

AWS EKS PV/PVC Tutorial

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Outline

- Use PV with Hostpath
 - Pod with PV/PVC
- Use PV with EBS
 - Pod with PV/PVC
 - StatefulSet with PV/PVC

Use PV with Hostpath

- Create PV/PVC using HostPath

```
apiVersion: v1
kind: PersistentVolume
metadata:
  name: task-pv-volume
  labels:
    type: local
spec:
  storageClassName: manual
  capacity:
    storage: 1Gi
  accessModes:
    - ReadWriteOnce
  hostPath:
    path: "/data"
    type: DirectoryOrCreate
```

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: hello-pvc
spec:
  storageClassName: manual
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 1Gi
```

Use PV with Hostpath

- Create Pod using the Hostpath PVC

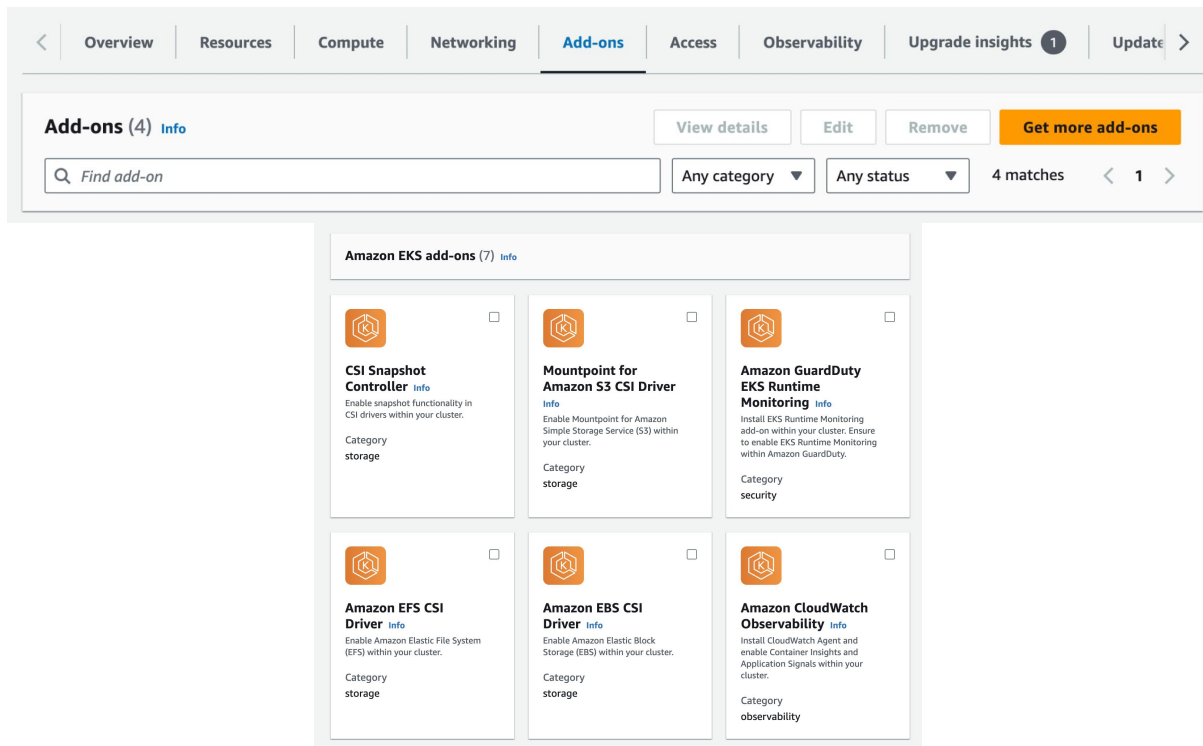
```
apiVersion: v1
kind: Pod
metadata:
  name: stateful-http-server
  labels:
    app: http-server
spec:
  volumes:
    - name: hello-storage
      persistentVolumeClaim:
        claimName: hello-pvc
  containers:
    - name: http-server
      image: yancanmao/app-stateful
      volumeMounts:
        - mountPath: "/data"
          name: hello-storage
```

Test of Effectiveness

- yancanmao@r-201-111-25-172 kube-yaml % kubectl apply -f pv.yaml
persistentvolume/task-pv-volume created
- yancanmao@r-201-111-25-172 kube-yaml % kubectl apply -f pvc.yaml
persistentvolumeclaim/hello-pvc created
- yancanmao@r-201-111-25-172 kube-yaml % kubectl apply -f server-pod-pvc.yaml
pod/stateful-http-server created
- yancanmao@r-201-111-25-172 kube-yaml % kubectl get pods
NAME READY STATUS RESTARTS AGE
stateful-http-server 1/1 Running 0 32s
- yancanmao@r-201-111-25-172 kube-yaml % kubectl get pvc
NAME STATUS VOLUME CAPACITY ACCESS MODES STORAGECLASS VOLUMEATTRIBUTESCLASS AGE
hello-pvc Bound task-pv-volume 1Gi RWO manual <unset> 51s
- yancanmao@r-201-111-25-172 kube-yaml % kubectl get pv
NAME CAPACITY ACCESS MODES RECLAIM POLICY STATUS CLAIM STORAGECLASS VOLUMEATTRIBUTESCLASS REASON AGE
task-pv-volume 1Gi RWO Retain Bound default/hello-pvc manual <unset> 61s
- yancanmao@r-201-111-25-172 kube-yaml % █

Use PV with EBS

- Get EBS CSI Driver









The screenshot displays the AWS EKS Add-ons console. The top navigation bar includes tabs for Overview, Resources, Compute, Networking, Add-ons (selected), Access, Observability, Upgrade insights (with a notification badge), and Update. Below the navigation bar, the 'Add-ons' section is titled 'Add-ons (4) Info'. It features a search bar with the placeholder 'Find add-on', a filter for 'Any category', a status filter for 'Any status', and a result count of '4 matches'. A grid of six add-on cards is shown, each with an EKS icon, a title, a brief description, and a category. The cards are: CSI Snapshot Controller (storage), Mountpoint for Amazon S3 CSI Driver (storage), Amazon GuardDuty EKS Runtime Monitoring (security), Amazon EFS CSI Driver (storage), Amazon EBS CSI Driver (storage), and Amazon CloudWatch Observability (observability).

Overview Resources Compute Networking **Add-ons** Access Observability Upgrade insights 1 Update

Add-ons (4) Info View details Edit Remove Get more add-ons

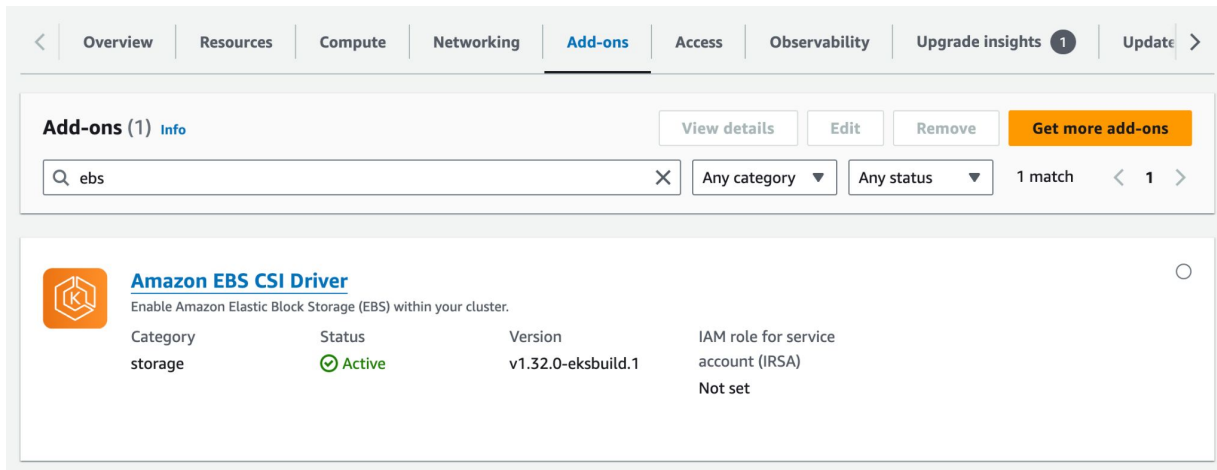
Find add-on Any category Any status 4 matches < 1 >

Amazon EKS add-ons (7) Info

 CSI Snapshot Controller Info Enable snapshot functionality in CSI drivers within your cluster. Category: storage	 Mountpoint for Amazon S3 CSI Driver Info Enable Mountpoint for Amazon Simple Storage Service (S3) within your cluster. Category: storage	 Amazon GuardDuty EKS Runtime Monitoring Info Install EKS Runtime Monitoring add-on within your cluster. Ensure to enable EKS Runtime Monitoring within Amazon GuardDuty. Category: security
 Amazon EFS CSI Driver Info Enable Amazon Elastic File System (EFS) within your cluster. Category: storage	 Amazon EBS CSI Driver Info Enable Amazon Elastic Block Storage (EBS) within your cluster. Category: storage	 Amazon CloudWatch Observability Info Install CloudWatch Agent and enable Container Insights and Application Signals within your cluster. Category: observability

Use PV with EBS

- Check Amazon EBS CSI Driver is **activated** in EKS Cluster.



The screenshot shows the AWS EKS console interface. The top navigation bar includes tabs for Overview, Resources, Compute, Networking, Add-ons (selected), Access, Observability, Upgrade insights (1), and Update. The main content area is titled 'Add-ons (1)' with an 'Info' link. It features a search bar containing 'ebs', filters for 'Any category' and 'Any status', and a '1 match' indicator. The single add-on listed is the 'Amazon EBS CSI Driver', which is described as enabling Amazon Elastic Block Storage (EBS) within the cluster. Its status is 'Active' (indicated by a green checkmark), its version is 'v1.32.0-eksbuild.1', and its IAM role is 'account (IRSA)'. A 'Not set' status is also shown for the IAM role.

Category	Status	Version	IAM role for service
storage	Active	v1.32.0-eksbuild.1	account (IRSA)
			Not set

Use PV with EBS

- Create a Storage-Class with retain policy for EBS



```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: ebs-sc
provisioner: ebs.csi.aws.com
parameters:
  type: gp2
  fsType: ext4
reclaimPolicy: Retain
volumeBindingMode: WaitForFirstConsumer
```


Use PV with EBS

- Create PV using EBS with retain storage-class

```
apiVersion: v1
kind: PersistentVolume
metadata:
  name: ebs-pv
spec:
  capacity:
    storage: 1Gi
  volumeMode: Filesystem
  accessModes:
    - ReadWriteOnce
  persistentVolumeReclaimPolicy: Retain
  storageClassName: ebs-sc
  csi:
    driver: ebs.csi.aws.com
    volumeHandle: vol-06d5f1e046daa076e # Replace with your EBS volume ID
```

Use PV with EBS


- Create PVC based on the EBS PV



```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: ebs-pvc
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 1Gi
  storageClassName: ebs-sc
```

Use PV with EBS

- Create Pod using the EBS PVC



```
apiVersion: v1
kind: Pod
metadata:
  name: stateful-http-server
  labels:
    app: http-server
spec:
  volumes:
    - name: hello-storage
      persistentVolumeClaim:
        claimName: ebs-pvc
  containers:
    - name: http-server
      image: yancanmao/app-stateful
      volumeMounts:
        - mountPath: "/data"
          name: hello-storage
```

Test of Effectiveness

- yancanmao@r-201-111-25-172 kube-yaml % kubectl apply -f pv-ebs.yaml
persistentvolume/ebs-pv created
- yancanmao@r-201-111-25-172 kube-yaml % kubectl apply -f pvc-ebs.yaml
persistentvolumeclaim/ebs-pvc created
- yancanmao@r-201-111-25-172 kube-yaml % kubectl apply -f server-pod-pvc-ebs.yaml
pod/stateful-http-server created

• yancanmao@r-201-111-25-172 kube-yaml % kubectl get pods

NAME	READY	STATUS	RESTARTS	AGE
stateful-http-server	1/1	Running	0	3m7s

• yancanmao@r-201-111-25-172 kube-yaml % kubectl get pvc

NAME	STATUS	VOLUME	CAPACITY	ACCESS MODES	STORAGECLASS	VOLUMEATTRIBUTESCLASS	AGE
ebs-pvc	Bound	ebs-pv	1Gi	RWO	ebs-sc	<unset>	3m31s

• yancanmao@r-201-111-25-172 kube-yaml % kubectl get pv

NAME	CAPACITY	ACCESS MODES	RECLAIM POLICY	STATUS	CLAIM	STORAGECLASS	VOLUMEATTRIBUTESCLASS	REASON	AGE
ebs-pv	1Gi	RWO	Retain	Bound	default/ebs-pvc	ebs-sc	<unset>		3m42s

Use PV with EBS

- Create StatefulSet using EBS CSI
 - StatefulSet automatically create PV/PVC

```
apiVersion: apps/v1
kind: StatefulSet
metadata:
  name: ebs-statefulset
spec:
  serviceName: "ebs-service"
  replicas: 3
  selector:
    matchLabels:
      app: ebs-app
  template:
    metadata:
      labels:
        app: ebs-app
    spec:
      containers:
        - name: ebs-container
          image: yancanmao/app-stateful
          volumeMounts:
            - name: ebs-storage
              mountPath: "/data"
  volumeClaimTemplates:
    - metadata:
        name: ebs-storage
      spec:
        accessModes: [ "ReadWriteOnce" ]
        storageClassName: "ebs-sc"
        resources:
          requests:
            storage: 1Gi
```

Test of Effectiveness

● yancanmao@r-201-111-25-172 kube-yaml % kubectl get pods

NAME	READY	STATUS	RESTARTS	AGE
ebs-statefulset-0	1/1	Running	0	3m6s
ebs-statefulset-1	1/1	Running	0	2m58s
ebs-statefulset-2	1/1	Running	0	2m46s

● yancanmao@r-201-111-25-172 kube-yaml % kubectl get pvc

NAME	STATUS	VOLUME	CAPACITY	ACCESS MODES	STORAGECLASS	VOLUMEATTRIBUTESCLASS
ebs-storage-ebs-statefulset-0	Bound	pvc-75590968-da7c-4dc9-962d-0c482409cd55	1Gi	RWO	ebs-sc	<unset>
ebs-storage-ebs-statefulset-1	Bound	pvc-4308646d-591d-4b51-9bdb-d1b2b771bef4	1Gi	RWO	ebs-sc	<unset>
ebs-storage-ebs-statefulset-2	Bound	pvc-61956407-5e50-4330-8a49-801f261f6b4b	1Gi	RWO	ebs-sc	<unset>

● yancanmao@r-201-111-25-172 kube-yaml % kubectl get pv

NAME	VOLUMEATTRIBUTESCLASS	REASON	AGE	CAPACITY	ACCESS MODES	RECLAIM POLICY	STATUS	CLAIM	STORAGECLASS
pvc-4308646d-591d-4b51-9bdb-d1b2b771bef4	<unset>		3m5s	1Gi	RWO	Retain	Bound	default/ebs-storage-ebs-statefulset-1	ebs-sc
pvc-61956407-5e50-4330-8a49-801f261f6b4b	<unset>		2m52s	1Gi	RWO	Retain	Bound	default/ebs-storage-ebs-statefulset-2	ebs-sc
pvc-75590968-da7c-4dc9-962d-0c482409cd55	<unset>		3m12s	1Gi	RWO	Retain	Bound	default/ebs-storage-ebs-statefulset-0	ebs-sc