KubeCon
CloudNativeCon
Europe 2020
Virtual
HELM
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CONNECTED

Using KubeVirt to Run VMs at Scale

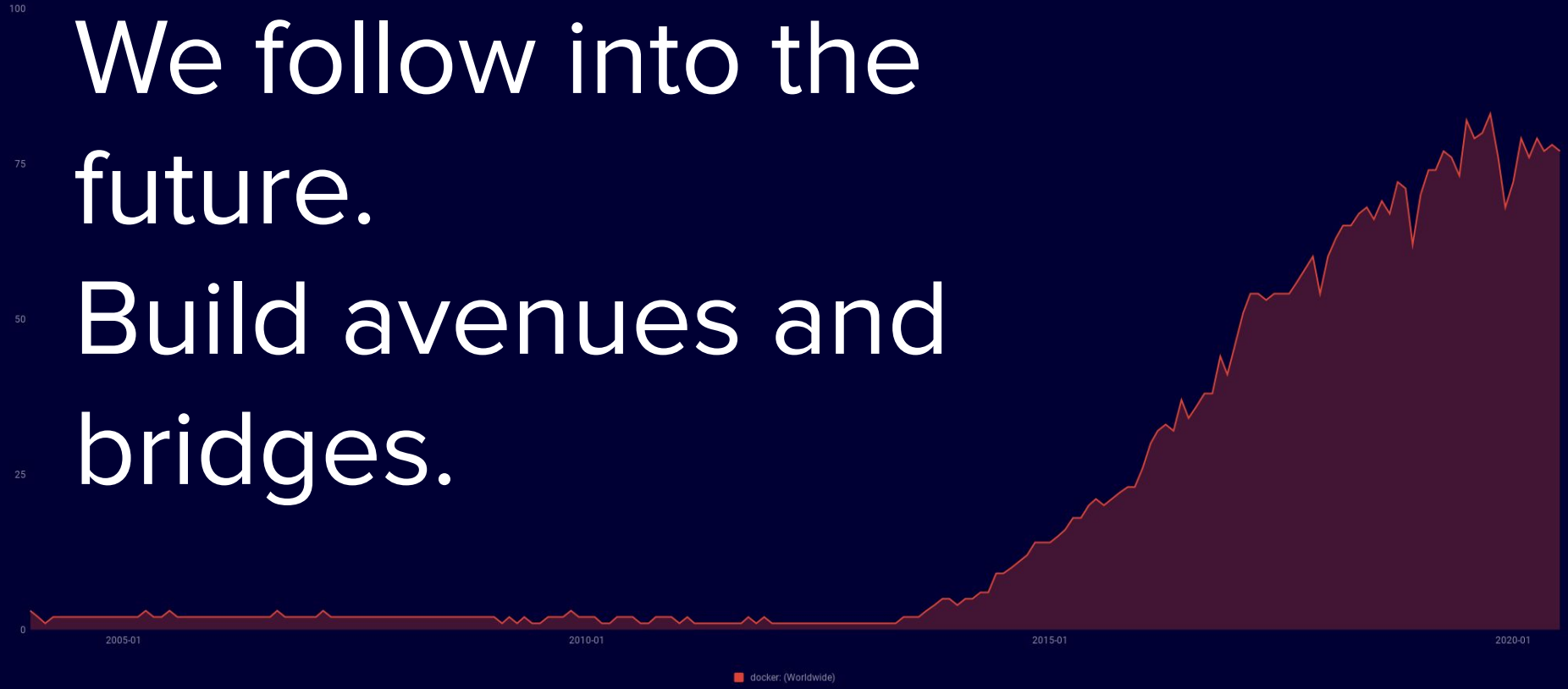
Marcus Sorensen, Apple Inc
Fabian Deutsch, Red Hat

- Fabian
  - Intro
  - Architecture
  - ~~Classical VM use case with OKD UI~~
- Marcus
  - Running KubeVirt in production
  - Lessons learned and pain point

The future is bright

The future is brighter with Kubernetes

We follow into the future.
Build avenues and bridges.



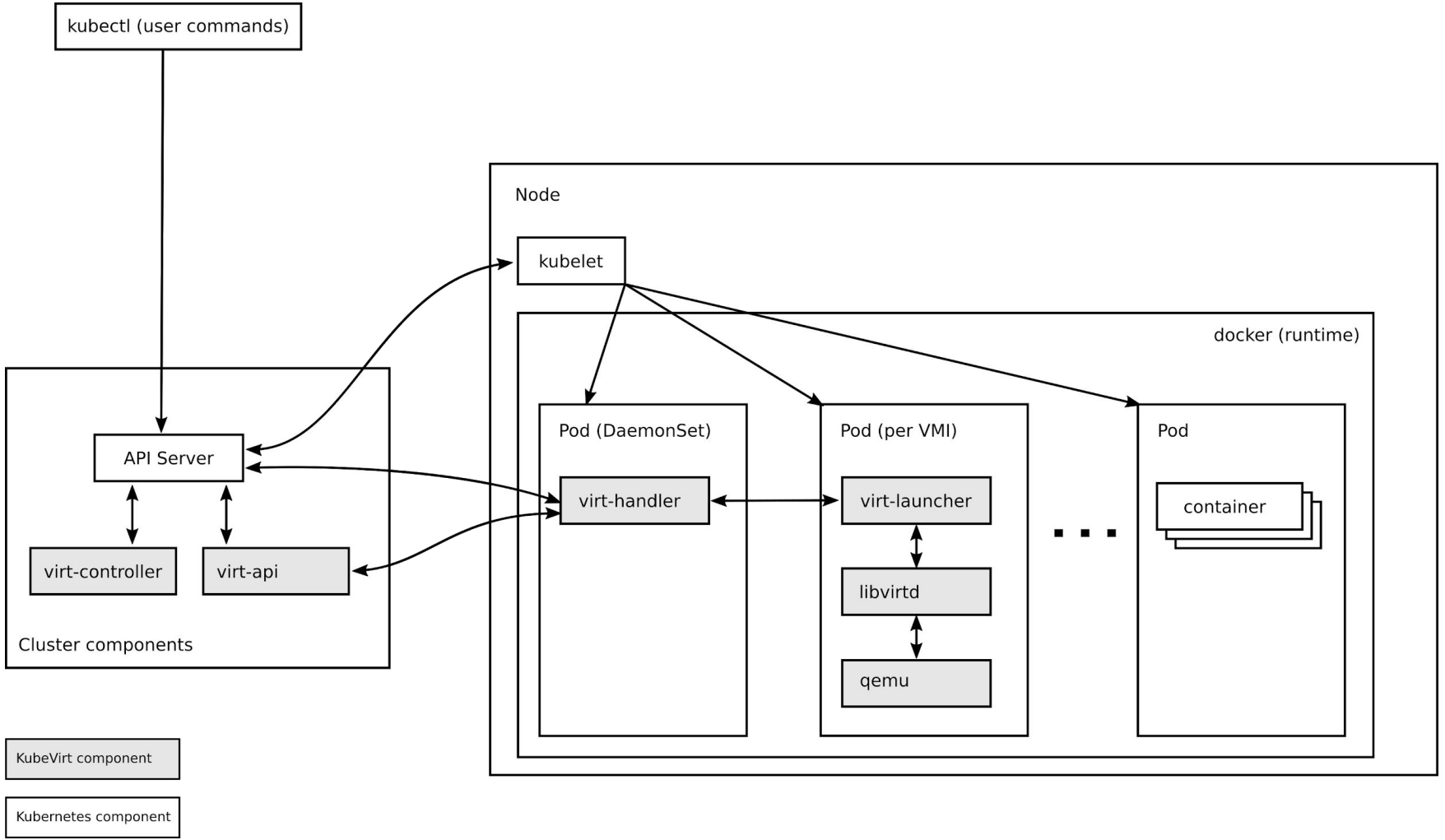
Legacy does not go away.
Keep what you need.

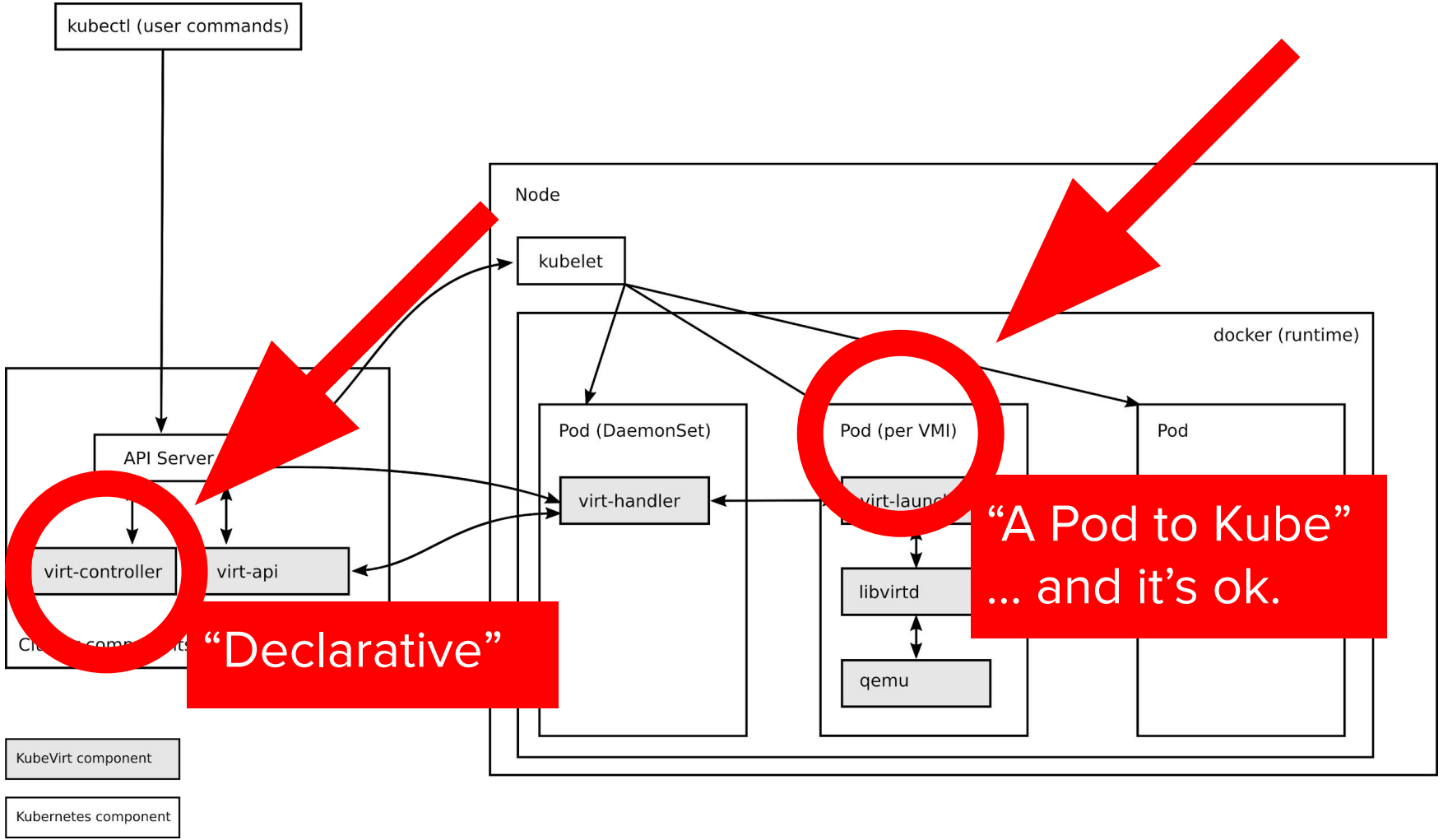
CLOUD NATIVE
COMPUTING FOUNDATION

CNCF Sandbox Project

Marry Virtual Machines ..... Legacy and Kubernetes ..... Future*

Using common Kubernetes ingredients: Operators, CRDs, and Pods


kubectl (user commands)
Node
kubelet
docker (runtime)
API Server
virt-controller
virt-api
Cluster components
Pod (DaemonSet)
virt-handler
Pod (per VMI)
virt-launcher
libvirtd
qemu
Pod
container
KubeVirt component
Kubernetes component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Node
kubelet
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API Server
Pod (DaemonSet)
Pod (per VMI)
Pod
virt-handler
virt-launch
virt-controller
virt-api
libvirtd
qemu
“Declarative”
“A Pod to Kube”
... and it’s ok.
KubeVirt component
Kubernetes component

```
$ kubectl …
# to rule them all
```

Start, Stop,

Live Migration,

Multi Network, SR-IOV ..... multus*

Block Storage, ... Persistent Volumes

Snapshots, ... Volume Snapshots

...

Develop on and use One platform

Enable developer self-service, simplify and unify access to resources.

➔ Kube-on-Kube

Kubernetes hosted on KubeVirt. Nothing else.

Operate
One platform

Concentrate an organization's knowledge on operating Kubernetes

Scale
One platform

Using common Kubernetes ingredients: Operators, CRDs, and Pods

Marcus Sorensen

Cloud Developer, Apple Inc

Why KubeVirt?

- Enables VM workloads to leverage Kubernetes
- Enables single compute platform for containers and VMs
- Works with standard upstream Kubernetes

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Added --kubelet-pods-dir to virt-handler

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- Implicit requirement for NET_RAW capability, fixed

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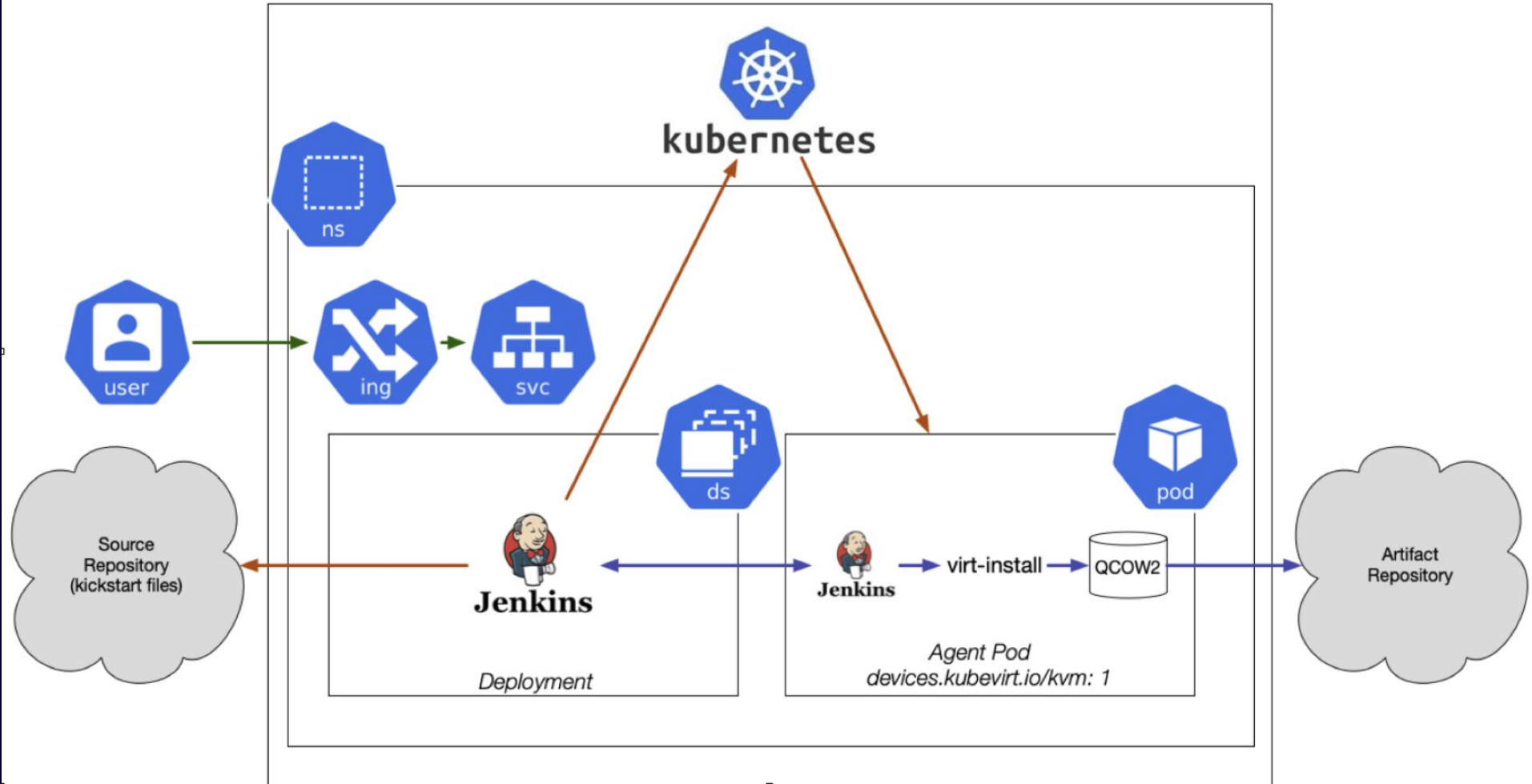
- Opinionated virt-operator deployment model
- Usage of self-signed certificates and CA
- No support for a custom kubelet root path
- Implicit requirement for NET_RAW capability, fixed
- Found and fixed Containerd incompatibility

Infrastructure Developer Use Cases

VM Template Builder

VM Template Build Pipeline



Kubernetes Pod Template

Name	jenkins-virt
Namespace	
Labels	virt
Usage	Only build jobs with label expressions matching this node
Pod template to inherit from	jenkins-default
Max number of instances	4
Pod Retention	On Failure
Time in minutes to retain agent when idle	60
Time in seconds for Pod deadline	3600
Timeout in seconds for Jenkins connection	90
Annotations	Add Annotation

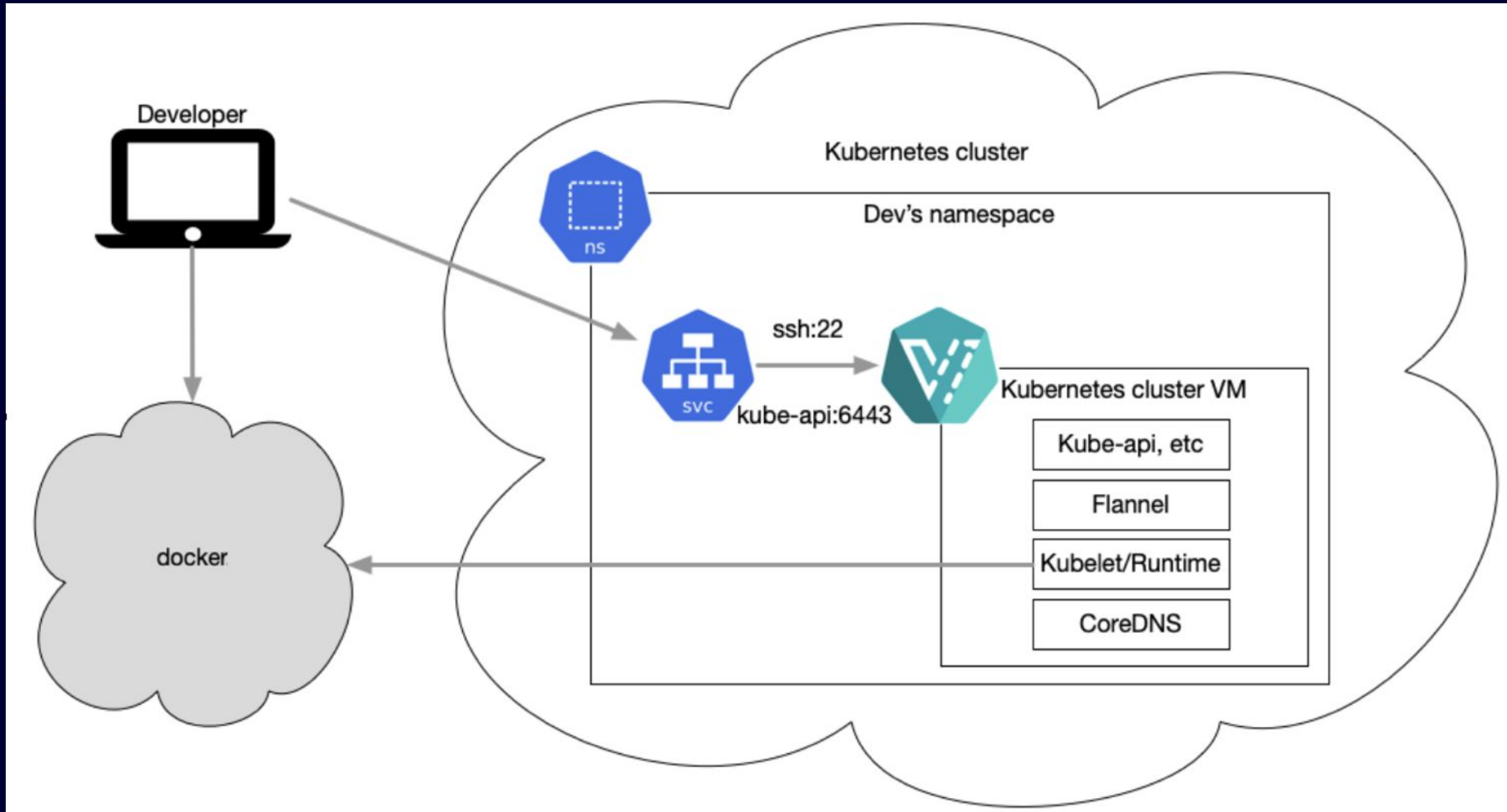
List of annotations to set in slave pod

Raw yaml for the Pod

```
resources:
  limits:
    cpu: "2"
    devices.kubevirt.io/kvm: "1"
    memory: 4Gi
  requests:
    cpu: "1"
    devices.kubevirt.io/kvm: "1"
    memory: 2Gi
```

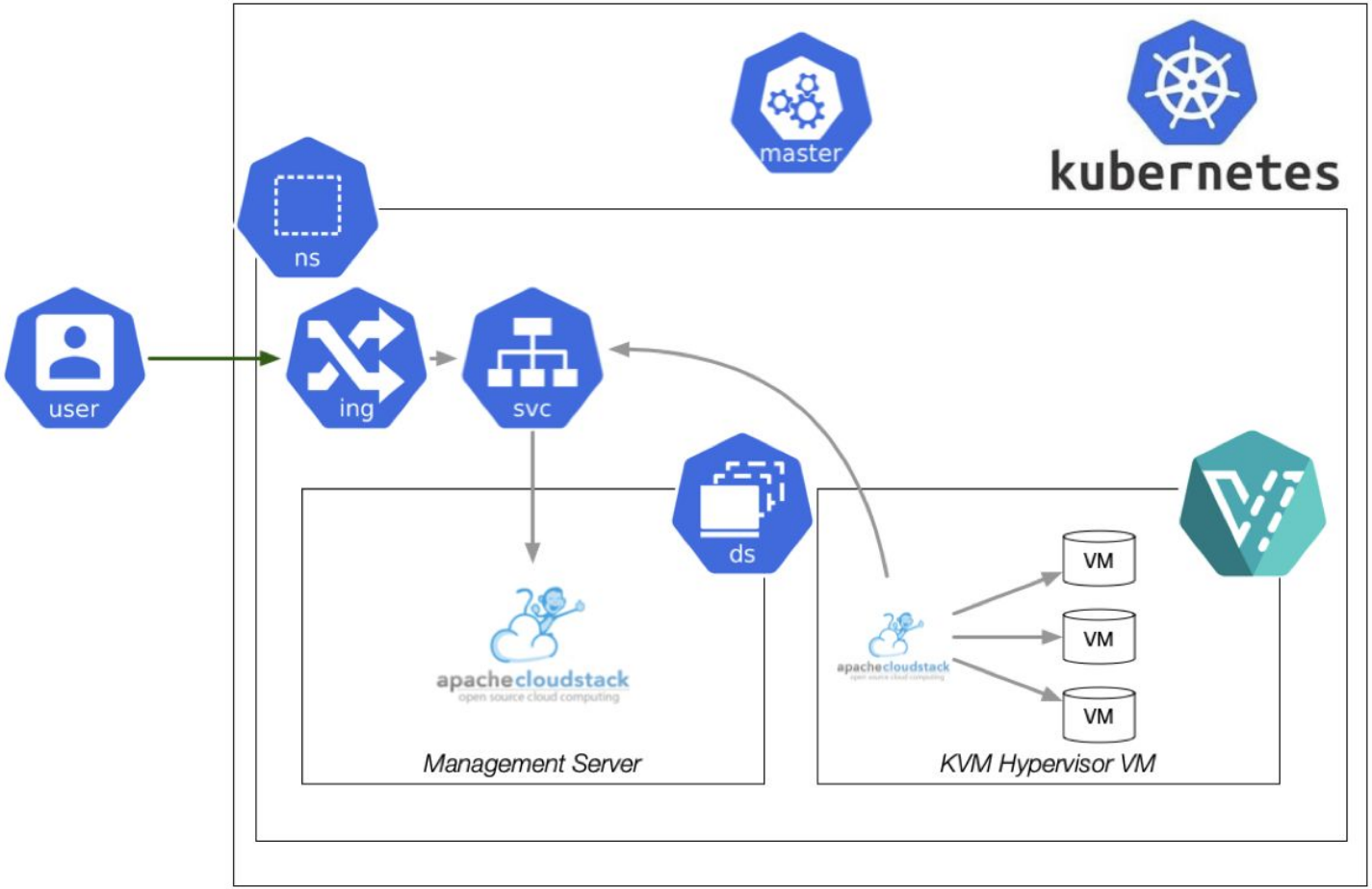
Virtual

Kubernetes Clusters


Developer
Kubernetes cluster
ns
Dev's namespace
ssh:22
svc
kube-api:6443
Kubernetes cluster VM
Kube-api, etc
Flannel
Kubelet/Runtime
CoreDNS
docker

Hypervisor Development

Cloud Development/Test Environment



Kubernetes Node Nested KVM Support

```
# cat  /etc/modprobe.d/kvm.conf

options kvm_intel nested=1

options kvm_amd nested=1
```

Other Use Cases

- Appliances
- Other OS
- Bare metal requests

Tips

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- Containerized Data Importer **DataVolume**

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- Watch quotas and IP use with virt-handler

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- KubeVirt tests can be run as a cron job
- Containerized Data Importer DataVolume
- Watch quotas and IP use with virt-handler
- /dev/kvm can be used standalone

Thank You!

Q&A