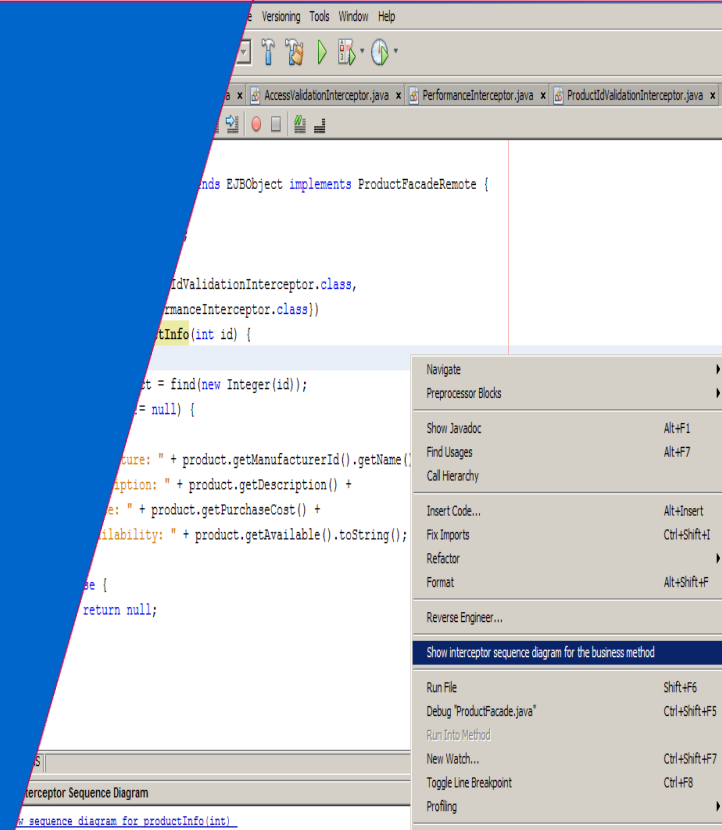# I2SD: Reverse engineering sequence diagrams from Enterprise JavaBeans with interceptors

Serguei Roubtsov

Alexander Serebrenik

Aurélien Mazoyer (*Polytech'Nice-Sophia*)

Mark van den Brand

Technische Universiteit
Eindhoven
University of Technology

Where innovation starts
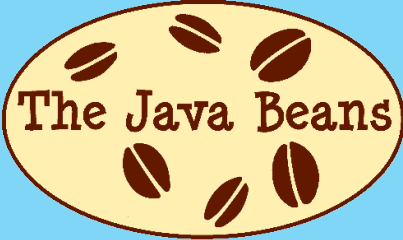
Interceptors

Logging, security, performance, …

- **Business method interceptor**
  - **when a method is called**
- **Lifecycle callback interceptor**
  - **when an object is created or destroyed**

```
public class importantClass {

    public String importantMethod() {
        …
    }
    …
}
```

The Java Beans

Order of invocation

Flexibility

[EJB 3.0 JSR-220]:
- **How?**
  - *XML file*
  - *Annotation*
- **At what level?**
  - *Bean class*
  - *Method (BMI)*
- **Where?**
  - *Bean class*
  - *Superclass*
  - *Separate class*
  - *Injected bean*
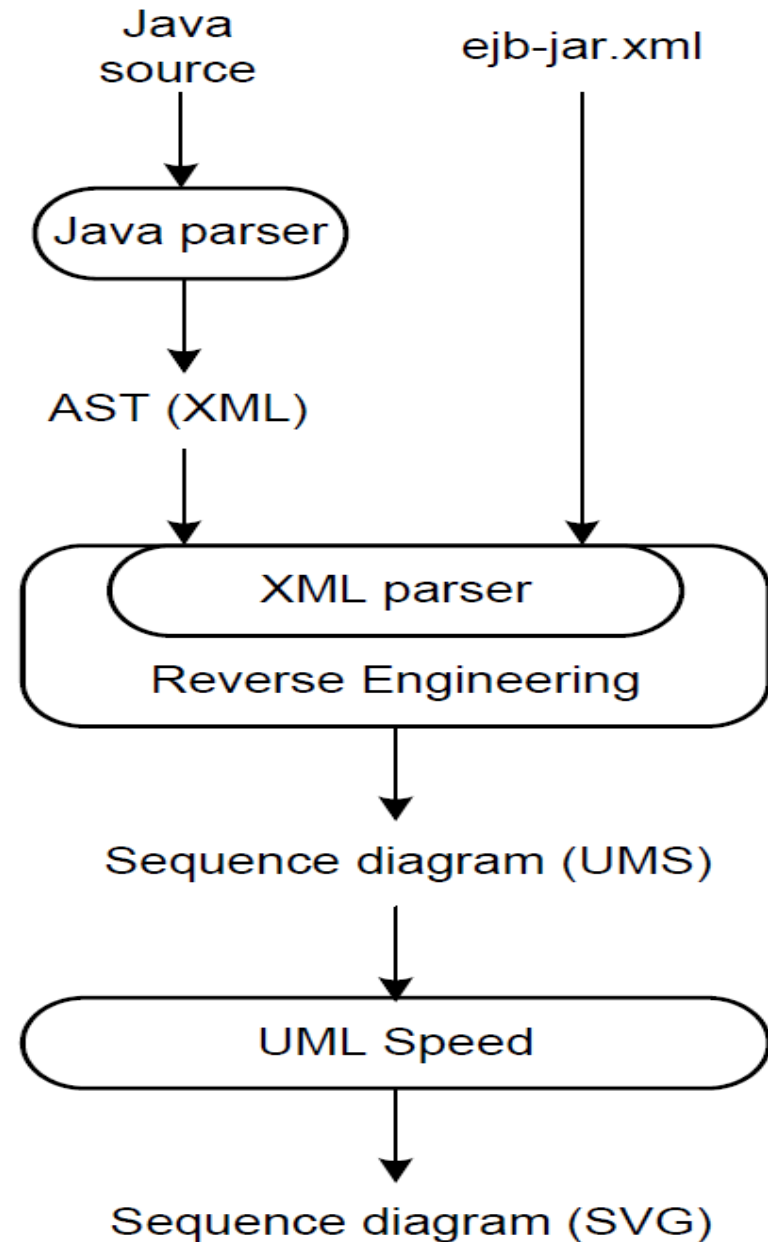
Order of invocation

- **Influenced by how, where and at what level.**
- **Governed by complex and interwined laws**
  - **9 for the business method interceptors**
  - **7 for the life cycle callback interceptors**
- **Comprehension of the invocation order is complex!**

- **Visualization: sequence diagrams**
  - **Beneficial for comprehension [Tiley Huang 2003]**
  - **Suited for the task as interceptor invocation**
    - **Sequential**
    - **Data independent (more or less)**

I2SD

- **Co-evolution concern $\Rightarrow$ separation of the parsers**

- **Visualization + analysis $\Rightarrow$ SVG (XML-based)**
  - **Suited for post-processing**

- **Integrated in NetBeans**
  - **Uses the internal on-the-fly NetBeans compiler**

User scenarios (paper)

- **Developer Alice tries to understand a performance problem**
  - **Measurements of the explicit calls do not help**
  - **I2SD exposes "hidden" interceptor calls**
  - **Alice measures performance of these calls**
  - **Alice-like demo**

- **Quality assessor Bob evaluates maintainability**
  - **Metrics: number of calls in a scenario**
    [J. Muskens, M. R. Chaudron, and R. Westgeest PROGRESS 2002]
  - **Bob runs I2SD as a batch job**
  - **Compares results against the benchmarks**

Conclusions

- **Interceptors are flexible and beneficial**
  - **Order of invocation is challenging**
  - **Reason for slow adoption?**

- **I2SD reconstructs sequence diagrams**
  - **Helps both developers and quality assessors**

- **More information and availability**
  - **Serguei Roubtsov**
  - **s.roubtsov@tue.nl**

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