

Serverless Python

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About Myself

- British - living in Grenoble, in the French Alps
- Cloud Native Trainer *@mjbright*
- Docker Community Lead
- Python User Group Creator
- Kubernetes CKA
- Crazy about Open Source and Cloud Technologies

Serverless Computing

1. What Is Serverless?

2. Review of Cloud Provider Offerings
+CNCF Serverless WG

3. Open Source Tools
Demo of Chalice/Lambda

4. Open Source Platforms
Demo of OpenFaaS

What Is Serverless?

Serverless

- No more servers ?!
- The ultimate
"Cloud Native" ?

Serverless: a paradigm

- & a company
- & a tool

FaaS + BaaS

- Functions as a Service
- Back-ends as a Service
- Functions glue together API-based back-end services

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 - The making of ...

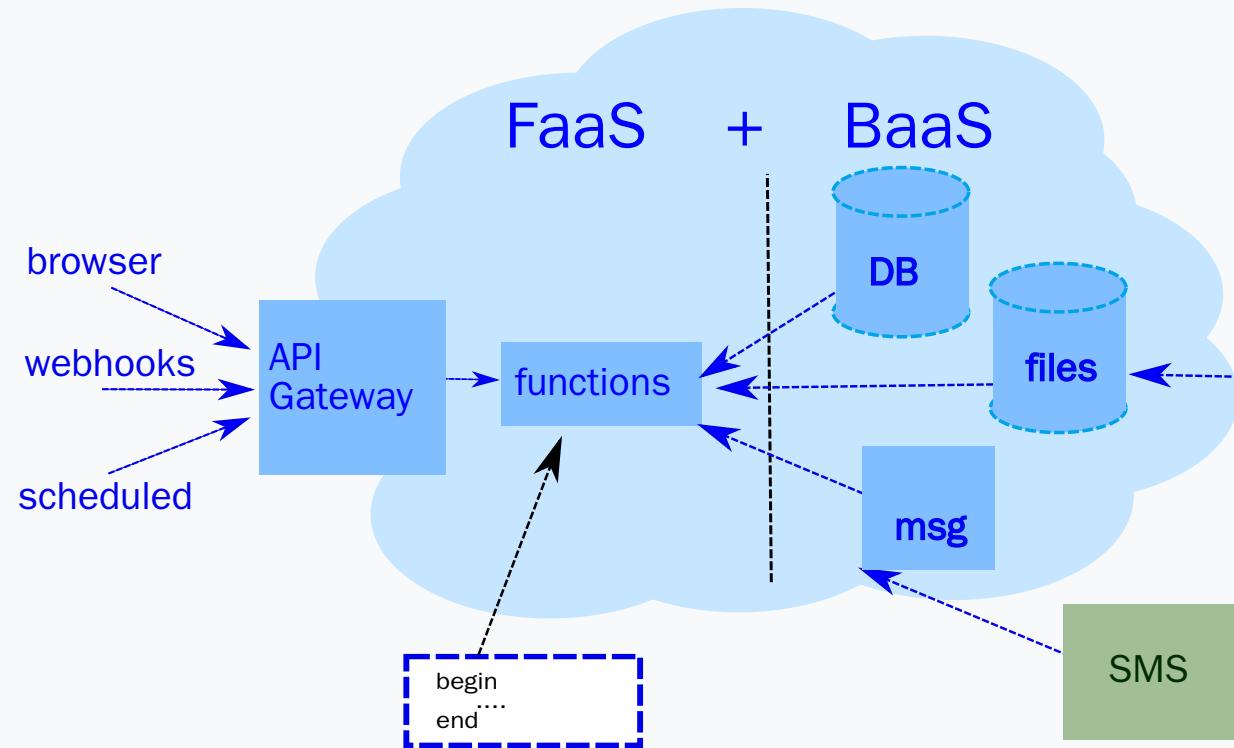


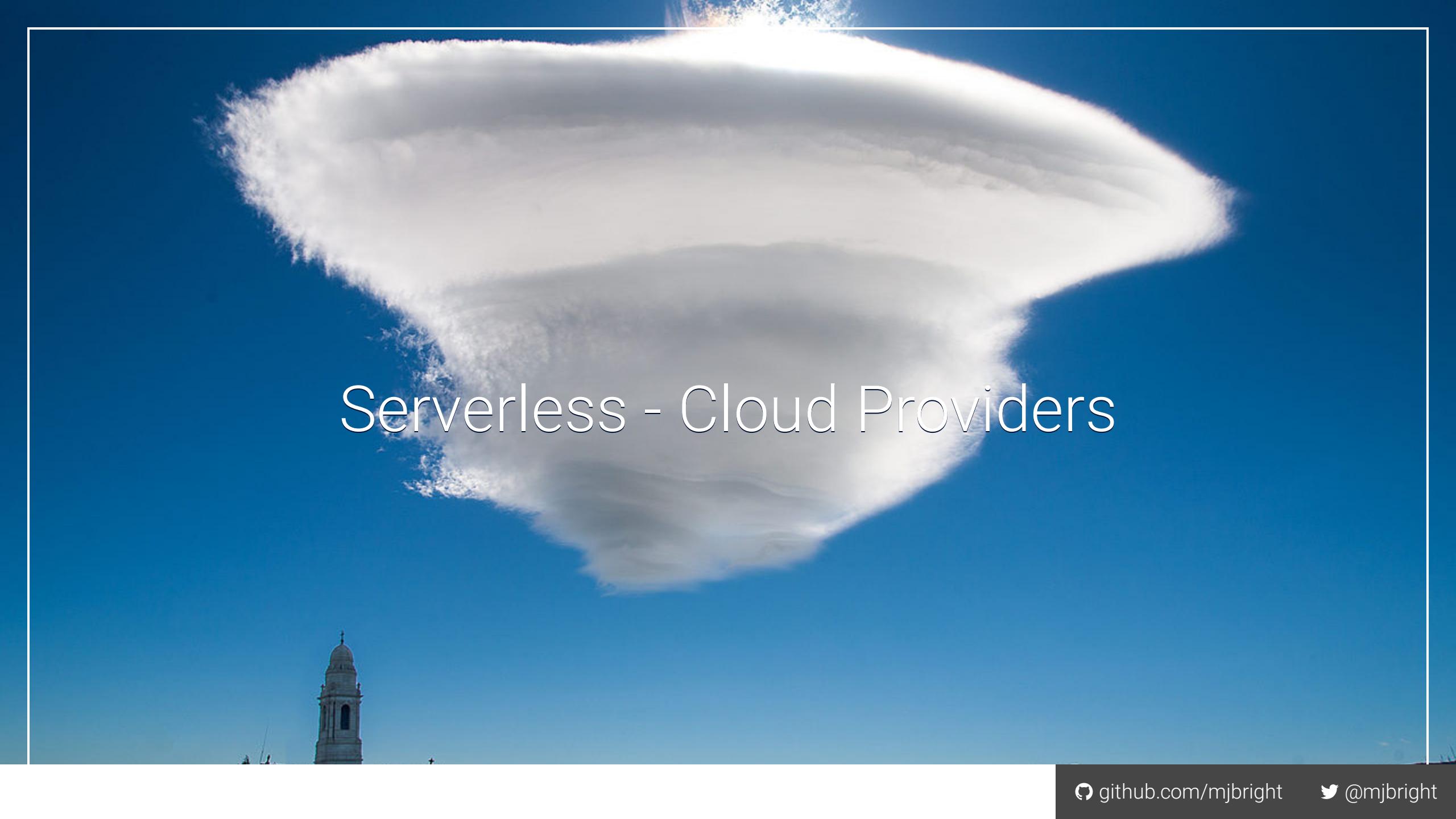
BAREMETAL



VIRTUAL MACHINES

Serverless - an Event Driven Architecture





Serverless - Cloud Providers

Serverless - Main Cloud Provider Offerings



AWS LAMBDA



AZURE FUNCTIONS



GOOGLE CLOUD FUNCTIONS



IBM CLOUD FUNCTIONS



AWS Lambda

Introduced **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 [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



Azure Functions

– *Introduced in 2016*

Many language choices:

GA: JavaScript, C#, F#, Python

Exp: Python, PHP, Typescript, Batch/Bash,
PowerShell, Java

OpenSource runtime:

<https://github.com/Azure/azure-functions-host>

Excellent Developer Tools Azure Portal,



Google Cloud Functions

- *Alpha release in Feb 2016.*

Language support:

Node.js/JS and Python(beta).



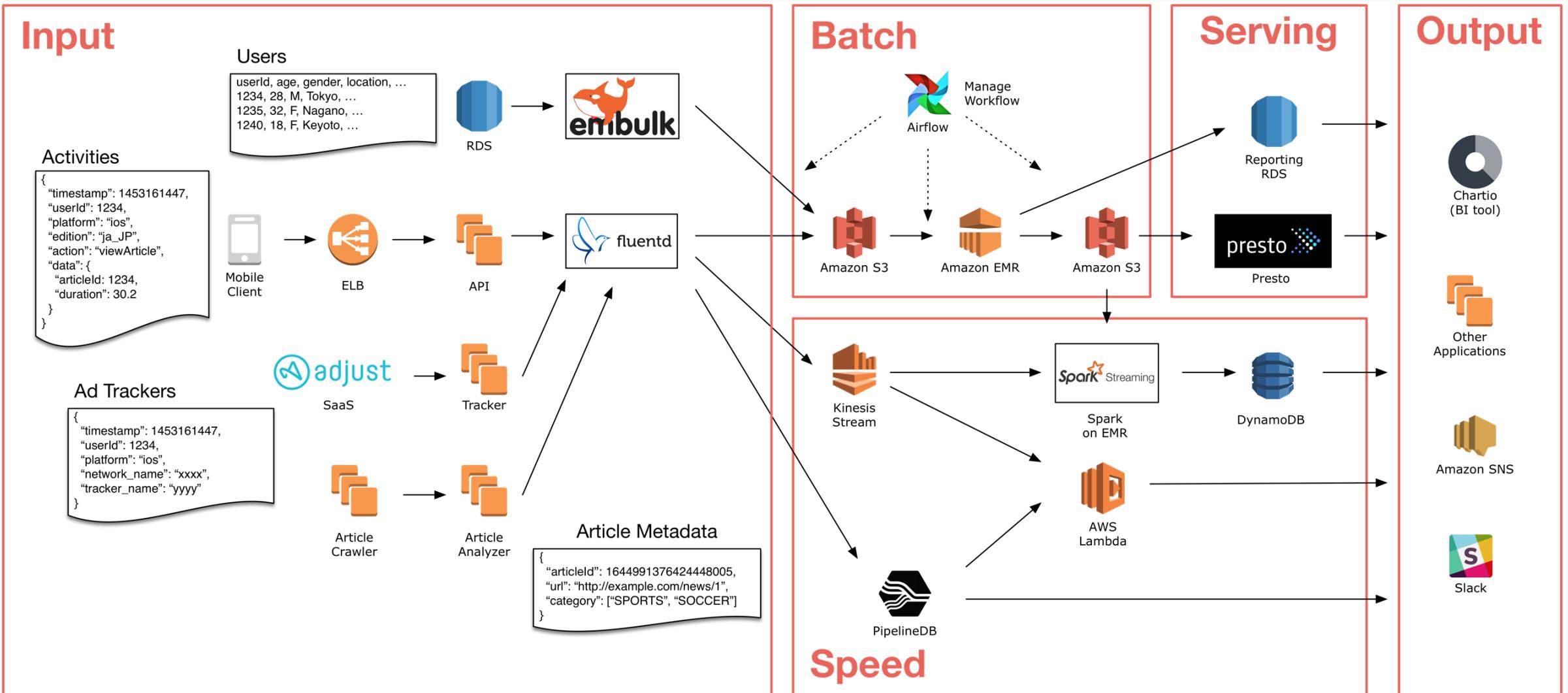
IBM Cloud Functions

— *Experimental release in Feb 2016*

⌚ **Open Sourced as Apache OpenWhisk** <https://github.com/apache/incubator-openwhisk>

Runtime support:	Events support:
 JS/NodeJS Swift Java Go PHP Python Any language (via Docker)	 Github Cloudant IBM Message Hub Mobile Push Periodic Alarm

AWS Lambda: Use Case - Smart News



Potentially **huge** cost savings for your business, or not ... **Source:**
"The hidden costs of serverless"

The CNCF Created a Serverless WG

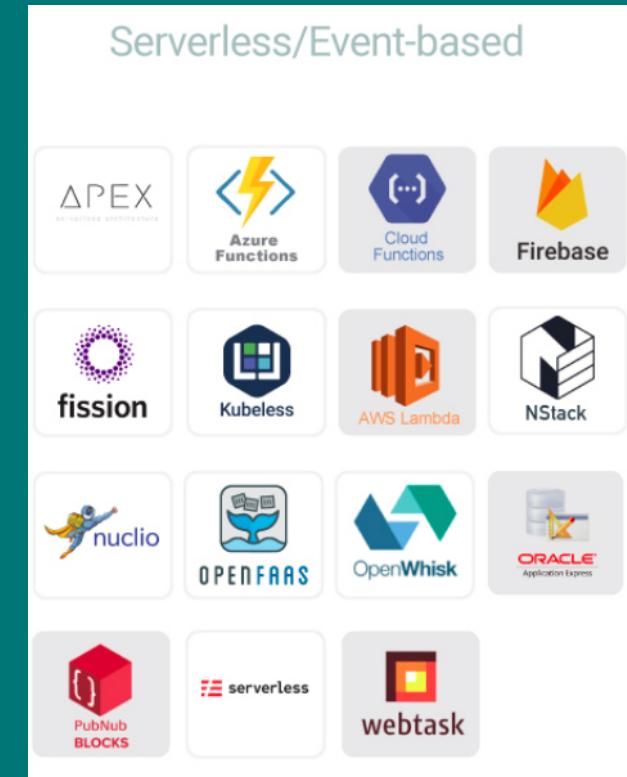
We need open standards for Serverless

The working group defines/identifies

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

Resources

- g Serverless Whitepaper
- ⌚ Github repository
- g Google group
- # Slack channel
- YouTube Meeting Videos
- σ Meeting Minutes



kNative

Google released kNative in 2018

A framework for providing common facilities to Serverless platforms.

- Orchestrating source-to-container builds
- Event binding
- Traffic management
- Built on Kubernetes and Istio



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)

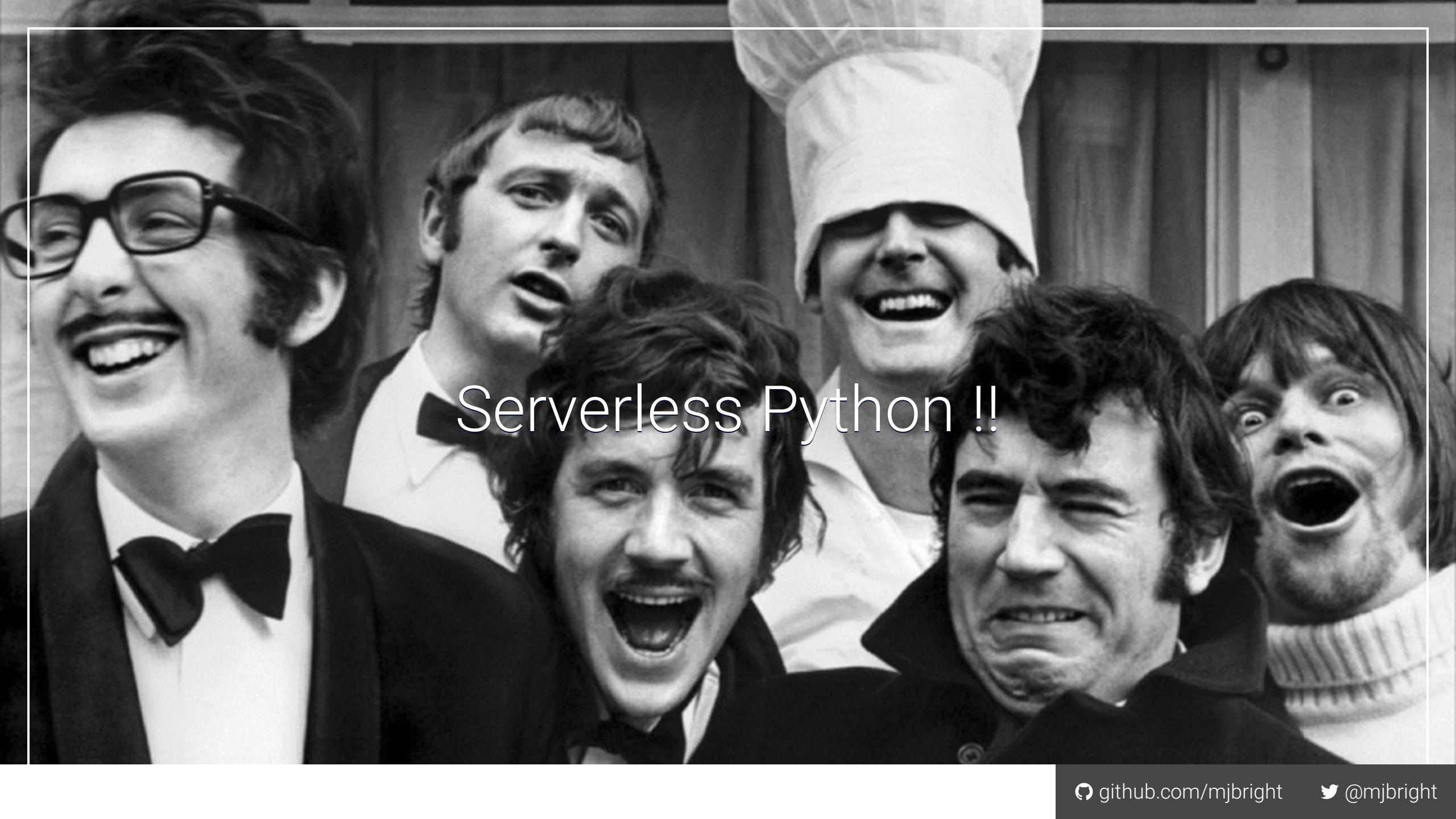
Zappa, Chalice (AWS Lambda/Python)



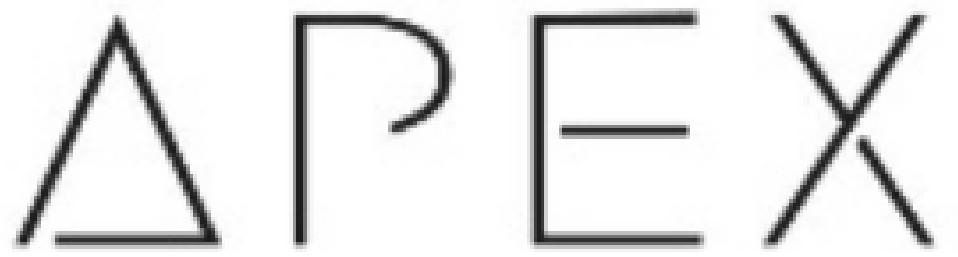
A Company, a Tool, an Open-Source Project

Deploys to various Cloud Providers/Open Source Platforms:

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



Serverless Python !!



APEX

APEX

SUPPORTS:

Javascript

++ Go



Python



CHALICE

CHALICE

SUPPORTS:

Python / Flask-like



Chalice

Chalice

- Open sourced by AWS - Python/AWS λ

pip installable module, command-line tool

Demo Time - Chalice !

Serverless - Open Source Platforms

KUBELESS

FISSION

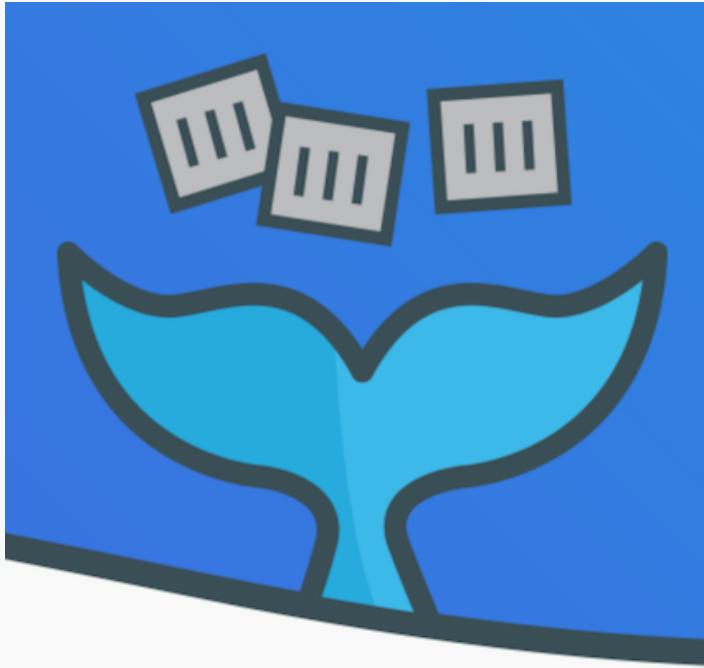
APACHE OPENWHISK

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
- **OpenFaaS Cloud** initiative for GitOps

— Alex Ellis, Docker Captain, *VMWare*

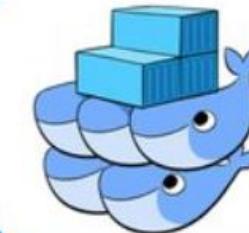
OpenFaaS - Architecture

API Gateway

Function Watchdog



Prometheus



Swarm



Kubernetes



OpenFaaS - Finnian Anderson, Colourising Video with OpenFaaS

Alfred Hitchcock's "Psycho" trailer, recolourised using OpenFaaS



Demo Time - OpenFaaS !

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**
-

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 !

 @mjbright