Ceph storage with Rook

Running Ceph on Kubernetes

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Agenda

- What is Rook?
- Architecture of Rook
- Kubernetes Native Integration
- What can Rook help you do (better) with Ceph?
- Demo of Rook's capabilities
  - Creating a Ceph cluster
  - Showing ease of consuming storage using an example application
  - Adding and removing a new (Ceph) cluster node
- Why Rook?

What is Rook?

What is Rook?

- Cloud-Native Storage Orchestrator
- Extends Kubernetes with custom types and controllers
- Automates deployment, bootstrapping, configuration, provisioning, scaling, upgrading, migration, disaster recovery, monitoring, and resource management

What is Rook?

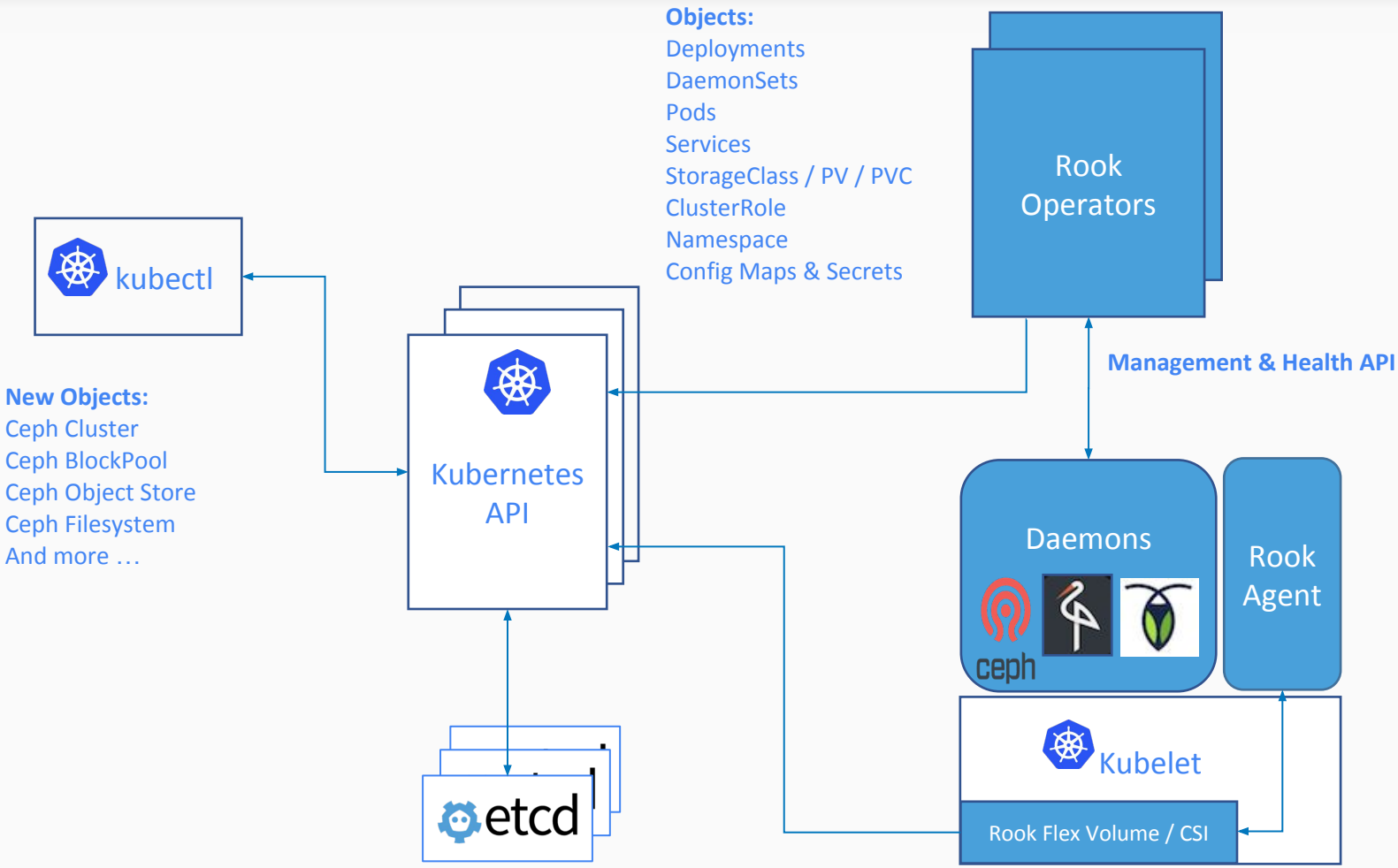
- Framework for many storage providers and solutions
- Open Source (Apache 2.0)
- Hosted by the Cloud-Native Computing Foundation (CNCF)

Rook Framework for Storage Solutions

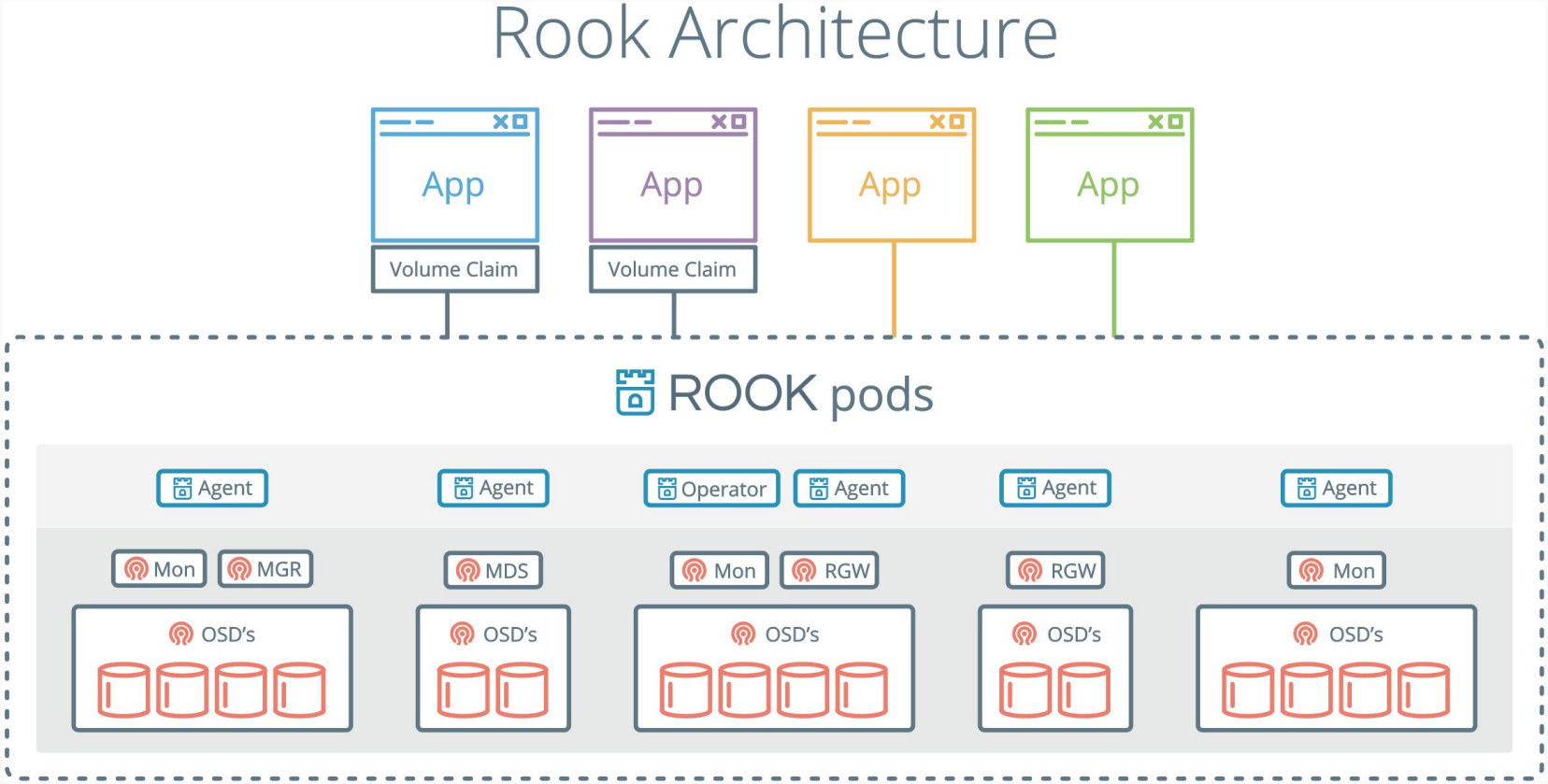
- Rook is more than just a collection of Operators and CRDs
- **Framework** for storage providers to integrate their solutions into cloud-native environments
  - Storage resource normalization
  - Operator patterns/plumbing
  - Common policies, specs, logic
  - Testing effort
- Ceph, CockroachDB, Minio, Nexenta, and more...

Architecture of Rook

Architecture

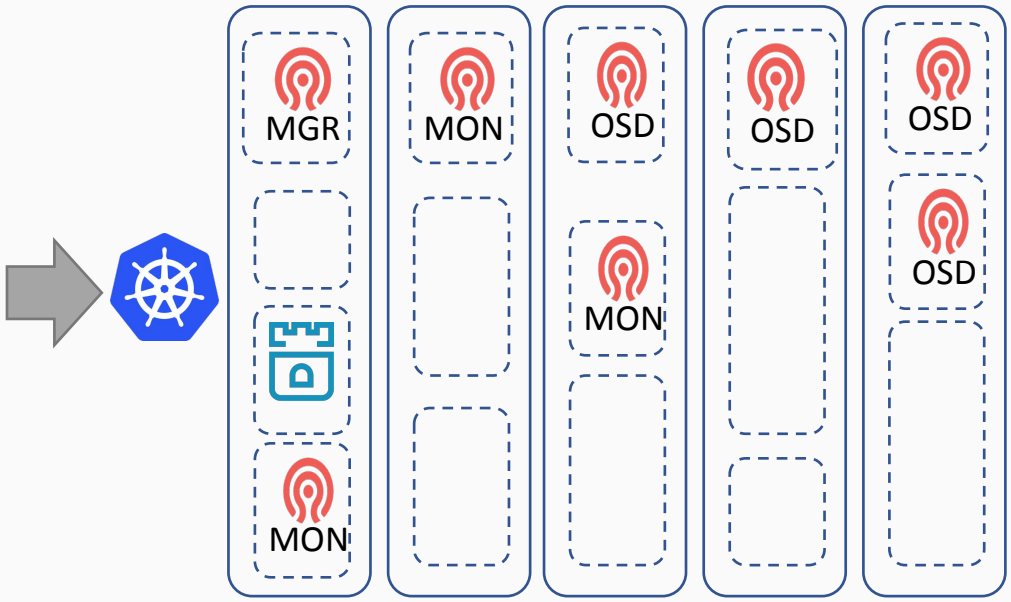


Ceph on Kubernetes with Rook



Ceph on Kubernetes with Rook

```yaml
apiVersion: ceph.rook.io/v1
kind: CephCluster
metadata:
  name: rook-ceph
  namespace: rook-ceph
spec:
  cephVersion:
    image: ceph/ceph:v13.2.4-20190109
  dataDirHostPath: /var/lib/rook
  dashboard:
    enabled: true
  mon:
    count: 3
    allowMultiplePerNode: true
  storage:
    useAllNodes: true
    useAllDevices: false
```



Kubernetes Native Integration

StorageClass

```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
   name: rook-block
   namespace: rook
provisioner: rook.io/block
parameters:
  pool: replicapool
  clusterName: rook
```

PersistentVolumeClaim

```yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: wp-pv-claim
  labels:
    app: wordpress
spec:
  storageClassName: rook-block
  accessModes:
  - ReadWriteOnce
  resources:
    requests:
      storage: 20Gi
```

Results in..

PersistentVolume
20 Gigabyte

Rook Cluster CRD

```yaml
apiVersion: ceph.rook.io/v1
kind: CephCluster
metadata:
  name: rook-ceph
  namespace: rook-ceph
spec:
  cephVersion:
    image: ceph/ceph:v13.2.4-20190109
  dataDirHostPath: /var/lib/rook
  dashboard:
    enabled: true
  mon:
    count: 3
    allowMultiplePerNode: true
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```

What can Rook help you do (better) with Ceph?

What can Rook help you do (better) with Ceph?

- Health checking for MONs with automatic failover
- Simple management of Ceph Cluster, Pools, Filesystem and RGW through Kubernetes objects.
- Storage Selection in one central place.

Storage Selection

```
storage:
  useAllNodes: true
  useAllDevices: false
  deviceFilter:
  config:
    # storeType: bluestore
    osdsPerDevice: "1"
    directories:
    - path: /rook/storage-dir
    nodes:
```

Storage Selection

```
nodes:
- name: "172.17.4.101"
  directories:
  - path: "/rook/storage-dir"
  resources:
    limits:
      cpu: "500m"
      memory: "1024Mi"
    requests:
      cpu: "500m"
      memory: "1024Mi"
- name: "172.17.4.201"
  devices:
  - name: "sdb"
  - name: "nvme01"
    config:
      osdsPerDevice: "5"
```

Why Rook?

Why Rook?

- Simplifies running a storage backend by orchestrating it
  - Self managing (Health checking)
  - Dynamic provisioning of the storage
- Abstraction (coming) to reduce developer “overhead”
  - Object Store Bucket, Database Custom Resource Definition
  - (Less) vendor lock-in through running services your own

More than Ceph…

More than Ceph…

- Minio Object Storage
- CockroachDB Database
- EdgeFS
- NFS Server

All thanks to the community!

Demo

Demo

- Creating a Ceph cluster
- Showing ease of consuming storage using an example application
- Adding and removing a new (Ceph) cluster node

Demo Files: GitHub galexrt/presentation-distributed-storage-with-rook

How to get involved?

- Contribute to Rook
  - https://github.com/rook/rook
  - https://rook.io/
- Slack - https://rook-io.slack.com/
  - #conferences
- Twitter - @rook_io
- Forums - https://groups.google.com/forum/#!forum/rook-dev
- Community Meetings

Questions?

https://github.com/rook/rook

https://rook.io/

Thank you!

https://github.com/rook/rook

https://rook.io/

The End

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The Cloud Report:
the-report.cloud/?s=Rook