Cluster API: Deploy MicroK8s cluster on every cloud

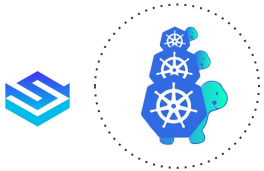
CANONICAL ubuntu

Cluster API sharing sessions

- Deploy MicroK8s cluster on every cloud
- Day 0 operations: Types of deployments, access the deployed cluster, scaling the cluster, managing add-ons
- Day 2 operations: Upgrade workload cluster, upgrade management cluster, management cluster migrations

Canonical Kubernetes solution

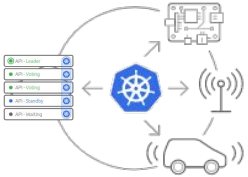
Install, maintain, upgrade, and integrate infrastructure and apps across clouds



Automate cluster lifecycle management

Charmed Kubernetes

MicroK8s



Amazon EC2

openstack.

Azure VM

IBM Cloud

Google Compute Engine

DigitalOcean

VMware PKS

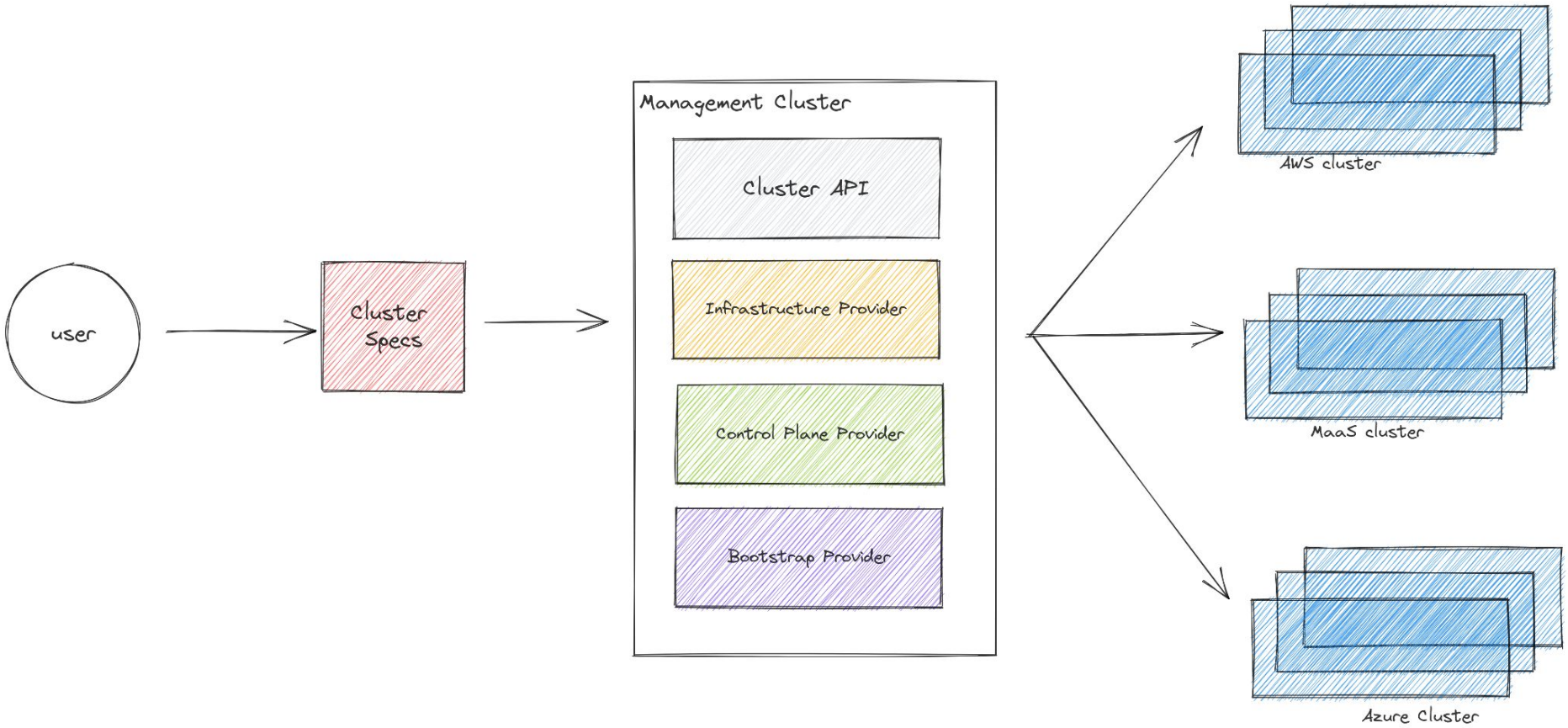
MAAS

2 Provisioning and LCM

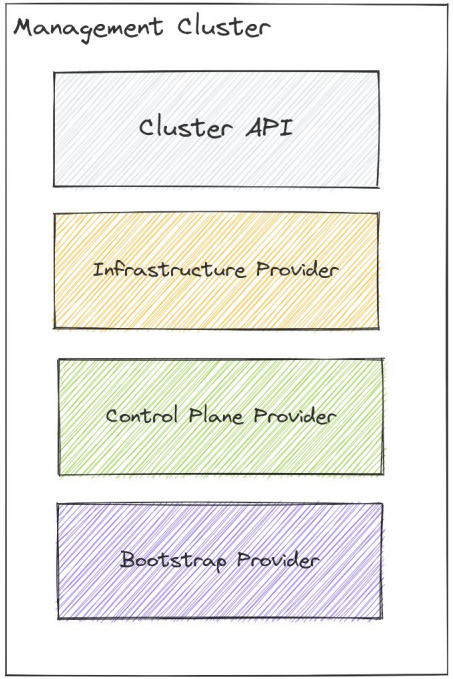
2 K8s distributions

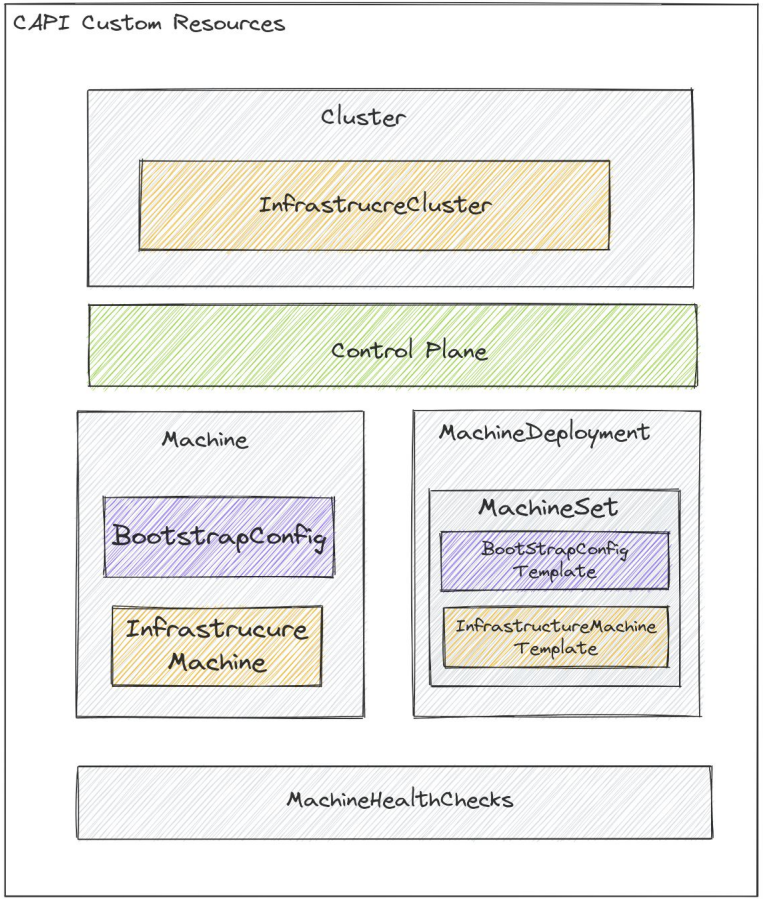
+20 Infrastructure providers

Cluster API: Multi-cloud and Multi-cluster



Basic concepts and CRDs





All these components in management cluster are custom resource managed by their respective controllers.

- **Cluster API**: Provides CAPI specific CRDs like Machines, MachineSets, Cluster etc.
- **Bootstrap Provider:** Turns a VM/server into a K8s node.
- **Control Plane Provider**: Serves the Kubernetes API and continuously reconciles desired state using reconciller loops.
- **Infrastructure Provider**: Provisions infrastructure/computational resources required by the Cluster or by Machines.

Use Cases and Benefits

- Managing the Cluster Lifecycle
- Easily upgrading Clusters
- Scaling
- Self-Healing
- Managing Multiple Clusters

MicroK8s providers

Cluster API bootstrap provider MicroK8s[1][2]: Responsible for generating a cloud-init script to turn a Machine into a Kubernetes Node. This implementation uses MicroK8s for Kubernetes bootstrap.

Cluster API control plane provider MicroK8s[3]: Responsible for managing the control plane of the provisioned clusters using MicroK8s.

[1] https://github.com/canonical/cluster-api-bootstrap-provider-microk8s

[2] https://cluster-api.sigs.k8s.io/tasks/bootstrap/microk8s-bootstrap.html

[3] https://github.com/canonical/cluster-api-control-plane-provider-microk8s

Provider Implementations

The code in this repository is independent of any specific deployment environment. Provider specific code is being developed in separate repositories, some of which are also sponsored by SIG Cluster Lifecycle. Check provider's documentation for updated info about which API version they are supporting.

Bootstrap

- EKS
- Kubeadm
- MicroK8s
- Talos

Control Plane

- Kubeadm
- MicroK8s
- Nested
- Talos

Source: https://cluster-api.sigs.k8s.io/reference/providers.html

Time for a demo