



Migration of a large Oracle Forms application to Scout

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System „Logitrack“

- Developed from 2004 on
- 50 man years effort
- Developers had strong Oracle / PL/SQL Know How
- ERP System for Logistics branch covering Air-, Ocean-, Road Logistics

System Metrics

- 22 Modules
- 1300 Tables / Views
- 1150 Forms
-



Rhenus fusioned with company that developed Logitrack

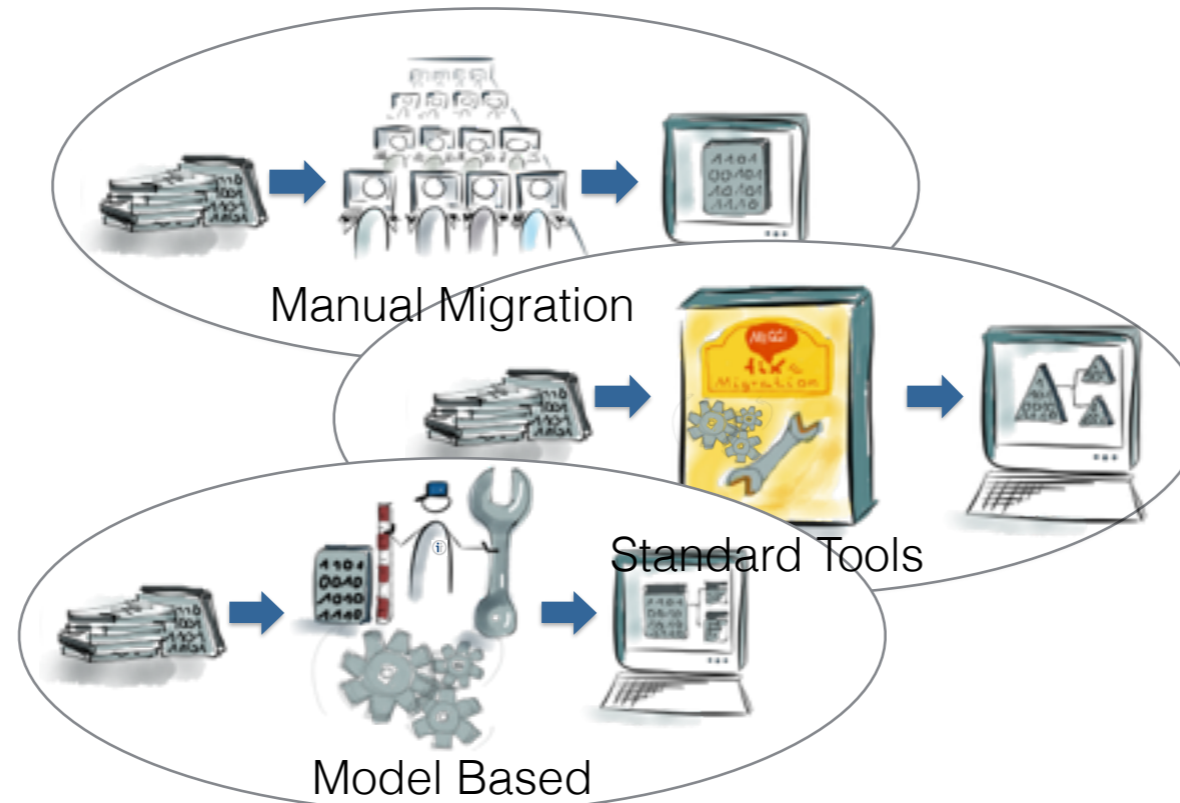
IT Landscape Consolidation

Oracle Forms drop from technology stack

- Forms still supported, but not actively developed further
- Designer is dead, last version with Oracle 10
- Java Know-How is easier to get than PL/SQL

Build a common DEVELOPMENT ENVIRONMENT

Migration Approaches



Manuelle Migration

Vorteil:

- Potential zur Restrukturierung

Nachteile:

- Parallele Entwicklung von Alt- und Neusystem
- Zeit-, Personal- und Kostenintensiv
- Homogenität des Zielsystems schwer sicherzustellen
- Konsistenz zum Altsystem schwer nachweisbar

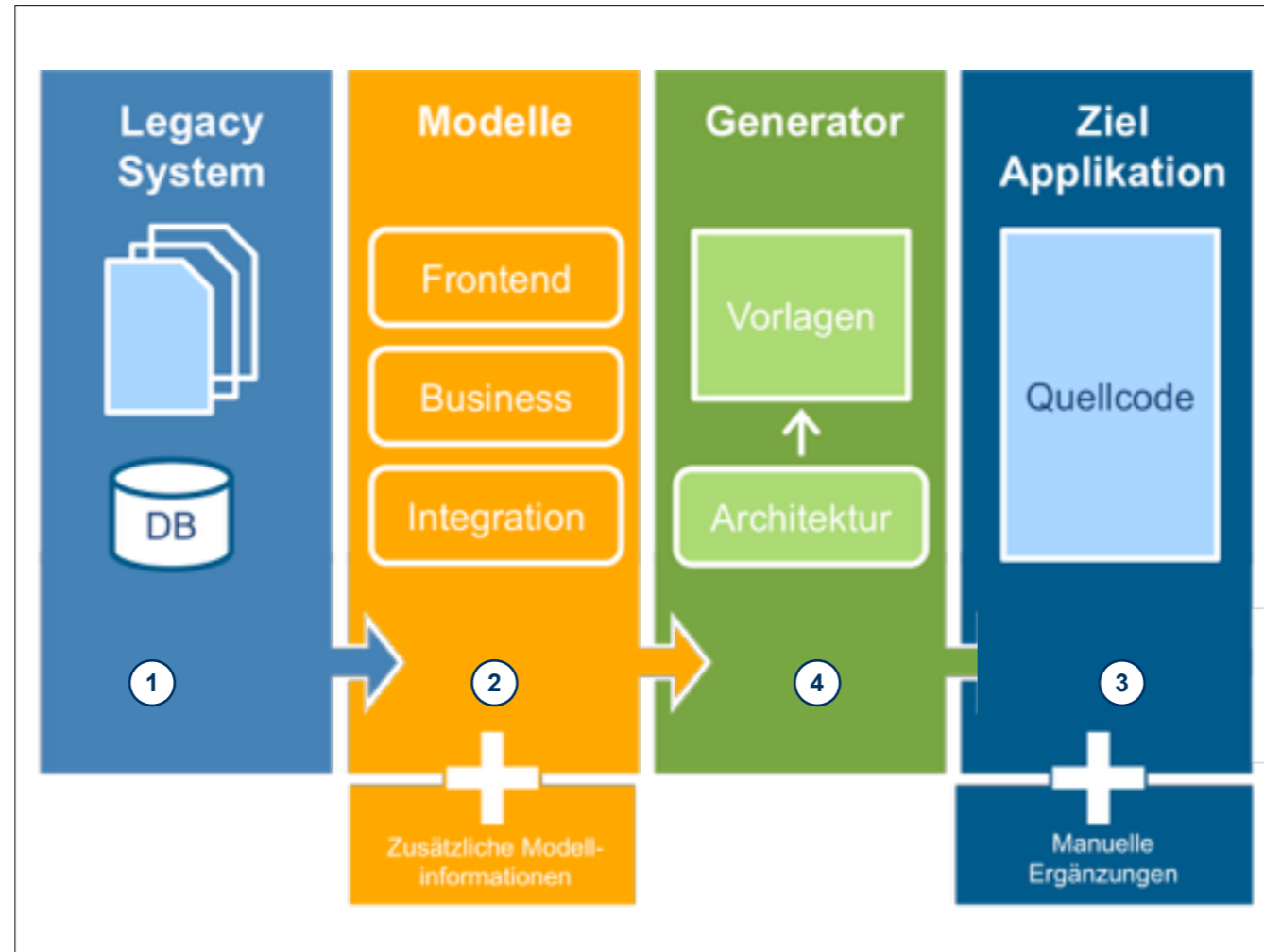
Standard Werkzeug

Vorteile:

- Fertiges Werkzeug
- Zeitersparnis
- Ggf. Kostenersparnis

Nachteile:

- Werkzeug und Zielarchitektur nicht anpassbar
- Weiterentwicklung sehr aufwendig/nicht möglich
- Abhängigkeit vom Werkzeughersteller



- 1) Legacy System analyzed
- 2) Automated extraction of Metadata from Legacy System
- 3) Build Reference Application
- 4) Derive Code Generator

How we opted for Scout



Initial prototype targeted plain RAP with Spring and custom application framework

Scout seemed to fit, but no concrete experience available => Risk

POC: Replace Client layer by Scout

Good match for desired target architecture

Took a longer time until we got a final decision to go with Scout

TMMA002 - Countries

| iso 2 Code | Description | iso 3 Code | iso Num | Cont. Desc | EU | EFTA | SEPA | Postal code position | PC Prefix | Home no. position | State Code | VAT Prefix | Access Code |
|------------|----------------------|------------|---------|--------------------|----|-------------------------------------|------|----------------------|-----------|-------------------|------------|------------|-------------|
| | | 000 | | DUMMY | | | | Before | | After | No | | |
| AD | ANDORRA | AND | 020 | ANDORRA | | <input checked="" type="checkbox"/> | | Before | | After | No | | 375 |
| AE | UNITED ARAB EMIRATES | ARE | 784 | VER ARAB EMIRATEN | | | | Before | | After | No | | 371 |
| AF | AFGHANISTAN | AFG | 004 | AFGHANISTAN | | | | Before | | After | Yes | | 33 |
| AG | ANTIGUA AND BARBUDA | ATG | 028 | ANTIGUA EN BARBUDA | | | | Before | | After | No | | 268 |
| AJ | ANGUILLA | AGA | 660 | ANGUILLA | | | | Before | | After | No | | 309 |
| AL | ALBANIA | ALB | 009 | ALBANE | | | | Before | | After | No | | 355 |

TM - Relations

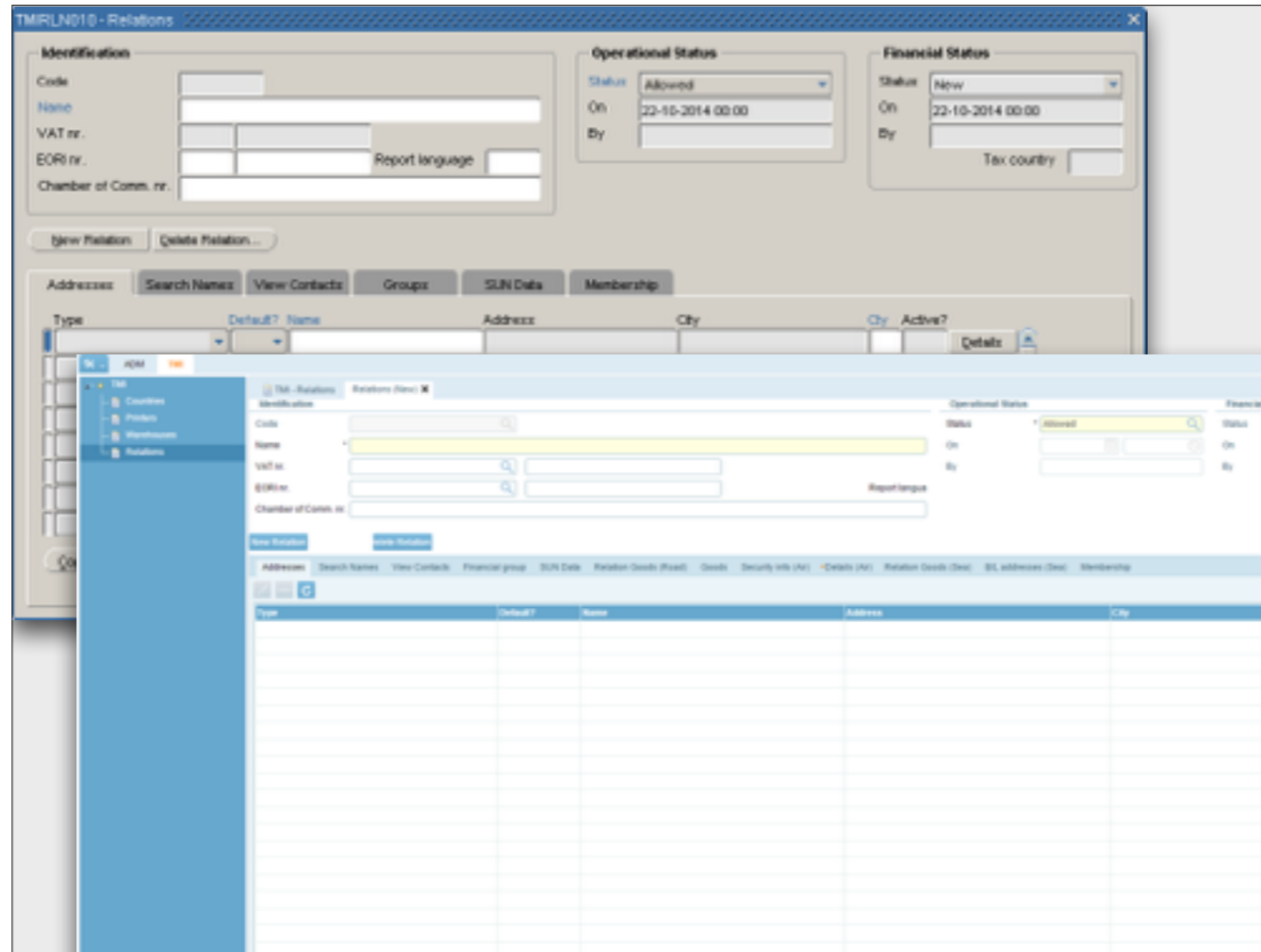
Relations (New) Posters Countries X

| iso 2 Code | Description | iso 3 Code | iso Num | Cont. Desc | |
|------------|---------------------|------------|---------|---------------------|-------------------------------------|
| NL | THE NETHERLANDS | NLD | 528 | NETHERLANDS | <input checked="" type="checkbox"/> |
| NO | NORWAY | NOR | 578 | NOORWEGEN | <input type="checkbox"/> |
| NP | NEPAL | NPL | 524 | NEPAL | <input type="checkbox"/> |
| NR | NAUROE | NRU | 520 | NAURU | <input type="checkbox"/> |
| NU | NIUE | NIU | 570 | NIUE-ELAND | <input type="checkbox"/> |
| NZ | NEW ZEALAND | NZL | 554 | NIUW ZEELAND | <input type="checkbox"/> |
| OC | OCEANIE AMERKAANS | OC | 832 | AMERKAANS OCEANIE | <input type="checkbox"/> |
| OM | OMAN | OMN | 512 | OMAN | <input type="checkbox"/> |
| PA | PANAMA | PAN | 591 | PANAMA | <input type="checkbox"/> |
| PE | PERU | PER | 604 | PERU | <input type="checkbox"/> |
| PF | FRANS-POLYNESE | PVF | 258 | FRANS-POLYNESE | <input type="checkbox"/> |
| PG | PAPOEA NIEUW GUINEA | PVG | 598 | PAPOEA NIEUW GUINEA | <input type="checkbox"/> |
| PH | PHILIPPINES | PHL | 608 | FILIPINEN | <input type="checkbox"/> |
| PK | PAKISTAN | PAK | 586 | PAKISTAN | <input type="checkbox"/> |

States Cities Translations Zipcode masks

| Code | Description |
|------|---------------|
| ZH | Zuid Holland |
| NH | Noord Holland |
| NB | Noord Brabant |
| FR | Friesland |

A typical mask in the Logitrack application
 ~30% of the forms have such a simple structure



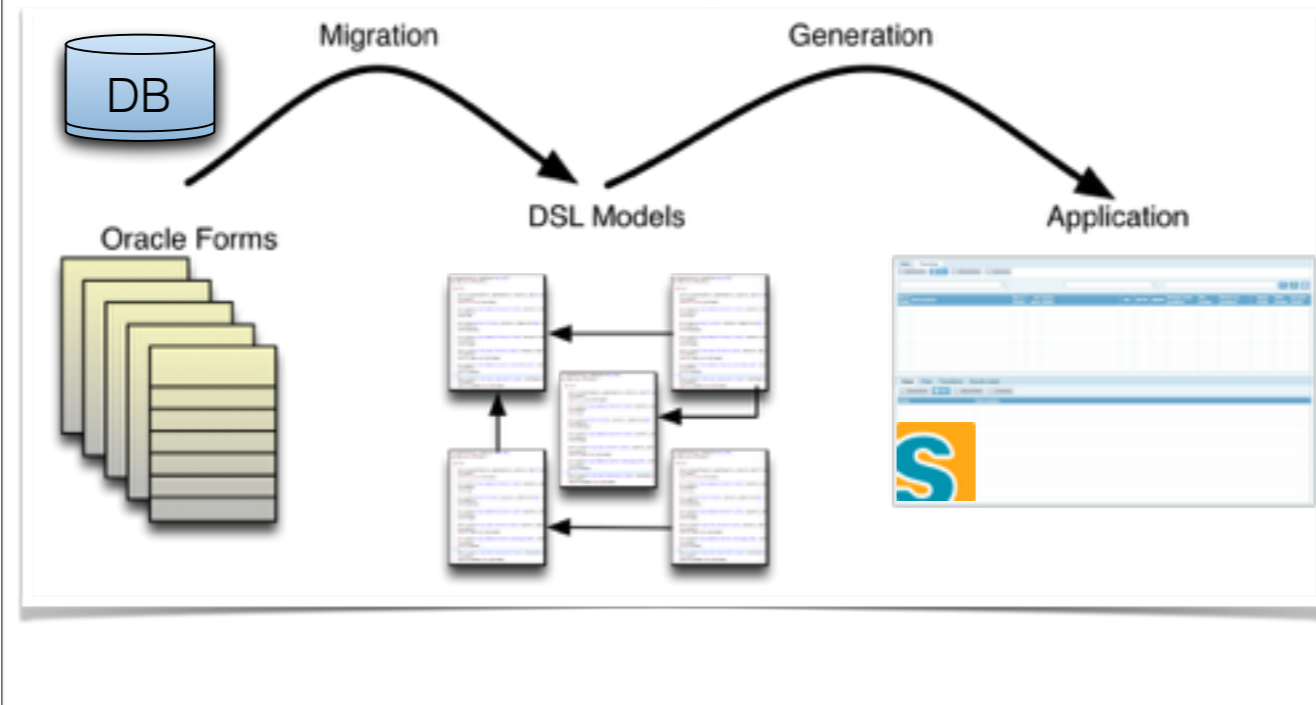
One of the most complex mask

~250 fields

12 Tab Pages

Master-Detail with tables (react on master table row selection)

Transformation Process



As Input we have the Database and XML exported from Oracle Forms
From this textual DSL models (based on Xtext) are generated (using Xtend)
The DSL models are translated to application code via code generation

Trans

DB

Oracle Forms

M

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <Module version="101020002" xmlns="http://xmlns.oracle.com/Forms">
3 <FormModule Name="TMR1M010" DirtyInfo="false" MenuModule="tr1menu" RuntimeComp="5.0" FirstNav
4 <Coordinate CharacterCellWidth="100" CoordinateSystem="Real" CharacterCellHeight="100" Real
5 <Alert Name="CGASK_COMMIT" DirtyInfo="false" AlertMessage="Do you wish to commit the chng
6 <Alert Name="QMSWARNING" ParentType="23" DirtyInfo="true" ParentName="QMSMODULE" Subcl
7 <Alert Name="QMSINFORMATION" ParentType="23" DirtyInfo="true" ParentName="QMSMODULE" Su
8 <Alert Name="QMSDIALOG" ParentType="23" DirtyInfo="true" ParentName="QMSMODULE" Subclas
9 <Alert Name="QMSERROR" ParentType="23" DirtyInfo="true" ParentName="QMSMODULE" Subclass
10 <AttachedLibrary Name="TMTPL" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File" L
11 <AttachedLibrary Name="QMSLIB65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File"
12 <AttachedLibrary Name="DFGALL65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File
13 <AttachedLibrary Name="DFGPLE65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File"
14 <AttachedLibrary Name="DFGSE65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File"
15 <AttachedLibrary Name="DFGTE65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File"
16 <AttachedLibrary Name="TMIAPP65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File"
17 <AttachedLibrary Name="TMR1M010" LibrarySource="File" LibraryLocation="tr1m1010" />
18 <AttachedLibrary Name="DFGNV65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File"
19 <AttachedLibrary Name="DFGTAB65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File"
20 <AttachedLibrary Name="DFGSL65" Comment="CGIGNORE_ON_DESIGN_CAPTURE" LibrarySource="File"
21 <Block Name="MLASMENU_BLOCK" ParentType="23" DirtyInfo="true" ParentName="MLASOBJECTGROUP"
22 <Item Name="QMSORI" DirtyInfo="true" PersistentClientInfoLength="12" Comment="CGIGNORE
23 <Trigger Name="WHEN-NEW-ITEM-INSTANCE" TriggerText="/* CGAPSOLES_SEQUENCE_BEFORE */&
24 </Item>
25 <Item Name="ID" DirtyInfo="true" PersistentClientInfoLength="7" Comment="CGIGNORE_ON_DE
26 <Item Name="FROM_MODULE" DirtyInfo="true" PersistentClientInfoLength="16" Comment="CGSI
27 <Item Name="FROM_BLOCK" DirtyInfo="true" PersistentClientInfoLength="15" Comment="CGSI
28 <Item Name="TO_MODULE" DirtyInfo="true" PersistentClientInfoLength="14" Comment="CGSI
29 <Item Name="SEQUENCE_NUMBER" BackColor="white" DirtyInfo="true" PersistentClientInfoLeng
30 <Trigger Name="KEY-NEXT-ITEM" TriggerText="BEGIN&#10; execute_trigger('when-nd
31 <Trigger Name="KEY-PREV-ITEM" TriggerText="/* CGV$NAVIGATE_PRIVBLK */&#10;BEGIN&
32 </Item>
33 <Item Name="MENU_TEXT" BackColor="white" DirtyInfo="true" PersistentClientInfoLength="14
34 <Trigger Name="KEY-NEXT-ITEM" TriggerText="/* CGV$NAVIGATE_NXTBLK */&#10;BEGIN&
35 </Item>
36 <Trigger Name="ON-LOCK" TriggerText="/* CGAPSOLES_SEQUENCE_BEFORE */&#10;begin&#10;
37 <Trigger Name="POST-INSERT" TriggerText="/* CGAPSOLES_SEQUENCE_BEFORE */&#10;begin&#10;
```

An example of an Oracle Forms XML export

These files are preprocessed in a first step to reduce the amount of data. This can reduce in best case to 10% of the original file length

Trans

```
@DBEntity(dbObject="TMI_PRINTERS", dbType="TABLE", dbSchema="TMI_SYS", identifier="TMI_P
entity Printer {
  @DBField(column="ID", dbType="NUMBER(10)", primaryKey=true, mandatory=true, unique=t
  Long id
  @DBField(column="CODE", dbType="VARCHAR2(20)", mandatory=true, length=20)
  String code
  @DBField(column="DESCRIPTION", dbType="VARCHAR2(35)", length=35)

@View(label="Printers", displayHintType="TABLE_VIEW", modal=false)
view Printers {

  @Region(orderByClause="order by CODE")
  region Page1 based-on [TMI.Printer] {

    table Ptr {}
    @com.rhenus.fl.frame.annotations.Numberfield(insertAllowed=false, updateAllowed=f
    @Layout(width=5)
    numberfield id extends [stdlib.Number]

    @com.rhenus.fl.frame.annotations.Textfield(required=true, caseRestriction="Upper"
    @Layout(width=135)
    textfield code

    @com.rhenus.fl.frame.annotations.Textfield(Label="Description", maxLength=35)
    @Layout(width=195)
    textfield description

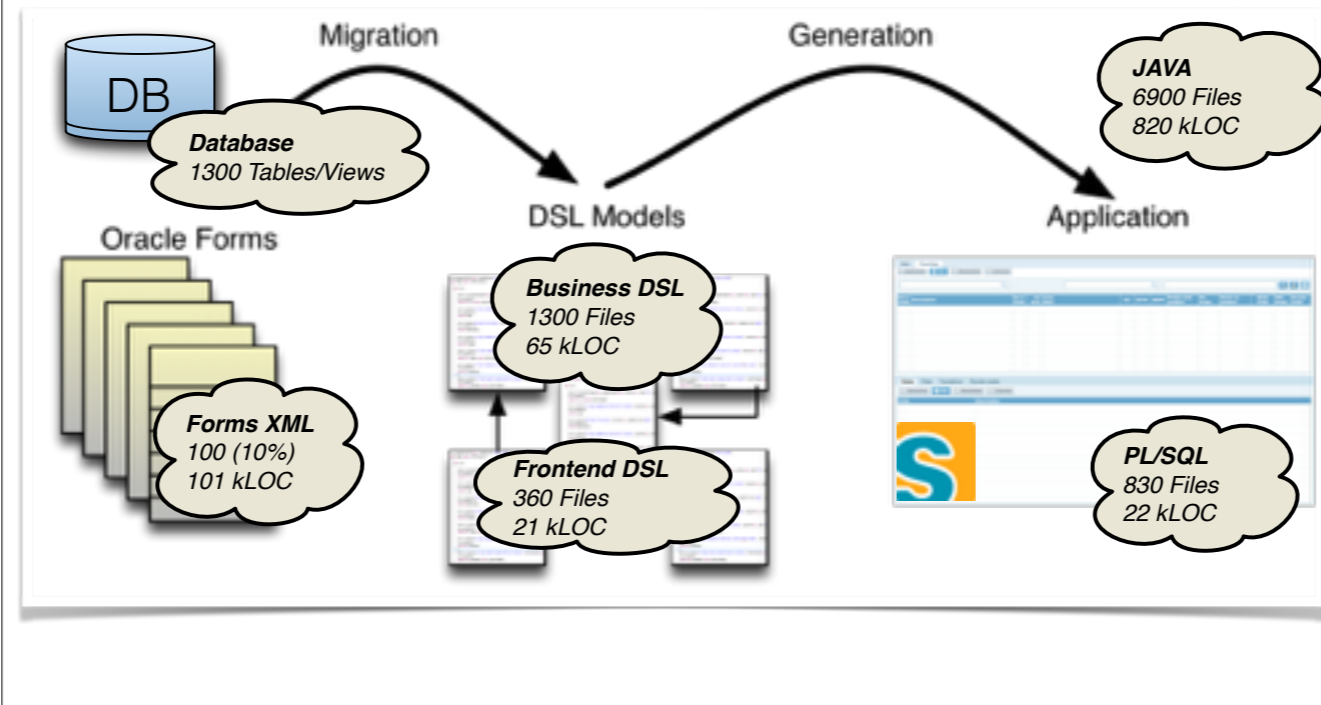
    @com.rhenus.fl.frame.annotations.Listfield(required=true, label="Type")
    @Layout(width=100)
    @RefCode(codeTable="TMI_REF_CODES", domain="PTR_TYPE")
    listfield ptrType extends [stdlib.Pop]
```

Examples of textual DSL models

These models are generated once during the migration phase

Further development happens in these DSL formats

Transformation Process



Some metrics we have right now

Currently we use ~10% of the forms as source for an integration build

For the database it is planned to reduce the visible scope of the 1300 tables/views behind an API schema, which contains only the relevant part for the application

Generated Artifacts



~40 different artifact types are generated from the DSL models

The initial application structure is scaffolded with a Maven archetype



<https://www.flickr.com/photos/booleansplit/12329159165/>

No 100% Generation
Generation Gap Pattern
@Replace, @InjectTo
Framework Development
PLSQL code is dumped to files for manual translation
It does not pay off to try to translate PLSQL code for a single project



Demo:

- Development Environment
- Generating DSL models
- Generating application code
- Show running application

Lessons Learned



Issues:

- Layout

Using the code generator it was easy to migrate from Scout 3.9 to 4.0

Especially our Multi Column Content Assist broke. We had a custom solution, but with Scout 4 this is supported more direct by the framework

The simple forms can be generated to 100%

Using code generation we are flexible to start the migration process before all issues are solved. Initially the developers concentrate on migrating the form structure and UI logic, which can be done already now

PLSQL developers were able to produce a working application without seeing any Java code in the first training week

Outlook



Migration phase starts now

Major manual development issues:

- Search component
- Integration of stored procedures

Major parts we have to solve in the tooling/framework:

- Lazy loading of tab page content
- Limit table content
- Modularization

Questions ?

Thank you for your attention

