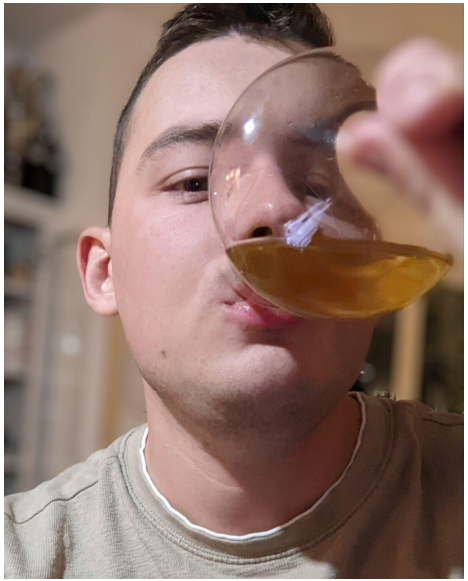
Operating Kubernetes Across Hypervisors with Cluster API & GitOps

Richard Case

Cluster API Provider AWS Maintainer
Cluster API Provider GCP Maintainer
Cluster API Provider RKE2 Maintainer



Alex Demicev

Cluster API Operator Maintainer
Cluster API Provider RKE2 Maintainer

Abstract

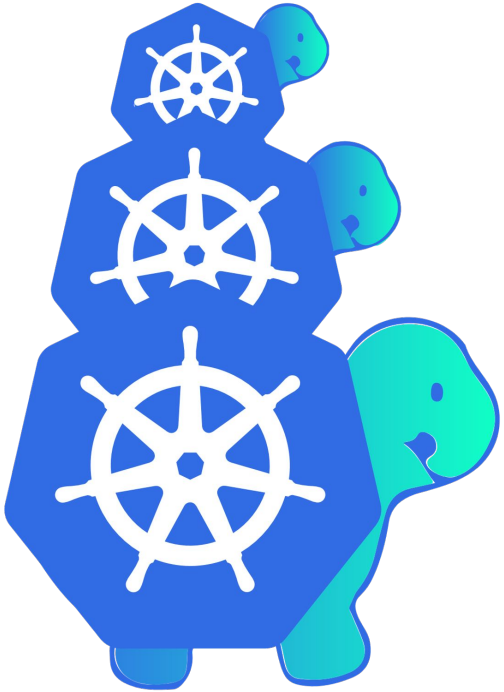
- What is Cluster API (CAPI)
- How Proxmox works with CAPI
- GitOps + ClusterAPI + Proxmox = ❤️
- Replicating the same process using Kubevirt

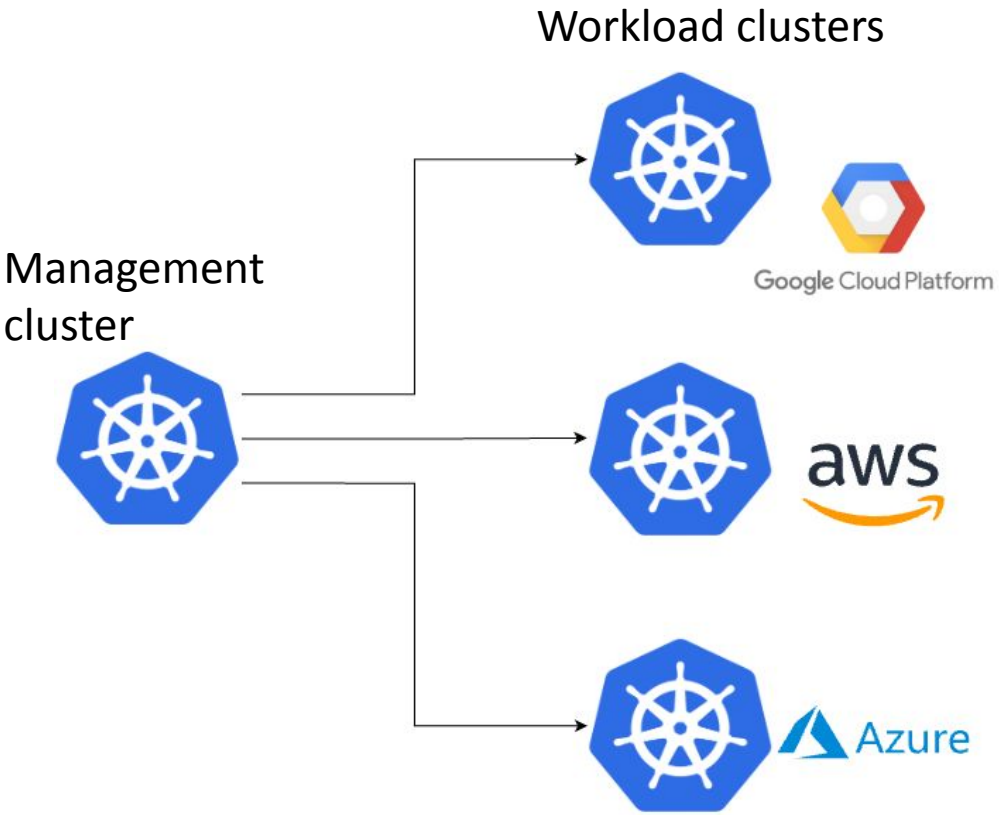
Demo Materials

- All materials from demos available in GitHub

https://github.com/capi-samples/fosdem-24

Cluster API



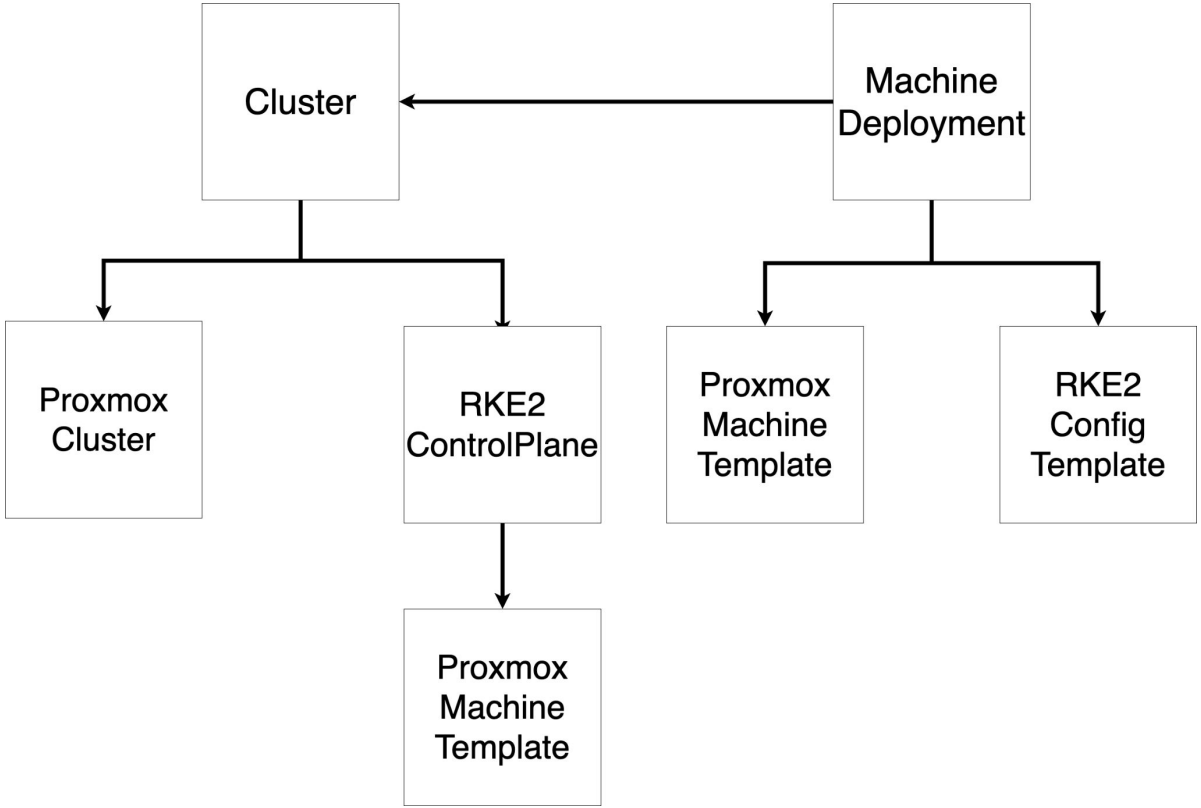

Workload clusters
Management cluster
Google Cloud Platform
aws
Azure

Proxmox Virtual Environment (VE)

- Virtualization platform
  - KVM
  - LXC
- Open source
- Management via Web UI, CLI & API
- Includes security, storage, networking management, HA etc.
- 2 Cluster API infrastructure providers

https://www.proxmox.com/en/

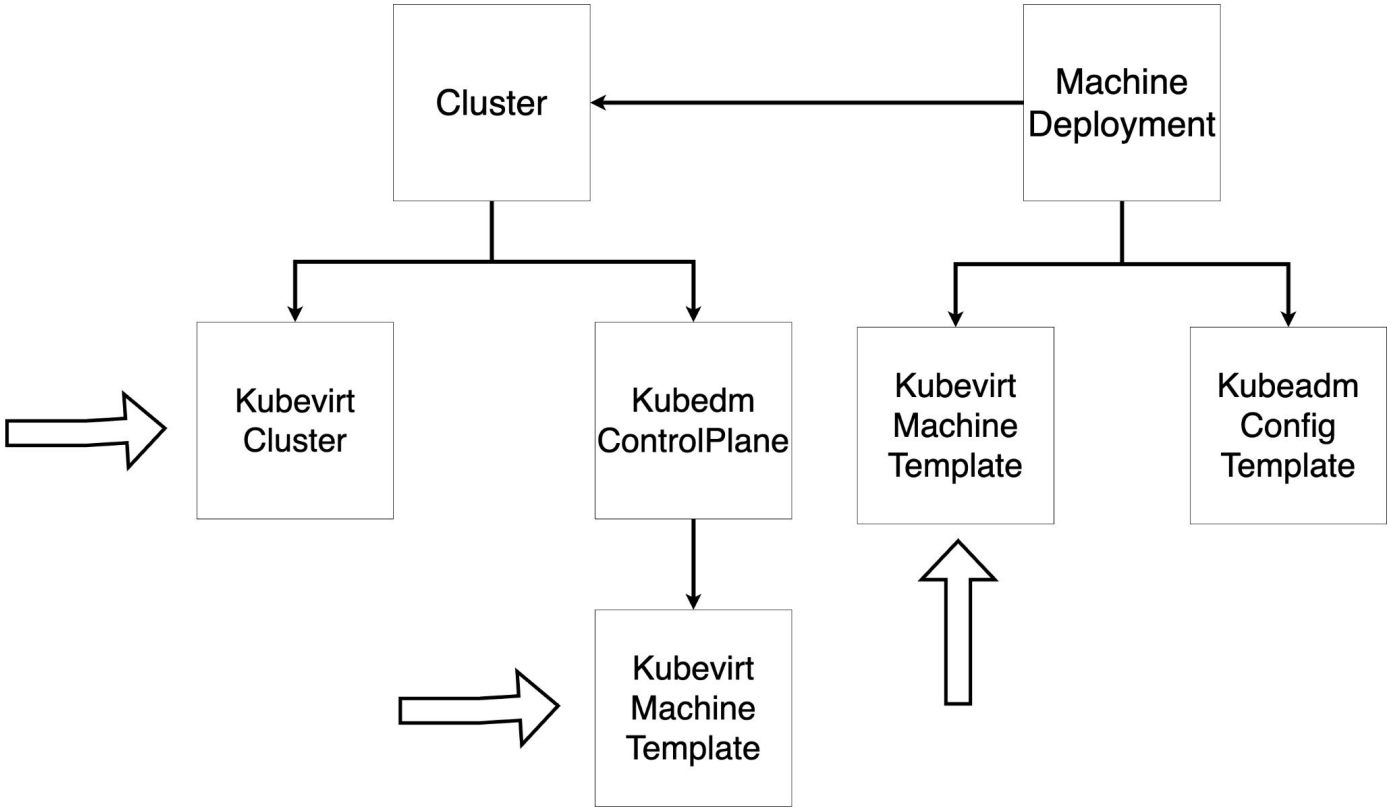
Cluster API + Proxmox



Demo

Cluster provisioning using Proxmox

Cluster API + Kubevirt



Demo

Cluster provisioning using Kubevirt

Key take aways

- CAPI support many infrastructure environments:
  - Hyperscaler cloud (e.g. AWS, Azure, GCP)
  - Other cloud services (e.g. Hetzner, Oracle, Equinix Metal)
  - Virtualisation (e.g. vSphere, Proxmox, Kubevirt, Microvm)
  - Baremetal (e.g. Metal3, Tinkerbell, MaaS)
  - Other (e.g. Kamaji, vCluster, EKS-A)
- CAPI Supports many “flavors” of Kubernetes:
  - Pure upstream (i.e. via kubeadm)
  - Other (e.g. k3s, rke2, talos, eks-d)
- Fully declarative clusters
  - Great for GitOps