Traefik Exercise

Pre reqs

- Linux (WSL2 with Ubuntu in my case)*:* https://learn.microsoft.com/en-us/windows/wsl/install
- Kubernetes (Docker Desktop engine with kubeadm): https://www.docker.com/blog/how-to-set-up-a-kubernetes-cluster-on-docker-desktop/
- Helm: https://helm.sh/docs/intro/install/
- Git and Github: https://github.com/gustavosaviano/traefik-exercise
- foobar-api: https://github.com/containous/foobar-api

First Challenge

Right from the start, I noticed the `containous/foobar-api` image was no longer available in Docker Hub repos. When inspecting the manifest, this is what I received:

```
gus@coxa-pc:~$ docker manifest inspect containous/foobar-api
errors:
denied: requested access to the resource is denied
unauthorized: authentication required

gus@coxa-pc:~$ docker manifest inspect traefik/foobar-api
errors:
denied: requested access to the resource is denied
unauthorized: authentication required
```

To work around this, I initially created a Dockerfile to build the image myself and pushed it to the Docker Desktop engine. While this worked, it added an extra step to the workflow (more on this later on).

Later, while double-checking the image availability again, I found a similar image in Fernando's repo. Since Fernando appears to be the same person listed in the tech meeting invite, I decided to use this image (`fernandobenegasa/foobar-api`):

```
gus@coxa-pc:~$ docker search fernandobenegasa/foobar-api
NAME                                DESCRIPTION
STARS     OFFICIAL
fernandobenegasa/foobar-api
```

Deploying an MVP

I decided to go in small, incremental steps. My goal was to get the process flowing and show my thought throughout the exercise. So to start, I deployed a MVP of the `foobar-api` just to see the application running:

```
gus@coxa-pc:~/traefik-exercise$ cat 01-foobar.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: foobar-api
spec:
```

```
  replicas: 1
  selector:
    matchLabels:
      app: foobar-api
  template:
    metadata:
      labels:
        app: foobar-api
    spec:
      containers:
      - name: foobar-api
        image: fernandobenegasa/foobar-api
        ports:
        - containerPort: 80
---
apiVersion: v1
kind: Service
metadata:
  name: foobar-api-svc
spec:
  selector:
    app: foobar-api
  ports:
    - protocol: TCP
      port: 80
      targetPort: 80
```

```
gus@coxa-pc:~/traefik-exercise$ k apply -f 01-foobar.yaml
deployment.apps/foobar-api created
service/foobar-api-svc created

gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS              RES
TARTS   AGE
foobar-api-6446857f59-mpk2z   0/1     ContainerCreating   0
```

```
4s

gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS    RESTARTS
AGE
foobar-api-6446857f59-mpk2z   0/1     Error     2 (18s ago)
27s
```

Second Challenge

Well, that didn't go as expected. Right after deployment, the `foobar-api` pod entered an Error status and fell into a `CrashLoopBackOff` loop:

```
gus@coxa-pc:~/traefik-exercise$ k get pod foobar-api-6446857f
59-mpk2z -o yaml | tail -30
      terminated:
        containerID: docker://1c39f6a569c2f7e4dcac02e6b872450
1b0f1c528cd59a6cd374958e7f066f45c
        exitCode: 1
        finishedAt: "2026-01-17T20:34:28Z"
        reason: Error
        startedAt: "2026-01-17T20:34:28Z"
    name: foobar-api
    ready: false
    resources: {}
    restartCount: 5
    started: false
    state:
      waiting:
        message: back-off 2m40s restarting failed container=f
oobar-api pod=foobar-api-6446857f59-mpk2z_default(48d8bdc0-de
2c-411d-b80b-d47f8775bc3f)
        reason: CrashLoopBackOff
    volumeMounts:
    - mountPath: /var/run/secrets/kubernetes.io/serviceaccoun
```

```
t
      name: kube-api-access-vm64f
      readOnly: true
      recursiveReadOnly: Disabled
  hostIP: 192.168.65.3
  hostIPs:
  - ip: 192.168.65.3
  observedGeneration: 1
  phase: Running
  podIP: 10.x.x.xx
  podIPs:
  - ip: 10.x.x.xx
  qosClass: BestEffort
  startTime: "2026-01-17T20:31:20Z"
```

So it was time to troubleshoot. The pod logs provided the answer right away: the application was failing because it required a certificate.

```
gus@coxa-pc:~/traefik-exercise$ k logs foobar-api-6446857f59-
mpk2z
Starting up on port 443
2026/01/17 20:37:19 You need to provide a certificate
```

Checking the `app.go` source code confirmed this: the requirement for `cert.pem` and `key.pem` is hardcoded and the application expects these files to exist in the `/cert` directory before it can start:

```
gus@coxa-pc:~/foobar-api$ grep -C 3 "You need to provide a ce
rtificate" app.go

        _, err := os.Stat("/cert/cert.pem")
        if err != nil {
                log.Fatal("You need to provide a certificat
e")
        }
```

```
        _, err = os.Stat("/cert/key.pem")
        if err != nil {
                log.Fatal("You need to provide a certificat
e")
        }
        log.Fatal(server.ListenAndServeTLS("/cert/cert.pem",
"/cert/key.pem"))
}
```

So, unfortunately, my initial idea of deploying an MVP didn't make it. However, this was a good learning moment. I now had to find a way to make it work without modifying the code itself to go through the certificate check.

The K8s-native Fix

I wanted to keep it simple and stick to native K8s solutions. I considered using `cert-manager` but that would require external installations and extra steps. Instead, I went for an InitContainer.

So I edited the `01-foobar.yaml` to include:

1. A PVC to hold the `cert.pem` and `key.pem` files.
2. An initContainer running a simple script to check if the files exist in the `/cert` volume and, if not, use `openssl` to generate a self-signed certificate and key:

```
gus@coxa-pc:~/traefik-exercise$ cat 01-foobar.yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: foobar-api-certs-pvc
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 10Mi
---
```

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: foobar-api
  labels:
    app: foobar-api
spec:
  replicas: 1
  selector:
    matchLabels:
      app: foobar-api
  template:
    metadata:
      labels:
        app: foobar-api
    spec:
      volumes:
      - name: cert-volume
        persistentVolumeClaim:
          claimName: foobar-api-certs-pvc

      initContainers:
      - name: cert-gen
        image: alpine:latest
        command: ["/bin/sh", "-c"]
        args:
          - |
            apk add openssl;
            if [ ! -f /cert/cert.pem ]; then
              openssl req -x509 -newkey rsa:4096 -keyout /cer
t/key.pem -out /cert/cert.pem -days 365 -nodes -subj '/CN=foo
bar-api.local';
            else
              echo "Cert already exists";
            fi
        volumeMounts:
```

```
        - name: cert-volume
          mountPath: /cert

      containers:
      - name: foobar-api
        image: fernandobenegasa/foobar-api:latest
        ports:
        - containerPort: 80
        volumeMounts:
        - name: cert-volume
          mountPath: /cert
---
apiVersion: v1
kind: Service
metadata:
  name: foobar-api-svc
spec:
  selector:
    app: foobar-api
  ports:
    - protocol: TCP
      port: 443
      targetPort: 443
```

```
gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS             REST
ARTS         AGE
foobar-api-6446857f59-mpk2z   0/1     CrashLoopBackOff   12
(3m36s ago)   40m

gus@coxa-pc:~/traefik-exercise$ k delete pod foobar-api-64468
57f59-mpk2z
pod "foobar-api-6446857f59-mpk2z" deleted from default namesp
ace
```

```
gus@coxa-pc:~/traefik-exercise$ k apply -f 01-foobar.yaml
persistentvolumeclaim/foobar-api-certs-pvc created
deployment.apps/foobar-api configured
service/foobar-api-svc configured

gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS             REST
ARTS     AGE
foobar-api-598687ff9b-4nrzf   0/1     Init:0/1           0
4s
foobar-api-6446857f59-9vjqs   0/1     CrashLoopBackOff   1 (7
s ago)   11s

gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS    RESTARTS   AG
E
foobar-api-598687ff9b-4nrzf   1/1     Running   0          14
s

gus@coxa-pc:~/traefik-exercise$ k logs foobar-api-598687ff9b-
4nrzf
Defaulted container "foobar-api" out of: foobar-api, cert-gen
(init)
Starting up on port 443

gus@coxa-pc:~/traefik-exercise$ k exec -it foobar-api-598687f
f9b-4nrzf -- ls -l /cert
Defaulted container "foobar-api" out of: foobar-api, cert-gen
(init)
total 8
-rw-r--r--    1 root     root          1826 Jan 17 21:12 cer
t.pem
-rw-------    1 root     root          3272 Jan 17 21:12 key.
pem
```

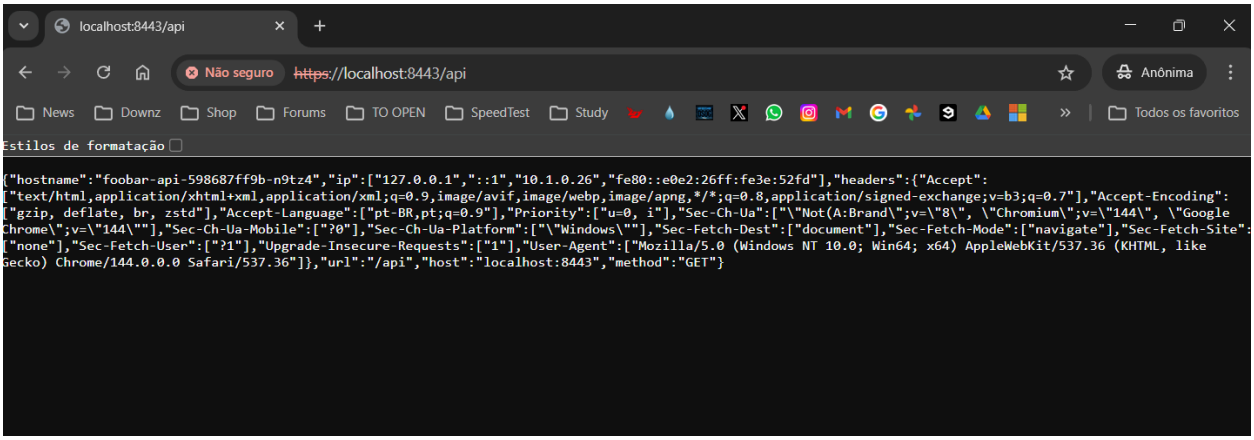
Simulating the script logic:

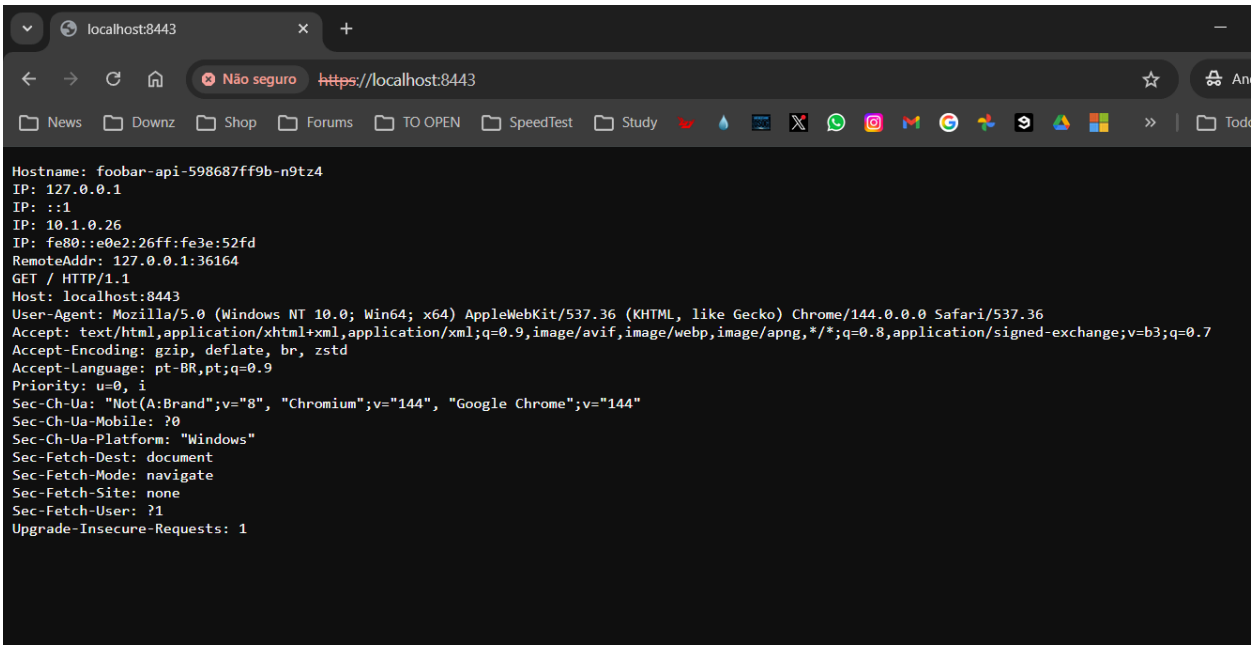
```
gus@coxa-pc:~/traefik-exercise$ k delete pod -l app=foobar-ap
i
pod "foobar-api-598687ff9b-4nrzf" deleted from default namesp
ace

gus@coxa-pc:~/traefik-exercise$ k apply -f 01-foobar.yaml
persistentvolumeclaim/foobar-api-certs-pvc unchanged
deployment.apps/foobar-api unchanged
service/foobar-api-svc unchanged

gus@coxa-pc:~/traefik-exercise$ k logs deploy/foobar-api -c c
ert-gen
(1/1) Installing openssl (3.5.4-r0)
Executing busybox-1.37.0-r30.trigger
OK: 9023 KiB in 17 packages
Cert already exists
```

Now, I had a working MVP. Confirmed it by running a port-forward and hitting the API endpoints (`/data`, `/echo`, `/bench`) via `curl`.

```
gus@coxa-pc:~/traefik-exercise$ k port-forward deploy/foobar-
api 8443:443
Forwarding from 127.0.0.1:8443 -> 443
Forwarding from [::1]:8443 -> 443
Handling connection for 8443
Handling connection for 8443
Handling connection for 8443

gus@coxa-pc:~$ curl -k https://localhost:8443/data
|

gus@coxa-pc:~$ curl -k https://localhost:8443/echo
Bad Request

gus@coxa-pc:~$ curl -k https://localhost:8443/bench
```

```
1

gus@coxa-pc:~$ curl -k https://localhost:8443/
Hostname: foobar-api-598687ff9b-n9tz4
IP: 127.0.0.1
IP: ::1
IP: 10.x.x.xx
IP: fe80::e0e2:26ff:fe3e:52fd
RemoteAddr: 127.0.0.1:45206
GET / HTTP/1.1
Host: localhost:8443
User-Agent: curl/8.5.0
Accept: */*

gus@coxa-pc:~$ curl -k https://localhost:8443/api
{"hostname":"foobar-api-598687ff9b-n9tz4","ip":["127.0.0.
1","::1","10.x.x.xx","fe80::e0e2:26ff:fe3e:52fd"],"headers":
{"Accept":["*/*"],"User-Agent":["curl/8.5.0"]},"url":"/ap
i","host":"localhost:8443","method":"GET"}
```





Integrating Traefik

With the application stable, it was finally time to integrate Traefik as part of the infra as the reverse proxy.

So I created the `02-traefik-values.yaml` file to define the custom configs (like enabling persistence and the Traefik dashboard), so that Helm could merge them with the default chart settings. Then, I installed Traefik via Helm:

```
gus@coxa-pc:~/traefik-exercise$ cat 02-traefik-values.yaml
persistence:
  enabled: true
  name: data
  accessMode: ReadWriteOnce
  size: 10Mi
  path: /data

ingressRoute:
  dashboard:
    enabled: true

additionalArguments:
```

```
  - "--certificatesresolvers.myresolver.acme.storage=/data/ac
me.json"
  - "--certificatesresolvers.myresolver.acme.email=gustavosav
iano@gmail.com"
  - "--certificatesresolvers.myresolver.acme.httpchallenge.en
trypoint=web"
```

```
gus@coxa-pc:~/traefik-exercise$ helm repo add traefik http
s://traefik.github.io/charts
"traefik" already exists with the same configuration, skippin
g

gus@coxa-pc:~/traefik-exercise$ helm install traefik traefik/
traefik -f 02-traefik-values.yaml
NAME: traefik
LAST DEPLOYED: Sat Jan 17 18:59:56 2026
NAMESPACE: default
STATUS: deployed
REVISION: 1
DESCRIPTION: Install complete
TEST SUITE: None
NOTES:
traefik with docker.io/traefik:v3.6.6 has been deployed succe
ssfully on default namespace!

gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS    RESTARTS   AG
E
foobar-api-598687ff9b-n9tz4   1/1     Running   0          43
m
traefik-5f5775fb87-rwlqs      1/1     Running   0          34
s
```

The Third Challenge

Since I had to bind a self-signed certificate to start the Go app, I faced a new issue: Traefik did not trust this certificate with the default settings.

When Traefik attempted to communicate with the backend service, it failed with a `500 Internal Server Error`. The logs confirmed the issue:

```
gus@coxa-pc:~$ curl -k https://foobar-api.localhost:8443
Internal Server Error

gus@coxa-pc:~/traefik-exercise$ k logs deploy/traefik | grep
x509
2026-01-17T22:15:56Z ERR 500 Internal Server Error error="tl
s: failed to verify certificate: x509: cannot validate certif
icate for 10.x.x.xx because it doesn't contain any IP SANs"
2026-01-17T22:16:06Z ERR 500 Internal Server Error error="tl
s: failed to verify certificate: x509: cannot validate certif
icate for 10.x.x.xx because it doesn't contain any IP SANs"
2026-01-17T22:18:15Z ERR 500 Internal Server Error error="tl
s: failed to verify certificate: x509: cannot validate certif
icate for 10.x.x.xx because it doesn't contain any IP SANs"
```

To resolve this, I checked Traefik docs and found the `insecureSkipVerify` option in the `ServersTransport` configuration. So I created a custom `ServersTransport` resource named `trust-self` and applied it to the IngressRoute. This told Traefik to skip certificate validation for this specific backend service, allowing the connection to proceed:

```
gus@coxa-pc:~/traefik-exercise$ k get crd | grep serverstrans
ports
serverstransports.traefik.io                  2026-01-17T12:
52:30Z

gus@coxa-pc:~/traefik-exercise$ cat 03-ingress.yaml
apiVersion: traefik.io/v1alpha1
kind: ServersTransport
metadata:
```

```
  name: trust-self
spec:
  insecureSkipVerify: true
---
apiVersion: traefik.io/v1alpha1
kind: IngressRoute
metadata:
  name: foobar-api-ingress
spec:
  entryPoints:
    - websecure
  routes:
  - match: Host(`foobar-api.localhost`)
    kind: Rule
    services:
    - name: foobar-api-svc
      port: 443
      scheme: https
      serversTransport: trust-self
  tls:
    certResolver: myresolver
```

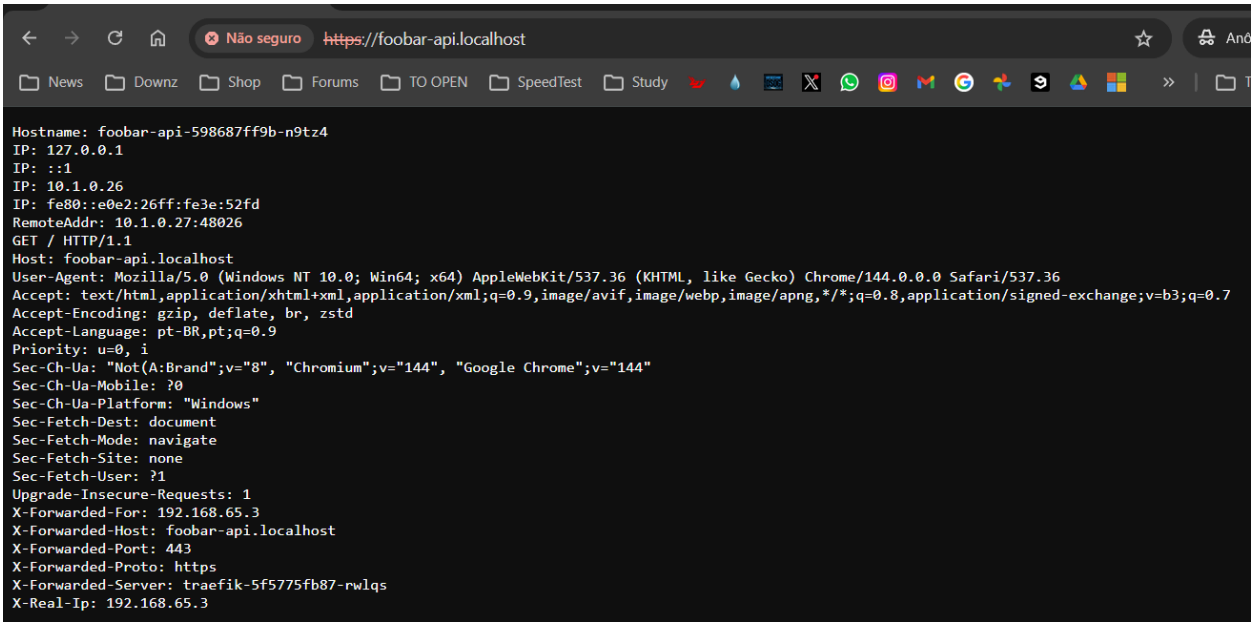
With this fix in place, the architecture was complete. I verified the setup by curling via Traefik's entrypoint:

```
gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS    RESTARTS   AG
E
foobar-api-598687ff9b-n9tz4   1/1     Running   0          64
m
traefik-5f5775fb87-rwlqs      1/1     Running   0          22
m

gus@coxa-pc:~/traefik-exercise$ k get services
NAME             TYPE           CLUSTER-IP       EXTERNAL-IP
PORT(S)                      AGE
```

```
foobar-api-svc   ClusterIP      10.106.142.135   <none>
443/TCP                     110m
kubernetes       ClusterIP      10.96.0.1        <none>
443/TCP                     10h
traefik          LoadBalancer   10.108.110.115   localhost
80:31868/TCP,443:31609/TCP   22m

gus@coxa-pc:~/traefik-exercise$ k get serverstransport
NAME         AGE
trust-self   77s

gus@coxa-pc:~/traefik-exercise$ k port-forward svc/traefik 84
43:443
Forwarding from 127.0.0.1:8443 -> 8443
Forwarding from [::1]:8443 -> 8443
Handling connection for 8443

gus@coxa-pc:~$ curl -v -k https://foobar-api.localhost:8443
* Host foobar-api.localhost:8443 was resolved.
* IPv6: ::1
* IPv4: 127.0.0.1
*   Trying [::1]:8443...
* Connected to foobar-api.localhost (::1) port 8443
* ALPN: curl offers h2,http/1.1
* TLSv1.3 (OUT), TLS handshake, Client hello (1):
* TLSv1.3 (IN), TLS handshake, Server hello (2):
* TLSv1.3 (IN), TLS handshake, Encrypted Extensions (8):
* TLSv1.3 (IN), TLS handshake, Certificate (11):
* TLSv1.3 (IN), TLS handshake, CERT verify (15):
* TLSv1.3 (IN), TLS handshake, Finished (20):
* TLSv1.3 (OUT), TLS change cipher, Change cipher spec (1):
* TLSv1.3 (OUT), TLS handshake, Finished (20):
* SSL connection using TLSv1.3 / TLS_AES_128_GCM_SHA256 / X25
519 / RSASSA-PSS
* ALPN: server accepted h2
* Server certificate:
```

```
*  subject: CN=TRAEFIK DEFAULT CERT
*  start date: Jan 17 22:22:03 2026 GMT
*  expire date: Jan 17 22:22:03 2027 GMT
*  issuer: CN=TRAEFIK DEFAULT CERT
*  SSL certificate verify result: self-signed certificate (1
8), continuing anyway.
*   Certificate level 0: Public key type RSA (2048/112 Bits/s
ecBits), signed using sha256WithRSAEncryption
* TLSv1.3 (IN), TLS handshake, Newsession Ticket (4):
* using HTTP/2
* [HTTP/2] [1] OPENED stream for https://foobar-api.localhos
t:8443/
* [HTTP/2] [1] [:method: GET]
* [HTTP/2] [1] [:scheme: https]
* [HTTP/2] [1] [:authority: foobar-api.localhost:8443]
* [HTTP/2] [1] [:path: /]
* [HTTP/2] [1] [user-agent: curl/8.5.0]
* [HTTP/2] [1] [accept: */*]
> GET / HTTP/2
> Host: foobar-api.localhost:8443
> User-Agent: curl/8.5.0
> Accept: */*
>
< HTTP/2 200
< content-type: text/plain; charset=utf-8
< date: Sat, 17 Jan 2026 22:30:33 GMT
< content-length: 434
<
Hostname: foobar-api-598687ff9b-n9tz4
IP: 127.0.0.1
IP: ::1
IP: 10.x.x.xx
IP: fe80::e0e2:26ff:fe3e:52fd
RemoteAddr: 10.1.0.27:53634
GET / HTTP/1.1
Host: foobar-api.localhost:8443
```

```
User-Agent: curl/8.5.0
Accept: */*
Accept-Encoding: gzip
X-Forwarded-For: 127.0.0.1
X-Forwarded-Host: foobar-api.localhost:8443
X-Forwarded-Port: 8443
X-Forwarded-Proto: https
X-Forwarded-Server: traefik-5f5775fb87-rwlqs
X-Real-Ip: 127.0.0.1

* Connection #0 to host foobar-api.localhost left intact
```



Improvements

Now that the application is running fine, I decided to focus on hardening the infra, as requested.

To start with, I updated the deployment configuration to include Readiness and Liveness probes, as per what was requested in the email:

- **Readiness:** configured to hit the root path (`/`) on port 443.

- **Liveness:** configured to hit the `/health` endpoint as the application logic allows us to manipulate its status, so I could test failure scenarios.

```
gus@coxa-pc:~/traefik-exercise$ grep -A 14 liveness 01-fooba
r.yaml
        livenessProbe:
          httpGet:
            path: /health
            port: 443
            scheme: HTTPS
          initialDelaySeconds: 5
          periodSeconds: 10
        readinessProbe:
          httpGet:
            path: /
            port: 443
            scheme: HTTPS
          initialDelaySeconds: 2
          periodSeconds: 5
---
```

Let's test it out:

```
gus@coxa-pc:~/traefik-exercise$ k apply -f 01-foobar.yaml
persistentvolumeclaim/foobar-api-certs-pvc unchanged
deployment.apps/foobar-api configured
service/foobar-api-svc unchanged

gus@coxa-pc:~/traefik-exercise$ k describe pod -l app=foobar-
api | grep -iE "liveness|readiness"
    Liveness:       http-get https://:443/health delay=5s tim
eout=1s period=10s #success=1 #failure=3
    Readiness:      http-get https://:443/ delay=2s timeout=1
s period=5s #success=1 #failure=3
```

```
    gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS    RESTARTS
AGE
foobar-api-7d755ddf5f-cjzl9   1/1     Running   0
105s
traefik-5f5775fb87-rwlqs      1/1     Running   1 (124m ago)
3h6m
```

To prove the configuration works, I performed a failure simulation. Since the application's `/health` accepts a POST request to manually set its status code, I "poisoned" the probe by sending a HTTP 500 to the endpoint:

```
gus@coxa-pc:~$ curl -k -X POST -d "500" https://foobar-api.lo
calhost:8443/health

gus@coxa-pc:~$ k describe pod -l app=foobar-api | grep -iE "l
iveness|readiness"
    Liveness:       http-get https://:443/health delay=5s tim
eout=1s period=10s #success=1 #failure=3
    Readiness:      http-get https://:443/ delay=2s timeout=1
s period=5s #success=1 #failure=3
  Warning  Unhealthy  15s (x3 over 35s)   kubelet
Liveness probe failed: HTTP probe failed with statuscode: 500
  Normal   Killing    15s                 kubelet
Container foobar-api failed liveness probe, will be restarted

gus@coxa-pc:~$ k get pods
NAME                          READY   STATUS    RESTARTS
AGE
foobar-api-7d755ddf5f-cjzl9   1/1     Running   1 (2m ago)
5m51s
traefik-5f5775fb87-rwlqs      1/1     Running   1 (128m ago)
3h10m
```

Back to normal:

```
gus@coxa-pc:~$ curl -k -X POST -d "200" https://foobar-api.lo
calhost:8443/health
```

Time for Security

Given the requirement to secure access to the program asked in the email (and since I plan to expose the admin Traefik dashboard as well) I decided to implement an auth layer using Traefik CRD Middleware. It is always good practice to add multiple security layers to the infra. Right now, we have TLS certificates at both the frontend and backend and now, we will add basic auth to control who can access these resources:

```
gus@coxa-pc:~$ k get crds | grep -i middleware
middlewares.traefik.io                          2026-01-17T12:
52:30Z
middlewaretcps.traefik.io                       2026-01-17T12:
52:30Z
```

While Middleware has many options (as Rate Limiting or IP Whitelisting), I decided to keep the implementation simple and straightforward by only adding basicAuth, as follows:

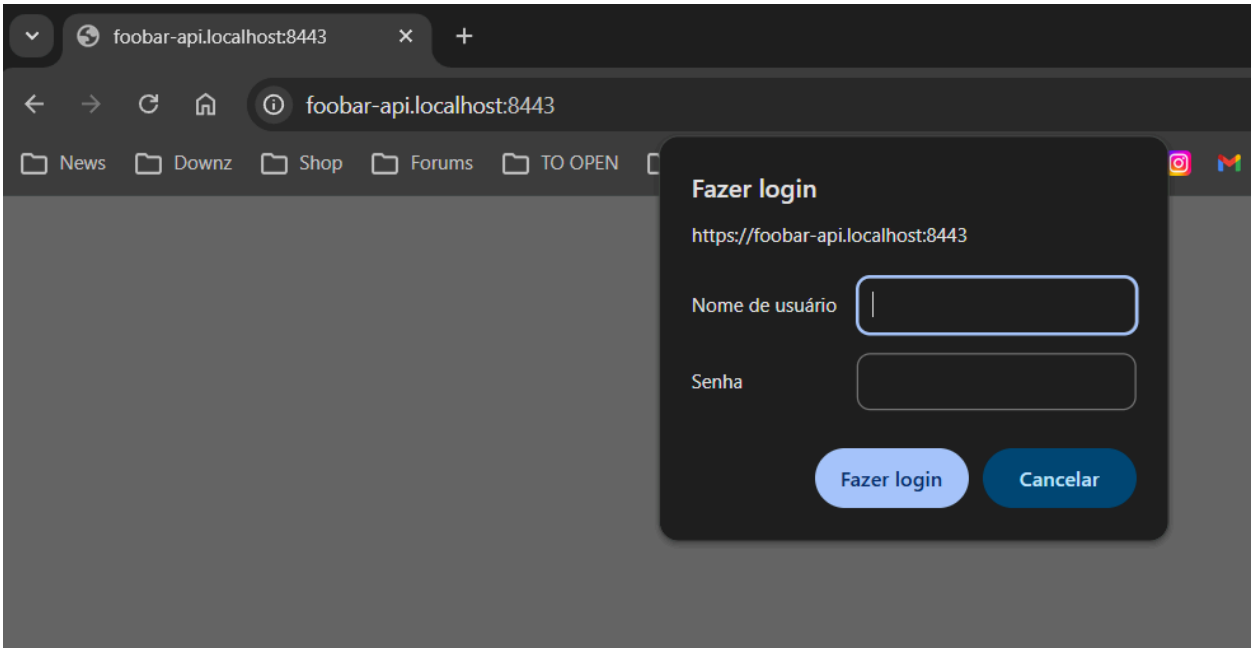
```
gus@coxa-pc:~/traefik-exercise$ k create secret generic fooba
r-api-auth-secret --from-literal=users='test:$apr1$0F
CEKvM.$D3qeQB/DIxqr18jLfaAQd.'
secret/foobar-api-auth-secret created

gus@coxa-pc:~/traefik-exercise$ cat 04-middleware.yaml
apiVersion: traefik.io/v1alpha1
kind: Middleware
metadata:
  name: foobar-api-auth
spec:
  basicAuth:
    secret: foobar-api-auth-secret
```

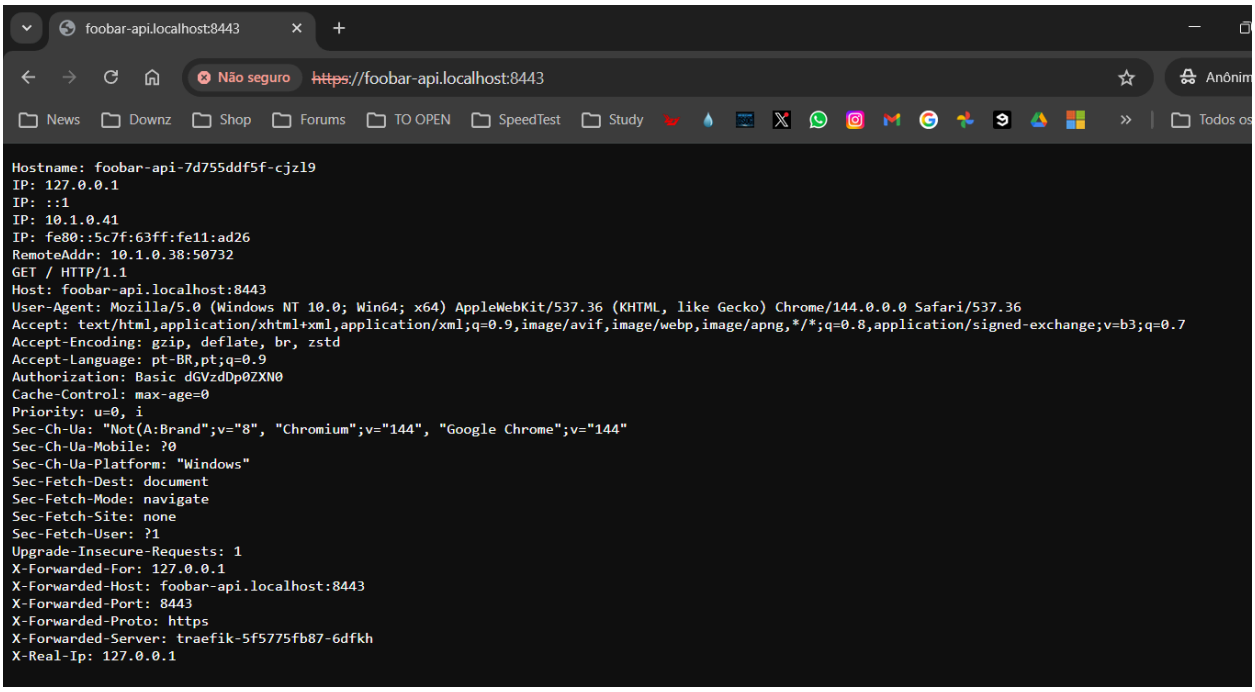
```
gus@coxa-pc:~/traefik-exercise$ cat 03-ingress.yaml | grep -A
1 middleware
    middlewares:
      - name: foobar-api-auth

gus@coxa-pc:~/traefik-exercise$ k apply -f 04-middleware.yaml
middleware.traefik.io/foobar-api-auth unchanged

gus@coxa-pc:~/traefik-exercise$ k apply -f 03-ingress.yaml
serverstransport.traefik.io/trust-self unchanged
ingressroute.traefik.io/foobar-api-ingress unchanged
```

Testing:

```
gus@coxa-pc:~/traefik-exercise$ k port-forward svc/traefik 84
43:443
Forwarding from 127.0.0.1:8443 -> 8443
Forwarding from [::1]:8443 -> 8443

gus@coxa-pc:~$ curl -k https://foobar-api.localhost:8443
401 Unauthorized

gus@coxa-pc:~$ curl -k -u test:test https://foobar-api.localh
ost:8443
Hostname: foobar-api-7d755ddf5f-cjzl9
IP: 127.0.0.1
IP: ::1
IP: 10.x.x.xx
IP: fe80::5c7f:63ff:fe11:ad26
RemoteAddr: 10.x.x.xx:57372
GET / HTTP/1.1
Host: foobar-api.localhost:8443
User-Agent: curl/8.5.0
Accept: */*
Accept-Encoding: gzip
```

```
Authorization: Basic dGVzdDp0ZXN0
X-Forwarded-For: 127.0.0.1
X-Forwarded-Host: foobar-api.localhost:8443
X-Forwarded-Port: 8443
X-Forwarded-Proto: https
X-Forwarded-Server: traefik-5f5775fb87-6dfkh
X-Real-Ip: 127.0.0.1
```





Auditing

To meet the requirement for full visibility into the infrastructure, I moved on to adjusting Traefik's logging features and implementing tracing. This allows us to trace requests "back-to-back" and understand exactly what is happening behind the scenes.

First, I adjusted the logging config. I changed the general log level from the default `ERROR` to `DEBUG` to provide more details about Traefik's internals.

I also enabled Access Logging. Unlike system logs, access logs track the actual traffic activity, showing us details for every request such as client IP, response status codes, and processing duration:

```
gus@coxa-pc:~/traefik-exercise$ cat 02-traefik-values.yaml |
grep logs -A10
logs:
  general:
    level: DEBUG
  access:
    enabled: true
    format: json
```

```
    fields:
      general:
        defaultmode: keep
      headers:
        defaultmode: keep
```

Testing:

```
gus@coxa-pc:~/traefik-exercise$ helm upgrade traefik traefik/
traefik -f 02-traefik-values.yaml
Release "traefik" has been upgraded. Happy Helming!
NAME: traefik
LAST DEPLOYED: Sun Jan 18 12:16:07 2026
NAMESPACE: default
STATUS: deployed
REVISION: 2
DESCRIPTION: Upgrade complete
TEST SUITE: None
NOTES:
traefik with docker.io/traefik:v3.6.6 has been deployed succe
ssfully on default namespace!

gus@coxa-pc:~/traefik-exercise$ k logs deploy/traefik | tail
2026-01-18T15:16:10Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/crd/kubernetes_http.go:777 > No secret name
provided providerName=kubernetescrd
2026-01-18T15:16:10Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/ingress/kubernetes.go:186 > Skipping Kubern
etes event kind *v1.EndpointSlice providerName=kubernetes
2026-01-18T15:16:10Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/crd/kubernetes.go:179 > Skipping Kubernetes
event kind *v1.EndpointSlice providerName=kubernetescrd
2026-01-18T15:16:10Z ERR github.com/traefik/traefik/v3/pkg/pr
ovider/acme/provider.go:501 > Unable to obtain ACME certifica
te for domains error="unable to generate a certificate for th
e domains [foobar-api.localhost]: acme: error: 400 :: POST ::
```

```
https://acme-v02.api.letsencrypt.org/acme/new-order :: urn:ie
tf:params:acme:error:rejectedIdentifier :: Invalid identifier
s requested :: Cannot issue for \"foobar-api.localhost\": Dom
ain name does not end with a valid public suffix (TLD)" ACME
CA=https://acme-v02.api.letsencrypt.org/directory acmeCA=http
s://acme-v02.api.letsencrypt.org/directory domains=["foobar-a
pi.localhost"] providerName=myresolver.acme routerName=defaul
t-foobar-api-ingress-a23eb72bc207fc8fa5d6@kubernetescrd rule=
Host(`foobar-api.localhost`)
2026-01-18T15:16:10Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/ingress/kubernetes.go:186 > Skipping Kubern
etes event kind *v1.EndpointSlice providerName=kubernetes
2026-01-18T15:16:10Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/crd/kubernetes_http.go:777 > No secret name
provided providerName=kubernetescrd
2026-01-18T15:16:10Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/crd/kubernetes.go:179 > Skipping Kubernetes
event kind *v1.EndpointSlice providerName=kubernetescrd
2026-01-18T15:16:27Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/ingress/kubernetes.go:186 > Skipping Kubern
etes event kind *v1.Node providerName=kubernetes
2026-01-18T15:16:27Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/crd/kubernetes_http.go:777 > No secret name
provided providerName=kubernetescrd
2026-01-18T15:16:27Z DBG github.com/traefik/traefik/v3/pkg/pr
ovider/kubernetes/crd/kubernetes.go:179 > Skipping Kubernetes
event kind *v1.Node providerName=kubernetescrd

gus@coxa-pc:~$ k logs deploy/traefik | tail -2
{"ClientAddr":"127.0.0.1:39090","ClientHost":"127.0.0.1","Cli
entPort":"39090","ClientUsername":"test","DownstreamContentSi
ze":469,"DownstreamStatus":200,"Duration":8146727,"OriginCont
entSize":469,"OriginDuration":6942660,"OriginStatus":200,"Ove
rhead":1204067,"RequestAddr":"foobar-api.localhost:8443","Req
uestContentSize":0,"RequestCount":1,"RequestHost":"foobar-ap
i.localhost","RequestMethod":"GET","RequestPath":"/","Request
```

Port":"8443","RequestProtocol":"HTTP/2.0","RequestScheme":"ht
tps","RetryAttempts":0,"RouterName":"default-foobar-api-ingre
ss-a23eb72bc207fc8fa5d6@kubernetescrd","ServiceAddr":"10.1.0.
41:443","ServiceName":"default-foobar-api-ingress-a23eb72bc20
7fc8fa5d6@kubernetescrd","ServiceURL":"https://10.x.x.xx:44
3","StartLocal":"2026-01-18T15:17:35.087656757Z","StartUT
C":"2026-01-18T15:17:35.087656757Z","TLSCipher":"TLS_AES_128_
GCM_SHA256","TLSVersion":"1.3","downstream_Content-Length":"4
69","downstream_Content-Type":"text/plain; charset=utf-8","do
wnstream_Date":"Sun, 18 Jan 2026 15:17:35 GMT","entryPointNam
e":"websecure","level":"info","msg":"","origin_Content-Lengt
h":"469","origin_Content-Type":"text/plain; charset=utf-8","o
rigin_Date":"Sun, 18 Jan 2026 15:17:35 GMT","request_Accep
t":"*/*","request_Authorization":"Basic dGVzdDp0ZXN0","reques
t_User-Agent":"curl/8.5.0","request_X-Forwarded-Host":"foobar
-api.localhost:8443","request_X-Forwarded-Port":"8443","reque
st_X-Forwarded-Proto":"https","request_X-Forwarded-Server":"t
raefik-74b7c689bc-zwrgt","request_X-Real-Ip":"127.0.0.1","tim
e":"2026-01-18T15:17:35Z"}
{"ClientAddr":"127.0.0.1:58146","ClientHost":"127.0.0.1","Cli
entPort":"58146","ClientUsername":"","DownstreamContentSize":
17,"DownstreamStatus":401,"Duration":275951,"GzipRatio":0,"Or
iginContentSize":0,"OriginDuration":0,"OriginStatus":0,"Overh
ead":275951,"RequestAddr":"foobar-api.localhost:8443","Reques
tContentSize":0,"RequestCount":2,"RequestHost":"foobar-api.lo
calhost","RequestMethod":"GET","RequestPath":"/","RequestPor
t":"8443","RequestProtocol":"HTTP/2.0","RequestScheme":"http
s","RetryAttempts":0,"RouterName":"default-foobar-api-ingress
-a23eb72bc207fc8fa5d6@kubernetescrd","StartLocal":"2026-01-18
T15:17:48.943890857Z","StartUTC":"2026-01-18T15:17:48.9438908
57Z","TLSCipher":"TLS_AES_128_GCM_SHA256","TLSVersion":"1.
3","downstream_Content-Type":"text/plain","downstream_Www-Aut
henticate":"Basic realm=\"traefik\"","entryPointName":"websec
ure","level":"info","msg":"","request_Accept":"*/*","request_
User-Agent":"curl/8.5.0","request_X-Forwarded-Host":"foobar-a
pi.localhost:8443","request_X-Forwarded-Port":"8443","request

```
_X-Forwarded-Proto":"https","request_X-Forwarded-Server":"tra
efik-74b7c689bc-zwrgt","request_X-Real-Ip":"127.0.0.1","tim
e":"2026-01-18T15:17:48Z"}
```

With logs in place, I moved to the Tracing piece. I chose to use the OpenTelemetry framework, as described in Traefik official docs, for generating traces, with Jaeger as the backend to process and visualize them:

```
gus@coxa-pc:~/traefik-exercise$ cat 05-tracing.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: jaeger
spec:
  replicas: 1
  selector:
    matchLabels:
        app: jaeger
  template:
    metadata:
      labels:
          app: jaeger
    spec:
      containers:
      - name: jaeger
        image: jaegertracing/all-in-one:latest
        env:
          - name: COLLECTOR_OTLP_ENABLED
            value: "true"
        ports:
        - containerPort: 16686
        - containerPort: 4317
---
apiVersion: v1
kind: Service
metadata:
```

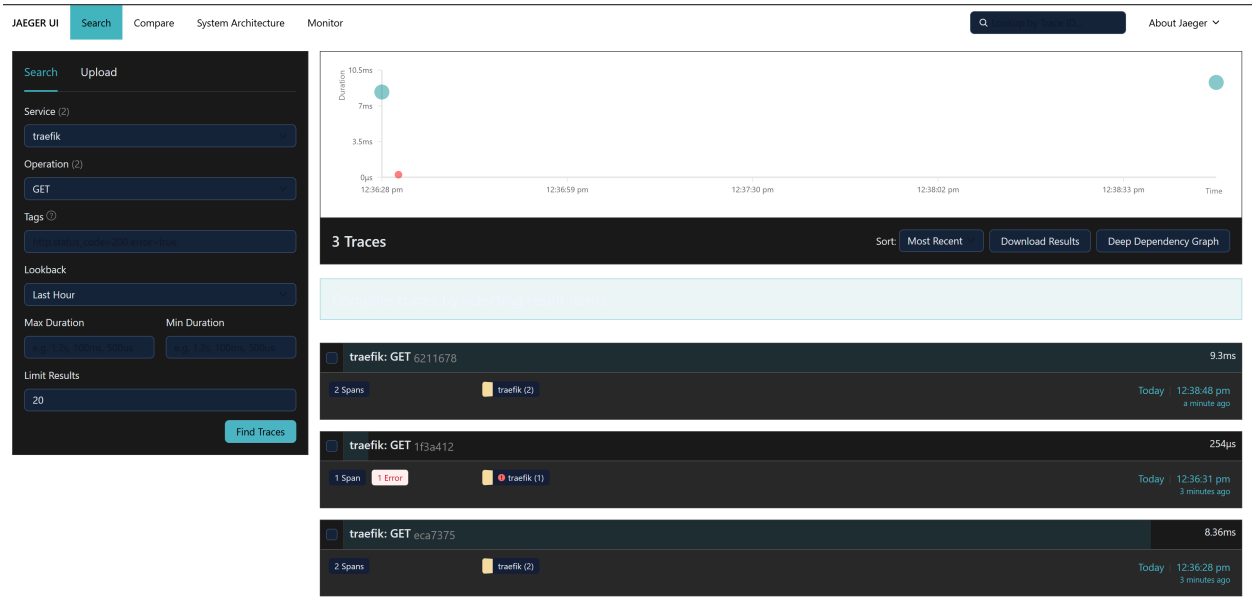
```
  name: jaeger
spec:
  ports:
  - port: 16686
    name: ui
  - port: 4317
    name: otel-grpc
  selector:
    app: jaeger


gus@coxa-pc:~/traefik-exercise$ k apply -f 05-tracing.yaml
deployment.apps/jaeger created
service/jaeger created

gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS    RESTARTS
AGE
foobar-api-7d755ddf5f-cjzl9   1/1     Running   2 (41m ago)
14h
jaeger-6c996c4fd4-k9tvk       1/1     Running   0
8s
traefik-74b7c689bc-zwrgt      1/1     Running   0
5m41s
```

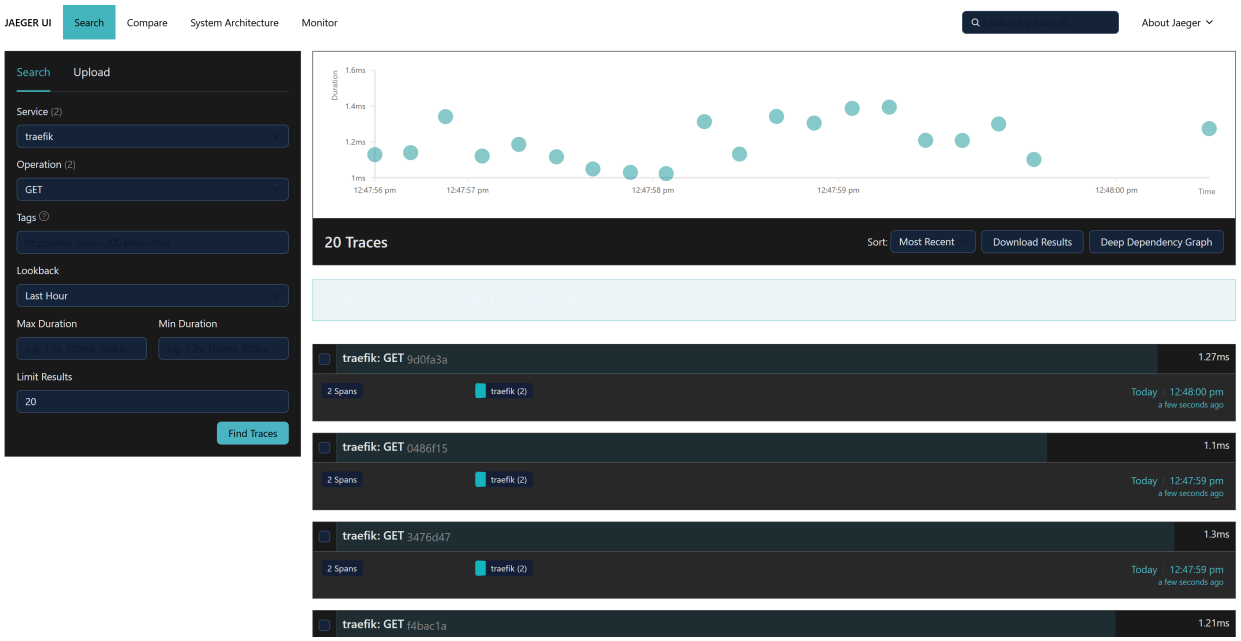
```
gus@coxa-pc:~/traefik-exercise$ grep tracing 02-traefik-value
s.yaml
  - "--tracing.otlp.grpc.endpoint=jaeger.default.svc.cluster.
local:4317"
  - "--tracing.otlp.grpc.insecure=true"

gus@coxa-pc:~/traefik-exercise$ helm upgrade traefik traefik/
traefik -f 02-traefik-values.yaml
Release "traefik" has been upgraded. Happy Helming!
NAME: traefik
```

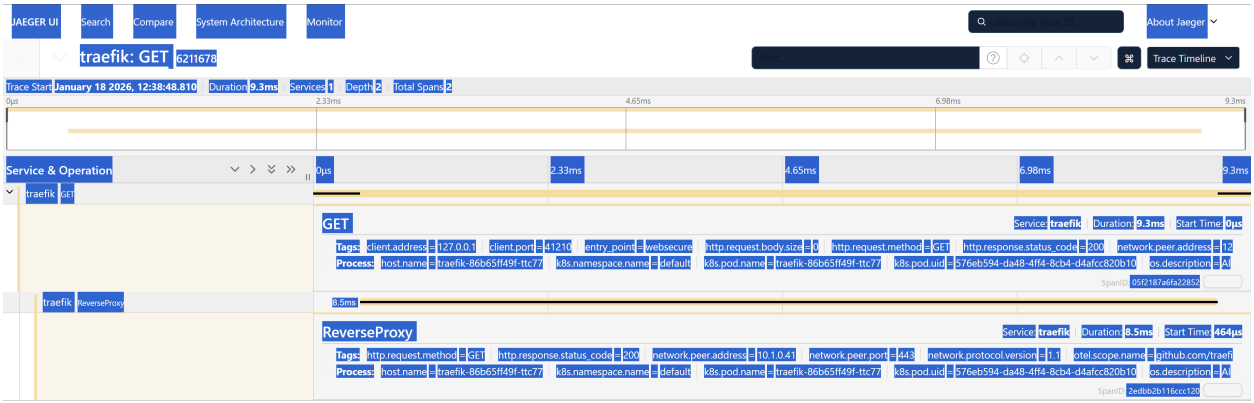
```
LAST DEPLOYED: Sun Jan 18 12:35:40 2026
NAMESPACE: default
STATUS: deployed
REVISION: 4
DESCRIPTION: Upgrade complete
TEST SUITE: None
NOTES:
traefik with docker.io/traefik:v3.6.6 has been deployed succe
ssfully on default namespace!
```

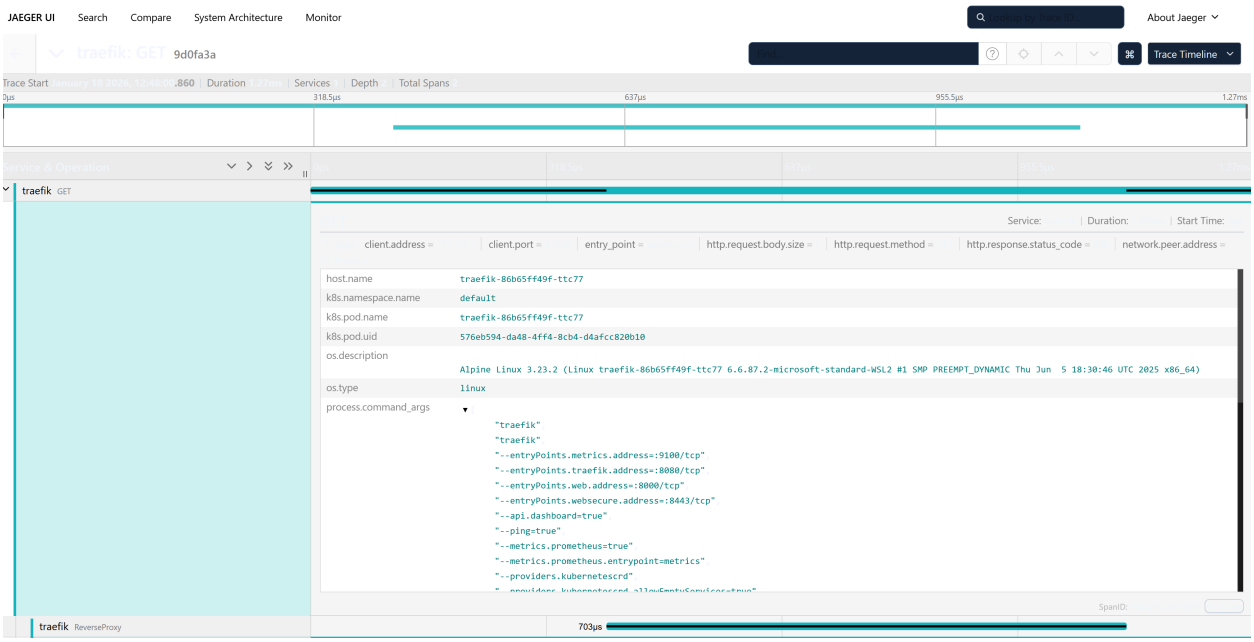
Checking the Jaeger UI:

```
gus@coxa-pc:~/traefik-exercise$ k port-forward svc/jaeger 166
86:16686
Forwarding from 127.0.0.1:16686 -> 16686
Forwarding from [::1]:16686 -> 16686
```




JAEGER UI
Search
Compare
System Architecture
Monitor
About Jaeger
Search
Upload
Service (2)
traefik
Operation (2)
GET
Tags
Lookback
Last Hour
Max Duration
Min Duration
Limit Results
20
Find Traces
Duration
1.6ms
1.4ms
1.2ms
1ms
12:47:56 pm
12:47:57 pm
12:47:58 pm
12:47:59 pm
12:48:00 pm
Time
20 Traces
Sort:
Most Recent
Download Results
Deep Dependency Graph
traefik: GET 9d0fa3a
1.27ms
2 Spans
traefik (2)
Today 12:48:00 pm
a few seconds ago
traefik: GET 0486f15
1.1ms
2 Spans
traefik (2)
Today 12:47:59 pm
a few seconds ago
traefik: GET 3476d47
1.3ms
2 Spans
traefik (2)
Today 12:47:59 pm
a few seconds ago
traefik: GET f4bac1a
1.21ms


JAEGER UI
Search
Compare
System Architecture
Monitor
About Jaeger
traefik: GET 6211678
Trace Timeline
Trace Start January 18 2026, 12:38:48.810
Duration 9.3ms
Services 1
Depth 2
Total Spans 2
0µs
2.33ms
4.65ms
6.98ms
9.3ms
Service & Operation
traefik GET
GET
Service: traefik
Duration: 9.3ms
Start Time: 0µs
Tags: client.address = 127.0.0.1
client.port = 41210
entry_point = websecure
http.request.body.size = 0
http.request.method = GET
http.response.status_code = 200
network.peer.address = 12
Process: host.name = traefik-86b65ff49f-ttc77
k8s.namespace.name = default
k8s.pod.name = traefik-86b65ff49f-ttc77
k8s.pod.uid = 576eb594-da48-4ff4-8cb4-d4afcc820b10
os.description = Al
SpanID 05f2187a6fa22852
traefik ReverseProxy
8.5ms
ReverseProxy
Service: traefik
Duration: 8.5ms
Start Time: 464µs
Tags: http.request.method = GET
http.response.status_code = 200
network.peer.address = 10.1.0.41
network.peer.port = 443
network.protocol.version = 1.1
otel.scope.name = github.com/traefi
Process: host.name = traefik-86b65ff49f-ttc77
k8s.namespace.name = default
k8s.pod.name = traefik-86b65ff49f-ttc77
k8s.pod.uid = 576eb594-da48-4ff4-8cb4-d4afcc820b10
os.description = Al
SpanID 2edbb2b116ccc120



Observability and Metrics

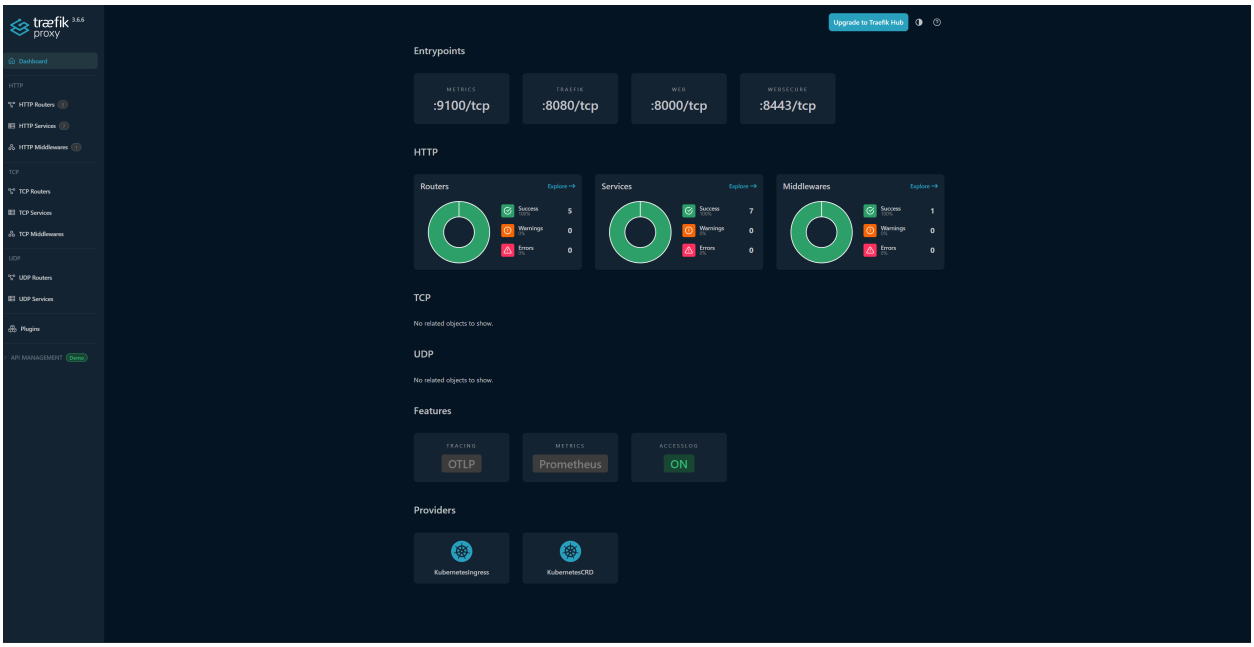
Finally, to satisfy the metrics requirements requested in the email and complete the infra enhancements, I implemented monitoring and observability. This includes the Traefik Dashboard, Prometheus for metrics collection, and Grafana for data visualization.

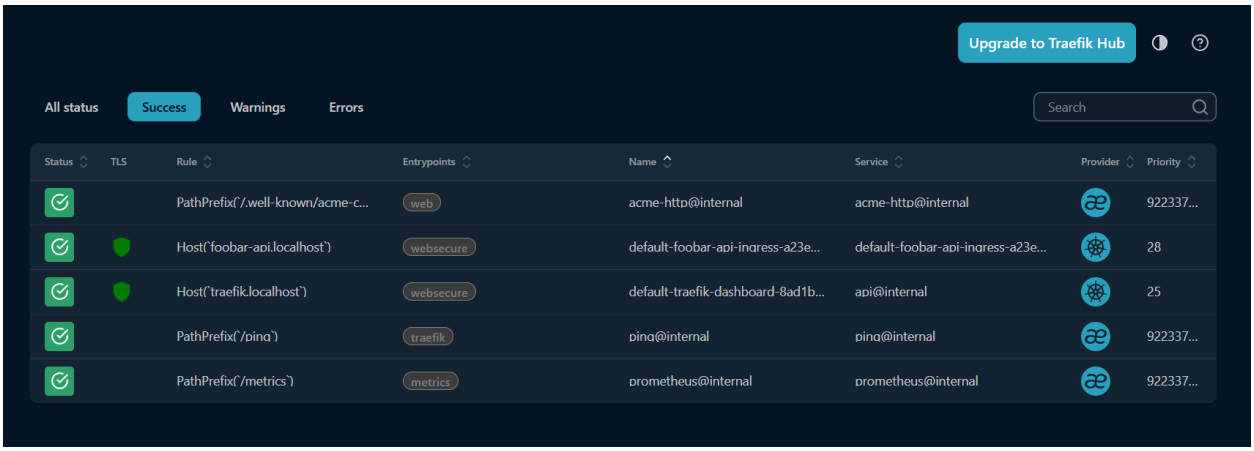
So first, I implemented the Traefik Dashboard. While this can be enabled automatically via Helm, I chose to define it using an `IngressRoute`. This approach gives me control over the routing and allows me to secure the dashboard using the same Basic Auth Middleware we created earlier:

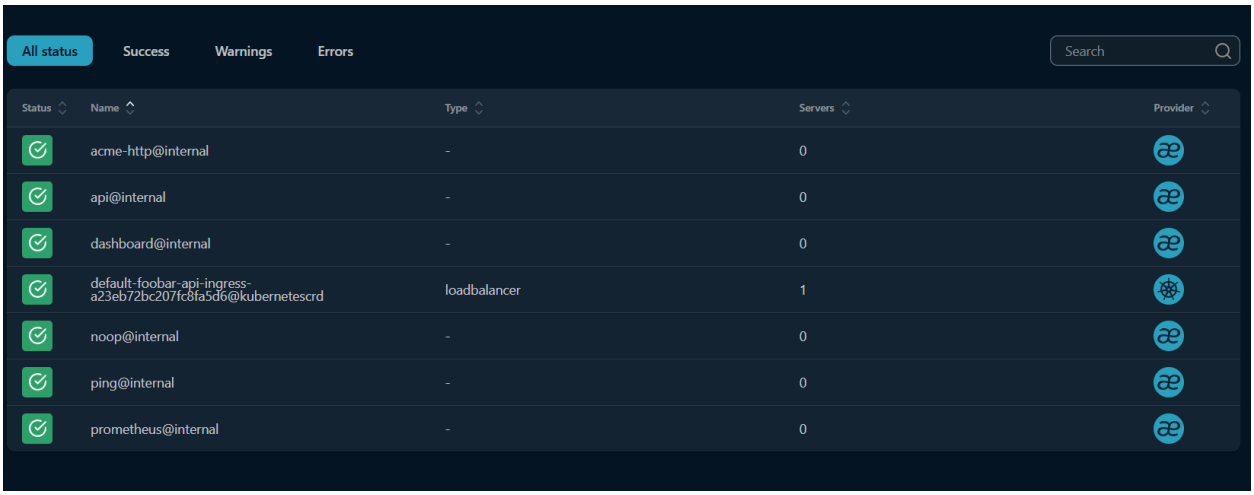
```
gus@coxa-pc:~/traefik-exercise$ grep -C10 traefik.localhost 0
3-ingress.yaml
---
apiVersion: traefik.io/v1alpha1
kind: IngressRoute
metadata:
  name: traefik-dashboard
spec:
  entryPoints:
    - websecure
```

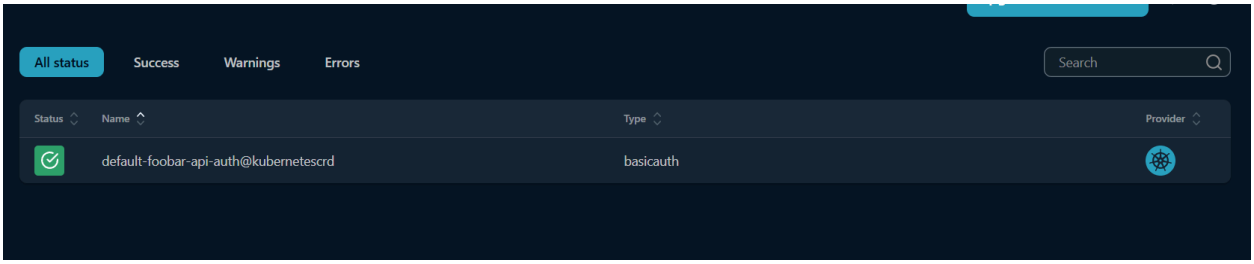
```
  routes:
  - match: Host(`traefik.localhost`)
    kind: Rule
    middlewares:
      - name: foobar-api-auth
    services:
    - name: api@internal
      kind: TraefikService

gus@coxa-pc:~/traefik-exercise$ k apply -f 03-ingress.yaml
serverstransport.traefik.io/trust-self unchanged
ingressroute.traefik.io/foobar-api-ingress unchanged
ingressroute.traefik.io/traefik-dashboard created

gus@coxa-pc:~/traefik-exercise$ k get ingressroutes
NAME                 AGE
foobar-api-ingress   17h
traefik-dashboard    18s
```

And voila:









With the dashboard active, I moved on to the metrics. I deployed Prometheus to scrape data and Grafana to visualize it:

```
gus@coxa-pc:~/traefik-exercise$ cat 06-prometheus.yaml
apiVersion: v1
kind: ConfigMap
metadata:
  name: prometheus-config
```

```
  labels:
    app: prometheus
data:
  prometheus.yml: |
    global:
      scrape_interval: 10s
    scrape_configs:
      - job_name: 'traefik'
        static_configs:
          - targets: ['traefik.default.svc.cluster.local:910
0']
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: prometheus
spec:
  replicas: 1
  selector:
    matchLabels:
      app: prometheus
  template:
    metadata:
      labels:
        app: prometheus
    spec:
      containers:
      - name: prometheus
        image: prom/prometheus
        args:
          - "--config.file=/etc/prometheus/prometheus.yml"
        ports:
        - containerPort: 9090
        volumeMounts:
        - name: config-volume
          mountPath: /etc/prometheus/
```

```
      volumes:
      - name: config-volume
        configMap:
          name: prometheus-config
---
apiVersion: v1
kind: Service
metadata:
  name: prometheus
spec:
  selector:
    app: prometheus
  ports:
    - port: 9090
      targetPort: 9090
```

```
gus@coxa-pc:~/traefik-exercise$ cat 07-grafana.yaml
apiVersion: v1
kind: ConfigMap
metadata:
  name: grafana-datasources
data:
  prometheus.yaml: |
    apiVersion: 1
    datasources:
    - name: Prometheus
      type: prometheus
      url: http://prometheus:9090
      access: proxy
      isDefault: true
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: grafana
```

```
spec:
  replicas: 1
  selector:
    matchLabels:
      app: grafana
  template:
    metadata:
      labels:
        app: grafana
    spec:
      containers:
      - name: grafana
        image: grafana/grafana
        ports:
        - containerPort: 3000
        volumeMounts:
        - name: grafana-datasources
          mountPath: /etc/grafana/provisioning/datasources/
      volumes:
      - name: grafana-datasources
        configMap:
          name: grafana-datasources
---
apiVersion: v1
kind: Service
metadata:
  name: grafana
spec:
  selector:
    app: grafana
  ports:
    - port: 3000
      targetPort: 3000
```

Deploying them:

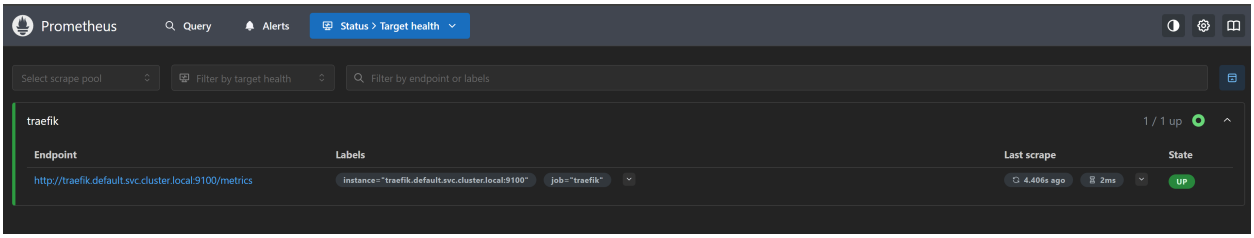
```
gus@coxa-pc:~/traefik-exercise$ k apply -f 06-prometheus.yaml
configmap/prometheus-config created
deployment.apps/prometheus created
service/prometheus created

gus@coxa-pc:~/traefik-exercise$ k apply -f 07-grafana.yaml
configmap/grafana-datasources created
deployment.apps/grafana created
service/grafana created

gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS    RESTARTS
AGE
foobar-api-7d755ddf5f-cjzl9   1/1     Running   2 (95m ago)
15h
grafana-79697b5f8-jzzk5       1/1     Running   0
50s
jaeger-6c996c4fd4-k9tvk       1/1     Running   0
54m
prometheus-54488fdf45-8vr4v   1/1     Running   0
53s
traefik-86b65ff49f-ttc77      1/1     Running   0
40m
```

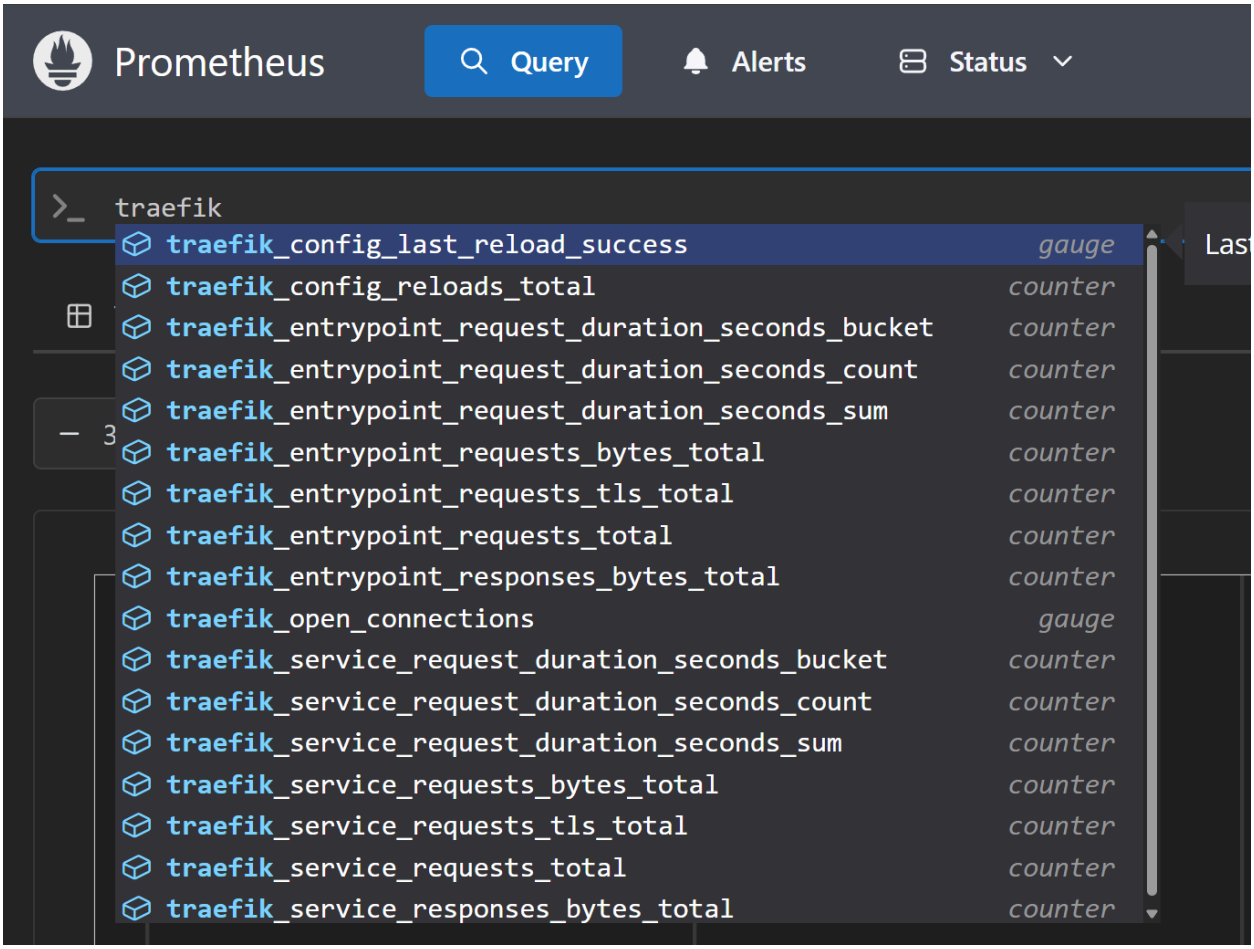
For Prometheus to actually see anything, I had to update the Traefik Helm configuration:

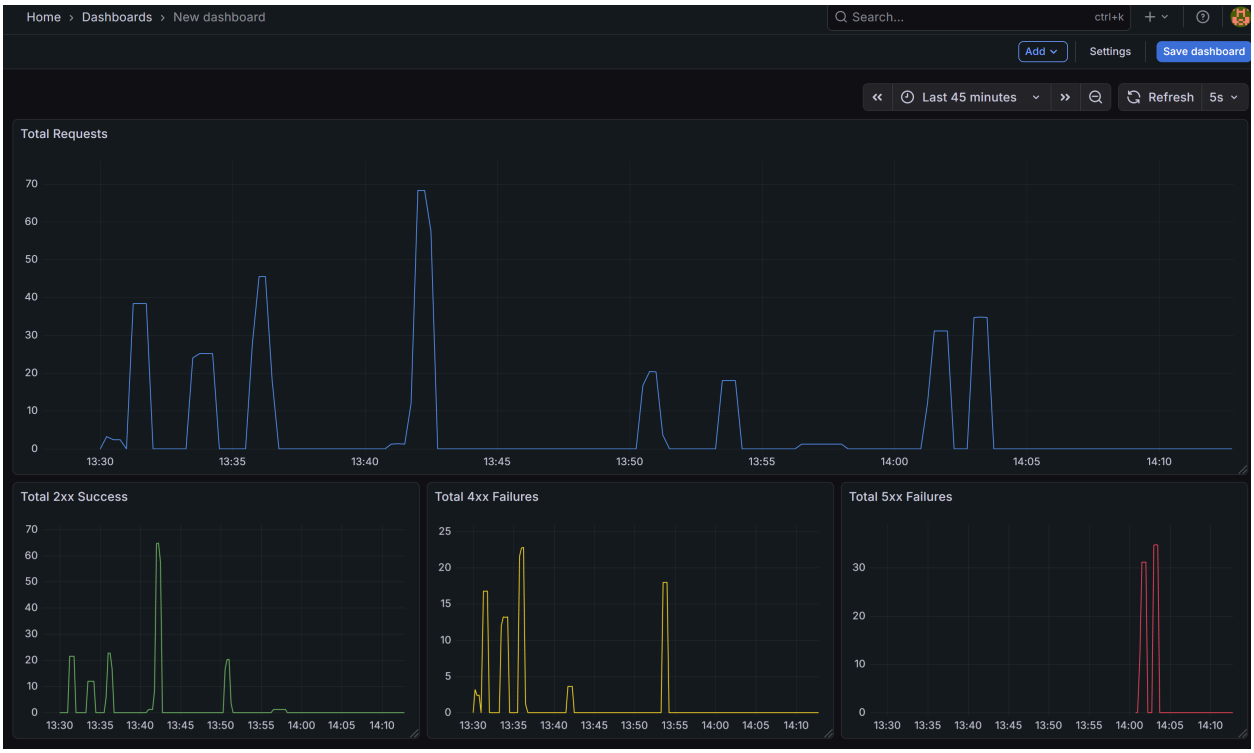
```
gus@coxa-pc:~/traefik-exercigrep -A30 metrics 02-traefik-valu
es.yaml
metrics:
  prometheus:
    enabled: true

ports:
  metrics:
```

```
    expose:
      default: true
    exposedPort: 9100
    port: 9100
    protocol: TCP

gus@coxa-pc:~/traefik-exercise$ helm upgrade traefik traefik/
traefik -f 02-traefik-values.yaml
Release "traefik" has been upgraded. Happy Helming!
NAME: traefik
LAST DEPLOYED: Sun Jan 18 13:21:34 2026
NAMESPACE: default
STATUS: deployed
REVISION: 8
DESCRIPTION: Upgrade complete
TEST SUITE: None
NOTES:
traefik with docker.io/traefik:v3.6.6 has been deployed succe
ssfully on default namespace!
```

With both deployed and traffic flowing, I accessed Prometheus UI and confirmed that the Traefik target was up and metrics were being actively scraped. Then I built some dashboards in Grafana to visualize the rates and traffic flow:




Prometheus
Query
Alerts
Status
traefik
traefik_config_last_reload_success gauge
traefik_config_reloads_total counter
traefik_entrypoint_request_duration_seconds_bucket counter
traefik_entrypoint_request_duration_seconds_count counter
traefik_entrypoint_request_duration_seconds_sum counter
traefik_entrypoint_requests_bytes_total counter
traefik_entrypoint_requests_tls_total counter
traefik_entrypoint_requests_total counter
traefik_entrypoint_responses_bytes_total counter
traefik_open_connections gauge
traefik_service_request_duration_seconds_bucket counter
traefik_service_request_duration_seconds_count counter
traefik_service_request_duration_seconds_sum counter
traefik_service_requests_bytes_total counter
traefik_service_requests_tls_total counter
traefik_service_requests_total counter
traefik_service_responses_bytes_total counter



Redeploying Using the Local Built Image

Just to double-check that I have done everything correctly, at least slighty, I am going to delete every object from the K8s cluster, including the Helm releases, and redeploy from scratch. This time, I will use the custom-built image created from the cloned repository provided in the email.

First, building the image:

```
gus@coxa-pc:~/foobar-api$ cat Dockerfile
FROM golang:1.21 as builder
WORKDIR /app

COPY go.mod go.sum ./
RUN go mod download

COPY . .
RUN CGO_ENABLED=0 go build -a -trimpath -ldflags="-s" -o whoa
mi .
```

```
FROM alpine:latest
WORKDIR /app
COPY --from=builder /app/whoami .
EXPOSE 80
CMD ["./whoami"]

gus@coxa-pc:~/foobar-api$ docker build -t local/foobar-api:la
test .
[+] Building 8.1s (16/16) FINISHED
docker:default
 => [internal] load build definition from Dockerfile
0.0s
 => => transferring dockerfile: 293B
0.0s
 => WARN: FromAsCasing: 'as' and 'FROM' keywords' casing do n
ot match (line 1)
0.0s
 => [internal] load metadata for docker.io/library/golang:1.2
1
1.3s
 => [internal] load metadata for docker.io/library/alpine:lat
est
0.1s
 => [auth] library/golang:pull token for registry-1.docker.io
0.0s
 => [internal] load .dockerignore
0.0s
 => => transferring context: 2B
0.0s
 => [stage-1 1/3] FROM docker.io/library/alpine:latest@sha25
6:865b95f46d98cf867a156fe4a135ad3fe50d2056aa3f25ed31662dff6da
4eb62
0.1s
 => => resolve docker.io/library/alpine:latest@sha256:865b95f
46d98cf867a156fe4a135ad3fe50d2056aa3f25ed31662dff6da4eb62
0.1s
```

```
 => [internal] load build context
0.0s
 => => transferring context: 2.44kB
0.0s
 => [builder 1/6] FROM docker.io/library/golang:1.21@sha256:4
746d26432a9117a5f58e95cb9f954ddf0de128e9d5816886514199316e4a2
fb
0.1s
 => => resolve docker.io/library/golang:1.21@sha256:4746d2643
2a9117a5f58e95cb9f954ddf0de128e9d5816886514199316e4a2fb
0.1s
 => CACHED [builder 2/6] WORKDIR /app
0.0s
 => CACHED [builder 3/6] COPY go.mod go.sum ./
0.0s
 => CACHED [builder 4/6] RUN go mod download
0.0s
 => [builder 5/6] COPY . .
0.1s
 => [builder 6/6] RUN CGO_ENABLED=0 go build -a -trimpath -ld
flags="-s" -o whoami .
6.2s
 => CACHED [stage-1 2/3] WORKDIR /app
0.0s
 => CACHED [stage-1 3/3] COPY --from=builder /app/whoami .
0.0s
 => exporting to image
0.2s
 => => exporting layers
0.0s
 => => exporting manifest sha256:9b77ff8256161d7e09f8eee57f62
b94039eba7060948697eef6f9e435a887b29
0.0s
 => => exporting config sha256:bcf0f6497b3c108814532c599a3538
0600b2840c0bab518c944b72dbdec2a8dd
0.0s
```

```
 => => exporting attestation manifest sha256:604195b7e9385ac9
22d9775962423d4ee8bf764d39b77a71838f1c6b4eaa4513
0.1s
 => => exporting manifest list sha256:23b94cdf75e048a08774c45
1e554b2a9b1e1ba4d25a5637b293b591f3a5613e7
0.0s
 => => naming to docker.io/local/foobar-api:latest
0.0s
 => => unpacking to docker.io/local/foobar-api:latest
0.0s

 1 warning found (use docker --debug to expand):
 - FromAsCasing: 'as' and 'FROM' keywords' casing do not matc
h (line 1)

gus@coxa-pc:~/foobar-api$ docker images | grep  local/foobar-
api
WARNING: This output is designed for human readability. For m
achine-readable output, please use --format.
local/foobar-api:latest
```

Then, deleting everything

```
gus@coxa-pc:~/foobar-api$ helm uninstall traefik
These resources were kept due to the resource policy:
[PersistentVolumeClaim] traefik

release "traefik" uninstalled

gus@coxa-pc:~/traefik-exercise$ k delete -f .
persistentvolumeclaim "foobar-api-certs-pvc" deleted from def
ault namespace
deployment.apps "foobar-api" deleted from default namespace
service "foobar-api-svc" deleted from default namespace
serverstransport.traefik.io "trust-self" deleted from default
namespace
```

```
ingressroute.traefik.io "foobar-api-ingress" deleted from def
ault namespace
ingressroute.traefik.io "traefik-dashboard" deleted from defa
ult namespace
middleware.traefik.io "foobar-api-auth" deleted from default
namespace
deployment.apps "jaeger" deleted from default namespace
service "jaeger" deleted from default namespace
configmap "prometheus-config" deleted from default namespace
deployment.apps "prometheus" deleted from default namespace
service "prometheus" deleted from default namespace
configmap "grafana-datasources" deleted from default namespac
e
deployment.apps "grafana" deleted from default namespace
service "grafana" deleted from default namespace
error: unable to decode "02-traefik-values.yaml": Object 'Kin
d' is missing in '{"additionalArguments":["--certificatesreso
lvers.myresolver.acme.storage=/data/acme.json","--certificate
sresolvers.myresolver.acme.email=gustavosaviano@gmail.com","-
-certificatesresolvers.myresolver.acme.httpchallenge.entrypoi
nt=web","--tracing.otlp.grpc.endpoint=jaeger.default.svc.clus
ter.local:4317","--tracing.otlp.grpc.insecure=true"],"logs":
{"access":{"enabled":true,"fields":{"general":{"defaultmod
e":"keep"},"headers":{"defaultmode":"keep"}},"format":"jso
n"},"general":{"level":"DEBUG"}},"metrics":{"prometheus":{"en
abled":true}},"persistence":{"accessMode":"ReadWriteOnce","en
abled":true,"name":"data","path":"/data","size":"128Mi"},"por
ts":{"metrics":{"expose":{"default":true},"exposedPort":910
0,"port":9100,"protocol":"TCP"}}}'

gus@coxa-pc:~/traefik-exercise$ k delete secret foobar-api-au
th-secret
secret "foobar-api-auth-secret" deleted from default namespac
e

gus@coxa-pc:~/traefik-exercise$ k delete pvc traefik
```

```
persistentvolumeclaim "traefik" deleted from default namespac
e

gus@coxa-pc:~/traefik-exercise$ k get all
NAME                 TYPE        CLUSTER-IP   EXTERNAL-IP   P
ORT(S)   AGE
service/kubernetes   ClusterIP   10.96.0.1    <none>        4
43/TCP   29h
```

Now updating the deployment:

```
gus@coxa-pc:~/traefik-exercise$ grep -A2 fernandobenegasa 01-
foobar.yaml
        #image: fernandobenegasa/foobar-api
        image: local/foobar-api:latest
        imagePullPolicy: Never
```

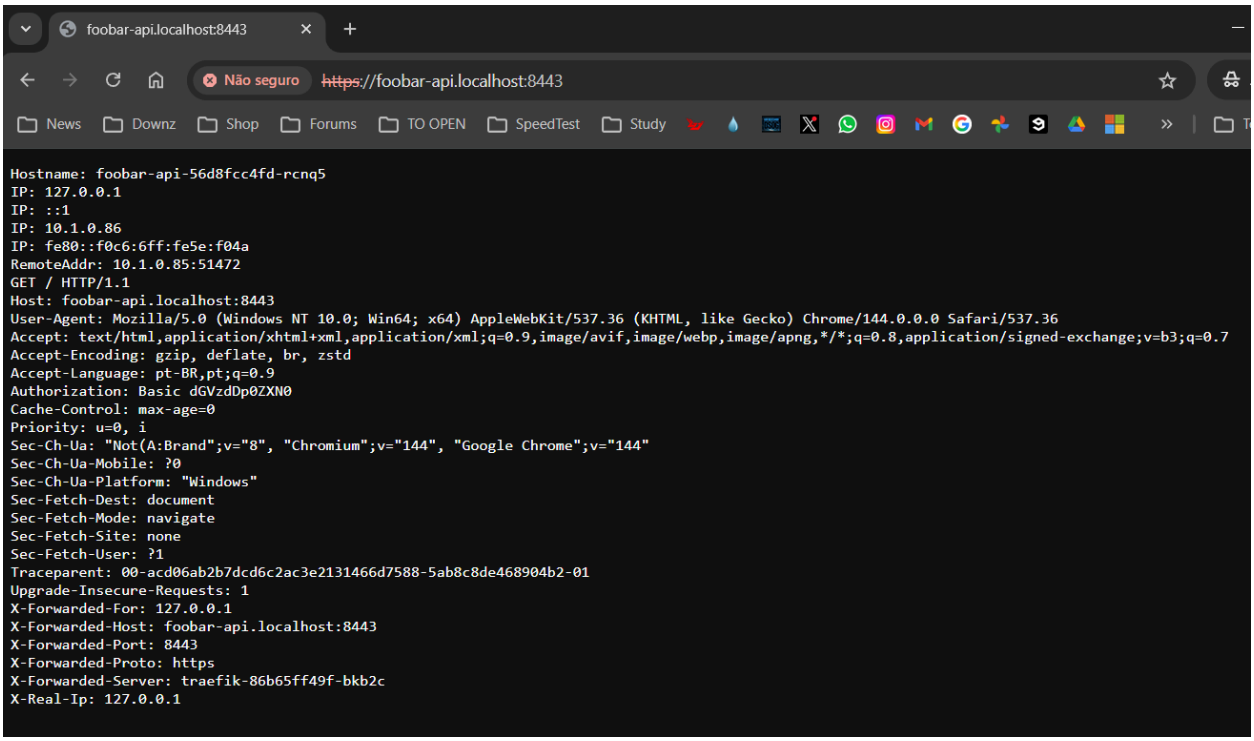
And redeploying (Ps: I had to tweak a few settings regarding the app/container ports (switching between 443 <> 80) because the image from Fernando seems slightly different from the one built directly from GitHub. Without these tweaks, the `foobar-api` pod would continue in a `CrashLoopBackOff` failure state):

```
gus@coxa-pc:~/traefik-exercise$ helm install traefik traefik/
traefik -f 02-traefik-values.yaml
NAME: traefik
LAST DEPLOYED: Sun Jan 18 14:43:49 2026
NAMESPACE: default
STATUS: deployed
REVISION: 1
DESCRIPTION: Install complete
TEST SUITE: None
NOTES:
traefik with docker.io/traefik:v3.6.6 has been deployed succe
ssfully on default namespace!

gus@coxa-pc:~/traefik-exercise$ k create secret generic fooba
```

```
r-api-auth-secret --from-literal=users='test:$apr1$0FCEKvM.$D
3qeQB/DIxqr18jLfaAQd.'
secret/foobar-api-auth-secret created

gus@coxa-pc:~/traefik-exercise$ k apply -f .
persistentvolumeclaim/foobar-api-certs-pvc created
deployment.apps/foobar-api created
service/foobar-api-svc created
serverstransport.traefik.io/trust-self created
ingressroute.traefik.io/foobar-api-ingress created
ingressroute.traefik.io/traefik-dashboard created
middleware.traefik.io/foobar-api-auth created
deployment.apps/jaeger created
service/jaeger created
configmap/prometheus-config created
deployment.apps/prometheus created
service/prometheus created
configmap/grafana-datasources created
deployment.apps/grafana created
service/grafana created
error: error validating "02-traefik-values.yaml": error valid
ating data: [apiVersion not set, kind not set]; if you choose
to ignore these errors, turn validation off with --validate=f
alse

gus@coxa-pc:~/traefik-exercise$ k get pods
NAME                          READY   STATUS    RESTARTS   AG
E
foobar-api-56d8fcc4fd-rcnq5   1/1     Running   0          41
s
grafana-79697b5f8-gs8z5       1/1     Running   0          41
s
jaeger-6c996c4fd4-lqdv6       1/1     Running   0          41
s
prometheus-54488fdf45-f8hz8   1/1     Running   0          41
s
```

```
traefik-86b65ff49f-bkb2c      1/1     Running   0          53
s

gus@coxa-pc:~/traefik-exercise$ k get all
NAME                                READY   STATUS    RESTARTS
AGE
pod/foobar-api-56d8fcc4fd-rcnq5   1/1     Running   0
45s
pod/grafana-79697b5f8-gs8z5       1/1     Running   0
45s
pod/jaeger-6c996c4fd4-lqdv6       1/1     Running   0
45s
pod/prometheus-54488fdf45-f8hz8   1/1     Running   0
45s
pod/traefik-86b65ff49f-bkb2c      1/1     Running   0
57s

NAME                     TYPE           CLUSTER-IP      EXTER
NAL-IP   PORT(S)                                  AGE
service/foobar-api-svc   ClusterIP      10.106.60.94    <none
>        80/TCP                                   45s
service/grafana          ClusterIP      10.97.206.132   <none
>        3000/TCP                                 45s
service/jaeger           ClusterIP      10.96.110.91    <none
>        16686/TCP,4317/TCP                       45s
service/kubernetes       ClusterIP      10.96.0.1       <none
>        443/TCP                                  29h
service/prometheus       ClusterIP      10.106.241.28   <none
>        9090/TCP                                 45s
service/traefik          LoadBalancer   10.97.209.191   local
host     9100:31541/TCP,80:32687/TCP,443:31492/TCP   57s

NAME                         READY   UP-TO-DATE   AVAILABLE
AGE
deployment.apps/foobar-api   1/1     1            1
45s
```

```
deployment.apps/grafana      1/1     1            1
45s
deployment.apps/jaeger       1/1     1            1
45s
deployment.apps/prometheus   1/1     1            1
45s
deployment.apps/traefik      1/1     1            1
57s

NAME                                    DESIRED   CURRENT   R
EADY   AGE
replicaset.apps/foobar-api-56d8fcc4fd   1         1         1
45s
replicaset.apps/grafana-79697b5f8       1         1         1
45s
replicaset.apps/jaeger-6c996c4fd4       1         1         1
45s
replicaset.apps/prometheus-54488fdf45   1         1         1
45s
replicaset.apps/traefik-86b65ff49f      1         1         1
57s
```



Refs

- https://doc.traefik.io/traefik/getting-started/quick-start-with-kubernetes/
- https://doc.traefik.io/traefik/setup/kubernetes/
- https://doc.traefik.io/traefik/expose/kubernetes/
- https://doc.traefik.io/traefik/reference/routing-configuration/http/load-balancing/serverstransport/
- https://doc.traefik.io/traefik/reference/routing-configuration/http/middlewares/overview/
- https://doc.traefik.io/traefik/reference/routing-configuration/kubernetes/crd/http/middleware/
- https://doc.traefik.io/traefik/observe/logs-and-access-logs/
- https://doc.traefik.io/traefik/observe/metrics/
- https://doc.traefik.io/traefik/observe/tracing/
- https://www.jaegertracing.io/docs/1.76/getting-started/

- https://www.jaegertracing.io/docs/1.76/deployment/operator/#allinone-default-strategy
- https://www.jaegertracing.io/docs/1.76/deployment/
- https://opentelemetry.io/blog/2023/jaeger-exporter-collector-migration/
- https://doc.traefik.io/traefik/v3.0/observability/tracing/opentelemetry/
- https://doc.traefik.io/traefik/reference/install-configuration/api-dashboard/
- https://doc.traefik.io/traefik-enterprise/v2.0/operating/dashboard/
- https://prometheus.io/docs/prometheus/latest/configuration/configuration/
- https://grafana.com/docs/grafana/latest/setup-grafana/installation/kubernetes/
- https://docs.docker.com/get-started/docker-concepts/building-images/