Real-time Container Monitoring Best Practices

Presented by AWS & Datadog



Today's Speakers



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AWS

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Agenda

- Introduction & Session Overview
- Containers at AWS
- Real-world Containers Best Practices & Use Cases
- What's Next?
- Audience Q&A





Poll Question

What container runtime are you currently using?

- Docker
- Containerd
- CRI-O
- Other







Containers at AWS

More options and power than ever before

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What customers ask for



Build applications, not infrastructure



Manage infrastructure to their requirements



Scale quickly and seamlessly



Security and isolation by design

What are our customers building?



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Applications

Mobile & web applications

Back-end web services

IoT

Data processing



Shared services platform

CI/CD

IaaS

Management, security, & governance

Logging & monitoring



Enterprise app migration

.NET Classic Windows apps

Linux apps

Third-party applications



Machine learning

Autonomous vehicle

Recommendation engines

Fraud detection

Chatbots

How are customers building?



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Compute operational models

Least

What you manage

Most

	AWS manages	Customer manages
AWS Lambda Serverless functions	Physical hardware, software, networking, and facilities	Application code
AWS Fargate Serverless containers	Container orchestration, provisioning Cluster scaling Physical hardware, host OS/kernel, networking, and facilities	Application code Data source integrations Security config and updates Network config Management tasks
Amazon ECS/EKS Container-management -as-a-service	Physical hardware software, networking, and facilities	Application code Data source integrations Work clusters Security config and updates, network config, firewall, management tasks
Amazon EC2 Infrastructure-as-a-Service	Physical hardware software, networking, and facilities	Application Data source integrations Scaling Security config and updates Network config Management tasks Provisioning, managing scaling

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Poll Question

Are you using or have aspirations to have aspirations to use AWS serverless technologies such as Fargate or Lambda?

- Yes
- No
- Not yet, but we are planning to implement

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The containers stack on AWS

CONTAINERS

- CONTAINER SERVICE
- MANAGED KUBERNETES
- STORE & RETRIEVE DOCKER IMAGES

COMPUTE

- AUTO SCALING
- BATCH JOBS
- EVENT-DRIVEN SERVERLESS COMPUTING
- INSTANCE TYPES
- MANAGED VIRTUAL PRIVATE SERVERS
- MANAGED REPOSITORY FOR SERVERLESS APPS
- RUN & MANAGE WEB APPS
- SERVERLESS COMPUTE
- VIRTUAL SERVERS
- ISOLATED COMPUTE ENVIRONMENTS (FOR NITRO ENCLAVES)

NETWORKING & CONTENT DELIVERY

- APPLICATION DELIVERY
- DEDICATED NETWORK CONNECTION
- DOMAIN NAMING SERVICE
- LOAD BALANCING
- MONITOR APIS
- MONITOR MICROSERVICES
- NETWORK TOPOLOGY
- NETWORKING HUG
- PRIVATE CONNECTION TO APPS
- SCALE VPS & ACCOUNT CONNECTIONS
- SERVICE DISCOVERY
- VIRTUAL PRIVATE CLOUD

HYBRID ARCHITECTURE

- AWS-SERVICES ON-PREMISES
- DATA INTEGRATION
- INTEGRATED DEVICES & EDGE SYSTEMS
- INTEGRATED IDENTITY & ACCESS
- INTEGRATED NETWORKING
- INTEGRATED RESOURCE & DEPLOYMENT MANAGEMENT
- VMWARE CLOUD ON AWS

INFRASTRUCTURE

- AVAILABILITY ZONES
- CUSTOM HARDWARE
- DATA CENTER INFRASTRUCTURE
- GLOBAL NETWORK BACKBONE
- POINT OF PRESENCE
- POWER INFRASTRUCTURE
- REGIONS

STORAGE

- ARCHIVE STORAGE
- BACKUP & RESTORE
- BLOCK STORAGE
- DATA TRANSFER
- EDGE PROCESSING & COMPUTING
- FILE STORAGE
- HIGH PERFORMANCE FILE SYSTEM
- HYBRID CLOUD STORAGE
- OBJECT STORAGE
- WINDOWS FILE SYSTEM

SECURITY, IDENTITY, & COMPLIANCE

- ACCESS CONTROL
- ASSESSMENT & REPORTING
- CONFIGURATION COMPLIANCE
- DATA PROTECTION
- DDOS PROTECTION
- IDENTITY MANAGEMENT
- KEY MANAGEMENT & STORAGE
- MONITORING & LODGING
- RESOURCE MANAGEMENT
- THREAT DETECTION
- WEB APPLICATION FIREWALL
- THREAT DETECTION & INVESTIGATION FOR AMAZON DETECTIVE
- AUTOMATED SECURITY POSTURE CHECKS FOR AWS SECURITY HUB

MANAGEMENT & GOVERNANCE

- ACTIVITY & API USAGE TRACKING
- CHATBOT
- CONFIGURATION TRACKING
- GOVERNANCE
- INVENTORY TRACKING
- LICENSE MANAGER
- MANAGE POLICIES
- MANAGE RESOURCES
- MONITORING
- PROVISIONING
- RESOURCE TEMPLATES
- SECURITY RECOMMENDATIONS
- SERVER MANAGEMENT
- SERVICE CATALOG
- SYSTEM MANAGER

DEV TOOLS

- ANALYSE & DEBUG
- APPLICATION LIFECYCLE MANAGEMENT
- AUTHORING
- BUILD & TEST
- CONTAINERS
- DEVOPS RESOURCE MANAGEMENT
- ONE CLICK APP DEVELOPMENT
- PATCHING
- PIPELINE ORCHESTRATION
- RESOURCE TEMPLATES
- TRIGGERS

MOBILE

- API GATEWAY
- DEVELOPMENT FRAMEWORK
- IDENTITY
- MOBILE ANALYTICS
- MOBILE APP TESTING
- SINGLE INTEGRATED CONSOLE
- SYNC
- TARGETED PUSH NOTIFICATIONS

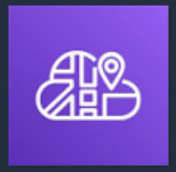
APPLICATION INTEGRATION

- EMAIL
- MESSAGE BROKER
- QUEUING & NOTIFICATIONS
- SEARCH
- TRANSCODING
- WORKFLOW

AWS has the richest container portfolio anywhere

APPLICATION NETWORKING

Service discovery and service mesh



AWS Cloud Map



AWS App Mesh

MANAGEMENT

Deployment, scheduling, scaling, and management of containerized applications



Amazon Elastic Container Service (Amazon ECS)



Amazon Elastic Kubernetes Service (Amazon EKS)



Red Hat OpenShift Service for AWS (ROSA)

HOSTING

Where the containers run



Amazon Elastic Compute Cloud (Amazon EC2)



AWS Fargate

IMAGE REGISTRY

Container image repository



Amazon Elastic Container Registry (Amazon ECR)

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Container technology



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Management: Amazon EKS, Amazon ECS and now ROSA



ECS

Powerful simplicity



EKS

Open flexibility



ROSA

Opinionated platform

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Powerful simplicity



ECS

AWS-opinionated way to run containers at scale

Reduce decisions without sacrificing scale or features

Reduce time to build, deploy, and migrate applications

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Open flexibility



EKS

Gain agility and efficiency with AWS-optimized Kubernetes, and standardize operations everywhere

Secure, highly available, with observability across all Kubernetes deployments

Build with choice of solutions from the broader community around Kubernetes

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Opinionated container platform



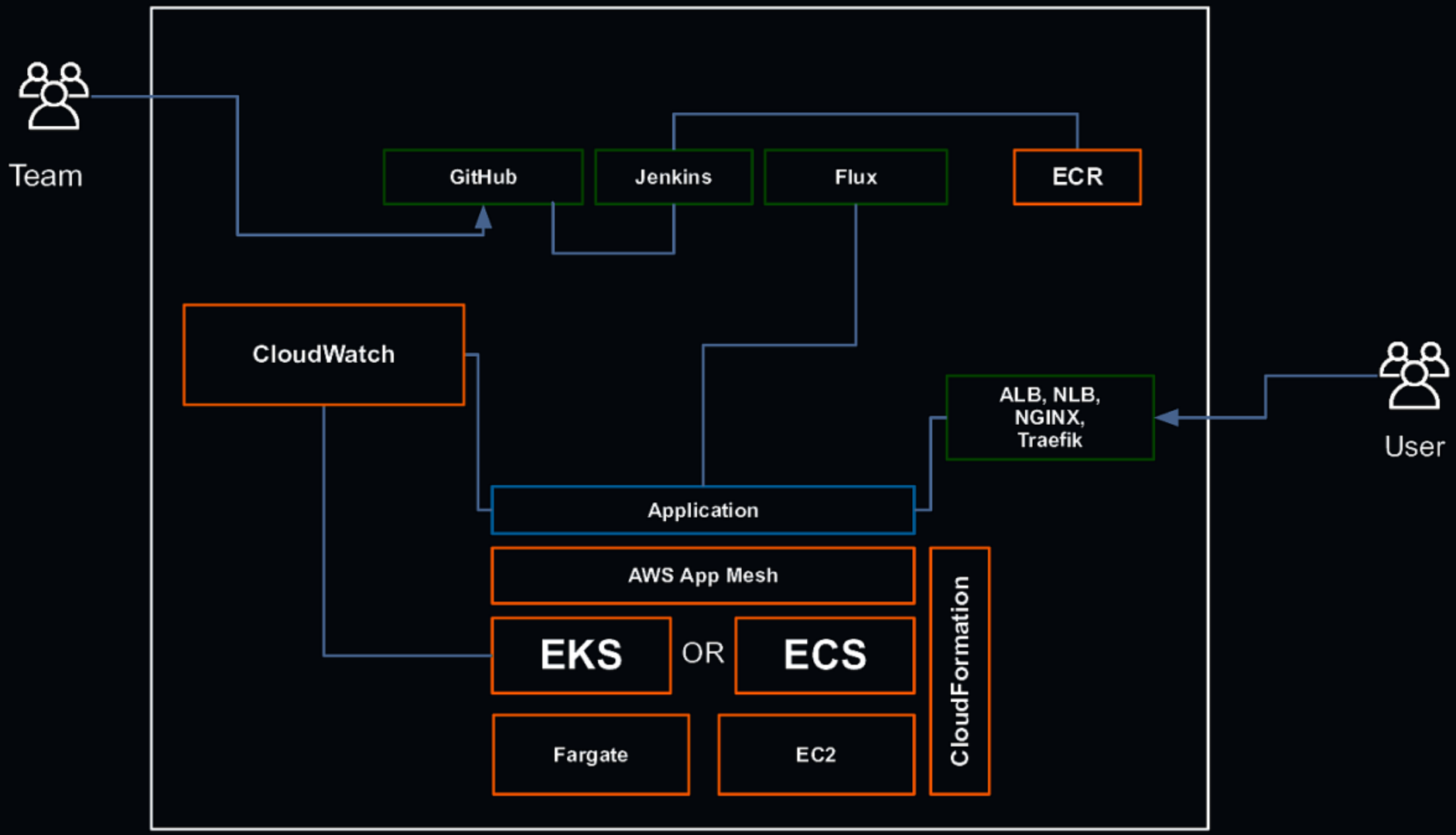
ROSA

Leverage integrated tools and services for developers and operators

Transfer OpenShift skills and processes from on-prem environments

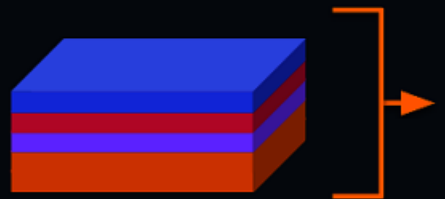
Simplify management, support and billing of OpenShift environments

Customers usually mix and match



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AWS App Runner
Fully managed service for web applications



Serverless Platform

AWS App Runner



provides a highly abstracted
and simple managed experience for running
web applications and API hosting services



Web application



Backend server

- https://www.datadoghq.com/blog/aws-app-runner-monitoring

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Run your containers anywhere based on your workload needs

Serverless



AWS Fargate

EC2 options



Amazon EC2



Spot instance

Edge and 5G



AWS Local Zones



AWS Wavelength

On-premises



AWS Outposts

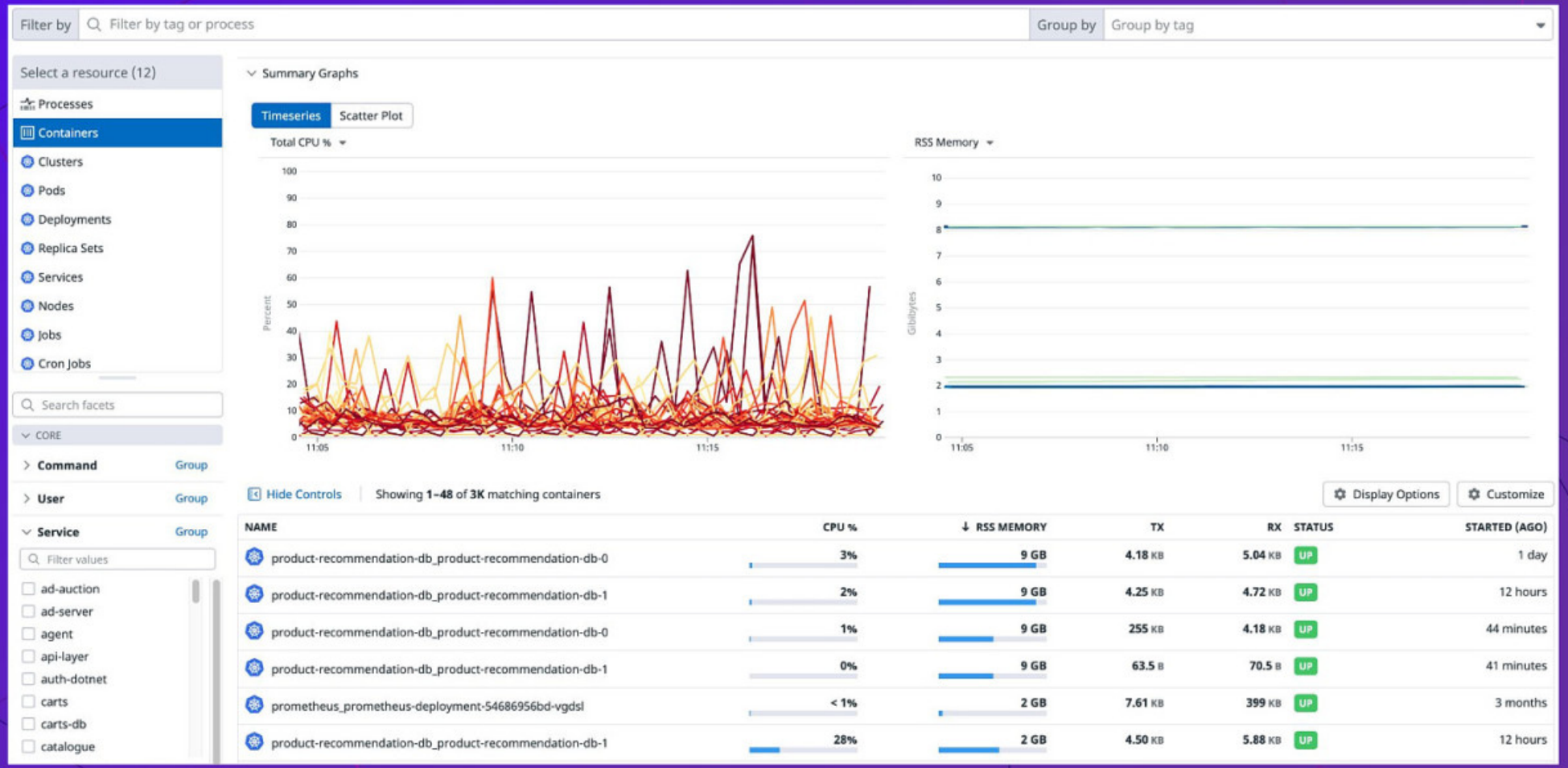


EKS Anywhere



ECS Anywhere

Containers are worth looking at



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Containers monitoring is not magic

Tagging

Containers are tagged with all existing host-level tags, as well as with metadata associated with individual containers.

All containers are tagged by `image_name`, including integrations with popular orchestrators, such as ECS and Kubernetes, which provide further container-level tags. Additionally, each container is decorated with Docker, ECS, or Kubernetes icons so you can tell which are being orchestrated at a glance.

ECS containers are tagged by:

- `task_name`
- `task_version`
- `ecs_cluster`

Kubernetes containers are tagged by:

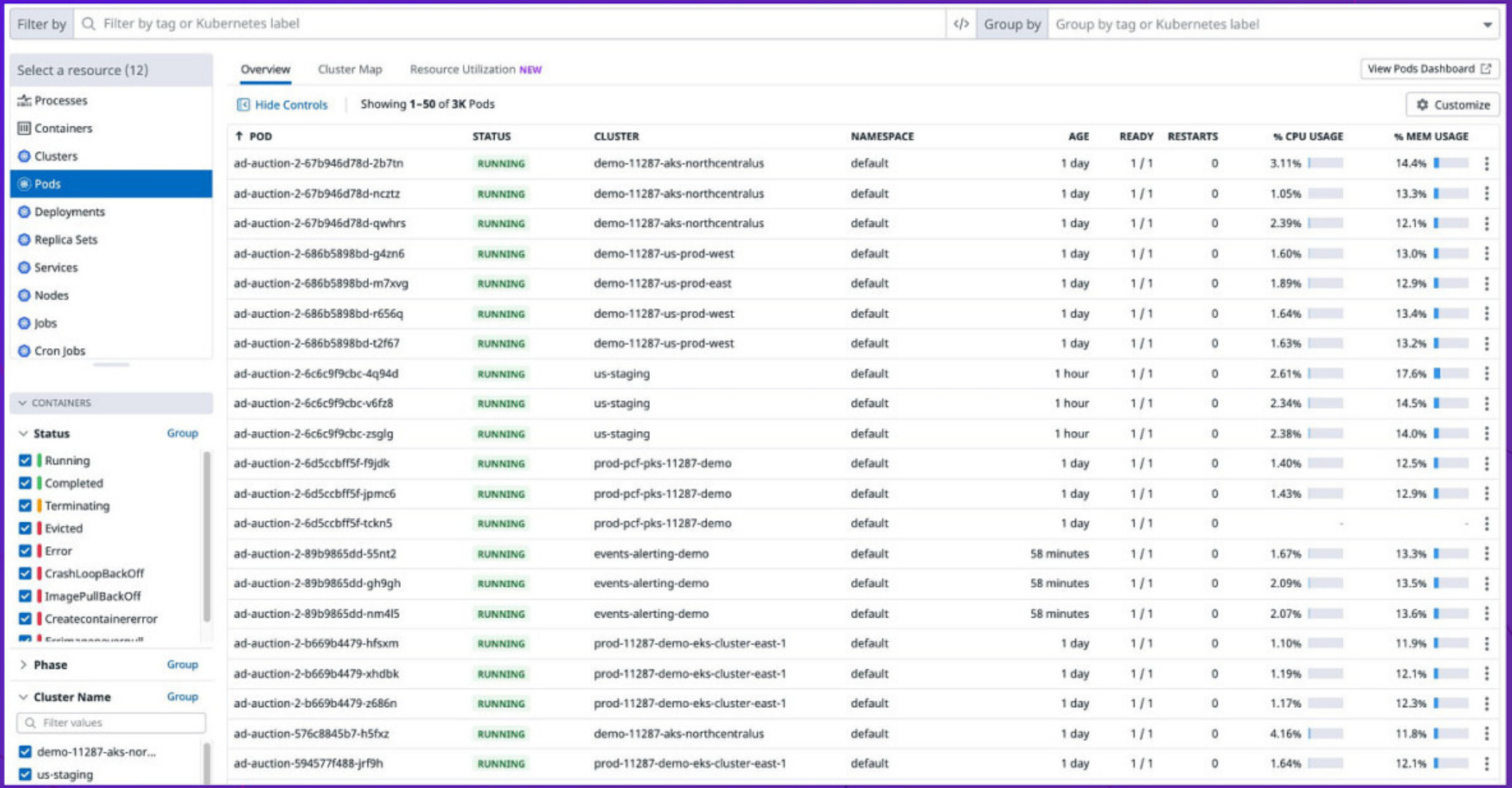
- `pod_name`
- `kube_pod_ip`
- `kube_service`
- `kube_namespace`
- `kube_replica_set`
- `kube_daemon_set`
- `kube_job`
- `kube_deployment`
- `kube_cluster`

If you have a configuration for Unified Service Tagging in place, `env`, `service`, and `version` is picked up automatically. Having these tags available lets you tie together APM, logs, metrics, and live container data.

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Kubernetes is sort of magic though…



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10 Trends in Real World Containers

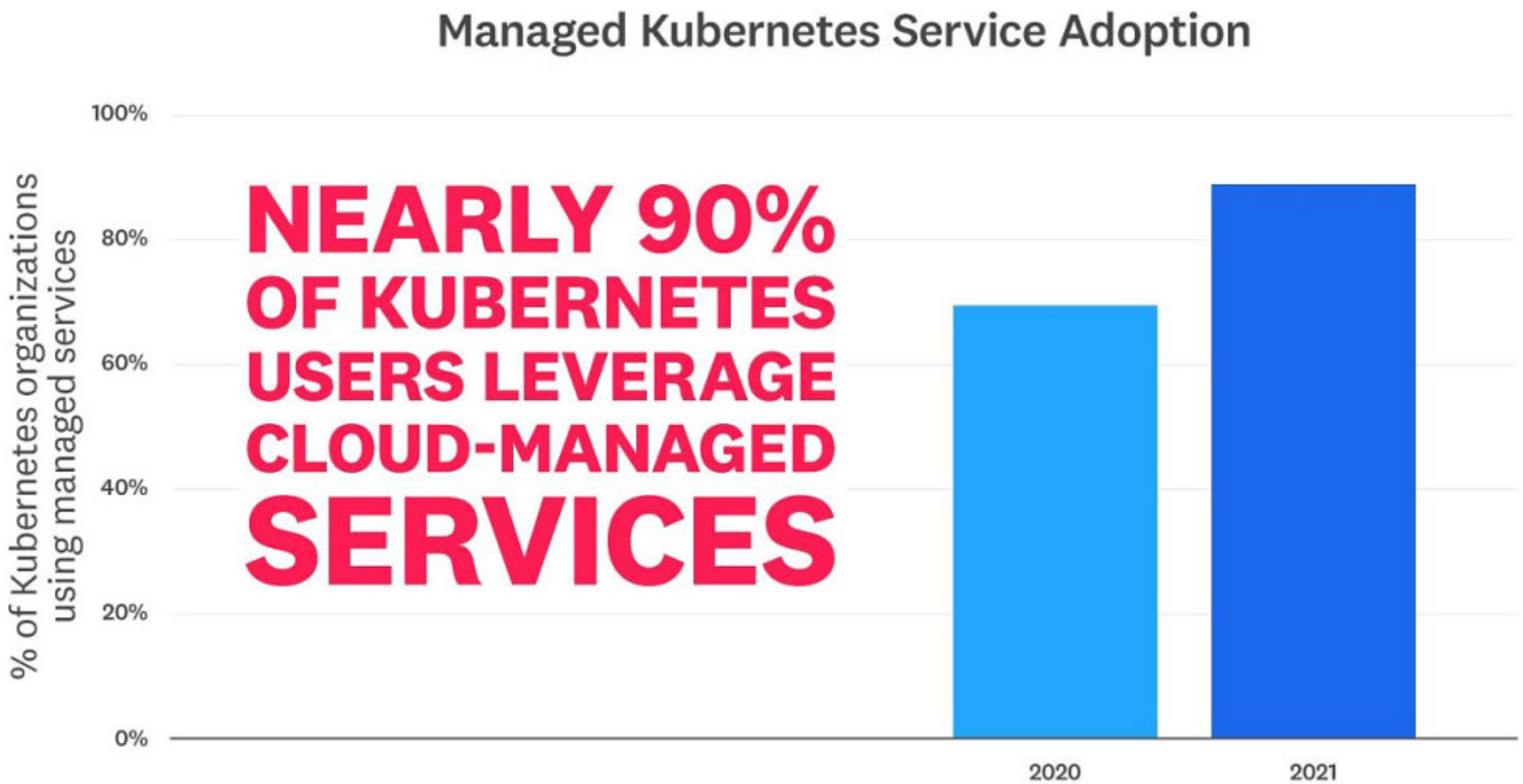
https://datadoghq.com/container-report/



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EKS had a 20% increase in adoption among AWS orgs

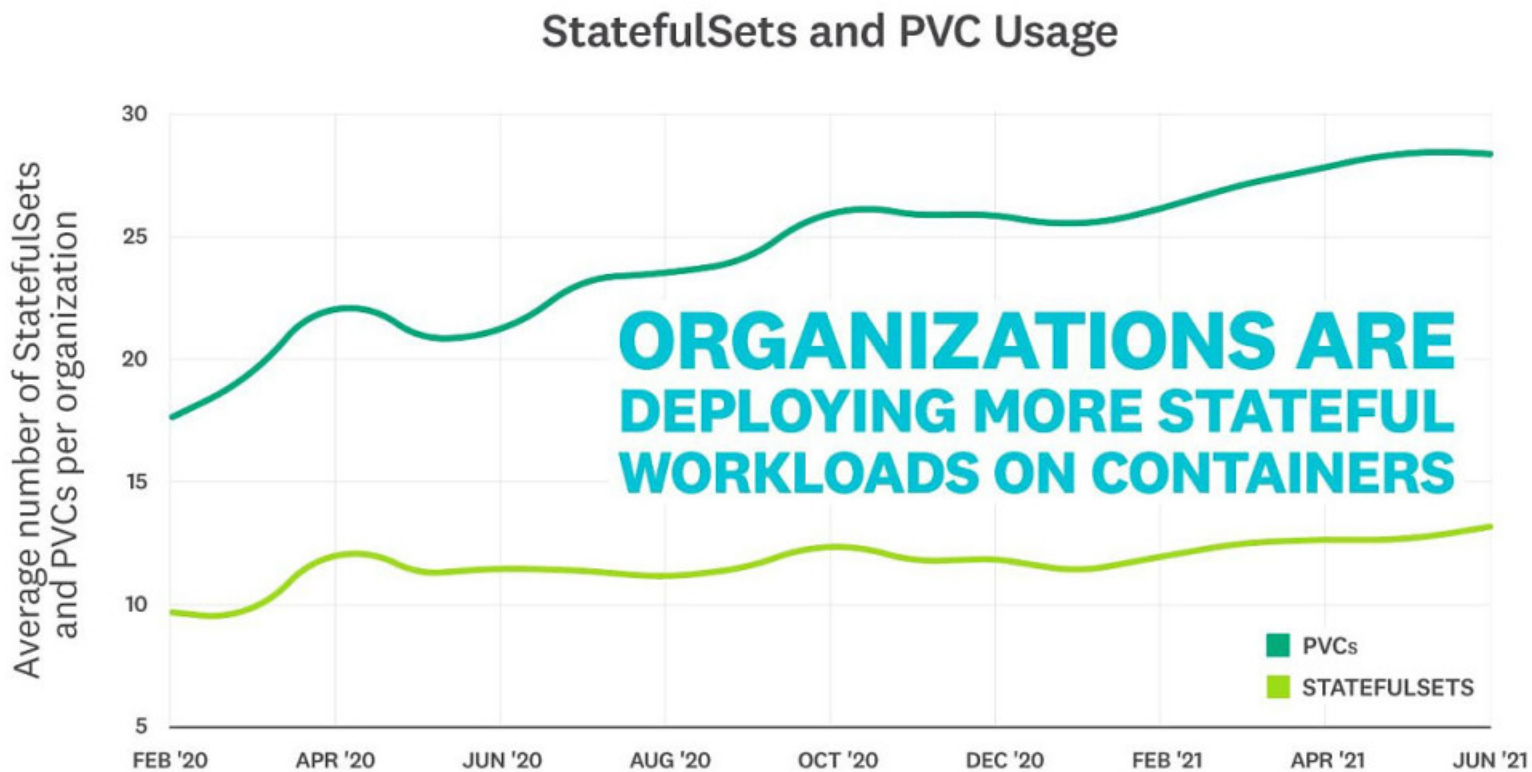


Source: Datadog

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Stateful workloads, containers, and you

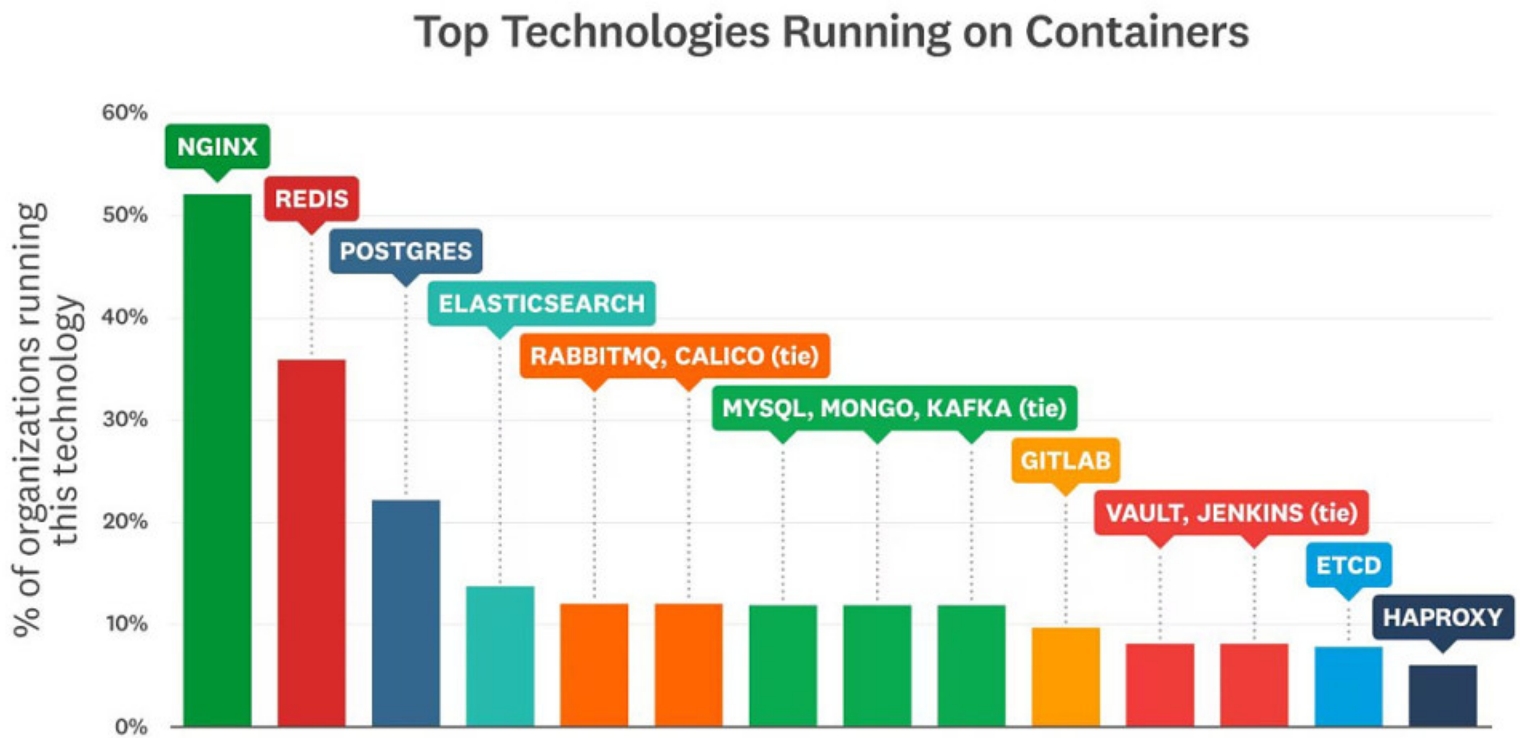


Source: Datadog

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Images: the hot top ten!

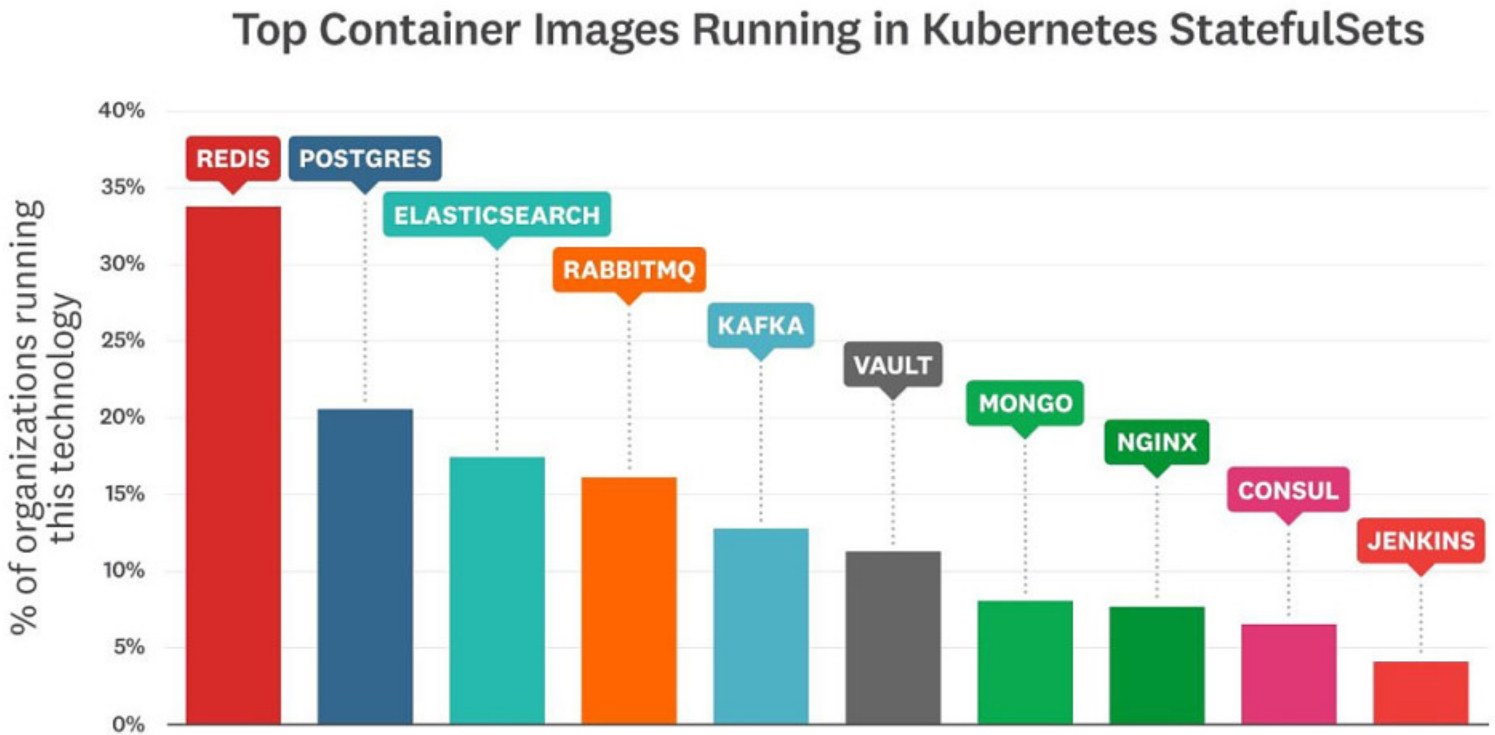


Source: Datadog

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Images: the hot top ten (DJ k8s remix!)

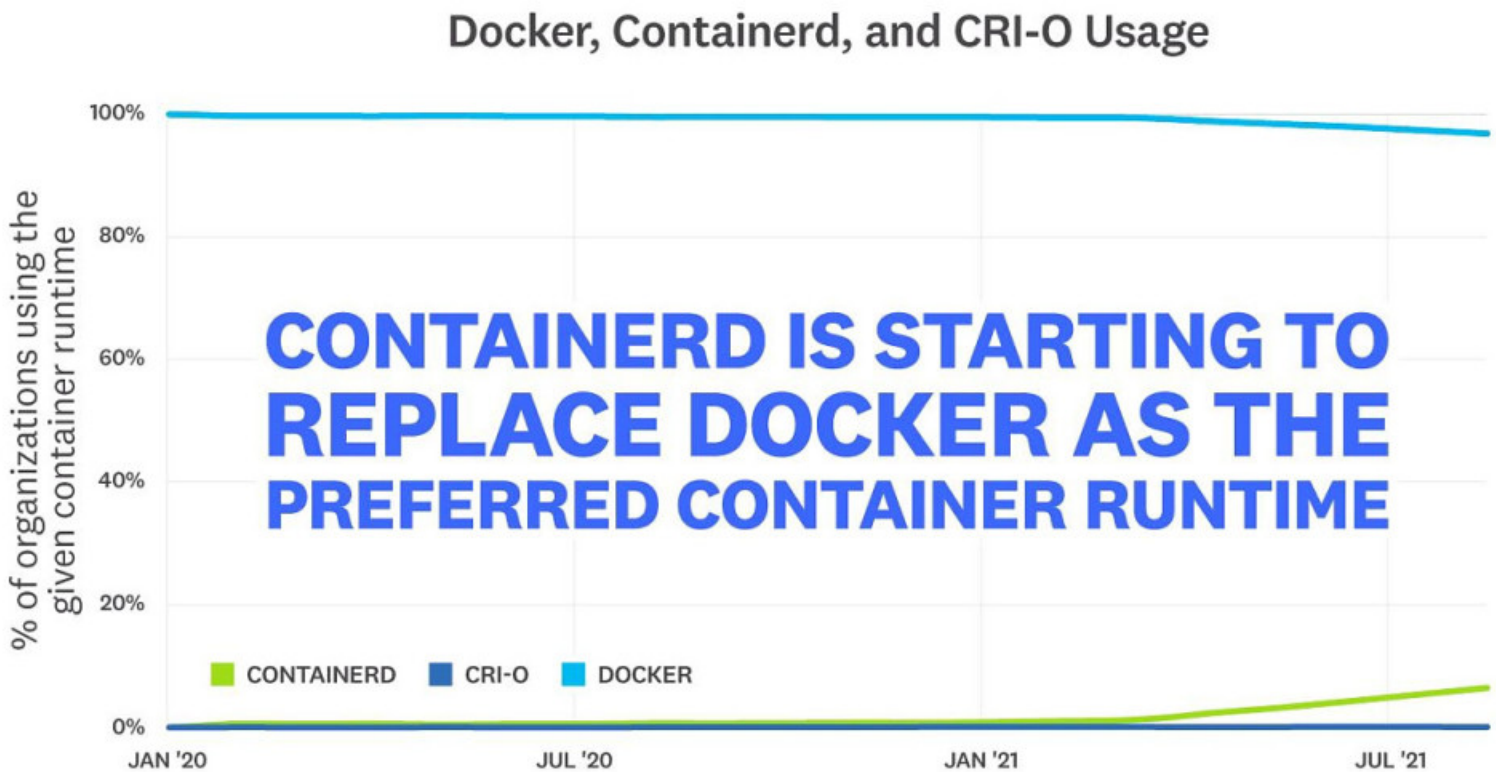


Source: Datadog

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Docker is champ, but new challengers are rising…

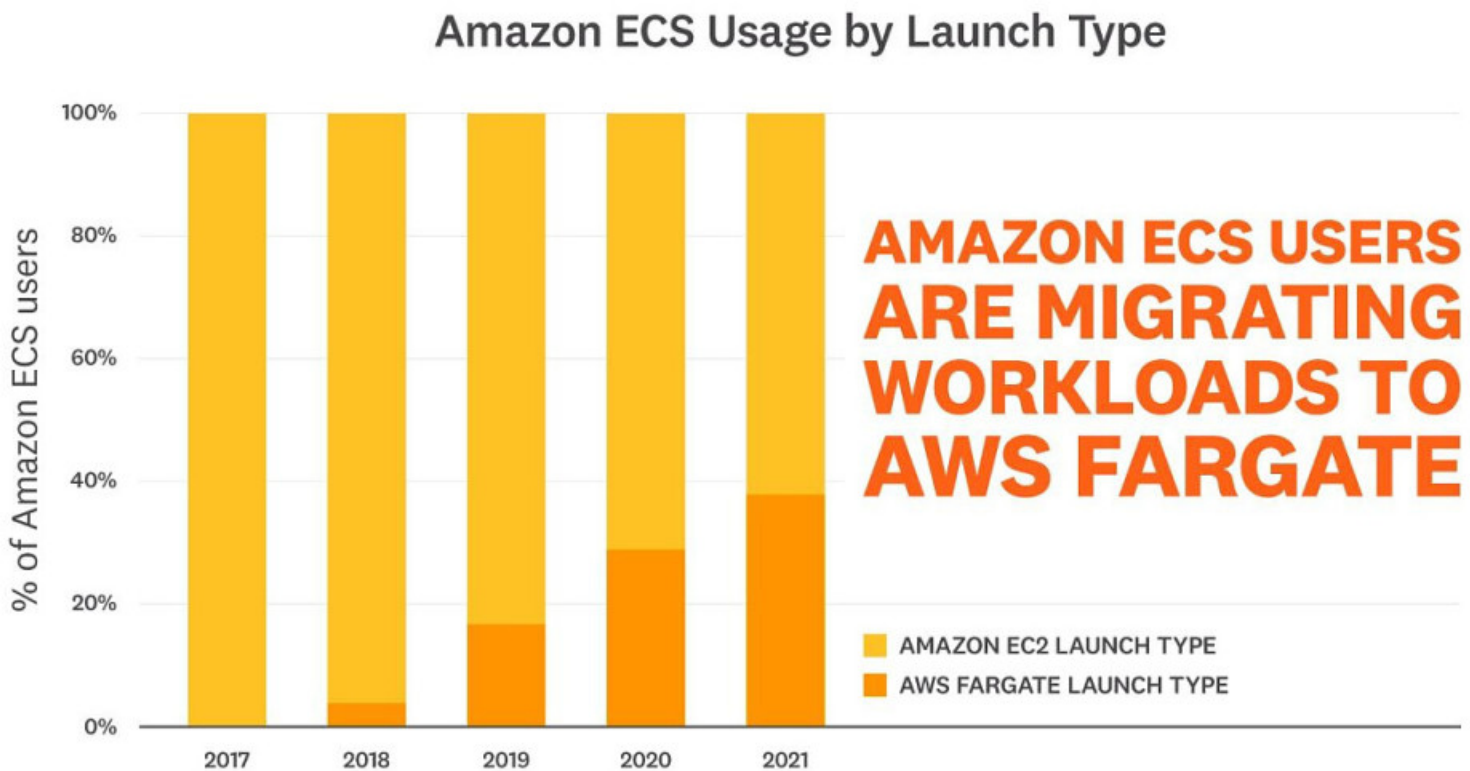


Source: Datadog

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How it started vs. how it's going



Source: Datadog

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It's Speculation Time!

- Edge computing (containers on the edge)
- Increased importance of orchestration / mesh technology
- Docker for dev, containerd (or other) for prod?
- Moving towards higher levels of abstraction
- Containers as a packaging and dependency mechanism





Q&A





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Thank You

