Ease Your Ingress Management And Observability With Traefik And Maesh

Containous & Nuaware

Whoami

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- Head of Product Open Source @ Containous
- Maintainer on Traefik
- @mZapfDE
- SantoDE

Containous

https://containo.us

- We Believe in Open Source
- We Deliver Traefik, Traefik Enterprise Edition, Maesh
- Commercial Support
- 30 people distributed, 90% tech

Why Traefik

Why, Mr Anderson?

THE EVOLUTION OF

SOFTWARE ARCHITECTURE

1990's

SPAGHETTI-ORIENTED
ARCHITECTURE
(aka Copy & Paste)

2000's

LASAGNA-ORIENTED
ARCHITECTURE
(aka Layered Monolith)

2010's

RAVIOLI-ORIENTED
ARCHITECTURE
(aka Microservices)

WHAT'S NEXT?

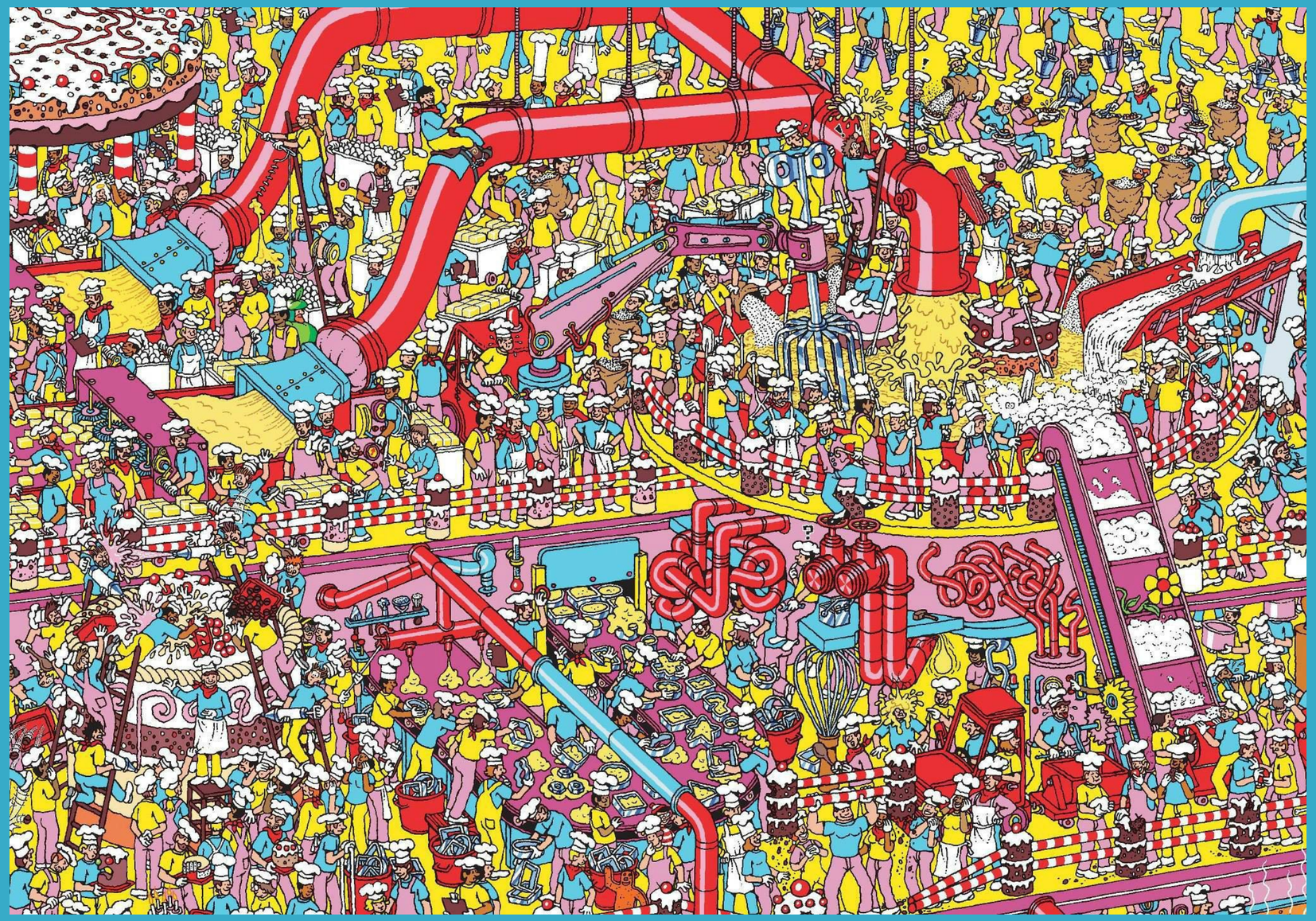
PROBABLY PIZZA-ORIENTED ARCHITECTURE

By @benorama

The Promise Of Microservices…

⋯And What Happens

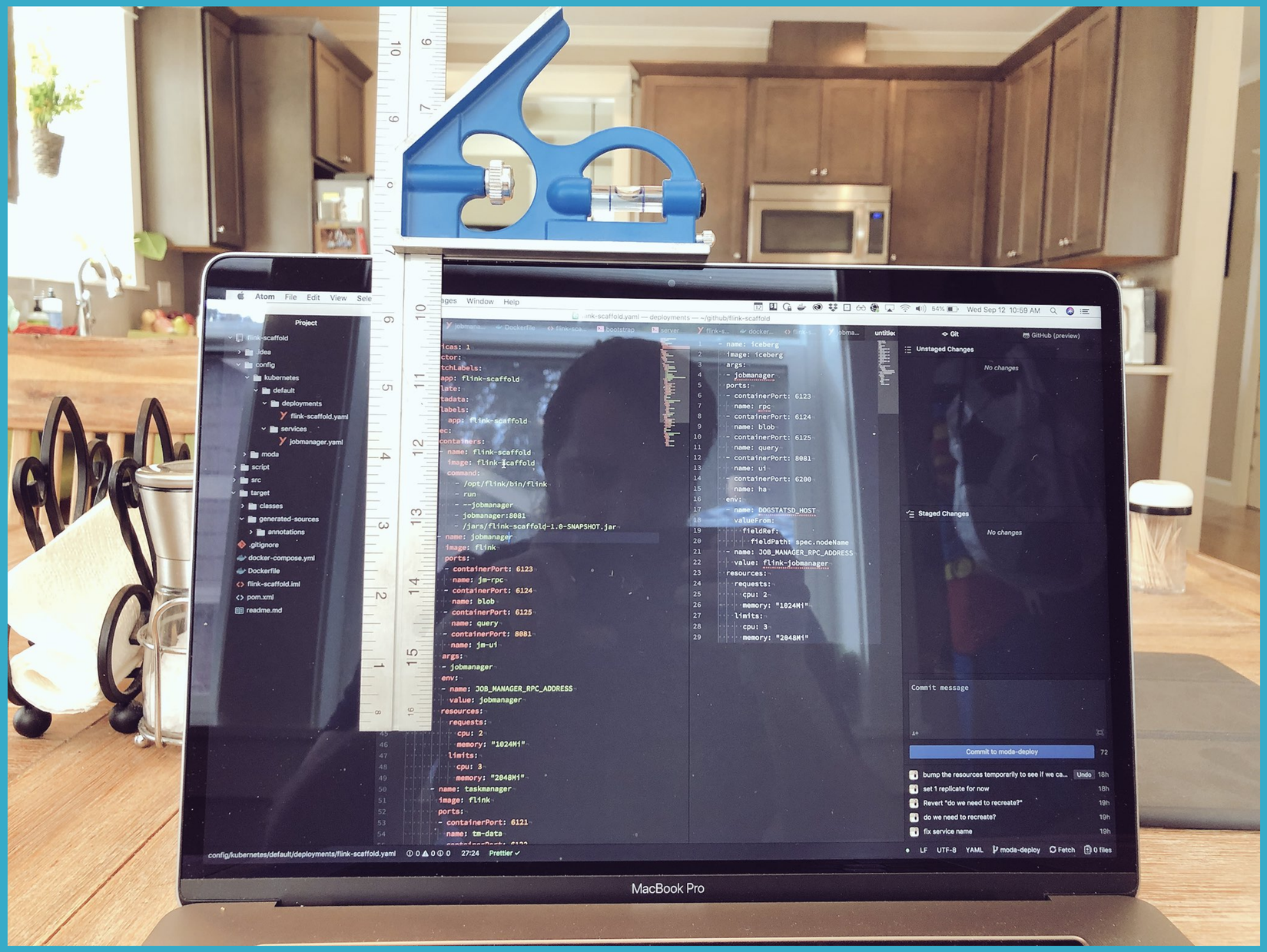
Where’s My Service?



Tools Of The Trade

Common Problems

- Repetitive Configuration
- Pure amount hard to manage
- How to handle rewrites, redirects, tls...?

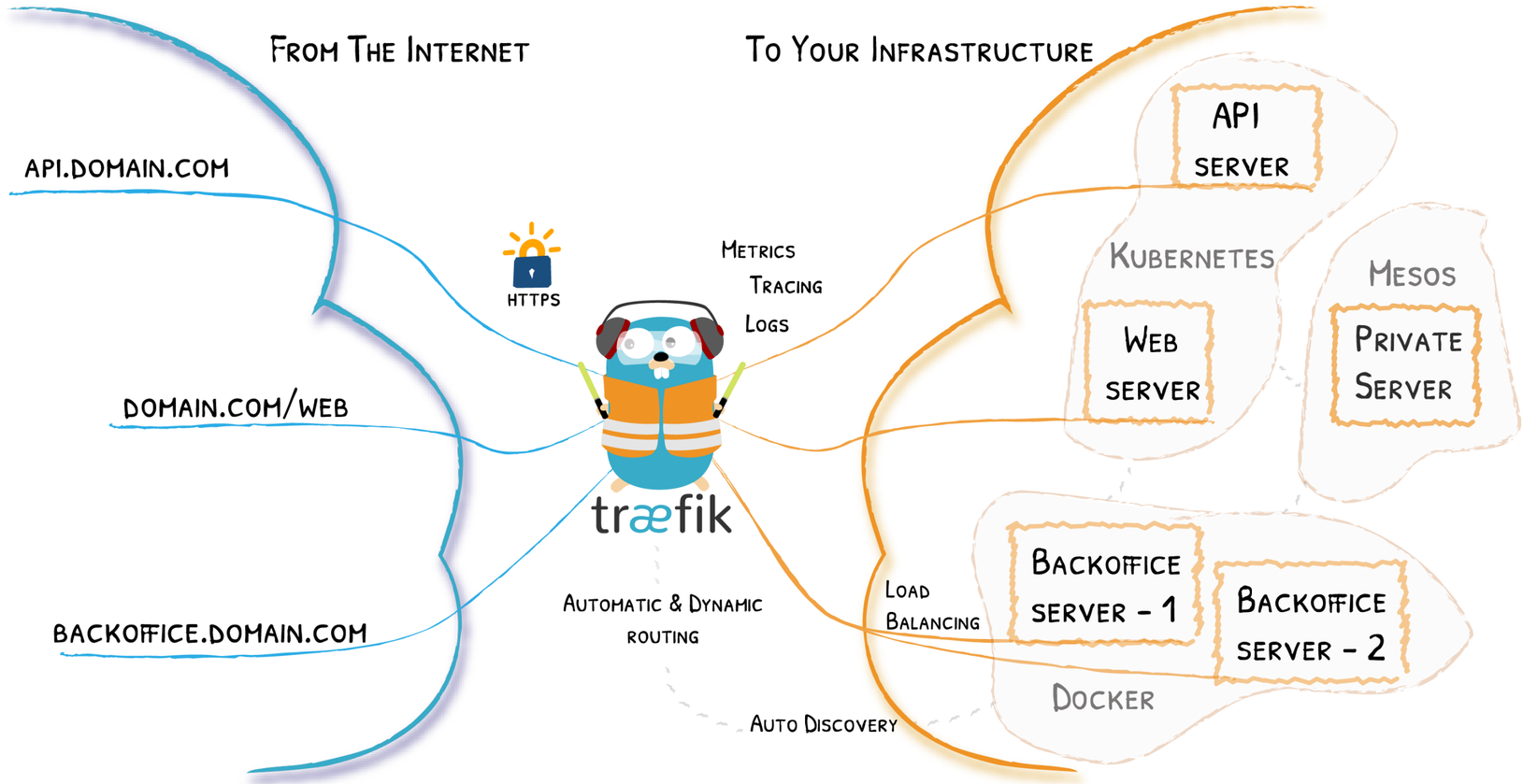


Source: https://twitter.com/Caged/status/1039937162769096704

What If I Told You?

That You Don’t Have to Write This Configuration File...?

Here Comes Traefik!



Traefik Project

27,000+
stars on GitHub

1.4 B+
downloads

450+
contributors

TOP 15
golang project

100K +
living
instances

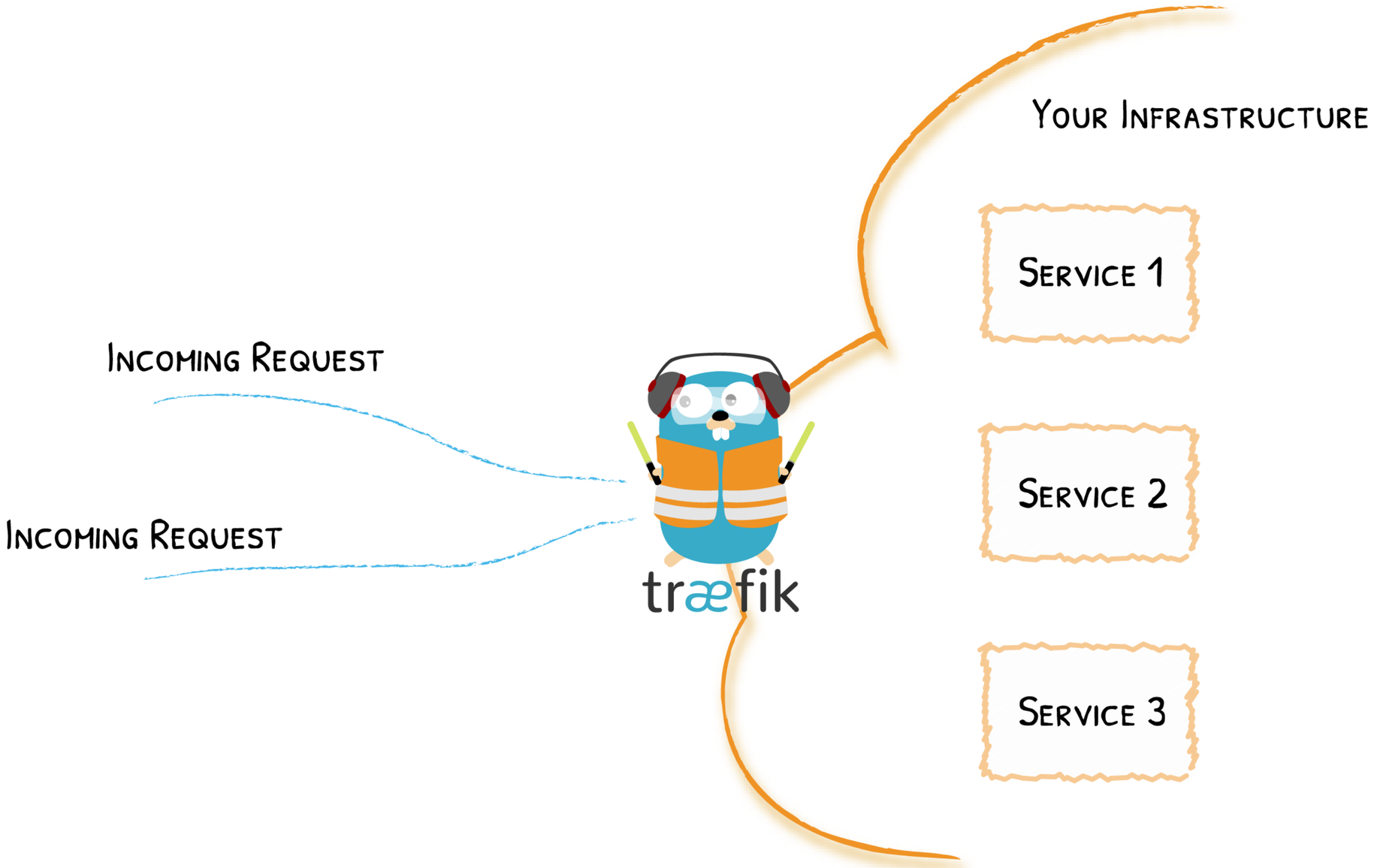
Traefik 2.0 Quick Overview

- Revamped Documentation
- Clarified Concepts
- Expressive Routing Rule Syntax
- Middlewares
- TCP Support
- Canary / Mirroring
- And so Much More...

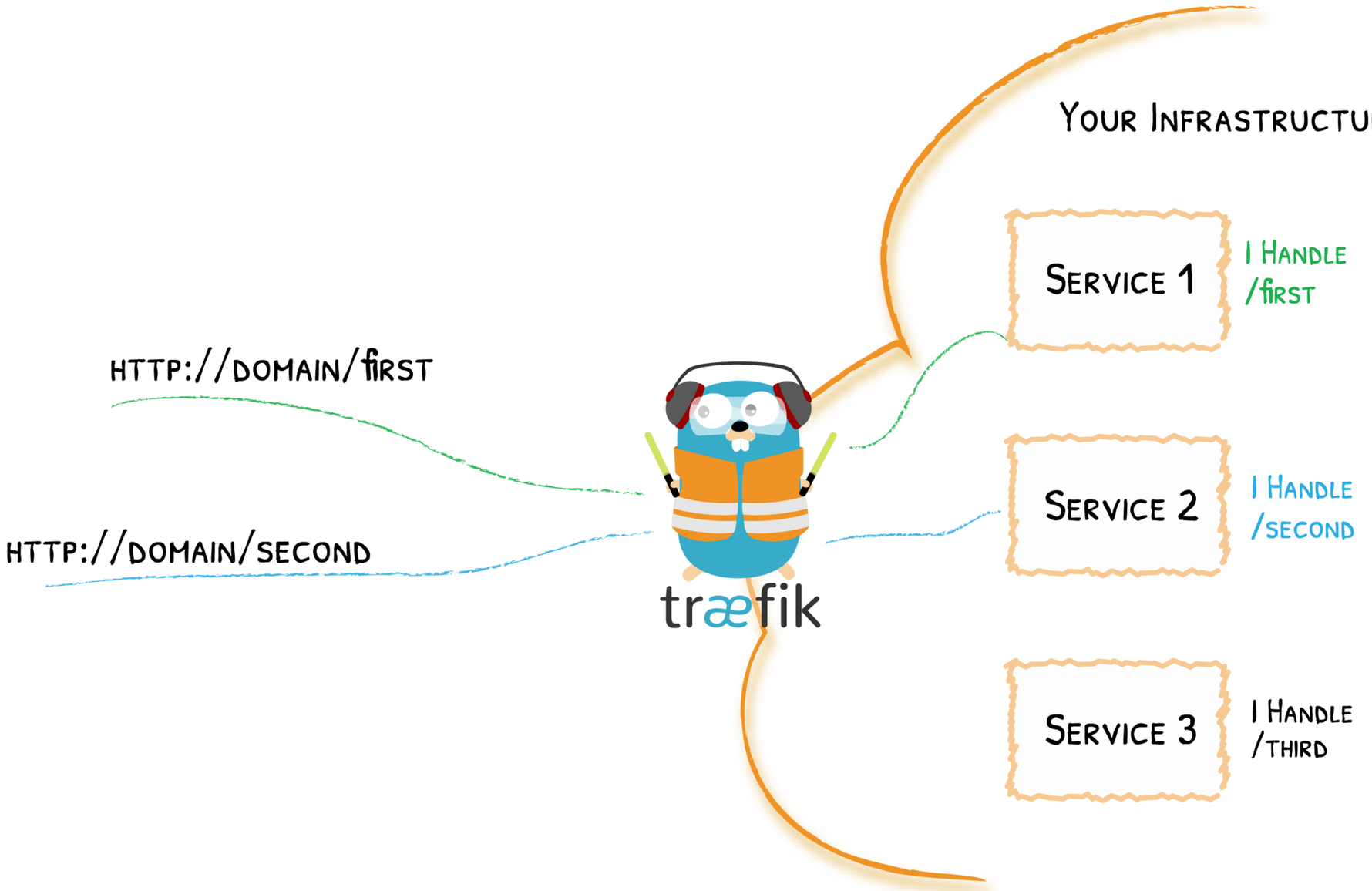
Learn more on the blog post

Traefik (V2.0) Core Concepts

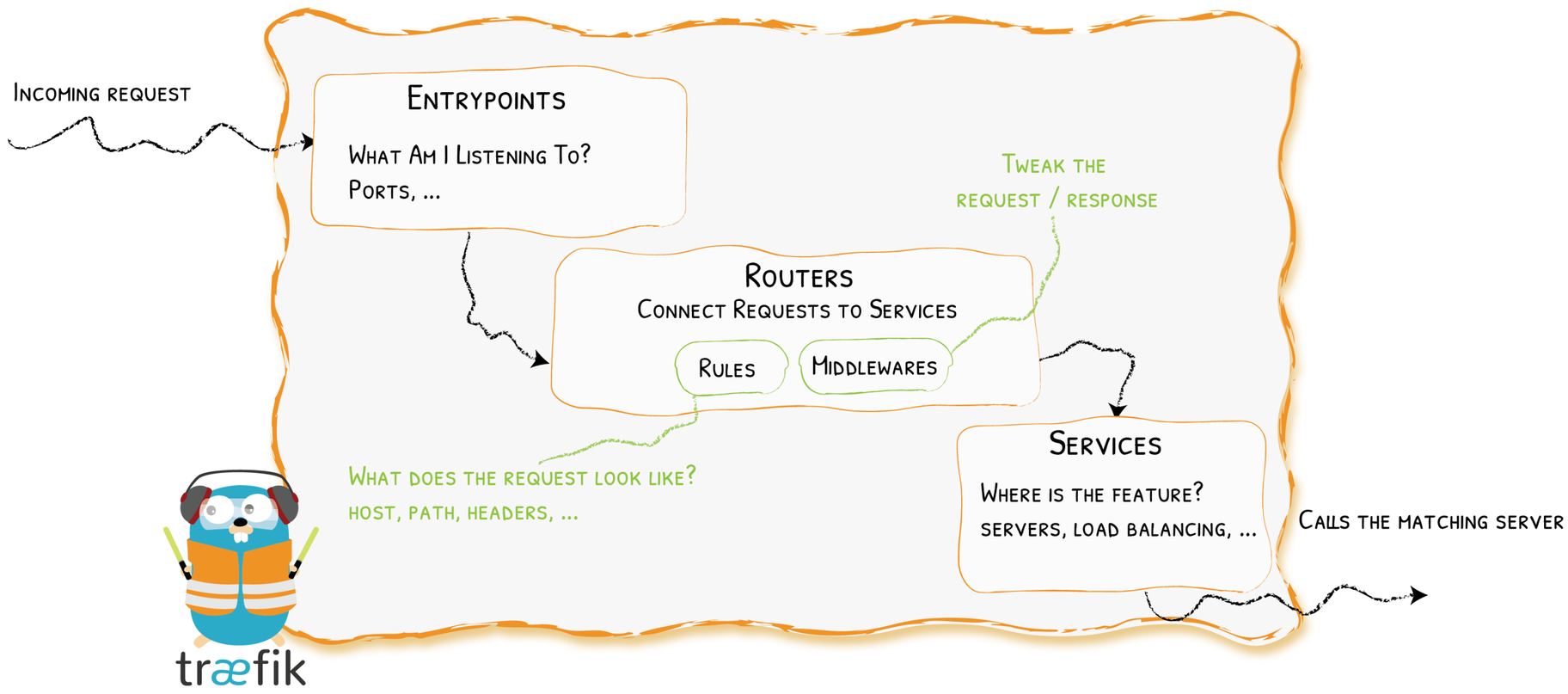
Traefik Is An Edge Router



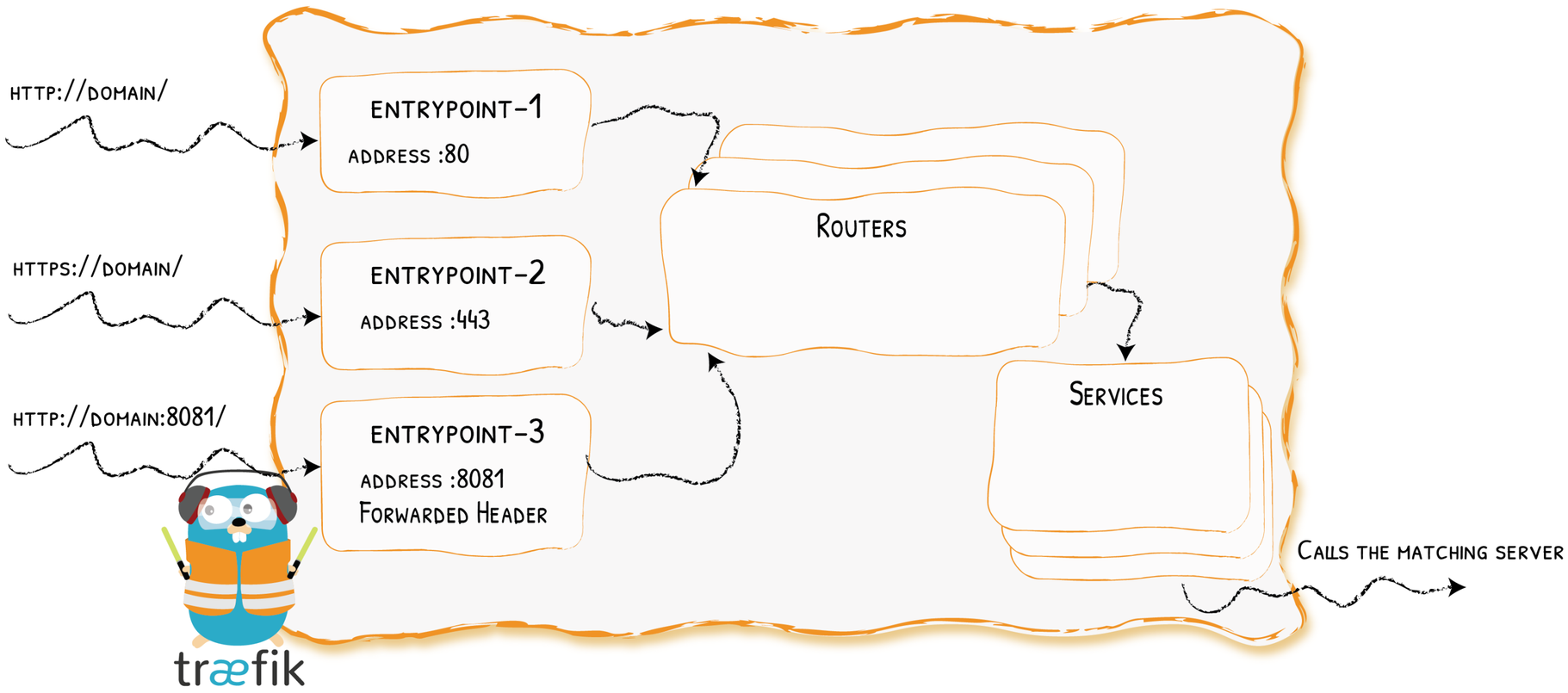
Dynamically Discovers Services



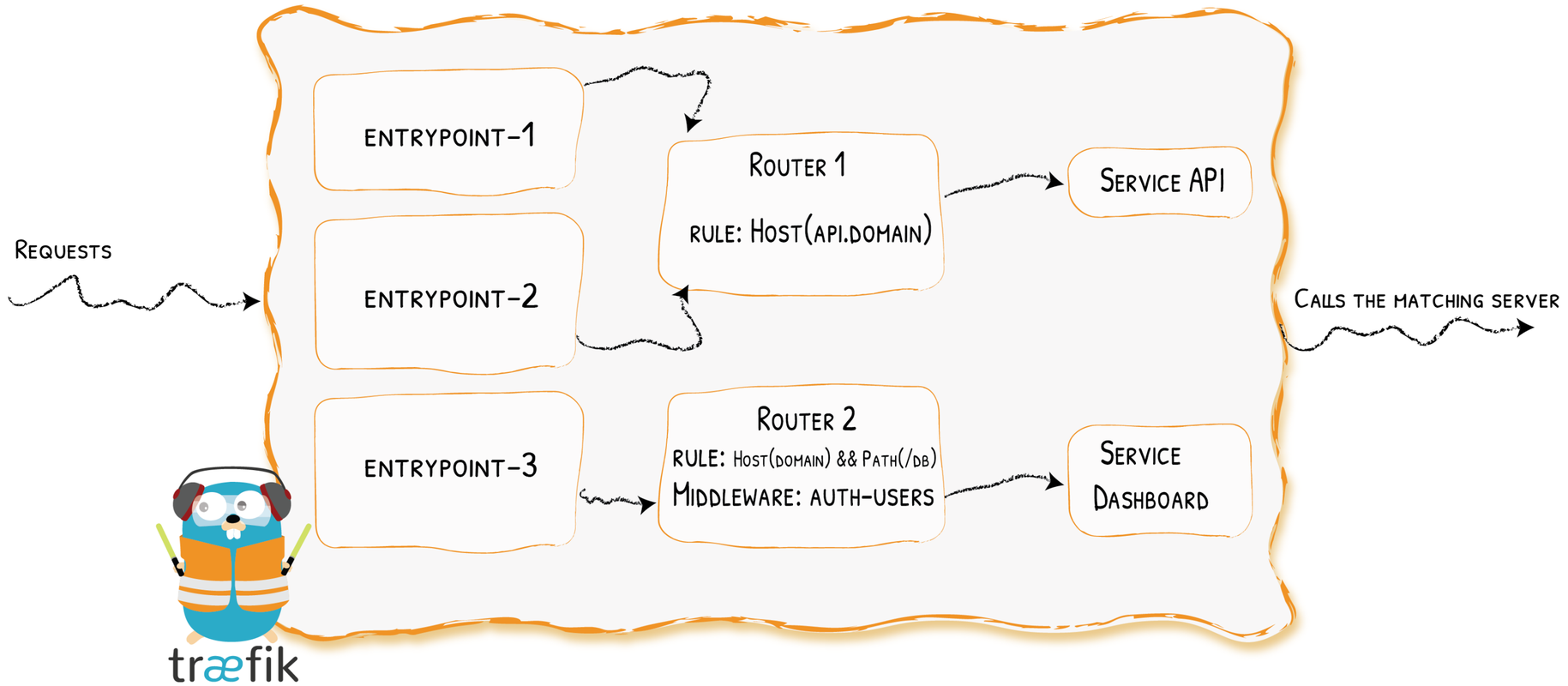
Architecture (V2.0) At A Glance



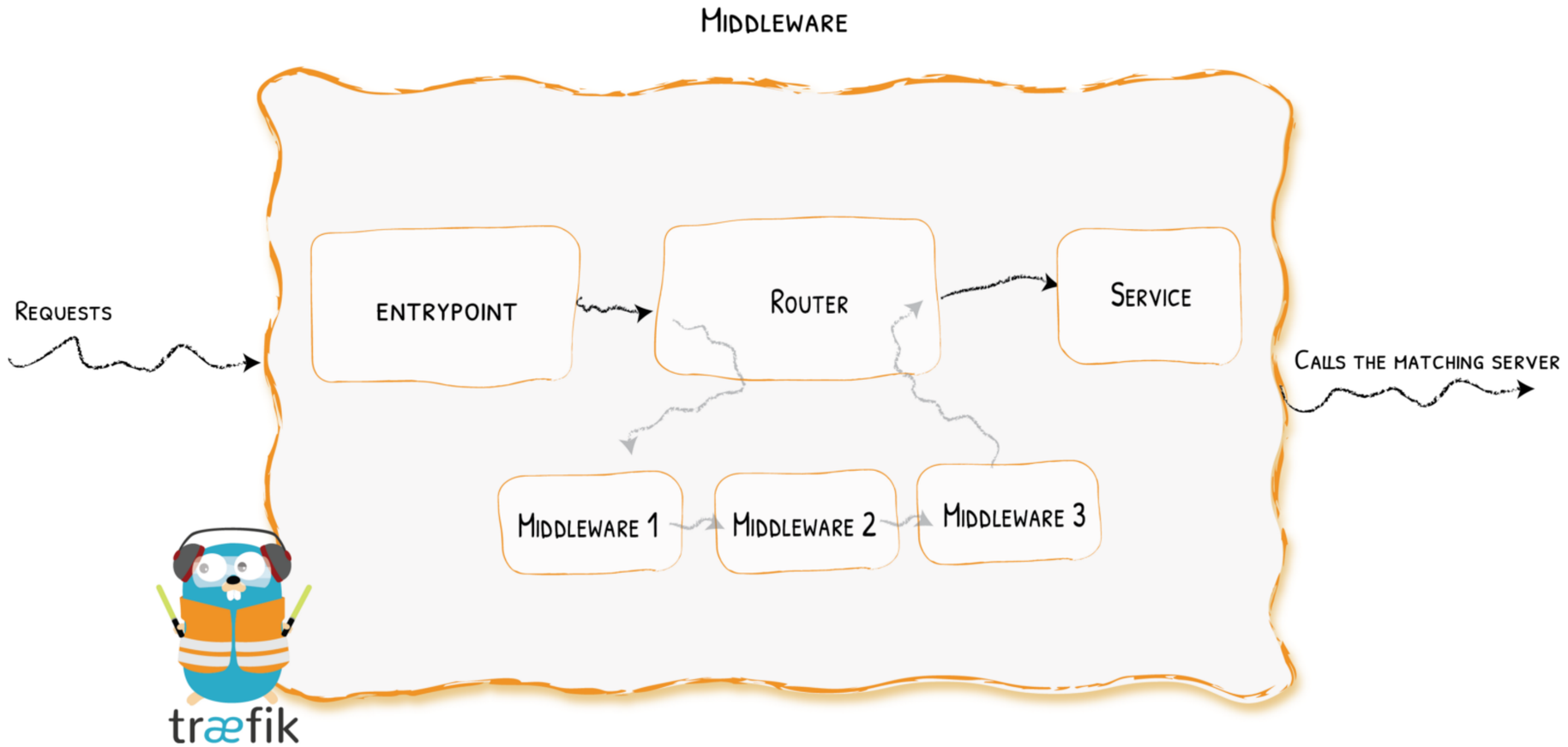
Entrypoints



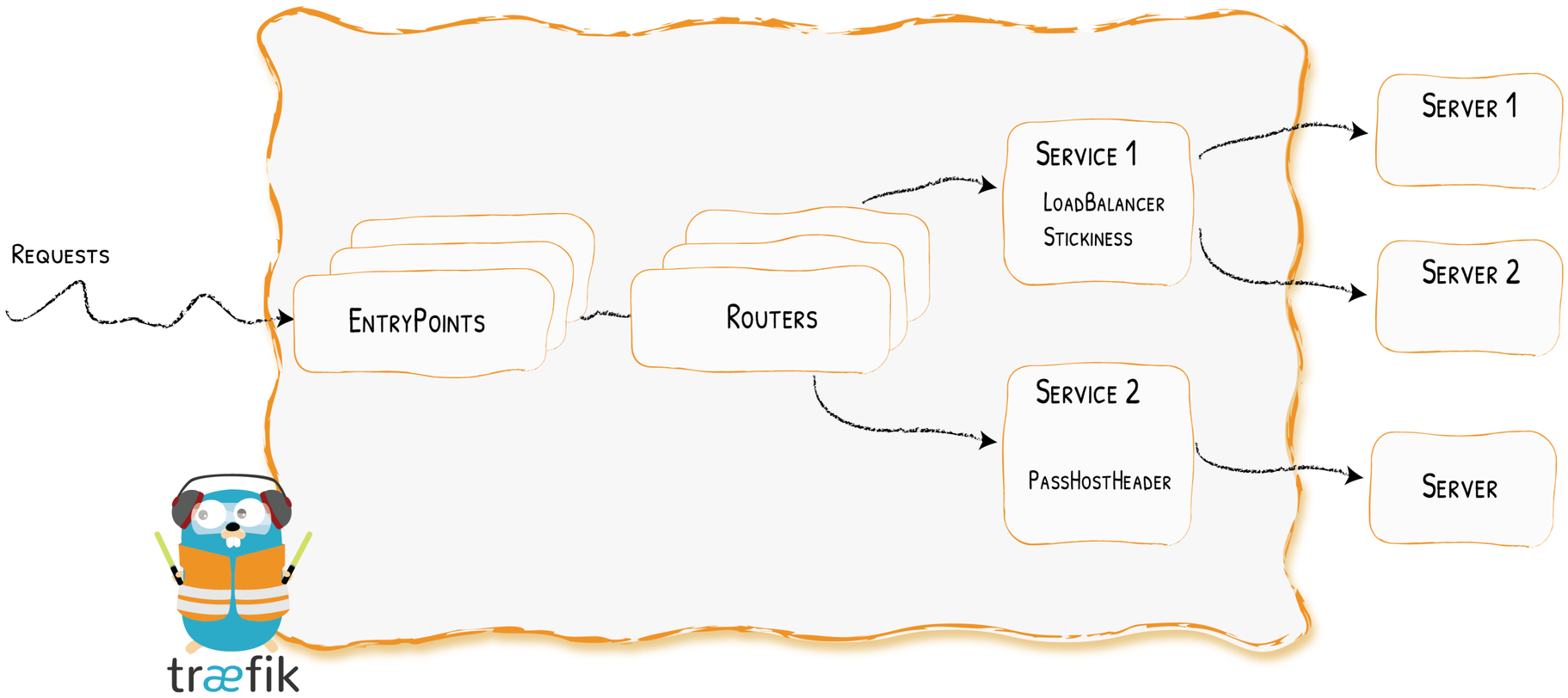
Routers


ENTRYPOINT-1
ROUTER 1
RULE: HOST(API.DOMAIN)
SERVICE API
REQUESTS
ENTRYPOINT-2
CALLS THE MATCHING SERVER
ENTRYPOINT-3
ROUTER 2
RULE: HOST(DOMAIN) && PATH(/DB)
MIDDLEWARE: AUTH-USERS
SERVICE
DASHBOARD
træfik

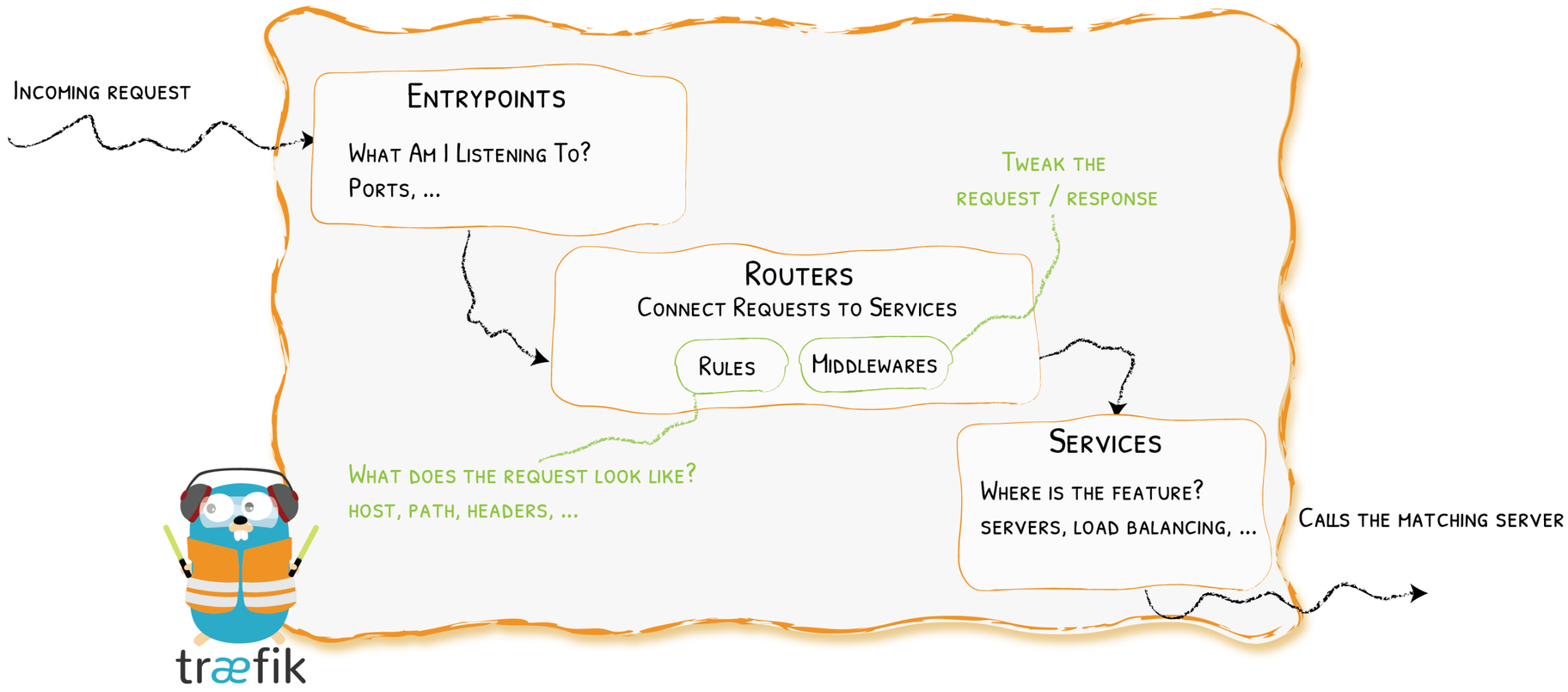
Middlewares



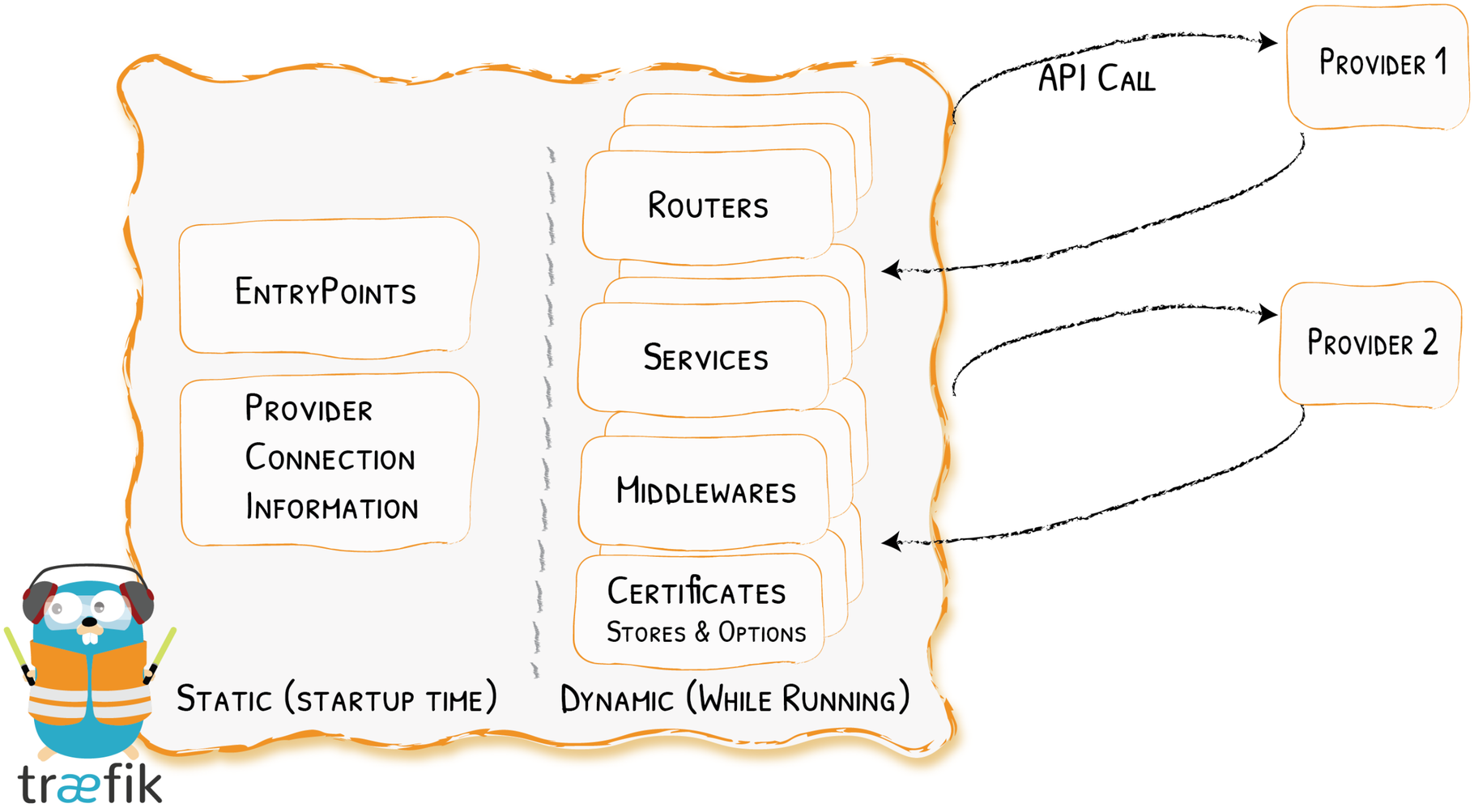
Services


Requests
EntryPoints
Routers
Service 1
LoadBalancer
Stickiness
Service 2
PassHostHeader
Server 1
Server 2
Server
træfik

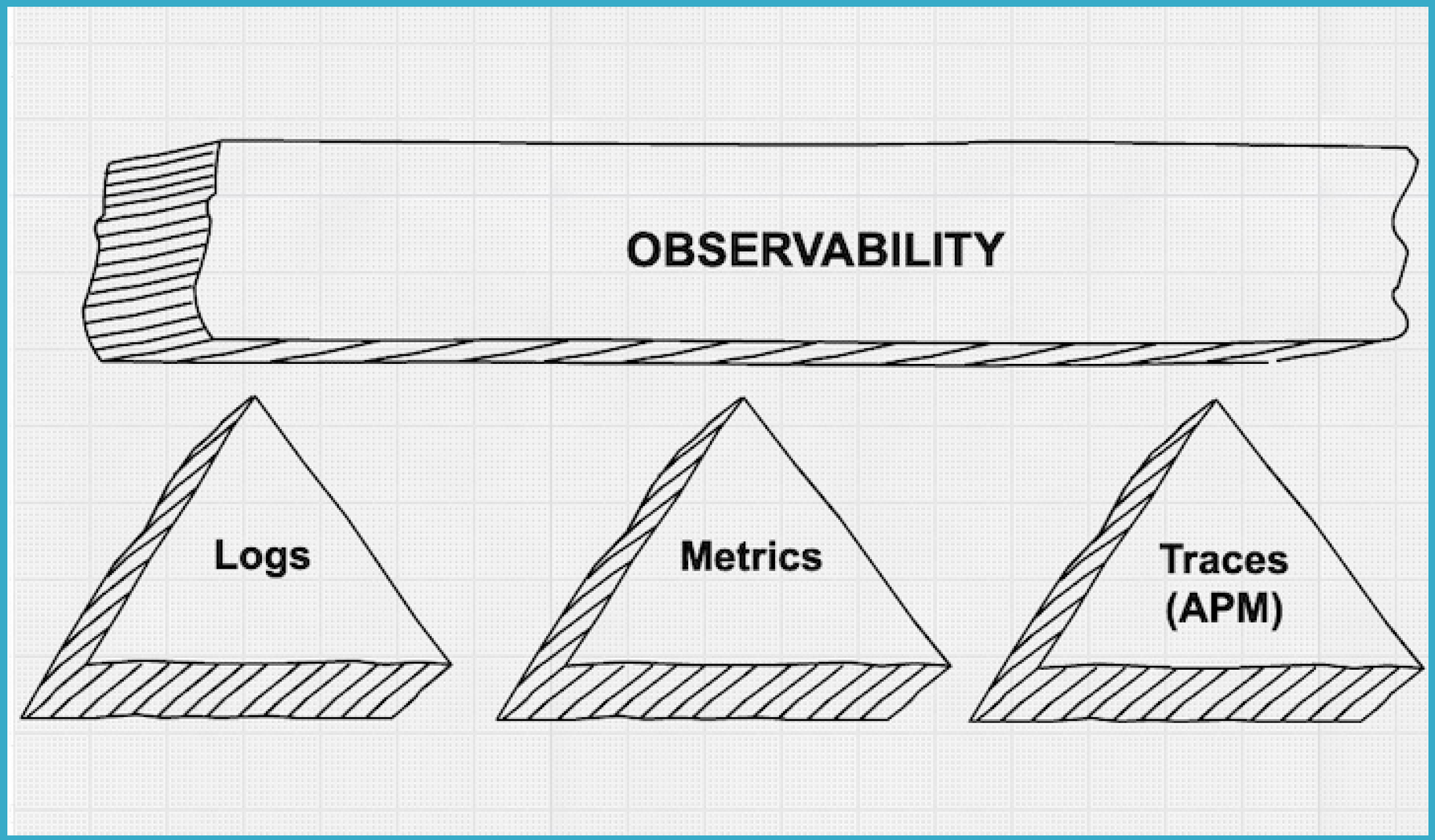
Architecture (Again) At A Glance



Static & Dynamic Configuration



Observability & Tracing With Traefik



Logs

- Difference between access / system logs
- Can you show internal behavior of your application
- Historical View

Metrics

- Ressource metrics (CPU / Memory / IO Performance...)
- Application metrics (Req/s, Open Connections...)
- Short-time period view

Tracing

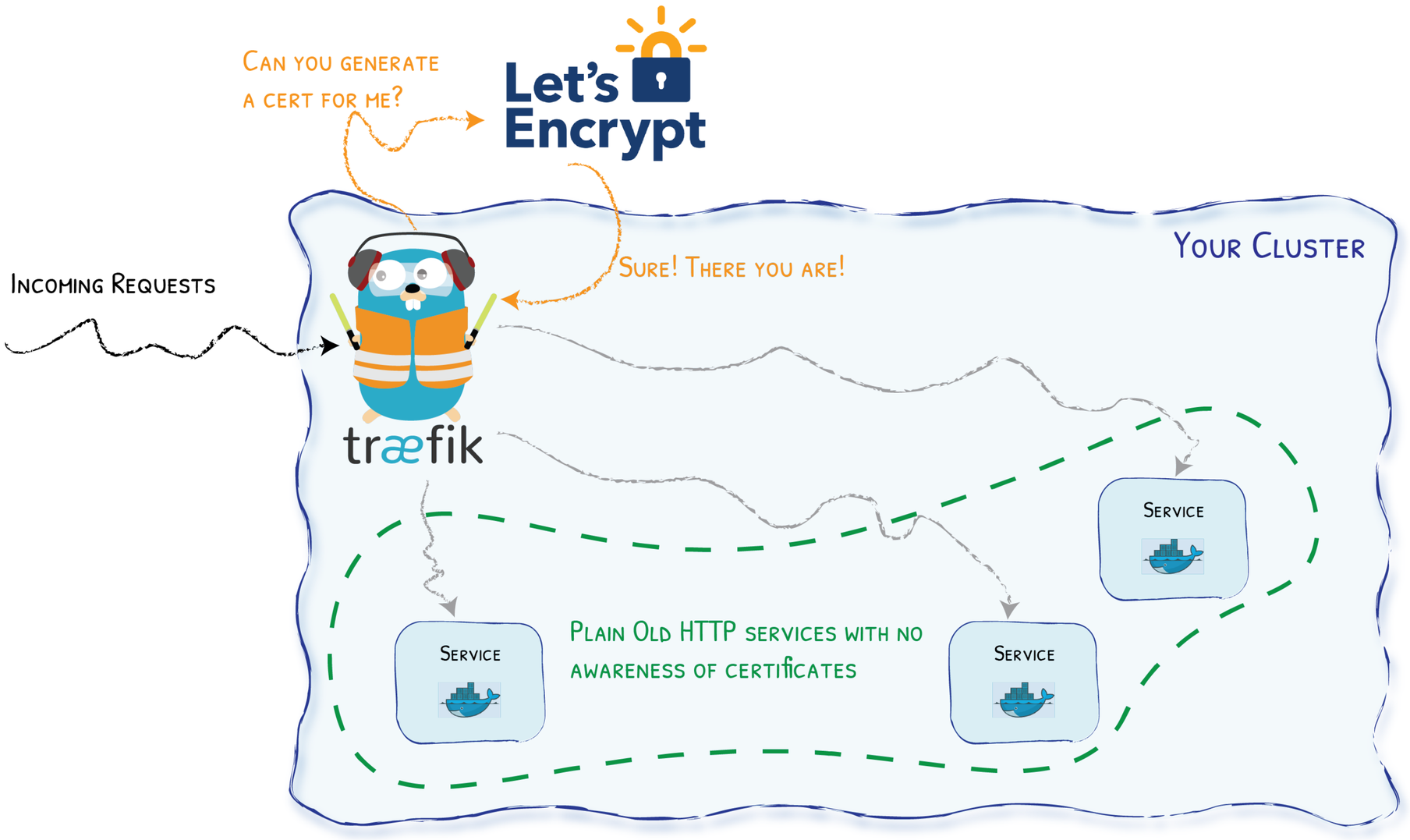
- Deep-Dive into how the app works
- Calltrace

Result

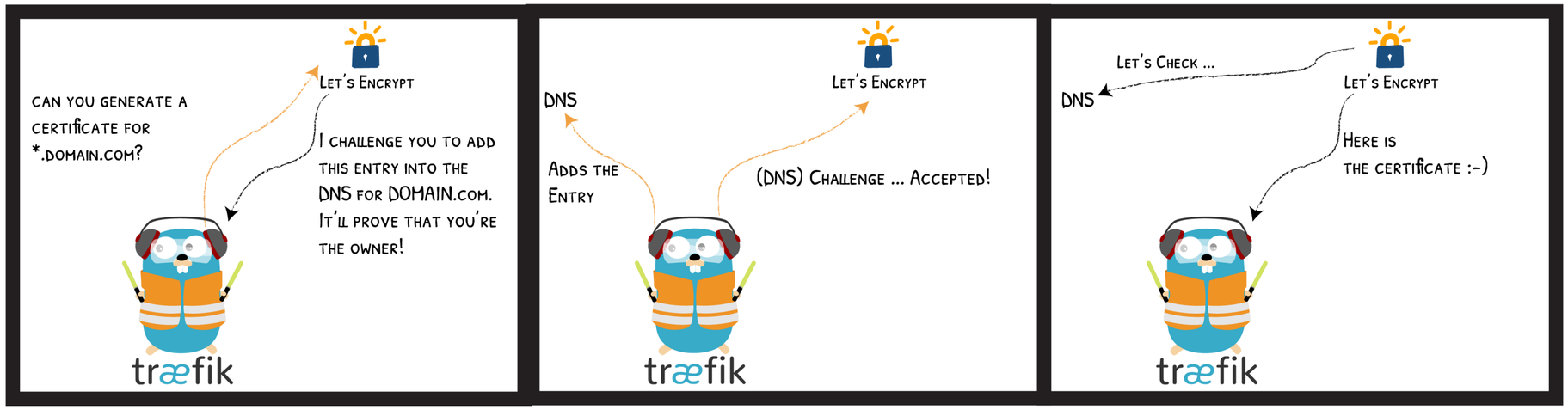
- Combining all 3
- Possibility to fully diagnose problems
- Combination of Logs / Metric might show missbehaving apps
- Tracing for finding root cause

Traefik And Let’s Encrypt

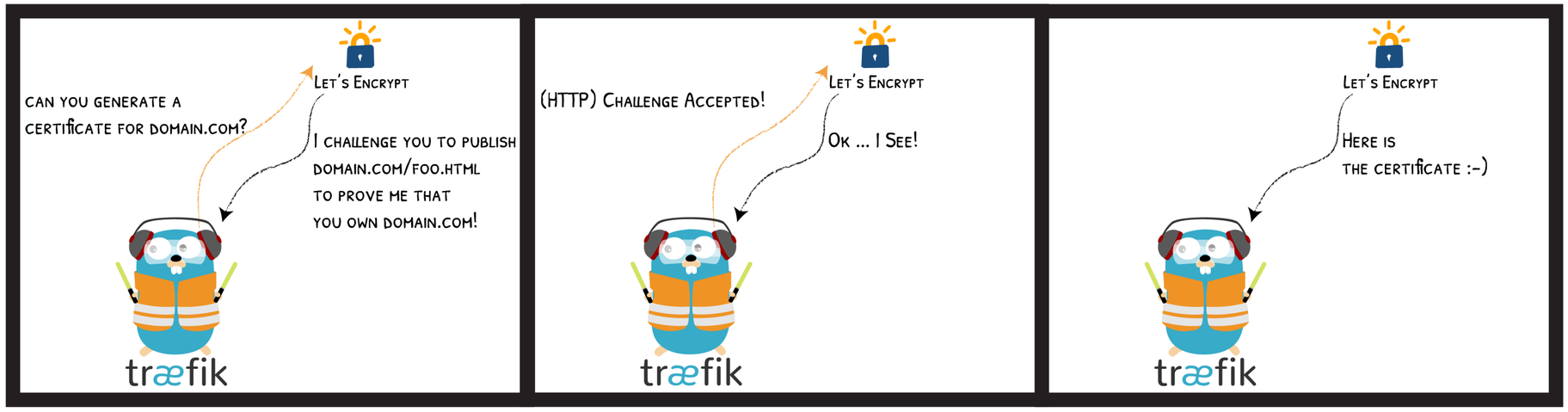
HTTPS & Let's Encrypt



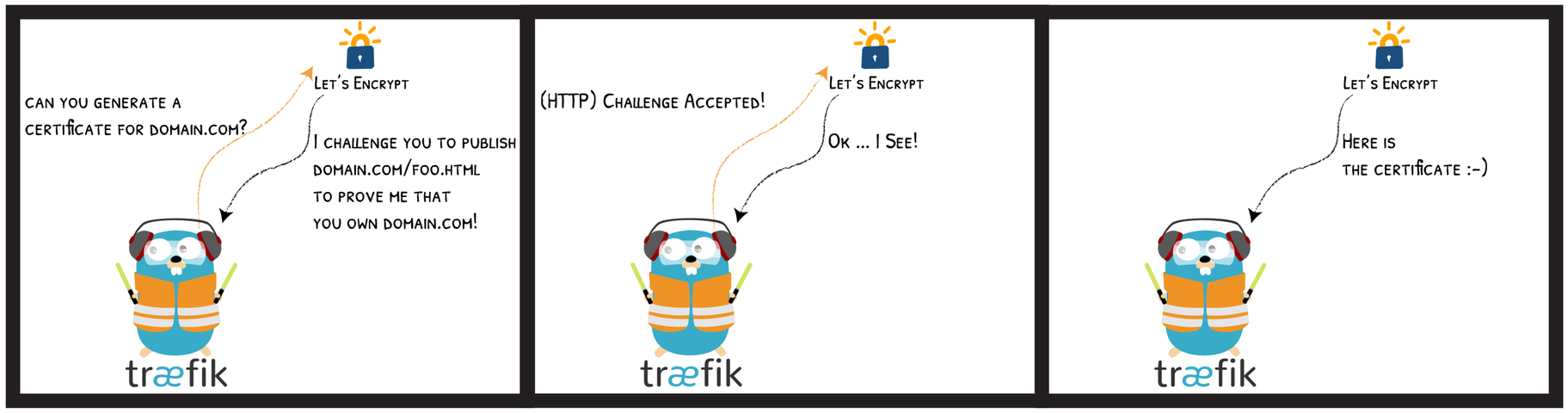
Let's Encrypt DNS Challenge



Let's Encrypt HTTP Challenge



Let's Encrypt TLS Challenge



Traefik With ⎈

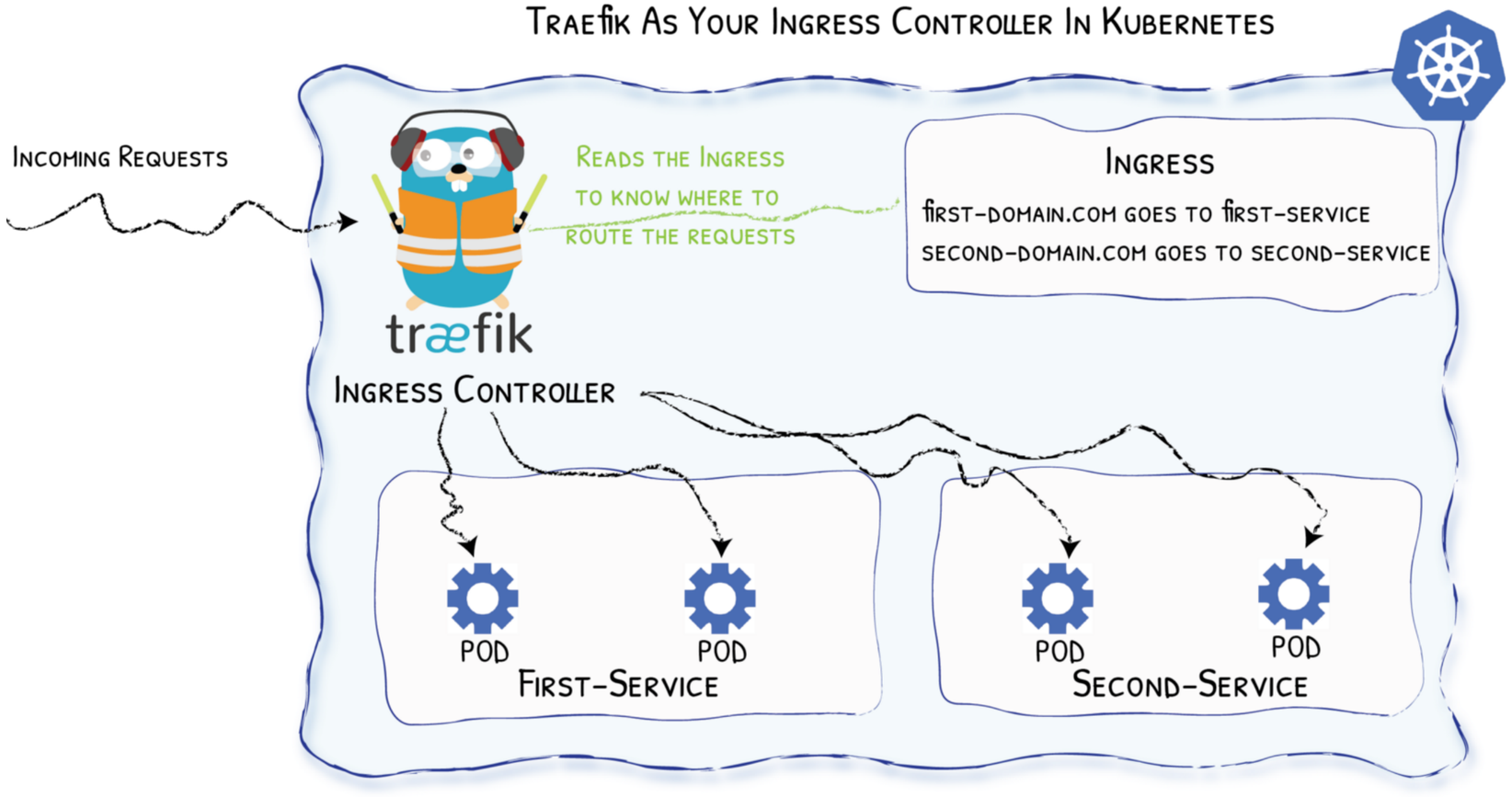


Diagram from https://medium.com/@geraldcroes

Ingress Example With ☸

```
apiVersion: networking.k8s.io/v1beta1
kind: Ingress
metadata:
  name: corporate-webapp
  annotations:
    kubernetes.io/ingress.class: 'traefik'
spec:
  rules:
  - host: localhost
    http:
      paths:
      - backend:
          serviceName: corporate-webapp
          servicePort: 80
```

☸ CRD - Custom Resources Definition

```
# File "webapp.yaml"
apiVersion: traefik.containo.us/v1alpha1
kind: IngressRoute
metadata:
  name: simpleingressroute
spec:
  entryPoints:
    - web
  routes:
  - match: Host(`localhost`) && PathPrefix(`/whoami`)
    kind: Rule
    services:
    - name: webapp
      port: 80
```

```
$ kubectl apply -f webapp.yaml
$ kubectl get ingressroute
```

☸ & TCP (With CRD)

```yaml
apiVersion: traefik.containo.us/v1alpha1
kind: IngressRouteTCP
metadata:
  name: ingressroutetcpmongo.crd
spec:
  entryPoints:
    - mongotcp
  routes:
  - match: HostSNI(`mongo-prod`)
    services:
    - name: mongo-prod
      port: 27017
```

Redirect HTTP To HTTPS

```
apiVersion: traefik.containo.us/v1alpha1
kind: Middleware
metadata:
  name: redirect-http
  namespace: webapp
spec:
  redirectScheme:
    scheme: https
```

Rewrite Path

```
apiVersion: traefik.containo.us/v1alpha1
kind: Middleware
metadata:
  name: redirect-http
  namespace: webapp
spec:
  redirectScheme:
    scheme: https
```

Redirect With Domain Replacement

```
apiVersion: traefik.containo.us/v1alpha1
kind: Middleware
metadata:
  name: test-redirectregex
spec:
  redirectRegex:
    regex: ^http://localhost/(.*)
    replacement: http://mydomain/${1}
```

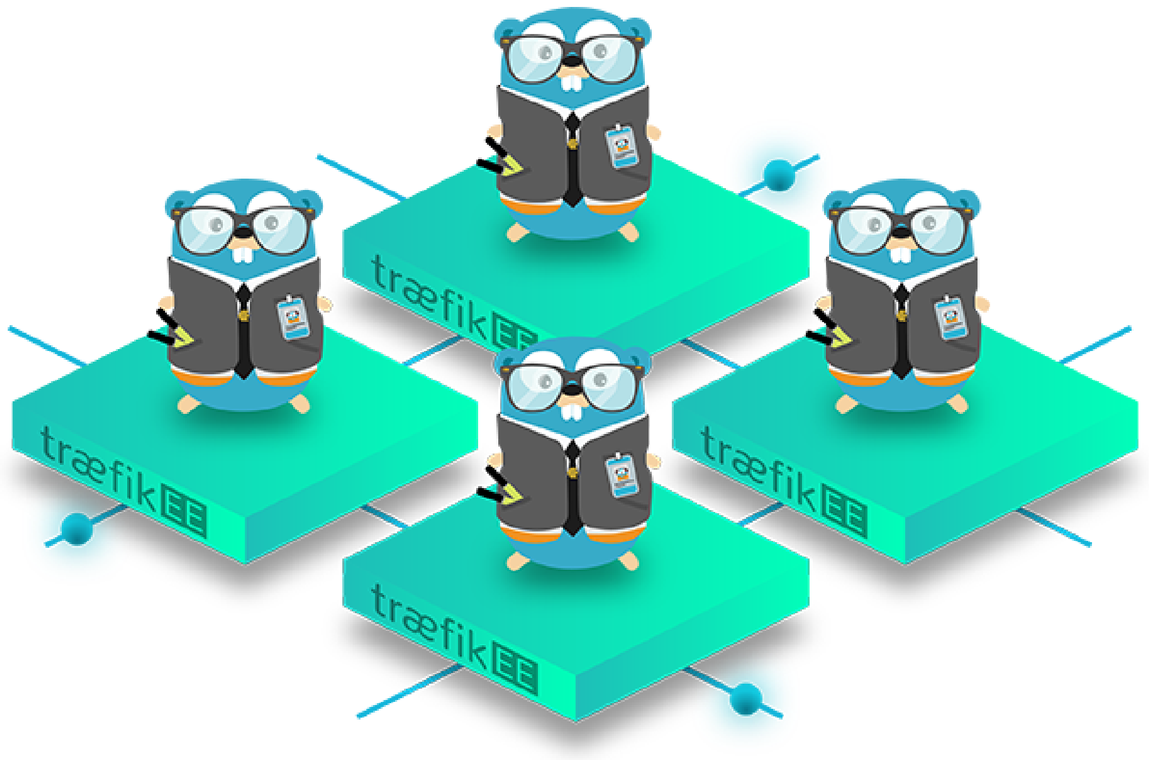
Strip Prefix

```yaml
apiVersion: traefik.containo.us/v1alpha1
kind: Middleware
metadata:
  name: test-stripprefix
spec:
  stripPrefix:
    prefixes:
      - /foobar
      - /fiibar
```

Canary

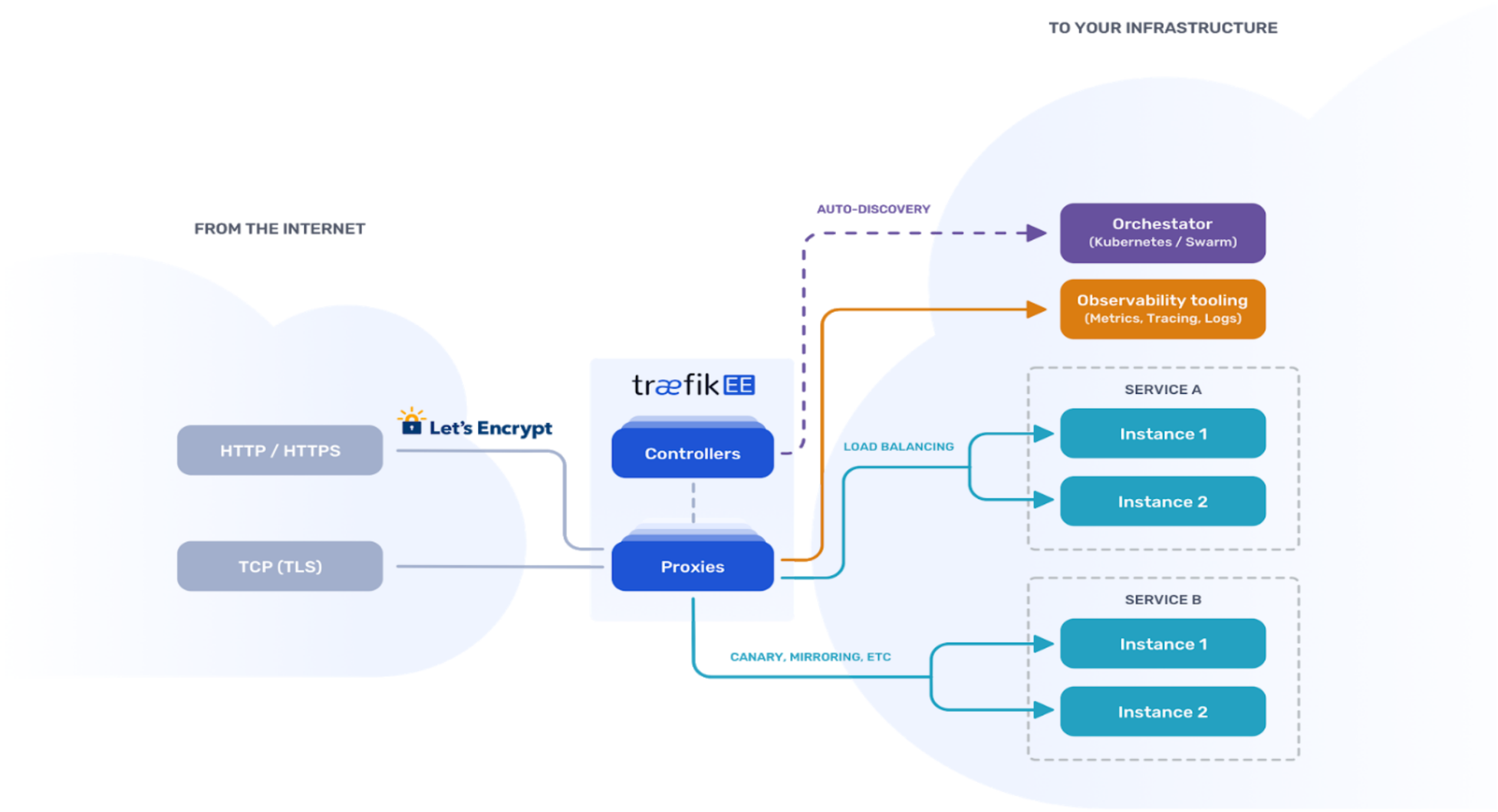
```yaml
apiVersion: traefik.containo.us/v1alpha1
kind: TraefikService
metadata:
  name: webapp-canary
  namespace: webapp
spec:
  weighted:
    services:
      - name: webapp-v1
        weight: 3
        port: 80
        # Optional, as it is the default value
        kind: Service
      - name: webapp-v2
        weight: 1
        port: 80
        kind: Service
```

Traefik Also Comes In Herd

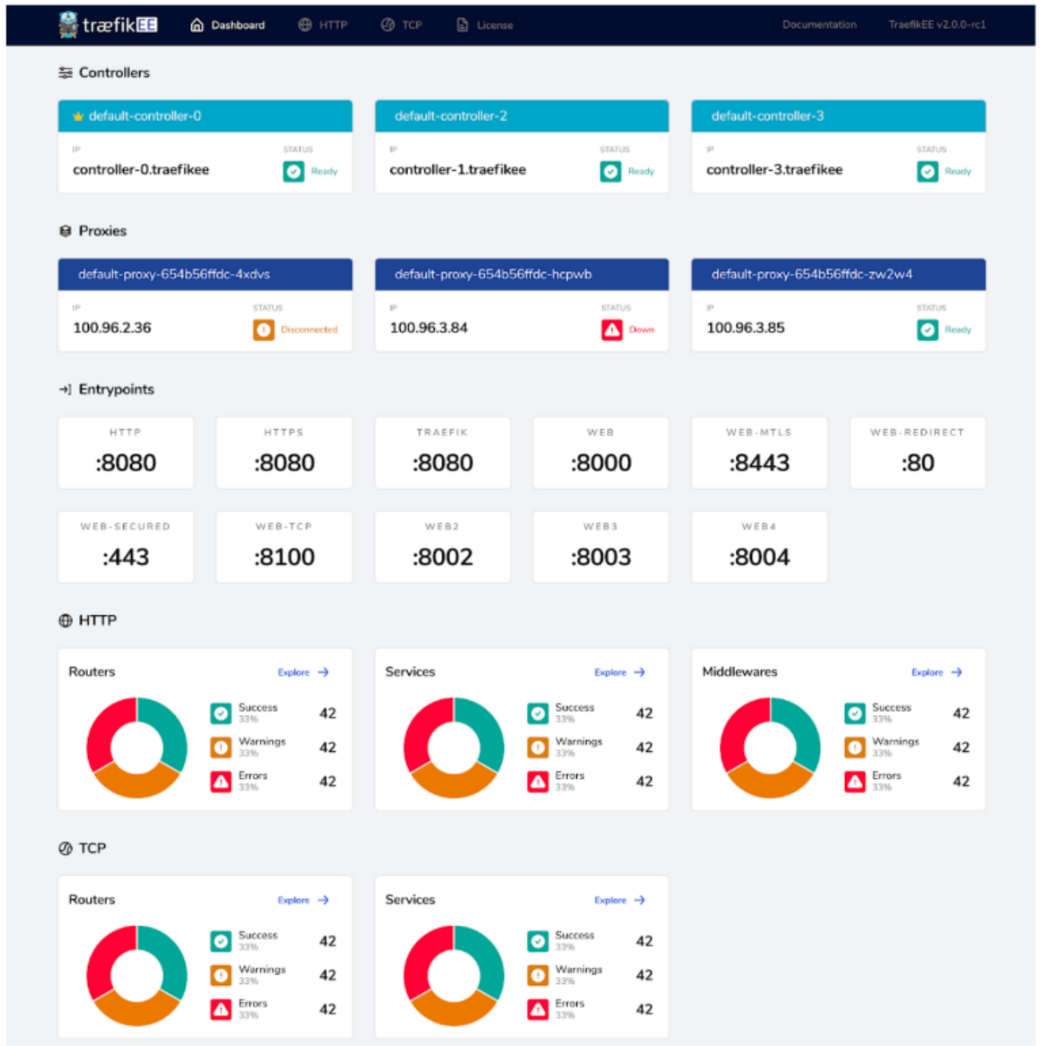


Advantages

- High availablity by default
- Cluster consensus build on Raft
- Shared State
- Distributed Middlewares
- Distributed Lets Encrypt


FROM THE INTERNET
TO YOUR INFRASTRUCTURE
AUTO-DISCOVERY
HTTP / HTTPS
TCP (TLS)
Let's Encrypt
træfik EE
Controllers
Proxies
Orchestator
(Kubernetes / Swarm)
Observability tooling
(Metrics, Tracing, Logs)
LOAD BALANCING
SERVICE A
Instance 1
Instance 2
CANARY, MIRRORING, ETC
SERVICE B
Instance 1
Instance 2

UI



CONTAINOUS

Customers

All types of companies

All over the world

All industries

As Simple As Traefik

- Install it:

```
# Cluster Installation
traefikeectl install \
    --licensekey="SuperSecretLicence" \
    --dashboard \
    --kubernetes # Or --swarm
```

- Configure it:

```
# Routing Configuration, same as Traefik's
traefikeectl deploy \
  --defaultentrypoints=http,https \
  --entryPoints='Name:http Address::80' \
  --entryPoints='Name:https Address::443 TLS' \
  --logLevel=INFO \
  --kubernetes
```

Pricing

Professional

2 Data Nodes
& 1 Control Node

8-hour SLA (weekdays)

$5 000 annual
subscription

Enterprise

10 Data Nodes
& 1 Control Node

8-hour SLA (weekdays)

$10 000 annual
subscription

Mission Critical

10 Data Nodes
& 7 Control Nodes

2-hour SLA

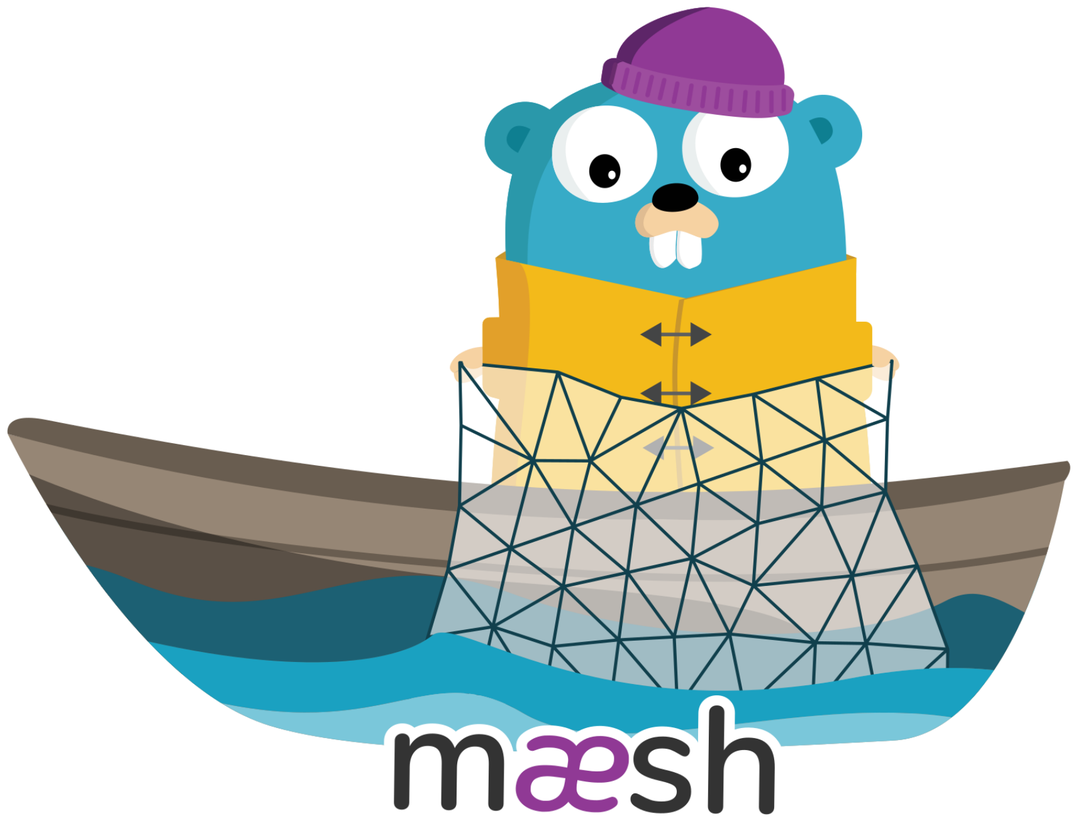
$30 000 annual
subscription

Free Trial

https://containo.us/traefikee

East / West Traefik

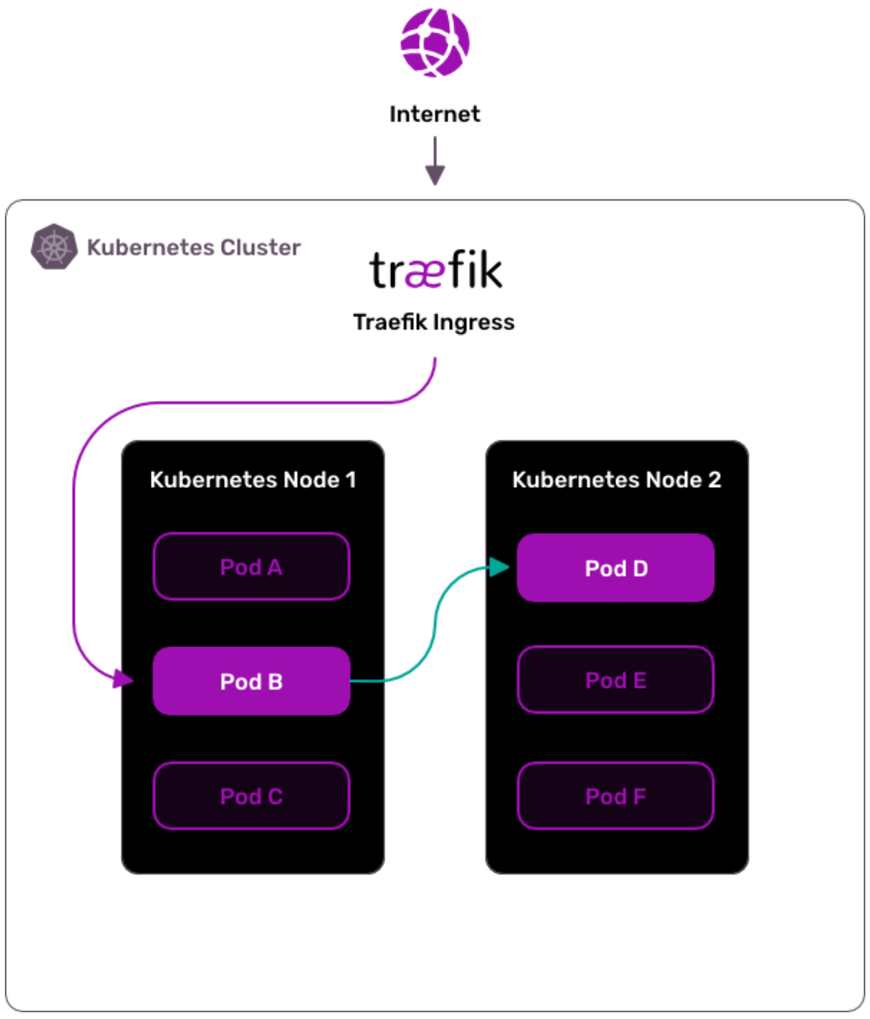
Say Hello To Maesh

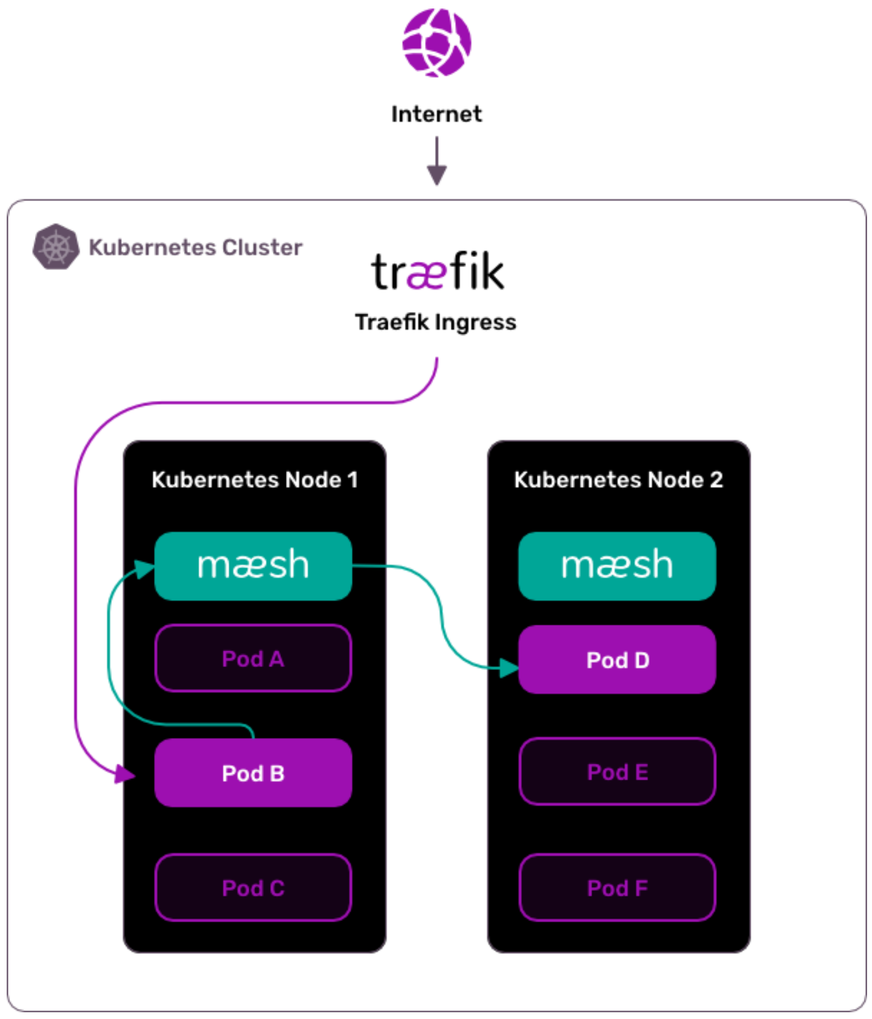


What Is Maesh?

Maesh is a lightweight, easy to configure, and non-invasive service mesh that allows visibility and management of the traffic flows inside any Kubernetes cluster.

Maesh Architecture





More On Maesh

- Built on top of Traefik,
- SMI (Service Mesh Interface specification) compliant,
- Opt-in by default.

Maesh Website

Show Me The Code!

- Install Maesh (Helm Chart):

```
helm repo add maesh https://containous.github.io/maesh/charts
helm repo update
helm install --name=maesh --namespace=maesh maesh/maesh --values=./maesh/values.yaml
```

- Deploy Applications:

```
kubectl apply -f apps/0-namespace.yaml
kubectl apply -f apps/1-svc-accounts.yaml
kubectl apply -f apps/2-apps-client.yaml
kubectl apply -f apps/3-apps-servers.yaml
kubectl apply -f apps/4-ingressroutes.yaml
```

- Deploy SMI Objects to allow traffic in the mesh:

```
kubectl apply -f apps/5-smi-http-route-groups.yaml
kubectl apply -f apps/6-smi-traffic-targets.yaml
```

A Closer Look To SMI Objects

```yaml
apiVersion: specs.smi-spec.io/v1alpha1
kind: HTTPRouteGroup
metadata:
  name: app-routes
  namespace: apps
matches:
- name: all
  pathRegex: "/"
  methods: ["*"]
---
apiVersion: access.smi-spec.io/v1alpha1
kind: TrafficTarget
metadata:
  name: client-apps
  namespace: apps
destination:
  kind: ServiceAccount
  name: apps-server
  namespace: apps
specs:
- kind: HTTPRouteGroup
  name: app-routes
  matches:
  - all
sources:
- kind: ServiceAccount
  name: apps-client
  namespace: apps
```

That’s All Folks!


We Have
Stickers!
træfik

We Are Hiring!

CONTAINOUS

```
docker run -it containous/jobs
```

Thank You!

- @mZapfDE
- SantoDE

- Slides (HTML): https://containous.github.io/slides/containous-nuaware-london-2020
- Slides (PDF): https://containous.github.io/slides/containous-nuaware-london-2020/slides.pdf
- Source on : https://github.com/containous/slides/tree/containous-nuaware-london-2020