CROSS-AZ EKS WITH FSXN STORAGE

aws
COMMUNITY DAY
DACH

Sebastian Meindorfer, SVA

Phillipp Schmitt, SVA

Axel Frentzen, NetApp

Fabian Born, NetApp

Hendrik Land, NetApp

Who are we?

The experts for storage and data management

SVA

- Leading German IT systems integrator for over 25 years

- End-to-end infrastructure,
- cloud, data & ai solutions

- Partner for
- AWS, Azure, Google Cloud

- Driving innovation in cloud

NetApp

- Storage & data management for 30+ years

- Multi-protocol, open standards

- Secure, Scalable, API first

- Building cloud services

- Including <u>with</u> the 3 largest clouds

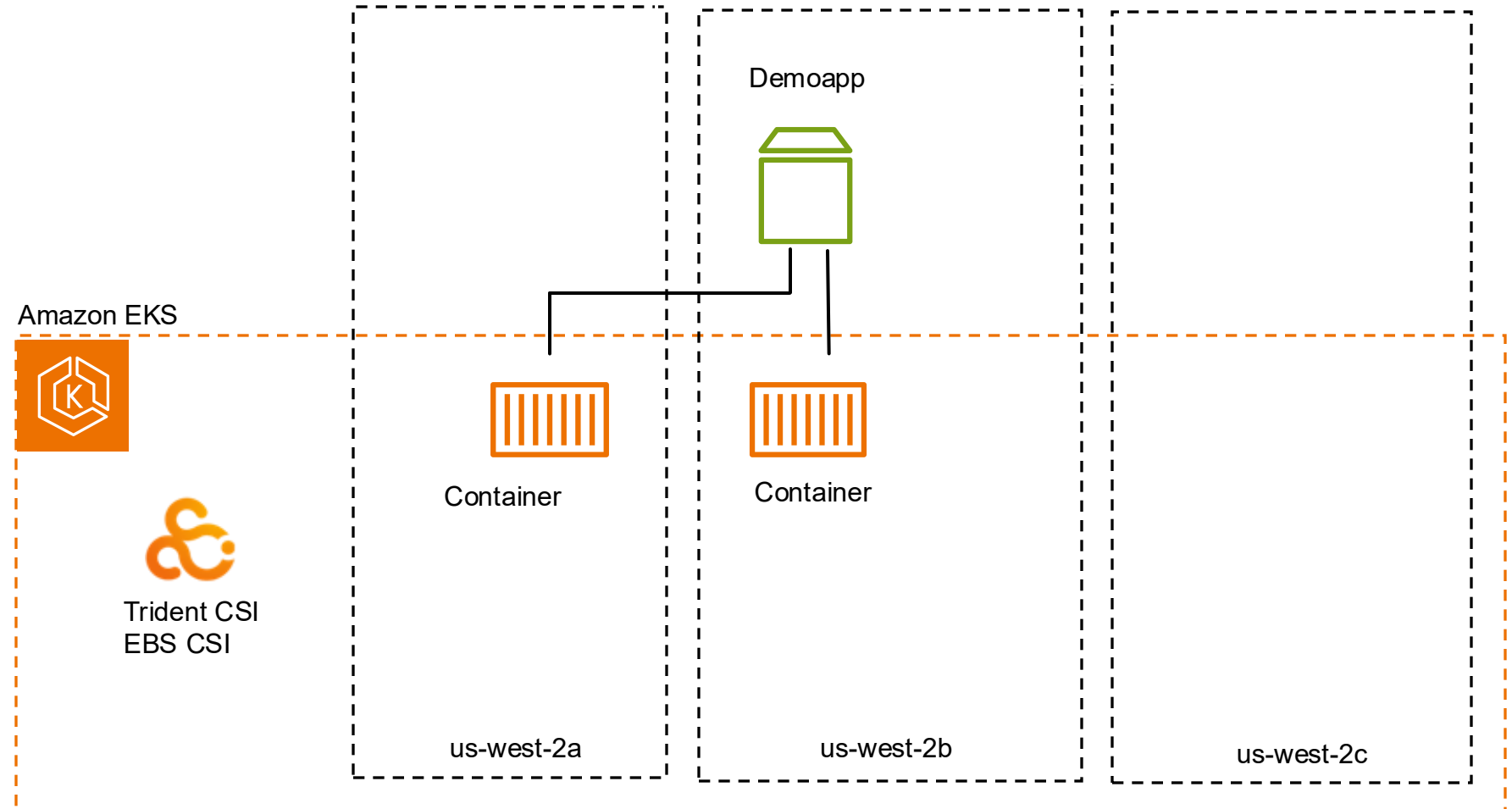(AWS FSxN, Google Cloud NetApp Volumes, Azure NetApp Files)

Lab Setup

Preconfigured:

- EKS Cluster
- EBS CSI Driver
- Trident Deployment

Amazon FSx for NetApp ONTAP

Demoapp

Amazon EKS

Trident CSI
EBS CSI

Container

Container

us-west-2a

us-west-2b

us-west-2c

Prepare your lab...

Lab Environment + Lab Guide

https://bit.ly/4oawZjD

https://bit.ly/AWScd2025
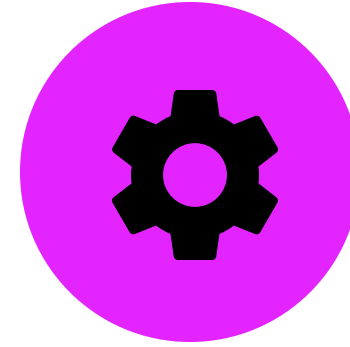
https://github.com/brewery-ninjas/aws-cd2025-munich

KUBERNETES DOES NOT HAVE BUILT-IN STORAGE AND DATA MANAGEMENT

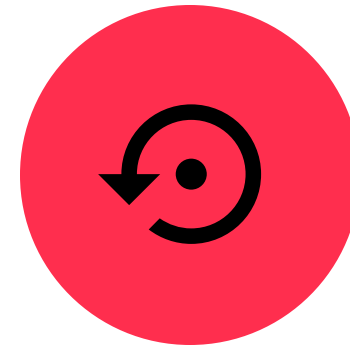# Every application has "state" - Not all data can be kept outside K8s

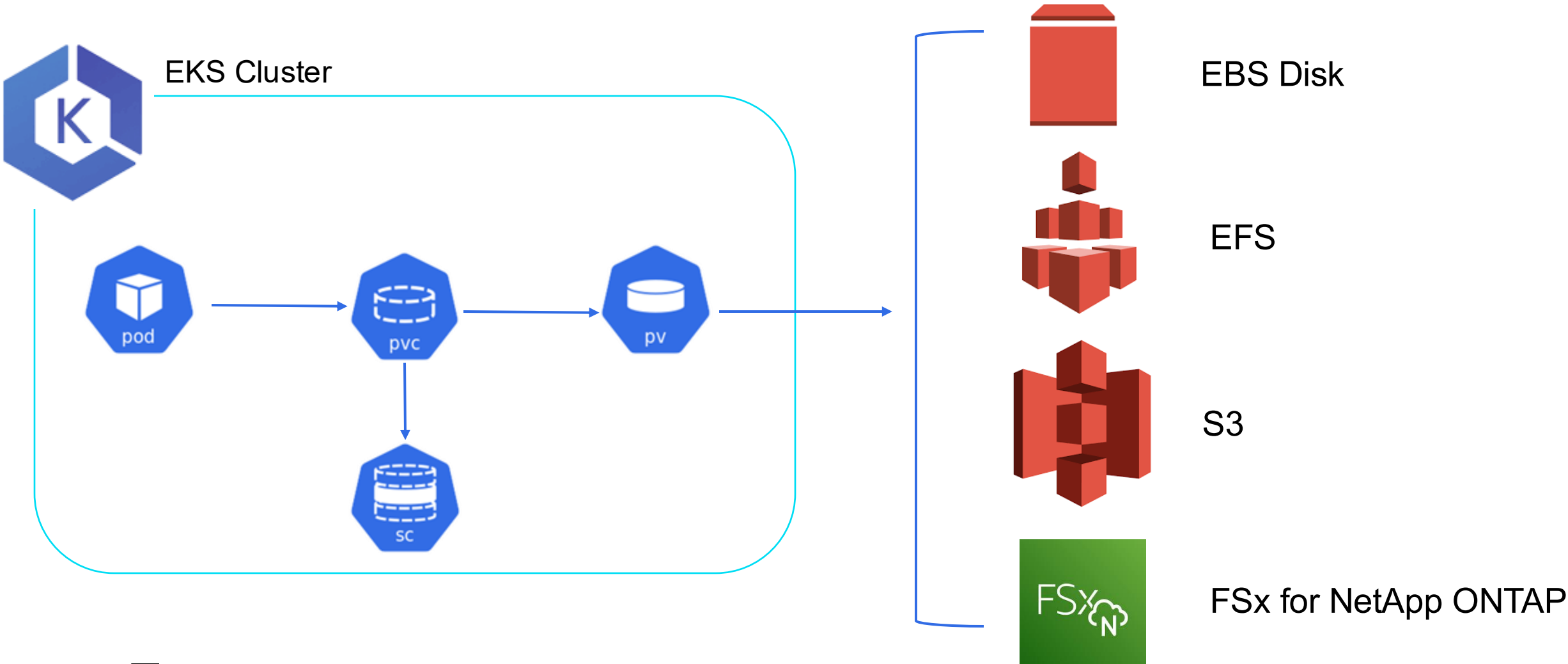Vendor requirements

Exact version/flavor of database

Consistency and portability

Self-sufficient DevOps teams

Storage Options for EKS
Native/1st party AWS

EKS Cluster

pod → pvc → pv

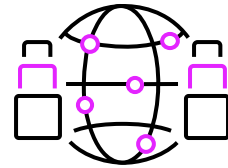pvc → sc

EBS Disk

EFS

S3

FSx for NetApp ONTAP
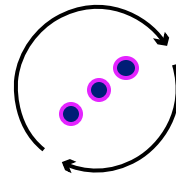
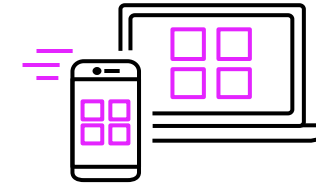# Worry-free data management that just works

Amazon FSx for NetApp ONTAP

No storage expertise required

High Availability across AZs

Fully managed, performant with PB+ scale

Multi-protocol file and block (NFS, SMB, iSCSI)
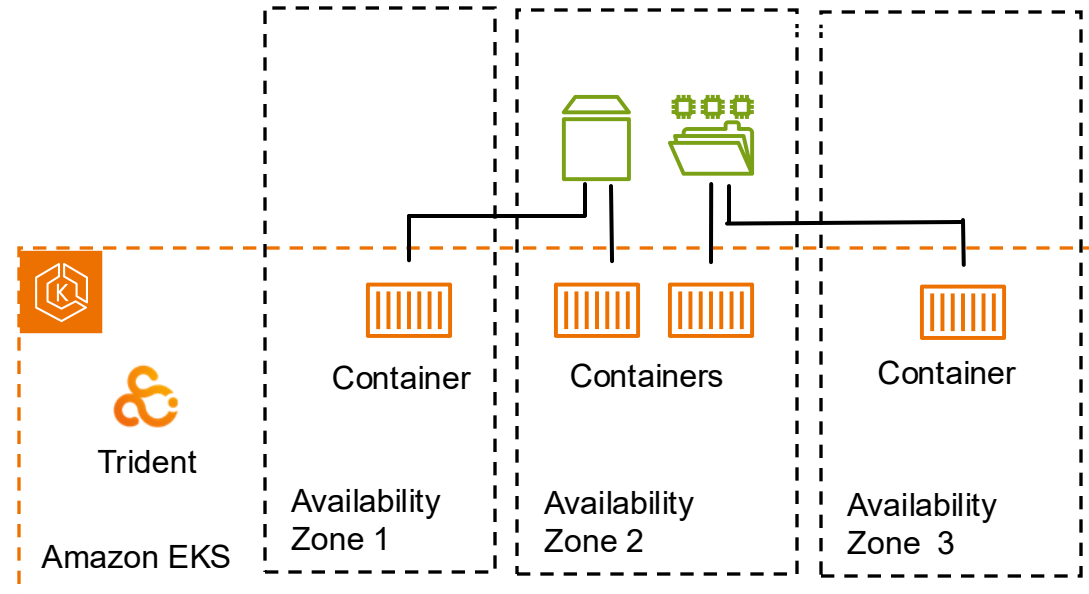
At least 50% savings on storage costs

NetApp SVA

Multi-AZ access with FSx for ONTAP

Containers can access storage across AZs
- Supported on file and block volumes
- Both in single-AZ and multi-AZ deployments

Amazon FSx for NetApp ONTAP

Trident

Amazon EKS

Container

Availability Zone 1

Containers

Availability Zone 2

Container

Availability Zone 3

Prevents pods from getting stuck when containers are scaled up in another AZ.

Cross-region replication with FSx for ONTAP

Amazon FSx for NetApp ONTAP

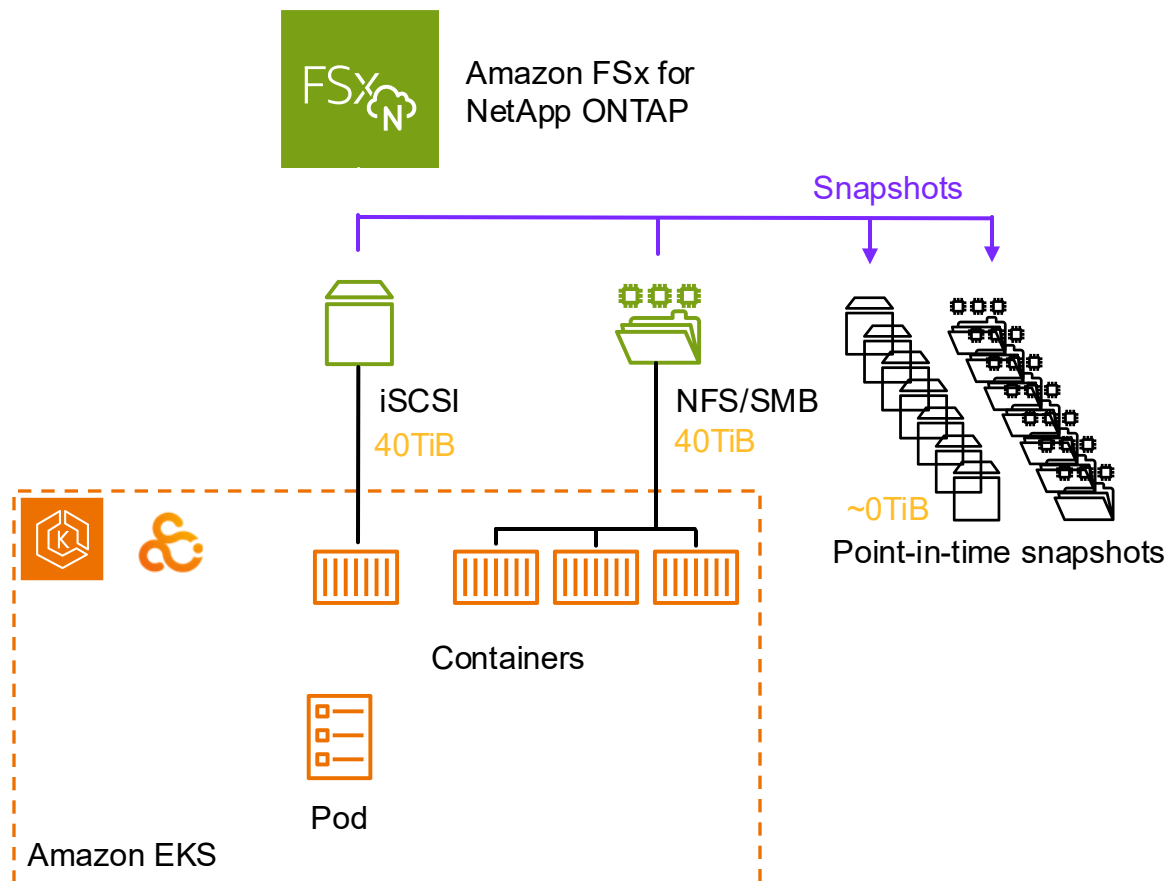**Built-in replication engine (SnapMirror)**

- Highly-efficient, block-level incremental forever
- 1.2 AES-256 GCM and IPsec encryption
- RPO as low as 5 minutes (minimal data loss)
- RTO in single-digit minutes (rapid recovery)

Cross-region replication

Containers

Trident

Amazon EKS   Pod

Region 2

Containers

Trident

Amazon EKS   Pod

Region 1
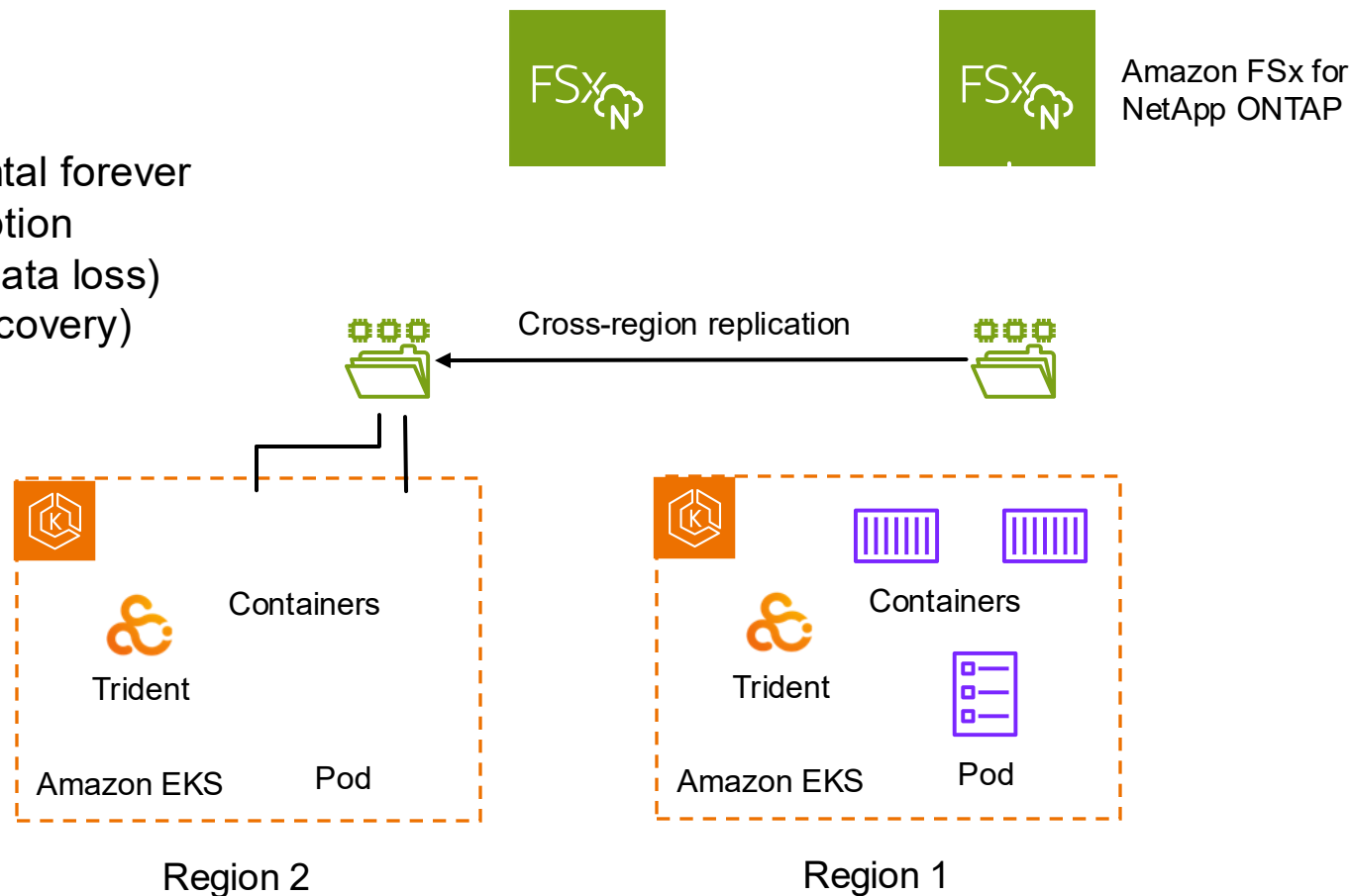
Data is replicated in its native format enabling rapid disaster recovery.

RPO - Recovery Point Objective
RTO - Recovery Time Objective

"Game-changing" Snaphots

Amazon FSx for NetApp ONTAP

Snapshots

iSCSI
40TiB

NFS/SMB
40TiB

~0TiB

Point-in-time snapshots

Containers
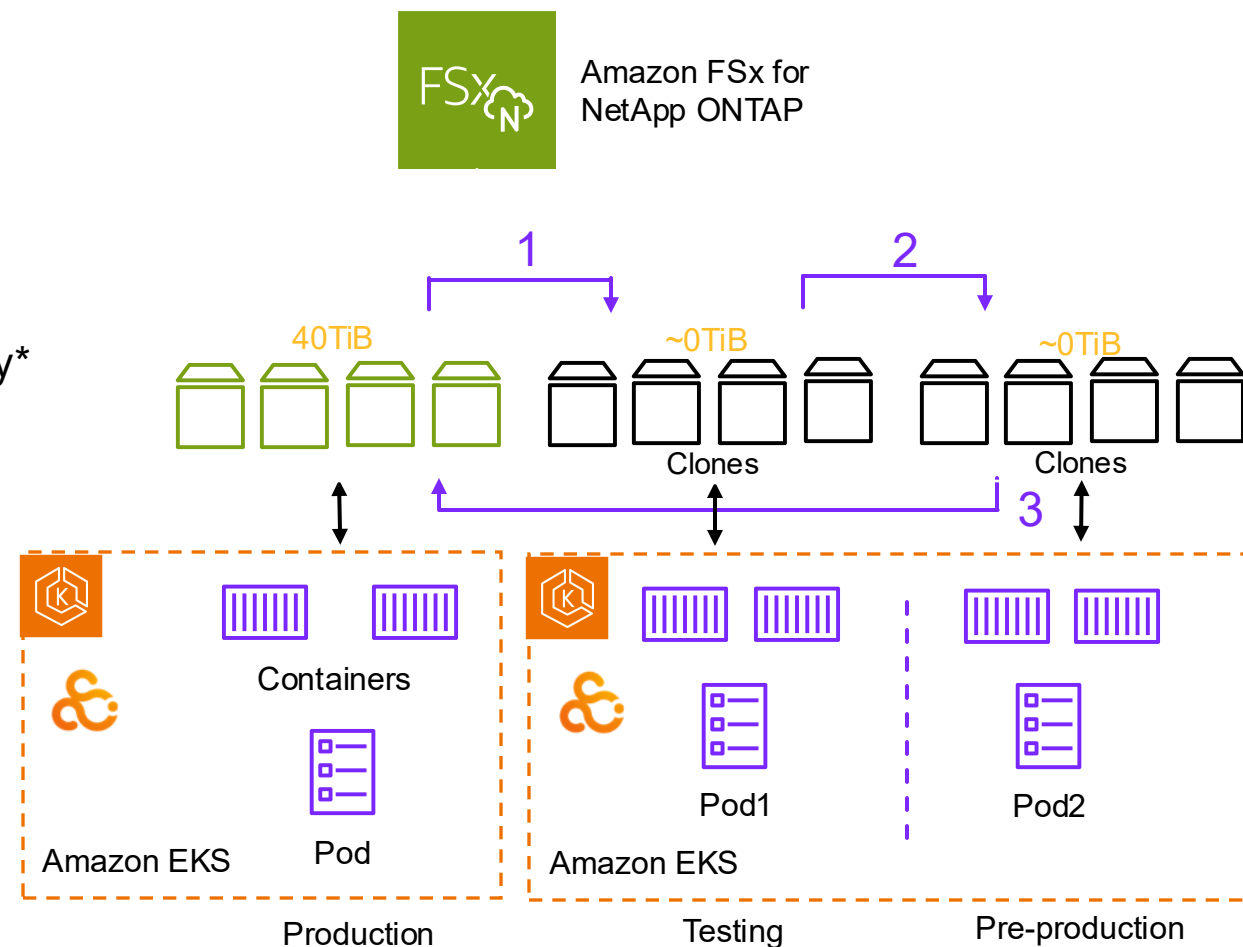
Pod

Amazon EKS

Instant point-in-time volume snapshots

- Snapshots occupy negligible space when created
- Negligible performance overhead
- There's no penalty for creating frequent snapshots
- Devs are free to create snapshots as they see fit

FSx for ONTAP Snapshots greatly improve data resilience and security.

Data cloning that accelerates delivery pipeline

Amazon FSx for NetApp ONTAP

**Volume clones created instantaneously from snapshots**

- Like snapshots, clones don't consume storage capacity*
- They also don't impact performance
- Unlike snapshots, clones are independent volumes
- Easily automate with APIs

40TiB   ~0TiB   ~0TiB

Clones   Clones

Containers

Amazon EKS   Pod

Production

Pod1   Pod2

Amazon EKS

Testing   Pre-production

In data-heavy environments, FSx for ONTAP can reduce data cloning cycles from hours to seconds.

* storage capacity is consumed when there is a change on the clone or the parent volume.

Trident

- Kubernetes Storage Integration done right

- CSI Storage Orchestrator

- Open Source

- Fully supported
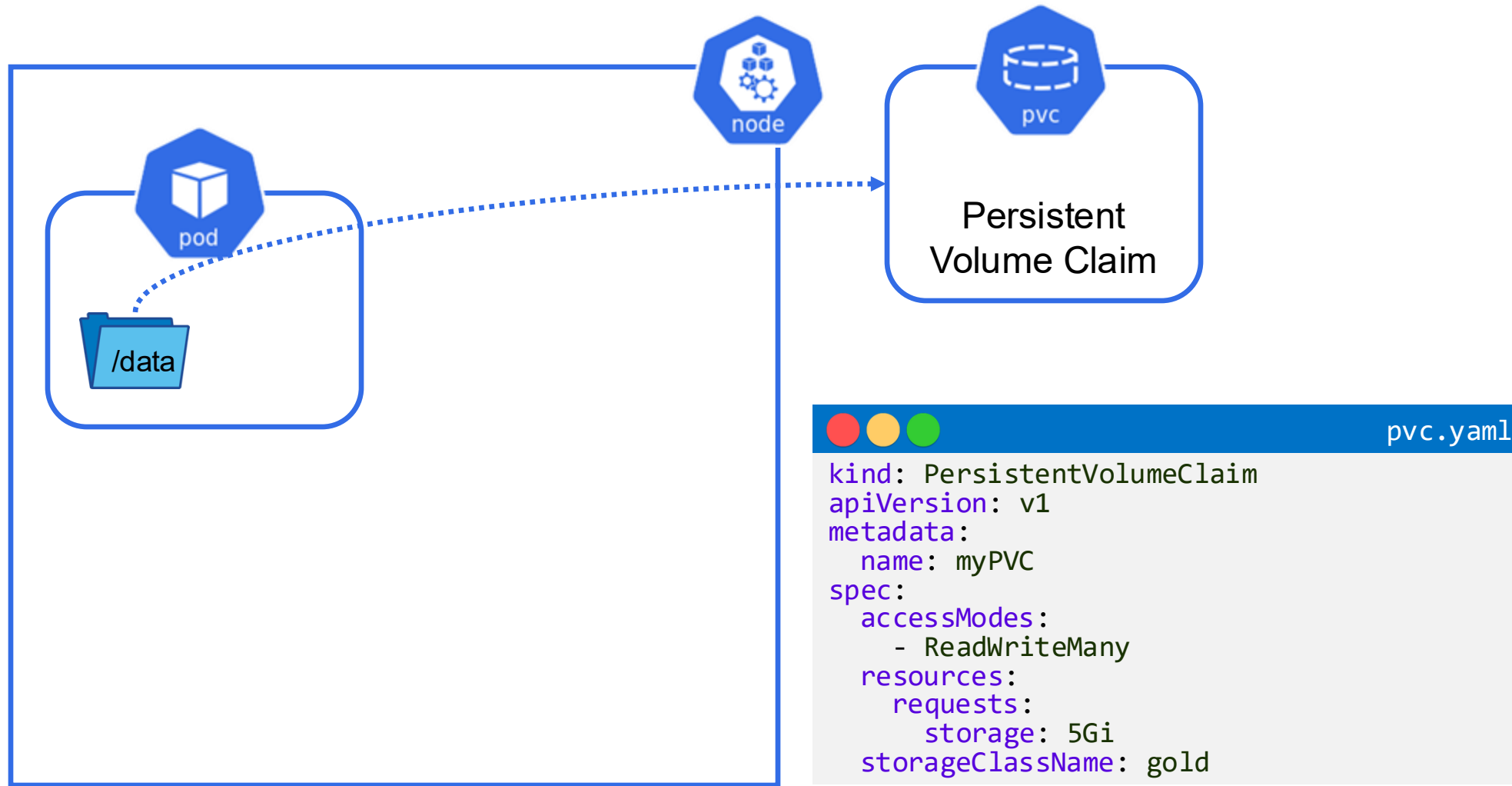
- Hybrid-Multi-Cloud

- File & Block Storage
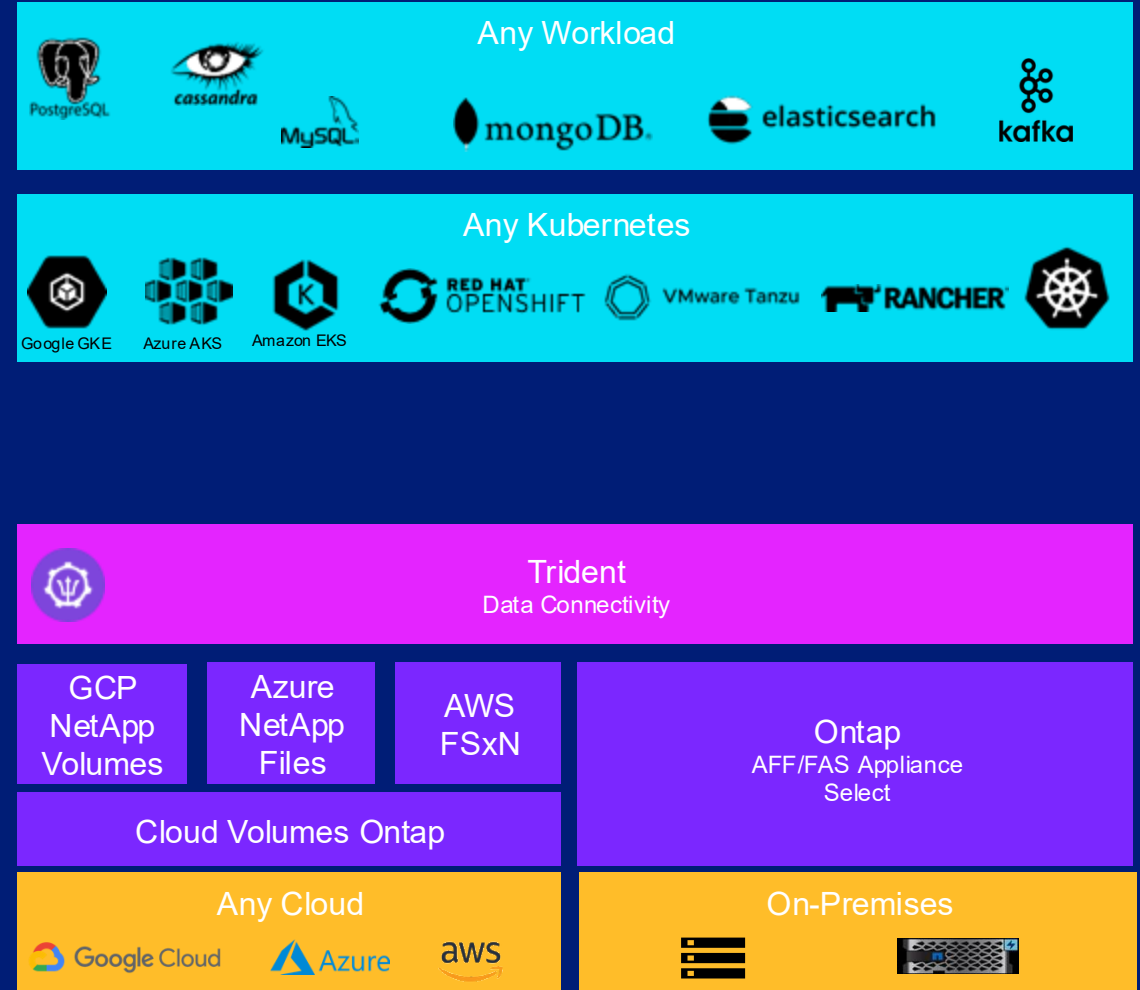
Dynamic storage provisioning in K8s
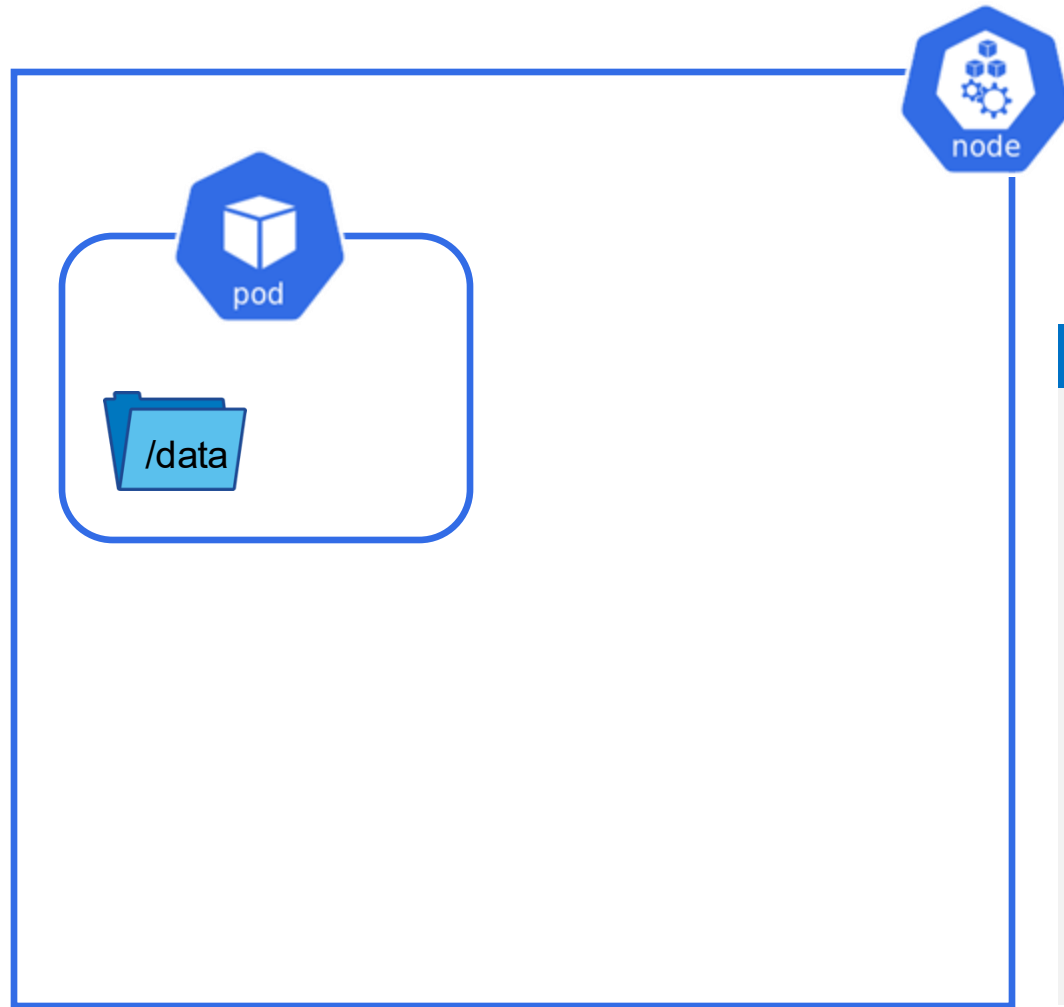

```yaml
pod.yaml

kind: Pod
apiVersion: v1
metadata:
  name: myLittlePod
spec:
  volumes:
    - name: myVol
      persistentVolumeClaim:
       claimName: myPVC
  containers:
  - name: ubuntu-test
    image: ubuntu
    command: ["/<do something>"]
    volumeMounts:
      - mountPath: "/data"
        name: myVol
```
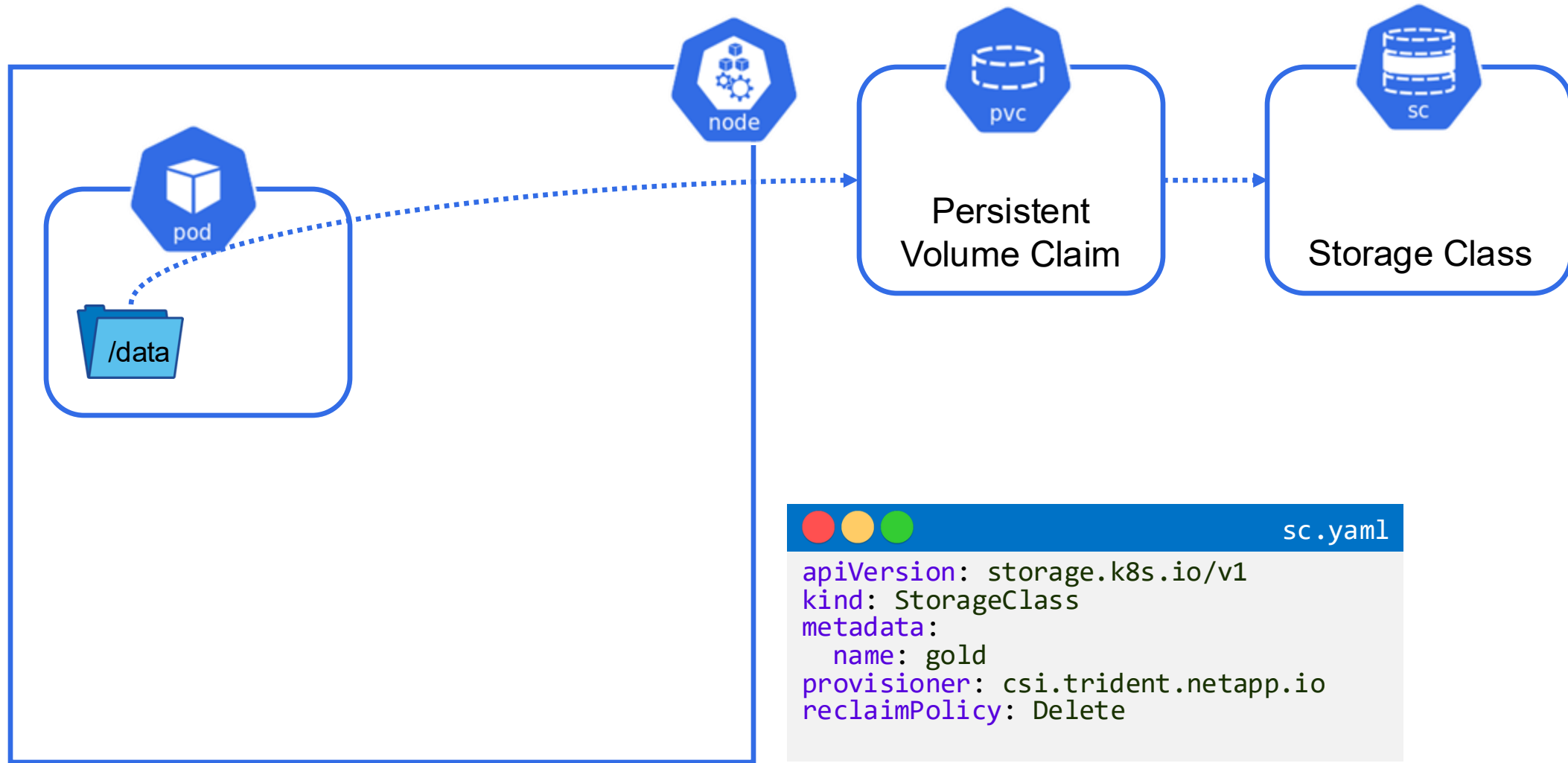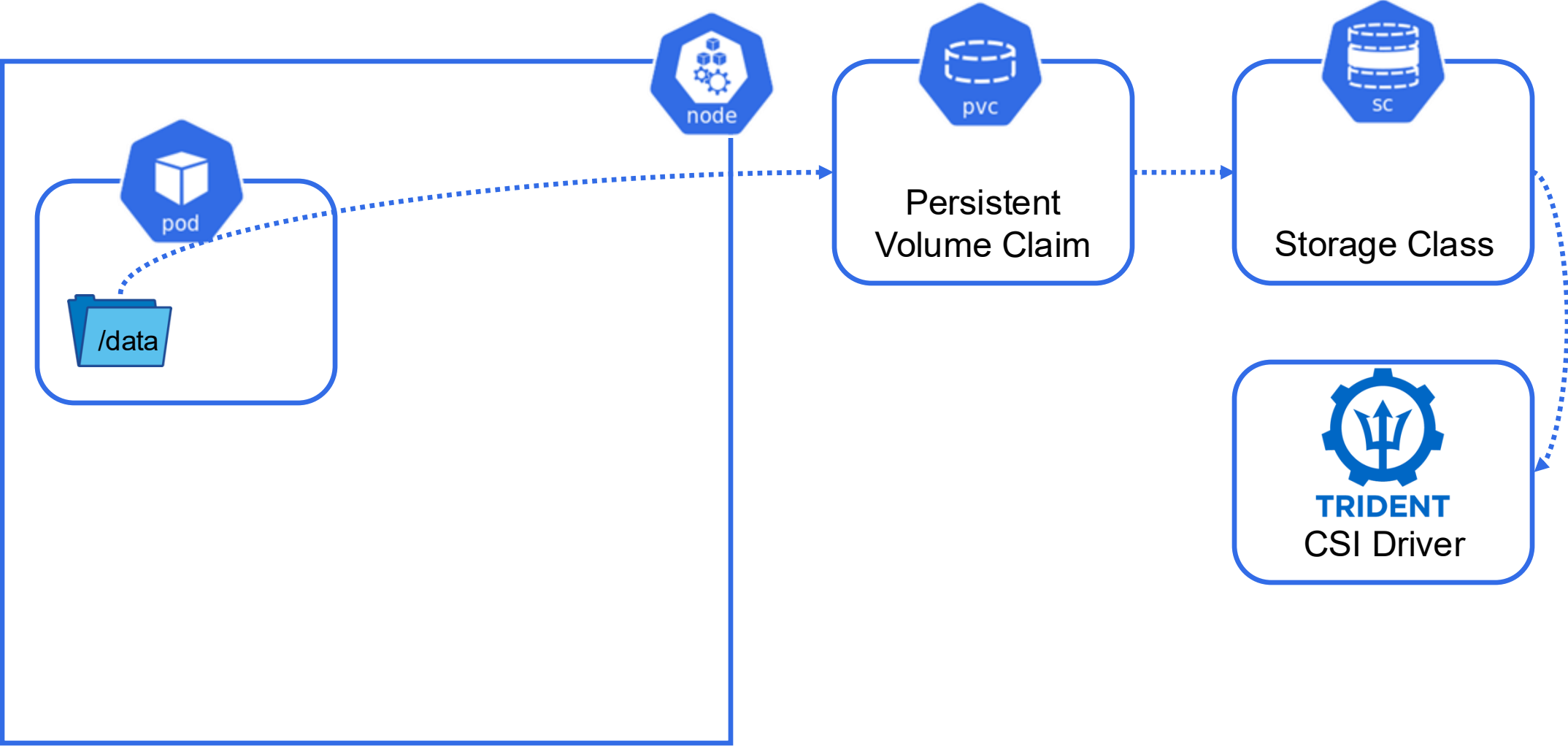
Dynamic storage provisioning in K8s


```yaml
                                                  pvc.yaml
kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: myPVC
spec:
  accessModes:
    - ReadWriteMany
  resources:
    requests:
      storage: 5Gi
  storageClassName: gold
```

Dynamic storage provisioning in K8s


```yaml
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: gold
provisioner: csi.trident.netapp.io
reclaimPolicy: Delete
```
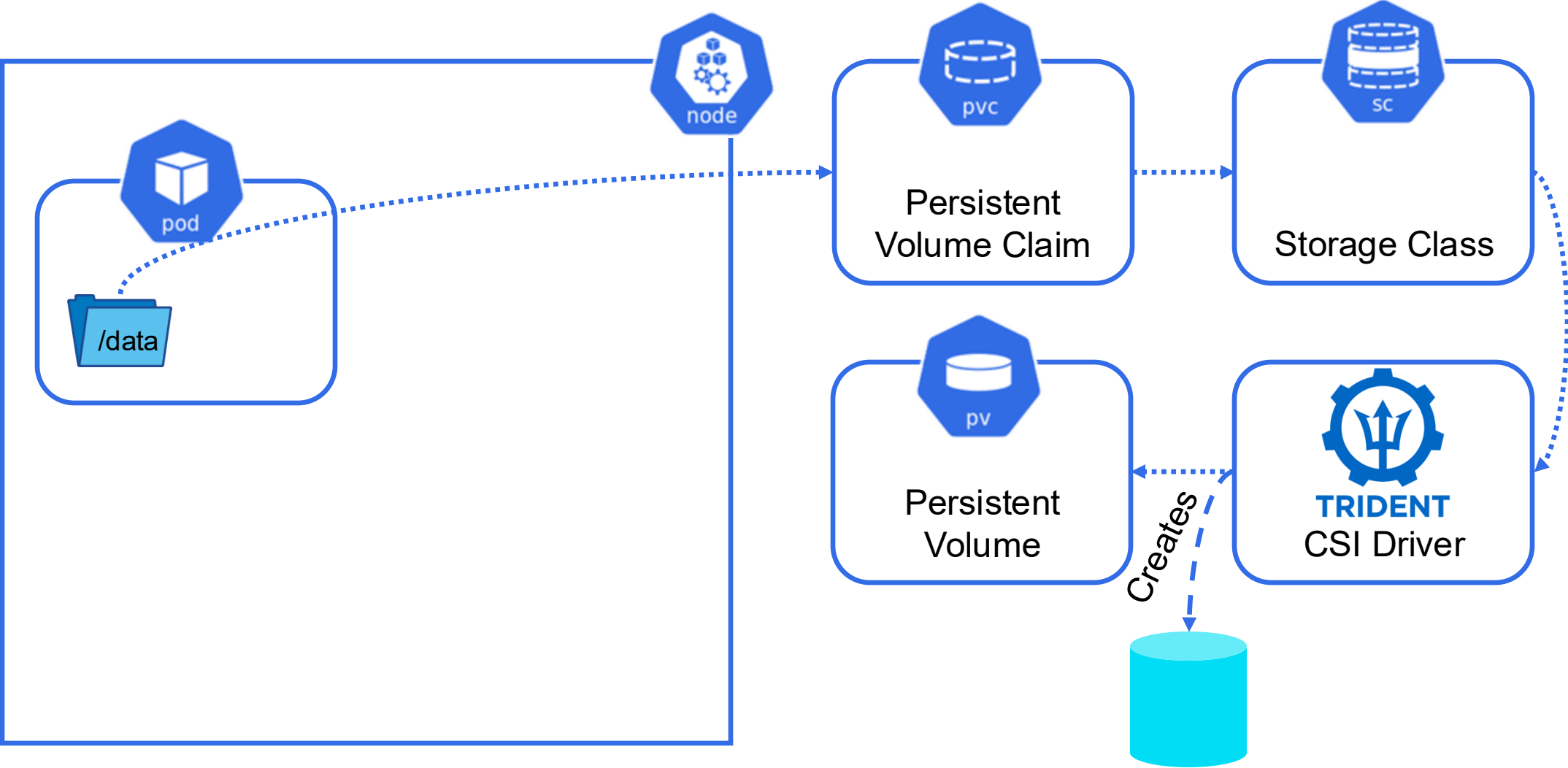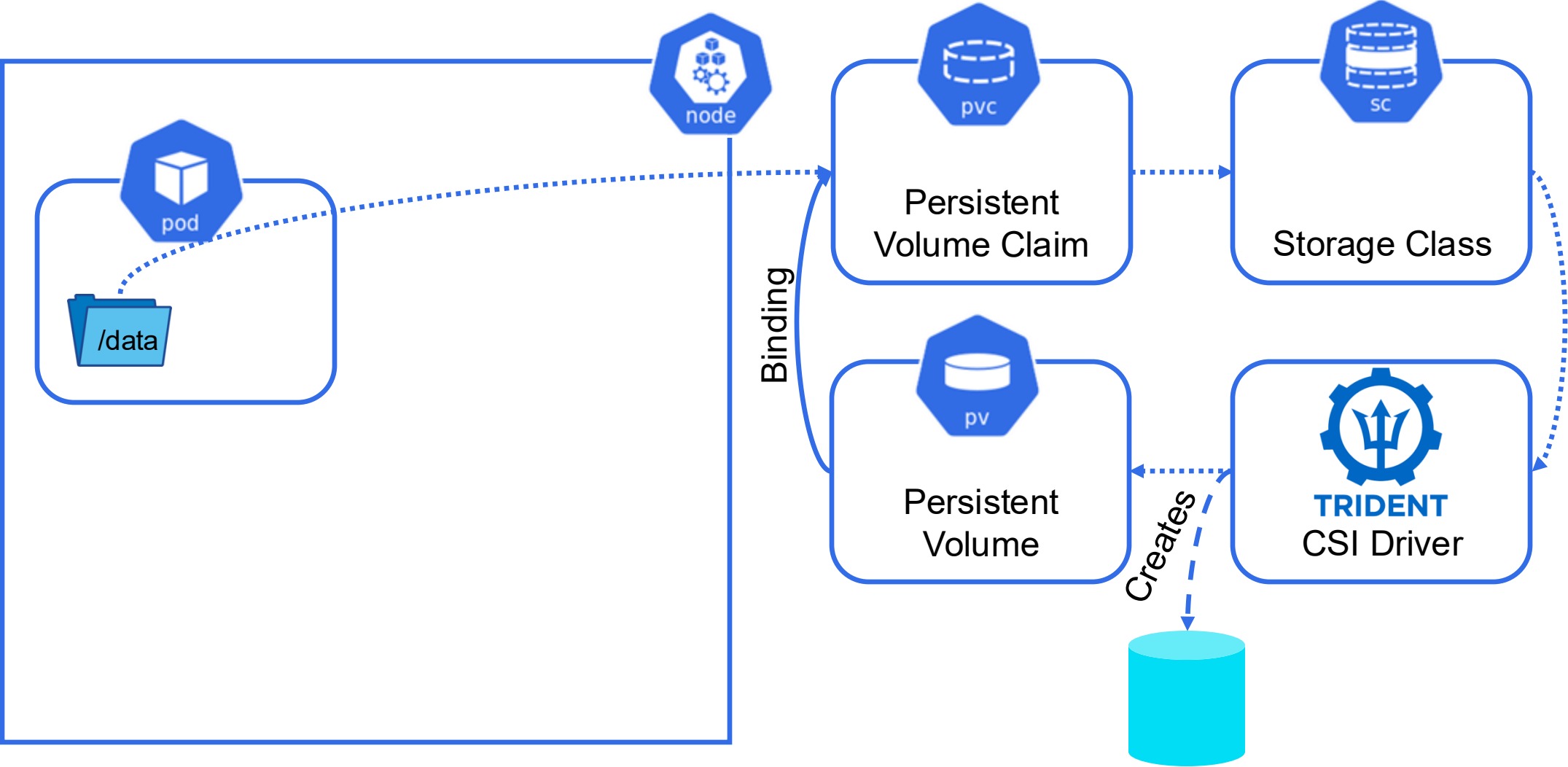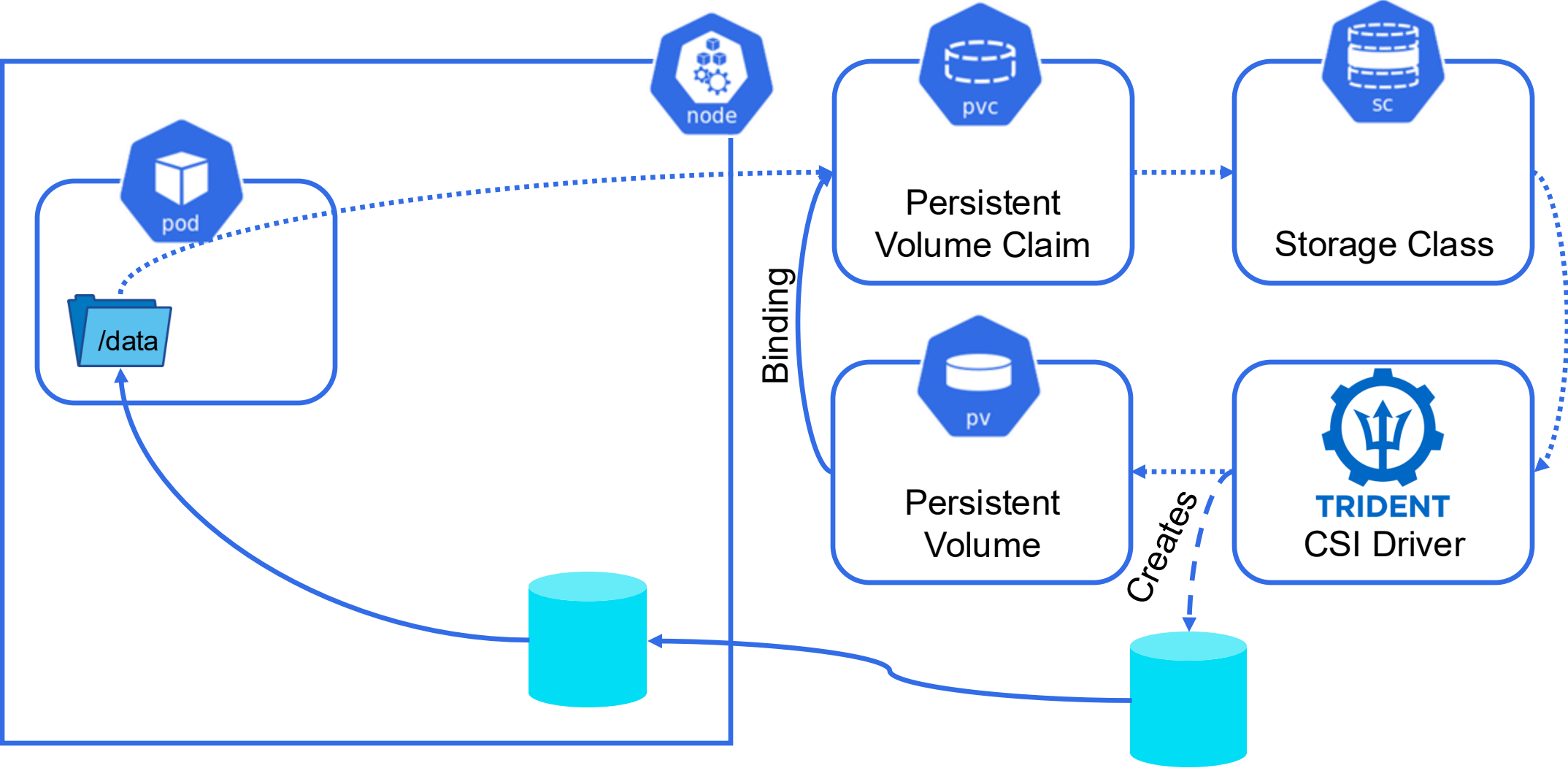
Dynamic storage provisioning in K8s

Dynamic storage provisioning in K8s

Dynamic storage provisioning in K8s

Dynamic storage provisioning in K8s

Trident EKS Addon

Automated deployment of Trident in an existing EKS cluster

Cloud experience for AWS users

Enabled by "free of charge" subscription in AWS account

https://aws.amazon.com/marketplace/pp/prodview-mptzckr6mggia

Trident protect

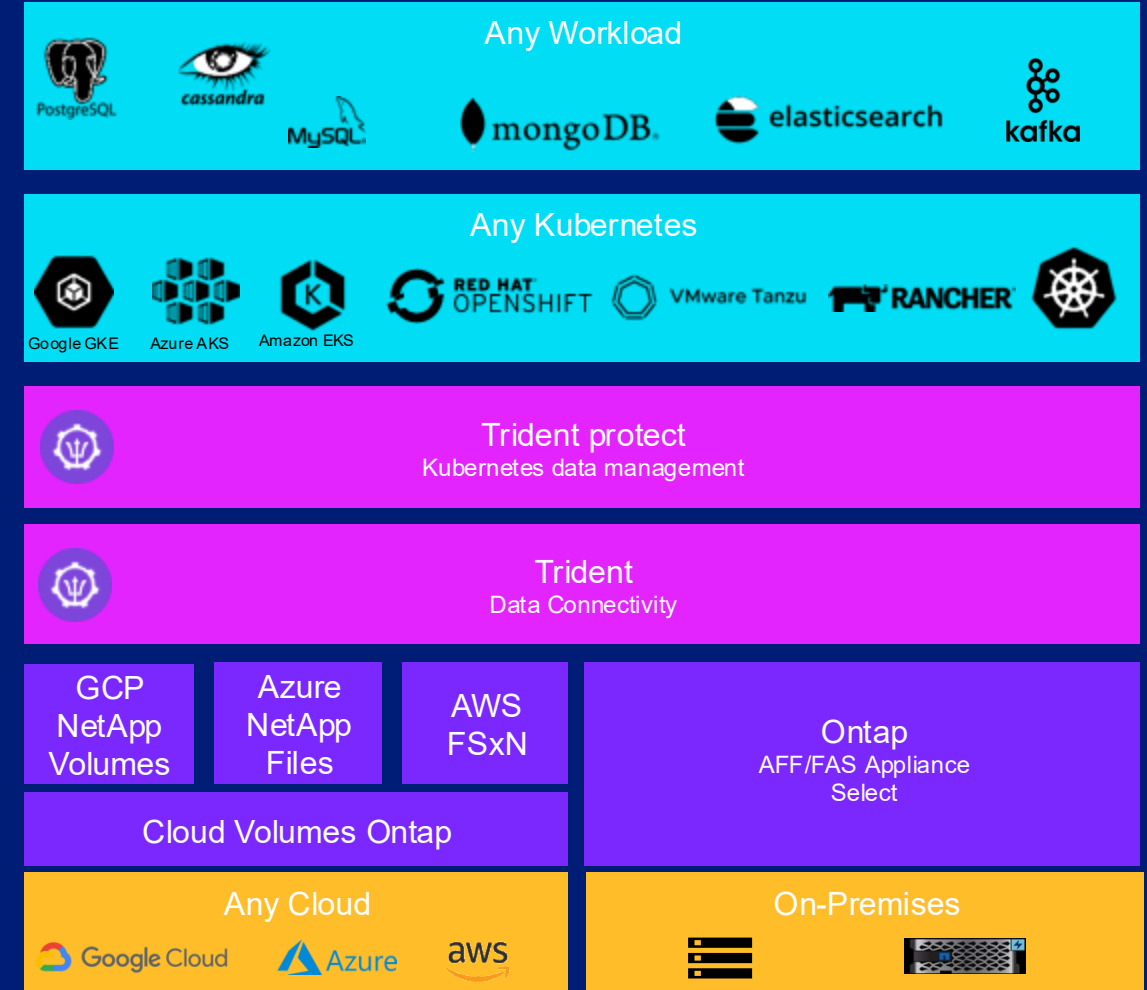Free Trident add-on

Backup & Restore
- Data cannot be lost or corrupted!
- (Even in cloud-native world)

Disaster Recovery
- Business needs to recover & continue
- (Under all conditions)

Advanced Data Management
- App Data is valuable
- (More than the k8s clusters which created it)

RESOURCES

Product page
https://aws.amazon.com/fsx/netapp-ontap

FAQ
https://aws.amazon.com/fsx/netapp-ontap/faqs

Tutorials and on-demand sessions
https://aws.amazon.com/fsx/netapp-ontap/resources

Documentation
https://docs.aws.amazon.com/fsx/latest/OntapGuide
https://docs.netapp.com/us-en/trident/index.html

Hands-On Time

Lab Setup

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us-west-2a

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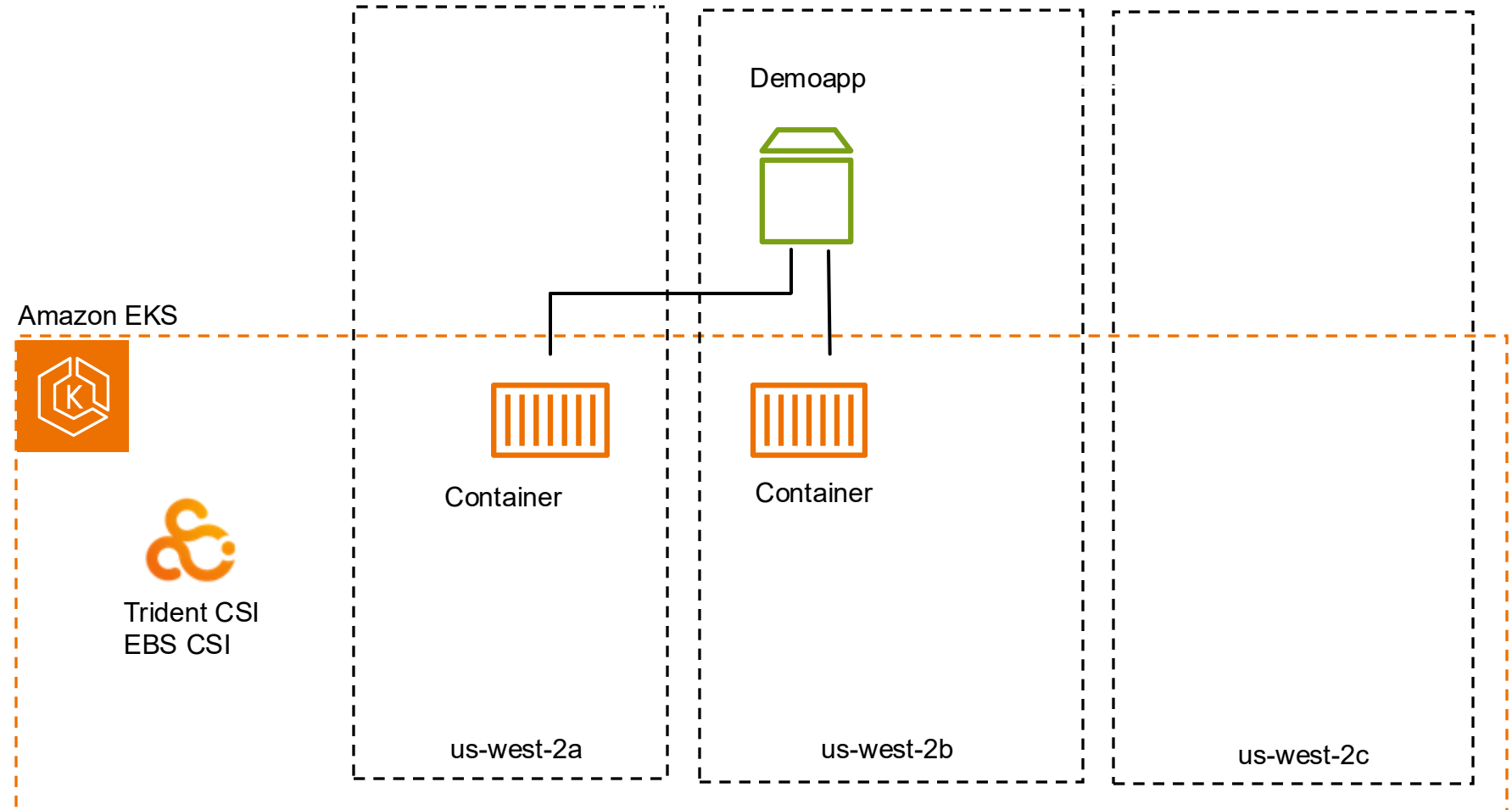
Your Tasks

Explore the Lab Setup

Configure Trident FSxN Integration

Provision app & storage

Explore Multi-AZ behavior

Create Snapshots & Clones

Be curious. Be interactive. Learn.

Prepare your lab…

Lab Environment + Lab Guide

https://bit.ly/4oawZjD

https://bit.ly/AWScd2025

https://github.com/brewery-ninjas/aws-cd2025-munich

YOUR FEEDBACK, PLEASE.

https://forms.office.com/r/AZJAM1FLYQ