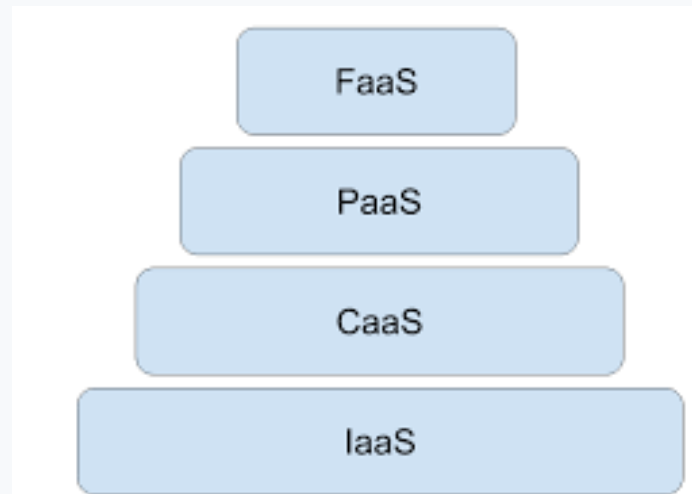
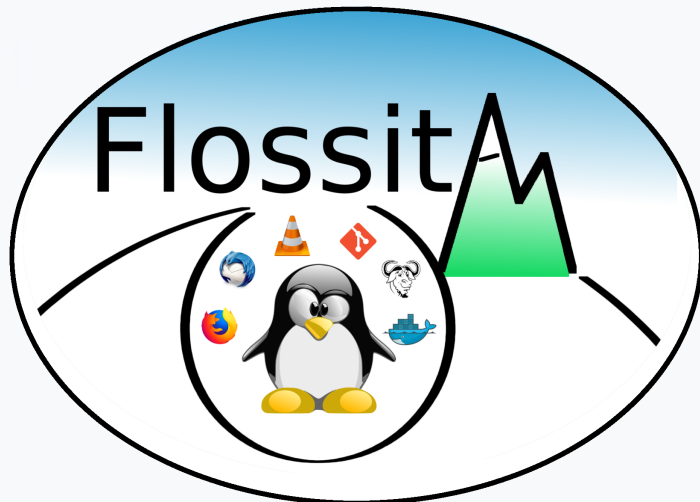


FaaS (Functions as a Service) - aka Serverless

Michael Bright, 19 January 2018,
FlossCon Grenoble

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



Serverless Computing

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

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

3. **Serverless Tools**

4. **Serverless Platforms**

Serverless In Action - demos

5.

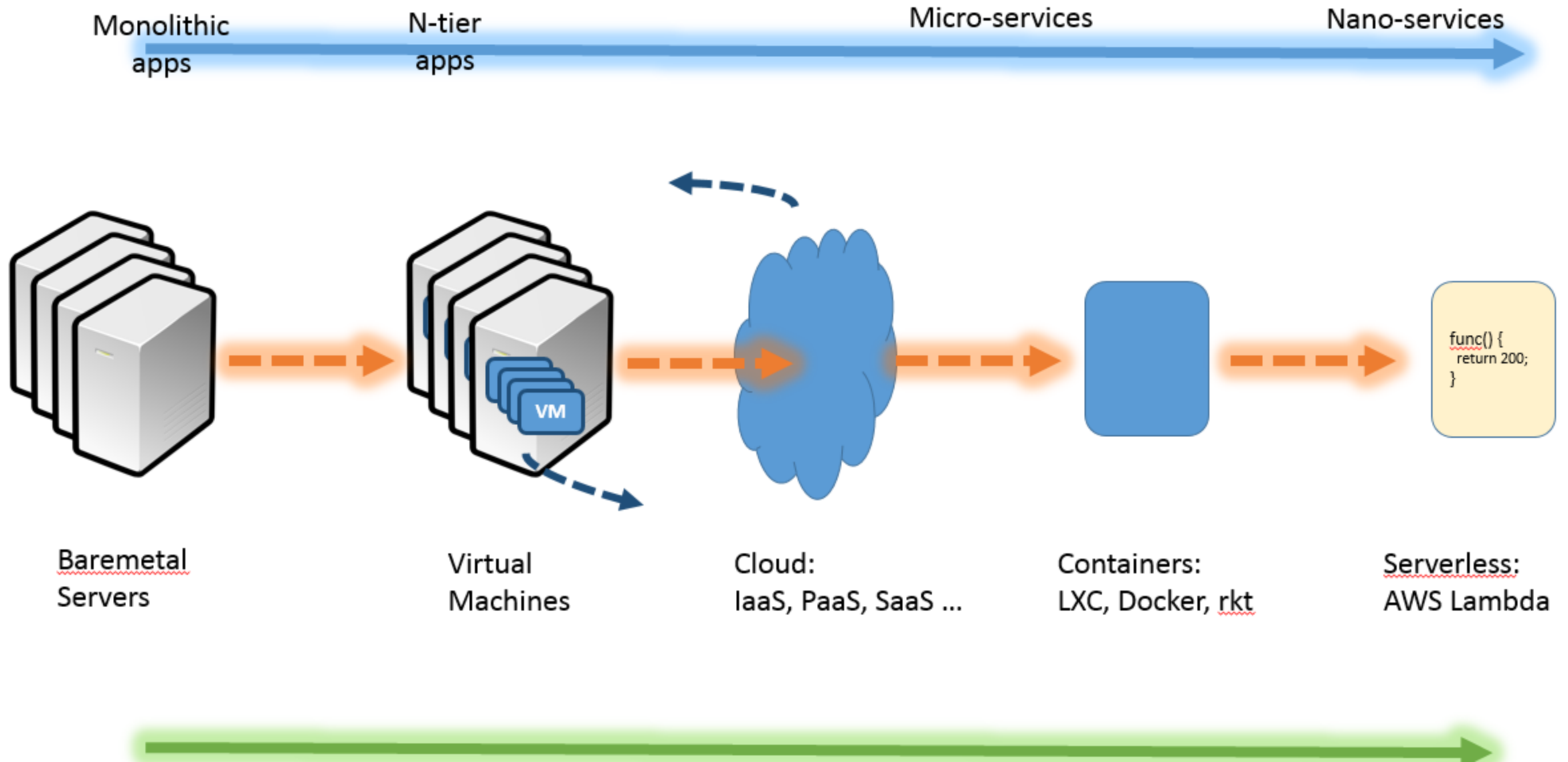


What is Serverless
No more servers ?!

A serene landscape photograph of a sunset over a calm 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 still, reflecting the vibrant orange and yellow colors of the setting sun. On the left, the dark silhouettes of trees are visible. In the distance, a small boat is anchored on the right side, and a range of low mountains or hills is visible on the horizon under a sky with soft, wispy 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

Applications accessing other cloud services ...

NOW FAAS + BAAS

Functions as a Service - your stateless logic

Functions accessing other cloud services ...

PAY AS YOU GO

- Pay for real usage
- No initial investment
- Great for startups

AGILE

Short time to market
Enables innovation

ALSO A COMPANY!

Unfortunately!

Serverless.com provide deployment tools

A photograph of a conveyor belt sushi restaurant. In the foreground, a wooden conveyor belt moves various sushi items. There are two large maki rolls on a white plate with a blue floral pattern. Next to them is a red bowl with the Japanese characters '注文品' (Order Item) written on it. Further back, there are more sushi items, including nigiri and maki, on plates and in bowls. A menu board is visible in the background, displaying various sushi options with prices. A person's arm is visible on the right side, reaching for a sushi item. The text 'The future of fast-food is Serverless' is overlaid in white on the image.

The future of fast-food is Serverless

Serverless - Event Driven Architecture



Browser

The diagram illustrates a serverless event-driven architecture. A blue rounded rectangle labeled 'Browser' is positioned on the left. Three grey circles, representing events, are shown moving from the browser into a central queue. The queue is a horizontal container with a light blue background and a dark blue border. The events are represented by grey circles with dark blue outlines. The first circle is partially inside the queue, the second is fully inside, and the third is partially inside. The queue is connected to a series of serverless functions represented by blue rounded rectangles on the right. The first function is labeled 'Function 1' and the second is labeled 'Function 2'. The queue is also connected to a database represented by a blue rounded rectangle on the right labeled 'Database'.

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

- quarterly analyses
 - monthly payroll
 - weekly news
 - daily summaries
-
- Bank checks
(with image recognition)

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 ***β***eta 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 on AWS Lamba

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

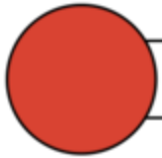
Language support: *Node.js, Swift or BYoC*

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

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

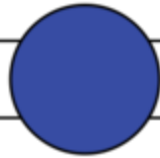
Weaknesses: *lock-in*

**Closed/
Proprietary
Cloud**



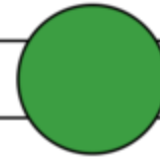
No Access

**Open
Cloud**



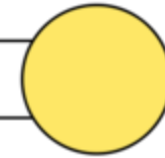
Open APIs
Open Formats

**Open
Source
Cloud**



Open APIs
Open Formats
Open Source

**Free
Cloud**



Open APIs
Open Formats
Open Source
Open Data

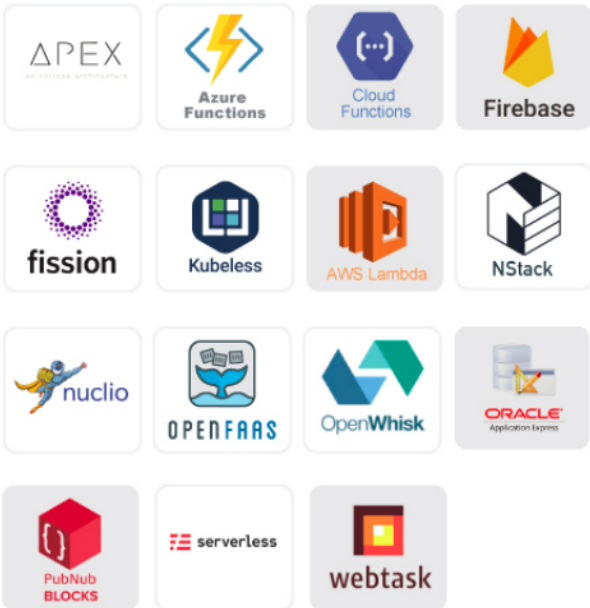
Cloud Computing Openness

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*

* Google Group

 *cncf-wg-serverless*

* Meetings

 *Video playlist*

Minutes

* Whitepaper

 *in Google Drive*

* Slack Channel

 *WP*

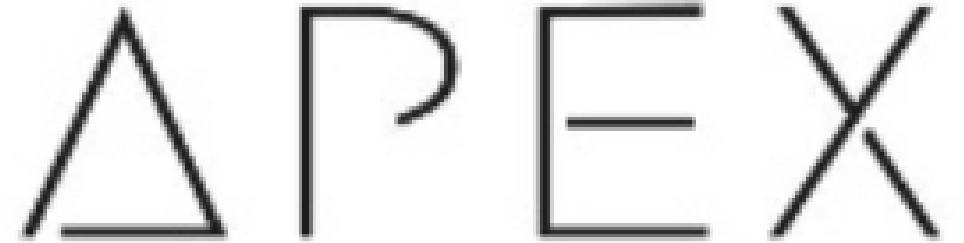


Serverless - Tools

Serverless - Open Source tooling ...

The logo for Serverless, featuring the word "SERVER" in a bold, italicized, white sans-serif font, followed by a yellow lightning bolt, and then the word "LESS" in the same font style, all on a black rectangular background.

SERVERLESS(.COM)

The logo for APEX, featuring the word "APEX" in a tall, thin, black sans-serif font, where the letters are widely spaced and have a modern, geometric feel.

APEX(.COM)



— *Open Source project*

*Deploy to various Cloud
Providers:*

- - AWS Lambda
- - Azure
- - Google
- - OpenWhisk
- - Kubeless
- - SpotInst

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



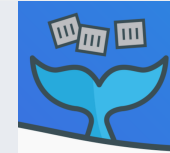
KUBELESS



FISSION



APACHE OPENWHISK



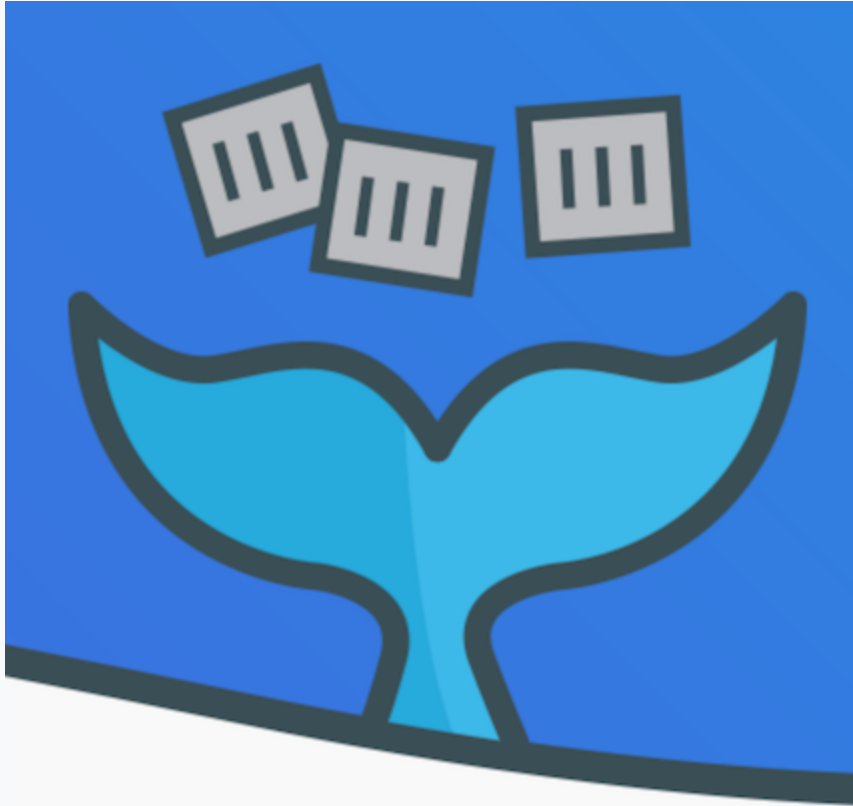
OPENFAAS



FN PROJECT



SPRING CLOUD FUNCTIONS



OpenFaaS

- - OpenFaaS runs on Docker-Swarm or Kubernetes
- - FaaS-Netes runs on Kubernetes
- - faas-cli: command-line tool
- - A young project with a vibrant community of volunteers

— *Alex Ellis, Docker Captain*

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 hills of a similar red hue stretch towards a bright blue sky filled with soft, white clouds. 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

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

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 !

@mjbright

Chalice

Chalice

— *Open sourced by AWS - Python/AWS λ*

pip installable module, command-line tool

λambdaify

Lambdaify

—



Zappa.io

— *Open sourced by Gun.io - Python/AWS λ*

pip installable module, command-line tool

Can run Django ... serverless (?)