



KubeCon



CloudNativeCon

Europe 2018

Q A W A R E

Istio by Example

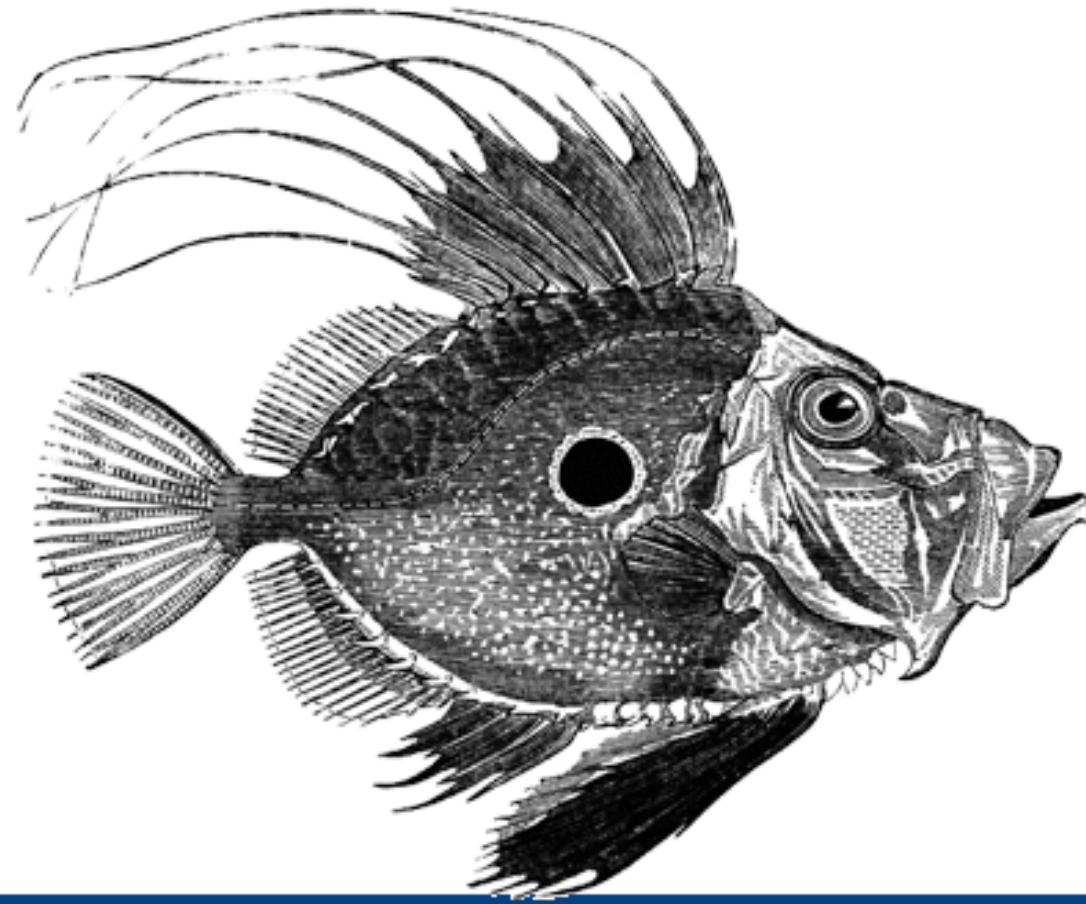
Josef Adersberger, CTO QAware

 @adersberger



Why?

Fight Microservice Obesity

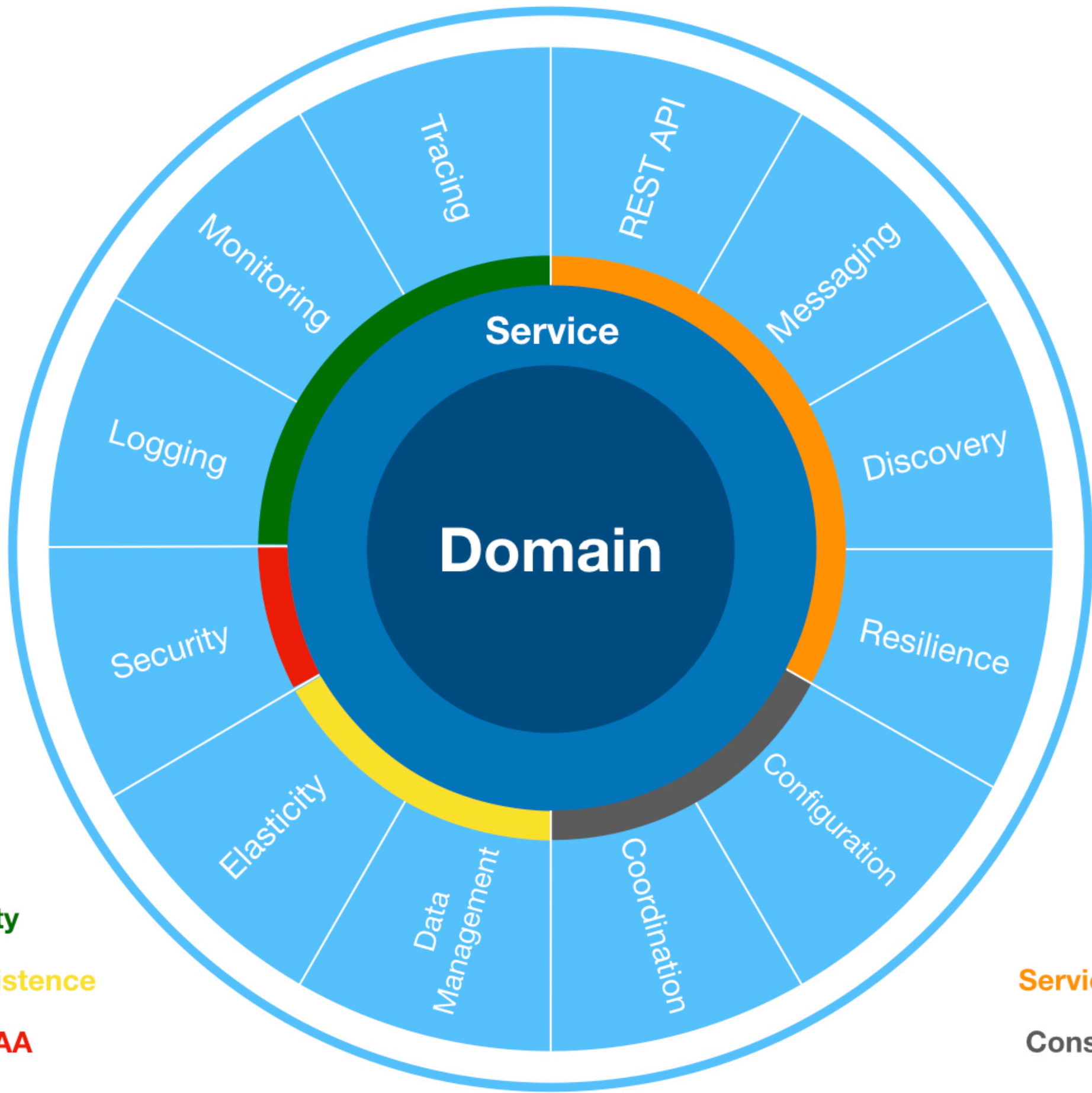


Hype-Driven Software Development

Istio Edition

O RLY?

Josef Adersberger



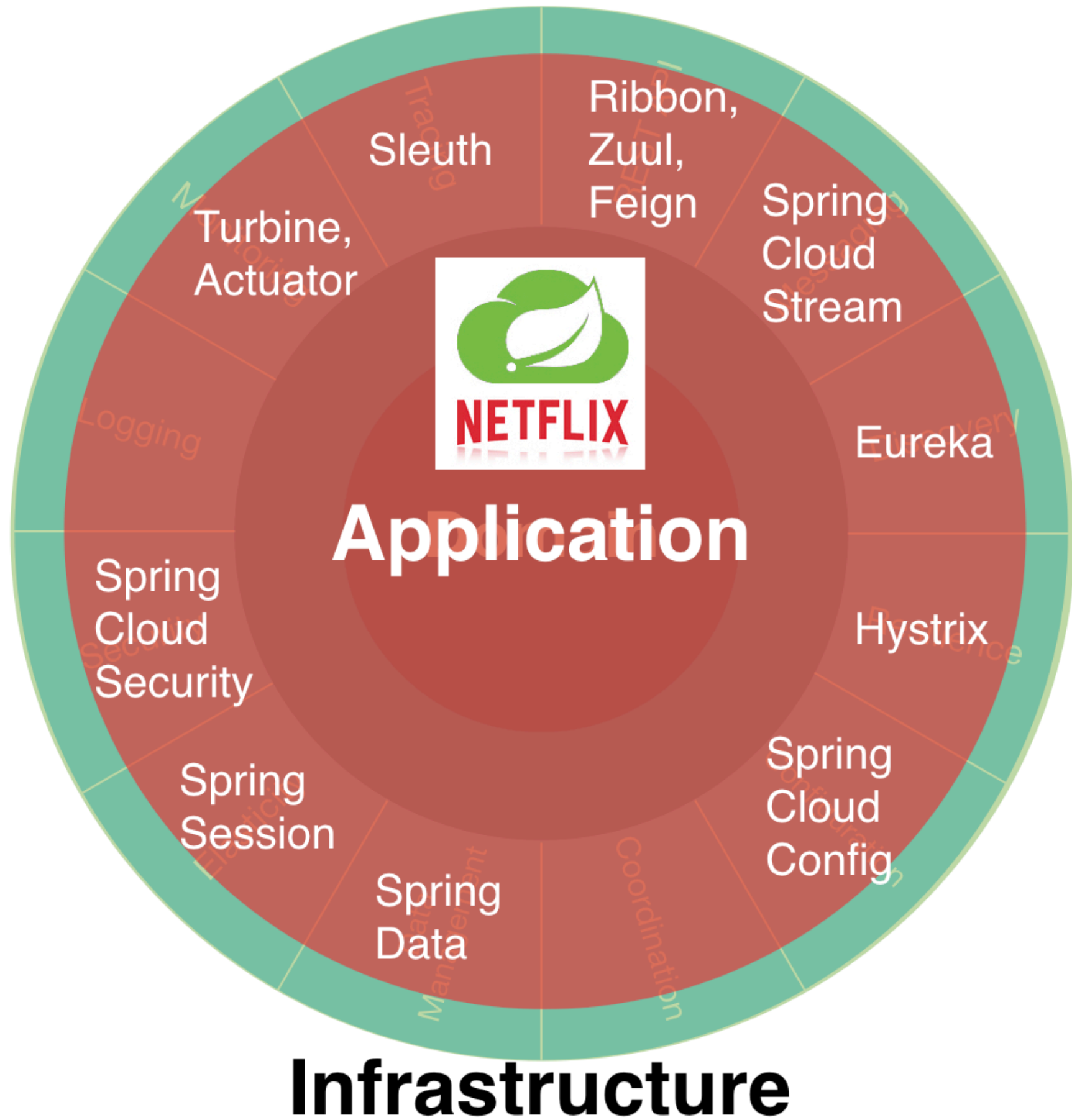
Diagnosability

State & Persistence

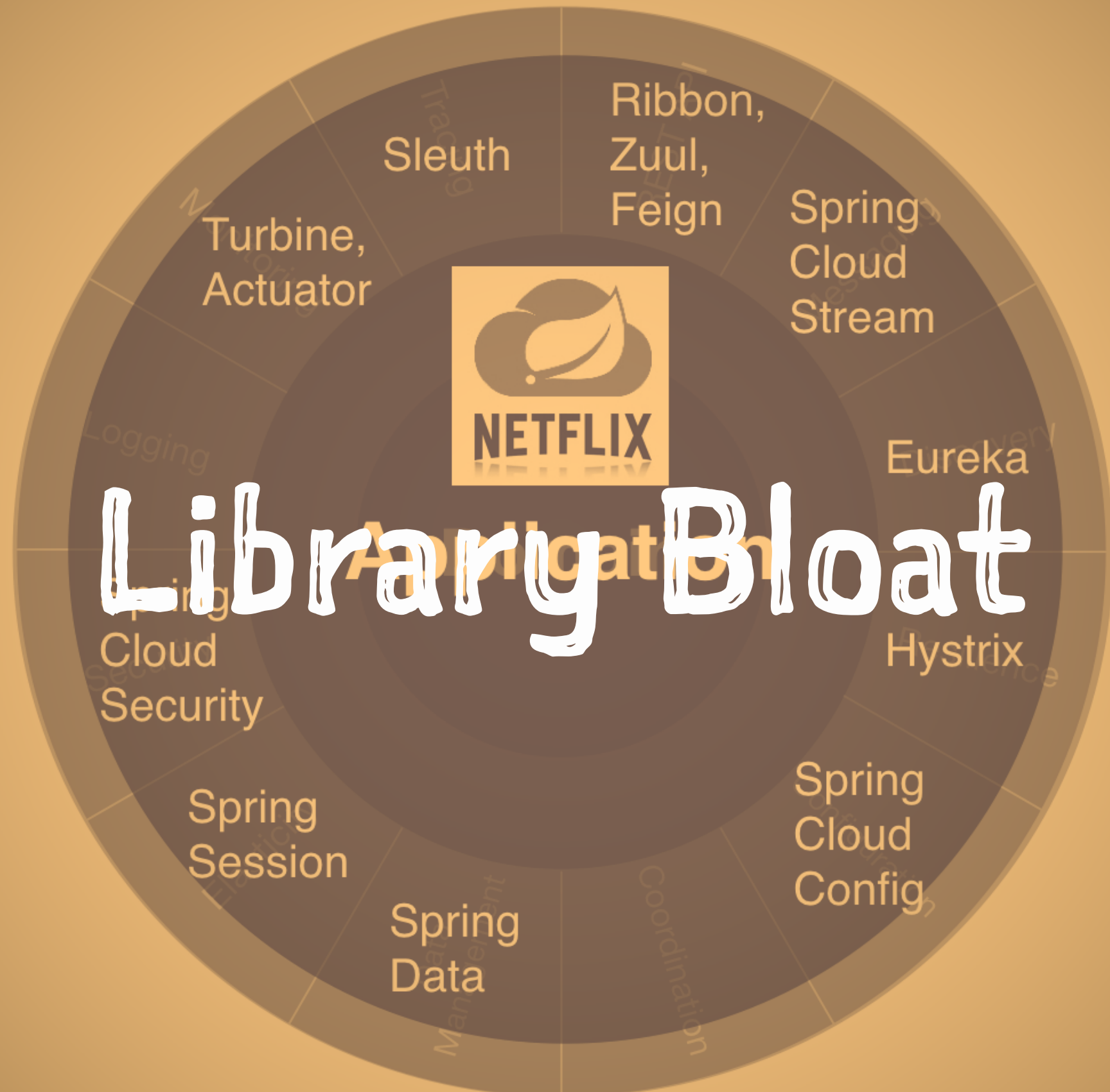
Security & AAA

Service Exposition

Consens & Config

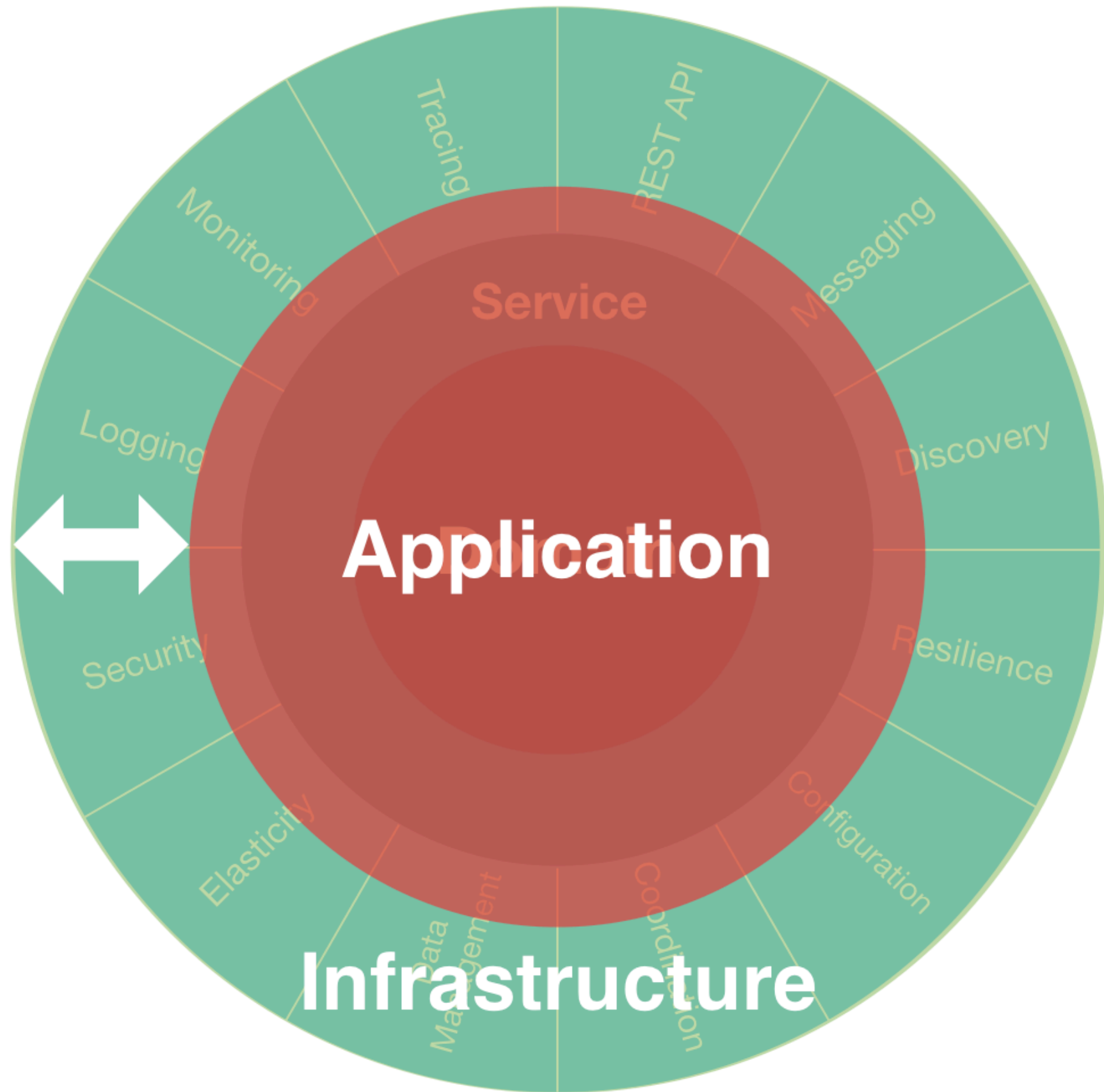


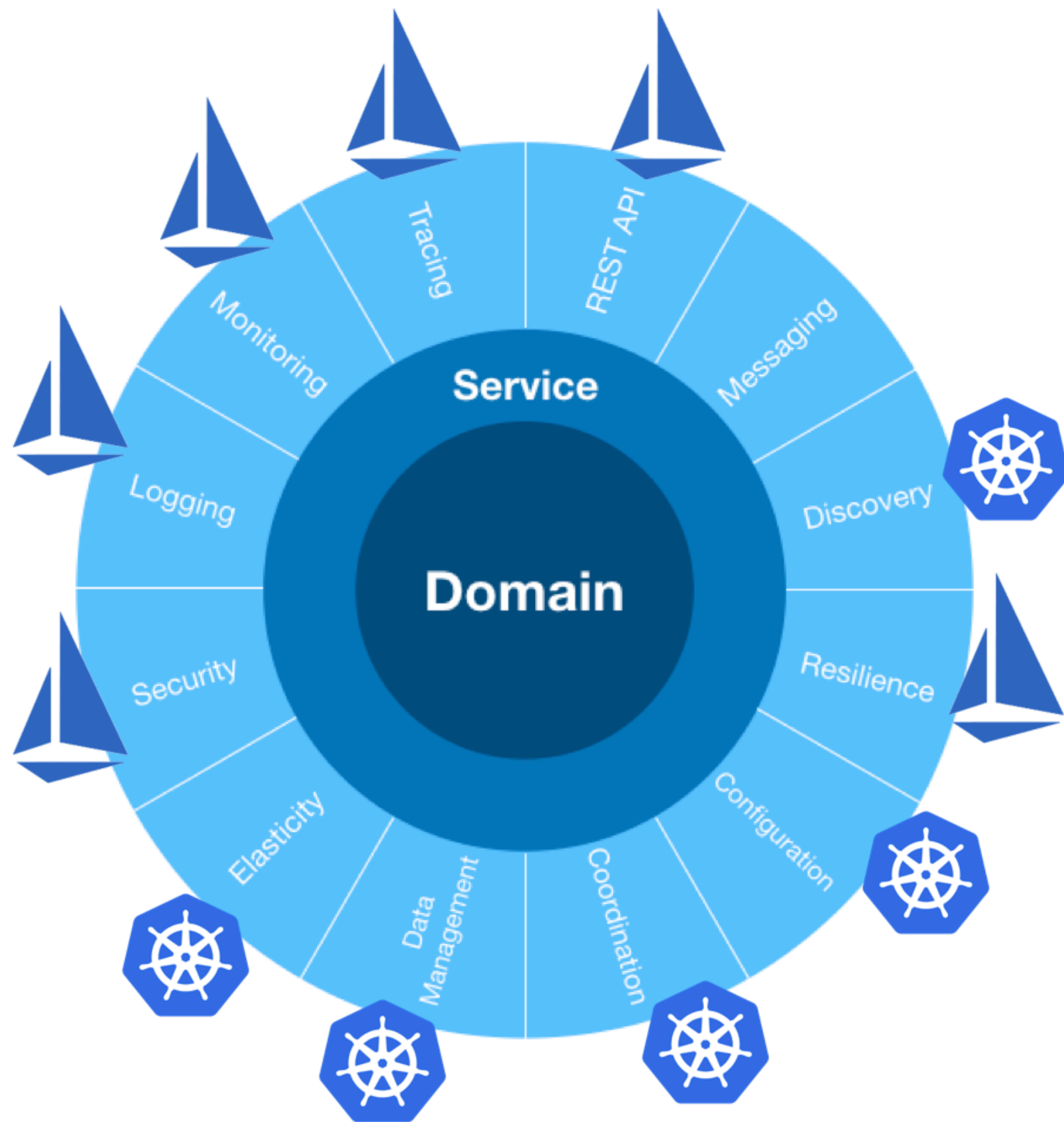
Infrastructure



Library Bloat

Infrastructure





Setting the sails with Istio





Docker

Community Edition

Version 18.04.0-ce-mac62 (23965)


Channel edge

e1a85f64c1

Baby step: Install a (local) Kubernetes cluster



Engine: 18.04.0-ce

 Notary: 0.6.0



Compose: 1.21.0



Credential Helper: 0.6.0



Machine: 0.14.0



Kubernetes: v1.9.6

Step 1: Deploy Istio and a Sample Application

Application

Video



```
1 > # Setup Istio
2 > curl -L https://git.io/getLatestIstio | sh -
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
  0     0    0     0    0     0      0     0      0  0
100 1448 100 1448    0     0  1778     0      0  1778
Downloading istio-0.7.1 from https://github.com/istio/istio/releases/download/0.7.1/istio-0.7.1-osx.tar.gz ...
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
100  612    0  612    0     0  1108     0  --:--:-- --:--:-- --:--:--  1106
100 11.2M 100 11.2M    0     0  413k     0  0:00:27 0:00:27 --:--:--  347k
Downloaded into istio-0.7.1:
LICENSE  README.md  bin  install  istio.VERSION  samples  tools
Add /Users/josef.adersberger/Documents/publikationen/vortraege/2018-Istio-by-Example/istio-by-example/code/istio-0.7.1/bin to your
path; e.g copy paste in your shell and/or ~/.profile:
export PATH="$PATH:/Users/josef.adersberger/Documents/publikationen/vortraege/2018-Istio-by-Example/istio-by-example/code/istio-0.
7.1/bin"
3 > export PATH="$PATH:/Users/josef.adersberger/Documents/publikationen/vortraege/2018-Istio-by-Example/istio-by-example/code/isti
o-0.7.1/bin"
4 > istioctl
```

Step 2: Deploy Istio Observability Stack

Video



```
1 > # Deploy Prometheus
3 > kubectl apply -f istio-*/install/kubernetes/addons/prometheus.yaml
configmap "prometheus" unchanged
service "prometheus" created
deployment "prometheus" created
serviceaccount "prometheus" unchanged
clusterrole "prometheus" configured
clusterrolebinding "prometheus" configured
5 > kubectl expose deployment prometheus --name=prometheus-expose --port=9090 --target-port=9090 --type=LoadBalancer -n=istio-system
service "prometheus-expose" exposed
7 > # Deploy Grafana
9 > kubectl apply -f istio-*/install/kubernetes/addons/grafana.yaml
service "grafana" created
deployment "grafana" created
serviceaccount "grafana" created
11 > kubectl expose deployment grafana --name=grafana-expose --port=3000 --target-port=3000 --type=LoadBalancer -n=istio-system
service "grafana-expose" exposed
13 > open http://localhost:3000/d/1/istio-dashboard
```

Stimulate!

```
wget -P /usr/local/bin https://github.com/adarsberger/slapper/releases/download/0.1/slapper
```

```
slapper -rate 4 -targets ./target -workers 2 -maxY 15s
```

Canary Releases: A/B Testing

```
apiVersion: config.istio.io/v1alpha2
kind: RouteRule
metadata:
  name: reviews-test-v2
spec:
  destination:
    name: reviews
  precedence: 2
  match:
    request:
      headers:
        cookie:
          regex: "^(*?;)?(user=jason)(;.*)?$"
  route:
  - labels:
    version: v2
```

```
istioctl create -f route-rule-reviews-test-v2.yaml
```

Canary Releases: Rolling Upgrade

```
apiVersion: config.istio.io/v1alpha2
kind: RouteRule
metadata:
  name: reviews-default
spec:
  destination:
    name: reviews
  precedence: 1
  route:
  - labels:
    version: v1
    weight: 50
  - labels:
    version: v3
    weight: 50
```

```
istioctl create -f route-rule-reviews-50-v3.yaml
```

Canary Releases: Blue/Green

```
apiVersion: config.istio.io/v1alpha2
kind: RouteRule
metadata:
  name: reviews-default
spec:
  destination:
    name: reviews
  precedence: 1
  route:
  - labels:
    version: v3
    weight: 100
```

```
istioctl replace -f route-rule-reviews-v3.yaml
```


Security: Access Control

```
apiVersion: "config.istio.io/v1alpha2"
```

```
kind: denier
```

```
metadata:
```

```
  name: denyreviewsv3handler
```

```
spec:
```

```
  status:
```

```
    code: 7
```

```
    message: Not allowed
```

```
---
```

```
apiVersion: "config.istio.io/v1alpha2"
```

```
kind: checknothing
```

```
metadata:
```

```
  name: denyreviewsv3request
```

```
spec:
```

```
---
```

```
apiVersion: "config.istio.io/v1alpha2"
```

```
kind: rule
```

```
metadata:
```

```
  name: denyreviewsv3
```

```
spec:
```

```
  match: source.labels["layer"]=="inner" && destination.labels["layer"] == "outer"
```

```
  actions:
```

```
  - handler: denyreviewsv3handler.denier
```

```
    instances: [ denyreviewsv3request.checknothing ]
```

Security: Egress

```
apiVersion: networking.istio.io/v1alpha3
```

```
kind: ExternalService
```

```
metadata:
```

```
  name: google-ext
```

```
spec:
```

```
  hosts:
```

```
  - www.google.com
```

```
  ports:
```

```
  - number: 443
```

```
    name: https
```

```
    protocol: http
```

```
---
```

```
apiVersion: networking.istio.io/v1alpha3
```

```
kind: DestinationRule
```

```
metadata:
```

```
  name: google-ext
```

```
spec:
```

```
  name: www.google.com
```

```
  trafficPolicy:
```

```
    tls:
```

```
      mode: SIMPLE # initiates HTTPS when talking to www.google.com
```

Resiliency: Circuit Breaker

```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: httpbin
spec:
  name: httpbin
  trafficPolicy:
    connectionPool:
      tcp:
        maxConnections: 100
      http:
        http1MaxPendingRequests: 1
        maxRequestsPerConnection: 1
    outlierDetection:
      http:
        consecutiveErrors: 1
        interval: 1s
        baseEjectionTime: 3m
        maxEjectionPercent: 100
```

Resiliency: Latency Injection

```
apiVersion: config.istio.io/v1alpha2
```

```
kind: RouteRule
```

```
metadata:
```

```
  name: ratings-delay
```

```
spec:
```

```
  destination:
```

```
    name: reviews
```

```
  route:
```

```
  - labels:
```

```
    version: v1
```

```
  httpFault:
```

```
    delay:
```

```
      percent: 10
```

```
      fixedDelay: 5s
```

Resiliency: Error Injection

```
apiVersion: config.istio.io/v1alpha2
kind: RouteRule
metadata:
  name: ratings-abort
spec:
  destination:
    name: ratings
  route:
  - labels:
      version: v1
  httpFault:
    abort:
      percent: 10
      httpStatus: 400
```

[https://github.com/
adersberger/istio-by-
example](https://github.com/adersberger/istio-by-example)

Thank you!



josef.adersberger@qaware.de



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