An Ontology Based Approach for the Construction of an Address Gazetteer: the IDEZAR Gazetteer Use-case

J. Nogueras-Iso, F. J. López, J. Lacasta, F. J. Zarazaga-Soria, P.R. Muro-Medrano
Computer Science and Systems Engineering Department, University of Zaragoza, Zaragoza, Spain

Visser, P.R.S., Jones, D.M., Bench-Capon, T.J.M., Shave, M.J.R.: An Analysis of Ontological In order to create the contents of an address gazetteer service that forms part of the Spatial Data Infrastructure (SDI) of local administrations such as a city council, the SDI developers must perform a work of analyzing and harmonizing all the existent repositories containing address information in the different offices of the council.

In our case, we have faced the problem of creating an address gazetteer service for the Zaragoza council SDI [Portoles-Rodríguez et al., 2005], which is specialized in the Urban Networks of this city. And analyzing the information related with addresses and urban transport networks in the Spanish local administration, we have faced that different taxonomies are used for the identification of urban network feature types in different administrative processes. For instance, one of these taxonomies is the one used in the central database repository managed by the council Informatics office. However, when the city council needs to exchange information with external organizations like the National Cadastre Office or the National Statistics Institute, the information needs to be reformatted in order to comply with the feature types accepted by these institutions. Moreover, it is usual that this reformatted information is stored in parallel repositories (e.g., tax office databases, urban planning office databases) whose updates are not synchronized with the central repository.

In order to overcome this existent heterogeneity in the different repositories, it seems sensible to establish a unified model of the feature types that can be found in this domain, and make the necessary mappings to the particular taxonomies that must be used in external organizations or in the different repositories maintained at council level. This feature type model could be formally represented by an ontology that defines explicitly the concepts and relationships between these concepts in a domain [Gómez-Pérez et al, 2003; Visser et al., 1997].

Having observed this necessity of defining an ontology for feature types in the urban networks domain, the objectives of this work are three-fold. The first objective is to analyze the different taxonomies in the public administration for urban networks [Levoleger and Corbin, 2005].

The second objective is to use these source taxonomies in order to define later a unified urban network ontology overcoming the existent heterogeneity. On the one hand, this unified ontology will facilitate the interoperability with external administrative organizations. And on the other hand, it will enable the modelling of the contents served by the Gazetteer service in the Zaragoza council SDI (IDEZAR, http://www.zaragoza.es/idezar/).

And the third and final objective is to use this experience of defining this unified ontology in order to provide some guidelines for the construction of ontologies. More specifically this work will provide feedback to the Towntology project (http://www.towntology.net). This project is funded by COST (intergovernmental framework for European Cooperation in the field of Scientific and Technical Research) through the action COST C21 in the Urban Civil Engineering (UCE) domain and it aims at increasing to increase the knowledge and promote the use of ontologies in the domain of Urban Civil Engineering projects [Teller et al., 2005], in the view of facilitating the communications between information systems, stakeholders and UCE specialists at a European level (Groupware).

The full paper version of this contribution will analyze the use-case selected for this work explaining the different urban network databases (including their different feature type taxonomies) that must be used for the creation of a gazetteer. Then, it will be described how the contents of the gazetteer can be created using two different approaches. Whereas the first approach will describe an ad-hoc manual mapping among taxonomies used in the source repositories, the second one will describe how to establish a formal urban network ontology that integrates the mappings among the different taxonomies. For the

formalization of the ontology in this second approach we will explore the use of ontology editing tools like Towntology [Keita et al., 2004] (visual tool to facilitate the discussion among experts of the ontology construction) or Protegé [Noy et al., 2000] (enabling the use of more formal language specifications). The main aim of this experimental part of the work is to demonstrate that the second approach provides more flexibility and scalability, facilitating the upload process and possible future extensions.

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European Commission
Joint Research Centre (DG JRC)
Institute for Environment and Sustainability (IES)
Spatial Data Infrastructures Unit
I-21020 Ispra (VA), Italy

Contact information
Tel.: +0039 0332 786491
Fax: +0039 0332 789803

E-mail: ies@jrc.it
Website: http://ies.jrc.cec.eu.int/

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Contents

SESSION: SDI 1

INSPIRE FROM THE NATIONAL AND REGIONAL PERSPECTIVE: SURVEY AMONG THE SDI STAKEHOLDERS IN THE CZECH REPUBLIC 2
E. Pauknerova, P. Tryhubova

THE SPIRIT OF INSPIRE LIVES IN THE AUSTRIAN MINISTRY OF LIFE 5
F. Lux, W. Fahrner, T. Zelenka

WILL INSPIRE COME UP TO ALL EXPECTATIONS? 7
R. Gissing

SDI SOCIAL AND ECONOMIC IMPACT USERS' PERSPECTIVE 8
F. Salgé, J. Geirinhas, S.Gizzi

FRAMING THE EVOLUTION OF SPATIAL DATA INFRASTRUCTURES 10
M. Wachowicz, A. Bregt and J. Crompvoets.

SESSION: PEER GROUP 13

THE IMPORTANCE OF GEOGRAPHIC INFORMATION IN BIODIVERSITY AND NATURE CONSERVATION 14
R.A. Wadsworth, A. Watt

SETTING UP A GI RESEARCH AGENDA FOR ENVIRONMENTAL MANAGEMENT: THE PEER EXPERIENCE 16
M. Wachowicz[1] and S. Labbé[2]

LANDSCAPE CHARACTER ASSESSMENT AS A BASIS FOR PLANNING AND DESIGNING SUSTAINABLE LAND USE IN EUROPE 18
D. Wascher, M. Perez-Soba & S. Mücher

EUROPEAN ENVIRONMENT AGENCY SDI – PROGRESS AND PLANS TO SUPPORT THE IMPLEMENTATION OF A SHARED ENVIRONMENTAL INFORMATION SYSTEM 20
M.P. Lund, J. Bliki, A. Sousa, M. Erhard, T. Jessen, C. Steenmans

CONTAMINATED ENVIRONMENTS, RISK ASSESSMENT AND REMEDIATION STRATEGIES 21
B. Münier, S. Gyldenkærne, P.B. Sørensen, M. Thomsen, P. Fauser

SESSION: NATIONAL SDI 23

PORTALU – A NEW NATIONWIDE PORTAL TO ENVIRONMENTAL INFORMATION IN GERMANY 24
T. Vögele, M. Klenke, F. Kruse

GI & SDI AS PART OF NATIONAL AND FEDERAL EGOVERNMENT– STATUS AND PERSPECTIVE FOR THE WORK OF THE CHAMBERS OF COMMERCE AND INDUSTRY 27
A. Fritzsche,

GEODATA DISTRIBUTION NATIONWIDE - GEOPORTAL OF CZECH LAND SURVEY OFFICE 30
R. Widz, J. Havas, V. Spacek, J. Svaty

THE SPANISH SDI: FROM TECHNOLOGICAL TO ORGANIZATIONAL ASPECTS 31
A.Rodríguez, P.Abad, E.López, A. Sánchez, J.A. Alonso

STRENGTHS AND WEAKNESSES IN GEOSPATIAL DATA INFRASTRUCTURE IN ROMANIA 33
A. Ionita, I. Nedelcu, S. Andrei, V. Chendes, V. Craciunescu, M. Bichir, V. Gancz

SESSION: METADATA AND CATALOGUES 35

DISTRIBUTED METADATA CATALOGUES THEORY VS. REALITY 36
I. Kanellopoulos, M. Millot, L. Bernard, K. Senkler, U. Voges

NEAR-TERM METADATA CHALLENGES 37
M. Gould, J. Rocha, S. Nativi, J. Nogueras, M. Manso

STANDARDS-BASED APPROACHES TO PUBLISHING AND ACCESSING CONTENT IN SPATIAL DATA INFRASTRUCTURES 39
C. Portele, R. Erstling

STYLEDCAT: DEFINITION OF A SLD CATALOGUE 41
A.Maldonado, M.A.Bernabé, M.A.Manso, M.C.Muñoz, M.Manrique

DISTRIBUTED DATA MANAGEMENT IN INTERNET MAP SERVICES EXPERIENCES FROM LOUNAISPAIKKA THEMATIC ATLAS 44
A. Vasanen1, T. Toivonen2

SESSION NATIONAL SDI II 47

OVERVIEW OF THE INSPIRE THEMES – EXEMPLIFIED THROUGH RUNNING NATIONAL SERVICES IN THE NORWEGIAN SDI 48
A. Lillethun

SWEDISH PREPARATIONS FOR INSPIRE 50
S. Jönsson, U. Sandgren

INSPIRE AND DANISH E-GOVERNMENT INITIATIVES SYNERGY OR CONFLICT 52
J. Ryttersgaard

SOCIAL AND ECONOMIC BENEFITS FROM COMPILING THE FOREST DATA BANK PROJECT (DASOLOGIO) IN GREECE 54
D.S. Palaskas, N.I. Stamou

RAVI AND THE DUTCH NATIONAL CLEARINGHOUSE ARE SHARING DUTCH INSPIRE 56
B.C. Kok, M. Reuvers

SDI TECHNOLOGY 57

"WHERE WOULD YOU GO FOR MAPPING SERVICES, [NMAS] OR GOOGLE MAPS?" IMPLEMENTING "HACKABLE" USER-DRIVEN GI SERVICES WITHIN SDIS 58
G. Barrotta, P. Cipriano, S. Pezzi, L. Zanella

CSCAT: CATALOGUE OF COORDINATE REFERENCE SYSTEM DEFINITION AND TRANSLATION WEB SERVICE 60
M.A. Manso, M.A. Bernabé

THE ROLE OF FREE SOFTWARE THICK CLIENTS IN SDI: CASE OF GVSIG 62
M. Gould, C. Granell, M.A. Esbrí, G. Carrión

HOW TO MOVE FORWARD IN IMPLEMENTING SDIS WITH SOA? 63
Ç. Cömert, H. Akıncı

PROVIDING WFD REPORTING OVER SDI SERVICES 65
M. Á. Latre, R. Béjar, J. A. Álvarez, O. Castillo, P. R. Muro-Medrano

NATIONAL / REGIONAL SDI I 69

OUT SPIRE 70
S. Carlyle, M. Clark

DEVELOPMENT OF A DANISH INFRASTRUCTURE FOR SPATIAL INFORMATION (DAISI) - GOALS AND MEANS 72
H. Brande-Lavridsen, B.H. Jensen

REACHING OUT AND UNDER 74
I. Jackson

EU-PROJECT: CROSS-BORDER SPATIAL INFORMATION SYSTEM WITH HIGH ADDED VALUE (CROSS-SIS) 77
J. Riecken

GEOINFORMATICS AND GISCIENCE EDUCATION: UNIGIS AS SDI BRAINWARE 79
J.Strobl

SESSION: DATA HARMONISATION 81

AN ONTOLOGY BASED APPROACH FOR THE CONSTRUCTION OF AN ADDRESS GAZETTEER: THE IDEZAR GAZETTEER USE-CASE 82
J. Nogueras-Iso, F. J. López, J. Lacasta, F. J. Zarazaga-Soria, P.R. Muro-Medrano

EUROROADS' CONTRIBUTION TO THE IMPLEMENTATION OF INSPRE 84
U.L Sandgren

A NEW PRODUCTION PARADIGM BASED ON A SDI 86
P Trevelyan, G Mallin, Jeremy Tandy

'FEATURE/OBJECT DATA MODELS' – A REPORT ON THE EUROSDR/EUROGEOGRAPHICS WORKSHOP, 24-25 APRIL 2006 87
P. Woodsford, A. Illert, K. Murray, C. Portele, M. Seifert

DATA CERTIFICATION AND SPATIAL DATA QUALITY MANAGEMENT 95
M. Sanderson

SESSION: NATIONAL / REGIONAL SDI II **101**

LOUNAISPAIKKA REGIONAL GI SERVICE AND COLLABORATION INITIATIVE BUILDING A LSDI IN SOUTH WESTERN FINLAND 102
L. Nurmi, A. Vasanen

STANDARDS FOR DATA AND METADATA SHARING IN ITALY: THE SIGMA TER INFRASTRUCTURE 105
G. Ciardi, P. Cipriano

ASSESSING THE IMPLEMENTATION OF A X-BORDER SPATIAL DATA INFRASTRUCTURE IN THE EUREGIO MAAS RHINE 107
J.D. Bulens, J. Crompvoets, F.R. Kooij, L.A.E. Vullings, A. Ligtenberg

SITAD: FROM A REGIONAL SDI TO A MODEL FOR DELIVERING CROSS-BORDER INFORMATION ON GEOGRAPHICAL DATA 110
L. Garretti, S.Griffa, R. Lucà

SESSION: SDI IMPACTS **113**

A ROAMING-ENABLED SDI (RSDI) OR THE RELATIONSHIP BETWEEN TECHNOLOGY AND MARKET PRESENCE 114
R.M. Wagner, A. Remke

TRANSPARENCY OF ACCESSIBILITY TO GOVERNMENT-OWNED GEO-INFORMATION 116
F. Welle Donker, B. van Loenen

MOTIIVE EXPERIENCES USING SIMULATION SOFTWARE TO ASSESS SDI COST-BENEFIT 125
R.A. Longhorn

TOWARDS THE SOCIO-ECONOMIC ASSESSMENT OF SPATIAL DATA INFRASTRUCTURES 127
M. Craglia, J. Nowak

SESSION: REGIONAL SDI **129**

S. I. T. R. TERRITORIAL INFORMATION SYSTEM OF SARDINIA 130
G.Pittau, R.Vinelli, M.Salvemini, L.Corvetto

HOW MUNICIPALITIES ARE JOINING REGIONAL SDI: FIRST RESULTS AND CONCLUSIONS 133
J. Guimet Perenya,

NAVARRA IN INSPIRE. INTEGRATION OF SDI AT REGIONAL (IDENA) AND LOCAL (IDEPAMPLONA) LEVEL 134
M. Cabello, P. Echamendi, M.A. Jiménez de Cisneros, A. Valentín

REGIO-GEO.CH – INTER-REGIONAL SPATIAL DATA HUB WITH AUTOMATED DATA SHARING AND QUALITY CONTROL 136
A. Bernath

SESSION: DATA SHARING..... 137

ELIMINATING OBSTACLES AT THE POINT OF USE: SHARING ORDNANCE SURVEY DATA AMONG PUBLIC AUTHORITIES IN GREAT BRITAIN 138
C. Hadley, N. Sutherland

INSPIRE AND INTELLECTUAL PROPERTY RIGHTS – A THUNDERSTORM OR A TEMPEST IN A TEAPOT? 139
K. Janssen

DATA LENDING FACILITY – THE INNOVATIVE DOWNLOAD SERVICE OF THE FINNISH NSDI 141
T. Toivonen, R. Kalliola & E. Ennola

AVAILABILITY OF GOVERNMENTAL GEO-INFORMATION, COMPLICATIONS IN PRACTICE 144
H. Nobbe

SESSION: CLOSING PLENARY AND WRAP-UP **145**

HOW TO KEEP REBUILDING A SDI ? – THE PORTUGUESE EXPERIENCE 146
R. P. Julião *146*

SESSION: POSTERS 147

THE MEDWET WEB INFORMATION SYSTEM: AN SDI APPLICATION 148
L. Hatziiordanou, P. Katsaros
CAGI AND ITS CONTEMPORARY ACTIVITIES 149
J. Hiess
GIBSER WORKSHOPS - CBC GIS LESSONS 150
[1]F. Hoffmann, J. Hiess
INSPIRE AGAINST THE BACKGROUND OF SUSTAINABLE DEVELOPMENT, DPSIR AND AIR MONITORING 151
W. Pazdan
X-BORDER GDI NRW - NL 153
K. van Raamsdonk
ENVIRONMENTAL DATA SHARING OPPORTUNITIES – ESTONIAN ENVIRONMENTAL REGISTER 157
K. Liiv, T. Dišlis
LOCAL SPATIAL DATA INFRASTRUCTURES – THE NEXT STEP FOR MUNICIPAL GIS 158
R. P. Julião, R. Dias
MUNICIPAL ENVIRONMENTAL-MONITORING SYSTEM 159
F. Speiser, I. Magyar, R. Jamniczky, Á. Rédey
WIN: A NEW GEO-INFORMATION ARCHITECTURE FOR RISK MANAGEMENT 160
C. Alegre, H. Sassier, A. Pi Figueroa
GEODATA PUBLISHER SERVICE IMPROVES THE AVAILABILITY OF CONTENT IN SPATIAL DATA INFRASTRUCTURES 161
R. Erstling, C. Portele