interface ID	Security groups
us-east-1a	fsmt-0a68cfbf	subnet-05d5cb20d40fac1b0	Available	10.0.3.124	eni-07b13ee2286fcd6b	sg-0714eb507e7ec197d (default)
us-east-1b	fsmt-0b68cfbe	subnet-052cbb9424c89cd62	Available	10.0.2.251	eni-08d21c871144c475a	sg-0714eb507e7ec197d (default)

1. By default Private Subnets are selected for each Availability Zone. You may click on Manage and update the delete the existing Mountpoints and add the desired subnet.

us-east-1a ▼

subnets:

- subnet-05d5cb20d40fac1b0
- subnet-0f7863796213620f5
- cloudops-public-subnet-01 - 10.0.1.0/24
- subnet-05d5cb20d40fac1b0
- cloudops-web-01 - 10.0.3.0/24

Choose security groups: sg-0714eb507e7ec197d (default) [X]

Buttons: Add mount target, Cancel, Save

### 1.5. Create Security Group to Mount EFS on ec2 instances.

To mount EFS file share on ec2 instances, create a security group that allows traffic on NFS port i.e., 2049 from ec2 instances.

Details			
Security group name EFS-SG	Security group ID sg-0932fb8cf98b85547	Description Allows NFS Access to	VPC ID vpc-86b20dfb
Owner 119077514921	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

Inbound rules (1)				
Type	Protocol	Port range	Source	Description - optional
NFS	TCP	2049	sg-0c9ff3bd1f3cd4c7b2 / ec2-Security Group	-

In the above picture the Source should be the Security Group of the EC2 security group

### 1.6. Mounting the EFS on Linux ec2 instances.

Once your Mount points show as available, click on Attach

**efsdemo (fs-98965c2c)**

General

Performance mode: General Purpose

Throughput mode: Bursting

Lifecycle policy: 30 days since last access

Availability zone: Regional

Automatic backups: **Enabled**

Encrypted: 3ee6f19-3707-4a80-b6cd-80e6b83a5b8d (aws/elasticfilesystem)

File system state: **Available**

Network

Availability zone	Mount target ID	Subnet ID	Mount target state	IP address	Network interface ID	Security groups
us-east-1a	fsmt-8c74d339	subnet-0f7863796213620f5	<b>Available</b>	10.0.1.132	eni-04ee33c8a07e0b1eb	sg-0714eb507e7ec197d (default)
us-east-1b	fsmt-0b68cfbe	subnet-052cbb9424c89cd62	<b>Available</b>	10.0.2.251	eni-08d21c871144c475a	sg-0714eb507e7ec197d (default)

Copy the Command and execute it inside the Linux instance after modifying the parameters (such as Mount point)

Create a Mount point if required.

**Attach**

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

☒ Mount via DNS ☐ Mount via IP

Using the EFS mount helper:

```
sudo mount -t efs -o tls fs-98965c2c:/ efs
```

Using the NFS client:

```
sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-98965c2c.efs.us-east-1.amazonaws.com:/ efs
```

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

**Note:** EFS can be used only with Linux ec2 instances and cannot be used with Windows ec2 instances. Use [FSx](#) for Windows ec2 instances.

### 1.6.1. EFS Access Points

Amazon EFS access points are application-specific entry points into an EFS file system that make it easier to manage application access to shared datasets. Access points can enforce a user identity, including the user's POSIX groups, for all file system requests that are made through the access point. Access points can also enforce a different root directory for the file system so that clients can only access data in the specified directory or its subdirectories.

You can use IAM policies to enforce that specific applications use a specific access point.

By combining IAM policies with access points, you can easily provide secure access to specific datasets for your applications.