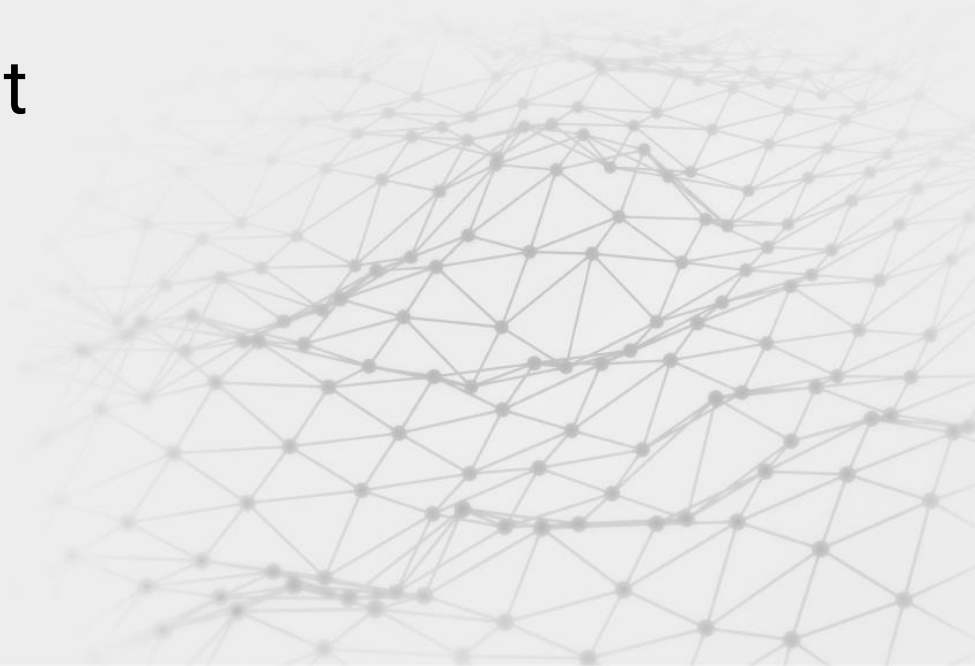
Debugging your microservices with Linkerd in Kubernetes

Dennis Adjei-Baah, Buoyant



*"Production usage of CNCF projects has grown more than **200%** on average since December 2017, and evaluation has jumped **372%.**"*

https://www.cncf.io/blog/2018/08/29/cncf-survey-use-of-cloud-native-technologies-in-production-has-grown-over-200-percent/

Challenges in Using & Deploying Containers

As cloud native technologies change the way companies are designing and building applications, challenges are inevitable. The top challenges that respondents face are:

- Cultural Changes with Development Team (41%)
- Complexity (40% up from 35%)
- Lack of Training (40%)
- Security (38% down from 43%)
- Monitoring (34% down from 38%)
- Storage (30% down from 41%)
- Networking (30% down from 38%)

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About Me

Software Engineer @ **Buoyant**

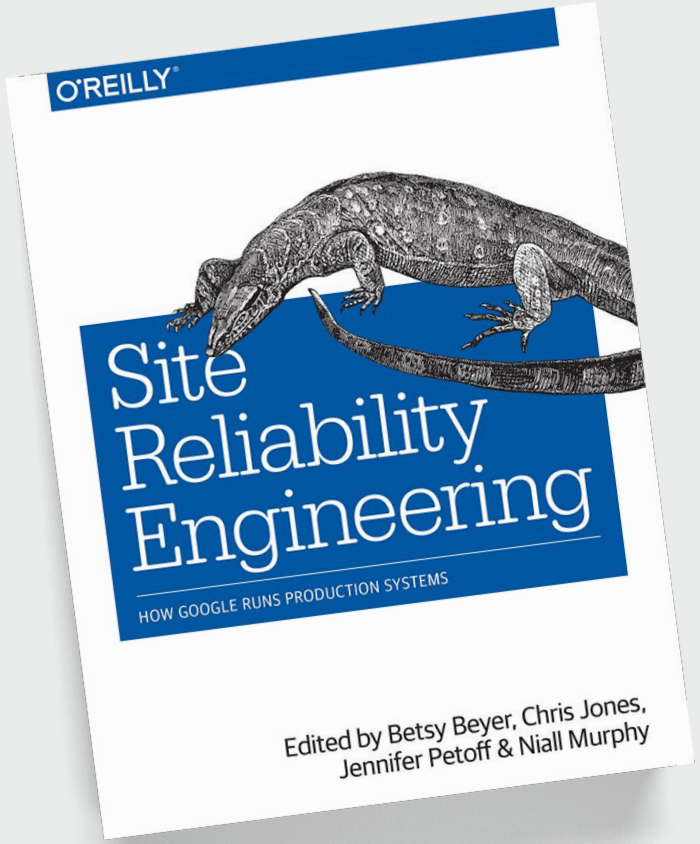
Linkerd maintainer

Twitter: **dadjeib**

Github: **dadjeibaah**

Why Monitor?

- Know what's going in production
- Answer question about your services



http://bit.ly/2MeJB8C

What we need to monitor

- **Application level** metrics
- What are my success rates for all my services?
- Which services are performing poorly? i.e. latency
- How much traffic is being distributed amongst Service A's pods?

K8S Metrics Server

- Out-of-the-box monitoring
- Monitor resource usage
- Scale workloads based on metrics

Logging in Kubernetes


```
➜  k8s-meetup stern authors --container service | head
+ authors-754957db59-vxxn4 › service
authors-754957db59-vxxn4 service 127.0.0.1 - - [17/Jan/2019:21:21:13 +0000] "POST /authors.json HTTP/1.1" 201 133 0.0390
authors-754957db59-vxxn4 service 127.0.0.1 - - [17/Jan/2019:21:21:13 UTC] "POST /authors.json HTTP/1.1" 201 133
authors-754957db59-vxxn4 service - -> /authors.json
authors-754957db59-vxxn4 service 127.0.0.1 - - [17/Jan/2019:21:21:13 +0000] "GET /authors/1981.json HTTP/1.1" 200 133 0.0020
authors-754957db59-vxxn4 service 127.0.0.1 - - [17/Jan/2019:21:21:13 UTC] "GET /authors/1981.json HTTP/1.1" 200 133
authors-754957db59-vxxn4 service - -> /authors/1981.json
authors-754957db59-vxxn4 service 127.0.0.1 - - [17/Jan/2019:21:21:13 +0000] "HEAD /authors/1981.json HTTP/1.1" 200 133 0.0021
authors-754957db59-vxxn4 service 127.0.0.1 - - [17/Jan/2019:21:21:13 UTC] "HEAD /authors/1981.json HTTP/1.1" 200 0
authors-754957db59-vxxn4 service - -> /authors/1981.json
authors-754957db59-vxxn4 service 127.0.0.1 - - [17/Jan/2019:21:21:13 +0000] "GET /authors/1981.json HTTP/1.1" 200 133 0.0021
```

Monitoring and Observability in Kubernetes

- Kubernetes gives you the infra to monitor pod level metrics
- Kubernetes makes sure your services are up and running
- Making sure that your services are up and running ***correctly*** is something **you** have to do.

Monitoring takes work

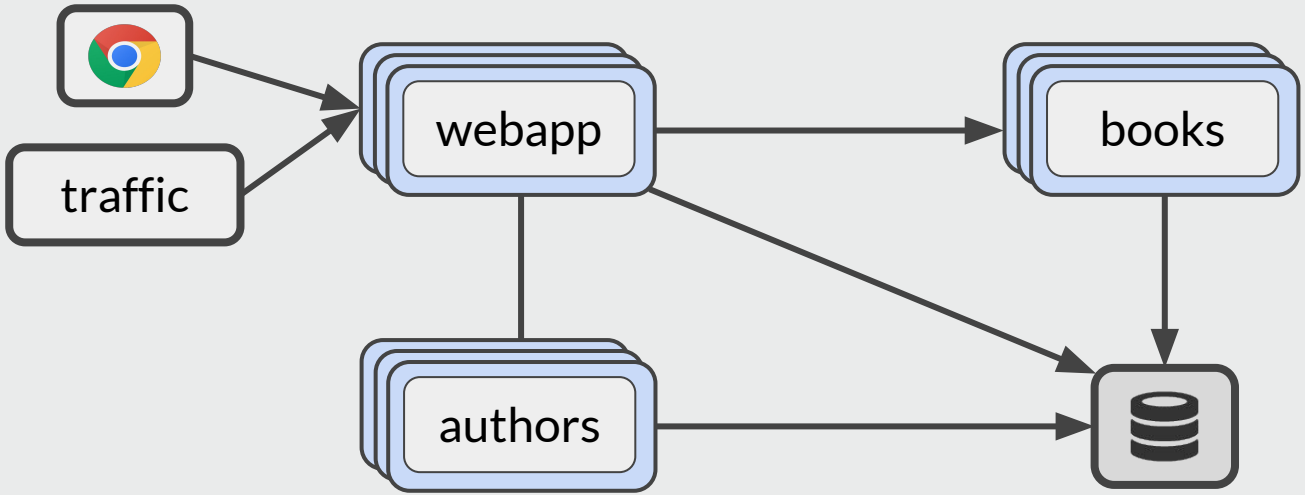
influxdb

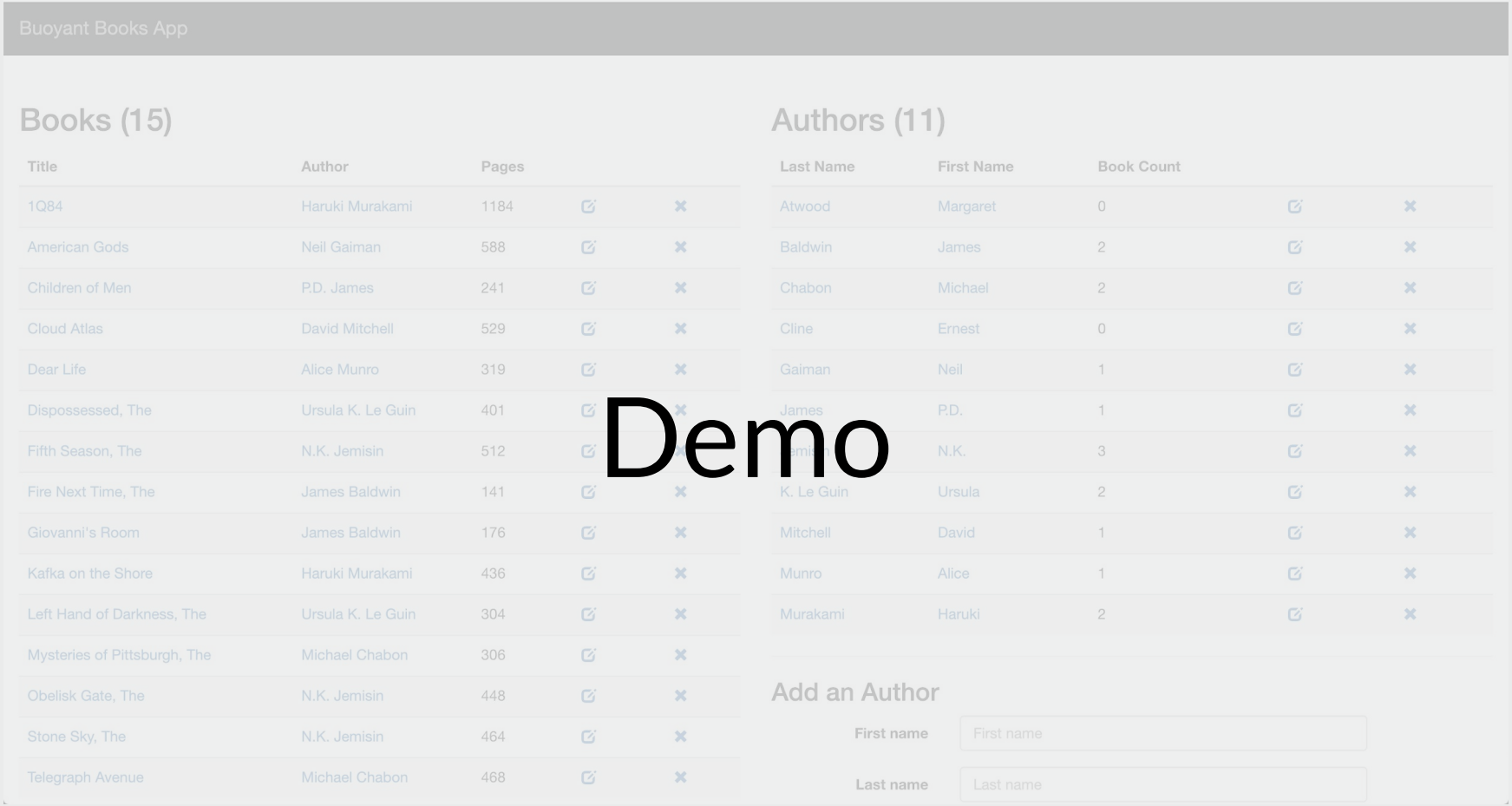
?

Sysdig

Demo: Booksapp

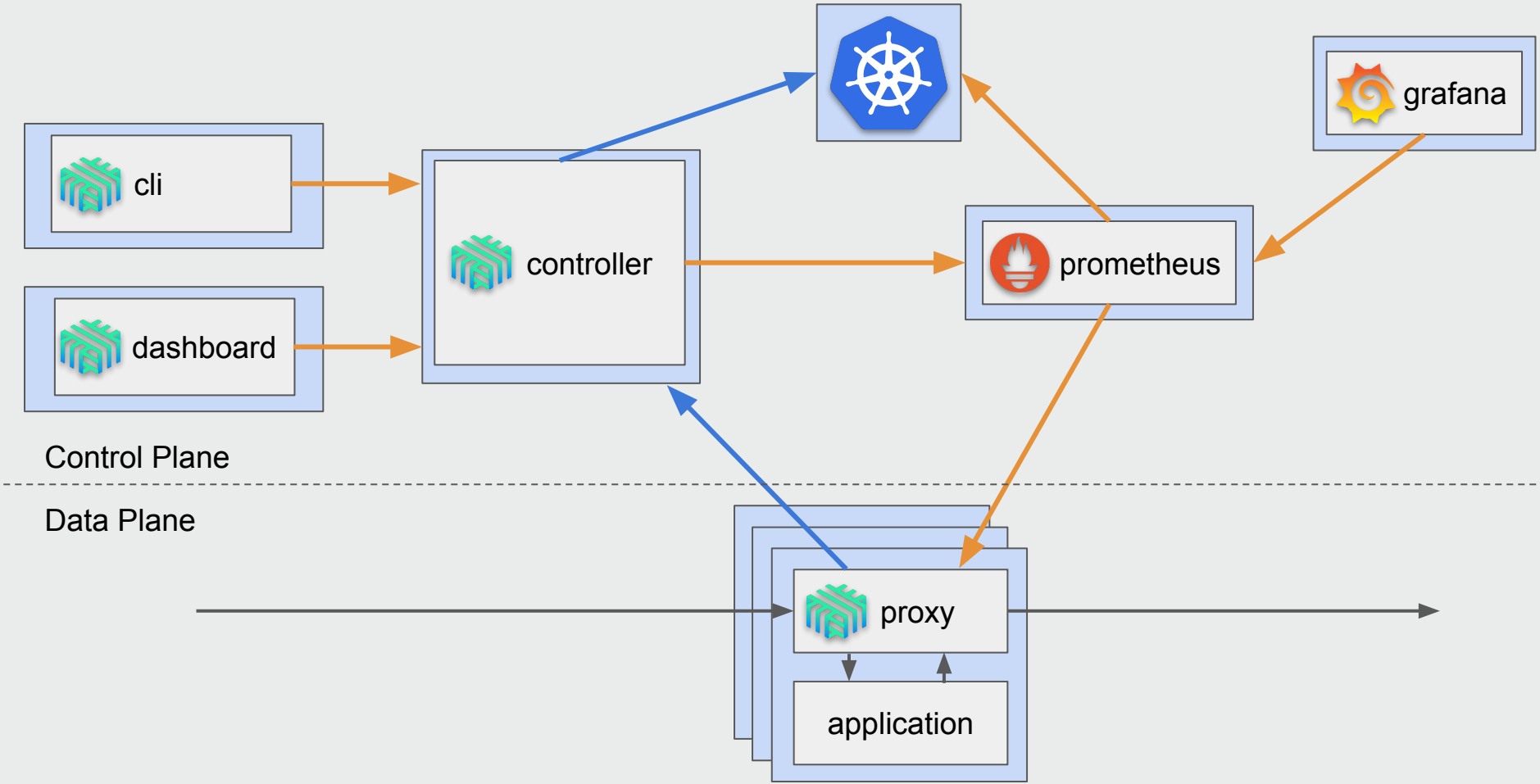
- REST API example (https://run.linkerd.io/booksapp.yml)
- Can we find the the problematic endpoint?




Buoyant Books App
Books (15)
Title
Author
Pages
1Q84
Haruki Murakami
1184
American Gods
Neil Gaiman
588
Children of Men
P.D. James
241
Cloud Atlas
David Mitchell
529
Dear Life
Alice Munro
319
Dispossessed, The
Ursula K. Le Guin
401
Fifth Season, The
N.K. Jemisin
512
Fire Next Time, The
James Baldwin
141
Giovanni's Room
James Baldwin
176
Kafka on the Shore
Haruki Murakami
436
Left Hand of Darkness, The
Ursula K. Le Guin
304
Mysteries of Pittsburgh, The
Michael Chabon
306
Obelisk Gate, The
N.K. Jemisin
448
Stone Sky, The
N.K. Jemisin
464
Telegraph Avenue
Michael Chabon
468
Authors (11)
Last Name
First Name
Book Count
Atwood
Margaret
0
Baldwin
James
2
Chabon
Michael
2
Cline
Ernest
0
Gaiman
Neil
1
James
P.D.
1
N.K.
3
K. Le Guin
Ursula
2
Mitchell
David
1
Munro
Alice
1
Murakami
Haruki
2
Add an Author
First name
First name
Last name
Last name

Demo

Linkerd 2.0


cli
dashboard
controller
grafana
prometheus
Control Plane
Data Plane
proxy
application

Demo

Install Linkerd

Per-route metrics

- Create “routes” that match certain conditions
- /authors/{1...n}.json
- High cardinality => too many time series

Service profile configuration

```
➜ swagger linkerd profile  --open-api authors.swagger authors
apiVersion: linkerd.io/v1alpha1
kind: ServiceProfile
metadata:
  creationTimestamp: null
  name: authors.default.svc.cluster.local
  namespace: linkerd
spec:
  routes:
  - condition:
      method: GET
      pathRegex: /authors\.json
    name: GET /authors.json
  - condition:
      method: POST
      pathRegex: /authors\.json
    name: POST /authors.json
```

Demo

Service Profiles

Easy as in Linkerd

- Easy to install
- zero to metrics in no time
- Adding Linkerd in production can be an incremental

LINKERD

CLOUD NATIVE COMPUTING FOUNDATION

24+ months in production

2k+ Slack channel members

7,000+ GitHub stars

20m+ DockerHub pulls

80+ contributors

400b+ production requests/mo

COMCAST

CHASE

OfferUp

planet.

monzo

Expedia

hush.

GoDaddy

credit karma

Get involved

- Getting Started Guide: linkerd.io/2/getting-started/
- Linkerd Slack: linkerd.slack.com
- Slides: github.com/dadjeibaah