



ArgoCon

Scaling to Thousands of Data & CI/CD Pipelines Using Argo and Virtual Clusters

Tim Collins - Pipekit | Lukas Gentele - Loft

INTROS



Tim Collins

Senior Infrastructure Engineer @ [Pipekit.io](https://pipekit.io)

- Can be found living in the CNCF Argo Slack.
- Member of the Pipekit Services team
- Terrible Guess Who character.



Lukas Gentile

CEO @ [Loft Labs](https://loftlabs.com)

- OSS Projects: vCluster, DevPod, DevSpace
- German living in San Francisco
- Meet me at KubeCon booth C15



THE PROBLEM



What is Pipekit?

- A control plane for Argo Workflows
 - Makes multi-cluster a breeze
 - Enterprise-level RBAC
 - A central pane of glass for managing everything Argo Workflows
- Bring your own clusters
 - Install the Pipekit Agent into your cluster to manage your Workflows

The Challenge

- We want people to try Pipekit.
- Enterprises can be slow to provide clusters for free trials.
- Company policy often prevents running a local cluster.

The customers that want to self-host won't have a cluster available to trial Pipekit with.



GOALS

- New trialists should be running their first Pipe (Workflow) within 5 minutes of signing up.
- Reduce the friction for getting started with Pipekit by hosting a free trial cluster.
 - must not compromise on security.
 - the workflows of one trialist must not negatively affect another trialist.



SOLUTIONS

EKS Clusters

✗ - Won't meet our 5 minute goal

✗ - Jeff Bezos is rich enough

✓ - Meets security/isolation requirements

One EKS Cluster

✓ - Meets our 5 minute goal

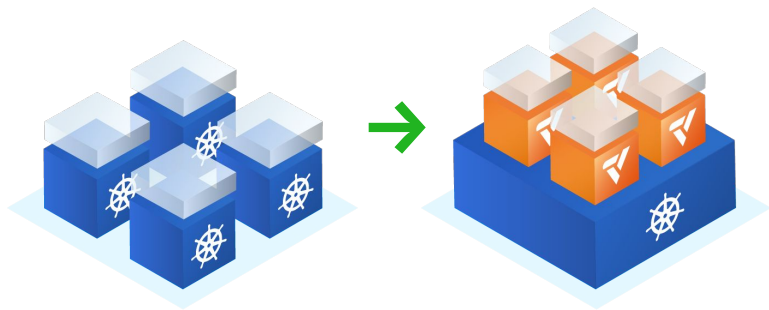
✓ - Not too expensive

✗ - Security/Isolation concerns.

Another Way?



= Virtual Clusters



Virtual clusters run as containers
inside namespaces of “real” cluster



Virtual Kubernetes Clusters

vCluster is the only certified Kubernetes distro
for creating virtual Kubernetes clusters



40 Million+
vClusters Created



3,500+
GitHub Stars

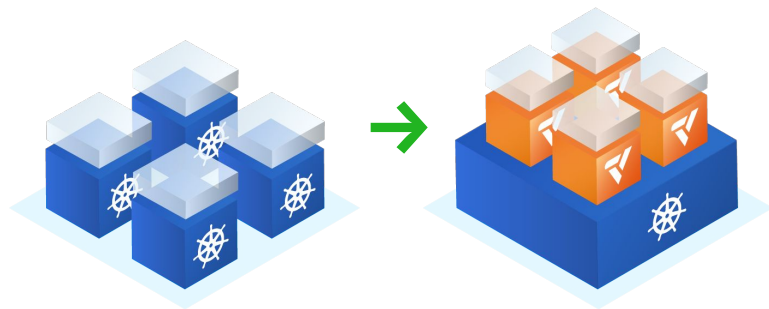
github.com/loft-sh/vcluster

| www.vcluster.com



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= Virtual Clusters



Virtual clusters run as containers
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vCluster / Advantages

- **Faster**
 - Virtual Clusters start in <30 seconds
- **Cheaper**
 - 40-70% Cost Savings
- **BUT Still Secure**
 - Isolated Control Plane for each vcluster
- **AND Reliable + Production-Grade**
 - Battle-Tested by companies like:

atlan

gofundme™

CoreWeave

Outreach

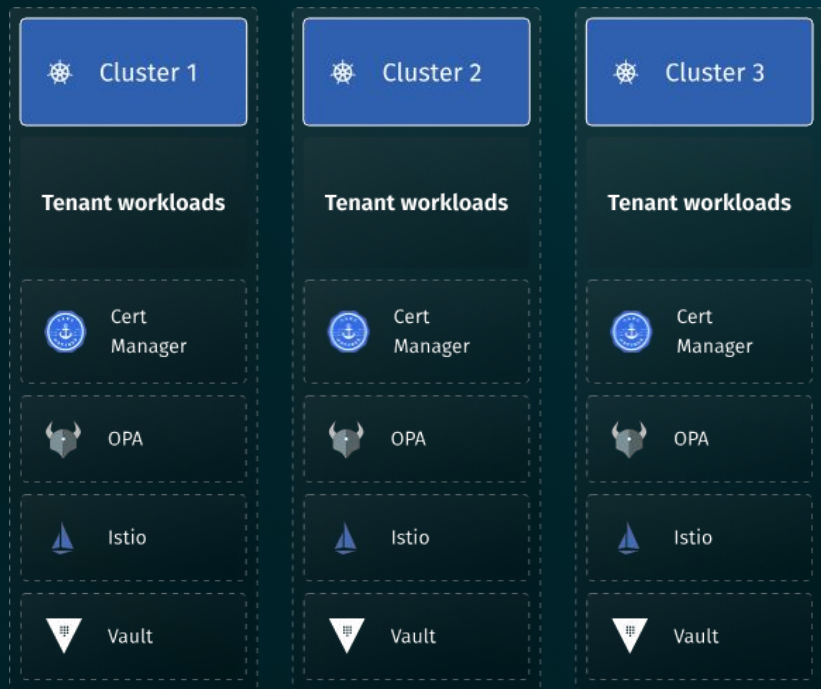
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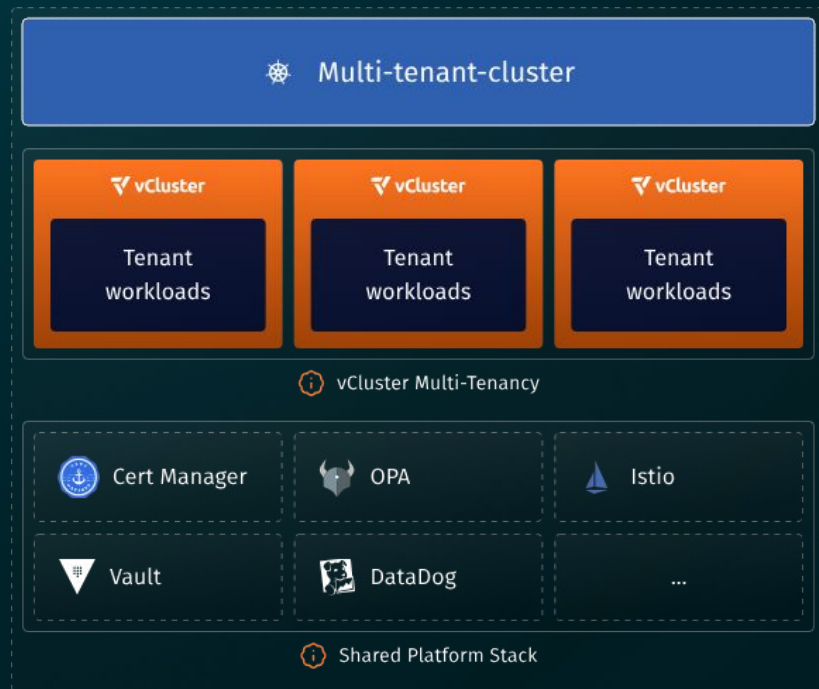
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vCluster = Secure Multi-Tenancy

Without vCluster



With vCluster



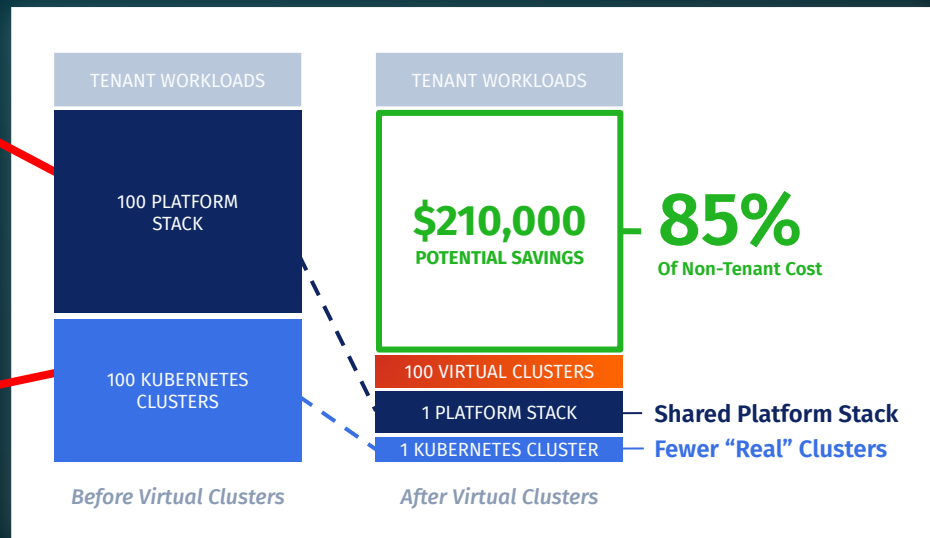


\$160,000 Cost For 100 Platform Stacks

- \$1,600 average platform stack cost
- Runs key components such as NGINX Ingress Controller, Cert-Manager, Istio, Open Policy Agent, etc.

\$87,600 Cost For 100 Clusters

- EKS, GKE, and AKS charge \$876 per cluster per year
- Private cloud clusters are usually even more expensive to operate



DEMO

ARGO MAGIC

Argo CD Declarative Setup

- <https://argo-cd.readthedocs.io/en/stable/operator-manual/declarative-setup/>
- <https://argo-cd.readthedocs.io/en/stable/operator-manual/secret-management/>
- <https://github.com/pipekit/argo-workflows-ci-example>

Argo Workflows WorkflowEventBinding

- <https://argoproj.github.io/argo-workflows/events/>
- Can trigger WorkflowTemplates or ClusterWorkflowTemplates
- Used for relatively small event loads. Can process 64 events per Argo Server.
 - Consider Argo Events for larger requests



ARGO MAGIC

Argo Workflows Kubernetes Resource

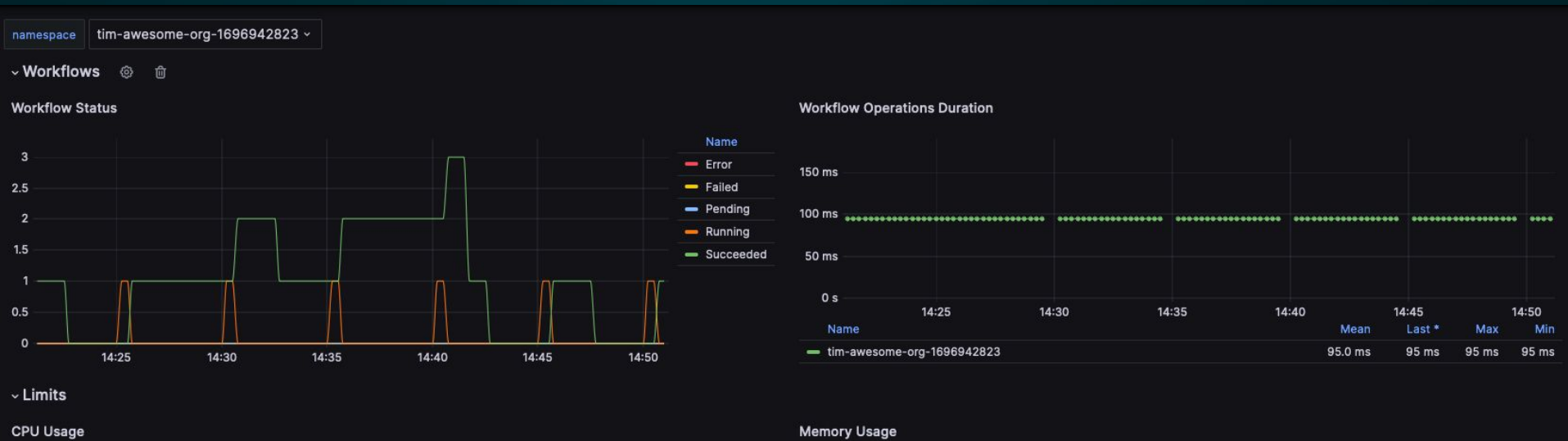
- <https://argoproj.github.io/argo-workflows/walk-through/kubernetes-resources/>
- Can be used to deploy and monitor Argo CD Applications...
- ... but don't. Use gitops!

Argo CD ApplicationSets

- Single Kubernetes manifest to target all our vClusters
- Using the Cluster generator
- <https://argo-cd.readthedocs.io/en/stable/operator-manual/applicationset/>



OBSERVABILITY



- Workflows custom metrics to monitor vCluster deployment time
 - <https://argoproj.github.io/argo-workflows/metrics/>
- Syncing services from vCluster to host allows us to configure serviceMonitors on the host cluster
- Alerting and automation on abuse/failure etc.



DOES IT SCALE?

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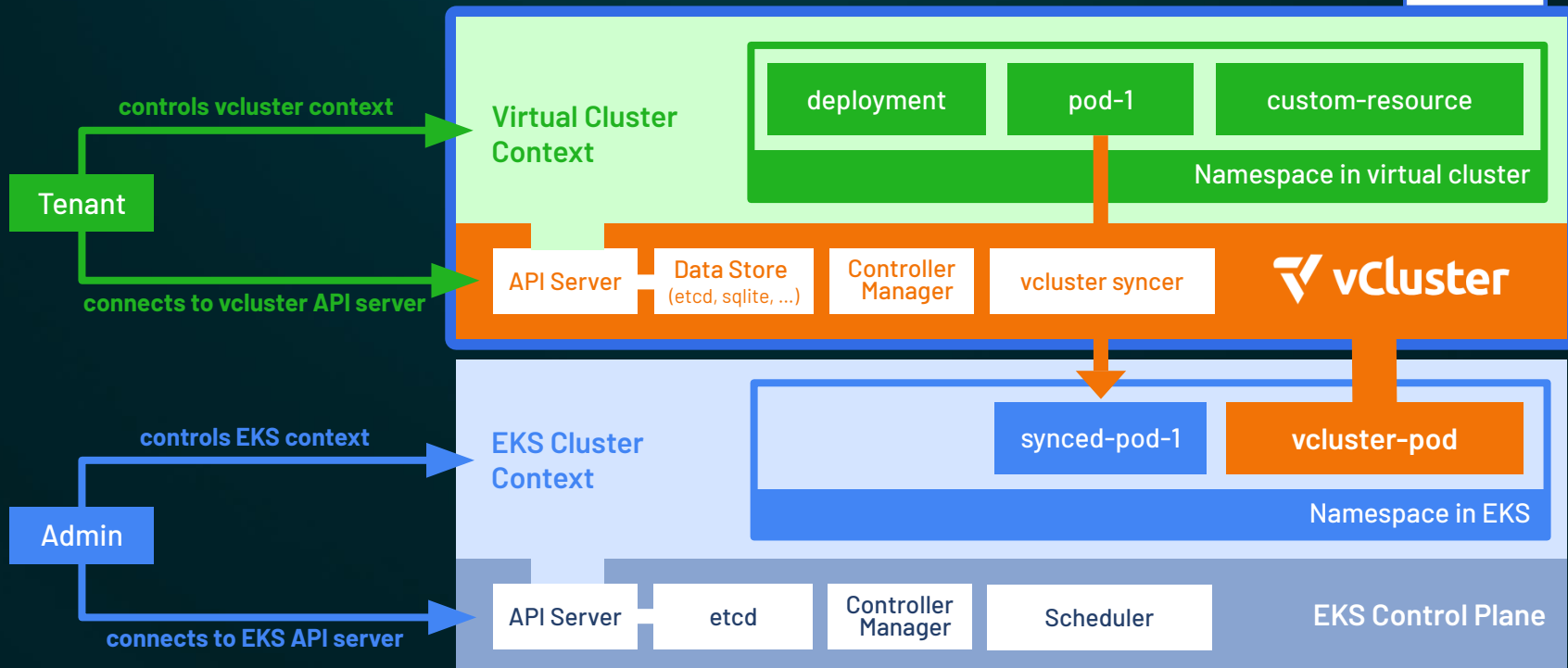
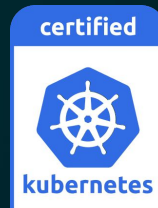


HONOURABLE MENTIONS

- **Spegel Image Cache**
 - A stateless cluster local OCI registry mirror
 - <https://github.com/XenitAB/spegel>
- **Argo CD Lovely Plugin**
 - A plugin to make Argo CD behave like we'd like
 - <https://github.com/crumbhole/argocd-lovely-plugin>
- **Renovate**
 - Automated dependency updates
 - <https://github.com/renovatebot/renovate>
- **Renovate Helm Helper**
 - Enhance renovate helm PRs by merging in values.yaml changes
 - <https://github.com/crumbhole/renovate-helm-helper>



vCluster / Architecture



OTHER VCLUSTER USES AT PIPEKIT

- CI
 - Integration tests
 - Helm Chart CI
- Developer Preview Environments
- Demo Environments



FREE THINGS



- Free 30d trial of Pipekit. Including free trial cluster s.pipekit.io/argocon-vcluster
- Assets related to this talk can be found at github.com/pipekit/talk-demos
- Example workflows (and Hera workflows) to run during your free trial github.com/pipekit/examples



- Controller & CRD for virtual cluster management
- Security-hardened vCluster control plane image
- Management UI for virtual clusters
- Templating and self-service for virtual clusters
- SSO & Audit Logging for virtual cluster
- Enterprise Support & SLAs

Get Started For FREE @ www.vcluster.pro

OR RUN:

```
bash
$ vcluster pro start
Starting vCluster.Pro control plane...
```