Launching the Micro Future

Groovy, Grails and the Micro Future

— by Graeme Rocher

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Agenda

— How we got here
— Microservice Challenges
— Launching the Micro Future
— Grails Roadmap

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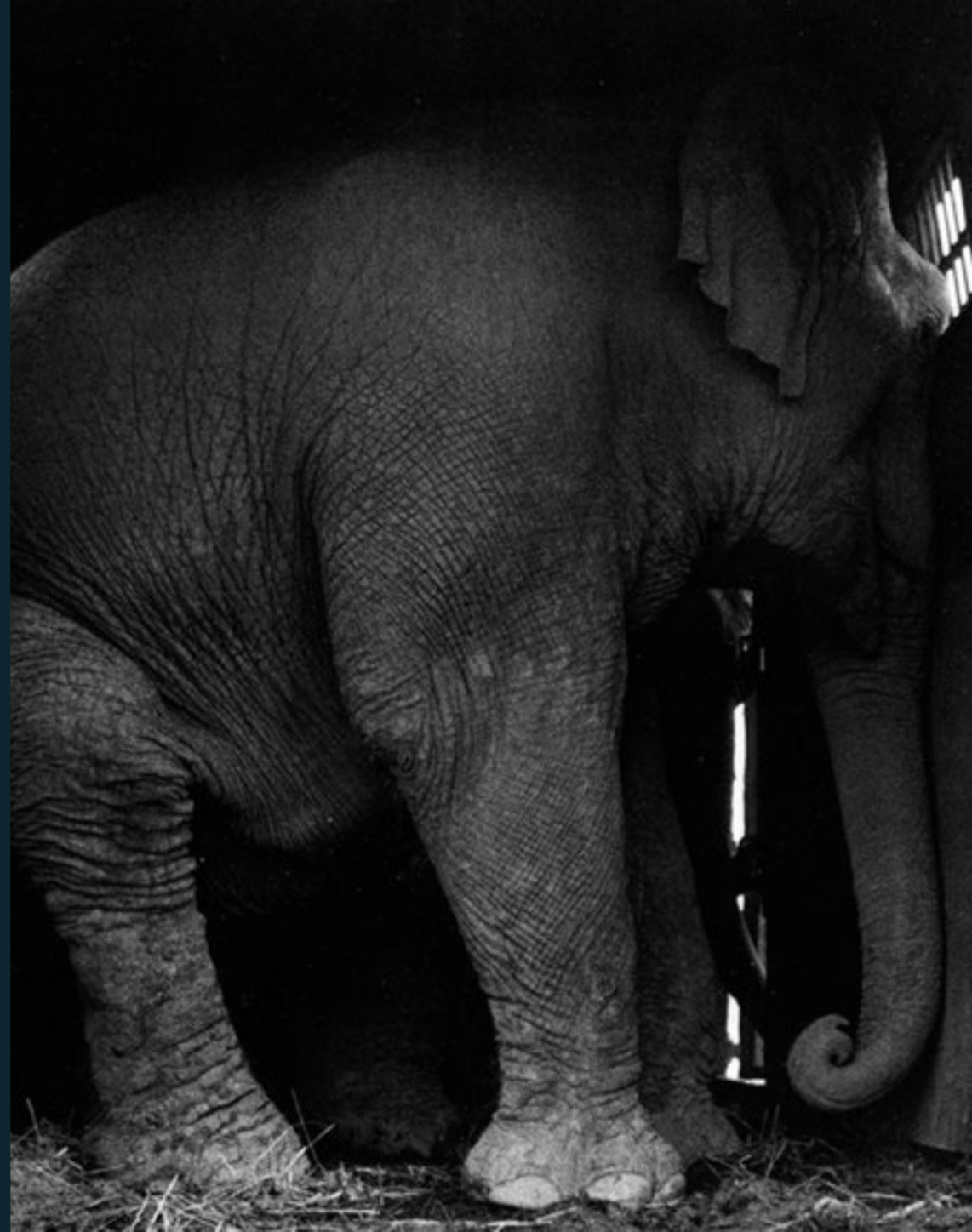
Then and Now

— Since 2008, a lot has changed
— 10 years ago Grails 1.0 was released!
— Everybody was building Monoliths
— No Angular, No React, No Docker, No Microservices

So We Try to Adapt

- Let's try and fit Monolith focused framework into Micro environment!
- Spring and Grails were never designed for this
- … No matter how much marketing you hear



What to do, What to do?

Shall we:

1. Try and convince people that something never designed for Microservices is still ok?
2. Go back to the drawing board

The Goal

— Create a New Framework designed from the ground-up for Microservices and Server-less Computing
— Blazing fast startup time
— Low Memory Footprint
— As Small As Possible JAR Sizes
— Zero Dependency
— 12 Factor - https://12factor.net

The Analysis

To meet this goal we performed an analysis of Spring and Grails and the challenges to using them to develop Microservice applications

What Spring (and Grails) Do

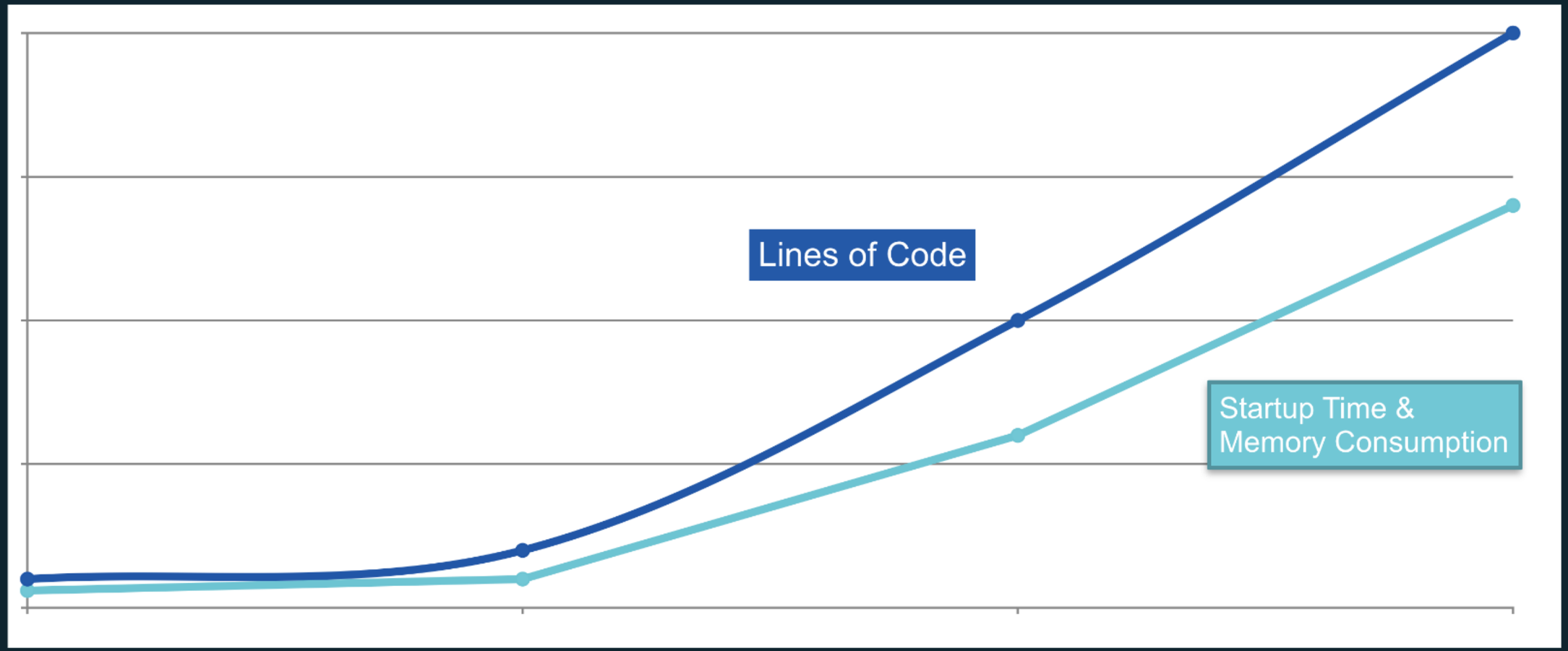
Spring is an amazing technical achievement and does so many things, but does them at Runtime.

— Reads the byte code of every bean it finds

— Synthesizes new annotations for each annotation on each bean method, constructor, field etc. to support Annotation metadata

— Builds Reflective Metadata for each bean for every method, constructor, field etc.

So What's the Problem?



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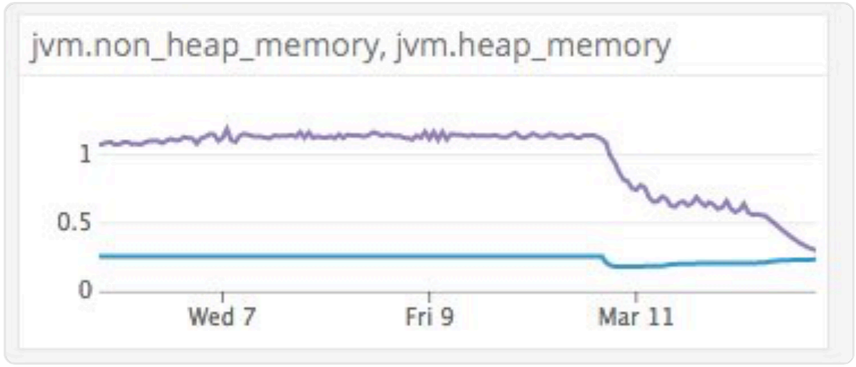
So What's the Problem?

Eric Helgeson
@nulleric

Follow

Grails 3.2.11 -> 3.3.3 - memory usage went down quite a bit! ~1.1G before, now ~250MB (this is even after removing DI from domain classes. @grailsframework #grailsfw



The Micro Reality

- With Spring (and Grails) anything beyond "Hello World" becomes fat quickly
- But we love the programming model and productivity so we live with it
- There must be a better way...

MICRONAUT

Introducing Micronaut

- Designed from the ground up with Microservices in mind
- Ultra-light weight and Reactive - Based on Netty
- Integrated AOP and Compile-Time DI
- HTTP Client & Server

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DEMO

— Hello Micronaut

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Hello Micronaut

```
@Controller
class HelloController {
    @Get("/hello/{name}")
    String hello(String name) { "Hello $name!" }
}
@Client("/") // Client Generated at Compile Time
interface HelloClient {
  @Get("/hello/{name}")
  String hello(String name)
}
```

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How Small?

— Smallest Micronaut Hello World JAR is 8MB when written Java or 12MB in Groovy

— Can be run with as little as 10mb Max Heap (24mb for Groovy)

— Startup time is sub-second for Java, around a second for Groovy

— All Dependency Injection, AOP and Proxy generation happens at compile time

But... How?

— Compile Time Dependency Injection & AOP for Groovy, Java and Kotlin (!)

— AST Transforms for Groovy. Annotation processors for Java/Kotlin

— Annotation metadata produced at Compile Time

— Reflection Free and No Reflection Data Caching

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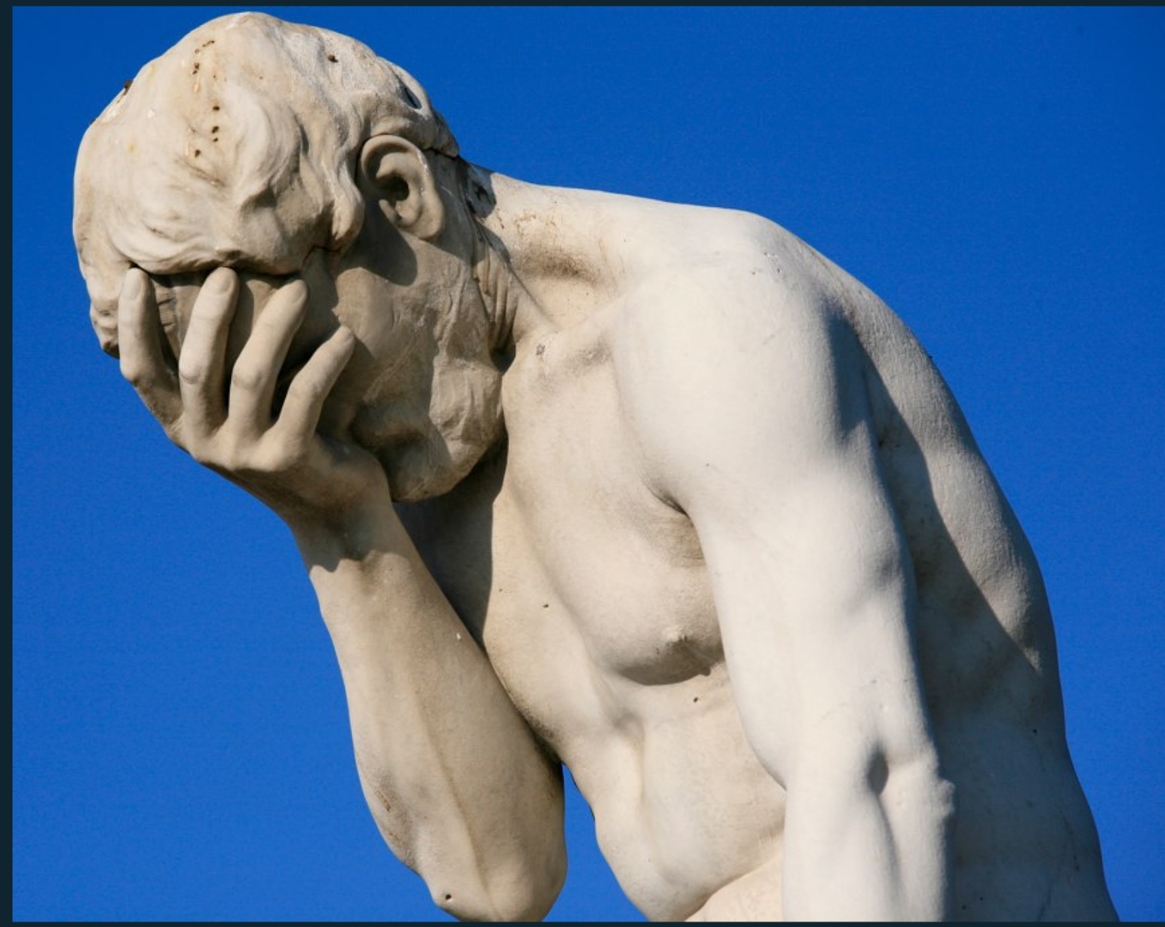
Not Another HTTP Server!?

— If all we had achieved was another HTTP server Micronaut wouldn't be very interesting

— So what else does it do?



Natively Cloud Native

— Service Discovery - Consul and Eureka Supported; Route 53 Planned

— Configuration Sharing - Consul Supported; Amazon & GCP Planned

— Client Side Load Balancing - Integrated or Netflix Ribbon Supported

— Support for Serverless Computing via AWS Lambda

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DEMO

— Micronaut Pet Store

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The HTTP Server

— Fully Reactive and non-blocking - Reactor and RxJava 2.x support

— Auto configuration for common databases

```
@Get('/pets')
Single<List<Pet>> pets() {
    petClient.list()
             .onErrorReturnItem(Collections.emptyList())
}
```

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The HTTP Client

— Client Implementations Produced at Compile Time

— Service Discovery by Service ID

— Automatic Client Side Load Balancing & Fallback

```
@Client(id = "pets", path = "/v1")
interface PetClient {
    @Get('/pets')
    Single<List<Pet>> list()
}
```

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Serverless Computing

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— Write Functions and Run them locally or as regular server applications

— Deploy Functions to AWS Lambda - after warm-up functions execute in milliseconds

```
@Field @Inject Twitter twitter

@CompileStatic
URL updateStatus(Message status) {
    Status s = twitter.updateStatus(status.text)
    String url = "https://twitter.com/$s.user.screenName/status/${s.id}"
    return new URL(url)
}
```

Micronaut Roadmap

— First Milestones in Q2
— GA by the end of the year. Still todo:
— AWS Route 53,
Google Metadata Server Support
— Metrics & Distributed Tracing
— JWT Token Auth

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Micronaut - Find Out More

- We have launched a Micronaut website at: http://micronaut.io
- Register at the bottom to get notifications
- Speak to us (OCi) if you wish to use Micronaut in beta form
- Check out Alvaro's talk about Micronaut on Saturday at 9:30am

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What About Grails?

— Grails is awesome, mature and robust
... for Creating Monoliths

— Not every Application needs Microservices

— You will want parts of Micronaut in your Grails apps:
HTTP Client, Discovery Client etc.

Grails Status Update

— Grails 3.3.3 just released
— Users seeing measured improvement in Memory consumption in production
— More 3.3.x releases planned

Grails 4.0 (Q4 2018)

— Java 8 minimum, Java 9 support, Groovy 2.5
— Spring Boot 2 and Spring 5
— GORM 7.0 (Hibernate 5.2 minimum)
— Micronaut Integration

Summary

— Micronaut aims to provide the same wow factor for Microservices that Grails did for Monoliths

— Built by the people that made Grails, leveraging over 10 years experience in framework development

— Coming soon in 2018

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Q & A

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