



ESTRELLA - 027655

European project for Standardized Transparent Representations in order to Extend Legal Accessibility Specific Targeted Research or Innovation Project

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Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

ESTRELLA - Executive summary

ESTRELLA brings together the leading European companies and experts in the market of legal knowledge systems, to collaborate on the development, demonstration and dissemination of an innovative, open platform enabling citizens and businesses to easily access, understand and apply complex legislation and regulations. The interests of public administration are represented in ESTRELLA by the participation of the national tax ministries of Hungary and Italy.

The main technical objectives of the ESTRELLA project were to develop a Legal Knowledge Interchange Format (LKIF), building upon emerging XML-based standards of the Semantic Web, including RDF and OWL. ESTRELLA also designed a document management system for legal sources, based on a uniform XML format, enabling search, explicating relations with other documents and LKIF models of their content, and version management.

To demonstrate and validate the ESTRELLA platform, European legislation and national tax legislation of two European countries were modelled and used for pilot applications.

In the first year of the project a first version of LKIF was specified. In this second year, LKIF was tested in actual use in three pilots and already refined. In this third and last year the final version of LKIF was produced and published. The expressiveness of the language increased, the integration with the CEN MetaLex XML format for sources of law was improved and LKIF is easier to extend now.

The reference inference engine for LKIF – implemented in Scheme - that was produced (named ‘*Carneades*’), the API’s for interacting with LKIF knowledge bases, and the translators from and to the vendor formats were improved. Carneades has been ported to the R6RS scheme standard and now runs on 3 different open source scheme implementations. It now supports complex rule bodies and has a built in ontology reasoner for the DLP dialect of description logic. It also has a prototype graphical user interface. The API now provides a programming language-independent, web-oriented interface to the inference engine based on SOAP and WSDL.

Additionally, the project experimented with a normative assessment (a central subtask in all legal reasoning) approach entirely based on OWL DL. This led to the implementation of HARNESS (“Hybrid Architecture for Reasoning with Norms Exploiting Semantic web Standards”), a Protegé plugin that reasons with norms expressed in OWL DL 2.0. The consortium has also contributed to the specification of OWL DL 2.0 and participates in the W3C OWL working group.

Concerning the management of legal sources, the project has continued co-operation with the CEN/ISSS standardization activities initiated by UvA early in 2006. The project contributed significantly to the new version of CEN MetaLex that was adopted in the September 2008 meeting in Florence (Italy). The translators between national standards and CEN MetaLex were improved and adapted to the last version of CEN MetaLex.

An interchange format for metadata of sources of law was developed, called LMIF (Legal Metadata Interchange Format), that enables translation of national metadata and CEN MetaLex and coupling to LKIF models and ontology.

An Open Source legal CMS based on CEN MetaLex, called eXistrella, has been designed and delivered.

The ESTRELLA business model and Exploitation Plans have been delivered. Specific exploitation plans are declared by the industrial partners and by the research groups within the project. A key part of the exploitation focus is the promotion of LKIF as a CEN Standard through the formation of a working group. This starts with the ESTRELLA partners and will grow to include all interested parties requiring representation in that activity. Besides Alex Gold (Hungary), two small Italian companies and a Dutch company in the field of legal KBS have shown concrete interest in complying to LKIF.

Many scientific papers on ESTRELLA results were produced in the period. All results are publicly available through the Estrella web site.¹

¹ <http://www.estrellaproject.org/>

Appendix 1 – Plan for using and disseminating the knowledge

ESTRELLA aimed to reduce the barriers present in the market for Legal Knowledge Tools, such as rule-based systems – by developing a Legal Knowledge Interchange Format (LKIF) and a reference platform on which to demonstrate and test it. The pilots have shown that the project has successfully developed the LKIF and have supported LKIF demonstration and testing with an appropriate reference architecture and tools. LKIF usage has been tested in a series of realistic pilots hosted by key Governmental bodies forming part of the legal-draft and implementation process in their respective countries. LKIF is now available, and in fact has been adopted by vendors outside the project as a standard for legal knowledge interchange.

The ESTRELLA partners have delivered an initial business model for LKIF deployment their current exploitation position / intentions. The ESTRELLA work plan shows that the Exploitation Plan aimed to:

- organize and ensure the reusability of project outputs for future applications through elaboration of a detailed exploitation plan,
- illustrate usage scenarios to support understanding by target user groups.

The exploitation plan was intended to build upon the business case and to provide a detailed approach to ESTRELLA exploitation, including options for market entry, opportunities for promotion of uptake, and specific plans for immediate exploitation actions agreed by the consortium. However, the initial business model was elaborated as a more detailed business plan, and so addressed:

- options for market entry,
- opportunities for promotion of uptake,
- options for immediate exploitation

Illustration of usage scenarios has been provided in detail by the pilots in ESTRELLA, and so the pilot descriptions, operation features, and test results are considered an appropriate appendix to this document.

At present the ESTRELLA partners are still working to find a way to realise some of the opportunities and options, and so the exploitation plan, rather than reiterate the bulk of the business plan, presents and further discusses key issues that are close to resolution, and then addresses the pathway to dealing with issues and options where no immediate solution is yet identified. The primary reason for the delay in solving the deployment problem is finding a way to fund an organised activity dealing with standardisation, wider market validation, and initial deployment.

Section 2 – Dissemination of knowledge

Planned/ actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
Continuing	Web site www.estrellaproject.org	General public	All	Unknown	UvA
21.7.08	Conference	Researchers	Worldwide	50	Fokus
25.7.08	Conference	Researchers	Worldwide	25	Fokus
23 Oct	eChallenges Conference	EU, Civil servants, scientists	Whole of Europe	650	RuleWise, UvA, IDL, Bologna, CUB
29/9 – 3/10	EKAW 2008	Academia / Industrial	Worldwide prim.Europe	± 60	UvA
6-10 /7/2008	Training Course on RuleBurst	Industry	London	20	Haley
14-19 /7/2008	Dissemination DEON08	Researchers	Luxembourg	50	
08-13/ 07/08	Legislative Informatics Summer School - LEX	Public administratio ns	Fiesole, Firenze	50	UniBo, UvA
22- 26/09/2008	Training	Public administratio ns	Roma	10	
9-13 Dec 2008	Conference	Academics	Fiesole	60	UvA, UniBo, Fokus, UniLiv, CUB
22-25 April	Conference	Civil servants EU countries/scienti sts	Whole of Europe	150	RuleWise/Uv A/IDL
Apr 25, 2008	Lecture	Higher Education	Germany	50	4
May 19-21	Course	Higher Education	Italy	50	4, 2
May 27-31	Conference	Researchers	Worldwide	150	4, 3
May 28-30, 2008	Conference	Academic	International	75	UniLiv
21-23.1.08	Conference	Scientific	Many	40	FHG/Fokus
21-22.2.08	Conference	Lawyers	D, A, CH	60	UvA; FHG/Fokus
4-5.3.08	Conference	Lawyers	Germany	70	FHG/Fokus
27/3	Metalex Presentation	Tax law modellers	NL	6	UvA
March 2008	Tutorial	Immigration office lawyers and modelers	NL	43	UvA

Scientific papers produced:

- Saskia van de Ven, Joost Breuker, Rinke Hoekstra, Lars Wortel, and Abdallah El-Ali. Automated legal assessment in owl 2. In *Legal Knowledge and Information Systems*.

- Jurix 2008: The 21st Annual Conference, Frontiers in Artificial Intelligence and Applications*. IOS Press, December 2008.
- Saskia van de Ven, Rinke Hoekstra, Joost Breuker, Lars Wortel, and Abdallah El-Ali. Judging Amy: Automated legal assessment using OWL 2. In *Proceedings of OWL: Experiences and Directions (OWLED 2008 EU)*, October 2008.
 - Rinke Hoekstra and Joost Breuker. Polishing diamonds in OWL2. In Aldo Gangemi and Jérôme Euzenat, editors, *Proceedings of the 16th International Conference on Knowledge Engineering and Knowledge Management (EKAW 2008)*, LNAI/LNCS. Springer Verlag, October 2008.
 - Boer, A., Winkels, R. and Vitali, F. (2008). MetaLex XML and the Legal Knowledge Interchange Format. *Computable Models of the Law. Lecture Notes in Artificial Intelligence 4884*, pp. 21-41, Springer Verlag, Berlin, 2008. ISBN: 978-3-540-85568-2.
 - Rinke Hoekstra, Joost Breuker, Marcello Di Bello, and Alexander Boer. LKIF core: Principled ontology development for the legal domain. In Joost Breuker, Pompeu Casanovas, Michel Klein, and Enrico Francesconi, editors, *Law, Ontologies and the Semantic Web, Frontiers of Artificial Intelligence and Applications*. IOS Press, Amsterdam, 2008.
 - Guido Governatori and Antonino Rotolo. Changing Legal Systems: Abrogation and Annulment. Part I: Revision of Defeasible Theories. In *proceedings of the Ninth International Conference on Deontic Logic in Computer Science (DEON'08)*.
 - R. Hoekstra. Use of OWL in the legal domain (statement of interest). In Kendall Clark and Peter F. Patel-Schneider, editors, *Proceedings of OWL: Experiences and Directions (OWLED 2008 DC)*, Washington, DC (metro), April 2008.
 - Szymon Klarman, Rinke Hoekstra, and Marc Bron. Versions and applicability of concept definitions in legal ontologies. In Kendall Clark and Peter F. Patel-Schneider, editors, *Proceedings of OWL: Experiences and Directions (OWLED 2008 DC)*, Washington, DC (metro), April 2008
 - Gordon, T. F. (2008). Hybrid reasoning with argumentation schemes. In *Proceedings of the 8th Workshop on Computational Models of Natural Argument (CMNA 08)*, pages 16–25, Patras, Greece. The 18th European Conference on Artificial Intelligence (ECAI 2008).
 - Gordon, T. F. (2008). Constructing legal arguments with rules in the legal knowledge interchange format (LKIF). In Casanovas, P., Casellas, N., Rubino, R., and Sartor, G., editors, *Computable Models of the Law*, number 4884 in Lecture Notes in Computer Science, pages 162–184. Springer Verlag.
 - Katie Atkinson (2008) Introduction to Special Issue on Modelling Cases, *Artificial Intelligence and Law*. Forthcoming, available on-line.
 - K. Atkinson and T. Bench-Capon (2008): Abstract argumentation scheme frameworks. In: *Proceedings of the Thirteenth International Conference on Artificial Intelligence: Methodology, Systems, Applications (AIMSA 2008)*, Varna, Bulgaria. Springer LNCS 5253 pp220-34.
 - Adam Wyner and Trevor Bench-Capon (2008) Modelling Judicial Context in Argumentation Frameworks In P. Besnard, S. Doutre, and A. Hunter (eds.) *Computational Models of Argument - Proceedings of COMMA 2008*, IOS Press. Frontiers in Artificial Intelligence and Applications.
 - Atkinson and T. Bench-Capon (2008): Co-ordination and co-operation in agent systems: social laws and argumentation. In I. Rahwan and P. Moraitis (editors): *Proceedings of the Fifth International Workshop on Argumentation in Multi-Agent Systems (ArgMAS 2008)*, Estoril, Portugal, pp. 58-73.

- A.Z. Wyner, T.J.M. Bench-Capon and K. Atkinson, (2008), Three Senses of “Argument”. In P. Casonovas et al (eds) *Computable Models of the Law*, LNAI 4884, Springer: Berlin. pp. 146–161.
- Monica Palmirani and Luca Cervone (in press). A native XML repository for heterogeneous legal resources: eXistimas. *Proceedings of the Workshop on Legislative XML 2008: the Law in the Semantic Web and beyond*.