



Quarkus

The Future of Java?

Bernd Fischer
Lars Martin

Quarkus - Future of Java?

Who's that guy?



Passionate Java Developer (especially Spring)
Container and Cloud Native Enthusiast
@berndfischer63



Passionate Java and Kafka Developer
Container and Cloud Native Enthusiast
@LarsMartinLE

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Motivation

Is Java (JVM, language + frameworks) prepared for

- Container,
- Cloud Native Architecture
- Serverless

Concrete Topics

- Docker Image size and layering ?
- Memory footprint ?
- Start time ?
- Resource awareness ?
- Supported standards ?
- Development cycle time ?

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Ahead of Time
Compiling?
Native image?

The logo for GraalVM, featuring the word "Graal" in blue and "VM" in orange, with a small trademark symbol (TM) to the right.

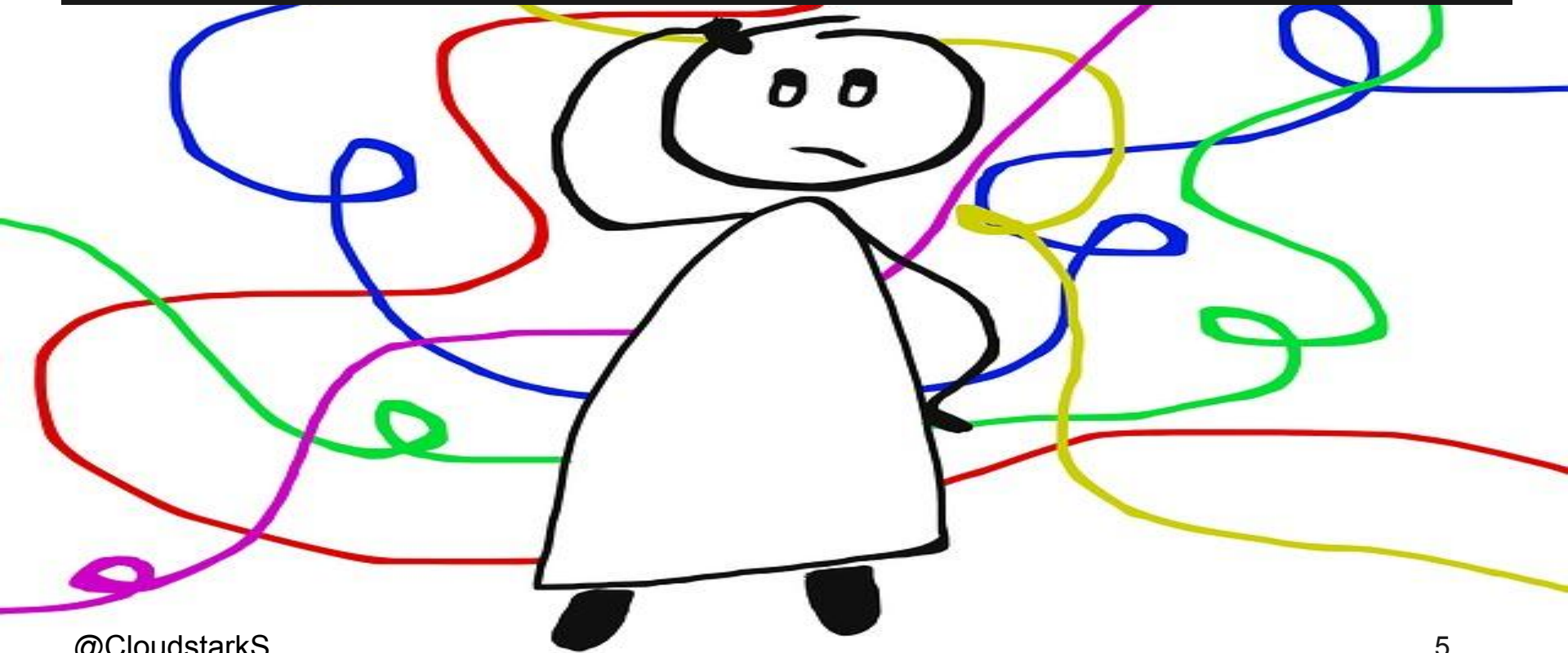
Reflection?

Dynamic Proxies?

...

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QUARKUS

Framework tailored for Graal- and Substrate-VM
Container First
Cloud Native
Standard oriented (Java SE/EE)

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Example Application

"REST"-App with DB connection (H2/MySql)

- "/"
 - Quarkus Welcome Page
- "/hello/{name}"
 - returns "hello" + name
- "/todos"
 - returns content from DB table "Todo"

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Create project skeleton

```
mvn io.quarkus:quarkus-maven-plugin:0.21.2:create \  
  -DprojectId=de.benfir.evl \  
  -DprojectArtifactId=evl-quarkus \  
  -DprojectVersion=1.0-SNAPSHOT \  
  -DclassName="de.benfir.evl.quarkus.GreetingController"  
  
mvn quarkus:add-extension -Dextensions="jdbc-mariadb"
```


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Create project skeleton

...

```
<plugin>
  <groupId>io.quarkus</groupId>
  <artifactId>quarkus-maven-plugin</artifactId>
  <version>${quarkusConf.version}</version>
  <executions>
    <execution>
      <goals><goal>build</goal></goals>
    </execution>
  </executions>
</plugin>
```

...

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Dev-Mode aka Hot-Reloading



```
mvn compile quarkus:dev -Ddebug=false  
...
```

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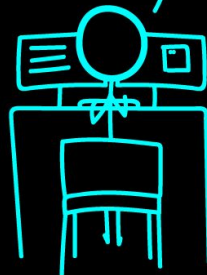
Dev-Mode aka Hot-Reloading

DEVELOPER JOY

WAIT.
SO YOU JUST SAVE IT,
AND YOUR CODE IS RUNNING?
AND IT'S JAVA?!



I KNOW, RIGHT?
SUPERSONIC JAVA, FTW!



https://quarkus.io/assets/images/quarkus_graphics_v3_devjoy_02.png

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Configuration

- support for SPI and CDI based usage
- extensible configuration sources
 - environment variables
 - system properties
 - application.properties
- alternative sources possible
 - ConfigMaps
 - ...
- injection or lookup with type conversions

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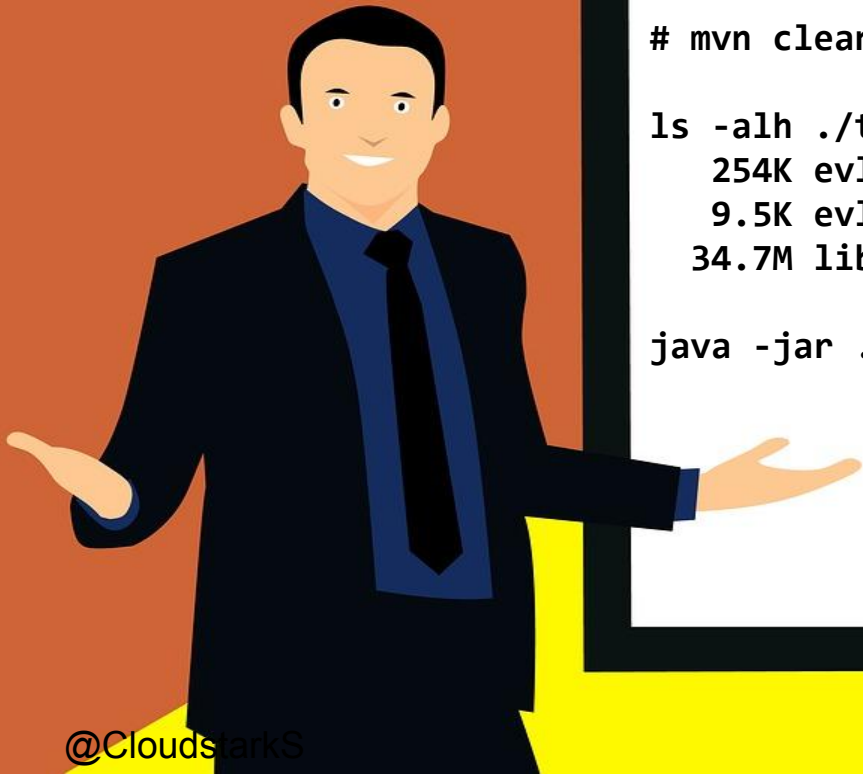
Database Handling - JPA - Panache

```
@ApplicationScoped
public class TodoRepository
implements PanacheRepositoryBase<Todo, Integer>
{
    @Transactional
    public void init(){
        List<Todo> todos = Todo.listAll();
        if( todos.isEmpty() ){
            Todo todo = new Todo();
            todo.title = "Prepare talk for JSD2019";
            todo.persist(); // ← look ...
        }
    }
}
```

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Maven Build



```
# mvn clean package
```

```
ls -alh ./target
```

```
 254K evl-quarkus-runner.jar
```

```
  9.5K evl-quarkus.jar
```

```
34.7M lib/*.jar
```

```
java -jar ./target/evl-quarkus-runner.jar
```

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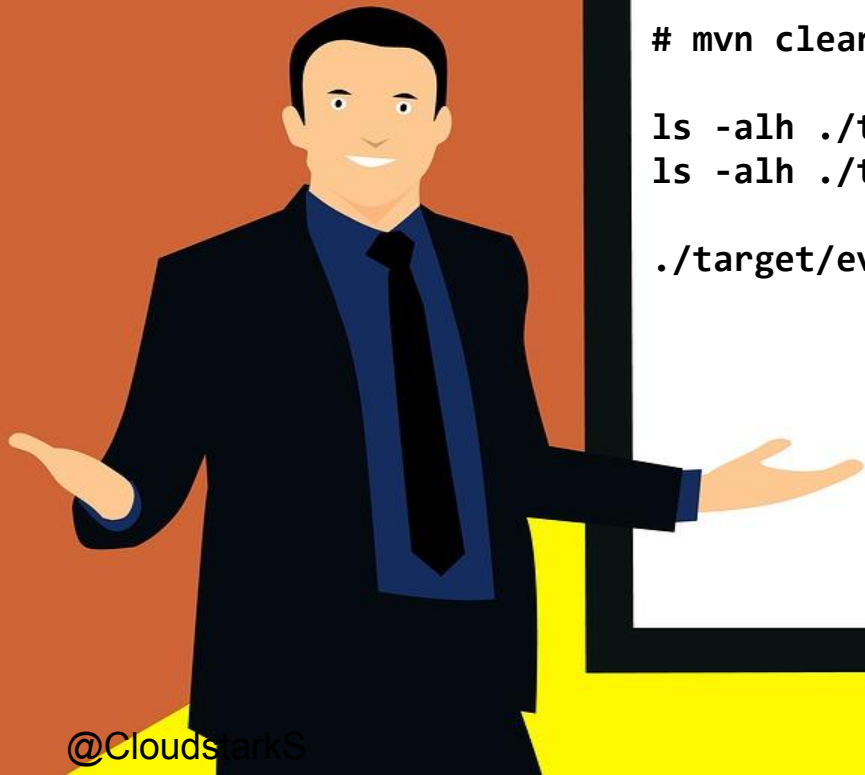
Outcome

- fast hot-reloading
- mini start time

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Native Binary



```
# mvn clean package -Pnative  
  
ls -alh ./target  
ls -alh ./target/evl-quarkus*  
  
./target/evl-quarkus-runner
```


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Outcome

- native Mac-/Darwin- binary
- mini start time
- long and resource intensive build time

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Docker Image - Native (Linux)

```
mvn clean package \  
-Pnative \  
-Dnative-image.container-runtime=docker \  
-DskipTests=true
```

```
ls -al ./zzTemp/evl-quarkus-runner-linux  
./zzTemp/evl-quarkus-runner-linux
```

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Docker Image - Native (Linux)

```
# syntax=docker/dockerfile:experimental
FROM quay.io/quarkus/centos-quarkus-maven:19.2.0

COPY src /usr/src/app/src
COPY pom.xml /usr/src/app

USER root
RUN chown -R quarkus /usr/src/app
USER quarkus

RUN --mount=type=cache,id=mvn,uid=1001,gid=1001,
target=/home/quarkus/.m2/repository mvn -f /usr/src/app/pom.xml -Pnative
clean package
```

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Docker Image - Native (Linux)

```
FROM registry.access.redhat.com/ubi8/ubi-minimal
```

```
WORKDIR /work/
```

```
COPY --from=benfir/evl-quarkus:0.1-svm-base  
/usr/src/app/target/*runner ./application
```

```
RUN chmod 775 /work
```

```
EXPOSE 8080
```

```
CMD [ "./application", "-Dquarkus.http.host=0.0.0.0" ]
```

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Docker Image - Native (Linux)

```
FROM cescoffier/native-base
```

```
WORKDIR /work/
```

```
COPY --from=benfir/evl-quarkus:0.1-svm-base  
/usr/src/app/target/*runner ./application
```

```
CMD [ "./application", "-Dquarkus.http.host=0.0.0.0" ]
```

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Docker Image - Native (Linux)



```
docker image ls benfir/*
```

```
docker container run --rm \  
--name quarkus \  
--env QUARKUS_DATASOURCE_URL=jdbc:mariadb... \  
--net dmo_net \  
--publish 1234:8080 \  
benfir/evl-quarkus:0.1-svm-dyn02
```

```
docker container stats
```

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Summary - Pro (Substrate VM)

- container first and cloud native
- fast hot reload
- faster startup
- smaller memory footprint
- smaller executable footprint
- self contained native binaries

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Summary - Con (Substrate VM)

- it's uses different concepts than I did until now
 - Substrate VM
 - Java EE/Jakarta (?) vs. Spring, JPA with Panache, ...
- not good supported by third party libraries (until now)
- it's a young project ... (early adoption)
- not every Java code easily compiles and if, you may encounter surprises during runtime
- tooling has a big disk footprint and compiling to native takes huge amount of resources (cpu, memory and time)

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Summary - Use Cases

- Optimized for
 - short-lived processes
 - JAX-RS and JPA
- Microservices
 - i.e. Kafka Connectors
- Serverless Functions
- CLI
- Embedded / constraint devices ...
- Cloud-/Kubernetes extensions ...

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One more thing ...
Graal-/Substrate-VM and Spring

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Spring-Graal



```
cd $HOME/Projects-BenFir/evl/evl-quarkus-sb
```

```
ls -alh ./target/classes
```

```
./target/classes/demo-boot-graal
```

```
curlie localhost:8080
```

```
curlie localhost:8080/greeting
```

```
curlie localhost:8080/greeting$name=quarkus
```

```
https://github.com/spring-projects-experimental/  
spring-graal-feature
```

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This is the last slide ...

Questions?

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