

Attività in corso per l'allineamento dei dati geografici nazionali al modello dati INSPIRE

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Punto di partenza sperimentazione: NC e MI descritti nel GeoUMLcatalogue

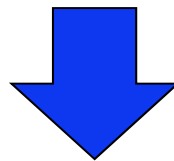
The screenshot displays the 'GeoUML catalogue Editor' window. The title bar reads 'GeoUML catalogue Editor - Catalogo dei Dati Territoriali - Specifiche di Contenuto per i DB Geotopografici - 1.1 (work in progress)'. The menu bar includes 'File', 'Visualizza', 'Modifica', 'Genera', and 'Help'. On the left, a 'classi' tree shows three classes: '010107 - EL_STR - Elemento stradale', '010108 - GZ_STR - Giunzione stradale', and '010114 - RT_ST1 - Rete stradale liv.1'. The main area shows the configuration for '010107 - Elemento stradale'. It includes fields for 'Codice' (010107) and 'Codice alfanumerico' (EL_STR). There are checkboxes for 'Classe a istanza monoscala' and 'Astratta'. The 'Strato di appartenenza' is set to '01 - Viabilità, mobilità e trasporti' and the 'Tema di appartenenza' is '0101 - Strade'. The 'Componenti spaziali' section is expanded, showing '010107101 - Tracciato (GU_CPCurve3D)' with sub-attributes: '01010701 - EL_STR_TY - Tipo', '01010703 - EL_STR_CF - Classifica tecnica', '01010705 - EL_STR_STA - Stato', '01010706 - EL_STR_FON - Fondo', and '01010707 - EL_STR_CL - Classe di larghezza'. The 'Vincoli' section shows 'Vincoli part whole'.



Punto di arrivo della sperimentazione: INSPIRE

Cosa significa allineamento ad Inspire?

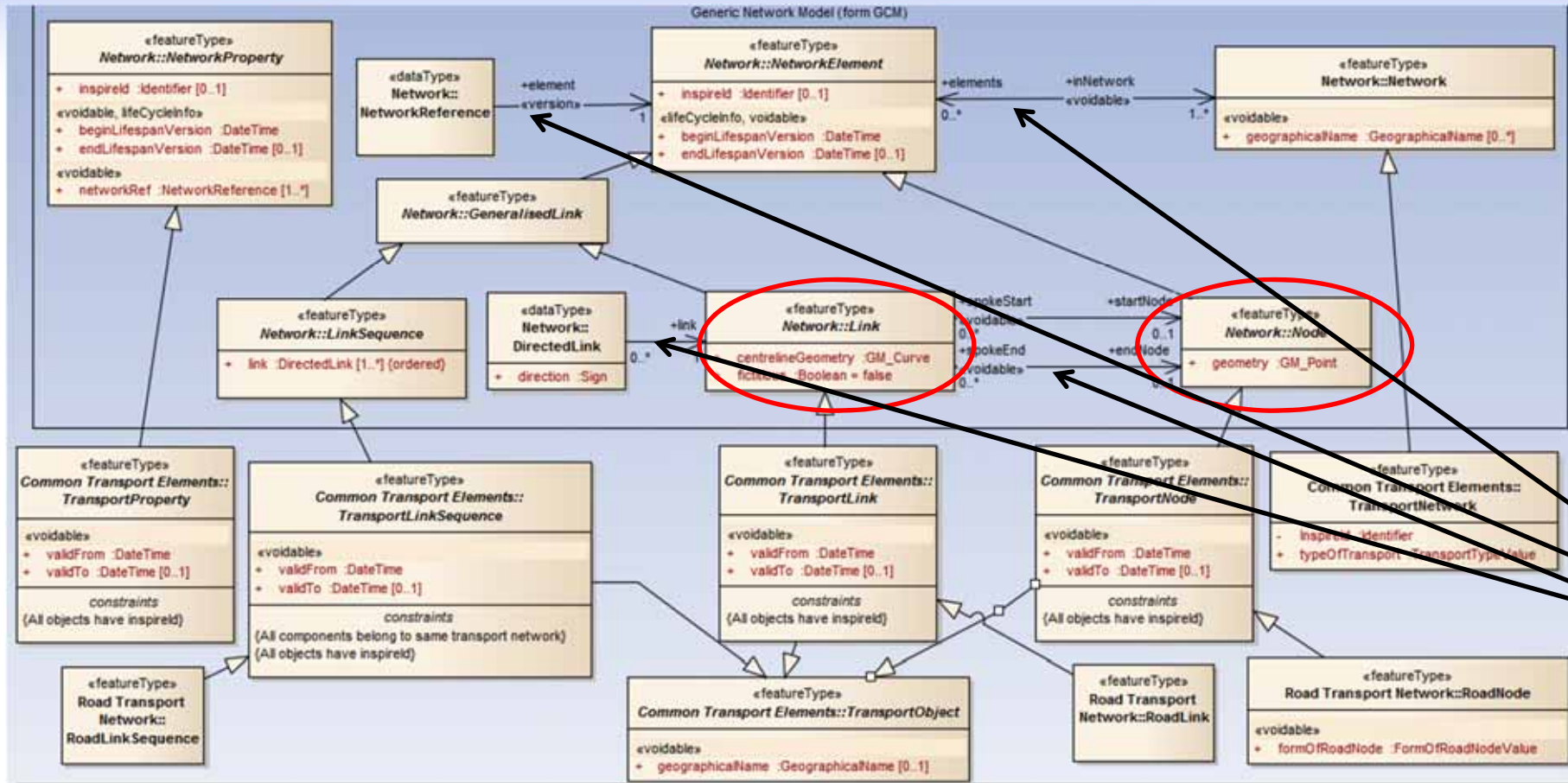
- Trasformare i dati del NC in quelli previsti da Inspire (EAP specification)
- Mettere a disposizione i dati Inspire tramite servizi WFS che adottano il modello implementativo GML/Inspire (XSD)



Dall'approccio download ad una visione orientata ai servizi: dati up-to-date, query flexibility, reduced download size (size gml \cong 10 size .shp).

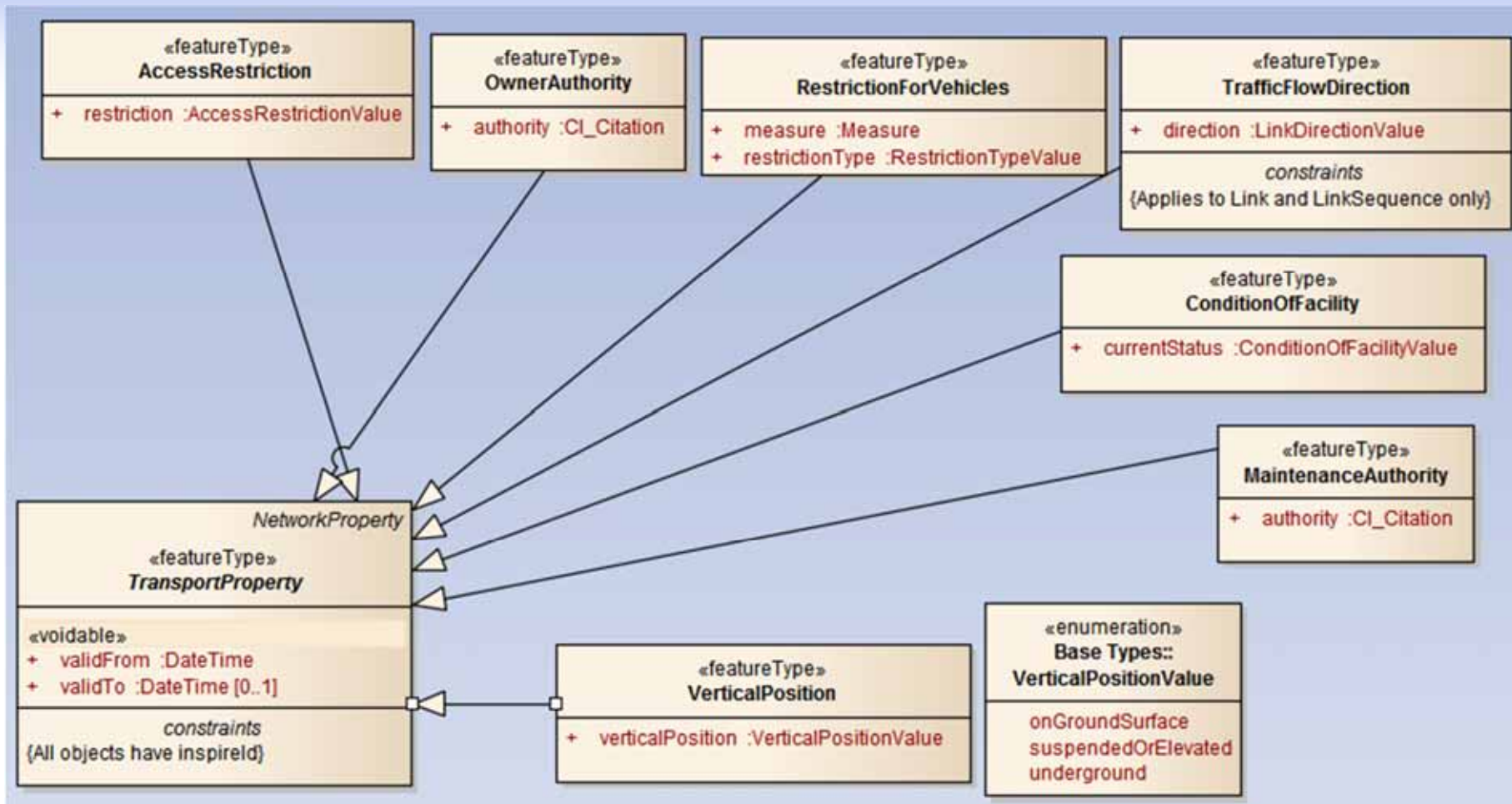


Sintesi Road Network (hand made)

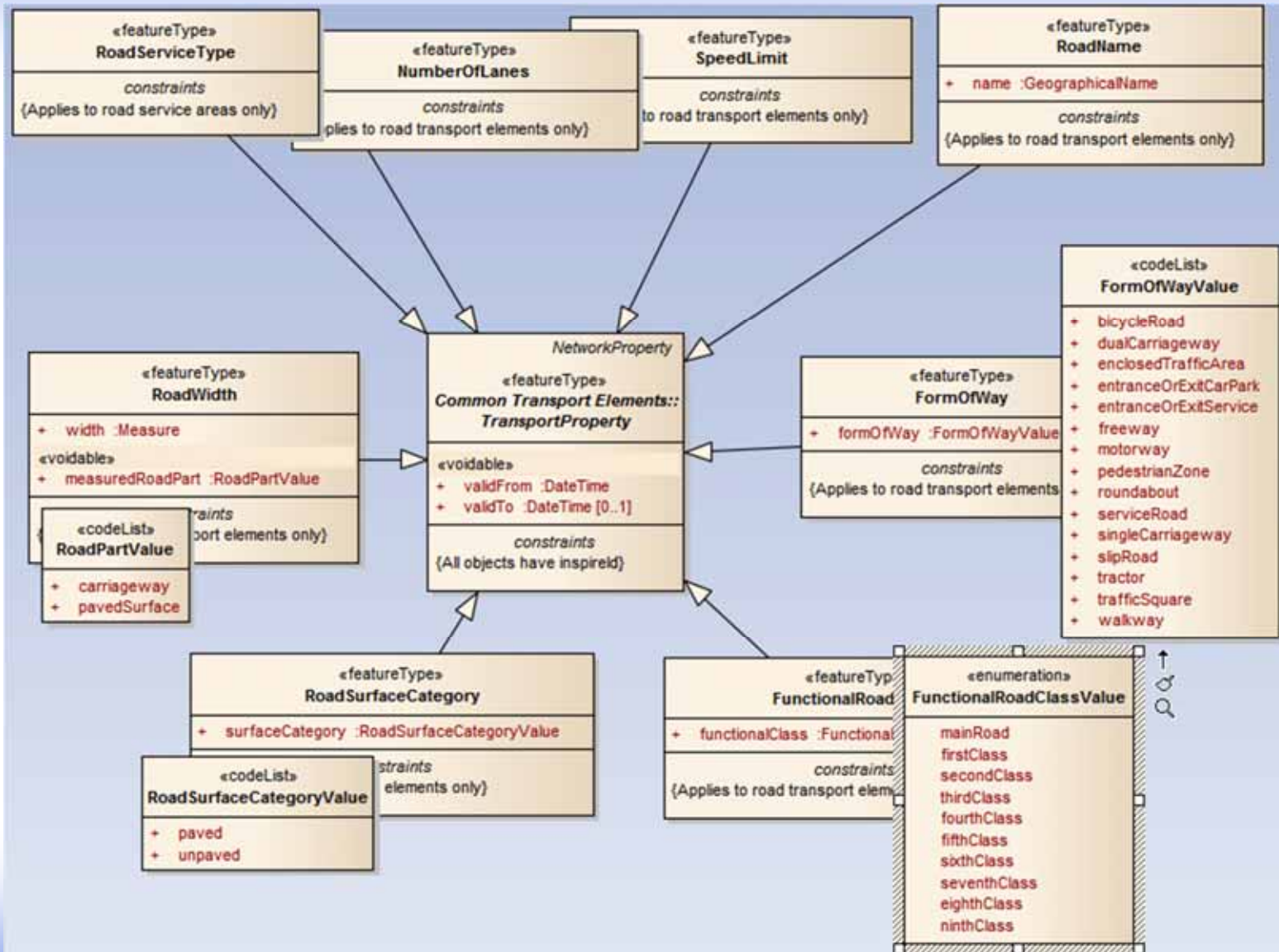


complessità della specifica – dalle geometrie alle associazioni

Transport properties



Transport properties



Prima considerazione: non convenienza dell'allineamento manuale a INSPIRE

1. Complessità regole ad hoc (mapping tables non sufficienti)
2. Complessità traduzione e configurazione del WFS
3. Instabilità specifiche Inspire (modifiche Annex, Coerenza EAP, XSD, Mapping tables)

Application Schema 'Road Transport Network' (version 3.0)						
Type	Documentation	Attribute Association role Constraint	Attribute / Association role / Constraint documentation	Values / Enumerations	Multi plicity	Voidable / Non-Voidable
RoadLink Supertypes: <i>TransportLink TransportObject Link GeneralisedLink NetworkElement</i>	A linear spatial object that describes the geometry and connectivity of a road network between two points in the network. Road links can represent paths, bicycle roads, single carriageways, multiple carriageway roads and even fictitious trajectories across traffic squares.	geographicalName	A geographical name that is	GeographicalName	0..1	voidable
		beginLifetimeVersion	Date and time at which this	DateTime	1	voidable
		inspireId	External object identifier of	Identifier	0..1	
		endLifetimeVersion	Date and time at which this	DateTime	0..1	voidable
		inNetwork	The networks in which a	Network	1..*	voidable
		centrelineGeometry	The geometry that	GM_Curve	1	
		fictitious	Indicator that the centreline	Boolean	1	
		endNode	The optional end node for	Node	0..1	
		startNode	The optional start node for	Node	0..1	
		validFrom	The time when the transport	DateTime	1	voidable
		validTo	The time from which the	DateTime	0..1	voidable
RoadNode Supertypes: <i>TransportNode TransportObject Node NetworkElement</i>	A point spatial object that is used to either represent connectivity between two road links or to represent a significant spatial object such as a services station or roundabout.	geographicalName	A geographical name that is used to identify the transport	GeographicalName	0..1	voidable
		beginLifetimeVersion	Date and time at which this version of the spatial object	DateTime	1	voidable
		inspireId	External object identifier of	Identifier	0..1	
		endLifetimeVersion	Date and time at which this	DateTime	0..1	voidable
		inNetwork	The networks in which a	Network	1..*	voidable
		geometry	The location of the node.	GM_Point	1	
		spokeEnd	The links that enter the	Link	0..*	voidable
		spokeStart	The links that leave the	Link	0..*	voidable
		validFrom	The time when the transport	DateTime	1	voidable
		validTo	The time from which the	DateTime	0..1	voidable
RoadLinkSequence Supertypes: <i>TransportLinkSequence TransportObject LinkSequence GeneralisedLink NetworkElement</i>	A linear spatial object, composed of an ordered collection of road links, which represents a continuous path in a road network without any branches. The element has a defined beginning and end and every position on the road link sequence is	geographicalName	A geographical name that is used to identify the transport	GeographicalName	0..1	voidable
		beginLifetimeVersion	Date and time at which this version of the spatial object	DateTime	1	voidable
		inspireId	External object identifier of the spatial object. NOTE	Identifier	0..1	
		endLifetimeVersion	Date and time at which this version of the spatial object	DateTime	0..1	voidable
		inNetwork	The networks in which a	Network	1..*	voidable
		link	The ordered collection of	DirectedLink	1..*	
		validFrom	The time when the transport	DateTime	1	voidable
		validTo	The time from which the	DateTime	0..1	voidable
		formOfRoadNode	Description of the function of	FormOfRoadNode	1	voidable

Primo passo: prototipo di uno strumento di supporto ad Inspire

Obiettivi:

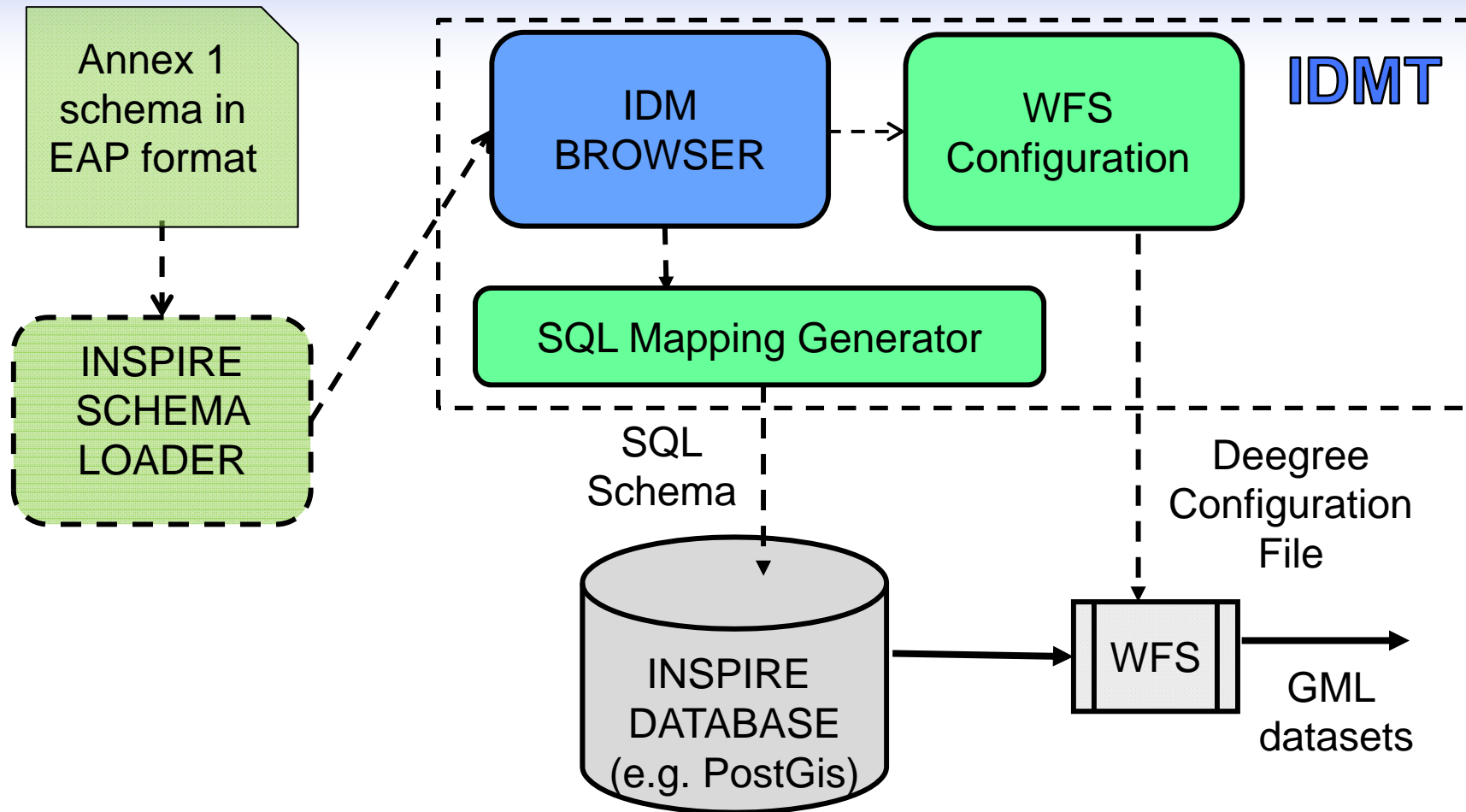
- Fornire un browser sulle specifiche Inspire basato sul modello IDM (Inspire Data Model)
- Definire un MI (Modello Implementativo) per tradurre le specifiche Inspire in strutture dati di un DBInspire
- Configurare il WFS basato sugli XSD Inspire che consenta l'accesso al DBInspire via GML



GeoUML Catalogue non adatto: non copre alcuni costrutti IDM (es., gerarchie di datatype e codelist)



Inspire Data Model Tools



Sito spatialdbgroup.polimi.it - sezione download: IDMT
(free use license)



IDMT: browser

The screenshot displays the INSPIRE Data Model Browser interface. On the left, a tree view shows a hierarchy of packages and classes. A red circle highlights the 'Packages' and 'Classes' sections, with a red box containing the text 'selezione di Package e Classi'. The main area shows the details for the 'Road' feature type, including its description and a list of properties. A blue circle highlights the 'All Properties' section, with a blue box containing the text 'Proprietà di una Classe'. The 'All Properties' section lists various properties such as 'nationalroadcode', 'localroadcode', 'validto', 'validfrom', 'beginlifespanversion', 'endlifespanversion', 'geographicalName', 'sourceofname', 'language', 'nativeness', 'grammaticalNumber', 'grammaticalGender', 'spelling', 'transliterationscheme', 'text', 'script', 'pronunciation', 'nameStatus', and 'inspireid'. The 'inspireid' property is highlighted with a blue box.

selezione di Package e Classi

Proprietà di una Classe

ASITA 15 ottobre 2014

11

Road X

<featuretype> Road package: Road Transport Network

Description [-] -- Definition --
 A collection of road link sequences and/or individual road links that are characterize
 -- Description --
 EXAMPLE Examples are roads characterized by a specific identification code, used by road management auth

All Properties [-] Direct Properties (blue) and Inherited Properties (Yellow)

- <voidable>nationalroadcode (CharacterString)[0..1]
- <voidable>localroadcode (CharacterString)[0..1]
- <voidable>validto (DateTime)[0..1] FROM: TransportLinkSet[Common Transport Elements]
- <voidable>validfrom (DateTime)[1..1] FROM: TransportLinkSet[Common Transport Elements]
- <voidable>beginlifespanversion (DateTime)[1..1] FROM: NetworkElement[Network]
- <voidable>endlifespanversion (DateTime)[0..1] FROM: NetworkElement[Network]
- D <voidable>geographicalName(DataType: GeographicalName)[0..1] FROM: TransportObject[Common]
- <voidable>sourceofname (CharacterString)[1..1]
- <voidable>language (CharacterString)[1..1]
- C <voidable>nativeness(Codelist: NativenessValue)[1..1]
- C <voidable>grammaticalNumber(Codelist: GrammaticalNumberValue)[0..1]
 - singular
 - plural
 - dual
- C <voidable>grammaticalGender(Codelist: GrammaticalGenderValue)[0..1]
- D spelling(DataType: SpellingOfName)[1..*]
 - <voidable>transliterationscheme (CharacterString)[0..1]
 - text (CharacterString)[1..1]
 - <voidable>script (CharacterString)[1..1]
- D <voidable>pronunciation(DataType: PronunciationOfName)[1..1]
- C <voidable>nameStatus(Codelist: NameStatusValue)[1..1]
- D inspireId(DataType: Identifier)[0..1] FROM: NetworkElement[Network]

Association Roles [-] Roles and Inherited Roles

- R post[0..*]MarkerPost FROM TransportLinkSet[Common Transport Elements] inverse route[1..1]

**IDMT:
Proprietà della
classe Road**

Proprietà ereditate

Espansione
dei
Datatype

dominio enumerato

Attributo enumerato



Sperimentazione primo passo:

- traduzione ad hoc del road network nell'InspireDB
- Installazione di un WFS sperimentale

220MB
gml file

<http://wfs.spatialdbgroup.polimi.it/deegree-webservices-3.3.9/services>



The screenshot shows the website interface for SpatialDBgroup. At the top, there are navigation buttons for 'Home', 'People', and 'WFS'. The main content area displays the following information:

- Name: *DBSdemo*
- CRS: *3003*
- Dimension: *3D*
- Implementation Model: *SQL for GML*
- Selected Feature Types: *Network, TransportNetwork, RoadLink, RoadNode, RoadLinkSequence, RoadWidth and*

The INSPIRE Database has been loaded with production data containing about 80,000 *RoadLinks* and 30,000 *RoadN*

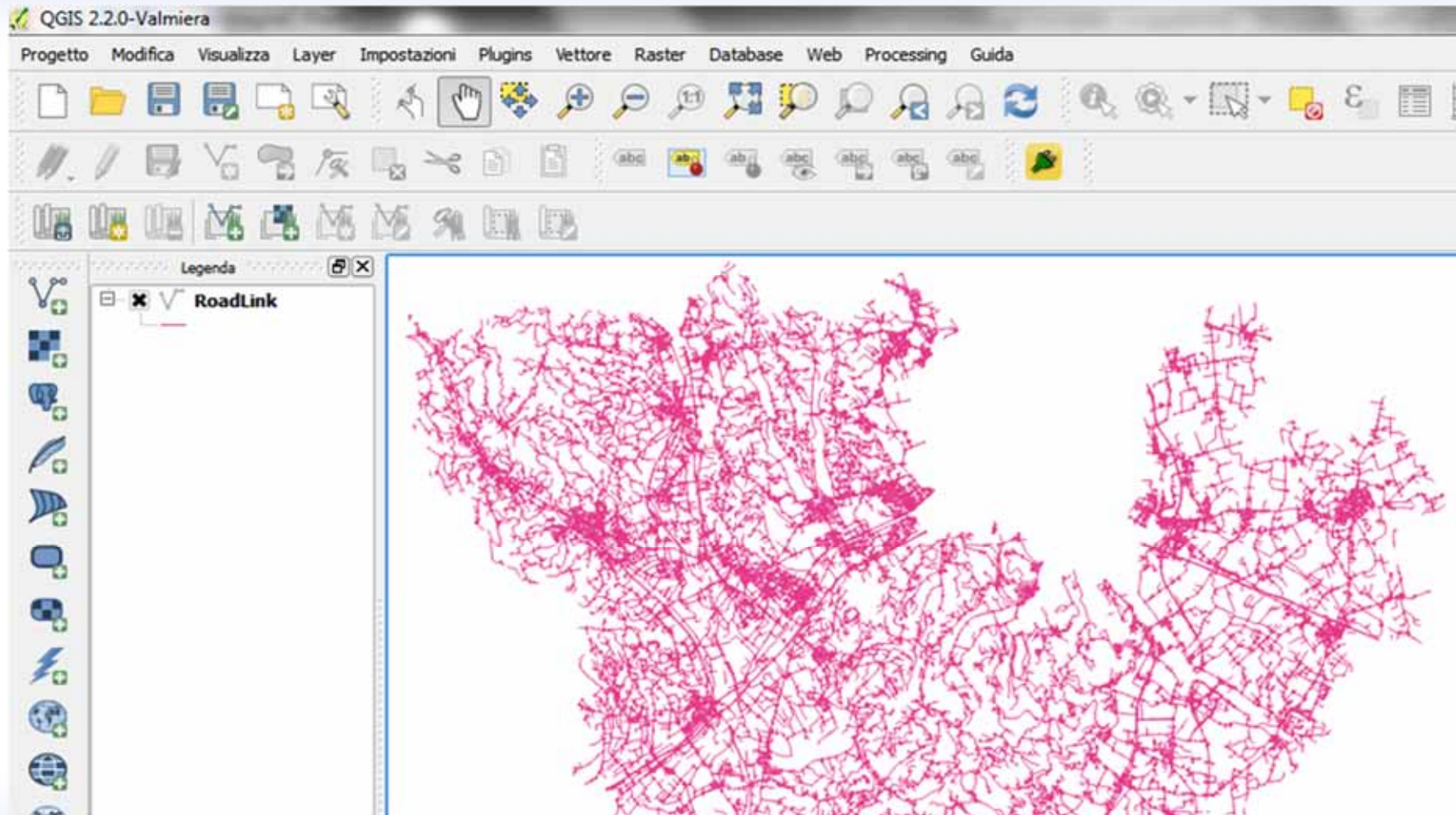
In order to use the service it is necessary to write the necessary queries and submit them with a Browser. Some of the following links:

- Selection of all Road Links (gml v.2.1.2)

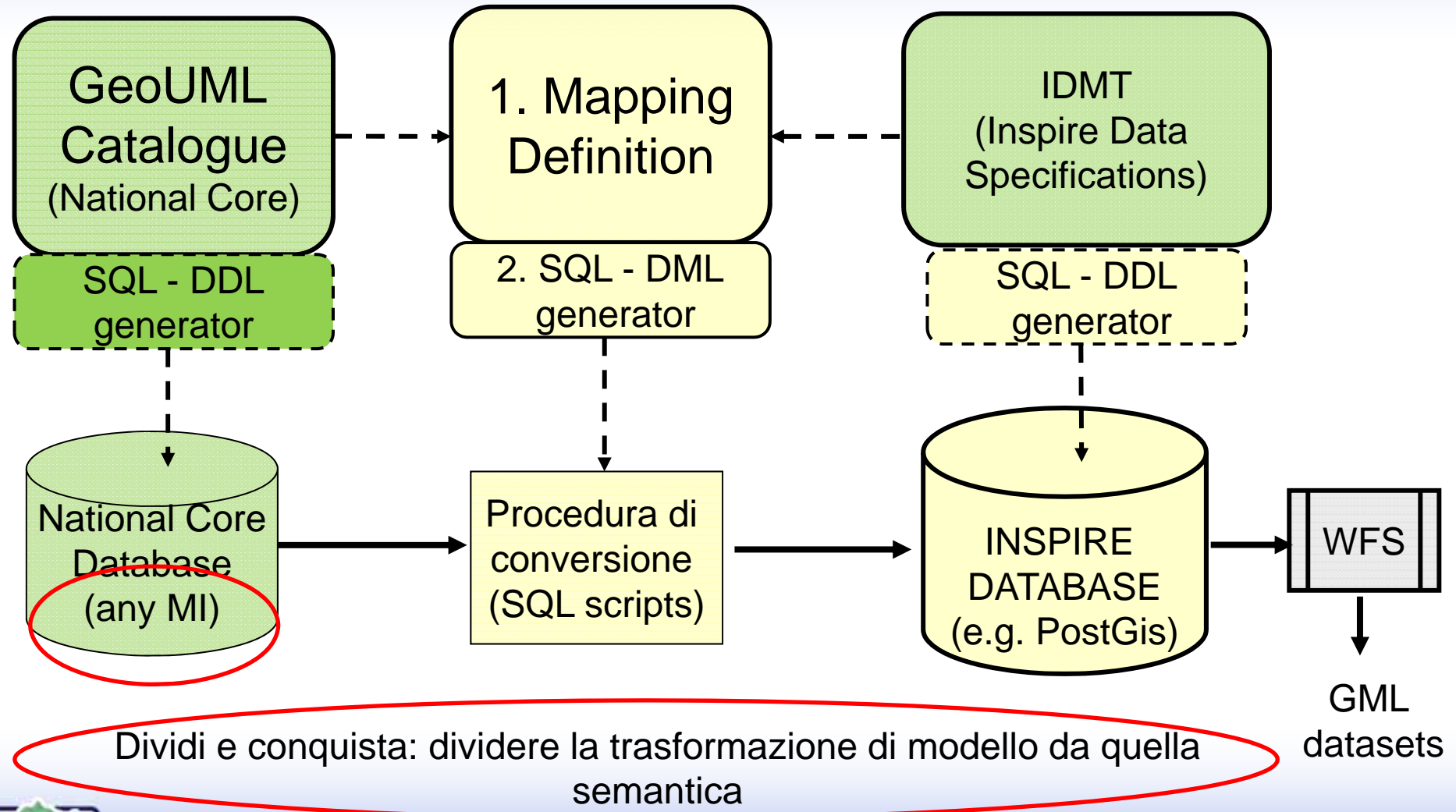
<http://wfs.spatialdbgroup.polimi.it/deegree-webservices-3.3.9/services?SERVICE=WFS&VERSION=1.1.0&REQUEST=GetFeature&typename=RoadLink&subtype=3Dgml%2F2.1.2&TRAVERSEXLINKDEPTH=0&TypeName=RoadLink>



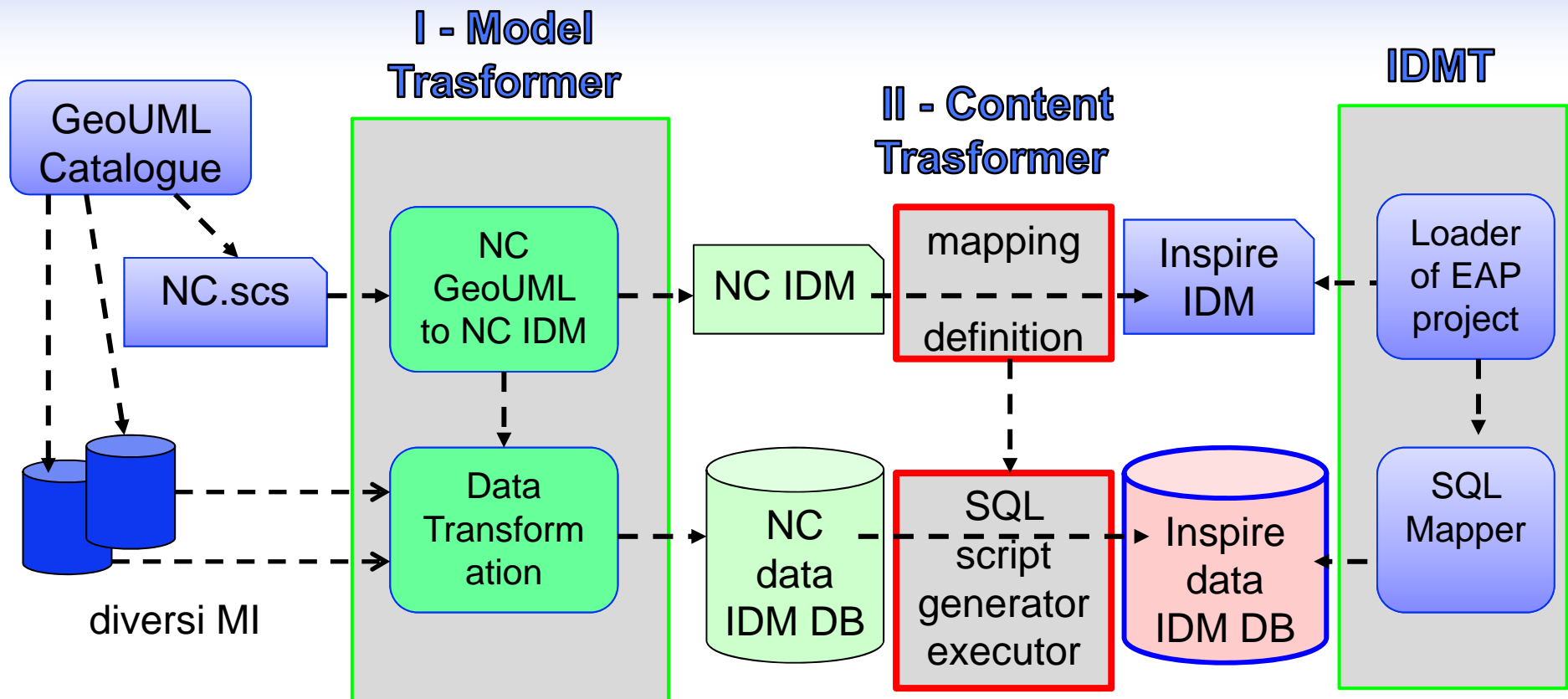
Il file gml estratto col servizio WFS viene caricato in QGIS



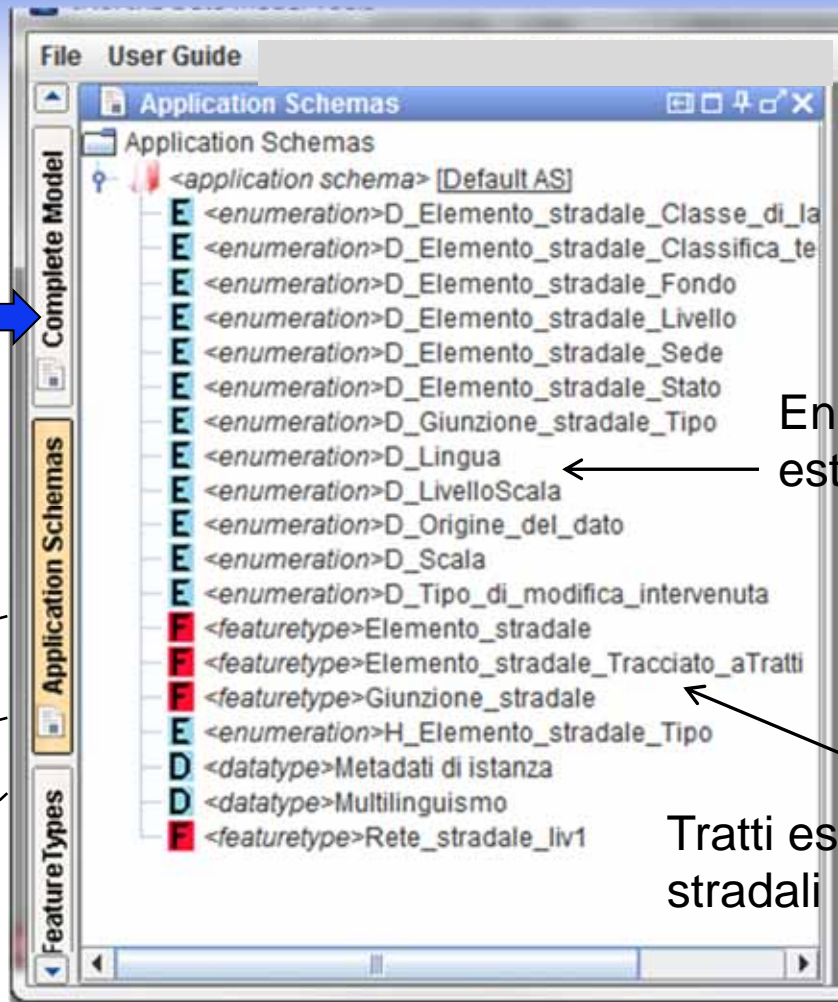
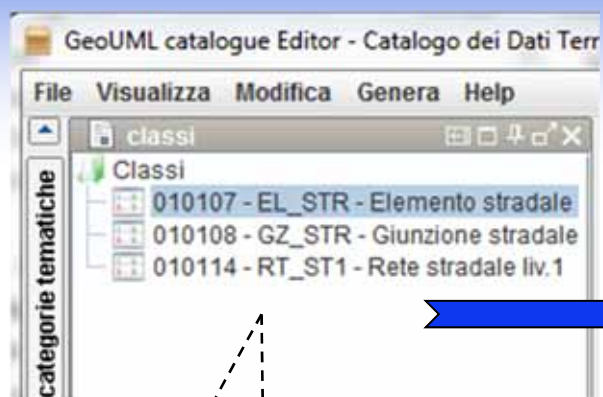
Secondo passo: riflessione sul mapping semantico



Two-steps mapping

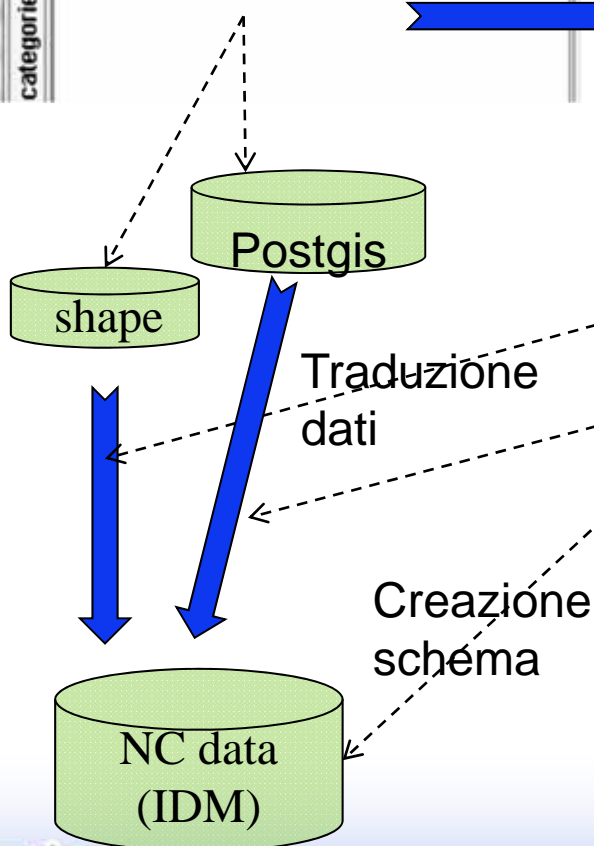


Model transformer tool



Enumerati/datatype estratti

Tratti estratti da elementi stradali



Sperimentazione sul road network,
ma estendibile al NC (lavori in corso)



Terzo passo: Inspire Transformation environment

The screenshot displays the Inspire Transformation environment interface. On the left, the 'Application Schemas' pane shows a tree view of a schema named '<application schema> [Default]'. It lists various elements such as '<enumeration>D_Element', '<enumeration>D_Giunzion', and '<featuretype>Elemento_st'. On the right, another 'Application Schemas' pane shows a tree view for '<application schema> [Road Transport Netw]'. This pane lists numerous elements including '<codelist>AreaConditionValue', '<featuretype>ERoad', '<featuretype>FormOfWay', and '<featuretype>Road'. The central workspace is a large grey area containing the following text:

- 1. Mapping definition
- 2. SQL generator
- (Lavori in corso)

The interface includes a menu bar with 'File', 'User Guide', and 'About'. On the far left, there are three vertical buttons: 'Complete Model', 'Application Schemas', and 'Feature Types'. On the far right, there are three vertical buttons: 'Complete Model R', 'Application Schemas R', and 'Featur'.

Caratteristiche prossima evoluzione:

- Prototipo del mapping definition per il road Network
 - compromesso tra regole generali e ad hoc per i network
- Prototipo dell SQL generator per le regole del network
- Sperimentazione uso prototipo per definizione regole network con lo strumento (experts in NC, GeoUML and current tools, Inspire)
- Verifica trasversale con Hale,...

Linee di sviluppo?

- Estensione agli altri application schema (Annex II e III inclusi)



One final question: cosa significa esporre i dati per Inspire?

Cosa è obbligatorio esportare del NC?

The diagram illustrates the relationships between 'GeneralisedLink' and 'NetworkElement' classes. The 'GeneralisedLink' class (a feature type 'Network::Link') has properties 'centrelineGeometry :GM_Curve' and 'fictitious :Boolean = false'. The 'NetworkElement' class (a feature type 'Network::Node') has a property 'geometry :GM_Point'. There are two associations: one from 'GeneralisedLink' to 'NetworkElement' with role '+startNode' and cardinality '0..1', and another with role '+endNode' and cardinality '0..1'. Both associations have 'voidable' multiplicity on the 'GeneralisedLink' side. A third association is shown from 'NetworkElement' to 'GeneralisedLink' with role '+spokeStart' and cardinality '0..*', and another with role '+spokeEnd' and cardinality '0..*'. Both associations have 'voidable' multiplicity on the 'NetworkElement' side.

