

Kubernetes with Red Hat OpenShift

World Tour

Deep Dive into Containers and Enterprise Kubernetes

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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.

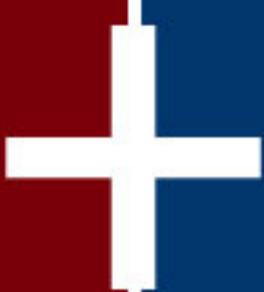


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Projected market for application container technologies, 2022

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](#)

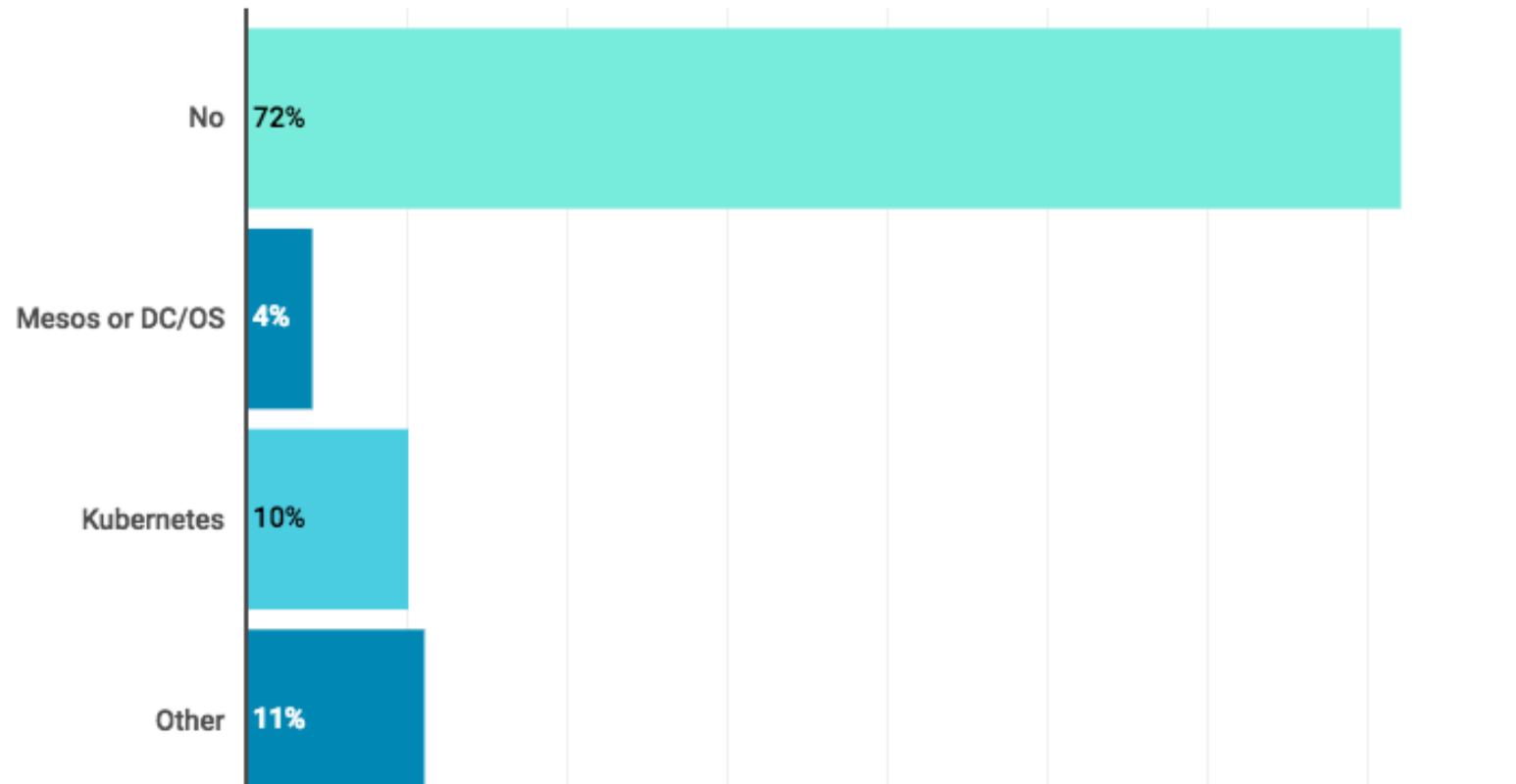
65%

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

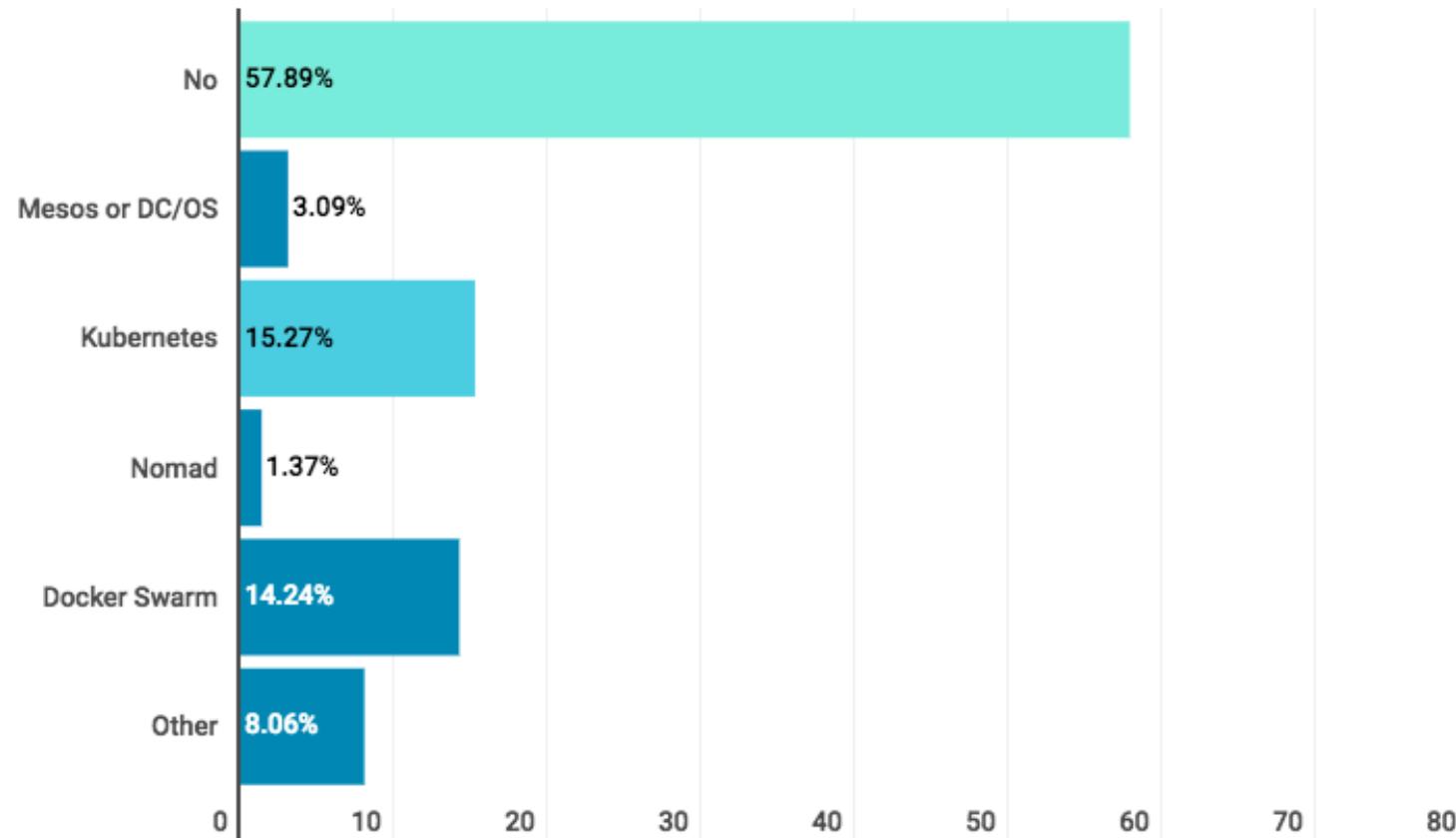
Source: [2019 Container Adoption Survey](#)

88,483

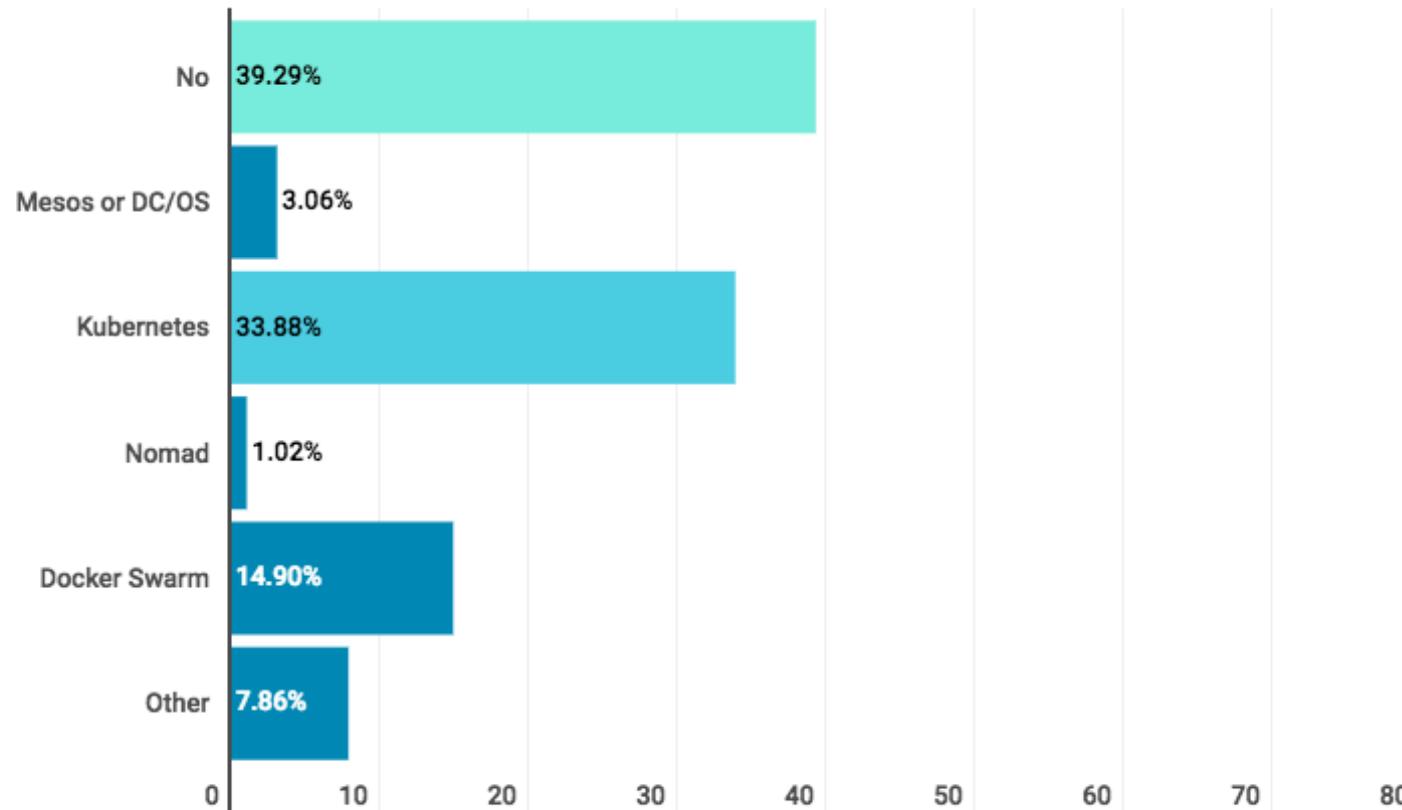
Do you use orchestration services, and if so which? (2016)



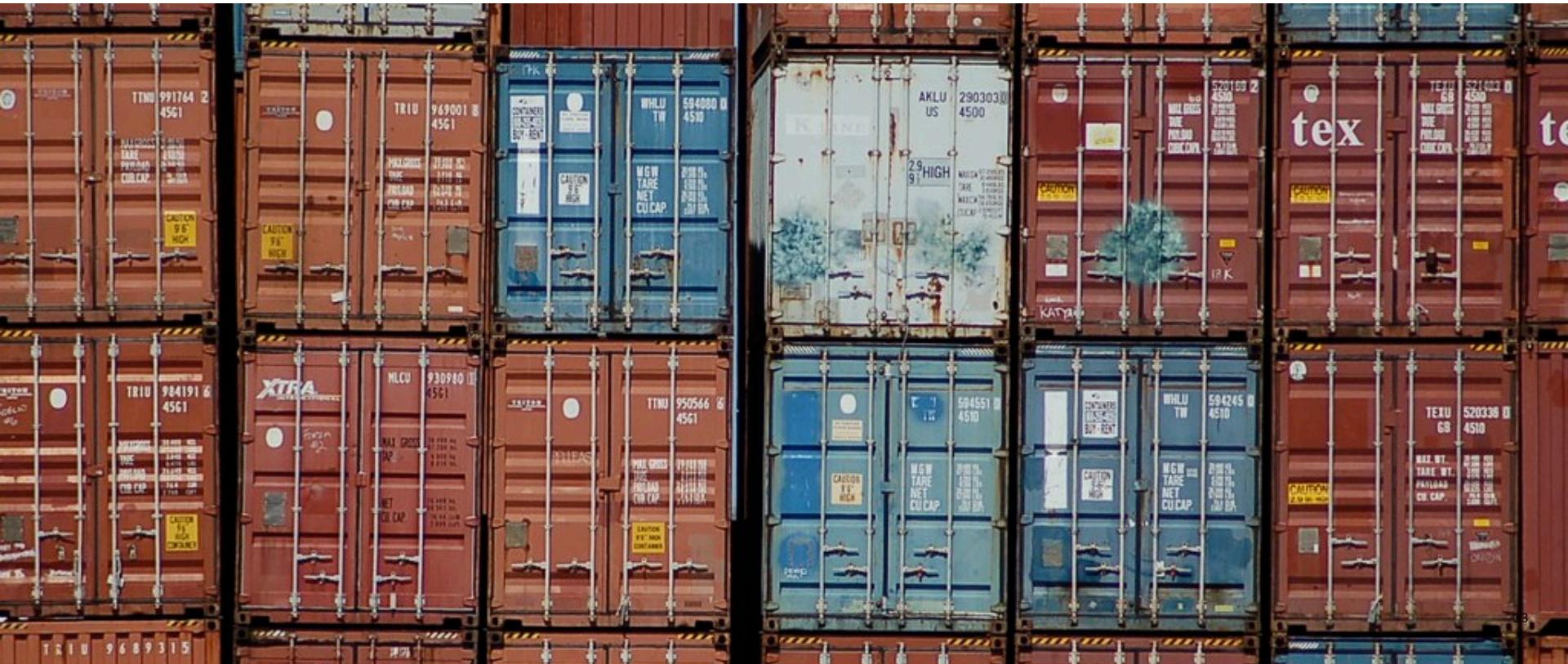
Do you use orchestration services, and if so which? (2017)



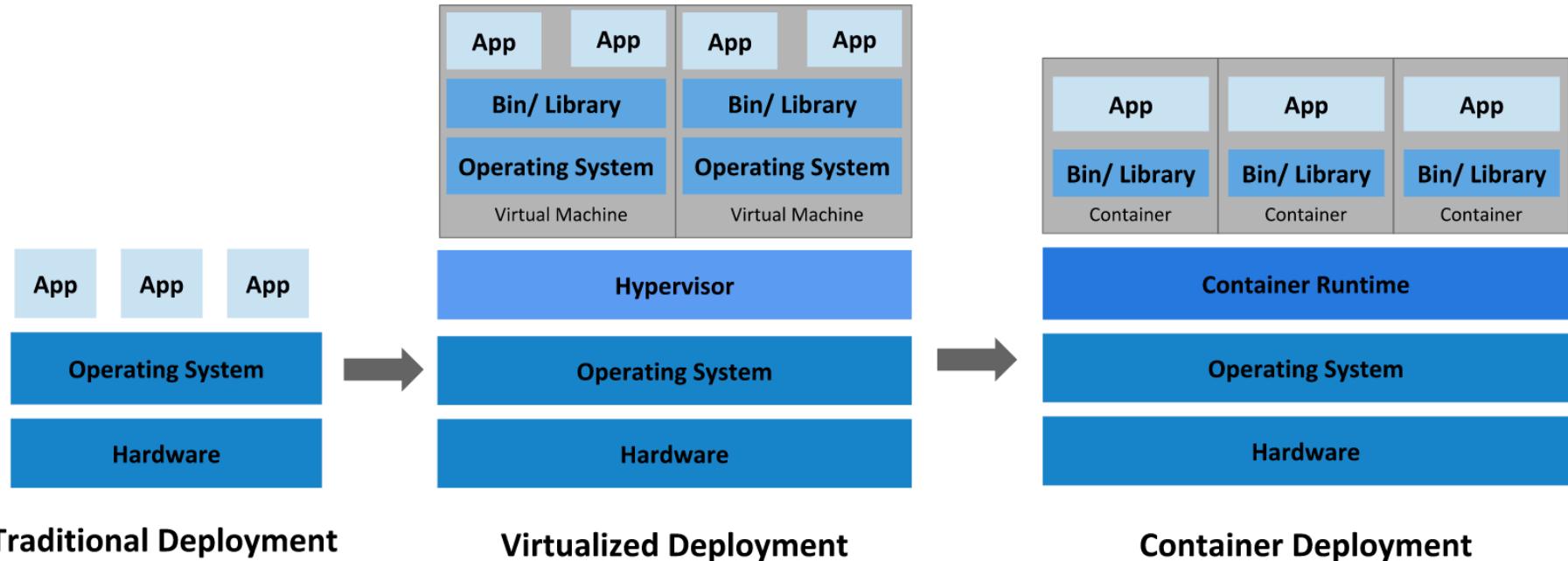
Do you use orchestration services, and if so which? (2018)



↳ 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



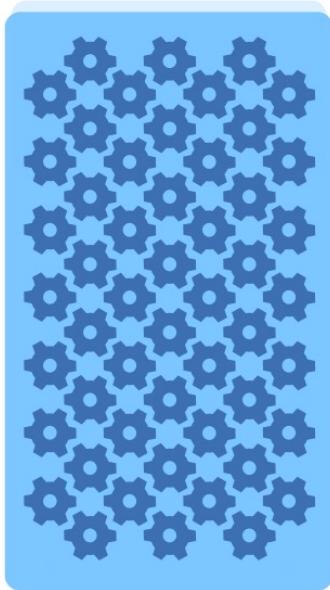
Microservices Defined

Martin Fowler: Microservices

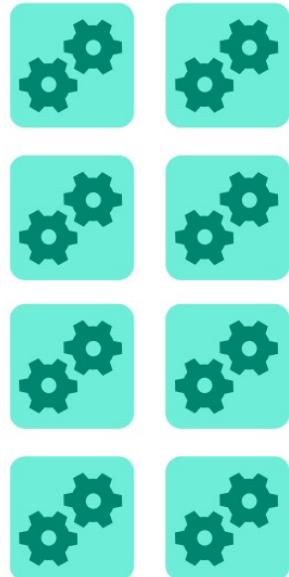
“In short, the microservice architectural style is an approach to developing a single application as a suite of small services, each running in its own process and communicating with lightweight mechanisms, often an HTTP resource API. These services are built around business capabilities and independently 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



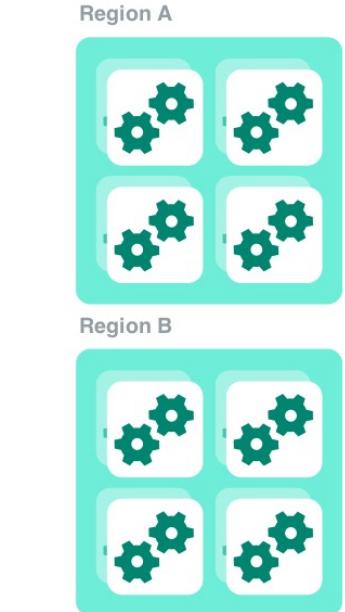
Monolithic Application



Break-down into microservices

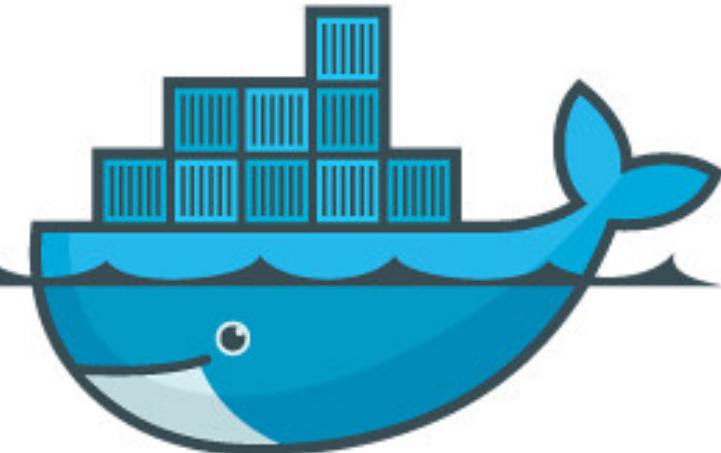


Make each microservice HA



Protect against regional outage

↳ Docker Containers



docker

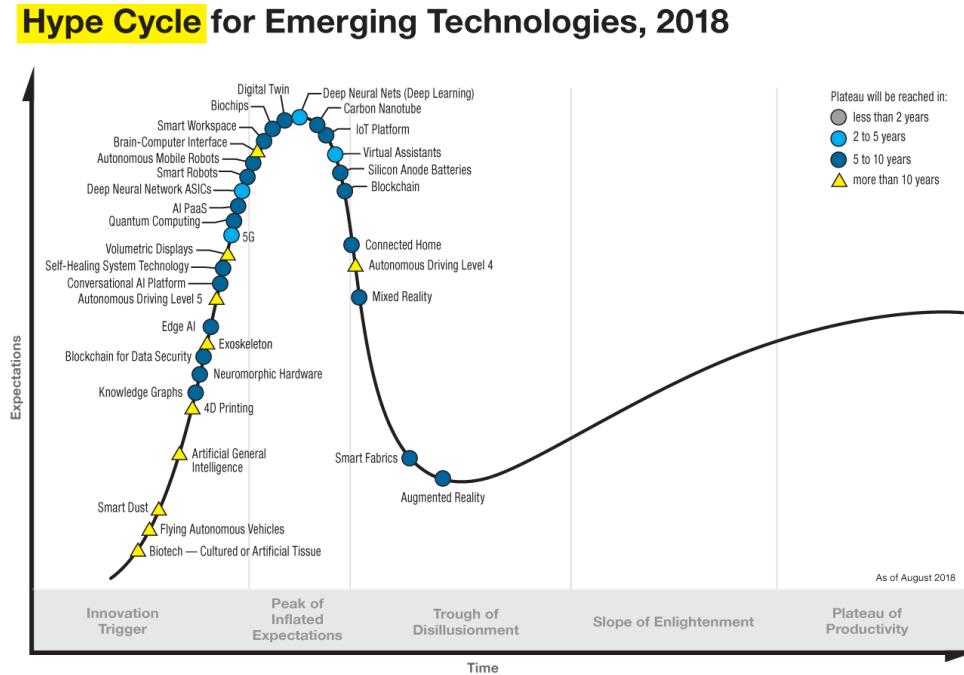


The Gartner Hype Cycle

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

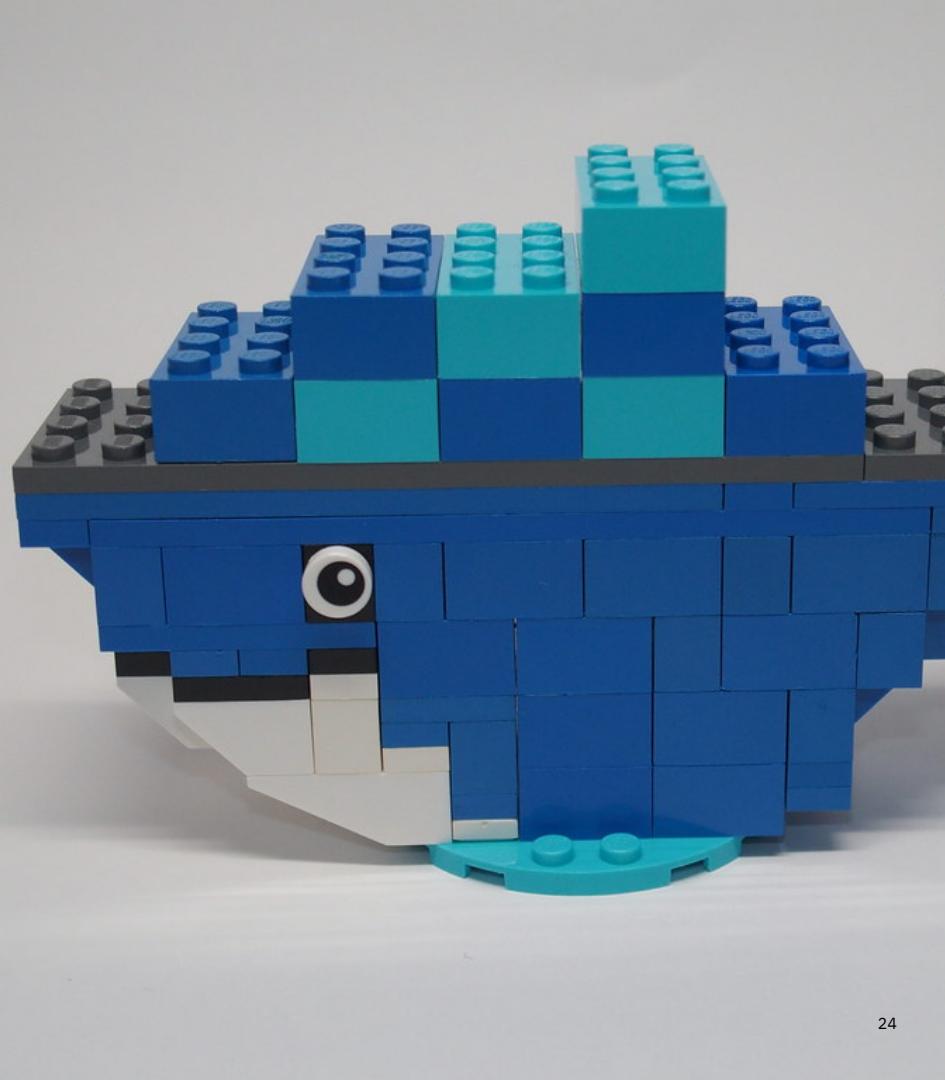
As a technology, containers are still gaining in popularity, especially with enterprises.

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

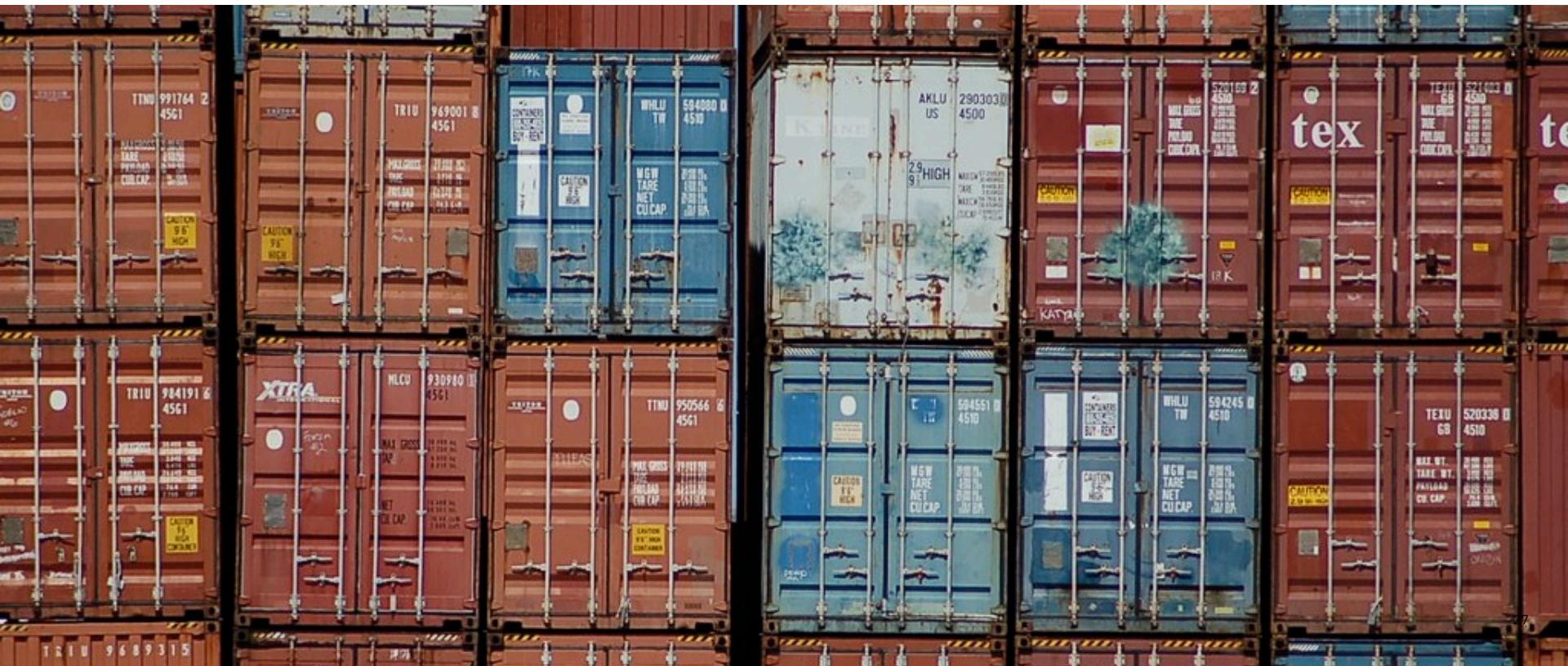


Orchestration

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



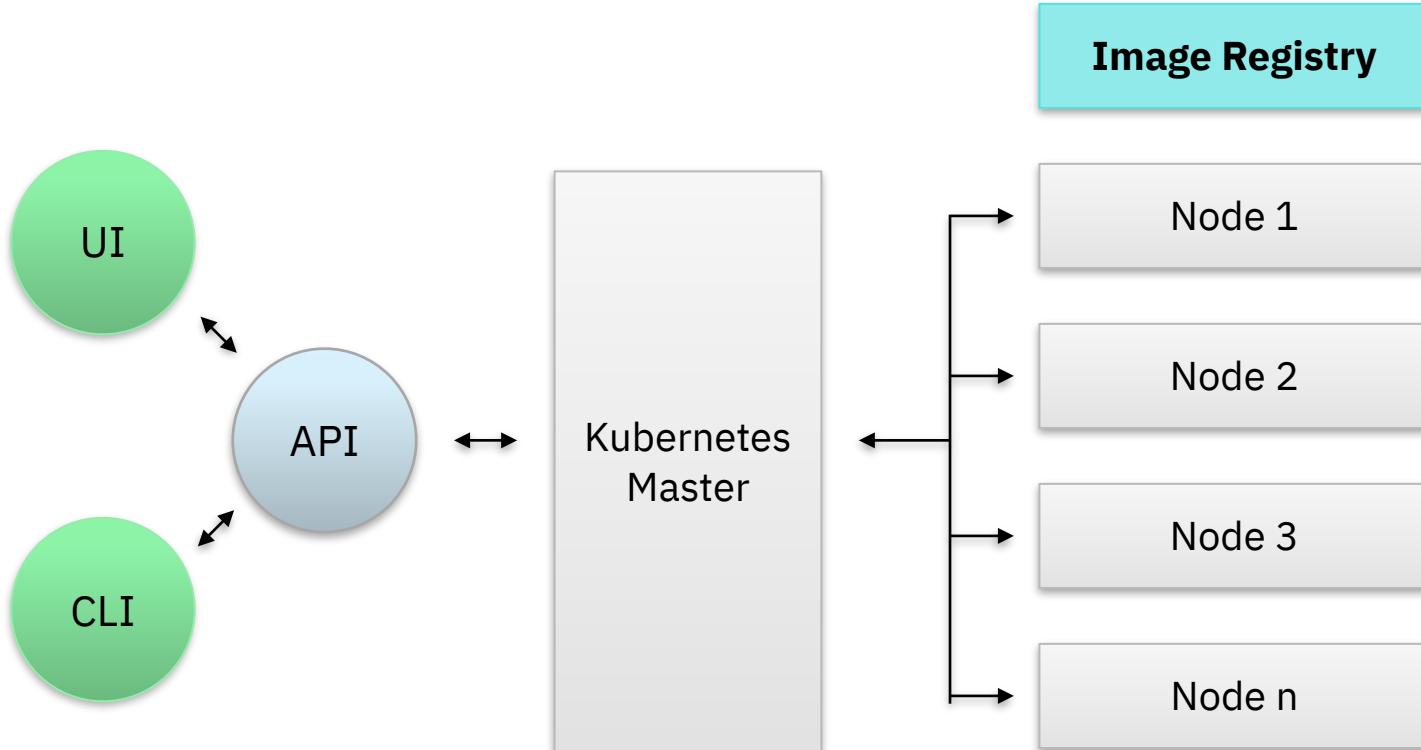
↳ Kubernetes





kubernetes

Kubernetes Architecture



Why Kubernetes?

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



What Doesn't Kubernetes Do?

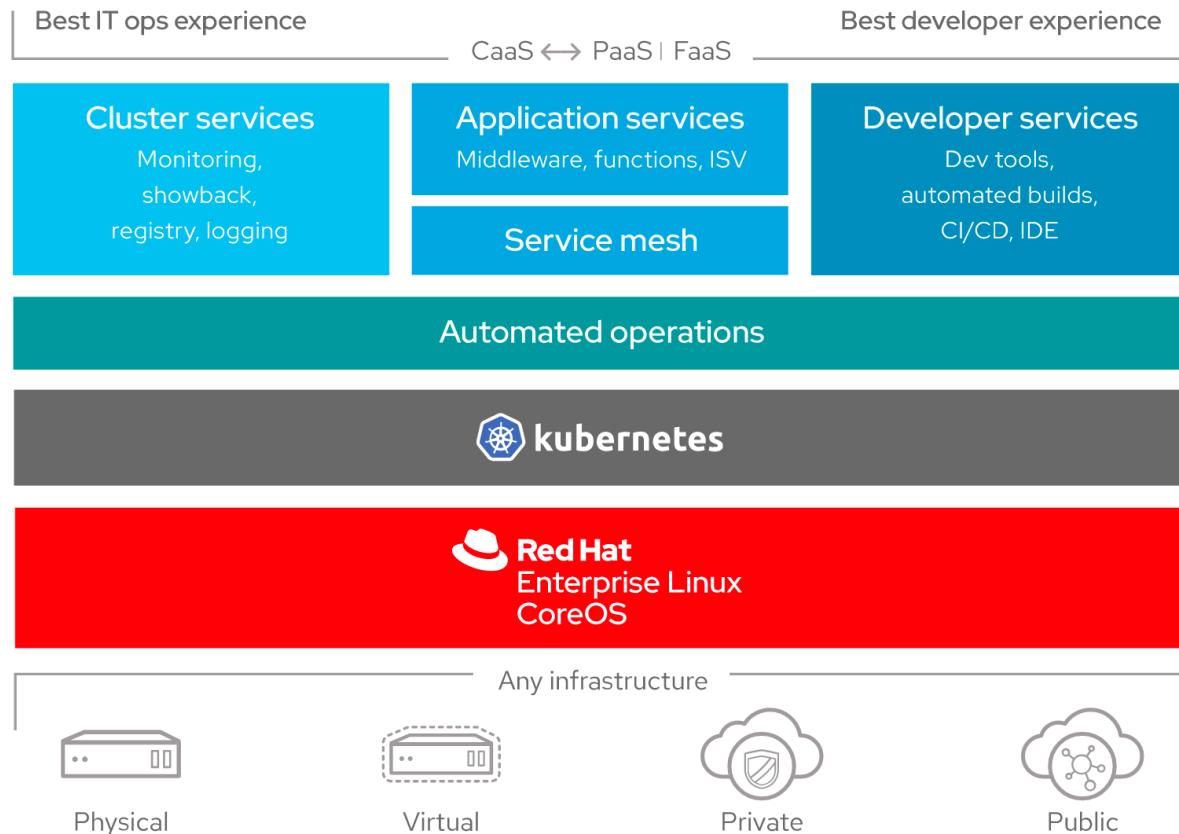
- Define Application Types
- Deploy Code
- Application-Level Services
- Logging/Monitoring/Alerting
- Config
- Machine Management



↳ OpenShift



↳ OpenShift Architectural Overview



OpenShift Overview

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



Why OpenShift 4 instead of 3?

- Not Just an Upgrade
- Immutable RHEL CoreOS
- OpenShift Services Mesh
- Operator Framework
- Knative Framework
- CodeReady Containers
- Simplified Update Process



Red Hat OpenShift 4.3 released January 15, 2020

<https://blog.openshift.com/introducing-red-hat-openshift-4-3-to-enhance-kubernetes-security/>

Today, Red Hat announces the general availability of Red Hat OpenShift 4.3, the newest version of the industry's most comprehensive enterprise Kubernetes platform.

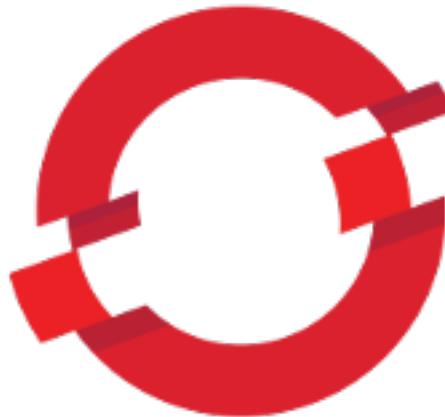
- **Encryption to strengthen the security of containerized applications on OpenShift**
- **Better access controls to comply with company security practices**
- **OpenShift Container Storage 4 across the cloud**
- **Automation to enhance day two operations with OpenShift**

OpenShift vs OKD

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



↳ Kubernetes vs Red Hat OpenShift



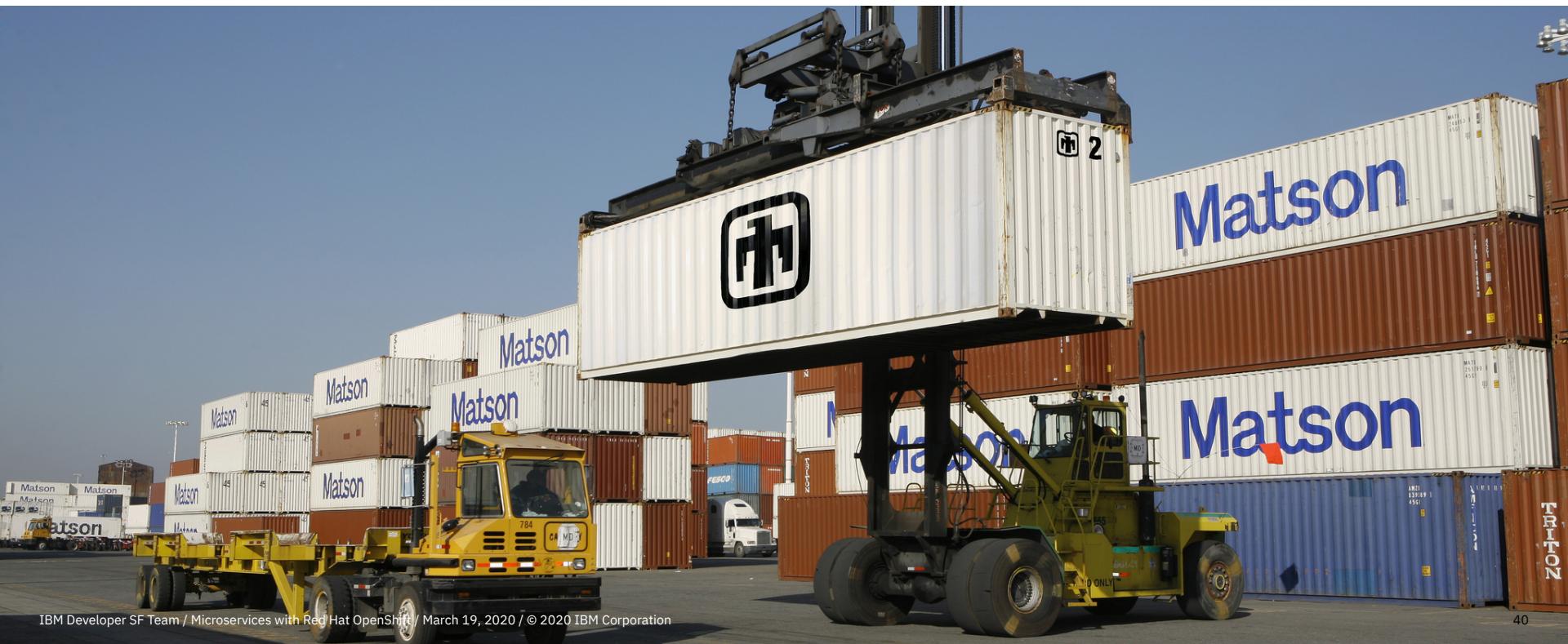
kubernetes OPENSHIFT

K8s vs Red Hat OpenShift

- Product vs Project
- Security
- Management
- Integrations
- Support
- Catalog



↳ Conclusion & Lab



Let's Go to the Labs!

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http://ibm.biz/openshift_deepdive

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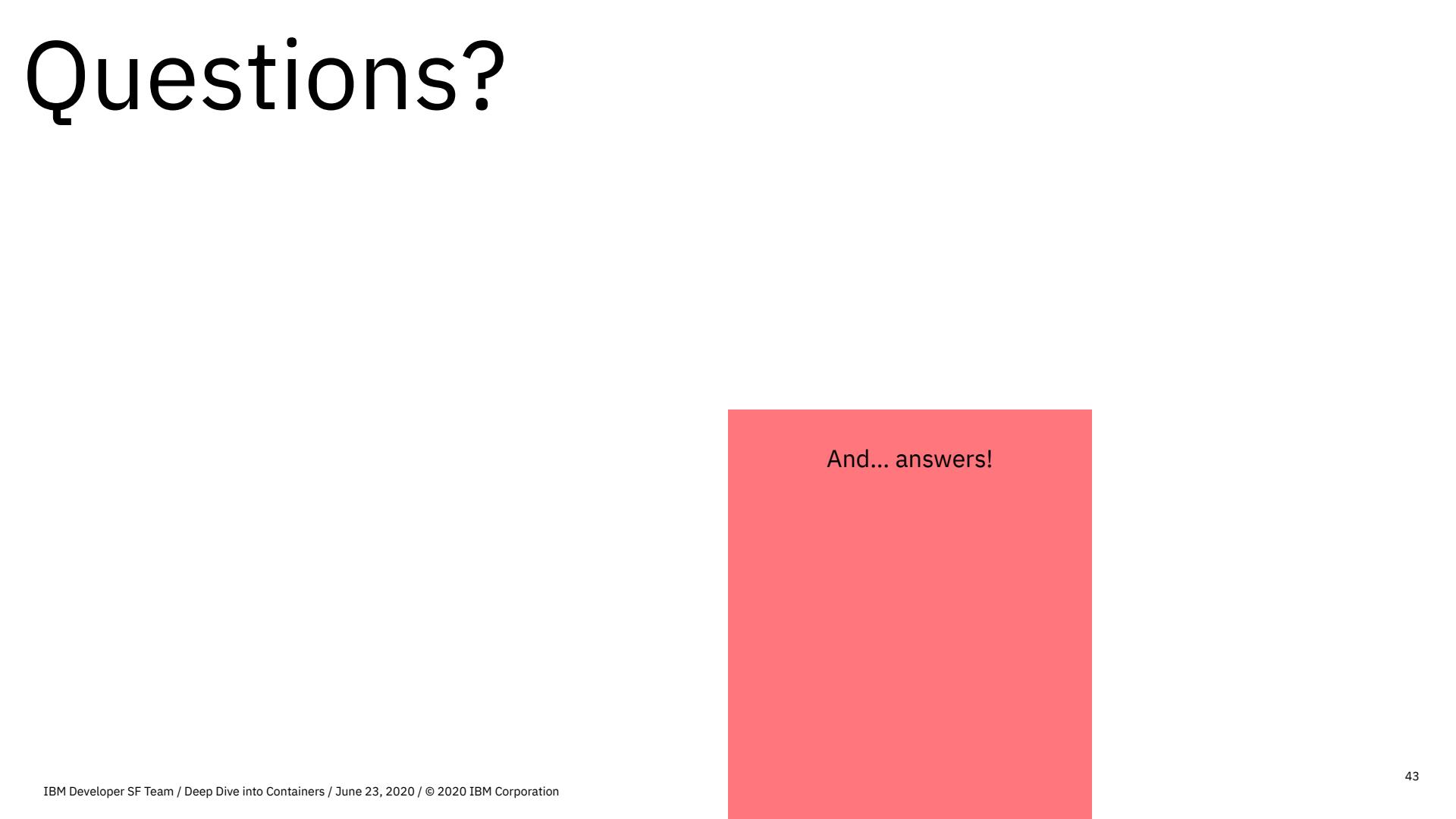
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Questions?



And... answers!

