About Myself

- British - living in Grenoble, in the French Alps
- Developer Advocate @containous creators of @traefikproxy
- Docker Community Lead
- Python User Group Creator
- Kubernetes CKA
- Crazy about Open Source and Cloud Technologies
About Traefik

- Reverse-proxy/load-balancer
- Hot configuration reloads
- Many backends
- Let's Encrypt Support + automated cert. renewal
- Widely deployed
- Can act as a Kubernetes Ingress Controller

... more on this later, in the demo ...

[github.com/containous/traefik](github.com/containous/traefik)  @containous  @traefikproxy
Serverless Computing

1. What Is Serverless?

2. Review of Cloud Provider Offerings
   +CNCF Serverless WG

3. Open Source Tools

4. Open Source Platforms

5. Demo of OpenFaaS/Traefik

github.com/containous/traefik  @containous  @traefikproxy
What Is Serverless?

No more servers?!  

FaaS + BaaS  

Functions as a Service  

Back-ends as a Service  

Functions glue together API-based back-end services

The ultimate "Cloud Native"?  

Serverless: a paradigm  

& a company  

& a tool
Serverless - What Is it?

At the peak of the Hype Cycle!!

**NOT CARING ABOUT SERVERS**
Developers focus on
 apps
 Platform provider
 - Provisions
 - Auto-scales
 - Maintains

**PAY AS YOU GO**
- (*)Pay for real (fn) usage
- (*)No initial investment
- (*)High availability for free
- Great for startups

**AGILE**
- Short time to market
- Enables innovation
- (*)Massive scale on demand

* - These are the promises of Serverless
Serverless - an Event Driven Architecture

FaaS + BaaS

API Gateway → functions

DB → files

msg

browser, webhooks, scheduled

begin
end

github.com/containous/traefik  @containous  @traefikproxy
## Serverless - What is it? ... Use Cases

Where it doesn't make sense to pay for always-on services - it's a *business choice*!

<table>
<thead>
<tr>
<th>EVENT DRIVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled (peak) events</td>
</tr>
<tr>
<td>- monthly payroll</td>
</tr>
<tr>
<td>- daily accounting</td>
</tr>
<tr>
<td>- check processing (with image recognition)</td>
</tr>
</tbody>
</table>

| Unpredictable external events |
| - web requests |
| - web hooks |
| - file uploads |

<table>
<thead>
<tr>
<th>DOMAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI / CD</td>
</tr>
<tr>
<td>Banking</td>
</tr>
<tr>
<td>IoT</td>
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<tr>
<td>Glue-logic (of BaaS)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideal Serverless applications are latency tolerant, event-driven, short-lived</td>
</tr>
</tbody>
</table>
Serverless - Cloud Providers
Serverless - Main Cloud Provider Offerings

- AWS Lambda
- Azure Functions
- Google Cloud Functions
- IBM Cloud Functions

github.com/containous/traek @containous @traefikproxy
AWS Lambda

Introduced in Beta in Nov 2014
Leader in developer uptake, back-end services and eco-system.

**Language choices:** Node.js (JS), Python, Java 8, C#, VB/F#

**NEW Features** - Announced at Reinvent 2017
- Go (static binaries) and .Net(C#)
- SAM for off-line debugging

**Cost:** Free tier: 1 mn req/mth, then $0.00001667/GBy-sec [details](#)

**Strengths:** Created the space, enormous ecosystem, Cloud9 IDE?

**Weaknesses:** A little slow, limited languages, lock-in.
Potentially **huge** cost savings for your business, or not ...

**Source:** "The hidden costs of serverless"

<table>
<thead>
<tr>
<th></th>
<th>IBM OpenWhisk</th>
<th>AWS Lambda</th>
<th>Azure Functions</th>
<th>GCP Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requests</strong></td>
<td>N/A</td>
<td>$0.2 per 1M requests</td>
<td>$0.2 per 1M requests</td>
<td>$0.4 Per 1M requests</td>
</tr>
<tr>
<td><strong>GB/s (compute time)</strong></td>
<td>$0.000017 per GB-s</td>
<td>$0.000016 per GB-s</td>
<td>$0.000016 per GB-s</td>
<td>$0.00000231/GB-s</td>
</tr>
<tr>
<td><strong>Data Transfer (IN)</strong></td>
<td>Free</td>
<td>$0.1-$0.2 between VPCs/regions</td>
<td>Free</td>
<td>Free</td>
</tr>
<tr>
<td><strong>Data Transfer (OUT)</strong></td>
<td>$0.05-$0.09 per GB</td>
<td>$0.05-$0.09 per GB</td>
<td>$0.05-$0.09 per GB</td>
<td>$0.12 per GB</td>
</tr>
<tr>
<td><strong>API Gateway</strong></td>
<td>Free</td>
<td>$3.50 per 1M calls</td>
<td>Free</td>
<td>$3.00 per 1M calls</td>
</tr>
</tbody>
</table>
The CNCF Created a Serverless WG

We need open standards for Serverless

The working group defines/identifies

* common terminology
* common use cases and patterns
* relation to PaaS and container orchestration

Resources

- Serverless Whitepaper
- Github repository
- Google group
- Slack channel
- Meeting Videos
- Meeting Minutes
Serverless - Open-Source Tooling

Hundreds of Open-Source tools facilitate development, testing and deployment

Some tools seek to support multi-language, some multi-platform or a combination ...

See
awesome-serverless

Some Important Frameworks

Serverless(.com)
apex(.com)
Chalice (AWS Lambda/Python)
A Company, a Tool, an Open-Source Project

Deploys to various Cloud Providers/Open Source Platforms:
- AWS Lambda
- Azure Functions
- Google Cloud Functions
- OpenWhisk
- Kubeless
- SpotInst
- Webtasks

[github.com/containous/traek](https://github.com/containous/traek)  @containous  @traefikproxy
Serverless - Open Source Platforms

- KUBELESS
- FISSION
- APACHE OPENWHISK
- OPENFAAS
- FN PROJECT
- NUCLIO
- SPRING CLOUD FUNCTIONS
OpenFaaS

- OpenFaaS runs on Docker-Swarm or Kubernetes
- **Bring Your Own Container**
- Portal with Function Store
- faas-cli: command-line tool
- FaaS-Netes runs on Kubernetes
- A young project with a vibrant community of volunteers
- Easy to get started, many guides and blog posts from community
- Integrates Prometheus

— Alex Ellis, Docker Captain, *VMWare*
OpenFaaS - Finnian Anderson, Colourising Video with OpenFaaS

Alfred Hitchcock's "Psycho" trailer, recolourised using OpenFaaS
Demo Time !
Demo - Traefik Architecture
Demo - OpenFaaS + Traefik
Demo - Adding Traefik Service into Docker-Compose file - 1

```yaml
services:
  traefik:
    image: traefik:v1.5
    command: --docker
      --docker.swarmmode
      --docker.domain=traefik
      --docker.watch
      --api
      --api.dashboard
      --debug
      --defaultEntryPoints=http,https
      --entryPoints=Name:http Address::80 Redirect.EntryPoint:https
      --entryPoints=Name:https Address::443 TLS:/ssl/wildcard.crt,/ssl/wildcard.key
```
# colorize images:
colorise:
  image: alexellis2/openfaas-colorization:0.4.0
  labels:
    function: "true"
  networks:
    - functions
  environment:
    fprocess: "python -u index.py"
    no_proxy: "gateway"
    https_proxy: $https_proxy
    url_mode: "true"
  deploy:
    placement:
      constraints:
        - 'node.platform.os == linux'
    labels:
      - "traefik.port=8080"
      - "traefik.enable=true"
To Summarize

- Serverless is *still* a young technology
- It has a lot of promise for many workloads
- There are *real* **cost savings** to be made on opex and capex
- Major cloud players are investing in the technology
- There are many deployment choices today
- **We need an open cloud**
Thanks!

@containous is hiring!

Traefik.io

Containous.us
# Resources - 1

<table>
<thead>
<tr>
<th>RESOURCE</th>
<th>DESCRIPTION</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lists</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>awesome-serverless</td>
<td>Curated list of awesome services, solutions and resources for serverless /</td>
<td>[github] anaibol/awesome-serverless</td>
</tr>
<tr>
<td></td>
<td>nobackend applications.</td>
<td></td>
</tr>
<tr>
<td>awesome-Serverless(.com)</td>
<td>Curated list of resources related to serverless architectures and the <strong>Serverless</strong> Framework</td>
<td>[github] JustServerless/awesome-serverless</td>
</tr>
<tr>
<td><strong>Tools</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serverless</td>
<td>Tools for deploying to several Cloud Providers</td>
<td>[github] serverless/serverless</td>
</tr>
<tr>
<td>Apex</td>
<td>Tools for deploying to AWS Lambda</td>
<td>[github] apex/apex</td>
</tr>
</tbody>
</table>
## Resources - 2

<table>
<thead>
<tr>
<th>RESOURCE</th>
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<tbody>
<tr>
<td><strong>Cloud Providers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWS Lambda</td>
<td>Amazon's Serverless Platform</td>
<td><a href="https://aws.amazon.com/fr/lambda/">https://aws.amazon.com/fr/lambda/</a></td>
</tr>
<tr>
<td>Google Cloud Functions</td>
<td>Google's Serverless Platform</td>
<td><a href="https://cloud.google.com/functions/">https://cloud.google.com/functions/</a></td>
</tr>
</tbody>
</table>
## Resources - 3

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td><strong>Open Source Serverless Platforms</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kubeless</td>
<td>Serverless platform from Bitnami</td>
<td>url</td>
</tr>
<tr>
<td>Fission.io</td>
<td>Serverless platform from Platform9</td>
<td>url</td>
</tr>
<tr>
<td>Apache OpenWhisk</td>
<td>Serverless platform from IBM</td>
<td>url</td>
</tr>
<tr>
<td>OpenFaaS</td>
<td>Serverless platform from Alex Ellis, Docker Captain</td>
<td>url</td>
</tr>
<tr>
<td><strong>Serverless Python Frameworks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apex</td>
<td>Serverless framework supporting Python and other languages</td>
<td>url</td>
</tr>
<tr>
<td>Chalice</td>
<td>Serverless framework supporting Python / Flask</td>
<td>url</td>
</tr>
<tr>
<td>Lambdify</td>
<td>Serverless framework supporting Python</td>
<td>url</td>
</tr>
<tr>
<td>Zappa</td>
<td>Serverless framework supporting Python / WSGi</td>
<td>url</td>
</tr>
</tbody>
</table>
Thanks !

@containous is hiring!

Awesome-Traefik on github

@mjbright