

Administrative Units, an Ontological Perspective

Francisco J. López-Pellicer, Aneta J. Florczyk, Javier Lacasta,
Francisco Javier Zarazaga-Soria and Pedro R. Muro-Medrano

Advanced Information Systems Laboratory,
<http://iaaa.cps.unizar.es>

Department of Computer Science and Systems Engineering,
University of Saragossa, Saragossa, Spain

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1 Motivation

- Modern life and bounded spaces
- Administrative Units
- Databases and Administrative Units

- SDI approach
- Problems detected

- Design goals
- Domain ontology
- Example of use

- Uses so far
- Future steps

[illegible]

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- 2 The current state of play
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- 4 Conclusions
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[illegible]

Modern life and bounded spaces

Territory

- Geographical containers of social processes
 - Mainland, islands and exclaves of Spain
 - Valira valley (Andorra) ...

Organization

- Governance of territorial space, units of administration
 - Kingdom of Spain
 - Principality of Andorra ...

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SDI approach

Knowledge organization

- Simple gazetteers as knowledge stores
 - Name
 - Extent
 - Type (often stored in other KOS)
- AU stored as gazetteer entries

SDI approach (cont.)

Standards focused on Geo

- ISO 19109
 - (Geographic) Feature
- ISO 19112
 - Geographic Thesaurus
 - Types and location instances

Problems detected

Main problems

- Described as if they were uniform
- Conventional perception of the AU as a geographic container

Missed info

- Types of administrative units
- Effective spatial relations
- Temporal relations

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Design goals

Requirements

- Social objects
 - Administrative units
 - Territory
- Dual hierarchy
 - Administrative
 - Geographic
- Geographic containment does not imply Administrative containment

Required high-level concepts

Concepts

- Organization
- Geographical place (as social construct, Political Geographic Object or PGO)
- Collection of things
- Roles

Relations with temporal aspect

- Existence
- Membership to a collection
- Part-of (generic)
- Part-of (geographical places)

Why DOLCE as upper ontology?

Pros

- Provide what we need
- Widely used ontology
- Active scientific community
- Available in OWL-DL

Cons

- Areas in development

Core concepts

Jurisdictional Geographic Object (JGO)

- Geographic object
 - The territory of Italy
 - The geographical scope of the NATO...
- Spatial properties may vary along time
 - The territorial variations of the Caucasus region ...

Definition

$$\text{JGO}(x) \rightarrow \text{PGO}(x)$$

Basic taxonomy

Administrative Division (AD)

- Any JD which is always a division of other JD
 - borough
 - commune
 - parish
 - town ...

Definition

$$AD(x) \rightarrow JD(x) \wedge \forall t (PRE(x, t) \rightarrow \exists y (JD(y) \wedge PC(x, y, t)))$$

Basic taxonomy (cont.)

Authority Framework (AF)

- Any JD which is an aggregation of other JD
- It is possible to an AD or a ST be also an AF
 - United states (federate state), aggregate of states
 - Barcelona (province), aggregate of municipalities ...

Definition

$$AF(x) \rightarrow JD(x) \wedge \forall t (PRE(x, t) \rightarrow \exists y (JD(y) \wedge MEM(y, x, t)))$$

Spain: quite complex

Name	Description	Units	ADL Feature Type
Comunidad Autónoma	autonomous community	17	countries, 1st order division
Ciudad Autónoma	autonomous city	2	
Provincia	province	50	countries, 2nd order division
Isla	island	11	
Veguería	group of district (Catalonia)	6	
Comarca	district (Aragon, Basque Country, Castile and Leon, Catalonia)	81	countries, 3rd order division
Mancomunidad	municipality association	1.019	
Área metropolitana	metropolitan area	4	
Facería	common land (Navarre)	64	
Municipio	municipality	8.111	
E.Á.T.I.M.	minor civil unit	1.019	countries, 4th order division
Parroquia	parish (Galicia)	3.781	

Spain: quite complex (cont.)

Mainland and islands

- Comunidad Autónoma (autonomous community)
- Provincia (province) ...

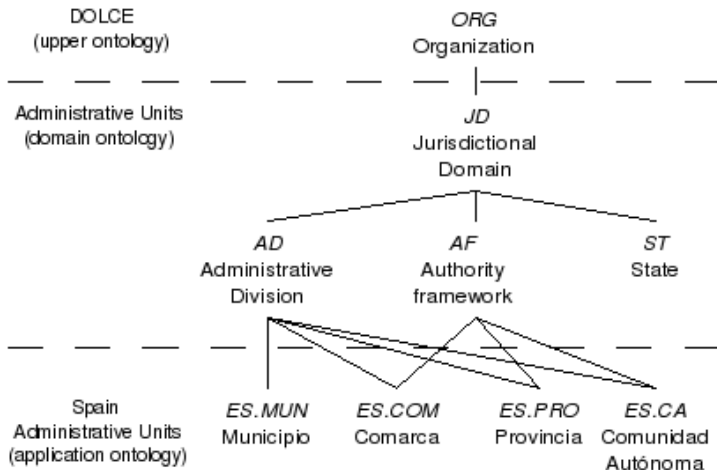
Mainland (some autonomous communities)

- Veguería (group of districts)
- Facería (common land)
- Parroquia (parish) ...

Islands and exclaves

- Ciudad Autónoma (autonomous city)
- Isla (island)

Spain Administrative Units (part)



Cubelles as example



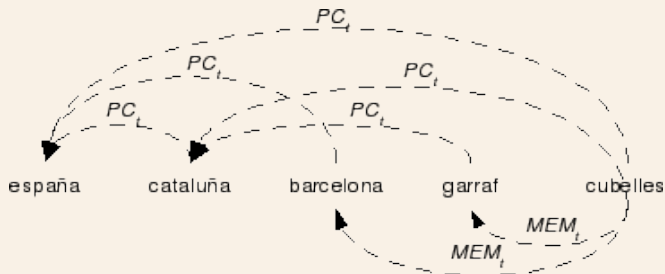


Hierarchies

Geographic containment hierarchy



Multipath administrative hierarchy



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<meta name="Description" content="Some employees
need an image design reengineering, let's take over
the world" />
<meta name="Section" content="Diseño Gráfico" />
<meta name="Description" content="Some employees
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the world" />
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<meta name="Description" content="Some employees
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the world" />
```

Uses so far

Cross-border gazetteer databases

- France and Spain

Distributed gazetteer client

- Administrative thesaurus in the client
- Help to rewrite queries in the backend

Future steps

Technology

- Development of a semiautomatic extractor process
 - France, United Kingdom, Portugal and Spain
 - Data access not yet harmonized

Applications

- Development of integrated gazetteer databases
 - Ease browsing
 - Align hierarchies

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