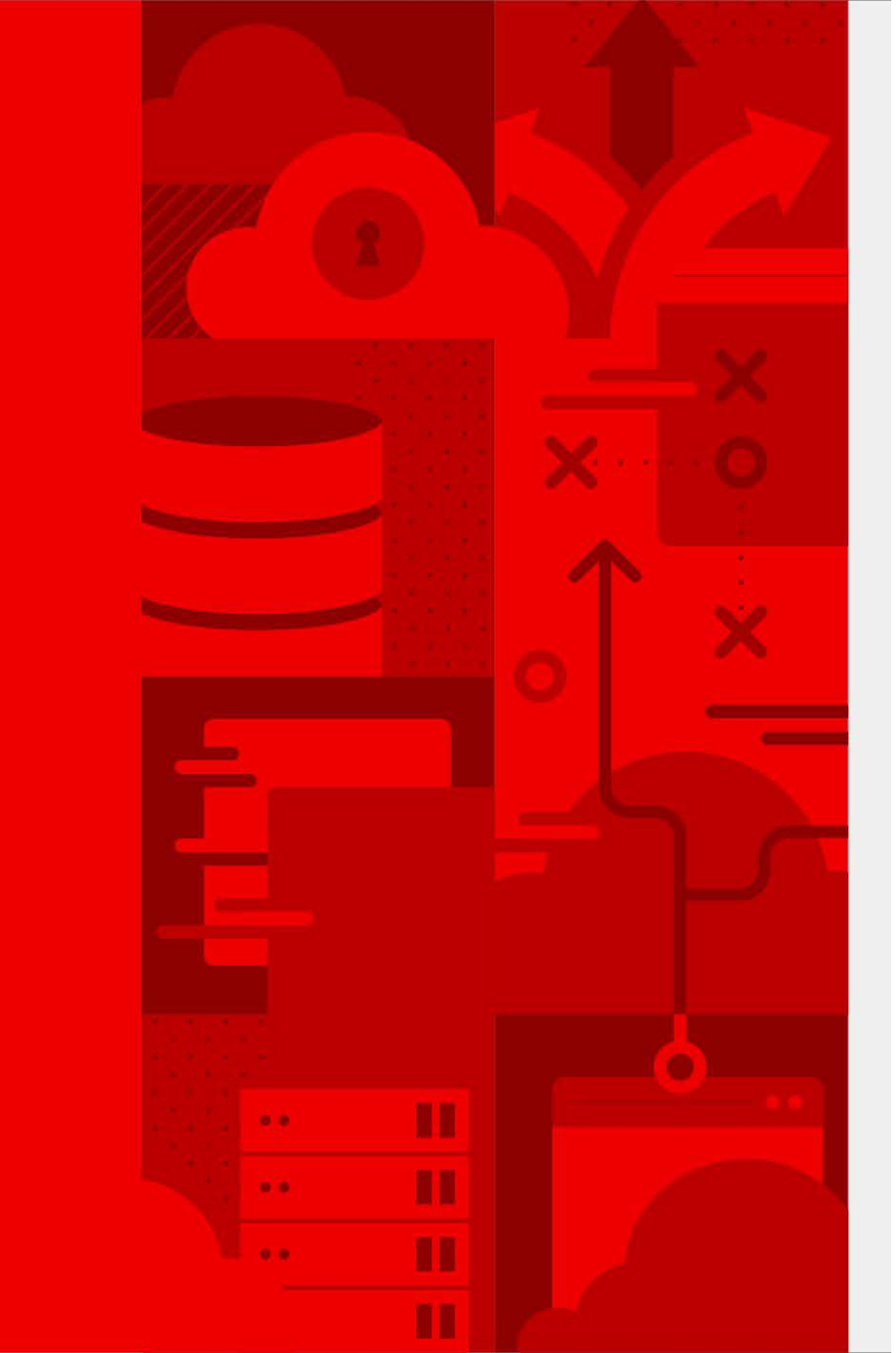

QUARKUS

Technical Deep Dive

Jose Alsonso
Todd Millard
Mike Kohorst

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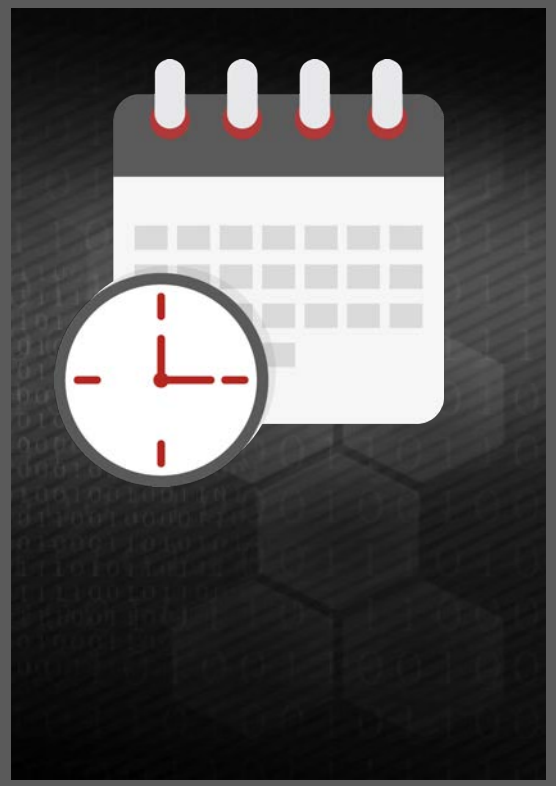
INTEGRATE·AUTOMATE·DELIVER

WEBINAR AGENDA

- 2pm start. 180mins Duration. Recorded event.



10:00	01	Company Introduction
10:15	02	Introduction to Quarkas
10:30	03	Commence Workshop THREE
12:45	04	Conclusions and Wrap-up
1:00	05	Close

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CROSSVALE™
INTEGRATE · AUTOMATE · DELIVER

Who Is Crossvale?

WHAT, WHERE, HOW AND WHEN

- Offices in UK, Spain and US

How we Engage

- Discovery calls
- Assessments
- PoC
- SoW

Contact:

sales@Crossvale.com

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Crossvale is your fastest route to your business success

Who Is Crossvale?

Crossvale supports customers in rethinking **Digital Transformation**.

Our team provides expertise in every area to meet the needs of your **Modernization** initiative

We are **Hybrid** heavy

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DAY ZERO

DAY ONE

DAY TWO

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Automation

Hybrid Cloud

SDLC Modernization

Rethink Repetitive Tasks

Automation Enables Strategic Thinking at the Speed of Business

Low-Level repetitive Business and IT tasks are cost organizations large amounts of shareholder value!

Rethink Where IT is Running

Hybrid Cloud Enables IT to Run at the Speed of Business

A lack of a modern hybrid cloud strategy limits organization's ability to think innovatively, which enables disruptors to take market share.

Rethink Development Processes

Modern SDLC Enables IT to Develop at the Speed of Business

Legacy SDLC processes cost organizations known and unknown revenue opportunities. When IT is not able to deliver at the speed of Business

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RED HAT PARTNER OF THE YEAR

- 2018 – Red Hat Application Platform Partner of the Year.
- 2019 – Red Hat Application Platform Partner of the Year.
- 2020 – Red Hat Leading Edge Partner of the Year.
- 2021 – Red Hat Customer solution Partner of the Year
- 2021 – Crossvale EMEA – Red Hat Container Platform Specialist

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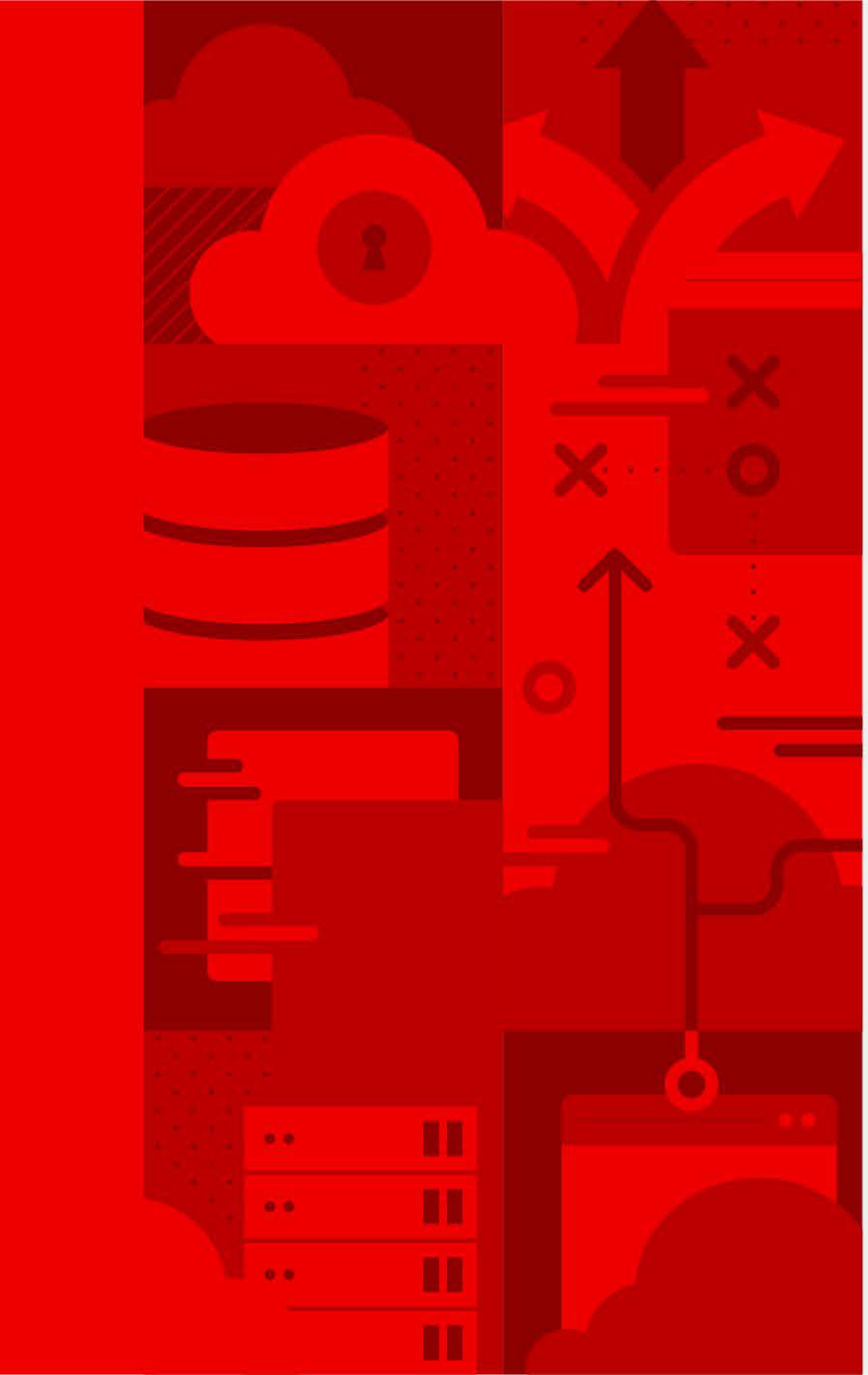
Red Hat
Apex Partner

CROSSVALE
INTEGRATE·AUTOMATE·DELIVER



QUARKUS

Technical Deep Dive

KUBERNETES-NATIVE JAVA

Monolith

Cloud Native

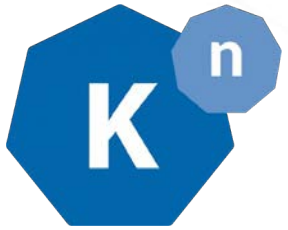
Microservices

Serverless

Event-Driven Architecture

kubernetes

Istio



Knative

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Red Hat

“HISTORICAL” ENTERPRISE JAVA STACK

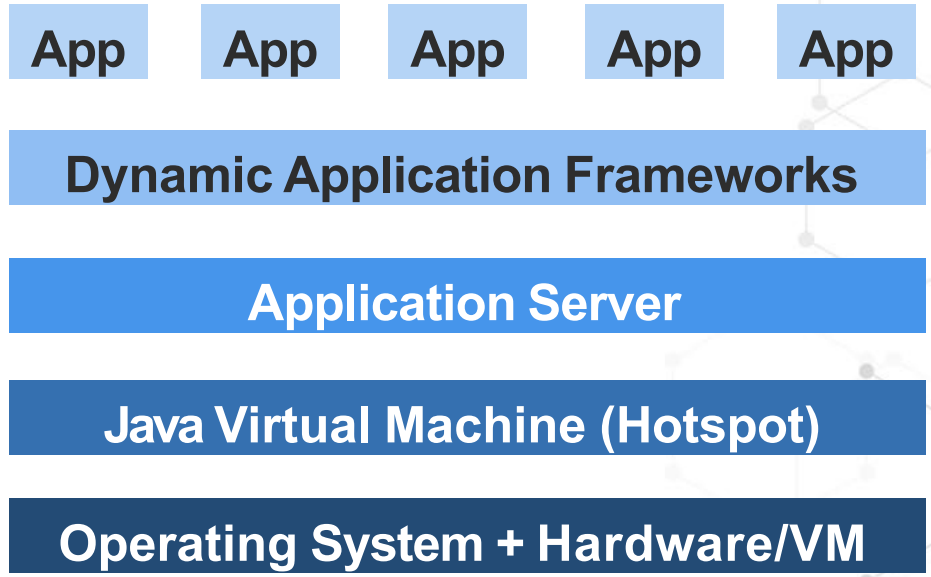
Architecture: Monoliths

Deployment: multi-app, appserver

App Lifecycle: Months

Memory: 1GB+ RAM

Startup Time: 10s of sec



"MODERN" ENTERPRISE JAVA STACK

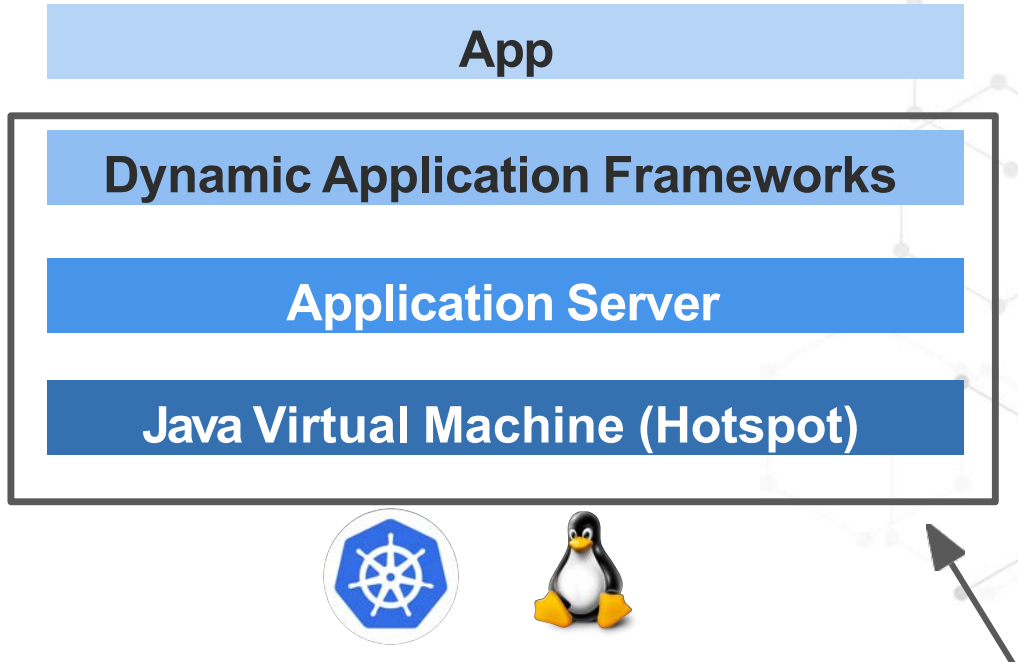
Architecture: Microservices

Deployment: Single App

App Lifecycle: Days

Memory: 100MBs+ RAM

Startup Time: Seconds



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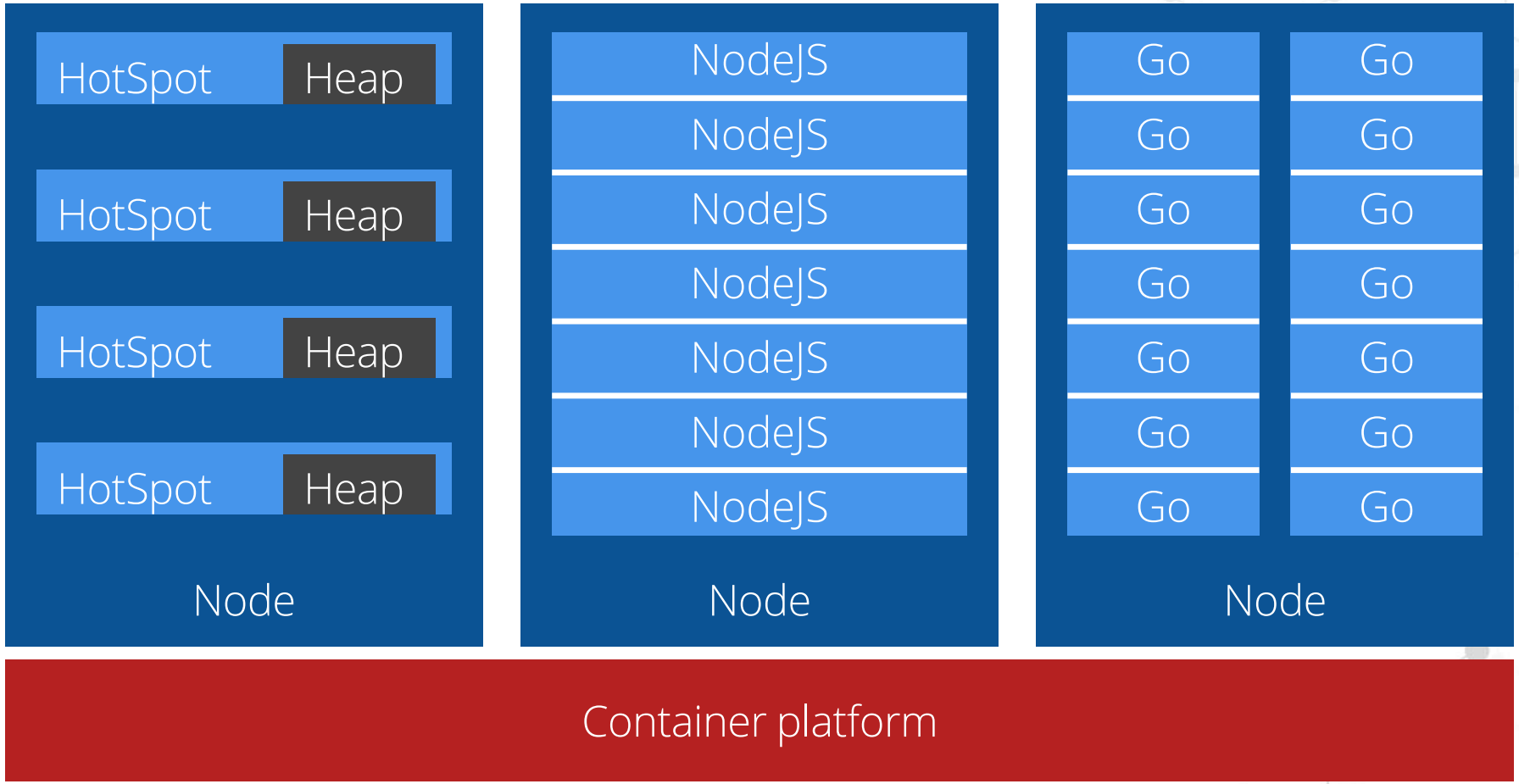
HIDDEN TRUTH ABOUT JAVA + CONTAINERS



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THERE IS A NEED FOR A NEW JAVA STACK FOR CLOUD-NATIVE AND SERVERLESS

QUARKUS

SUPERSONIC. SUBATOMIC. JAVA.

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WHAT IS QUARKUS?

QUARK: elementary particle / **US**: hardest thing in computer science

EXPERTS FROM CLOUD-NATIVE JAVA OS PROJECTS

Eclipse Vert.x

Hibernate

RESTEasy

Eclipse MicroProfile

WildFly

Undertow

OpenJDK

QUARKUS

DIFFERENTIATORS

Container First

Tailors your app for HotSpot & GraalVM Fast boot time and low RSS memory Serverless fit

Unifies Imperative & Reactive

Combines blocking and non-blocking Built-in event bus

Developer Joy

Live coding

Unified configuration

Best of Breed Libraries & Standards

90+ extensions

“Powered by Quarkus” applications

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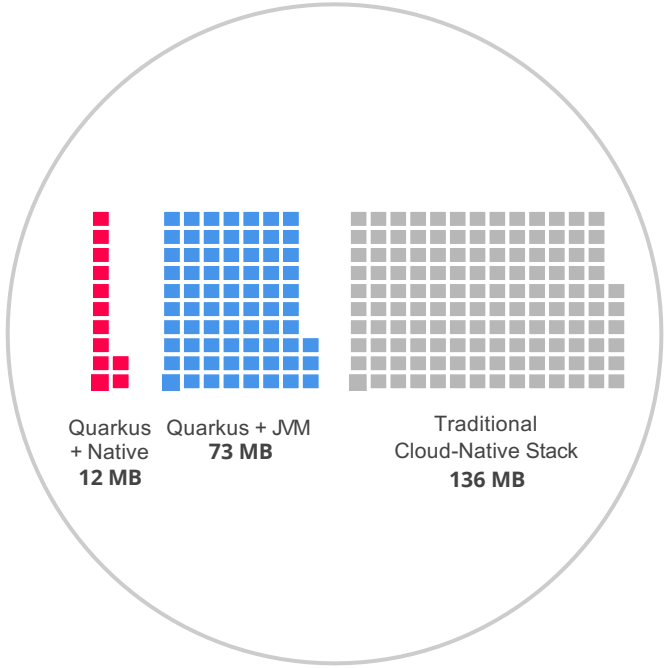
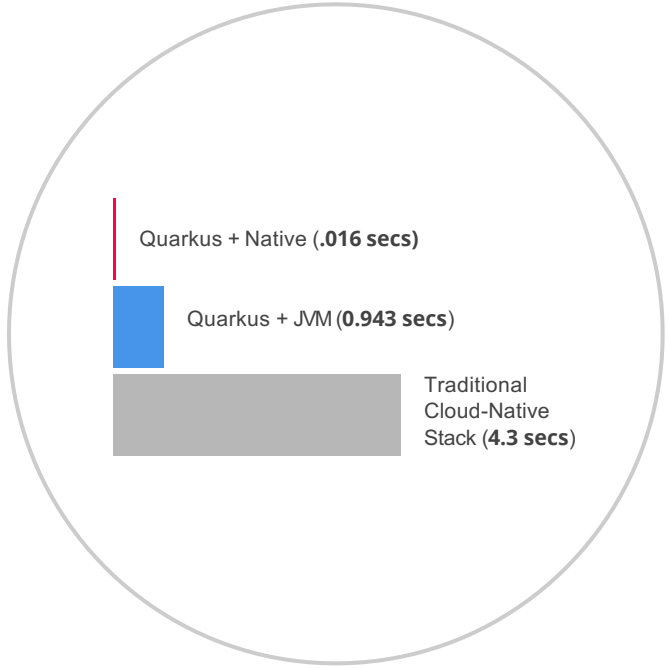
BENEFIT NO. 1: CONTAINER FIRST

"We went from 1-min startup times to 400 milliseconds"

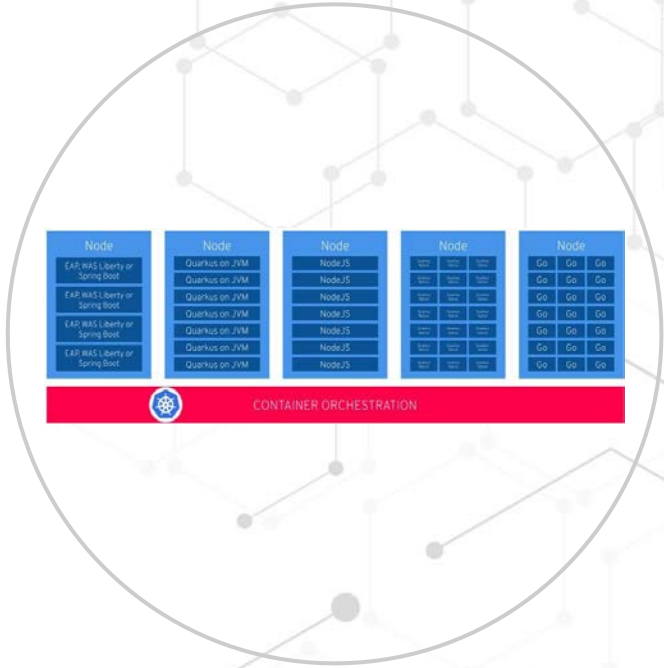
Reduced Memory Footprint



Fast Startup Time



Smaller Disk Footprint



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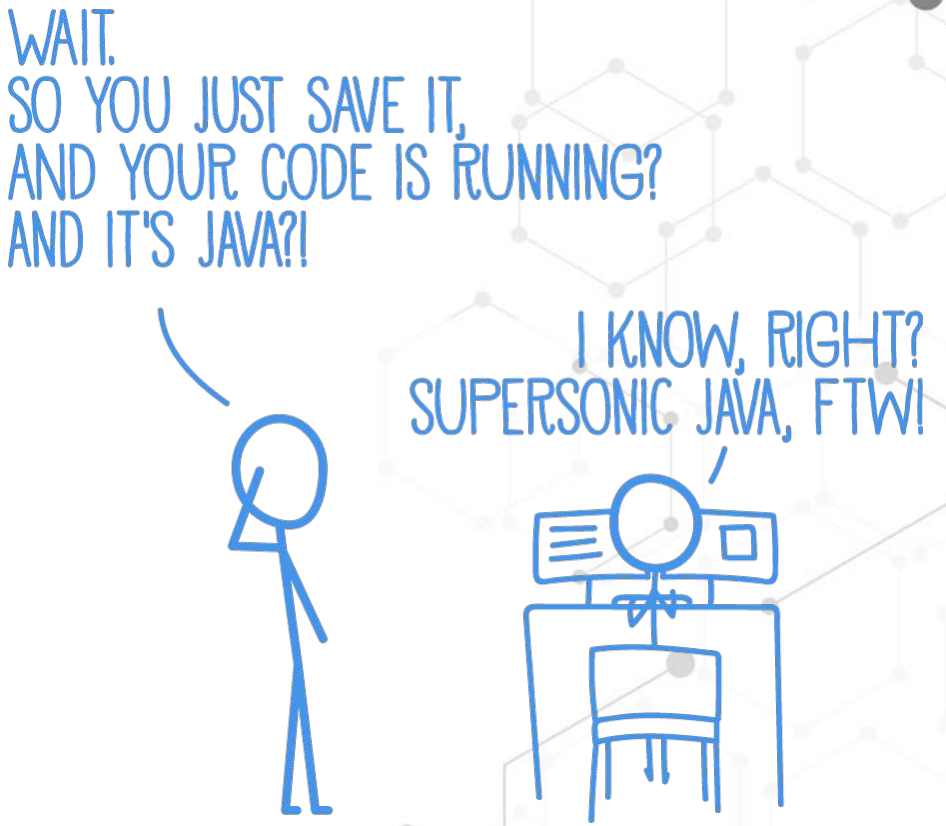
BENEFIT NO. 2 : DEVELOPER JOY

"Our developers used to wait 2 to 3 mins to see their changes. Live coding does away with this."

A cohesive platform for optimized developer joy:

- Based on standards and more
- Unified configuration
- Live coding
- Streamlined code for the 80% common usages, flexible for the 20%
- No hassle native executable generation



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BENEFIT NO. 3: UNIFIES IMPERATIVE AND REACTIVE

```
@Inject
SayService say;

@GET
@Produces(MediaType.TEXT_PLAIN)
public String hello() {
      return say.hello();
}
```

```
@Inject @Stream("kafka")
Publisher<String> reactiveSay;

@GET
@Produces(MediaType.SERVER_SENT_EVENTS)
public Publisher<String> stream() {
      return reactiveSay;
}
```

- Combine both Reactive and imperative development in the same application
- Inject the EventBus or the Vertx context
- Use the technology that fits your use-case
- Key for reactive systems based on event driven apps

BENEFIT NO. 4 : BEST OF BREED FRAMEWORKS & STANDARDS

"When you adopt Quarkus, you will be productive from day one since you don't need to learn new technologies."

Eclipse Vert.x


Hibernate

RESTEasy


Apache Camel


Eclipse MicroProfile


Netty


Kubernetes

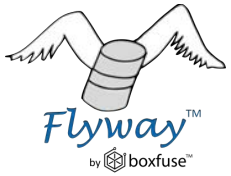

OpenShift


Jaeger

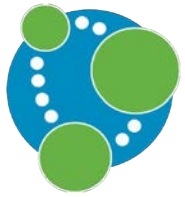

Prometheus


Apache Kafka


Infinispan



Flyway


Neo4j

MongoDB

MQTT


KeyCloak

Apache Tika

CROSSVALE
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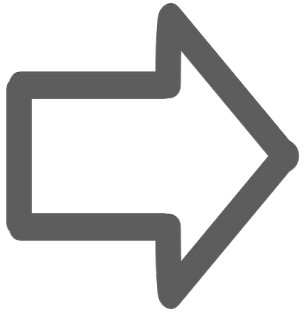
Red Hat

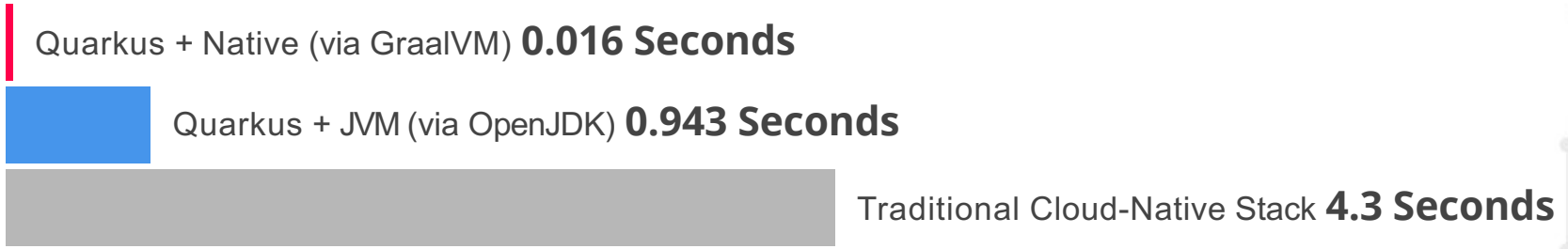


SUPERSONIC, SUBATOMIC

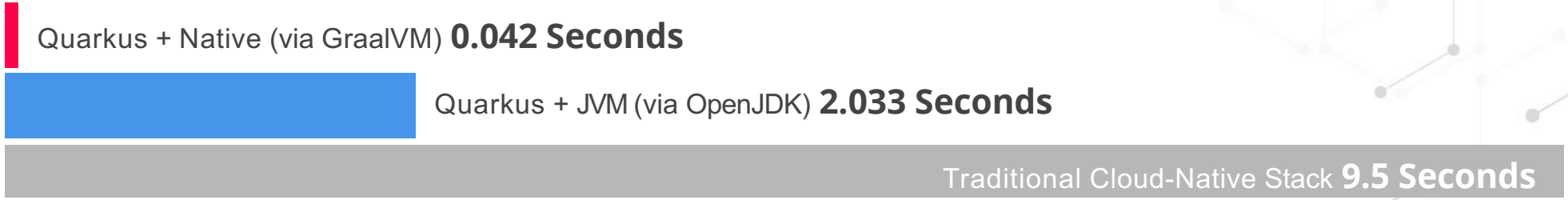
Fast.
Blazing fast to start.
Millisecond fast!

SUPERSONIC, SUBATOMIC JAVA

REST



REST + CRUD



Time to first response

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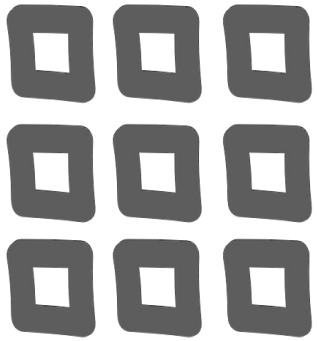
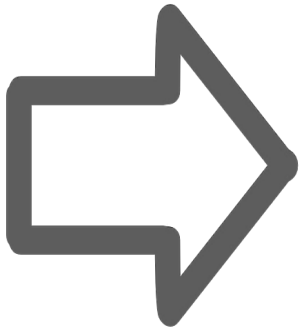




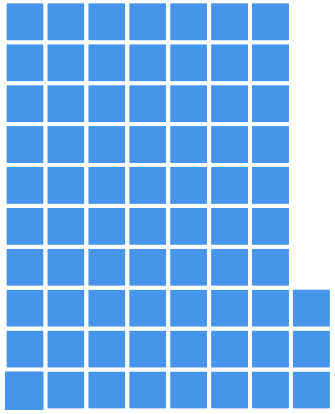
Supersonic, Subatomic

Improve memory consumption. Increase deployment density.

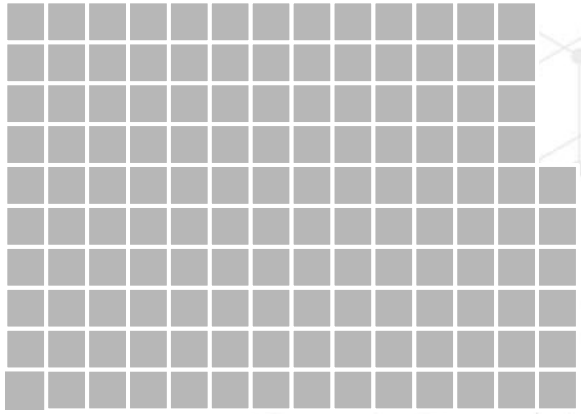
SUPERSONIC, SUBATOMIC JAVA

REST*

Quarkus + Native
(via GraalVM)
12 MB



Quarkus + JVM
(via OpenJDK)
73 MB

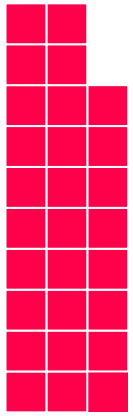


Traditional
Cloud-Native Stack
136 MB

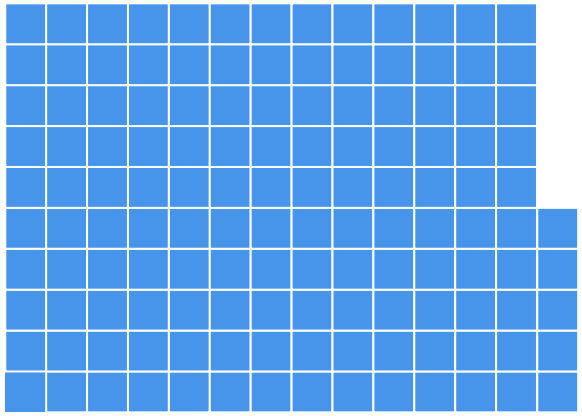
*Memory (RSS) in Megabytes, tested on a single-core machine

SUPERSONIC, SUBATOMIC JAVA

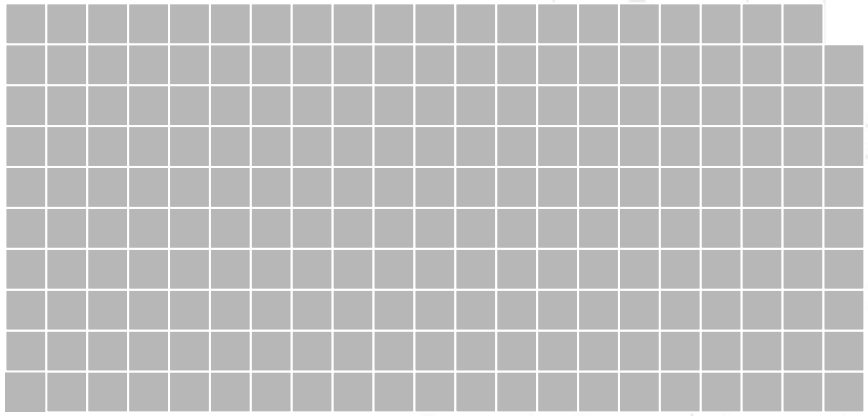
REST + CRUD*



Quarkus + Native
(via GraalVM)
28 MB



Quarkus + JVM
(via OpenJDK)
145 MB



Traditional
Cloud-Native Stack
209 MB

*Memory (RSS) in Megabytes, tested on a single-core machine

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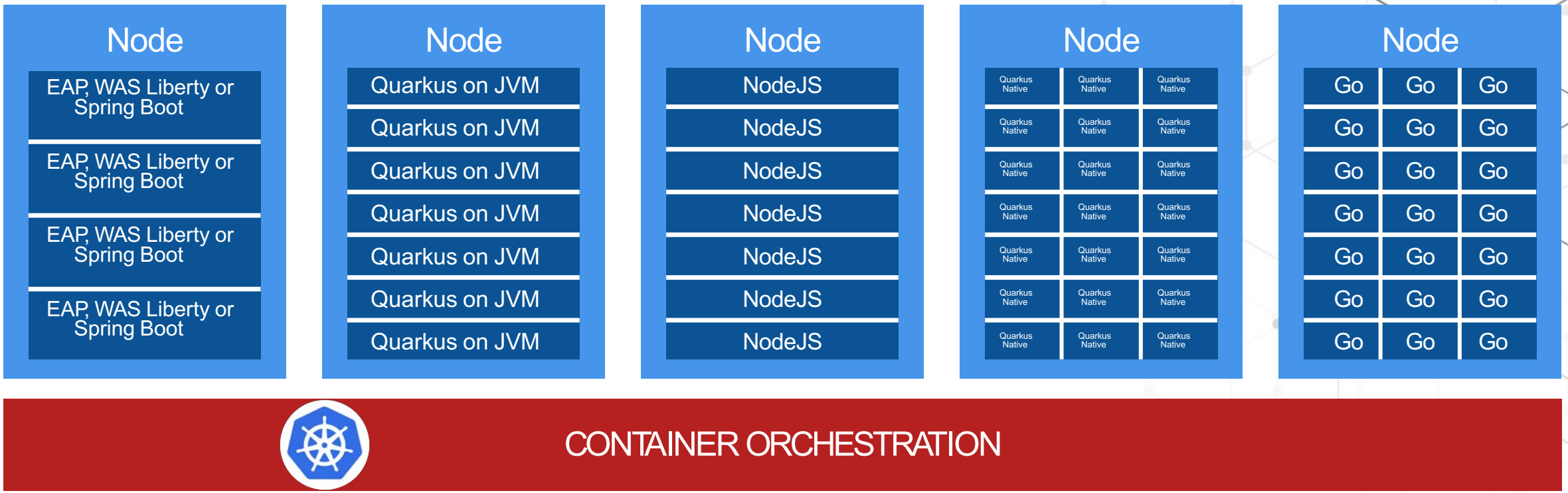
CLOUD NATIVE JAVA STACK + CONTAINERS



*"We could run **3 times** denser deployments without sacrificing **availability** and **response times** of services"*

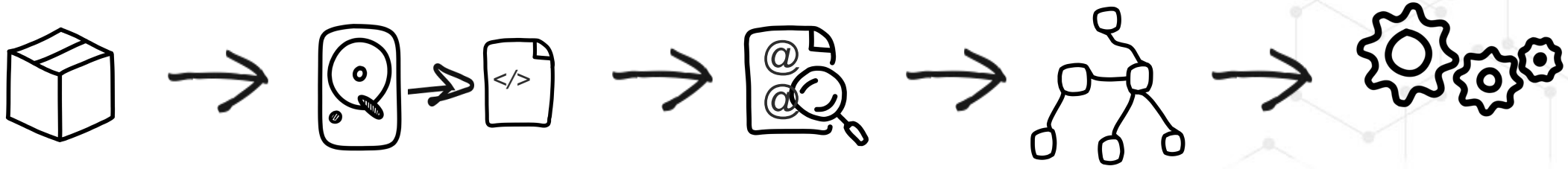
https://developers.redhat.com/blog/2017/03/14/java-inside-docker/

HOW DOES QUARKUS WORK?

HOW DOES A FRAMEWORK START?

Build Time

Runtime



Packaging (maven, gradle…)

Load config file from file system Parse it

Classpath scanning to find annotated classes Attempt to load class to enable/disable features

Build its model of the world.

Start the management (thread, pool…)

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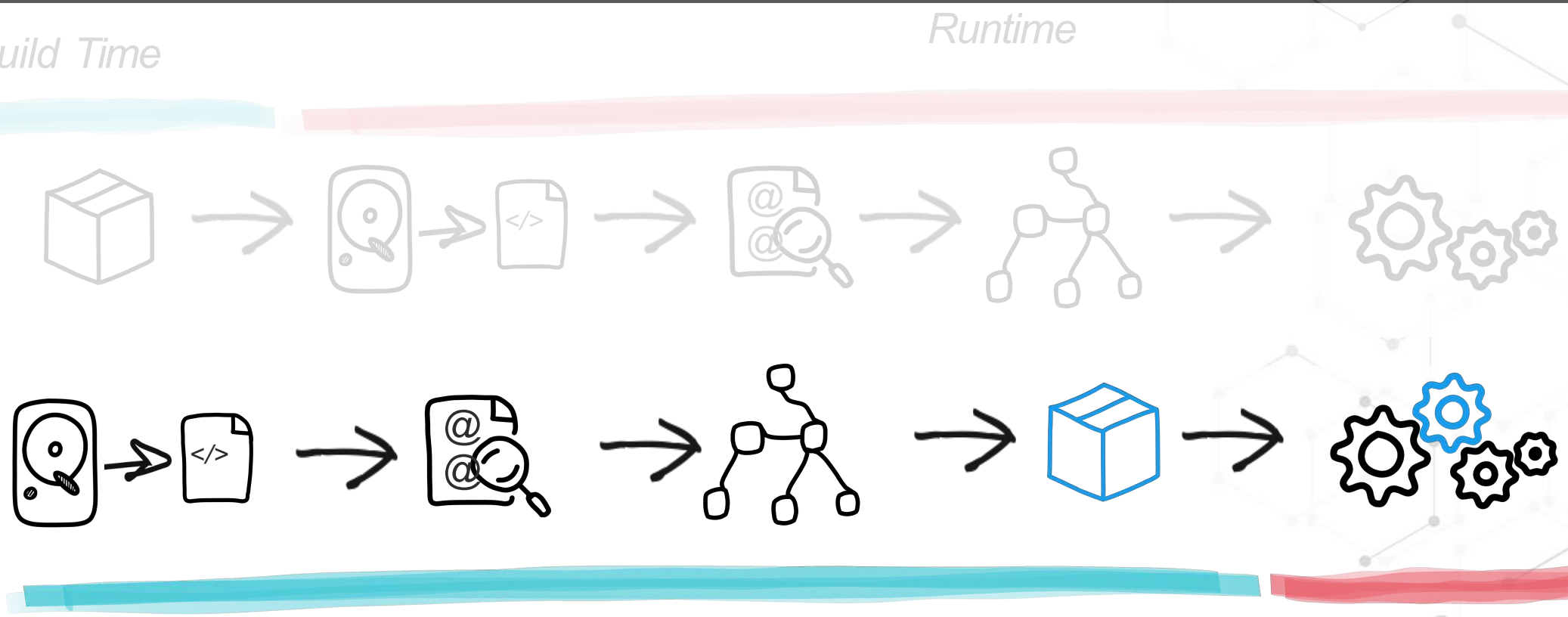
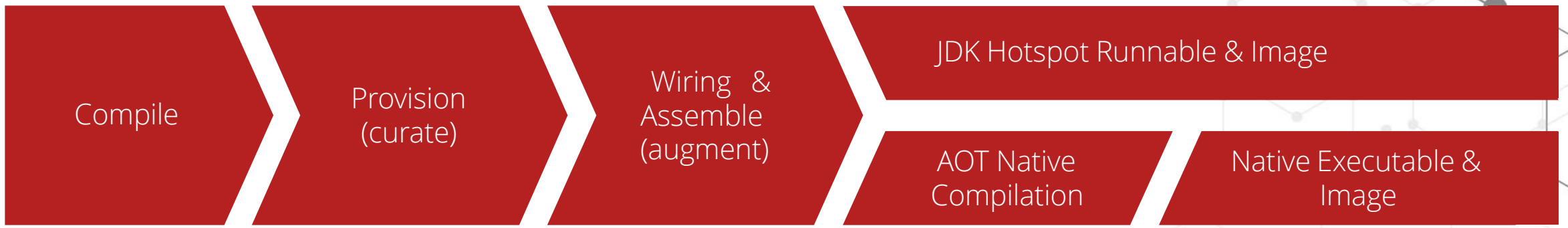
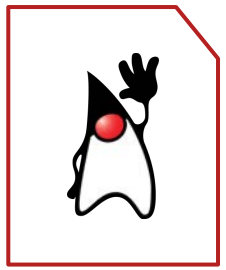
THE QUARKUS WAY

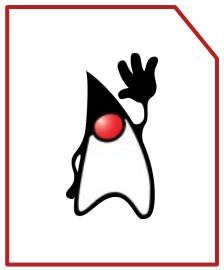


AN AHEAD-OF-TIME, BUILD-TIME, RUNTIME

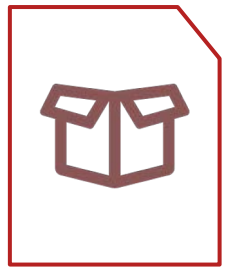




app.jar

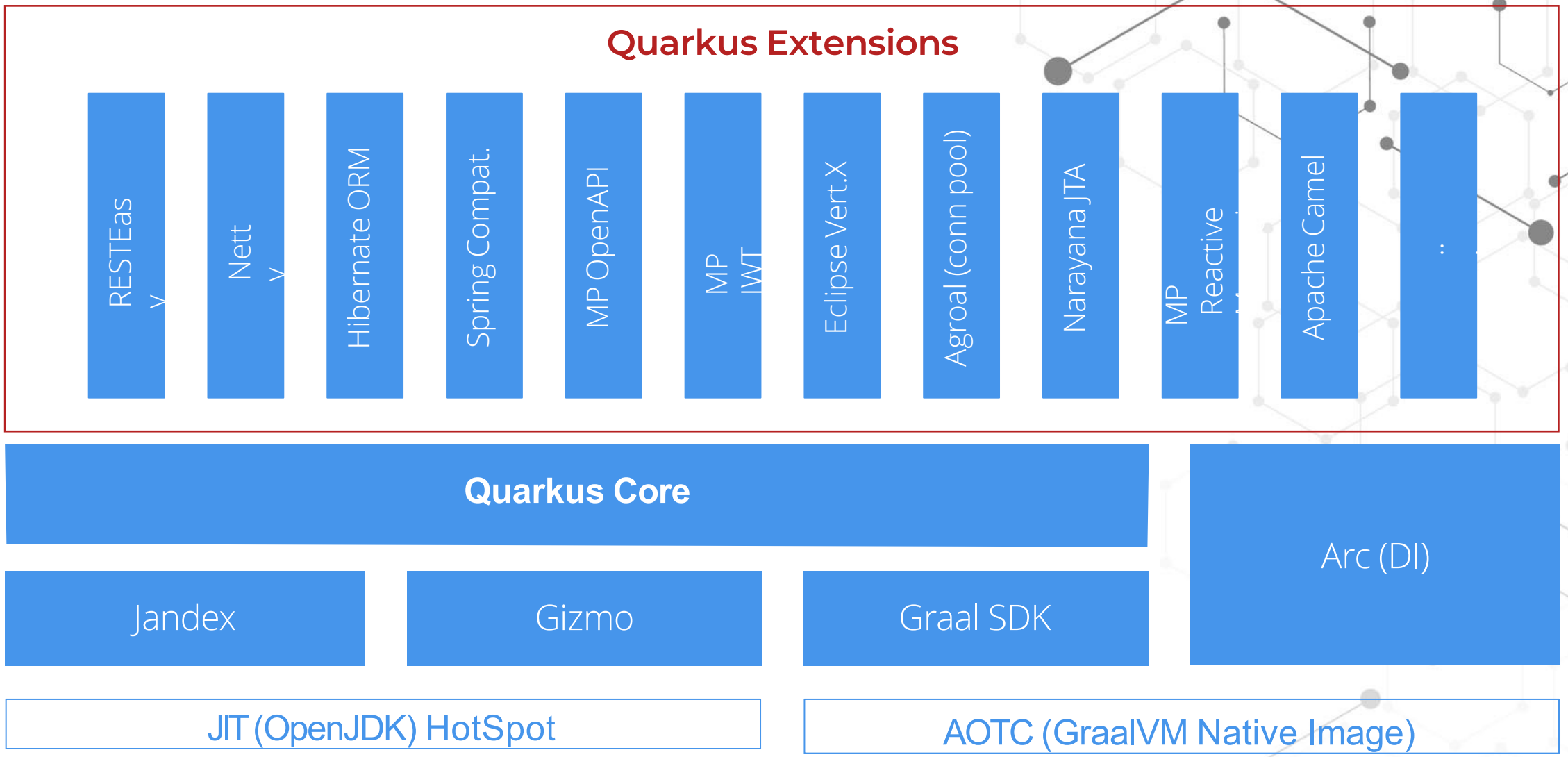


frameworks



Runnable java app

native-app


Quarkus Extensions
RESTEas
Nett
Hibernate ORM
Spring Compat.
MP OpenAPI
MP
IWT
Eclipse Vert.X
Agroal (conn pool)
Narayana JTA
MP
Reactive
Apache Camel
Quarkus Core
Arc (DI)
Jandex
Gizmo
Graal SDK
JIT (OpenJDK) HotSpot
AOTC (GraalVM Native Image)

Red Hat

THE RIGHT VM FOR THE RIGHT DEPLOYMENT

JIT (OpenJDK HotSpot)

- High memory density requirements High request/s/MB
- Fast startup time

- Best raw performance (CPU) Best garbage collectors Higher heap size usage

- Known monitoring tools Compile Once, Run anywhere
- Libraries that only works in standard JDK

AOT (GraalVM native image)*

- Highest memory density requirements Highest request/s/MB
- for low heap size usages Faster startup time
  - 10s of ms for Serverless

*Currently in Tech Preview

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Red Hat

QUARKUS TOOLS - BUILD

maven |  Gradle*

```
mvn io.quarkus:quarkus-maven-plugin:1.3.2.Final-redhat-00001:create \
    -DprojectGroupId=org.acme \
    -DprojectArtifactId=getting-started \
    -DplatformGroupId=com.redhat.quarkus \
    -DplatformVersion=1.3.2.Final-redhat-00001 \
    -DclassName="org.acme.quickstart.GreetingResource" \
    -Dpath="/hello"
cd getting-started
```

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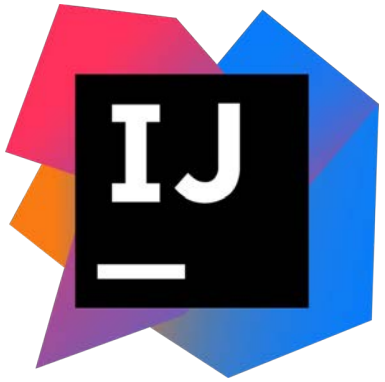
*community supported

Red Hat

QUARKUS TOOLS - IDE

VSCode

Eclipse



IntelliJ

che.openshift.io

EXTENSIBLE ECOSYSTEM

VIBRANT ECOSYSTEM OF EXTENSIONS

Eclipse Vert.x

Hibernate

RESTEasy

Apache Camel

Eclipse MicroProfile

Netty

Kubernetes

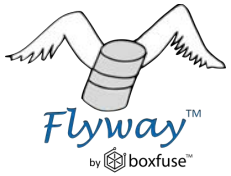
OpenShift

Jaeger

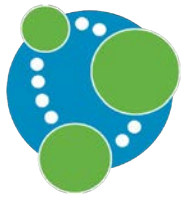
Prometheus

Apache Kafka

Infinispan



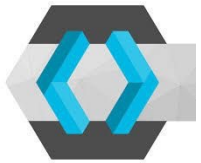
Flyway



Neo4j

MongoDB

MQTT



KeyCloak

Apache Tika

CAN I ADD MY DEPENDENCIES?

YES

Add your own dependency

- Works on the JVM (OpenJDK)
- May work on AOT (GraalVM)

Write your own extension

- Like add your dependency plus...
- Build time startup and memory improvements
- Better dead code elimination
- Developer Joy

USE CASES

"Quarkus is an ideal runtime for"

NET NEW

Low memory footprint + lightning fast startup time + small disk footprint = an ideal runtime for Kubernetes-native microservices

MONO 2 MICRO

Quarkus is a great choice to modernize existing monolithic applications by breaking it into smaller, loosely coupled microservices.

SERVERLESS

Scaling up or down (0) is extremely fast with Quarkus making it an ideal runtime for creating serverless applications.

EVENT-DRIVEN/REACTIVE

Quarkus utilizes an asynchronous, reactive event loop that makes it easy to create reactive applications.

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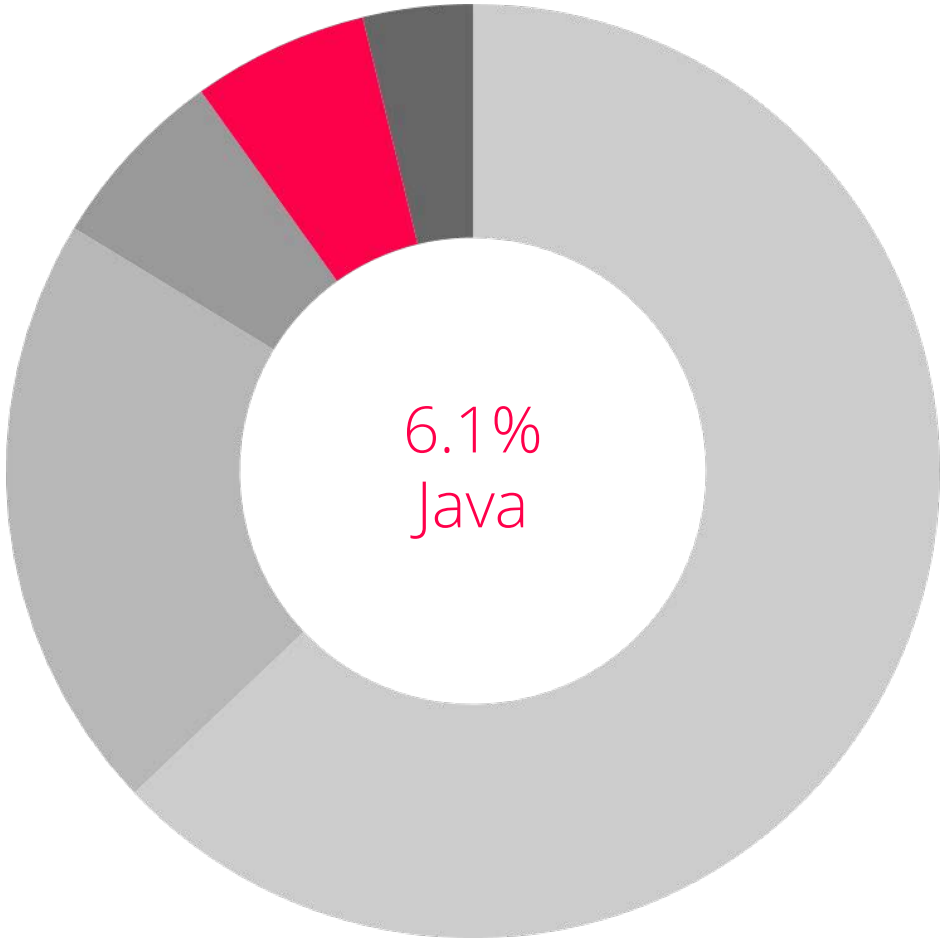
QUARKUS MAKES JAVA RUN BETTER IN SERVERLESS ENVIRONMENTS

SERVERLESS LANGUAGE ADOPTION



- 62.9% Node.js
- 20.8% Python
- 6.4% Go
- 6.1% Java
- 3.8% C#

https://serverless.com/blog/2018-serverless-community-survey-huge-growth-usage/

QUARKUS - OPTIMIZING THE JAVA STACK

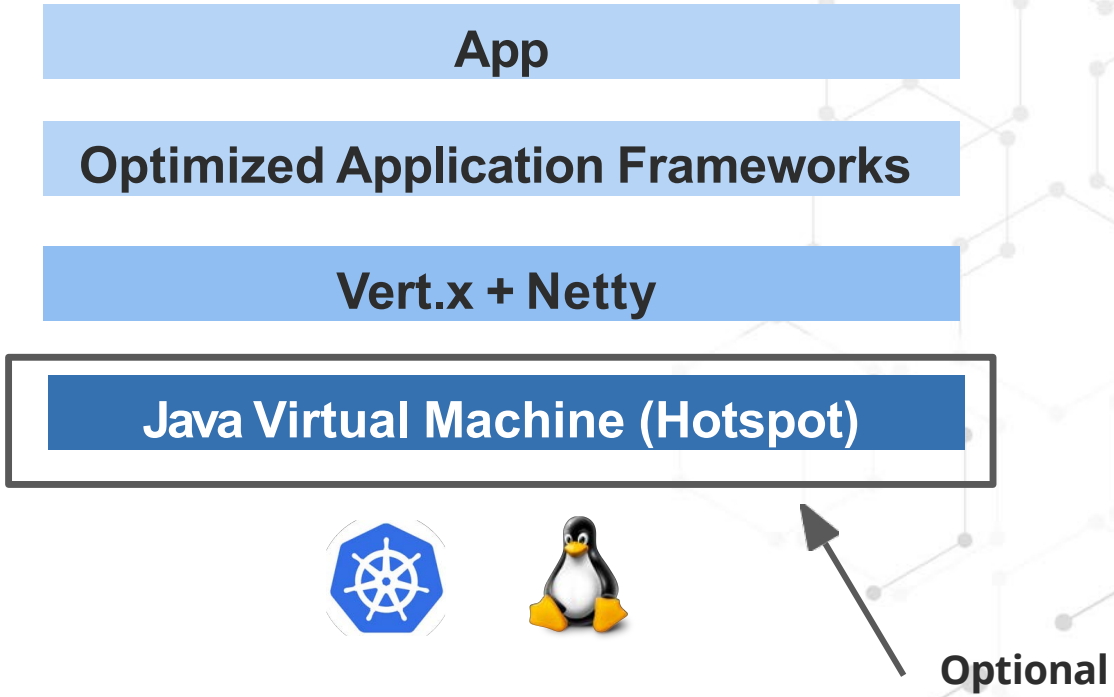
Architecture: Microservices, Serverless

Deployment: Single App

App Lifecycle: Milliseconds to Days

Memory: 10MBs+ RAM

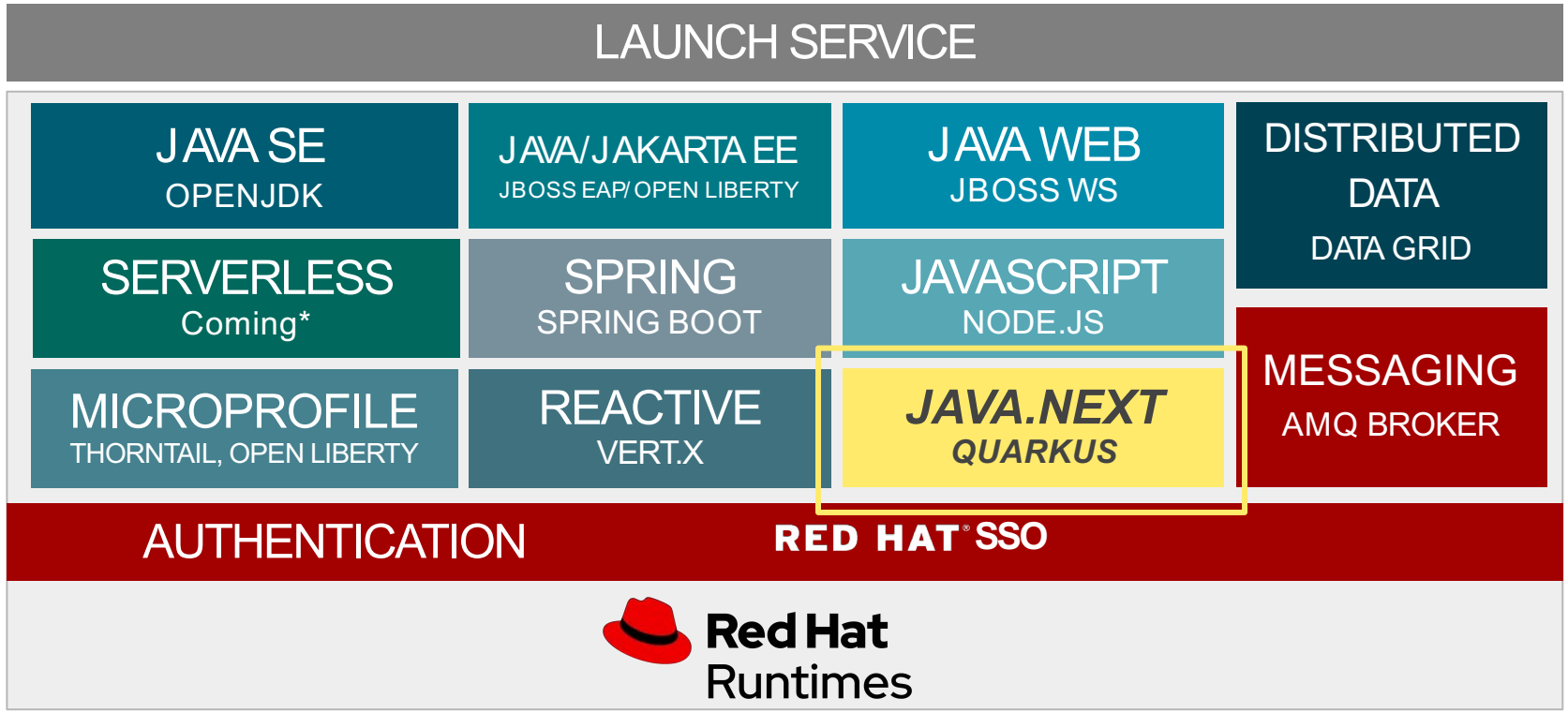
Startup Time: Milliseconds



RED HAT BUILD OF QUARKUS

RED HAT RUNTIMES

"support your existing apps, your future apps, and the transformation in between."



Facilitate cloud-native app development ON THE CLOUD:

- ✓ **Faster getting started**
- ✓ **Simplify container dev**
- ✓ **Automate DevOps**
- ✓ **Standardize tools & processes**
- ✓ **Fully supported JDK**

*Red Hat build of Quarkus is included and now available via the Red Hat Runtimes bundle.

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Red Hat

APPLICATION ENVIRONMENT WITH RED HAT

“QUARKUS POWERS THE NEXT-GEN RED HAT STACK FOR HYBRID-CLOUD APPS”

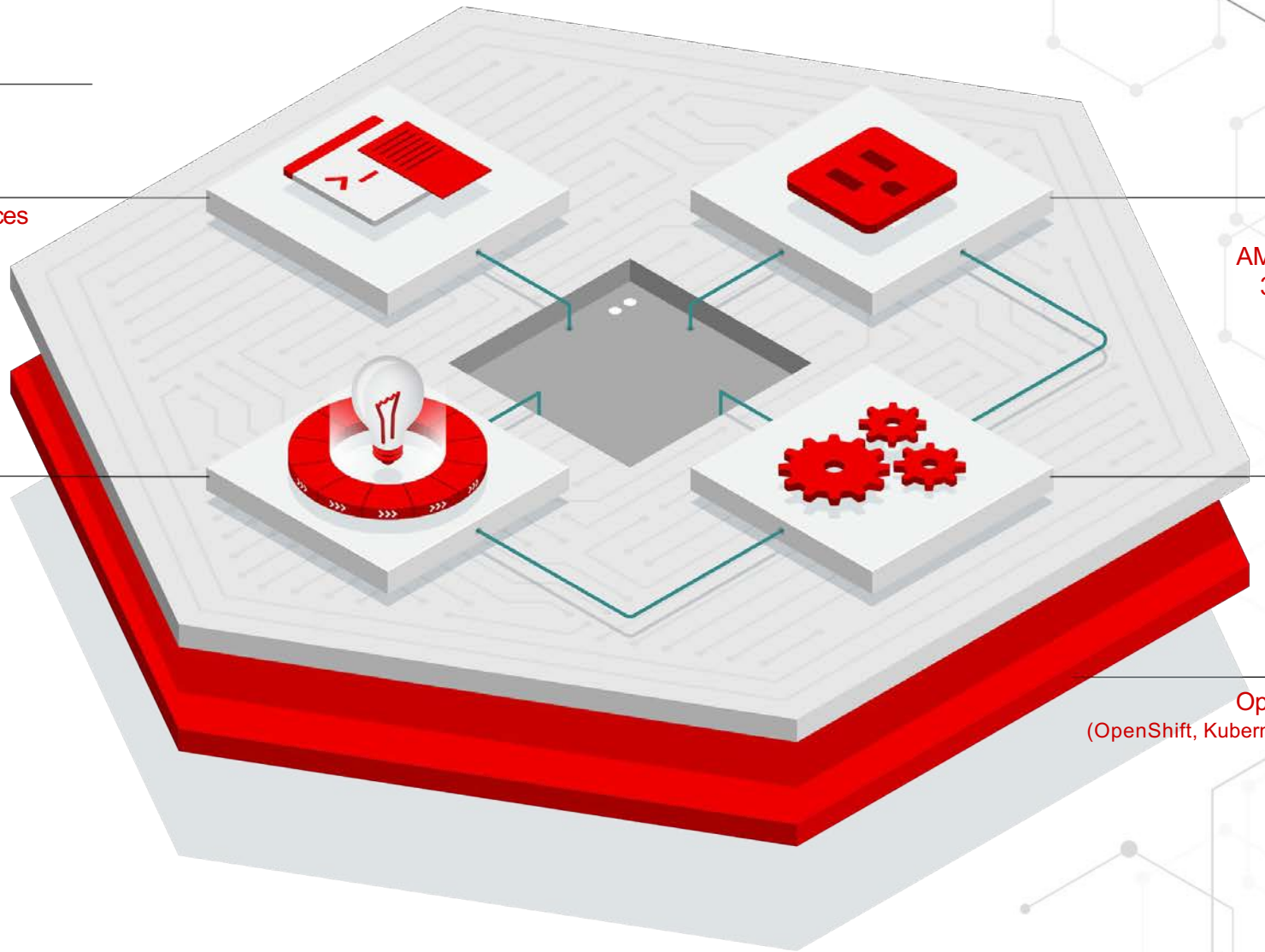
Red Hat
Middleware

Red Hat
CodeReady

CodeReady Workspaces

Red Hat
Process Automation

Kogito



Red Hat
Integration

Camel K
AMQ Streams (Kafka)
3Scale API Registry

Red Hat
Runtimes

Quarkus
Data Grid
SSO

Red Hat OpenShift
Container Platform

OpenShift Extensions
(OpenShift, Kubernetes, container build)

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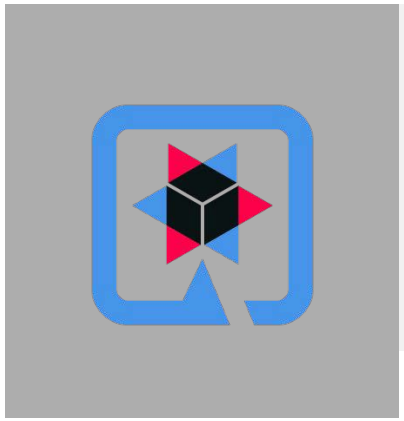
ADDITIONAL RESOURCES

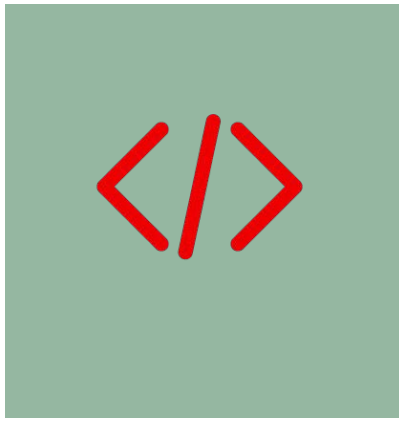
CUSTOMERS

Documentation
Getting Started
Start Coding



COMMUNITY

Quarkus.io
Guides
Blogs



DEVELOPERS

Interactive Tutorials
Blogs & Posts

Video Series
User Stories

Tips & Tricks (QTips)

THANK YOU

Hope to see you at our next event

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UPCOMING EVENTS

14th December → PART 4 - Scale to Zero: Event-driven Architecture with Serverless

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