Hálózatba kapcsolt erőforrás platformok és alkalmazásaik

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Microservices

- An architecture pattern decomposing vertically a monolith system into loosely coupled subsystems (microservices). Nothing more. The pattern doesn't dictate how it should be done technically.
- Just to highlight it: Microservices and Containers are **not the same** and **totally independent**. You can use Docker with a monolith app, and you can have several micro-services without using Docker at all.

Architecture pattern evolution

- Monolith
  - distributed horizontally on Prem/Cloud/Hybrid
  - containerized horizontally
- Microservices
  - distributed vertically and horizontally on Prem/Cloud/Hybrid
  - containerized vertically and horizontally

Serverless features

- A unit of work consumes resources only when it is used
  - Function is a unit of work
    - stateless, short lived
    - serves one goal
    - arguments (input) and result (output)
- Orchestration of independent pieces of work (functions as a service FaaS)
  - Carrying state of the entire flow (program)
  - Error handling
  - Transaction management

Serverless model

- Focus on business logic
- Code centric paradigm. Hyde Infrastructure.
  - Focus on coding resolving business problems and forget about infrastructure
  - Everything is working on some “computing resources”
- Scalability
  - Developers don't do anything for scaling. Scaling is handled automatically.
- Billing
  - Don't pay for idle time
  - Pay for milliseconds
- Utilization
  - [illegible]

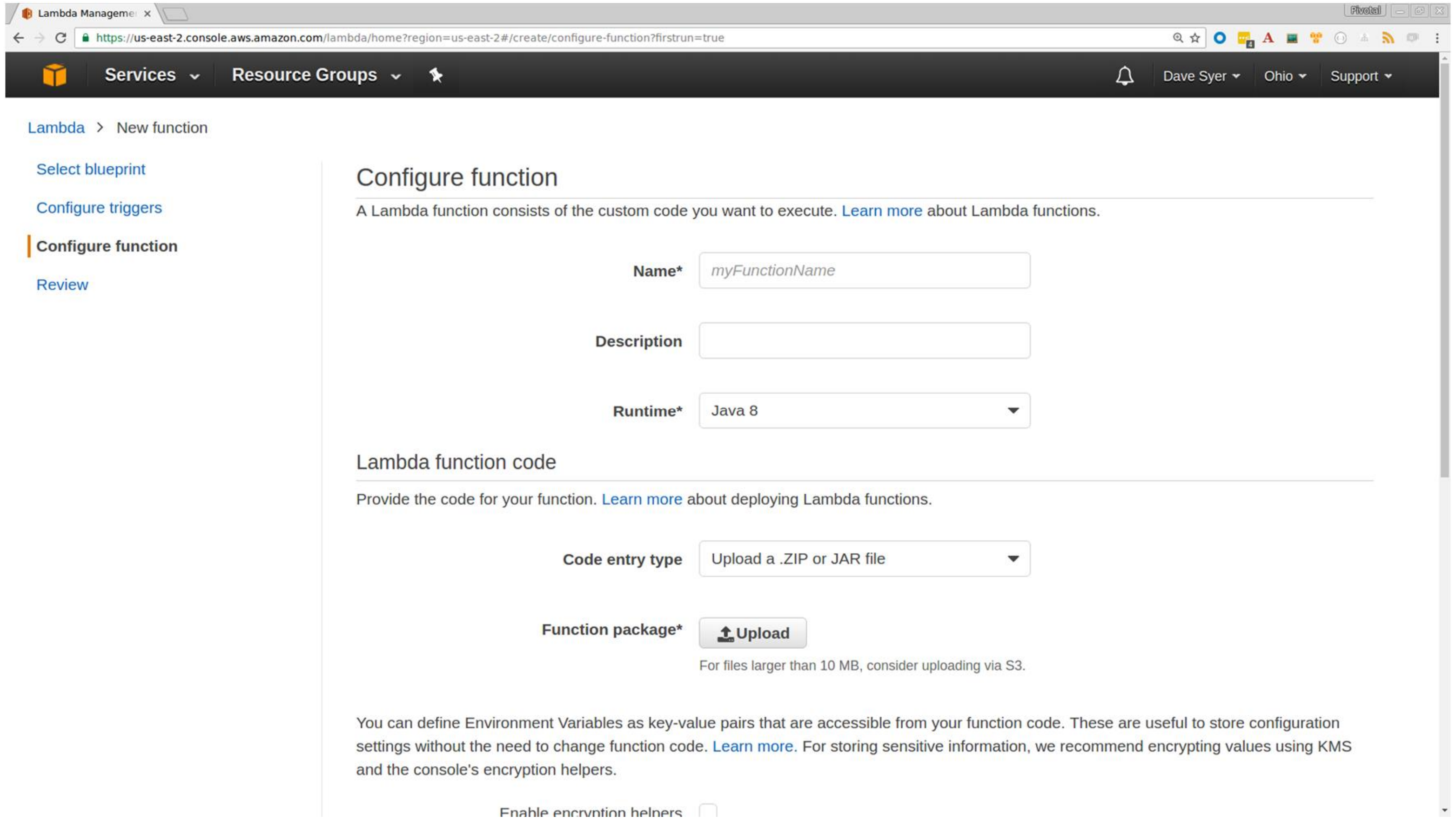
Serverless Platform

- Public clouds:
  - AWS Lambda
  - Google Cloud Functions
  - Azure Functions
  - IBM (OpenWhisk based)
  - Oracle (fn based)
- Open source frameworks:
  - OpenWhisk
  - Kubeless
  - Fn
  - OpenFaaS
  - Fission
  - …and many more

Multiple language support (availability depends on the framework):

- NodeJS
- Python
- Java
- Scala
- Clojure
- …

Amazon Lambda



Lambda Manageme
https://us-east-2.console.aws.amazon.com/lambda/home?region=us-east-2#/create/configure-function?firstrun=true
Services
Resource Groups
Dave Syer
Ohio
Support

Lambda > New function

- Select blueprint
- Configure triggers
- **Configure function**
- Review

Configure function

A Lambda function consists of the custom code you want to execute. Learn more about Lambda functions.

Name*	*myFunctionName*
Description	
Runtime*	Java 8

Lambda function code

Provide the code for your function. Learn more about deploying Lambda functions.

Code entry type	Upload a .ZIP or JAR file
Function package*	**Upload**

For files larger than 10 MB, consider uploading via S3.

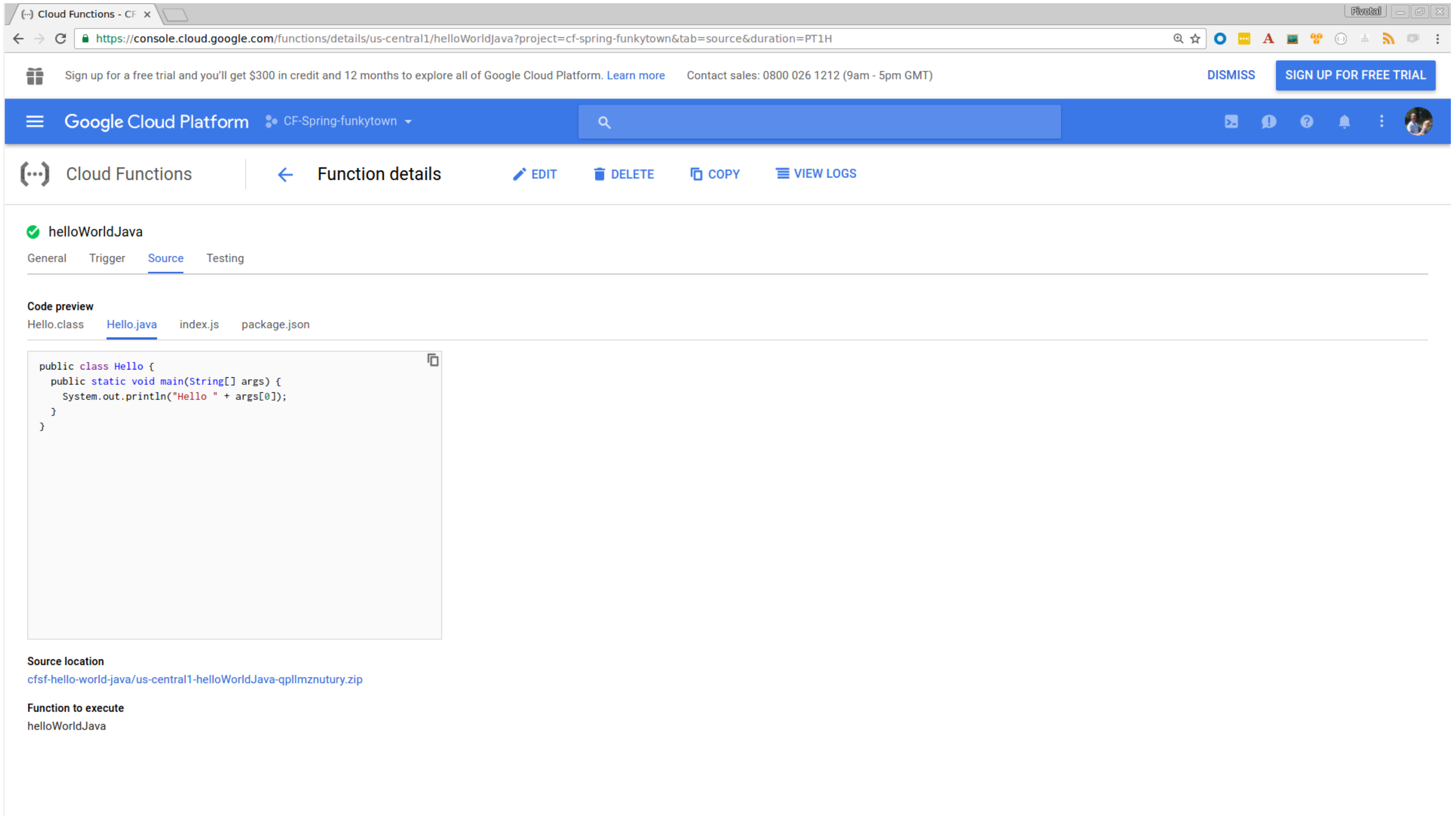
You can define Environment Variables as key-value pairs that are accessible from your function code. These are useful to store configuration settings without the need to change function code. Learn more. For storing sensitive information, we recommend encrypting values using KMS and the console's encryption helpers.

Enable encryption helpers

AWS Lambda

- One of the first Function projects on the market
  - The idea is:
    - You have your code written with one of supported languages (limited list, binaries are preconfigured by AWS)
    - Your code exposes some standardized API
    - You upload your code (in a zip file) to AWS Lambda
    - Basing on event (e.g. request on URL) AWS Lambda allocates resources for your code, invokes a function and releases the resource at the end
    - The flow is orchestrated with AWS Step Functions
    - Visual Flow designer

Google Cloud Function



Cloud Functions - CF

https://console.cloud.google.com/functions/details/us-central1/helloWorldJava?project=cf-spring-funkytown&tab=source&duration=PT1H

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helloWorldJava

Code preview

```
public class Hello {
  public static void main(String[] args) {
    System.out.println("Hello " + args[0]);
  }
}
```

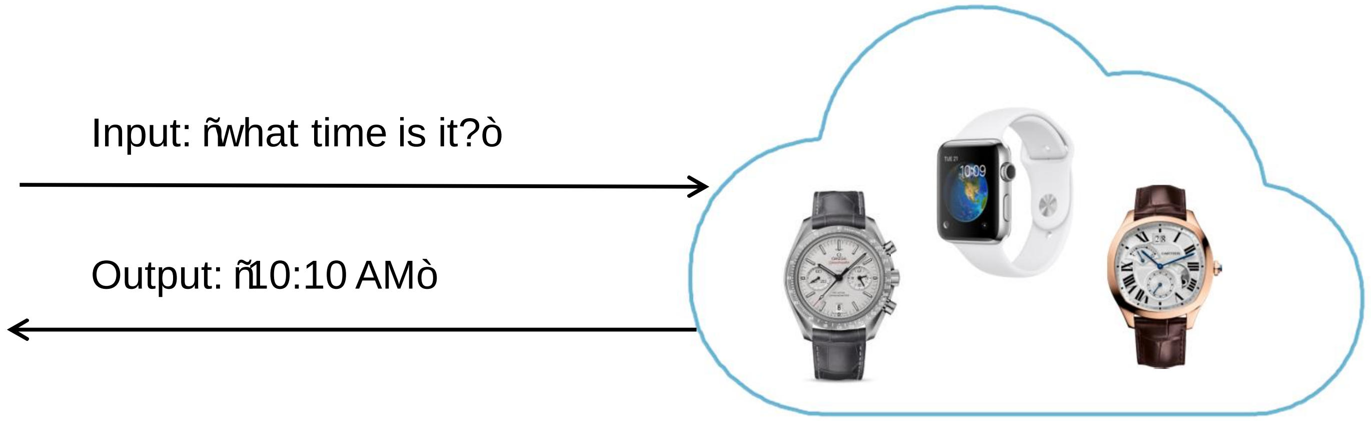
Source location

cfsf-hello-world-java/us-central1-helloWorldJava-qpllmznutury.zip

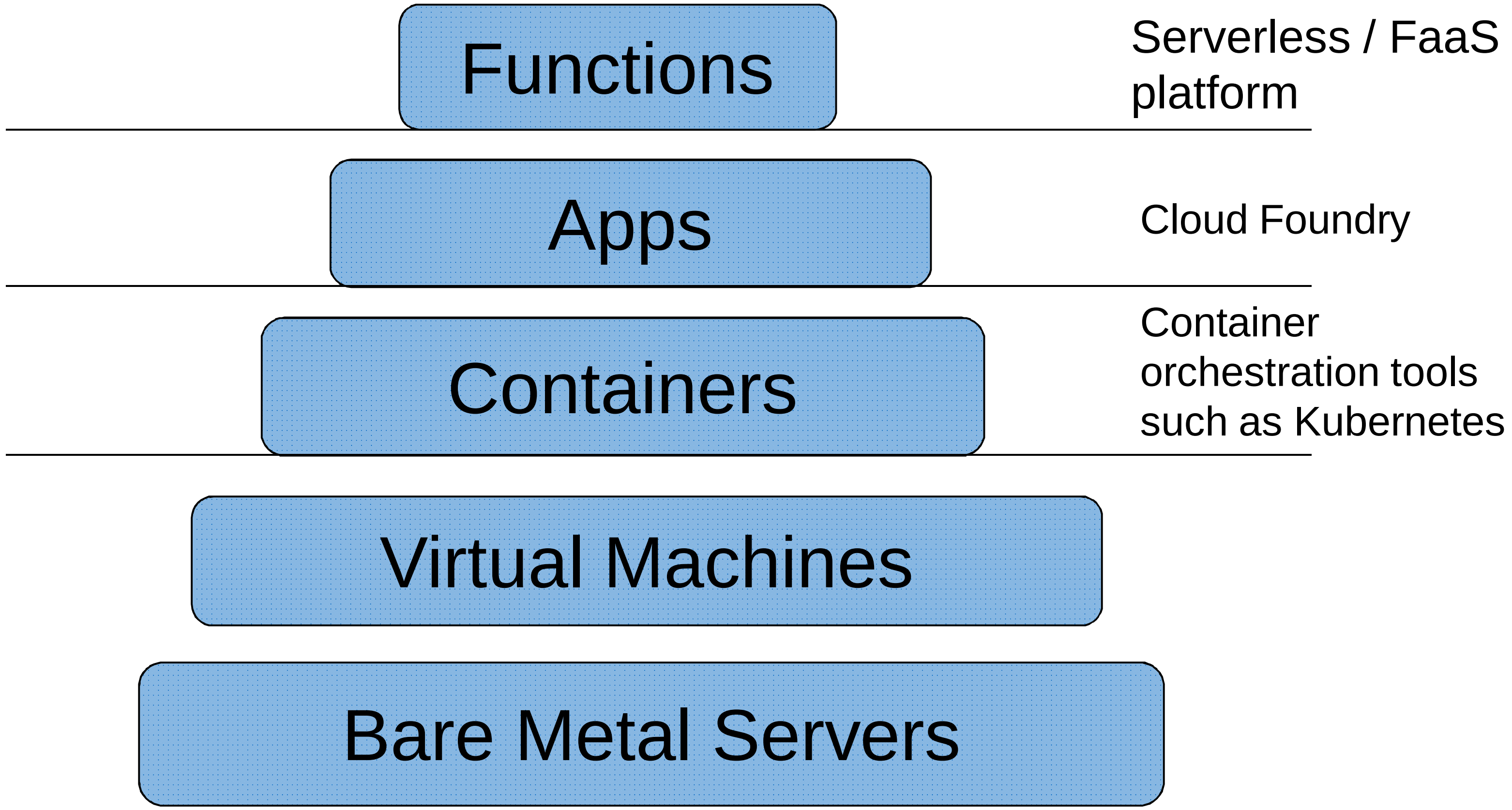
Function to execute

helloWorldJava

What is a function?



Cloud Abstractions


Functions
Apps
Containers
Virtual Machines
Bare Metal Servers
Serverless / FaaS platform
Cloud Foundry
Container orchestration tools such as Kubernetes

Function = the user code sent to a serverless platform

- Static self-running piece-of-work wrapped into a container with everything it needs for its work
  - code + platform
  - stateless
  - single purposed
  - arguments (input) and result (output)

Challenges of Serverless / FaaS

- New architectural style
- Management of large populations of functions
- Vendor lock-in
- Execution duration limit
- Start up latency
- Network latency among functions
- Immature tooling for development
- Immature tooling for Day 2