

Spring Data Repositories Best Practices

Thomas Darimont
JUG KL 13.08.2015



Thomas Darimont
Software Architect - eurodata AG

Former Pivotal
Principal Software Engineer



Spring Data Committer
JPA / MongoDB / Redis / Core



t.darimont@eurodata.de



www.tutorials.de



thomasdarimont

Spring Data



Provides a *consistent approach* to *data access* for *several persistence models*.

Configuration, Templates, Exception
Translation, Object Mapping, Repository
Abstraction.

Modules & Store Support

	Foundational	Store modules		Remote
Core modules	Core	JPA	Gemfire	REST
	KeyValue	MongoDB	Redis	
		Solr		
Community modules		Elasticsearch	Cassandra	
		Couchbase	Neo4j	

DZone Refcard

#184



DZone Refcardz

Get More Refcardz! Visit refcardz.com

CONTENTS INCLUDE:

- » About the Spring Data Project
- » Configuration Support
- » Object Mapping
- » Template APIs
- » Repositories
- » Advanced Features... and more!

Core Spring Data

By: Oliver Gierke

ABOUT THE SPRING DATA PROJECT

The Spring Data project is part of the ecosystem surrounding the Spring Framework and constitutes an umbrella project for advanced data access related topics. It contains modules to support traditional relational data stores (based on plain JDBC or JPA), NoSQL ones (like MongoDB, Neo4j or Redis), and big data technologies like Apache Hadoop. The core mission of the project is to provide a familiar and consistent Spring-based programming model for various data access technologies while retaining store-specific features and capabilities.

General Themes

Infrastructure Configuration Support

A core theme of all the Spring Data projects is support for configuring resources to access the underlying technology. This support is implemented using XML namespaces and support classes for Spring JavaConfig allowing you to easily set up access to a Mongo database, an embedded Neo4j instance, and the like. Also, integration with core Spring functionality like JMX is provided, meaning that some stores will expose statistics through their native API, which will be exposed to JMX via Spring Data.

Object Mapping Framework

Most of the NoSQL Java APIs do not provide support to map domain objects onto the stores' data model (e.g., documents in MongoDB, or nodes and relationships for Neo4j). So, when working with the native Java drivers, you would usually have to write a significant amount of code to

JPA

XML element	Description
<code><jpa:repositories /></code>	Enables Spring Data repositories support for repository interfaces underneath the package configured in the base-package attribute. JavaConfig equivalent is <code>@EnableJpaRepositories</code> .
<code><jpa:auditing /></code>	Enables transparent auditing of JPA managed entities. Note that this requires the <code>AuditingEntityListener</code> applied to the entity (either globally through a declaration in <code>orm.xml</code> or through <code>@EntityListener</code> on the entity class).

MongoDB

For Spring Data MongoDB XML namespace elements not mentioning a dedicated `@Enable` annotation alternative, you usually declare an `@Bean`-annotated method and use the plain Java APIs of the classes that would have otherwise been set up by the XML element. Alternatively, you can use the JavaConfig base class `AbstractMongoConfiguration` that Spring Data MongoDB ships for convenience.

XML element	Description
<code><mongo:db-factory /></code>	One stop shop to set up a Mongo instance pointing to a particular database instance. For advanced-use cases define a <code><mongo:mongo /></code> externally and refer to it using a <code>mongo-ref</code> attribute.

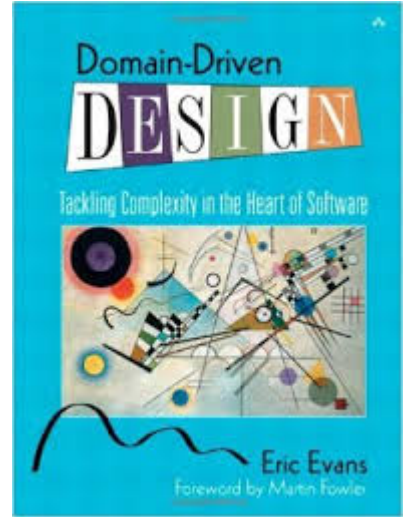
Repositories

Concept of *Domain Driven Design*

A Repository...

“...mediates between the domain and data mapping layers using a collection-like interface for accessing domain objects.”

<http://martinfowler.com/eaCatalog/repository.html>



Hands On

All code on github!

Steps as individual commits :)

[jugsaar/visit-jugkl-20150813-springdata-repositories](https://github.com/jugsaar/visit-jugkl-20150813-springdata-repositories)
[spring-projects/spring-data-examples](https://github.com/spring-projects/spring-data-examples)

Step 0 - Project Setup

1. Spring Source Toolsuite (STS)
2. Spring Boot Starter
3. Define Maven Project
4. Add JPA + H2 Dependency
5. Profit!

Step 0 - Summary

- Spring Boot + Spring Data = Easy!
- Easily configure dependencies
- Defaults application config from classpath
→ Spring Data Repositories Ready to use!

Step 1 - Setup Domain Model

- Define basic JPA entities
- Populate Database
- Test Population

Step 1 - Summary

- We defined Customer + Address Entity
- Populate Database via data.sql
- Test Population via Integration Test

Step 2 - Enable JPA Repositories

- Define Customer Repository
- Basic CRUD functionality
- Based on Spring Data Repositories

Customers can be ***saved, looked up*** by their ***id, email address***.

Step 2 - Summary

- Interface-based programming model
- No implementation required
- Queries derived from method names

Step 3 - Extended CRUD Methods

Customers can be *deleted* and *listed*!

Step 3 - Summary

- Switched to CrudRepository
- Exposed CRUD methods
- Broad API exposed

Step 4 - Add Pagination Support

An User can ***pagewise*** browse through a ***Customer list***.

... wants to ***browse*** through the ***list*** of Customers ***sorted by lastname*** in ***desc order***.

Step 4 - Summary

- Switched to PagingAndSortingRepository
- Exposed CRUD methods and paging ones
- Broad API exposed

Step 5 - Redeclare existing methods

Re-declaring existing CRUD methods

CustomerRepository.findAll() should return a ***List***.

The ***transaction timeout*** for ***save(...)*** should be ***customized*** to ***10 seconds***

Step 5 - Summary

- Re-declared methods
- To customize return types
- Customize Behaviour
(Tx, Locking, Query, Hints, Fetching)
- Customize Query

Step 6 - Def. your own Abstractions

Introducing a read-only repository base interface.

Products* shall be ***accessible*** only ***in read-only mode***.

Step 6 - Summary

- Crafted custom abstraction
- Use by implementing base interface
- Customize return types
- Narrow down the API to the necessary parts

Step 7 - Using custom queries

Using manually defined queries.

As a user, I want to ***look up products by their custom attributes.***

Step 7 - Summary

- You can customize the queries
- Via @Query annotation
- JPA named queries properties
 - @NamedQuery
 - <named-query> in orm.xml
- Spring Data named queries properties file

Step 8 - Flexible Predicate execution

As a user, I want to ***search*** for ***customers by first name, last name, email address and any combination*** of them

Step 8 - Summary

- Querydsl - type safe queries for Java
- extend QuerydslPredicateExecutor
- Flexible query model

Step 9 - Custom Implementations

Custom implementations for repositories.

As an admin user, I'd like to ***use custom code*** to ***raise*** all prices of for winter sale.

Step 9 - Summary

- Provide custom implementation
- Injection & Base class support
(Querydsl, Hibernate, Jdbc-DaoSupport)

Stuff on top

- Spring MVC integration
 - Native support for Pagination
 - Inject Domain Instances into your MVC handlers
- Spring Data REST
- Spring Boot integration

Summary

Interface-based programming model

Start simple, get more sophisticated

Declarative query execution

Flexible predicate execution

Custom implementations

CDI integration

Spring Security integration

Questions

WHY DO WHALES JUMP
WHY ARE WITCHES GREEN
WHY ARE THERE MIRRORS ABOVE BEDS
WHY DO I SAY UH
WHY IS SEA SALT BETTER
WHY ARE THERE TREES IN THE MIDDLE OF FIELDS
WHY IS THERE NOT A POKEMON MIMO
WHY IS THERE LAUGHING IN TV SHOWS
WHY ARE THERE DOORS ON THE FRIEDLY
WHY ARE THERE SO MANY SNOWSTORMS RAINING
WHY AREN'T THERE ANY COUNTRIES IN ANTARCTICA
WHY ARE THERE SCARY SOUNDS IN MINECRAFT
WHY IS THERE KICKING IN MY STOMACH
WHY ARE THERE TWO SURGES AFTER HTTP
WHY ARE THERE CELEBRITIES
WHY DO SNAKES EXIST
WHY DO OYSTERS HAVE PEARLS
WHY ARE DUCKS CALLED DUCKS
WHY DO THEY CALL IT THE CLAP
WHY ARE KYLE AND CHARMAN FRIENDS
WHY IS THERE AN ARROW ON PAPA'S HEAD
WHY ARE TEXT MESSAGES BLUE
WHY ARE THERE MUSTACHES ON CARS
WHY ARE THERE MUZZLES EVERYWHERE
WHY ARE THERE SO MANY BIRDS IN OHIO
WHY IS THERE SO MUCH RAIN IN OHIO
WHY IS OHIO WEATHER SO WEIRD
WHY ARE THERE MALE AND FEMALE BIKES
WHY ARE THERE TINY SPIDERS IN MY HOUSE
WHY DO SPIDERS COME INSIDE
WHY ARE THERE HUGE SPIDERS IN MY HOUSE
WHY ARE THERE LOTS OF SPIDERS IN MY HOUSE
WHY ARE THERE SPIDERS IN MY ROOM
WHY ARE THERE SO MANY SPIDERS IN MY ROOM
WHY DO SPIDER BITES ITCH
WHY IS DYING SO SCARY
WHY IS THERE NO GPS IN LAPTOPS
WHY DO KNEES CLICK
WHY AREN'T THERE E. COLI
WHY IS ISOLATION BAD
WHY DO BOYS LIKE ME
WHY DON'T BOYS LIKE ME
WHY IS THERE ALWAYS A 3RD UPDATE
WHY ARE THERE RED DOTS ON MY THROAT
WHY IS LYING GOOD

WHY DO TESTICLES MOVE
WHY ARE THERE PSYCHICS
WHY ARE WATS SO EXPENSIVE
WHY IS THERE CRYING IN MY SHIRT
WHY DO YOUR BOOGIES HURT
WHY ARE THERE SLAVES IN THE BIBLE
WHY DO TWINS HAVE DIFFERENT FINGERPRINTS
WHY ARE AMERICANS AFRAID OF DRAGONS
WHY IS HTTPS CROSSED OUT IN RED
WHY IS THERE A LINE THROUGH HTTPS
WHY IS THERE A RED LINE THROUGH HTTPS ON FACEBOOK
WHY IS HTTPS IMPORTANT
WHY AREN'T MY ARMS GROWING
WHY ARE THERE SLAVES IN THE BIBLE
WHY IS THERE SLAVERY
WHY ARE THERE SO MANY CROWS IN ROCHESTER, NY
WHY IS PSYCHIC WEAK TO BUG
WHY DO CHILDREN GET CANCER
WHY IS POSEIDON ANGRY WITH ODYSSEUS
WHY IS THERE ICE IN SPACE
WHY ARE THERE ANTS IN MY LAPTOP
WHY IS EARTH TILTED
WHY IS SPACE BLACK
WHY IS OUTER SPACE SO COLD
WHY ARE THERE PHANTOMS ON THE MOON
WHY IS NASA SHUTTING DOWN
WHY ARE THERE GHOSTS
WHY IS THERE AN OWL IN MY BACKYARD
WHY IS THERE AN OWL OUTSIDE MY WINDOW
WHY IS THERE AN OWL ON THE DOLLAR BILL
WHY DO OWLS ATTACK PEOPLE
WHY ARE AK 47s SO EXPENSIVE
WHY ARE THERE HELICOPTERS CIRCLING MY HOUSE
WHY ARE THERE GODS
WHY ARE THERE TWO SPOOKS
WHY ARE MY BOOGIES ITCHY
WHY ARE CIGARETTES LEGAL
WHY ARE THERE DUCKS IN MY POOL
WHY IS JESUS WHITE
WHY IS THERE LIQUID IN MY EYE
WHY DO Q TIPS FEEL GOOD
WHY DO GOOD PEOPLE DIE
WHY IS MT VESUVIUS THERE
WHY DO THEY SAY T MINUS
WHY ARE THERE OBEISKS
WHY ARE WRESTLERS ALWAYS WET
WHY ARE OCEANS BECOMING MORE ACIDIC
WHY IS ARWEN DYING
WHY AREN'T MY QUAIL LAYING EGGS
WHY AREN'T MY QUAIL EGGS HATCHING
WHY AREN'T THERE ANY FOREIGN MILITARY BASES IN AMERICA

WHY ARE THERE DINOSAUR CHOSTS
WHY ARE THERE FEMALE MR NIMES

WHY ARE THERE SQUIRRELS

WHY ARE THERE HELLS

WHY IS SEX SO IMPORTANT

WHY AREN'T THERE GUNS IN HARRY POTTER

WHY ARE ULTRASOUNDS IMPORTANT
WHY ARE ULTRASOUNDS PAINFUL
WHY IS STEALING WRONG

QUESTIONS
FOUND IN GOOGLE AUTOCOMPLETE