

# Annotations

---



**Jesper de Jong**  
Software Architect

@jesperdj [www.jesperdj.com](http://www.jesperdj.com)



# Annotations

Annotations are used to add **metadata** to Java source code.



# Use Cases for Annotations

**Provide additional information to the **compiler****

`@Override`

`@SafeVarargs`

`@Deprecated`

`@FunctionalInterface`

`@SuppressWarnings`



# Use Cases for Annotations

Processing annotations at **compile time** using an **annotation processor**

**Lombok**

<https://projectlombok.org>

**Immutableables**

<https://immutableables.github.io>

**MapStruct**

<https://mapstruct.org>



# Use Cases for Annotations

Processing annotations at **runtime**

**Spring Framework**  
<https://spring.io>

**Java EE / Jakarta EE**  
<https://jakarta.ee>

**Jackson**  
<https://github.com/FasterXML/jackson>

**JUnit**  
<https://junit.org>



# Applying Annotations

## **Declaration** annotations

Applied to declarations of  
classes, fields, methods,  
local variables etc.

## **Type** annotations

Applied to types  
to enhance the type system



# Declaration vs. Type Annotations

```
@NonNull String name;
```



# Declaration vs. Type Annotations

## Declaration annotation

```
@NonNull String name;
```

The **annotation** pertains to  
the **declaration** of the variable





# Declaration vs. Type Annotations

## Type annotation

```
@NonNull String name;
```

The **annotation** pertains to  
the **type** of the variable



# Declaration vs. Type Annotations

## Type annotation

```
@NonNull String name;
```

**The type of the variable is “NonNull String”**



# Declaration vs. Type Annotations

## Declaration annotation

```
@NonNull String name;
```

## Type annotation

```
@NonNull String name;
```



# Declaration vs. Type Annotations

## Type annotation

```
@Target(ElementType.TYPE_USE)  
public @interface NonNull {  
    // ...  
}
```



# Declaration vs. Type Annotations

## Declaration annotation



```
@NonNull String name;
```

## Type annotation

```
@NonNull String name;
```

# Using Type Annotations

**Checker Framework**  
<https://checkerframework.org>



# Summary



## Use cases for annotations

- Special annotations for the compiler
- Compile time processing
- Runtime processing

## Declaration and type annotations

## Define your own annotation

- @interface
- Annotation elements
- Applying meta-annotations

## Working with annotations at runtime



# Up Next: Optional

---

