# Implementation of an ADE module for citygml4j

## Package structure

* Project
  + Adapter
  + Model
  + Module
  + Walker

## Model

### Implementation of UML Model

|  |  |  |  |
| --- | --- | --- | --- |
| **UML** | | | **Java** |
| **Class** | *Generalization relation* | *Stereotype* |  |
| Subclass of ADEOf<> | DataType | Extends ADEOf<> implements ADEObject |
| No parent class | DataType | Extends rg.xmlobjects.gml.model.GMLObject, implements ADEObject (according to GML encoding 🡪 substitutiongroup = AbstractObject) |
| No parent class | ObjectType | extends AbstractGML implements (CityGMLObject 🡪) ADEObject, VisitableObject |
| No explicit parent class | FeatureType | Extends org.citygml4j.model.core.AbstractFeature, implements ADEObject |
| Subclass of CityGML class | FeatureType | Extends CityGML class, implements ADEObject |
|  | No parent class | Code | No implementation 🡪 class attribute of type org.xmlobjects.gml.model.basictypes.Code |
|  | No parent class | Enumeration |  |
|  | No parent class | Union |  |
| **Class attributes (simple/primitive type)** | | | Class attributes |
| **Association/aggregation/composition to class T or class T as property in another class** | | | * **Class with DataType stereotype**: extends AbstractInlineProperty implements ADEObject * **Class with ObjectType stereotype**: extends AbstractInlineProperty implements (CityGMLObject 🡪) ADEObject, OwnershipAttributes * **Class with FeatureType stereotype**: Individual “property” class extends FeatureProperty<T> implementing ADEObject * **Classes that require an own property name (e.g. laneSection) require an own property class. Classes which just use the property of the super class (e.g. OpenDRIVEConnectingRoad (subclass of AbstractTransportation class)) do not need the property class as they inherit the property from their superclass** |
| **Association/aggregation/composition property** | | | Class attribute (list, single) of the type of the “property” class |

**Principle: All ADE classes have to implement the ADEObject interface** except they subclass an ADEOf<> class. The superclasses and implemented interfaces depend on the respective class. **ALSO THE PROPERTY CLASSES HAVE TO IMPLEMENT THE ADEOBJECT CLASS?**

**Problem:** ADE makes use of multiple inheritance 🡪 Solution: Use of interfaces

**Problem**: GML3.3 is not implemented by gml-objects library yet

🡪 Model GML3.3 classes as ADE module/classes

**🡪 Model GML3.3 classes as individual module with dependency on gml-objects module**

🡪 Extend gml-objects library

## Adapter

Each class of the model package requires an adapter class. A special case is the adapter for subclasses of ADEOf<> classes (see ADE sample). The build…-functions are used when reading in a file and instantiating the internal objects. The write…-functions are used when writing the internal objects out to a file.

|  |  |  |
| --- | --- | --- |
| **Type of Java class** | **Adapter class** | **Condition** |
| FeatureType class | Subclass of CompositeObjectAdapter | FeatureType class is subclass of an CityGML class, which is **NOT**  an abstract class 🡪 Constructor calls super-Constructor with actual superclass adapter, e.g.  public IndustrialBuildingAdapter() {  super(BuildingAdapter.class); }  ; Since the non-abstract superclasses already implement the ObjectBuilder functions it is not possible to derive directly from them because the subclasses have to implement the ObjectBuilder interface functions themselves |
| Subclass of <superclass>Adapter | FeatureType class does subclass an **abstract** CityGML module class (classes without an explicit superclass subclass AbstractFeature by default); Since the abstract classes does **NOT** implement the ObjectBuilder functions it is possible to derive directly from them and implement the interface methods |
| FeatureType Property class | Subclass of AbstractFeaturePropertyAdapter |  |
| DataType class | Implements ObjectBuilder and ObjectSerializer | For ADEOf<> subclasses an annotation SingletonADEProperty is required, also in XMLElement annotation only the name of the DataType class element is stated |
| DataType Property class | Subclass of AbstractInlinePropertyAdapter |  |

TopLevelFeature classes additionally implement the TopLevelFeature interface.

The name of the XML-element of the class has to be stated in the @XMLElement annotation, i.e. the class name.

XML Any type 🡪 Java DOM? Xml-objects?

## Module

Module class

* Extends the ADEModule class and passes its namespace and CityGML version to the super-constructor
* Overrides the getSchemaResource()-method and returns the schema location
* (has static and final namespace ADE attribute)

## Walker

For each FeatureType class there is a visit-method calling the visit-method taking a parameter of the type of the classes superclass. If the visit-method exits the classes of the ADE module the walker.visit-mehtod is called.

* Catch exceptions. If XML-elements are present in the document, which cannot be handled by the adapter classes they are simply neglected.

## First Steps

* Prepare simple CityGML OpenDRIVE ADE test document with only one road an only simple attributes
* Implement only Road class with simple attributes
* Iteratively extend the ADE module and test document by the rest of the ADE classes