OPENFAAS

OpenFaaS Cloud with Linkerd
(for a Secure Multi-user Serverless Platform)

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Agenda ⚡

- **OpenFaaS / Linkerd @ 10,000ft**
- **OpenFaaS Cloud (OFC)**
  - Overview & demo
  - Kubernetes multi-tenancy
  - Infrastructure vs. user-level security
- **Future work**

📸 @openfaas @linkerd

OpenFaaS – Secure, Simple, Serverless

- Founded 2016
- Values
  - Developers-first
  - Operator-friendly
  - Community-centric
- Hosted by OpenFaaS Ltd

19.6k stars
250 contributors
2k Slack

Serverless 1.0 (Cloud Functions/FaaS)

Workload	Node.js Function	Node.js Function	Node.js Microservice
Packaging	Zip File	Zip File	?
Platform	AWS Lambda	Google Cloud Functions	?
Infrastructure	AWS	GCP	Enterprise

OpenFaaS (Serverless 2.0)

Any code
Build both microservices & functions in any language. Legacy code and binaries.

Anywhere
Avoid lock-in through the use of Docker. Run on any public or private cloud.

Any scale
Auto-scale for demand or to zero when idle.

Add...

OpenFaaS: template system

stack.yml

```yaml
functions:
  hello-fn:
    lang: node10-express
    handler: ./hello-fn
    image: hello-fn:latest
```

handler.js

```javascript
module.exports = (event, context) => {
    context.status(200).succeed("Hello world");
}
```

- Memory / CPU limits
- Labels / Annotations

- Environment variables
- Secrets

OpenFaaS: Dockerfile is fair game

```
FROM ruby:2.4-alpine3.6
WORKDIR /home/app
COPY     .    .
RUN bundle install
RUN addgroup -S app \
  && adduser app -S -G app
RUN chown app:app -R /home/app
WORKDIR /home/app

USER app
CMD ["ruby", "main.rb"]
```

OpenFaaS Users

BULLET PROOF   BT   CITRIX®   CONTIAMO   Dim Solution.   DRAGONCHAIN

DX   FORM3 FINANCIAL CLOUD   GalaxyCard   GMO INTERNET GROUP   iconscout   InfoTech Partners

intility   INTRAFFIC mastering mobility   KW COMMERCE   LIVEPERSON   MoneyLion   NAAMIO

NEXY LAN HOSTING ARCHITECT   packet   PENTIUM   PA   Podkite   Scaleway

SEFIN Governo do Estado de Rondônia Secretaria de Estado de Finanças   TRANSMUTE   traversals   UNIVERSITY OF CALGARY   Ustore   UNIVERSITY of WASHINGTON

VIRALITY   VISION Banco   WIRELINE   Ytel   *Linkerd optional*

Linkerd

- Only Service Mesh in CNCF
- <60s install - Go & Rust

- Actionable metrics
- Loved by engineers
- Deep runtime diagnostics

CNCF Incubating

Why Linkerd?

- Lightweight, easy-to-use

- Traffic-splitting
- Mutual TLS
- Dashboard

Linkerd's Dashboard
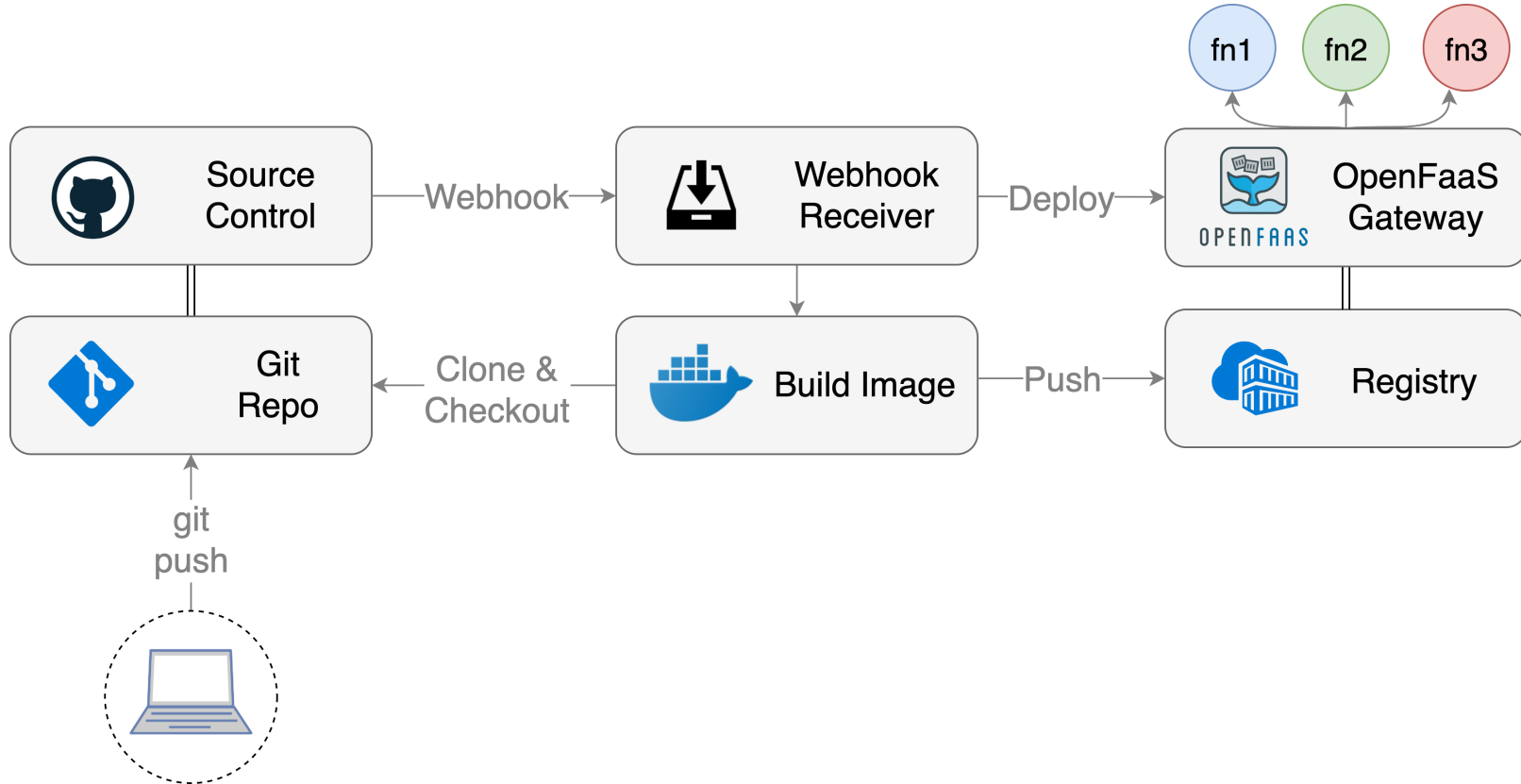
OpenFaaS vs. OpenFaaS Cloud

vs.

Multi-user PaaS for Kubernetes managed by git

OpenFaaS Cloud – conceptual overview

OFC Features

- Automated CI/CD
- GitHub/GitLab
- Runtime secrets
- Dashboard
- OAuth
- Logs

Secure, free & OSS

Demo - Community Cluster

Demo - Community Cluster

Cinema & venue management platform

A modern, all-in-one platform to manage ticketing, concessions, reporting and marketing for your cinema or venue.

Case-study: Good First Issue Bot

OpenFaaS Cloud – Webhooks
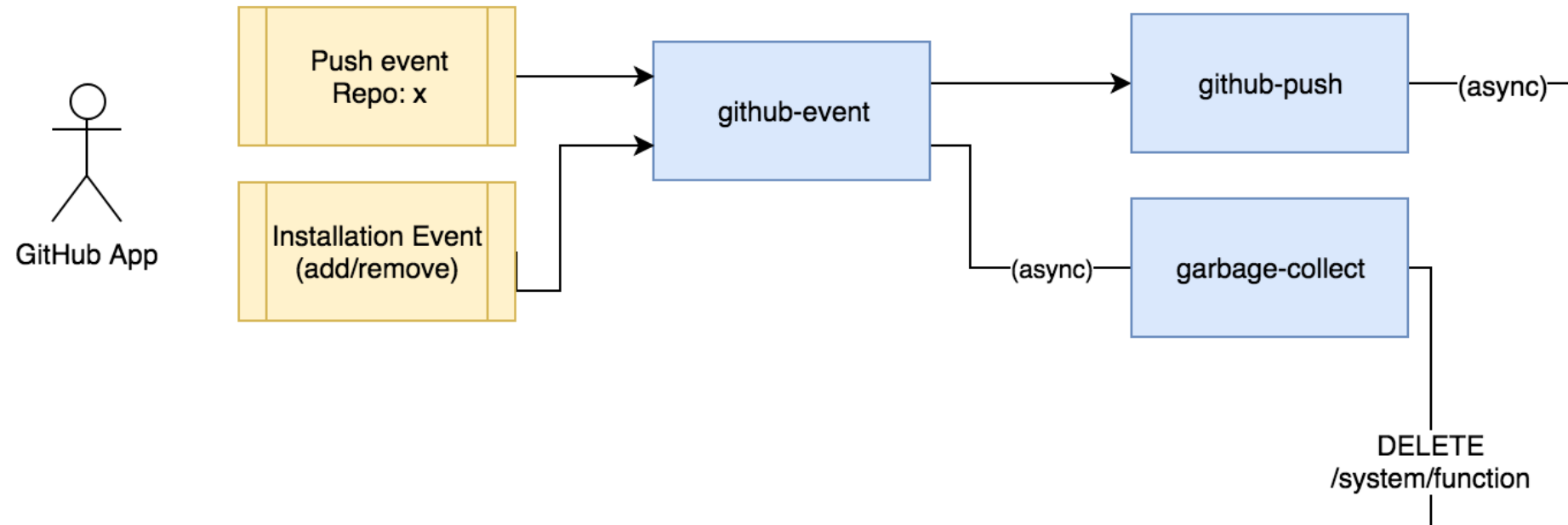
OpenFaaS Cloud – CI/CD pipeline
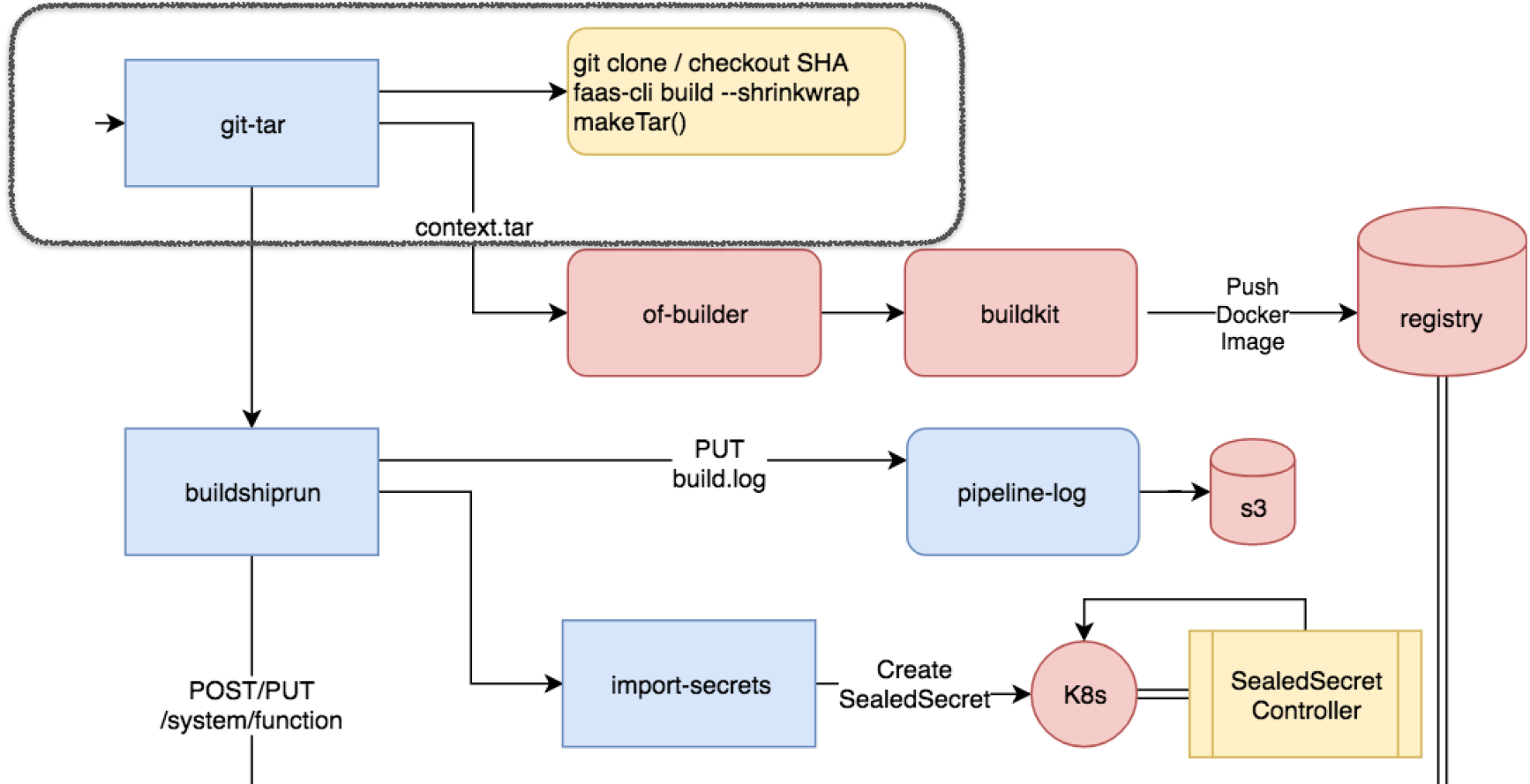
OpenFaaS Cloud – CI/CD pipeline
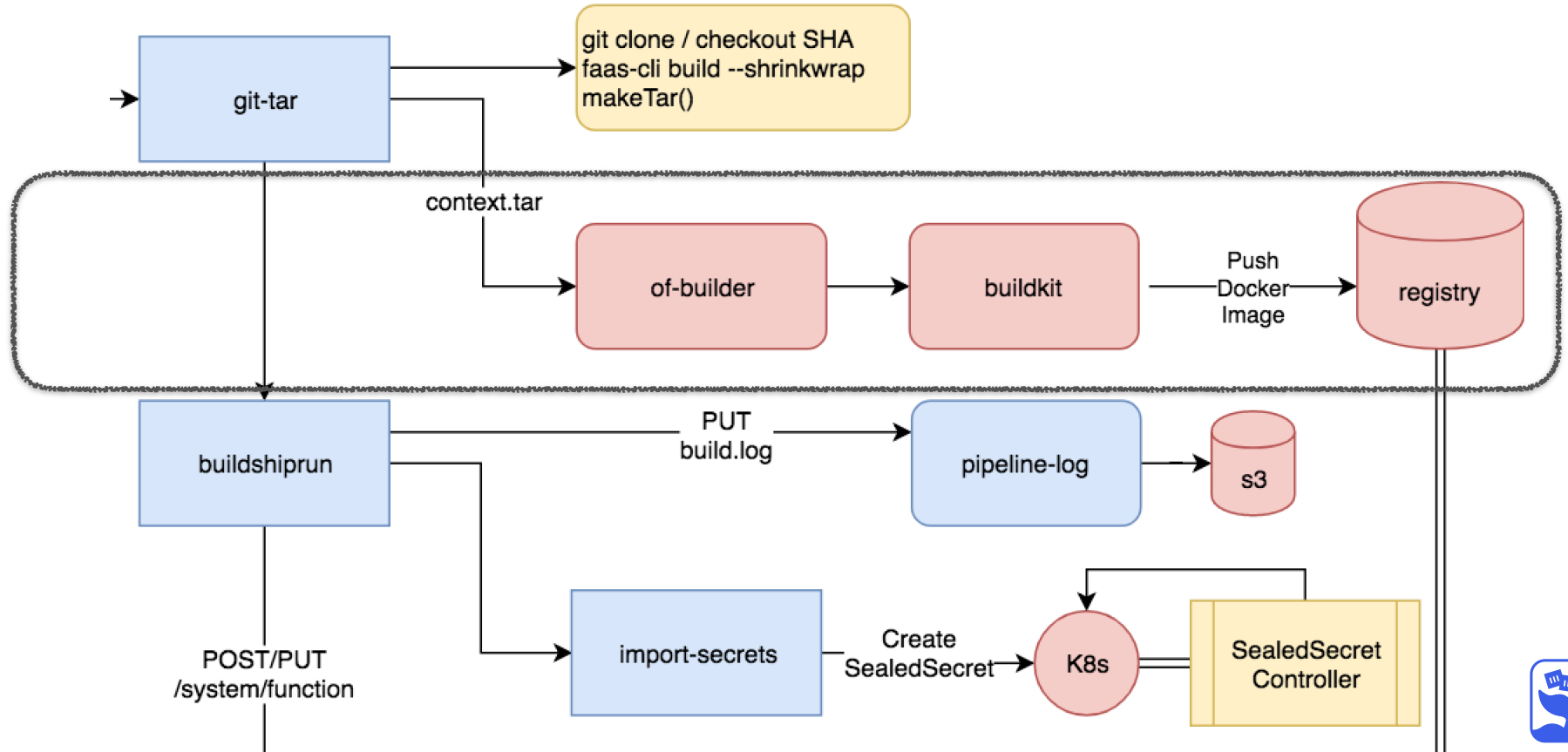
OpenFaaS Cloud – CI/CD pipeline
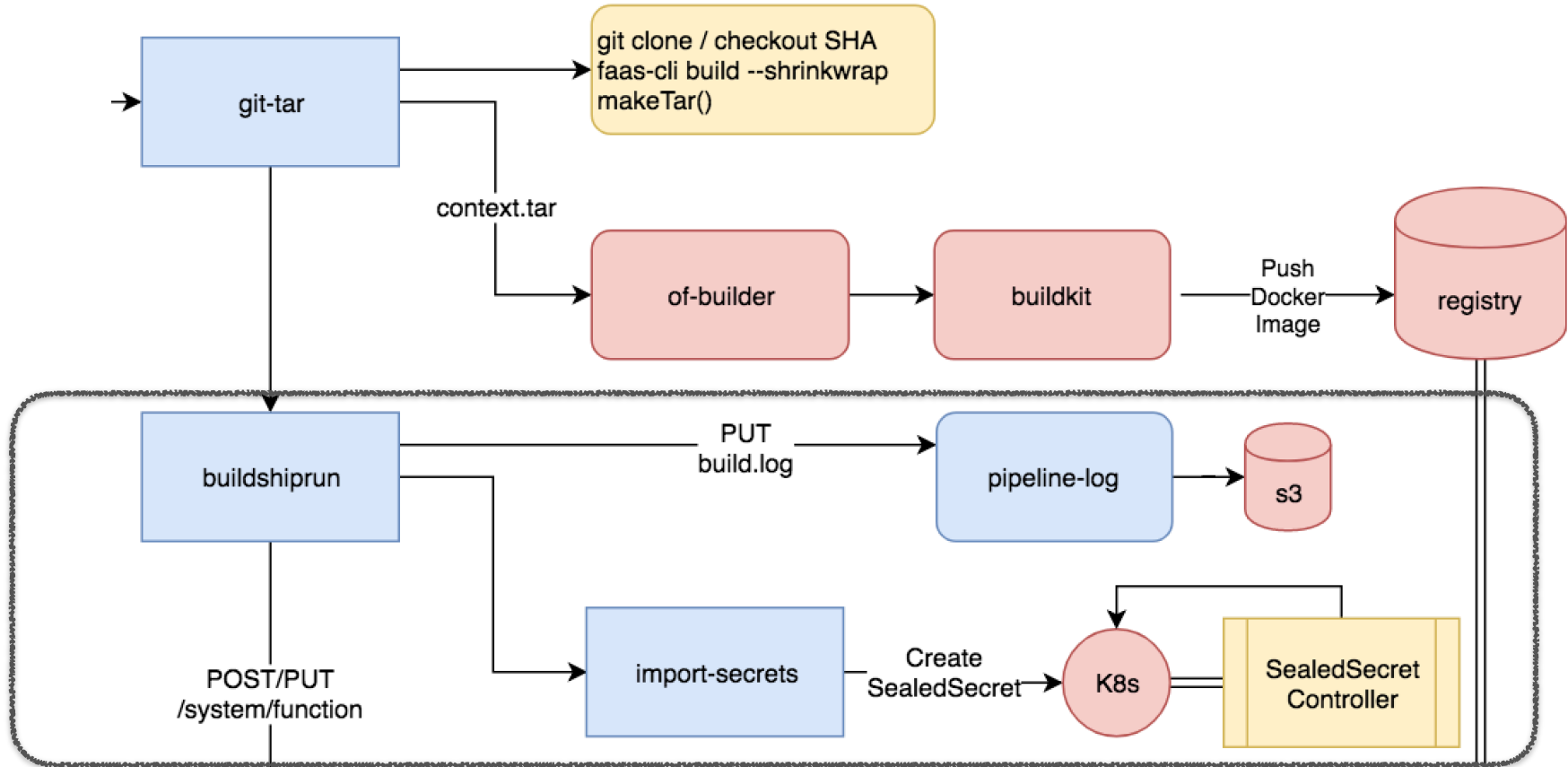
OpenFaaS Cloud – Dashboard
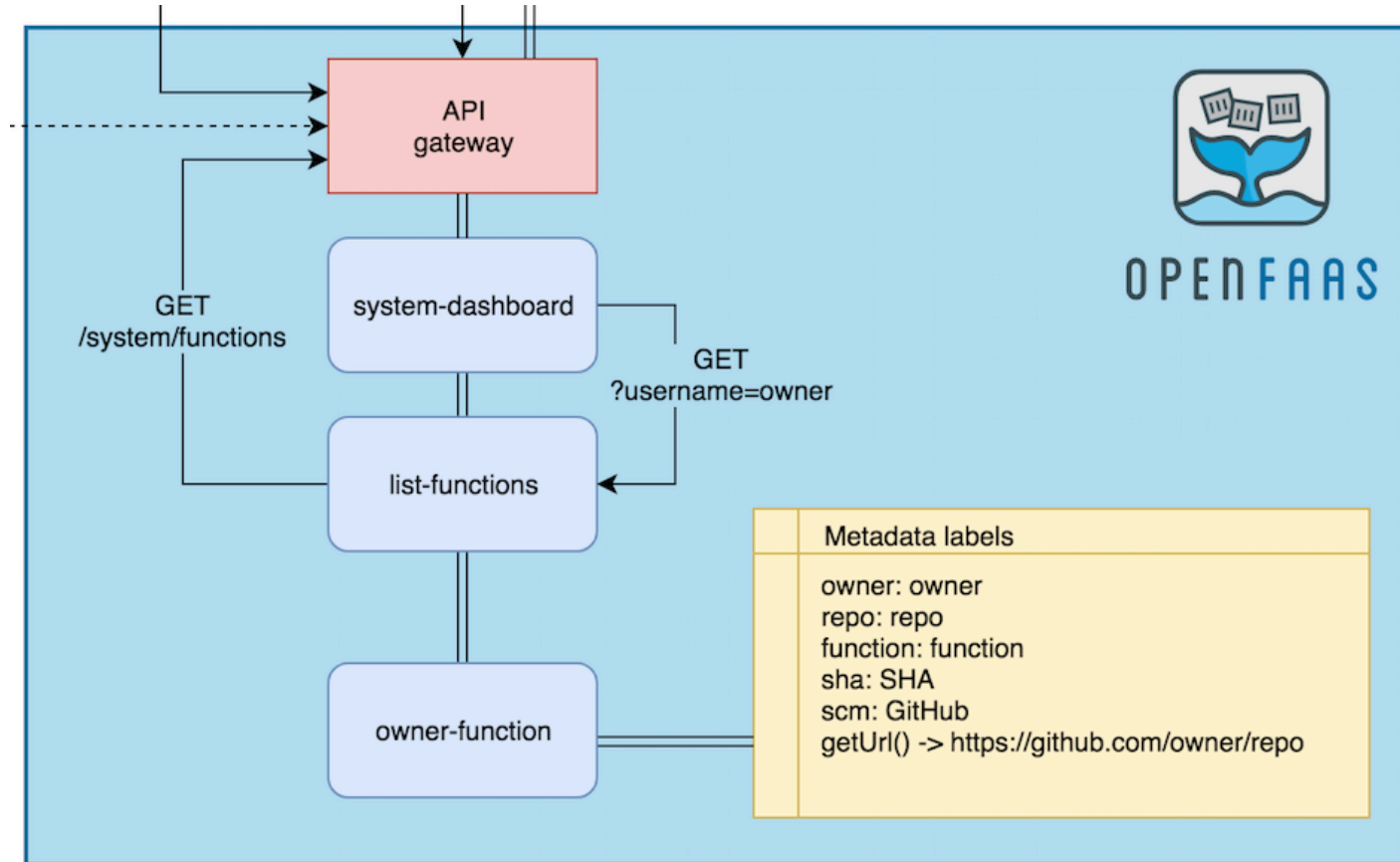
Confidential configuration - SealedSecrets

```
access_key=1234
secret_key=abcd
```

Seal()

```
secrets.yml

access_key=Ydx==
secret_key=E2Dvv==
```

Unseal()

```
access_key=1234
```

```
secret_key=abcd
```
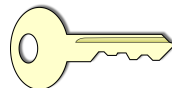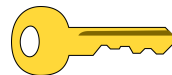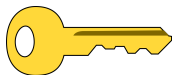
Public/private key

Kubernetes isolation

- CPU/memory limits
- Namespaces
  - Quotas*
- Network Policy
- Pod Security Policy*
- Open Policy Agent*
- CRI

Security in OFC

- Read-only FS
- Non-root
- OAuth
- HMAC for webhooks
- Public TLS
- SealedSecrets
- Rate-limiting
- mTLS (Linkerd)

Linkerd debugging via CLI


```
[kosmos:github.com alex$ ~/.linkerd2/bin/linkerd edges deploy -A
SRC                                  DST                    SRC_NS         DST_NS         SECURED
nginxingress-nginx-ingress-controller  edge-router          default        openfaas       √
linkerd-controller                   linkerd-prometheus     linkerd        linkerd        √
linkerd-grafana                      linkerd-prometheus     linkerd        linkerd        √
audit-event                          gateway                openfaas-fn    openfaas       √
buildshiprun                         gateway                openfaas-fn    openfaas       √
buildshiprun                         of-builder             openfaas-fn    openfaas       √
garbage-collect                      gateway                openfaas-fn    openfaas       √
git-tar                              gateway                openfaas-fn    openfaas       √
github-push                          gateway                openfaas-fn    openfaas       √
list-functions                       gateway                openfaas-fn    openfaas       √
pipeline-log                         cloud-minio            openfaas-fn    openfaas       √
system-dashboard                     gateway                openfaas-fn    openfaas       √
system-github-event                  gateway                openfaas-fn    openfaas       √
gateway                              alexellis-run-on-k8s   openfaas       openfaas-fn    √
gateway                              list-functions         openfaas       openfaas-fn    √
gateway                              system-dashboard       openfaas       openfaas-fn    √
alertmanager                         gateway                openfaas       openfaas       √
edge-router                          edge-auth              openfaas       openfaas       √
edge-router                          gateway                openfaas       openfaas       √
faas-idler                           gateway                openfaas       openfaas       √
faas-idler                           prometheus             openfaas       openfaas       Not Provided By Service Discovery
gateway                              basic-auth-plugin      openfaas       openfaas       √
gateway                              prometheus             openfaas       openfaas       Not Provided By Service Discovery
kosmos:github.com alex$
```
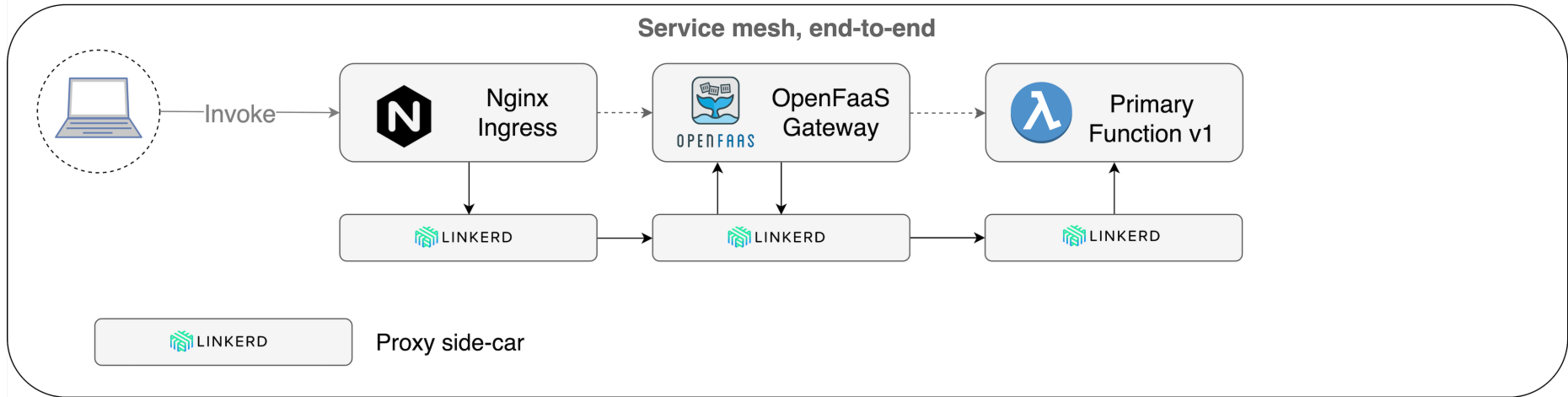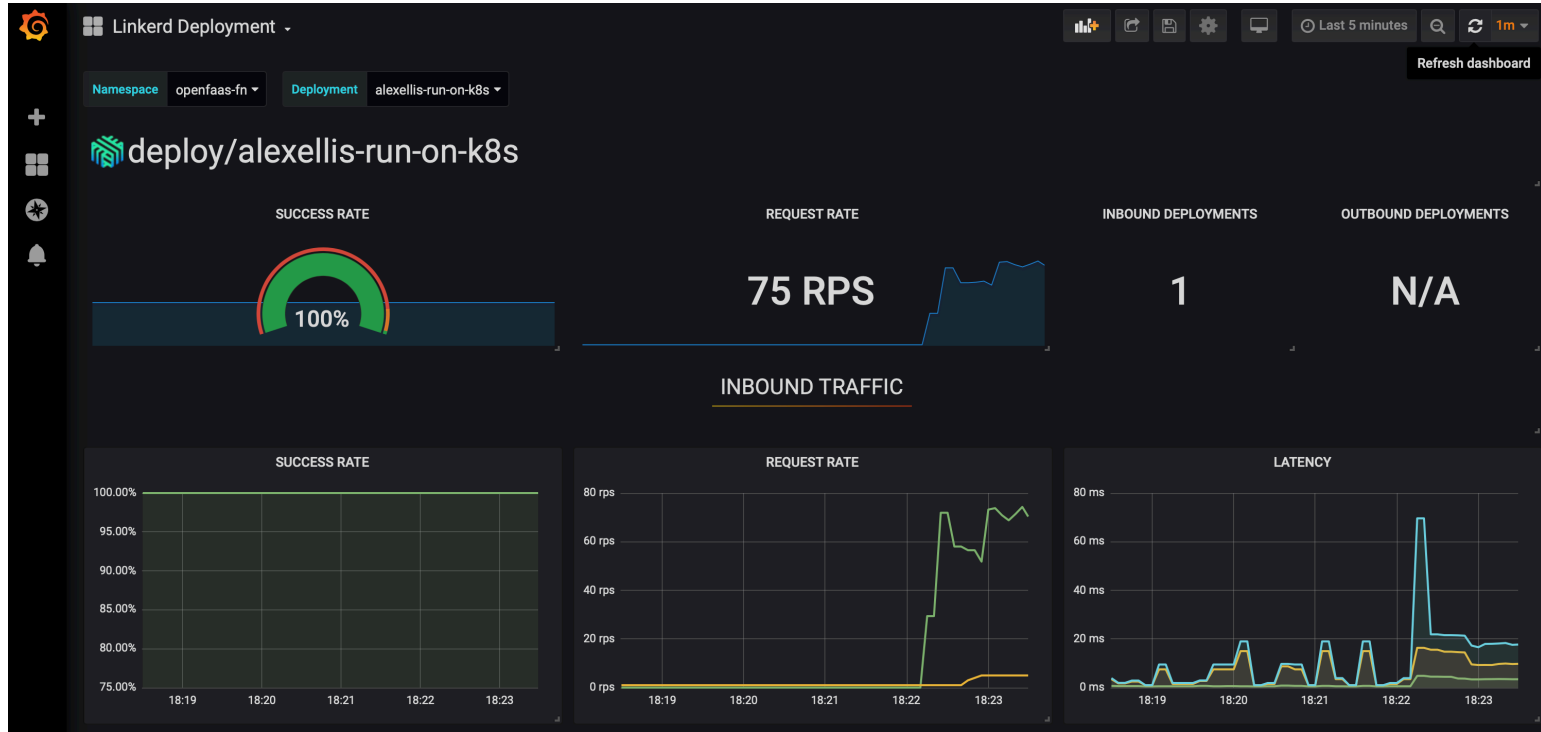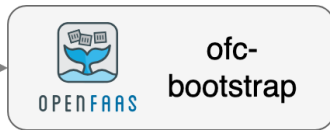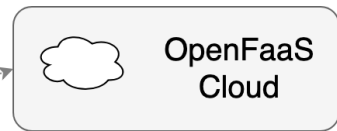
Encryption end-to-end
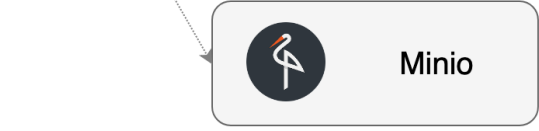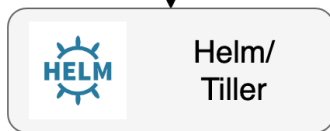
Linkerd - During auto-scaling

0 to OFC in < 100s

$ ofc-bootstrap \
 -yaml=init.yaml

Future work

- Preview branches
- Build secrets
- Quotas
- Static analysis

With Linkerd

- mTLS for TCP
- Canaries w/ SMI
- Chargeback
- Retry budget

Summing up: OpenFaaS Cloud w/ Linkerd

Automated:
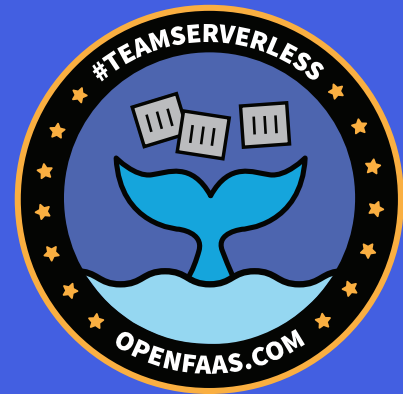
- Builds

- Security

- Management

Connect & Learn 🎬📸

- Get started
  - https://github.com/openfaas/openfaas-cloud
  - https://github.com/openfaas-incubator/openfaas-linkerd2

https://slack.openfaas.io/ 👍

https://slack.linkerd.io/

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Thank You!

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