



TWG Cadastral parcels

Terminology

08 and 09 April 2008

Terminology

User requirements



From check-lists:

- Mainly national use cases \Rightarrow use of cadastral concepts as defined by national cadastral data producers/providers

From INSPIRE context:

- Need of a harmonised terminology

Terminology

List of terms



- Theme : Cadastral parcels
- Spatial Objects types:
 - CadastralParcel
 - CadastralIndexSet
- Attributes
- Other terms (glossary)
 - Controlled gaps
 - Uncontrolled gaps
 - ...

Theme Cadastral parcels



Objectives:

- To give what is in the scope
 - The INSPIRE Directive focuses on the geographical part of cadastral data.
 - **Need for more details?**
- To give main applications:
 - in the INSPIRE context, cadastral parcels will be mainly used as locators for geo-information in general, including environmental data.
- To give what is out of the scope (though being often present in cadastre)
 - Rights and owners (out of INSPIRE)
 - Buildings, addresses, land use (in other INSPIRE themes)

Spatial object type Cadastral parcels



Why do we need better definition/description:

- Definition given by the Directive very vague
“areas defined in cadastral registers or equivalent”
- Some MS have several spatial object types corresponding to the Directive definition:
 - Sub-parcels (plots)
 - Parcels
 - Multi-parcels (basic property units)

Spatial object type

Cadastral parcels



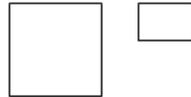
User requirements:

- To be good locators of geo-information, cadastral parcels must form, as far as possible, a partition of national territory
 - Be single areas
 - No gaps, no overlaps
- Some use cases (Soil directive, Public land management) need the legal notion of parcel as a unit for ownership.

Spatial object type Cadastral parcels

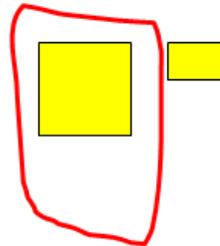
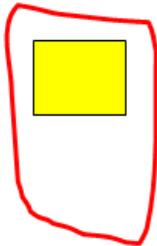


Single area parcel



Multi-area parcel

 Area of interest (e.g. flooded area, eligible area, protected site, ...)



Need for single areas

Result of request « parcels intersecting area of interest » would be better (closer to what expected by the user) with parcels as single area than with parcels as multi-area.

Spatial object type

Cadastral parcels



- TWG CP proposal for definition of cadastral parcels (Palma meeting)
 - “single area of Earth surface under homogeneous property rights and unique ownership”

Spatial object type

Cadastral parcels



- Open issues
 - Change the INSPIRE definition or just add explanations in the description (or in data capture)
 - Is our alternative definition/description relevant?
 - single area/multi-surface
 - emphasise “Earth surface”
 - add the partition notion
- } Flying parcels in UK



TWG Cadastral parcels

Metadata

8 and 9 Sep 2008

Metadata



Metadata in INSPIRE means “metadata for discovery”!

Data Product Specification (DPS) is in ISO-terms “metadata for evaluation and use”:

- extent information
- quality information
- lineage information
- temporal information

Metadata



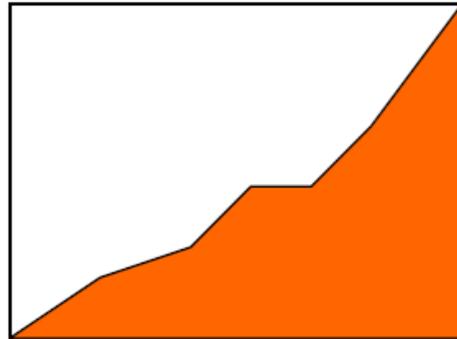
Table 1: Metadata for spatial data sets and spatial data set series

Reference	Metadata elements	Multiplicity	Condition
1.1	Resource title	1	
1.2	Resource abstract	1	
1.3	Resource type	1	
1.4	Resource locator	0..*	Mandatory if a URL is available to obtain more information on the resource, and/or access related services.
1.5	Unique resource identifier	1..*	
1.7	Resource language	0..*	Mandatory if the resource includes textual information.
2.1	Topic category	1..*	
3	Keyword	1..*	
4.1	Geographic bounding box	1..*	
5	Temporal reference	1..*	
6.1	Lineage	1	
6.2	Spatial resolution	0..*	Mandatory for data sets and data set series if an equivalent scale or a resolution distance can be specified.
7	Conformity	1..*	
8.1	Conditions for access and use	1..*	
8.2	Limitations on public access	1..*	
9	Responsible organisation	1..*	
10.1	Metadata point of contact	1..*	
10.2	Metadata date	1	
10.3	Metadata language	1	

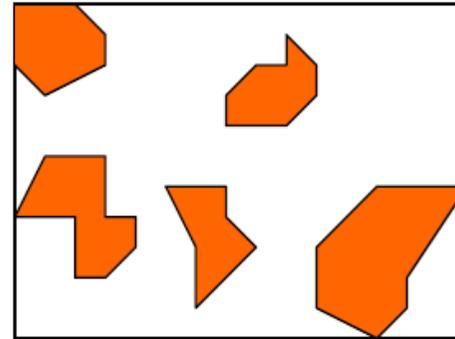
Metadata



Extent information



available INSPIRE cadastral data in countries building their cadastre (e. g. Greece)



available INSPIRE cadastral data in countries still having raster data (e.g. France)

Metadata



Extent information

Specific extent-dependent information can be implemented as attributes on CadastralIndexSet:

- original map scale
- estimated accuracy
- production method

Metadata



Quality information

- positional accuracy - in 12 use cases
- completeness - omission - in 6 use cases
- logical consistency - topological - in 5 use cases
- logical consistency - conceptual - in 5 use cases
- thematic accuracy - in 2 use cases

Metadata



Lineage information

- specification used in the production - in 3 use cases
- lineage - statement and process step - in 3 use cases
- name of supplier/responsible party - in 2 use cases
- original map scale - in 1 use case

statement - “what”: public area and roads are not included

process step - “how”: automatic vector production from
analogue maps in scale 1:2.000

Metadata



Temporal information

- validity date from/to – in 5 use cases
- date of data capture – in 1 use case
- date of update – in 1 use case
- actuality – in 1 use case
- original information date – in 1 use case
- date of publication – in 1 use case

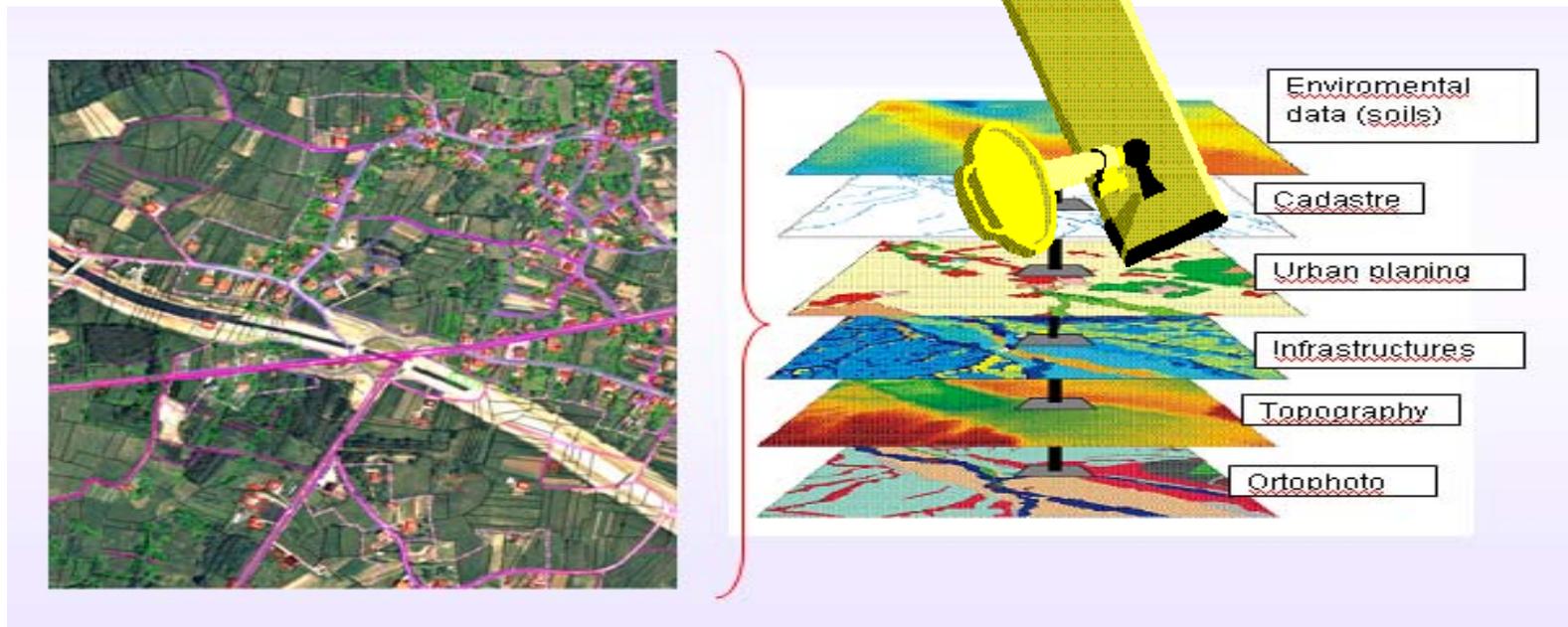
Temporal information is needed on instance level

Update information on DPS level

User requirements discussion paper: Identifier Management



- ***In almost all the user cases the cadastral parcel identifier is necessary.***
- *In most of them, the cadastral parcel id is one of the attributes required in the application schema. (with different names)*
- ***The identifier of the cadastral parcels is used in most of the cases to reference other information.***



User requirements discussion paper: Identifier Management



A link between cadastral data and other information (data, dossiers) is often quoted (urbanismo en red, GéoPLU, ADA, EULIS, Statistics in Spain, CartoCiudad, RWOGIS, public restrictions in Netherlands).

This link is done:

- ***Mainly using the parcel identifier (“cadastral reference”)***
- ***But also***
 - *using the address alone or combined with parcel identifier*
 - *using the geometry (generally a centroid point)*
 - *or is not explained*

¿we are sure that is not a reference data?

User requirements discussion paper: Identifier Management



- **Most of the use cases don't give information about the consistence of the identifier of the cadastral parcel across boundaries.**
- **Over portrayal aspects, in most of the user cases the identifier of the cadastral parcels is needed to display.**
- *all the identifier or part of it.*



User requirements discussion paper: **Identifier Management**



- ***In relation with consistency between themes, parcel numbers are often based on administrative units (municipalities, sections) and most of the studied use cases need data consistence between cadastral parcels and other themes***

Some examples

- *addresses and geographic location*
- *buildings, street(names), water(names), etc.*
- *every son feature must be contained inside its father feature*

Some problems of inconsistency



- ***may have semantic inconsistencies between administrative units and cadastral parcels:***

When the parcel identifier includes the municipality code, in case of merging or splitting or boundary correction between two municipalities, the municipality code will change

- ***to use cadastral data and administrative data or other data which do not always have the same publication date***

User requirements discussion paper: Identifier Management



Requirements

- ***The INSPIRE Directive requires unique identifiers for spatial objects in Annex I or II themes.***
- ***The characteristics of this unique (external) identifier are described in the Generic Conceptual Model:***
 - *Be unique in the INSPIRE context*
 - *Be feasibly*
 - *Be persistent*
 - *give a way to find the download service where the spatial object is available*
 - *Be compliant with the lexical rules*

User requirements discussion paper: Identifier Management



UNIQUENESS

- *In most of the use cases studied they don't speak about UNIQUE parcel identifiers, they speak only about parcel identifiers.*
- *But because the identifier of the cadastral parcels is used in most of the cases to reference other information, this identifier must be preferable unique.*
- *In most of the cases, because they are national cases, the cadastral identifier is a thematic identifier.*



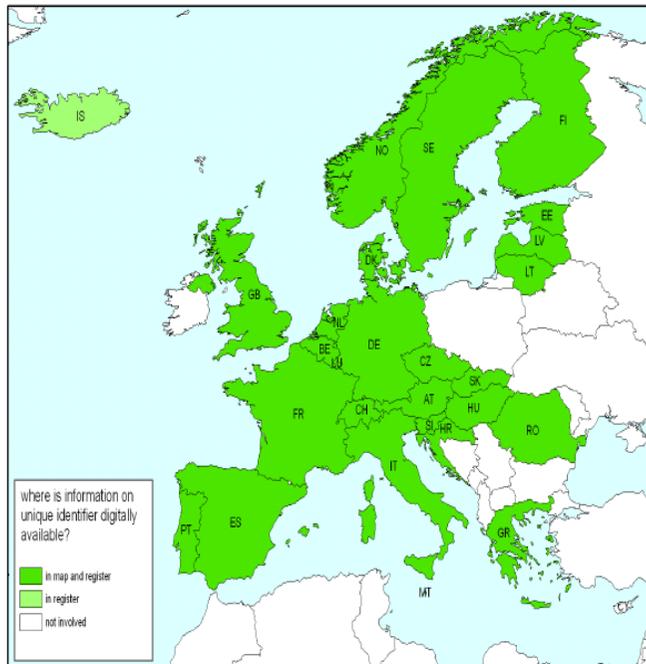
- *TWG strongly support the importance of the unique identifier*
- *GCM: the Inspire Identifier (external) must be unique in the INSPIRE context)*
- *a change of the national unique identifier should not be necessary, but interoperability has to be guaranteed”*

User requirements discussion paper: Identifier Management



FEASIBILITY

INSPIRE D2.5: Feasibility: The system has been designed to allow that identifiers under existing national identifier systems can be mapped.



Map 3: Location unique identifier

- ***A national unique cadastral parcel identifier is available in every country.***
- ***The composition of the identifier within the countries can differ (for example only digits (44880090222) or a combination of digits/characters (APD00 F 2345) ETC.***
- ***In general, the identifier is digitally available in register and map. (Island?)***

User requirements discussion paper: Identifier Management



But every country has differently structured identifiers of different lengths (which do not seem to be meaning less: sometimes an hierarchical cadastral division is stored in the identifier, sometimes some lineage can be observed, e.g. when parcel is split).



- *In some countries the cadastral parcels are aggregated (with other parcels or buildings) to larger units, which may get their own identifier (in Norway the parcel does not even have a unique identifier, but only the Cadastral Unit has).*
- *smaller units identifiable.*
- *Besides the thematic identifier in Denmark a parcel has also a 128 bit non meaningful computer id (which is used by services): uuid.*
- *in France (BD Parcellaire), there is no single identifier attribute, rather a set of attributes together forming a unique thematic identifier.*
 - ***Some of the France users complained that the identifier is supplied as a set of attributes whereas one attribute would be better***
 - *GeoPLU indicates that for INSPIRE, the concatenation of country code and the current set of attributes which constitute the local parcel identifier would be suitable. It would be more practical to keep a separator between the municipality code, the section code and the parcel number (if not, the user has to count the number of characters, it is less practical).*

User requirements discussion paper: **Identifier Management**



- *The structure of parcel identifiers is different for every country and it is outside the scope/ambition of INSPIRE to make this uniform, **this would be not a problem with the studied use cases, even at the European level** because it is possible to make parcel identifiers unique within the EU, add a country prefix (according to ISO 3166, 2 letter code).*
- ***in the Generic Conceptual Model:***
 - *It has to be compliant with the lexical rules:*
 - *composed of a namespace beginning by the 2 letter country code*
 - *including only the limited set of characters allowed*
- *a possibly alternative identifier (with) geographic meaning could be a coordinate (reference point within the parcel).*

User requirements discussion paper: **Identifier Management**



PERSISTENCE

INSPIRE D2.5 : **Requirement 67:**

Persistence: *The identifier shall remain unchanged during the life-time of an object*



From the As-is analysis done by PVO

When the parcel identifier includes the municipality code, in case of mergin or splitting two municipalities can change the parcel identifiers.....PVO recommended to keep the old municipality code

The identifiers are some times 'reused' then per definition the are not unique (and can not identify the right version trough time).

To make it unique it must be either used together with a version-number of a time-stamp

User requirements discussion paper: Identifier Management



TRACEABILITY

- **Requirement 69:** Traceability: Since INSPIRE assumes a distributed, service-based SDI, a mechanism is required to find a spatial object based on its identifier.
- the identifier shall provide sufficient information to determine the download service that provides access to the spatial object.

*Because the structure of the local identifier of the cadastral parcel is so different in each country
How to describe the structure of the different
National ID in the DPS?*



User requirements discussion paper: **Identifier Management**



Conclusions and recommendations (1)

- *The unique identifier of every cadastral parcel should be a mandatory element in the application schema and in the feature catalogues.*

Both:
Inspire identifier
(external identifier)
National identifier
(thematic identifier)

Must be attributes for

Both:
Cadastral parcels
Cadastral index set

- *The identifier of the cadastral parcels is used in most of the cases to reference other information. For this reason the identifiers must be unique and persistent.*

User requirements discussion paper: **Identifier Management**



- **Conclusions and recommendations (2)**
- ***In almost all the studied user cases the cadastral parcel identifier is necessary and it is not a problem because there are these identifiers in the European members cadastral data set. The role of these identifiers and their management are in general ok with the user requirements, but at national level.***
- ***A change of the national unique identifier should not be necessary, but interoperability has to be guaranteed with the mechanism described, adding a country prefix (according to ISO 3166, 2 letter code).***
 - ***in some of countries the cadastral parcels not even have a unique identifier, but only the Cadastral Unit has.***



¿add information over the 27 identifier structure in part 5.1 of DPS? ¿examples?

User requirements discussion paper: Identifier Management



- Conclusions and recommendations (3)
- *In most of the studied cases the identifier of the cadastral parcels is needed to display but every country has its own identifier,*

¿how we manage this variability? ?

*in the Generic Conceptual Model:
including only the limited set of
characters allowed*

¿multilinguism?

- *Most of the studied use cases need data consistence between cadastral parcels and other themes.*



- may have semantic inconsistencies between administrative units and cadastral parcels when merging or splitting municipalities

-To use cadastral data and administrative data which do not always have the same publication date

User requirements discussion paper: Identifier Management



Conclusions and recommendations (4)

- **The identifier shall provide sufficient information to determine the download service that provides access to the spatial object,**
 - **and because the structure of the local identifier of the cadastral parcel is so different in each country, ¿how we do it?**



¿add information over the 27 identifier structure in part 5.1 of DPS? ¿examples?



- *Parcel numbers are often based on administrative units (municipalities, sections) and it would be more practical to keep a separator between the different parts of the identifier: the municipality code, the section code and the parcel number*

User requirements discussion paper: Identifier Management



TESTING IS NEEDED

*In general the users have adapted themselves to the identifiers that were available in every country and when the data specifications and the implementing rules will be fixed to all Europe, we should ask the users **to test** them, to see if following all this recommendations and requirements of INSPIRE, they can do a good use of the cadastral data.*

"She should come to an end now!"



Thanks for your attention !!



TWG Cadastral parcels

Temporal aspects and maintenance

8 and 9 September 2008

**(note also see first round discussion paper by
Tarja on origin/history, 14 and 15 April 2008)**

User requirements (1/3)



- Parcel instances change 'continuously'
- Delay between start of change process (e.g. split of parcel), survey date, inclusion in database, publication date, etc.
- Most apps want database (publication) date
- Few apps want other dates
- About 1/3rd of apps need history

User requirements (2/3)



- No meaningful update lifecycle of data set
- Little less than half want (yearly) snapshots, while the others want the most up to date
- Yearly snapshots do not require incremental updates (though some apps want them)
- Most up to date, two options: 1. direct to source (web), 2. frequent incremental updates based on versioning

User requirements (3/3)



- No appl required versioning of attributes (only versions of complete objects)
- No appl required events (causing the changes), focus on states
- No appl required begin and end dates objects (only begin and end dates versions)
- No appl required successor/predecessor info

Harmonisation approach (1/2)



DT DS documents

- **Many** D2.5 requirements concerning life cycle and maintenance: 24, 25, 26, 27, 28, 29, 35, 52, 53, 63
- Several D2.5 recommendations: 9, 10, 13, 24
- Some D2.6 related text and recommendation 24

Recommendation 9 D2.5: If the spatial objects in a data set are updated individually, then application-specific version information is typically attached to the individual spatial object

The use of timestamps is recommended in INSPIRE (compared, for example, with version counts).

Harmonisation approach (2/2)



- **Requirement 35** Temporal characteristics of a spatial object shall be expressed ...
 - by specifying properties of the spatial object type with a value that is a temporal geometry or a temporal topology (see ISO 19109 8.6; ...);
 - by specifying properties of the spatial object type with a value that is one of the basic types Date, DateTime and Time... The Gregorian calendar shall be the default calendar, **UTC the default time zone.**



As-is analysis

- See first round (14 and 15 April 2008)
- Most new check-list (Germany, Latvia, Switzerland and UK) info is in-line with first round: continuous change/instances
- Latvia mentioned also **planned** parcels
- Germany mentioned incremental updates now and Swisterland mentioned this for the future.



Proposals

WG-CPI survey

- Origin and history are one of the five core elements in the WG-CPI survey

For CadastralParcel and CadastralIndexSet

- Obligatory <<lifeCycleInfo>> with beginLifespanVersion and endLifespanVersion
- No beginLifespanObject and endLifespanObject
- Optional beginOriginalDataCaptureDate and endOriginalDataCaptureDate (only for CadastralP)

GII requires version management (others might refer to your data, that is changing)



Open Points

- How to specify temporal reference systems in the model (date=Gregorian c, time: some alternatives: local, CET, UTC,...)? Uniform over....?
- No version_id to identify a specific version of object, just object_id and beginLifespanVersion, agreed?
- Is there a need for planned parcels (Latvia)? With own geometry/topology?



TWG Cadastral parcels

Spatial aspects

Verona, September 8th 2008

User requirements (I)



- Most users require only 2D data
- However, in future, there may be requirements for 2,5D parcels
 - In case of significant topographic differences (mountains) for State Land Management
 - because some users would like to combine parcels with 3D data:
 - VINGIS : to combine parcels with data derived from DTM, such as elevation, slope, orientation
 - GéoPLU : to wrap 2,5D parcels and 3D parcels on DTM for visibility easements
- Need for 3D parcels is quoted twice :
 - by EULIS: there is a growing registration of 3D parcels in some countries (Norway, Sweden).
 - by Telefonica Soluciones but without any other detail. Not clear if it is 3D parcels or other 3D data (as Spain has only 2D parcels)

User requirements (II)



- About use of interpolation types:
 - Most users just have not answered this question
 - Some users accept circular arcs, as some national systems include arcs (e.g Protected sites in Germany, Restrictions on land use in Netherlands, EULIS)
 - Some other users just want linear interpolation
 - GéOPLU: no interest for other types of interpolation
 - AFTRP: other curves not easily manageable by GIS, need for straight lines as simple as possible, with minimum number of vertices (because cadastral parcels often used as background data to capture other features)
 - Statistics (Spain)
- Centroid coordinates required by at least one user (Telefonica Soluciones) in addition to 2D coordinates.

User requirements (III)



- About topology:
 - one fourth of the users don't have requirements on the topology component
 - need for closed surfaces quoted by some use cases (AFTRP + Véolia + urbanismo en red)
 - The rest requires topology without uncontrolled gaps or overlaps. However, some users seem to have adapted their process to existing data (e.g. GéOPLU in France, Water abstraction in Spain).
 - Controlled gaps (i.e. non-cadastration of public domain) in some countries is not always considered as an issue (e.g. French use cases and EULIS)
 - But full coverage of the national territory is explicitly required by other use cases (mainly the Spanish use cases).

User requirements (IV)



- Some users may use raster data, all may use vector data. A few users do not accept raster data only.
- Use of raster data is generally considered as a “minimum solution”
 - Because only raster data is available (e.g. the French use cases)
 - Because the application is only for viewing (PIR, probably also EULIS)
 - As temporary solution (ADA : in future, raster data will be excluded)
- Drawbacks of using raster data are detailed by the Veolia use case (big data volume, not possible to change symbology, bad results when zooming, bad quality when printing, not possible to make requests or modifications/simulations)

Other requirements



- Some TWG CP members think that 3D parcels will be required in the near future because:
- In a growing number of countries 3D data is used more and more to describe 'volume' parcels explicitly and applications not aware of this would have an incomplete ownership (and other rights, restrictions and responsibilities) picture.
- For non-environmental use cases the need for 3D parcels is very clear (subsurface constructions, larger buildings) as the 2D parcels are not sufficient anymore to describe the ownership (RRR) situation of the ever increasing dense and complex use of space.
- There may be environmental applications requiring the 3D parcels explicitly; e.g. the ownership registration of the legal space around utilities (or pipelines with dangerous material) in Rotterdam.
- In current situation, many GIS are not able to manage 3D data. So, all users must be offered the option to receive only 2D - 2,5D data.



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- Other terms (glossary)
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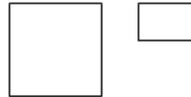
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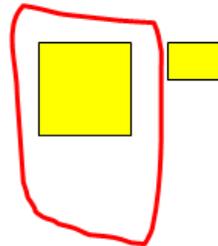
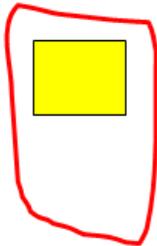


Single area parcel



Multi-area parcel

 Area of interest (e.g. flooded area, eligible area, protected site, ...)



Need for single areas

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- Open issues
 - Change the INSPIRE definition or just add explanations in the description (or in data capture)
 - Is our alternative definition/description relevant?
 - single area/multi-surface
 - emphasise “Earth surface”
 - add the partition notion
- } Flying parcels in UK



TWG Cadastral parcels

**User requirement analysis -
Application schemas and
feature catalogues**

8./9.9.2008 Verona, ABE



3 types of elements

- **Broadly required spatial objects and attributes**
- **Spatial objects, attributes and issues to be discussed/confirmed**
- **Referenced elsewhere, out of scope or not matter of CP**
- (count), [referenced checklist]



- **Cadastral Parcel (20)**

- Issues

- non-cadastration of public domain [1] and streets [France ?]
 - symbol to indicate if a parcel limit belongs to one owner or to both [1]
 - Urban parcel [11] -> see land cover

- **Identifier (19)**

- **Official surface (5)**



- Centroid (2)
 - Issues
 - the centroid is carrying the parcel identifier [1]
 - Centroid coordinates [1 1]
- Date of validity (2)
- Topology (1)

- CRS (2) → see separate discussion paper
- Restrictions (1) → not a matter for CP
- Land cover/use (4) → Out of TWG-CP scope
- Land value (1) → Out of TWG-CP scope
- Owners (1) → Out of TWG-CP scope



- Subparcel (1)
- **IndexSet (7)**
 - Issues
 - Different structures/terminology (municipalities with their name and code [1, 2, 4, 21], sections with their code [1, 4], cadastral units [7], Block (feature containing cadastral parcel), Block ID, municipality code (where it is located) [15], Lot number [17])



- Links (8/2)

- Issues

- postal address with the code, type and name of the street [5] & The address (some times) [6, 7] -> Link to TWG-AD ?
 - The municipality with their code [6] -> link to TWG-AU
 - The buildings (with the description) [6, 15, 19] -> Out of TWG-CP scope
 - The use of the parcel -> see land cover
 - Houses for sale, with coordinates [14] -> Out of TWG-CP scope
 - Land use category [18] -> see land cover
 - Restrictions [21] -> not a matter for CP



Thanks for your attention



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 - Sub-parcels (plots)
 - Parcels
 - Multi-parcels (basic property units)

Spatial object type

Cadastral parcels



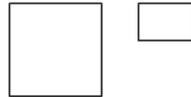
User requirements:

- To be good locators of geo-information, cadastral parcels must form, as far as possible, a partition of national territory
 - Be single areas
 - No gaps, no overlaps
- Some use cases (Soil directive, Public land management) need the legal notion of parcel as a unit for ownership.

Spatial object type Cadastral parcels

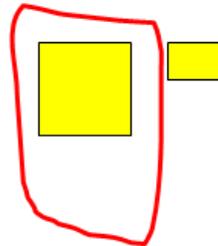
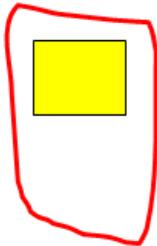


Single area parcel



Multi-area parcel

 Area of interest (e.g. flooded area, eligible area, protected site, ...)



Need for single areas

Result of request « parcels intersecting area of interest » would be better (closer to what expected by the user) with parcels as single area than with parcels as multi-area.

Spatial object type

Cadastral parcels



- TWG CP proposal for definition of cadastral parcels (Palma meeting)
 - “single area of Earth surface under homogeneous property rights and unique ownership”

Spatial object type

Cadastral parcels



- Open issues
 - Change the INSPIRE definition or just add explanations in the description (or in data capture)
 - Is our alternative definition/description relevant?
 - single area/multi-surface
 - emphasise “Earth surface”
 - add the partition notion
- } Flying parcels in UK