Persistence - Part 2

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pictures: sxc.hu, pixabay

Advanced concepts & tricks...

Stop!

https://github.com/collet/4A_ISA_TheCookieFactory/blob/develop/chapters/Persistence.md

First

Set up: Persistence Unit (general)

```xml
<?xml version="1.0" encoding="UTF-8"?>
<persistence version="2.0" xmlns="http://java.sun.com/xml/ns/persistence"
             xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
             xsi:schemaLocation="http://java.sun.com/xml/ns/persistence
             http://java.sun.com/xml/ns/persistence/persistence_2_0.xsd">

    <persistence-unit name="tcf_persistence_unit" transaction-type="JTA">
        <jta-data-source>TCFDataSource</jta-data-source>

        <class>fr.unice.polytech.isa.tcf.entities.Customer</class>
        <class>fr.unice.polytech.isa.tcf.entities.Item</class>
        <class>fr.unice.polytech.isa.tcf.entities.Order</class>

        <exclude-unlisted-classes>true</exclude-unlisted-classes>
        <properties>
            <property name="openjpa.jdbc.SynchronizeMappings" value="buildSchema(ForeignKeys=true)"/>
        </properties>
    </persistence-unit>

</persistence>
```

DataSource

Setup: Prod ≠ Test

```
<resources>
    <Resource id="production" type="DataSource">
        JdbcDriver  org.hsqldb.jdbcDriver
        JdbcUrl     jdbc:hsqldb:file:proddb
        UserName    sa
        Password
        LogSql      true
        JtaManaged  true
    </Resource>
</resources>
```

WEB-INF/resources.xml

```
<property name="properties">
  my-datasource = new://Resource?type=DataSource
  my-datasource.JdbcUrl = jdbc:hsqldb:mem:TCFDB;shutdown=true
  my-datasource.UserName = sa
  my-datasource.Password =
  my-datasource.JtaManaged = true
  my-datasource.LogSql = true
</property>
```

arquillian.xml

Set up: Bytecode enhancement (OpenJPA specific)

```
<plugin>
        <groupId>org.apache.openjpa</groupId>
   <artifactId>openjpa-maven-plugin</artifactId>
   <version>2.4.1</version>
   <configuration>
      <includes>**/entities/*.class</includes>
      <addDefaultConstructor>true</addDefaultConstructor>
      <enforcePropertyRestrictions>true</enforcePropertyRestrictions>
   </configuration>
   <executions>
      <execution>
         <id>enhancer</id>
         <phase>process-classes</phase>
         <goals>
            <goal>enhance</goal>
         </goals>
      </execution>
   </executions>
</plugin>
```

Dedicated Java agent

Annotations: Structural constraints / Validation

```
@Entity
public class Customer implements Serializable {

        @Id
        @GeneratedValue(strategy = GenerationType.AUTO)
        private int id;

        @NotNull
        private String name;

        @NotNull
        @Pattern(regexp = "\\d{10}+", message = "Invalid creditCardNumber")
        private String creditCard;

        @OneToMany(mappedBy = "customer")
        private Set<Order> orders = new HashSet<>();

        // ...
}
```

Classical querying

```
int id = 42;
Customer c = (Customer) entityManager.find(Customer.class, id);
```

```
entityManager.createQuery("DELETE FROM Customer").executeUpdate();
```

Issues?

EQL: EJB Query Language

```
@Override
public Optional<Customer> findByName(String name) {
        CriteriaBuilder builder = entityManager.getCriteriaBuilder();

        CriteriaQuery<Customer> criteria = builder.createQuery(Customer.class);
        Root<Customer> root =  criteria.from(Customer.class);

        criteria.select(root).where(builder.equal(root.get("name"), name));
        TypedQuery<Customer> query = entityManager.createQuery(criteria);

        try {
                return Optional.of(query.getSingleResult());
        } catch (NoResultException nre){
                 return Optional.empty();
        }
}
```

Query Typing

Cascading

There is a containment relationship between Customers and Orders.
Deleting a Customer should delete the associated Orders transitively

```
public class Customer {

        // ...
        @OneToMany(cascade = {CascadeType.REMOVE}, mappedBy = "customer")
        private Set<Order> orders = new HashSet<>();

        // ...
}
```

Warning: be very careful when cascading operations, especially the REMOVE one.
Deleting an Order should not delete the associated customer...

JPA Cascading Types

- **CascadeType.PERSIST** : cascade type persist means that save() or persist() operations cascade to related entities.

- **CascadeType.MERGE** : cascade type merge means that related entities are merged when the owning entity is merged.

- **CascadeType.REFRESH** : cascade type refresh does the same thing for the refresh() operation.

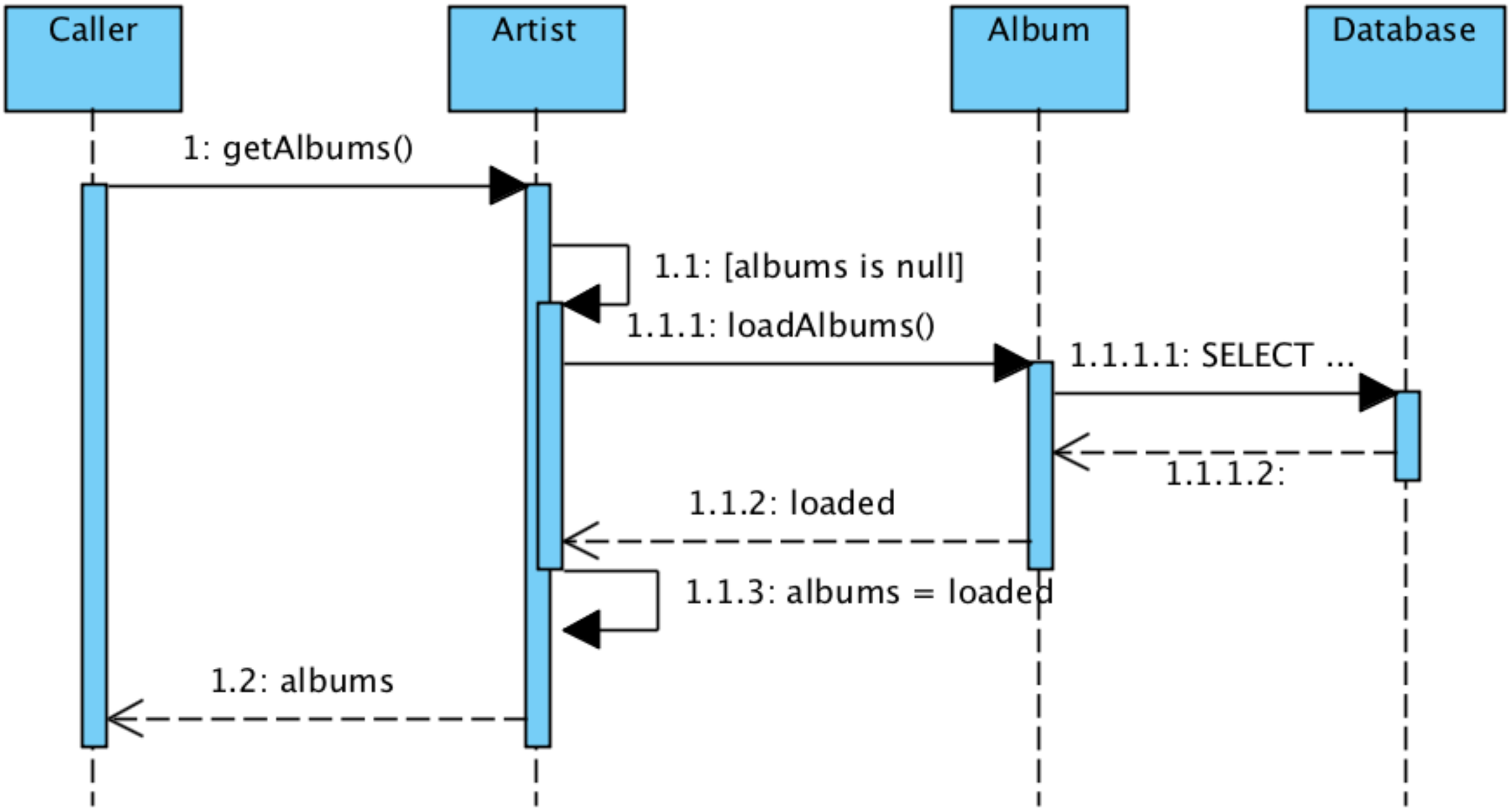
- **CascadeType.REMOVE** : cascade type remove removes all related entities association with this setting when the owning entity is deleted.

- **CascadeType.DETACH** : cascade type detach detaches all related entities if a “manual detach” occurs.

- **CascadeType.ALL** : cascade type all is shorthand for all of the above cascade operations.

There is no default cascade type in JPA. By default no operations are cascaded.

Lazy Loading



[PoEAA]

Lazy loading of the the orders associated to a given customer

```java
@OneToMany(cascade = {CascadeType.REMOVE}, fetch = FetchType.LAZY, mappedBy = "customer")
private Set<Order> orders = new HashSet<>();
```

```java
@Test
public void lazyLoadingDemo() throws Exception {
        // Code executed inside a given transaction
        manual.begin();
                Customer john = new Customer("John Doe", "1234567890");
                entityManager.persist(john);
                Order o1 = new Order(john, Cookies.CHOCOLALALA, 3); entityManager.persist(o1); john.add(o1);
                Order o2 = new Order(john, Cookies.DARK_TEMPTATION, 1); entityManager.persist(o2); john.add(o2);
                Order o3 = new Order(john, Cookies.SOO_CHOCOLATE, 2); entityManager.persist(o3); john.add(o3);
                Customer sameTransaction = loadCustomer(john.getId()) ;
                assertEquals(john, sameTransaction);
                assertEquals(3, john.getOrders().size()); // orders are attached in this transaction => available
        manual.commit();

        // Code executed outside the given transaction
        Customer detached = loadCustomer(john.getId()) ;
        assertNotEquals(john, detached);
        assertNull(detached.getOrders()); // orders are not attached outside of the transaction => null;
}


private Customer loadCustomer(int id) {
        return entityManager.find(Customer.class, id);
```

OUTSIDE THE TRANSACTION (DETACHMENT...)

A single module for all entities, just like TCF