One CSI plugin for All? Experimenting Heterogeneous Storage with Single CSI Plugin for Kubernetes

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Agenda

- Brief on Kubernetes and CSI interaction
- Understanding SODA CSI Plugin
- One CSI Plugin for all – 2 design options
- Demo
- Advantages
Kubernetes and CSI interaction

Kubernetes cluster with CSI

Kubernetes core
- Master
- Node
  - Kubelet
- Node
  - Kubelet

External component (Kubernetes Team)
- Driver registrar
- External provisioner
- External attacher

External component (3rd party)
- CSI Identity
- CSI Controller
- CSI Node

External storage (AWS EBS, GCE PD,...)
SODA Ecosystem and its CSI Plugin

K8S Deployment

Create PVC
Attach PVC to POD

node-driver-registrar

external-provisioner

external-attacher

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Kubernetes

SODA-csiplugin

SODA-NBP

Block volumes
Block volumes attachments
Block volumes Snapshots
Host
File Shares
File Share Acls

SODA-API

SODA-Controller

SODA-Dock

Driver1
Driver2
Driver3
Driver4
SODA-CSI Plug-N-Play (Design Option 1)
Normal volume provisioning flow for csi driver
Volume provisioning flow with PlugNPlay
**SODA-CSI Plug-N-Play** (Design Option 2)

**Goals**

Make a single CSI Plug-N-Play mechanism which helps to:

- Provision and manage the Storage of heterogeneous Storage providers.
- Third party CSI drivers should be used directly from Vendors so that SODA/Users need not worry about it's maintenance.
- Use Soda Profile ID to determine which storage vendor drivers need to be used to provision the storage.
- Experience all the features set of SODA.
A typical call flow for SODA CSI Plug-N-Play mechanism will be:

- Once the PVC Object is created by user then soda-csi-provisioner will get a request to provision the Storage.
- soda-csi-provisioner will interact with SODA API's to get the profile details and other parameters to determine if the required driver is same as the current driver in a pod.
- soda-csi-provisioner updates the SODA API server with the volume provisioning request and gather the required intelligence from SODA about the current provisioning.
- soda-csi-provisioner will forward the request to CSI driver in the same pod to do the actual provisioning.
Demo

Design option 1:
Advantages

- Different third party csi drivers under one management
- All SODA ecosystem features, provisionings can be leveraged for all csi drivers in use
References

- https://github.com/sodafoundation/nbp/tree/master/csi
- https://github.com/sodafoundation/design-specs/blob/master/specs/elba/CSIPlugNPlayDesign.md
- https://github.com/asifdxxtreme/soda-csi-plugin/tree/master/doc
Thank You