

Rook Ceph plugin

Introduce

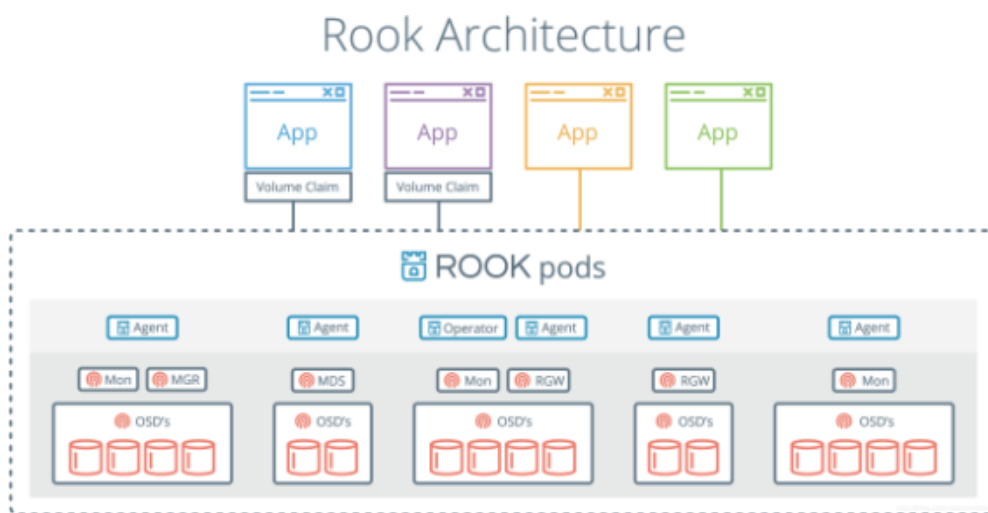
This plugin describe the deployment with containerized Ceph cluster by Rook operator and provide storage service in edge location node.

As a distributed backend storage, Ceph is widely used on Cloud and Edge solutions, it can provide Block, Filesystem and Object storage service. Traditional deployment for Ceph tools include: ceph-deploy, puppet, ansible etc.

Rook is a storage orchestrator for Kubernetes, which turns distributed storage system into self-managing, self-scaling, self-healing storage services, compared with traditional tools, there are several expectations by using Rook:

- Reduced deployment time for new clusters
- Simplified upgrades
- More agile horizontal scaling
- Better failure tolerance
- Reduced reliance on expert Ceph operators

CSI (Container Storage Interface) is a standard for exposing arbitrary block and file storage storage system to containerized workload on Container Orchestration Systems (COS) like Kubernetes. Also Ceph-CSI is supported by Rook from v1.0.



Implement

Rook implementation include two parts, Rook operator and Rook Ceph cluster.

Rook operator include CRDs and also including Ceph-CSI support for volume provisioning.

```

apiVersion: apps/v1
kind: Deployment
metadata:
  name: rook-ceph-operator
  namespace: rook-ceph
labels:
  operator: rook
  storage-backend: ceph
spec:
  selector:
    matchLabels:
      app: rook-ceph-operator
  replicas: 1
  template:
    metadata:
      labels:
        app: rook-ceph-operator
    spec:
      serviceAccountName: rook-ceph-system
      containers:
        - name: rook-ceph-operator
          image: rook/ceph:v1.0.4
          args: ["ceph", "operator"]
          volumeMounts:
            - mountPath: /var/lib/rook
              name: rook-config
            - mountPath: /etc/ceph
              name: default-config-dir
          env:
            - name: ROOK_CURRENT_NAMESPACE_ONLY
              value: "true"
            # CSI enablement
            - name: ROOK_CSI_ENABLE_CEPHFS
              value: "true"
            - name: ROOK_CSI_CEPHFS_IMAGE
              value: "quay.io/cephcsi/cephfsplugin:v1.0.0"
            - name: ROOK_CSI_ENABLE_RBD
              value: "true"
            - name: ROOK_CSI_RBD_IMAGE
              value: "quay.io/cephcsi/rbdplugin:v1.0.0"
            - name: ROOK_CSI_REGISTRAR_IMAGE
              value: "quay.io/k8scsi/csi-node-driver-registrar:v1.0.2"
            - name: ROOK_CSI_PROVISIONER_IMAGE
              value: "quay.io/k8scsi/csi-provisioner:v1.0.1"
            - name: ROOK_CSI_SNAPSHOTTER_IMAGE
              value: "quay.io/k8scsi/csi-snapshotter:v1.0.1"
            - name: ROOK_CSI_ATTACHER_IMAGE
              value: "quay.io/k8scsi/csi-attacher:v1.0.1"
            # The name of the node to pass with the downward API
            - name: NODE_NAME
              valueFrom:
                fieldRef:
                  fieldPath: spec.nodeName
            # The pod name to pass with the downward API
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            # The pod namespace to pass with the downward API
            - name: POD_NAMESPACE
              valueFrom:
                fieldRef:
                  fieldPath: metadata.namespace
      volumes:
        - name: rook-config
          emptyDir: {}
        - name: default-config-dir
          emptyDir: {}

```

Rook Ceph cluster include settings for Ceph monitor and storage, currently the setting as following:

```
apiVersion: ceph.rook.io/v1
kind: CephCluster
metadata:
  name: rook-ceph
  namespace: rook-ceph
spec:
  cephVersion:
    image: ceph/ceph:v13.2.2-20190410
    allowUnsupported: false
  dataDirHostPath: /var/lib/rook
  mon:
    count: 3
    allowMultiplePerNode: true
  dashboard:
    enabled: true
  network:
    hostNetwork: false
  rbdMirroring:
    workers: 0
  annotations:
  resources:
    storage: # cluster level storage configuration and selection
    useAllNodes: true
    useAllDevices: false
    deviceFilter:
  location:
  config:
    storeType: filestore
    metadataDevice: # "md0" specify a non-rotational storage so ceph-volume will use it as block db device of bluestore.
    databaseSizeMB: "10240" # uncomment if the disks are smaller than 100 GB
    journalSizeMB: "10240" # uncomment if the disks are 20 GB or smaller
  directories:
    - path: "/var/lib/rook/storage-dir"
```