Java Reflection Hacks

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14. Meeting
Java User Group Saarland
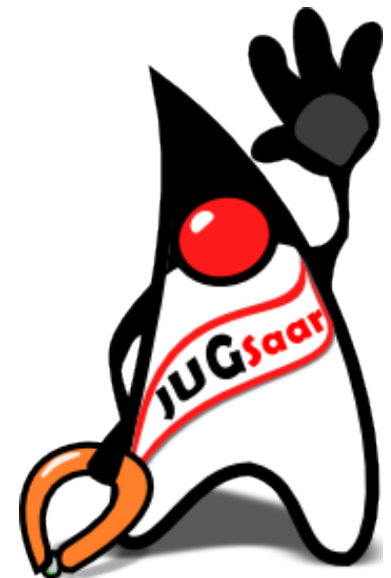
Agenda

- Reflection
- Model
- Properties
- Users
- Examples
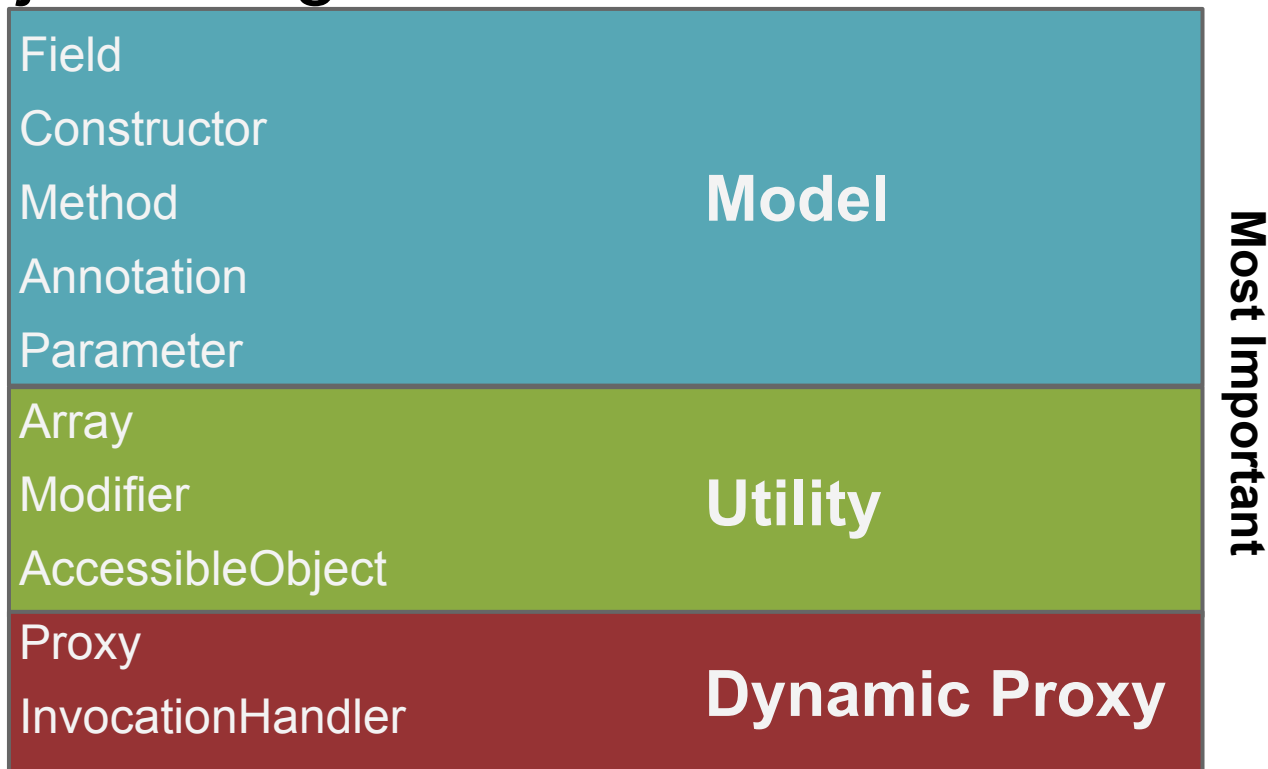- Useful Stuff
- Hacks

Reflection

- Java Core API
- Since Java 1.1
- Introspection
  - Type
  - Metadata
  - State
- Dynamic Method Invocations
  - call methods of any visibility!
- Object state manipulation
  - without using Objects API
  - private state!

Model

- java.lang.Class
- java.lang.reflect.*

Field Constructor Method Annotation Parameter	**Model**
Array Modifier AccessibleObject	**Utility**
Proxy InvocationHandler	**Dynamic Proxy**

Most Important

Properties

- Flexibility
- Untyped / "stringly-typed"
- Enables "hidden features"
- Low-Level API
- Error Prone
- Relience on implementation details
- Potentially tied to JVM
- Overhead

Users

- Serialization
  - reading / writing fields
- Testing
  - populate objects / mocks
- Compatibility checks
  - test for binary compatibility
- Dynamic Configuration
- Aspect Oriented Programming
  - Add behaviour (Advices) to existing code
- Frameworks
  - Combinations of the above

Examples

- Ex 1 - Introspect a class
- Ex 2 - Declared vs Default in Reflection
- Ex 3 - Call a Method dynamically
- Ex 4 - Read / Write Object state
- Ex 5 - Dynamic Object creation
- Ex 6 - Dynamic Proxies
- Ex 7 - Read Annotations

Useful Stuff

- UC 1 - Detect calling class
- UC 2 - Dynamic Data Models
- UC 3 - Dynamic Object Adapter
- UC 4 - Call Java 8 default methods
- UC 5 - Extract Parameter names
- UC 6 - Compatibility checks

  - https://twitter.com/thomasdarimont/status/618198996650184704
- UC 7 - Bridge 4 binary incompatible APIs

Hacks

- Hck 1 - String literals
- Hck 2 - Auto-boxing
- Hck 3 - Throw Checked Exceptions
- Hck 4 - Change static final field
- Hck 5 - Create object without calling ctor
- Hck 6 - Create insert new enum value
- Hck 7 - Change annotation values at runtime

Takeaway

- Caution!
- Reflection is very addictive!
- Lot's of fun
- ~~Im~~possible things
- Can be hard to maintain...
- use wisely

Links

- [Java Specialists Newsletter](#)
- [Reflection Madness Talk](#)
- [Some tricks with Reflection](#)