INSTALLATION OF EFS ON EKS CLUSTER

1. INSTALL EKSCTL ON LINUX.

```
root@DESKTOP-VIDGD8F:KUBERNETES# eksctl create cluster -f eks-cube-cluster.yaml
2024-02-27 12:32:02 [ℹ]  eksctl version 0.171.0
2024-02-27 12:32:02 [ℹ]  using region ap-south-1
2024-02-27 12:32:02 [ℹ]  skipping ap-south-1c from selection because it doesn't support the following instance type(s): t2.medium,t2.small
2024-02-27 12:32:02 [ℹ]  setting availability zones to [ap-south-1a ap-south-1b]
2024-02-27 12:32:02 [ℹ]  subnets for ap-south-1a - public:192.168.0.0/19 private:192.168.64.0/19
2024-02-27 12:32:02 [ℹ]  subnets for ap-south-1b - public:192.168.32.0/19 private:192.168.96.0/19
2024-02-27 12:32:03 [ℹ]  nodegroup "eks-cube-dev-ng-01" will use "ami-0ee9bbeeb96514b3b" [AmazonLinux2/1.27]
2024-02-27 12:32:03 [ℹ]  using SSH public key "/root/.ssh/id_rsa.pub" as "eksctl-eks-cube-dev-nodegroup-eks-cube-dev-ng-01-4f:d5:d7:98:8d:8b:6b:06:1c:ef:67:cf:a9:a9:4c:e2
"
2024-02-27 12:32:03 [ℹ]  nodegroup "eks-cube-dev-ng-02" will use "ami-0ee9bbeeb96514b3b" [AmazonLinux2/1.27]
2024-02-27 12:32:03 [ℹ]  using SSH public key "/root/.ssh/id_rsa.pub" as "eksctl-eks-cube-dev-nodegroup-eks-cube-dev-ng-02-4f:d5:d7:98:8d:8b:6b:06:1c:ef:67:cf:a9:a9:4c:e2
"
2024-02-27 12:32:03 [ℹ]  using Kubernetes version 1.27
2024-02-27 12:32:03 [ℹ]  creating EKS cluster "eks-cube-dev" in "ap-south-1" region with un-managed nodes
2024-02-27 12:32:03 [ℹ]  2 nodegroups (eks-cube-dev-ng-01, eks-cube-dev-ng-02) were included (based on the include/exclude rules)
2024-02-27 12:32:03 [ℹ]  will create a CloudFormation stack for cluster itself and 2 nodegroup stack(s)
2024-02-27 12:32:03 [ℹ]  will create a CloudFormation stack for cluster itself and 0 managed nodegroup stack(s)
2024-02-27 12:32:03 [ℹ]  if you encounter any issues, check CloudFormation console or try 'eksctl utils describe-stacks --region=ap-south-1 --cluster=eks-cube-dev'
2024-02-27 12:32:03 [ℹ]  Kubernetes API endpoint access will use default of {publicAccess=true, privateAccess=false} for cluster "eks-cube-dev" in "ap-south-1"
2024-02-27 12:32:03 [ℹ]  CloudWatch logging will not be enabled for cluster "eks-cube-dev" in "ap-south-1"
2024-02-27 12:32:03 [ℹ]  you can enable it with 'eksctl utils update-cluster-logging --enable-types={SPECIFY-YOUR-LOG-TYPES-HERE (e.g. all)} --region=ap-south-1 --cluster
=eks-cube-dev'
2024-02-27 12:32:03 [ℹ]
2 sequential tasks: { create cluster control plane "eks-cube-dev",
    2 sequential sub-tasks: {
        wait for control plane to become ready,
        2 parallel sub-tasks: {
            create nodegroup "eks-cube-dev-ng-01",
            create nodegroup "eks-cube-dev-ng-02",
        },
    }
}
2024-02-27 12:32:03 [ℹ]  building cluster stack "eksctl-eks-cube-dev-cluster"
2024-02-27 12:32:04 [ℹ]  deploying stack "eksctl-eks-cube-dev-cluster"
```

```
root@DESKTOP-VIDGD8F:KUBERNETES# kgn
NAME                                           STATUS   ROLES    AGE     VERSION
ip-192-168-14-80.ap-south-1.compute.internal   Ready    <none>   7m44s   v1.27.9-eks-5e0fdde
ip-192-168-38-174.ap-south-1.compute.internal  Ready    <none>   7m59s   v1.27.9-eks-5e0fdde
ip-192-168-4-61.ap-south-1.compute.internal    Ready    <none>   8m6s    v1.27.9-eks-5e0fdde
ip-192-168-61-72.ap-south-1.compute.internal   Ready    <none>   8m9s    v1.27.9-eks-5e0fdde
```

EFS Plugin Install
REF Link
----> https://github.com/haneefshaikh/cubejs_on_eks/tree/main

TO CREATE AN IAM OIDC IDENTITY PROVIDER FOR YOUR CLUSTER WITH EKSCTL

Determine whether you have an existing IAM OIDC provider for your cluster. Retrieve your cluster's OIDC provider ID and store it in a variable.

oidc_id=$(aws eks describe-cluster --name eks-cube-test --query "cluster.identity.oidc.issuer" --output text | cut -d '/' -f 5)

```
root@DESKTOP-VIDGD8F:task4# oidc_id=$(aws eks describe-cluster --name eks-cube-dev --query "cluster.identity.oidc.issuer" --output text | cut -d '/' -f 5)
root@DESKTOP-VIDGD8F:task4#
```

Determine whether an IAM OIDC provider with your cluster's ID is already in your account.

aws iam list-open-id-connect-providers | grep $oidc_id | cut -d "/" -f4

```
root@DESKTOP-VIDGD8F:task4#
root@DESKTOP-VIDGD8F:task4# aws iam list-open-id-connect-providers | grep $oidc_id | cut -d "/" -f4
root@DESKTOP-VIDGD8F:task4#
```

Create an IAM OIDC identity provider for your cluster with the following command. Replace eks-cube-dev with your own value.

eksctl utils associate-iam-oidc-provider --cluster eks-cube-test --approve

```
root@DESKTOP-VIDGD8F:task4# eksctl utils associate-iam-oidc-provider --cluster eks-cube-dev --approve
2024-02-27 14:34:44 [ℹ]  will create IAM Open ID Connect provider for cluster "eks-cube-dev" in "ap-south-1"
2024-02-27 14:34:45 [✔]  created IAM Open ID Connect provider for cluster "eks-cube-dev" in "ap-south-1"
root@DESKTOP-VIDGD8F:task4#
```

Check again whether an IAM OIDC provider with your cluster's ID is created in your account.

aws iam list-open-id-connect-providers | grep $oidc_id | cut -d "/" -f4

```
root@DESKTOP-VIDGD8F:task4# aws iam list-open-id-connect-providers | grep $oidc_id | cut -d "/" -f4
563845675DCFF584D760A0B0D815B504"
root@DESKTOP-VIDGD8F:task4#
```

AMAZON EFS CSI DYNAMIC PROVISIONING

Download the IAM policy document

curl -S https://raw.githubusercontent.com/kubernetes-sigs/aws-efs-csi-driver/v1.2.0/docs/iam-policy-example.json -o iam-policy.json

```
root@DESKTOP-VIDGD8F:KUBERNETES# curl -S https://raw.githubusercontent.com/kubernetes-sigs/aws-efs-csi-driver/v1.2.0/docs/iam-policy-example.json -o iam-policy.json
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   732  100   732    0     0    846      0 --:--:-- --:--:-- --:--:--   846
root@DESKTOP-VIDGD8F:KUBERNETES#
```

Create an IAM policy

aws iam create-policy \
--policy-name EFSCSIControllerIAMPolicy \
--policy-document file://iam-policy.json

```
root@DESKTOP-VIDGD8F:KUBERNETES# aws iam create-policy --policy-name EFSCSIControllerIAMPolicy --policy-document file://iam-policy.json
{
    "Policy": {
        "PolicyName": "EFSCSIControllerIAMPolicy",
        "PolicyId": "ANPATXEPQB7UJYVPEZTSN",
        "Arn": "arn:aws:iam::255851499496:policy/EFSCSIControllerIAMPolicy",
        "Path": "/",
        "DefaultVersionId": "v1",
        "AttachmentCount": 0,
        "PermissionsBoundaryUsageCount": 0,
        "IsAttachable": true,
        "CreateDate": "2024-02-27T08:13:42Z",
        "UpdateDate": "2024-02-27T08:13:42Z"
    }
}
root@DESKTOP-VIDGD8F:KUBERNETES#
```

Create a Kubernetes service account

eksctl create iamserviceaccount \
--cluster=eks-cube-test \
--region=us-east-2 \
--namespace=kube-system \
--name=efs-csi-controller-sa \
--override-existing-serviceaccounts \
--attach-policy-arn=arn:aws:iam::<AWS account ID>:policy/EFSCSIControllerIAMPolicy \
--approve

```
root@DESKTOP-VIDGD8F:KUBERNETES# eksctl create iamserviceaccount --cluster=eks-cube-dev --region=ap-south-1 --namespace=kube-system --name=efs-csi-controller-sa --override-existing-serviceaccounts --attach-policy-arn=arn:aws:iam::255851499496:policy/EFSCSIControllerIAMPolicy --approve
2024-02-27 21:36:09 [ℹ]  1 iamserviceaccount (kube-system/efs-csi-controller-sa) was included (based on the include/exclude rules)
2024-02-27 21:36:09 [!]  metadata of serviceaccounts that exist in Kubernetes will be updated, as --override-existing-serviceaccounts was set
2024-02-27 21:36:09 [ℹ]  1 task: {
    2 sequential sub-tasks: {
        create IAM role for serviceaccount "kube-system/efs-csi-controller-sa",
        create serviceaccount "kube-system/efs-csi-controller-sa",
    } }2024-02-27 21:36:09 [ℹ]  building iamserviceaccount stack "eksctl-eks-cube-dev-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 21:36:09 [ℹ]  deploying stack "eksctl-eks-cube-dev-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 21:36:09 [ℹ]  waiting for CloudFormation stack "eksctl-eks-cube-dev-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 21:36:40 [ℹ]  waiting for CloudFormation stack "eksctl-eks-cube-dev-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 21:36:42 [ℹ]  created serviceaccount "kube-system/efs-csi-controller-sa"
```

To verify that the new service role is created, run one of the following commands:

eksctl get iamserviceaccount --cluster eks-cube-test --name efs-csi-controller-sa --namespace kube-system

```
root@DESKTOP-VIDGD8F:task4# eksctl get iamserviceaccount --cluster eks-cube-dev --name efs-csi-controller-sa --namespace kube-system
NAMESPACE       NAME                    ROLE ARN
kube-system     efs-csi-controller-sa   arn:aws:iam::255851499496:role/eksctl-eks-cube-dev-addon-iamserviceaccount-k-Role1-tcyY1eyt4vuN
root@DESKTOP-VIDGD8F:task4#
```

Now install AWS EFS Storage Controller driver.

helm repo add aws-efs-csi-driver https://kubernetes-sigs.github.io/aws-efs-csi-driver

```
root@DESKTOP-VIDGD8F:k8sCluster_kubeadm_terraform# helm repo add aws-efs-csi-driver https://kubernetes-sigs.github.io/aws-efs-csi-driver
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /mnt/c/Users/ADMIN/Desktop/My_Notes/KUBERNETES/k8sCluster_kubeadm_terraform/suitable
-ant.conf
WARNING: Kubernetes configuration file is world-readable. This is insecure. Location: /mnt/c/Users/ADMIN/Desktop/My_Notes/KUBERNETES/k8sCluster_kubeadm_terraform/suitable
-ant.conf
"aws-efs-csi-driver" has been added to your repositories
root@DESKTOP-VIDGD8F:k8sCluster_kubeadm_terraform#
```

helm repo update

```
root@DESKTOP-VIDGD8F:KUBERNETES# helm repo update
Hang tight while we grab the latest from your chart repositories...
...Successfully got an update from the "aws-efs-csi-driver" chart repository
Update Complete. ⎈Happy Helming!⎈
```

helm upgrade -i aws-efs-csi-driver aws-efs-csi-driver/aws-efs-csi-driver \
--namespace kube-system \
--set image.repository=602401143452.dkr.ecr.us-west-2.amazonaws.com/eks/aws-efs-csi-driver \
--set controller.serviceAccount.create=false \
--set controller.serviceAccount.name=efs-csi-controller-sa

```
root@DESKTOP-VIDGD8F:~# helm upgrade -i aws-efs-csi-driver aws-efs-csi-driver/aws-efs-csi-driver --namespace kube-system --set image.repository=
602401143452.dkr.ecr.us-west-2.amazonaws.com/eks/aws-efs-csi-driver --set controller.serviceAccount.create=false --set controller.serviceAccount
.name=efs-csi-controller-sa
Release "aws-efs-csi-driver" does not exist. Installing it now.
NAME: aws-efs-csi-driver
LAST DEPLOYED: Tue Feb 27 18:39:02 2024
NAMESPACE: kube-system
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
To verify that aws-efs-csi-driver has started, run:

    kubectl get pod -n kube-system -l "app.kubernetes.io/name=aws-efs-csi-driver,app.kubernetes.io/instance=aws-efs-csi-driver"
root@DESKTOP-VIDGD8F:~#
```

To verify that aws-efs-csi-driver has started, run:

kubectl get pod -n kube-system -l "app.kubernetes.io/name=aws-efs-csi-driver,app.kubernetes.io/instance=aws-efs-csi-driver"

```
root@DESKTOP-VIDGD8F:~# kubectl get pod -n kube-system -l "app.kubernetes.io/name=aws-efs-csi-driver,app.kubernetes.io/instance=aws-efs-csi-driv
er"
NAME                                  READY   STATUS    RESTARTS   AGE
efs-csi-controller-598bf64f56-9dpbp   3/3     Running   0          15m
efs-csi-controller-598bf64f56-dgrmg   3/3     Running   0          15m
efs-csi-node-dfbrr                    3/3     Running   0          15m
efs-csi-node-fwt9l                    3/3     Running   0          15m
efs-csi-node-r8l7l                    3/3     Running   0          15m
efs-csi-node-s5slj                    3/3     Running   0          15m
root@DESKTOP-VIDGD8F:~#
```

To create iamserviceaccount.

eksctl create iamserviceaccount \

--cluster=eks-cube-test \

--namespace=kube-system \

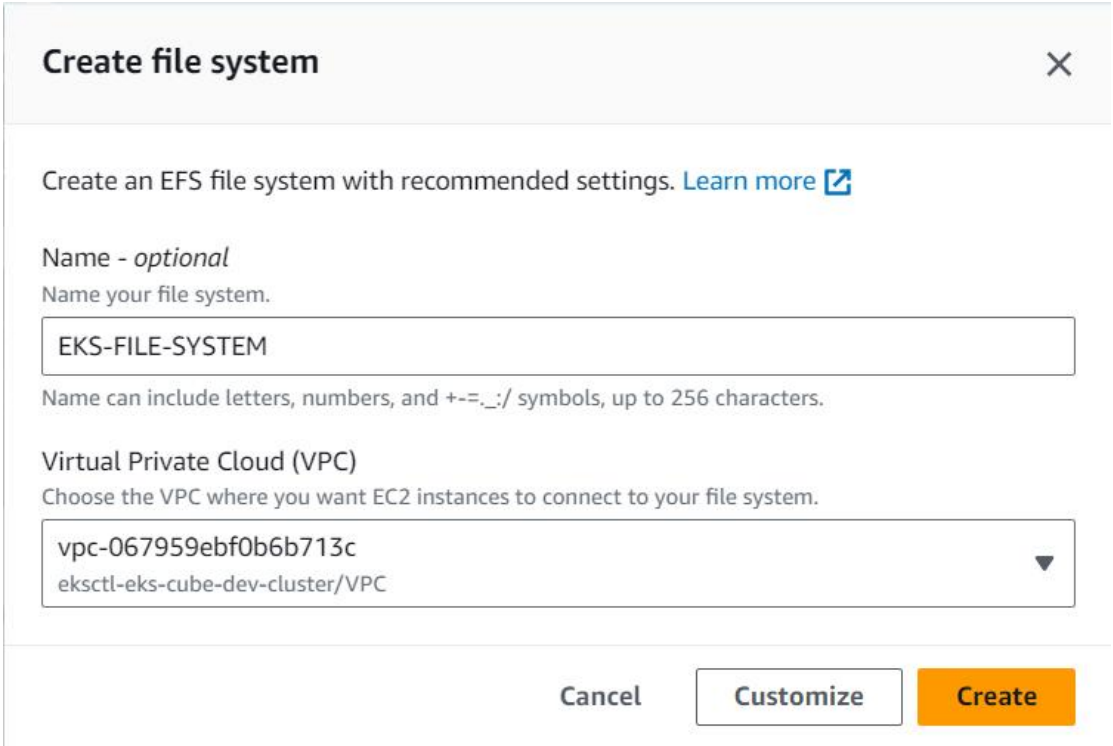
--name=aws-load-balancer-controller \

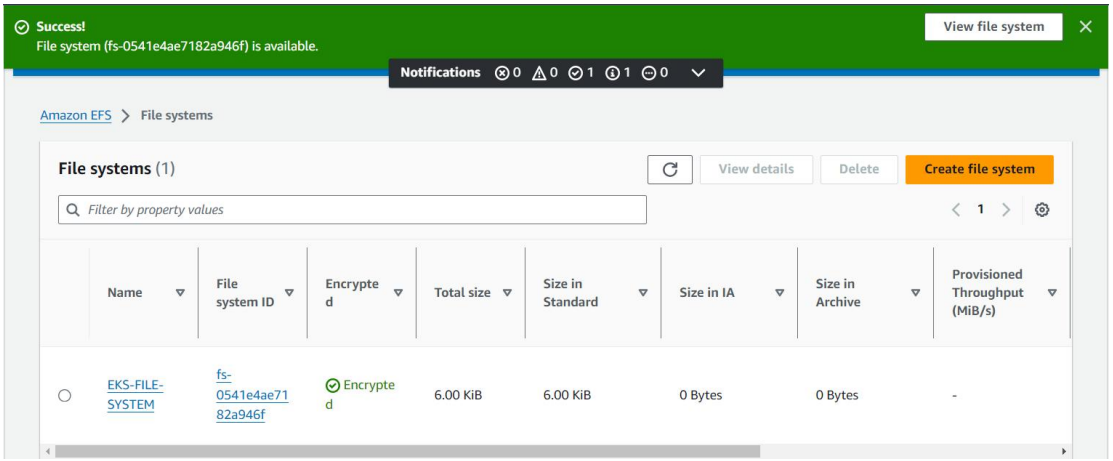
--attach-policy-arn=arn:aws:iam::509002973204:policy/AWSLoadBalancerControllerIAMPolicy \

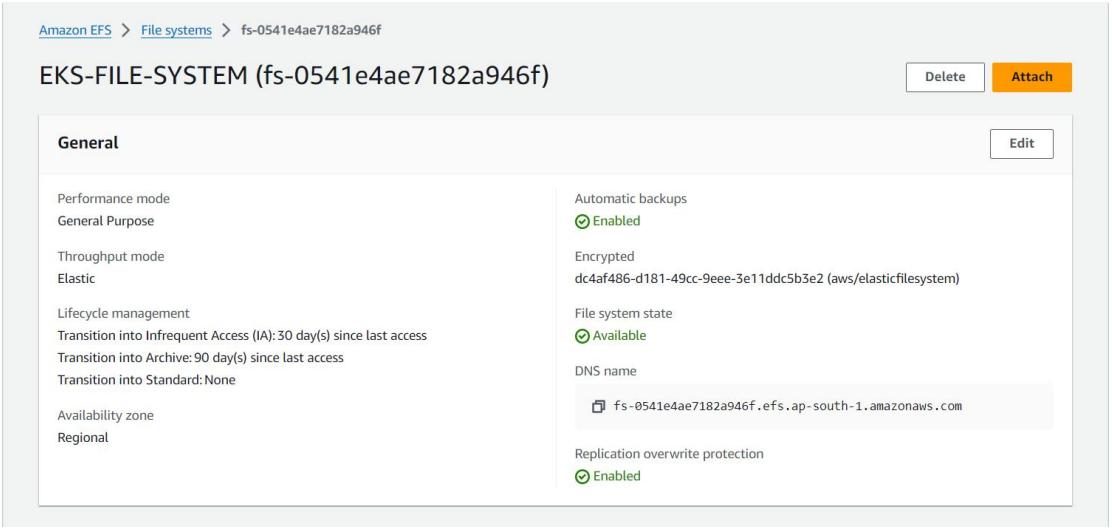
--override-existing-serviceaccounts \

--approve

```
root@DESKTOP-VIDGD8F:KUBERNETES# eksctl create iamserviceaccount --cluster=eks-cube-dev --namespace=kube-system --name=aws-load-balancer-control
ler --attach-policy-arn=arn:aws:iam::255851499496:policy/AWSLoadBalancerControllerIAMPolicy --override-existing-serviceaccounts --approve
2024-02-27 18:59:40 [▶]  2 existing iamserviceaccount(s) (kube-system/aws-load-balancer-controller,kube-system/efs-csi-controller-sa) will be ex
cluded
2024-02-27 18:59:40 [▶]  1 iamserviceaccount (kube-system/aws-load-balancer-controller) was excluded (based on the include/exclude rules)
2024-02-27 18:59:40 [!]  metadata of serviceaccounts that exist in Kubernetes will be updated, as --override-existing-serviceaccounts was set
2024-02-27 18:59:40 [▶]  no tasks
root@DESKTOP-VIDGD8F:KUBERNETES#
```








```
root@DESKTOP-VIDGD8F:task4# vim pv.yaml
root@DESKTOP-VIDGD8F:task4# cat pv.yaml
apiVersion: v1
kind: PersistentVolume
metadata:
  name: efs-pv
spec:
  capacity:
    storage: 5Gi
  volumeMode: Filesystem
  accessModes:
    - ReadWriteOnce
  storageClassName: ""
  persistentVolumeReclaimPolicy: Retain
  csi:
    driver: efs.csi.aws.com
    volumeHandle: fs-0541e4ae7182a946f
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# kubectl apply -f .
persistentvolume/efs-pv created
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# kubectl get pv
NAME     CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS      CLAIM   STORAGECLASS   REASON   AGE
efs-pv   5Gi        RWO            Retain           Available                                   70s
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# vim pvc.yaml
root@DESKTOP-VIDGD8F:task4# cat pvc.yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: efs-claim
spec:
  accessModes:
    - ReadWriteOnce
  storageClassName: ""
  resources:
    requests:
      storage: 5Gi
root@DESKTOP-VIDGD8F:task4#
```

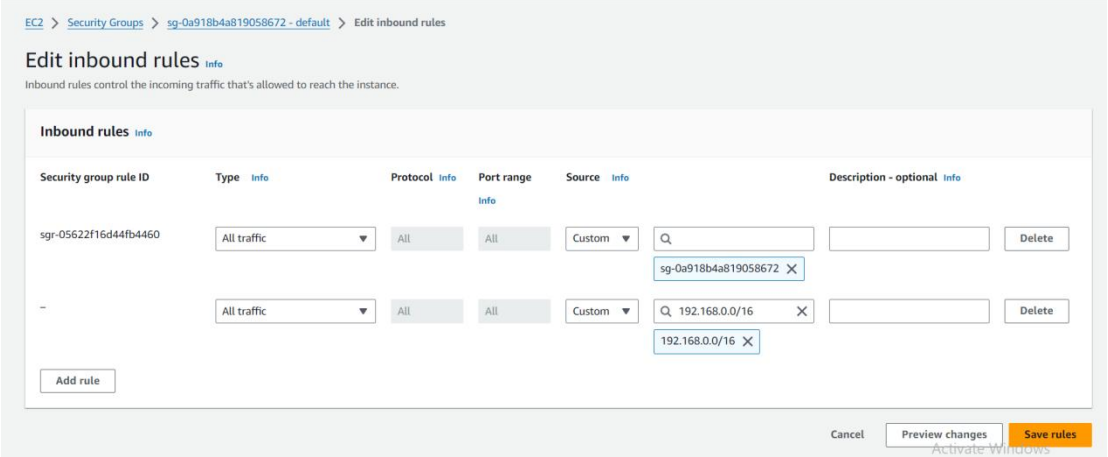
```
root@DESKTOP-VIDGD8F:task4# kubectl apply -f pvc.yaml
persistentvolumeclaim/efs-claim created
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# kubectl get pvc
NAME        STATUS   VOLUME   CAPACITY   ACCESS MODES   STORAGECLASS   AGE
efs-claim   Bound    efs-pv   5Gi        RWO                           6s
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# kubectl get pv
NAME     CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM              STORAGECLASS   REASON   AGE
efs-pv   5Gi        RWO            Retain           Bound    default/efs-claim                          5m17s
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# cat pod.yaml
apiVersion: v1
kind: Pod
metadata:
  name: efs-app
spec:
  containers:
  - name: app
    image: centos
    command: ["/bin/sh"]
    args: ["-c", "while true; do echo $(date -u) >> /data/out.txt; sleep 2; done"]
    volumeMounts:
    - name: persistent-storage
      mountPath: /data
  volumes:
  - name: persistent-storage
    persistentVolumeClaim:
      claimName: efs-claim
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# kubectl apply -f pod.yaml
pod/efs-app created
root@DESKTOP-VIDGD8F:task4#
```



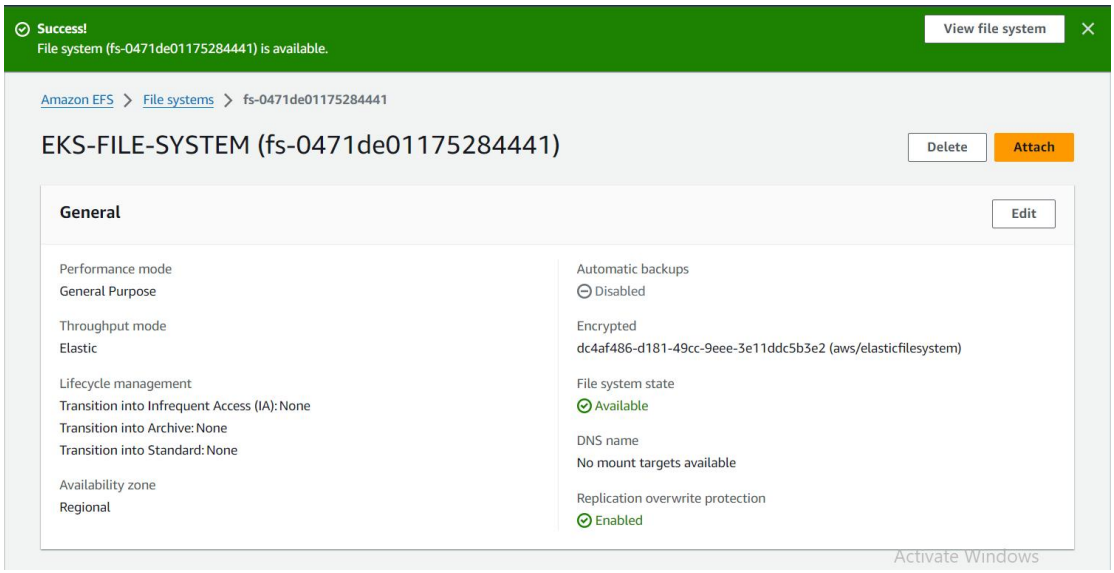

```
root@DESKTOP-VIDGD8F:task4# kubectl apply -f .
pod/efs-app created
persistentvolume/efs-pv created
persistentvolumeclaim/efs-claim created
```

```
root@DESKTOP-VIDGD8F:task4# kgp
NAME      READY   STATUS    RESTARTS   AGE
efs-app   1/1     Running   0          61s
```

```
root@DESKTOP-VIDGD8F:task4# k get pv
NAME     CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM              STORAGECLASS   REASON   AGE
efs-pv   5Gi        RWO            Retain           Bound    default/efs-claim                          66s
```

```
root@DESKTOP-VIDGD8F:task4# k get pvc
NAME        STATUS   VOLUME   CAPACITY   ACCESS MODES   STORAGECLASS   AGE
efs-claim   Bound    efs-pv   5Gi        RWO                           69s
```

Next, we need to create a Storage Class and provide the FileSystemId of the newly created file system:




```
root@DESKTOP-VIDGD8F:task4# vim sc.yaml
root@DESKTOP-VIDGD8F:task4# cat sc.yaml
kind: StorageClass
apiVersion: storage.k8s.io/v1
metadata:
  name: efs-sc
provisioner: efs.csi.aws.com
parameters:
  provisioningMode: efs-ap
  fileSystemId: fs-0471de01175284441
  directoryPerms: "700"
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# vim pvc.yaml
root@DESKTOP-VIDGD8F:task4# cat pvc.yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: efs-claim
spec:
  accessModes:
    - ReadWriteMany
  storageClassName: efs-sc
  resources:
    requests:
      storage: 5Gi
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# cat pod.yaml
apiVersion: v1
kind: Pod
metadata:
  name: efs-app
spec:
  containers:
  - name: app
    image: centos
    command: ["/bin/sh"]
    args: ["-c", "while true; do echo $(date -u) >> /data/out.txt; sleep 2; done"]
    volumeMounts:
    - name: persistent-storage
      mountPath: /data
  volumes:
  - name: persistent-storage
    persistentVolumeClaim:
      claimName: efs-claim
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# kubectl apply -f sc.yaml
storageclass.storage.k8s.io/efs-sc created
root@DESKTOP-VIDGD8F:task4# kubectl apply -f pvc.yaml
persistentvolumeclaim/efs-claim created
root@DESKTOP-VIDGD8F:task4# kubectl apply -f pod.yaml
pod/efs-app created
root@DESKTOP-VIDGD8F:task4#
```

```
root@DESKTOP-VIDGD8F:task4# k get sc,pvc,po
NAME                                          PROVISIONER             RECLAIMPOLICY   VOLUMEBINDINGMODE      ALLOWVOLUMEEXPANSION   AGE
storageclass.storage.k8s.io/efs-sc            efs.csi.aws.com         Delete          Immediate              false                  8m10s
storageclass.storage.k8s.io/gp2 (default)     kubernetes.io/aws-ebs   Delete          WaitForFirstConsumer   false                  113m

NAME                                 STATUS   VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   AGE
persistentvolumeclaim/efs-claim      Bound    pvc-04082afd-552c-402f-88af-797a172ada48   5Gi        RWX            efs-sc         8m4s

NAME          READY   STATUS    RESTARTS   AGE
pod/efs-app   1/1     Running   0          7m55s
root@DESKTOP-VIDGD8F:task4#
```