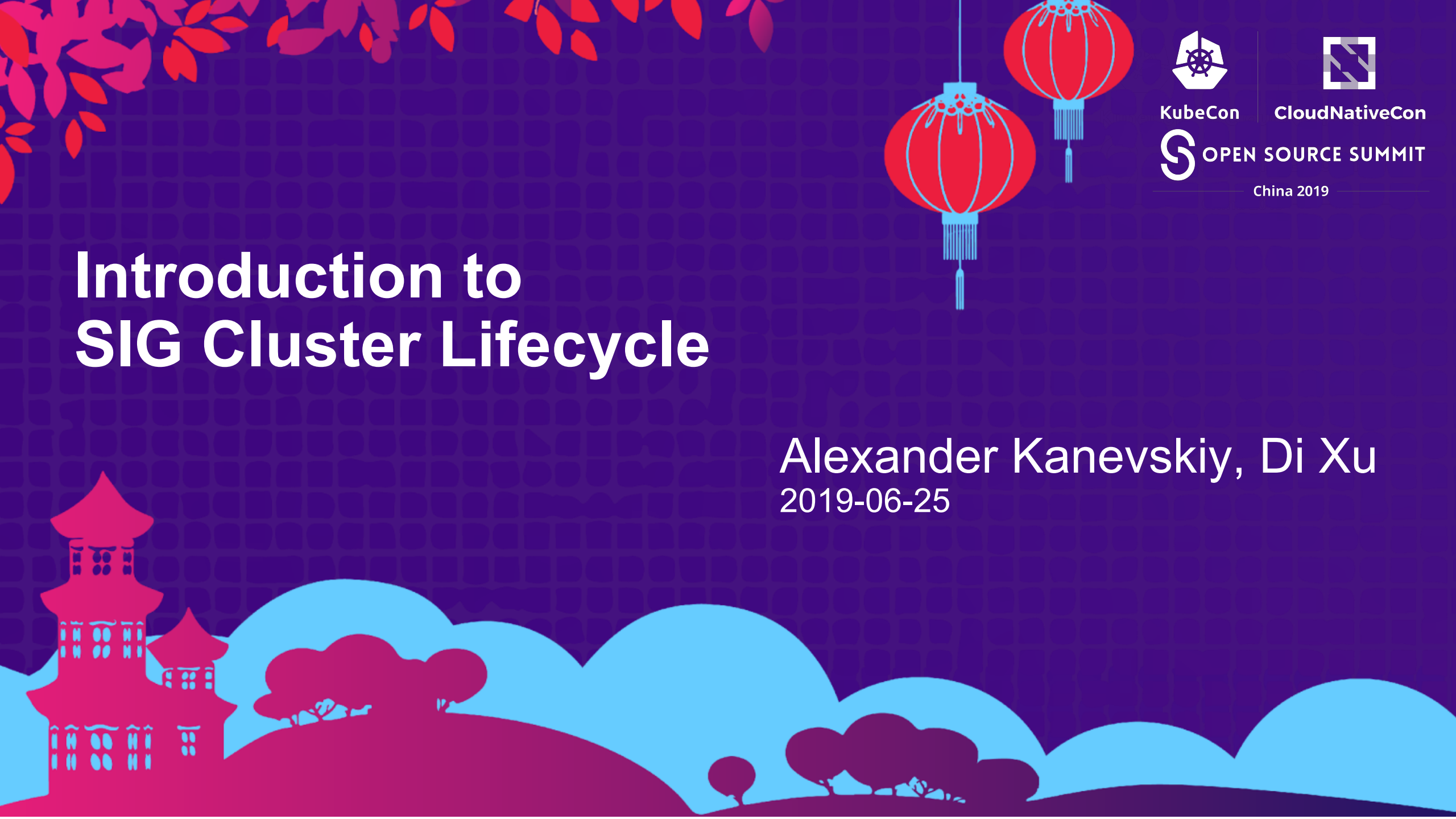

KubeCon
CloudNativeCon
OPEN SOURCE SUMMIT
China 2019




# Introduction to SIG Cluster Lifecycle

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# Who are we?



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Kubernetes Member
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@dixudx

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Kubernetes Member
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@kad

# Who are SCL?



- 600+ members on mailing list
- 2000+ members in #sig-cluster-lifecycle Slack
- 20+ companies represented during SIG meetings
- 5 continents with contributors
- O(10^3) contributions per cycle
- 15+ SIG sponsored subprojects

# Mission



"SIG Cluster Lifecycle's objective is to simplify creation, configuration, upgrade, downgrade, and teardown of Kubernetes clusters and their components."

*-- SIG Cluster Lifecycle Charter*

# Why?

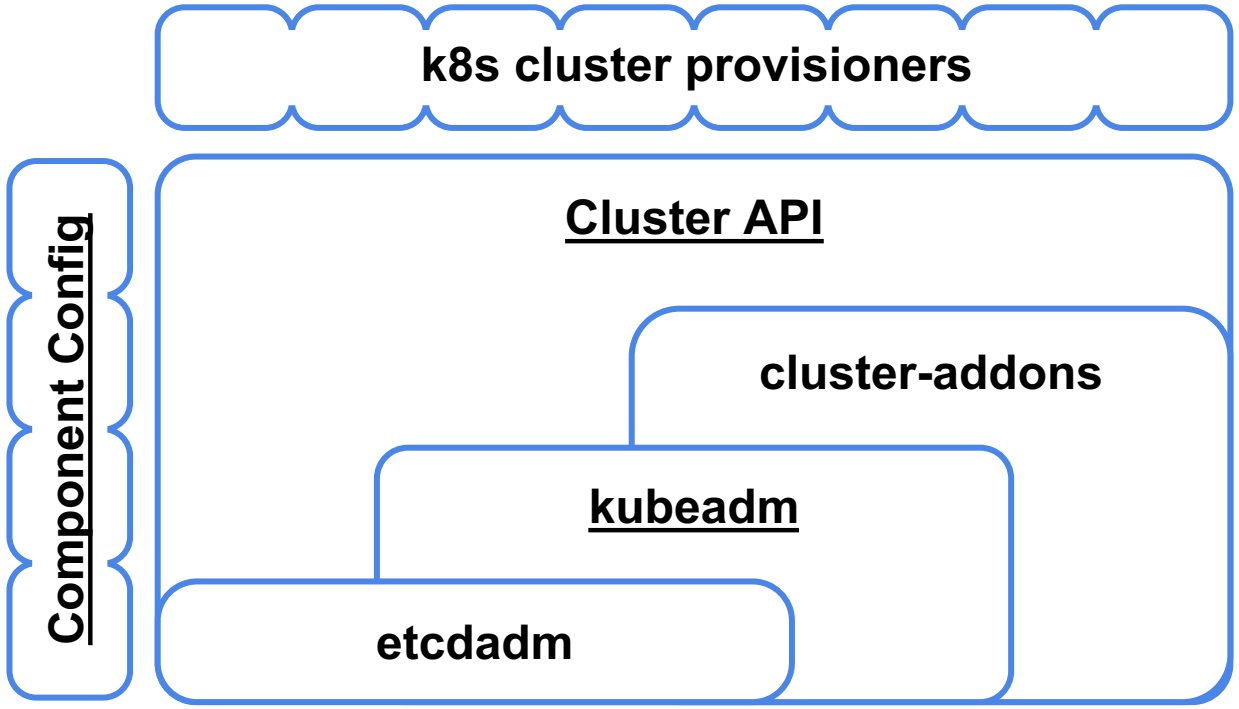


- To prevent the mistakes of other open source clustering tools, as...
  - Kubernetes is the beginning of the story, not the end
  - Commoditizing the deployment of the core raises all boats and allows the community to focus on solving end user problems
  - “Production Grade” shouldn’t be firewalled
  - It should “just work”
  - Because cross provider behavior matters (conformance)
- To make the management of (X) clusters across (Y) providers simple, secure, and configurable.

# SCL Overview



SCL is one of the biggest Kubernetes SIGs, with 100s of contributors across several companies actively contributing to 17 subprojects and several workgroups




**k8s cluster provisioners:**

- minikube
- kops
- kubespray
- kind (SIG Testing)
- kubeadm-dind-cluster
- cluster-api-provider-<name>
- ...


# Key Subprojects

# kubeadm (GA)

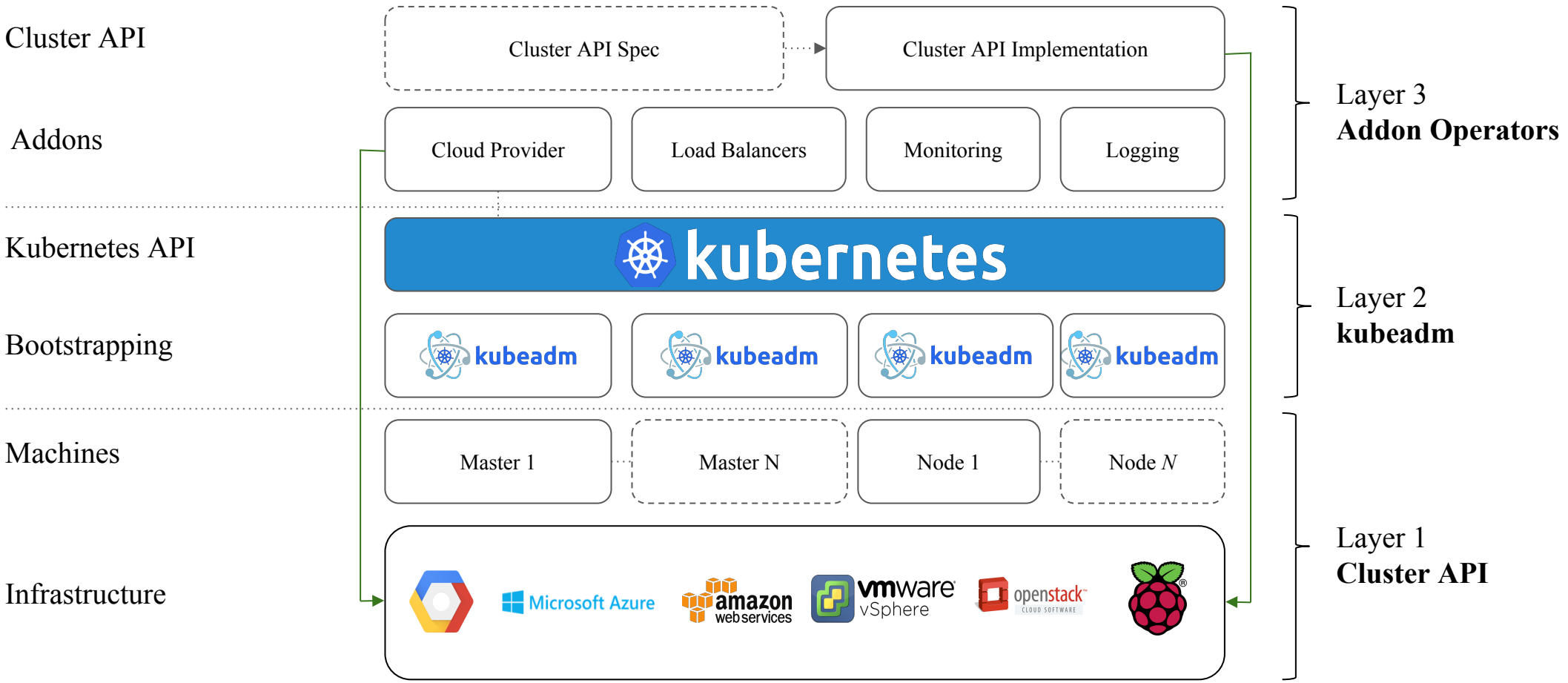


- kubeadm's task is to set up a **best-practice cluster** for each *minor version*
- The user experience should be *simple*, and the cluster reasonably *secure*
- kubeadm's scope is limited; intended to be a **building block**
  - Only ever deals with the local filesystem and the Kubernetes API
  - Agnostic to ***how exactly*** the kubelet is run
  - Setting up or favoring a specific CNI network is **out of scope**
- Composable architecture with everything divided into **phases**
  - Allows for **DIY** using other higher order tools as chef/puppet/etc.

# kubeadm (GA)



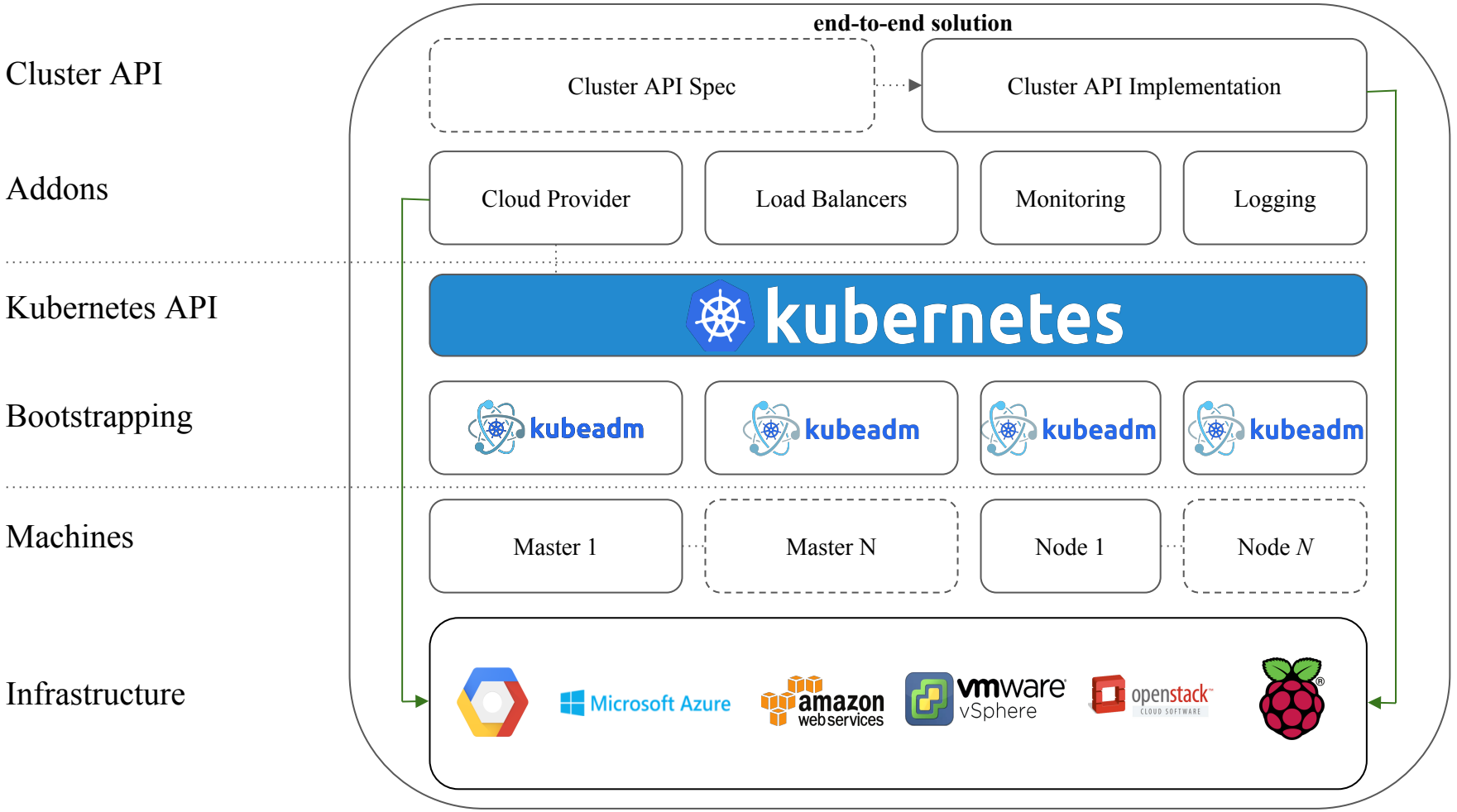
**= The official tool to bootstrap a minimum viable, best-practice Kubernetes cluster**



# kubeadm vs end-to-end solution



**kubeadm is built to be part of a higher-level solution**

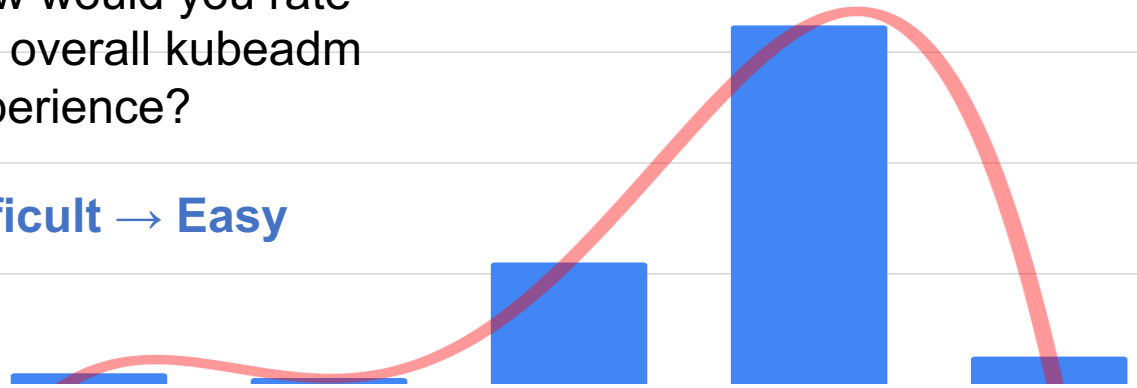


# kubeadm Survey

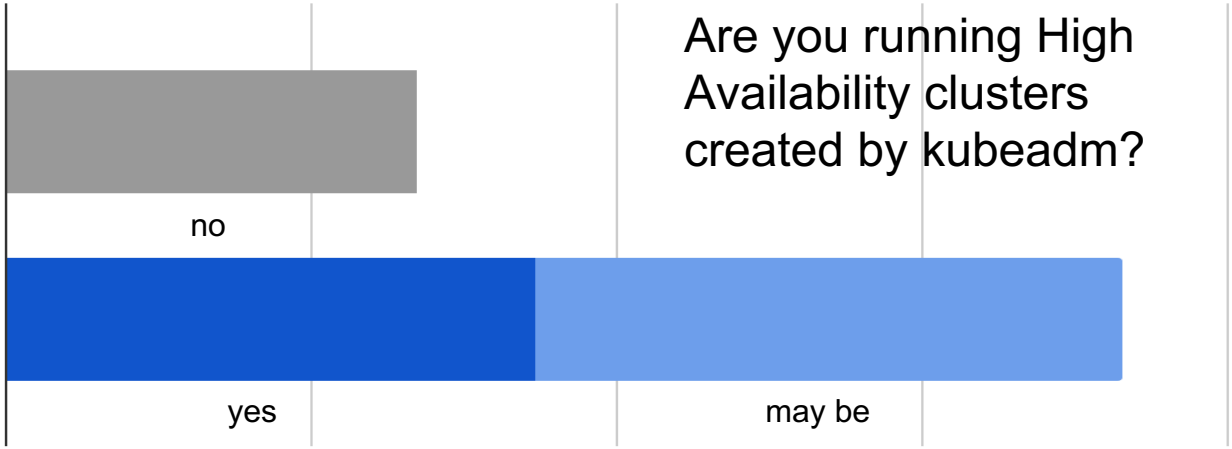


How would you rate the overall kubeadm experience?

**Difficult → Easy**



Are you running High Availability clusters created by kubeadm?



# kubeadm in v1.15



- Kubeadm configuration API v1beta2
- Better certificate management on upgrades
- Entirely new test suite for ensuring stability
- High Availability control plane
  - Documentation: http://bit.ly/kubeadm-ha
  - Demo: http://bit.ly/kubeadm-ha-screencast
  - Deep dive kubeadm: http://bit.ly/kubeadm-deep-dive-eu19


- One more thing: Kubeadm new logo!
  - Special thanks to Alex Contini (@alexcontini)

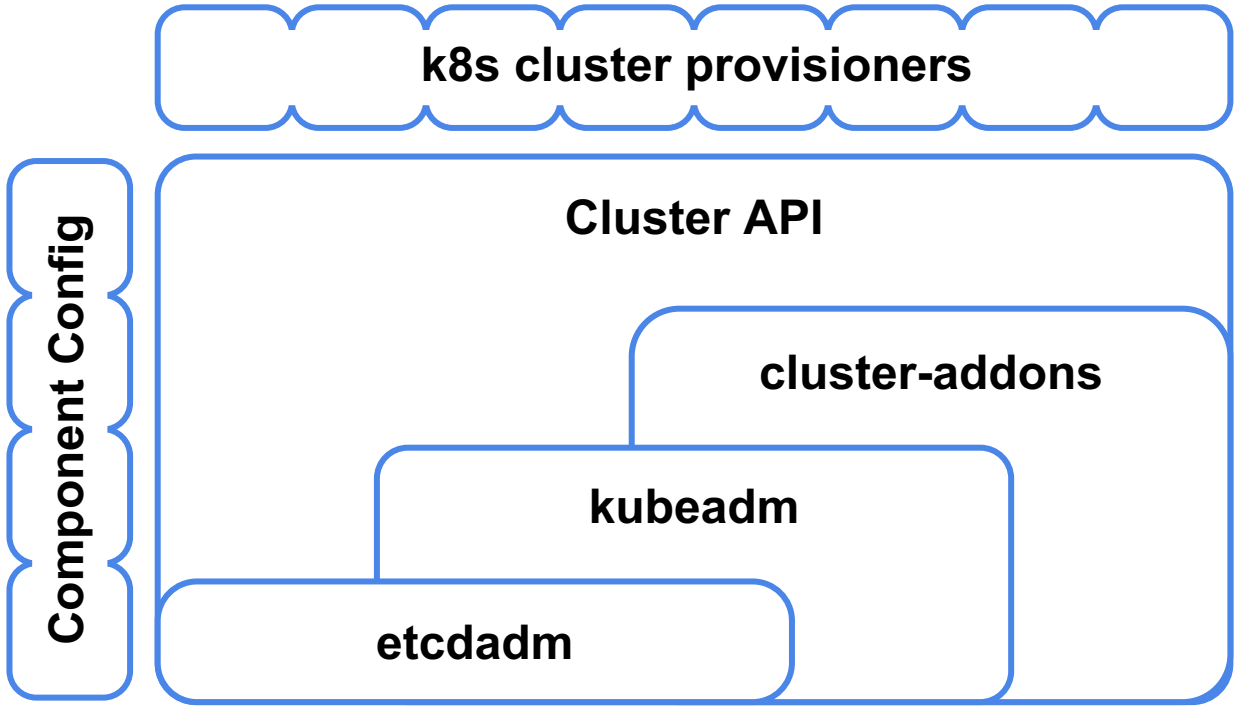
# Cluster API



- The What and the Why of Cluster API "To make the management of (X) clusters across (Y) providers simple, secure, and configurable."
  - "How do I provision all the other infrastructure I need for a Kubernetes cluster (load balancers, VPC, etc.)?"
  - "How do I manage other lifecycle events across that infrastructure (upgrades, deletions, etc.)?"
  - "How can I manage any number of clusters in a similar fashion to how I manage deployments in Kubernetes?"
  - "How can we control all of this via an API?"

# Cluster API






**Tools atop of Cluster API**

- kops
- kubicorn
- Multiple control plane managers
  - SAP Gardener
  - KaaS layers

# Cluster API Overview



- With Kubernetes we manage our applications declaratively
  a. Why not for the cluster itself?
- With the Cluster API, we can declaratively define the desired cluster state
  a. Operator implementations reconcile the state
  b. Use Spec & Status like the rest of k8s
  c. Common management solutions for e.g. upgrades, autoscaling and repair
  d. Allows for “GitOps” workflows

```yaml
apiVersion: cluster.k8s.io/v1alpha1
kind: MachineDeployment
metadata:
  name: my-nodes
spec:
  replicas: 3
  selector:
    matchLabels:
      foo: bar
  template:
    metadata:
      labels:
        foo: bar
    spec:
      providerConfig:
        value:
          apiVersion: "baremetalconfig/v1alpha1"
          kind: "BareMetalProviderConfig"
          zone: "us-central1-f"
          machineType: "n1-standard-1"
          image: "ubuntu-1604-lts"
      versions:
        kubelet: 1.14.2
        containerRuntime:
          name: containerd
          version: 1.2.0
```

# WG Component Standard



- Problem 1: The core Kubernetes components are not consistent in
  - how they are configured
  - how they should be set up
  - what HTTP(S) endpoints they register
  - how they do (delegated) auth
- Problem 2: It’s pretty hard to write a k8s-like component with declarative config
- Solution: Factor common component-related code into a `k8s.io/component-base` toolkit repository. Make it easier to write a non-core component that follows the k8s style

# ComponentConfig



- **Maintainability:**

  When $component's flag set grows over 50+ flags, configuring it becomes painful
- **Upgradability:**

  On upgrades, $component still works using versioned config vs. flags
- **Programmability:**

  Configuration expressed as JSON/YAML objects allows for consistent manipulation
- **Possibility:**

  Many types of config simply can't be expressed as simple key-value
- **Declarative:**

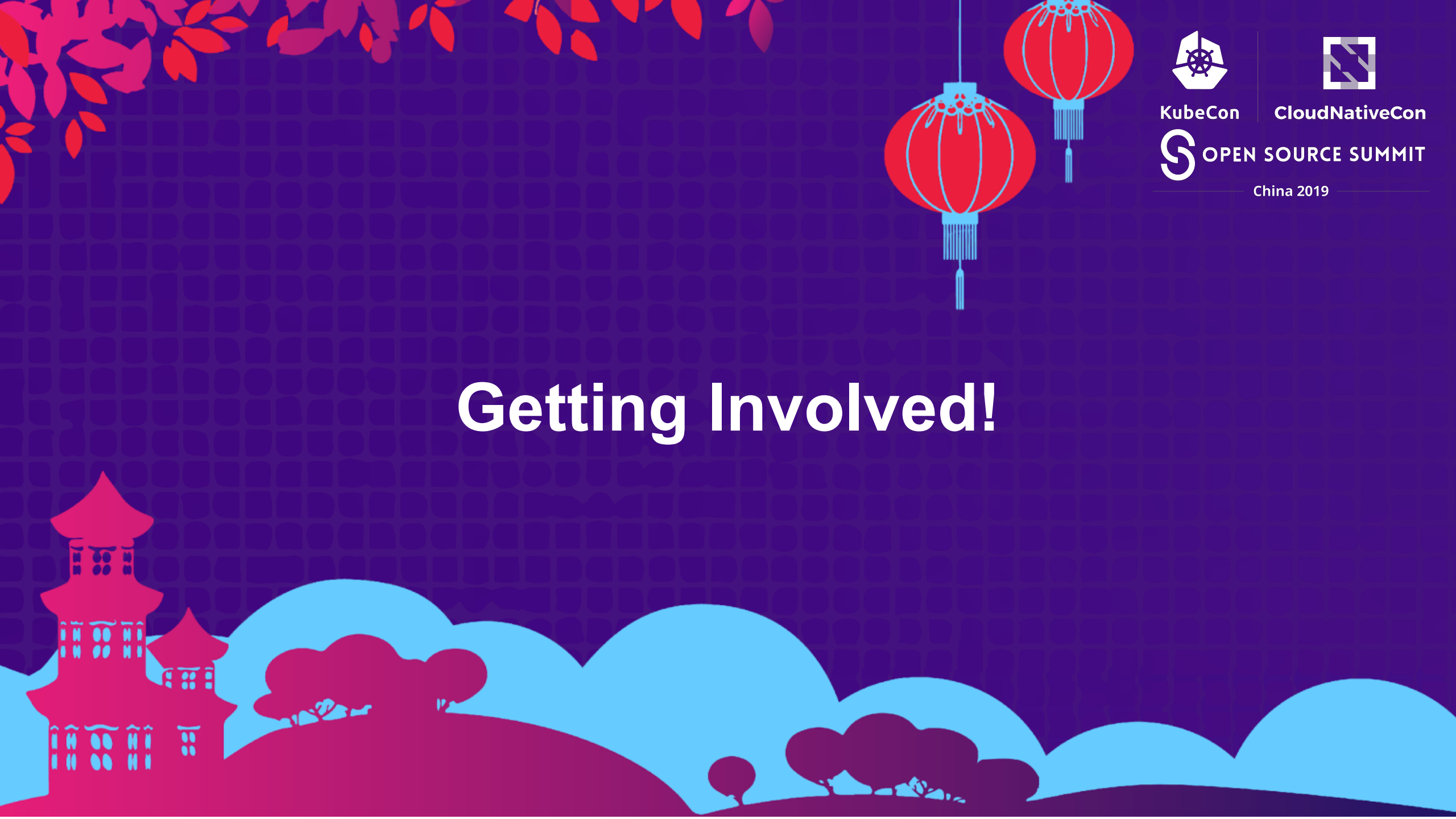
  OpenAPI information can easily be exposed / used for doc generation
- See Lucas' talk on this here: Configuring Your Kubernetes Cluster on the Next Level

# ComponentConfig End Goal



```
$ kube-controller-manager --config config.yaml
```

```yaml
apiVersion: kubecontrollermanager.config.k8s.io/v1
kind: KubeControllerManagerConfiguration
controllers:
  csrSigning:
    clusterSigningCertFile: /some/path
  namespace:
    concurrentNamespaceSyncs: 5
  nodeLifecycle:
    enableTaintManager: true
```




# Getting Involved!

# Getting Involved!



## SIG Cluster Lifecycle

- 100s of contributors across several companies
- We're working on growing the contributor/reviewers pool
- We have many  EMEA contributors

## SIG Cluster Lifecycle and China

- SCL China bi-weekly meetings
- Chinese Friendly Time
- Collecting appropriate time slots
- Planned to Start from July

# How can you Contribute



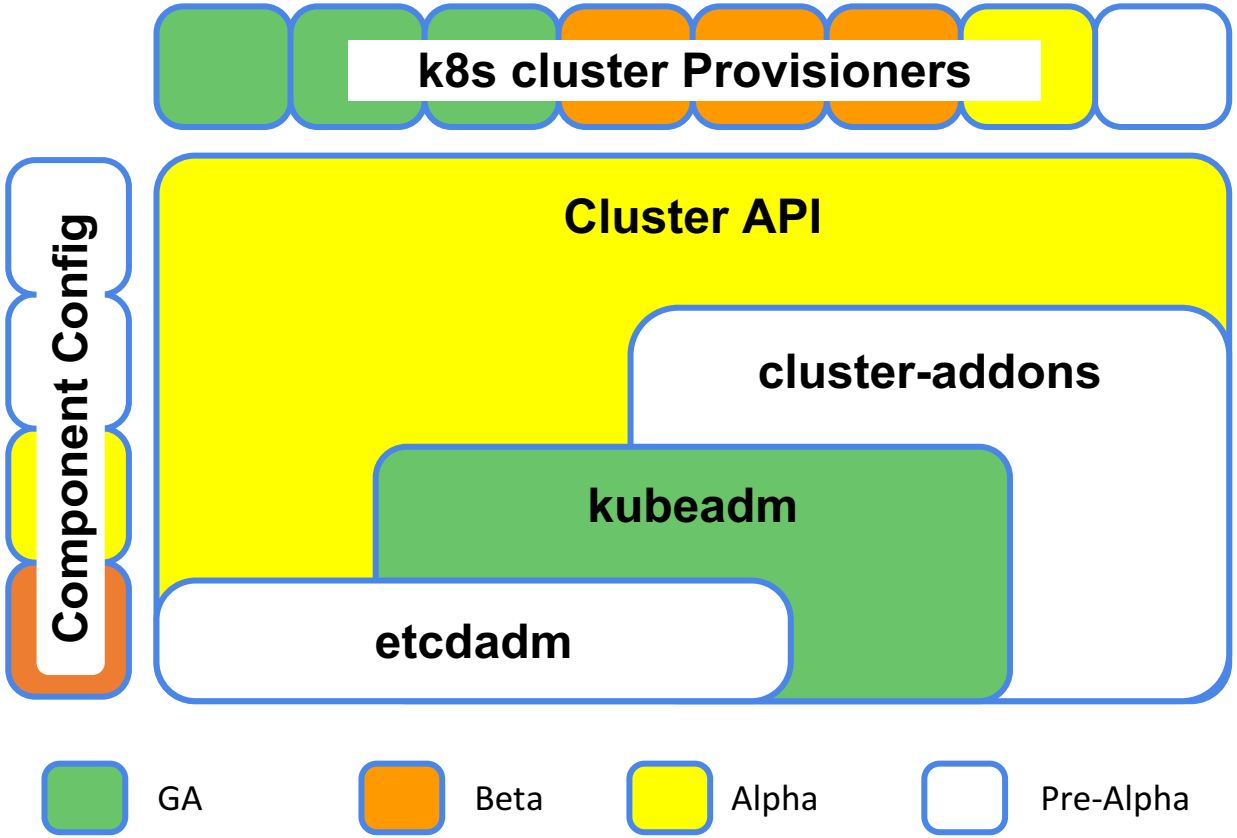
- SIG Cluster Lifecycle New Contributor Onboarding
- Look for “good first issue”, “help wanted” and “sig/cluster-lifecycle” labeled issues in our repositories (in k/k or in various project repository)
- Attend our Zoom meetings / be around on Slack
- We have “Office Hours” for our projects: weekly for kubeadm and Cluster API, bi-weekly for kops and kubespray
- Full list of SIG meetings and links to minutes and recordings can be found on SIG page
- Contributing to SIG Cluster Lifecycle documentation

# The SCL Roadmap



## We need your help!

There is still a lot of work to do in order to get the full puzzle in place!



# Other Logistics



- Follow the SIG Cluster Lifecycle YouTube playlist
- Check out the meeting notes for our weekly office hours meetings
- Join #sig-cluster-lifecycle, #kubeadm, #cluster-api, #kops-dev, #kops-users, #kubespray, #minikube, …channels
- Check out the kubeadm setup guide, reference doc and design doc
- Read how you can get involved, and watch the new contributor onboarding session!

# Other SCL Talks



- Kubespray Deep Dive
  - Tuesday, June 25 • 16:45 - 17:20
  - https://sched.co/Nrr5
- Minikube: Bringing Kubernetes to the Next Billion Users
  - Tuesday, June 25 • 16:45 - 17:20
  - https://sched.co/Nrmy

- Check also SCL sessions from KubeCon Europe’19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Thank you!
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