



# Continuous delivery while migrating to Kubernetes

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# Agenda

FINN Infrastructure History

Kubernetes at FINN

Finn Infrastructure As A Service

Migration of Applications

Conclusions and Questions

# What is FINN

Marketplace

Cars, real estate,  
bits-and-pieces, travel, jobs

Norway's second largest  
website

Part of Schibsted





120 developers

350 microservices

1200 deployments pr week

6 minutes (median) from  
push to deploy

The screenshot shows the FINN website homepage. At the top, there is a navigation bar with the FINN logo, the text "Mulighetenes marked", and several utility icons: a lightning bolt with a "5" (Varslinger), a plus sign (Ny annonse), a speech bubble (Meldinger), and a user profile (Min FINN). Below the navigation bar is a search bar with the placeholder text "Søk etter drill, dusk eller FINN-kode". The main content area is a grid of 16 icons representing different categories: Eiendom, Bil, Torget, Jobb, MC, Båt, Småjobber, Reise, Oppdrag, Nyttekjøretøy, Kart, Møteplassen, and Shopping. To the right of the grid is a sidebar with "Lagrede søk" (Saved searches) and "Siste søk" (Recent searches). The "Lagrede søk" section lists several searches, and the "Siste søk" section lists the most recent ones. At the bottom of the page, there is a section titled "FINN anbefaler" (FINN recommends) featuring three property listings with images and brief descriptions.

Sikker https://www.finn.no

FINN Mulighetenes marked

Varslinger 5

Ny annonse

Meldinger

Min FINN

Søk etter drill, dusk eller FINN-kode

Eiendom Bil Torget Jobb

MC Båt Småjobber Reise

Oppdrag Nyttekjøretøy Kart Møteplassen

Shopping

Lagrede søk

'kubernetes', Jobb

Ny+bil

dyrt+og+nord

Brekkelia or Svensenga

øraker borettslag

Alle lagrede søk

Siste søk

Jobb ledig

'ullevålsveien 10', Eiendom

'kubernetes', Jobb

'esmart systems', Jobb

Systemarkitekt, Utvikler (generell), Oslo+Lille...

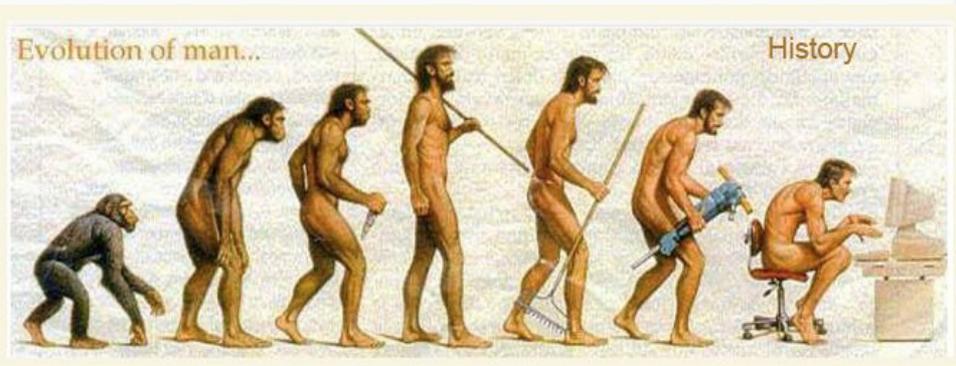
Tøm lista

FINN anbefaler

Kringsjå - Lys og moderne 3-roms hjørn..  
5 900 000,- Oslo

DISEN / GREFSEN - Idyllisk og flott ha..  
7 500 000,- Oslo

Torshov - Lys og flott 3-r hjørneleil. Attr..  
4 500 000,- Oslo



## FINN Infrastructure History

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## **Services**

3 → 350

## **Virtual Machines**

10s → 100s

## **Developers**

40 → 130

## **Deployments**

1/week → 1000/week



We have outgrown our infrastructure and deployment system





**Scheduling:** Where should my container run?

**Lifecycle and health:** Keep the container running despite failures

**Discovery:** Where is my container now?

**Monitoring:** What is happening with my container?

**Auth{n,z}:** Who can do what with my container?

**Aggregates:** Compose containers into jobs

**Scaling:** Manage variable load





FINN Infrastructure History

## **Kubernetes at FINN**

Finn Infrastructure As A Service

Migration of Applications

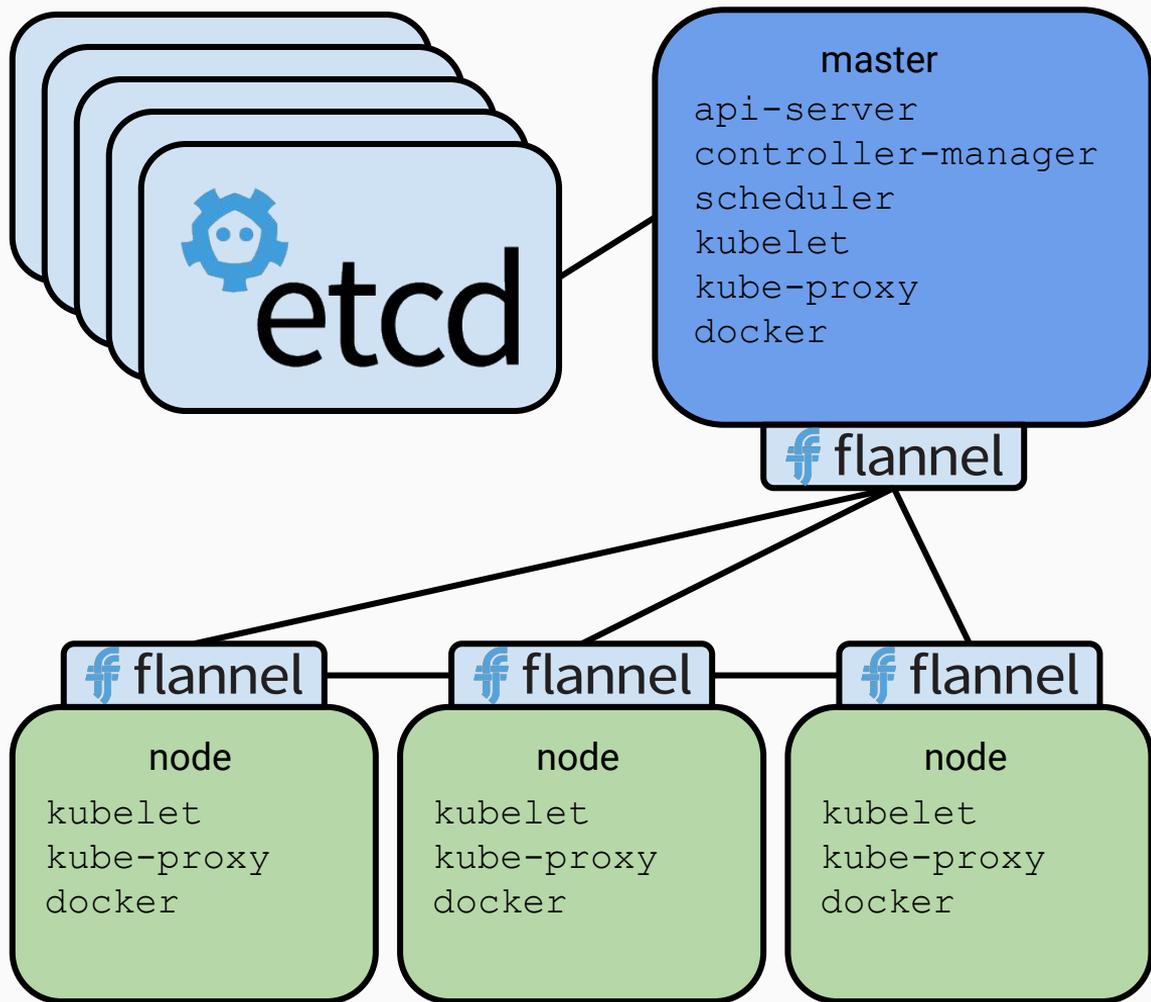
Conclusions and Questions

# On premise

The hard way before it was cool

“Private cloud” to bare metal

Google container engine



# Google Container Engine

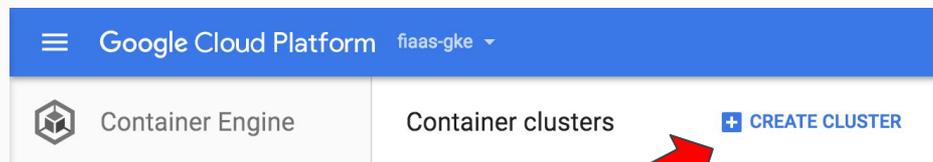
Extremely easy cluster provisioning

Less ops overhead

Might be harder to integrate with existing infrastructure

Latency

(Legal)





FINN Infrastructure History

Kubernetes at FINN

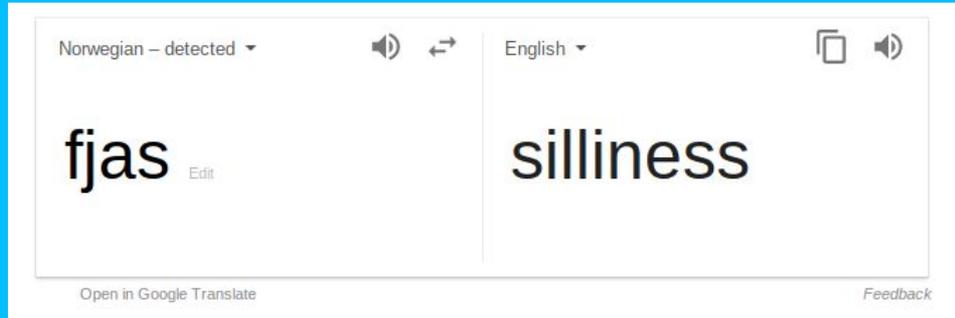
## FINN Infrastructure As A Service

Migration of Applications

Conclusions and Questions

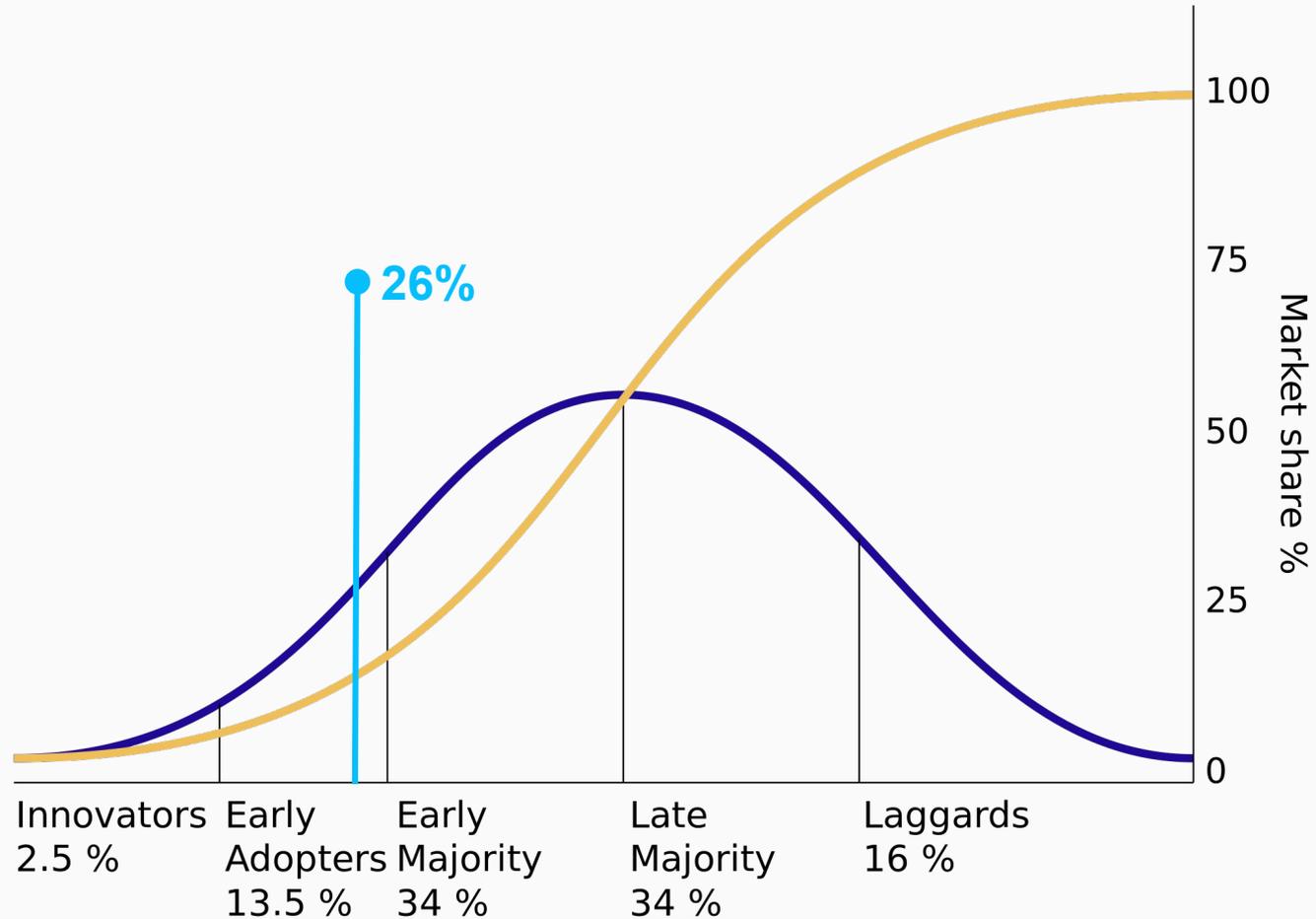
# FIAAS

*Finn Infrastructure As A Service*



# FIAAS - Solving FINN.no's problems





# Layering

## Kubernetes

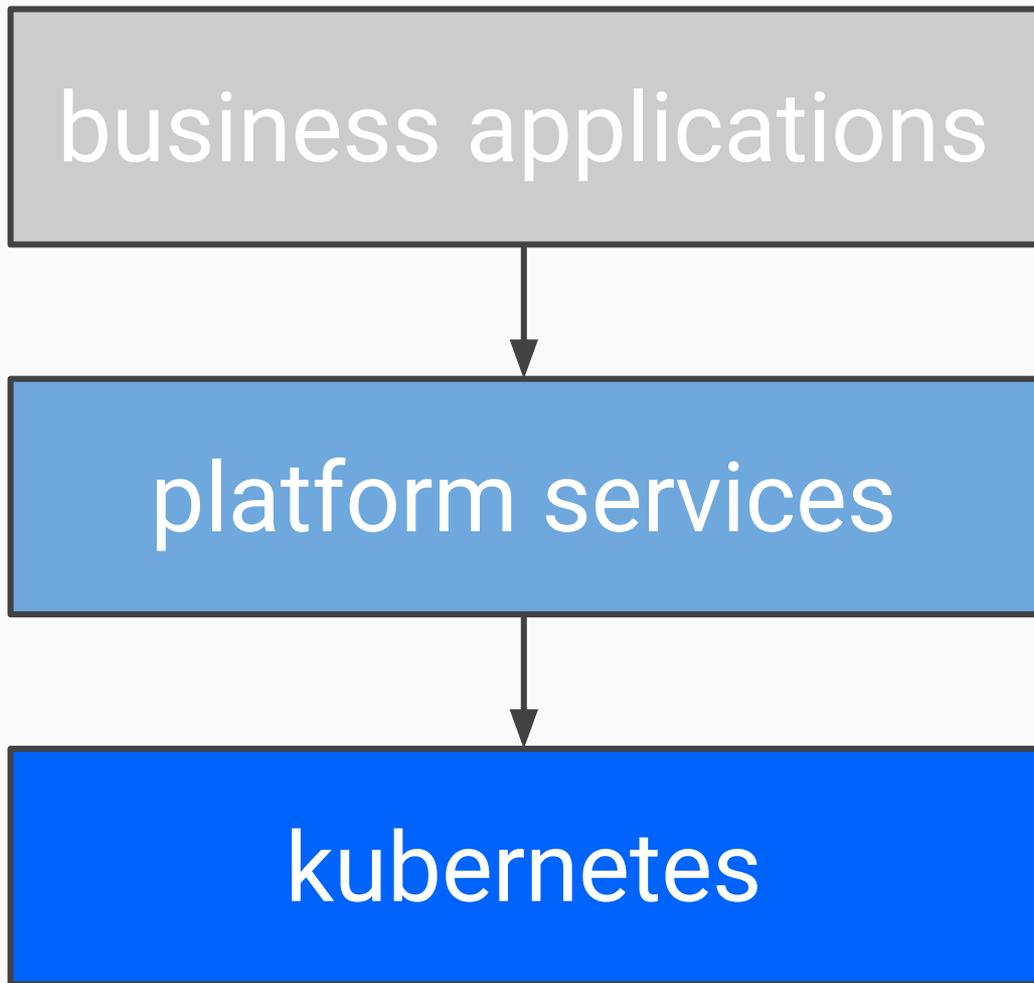
- On-premise
- Google Container Engine

## Platform Services

- Helm pipeline

## Business Applications

- FIAAS pipeline



# Contracts

app-config

deployment

metrics

logs

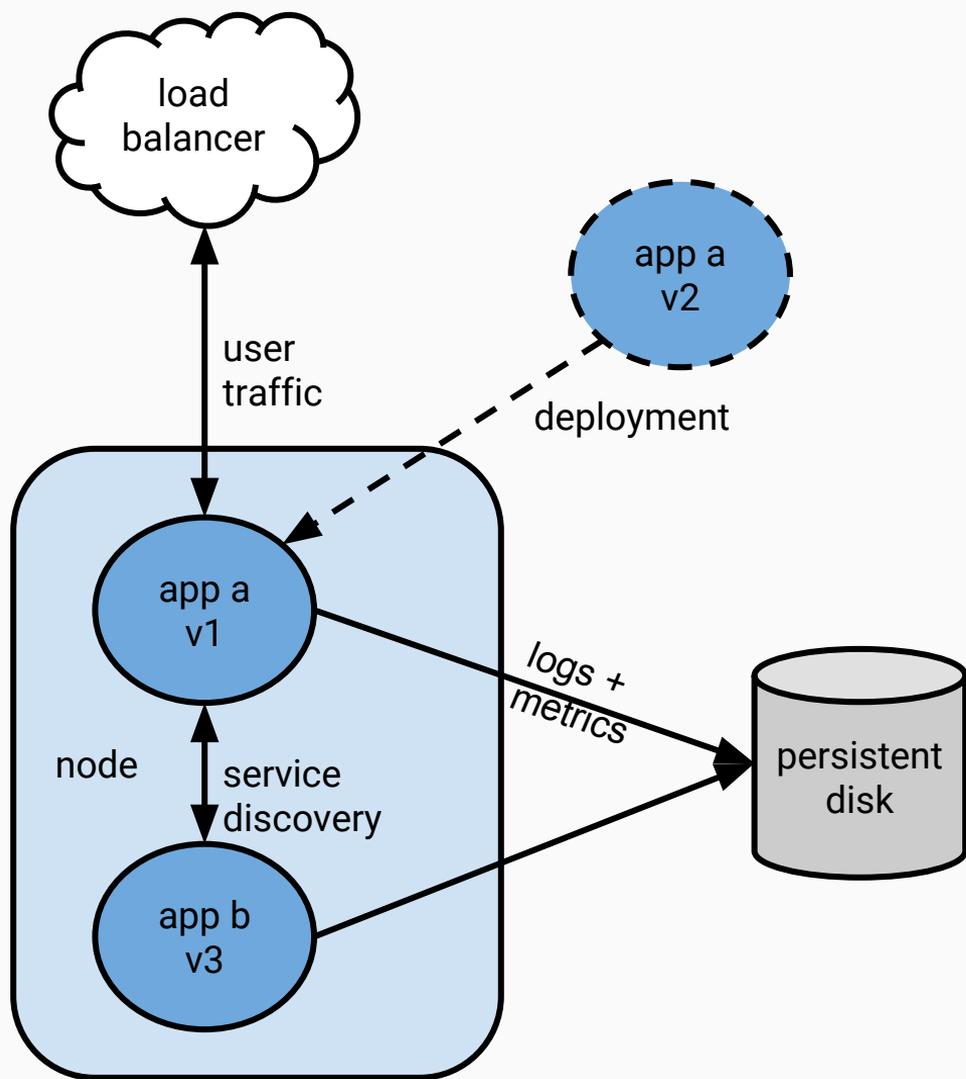
load balancing

service discovery

scaling

secrets

healthchecks



# Kubernetes manifests vs. fiaas.yaml

147 loc

```
---
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "81"
  generation: 168
  labels:
    app: finnlet-server
    fiaas/deployed_by: "20161013140423"
    fiaas/version:
      05m3dbc9a9u0m1ds2mlqgprsv3v
  name: finnlet-server
  namespace: default
spec:
  replicas: 10
  selector:
    matchLabels:
      app: finnlet-server
  strategy:
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 1
    type: RollingUpdate
  template:
    metadata:
      annotations:
        prometheus.io/path:
          /internal-backstage/prometheus
        prometheus.io/port: http
        prometheus.io/scrape: "true"
      creationTimestamp: null
      labels:
        app: finnlet-server
        fiaas/deployed_by: "20161013140423"
        fiaas/version:
          05m3dbc9a9u0m1ds2mlqgprsv3v
      name: finnlet-server
      namespace: default
    spec:
      containers:
        - env:

```

```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "81"
  generation: 168
  labels:
    app: finnlet-server
    fiaas/deployed_by: "20161013140423"
    fiaas/version:
      05m3dbc9a9u0m1ds2mlqgprsv3v
  name: finnlet-server
  namespace: default
spec:
  replicas: 10
  selector:
    matchLabels:
      app: finnlet-server
  strategy:
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 1
    type: RollingUpdate
  template:
    metadata:
      annotations:
        prometheus.io/path: /internal-backstage/prometheus
        prometheus.io/port: http
        prometheus.io/scrape: "true"
      creationTimestamp: null
      labels:
        app: finnlet-server
        fiaas/deployed_by: "20161013140423"
        fiaas/version:
          05m3dbc9a9u0m1ds2mlqgprsv3v
      name: finnlet-server
      namespace: default
    spec:
      containers:
        - name: FINNLET_SERVER
          image: FINNLET_SERVER
          ports:
            - containerPort: 8080
          probes:
            httpGet:
              path: /internal-backstage/health/
              port: http
            tcpSocket:
              port: 8080
          livenessProbe:
            httpGet:
              path: /internal-backstage/health/
              port: http
          readinessProbe:
            httpGet:
              path: /internal-backstage/health/
              port: http
          resources:
            requests:
              memory: 1Gi
          securityContext:
            allowPrivilegeEscalation: false
            readOnlyRootFilesystem: true
            runAsUser: 1000
            seLinuxOptions:
              type: SELinux
            sysctls:
              - fs.protected_hardlinks: 1
              - fs.protected_symlinks: 1
            volumes:
              - name: FINNLET_SERVER
                type: EmptyDir
          volumeMounts:
            - name: FINNLET_SERVER
              mountPath: /var/termination.log
              subPath: cluster-ipv4
            - name: FINNLET_SERVER
              mountPath: /var/termination.log
              subPath: cluster-ipv6
            - name: FINNLET_SERVER
              mountPath: /var/termination.log
              subPath: service-account
            - name: FINNLET_SERVER
              mountPath: /var/termination.log
              subPath: service-account-home
            - name: FINNLET_SERVER
              mountPath: /var/termination.log
              subPath: service-account-permissions
          terminationGracePeriodSeconds: 10
      dnsPolicy: ClusterFirst
      restartPolicy: Always
      serviceAccount: fiaas-mc-access
      serviceAccountName: fiaas-mc-access
      terminationGracePeriodSeconds: 10
    status:
      observedGeneration: 168
      replicas: 10
      updatedReplicas: 10
  apiVersion: v1
  kind: Service
metadata:
  annotations:
    deployment.kubernetes.io/revision: "81"
  labels:
    app: finnlet-server
  name: finnlet-server
  namespace: default
spec:
  clusterIP: 100.100.0.0/2
  ports:
    - name: http
      port: 80
      protocol: TCP
      targetPort: 8080
  selector:
    app: finnlet-server
  type: NodePort
status:
  loadBalancer: {}
apiVersion: extensions/v1beta1
---
apiVersion: v1
kind: Ingress
metadata:
  annotations:
    ingress.kubernetes.io/rewrite-target: "false"
  labels:
    app: finnlet-server
    fiaas/deployed_by: "20161013140423"
    fiaas/version:
      05m3dbc9a9u0m1ds2mlqgprsv3v
  name: finnlet-server
  namespace: default
spec:
  rules:
    - host: finnlet-server.k8s1-prod-us1.finnlet.com
      http:
        paths:
          - backend:
              serviceName: finnlet-server
              port: 80
  tls:
    - secretName: {}

```

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```
---
version: 2
replicas: 10
ports:
  - target_port: 8080
healthchecks:
  liveness:
    http:
      path: /internal-backstage/health/
```

```
version: 2
replicas: 10
ports:
  - target_port: 8080
healthchecks:
  liveness:
    http:
      path: /internal-backstage/health/
      port: 8080
```

The contract between applications and infra  
More flexibility in changing underlying infra  
Convention over configuration  
Smart defaults in code - not templates

# Deployment

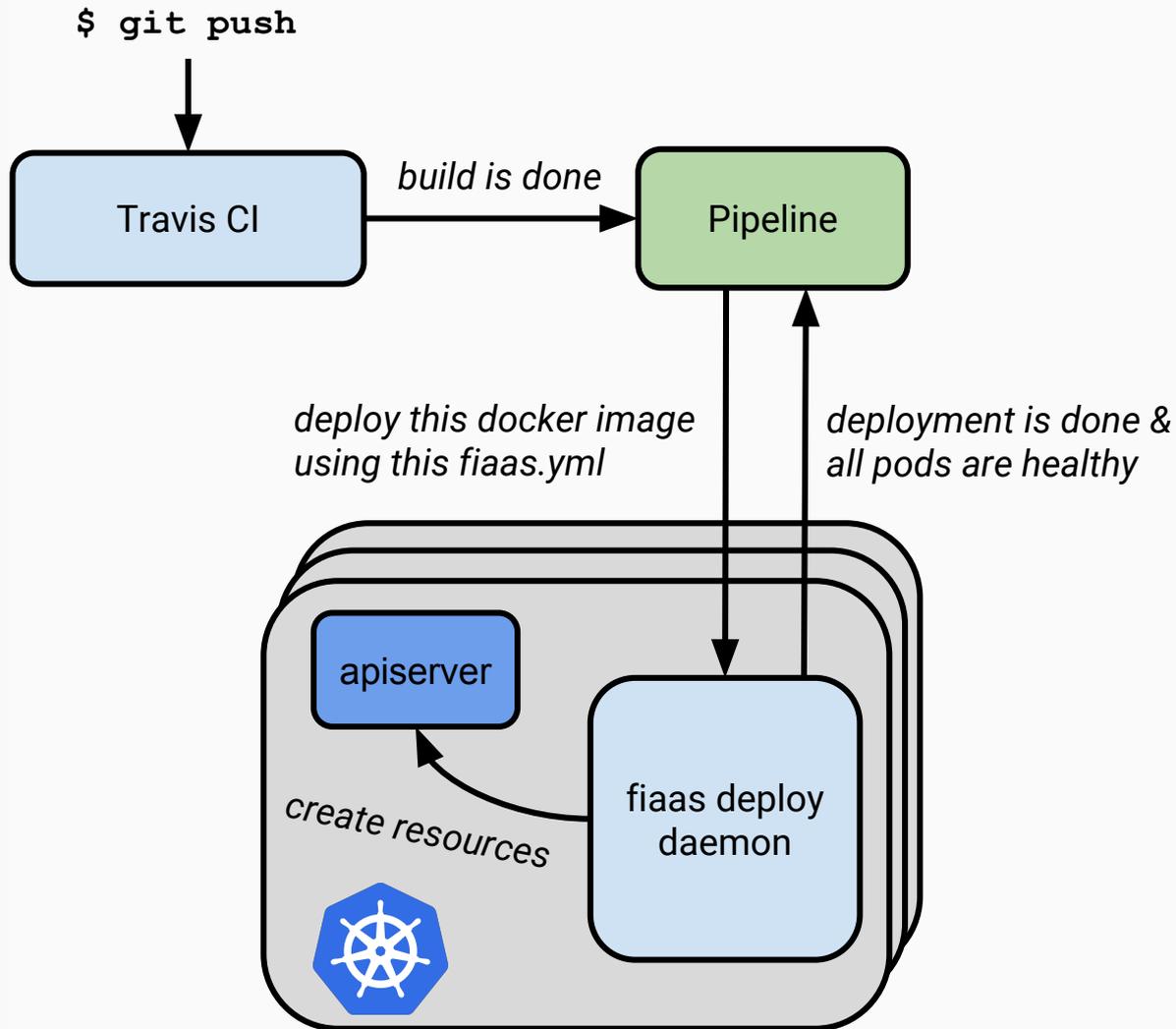
## Deployable

- config file: `fiaas.yaml`
- image: `$team/$app:$version`

## Fiaas deploy daemon - operator

## Process

- Package deployable
- Pipeline post to kafka topic
- Deploy daemon subscribes to topic
- Deploy daemon creates k8s resources



# Observability

## Logging

- Elasticsearch
- fluentd
- Kibana

## Metrics

- Prometheus
- Grafana
- Generic app dashboard

fiass-canary





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# Adapting apps

12 factor

health checks

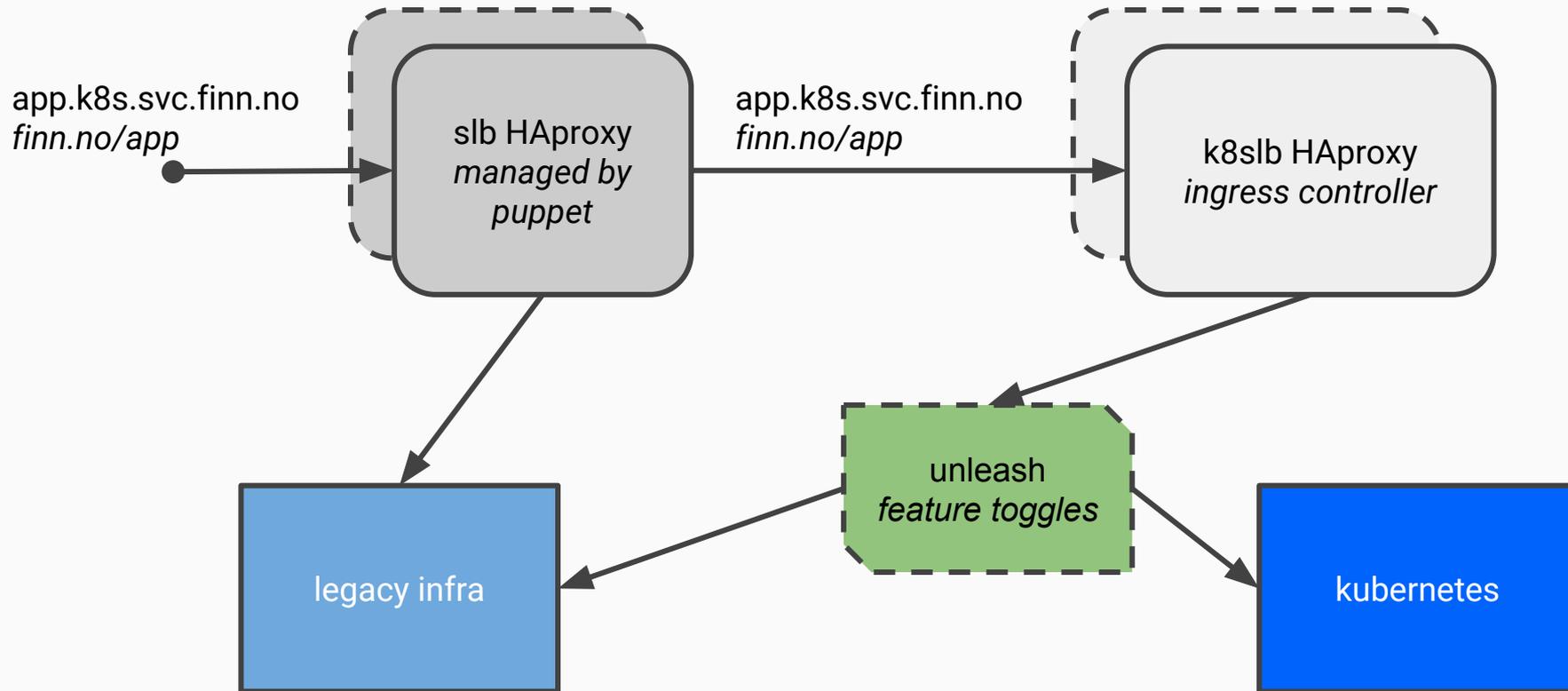
resource constraints

secrets

ingress







# Feature toggles

migrate percentages of user/client  
traffic

at the load balancer

at the client



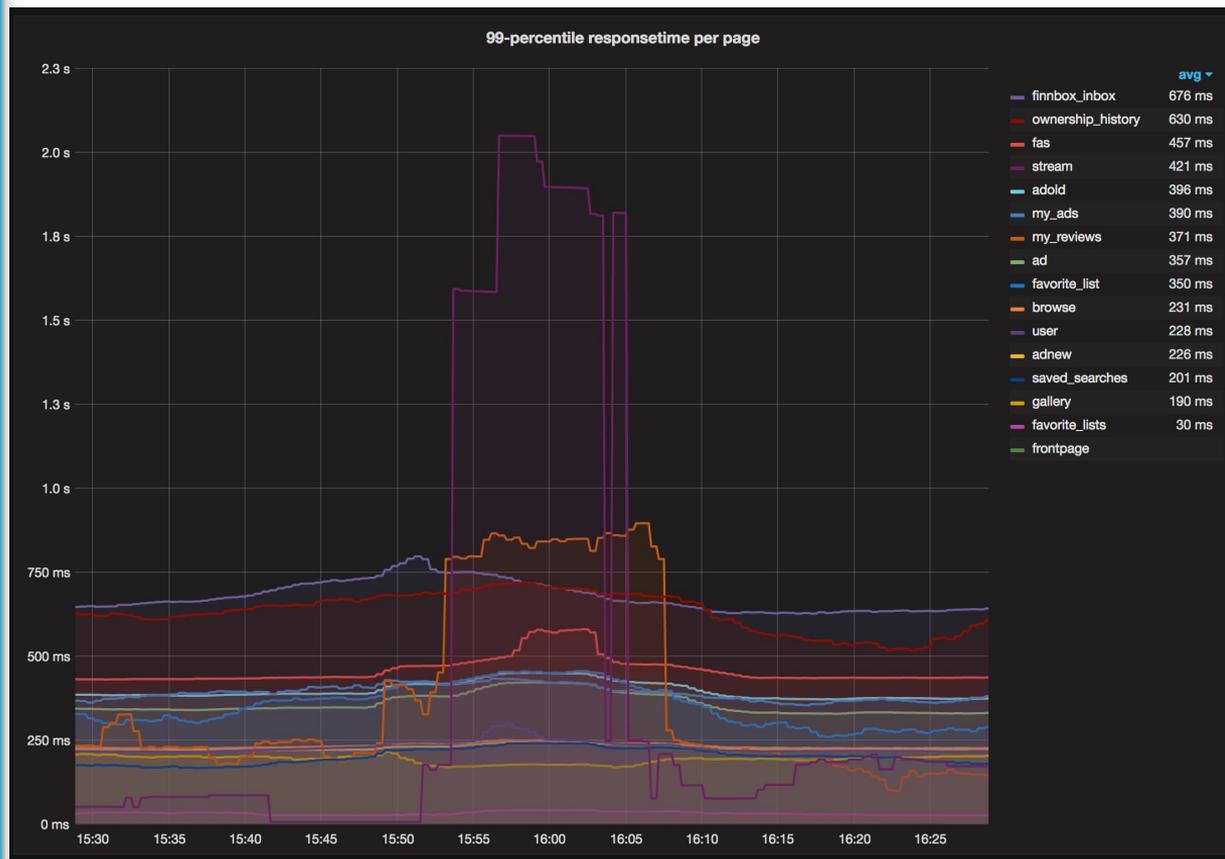
# Useful metrics

response time per call

response status per call

resource usage

app specific metrics



# Conclusions

# Questions?



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