Question: Why do we need EFS even though we have S3 and also EBS?

First let's see where S3 and EBS fits in:

S3 – Simple Storage Service:

- Is of type Object storage
- works best for any kind of storage needs that integrate well with cloud front.
- As its object store, S3 does not support installation of the Operating System.
- Can be accessed from anywhere on the internet, depending upon the permission set for the object as well as bucket.
- Works well for static contents or hosting websites.

EBS – Elastic Block Store:

- is like a hard drive attached to your PC.
- For performance and fast IO operation we should use EBS.
- It's a block storage and an OS can be installed on it.
- EBS volumes are localized in a particular availability zone in an AWS region.

Scenario: Say, a website having multiple servers in different availability zones and we want to store all the images of that site in a common location so that all servers can access that simultaneously and we don't have to upload or sync it for every individual server.

How can we achieve that with a simple solution using common storage? That's where EFS comes into play.

EFS – Elastic File System:

- Able to connect and share data across 100's of EC2 instances and that is dynamic as well and performant (IOPS are equivalent to EBS volume IOPS.)
- EBS is limited to particular AZ, whereas **EFS is a network file system** that works on NFS 4.1 spans across all the AZ's in an AWS Region.
- Provides GP2 as well as IO Provisioned storage options.
- **Caution:** It's costly – use it wisely.
- **Usage**: Serve web content, keep various backups, and reduce storage spending

Demo:

1. Create 2 EC2 instances in 2 different availability zones
    a. Ensure that the SG has the NFS inbound permission
2. Create an EFS in the same region (not limited to availability zone)

a. Ensure that the SG has proper required permission

3. Try to install NFS in the EC2 instances and mount to that EFS following the below commands sequentially:
   a. Login to each EC2 instance and run the below command to install utils for efs - for amazon ami:

      ```
      sudo yum install -y amazon-efs-utils
      ```

   b. Now create a mount directly in all the EC2 instances:

      ```
      sudo mkdir /efs
      ```

   c. Then mount the EFS volume created to access using the 'efs' folder just created as below:

      ```
      sudo mount -t efs <NFS_VOLUME_ID>:/ /efs
      ```

   d. Then create a file in the 'efs' folder from one of your EC2 instance and try to access that from another EC2 instance as below:

      ```
      cd /efs
      sudo su
      echo "My EFS learning" > learning.txt
      ```

      This will create the learning.txt file using one of the EC2 instances and we will be able to access that from another EC2 instance using the mount path.

Troubleshooting: https://cloudkul.com/knowledgebase/mount-nfs4-connection-timed-error/

Ref:
https://www.devopsschool.com/blog/efs-demo-working-with-efs-with-ec2-instance/
https://ghumare64.medium.com/what-is-efs-why-we-need-efs-when-we-have-ebs-ebs-vs-efs-with-practical-demo-1c5ff3da3286
https://blog.knoldus.com/amazon-elastic-file-system-part-1/