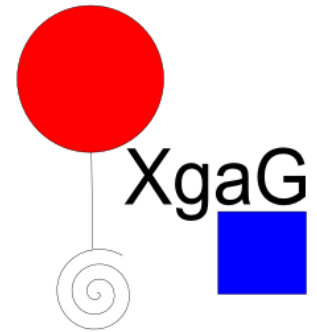
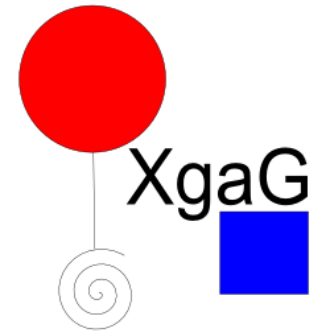


XgaG - Send your sister to model a board game!



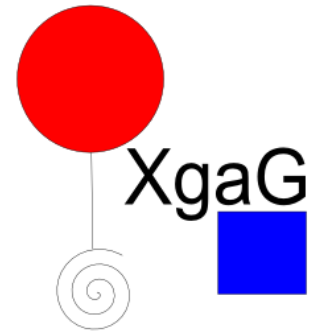
- XgaG = Brettspielmodellierung
- XgaG besteht aus
 - Metamodell für Brettspiele
 - Editoren zur Modellgenerierung
 - Beispieltransformation für kommerzielle Plattform ZillionsOfGames

Überblick



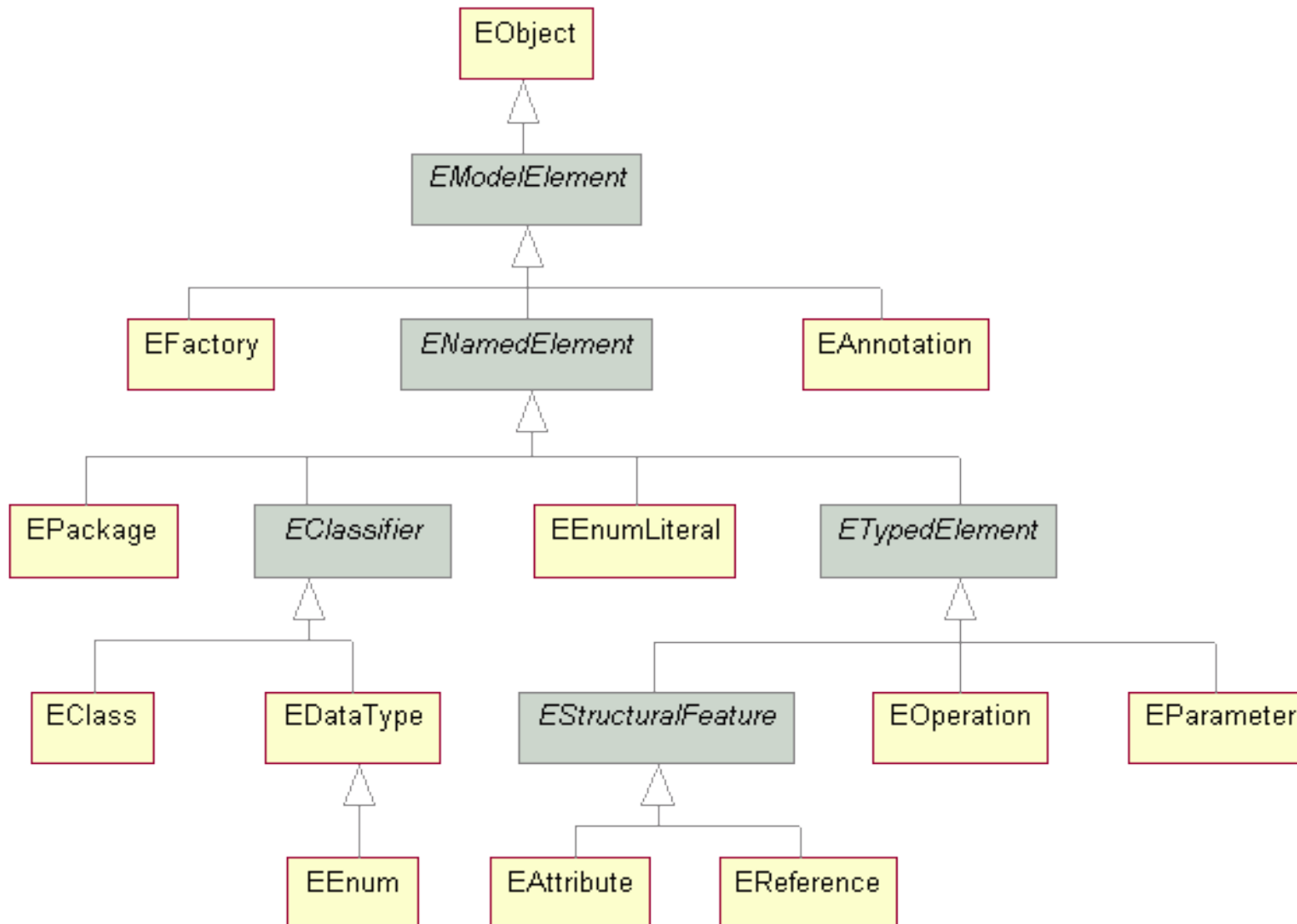
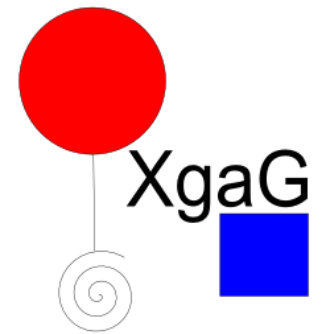
- **Verwendete Technologien**
 - EMF Eclipse Modeling Framework
 - GMF Graphical Modeling Framework
 - OAW Open Architecture Ware
- **Spielanleitung XgaG Brettspiel**
- **Live-Demo**

Eclipse Modeling Framework (EMF)

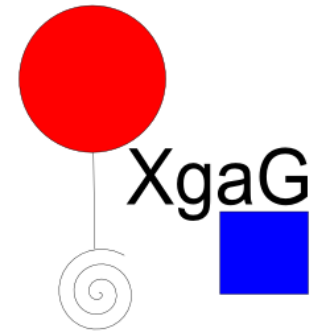


- Java Open-Source Modellierungs-Framework
- Generierung von Quellcode aus Modellen
- Bestehend aus
 - EMF.Ecore Metamodell (vgl. MOF)
 - EMF.Edit
 - EMF.Codegen

EMF Klassenhierarchie

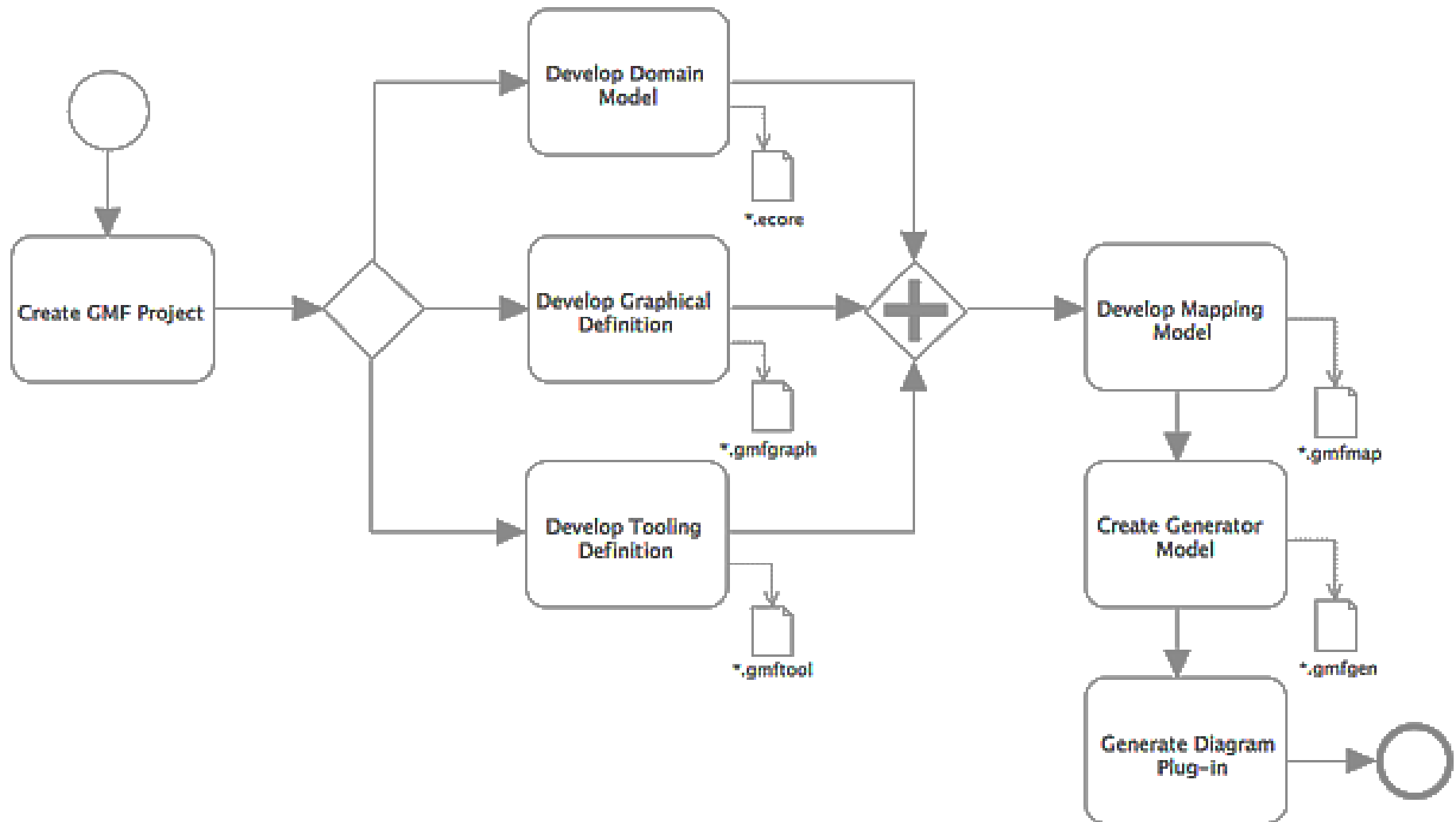
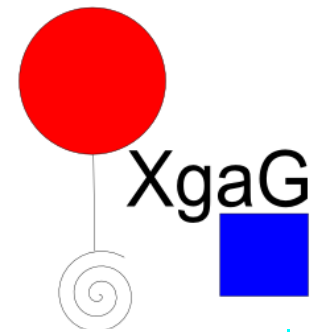


Graphical Modeling Framework (GMF)

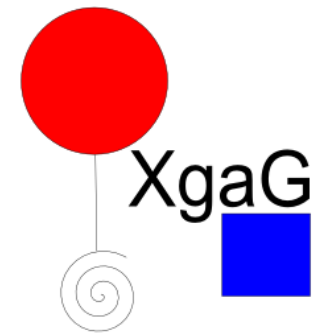


- Ecore-Modell zur Erzeugung grafischer Editoren in Eclipse
- Input
 - Domänen-Modell (Ecore)
 - Modell der grafischen Elemente
 - Zuordnung Domäne <-> Editierung
- Output
 - Eclipse Editor Plug-In

GMF Modellierung



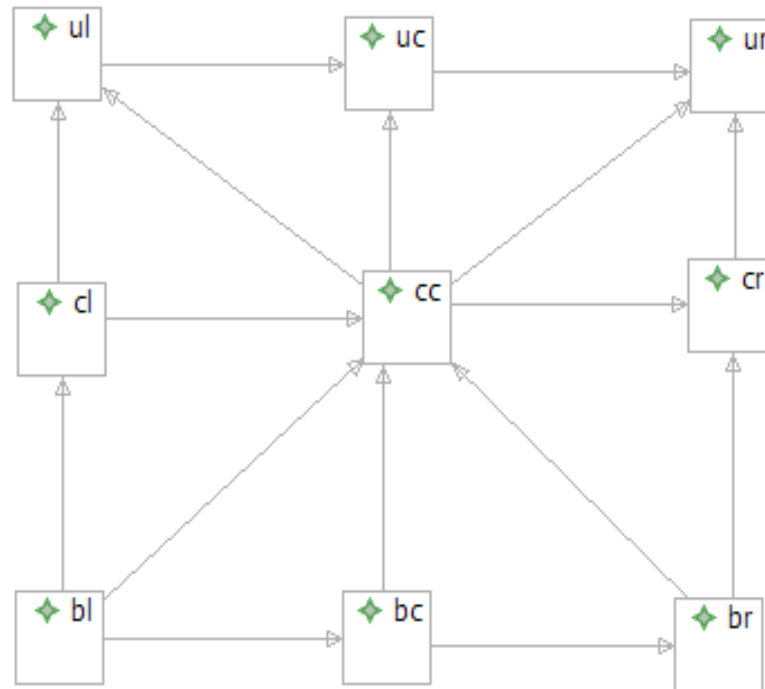
GMF - vorher/nachher



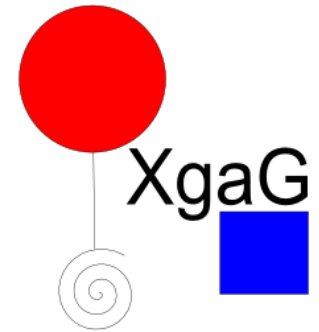
platform:/resource/XgaGPlugins/tictactoe/tictactoe.board

Board TicTacToeBoard

- ◆ Field ul
- ◆ Field uc
- ◆ Field ur
- ◆ Field cl
- ◆ Field cc
- ◆ Field cr
- ◆ Field bl
- ◆ Field bc
- ◆ Field br
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Edge
- ◆ Direction north
- ◆ Direction east
- ◆ Direction northeast
- ◆ Direction northwest

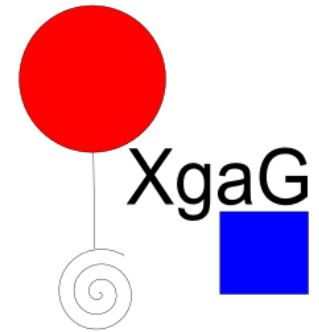


Open Architecture Ware (OAW)



- Modulares Open Source MDA/MDSD Framework
- Unterstützt EMF Modelle
- Features
 - Workflow Engine
 - Xtend / Xpand: Transformationssprachen
 - [Check, Xtext und weitere Add-Ons]

Einfacher OAW Workflow



```
<workflow>  
  <property file="workflow.properties"/>
```

```
<component id="xmiParser" class="org.openarchitectureware.emf.XmiReader">  
  <metaModelPackage value="xgag.game.GamePackage"/>  
  <modelFile value="{GameModel}"/>  
  <outputSlot value="gameModel"/>  
  <firstElementOnly value="true"/>  
</component>
```

1. Komponente parst Modell

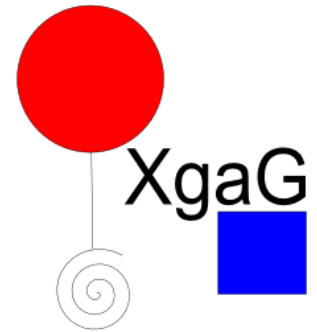
Kommunikation über Slots

```
<component id="rmCreator" class="zillions.ResourceWrapperGenerator">  
  <inputSlot value="gameModel"/>  
  <filename value="{GameModel}"/>  
</component>
```

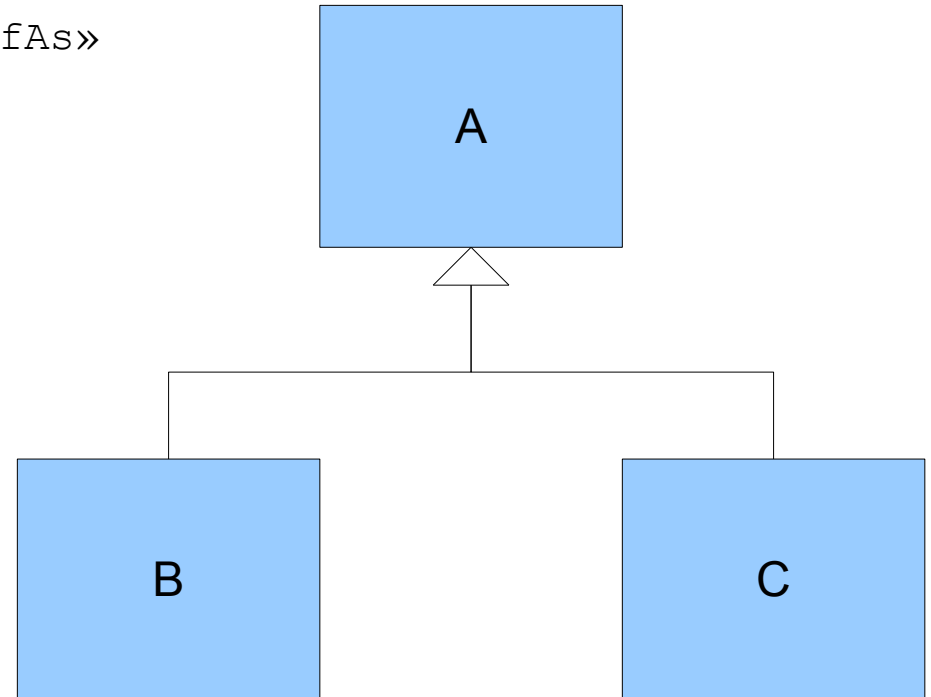
2. Komponente operiert auf Modell

```
</workflow>
```

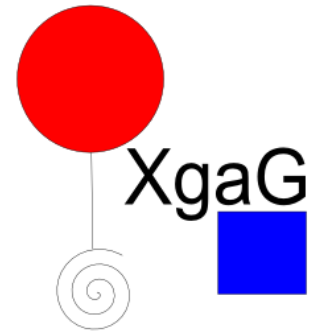
Xpand Templates



```
«DEFINE Root FOR someMetaClass»  
  «EXPAND implClass FOREACH listOfAs»  
«ENDDFINE»  
  
«DEFINE implClass FOR A»  
  // do something for A  
«ENDDFINE»  
  
«DEFINE implClass FOR B»  
  // do something for B  
«ENDDFINE»  
  
«DEFINE implClass FOR C»  
  // do something for C  
«ENDDFINE»
```



Scaleable Vector Graphics (SVG)

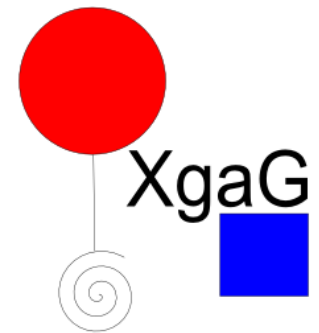


- XML basiertes Format für Vektorgrafiken
- W3C Standard

Zillions of Games

- „Universelle Spiel-Engine“ für Windows
- Eigene Definitionssprache für Spiele

Spielanleitung

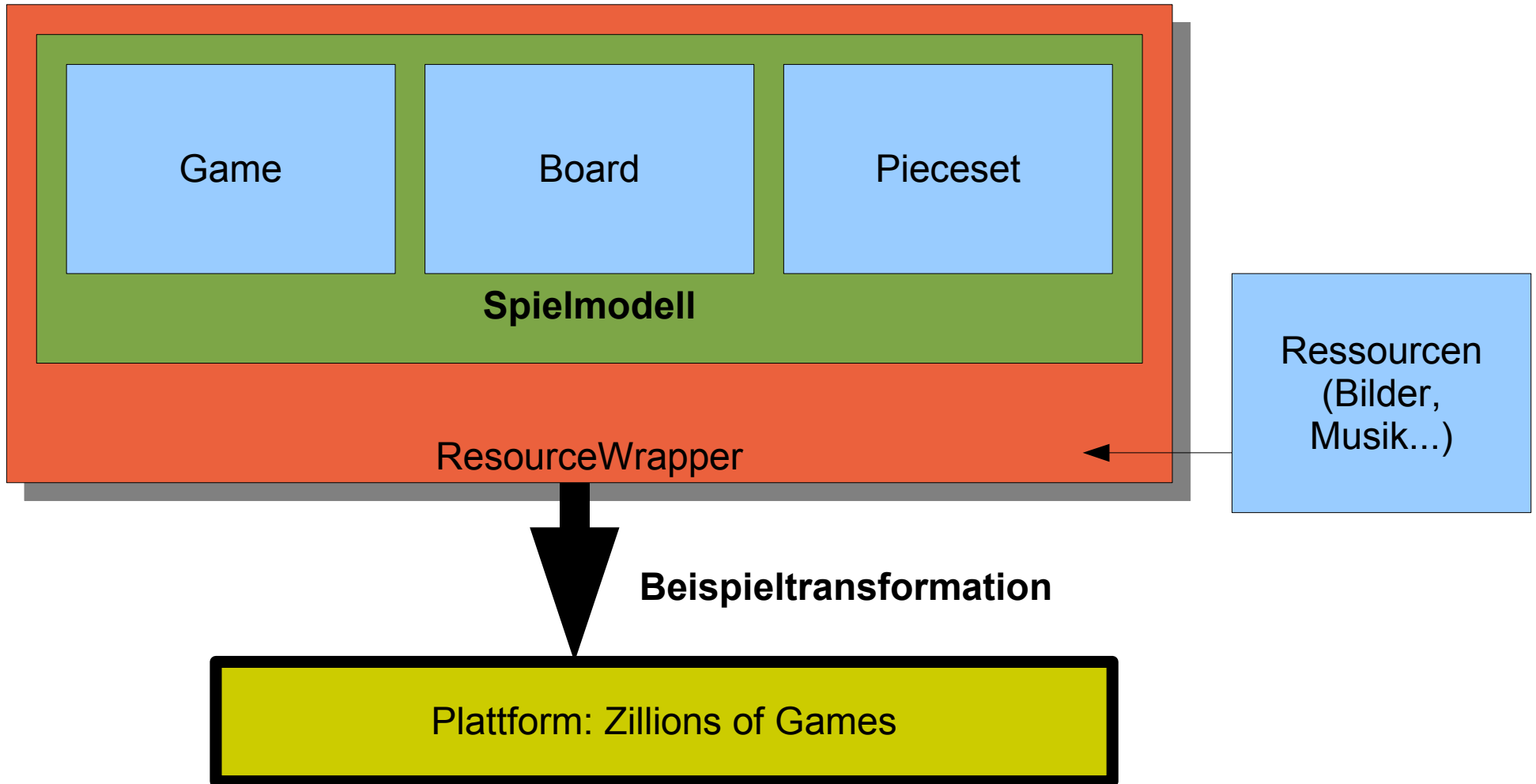
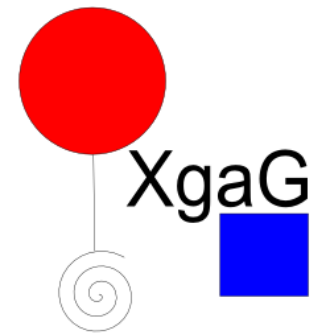


- Überblick verschaffen
- Spielbrett erstellen
- Figuren definieren
- Spiellogik einbauen
- GMF Spielbrett „recyclen“
- ResourceWrapper generieren
- XgaG nach Zillions transformieren

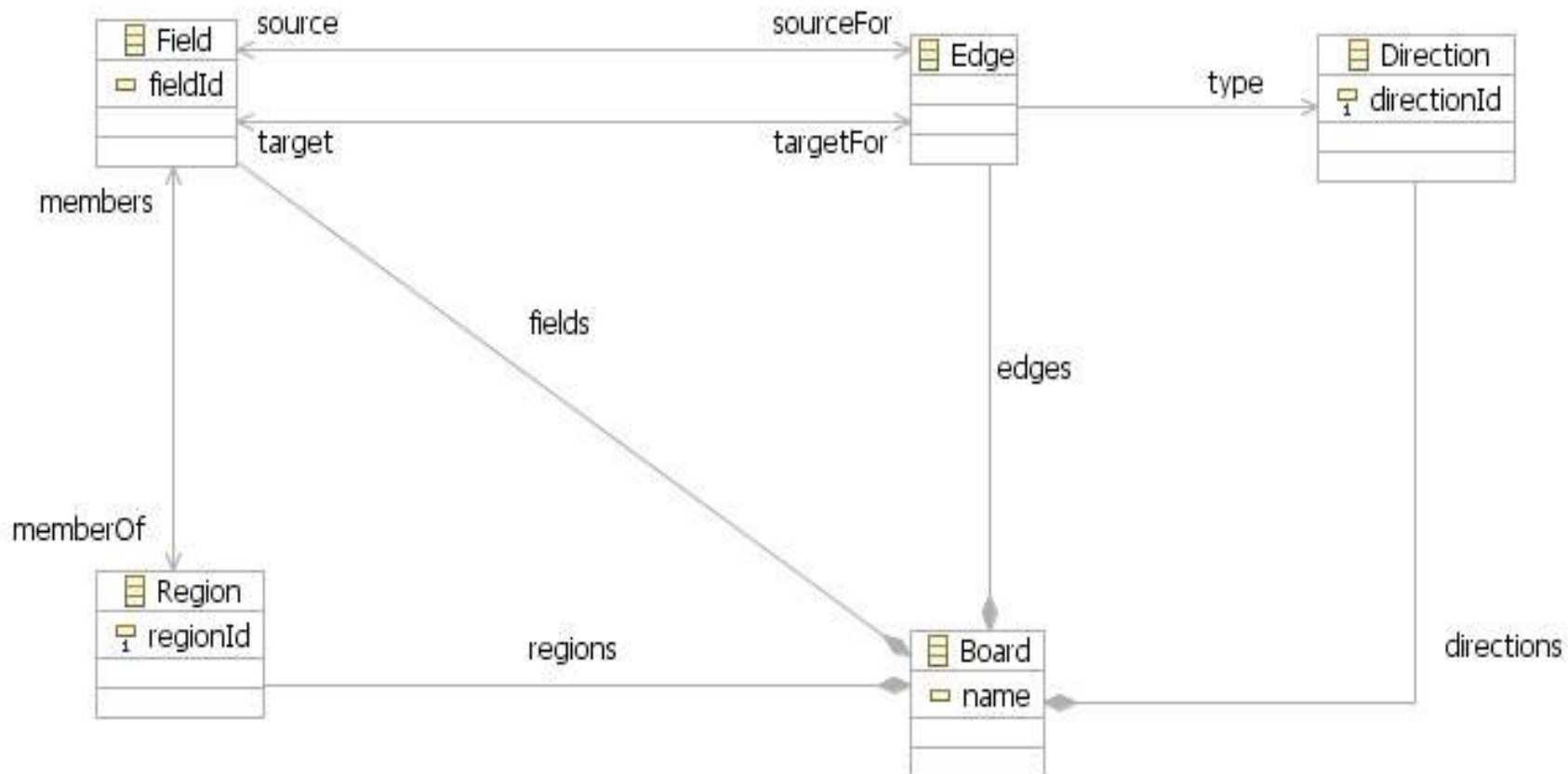
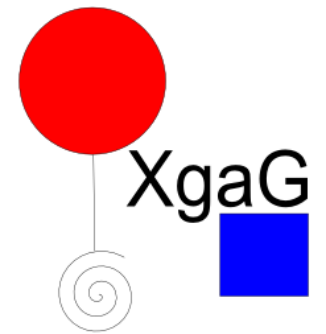
Logische
Modellierung

OAW
Workflows

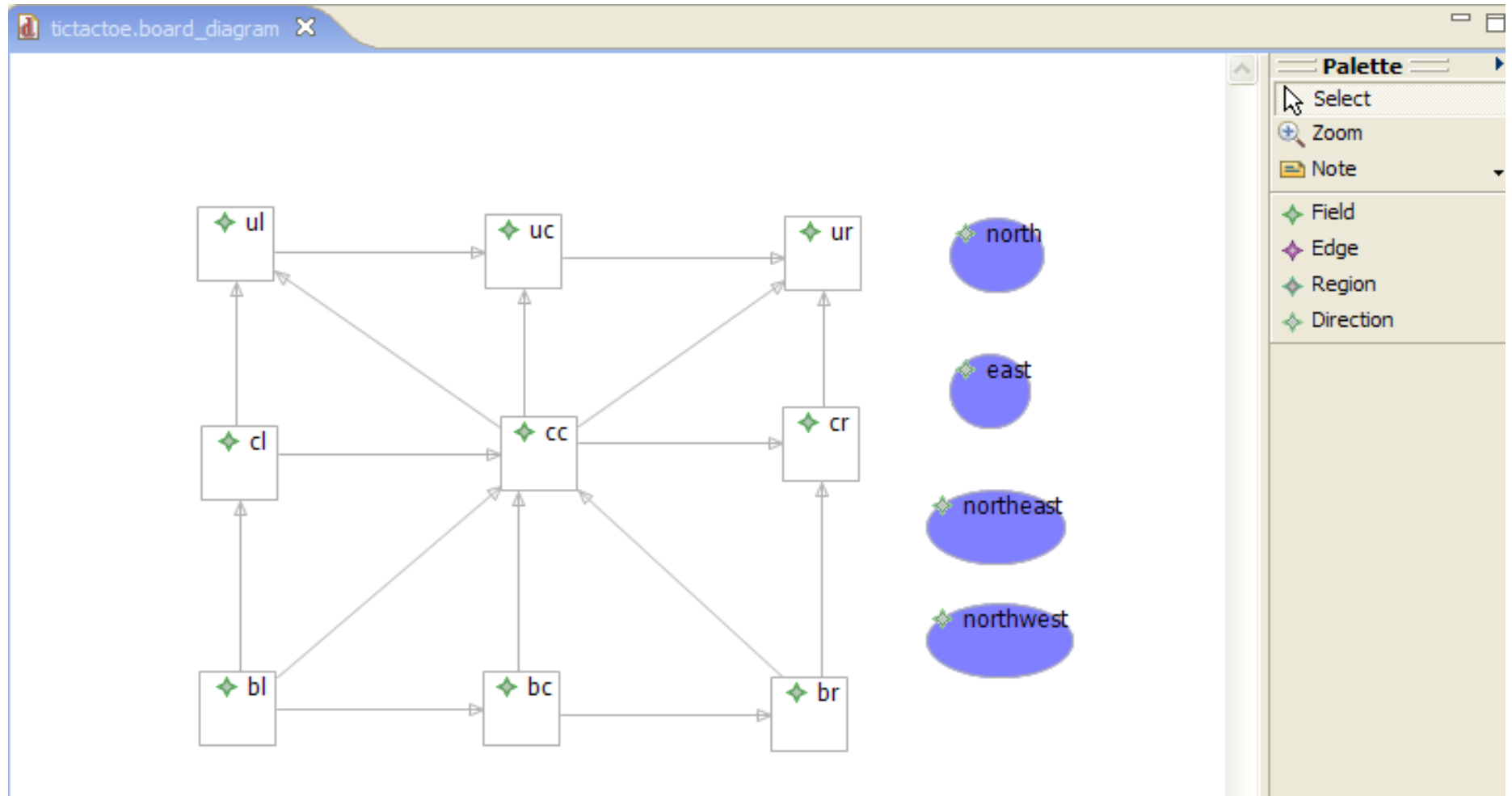
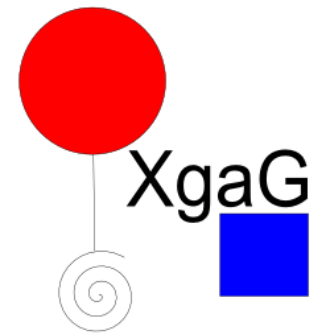
Überblick XgaG Modelle



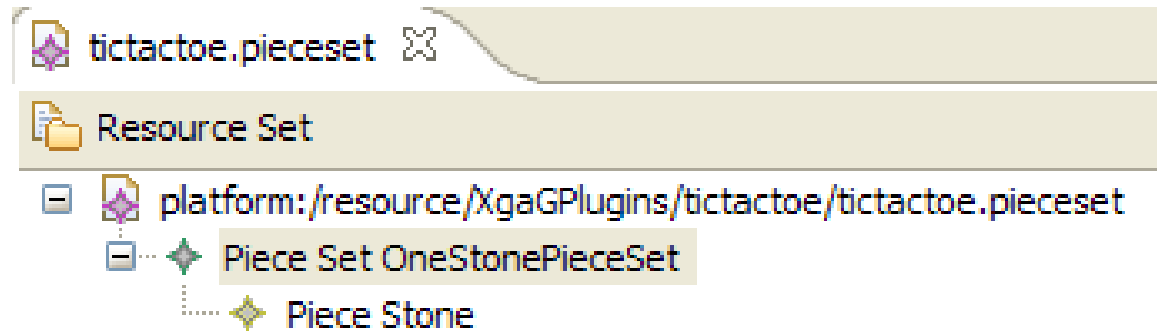
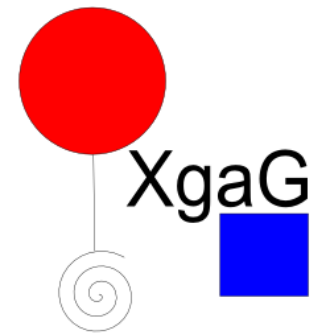
Spielbrett erstellen (1)



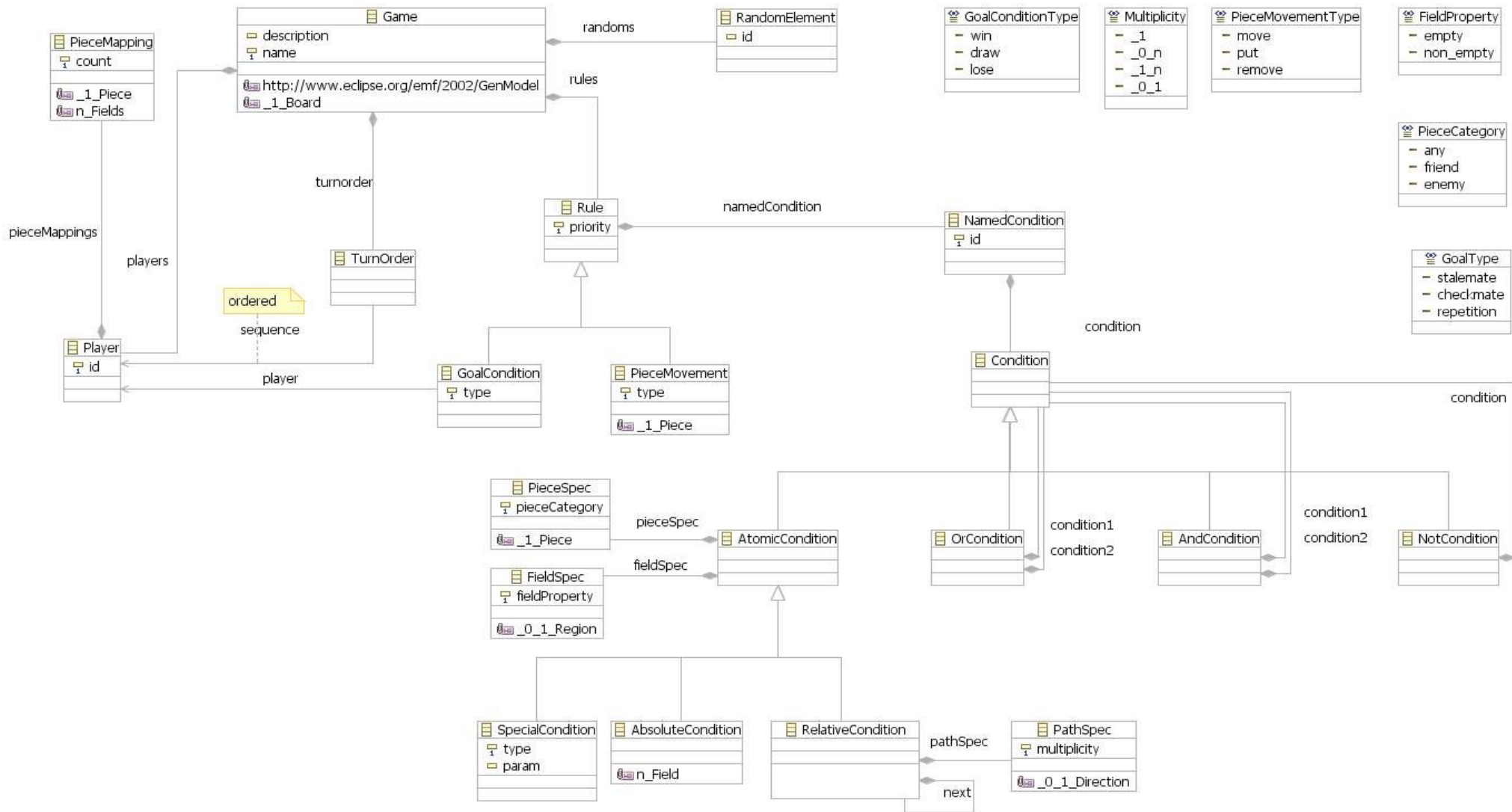
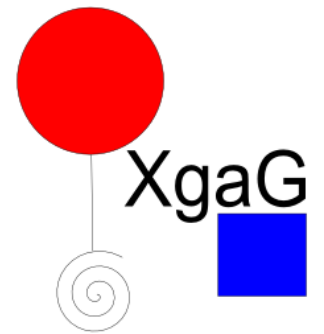
Spielbrett erstellen (2)



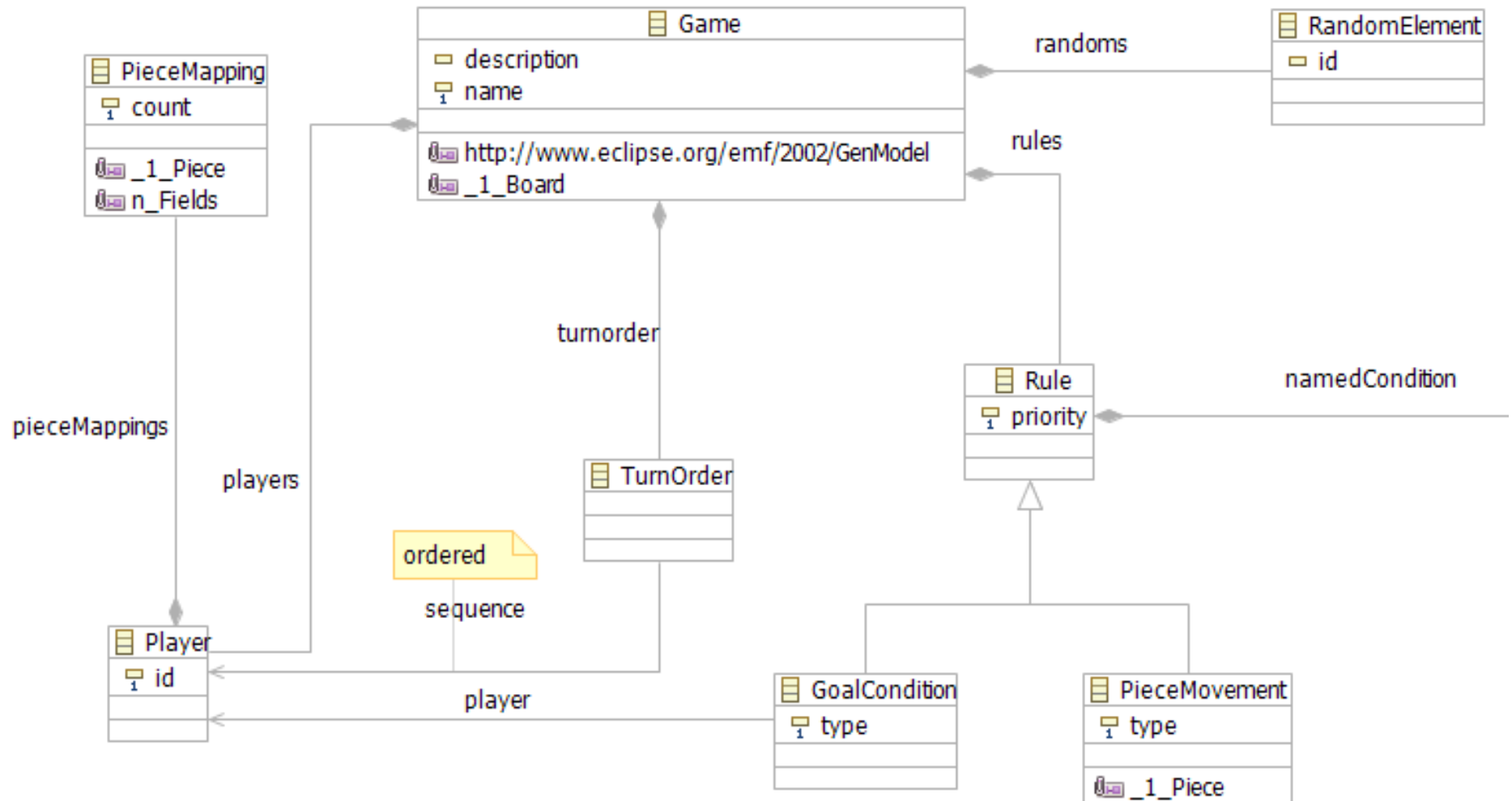
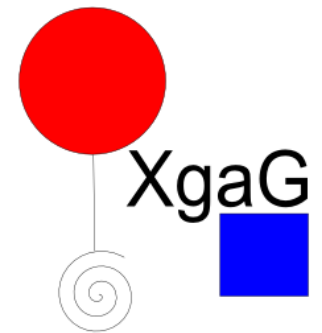
Figuren definieren



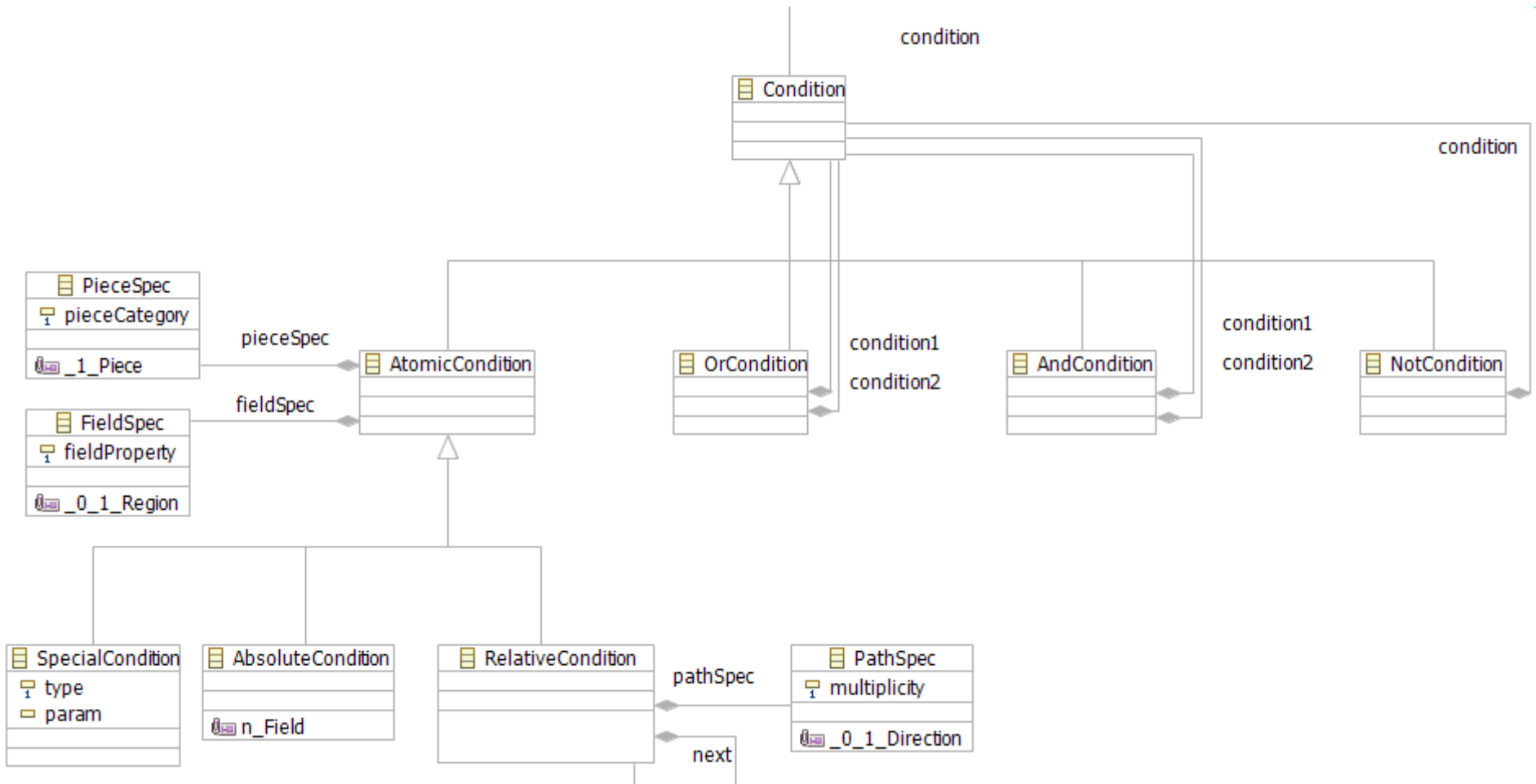
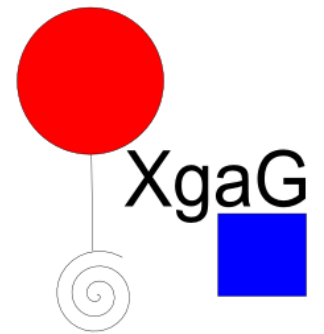
Spiellogik Übersicht



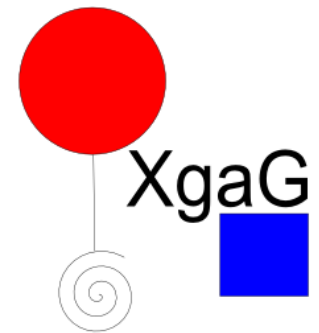
Spiellogik einbauen (1)



Spiellogik einbauen (2)



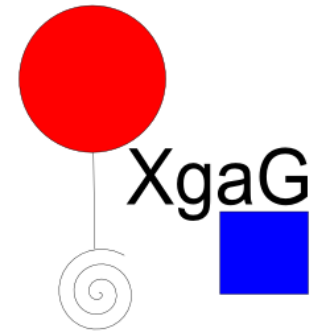
Spiellogik einbauen (3)



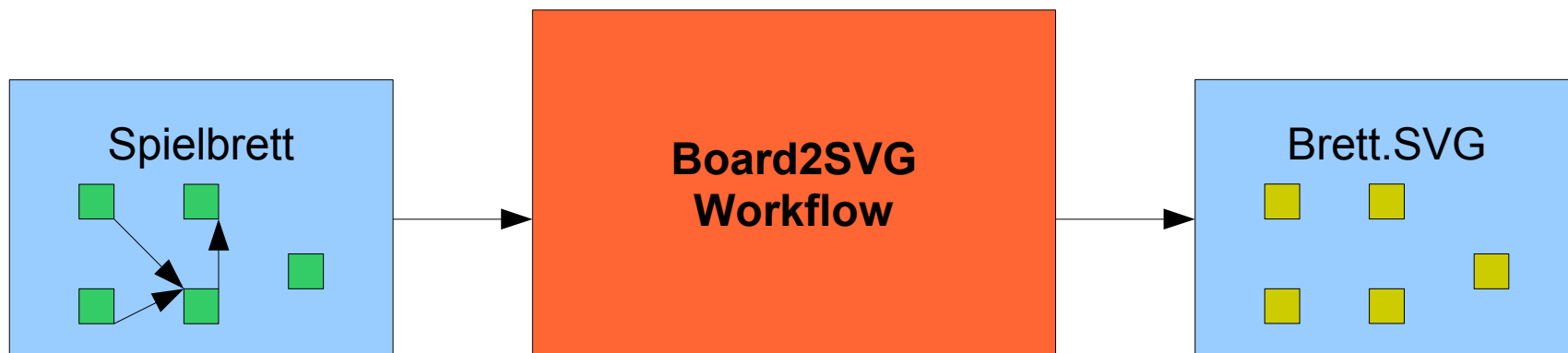
The screenshot shows the XgaG IDE interface for a TicTacToe game. The main window displays a tree view of the resource set. The root node is 'platform:/resource/XgaGPlugins/tictactoe/TicTacToe.game'. Underneath, there is a 'Game TicTacToe' node, which contains two players: 'Player Jaqueline' and 'Player Amelie'. Each player has a 'Piece Mapping 5' associated with it. Below the players, there is a 'Piece Movement put' node, which contains a 'Named Condition dropStone' node. This node has a 'Relative Condition' child, which in turn has a 'Field Spec empty' child. Below the movement rules, there is a 'Goal Condition win' node, which contains a 'Named Condition win_both' node. This node has an 'Or Condition' child, which has another 'Or Condition' child. This second 'Or Condition' has a 'Relative Condition' child, which has a 'Piece Spec friend' child. The 'Piece Spec friend' node is highlighted with a blue selection box. At the bottom of the IDE, there is a 'Properties' tab showing the following table:

Property	Value
Piece	◆ Piece Stone
Piece Category	■ friend

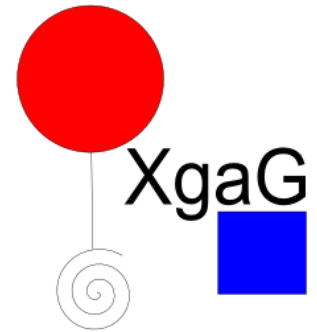
GMF Spielbrett „recycle“



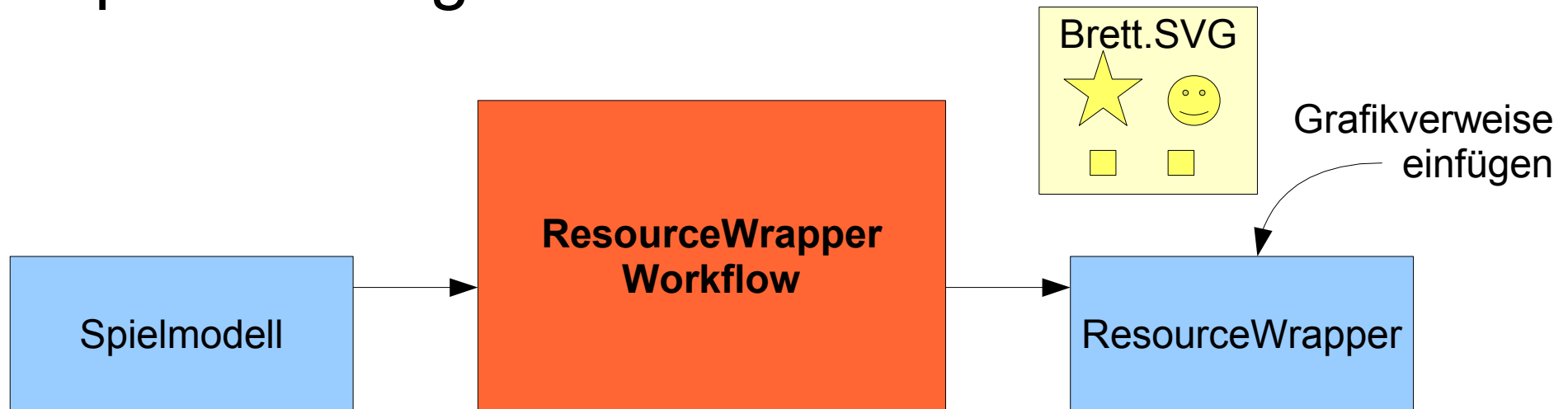
- GMF Spielbrett wird für graphische Darstellung wiederverwendet
 - Koordinaten der Feldelemente aus GMF Diagramm extrahieren
 - SVG Elemente referenzieren Spielbrettfelder



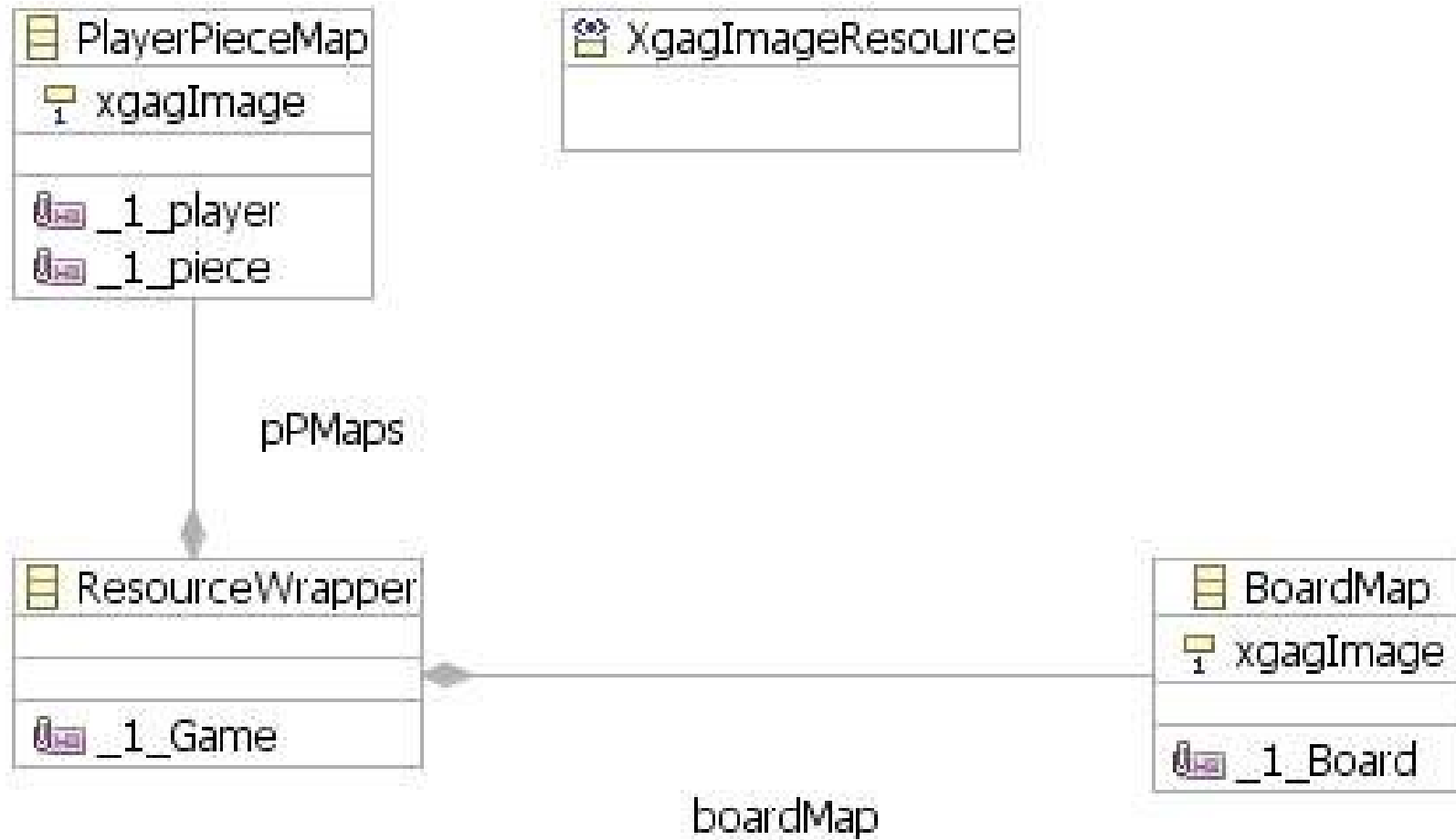
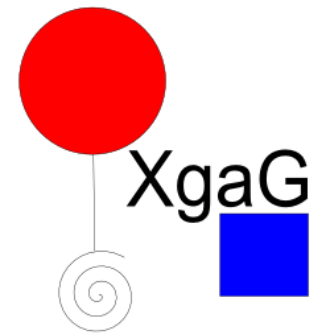
ResourceWrapper - Workflow



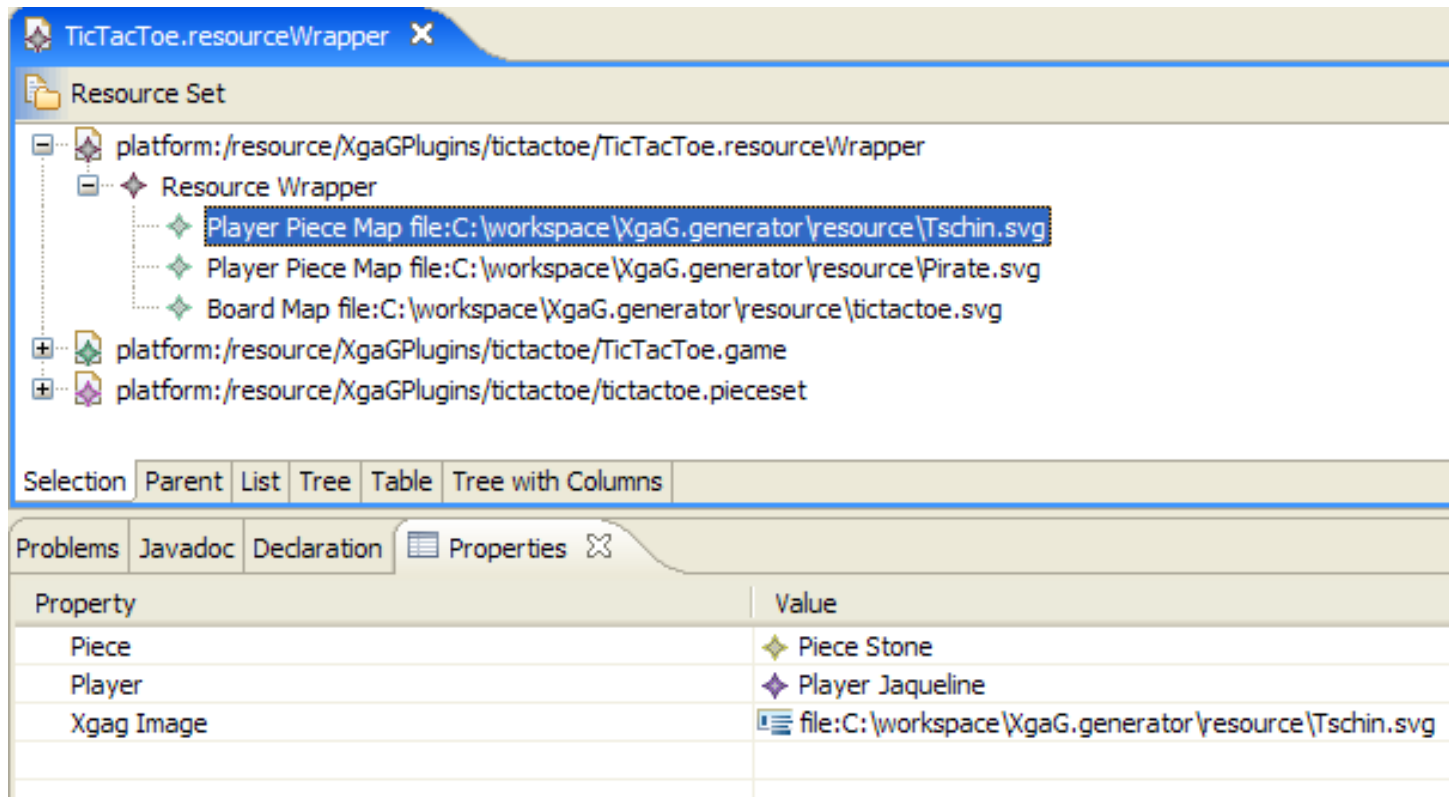
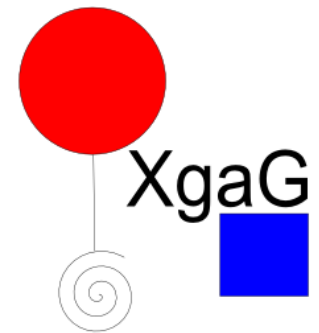
- ResourceWrapper verbindet Spiel und Repräsentation
- Instanz eines ResourceWrapper wird aus Spielmodell generiert



ResourceWrapper (1)



ResourceWrapper (2)



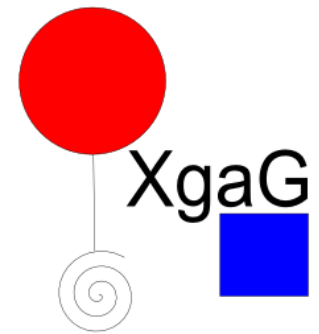
The screenshot shows an IDE window titled 'TicTacToe.resourceWrapper'. The main area displays a 'Resource Set' tree structure. Under 'Resource Wrapper', three entries are listed:

- Player Piece Map file:C:\workspace\XgaG.generator\resource\Tschin.svg
- Player Piece Map file:C:\workspace\XgaG.generator\resource\Pirate.svg
- Board Map file:C:\workspace\XgaG.generator\resource\tictactoe.svg

Below the tree, the 'Properties' tab is active, showing the following table:

Property	Value
Piece	◆ Piece Stone
Player	◆ Player Jaqueline
Xgag Image	📄 file:C:\workspace\XgaG.generator\resource\Tschin.svg

XgaG nach Zillions transformieren

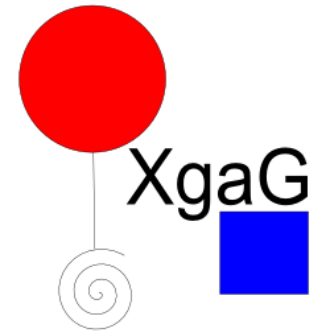


- Transformationen

- Extraktion benötigter Flächeninformationen für Zugdarstellung
- Regelumsetzung mittels Xpand und Xtend



Weitere Informationen



- <http://xgag.sourceforge.net>
- <http://www.eclipse.org/emf>
- <http://www.eclipse.org/gmf>
- <http://www.openarchitectureware.org>
- <http://www.zillions-of-games.com>