A stage for Samba in the era of the container platform!?

sambaXP 2020

Michael Adam
Red Hat / Samba Team
What we’ll discuss today

Kubernetes
- Intro
- Storage
- CSI
- Operators

Storage Location
- Platform
- Infra vs Platform
- Kubevirt

Enter Samba
- Use cases
- Container
- Operator
- Provisioner?
kubernetes
Kubernetes (K8s) is an open-source system for automating deployment, scaling, and management of containerized applications.

https://kubernetes.io/
Storage abstraction in k8s

Some terminology

- **PersistentVolume (PV)**
  K8s object wrapping a backend storage volume. This could live inside of k8s or somewhere outside.
  Types: *FileSystem* and *Block*

- **PersistentVolumeClaim (PVC)**
  Handle for a user to consume a PV in an application / namespace.

- **Mount plugin**
  Volumes are mounted on the host node and bind-mounted into the container. (Block PVs: device in container)
Dynamic Provisioning: Volume self-service for users

More terminology...

(Dynamic) Provisioner
Server component responding to PVC create requests

StorageClass (SC)
K8s resource pointing to a dynamic provisioner, configured with a certain backend storage pool.

Flow
- User issues `kubectl create -f pvc.yml`
- PVC ⇒ StorageClass ⇒ provisioner
- Provisioner reacts and creates PVC
Small Demo
Operators
Automating Application Management

- Server component: controller
- Custom resources (CR): new type k8s APIs
- CR: Desired state
- Operator reconciles to achieve desired state

- Initial deployment
- Keeps application running (fixes outages)
- Changes in scaling (replica)
- etc...

Infrastructure:
- https://github.com/operator-framework
- https://operatorhub.io/
- operator-lifecycle-manager

Examples:
- Rook-ceph (https://github.com/rook/rook)
- prometheus-operator
- ...

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CSI

Container Storage Interface

- Further standardizing storage abstractions beyond k8s.
  - (kubernetes, cloud foundry, mesos, nomad, ...)
- The new standard in kubernetes.

- [https://github.com/container-storage-interface/spec](https://github.com/container-storage-interface/spec)

- Example: [https://github.com/ceph/ceph-csi](https://github.com/ceph/ceph-csi)
Object access (S3) not currently part of core k8s / CSI

Extensions possible with CRDs:

- ObjectBucket
- ObjectBucketClaim
- bucket provisioner

Discussed as native k8s enhancement:

https://github.com/kubernetes/enhancements/pull/1383
Storage Location

- Platform
- Infra vs Platform
- Kubevirt
Storage in the platform (k8s)

Converged with the platform

- Block storage coming from somewhere
  - local, SAN, cloud, ...
- SDS layer as containers in k8s
- Scaling with k8s
- Managed by operator(s)
Red Hat Openshift Container Storage (OCS)

Evolution

1st Generation
- Based on Gluster
- OpenShift 3.X
- Pioneer in dynamic provisioning
- Started 2016

2nd Generation
- Based on Ceph
- OpenShift 4.X
- Operator driven
- CSI
- GUI ("Console")
- 2019/2020
OCS
Architecture

Public Cloud (VPC / Virtual Network)

AVAILABILITY ZONE A

AVAILABILITY ZONE B

AVAILABILITY ZONE C

Cloud Services | Security | Block Storage | Object Storage
Storage converged with the platform (k8s)
Storage on top of the infrastructure
Storage converged with infrastructure
Reverse the layers: Platform is Infrastructure
kubevirt

Running VMs in containers

- Expand k8s with APIs to run and manage VMs
- Run VMs alongside container apps
- Consume the same storage

- [https://github.com/kubevirt/kubevirt](https://github.com/kubevirt/kubevirt)
- [https://kubevirt.io/](https://kubevirt.io/)
Enter S'AMBA

▸ Use Cases
▸ Container
▸ Operator
▸ Provisioner?
Use cases for Samba in k8s

Windows VMs running in kubevirt as k8s containers.
- Need storage to store their application data
- Need to exchange data between VMs
- Prefer SMB over NFS...

Mixed k8s clusters: Windows worker nodes
- How can Windows workers use PVCs from Linux nodes?
- SMB for file
- iSCSI for block

Extra thought:
- Provide an AD service for projects with Samba!
The basic idea

Extremely simple Samba service container concept

SMB Service on PVCs
Establish notion of an SMB Service per PVC. Even an SMB-PVC. (1:1 correspondence.)
Managed by an operator.

Very simple Samba container
No complicated clustered Samba.
Just re-exporting a directory from the container.

Possibly: Provisioner for SMB-access PVCs
A CSI driver for mounting PVCs via SMB already exists.
Simple Samba Container

https://github.com/obnoxxx/samba-container

https://quay.io/repository/obnox/samba-centos8

- Runs only smbd
- Serves /share out as [share]
- Currently only supports one user

TODO:

- Multiple users
- AD integration
Samba Operator

https://github.com/obnoxxx/samba-operator

https://quay.io/repository/obnox/samba-operator

Two CRDs:

- SmbService: use existing PVC
- SmbPvc: create new PVC and SmbService
Demo!
Thank you!

Questions?

obnox@samba.org

obnox@redhat.com