National Technical University of Athens
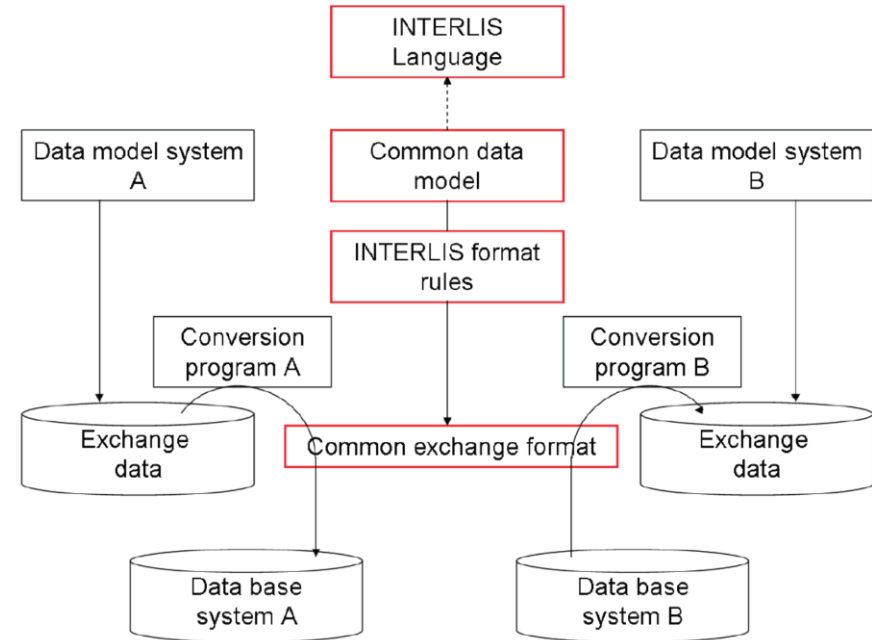
INTERLIS

- March 17, 2017
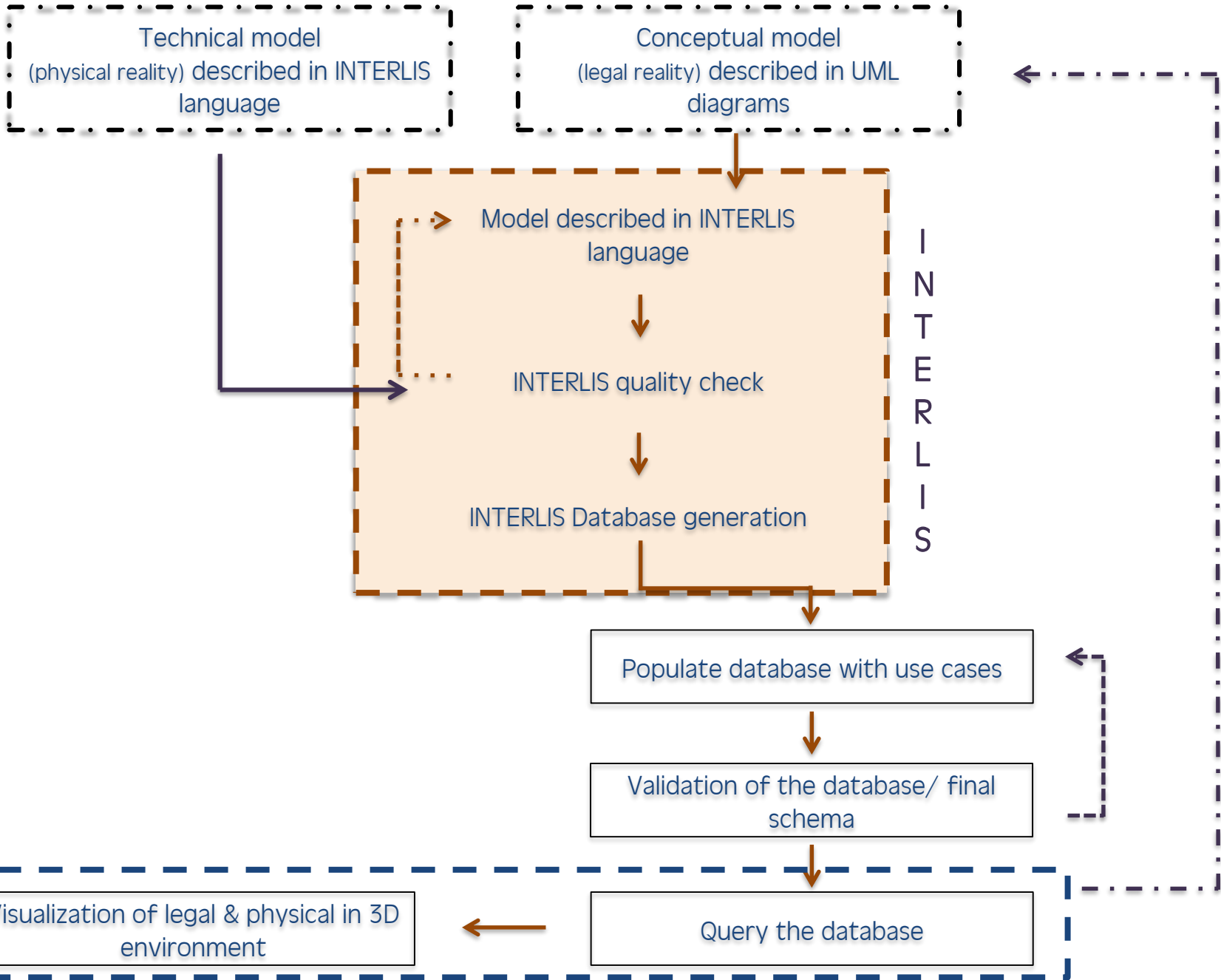
Delft, Delft University of Technology

◎ **National (Swiss) Standard**

◎ **C**onceptual **S**chema **L**anguage,

◎ **Object Relational** modeling language

◎ **Neutral Transfer Format** (XML - based),

◎ Formal **specification of constraints**,

◎ Automated **quality control** of the data,

◎ **Long-term** availability (archiving data)

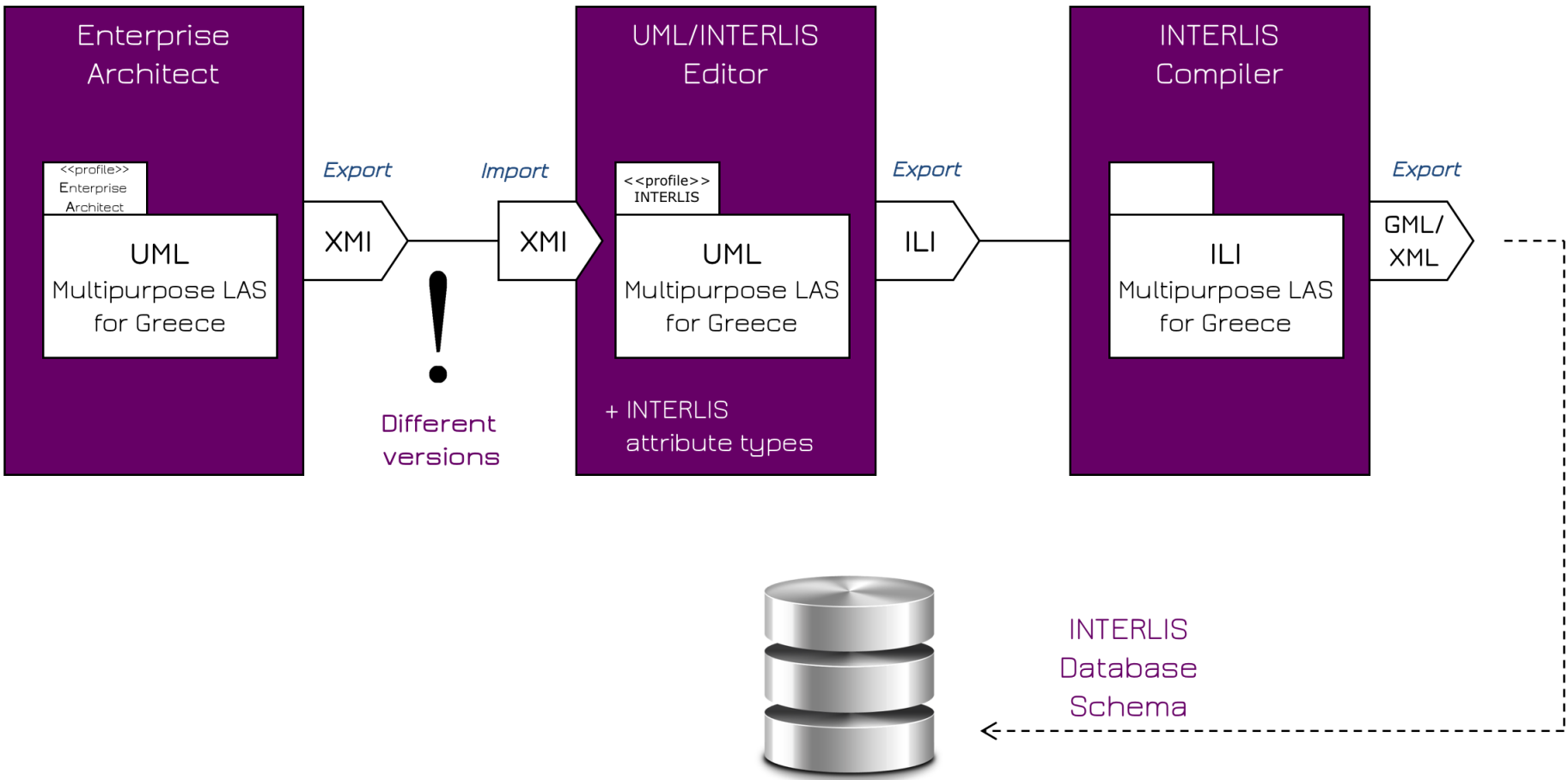◎ **Interoperability** between information systems

[Cogis, 2006]

IMPORT

ILI,
RATION
AL XMI

EXPORT

SVG,
JPEG, ILI,
WMS, XML
SCHEMA

Technical model
(physical reality) described in INTERLIS language

Conceptual model
(legal reality) described in UML diagrams

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Model described in INTERLIS language

INTERLIS quality check

INTERLIS Database generation

Populate database with use cases

Validation of the database/ final schema

Query the database

Visualization of legal & physical in 3D environment

Towards the development of a prototype

Interoperability Issues

Transformation on conceptual schema level

Conceptual model based on LADM in EA model

XMI

compatibility problem

Rational Rose XMI

INTERLIS

Solutions from the literature

Re-design the model in INTERLIS

Transfer format [IFC, CityGML, InfraGML]

INTERLIS Database schema [constraints supported]

Populate database with real data

Validation of the database/ final schema
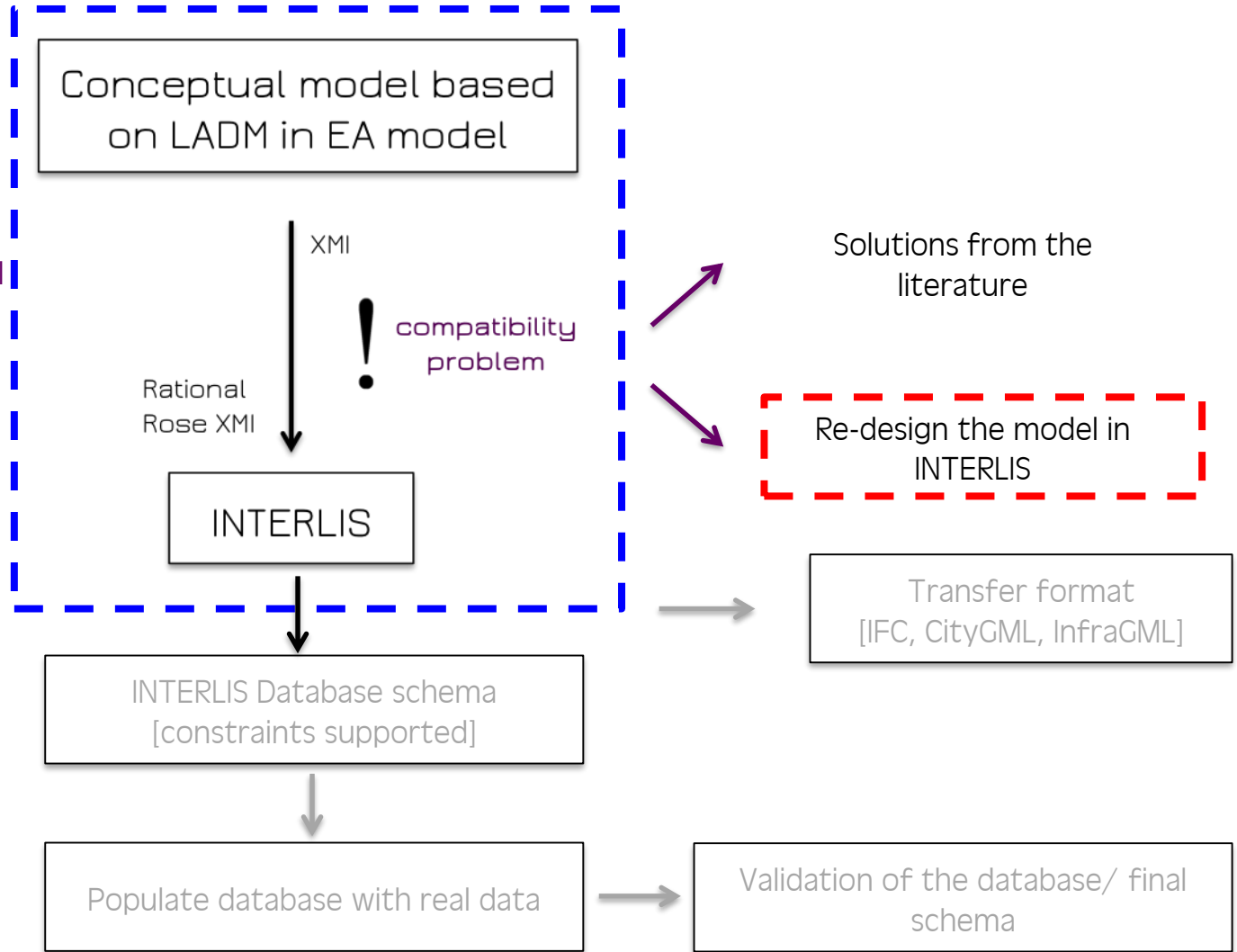
Already described **ISO models** from Swiss

Land Management Group

KEY challenges to describe

* Code lists – Enumeration types
* Constraints
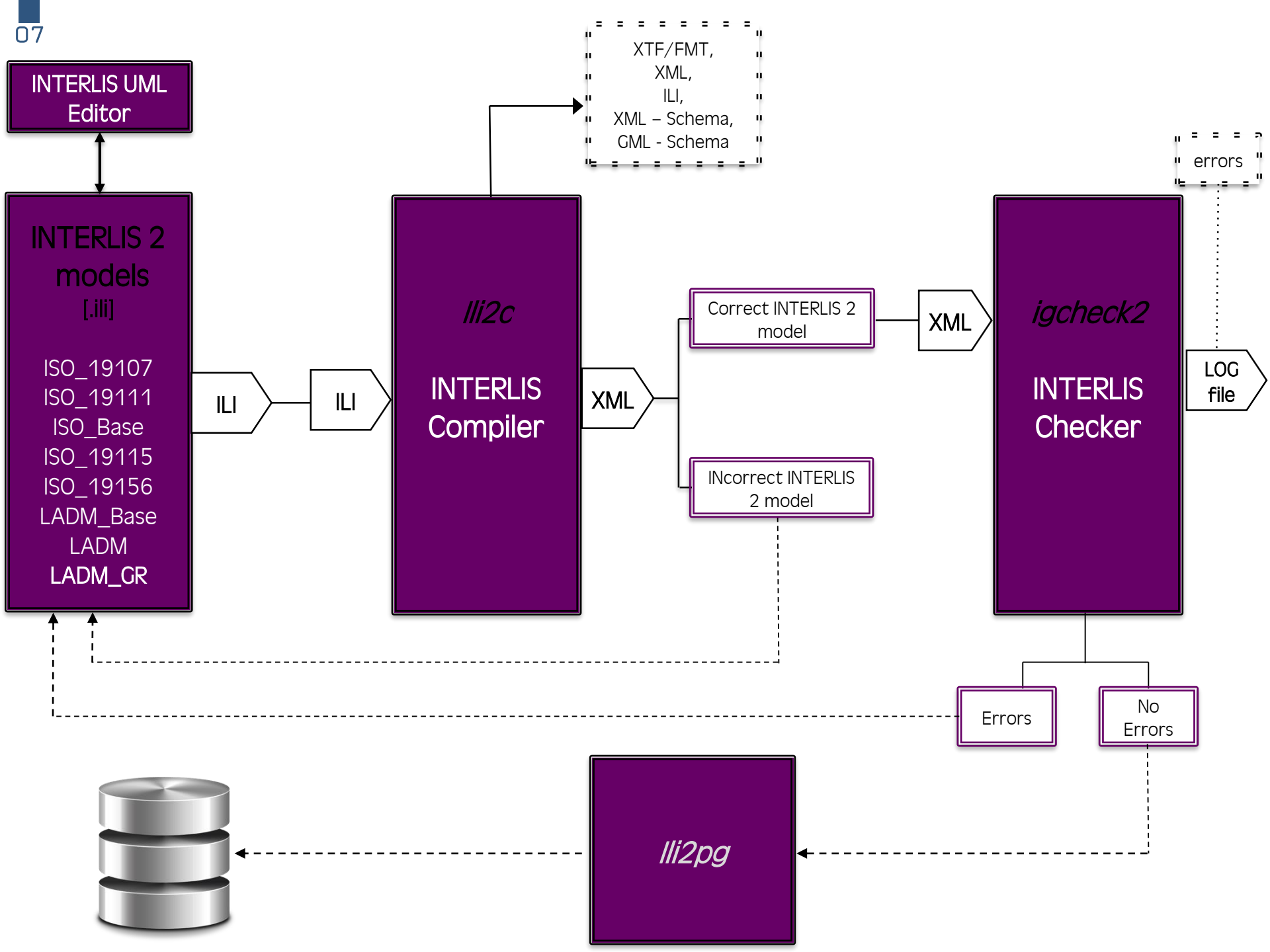* 3D data type
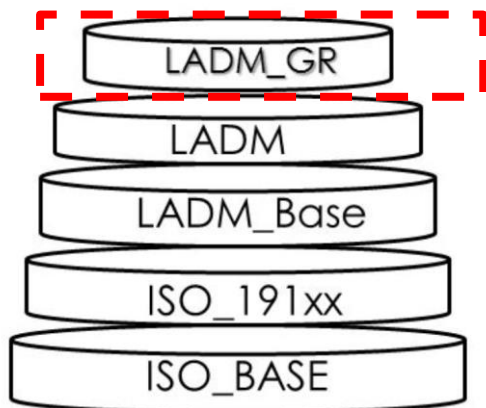
Neutral vendor format –

Explicit formulation of constraints
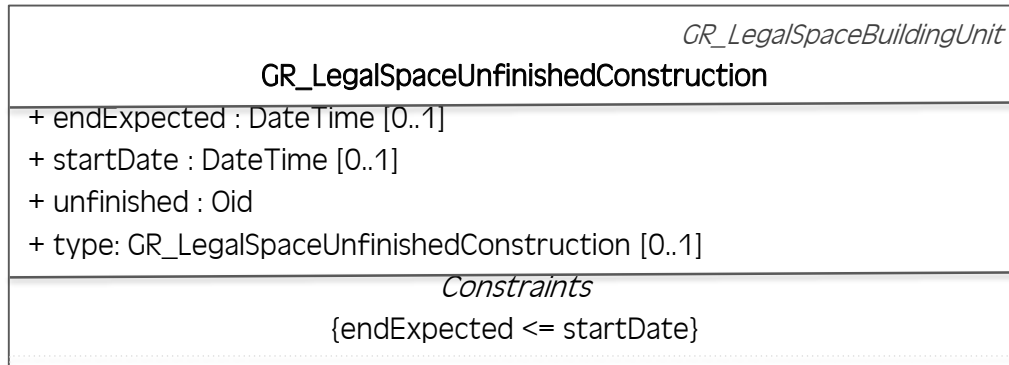
```
INTERLIS 2.3;

CONTRACTED MODEL LADM_GR (en)

AT "http://www.gdmc.nl/"
VERSION "2015-11-30" =

    IMPORTS UNQUALIFIED ISO_Base;
    IMPORTS UNQUALIFIED ISO19107;
    IMPORTS UNQUALIFIED ISO19111;
    IMPORTS UNQUALIFIED ISO19115;
    IMPORTS UNQUALIFIED ISO19156;
    IMPORTS UNQUALIFIED LADM_Base;
    IMPORTS UNQUALIFIED LADM;
```

INTERLIS UML Editor

INTERLIS 2 models
[.ili]

ISO_19107
ISO_19111
ISO_Base
ISO_19115
ISO_19156
LADM_Base
LADM
LADM_GR

ILI

ILI

lli2c

INTERLIS Compiler

XTF/FMT,
XML,
ILI,
XML – Schema,
GML - Schema

XML

Correct INTERLIS 2 model

XML

INcorrect INTERLIS 2 model

errors

igcheck2

INTERLIS Checker

LOG file

Errors

No Errors

lli2pg

UML – INTERLIS - Database

UML
Diagram

GR_LegalSpaceBuildingUnit

GR_LegalSpaceUnfinishedConstruction

+ endExpected : DateTime [0..1]

+ startDate : DateTime [0..1]

+ unfinished : Oid

+ type: GR_LegalSpaceUnfinishedConstruction [0..1]

Constraints

{endExpected <= startDate}

INTERLIS
language

CLASS GR_LegalSpaceUnfinishedConstruction **EXTENDS**
GR_LegalSpaceBuildingUnit =
   unfinishedID: **MANDATORY** Oid;
   type: **LIST** {0..1} **OF**
GR_LegalSpacedUnfinishedConstructionType;
   startDate: **MANDATORY** DateTime;
   endExpected: **MANDATORY** DateTime;
   MANDATORY CONSTRAINT
     endExpected <= startDate;
END GR_LegalSpaceUnfinishedConstruction;

Database
tables

GR_LegalSpaceUnfinishedConstruction		
unfinished_id	Integer	"pK"
Endexpected	DateTime	
startDate	DateTime	
type	Integer	"fK"

ID reference from
the code list table

Conclusions & Challenges

- ❑ <u>directly implementable LADM</u> model which speed up the technical implementation;
- ❑ <u>Compatibility</u> problems arise – faced;
- ❑ Formulate **Code lists** to achieve <u>semantically meaningful</u> concept (hierarchy);
- ❑ Formal specification of <u>constraints</u>.

- ◎ <u>INTEROPERABILITY:</u> definition of functions, constraints and rules to be applied at the data types and check their validation;
- ◎ creation of the mappings between the tools in order to recognize & check the proposed structures;

- ◎ quality checking both 2D &3D representations:
- (a) avoid gaps and overlapping between neighboring objects
- (b) validate that all the objects are closed

Thank you!!

FIG