Kind-ness for your Kubernetes Clusters

@mauilion

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- Staff Cloud Native Architect at VMware

- Presenter on tgik.io

- I have been helping folks with Kubernetes for 4 years!

- I specialize in Kubernetes Networking and Security.

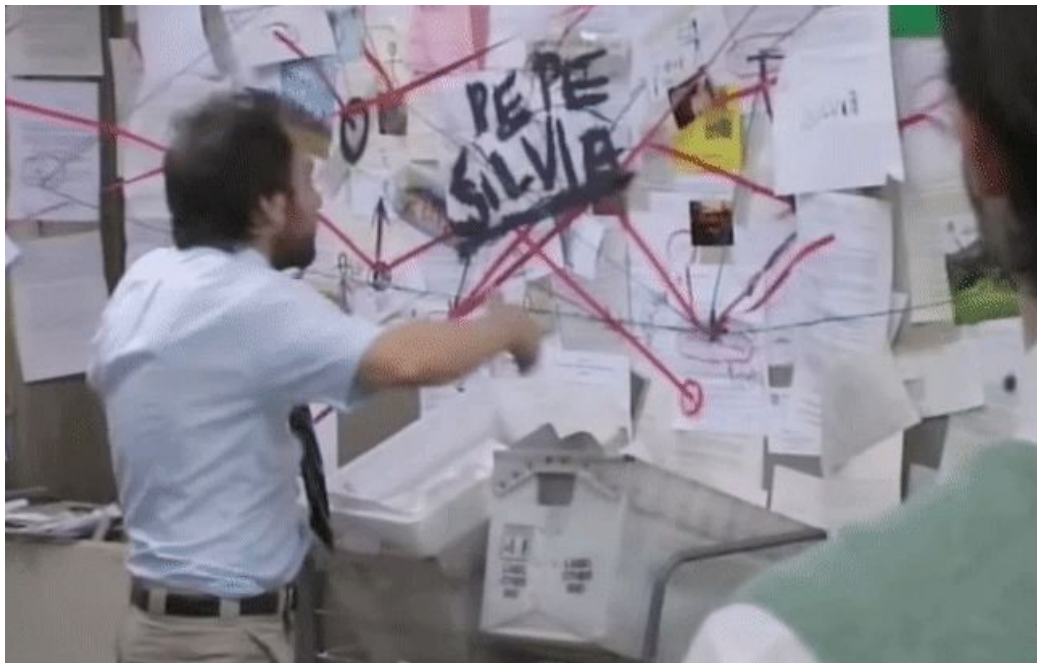- Find me on slack.k8s.io at @mauilion or in #kind!

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I help folks understand

What is kind

Kind is an open source project

- Kubernetes in Docker

- Docs: kind.sigs.k8s.io

- Github: sigs.k8s.io/kind

- Fast Moving Project!

- Build it yourself with:

  `GO111MODULE="on" go get sigs.k8s.io/kind@v0.4.0.`

- Releases available for OSX, Linux and Windows.

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What do folks use it for?

- A quick kubernetes cluster with a single node.
- A quick kubernetes cluster with multiple nodes including HA masters.
- A way to build confidence in code submitted to the Kubernetes Project.
  - https://mauilion.dev/posts/kind-k8s-testing/

- All Locally on any OSX, Linux or Windows machine.

- A way to do e2e tests of your code in the Kubernetes Project.
  - /test pull-kubernetes-e2e-kind in your pr should take about 20 minutes.

- A way to run Kubernetes in your CI environment.
  - Examples: https://github.com/kind-ci/examples

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How does it work?

- Kind requires that you have Docker installed.

- Kind leverages Kubeadm to configure and bootstrap your cluster.
  - Which means it's very configurable!

- The "nodes" in your Kind cluster are docker containers!

- The "nodes" in your cluster create containers by directly using the linux kernel!

- You can "cache" images in your cluster with kind load!

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What's Kubeadm?

- [automated HA clusters with kubeadm](#)

- Focused on getting you from infrastructure to Kubernetes!

- Supports HA control plane.

- Supports in place upgrades.

- Very Very configurable!

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How does kind compare to minikube?

kind

- Works on OSX, Windows and Linux
- Uses kubeadm to configure the cluster
- Low overhead based on containers
- Multi node and HA control plane
- Supports building Kubernetes from source
- Written in go, can be used as a library
- Since we have multiple nodes local docker images have to be loaded in.
- Kind has support for local persistent volumes
- Routing problems on OSX and Windows

minikube

- Works on OSX, Windows and Linux
- Uses kubeadm to configure the cluster
- Higher overhead when using virtualization
- Single node.
- Minikube can use a daily build of k8s but not a local build.
- Minikube can make use of node filesystem as shared volumes
- Minikube can act as a remote docker endpoint
- Routing works the same on all OSs

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Who is kind?

Jorge Alarcon Ochoa

Benjamin Elder BenTheElder

@kubernetes release team, https://sigs.k8s.io/kind creator

⊙ Sunnyvale, CA

James Munnelly munnerz

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⊙ Varna, BG

Antonio Ojea aojea

The network is reliable. Latency is zero, Bandwidth is infinite, ..

⊙ Spain

Patrick Lang PatrickLang

I build, test and teach containers on Windows Server and Azure with Docker and Kubernetes

PRO

Fabrizio Pandini fabriziopandini

my commits are my opinions

⊙ Milano, Italy

Jintao Zhang tao12345666333

Container, Docker, Go, Kubernetes, Python, Vim; he/him; Twitter: TaoBeier

⊙ Beijing

+ 53 more contributors!

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Who is kind?

You are!

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Some things are difficult

- Routing is limited on Windows and OSX due to the way that Docker is installed there.
  - You can't reach the "nodes" directly. This means no "dynamic" host port.
- Kind assumes that you will delete and recreate a cluster not restart it.
  - Clusters are assumed to be ephemeral.
- All kind nodes share a single linux kernel. So no apparmor or selinux!
  - There is some exploration of using weaveworks/ignite to address this tho!

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DEMO TIME

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Demo 1

- Use Kind to create a multi node cluster and explore how it works.

- kubectl get nodes

- kubectl config view --flatten --minify

- kubectl run nginx --image=nginx:stable --replicas=5

- docker exec -ti kind-control-plane

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Customization via kubeadm

- Kustomize

  - https://github.com/kubernetes-sigs/kustomize

- Pod Security Policies

- CNI configuration

- Exposed ports

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tgik.io

Come work with me at VMware

We are hiring!
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