

E/T-D14

Final Educational and Industrial Training Infrastructure

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Abstract

This deliverable finally reports about the use of REASE, the prototype of the educational infrastructure used for both academic and industrial training, and describes the measures taken to ensure that it will be continued after the end of the REWERSE funding. It also reports about further improvements made to REASE as a result of the validation and evaluation of REASE and sketches the plans for integration of more courses for both learners from academia and industry. This report is based on joint work between both, the education and training activity and the technology transfer activity of REWERSE as well as with the education area of the NoE KnowledgeWeb.

The deliverable E/T-D14 comprises both, a written report and the prototype as described in this report and available under http://rease.semanticweb.org.

Keyword List

Semantic Web education, Learning unit repository, REASE, inter-network cooperation

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Final Educational and Industrial Training Infrastructure

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1. Introduction

This deliverable reports about the final version of REASE (Repository of EASE for Learning Units)¹, the educational infrastructure for learning units on Semantic Web topics, focusing on the improvements made in 2007 as compared to the deliverable E/T-D9 from February 2007. The main purpose of REASE is to collect such learning units and make them accessible to the community in one repository. To ensure that the repository can operate also beyond the EU funding for REWERSE, it will be hosted by the European Association for Semantic Web Education (EASE). EASE has been founded in June 2006 and was formally established in June 2007 with members from KnowledgeWeb and REWERSE (for more information, cf. http://ease.semanticweb.org).

This deliverable is the fourth and final deliverable from a series of in total four deliverables, starting from E/T-D4, where the design of the infrastructure was described and discussed, and continuing with E-D6 and T-D6, describing the first shared prototype of the infrastructure for education (E-D6) and industrial training (T-D6) and continuing with E/T-D9 where a second improved version has been described. The main purpose of this deliverable is to describe the final state of REASE and the improvements regarding functionalities and design that have been included since the last deliverable E/T-D9 was issued. The report also sketches the plans for the integration of additional courses for learners from both academia and industry.

This deliverable comprises both, a written report and the prototype as described in this report and available under http://rease.semanticweb.org.

¹ http://rease.semanticweb.org

2. REASE Usage

To see the impact of the changes to REASE made since publishing the last deliverable in February 2007, we have updated the log-file analysis showing that the usage of REASE has significantly increased during the past months. The presented numbers are gathered from log files of the underlying web server as of mid December and from the bookings and access information of the database, on which REASE is based.

2.1.1. General Usage of the REASE Web Pages

The usage of the REASE web pages since they went online in July 2004 is shown in the following figure (the statistics were taken on Dec-11 2007 from the web server log file excluding accesses from popular web robots and accesses from within the hosting domain of REASE):

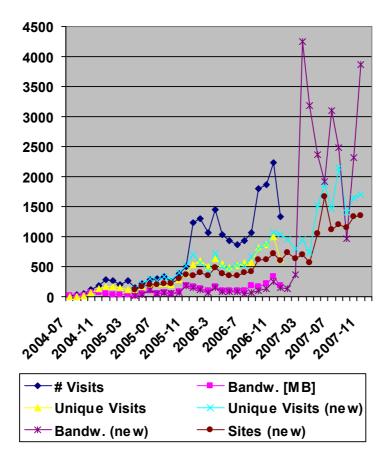


Figure 1. General Usage of REASE web pages

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 evaluation activities in November 2005, the main

increase could not be associated with a single or few events. After the addition of several learning resources in the end of 2005, the general usage of REASE increased significantly at the beginning of 2006 with the usual 'break' in the summer. The peak in November 2006 is again partly caused by the evaluation of the platform. In May 2007, there was again a significant increase in the usage of the REASE web pages, which could not be attributed to a single event. More details are discussed in the following sections about registered users and institutions and the actual access patterns of the learning material as well as in Section 4 about REASE for industry.

2.1.2. Registrations on REASE

To access most of the material on REASE, users have to register first and specify 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 as of December 2007.

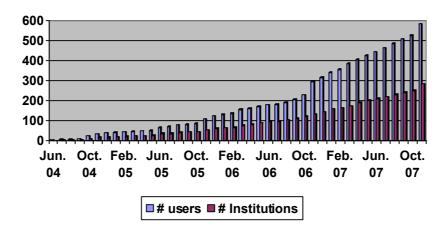


Figure 2. Number of registered users / institutions on REASE

The first public announcement of REASE in October / November 2004 led to the registration of users and institutions from KnowledgeWeb and REWERSE mainly. The second increase in June 2005 is mainly caused by the fact that REASE was used to distribute the learning material for the REWERSE summer school. 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. In 2006, the increase in the number of registered institutions continued even with a slight increase in the rate of change. The number of registered users also increased and doubled compared with the end of 2005. However, please note that about 50 additionally registered users are due to the user study for the REASE evaluation as performed in November 2006. In 2007, again the rate of change in the number of registered users and institutions increased slightly, REASE now has more than 500 users coming from more than 250 institutions.

Regarding industrial users, we have found that while in 2006 about 20 registered institutions (8% of all) are from a non-academic context, this number increases to about 35 (13% of all) in 2007.

2.1.3. Access to REASE Resources

REASE resources were accessed as shown in the following figure:

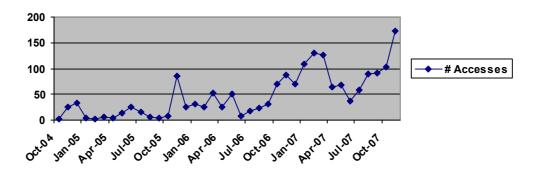


Figure 3. Accesses to REASE resources

The peaks in October and November 2004 were caused by a few users who accessed 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 evaluation activities. 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! Accesses continued on a much higher base level in 2006 with the usual 'summer break' in June-August. As in 2005, the peak in November 2006 is partly a result of the user study. In 2007, accesses again increased significantly overall (with the usual summer break again), this year without involving a user study with many participants as in the previous years. Hence, we can say that REASE has found its community of users which has increased over the past years.

3. The Final Version of REASE

After the major changes introduced in the beginning of 2007 (as described in E/T-D9) as a result from the REASE evaluation in 2006, we focused on incremental changes and improvements in 2007.

3.1. Technological Improvements

One of the requested missing features mentioned in the free-text feedback of the questionnaires was the possibility to search also the full-text of the provided resources and to include stemming into the search engine. This was added to the platform in late 2007, though full-text indexing is currently restricted to PDF document (which, however constitute the majority of the textual resources on REASE). Furthermore, we introduced separate stemmers for different languages, so that the currently existing resources in French, English and German are all indexed with the respective language-specific stemming component.

To better support the work of the resource providers, we also introduced separate session timeouts for users being logged in (3 hours) as opposed to anonymous users (30 minutes), which have to be timed-out earlier to reduce the memory consumption. This is a problem because search engine crawlers visit REASE pretty often every day leading to a very high memory consumption to store the session variables if the session timeout is increased for all users (i.e., users being logged-in and anonymous users).

3.2. Interface Improvements

As the main changes of the interface as done in the beginning of 2007 were received very well, we did only minor modifications, basically to improve the look and feel of the platform.

At first, we changed the presentation of drop-down filters used for searching to show only those values which lead to non-empty search results. For example, for the language filter, REASE currently has resources in German, English, and French (while the original version of REASE showed all possible languages available in the ISO standard). The same applies to the presentation of the different learning resources types, which were reduced to 10 elements (case study, collection, course unit, demonstration, exercise, group work, lecture notes, presentation, recorded lecture, tutorial).

Furthermore, we added to the search results a new header describing matching catalogue categories, in case such categories were actually found. The main problem here was that the providers of resources of course did not annotate their resource with 'OWL' separately if they already classified it under the category 'OWL'; however when searching for 'OWL' the resource could only be found if it was additionally annotated with OWL in one of the free-text fields.

Furthermore, we adapted the REASE catalogue to match the Semantic Web Topic Hierarchy version 2 (as described in E-D11) and re-classified existing resources accordingly.

Finally, we moved to a different weblog analyzing tool (webalizer), because the old tool was not able to filter search engine traffic and referrer log spam in a flexible way, which started to have an impact on the log file analysis from May 2007.

We also modified the main page slightly, adding more information about what content REASE actually contains, such as the material from the KnowledgeWeb and REWERSE summer schools, the ESWC / ISWC conferences and the like.



Figure 4. The REASE main page

4. REASE for Industry

In this section we describe the activities of Technology Transfer and Awareness regarding REASE.

4.1. Increasing the attractiveness of REASE for IT professionals

To make REASE more relevant for IT professionals², it has already been pointed out in the deliverable E/T-D9 that more content suitable for industry needs to be added. It goes without saying that a considerable amount of high quality content for professionals in companies will make REASE more attractive for this specific target group. As the market regarding Semantic Web Education for professionals is in its early stages, REASE has the chance to position itself as a major provider of educational material for professionals.

4.1.1. Course material produced within REWERSE

An important issue in this context is the production of courses for industry by REWERSE members. Besides putting material online such as power point slides or video lectures produced at REWERSE industry events³, specific tutorials produced for a professional/company audience would be of high value for REASE. Measures taken to produce these tutorials are described in the deliverable T-D11. The development of course material for IT professionals in high quality requires considerable work and the courses often need to be continuously adapted to the changing needs of the specific target audiences. At present, all authors of the courses proposed in T-D11 have various materials available on REASE and further material would be uploaded when available.

4.1.2. Course material produced by external course providers

The EU IST Integrated Project Semantic Knowledge Technologies (SEKT) produced a number of tutorials in the form of video lectures targeted at IT professionals and the academic community covering all aspects of semantic technology. For REASE, we were particularly looking for introductory courses to the Semantic Web. After evaluating the tutorials provided by SEKT regarding their suitability for the REASE portal, three tutorials have been selected to be uploaded to http://rease.semanticweb.org. Due to format issues, only one tutorial, a "short tutorial on Semantic Web" by York Sure, could be uploaded so far. Additionally, about eight tutorials held at the industry track of the ISWC 2006 and accessible from videolectures.net (hosted by one of the former partners of the project SEKT) are now available at REASE.

In E/T-D9 it has been remarked that measures to make the portal more attractive for professionals have been to add courses and information about course providers such as the Semantic Web Company. Up till now, ten announcements for educational events have been added by the Semantic Web Company (taking March 2006 as starting point). At that point of time, it was the intention to add also material by other course providers active in the Semantic Web Education market. The picture of today shows that the European market in this respect currently seems to be consolidated and solely focused on the activities of the Semantic Web Company⁴ in the German-speaking area. Institutions like the Semantic Web Academy in Karlsruhe⁵ are, for instance, not active anymore which stresses the difficulty to

² A special target group in the professionals/companies sector for REASE are IT managers, developers and the business level

³ Eg. Rule Interchange on the Web by Axel Polleres Paula-Lavinia Patranjan held at EBRC 2007, Rich Clients need Rich Interfaces - Query Languages for XML and RDF Access on the Web by Paula-Lavinia Patranjan held at XML Tage 2006

⁴ The Semantic Web Company has been the pioneer in the field of Semantic Web education for professionals

⁵ http://www.semanticweb-akademie.de/ (no updates last or this year)

implement Semantic Web courses for professionals in a profitable way. Of course, there are Semantic Web seminars offered from time to time also at other institutions such as the ZGDV (Computer Graphics Center)⁶. But those institutions are not specialised on Semantic Web Education for professionals and therefore cannot contribute substantially to the content of the REASE portal. Consequently, no more courses of other face-to-face providers could be added.

4.1.3. REWERSE demos on REASE

Another possibility to add material relevant for professionals, mentioned also in E/T-D9, consists in adding demos with educational value. As a considerable number of demos have been produced in the REWERSE context, it is important to select those demos which are suitable for the intended audience. The expected audience can be described as IT managers, developers and the business level.

The following criteria have been set to aid the decision process:

- demo can be followed by someone who is not an expert on the topic (professionals from industry usually have practical knowledge and their focus is not so much on the theoretical issues)
- if specific and/or extensive knowledge is required for the demo, this should be remarked
- demo demonstrates a topic with practical examples (usually user can try out certain features of the program)
- user should be guided and knows what to expect
- major downloading activities or the installing of specific software will make the use/viewing of the demo for a non-expert too cumbersome

An important issue to clarify in advance has also been to decide in which form the material should be provided on REASE. REASE basically gives one the choice to either upload the material or provide a link to the material. Although it is not enforced to upload the material, it is in general recommended doing it to avoid that the material is no longer available once the link has changed. On the other hand, uploaded material can become outdated when its authors are not taking care of the material they uploaded to REASE. A link to a website is in this case more likely to be up-to-date. Having these problems in mind, it has been decided to provide a link to the demos on REASE. In most cases, it is the only available option as demonstrations run on external servers and require specific programs which inhibits a simple upload process to REASE.

Following our request for demos, the feedback from REWERSE working groups has been very positive. So far, the following demonstrations could be uploaded:

- Strelka a UML-based Rule Modeling Tool from the working group I1
- Protune-X: Advanced explanation facility for Protune's policies and negotiations from the working group I2
- Personal Publication Reader by the working group A3

More material from the mentioned as well as also from other working groups will be uploaded and described in REASE in the coming weeks.

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⁶ http://www.zgdv.de/

To give an idea about what kind of information is provided about these demos in REASE, a list of the metadata elements used for the description of the demonstrations is provided in the following. Most fields are mandatory and triggered by the selection of the Educational Material Type "Demonstration":

- Location (a resource can be uploaded, but usually a link will be set connecting one to the website with the running demonstration)
- Contributors (authors)
- Description Language and Learning Resource Language
- Title
- Description
- Classification
- Learning Resource Type (at this point it can be remarked for instance, that we are dealing here with educational material intended also for an industrial audience)

From the optional metadata elements, target audience, format or technical requirements could also provide useful information for potential users of REASE.

Additionally, an offer needs to be made specifying if the resource is being made available for the general public or, for instance, restricted to be viewed only by registered users.

In addition to the demonstrations coming out of the REWERSE context, also other demonstrations produced by external institutions could provide a valuable resource for REASE. In this context, the Semantic Web Challenge ⁷ organized each year in conjunction with the ISWC, offers a number of interesting demos which could be included in REASE. The basic issue will be that the use of the demonstrations is not hindered by having to install extensive additional software such as specific developer tools. In the following months, a small number of demonstrations from the Semantic Web Challenge will be selected and authors will be asked if they are interested in making their demonstration available on REASE.

4.1.4. The link section on REASE

The REASE portal contains a link section for professionals, which is accessible through the left-hand navigation bar. The link section provides information on further providers of Semantic Web Education for Professionals, additional resources such as the SEKT tutorials and further background links listing among others initiatives or tutorials. In the deliverable E/T-D9 it has been considered to add a list of recommended books for professionals. This consideration has proved to be not feasible. A comprehensive overview of available books for professionals would need to be compiled including detailed comments for the recommended books. Only these measures would add the necessary value for professionals for consulting such a recommendation list. As a consequence, major editorial work would be required with the problem that no person could be made responsible for the described work including keeping the list up-to-date in the future. Furthermore, as the Semantic Web Company provides an extensive, commented and updated list of recommended literature on its website, a note to this resource in the link section of the REASE site⁸ is regarded as sufficient.

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⁷ http://challenge.semanticweb.org/

⁸ In the description part of the Semantic Web Company, a reference is made to their reading list.

4.2. Popularity of material for professionals

When considering the popularity of material in REASE, it is useful to look at the number of accesses to the specific resources in REASE or to evaluate in a general way the filtering options people have used to see which topics are of particular relevance.

In reference to filtering options, it has been pointed out in E-D11 that those options, which allow restricting browsing only to industrial resources or a specific kind of resources such as recorded lectures, are used rather rarely. It looks like most people search using specific keywords regarding the topics they are interested in. This observation is described in more detail in the article "REASE: The Repository for Learning Units about the Semantic Web" by Jörg Diederich, Martin Dzbor and Diana Maynard (New Review of Hypermedia and Multimedia, Vol. 13, No. 2, 2007, pages 211 - 237. DOI: 10.1080/13614560701728390). Consequently, no substantial insight regarding certain topics can be gained out of the evaluation of the use of the filtering options.

The number of accesses to the resources in REASE provides a better possibility for judging the popularity of certain resources. When looking at the popularity of resources on REASE in general, topics coming out of the Ontology or general Semantic Web field are among the most popular so far. A clear favourite over the last years is a course provided for an industrial audience – "Semantic Web tutorial" by York Sure. Also very popular is a recorded lecture combined with power point slides – "A short tutorial on Semantic Web" provided by Andreas Hotho and York Sure. In the last six months, also a course on reasoning moved up the list of popular resources – "Practical reasoning with OWL and Rules" by Markus Krötzsch. As this was the topic at the workshop "Semantic Web Technology Showcase" at the ESTC 2007, the main target audience were professionals as well. These are only some examples which demonstrate that practically orientated material targeted at an industry audience proves to have high popularity among the users of REASE.

4.3. Promotion of REASE

Quality content in REASE is one side of the coin. If the portal is not known among professionals, it will not be visited and used in any major way. To aid the goal of promoting REASE, a flyer has been produced for easier distribution.

4.3.1. Production of REASE flyer

The goal was to produce a flyer which is visually and verbally appealing and gives a solid impression on what to expect when visiting http://rease.semanticweb.org. Consequently, the design of the flyer is straightforward looking to attract interest. The slogan "REASE – learn more about the Semantic Web" had been chosen to present the idea behind REASE in a few words. For easier distribution purposes, a postcard format had been chosen. To give a first impression of REASE, a snapshot can be found on the backside of the flyer. When distributing the flyer, the snapshot can serve as a tool for explaining functionalities of REASE.

Textual information contains general information of the purpose of REASE, content which can be expected to be found in REASE, the users of REASE (academic, research and professionals community) as well as the registered institutions to show the relevance of this portal. Additionally, there is information on the networks Knowledge Web and REWERSE and EASE association including their logos. Last, but not least, the URL of the REASE portal and contact information is given.





Figure 5. The REASE flyer

The flyer was produced in cooperation between Education and Training partner Hannover and the TTA partner webXcerpt. The first draft of the flyer was finished on the 16th of March and the first circulation produced in May consisted of 450 flyers.

4.3.2. Measurable effects of the distribution of the REASE flyer

The flyer was distributed by the Technology and Awareness group at three specific events:

- ❖ ESTC 2007 in Vienna 31 st of May
- ❖ EBRC 2007 in Düsseldorf 18-20th June
- ❖ I-SEMANTICS 2007 in Graz 5-7th September

Additionally, the flyer was distributed by REWERSE and Knowledge Web members among others at the ESWC 2007 3-7th June in Innsbruck.

Effects of the distribution of the REASE flyer could be measured by usage statistics of the REASE website. Usage statistics are based on the log files of a website. Those log files contain the number of requests made to a server and further information about these requests. All this can be very accurately determined. In contrast, numbers of actual visitors is inferred information.

⁹ Source: http://rease.semanticweb.org/stats/

The most important observation which could be made is the general increase of visitors to the site since May 2007. The months May, June, July, August, September, October and November show two to almost three times more unique visitors than the months before (November 2006 to April 2007). The following graphic demonstrates the increase in visitors starting May 2007 with a continuing high level of accesses up till now:

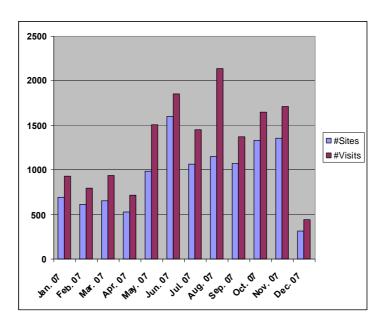


Figure 6. General Usage of REASE web pages measured in visits and sites

The term "visits" denotes general accesses to the server still interpreted as individual visits while the term "sites" denotes accesses from unique IP addresses and is therefore the number which gets one the closest to the actual number of accesses by individual real people. ¹⁰ The numbers in December 2007 are relatively low as the list was compiled of the data available on the 12th of December.

What is clearly visible is the start of increase in both visits and sites in May 2007. The increased access level continues up till the present date. Numbers of visits and sites are in May 2007 and the following months double to almost three times more than in the months before. As distribution activities of the REASE flyer started in May 2007, there is a clear correlation between these distribution activities and the general increase of accesses.

4.3.3. Linking of the REASE website

Linking the REASE website to other highly ranked sites would increase its visibility in search engines such as Google. This fact is important as professionals might find REASE through search engines.

Looking at individual websites from where http://rease.semanticweb.org is accessed from, most referrals are coming from websites such as W3C and co-odes and also the LMU web pages (when taking referrals from Google not into account). All these pages are highly ranked and therefore push the importance of the REASE website. Another important link is from http://semantic-web-days.net, a website used for promoting TTA activities, in particular events such as the Semantic Web Days 2007.

¹⁰ Further information can be found at http://www.webalizer.com/

4.3.4. SWEO Cooperation

The Semantic Web Education and Outreach (SWEO) Interest Group has as one of its goals to educate the Web community regarding related solutions and technologies. SWEO has shown interest to use REASE for the promotion of Semantic Web tutorials recommended by SWEO. For this purpose, SWEO will add resources for all the recommended tutorials to REASE once the discussion about which tutorials to recommend has been finished. These recommended resources will be presented on a special page on REASE.

4.4. Sustainability aspects of REASE for industry

Sustainability regarding the portal also from an industry perspective is an important issue. One issue in this respect is the durability of the REASE portal itself. REASE has a strong academic support expressed in form of EASE, the European Association for Semantic Web Education, which will continue hosting the portal. Consequently, this association will guarantee the continuity of the REASE portal.

Additionally, one could ask oneself if material and topics interesting for professionals will be contributed also after the end of the REWERSE project. In this respect, it would be essential to engage important players in the market of Semantic Web education for professionals. The Semantic Web Company, the player in the market of Semantic Web education for professionals, is currently contributing content to REASE and will also most likely continue their contributions. It could be a goal to engage other players from industry, but development of REASE also depends on future developments of the market for Semantic Web Educators and it is difficult to judge what will happen in this respect. Another important factor would be the use of the REASE portal for the promotion of material by the Semantic Web Education and Outreach (SWEO) Interest Group of the W3C.

5. Future Plans

5.1. Additional Learning Units

In total, there are currently 204 learning units available in REASE (as of 11th December 2007), from which REWERSE has contributed 67. 4 of these modules are in French, 6 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:

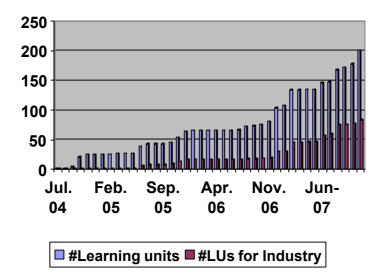


Figure 7. Available learning resources on REASE for all / industrial users

Thus, the percentage of courses suited for industrial education has grown from less than 10% at the beginning of 2005 and 25% at the end of 2005 to 30% at the end of 2006, 35% in February 2007 and 41% in December 2007.

The full list of courses is available online in REASE at http://rease.semanticweb.org/ubp/search@srchBrowseCatalog?event=search@lrfBrowse()

In 2008, it is planned to again add the material from the Reasoning Web summer school as in previous years.

6. Sustainability: EASE

The European Association for Semantic Web Education (EASE), which has been founded in June 2006 and was formally established in June 2007, has been founded to take over REASE once the funding from KnowledgeWeb and REWERSE is finished. The EASE managing committee has decided in its meeting in November 2007 to approach the main persons organizing the major Semantic Web event in 2008 to make them aware, that REASE can be also used to disseminate the highlight event of their respective events. For this purpose, the organizers of the KnowledgeWeb summer school, the REWERSE summer school, the ESWC, the ISWC, and the ESTC conference have been contacted so far and further groups will be contacted, which are involved in Semantic Web projects and have not contributed to REASE so far. Together with the EASE newsletter, a first version of which has been sent out in November 2007, too, this will ensure a higher visibility of REASE in the Semantic Web community.

7. Summary and Outlook

In this deliverable we have reported about the final status of the REASE prototype, which is based on the evaluation of the first prototype, jointly done between the education and training activity and the technology transfer activity of REWERSE and the education area in KnowledgeWeb. We have focused on including the remaining suggestions for improvements as an outcome of the REASE evaluation from 2006, but also spent a considerable effort in migrating the REASE catalogue to version 2 of the Semantic Web Topic Hierarchy.

For future work, we currently focus on increasing the attractiveness of REASE by adding further content even throughout 2008, when REASE will be taken over by the European Association for Semantic Web Education (EASE) to ensure that it sustains even after the end of the NoE funding.