

Linux Day Torino 2024



træfik

il reverse proxy
cloud native

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linux.it
ils.org

Overview



Docker Hub search results for "traefik". The top navigation bar shows the Docker Hub logo, a search bar with "traefik", and user options like "Sign In" and "Sign up". Below the search bar, the results show the "traefik" repository page. The repository card includes a cartoon owl icon, the name "traefik", a "Docker Official Image" badge, a download count of "1B+", a star count of "3.3K", and a description: "Traefik, The Cloud Native Edge Router". A "NETWORKING" tag is present. On the right, there is a button to "docker pull traefik" with a "Copy" link. The main content area shows tabs for "Overview" (which is selected) and "Tags".

GitHub repository page for "traefik / traefik" (Public). The header shows the repository name, a "Public" status, and links for "Notifications", "Fork", "Star", and "Star 51k". Below the header, the main navigation bar includes "Code", "Issues 616", "Pull requests 37", "Actions", "Projects", "Wiki", "Security 18", and "Insights" (which is selected). On the left, a sidebar menu lists "Pulse", "Contributors", "Community Standards" (which is selected), "Commits", "Code frequency", "Dependency graph", and "Network". The main content area features a "Community Standards" section with a message about comparing to recommended standards, and a "Checklist" section with a single item: "Description" marked with a green checkmark.

Stats



- 1 B+ Docker Hub downloads
 - 50k+ Stars on GitHub
 - 500+ Contributors

Use cases



- Reverse Proxy
- API Gateway
- Load Balancing
- Certificate Management
- Kubernetes Ingress (or IngressRoute?)

History



- Project born in 2015
- Founder: Emile Vauge
- French project (as a lot of open source EMEA projects)
<=Tell me why!

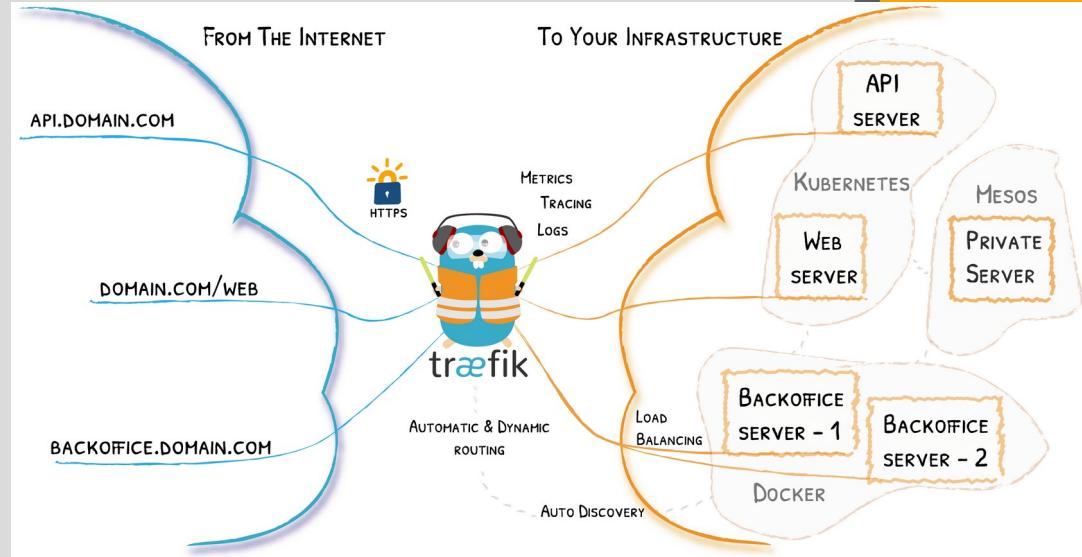
Why?



- Tons of reverse Proxies but none were dynamic
- Microservices are dynamic which requires dynamic configurations
- Watches the Orchestrator for new events
(provider integration is the way!)

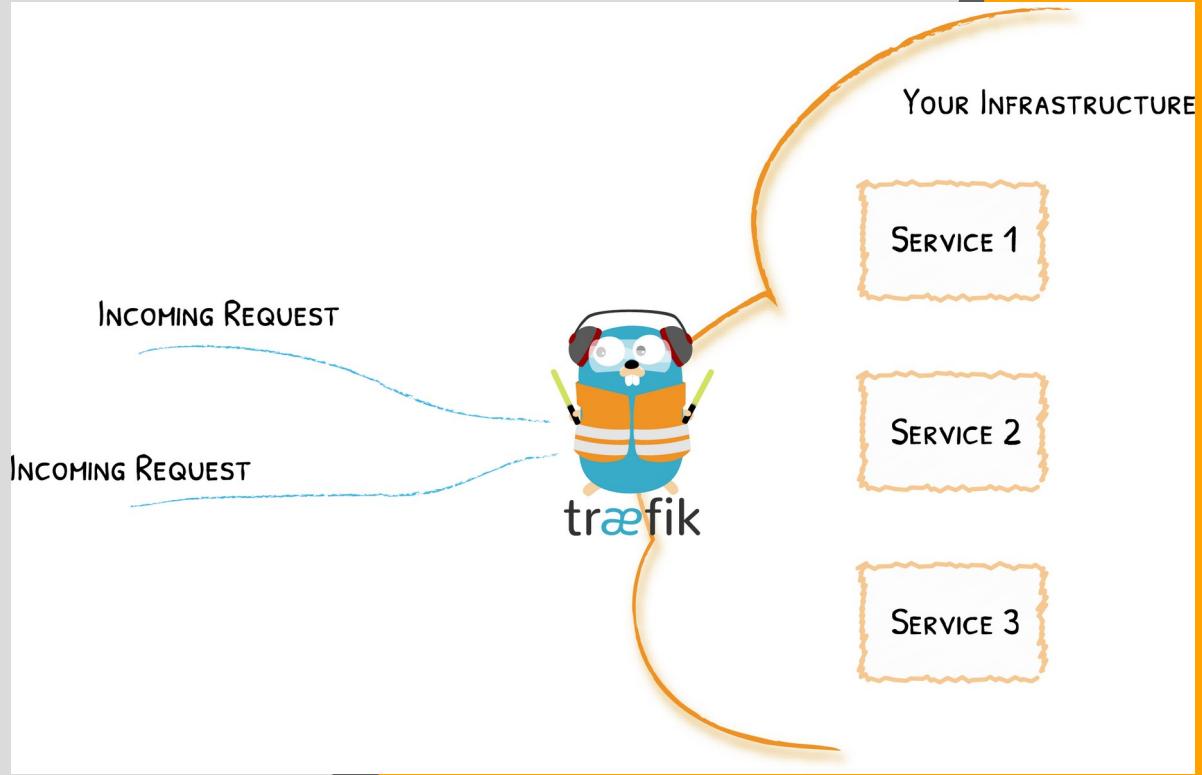
Basic overview

- Written in Go
- Edge Router
- Automatically discovers service configurations
 - Native integration with AWS, Kubernetes, Docker, Mesos, Nomad and many more
 - Traefik automatically synchronizes configuration changes in real-time, no restarts, no down-time



Edge router

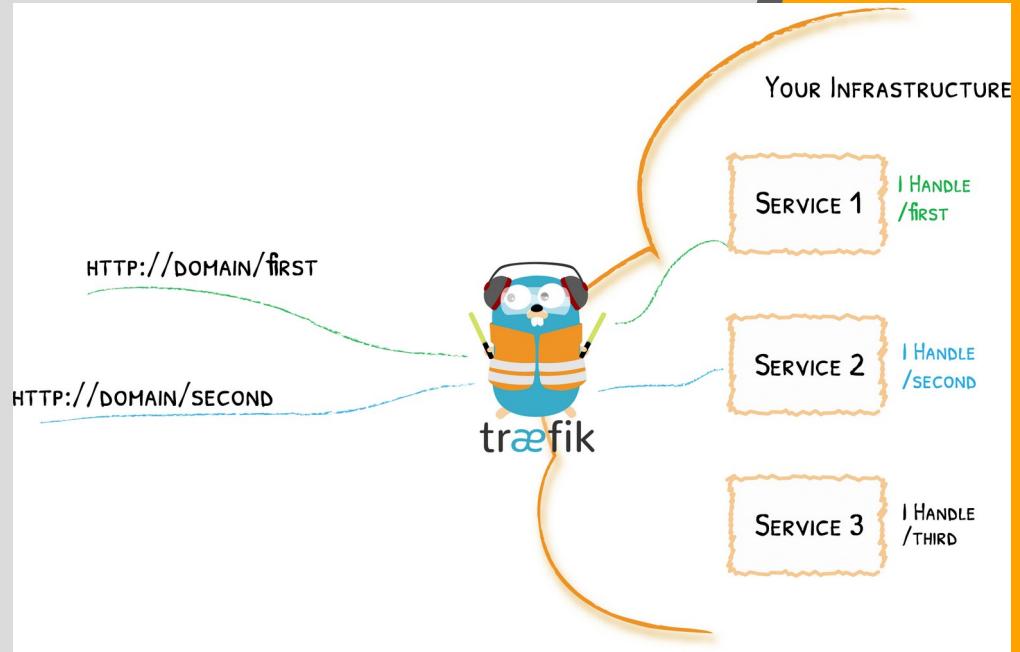
- Front door to your platform
- Intercepts incoming requests and routes the request
- Defined logic to determine which service receives the request based on Path, host, headers, and more



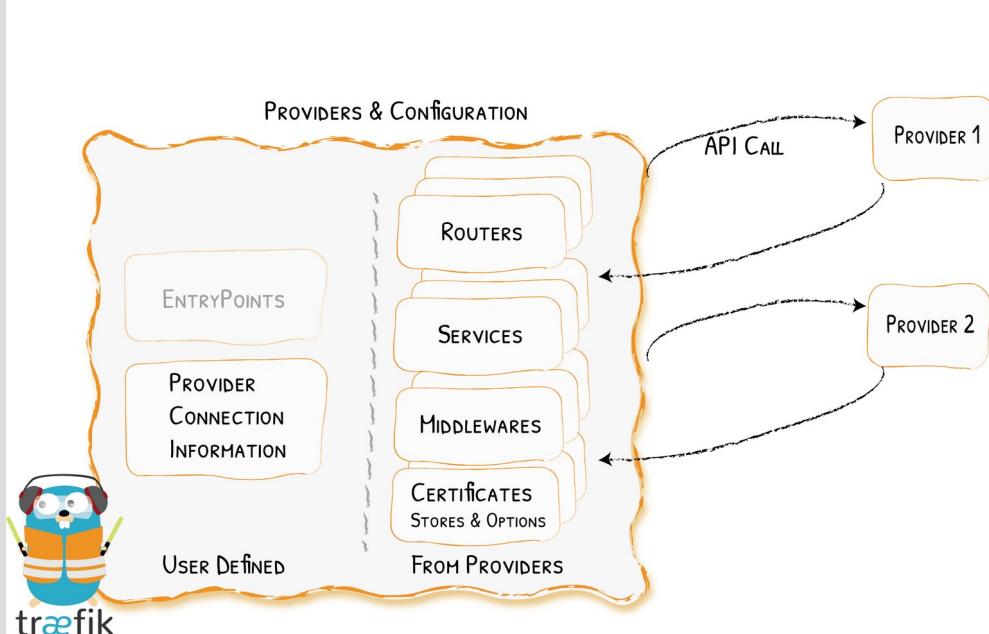
Auto service discovery



- Traditional edge /routers reverse proxies need a configuration file to get every possible route to the service(s)
- Traefik get all the information directly to the service
- This means less configurations after Traefik initialization and always up to date rules



Supported providers



traefik

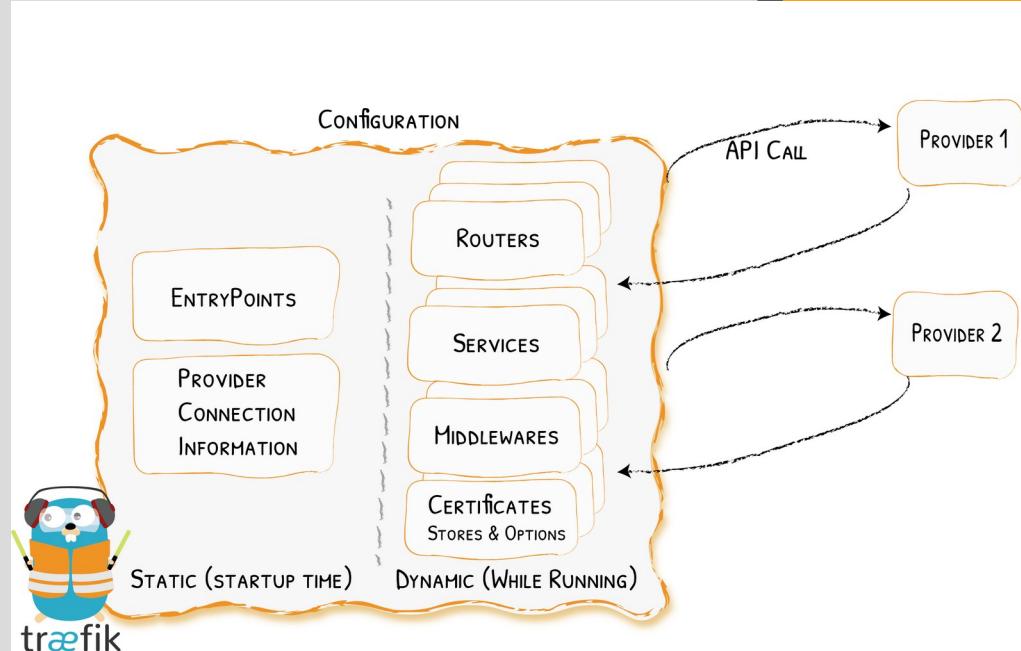
Provider	Type	Configuration Type	Provider Name
Docker	Orchestrator	Label	docker
Kubernetes IngressRoute	Orchestrator	Custom Resource	kubernetescrd
Kubernetes Ingress	Orchestrator	Ingress	kubernetes
Kubernetes Gateway API	Orchestrator	Gateway API Resource	kubernetesgateway
Consul Catalog	Orchestrator	Label	consulcatalog
Nomad	Orchestrator	Label	nomad
ECS	Orchestrator	Label	ecs
File	Manual	YAML/TOML format	file
Consul	KV	KV	consul
Etcd	KV	KV	etcd
ZooKeeper	KV	KV	zookeeper
Redis	KV	KV	redis
HTTP	Manual	JSON format	http

Configuration introduction



Configuration in Traefik can refer to two different things:

- The fully dynamic routing configuration (referred to as the dynamic configuration)
- The startup configuration (referred to as the static configuration)



Dashboard

traefik Dashboard HTTP TCP Documentation Traefik 2.0.0-rc1

→ Entrypoints

WEB :80 WEB-SECURED :443 TRAEFIK :8080

HTTP

Routers Services Middlewares

TCP

Routers Services

Features

ON

Providers

Docker File Marathon KubernetesIngress KubernetesCRD Rancher

The dashboard provides a comprehensive overview of the Traefik configuration and performance across different layers:

- Entrypoints:** Shows three main entry points: WEB (port :80), WEB-SECURED (port :443), and TRAEFIK (port :8080).
- HTTP Metrics:** Three donut charts show the distribution of requests for Routers, Services, and Middlewares. Each chart has three segments: Success (green), Warnings (orange), and Errors (red), each accounting for 33% of the total.
- TCP Metrics:** Similar to HTTP, three donut charts show the distribution of requests for Routers and Services. The distribution is identical to the HTTP metrics.
- Features:** Shows the status of tracing (Zipkin), metrics (Prometheus), and access logs (ON).
- Providers:** Lists supported providers: Docker, File, Marathon, KubernetesIngress, KubernetesCRD, and Rancher.

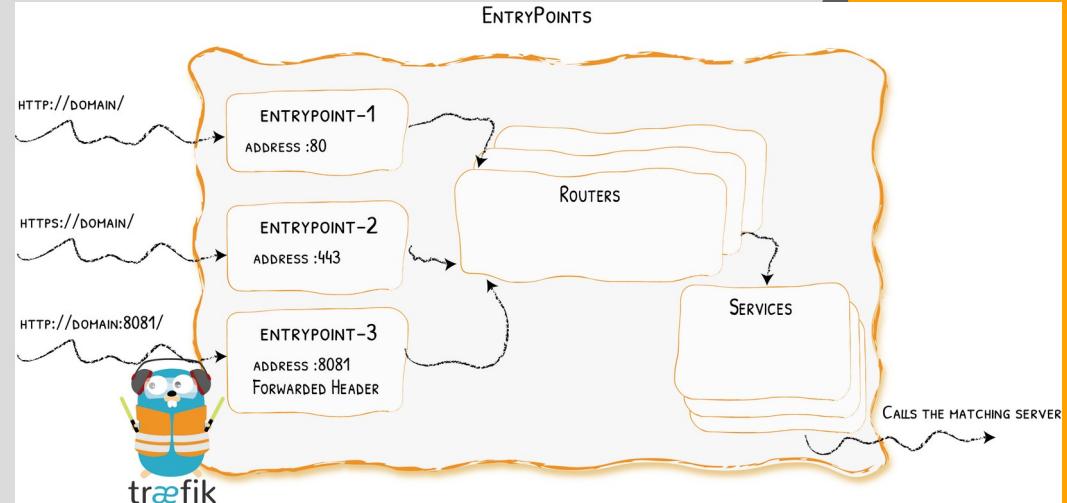


EntryPoints



EntryPoints are the network entry points into Traefik.

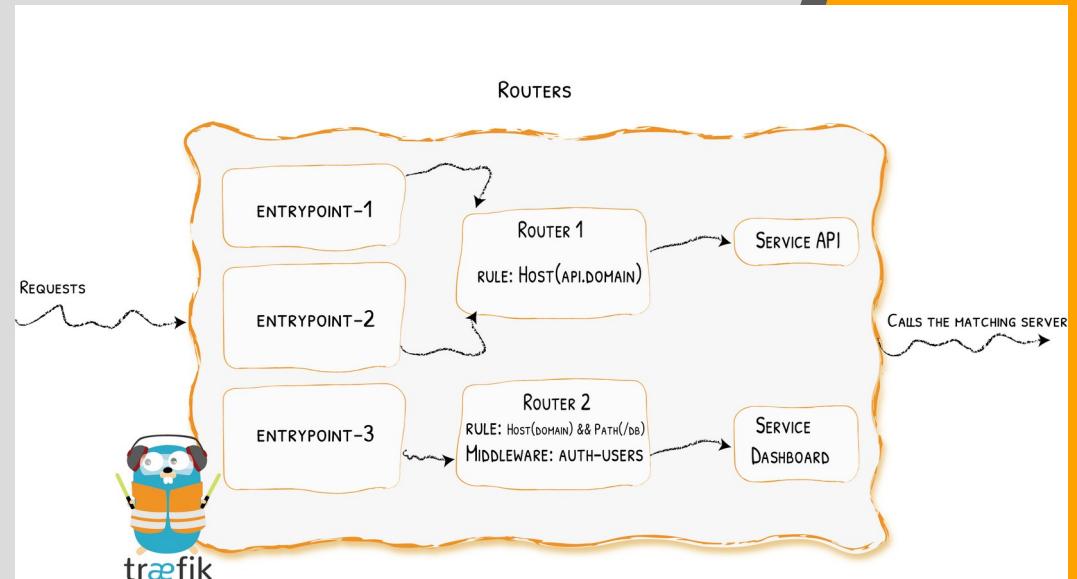
They define the port which will receive the packets, and whether to listen for TCP or UDP.



Routers

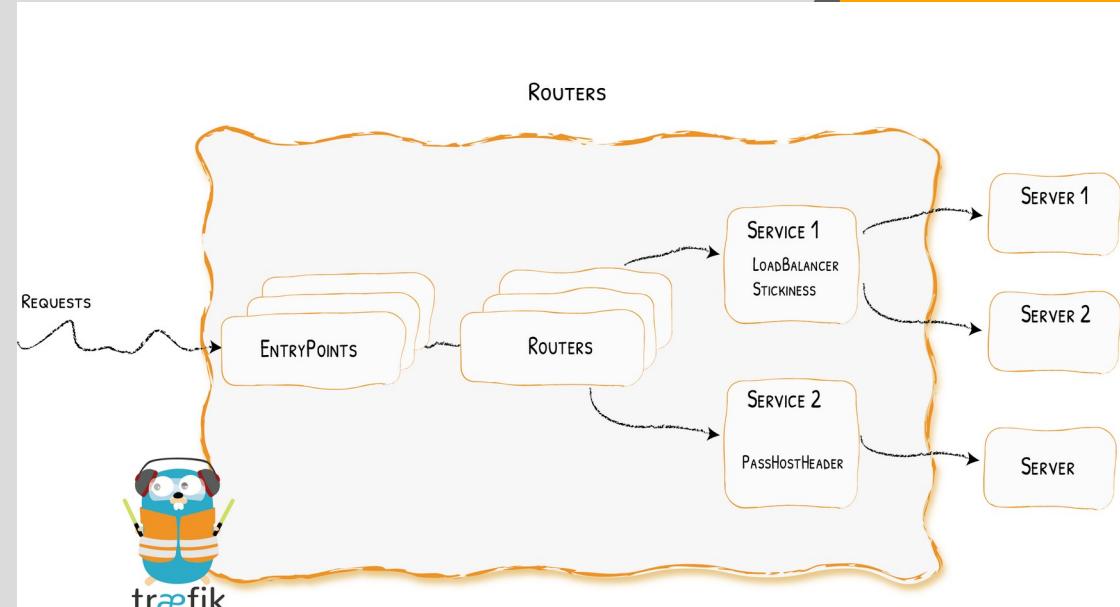


A router is in charge of connecting incoming requests to the services that can handle them. In the process, routers may use pieces of middleware to update the request, or act before forwarding the request to the service.



Services

The Services are responsible for configuring how to reach the actual services that will eventually handle the incoming requests.



Providers



- A Provider links an infrastructure component (Orchestrator, Container Engine, Key-Value store, or File to Traefik)
- Configure Traefik to connect to the Provider
- Traefik detects configuration changes and events from the Provider

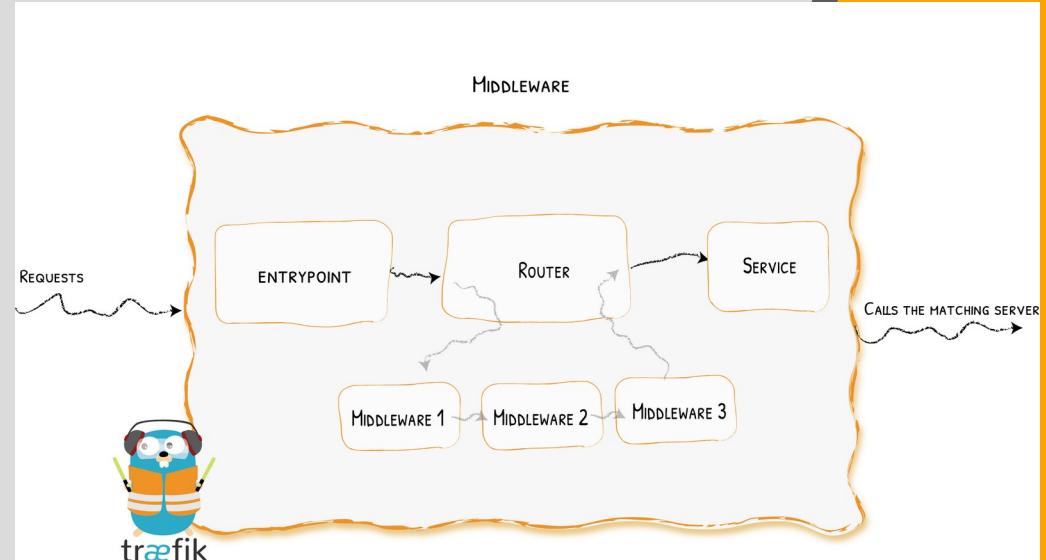
Middlewares



Attached to the routers, pieces of middleware are a means of tweaking the requests before they are sent to your service (or before the answer from the services are sent to the clients).

There are several available middleware in Traefik, some can modify the request, the headers, some are in charge of redirections, some add authentication, and so on.

Middlewares that use the same protocol can be combined into chains to fit every scenario.



Metrics

Traefik provides metrics in the OpenTelemetry format as well as the following vendor specific backends:

- Datadog
- InfluxDB2
- Prometheus
- StatsD

Traefik Proxy hosts an official Grafana dashboard for both on-premises and Kubernetes deployments.



Metric	Type	Labels	Description
Config reload total	Count		The total count of configuration reloads.
Config reload last success	Gauge		The timestamp of the last configuration reload success.
Open connections	Gauge	entrypoint, protocol	The current count of open connections, by entrypoint and protocol.
TLS certificates not after	Gauge		The expiration date of certificates.



Tracing



OpenTelemetry

OpenTelemetry is a collection of APIs, SDKs, and tools.

Use it to instrument, generate, collect, and export telemetry data (metrics, logs, and traces) to help you analyze your software's performance and behavior.

Advanced techniques



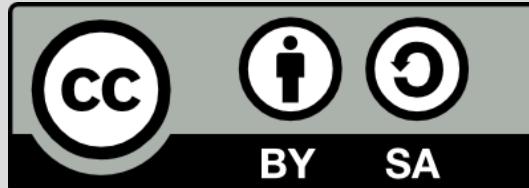
- Not covered with deep dive demo
- Maybe I will start a dedicated course on video.linux.it
[\(oirasor_channel@video.linux.it\)](mailto:oirasor_channel@video.linux.it)
- If interested feel free to contact:
oirasor@linux.it

Advanced techniques



- Load Balancing (WRR)
- Progressive Delivery (WRR)
- Mirroring with Traefik
- Sticky Sessions
- Nested health checks

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