

Beyond @CloudFunction: Powerful Code Annotations to Capture Serverless Runtime Patterns

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Distributed Application Computing Paradigms + Service Prototyping
<https://blog.zhaw.ch/splab/>

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Preliminaries

FaaSification \subset Cloudification

→ semi-automated provisioning of applications into FaaS+BaaS environments

Domain-specific level, e.g. business documents

- serverless surveys [<https://github.com/serviceprototypinglab/funforms>]

Code level

- methods/functions with simple annotations (*@CloudFunction* etc.)
- deeper inspection, consideration of runtime patterns ← this talk

Patterns

- where the function is deployed,
- when and how it is executed,
- which state it stores where,
- what insights it generates,
- ...

→ requires code + configuration
+ operational practices adjustments

Patterns & Annotations

Scopes:
 F – function/method
 H – helper functions
 V – variables
 U – unit of code/class

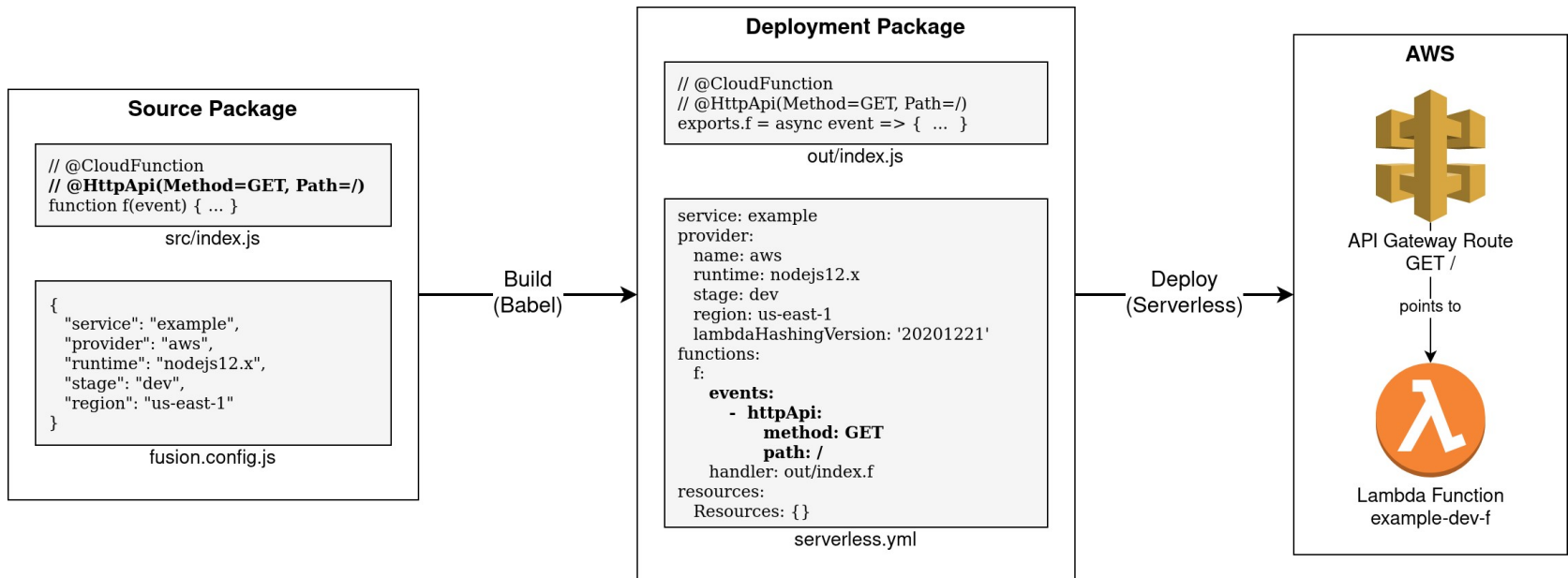
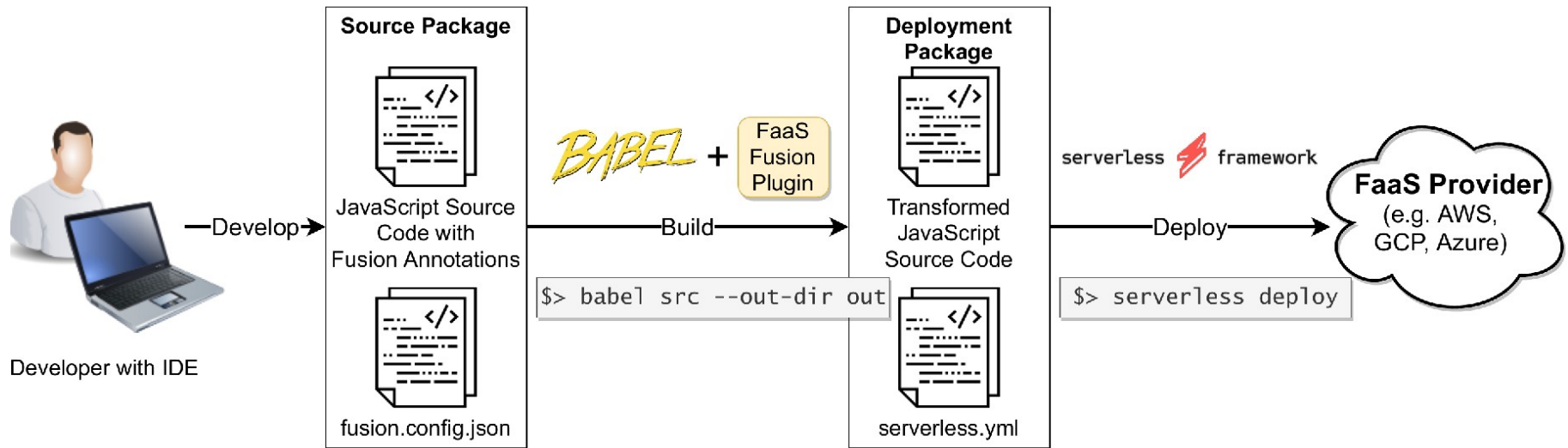
	Annotation	Scope	Pattern
Lambada Termite	@CloudFunction	F	Offload method invocation to cloud function in FaaS.
	@SecureFunction	F	Offload method invocation to trusted execution environment.
CoRFu	@LiquidFunction	F	Offload method invocation dynamically to edge-cloud continuum.
	@Warmup	F	Minimise risk of function invocation with coldstart.
COSE, autotuning	@Autotune	F	Adjust function memory configuration to actual consumption.
	@Schedule	F	Invoke function periodically based on time trigger.
	@HttpApi	F	Integrate function into web through exposed endpoint.
(blog)	@DeepTrace	F	Activate tracing and input dependency detection.
freshen	@Freshen	H	Install pre-execution and other lifecycle hooks.
(blog)	@Cache	V	Ensure global data lifetime across invocations.
	@Persist	V	BaaS (object store, database) data storage and retrieval.
Lambada	@CloudObject	U	Offload all methods and persist all attributes of class.

currently implemented in FaaS Fusion



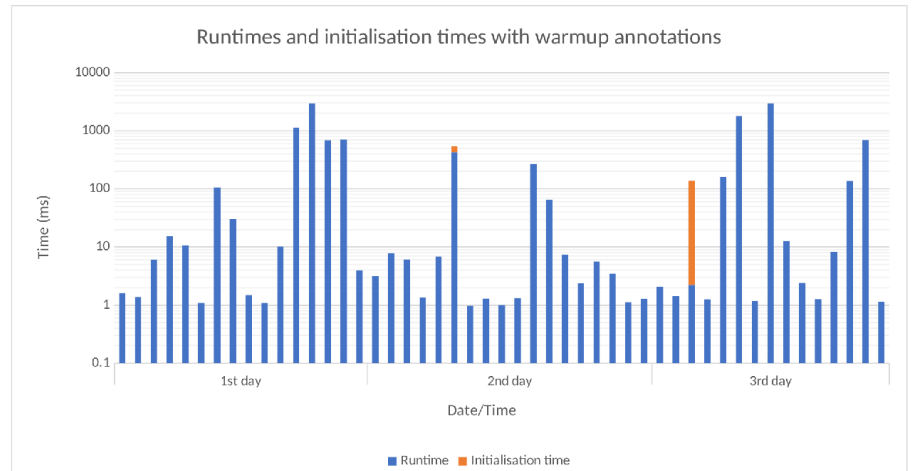
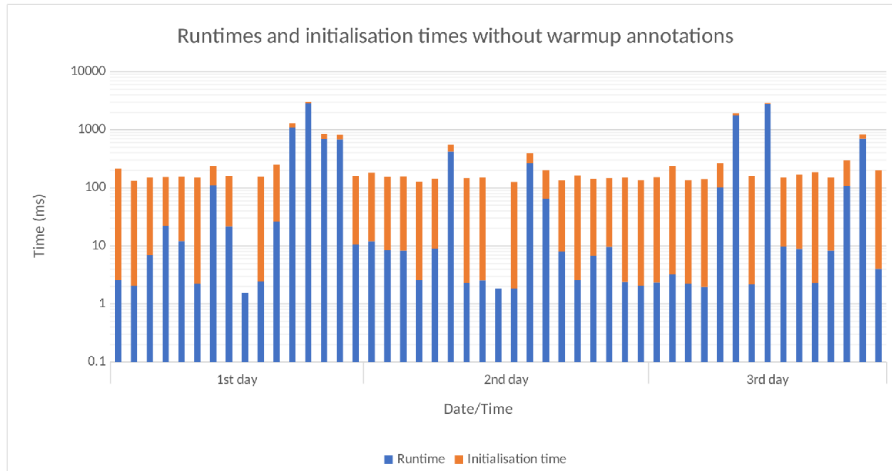
@HttpApi
 (Method=GET,
 Path=/)

FaaS Fusion Design

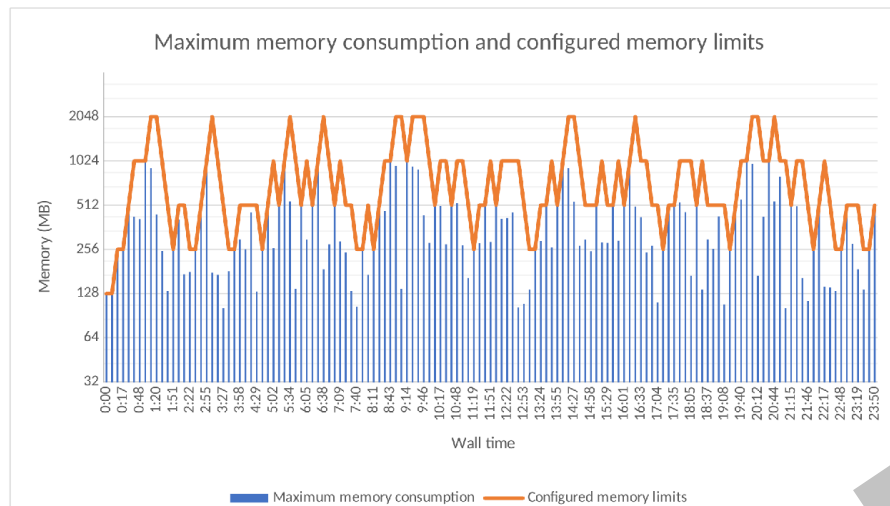


FaaS Fusion Evaluation

@Warmup example



@Autotune example



QUESTIONS?

Code available [<https://github.com/serviceprototypinglab/faasfusion>]