# AKRAINO BLUEPRINT FAMILY "KUBERNETES-NATIVE INFRA FOR EDGE"
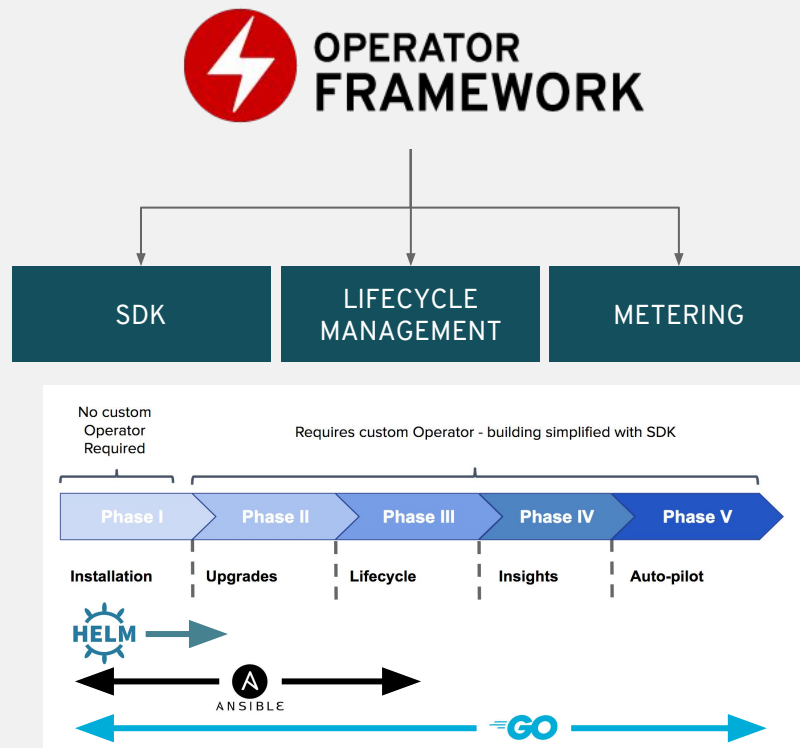
2018-11-15

Kubernetes Cluster API

- Brings declarative, Kubernetes-style APIs for cluster creation, configuration & management.
- Implemented using Kubernetes Operators to scale, upgrade, heal, etc. clusters in fully automated, provider-agnostic manner.
- Integrates with provider-specific Machine Controllers and Machine Config Daemons for cloud, virt. & baremetal environments.

  ➜ Manage your clusters consistently independently of where/how it's deployed.

- New working group under Kubernetes Cluster Lifecycle SIG

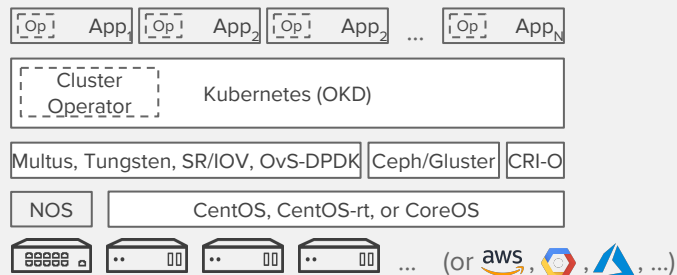https://github.com/kubernetes-sigs/cluster-api
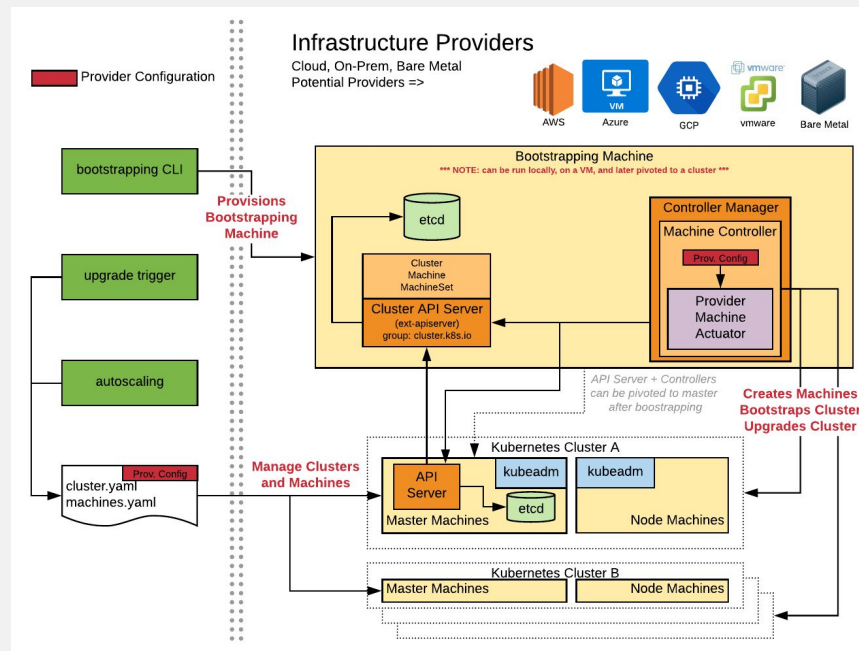
Operator Framework

- Automate day 2 lifecycle management of containerized applications in Kubernetes
- Leverage CRDs to deploy Kubernetes native services that can access Kube API events
- Operator SDK simplifies creation of Operators in Go (or leverage Helm or Ansible automation)
- Helm Operator allows you to convert Helm Charts into Operators
    - Deploy Charts without requiring Tiller
    - Leverage Kube RBAC to deploy Charts
    - Automated, over the air updates for Chart deployed services

OPERATOR FRAMEWORK

SDK	LIFECYCLE MANAGEMENT	METERING

No custom Operator Required

Requires custom Operator - building simplified with SDK

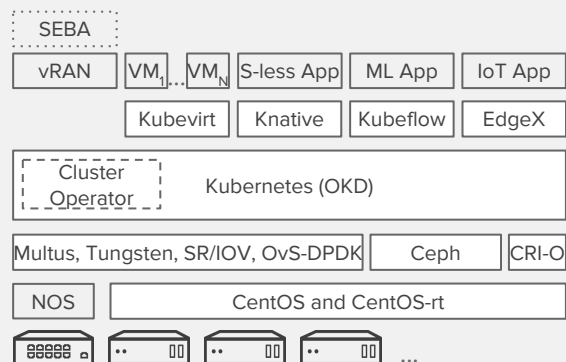| Phase I	Phase II	Phase III	Phase IV	Phase V
Installation	Upgrades	Lifecycle	Insights	Auto-pilot

HELM

ANSIBLE

GO

redhat.

"Kubernetes-Native Infra (KNI) for Edge" Family

- Family of Blueprints based on a self-managing Kubernetes cluster
- Implements the Kubernetes Community's Cluster API & Operator
- Standardizes on Kubernetes Operators for App LCM
- Supports performance-sensitive container workloads requiring multi-NIC, real-time, HW accel., etc.
  - NFV, IoT, AI/ML, ...
- Supports VM workloads via KubeVirt
- Multi-site Kubernetes Federation

| Op App₁ | Op App₂ | Op App₂ | ... | Op Appₙ |

| Cluster Operator | Kubernetes (OKD) |

| Multus, Tungsten, SR/IOV, OvS-DPDK | Ceph/Gluster | CRI-O |

| NOS | CentOS, CentOS-rt, or CoreOS |

... (or aws, , , ...)

redhat.

"KNI for Multi-Access Edge" Blueprint

- KNI Blueprint for provider multi-access edge use cases
- Runs containerized vRAN and/or vBNG (possibly SEBA) workloads
- Supports various types of edge apps via its middlewares:
  - VM-based (Kubevirt)
  - AI/ML (Kubeflow)
  - serverless (Knative)
  - IoT (EdgeX)

redhat.