Red Hat OpenShift

OpenShift Backup / Restore / Disaster recovery

Optional subheading

Alfred Bach
PSA EMEA

Presenter's Name
Title

Red Hat

Introduction

Optional subheading

ephemeral *adjective*

ephem·er·al | \ i-ˈfem-rəl, -ˈfēm-; -ˈfe-mə-, -ˈfē- \

Definition of *ephemeral* (Entry 1 of 2)

1 : lasting a very short time
// ephemeral pleasures

2 : lasting one day only
// an ephemeral fever

OpenShift provides a lot of container resilience. If a Pod dies and was created through one of the higher level resources (ReplicaSet, Deployment, StatefulSet, etc), OpenShift will recreate it.

However, there are some circumstances where you want to preserve the cluster configuration and restore it in the case of a problem.

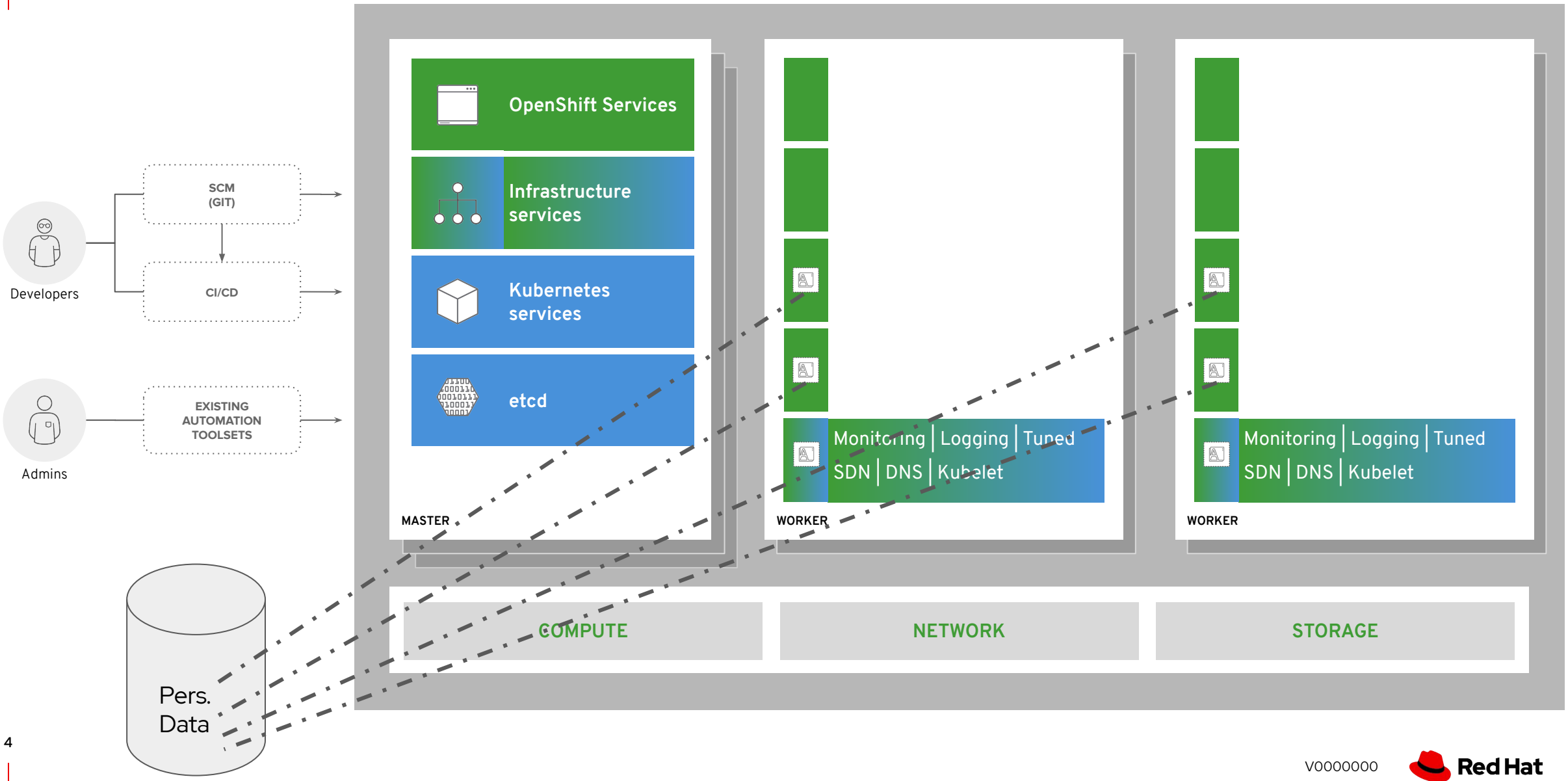
Source:
Insert source data here
Insert source data here
Insert source data here

Control Plane and Data Plane

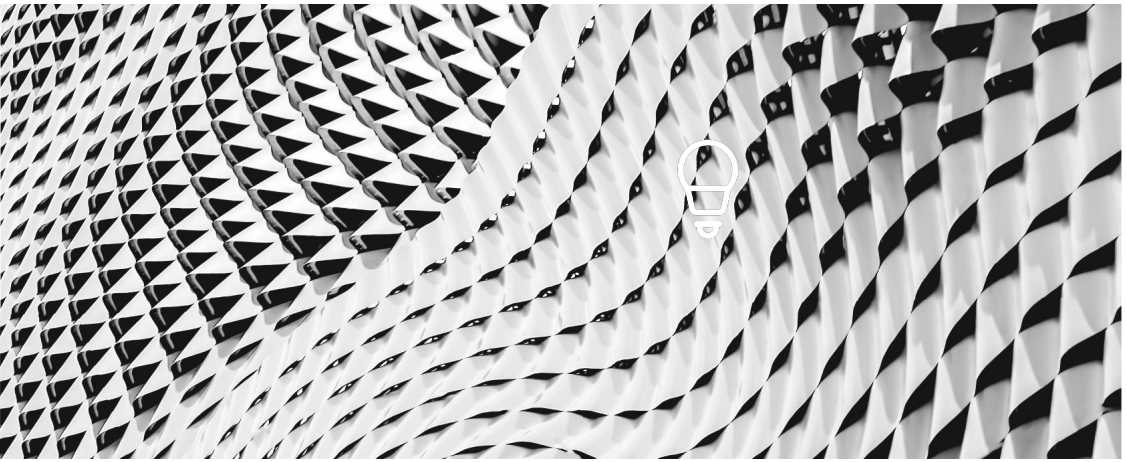
From the OpenShift and Kubernetes perspective, there is a clear definition of the Control Plane, but, when it comes to the Data Plane, it is loosely defined and its definition is normally based on the context it is being used. To avoid confusion, this is the way we use the terms here:

- **OpenShift Control Plane** : The *OCP Control Plane* is comprised of the Kubernetes Control Plane1 (Kubernetes Master2 and the *kubelet* process in each node). For the purpose of this book, we are considering the OpenShift consoles, logging, metrics, and cluster monitoring services as part of this plane.
- **OpenShift Data Plane**: The term *OCP Data Plane*, even when not officially defined in the OKD and OCP documentation, is normally used to describe the traffic forwarding plane of the SDN layer.

Control Plane and Data Plane



OpenShift backup and restore



Etcd key-value store backup

The etcd backup procedure can be performed on any etcd node, and consists of the following steps:

1. Stop the etcd service: `systemctl stop etcd`
2. Create an etcd backup: `etcdctl backup --data-dir /var/lib/etcd --backup-dir ~/etcd.back`
3. Copy the etcd `db` file: `cp /var/lib/etcd/member/snap/db ~/etcd/member/snap/db`
4. Start the etcd service: `systemtl start etcd`

The etcd key-value store recovery procedure is performed on etcd nodes and consists of the following steps:

1. Create a single node cluster
2. Restore data to `/var/lib/etcd/`, from backup, while etcd is not running
3. Restore `/etc/etcd/etcd.conf`, from backup
4. Restart etcd
5. Add new nodes to the etcd cluster

Open Shift nodes

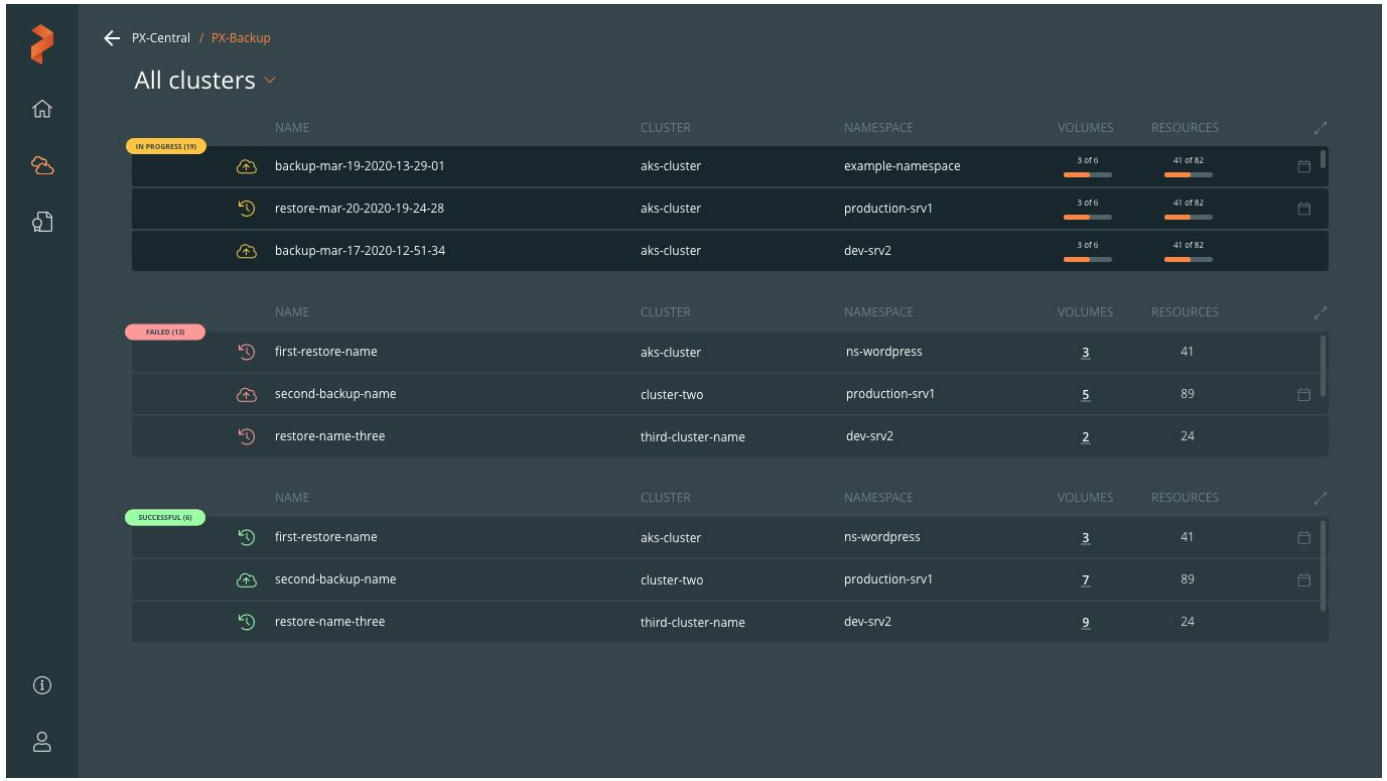
There is no specific need to save any data on an OpenShift node, since there is no stateful data; you can easily reinstall all of the nodes one by one, or while reinstalling the OpenShift cluster.

Persistent storage

In many cases, OpenShift pod persistent data can be saved and restored with the `oc rsync` command, but it is not the most reliable and efficient method. Persistent storage backup procedures are very different for every storage type, and must be considered separately.

Backup Methodes

portworx by Pure Storage



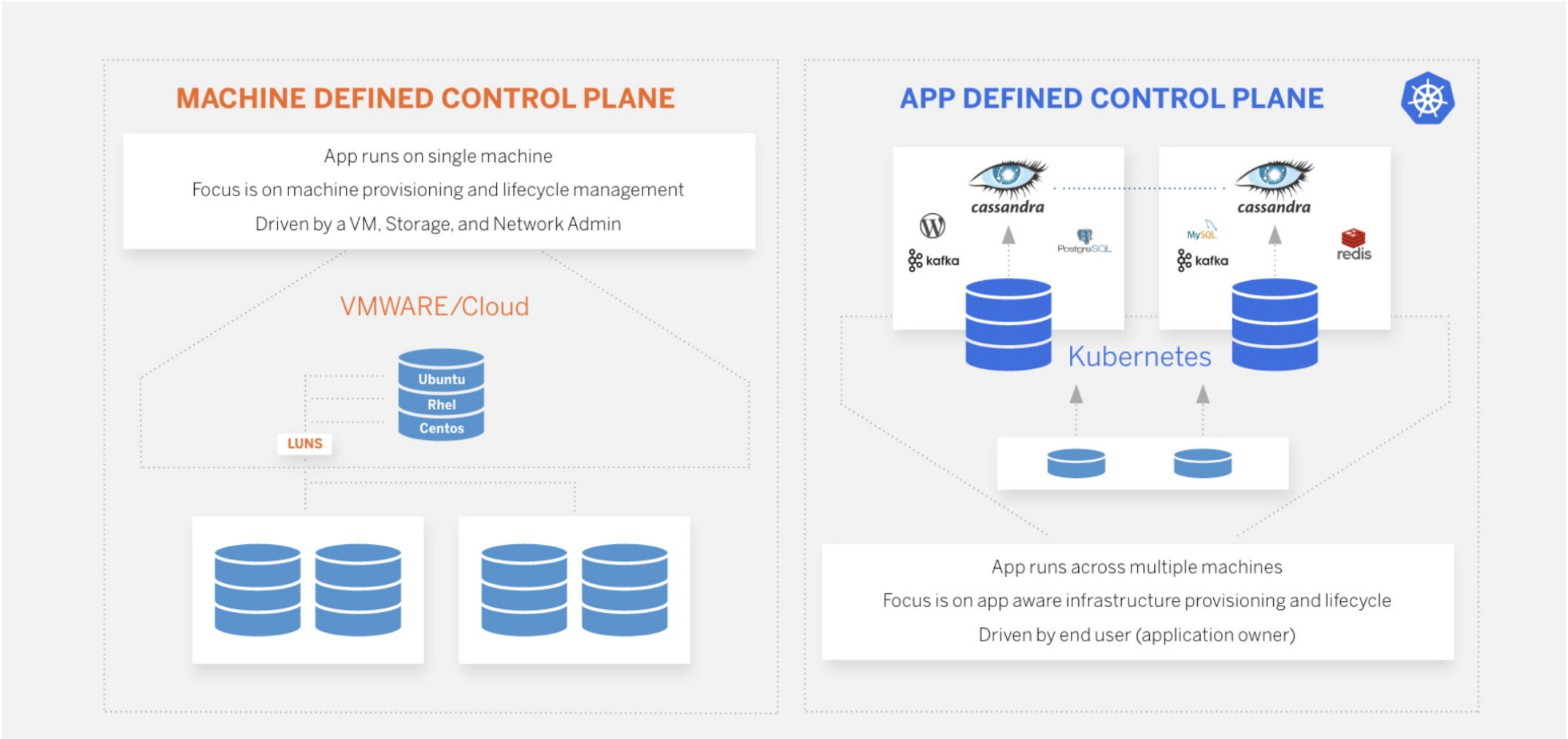
PX Backup

Easily backup and restore all your Kubernetes applications

V0000000

Red Hat

portworx
by Pure Storage



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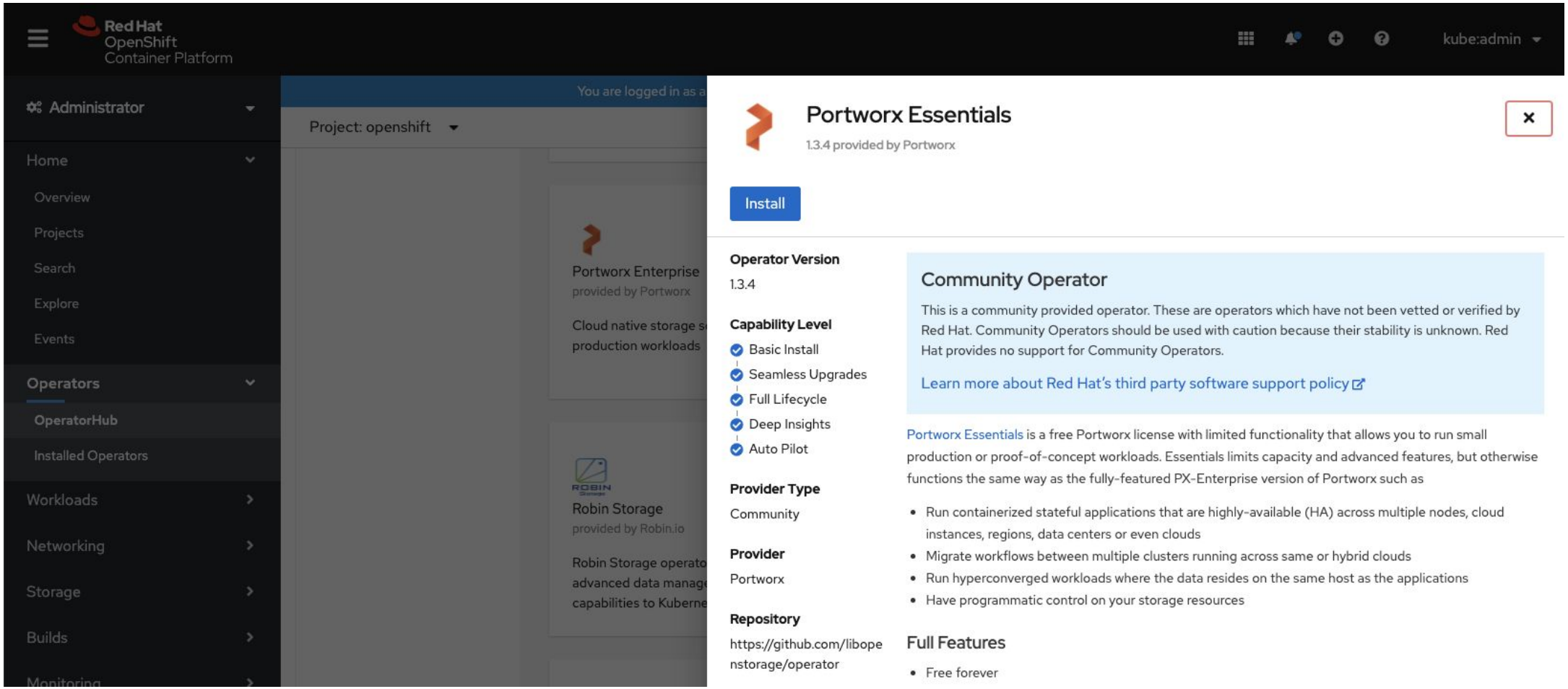
portworx
by Pure Storage



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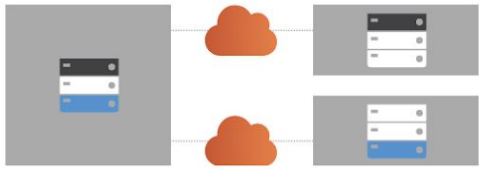
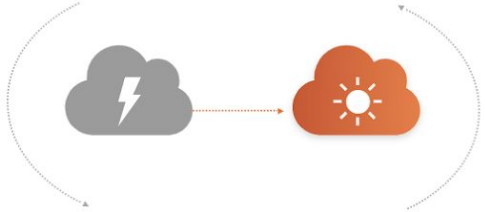
Use Cases



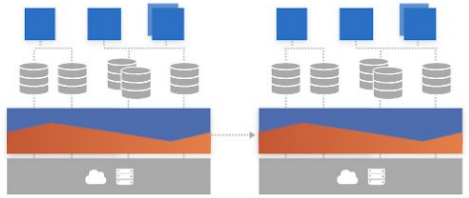
Backup

Backup entire Kubernetes applications, including data, app configuration, and Kubernetes objects across clouds.



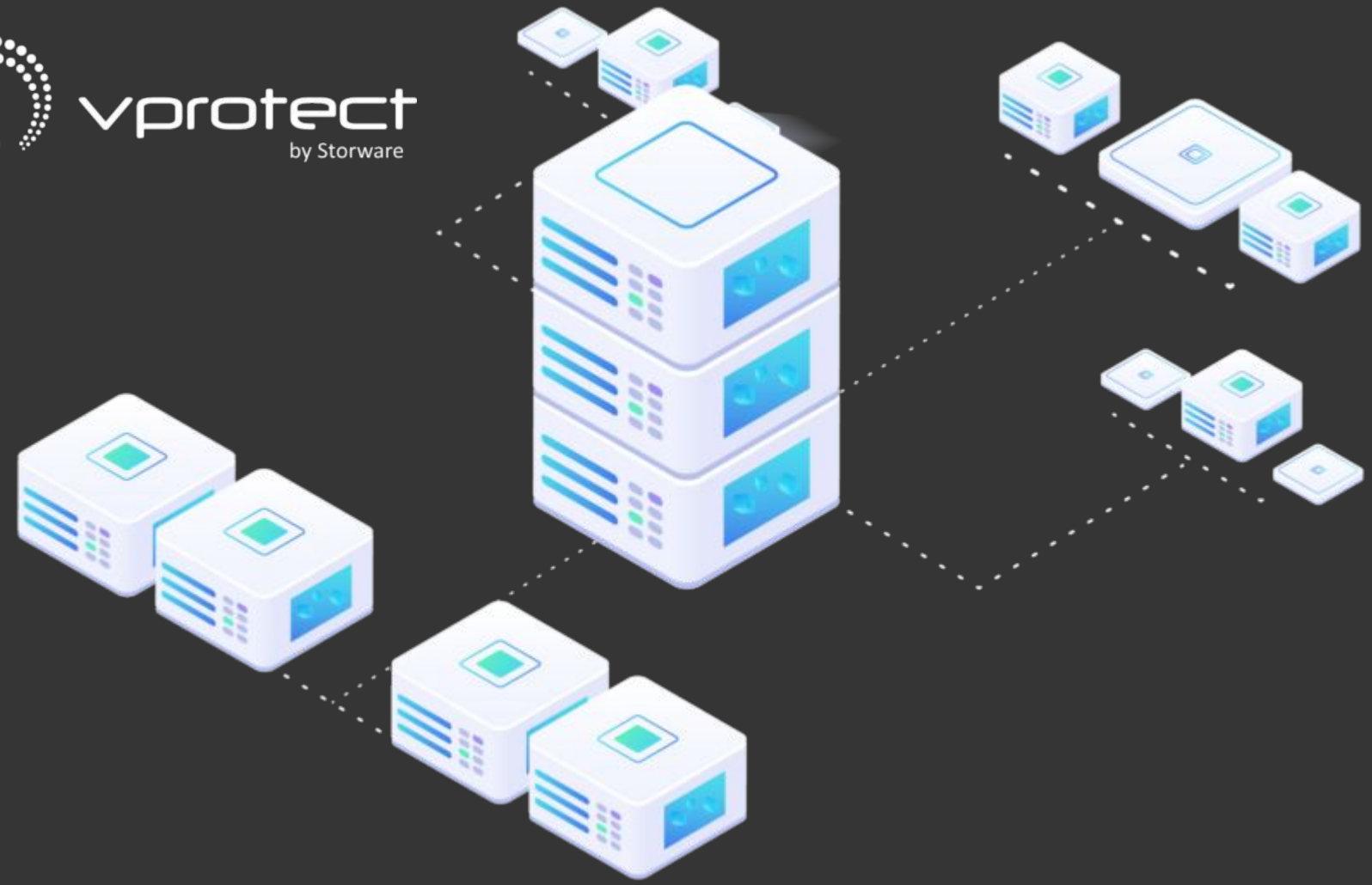
Restore

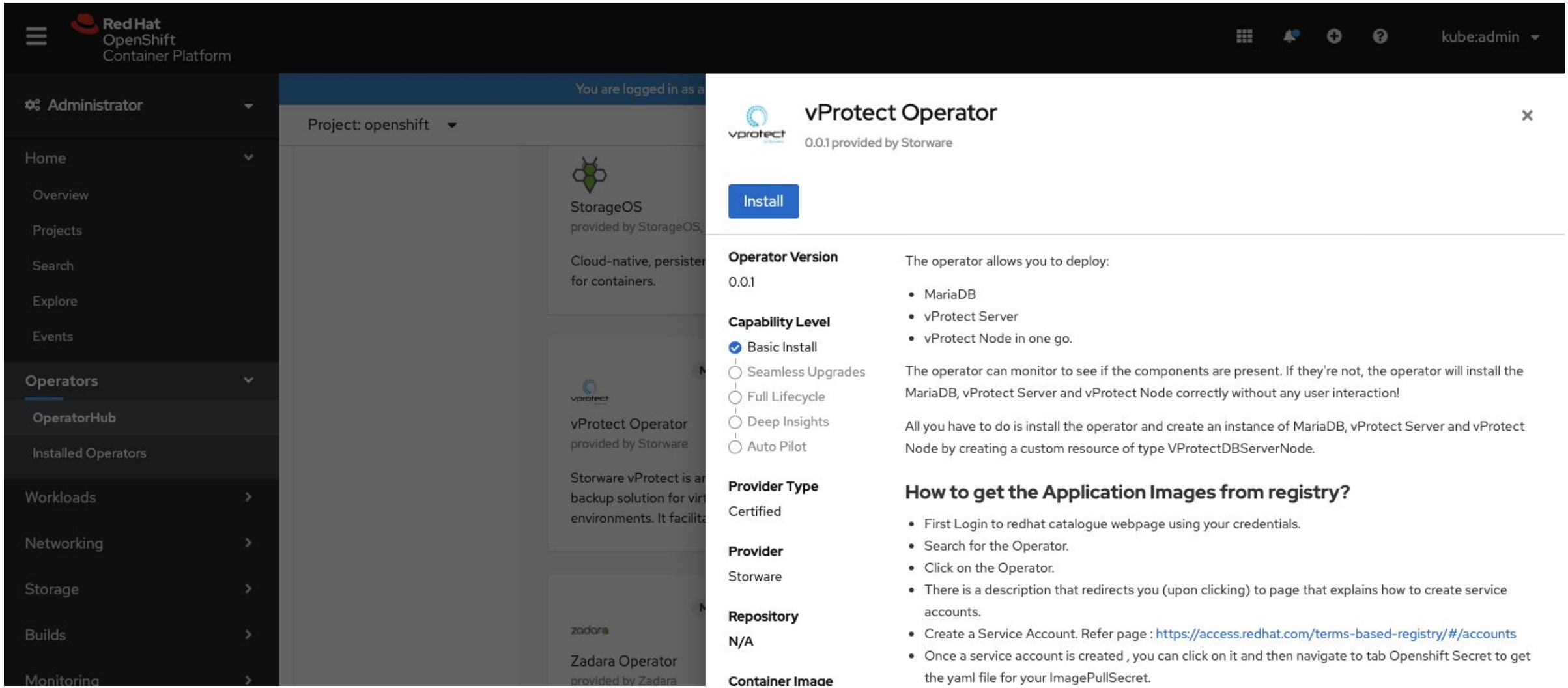
Restore any Kubernetes application to any Kubernetes cluster in the cloud or on-prem.



Migrate

Move a single Kubernetes application or an entire namespace between clusters in a single data center or between environments.


vprotect
by Storware


Red Hat
OpenShift
Container Platform
kube:admin
Administrator
Project: openshift
Home
Overview
Projects
Search
Explore
Events
Operators
OperatorHub
Installed Operators
Workloads
Networking
Storage
Builds
Monitoring
StorageOS
provided by StorageOS
Cloud-native, persister
for containers.
vProtect Operator
provided by Storware
Storware vProtect is ar
backup solution for virt
environments. It facilita
Zadara Operator
provided by Zadara
vProtect Operator
0.0.1 provided by Storware
Install
Operator Version
0.0.1
Capability Level
Basic Install
Seamless Upgrades
Full Lifecycle
Deep Insights
Auto Pilot
Provider Type
Certified
Provider
Storware
Repository
N/A
Container Image
The operator allows you to deploy:
MariaDB
vProtect Server
vProtect Node in one go.
The operator can monitor to see if the components are present. If they're not, the operator will install the MariaDB, vProtect Server and vProtect Node correctly without any user interaction!
All you have to do is install the operator and create an instance of MariaDB, vProtect Server and vProtect Node by creating a custom resource of type VProtectDBServerNode.
How to get the Application Images from registry?
First Login to redhat catalogue webpage using your credentials.
Search for the Operator.
Click on the Operator.
There is a description that redirects you (upon clicking) to page that explains how to create service accounts.
Create a Service Account. Refer page : https://access.redhat.com/terms-based-registry/#/accounts
Once a service account is created , you can click on it and then navigate to tab Openshift Secret to get the yaml file for your ImagePullSecret.

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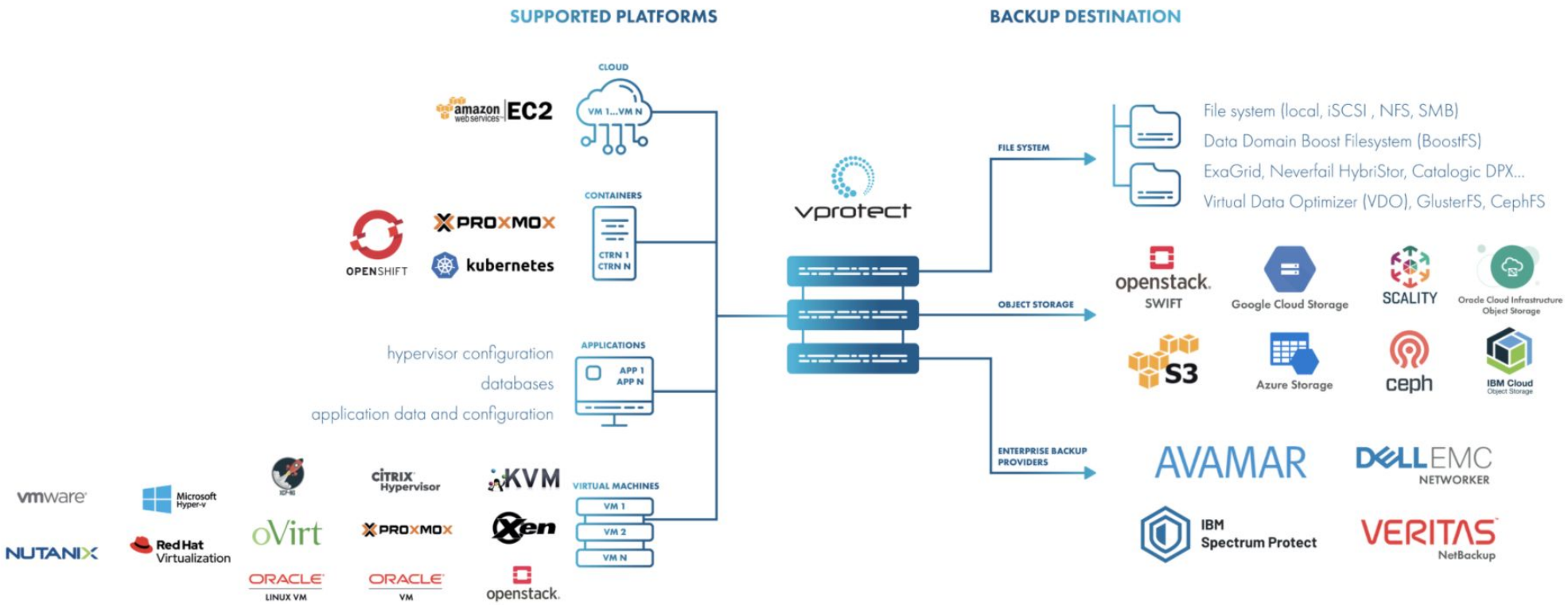
vProtect 3.9 architecture



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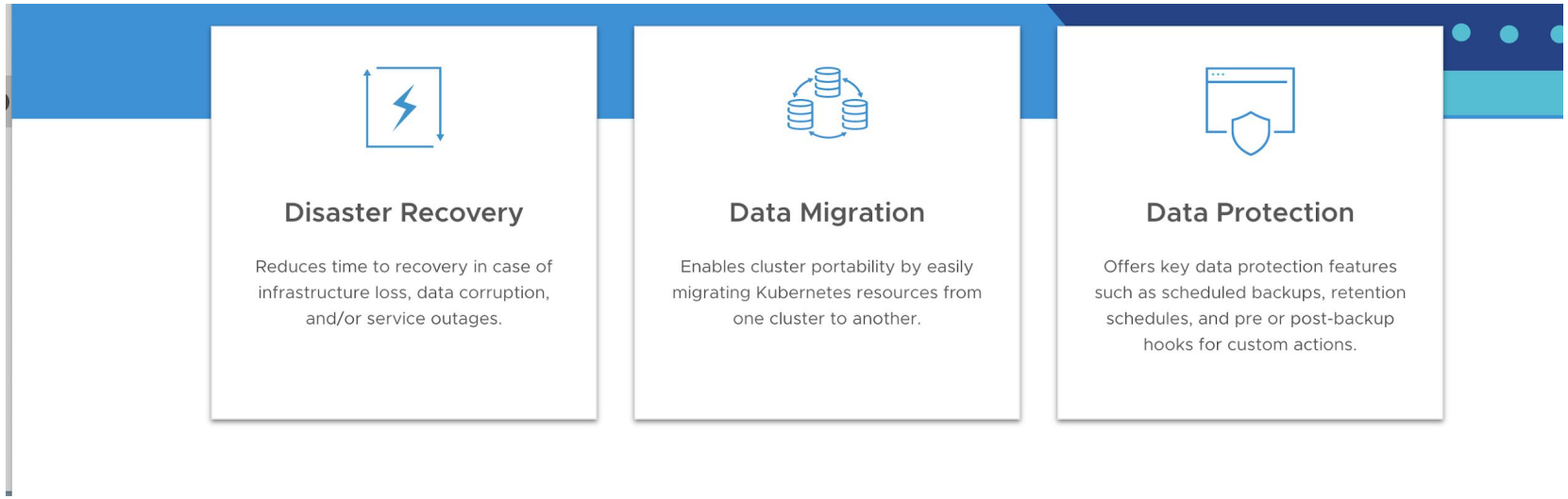
VELERO



Velero is an open source tool to safely backup and restore, perform disaster recovery, and migrate Kubernetes cluster resources and persistent volumes.

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VELERO

Features

Back up Clusters

Backup your Kubernetes resources and volumes for an entire cluster, or part of a cluster by using namespaces or label selectors.

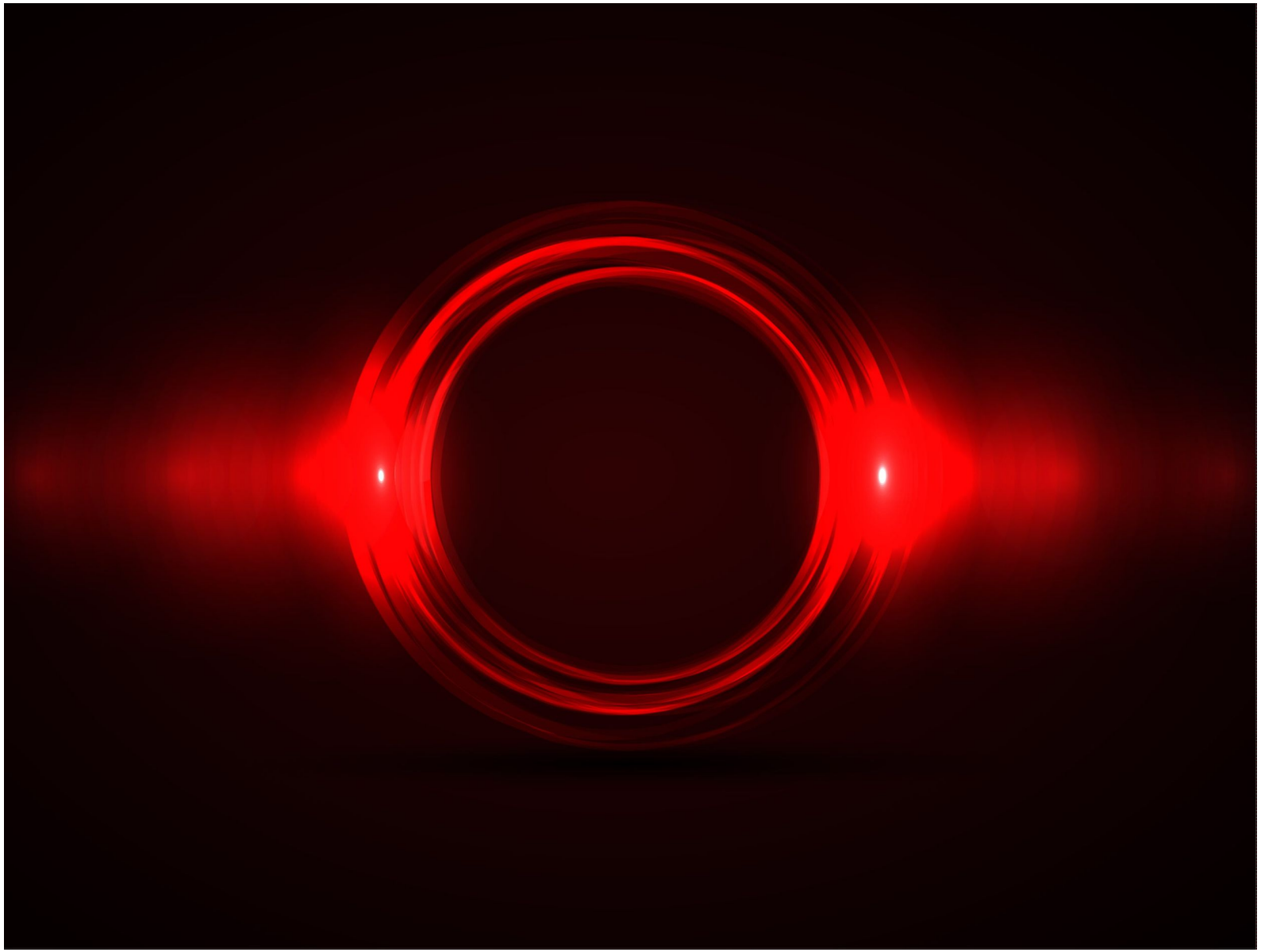
Schedule Backups

Set schedules to automatically kickoff backups at recurring intervals.

Backup Hooks

Configure pre and post-backup hooks to perform custom operations before and after Velero backups.

OpenShift Snapshot



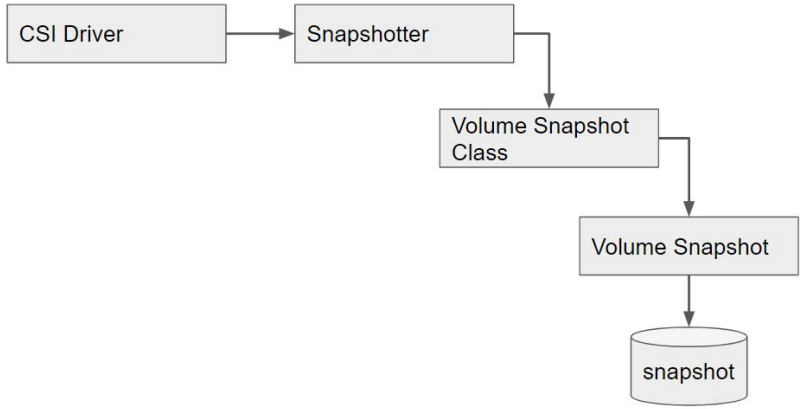
Getting Started with Volume Snapshots in OpenShift 4

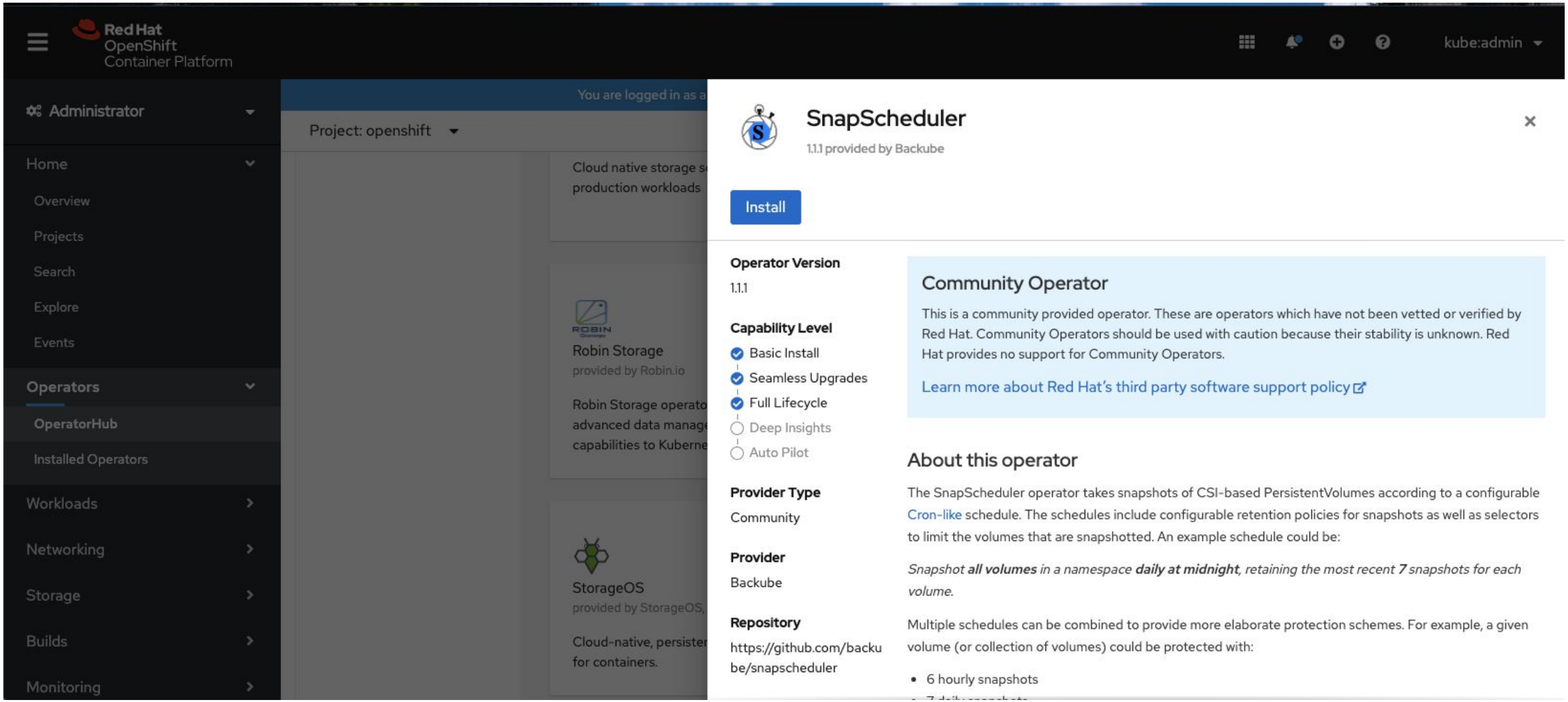
Overview

Volume snapshots are the ability to create snapshots of persistent volumes in kubernetes using the container storage interface (csi) driver. The csi driver allows storage solutions to integrate into kubernetes and expose their technologies. Snapshots of course, have been and are a key technology when discussing data workloads because they enable backup/restore seamlessly, on-demand and in a split second. Even though volume snapshots are in the alpha stage, several storage providers already have integrations, including one that is very interesting, Ceph RDB.

How it Works

The CSI driver allows for a snapshotter to be implemented. The snapshotter runs as a side-car container and watches the kubernetes API for snapshot related events from the CSI driver. In order to create a volume snapshot a volume snapshot class must exist. This is similar to the storage class but defines the snapshotter and access to the appropriate CSI driver. Once a volume snapshot class exists a volume snapshot can be created for a given persistent volume claim (pvc). The volume snapshot will then trigger the snapshot operation on the storage device, in this case Ceph RBD. The volume snapshot allows the snapshotter to provide metadata about the snapshot contents to the end-user.




Red Hat
OpenShift
Container Platform
kube:admin
Administrator
Project: openshift
Home
Overview
Projects
Search
Explore
Events
Operators
OperatorHub
Installed Operators
Workloads
Networking
Storage
Builds
Monitoring
You are logged in as a
Cloud native storage
production workloads
Robin Storage
provided by Robin.io
Robin Storage operato
advanced data manag
capabilities to Kuberne
StorageOS
provided by StorageOS,
Cloud-native, persister
for containers.
SnapScheduler
1.1.1 provided by Backube
Install
Operator Version
1.1.1
Capability Level
Basic Install
Seamless Upgrades
Full Lifecycle
Deep Insights
Auto Pilot
Provider Type
Community
Provider
Backube
Repository
https://github.com/backube/snapscheduler
Community Operator
This is a community provided operator. These are operators which have not been vetted or verified by Red Hat. Community Operators should be used with caution because their stability is unknown. Red Hat provides no support for Community Operators.
Learn more about Red Hat's third party software support policy
About this operator
The SnapScheduler operator takes snapshots of CSI-based PersistentVolumes according to a configurable Cron-like schedule. The schedules include configurable retention policies for snapshots as well as selectors to limit the volumes that are snapshotted. An example schedule could be:
Snapshot all volumes in a namespace daily at midnight, retaining the most recent 7 snapshots for each volume.
Multiple schedules can be combined to provide more elaborate protection schemes. For example, a given volume (or collection of volumes) could be protected with:
6 hourly snapshots

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RED HAT® OPENSHIFT
Container Storage

Dynamic, shared, and highly available storage for OpenShift applications

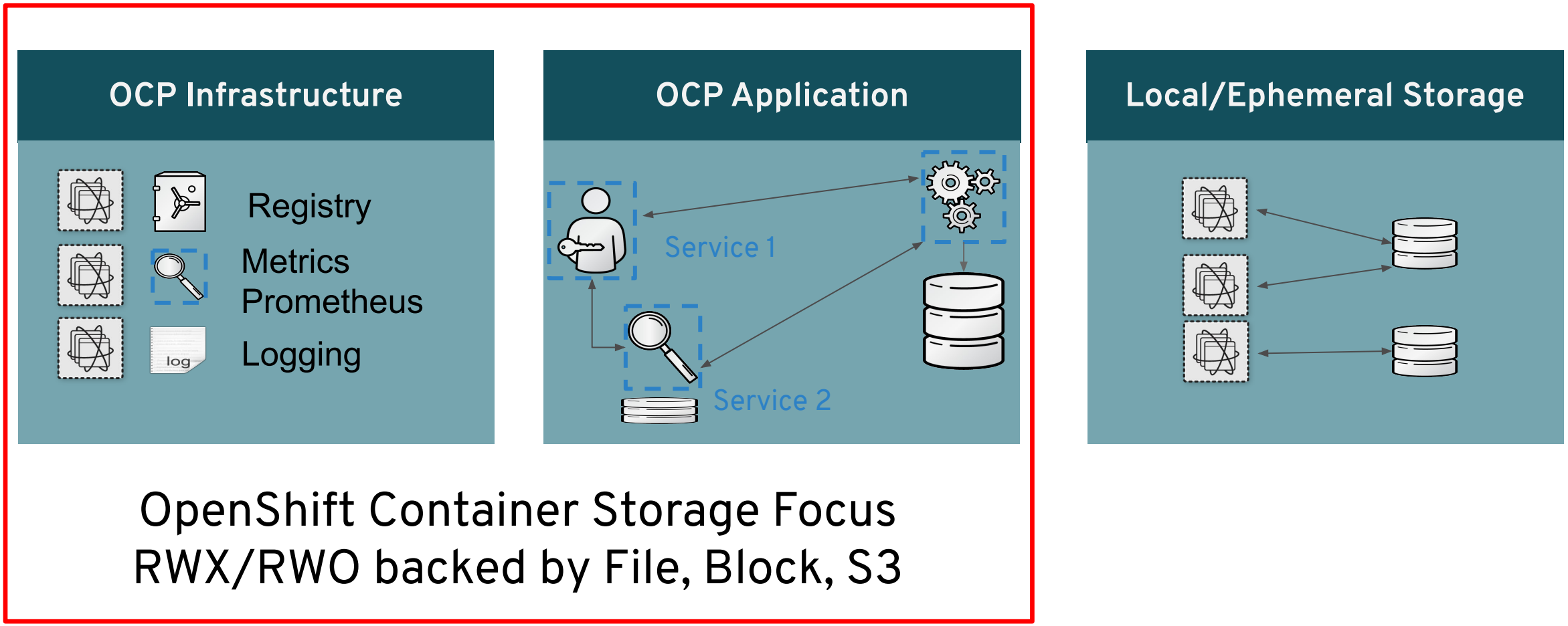
Red Hat

What is OpenShift Container Storage ?

Highly scalable, production-grade persistent storage

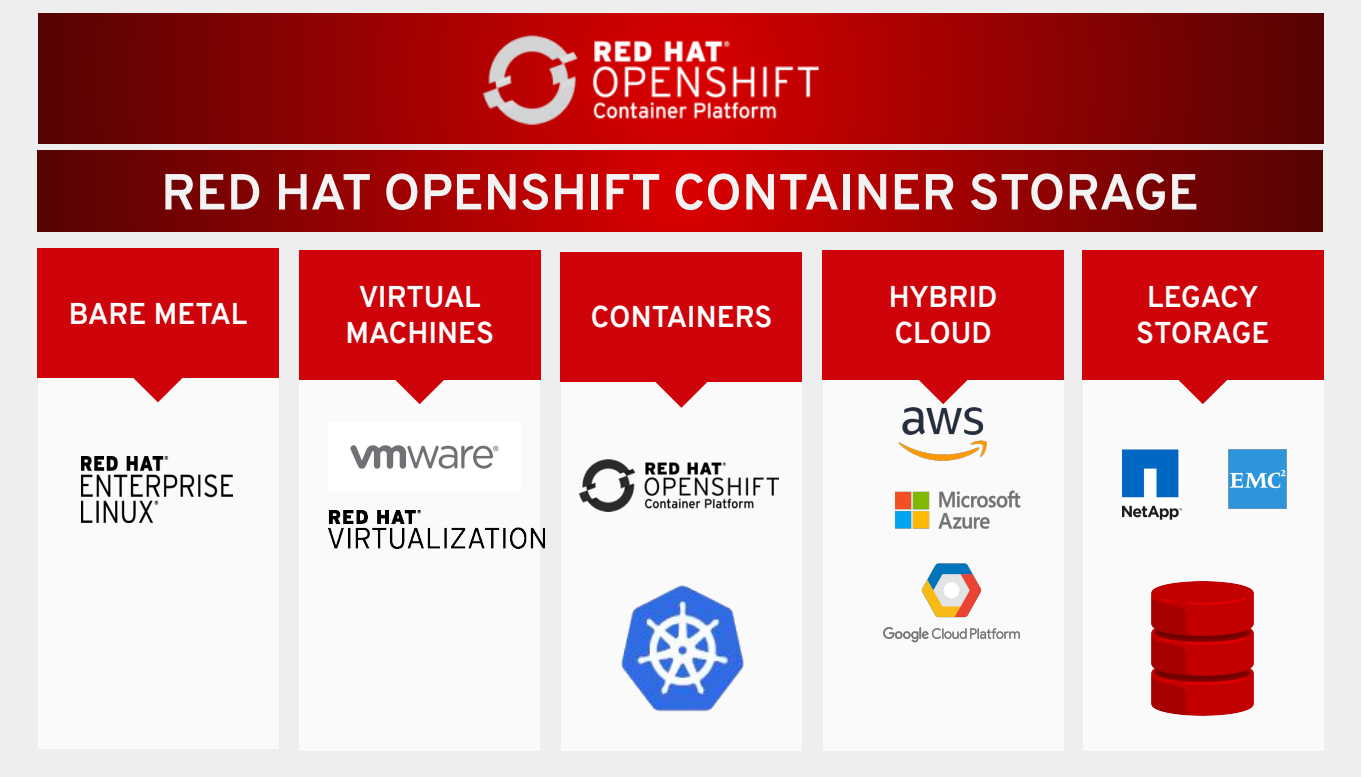
- For **stateful applications** running in Red Hat® OpenShift
- Optimized for Red Hat **OpenShift Infrastructure services**
- Developed, released and deployed in synch with Red Hat OpenShift
- Supported via a single contract with Red Hat OpenShift
- Complete persistent storage fabric across hybrid cloud for OCP

Why do you need Persistent Storage?



OpenShift Container Storage Focus
RWX/RWO backed by File, Block, S3

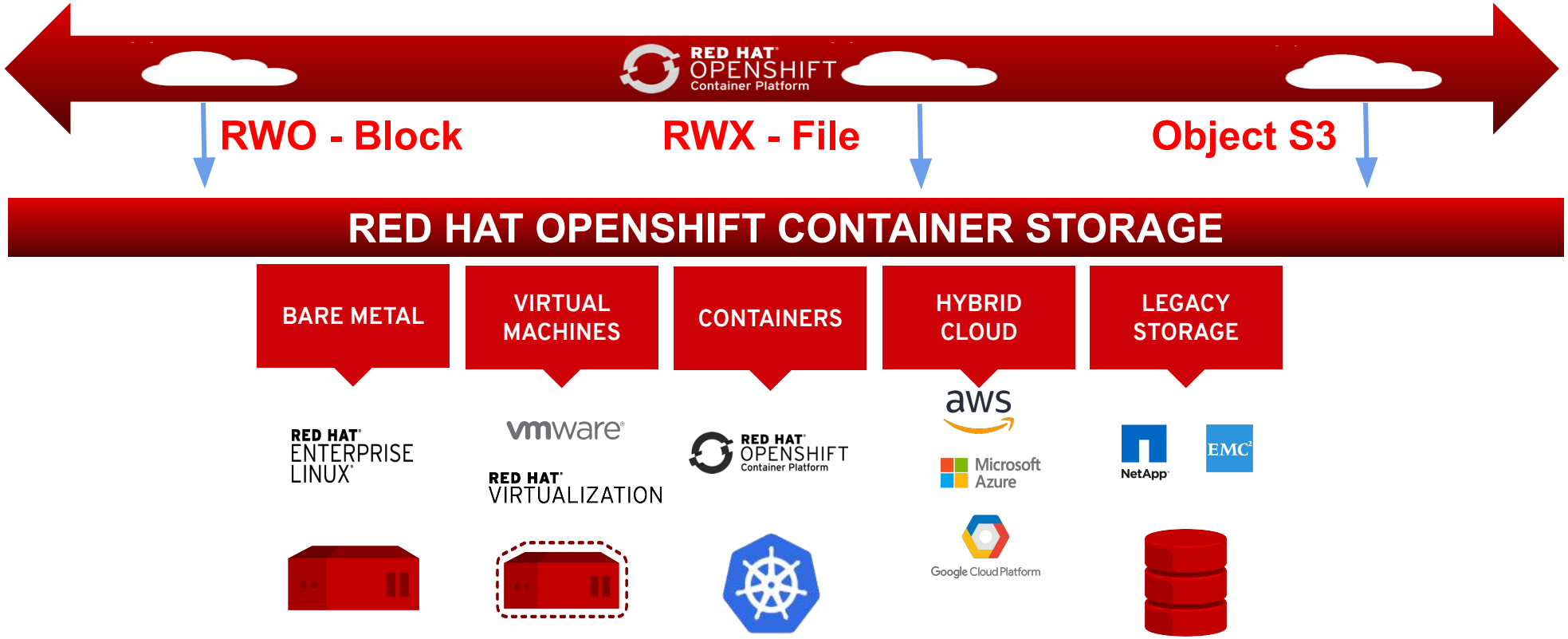
Consistent storage management, and operations



ANY CLOUD. ANY APP. NO LOCK IN

Future Proof against cloud or infrastructure lock-in

Complete Storage for Container Platform



Provides Storage for All Apps and infrastructure Services
in their native interfaces

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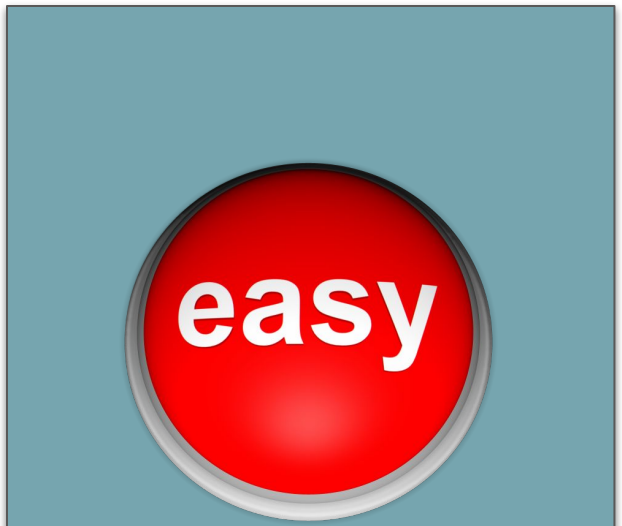
Focus Areas

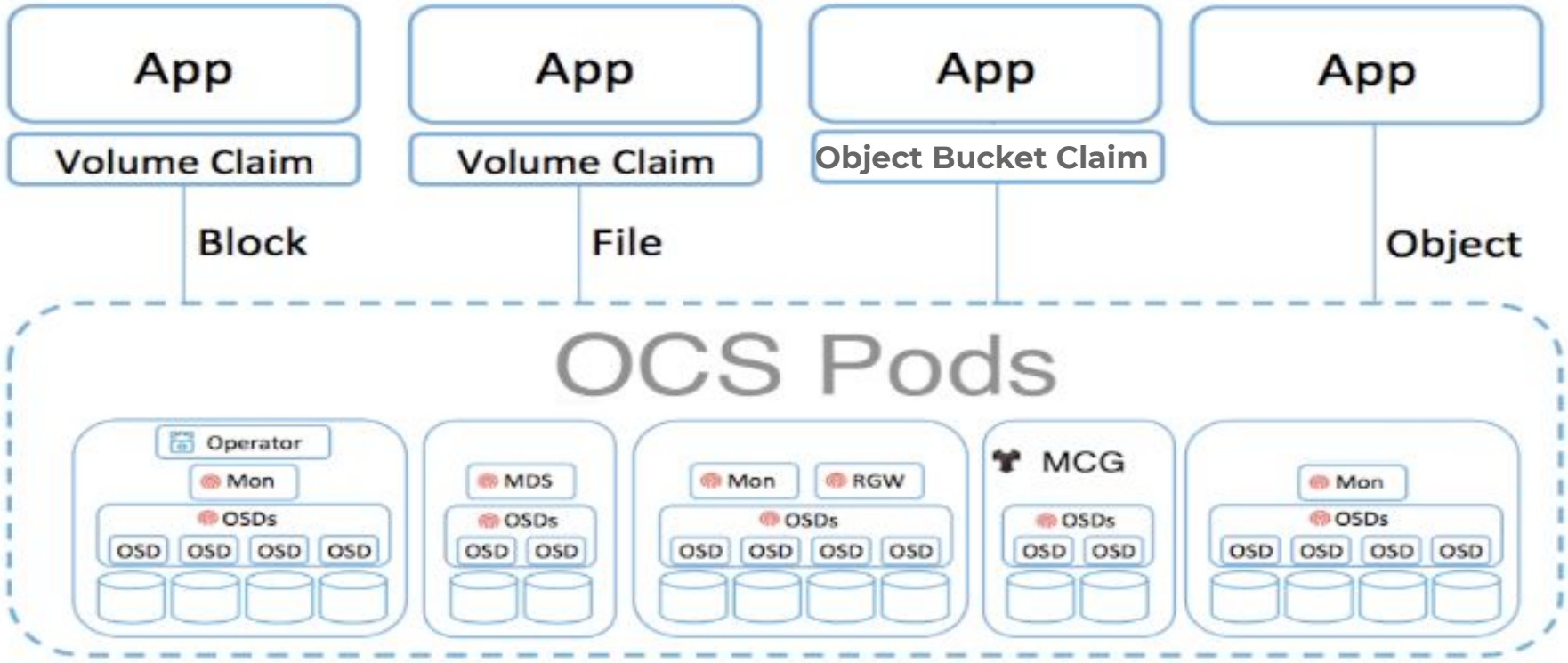


EASE OF USE
DAY 1 & DAY 2

HYBRID CLOUD
& DATA SERVICES

STORAGE
ENHANCEMENTS

OCS Operator based on Operator SDK with Operator Lifecycle Manager (OLM)



OCP 4 with OCS 4 - Technology Stack

Easy & Automated Management with Operators

Highly Resilient & Scalable Storage System

Multi-Cloud & Hybrid Object Storage

Thank you

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