

MICRONAUT FRAMEWORK

COMPILATION LIMITS

Presentation by [Ryszard Perkowski](#)

ABOUT ME



Fox Heap

USING SPRING SINCE 2006

AGENDA

- Problem
- Solution
- API Overview
- Benchmarks and other lies
- QA

So What's the Problem?



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WHY?

A LOT HAPPENS IN RUNTIME

- Read the byte code of every bean it finds
- Synthesize new annotations
- Build Reflective Metadata

OTHER PROBLEMS

- Type erasure
- Slow reflection
- Reflective data caches
- Classpath scanning
- Dynamic class loading

LET ME DEMON-STRATE

- Spring Boot petclinic



ON TOP OF IT

Types of Headaches

Migraine



Hypertension



Stress



Docker

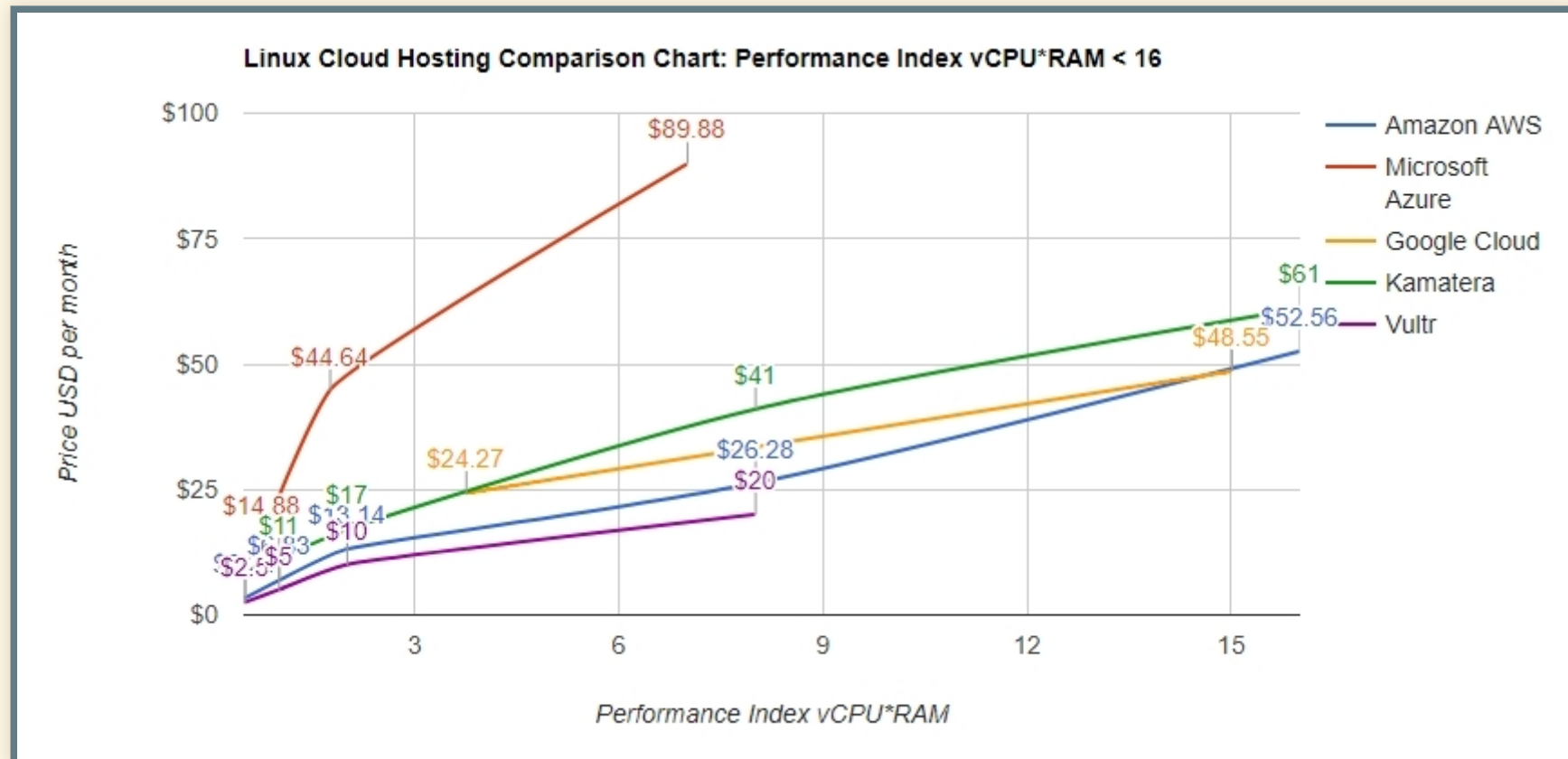


AWS

- IO
- CPU
- Network



CLOUD COST



https://en.wikipedia.org/wiki/Amazon_Elastic_Compute_Cloud

WHAT CAN YOU DO?

BUY A BIGGER MAC

i-KOMP

☆ OBSERWUJ



Macbook Pro 15 6-core i9 2.9Ghz 16GB 4TB 560X 4GB

od i-komp

29 200,00 zł

98,6%

poleca sprzedawcę

10 dni roboczych

czas wysyłki

darmowa

dostawa

darmowy

zwrot

OPCJE DOSTAWY ▾

Pojemność dysku

256

512

1000

2000

4000

Wielkość pamięci RAM

16 GB

32 GB

Liczba sztuk

—

1

+

ze 150 sztuk

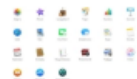
DODAJ DO KOSZYKA

KUP TERAZ

Masz firmę? Weź w leasing

Allegro gwarantuje bezpieczne zakupy

Otrzymasz kupiony przedmiot albo zwrócimy Ci pieniądze. [Sprawdź szczegóły.](#)



don't worry, pay more

BUY AMAZON SHARES

Amazon.com, Inc.
NASDAQ: AMZN

+ Follow

1,692.00 USD **-83.07 (4.68%)** ↓

Jun 3, 12:40 EDT · Disclaimer

1 day

5 days

1 month

6 months

YTD

1 year

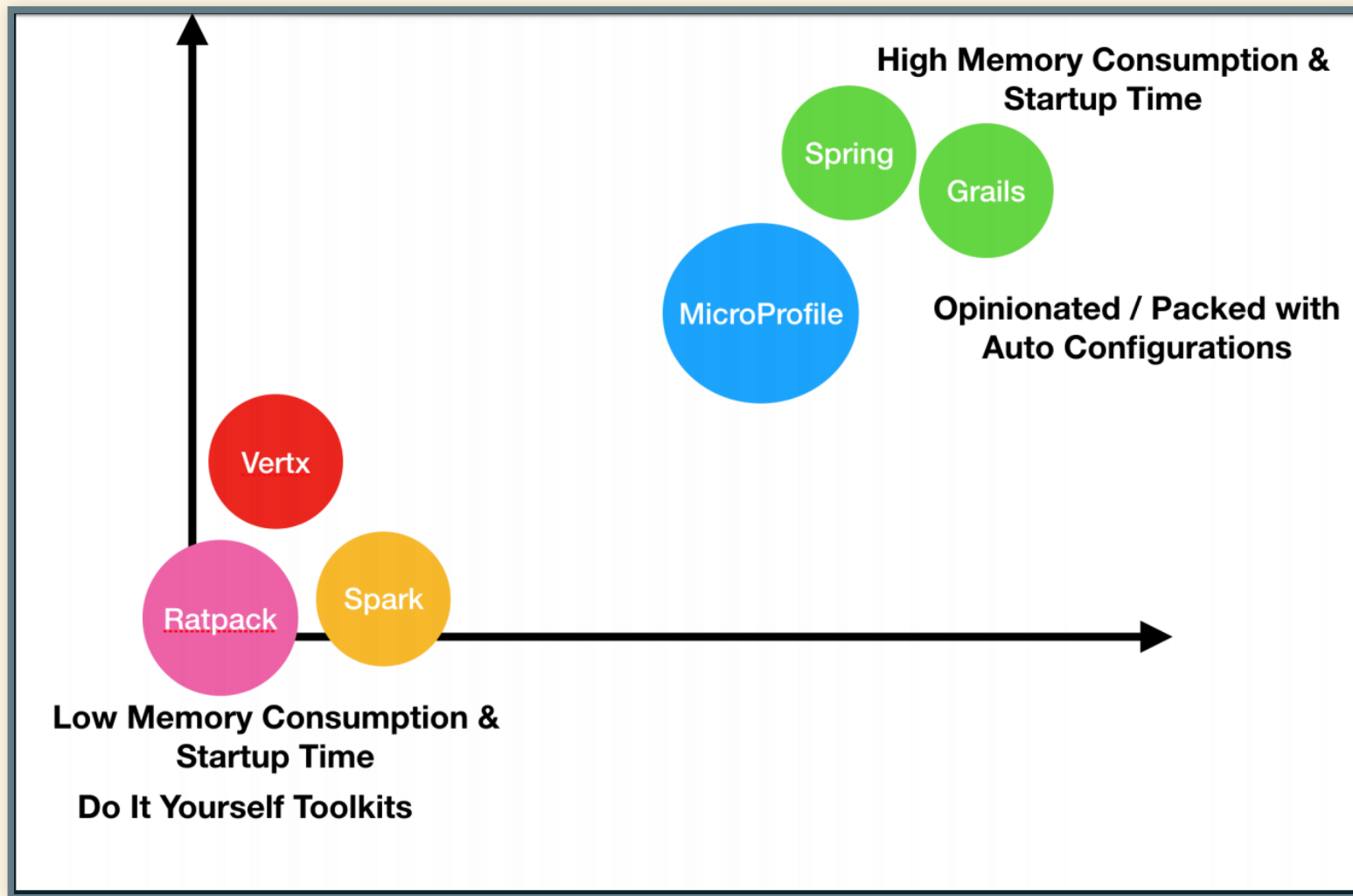
5 years

Max



Open	1,760.01	Div yield	-
High	1,766.29	Prev close	1,775.07
Low	1,685.04	52-wk high	2,050.50
Mkt cap	833.07B	52-wk low	1,307.00
P/E ratio	70.59		

do less



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SOLUTION - POTENTIAL

- Ahead of time compilation
- Google Dagger 2.x

JAVA SERVER WORLD



M I C R O N A U T

GOAL

- Create a New Framework designed from the groundup for Microservices and Serverless Computing
- Blazing fast startup time
- Low Memory Footprint
- As Small As Possible JAR Sizes
- Zero Dependency
- 12 Factor - <https://12factor.net>

HOW

- DI during compilation
- Reactive - based on Netty
- AOP, proxies all processed during compilation

HOW SMALL

How Small?

- Smallest Micronaut Hello World JAR is 10MB when written Java or 12MB in Groovy
- Can be run with as little as 10mb Max Heap with Kotlin or Java (22mb for Groovy)
- Startup time around a second for Kotlin or Java (a little more for Groovy)
- All Dependency Injection, AOP and Proxy generation happens at compile time



OCI | WE ARE SOFTWARE ENGINEERS



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API

- Demo

API FUNCTIONS

- AWS Lambda

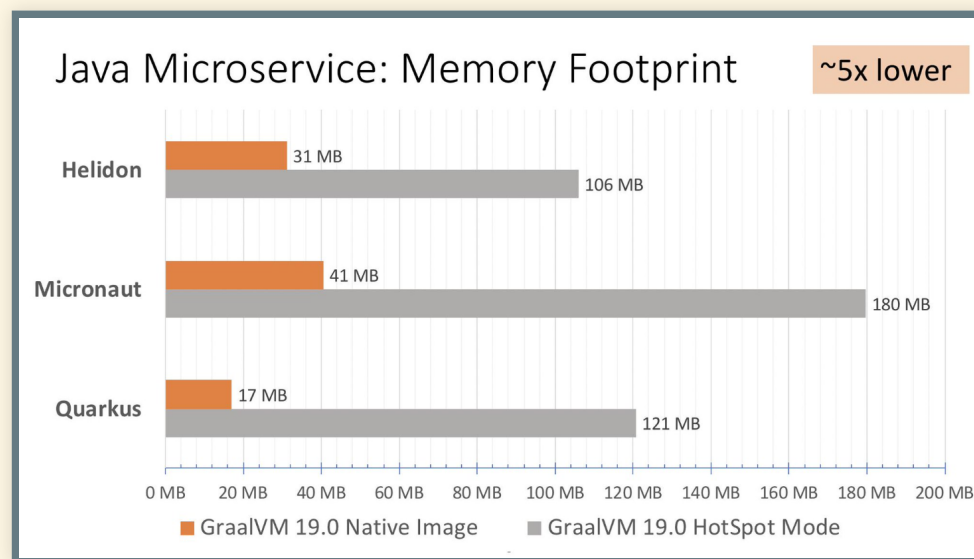
OTHER BENEFITS

- Better tooling integration (Jackson)
- Auto Documentation
- GraalVM

GRAALVM

GRAALVM NATIVE IMAGE

20ms startup with 18MB consumption



<https://medium.com/graalvm/lightweight-cloud-native-java-applications-35d56bc45673>

GRAALVM REQUIREMENTS

plan ahead

BENCHMARKS

Benchmark

OUR RESULTS

- Project size - medium - ~ 300 classes with logic
- Jar size - 150MB -> 42MB
- Startup - 8s - 2s

OUR ISSUES

- HTTP status 499

OUR ISSUES

4xx CLIENT ERROR

499 CLIENT CLOSED REQUEST

A non-standard status code introduced by [nginx](#) for the case when a client closes the connection while nginx is processing the request.

Source: [nginx.org](#)

← [Return to httpstatuses.com](#)

COMPETITION

- Quarkus
- Helidon

Micronaut Application Framework <http://micronaut.io>

microservices

java

kotlin

groovy

cloudnative

serverless

📄 6,104 commits

🌿 36 branches

📦 20 releases

👤 129 contributors

📄 Apache-2.0

Branch: master ▾

New pull request

Create new file

Upload files

Find File

Clone or download ▾



jameskleeh Merge pull request #1682 from jespersm/patch-1 ...

Latest commit 982b64c 3 days ago

📁 aop	Fix handling of raw generic argument types	last month
📁 benchmarks	Add benchmark for processing environment variables. Issue #1714	6 days ago
📁 bom	Merge branch '1.1.x'	9 days ago
📁 buffer-netty	Fix shadowjar configuration (#1486)	this year
📁 cli	Merge branch '1.1.x'	9 days ago
📁 config	Merge branch '1.1.x'	last month
📁 configurations	Merge branch '1.1.x'	18 days ago
📁 core	Fix Javadoc	5 days ago
📁 discovery-client	Fix multiple environment ordering in route53 and consul config discovery	8 days ago
📁 function-client	Optimize annotation metadata resolution performance (#1717)	9 days ago
📁 function-web	Merge branch '1.1.x'	9 days ago

FUTURE LOOKS BRIGHT



- ORM
- reflection-free validation-api
- OAuth2
-
- JMS

SUMMARY

- Micronaut is small and fast
- has many Spring features
- allows for a lot of new features

Q & A