Desarrollo de micro servicios cloud-native con Quarkus

Joe | 2024

Persistencia de Datos con Panache

Configurando persistencia

```
<dependencies>
    <!-- Hibernate ORM dependency -->
    <dependency>
        <groupId>io.quarkus</groupId>
        <artifactId>quarkus-hibernate-orm</artifactId>
    </dependency>
</dependencies>
```

```
<dependencies>
    <!-- Panache dependency -->
    <dependency>
        <groupId>io.quarkus</groupId>
        <artifactId>quarkus-hibernate-orm-panache</artifactId>
    </dependency>
</dependencies>
```

Agregando el driver

```
<dependencies>
    <!-- JDBC driver dependency -->
    <dependency>
        <groupId>io.quarkus</groupId>
        <artifactId>quarkus-jdbc-postgresql</artifactId>
    </dependency>
</dependencies>
```

Configurando la base de datos

```
# datasource configuration
quarkus.datasource.username = myusername (1)
quarkus.datasource.password = mypassword (2)
quarkus.datasource.jdbc.url = jdbc:postgresql://localhost:5432/mydatabase (3)

# Optional configuration
quarkus.hibernate-orm.sql-load-script = META-INF/import-dev.sql (4)
quarkus.hibernate-orm.database.generation = drop-and-create (5)
```

Usando profiles: dev y prod

```
# production datasource configuration
%prod.quarkus.datasource.username = myusername
%prod.quarkus.datasource.password = mypassword
%prod.quarkus.datasource.jdbc.url = jdbc:postgresql://localhost:5432/mydatabase
%prod.quarkus.hibernate-orm.sql-load-script = no-file (1)

# development datasource configuration
%dev.quarkus.hibernate-orm.sql-load-script = META-INF/import-dev.sql
%dev.quarkus.hibernate-orm.database.generation = drop-and-create
%dev.quarkus.datasource.devservices.image-name = quay.io/example/postgres:14.1 (2)
```

Persistencia con Hibernate ORM

```
@ApplicationScoped
public class EmployeeService {
    @Inject
    EntityManager em; (1)

    @Transactional (2)
    public void createEmployee( String name ) {
        Employee employee = new Employee();
        employee.setName( name );
        em.persist( employee ); (3)
    }
}
```

Default: REQUIRED

REQUIRES_NEW

MANDATORY

Persistencia con Hibernate ORM

```
@Transactional( TxType.REQUIRES_NEW )
public void createEmployee( String name ) {
    Employee employee = new Employee();
    employee.setName( name );
    em.persist( employee );
}
```

Simplificando la persistencia con Panache

Patrón Repository

```
@Entity
public class Expense {
    @Id
    @GeneratedValue
    private Long id;
    private String name;
    private BigDecimal amount;
    private String description;
    private LocalDateTime creationDate;

    // Getters and Setters
}
```

```
@ApplicationScoped
public class ExpenseRepository implements PanacheRepository<Expense> {
}
```

```
@Inject
ExpenseRepository expenseRepository;

Expense expense = new Expense();
expense.setName( "Hotel stay" );
expense.setAmount( 100 );
expense.setDescriptio( "Conference travel" );
expense.setCreationDate( LocalDateTime.now() );

expenseRepository.persist( expense );
```

Simplificando la persistencia con Panache

Active Record Pattern

```
@Entity
public class Expense extends PanacheEntity {
    public String name;
    public BigDecimal amount;
    public String description;
    public LocalDateTime creationDate;
}
```

```
Expense expense = new Expense();
expense.name = "Hotel stay";
expense.amount = 100;
expense.description "Conference travel";
expense.creationDate = LocalDateTime.now();

expense.persist();
```

```
@Entity
public class Expense extends PanacheEntity {
    public String name;
    public BigDecimal amount;
    public String description;
    public LocalDateTime creationDate;

    public static List<Expense> findCurrent(){
        return list( "creationDate", LocalDatetime.now() );
    }
}
```

Métodos provistos por Panache

```
// Persist the entity
instance.persist();

// check if the entity is persistent
instance.isPersistent()

// get a list of all entities
List<Entity> allEntitys = Entity.listAll();

// find a specific entity by ID
instance = Entity.findById( entityId );

// find a specific instance by ID via an Optional
Optional<Entity> optional = Entity.findByIdOptional( entityId );

// find all alive entities
List<Entity> aliveInstances = Entity.list( "alive", true );

// count all entities
long countAll = Entity.count();

// count all alive entities
long countAlive = Entity.count( "alive", true );

// delete all alive entities
Entity.delete( "alive", true );

// delete all entities
Entity.deleteAll();

// delete by id
boolean deleted = Entity.deleteById( entityId );

// set all alive entities as not alive
Entity.update( "alive = false where alive = ?1", true );
```

Paging y Sorting Query Results

Panache Paging Functions

Function	Usage
`page()`	Returns the current page.
`page( Page page )`	Sets and returns the specified page.
`page( int pageIndex, int pageSize )`	Shorthand for the previous method.
`pageCount()`	Returns the number of pages for the current page size.
`range( int startIndex, int lastIndex )`	Retrieves the results between `startIndex` and `lastIndex`.

```
@GET
public List<Example> list() {
   PanacheQuery<Example> exampleQuery = Example.findAll();
   return exampleQuery.page(Page.of(0, 10)).list();
}
```

Paging y Sorting Query Results

Panache Sorting Functions

Function	Usage
`by( String column )`	Sorts by the given column in ascending order.

Function	Usage
`by( String column, Direction direction )`	Sorts by the column using the specified direction (Ascending or Descending).
`by( String… columns )`	Sorts by the given columns in the given order.
`and( String column )`	Adds an additional sorting column in ascending order.
`and( String column, Direction direction )`	Adds an additional sorting column with the given direction.
`empty()`	Returns an empty sorting instance.
`ascending()`	Sets the ascending order for the current sort columns.
`ascending( String… columns )`	Sets the columns to sort in ascending order.
`descending()`	Sets the descending order for the current sort columns.
`descending( String… columns )`	Sets the columns to sort in descending order.

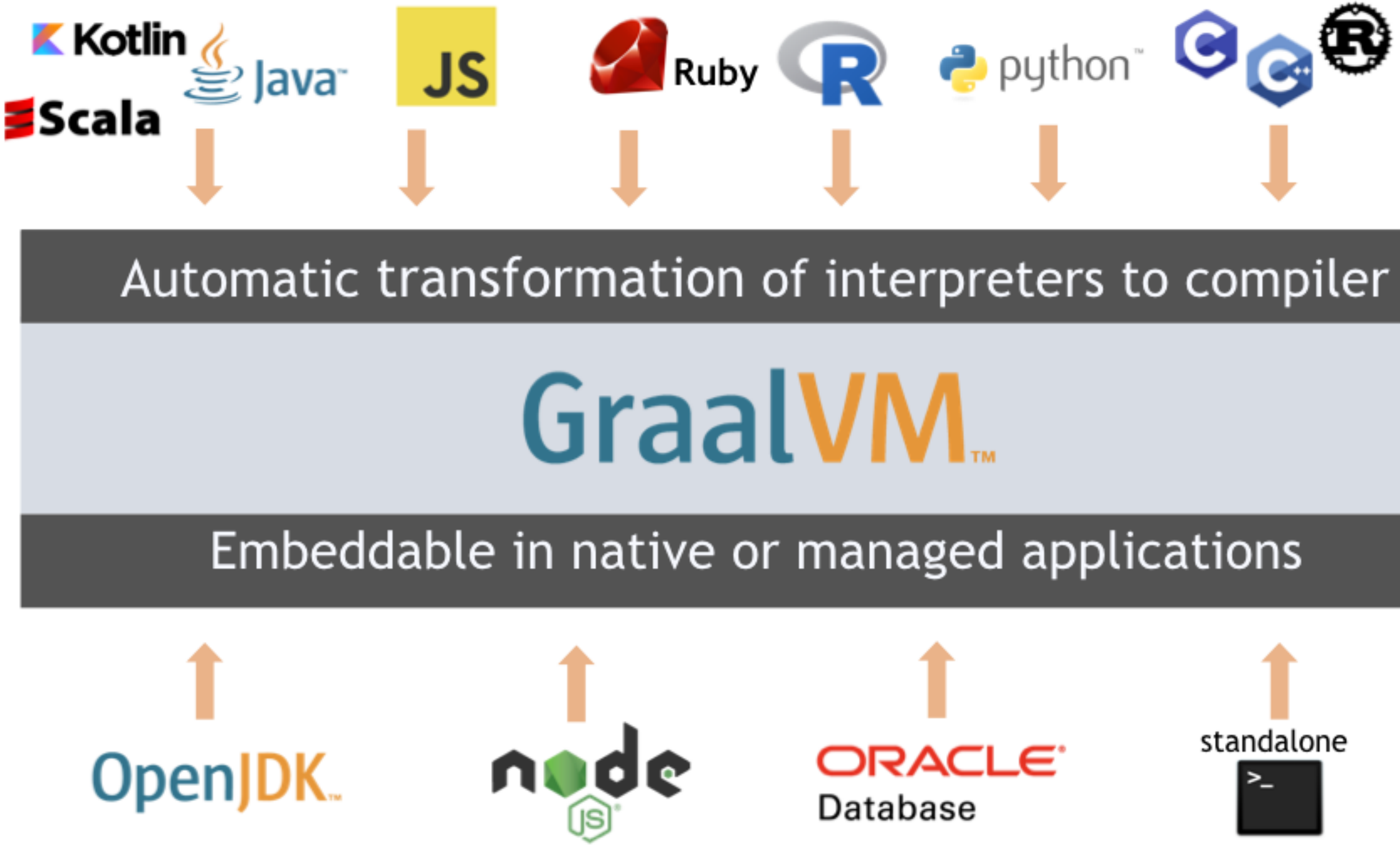
```
@GET
public List<Example> list() {
   return Example.findAll( Sort.by("sample") ).list();
}
```

Recursos

1. https://quarkus.io/version/2.13/guides/hibernate-orm#quarkus-hibernateorm_configuration
2. https://en.wikipedia.org/wiki/Jakarta_Persistence

Demo

Construyendo aplicaciones nativas con Quarkus y GraalVM


Kotlin
Java
Scala
JS
Ruby
R
python
Automatic transformation of interpreters to compiler
GraalVM
Embeddable in native or managed applications
OpenJDK
node
ORACLE
Database
standalone

graalvm/**mandrel**

Mandrel is a downstream distribution of the GraalVM community edition. Mandrel's main goal is to provide a native-image release specifically...

mvn package -Pnative

mvn package -Pnative -Dquarkus.native.container-build=true

```
quarkus.native.container-build=true
```

application.properties

```
quarkus.native.container-runtime=podman (1)
quarkus.native.builder-image=registry.access.redhat.com/quarkus/mandrel-21-jdk17-
rhel8:21.3 (2)
```

Limitaciones de aplicaciones nativas

- Inyectar recursos en tests de ejecutables nativos
- Registrarse para reflection (@RegisterForReflection)
- Modificadores de acceso privados
- Reflection en librerías de terceros

No podemos usar @RegisterForReflection con librerías de terceros que no son extensiones Quarkus. Más bien tenemos que crear este archivo en src/main/resources/reflection-config.json

```
[
  {
    "name" : "com.redhat.library.MyThirdPartyClass",
    "allDeclaredConstructors" : true,
    "allPublicConstructors" : true,
    "allDeclaredMethods" : true,
    "allPublicMethods" : true,
    "allDeclaredFields" : true,
    "allPublicFields" : true
  }
]
```

Y luego agregarlo en application.properties:

```
quarkus.native.additional-build-args =-H:ReflectionConfigurationFiles=reflection-config.json
```

Casos de uso para aplicaciones nativas

- Las aplicaciones nativas son ideales para entornos donde hay poca memoria, se necesita un tiempo de inicio rápido y performance inicial de CPU es clave.
  - Arquitecturas serverless
  - Aplicaciones con requerimientos de alta densidad de memoria
  - Despliegue en plataformas de orquestación
  - Aplicaciones de linea de comandos

Desventajas de aplicaciones nativas

- No Just-in-time (JIT) compilation
- Limitaciones en el código
- Lento build time
- Alto consumo de memoria

```
]$ mvn package -Pnative -Dquarkus.native.native-image-xmx=6G
```

Desventajas de aplicaciones nativas

- Profiling y debugging no trabaja con Java tools
- El tamaño del ejecutable nativo es grande

Recursos

1. https://quarkus.io/version/2.13/guides/building-native-image

Ejercicio: Construir aplicaciones nativas con Quarkus y GraalVM

Laboratorio: Desarrollando cloud-native micro services con Quarkus

Gracias

www.joedayz.pe