Checking for Null Using Annotations

Esteban Herrera

JAVA ARCHITECT

@eh3rrera   www.eherrera.net

In Java, there are no standard annotations to prevent nulls.

JSR 305

Abandoned since 2012

FindBugs unofficial implementation

- javax.annotation package
- Problems
  - Java 9 modules
  - Licensing issues

However, JSR 305 annotations are popular and well-supported

Alternatives Annotation Libraries

Eclipse

Jetbrains

SpotBugs

Checker Framework

How to Choose an Annotation Library?

Where can you use the annotation?

- Java 8 type annotations
  - List<@NotNull String>
- Common contexts
  - Method parameters and return values
  - Fields
  - Local variables
  - Packages

How to Choose an Annotation Library?

At what point is the null check performed?
- Static code analysis
  - Compile time error
- Run time
  - Throw exception

How to Choose an Annotation Library?

Think about compatibility

- IDE and/or build tools

- Language interoperability (Kotlin)

Annotations We'll Review

Spring Framework

Bean Validation

Project Lombok

Spring Annotations

Spring Null-safety Annotations

org.springframework.lang package

- @NonNull
- @Nullable
- @NonNullApi
- @NonNullFields

Provide warnings/errors at compile time

Meta-annotated with JSR 305 based annotations

Also work with other Spring projects

Demo

Annotations

- @NonNull

- @Nullable

- @NonNullApi

IntelliJ IDEA

Bean Validation Annotations

Bean Validation

Standard validation specification

- JSR 303 (first version)
- JSR 380 (second version)

Set of constraints as annotations

A Validator checks if the constraints are satisfied

Bean Validation

Examples of constraints
- @NotNull
- @Size
- @Min/@Max
- @PositiveOrZero

Hibernate Validator is the reference implementation

Does Hibernate Validator only validate objects of the domain model?

- No, it validates objects in all layers

Are @NotNull and @Column(nullable=false) equivalent?

- No

@Column(nullable=false) and @NotNull

@Column

Part of the JPA specification

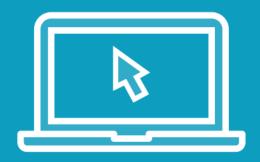If Hibernate creates the table, it adds a not null constraint to the database column

@NotNull

Part of the Bean Validation specification

Triggers a validation during an update or persist lifecycle event

Validates at the application level

Project Lombok Annotations
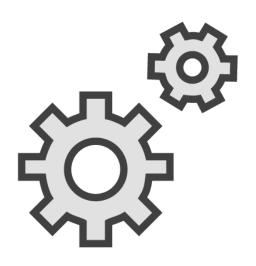
Project Lombok

Helps to reduce boilerplate code

Works as an annotation post-processor

@NonNull annotation for parameters of methods and constructors

- Also used with the @Data annotation

Configuration Options

Type of the exception that is thrown

- NullPointerException

- IllegalArgumentException

- AssertionError

Flag usage of this annotation as a warning or as an error

Demo

@NonNull annotation

Configuration options

IntelliJ IDEA

Summary

Libraries with @NotNull/@NonNull annotations

- Spring
- Hibernate Validator
- Project Lombok

Null-safety annotations

- Compile-time
- Run-time

Summary

To choose an annotation library consider

- At what point the null check is performed

- Where you can use the annotations

- Tool and language interoperability compatibility

Annotations may give you a false sense of protection

- They are not enough

In the next module:
Using the Null Object pattern