What's All the Fuss About Serverless?

April 26th, 2019

Hello!

I'm Taylor Krusen.
I work for Dropbox.

Let's talk about
Serverless

Twitter: @TaylorKrusen

Overview

What I'll cover

- Serverless as a concept
- Reasons for popularity
- Pragmatic usage

Who is this talk for?

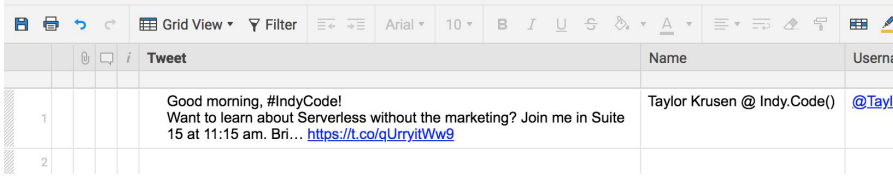
Developers with…

- Curiosity / interest in serverless
- Limited or no exposure to serverless

Goals

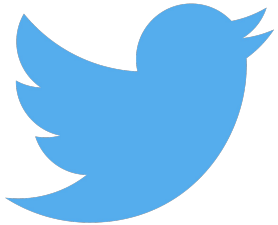
- Understand serverless and the situations where it will benefit you
- Look past marketing jargon
- Navigate the ecosystem of tools
- Get excited about serverless

Tweet to Sheet



Twitter: @TaylorKrusen

Tweet to Sheet Master Plan



- Webhook fires on account activity

- Code runs on AWS Lambda

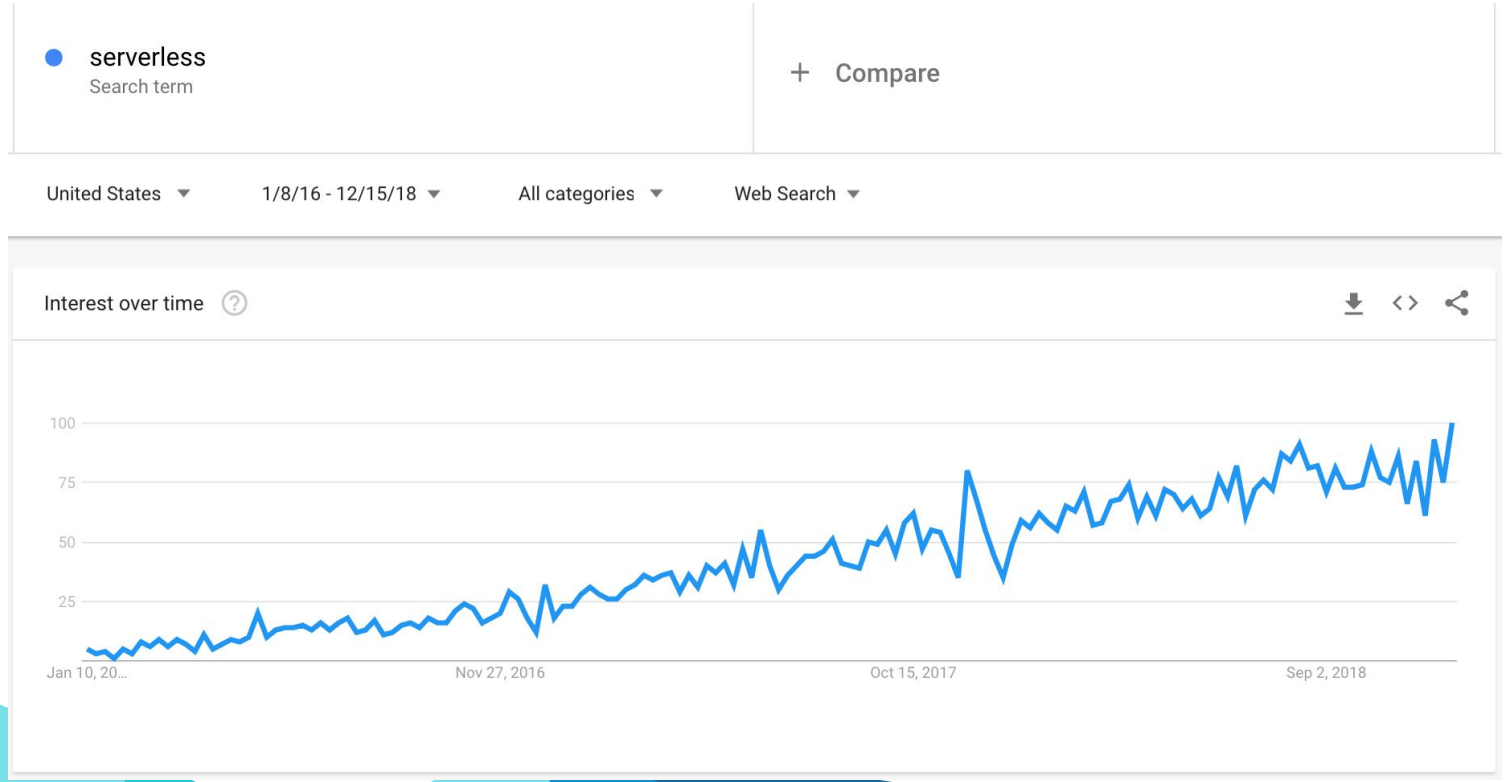
- Specific tweets written to sheet

Participate?!

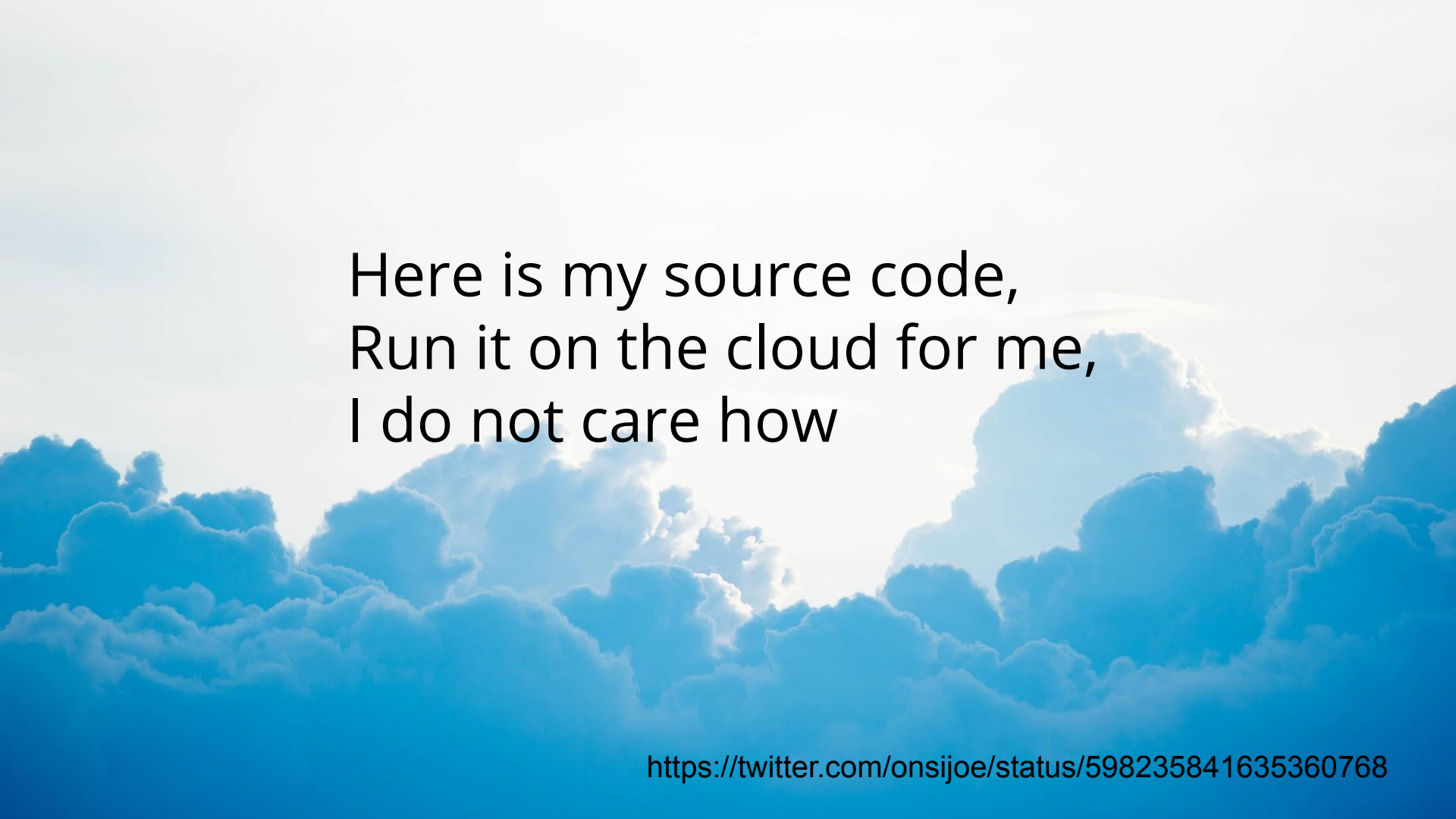
- Tweet @TaylorKrusen and include the hashtag #Jokes
- Your tweet is added to sheet. Review list at end.

Serverless

Popularity

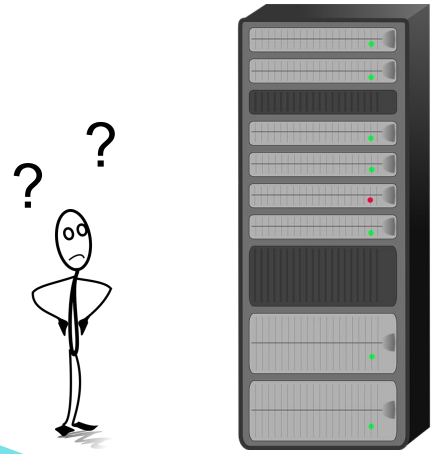

serverless
Search term
Compare
United States
1/8/16 - 12/15/18
All categories
Web Search
Interest over time
100
75
50
25
Jan 10, 20...
Nov 27, 2016
Oct 15, 2017
Sep 2, 2018


DUDE
WHERES MY SERVER



https://twitter.com/onsijoe/status/598235841635360768

Serverless



Abstraction

- Don’t need to own or provision a server.

Event-driven

- Managed FaaS in the cloud.

Pay-per-use

- Only charged for code that runs

Serverless Spectrum

Degree of *serverlessness*

- Reliance on BaaS (third-party services)
- Ephemeral computing
- Degree of ‘control’ over server
- Coupling of resources used and resources billed

‘The Serverless Spectrum’ by Ben Kehoe

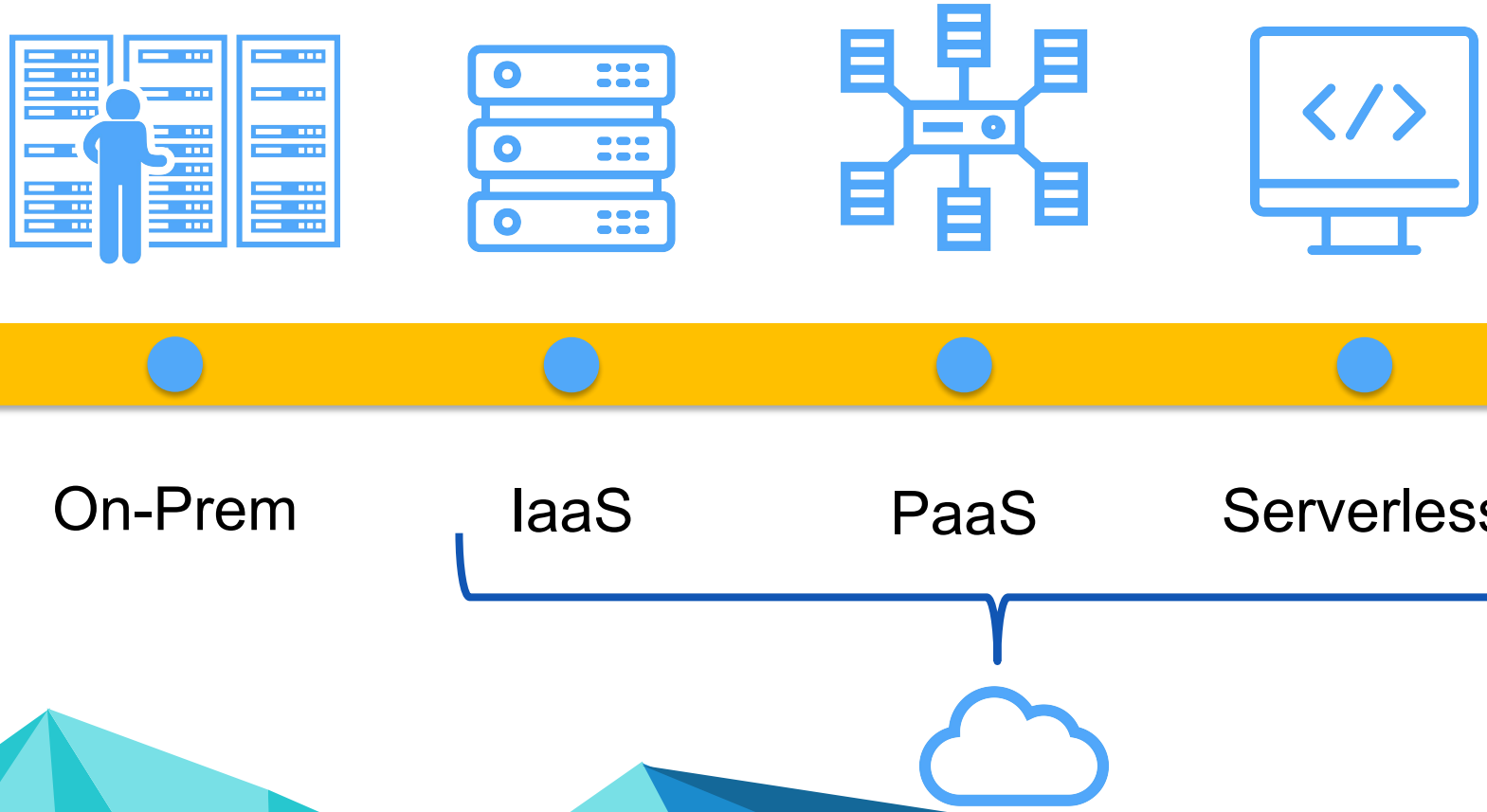
“Abstraction is selective ignorance”

- Andrew Koenig

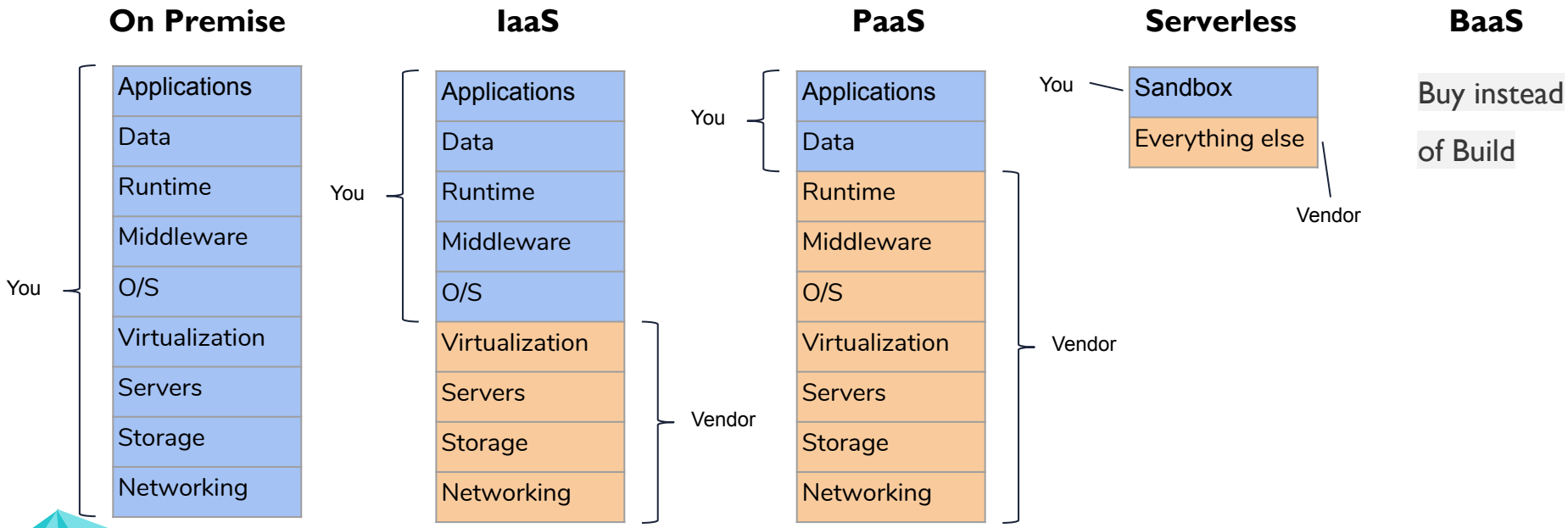
Alphabet Soup

- FaaS = Function as a Service
  - Allows users to develop, run and manage app functionalities without building or maintaining the related infrastructure.
- BaaS = Backend as a Service
  - Middleware that allows developers to connect their app to cloud services.
- PaaS = Platform as a Service
  - Similar to FaaS, but different architecture and scaling.
  - Long running application thread.
  - Bill per time running rather than by execution.
- IaaS = Infrastructure as a Service
  - Hardware is provided and managed by an external vendor.

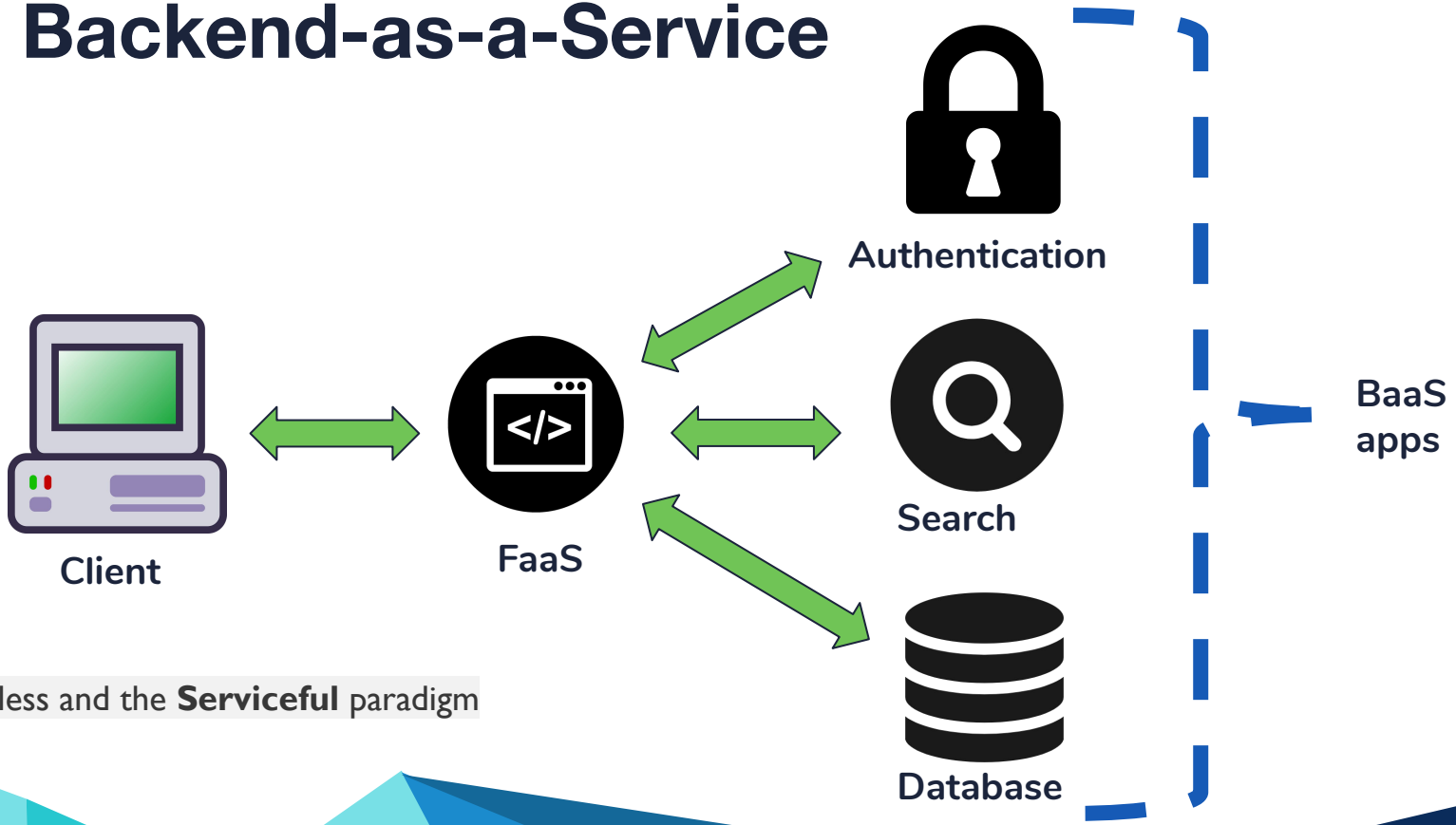
- Ephemeral
  - Something short-lived or temporary.
- Server
  - A computer device or program that provides functionality for other programs / devices.


On-Prem
IaaS
PaaS
Serverless

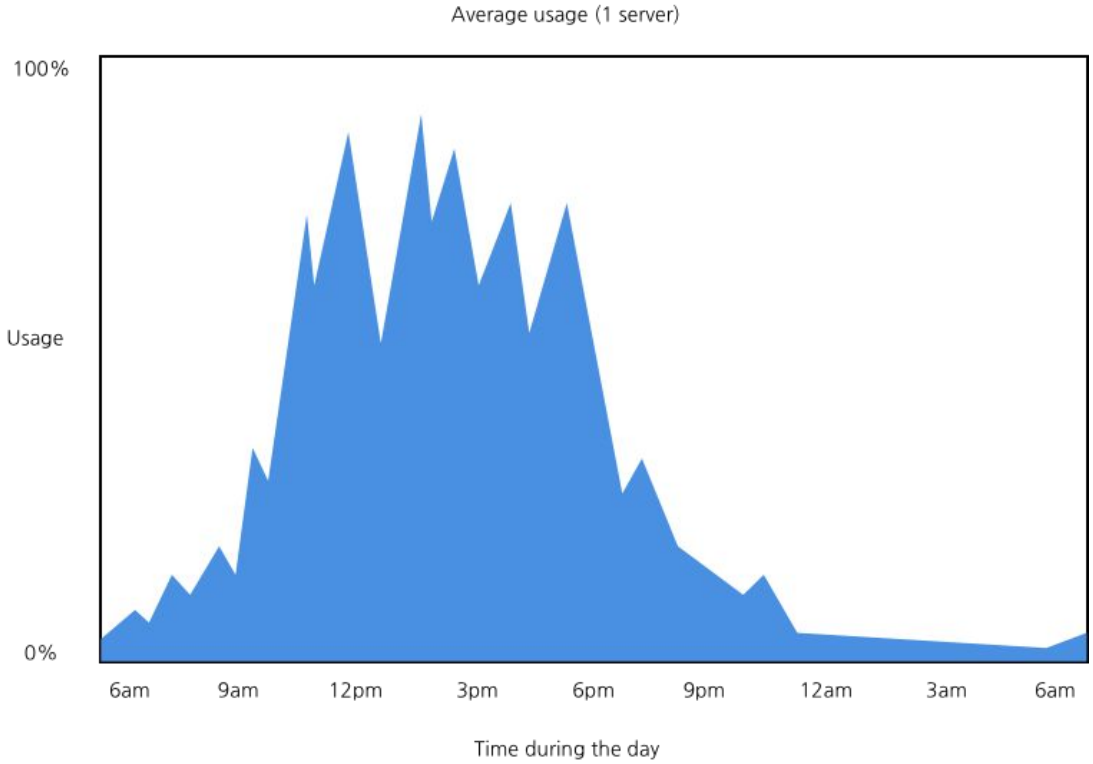
Evolution of Cloud Offerings

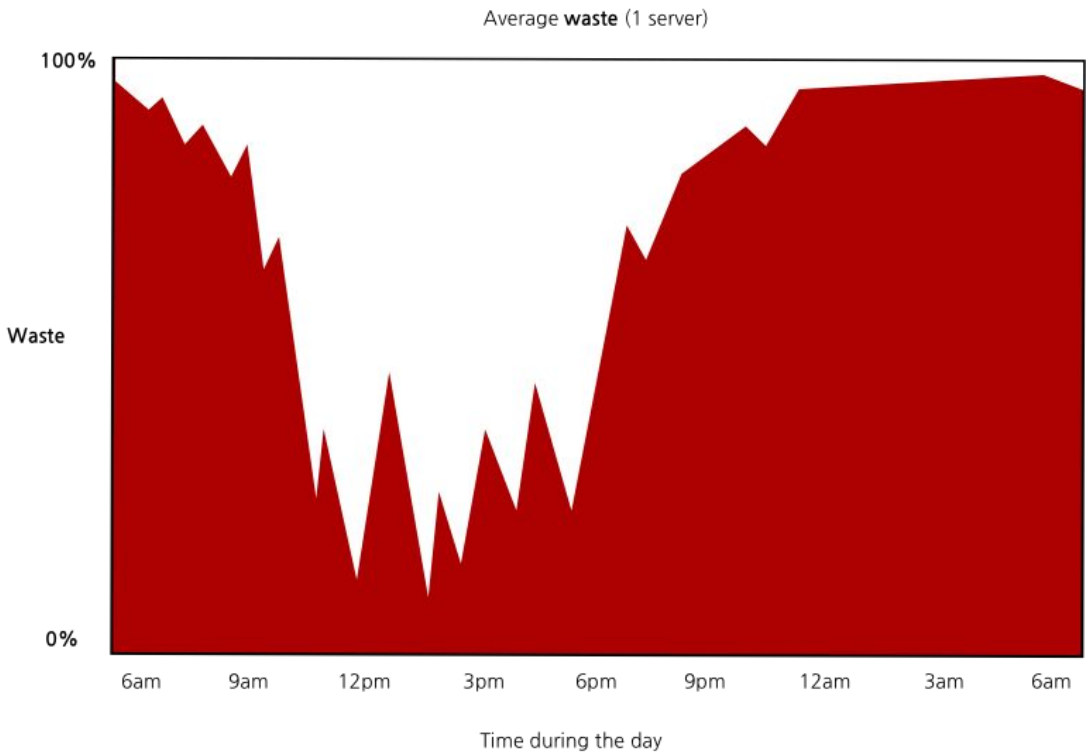


Backend-as-a-Service

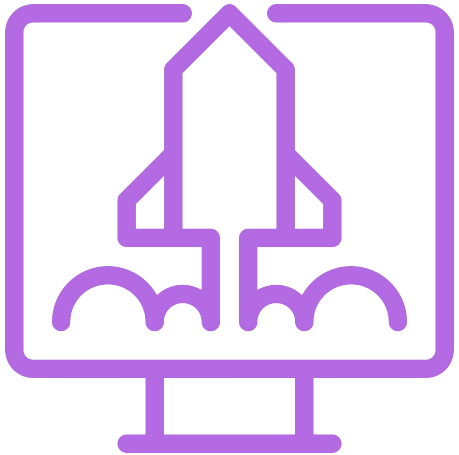


Serverless and the **Serviceful** paradigm

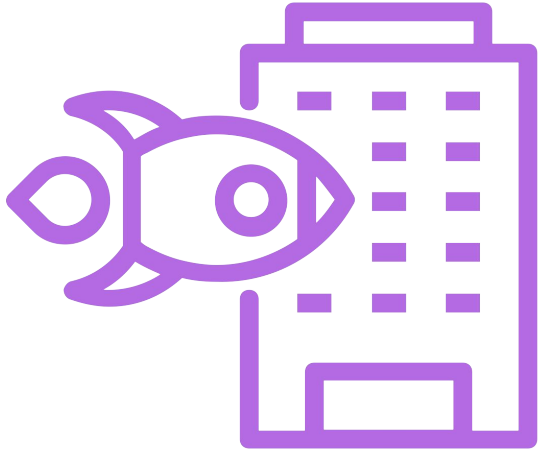

Average usage (1 server)
100%
Usage
0%
6am
9am
12pm
3pm
6pm
9pm
12am
3am
6am
Time during the day


Average **waste** (1 server)
100%
Waste
0%
6am
9am
12pm
3pm
6pm
9pm
12am
3am
6am
Time during the day

Winners

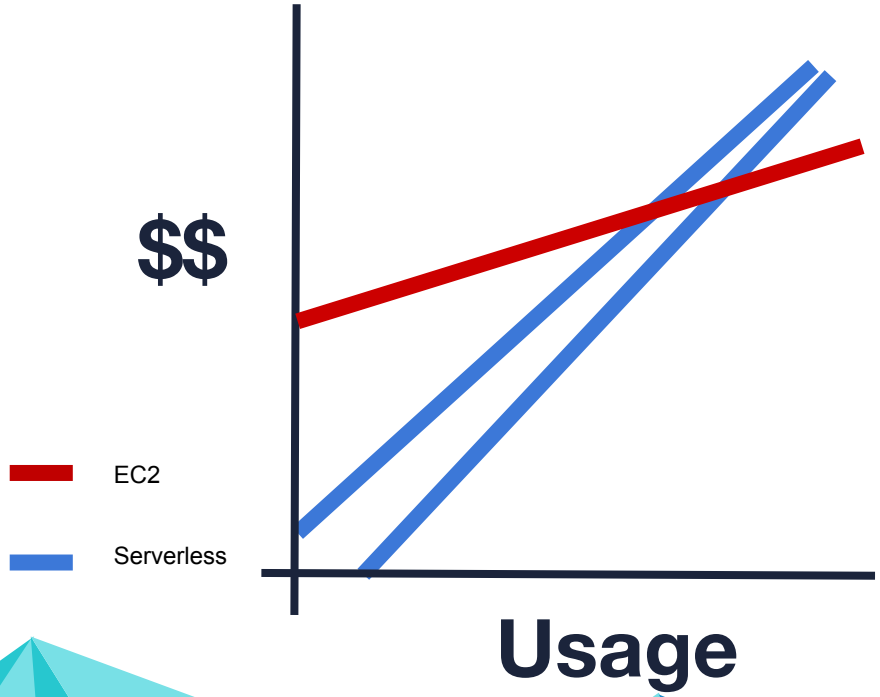


Startup and small business



Enterprise

Why



- Developers can focus on business value
- Auto-scaling web apps and APIs
- Disruptive pricing model

https://www.bbva.com/en/economics-of-serverless/

Benefits and Compromises

Speed / Velocity / Agility

- Faster time to market
- Less to build

Simplicity

- Very easy for users of the FaaS

Stateless

Lack of tooling

Less control

- No knobs to tweak

Architectural complexity

- ‘mini monoliths’
- Someone needs to wrap their head around everything

Benefits and Compromises

Lower operational burden

- Outsourced infrastructure
- Fewer people
- ‘Better’ security and reliability

Implementation drawbacks

- Integration testing
- Versioning / packaging
- May need seperate FaaS for everything

Reliance on 3rd party tools

- Effectiveness
- Reliability
- Vendor lock-in
- Risk

Benefits and Compromises

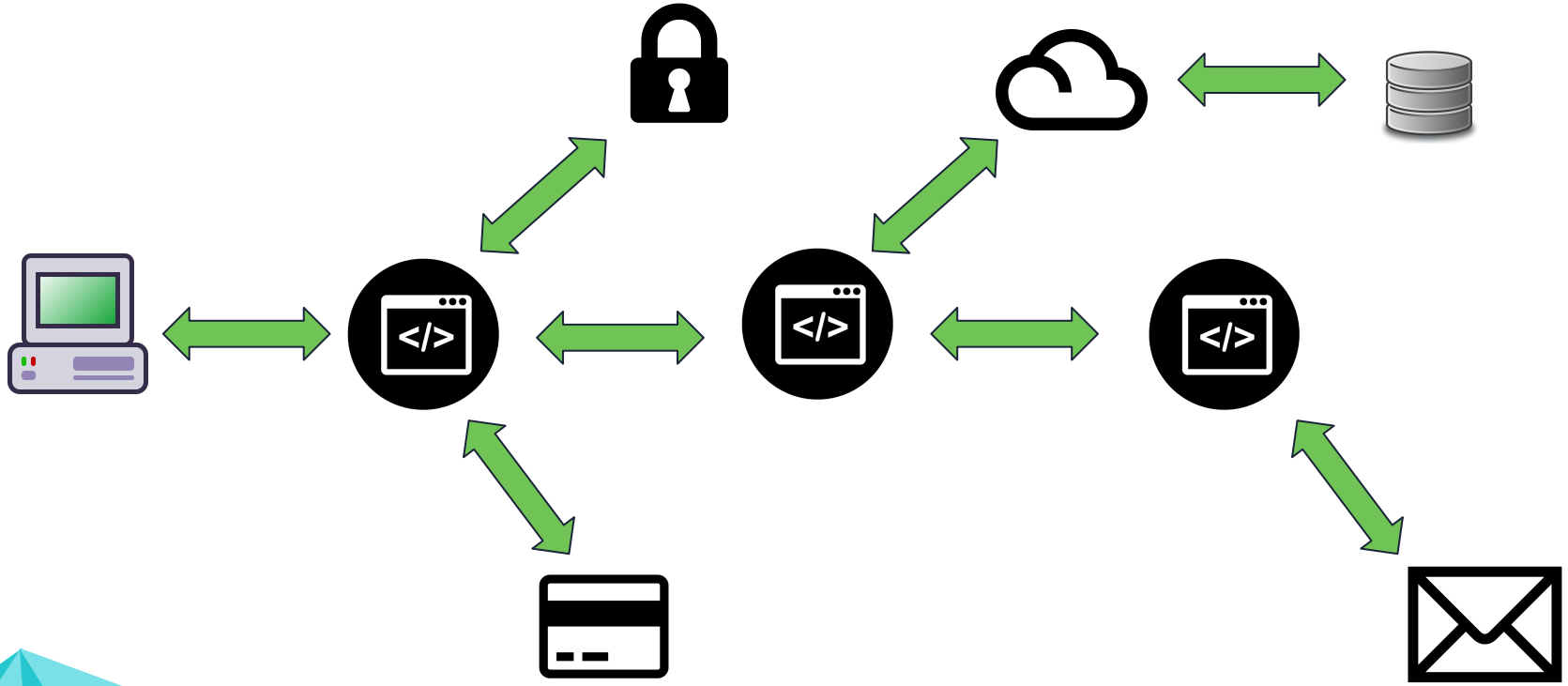
“

Serverless is a way to focus on business value.

~ Ben Kehoe -- Serverless is a State of Mind

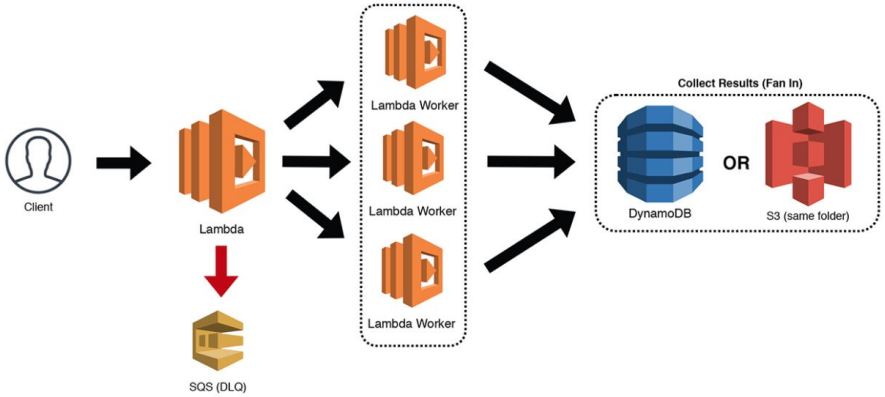
Shifting Paradigms

Serverless Architecture



Building Differently

'Serverless Microservice Patterns for AWS' by Jeremy Daly



Fan-out/Fan-in Pattern

https://www.jeremydaly.com/serverless-microservice-patterns-for-aws/

Use Cases

Scripts triggered by events

- Your custom code reacts to ‘events’.
- Cron job: trigger functions on a schedule.

- External: web hook
- Internal: closed ecosystem like Lambda and an s3 event

Web applications

- UI driven application calling HTTP endpoints that trigger your code

Schneider Electric

Serverless Economy

Serverless Web Apps

A web app is more than FaaS…

Typically consists of:

- Lambda
- API Gateway (HTTP endpoints)
- S3 to serve static content
- DynamoDB
- Many others…

Hidden Costs

TimerCheck.io

- Over 2m requests
- 300k+ seconds of compute

Details	Total
AWS Service Charges	$11.12
▸ API Gateway	$7.47
▸ CloudTrail	$0.00
▸ CloudWatch	$1.51
▸ Data Transfer	$0.04
▸ DynamoDB	$0.00
▸ Elastic Compute Cloud	$0.73
▸ Lambda	$0.22
▸ Route 53	$1.09
▸ Simple Notification Service	$0.00
▸ Simple Storage Service	$0.07

Major Players

- Serverless offering: **Azure Functions**
- Launched in March, 2016

- Serverless offering: **Cloud Functions**
- Launched in March, 2017
- General Availability on July 24, 2018

- Serverless offering: **Cloud Functions**
- Launched in Dec, 2017
- Available as ‘OpenWhisk’ in Dec, 2016

- Serverless offering: **Lambda**
- Launched in Nov, 2014
- Most mature ecosystem

Cloud Fight

The Future?

Lambda

- Runs on Linux environment
- Functions built as standalone elements
- Provisions memory *per function*
- Better scaling for HTTP endpoints

Azure Functions

- Runs on Windows environment
- Multiple functions grouped together as an application
- Provisions memory *per application*
- Platform is *very* user friendly
- Robust developer resources

Serverless Providers

	AWS ($)	Microsoft ($)	Google ($)	IBM ($)
L	0.00	0.00	0.00	0.00
M	18.55	4.40	9.76	3.83
H	799.76	603.40	709.95	630.70
!!	22,667.13	20,093.40	23,321.20	21,243.20

L = 1,000ms & 128mb & 1m exececutions

M = 1,000ms & 128mb & 5m exececutions

H = 3,000ms & 256mb & 50m exececutions

!! = 5,000ms & 512mb & 500m exececutions

Estimates via serverlesscalc.com from @acloudguru

Supported Languages

Language	Amazon	Microsoft	Google	IBM
Node.js	Y	Y	Y	Y
Python	Y	Partial	Partial	Y
Java	Y	N	N	Y
C#	Y	Y	N	Y
Go	Y	N	N	Y
F#	N	Y	N	Y
Swift	N	N	N	Y
PHP	N	Partial	N	Y

Serverless Providers

Other points of consideration?

- Your specific needs
- Ecosystem
- Community

Auth0's Webtask

Oracle's Fn Project

Apache's OpenWhisk

APACHE
OpenWhisk™

- Any language!!

- Open source serverless platform

- Can run locally out of a container

- Choose your cloud (or host it yourself)

- Reusable and extensible

- Good introduction to distributed systems

Deploy your serverless code to:

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

State of Serverless

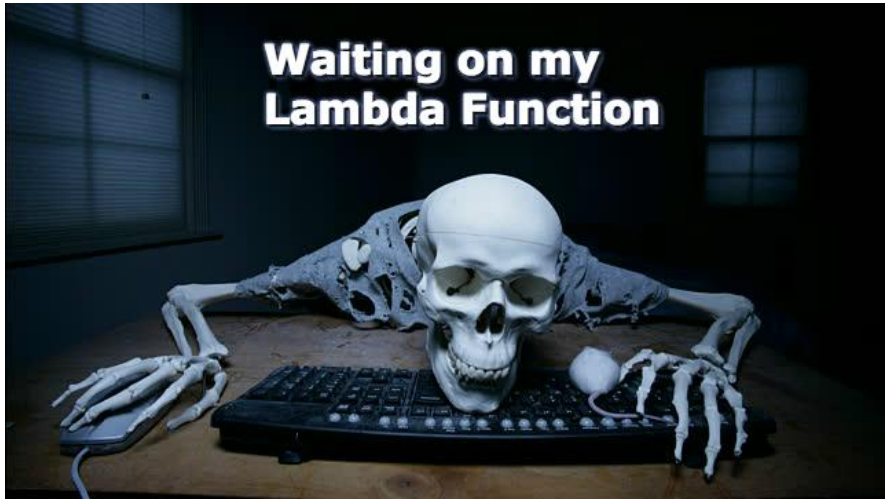
Steadily Moving Forward

(Can we please stop talking about AWS now?)

Lambda

- Lambda Runtime API
- Lambda Layers
- Websocket support in API Gateway & Lambda
- AWS IDE integration
- AWS Firecracker goes open-source
- Aurora
- DynamoDB on demand
- Timestream timeseries database

Cold Starts



https://mikhail.io/2018/08/serverless-cold-start-war/


chrismunns
@chrismunns
Follow
OK #serverless #awslambda friends. Want to know how to *properly* do pre-warming of Lambda functions? @jeremy_daly has codified our best practices for it right here: github.com/jeremydaly/lam…. NOTE: you *may* not need this at all! don't prewarm just cause!
jeremydaly/lambda-warmer
A module to optimize AWS Lambda function cold starts - jeremydaly/lambda-warmer
github.com
7:25 AM - 13 Jul 2018
43 Retweets 109 Likes
4
43
109

- Task: calculate all prime numbers less than 1,000,000.

Memory Allocation	Execution Time	Cost
128 MB	11.72296 sec	$0.024628
256 MB	6.67894 sec	$0.028035
512 MB	3.194954 sec	$0.026830
1024 MB	1.46598 sec	$0.024638

https://www.slideshare.net/ChrisMunns/aws-startup-day-boston-2018-the-best-practices-and-hard-lessons-learned-of-serverless-applications


THE
WALLED
GARDEN

cloudevents

What

- Open specification about event metadata

Who

- Support from IBM, Google, Red Hat, many more
- First class support from Microsoft Azure

Why

- Interoperable cloud architectures
- Distributed data across vendors and clouds

The Serverless and Event-Driven Future
https://www.youtube.com/watch?v=TZPPjAv12KU

Questions?

… and #JokeCollector Review!

Twitter: @TaylorKrusen