KubeCon | CloudNativeCon

North America 2018

Running VM Workloads Side by Side with Container Workloads

Intro

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Virtualization Extension

Kubernetes: Container **Platform**

Virtualization Extension

Kubernetes: Container **Platform**

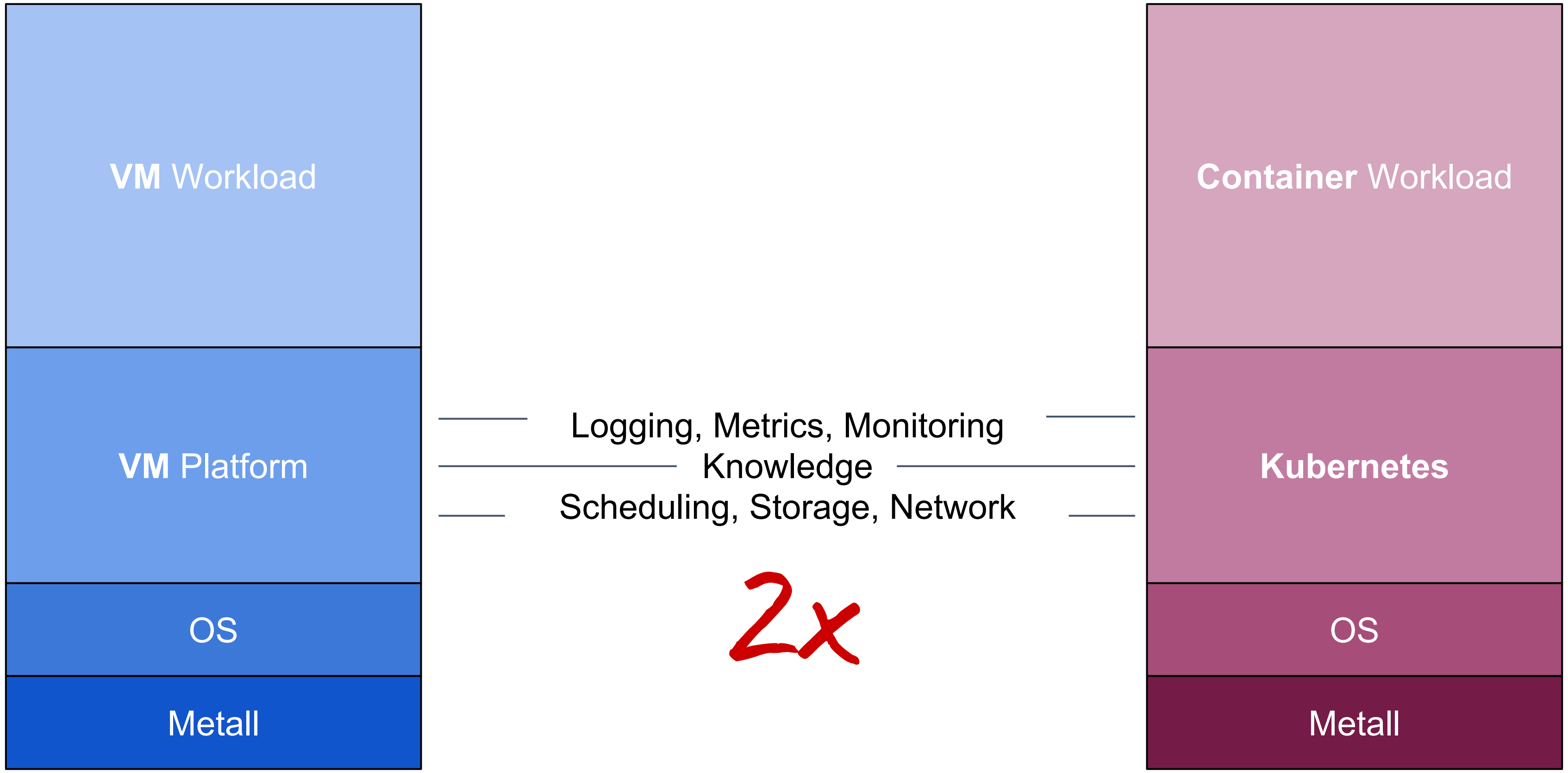
KubeVirt: Virtualization **Extension**

But… Why KubeVirt?

- Already have on-premise solutions like Openstack, oVirt
- And then there's the public cloud, AWS, GCP, Azure.
- Why would we do this VM management stuff yet again?

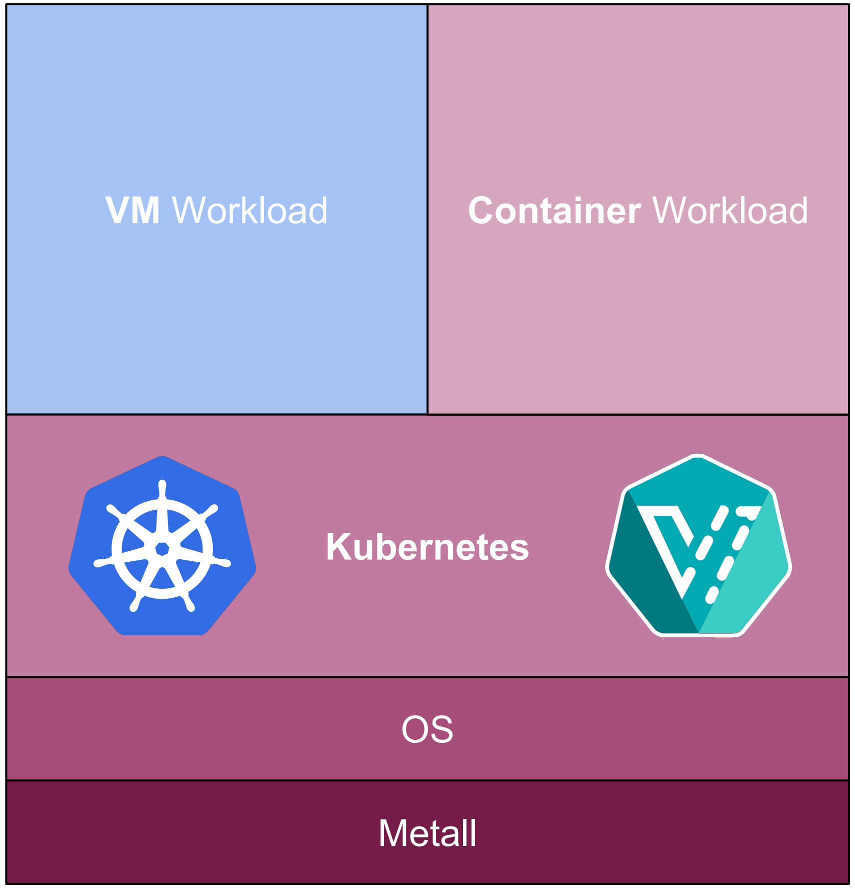
Infrastructure Convergence

Old Way … Multiple Workloads, Multiple Stacks



Infrastructure Convergence

KubeVirt way… Multiple Workloads, One Stack



VM Workload

Container Workload

Kubernetes

OS

Metall

- Logging, Metrics, Monitoring
- Knowledge
- Scheduling, Storage, Network

1x

Workflow Convergence

- Converging VM management into **container management workflows**.
- Same tooling (**kubectl**)
- **Declarative API** for VM management (just like pods, deployments, etc...)

```
# Creating a POD
$ cat <<EOF | kubectl create -f
-
apiVersion: v1
kind: Pod
...
spec:
  containers:
  - name: busybox
    image: busybox
...
```

```
# Creating a Virtual Machine
$ cat <<EOF | kubectl create -f -
apiVersion: kubevirt.io/v1alpha1
kind: VirtualMachineInstance
...
spec:
  domain:
    cpu:
      cores: 2
    devices:
      disk: fedora29
...
```

Simplicity

- Drops into any existing kubernetes cluster.
- No runtime level configuration required
- No per node configuration required.
- Just works.

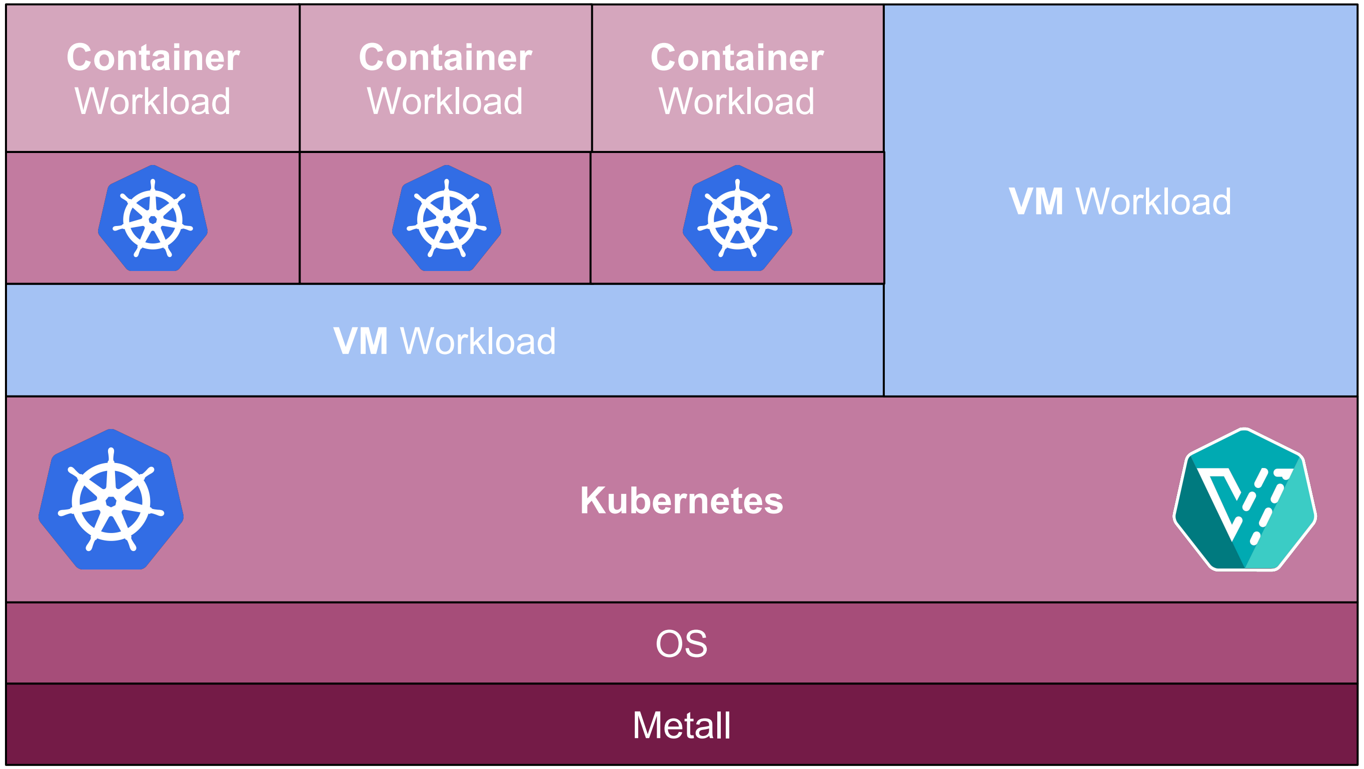
```
# As simple as posting one of our release manifests to a kubernetes cluster
$ kubectl create -f https://github.com/kubevirt/kubevirt/releases/download/v0.11.0/kubevirt.yaml
```

```
# Then start posting Virtual Machine manifests to launch VMs.
$ kubectl create -f my-vm.yaml
```

Demo

https://bit.ly/2LfD5xK

Multi-Cluster with KubeVirt



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ClusterAPI

- Declarative, Kubernetes-style APIs to cluster creation, configuration, and management.

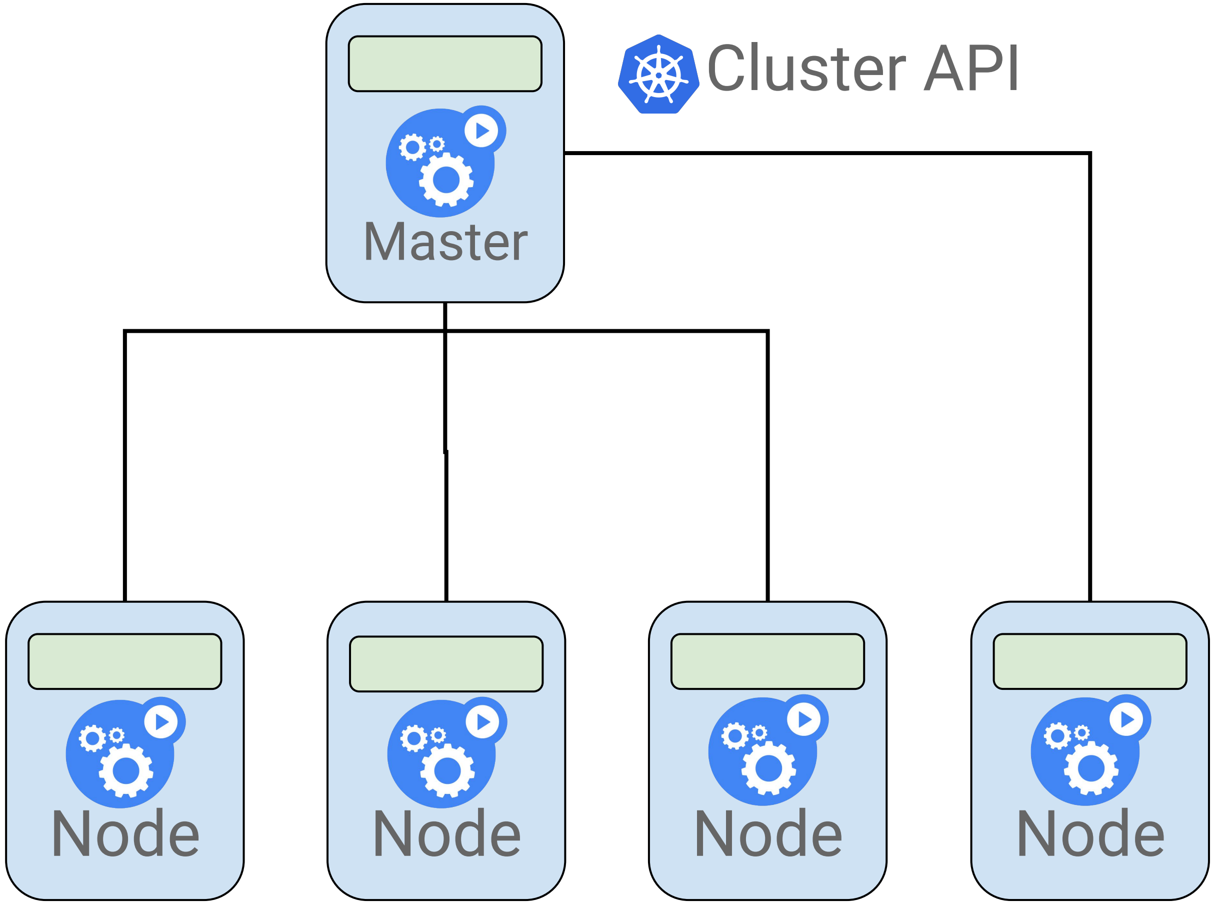
- Machine API manages the lifecycle of maschine in Kubernetes

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

Kubernetes Native Integration

- Generic cluster scaling
- Pets vs cattle for nodes
- Implementation of generic auto scaling possible
- Very similar setup for different provider

```
kubectl create machines
```



Machines/Nodes

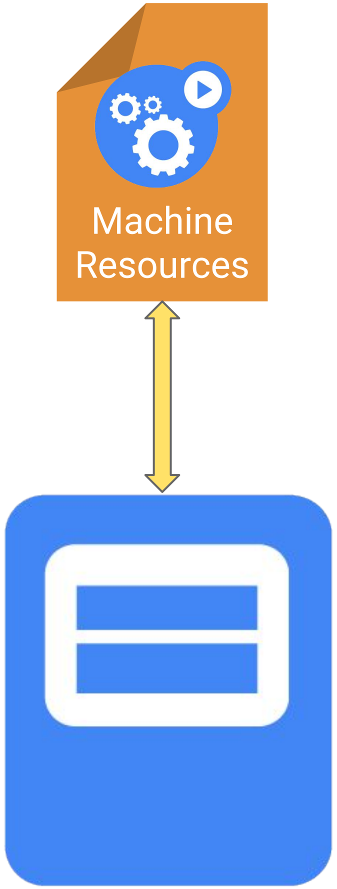
- A "Machine" is the declarative spec for a Node, as represented in Kubernetes core.
- After provisioning a new Node matching the Machine spec is registered.

MachineController

Watches for new `Machine` resources

Provision the machine using provider-specific drivers

- Machine joins the cluster
- Kubelet creates the Node resource



How to implement a new provider?

```
// Provider exposed all required functions to interact with a cloud provider
type Provider interface {
  AddDefaults(spec v1alpha1.MachineSpec) (v1alpha1.MachineSpec, bool, error)

  // Validate validates the given machine's specification.
  //
  // In case of any error a "terminal" error should be set,
  // See v1alpha1.MachineStatus for more info
  Validate(machinespec v1alpha1.MachineSpec) error

  // Get gets a node that is associated with the given machine.
  //
  // Note that this method can return what we call a "terminal" error,
  // which indicates that a manual interaction is required to recover from this state.
  // See v1alpha1.MachineStatus for more info and TerminalError type
  Get(machine *v1alpha1.Machine) (instance.Instance, error)

  GetCloudConfig(spec v1alpha1.MachineSpec) (config string, name string, err error)

  // Create creates a cloud instance according to the given machine
  Create(machine *v1alpha1.Machine, update MachineUpdater, userdata string) (instance.Instance, error)

  Delete(machine *v1alpha1.Machine, update MachineUpdater, instance instance.Instance) error
}
```

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github.com/kubermatic/machine-controller/../kubevirt/provider.go

Demo

Where to get it and how to use it?

- github.com/kubevirt/kubevirt
- github.com/kubermatic/machine-controller

```
make deploy
kubectl apply -f examples/kubevirt-0.10.0.yaml
kubectl apply -f examples/kubevirt-machinedeployment.yaml
```

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