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The bridge to possible

# Introduction to Kubernetes

If you thought docker-compose was tough...

Quinn Snyder | Technical Advocate, Learning and Certifications

@qsnyder

CISCOU-2001



#CiscoLive

# Cisco Webex App

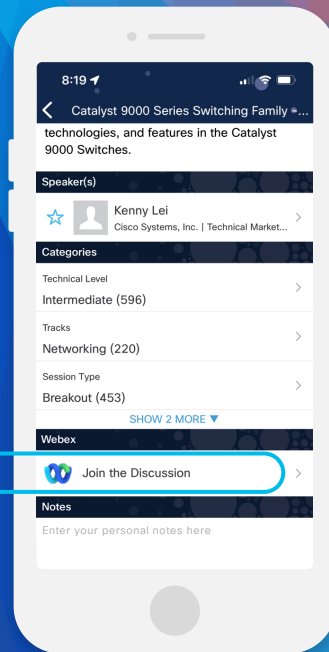
## Questions?

Use Cisco Webex App to chat with the speaker after the session

## How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until June 9, 2023.

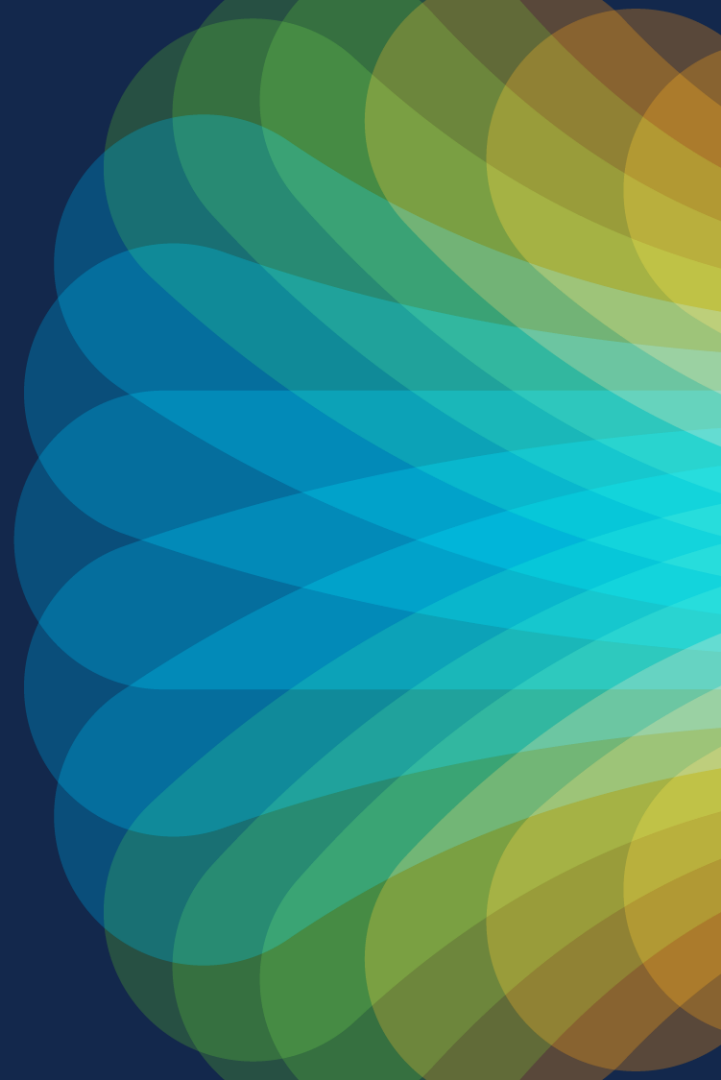


<https://ciscolive.ciscoevents.com/ciscolivebot/#BRKXXX-xxxx>

# Agenda

- Introduction
- Kubernetes Background
- Fundamental Components
- How to Lab
- Demo
- Conclusion

# Background Information



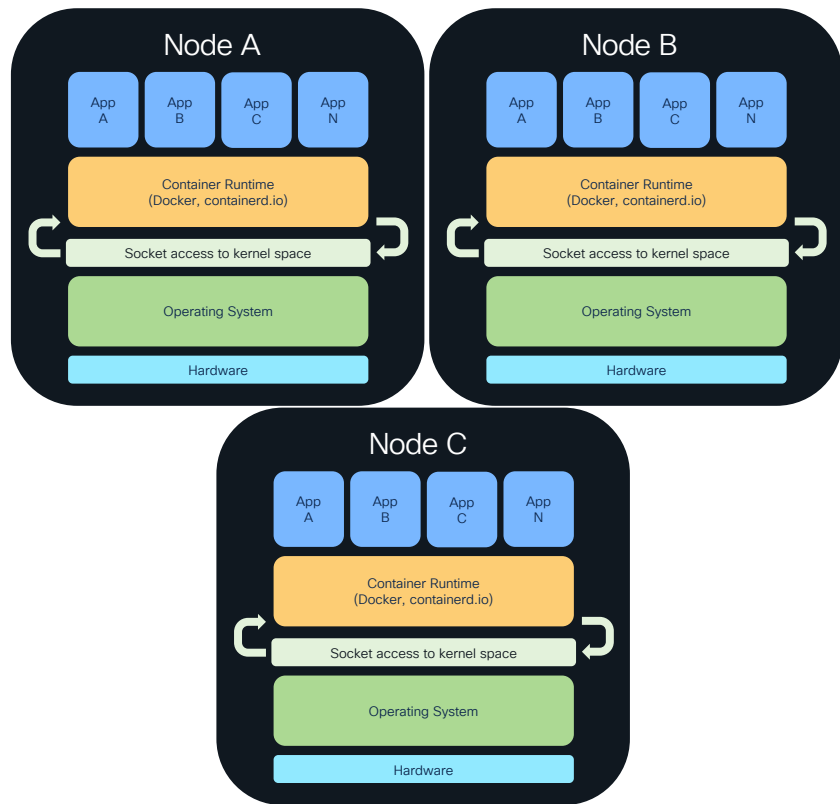
# Coo-bernetes, not Cube-ernetes...



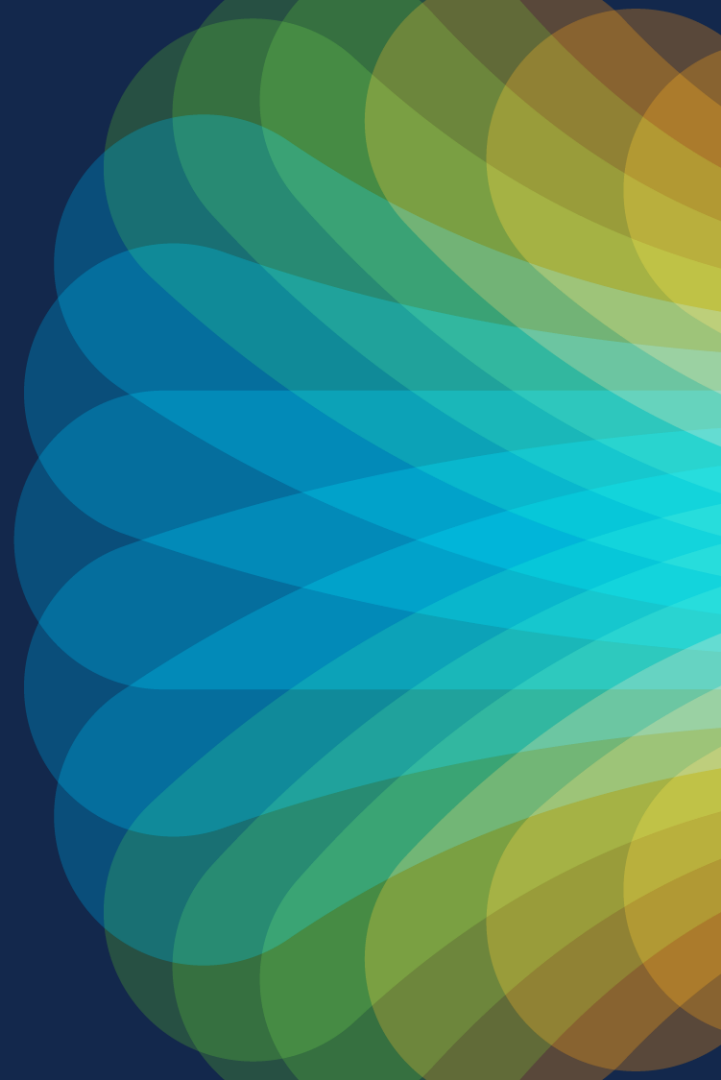
- Google project – released in 2014
  - Now CNCF project
  - Go-based
- Platform for the deployment and operation of (stateless) microservices applications and their lifecycle
- API-driven management/control-plane
- Support amongst every major platform and cloud provider

# Its Docker (containerd.io) All the Way Down...

- K8s control-plane manages deployments across nodes
- Scheduler splits containers (pods) across nodes (servers)
- Failure recovery, resource balancing handled by control-plane
- Interacting with K8s -> kubectl
  - Don't use Docker CLI
  - API-driven, can be run from any workstation with kubeconfig



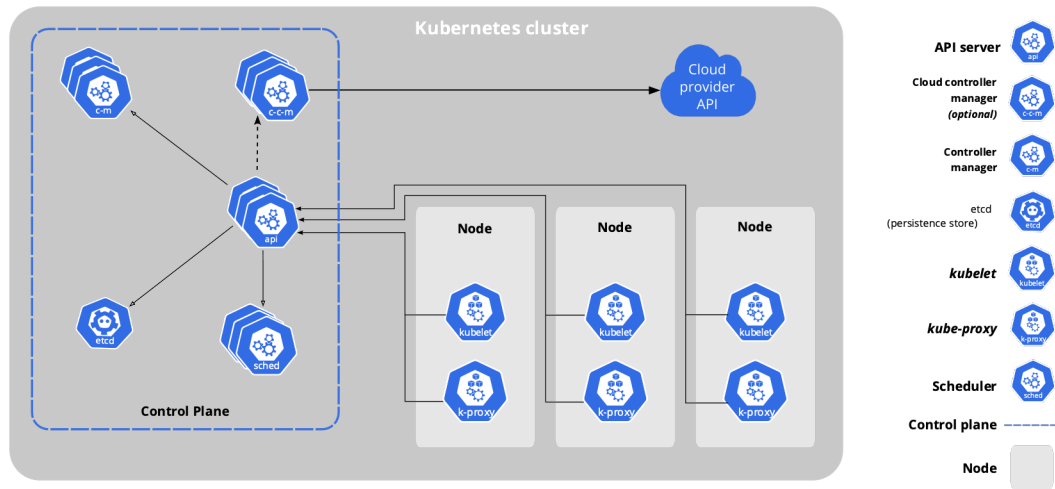
# Components and Terminology





# Nodes, Kubelets, and APIs; Oh My!

- Basic k8s arch: (1) or more control-plane, (1) or more nodes
- CP: no workloads (unless *tainted*)
- CP controls scheduling, resource management
- CP not a node
- Nodes are just grunts
  - Disable all OS things that make them smart -> leverage CP



# Eye Chart of Terms (I'm Sorry)

- Cluster
  - A set of worker machines (nodes)
- Deployment
  - An object that manages a replicated application
- Namespace
  - An abstraction to support isolation of groups of resources within a cluster
- Node
  - Worker machine (runs microservices workloads)
- Pod
  - A set of running containers
- Service
  - A method for exposing a running application from within a cluster

<https://kubernetes.io/docs/reference/glossary/?fundamental=true>

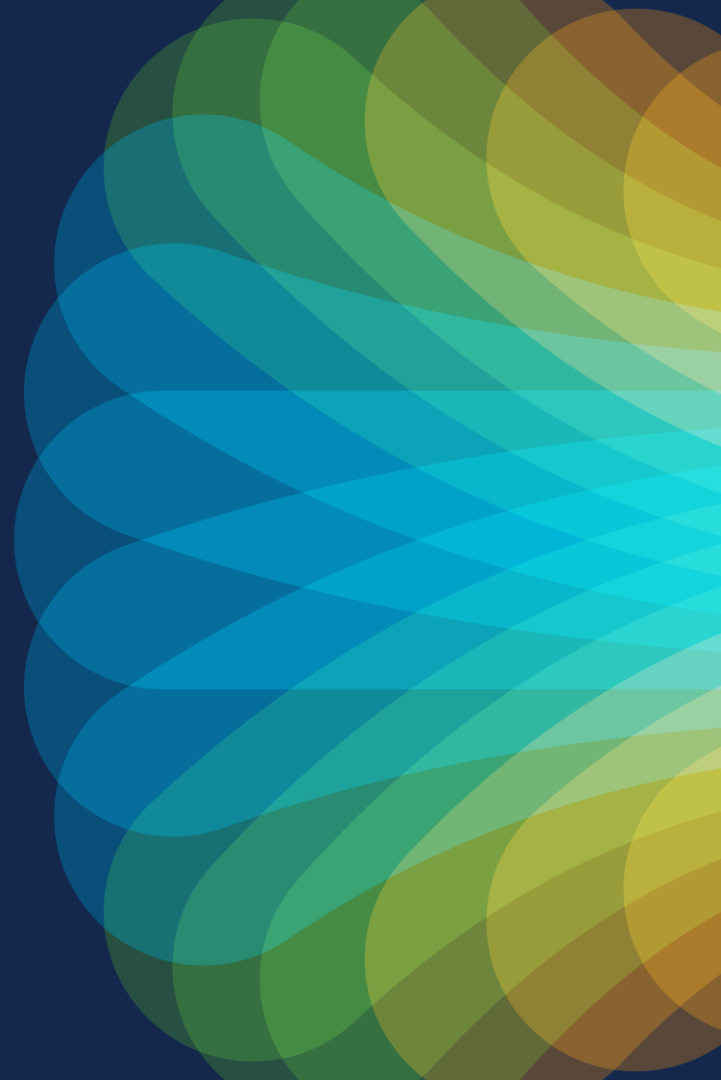
# Vanilla k8s is just that...plain

- k8s does not include additional “features”
  - Overlay networking
  - Distributed storage
  - Observability
- Many projects exist for “nice to haves”
  - Rook, Ceph
  - Calico, Flannel
  - Calisti, Panoptica (Cisco)



*“Every engineer should install bare metal K8s without shortcuts” ~ Quinn Snyder (really)*

# Easier Ways to K8s



# Various “Local” K8s Tools

- Microk8s
  - Canonical; lightweight test/edge
  - <https://microk8s.io>
- Minikube
  - <https://minikube.sigs.k8s.io/docs/>
  - Focus on speed, compatibility (beyond skew), app devs/test
- KinD (K8s in Docker)
  - Closest “emulation” of K8s cluster – “inception”
  - <https://kind.sigs.k8s.io>
- Docker Desktop

# ”Production” K8s Implementations

- Microk8s

- K3s

- OpenShift

- “Pick a cloud provider”

- ....

- Roll-your-own

These are my favorites



Don't do this  
(more than once)

Chapter 7 of the DEVCOR OCG covers K8s and cloud. I'll also sign it if you'd like

# Demo

<https://github.com/qsnyder/ciscou-2001>



# Fill out your session surveys!



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**These points** help you get on the leaderboard and increase your chances of winning daily and grand prizes



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- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
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# Thank you

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