Remarks and Observations related to the further development of the Core Cadastral Domain Model

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Agenda

1. Introduction
2. Cadastral Domain Model, summary
3. Experiences from developing countries
4. Impact on the Cadastral Domain Model
5. Boundary of the System
6. Main proposed changes
7. Conclusions

Standards

- There are supposed to be huge differences between systems
- Look to the common area's:
  - Standardised Model
  - Avoid re-inventing the wheel
  - Enable involved parties to communicate

Basic datamodel

1. Parcel
2. Apartment
3. Building
4. Spatial Unit

One Point
Lines
Polygon (low accuracy)
Polygon (high accuracy)

Qualilty labels

1. Formal Ownership
2. Customary
3. Indigenous
4. Tenancy
5. Starter, landhold, freehold
6. Possession
7. Mortgage
8. Usufruct
9. Long Lease
10. Restriction Type 1
11. Restriction Type 2
12. State
13. Informal
14. Unknown
15. Disagreement
16. Occupation
17. Uncontrolled privatisation
18. **Conflict**

Overlap

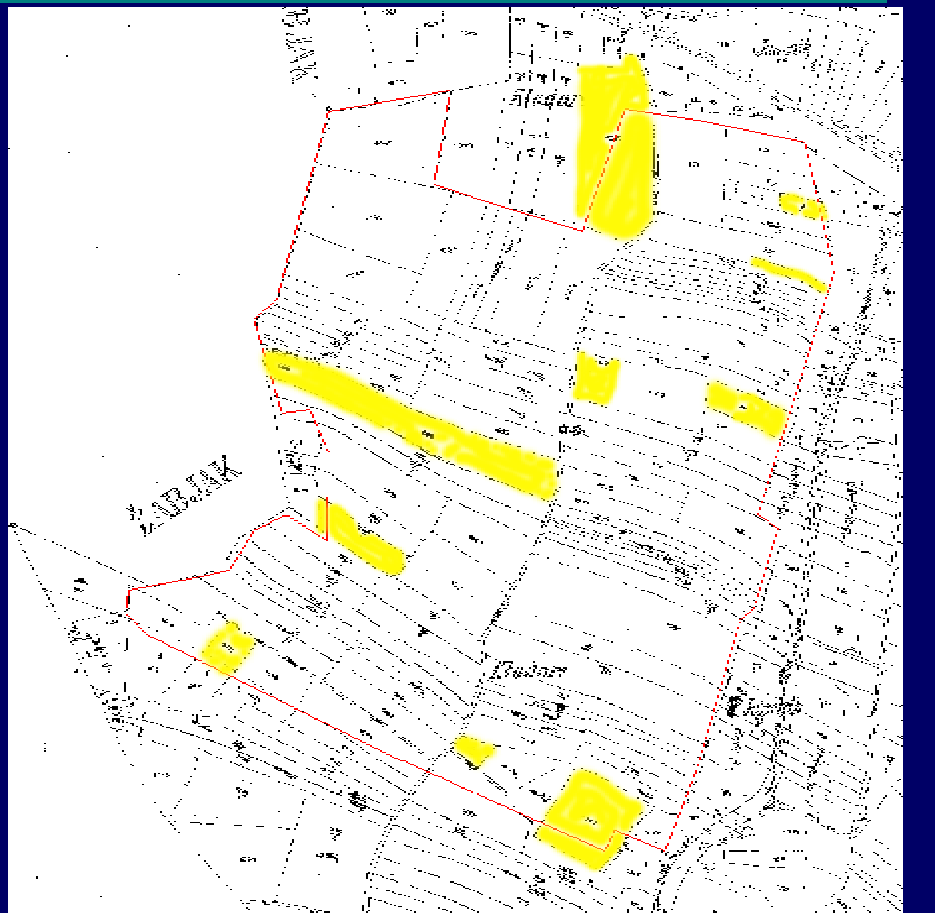
1. Natural Person
2. Company
3. Municipality
4. Co-operation
5. Group
6. Ministry

Biometric identification

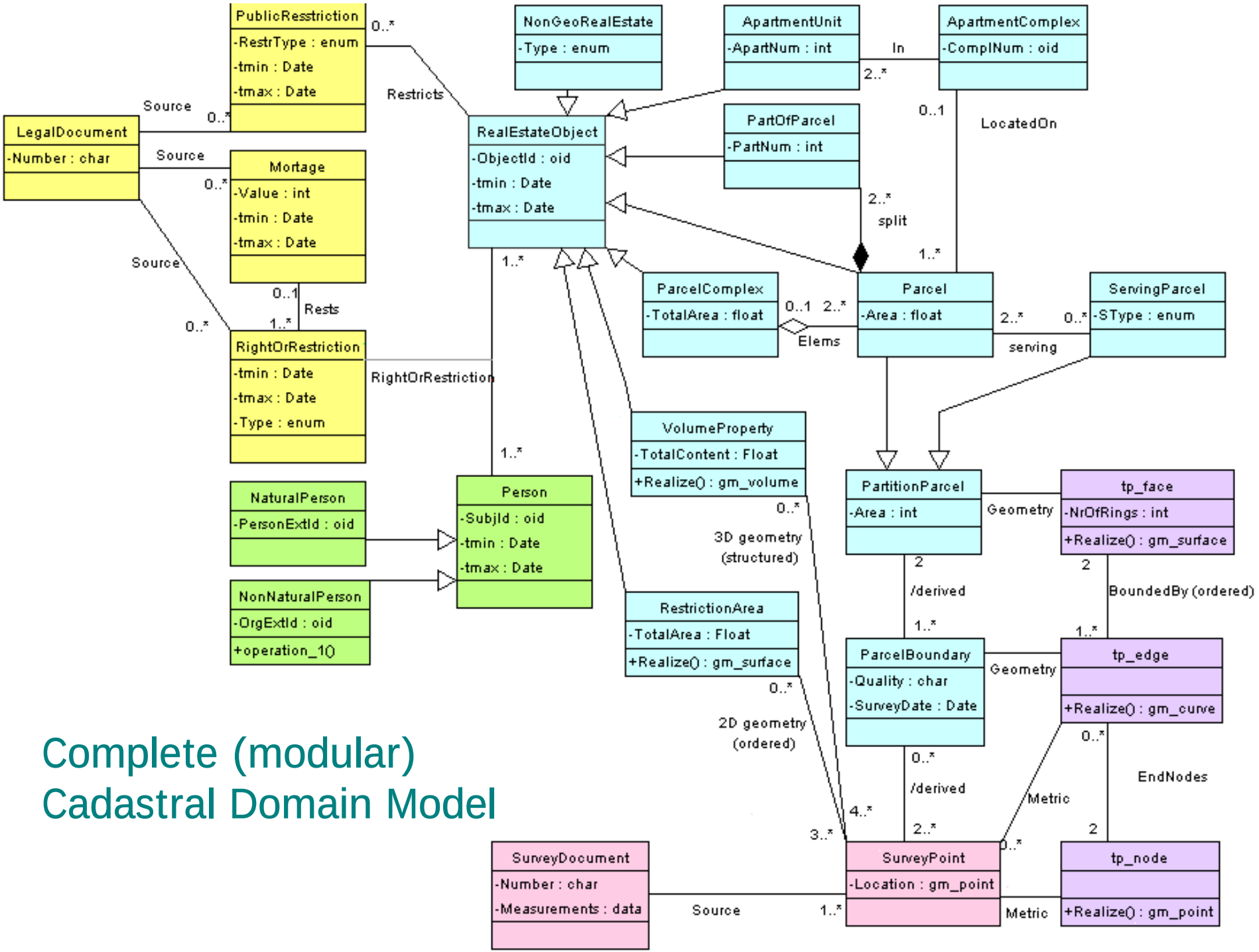
K.o. Klokočevac, Croatia

Situation in field

Situation on Cadastral map

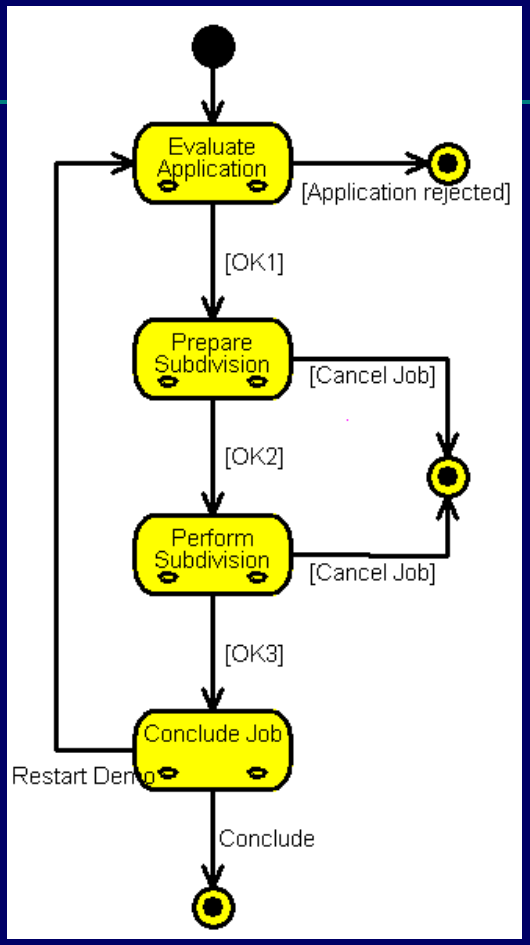


Parcels with unsolved ownership



Complete (modular) Cadastral Domain Model

Work Flow



- Guides User through all steps in a Job
- Controls the Work Process
- Includes manual- & automated steps

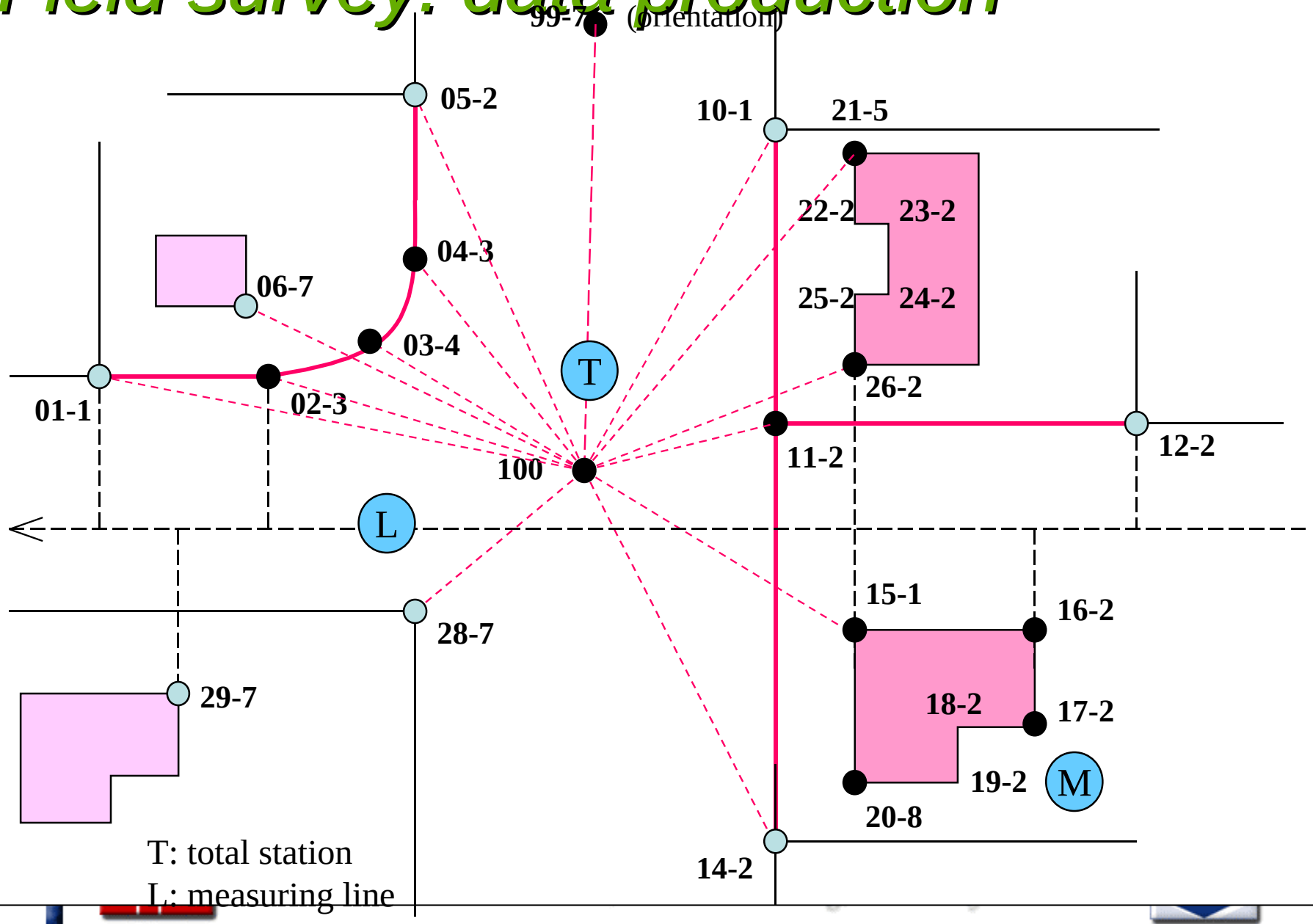
Interorganisational workflows

Again: standards to be developed

Data Acquisition

- Different accuracy in different area's
- It should be more easy to combine different data acquisition methods with available data sources
- Lidar, Ikonos, Quickbird, GPS, Galileo, Cyclomedia, Tape measurements, Total stations, Ortho Photo's, Aerial Photographs
- Source documents
- WGS/UTM
- No monumentation

Field survey: data production



Boundary of the system - why needed?

- Every object is related to ‘something’ else (currently not is the model) and again ‘something’ else object classes are related to yet other object classes
- It is tempting to keep on adding packages to make the model more and more complete
- However, this will be never ending and we have to draw the boundary somewhere
- It helps to realize that other objects may be accessed via the GII
- Often when comparing 2 models the differences are more often the result of different boundary

Boundary of the system - inside as in Brno model, outside:

- Spatial reference system
- Ortho photo, satellite, Lidar
- Topography
- Geology, geo-technical, soil
- Pipelines and cables
- Addresses (postal codes)
- Building registers
- Natural person registers
- Non-Natural person registers
- Polluted area registers
- Mining right registers
- Cultural history
- (Religious) monuments
- Fishing/hunting/grazing rights
- Ship/airplane (car) registers
- ...

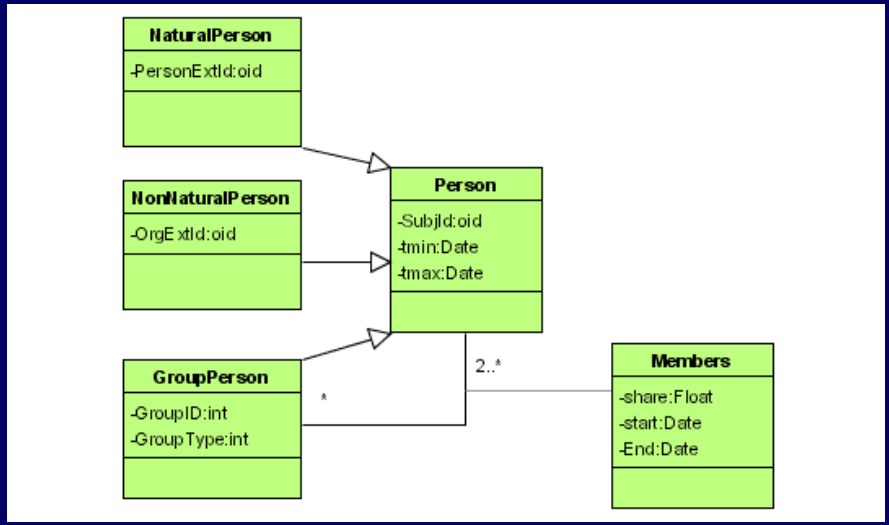
Boundary of the system - some remarks

- Boundary is a bit arbitrary (based on what is practical and the custom in most countries)
- Ok, now the other objects are outside the model (and within GII), this does not make it easier: the different models have to be harmonized
- Also, under what conditions is one organization accepting to be dependent on the information of another organization for its (primary) tasks
- Information assurance: available, quality, history,...

Boundary of the system – distributed model/system

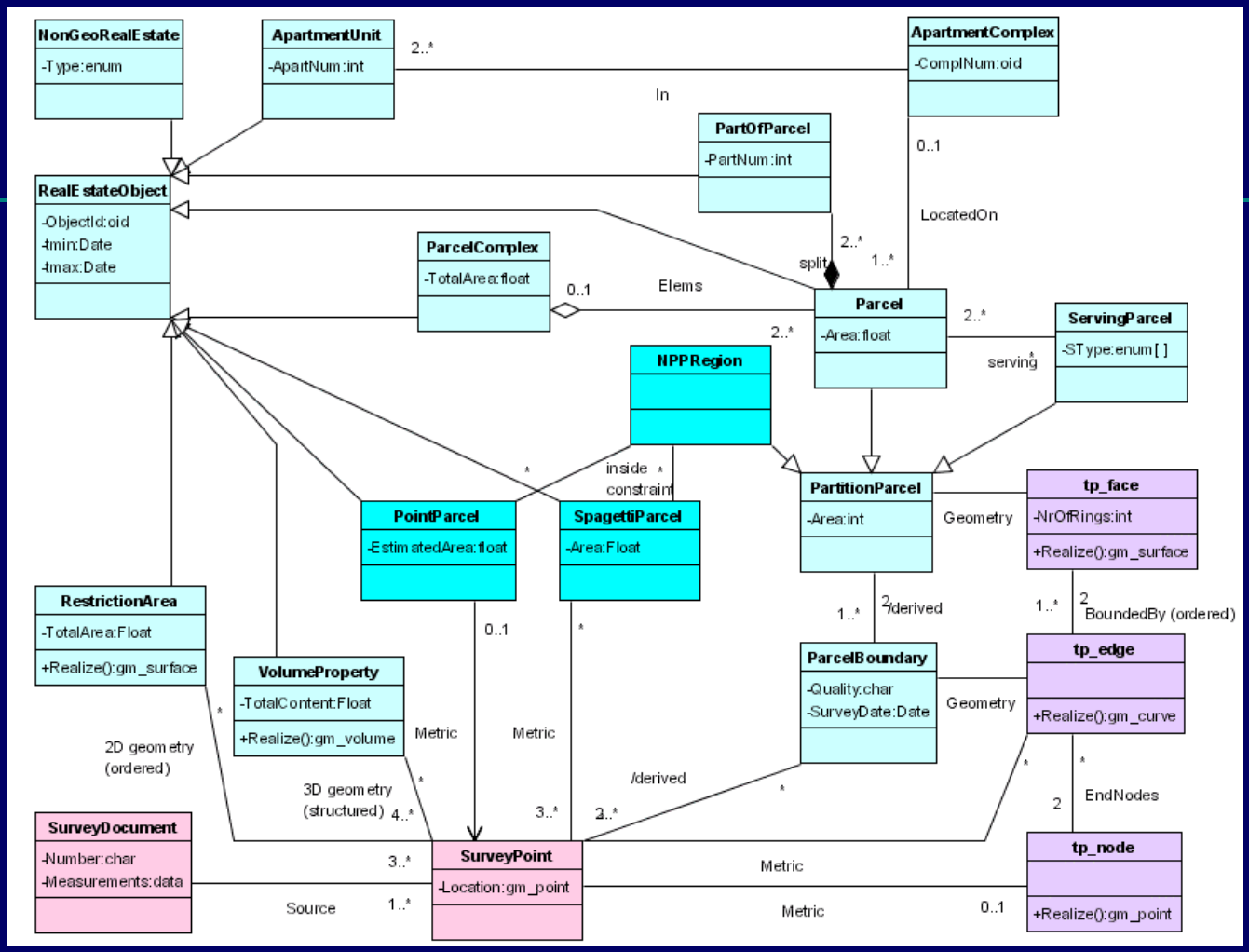
- How to maintain consistency between different parts of a distributed system (model contents)?
- What happens when the source removes an object to which another system is referring?
- Temporal solution **à** use history version of referenced object
- Better **à** update the reference itself (application/ business dependent)
- Provide generic 'update warning system' to subscribers

Main proposed changes - Group



Main proposed changes - Parcels…

- Not always available in the format of a planar partition
- Sometimes just one references point available or ‘unconnected’ polygon (or spaghetti) **à** these solutions may be sufficient (and cost effective)
- How to integrate both approaches in one model?
- High quality planar partition should not be degenerated by point/spaghetti parcels
- Divide domain into two types: planar partioned regions and non-planar partioned (NPP) regions


NonGeoRealEstate
-Type:enum
ApartmentUnit
-ApartNum:int
2..*
In
ApartmentComplex
-ComplNum:oid
PartOfParcel
-PartNum:int
0..1
LocatedOn
RealEstateObject
-ObjectId:oid
-tmin:Date
-tmax:Date
ParcelComplex
-TotalArea:float
0..1
Elems
split
2..*
1..*
Parcel
-Area:float
2..*
ServingParcel
-SType:enum[ ]
serving
NPPRegion
inside
constraint
PartitionParcel
-Area:int
Geometry
tp_face
-NrOfRings:int
+Realize():gm_surface
PointParcel
-EstimatedArea:float
SpagettiParcel
-Area:Float
RestrictionArea
-TotalArea:Float
+Realize():gm_surface
1..*
2
/derived
1..*
2
BoundedBy (ordered)
ParcelBoundary
-Quality:char
-SurveyDate:Date
Geometry
tp_edge
+Realize():gm_curve
VolumeProperty
-TotalContent:Float
+Realize():gm_volume
Metric
Metric
2D geometry
(ordered)
3D geometry
(structured)
4..*
/derived
2
EndNodes
SurveyDocument
-Number:char
-Measurements:data
3..*
3..*
2..*
SurveyPoint
-Location:gm_point
Metric
Source
1..*
Metric
0..1
tp_node
+Realize():gm_point

Main proposed changes – 3D spatiotemporal objects

- 3D as introduced in Brno version of model
- However temporal/dynamic aspect relevant:
  - Long lease (or ownership for limited time)
  - Nomadic behavious
  - Time-sharing (mon-fri:X, sat-sun:Y)
  - Fishing/hunting rights during certain season
- Pracels not aways sharp (point/spaghetti)
- 3D spatiotemporal parcels with (possibly) fuzzy boundaries as fundamental unit in most generic model

Conclusion

- More sharing of knowledge, improved via FIG Standards Network, ISO TC 211, CEN TC287 (soon domain models), OGC Property and Land Initiative
- Current proposal is under development, workshops, reviews, Cairo
- More attention to process side (in addition to data side)
- Not only the model itself is important, but the fact that there is consensus (also important role of industry)

Thank you