

Spring JPA

- description :
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JPA

- SQL?
- ()
- ?
- DB
- - Table
- 가 가

JPA

- JPA . - . ()
- JPA .

JPA

- or

JPA

- (,)
- ()
-
- 1 ()
- ()
-
- SQL 가
-
- (Dirty Checking)
-
-
- ,
-

- (Lazy Loading)

```
@Entity : JPA가
public, protected      ,
@Table(name = "          ")

      가
create, create-drop, update, validate, auto, none
      create, update
      update, validate
      ,      validate, none
@Column      JPA      ,      ddl
updatable = false,
nullable = false
unique = true,

sql  date=      , time=      , timestamp

GeneratorType.IDENTIFY
persist()      가
GeneratorType.SEQUENCE
      가
```

```
,
-      (      ),
JPA

(      ...)

,      ...      가?

      가      .
```

- . (가),
- 가 ()
- 가 .
- 가 ,
- mappedBy . ()
- mappedBy .

- mappedBy = , , 가 ,
- .
- .
- , 가 . (-)
- - 가 , (1:n)
 - , !!

-
-
-
-

```
//
public void addMember(MemberHello member) {
    member.setTeam(this);
    members.add(member);
}

//
public void changeTeam(Team team) {
    this.team = team;
    team.getMembers().add(this); //
}
```

- - toString(), lombok, JSON
 -
 - lombok toString , Entity (Api (⇒ DTO),)
- - - (@ManyToOne)
 - 가 , , - 가 , @ManyToOne
 - (mappedBy가)
 - (@OneToMany)
 - , 가 가 -
 - , 가 ,
 - 가
 - @JoinColumn . () ,
 - , 가 (@JoinColumn(name="", insertable=false, updatable=false)

- (@OneToOne)
 -
 - @JoinColumn ()
 - 가 (mappedBy(name = ""))
 -
 - 가
 -
 -
- (@ManyToMany)
 - 2
 - 가 , 가
 - 2 가
 - 가 !!
 - @ManyToMany → @OneToMany,
 - @ManyToOne
 - PK 가 , Pk ,
- ,
 - 가
 -
 - 가 가
 - 가 가
 - →
 - ← 가 , 가 2
- -
 -
 -
 -

가

가

, , 가

@MappedSuperclass - 가 가

abstract()

, , ,

@Entity @MappedSuperclass 가

```

em.getReference() //
    ?
    .
    (DB 가
    , 가
    ,
    == instanceof
    ,
    em.getReference()
    )
    JPA
    == true
    PersistenceUnitUtil.isLoaded(Object entity)
    entity.getClass().getName()
    , JPA
    org.hibernate.Hibernate.initialize(entity);
    (EAGER), (LAZY)
    가
    JPQL N+1
    @ManyToOne, @OneToOne -> LAZY
    @OneToMany, @ManyToMany
    @ Fetch join, annotation,
    !, JPQL fetch
    가
    (CASCADE)

    CASCADE.ALL or CASCADE.PERSIST
    -
    가
    (
    orphanRemoval = true
    가
    가
    (@OneToOne, @OneToMany 가 )
    CASCADE.ALL, orphanRemoval = true
    (DDD Aggregate Root
    )
    :

```

```

        가 가 ( )
        가 가

        (      ->      가 )
        가
        가

        ORM                      가 ( find-grained)
                                가
        @AttributeOverrides, @AttributeOverride

        (= <-      ( )      , new      )
        .
        (immutable object)      ,
        (      ,      private      )
        new      가      ,      (
        .      !!)
:
        가
        .

(identity)      :      , ==
(equivalence)      :      , equals()

equals() override      . (
    , hashCode      ...)

(@ElementCollection, @CollectionTable      )

        가      가      ,
가

        가      new      가      (side effect      )
        가
        .
        ,
        .
        (null X,      x)
        (      )

```

JPQL 가 100% 가

JPQL: Java Persistence Query Language (!!)

```

        (
            SQL
        )
        -> SQL (feat Dialect)
        SQL,
        SQL
        (
        )
        : , , ( , ), DISTINCT
가
        setFirstResult(0) - 0

        (
        )
        - ON
        JPA 2.1
        가 , ( 5.1 가 )
        exists, ALL, ANY 가 , (NOT) IN 가
        JPA WHERE, HAVING 가 , SELECT
        FROM JPQL 가 (
        )
        Native Query Application , 2
        JPQL
        : 'HELLO', 'She''s'
        : 10L, 10D, 10F
        Boolean: TRUE, FALSE
        ENUM: FQCN
        : TYPE(m) = Member
        : EXISTS, IN, AND, OR, NOT, =, >, >=, <, <=, <>, BETWEEN, LIKE, IS
        NULL

        CASE : 가
        CASE :
        COALESCE:
        NULLIF:

        CONCAT, SUBSTRING, TRIM, LOWER, UPPER, LENGTH, LOCATE, ABS, SQRT, MOD,
        SIZE, INDEX(JPA )
        (Dialect 가 ), select
        function('group_concat', i.name) from Item i ...

        : , m.username, , 가
        :
        : @ManyToOne, @OneToOne, , (INNER
        JOIN) , 가 가
        : @OneToMany, @ManyToMany, , m.orders,
        , 가( size 가 )
        FROM 가
        : 가 (join )
        , (JOIN
        )

```

```

    (fetch join)
JPQL      (      SQL      )
      SQL
join fetch
    가      fetch join      (      -
    가      )
JPA DISTINCT      (SQL DISTINCT      JPA DISTINCT      가
    )
    (      ) -      N+1
    가 (      ),      가
    API      . (      )
    ,      가 ,
    ( N+1      ) -      1000

TREAT(JAP 2.1),      가

JPQL      가

Named
    @Entity      JPQL      (      ), XML      가
    SQL      가
    &
JPA      Named      가

JPA
UPDATE, DELETE
executeUpdate()
INSERT(insert into .. select,      )

JPA Criteria
JPQL
JAVA      (      ,      ).
SQL      가      (      )
    , SQL

JPQL
    ,      (Member)
    (m) (as      가 ) - 가

QueryDSL
JPQL
    ,      가

```

SQL

```
JDBC API      , MyBatis, SpringJdbcTemplate
    em.persist()

// flush -> commit, query
createNativeQuery, createQuery      flush
```

- context-hibernate.xml
- context-jpa-respository.xml

context-hibernate.xml

Tip

3 .

```
<property name="dataSource" ref="" />
```

- context-datasource.xml JPA DB bean ID

```
<property name="packagesToScan" value="" >
```

- values

```
<prop key="hibernate.dialect">
```

- JPA가 DB
-

```
<?xml version="1.0" encoding="utf-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
  xmlns:context="http://www.springframework.org/schema/context"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans-4.0.xsd
http://www.springframework.org/schema/context
http://www.springframework.org/schema/context/spring-context-4.0.xsd">

  <!--      가      EntityManager      , @PersistenceContext      -->
  <bean id="entityManagerFactory"
class="org.springframework.orm.jpa.LocalContainerEntityManagerFactoryBean">
```

```

<property name="dataSource" ref="egov.dataSource" />
<!-- -->
<property name="packagesToScan" value="com" />
<!-- -->
<property name="jpaVendorAdapter">
    <bean
class="org.springframework.orm.jpa.vendor.HibernateJpaVendorAdapter">
        <property name="showSql" value="true" />
        <property name="generateDdl" value="true" />
    </bean>
</property>
<!-- persistence.xml -->
<property name="jpaProperties">
    <props>
        <!-- <prop
key="hibernate.ejb.naming_strategy">org.hibernate.cfg.EJB3NamingStrategy</pr
op> -->
        <prop
key="hibernate.ejb.naming_strategy">org.hibernate.cfg.ImprovedNamingStrategy
</prop>
        <!-- hibernate 5 (4)-
        <prop key="hibernate.naming.implicit-
strategy">org.hibernate.boot.model.naming.ImplicitNamingStrategyLegacyJpaImp
l</prop>
        <prop key="hibernate.naming.physical-
strategy">org.hibernate.boot.model.naming.PhysicalNamingStrategyStandardImpl
</prop>
        -->
        <prop key="hibernate.hbm2ddl.auto">validate</prop>
        <prop
key="hibernate.dialect">org.hibernate.dialect.Oracle10gDialect</prop>
        <prop key="hibernate.show_sql">true</prop>
        <prop key="hibernate.format_sql">true</prop>
        <prop key="hibernate.use_sql_comments">true</prop>
        <prop key="hibernate.jdbc.batch_size">5</prop>
    </props>
</property>
</bean>

</beans>

```

hibernate.dialect

DB2	org.hibernate.dialect.DB2Dialect
DB2 AS/400	org.hibernate.dialect.DB2400Dialect
DB2 OS390	org.hibernate.dialect.DB2390Dialect
PostgreSQL	org.hibernate.dialect.PostgreSQLDialect

MySQL5	org.hibernate.dialect.MySQL5Dialect
MySQL5 with InnoDB	org.hibernate.dialect.MySQL5InnoDBDialect
MySQL with MyISAM	org.hibernate.dialect.MySQLMyISAMDialect
Oracle (any version)	org.hibernate.dialect.OracleDialect
Oracle 9i	org.hibernate.dialect.Oracle9iDialect
Oracle 10g	org.hibernate.dialect.Oracle10gDialect
Oracle 11g	org.hibernate.dialect.Oracle10gDialect
Sybase	org.hibernate.dialect.SybaseASE15Dialect
Sybase Anywhere	org.hibernate.dialect.SybaseAnywhereDialect
Microsoft SQL Server 2000	org.hibernate.dialect.SQLServerDialect
Microsoft SQL Server 2005	org.hibernate.dialect.SQLServer2005Dialect
Microsoft SQL Server 2008	org.hibernate.dialect.SQLServer2008Dialect
SAP DB	org.hibernate.dialect.SAPDBDialect
Informix	org.hibernate.dialect.InformixDialect
HypersonicSQL	org.hibernate.dialect.HSQLDialect
H2 Database	org.hibernate.dialect.H2Dialect
Ingres	org.hibernate.dialect.IngresDialect
Progress	org.hibernate.dialect.ProgressDialect
Mckoi SQL	org.hibernate.dialect.MckoiDialect
Interbase	org.hibernate.dialect.InterbaseDialect
Pointbase	org.hibernate.dialect.PointbaseDialect
FrontBase	org.hibernate.dialect.FrontbaseDialect
Firebird	org.hibernate.dialect.FirebirdDialect

context-jpa-respository.xml

Tip

```
<jpa:repositories base-package="">
```

- base-package=""

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
  xmlns:jpa="http://www.springframework.org/schema/data/jpa"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans-4.0.xsd
http://www.springframework.org/schema/data/jpa
http://www.springframework.org/schema/data/jpa/spring-jpa.xsd">

  <jpa:repositories base-package="com"></jpa:repositories>
```

</beans>

POM.xml

```
<properties>
  <egovframework.jpa.version>3.7.0</egovframework.jpa.version>
  <hibernate.version>4.3.11.Final</hibernate.version>
</properties>
<dependencies>
  <dependency>
    <groupId>egovframework.rte</groupId>
    <artifactId>egovframework.rte.psl.data.jpa</artifactId>
    <version>${egovframework.jpa.version}</version>
  </dependency>

  <!-- Hibernate -->
  <dependency>
    <groupId>org.hibernate</groupId>
    <artifactId>hibernate-core</artifactId>
    <version>${hibernate.version}</version>
  </dependency>

  <dependency>
    <groupId>org.hibernate</groupId>
    <artifactId>hibernate-validator</artifactId>
    <version>5.4.2.Final</version>
  </dependency>
  <dependency>
    <groupId>org.springframework.data</groupId>
    <artifactId>spring-data-jpa</artifactId>
    <version>1.11.10.RELEASE</version>
    <exclusions>
      <exclusion>
        <groupId>org.slf4j</groupId>
        <artifactId>slf4j-api</artifactId>
      </exclusion>
      <exclusion>
        <groupId>org.slf4j</groupId>
        <artifactId>jcl-over-slf4j</artifactId>
      </exclusion>
    </exclusions>
  </dependency>
</dependencies>
```

Builder

- [\[SpringBoot + JPA\] Lombok @Builder](#)

, [spring](#), [jpa](#),

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