

# FaaS (Functions as a Service) - aka Serverless

Michael Bright, 27 January 2018,  
DevConf.cz, Brno

These slides online at [https://mjbright.github.io/Talks/2018-Jan-27\\_Devconf.cz\\_Serverless](https://mjbright.github.io/Talks/2018-Jan-27_Devconf.cz_Serverless)



Developer Evangelist @



# Serverless Computing

1. **What is Serverless?**  
Your experiences?

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2. **Review of Cloud Provider Offerings.**  
+CNCF Serverless WG

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3. **Serverless Tools**

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4. **Serverless Platforms**

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**Serverless In Action - demos**

5.





What is Serverless  
No more servers ?!

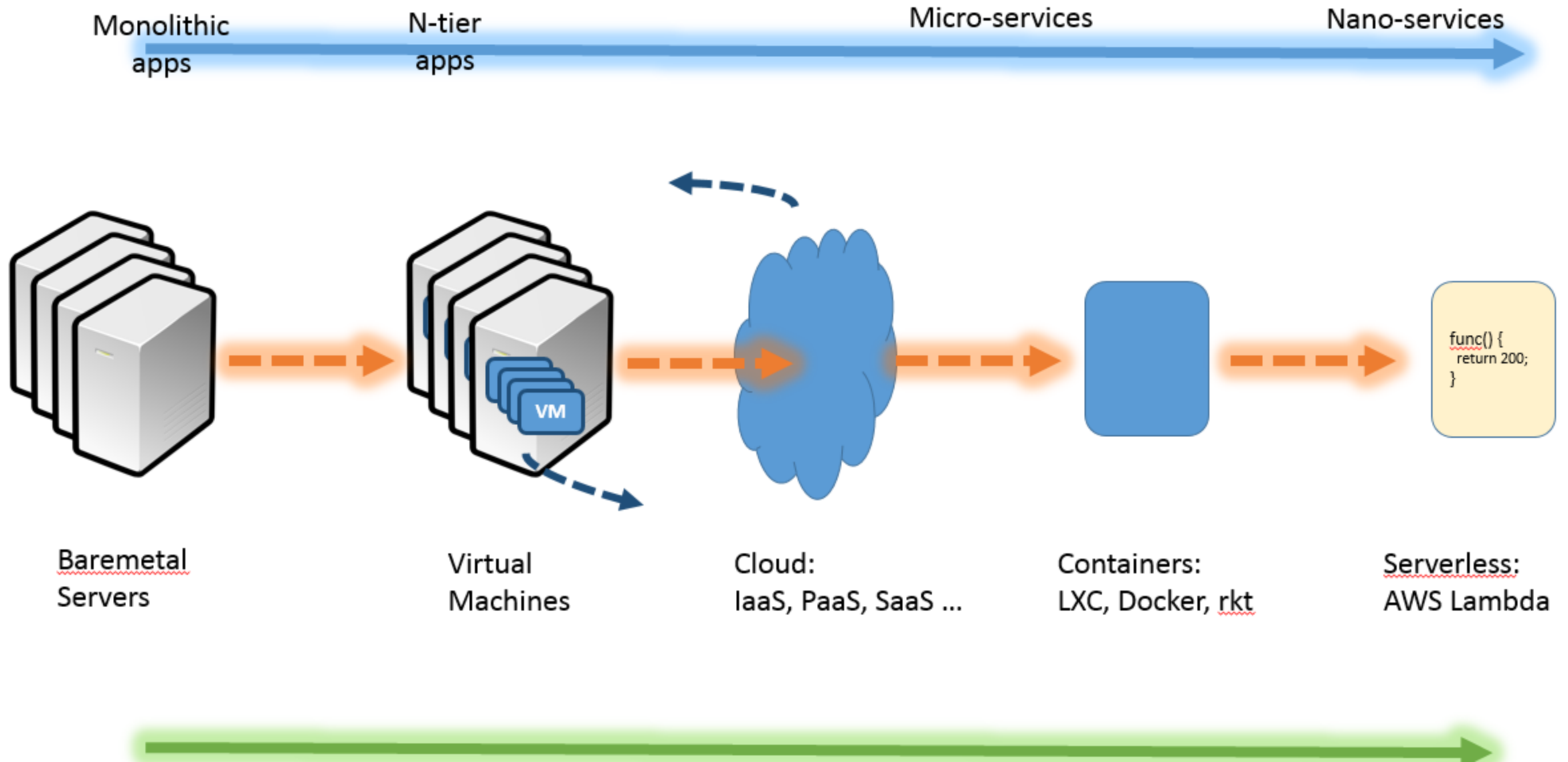


A serene sunset scene over a body of water. In the foreground, a wooden pier made of planks and posts extends from the bottom center towards the middle of the frame. The water is calm, reflecting the vibrant orange and yellow colors of the setting sun. In the distance, a small boat is visible on the right side of the water. The sky is a mix of blue and orange, with some clouds. The overall mood is peaceful and contemplative.

# The path to Serverless



# Serverless - The making of ...



# Serverless - What is it? ...

At the peak of the Hype Cycle !!

## DON'T CARE ABOUT SERVERS

- Developers focus on apps
- Servers are auto-scaled
- No server provisioning

## BAAS

- Back-end as a Service - e.g. DB, messaging

## NOW FAAS + BAAS

Functions as a Service - your stateless logic

## PAY AS YOU GO

- Pay for real usage (theory)
- No initial investment
- Great for startups

## AGILE

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

## ALSO A COMPANY!

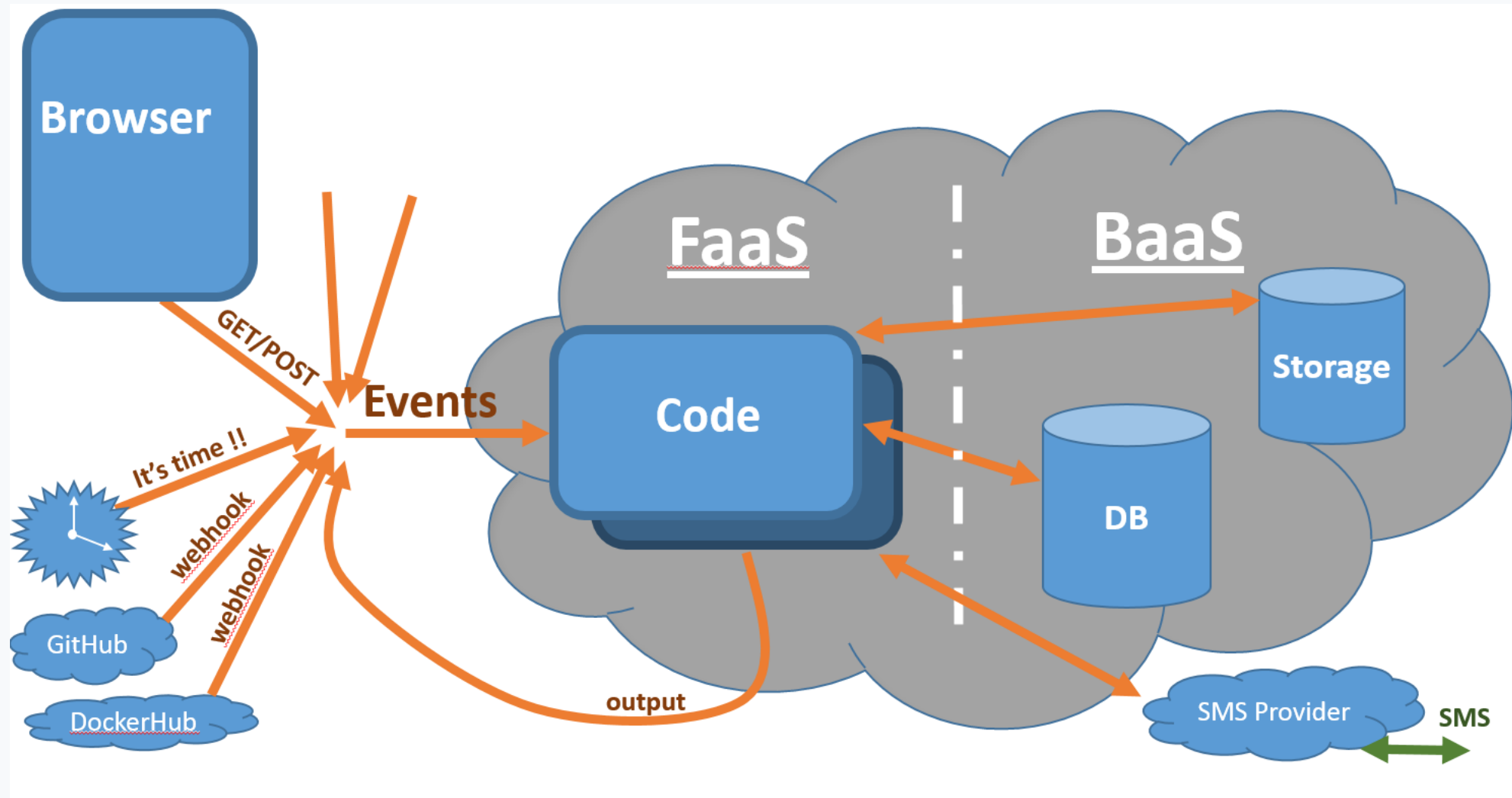
Unfortunately!  
-Serverless(.com) provide deployment tools  
-called Serverless !



A photograph of a conveyor belt sushi restaurant. In the foreground, a wooden conveyor belt moves various sushi items. There are two maki rolls on a white plate, a red bowl with the Japanese characters '注文品' (Order items), and a small sign with a picture of a salmon nigiri. In the background, a menu board displays various sushi options with prices. A person is visible behind the counter, and a drink is in a red bowl. The text 'The future of fast-food is Serverless' is overlaid in white.

The future of fast-food is Serverless

# Serverless - Event Driven Architecture



API Gateway allows external access to functions ...



# Serverless - What is it? ... Use Cases



# Serverless - What is it? ... Use Cases

Where it doesn't make sense to pay for always-on services

## PERIODIC

- monthly payroll
- weekly news
- daily summaries
  
- Bank check processing  
(with image recognition)

## UNPREDICTABLE

- git webhooks
- user web requests
- S3 file uploads
- SMS reception

## DOMAINS

- IoT
- Banking
- Glue-logic

## CHARACTERISTICS

- latency tolerant
- event-driven
  
- short-lived
- periodic





# Serverless - Cloud Providers

# Serverless - Cloud Provider Offerings



**AWS LAMBDA**



**AZURE / AZURE FUNCTIONS**



**GOOGLE / GOOGLE CLOUD FUNCTIONS**



**IBM CLOUD FUNCTIONS**



**ORACLE CLOUD / FN**







## AWS Lambda

### Overview

- Introduced ***Beta*** in Nov 2014, stable version by end of 2015.  
Leader in developer uptake, back-end services and eco-system.

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

**NEW: Go (static binaries) and .Net(C#)**

**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

### Overview

— Introduced in May 2016

**Many language choices:** JavaScript, C#, F#, Python, PHP, Bash, PowerShell ...

**Cost:** Free tier: 1 mn req/mth, then \$0.000016/GBy-sec [details](#)

**Strengths:** Win dev ecosystem, VStudio tools, Azure Stack

**Weaknesses:** still young, lock-in



## Google Cloud Functions

[Overview](#)

— *Alpha release in Feb 2016.*

**Language support:** *JavaScript only.*

**Cost:** *Free tier: 2mn req/mth, then \$0.0000004/GBy-sec [details](#)*

**Strengths:** *Google dev ecosystem, backend services*

**Weaknesses:** *Very young, Js only, commitment? Cost, lock-in*



## IBM Cloud Functions

### Overview

— *Experimental release in Feb 2016*

*Open Sourced as Apache OpenWhisk*

**Language support:** *Node.js, Swift or BYoC*

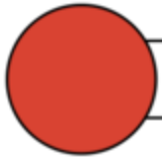
**Cost:** *Free tier: 2mn req/mth, then \$0.0000004/GBy-sec [details](#)*

**Strengths:** *Open source community, RedHat/Adobe backing, Fast growth*

**Weaknesses:** *lock-in*

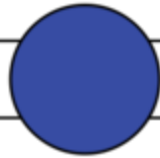


**Closed/  
Proprietary  
Cloud**



No Access

**Open  
Cloud**



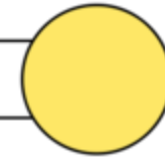
Open APIs  
Open Formats

**Open  
Source  
Cloud**



Open APIs  
Open Formats  
Open Source

**Free  
Cloud**



Open APIs  
Open Formats  
Open Source  
Open Data

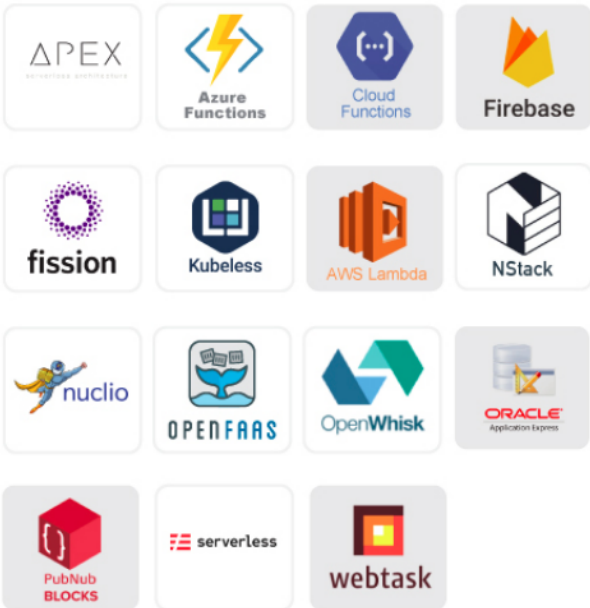
Cloud Computing Openness

CC-BY-SA 3.0 by Sam Johnston

But we need open Serverless for open Cloud

# The CNCF has created a Serverless WG

## Serverless/Event-based



# CNCF Serverless WG to

## **Provide clarity on the topic:**

- \* Define common terminology
- \* Define the scope of the space
- \* Identify common use cases and patterns
- \* Identify relation to PaaS and container orchestration

## **Identify potential next steps for the community:**

- \* Identify areas for harmonization or interop work

## **Create a whitepaper on Serverless.**

# CNCF Serverless WG Resources


\* Github repo

 *@cncf:wg-serverless*

\* Whitepaper

 *in Google Drive*


\* Google Group

 *cncf-wg-serverless*

\* Slack Channel

 *WP*

\* Meetings

 *Video playlist*

*Minutes*





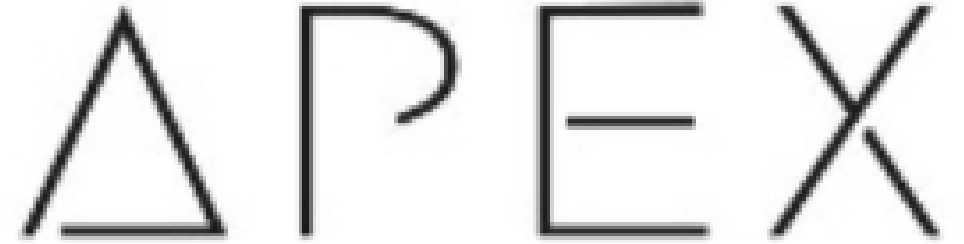
# Serverless - Tools



# Serverless - Open Source tooling ...

The logo for Serverless, featuring the word "SERVER" in white, a yellow lightning bolt in the middle, and the word "LESS" in white, all on a black background.

SERVERLESS(.COM)

The logo for Apex, featuring the word "APEX" in a large, thin, black, sans-serif font.

APEX(.COM)

The logo for AWS (Amazon Web Services), featuring the letters "aws" in a stylized, lowercase, blue font.



— *Open Source project*

*Deploy to various Cloud Providers/Open Source Frameworks:*

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

The logo for APEX, featuring the letters A, P, E, and X in a stylized, outlined font. The 'A' is a simple triangle, the 'P' has a curved top, the 'E' has three horizontal bars, and the 'X' is formed by two intersecting lines.

- *Up is platform-agnostic, supporting AWS Lambda and API Gateway as the first targets.*

*Extends beyond Lambda's natively supported languages by supporting Golang*

*Up focuses on deploying "vanilla" HTTP servers, using existing frameworks such as*

*Express, Koa, Django, Golang net/http or others.*





# Serverless - Open Source Frameworks

# Serverless - Open Source Frameworks



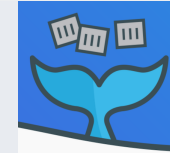
**KUBELESS**



**FISSION**



**APACHE OPENWHISK**



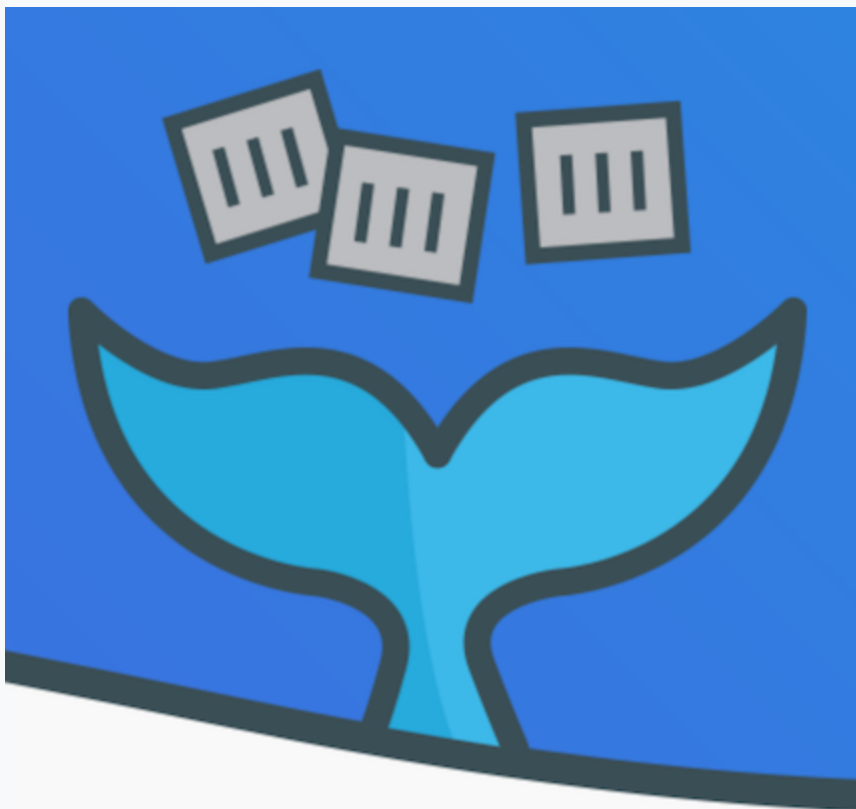
**OPENFAAS**



**FN PROJECT**



**NUCLIO**



## OpenFaaS

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

— *Alex Ellis, Docker Captain*

# OpenFaaS - Johhny Mkhael, Unleashing the Artist in you



[← HOME](#)





# OpenFaaS - Finnian Anderson, Colourising Video with OpenFaaS Serverless Functions

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



# To summarize

- - Serverless is a new technology
- - It has a lot of promise for many workloads
- - All major Cloud players on investing in the technology
- - **But we need an Open Cloud**
- - "The ultimate Cloud Native"
- - There are many deployment choices today
- - As platforms mature we can expect more stable performance

—



A surreal landscape featuring a large, vibrant red tree with a dense, rounded canopy. The tree stands in a field of red grass dotted with small white flowers. In the background, rolling red hills are visible under a bright blue sky filled with fluffy white clouds. A white heart icon is positioned to the left of the text "Thanks !".

♥ Thanks !

@mjbright



# Resources - 1

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

# Resources - 2

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



# Resources - 3

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



A surreal landscape featuring a large, vibrant red tree with a dense, rounded canopy. The tree stands in a field of red grass dotted with small white flowers. In the background, rolling hills of a similar red hue stretch towards a bright blue sky filled with soft, white clouds. A faint rainbow is visible on the horizon. Overlaid on the tree is the text 'Thanks !' in white, preceded by a white heart icon. Below this, a small white bird icon is visible, followed by the text '@mjbright' in a light blue color.

♥ Thanks !

@mjbright



# Chalice

Chalice

— *Open sourced by AWS - Python/AWS  $\lambda$*

*pip installable module, command-line tool*

**λambdaify**

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Lambdaify

—



Zappa.io

— *Open sourced by Gun.io - Python/AWS  $\lambda$*

*pip installable module, command-line tool*

*Can run Django ... serverless (?)*