



Unblocking the Release Train with Istio Traffic Management

Dave Shepherd

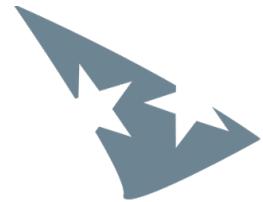
Senior Platform Engineer

Pierre Meunier

Senior Platform Engineer



Wealth Wizards



Wealth Wizards

Regulated robo-advisers

- Financial Advisers
- Automated Financial Advice
- FCA Regulated
- Lots of regulations

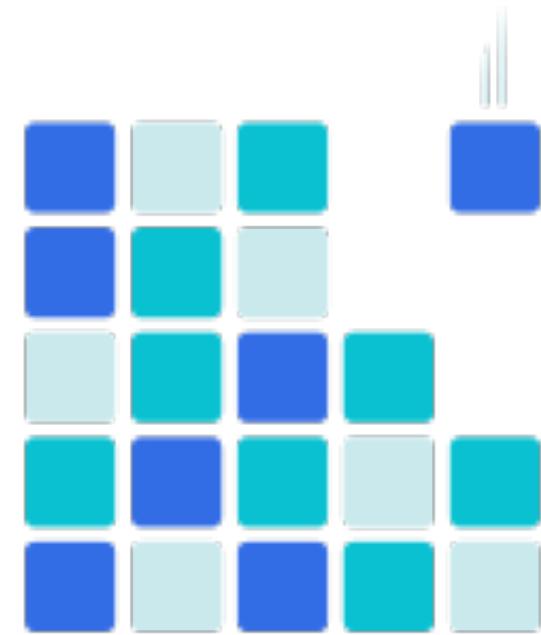
Engineering

- Approximately 120 microservices
- Deployed for multiple tenants



Our microservices

- Small
- Single purpose
- Simple
- Avoid duplication



Our microservices

- Complexity pushed to the platform
- Hosted on Kubernetes



Kubernetes

- Platform for managing containerised services
- Scale
- Resilience



Kubernetes

- We started with 1.2
- Using it for over 3 years
- It started with “kube-up”



Kubernetes

- Infrastructure as code
 - Terraform
 - kops
 - Custom tooling
- For
 - Consistency
 - Repeatability
 - Ease



Our platform

- Evolved over time
- Continuous delivery principles
- Self service



louis.quaintance 9:15 AM

@konan deploy ww-cms ww-red TS-4122-cms-live



konan APP 9:15 AM

@louis.quaintance: (201) Deploying ww-cms on ww-red namespace (<https://jenkins.wizards.engineering/job/Polaris/job/deploy/job/master>) requested.

Please follow deployment progress at <https://dashboard.proof.wizards.engineering/#!/deployment/ww-red/ww-cms?namespace=ww-red>



Our platform

- Slow moving industry
- Outside factors
- Unexpected delays in delivery



After a change is 'completed'

- Code review
- QA review
- Automated testing
- Compliance check
- Deploy





What happens if a problem is found?



Some options

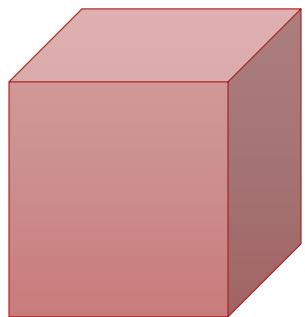
- Dark features
 - Feature flags
 - Beta users
- Environments for features

```
if (myGreatFeatureEnabled) {  
    ... displayNewFeature();  
} else {  
    ... displayOldFeature();  
}
```

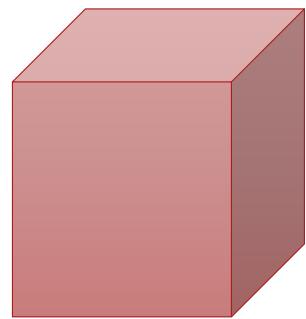
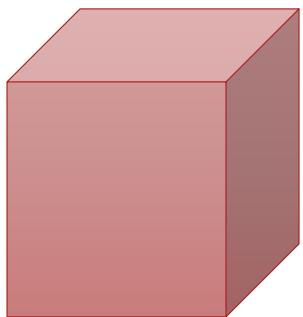
We keep getting asked for new 'environments'



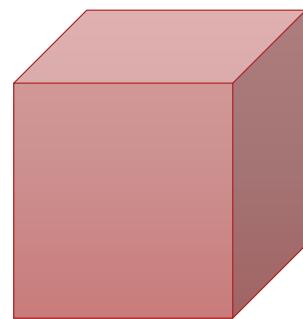
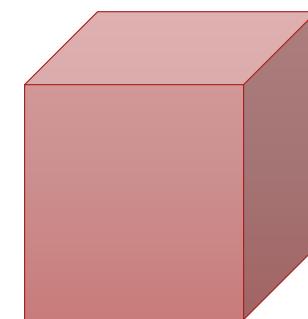
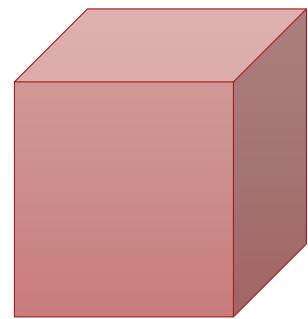
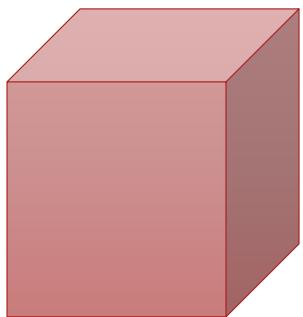
In a monolithic world



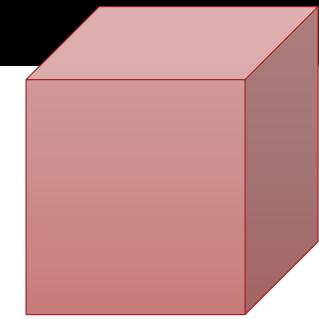
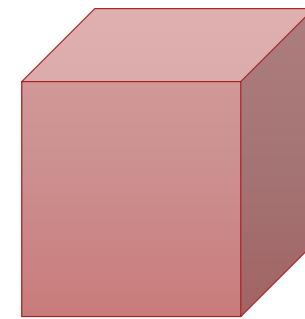
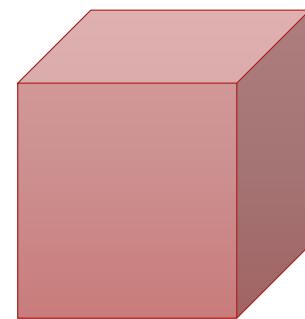
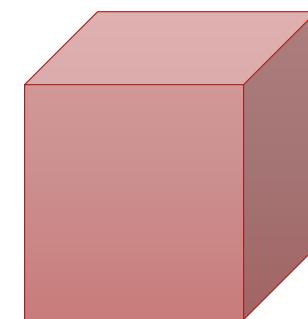
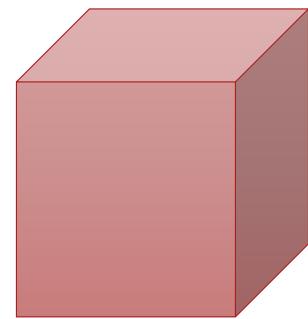
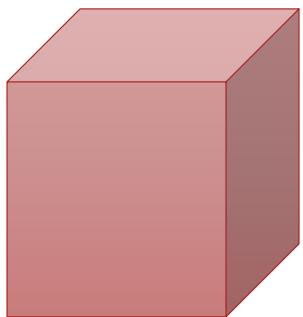
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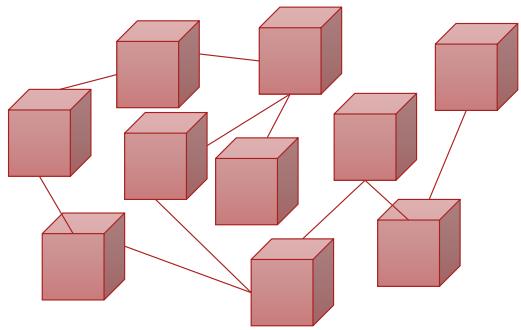
In a monolithic world



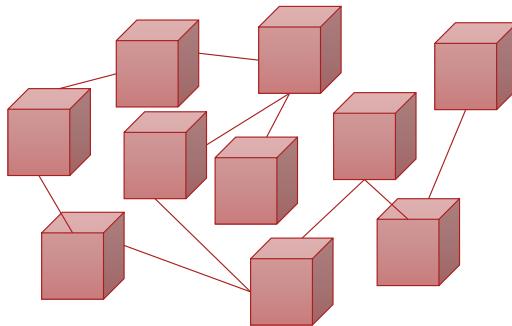
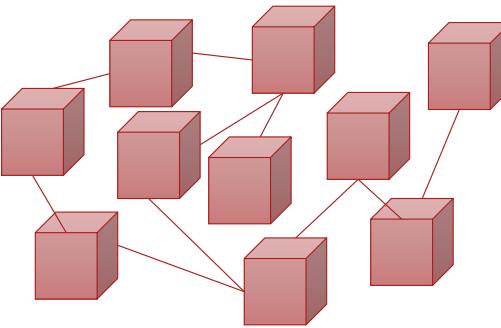
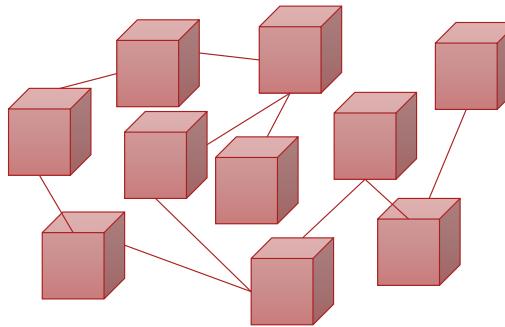
In a monolithic world



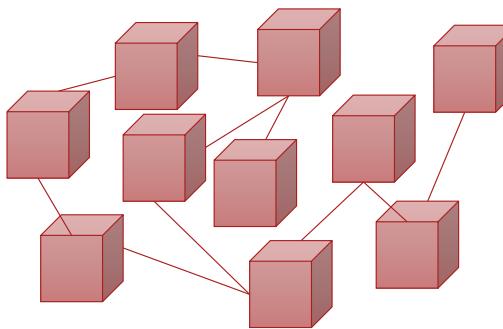
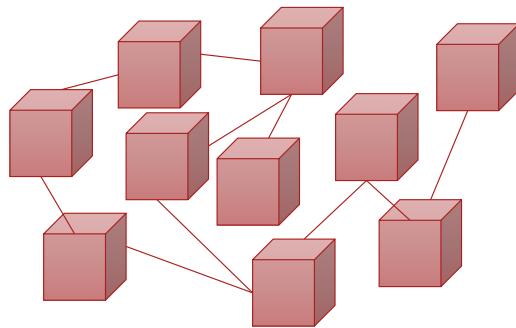
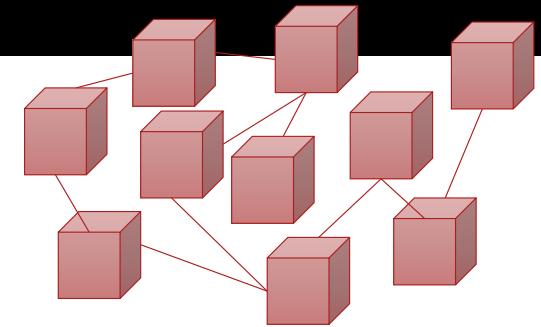
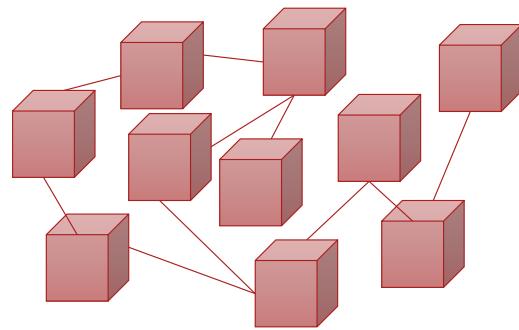
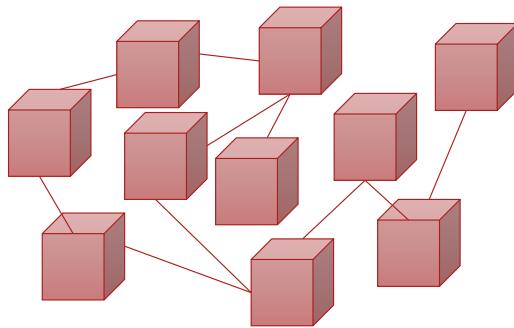
In a microservices world



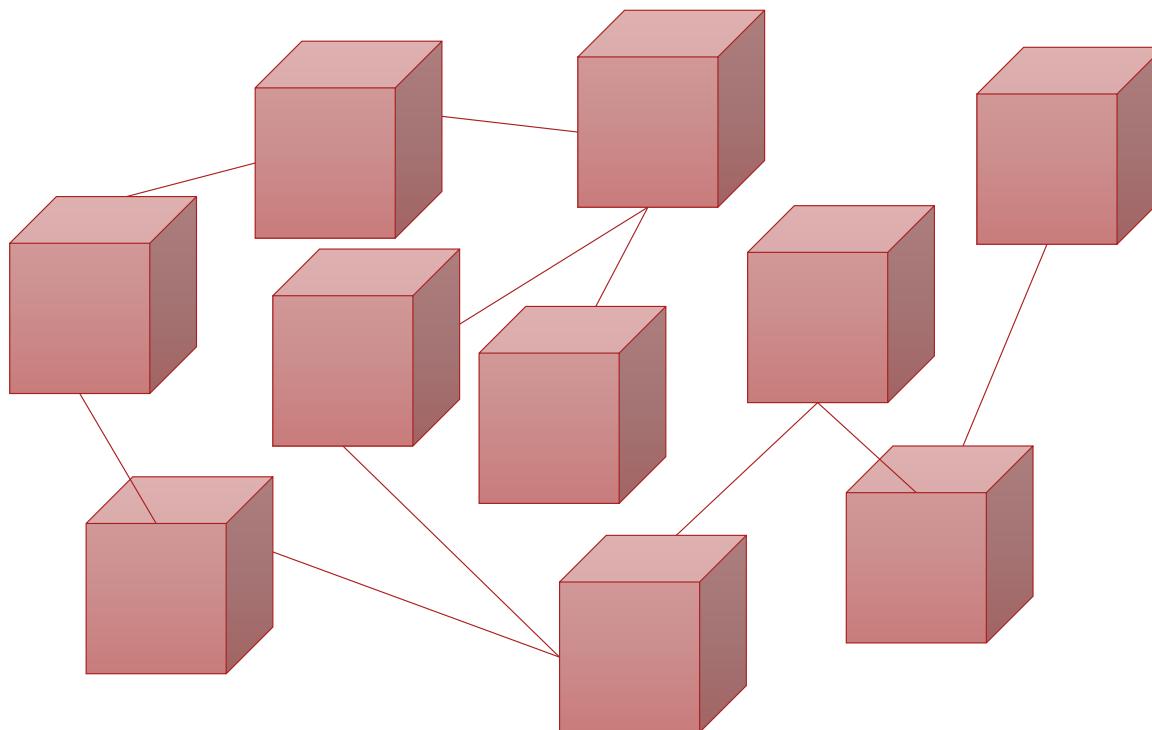
In a microservices world



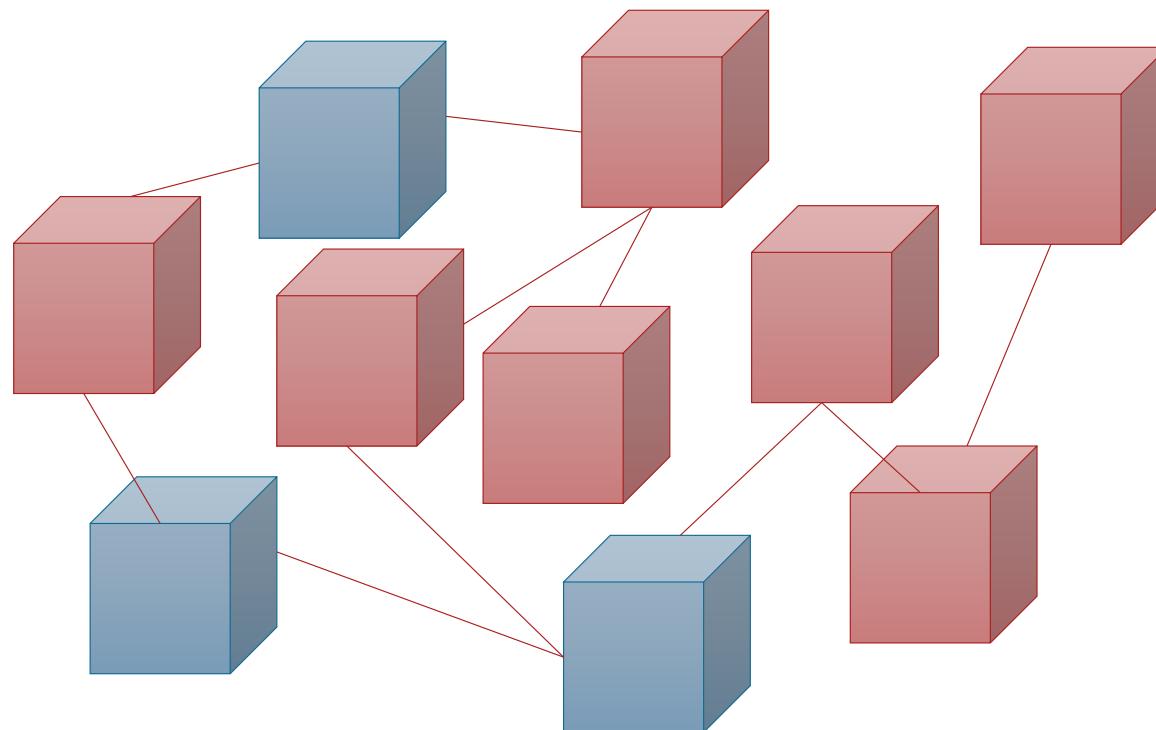
In a microservices world



Why not just spin up the bits that have changed?

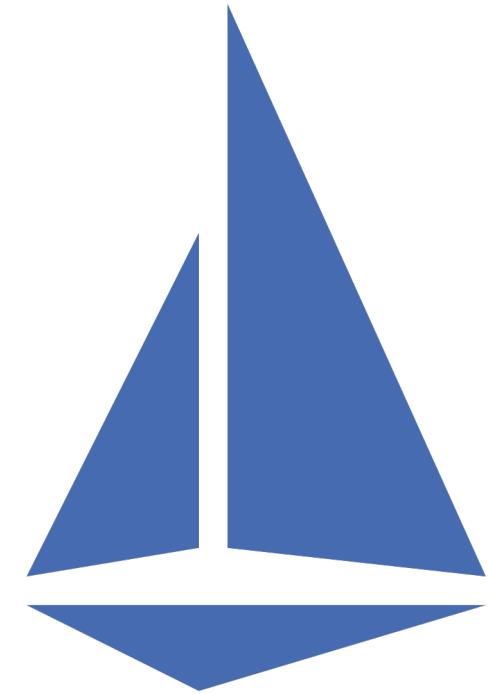


Why not just spin up the bits that have changed?

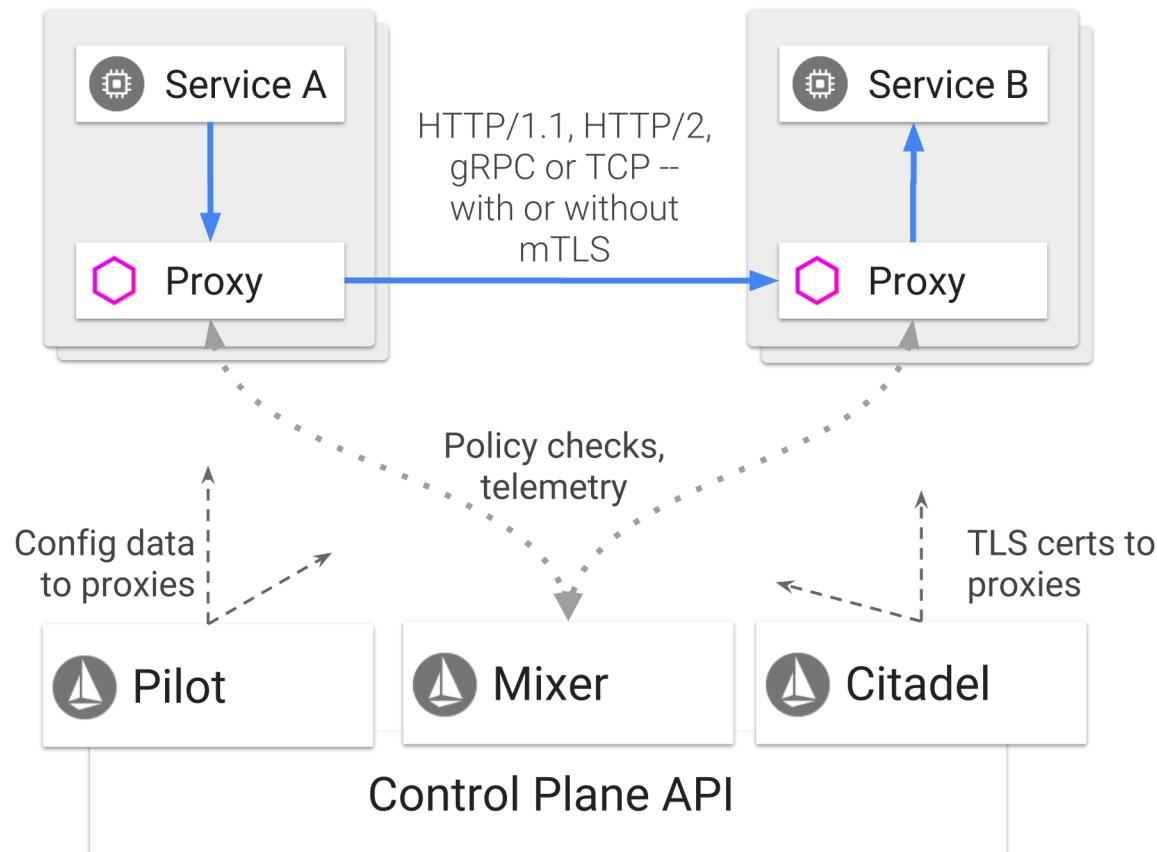


What is Istio?

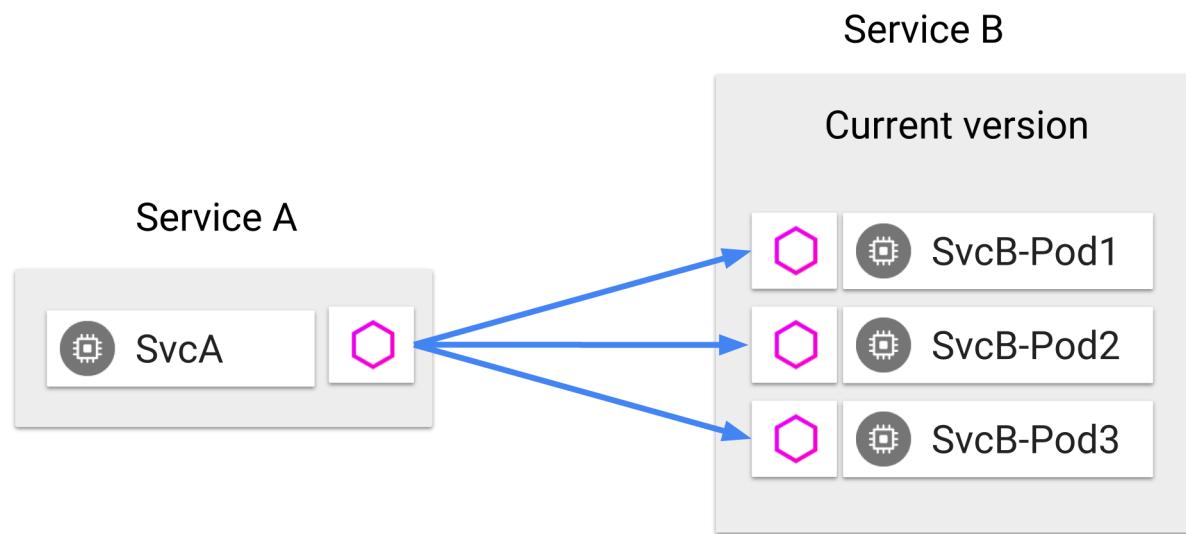
- A service mesh
- Providing:
 - Traffic management
 - Security
 - Observability



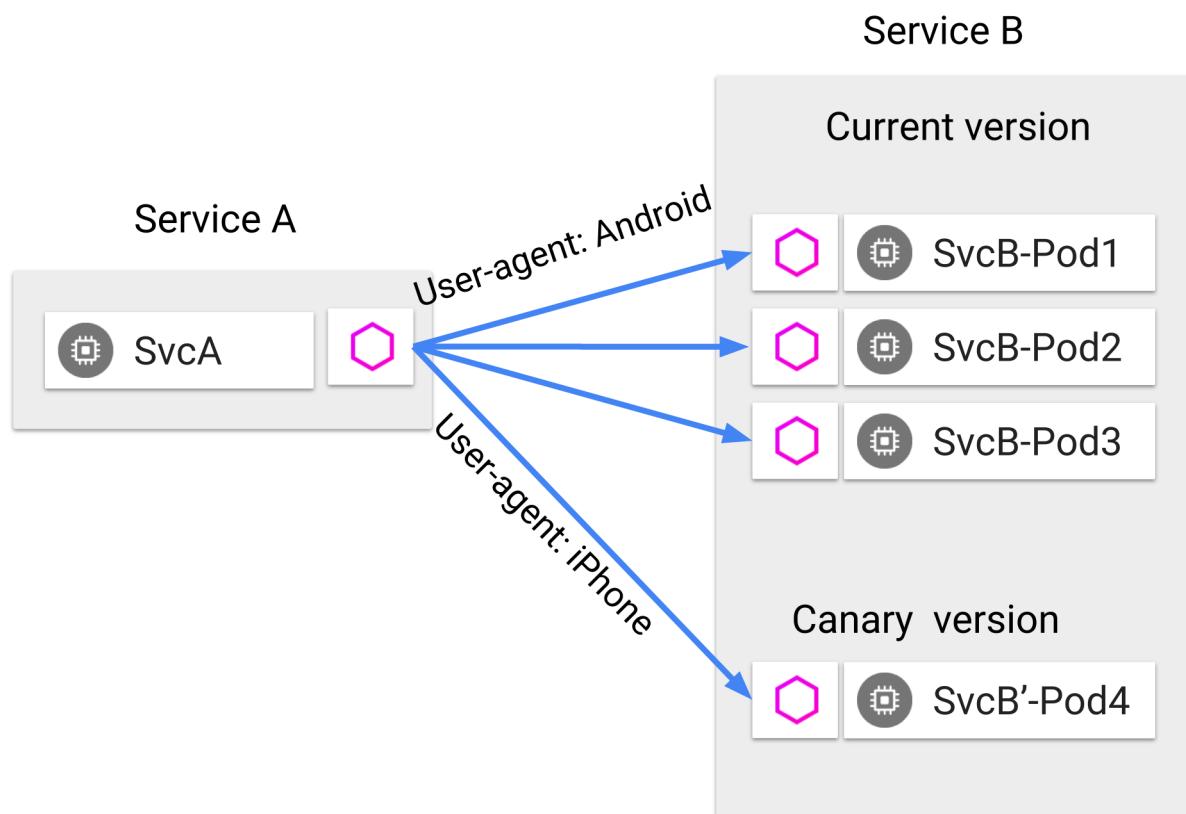
How does Istio work?



Traffic management



Traffic management



https://ww-green.wealthwizards.io/fact-find

Apps WW Personal How to Install and... Legal & General N... SVG Crowbar 2 Other Bookmarks

Wealth Wizards SMART PLATFORM User Hub | SIGN OUT

Welcome to the Robo-Paraplanner

NEW RETIREMENT CASE NEW DB CASE

Search by first name, last name or national insurance number

SEARCH

« < 1 2 3 4 5 > »

NAME DATE OF BIRTH POST CODE

selectors.spec.js

```
form-coupler
fulfilment-charge
header
health
health-questionnaire
io-integration
modals
permissions
postcode-anywhere
```

97
98
99
100
101
102
103
104
105
106

```
{WealthWizards.FACT_FIND_LIST_SEARCH_ENABLED && (
  <div style={{ display: 'flex', width: '100%' }}>
    <input
      placeholder="Search by first name, last name or national insurance number"
      type="text"
      data-test="search-filter-input"
      className="fact-finds-list-container__input"
      onChange={e => this.setState({ query: e.target.value })}
      onKeyPress={({ key }) =>
        key === 'Enter' && query(client, this.state.query, 1)
      }
    />
  </div>
)
```

FactFindListComponent > render()

6: TODO 9: Version Control Terminal Docker SonarLint Event Log

Dockerfile detection: You may setup Docker deployment run configuration for the following file(s): // /Users/david.shepherd/development/wealth-wizards/fac... (yesterday 15:27) 72:33 LF+ UTF-8+ Git: feature/OPS-1234

Example configuration

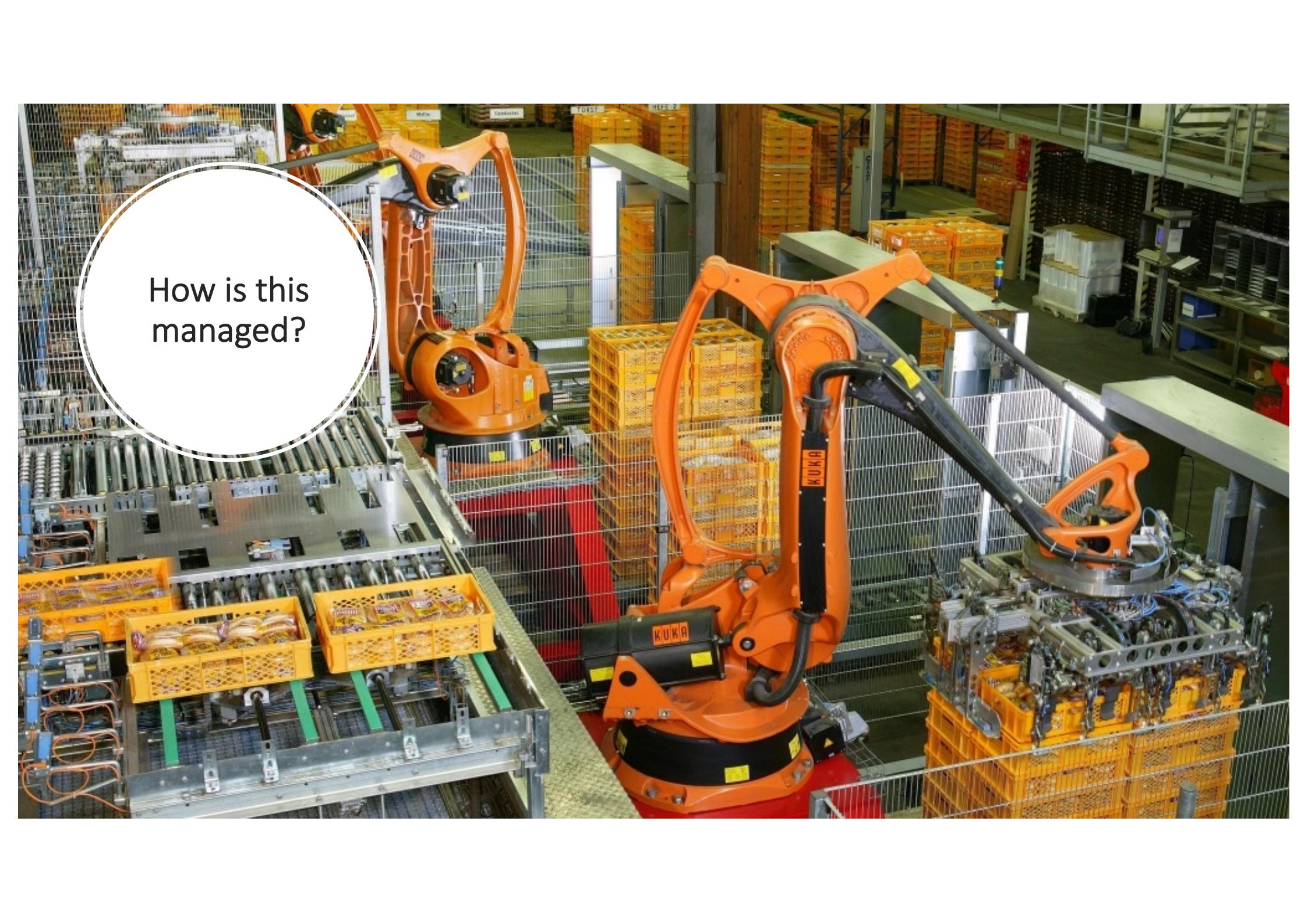
```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: fact-find-ui
spec:
  host: fact-find-ui.ww-green.svc.cluster.local
  subsets:
  - labels:
      version: OPS-1234
      name: OPS-1234
    - labels:
        version: master
        name: master
```

Example configuration

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: fact-find-ui-ingress
spec:
  gateways:
    - default-gateway
  hosts:
    - ww-green.wealthwizards.io
    - '*.ww-green.wealthwizards.io'
  http:
    - appendHeaders:
        x-variant-id: OPS-1234
      match:
        - authority:
            regex: (OPS-1234|ops-1234).ww-green.wealthwizards.io
      route:
        - destination:
            host: fact-find-ui.ww-green.svc.cluster.local
            subset: OPS-1234
    - route:
        - destination:
            host: fact-find-ui.ww-green.svc.cluster.local
            subset: master
  - match:
      - headers:
          x-variant-id:
            regex: (OPS-1234|ops-1234)
      route:
        - destination:
            host: fact-find-ui.ww-green.svc.cluster.local
            subset: master
```

Example configuration

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: fact-find-ui-mesh
spec:
  hosts:
  - fact-find-ui.ww-green.svc.cluster.local
  http:
  - match:
    - headers:
        x-variant-id:
          regex: (OPS-1234|ops-1234)
    route:
    - destination:
        host: fact-find-ui.ww-green.svc.cluster.local
        subset: OPS-1234
  - route:
    - destination:
        host: fact-find-ui.ww-green.svc.cluster.local
        subset: master
```



How is this
managed?



A photograph of a large tree trunk from a low-angle perspective, looking up through its dense canopy of green leaves against a bright sky. A white circle with a black outline is positioned in the upper left quadrant, containing the text "Branches are built and deployed".

Branches
are built
and
deployed



Kube-housekeeper

- Tidies up old branch deployments

<https://github.com/WealthWizardsEngineering/kube-housekeeper>

AutoKube

- Listens for changes
- Updates the routing rules

<https://github.com/WealthWizardsEngineering/AutoKube>



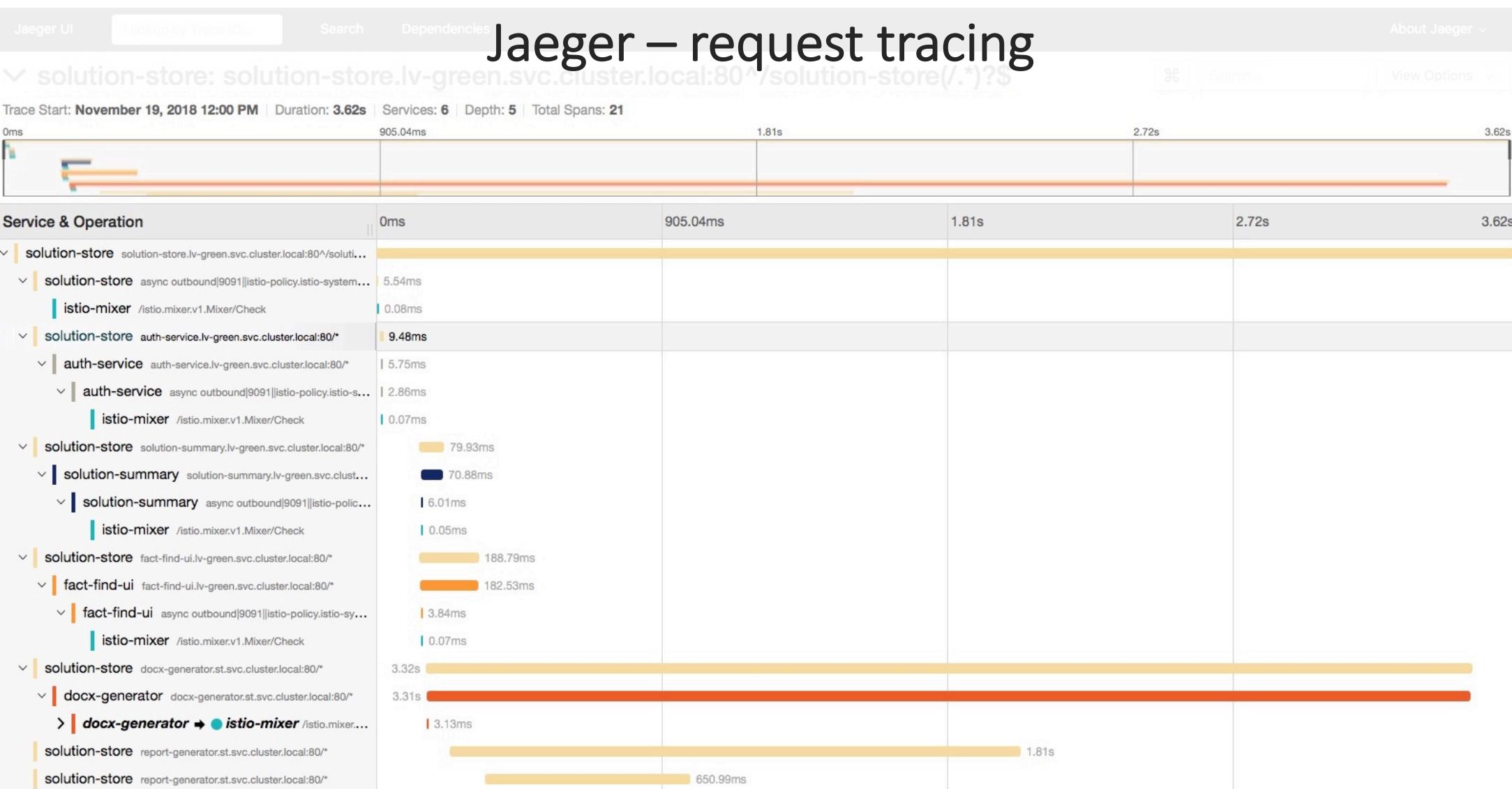


hpropagate

<https://github.com/WealthWizardsEngineering/hpropagate>

- Headers passed to downstream services
- Downstream services can be tested

```
require('hpropagate')();
const server = require('./server');
server.listen(PORT, () => {
  console.log('Server running on port %d', PORT);
});
```





Six months later...

- Indispensable
- Quicker and easier releases
- Improved collaboration

Plain sailing?

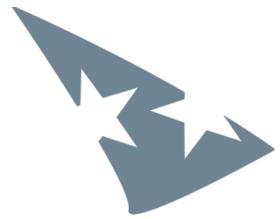
- Steep learning curve
- Stability issues
- Complex
- We almost backed out Istio



Summary

- Istio helps solve our bottleneck
- The microservices know nothing about it
- Istio has lots of potential
- High level of complexity





Wealth Wizards

Thank you

- <https://medium.com/ww-engineering>
- <https://github.com/WealthWizardsEngineering>
- We're hiring:
 - <https://www.wealthwizards.com/careers/>