

# Easy HTTPS For Your Microservice Architectures Running On Kubernetes



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

# Whoami

Manuel Zapf

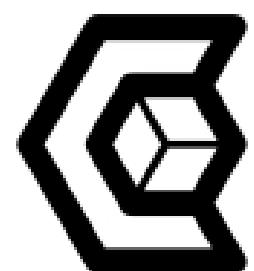
- Head of Product Open Source @ Containous
- Maintainer on Traefik
-  @manuel\_zapf
-  SantoDE



# 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

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**1990's**

SPAGHETTI-ORIENTED  
ARCHITECTURE  
(aka Copy & Paste)



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**2000's**

LASAGNA-ORIENTED  
ARCHITECTURE  
(aka Layered Monolith)



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**2010's**

RAVIOLI-ORIENTED  
ARCHITECTURE  
(aka Microservices)

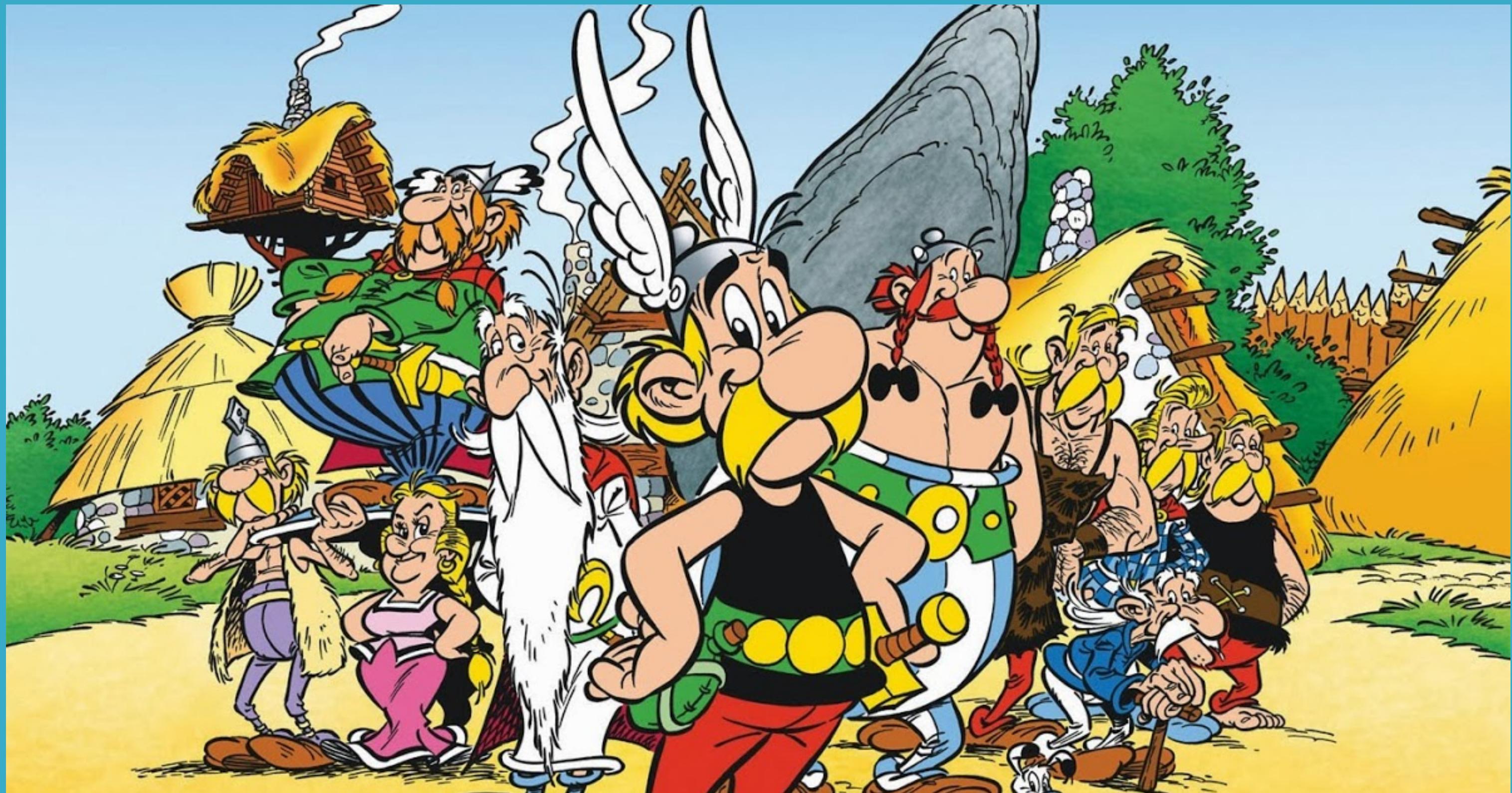


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**WHAT'S NEXT?**  
PROBABLY PIZZA-ORIENTED ARCHITECTURE

By @benorama

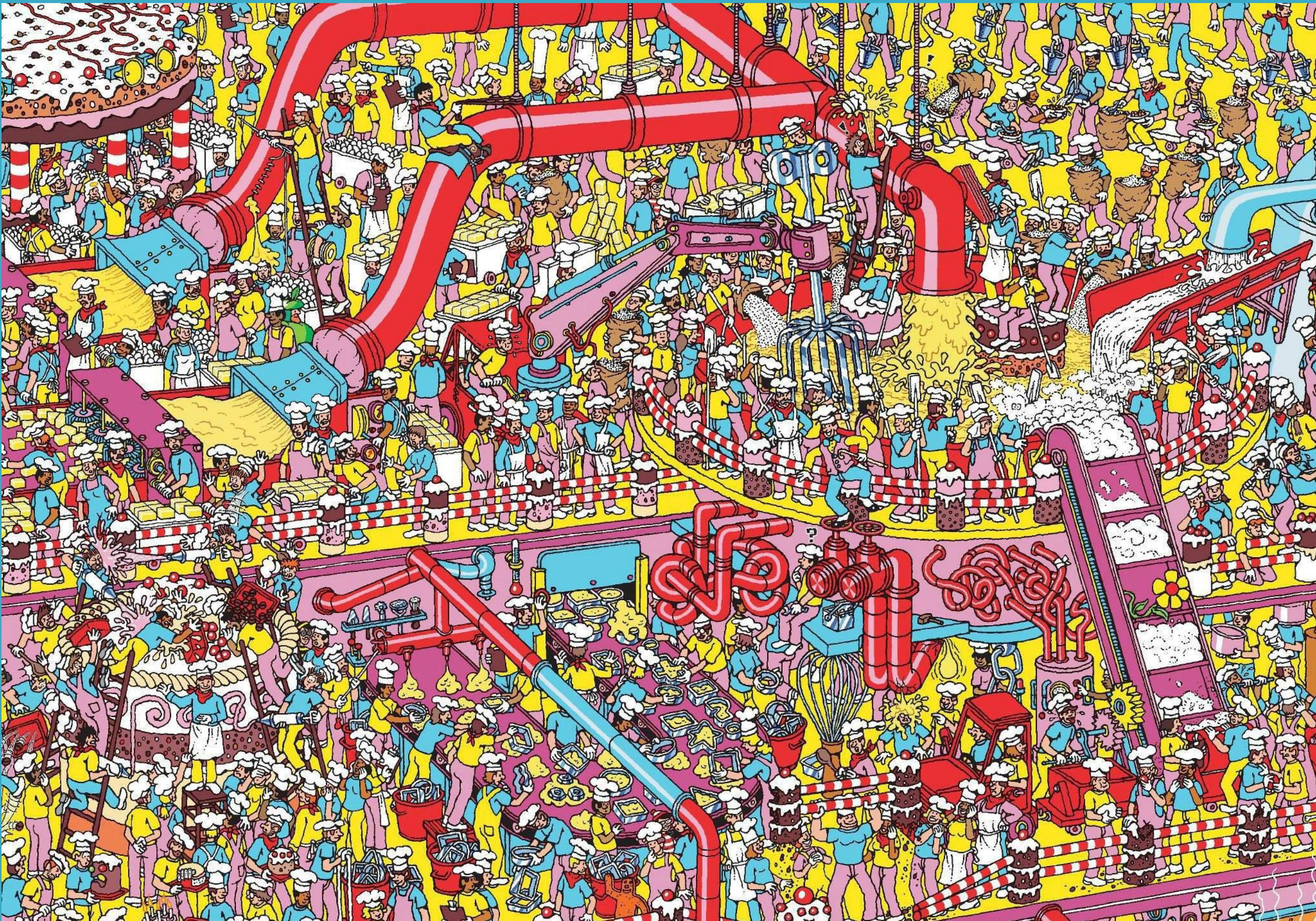
# The Premise Of Microservices...



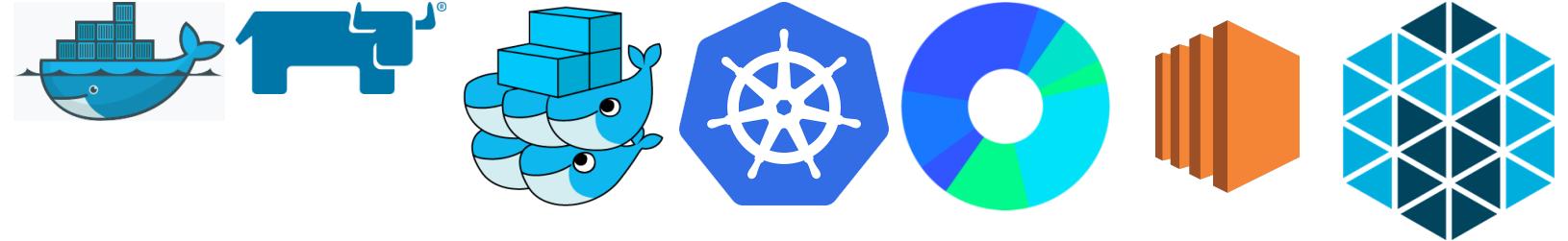
# ...And What Happens



# Where's My Service?



# Tools Of The Trade



# WTF Is 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

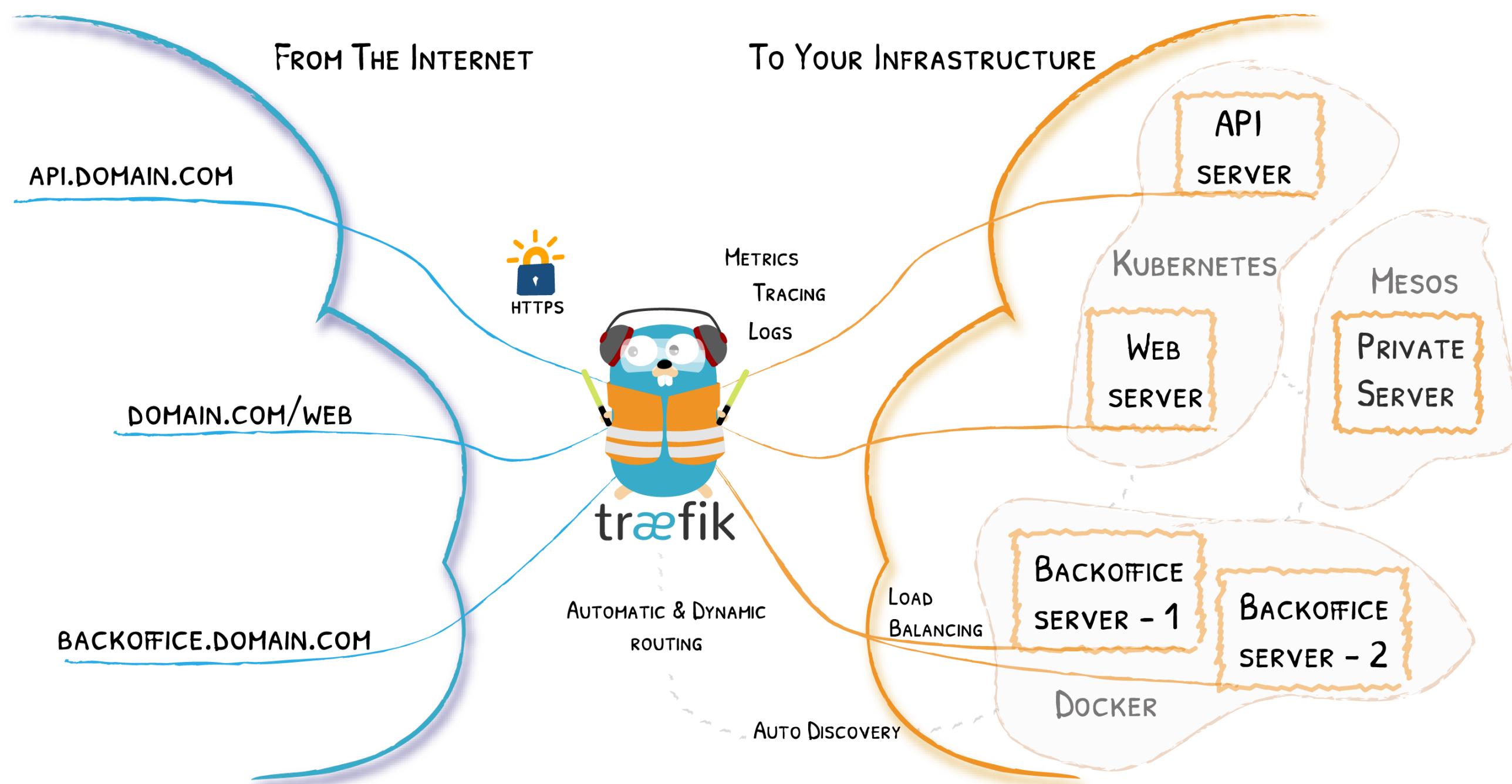
- Hard to setup and especially to maintain
- Demanding in Ressources, Knowledge...
- Complex Concepts (Services. Ingress)...

# What If I Told You?



That there is a solution...?

# Here Comes Traefik!



# Traefik Project



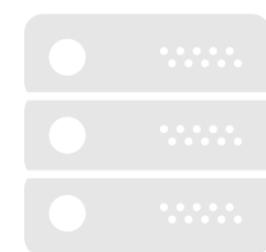
**27,000+**

stars on GitHub



**450+**

contributors



**100K +**  
living  
instances



**1.4 B+**

downloads



**TOP 15**

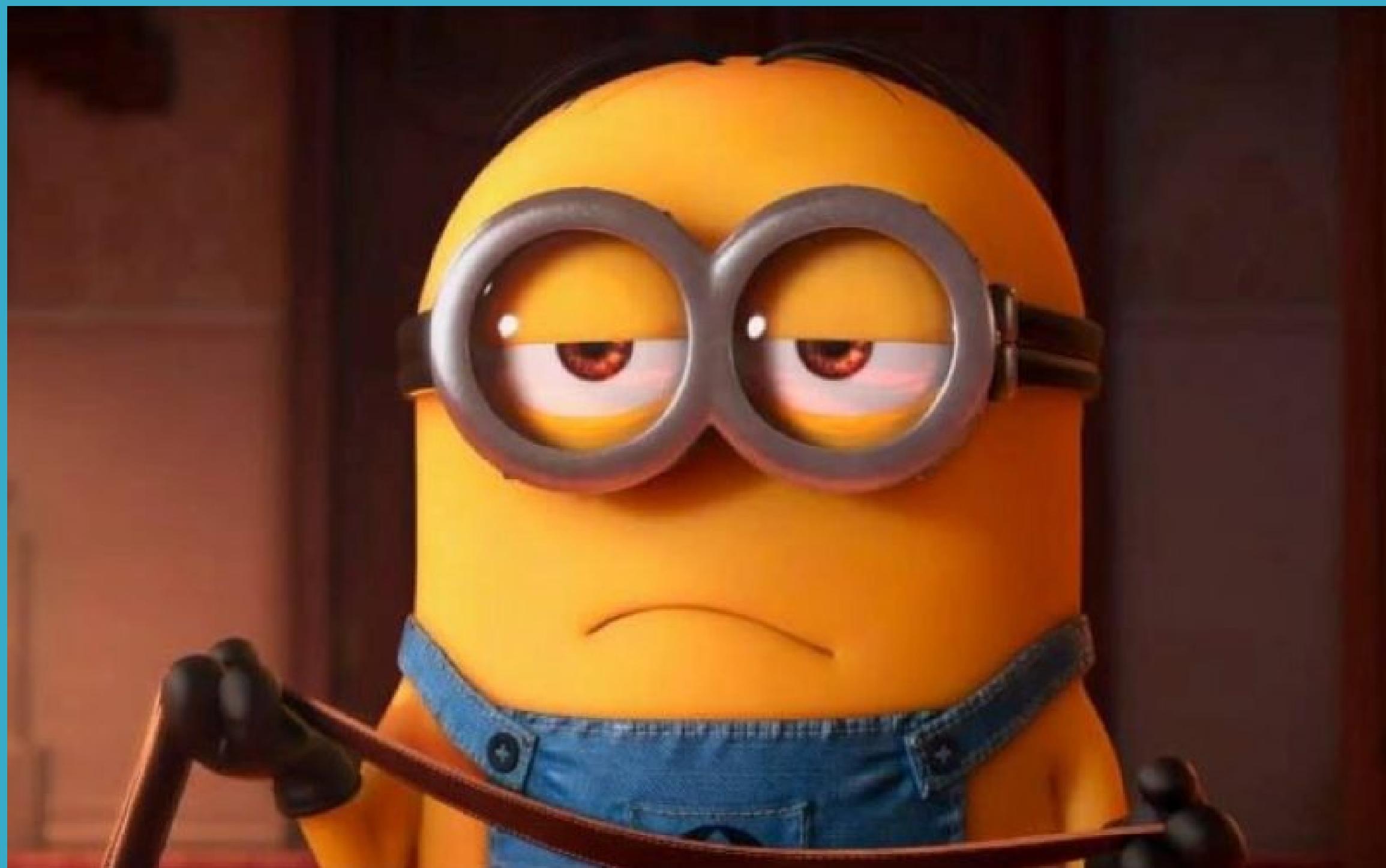
golang project

# Traefik 2.0 Quick Overview

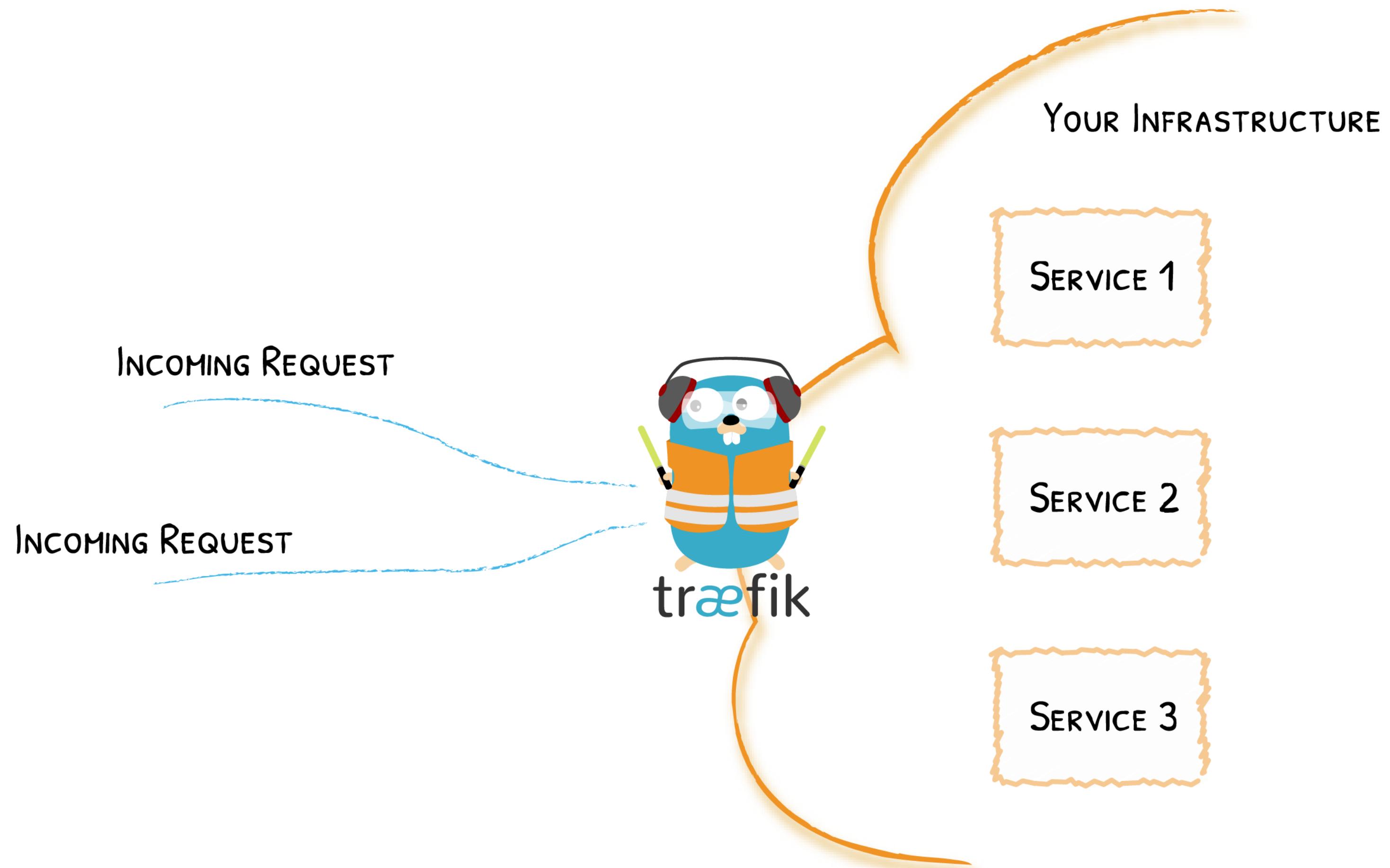
- Revamped Documentation
- Clarified Concepts
- Expressive Routing Rule Syntax
- Middlewares
- TCP Support
- Canary / Mirroring
- And so Much More...

Learn more on the blog post

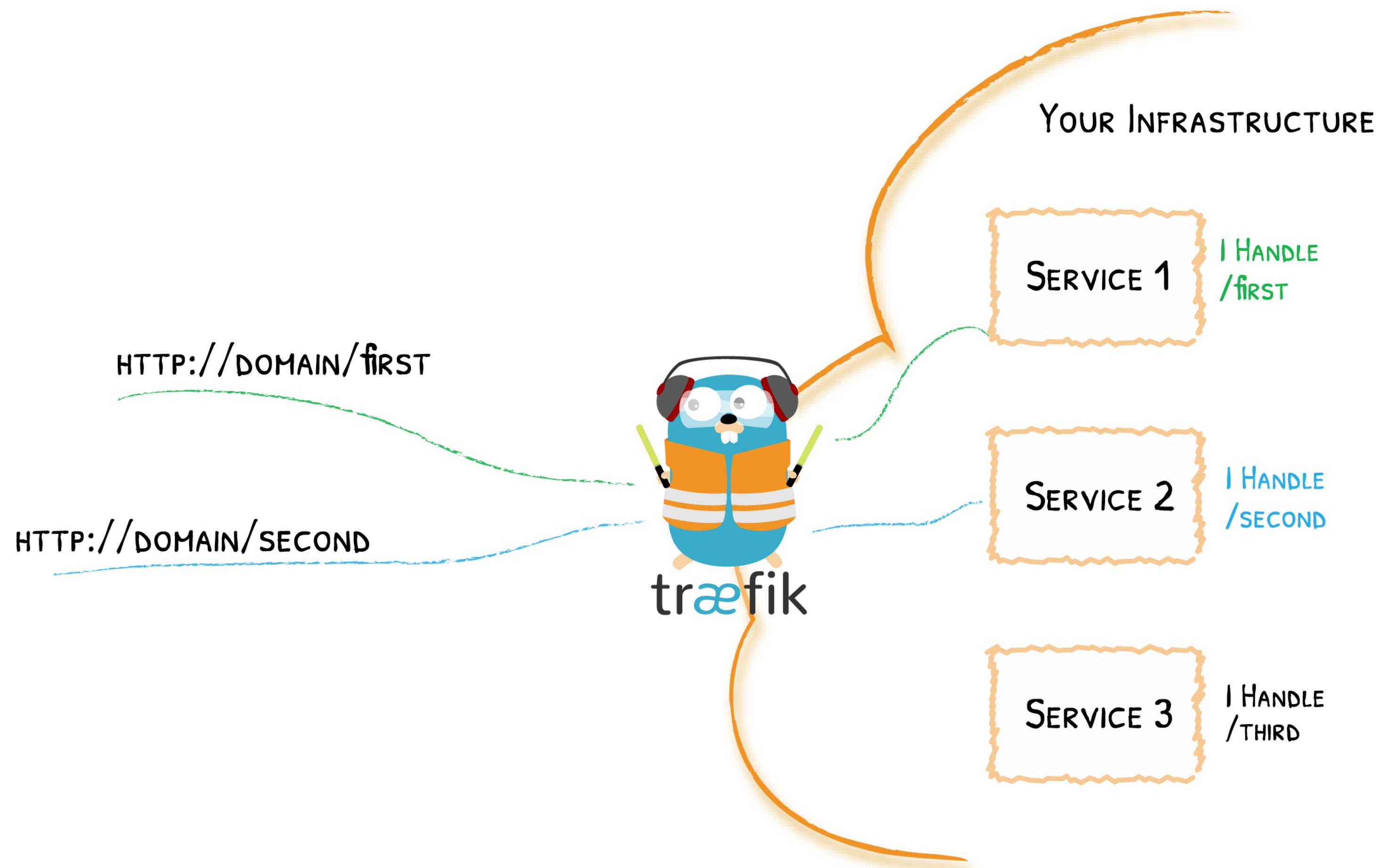
# Traefik (V2.0) Core Concepts



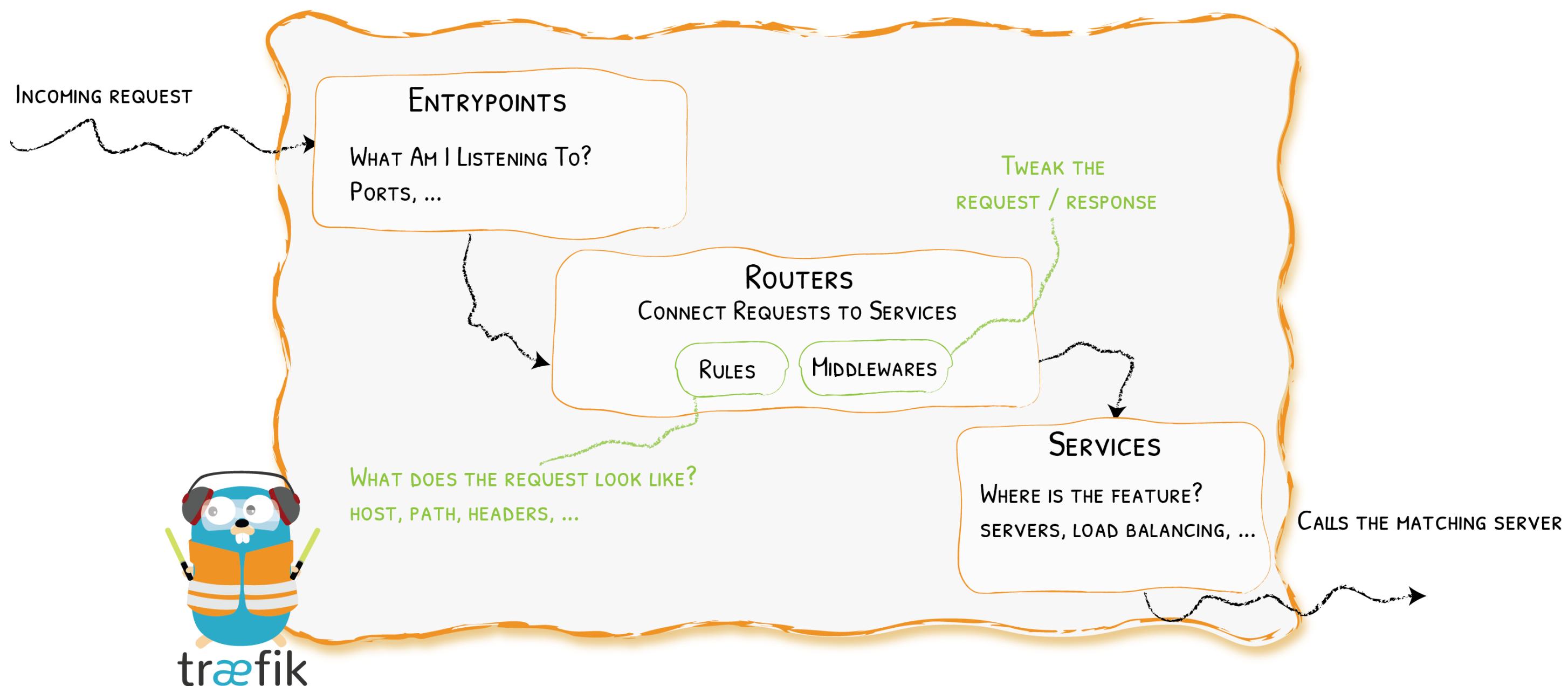
# Traefik Is An Edge Router



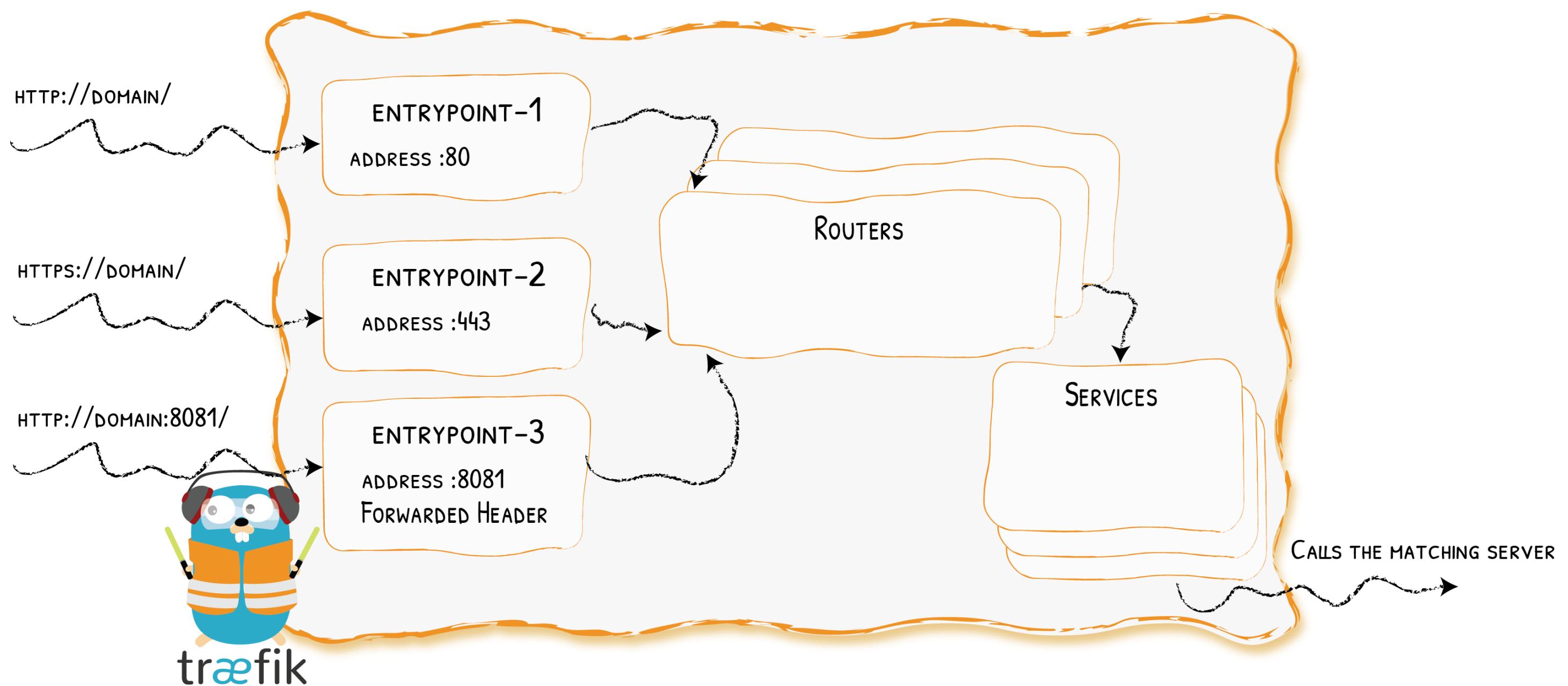
# Dynamically Discovers Services



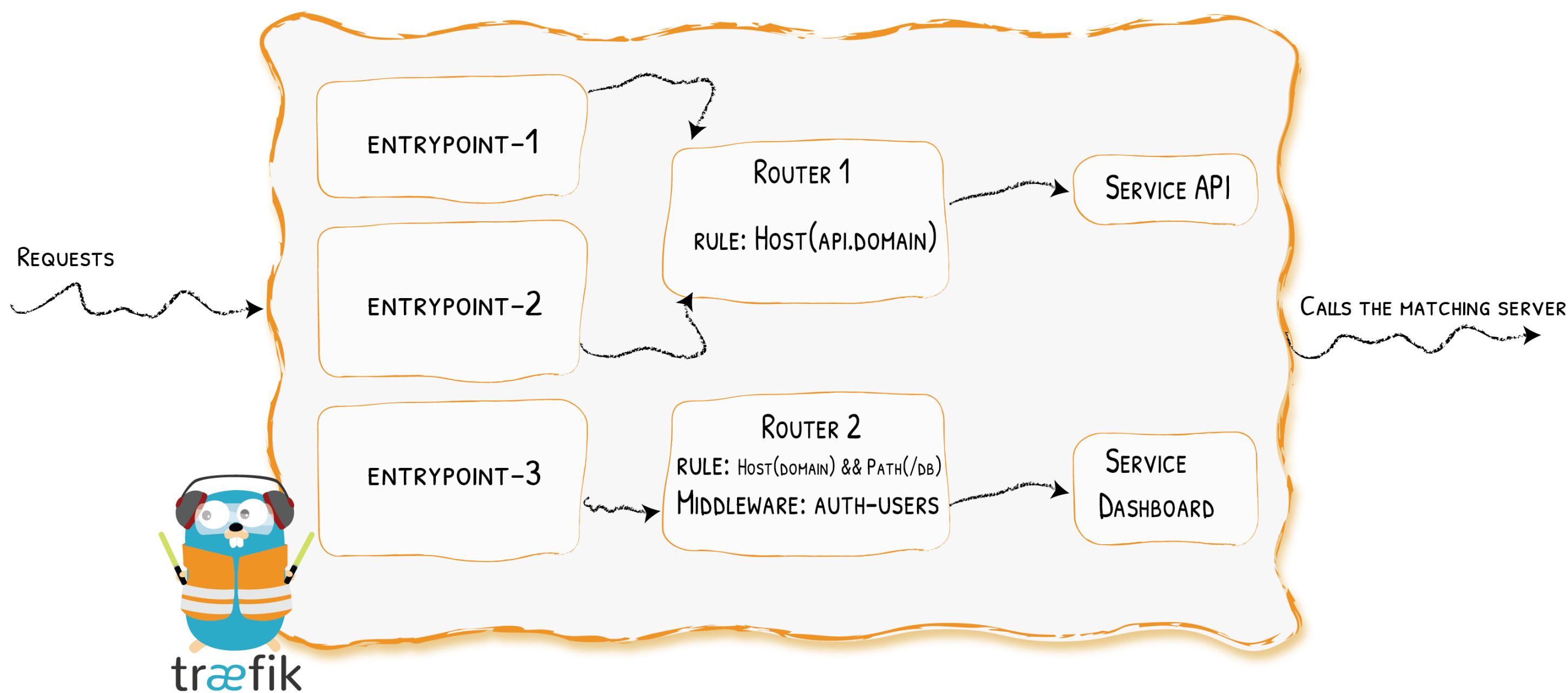
# Architecture (V2.0) At A Glance



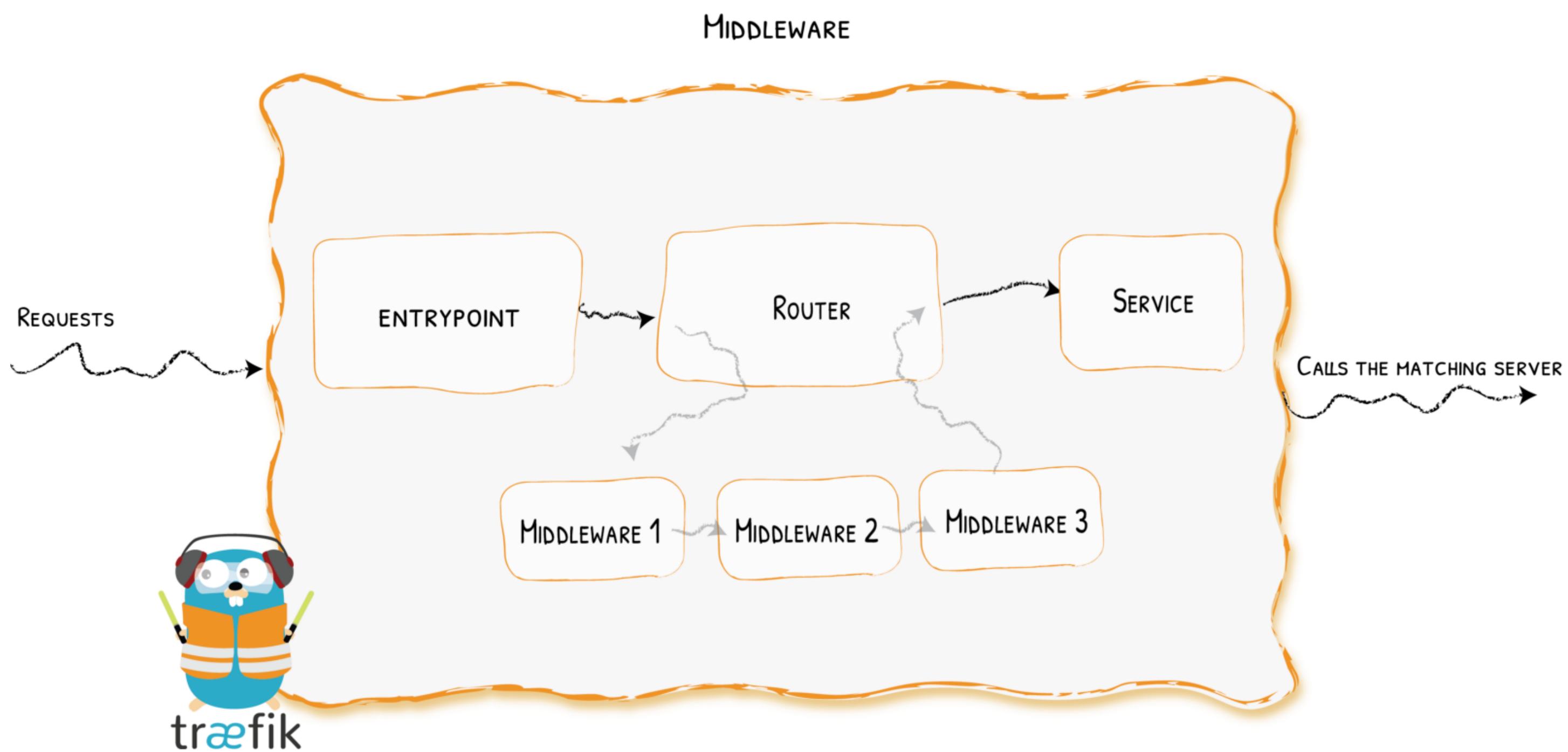
# Entrypoints



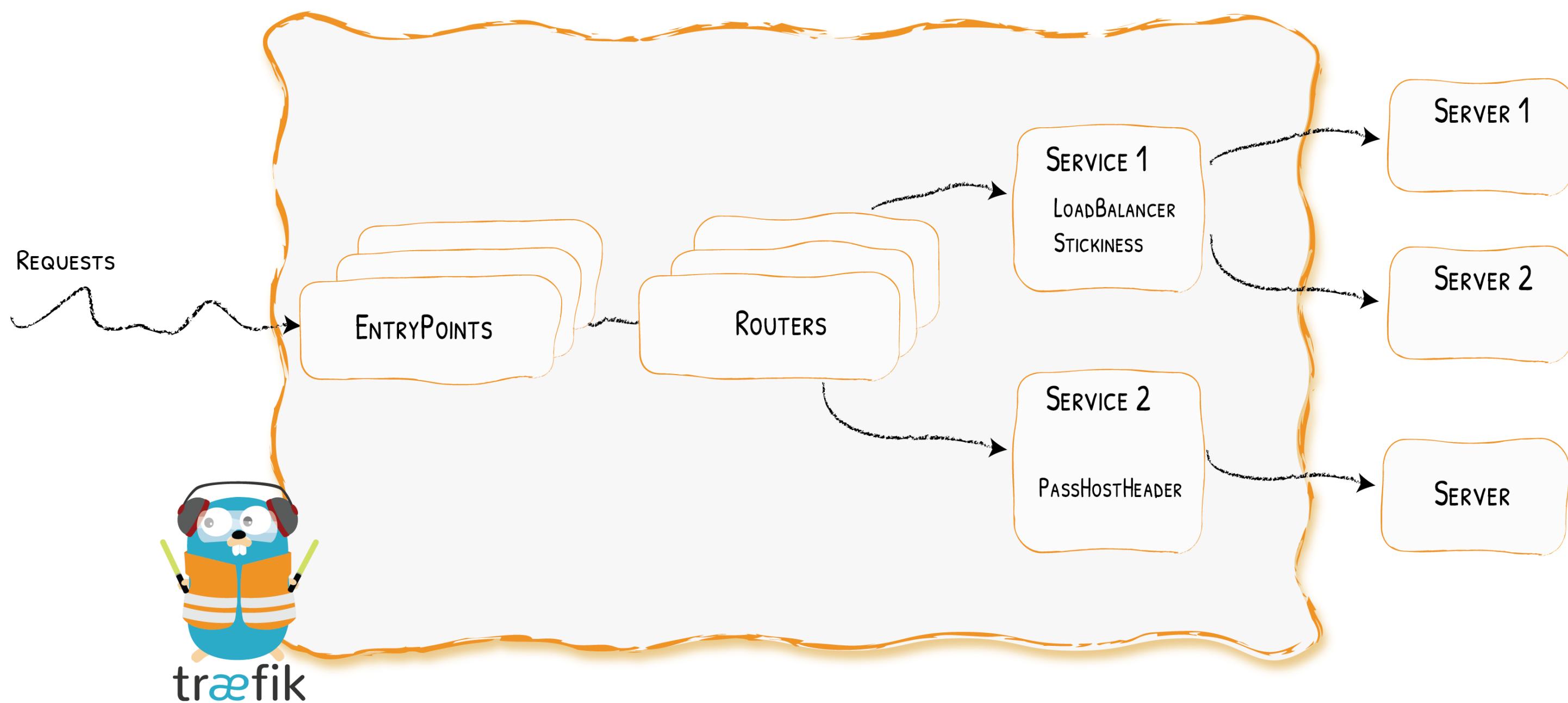
# Routers



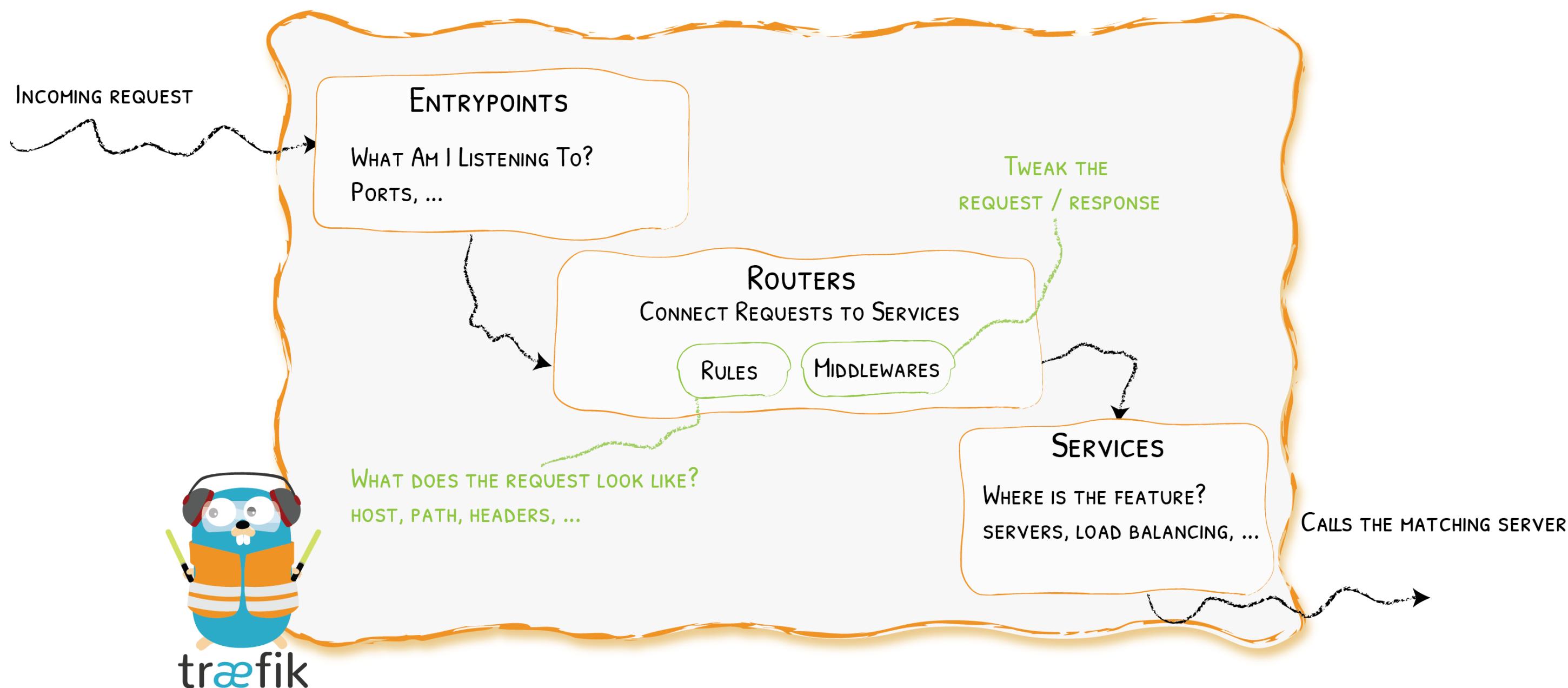
# Middlewares



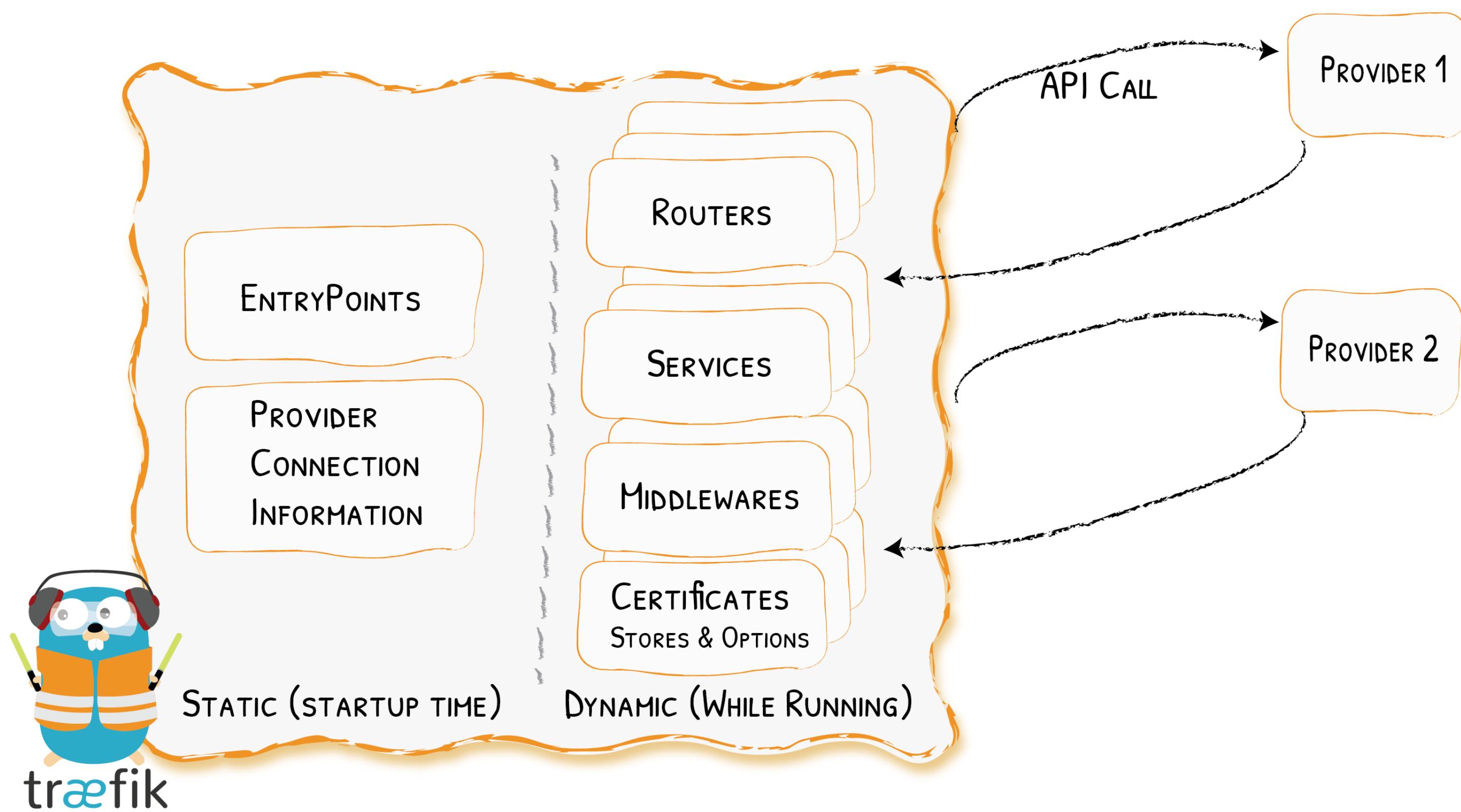
# Services



# Architecture (Again) At A Glance

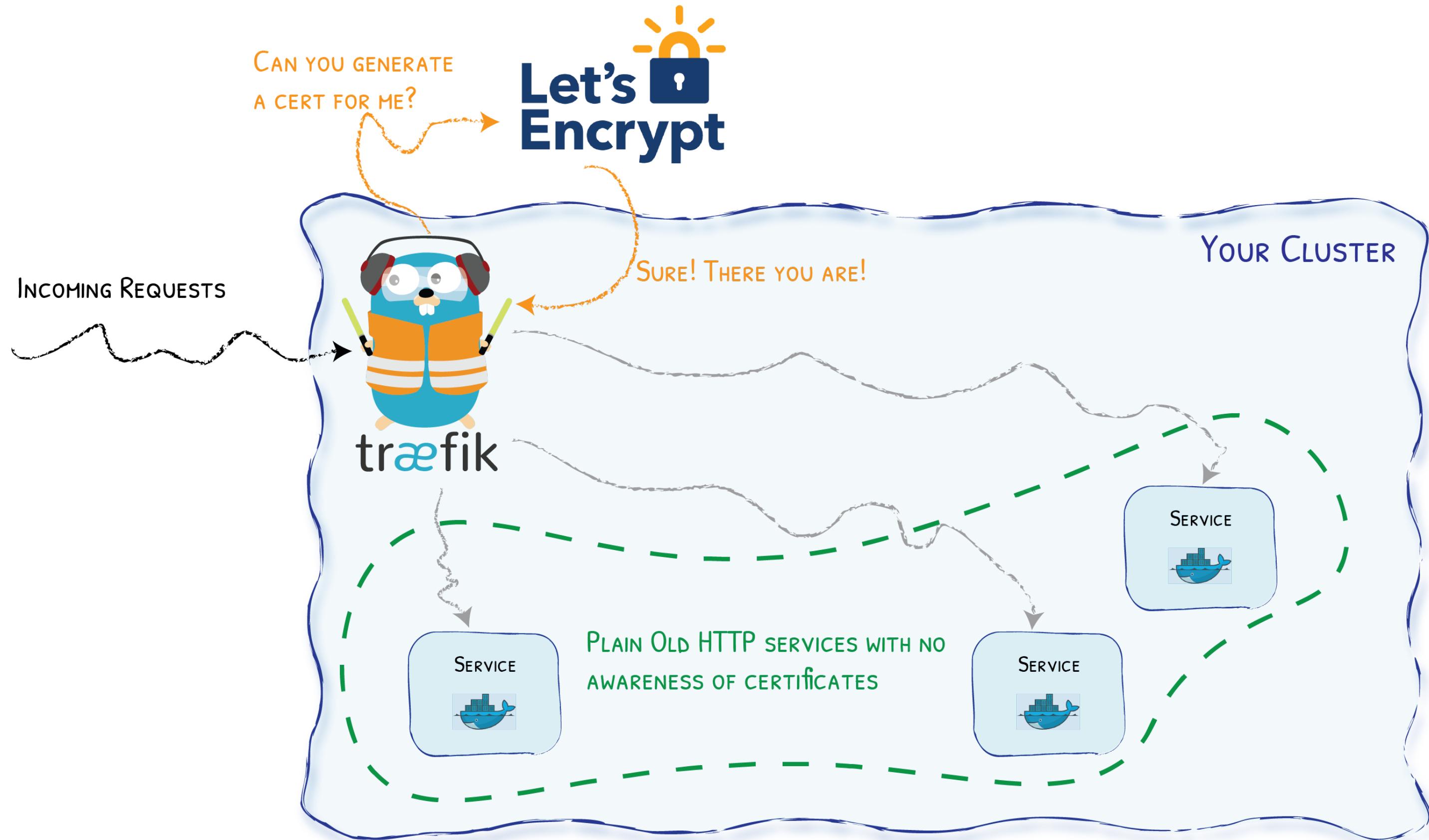


# Static & Dynamic Configuration



# Traefik And Let's Encrypt

# HTTPS & Let's Encrypt



# Traefik With ⚓

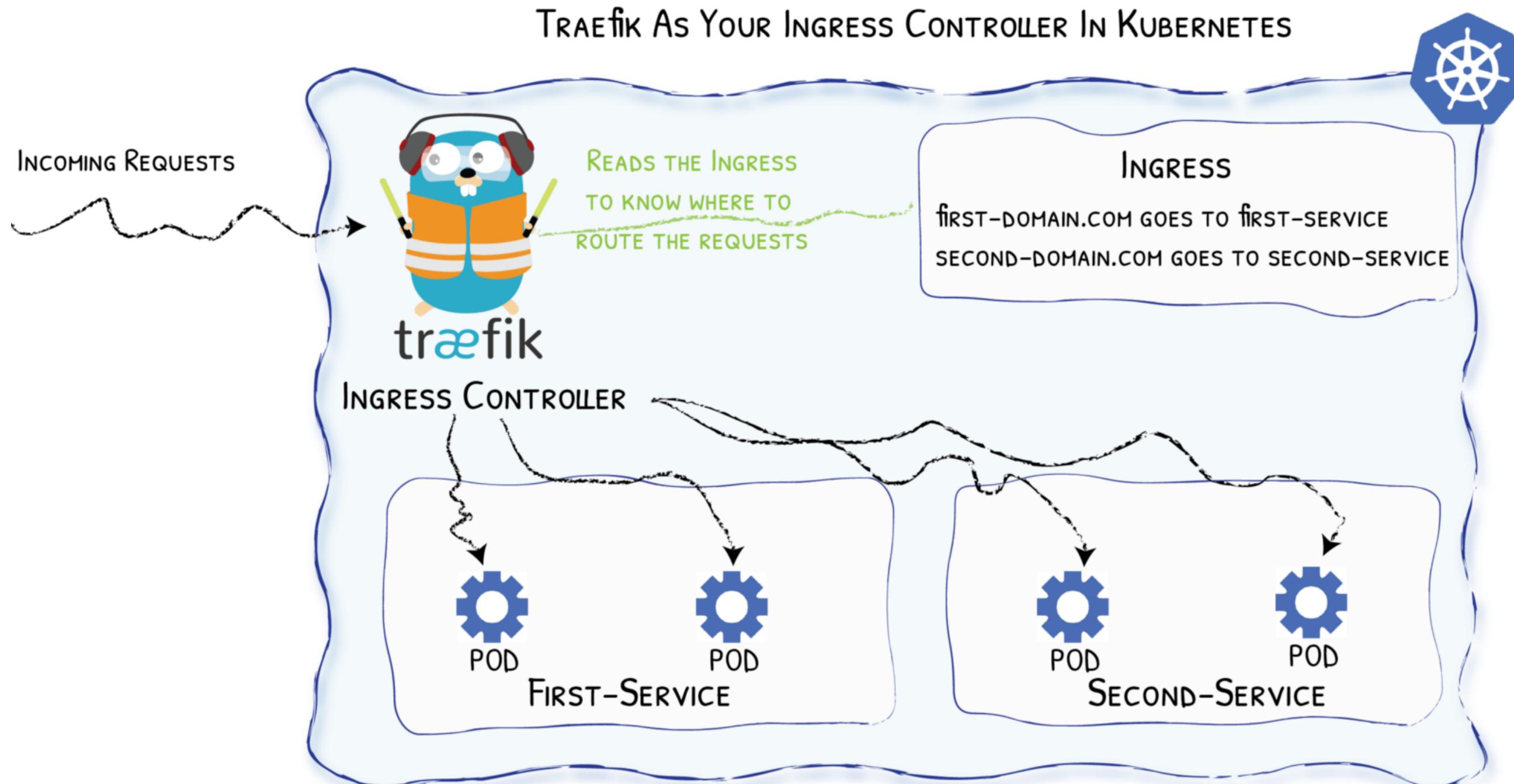


Diagram from <https://medium.com/@geraldcroes>

# 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

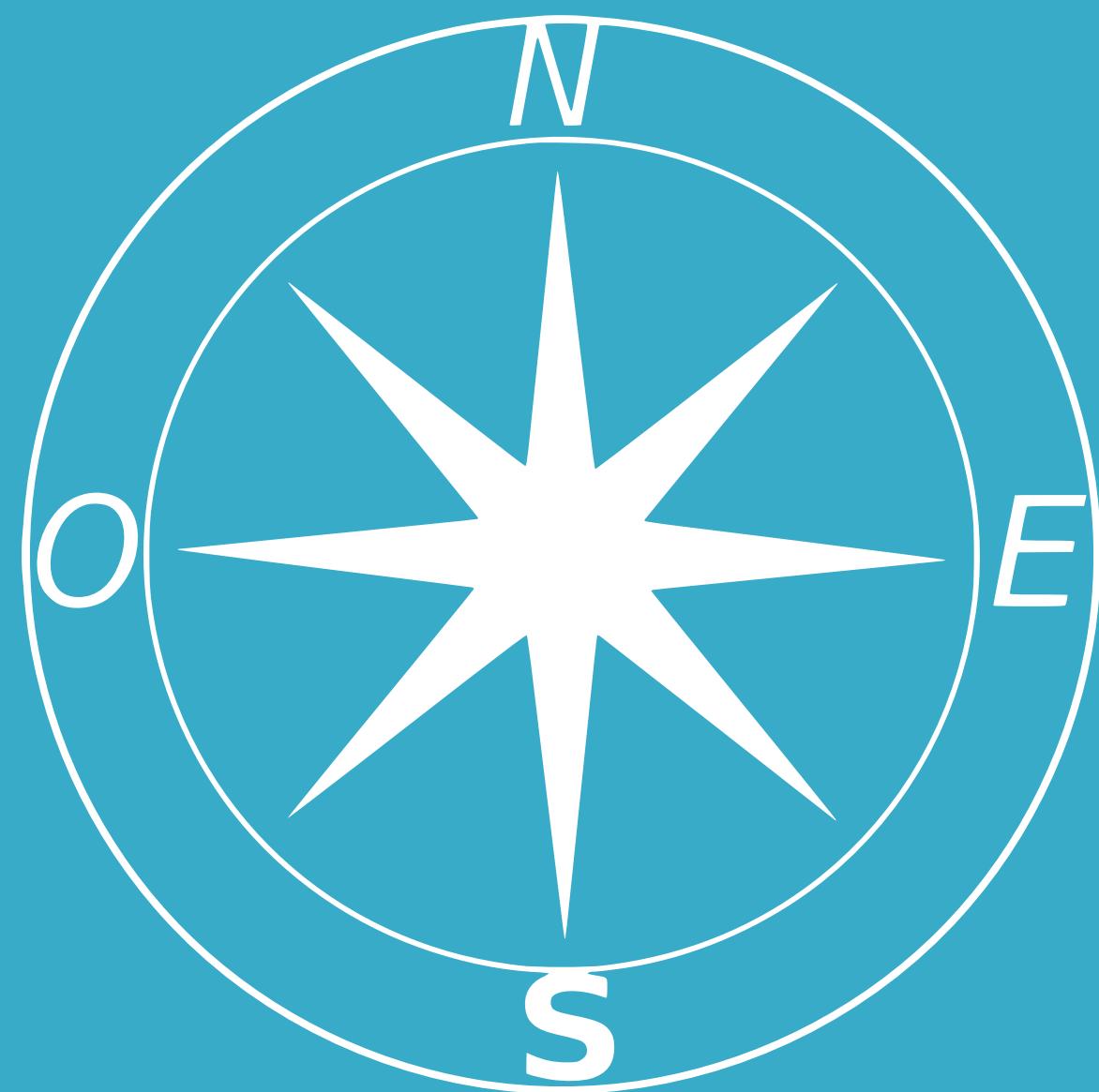
træfik 2.2



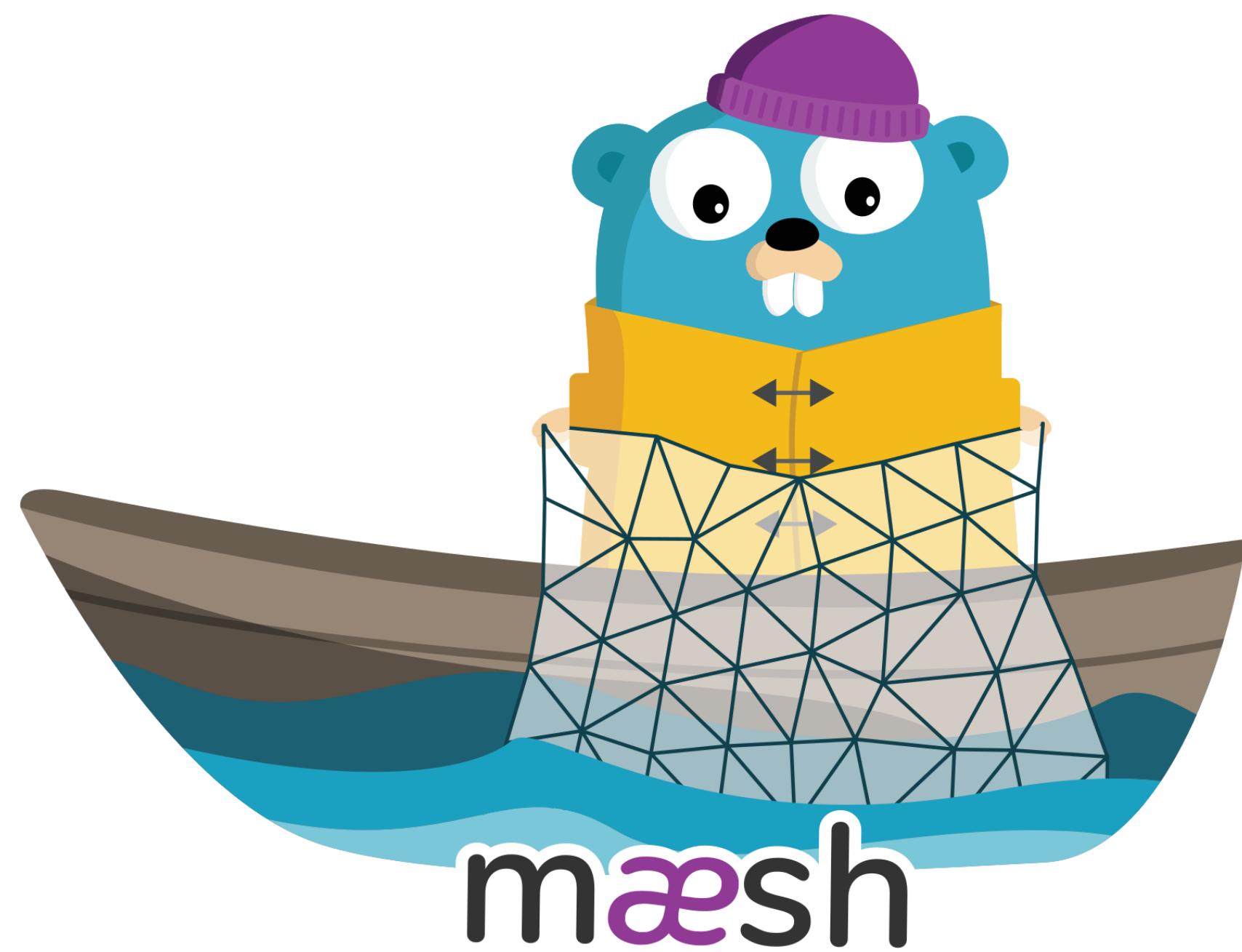
# More Info

- Back to Traefik 2.0
- Community Forum
- Official Documentation

# East / West Traefik



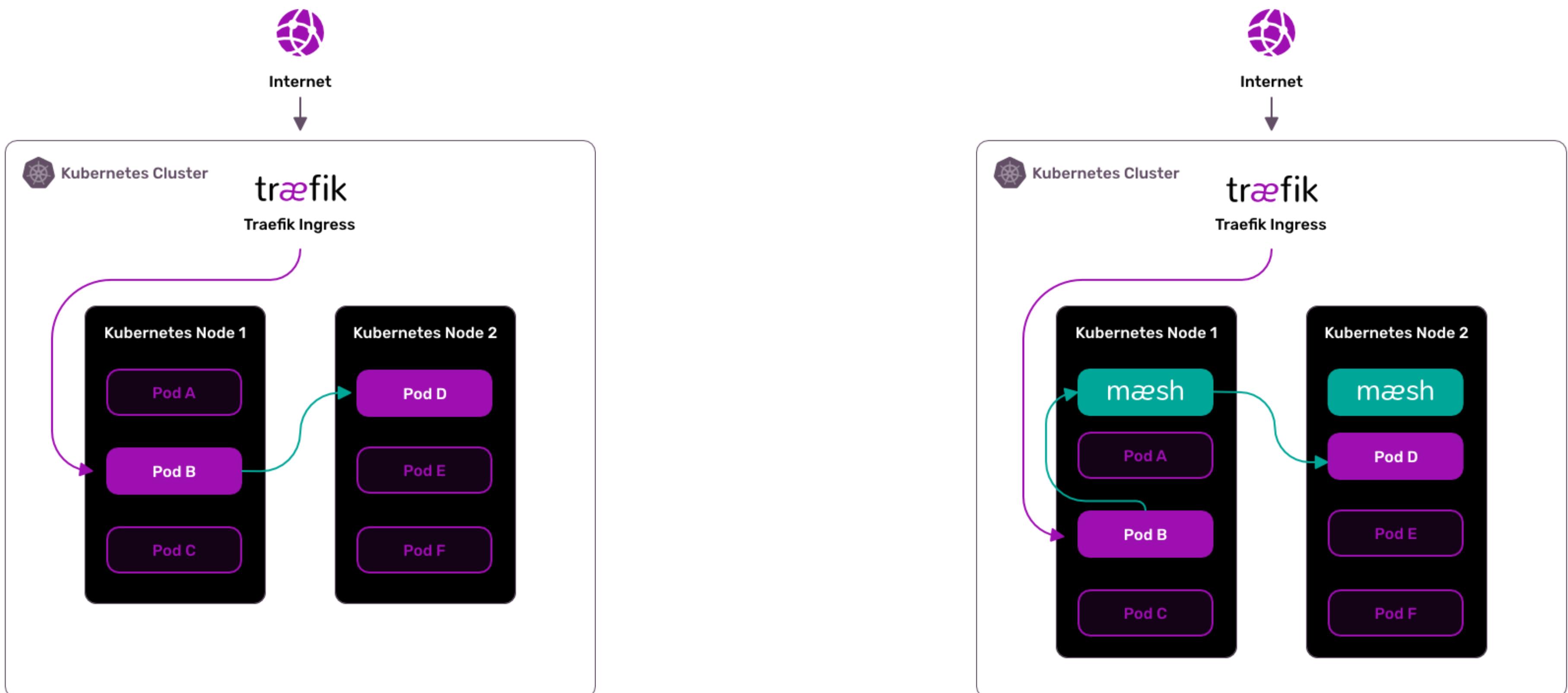
# Say Hello To Maesh



# 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
```

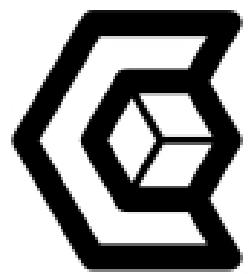
# A Closer Look To SMI Objects

```
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 Are Hiring!

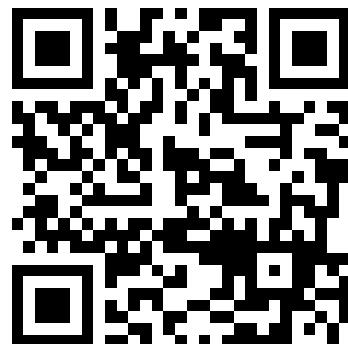


**CONTAINOUS**

```
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>