

# MDA Employed in a Joint eGovernment Strategy: An Experience Report

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# The next 30 minutes

- First: a bird's eye view on DOL (**D**eutschland **O**n**L**ine, Germany Online) and its sub-projects
- Then going into how DOL standardizes the development of XÖV standards
- Focus on the usage of UML models and profiles
- and a „production chain“ for XÖV standards
- ( there is so much more to tell about DOL - but not in this talk )

# DOL (Deutschland OnLine) Germany Online

- A joint eGovernment strategy enacted by the federal government, federal-state governments, and municipalities in Germany
- Goal: interoperable semantic standards for electronic data exchange between (G2G) and with (B2G) public authorities: „XÖV“ standards
- Prioritized projects: municipal citizen registration, civil status registration, immigration offices, judiciary domain, vehicle registration, infrastructure, and standardisation

# DOL Projects

**Municipal  
Citizens  
Registration**

**Civil Status  
Registration**

**Data  
Exchange  
for  
Immigration  
Offices**

**Data  
Exchange  
in the  
Judiciary  
Domain**

**Vehicle  
Registration**

**Networks**

**Standardisation**

# XÖV standards of DOL

- XÖV stands for XML in der Öffentlichen Verwaltung, XML in public authorities.
- Semantic standards that define processes and information structures for the data interchange in specific domains of the public administration
- Implemented by system vendors for the municipalities
- Describe only interchange, not internal processes
- Delivered as one document (PDF) and several XML Schema files (some projects also include WSDL files)

# Example: XMeld

- Domain: municipal citizens registration
- There are ~5000 offices in the municipalities (no central register in Germany)
- *A lot* of paper has been sent in the past.
- Many processes between municipalities work now electronically (in production since beginning of 2007)
- Several system vendors; data exchange successfully standardized by XMeld (892 pages, 421 complex types)
- XMeld has been made legally binding
- It is the pioneer project for DOL

# The standardization project

The standardisation project standardizes the development of XÖV standards. It provides ...

- ... a lot of organizational help (how to carry out XÖV projects in the public administration)
- ... a model-driven development method to achieve high quality, cost-effective XÖV standards (including two UML profiles)
- ... „production chain“ for XÖV standards (including the MDA tool XGenerator)
- ... a repository model for common information concepts

# UML models and profiles in DOL

- UML profiles are employed to ensure modeling rules and allow for platform-specific tailoring (for XML Schema and WSDL)
- Heavy use of OCL wellformedness rules to ensure model quality
- UN/CEFACT Core Components are used to standardise information concepts across projects of different domains.
- The „data conference“ develops a core components repository model; evolving standardisation of the standards: from conceptual to concrete reuse

Constructed example „XTenant“

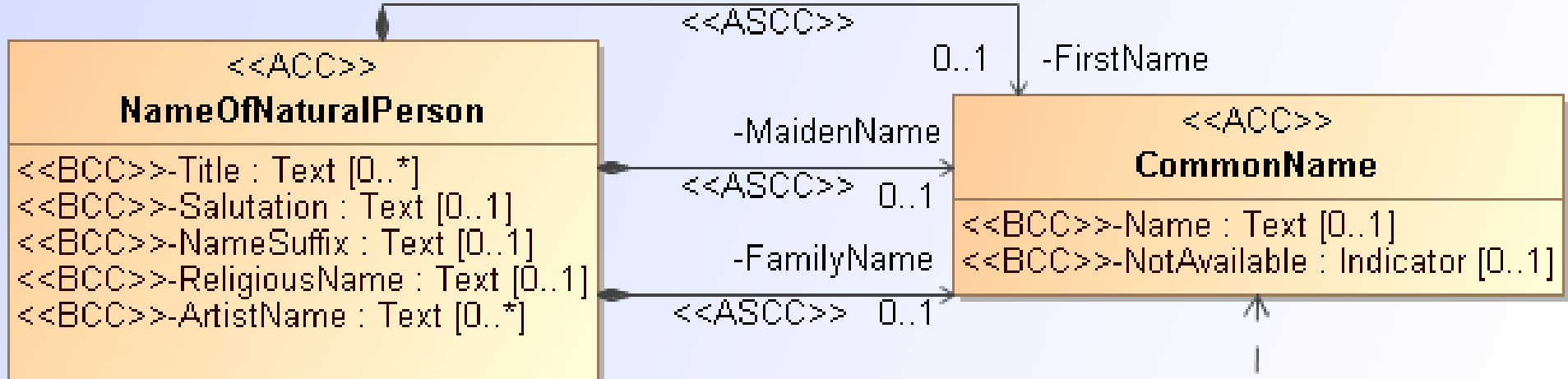
-

Conceptual model

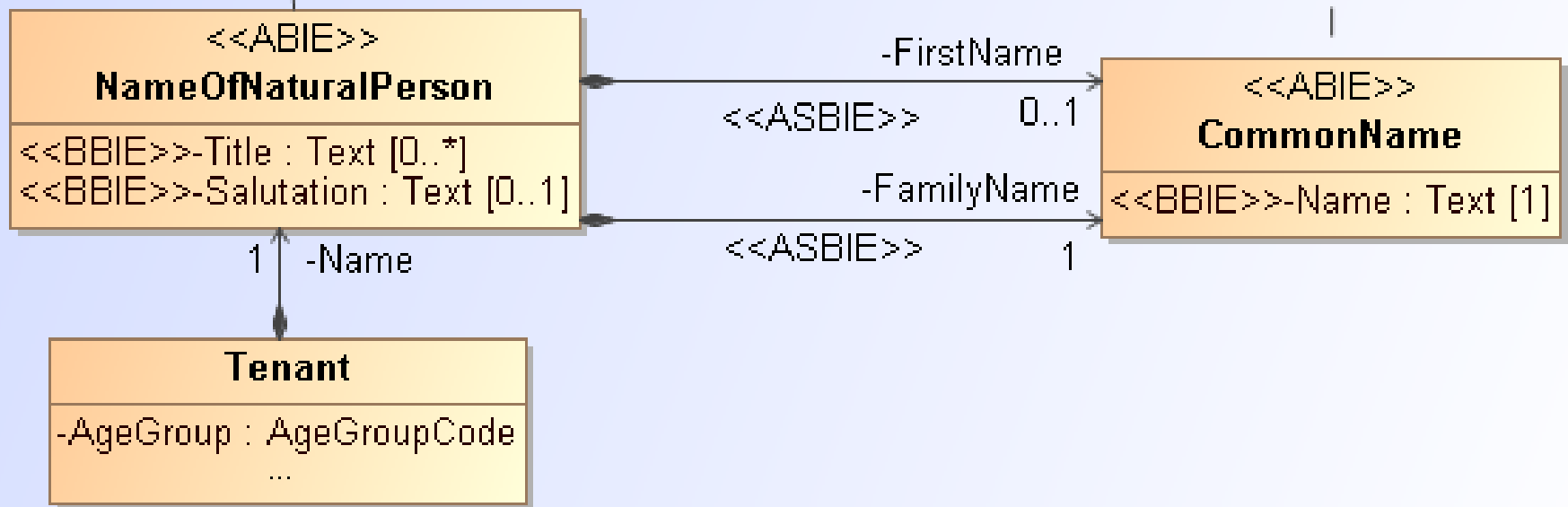
(developed together with a working group of domain experts)

<<CCLibrary>>  
**XOEV-CoreComponents/V1**

{baseURN = "www.deutschland-online.de/Standardisierung/Datenkonferenz/XOEV-Kernkomponenten/V1",  
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**XTenant (Example)**

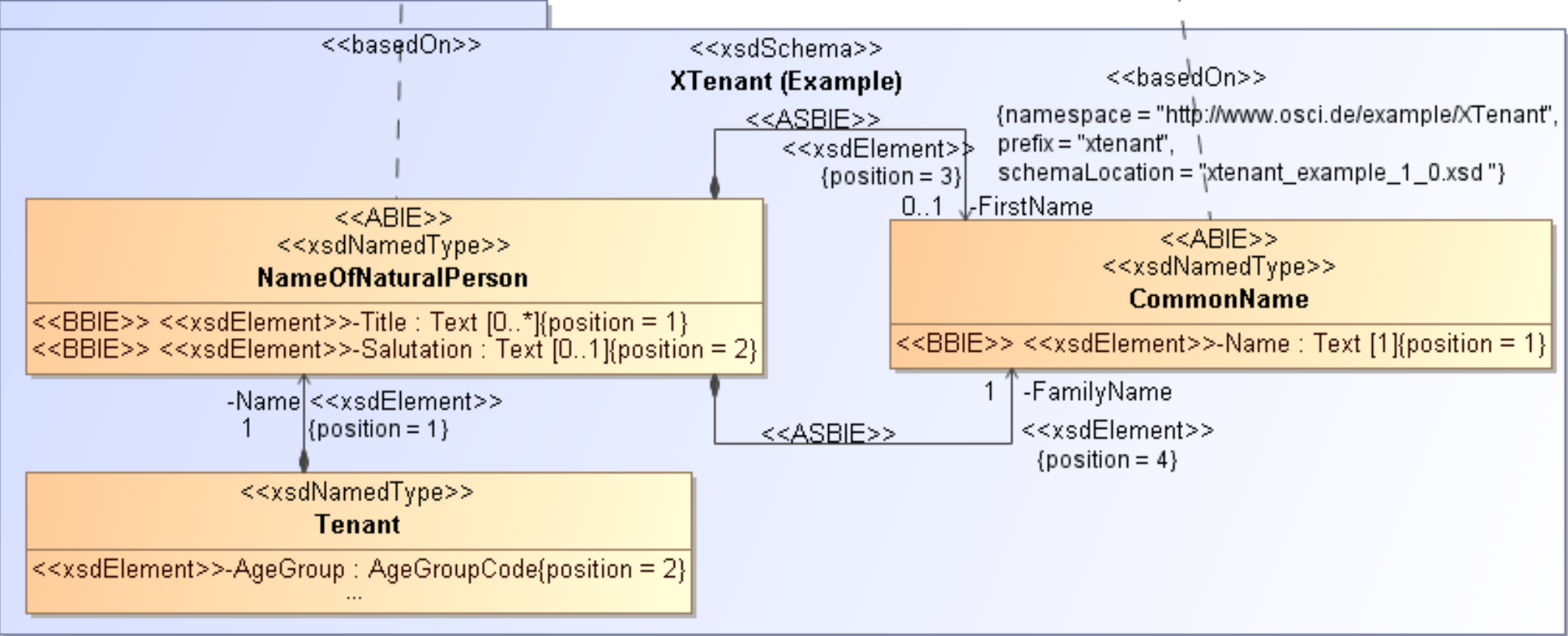
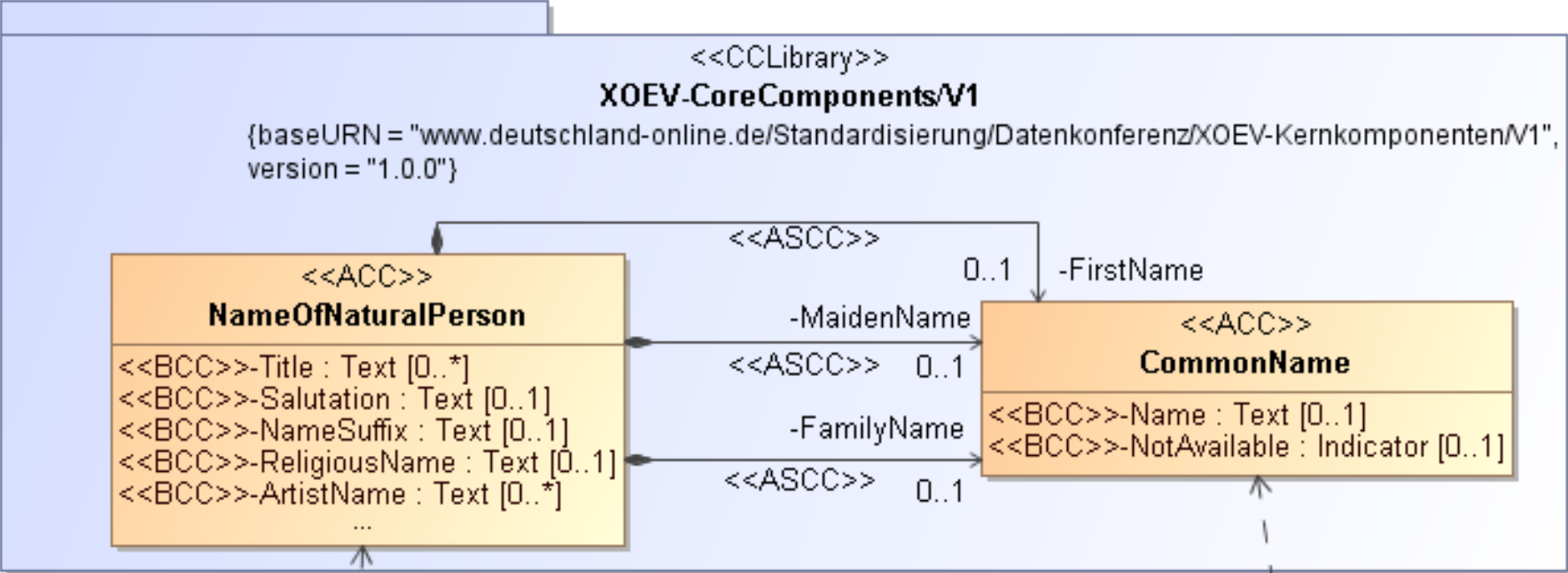


From PIM to PSM

-

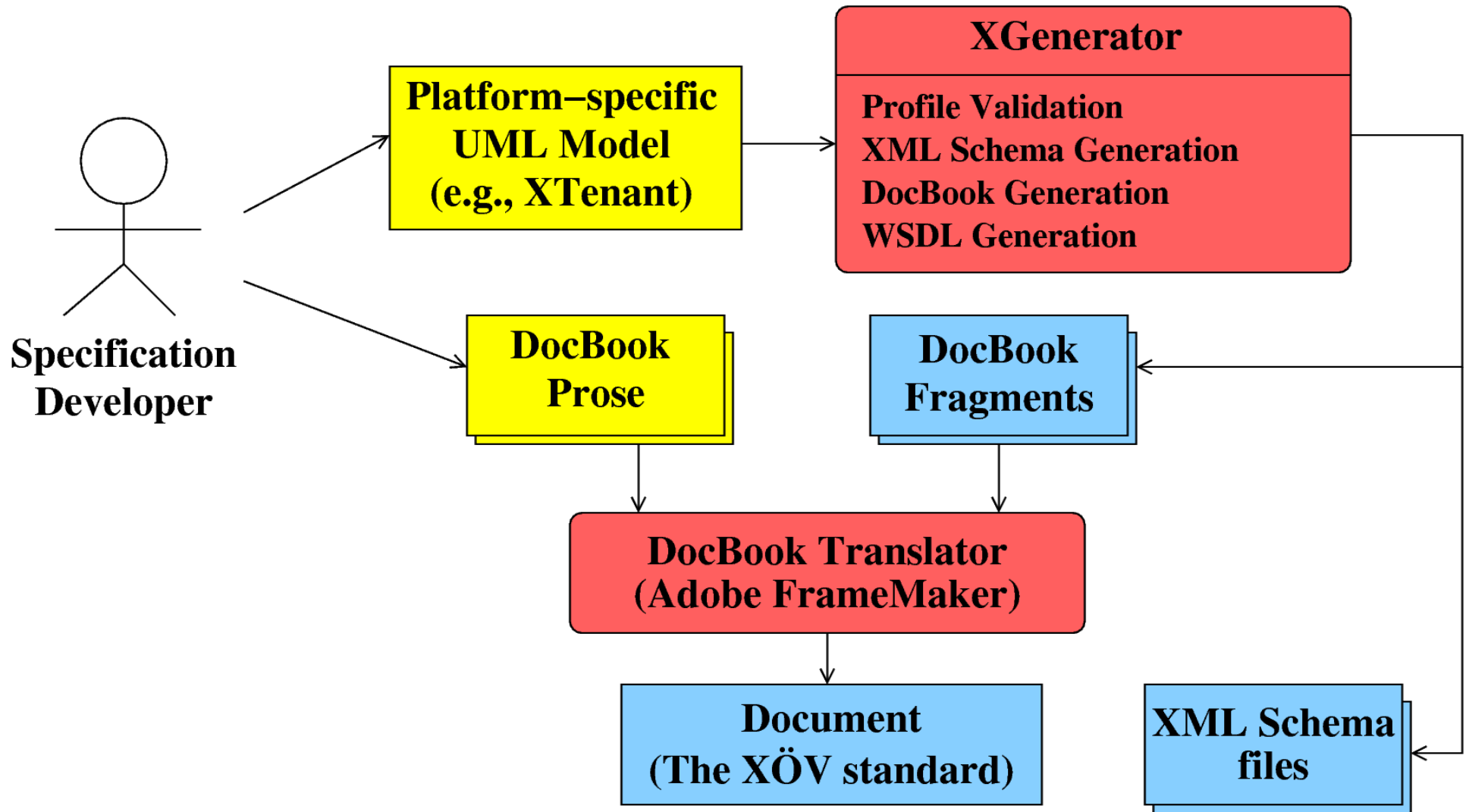
platform-specific annotations

(no need for domain knowledge for this part)



# Creating the deliverable standard

# The XÖV „production chain“



# Profile validation and model-to-text transformation in XGenerator

- XGenerator is configured with a set of OCL well-formedness rules and query operations over the UML meta-model
- Profile violations are reported together with the offending model elements
- A template language is provided to produce textual output (i.e., XML) based on the model. This approach is used to produce XSD, DocBook, and WSDL.
- The UML Specification Environment (USE) is employed as the OCL core of XGenerator.

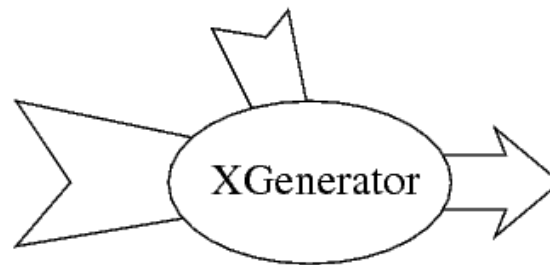
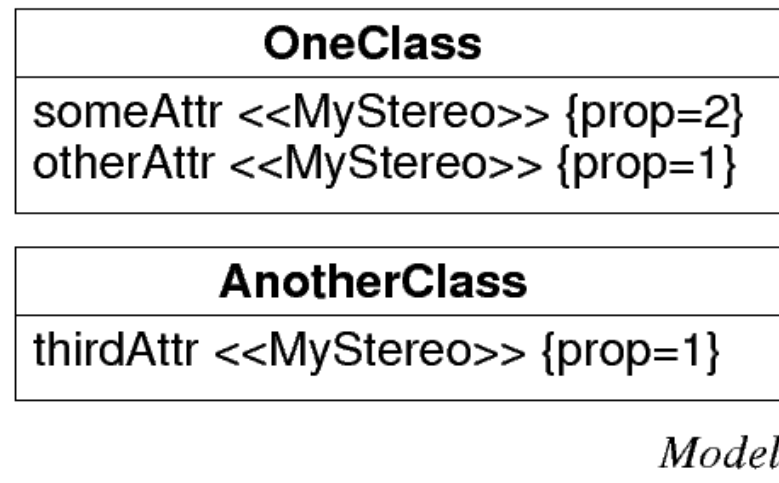
# Example of a well-formedness rule (taken from the CoreComponents profile)

```
<invariant context='Class' name='ABIE_OneOrMoreBBIE'>
<body>
  self.isABIE() implies
    self.realAttributes()->select(p | p.isBBIE())>size() >= 1
  and
    self.realAttributes()->select(p | not p.isBBIE())>size() = 0
</body>
<documentation>
  An ABIE must contain one or more attributes of stereotype BBIE.
  There must be no other attributes.
</documentation>
</invariant>
```

# Example of a transformation template (constructed)

```
#template.params("p : Package")
#foreach(c in p.hlpAllClasses()
class: $c.name
  #foreach(a in p.ownedAttribute
    ->sortedBy(extensionMyStereo.prop)
  property: $a.name
  #end
#end
```

*Template*



```
class: AnotherClass
  property: thirdAttr
class: OneClass
  property: otherAttr
  property: someAttr
```

*Result*

# Facts about both profiles and the templates

- At the time being, there are ~ 50 OCL well-formedness rules in both profiles
- The transformation templates for XSD and DocBook consist of ~1200 lines of template code plus
- additional operations of ~ 230 lines of OCL.
- The UML profiles are continuously being extended to increase modeling quality

# Open problems / outlook

- At the time being, almost all XÖV projects consequently use the production chain, but many projects still hesitate to employ existing core components.
- Make it easier! We need better tool integration.
- Develop better case tool support for profiled modeling (currently: a couple of plugins for MagicDraw UML)

Thanks for you attention!