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September 5th, 10:00am

TRANSACTIONS

Using

What is a transaction ? what are the types and the 4 keys properties that ensure the validity of this transaction ?

What are the advantages of Spring framework that in term of transaction management ?

When to use programmatic trans. management over declarative trans. management and vice versa ?

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TRANSACTION

money transfer transaction

debit the sender account

credit the beneficiary's account

single unit of work

series of actions that fail as a group or complete entirely as a group

Commit

all actions should be rollback in case of any failure

4 KEY ACID PROP

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FAILURE RECOVERY

ATOMICITY

All or nothing approach
i.e. transactions do not occur partially

DURABILITY

Once the trans. has completed execution, the updates to the database are permanent and persistent.
i.e. changes are never lost even if a system failure occurs.

CONCURRENCY CONTROL

CONSISTENCY

Trans. should bring the database from one valid state to another.
i.e. integrity constraints and correctness of database must be maintained

ISOLATION

Transactions occur independently without interference
i.e. ensuring consistency of database state (trans. has readed corrupted uncomitted data of another one)

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TRANSACTION TYPES

GLOBAL TRANSACTIONS

Multiple resources manage the transaction

ie: a server allowing for access to multiple resources such as relational databases and message queues (Kafka, RabbitMQ) in a distributed computing environment

LOCAL TRANSACTIONS

One resource manage the transaction

ie: a JDBC connection in a centralized computing environment

ADVANTAGES OF SPRING FRAMEWORK

CONSISTENT PROGRAMMING MODEL

Spring is setting a **uniform API** across all different transaction & persistence APIs that help manage transactions.

Several different APIs involved on manage trans.

Java Transaction API	**Java Database Connectivity**	**Hibernate**
Java Persistence API	**Java Data Objects**	**Java Message Service**

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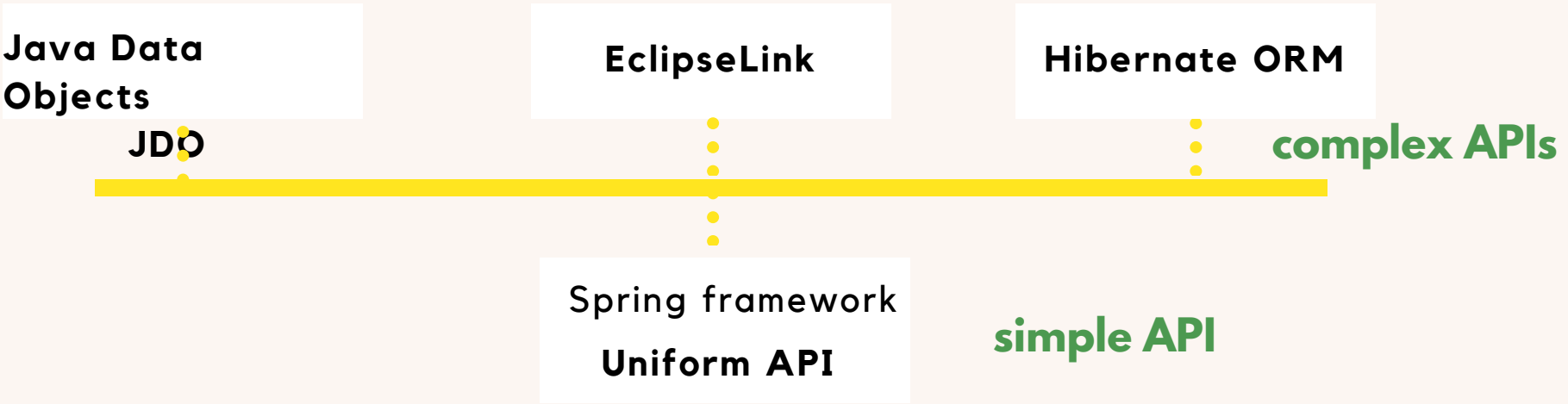
ADVANTAGES OF SPRING FRAMEWORK

CONSISTENT PROGRAMMING MODEL

Imagine that you're using EclipseLink as your persistence provider, and you wanna migrate to Hibernate,
without spring you'd have to make code changes because they have different implementations for trans. management.
using Spring, no code changes are required, and you're using a simpler uniformAPi than any complex API.



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ADVANTAGES OF SPRING FRAMEWORK

- Lightweight and flexible trans. management.

- Support for both programmatic & declarative trans. management.

- Extra support by SpringBoot for transaction management.

- Benefits from different trans. management strategies.

- Separation of business logic & transaction code (declarative).

- Container managed, Time saving, easier to maintain.

DECLARATIVE TRANSACTION MANAGEMENT

- An approach that separate trans. manag. from the business code:

  - Manage transactions via configuration (XML or annotation)
  - Easy to maintain.
  - Preferred when there is a lot of transaction logic.
  - Spring uses aspect-programming oriented paradigm to intercept transactional methods and generate a proxy classes that adds the transactional behavior to them.
  - The default advice mode for processing @Transactional annotations is proxy.

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PROGRAMMATIC TRANSACTION MANAGEMENT

The developer writes custom code to manage the transaction and set boundaries via a callback method.

- Use of transaction template and platform trans. manager APIs.
- Handles more transaction details compared to declarative way.
- Explicitly coded transaction management.
- Manage transactions via code.
- Useful for minimal transaction logic.
- Flexible but difficult to maintain.
- Couples transaction and business logic.

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TRANS. WITH SPRING

Read full article on my website:

https://haffani.netlify.app/publications/spring-data-transaction

See source code on my *github* account:

https://github.com/haffani/spring-transaction-management

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