



Berner Fachhochschule  
Haute école spécialisée bernoise  
Bern University of Applied Sciences

# Aspect-oriented programming with AspectJ

David Aeschlimann, Emanuel Knecht

Prof. Dr Jürgen Eckerle

2015

# Structure

- History of AOP
- Flaws of Object oriented programming
- Aspect oriented approach
- Demo
- Pros and cons
- Questions

# History of AOP with AspectJ

- 1995 Concept invented in Xerox PARC
  - 1998 First implementation released
    - 2002 AspectJ 1.0 released
    - ...
- 9.9.2015 Latest Version (1.8.7) released

# Object oriented

```
public class SomeClass {

    // Core data members
    // Logging object reference
    // Concurrency lock

    public void someOperation(Object param) {
        // check input parameter
        // Ensure authorization
        // Lock object (thread safety)
        // Start transaction
        // Perform operation
        // Log successful performance of operation
        // Commit transaction
        // Unlock object
    }
}
```

# Object oriented

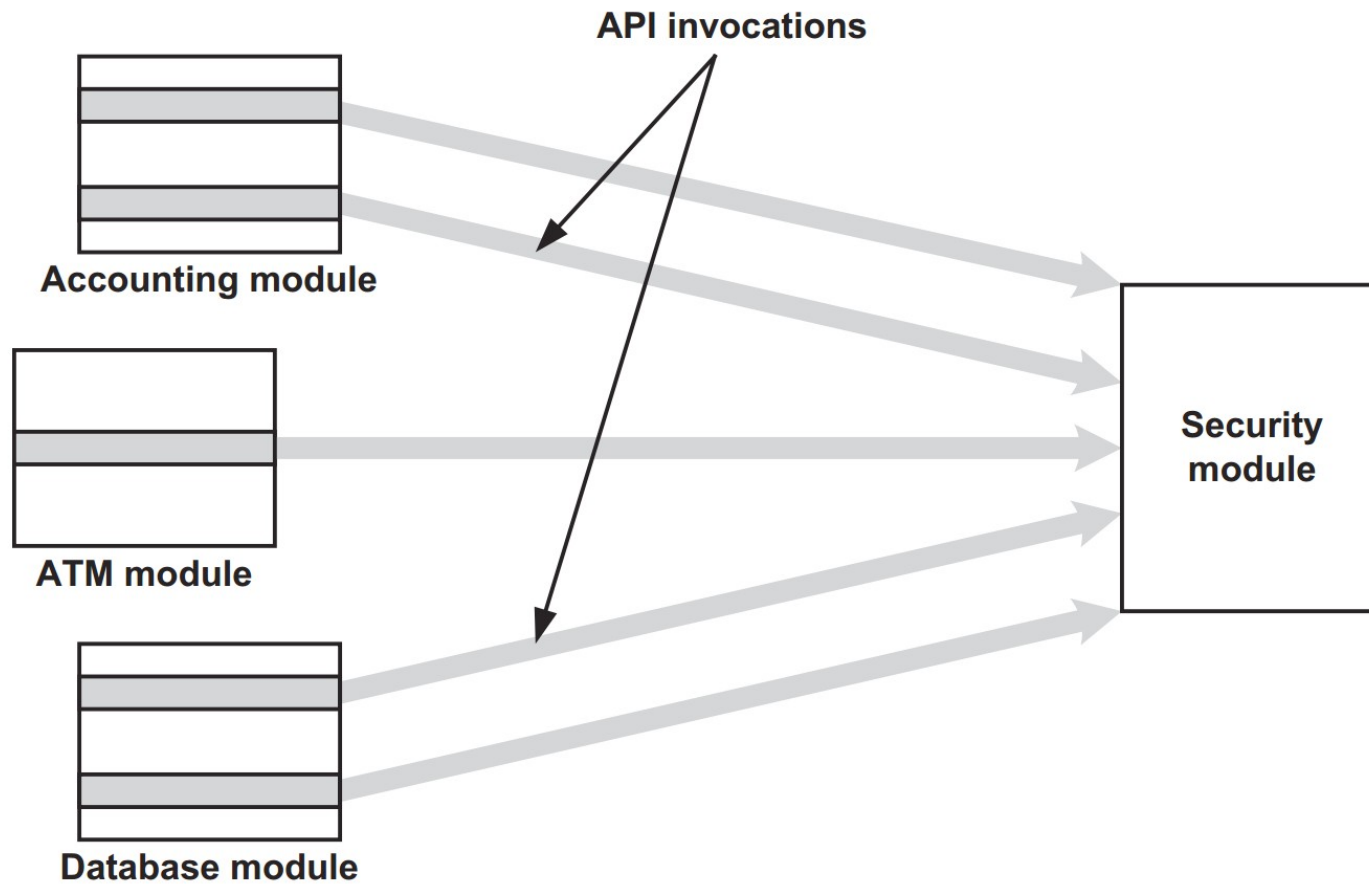
```
public class SomeClass {

    // Core data members
    // Logging object reference
    // Concurrency lock

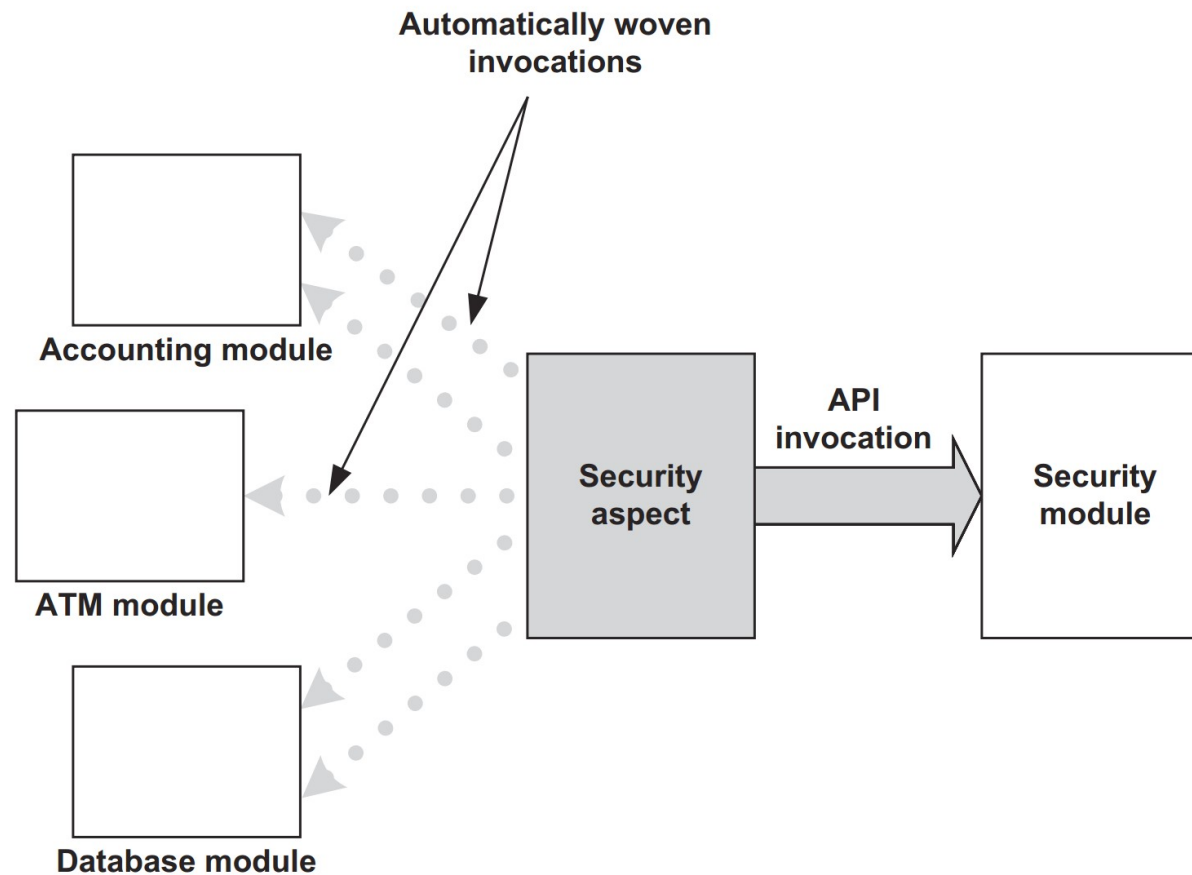
    public void someOperation(Object param) {
        // check input parameter
        // Ensure authorization
        // Lock object (thread safety)
        // Start transaction
        // Perform operation
        // Log successful performance of operation
        // Commit transaction
        // Unlock object
    }
}
```

**SINGLE RESPONSIBILITY PRINCIPLE**

# Object oriented



# Aspect oriented

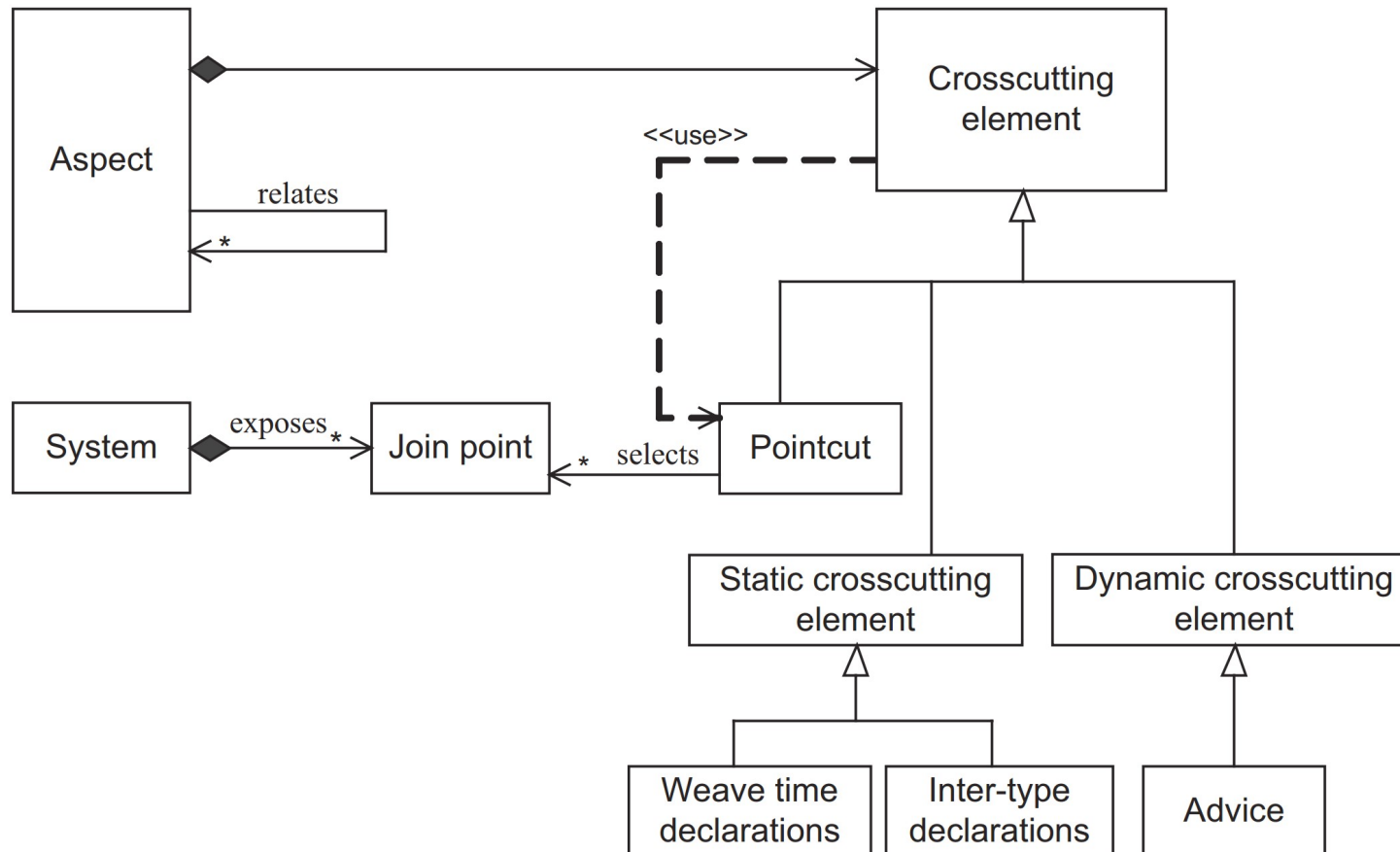


# Aspect oriented

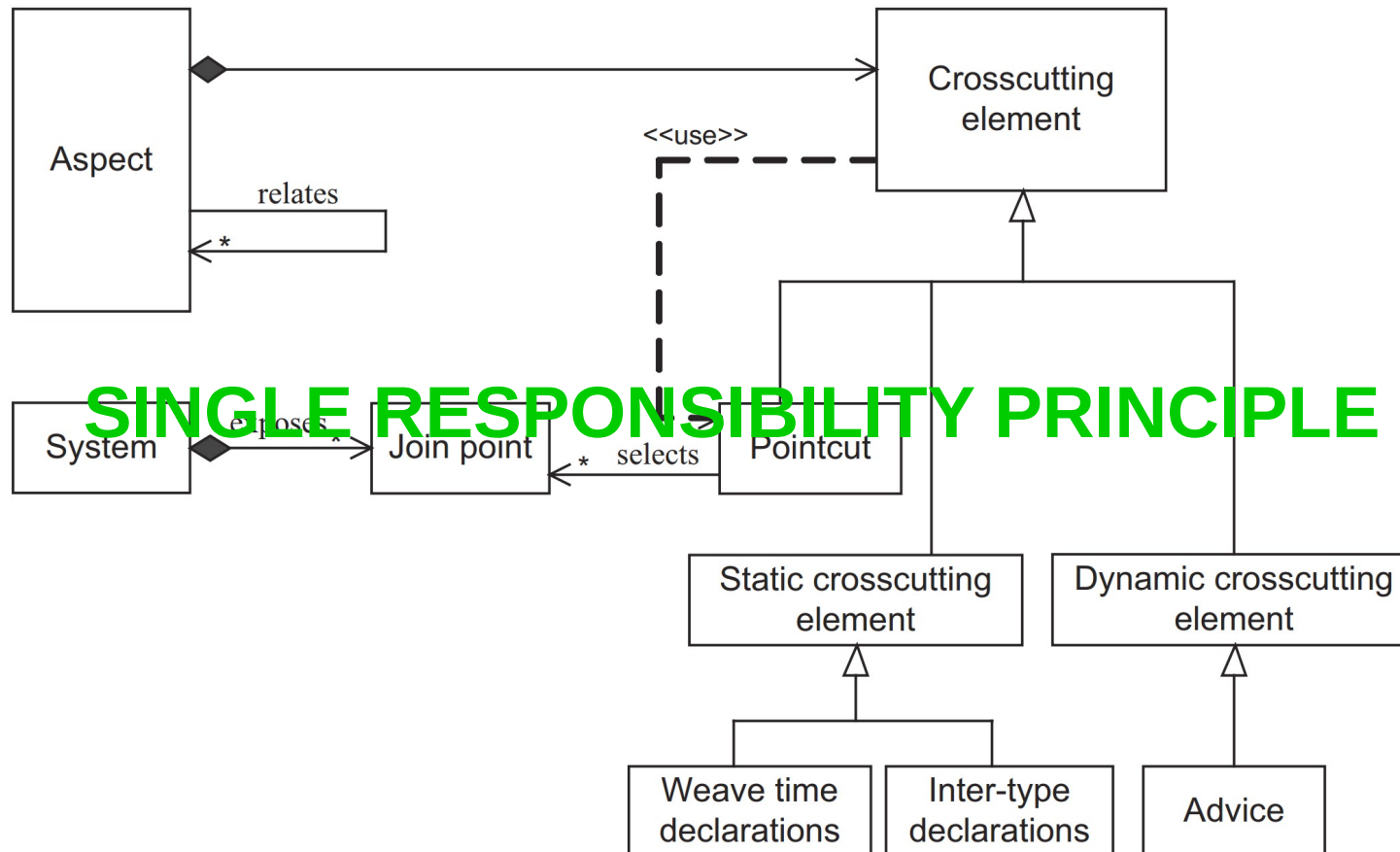
- Join Point
- Pointcut
- Advice
- Dynamic crosscutting
- Static crosscutting
- Aspect



# Aspect oriented



# Aspect oriented



# Languages

- Java
  - AspectJ
  - Spring AOP
- C/C++
  - AspectC++
- C#
  - PostSharp
  - AspectSharp
  - Afterthought (Open Source)
- Nemerle

# Demo



Berner Fachhochschule  
Haute école spécialisée bernoise  
Bern University of Applied Sciences

# Pros and Cons

- ✓ Easy design
- ✓ Clean code
- ✓ Reusability
- ✓ Extendability
- ✗ Experience needed
- ✗ Changes in build and deployment
- ✗ Obscure program flow

# Questions?



Berner Fachhochschule  
Haute école spécialisée bernoise  
Bern University of Applied Sciences

