



Business
Technology Days

BIG
DATA
CON

Dr. Maximilian Kögel | EclipseSource Munich

Building a Tool based on Eclipse in 20 Minutes

EMF Client Platform

Run Search

Model Explorer

- Orders
 - Client EclipseSource
 - Project Thunderstorm
 - Order 2012-392
 - Deliverable Wed Oct 31 23:19:58 CET 2012
 - Deliverable Fri Nov 30 23:20:01 CET 2012
 - Deliverable Mon Dec 31 23:20:02 CET 2012
 - Invoice 2012-487
 - Invoice 2012-493
 - Order 2013-203
 - Deliverable Sun Mar 31 23:20:04 CEST 2013
 - Deliverable Tue Apr 30 23:20:05 CEST 2013
 - Invoice 2013-102
 - Invoice 2013-201
- Employee Maximilian Kögel

Order 2013-203 [Order]

Id: 2013-203

Deliverables

Due Date	Unit Amount
31.03.2013 23:20:04	15.0
30.04.2013 23:20:05	20.0

Invoices

Id	Unit Amount	Invoice Date	State
2013-102	15.0	31.03.2013 23:24:56	Invoiced
2013-201	20.0	30.04.2013 23:24:58	New

Standard View

Model Repositories

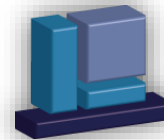
- Eclipse Workspace
- Local EMFStore

Common Requirements

- CRUD UI
- Graphical Editors
- Data Validation
- Storage (+ Versioning)
- Multi-User
- Data Import/Export

Frameworks

- Eclipse Rich Client Platform
- Eclipse Modeling Framework (EMF)
- EMF Client Platform
- Graphiti, GMF
- EMFStore, CDO





What is Eclipse RCP?

“Eclipse RCP is a **platform** for building and deploying **rich client applications**. It includes Equinox, a component framework based on the **OSGi** standard, the ability to deploy **native GUI** applications to a variety of desktop operating systems, such as **Windows, Linux and Mac OSX** and an integrated **update mechanism** for deploying desktop applications from a central server.”

Source: <http://www.eclipse.org/home/categories/rcp.php>



What is EMF?

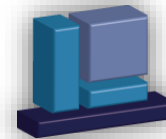
“The EMF project is a **modeling framework** and **code generation** facility for building tools and other applications based on a **structured data model**. From a model specification described in XMI, EMF provides tools and runtime support to produce a set of **Java classes** for the model, along with a set of adapter classes that enable **viewing** and **command-based editing** [...]”

Source: <http://www.eclipse.org/emf>



EMF-based Frameworks

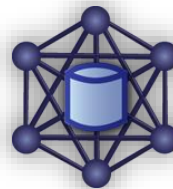
- EMF Client Platform



- Graphiti, GMF



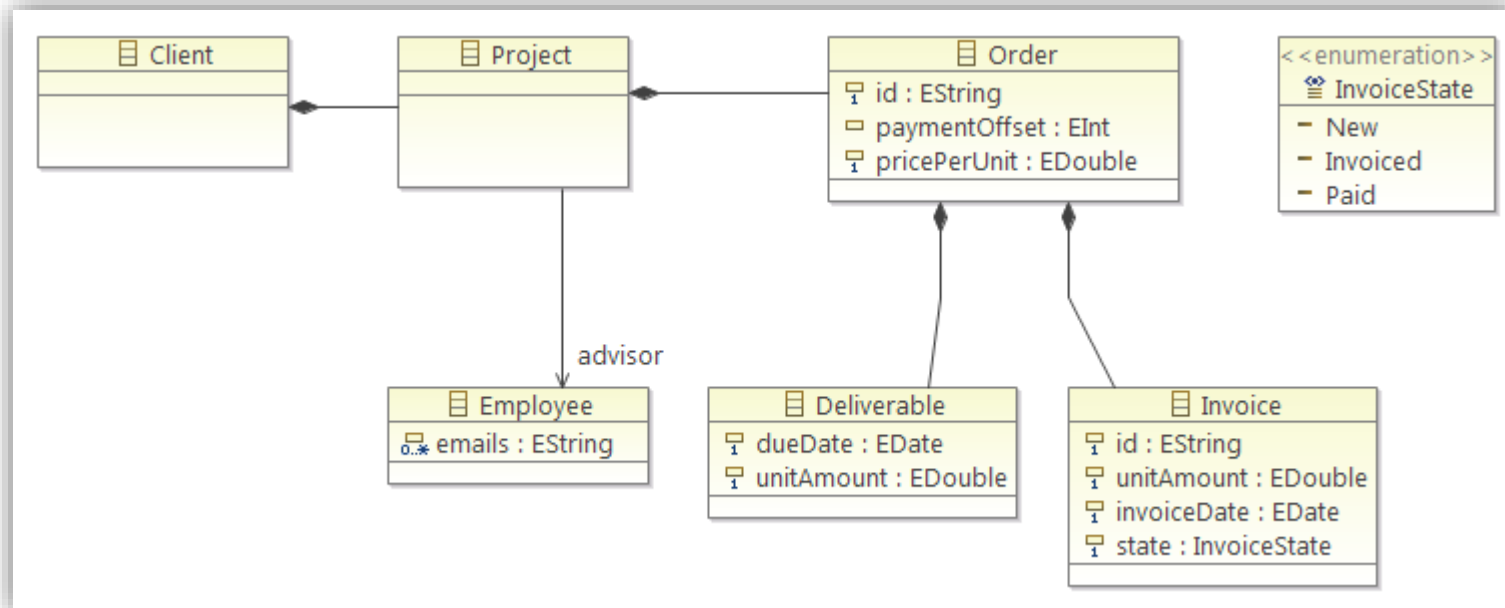
- EMFStore, CDO



Creating the Tool

- **Define Data Model**
- Define Visual Model Properties
- Customize Editor and Navigator
- Add Custom Behavior
- Define Validation Rules
- Add Graphical Editor
- Configure Backend

Define Data Model



CRUD Editor and Navigator

- **CRUD:**
 - **C**reate Data
 - **S**how (**R**ead) Data
 - **U**ppdate Data
 - **D**elate Data
- **Form-based UI**

Project Thun... Order 2012-392 Order 2013-203 »11

Order 2013-203 [Order]

Id: 2013-203

Deliverables

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31.03.2013 23:20:04	15.0
30.04.2013 23:20:05	20.0

Invoices

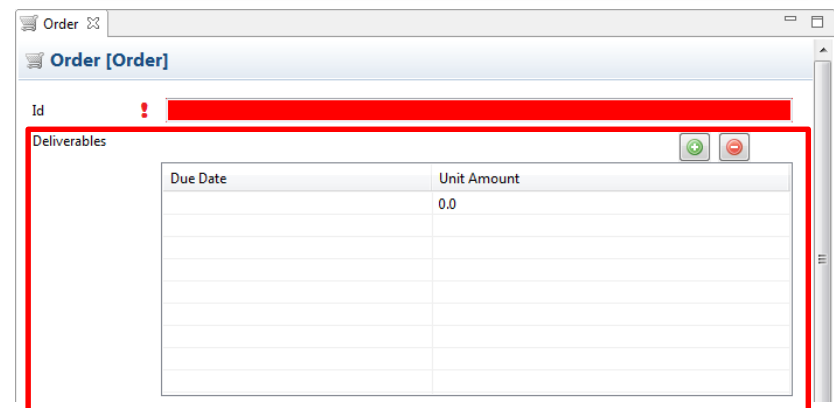
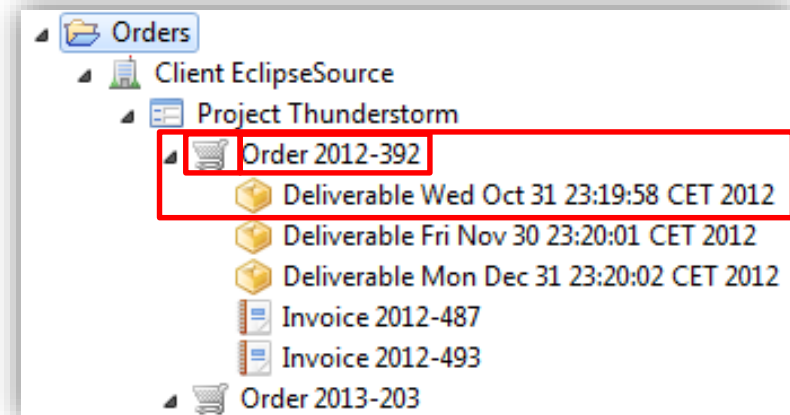
Id	Unit Amount	Invoice Date	State
2013-102	15.0	31.03.2013 ...	Invoiced
2013-201	20.0	30.04.2013 ...	New

Creating the Tool

- Define Data Model
- **Define Visual Model Properties**
- Customize Editor and Navigator
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- Add Graphical Editor
- Configure Backend

Define Visual Properties

- **Icons**
- **Labels**
- **Tree Structure**
- **Attributes Visibility**

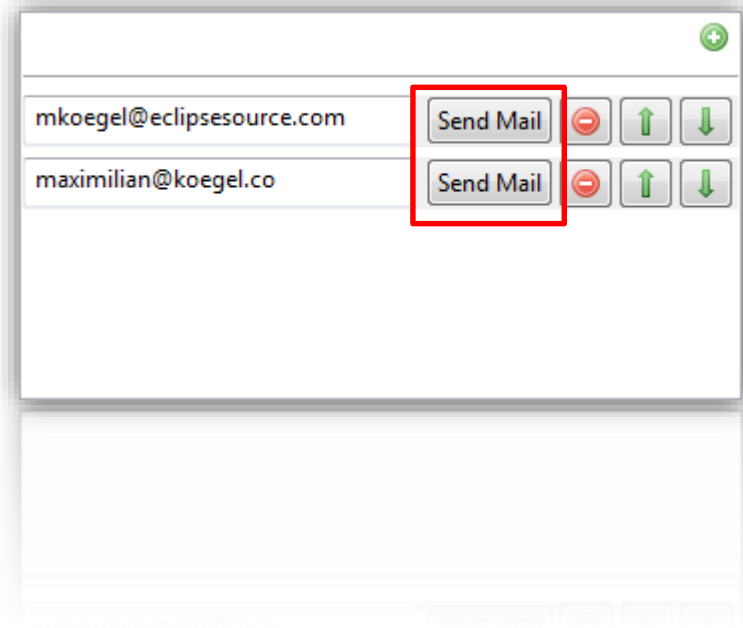


Creating the Tool

- Define Data Model
- Define Visual Model Properties
- **Customize Editor and Navigator**
- Add Custom Behavior
- Define Validation Rules
- Add Graphical Editor
- Configure Backend

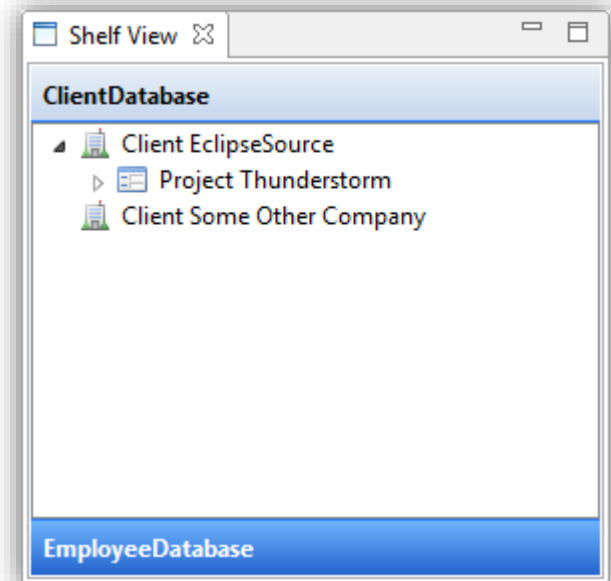
Customize Editor

- Change Attribute UI (Control)
- Replace Attribute UI
- Replace Editor



Customize Navigator

- Change structure
- **Change representation**

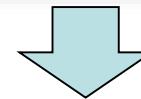
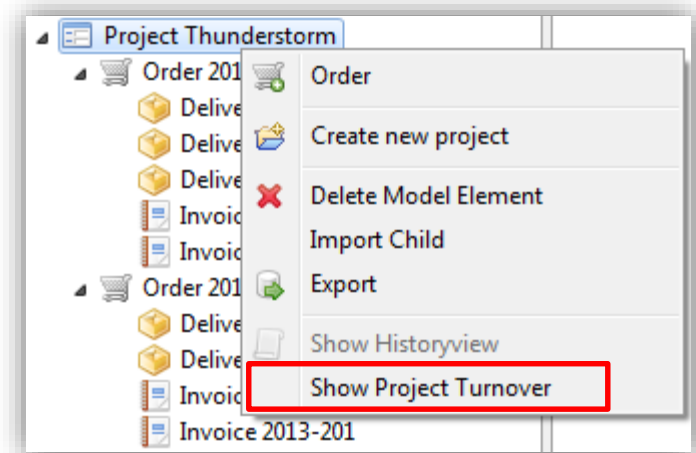


Creating the Tool

- Define Data Model
- Define Visual Model Properties
- Customize Editor and Navigator
- **Add Custom Behavior**
- Define Validation Rules
- Add Graphical Editor
- Configure Backend

Add custom behavior

- Business Logic
 - **User triggered**
 - Change triggered
 - Condition triggered



The screenshot shows a table titled 'Project Turnover' with the following data:

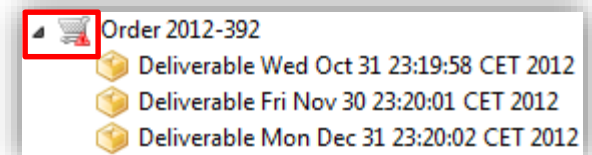
März	21000.0	Unpaid
April	28000.0	Unpaid
Oktober	14000.0	Paid
Dezember	28000.0	Paid

Creating the Tool

- Define Data Model
- Define Visual Model Properties
- Customize Editor and Navigator
- Add Custom Behavior
- **Define Validation Rules**
- Add Graphical Editor
- Configure Backend

Data Validation

- Define Validation Rules
- View Validation Violations
 - **Live** vs. Batch **validation**
 - Navigability + Quick Fixes



Invoices			
Id	Unit Amount	Invoice Date	State
2012-487	10.0	31.10.2012 ...	Paid



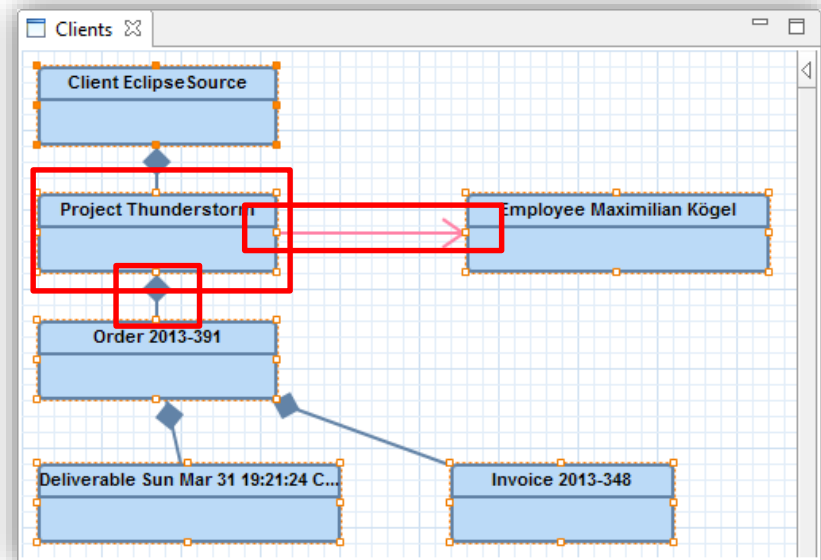
Invoice unit amount (10.0) and Deliverables unit amount (30.0) do not match.

Creating the Tool

- Define Data Model
- Define Visual Model Properties
- Customize Editor and Navigator
- Add Custom Behavior
- Define Validation Rules
- **Add Graphical Editor**
- Configure Backend

Graphical Editor

- Entities become Nodes
- References become Edges
- Additional Editor/View
- Layout Information



Creating the Tool

- Define Data Model
- Define Visual Model Properties
- Customize Editor and Navigator
- Add Custom Behavior
- Define Validation Rules
- Add Graphical Editor
- **Configure Backend**

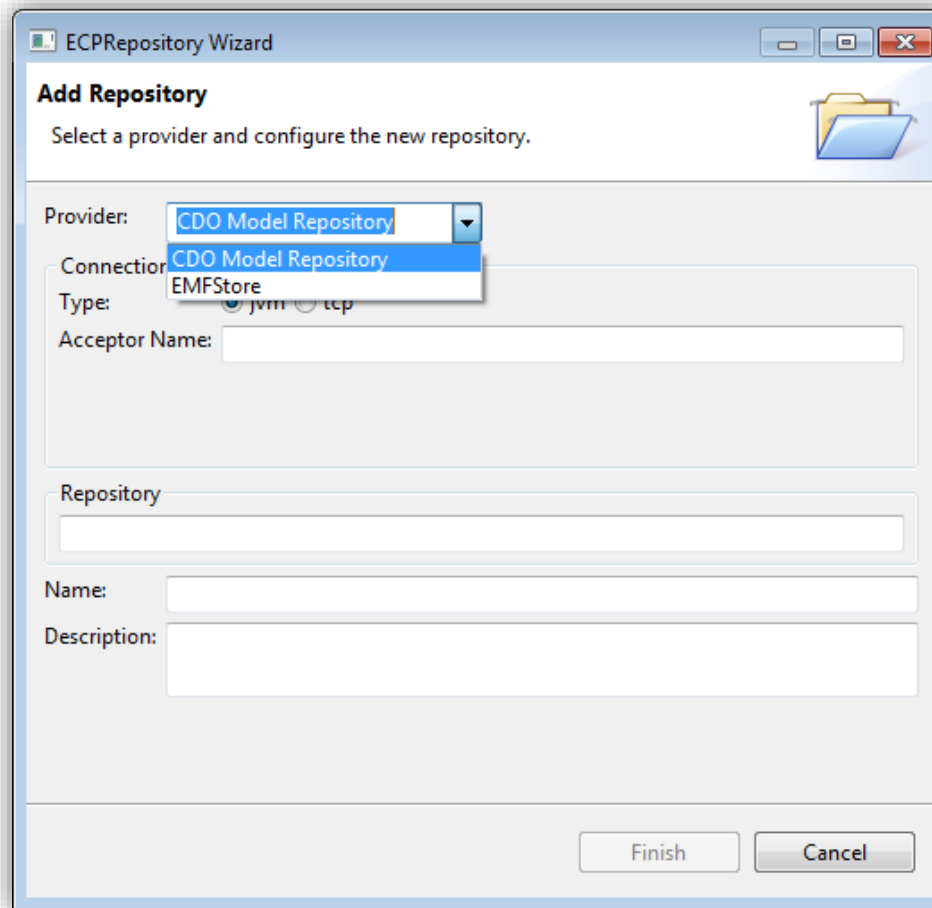
Storage (+Versioning)

- Store Data
 - Relational Databases
 - Non-SQL Databases
 - Files: XML, XMI, JSON...
- Versioning:
 - History
 - Differencing
 - „Blaming“

Multi-User

- Multiple Clients - Shared Data
- Synchronization:
 - Online (with Locking)
 - Offline (with Conflict Resolution/Merging)
- Authorization and Authentication
 - Users, Groups
 - Roles, Permissions

Storage and MultiUser



More features

- Data Import/Export: EMF, Apache POI
- Web Frontend: RAP
- Textual Syntax / DSLs: XText
- Metamodeling: Dynamic EMF
- 3D Representation: GEF3D
- Data Migration: Edapt
- ...

Summary

- Many tools share common requirements
- Frameworks can help with these
- Eclipse features matching frameworks
- Use EMF Client Platform as starting point: <http://eclipse.org/emfclient/>