

Introduction to Kubernetes and OpenShift (Lab)

—

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Slides at: github.com/drnugent

Hi, I'm Dave

I'm a developer advocate for IBM in San Francisco. I also help organize:

- The SF JavaScript Meetup
- IBM Developer SF Meetup
- ForwardJS San Francisco && Ottawa

I participate in meetups, hackathons, webinars and write articles about technology for IBM and other organizations.

Warning: I am a lowly developer



Agenda

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Projected market for application container technologies, 2022

Source: [2019 Container Adoption Survey](#)

\$4 . 3B

IT Admins who are running container technologies

Source: [2019 Container Adoption Survey](#)

87%

IT Admins using Two or More Orchestration Tools

Source: [2019 Container Adoption Survey](#)

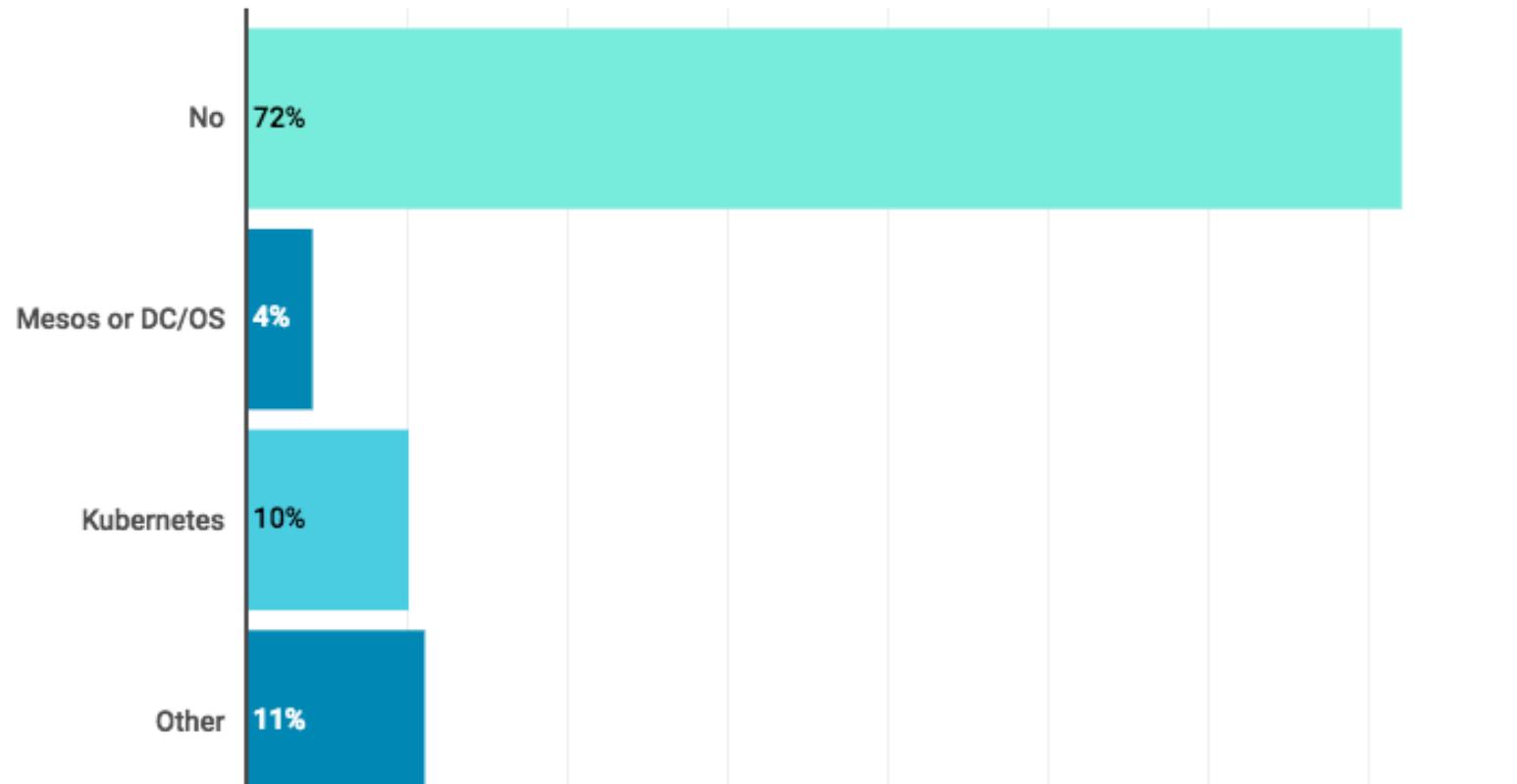
65%

Commits made to the [Kubernetes repository](#) on GitHub

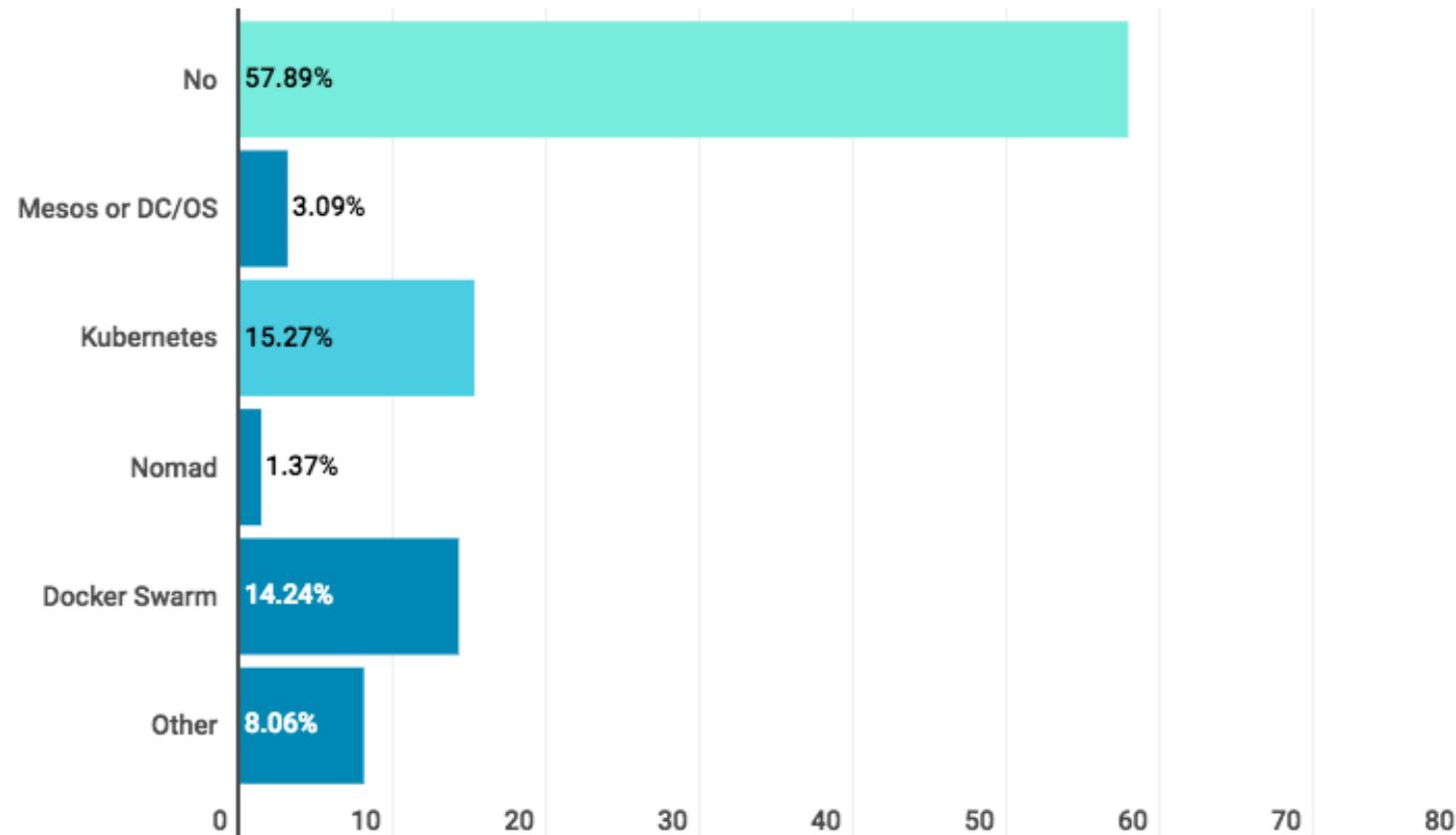
Source: [2019 Container Adoption Survey](#)

84,413

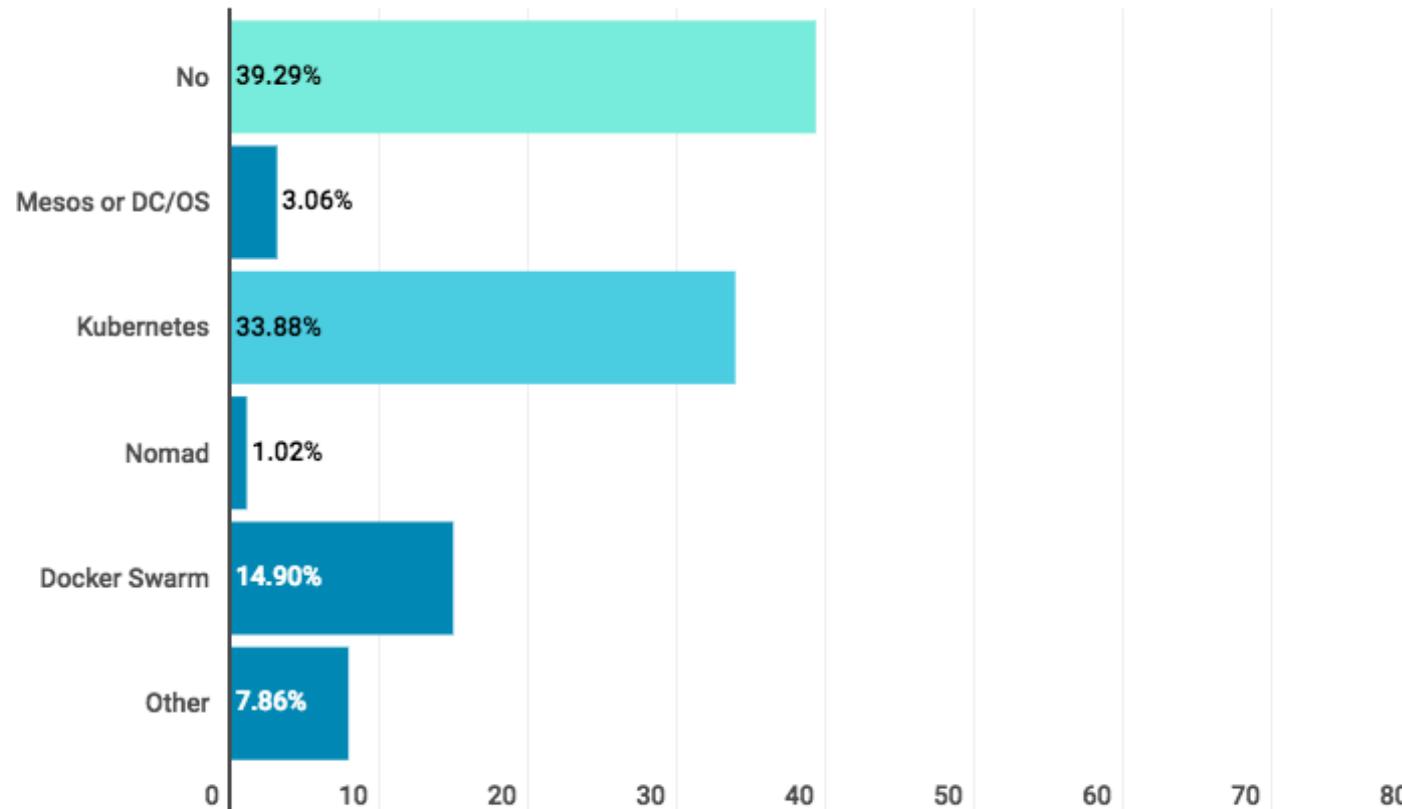
Do you use orchestration services, and if so which? (2016)



Do you use orchestration services, and if so which? (2017)



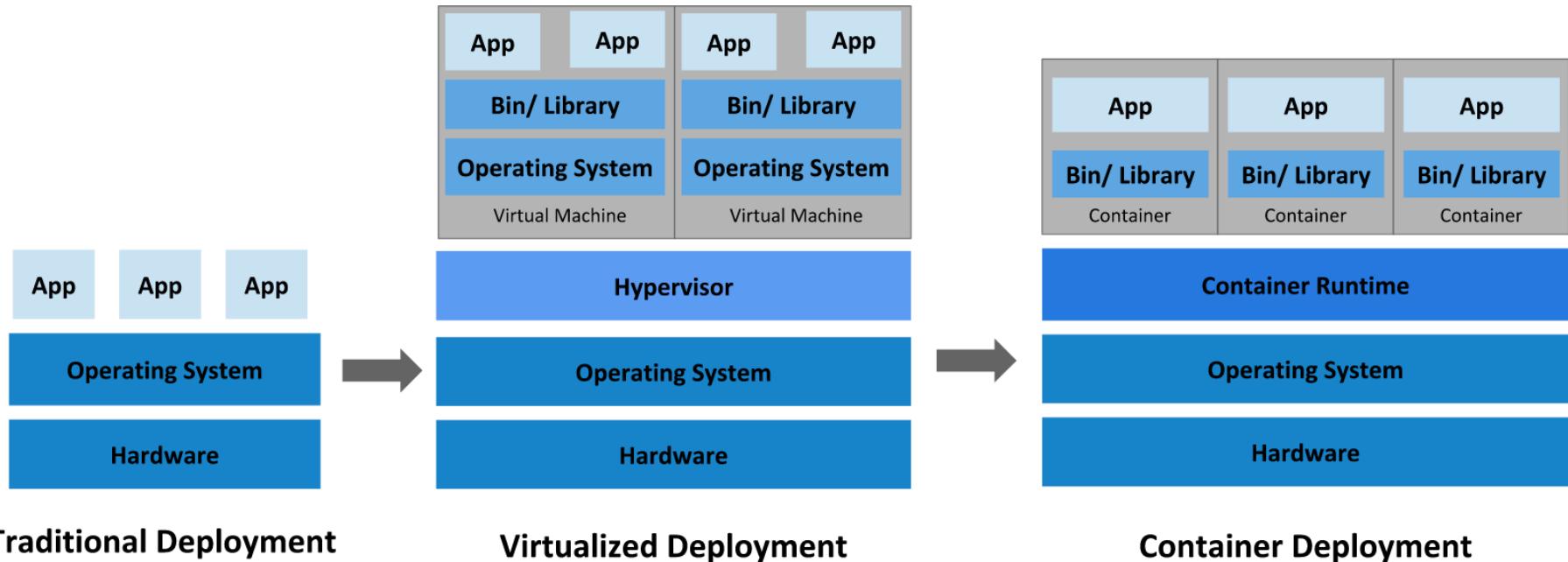
Do you use orchestration services, and if so which? (2018)



↳ Why Containers?



Why Containers?



Containers overview

- Environment isolation
- Demand growth
- New Cloud-Native Apps
- Modernize existing apps
- Dev vs Ops

A standard way to package an application and all its dependencies so that it can be moved between environments and run without changes.

Containers work by isolating the differences between applications inside the container so that everything outside the container can be standardized.

Containers: Dev vs Ops

Code	Logging
Libraries	Remote Access
Config	Network Config
Runtime	Monitoring
OS	



Why Containers?

- Agile
- Continuous Deployment
- Separation of Concerns
- Observability
- Consistency
- Management
- Microservices
- Resource Isolation
- Resource Utilization



Other High-Level Benefits

- Portable
- Easy to manage
- Containers provide “just enough” isolation
- Immutable



↳ Microservice Architectures



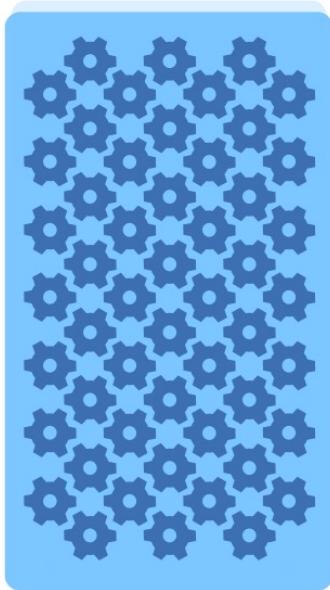
Microservices Defined

Martin Fowler: Microservices

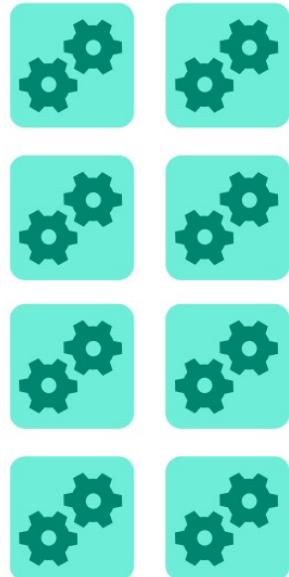
“In short, the microservice architectural style is an approach to developing a single application as a suite of small services, each running in its own process and communicating with lightweight mechanisms, often an HTTP resource API. These services are built around business capabilities and independently deployable by fully automated deployment machinery. There is a bare minimum of centralized management of these services, which may be written in different programming languages and use different data storage technologies. “



Microservices



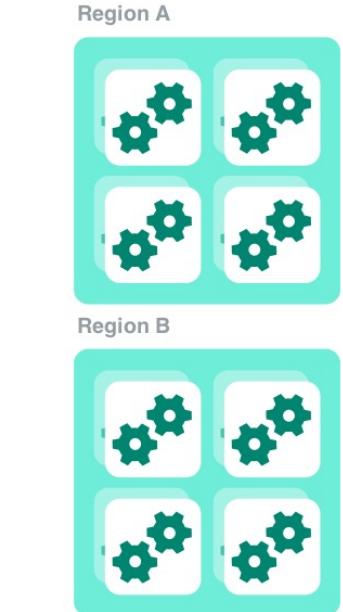
Monolithic Application



Break-down into microservices

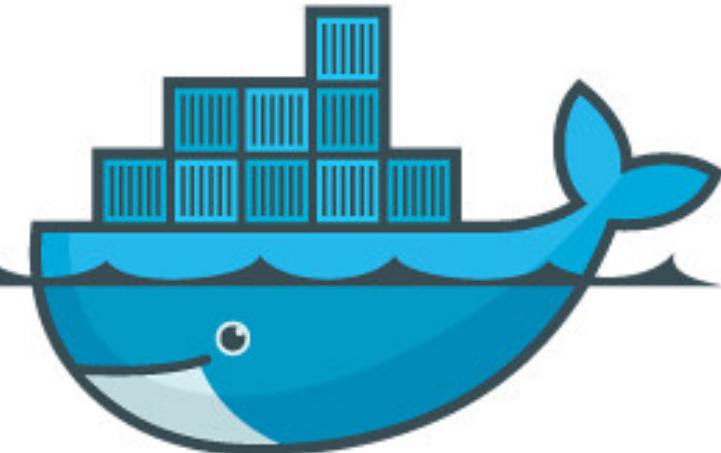


Make each microservice HA



Protect against regional outage

↳ Docker Containers



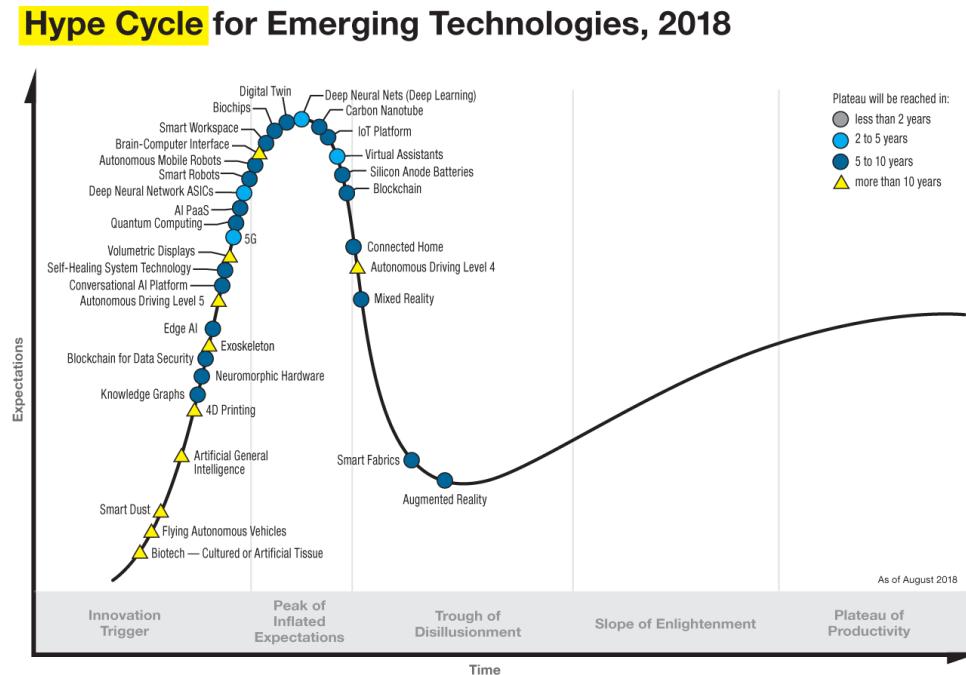
docker

The Gartner Hype Cycle

Docker generated a lot of buzz and \$272M+ in venture capital funding.

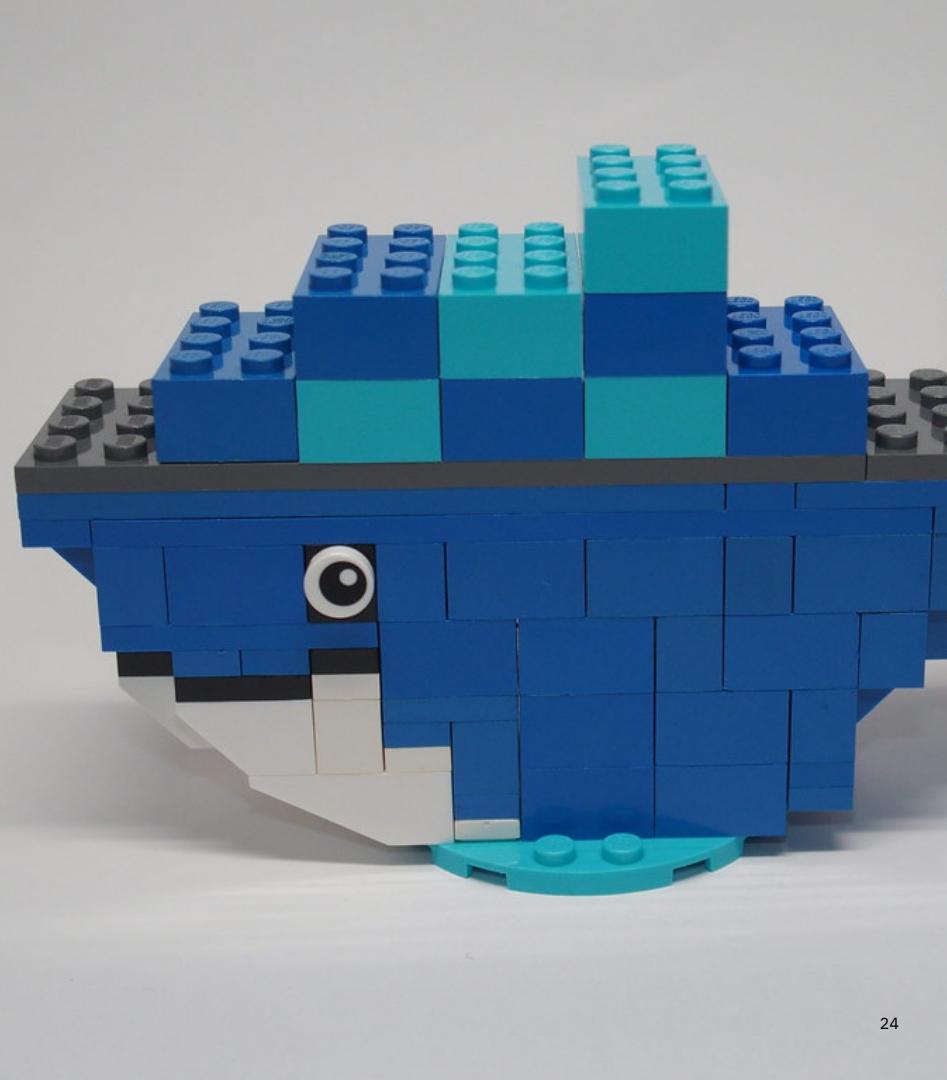
As a technology, containers are still gaining in popularity, especially with enterprises.

With a focus on Kubernetes, what is the future for Docker and Docker, Inc?



Docker Components

- Docker Engine
 - Manages containers on a host
 - Accepts requests from clients
 - Maps container ports to host ports
- Images
- Docker Client
 - Drives engine
 - Drives “builder” of images
- Docker Registry



↳ Orchestration

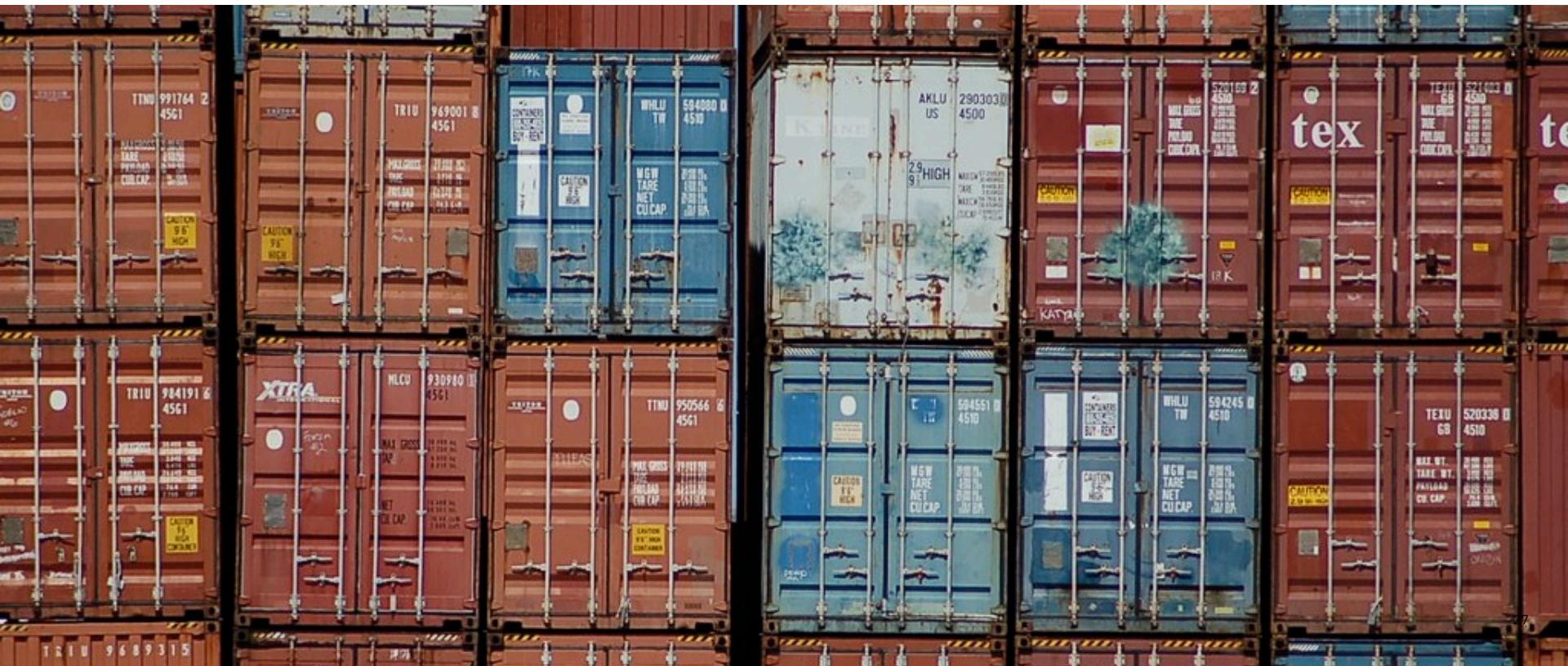


Orchestration

- Scheduling
- Cluster management
- Service discovery
- Provisioning
- Monitoring
- Configuration management



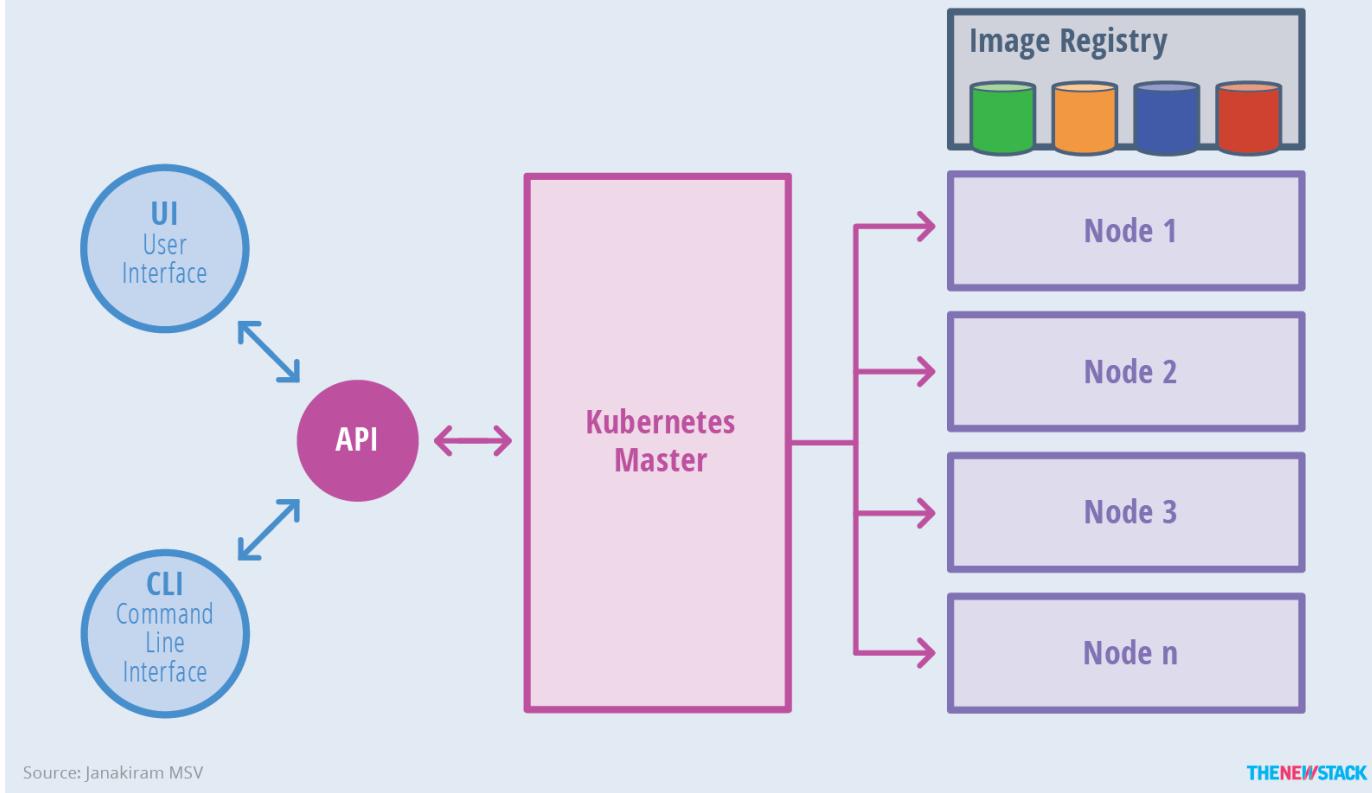
↳ Kubernetes





kubernetes

Kubernetes Architecture



Source: Janakiram MSV

THE NEW STACK

Why Kubernetes?

- Service Discovery
- Storage Orchestration
- Rollouts/Rollbacks
- Automatic Bin Packing
- Self-Healing
- Secret/Config Management



What Doesn't Kubernetes Do?

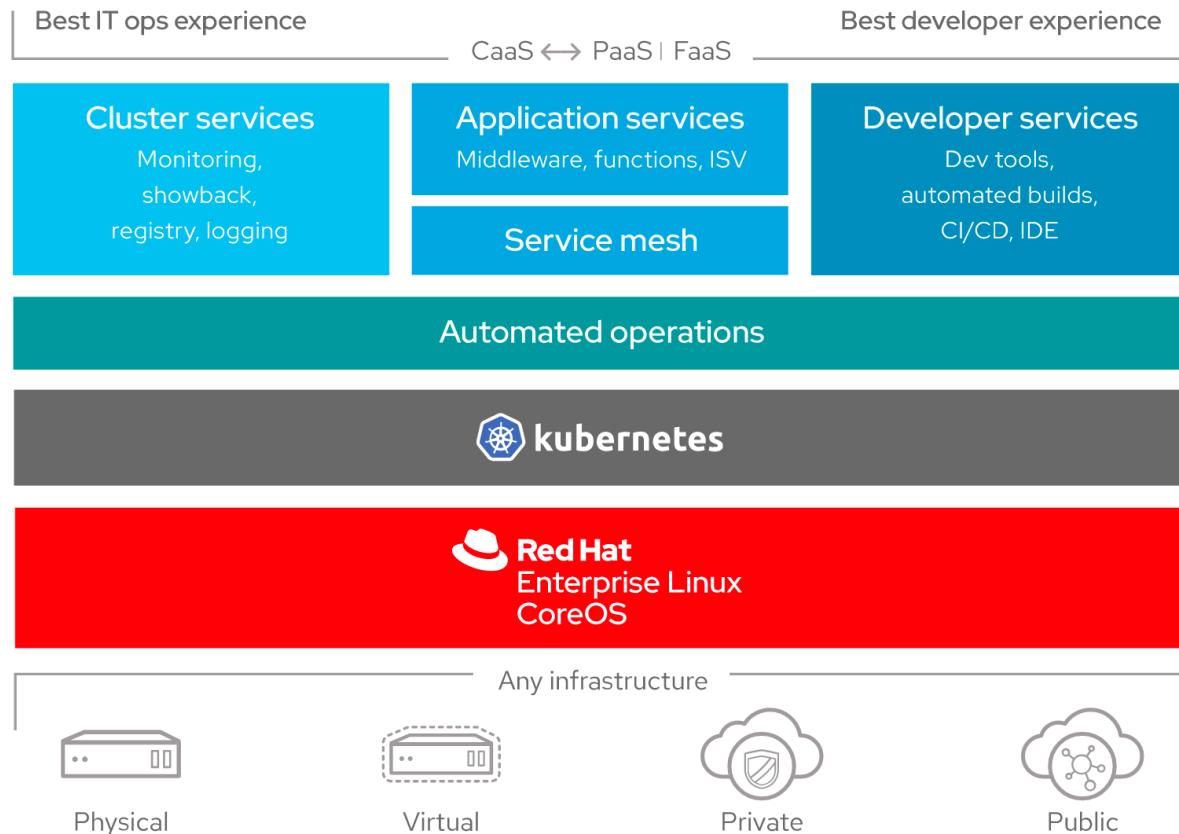
- Define Application Types
- Deploy Code
- Application-Level Services
- Logging/Monitoring/Alerting
- Config
- Machine Management



↳ OpenShift



↳ OpenShift Architectural Overview



OpenShift Overview

- Container Host & Runtime
- Enterprise Kubernetes
- Validated Integrations
- Integrated Container Registry
- Developer Workflows
- Access to Services



OpenShift Developer Services

- OpenShift Service Mesh
- OpenShift Serverless
- OpenShift Pipelines



Red Hat OpenShift 4.2 released October 16, 2019

<https://blog.openshift.com/introducing-red-hat-openshift-4-2-developers-get-an-expanded-and-improved-toolbox/>

Today Red Hat announces Red Hat OpenShift 4.2 extending its commitment to simplifying and automating the cloud and empowering developers to innovate.

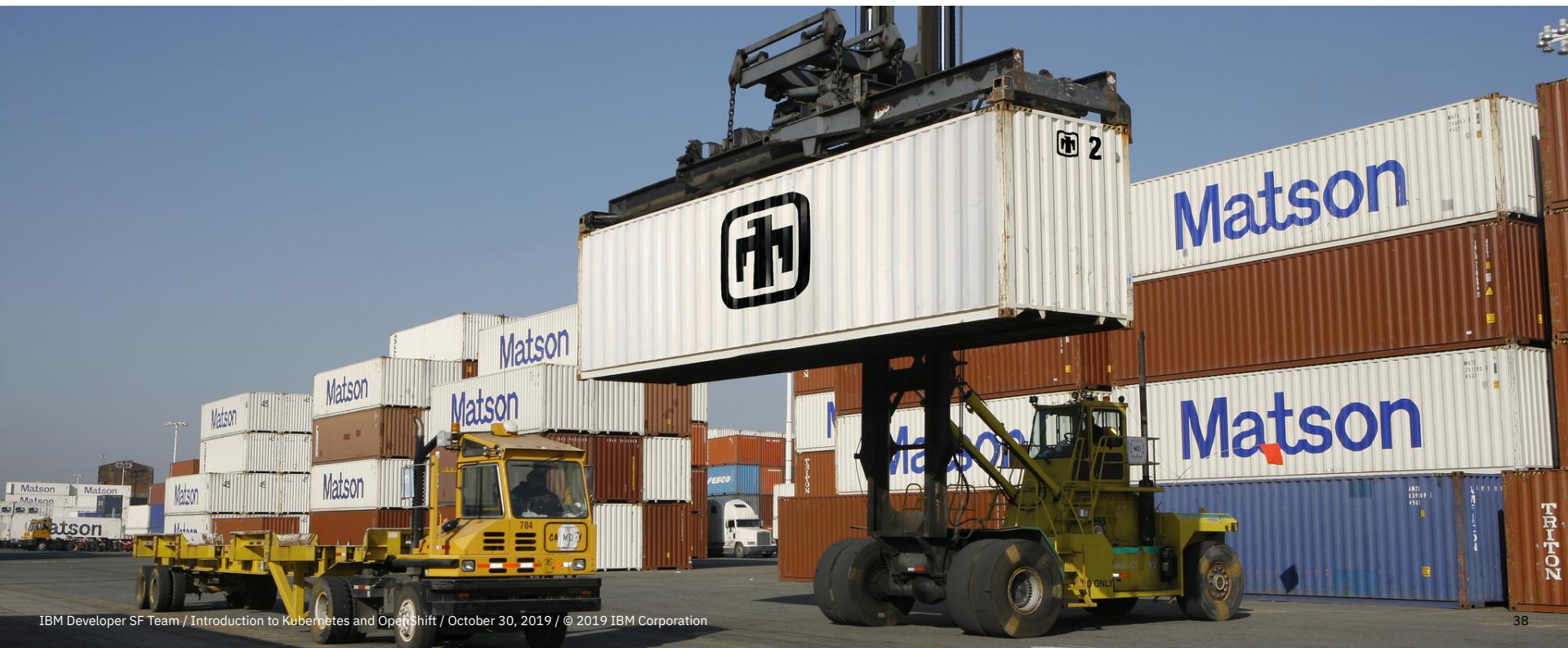
Red Hat OpenShift 4, introduced in May, is the next generation of Red Hat's trusted enterprise Kubernetes platform, reengineered to address the complexity of managing container-based applications in production systems. It is designed as a self-managing platform with automatic software updates and lifecycle management across hybrid cloud environments, built on the trusted foundation of Red Hat Enterprise Linux and Red Hat Enterprise Linux CoreOS.

OpenShift vs OKD

- OKD (Origin Community Distribution)
- github.com/openshift/origin
- 30,872 commits, 364 contributors



↳ Conclusion & Lab



OpenShift Lab Setup

1. Sign up for IBM Cloud

ibm.biz/openshift-webinar

2. Get your OpenShift Cluster

openshiftwebinar.mybluemix.net (key: oslab)

3. Switch to your new IBM Cloud profile

4. Start a Web Shell

workshop.shell.cloud.ibm.com (password: ikslab)

5. Follow the Lab Setup Instructions

ibm.biz/openshift-webinar-lab

6. Follow Step 4: Deploy an application on OpenShift on the IBM Cloud

ibm.biz/openshift-webinar-lab-4



Build Smart



Saturday, November 2

Online: Digital Developer Conference

Wednesday, November 6

Online Meetup: Build Watson-Enhanced Voice Agents on IBM Cloud with Nexmo

Thursday, November 7, 2019

Lunch and Learn: Kubernetes workshop with OpenShift

ibm.biz/bayareaevents

Part of **IBM Developer** – 34 groups [?](#)

IBM Developer SF Bay Area



San Francisco, CA



7,619 members · Public group [?](#)



Organized by Angie K and 6 others

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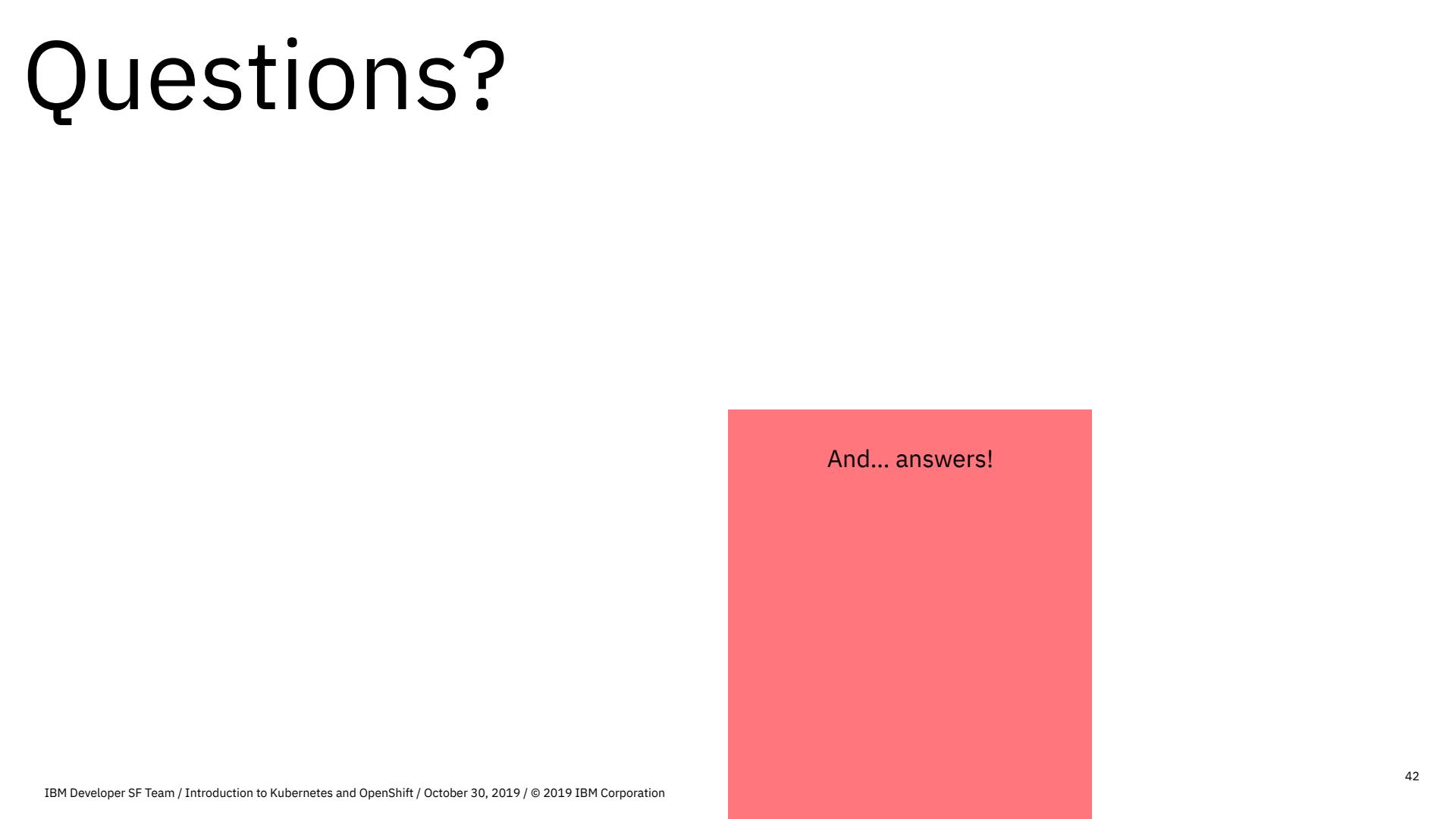
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Questions?



And... answers!

