KubeCon | CloudNativeCon Europe 2021

Virtual

Kubernetes VMware User Group

What's New for K8s Users on VMware Infrastructure

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May 6, 2021 13:30-14:05 CEST

Agenda

Deprecation of in-tree Cloud Provider and storage driver

What this means for those affected

Recent and upcoming features and changes

Top 3 under-recognized do's and don't's for K8s on vSphere

How to get involved in the User Group

to meet other users, and share advice and experiences

Deprecation of in-tree

What it means

Deprecation of in-tree Cloud Provider and Storage driver

What it means to you? What would happen if you ignored this?

At some point, the in-tree versions will be dropped from Kubernetes project releases.

- This would mean that you can't use new Kubernetes releases
- If you try to continue to stay on older releases, at some point they would stop getting security patches
- The storage driver itself stopped getting new features over a year ago

Deprecation of in-tree Cloud Provider and Storage driver

Does this affect you?

"Greenfield" new and recent adopters are **not affected** by this. If you are using the CSI storage driver now, this does not affect you.

But 100's to perhaps 1000's of Kubernetes users on upstream open source or VMware, OpenShift, Anthos or other distributions are speculated to still be using the in-tree platforms.

If you are affected, understand that moving to the Cloud Native Storage (CNS) foundation through CSI will bring you much better backup support, better vMotion handling and better monitoring.

If you are on a commercial distribution, please follow vendor guidance regarding migration.

Migrating to out-of-tree Cloud Provider and Storage driver

Requirements

If you are on in-tree, you must migrate both of these – doing just one is not an option.

Some older versions of vSphere will not support migration to out-of-tree

- If you are on one of these you would need to update vSphere first
  - If you are running with very old hardware components, it is possible that updating vSphere is not possible, which means that migration is also not possible

	in-tree storage	CSI
Dynamic volume provisioning	Yes	Yes
Access mode support	RWO	RWO, RWM
Who mounts, formats & stages volumes	kubelet	CSI node daemonset pod
Multiple datacenter support	Yes	Yes
Multiple vCenter support	Deprecated as of K8s 1.21	No
Raw block volume support	Yes	Roadmap – under internal test
Inline volume support	Yes	No see link
Documentation	link	link

Migration Documentation

Migration is too long to cover here – but a demo might be done in a future User Group meeting, which can address longer topics

Doumention is here: https://vsphere-csi-driver.sigs.k8s.io/features/vsphere_csi_migration.html

Recent and upcoming features and changes

This session is being recorded shortly before the K8s 1.21 release.

It is possible something I say here will be wrong, as it is based on educated guesses.

I will be present during the session at the virtual conference and I will mention any corrections during the post-session Q&A.

Kubernetes 1.21 enhancement

Improve speed of vSphere PV provisioning on larger clusters

vSphere PV provisioning progressively got slower as more nodes and hosts are added to the installation. This was because per node or per host API calls were being made to gather information.

A change was made to reduce vCenter API calls from potentially hundreds to 5 or 6 by requesting bulk fetched of information.

Kubernetes PR #100054,

Deprecated as of Kubernetes 1.21

diskformat storage class parameter – applied to in-tree only

This parameter allowed speciation of thin (default), zeroedthick, or eagerzeroedthick.

If you use this, please consider updating storageclass and remove diskformat parameter.

vSphere CSI Driver does not support the diskformat storageclass parameter.

Deprecated as of Kubernetes 1.21

Support for vSphere releases prior to 6.7u3

Please consider upgrading vSphere to 67u3 or above.

vSphere CSI Driver requires minimum vSphere 67u3.

Deprecated as of Kubernetes 1.21

VM hardware versions less than 15

VM Hardware version less than 15 is deprecated as of v1.21.

Please consider upgrading the Node VM Hardware version to 15 or above.

vSphere CSI Driver recommends Node VM's Hardware version set to at least vmx-15.

Deprecated as of Kubernetes 1.21

Multi vCenter support

If you have a Kubernetes cluster spanning across multiple vCenter servers, please consider moving all k8s nodes to a single vCenter Server.

vSphere CSI Driver does not support Kubernetes deployment spanning across multiple vCenter servers.

See Kubernetes PR #98546

Kubernetes Deprecation Policy

You are advised to take action now

Actual end of life will be Kubernetes v1.24

Bug fix as of Kubernetes 1.21

In-tree storage plugin

If a node has no pods with volumes running on it, the storage implementation doesn't run a VerifyVolumesAreAttached check for such a node and hence dangling volume mechanism does not work for it.

This is a follow up to fix that code and ensure that all known nodes are scanned periodically for unattached volumes.

See Kubernetes PR #96689

vSphere 7.2 U2

Known issue (minor)

Concurrent Cloud Native Storage (CNS) API calls might cause an error in the (vim.vslm.vcenter.VStorageObjectManager) update metadata task

In rare cases, the CnsAttachVolume(attach) and CnsUpdateVolumeMetadata(updateVolumeMetadata) methods of the API for managing the lifecycle of container volumes, (vim.cns.VolumeManager), might race on the same volume. As a result, the update metadata task of the (vim.vslm.vcenter.VStorageObjectManager) method, updateVstorageObjectMetadataEx, might fail with an error in the vSphere Client. However, you can ignore the error, because the Kubernetes Container Storage Interface (CSI) driver retries the operation.

Workaround: None

Top 3 under-recognized do's and don't's for K8s on vSphere

1. Root Causes of Common Problems

These are things that come up frequently in Slack inquiries

Root cause of the most commonly reported storage related problem:

You haven't enabled NODE_UUID – pre-requisite as covered in docs OR

Second most common root cause:

user name and password for vCenter is wrong

Third most common:

Not running on vSphere 6.7U3 or later

2a. Know where the logs live

Cloud Provider

Getting logs

Get cloud controller manager pod

```
kubectl get pods –n kube-system | grep cloud
```

Get log

kubectl logs <name> --all-containers -n kube-system | more

Note that your distribution might set up central log collection of bundling – so maybe easier ways to get this.

Expect issues related to configuration and authentication to show up here

2b. Know where the logs live

CSI

Find the pods

```
kubectl get pods –A | grep csi
```

The pods will have multiple containers

Dump all log in a pod

kubectl logs vsphere-csi-controller-0 –all-containers –n kube-system | more

Or isolate by function

kubectl logs <pod name> -c **vsphere-csi-controller** –n kube-system

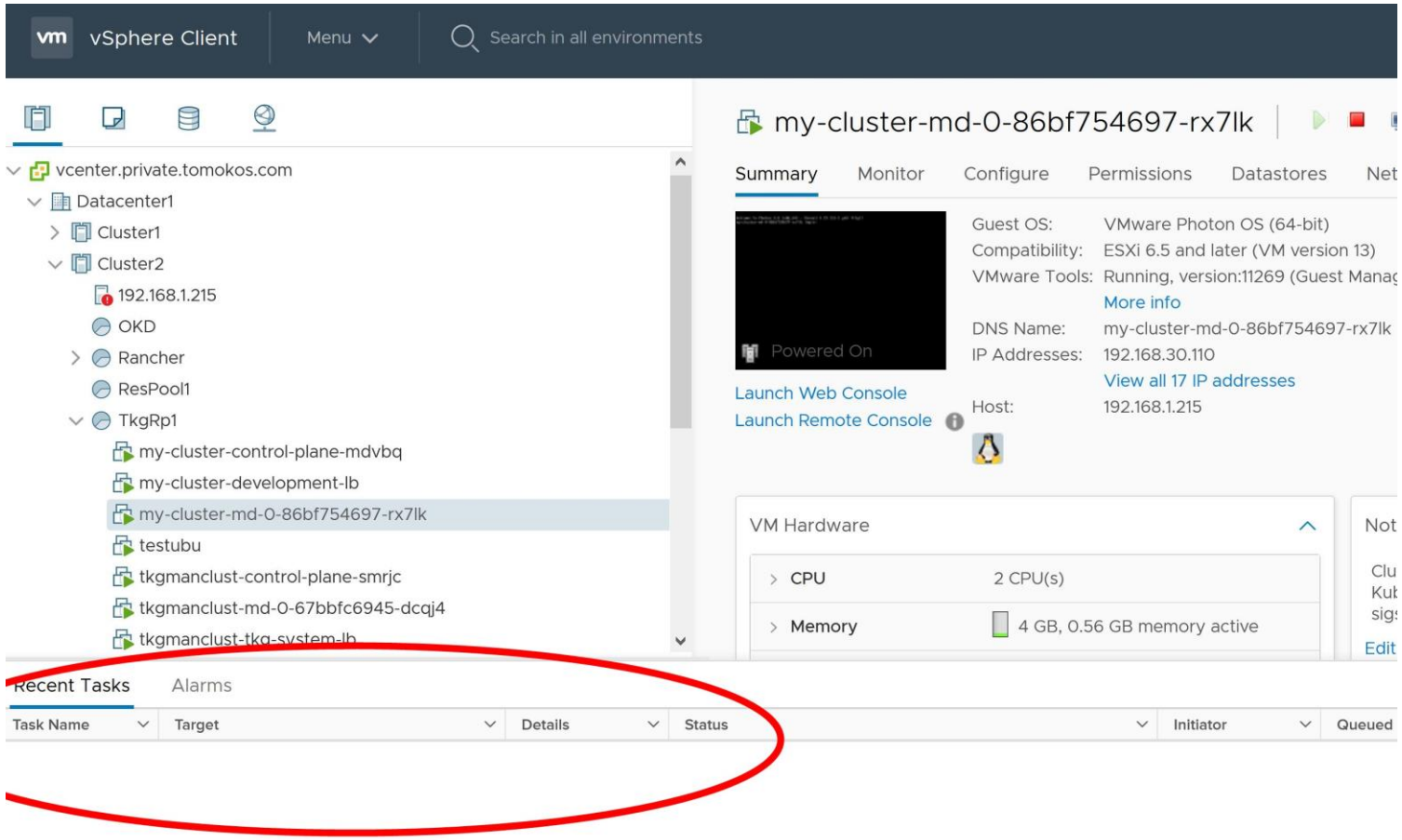
kubectl logs <pod name> -c **csi-attacher** –n kube-system

kubectl logs <pod name> -c **vsphere-syncer** –n kube-system

kubectl logs <pod name> -c **csi-provisioner** –n vmware-system-csi

2c. Know where the logs live

vSphere



VM and storage activity should show up in the Recent Tasks section of the UI

3. Be aware of the known issues list for the CSI driver

Could save you some time and frustration

https://vsphere-csi-driver.sigs.k8s.io/known_issues.html#issue_5

Where to experience more material like this and interact with other users

The Kubernetes VMware User Group

Kubernetes VMware User Group

What is it?

Similar to SIGs and Working Groups - intended to serve the needs of users running Kubernetes on particular platforms.

The VMware User group is the first (and currently only) K8s UG for a platform - covers running K8s on all VMware hypervisors.

Why is this important?

Create community culture among our users

- Users can help each other
- Users can help us make Kubernetes better – and strengthen user experience on our platforms:
  - Feature requests
  - Feedback + issue resolution

Who is involved?

Co-chairs

- Steven Wong, MAPBU CET
- Myles Gray, VMware Storage Tech Marketing, UK

User Co-leads

- Bryson Shepherd, Walmart
- Joe Searcy, T-Mobile

Kubernetes VMware User Group

User Group Meeting:

First Thursday each month 11am PT
calendar link

Link to join the group

- groups.google.com/forum/#!forum/kubernetes-ug-vmware

Link to join Slack channel (190+ Slack channel participants as of March 2020)

- https://kubernetes.slack.com/messages/ug-vmware

Speaker contact info

Deck link: https://sched.co/iE7q

Recommended related session:

SIG Storage Intro and Update (today - next):
https://sched.co/iE7S

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