

# CityGML IMGeo ADE

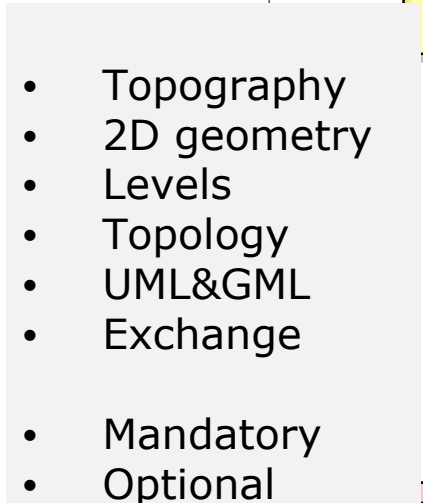
## Clearer guidelines for extending CityGML

**June 2013**  
**Linda van den Brink**



## Introduction

- IMGeo = Dutch large scale topography standard
- Finalized & published February 2012 (update published Dec 2012)
- Based on CityGML and modeled in UML as an **application domain extension**
- **Resulted in several CRs; this presentation about CR 166 (#11-101)**
- **“Clearer guidelines for extending CityGML”**
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June 2013

## Problems with creating ADE

- No guidance how to create ADE *for UML*
  - There are examples how to create UML extension of CityGML (but it is only classes) (noise, geo-technology, BIM)
  - XML ADE extension method is well described + examples
- The way CityGML adds properties in XML schema does not have equivalent in UML

## Alternatives for ADE: 1&2 / 6

- Use the extension possibilities of GenericCityObject and \_genericAttribute (OGC, 2008; 10.10)
  - *Adv*: no extra modeling work
  - *Dis*: the extension would not be formally defined
  
- Add properties in the CityGML classes directly in the CityGML package
  - *Adv*: No subclass definition is necessary
  - *Dis*: Packages reflect governance (UML will be violated also OGC modular representation)

## Alternatives for ADE: 3&4 / 6

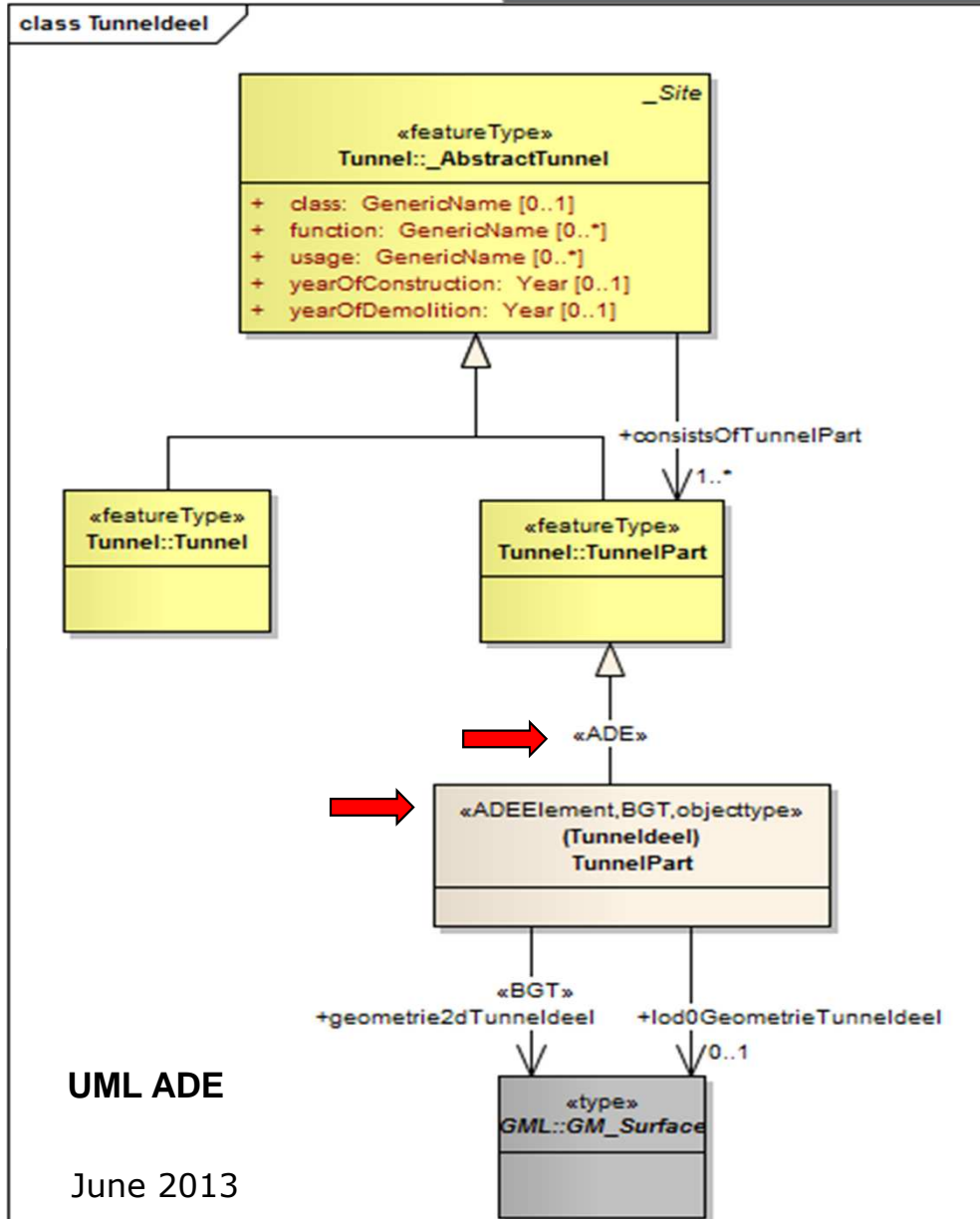
- Add properties in a subclass in the ADE package but suppress this subclass from the generated XML schema.
  - *Adv*: no UML violation, ISO 19100 series, and OGC rules.
  - *Dis*: normally inherits all from its super class, but in this case that is not intended....
- Define the ADE hook  
`\_GenericApplicationPropertyOf...` as a class associated to the CityGML class and define to be added properties as subclass of the ADE hook class.
  - *Adv*: clear distinction between the concept of subtyping a CityGML class and extending a CityGML class with properties
  - *Dis*: it is less clear than subtyping the CityGML class, which is a well-known way of modeling; not in line with the ISO 19109 General Feature Model, no concept of attribute substitution.

## Alternatives for ADE: 5&6 /6

- Add properties in an abstract superclass.
  - *Adv*: avoids the problem of using a subclass while not intending inheritance of properties.
  - *Dis*: the generalization relationships have to be added to the CityGML class which violates basic UML and XML namespace governance rules.
- Define a general type `ADEPropertyType` and `extendsType`, and maintain the to be added types outside the UML in a registry.
  - *Adv*: avoids violating UML rules, the General Feature Model (ISO 19109).
  - *Dis*: maintain added feature properties outside the UML. ADE extension cannot be completely modeled in UML: extra classes would be part of the UML model and the properties would not.

## **Solution for IMGeo**

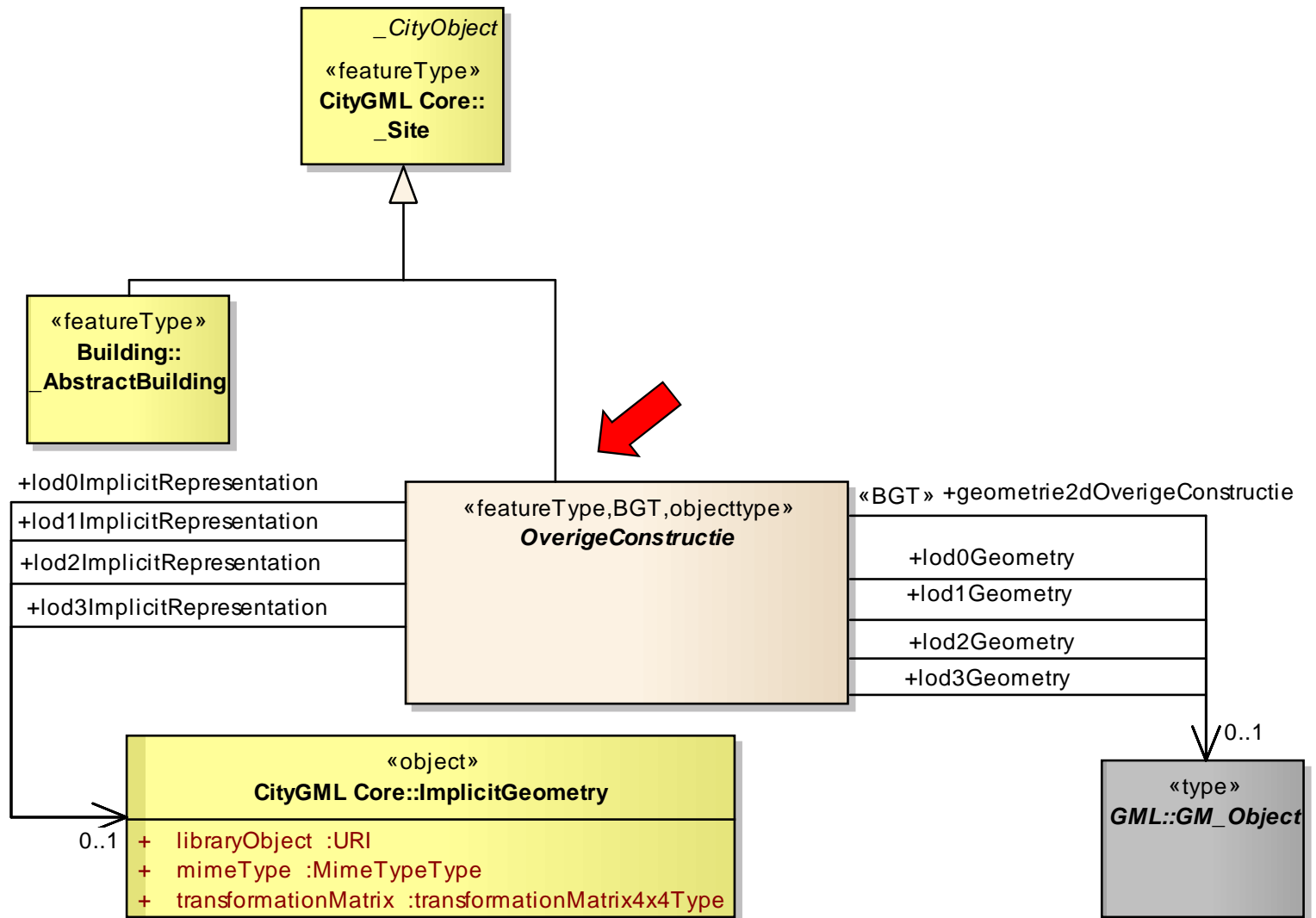
- **Alt. 3: Properties in subclasses in the ADE package but suppresses these subclasses from the generated XML Schema**
  - Compliant with relevant rules of UML, the ISO 19109 and OGC
  - conceptually logical: IMGeo classes are subclasses of CityGML => adding the extra properties to these subclasses is appropriate
  - understandable for people with basic knowledge of UML class diagrams



- Enterprise Architect
- The CityGML classes first modelled
- IMGeo as subclasses (with Dutch translation)
- If similar classes are not available:
  - Re-model IMGeo
  - Create new classes

# A new class derived from \_Site

class OverigeConstructie



## Generating GML application schema

- ShapeChange was used to generate schema
- Custom encoding rule added for classes with the <<ADEElement>> stereotype
- >> these are:
  1. suppressed from the GML Application schema
  2. their properties are added to the ADE namespace as substitutes for the CityGML  
" \_GenericApplicationPropertyOf<Featuretypename>  
" hooks

# Described approach as best practice

based on a paper, presented at 3D GeoInfo, May 2012

OGC 12-066

## Proposal:

**move described  
approach into  
CityGML 3.0 spec**

**As per CR 166  
(#11-101)**

**Open Geospatial Consortium Inc.**

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Reference number of this OGC® project document: **OGC 12-066**

Version: 1.0

Category: OGC® Best Practice candidate

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UML ADE

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**Modeling an application domain extension of CityGML in UML –  
candidate best practice**

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<b>Assigned OGC Document #:</b>	11-101
<b>Name:</b>	*Linda van den Brink
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<p>If this is a revision of a previous submission and you have a Change Request Number, then check here:</p> <p><input type="checkbox"/></p> <p>Enter the CR number here: <input type="text"/></p> <p>Enter the Revision Number that you are revising here: <input type="text"/></p>	
<b>Title:</b> ⓘ	*Clearer guidelines for extending CityGML
<b>Source:</b> ⓘ	*Geonovum; the 3D pilot held 2010-2011 in the Netherlands.
<b>Work item code:</b> ⓘ	
<b>Category:</b> ⓘ	* C (Functional modification of feature) ▾
<b>Reason for change:</b> ⓘ	<p>*</p> <p>The guidelines (or rules) for extending CityGML should be described more fully and clearly so that a working extension of CityGML (i.e. working in CityGML software) can be created by relying on these rules and/or guidelines.</p>