From a lot of Boxes to a lot of Words

Migrating to Xtext

Jochen Schmich, Fiducia & GAD IT AG / Hendrik Bünner itemis AG
Ludwigsburg, 26.10.2017
1. Introduction
2. Our Goals
3. How to get there?
4. Wrap Up
Our Locations

Five locations in Germany ensure high security and best customer contact

- **Karlsruhe and Münster**
  Board, Administration, Product Management, Development, Production, Sales, Customer Service and Printing

- **Munich**
  Product Management, Development, Sales and Customer Service

- **Berlin**
  Sales and Printing

- **Frankfurt**
  Registered Office and Sales
Overview

Our company – The most important figures

- **Turnover**
  - Fiducia & GAD IT AG: approx. €1,200m
  - Group Turnover: approx. €1,400m

- **Headcount**
  - Fiducia & GAD IT AG: 4,445
  - Group Headcount: over 6,400

Diverse Target Markets

More than 1,200 customers and owners in four target markets are the basis of our successful business strategy.

Cooperative Banks 932

Cooperative Specialized Commercial Banks 45

Market Customers 158

Companies within the Cooperative Financial Network 74

Scope of Services of Our Banking System

The heart of our IT solutions is agree21Banking.

- Banking system – universal and fully integrated
- Business models – from universal to special bank
- Ready for the future - innovative, efficient and secure
- Digital – always and everywhere accessible for the customer
- Process consistency – Improves productivity
- High level of automation – accelerates processes
Scope of Services of Our Banking System

The heart of our IT solutions is agree21Banking.

- Banking system – universal and fully integrated
- Business models – from universal to special bank
- Ready for the future - innovative, efficient and secure
- First version shipped in 2003
- 97 Mio Java LOC
- Process consistency – Improves productivity
- High level of automation – accelerates processes
Context

- Code for agree21 modules is generated from UML Class models (IBM RSA)
- 620 modules with generated code
- 105 module owners
- Restriction in budget and resources
- Avoid test efforts
- Varying model quality
- Framework-centric modeling (JBF – Java Based Banking Framework)
  - Application Models
  - Services
  - Enumerations
  - Persistence
  - …
Agenda

1. Introduction
2. Our Goals
3. How to get there?
4. Wrap Up
# How to make the users happy?

<table>
<thead>
<tr>
<th>Goal</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Familiar language &amp; concepts</td>
<td>- Simple metamodel</td>
</tr>
<tr>
<td>- Fast results</td>
<td>- Resemble framework concepts</td>
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<tr>
<td>- One tool to use</td>
<td>- Removed unnecessary abstractions</td>
</tr>
<tr>
<td>- Visualization</td>
<td>- Leverage Out-Of-The-box features</td>
</tr>
<tr>
<td>- Easy Transition</td>
<td>- We already use 2 Xtext DSLs</td>
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<tr>
<td></td>
<td>- „Model Libraries“ are replaced by JvmTypeReferences</td>
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<tr>
<td></td>
<td>- Provide guidance for typical usage scenarios</td>
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How to make the users happy?

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<thead>
<tr>
<th>Goal</th>
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<tr>
<td>Familiar language &amp; concepts</td>
<td>Optimized critical use cases</td>
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<td>Fast results</td>
<td>FAST content assistance</td>
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<tr>
<td>One tool to use</td>
<td>FAST generators: Re-wrote all RSA generators with Java and Xtend (formerly Xpand-based)</td>
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<td>Visualization</td>
<td>Intensive profiling</td>
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<tr>
<td>Easy Transition</td>
<td>Caching (JDT Types, Index)</td>
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</table>
How to make the users happy?

Goal

- Familiar language & concepts
- Fast results
- One tool to use
- Visualization
- Easy Transition

Measure

- Less context switching
- Developers will only need Eclipse for modeling and generation
### How to make the users happy?

<table>
<thead>
<tr>
<th>Goal</th>
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<tbody>
<tr>
<td>Familiar language &amp; concepts</td>
<td>Models tend to get LARGE and users need an overview</td>
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<td>Sirius used to create class diagrams</td>
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<td>One tool to use</td>
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<td>Familiar language &amp; concepts</td>
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<td>Visualization</td>
<td>FAQ</td>
</tr>
<tr>
<td>Easy Transition</td>
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</table>
What do you get?

Diagram Support

JBF Services DSL

JBF Persistence DSL

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What do you get?

Diagram Support

Backed by 7500+ Xpect Tests!

JBF Services DSL

Öffentlich (C1)

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1. Introduction
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How to get there?

Existing Tool

New Tool
How to get there?

Model Transformation?

Existing Tool

New Tool
How to get there?

Reverse Engineering

Existing Tool

New Tool
The Migration Tool

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The Migration Tool

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The Migration Tool

- .java
- Eclipse JDT
- Java AST
  - Class
  - Field
  - Method
- .dsl
- DSL AST
  - ApplicationModel
  - Property
  - Method
- DSL Migrator

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The Migration Tool

- .java
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- DSL AST
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- DSL Serializer
- DSL Migrator
„A Shot in the Dark“

Just give them a Migration Tool!

Reverse Engineering

Existing Tool

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New Tool
„A Shot in the Dark“

Just give them a Migration Tool!
„A Shot in the Dark“

Just give them a Migration Tool!
This won’t work out!

Such an approach would take ages!

- Performance problems will occur!
- Unexpected generator bugs will pop up!
- Unpredictable!
- No governance!
- No guidance for the user!
- Magic lamps are beyond budget!

New Tool
Who is involved?

Tool User / Module Owner

„Migrator“

Tool Developer
What do they want?

Tool Users / Module Owner

‟Migrator‟

Tool Developer

Develop Migration tools

- Wants to know if Generator / Migration works (Bugs, „differences‟)
- Happy users
What do they want?

**Tool Developer**

- Develop Migration tools
  - Wants to know if Generator / Migration works (Bugs, „differences“)
  - Happy users

**„Migrator“**

- Prepare & Perform Migration
  - Automated process
  - Wants to estimate the effort („differences“)
  - Wants to make a plan
  - Easy review of code changes
  - Wants to get bugs fixed fast
  - Wants to guide the user

**Tool Users / Module Owner**
What do they want?

Tool Users / Module Owner

- Review, test and check-in
  - Avoid test efforts
  - Use the new tool right away
  - Easy review of code changes
  - Wants to know the effort („differences“)

„Migrator“

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Öffentlich (C1)
Automate the Process - Migration

Migrate to DSL

Java

Eclipse JDT

Class

Field

Method

DSL AST

ApplicationModel

Property

Method

DSL Migrator

DSL Serializer

.dl

.dl
Automate the Process - Generation

- Generate based on the reverse engineered DSL
- Compare the generated source code with the source code used as input
- Differences
  - Known vs. Unknown
  - Structural vs. Textual vs. Javadoc
- Metrics
  - Runtime of migration
  - Number of model elements created
  - Errors and Warnings in the created DSL models
Automate the Process - Reporting

1. Setup Workspace
2. Migrate to DSL
3. Run Generator
4. Collect Metrics & Differences
5. Write Results

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Track the Progress!

### Migrator

#### Tool Users

- Tool User A
- Tool User B
- Tool User C

#### Tool Developer

- Tool User A
- Tool User B
- Tool User C

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Track the Progress!

Tool Users

„Migrator“

Tool Developer

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Track the Progress!

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Track the Progress!

Tool Users

„Migrator“

Tool Developer

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It's all about differences!

Tool Users

„Migrator“

Tool Developer

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1. Introduction
2. Why change it?
3. How to get there?
4. Wrap Up
Wrap Up - Lessons Learned

- Unit testing with Xpect is useful (…given some patience)
- Eclipse compare mechanism is too close integrated into the UI
- JDT indexing models with large classpath, may take forever – Looking forward to the new index implementation
- It would be more intuitive if Sirius diagrams could be opened from the Package Explorer
- Testing with real modules ensures comprehensive forecasts
- Eclipse ecosystem is exactly the right tool to implement such a migration
Wrap Up - Conclusion

- Positive User Feedback
  - Stable
  - Developer-oriented
  - Minimal efforts for migration
  - Virtually no need for training / Jumpstart
  - Improved model quality

- Leveraging the benefits of textual and graphical modeling

- Automated migration environment as basis for impact analysis for future enhancements
Thank you! Questions?
Evaluate the Sessions

Sign in and vote at eclipsecon.org

- 1  0  + 1