Serverless Computing

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25 March 2018, FOSS Asia, Singapore

CONTAINOUS

These slides online at https://mjbright.github.io/Talks/2018-Mar-

About Myself

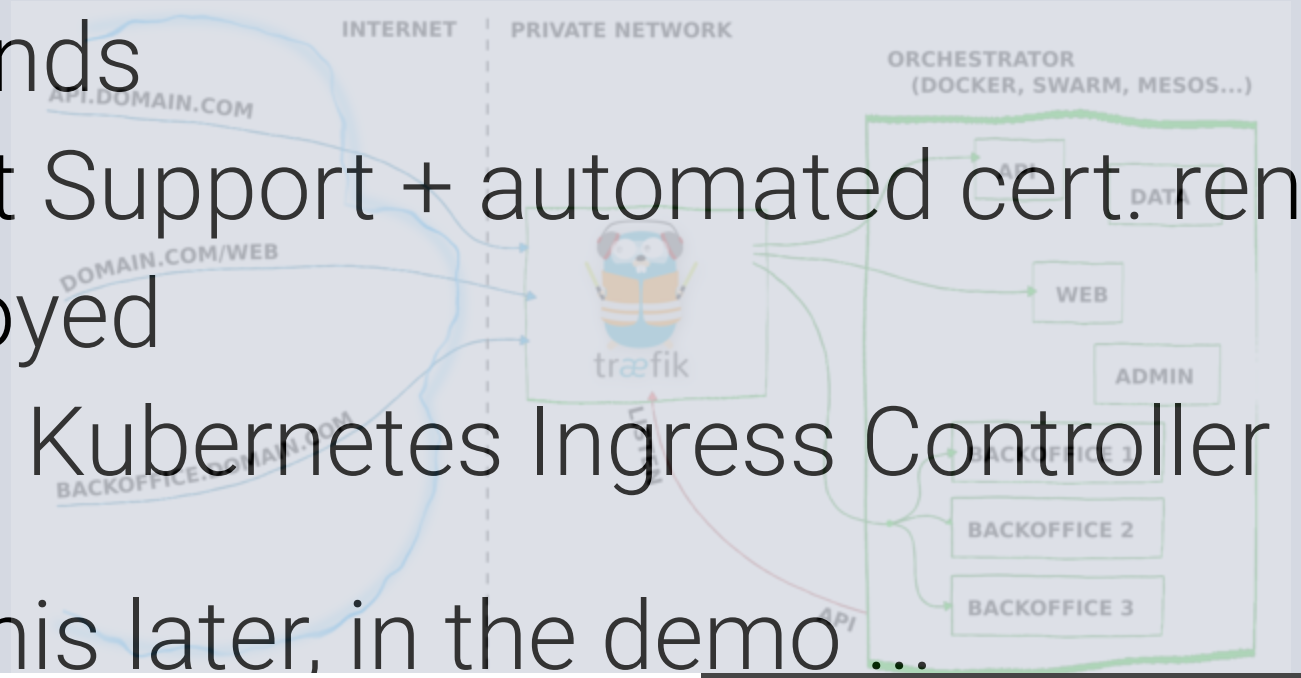
- British - living in Grenoble, in the French Alps
- Developer Advocate *@containous* creators of *@traefikproxy*
- Docker Community Lead
- Python User Group Creator
- Kubernetes CKA
- Crazy about Open Source and Cloud Technologies

About Traefik

CONTAINOUS **is hiring !**

- 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 ...



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**

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

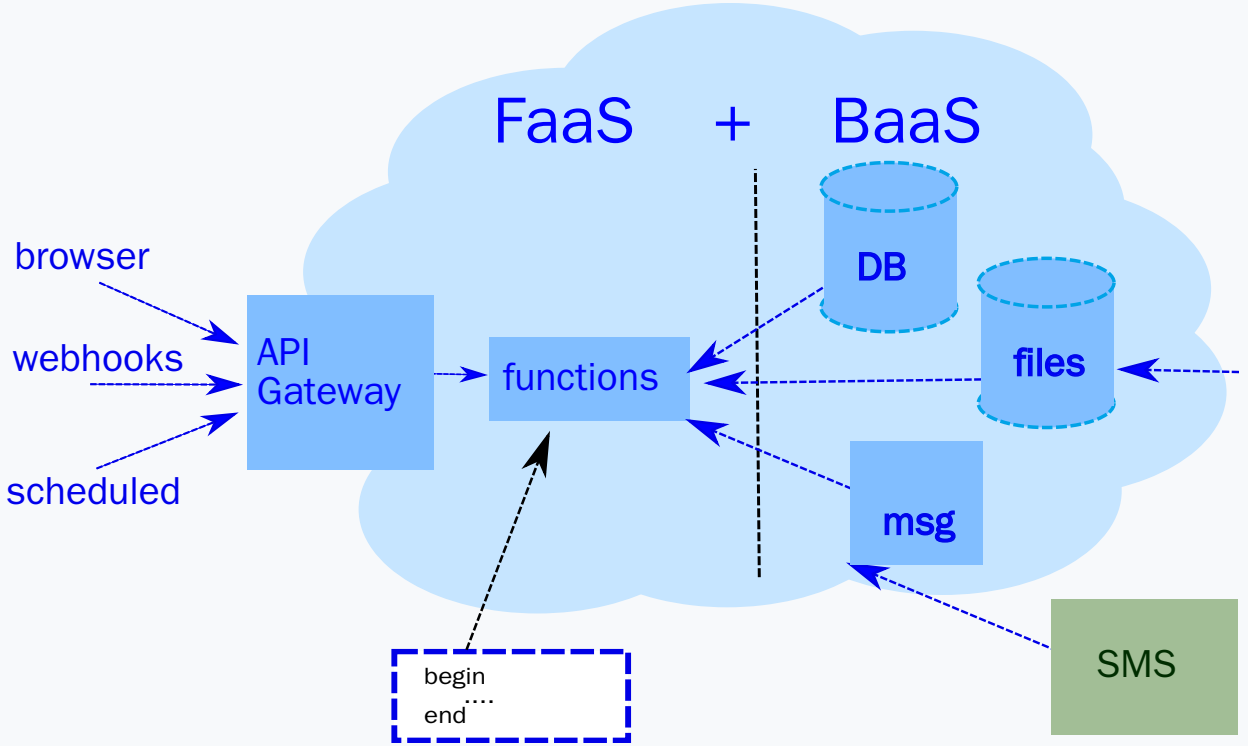
- (*)Pay for real (fn) usage
- (*)No initial investment
- (*)High availability for free
- Great for startups

AGILE

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

```
* - These are the promises of Serverless
```

Serverless - an Event Driven Architecture



Serverless - What is it? ... Use Cases

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

EVENT DRIVEN

Scheduled (peak) events
- monthly payroll
- daily accounting
- check processing (with image recognition)

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

DOMAINS

CI / CD

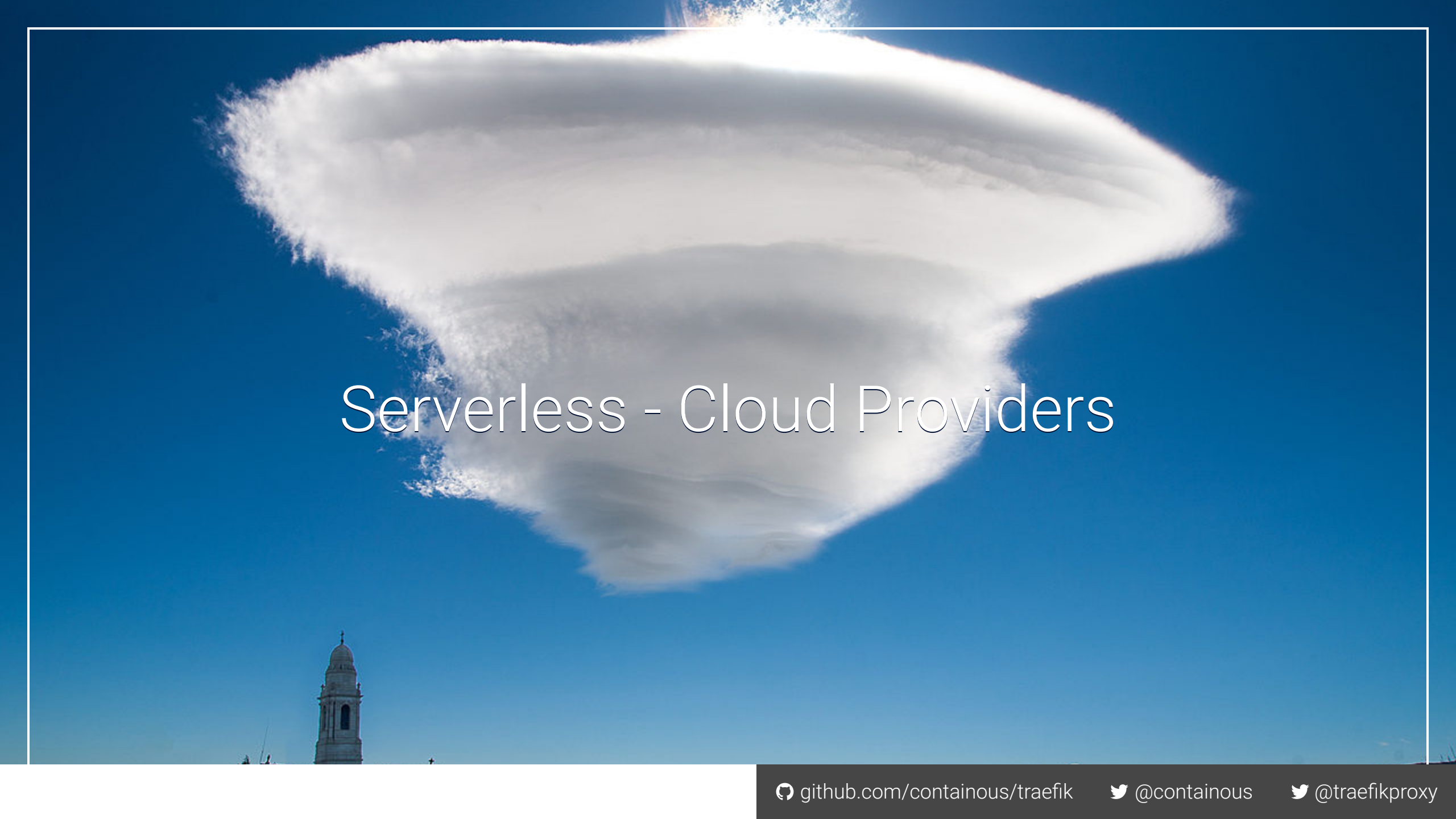
Banking

IoT

Glue-logic (of BaaS)

CHARACTERISTICS

Ideal *Serverless* applications are latency tolerant, event-driven, short-lived


Serverless - Cloud Providers

Serverless - Main Cloud Provider Offerings

AWS LAMBDA

AZURE FUNCTIONS

GOOGLE CLOUD FUNCTIONS

IBM CLOUD FUNCTIONS

AWS Lambda

Introduced βeta 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"

	IBM OpenWhisk	AWS Lambda	Azure Functions	GCP Functions
Requests	N/A	$0.2 per 1M requests	$0.2 per 1M requests	$0.4 Per 1M requests
GB/s (compute time)	$0.000017 per GB-s	$0.000016 per GB-s	$0.000016 per GB-s	$0.00000231/GB-s
Data Transfer (IN)	Free	$0.1-$0.2 between VPCs/regions	Free	Free
Data Transfer (OUT)	$0.05- $0.09 per GB	$0.05- $0.09 per GB	$0.05- $0.09 per GB	$0.12 per GB
API Gateway	Free	$3.50 per 1M calls	Free	$3.00 per 1M calls

The CNCF Created a Serverless WG

We need open standards for Serverless

The working group defines/identifies

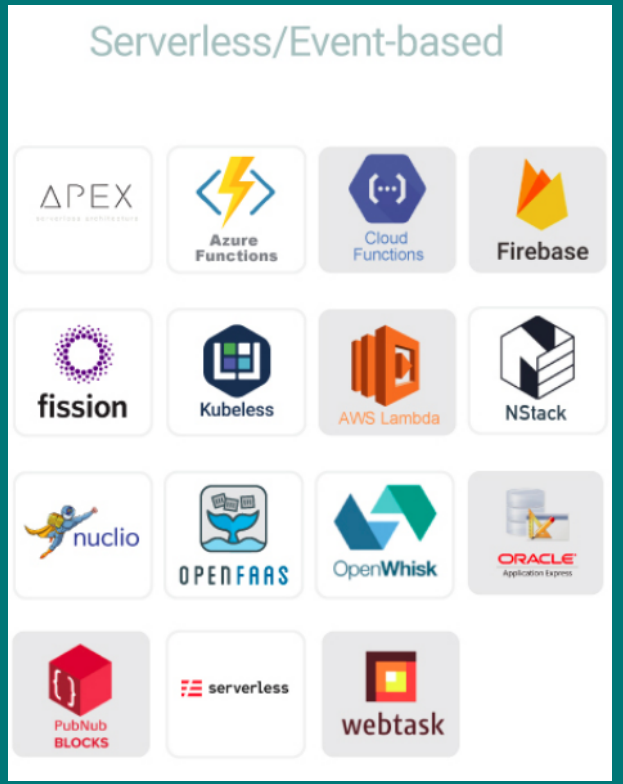
* common terminology

* 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

See
awesome-serverless

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

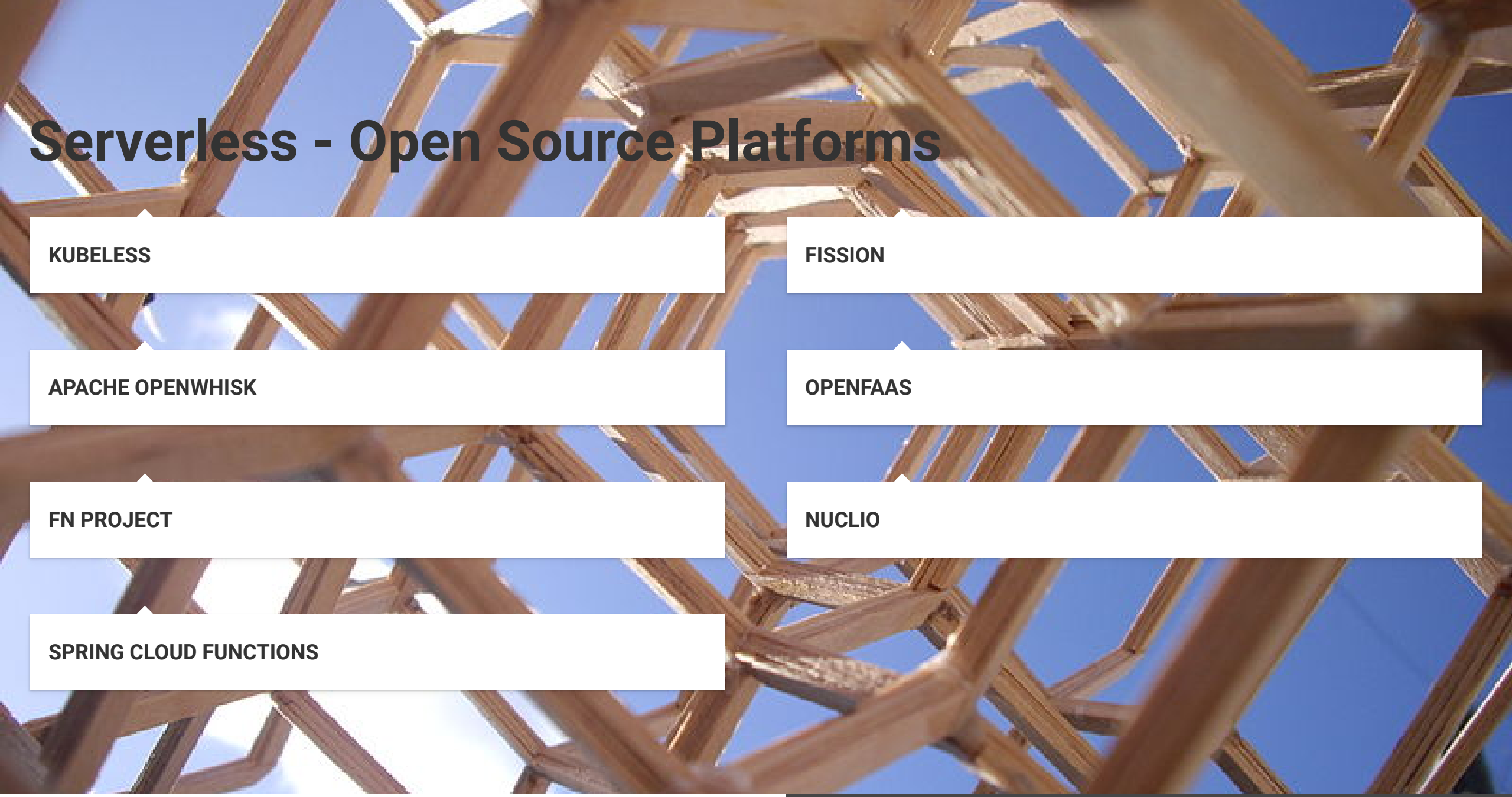
Some Important Frameworks

Serverless(.com)
apex(.com)
Chalice (AWS Lambda/Python)

A Company, a Tool, an Open-Source Project

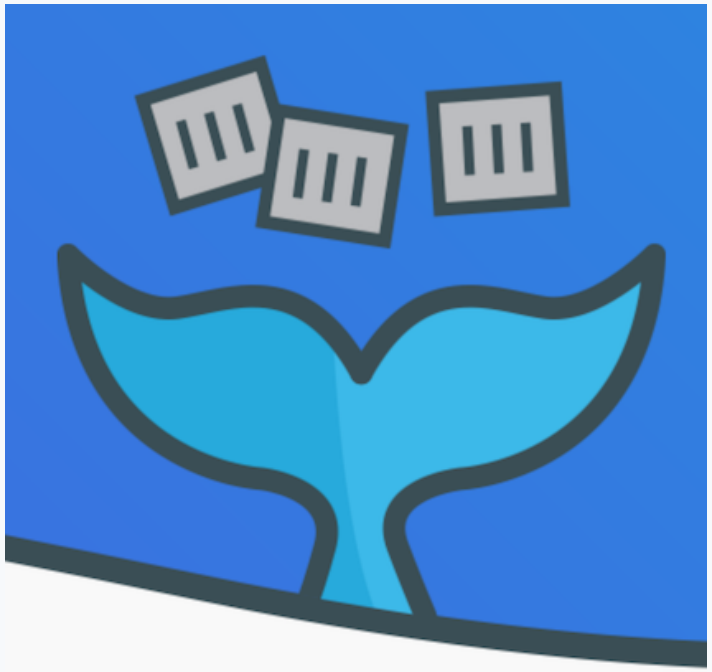
Deploys to various Cloud Providers/Open Source Platforms:

- AWS Lambda
- Azure Functions
- Google Cloud Functions
- OpenWhisk
- Kubeless
- SpotInst
- Webtasks



Serverless - Open Source Platforms

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

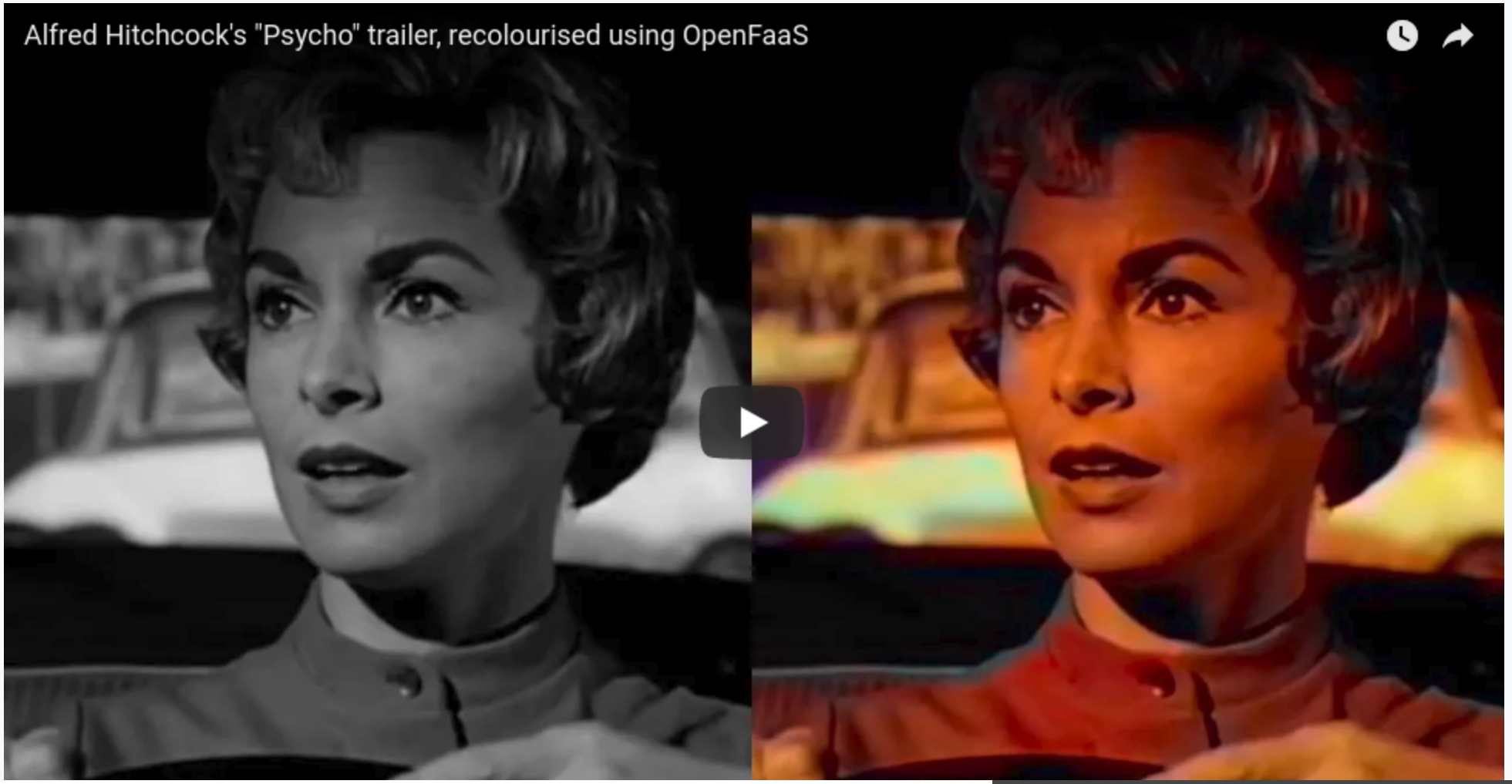


OpenFaaS

- 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



Demo Time !

Demo - Traefik Architecture

Demo - OpenFaaS + Traefik

Demo - Adding Traefik Service into Docker-Compose file - 1

```
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'
```

Demo - Adding Traefik Service into Docker-Compose file - 2

```
# 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 !

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Traefik.io

Containo.us

Resources - 1

RESOURCE	DESCRIPTION	URL
Lists		
awesome-serverless	Curated list of awesome services, solutions and resources for serverless / nobackend applications.	[github] anaibol/awesome-serverless
awesome-Serverless(.com)	Curated list of resources related to serverless architectures and the **Serverless Framework**	[github] JustServerless/awesome-serverless
Tools		
Serverless	Tools for deploying to several Cloud Providers	[github] serverless/serverless
Apex	Tools for deploying to AWS Lambda	[github] apex/apex

Resources - 2

RESOURCE	DESCRIPTION	URL
Cloud Providers		
AWS Lambda	Amazon's Serverless Platform	https://aws.amazon.com/fr/lambda/
Azure Functions	Microsoft's Serverless Platform	https://azure.microsoft.com/en-us/services/functions/
Google Cloud Functions	Google's Serverless Platform	https://cloud.google.com/functions/
IBM Cloud Functions	IBM's Serverless Platform	https://www.ibm.com/cloud-computing/bluemix/openwhisk

Resources - 3

RESOURCE	DESCRIPTION	URL
Open Source Serverless Platforms		
Kubeless	Serverless platform from Bitnami	url
Fission.io	Serverless platform from Platform9	url
Apache OpenWhisk	Serverless platform from IBM	url
OpenFaaS	Serverless platform from Alex Ellis, Docker Captain	url
Serverless Python Frameworks		
Apex	Serverless framework supporting Python and other languages	url
Chalice	Serverless framework supporting Python / Flask	url
Lambdify	Serverless framework supporting Python	url
Zappa	Serverless framework supporting Python / WSGi	url

♡ Thanks !

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Awesome-Traefik on github

@mjbright