CS544 EA

Applications

Spring Transactions

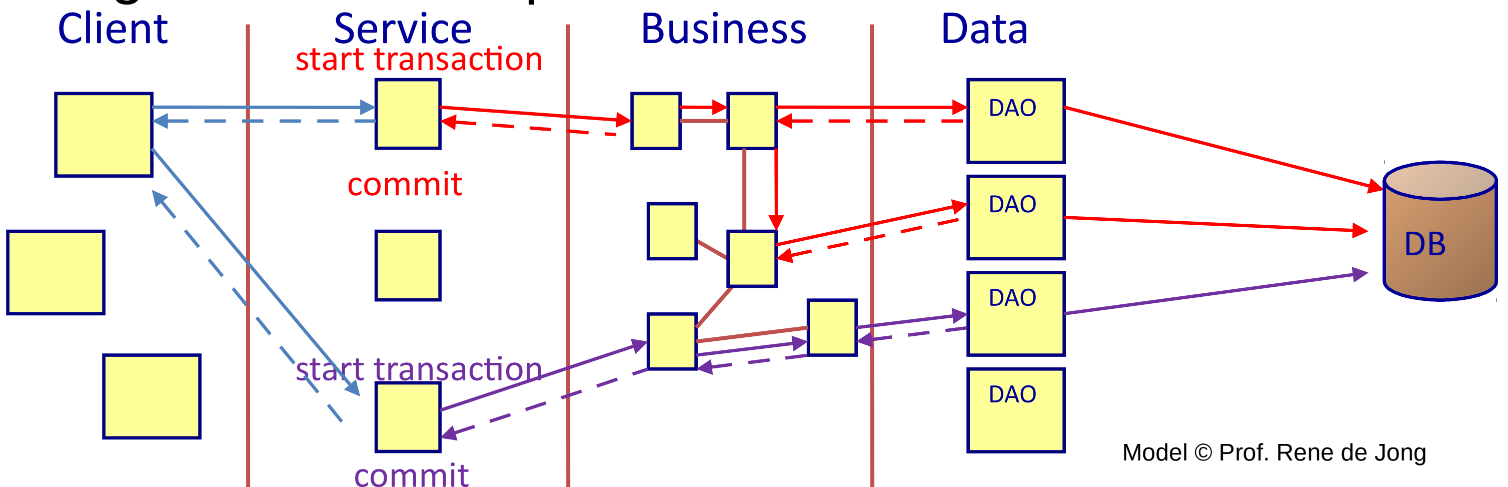
Spring Transaction Support

- Spring is not a transaction manager
  - We still need a transaction manager
    - JDBC transaction manager
    - Hibernate transaction manager
    - XA transaction manger (JTA)

- Spring provides an **abstraction for TX management**
  - You declare how transactions should be managed
  - Spring make it work with the underlying transaction manager

Transaction Demarcation

- The transactional demarcation is the specification of the **transactional boundaries**
- This is typical at the service level
  - Multiple DAO’s can be involved in one transaction
  - Creating a transaction per unit of work



Model © Prof. Rene de Jong

BMT

```
public class CustomerService {
  private CustomerDAO customerDao = new CustomerDAO();
  private AddressDAO addressDao = new AddressDAO();
  private CreditCardDAO ccDao = new CreditCardDAO();
  private EntityManager em = EntityManagerHelper.getCurrent();

  public void addNewCustomer(Customer cust, Address shipAddr, CreditCard cc,
                             Address billAddr) {
    cc.setAddress(billAddr);
    cust.setShipAddress(shipAddr);
    cust.setCreditCard(cc);

    em.getTransaction().begin();
    addressDao.create(shipAddr);
    addressDao.create(billAddr);
    ccDao.create(cc);
    customerDao.create(cust);
    em.getTransaction().commit();
  }

  ...
```

Programmatically begins the transaction

Transaction is automatically propagated to enclosed methods

Programmatically ends the transaction

CMT

```
@Service
public class CustomerService {
  private CustomerDAO customerDao;
  private AddressDAO addressDao;
  private CreditCardDAO ccDao;

  @Transactional(propagation=Propagation.REQUIRED)
  public void addNewCustomer(Customer cust, Address shipAddr, CreditCard cc,
          Address billAddr) {

    cc.setAddress(billAddr);
    cust.setShipAddress(shipAddr);
    cust.setCreditCard(cc);

    addressDao.create(shipAddr);
    addressDao.create(billAddr);
    ccDao.create(cc);
    customerDao.create(cust);
  }

  ...
```

Simply declare that a transaction is needed

REQUIRED is the default and therefore optional

Spring takes care of opening and closing the TX

Transaction propagates to called methods as normal

Class Annotations

```
@Repository
@Transactional(propagation = Propagation.REQUIRED)
public class AddressDao {

     @PersistenceContext
     private EntityManager em;

     @Transactional(propagation = Propagation.MANDATORY)
     public void create(Address addr) {
          em.persist(addr);
     }

     public Address get(int id) {
          return em.find(Address.class, id);
     }

     public void update(Address addr) {
          em.merge(addr);
     }

     public void delete(Address addr) {
          em.remove(addr);
     }
}
```

Annotating a class specifies that all its methods should be Transactional

You can add method level annotations to specify exceptions

These are propagation REQUIRED

Additional Options

- You can also specify the **isolation** level

```
@Repository
@Transactional(propagation = Propagation.REQUIRED, isolation=Isolation.READ_COMMITTED)
public class AddressDao {

     @PersistenceContext
     private EntityManager em;
```

- Or that a transaction should be **read only**

```
@Repository
@Transactional
public class AddressDao {

     @Transactional(readOnly=true)
     public Address get(int id) {
          return em.find(Address.class, id);
     }
```

Additional Options

- A **timeout** in seconds (needs TXManager support)

```
@Repository
@Transactional
public class AddressDao {

     @Transactional(timeout=10)
     public void update(Address addr) {
          em.merge(addr);
     }
```

By default rollback for checked exceptions but not for unchecked exceptions

- What exceptions to **rollback** for

```
@Repository
@Transactional(
     rollbackFor={MyCheckedException.class},
     noRollbackFor={MyRuntimeException.class}
)
public class AddressDao {
```