Project Presentation Year 3

European Network of Excellence

REWERSE

Reasoning on the Web with Rules and Semantics

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REWERSE – Reasoning on the Web

The project

EU Network of Excellence (FP6)

- IST - “Semantic-based knowledge systems”
- Funded by EC and Switzerland with 5,5 Mio €
- Duration: March 2004 – February 2008

Networking …

- Over 100 researchers from 27 institutions in 14 European countries organized in 13 groups

… Excellence in research on

- Reasoning on the Web with Rules & Semantics

Portfolio of REWERSE Activities

Reasoning Languages for Advanced Web Systems

Web reasoning languages & processing

- Define minimal set of Web reasoning languages
  - Coherent and inter-operable
  - Functionality and application independent
- Enhanced with support tools

Advanced Semantic Web Applications as testbeds

- Context-adaptive Web systems
- Web-based decision support systems

Dissemination

- Education and Training
- Technology Transfer to industry
- Standardization

REWERSE Workpackages

4 Core Work Areas, 13 Workpackages

Web reasoning languages and their processing

I1: Rule Markup
I2: Policies
I3: Composition & Typing
I4: Query
I5: Evolution

Dissemination Activities

ET: Education and Training
TTA: Technology Transfer
STD: Standardisation

Advanced Web Applications

A1: Time & Location
A2: Bioinformatics
A3: Personalisation

Assessment and Management

PRA: Assessment
M: Management

Achievements Year 3

Overview

Research: SW Reasoning Languages & Applications

- Consolidation language definitions & methods
- Implementation of stable prototypes (rewerse.net/demos/)
- Research publications (rewerse.net/publications.html)

Integration

- Important joint research activities
- Demonstrate added value of NoE instrument!

Dissemination

- Reasoning Web 2006 Summer School
- REWERSE exhibition at “Semantics 2006”
- PPSWR 2006, workshops, tutorials
- W3C standardisation activities

Reasoning Languages – Main Results

I1: Rule Modelling & Markup

Activities

- Integrated rule modelling, visualization, verbalization and markup framework supported by tools

Languages, Tools and Methodologies

- R2ML (REWERSE Rule-markup Language)
- URML (semi-visual rule modelling)
- Strelka (visualization tool)
- ERDF (RDF + two negation types)

Use-cases

- UServ Product Derby Case Study, EU-Rent Case Study

Online References (rewerse.net/I1/)

- http://rewerse.net/demos/i1.html

Reasoning Languages – Main Results

I2: Policy Specification, Composition, Conformance

Activities

- High-level languages & tools for specifying and integrating complex policies (rules to establish trust)
- Controlled natural language interfaces

Languages, Tools and Methodologies

- Protune (rule-based language for trust negotiation)
- ACE (controlled English front-end for REWERSE)
- Trust negotiation strategies

Use-cases

- Automated Trust Establishment for eCommerce (accepted as RIF use-case: www.w3.org/TR/rif-ucr/)

Online References (rewerse.net/I2/)

- Demos rewerse.net/I2/software.html
  www.ifi.unizh.ch/attempto/

Reasoning Languages – Main Results

I3: Composition and Typing

Activities

- Typing & component based technologies ⇒ interoperability & reusability of SW languages

Languages, Tools and Methodologies

- Reuseware Composition Framework (composition based development of REWERSE-related languages)
- XcerptT (Xcerpt Type System)
- Pre- and descriptive typing for rule languages

Online References (rewerse.net/I3/)

- Demos reuseware.sourceforge.net
  www.ida.liu.se/~artwi/XcerptT
  rewerse.net/demos/i3.html

Reasoning Languages – Main Results

I4: Reasoning Aware Querying

Activities

- Versatile query language for heterogeneous Web data

Languages, Tools and Methodologies

- Xcerpt (Web + SW query language) + visXcerpt
- Abstract Machine AMaXoS + Query Algebra
  for efficient implementation of Xcerpt and beyond
- dlv-hex (answer set progr. to combine rules & ontologies)

Use-cases

- Practical needs of users of Web query languages

  (I4-D3, RP-2005-83, RP-2006-072, several tutorials)

Online References (rewerse.net/I4/)

- Demos http://rewerse.net/I4/software/Xcerpt/
  http://con.fusion.at/dlvhex/

Reasoning Languages – Main Results

I5: Evolution and Reactivity

Activities

- General Framework for Web Evolution & Reactivity

Languages, Tools and Methodologies

- r3 (SW rule engine for reactive rules of diff. formats)
- MARS (Modular Active Rules for the SW Framework)
- XChange (language to program reactivity on the Web)

Use-cases (cf. I5-D2)

- Project Information System and Portal
- Travel planning scenario
- Bioinformatics event broker

Online References (rewerse.net/I5/)

- Demos
  rewerse.net/I5/r3/
  www.dbis.informatik.uni-goettingen.de/MARS/
  www.pms.ifi.lmu.de/projekte/xchange/Prototype.html

Advanced Web Apps – Main Results

A1: Reasoning with Temporal & Spatial Web Data

Activities

- Web-based Decision Support for Event, Temporal and Geographical Data

Languages, Tools and Methodologies

- CTTN (Computational Treatment of Temporal Notions)
- MPLL (Symbolic Spatial Specification Language)
- EFGT net (represent & reason with named entities)
- Several peripheral systems implemented

Use-cases

- Reasoning with fuzzy temporal relations
- Munich public transportation network as test suite

Online References (rewerse.net/A1/)

- Demos: http://rewerse.net/A1/material.html

Advanced Web Apps – Main Results

A2: Bioinformatics Semantic Web

Activities

- Contribute to Semantic Web for life sciences with applications using rules & reasoning on the Web

Languages, Tools and Methodologies

- GoPubMed (ontology-based search for biomedical literature) ⇒ Spin-off company Transinsight
- Several other prototypes (A2-D4)
- Strong links to REWERSE I-groups

Use-case suites (A2-D3)

- Use of rules to integrate biomedical data
- Rules for reasoning over protein interactions

Online References (rewerse.net/A3/)

- Demos: http://rewerse.net/A2/demos

Advanced Web Apps – Main Results

A3: Personalized Information Systems

Activities

- Personalization supported by reasoning on SW data

Languages, Tools and Methodologies

- Personal Publication Reader
- Several SW personalization services, e.g.
  - e-learning
  - recommender systems

Use-case suite (A3-D2, A3-D6)

- Personal Reader Framework: Environment for designing & implementing Personalization Services

Online References (rewerse.net/A3/)

- Demos: www.personal-reader.de
  rewerse.net/demos/a3.html

Summary Research Achievements
SW Reasoning Languages, Tools & Applications

Web Reasoning Languages & Tools

- I1: R2ML, URML, Strelka, ERDF
- I2: Protune, Protune-X, ACE, Attempto Tools
- I3: XcerptT, Reuseware Composition Framework
- I4: Xcerpt, AMaXoS, dlvhex
- I5: r3, MARS, XChange

Advanced Web Application

- A1: CTTN, GeTS, CTSN, MPLL, TransRoute, EFGT Net
- A2: GoPubMed, MeshPubMed, BIOCHAM, Chemera, Sambo, KitAMO, KitEGA, ...
- A3: Personalized Reader Framework: Personal Publication Reader, Personal Reader Agent (MyEar, MyNews) ...

Research – Publication Results

In Numbers (rewerse.net/publications.html)

412 peer-reviewed publications at month 36

Publications	Status Month	36	Feb 07			
(peer-reviewed)	**Total**	Year 1 Mar 04-Feb 05	Year 2 Mar 05-Feb 06	Year 3 Mar 06-Feb 07	Year 4 Mar 07-Feb 08	∅ per year
Total	**412**	92	135	169	16	137,3
∅ member (of 113)	3,6	1,2	1,2	1,5	0,1	1,2
∅ participant (of 27)	15,3	3,4	0,0	6,3	0,6	5,1
∅ research WG (of 8)	51,5	11,5	16,9	21,1	2,0	17,2
Integration: Joint publications						
Sum inter-WP	57	16	19	20	2	19,0
% inter-WP	14%	17%	14%	12%	13%	14%
Sum inter-participant	61	14	25	20	2	20,3
% inter-participant	15%	15%	19%	12%	13%	15%

Dissemination – Main Results

ET: Education & Training

Activities

- Education & Training for young researchers on Semantic Web & Reasoning topics

Main Results (rewerse.net/ET/)

- Annual Summer School “Reasoning Web” (reasoningweb.org)
- Semantic Web Curriculum Topics (wiki.ontoworld.org/wiki/Semantic_Web_Topic_Hierarchy)
- REASE Repository of SW e-learning material (with Knowledge Web) (rease.semanticweb.org)

Repository of EASE
REASE
for Learning Units

Dissemination – Main Results
TTA: Technology Transfer

Activities

- Increase industry awareness for REWERSE & related Semantic Web topics

Main Results (rewerse.net/TTA/)

- Dissemination events
  - Semantic Web Days, Oct 2005 + Sep 2007 (www.semantic-web-days.net)
  - Stands, e.g. at EBRC, Semantics, CeBIT, ...
- PR activities (press, flyer, posters, strategy ...)
- Industry education learning structure (T-D3, T-D5, T-D7)
- Industry co-operations, e.g. A2-Elsevier

Dissemination – Main Results

STD: Standardization

Activities

- Promote results within standardisation bodies
- Support technology transfer

Main Results (rewerse.net/STD/)

- W3C membership of REWERSE since Oct 05
- Active participation in W3C groups, mainly
  - Rule Interchange format WG (RIF)
  - Semantic Web Health Care and Life Sciences (HCLS)
- Preparation of standards submission
- External contacts: NRC, DERI, Mitre, Fujitsu

Dissemination – Main Results

Research Dissemination

Activities

- Public REWERSE research archive
- Research events on Reasoning on the Web

Main Results

- Research archive on rewerse.net
  - Publications: rewerse.net/publications.html
  - Deliverables: rewerse.net/deliverables.html
- Four Int. Workshops PPSWR (rewerse.net/PPSWR/)
- Int. Conference on Web Reasoning and Rule Systems (RR)
  - Starting June 2007 (rewerse.net/RR/)
  - Joins PPSWR + RuleML + RoW to large event

PPSWR 2006

RR2007

Contacts and Co-operations Year 3

Outside REWERSE ...

With other networks and projects

- Knowledge Web, MUSING, ...
- RuleML, Salzburg Research, Semantic Web School, W3C, DERI, ...

Various companies

- Elsevier, HP labs, ILOG, Jentro, ontoprise, Resprotect, SAP, Scionics, Siemens, Transinsight, Unilever, ...
- Spin-off Transinsight (A2)

Emerging networking for FP7 proposals

Expected Outcome by End of 2008

Reasoning languages

Methods and Principles

- I1: Comprehensive rule-interchange format + tools
- I2: Policy negotiation suite with explanations
- I3: Component-based SW language development
- I4: Efficient & scalable query algebra for Xcerpt
- I5: General framework for reactivity on the Web
- Formulation of pre-standards for languages

Public Release of Prototypes

- Stable & comprehensive prototypes for languages
- Integration of support tools ⇒ complete suites

Testing on further use-cases (also inter-WP)

Expected Outcome by End of 2008

Advanced Web Applications

A1: Time & Location

- Provide public libraries & servers
  - which process geotemporal & geospatial notions
  - which can be used by other (SW) systems

A2: Bioinformatics Semantic Web

- Stable & efficient Semantic Web applications for life-sciences using rules & reasoning

A3: Personalisation

- Personalization Services offering various personalization functionality, powered by reasoning on Semantic Web data

Further integration of results of I-groups

Expected Outcome by End of 2008

Dissemination

Continuation of dissemination activities

- Summer School “Reasoning Web” & REASE
- Semantic Web Days

Training

- Face-to-face courses for industry + academia

Research dissemination

- Annual international conference RR
- Possible: Establish electronic journal

Standardisation

- Contribute to RIF core language plus dialect(s)
- Keep W3C membership and group participation
- W3C member submissions of REWERSE outcome

Networking structure beyond REWERSE

Practical Value & Use of NoE REWERSE

Means to Generate Quality Research

REWERSE is a research oriented NoE …

- Goals similar to STREP or IP, but
- More distributed
- Wider range of topics: methods & applications

… that has demonstrated

- High research productivity
- Inter-WP cross-fertilization
- International transfer of EU research, e.g. W3C

… that has required

- Precise definition of research agenda
- Dedicated groups (steering, management, all)

Practical Value & Use of NoE REWERSE

Training, Dissemination and Integration

Summer School "Reasoning Web"

- Excellent training of young researchers
- Widespreading of novel issues & results

Dissemination Event "Semantic Web Days"

- Good industry transfer instrument
- More resources could increase visibility

REWERSE has built strong community

- On rules and reasoning on the Web
- Beyond academia
- To be continued & extended (e.g. more SMEs)

Practical Value in a Nutshell

EU funding of NoE REWERSE facilitated ...

High-quality research & applications

- On rules and reasoning on the Web

Excellent international working groups

- With cross-fertilization

Dissemination support for researchers

- Increased outreach to industry & academia

Educating young researchers within project

Basis for long lasting integration & impact

- ... beyond REWERSE

More Information
Online References

REWERSE Web page

- http://rewerse.net

Publications Archive

- http://rewerse.net/publications.html

REWERSE Deliverables

- http://rewerse.net/deliverables.html

Demos and Screencasts

- http://rewerse.net/demos/

Contact

- http://rewerse.net/contact.html