

# Launching the Micro Future

Groovy, Grails and Project Particle  
— by Graeme Rocher



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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 Micro Services

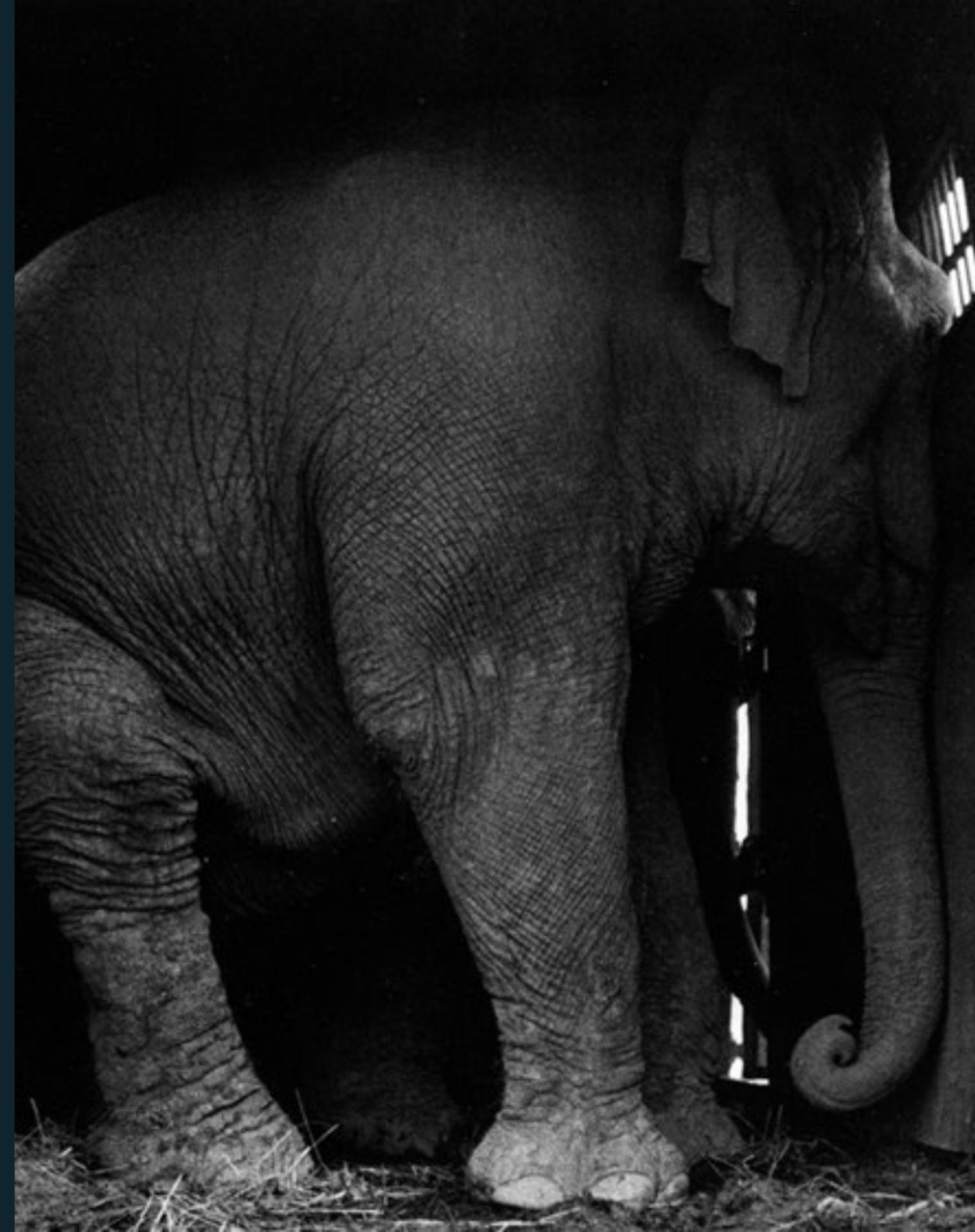


# So We Try to Adapt

- 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



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## What to do, What to do?

Shall we:

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

# The Goal

- Create a New Framework designed from the ground-up for Micro Services 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 Micro Service applications

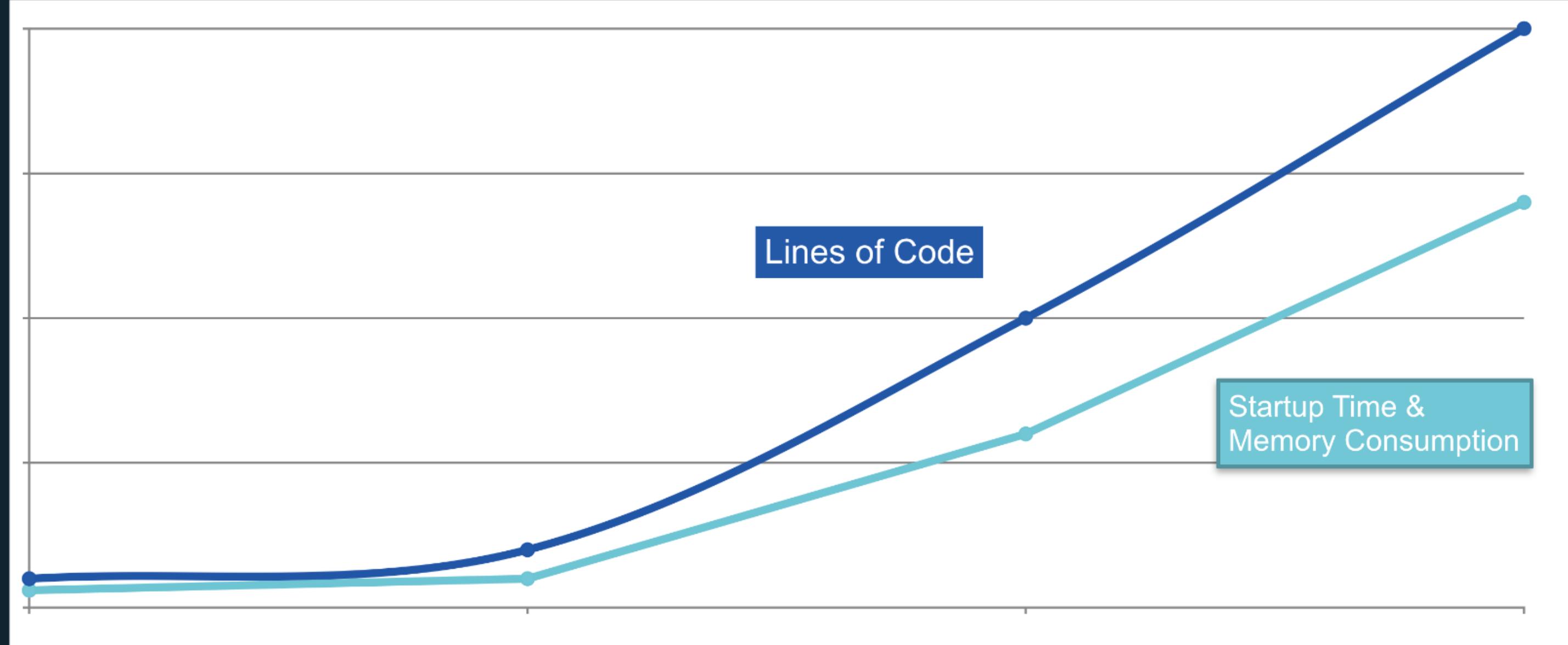


# What Spring (and Grails) Do

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.

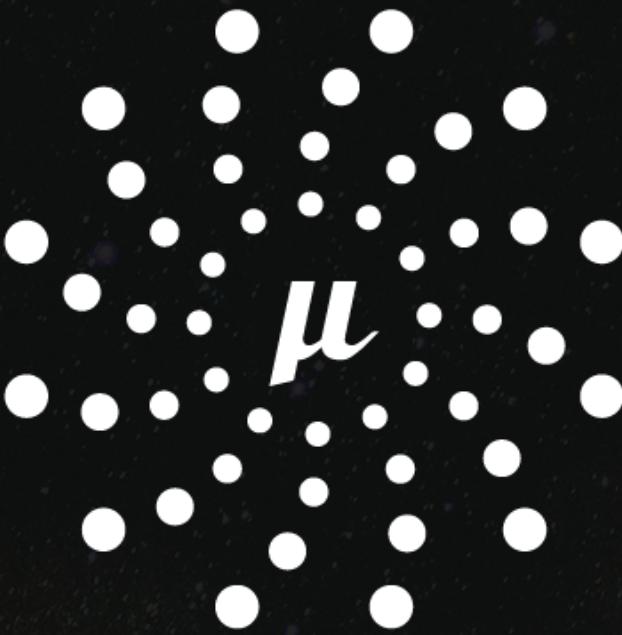
# So What's the Problem?



# 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...

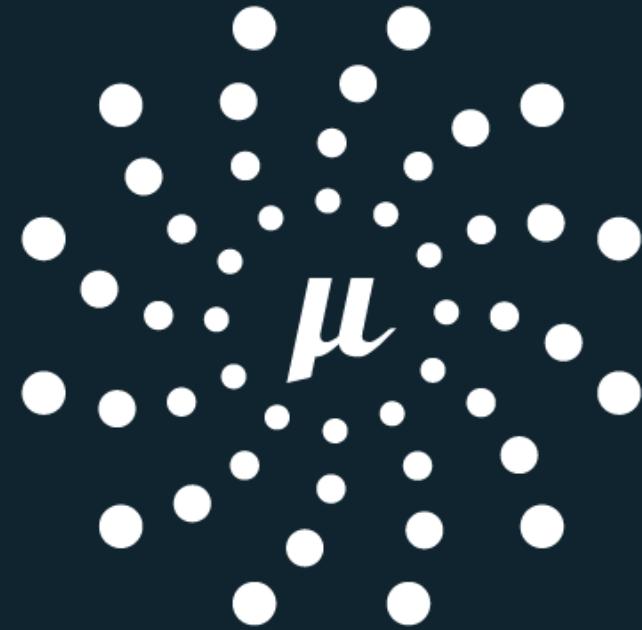




M I C R O N A U T

# Introducing Micronaut

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



MICRONAUT

# 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)
}
```

# How Small?

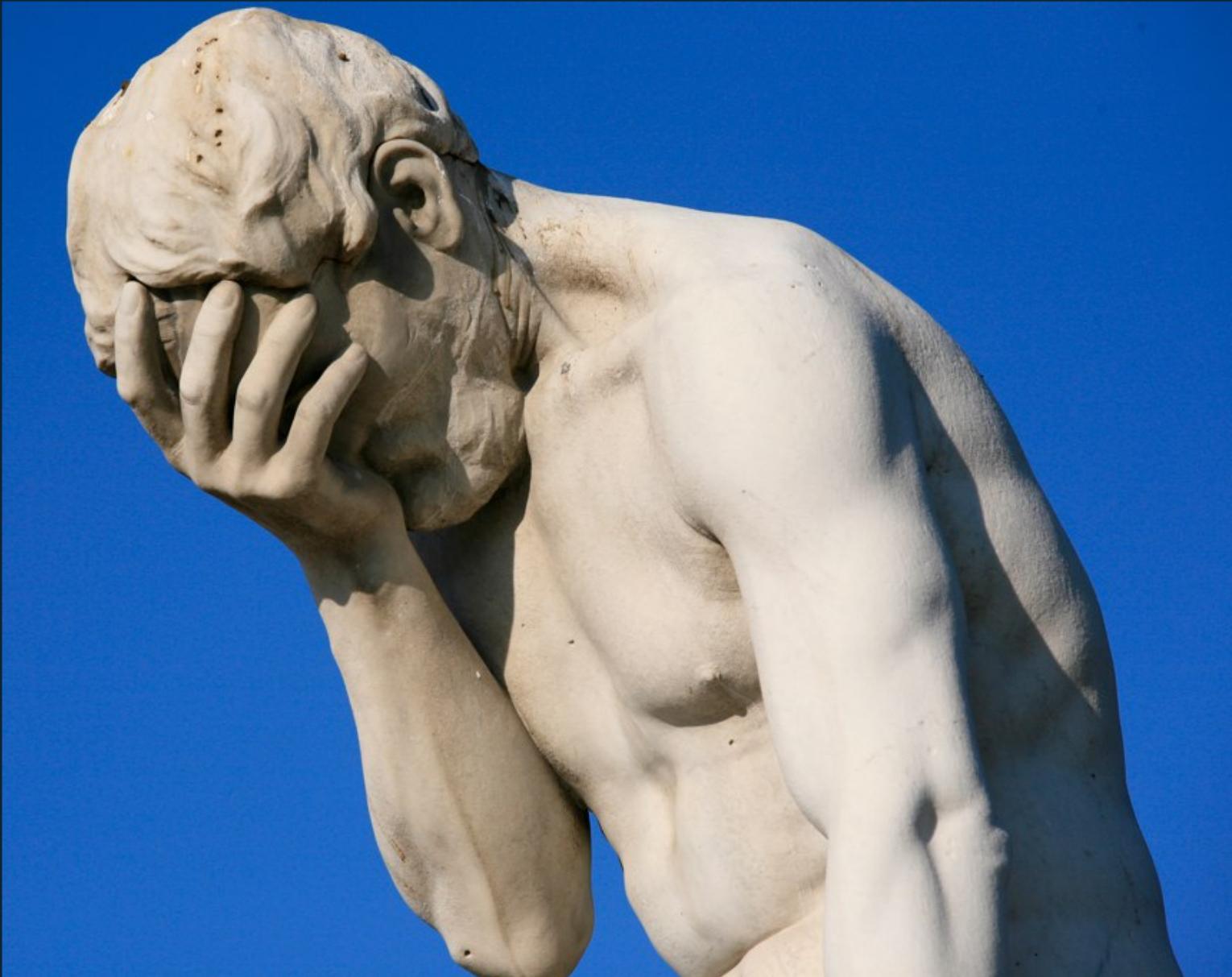
- Micronaut Hello World JAR is 8MB when written Java or 12MB in Groovy
- Can be run with as little as 8mb Max Heap (12 for Groovy)
- Startup time is sub-second
- All Dependency Injection, AOP and Proxy generation happens at compile time

# But... How?

- Compile Time Dependency Injection & AOP for Groovy and Java
- Annotation metadata produced at Compile Time
- Reflection Free and No Reflection Data Caching

# 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

# DEMO

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MICRONAUT

# 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())
}
```

# 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()
}
```

# Serverless Computing



- 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
- TODO: AWS Route 53,  
Google Metadata Server Support
- TODO: Metrics & Distributed Tracing
- TODO: Retry & Hystrix Support



# What About Grails?

- Grails is awesome, mature and robust  
... for Creating Monoliths
- Not every Application needs Micro Services
- You will want parts of Micronaut in your Grails apps:  
HTTP Client, Discovery Client etc.



# Grails 4.0 (Q4 2018)

- Java 8 minimum, Java 9 support, Groovy 2.5
- Spring Boot 2 and Spring 5
- GORM 7.0
- Micronaut Integration



# Summary

- Micronaut aims to provide the same wow factor for Micro Services 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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