

Modeling of Banking Applications with Xtext and GMF

NORD / LB

Who is this guy?



itemis

Holger Schill
Xtext Committer

The NORD/LB Team



Matthias Wronka

Rainer Rohloff

The Challenge

Base/ONE

Basis ohne nutzlose Extras

Base without useless extras

The Challenge

EJB

Navigationrules

FormBeans

Basis

Extras

Databinding

witho

Properties

Apache Tobago

Projectsetup

Webservices

JSF



CONFIGURATION HELL.



Abstraktion

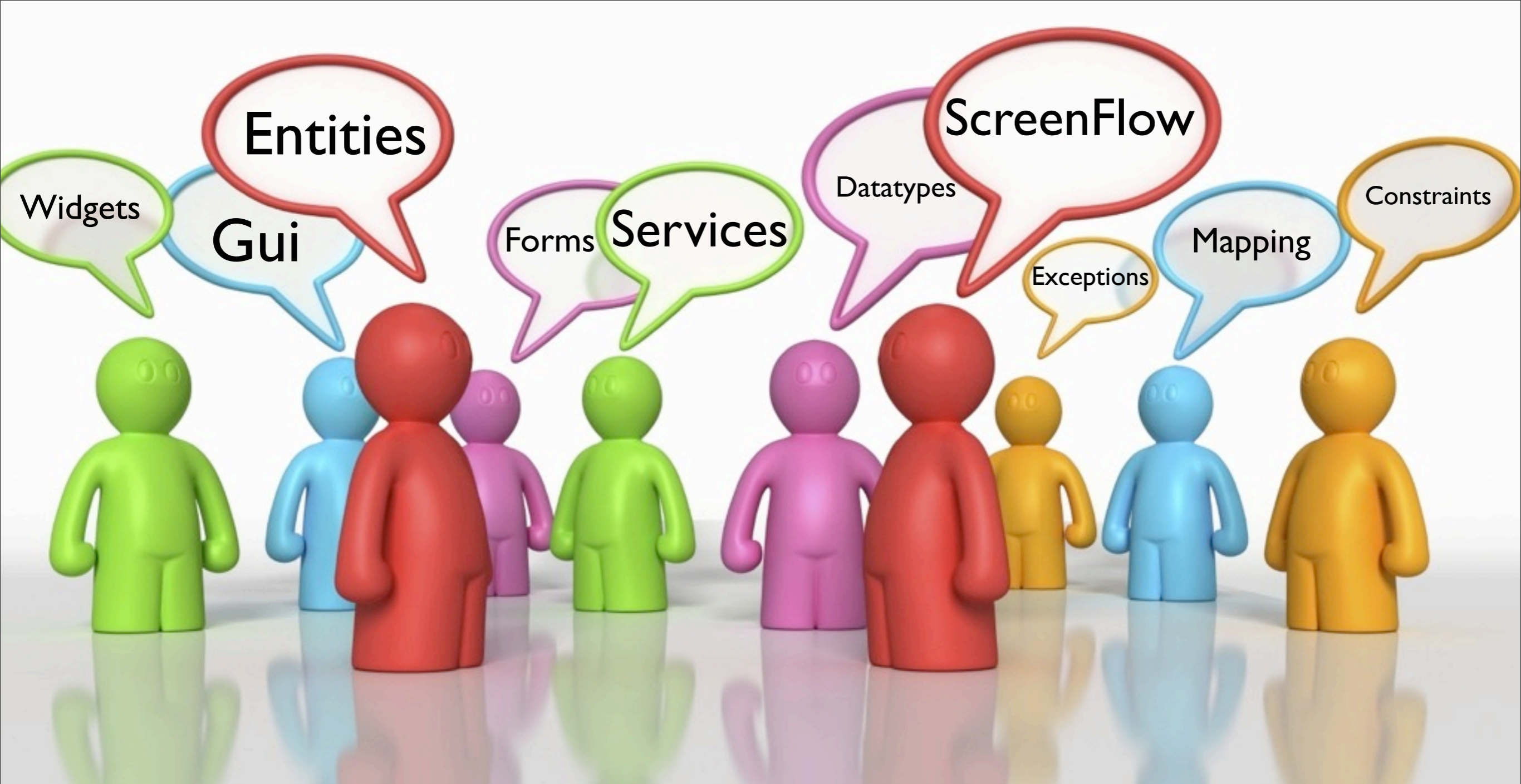






Think before
start
&
frequently
reflect





LANGUAGES

Xtext



```
package de.nordlbit.gamma.po;
import de.nordlbit.base.bc.types.library;

PO Person {
    shortDescription "A User is someone who has a profile on this server.";
    serialUID 1L;
    Attribute FDTString Name;
    Attribute FDTString eMail;
}

PO Contact extends Person {
    shortDescription "A Contact is a person or institutions that is held in the
addressbook";
    serialUID 1L;
    Reference Address address;
}

PO Address {
    shortDescription "An adress is referenced by a contact";
    serialUID 1L;
    Attribute FDTString type;
    Attribute FDTString street;
    Attribute FDTInteger zip;
    Attribute FDTString city;
    Attribute FDTString country;
}
```



```
package de.nordlbit.gamma.bc;

import de.nordlbit.gamma.po.model;

Service GetCurrentUser {
    shortDescription "Service for reading user-data.";
    longDescription "This service is passed a person with at least a name. The
    corresponding Data like mail-adress is returned.";
    serialUID 1L;
    parameterType Person;
    returnType Person;
    webservice;
}

Service SendMail {
    shortDescription "Service for sending a mail.";
    serialUID 1L;
    parameterType Mail;
}

Service ReceiveMails {
    shortDescription "Service for receiving a mail.";
    serialUID 1L;
    parameterType Person;
}
```



Y+oU+

```
package de.nordlbit.gamma.exception;

import de.nordlbit.base.bc.types.library;
import de.nordlbit.base.exception.library;

BuildingBlock GAMMA {
    Exception MailingException extends BaseOneApplicationException {
        shortDescription "Indicates an application/user-error.";
        serialUID 1L;
        Error NoRecipientSpecified {
            id "0001";
            message "A mail must have a recipient!";
        }
        Error UnknownRecipient {
            id "0002";
            message "The recipient {mail} is unknown on this server!";
            parameter FDTString mail;
        }
    }
}
```

```
package de.nordlbit.gamma;  
import de.nordlbit.gamma.po.model;
```

```
ManagedBean currentUser {  
    type Person;  
    scope session;  
}
```

```
ManagedBean mail {  
    type Mail;  
    scope request;  
}
```

```
ManagedBean folder {  
    type Folder;  
    scope request;  
}
```

```
ManagedBean adressBookPrivate {  
    type Adressbook;  
    scope session;  
}
```



```

GuiWorkflowNode NewAdress {
  packageName de.nordlbit.gamma.ui.contacts;
  subprocess;
  StartNode NewAdress;
  ViewNode Adress {
    ManagedBeanRefNode managedBean de.nordlbit.gamma.ManagedBean.currentUser;
    ManagedBeanRefNode managedBean de.nordlbit.gamma.ManagedBean.contact;
    ActionNode save {
      OutcomeNode error;
      OutcomeNode saved;
    }

    ActionNode cancel {
      OutcomeNode cancelled;
    }
  }

  EndNode Cancel;
  EndNode End;
  Transition source NewAdress -> target Adress;
  Transition source Adress.save -> target End trigger Adress.save.saved;
  Transition source Adress.save -> target Adress trigger Adress.save.error;
  Transition source Adress.cancel -> target Cancel trigger Adress.cancel.cancelled;
}

```

ScreenFlow

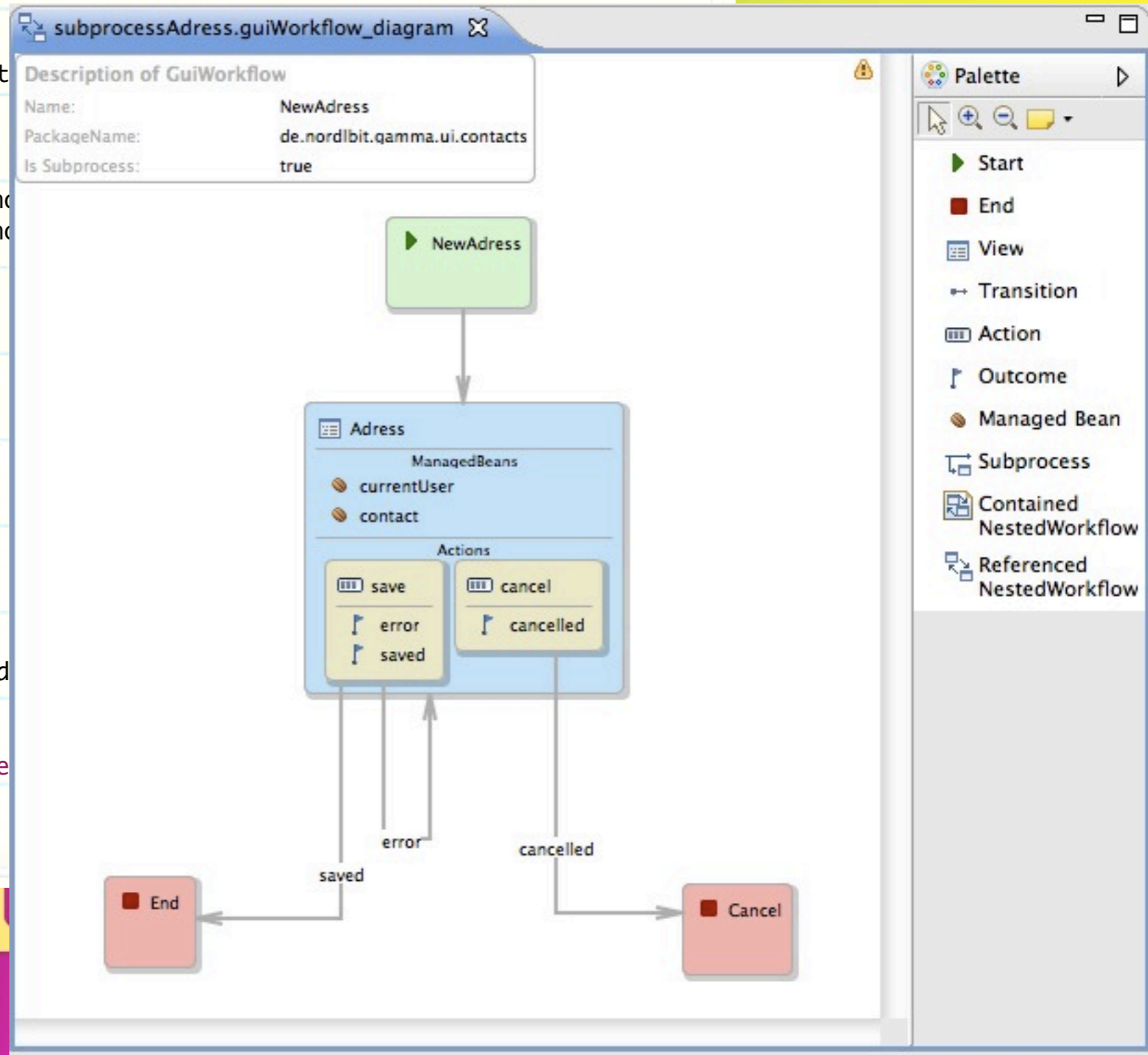
```

GuiWorkflowNode NewAddress {
  packageName de.nordlbit.gamma.ui.contacts
  subProcess;
  StartNode NewAddress;
  ViewNode Adress {
    ManagedBeanRefNode managedBean de.no
    ManagedBeanRefNode managedBean de.no
    ActionNode save {
      OutcomeNode error;
      OutcomeNode saved;
    }

    ActionNode cancel {
      OutcomeNode cancelled;
    }
  }

  EndNode Cancel;
  EndNode End;
  Transition source NewAddress -> target Ad
  Transition source Adress.save -> target
  Transition source Adress.save -> target
  Transition source Adress.cancel -> targe
}

```



ScreenFlow

Gui modeling



Gui modeling

```
<tc:panel id="main-panel">
  <f:facet name="layout">
    <tc:gridLayout rows="*;" columns="*;" />
  </f:facet>
  <tc:tabGroup selectedIndex="${adressbookFormState.selectedIndex_1j08pp5s3bul}"
    immediate="true" id="_1j08pp5s3bul">
    <tc:tab id="_1c4zf57htnure" label="${appBundleGen.privat}">
      <f:facet name="layout">
        <tc:gridLayout rows="*;" columns="*;" />
      </f:facet>
      <tc:sheet state="${adressbookFormState.sheetState_17h3cyd3zh7ma}" columns="*;*;*;"
        value="${adressBookPrivate.contactsListWrapper}" var="row" id="_17h3cyd3zh7ma"
        rows="6">
        <tc:columnEvent event="dblclick">
          <tc:command action="${adressbookForm.openContactDbClickAction}"
            actionListener="${adressbookForm.openContactDbClickActionListener}">
            <tc:attribute name="renderedPartially" value=":main:main-panel" />
          </tc:command>
        </tc:columnEvent>
        <tc:column id="_1uajmhbyybjcw" label="${appBundleGen.name}">
          <tc:out id="_z1nimerx19yk" value="${row.name}" />
        </tc:column>
        <tc:column id="_1eivl9o5svhy7" label="${appBundleGen.email}">
          <tc:out id="_16qcxp7pxyrl" value="${row.EMail}" />
        </tc:column>
        <tc:column id="_1kb89155ckpgx" label="${appBundleGen.ort}">
          <tc:out id="_1i4ifbh5zyouf" value="${row.adress.city}" />
        </tc:column>
      </tc:sheet>
    </tc:tab>
  </tc:tabGroup>
</tc:panel>
```

```

ContainerWidget {
  boundElement de.nordlbit.gamma.ui.contacts.Kontakte.adressbook;
  children {
    ContainerWidget {
      layoutManager GridLayoutManager {
        rowSizeConstraints {
          GridLayoutSizeConstraint unit FIXED = 0;
        }

        columnSizeConstraints {
          GridLayoutSizeConstraint unit FILL = 0;
        }
      }
      children {
        Widget {
          boundContainer de.nordlbit.gamma.ManagedBean.currentUser;
          boundElement de.nordlbit.gamma.po.Person.Feature.eMail;
          layoutConstraint GridLayoutConstraint {
            colSpan 1;
            rowSpan 1;
          }

          type de.nordlbit.baseone.StandardWidgets.tx_in;
          attributeValues {
            WidgetAttributeValue value = "${currentUser.EMail}";
            WidgetAttributeValue label = "Aktuelles Konto";
            WidgetAttributeValue id = "_1il6x2nircxp0";
            WidgetAttributeValue readonly = "true";
          }
        }
      }
      type de.nordlbit.baseone.Container.InfoPane;
    }
  }
}

```

```

*;*;"
h7ma"

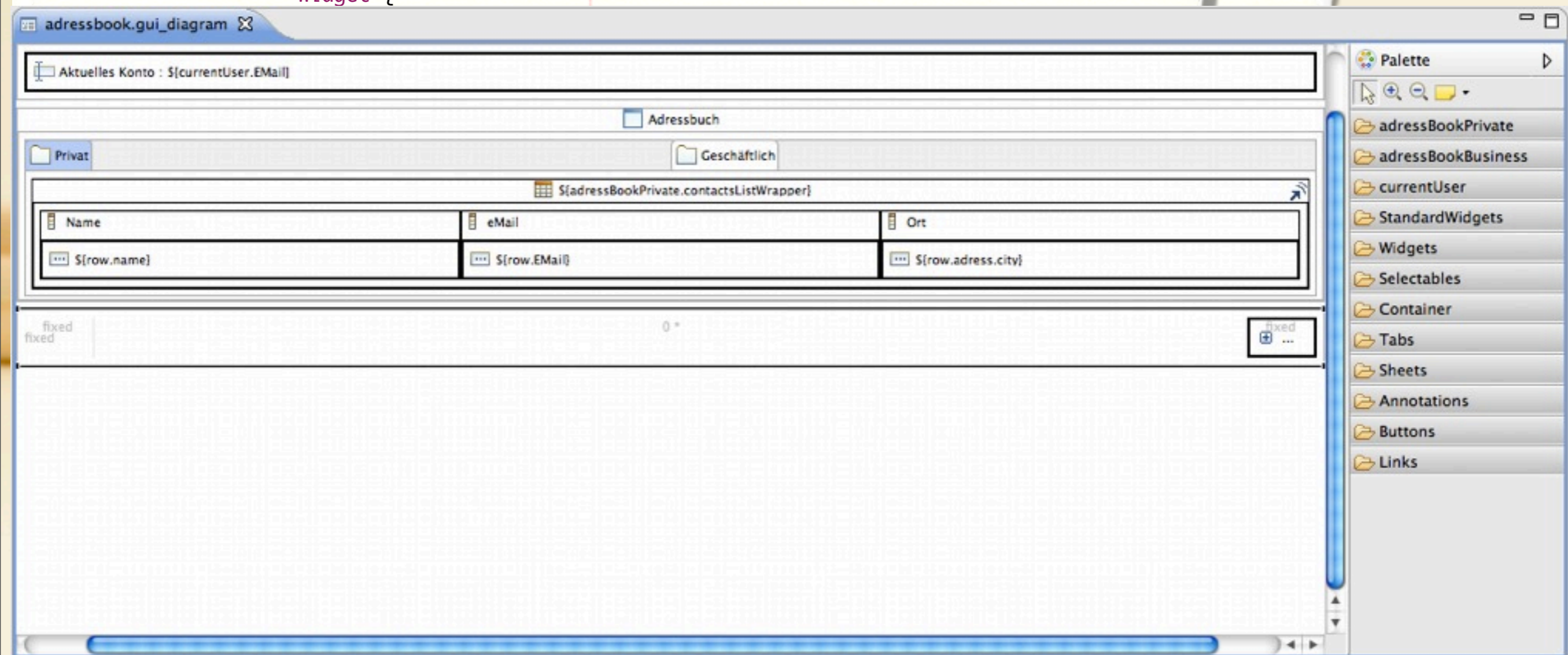
```

```

ContainerWidget {
  boundElement de.nordlbit.gamma.ui.contacts.Kontakte.adressbook;
  children {
    ContainerWidget {
      layoutManager GridLayoutManager {
        rowSizeConstraints {
          GridLayoutSizeConstraint unit FIXED = 0;
        }

        columnSizeConstraints {
          GridLayoutSizeConstraint unit FILL = 0;
        }
      }
    }
    children {
      Widget {

```



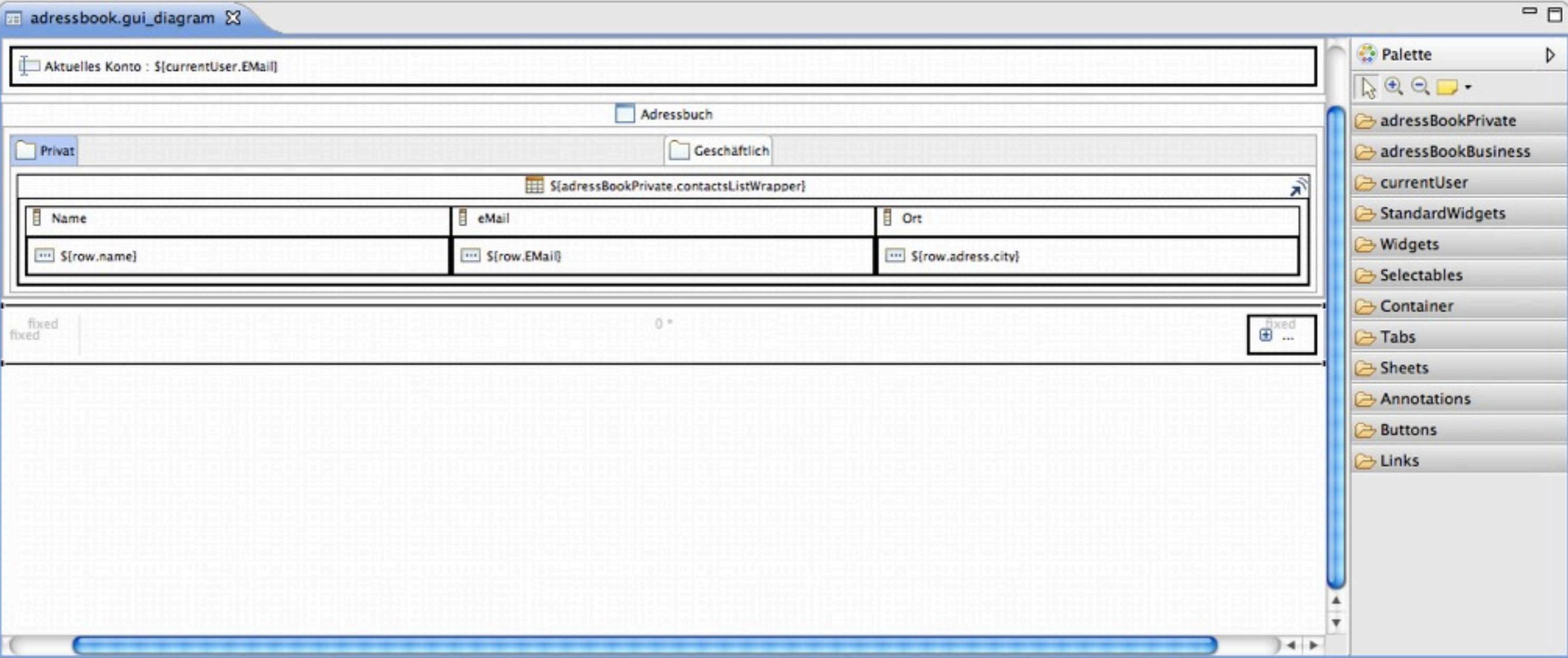
Aktuelles Konto **batman@gotham-city.us**

- Kontakte
- Adressbuch**
- Mailing

Adressbuch

Privat **Geschäftlich**

Name	eMail	Ort
Holger	Holger.Schill@itemis.de	Kiel
Holger	Holger.Schill@itemis.de	Kiel



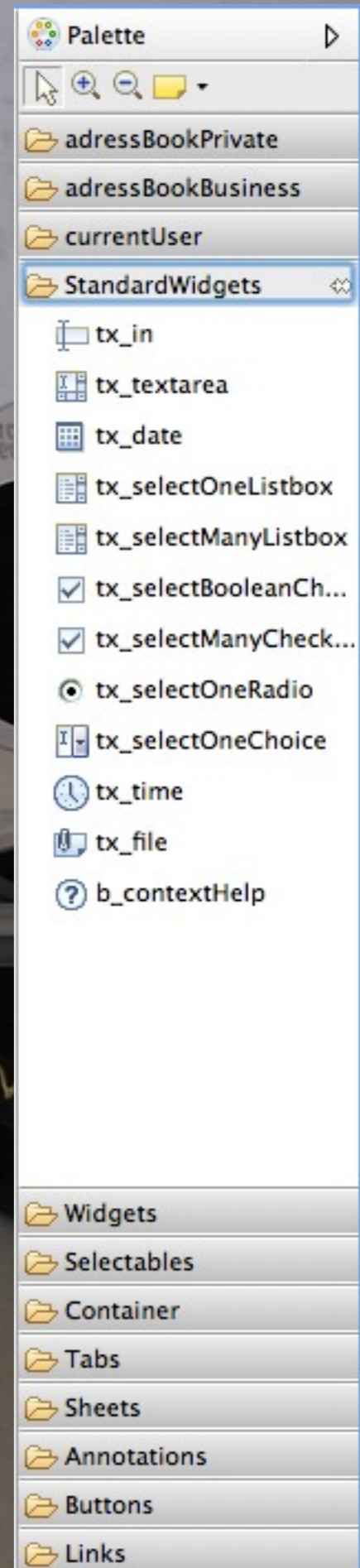
Dynamic Palette



Dynamic Palette

```
package de.nordlbit.baseone;

WidgetTypeGroup StandardWidgets {
    public Widget tx_in xmlElementType "tx:in" {
        Attribute value "The current value of this component.";
        Attribute tip "Text value to display as tooltip.";
        ...
    }
    public Widget tx_date xmlElementType "tx:date" {
        Attribute value "The current value of this component.";
        ...
    }
}
```



Dynamic Palette



Dynamic Palette

```
ManagedBean adressBookPrivate {  
  type Addressbook;  
  scope session;  
}
```

```
PO Addressbook {  
  shortDescription "The adressbook contains addresses.";  
  serialUID 1L;  
  Reference Person owner;  
  Attribute FDTString adressbookName;  
  Reference Contact* contacts;  
}  
  
PO Person {  
  shortDescription "A User is someone who has a profile on this server.";  
  serialUID 1L;  
  Attribute FDTString Name;  
  Attribute FDTString eMail;  
}  
  
PO Contact extends Person {  
  shortDescription "A Contact is a person or institutions that is held in the adressbook";  
  serialUID 1L;  
  Reference Address address;  
}  
  
PO Address {  
  shortDescription "An adress is referenced by a contact";  
  serialUID 1L;  
  Attribute FDTString type;  
  Attribute FDTString street;  
  Attribute FDTInteger zip;  
  Attribute FDTString city;  
  Attribute FDTString country;  
}
```

Palette

- adressBookPrivate
 - adressbookName
 - owner
 - contacts
- adressBookBusiness
- currentUser
- StandardWidgets
- Widgets
- Selectables
- Container
- Tabs
- Sheets
- Annotations
- Buttons
- Links

Dynamic Palette

```
ManagedBean adressBookPrivate {  
  type Addressbook;  
  scope session;  
}
```

```
PO Addressbook {  
  shortDescription "The adressbook";  
  serialUID 1L;  
  Reference Person owner;  
  Attribute FDTString adressbookName;  
  Reference Contact* contacts;  
}  
  
PO Person {  
  shortDescription "A User is someone who has a profile on this server.";  
  serialUID 1L;  
  Attribute FDTString Name;  
  Attribute FDTString eMail;  
}  
  
PO Contact extends Person {  
  shortDescription "A Contact is a person of the adressbook";  
  serialUID 1L;  
  Reference Address address;  
}  
  
PO Address {  
  shortDescription "An address is referenced by the adressbook";  
  serialUID 1L;  
  Attribute FDTString type;  
  Attribute FDTString street;  
  Attribute FDTInteger zip;  
  Attribute FDTString city;  
  Attribute FDTString country;  
}
```

```
FDT FDTString javaType java.lang.String;  
FDT FDTInteger javaType java.math.BigInteger;  
  
WidgetProposal FDTString {  
  tx_in;  
  tx_textarea;  
  tc_in;  
  tc_textarea;  
  tc_label;  
  tc_out;  
}
```

Palette

adressBookPrivate

- + adressbookName
- owner
- contacts

adressBookBusiness

currentUser

StandardWidgets

Widgets

Selectables

Container

Tabs

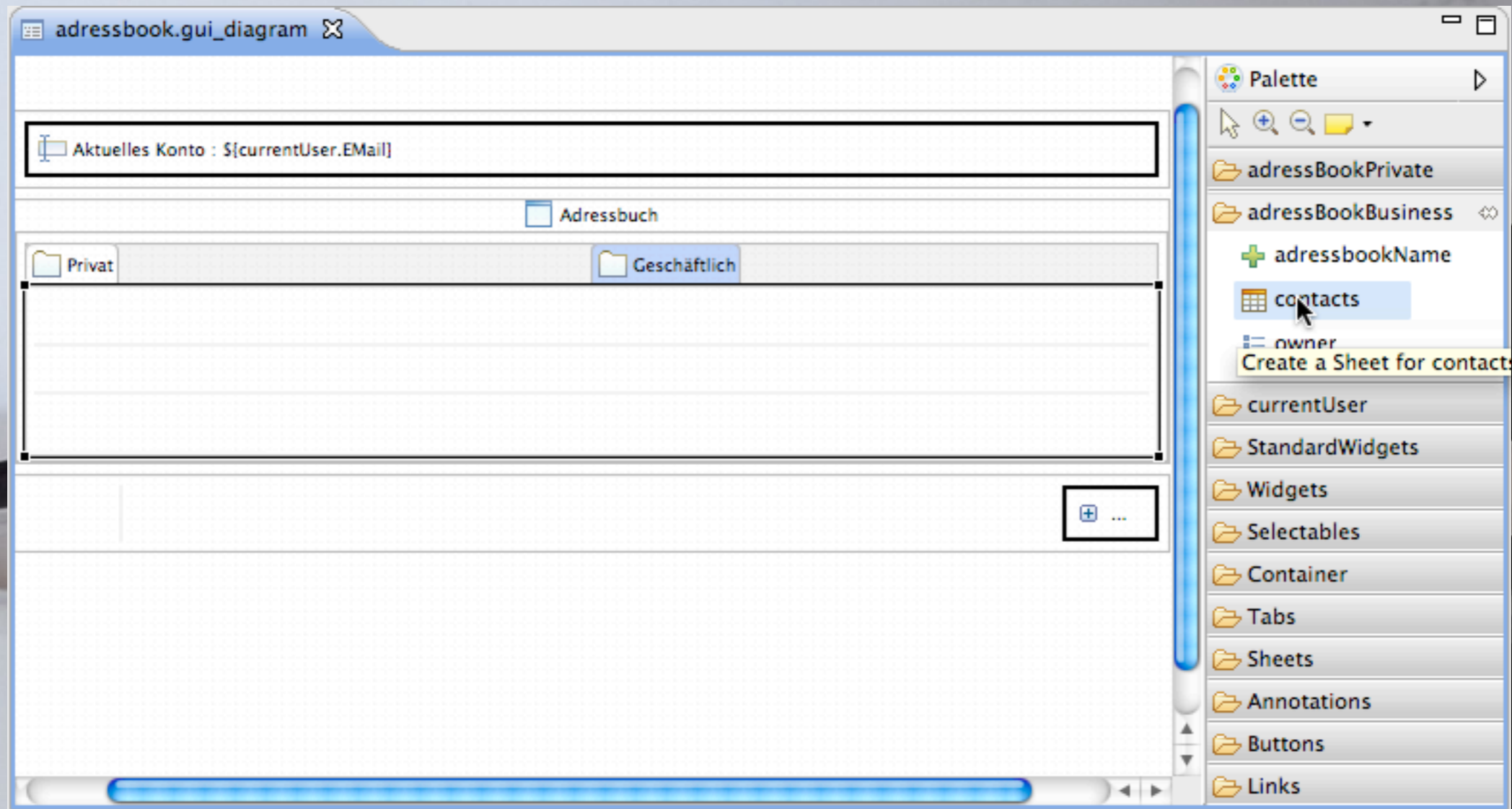
Sheets

Annotations

Buttons

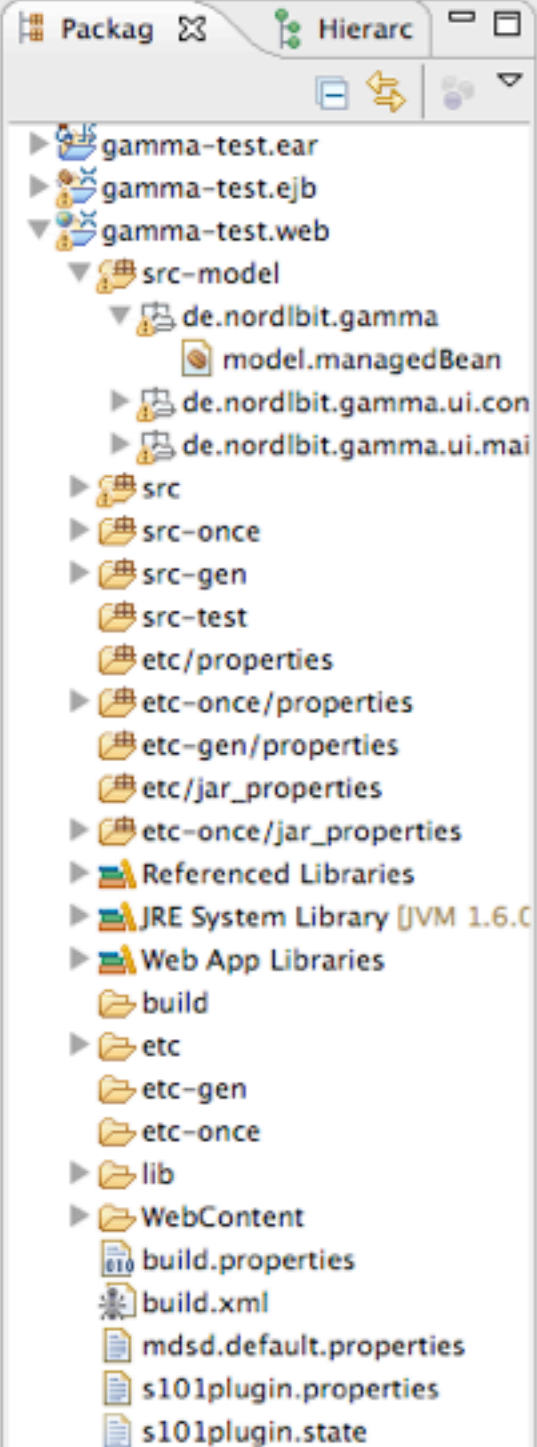
Links

Dynamic Palette



Refactoring





```
package de.nordlbit.gamma.po;
import de.nordlbit.base.bc.types.library;

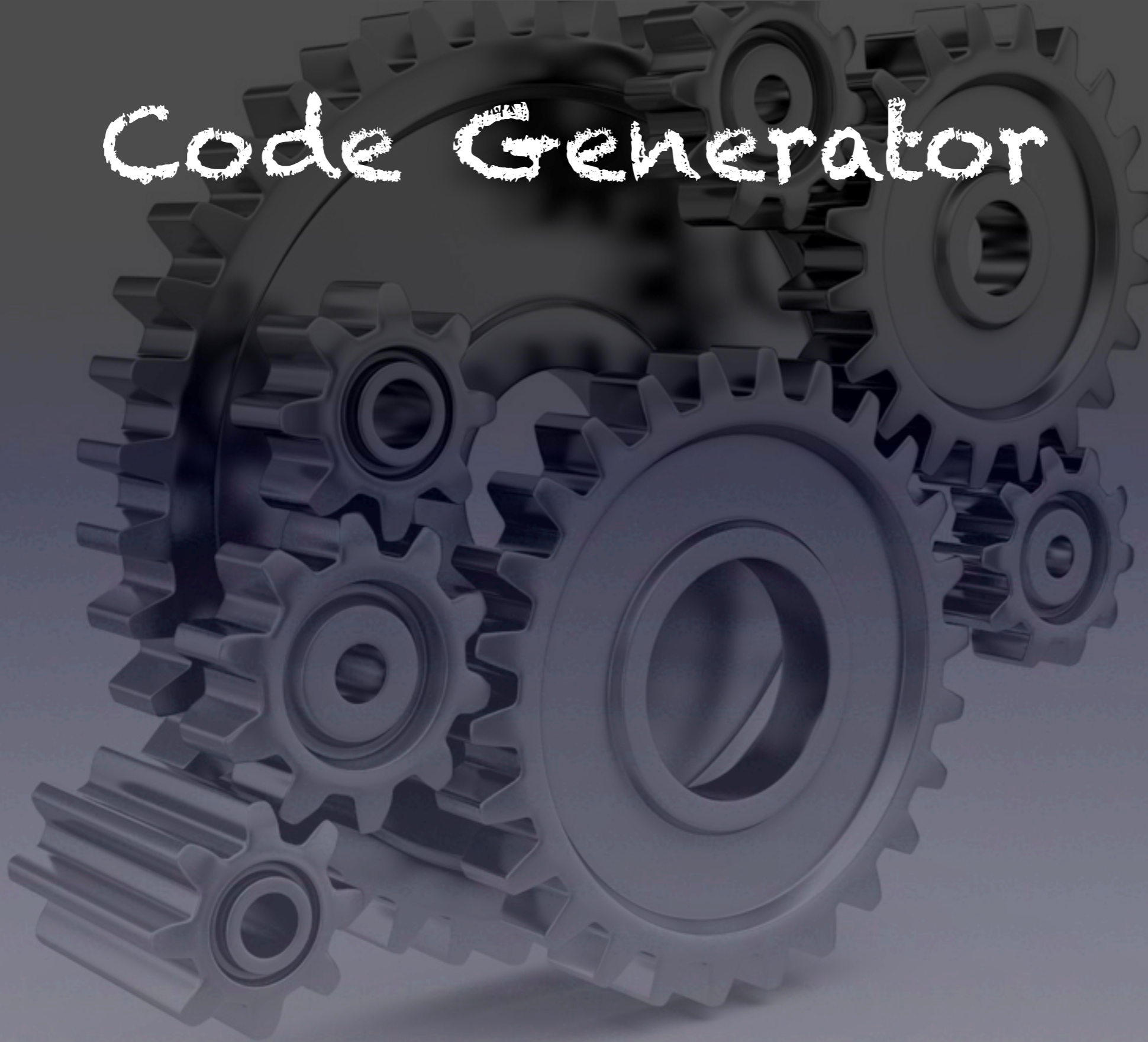
@PO Person {
    shortDescription "A User is someone who has a profile on this server.";
    serialUID 1L;
    Attribute FDTString Name;
    Attribute FDTString eMail;
}

@PO Contact extends Person {
    shortDescription "A Contact is a person or institutions that is held in the adressbook";
    serialUID 1L;
    Reference Address address;
}

@PO Adress {
    shortDescription "An adress is referenced by a contact";
    serialUID 1L;
    Attribute FDTString type;
    Attribute FDTString street;
    Attribute FDTInteger zip;
    Attribute FDTString city;
    Attribute FDTString country;
}

@PO Mail {
    shortDescription "A mail is a mail...";
    serialUID 1L;
    Reference Person sender;
    Reference Contact* to;
    Reference Contact* cc;
    Reference Contact* bcc;
    Attribute FDTString subject;
    Attribute FDTString ^message;
    Attribute FDTByteData attachment;
}
```

Code Generator





Code Generator

written by them

Code Generator

written by them

Independent from the IDE

BUT belongs to a certain version of the
framework

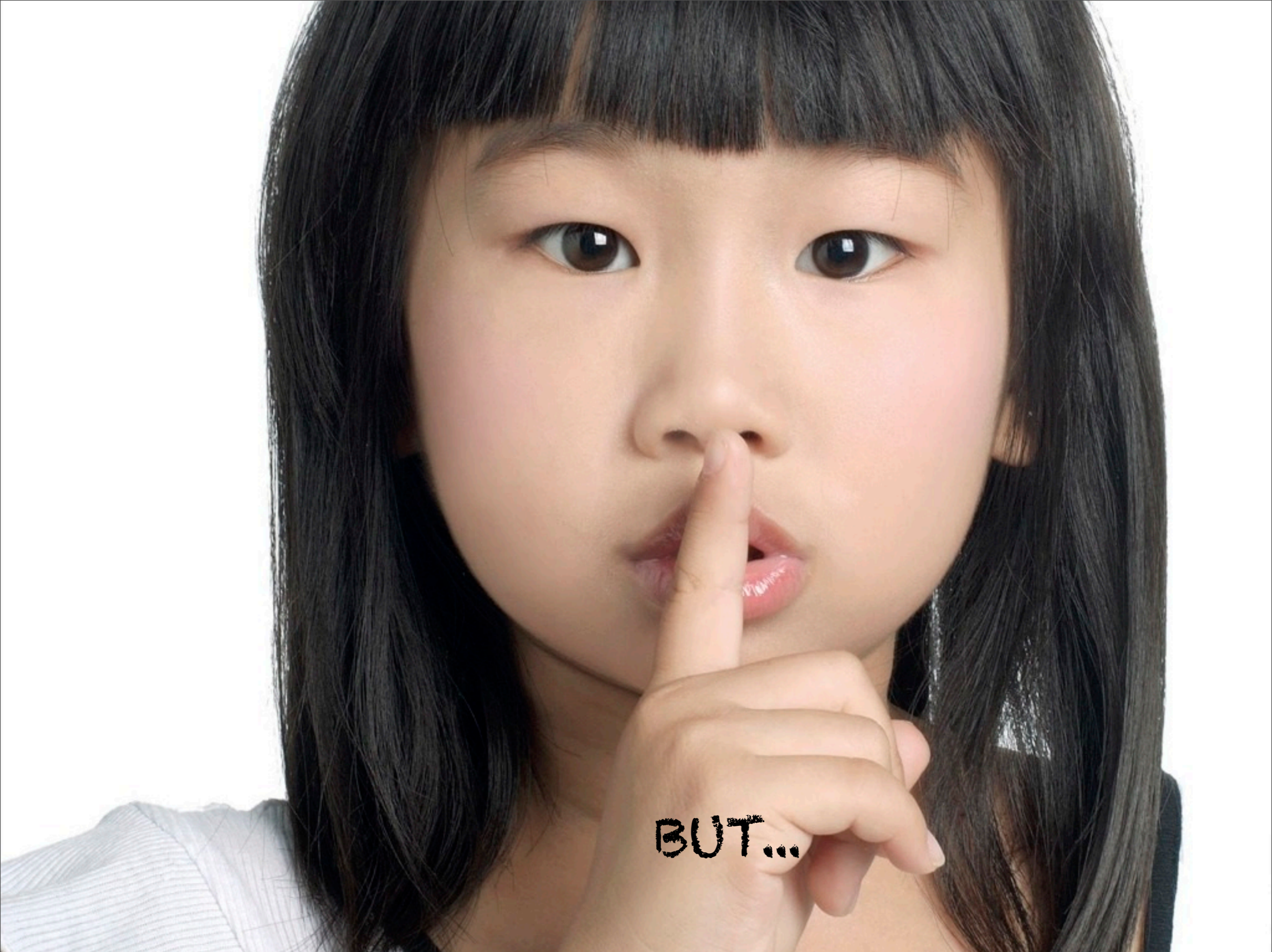
Code Generator

written by them

Independent from the IDE

BUT belongs to a certain version of the
framework

started with Xpand
migrated to Xtend recently



BUT...

Migration from mainframe to Base/ONE

```
* ____13____
F0104  DFLD                POS=(13,03,01),LTH=01,MHUL
      DFLD                'Kunde',POS=(13,05,01)
F0301  DFLD                POS=(13,17,01),LTH=3,MHUL
F1004  DFLD                POS=(13,28,01),LTH=10,MHUL
*
* ____14____
F0105  DFLD                POS=(14,03,01),LTH=01,MHUL
      DFLD                'Konto',POS=(14,05,01)
F0302  DFLD                POS=(14,17,01),LTH=3,MHUL
F0303  DFLD                POS=(14,21,01),LTH=3,MHUL
F1201  DFLD                POS=(14,26,01),LTH=12,MHUL
F0109  DFLD                POS=(14,42,01),LTH=1,MHUL
*
* ____16____
F010A  DFLD                POS=(16,03,01),LTH=01,MHUL
      DFLD                'Vorschlagsliste von',POS=(16,05,01)
F0201  DFLD                POS=(16,26,01),LTH=02,MHUL
      DFLD                'bis',POS=(16,30,01)
F0202  DFLD                POS=(16,34,01),LTH=02,MHUL
      DFLD                'ab',POS=(16,39,01)
F1002  DFLD                POS=(16,42,01),LTH=8,MHUL
      DFLD                '(TTMMJJJJ)',POS=(16,51,01)
```

Migration from mainframe to Base/ONE

The screenshot shows the Eclipse IDE interface. The Package Explorer on the left displays the project structure for 'migrator.web', including sub-packages like 'src', 'etc', and 'lib'. The main editor window shows the file 'zoform.mfs' with the following content:

```
DFLD      '/' ,POS=(09,55,01),H
DFLD      'T=Taglich)' ,POS=(09,57,01),H
*
* -----10-----
F0101  DFLD      POS=(10,03,01),LTH=01,MHUL
DFLD      'Obligo' ,POS=(10,05,01)
F1001  DFLD      POS=(10,28,01),LTH=10,MHUL
F0106  DFLD      POS=(10,42,01),LTH=01,MHUL
*
* -----11-----
F0102  DFLD      POS=(11,03,01),LTH=01,MHUL
DFLD      'Konzern' ,POS=(11,05,01)
F0701  DFLD      POS=(11,31,01),LTH=7,MHUL
F0107  DFLD      POS=(11,42,01),LTH=01,MHUL
*
* -----12-----
F0103  DFLD      POS=(12,03,01),LTH=01,MHUL
DFLD      'Kreditnehmer' ,POS=(12,05,01)
F0111  DFLD      POS=(12,26,01),LTH=1,MHUL
F1003  DFLD      POS=(12,28,01),LTH=10,MHUL
F0108  DFLD      POS=(12,42,01),LTH=01,MHUL
*
* -----13-----
F0104  DFLD      POS=(13,03,01),LTH=01,MHUL
DFLD      'Kunde' ,POS=(13,05,01)
F0301  DFLD      POS=(13,17,01),LTH=3,MHUL
F1004  DFLD      POS=(13,28,01),LTH=10,MHUL
*
* -----14-----
F0105  DFLD      POS=(14,03,01),LTH=01,MHUL
```

Speed



Questions?

