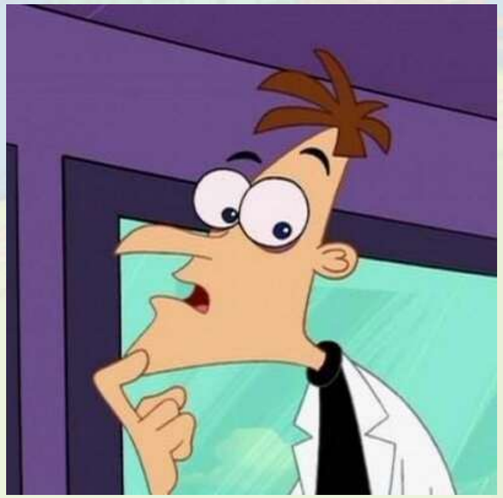
Introducing k3s - a Lightweight Kubernetes Distribution

RANCHER

#k3s • March 13, 2019

Shannon Williams

Co-Founder/VP Sales & Marketing
Rancher Labs
@smw355



Darren Shepherd

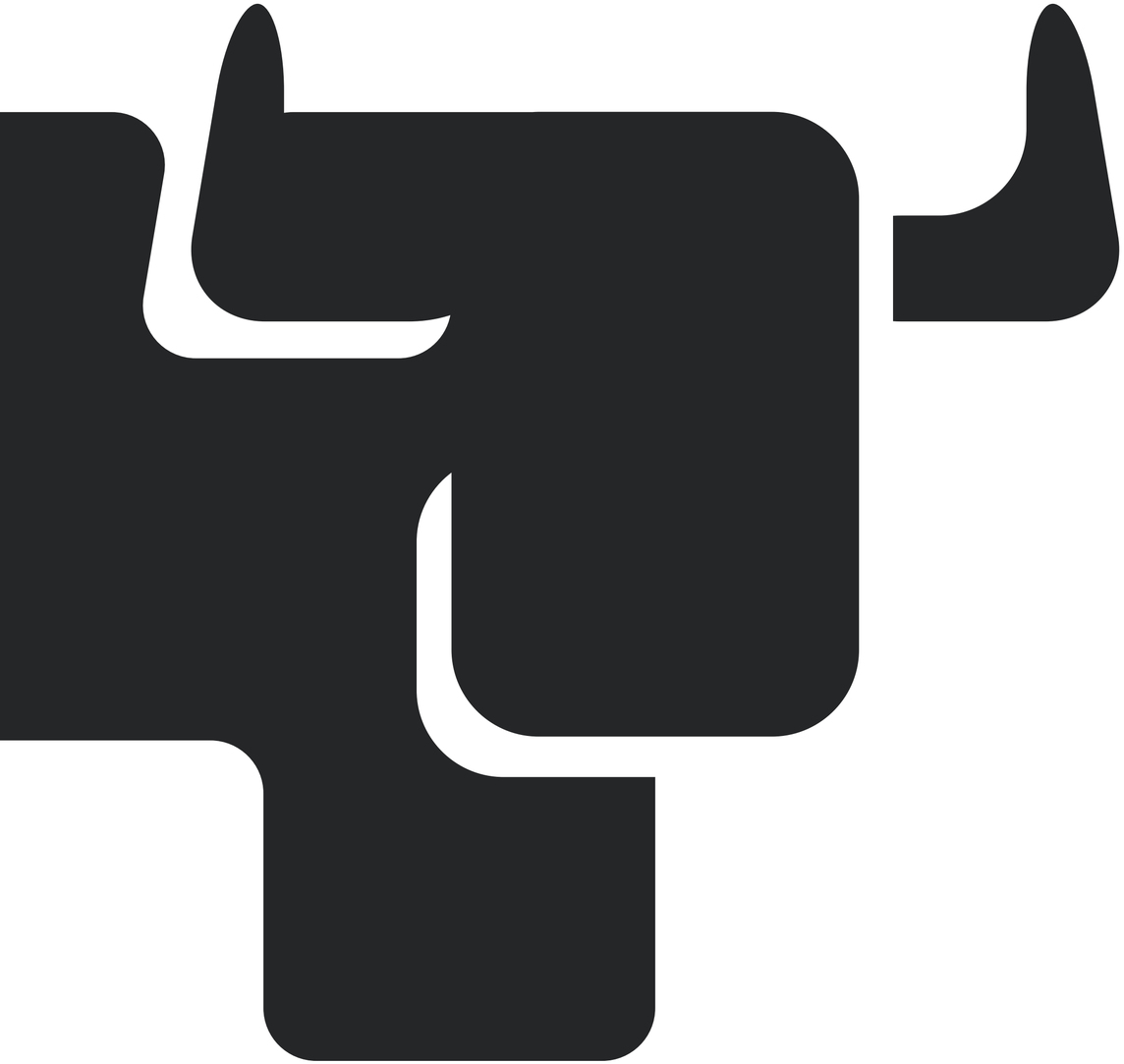
Co-Founder/Chief Architect
Rancher Labs
@ibuildthecloud

First things first…

This is a 

not a 

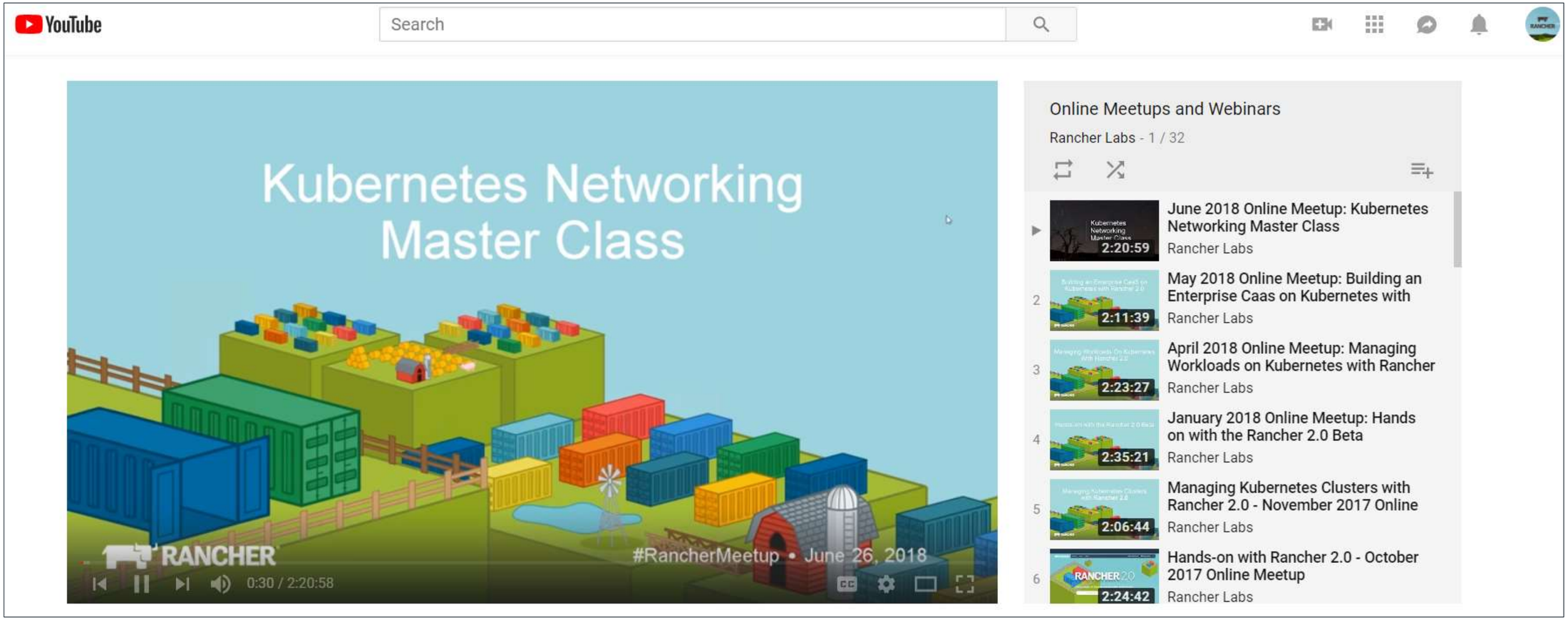
!



There are rules for a meetup!

- We won’t be done on time
- Questions are always welcome
- There are no bad questions
- Demo, then demo some more
- Things will break, be patient

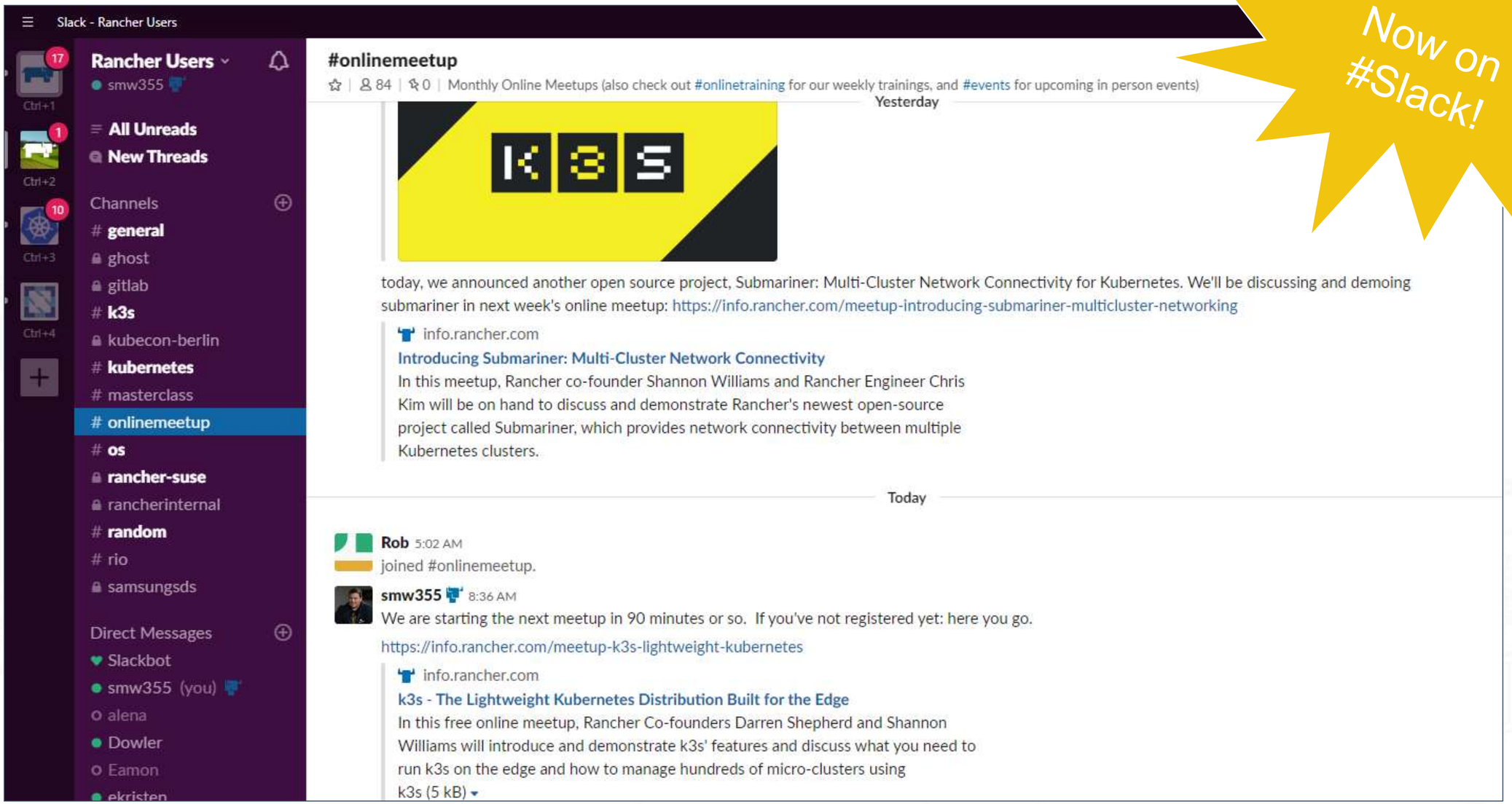
This meetup is being recorded!



http://youtube.com/c/rancher

Join the conversation on Twitter

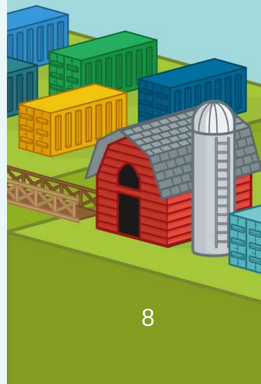
#RancherMeetup


Slack - Rancher Users
Rancher Users
smw355
All Unreads
New Threads
Channels
general
ghost
gitlab
k3s
kubecon-berlin
kubernetes
masterclass
onlinemeetup
os
rancher-suse
rancherinternal
random
rio
samsungsds
Direct Messages
Slackbot
smw355 (you)
alena
Dowler
Eamon
ekristen
#onlinemeetup
84 | 0 | Monthly Online Meetups (also check out #onlinetraining for our weekly trainings, and #events for upcoming in person events)
Yesterday
today, we announced another open source project, Submariner: Multi-Cluster Network Connectivity for Kubernetes. We'll be discussing and demoing submariner in next week's online meetup: https://info.rancher.com/meetup-introducing-submariner-multicluster-networking
info.rancher.com
Introducing Submariner: Multi-Cluster Network Connectivity
In this meetup, Rancher co-founder Shannon Williams and Rancher Engineer Chris Kim will be on hand to discuss and demonstrate Rancher's newest open-source project called Submariner, which provides network connectivity between multiple Kubernetes clusters.
Today
Rob 5:02 AM
joined #onlinemeetup.
smw355 8:36 AM
We are starting the next meetup in 90 minutes or so. If you've not registered yet: here you go.
https://info.rancher.com/meetup-k3s-lightweight-kubernetes
info.rancher.com
k3s - The Lightweight Kubernetes Distribution Built for the Edge
In this free online meetup, Rancher Co-founders Darren Shepherd and Shannon Williams will introduce and demonstrate k3s' features and discuss what you need to run k3s on the edge and how to manage hundreds of micro-clusters using k3s (5 kB)

Now on #Slack!

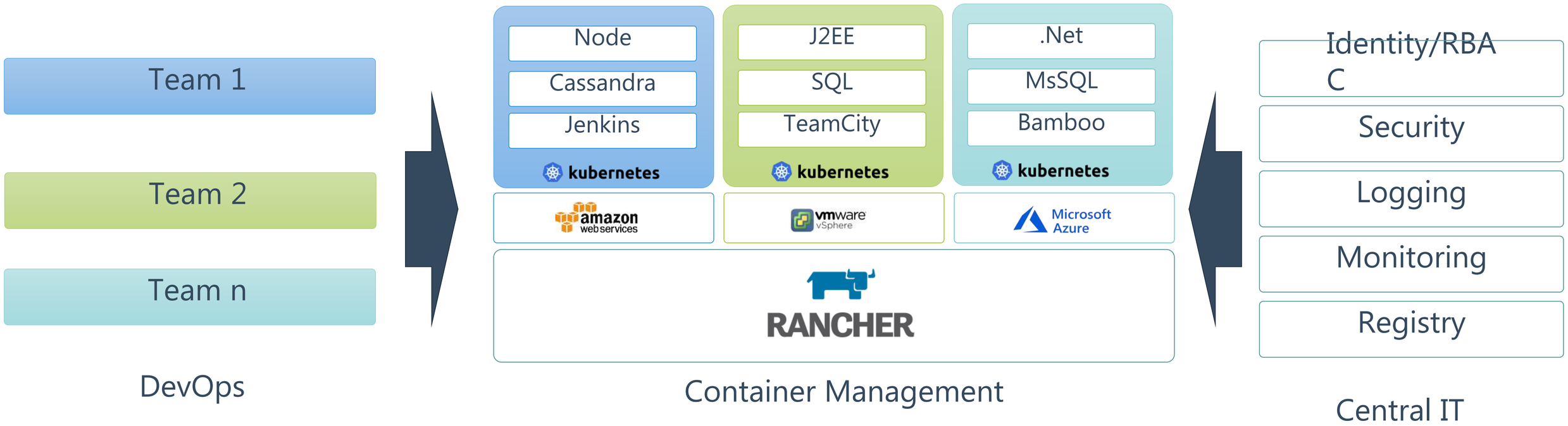
Agenda

1. Rancher Introduction - Shannon
2. Increasing demand for an edge-optimized Kubernetes - Shannon
3. Introducing k3s – a micro-distribution of Kubernetes - Darren
4. Demo - Darren
5. Questions and Getting Started



RANCHER

Rancher is an Open Source Container Management Platform



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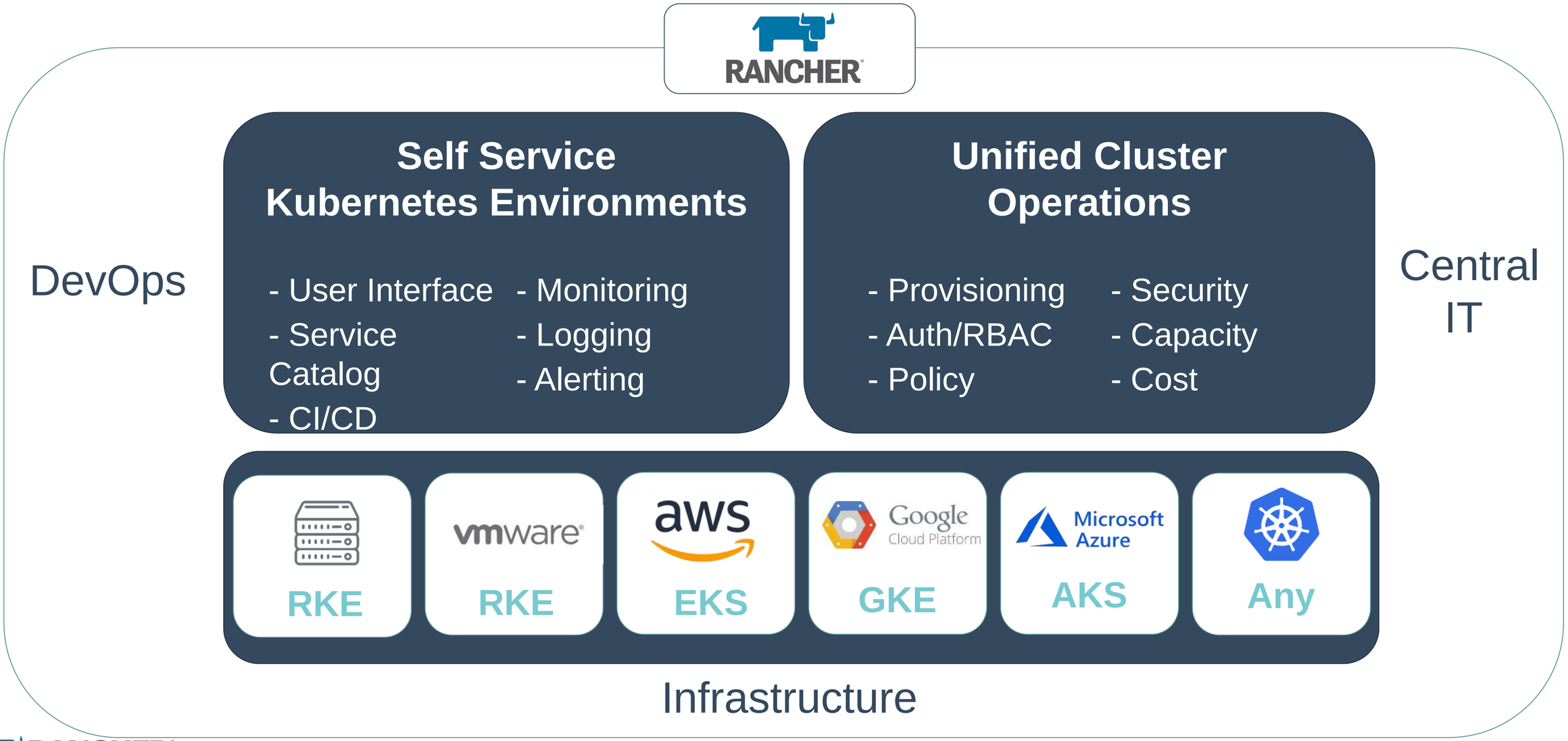
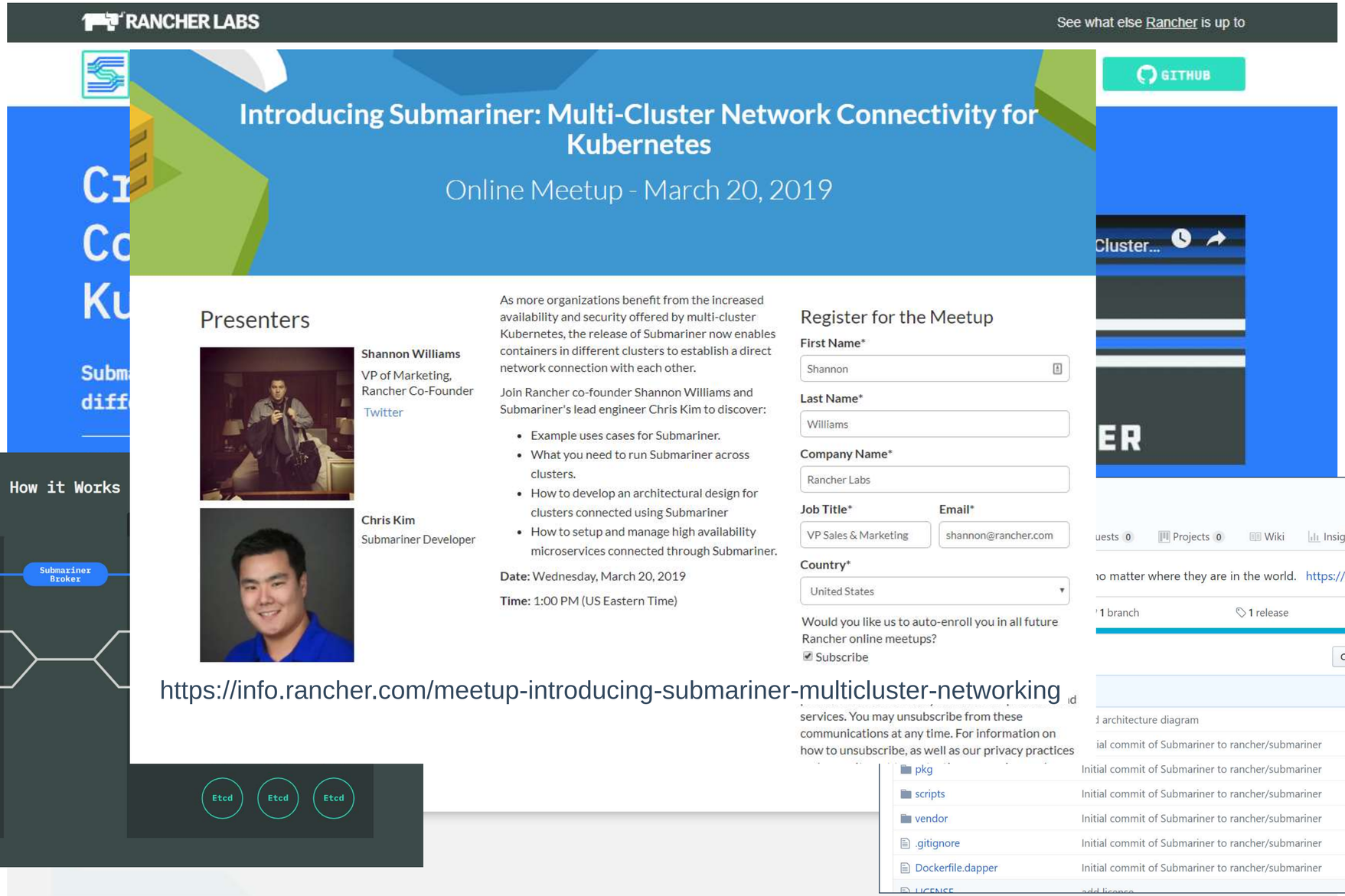
Rancher is an Open Source Container Management Platform



Introducing Submariner.io



https://info.rancher.com/meetup-introducing-submariner-multicluster-networking

Introducing K3s

In the last year we've seen a major increase in the demand for Kubernetes outside the datacenter

Bare Metal K8s Clustering at Chick-fil-A Scale

Chick-fil-A Tech Blog Follow
Jun 25, 2018 · 6 min read

by Brian Chambers, Caleb Hurd, and Alex Crane

kubernetes

https://www.youtube.com/watch?v=8edDcy3oeUo

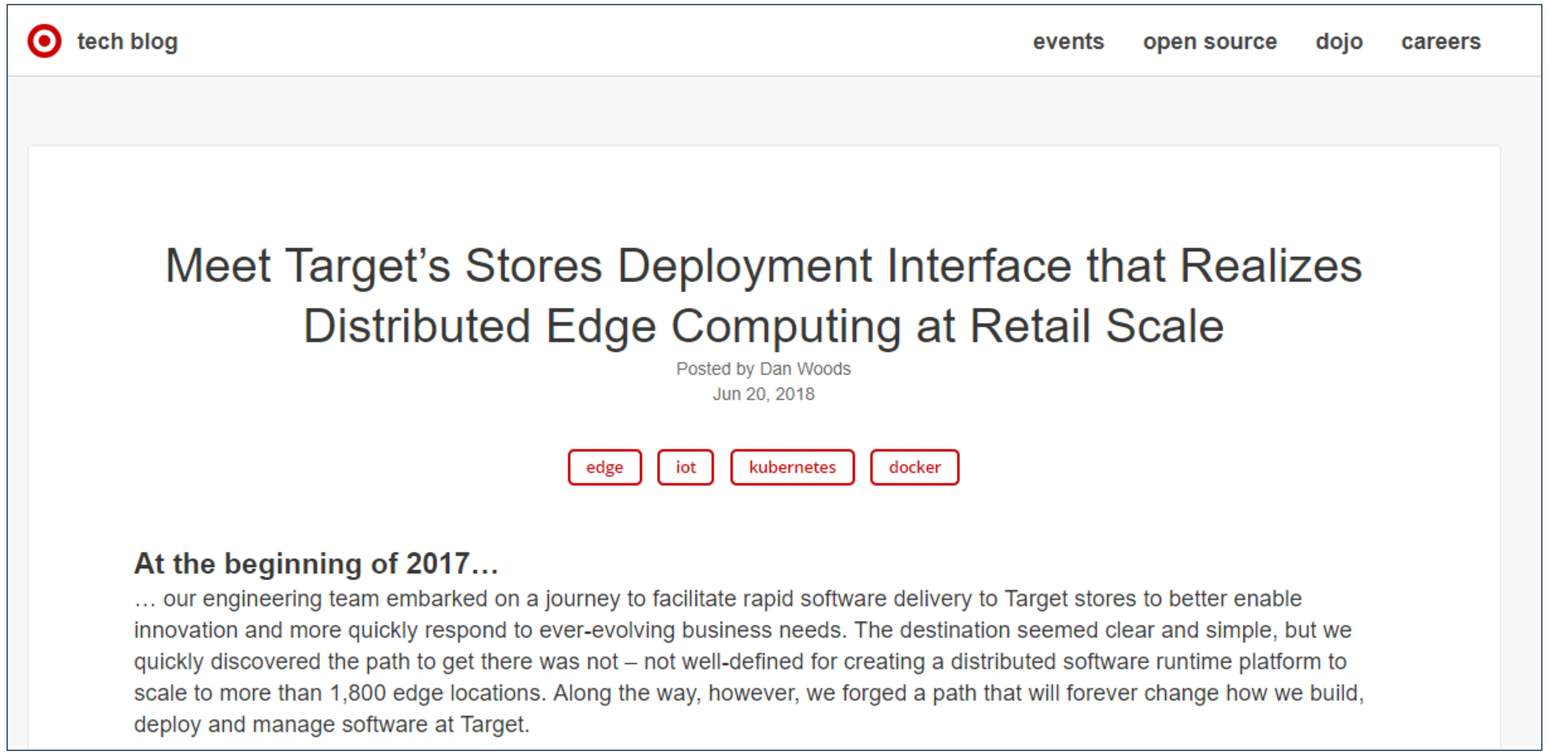
At full scale Chick-fil-A will be running Kubernetes at the Edge in each of our 2000 restaurants. That means roughly 6000 devices at the Edge running Kubernetes.

One of the biggest challenges associated with this is **bare metal clustering** on-the-fly, in-restaurant.

While most Kubernetes deployments are in the cloud or benefit from skilled technicians that are physically located near their deployments (or at least equipped with remote access), our deployments are completed by installers who focus only on initial hardware installations. They never connect to the compute devices directly—rather they connect ethernet and power cords, and then look at an app to check the status of the cluster as it self-bootstraps. Replacements are completed by restaurant Owner/Operators or their teams, which are sometimes less technical.

On top of that, our Edge deployments are not exactly in a "datacenter environment".

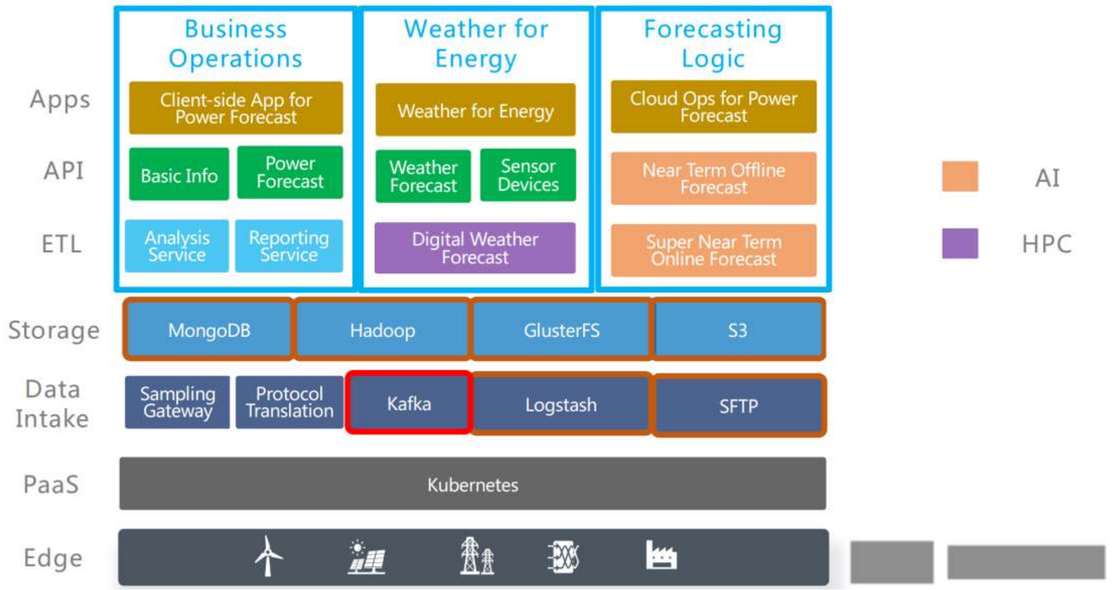
In the last year we've seen a major increase in the demand for Kubernetes outside the datacenter



https://tech.target.com/infrastructure/2018/06/20/enter-unimatrix.html

In the last year we've seen a major increase in the demand for Kubernetes outside the datacenter

GOLDWIND



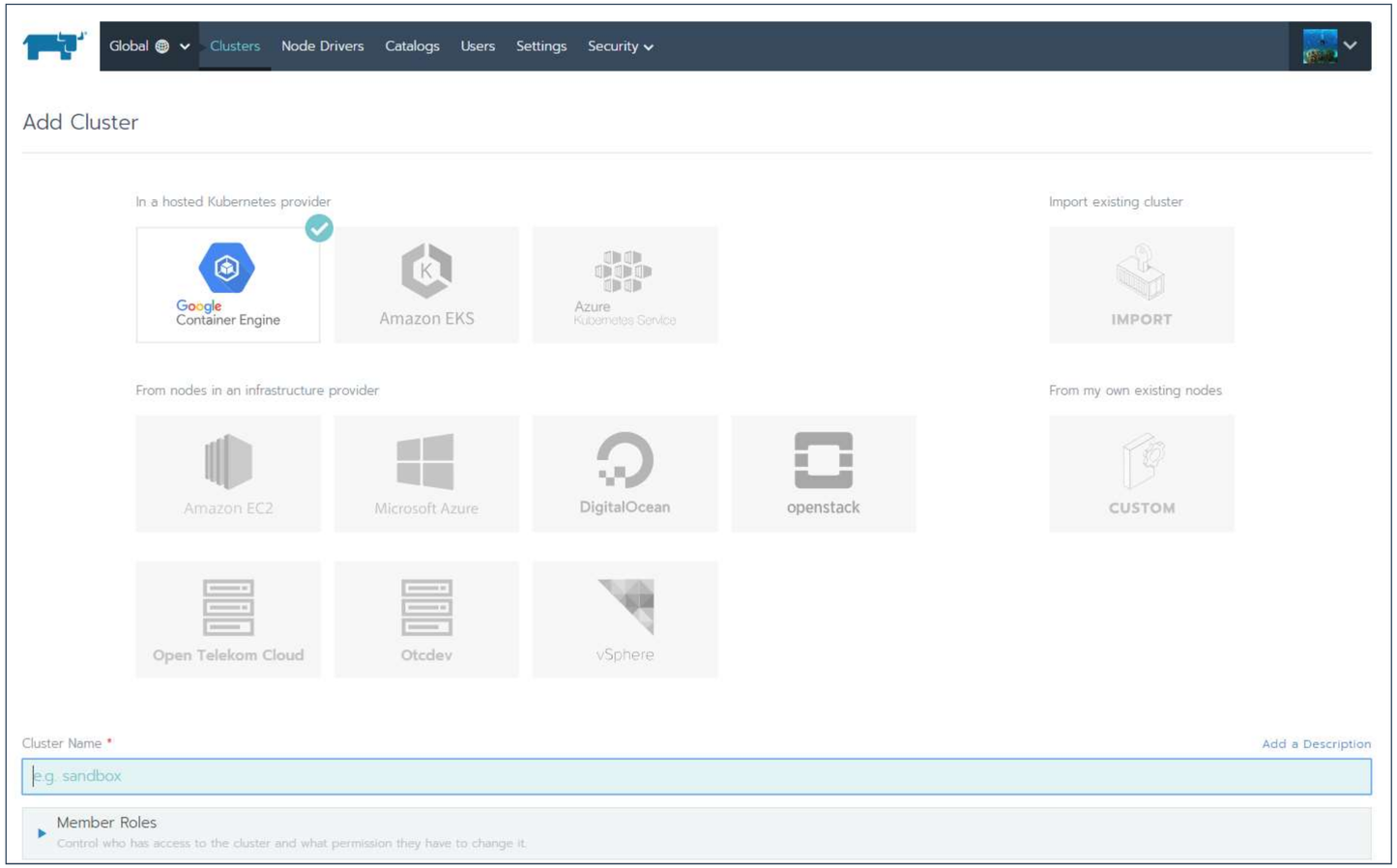
https://kccncchina2018english.sched.com/event/FzEF?iframe=no

Containers and Kubernetes are an excellent choice for deploying complex software to the edge

- Containers are awesome
- Consistent across a wide variety of infrastructure
- Capable of standalone or clustered operations
- Easy to upgrade and/or replace containers
- Support for different infrastructure configs (storage, cpu, etc)
- Strong ecosystem (monitoring, logging, CI, management, etc)

Our journey to building an edge-optimized k8s distro started with Rancher

- Open source
- Multi-cluster management
- Deploy k8s anywhere
- Manage any k8s cluster



In late 2017, we pulled out RKE our Kubernetes installer

- Open-source k8s installer and distribution
- Externally define cluster config
- Launch services and add-ons as part of deployment

```
./rke --version
rke version v0.0.6-dev

./rke --help
NAME:
   rke - Rancher Kubernetes Engine, Running kubernetes cluster in the cloud

USAGE:
   rke [global options] command [comm

VERSION:
   v0.0.6-dev

AUTHOR(S):
   Rancher Labs, Inc.

COMMANDS:
     up                Bring the cluste
     remove            Teardown the clu
     version           Show cluster Kub
     config, config    Setup cluster co
     help, h           Shows a list of

GLOBAL OPTIONS:
   --debug, -d    Debug logging
   --help, -h     show help
   --version, -v  print the version
```

```
---
nodes:
  - address: 192.168.1.5
    user: ubuntu
    role: [controlplane]
  - address: 192.168.1.6
    user: ubuntu
    role: [worker]
  - address: 192.168.1.7
    user: ubuntu
    role: [etcd]

services:
  etcd:
    image: quay.io/coreos/etcd:latest
  kube-api:
    image: rancher/k8s:v1.8.3-rancher2
  kube-controller:
    image: rancher/k8s:v1.8.3-rancher2
  scheduler:
    image: rancher/k8s:v1.8.3-rancher2
  kubelet:
    image: rancher/k8s:v1.8.3-rancher2
  kubeproxy:
    image: rancher/k8s:v1.8.3-rancher2
```

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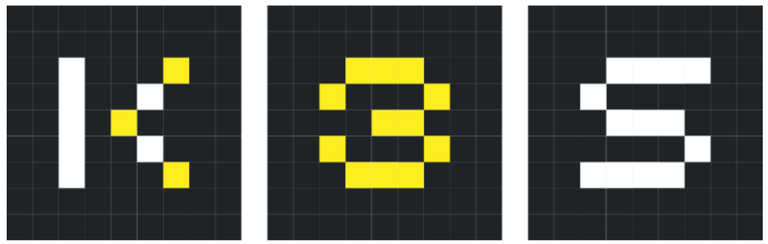
However, running Kubernetes on the edge left us with some challenges

- Most Kubernetes distributions don’t support ARM
- Kubernetes could easily consume up to 4gb of RAM
- Kubernetes wasn’t built for embedded or offline management
- Need for simplified operations

Introducing k3s



- Lightweight certified Kubernetes distro
- Built for production operations
- 40MB binary, 512MB memory consumption
- Single process w/ integrated Kubernetes master, Kubelet, and containerd
- SQLite in addition to etcd
- Simultaneously released for x86_64, ARM64, and ARMv7
- Open source project, not yet a Rancher product

To build k3s we removed unnecessary code and made a few enhancements

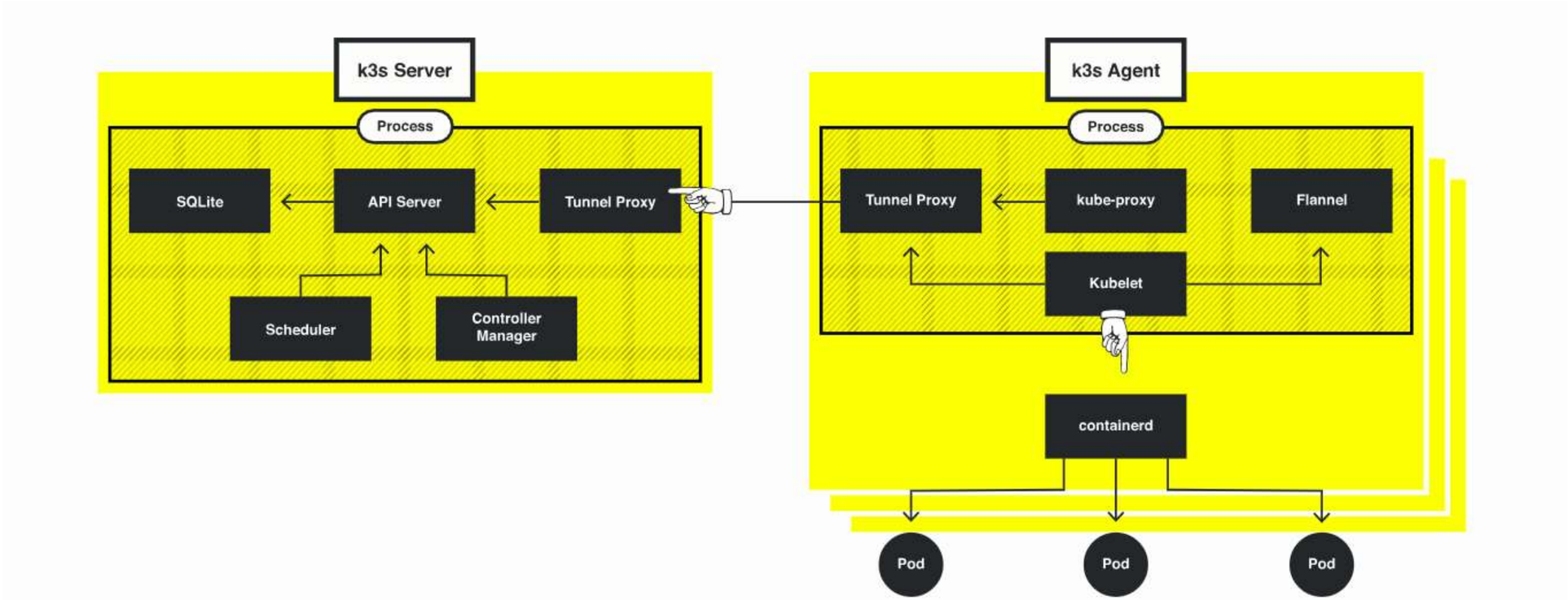
Removes

- Legacy and non-default features
- Alpha features
- In-tree cloud providers
- In-tree storage drivers
- Docker (optional)

Adds

- Simplified installation
- SQLite3 support in addition to etcd
- TLS management
- Automatic Manifest and Helm Chart management
- containerd, CoreDNS, Flannel

How k3s works



K3s use cases

1. Edge computing and Embedded systems
2. IOT Gateway
3. CI environments
4. Single-App Clusters

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Get started with k3s in two easy steps

Quick Start

1. Download k3s - latest release, x86_64, ARMv7, and ARM64 are supported

2. Run server

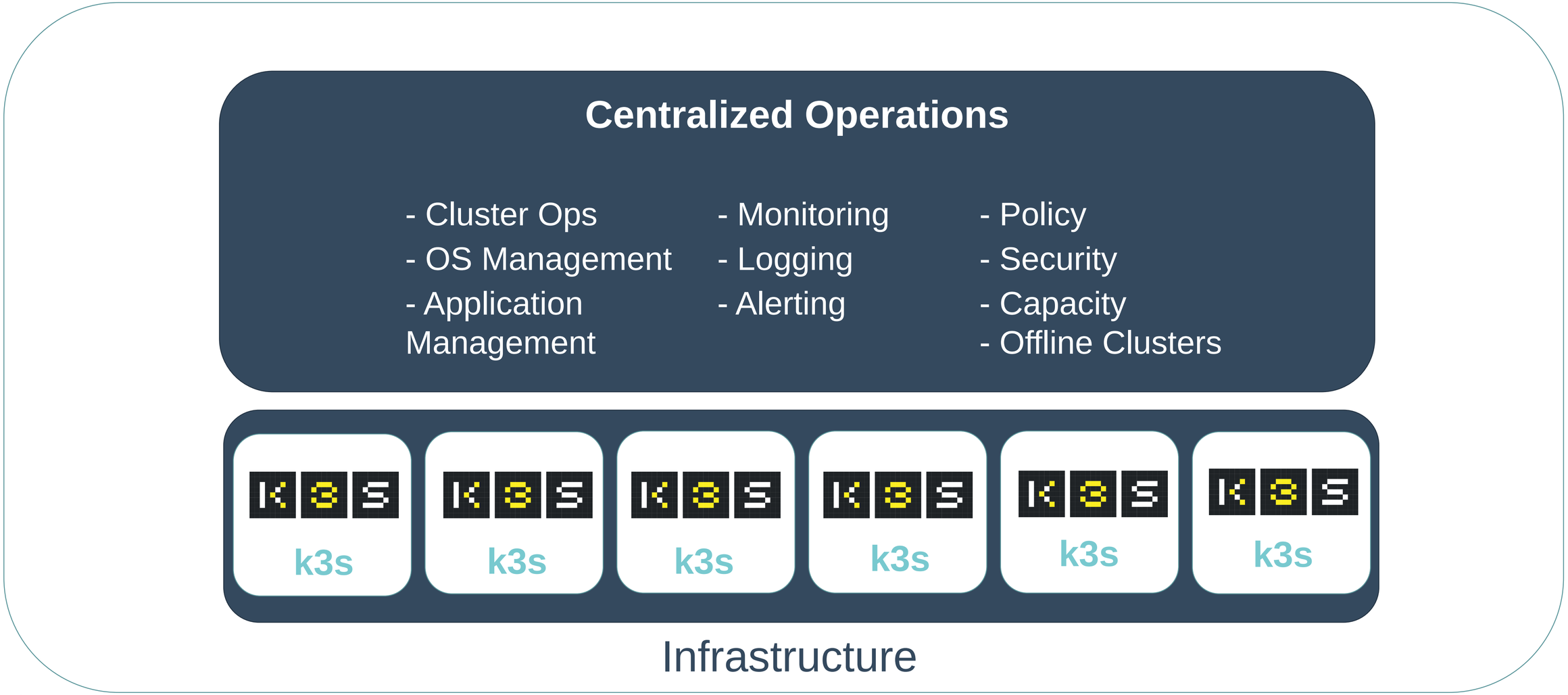
```
sudo k3s server &
# Kubeconfig is written to /etc/rancher/k3s/k3s.yaml
sudo k3s kubectl get node

# On a different node run the below. NODE_TOKEN comes from /var/lib/rancher/k3s/server/node-token
# on your server
sudo k3s agent --server https://myserver:6443 --token ${NODE_TOKEN}
```

Demo

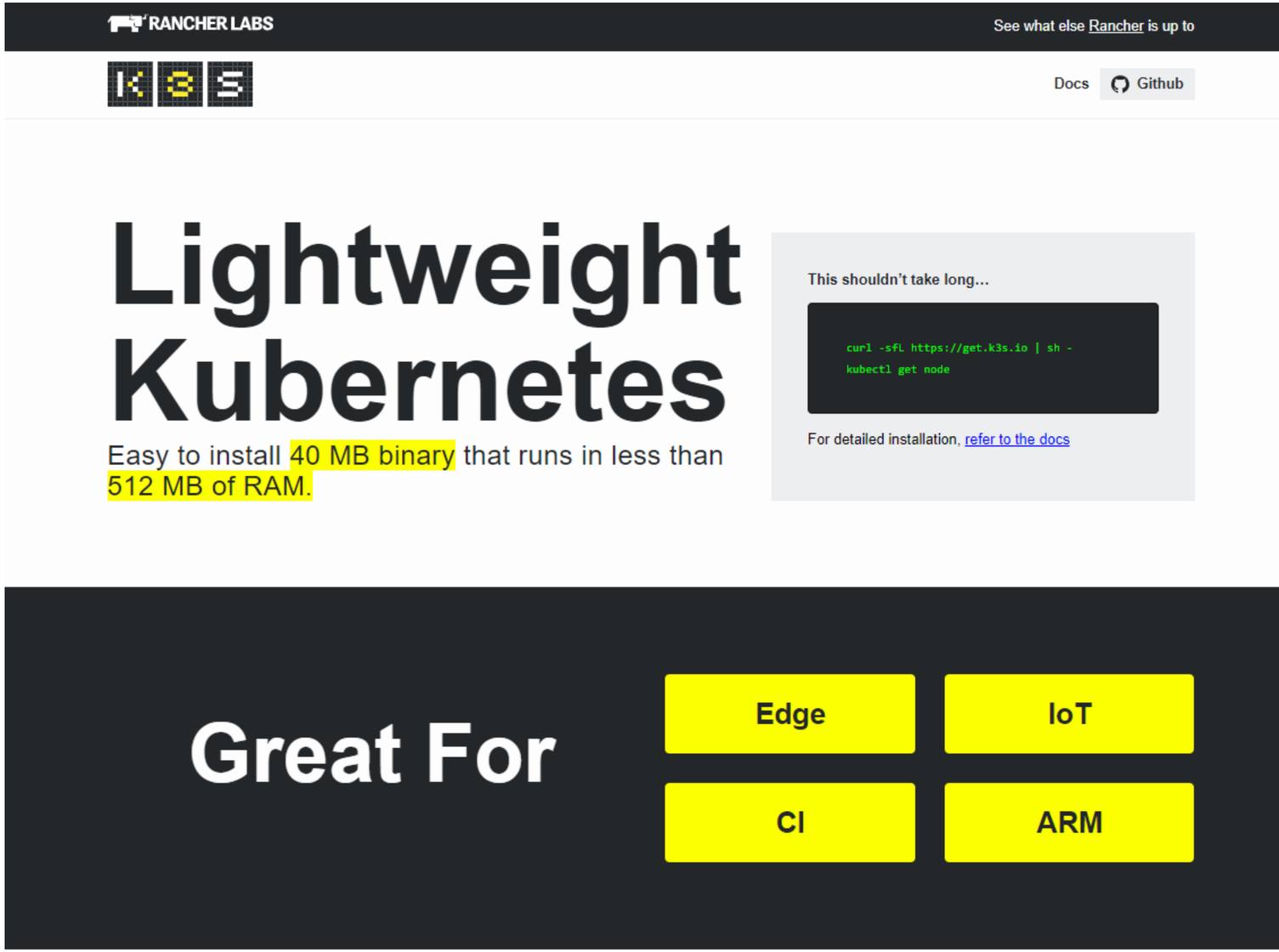
Fleet Management for Edge Clusters

1. Multi-cluster operations (monitoring, logging, etc.)
2. Centralized access control and user management
3. Centralized security policies
4. Multi-cluster application templates
5. CI environments

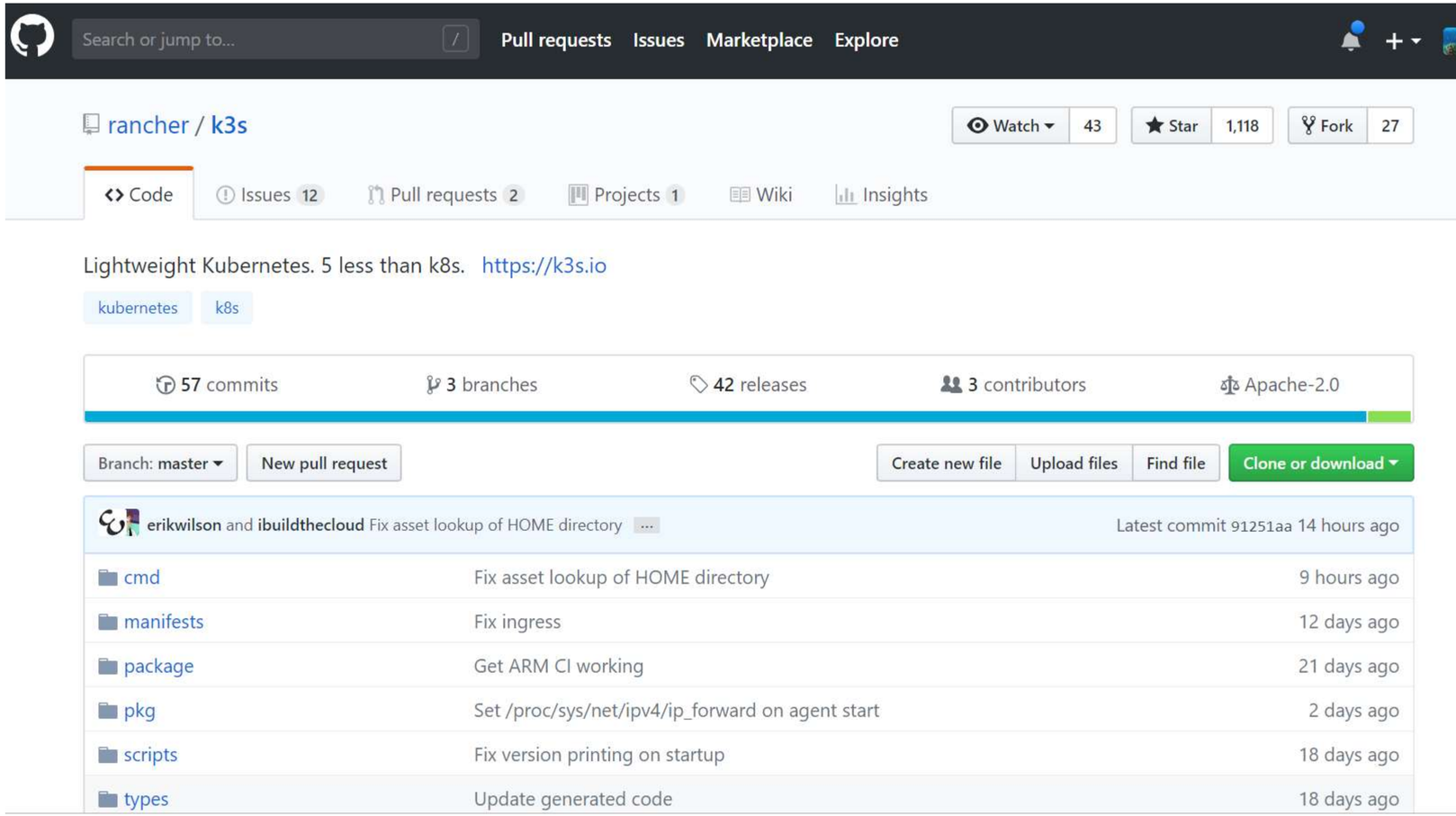
Building Operations for 1000s of clusters



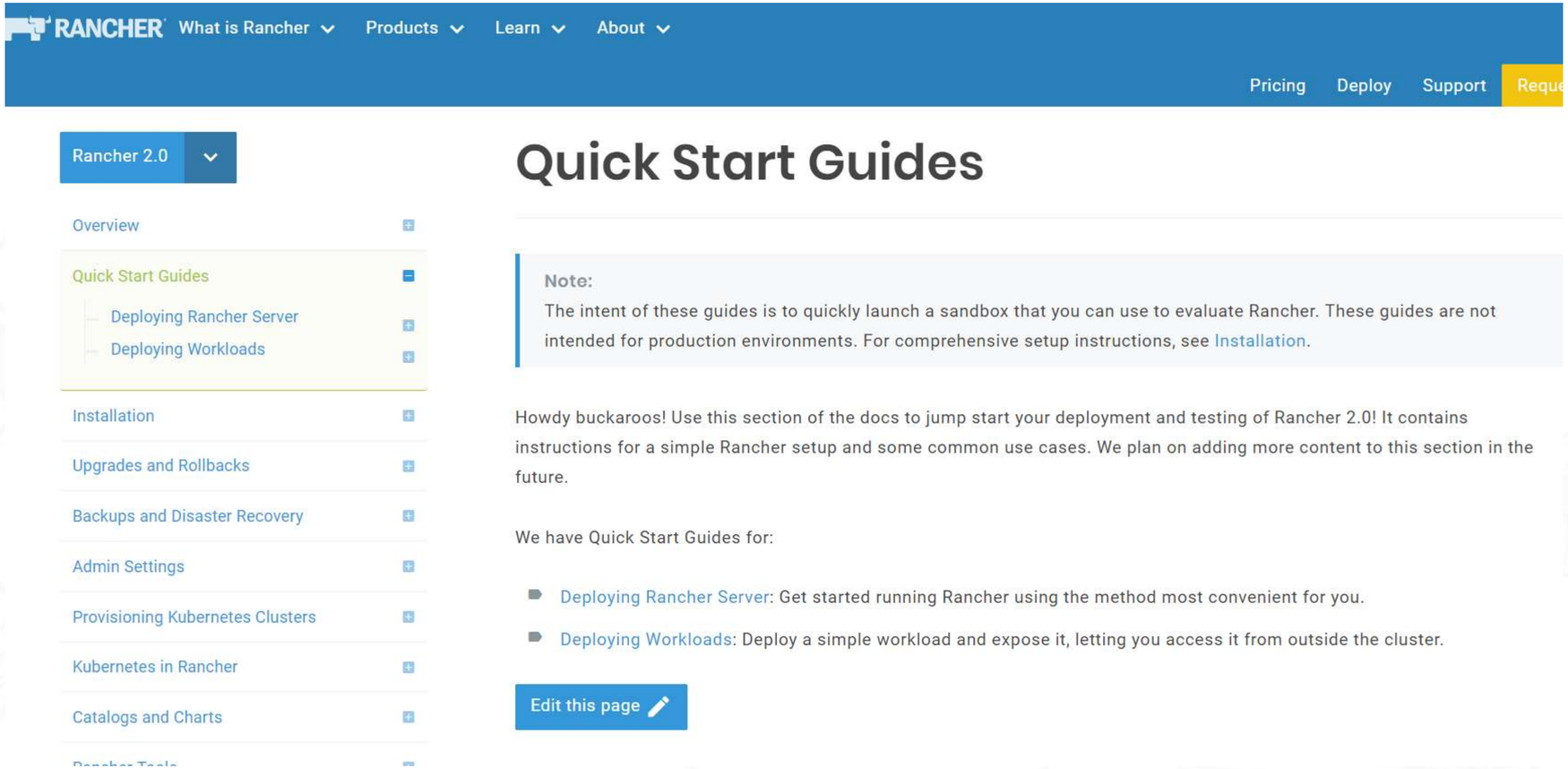
http://k3s.io


RANCHER LABS
See what else Rancher is up to
Docs
Github
Lightweight Kubernetes
Easy to install 40 MB binary that runs in less than 512 MB of RAM.
This shouldn't take long...
curl -sfL https://get.k3s.io | sh -
kubectl get node
For detailed installation, refer to the docs
Great For
Edge
IoT
CI
ARM

https://github.com/rancher/k3s

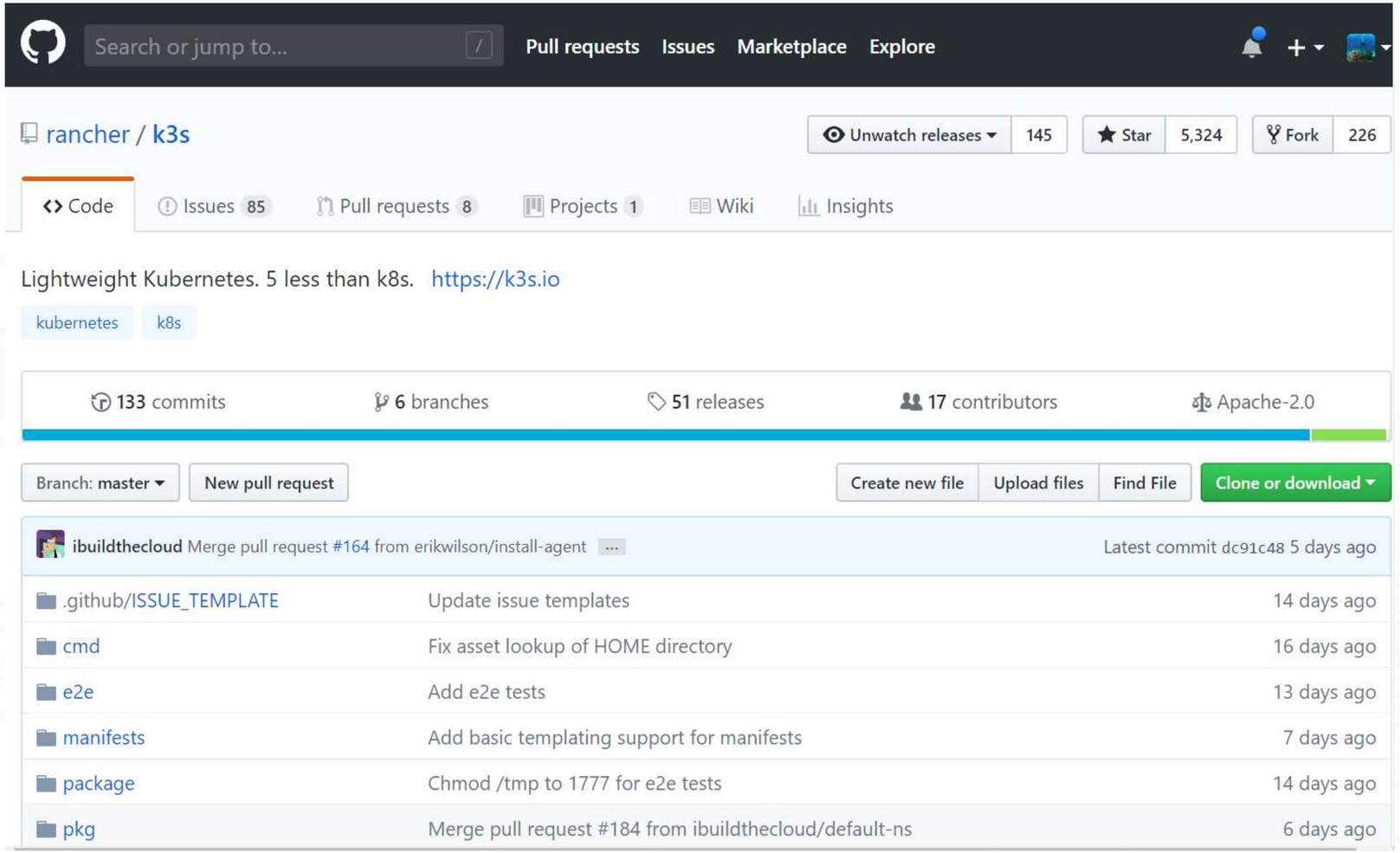


Rancher Quick Start Guide



https://rancher.com/docs/rancher/v2.x/en/quick-start-guide/

Rancher, RancherOS, k3s, RKE are in GitHub



http://github.com/rancher

Thank you

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