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# Beyond Block Diagrams: Different Ways of Understanding K8s Architecture

*Kim Schlesinger, DigitalOcean*

# Hi, I'm Kim



**Developer Advocate**

**Site Reliability Engineer**



**JavaScript Developer**

**Elementary School Teacher**

# Cloud Native Generation



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Photo source: <https://unsplash.com/photos/8iZG31eXkks>

# Mental Models



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“Any framework that you can hold as a mental representation of an external reality.”

- [What is a mental model?](#) by Julia Clavien



Photo source: [https://unsplash.com/photos/3KGF9R\\_0oHs](https://unsplash.com/photos/3KGF9R_0oHs)

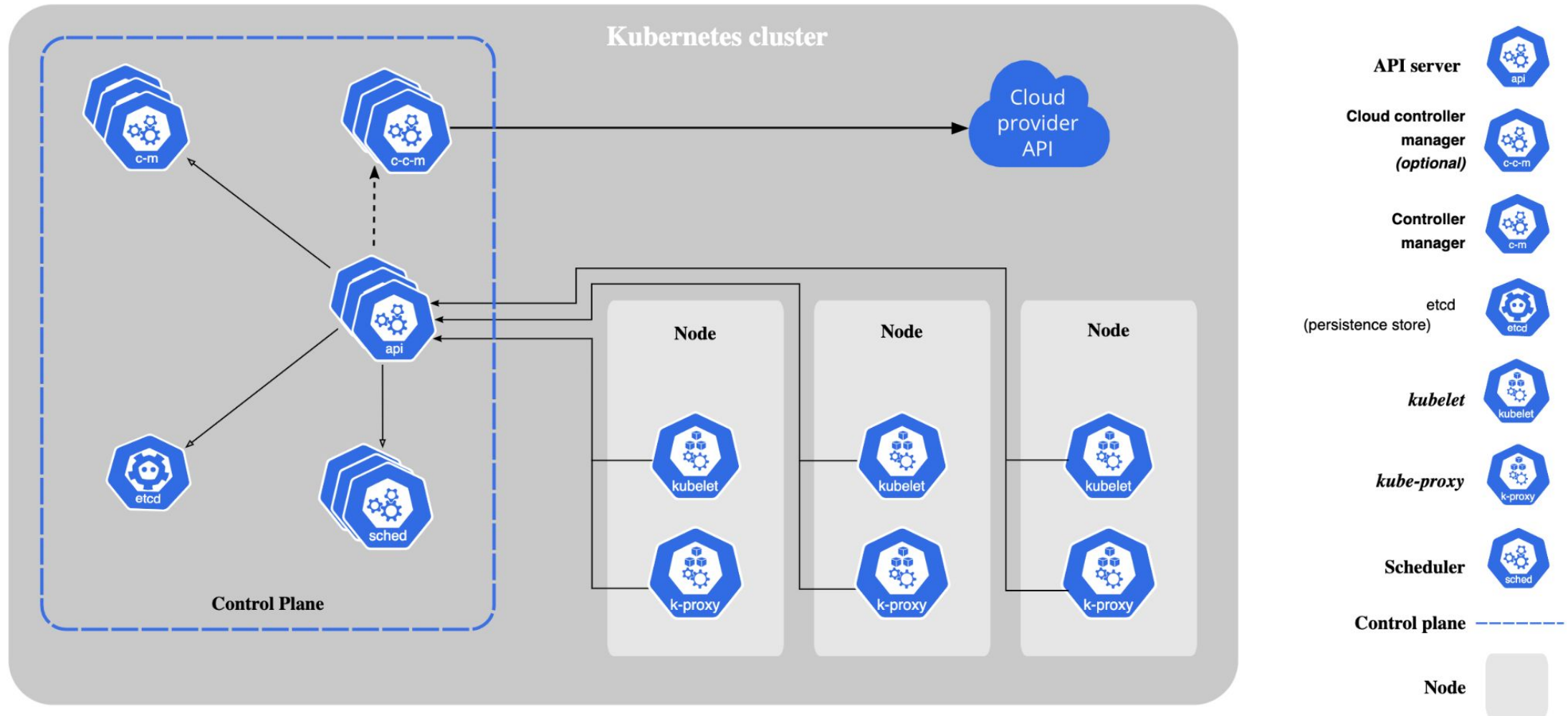


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From the Kubernetes Documentation, Kubernetes Components: <https://kubernetes.io/docs/concepts/overview/components/>



# Why?



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Hire, train and retain early-career engineers with limited computing experience

# Takeaways



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1. Create diagrams that show the passage of time
2. Use distributed tracing technology as a learning tool
3. Build 3D models of Kubernetes clusters



Photo source: [https://unsplash.com/photos/\\_gEKtylbRSM](https://unsplash.com/photos/_gEKtylbRSM)



# Agenda



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1. Time Sequence Diagram
2. Distributed Traces + Diagram
3. 3D Model

# Agenda



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# Example



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```
1  apiVersion: v1
2  kind: Pod
3  metadata:
4    name: busybox
5    labels:
6      app: busybox
7  spec:
8    containers:
9      - image: busybox
10       command:
11         - sleep
12         - "3600"
13       imagePullPolicy: IfNotPresent
14       name: busybox
15     restartPolicy: Always
```



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```
kubectl create -f pod.yaml
```

# Time Sequence Diagram

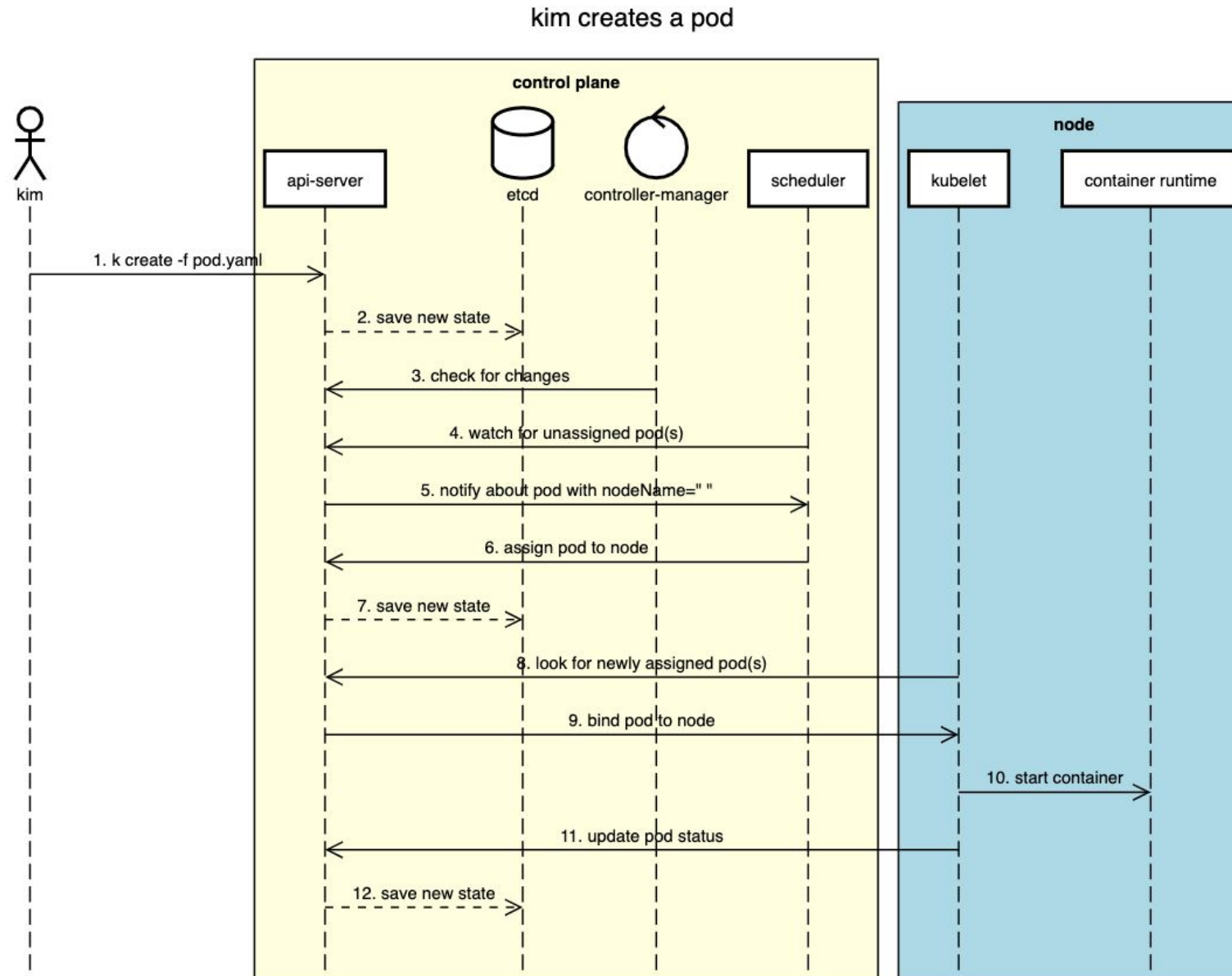


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“Distributed tracing, also called distributed request tracing, is a method used to profile and monitor applications, especially those built using a microservices architecture.”

- [OpenTracing Project](#)

# Example

## Meow-Micro

- 2 go microservices
- The meow-client accepts requests via a REST API and uses GRPC to communicate with the meow-server
- Fernando Diaz at GitLab





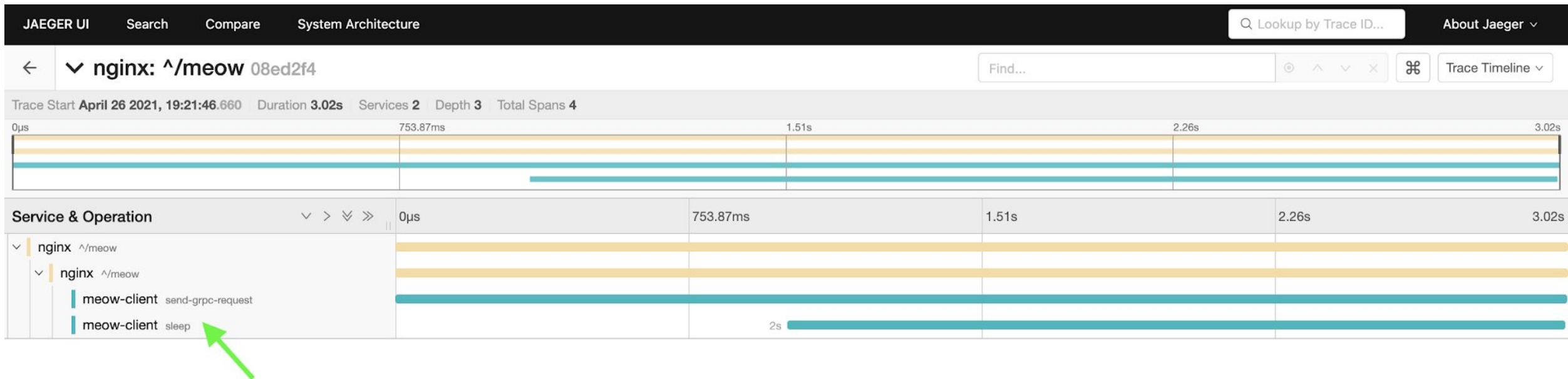
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```
curl http://143.244.209.228/meow -X POST -d '{"name": "Meow-Mixer"}'
```



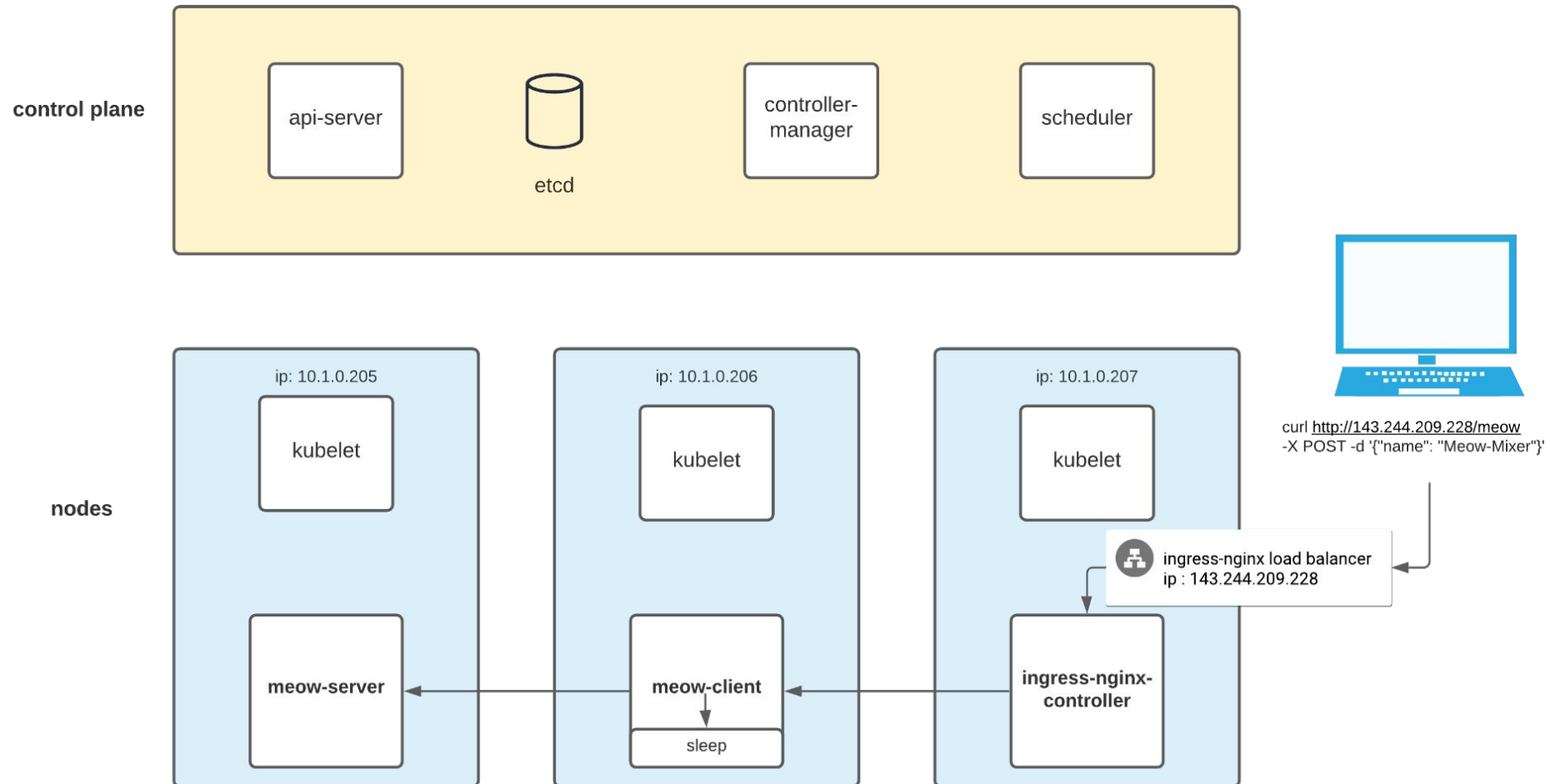
From [Setting up Distributed Tracing with OpenTelemetry & Jaeger in Kubernetes Ingress-NGINX](#) by Fernando Diaz



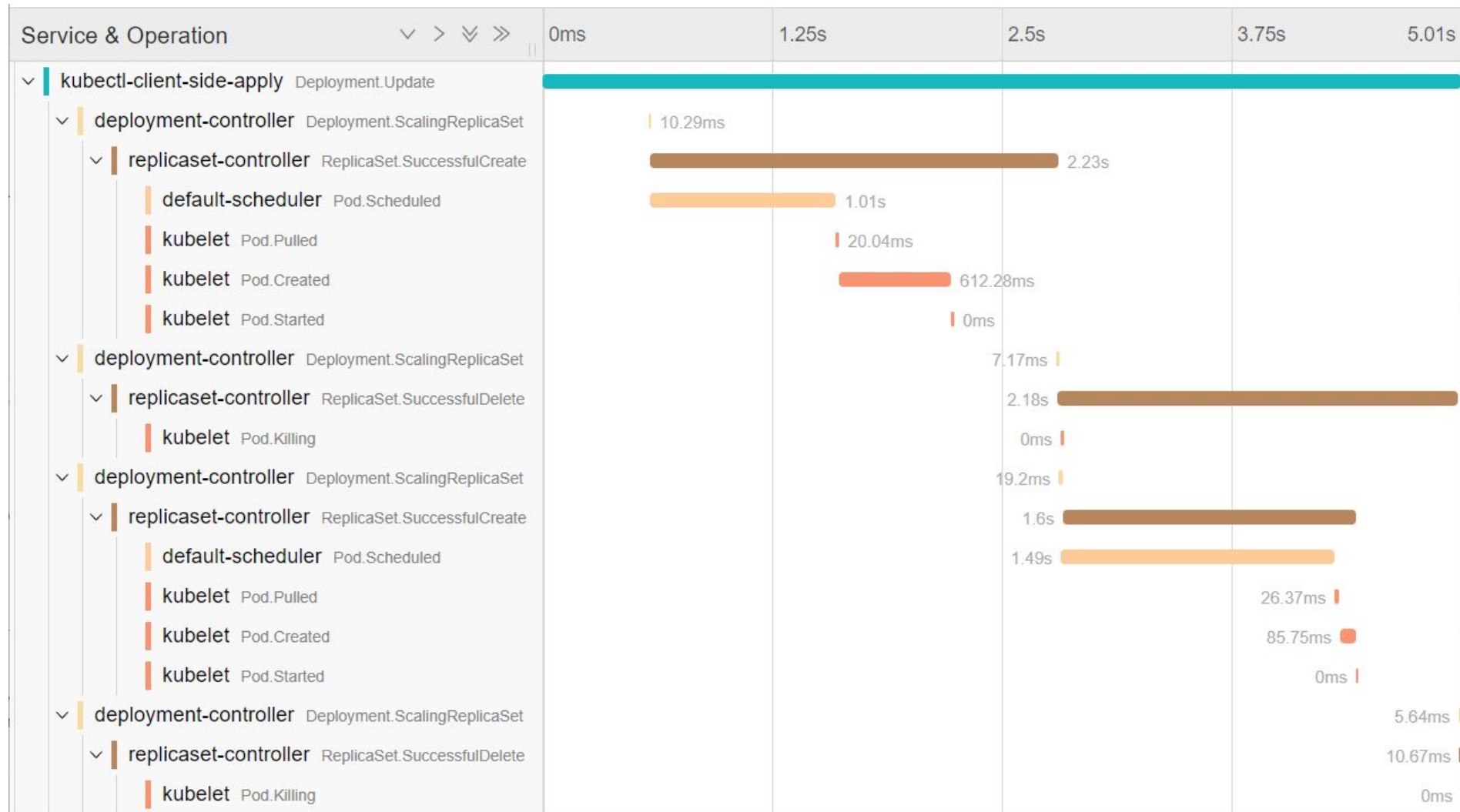
From [Setting up Distributed Tracing with OpenTelemetry & Jaeger in Kubernetes Ingress-NGINX](#) by Fernando Diaz



## Jaeger Distributed Traces for ingress-nginx and meow-micro



# Weaveworks kspan



Example: rollout of a Deployment of two Pods

From [weaveworks-experiments/kspan: Turning Kubernetes Events into spans](https://weaveworks-experiments/kspan: Turning Kubernetes Events into spans)

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# Example



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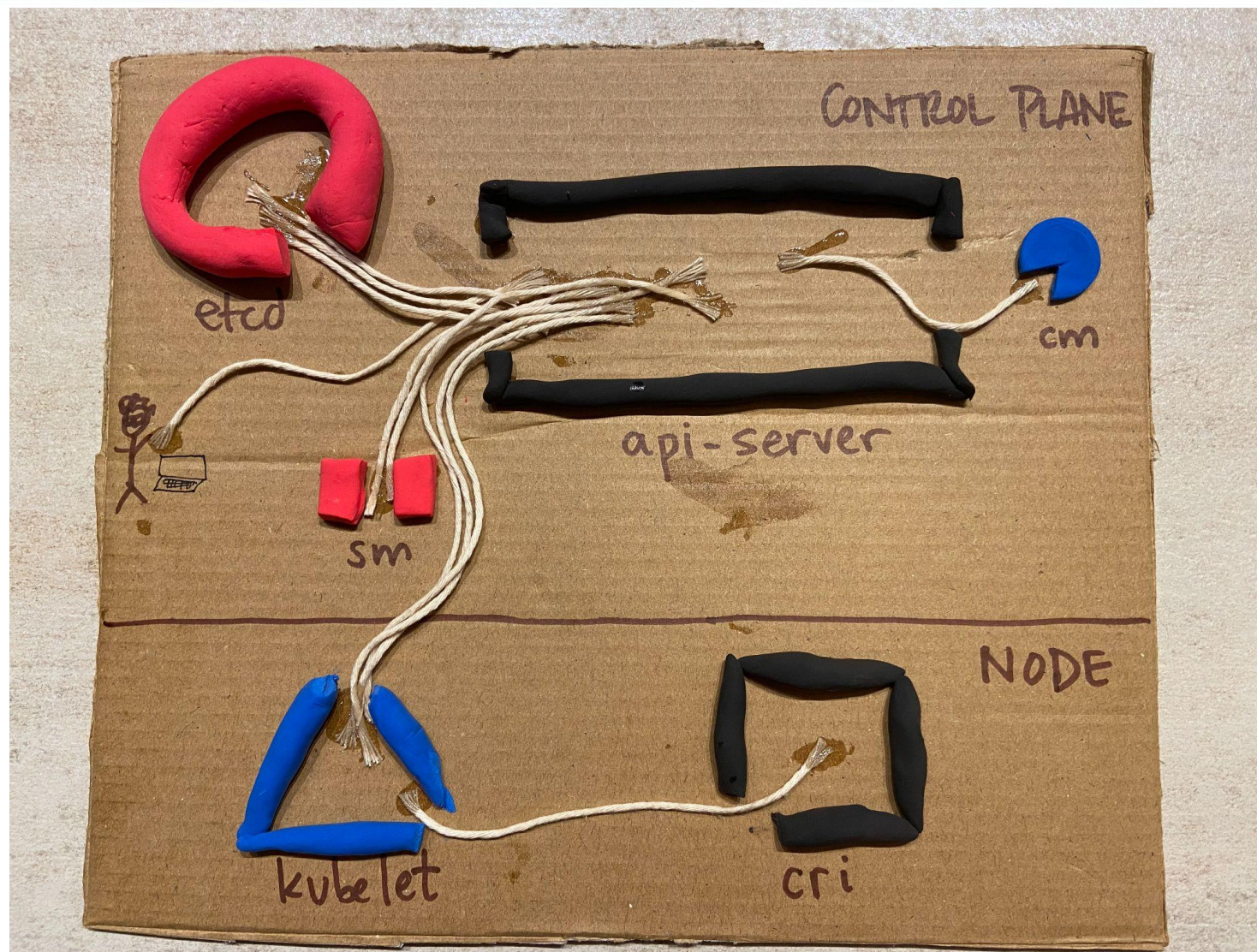


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# Recap



# Mental Models



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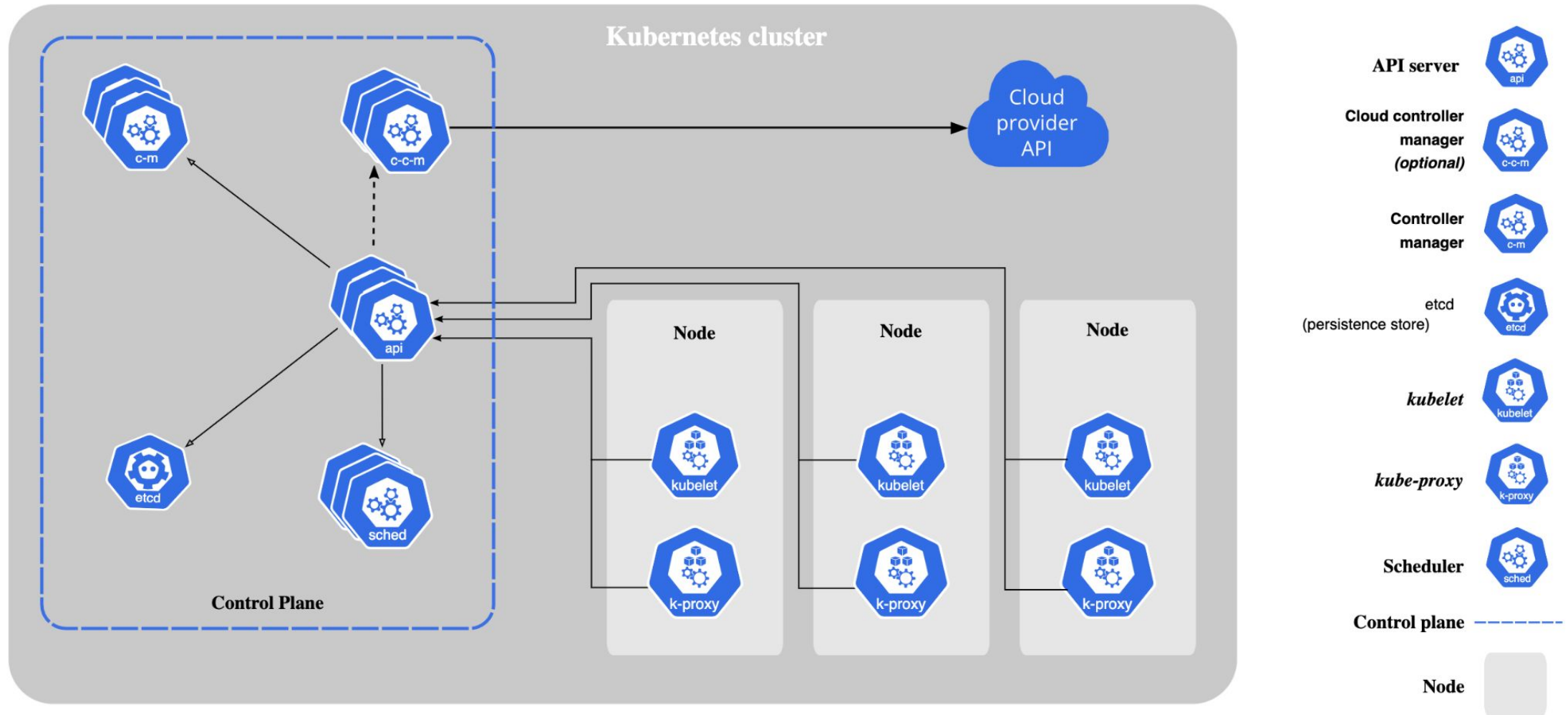


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# Why?



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## Examples of Kubernetes Time Sequence Diagrams

- [Writing custom Kubernetes Scheduler - My Fake Tardis](#)
- [A Sequential Breakdown of the Kubernetes Deployment Process-ContainerLabs](#)

## Time Sequence Diagram Generator

- [SequenceDiagram.org - UML Sequence Diagram Online Tool](#)

## Distributed Tracing with Jaeger and ingress-nginx

- [Jaeger: open source, end-to-end distributed tracing](#)
- [OpenTracing - NGINX Ingress Controller](#)

## Tutorial

- [Setting up Distributed Tracing in Kubernetes with OpenTracing, Jaeger, and Ingress-NGINX](#) by Fernando Diaz, [@awkwardferny](#)

## Diagram Tool

- [LucidChart](#)

## kspan

- [Traces from Events: A New Way to Visualise Kubernetes Activities - Bryan Boreham](#)
- [weaveworks-experiments/kspan: Turning Kubernetes Events into spans](#)



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