Workshop “Energy Data”
Reggio Emilia, 21 febbraio 2017

GeoSmartCity: modelli dati “underground” – “green energy” e applicazione pratica a Reggio

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  - Componenti
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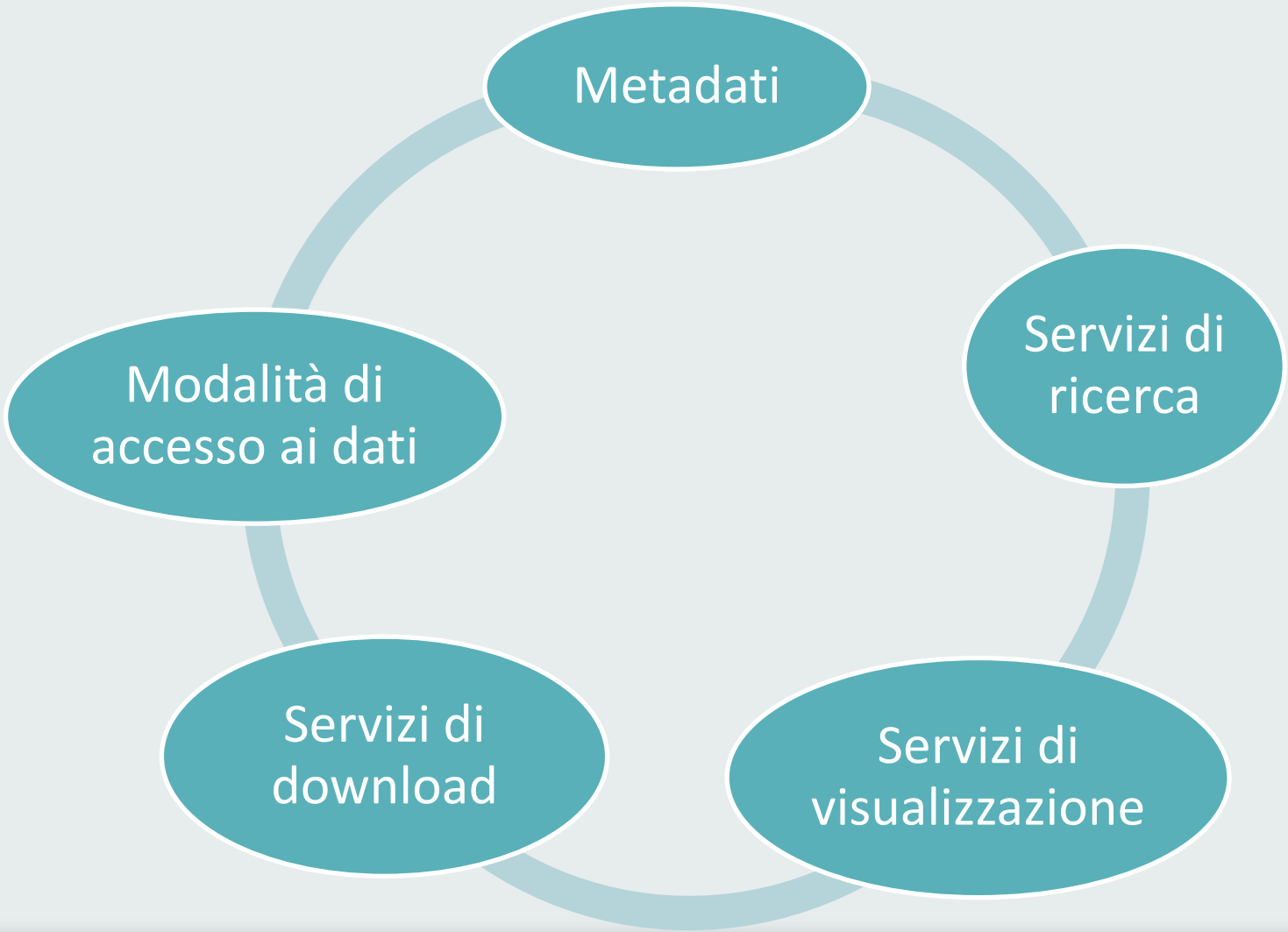
  - L'approccio di estensione dei modelli dati INSPIRE
  - I modelli dati GSC per i due scenari

Infrastrutture di Dati Territoriali

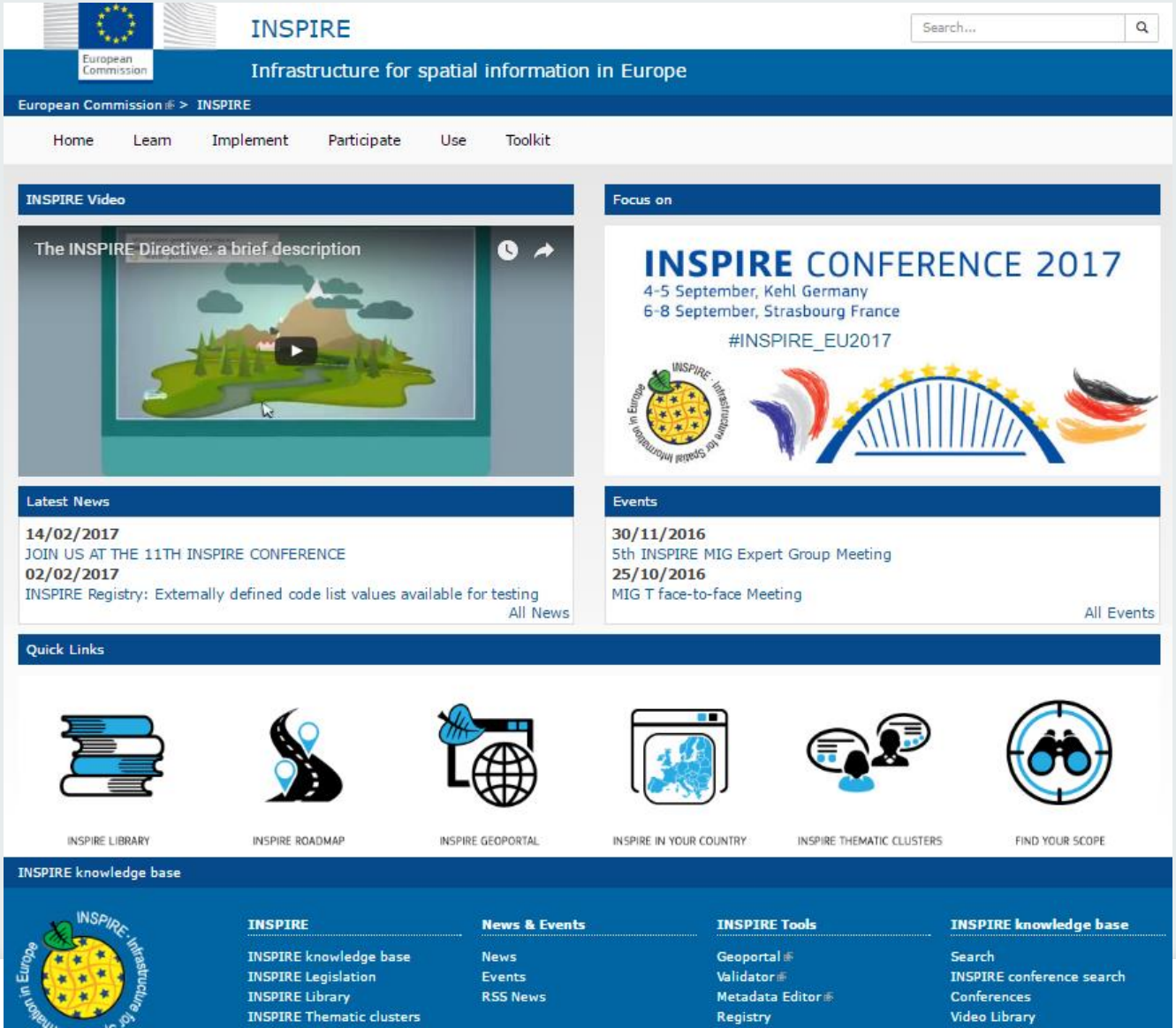


Infrastrutture di Dati Territoriali

Principali ostacoli che impediscono l'uso diffuso dei dati geografici:

- I dati sono spesso mancanti o incompleti.
- La descrizione (documentazione) dei dati territoriali disponibili è spesso incompleta.
- I dati geografici non possono spesso essere combinati con altri dati geografici.
- I sistemi per trovare, accedere e utilizzare i dati funzionano spesso in modo isolato e non sono compatibili tra loro.
- Le barriere culturali, istituzionali, finanziarie e legali impediscono o ritardano la condivisione e il riutilizzo dei dati territoriali esistenti.

Direttiva INSPIRE



Direttiva INSPIRE: i temi

ANNEX: 1


Addresses


Administrative units


Cadastral parcels


Coordinate reference systems


Geographical grid systems


Geographical names


Hydrography


Protected sites


Transport networks

ANNEX: 2

Elevation


Geology

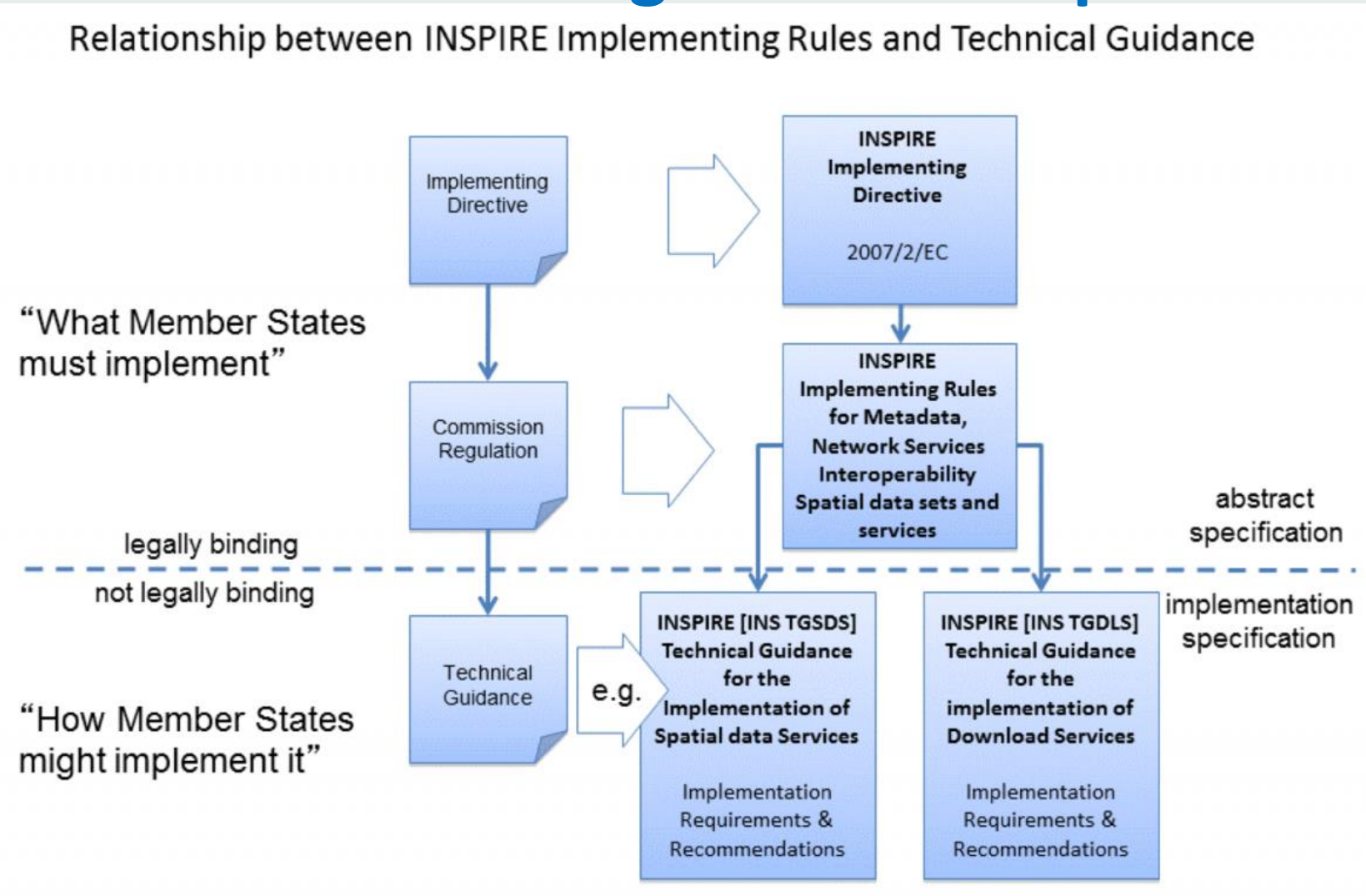

Land cover

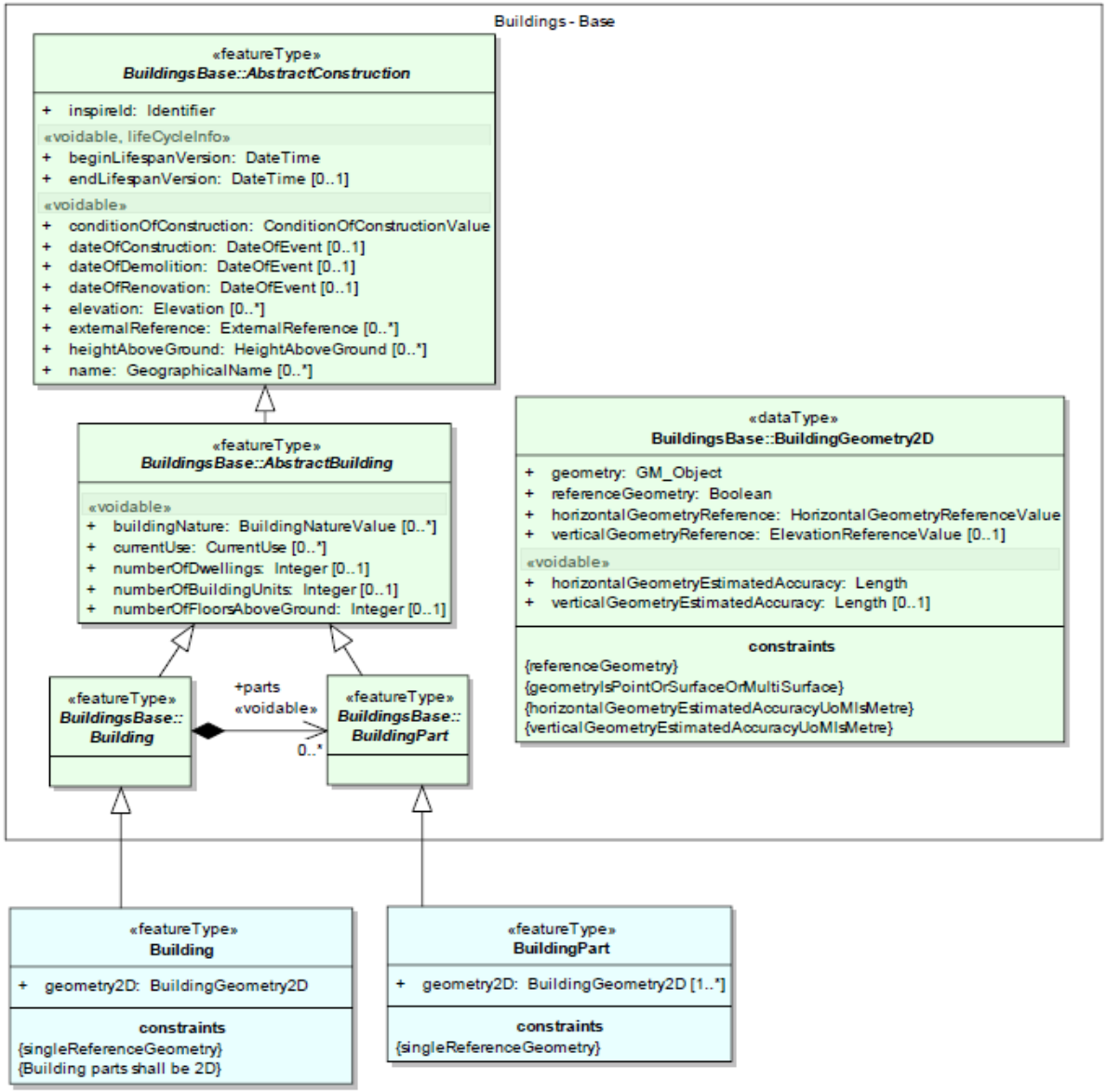

Orthoimagery

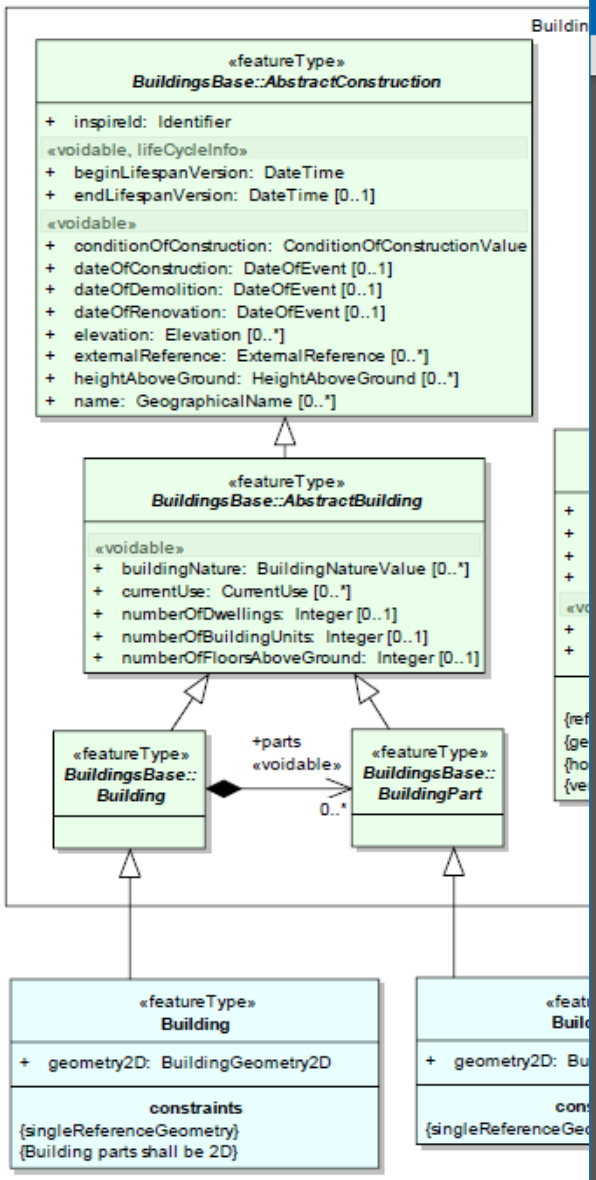
Direttiva INSPIRE: i temi

ANNEX: 3

Direttiva INSPIRE: regolamenti e specifiche




Buildings - Base
«featureType»
BuildingsBase::AbstractConstruction
+ inspireId: Identifier
«voidable, lifeCycleInfo»
+ beginLifespanVersion: DateTime
+ endLifespanVersion: DateTime [0..1]
«voidable»
+ conditionOfConstruction: ConditionOfConstructionValue
+ dateOfConstruction: DateOfEvent [0..1]
+ dateOfDemolition: DateOfEvent [0..1]
+ dateOfRenovation: DateOfEvent [0..1]
+ elevation: Elevation [0..*]
+ externalReference: ExternalReference [0..*]
+ heightAboveGround: HeightAboveGround [0..*]
+ name: GeographicalName [0..*]
«featureType»
BuildingsBase::AbstractBuilding
«voidable»
+ buildingNature: BuildingNatureValue [0..*]
+ currentUse: CurrentUse [0..*]
+ numberOfDwellings: Integer [0..1]
+ numberOfBuildingUnits: Integer [0..1]
+ numberOfFloorsAboveGround: Integer [0..1]
«dataType»
BuildingsBase::BuildingGeometry2D
+ geometry: GM_Object
+ referenceGeometry: Boolean
+ horizontalGeometryReference: HorizontalGeometryReferenceValue
+ verticalGeometryReference: ElevationReferenceValue [0..1]
«voidable»
+ horizontalGeometryEstimatedAccuracy: Length
+ verticalGeometryEstimatedAccuracy: Length [0..1]
constraints
{referenceGeometry}
{geometryIsPointOrSurfaceOrMultiSurface}
{horizontalGeometryEstimatedAccuracyUoMIsMetre}
{verticalGeometryEstimatedAccuracyUoMIsMetre}
«featureType»
BuildingsBase::
Building
+parts
«voidable»
0..*
«featureType»
BuildingsBase::
BuildingPart
«featureType»
Building
+ geometry2D: BuildingGeometry2D
constraints
{singleReferenceGeometry}
{Building parts shall be 2D}
«featureType»
BuildingPart
+ geometry2D: BuildingGeometry2D [1..*]
constraints
{singleReferenceGeometry}



INSPIRE_DataSpecification_BU_v3.0.pdf - Adobe Acrobat Pro

File Modifica Vista Finestra ?

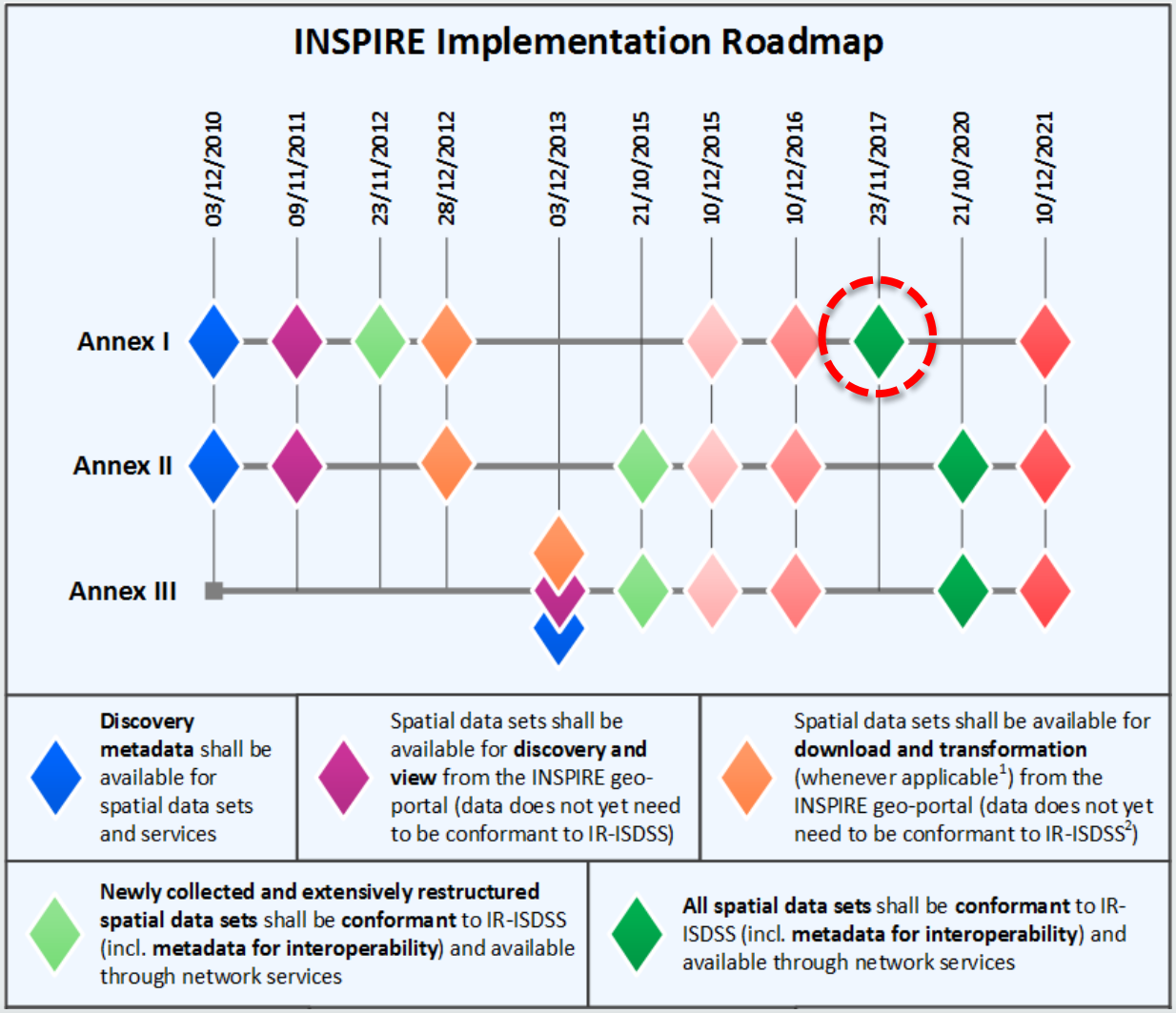
European Commission

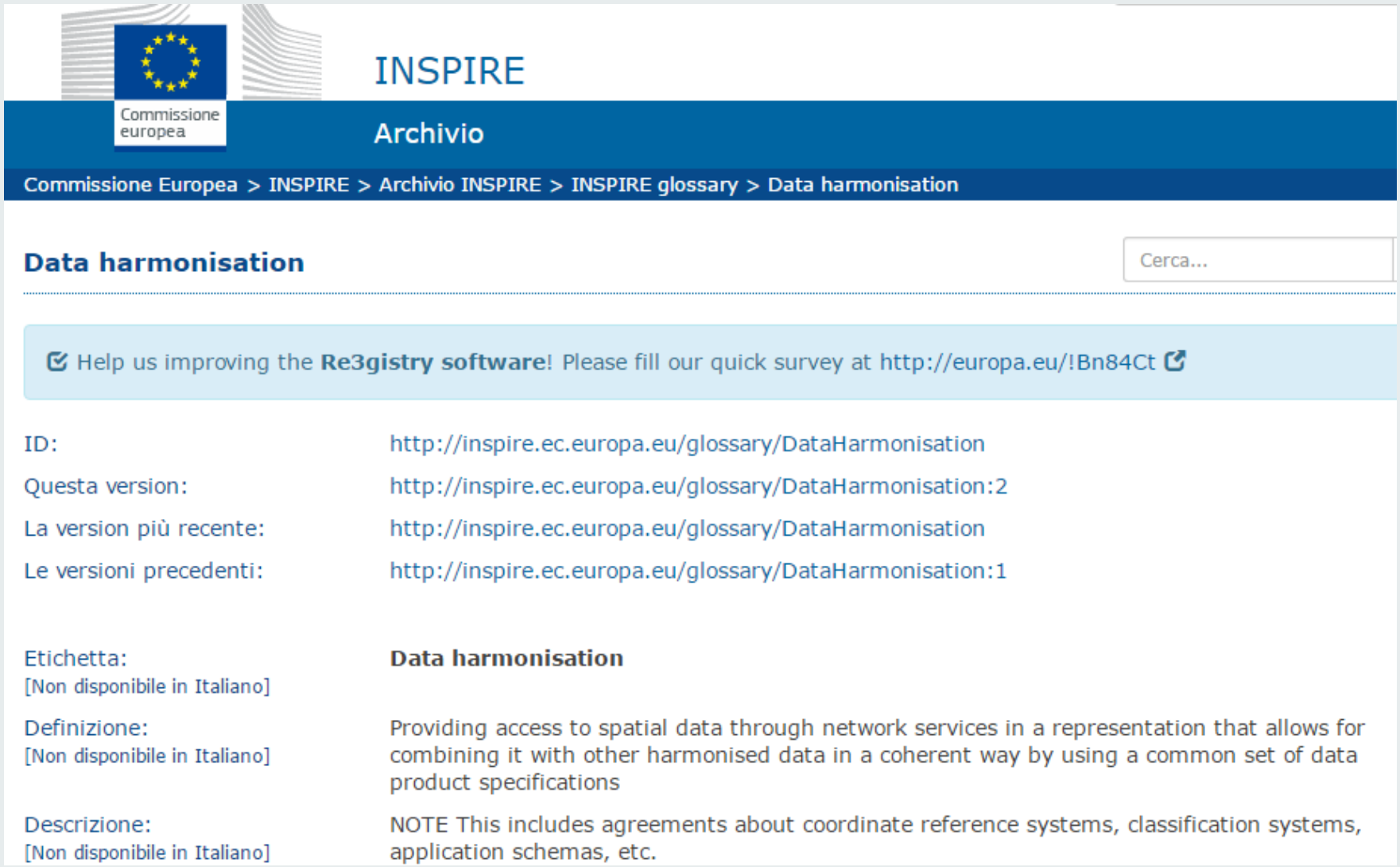
INSPIRE
Infrastructure for Spatial Information in Europe

D2.8.III.2 Data Specification on *Buildings* – Technical Guidelines

Title	D2.8.III.2 INSPIRE Data Specification on *Buildings* – Technical Guidelines
Creator	INSPIRE Thematic Working Group *Buildings*
Date	2013-12-10
Subject	INSPIRE Data Specification for the spatial data theme *Buildings*
Publisher	European Commission Joint Research Centre
Type	Text
Description	This document describes the INSPIRE Data Specification for the spatial data theme *Buildings*
Contributor	Members of the INSPIRE Thematic Working Group *Buildings*
Format	Portable Document Format (pdf)
Source	
Rights	Public
Identifier	D2.8.III.2_v3.0
Language	En
Relation	Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
Coverage	Project duration

Direttiva INSPIRE: roadmap





Commissione europea

INSPIRE

Archivio

Commissione Europea > INSPIRE > Archivio INSPIRE > INSPIRE glossary > Data harmonisation

Data harmonisation

Cerca...

Help us improving the **Re3gistry software**! Please fill our quick survey at http://europa.eu/!Bn84Ct

ID:	http://inspire.ec.europa.eu/glossary/DataHarmonisation
Questa version:	http://inspire.ec.europa.eu/glossary/DataHarmonisation:2
La version più recente:	http://inspire.ec.europa.eu/glossary/DataHarmonisation
Le versioni precedenti:	http://inspire.ec.europa.eu/glossary/DataHarmonisation:1
Etichetta: [Non disponibile in Italiano]	**Data harmonisation**
Definizione: [Non disponibile in Italiano]	Providing access to spatial data through network services in a representation that allows for combining it with other harmonised data in a coherent way by using a common set of data product specifications
Descrizione: [Non disponibile in Italiano]	NOTE This includes agreements about coordinate reference systems, classification systems, application schemas, etc.

GSC: i modelli dati INSPIRE estesi

- Obiettivi:
  - Definire i modelli dati necessari ad armonizzare i dati territoriali eterogenei per essere ulteriormente gestiti dall'hub.
  - Armonizzare i dati spaziali provenienti da diverse fonti eterogenee (source data model) verso gli schemi comuni (target data model).

Metodologia per la generazione dei data model comuni

Collect requirements

- Create a template file in order to collect the users' data modelling requirements in a structured way.
- Request each pilot to provide the list of information (attributes, code list ..) needed to run its use cases.

Analyse & Compare

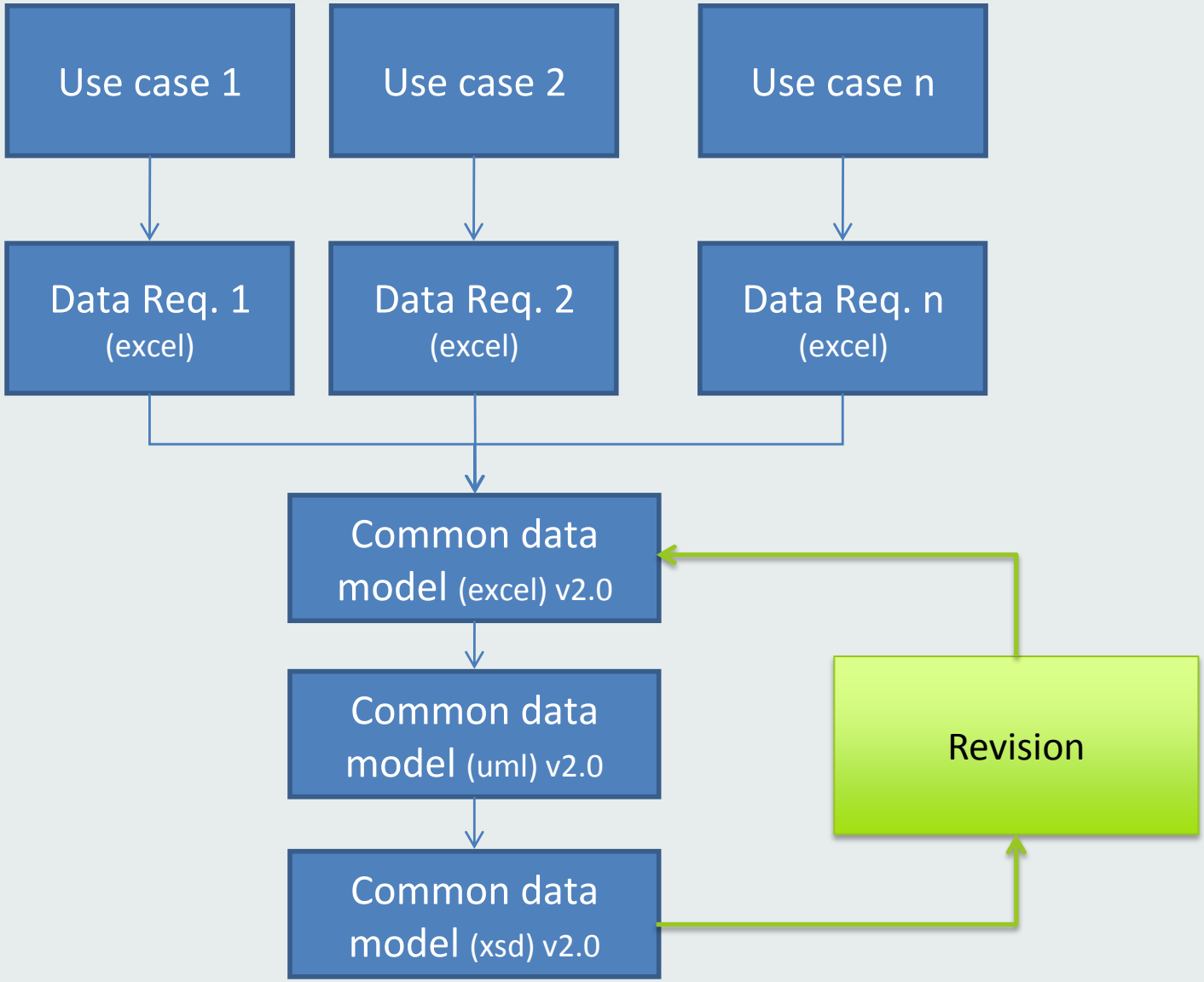
- Align different pilots' data modelling requirements (whereas feasible, group requirements into common classes)
- Compare data requirements so collected to the relevant INSPIRE Data Specifications

Extend data models

- Provide an extension of the INSPIRE data models to take into account requirements not covered by the INSPIRE DS
- Provide detailed instructions for maintenance of the schemas and the revision loop

Validate results

- Successfully validate the produced schemas against encoding requirements using desktop (Oxygen) and online (OGC CITE test Suite) tools.


Use case 1
Use case 2
Use case n
Data Req. 1 (excel)
Data Req. 2 (excel)
Data Req. n (excel)
Common data model (excel) v2.0
Common data model (uml) v2.0
Common data model (xsd) v2.0
Revision

A	B	C	D	E	F	G	
User services N°	DATA LOGIC NAME	DESCRIPTION LOGIC NAME	INPUT_OUTPUT DATA	DATA TYPE	INSPIRE	Extended properties (e.g. from CityGML ADE Energy	EXSISTING TABLE . ATTRI (OR OUTPUT METHOD CA
1	Building.Geometry 2D	footprint of the building	INPUT	Geometry	Building.Geometry 2D		EDIFICI_COMUNALI.SHA
	Building.Name	Name of the building, if known	INPUT	Text	Building.Name		EDIFICI_COMUNALI.DEN
	Building.Nature	Typology of the building	INPUT	Code list	Building.Nature		EDIFICI_COMUNALI.TIPC
	Building.Use(s)	Uses of the building	INPUT	Code list	Building.currentUse		EDIFICI_COMUNALI.TIPC
2	Building.Geometry 2D		INPUT	Geometry	Building.Geometry 2D		EDIFICI_COMUNALI.SHA
	Building.Name		INPUT	Text	Building.Name		EDIFICI_COMUNALI.DEN
	Building.Nature		INPUT	Code list	Building.Nature		EDIFICI_COMUNALI.TIPC
	Building.Use(s)		INPUT	Code list	Building.currentUse		EDIFICI_COMUNALI.TIPC
	Building.Presence of photovoltaic panels	Presence of solar panels used by the	INPUT	Number	(rel) installationValue (solarPanel)		IMPIANTI_RINNOVABILI_
3	Building.Geometry 2D		INPUT	Geometry	Building.Geometry 2D		EDIFICI_COMUNALI.SHA
	Building.Name		INPUT	Text	Building.Name		EDIFICI_COMUNALI.DEN
	Building.Nature		INPUT	Code list	Building.Nature		EDIFICI_COMUNALI.TIPC
	Building.Use(s)		INPUT	Code list	Building.currentUse		EDIFICI_COMUNALI.TIPC
	Building.Heated volumes	Cube meters (volume) of the building	INPUT	Number	n.a.		CENTRALI_TERMICHE_E
	Building.Unit of measure of energy consumption	Unit of measure of energy used (e.g. m3 for gas)	INPUT	Code list	n.a.		CONSUMI_CENTRALI_TE
	Building.Energy fuel	building	INPUT	Number	n.a.		CONSUMI_CENTRALI_TE
	Building.Energy value	fuel	INPUT	Number			CONSUMI_CENTRALI_TE
	Building.Energy consumption (in kWh)	kWh	INPUT	Number			CONSUMI_CENTRALI_TE
	Building.Presence of photovoltaic panels		INPUT	Number	Building.Installation (association)		IMPIANTI_RINNOVABILI_
4	Building.Geometry 2D		INPUT	Geometry	Building.Geometry 2D		EDIFICI_COMUNALI.SHA
	Building.Name		INPUT	Text	Building.Name		EDIFICI_COMUNALI.DEN
	Building.Nature		INPUT	Code list	Building.Nature		EDIFICI_COMUNALI.TIPC
	Building.Use(s)		INPUT	Code list	Building.currentUse		EDIFICI_COMUNALI.TIPC
	Building.Energy consumption (total in kWh)						
	Building.Presence of photovoltaic panels		INPUT	Number			IMPIANTI_RINNOVABILI_
	Building.Geometry 2D		INPUT	Geometry	Building.Geometry 2D		EDIFICI_COMUNALI.SHA
	Building.Name		INPUT	Text	Building.Name		EDIFICI_COMUNALI.DEN
	Building.Nature		INPUT	Code list	Building.Nature		EDIFICI_COMUNALI.TIPC
	Building.Use(s)		INPUT	Code list	Building.currentUse		EDIFICI_COMUNALI.TIPC

A	B	C	D	E	F	G	H	I	J	K
Pilot 01			Pilot 02				Pilot 03			
UC-GSCP01-01	UC-GSCP01-02	DATA LOGIC NAME (PILOT 1)	UC-GSCP02-01	UC-GSCP02-02	UC-GSCP02-03	DATA LOGIC NAME (PILOT 2)	DATA LOGIC NAME (PILOT 3)	DATA LOGIC NAME *	DESCRIPTION LOGIC NAME *	INPUT_OTPUT DATA
X (1, 2, 3, 4, 5, 6, 6bis, 7, 8)	X (1,2,3,4,7)	BuildingTerritory.Geometry 2D; BuildingUE.Geometry 2D	X	X	X	Building.Geometry 2D	Building.Geometry 2D; EconomicActivity.the_geom	**geometry2D**	footprint of the territorial building	INPUT
X (1, 2, 3, 4, 5, 6, 6bis, 7, 8)		BuildingUE.Name	X	X	X	Building.Name		**name**	Name of the building	INPUT
X (1, 2, 3, 4, 5, 6, 6bis, 7, 8)	X (1,2,3,4,7)	BuildingUE.Nature	X	X	X	Building.Nature	Building.Nature (__TEDIF)	**buildingNature**	Typology of the building	INPUT
							Building.gid; UserBulding.gid;	**inspireId**		INPUT
X (1, 2, 3, 4, 5, 6, 6bis, 7, 8)		BuildingUE.Ownership						**ownership**	Ownership of the building	INPUT
X (1, 2, 3, 4, 5, 6, 6bis, 7, 8)	X (1,2,3,4,7)	BuildingUE.Use(s)	X	X	X	Building.Use(s)	Building.currentUse (__TUTIL); EconomicActivity.tser	**currentUse**	Type of uses of the building (use classification based on the energy certification)	INPUT
X (1, 2, 3, 4, 5, 6, 6bis, 7, 8)	X (1,2,3,4,7)	BuildingUE.Address	X	X	X	Building.Postcode; Building.Neighborhood		**address**	Address building (Street, Civic, Civic sub)	INPUT
X (1, 2, 3, 4, 5, 6, 6bis, 7, 8)		BuildingUE.CostructionYear	X	X	X	Building.Construction period - begin; Building.Construction period - end	Building.__EPOCA; Building.UserYear	**dateOfConstruction**	Costruction Year of the building (if available or estimated)	INPUT
			X	X	X	Building.height; Building.height_statu		**heightAboveGround**	Total height of the building, in meters	INPUT

Estensione dei modelli dati INSPIRE

INSPIRE
Infrastructure for Spatial Information in Europe

INSPIRE Generic Conceptual Model

Title	D2.5: Generic Conceptual Model, Version 3.4
Status	Version for Annex II/III data specifications v3.0
Creator	Drafting Team "Data Specifications"
Date	2014-04-08
Subject	Generic Conceptual Model of the INSPIRE data specifications
Publisher	Drafting Team "Data Specifications"
Type	Text
Description	Generic Conceptual Model of the INSPIRE data specifications
Contributor	Members of the INSPIRE Drafting Team "Data Specifications", INSPIRE Spatial Data Interest Communities & Legally Mandated Organisations, INSPIRE Consolidation Teams and other Drafting Teams
Format	Portable document format (pdf)
Source	Drafting Team "Data Specifications"
Rights	Public
Identifier	D2.5_v3.4
Language	En
Relation	n/a
Coverage	Project duration

Annex F
(informative)

Example for an extension to an INSPIRE application schema

F.1 Introduction

The agreement on harmonised data specifications addresses the need of users, in particular pan-European users, to combine multiple spatial data sets without repetitive manual intervention and in such a way that the result is coherent. This requires an effort to transform the existing spatial data to the new harmonised data specifications. In the long-term, it is the hope that less and less effort will be required for such transformations and that data providers start to re-use the harmonised data specifications as the basis for their spatial data sets in case they are restructured. Since national spatial data sets will in almost all cases contain information not covered by the INSPIRE data specifications, national SDIs or community SDIs will typically have to extend the INSPIRE data specification for their own purpose.

The Generic Conceptual Model has been designed to support such extensions. This annex provides an example for a simple extension.

F.2 General rules

The INSPIRE data specifications have been developed through a process involving the European stakeholders. While the future maintenance of the specifications has not yet been fixed, it is reasonable to assume that this will be the case in the future, too. The INSPIRE

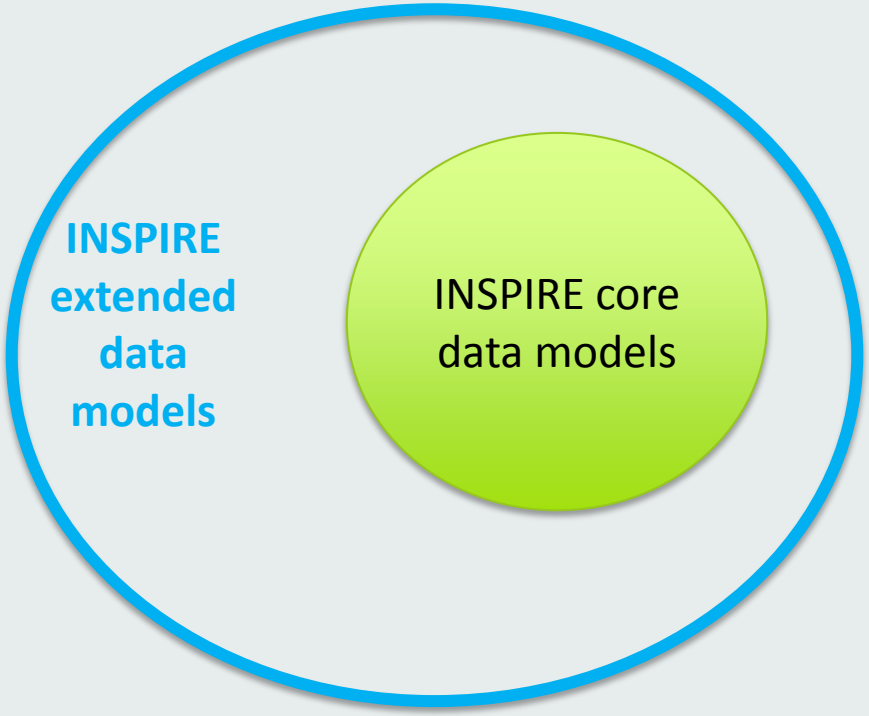
Extending an INSPIRE data specification would imply at a minimum that:
- the extension does not change anything in the INSPIRE data specification but normatively references it with all its requirements
- the extension does not add a requirement that breaks any requirement of the INSPIRE data specification

However, the extension may, for example, do any of the following:
- add new application schemas importing INSPIRE or other schemas as needed
- add new types and new constraints in your own application schemas
- extend INSPIRE code lists as long as the INSPIRE data specification does not identify the code list as a centrally managed, non-extensible code list
- add additional portrayal rules

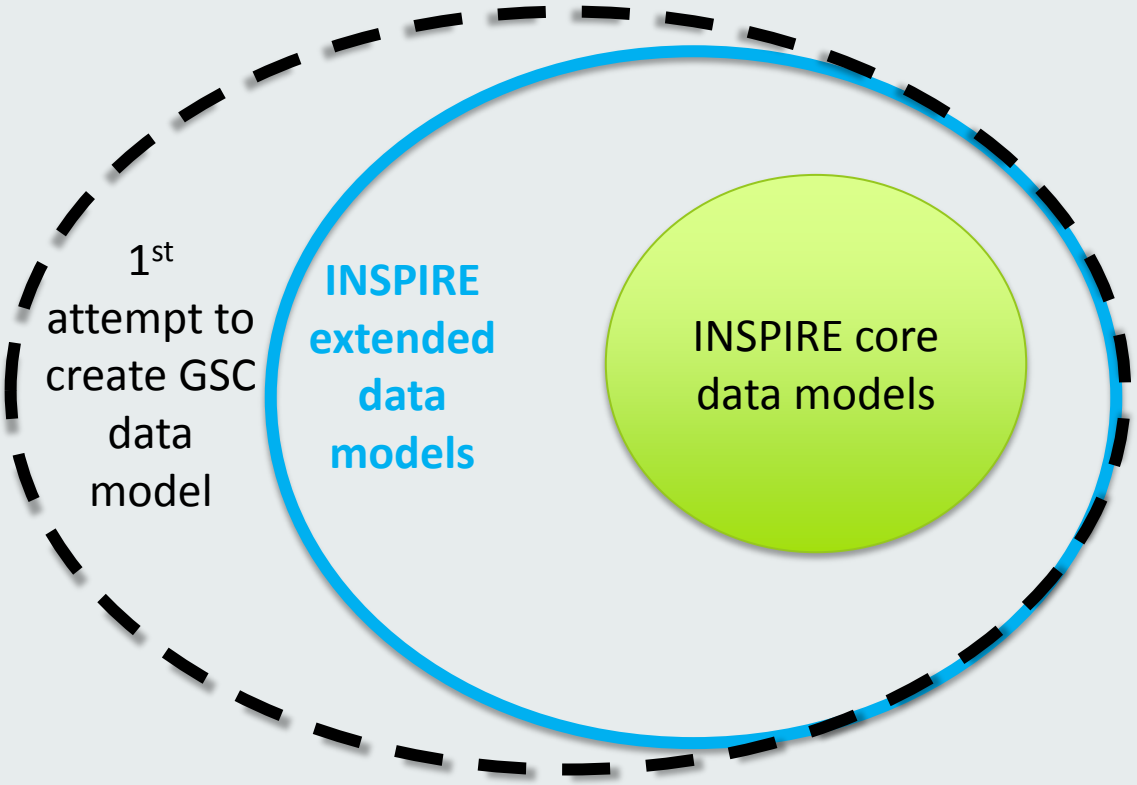
In addition to these general rules that are mainly implied by the rules of UML, further harmonisation will be achieved, if the extensions conform to all requirements of this document and the document "Guidelines for the encoding of spatial data", too.

L’approccio di estensione dei modelli dati GSC

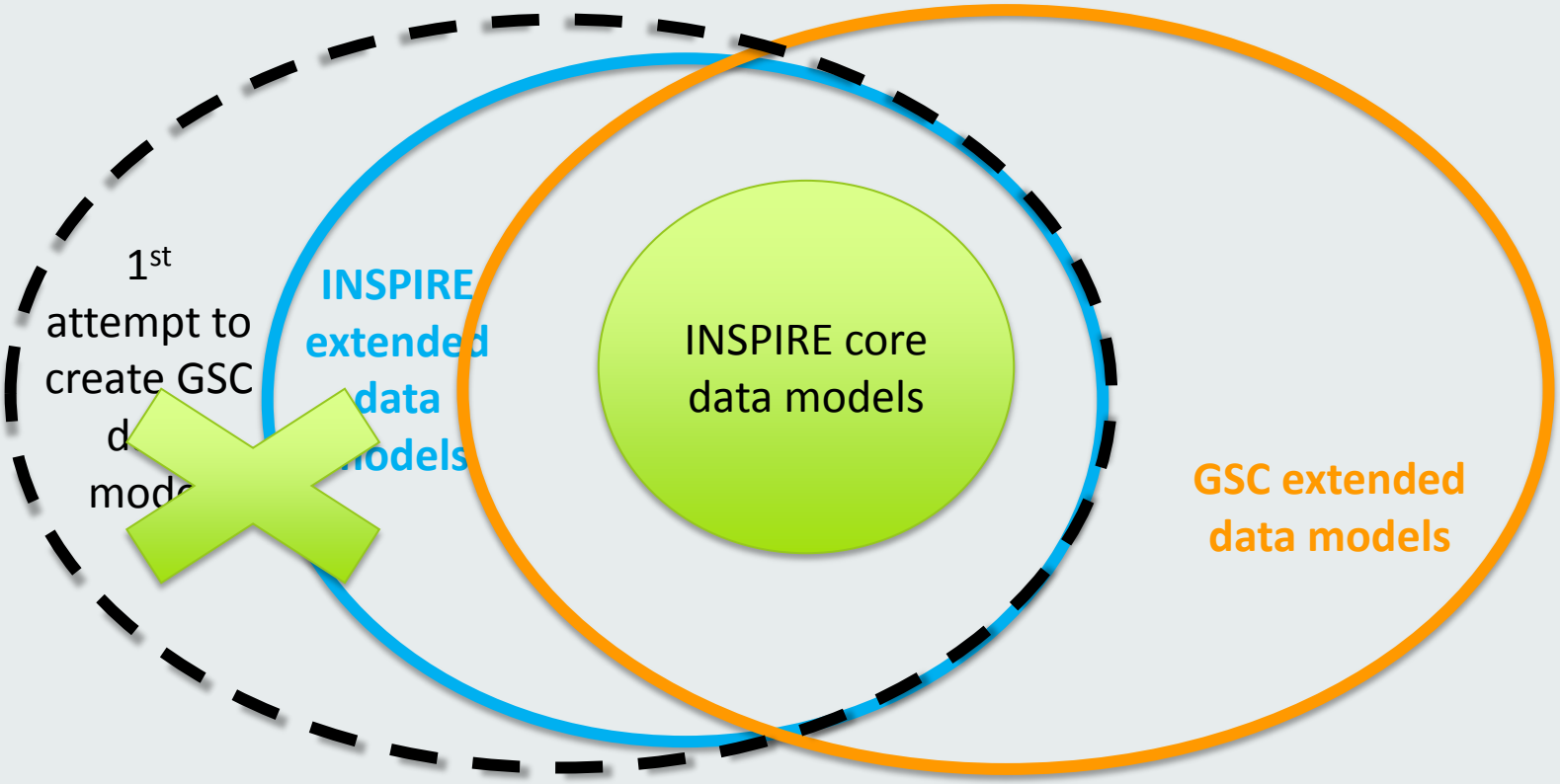
L’approccio di estensione dei modelli dati GSC



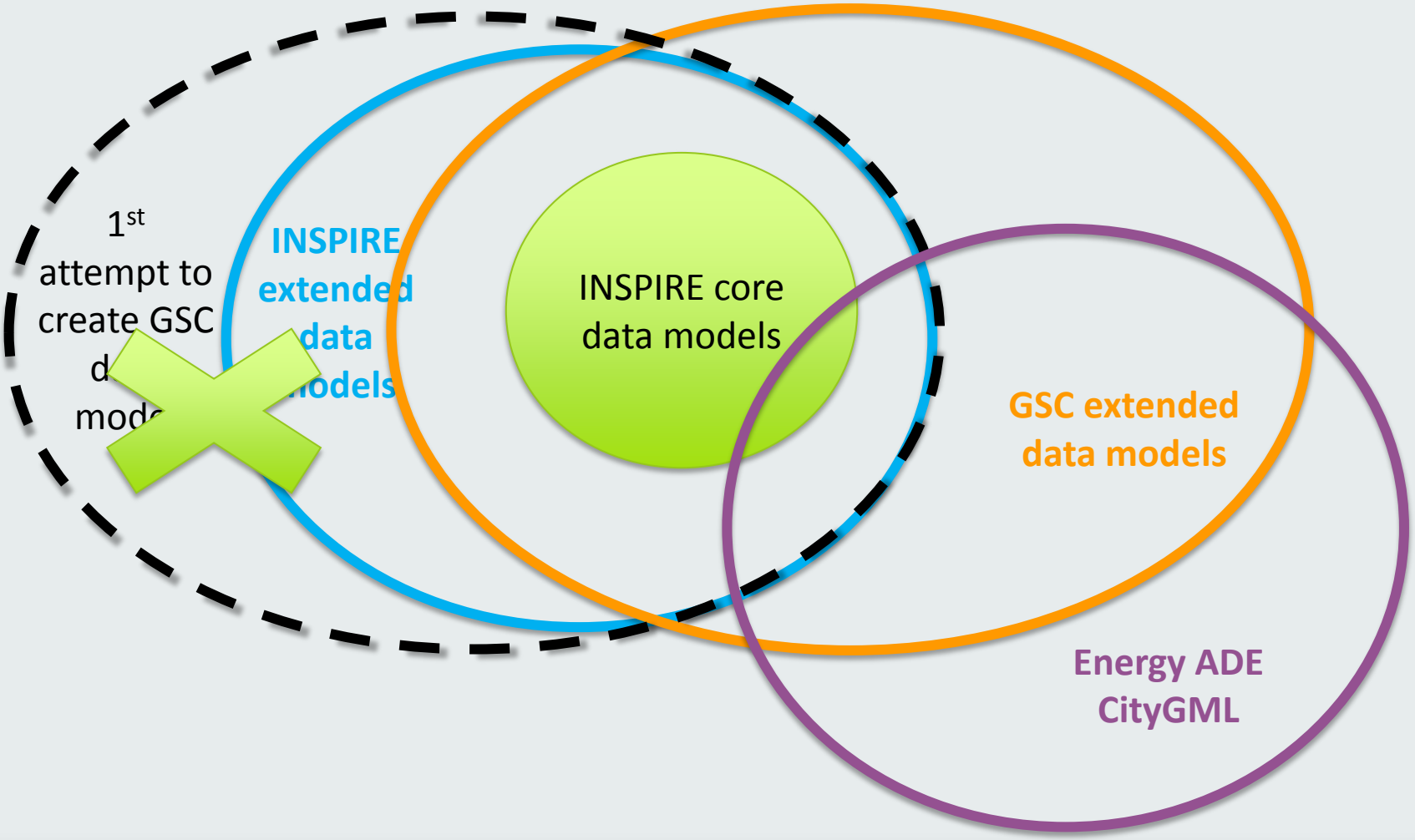
L’approccio di estensione dei modelli dati GSC



L’approccio di estensione dei modelli dati GSC



L’approccio di estensione dei modelli dati GSC



A	B	C	D	E	F	G	H	I	J	K	L
Application Schema 'Building2D-Energy' (version 2.1)								**Pilot Mapping**			
Type	**Documentation**	**Attribute Association role New/updated attribute**	**Attribute / Association role Documentation**	**Values / Enumerations**	**Multiplicity**	**Voidable / Non-Void:**		**Pilot 01**	**Pilot 02**	**Pilot 03**	
Building Supertypes:Building *BuildingAbstractBuildingAbstractConstructionBuildingInfo BuildingAndBuildingUnitInfo*	Building A Building is an enclosed construction above and/or underground, used or intended for the shelter of humans, animals or things or for the production of economic goods. A building refers to any structure permanently constructed or erected on its site.										
		beginLifespanVersion	Begin lifespan version Date and time at which this version of	DateTime	1	voidable					
		conditionOfConstruction	Condition of construction Status of the	ConditionOfConstructionValue	1	voidable					
		dateOfConstruction	Date of construction Date of construction.	DateOfEvent	0..1	voidable		BuildingUE.Costruction	Building.Construction	Building.__EPOCA;	
		dateOfDemolition	Date of demolition Date of demolition	DateOfEvent	0..1	voidable					
		dateOfRenovation	Date of last major renovation Date of last major renovation	DateOfEvent	0..1	voidable					
		elevation	Elevation Vertically-constrained dimensional property	Elevation	0..*	voidable			Building.Elevation_value		
		endLifespanVersion	End lifespan version Date and time at which this version of	DateTime	0..1	voidable					
		externalReference	External reference Reference to an external	ExternalReference	0..*	voidable					
		heightAboveGround	Height above ground Height above ground NOTE:	HeightAboveGround	0..*	voidable			Building.height:		
		inspireId	inspire id External object identifier of the spatial	Identifier	1					Building.gid; UserBuilding	
		name	Name Name of the construction EXAMPLES: Big	GeographicalName	0..*	voidable		BuildingUE.Name	Building.Name		
		buildingNature	Building nature Characteristic of the building that	BuildingNatureValue	0..*	voidable		BuildingUE.Nature	Building.Nature	Building.Nature (__TEDIE)	
		currentUse	Current use Activity hosted within the building. This attribute addresses mainly the	CurrentUse	0..*	voidable		BuildingUE.Use(s)	Building.Use(s)	Building.currentUse (__TUTIL);	
		numberOfDwellings	Number of dwellings Number of dwellings A	Integer	0..1	voidable					
		numberOfBuildingUnits	Number of building units Number of building units in the	Integer	0..1	voidable			Building.Units		
		numberOfFloorsAboveGr	Number of floors above	Integer	0..1	voidable			Building.Num		

GSC - Underground Scenario

INSPIRE Utilities and Governmental Services (US) - *"Utility networks"* Profile:

- is based on a node-arc-node structure and network concept
- information is detailed in:
  - one "Common Utility Networks Elements" application schema, that contains all the common elements shared among the different utility network type
  - six network - specific application schemas
    - Electricity network
    - Oil, Gas & Chemicals network
    - Sewer network
    - Telecommunications network (only proposed in the technical guidance, out of legislation)
    - Thermal network
    - Water network

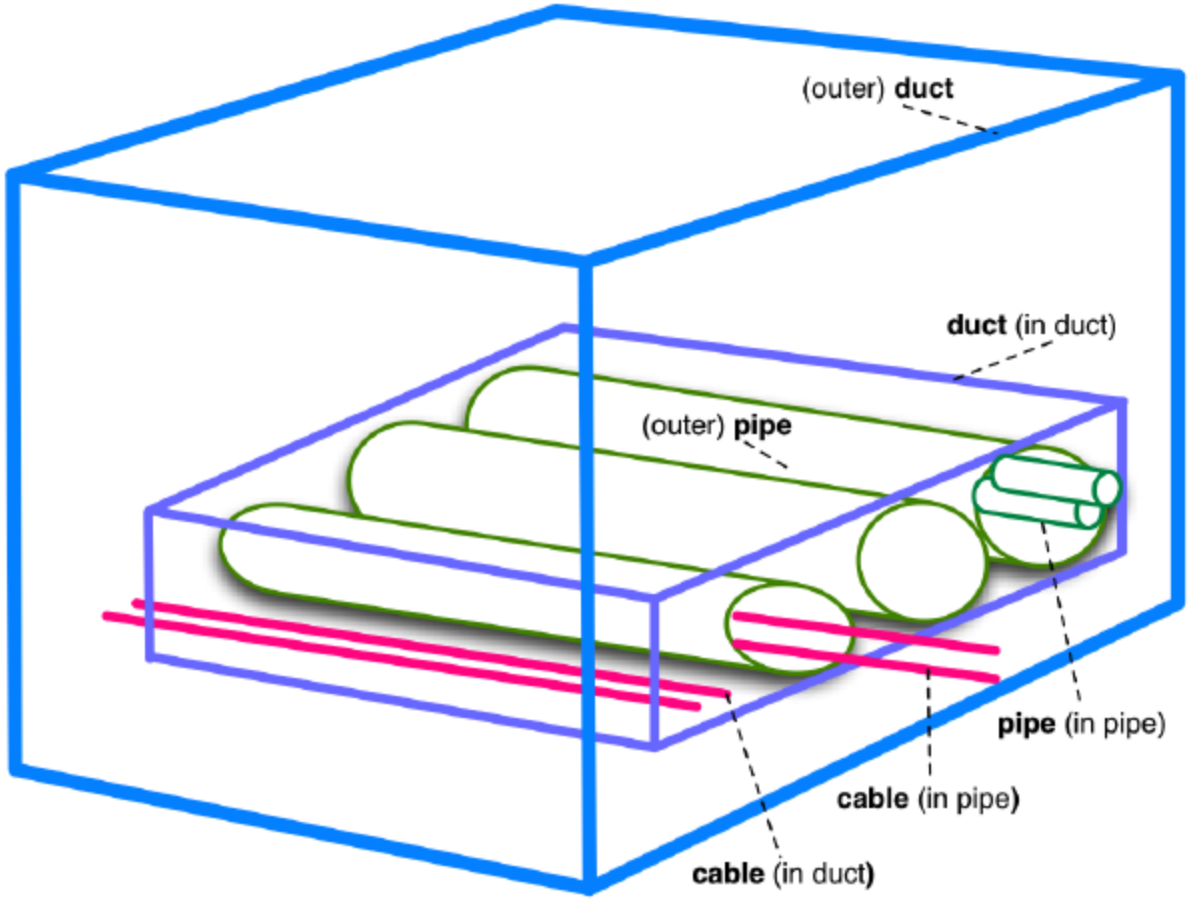
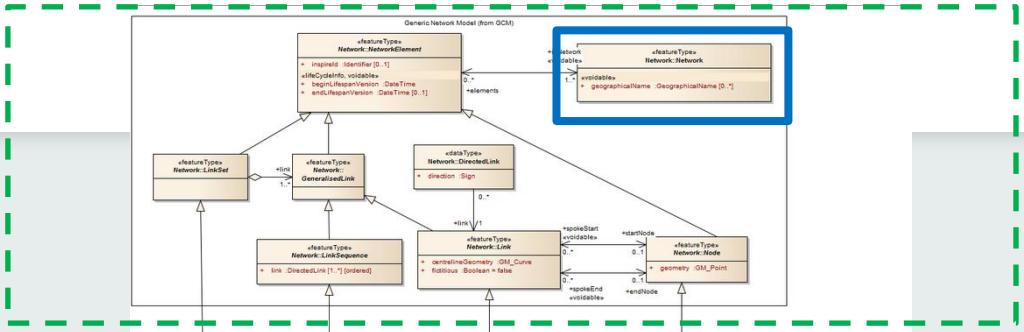
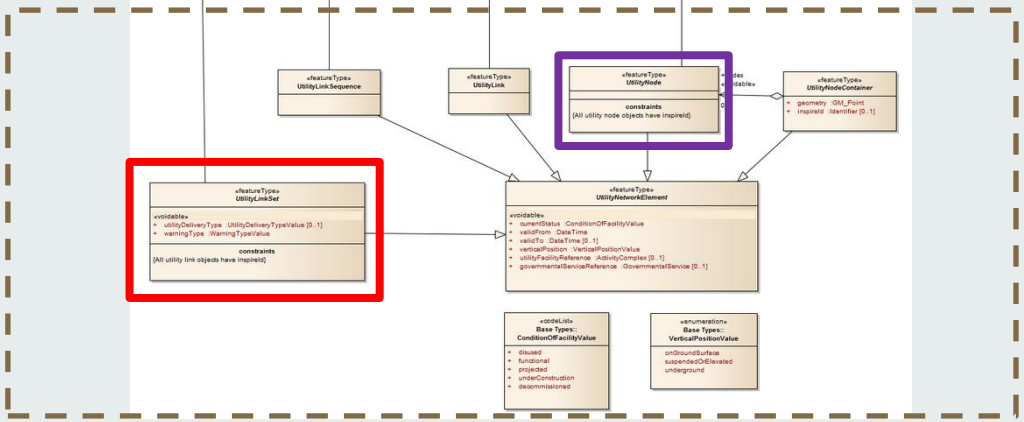


Figure 9 – Physical relations between cables, pipes and ducts

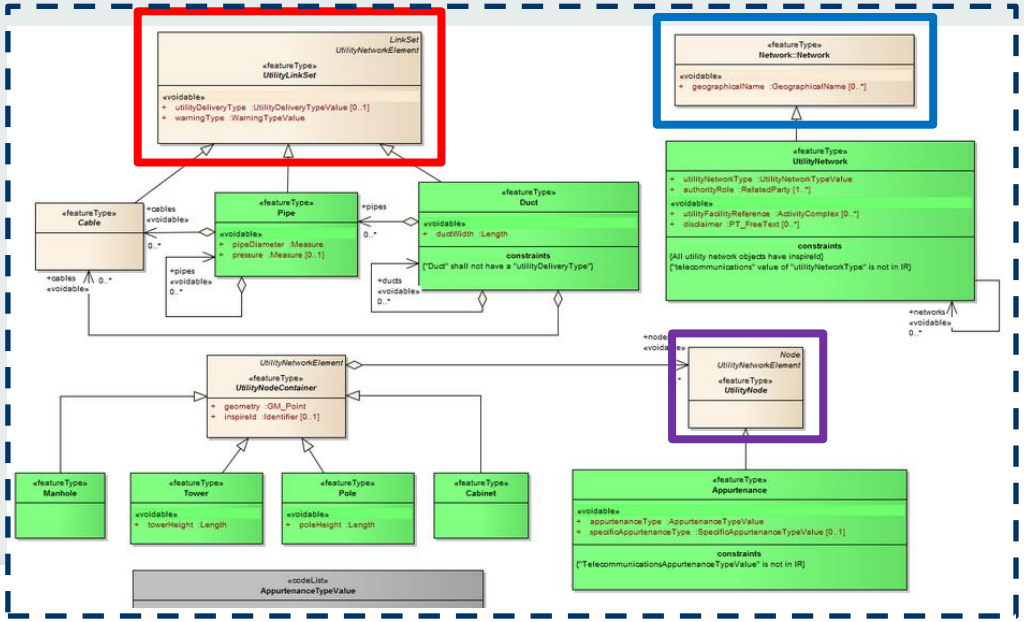
Generic Network Model (from GCM)



Utility Network Profile – Abstract Types



Utility Network Profile – CommonTypes

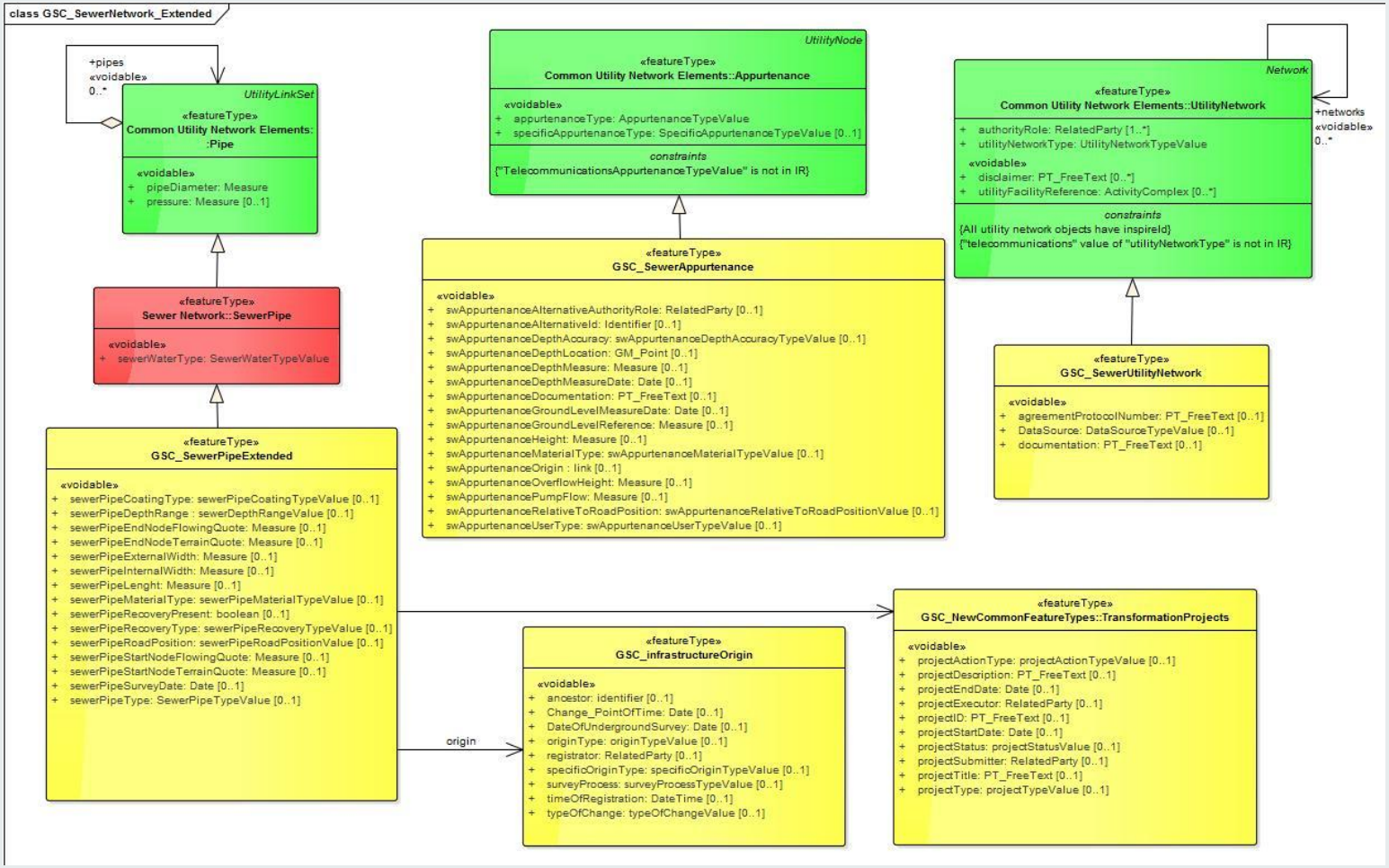


GeoSmartCity - Underground Scenario Data Model

The GeoSmartCity Utilities and Governmental Services data model inherits the core **INSPIRE** data model for **Utilities and Governmental Services** and extends it by means of:

- **1 "New Common Types" application schema**, which contains definitions for feature types and data types which are not present in the INSPIRE core and that are common to all GSC- extended US schemas
- **6 *network-specific extended* application schemas** ,which extend INSPIRE core US feature types adding new attributes and relevant code clist / codelist values:
    - Electricity network
    - Oil, Gas & Chemicals network
    - Sewer network
    - Telecommunications network
    - Thermal network
    - Water network
- **1 *theme-specific extension*** of the Base Model "Activity Complex" application schema according to what stated by D2.10 "The types defined in the Base Model *Activity Complex* are supposed to be extended in the related thematic data specifications

GeoSmartCity estensione per il "Sewer Network"



GSC – Green Energy Scenario - Buildings

NOTE: **Data producers may also extend INSPIRE profiles by other information not included in this specification, under the condition they respect the rules provided in the Generic Conceptual Model.**

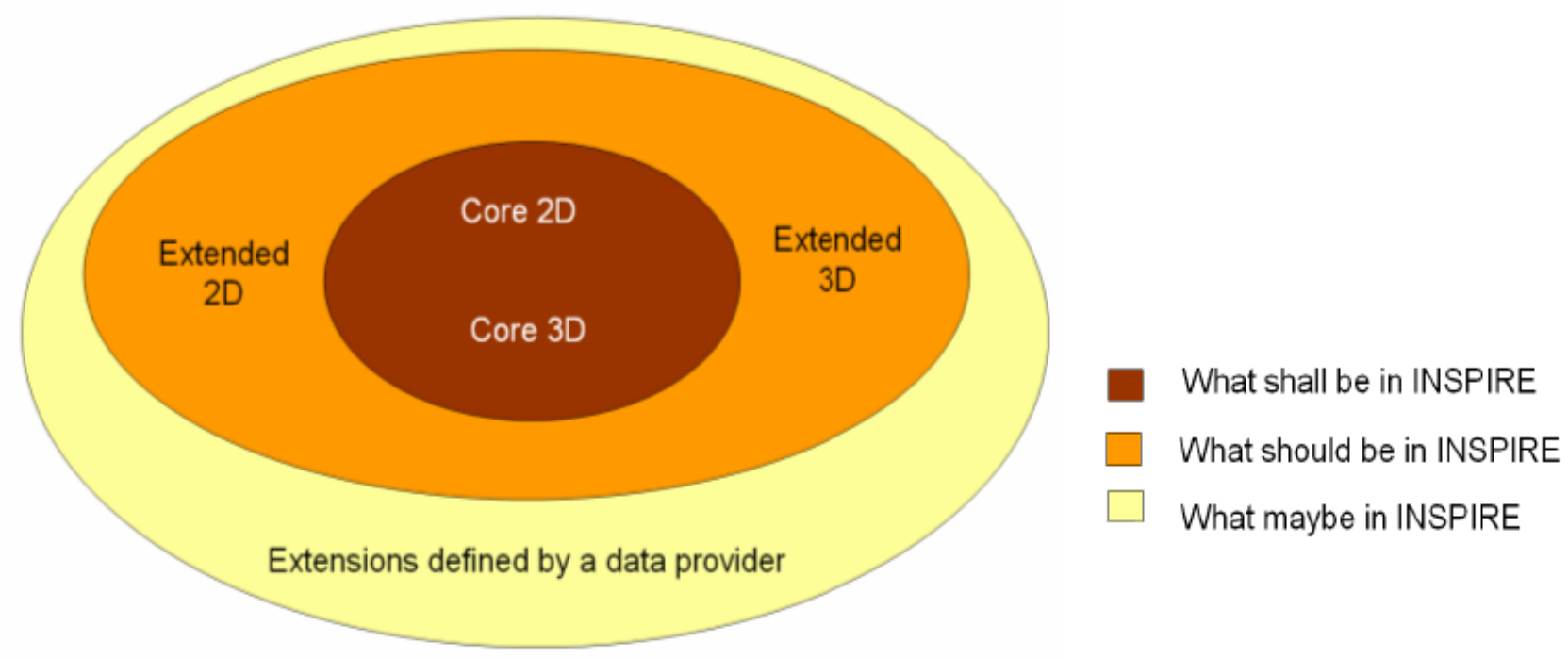


Figure 4: Modular approach for modelling Buildings theme

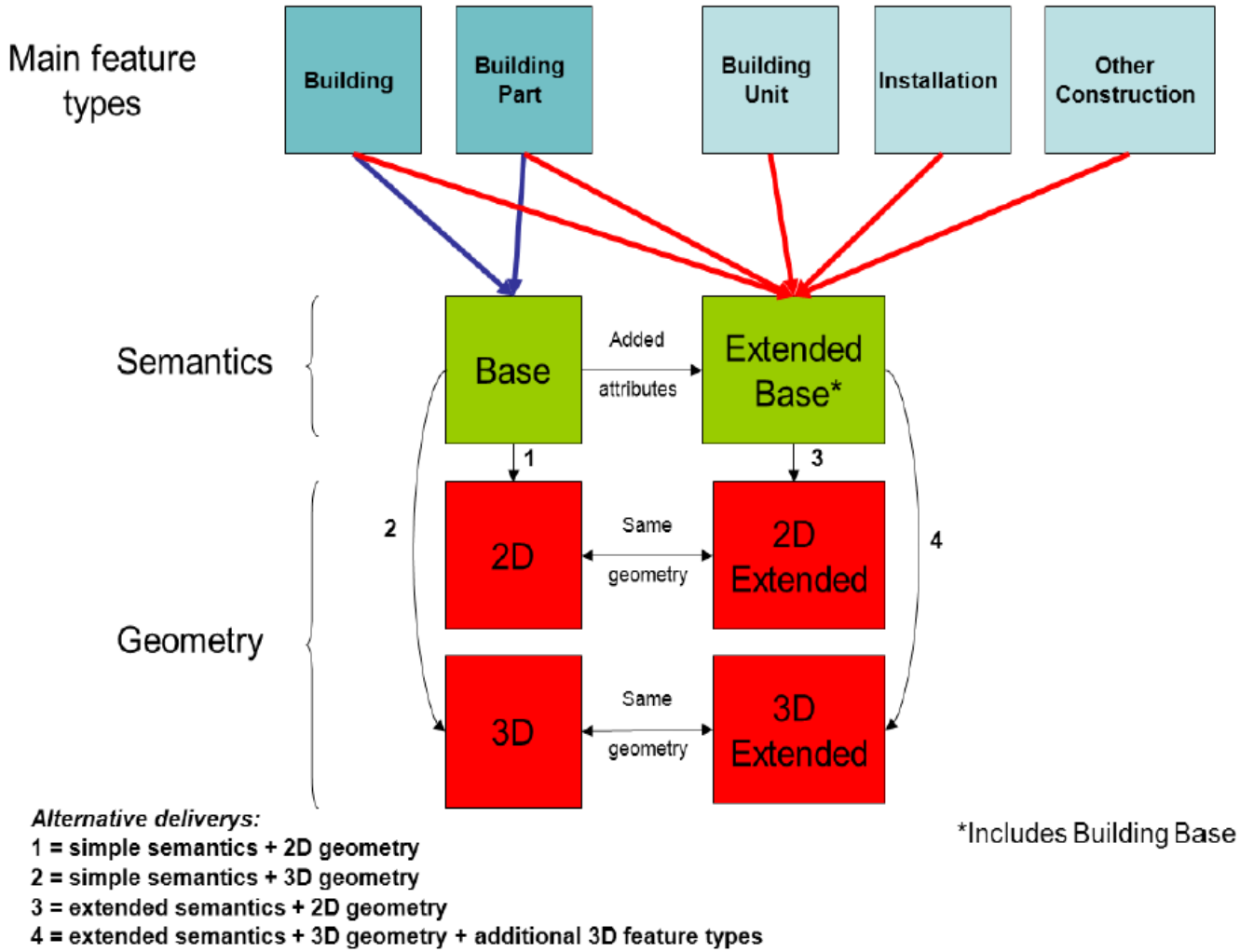
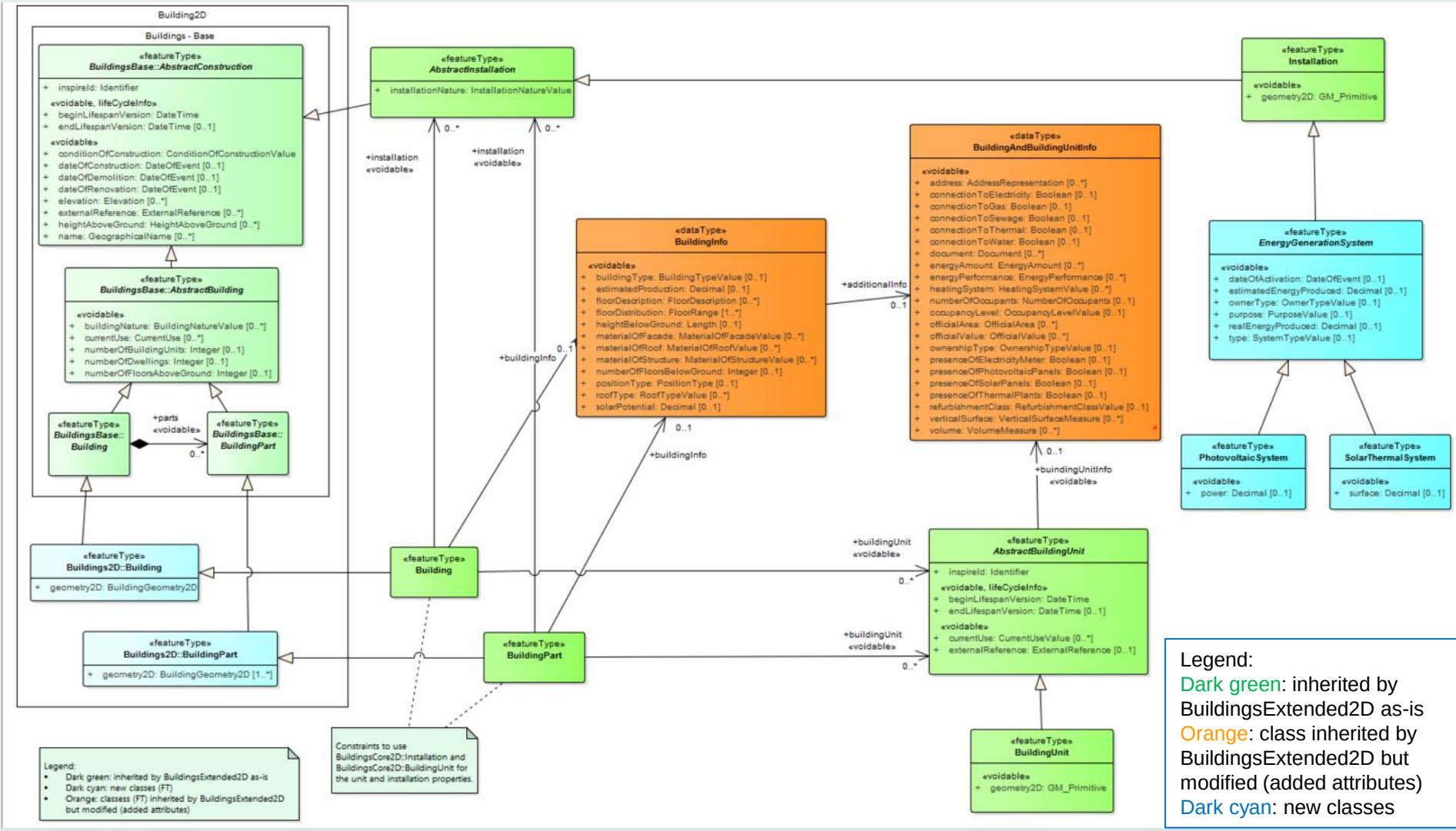


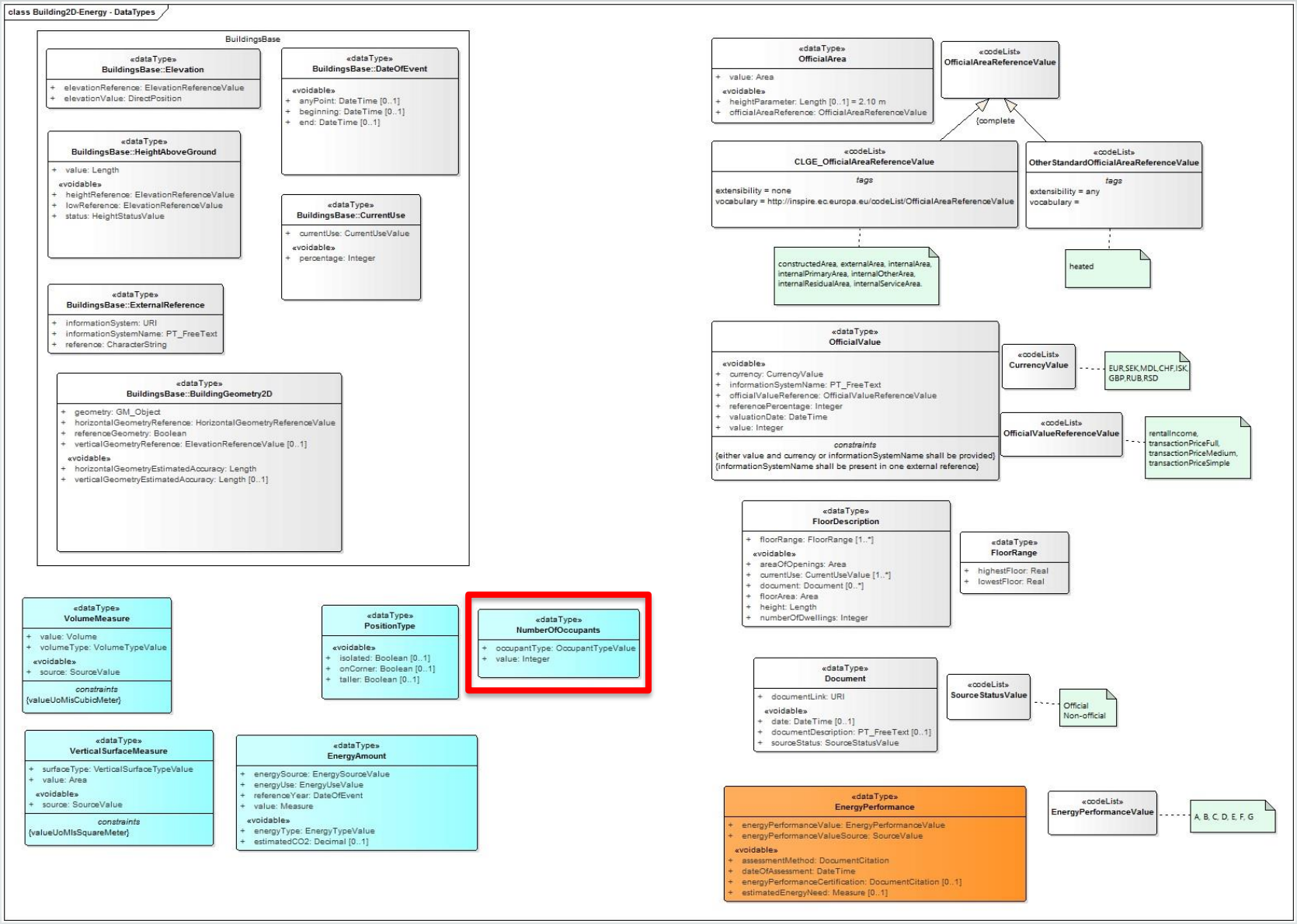
Figure 3: Content and structure of application schemas for theme Buildings

Feature types are represented in blue. Abstract application schemas are represented in green. Instanciable application schemas are represented in red.

GeoSmartCity – Green Energy Scenario Data Model



Legend:
Dark green: inherited by BuildingsExtended2D as-is
Orange: class inherited by BuildingsExtended2D but modified (added attributes)
Dark cyan: new classes


class Building2D-Energy - DataTypes
BuildingsBase
«dataType» BuildingsBase::Elevation
+ elevationReference: ElevationReferenceValue
+ elevationValue: DirectPosition
«dataType» BuildingsBase::DateOfEvent
«voidable»
+ anyPoint: DateTime [0..1]
+ beginning: DateTime [0..1]
+ end: DateTime [0..1]
«dataType» BuildingsBase::HeightAboveGround
+ value: Length
«voidable»
+ heightReference: ElevationReferenceValue
+ lowReference: ElevationReferenceValue
+ status: HeightStatusValue
«dataType» BuildingsBase::CurrentUse
+ currentUse: CurrentUseValue
«voidable»
+ percentage: Integer
«dataType» BuildingsBase::ExternalReference
+ informationSystem: URI
+ informationSystemName: PT_FreeText
+ reference: CharacterString
«dataType» BuildingsBase::BuildingGeometry2D
+ geometry: GM_Object
+ horizontalGeometryReference: HorizontalGeometryReferenceValue
+ referenceGeometry: Boolean
+ verticalGeometryReference: ElevationReferenceValue [0..1]
«voidable»
+ horizontalGeometryEstimatedAccuracy: Length
+ verticalGeometryEstimatedAccuracy: Length [0..1]
«dataType» VolumeMeasure
+ value: Volume
+ volumeType: VolumeTypeValue
«voidable»
+ source: SourceValue
constraints
{valueUoMisCubicMeter}
«dataType» PositionType
«voidable»
+ isolated: Boolean [0..1]
+ onCorner: Boolean [0..1]
+ taller: Boolean [0..1]
«dataType» NumberOfOccupants
+ occupantType: OccupantTypeValue
+ value: Integer
«dataType» VerticalSurfaceMeasure
+ surfaceType: VerticalSurfaceTypeValue
+ value: Area
«voidable»
+ source: SourceValue
constraints
{valueUoMIsSquareMeter}
«dataType» EnergyAmount
+ energySource: EnergySourceValue
+ energyUse: EnergyUseValue
+ referenceYear: DateOfEvent
+ value: Measure
«voidable»
+ energyType: EnergyTypeValue
+ estimatedCO2: Decimal [0..1]
«dataType» OfficialArea
+ value: Area
«voidable»
+ heightParameter: Length [0..1] = 2.10 m
+ officialAreaReference: OfficialAreaReferenceValue
«codeList» OfficialAreaReferenceValue
{complete
«codeList» CLGE_OfficialAreaReferenceValue
tags
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vocabulary = http://inspire.ec.europa.eu/codeList/OfficialAreaReferenceValue
«codeList» OtherStandardOfficialAreaReferenceValue
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extensibility = any
vocabulary =
constructedArea, externalArea, internalArea, internalPrimaryArea, internalOtherArea, internalResidualArea, internalServiceArea.
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«voidable»
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+ informationSystemName: PT_FreeText
+ officialValueReference: OfficialValueReferenceValue
+ referencePercentage: Integer
+ valuationDate: DateTime
+ value: Integer
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{informationSystemName shall be present in one external reference}
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+ floorRange: FloorRange [1..*]
«voidable»
+ areaOfOpenings: Area
+ currentUse: CurrentUseValue [1..*]
+ document: Document [0..*]
+ floorArea: Area
+ height: Length
+ numberOfDwellings: Integer
«dataType» FloorRange
+ highestFloor: Real
+ lowestFloor: Real
«dataType» Document
+ documentLink: URI
«voidable»
+ date: DateTime [0..1]
+ documentDescription: PT_FreeText [0..1]
+ sourceStatus: SourceStatusValue
«codeList» SourceStatusValue
Official
Non-official
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+ energyPerformanceValueSource: SourceValue
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+ dateOfAssessment: DateTime
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+ estimatedEnergyNeed: Measure [0..1]
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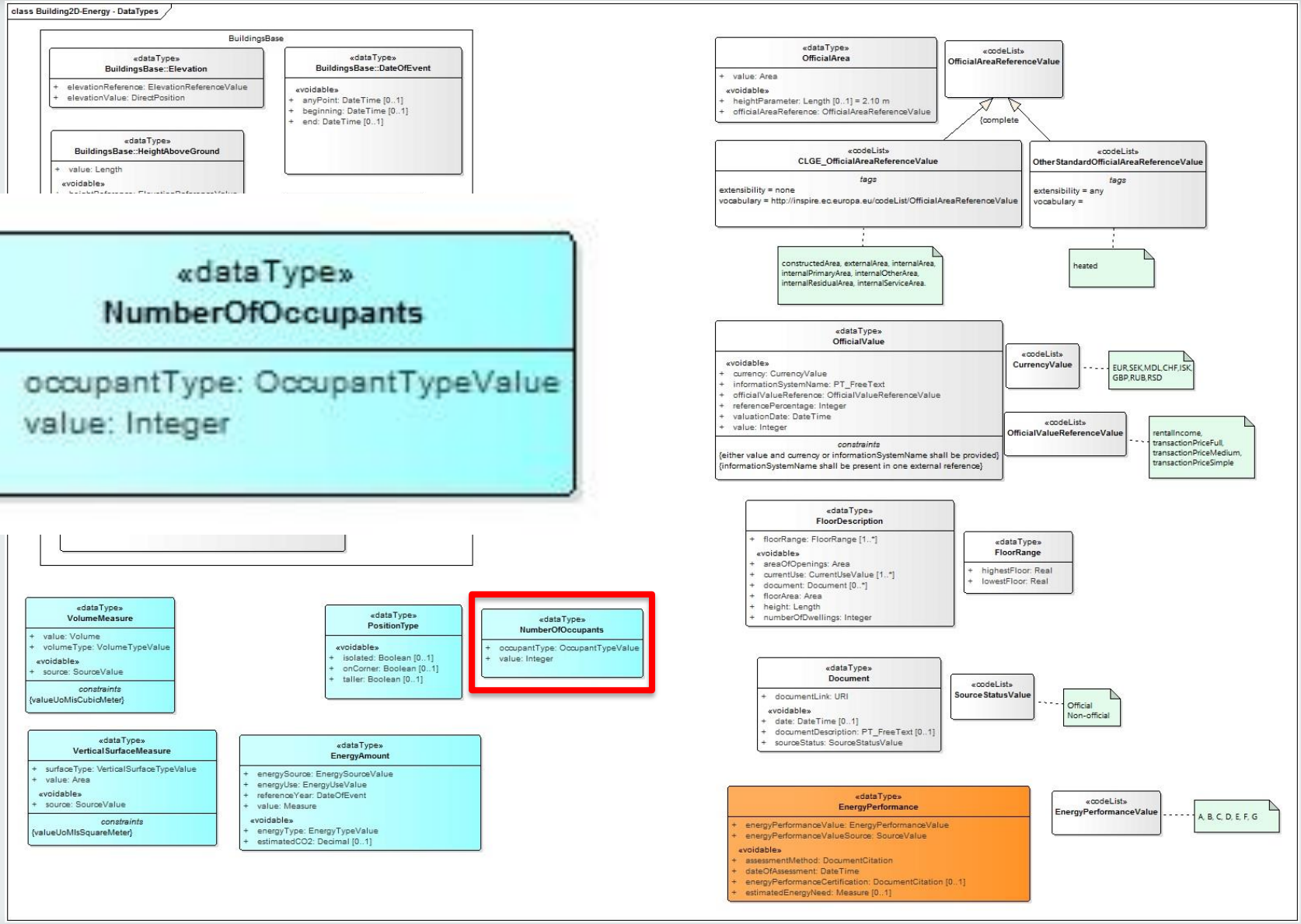
A, B, C, D, E, F, G


class Building2D-Energy - DataTypes
BuildingsBase
«dataType»
BuildingsBase::Elevation
+ elevationReference: ElevationReferenceValue
+ elevationValue: DirectPosition
«dataType»
BuildingsBase::DateOfEvent
«voidable»
+ anyPoint: DateTime [0..1]
+ beginning: DateTime [0..1]
+ end: DateTime [0..1]
«dataType»
BuildingsBase::HeightAboveGround
+ value: Length
«voidable»
«dataType»
NumberOfOccupants
+ occupantType: OccupantTypeValue
+ value: Integer
«dataType»
OfficialArea
+ value: Area
«voidable»
+ heightParameter: Length [0..1] = 2.10 m
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+ height: Length
+ numberOfDwellings: Integer
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+ lowestFloor: Real
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PositionType
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+ taller: Boolean [0..1]
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+ value: Integer
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+ documentDescription: PT_FreeText [0..1]
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Non-official
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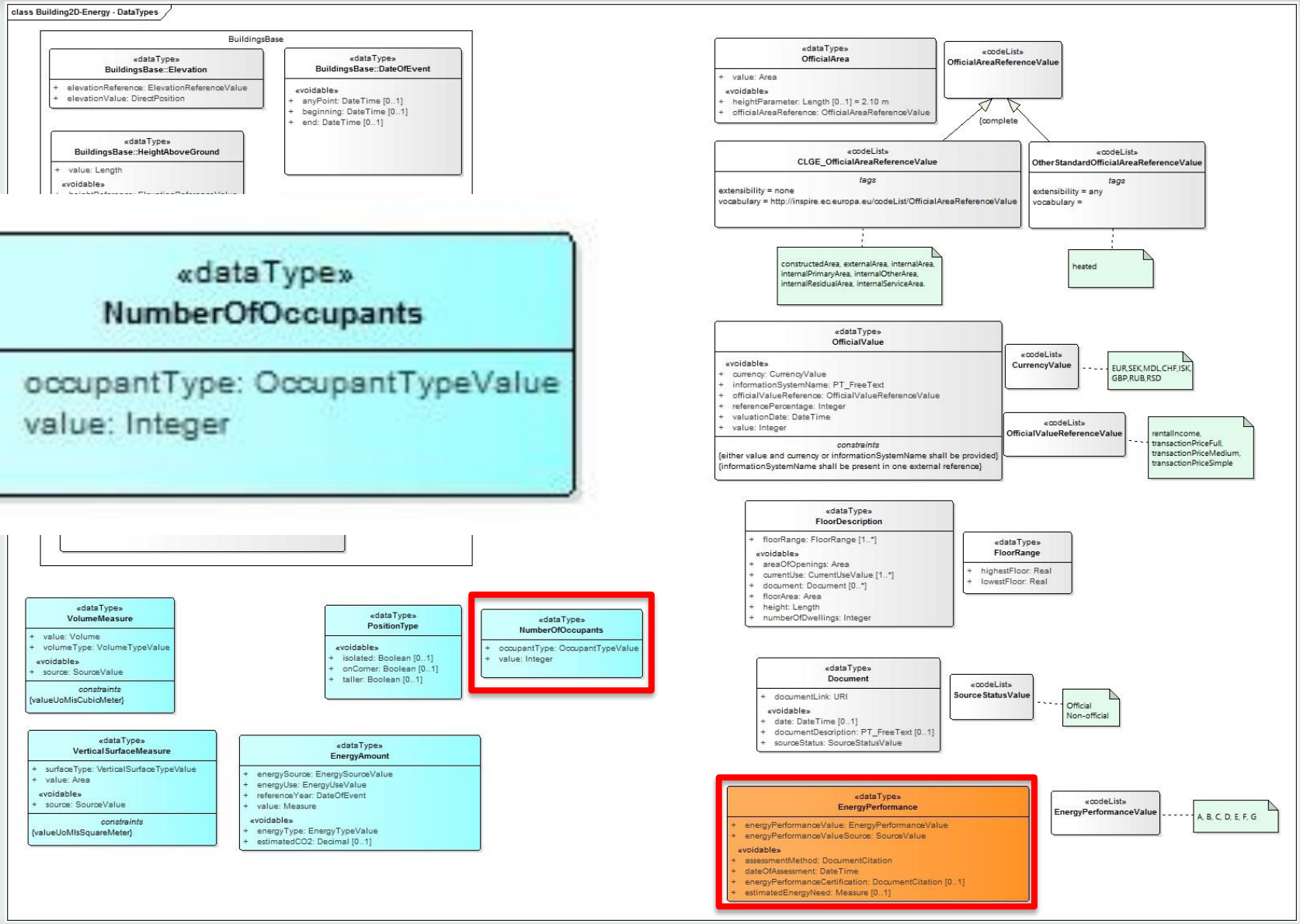
A, B, C, D, E, F, G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+ end: DateTime [0..1]
«dataType»
BuildingsBase::HeightAboveGround
+ value: Length
«voidable»
«dataType»
NumberOfOccupants
+ occupantType: OccupantTypeValue
+ value: Integer
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+ value: Area
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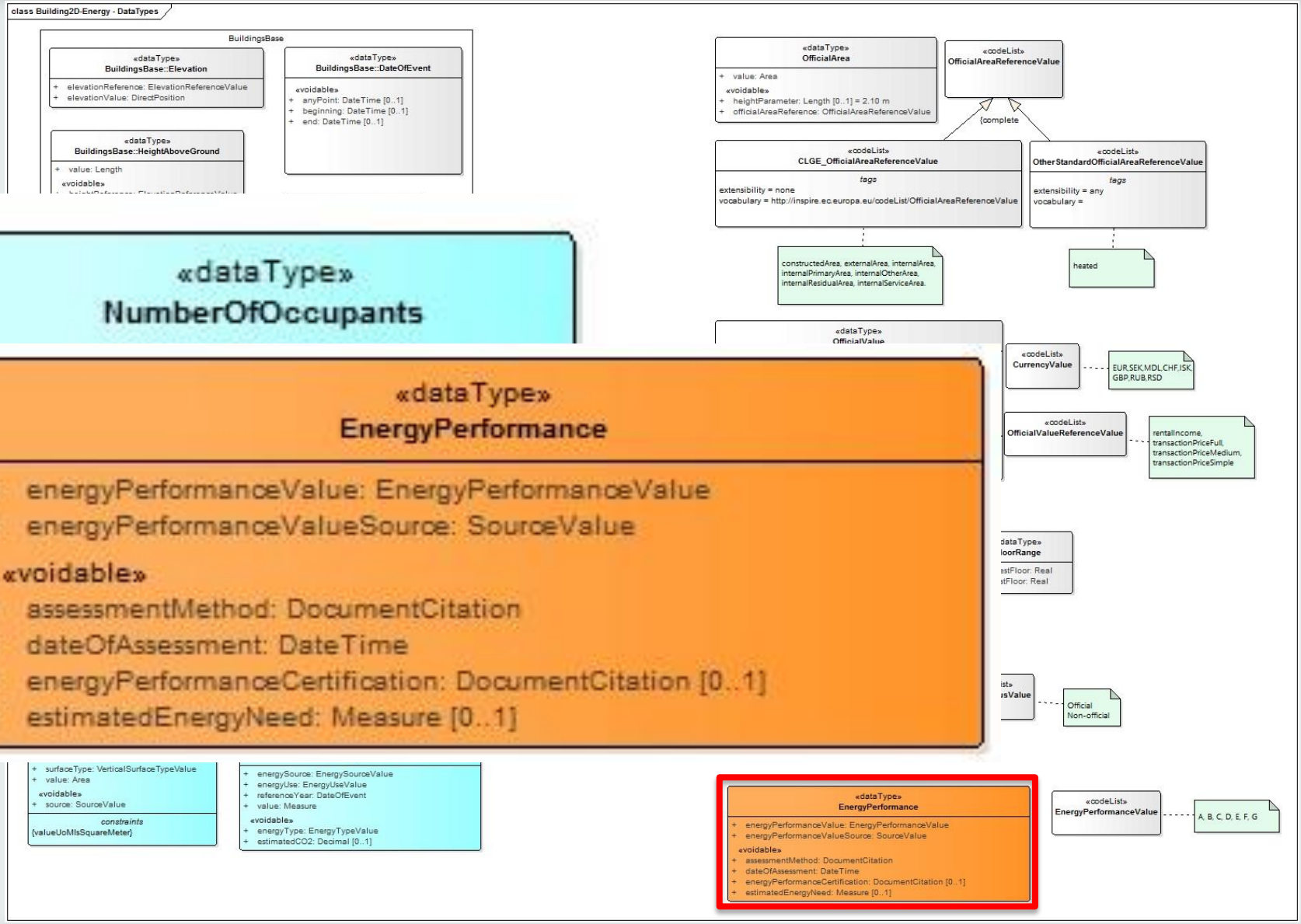
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OfficialValueReferenceValue
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+ dateOfAssessment: DateTime
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EnergyPerformanceValue
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GRAZIE!

Fabio Vinci
f.vinci@epsilon-italia.it

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