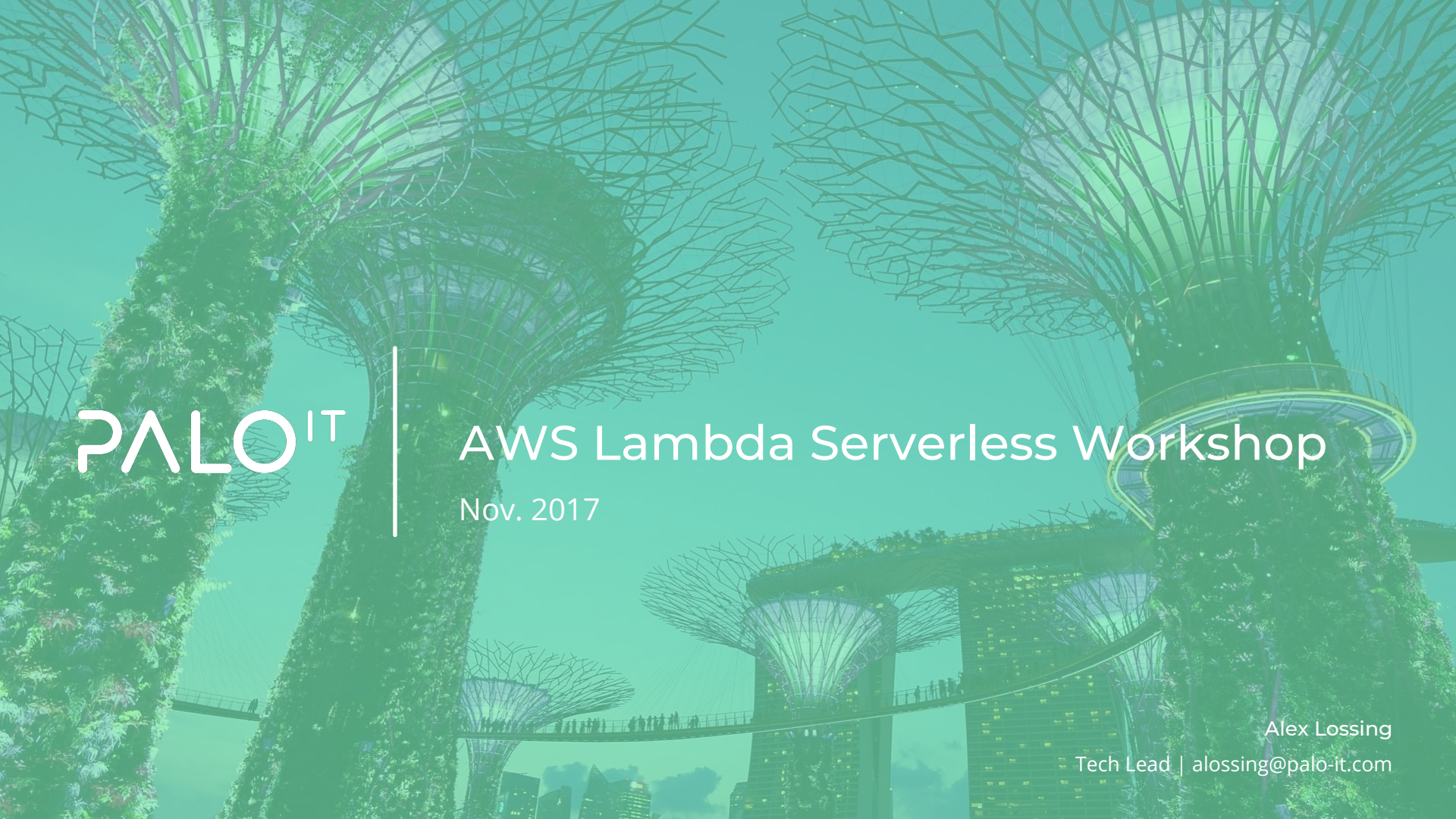

PALO IT

AWS Lambda Serverless Workshop

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CONTENT

1. What is Serverless ?
2. Focus on AWS Lambda
3. Serverless.com Framework
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1 WHAT IS SERVERLESS

Serverless Architectures

No more server ?

Serverless computing is a cloud computing execution model in which the **cloud provider dynamically manages the allocation of machine resources**. [...] It is a form of **utility computing**.
Serverless computing still requires servers. The name "serverless computing" is used because the **server management and capacity planning decisions are completely hidden** from the developer or operator.

Source: Wikipedia

A **serverless architecture** approach replaces long-running virtual machines with **ephemeral compute power** that **comes into existence on request** and **disappears immediately after use**.

Source: ThoughtWorks Technology Radar

Serverless Architectures

The evolution of XaaS

Cloud

NoOps?

On Premise D.I.Y.

You manage **everything**:
Application, Data, Runtime, Middleware, OS, Virtualization, Servers, Storage, Networking, Cooling...

Infrastructure IaaS

You manage **only**:
Application, Data, Runtime, Middleware, OS

Platform PaaS

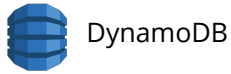
You manage **only**:
Application, Data with an Interface to manage servers, with Auto scaling...

Software SaaS

Full Frontend and backend managed services


Backend BaaS

First <u>Serverless</u> Definition:
Full 3rd party backend managed services.
Integration through API and client SDK.



Function FaaS

<u>Serverless</u> Application:
Develop backend functions, deploy in fully managed env. by a 3rd party.

(Oct. 2014)


Google
Cloud Functions


Microsoft
Azure Functions

Serverless (FaaS)

Principal

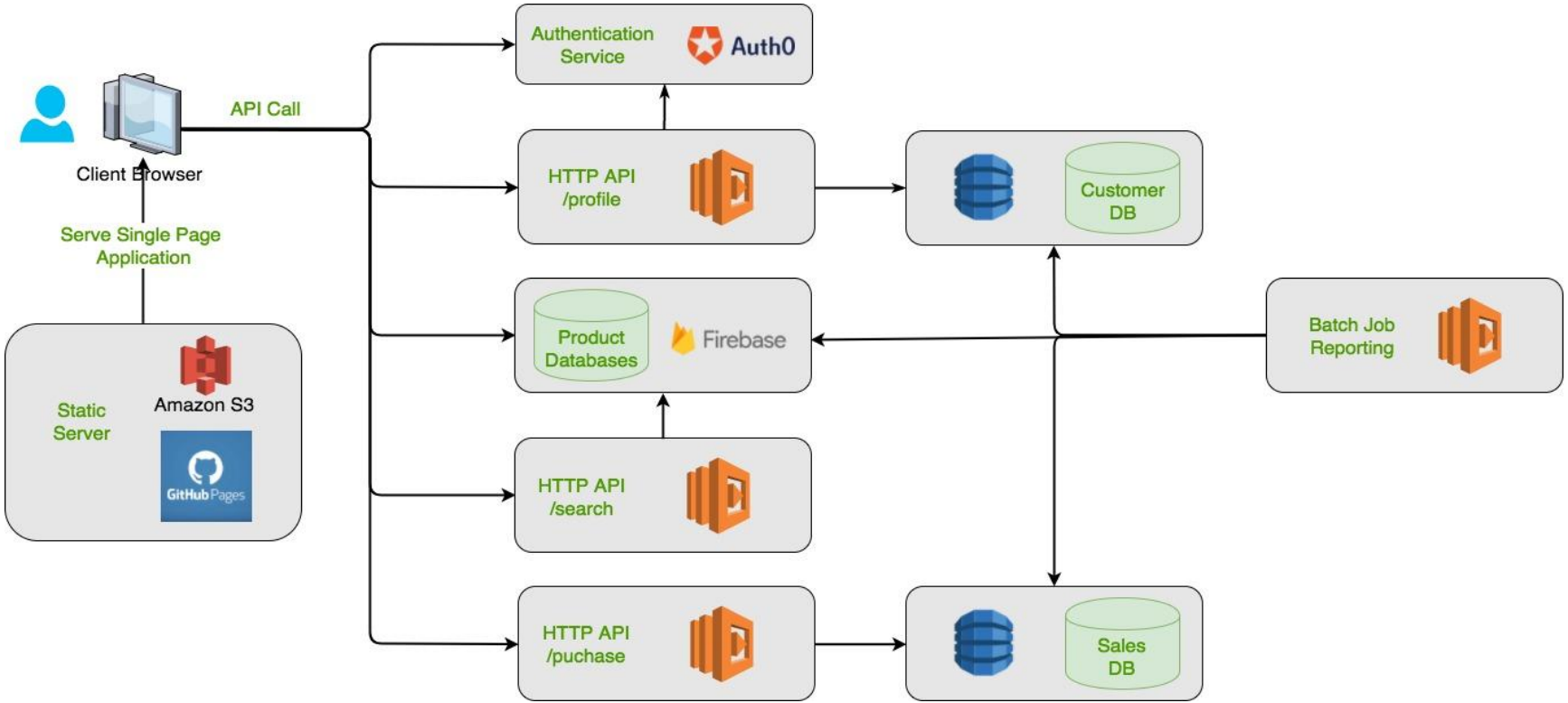
- You develop a function and deploy a function.
- No management of server systems and applications servers.
- Function are deployed on request base and are Ephemere, thus stateless.

  => You can save state/sessions in a central storage like a NoSQL database.
- Execution Duration and Memory are dependent on third-party provider. (Remember, you don't manage the server anymore).

  => If you need more resources, you can launch multiple lambdas following master/worker pattern.
- Cold Start: Latency to take in account. => You can keep your function "warm"

Serverless Architectures

Example of a Full Serverless Architecture



Serverless

Benefits

- Reduce Operational Cost
- Reduce Development Cost (BaaS)
- Scaling
- “Zero” Administration
- Time to market, experimentation
- “Greener”. Mutualize resources
- By nature, you build a more decouple application (Microservice).
- Event-driven, Asynchronous architecture. Can still work synchronously for HTTP call.

Challenges

- Vendor control, “Black Box”. No server access.
- Vendor limitations (cold start, duration, memory…)
- Vendor “lock-in”
- Multitenancy and Regulatory Compliance
- Security concerns
- Development environment setup.
- Testing. Unit testing easy, Integration testing harder
- Stateless Architecture
- Event-driven, Asynchronous architecture
- Distributed/Microservice Architecture challenges (Data Consistency, DevOps, Monitoring, Deployment…)

Serverless Architectures

No More Ops ?

Serverless doesn't imply "No Ops".

- **"Sys Admin"** role may not be needed anymore depending how far you go with serverless.
- Ops is also **monitoring, deployment, security, networking, production debugging,**...
- Serverless architecture with FaaS are **distributed architectures** and come with their associated challenges. **DevOps** culture is important. Deployment, monitoring, operations and maintenance are shared responsibilities.

2

AWS Lambda

AWS Lambda

AWS Lambda lets you run code **without provisioning or managing servers**. You **pay only for the compute time you consume** [...]. With Lambda, you can run code for virtually any type of application or backend service - all with zero administration. Just upload your code and Lambda takes care of everything required to **run and scale** your code **with high availability**. You can set up your code to automatically **trigger** from other AWS services or call it directly from any web or mobile app.

https://aws.amazon.com/lambda/

AWS Lambda

Language supported

AWS Lambda

Event-Base triggering

All Lambda can invoke manually or triggered through and event:

AWS Lambda

Behind the scene: THE CONTAINER MODEL

AWS PROVISIONS and MANAGES RESOURCES

"MyLambdaFunction"
Code source

Config
- Memory: 128 MB to 1,5G
- Execution time: Max 300 sec

2. Launch a Container
("Cold start" ms to 5 sec...)

6. If no invocation for "5mn" to "15mn" (Unofficial), Container is destroyed

REQUEST

1. Event Trigger

4. Response

CONTAINER
3. Execution Environment
"MyLambdaFunction"

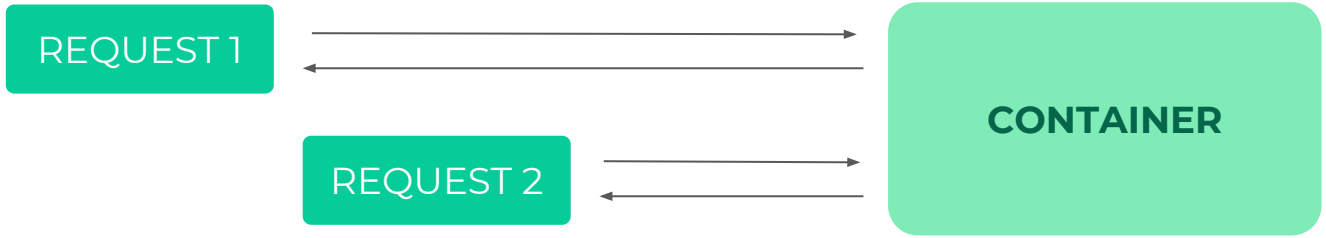
5. Container is kept alive

CONTAINER

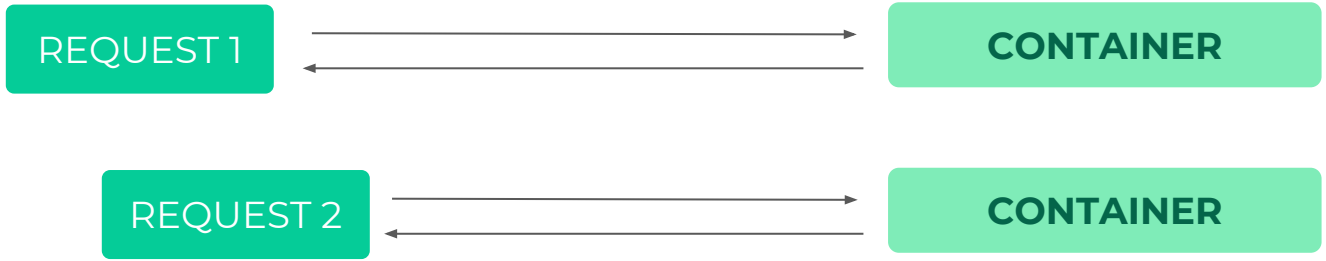
AWS Lambda

Behind the scene: Multiple requests

Sequential Requests:



Parallel Requests:



AWS Lambda

Cost

Number of requests:

- $0.20 per 1 million requests thereafter ($0.0000002 per request)

Duration:

- Duration is calculated from the time your code begins executing until it returns or otherwise terminates, rounded up to the nearest 100ms.
- The price depends on the amount of memory you allocate to your function.
- You are charged $0.00001667 for every GB-second used.

Free-tiers: 1M free requests per month and 400,000 GB-seconds of compute time per month.

Source: https://aws.amazon.com/lambda/pricing/

DEMO

AWS Lambda “Hello World”

http://docs.aws.amazon.com/lambda/latest/dg/getting-started-create-function.html

3

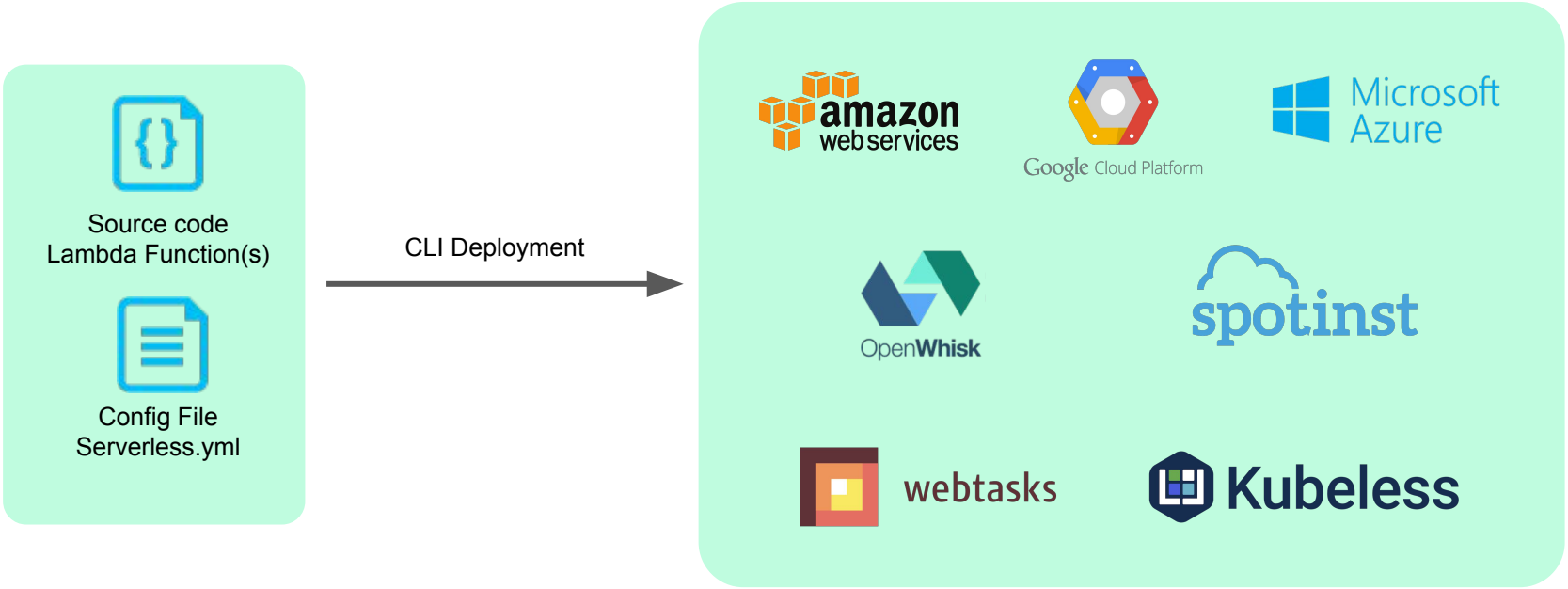
Serverless.com Framework

Serverless.com

Framework

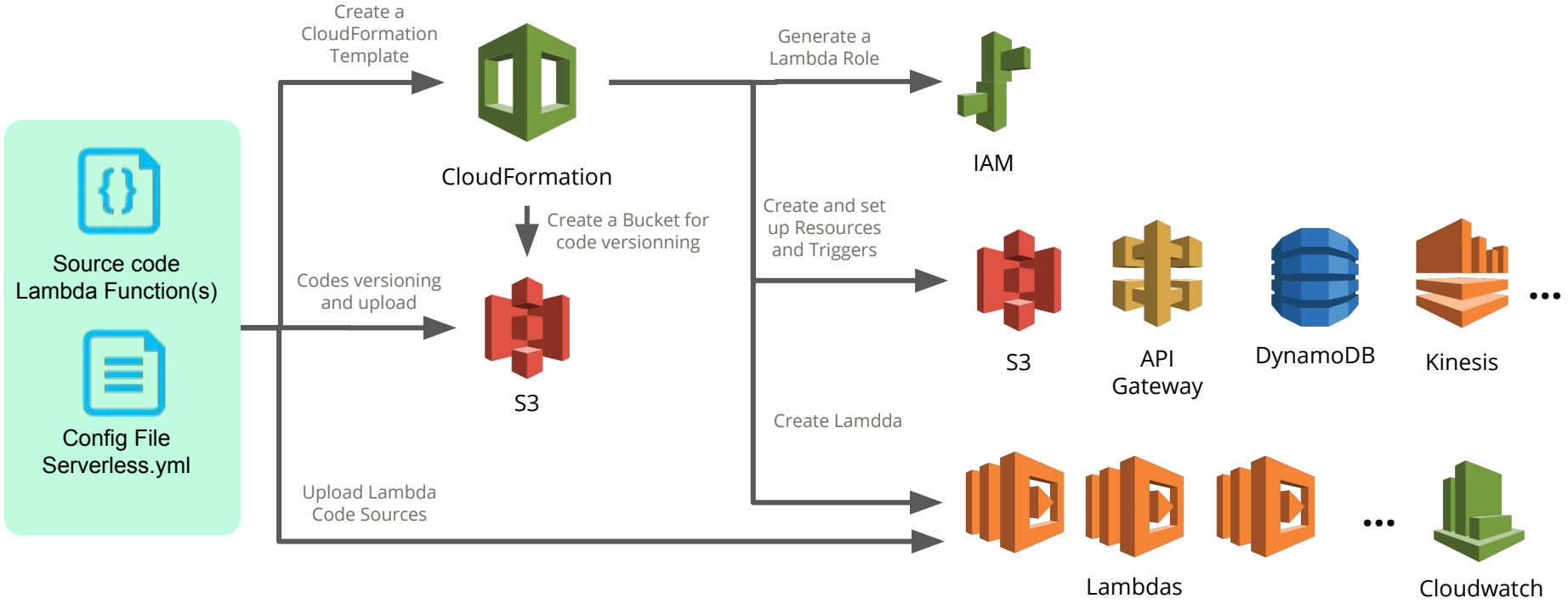
“Serverless is your toolkit for deploying and operating serverless architectures.”

Manage you serverless architecture as an Application:



Serverless.com

AWS Lambda



4 Workshop

Workshop: Serverless.com with AWS Lambda

https://github.com/lossingalex/aws-serverless-exercise

- AWS Credentials Setup
- 4 Exercises using Serverless.com framework with AWS Lambda:
  - Exercise 1: Hello World Lambda
  - Exercise 2: Hello World through AWS Http Gateway Event
  - Exercise 3: Create Rest API TODO App with DynamoDB (Add TODO task and fetch list of tasks)
  - Exercise 4: Add a list of tasks from a CSV file using S3 Event with Lambda

THANK YOU

Any questions? Feel free to ask!

References

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