"Dies Ist Keine Sichere Verbindung" - Edge Router Konfiguration Leicht Gemacht

træfik

How To Use These Slides?

- **Browse the slides:** Use the arrows
  - Change chapter: Left/Right arrows
  - Next or previous slide: Top and bottom arrows
- **Overview of the slides:** keyboard's shortcut "`o`"
- **Speaker mode (and notes):** keyboard's shortcut "`s`"

Whoami

- Manuel Zapf:
  - Træfik's Solution Architect 🔨 @ Containous
- @mZapfDE
- SantoDE

Containous

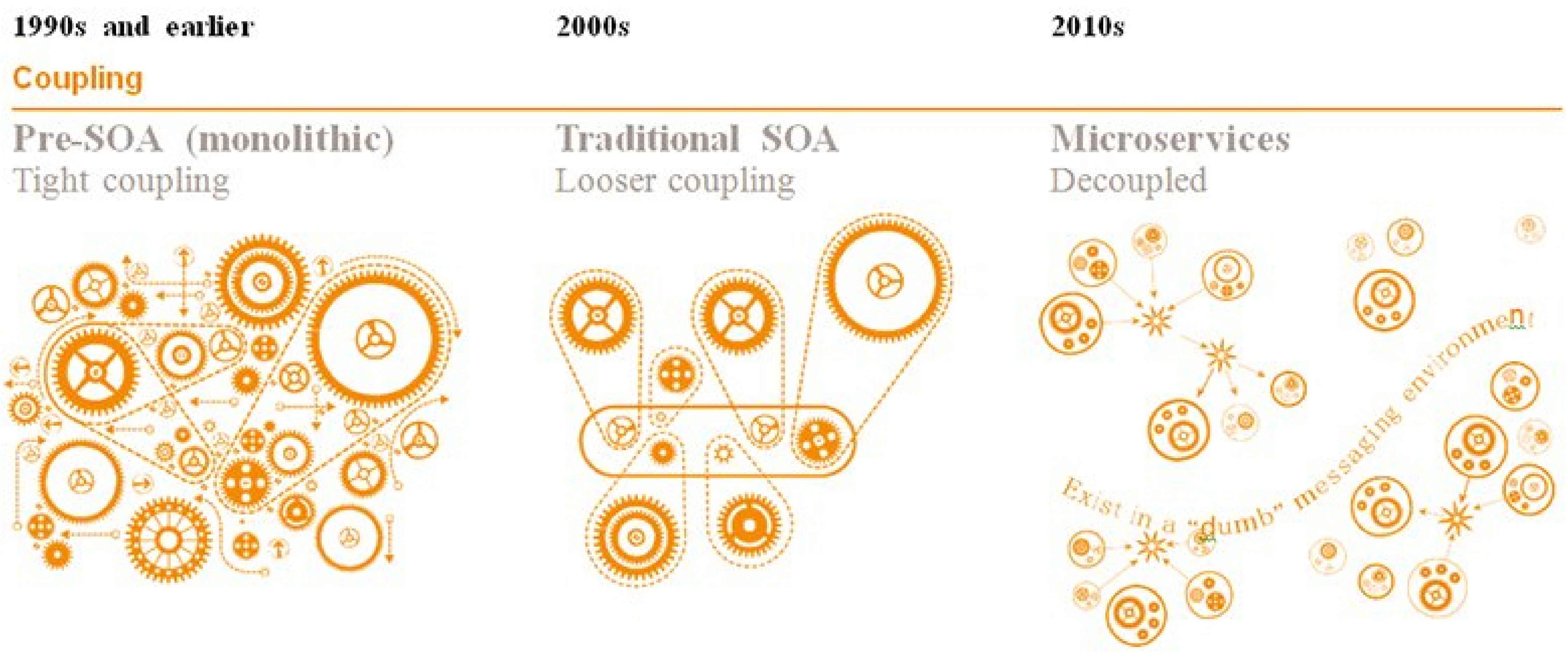
https://containo.us

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

Why Traefik?

Why, Mr Anderson?

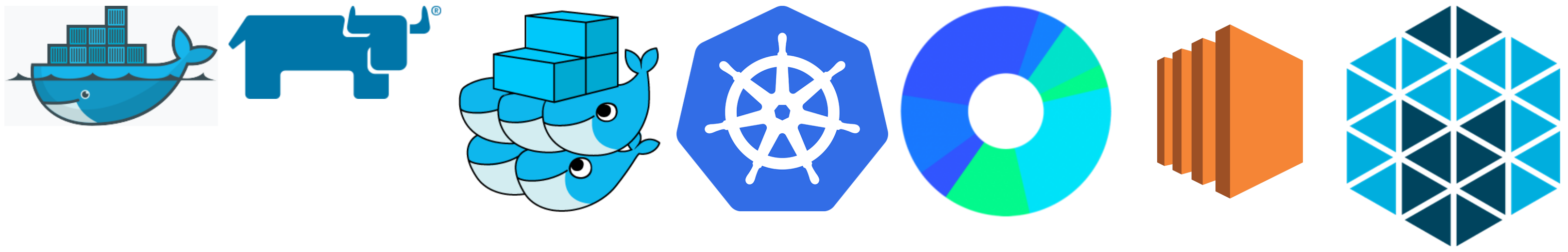
Evolution Of Software Design



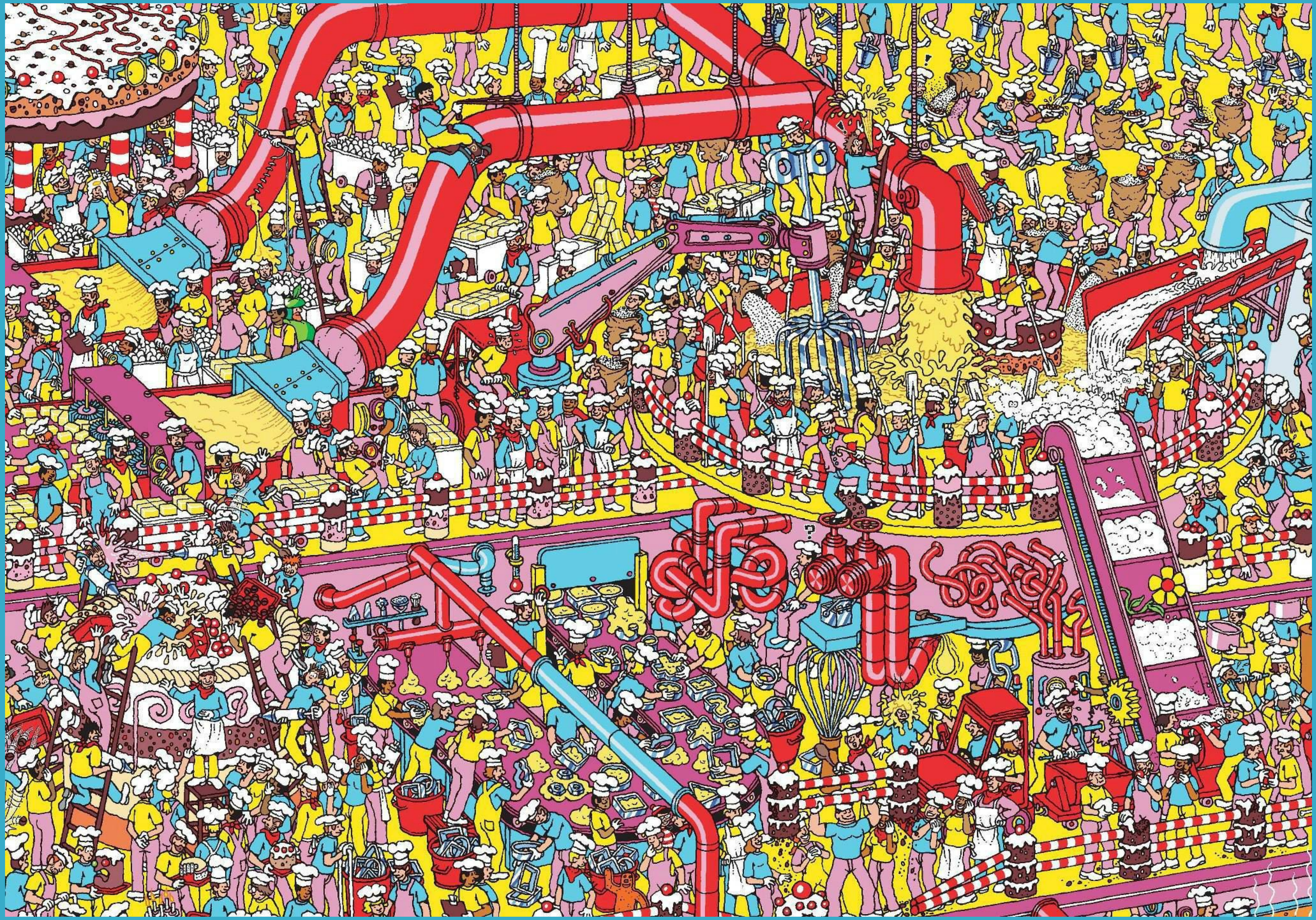
The Premise Of Microservices...

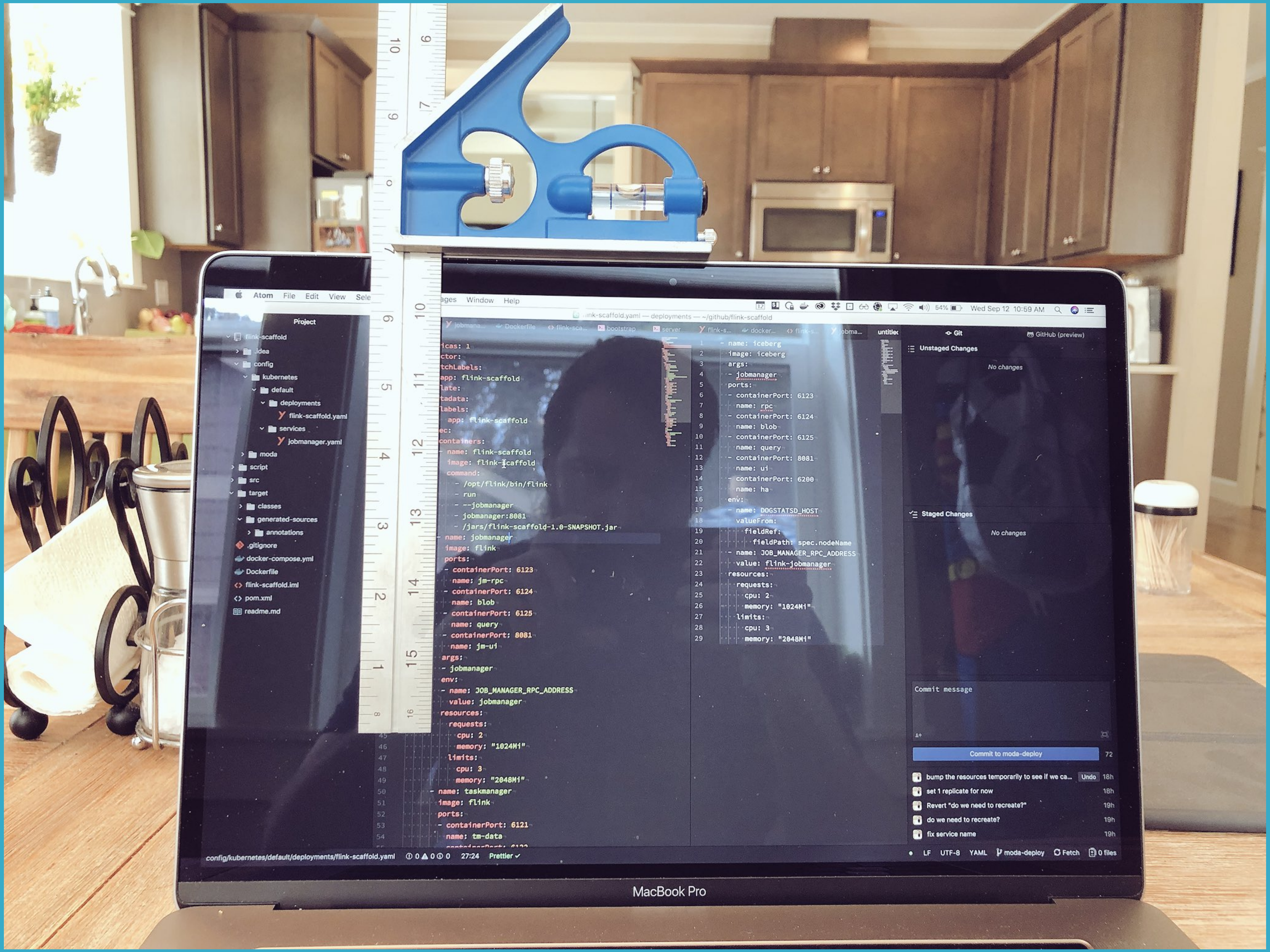
...And What Happens

Tools Of The Trade



Where's My Service?



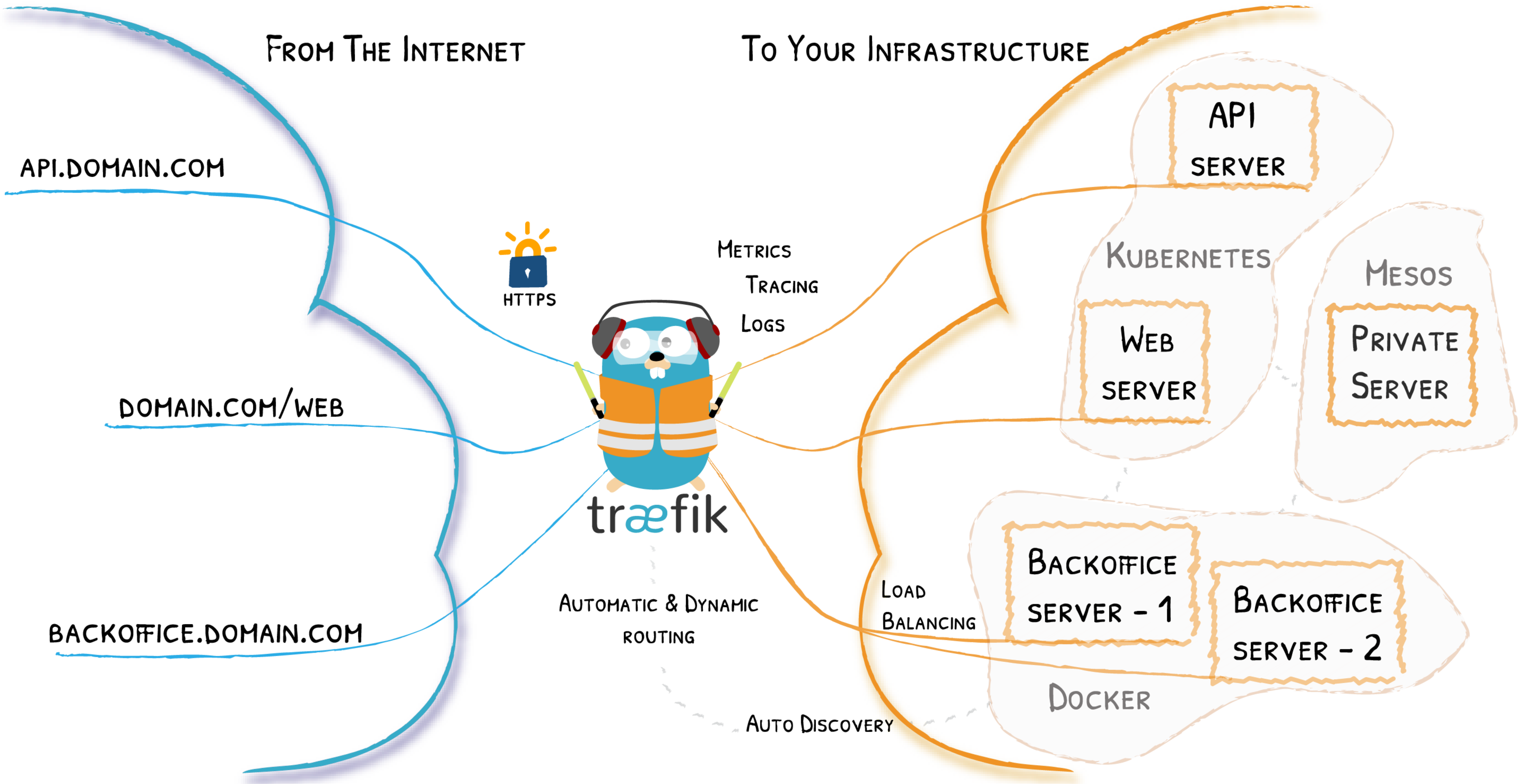


Source: https://twitter.com/Caged/status/1039937162769096704

What If I Told You?

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

Here Comes Traefik!



Traefik Project

- https://github.com/containous/traefik
- MIT License
- Written in Go
- 24,000+ ☆ 900M+ ⬇ 350+ 👷
- Created in 2015
- Current stable branch: `v1.7`

BACK TO TRAEFIK PART 2.0

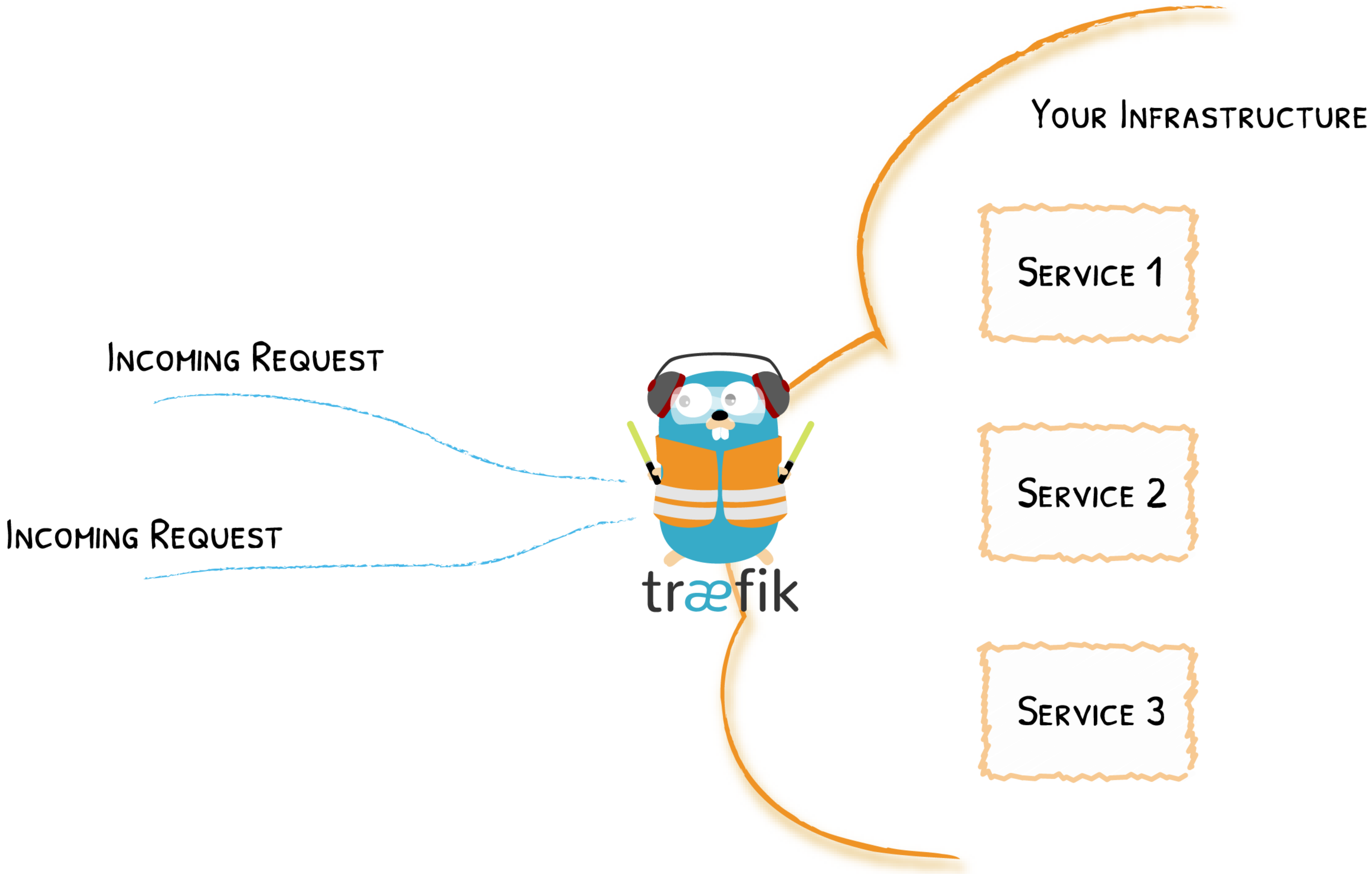
Traefik 2.0 Quick Overview

- Revamped Documentation
- Clarified Concepts
- Expressive Routing Rule Syntax
- Middlewares
- TCP Support
- TLS stores & options
- And so Much More…

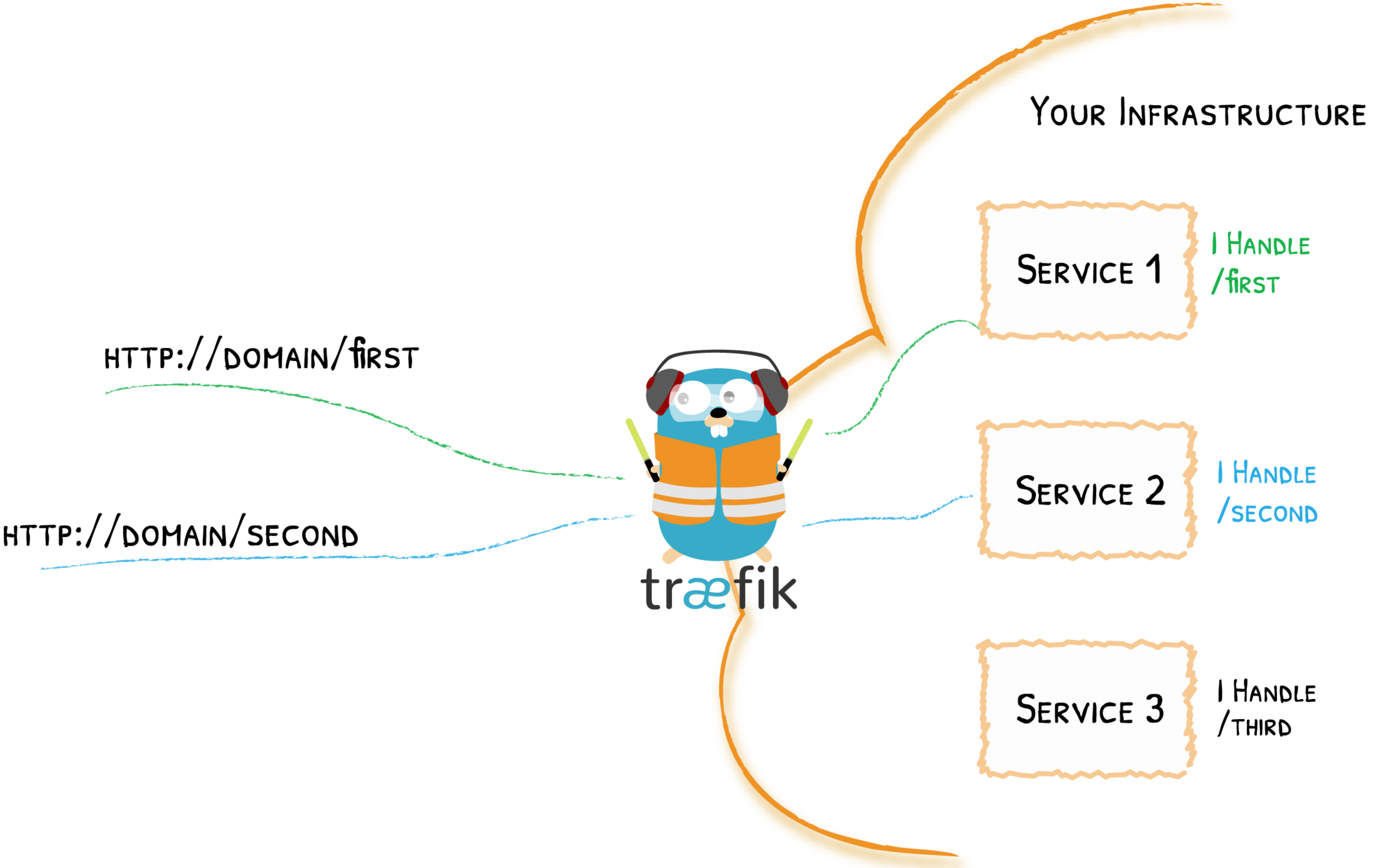
Learn more on the blog post

Traefik (V2.0) Core Concepts

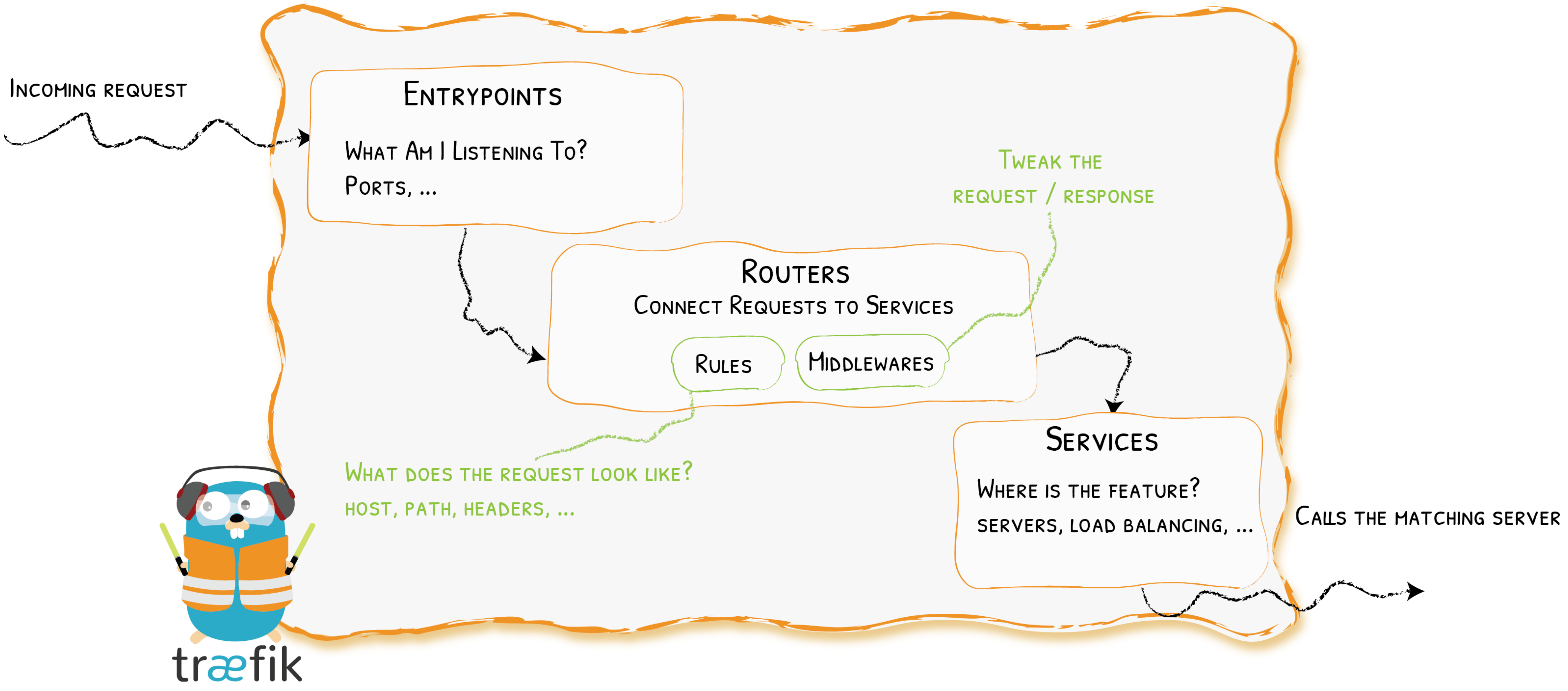
Traefik Is An Edge Router



Traefik Dynamically Discovers Services



Architecture (V2.0) At A Glance



Incoming request

Entrypoints

What Am I Listening To?
Ports, ...

Routers
Connect Requests to Services

Rules

Middlewares

Tweak the
request / response

What does the request look like?
host, path, headers, ...

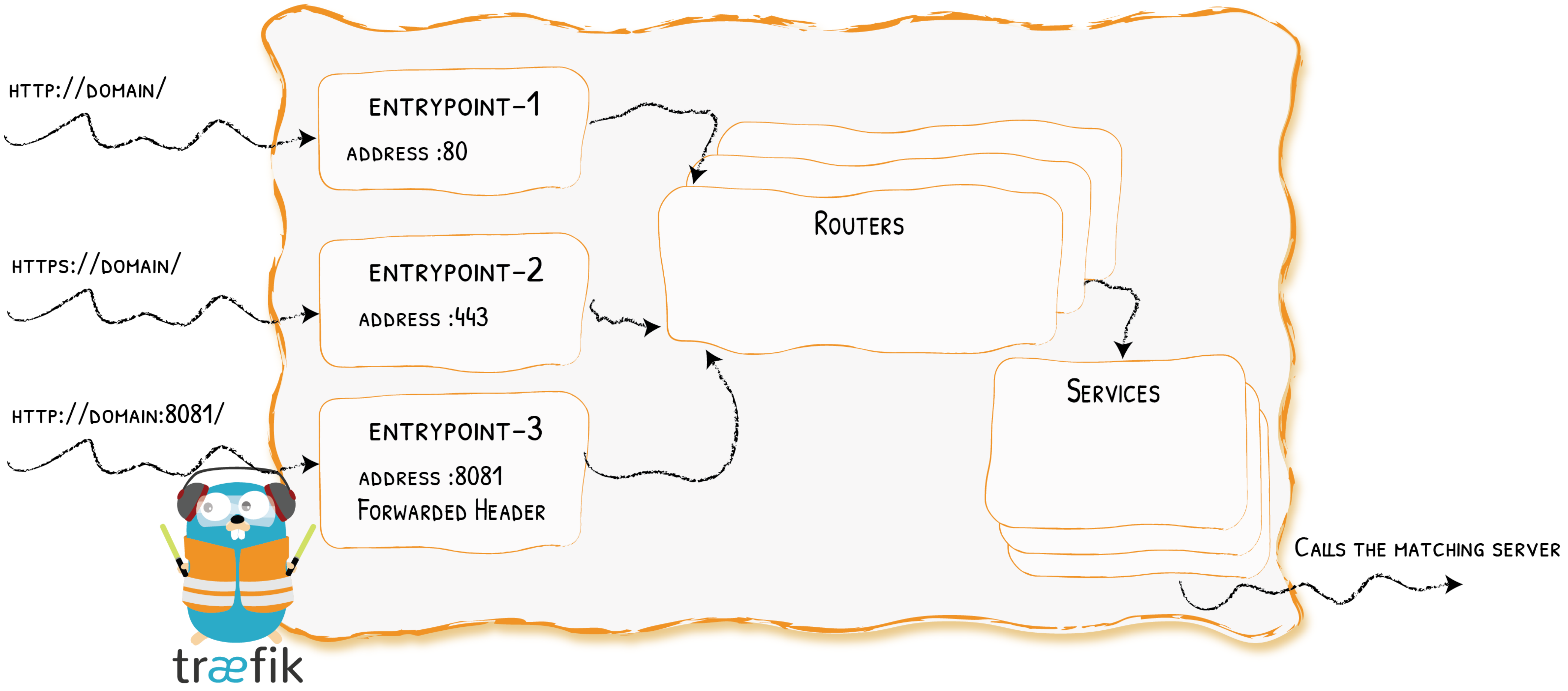
Services

Where is the feature?
servers, load balancing, ...

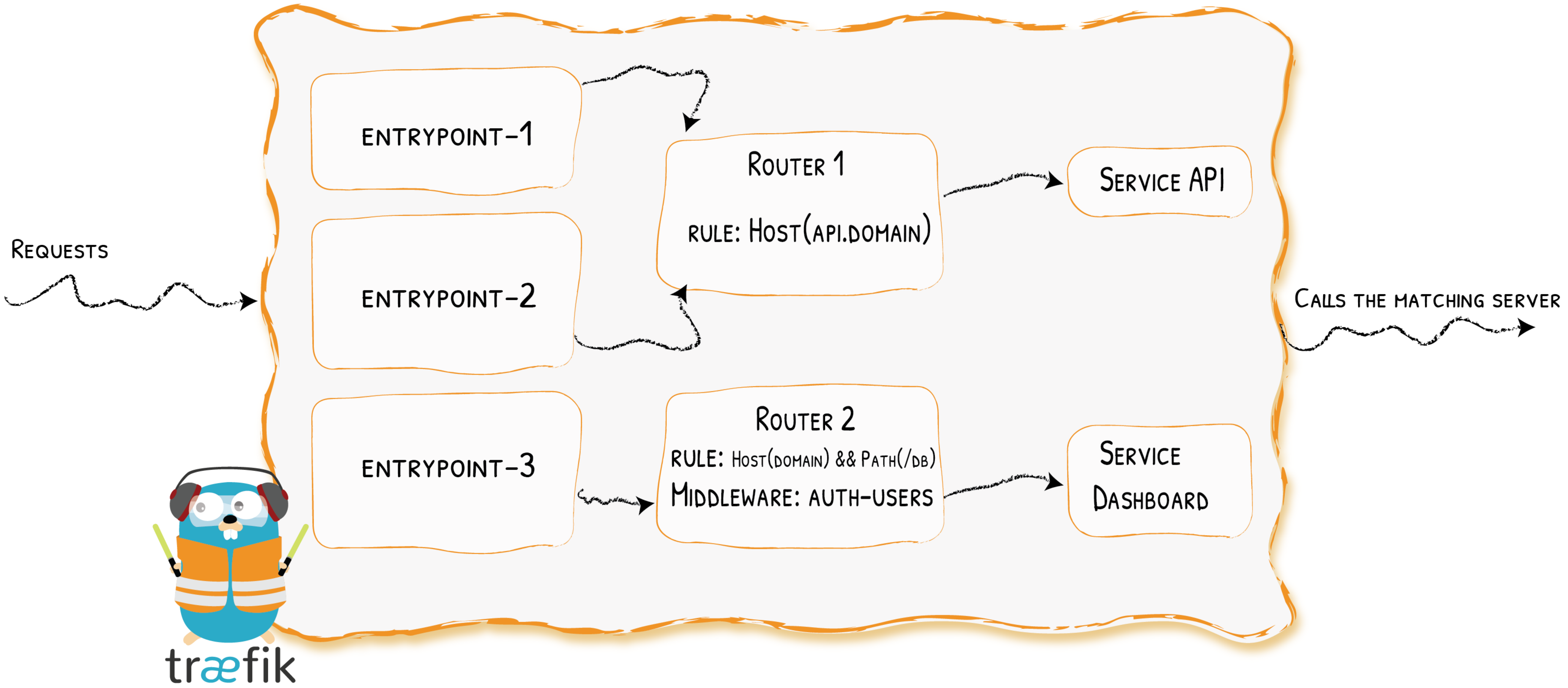
Calls the matching server

traefik

Entrypoints



Routers



Requests

entrypoint-1

entrypoint-2

entrypoint-3

Router 1

rule: Host(api.domain)

Router 2

rule: Host(domain) && Path(/db)

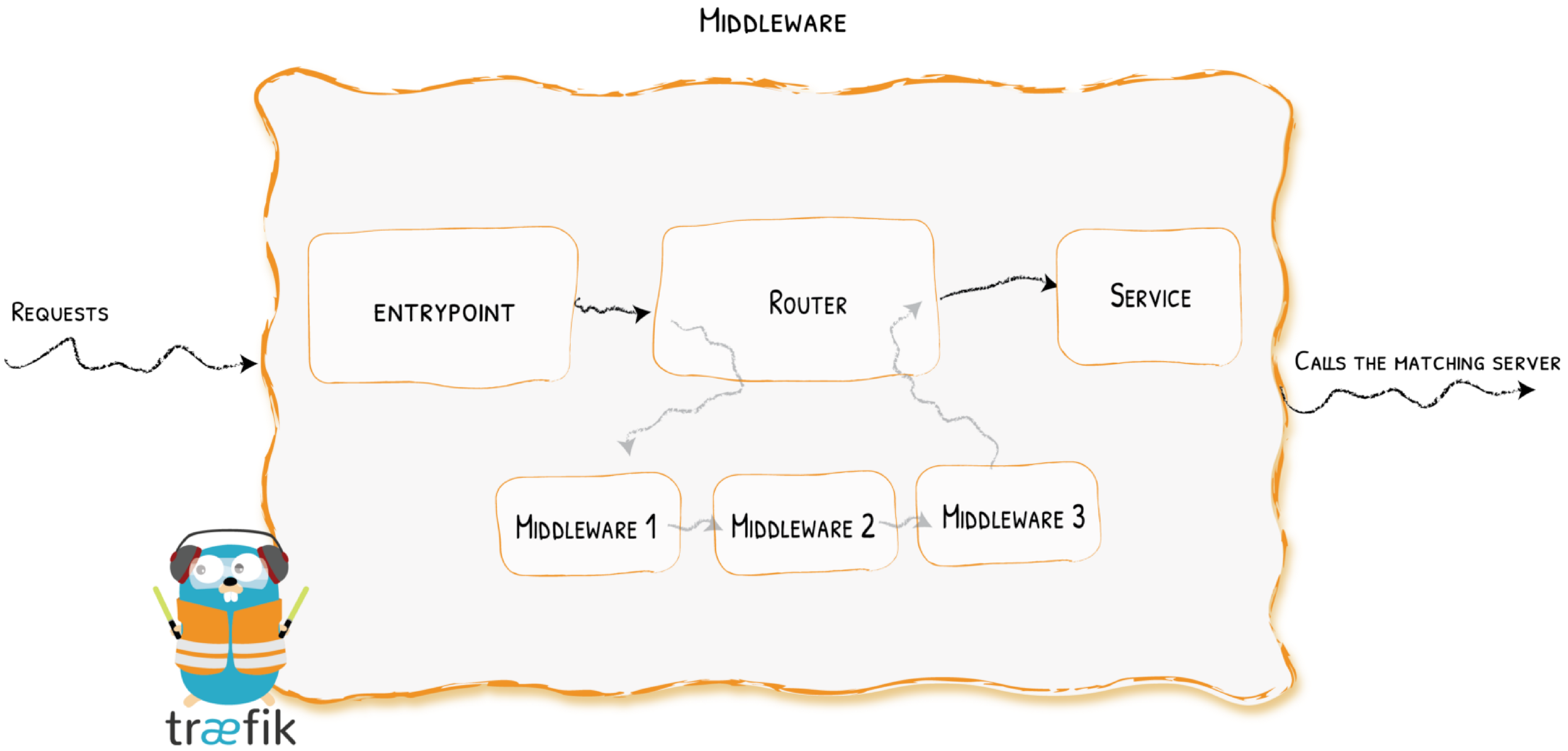
Middleware: auth-users

Service API

Service Dashboard

Calls the matching server

Middlewares



Middleware

Requests

Entrypoint

Router

Service

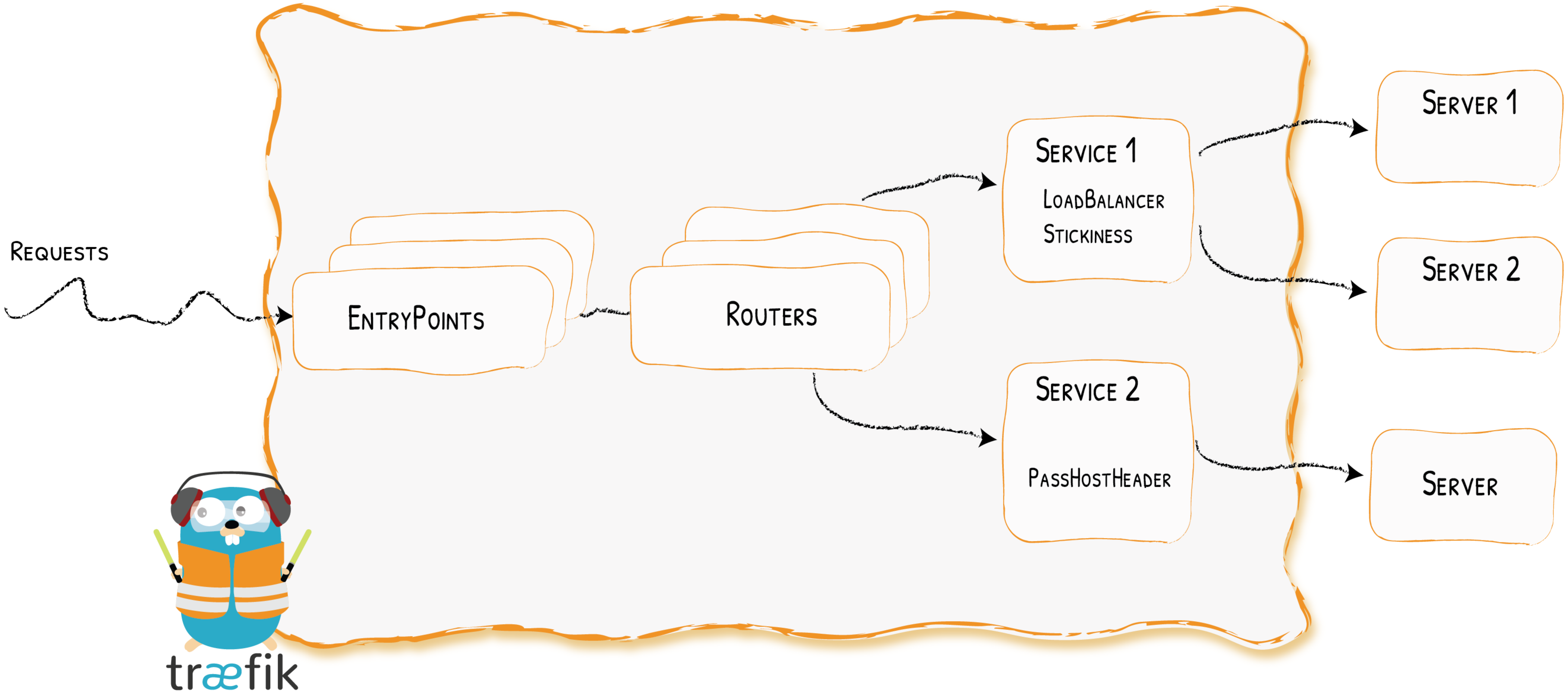
Middleware 1

Middleware 2

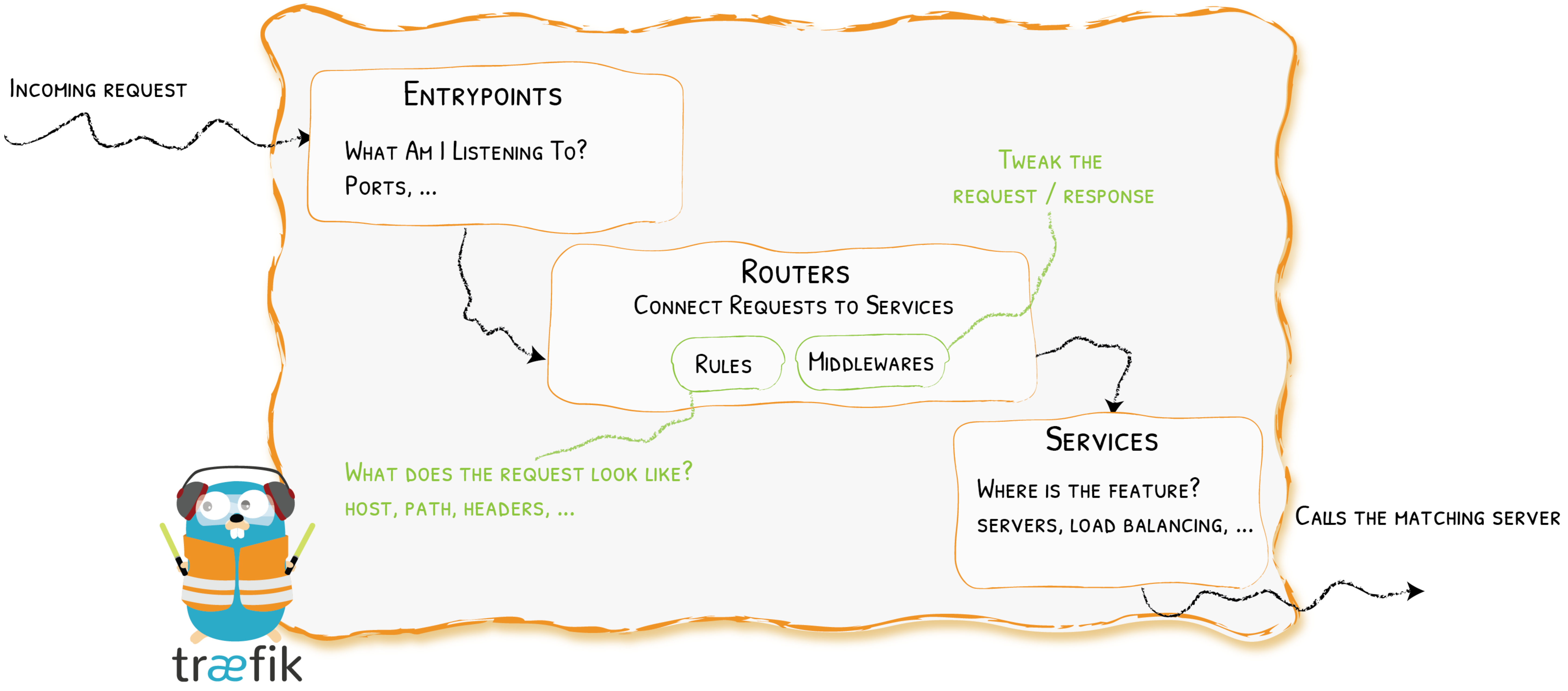
Middleware 3

Calls the matching server

Services


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

Architecture (Again) At A Glance



Incoming request

Entrypoints

What Am I Listening To?
Ports, ...

Routers
Connect Requests to Services

Rules

Middlewares

Tweak the
request / response

What does the request look like?
host, path, headers, ...

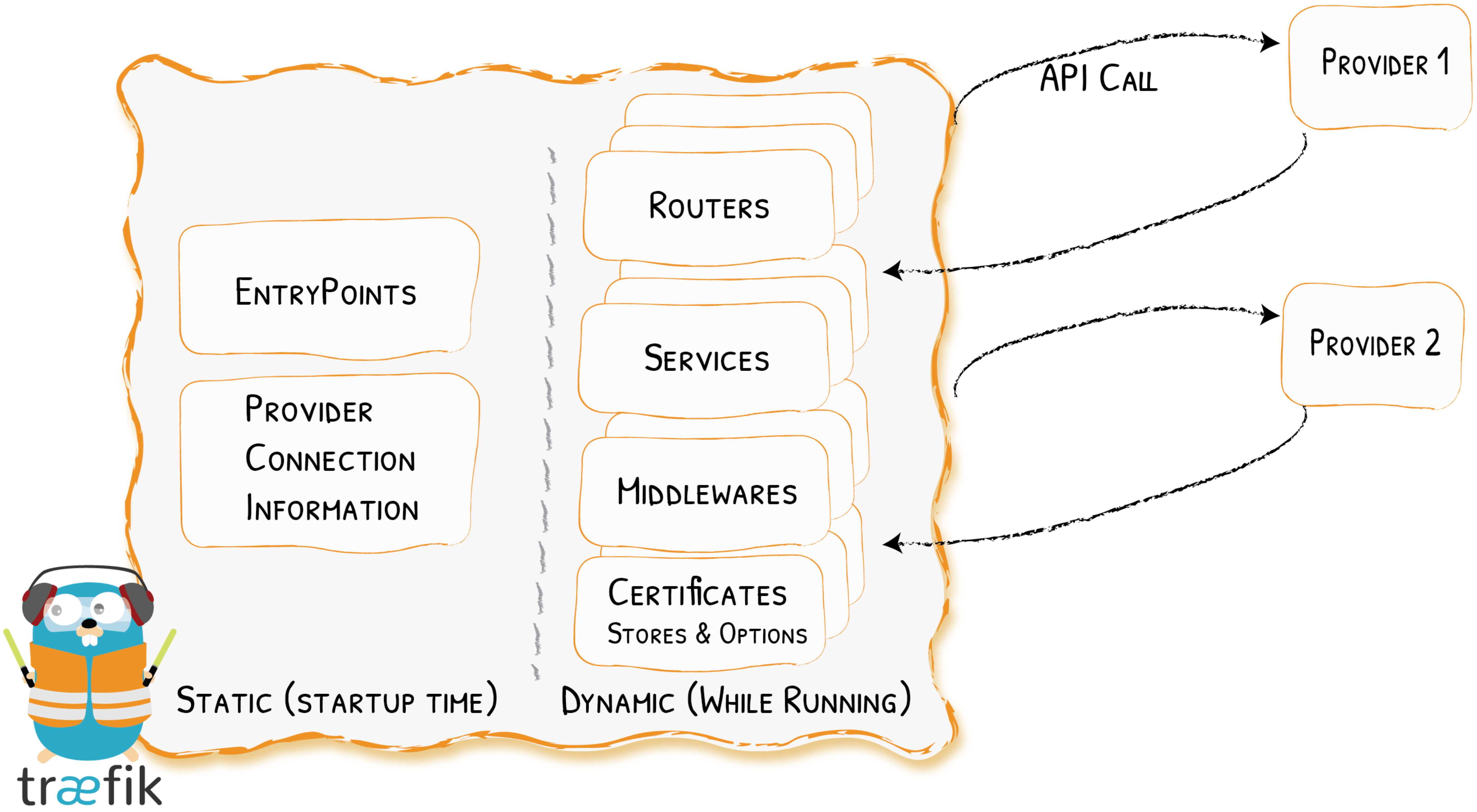
Services

Where is the feature?
servers, load balancing, ...

Calls the matching server

træfik

Static & Dynamic Configuration



EntryPoints

Provider Connection Information

Static (startup time)

Routers

Services

Middlewares

Certificates Stores & Options

Dynamic (While Running)

API Call

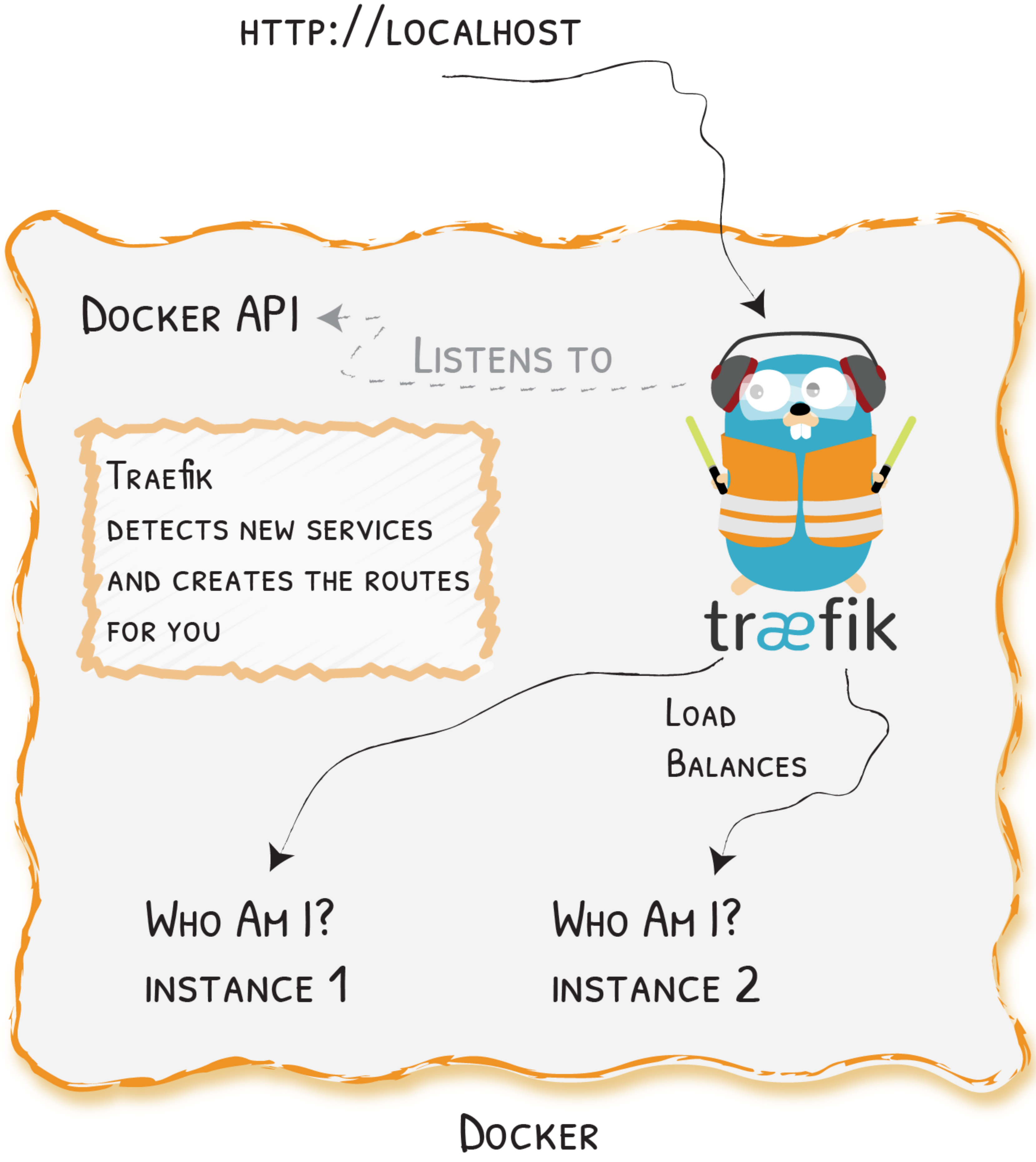
Provider 1

Provider 2

traefik

Show Me The Configuration!

Simple Example With 🐳



HTTP://LOCALHOST

DOCKER API

LISTENS TO

TRAEfik
DETECTS NEW SERVICES
AND CREATES THE ROUTES
FOR YOU

træfik

LOAD
BALANCES

WHO AM I?
INSTANCE 1

WHO AM I?
INSTANCE 2

DOCKER

TRAEfik IS THE ONLY
ACCESSIBLE CONTAINER
FROM THE OUTSIDE.

OTHER SERVICES ARE
DEPLOYED ON DEMAND
AND AVAILABLE THROUGHT
TRAEfik.

With 🐳

- With Docker Compose:

```
version: '3'

services:
  reverse-proxy:
    image: traefik:v2.0
    command: --providers.docker
    ports:
      - "80:80"
    volumes:
      - /var/run/docker.sock:/var/run/docker.sock

  webapp:
    image: containous/whoami
    labels:
      - "traefik.http.routers.webapp.rule=Host(`localhost`)"
```

With 🐳: Context

```yaml
# https://mycompany.org/jenkins -> http://jenkins:8080/jenkins
jenkins:
    image: jenkins/jenkins:lts
    environment:
      - JENKINS_OPTS=--prefix=/jenkins
    labels:
      - "traefik.http.services.jenkins.LoadBalancer.server.Port=8080" # Because 50000 is also exposed
      - "traefik.http.routers.jenkins.rule=Host(`mycompany.org`) && PathPrefix(`/jenkins`)"
      - "traefik.http.routers.jenkins.service=jenkins"
```

With 🐳: Rewrites

```
# https://mycompany.org/gitserver -> http://gitserver:3000/
gitserver:
    image: gitea/gitea
    labels:
      - "traefik.http.routers.gitserver.rule=Host(`mycompany.org`) && PathPrefix(`/gitserver`)"
      - "traefik.http.middlewares.gitserver-stripprefix.stripprefix.prefixes=/gitserver"
      - "traefik.http.routers.gitserver.middlewares=gitserver-stripprefix"
```

Traefik With ⎈

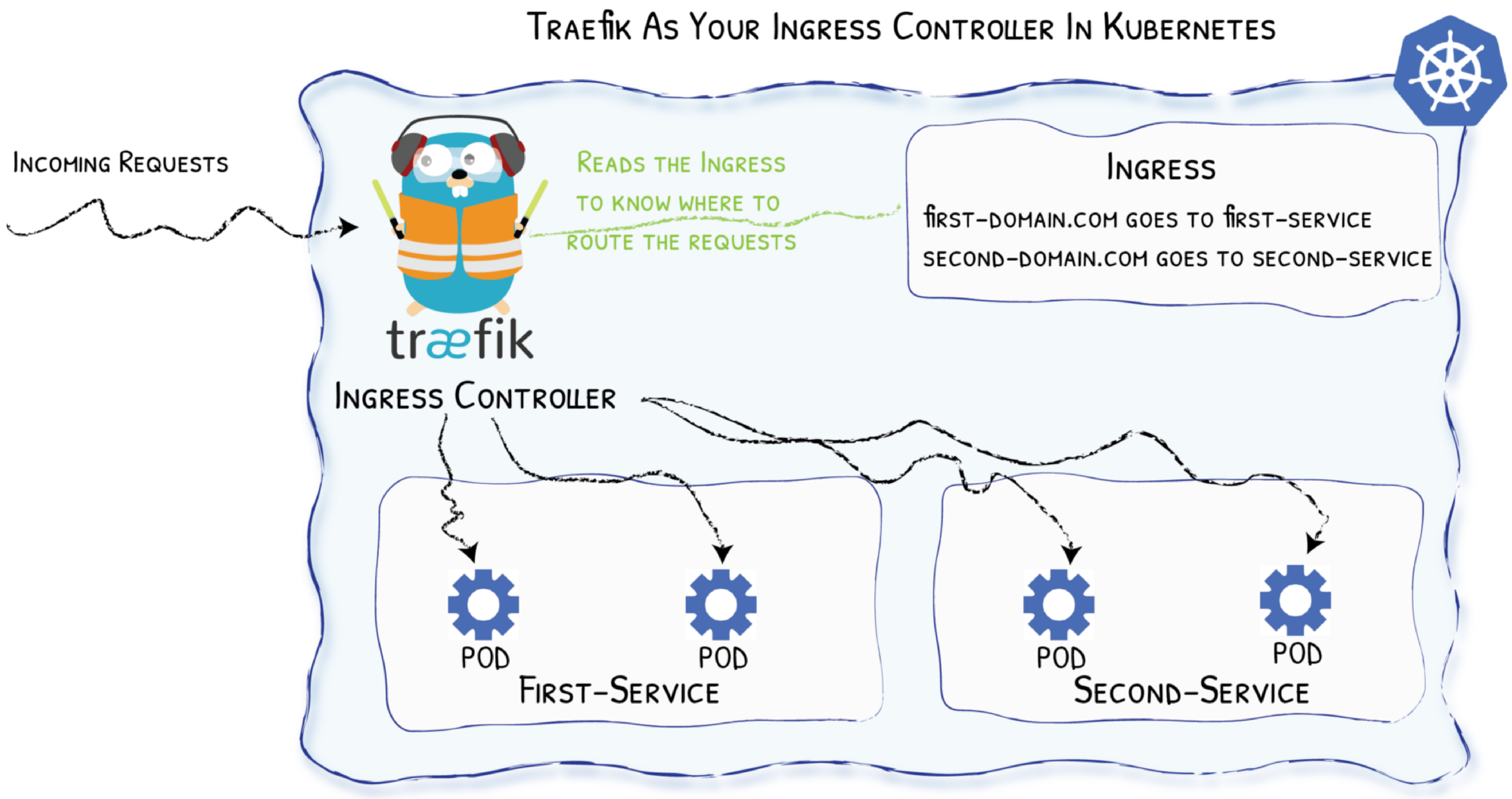

Traefik As Your Ingress Controller In Kubernetes
Incoming Requests
Reads the Ingress to know where to route the requests
træfik
Ingress Controller
Ingress
first-domain.com goes to first-service
second-domain.com goes to second-service
POD
POD
First-Service
POD
POD
Second-Service

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

Example Code With ☸

```yaml
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
  annotations:
    kubernetes.io/ingress.class: 'traefik'
spec:
  rules:
  - host: localhost
    http:
      paths:
      - path: "/whoami"
        backend:
          serviceName: 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
```

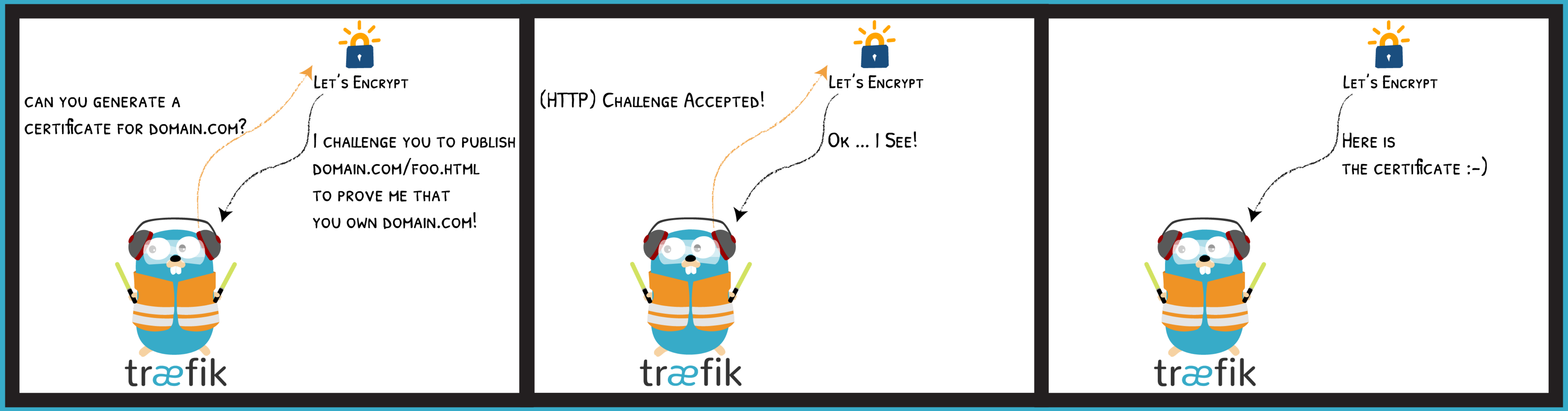
træfik ❤

HTTP

&

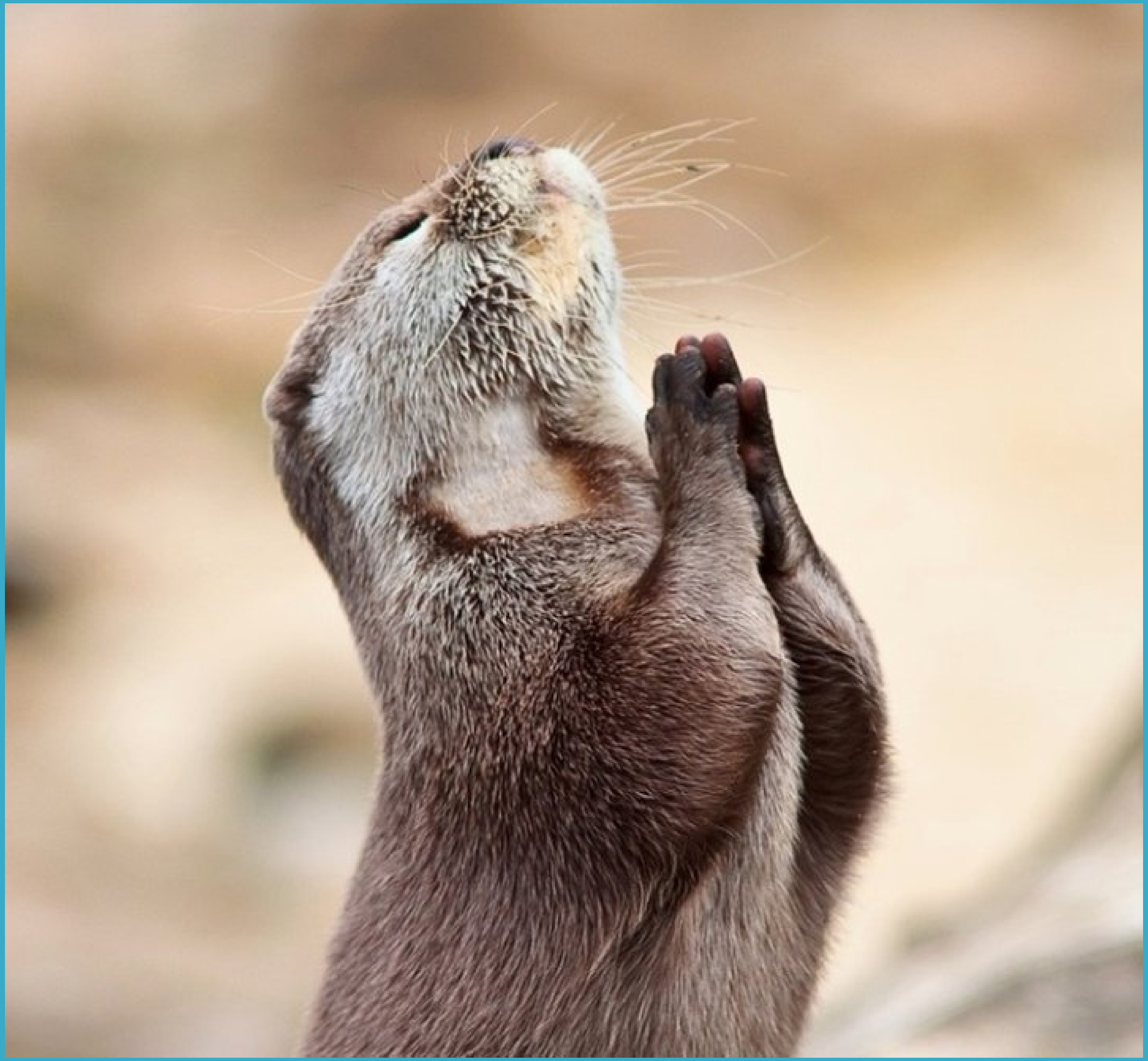
TCP

HTTPS For Everyone With Let's Encrypt

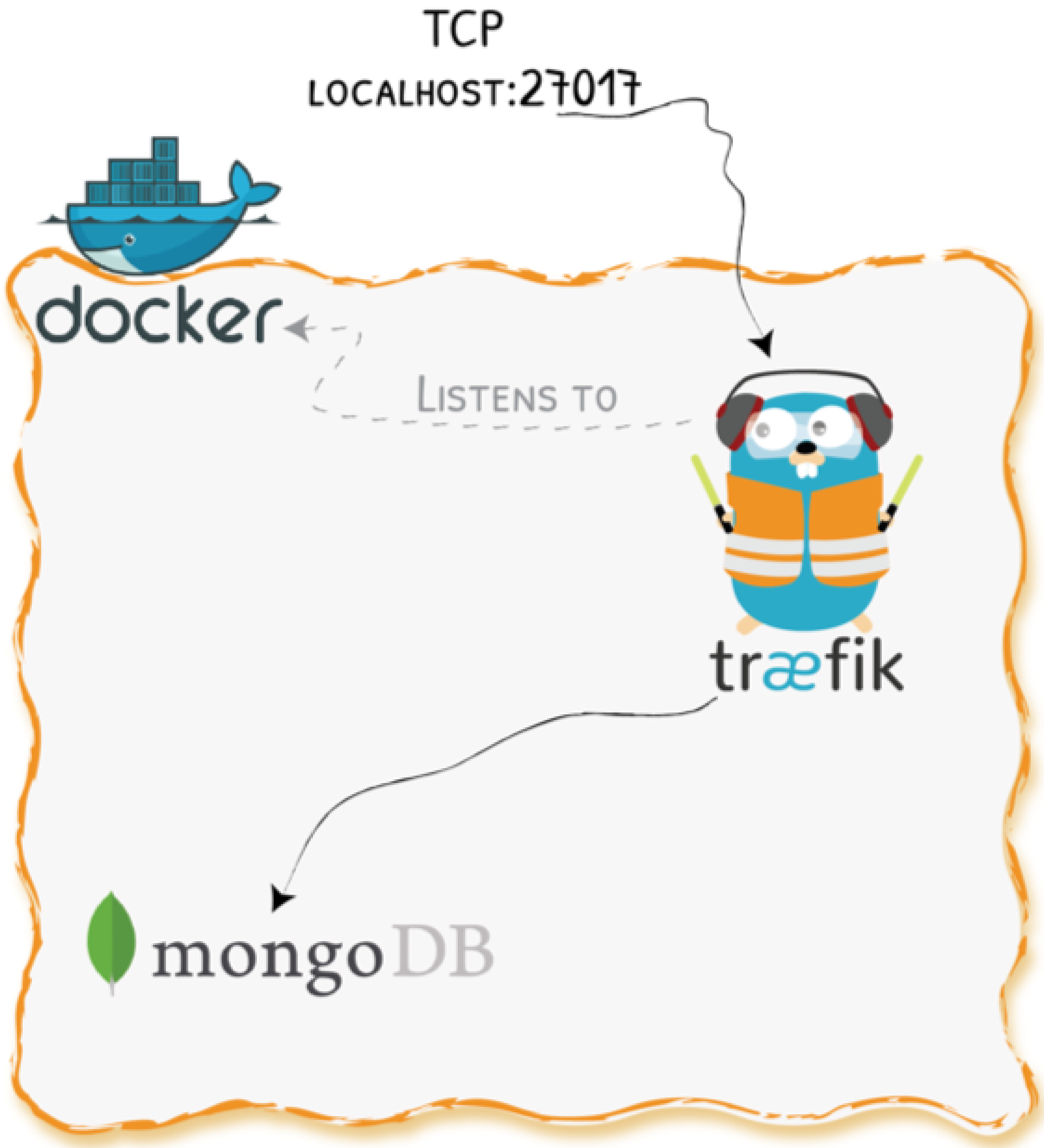

CAN YOU GENERATE A CERTIFICATE FOR DOMAIN.COM?
LET'S ENCRYPT
I CHALLENGE YOU TO PUBLISH DOMAIN.COM/FOO.HTML TO PROVE ME THAT YOU OWN DOMAIN.COM!
træfik
(HTTP) CHALLENGE ACCEPTED!
LET'S ENCRYPT
OK ... I SEE!
træfik
LET'S ENCRYPT
HERE IS THE CERTIFICATE :-)
træfik

- TLS, DNS and HTTP challenges supported

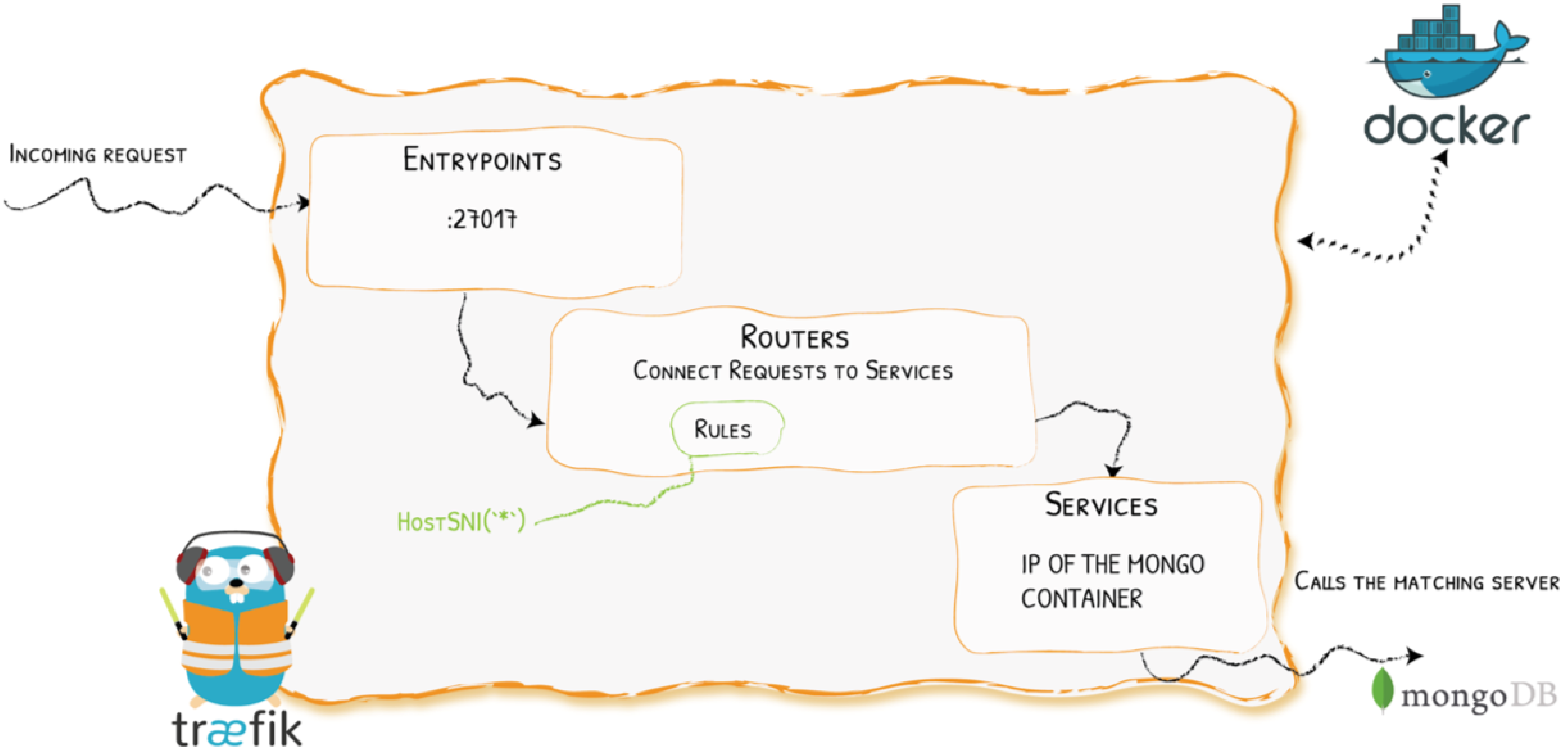
Demo



Demo 1 - Straightforward TCP Routing

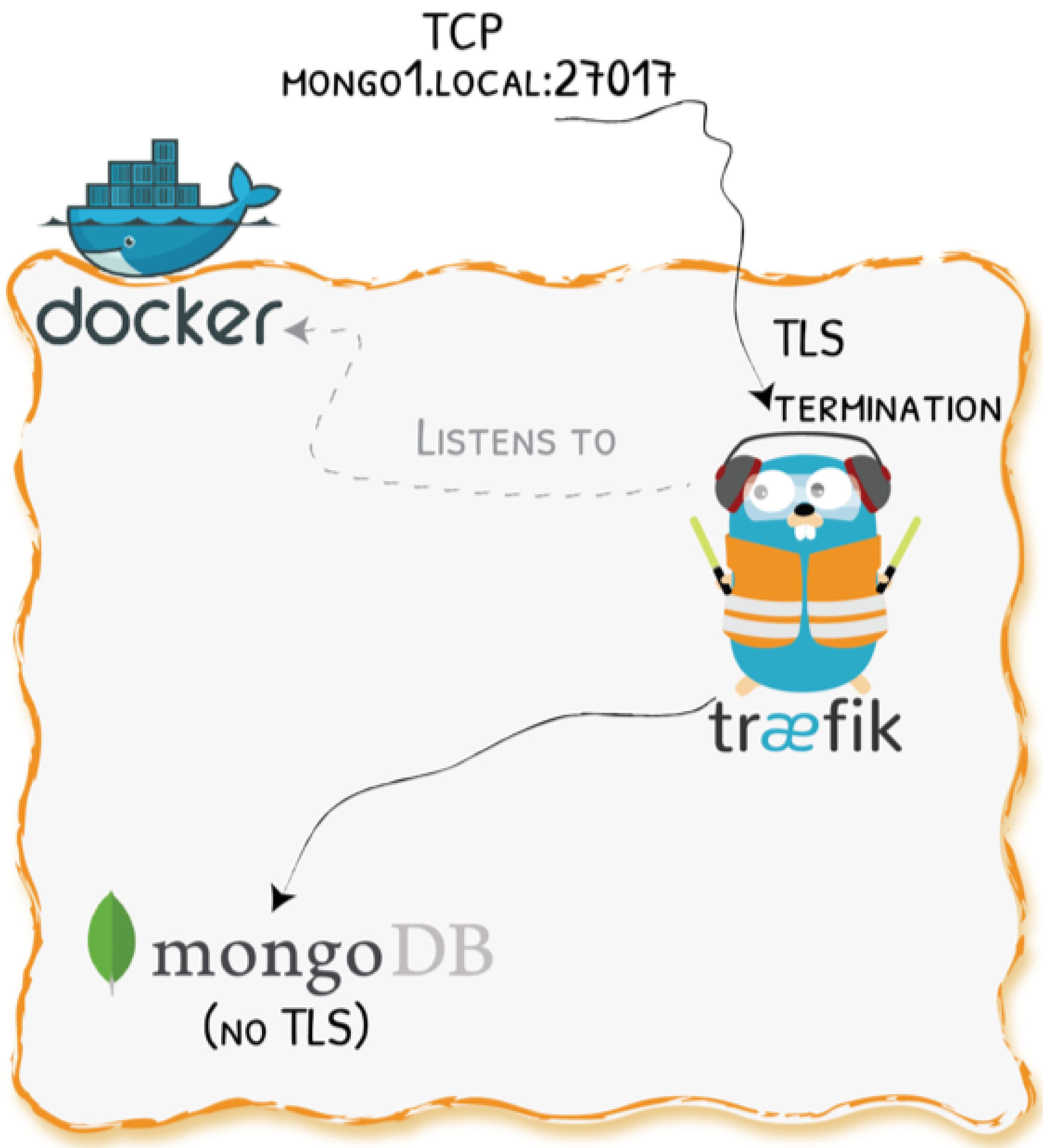


Demo 1 - Configuration

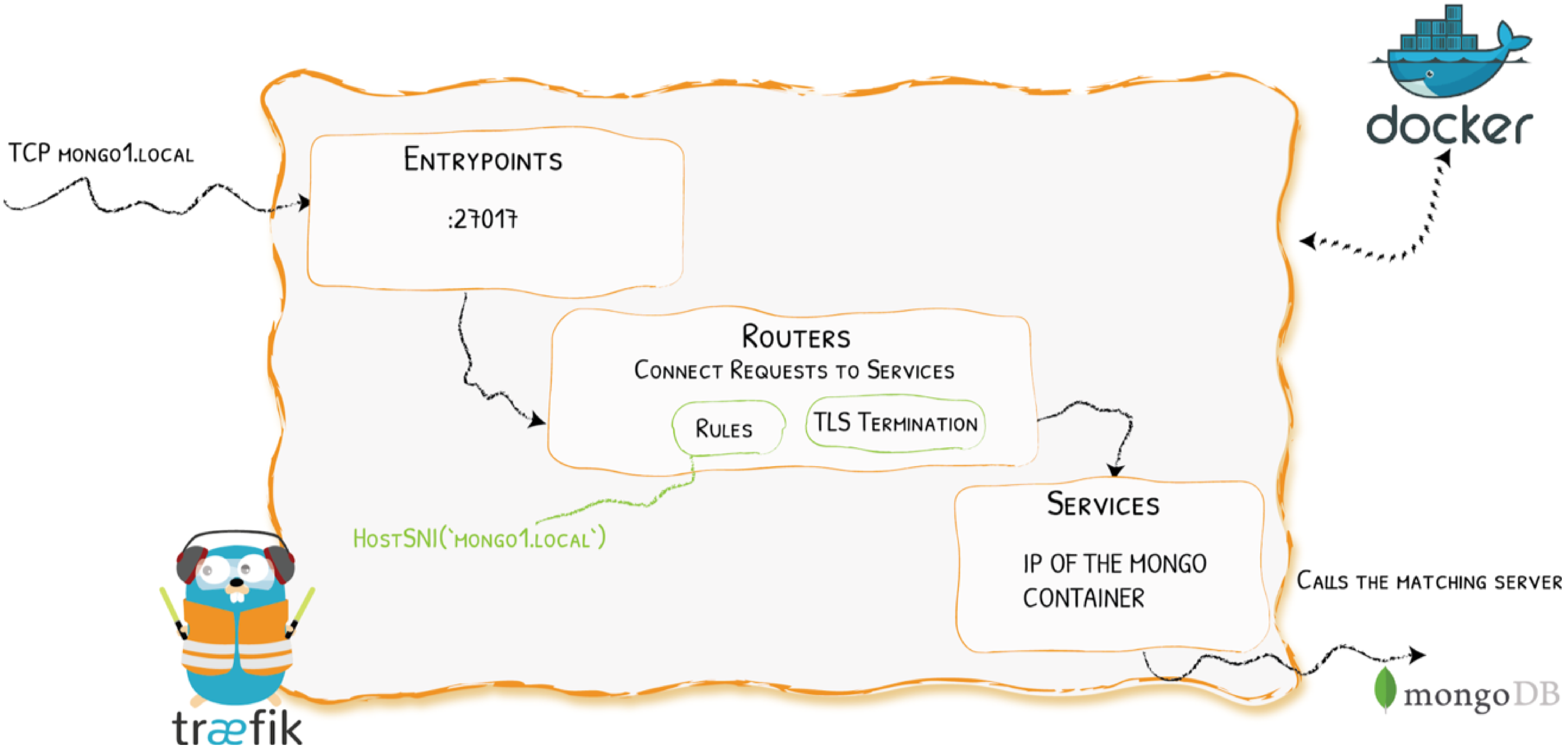


Demo Code on

Demo 2 - Let's Add TLS To TCP With Traefik



Demo 2 - Configuration



TCP mongo1.local

Entrypoints

:27017

Routers

Connect Requests to Services

Rules

TLS Termination

HostSNI(`mongo1.local`)

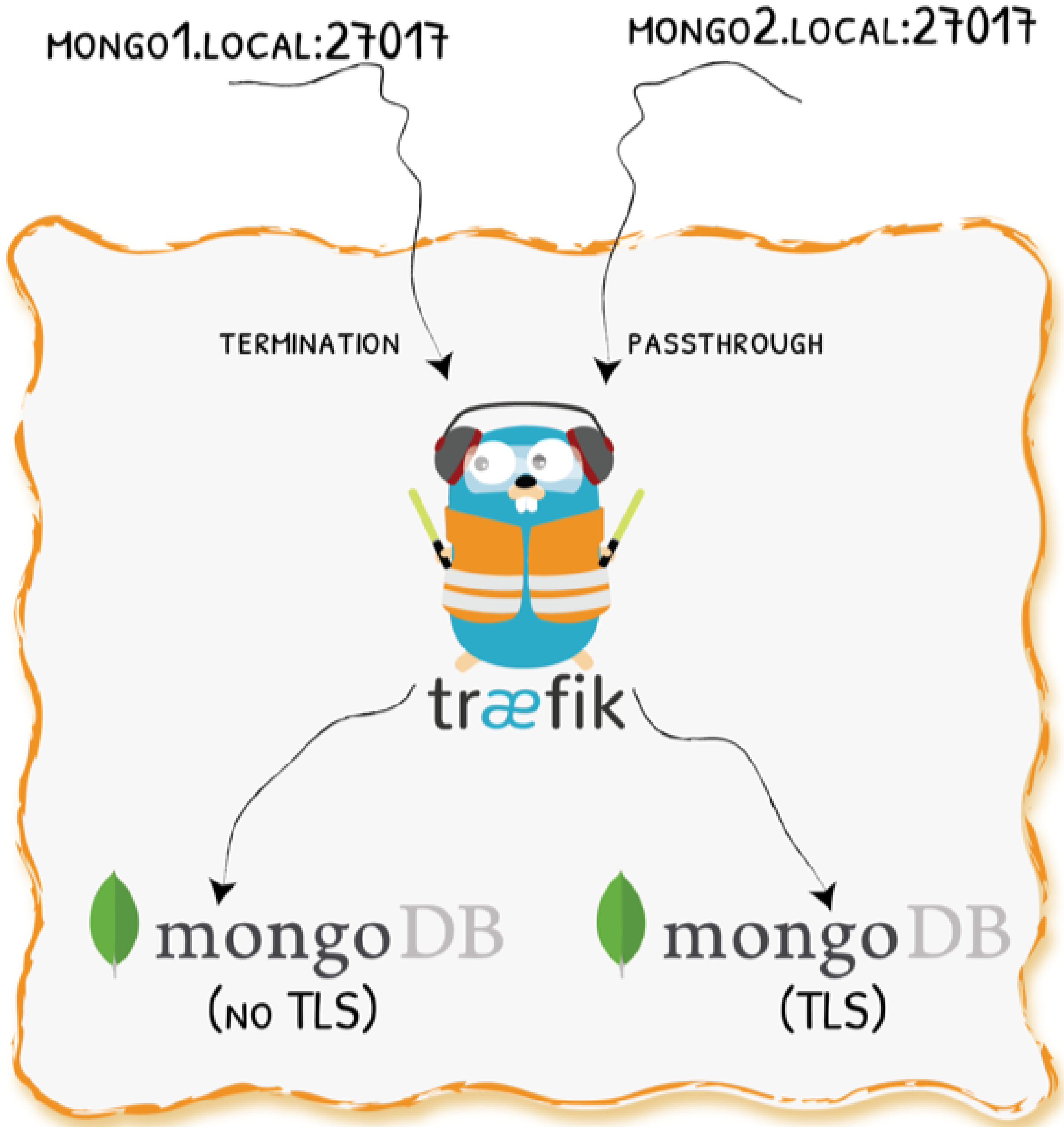
Services

IP OF THE MONGO CONTAINER

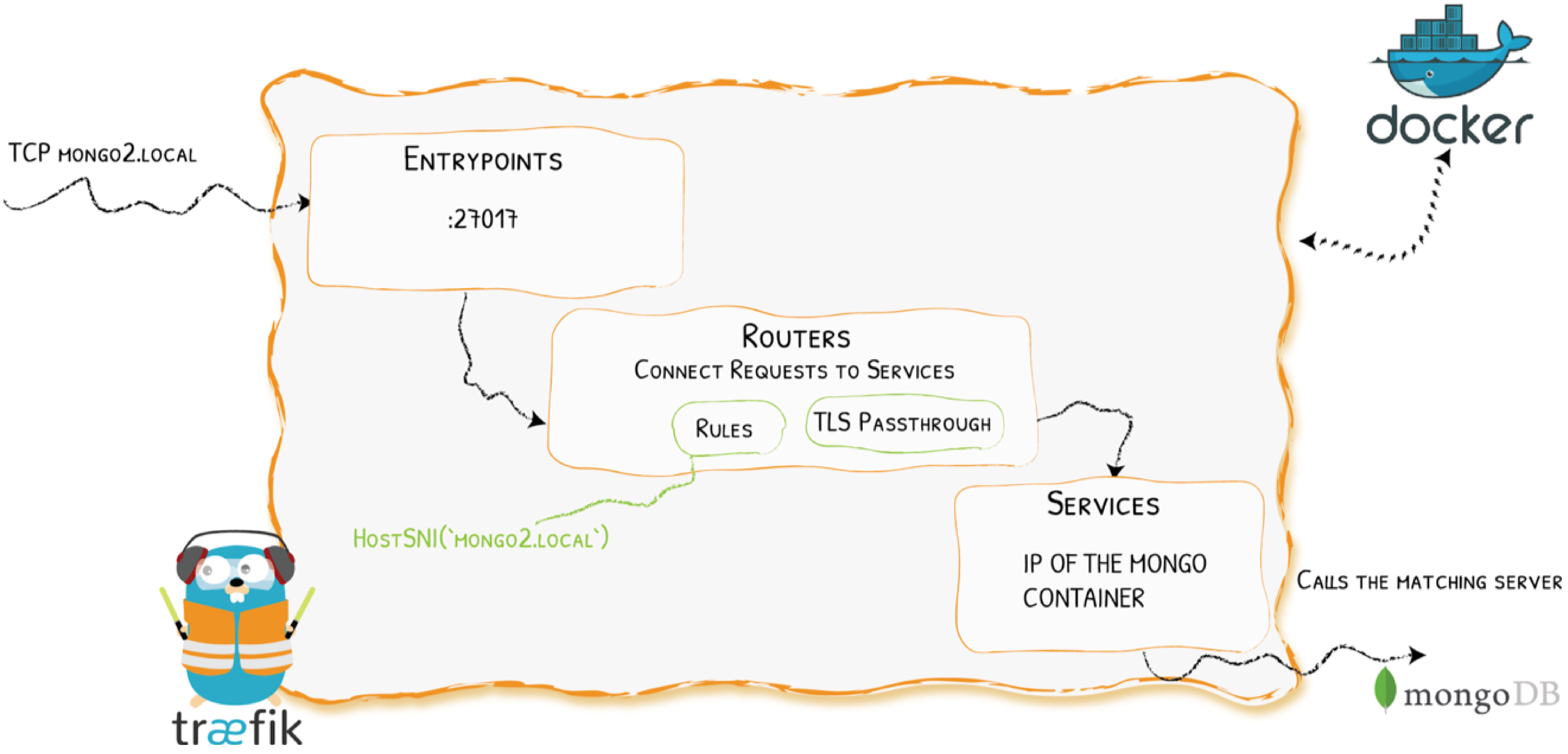
Calls the matching server

Demo Code on

Demo 3 - SNI Routing + TLS Passthrough

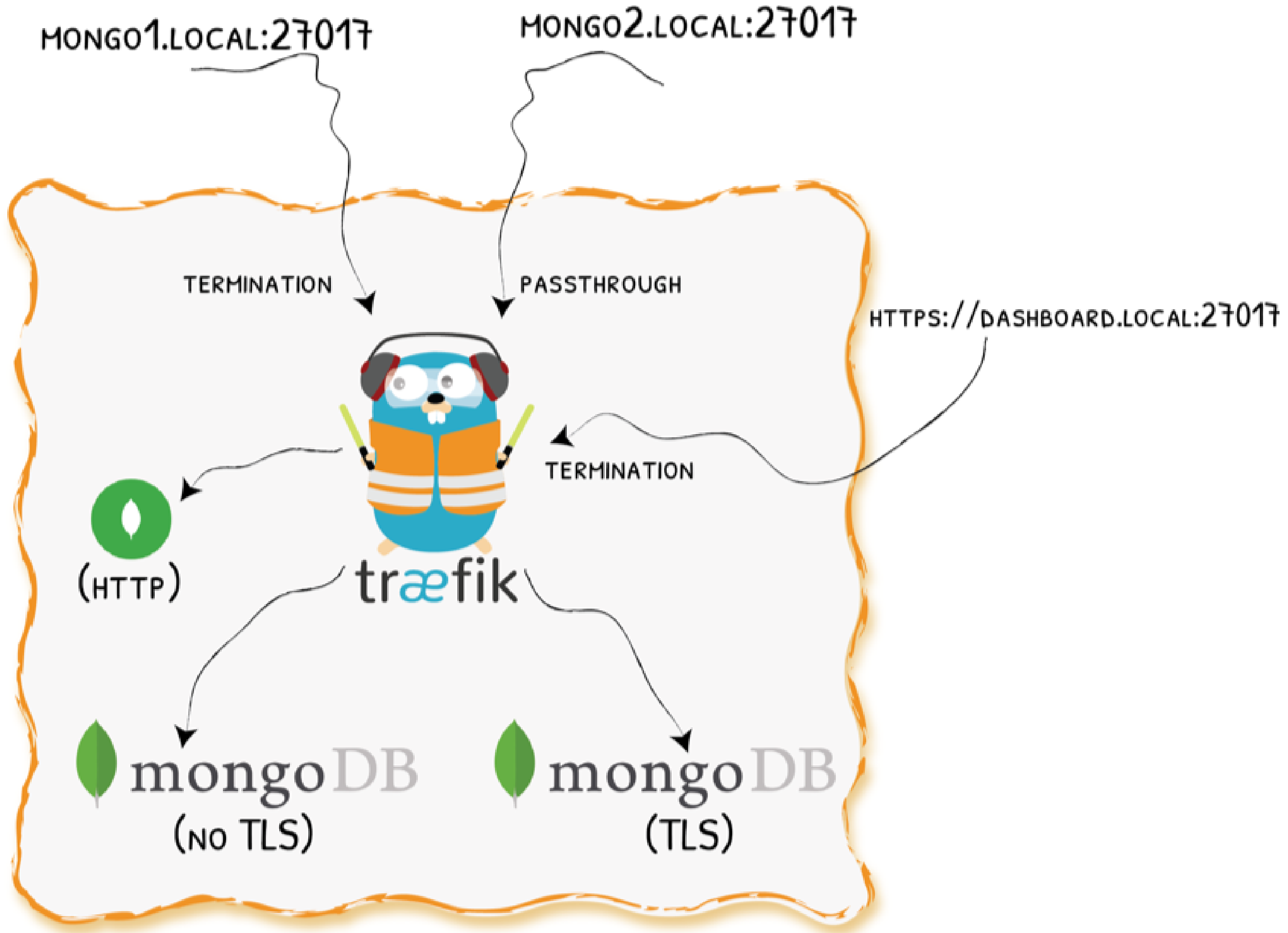


Demo 3 - Configuration



Demo Code on

Demo 4 - Muxing HTTPS And TCP On The Same Port



Demo Code on

Demo 5 - Deploying A Simple WebApp With Lets Encrypt

Demo Code on

More To Come For V2.0

- New WebUI
- New metrics
- UDP
- YAML
- Canary

More Info

bit.ly/traefik-v2

We Also Missed Talking About...

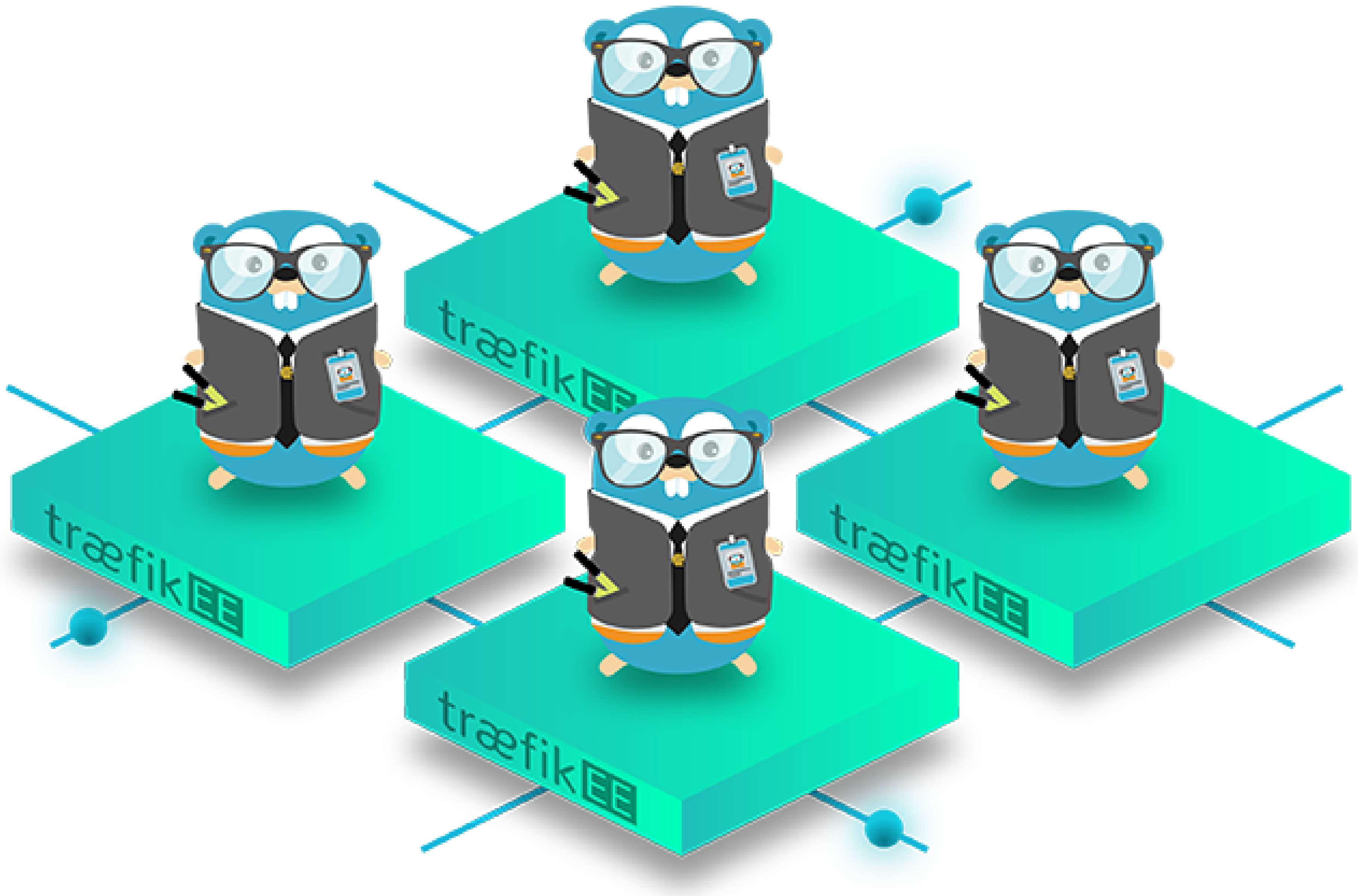
MESOS
ZIPKIN
LIMITING
KUBERNETES
Dynamic
Metrics
HTTP
ERROR
CIRCUIT-BREAKERS
PAGES
CERTIFICATE
TLS
Reverse-Proxy
HEADERS
GRPC
DYNAMIC/WILDCARD
Security
Configurations
Tracing
PROXY
SECRETS
PROMETHEUS
JAEGER
WEBSOCKETS
SSL
FORWARD
REDIRECTS
DOCKER
PROTOCOL
HEALTH
CHECKS
CLUSTER AUTH
HSTS
CONSUL
RATE
SWARM
MODE

TO BE
CONTINUED...

The Herd

You came to the wrong neighbour

Traefik Comes In Herd



HIGH AVAILABILITY

træfik ENTERPRISE EDITION

SECURITY
træfik ENTERPRISE EDITION

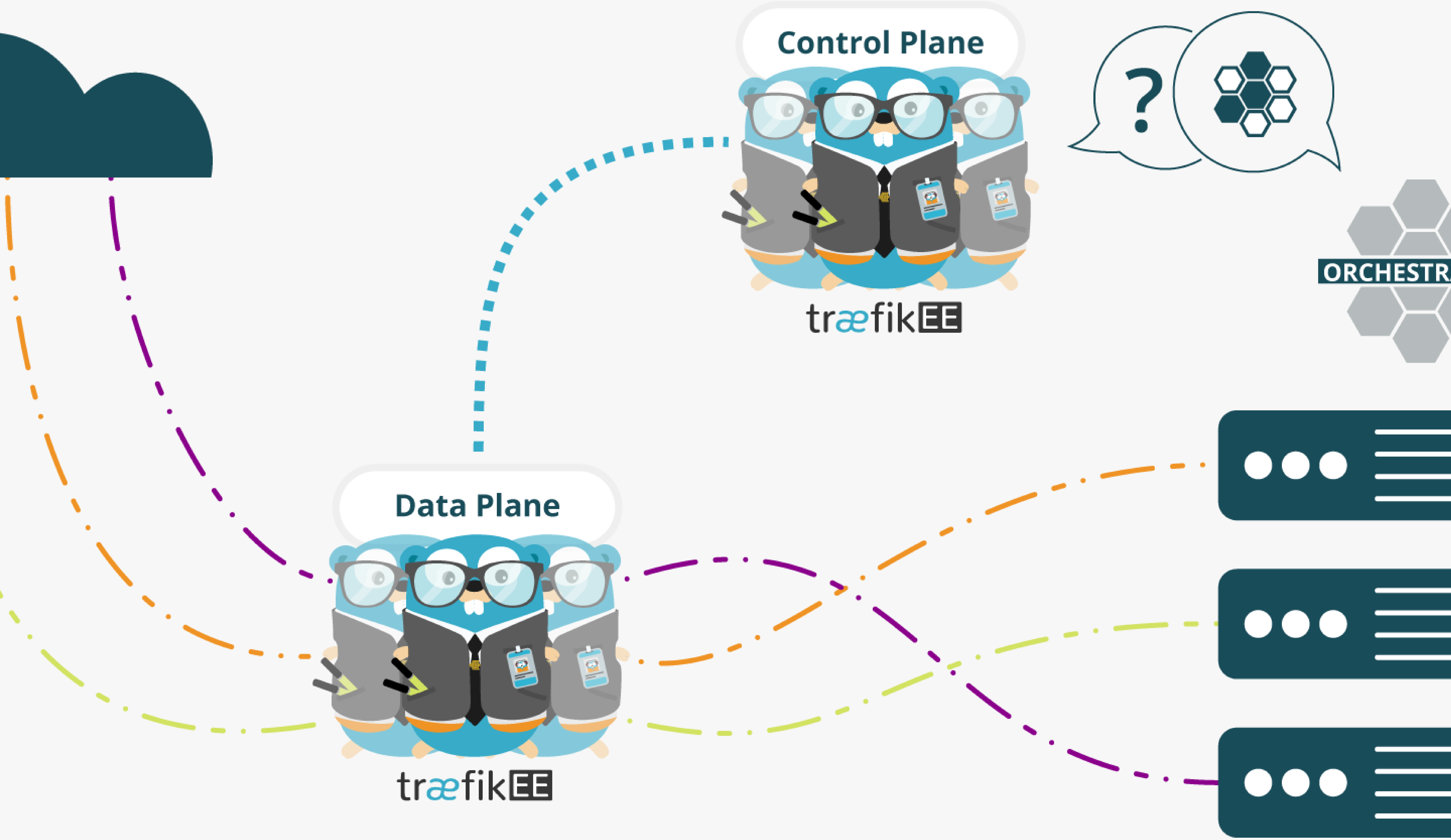
Scalability

SCALABILITY

træfik ENTERPRISE EDITION

NTERNET

TO YOUR INFRA



Control Plane

træfikEE

ORCHESTR

Data Plane

træfikEE

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 \
    --acme.email=ssl-admin@mycompany.org
    --acme.tlsChallenge
    ...
```

Free Trial

https://containo.us/traefikee

Thanks!

We Have Stickers!

We Are Hiring!

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

Thank You!

@mZapfDE

SantoDE

- Slides (HTML): https://containous.github.io/slides/bedcon-berlin-2019
- Slides (PDF): https://containous.github.io/slides/bedcon-berlin-2019/slides.pdf