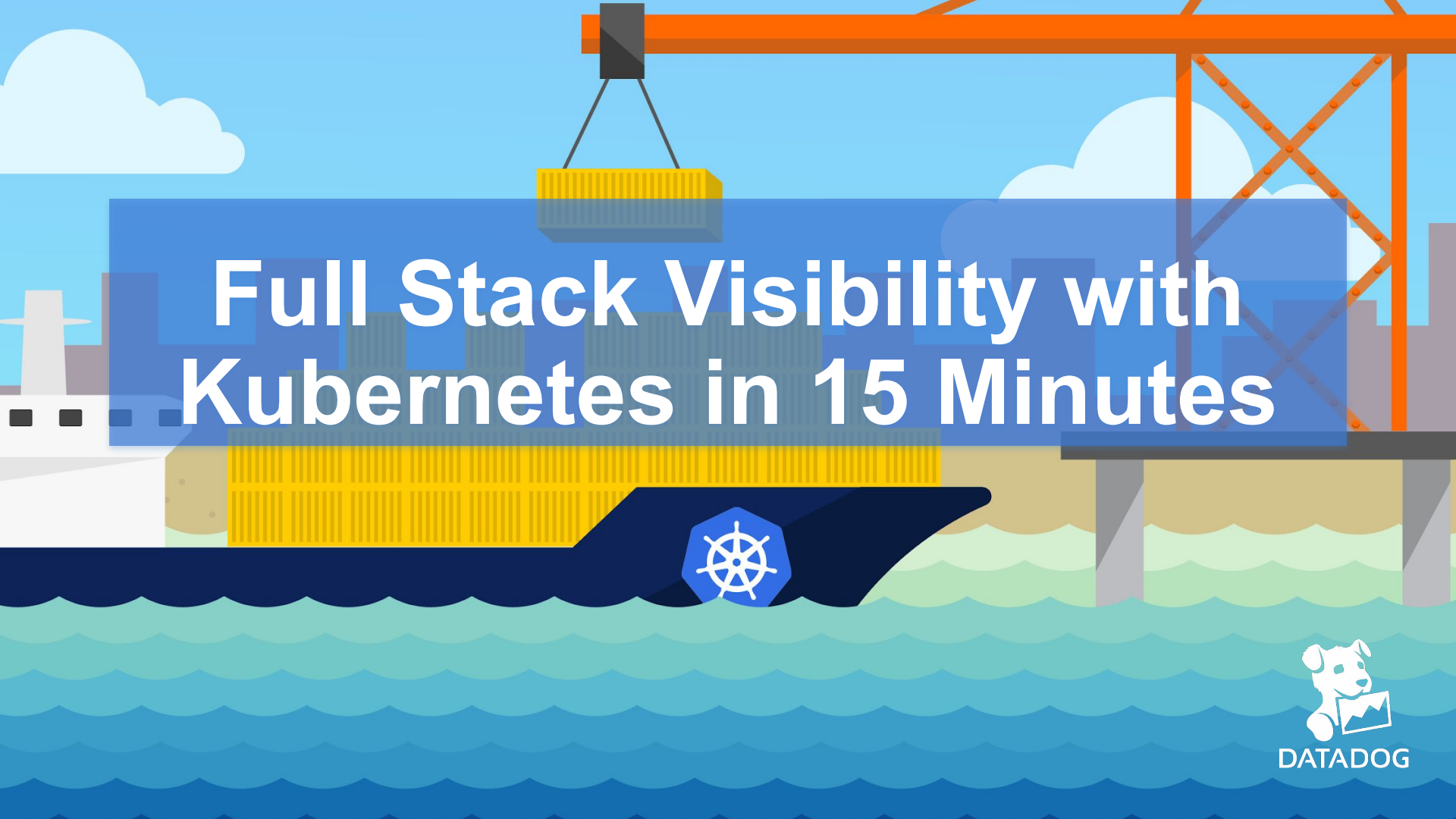

Full Stack Visibility with Kubernetes in 15 Minutes
DATADOG

Trivia

Why do they call it ***K8s***!?

Kubernetes with Datadog

A look from 50,000 feet

Integration Auto Discovery

LIVE CONTAINER MONITORING

Applications

Logs

Pods and Containers

Kube System, Nodes, K8s Health

Infrastructure On-Prem and Cloud

DATADOG + +

Infrastructure Metrics
Custom and out-of-the-box

Logs & Events
Structured and unstructured

Tags/Metadata
Custom and out-of-the-box

Retention
15 months by default (extendable on request)

Granularity
No roll ups, full granularity

Secure Focused
Encrypted at Rest, SOC 2 Compliant

APM
Structured and unstructured

Highly Available
Spanning multiple AZ's

Encrypted Communication
Outbound only via HTTPS/443

System Metrics
80+ CPU, Disk, Load, Network, etc.

250+ Integrations
Kubernetes, Docker, AWS (Lambda, S3, etc.), Ansible, Kubernetes, MapR and more

High resolution
15 sec host granularity, 1 sec. custom and business metric granularity

Deploying Datadog in K8s

Let’s start with the basics

Deployment Options

Host Based

- Additional Visibility
- Monitor Outside of K8s
- More Granular Configuration
- No Auto-Deployment without Config Management

Container Based

- Deploy as a ***DaemonSet***
- Simplified Management
- Deploy Quickly Everywhere
- Easier to Deploy and Configure

https://docs.datadoghq.com/agent/kubernetes/host_setup/

Tagging and Other Best Practices

Making sense out of all of this data

Good Tagging Practices

What Should You Tag?

- Applications
- Services
- Components
- Teams
- Departments
- Cost Centers
- Roles
- Customers
- Business Units
- Stores
- Regions
- etc...

Why It Matters:

If we can’t see or alert on what we want when we need to then monitoring anything has little point!

Where should we tag?

And what tags do we already get?

- Datadog Agent
- Docker Labels
- Pod Annotations
- Consul
- etcd

Kubernetes State Metrics

What are these?

kube-state-metrics is a simple service that listens to the Kubernetes API server and generates metrics about the state of the objects.

It is not focused on the health of the individual Kubernetes components, but rather on the health of the various objects inside, such as deployments, nodes and pods.

How do I get them?

1. Download the Kube-State manifests folder from GitHub: https://github.com/kubernetes/kube-state-metrics/tree/master/kubernetes

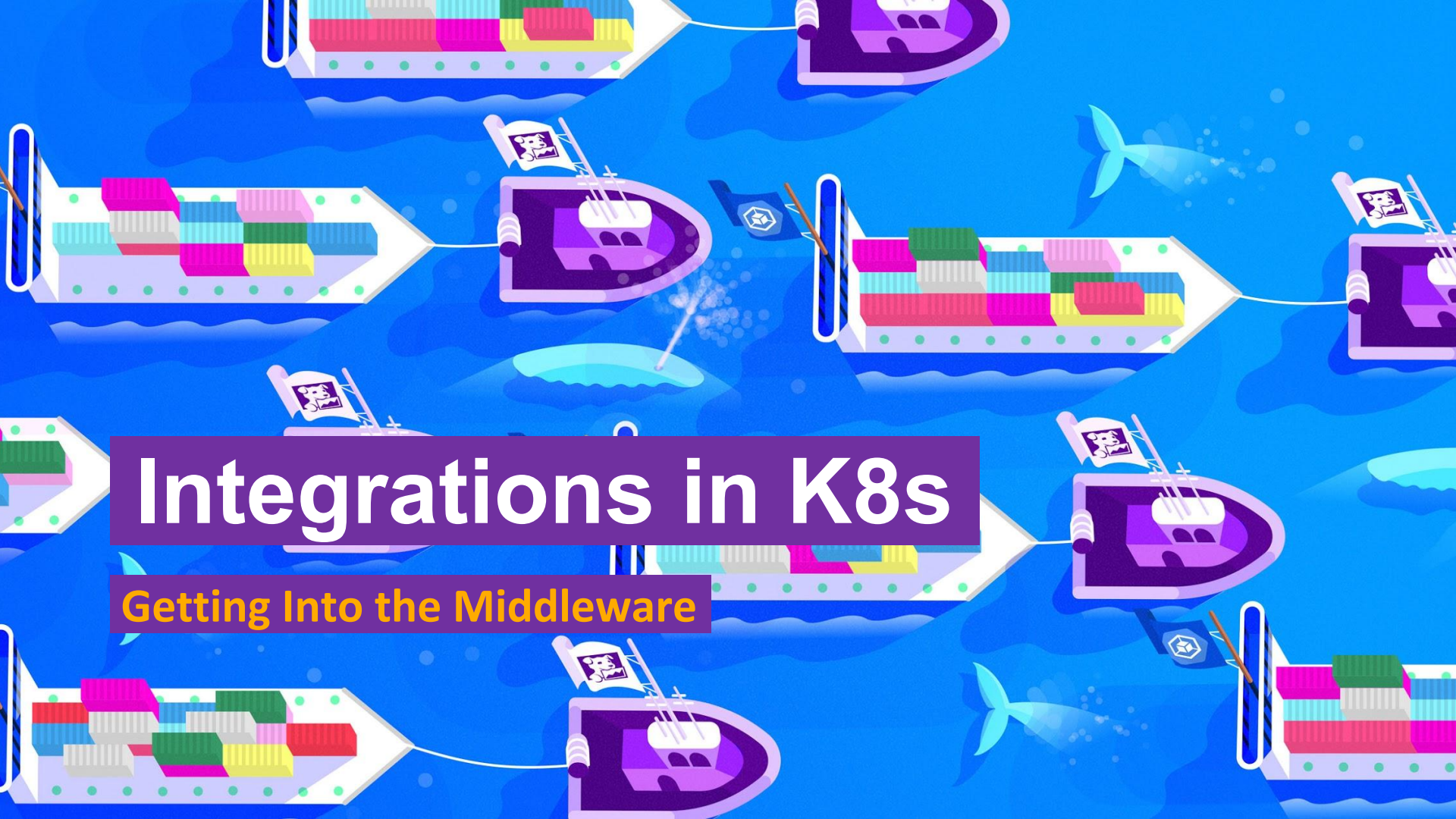
2. Apply them to your Kubernetes cluster:

```
kubectl apply -f <KUBE_STATE_FOLDER>
```

https://docs.datadoghq.com/agent/kubernetes/host_setup/

Building on the Basics

Going further with Integrations, Logs, and APM


Integrations in K8s
Getting Into the Middleware

Two Approaches to Integration

Mount a Local Directory

- Must deploy configuration to every node
- Have to manage configurations and track changes across nodes
- Config management can ease deployment.

Use Config Maps

- Manage configurations in Kubernetes configs
- Easy to track configurations
- Change configurations quickly and across-the cluster

https://docs.datadoghq.com/agent/kubernetes/integrations/


Live Container Monitoring
Monitoring Is All About Good Process

Setting Up Live Containers

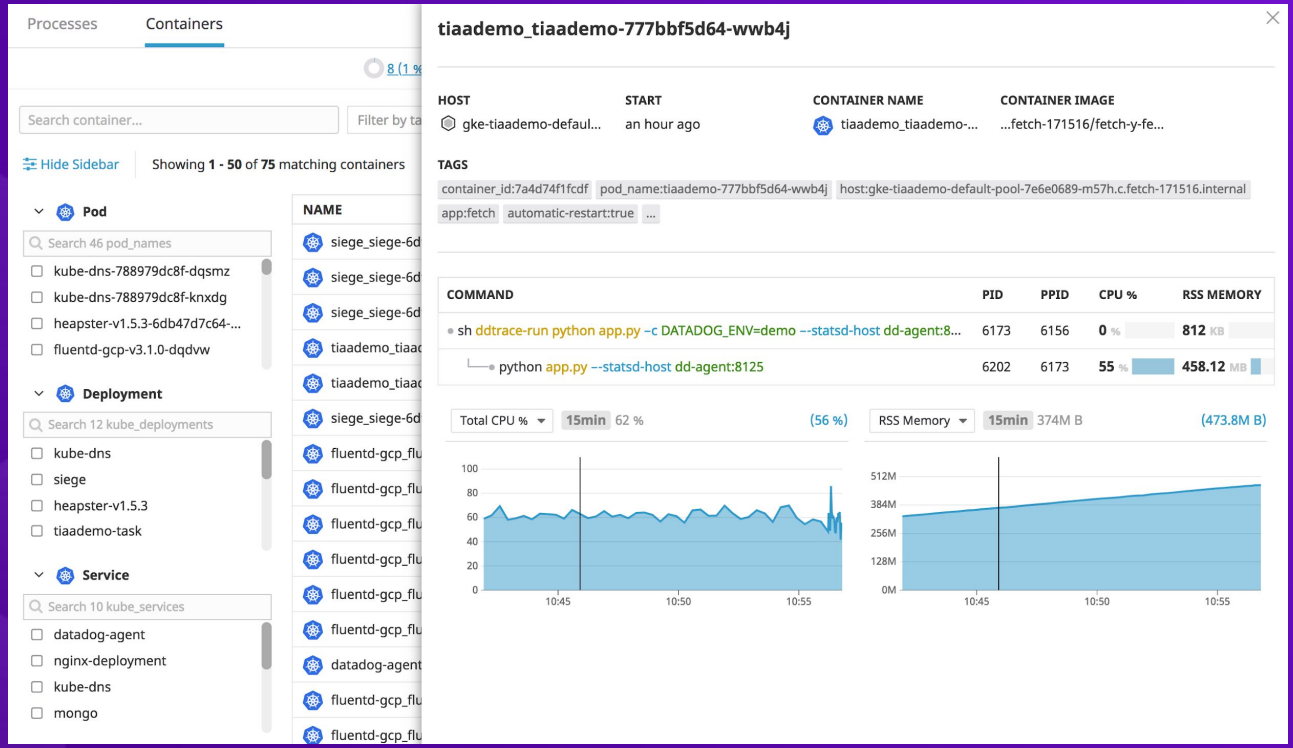
Live Container Configuration

```
(...)
  env:
    (...)
    - name: DD_PROCESS_AGENT_ENABLED
      value: "true"
  volumeMounts:
    (...)
    - name: passwd
      mountPath: /etc/passwd
      readOnly: true
  volumes:
    (...)
    - hostPath:
        path: /etc/passwd
      name: passwd
(...)
```

You'll get live processes on your nodes too!

https://docs.datadoghq.com/graphing/infrastructure/process/?tab=kubernetes#installation

What you should see:




Logs in K8s
All Your Logs Are Belong To Us

Setting Up Log Collection

Basic Logs Configuration

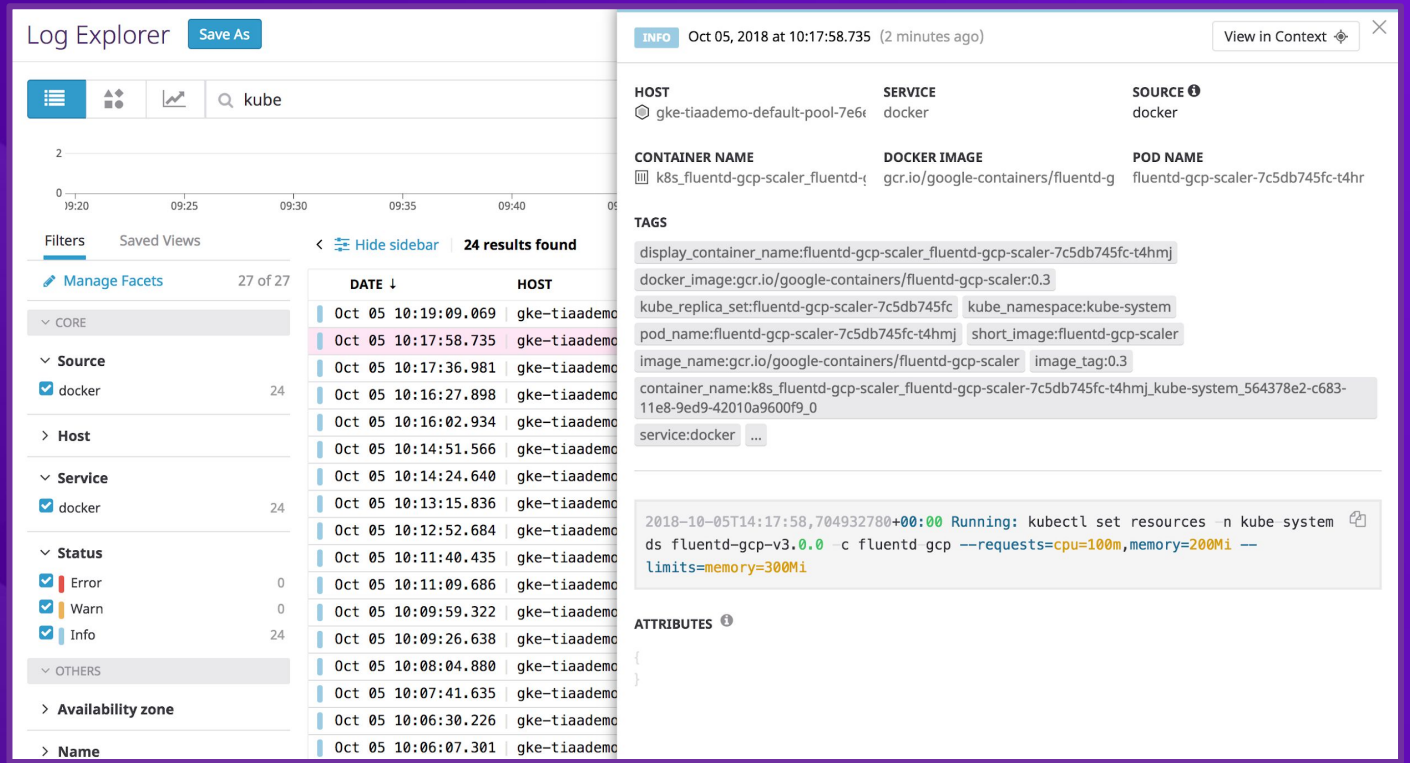
```
(...)
  env:
    (...)
    - name: DD_LOGS_ENABLED
        value: "true"
    - name: DD_LOGS_CONFIG_CONTAINER_COLLECT_ALL
        value: "true"
(...)
```

Tracking Our Read Location

```
(...)
    volumeMounts:
      (...)
      - name: pointerdir
          mountPath: /opt/datadog-agent/run
  (...)
  volumes:
    (...)
    - hostPath:
        path: /opt/datadog-agent/run
      name: pointerdir
  (...)
```

https://docs.datadoghq.com/agent/kubernetes/daemonset_setup/#log-collection

What you should see:




APM in K8s
Getting Down To The Code

Setting Up APM and Trace Search

APM Configuration

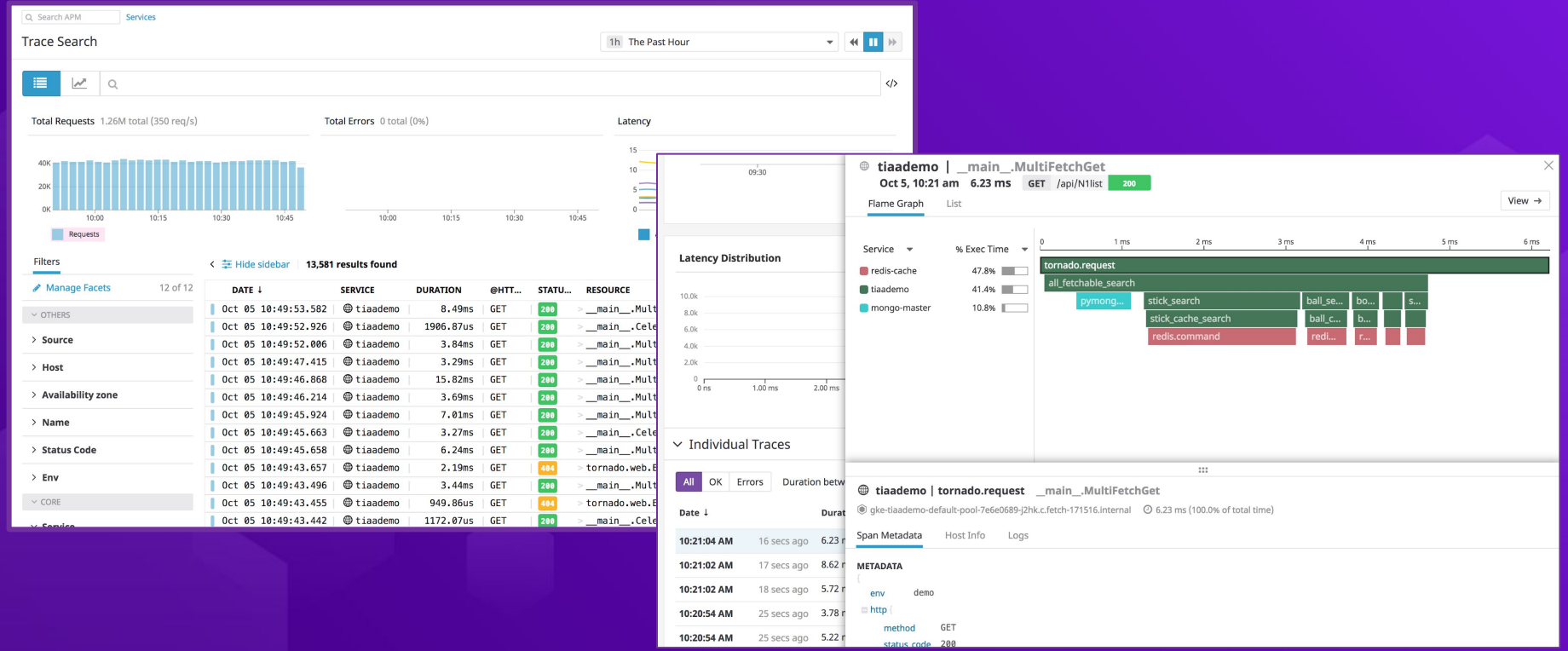
```
(...)
  env:
    (...)
    - name: DD_APM_ENABLED
      value: "true"
(...)
```

Trace Search Configuration

```
(...)
  env:
    (...)
    - name: DD_APM_ANALYZED_SPANS
      value: "YOURAPP|span.name=1"
(...)
```

https://docs.datadoghq.com/agent/kubernetes/daemonset_setup/#trace-collection

What you should see:




Auto Discovery
Monitor Anything and Everything

Setting Up AutoDiscovery

Docker Labels

```
LABEL
"com.datadoghq.ad.check_names"='[<CHECK_NAME>]'

LABEL
"com.datadoghq.ad.init_configs"='[<INIT_CONFIG>]'

LABEL
"com.datadoghq.ad.instances"='[<INSTANCE_CONFIG>]'

LABEL "com.datadoghq.ad.logs"='[<LOGS_CONFIG>]'
```

Pod Annotations

```
annotations:
  ad.datadoghq.com/<container_identifier>.check_names: '[<CHECK_NAME>]'
  ad.datadoghq.com/<container_identifier>.init_configs: '[<INIT_CONFIG>]'
  ad.datadoghq.com/<container_identifier>.instances: '[<INSTANCE_CONFIG>]'
  ad.datadoghq.com/<container_identifier>.logs: '[<LOG_CONFIG>]'
```

For Annotations, Autodiscovery identifies containers by *name*, NOT image (as it does for auto-conf files and key-value stores). That is, it looks to match `<container identifier>` to `.spec.containers[0].name`, not `.spec.containers[0].image`

https://docs.datadoghq.com/agent/autodiscovery/?tab=docker#template-source-kubernetes-pod-annotations

AutoDiscovery with a Key/Value Store

Environment Variables

```
/datadog/
  check_configs/
    docker_image_1/ # container identifier,
      - check_names: [<CHECK_NAME>]
      - init_configs: [<INIT_CONFIG>]
      - instances: [<INSTANCE_CONFIG>]
```

etcd, Consul, Zookeeper

```
etcdctl mkdir /datadog/check_configs/httpd

etcdctl set /datadog/check_configs/httpd/check_names '["apache"]'

etcdctl set /datadog/check_configs/httpd/init_configs '[{}]'

etcdctl set /datadog/check_configs/httpd/instances
'[{"apache_status_url":
"http://%%host%%/server-status?auto"}]'
```

https://docs.datadoghq.com/agent/autodiscovery/?tab=docker#template-source-key-value-store


Demo Time
Let’s see what this looks like in the wild...

Questions?

Thank you!

Mike Moore

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Find this presentation and related code at:
https://dtdg.co/ddk8s

webofmike.com

themsquared

@themsquared