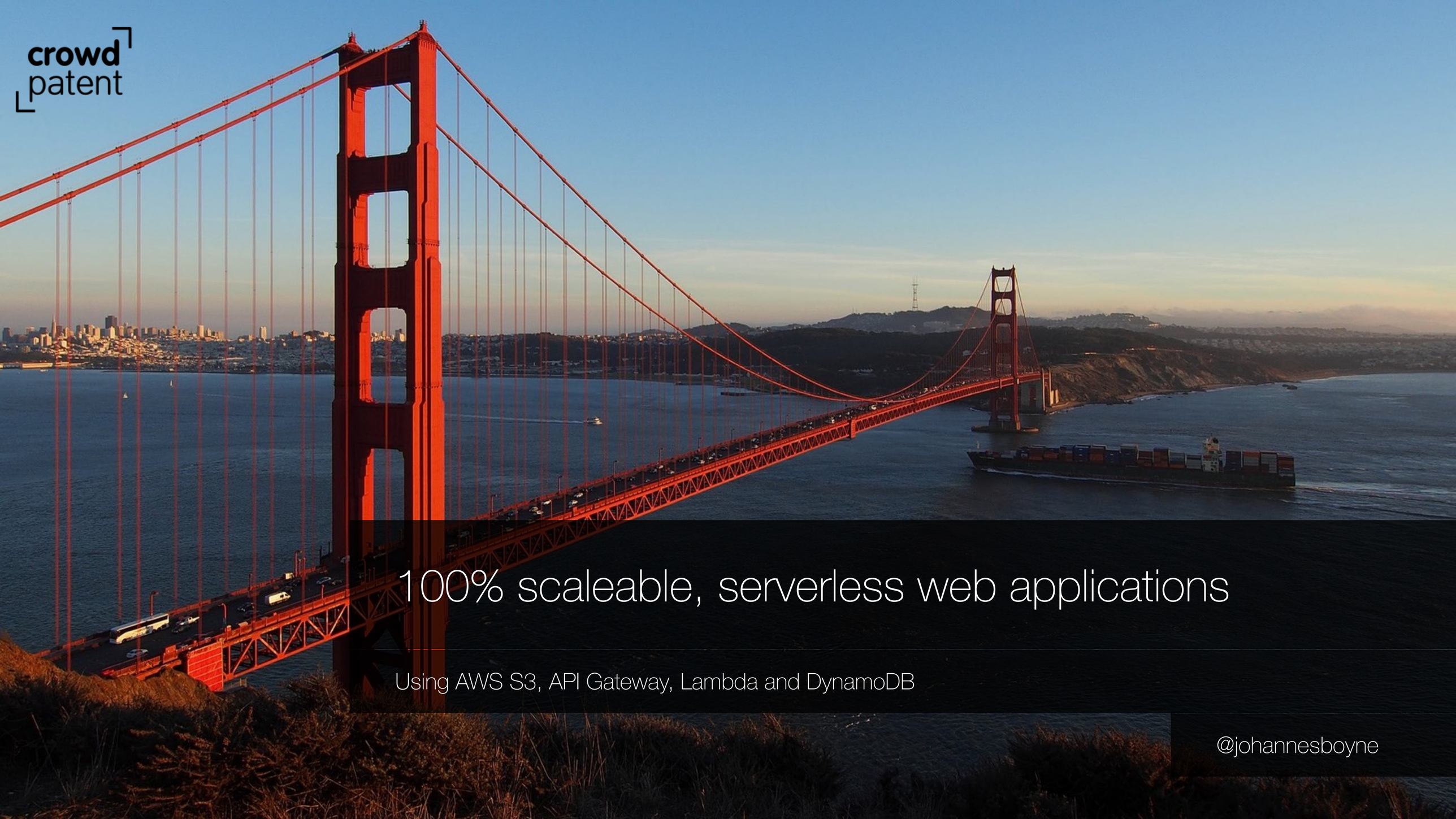
crowd patent

Welcome to Monster on Rails | Dec. 2015



crowd patent

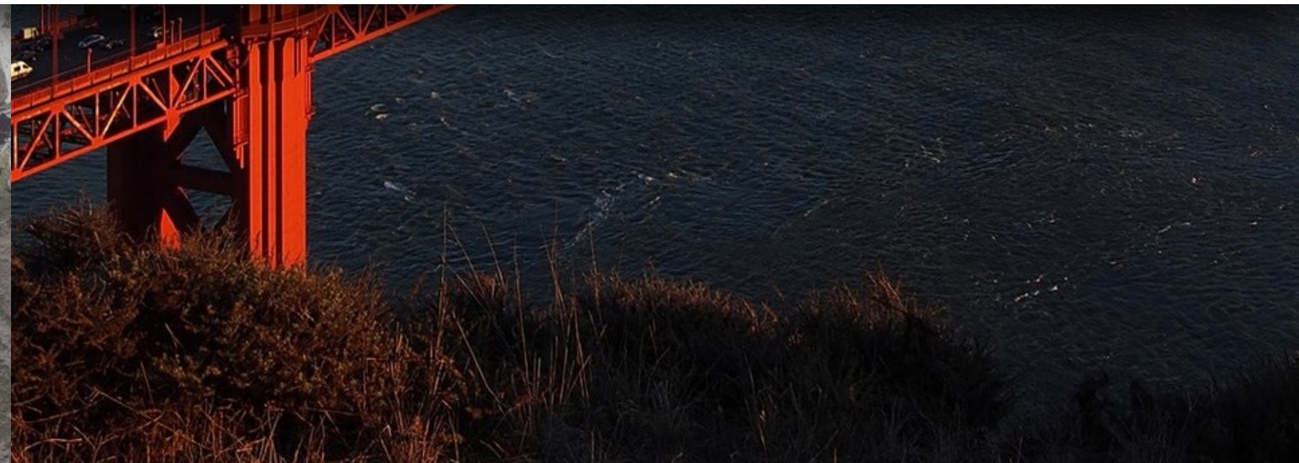
100% scaleable, serverless web applications

Using AWS S3, API Gateway, Lambda and DynamoDB

@johannesboyne

BOYNE | Consulting
BOYNE | Developing
BOYNE | Ventures

the world's first platform connecting **inventors**, **investors**, and **innovative companies** in the exploitation of inventions



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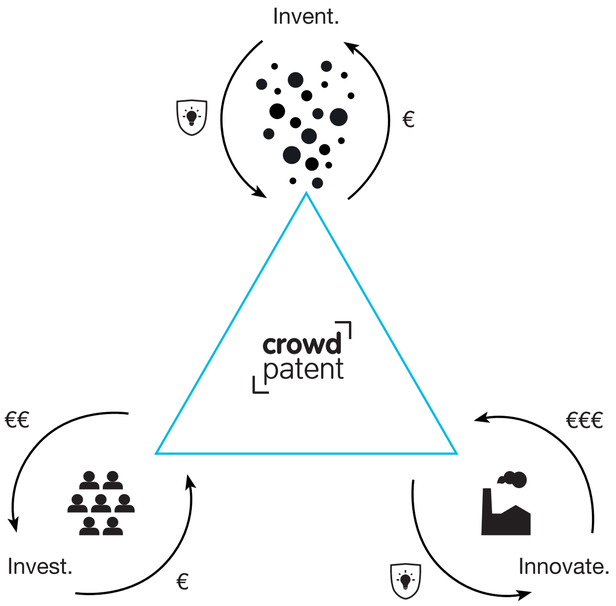

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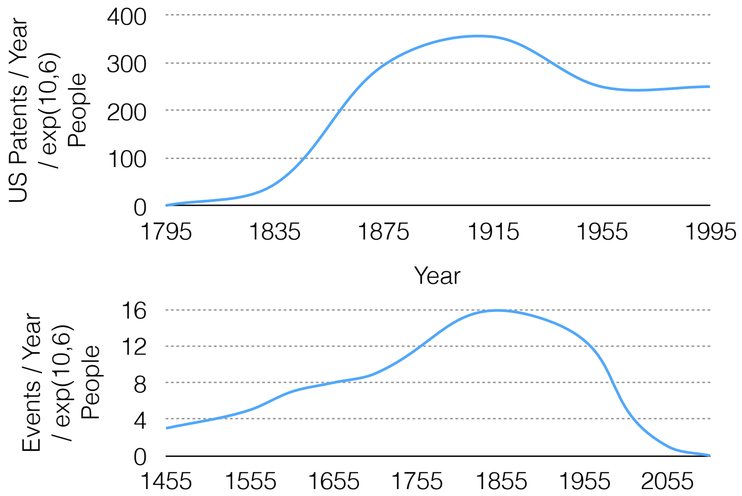

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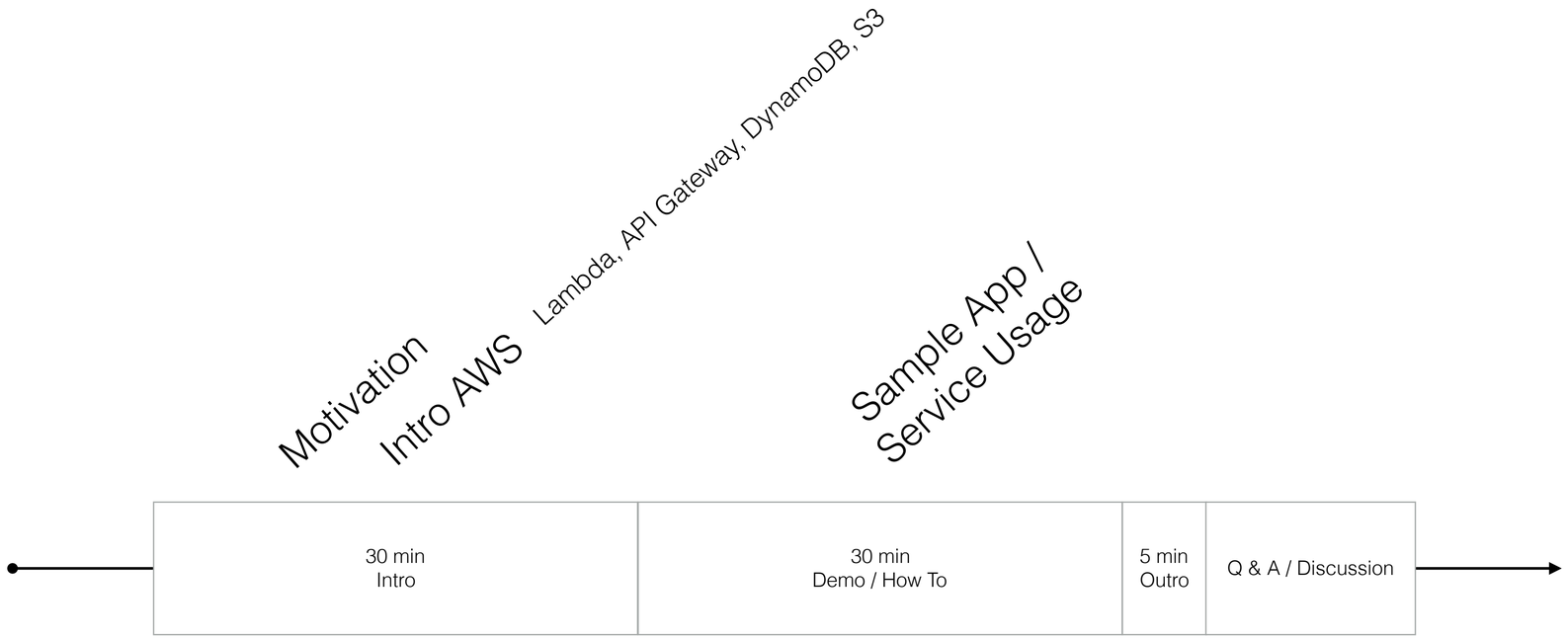
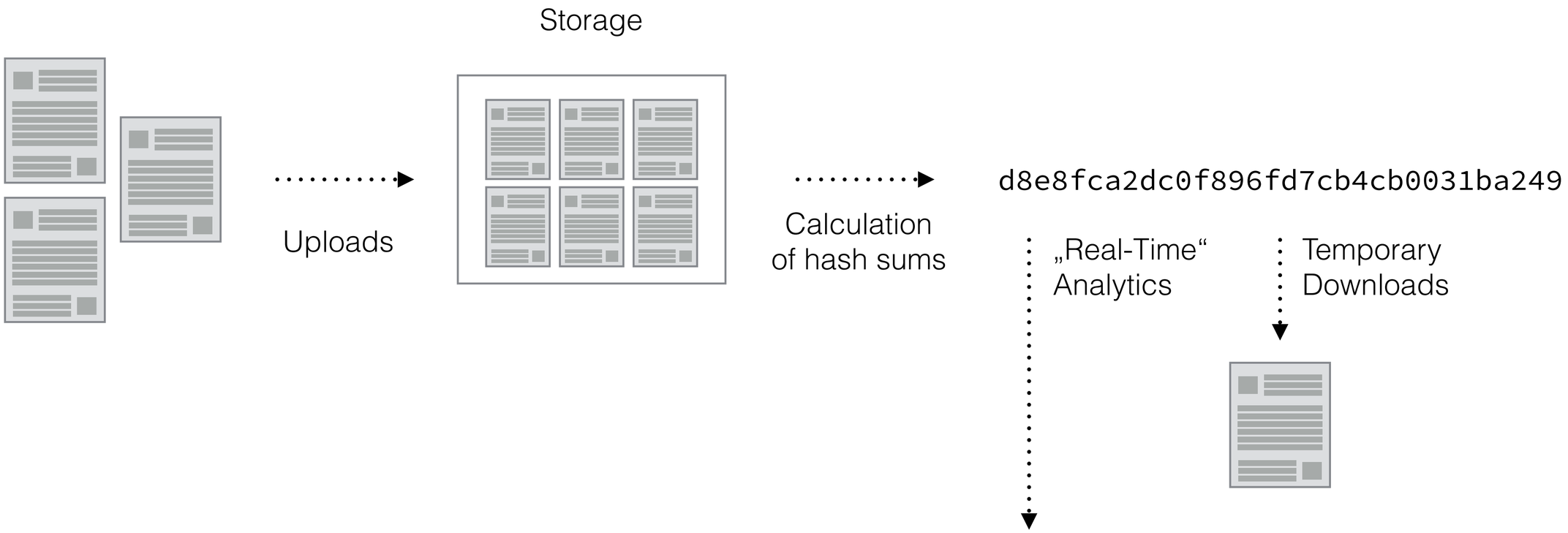

Motivation
Intro AWS
Lambda, API Gateway, DynamoDB, S3
Sample App /
Service Usage
30 min
Intro
30 min
Demo / How To
5 min
Outro
Q & A / Discussion

Innovate by choosing opportunities.

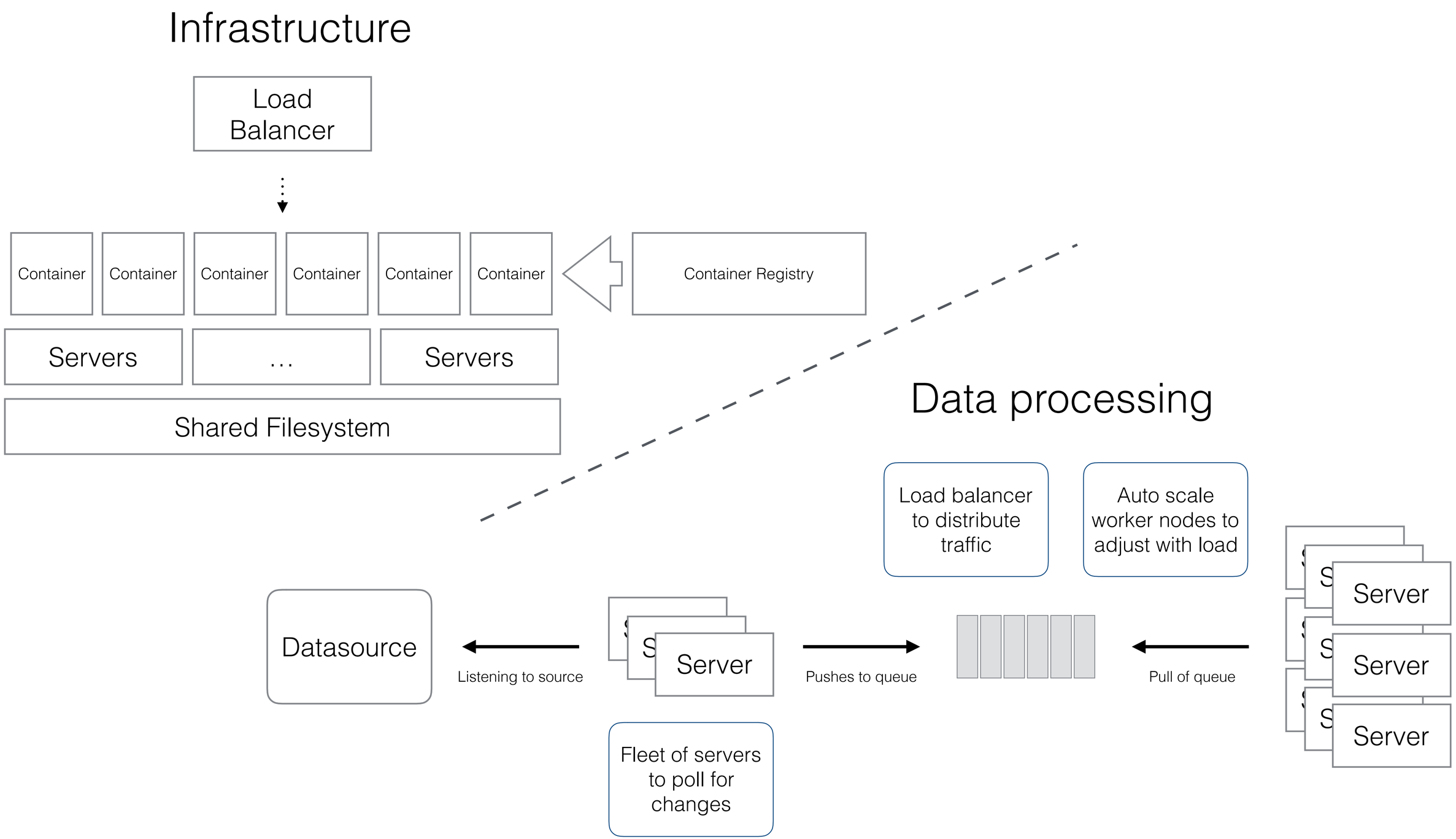
- „*Software is eating the world*“ –Marc Andreessen
- More software and services
- Agile and real-time innovation
- „*Software development will - in the future - be done without the need to think about underlying infrastructure.*“ –Nicolas Dillmann

λShare.xyz

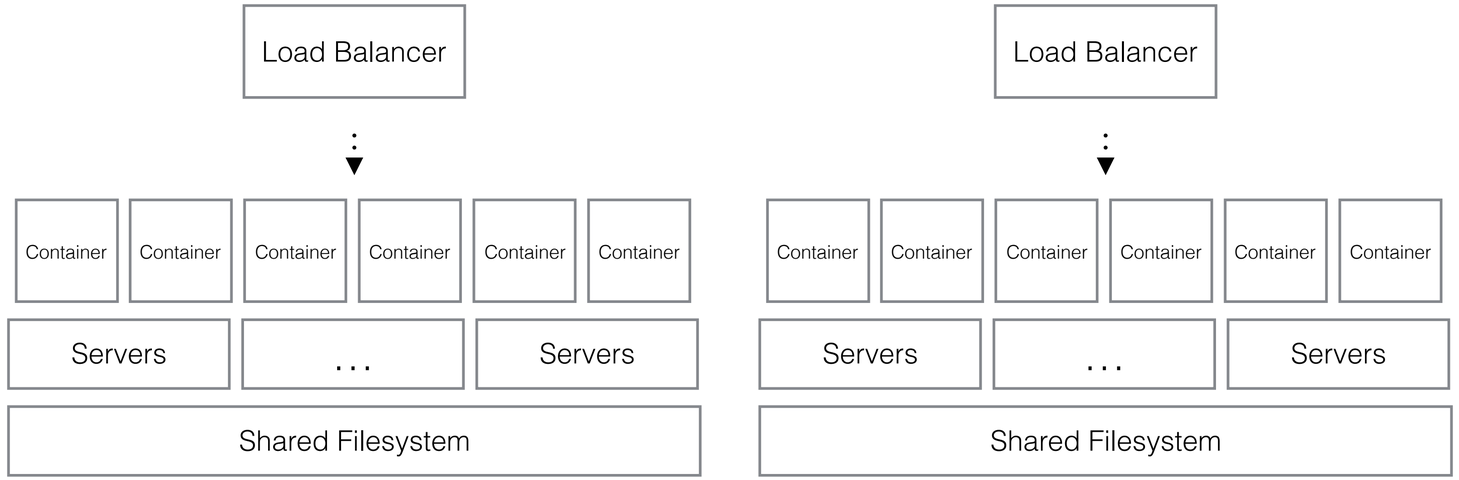

Storage
Uploads
Calculation
of hash sums
d8e8fca2dc0f896fd7cb4cb0031ba249
„Real-Time“
Analytics
Temporary
Downloads

How would you build it?

- Web application objectives:
  - Scaleable (you're the next unicorn)
  - Code-ownership & microservices
    - File uploads
    - Calculate hash sums of uploaded files („real-time“)
    - Custom analytics (event stream / cron job / …)


Infrastructure
Load Balancer
Container
Container
Container
Container
Container
Container
Container Registry
Servers
…
Servers
Shared Filesystem
Data processing
Load balancer to distribute traffic
Auto scale worker nodes to adjust with load
Datasource
Listening to source
Server
Pushes to queue
Pull of queue
Server
Server
Server
Fleet of servers to poll for changes

Cross-AZ replication for high availability, <u>across your whole stack</u>



The Amazon Ecosystem:

ecosystem |ˈekōˌsistəm, ˈēkō-|
(in general use) a complex network or interconnected system

The Amazon Ecosystem:
50+ Services

ecosystem |ˈekōˌsistəm, ˈēkō-|
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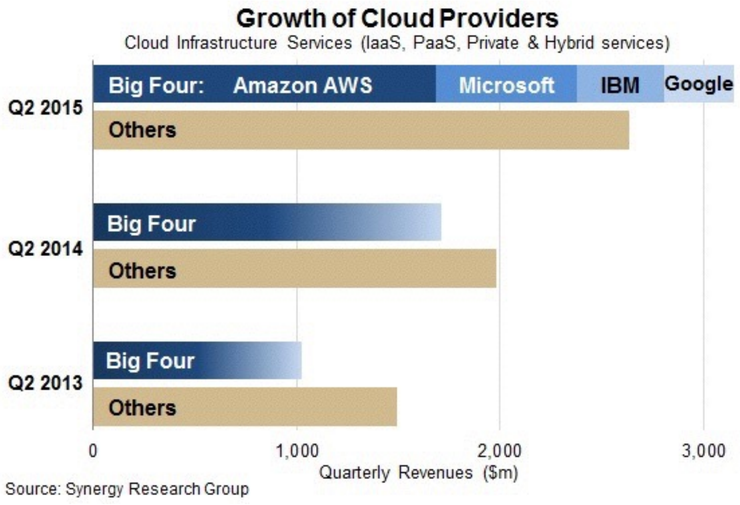
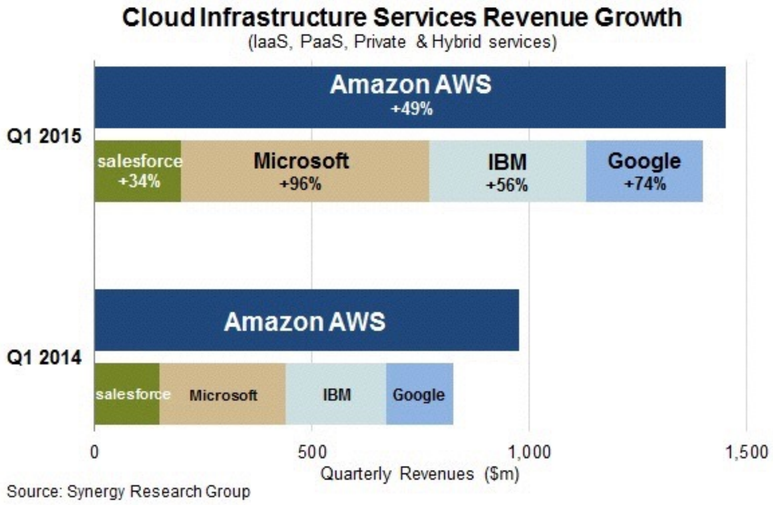
50+ Services

ecosystem |ˈekōˌsistəm, ˈēkō-|

(in general use) a complex network or interconnected system

How big (growth & revenue) is Amazon AWS?





AWS Q2 revenue: $1.8b ($391m profit)

delivers $^1/_3$ of the US internet traffic

EC2: Elastic Compute Cloud
„Virtual Servers“

EC2 Container Service
„Docker (orchestration) as a Service“

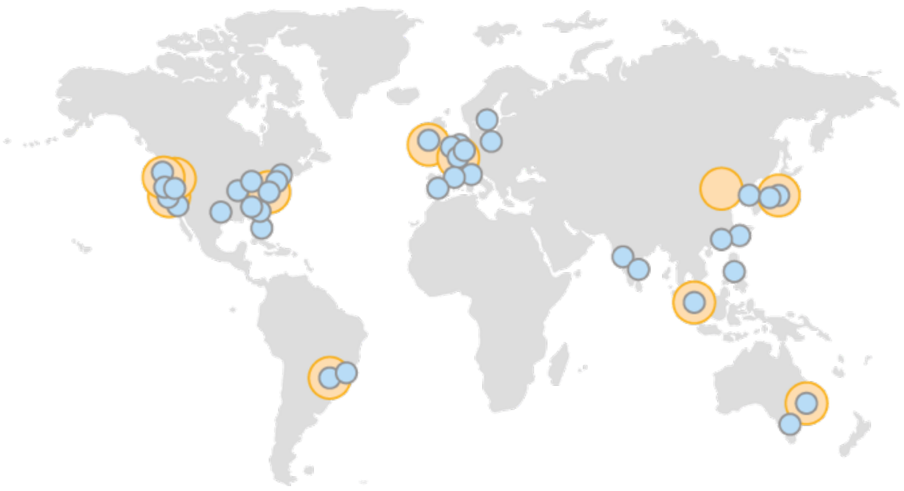
Lambda
„Microservices without servers“

S3
„Object Storage“ /
„Unlimited FTP“

DynamoDB
„NoSQL DB“

⋮

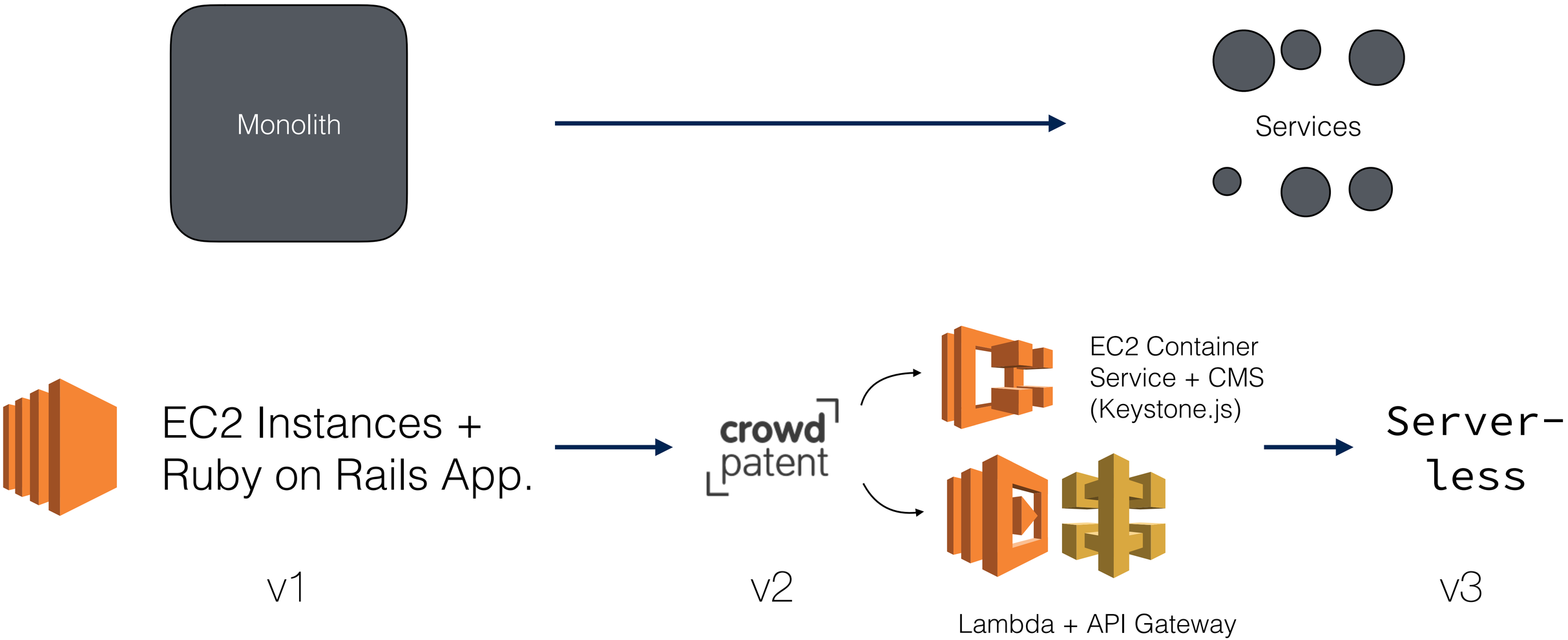
47 more



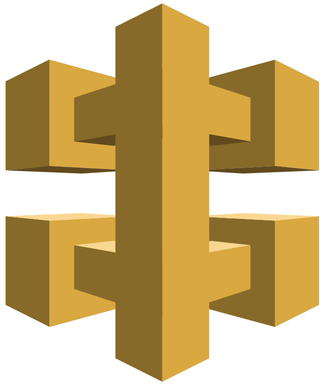
- USA West
  - Oregon
  - Kalifornien
- AWS GovCloud
- USA Ost (Virginia)
- Südamerika (São Paulo)
- EU
  - Dublin
  - Frankfurt
- Asien-Pazifik
  - Singapur
  - Sydney
  - Tokio
- China (Peking)

CrowdPatent's infrastructure change

CrowdPatent's infrastructure change

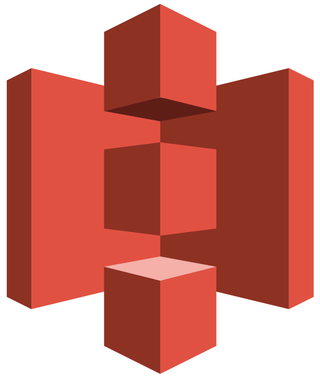


Lambda



API Gateway

DynamoDB



S3

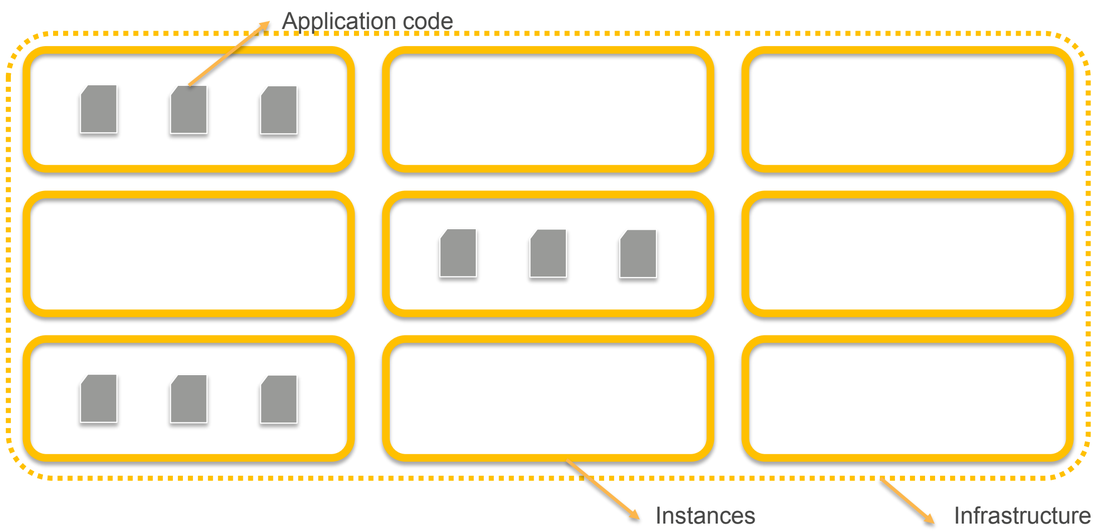
Evolution of Cloud Compute Toward Serverless

Jay Sandhaus

Evolution of Cloud Compute Toward Serverless

Jay Sandhaus

Evolution of Compute – Public Cloud

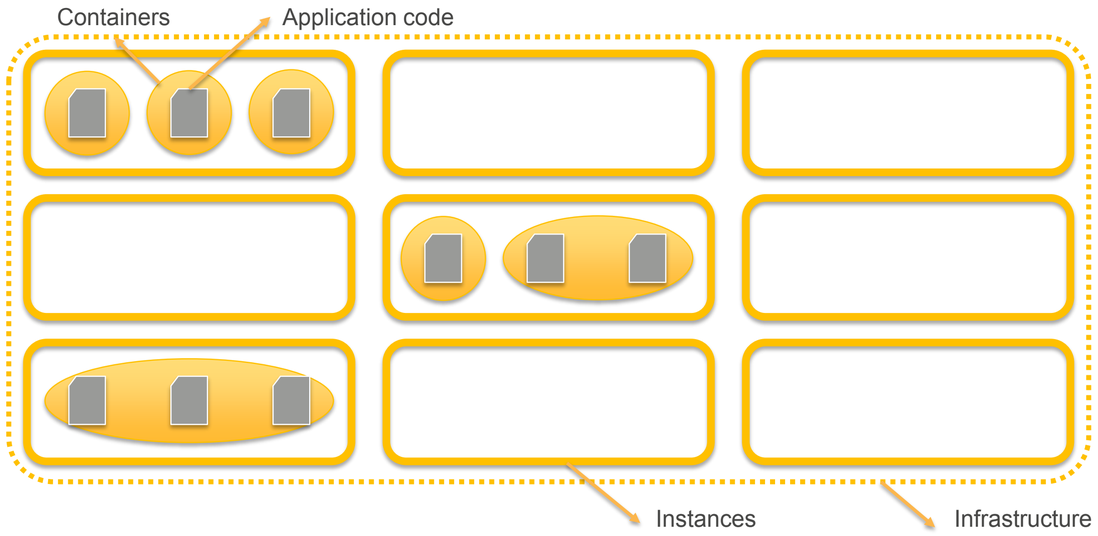


/ cc Jay Sandhaus http://de.slideshare.net/AmazonWebServices/arc308-the-serverless-company-using-aws-lambda

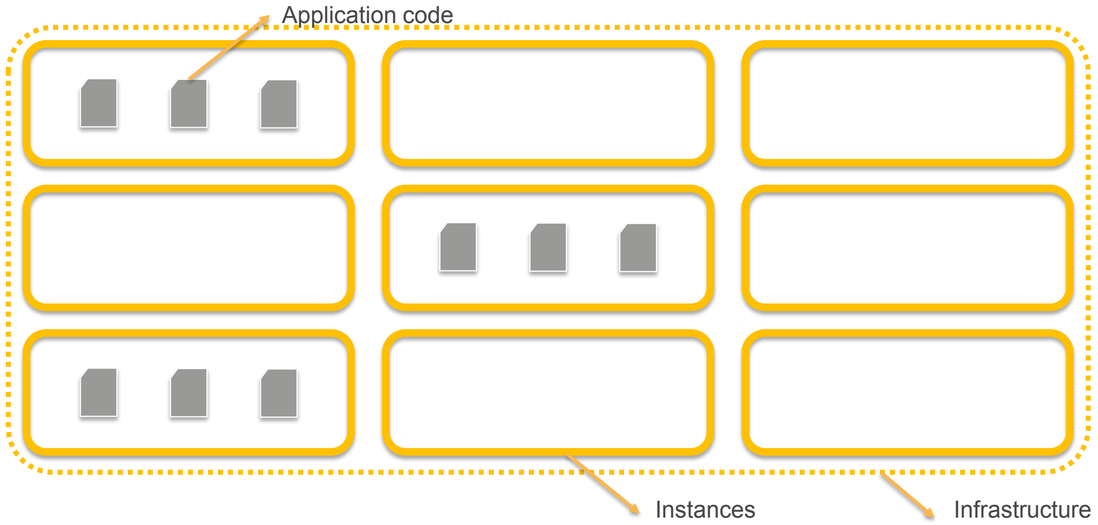
Evolution of Cloud Compute Toward Serverless

Jay Sandhaus

Evolution of Compute – Containers



Evolution of Compute – Public Cloud

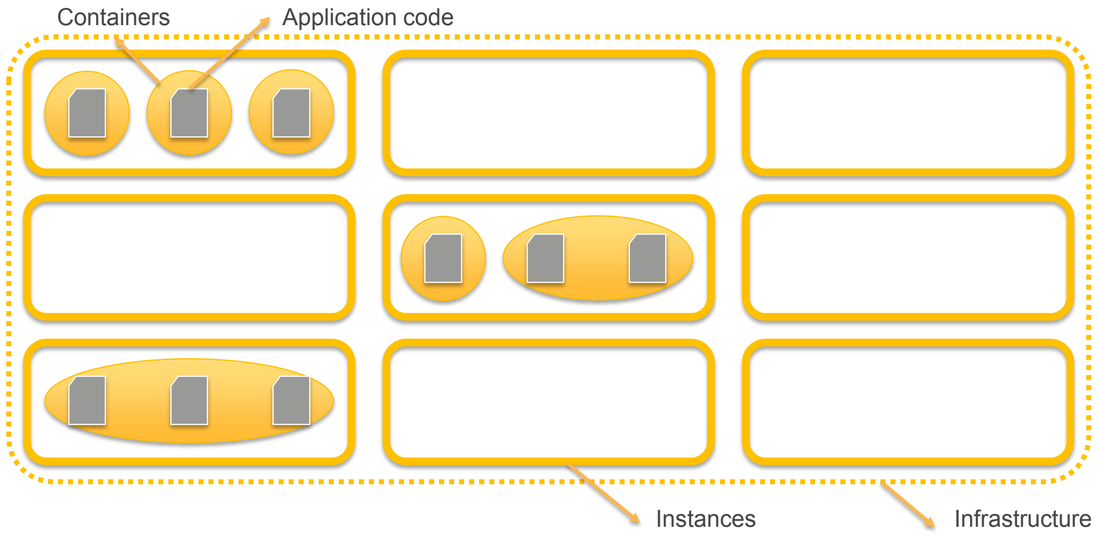


/ cc Jay Sandhaus http://de.slideshare.net/AmazonWebServices/arc308-the-serverless-company-using-aws-lambda

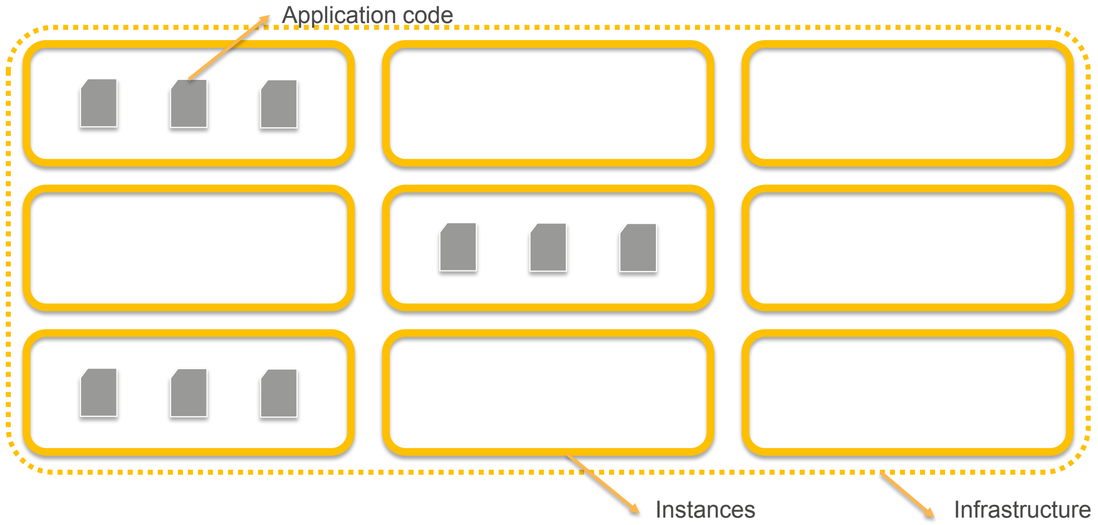
Evolution of Cloud Compute Toward Serverless

Jay Sandhaus

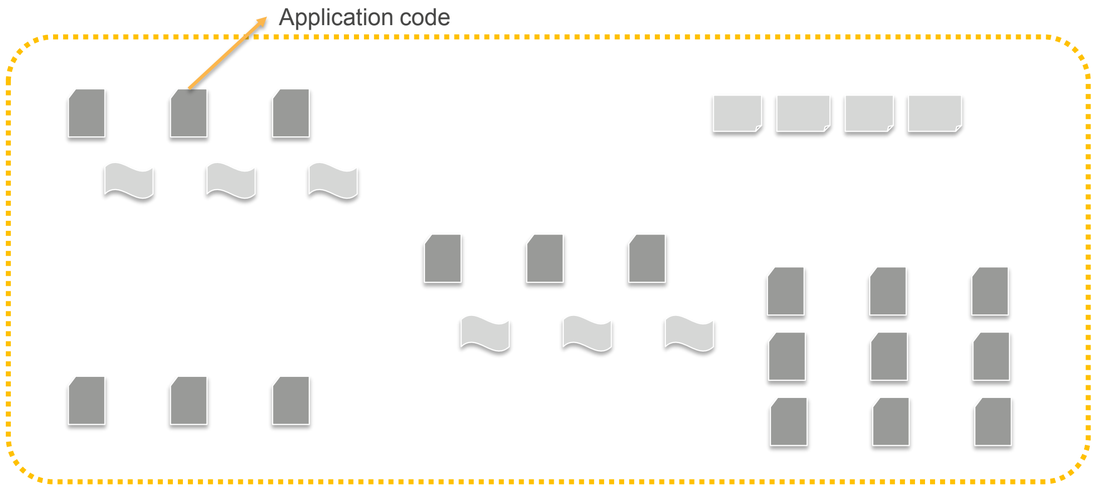
Evolution of Compute – Containers



Evolution of Compute – Public Cloud



Evolution of Compute – Serverless



Serverless, Event-Driven Computing

Event-Driven Computing

Event-Driven Computing

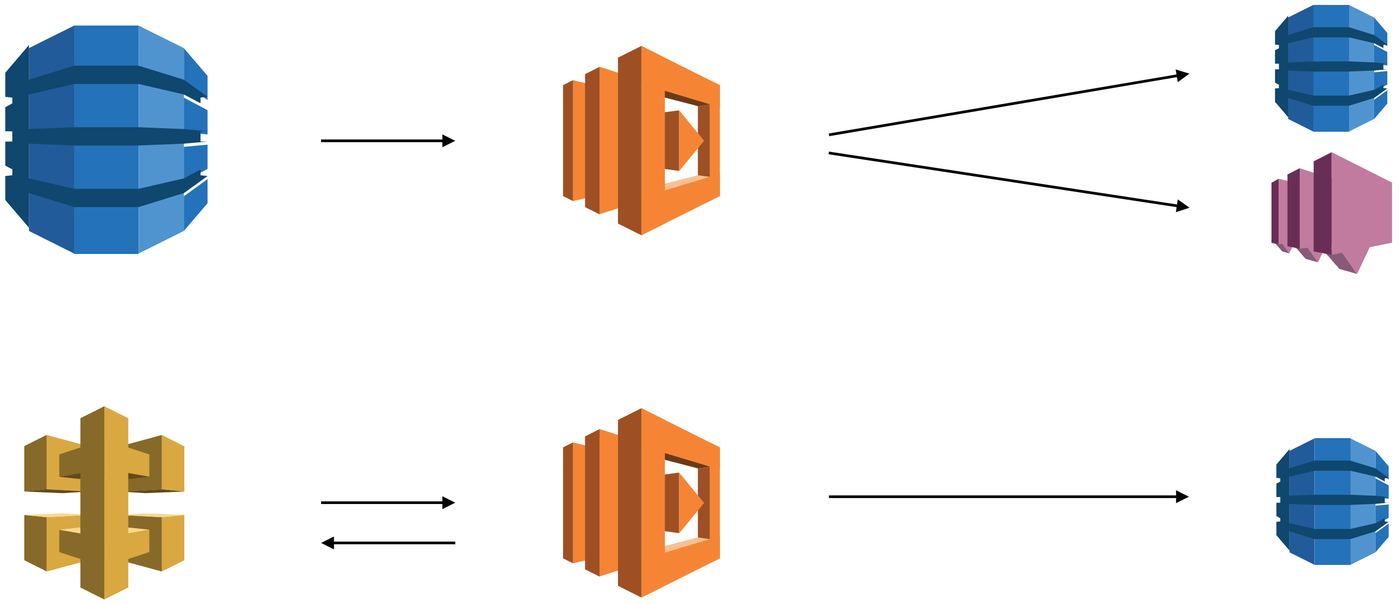
Event → Triggers Compute Function → Emits Event

Event-Driven Computing

Event → Triggers Compute Function → Emits Event

Event-Driven Computing

Event → Triggers Compute Function → Emits Event



Lambda

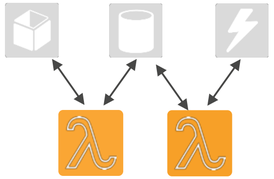
Lambda

AWS Lambda – Capabilities

BRING YOUR OWN CODE

SIMPLE RESOURCE MODEL

FLEXIBLE INVOCATION PATHS



GRANULAR PERMISSIONS CONTROL

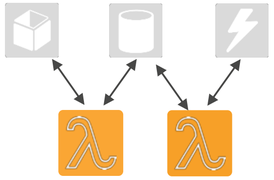
Lambda

AWS Lambda – Capabilities

BRING YOUR OWN CODE

SIMPLE RESOURCE MODEL

FLEXIBLE INVOCATION PATHS

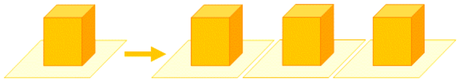


GRANULAR PERMISSIONS CONTROL

AWS Lambda – How it Works

AUTHORING

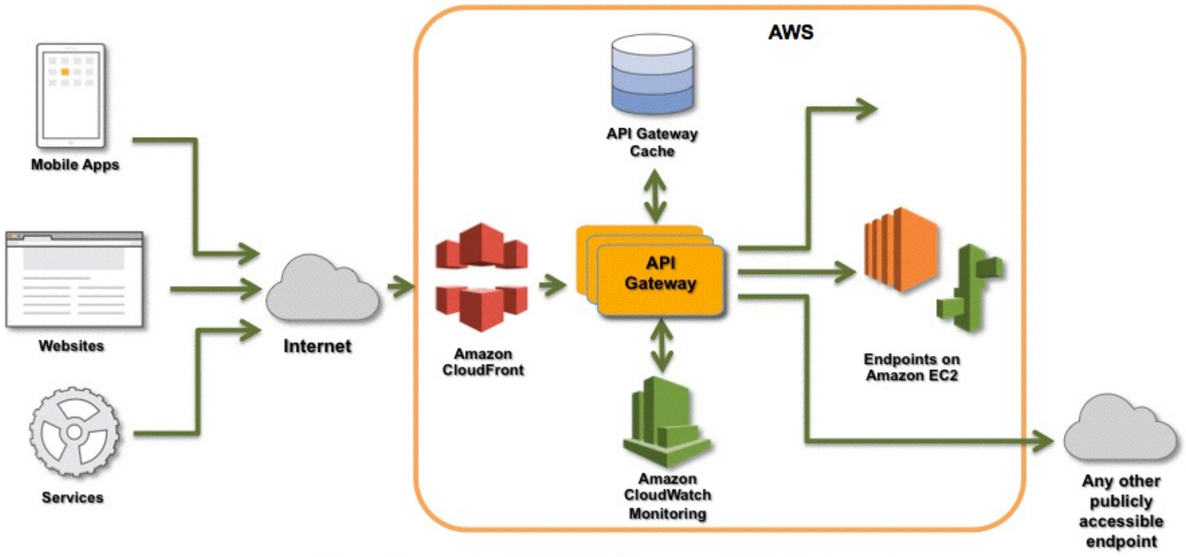
STATELESS



DEPLOYMENT

MONITORING & LOGGING

API Gateway



An Amazon API Gateway Call Flow

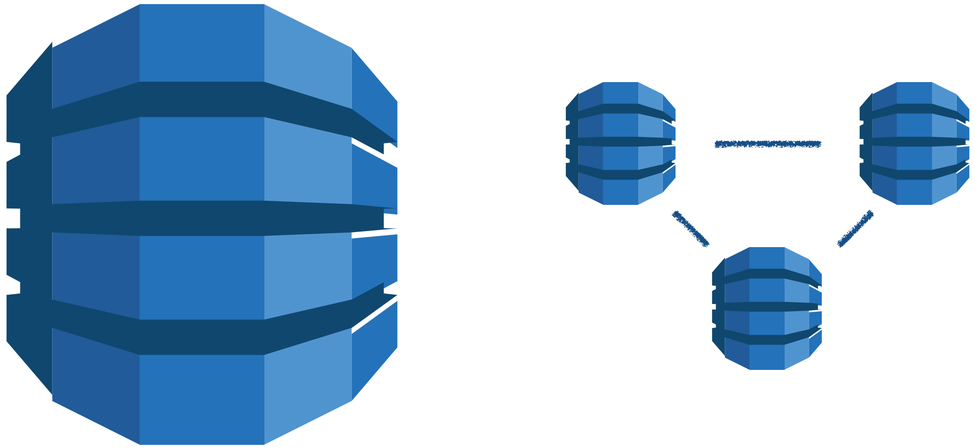
API Versioning

Security

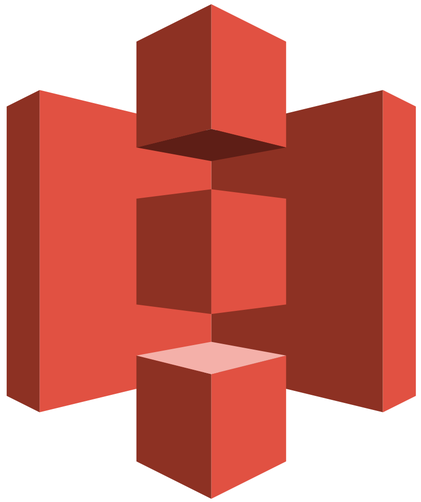
RESTful-Endpoints
(Existing Services)

Serverless

DynamoDB



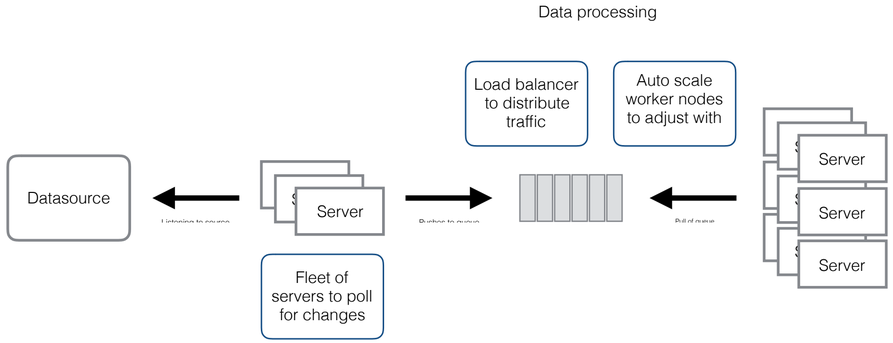
S3



How would you build it **now**?

- Web application objectives:
  - *Scaleable (you're the next unicorn) (automatically done)*
  - Code-ownership (microservices)
    - File uploads
    - Calculate hash sums of uploaded files („real-time“)
    - Custom analytics (event stream / cron job / …)

Data storage & processing



Data storage & processing

Storage done!

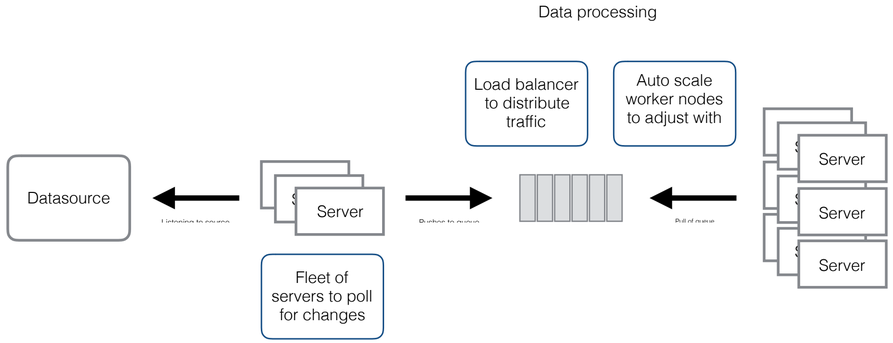
S3 provides:

- Redundancy
- Load balancing
- Direct uploads
- Logs
- Analytics
- Access control
- (Static hosting)

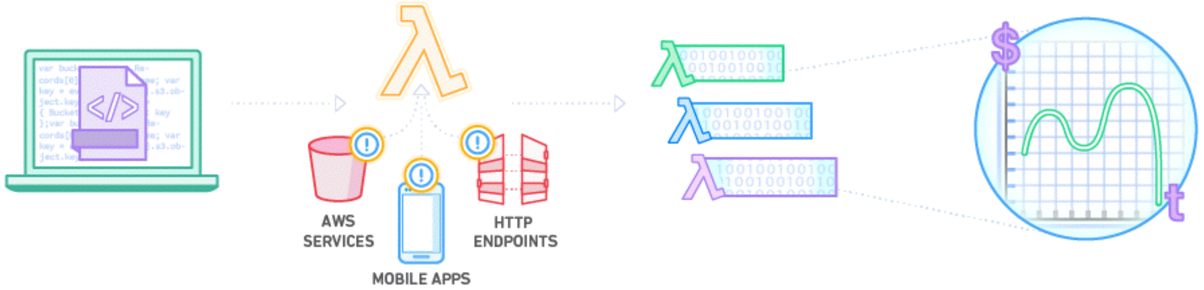
Processing done!

Lambda provides:

- Listening / polling
- Queuing
- Auto scaling
- Redundancy
- Load balancing



Let us build this app!



Upload your code to AWS Lambda

Set up your code to trigger from other AWS services, HTTP endpoints, or in-app activity

Lambda runs your code only when triggered, using only the compute resources needed

Pay just for the compute time you use

Example: *Image Thumbnail Creation*

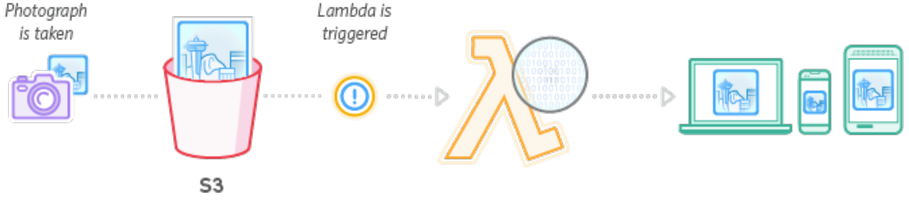
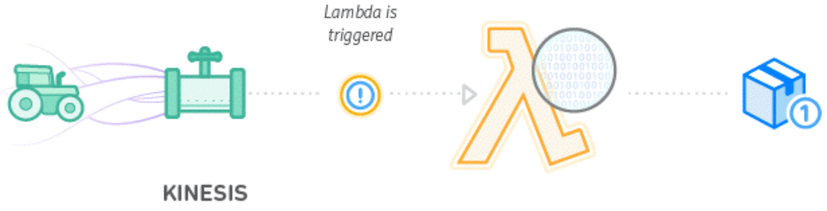


Photo is uploaded to S3 Bucket

Lambda runs image resizing code to generate web, mobile, and tablet sizes

Example: *Sensors in Tractor Detect Need for a Spare Part and Automatically Place Order*



Tractor sensors send data to Kinesis

Lambda runs code to detect trends in sensor data, identify anomalies, and order replacements for faulty parts

Example: *Analysis of Streaming Social Media Data*

Social media stream is loaded into Kinesis in real-time

Lambda runs code that generates hashtag trend data and stores it in DynamoDB

Example: *Mobile Backend for Social Media App*

App makes REST API call to endpoint

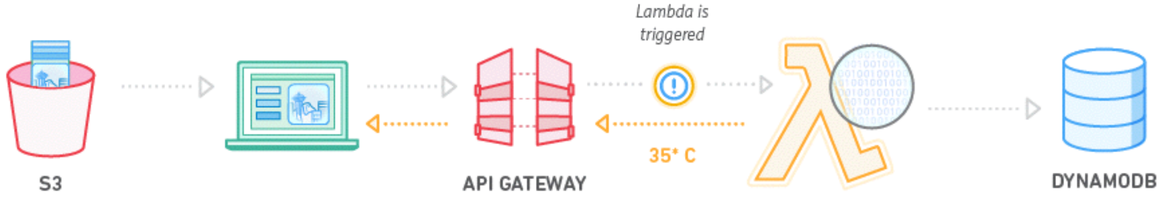
Lambda runs code to look up friends list and pushes status update notification to user's friends

Example: *Retail Data Warehouse ETL*

Order data is stored in operational database

Lambda runs data transformation code and loads results into data warehouse

Example: *Weather Application*

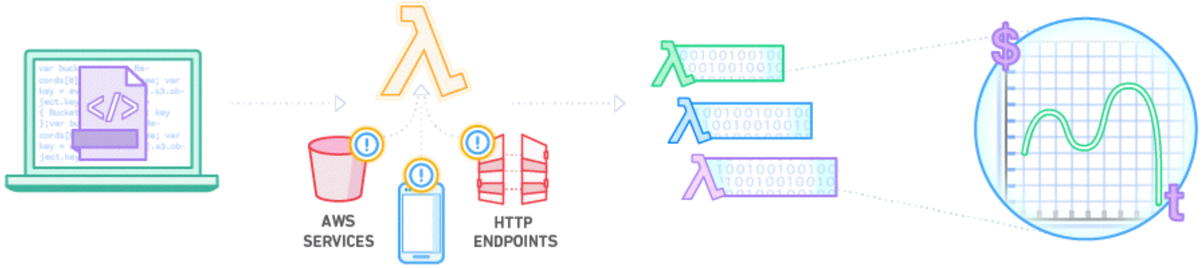


Front-end code for weather app hosted in S3

User clicks link to get local weather information

App makes REST API call to endpoint

Lambda runs code to retrieve local weather information and returns data back to user



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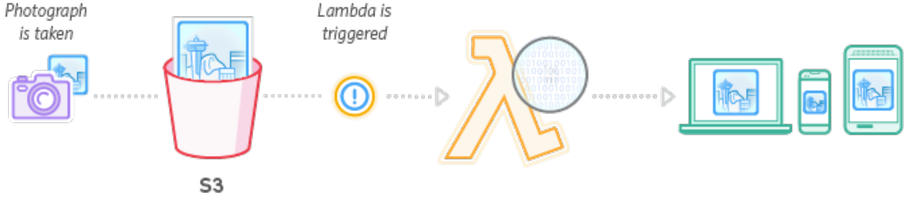

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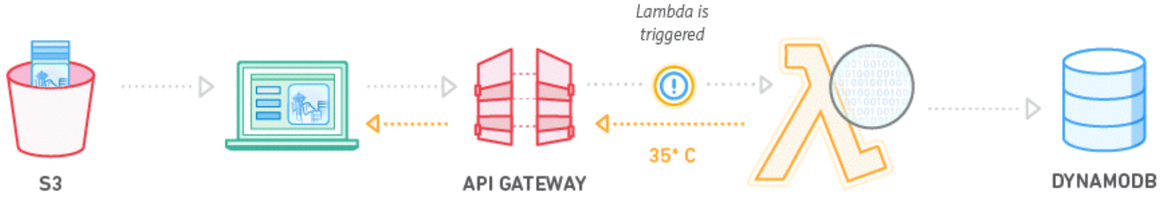

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Where to go next?

- Serverless (aka JAWS) may be of interest
- Deep Framework may be of interest
- **Checkout** Terraform + Lambda
- Play around with:
  - Lambda
  - API Gateway
  - S3 Static Website Hosting