

Extending UML2Tools for XML Schema Design

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The screenshot shows the hyperModel Designer interface with the following components:

- Project Explorer:** Shows the project structure for 'FpML-4-3', including 'FpML.uml' and 'XMLSchema'.
- UML Class Diagram:**
 - AllocationAmended:** Attributes: amendment : TradeAmendment [1..*], party : Party [2..*].
 - AllocationCancelled:** Attributes: _choice : TradeChoice [1..*], party : Party [2..*].
 - AllocationCreated:** Attributes: trade : Trade [1..*], party : Party [2..*].
 - TradeAmendment:** Attributes: _choice1 : _Choice1 [0..1], amendedTrade : Trade.
 - Party:** Attributes: partyId : PartyId [1..*], partyName : normalizedString [0..1], account : Account [0..*], id : ID.
 - Trade:** Attributes: tradeHeader : TradeHeader, product : Product, otherPartyPayment : Payment [0], brokerPartyReference : PartyRef, _group1 : CalculationAgent.mode, collateral : Collateral [0..1], documentation : Documentation, governingLaw : GoverningLaw [0], allocations : Allocations (n..1).
- Associations:**
 - AllocationAmended (1..*) -- amendment --> TradeAmendment.
 - AllocationCancelled (1..*) -- _choice --> TradeChoice.
 - AllocationCreated (1..*) -- trade --> Trade.
 - Party (2..*) -- party --> AllocationAmended.
 - Party (2..*) -- party --> AllocationCancelled.
 - Party (2..*) -- party --> AllocationCreated.
 - Party (2..*) -- party --> TradeAmendment.
 - Party (2..*) -- party --> Trade.
- Properties Panel:** Shows details for the selected 'TradeChoice' class, including its owner (AllocationCancelled) and name.

Enhancements for XML Schema Design

Extend the UML2 Tools model editors to enable design of XML Schemas:

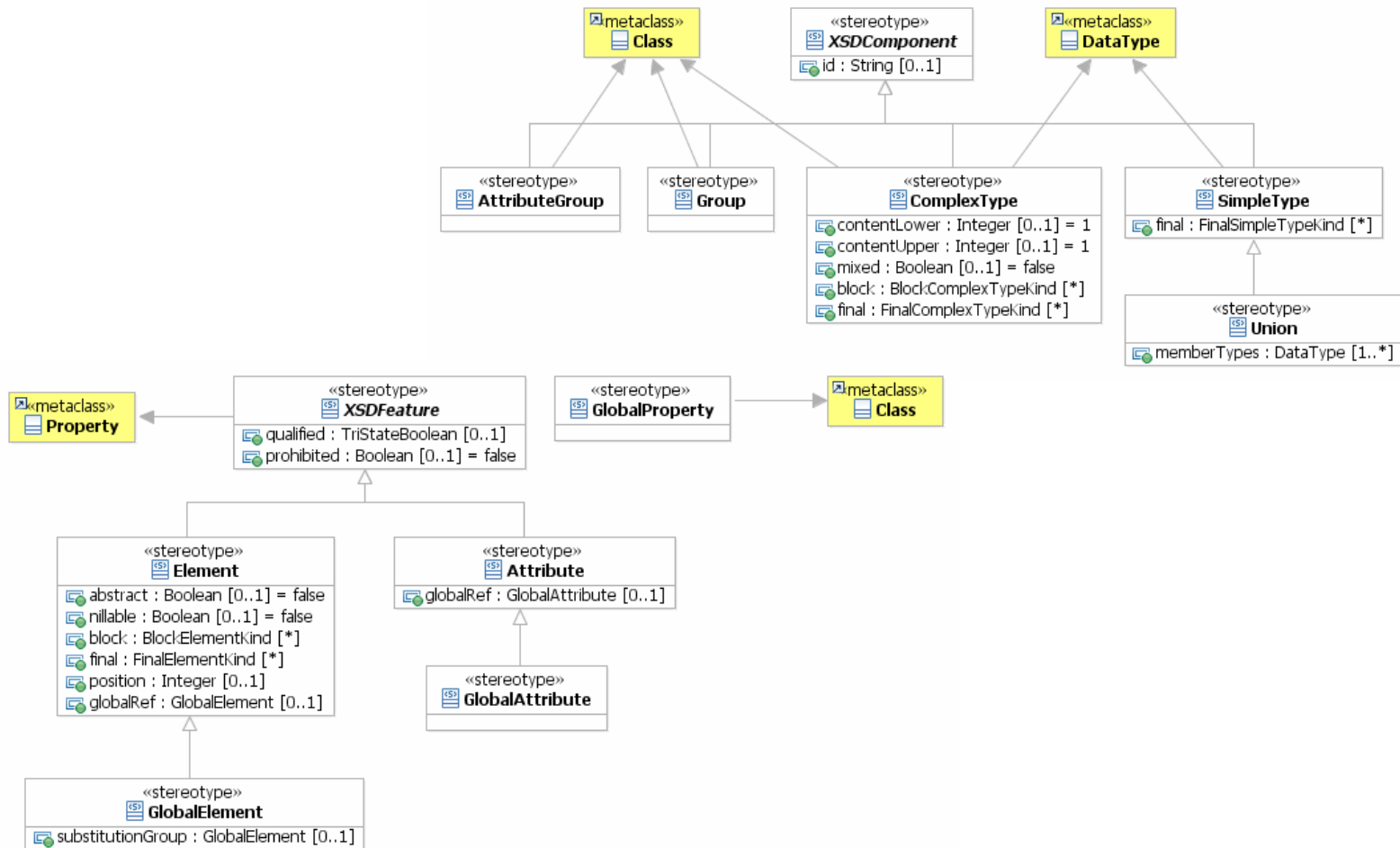
- UML Profile for XML Schema modeling extensions
- XSD Properties view tab for editing stereotype values
- Import XSD to UML and generate XSD from UML
 - ◆ Using wizard dialogs
 - ◆ Using custom Ant tasks
- Validate UML models with XML Schema Constraints
 - ◆ Using EMF Validation Framework
- Demonstrate with example from FpML banking standard, www.fpml.org

Enhancements to UML2 Tools

Several enhancements are required before UML2 Tools editors are usable by modelers. I have made these changes:

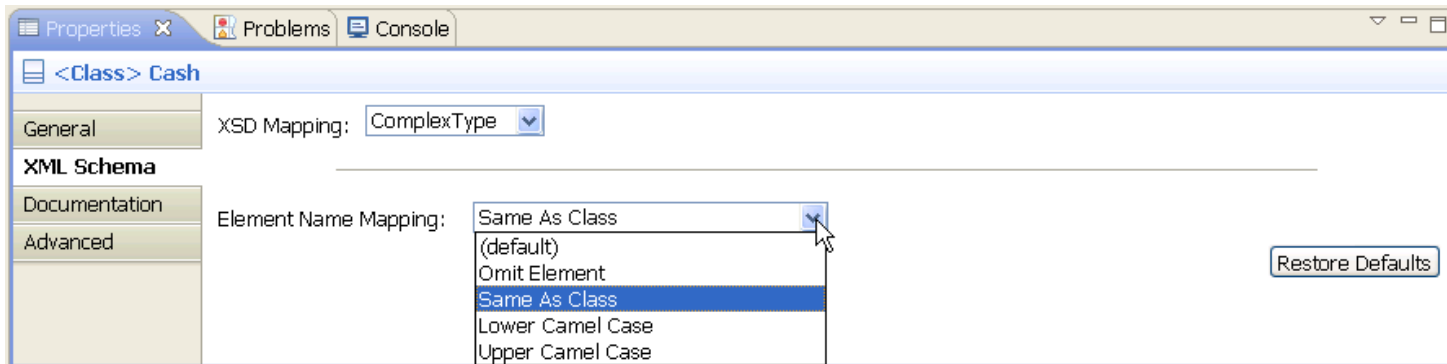
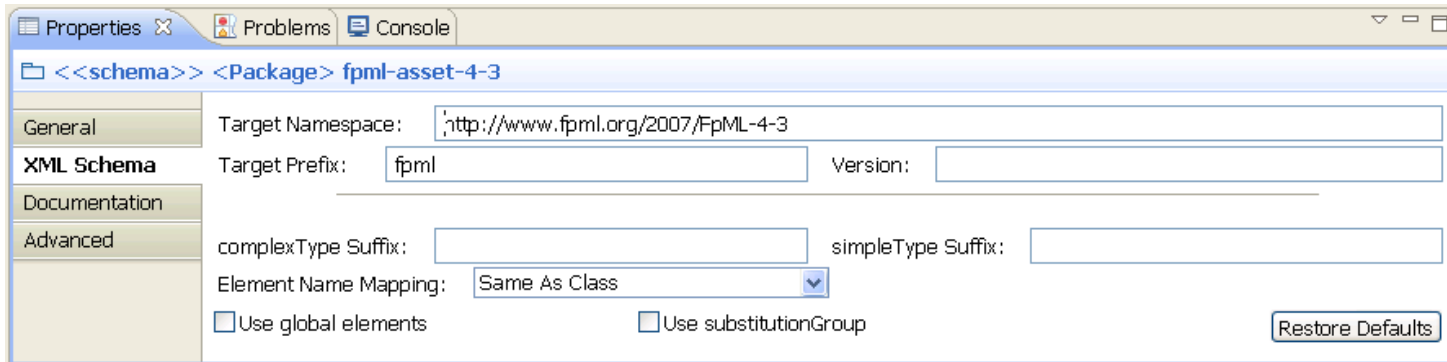
- Project Explorer
 - ◆ Filter model content; extends SaveablesProvider; enable undo/redo; use EMF transactions; improved context menus; add label decorator for validation problems
 - ◆ https://bugs.eclipse.org/bugs/show_bug.cgi?id=139767
- Explorer and all diagrams use a shared EditingDomain
 - ◆ Is this a fundamental limitation of GMF?
 - ◆ https://bugs.eclipse.org/bugs/show_bug.cgi?id=189974
- Properties View Tabs for editing model

UML Profile for XML Schema (subset)

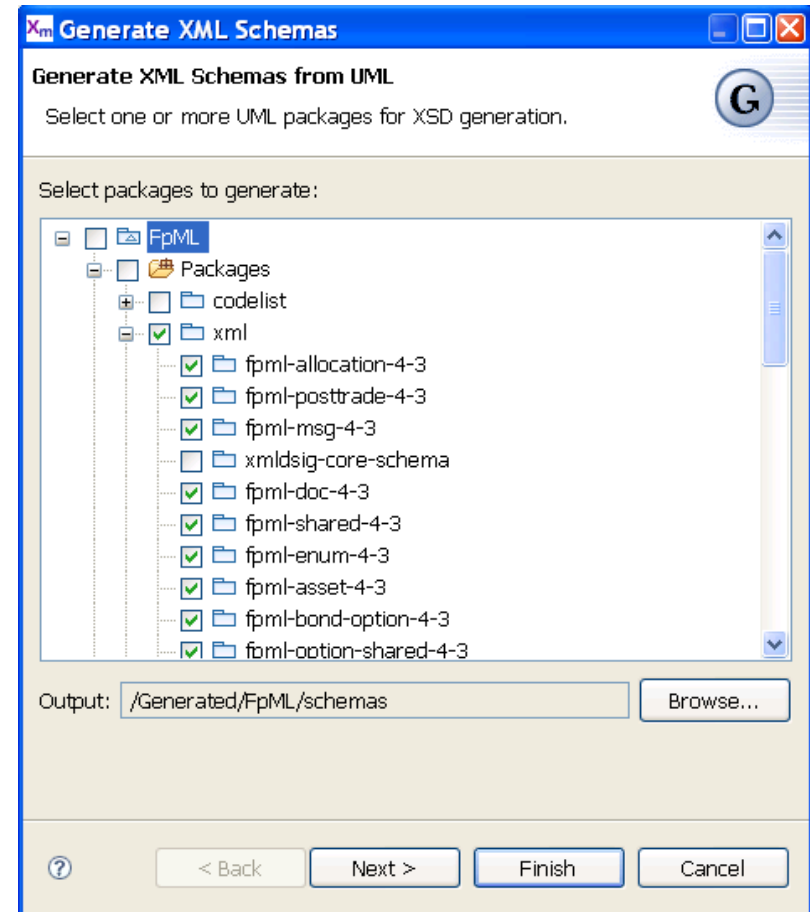
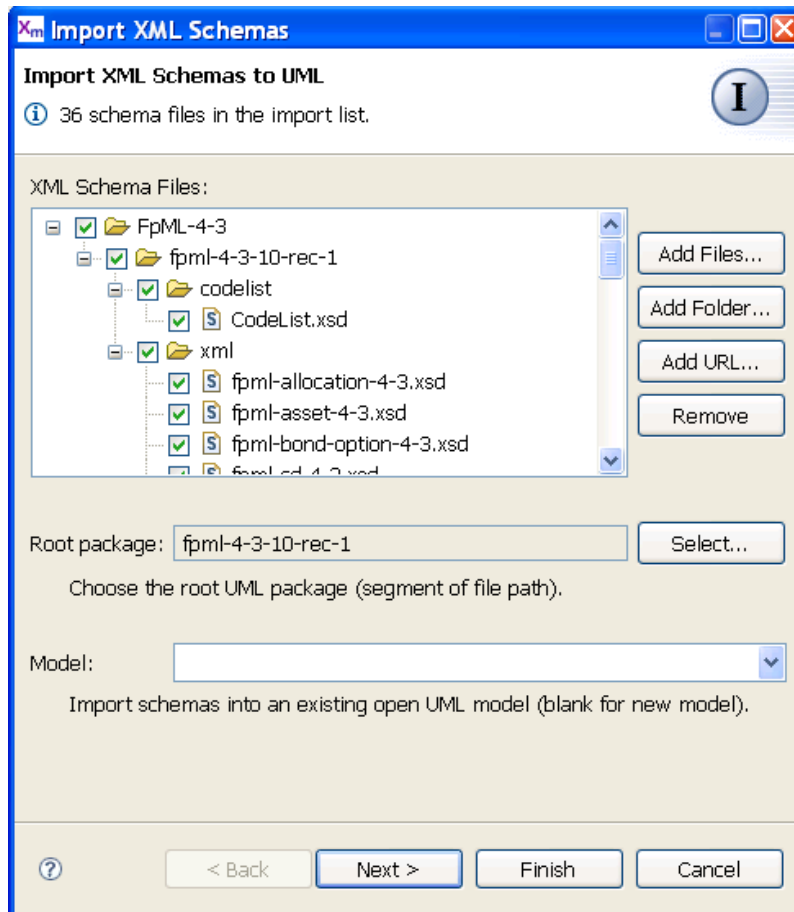


XML Schema Properties View Tab

XML Schema tab allows modelers to assign stereotypes and values, without requiring knowledge that they are using UML stereotypes.



Wizards for XML Schema Import & Generation



Ant Tasks for XML Schema Import & Generation

```
<property name="xsdSource" value="${basedir}/../../FpML-4-3/fpml-4-3-10-rec-1/xml"/>
<property name="modelName" value="FpML-4-3"/>
<property name="model" value="${basedir}/${modelName}.uml"/>
```

```
<target name="importSchemas" depends="init">
  <xmlmodeling model="${model}">
    <importXSD baseModelPath="${xsdSource}">
      <fileset dir="${xsdSource}" includes="*.xsd"/>
    </importXSD>
  </xmlmodeling>
</target>
```

```
<target name="generateSchemas" depends="init">
  <xmlmodeling>
    <model file="${model}" />

    <generateXSD destdir="${output}">
      <modelElement qname="${modelName}" nested="true"/>
    </generateXSD>
  </xmlmodeling>
</target>
```

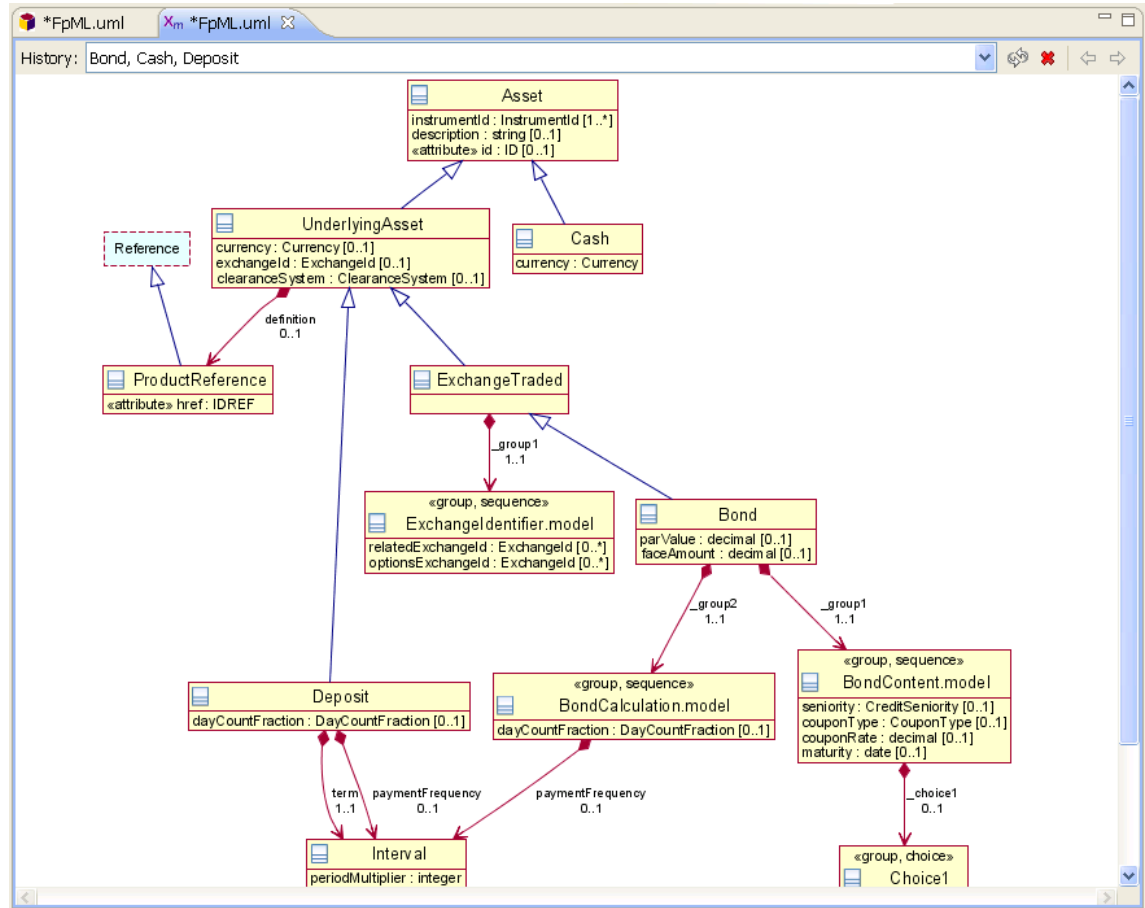
Model Visualization with Class “Dynagram”

Quick visualization of any UML model with a single mouse click.

Very useful for understanding models imported from XML Schema standards.

A dynamic class diagram (dynagram) is created on-the-fly from the selected class(es).

Displayed using an SVG viewer in Eclipse.



Validating UML models with XSD Constraints

The screenshot shows the Eclipse IDE interface. On the left, the 'Preferences' dialog is open to the 'Constraints' section. Under 'XML Schema', several constraints are checked, including 'Attribute has simpleType'. The 'Constraint ID' is shown as 'com.xmlmodeling.uml2.xsd.validation.properties.attributeSimpleType', and the 'Description' states: 'An XSD attribute must have a simpleType'.

In the foreground, the '*FpML.uml' editor displays a UML class diagram. The class 'VersionAttributes' has an attribute group 'atts' containing several attributes: 'version' (type 'VersionEnum', multiplicity '1..1'), 'expectedBuild' (type 'positiveInteger', multiplicity '0..1'), and 'actualBuild' (type 'Annotation', multiplicity '0..1').

At the bottom, the 'Problems' view shows one error: 'XSD attribute "actualBuild" does not have a simpleType.' The error details are as follows:

Description	Resource	Path	Location	Type
Errors (1 item)				
XSD attribute "actualBuild" does not have a simpleType.	FpML.uml	FpML-4-3	FpML::xml::fp...	EMF Problem