knowledge**web**

realizing the semantic web

D3.1.5 Published learning resources, quality guidelines and procedures, and usage of learning resources

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Abstract.
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Abstract
This deliverable summarizes the activities related to populating REASE, the repository of EASE for learning units about Semantic Web topics, with learning resources, including the creation of the new catalogue, a description of the published learning units, the quality management process, and a first evaluation of the usage of the published learning units.

Knowledge Web Consortium

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Changes

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Executive Summary

This deliverable summarizes the activities related to populating REASE, the repository of EASE for learning units about Semantic Web topics, with learning resources. The number of learning resources published by KnowledgeWeb members increased from about 30 at the end of 2004 to about 50 at the end of 2005. During self-assessment for the first project year, it became clear that REASE was lacking learning resources for industrial education. Therefore, we concentrated on such material: more than 50% of the learning units uploaded by KnowledgeWeb members in 2005 were also suited for industrial education.

Furthermore, we extended the REASE catalogue from 5 to more than 60 categories, which were derived from a more general discussion of a Semantic Web Topic Hierarchy among KnowledgeWeb and REWERSE participants.

To control the quality of the published learning units, we have set up a list of quality guidelines, which have to be followed when publishing learning units. This is complemented by a quality management process which determines how the guidelines are actually enforced.

Finally this deliverable comprises also a first evaluation of the usage of REASE and the published learning units, based on log file analysis.

Contents

1 Introduction

This deliverable is intended to document the work done in the past 18 months related to publishing educational material on REASE, the Repository of EASE for learning units[1]. Specifically our activities were focused around the following issues:

- Publishing more learning resources, especially ones for industry
- Extend the REASE catalogue to allow for a more effective search
- Creating guidelines and procedures for quality management
- Do a first evaluation of the usage of REASE.

These activities will be reported in more detail in the following sections. We start with a description of the new REASE catalogue and describe the published learning resources with the help of the catalogue thereafter.

2 The REASE catalogue

We started with the initial classification scheme for the learning units in the catalogue with five categories as described in D3.3.2v2. However, when more and more material was added, it became clear that the initial classification was no longer sufficient, so we initiated a general discussion about a Semantic Web curriculum[2] together with the NoE REWERSE to be able to align the REASE catalogue with the curriculum activities in REWERSE.

2.1 The Semantic Web Topic Hierarchy

The Semantic Web Topic hierarchy was developed jointly with REWERSE starting from the initial curriculum as discussed in the REWERSE deliverable E-D5, which itself is based upon the ACM Computing Classification System[3], and extends it with topics, which were not existent or relevant at the time of its creation. Specifically, we examined the session titles of the two major conferences in the area of Semantic Web, the International Semantic Web Conference (ISWC) and the European Semantic Web Conference (ESWC) from past years.

2.1.1 Overall Structure

The structure of the curriculum is in general three-fold:

- Foundations
- Semantic Web Core Topics
- Semantic Web Special Topics

This retains the overall top-level structure of the original initial version of the REASE catalogue. Such a backward compatibility is important as REASE is a running system being in daily use: It enables an automatic reclassification of already existing material in REASE and does not require a time-critical manual intervention of the original provider.

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[1] http://rease.semanticweb.org
[2] https://www-sop.inria.fr/wiki/bin/view/Acacia/KnowledgeWeb
[3] http://www.acm.org/class/1998/

However, a manual reclassification of the material into the newer, more fine-grained categories was still necessary and is ongoing since the new catalogue was only introduced end of August this year and is still subject to minor changes.

In the following subsections, we provide more details on the three main categories of the curriculum.

2.1.2 Foundations

Originally, the foundations category comprised the subcategories `Logics' and `Web technologies'. This was extended by many new categories to allow for a more fine-grained categorization and to integrate existing categories from the ACM classification system. A more detailed description of the curriculum can be found in the REWERSE deliverable E-D7, which will be published a few months after this deliverable.

Specifically, we added the following categories and sub-categories:

- Knowledge Engineering / Ontology Engineering
  - Methodologies
  - Ontology population / generation
  - Maintenance and versioning (dynamics)
  - Mapping / translation / matching / aligning (heterogeneity)
  - Validation
  - Interoperability / Integration
  - Modularization and Composition
  - Tools
- Knowledge Representation and Reasoning
  - Logics:
    - Predicate Logic
    - Description Logics
    - F-logic
  - Modal Logics
  - First-order Logic
  - Logic Programming
    - Horn Logic
    - Datalog
    - Prolog
    - Hilog
  - Reasoning
- Information Management
  - Data Modeling
    - Conceptual models; ontologies, UML
    - Relational data model
    - Semistructured data
    - Object-oriented model
  - Database systems

- Basic Web information technologies
  - XML
    - Namespaces
    - Schema languages
    - XML query and transformation languages
    - XML programming techniques
  - Web data integration
  - Security
  - Web services
  - Personalization techniques
  - Web data extraction / information extraction
  - Architecture of Web Information Systems
- Agents
- Natural Language Processing

An automatic mapping from the old categories was performed using:
- Logics → Knowledge Representation and Reasoning | Logics
- Web technologies → Basic Web information technologies

Learning units which were classified as 'Foundations' in general, were reclassified manually based on an individual inspection.

2.1.3 Semantic Web Core Topics

Originally, the REASE catalogue contained the categories `Knowledge Representation', `Ontologies', and `Semantic Web Technologies'. We extended this scheme to the following categories and subcategories, trying to align them also to the well-known Semantic Web Layer cake:

- Infrastructure
  - Architecture
  - Semantic Web Services
- Resource Description Framework / RDFSchema
- Languages
  - Query Languages
  - Update Languages
- Ontologies
  - Ontology representation / Ontology languages / OWL
  - Ontology Engineering
- Rules + Logic
  - Rule languages
  - Rule Markup
  - Reasoning languages
  - Reasoning Engines
- Proof
- Security / trust / privacy

- Applications
    - Knowledge Management
    - E-Learning
    - Bioinformatics
    - Multimedia
    - ehealth
    - ebusiness
    - Law
    - Engineering

The original categories were mapped as follows:

- Knowledge Representation → Foundations | Knowledge Representation and Reasoning
- Ontologies → Ontologies
- Semantic Web Technologies → Resource Description Framework / RDFSchema
    - This one was manually post-processed as it did not always match.

Again, learning units that were classified as 'Semantic Web Core Topic' in general, were reclassified manually.

2.1.4 Semantic Web Special Topics

Originally, there were no categories below this topic. We extended this significantly to capture current hot topics of Semantic Web research:

- Natural language processing / human language technologies
- Social impact of the Semantic Web
- Social networks and Semantic Web
- Peer-to-peer and Semantic Web
- Agents and Semantic Web
- Semantic Grid
- Outreach to industry
- Benchmarking and scalability

A reclassification was not necessary since we kept the category 'Semantic Web Special Topics'.

2.2 The REASE Catalogue

While this Semantic Web Topic Hierarchy reflects, of course, a compromise among the different opinions within the Semantic Web community (e.g., some consider `natural language processing' as a foundational topic while others treat it as special topic), we had to generate an even more simplified version for technical reasons: the REASE catalogue, though customizable, can only handle up to two hierarchical levels at maximum. This has also the advantage that the number of categories is more limited, so REASE users are not `lost' in too many catalogue categories.

As a result, we skipped the first-level hierarchy of `foundations', `Semantic Web core topics' as there sometimes also is no real distinction between them (there was, for example, quite some discussion during the creation of the topic hierarchy whether ontologies are foundational or belong to the core topics). Furthermore, we ignored the

subcategories of `Logics', `Logic Programming', `Data Modeling', and `XML', since it was not expected that learning material in REASE will deal specifically with one of the subtopics. Instead, it is expected that learning units in these topics give an overview, for example, on `Logics' and discuss most of the sub-categories.

As a result, the REASE catalogue comprises the following topics:

- Knowledge Engineering / Ontology Engineering
    - Methodologies
    - Ontology population / generation
    - Maintenance and versioning (dynamics)
    - Mapping / translation / matching / aligning (heterogeneity)
    - Validation
    - Interoperability / Integration
    - Modularization and Composition
    - Tools
- Knowledge Representation and Reasoning
    - Logics
    - Modal Logics
    - First-order Logic
    - Logic Programming
    - Reasoning
- Information Management
    - Data Modeling
    - Database systems
- Basic Web information technologies
    - XML
    - Web data integration
    - Security
    - Web services
    - Personalization techniques
    - Web data extraction / information extraction
    - Architecture of Web Information Systems
- Semantic Web Infrastructure
    - Architecture
    - Semantic Web Services
- Resource Description Framework / RDFSchema
- Semantic Web Languages
    - Query Languages
    - Update Languages
- Ontologies for the Semantic Web
    - Ontology representation / Ontology languages / OWL
    - Ontology Engineering

- Rules + Logic
  - Rule languages
  - Rule Markup
  - Reasoning languages
  - Reasoning Engines
- Proof in the Semantic Web
- Security / trust / privacy in the Semantic Web
- Semantic Web Applications
  - Knowledge Management
  - E-Learning
  - Bioinformatics
  - Multimedia
  - ehealth
  - ebusiness
  - Law
  - Engineering
- Semantic Web Special Topics
  - Natural language processing / human language technologies
  - Social impact of the Semantic Web
  - Social networks and Semantic Web
  - Peer-to-peer and Semantic Web
  - Agents and Semantic Web
  - Semantic Grid
  - Outreach to industry
  - Benchmarking and scalability

Of course, this catalogue is subject to changes, for example, to align it with the shared master activities in work package 3.2.

3 List of Published Learning Units

This section summarizes the learning units that have been published on REASE by the end of 2005.

3.1 Overview and Statistics

The following figure depicts the number of learning resources available on REASE since it was put online in July 2004.
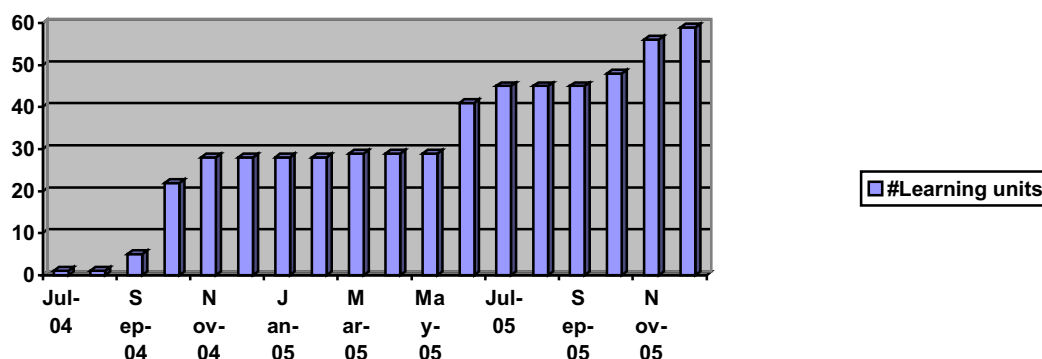
In total 59 learning units were published on REASE, of which 50 were published by KnowledgeWeb partners. 15 of these learning units (30%) are especially suited for industrial education (these numbers are subject to change and reflect the state of REASE in December 2005).

Two main events can be identified: In October / November 2004, an initial set of learning units was published as a results of the first public announcement of REASE in October 2004. A second significantly large set of resources was added in June / July 2005 by the tutors of the REWERSE summer school, who were required to add their resources before the start of the summer school. Finally, more resources were added step by step at the end of 2005 as a results of further educational activities in KnowledgeWeb, such as the industry-education events (reported in D3.2.9).

3.2 The Learning Units in Detail

In spite of the improved catalogue, we provide a simple classification of the material here into the following categories:
- Material for industrial education
- Full-course materials
- Miscellaneous modules related to Semantic Web
- Modules about core topics for Semantic Web
- Modules about special topics for Semantic Web

The material for industrial education was kept separate as this was identified as the main target audience, which was not sufficiently represented by the material available on REASE by the end of 2004. Full-course materials are listed separately since they typically cover a broad range of topics within the main topic 'Semantic Web'. Finally, smaller modules are classified into those dealing with prerequisites, core topics, and special topics. We also present a list of those modules on REASE, which were published by people from outside KnowledgeWeb (i.e. REWERSE and AgentLinkIII). A more detailed classification of all material can be found on REASE.

3.2.1 Material for industrial education

In this section we summarize the material for industrial education, divided into two groups: Material with introductory topics or core topics (like ontologies, RDF etc.) and

material about advanced topics from the top-level category 'Semantic Web Special Topics' (such as natural language processing).

Title	Semantic Web Information Day
Abstract	The Information Day gives an overview of the fundamental concepts and technologies of the Semantic Web. It enables you to incorporate the buzzword "Semantic Web" into your lexicon. Furthermore it gives you an opportunity to evaluate the meaning of the Semantic Web for your existing and future projects.
Provider	Free University Berlin
Language	German
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-freea-lnixon-1091099944332
Categories	Ontologies for the Semantic Web, RDF/RDFS, Outreach to Industry

Title	Semantic Web - Überblick und Einleitung
Abstract	Der Vortrag vermittelt einen Überblick über die grundlegenden Konzepte und Technologien des Semantic Web. Sie werden dadurch in die Lage versetzt, das Schlagwort Semantic Web in Ihre Begriffswelt einzuordnen.
Provider	Free University Berlin
Language	German
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-freea-lnixon-1118761334299
Categories	RDF / RDFS, Outreach to Industry

Title	Modellierung mit dem Semantic Web
Abstract	Welche Sprachen sind vorhanden um inhaltliche Sachverhalte im Semantic Web zu notieren? - RDF - RDF-Schema - OWL
Provider	Free University Berlin
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-freea-lnixon-1118761875283
Categories	Ontology Representation / Ontology Languages / OWL, RDF / RDFS, Outreach to Industry, Tools

Title	Semantic Web Tutorial
Abstract	Das "Semantic Web" wurde vom World Wide Web-Erfinder, Tim-Berners Lee, konzipiert, um das WWW durch inhaltliche Beschreibungen so anzureichern, dass das Finden und Verdichten von Informationen durch Maschinen enorm erleichtert wird. Ziel dieses Teils ist es, einen Überblick über die wichtigsten Methoden und Technologien solcher inhaltlicher, d.h. semantischer Beschreibungen von Informationen im Web zu geben, die für

	Wissensmanagementanwendungen besonders relevant sind.
	Der Inhalt dieses Teiles untergliedert sich in diesem Form: einer generellen Einführung in den Problembereich, Annotationssprachen, Erstellung und Verwendung von Ontologien, sowie Anwendungen. Nach jedem Teil ist Zeit für inhaltliche Diskussionen vorgesehen.
	Die Möglichkeiten von Semantic Web Technologien insbesondere für das Wissensmanagement werden den Teilnehmern dargelegt. Es wird der aktuelle Stand der Forschung dargestellt und mögliche Anwendungsgebiete und konkrete Anwendungen gezeigt. Anhand von Produktpalette und Referenzanwendungen von Semantic Web Firmen wird verdeutlicht, was heute schon im kommerziellen Bereich machbar ist.
Provider	AIFB – University of Karlsruhe
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-freea-lnixon-1130411486152
Categories	Outreach to Industry, Knowledge Management
Title	RDF Briefing
Abstract	An introduction into RDF with a small discussion why the ontology language OWL is needed
Provider	Vrije Universiteit Amsterdam
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-vrij-holger-1133369535466
Categories	RDF / RDFS, Ontology Representation / Ontology Languages / OWL, Outreach to Industry

Title	Semantic Web Services: A state of the art report
Abstract	Gives an overview about the most prominent approaches in the area of Semantic Web Services.
Provider	Vrije Universiteit Amsterdam
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-vrij-holger-1133372701206
Categories	Semantic Web Services, Outreach to Industry

Title	Ontology Engineering Best Practices - Building and Applying the SWRC Ontology
Abstract	This short tutorial describes how the Ontology 'Semantic Web for Research Communities' has been built, including a set of design considerations and guidelines for (re-)using it. It also includes a set of application examples.
Provider	AIFB – University of Karlsruhe
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-lear-diederich-1134387089110
Categories	Methodologies, Modularization and Composition, Ontology Engineering,

	Outreach to Industry

Title	Human Language Technology for the Semantic Web
Abstract	This tutorial covers the use of Human Language Technology for the Semantic Web and Web Services. It includes material on an introduction to Information Extraction, Evaluation, Language Engineering and Machine Learning approaches, Semantic Metadata Creation, and Language Generation.
Provider	University of Sheffield
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-usfd-diana-1097059567085
Categories	NLP / HLT, Outreach to Industry

Title	Perspectives for Semantic Web Applications in Europe
Abstract	What are the perspectives for applications based on the Semantic Web in European industry? On the basis of the work in KnowledgeWeb, we evaluate the current state of play and how KnowledgeWeb will facilitate the industrial uptake of this new technology.
Provider	Free University Berlin
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-freea-lnixon-1118762437312
Categories	Outreach to Industry

Title	Practical Applications of Human Language Technologies for the Semantic Web
Abstract	This 4-hour tutorial presented at the ACAI -05 Advanced Course in Knowledge Technologies SEKT Summer School covers the use of Human Language Technologies for the Semantic Web and Web Services, focusing particularly on practical applications. It gives some introduction to text mining and Information Extraction, and aims to show how such core technologies can be adapted to deal with the needs of the Semantic Web, by means of real-life examples and applications.
Provider	University of Sheffield
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-usfd-diana-1118919150028
Categories	NLP / HLT, Outreach to Industry

Title	HLT and Knowledge Acquisition for the Semantic Web: A Hands On Tutorial
Abstract	The core of this tutorial covers HLT tools, followed by a number of example Semantic Web applications, built by non-specialist HLT researchers. It covers the use of (1) GATE tools for deriving web service ontologies from

	text; (2) Text2Onto, an HLT-based paradigm for ontology construction; and (3) research on automatic ontology population from text and massive semantic annotation.
Provider	University of Sheffield, AIFB University of Karlsruhe, Vrije Universiteit Amsterdam
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-usfd-diana-1118922707478
Categories	NLP / HLT, Outreach to Industry

Title	Schema and Ontology Matching
Abstract	We view Matching as one of the key operations for enabling the Semantic Web since it takes two schemas/ontologies, each consisting of a set of discrete entities (e.g., tables, XML elements, classes, properties, rules, predicates), as input and determines as output the relationships (e.g., equivalence, subsumption) holding between those entities. In this tutorial we introduce, via examples, the schema/ontology matching problem and its application domains. We provide a detailed discussion of the techniques used for schema/ontology matching with the help of a classification of matching approaches. We overview state of the art systems in light of the classification presented, indicating which part of the solution space they cover. Finally, we outline future research directions and new scientific challenges arising in schema/ontology matching.
Provider	University of Trento, INRIA
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-univ-pavel-1121707366586
Categories	Outreach to Industry, Mapping / Translation / Matching / Aligning (Heterogeneity)

Title	Semantic Web Use Cases
Abstract	This will give an overview of typical business problems in different fields and their potential solution through Semantic Web technologies. We illustrate this through exemplary use cases collected by KnowledgeWeb and specify how through the co-operation between industry and research we can achieve successful technology transfer.
Provider	Free University Berlin
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-freea-lnixon-1129891830518
Categories	Outreach to Industry, Knowledge Management, Multimedia, eBusiness

Title	The Semantic Web and the Future of Social Software
Abstract	Short introduction to the Semantic Web and how it can enhance social software.

Provider	National University of Ireland, Galway
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-natia-jbreslin-1133280396675
Categories	Outreach to Industry Social Impact of the Semantic Web

Title	Blogging for Business: Syndication and RSS
Abstract	Short introduction to syndication and RSS at the "Blogging for Business" event in Cork. http://www.itcork.ie/index.cfm?page=events&eventId=47
Provider	National University of Ireland, Galway
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-natia-jbreslin-1133201478703
Categories	Basic Web Information Technology, Outreach to Industry

3.2.2 Full-course material

This section summarized the material on REASE which covers full courses in academia that might be usable in part by industry.

Title	Semantic Web Lecture
Abstract	This lecture comprises four modules, which are kept separately on REASE. Introduction and Overview: This first module of the Semantic Web Lecture describes the background on WWW and Semantic Web and introduces several markup languages such as HTML and XML. Furthermore, cascading style sheets, XPATH, and XSL are described. Basic building blocks: This second module of the Semantic Web Lecture describes the Semantic Web components RDF, RDF Schema, OWL and gives a brief introduction to ontology engineering. Logics: This third module of the Semantic Web Lecture covers the logics layer of the Semantic Web. It gives an introduction to logical languages, rule systems and rule markup languages. It covers aspects of trust and policy management in Semantic Web as well as Semantic Web Services. Adaptive Hypermedia Systems: This fourth module of the Semantic Web Lecture covers an example for an advanced topic in the area of Semantic Web: Adaptive Hypermedia Systems.
Provider	L3S Research Center
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-lear-diederich-1095939128541 http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-lear-diederich-1095948083855 http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-lear-diederich-1096016131071 http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-lear-diederich-1096017582439
Categories	Basic Web Information Technology, XML, Ontologies for the Semantic Web, RDF/RDFS, Ontology Engineering, Logics, Security/Privacy/Trust, Semantic Web Rules + Logics, Rule Markup, Social Networks and the Semantic Web

Title	Knowledge Management and Retrieval with Ontologies and Topic Maps

Abstract	Ontology-based knowledge management (6 h), Topic Maps (1.5) and Knowledge Retrieval (1.5)
Provider	AIFB, University of Karlsruhe
Language	German
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-aifb-ukarl-1097520909219
Categories	Ontology Representation / Ontology Languages / OWL, Basic Web Information Technology, Knowledge Management

Title	Knowledge Management II: Tools and Applications
Abstract	Case-based Reasoning (CBR), Community of Practice (CoP), Data Warehouse, Geschäftsprozessorientiertes Wissensmanagement
Provider	AIFB, University of Karlsruhe
Language	German
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-aifb-ukarl-1097521506331
Categories	Reasoning, eBusiness

Title	Knowledge Engineering applied to Semantic Web
Abstract	Complete course on knowledge engineering techniques and formalisms including: - ergonomics and scenario-based specifications; - ontology life cycles; - knowledge representation formalisms; - semantic web formalisms; - evaluation techniques; - semantic search engines;
Provider	INRIA
Language	French
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-inri-fabien_gadon-1097853456105
Categories	Basic Web Information Technology, Knowledge Engineering / Ontology Engineering, Ontologies for the Semantic Web, RDF / RDFS

Title	Web-based Knowledge Representation
Abstract	The WWW offers a great opportunity for using well-established and new knowledge representation techniques.The aim in using these is to make web pages intended for human users accessible for machines as well. Such a web would enable a set of intelligent services such as: search-engines, information filters, adaptive web-sites a.s.o. This course presents the technology that enables the new generation of the web. It presents knowledge modeling concepts (ontologies) and knowledge representation languages developed for the web (XML, RDF, OWL). We investigate the increasing expressiveness of these languages and point out issues for future research in this field.
Provider	Vrije Universiteit Amsterdam
Language	English

URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-vrij-frankh-1098889115195
Categories	RDF / RDFS

Title	Introduction to Description Logics
Abstract	The main effort of the research in knowledge representation is providing theories and systems for expressing structured knowledge and for accessing and reasoning with it in a principled way. In this course we will study Description Logics (DL), an important powerful class of logic-based knowledge representation languages (see www.dl.kr.org). The emphasis will be on a rigorous approach to knowledge representation and building ontologies. After an original review of the relevant concepts on computational logics, the course will start with an introduction to Object-Oriented representations in Information Systems and Artificial Intelligence, which serve as the main motivations for studying DL. DL will be introduced with its simplest formalization; the computational properties and algorithms of the so called structural DL will be analyzed. Then, the course considers propositional DL: we will study the computational properties and the reasoning with tableaux calculus. In the second part of the course, we will consider advanced topics such as the representation of knowledge bases and ontologies, and the connections of DL with Modal Logics and First Order Logic. The last module of the course will analyze the connections of DL with database theory.
Provider	Free University of Bozen-Bolzano
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-free-franconi-1099402926874
Categories	Logics, Knowledge Engineering / Ontology Engineering

Title	CT433.iii: Advanced Topics in IT: Semantic Web and Semantic Web Services
Abstract	This first half of this stream will introduce the Semantic Web and describe the metadata and ontological structures that are being used to build it. The second half will focus on the application of Semantic Web Services technology to B2B integration, including state-of-the-art implementations and standards. The main topics are as follows: Motivation for the Semantic Web Semantic Web Aspects Metadata and Semantics Data and Metadata Markup Languages and Formats Metadata Annotation Tools and Techniques Ontologies and Schemata Information Integration Synergies, ROI and Impact of the Semantic Web

	Introduction to Semantic Web Services and B2B Integration History and Current State Technology Concepts, Functionality and Execution Model Architectures and Implementations Products and Standards
Provider	National University of Ireland, Galway
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-natia-jbreslin-1133192611850
Categories	Semantic Web Applications, Semantic Web Infrastructure

3.2.3 Miscellaneous Modules related to Semantic Web Material

This and the remaining section cover smaller modules and tutorial, which have not been classified into 'Semantic Web Special Topics' and have not been classified into ' Outreach to industry' or comprise a full course. In this section, we start with material not directly related to Semantic Web, but useful for background knowledge.

Title	Introduction to XSL
Abstract	A short introduction to XSL and XSLT
Provider	University of Trento
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-univ-ronchet-1097778439781
Categories	Basic Web Information Technology

Title	Introduction to XML
Abstract	Powerpoint presentation: a short introduction to XML
Provider	University of Trento
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrIDlr-univ-ronchet-1097777977326
Categories	Basic Web Information Technology

Title	Introduction to Java tools for dealing with XML
Abstract	Introduction to various Java APIs for manipulating XML data with SAX and DOM, and to apply XSL transformations (TRax)
Provider	University of Trento
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-univ-ronchet-1097779082452
Categories	Basic Web Information Technology

3.2.4 Modules about Core Topics around Semantic Web

This section covers all modules in REASE which deal mainly with core topics around Semantic Web.

Title	Introduction to Knowledge-Level Models of Problem Solving

Abstract	This is a 40 minutes powerpoint presentation introducing the basics of knowledge-level models of problem solving. The presentation illustrates the evolution of knowledge-based systems from the early rule-based shells to the current architectures based on the distinction between generic tasks, problem solving methods, domain models and application-specific knowledge
Provider	The Open University
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-theo-emotta-1097763040129
Categories	Knowledge Engineering / Ontology Engineering, Methodologies

Title	Classification Problem Solving
Abstract	An analysis of classification problem solving using a knowledge-level architecture for characterizing knowledge-based problem solving
Provider	The Open University
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-theo-emotta-1097764942806
Categories	Knowledge Engineering / Ontology Engineering, Methodologies

Title	RDF, Resource Description Framework
Abstract	Ce cours présente le langage RDF dans son utilisation dans le Web sémantiaue
Provider	INRIA
Language	French
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrIDlr-inri-sylvain_d-1097824786423
Categories	RDF / RDFS

Title	User Models and User Modeling for Knowledge Management Systems: An ontology based User Modeling Approach
Abstract	PhD defense, Liana Razmerita, 3rd December 2003
Provider	INRIA
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-inri-sylvain_d-1098105953207
Categories	Knowledge Management

Title	Methods and tools for corporate memories
Abstract	Introduce corporate memories and describe the Corporate Semantic Web (CSW) Approach. Presented during a summer school.
Provider	INRIA
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-inri-sylvain_d-1098114616208
Categories	Methodologies, Tools, Knowledge Management

Title	Méthodes et Outils pour la Gestion des Connaissances
Abstract	DESCRIPTION Le cours traite les points suivants: Définitions et Besoins industriels Typologie des connaissances Modèles pour la gestion des connaissances Mémoire d'entreprise Approche Web sémantique d'entreprise Exemples Conclusions
Provider	INRIA
Language	French
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-inri-sylvain_d-1098117238321
Categories	Methodologies, Tools, Knowledge Management

Title	Description Logics for Conceptual Design, Information Access, and Ontology Integration
Abstract	In the tutorial I will argue that good Conceptual Modelling and Ontology Design is required to support powerful Query Management and to allow for semantic based Information Integration. Therefore, the tutorial has been structured into three parts: * In the first part, an extended ontology language and a methodology for conceptual and ontology design will be introduced. * In the second part, the query management problem in the presence of the previously devised conceptual model will be considered: a global framework will be introduced, together with various basic tasks involved in information access. * In the last part, general issues about ontology integration will be presented.
Provider	Free University of Bozen-Bolzano
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-free-franconi-1099402118641
Categories	Knowledge Engineering / Ontology Engineering

Title	Ontological Engineering
Abstract	This tutorial presents the theoretical foundations of Ontological Engineering, describes the most outstanding ontologies that are currently available, and covers the practical aspects of selecting and applying methodologies, languages, and tools for building ontologies. This tutorial also aims at presenting commercial-oriented and research-oriented ontology-based applications.
Provider	Universidad Politecnica de Madrid
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-univa-asun-1099404115104

Categories	Ontologies for the Semantic Web

Title	OWL Tutorial: Introduction to Ontology Development and Protégé-OWL
Abstract	Extensive OWL tutorial materials
Provider	The University of Manchester
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-theu-jeff-1100715238891
Categories	Semantic Web Special Topics

Title	Introduction to Semantic Web Ontology Languages
Abstract	Tutorial, jointly created with Grigoris Antoniou, at the REWERSE Summer School 2005.
Provider	Free University of Bozen-Bolzano
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-free-franconi-1122552631796
Categories	Logics

Title	Motivation for fuzzy OWL
Abstract	Few slides motivating more fuzzy OWL reasoning
Provider	Vrije Universiteit Amsterdam
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-vrij-holger-1133370220395
Categories	Ontology Representation / Ontology Languages / OWL, Reasoning

Title	Ontology mapping: a way out of the medical tower of Babel?
Abstract	Overview of existing approaches for ontology mappings
Provider	Vrije Universiteit Amsterdam
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-vrij-holger-1133369895277
Categories	Mapping / Translation / Matching / Aligning (Heterogeneity), Ontology Representation / Ontology Languages / OWL

Title	Fundamental Research Challenges Generated by the Semantic Web
Abstract	A 1 hour video about the research challenges in Semantic Web
Provider	Vrije Universiteit Amsterdam
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-vrij-holger-1133383390634
Categories	Ontologies for the Semantic Web, Knowledge Representation and Reasoning, Knowledge Engineering / Ontology Engineering, Semantic Web Applications

Title	OWL: An Ontology Language for the Semantic Web
Abstract	Tutorial given at the Third KnowledgeWeb Summer School on Ontological Engineering and the Semantic Web (SSSW '05)

Provider	The University of Manchester
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-theu-seanb-1133441337998
Categories	Ontology Representation / Ontology Languages / OWL

Title	OWL Reasoning Examples
Abstract	A collection of on-line examples illustrating the effects of inference and reasoning. Presented as hands-on material during the third KnowledgeWeb Summer School on Ontological Engineering and the Semantic Web (SSSW'05)
Provider	The University of Manchester
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-theu-seanb-1133441594714
Categories	Ontology Representation / Ontology Languages / OWL

3.2.5 Modules about Special Topics around Semantic Web

This section describes the modules, which have been classified into 'Semantic Web Special Topics", but not into 'Outreach to Industry'.

Title	WSMO Tutorial
Abstract	The tutorial is intended to disseminate the Web Service Modeling Ontology WSMO to worldwide audiences interested in Semantic Web Services. IRS-III is the tool used in the hands-on session
Provider	The Open University, DERI
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-theo-liliana-1097851359341
Categories	Semantic Web Special Topics, Semantic Web Services

Title	Distributed Artificial Intelligence and Knowledge Management: ontologies and multi-agent systems for a corporate semantic web
Abstract	This Ph.D. Thesis concerns multi-agents systems for the management of a corporate semantic web based on an ontology. It was carried out in the context of the European project CoMMA focusing on two application scenarios: support technology monitoring activities and assist the integration of a new employee to the organisation. Three aspects were essentially developed in this work: the design of a multi-agents architecture supporting both scenarios, and the organisational top-down approach followed to identify the societies, the roles and the interactions of agents; the construction of the ontology O'CoMMA and the structuring of a corporate memory exploiting semantic Web technologies; the design and implementation of the sub-societies of agents dedicated to the management of the annotations and the ontology and of the protocols

	underlying these groups of agents, in particular techniques for distributing annotations and queries between the agents.
	Keywords: distributed artificial intelligence, knowledge management, corporate memory, ontology, knowledge representation, multi-agent systems, semantic web, information retrieval.
Provider	INRIA
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-inri-fabien_gadon-1098109372460
Categories	Ontologies for the Semantic Web, Basic Web Information Technology, Knowledge Engineering / Ontology Engineering, RDF / RDFS, Semantic Web Special Topics

Title	Knowledge Assisted Multimedia Analysis
Abstract	This is a 3-hour powerpoint presentation introducing the basics in knowledge assisted multimedia analysis. The presentation gives emphasis on the knowledge representation infrastructure for semantic multimedia content analysis and reasoning. It also includes an overview of existing multimedia analysis, annotation and search and retrieval methods.
Provider	CERTH
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrIDlr-cent-vkpapa-1098345323868
Categories	Semantic Web Special Topics, Multimedia

Title	Document Annotation Through Information Extraction
Abstract	Tutorial presented at the Second European Summer School on Ontological Engineering and the Semantic Web, 18-24 July 2004 - Cercedilla (Spain) , http://babage.dia.fi.upm.es/summerschool/
Provider	University of Sheffield
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-usfd-fciravegna-1099915337904
Categories	Web Data Extraction, NLP / HLT

Title	Introduction to Multi-agent systems
Abstract	Multi-agent systems have emerged as one of the most important areas of research and development in information technology in the 1990s. A multi-agent system is one composed of multiple interacting software components known as agents, which are typically capable of co-operating to solve problems that are beyond the abilities of any individual member. Multi-agent systems are important primarily because they have been found to have very wide applicability, in areas as diverse as industrial process control and electronic commerce. This module will begin by introducing the student to the notion of an agent, and will lead them to an understanding of what an agent is, how they can be constructed, and how agents can be made to

	cooperate effectively with one-another to solve problems. The practical component of the module will based on the many Java agent frameworks currently available (e.g., the Java-based ``Jack'' programming language).
Provider	University of Liverpool
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-univb-valentina-1099517115906
Categories	Agents and the Semantic Web

Title	Text mining and the Semantic Web
Abstract	This hour-long tutorial gives an introduction to text mining issues for the Semantic Web, covering topics such as what text mining is, an introduction to information extraction and how it can be adapted for the Semantic Web, evaluation and visualisation tools and techniques. It is intended primarily for undergraduate and postgraduate students, but could equally serve as a learning tool for researchers new to the area of Human Language Technology and the Semantic Web.
Provider	University of Sheffield
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-usfd-diana-1110385153182
Categories	NLP / HLT

Title	Automating Document Annotation using Human Language Technologies and Machine Learning
Abstract	Tutorial given at the Third Semantic Web Summer School in Cercedilla, Spain, http://babage.dia.fi.upm.es/sssw05/ 10-16 July 2005
Provider	University of Sheffield
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-usfd-cirave-1122455322366
Categories	Web Data Extraction, NLP / HLT

3.2.6 Courses contributed by REWERSE

These courses are mainly related to rules, rule languages, the underlying logics, and personalization. Though they were not contributed by KnowledgeWeb partners, we list them here also to have a complete overview on the available material in REASE.

Title	Rules and Ontologies in F-logic
Abstract	A brief introduction to F-logic and its use for ontology specification. Slides of a lecture given at the Reasoning Web summer school, July 2005, Malta.
Provider	State University of New York at Stony Brook
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-stat-kifer-1118033616456

Categories	Ontologies for the Semantic Web, Logics, Logic Programming, Rule Languages

Title	Knowledge-base Programming with Frames and Logic
Abstract	This is a tutorial on knowledge representation using the FLORA-2 system. FLORA-2 combines F-logic, HiLog, and Transaction Logic in a powerful declarative language. More information as well as the system itself can be found at http://flora.sourceforge.net/
Provider	State University of New York at Stony Brook
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-stat-kifer-1118035174076
Categories	Logics, Ontologies for the Semantic Web, Logic Programming

Title	Web and Semantic Web Query Languages: A Survey
Abstract	This learning unit presents an overview on existing web and Semantic Web query languages and presents some of them in more detail, namely XML, RDF and Topic Maps.
Provider	LMU
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-lmua-bry-1118475429024
Categories	RDF / RDFS, Query Languages

Title	Information Extraction for the Semantic Web
Abstract	Web Information Extraction and Integration: Introduction, Overview, Case Studies and System Demonstration. Slides of a lecture given at the Reasoning Web summer school, July 2005, Malta.
Provider	DBAI, Vienna University of Technology
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-dbai-robert-1118694353138
Categories	Basic Web Information Technology, Web Data Extraction, Web Data Integration

Title	Personalization for the Semantic Web -Part II-
Abstract	Personalization is a process by which it is possible to give the user optimal support in accessing, retrieving, and storing information, where solutions are built so as to fit the preferences, the characteristics and the taste of the individual. This result can be achieved only by exploiting machine-interpretable semantic information, e.g. about the possible resources, about the user him/herself, about the context, about the goal of the interaction. Personalization is realized by an inferencing process applied to the semantic information, which can be carried out in many different ways depending on the specific task. The objective of this paper is to provide a coherent introduction into issues and methods for realizing personalization in the

	Semantic Web.
Provider	Dip. di Informatica, Universita' degli Studi di Torino
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-dipd-baldoni-119445597087
Categories	Personalization Techniques, Semantic Web Special Topics, eLearning

Title	Evolution and Reactivity on the Semantic Web
Abstract	In this course, presented at the Reasoning Web Summer School, July 2005, Malta, we talk about foundations of evolution and reactive languages in general, and then concentrate on some specific issues posed by evolution and reactivity in the Web and in the Semantic Web.
Provider	F. Ciências Tecnologia, U. Nova Lisboa, University of Göttingen
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-fcin-jja-1121071930599
Categories	Rule Languages, Update Languages, Logics

Title	Personalization for the Semantic Web, Part I
Abstract	This module describes personalization techniques for WWW-based systems. Topics are user modeling, adaptive hypermedia, and Web mining-based personalization.
Provider	L3S Research Center
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-lear-henze-1119511340834
Categories	Personalization Techniques

Title	Towards Types for Web Rule Languages
Abstract	Various schema languages have been introduced to describe (classes of) Web documents (DTD, XML Schema, Relax NG). We present mathematical treatment of their main features. We are interested in the sets of documents a schema defines; such sets will be called types. Using a mathematical formalism makes it possible to discuss chosen aspects of a schema language in a precise and simple way. Otherwise they are hidden among numerous details of a large and sophisticated schema language.

Our goal is typing of rule languages, more precisely approximately describing their semantics by means of types. Thus we are interested in formalisms for types that facilitate constructing (efficient) algorithms performing those operations on types that are needed in type checking and type inference for rules. |
| Provider | Linköping University |
| Language | English |

| URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-link-wlodr-1129138244147
Categories	Rule Languages, Query Languages

3.2.7 Courses contributed by AgentLinkIII

As a result of the cooperation between KnowledgeWeb and AgentLinkIII, one course was also added from one AgentLinkIII partner.

Title	OWL-S for Agents
Abstract	This tutorial looks at the issues (and motivation) behind Semantic Web Services from an agent perspective, and gives a brief overview of OWL-S.
Provider	University of Southampton
Language	English
URL	http://rease.semanticweb.org/ubp/PUSH/srchDetailsLR?lrID=lr-univi-caphreak-1118829328036
Categories	Semantic Web Services, Agents and the Semantic Web

3.3 Evaluation

In total, there are 59 learning units available in REASE, from which KnowledgeWeb has contributed 50. 4 of these modules are in French, 5 modules in German, the remaining ones are in English. As courses for industrial education were identified to be highly important, we focused on publishing such material in the past month, as shown in the following figure:
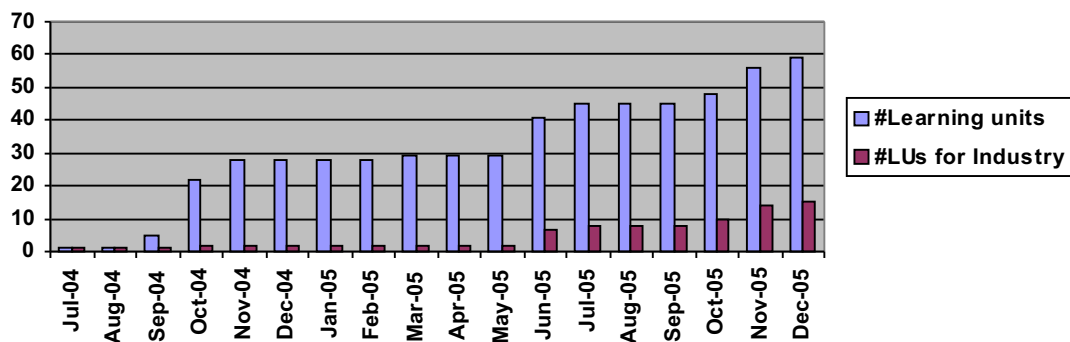
Thus, the percentage of courses suited for industrial education has grown from less than 10% at the beginning of 2005 to 25% at the end of 2005. About 60% of those learning units that have been added by KnowledgeWeb people during the last 12 month, were tagged as suited for industrial education (13 out of 22).

Furthermore, the KnowledgeWeb learning material covers 34 categories from the 61 available in the REASE catalogue, an additional 9 categories are covered by the REWERSE units. This underlines that there is not much overlap between the REWERSE material and the KnowledgeWeb material and that they complement each other very well.

While some of the categories are currently empty only because not all contributors have updated their learning unit metadata after the new catalogue has been placed onto REASE, the 'truly' uncovered categories can be broadly divided into two areas:
- Foundational categories
- Application-oriented categories

The foundational categories mainly stem from the fact that we used the ACM CCS curriculum as a base for our Semantic Web Topic Hierarchy, which is only in a very general way related to the Semantic Web. We need to discuss further whether some of these categories are reasonable for the REASE catalogue (they might still be used in the general Semantic Web Topic Hierarchy, which is also used, for example, for creating the curriculum of the shared master on Semantic Web and Ontologies).

In the application-oriented categories, there is a need to have more material and more examples. Developing the KnowledgeWeb use cases in the industry area, which are now discussed between the industry area and the research area, is also intended to lead to more educational material about these use cases, which can then be published on REASE in the future.

4 Quality Guidelines and Procedures

To assure a high quality of the material stored in REASE, a review process is required, especially since REASE is now moving more towards the public (we could assume a reasonable degree of quality for the material published from KnowledgeWeb / REWERSE partners up to now, but this will not necessarily be the case if people from outside both projects start uploading material). For this reason, we have set up a list of quality guidelines which are to be fulfilled before the learning material is finally accepted to be published at REASE. This is necessary to ensure that REASE can achieve a high reputation in the area of 'learning about Semantic Web'. The quality guidelines will evolve over time, so this section only describes the current state of the quality guidelines.

The quality of each learning unit is related to two major areas: technical requirements and requirements regarding the content.

4.1 Technical Requirements

The technical requirements define all issues which are not related to the content of a learning unit. Specifically, this comprises:

4.1.1 Non-Proprietary File Formats

To ensure that learning units do not depend on specific applications to be able to use them, they should not be published in proprietary file formats. As an example, the very popular file formats for Microsoft Office applications are very difficult to read for users from other operating systems.

Therefore, we require strictly that learning units must be provided at least in one non-proprietary format. However, we do want to keep the proprietary (source) formats additionally as many people work with them and reuse them for their own purposes (if the licence allows this).

Therefore, to support providing proprietary (editable) source files together with non-proprietary (read-only) versions, we have integrated an automatic conversion tool into REASE (Linbox[4]). If the learning resource provider uploads their material in one of the Office file formats, they will be automatically converted into a PDF file and a selection between both is presented to REASE users, who want to access the learning resource.

4.1.2 Uploading Material vs. Linking

Basically, each learning material provider has the choice to either upload their material to the REASE server or to provide a URL to where the learning material is located.

Providing a link basically has the potential advantage that updates are available instantaneously and automatically. However, it carries the risk that the material will not be available at all, for example, after a re-organization of the web server or if the provider changes institution. Furthermore, it is not possible to automatically convert proprietary file formats (as mentioned in the section above). Therefore, we require that material is uploaded instead of providing a URL only, unless the material is itself in HTML.

4.1.3 Metadata

To implement a reasonable search service on REASE, it is essential that a sufficient number of metadata fields is specified for each resource. The main part of verifying this metadata is already done by the system. On the one hand, the REASE catalogue provides a classification into the most popular Semantic Web Topics, on the other hand the most important additional metadata fields apart from the classification are 'mandatory' in the sense that the system will not allow the user to complete the upload of the material until the mandatory metadata fields are specified. However, if the metadata is to be described in free text, people might fill in wrong values such that a manual post-control of the metadata field is necessary.

4.1.4 File Formats

As mentioned above, learning objects that are provided in an editable format (the source code) are highly valuable for persons who are teachers themselves. Such editable formats may also be valuable for EASE, for example, if they are only available to EASE members, generating a higher interest for EASE in this way. However, we do not force providers to upload their material in a source format as this might prevent too many people to use REASE at all to provide their learning units.

4.1.5 Modularization

The utility of a learning resource also depends on its size. Oversized resources are difficult to use for a potentially interested learner and they are difficult to classify according to the REASE catalogue. For example, if someone uploads a lecture on Semantic Web covering a 6-month-course at university, all topics can be associated with this course. To avoid this problem of too-common learning materials, we require that

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[4] http://www.linbox.com/en/converter

such material is to be broken into several subunits before it is published in REASE. As a rule of thumb, material that covers more than 12 hours is considered to be too long to constitute a single learning unit in REASE, but this has to be decided on a case-by-case basis within the quality management process as described below.

4.1.6 Questionnaire

To be able to get feedback from users of learning resources, REASE allows each provider to attach a questionnaire to each learning unit. However, each provider has to individually decide whether her material is associated with a questionnaire or not. We are currently not demanding that they do this as the questionnaire support of REASE is incomplete. However, we might change this in the future to get more feedback from REASE users.

4.2 Non-Technical Requirements

The non-technical requirements are mainly related to the content of each learning resource. We basically have to verify two issues:
- o Relation to the Semantic Web
- o Quality of the actual content.

The first requirement is necessary to ensure that REASE keeps its focus on Semantic Web topics and the necessary basics to understand the Semantic Web. As an example, we are allowing material around the topics 'XML' (as RDF is often expressed in its XML variant), but a general tutorial about `HTML' or `computer networks' is out-of-focus.

4.3 Quality Management Procedures

Quality management in REASE is intended to ensure that all published learning units are in accordance with the above listed requirements. We can distinguish between automatically controlled requirements and those that have to be verified manually.

4.3.1 Controlling Requirements Automatically

The fulfilment of the technical requirements is as often as possible ensured automatically. For example, the most important metadata fields describing the learning units are mandatory such that REASE will not accept a new learning unit without these metadata fields being filled in. Furthermore, we implemented an automated conversion of the most popular proprietary formats (Microsoft Office) into the PDF format using the Linbox technology (http://www.linbox.com/converter).

4.3.2 Controlling Requirements Manually

This manual quality management process has to be effective and efficient. Therefore, REASE is required to support this process, which is already partly available: Each time an author publishes a new learning unit / updates an existing one, the administrator of REASE has to approve the changes. In this manner, we can avoid the publication of low-quality material, which is not related to REASE at all. This is a sustainable approach regarding the number of learning units and the expected low frequency of updates (which

is different to other large-scale approaches, such as wikipedia, as REASE is only about a limited topic).

To ensure that the quality of the content of all Semantic-Web related learning units is high, we envision the following process:

1. The REASE administrator (currently Jörg Diederich, L3S) verifies the remaining technical requirements (those that cannot / can only be validated automatically with difficulty).
2. He also assesses the content of each learning unit to filter out the non-borderline cases. These include, on the one hand, learning units from KnowledgeWeb partners or cooperating NoEs, which have a very high probability of being excellent and can thus be assumed to match the content requirements. On the other hand, the administrator can also easily filter out 'spammers', who try to use the platform for exchanging material completely unrelated to Semantic Web topics.
3. For borderline cases, we have installed an editorial board that will review the remaining units for their suitability to REASE in accordance with the quality guidelines. The current members of the editorial board are:
   - Holger Wache, VU (knowledge representation and reasoning: ontologies, representation languages, reasoning techniques)
   - Diana Maynard, USFD (human language technology)
   - York Sure, UKARL (ontology engineering, ontology management, semantic web infrastructure)
   - Lyndon Nixon, FUBerlin (materials for business professionals, multimedia, Semantic Web services)
   - Sylvain Dehors, INRIA (basic web information technology, ontologies for the Semantic Web, Resource Description Framework (RDF) / RDFSchema, e-learning)
   - Enrico Franconi, FUB (logics, Semantic Web languages)
   - Martin Dzbor, OU (interoperability & integration, dynamics, tools, architecture of information systems, personalization techniques, Semantic Web infrastructure/architecture, security/privacy/trust, information management)
   - John Breslin, NUIG (Semantic Web infrastructure, social networks in the Semantic Web)
   - Yiannis Kompatsiaris, CERTH (multimedia ontologies, semantic analysis and reasoning of multimedia content, multimedia and Semantic Web)
   - Mustafa Yarrar, VUB (knowledge engineering / ontology engineering, knowledge representation and reasoning, ontologies for the Semantic Web, Semantic Web special topics)

Finally, some learning units are expected to be highlighted using some kind of 'KnowledgeWeb certificate', which can either be requested by other members of KnowledgeWeb (for example, if they have successfully used the learning unit for their own courses) or by other REASE users, who can express their opinion of the learning unit using the REASE feedback mechanism and rating scheme. This feedback mechanism is currently, however, non-public and might be extended to become public.

Depending on the different communities represented in KnowledgeWeb (Description Logics, Ontology Engineering,…), we also envision recommendations for reading, which might be different depending on the community. These recommendations might be generated automatically / semi-automatically, depending on the advanced semantic platform for learning (ASPL), which will be developed in WP3.3.

5 Usage of Learning Resources

In this section, we report about the usage of REASE and the provided resources. The presented numbers are gathered from log files of the underlying web server and from the bookings and access information of the database, on which REASE is based.

5.1 General Usage of the REASE Web Pages

The usage of the REASE web pages since it went online in July 2004 is shown in the following figure (the statistics were taken on Dec-15 2005 from the web server log file excluding accesses from popular web robots and accesses from within the hosting domain of REASE):
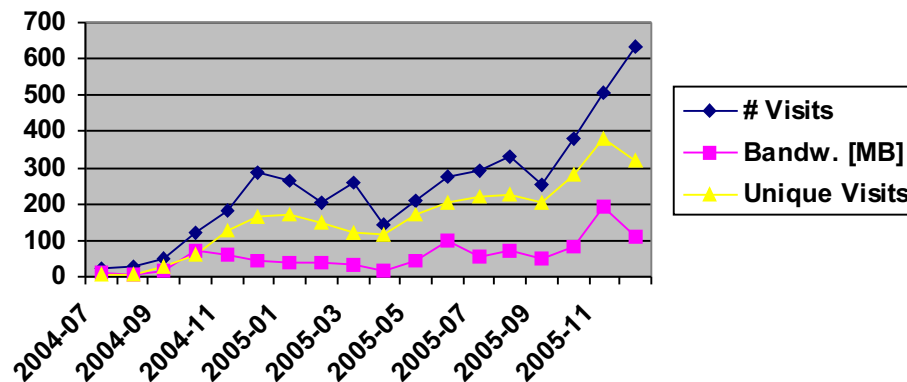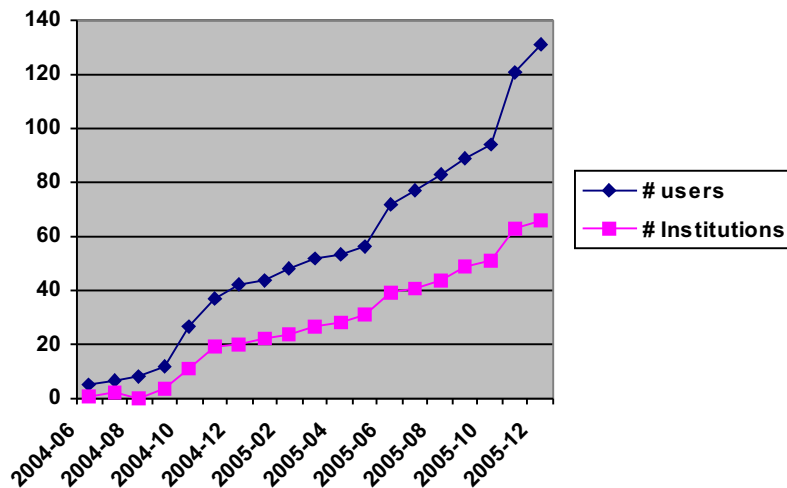

The first public announcement of REASE was issued in October 2004, leading to an initial increase in the access statistics, because a first set of learning resources became available in November 2004. Whereas the number of accesses remained stable in the first half of 2005, it increased again in summer 2005, mainly because of the summer school activities of KnowledgeWeb and REWERSE. Especially, the teachers of the REWERSE summer school were required to upload their material before the summer school starts so that the students could access them from REASE directly. Finally, the usage of the REASE web pages increased again starting from October 2005. As an example, the

REASE web pages were visited about 500 times from about 380 unique visitors in November 2005, downloading an approximate amount of 200 MB of data. Even though especially the increase in the number of non-unique visitors was partly caused by the evaluation activities in work package 3.3 (REASE is one service connected to ASPL-1, which was evaluated in November 2005 at USFD, OU, and Universitatea "Al. I. Cuza" Romania as reported in D3.3.5), the main increase could not be associated with a single or few events. More details are discussed in the following sections about registered users and institutions and the actual access patterns of the learning material.

5.2 Registrations on REASE

To access most of the material on REASE, users have to register first and specify (very few) information about their hosting institution (i.e., university or company and their country). The following figure depicts the number of registered users / institutions on REASE.

The first public announcement of REASE in October / November 2004 led to the registration of users and institutions from KnowledgeWeb mainly. The second peak in June 2005 is mainly caused by the fact that REASE was used to distribute the learning material for the REWERSE summer school as mentioned above. The increase in November 2005, however, is not dominated by KnowledgeWeb or REWERSE activities, only 2 from the 12 additionally registered institutions were actually directly related to one of these NoEs.

5.3 Access to REASE Resources

REASE resources were accessed as shown in the following figure:
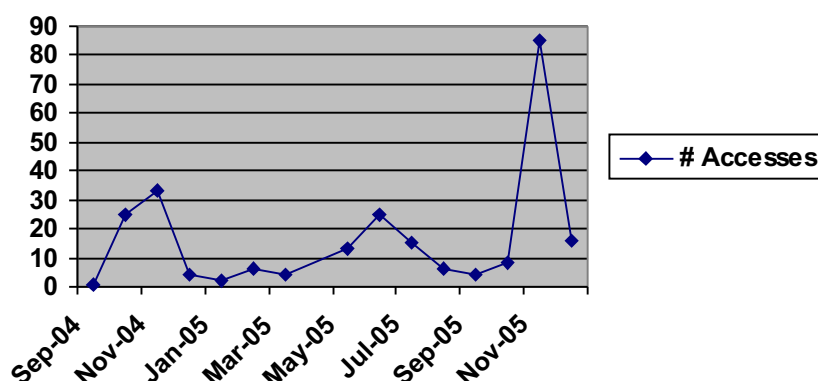
The peaks in October and November 2004 were caused by few users who accesses quite a large set of learning units, obviously playing around with the platform. This included people from KnowledgeWeb or REWERSE, but also one person from outside both NoEs. The peak in July 2005 could be because of the KnowledgeWeb and REWERSE summer schools, which took place at that time. The peak in November 2005 is partly (about 40 from the 85 accesses) caused by the evaluation activity of WP3.3. However, 39 accesses were from users all over the world (Malaysia, Germany, USA, France, Brazil, Canada, and Greece), who were definitely not involved in KnowledgeWeb or REWERSE!

5.4 Most Popular Resources on REASE

Based on the access pattern by REASE users, the following learning units are the 10 most popular ones on REASE:

1. Ontological Engineering (UPM)
2. Semantic Web Tutorial (UKARL)
   Introduction to Multi-Agent Systems (UniLiv)
4. Semantic Web Lecture – Basic Building Blocks (L3S)
   Human Language Technology for the Semantic Web (USFD)
   Web and Semantic Web Query Languages: A Survey (LMU, REWERSE)
7. Semantic Web Lecture - Introduction and Overview (L3S)
   Semantic Web Lecture – Logics (L3S)
   Web-based Knowledge Representation (VUA)
   Information Extraction for the Semantic Web (TU Wien, REWERSE)
   HLT and Knowledge Acquisition for the Semantic Web: A Hands On Tutorial (USFD)

Most of the material is available since November 2004, though there are three notable exceptions:

- Both REWERSE courses (rank 4 and 7) were uploaded in June 2005
- The Semantic Web Tutorial (rank 2) was uploaded in October 2005

While analyzing why the "Semantic Web Tutorial" become second most popular within 6 weeks we noted the following:

- It is the only English material on REASE providing an introduction to Semantic Web for people from industry
- It is on rank 9 on Google for the search 'Semantic Web Tutorial industry' (probably because the KnowledgeWeb portal is on rank 10 for the Google query 'Semantic Web industry'). [both ranks validated on 2005-12-19]

Of course, becoming the second most popular resource is only possible because the absolute number of bookings in REASE are not very high (about 15 for the most popular resource).

6 Summary and Future Work

In summary, the following main contributions were made regarding the activities related to REASE:

- A new more fine-granular classification system in the REASE catalogue, comprising more than 60 categories.
- 50 learning units from KnowledgeWeb partners available on REASE (an additional 22 compared to December 2004).
- Increase of the percentage of KnowledgeWeb learning units for industrial education from 10% to 30%.
- A detailed description of the quality management process and a first set of quality guidelines to be enforced by the process.
- An initial evaluation of the usage of REASE which shows a promising increase in usage during the past two month from users outside the KnowledgeWeb / REWERSE context.

The discussion about the REASE catalogue took place between KnowledgeWeb and REWERSE partners and finally merged into a global discussion of a Semantic Web Topic Hierarchy, which is described in more detail in the REWERSE deliverable E-D7 (available in March 2006). This topic hierarchy was also used as basis for the shared master curriculum (D3.2.4). Furthermore, the topic hierarchy was also included in the Semantic Web Research Community (SWRC) Ontology, (release 'swrc-swtopics'), see http://ontoware.org/projects/swrc/), which itself is already in use for several different purposes such as project portals or Semantic Web applications such as bibster[5]. The topic hierarchy as well as the REASE catalogue will be subject of a constant evolution since the research area 'Semantic Web' is also subject of such evolution. Specifically, we will include feedback from other usage of the topic hierarchy (e.g., in the shared master curriculum) to improve the classification.

Future work regarding REASE comprises the following issues:

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[5] http://bibster.semanticweb.org

- Publish more learning units, again focused on material for industrial education, but also trying to fill those categories in the topic hierarchy, which are not covered yet by existing material
- Publicize REASE and recruit new users
- Implement the quality management process and apply it to already published resources
- Continue to evaluate REASE moving from a passive log file analysis to more active evaluation schemes to get better feedback from user, for example, by making REASE users filling in questionnaires or by performing an explicit user study.