Kotlin+MicroProfile: Teaching 20 year old tricks to a new language

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19 de Julho de 2019

@tuxtor

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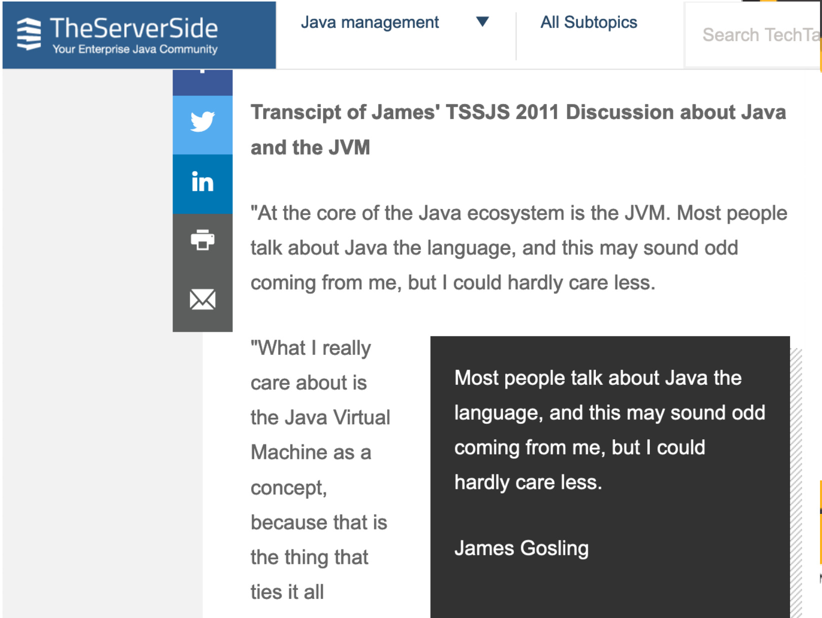
Java - Morrendo desde 1995



Transcipt of James' TSSJS 2011 Discussion about Java and the JVM

"At the core of the Java ecosystem is the JVM. Most people talk about Java the language, and this may sound odd coming from me, but I could hardly care less.

"What I really care about is the Java Virtual Machine as a concept, because that is the thing that ties it all

Most people talk about Java the language, and this may sound odd coming from me, but I could hardly care less.

James Gosling

¿Microsserviços?

Microsserviços

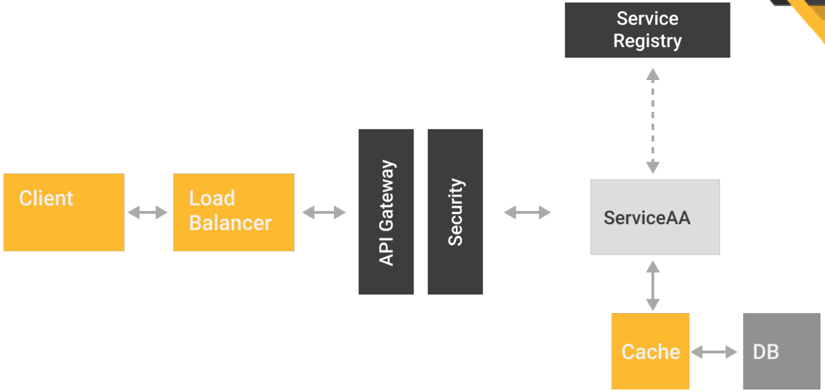


Figura 1: Microservicios

Microsserviços - Java

- DIY - Jooby, Javalin, Micronaut, Spark, Vert.x, Helidon SE
- Enterprise - Spring Boot, Microprofile (implementações)

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Microsserviços - Kotlin

- DIY - Jooby, Javalin, Micronaut, Spark, Vert.x, Helidon SE, **Ktor**
- Enterprise - Spring Boot, Microprofile (implementações)

Eclipse MicroProfile

Eclipse MicroProfile

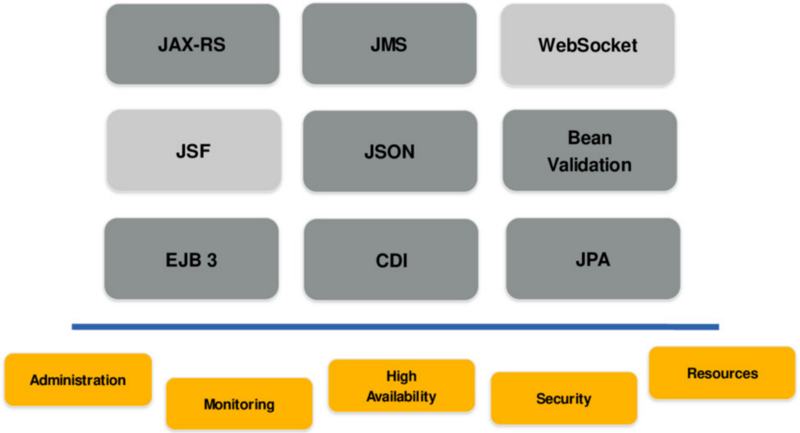
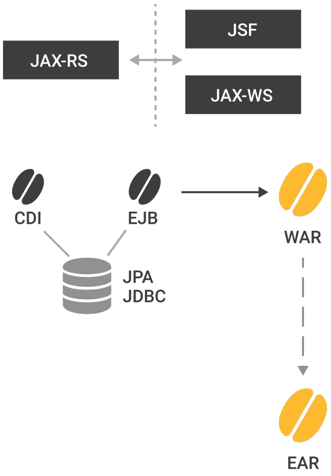


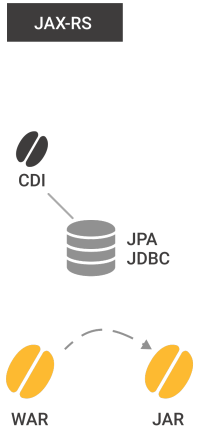
Figura 2: Credito: Reza Rahman

Eclipse MicroProfile



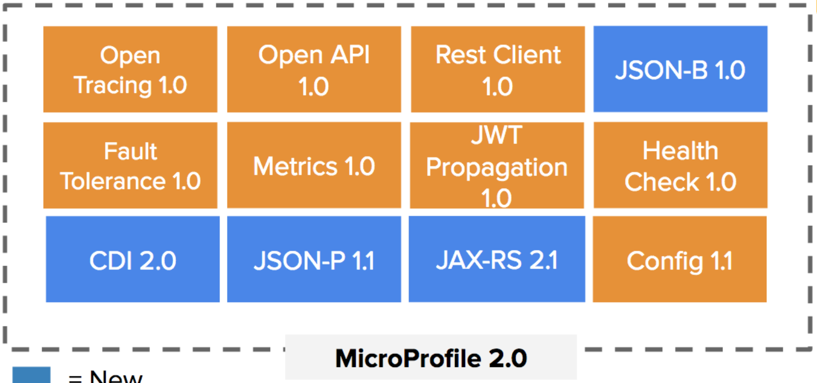
BV + JSON-P JSON-B + Security

Eclipse MicroProfile



BV + JSON-P JSON-B + Security

Eclipse MicroProfile



🟦 = New
🟧 = No change from last release

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Eclipse MicroProfile - implementações

Bibliotecas

- SmallRye (Red Hat)
- Hammock
- Apache Geronimo
- Fujitsu Launcher

JEAS - Fat Jar, Uber Jar

- Dropwizard
- KumuluzEE
- Helidon (Oracle)
- Open Liberty (IBM)
- Apache Meecrowave
- Thorntail (Red Hat)
- Quarkus (Red Hat)
- Payara Micro

Eclipse MicroProfile - Implementaciones

Micro server - Thin War

- Payara Micro
- TomEE JAX-RS

Full server

- Payara Application Server
- JBoss Application Server / Wildfly Application Server
- WebSphere Liberty (IBM)

https://wiki.eclipse.org/MicroProfile/Implementation

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Eclipse MicroProfile + Kotlin + Maven

Eclipse MicroProfile com Payara 5

```
<dependency>
        <groupId>org.eclipse.microprofile</groupId>
        <artifactId>microprofile</artifactId>
        <type>pom</type>
        <version>2.0.1</version>
        <scope>provided</scope>
</dependency>
```

Kotlin en Maven - Dependências

```
<dependency>
        <groupId>org.jetbrains.kotlin</groupId>
        <artifactId>kotlin-stdlib-jdk8</artifactId>
        <version>${kotlin.version}</version>
</dependency>
```

Kotlin en Maven - maven-compiler-plugin

```
<execution>
        <id>default-compile</id>
        <phase>none</phase>
</execution>
<execution>
        <id>default-testCompile</id>
        <phase>none</phase>
</execution>
<execution>
        <id>java-compile</id>
        <phase>compile</phase>
        <goals> <goal>compile</goal> </goals>
</execution>
<execution>
        <id>java-test-compile</id>
        <phase>test-compile</phase>
        <goals> <goal>testCompile</goal> </goals>
</execution>
```

Kotlin en Maven - kotlin-maven-plugin

```
<compilerPlugins>
<plugin>all-open</plugin>
</compilerPlugins>
 ...
<option>all-open:annotation=javax.ws.rs.Path</option>
<option>all-open:annotation=javax.enterprise.context.RequestScoped</option>
<option>all-open:annotation=javax.enterprise.context.SessionScoped</option>
<option>all-open:annotation=javax.enterprise.context.ApplicationScoped</option>
<option>all-open:annotation=javax.enterprise.context.Dependent</option>
<option>all-open:annotation=javax.ejb.Singleton</option>
<option>all-open:annotation=javax.ejb.Stateful</option>
<option>all-open:annotation=javax.ejb.Stateless</option>
```

Ideia geral: Adicionar as anotações do ciclo de vida no CDI e EJB

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Demo

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Kotlin + Jakarta EE + MicroProfile - Demo

- Kotlin 1.3
- Bibliotecas - SLF4J, Flyway, PostgreSQL
- Jakarta EE 8 - EJB, JPA
- MicroProfile - CDI, JAX-RS, MicroProfile Config
- Testing - Arquillian, JUnit, Payara Embedded

`https://dzone.com/articles/`
`the-state-of-kotlin-for-jakarta-eemicroprofile-tra`
`https://github.com/tuxtor/integrum-ee`

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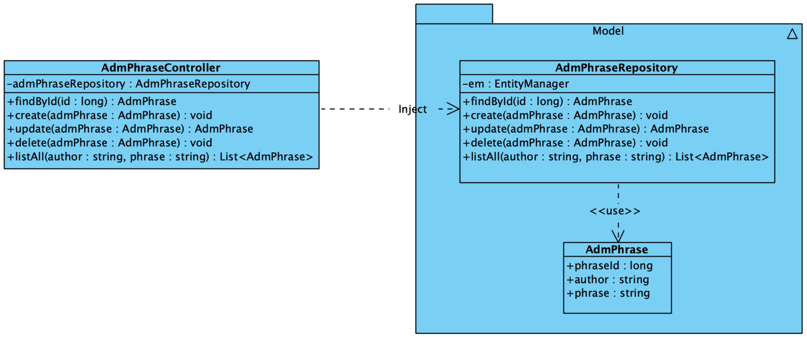
Kotlin + Jakarta EE + MicroProfile - Demo


AdmPhraseController
-admPhraseRepository : AdmPhraseRepository
+findById(id : long) : AdmPhrase
+create(admPhrase : AdmPhrase) : void
+update(admPhrase : AdmPhrase) : AdmPhrase
+delete(admPhrase : AdmPhrase) : void
+listAll(author : string, phrase : string) : List<AdmPhrase>
Inject
Model
AdmPhraseRepository
-em : EntityManager
+findById(id : long) : AdmPhrase
+create(admPhrase : AdmPhrase) : void
+update(admPhrase : AdmPhrase) : AdmPhrase
+delete(admPhrase : AdmPhrase) : void
+listAll(author : string, phrase : string) : List<AdmPhrase>
<<use>>
AdmPhrase
+phraseId : long
+author : string
+phrase : string

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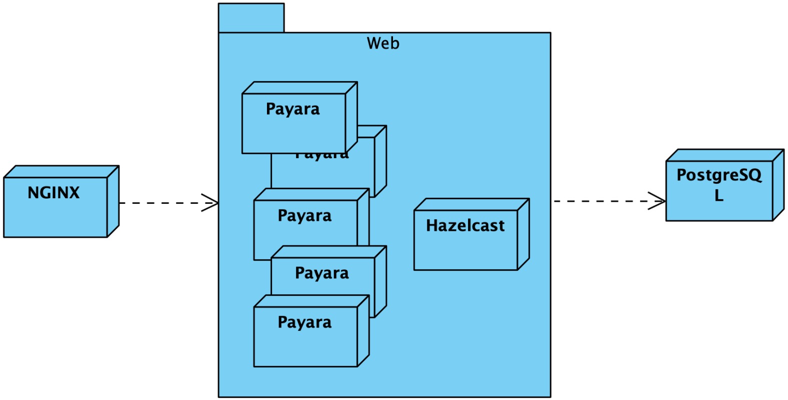
Kotlin + Jakarta EE + MicroProfile - Demo



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Kotlin - Entidade JPA

```
@Entity
@Table(name = "adm_phrase")
@TableGenerator(...)
data class AdmPhrase(
        @Id
        @GeneratedValue(strategy = GenerationType.TABLE,
                generator = "admPhraseIdGenerator")
        @Column(name = "phrase_id")
        var phraseId:Long? = null,
        var author:String = "",
        var phrase:String = ""
)
```

Data Clases, Nullable Types

Kotlin - Repositório CDI

```
@RequestScoped
class AdmPhraseRepository {

        @Inject
        private lateinit var em:EntityManager

        ...

}
```

Lateinit (nullable type)

Kotlin - Repositório CDI

```
fun create(admPhrase:AdmPhrase) = em.persist(admPhrase)

fun update(admPhrase:AdmPhrase) = em.merge(admPhrase)

fun findById(phraseId: Long) =
em.find(AdmPhrase::class.java, phraseId)

fun delete(admPhrase: AdmPhrase) = em.remove(admPhrase)
. . .
```

Single expression functions (One line methods)

Kotlin - Repositório CDI

```
fun listAll(author: String, phrase: String):
        List<AdmPhrase> {

        val query = """SELECT␣p␣FROM␣AdmPhrase␣p
␣␣␣␣␣␣␣␣where␣p.author␣LIKE␣:author
␣␣␣␣␣␣␣␣and␣p.phrase␣LIKE␣:phrase
␣␣␣␣␣␣␣␣"""

        return em.createQuery(query, AdmPhrase::class.java)
                .setParameter("author", "%$author%")
                .setParameter("phrase", "%$phrase%")
                .resultList
}
```

Multiline String, mutable declaration

Kotlin - Controlador JAX-RS

```
@Path("/phrases")
@Produces(MediaType.APPLICATION_JSON)
@Consumes(MediaType.APPLICATION_JSON)
class AdmPhraseController{

        @Inject
        private lateinit var admPhraseRepository: AdmPhraseReposit

        @Inject
        private lateinit var logger: Logger
        ...

}
```

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Kotlin - Controlador JAX-RS

```
@GET
fun findAll(
@QueryParam("author") @DefaultValue("%") author: String,
@QueryParam("phrase") @DefaultValue("%") phrase: String) =
        admPhraseRepository.listAll(author, phrase)

@GET
@Path("/{id:[0-9][0-9]*}")
fun findById(@PathParam("id") id:Long) =
        admPhraseRepository.findById(id)

@PUT
fun create(phrase: AdmPhrase): Response {
        admPhraseRepository.create(phrase)
        return Response.ok().build()
}
```

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Kotlin - Controlador JAX-RS

```
@POST
@Path("/{id:[0-9][0-9]*}")
fun update(@PathParam("id") id: Long?, phrase: AdmPhrase)
        :Response {
        if(id != phrase.phraseId)
                return Response.status(Response.Status.NOT_FOUND).

        val updatedEntity = admPhraseRepository.update(phrase)
        return Response.ok(updatedEntity).build()
}

@DELETE
@Path("/{id:[0-9][0-9]*}")
fun delete(@PathParam("id") id: Long): Response {
        val updatedEntity = admPhraseRepository.findById(id) ?:
        return Response.status(Response.Status.NOT_FOUND).build()
        admPhraseRepository.delete(updatedEntity)
        return Response.ok().build()
}
```

Elvis operator as expression

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12 fatores cloud native (Heroku)

Microprofile

- Config
- Backing service
- Disposability

Cloud

- Codebase (Git-Flow)
- Dependencies (Maven)
- Build, Release, Run
- Processes (Pipelines)
- Port binding
- Concurrency (Docker - k8s)
- Dev / Prod parity
- Logs
- Admin process

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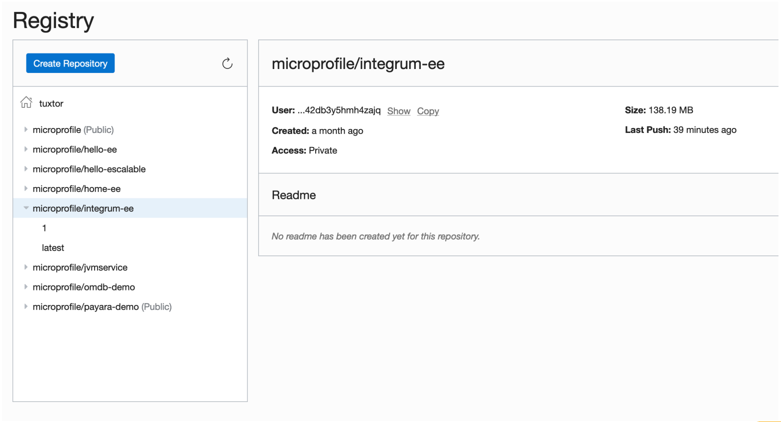
Oracle Cloud

```
<groupId>io.fabric8</groupId>
<artifactId>docker-maven-plugin</artifactId>
<version>0.30.0</version>
...
<image>
        <name>iad.ocir.io/tuxtor/microprofile/integrum-ee</name>
        <build>
                <dockerFile>${project.basedir}/Dockerfile</dockerF
        </build>
</image>
```

Oracle Cloud



Registry

tuxtor

- microprofile (Public)
- microprofile/hello-ee
- microprofile/hello-escalable
- microprofile/home-ee
- microprofile/integrum-ee
  - 1
  - latest
- microprofile/jvmservice
- microprofile/omdb-demo
- microprofile/payara-demo (Public)

microprofile/integrum-ee

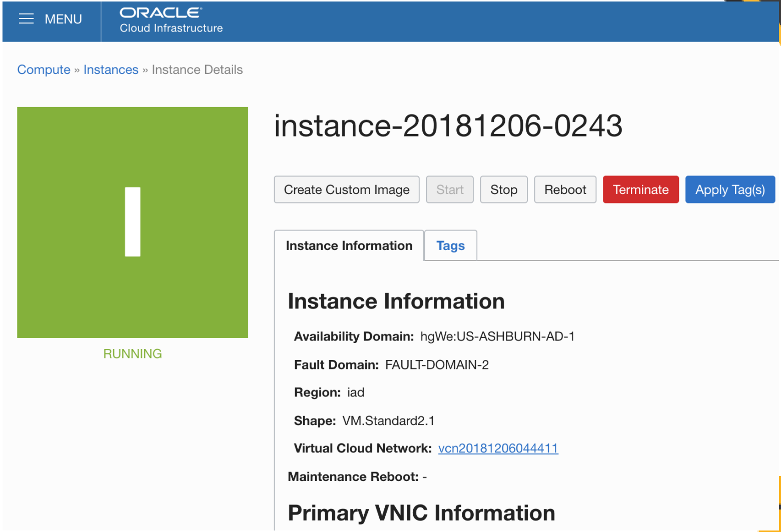
User: ...42db3y5hmh4zajq Show Copy
Created: a month ago
Access: Private

Size: 138.19 MB
Last Push: 39 minutes ago

Readme

No readme has been created yet for this repository.

Oracle Cloud



instance-20181206-0243

Instance Information

Availability Domain: hgWe:US-ASHBURN-AD-1

Fault Domain: FAULT-DOMAIN-2

Region: iad

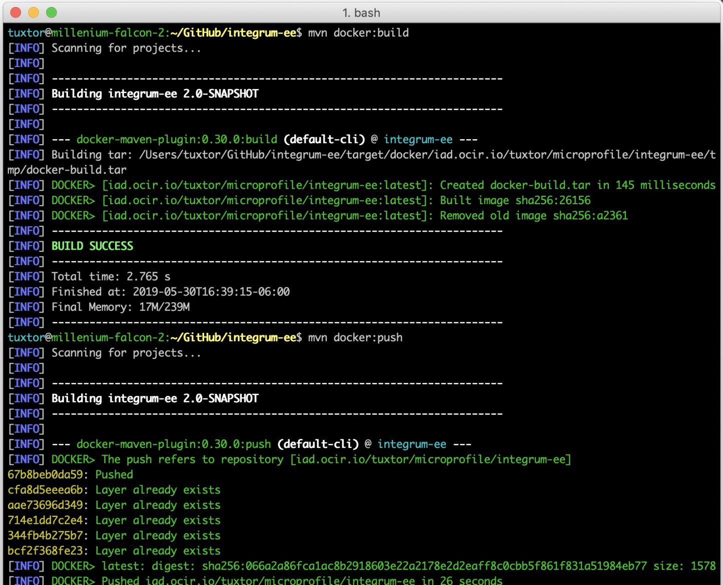
Shape: VM.Standard2.1

Virtual Cloud Network: vcn20181206044411

Maintenance Reboot: -

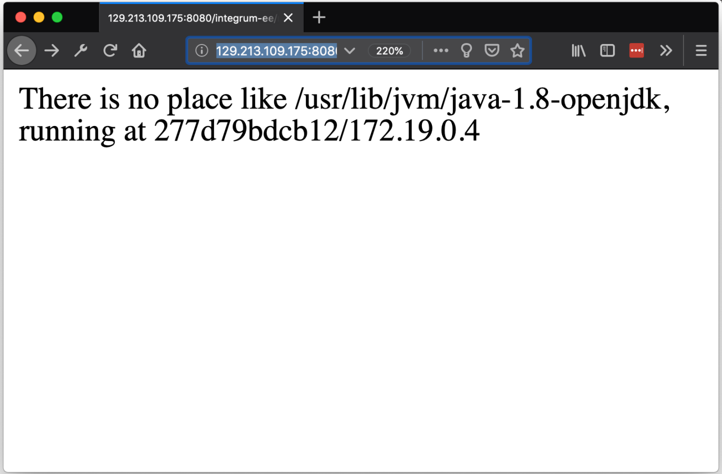
Primary VNIC Information

Oracle Cloud



```
tuxtor@millenium-falcon-2:~/GitHub/integrum-ee$ mvn docker:build
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building integrum-ee 2.0-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] --- docker-maven-plugin:0.30.0:build (default-cli) @ integrum-ee ---
[INFO] Building tar: /Users/tuxtor/GitHub/integrum-ee/target/docker/iad.ocir.io/tuxtor/microprofile/integrum-ee/t
mp/docker-build.tar
[INFO] DOCKER> [iad.ocir.io/tuxtor/microprofile/integrum-ee:latest]: Created docker-build.tar in 145 milliseconds
[INFO] DOCKER> [iad.ocir.io/tuxtor/microprofile/integrum-ee:latest]: Built image sha256:26156
[INFO] DOCKER> [iad.ocir.io/tuxtor/microprofile/integrum-ee:latest]: Removed old image sha256:a2361
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 2.765 s
[INFO] Finished at: 2019-05-30T16:39:15-06:00
[INFO] Final Memory: 17M/239M
[INFO] ------------------------------------------------------------------------
tuxtor@millenium-falcon-2:~/GitHub/integrum-ee$ mvn docker:push
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building integrum-ee 2.0-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] --- docker-maven-plugin:0.30.0:push (default-cli) @ integrum-ee ---
[INFO] DOCKER> The push refers to repository [iad.ocir.io/tuxtor/microprofile/integrum-ee]
67b8beb0da59: Pushed
cfa8d5eeea6b: Layer already exists
aae73696d349: Layer already exists
714e1dd7c2e4: Layer already exists
344fb4b275b7: Layer already exists
bcf2f368fe23: Layer already exists
[INFO] DOCKER> latest: digest: sha256:066a2a86fca1ac8b2918603e22a2178e2d2eaff8c0cbb5f861f831a51984eb77 size: 1578
[INFO] DOCKER> Pushed iad.ocir.io/tuxtor/microprofile/integrum-ee in 26 seconds
```

Oracle Cloud



```
There is no place like /usr/lib/jvm/java-1.8-openjdk,
running at 277d79bdcb12/172.19.0.4
```

Kotlin

Kotlin

- Static typing
- Java inter-op
- OO + FP
- Null safety
- Extension functions
- Operator overloading
- Data classes
- One line methods

Kotlin - Fatos interessantes

- Effective Java - Inmutabilidade, builder, singleton, override, final by default, variance by generics
- Elvis - Groovy
- Inferência de tipos - Scala
- Imutabilidade - Scala
- Identificadores - Scala
- Gestão de null values - Groovy
- Closures e funciones - Groovy

Java - Morrendo desde 1995

- Retrocompatibilidade
- Spring Boot, Micronaut, MicroProfile, GraalVM . . .
- Raw performance (Beam, Spark, Hadoop)
- Tooling - IDE, Maven, Drivers RDBMS
- JVM - (Twitter, Alibaba, Spotify, etc.)
- OpenJDK

Kotlin

Vantagens

- Código mais conciso
- Suporte real Java inter-op
- Aproveitar desenvolvedores Android para backend
- Uma nova forma de "Full-stack"

Desvantagens

- IntelliJ IDEA Ultimate (monolítico)
- A curva de aprendizagem do Kotlin é mais complicada no inicio
- Compilação (tempo)
- Os entornos EE geralmente são tread-managed e pode ser um problema para o uso de Co-routines

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Víctor Orozco

Duke's Choice Award
2016 Winner
Java

Oracle Groundbreakers

Java Champions

ORACLE
Certified Professional
Java SE 8 Programmer

ORACLE
Certified Associate
Java SE 8 Programmer

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- @tuxtor
- http://www.nabenik.com

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