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EMF-Databinding

JAX 2010
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EMF-Databinding

- **Founder and Owner of BestSolution.at**
- **Eclipse Committer**
  - EMF
  - e4
  - Platform UI
- **Projectlead**
  - Nebula
  - UFaceKit

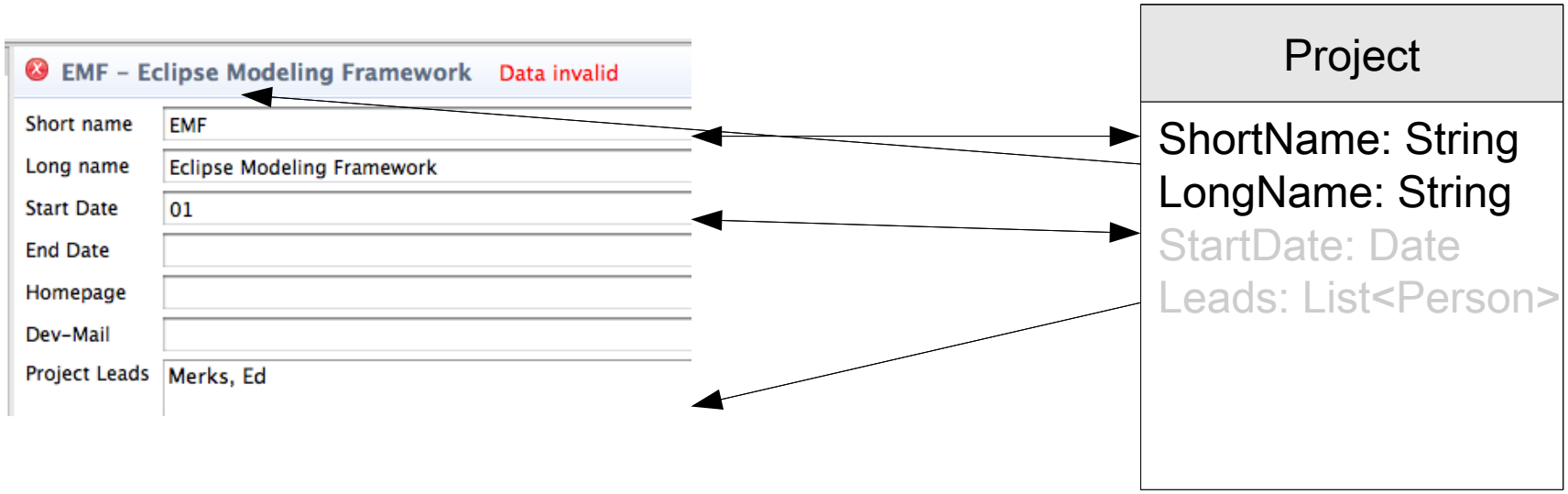
EMF-Databinding

- **Eclipse-Databinding**
  - Part of Eclipse SDK since 3.2
  - Major new API since 3.5
- **EMF-Databinding**
  - Available since EMF 2.4
  - Still marked as provisional though API and implementation are production ready

EMF-Databinding

- **What is Databinding**

  Synchronizing the attributes of 2 objects

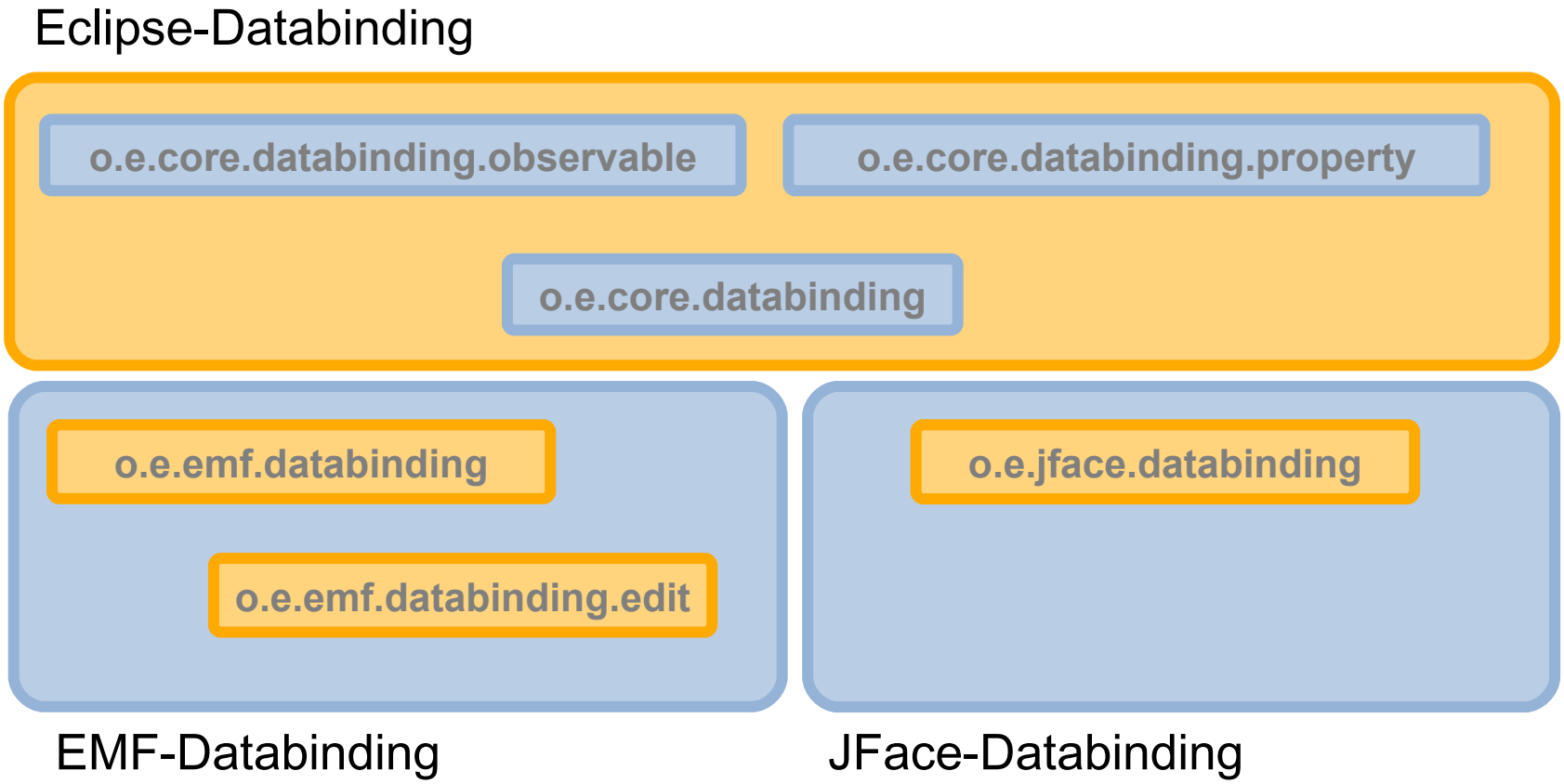


EMF-Databinding

- **Why use Databinding**
  - UI-Code not cluttered with Listeners
  - Automatic Thread syncing
  - Master-Detail
  - Conversion/Validation-Support
- **Why EMF-Databinding**
  - Advanced Features of EMF (e.g. Undo/Redo)

EMF-Databinding

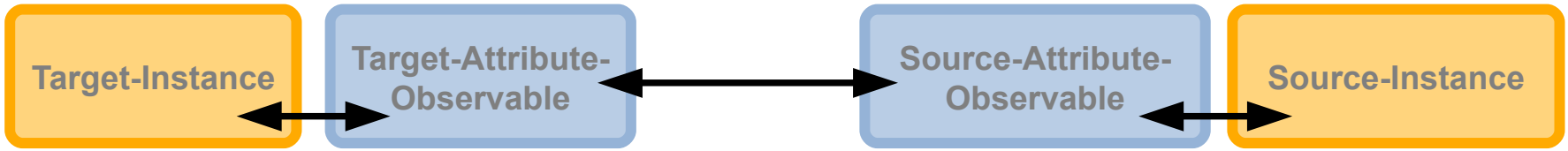
- **Package Overview and Relation**



EMF-Databinding

- **Binding Attributes**

  binding properties is done by creating observers and bind them to each other

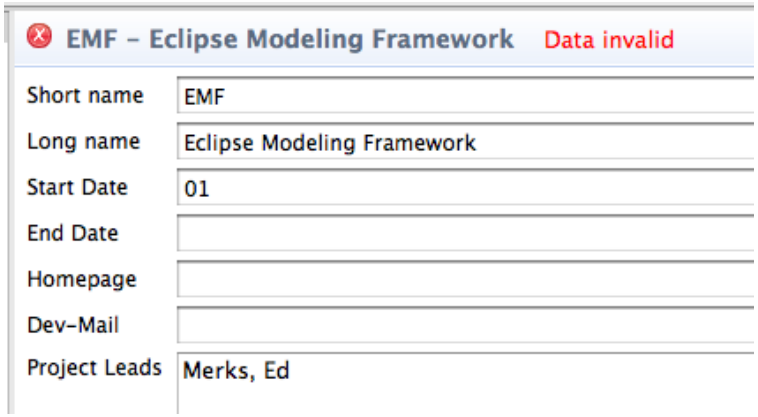


EMF-Databinding

- **Simple-Binding-Code**
  - Use Factories to create PropertyObservers
    - WidgetProperties for SWT/JFace-Observers
    - EMFProperties for EObject-Observers
  - Use DatabindingContext to connect

EMF-Databinding

- **Simple-Binding-Code**




```
Project project = ...

// Create Target Observable
Text t = new Text(comp,SWT.BORDER);
IValueProperty prop = WidgetProperties.text(SWT.Modify);
IObservableValue tObs = prop.observe(t);

// Create Source Observable
IValueProperty shortProp = EMFProperties.value(ProjectPackage.Literals.PROJECT__SHORTNAME);
IObservableValue sObs = shortProp.observe(project);

// Bind the Observables
EMFDataBindingContext ctx = new EMFDataBindingContext();
ctx.bindValue(tObs,sObs);
```

EMF-Databinding

- **Simple-Binding-Customization**
  - Update policy (never,on-request,...)
  - Custom Conversion between types
  - Custom validation

```
IObservableValue tObs = ...
IObservableValue sObs = ...

EMFUpdateValueStrategy t2s = new EMFUpdateValueStrategy();
StringToDateConverter c = new StringToDateConverter();
t2s.setConverter(c);

EMFUpdateValueStrategy s2t = new EMFUpdateValueStrategy();
DateToStringConverter c = new DateToStringConverter();
s2t.setConverter(c);

EMFDataBindingContext ctx = new EMFDataBindingContext();
ctx.bindValue(tObs,sObs,t2s,s2t);
```

EMF-Databinding

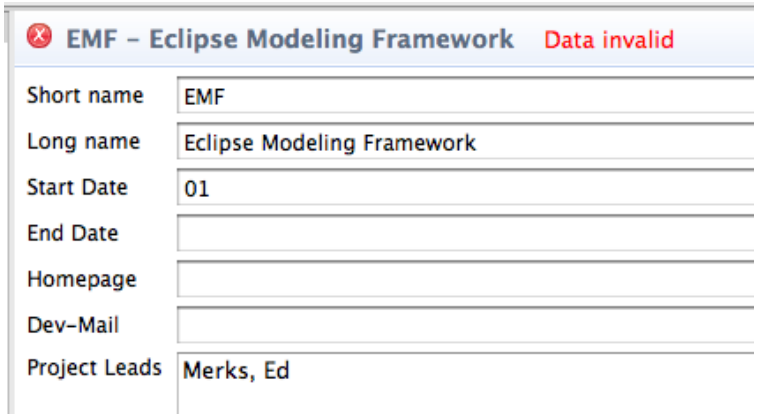
- **Structured-Control-Binding**
  - Wrap the control into a JFace-Viewer
  - Use utility classes coming with JFace-Databinding (Label and ContentProviders)
  - Pass in an Observable as input

EMF-Databinding

- **Structured-Control-Binding**

```
// Create Properties
IListProperty  mProp = EMFProperties.list(
 ProjectPackage.Literals.PROJECT__PROJECTLEADS);
IValueProperty fProp = EMFProperties.value(
 ProjectPackage.Literals.PERSON__FIRSTNAME);
IValueProperty lProp = EMFProperties.value(
 ProjectPackage.Literals.PERSON__LASTNAME);

// Create Observable
IObservableList input = mProp.observe(project);
```

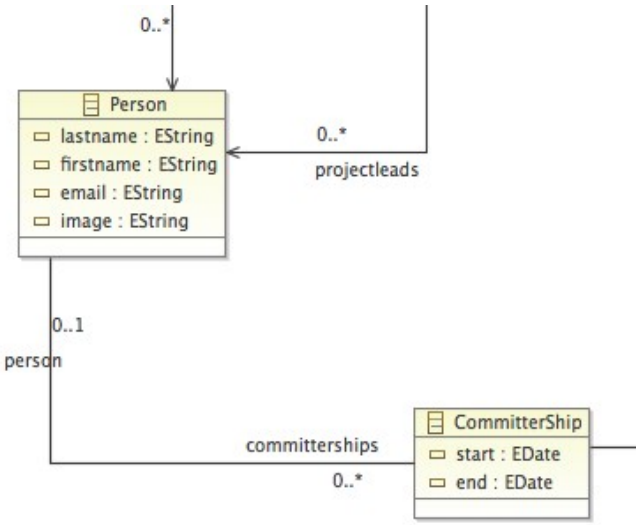



```
ObservableListContentProvider cp = new ObservableListContentProvider();
IObservableMap[] attributeMap = new IObservableMap[] {
  fProp.observeDetail(cp.getKnownElements()),
  lProp..observeDetail(cp.getKnownElements())
};

// Setup a TableViewer
TableViewer tv = new TableViewer(comp);
tv.setContentProvider(cp);
tv.setLabelProvider(new GenericMapCellLabelProvider("{0}, {1}", attributeMap));
tv.setInput(input);
```

EMF-Databinding

- Support for nested Attributes



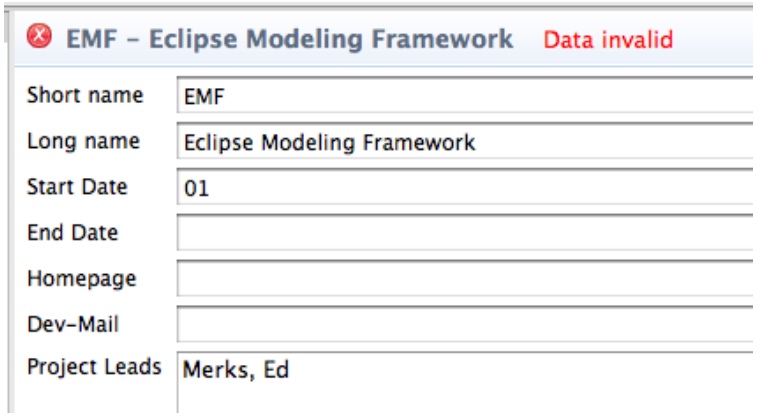

```
CommitterShip committerShip = ...

// Create a Path to the feature
FeaturePath path = FeaturePath.fromList(
  ProjectPackage.Literals.COMMITTER_SHIP__PERSON,
  ProjectPackage.Literals.PERSON__LASTNAME)
);

IValueProperty fProp = EMFProperties.value(path);
IObservableValue mObs = fProp.observe(committerShip);
```

EMF-Databinding

- **Binding-Computed Values**




```
Project project = ...

// Create Properties
IValueProperty sProp = EMFProperties.value(
  ProjectPackage.Literals.PROJECT__SHORTNAME);
IValueProperty lProp = EMFProperties.value(
  ProjectPackage.Literals.PROJECT__LONGNAME);


// Create Computed Value
IObservableValue mObs = = new ComputedValue()
  {
    private IObservableValue shortname = sProp.observe(project);
    private IObservableValue longname = lProp.observe(project);

    @Override
    protected Object calculate()
    {
      return shortname.getValue() + " - " + longname.getValue();
    }
};
```

EMF-Databinding

- **Master-Detail**
  - Master Value must be an IObservableValue
  - Simply use observeDetail instead of observe

```
IObservableValue project = ...

// Create Target Observable
Text t = new Text(comp,SWT.BORDER);
IValueProperty prop = WidgetProperties.text(SWT.Modify);
IObservableValue tObs = prop.observe(t);

// Create Source Observable
IValueProperty shortProp = EMFProperties.value(ProjectPackage.Literals.PROJECT__SHORTNAME);
IObservableValue sObs = shortProp.observeDetail(project);

// Bind the Observables
EMFDataBindingContext ctx = new EMFDataBindingContext();
ctx.bindValue(tObs,sObs);
```

EMF-Databinding

- **EMF-Edit integration**
  - Use EMF**Edit**Properties and changes go through the CommandStack

```
Project project = ...

// Create Target Observable
Text t = new Text(comp,SWT.BORDER);
IWidgetValueProperty prop = WidgetProperties.text(SWT.Modify);
IObservableValue tObs = prop.observeDelayed(400,t);

// Create Source Observable
IValueProperty sProp = EMFEditProperties.value(eDom,ProjectPackage.Literals.PROJECT__SHORTNAME);
IObservableValue sObs = sProp.observe(project);

// Bind the Observables
EMFDataBindingContext ctx = new EMFDataBindingContext();
ctx.bindValue(tObs,sObs);
```

EMF-Databinding

- **Supported Technologies**
  - Domain-Model
    - JavaBean, POJO – Eclipse Core Databinding
    - EObject – EMF Databinding
    - UBean – Eclipse UFaceKit
  - UI
    - SWT/JFace – Core Databinding
    - Swing – Eclipse UFaceKit
    - Qt – Eclipse UFaceKit
    - GWT – Eclipse UFaceKit
    - QxWT – UFaceKit.org
    - Android – UFaceKit.org (no code available in repository yet)

EMF-Databinding

- **Resources**
  - Personal Blog http://tomsondev.bestsolution.at/
  - Eclipse Wiki http://wiki.eclipse.org/JFace_Data_Binding
  - The RCP Book http://eclipsercp.org/

THE END