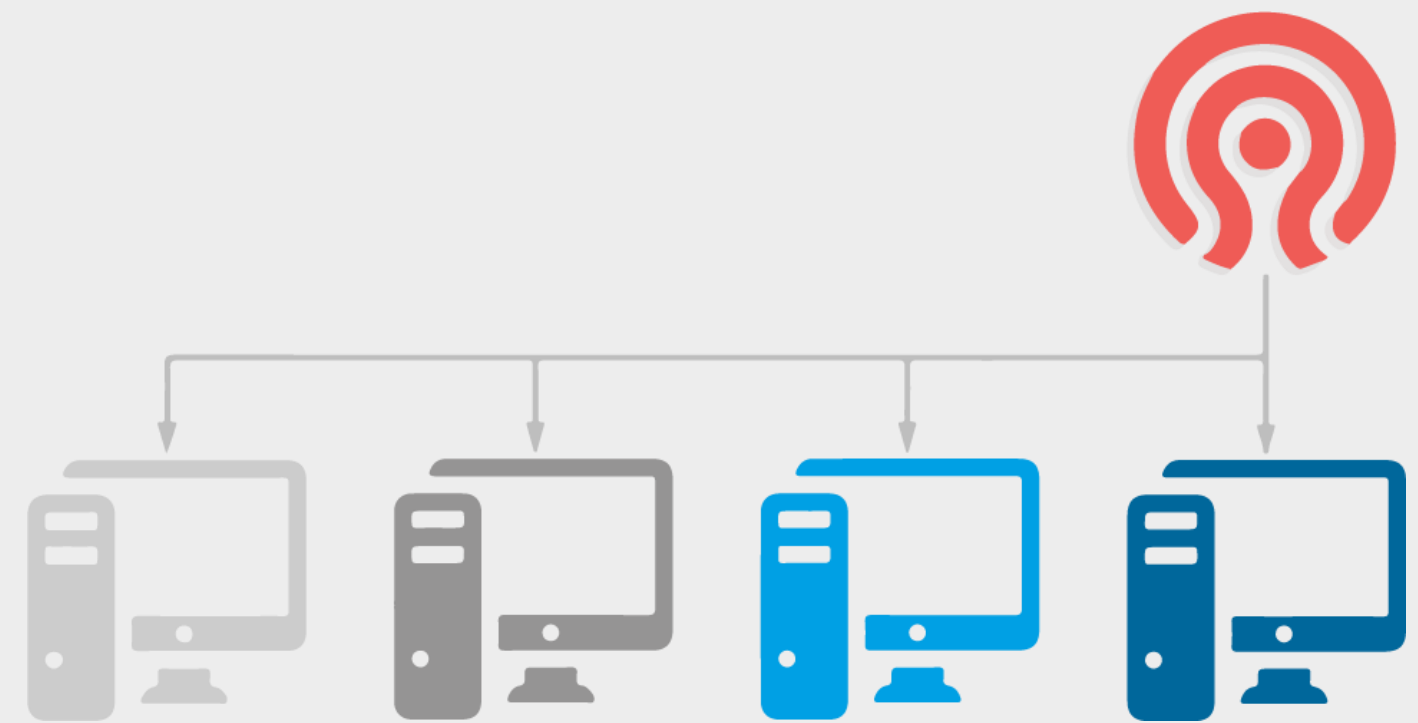


Хранение данных на примере serph

Установка Ceph

Сценарий <https://github.com/ceph/ceph-ansible>

```
git clone https://gitlab.slurm.io/slurm/ceph.git  
cd ceph  
pip install notario  
sh _deploy_cluster.sh
```



Подключение к подам

```
apiVersion: v1
kind: Pod
metadata:
  name: test
spec:
  containers:
  - image: k8s.gcr.io/test-webserver
    name: test-container
    volumeMounts:
    - mountPath: /test
      name: test-volume
  volumes:
  - name: test-volume
    # This AWS EBS volume must already exist.
    awsElasticBlockStore:
      volumeID: <volume-id>
      fsType: ext4
```

Подключение к подам

Типы томов:

<https://kubernetes.io/docs/concepts/storage/volumes/#types-of-volumes>

- configMap
- emptyDir
- hostPath
- secret

Проблемы:

- тома надо создавать вручную
- параметры доступа прописывать для каждого тома, каждого пода
- чтобы поменять тип подключенного тома - надо менять манифесты

Подключение к подам SC/PVC/PV

```
volumes:  
  - name: mypd  
    persistentVolumeClaim:  
      claimName: myclaim
```

Storage class: хранит параметры подключения

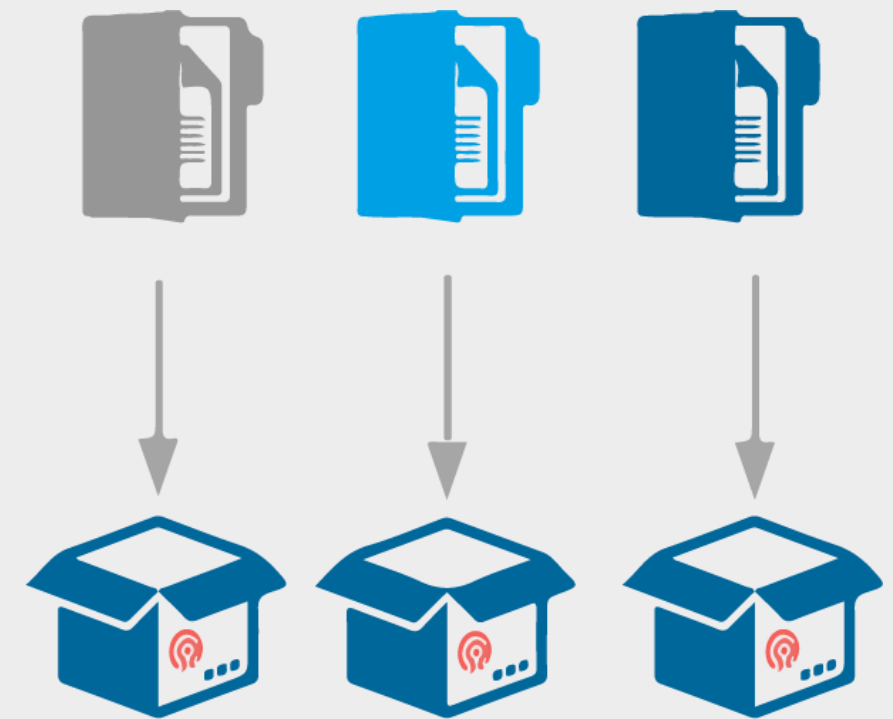
PersistentVolumeClaim: описывает требования к тому

PersistentVolume: хранит параметры и статус тома

Provisioner: параметр SC, плагин создания томов

Создание пула для RBD

```
node-1# ceph osd pool create kube 32  
node-1# ceph osd pool application enable kube kubernetes  
  
node-1# ceph auth get-or-create client.user mon 'allow r, allow command "osd blacklist"'  
osd 'allow rwx pool=kube'
```



Подключение RBD

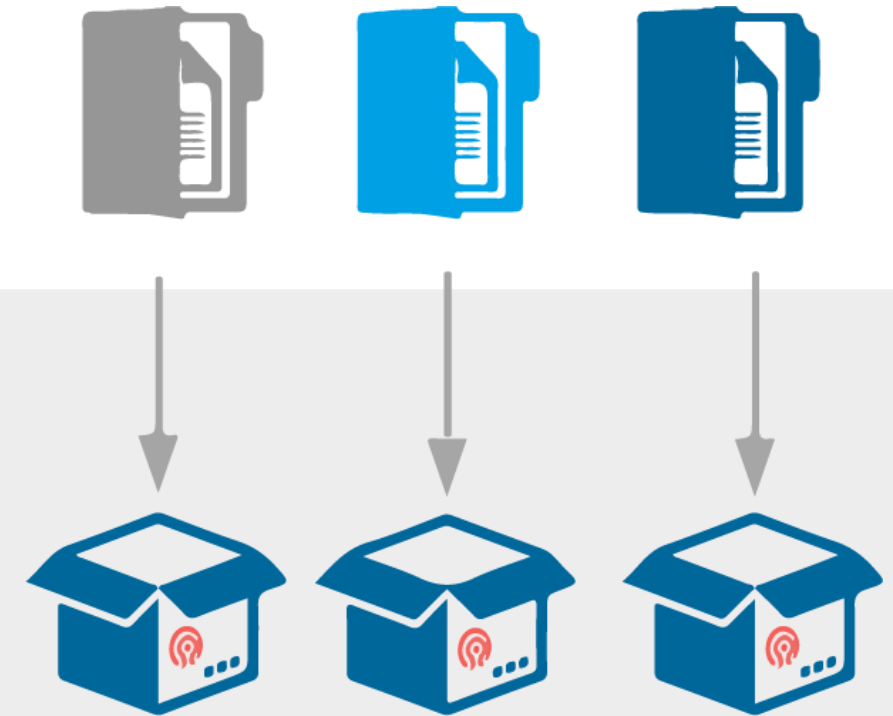
Admin key:

```
node-1# ceph auth get-key client.admin
```

```
master-1# kubectl create secret generic ceph-secret  
--type="kubernetes.io/rbd"  
--from-literal=key='AQAcU7JaU4NALBAyyyyyyyyyy=='  
--namespace=kube-system
```

Client key:

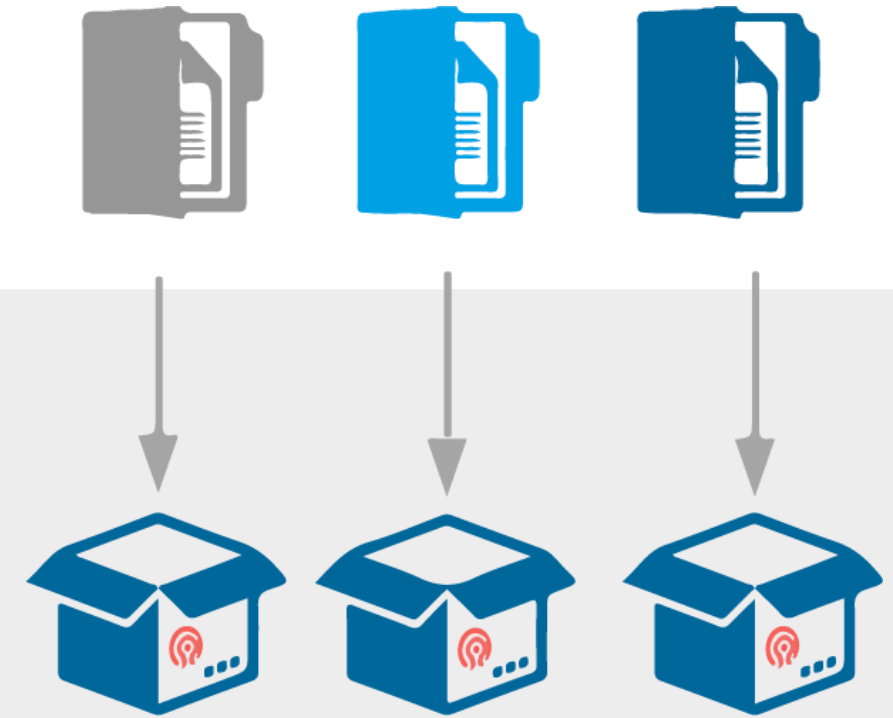
```
node-1# ceph auth get-key client.user  
master1# kubectl create secret generic ceph-secret-user  
--type="kubernetes.io/rbd"  
--from-literal=key='AQAcU7Jaxxxxxxxx=='  
--namespace=default
```



Подключение RBD

Storage class

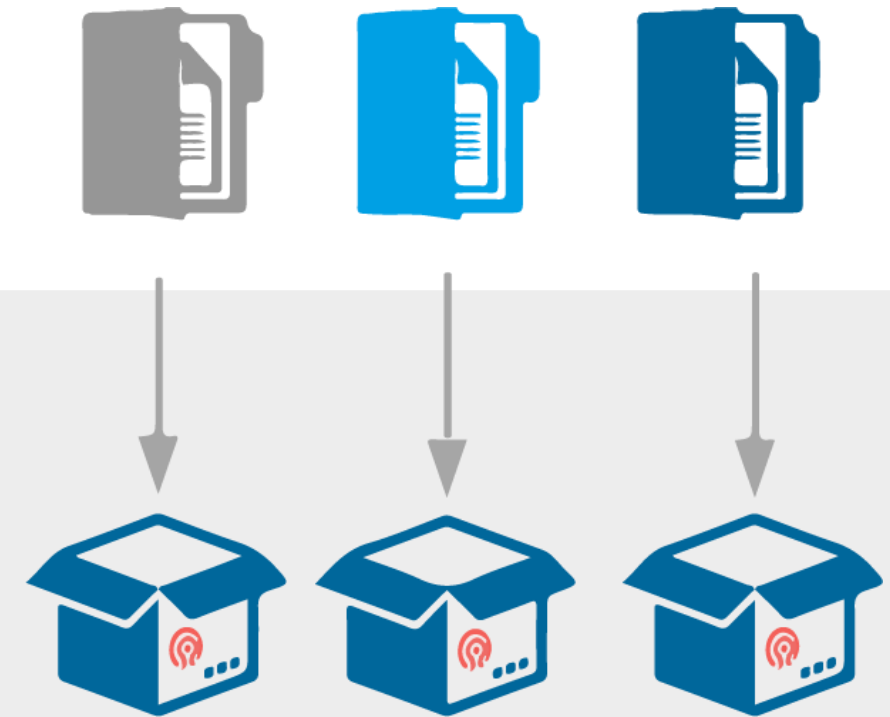
```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: kube
provisioner: kubernetes.io/rbd
parameters:
  monitors: <monitor-1-ip>:6789, <monitor-2-ip>:6789, <monitor-3-ip>:6789
  adminId: admin
  adminSecretName: ceph-secret
  adminSecretNamespace: "kube-system"
  pool: kube
  userId: user
  userSecretName: ceph-secret-user
```



Подключение RBD

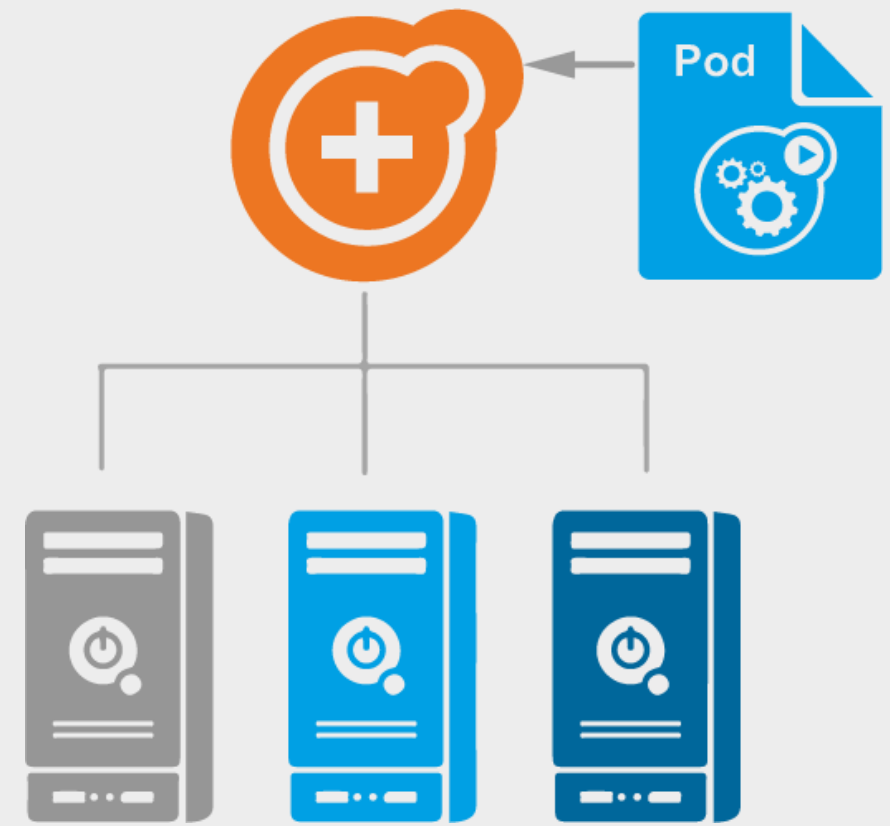
PVC

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: prometheus-3gb
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 3Gi
  storageClassName: kube
```



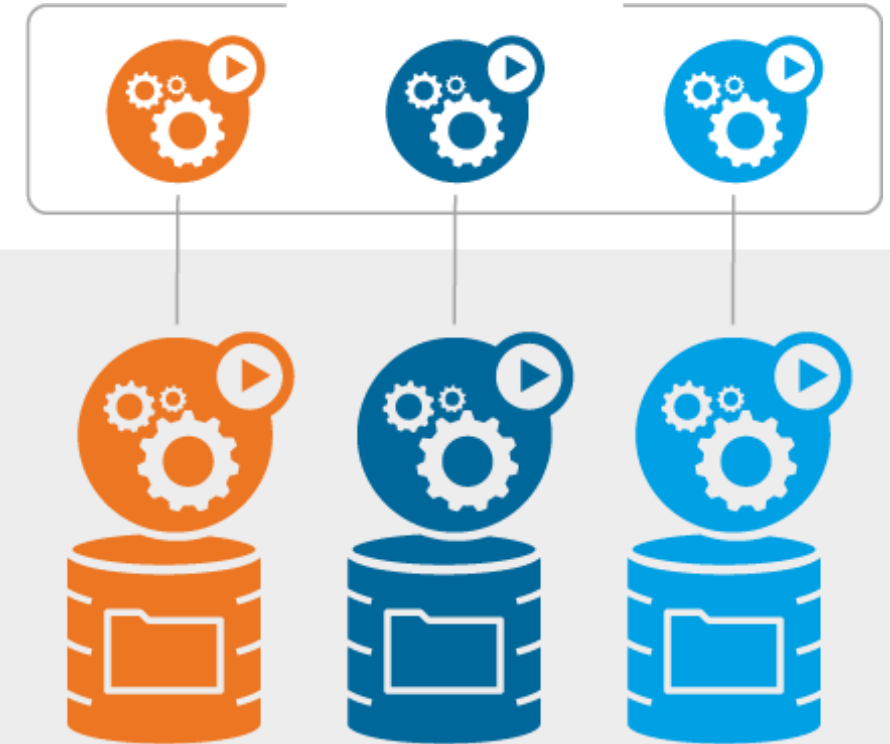
Deployment

```
apiVersion: apps/v1
kind: Deployment
spec:
  template:
    spec:
      containers:
      - volumeMounts:
        - name: data
          mountPath: /data
      volumes:
      - name: data
        persistentVolumeClaim:
          claimName: prometheus-3gb
```



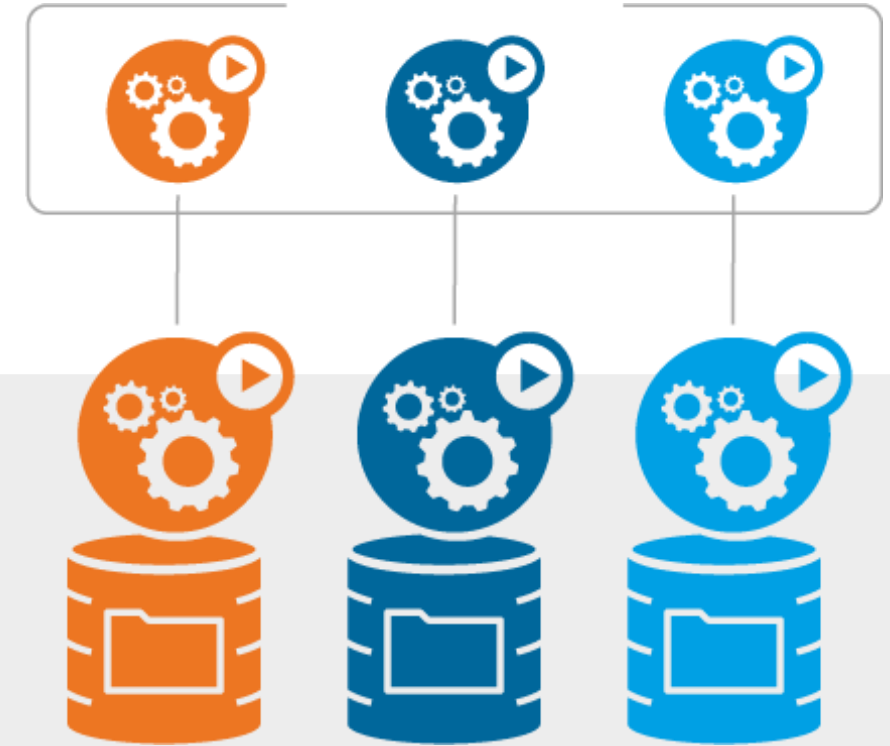
StatefulSet

```
apiVersion: apps/v1
kind: StatefulSet
spec:
  template:
    spec:
      containers:
        - volumeMounts:
            - name: mysql
              mountPath: /var/lib/mysql
  volumeClaimTemplates:
    - metadata:
        name: mysql
      spec:
        accessModes: [ "ReadWriteOnce" ]
        storageClassName: "rbd"
        resources:
          requests:
            storage: 1Gi
```



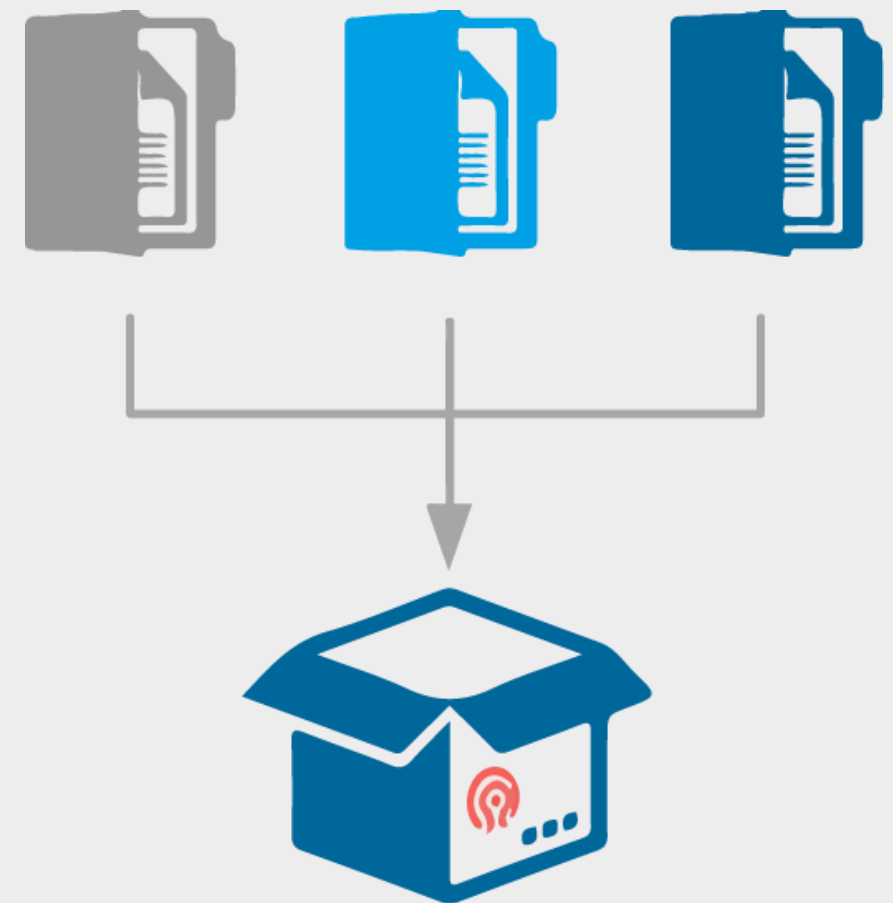
initContainers

```
spec:
  template:
    spec:
      initContainers:
      - image: busybox
        command: ["sh", "-c", "chown -R 27:27 /var/lib/mysql"]
        volumeMounts:
        - name: mysql
          mountPath: /var/lib/mysql
      containers:
      - image: mysql
        volumeMounts:
        - name: mysql
          mountPath: /var/lib/mysql
```



Создание пула для CephFS

```
ceph osd pool create cephfs_data 32  
ceph osd pool create cephfs_metadata 32  
ceph fs new cephfs cephfs_metadata cephfs_data  
ceph fs ls
```

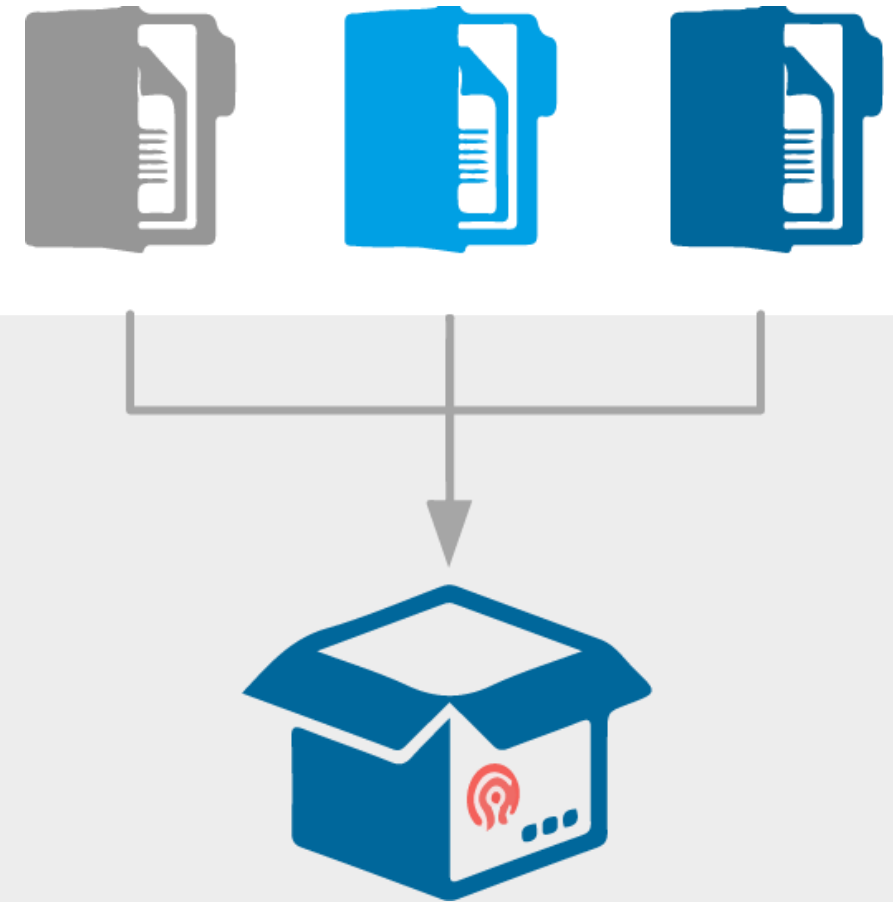


Подключение CephFS

```
node-1# mkdir -p /mnt/cephfs
node-1# mount.ceph 172.21.0.6:/ /mnt/cephfs
-o name=admin,
secret=`ceph auth get-key client.admin`
node-1# mkdir -p /mnt/cephfs/data_path

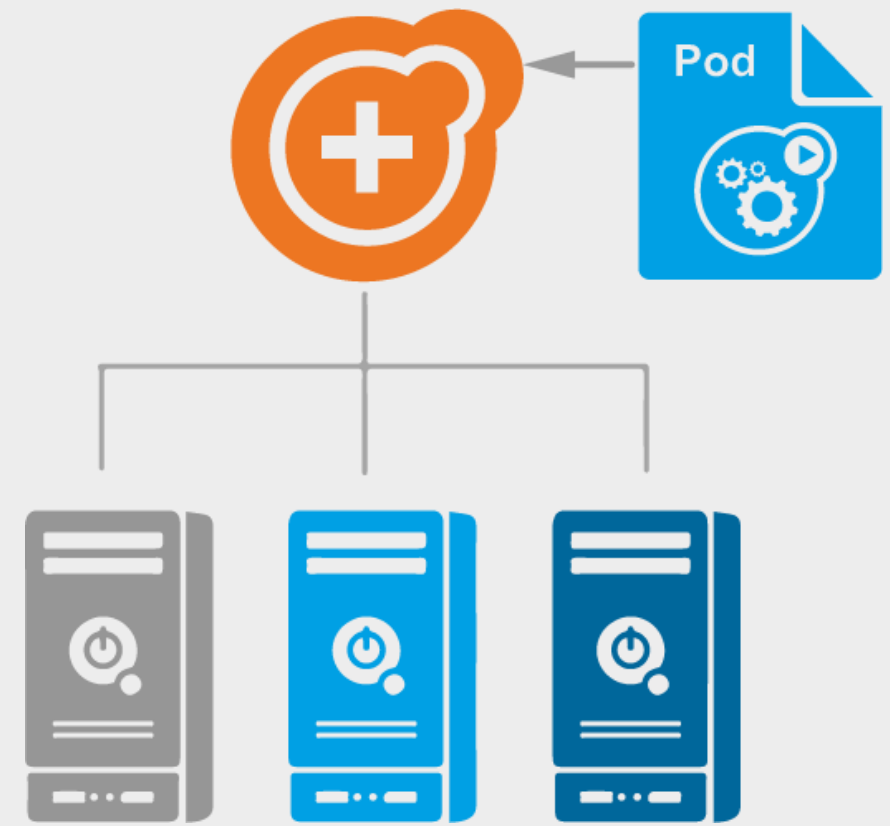
node-1# ceph auth get-or-create client.username mon 'allow r' mds 'allow r, allow rw
path=/data_path' osd 'allow rw pool=cephfs_data'

master-1#
create secret generic cephfs-secret-username
--from-literal=key='AQQxxxxxxxx' --namespace app
```



Deployment

```
apiVersion: apps/v1
kind: Deployment
spec:
  template:
    spec:
      containers:
      - volumeMounts:
        - name: cephfs
          mountPath: /path
      volumes:
      - name: cephfs
        cephfs:
          monitors:
          - 172.21.0.5:6789
          path: /namespace/app_name
          user: username
          secretRef:
            name: cephfs-secret-username
```



CephFS provisioner

```
helm repo add sb https://charts.southbridge.ru

helm inspect values sb/cephfs-provisioner
  > values.yaml
vim values.yaml
<<<<<<<<<<<<
  adminSecretName: ceph-secret-admin
  monitors:
    - 172.21.0.5:6789
    - 172.21.0.6:6789
    - 172.21.0.7:6789
<<<<<<<<<<<<

kubectl create secret generic ceph-secret-admin
  --namespace=kube-system --from-literal=secret=XX

helm upgrade --install cephfs-provisioner
sb/cephfs-provisioner -f values.yaml --namespace=kube-system
```

