

SERVERLESS APPLICATIONS & INFRASTRUCTURE

CHICAGO JUG MEETUP - DECEMBER 6, 2018

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PROJECT

YOUR PRESENTER: DAVE NUGENT FORWARDJS CONFERENCE CO-ORGANIZER

DATE

JANUARY, 2019

CLIENT

FORWARDJS.COM



PROJECT

YOUR PRESENTER: DAVE NUGENT SAN FRANCISCO JAVASCRIPT MEETUP ORGANIZER

DATE

DECEMBER, 2018

CLIENT

SF JAVASCRIPT MEETUP



PROJECT

YOUR PRESENTER: DAVE NUGENT

HACKATHON MENTOR

DATE

NOVEMBER 2018

CLIENT

CALHACKS, BERKELEY

MY GOAL TONIGHT

What is Serverless?

What is Serverless?

Serverless is a buzzword used to visit awesome, fun Chicago meetup groups on a company expense report

What is Serverless?

What is Serverless?

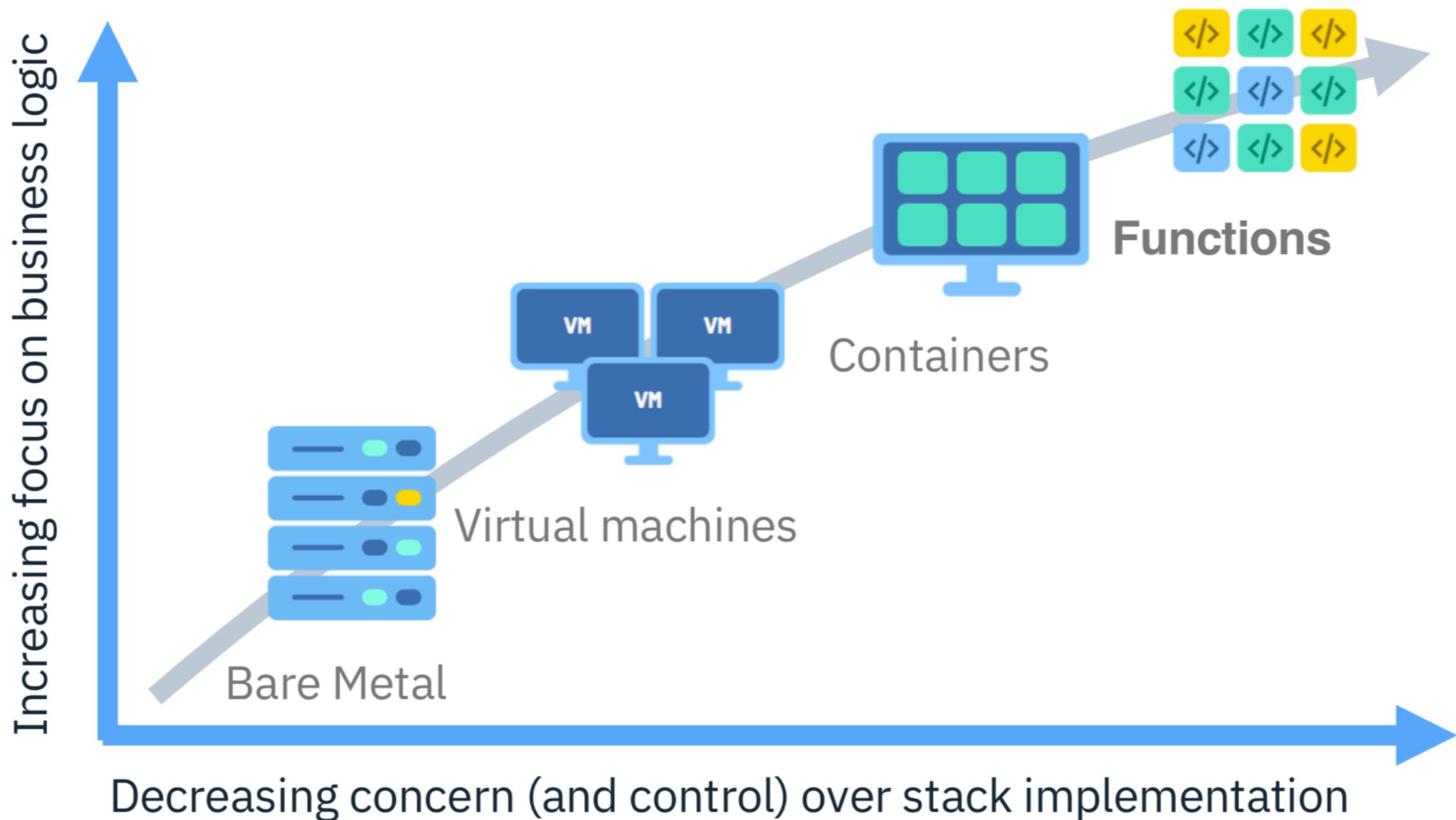
Serverless computing refers to the concept of building and running applications that **do not require server management**.

It describes a finer-grained deployment model where applications, **bundled as one or more functions**, are uploaded to a platform and then **executed, scaled, and billed** in response to the **exact demand needed** at the moment.

It refers to the idea that consumers of serverless computing no longer need to spend time and resources on **server provisioning, maintenance, updates, scaling, and capacity planning**. Instead, all of these tasks and capabilities are handled by a serverless platform and are completely abstracted away from the developers

<https://github.com/cncf/wg-serverless/tree/master/whitepapers/serverless-overview>

What is Serverless?

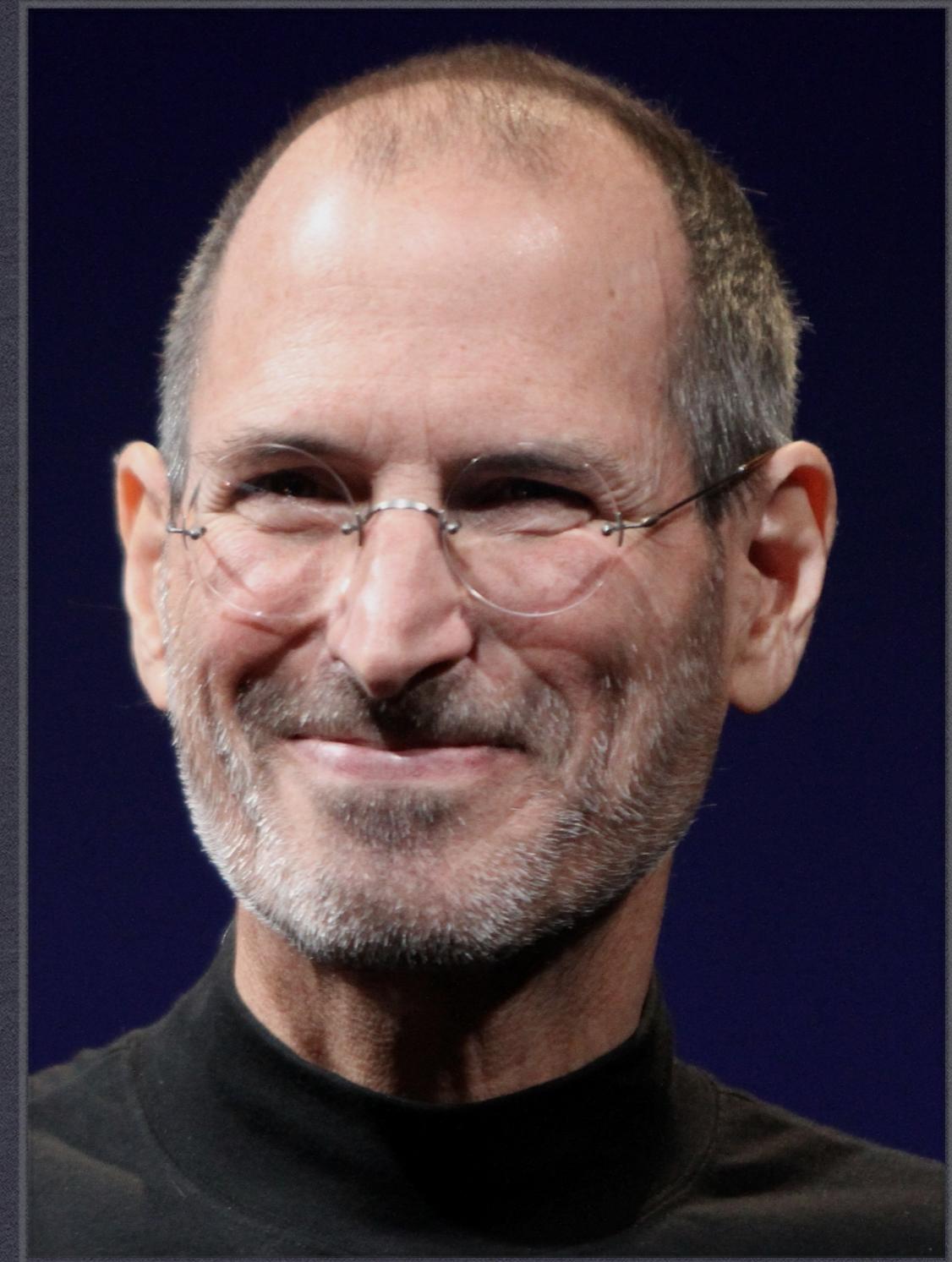


#5273 + (30077) - [X]

<erno> hm. I've lost a
machine.. literally _lost_.
it responds to ping, it works
completely, I just can't
figure out where in my
apartment it is.

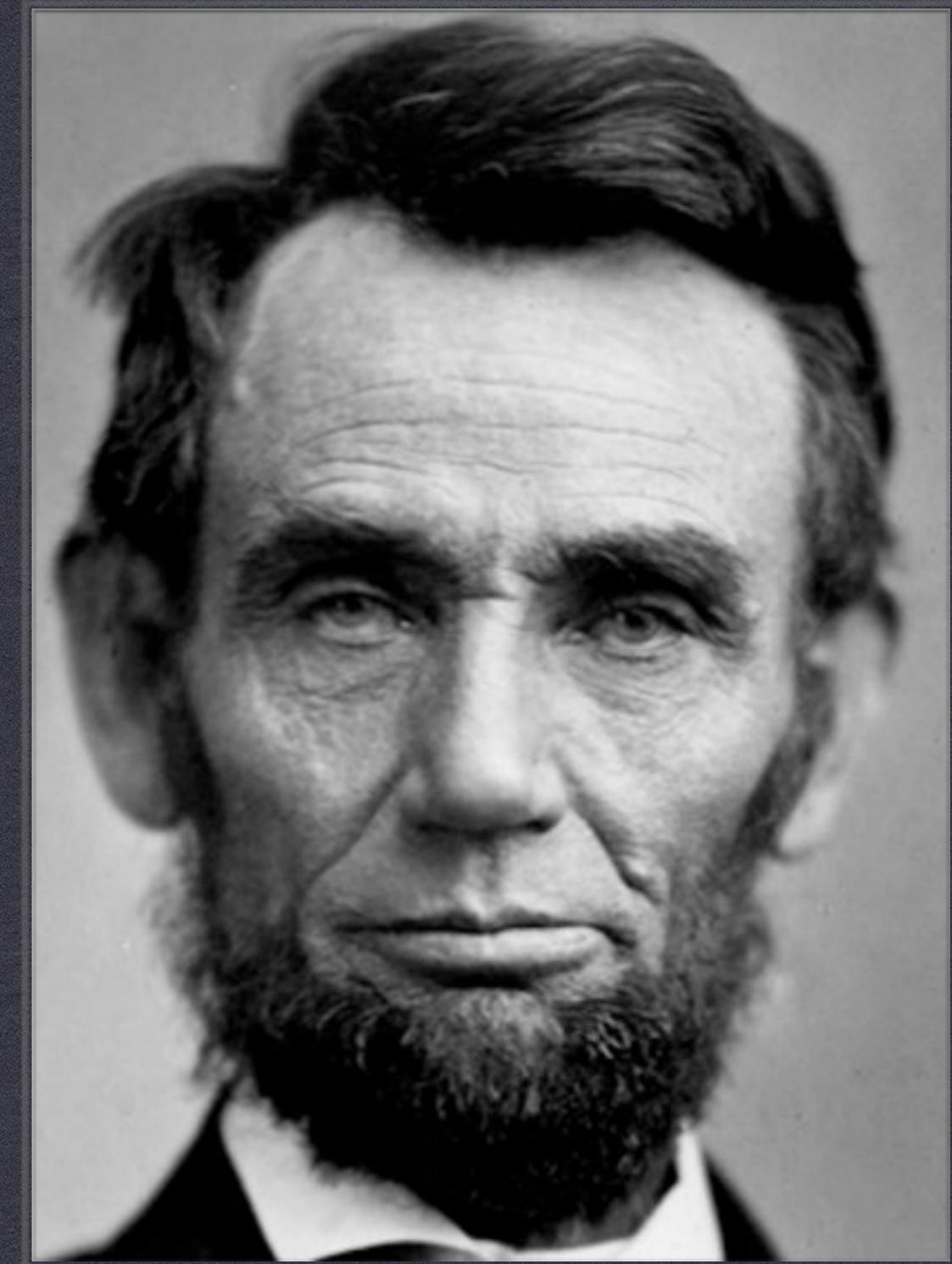
**“IF YOU CALL IT
SOFTWARE
ARCHITECTURE INSTEAD
OF SOFTWARE
PLANNING, YOUR SALARY
GOES UP BY 50%.”**

-STEVE JOBS*



**“DON’T BELIEVE
EVERYTHING YOU SEE
ON THE INTERNET
JUST BECAUSE
THERE’S A QUOTE
WITH A PICTURE
NEXT TO IT.”**

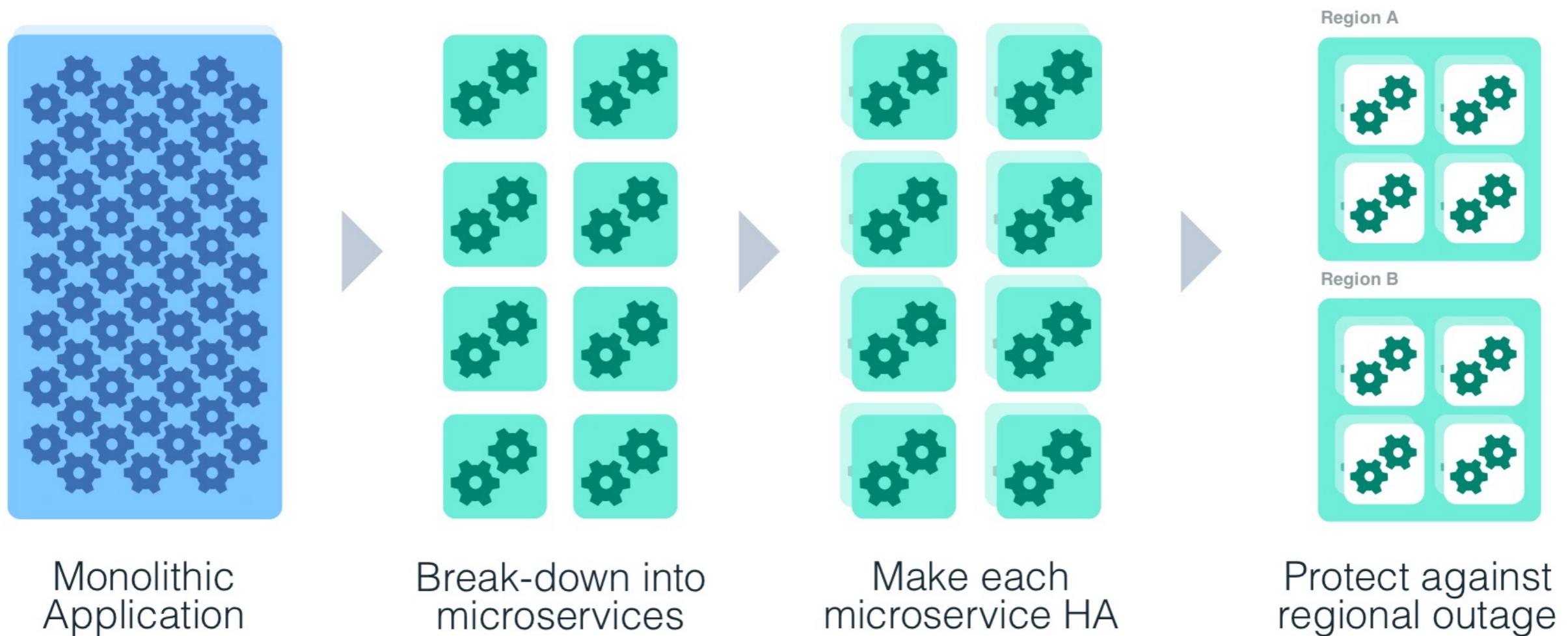
-ABRAHAM LINCOLN



What is Serverless?

Run Code without
Provisioning or
Managing Servers

What is Serverless?



What is Serverless?

Runs code **only** on-demand on a per-request basis

Serverless deployment & operations model



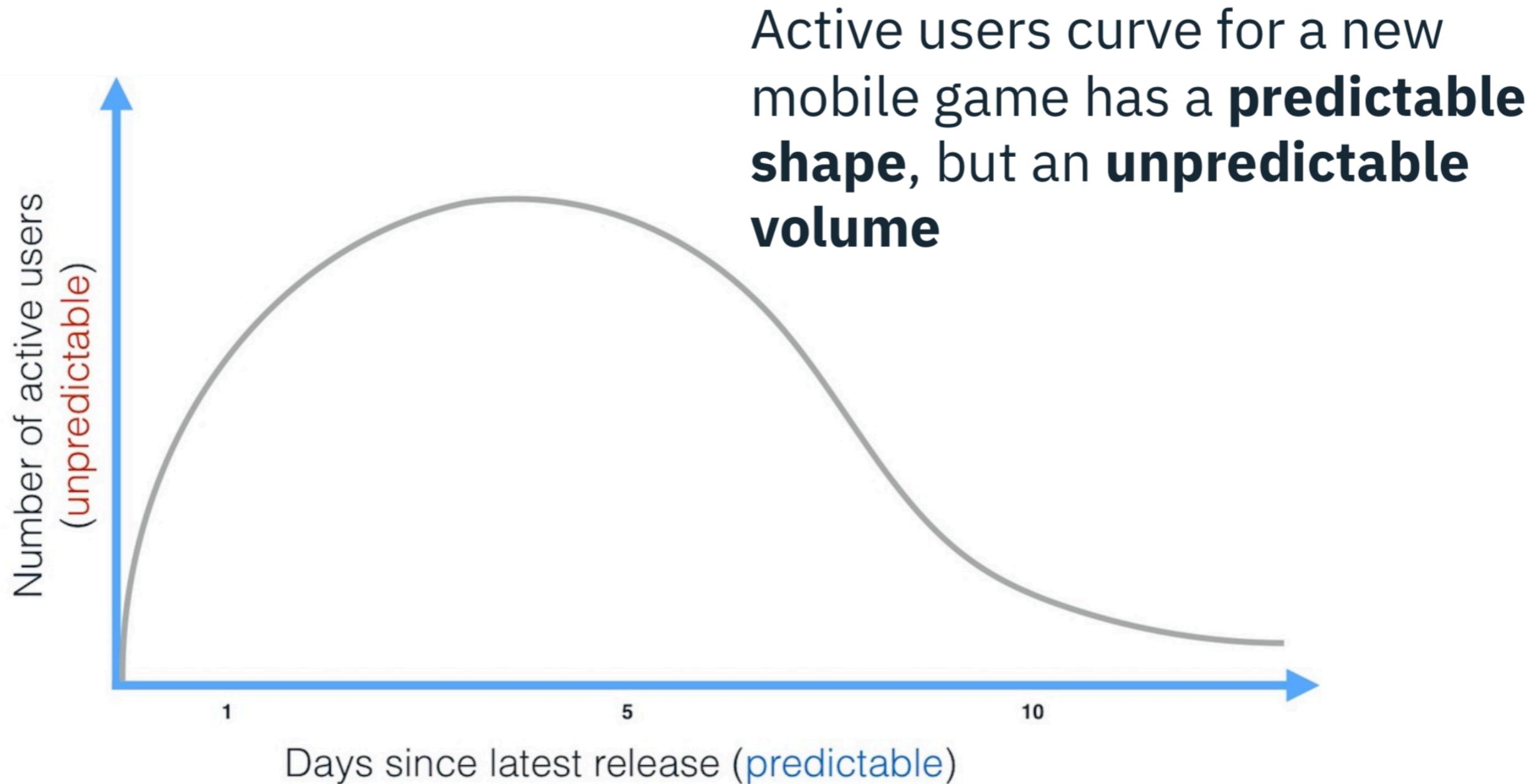
Not your problem



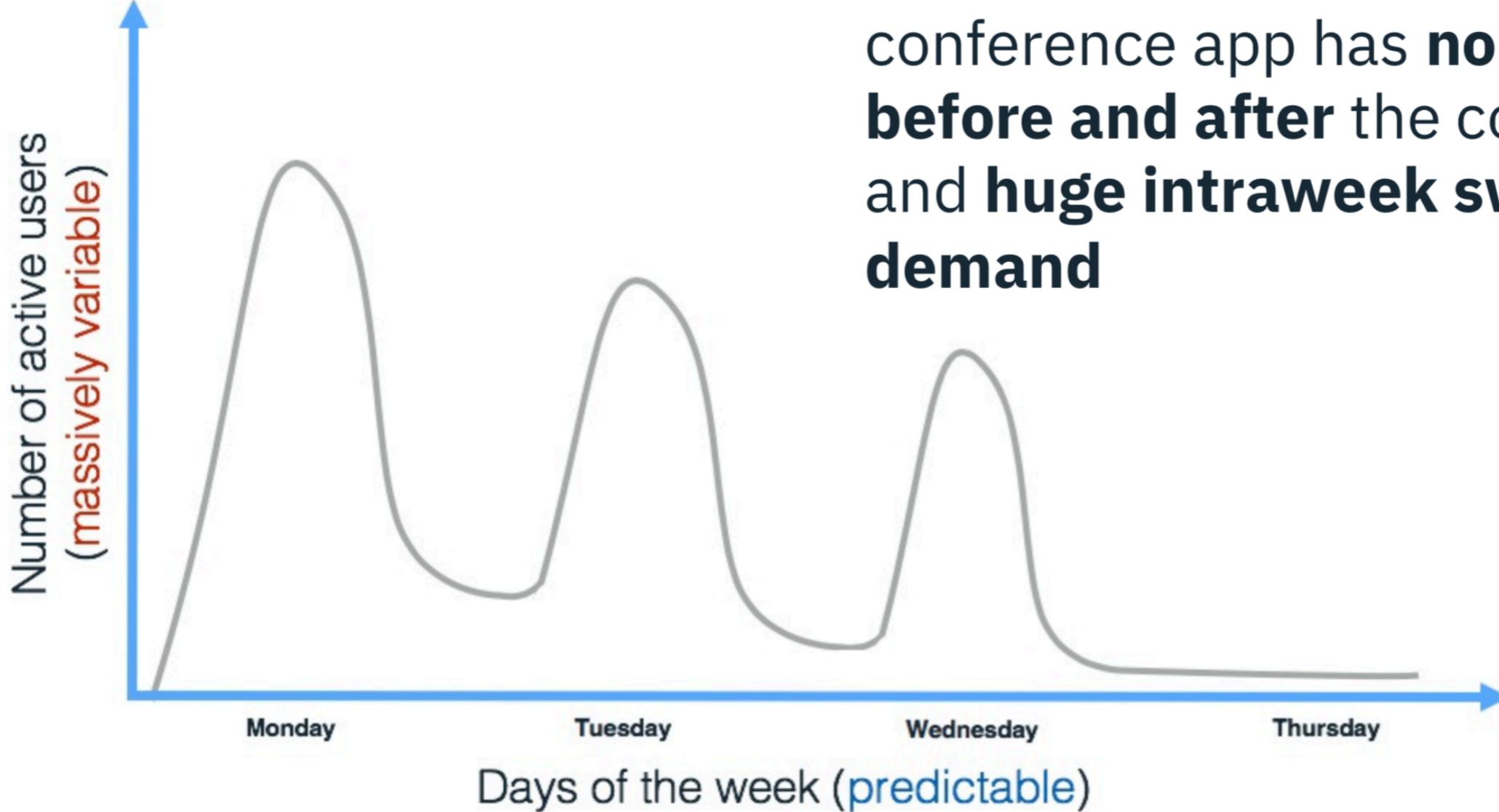
Focus on CODE

Why Serverless?

Why Serverless?

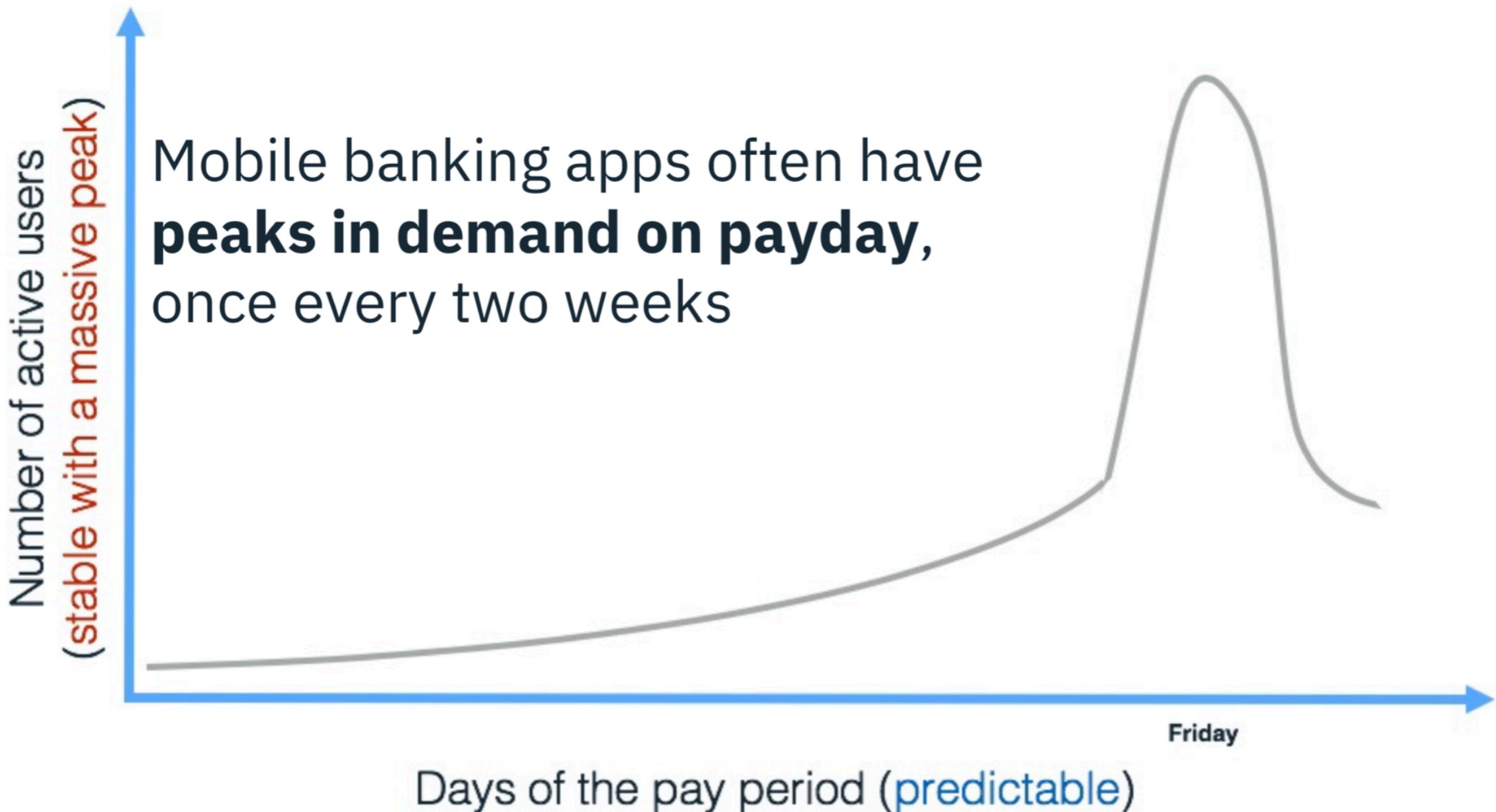


Why Serverless?



Active users curve for a mobile conference app has **no demand before and after** the conference, and **huge intraweek swings in demand**

Why Serverless?



Serverless Use Cases

Serverless Backends



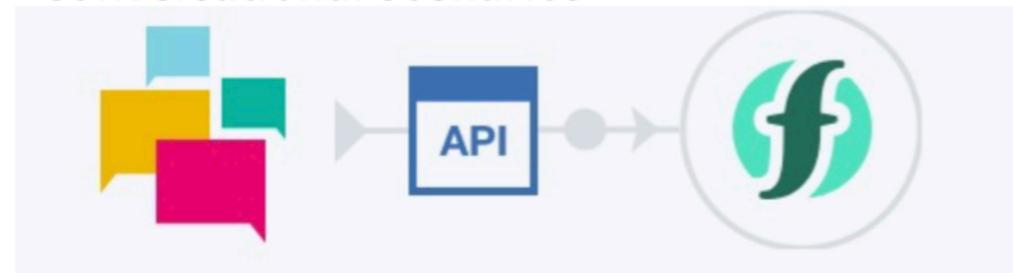
Mobile Backend



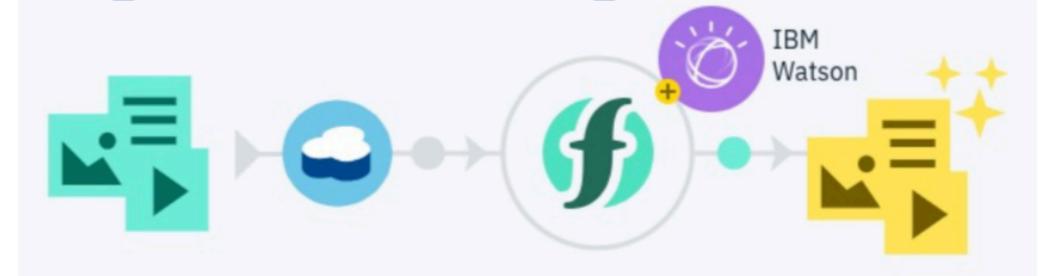
Data Processing



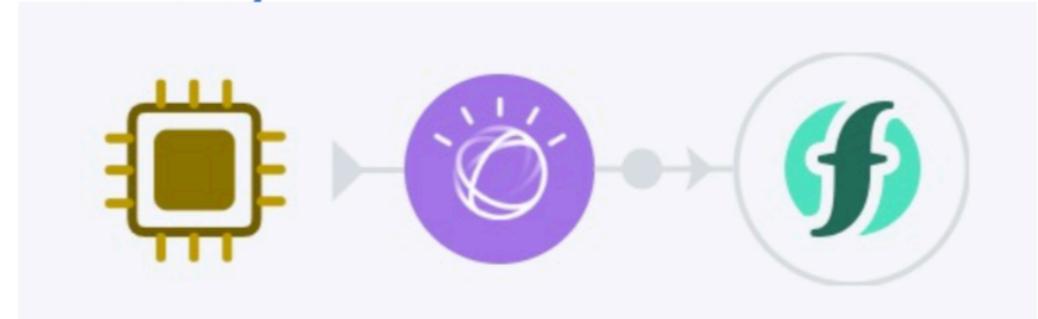
Conversational Scenarios



Cognitive Data Processing



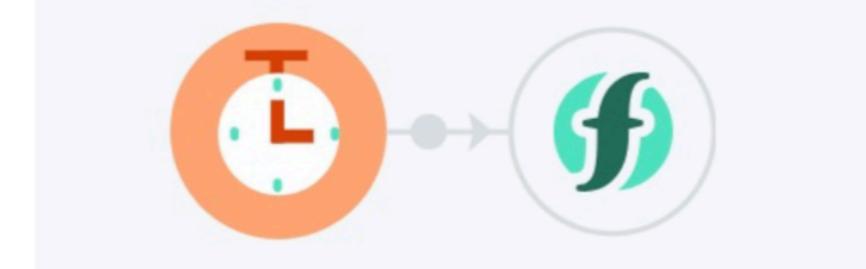
IoT Ready



Event Stream Processing



Scheduled Tasks



Serverless Use Cases

- * Asynchronous, concurrent, easy to parallelize into independent units of work
- * Infrequent or has sporadic demand, with large, unpredictable variance in scaling requirements
- * Stateless, ephemeral, without a major need for instantaneous cold start time
- * Highly dynamic in terms of changing business requirements that drive a need for accelerated developer velocity

Serverless Use Cases

- * Static web sites (Contact forms)
- * Automated backups
- * Bots
- * Tasks like uptime checks, policy enforcement
- * Background jobs
- * Prototypes

Serverless Use Cases

Amazon Lambda

Node.js, Python, Java, C# and Go

IBM Cloud Functions

Node.js 8, Node.js 6, Python 3.6.4, Python 3.6.1, PHP 7.1, PHP 7.2, and Swift 4, Swift 3.1.1, Ruby 2.5, Other languages can be added via Docker container (for example Java)

Based on open source OpenWhisk serverless platform. Can create your own serverless platform based on OpenWhisk

Microsoft Azure

C#, F#, Node.js (in GA) Java, Python, PHP, TypeScript, Bash, PowerShell (experimental mode)

Google Cloud Functions

Node.js, Python

Execution Time Limit

Amazon Lambda

15 seconds

IBM Cloud Functions

10 minutes

Microsoft Azure

10 minutes

Google Cloud Functions

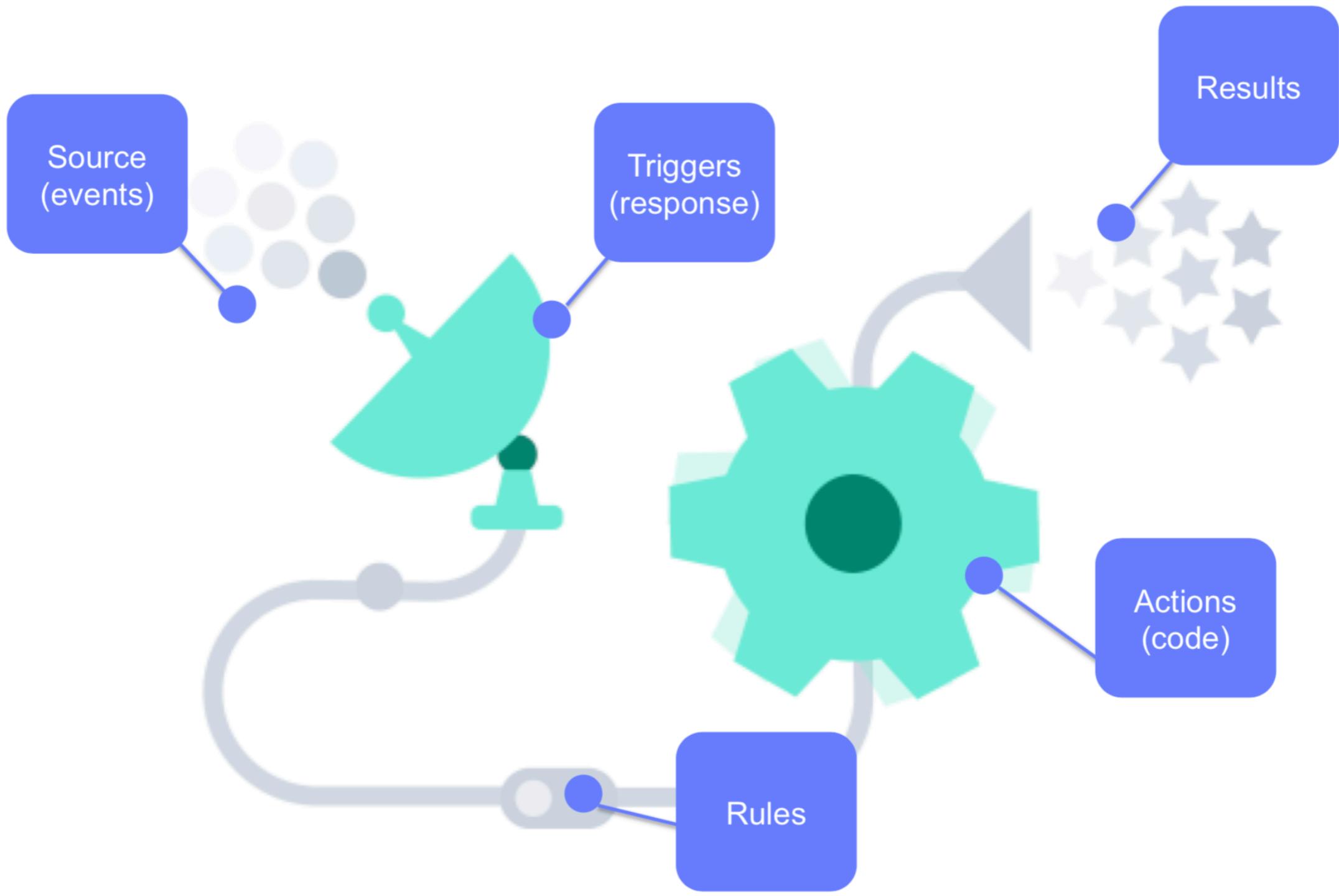
9 minutes

Serverless Latency

- * Cold Start (when functions start after a long time, it may take longer)
- * Workaround: keep your function warm with schedule invocations
- * Type of application you're building is important.
 - * Cold start may be OK for a backend app
 - * Not if you're sending a rocket into space

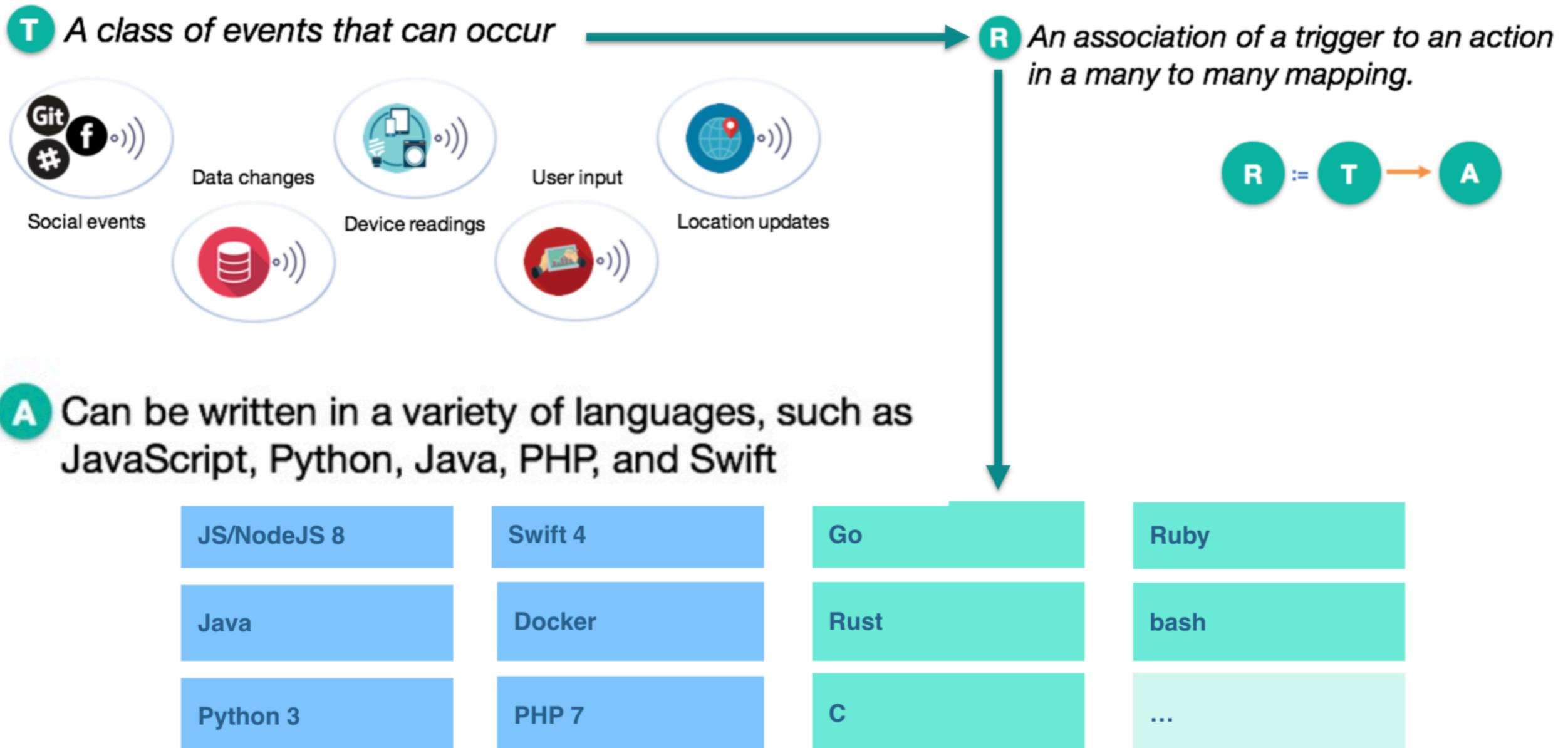
IBM Cloud Functions

(Apache OpenWhisk)



IBM Cloud Functions

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IBM Cloud Functions

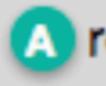
(Apache OpenWhisk)

P

A shared collection of triggers and actions



IBM Cloudant*



A read



A write



T changes



A translate



A forecast

Open
Source



A post
T topic

Third
Party

Git

T commit

Yours



A myAction
T myFeed

IBM Cloud Functions

(Apache OpenWhisk)

	Open source	Hosted service
Serverless engine	Apache OpenWhisk	IBM Cloud Functions
API Gateway	LoopBack	IBM API Gateway
Databases	Apache CouchDB MySQL	IBM Cloudant IBM Compose
Message streams	Apache Kafka	IBM Message Hub

IBM Cloud Functions

(Apache OpenWhisk)

- * Functions are stateless. Need some sort of persistence between runs.
- * Are you able to test and develop locally? `ibmcloud fn` CLI
- * Can you easily version your functions? Source control?
- * Can you easily monitor your functions?
- * Security and API gateway
- * Avoid long-running loops / mini-monoliths?
- * Latency (cold, warm and hot loads)
- * How do you track dependencies?

LET'S CREATE A FUNCTION

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Don't Use Serverless!

When should you not use Serverless?

- * Extensive customization/flexibility
- * Very long-running task that can't be broken down
- * Complex computation, high memory requirements
- * Extremely fast response time
- * Service availability > cloud functions service availability

Resources

Lists

- <https://github.com/anaibol/awesome-serverless>
- <https://github.com/pmuens/awesome-serverless>
- <https://twitter.com/tmclaughbos/lists/serverless>

Email newsletter

- <https://serverless.email/>

Code Patterns

- <https://developer.ibm.com/patterns/category/serverless/>

Serverless architecture

- <https://martinfowler.com/articles/serverless.html>

Code Patterns

CODE PATTERN | NOV 28, 2018

Implementing mobile user authentication

[Get the Code »](#)

IBM Cloudant Local (NoSQL)
Mobile Development +

CODE PATTERN | NOV 28, 2018

Analyze large data sets collected from a long-range IoT system that uses LoRaWAN networking

[Get the Code »](#)

Data Science IoT +

CODE PATTERN | NOV 27, 2018

Technical support ticket classification using Watson Natural Language Classification

[Get the Code »](#)

Artificial Intelligence Data Science +

CODE PATTERN | NOV 26, 2018

Stream and store retail order data for analysis

[Get the Code »](#)

Akka Analytics +

CODE PATTERN | NOV 19, 2018

Build a handwritten digit recognizer in Watson Studio and PyTorch

[Get the Code »](#)

Analytics Artificial Intelligence +

CODE PATTERN | NOV 16, 2018

Build an AR avatar for the iPhone

[Get the Code »](#)

Artificial Intelligence Conversation +

CODE PATTERN | NOV 16, 2018

Implement digest authentication in unsupported tools

[Get the Code »](#)

API Management Docker +

CODE PATTERN | NOV 14, 2018

Develop a voting application using Hyperledger and Ethereum

[Get the Code »](#)

Blockchain Hyperledger Fabric

THANK YOU!

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