

Easy HTTPS For Your Microservice Architectures Running On Kubernetes



DevOps Enterprise Transformation: Easy HTTPS for Your
Microservice Architectures running on Kubernetes

Whoami

Manuel Zapf

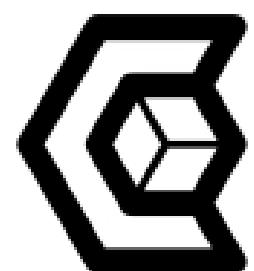
- Head of Product Open Source @ Containous
- Maintainer on Traefik
-  @manuel_zapf
-  SantoDE



Containous

<https://containo.us>

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



CONTAINOUS

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

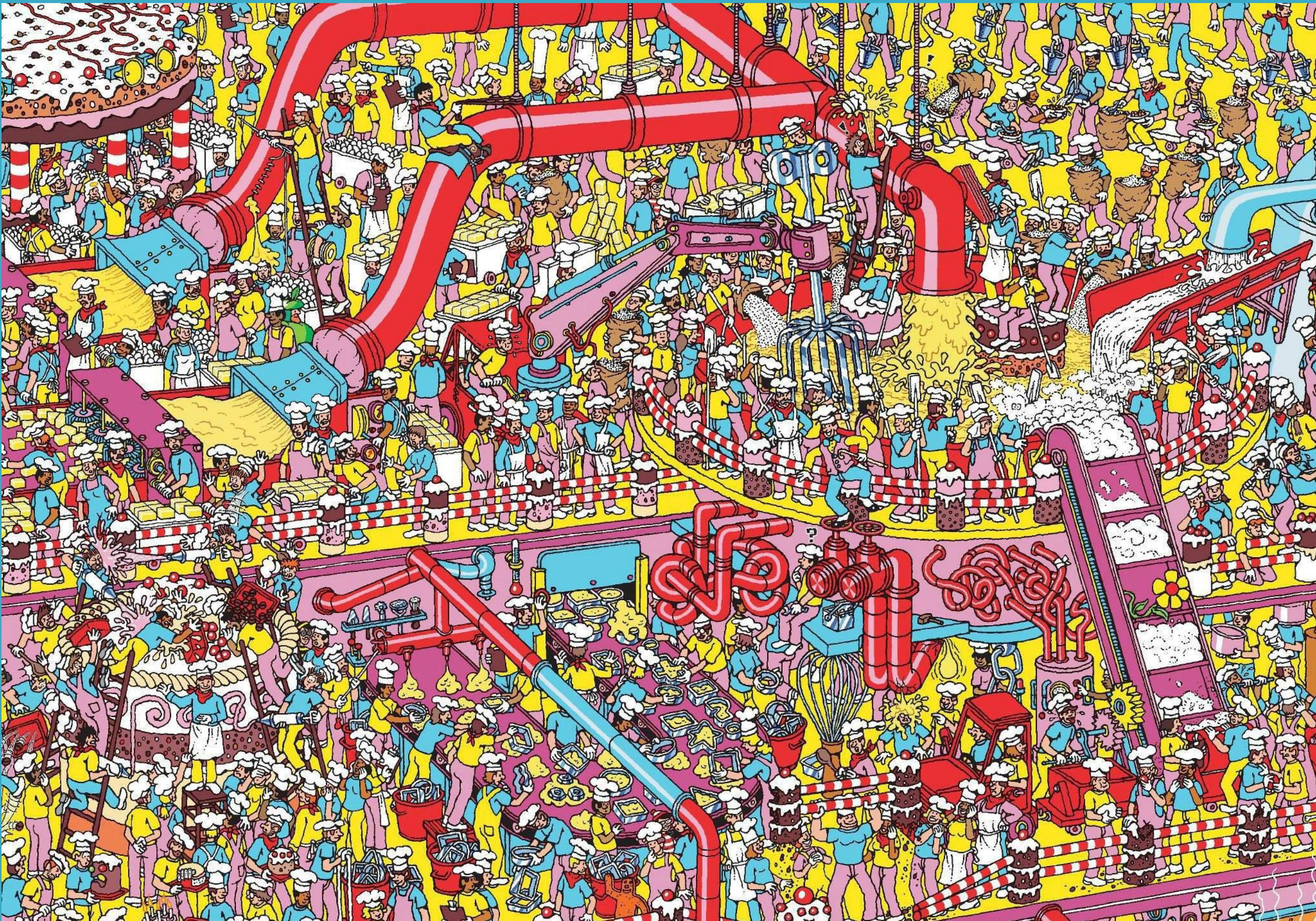
The Premise Of Microservices...



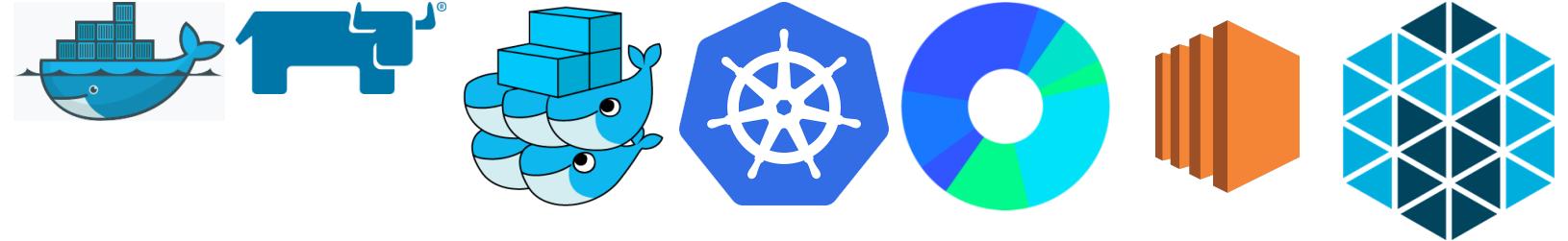
...And What Happens



Where's My Service?



Tools Of The Trade



Kubernetes 101

Evolution Of Kubernetes

- 2014: Google Introduces Kubernetes
- 2015: The year of Kube v1.0 & CNCF
- 2016: The Year Kubernetes Goes Mainstream!
- 2017: The Year of Enterprise Adoption & Support
- 2018: Kubernetes gets bigger and bigger
- 2019+: Kubernetes all over the World

What's That?

- Defacto standard to run microservice oriented architectures
- Widely adopted
- Huge community

Challenges

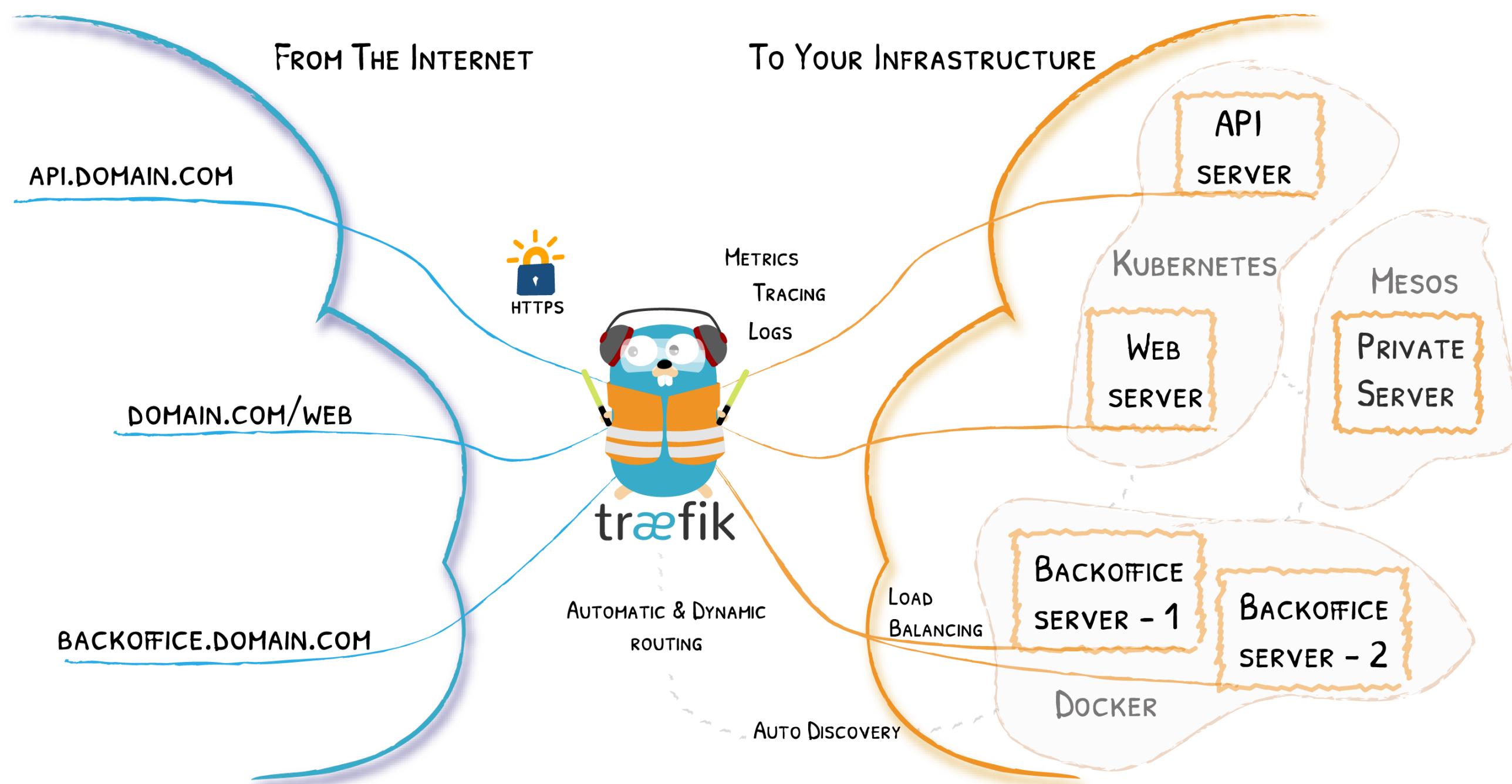
- Hard to setup and especially to maintain
- Demanding in Ressources, Knowledge...
- Complex Concepts (Services. Ingress)...

What If I Told You?



That there is a solution...?

Here Comes Traefik!



Traefik Project



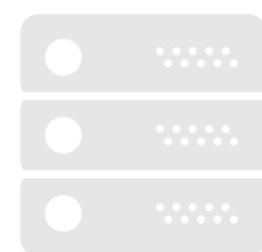
27,000+

stars on GitHub



450+

contributors



100K +
living
instances



1.4 B+

downloads



TOP 15

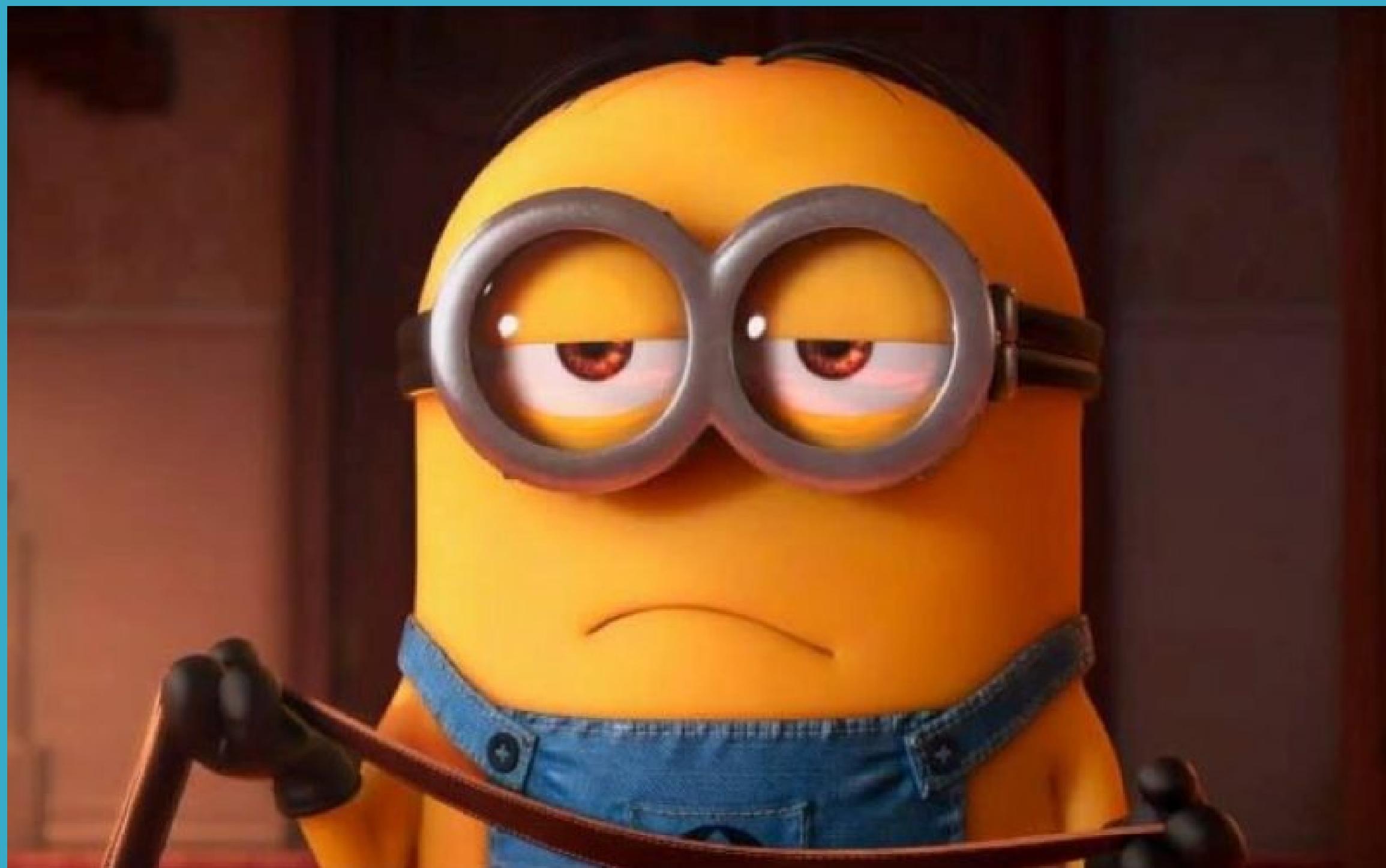
golang project

Traefik 2.0 Quick Overview

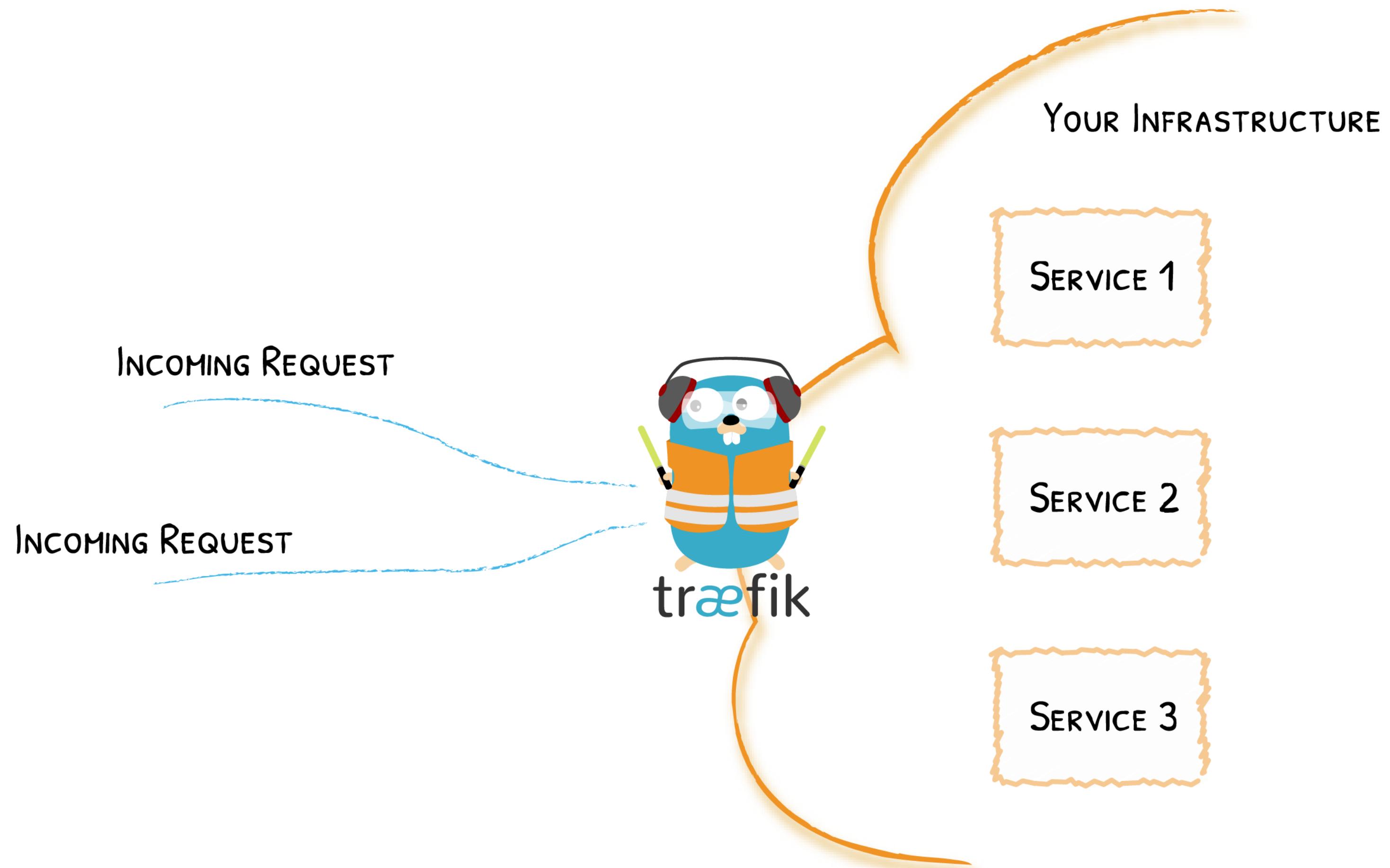
- Revamped Documentation
- Clarified Concepts
- Expressive Routing Rule Syntax
- Middlewares
- TCP Support
- Canary / Mirroring
- And so Much More...

Learn more on the blog post

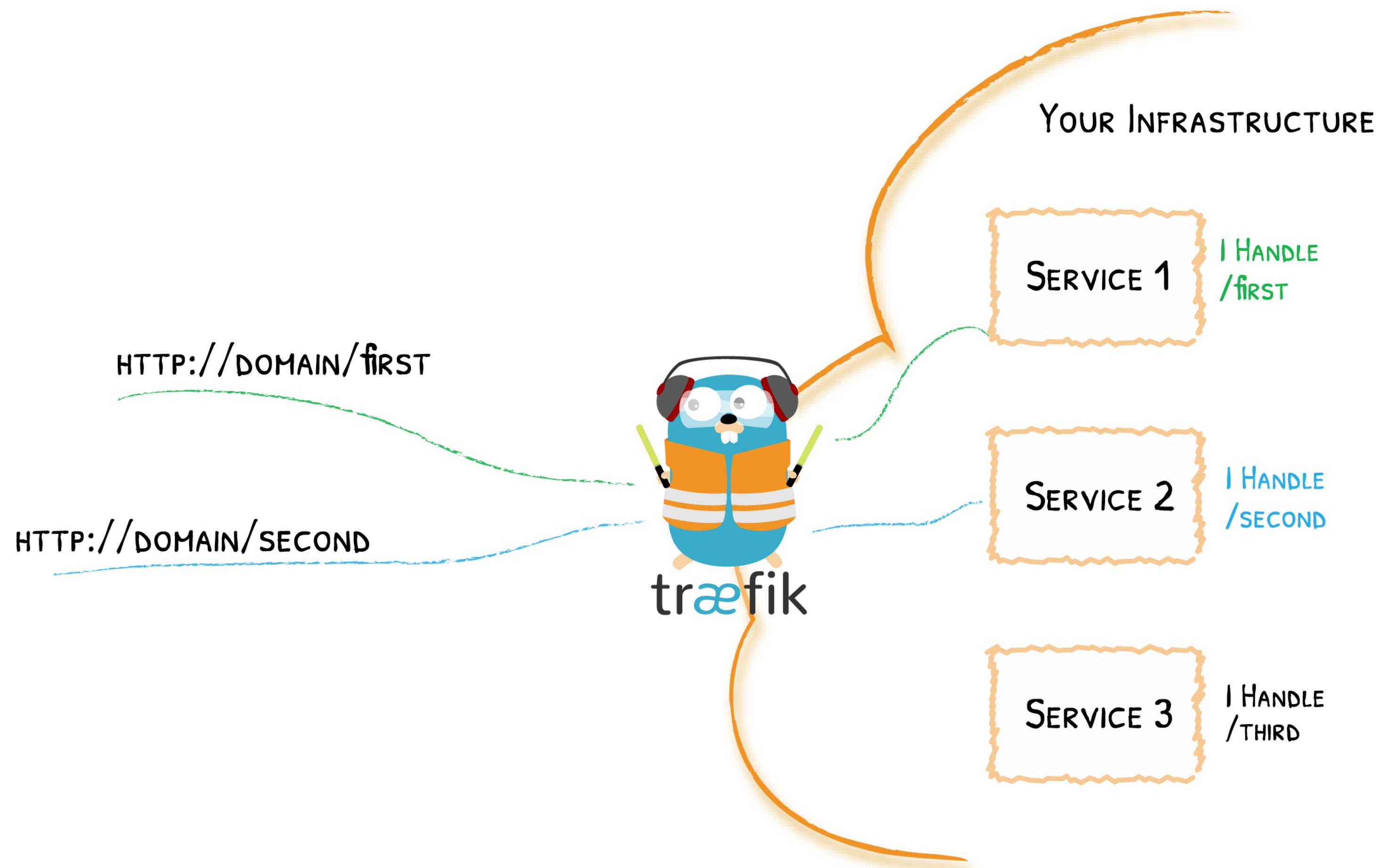
Traefik (V2.0) Core Concepts



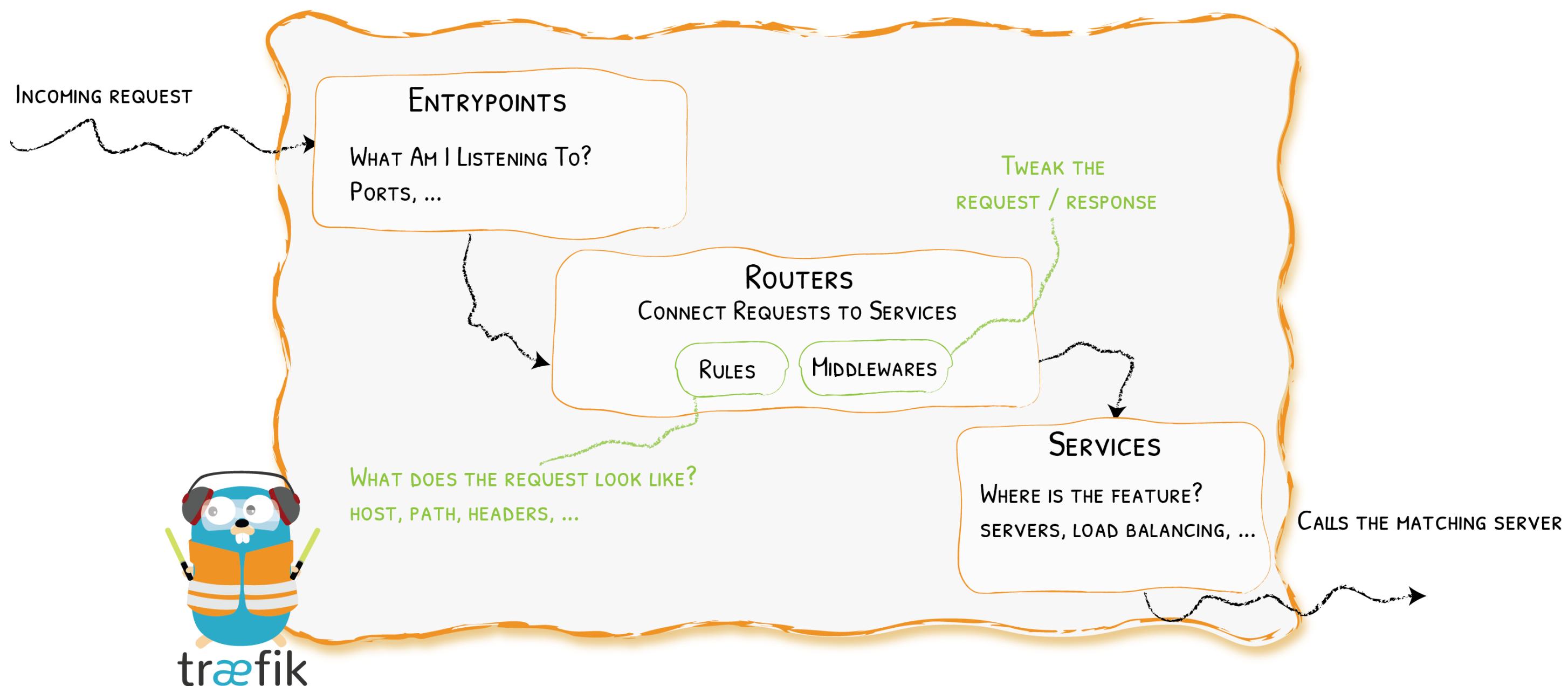
Traefik Is An Edge Router



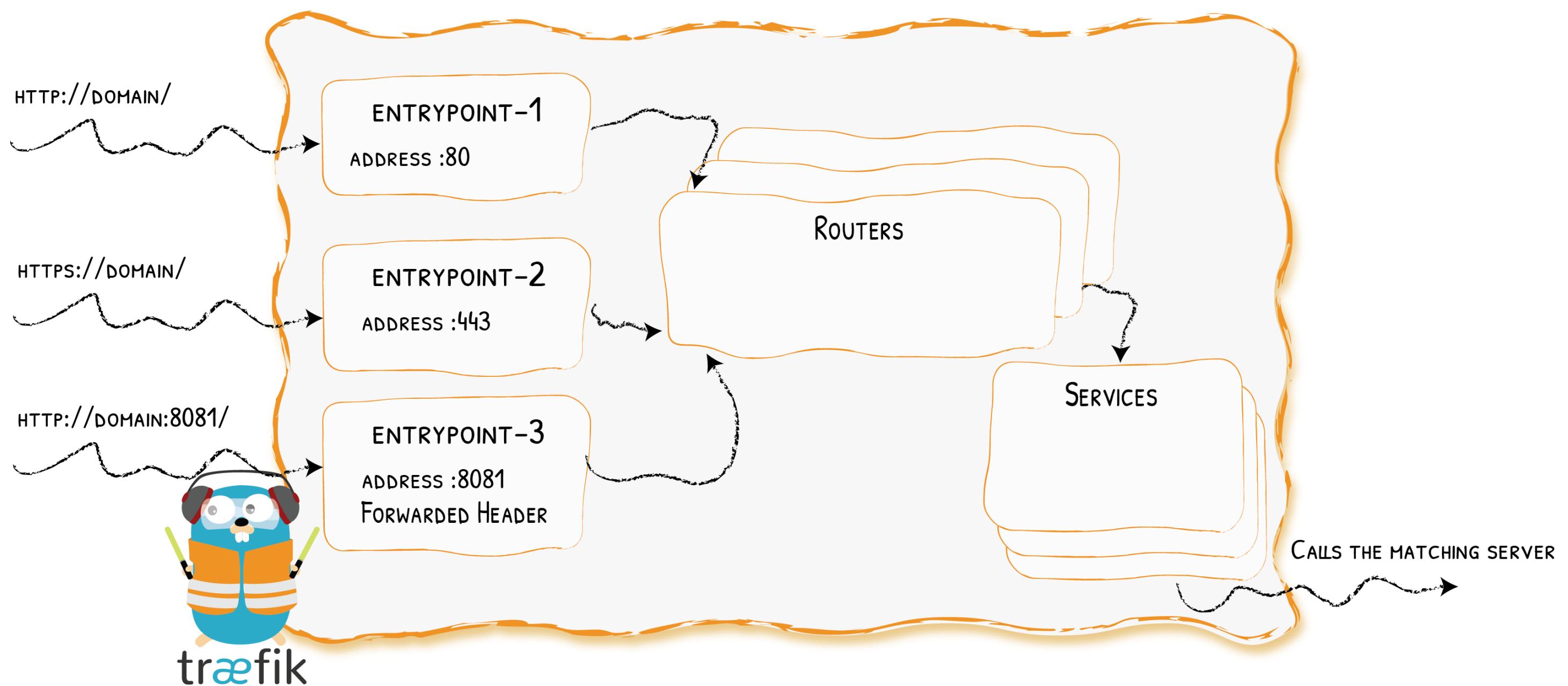
Dynamically Discovers Services



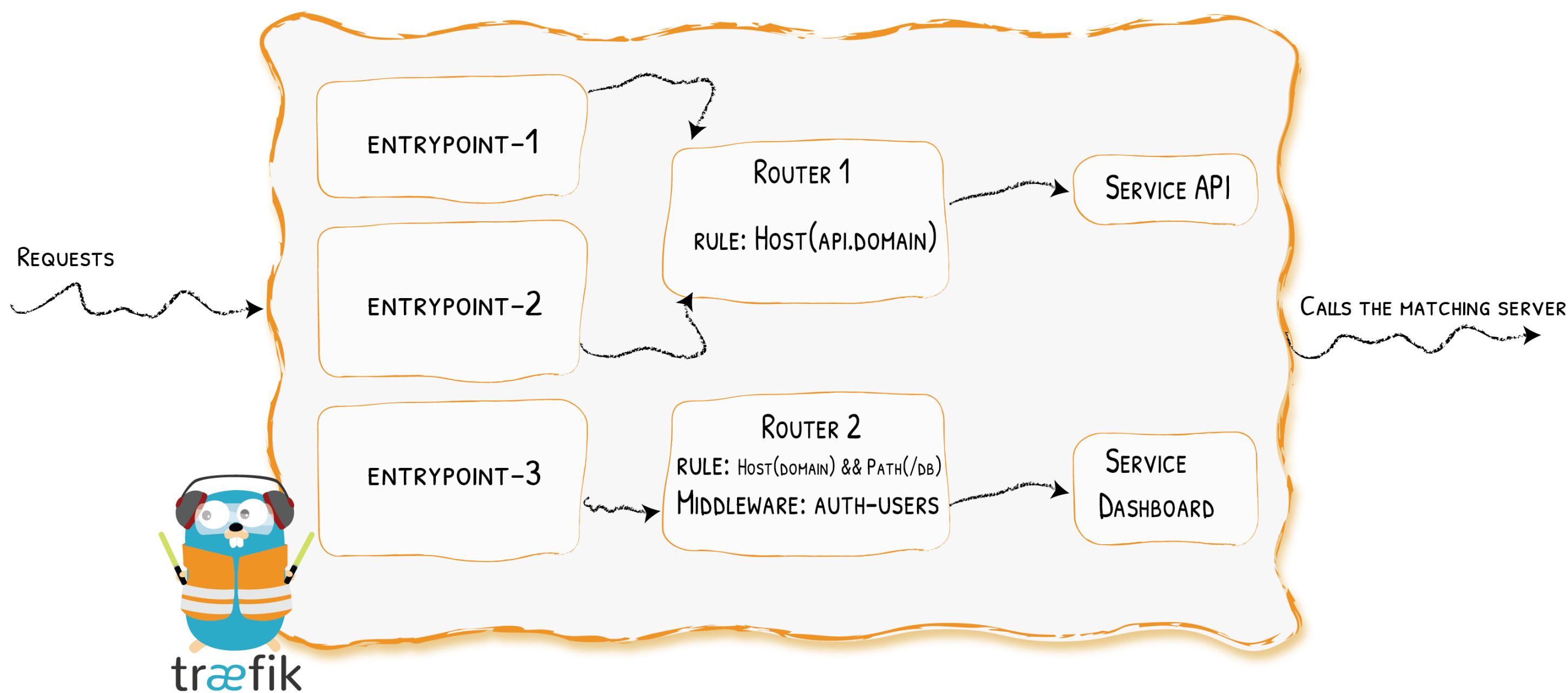
Architecture (V2.0) At A Glance



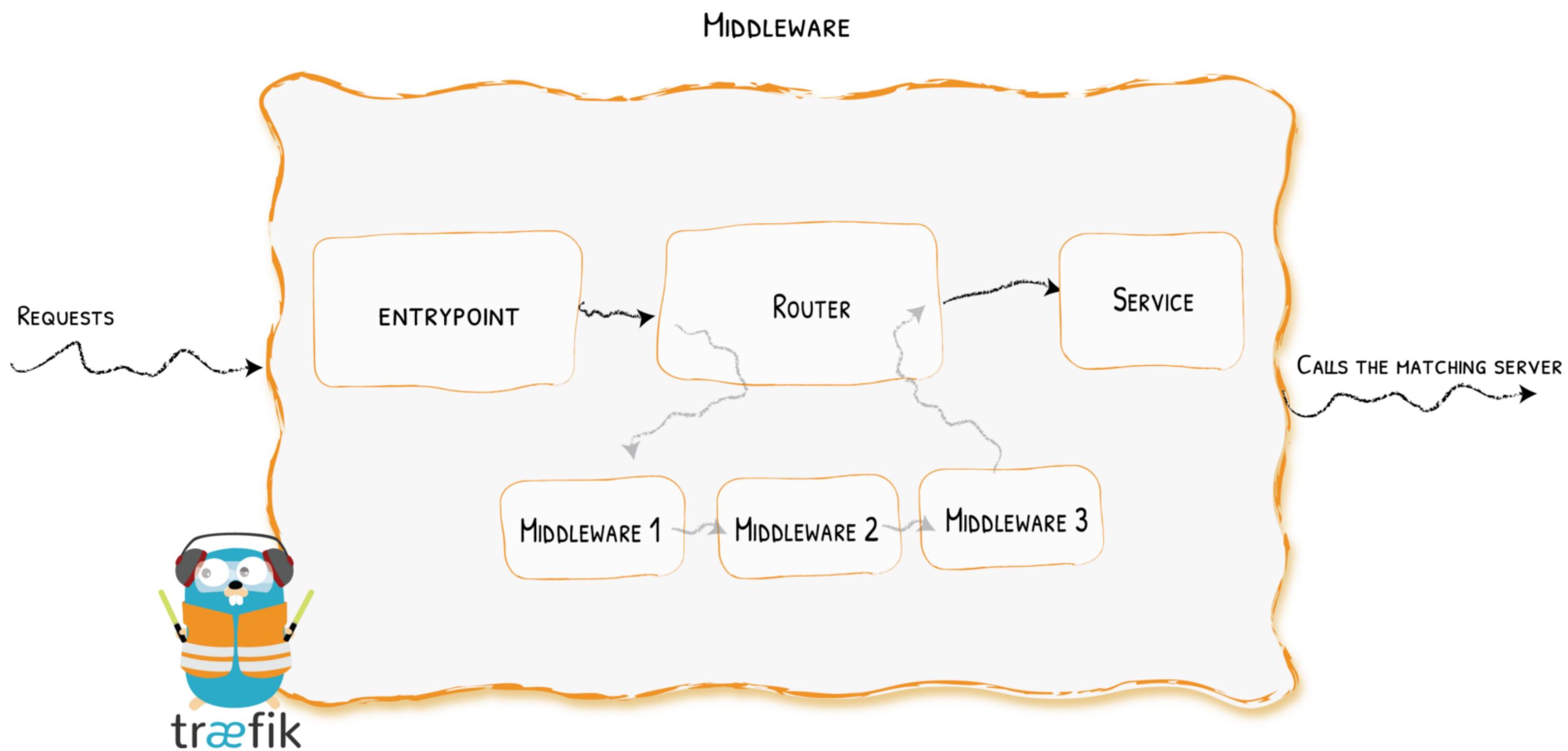
Entrypoints



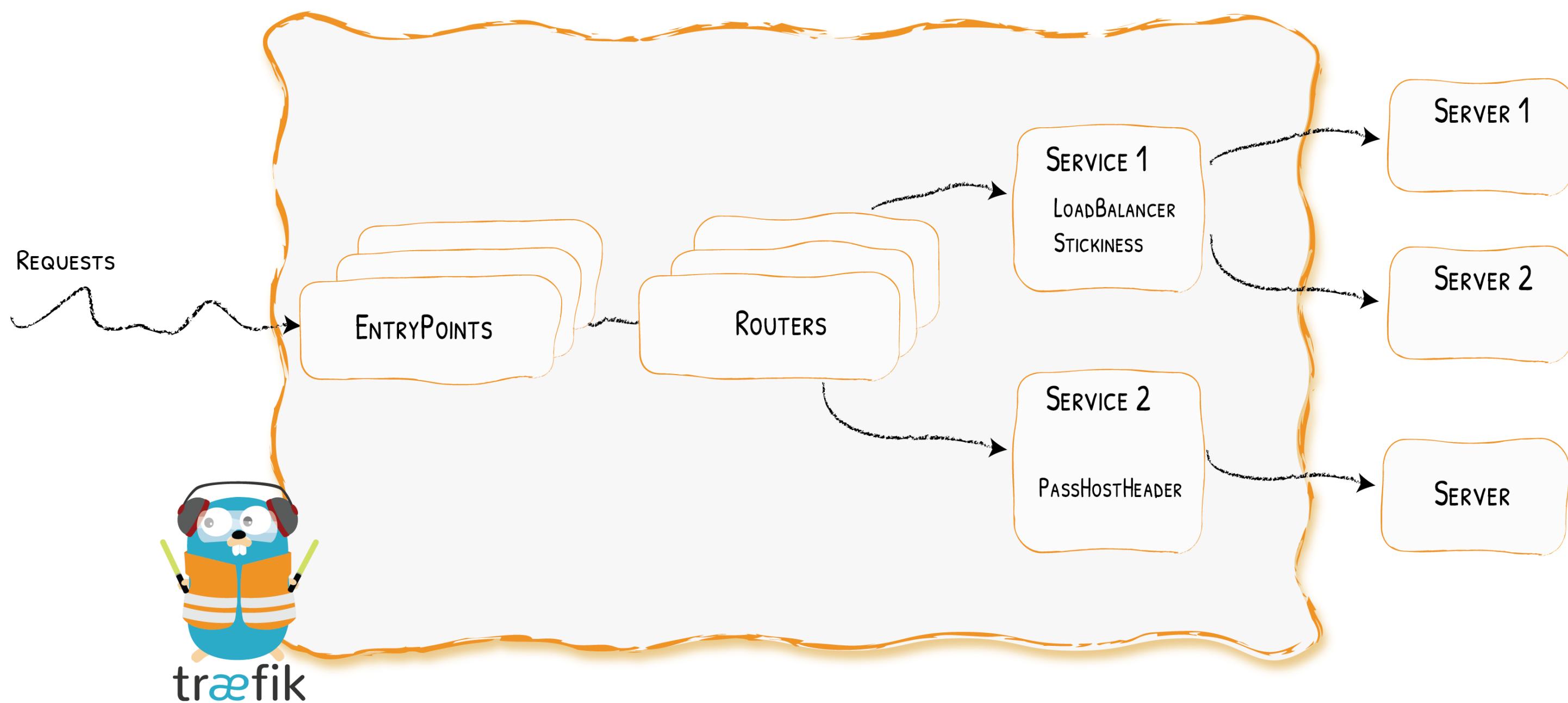
Routers



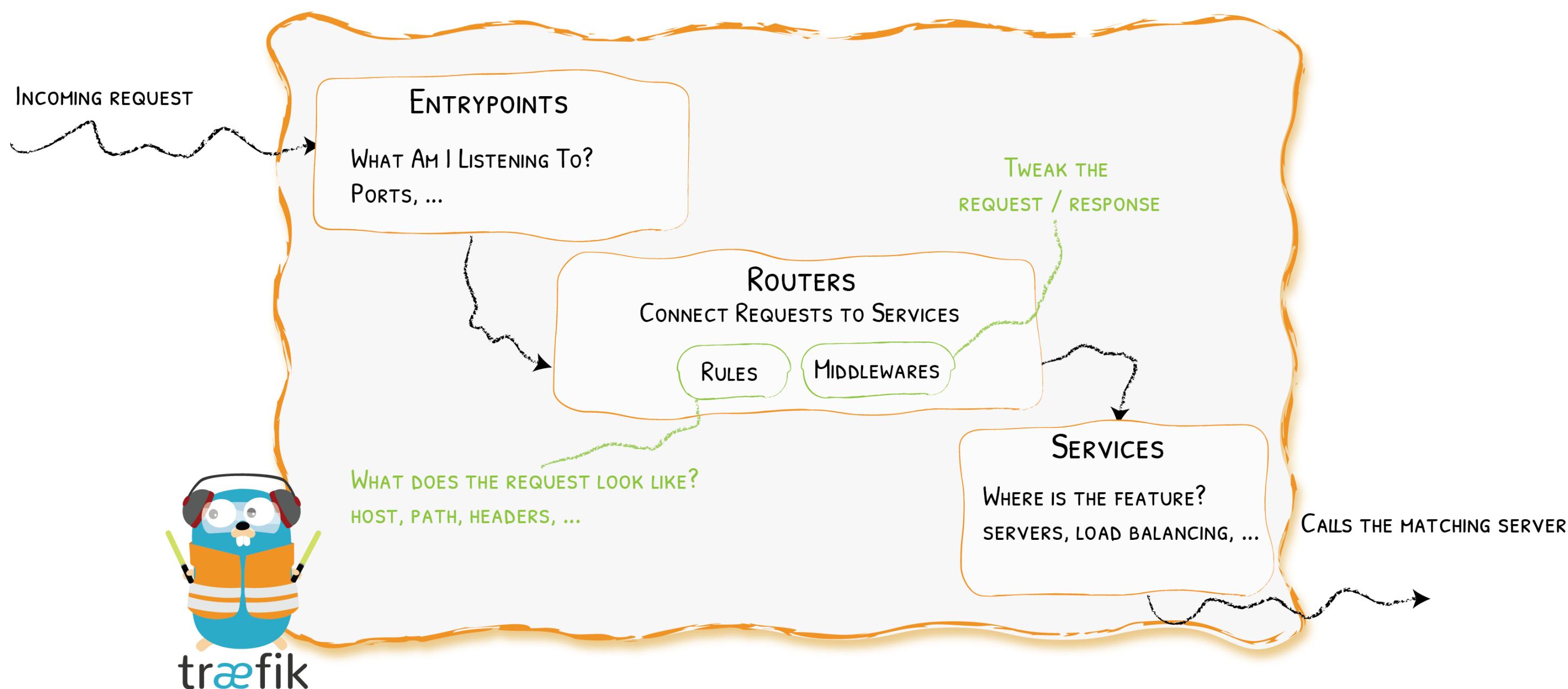
Middlewares



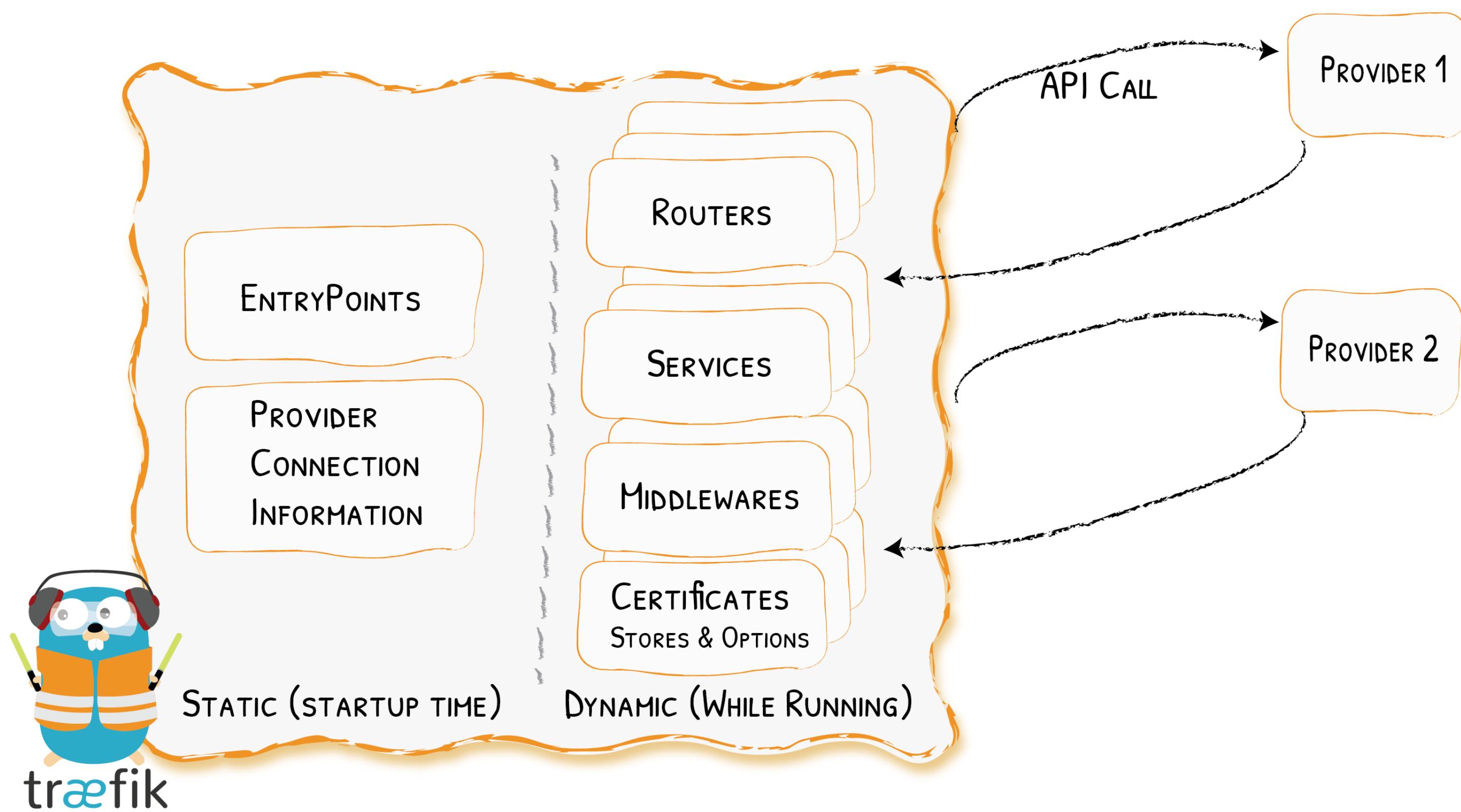
Services



Architecture (Again) At A Glance

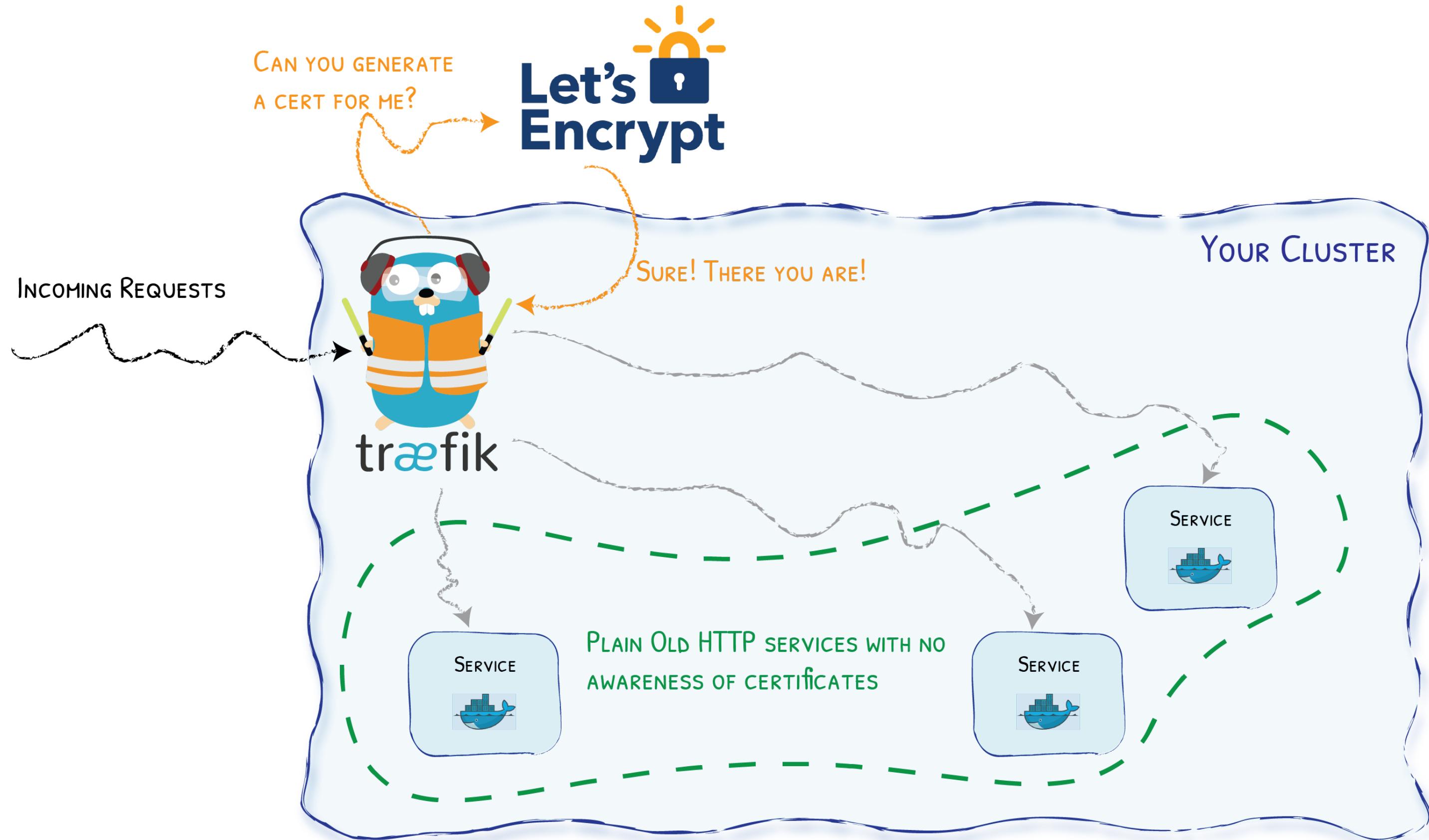


Static & Dynamic Configuration



Traefik And Let's Encrypt

HTTPS & Let's Encrypt



Traefik With ⚓

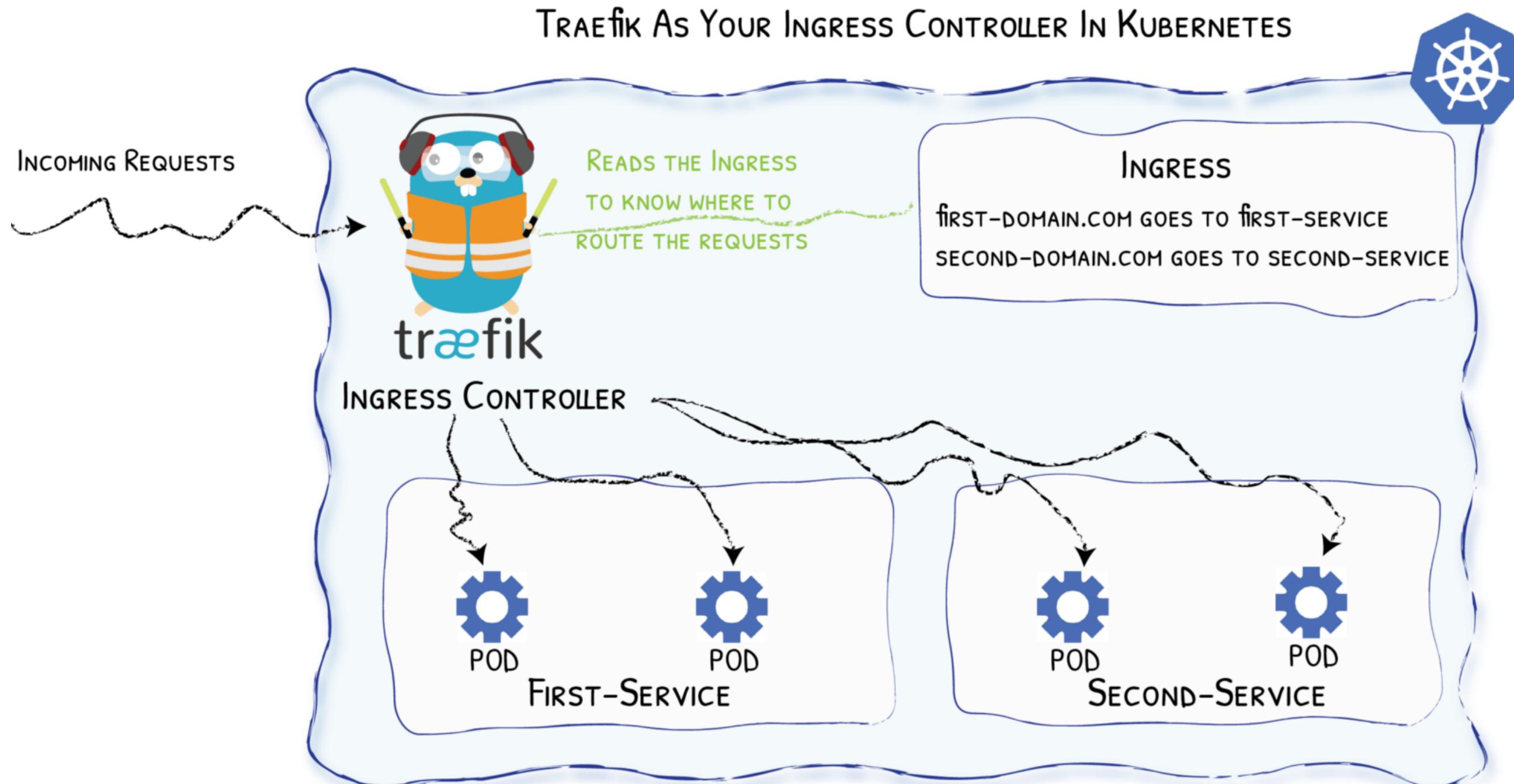


Diagram from <https://medium.com/@geraldcroes>

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)

```
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
```

We Also Missed Talking About ...

A circular word cloud centered around the term "CIRCUIT BREAKERS". Other visible words include: GRPC, S3, ZIPKIN, LIMITING, MESOS, KUBERNETES, Metrics, CERTIFICATE, TLS, Reverse-Proxy, HEADERS, DYNAMIC/WILDCARD, Security, Configurations, Tracing, PROXY, PROMETHEUS, JAEGER, SECRETS, WEBSOCKETS, SSL, FORWARD, REDIRECTS, DOCKER, CHECKS, PROTOCOL, HEALTH, HSTS, CLUSTER, AUTH, RATE, CONSUL, SWARM, MODE, and SWARM.

What's New With 2.2

Enhanced Kubernetes Ingress
KV stores
UDP
Elastic APM tracer
Web-UI Dark Mode
Entrypoint Defaults

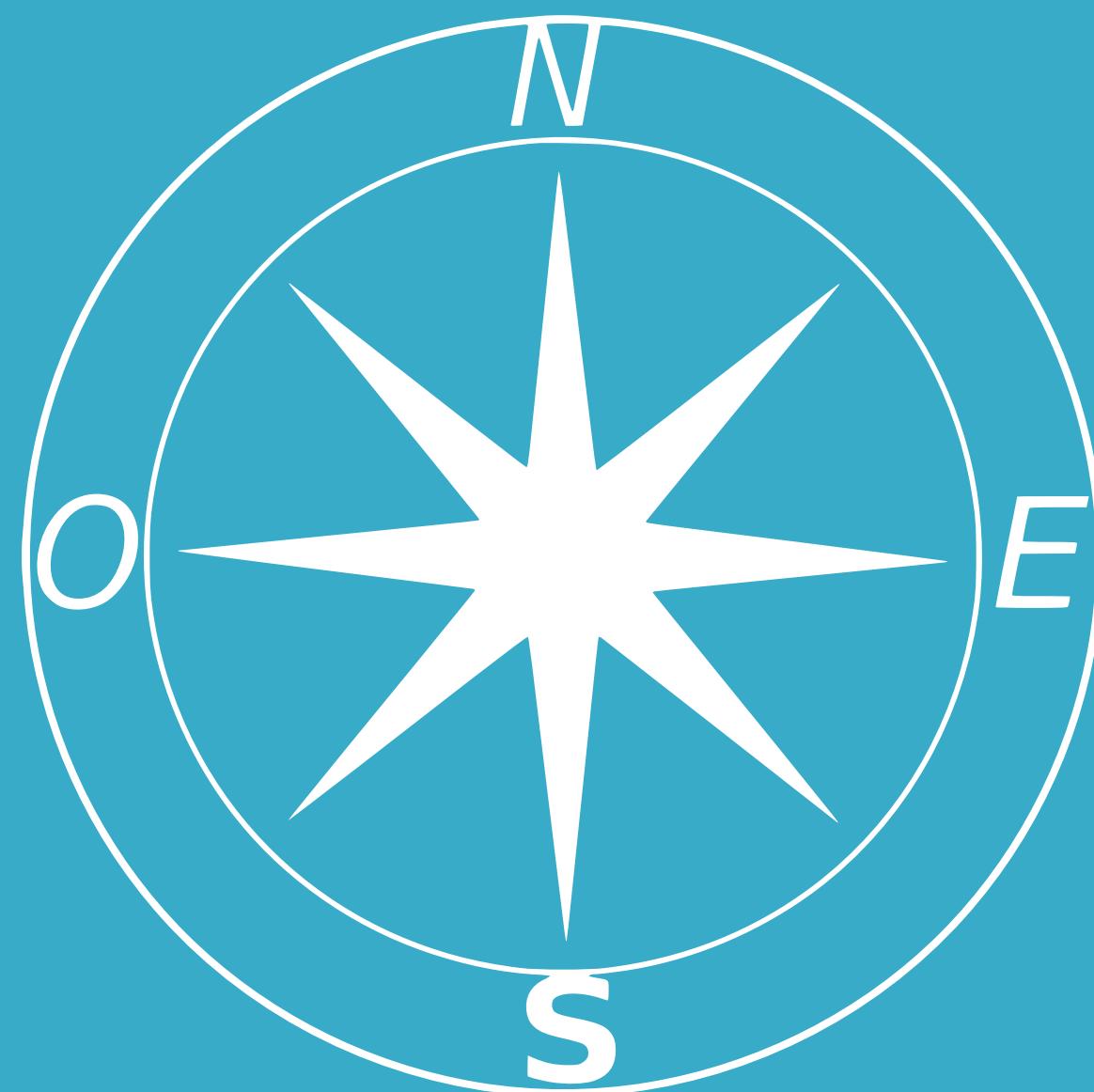
træfik 2.2



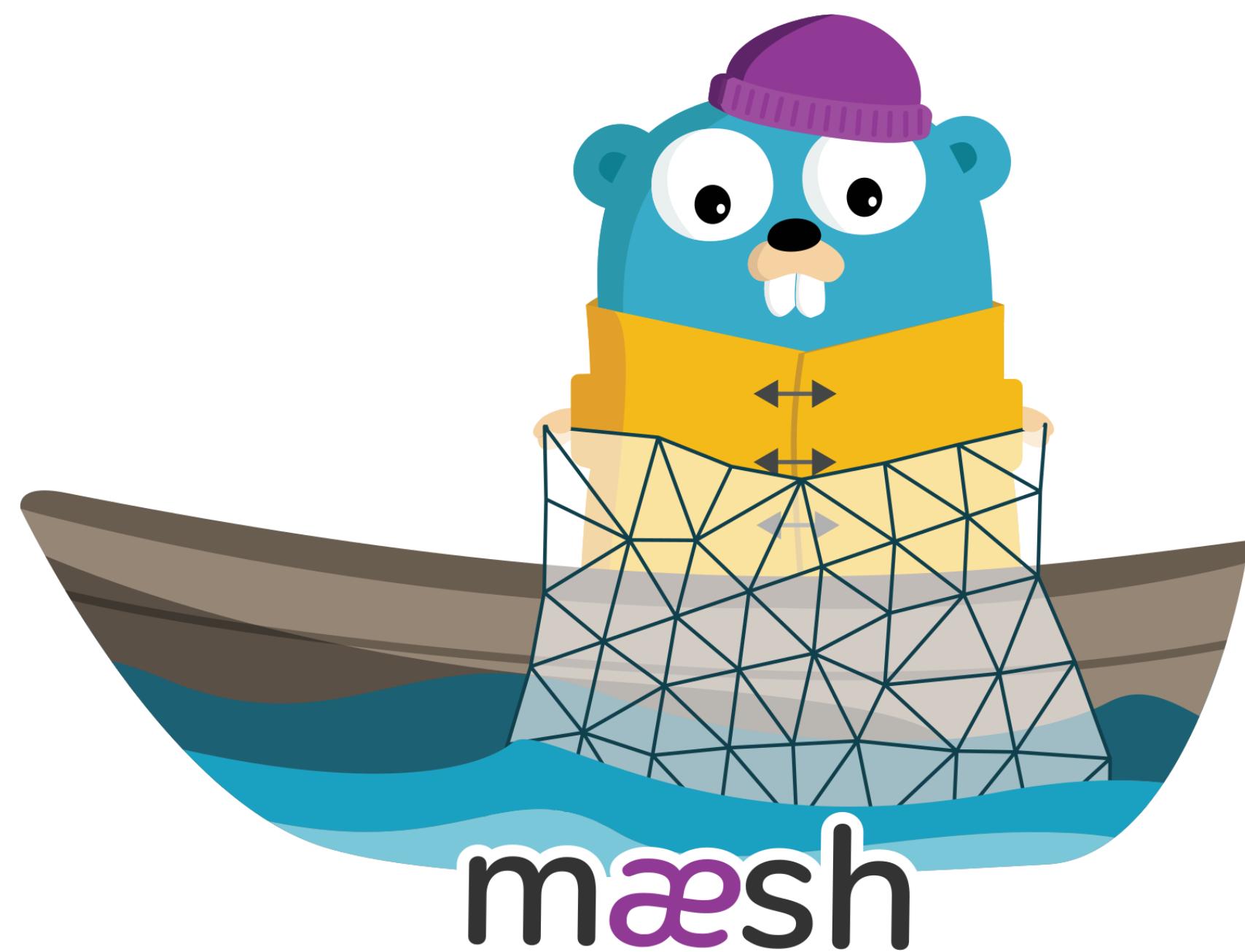
More Info

- Back to Traefik 2.0
- Community Forum
- Official Documentation

East / West Traefik



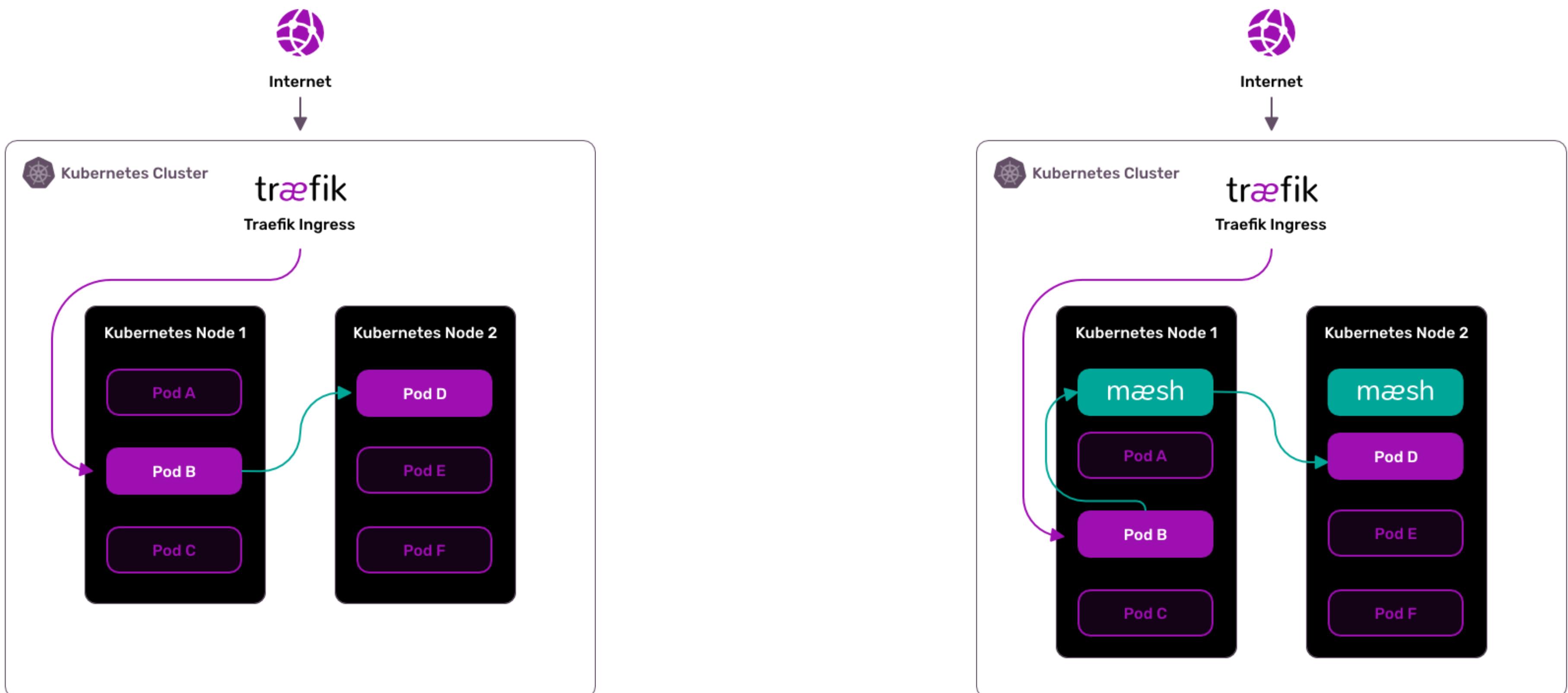
Say Hello To Maesh



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

```
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
```

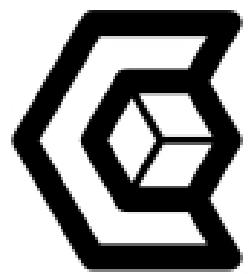
That's All Folks!



We Have
Stickers!

traefik

We Are Hiring!

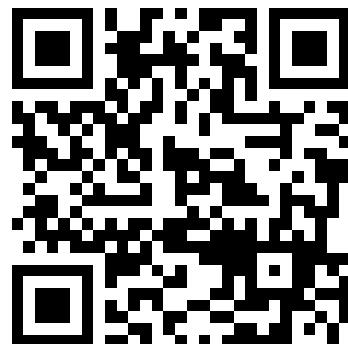


CONTAINOUS

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

Thank You!

-  @manuel_zapf
-  SantoDE



- Slides (HTML): <https://containous.github.io/slides/d2iq-virtual-summit>
- Slides (PDF): <https://containous.github.io/slides/d2iq-virtual-summit/slides.pdf>
- Source on : <https://github.com/containous/slides/tree/d2iq-virtual-summit>