1. INTERLIS 2 Reader/Writer for FME

The INTERLIS 2 reader and writer module (ili2fme) provides the Feature Manipulation Engine (FME) with access to INTERLIS 2 and INTERLIS 1 transfer files.

ili2fme is in stable state.

This documentation describes version 5.2.x of ili2fme. The current version of ili2fme can be found at http://www.eisenhutinformatik.ch/interlis/ili2fme/.

This chapter assumes you are familiar with FME and the INTERLIS 1 and 2 formats. For more information about FME, please read the FME documentation. For more information about INTERLIS, go to http://www.interlis.ch.

Please send comments about ili2fme to ce@eisenhutinformatik.ch.

1 Overview

Features read from an INTERLIS file consist of a series of attribute values. They may have no geometry. The attribute names are as defined in the INTERLIS model. The feature type of each INTERLIS feature is the qualified INTERLIS name (for INTERLIS 2: the qualified name of the class, for INTERLIS 1: the qualified name of the table). The mapping of the inheritance hierarchy is done with a super or sub-type strategy.

ili2fme supports the rich geometry model of FME.

ili2fme can read and write INTERLIS 1 and 2. However, in most cases you will need a FME script or workbench to write INTERLIS.

2 INTERLIS 2 Quick Facts

Format Type Identifier	ch.ehi.fme.Main
Long Format Name	Swiss INTERLIS (ili2fme)
Reader/Writer	Both
Dataset Type	File
Feature Type	Class name
Typical File Extensions	.xtf, .xml, .itf, .ili
Automated Translation Support	Automated reading
User-Defined Attributes	Yes
Coordinate System Support	No

Generic Color Support	No
Spatial Index	Never
Schema Required	Yes
Transaction Support	No
Geometry Type Attribute	xtf_geomtype

Geometry Support (classic geometry model)

Geometry	Supported	Geometry	Supported
aggregate	no	polygon	yes
circles	stroked	donut polygon	yes
circular arc	stroked	line	yes
elliptical arc	stroked	point	yes
ellipses	stroked	text	no
none	yes	3D	yes

Geometry Support (rich geometry model)

Geometry	Supported	Geometry	Supported
aggregate	no	polygon	yes
circles	stroked	donut polygon	yes
circular arc	yes	line	yes
elliptical arc	stroked	point	yes
ellipses	stroked	text	no
none	yes	3D	yes

3 Reading INTERLIS 1-Data

To read INTERLIS 1-data, the Model (.ili) must be known to FME.
It can be stored:

- in $(FME)\plugins\interlis2\ilimodels
- in a special model directory you specify
- in the same directory than your data

Then you can select an INTERLIS 1-datafile (.itf) and open it with FME (Viewer, Workbench, Universal Translator) and use it.

- All the enumerations from the ITFs will be converted to texts (values).
- If more than one geometry exists, the first geometry will be used as FME geometry, the other ones will be stored as Hex Well Known Binary in Attributes.

4 Reading INTERLIS 2-Data

Reading INTERLIS 2-data is essentially the same than reading INTERLIS 1-data with the following differences:

- The data comes in XTF-files (and not ITF-files)
- If your data models contain EXTENDS, FME will show all the data in a single "superstructure" – feature type. You will have to use an AttributeFilter on XTF_CLASS to separate the different classes in Workbench. Since ili2fme-4.4.0, the data model may also be imported with a "subclass"-strategy rather than a “superclass”-strategy. When "subclass" is chosen, a feature type is created for each concrete extended class, whereas one feature type is created per parent class when "superclass" is chosen.

5 Writing INTERLIS 1-Data

To write INTERLIS 1-data, the process is the following
Prerequisites: the INTERLIS model (.ili) has to exist before!

- Set up a Workbench
- Define an "Swiss INTERLIS (ili2fme)” destination dataset
- Import the feature type definitions from your ILI-model (Destination Data -> Import FeatureTypes -> Browse to your ILI-file)
- Define a transfer identification for each feature, by setting the format attribute "xtf_id" (e.g. generate it with a counter or map a format attribute like OBJECTID / FID or similar)
- Route your features to the destination feature types (connect the arrows)
- GO!

Please note, that:

- If the “xtf_class” format attribute is set, its value supersedes the name of the feature type. This may lead to unexpected results if your features come from an INTERLIS dataset, and “xtf_class” is still set (to the source class instead of the target class).

6 Writing INTERLIS 2-Data

To write out INTERLIS 2-data, you will have to follow these steps in addition to the ones explained for INTERLIS 1:

- Create one feature of feature type “XTF_BASKETS” for each TOPIC (With a Creator / NullGeometryCreator + AttributeCreator)
- Reference this basket in each feature type of the topic, by setting the format attribute "xtf_basket" (e.g. by attaching a constant).
- Write all herited classes to a "superstructure" feature type. (or choose a subclass-strategy)
- Define the qualified INTERLIS class name of each class, by setting the format attribute "xtf_class" in each feature type

Please note, that:

- “XTF_BASKETS” features must be created by hand in a common transformation with an INTERLIS 2 writer.
- “xtf_basket” format attributes must be set by hand in a common transformation with an INTERLIS 2 writer.
- “xtf_id” format attributes must be set/mapped in a common transformation with an INTERLIS 2 writer.

- You always need to provide fully qualified class names of the target INTERLIS model. For example, the correct parameter might be: "Fallbeispiel.Raumplanung.Bauzone".
- If the “xtf_class” format attribute is set, its value supersedes the name of the feature type. This may lead to unexpected results if your features come from an INTERLIS dataset, and “xtf_class” is still set (to the source class instead of the target class).

7 Writing GML-Data

Starting with version 5.0.0 ili2fme is able to write GML, according to the ILIGML specification. To write out GML, just follow the steps explained for INTERLIS 2, but select a file to write with extension ".gml".

8 Reading and writing INTERLIS

When you read and write INTERLIS data, read the sections on reading and writing. In addition, you always (even if writing INTERLIS 1) have to

- set the xtf_class format attribute on every destination feature type to the qualified INTERLIS class name (use an AttributeCreator transformer)!

9 Reader Reference

FME considers an INTERLIS transfer file to be a collection of features. The feature types are determined by scanning the transfer file and then reading the appropriate INTERLIS model/schema files. The model files have the extension .ili and should be located in the same folder as the transfer file and/or in the folder ${FME}/plugins/interlis2/ilimodels. A transfer file may need multiple model files. There are no DEF lines required.

9.1 Reader Keywords

The following table lists the keywords processed by the INTERLIS reader. The table shows only the suffixes prefixed by the current <ReaderKeyword> in a mapping file.

Keyword Suffix	*Value*
MODELS	Required INTERLIS-models to read the dataset (the model name, not the .ili-filename; separated by semicolons ‘;’). Or the special value %DATA, in which case the models are determined by inspecting the transfer file. Default Value: %DATA
MODEL_DIR	Folder or (remote) model repositories containing the .ili-files. These files are scanned for INTERLIS-models. You may use %XTF_DIR as placeholder for the directory of the data file that you will read. Multiple directories/repositories may be separated by semicolons ‘;’. Default Value: unset/empty
GEOMETRY_ENCODING	This keyword defines the encoding of geometry attributes, which are not used as FME geometry (Only the first geometry

	attribute becomes a FME geometry). • FMEXML encodes as FME XML • FMEBIN encodes as FME Binary • FMEHEXBIN encodes as FME Hex Binary • OGCHEXBIN encodes as OGC Hex Binary Default Value: OGCHEXBIN
CHECK_UNIQUEOID	This keyword defines the checking of TIDs/OIDs. If set to True, ili2fme will check if TIDs/OIDs are unique. If set to False, ili2fme will by-pass this check. Default Value: True
CREATE_LINETABLES	This keyword applies only to INTERLIS 1 datasets with INTERLIS AREA or INTERLIS SURFACE attributes. If set to True, ili2fme will create two additional feature types for each INTERLIS SURFACE or AREA attribute. One with the ending "_MT" containing the main table data as it appears in the transfer-file. The other additional feature type with the ending "_LT" containing the line helper table as it appears in the transfer-file. If set to False, ili2fme will create no additional tables. Default Value: False
SKIP_POLYGONBUILDING	This keyword applies only to INTERLIS 1 datasets with INTERLIS AREA or INTERLIS SURFACE attributes. If set to True, ili2fme will not build polygons from the line tables as they appear in the transfer-file. If set to False, ili2fme will build polygons from the line tables and the (geo)-references as they appear in the transfer-file. Default Value: False
ILI1_ADDDEFVAL	This keyword applies only to INTERLIS 1 datasets. If set to True, ili2fme will parse the explanation at the end of attribute definitions that are optional. If there is no attribute value in the data, ili2fme will add the one given in the model. The syntax rule is: `'//' 'undefiniert' '=' Constant | 'letztes' 'Zeichen' '//'.` If the value in the model is `'letztes' 'Zeichen'` ili2fme will follow the first

	reference attribute of this table, and use the length of the value of the first text attribute in the target table. If set to False, ili2fme will not supply any default values to the data. OPEN: Example Default Value: False
ILI1_ENUMASITFCODE	This keyword applies only to INTERLIS 1 datasets. If set to True, ili2fme will read values of attributes of type enumeration as numeric code (the same code as it appears in the transfer file). This option is not recommended and exists only for backward compatibility reasons. If set to False, ili2fme will map the code from the transfer file to enumeration element name (the value as it would appear in an INTERLIS 2 transfer file). This option is recommended because it is less error prone and offers compatibility between INTERLIS 1 and 2. Default Value: False
ILI1_RENUMBERTID	This keyword applies only to INTERLIS 1 datasets. If set to True, ili2fme will renumber the objects, so that the TID becomes unique across the whole transfer. If set to False, ili2fme will read the TIDs unchanged. Default Value: False
INHERITANCE_MAPPING	This keyword applies only to INTERLIS 2 datasets. If set to “SuperClass” the superclass inheritance mapping strategy is applied. If set to “SubClass” the subclass inheritance mapping strategy is applied. See the section titled “Inheritance mapping strategy” below for an explanation of the different strategies. Default Value: “SuperClass”
ILI1_CONVERTAREA	This keyword applies only to INTERLIS 1 datasets and if SKIP_POLYGONBUILDING is set to False. The name of a FME pipeline definition file (.fmi), to be used to build the FME polygons from the line helper table features of INTERLIS AREA attributes and main table features as read from the ITF file. ili2fme will set the following macros: • $(lineTableName) name of FME

	• $(mainTableName) name of main FME feature type on input (point) and output (polygon/donut) • $(maxOverlaps) max overlaps as defined by datatype of attribute in INTERLIS model The features that come out of the pipeline should have $(mainTableName) as feature type and polygon or donut as geometry. If the filename is relative, the file is looked after in the folder of the workbench first, and then in $(FME)/plugins/interlis2/converter If the value is not set, ili2fme will use a built-in pipeline. Default Value: unset/empty
ILI1_CONVERTSURFACE	This keyword applies only to INTERLIS 1 datasets and if SKIP_POLYGONBUILDING is set to False. The name of a FME pipeline definition file (.fmi), to be used to build the FME polygons from the line helper table features of INTERLIS SURFACE attributes and from the main table features as read from the ITF file. ili2fme will set the following macros: • $(lineTableName) name of FME feature type with polylines on input • $(mainTableName) name of main FME feature type on input (point) and output (polygon/donut) • $(mainTableRef) name of reference attribute in feature type $(lineTableName) • $(maxOverlaps) max overlaps as defined by datatype of attribute in INTERLIS model The features that come out of the pipeline should have $(mainTableName) as feature type and polygon or donut as geometry. If the filename is relative, the file is looked after in the folder of the workbench first and then in $(FME)/plugins/interlis2/converter If the value is not set, ili2fme will use a built-in pipeline. Default Value: unset/empty
CREATEFEATURETYPE4ENUM	This keyword is used to control how ili2fme creates FME feature types for INTERLIS enumerations: If set to "No", ili2fme will create no feature types for enumerations. If set to "SingleType", ili2fme will create on

	single additional feature type "XTF_ENUMS" and provide each element of all enumeration types as a feature of this feature type. If set to "OneTypePerEnumDef", ili2fme will create one feature type for each enumeration type. This option is useful to setup a ValueMapper factory in the FME workbench. Default Value: No
TRACEMSGS	This setting controls the level of detail of log messages written by ili2fme. If set to True, ili2fme will write detailed progress messages to the log. If set to False, ili2fme will only write normal progress messages to the log. Default Value: False

10 Writer Reference

The INTERLIS writer module stores features into an INTERLIS transfer file. The required models are determined by scanning the features and then reading the appropriate INTERLIS model/schema files. The model files have the extension .ili and should be located in the same folder as the transfer file and/or in the folder ${FME}/plugins/interlis2/ilimodels. A transfer file may need multiple model files. There are no DEF lines required.

The appropriate feature types are expected by the writer, as if the same model would have been read by the INTERLIS 2 reader.

This version of the Writer requires that the INTERLIS model already exists. The model can not be generated by the Writer. Therefore, in most cases you will need a FME script or workbench to prepare the expected feature types.

10.1 Writer Keywords

The following table lists the keywords processed by the INTERLIS 2 writer. The table shows only the suffixes which will be prefixed by the current `<WriterKeyword>` in a mapping file.

Keyword Suffix	*Value*
MODELS	Required INTERLIS-models to write the dataset (the model name, not the .ili-filename; separated by semicolons ';'). Or the special value %DATA, in which case the models are determined by inspecting the FME features. Default Value: %DATA
MODEL_DIR	Folder or (remote) model repositories containing the .ili-Files. These files are scanned for INTERLIS-Models. You may use %XTF_DIR as placeholder for

	the directory of the data file that you will write. Multiple directories/repositories may be separated by semicolons ';'. Default Value: unset/empty
CHECK_UNIQUEOID	This keyword defines the checking of TIDs/OIDs. If set to True, ili2fme will check if TIDs/OIDs are unique. If set to False, ili2fme will by-pass this check. Default Value: True
GEOMETRY_ENCODING	This keyword defines the encoding of geometry attributes, which are not used as FME geometry (Only the first geometry attribute becomes a FME geometry). • FMEXML encodes as FME XML • FMEBIN encodes as FME Binary • FMEHEXBIN encodes as FME Hex Binary • OGCHEXBIN encodes as OGC Hex Binary Default Value: OGCHEXBIN
INHERITANCE_MAPPING	This keyword applies only to INTERLIS 2 datasets. If set to "SuperClass" the superclass inheritance mapping strategy is applied. If set to "SubClass" the subclass inheritance mapping strategy is applied. See the section titled "Inheritance mapping strategy" below for an explanation of the different strategies. Default Value: "SuperClass"
USE_LINETABLES	This keyword applies only to INTERLIS 1 datasets with INTERLIS AREA or INTERLIS SURFACE attributes. If set to True, ili2fme will expect one additional feature type for each INTERLIS SURFACE or AREA attribute. The additional feature type with the ending "_$(attributeName)" contains the line helper features as they should appear in the transfer-file. If set to False, ili2fme will create the line helper table out of the polygons/donuts. Default Value: False
TRACEMSGS	This setting controls the level of detail of log messages written by ili2fme. If set to True, ili2fme will write detailed progress messages to the log. If set to False, ili2fme will only write normal progress messages to the log.

	Default Value: False

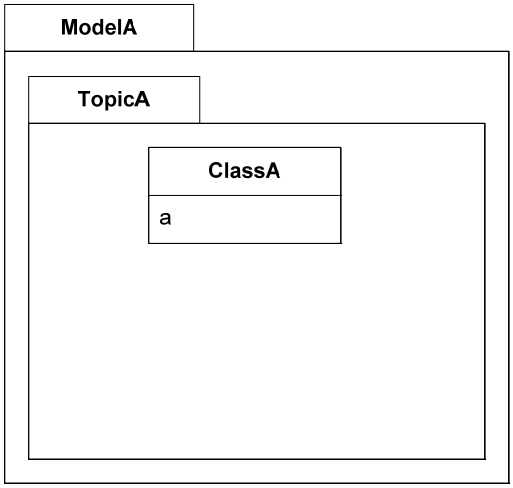
11 Feature Representation

The following clauses describe how ili2fme maps INTERLIS objects to FME features. Features written to the INTERLIS transfer file are expected to have the same structure, as they would have had when read.

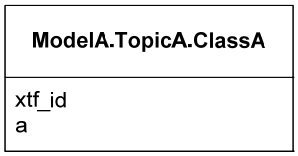
11.1 Overview

11.1.1 INTERLIS 1

INTERLIS allows for some nesting of type definitions. A class or table is defined in a topic. Several topics are grouped to a model. FME doesn't allow such a nesting. Therefore ili2fme maps INTERLIS class with their qualified name to FME feature types.



INTERLIS model

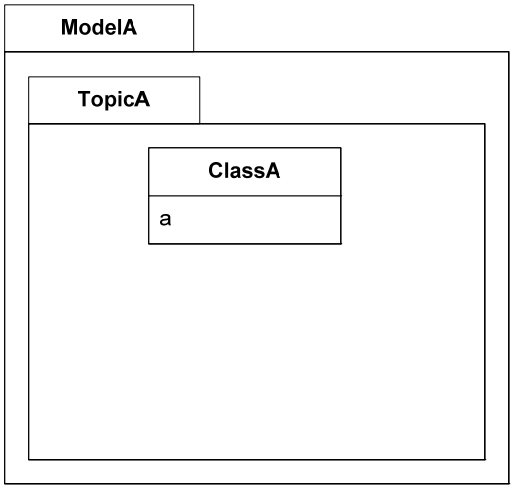


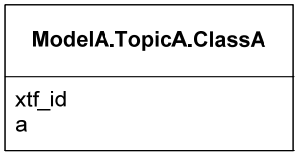
FME feature schema

Each FME feature type has a format attribute "xtf_id" that is the transfer identification of that feature in the ITF file.

11.1.2 INTERLIS 2 full transfer mode

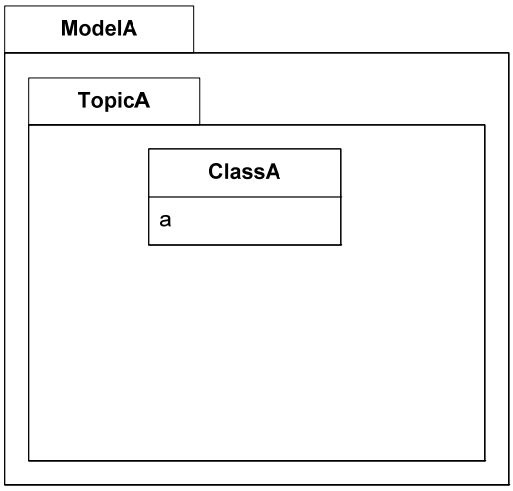
For INTERLIS 2 the mapping is the same as for INTERLIS 1, but only if there are no extended topics in the INTERLIS model and there is only one basket per topic in the transfer file.

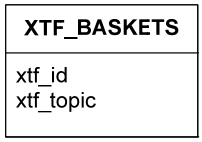


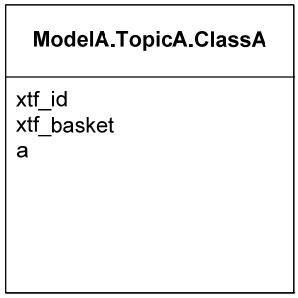


INTERLIS model **FME feature schema**

If an INTERLIS 2 data file has multiple baskets (instances of a topic; set of objects) of the same topic or the model has extended topics, additional format attributes are required.





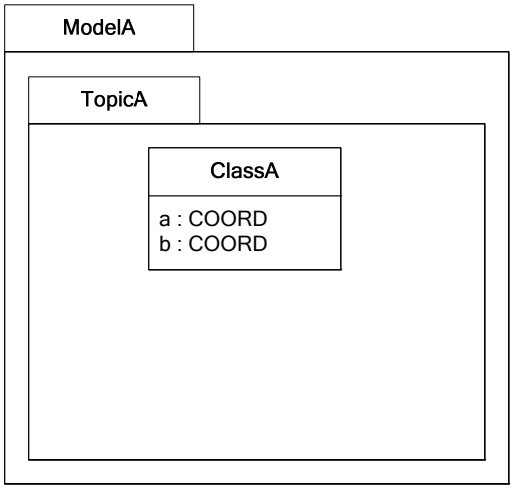


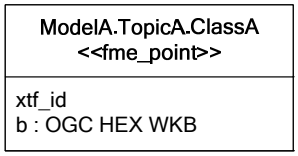
INTERLIS model **FME feature schema**

To know which feature belongs to which basket, each feature has a reference to the basket in the format attribute “xtf_basket”. Each basket is represented as an instance of the format feature type “XTF_BASKETS”. The attribute “xtf_topic” holds the qualified topic name that describes this basket (in this case that would be “ModelA.TopicA”). The attribute “xtf_id” of the feature type “XTF_BASKETS” is the transfer identification of the basket.

11.2 Multiple geometries per class

An INTERLIS class may define multiple attributes of type geometry.





INTERLIS model

FME feature schema

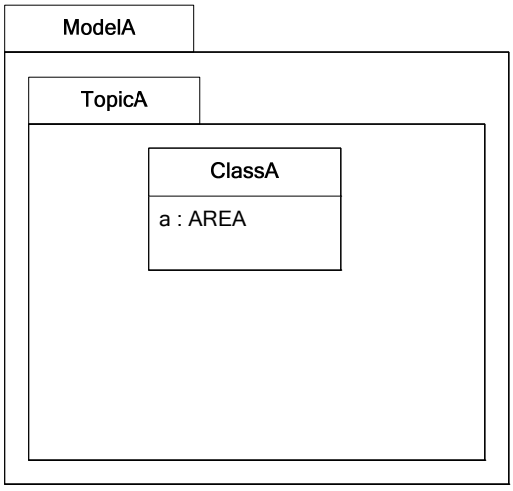
ili2fme maps the first geometry of the INTERLIS class to the FME geometry of the feature. Any additional INTERLIS geometry attributes are mapped to ordinary FME attributes. The value of these attribute (in this case the attribute “b”) is HEX encoded OGC WKB (this can be changed with the parameter GEOMETRY_ENCODING) and can be extracted from that attribute to the feature geometry with the transformer “GeometryReplacer” or set with “GeometryExtractor”.

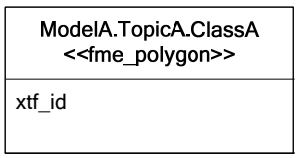
11.3 INTERLIS 1 AREA

INTERLIS 1 encodes attributes of type AREA in helper table prior to the main table. ili2fme can read these attributes in three modes:

- build polygons/donuts automatically from the line table
- read the main table and the line table as they are in the transfer file
- combination of the two cases above

With automatic polygon building the mapping is as follows

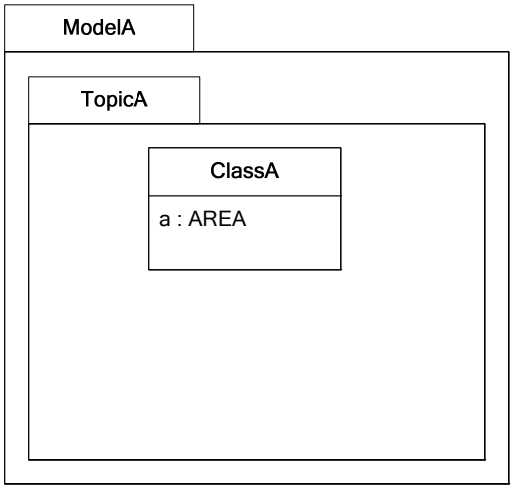


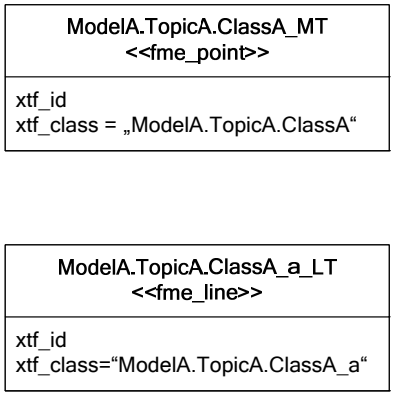


INTERLIS model

FME feature schema

With automatic polygon build disabled, the mapping is as follows





INTERLIS model

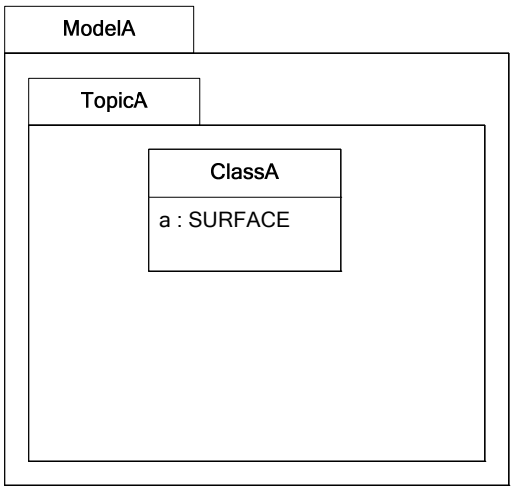
FME feature schema

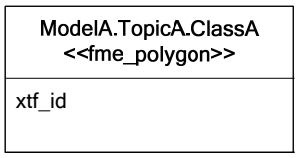
11.4 INTERLIS 1 SURFACE

INTERLIS 1 encodes attributes of type SURFACE in helper table following the main table. ili2fme can read these attributes in three modes:

- build polygons/donuts automatically from the line table
- read the main table and the line table as they are in the transfer file
- combination of the two cases above

With automatic polygon building the mapping is as follows

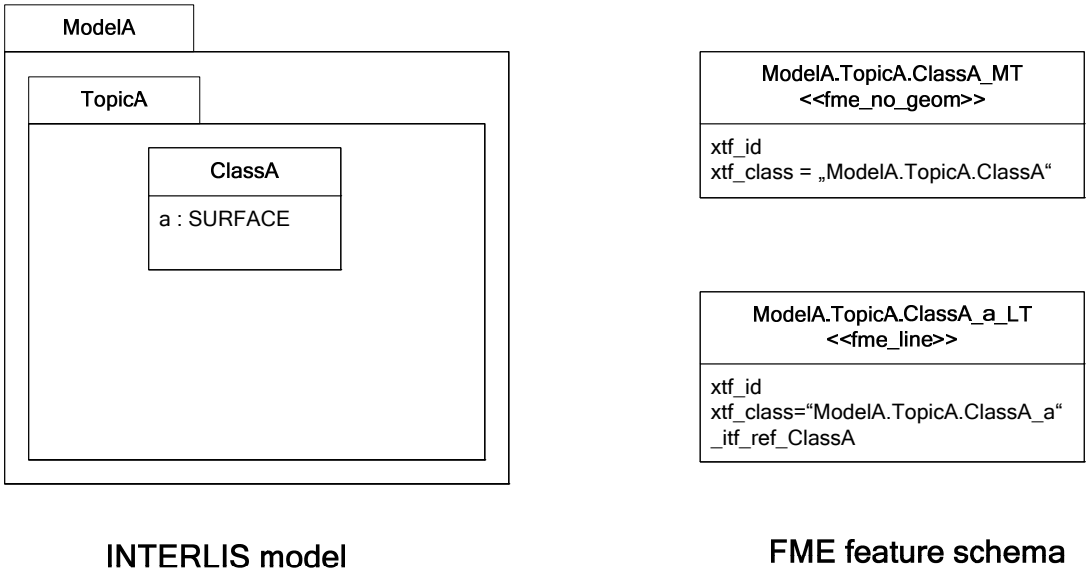




INTERLIS model

FME feature schema

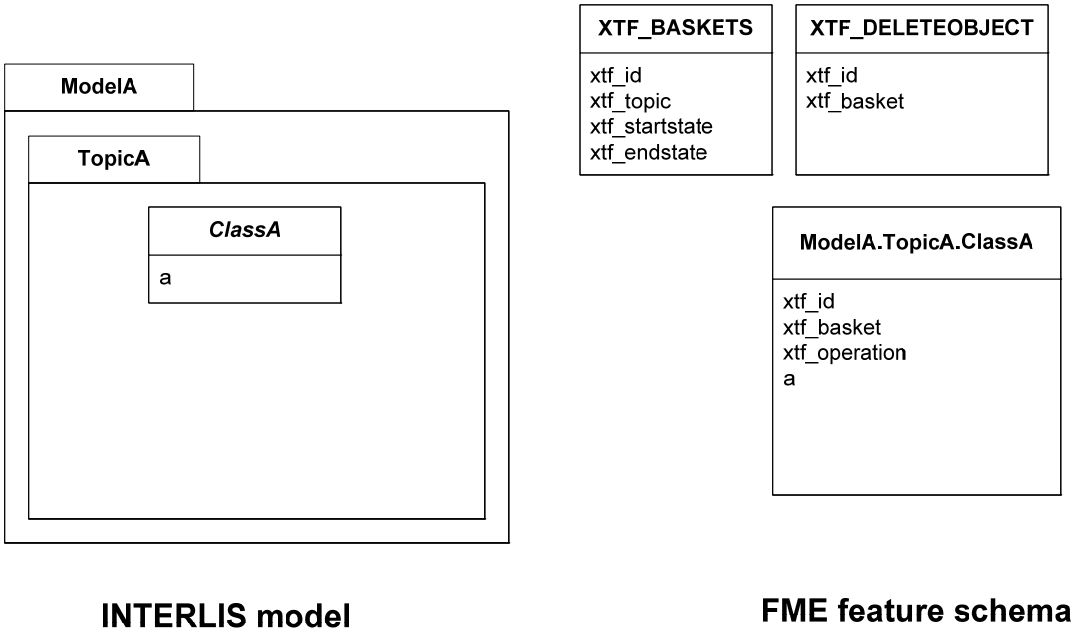
With automatic polygon build disabled, the mapping is as follows



The line table (“ModelA.TopicA.ClassA_a_LT”) gets an additional attribute (with the name of the main class; in this case “_itf_ref_ClassA”) that is a reference from the lines to the feature in the main table (“ModelA.TopicA.ClassA_MT”)

11.5 INTERLIS 2 incremental transfer

INTERLIS 2 supports incremental transfers (change only transfers). Incremental transfer happens per basket. There are two kind of incremental transfers: INITIAL and UPDATE. INITIAL ist the first transfer in a serie of transfers. It includes all objects. UPDATE is used for all succeeding transfers follwing INITIAL and includes only changed objects since the last transfer. Both kinds require additional format attributes.



For an INITIAL data transfer, the XTF_BASKETS feature that represents the basket has a value in the “xtf_endstate” attribute. The “xtf_startstate” attribute should not be set. There are no “XTF_DELETEOBJECT” features. The “xtf_operation” attribute should not be set.

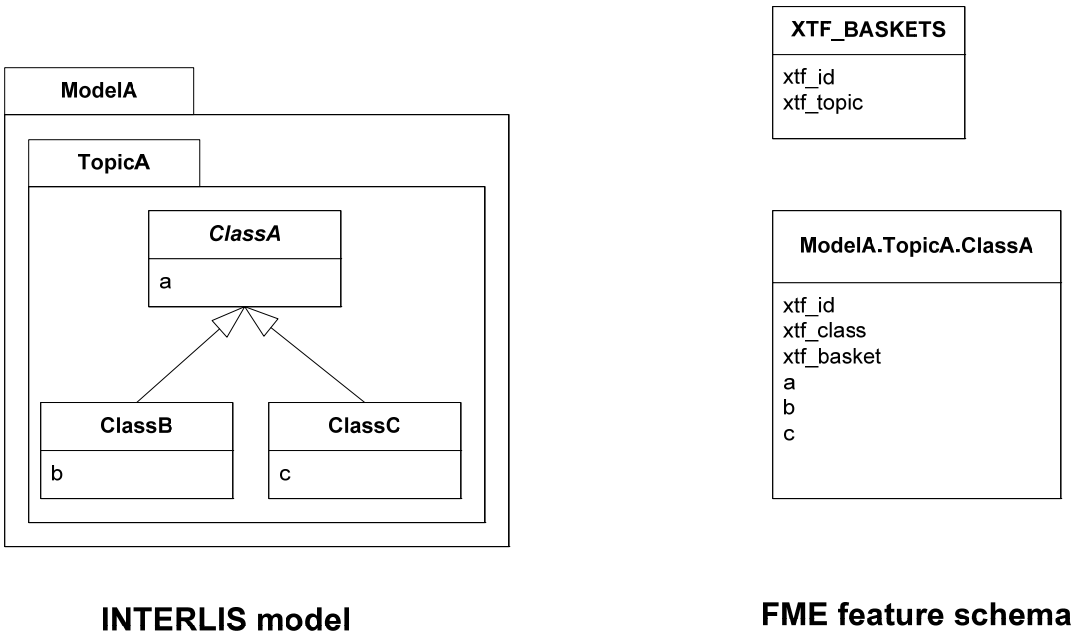
For an UPDATE data transfer, the XTF_BASKETS feature that represents the basket has a value in the “xtf_startstate” and the “xtf_endstate” attribute. The “xtf_startstate” value is the same as the “xtf_endstate” of the last transfer of that basket. The “xtf_operation” attribute should be set to “INSERT”, “UPDATE” or “DELETE”. Instead of mapping deleted objects to ordinary features with “xtf_operation” set to “DELETE”, they may alternatively be mapped to instances of the format feature type “XTF_DELETEOBJECT” (without any INTERLIS attribute values; just “xtf_id” and “xtf_basket”).

11.6 Inheritance mapping strategy

ili2fme supports to inheritance mapping strategies. Depending on you INTERLIS model, one or the other is appropriate.

11.6.1 Superclass strategy

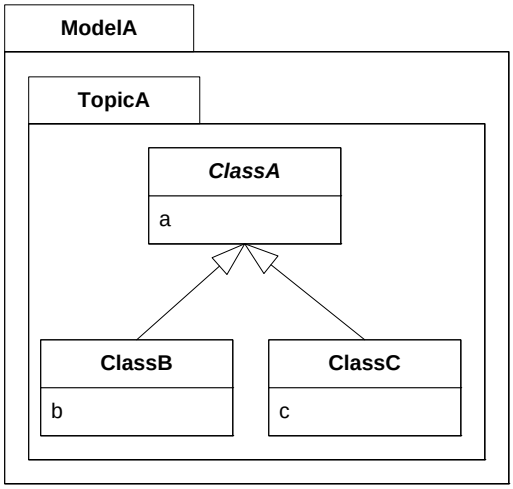
Attributes of non-root classes are shifted to the root, as illustrated by the following figure:

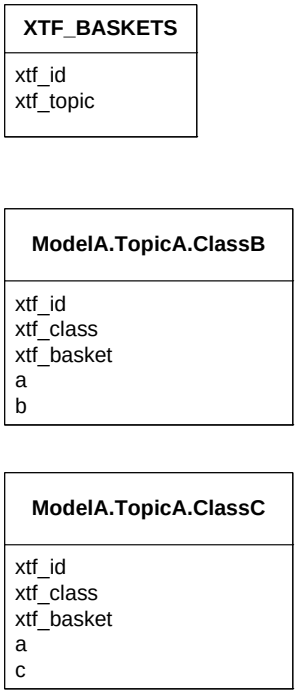


The format attribute „xtf_class“ may be used to determine if a feature is an instance of class „ModelA.TopicA.ClassB“ or class „ModelA.TopicA.ClassC“.

11.6.2 Subclass strategy

Attributes of base classes are shifted to leafs, as illustrated by the following figure:





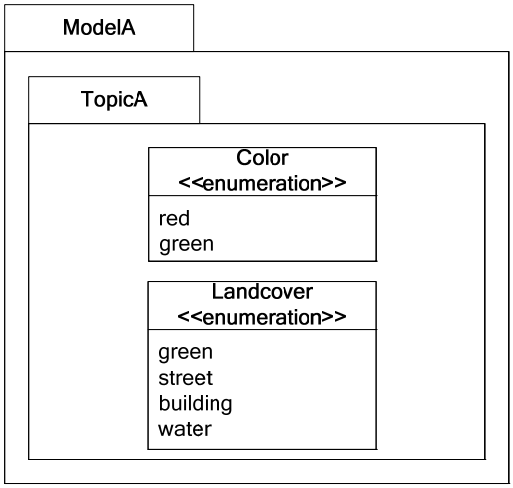
INTERLIS model **FME feature schema**

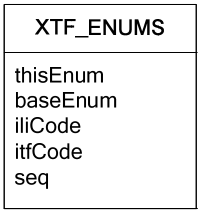
There is no feature type “ModelA.TopicA.ClassA” because it’s an abstract class in the INTERLIS model.

11.7 Enumerations

There are two modes to read enumerations:
"SingleType" will read all elements of all enumerations with the same FME feature type XTF_ENUMS.
"OneTypePerEnumDef" will create one FME feature type for each enumeration type.

11.7.1 Enumerations as one single feature type





INTERLIS model

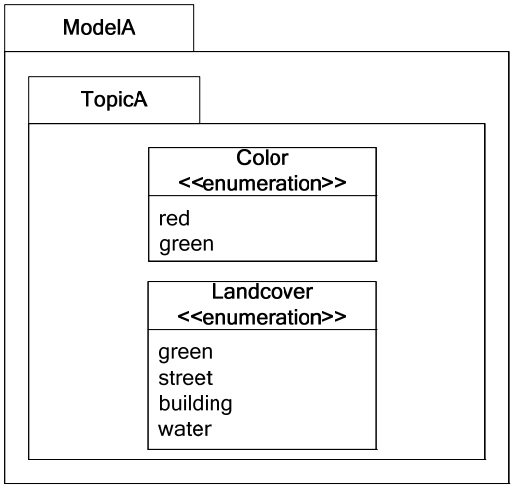
FME feature schema

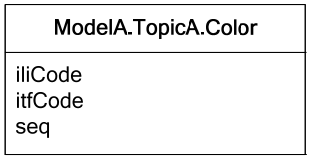
For the feature type "XTF_ENUMS", the following features will be read:

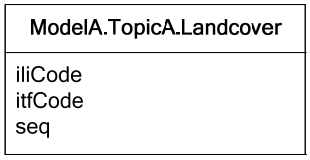
thisEnum	*baseEnum*	*iliCode*	*itfCode*	*seq*
ModelA.TopicA.Color		red	0	
ModelA.TopicA.Color		green	1	
ModelA.TopicA.Landcover		green	0	
ModelA.TopicA.Landcover		street	1	
ModelA.TopicA.Landcover		building	2	
ModelA.TopicA.Landcover		water	3	

The property "baseEnum" is only defined, if the enumeration is an extended one.
The property "seq" is only set, if the enumeration is ordered.

11.7.2 One feature type per enumeration







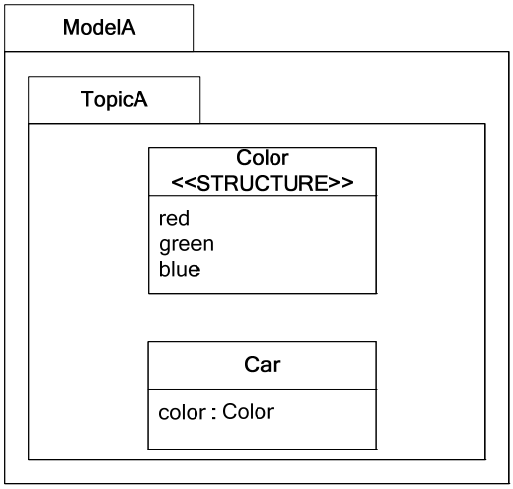
INTERLIS model

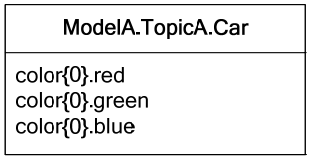
FME feature schema

For the feature type "ModelA.TopicA.Color" the following features will be read:

iliCode	*itfCode*	*seq*
red	0	
green	1	

11.8 BAG/LIST OF





INTERLIS model

FME feature schema

INTERLIS structure attributes (in the example the attribute "color" in the class "Car") are mapped to FME lists. The definition of the INTERLIS structure (in the example the structure "Color") is not mapped as a FME feature type.

11.9 Reference

11.9.1 Format Attributes

In addition to the generic FME feature attributes that FME Workbench adds to all features, this format adds the format-specific attributes described in this section.

Attribute	*Description*
xtf_id	Value of the TID XML-attribute out of the INTERLIS transfer file. Unique across all feature types.
xtf_class	Qualified name of the INTERLIS class name. This is different from the feature type name in the case of non base classes. In the figure above would ModelA.TopicA.ClassB be a possible value. If this value is not set, the feature type name is used as the qualified INTERLIS class name.
xtf_basket	Value of the BID XML-attribute out of the INTERLIS transfer file. May be used as foreign key to a feature of the feature type XTF_BASKET (see below). On writing, this may be used to write multiple baskets of the

	same topic. If writing INTERLIS 1 transfer files, this attribute is not required.
xtf_operation	Only used for incremental INTERLIS 2 transfer. Possible values are: INSERT, UPDATE, DELETE.
xtf_consistency	Only used for somehow modified data. Not yet fully supported.
xtf_geomattr	*Deprecated: Name of the geometry attribute read (e.g. "Geometrie"). An INTERLIS class may define multiple geometry attributes.*

11.9.2 Format features

The reader creates additional feature types, and the writer expects this feature types as well. If writing INTERLIS 1 transfer files, these feature types are not required.

11.9.2.1 Format feature type XTF_BASKETS

Attribute	*Description*
xtf_id	For each basket in the INTERLIS 2 transfer file, the value of the BID XML-attribute.
xtf_topic	Qualified name of the INTERLIS 2 topic name. In the figure above would ModelA.TopicA be a possible value.
xtf_startstate	Only used for incremental INTERLIS 2 transfer. If set, it indicates an UPDATE transfer. It indicates an INITIAL transfer, if it is not set. If it is not an incremental transfer, the value is ignored.
xtf_endstate	Only used for incremental INTERLIS 2 transfer. If set, it indicates an incremental transfer. If it is not set, this is not an incremental transfer.
xtf_consistency	Only used for somehow modified data. Not yet fully supported.

11.9.2.2 Format feature type XTF_DELETEOBJECT

Attribute	*Description*
xtf_id	Value of the TID XML-attribute out of the INTERLIS transfer file. Unique across all feature types.
xtf_basket	Value of the BID XML-attribute out of the INTERLIS transfer file. May be used as foreign key to a feature of the feature type XTF_BASKET. On writing, this may be used to write multiple baskets of the same topic.

11.9.2.3 Format feature type XTF_ENUMS

This feature type is only created by the reader, if the keyword is "CREATEFEATURETYPE4ENUM" is set to "SingleType".

Attribute	*Description*
thisEnum	Qualified INTERLIS name of the enumeration definition of this element.
baseEnum	Qualified INTERLIS name of the base enumeration definition of this element. This is only set, if the enumeration is EXTENDED.
iliCode	Qualified INTERLIS Name of the enumeration element. Same as it would appear in an INTERLIS 2 transfer file (XTF).
itfCode	Code of the enumeration element as it would appear in an INTERLIS 1 transfer file (ITF).
seq	Ordering position of the element. Only set, if this enumeration is ORDERED.

12 Limitations

- custom line forms
- XTF line attributes
- recursive structure attributes

13 Installation

13.1 Requirements

For the current version of ili2fme, you will need a JRE (Java Runtime Environment) installed on your system, version 1.4.1 or later.
The JRE (Java Runtime Environment) can be downloaded for free from the Website http://www.java.com/.
ili2fme was tested with FME 2009 (Build 5676) and FME 2010 (Build 6192).

13.2 Files

To install ili2fme, choose a directory and extract the distribution file there.

Copy the files and subdirectories of "${ili2fme}/FME Suite" to your FME directory.

Add your standard INTERLIS models to the directory "${FME}/plugins/interlis2/ilimodels".

At runtime, ili2fme requires the following files:

```
${FME}/plugins/ili2c.jar
${FME}/plugins/ili2fme.jar
${FME}/plugins/jts-1.8.jar
${FME}/metafile/ch.ehi.fme.Main.fme
${FME}/formatsinfo/interlis2.db
```

13.3 Configuration

To use ili2fme with the FME Universal Viewer, FME versions prior to FME 2008 requires you to set an environment variable: FME_VIEWER_THREADING=SINGLE.

ili2fme doesn't use or require any windows registry entries or user settings file.

13.4 How to migrate/update an existing ili2fme installation

Just copy the files and subdirectories of the new "${ili2fme}/FME Suite" to your FME directory.

Starting with ili2fme version 4.0, there is no longer a native part required. You may delete the files iom_fme.dll and `xerces-c_2_6-interlis2.dll`.

14 FAQ

14.1 Usage

I am getting the following error: "missing model Roads"
In the folder of your data-file or your folder ${FME}/plugins/interlis2/ilimodels there is no .ili-file containing a "MODEL Roads". Move the file Roads.ili to the folder of your data-file or the folder ${FME}/plugins/interlis2/ilimodels.

My destination format is INTERLIS and I'm getting the follwing error: "model name not specified"
You must change the Parameter "MODELS" to "%DATA" or the name of the INTERLIS model (without extension .ili) that you intend to write (on the Destination Dataset).

My destination format is INTERLIS and I'm getting the follwing error: "missing mandatory attribute xtf_class."
The appropriate feature types are expected by the writer, as if the same model would have been read by the INTERLIS 2 reader. That means: Every feature type must have the Attributes xtf_id, xtf_class, xtf_basket. There must be a feature type XTF_BASKET with attributes xtf_id and xtf_topic.

My destination format is INTERLIS and I'm getting the follwing error: "missing mandatory attribute xtf_basket."
The appropriate feature types are expected by the writer, as if the same model would have been read by the INTERLIS 2 reader. That means: Every feature type must have the Attributes xtf_id, xtf_class, xtf_basket. There must be a feature type XTF_BASKETS with attributes xtf_id and xtf_topic.

I have an INTERLIS model "Roads.ili". Should I place into the folder ${FME}/plugins/interlis2/ilimodels?
Yes, if you read or write data according to that model more than once. (ili2fme will also look in the folder of your data-file for INTERLIS models.)

Is the ordering of the model names as a value of the FME-keyword "Ili2fme_Models" significant?
No, any ordering will do.

If a model imports other models (like "Units" or "CoordSys"), should I name all models as value of the FME-keyword "Ili2fme_Models"?

No, but all required models (including indirectly imported ones), all required .ili-files, should be in the folder of your data-file or the folder $(FME)/plugins/interlis2/ilimodels.

If a model imports other models (like "Units" or "CoordSys"), which one should I name as value of the FME-keyword "Ili2fme_Models"?
Use the most specific one (the one that imports directly or indirectly all the other ones). The imported models will be used automatically.

If a model extends another one, which one should I name as value of the FME-keyword "Ili2fme_Models", the base model or the extended one?
Use the extended one. The base model will be used automatically.

I would like to convert to a particular INTERLIS model. How can I import the feature types?
Import the INTERLIS model file (file with the extension .ili), instead of a INTERLIS data file. (You have to change the Filetype in the file selector dialog to "All Files" to see the ili-files.)

14.2 Mapping

How to map XTF_ID, XTF_CLASS, XTF_BASKET if INTERLIS is the destination format?
XTF_ID is the XML attribute TID and should be unique across all feature types. Typically the value of the primary key of the source feature.
XTF_CLASS the qualified name of the destination INTERLIS-class. Typically a constant like "ModelName.TopicName.ClassName" (the actual value depends on your INTERLIS model).
XTF_BASKET is the foreign key of a feature of type XTF_BASKETS.

How to specify at export the kind of transfer (FULL, INITIAL, UPDATE) and the kind of feature operation (INSERT, UPDATE, DELETE)?
The kind of transfer is indicated by values in the attributes "xtf_startstate" and "xtf_endstate" of the format feature type "XTF_BASKETS". If "xtf_endstate" is not set, its an FULL transfer. If "xtf_endstate" is set and "xtf_startstate" is not set, it's an INITIAL transfer. If "xtf_endstate" and "xtf_startstate" are set, it's an INITIAL transfer.
The values INSERT, UPDATE, DELETE are required for incremental transfer. Use the format attribute "xtf_operation".

What is the purpose of the feature type "XTF_DELETEOBJECT"?
It's a shortcut to signal "this object is no longer in the basket".

What is the purpose of the format attribute "xtf_operation"? Which are the possible values?
This format attribute indicates the kind of change to the object. Possible values are: INSERT, UPDATE, DELETE. It's only used with incremental transfer mode.

What is the purpose of the format attribute "xtf_consistency"? Which are the possible values?
Possible values are: COMPLETE, INCOMPLETE, INCONSISTENT, ADAPTED.

If an attribute is of type enumeration (like „color: (red,green,blue);": Is it possible to get the values (0,1,2,...) instead of the resolved names?
XTF file: No. In INTERLIS 2 the resolved name is the value. In INTERLIS 2 there is no mapping of an enumeration to a numeric.
ITF file: Yes. Set the parameter ILI1_ENUMASITFCODE to "Yes". (But this is not recommended, because it is more difficult to detect errors in the mapping script, and the mapping script becomes incompatible to INTERLIS 2 (XTF).)

How are foreign keys mapped?
The value of the REF XML-attribute of the role (association end) gets the property value of the feature, that contains the role.

How are 1-1 associations mapped?
Like defined by the INTERLIS 2-encoding rules. The end class of the second role (association end) gets the property with the reference/foreign key. The property gets the name of the first role.

How are BAG/LIST-attributes mapped?
BAG/LIST-attributes are mapped as list attribute.

How is inheritance mapped?
ili2fme uses a super or subclass strategy.

My INTERLIS model contains a lot of classes, but in FME, I see only a few of them as feature types. Why?
ili2fme uses by default a super type strategy to map the inheritance tree of the INTERLIS classes. Only root classes in INTERLIS become feature types in FME. You may consider changing the mapping strategy to subclass.

How can I read the TID of records out of INTERLIS 1 transfer files (files with extension .itf)?
The TID is accessible threw the XTF_ID attribute in each feature type.

14.3 Configuartion

Which version of ili2fme is installed?
Run FME Viewer and open an INTERLIS data file. The version of ili2fme will be written to the log window of FME (e.g. "ili2fme-5.1.0-20090311").

Why does FME report: “No Reader named `ch.ehi.fme.Main' is available in this FME version”?
This may have several reasons:

- No JAVA installed
- Wrong Version of JAVA installed (ili2fme requires at least JAVA 1.4.1)
- Wrong FME edition (normally ili2fme requires at least FME Professional)
- Maybe jvm.dll is not found by FME.

FME uses standard registry entries to find JAVA. Check your JAVA installation (Open a command prompt and enter “`java –version`”).

15 Changes
See the file CHANGELOG.txt in the distribution of ili2fme.

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