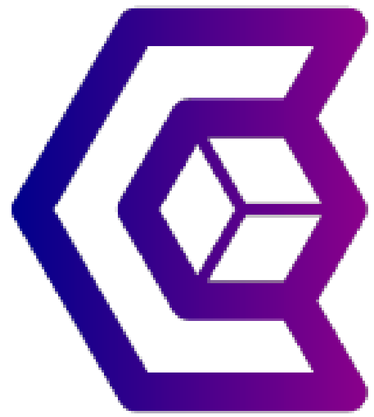
DevOps Enterprise Transformation: Easy Routing For Your Applications



Credit Suisse Devops Day - October 2019 @ Singapore

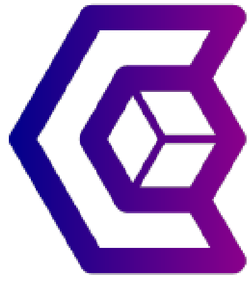
Whoami

- Damien DUPORTAL:
  - Træfik's Developer 🥑 Advocate @ Containous
- 🐦 @DamienDuportal
- dduportal

Containous

https://containo.us

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



Why Traefik?

Why, Mr Anderson?

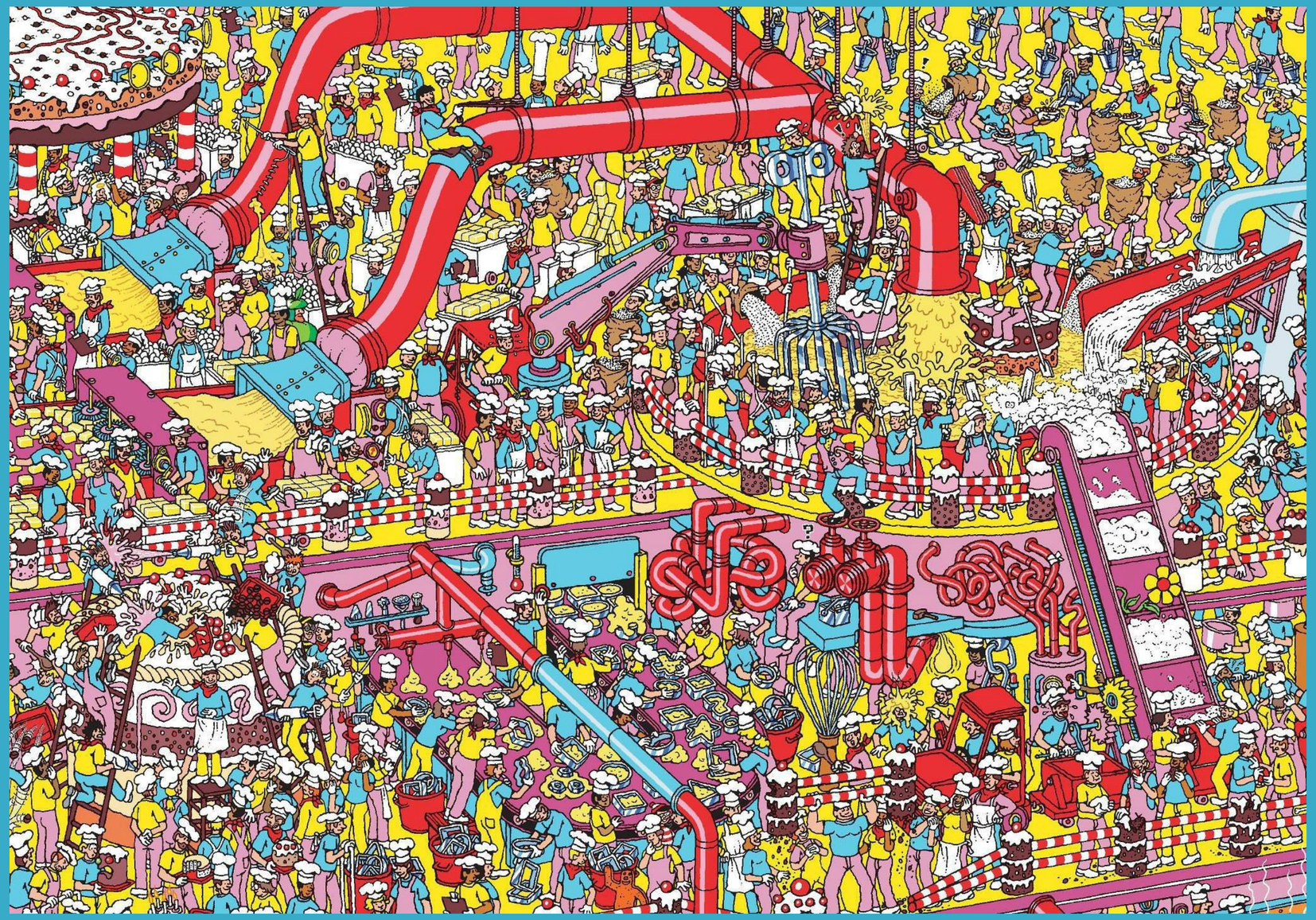
Evolution Of Software Design

1990s and earlier	2000s	2010s
Coupling		
Pre-SOA (monolithic)	**Traditional SOA**	**Microservices**
Tight coupling	Looser coupling	Decoupled

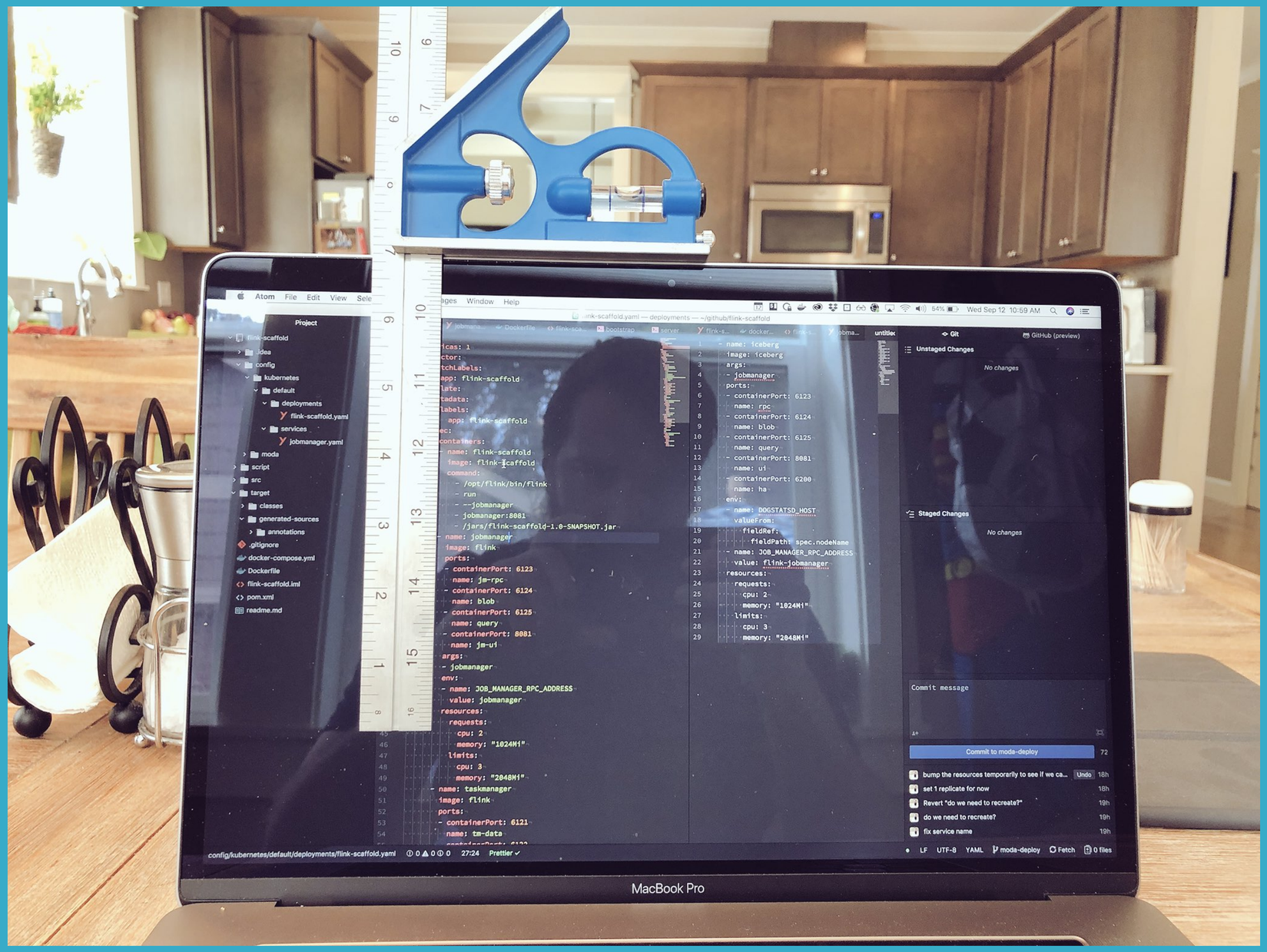
The Premise Of Microservices…

⋯And What Happens

Where’s My Service?



Tools Of The Trade

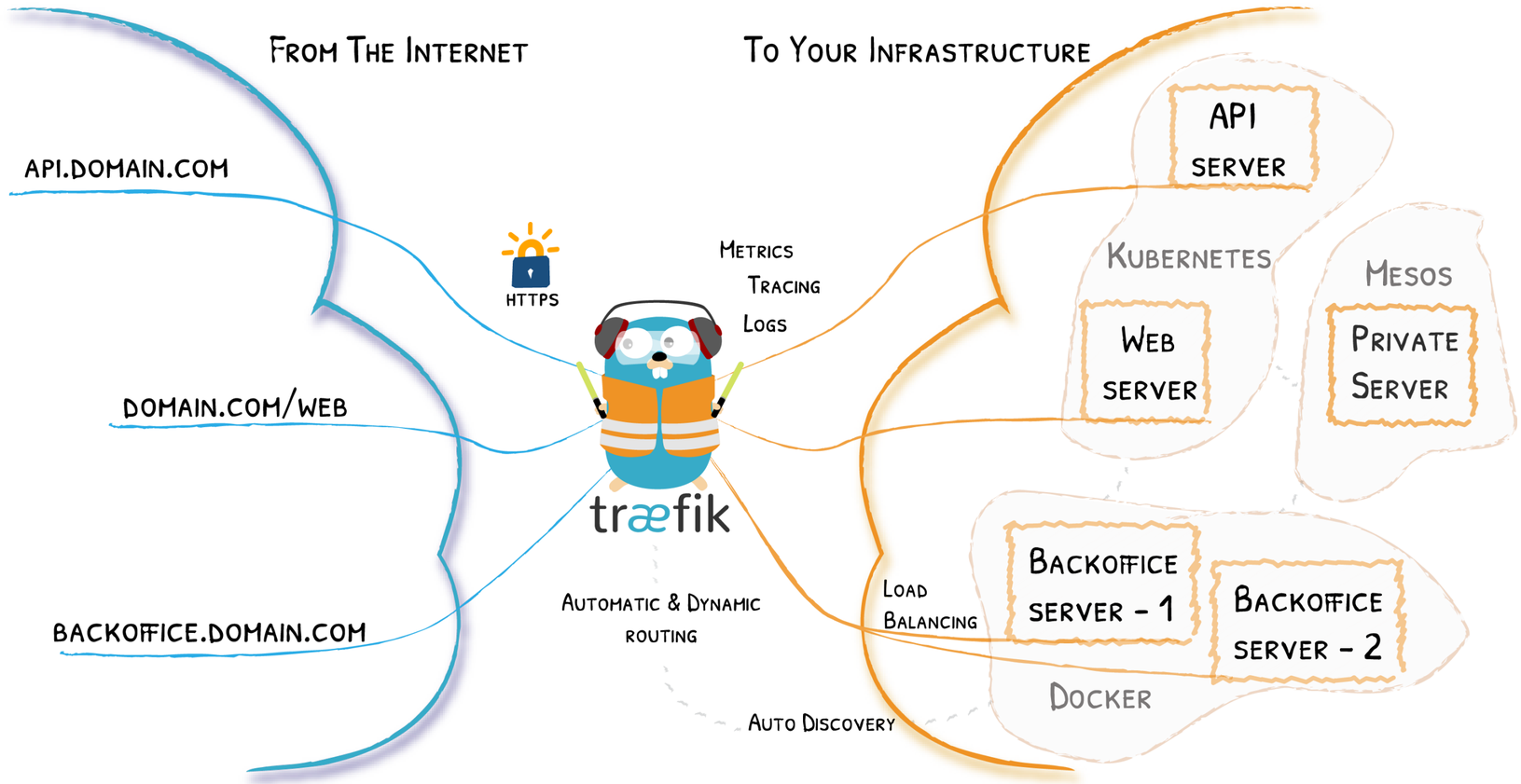


Source: https://twitter.com/Caged/status/1039937162769096704

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+ ☆ 1B+ ⬇ 400+
- Created in 2015, 4Y
- Current stable branch: `v2.0`

Deployment

- Single Binary
- Docker Image
- Runs nearly everywhere, VM’s, Cloud, Hybrid…

BACK TO TRAEFIK PART 2.0

Traefik 2.0 Quick Overview

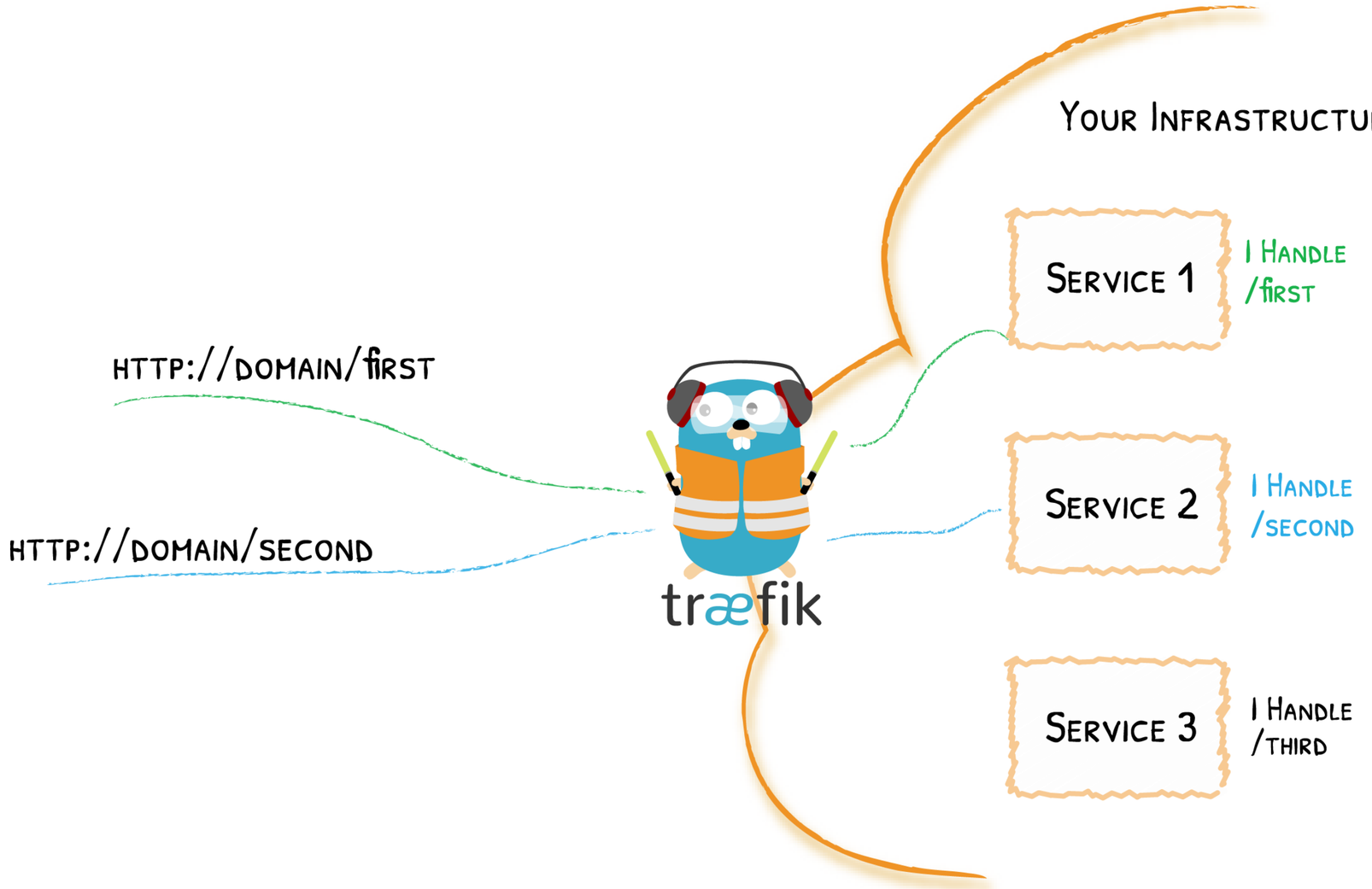
- Revamped Documentation
- Clarified Concepts
- Expressive Routing Rule Syntax
- Middlewares
- TCP Support
- Canary / Mirroring
- And so Much More…

Learn more on the blog post

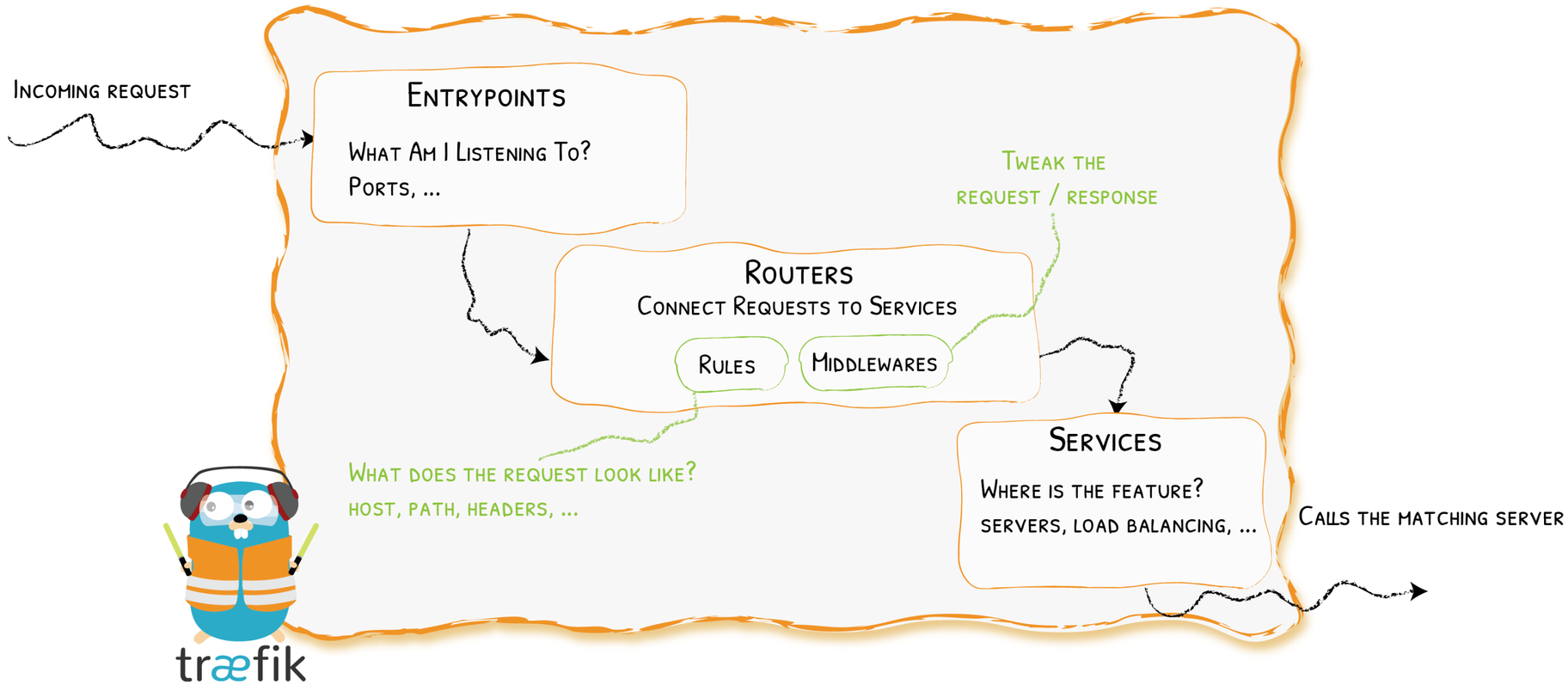
Traefik (V2.0) Core Concepts

Traefik···

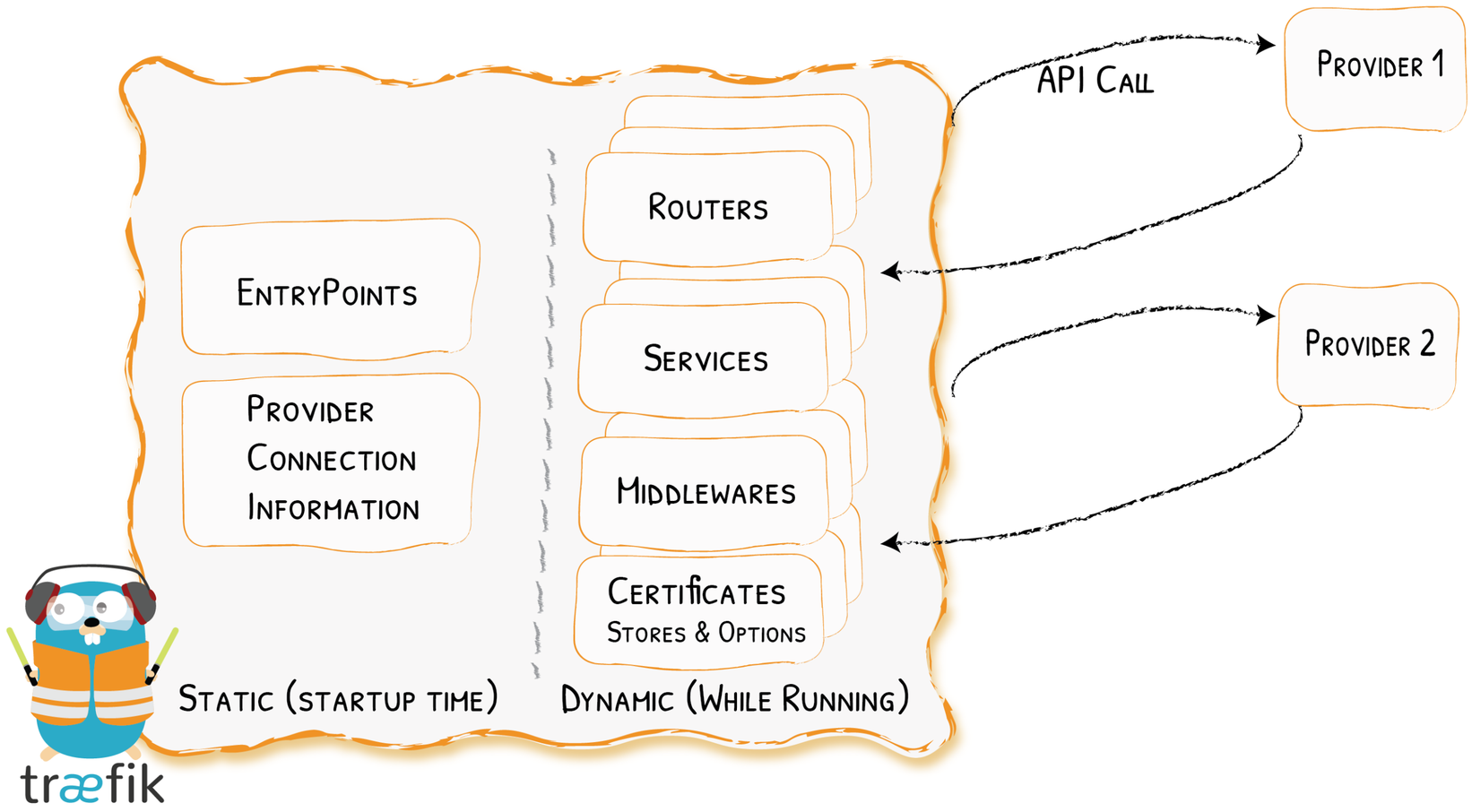
···sits at the edge of your infra, and dynamically discovers services:



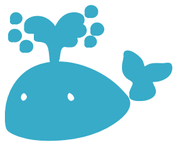
Architecture (V2.0) At A Glance



Static & Dynamic Configuration



Show Me The Configuration!

Example With 

```yaml
version: '3'

services:
  reverse-proxy:
    image: traefik:v2.0
    command: --providers.docker.endpoint="tcp://proxy-docker.svc.local:2376"
    ports:
      - "80:80"

corporate-webapp:
  image: company/corporate-webapp:1.2.3
  labels:
    - "traefik.http.routers.webapp.rule=Host(`company.com`)"

admin-webapp:
  image: company/admin-webapp:15.2.2
  labels:
    - "traefik.http.routers.admin-webapp.rule=Host(`company.com`) && PathPrefix(`/admin`)"
    - "traefik.http.routers.admin-webapp.service=admin-svc"
    - "traefik.http.services.admin-svc.LoadBalancer.server.Port=9999"
```

Traefik With ☸

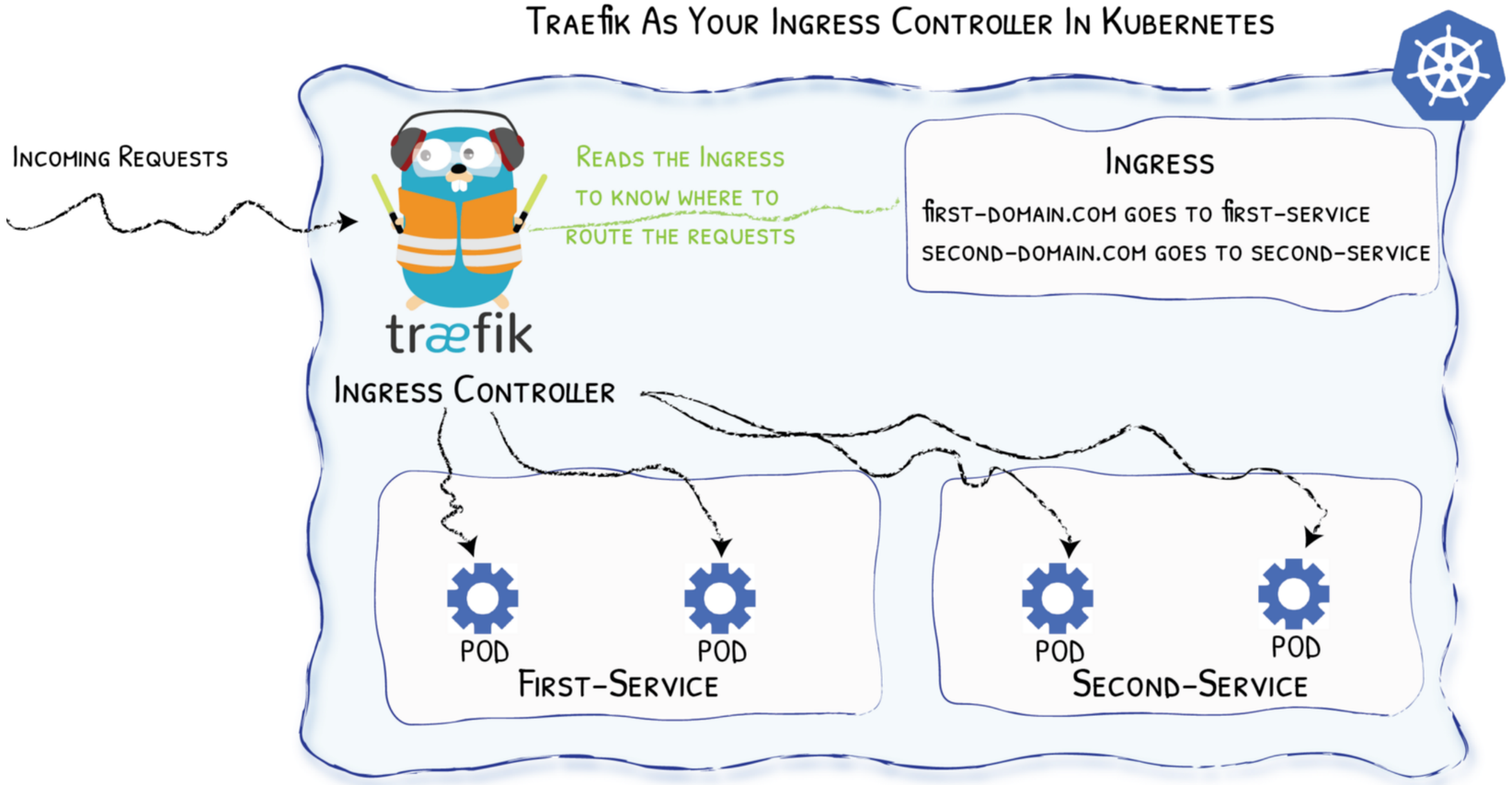


Diagram from https://medium.com/@geraldcroes

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
```

But···

Annotations

General annotations

The following general annotations are applicable on the Ingress object:

Annotation	Description
`traefik.ingress.kubernetes.io/app-root: "/index.html"`	Redirects all requests for `/` to the defined path. (1)
`traefik.ingress.kubernetes.io/error-pages: <YML>`	See custom error pages section. (2)
`traefik.ingress.kubernetes.io/frontend-entry-points: http,https`	Override the default frontend endpoints.
`traefik.ingress.kubernetes.io/pass-client-tls-cert: <YML>`	Forward the client certificate following the configuration in YAML. (3)
`traefik.ingress.kubernetes.io/pass-tls-cert: "true"`	Override the default frontend PassTLSCert value. Default: `false`.(DEPRECATED)
`traefik.ingress.kubernetes.io/preserve-host: "true"`	Forward client `Host` header to the backend.
`traefik.ingress.kubernetes.io/priority: "3"`	Override the default frontend rule priority.
`traefik.ingress.kubernetes.io/rate-limit: <YML>`	See rate limiting section. (4)
`traefik.ingress.kubernetes.io/redirect-entry-point: https`	Enables Redirect to another entryPoint for that frontend (e.g. HTTPS).
`traefik.ingress.kubernetes.io/redirect-permanent: "true"`	Return 301 instead of 302.
`traefik.ingress.kubernetes.io/redirect-regex: ^http://localhost/(.*)`	Redirect to another URL for that frontend. Must be set with `traefik.ingress.kubernetes.io/redirect-replacement`.
`traefik.ingress.kubernetes.io/redirect-replacement: http://mydomain/$1`	Redirect to another URL for that frontend. Must be set with `traefik.ingress.kubernetes.io/redirect-regex`.
`traefik.ingress.kubernetes.io/request-modifier: AddPrefix: /users`	Adds a request modifier to the backend request.
`traefik.ingress.kubernetes.io/rewrite-target: /users`	Replaces each matched Ingress path with the specified one, and adds the old path to the `X-Replaced-Path` header.

Annotations

You can add these Kubernetes annotations to specific Ingress objects to customize their behavior.

Tip

Annotation keys and values can only be strings. Other types, such as boolean or numeric values must be quoted, i.e. `"true"`, `"false"`, `"100"`.

Note

The annotation prefix can be changed using the `--annotations-prefix` command line argument, but the default is `nginx.ingress.kubernetes.io`, as described in the table below.

Name	type
nginx.ingress.kubernetes.io/app-root	string
nginx.ingress.kubernetes.io/affinity	cookie
nginx.ingress.kubernetes.io/affinity-mode	"balanced" or "persistent"
nginx.ingress.kubernetes.io/auth-realm	string
nginx.ingress.kubernetes.io/auth-secret	string
nginx.ingress.kubernetes.io/auth-secret-type	string
nginx.ingress.kubernetes.io/auth-type	basic or digest
nginx.ingress.kubernetes.io/auth-tls-secret	string
nginx.ingress.kubernetes.io/auth-tls-verify-depth	number
nginx.ingress.kubernetes.io/auth-tls-verify-client	string
nginx.ingress.kubernetes.io/auth-tls-error-page	string
nginx.ingress.kubernetes.io/auth-tls-pass-certificate-to-upstream	"true" or "false"
nginx.ingress.kubernetes.io/auth-url	string
nginx.ingress.kubernetes.io/auth-cache-key	string

☸ CRD - Custom Resources Definition

```yaml
# 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
```

Demo 1 With

Demo 2 With ☸

Menu:

Click here for demo's instructions

1. Install Traefik v2 in Kubernetes cluster
2. Deploy and expose an HTTP application
3. Deploy and expose a TCP application

Install Traefik In Kubernetes

Click here for demo's instructions

1. 🛠️ Custom Resource Definitions
2. 👮 Configure RBAC
   - To allow watching the Kubernetes API
3. 📦 Install Traefik as a Deployment
4. 🚪 Expose and 📡 publish Traefik with the right Service type
   - `LoadBalancer`, `NodePort`?
5. ✅ Configure Traefik and its features

Example: HTTP Application

Click here for demo's instructions

1. 📦 Install the web application as a Deployment
2. 🚪 Expose the web application with a Service of type `ClusterIP`
    - Internal access only
3. 📡 Publish the web application with an `IngressRoute`

Example: TCP Application

Click here for demo's instructions

Example with MongoDB:

1. Install MongoDB as a Deployment
2. Expose MongoDB with a Service of type `ClusterIP`
    - Internal access only
3. Publish MongoDB with an `IngressRouteTCP`

What's Next?

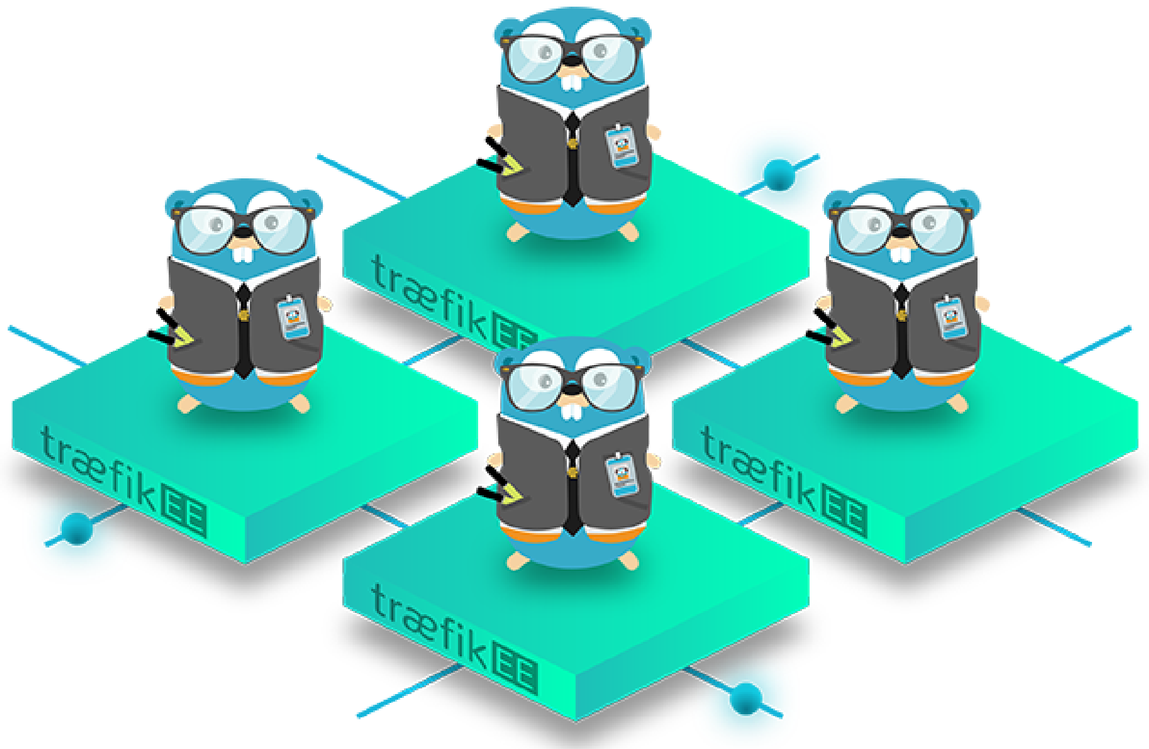
- KV Store
- UDP
- Canary and Mirroring With K8s CRD
- And More…

Where To Start?

- Community Forum
- Official Documentation
- Blog Posts:
  - Back to Traefik 2.0
  - Traefik 2.0: The Wait Is Over!
  - Traefik 2.0 & Docker 101

We Also Missed Talking About …

Traefik Enterprise Edition



HIGH AVAILABILITY

træfik ENTERPRISE EDITION

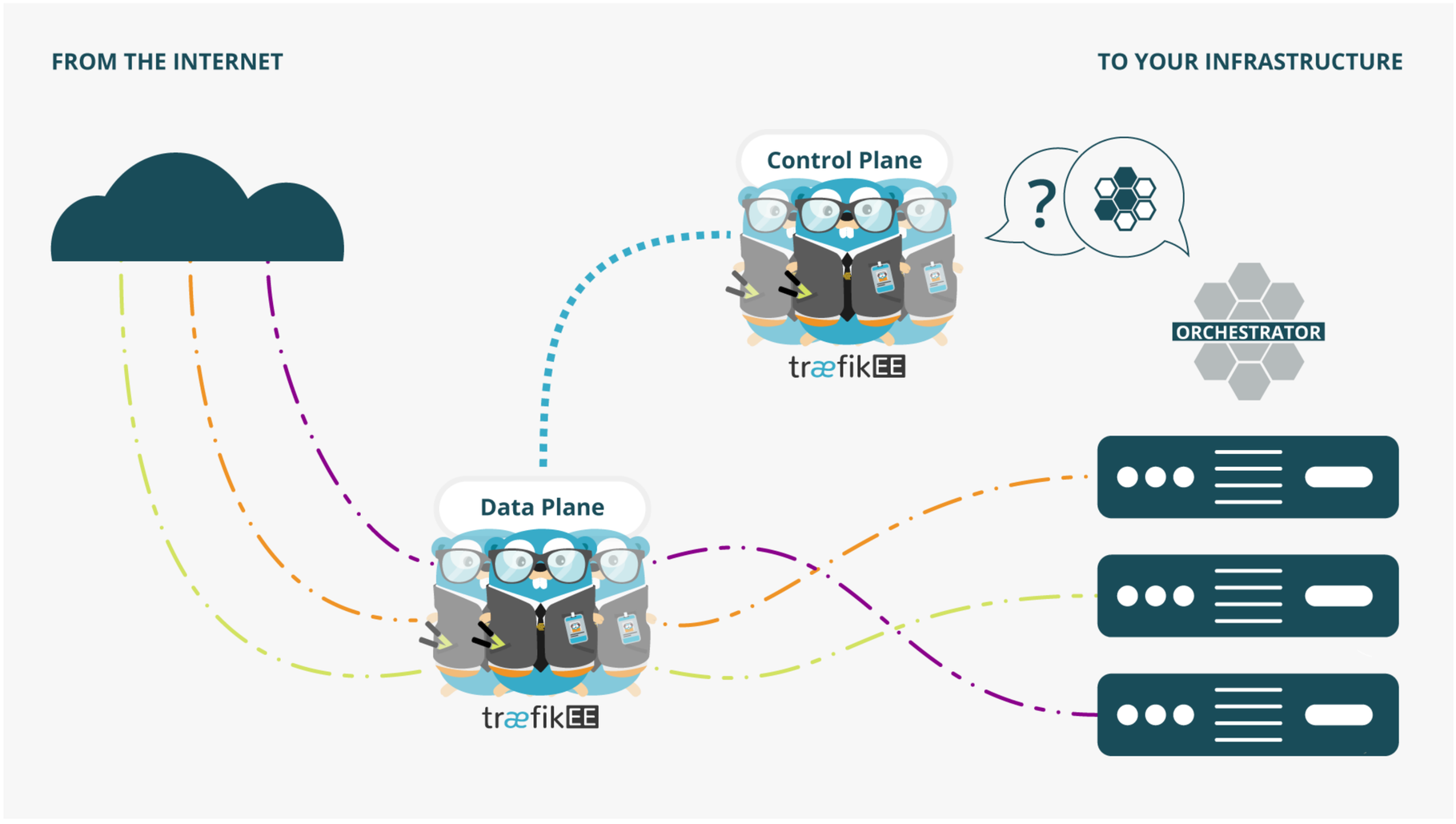
SECURITY

træfik ENTERPRISE EDITION

SCALABILITY

træfik ENTERPRISE EDITION

TraefikEE Architecture



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
    ...
```

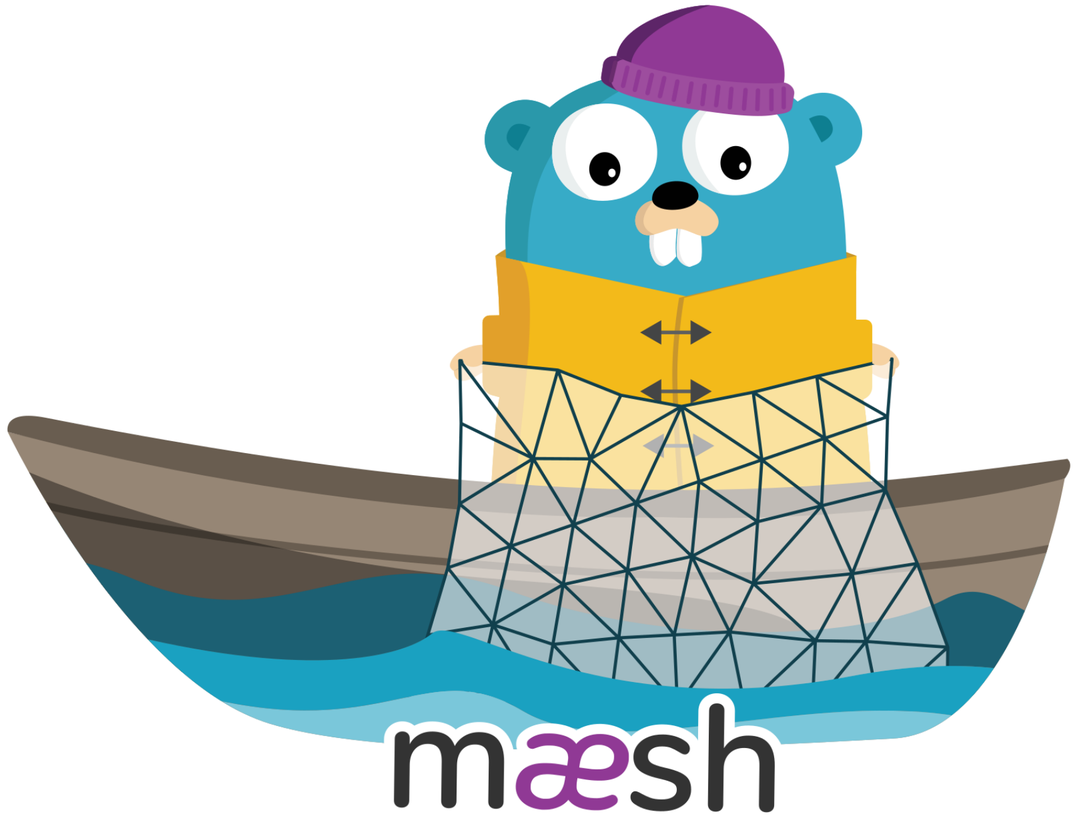
Demo Of TraefikEE

Free Trial

https://containo.us/traefikee

East / West Traefik

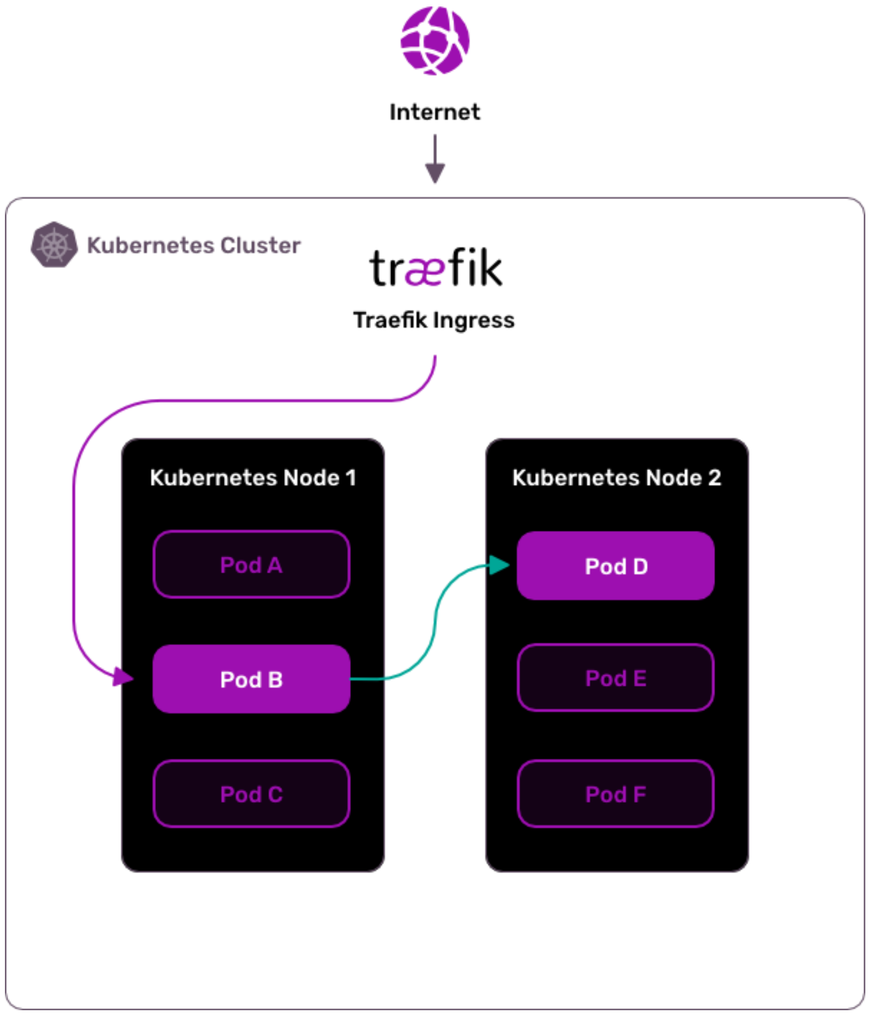
Say Hello To Maesh

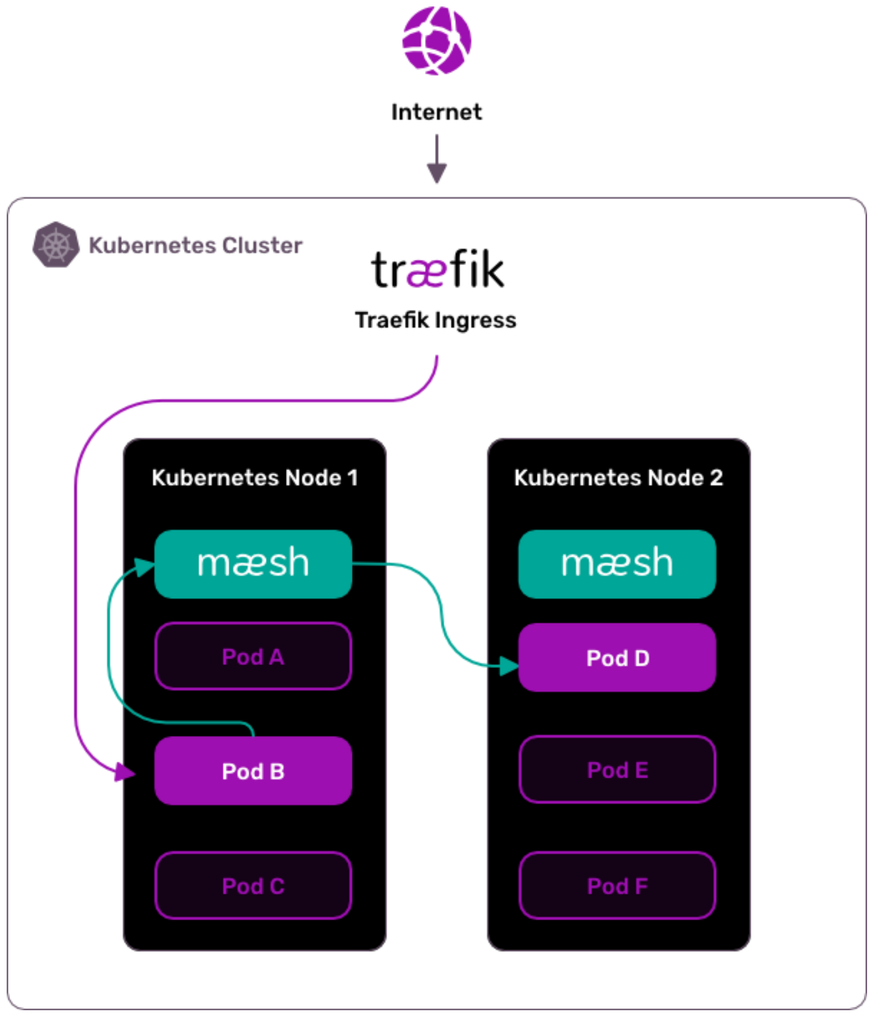


What Is Maesh?

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

That’s All Folks!

Thank You!

@DamienDuportal

dduportal

- Slides (HTML): https://containous.github.io/slides/cs-devops-days
- Slides (PDF): https://containous.github.io/slides/cs-devops-days/slides.pdf
- Source on : https://github.com/containous/slides/tree/cs-devops-days