```
$ cat pv.yaml
apiVersion: v1
kind: PersistentVolume
metadata:
  name: redis-pv
  labels:
    type: nfs
spec:
  capacity:
    storage: 100Mi
  volumeMode: Filesystem
  accessModes:
    - ReadWriteOnce
  persistentVolumeReclaimPolicy: Retain
  storageClassName: slow
  mountOptions:
    - hard
    - nfsvers=4.1
    path: /srv/nfs/kubedata
    server: 172.31.91.165  # IP of my master-node
```

```
$ cat pvc.yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: redis-pvc
spec:
  accessModes:
   - ReadWriteOnce
  volumeMode: Filesystem
  resources:
    requests:
      storage: 100Mi
  storageClassName: slow
  selector:
    matchLabels:
     type: nfs
```

```
$ cat deploy.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: redis-master
  labels:
    app: redis
spec:
 selector:
    matchLabels:
      app: redis
      role: master
      tier: backend
 replicas: 1
  template:
    metadata:
      labels:
        app: redis
        role: master
        tier: backend
    spec:
      containers:
      - name: master
        image: redis
        resources:
          requests:
            cpu: 100m
            memory: 100Mi
        volumeMounts:
        - name: data
          mountPath: "/redis/data"
        ports:
        - containerPort: 6379
      volumes:
      - name: data
        persistentVolumeClaim:
          claimName: redis-pvc
```

```
@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kubectl exec -ti redis-master-f549d9867-cw4fx -- /bin/bash
root@redis-master-f549d9867-cw4fx:/data# ll
bash: ll: command not found
root@redis-master-f549d9867-cw4fx:/data# ls
root@redis-master-f549d9867-cw4fx:/data# ls
root@redis-master-f549d9867-cw4fx:/data# ll
bash: ll: command not found
root@redis-master-f549d9867-cw4fx:/data# ls
root@redis-master-f549d9867-cw4fx:/data# echo " Hi Fardin, How are you" > fardin.txt
root@redis-master-f549d9867-cw4fx:/data# ls
fardin.txt
root@redis-master-f549d9867-cw4fx:/data# hostname
redis-master-f549d9867-cw4fx
root@redis-master-f549d9867-cw4fx:/data# ll
bash: ll: command not found
root@redis-master-f549d9867-cw4fx:/data# exit
exit
command terminated with exit code 127
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
NAME
                               READY
                                        STATUS
                                                  RESTARTS
                                                             AGE
redis-master-f549d9867-cw4fx
                               1/1
                                       Running
                                                             14m
                                                  0
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kgd
NAME
               READY
                       UP-TO-DATE
                                    AVATLABLE
                                                 AGE
redis-master
               1/1
                                                 14m
                       1
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kdd redis-master
deployment.apps "redis-master" deleted
```

Created one file fardin.txt in by logging into container and created the file and file was present the in master server

```
% kubectl exec -ti redis-master-f549d9867-zr4n9:/data# ls
root@redis-master-f549d9867-zr4n9:/data# ls
root@redis-master-f549d9867-zr4n9:/data# ll
bash: ll: command not found
root@redis-master-f549d9867-zr4n9:/data# ll
bash: ll: command not found
root@redis-master-f549d9867-zr4n9:/data# ll
bash: ll: command not found
root@redis-master-f549d9867-zr4n9:/data# cd ..
root@redis-master-f549d9867-zr4n9:/# ls
bin boot data dev etc home lib lib64 media mnt opt proc redis root run sbin srv sys tmp usr var
root@redis-master-f549d9867-zr4n9:/# cd redis/
root@redis-master-f549d9867-zr4n9:/redis# ls
data
root@redis-master-f549d9867-zr4n9:/redis# cd data/
root@redis-master-f549d9867-zr4n9:/redis# cd data/
root@redis-master-f549d9867-zr4n9:/redis/data# ls
asad.txt
root@redis-master-f549d9867-zr4n9:/redis/data# echo "Hi Fardin" >> fardin .txt
root@redis-master-f549d9867-zr4n9:/redis/data# cat fardin
Hi Fardin .txt
root@redis-master-f549d9867-zr4n9:/redis/data# rm fardin
root@redis-master-f549d9867-zr4n9:/redis/data# refardin
Hi Fardin .txt
root@redis-master-f549d9867-zr4n9:/redis/data# rm fardin
root@redis-master-f549d9867-zr4n9:/redis/data# echo "Hi Fardin" >> fardin.txt
```

```
root@ip-172-31-91-165:/srv/nfs/kubedata# ll
total 16
drwxrwxrwx 2 nobody nogroup 4096 Feb 27 07:09
drwxr-xr-x 3 root
                            4096 Feb 27 05:53 ../
                    root
rw-r--r-- 1 root
                              24 Feb 27 06:48 asad.txt
                    root
                              10 Feb 27 07:09 fardin.txt
rw-r--r-- 1 root
                    root
root@ip-172-31-91-165:/srv/nfs/kubedata# hostname -i
172.31.91.165
root@ip-172-31-91-165:/srv/nfs/kubedata# pwd
/srv/nfs/kubedata
root@ip-172-31-91-165:/srv/nfs/kubedata#
```

Tried deleting the deployment and recreated the new one, saw data is there

```
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kgd
NAME
               READY
                       UP-TO-DATE
                                     AVAILABLE
                                                 AGE
redis-master
               1/1
                       1
                                     1
                                                 12m
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kdd redis-master
deployment.apps "redis-master" deleted
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kgp
No resources found in default namespace.
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kaf deploy.yaml
deployment.apps/redis-master created
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kgp
NAME
                               READY
                                        STATUS
                                                  RESTARTS
                                                             AGE
redis-master-f549d9867-fmpnc
                               1/1
                                                             7s
                                        Running
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kubectl exec -ti redis-master-f549d9867-fmpnc -- ls /redis/data
asad.txt fardin.txt
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$
```

Now deleted everything (pv,pvc and deploy) and checked the data is working

```
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kdf .
deployment.apps "redis-master" deleted
persistentvolume "redis-pv" deleted
persistentvolumeclaim "redis-pvc" deleted
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kubectl get po,pv,pvc
No resources found
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kaf pv.yaml
persistentvolume/redis-pv created
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kaf pvc.yaml
persistentvolumeclaim/redis-pvc created
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kaf deploy.yaml
deployment.apps/redis-master created
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kgp
NAME
                               READY
                                        STATUS
                                                  RESTARTS
                                                             AGE
redis-master-f549d9867-ktzq6
                               1/1
                                        Running
                                                  0
                                                             3s
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
$ kubectl exec -ti redis-master-f549d9867-ktzq6 -- ls /redis/data
asad.txt fardin.txt
root@Asad-PC:/mnt/d/Devops/k8s/nfs_k8s
```

EKS EFS

Installed EKS cluster

Created EKS cluster

```
root@Asad-PC:/mnt/d/Devops/k8s/EKS
$ . get-config.sh
Updated context arn:aws:eks:us-east-1:734620144921:cluster/eks-cube-asad in /root/.kube/config
root@Asad-PC:/mnt/d/Devops/k8s/EKS
NAME
                                    STATUS
                                              ROLES
                                                        AGE
                                                                VERSION
                                                                v1.27.9-eks-5e0fdde
v1.27.9-eks-5e0fdde
ip-192-168-22-173.ec2.internal
                                    Ready
                                              <none>
                                                        2m20s
ip-192-168-23-40.ec2.internal
                                    Ready
                                              <none>
                                                        2m20s
ip-192-168-34-61.ec2.internal
                                                                v1.27.9-eks-5e0fdde
                                    Ready
                                              <none>
                                                        2m20s
                                                                v1.27.9-eks-5e0fdde
ip-192-168-54-184.ec2.internal
                                    Ready
                                                        2m17s
                                              <none>
```

Downloaded json file for policy creation

Created policy

```
root@Asad-PC:/mnt/d/Devops/k8s/EKS

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

"Policy": {
    "PolicyName": "EFSCSIControllerIAMPolicy",
    "PolicyId": "AMPA2WCWF2UMWOPLSRQW2",
    "Arn": "arn:aws:iam::734620144921:policy/EFSCSIControllerIAMPolicy",
    "Path": "/",
    "DefaultVersionId": "v1",
    "AttachmentCount": 0,
    "PermissionsBoundaryUsageCount": 0,
    "IsAttachable": true,
    "CreateDate": "2024-02-27T07:51:22+00:00",
    "UpdateDate": "2024-02-27T07:51:22+00:00"
}
```

Created OIDC

```
root@Asad-PC:/mnt/d/Devops/k8s/EKS

$ eksctl utils associate-iam-oidc-provider --cluster eks-cube-asad --approve
2024-02-27 13:30:56 [a] will create IAM Open ID Connect provider for cluster "eks-cube-asad" in "us-east-1"
2024-02-27 13:30:57 [v] created IAM Open ID Connect provider for cluster "eks-cube-asad" in "us-east-1"
```

Then created service account

```
**Sekstl create immserviceaccount --cluster=eks-cube-asad --region=us-east-1 --namespace=kube-system --name=efs-csi-controller-sa --override-existing
-serviceaccounts --attach-policy-arn=arn:aws:iam::aws:policy/service-role/AmazonEFSCSIDriverPolicy --approve
2024-02-27 13:36:15 [w] 1 iamserviceaccount (kube-system/efs-csi-controller-sa) was included (based on the include/exclude rules)
2024-02-27 13:36:15 [l] attack:
2 sequential sub-tasks: {
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 13:36:15 [w] building iamserviceaccount stack "eksctl-eks-cube-asad-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 13:36:15 [w] deploying stack "eksctl-eks-cube-asad-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 13:36:16 [w] waiting for CloudFormation stack "eksctl-eks-cube-asad-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 13:36:18 [w] waiting for CloudFormation stack "eksctl-eks-cube-asad-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 13:36:18 [w] waiting for CloudFormation stack "eksctl-eks-cube-asad-addon-iamserviceaccount-kube-system-efs-csi-controller-sa"
2024-02-27 13:36:18 [w] created serviceaccount "kube-system/efs-csi-controller-sa"
2024-02-27 13:36:48 [w] created serviceaccount "kube-system/efs-csi-controller-sa"
```

```
root@Asad-PC:/mnt/d/Devops/k8s/EKS
$ eksctl get iamserviceaccount --cluster eks-cube-asad --name efs-csi-controller-sa --namespace kube-system

NAMESPACE NAME ROLE ARN

kube-system efs-csi-controller-sa arn:aws:iam::734620144921:role/eksctl-eks-cube-asad-addon-iamserviceaccount--Role1-pY28RLlr33we
```

Installed helm

root@Asad-PC:~

\$ helm repo add aws-efs-csi-driver https://kubernetes-sigs.github.io/aws-efs-csi-driver
"aws-efs-csi-driver" has been added to your repositories

root@Asad-PC:~

\$ 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!*

```
root@Asad-PC:--
$ 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.ama zonaws.com/eks/aws-efs-csi-driver" does not exist. Installing it now.

RNE: aws-efs-csi-driver" does not exist. Installing it now.

NAME: aws-efs-csi-driver

LAST DEPLOYED: Tue Feb 27 14:27:15 2024

NAMESPACE: kube-system

STATUS: deployed

REVISION: 1

TEST SUITE: None

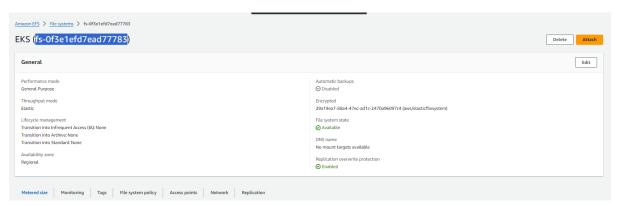
NOTES:
To verify that aws-efs-csi-driver has started, run:

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

root@Asad-PC:--
```

```
root@Asad=PC:~
$ kubectl get pod -n kube-system -l "app.kubernetes.io/name=aws-efs-csi-driver,app.kubernetes.io/instance=aws-efs-csi-driver"
NAME
efs-csi-controller-598bf64f56-4gxjm 3/3 Running 0 8m6s
efs-csi-controller-598bf64f56-cfqdx 3/3 Running 0 8m6s
efs-csi-node-44Qzrk 3/3 Running 0 8m7s
efs-csi-node-65wsd 3/3 Running 0 8m7s
efs-csi-node-blu9f 3/3 Running 0 8m7s
efs-csi-node-hvnq5 3/3 Running 0 8m7s
root@Asad=PC:~
```

Now created EFS space



```
oot@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ k get pv
NAME CAPACITY
efs-pv 5Gi
                                     RECLAIM POLICY
                     ACCESS MODES
                                                       STATUS
                                                                     CLAIM STORAGECLASS REASON
                                                                                                       AGE
                                                        Available
                                     Retain
                                                                                                       22s
$ 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-0f3e1efd7ead77783
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
```

```
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ cat pvc.yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
   name: efs-claim
spec:
   accessModes:
   - ReadWriteOnce
   storageClassName: ""
   resources:
    requests:
        storage: 5Gi

root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
```

```
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ 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@Asad-PC:/mnt/d/Devops/k8s/efs-eks
```

```
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ kgp
NAME READY STATUS RESTARTS AGE
efs-app 1/1 Running 0 9m53s
```

Checked the file

```
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ kubectl exec -ti efs-app -- tail -f /data/out.txt
Tue Feb 27 09:35:11 UTC 2024
Tue Feb 27 09:35:15 UTC 2024
Tue Feb 27 09:35:17 UTC 2024
Tue Feb 27 09:35:19 UTC 2024
Tue Feb 27 09:35:21 UTC 2024
Tue Feb 27 09:35:23 UTC 2024
Tue Feb 27 09:35:25 UTC 2024
Tue Feb 27 09:35:25 UTC 2024
Tue Feb 27 09:35:25 UTC 2024
Tue Feb 27 09:35:27 UTC 2024
Tue Feb 27 09:35:29 UTC 2024
```

```
$ kubectl exec -ti efs-app -- /bin/bash
[root@efs-app /]# ls
bin data dev etc home lib lib64 lost+found m
[root@efs-app /]# cd data/
[root@efs-app data]# ll
bash: ll: command not found
[root@efs-app data]# ls
out.txt
[root@efs-app data]# cat out.txt
Tue Feb 27 09:33:23 UTC 2024
Tue Feb 27 09:33:25 UTC 2024
Tue Feb 27 09:33:27 UTC 2024
Tue Feb 27 09:33:29 UTC 2024
Tue Feb 27 09:33:31 UTC 2024
Tue Feb 27 09:33:33 UTC 2024
Tue Feb 27 09:33:35 UTC 2024
Tue Feb 27 09:33:37 UTC 2024
Tue Feb 27 09:33:39 UTC 2024
Tue Feb 27 09:33:41 UTC 2024
Tue Feb 27 09:33:43 UTC 2024
Tue Feb 27 09:33:45 UTC 2024
Tue Feb 27 09:33:47 UTC 2024
```

Now took the date output

```
Tue Feb 27 09:38:10 UTC 2024
Tue Feb 27 09:38:12 UTC 2024
Tue Feb 27 09:38:14 UTC 2024
[root@efs-app data]# date
Tue Feb 27 09:39:11 UTC 2024
[root@efs-app data]# hostname
efs-app
[root@efs-app data]# |
```

Now deleted everything

```
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ kdf .
pod "efs-app" deleted
persistentvolume "efs-pv" deleted
persistentvolumeclaim "efs-claim" deleted
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ k get all
NAME
                     TYPE
                               CLUSTER-IP
                                              EXTERNAL-IP
                                                            PORT(S)
                                                                      AGE
                     ClusterIP 10.100.0.1
service/kubernetes
                                              <none>
                                                            443/TCP
                                                                      129m
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
```

```
root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ kaf pv.yaml
persistentvolume/efs-pv created

root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ kaf pvc.yaml
persistentvolumeclaim/efs-claim created

root@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ kaf pod.yaml
pod/efs-app created
```

And checked the new container is created and found data is retained

```
$ kubectl exec -ti efs-app -- /bin/bash
 [root@efs-app /]# cat /data/out.txt
 Tue Feb 27 09:33:23 UTC 2024
 Tue Feb 27 09:33:25 UTC 2024
 Tue Feb 27 09:33:27 UTC 2024
 Tue Feb 27 09:33:29 UTC 2024
 Tue Feb 27 09:33:31 UTC 2024
 Tue Feb 27 09:33:33 UTC 2024
 Tue Feb 27 09:33:35 UTC 2024
 Tue Feb 27 09:33:37 UTC 2024
 Tue Feb 27 09:33:39 UTC 2024
 Tue Feb 27 09:33:41 UTC 2024
 Tue Feb 27 09:33:43 UTC 2024
[root@efs-app /]# cat /data/out.txt | head -n 5
Tue Feb 27 09:33:23 UTC 2024
Tue Feb 27 09:33:25 UTC 2024
Tue Feb 27 09:33:27 UTC 2024
Tue Feb 27 09:33:29 UTC 2024
Tue Feb 27 09:33:31 UTC 2024
[root@efs-app /]# cat /data/out.txt | tail -n 5
Tue Feb 27 09:47:14 UTC 2024
Tue Feb 27 09:47:16 UTC 2024
Tue Feb 27 09:47:18 UTC 2024
Tue Feb 27 09:47:20 UTC 2024
Tue Feb 27 09:47:22 UTC 2024
[root@efs-ann /]#
 oot@Asad-PC:/mnt/d/Devops/k8s/efs-eks
$ k get pv,pvc,po
NAME
PARTY ACCESS MODES

persistentvolume/efs-pv 5Gi RWO
                          RECLAIM POLICY STATUS CLAIM
                                                 STORAGECLASS REASON
                                                             AGE
                                       default/efs-claim
                          Retain
                                  Bound
                     VOLUME
efs-pv
                          CAPACITY ACCESS MODES STORAGECLASS
                 STATUS
persistentvolumeclaim/efs-claim Bound
                          5Gi
                               RWO
NAME READY STATUS RI
pod/efs-app 1/1 Running 0
               RESTARTS
                     AGE
                     6m34s
```

root@Asad-PC:/mnt/d/Devops/k8s/efs-eks