



Rook Project Intro

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<https://rook.io/>

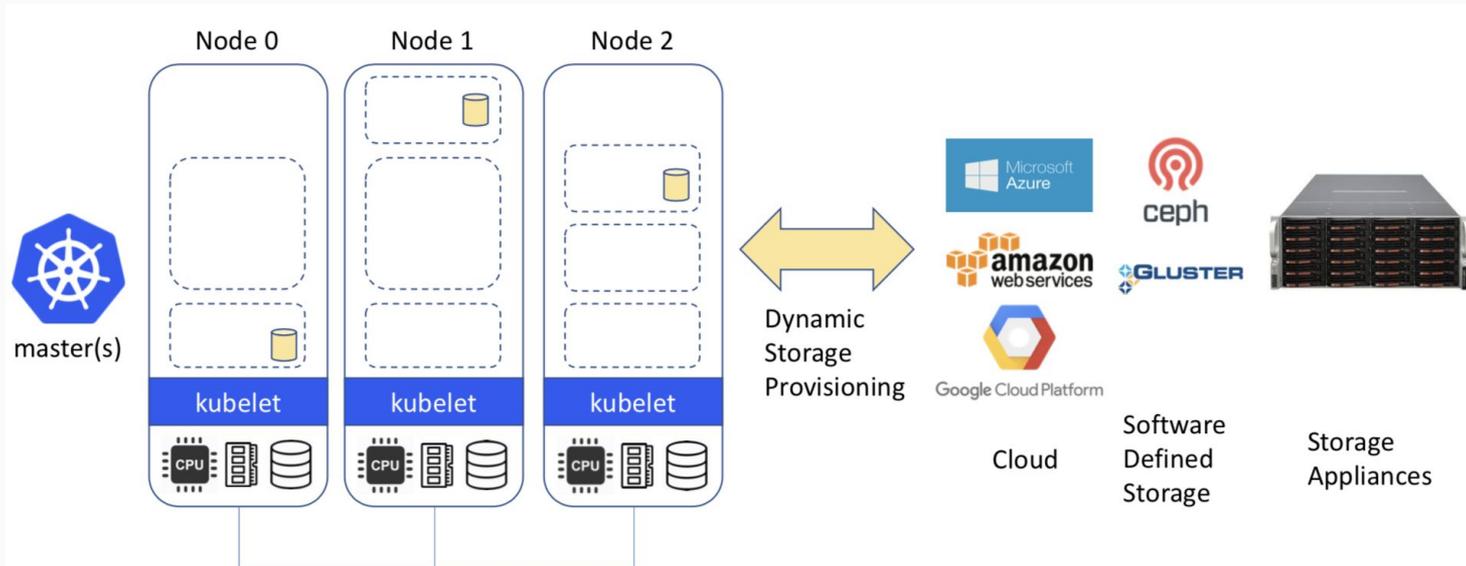
<https://github.com/rook/rook>

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

Storage for Kubernetes

- Volume plugins allow external storage solutions to provide storage to your apps

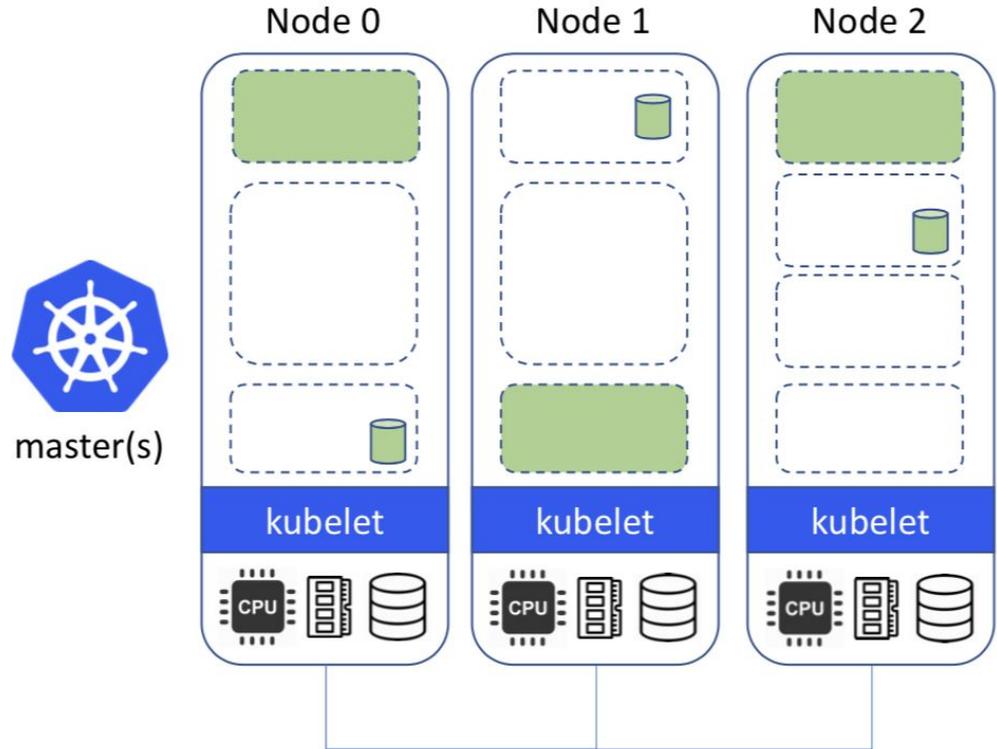


Limitations

- Not portable: requires these services to be accessible
- Deployment burden of external solutions
- Vendor lock-in due to using provider managed services

Storage ON Kubernetes

- Kubernetes can manage our storage solution
- Highly portable applications (including storage dependencies)
- Dedicated K8s storage cluster also possible



Power of Portability

- Power of **choice** - cost, features, availability, compliance, etc.
- Take our storage solutions wherever Kubernetes goes
- **Pod** and **Volume** abstractions enables portability
 - What about databases, buckets, message queues, data pipelines, etc.?
- **Crossplane** - open source multicloud control plane
 - <https://crossplane.io/>

Operator Pattern

- Codifies domain expertise to deploy and manage an application
 - Automates actions a human would normally do
- Control loop that reconciles user's desired state and the actual system state
 - Observe - discover current actual state of cluster
 - Analyze - determine differences from desired state
 - Act - perform operations to drive actual towards desired

Custom Resource Definitions (CRDs)

- Teaches Kubernetes about new first-class objects
- Custom Resource Definition (CRDs) are arbitrary types that extend the Kubernetes API
 - look just like any other built-in object (e.g. Pod)
 - Enabled native `kubectl` experience
- A means for user to describe their desired state

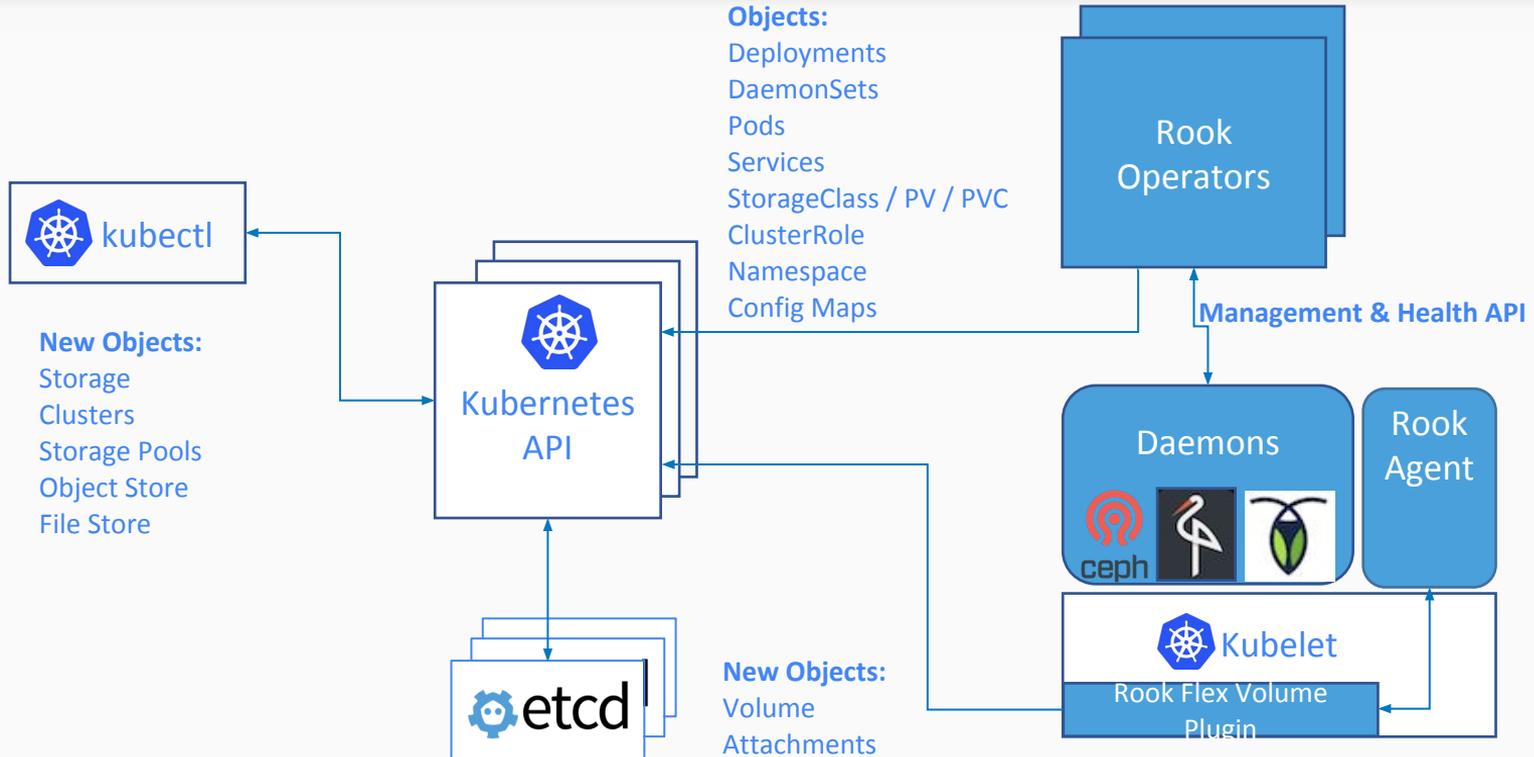
Rook Operators

- Implements the **Operator Pattern** for storage solutions
- Defines *desired state* for the storage cluster
 - Storage Cluster, Pool, Object Store, etc.
- The Operator runs reconciliation loops
 - Watches for changes in desired state
 - Watches for changes in the cluster
 - Applies changes to the cluster to make it match desired

Rook Operators

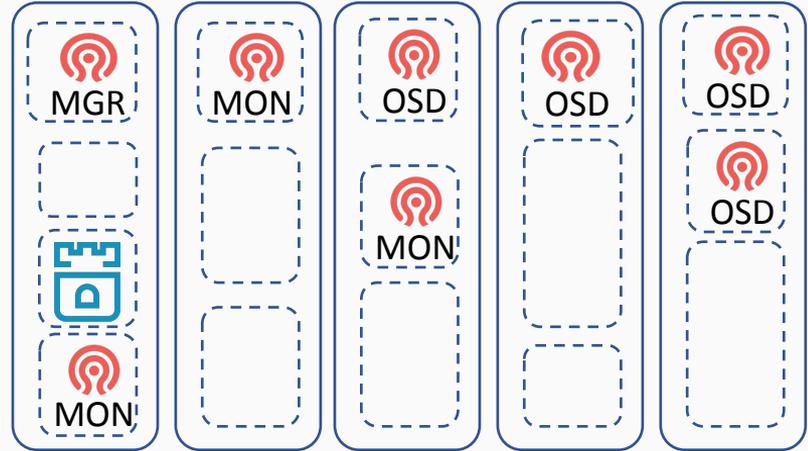
- The Operators leverages the full power of K8S
 - Services, ReplicaSets, DaemonSets, Secrets, ...
- Contain all the logic to manage storage systems at scale
 - Handle stateful upgrades
 - Handle rebalancing the cluster
 - Handle health and monitoring tasks
- Not on the data path – can be offline for minutes

Rook Architecture



Ceph on Kubernetes with Rook

```
apiVersion: ceph.rook.io/v1beta1
kind: Cluster
metadata:
  name: rook-ceph
spec:
  cephVersion:
    image: ceph/ceph:v13
  mon:
    count: 3
  network:
    hostNetwork: false
  storage:
    useAllNodes: true
    deviceFilter: "^sd."
    config:
      storeType: bluestore
```



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, NFS, Cassandra, Nexenta, and more...

Demo

Deploying a Ceph cluster with a Stateful Application

How to get involved?

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

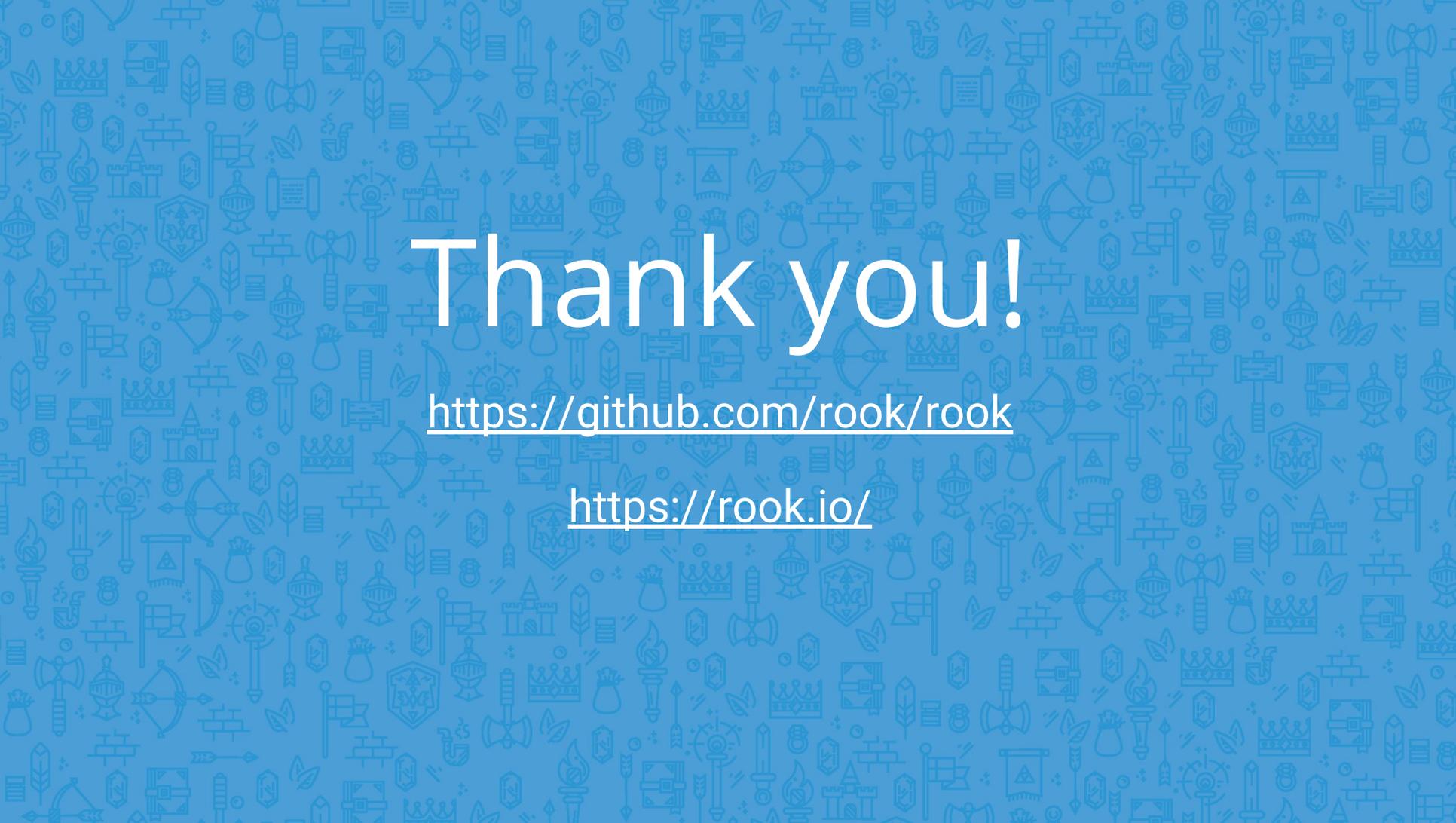
More Rook Sessions

- **Rook Deep Dive**
 - Code & architecture specifics, Ceph deep dive
 - **Thurs Dec 13th, 11:40am @ 618-620**
- **Meet the Rook Maintainers**
 - Chat with project leaders and ask questions
 - **Thurs Dec 13th, 12:30pm @ CNCF Booth**
- **Adding a New Storage Provider to Rook**
 - What are the steps and benefits for integrating new storage solutions with Rook?
 - **Thurs Dec 13th, 4:30pm @ 611-614**

Questions?

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Thank you!

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