



Scribe

Your Data, Anywhere

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Agenda

- Scribe overview
- Demos
 - Replication for disaster recovery
 - Data distribution
 - Integration with RHACM
- Q & A

What about your data?

- Kubernetes + gitops works well for stateless applications
 - Lose a node? \Rightarrow reschedule the pod
 - Lose a cluster? \Rightarrow restart app at remote site
- Gitops makes moving the application/config easy
- But what about your data?
 - Moving to another cluster is hard!

Scribe overview

- Scribe ⇒ **Cross-cluster, asynchronous data replication**
- Storage system independent
 - Underlying storage doesn't need to support replication
 - Disparate data sources and destinations
- Uses CSI capabilities if available
 - Clone and snapshot provide point-in-time copies of data
 - Scribe can still be used even without snap/clone
- Extensible architecture to support storage optimized replication

Use cases for Scribe

- Disaster recovery
 - Background replication of application persistent data
- Data distribution
 - Distribute data from central site \Rightarrow object store \Rightarrow edge sites
- Application and data migration
 - Cross-vendor storage migration
 - Cloud to on-prem
- Off-site analytics
- Development and testing with production data

Benefits & capabilities

- Multiple replication methods behind a single interface
 - Rsync -- **1:1 volume relationships** ⇒ Example: async DR
 - Efficient delta transfers directly from source to destination
 - Rclone -- **1:many volume relationships** ⇒ Example: data distribution
 - Uses intermediate cloud storage to support wide fan-out
- Supports both **in-cluster** and **cross-cluster** replication
- Builds on Kubernetes and CSI primitives
 - Well-positioned to take advantage of upcoming enhancements: Volume groups, data populators, container notifier

Status and future work

Current

- Initial release - v0.1
 - Rsync \Rightarrow 1:1 replication
 - Rclone \Rightarrow 1:many replication
- Install via [ArtifactHub.io](https://artifacthub.io)
 - Kubernetes 1.17+
 - OpenShift 4.6+

Future

- Packaging for OperatorHub
- Restic-based data mover
 - Archive use-cases
- Prometheus metrics
 - Status monitoring
- Replicate in/out of Kubernetes

Where to find us...

- Documentation:
<https://scribe-replication.readthedocs.io/>
- GitHub:
<https://github.com/backube/scribe>

DEMO 1

Rsync-based replication for disaster recovery

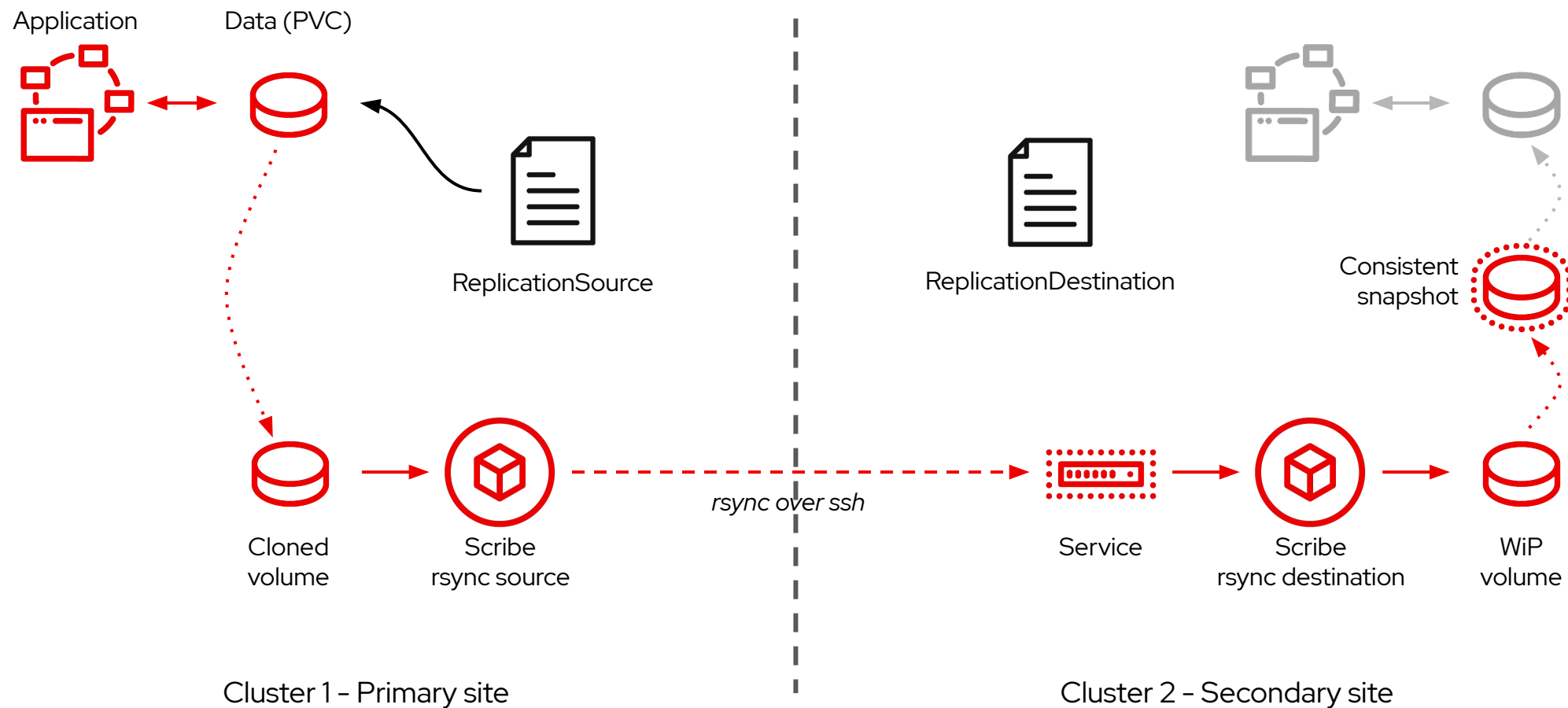
DEMO 2

Rclone-based wide fan-out replication

DEMO 3

Integration w/ Red Hat Advanced Cluster Management

Rsync replication



Primary cluster (us-west)

Every 2.0s: kubectl -n primary get all,pvc,volumesnapshots,replicationsour... jstrunk.2020.fedora: Thu Feb 18 11:50:59 2021

NAME	READY	STATUS	RESTARTS	AGE
pod/dokuwiki-5cc7c9c78b-vwcpk				
pod/scribe-rsync-src-wikidata-jc				

Secondary cluster (us-east)

Every 2.0s: kubectl -n secondary get all,pvc,volumesnapshots,replicationsou... jstrunk.2020.fedora: Thu Feb 18 11:51:01 2021

NAME	TYPE	AGE
service/dokuwiki	LoadBalancer	22m
:32234/TCP,443:32635/TCP		

NAME	READY	PORT(S)	TYPE	CLUSTER-IP	EXTERNAL-IP
deployment.apps/dokuwiki	1/1		LoadBalancer	172.30.35.147	a2793fd9b43074c349bc3ecc674729cd-1637569205.us-east-1.elb
		80:30683/TCP,443:30515/TCP		22m	
service/scribe-rsync-dest-wikidata			LoadBalancer	172.30.81.169	a5f6df43ee06c496bacd117e04995302-a54584ad059ae053.elb.us-
replicaset.apps/dokuwiki-5cc7c9c78b-east-1.amazonaws.com		22:32121/TCP		6m16s	

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
job.batch/scribe-rsync-src-wikidata	0/0	0	0	22m

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/dokuwiki-5cc7c9c78b	0	0	0	22m

NAME	COMPLETIONS	DURATION	AGE
job.batch/scribe-rsync-dest-wikidata	0/1	18s	18s

NAME	STATUS	VOLUME	CAPACITY	ACCESS MODES	ST
ORAGECLASS					
AGE					
persistentvolumeclaim/scribe-dest-wikidata	Bound	pvc-981a78cd-8507-4e78-a15c-3db03e31ede6	10Gi	RWO	gp
2-csi					
6m16s					

NAME	READYTOUSE	SOURCEPVC	SOURCESNAPSH
OTCONTENT			
RESTORESIZE			
SNAPSHOTCLASS			
SNAPSHOTCONTENT			
volumesnapshot.snapshot.storage.k8s.io/scribe-dest-wikidata-20210218165043	false	scribe-dest-wikidata	
10Gi			
gp2-csi			
snapcontent-8d602f7a-7301-4173-aceb-e1ef6a1fe84a	18s		19s

NAME	LAST SYNC	DURATION	NEXT SYNC
replicationdestination.scribe.backube/wikidata	2021-02-18T16:50:44Z	5m15.037068905s	

Rsync replication - summary

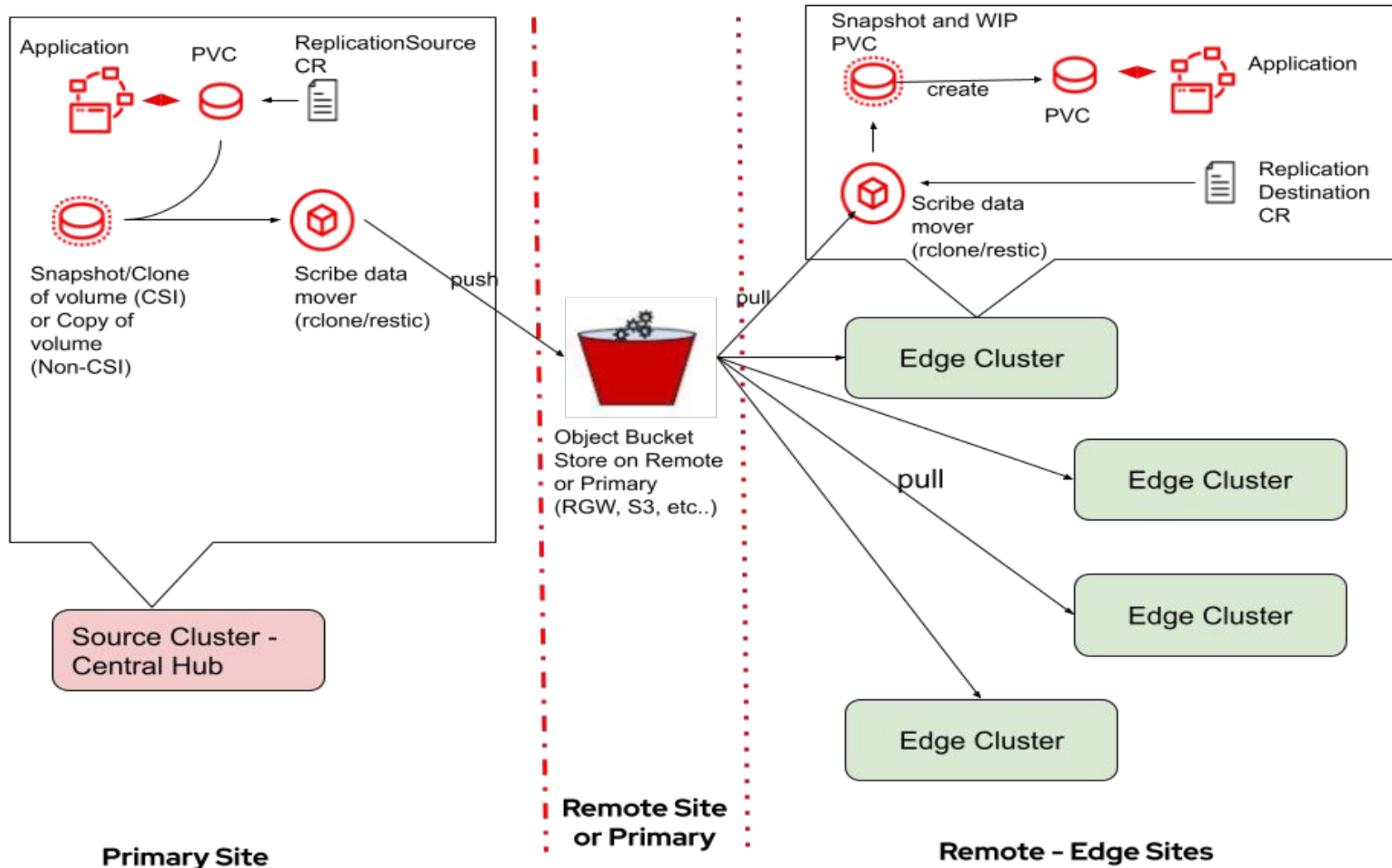
- Replication of wiki application to secondary cluster
- Scribe operator:
 - Replicates a point-in-time copy of application data
 - Latest image is preserved as VolumeSnapshot on secondary
- Application restored on secondary from the snapshot

DEMO 2

Rclone-based wide fan-out
replication

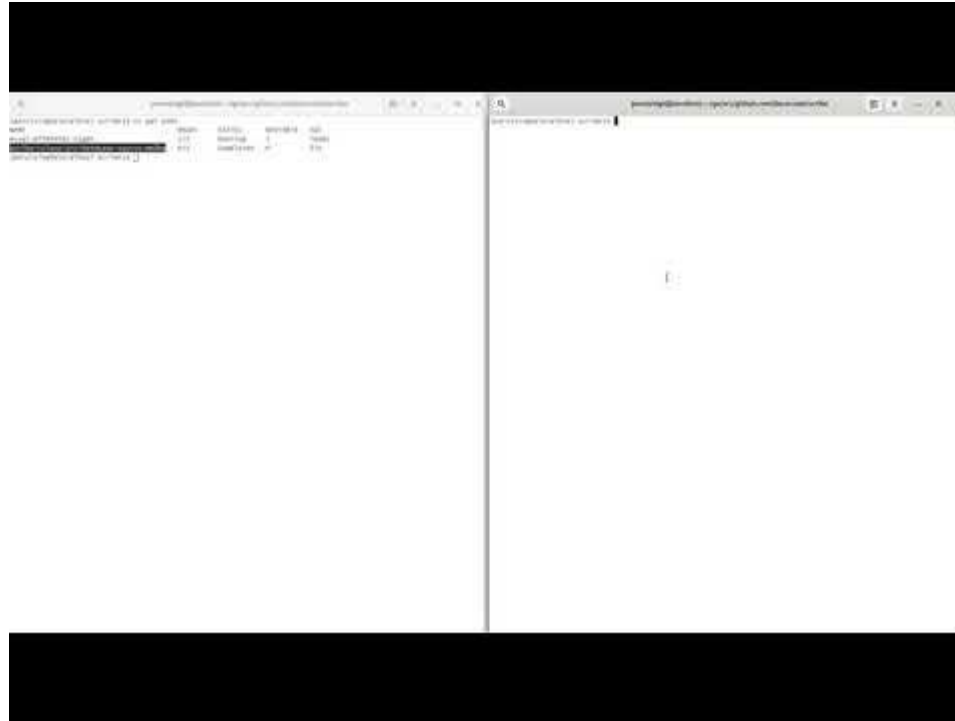
Rclone replication

Fan-Out - 1:Many



- Infrastructure
 - Kind (version 1.20) cluster with 2 namespaces
 - source : Primary site containing “source-of-truth”
 - dest: Edge sites that will pull primary data
- The application
 - MySql DB
 - HostPath based PV storage
 - `hostpath.csi.k8s.io` drivers for snapshots

Rclone replication



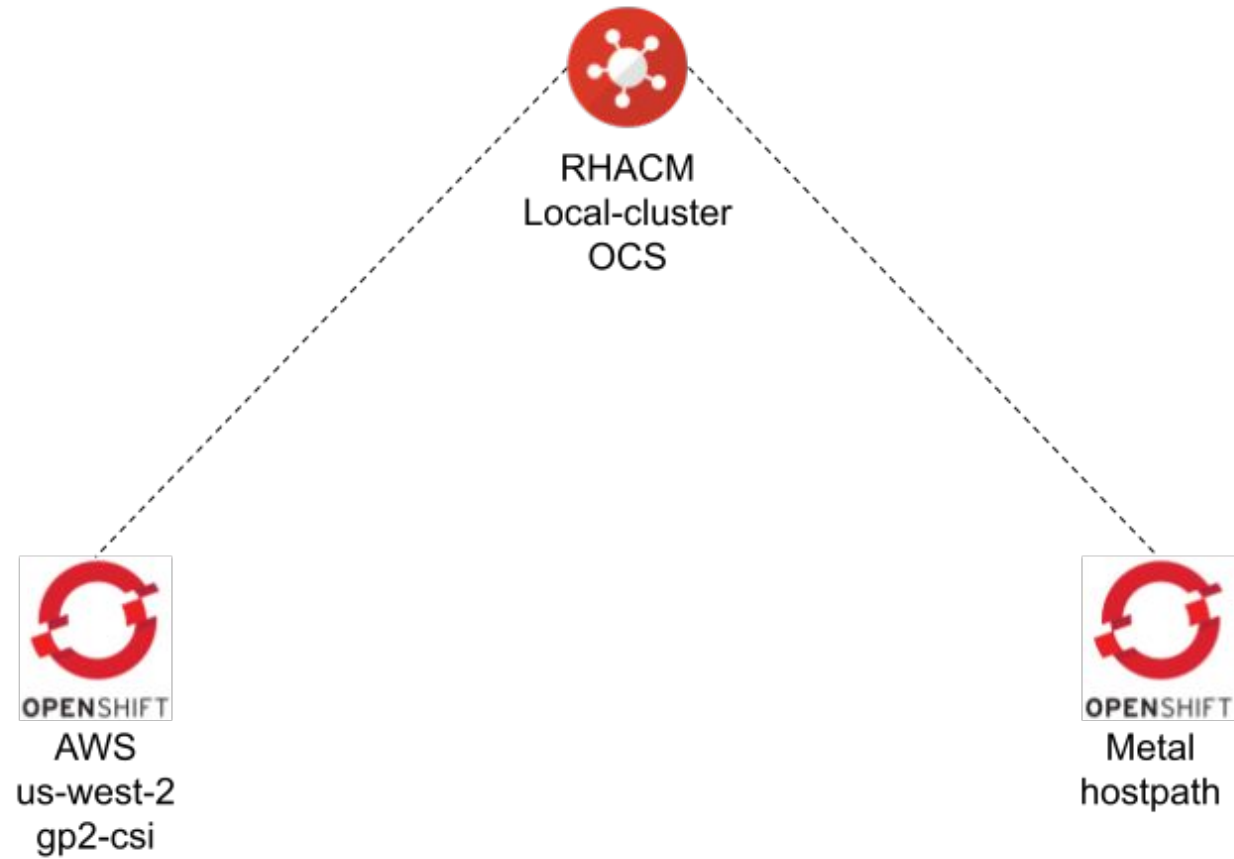
Rclone replication - Summary

- Replication of MySQL database application to a different namespace
- Scribe Operator:
 - Uses an intermediate storage like S3 Object Store
 - Primary site pushes data to the intermediate storage
 - Edge sites pull data from the intermediate storage

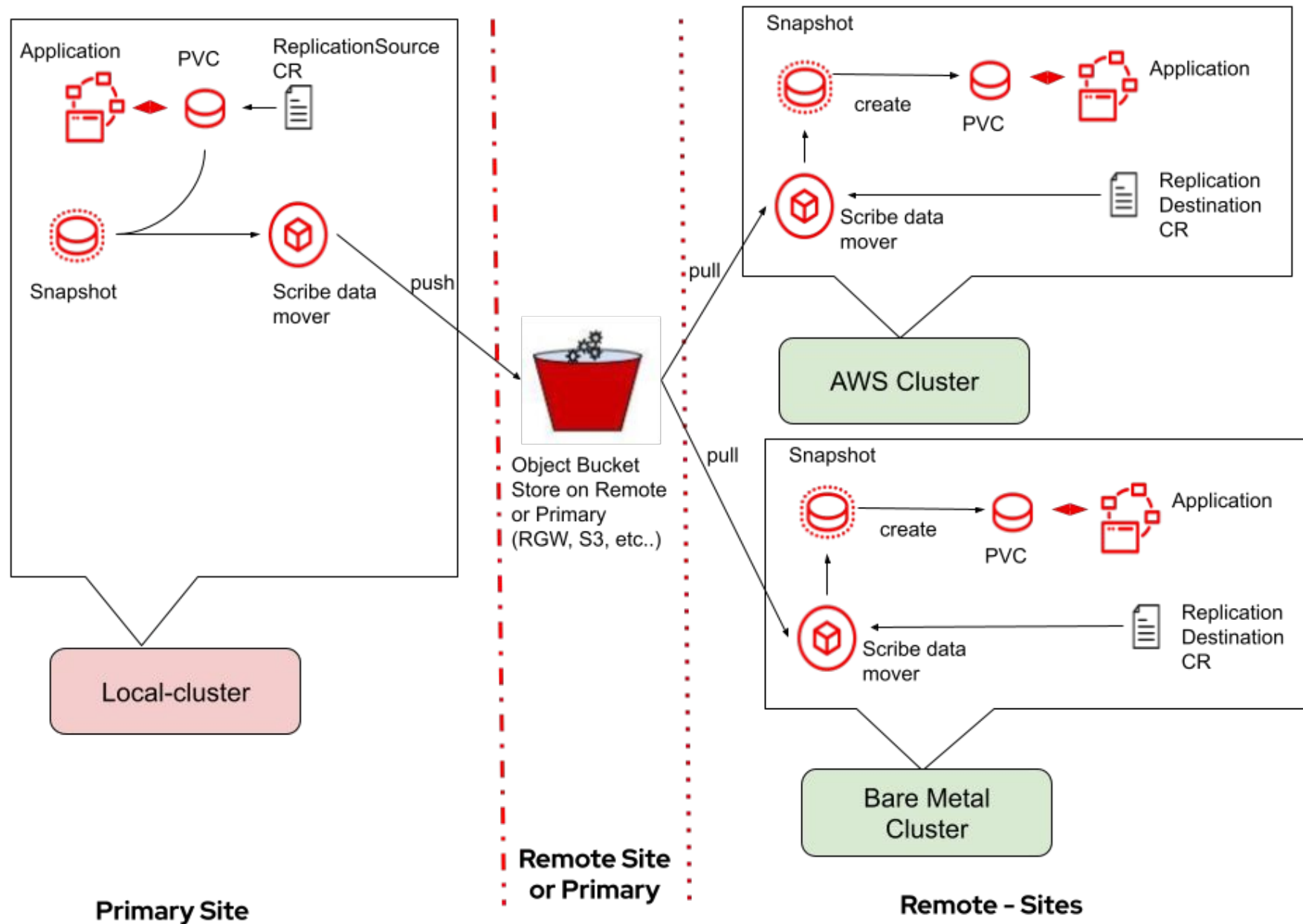
DEMO 3

Integration with Red Hat Advanced
Cluster Management

Architecture



Scenario



Red Hat Advanced Cluster Management for Kubernetes provides the tools and capabilities to address various challenges with managing multiple clusters and consoles, distributed business applications, and inconsistent security controls across Kubernetes clusters that are deployed on-premises, or across public clouds.



End-to-end visibility

View system alerts, critical application metrics, and overall system health. Search, identify, and resolve issues that are impacting distributed workloads using an operational dashboard designed for Site Reliability Engineers (SREs).

[Go to Overview](#)

Create, update, scale, and remove clusters reliably, consistently using an open source programming model that supports and encourages infrastructure as Code best practices and design principles.

[Go to Clusters](#)

Define a business application using open standards and deploy the applications using placement policies that are integrated into existing CI/CD pipelines and governance controls.

[Go to Applications](#)



Use policies to automatically configure and maintain consistency of security controls required by industry or other corporate standards. Prevent unintentional or malicious configuration drift that might expose unwanted and unnecessary threat vectors.

[Go to Governance and risk](#)

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