E-D8-1

Spring or Summer School II.1

Project title:	Reasoning on the Web with Rules and Semantics
Project acronym:	REWERSE
Project number:	IST-2004-506779
Project instrument:	EU FP6 Network of Excellence (NoE)
Project thematic priority:	Priority 2: Information Society Technologies (IST)
Document type:	D (deliverable)
Nature of document:	R (report)
Dissemination level:	PU (public)
Document number:	IST506779/Munich+Linkoeping/E-D8-1/D/PU/b1
Responsible editors:	Norbert Eisinger, Jan Małuszyński
Reviewers:	Summer School board
Contributing participants:	Munich, Linkoeping; Dresden, Hannover, Heraklion, Librt, Lisbon, Manchester, Vienna
Contributing workpackages:	ET, I1, I2, I3, I4, A2, A3
Contractual date of deliverable:	28 February 2006
Actual submission date:	28 February 2006

Abstract
This document consists of two chapters.

Chapter 1 reports on "Reasoning Web 2005", the first REWERSE Summer School.

Chapter 2 describes in detail the programme of "Reasoning Web 2006", the second REWERSE Summer School.

Keyword List
semantic web, reasoning, education and training, summer school

Project co-funded by the European Commission and the Swiss Federal Office for Education and Science within the Sixth Framework Programme.

Spring or Summer School II.1

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28 February 2006

Abstract
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Contents

Chapter 1

Reasoning Web 2005

The first summer school organised by REWERSE took place at the University of Malta from Monday 25th July 2005 to Friday 29th July 2005 (see `http://reasoningweb.org/2005`).

1.1 Programme

A detailed description of the programme of Reasoning Web 2005 was given in deliverable E-D3 [Eisinger and Małuszyński, 2005b] and is not repeated here. An overview of the programme can be found at `http://reasoningweb.org/2005` and in the table of contents of the summer school proceedings [Eisinger and Małuszyński, 2005a].

1.2 Proceedings and Teaching Material

As described in deliverable E-D3 [Eisinger and Małuszyński, 2005b], each course or talk was accompanied by a full paper in the summer school proceedings [Eisinger and Małuszyński, 2005a] published in the "Lecture Notes in Computer Science" series by Springer-Verlag. Publisher information about this volume can be found at `http://www.springeronline.com/3-540-27828-1`, an online version of the volume is available at `http://www.springerlink.com/openurl.asp?genre=issue&issn=0302-9743&volume=3564&issue=preprint`.

The lecturers of Reasoning Web 2005 uploaded their slides and similar material used in giving the courses to REASE (`http://rease.semanticweb.org`). REASE is the "Repository of EASE", a joint KnowledgeWeb and REWERSE educational infrastructure.[1] The Reasoning Web 2005 courses were classified according to the topic hierarchy of REASE, which is the topic hierarchy developed as part of the emerging curriculum recommendations for the field of Semantic Web. The classification can be found in deliverable E-D7 [Małuszyński et al., 2006].

1.3 Participants

Anyone interested in the summer school could apply for participation by filling in an online application form that asked for information about the applicant's research activities and inter-

[1] In earlier deliverables REASE was called VISWER; the name had to be changed for legal reasons.

ests. In addition, PhD students could offer a 30 minutes presentation of their PhD work. This application information was then reviewed by a selection committee.

Altogether 72 persons applied for participation, 43 of whom were admitted by the selection committee. From among those of the admitted applicants who had offered to present their PhD work, 8 were selected to do so.

Among the applicants about 50 percent were related to REWERSE and 50 percent were not. However, among the summer school participants almost 60 percent were REWERSE related. It turned out that REWERSE people tended to apply early during the application period, while many non-REWERSE people applied near the end of the application period. Unfortunately the reviewing procedure, which consisted of several consecutive selection rounds, had the undesired side-effect to give slightly higher chances to early applicants. This effect will be avoided in the future.

As Reasoning Web 2005 was the first summer school organised by REWERSE, one of its objectives was to help establish a REWERSE identity. The high proportion of REWERSE participants was certainly conducive to that objective. Nevertheless, the ratio REWERSE to non-REWERSE applicants also indicates that the summer school was not conceived as a REWERSE internal event and can be a useful means of dissemination of REWERSE results well beyond the network.

1.4 Evaluation

A short time after the event a questionnaire was sent to all 43 participants asking them to rate several aspects of the summer school. 16 participants replied. Their ratings are summarised in the following table on the scale 1 = very good, . . . , 3 = acceptable, . . . , 5 = very bad.

		average	standard deviation
1.	Summer School Programme		
1.1	lecture subjects:	1.9	0.5
1.2	number of lectures:	2.2	1.1
1.3	PhD presentations:	2.4	0.8
1.4	feedback to PhD presentations:	2.7	1.2
2.	Lectures		
2.1	level of details:	2.0	0.9
2.2	examples:	2.3	0.8
2.3	application aspects:	2.9	1.0
2.4	theoretical aspects:	1.9	1.0
3.	Lecture Notes		
3.1	size:	1.6	0.9
3.2	text quality:	1.6	0.5
3.3	relationship between lectures and lecture notes:	2.0	1.6
4.	Local Arrangements		
4.1	technical facilities (lecture hall, computers):	2.0	1.3
4.2	catering facilities (lunches, coffee break):	2.5	0.9
4.3	bus transfer:	1.7	0.6
4.4	social programme (excursion and banquet):	2.0	0.8
4.5	recommended hotels:	2.9	1.2
	Total average:	2.2	

The overall result of 2.2 (meaning good) shows that the style chosen for the Reasoning Web summer school was well received.

The ratings for the quality of the lectures are very close to this overall result, which means that the participants in general appreciated the work of the lecturers.

The best ratings were given for the proceedings. Question 3.2 about text quality scored both the best rating and the lowest standard deviation. Thus, student opinions on this point were almost unanimous. This result carries even more weight because the students were given two months time for replying to the questionnaire, making it possible for them to study the proceedings thoroughly.

The worst ratings were given for application aspects of the lectures (which will be a focus in 2006) and for the hotels. The hotels in Malta were fully adequate, but some organisational problems concerning overbooking and relocation of people to other hotels without prior notification could have been handled better.

The questionnaire also allowed feedback in the form of free text comments. Most of those comments suggested that the teaching time per day was quite long and yet the programme was rather densely packed.

Chapter 2

Reasoning Web 2006

The second summer school organised by REWERSE will take place at the New University of Lisbon from Monday 4th September 2006 to Friday 8th September 2006 (see `http://reasoningweb.org/2006`).

2.1 Objectives

The main objective of Reasoning Web 2006 is of course the same as for its predecessor: to provide an introduction into semantic web methods and issues with a particular focus on reasoning. However, it is more application oriented and more open to industrial topics. Moreover, cross-network co-operation with Knowledge Web has been strengthened by including Knowledge Web members into the programme committee and by lecturers from Knowledge Web.

2.2 Teaching Material

Each course or talk will again be accompanied by a full paper in the summer school proceedings. Negotiations about publishing the proceedings are in progress at the time of writing this report.

Also, like in the previous year, slides and other teaching material will be uploaded to REASE (`http://rease.semanticweb.org`).

2.3 Programme

Taking into account the feedback to Reasoning Web 2005, the programme was designed to be more application oriented with a special focus on bio-health applications. The courses selected by the programme committee can be grouped into four categories. In parantheses we relate these categories to the classification of Semantic Web topics proposed in [Małuszyński et al., 2006].

1. Semantic Web Query Languages
   (v. Semantic Web Query and Update Languages, v.1. Query Languages)
2. Semantic Web Rules and Ontologies
   (vi. Ontologies for the Semantic Web, vii. Semantic Web Rules + Logic)

3. Bioinformatics and Medical Ontologies
   (x. Semantic Web Applications, x.3. Bioinformatics, x.5. e-health)
4. Industrial and Standardisation Aspects
   (xi. Semantic Web Special Topics, xi.8. Outreach to Industry)

The following list is ordered by these categories. It does not include PhD presentations.

2.3.1 Semantic Web Query Languages

2.3.1.1 Querying the Web with SPARQL

Authors/Lecturers:
Bijan Parsia
Non-REWERSE contributors:
University of Maryland
Teaching Time:
2 hours
Abstract:
SPARQL is a query language and protocol which together support "remote access" of information published on the Web in RDF related languages (RDF(S) and OWL). We discuss the background, syntax, and semantics of the SPARQL query language and explore how SPARQL is to RDF(S) and OWL what HTTP and URIs were to HTML: that is, critical to making the Semantic Web as active as the Web itself.

Table of Contents:

1. SPARQL Background
   (a) (W3C) Semantic Web Languages: RDF, OWL, RIF
   (b) Why a protocol?
   (c) SPARQL and the Semantic Web
2. SPARQL Query Concepts, Syntax, and Use
   (a) Terms and data constructs
   (b) Triple and Graph Patterns
   (c) Pattern operators
   (d) Datasets (Background and Named Graphs)
   (e) Filters and functions
   (f) Query forms and results
3. SPARQL Query Semantics
   (a) Query answers and the semantics of the dataset
   (b) Rigid BNodes and answer minimization
   (c) The algebra
   (d) The very idea of a virtual graph
4. Future Directions
   (a) Filling out the protocol
   (b) Aggregates, update, and federation
   (c) SPARQL and Web 2.0

2.3.1.2 RDF Querying: Language Constructs and Evaluation Methods Compared

Authors/Lecturers:
François Bry, Tim Furche, Georg Gottlob, and Dimitris Plexousakis
Contributing REWERSE participants:
Heraklion, Munich, Vienna
Teaching Time:
2.5 hours
Abstract:
During the last two years, a plethora of query languages for RDF have been proposed. These languages can be grouped into the following "families": The "SPARQL family", including SquishQL, RDQL, RDFQL, SPARQL, and TriQL; the "RQL family" including RQL, SeRQL, and eRQL; the "XQuery inspired family" including the so-called "syntactic Web approach" to RDF querying and XsRQL; the "XSLT inspired family" including TreeHugger, RDF Twig, RDFT, and the query language of Nexus; the "XPath inspired family" including Versa, RDF Path, RPath, RxPath, and RxSLT; the "Controlled English family" currently with only Metalog; the "reactive rule family" including Algae, iTQL, WQL; the "deductive rule family" including N3QL, R-DEVICE, TRIPLE, and Xcerpt; the "QBE inspired family" including RDF-QBE, RDFQL, and visXcerpt. The lecture introduces into these families and their languages. Then, compares these families and languages considering first the constructs, second the evaluation methods, and third the reasoning capabilities of the languages. Concerning the language constructs, the capability to express grouped selection of RDF data, optional selections, triple-based vs. path-based data selection are considered. Concerning query evaluation, the capability to access RDF data at sites retrieved from partial answers, to cope with non-trivial cases, including cyclic dependencies and/or data, and to traverse (arbitrary length) paths in the RDF graph efficiently are considered. Concerning reasoning, the capability to derive data implied by the RDF and RDFS semantics and by user defined rules are considered.

Table of Contents:

1. A Brief Introduction to RDF and RDFS
   (a) Model
   (b) Serializations
   (c) Semantics
2. The RDF Query language families
   (a) The SPARQL Family: SquishQL, RDQL, RDFQL, SPARQL, and TriQL
   (b) The RQL Family: RQL, SeRQL, and eRQL
   (c) The RDF Query Languages Inspired From XQuery: The Syntactic Web Approach and XsRQL
   (d) The RDF Query Languages Inspired From XSLT: TreeHugger, RDF Twig, RDFT, and The Query Language of Nexus
   (e) Controlled English for Querying RDF: Metalog
   (f) The Reactive Rule Family: Algae, iTQL, WQL
   (g) The Deductive Rule Family: N3QL, R-DEVICE, TRIPLE, and Xcerpt
   (h) The RDF Query Languages Inspired From QBE: RDF-QBE, RDFQL, and visXcerpt

3. Language Constructs Compared
   (a) Grouped Selections
   (b) Optional Selections
   (c) Triple-based vs. Path-based Selections
4. Query Evaluation
   (a) Crawling Queries
   (b) Cyclic Dependencies and Data
   (c) Efficient Path Traversal
5. Reasoning
   (a) Reasoning after the RDF(S) Semantics
   (b) Reasoning after User Defined Rules
6. Conclusion

2.3.2 Semantic Web Rules and Ontologies

2.3.2.1 Integrating ontologies and rules: semantic and computational issues

Authors/Lecturers:
Riccardo Rosati
Non-REWERSE contributors:
University of Rome
Teaching Time:
2 hours
Abstract:
In this talk we present some recent results on the definition of logic-based systems integrating ontologies and rules. In particular, we take into account ontologies expressed in Description Logics and rules expressed in Datalog (and its nonmonotonic extensions).

We first introduce the main issues that arise in the integration of ontologies and rules. In particular, we focus on the following aspects: (i) from the semantic viewpoint, ontologies are based on an open-world semantics, while rules are typically interpreted under a closed-world semantics. This semantic discrepancy constitutes an important obstacle for the definition of a meaningful combination of ontologies and rules; (ii) from the reasoning viewpoint, the interaction between an ontology and a rule component is very hard to handle, and does not preserve decidability and computational properties: e.g., starting from an ontology in which reasoning is decidable and a rule base in which reasoning is decidable, reasoning in the formal system obtained by integrating the two components may not be a decidable problem.

Then, we present the main approaches for the integration of ontologies and rules, with special emphasis on how they deal with the above mentioned issues. We divide the current proposals into approaches based on a "loose" integration of ontologies and rules, and approaches based on a "tight" integration.

Finally, we illustrate the main open problems in this research area, pointing out what still prevents us from the development of both effective and expressive systems able to integrate ontologies and rules.

Table of Contents:

2.3.2.2 Reasoning with Rules and Ontologies

Authors/Lecturers:
Thomas Eiter
Contributing REWERSE participants:
Vienna
Teaching Time:
2 hours
Abstract:

For realizing the Semantic Web vision, a lot of efforts are spent for getting the layers of the Semantic Web Layer cake ready. Given that the Ontology Layer has reached a level of maturity, the current interest focuses on the Logic/Rule Layer and who to integrate it with the Ontology Layer. Several different proposals have been made for solving this problem, which does not have a straight solution. This stems from various different facts. One of these facts is that rule languages involve evaluation principles such as a closed world assumption, which is usually not adopted in ontologies. Furthermore, adding rules to ontologies quickly leads to undecidability of ontology formalisms such as the standard OWL Web Ontology Language. In this lecture, we shall after providing some preliminaries in the first part briefly survey some of the approaches which have been made to facilitate reasoning with rules and ontologies. We then will focus in the second part on approaches that combine rules under the answer set semantics for nonmonotonic logic programs, which is the dominant semantics to day, and ontologies. Special emphasis will be given to Non-Monotonic Description Logic Programs, which facilitates transparent integration of rules and ontologies as well as existing reasoning engines. After that,

we shall consider related approaches and report on recent ongoing developments in the area, as well as address open issues.

Table of Contents:

1. Introduction and Motivation
2. Preliminaries (OWL, RDF, ASP as rule language)
3. Combining rules with ontologies
   (a) Survey
   (b) Hybrid / seamless integration
   (c) Issue of non-monotonicty / CWA
4. Non-Monotonic Desription Logic Programs (Syntax, Semantics, Examples)
5. Related approaches and extensions
6. Conclusion

2.3.2.3 Semantic Web and Business Rules

Authors/Lecturers:
Silvie Spreeuwenberg
Contributing REWERSE participants:
Librt
Teaching Time:
2 hours
Abstract:

My visits of several workgroups and conferences in the semantic web community, given my background as a practitioner in the business rules community, has let me to make the following observation: "the business rules community and semantic web community talk about the same things, but by people with a different background; the business rules community is driven by the practical experiences of business people and business consultants while the semantic web community is a vision of scientists driven by (mostly) scientific publications".

If this observation is correct, it is important that there is more understanding of each other's work so that we can end up with a 'semantic business' that supports a practical approach to business problems and is supported by a long-term vision.

If this observation is not correct, and the business rules community and the semantic web community do talk about different things, then we need to get a better understanding of the border between the two communities so that we can develop standard transformations or processes to cross these borders.

Table of Contents:

1. Introduction business rules community
2. Introduction semantic web community
3. Differences and similarities
   (a) Roots
   Discussion of differences / similarities BR and SW with respect to the roots of the community.

(b) Target Audience
Discussion of differences / similarities BR and SW with respect to the target audience of the community

(c) Goal
Discussion of differences / similarities BR and SW with respect to the goal of the community

(d) Form
Discussion of differences / similarities BR and SW with respect to the form in which rules and knowledge is expressed

(e) Expression Power
Discussion of differences / similarities BR and SW with respect to the expression power of a language of the community

4. SBVR standard
   (a) Terminology basis
   (b) Natural language basis
   (c) Higher order logic
   (d) Deontic logic
   (e) Closed world vs. Open world
5. Tools
   (a) Management tools
   (b) Execution tools: To inference or not?
   (c) Future of this market, what do analysts say?
6. Challenges
   (a) For the Business Rule vendors
   (b) For the Semantic Web researchers

2.3.2.4 Composition of Rule Sets and Ontologies

Authors/Lecturers:
Uwe Aßmann
Contributing REWERSE participants:
Dresden
Teaching Time:
1 hour
Abstract:
To master large rule sets in ontologies and other logic-based specifications, a division into components plays a major role. A naive approach treats the rule sets as black boxes and composes them via combinators. However, the relationships between the components are usually quite complicated so that the black-box approach fails to be useful in many scenarios. Instead, the components should be "opened" before composition, and the paper presents several such "gray-box composition"echniques, namely facet-based composition, role-based composition, and role collaborations. In essence, all approaches describe the collaboration of rules and concepts

between the involved components, modeling their interrelation more precisely than it would be possible with a black-box approach.

Table of Contents:

1. Model management

   Models, in particular ontologies and rule specifications, need to be managed to be able to construct large systems. Reuse is an important factor, but reuse relies on an appropriate component and composition technology.

2. Invasive software composition

   Invasive software composition offers a set of composition operators to combine artifacts of languages flexibly. Several composition paradigms, such as view-based programming, generic programming, or aspect-oriented programming can be modeled using these operators.

3. Rule set and ontology composition

   Based on the invasive operators, also rule and ontology components can be composed. It is demonstrated that role models and -collaborations can be modeled with invasive operators. This opens the way for flexible merge of rule and ontology components, grey-box composition, that goes beyond the black-box composition style.

4. Applications

   This section shows applications of invasive rule set and ontology composition.

2.3.3 Bioinformatics and Medical Ontologies

2.3.3.1 Ontologies and Text Mining as a Basis for a Semantic Web for the Life Sciences

Authors/Lecturers:
Michael Schroeder and Patrick Lambrix
Contributing REWERSE participants:
Dresden, Linkoeping
Teaching Time:
3 hours
Abstract:
Researchers in various areas, e.g. medicine, agriculture and environmental sciences, use biomedical data sources and tools to answer different research questions or to solve various tasks, for instance, in drug discovery or in research on the influence of environmental factors on human health and diseases. During recent years an enormous amount of biomedical information has been generated. This data is spread in a large number of autonomous data sources and literature databases that are often publicly available on the Web. There are also numerous tools available on the Web. The recent explosion of the amount of on-line accessible information and tools has largely complicated the search for information. Finding the relevant sources and retrieving the relevant information are difficult tasks and often information from different sources needs to be integrated. The vision of a Semantic Web for bioinformatics alleviates these difficulties.

Table of Contents:

In this lecture we will discuss the following issues related to searching for bioinformatics information:

1. data sources (e.g. swissprot), document sources (e.g. PubMed) and tools (e.g. BLAST) and their search facilities
2. problems of finding bioinformatics information in the current Web
3. towards a Semantic Web for bioinformatics
4. ontologies in bioinformatics
5. Semantic Web methods and tools for bioinformatics (e.g. GOPubMed, SAMBO, ontology-based integration, ...)

2.3.3.2 Integrating Web Resources to Model Protein Structure and Function

Authors/Lecturers:
Ludwig Krippahl
Contributing REWERSE participants:
Lisbon
Teaching Time:
2 hours
Abstract:

In this lecture we address computational aspects of protein structure and function, including prediction of secondary structure, folding, structure determination from Nuclear Magnetic Resonance data, modelling of protein interactions, and metabolic pathways. The subject is introduced with an overview of protein structure and chemistry and the algorithms and representations used to model protein structures. The main focus of the lecture is the integration of information from sources relevant to protein structure modelling, such as structure databases and modelling servers, a task that made difficult by the heterogeneity of formats, the diversity of data sources, and the sheer volume of information available, making evident the need for a standard framework for data sharing, i.e. the Semantic Web. To help solve this problem, we present tools being developed according to the concept of a Semantic Web. These include the UniProtRDF project and tools currently implemented on the Chemera molecular modelling software which can facilitate the search and application of information available from Internet servers and databases.

Table of Contents:

1. Introduction

   Protein structure, importance of structure for function and drug design.
2. Algorithms

   Structure prediction, modelling of interactions, data processing.
3. Web Resources

   Secondary structure servers, the RSCB Protein Data Bank, structure and domain classification databases.
4. Integration of Resources

   UniProtRDF, service integration with Chemera, open problems and need for better integration.

2.3.3.3 Ontological & Practical Issues in using a Description Logic to Represent Medical Concepts: Experience from GALEN

Authors/Lecturers:
Alan Rector
Non-REWERSE contributors:
University of Manchester
Teaching Time:
2 hours

Abstract:
GALEN seeks to provide re-usable terminology resources for clinical systems. The heart of GALEN is the Common Reference Model (CRM) formulated in a specialised description logic. The CRM is based on a set of principles that have evolved over the period of the project and illustrate key issues to be addressed by any large medical ontology. The principles on which the CRM is based are discussed followed by a more detailed look at the actual mechanisms employed. Finally the structure is compared with other biomedical ontologies in use or proposed

Table of Contents:

1. Introduction
   (a) Background
   (b) GALEN's Aims and criteria for success
2. Rationale for the GALEN Ontology Schemata
   (a) Basic Principles
      i. 'Logical approximations'
      ii. 'Linguistic approximations'
      iii. Canonical forms and "canonization"
   (b) Ontological issues
      i. Categories, instances and natural kinds
      ii. Self-standing entities and modifiers
      iii. Reified relations1 or "Features"
      iv. Dualities
      v. Top level ontologies
      vi. Normative statements, congenital malformations, and imputed intentions
   (c) Logical issues
      i. Negation and uncertainty
      ii. Defaults and indexing
      iii. Definitions and general inclusion axioms
      iv. Embedded expressions
      v. Transitive attributes and inheritance across transitive attributes
   (d) Issues minimally or poorly represented
3. The GALEN Upper Domain Ontology
   (a) The Top Level Categories
      i. Top level distinctions

ii. Modifiers
iii. Phenomenon - Secondary structure for top level categories
iv. Breaking up long lists: the NAMED? convention

(b) Top level attributes1

i. Primary distinctions
ii. ConstructiveAttribute
iii. ModifierAttribute
iv. Structure of inheritance across transitive attributes
v. Additional uses of the attribute hierarchy

4. The GALEN Schemata

(a) Anatomy

i. Physical part whole relations and physical connection
ii. Regions
iii. Generic bits and pieces
iv. Tissues, cells and substances: mass, discrete, and indefinitely divisible
v. Topologies, cavities, spaces, lines and anatomical landmarks
vi. Arbitrary portions
vii. Reciprocal expressions

(b) Processes and Functions

(c) Diseases

i. What is a "disease"?
ii. Causation

5. Application Constructs: Medical Records and Coding Schemes

6. Discussion

(a) Evaluation against criteria
(b) Issues with the GRAIL formalism
(c) Comparison with other ontology schemas
(d) Outstanding issues
(e) Summary

7. Acknowledgements

Remark:
The speaker will cover in his lecture only selected parts of this content.

2.3.4 Industrial and Standardisation Aspects

2.3.4.1 The Rule Interchange Format under development at W3C

Authors/Lecturers:
Christian de Sainte Marie
Non-REWERSE contributors:
ILOG
Teaching Time:
2 hours

Abstract:

In November 2005, the W3C announced the formation of a working group dedicated to specifying an XML-based rule interchange format. In the first part of this lecture, we examine the context in which this working group was created, and the constraints it sets on the development of the rule interchange format. We start with a discussion of the differences and benefits of a rule interchange format versus a rule language for the Web. We then consider the use cases for a rule interchange format, and the rule languages that must be taken into account: these, together, set the requirements for the rule interchange format. The Use Cases and Requirements document was the first deliverable released by the working group. Another important aspect of the context in which the rule interchange format is designed is that there are many related standards, recommended or under development at the W3C as well as other organisations such as the OMG:: we discuss how some of these standards relate to rule interchange, and how they impact the design of the rule interchange format. As a conclusion to part 1, we present and we motivate the phased approach that was chosen for thedevelopment of the rule interchange format. In the second part, we present the latest state of the phase 1 specification: we introduce the architecture of the language, its core syntax and how the language addresses compatibility issues. We discuss the format extensibility, its conformance policy as well as some important issues. We conclude on the prospects for phase 2 and beyond.

Table of Contents:

1. The RIF in context
   (a) A Rule Language for the Web or a Rule Intechange Format?
   (b) All kinds of rule languages
   (c) Use cases and requirements for a Rule Intechange Format
   (d) I'm not a poor lonesome standard: RDF, OWL, SPARQL, PRR and the gang
   (e) A phased approach to the specification of an extensible format
2. The RIF, phase 1
   (a) Architecture
   (b) Syntax
   (c) Compatibility
   (d) Extensibility
   (e) Conformance
   (f) Issues
3. Future prospects and conclusion

2.3.4.2 The Semantic Web from an industrial perspective

Authors/Lecturers:
Alain Léger
Non-REWERSE contributors:
France Télécom
Teaching Time:
1 hour

Abstract:

Semantic Web technology is being increasingly applied in a large spectrum of applications in which domain knowledge is conceptualized and formalized (e.g., by means of an ontology) in order to support diversified knowledge processing (e.g., reasoning) by machine. Moreover, through the subtle joining of (cognitive) human reasoning and (logical) machine reasoning, it is possible for humans and machines to share complementary tasks. Some examples of application areas where these tasks arise are: corporate portals and knowledge management, e-commerce, e-work, healthcare, e-government, natural language understanding and automated translation, information search, data and services integration, social networks and collaborative filtering, knowledge mining, and so on. From a social and economic perspective, this emerging technology should contribute to growth in economic wealth, but it must also show clear cut value for everyday activities through technological transparency and efficiency. The uptake of Semantic Web technology by industry is progressing slowly. One of the problems is that academia is not always aware of the concrete problems that arise in industry. In contrast, industry is not often well informed about the academic developments that can potentially meet its needs. In this paper and lecture we present ongoing work in the cross-fertilization between industry and academy. In particular, we present here few key selected application fields and use cases from enterprises which are highly interested in the industrial uptake of Semantic Web. The Use cases are detailed and focused on the key knowledge processing components that will unlock the deployment of the technology in the selected application field. The talk ends with the presentation of the current technology roadmap designed by a team of Academic and Industry researchers.

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Acknowledgement

This work has been co-funded by the European Commission and by the Swiss Federal Office for Education and Science within the 6th Framework Programme project REWERSE number 506779 (cf. `http://rewerse.net`).

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