How to manage stateful applications in Kubernetes

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Agenda

- Context
- Volume provider
- Volumes lifecycle management
- Demo
- Conclusion

Why should I choose Kubernetes over VMs?

Because Kubernetes is a distributed system management framework

Why would we need to manage data persistence?

Because, stateless architecture... it does not exist

Types of volumes

Types of Volumes - Kubernetes Internals

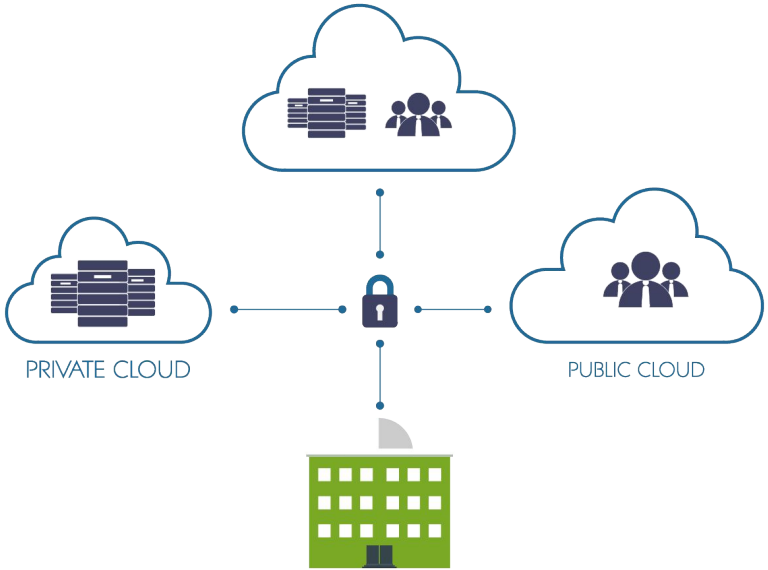
- configMap
- downwardAPI
- emptyDir
- gitRepo
- hostPath
- local
- persistentVolumeClaim
- projected
- Secret
- csi

Types of Volumes - Public Cloud

- awsElasticBlockStore
- azureDisk
- azureFile
- gcePersistentDisk

Types of Volumes - Non Cloud Dependant

- cephfs
- fc (fibre channel)
- flocker
- glusterfs
- nfs
- iscsi
- portworxVolume
- quobyte
- rbd (Rados Block Device)
- scaleIO
- storageos
- vsphereVolume



Any issues?

CSI to the rescue

What is CSI?

- Container Storage Interface
- Adopted by Kubernetes, Mesos and Cloud Foundry (for the moment)
- Supported as beta in Kubernetes 1.10 (planed to fall in stable for 1.12)
- Is a standardized way of exposing storage to a container

Why is it so important?

- Common interface to multiple platforms (standardisation)
- Allow storage provider to release out of tree

Real world scenario with **Bob** the dev and **John** the Sysadmin

Scenario: Persistent Volumes and Claims

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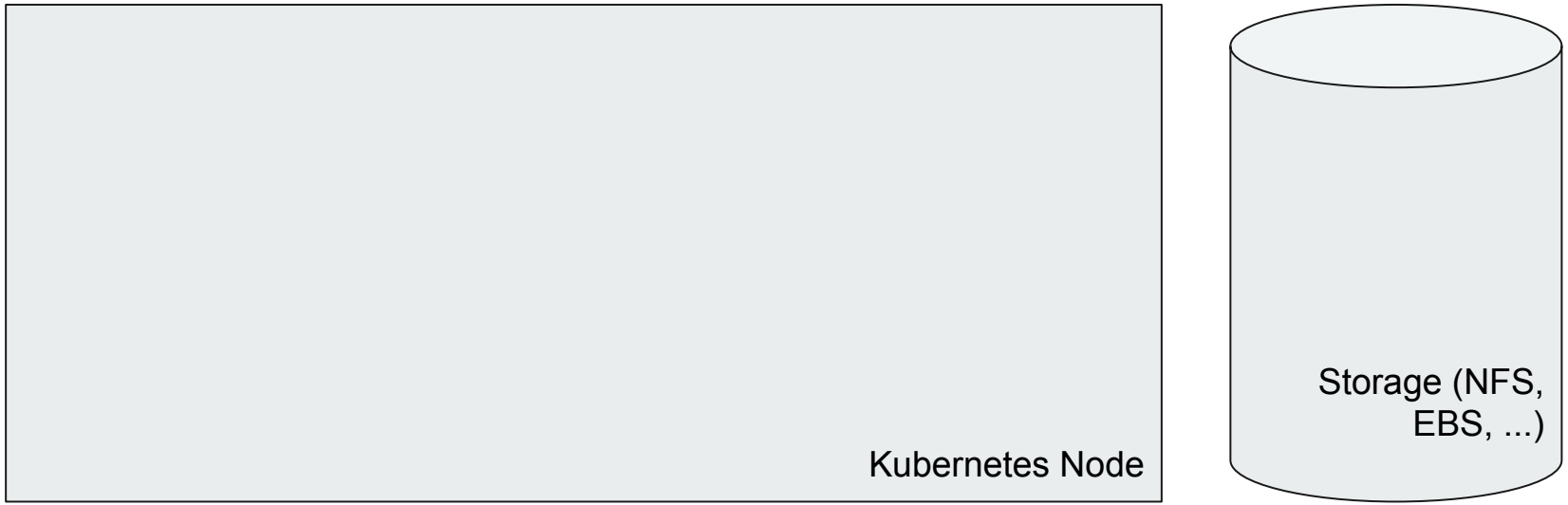

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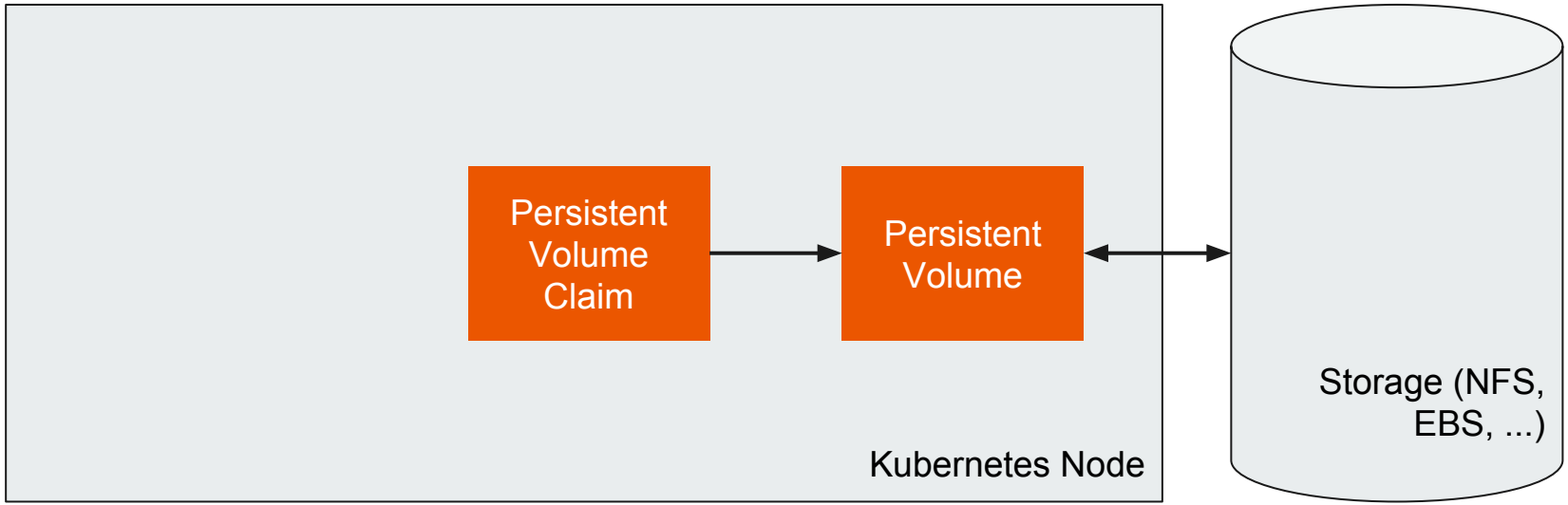

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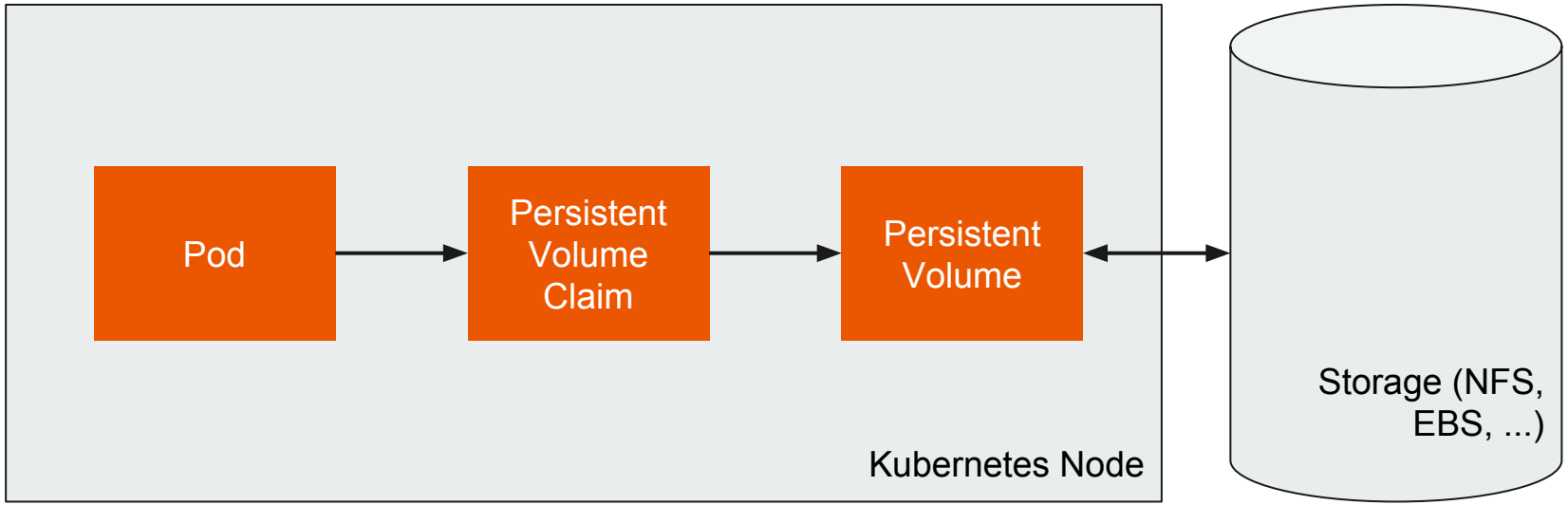

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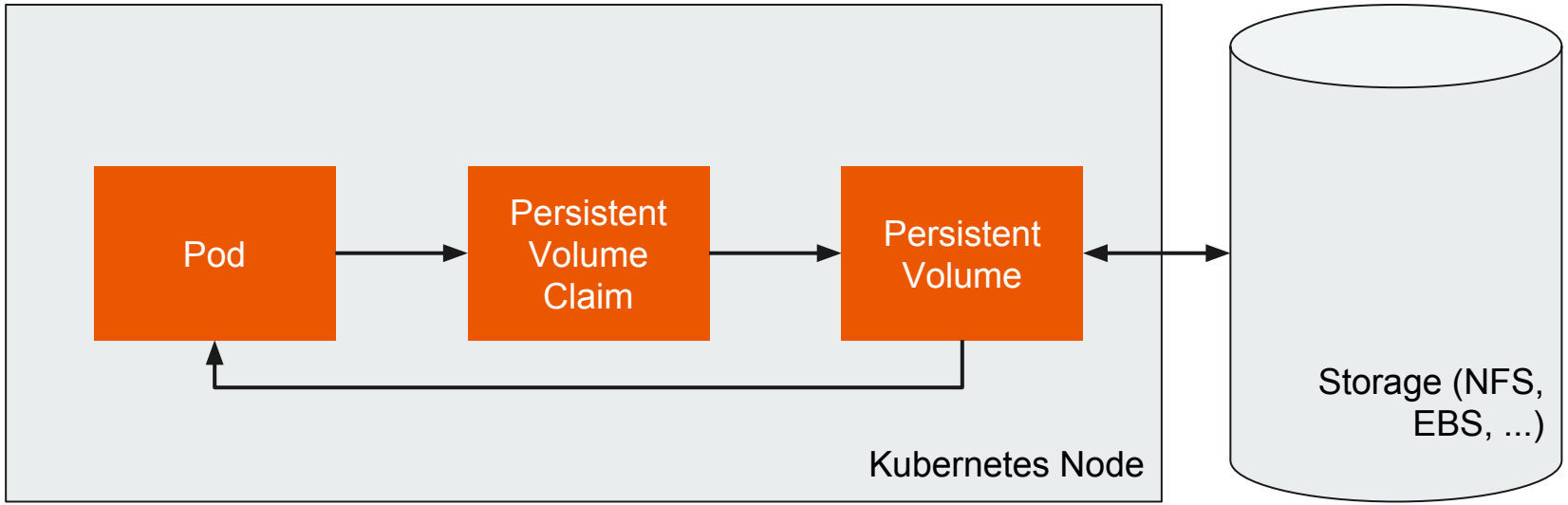

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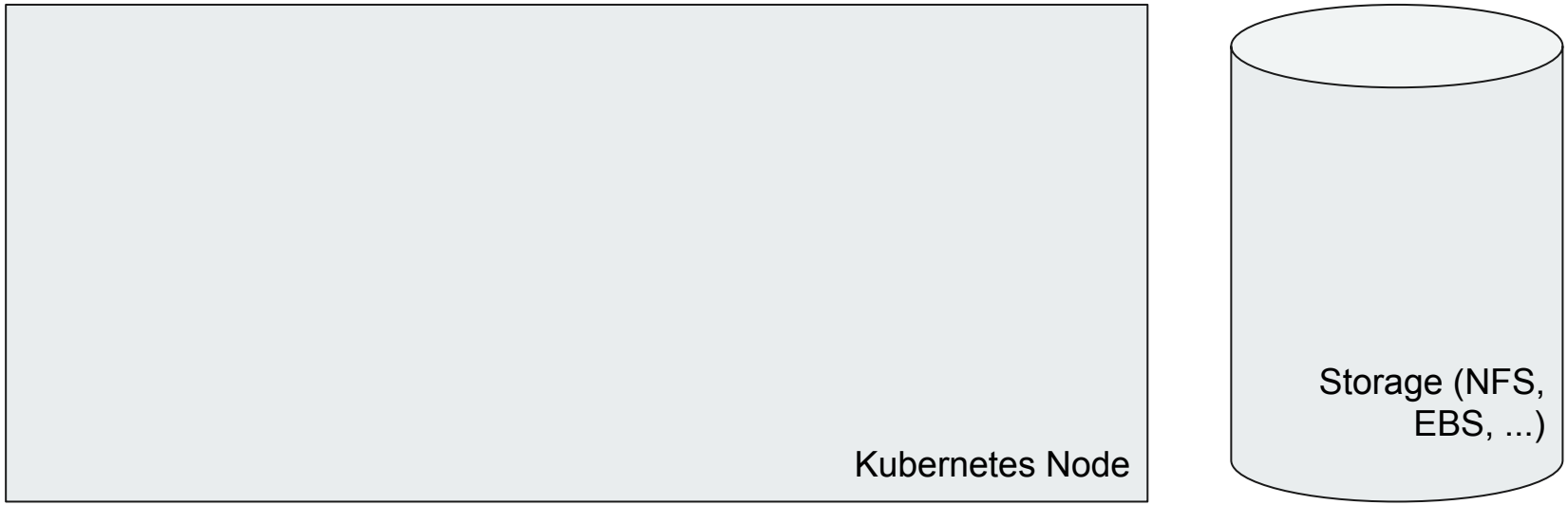

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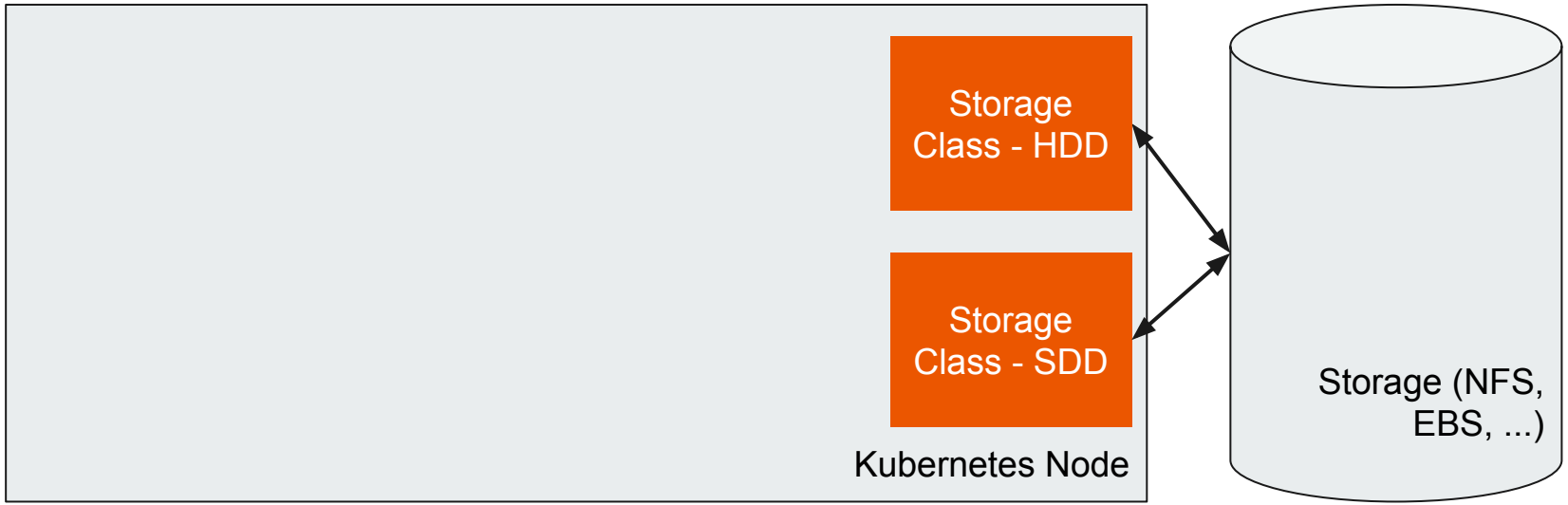

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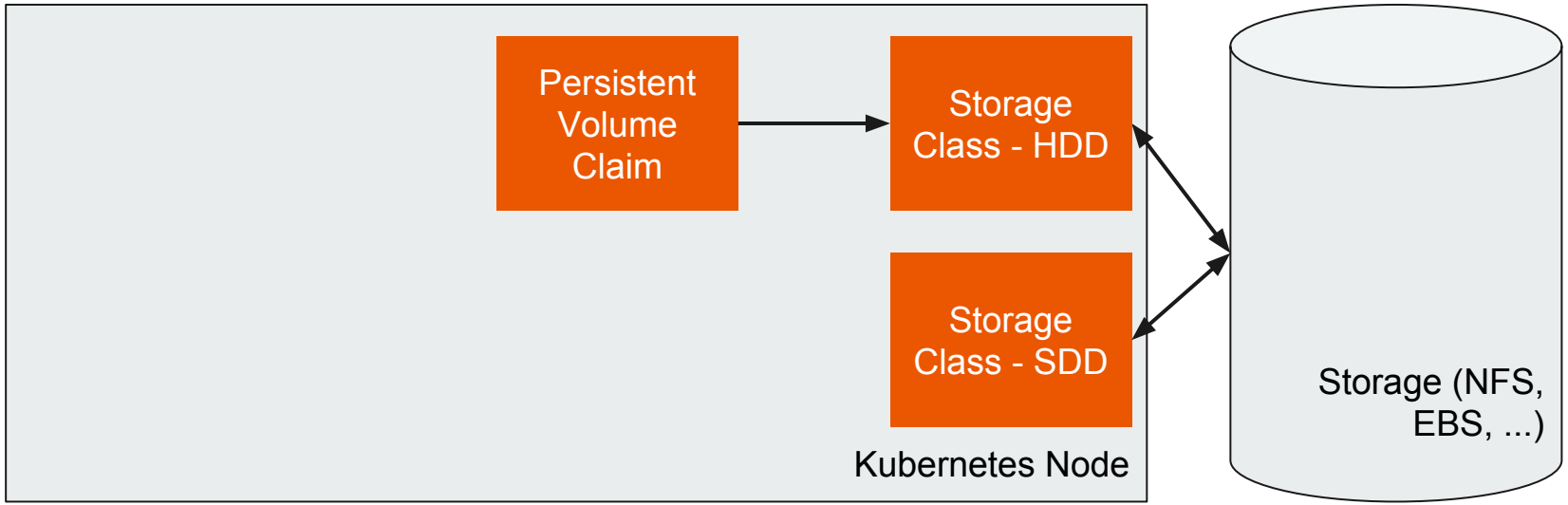

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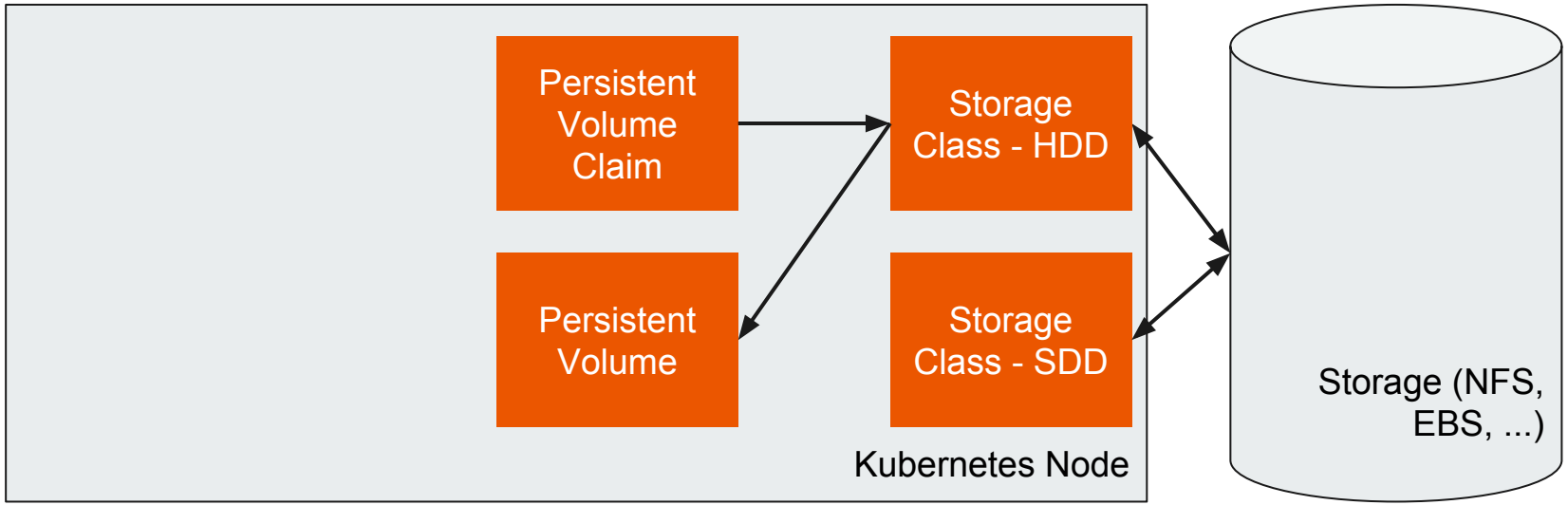

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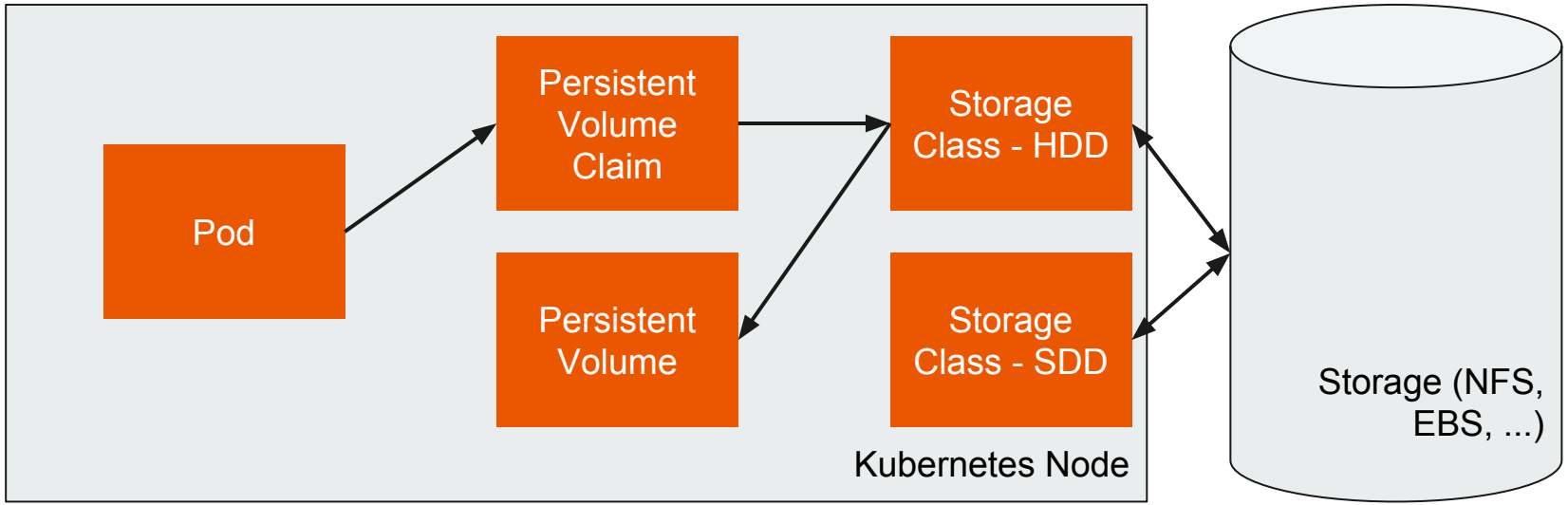

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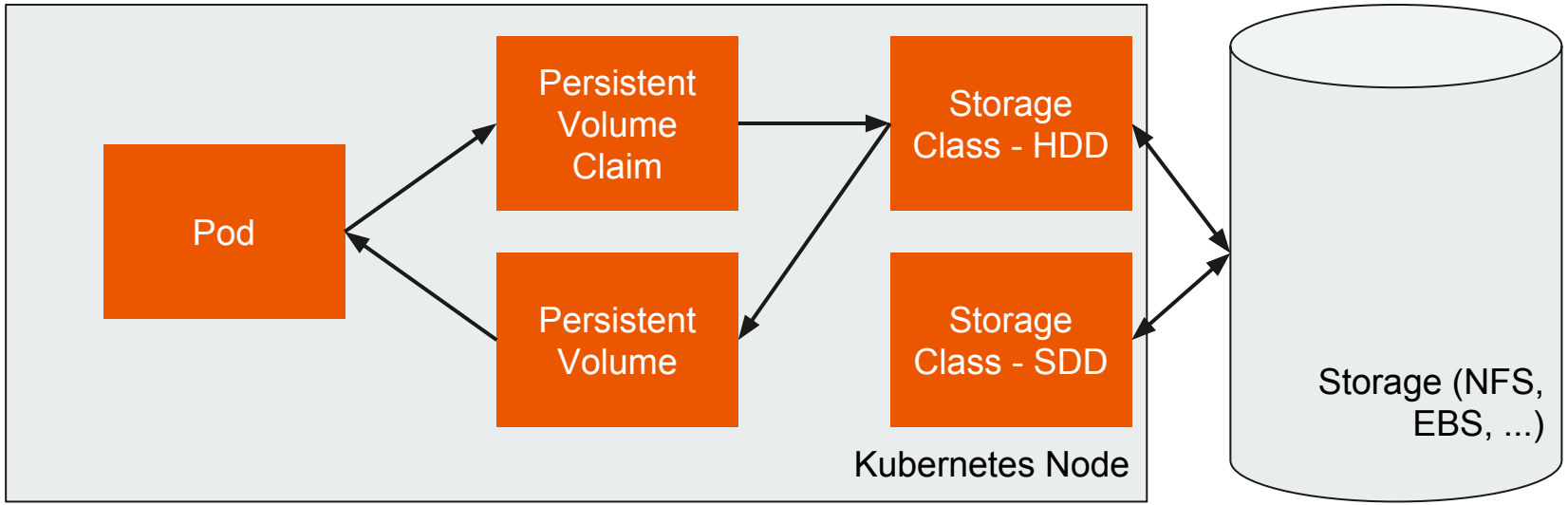


Demo

Conclusion

References

- Volumes Kubernetes Doc: https://kubernetes.io/docs/concepts/storage/volumes/
- Kubernetes Tasks: https://kubernetes.io/docs/tasks/
- Configure a Pod to Use a PersistentVolume for Storage: https://kubernetes.io/docs/tasks/configure-pod-container/configure-persistent-volume-storage/
- Run a Single-Instance Stateful Application: https://kubernetes.io/docs/tasks/run-application/run-single-instance-stateful-application/
- Run a Replicated Stateful Application: https://kubernetes.io/docs/tasks/run-application/run-replicated-stateful-application/
- StatefulSets Kubernetes Doc: https://kubernetes.io/docs/concepts/workloads/controllers/statefulset/

Thank you!

Link to the repos: https://github.com/woernfl/k8s-stateful-demo