Xtend

=> [ large scale model transformations with it ]

Andreas Graf / itemis AG / EclipseCon 2017
Blurb:

Xtend is a flexible and expressive dialect of Java, which compiles into readable Java compatible source code. You can use any existing Java library seamlessly.
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Blurb:

Cool:
- Model-To-Model
- Model-To-Text
- Lambdas **much nicer** than Java
- Active annotations
- Concise Syntax
The Project

A

B

Z
The Project

A

B

Z

OEM

AUTOSAR
The Project

376,000 LOC

A
B
Z

OEM

AUTOSAR
The Project

376,000 LOC in Xtend!
The Project

376,000 LOC in Xtend!
M2M
The Reference Problem
M2M

The Reference Problem

Multi-Pass

Custom Cache
def create target: new T_Interface trafo(S_Interface s) {
    target.shortName = s
}

t_p.interface = s_p.iface.trafo; t_o.owned+=s_o.elements.map[trafo]
M2M

Analyzing

Tracing Info:
Find all caches of create methods (reflection)

Attach information about source element from cache

(Dependency Injection makes this much easier)
M2M Annotations

.xtend

Xtend
Active Annotations

.java
M2M Annotations

```java
annotation Log {
}

class LogProcessor extends AbstractClassProcessor {
    public static String LOGGER_NAME = "LOGGER"

    override doTransform(MutableClassDeclaration annotatedClass, extension TransformationContext context) {
        annotatedClass.addField(LOGGER_NAME) {
            visibility = Visibility.PRIVATE
            static = true
            final = true
            type = Logger.newTypeReference
            initializer = "\n                Logger.create("annotatedClass.simpleName".class)"
        };
    }
}
```
M2M Annotations

@Transformation

| Created Element       | Method       | Parameters       | ...
|-----------------------|--------------|------------------|----------------
| T_Component           | trafoC       | S_Component      |                |
| T_Component           | trafoC_String| String           | Integer        |
| T_Port                | trafoPort    | S_Port           | Integer        |
| T_SomeElement         | blaFasel     | S_Interface      | T_Port         |
@Req

@Req(reqs=["REQ_12", "REQ_B5C"])

---

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Class</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>REQ_12</td>
<td>Trafo1</td>
<td>compoTransform</td>
</tr>
<tr>
<td>REQ_12</td>
<td>Trafo2</td>
<td></td>
</tr>
<tr>
<td>REQ_B5C</td>
<td>Trafo1</td>
<td>portTransform</td>
</tr>
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<td>REQ_B5C</td>
<td>Trafo1</td>
<td>portTransformSpecial</td>
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