T-D8

Awareness Event I: REWERSE at the KM Europe 2004

Abstract

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Keyword List

KM Europe, awareness event, exhibition stand, presentation, REWERSE

Awareness Event I: REWERSE at the KM Europe 2004

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Contents

1.   INTRODUCTION

At the start of REWERSE, the dissemination strategy of Technology Transfer & Awareness (TTA)[1] activities has been described in terms of the AIDA strategy (Ref: Deliverable T-D1). AIDA characterizes a promotion strategy and stands for creating awareness, interest, desire, and action, which would show itself finally in applications of REWERSE technologies. The awareness event taking place already at the end of 2004 aimed first of all at making other institutions and companies aware of REWERSE and also to incite their interest. The first awareness event also served hereby as a test ground for reactions to REWERSE. Positive feedback to the event would then allow the planning of events focused more on creating concrete cooperations and application possibilities for REWERSE.

Keeping the strategy in mind, one can say that the participation at the KM Europe 2004 in Amsterdam was a forerunner to the second awareness event in 2005 (Semantic Web Days in Munich). Besides offering a platform to incite attraction for REWERSE, the conference in Amsterdam also allowed to present specific deliverables as challenges (e.g. Personal Publication Reader, GoPubMed) only after six months of the launch of the project . The focus hereby was on the application working groups A2 (Bioinformatics) and A3 (Personalization) which had already presentable demos for an industrial audience. Additionally, selected products of REWERSE member companies were shown.

It was decided to participate at the KM Europe 2004 (8-10 Nov 04) with an exhibition stand, demos, and a presentation[2] to demonstrate REWERSE solutions obtained so far (9 Nov 04, 10:30 – 11:30). KM Europe 2004 appeared as a good testing ground for a presentation of REWERSE as the KM Europe was deemed to be the most important meeting for implementers and developers of innovative Knowledge-Management solutions in Europe.

It was expected to be able to monitor the public interest and the level of importance of REWERSE technologies, to investigate the needs for those technologies, to find out whether REWERSE technologies are presentable to a largely industrial audience, to produce awareness towards REWERSE, and to establish contacts. The KM Europe was chosen because there was a clear focus on an industrial audience which would give REWERSE members participating at the conference the opportunity to make contact to professionals. As there were also academics attending, in particular members of European research projects, the KM Europe also offered a good platform for exchanging experiences and finding possible cooperation partners.

2.   PREPARATION PHASE

2.1.   Marketing

About three weeks prior to the conference a press release in German and in English was produced and positioned in the German speaking area (Germany, Austria, Switzerland) as well as in several other European countries where project partners of REWERSE are located (Italy, Spain, and Malta). For non-German speaking European countries, a press release in English had been produced and sent out to the project partners who then in their turn contacted the press. In the case of Germany, German press releases were sent to a number of

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[1] The acronym TTA will be used in the following chapters to refer to the Technology Transfer & Awareness activity

[2] At the KM Europe 2004 itself, the presentation was referred to as a workshop. In this report the term „presentation" is used throughout as the short timeframe of one hour is more appropriate in the context of a presentation.

computer magazines such as Computer Zeitung, Computerwoche, and the editorial office of Heise News. For Austria, a German Press release was sent to the REWERSE partner Vienna who had contacts to the newspaper "Der Standard". The distribution in Switzerland was done by the Swiss REWERSE partner in Zurich. Additionally, a report was written shortly after the conference and published among others within the REWERSE community. Furthermore, information about the participation at the KM Europe was placed on the REWERSE website including the TTA website and several web sites of the REWERSE partners participating actively in the KM Europe event.

Creation and production of promotional material:

1. Directly after the kick-off Event of REWERSE the TTA activity group designed a flyer as the first promotional material developed for REWERSE. In this flyer one can find general information about the objectives of the project, the application areas, the working- and activity groups, and lastly a list of all REWERSE participants and contact information. Since the start of REWERSE the flyer has been disseminated at many conferences and fairs such as the CeBIT, ISWC, ESWC and other events visited by REWERSE scientists[3]. For the first edition of the REWERSE flyer 700 copies were printed. Following reprints amount altogether to 1600 copies (last edition April 2005).

2. Eight different REWERSE working groups' factsheets were developed in cooperation with the co-coordinators of the working groups. The following information was listed on the factsheets: abstract of the work/research done in the working group, use scenario, description of research, used tools and technologies, and contact information[4]. For the first edition each factsheet was printed 300 times. A following reprint for the Semantic Web Days 2005 consisted of 100 copies for each of the factsheets.

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[3] For an example of the flyer see appendix 6.1. The REWERSE flyer can be downloaded at
http://rewerse.net/TTA/Downloads/archive.htm
[4] For an example of a factsheet see appendix 6.2. Factsheets can be downloaded at
http://rewerse.net/TTA/Downloads/archive.htm

3. A REWERSE poster was produced for better visibility, for better transfer of the identity of the network, and to attract the attention of professionals passing the exhibition stand. Two versions of the poster were produced: in orange (see picture on the right)[5] and in blue.

4. A joint flyer was produced in cooperation with Knowledge Web to deepen the cooperation, to aid one another in promotion, and to have a joint appearance[6]. The joint flyer contains a general introduction, descriptions of the networks including mission statements and project facts, a list of joint activities, and contact information. For the first and second edition altogether 500 copies were printed.

On the organizer's side (Ark Group[7]) of the KM Europe, the following marketing activities were carried out: Presentation of the profile of REWERSE including the logo in the conference catalogue and on the conference homepage. For this purpose, REWERSE TTA produced a profile for REWERSE consisting of 100 characters[8].

2.2. Exhibition

The main task regarding the exhibition consisted in organizing the exhibition stand's furniture and accessories (such as literature folders), the internet connection, and the technical equipment (such as beamer, connectors and extension cord).

2.3. Demos & Presentation

Another major task was the design and organization of the demo sessions which involved the collection of demos from REWERSE working groups. The collection of demos resulted in eight different demos offered by REWERSE members. Jointly together with the REWERSE members who provided the demos, TTA selected five demos which were then demonstrated at the KM Europe 2004. Criteria for the selection were the state of elaboration of the demo,

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[5]For a larger-scale example see appendix 6.3.

[6]For an example see appendix 6.4.

[7]The Ark Group is a provider of business information. They are located in London and they were the official organizer of the KM Europe 2004.

[8]REWERSE profile: "The European research project REWERSE investigates reasoning-based technologies to process (Semantic) Web data. These technologies provide Web-based systems with advanced capabilities, in particular enhanced context-awareness and decision support. Consequently, the named capabilities are strengthening a person-centred, everyday use of the Web.

The Personal Publication Reader powered by Lixto and the webXcerpt Information Manager developed by REWERSE participants demonstrate intelligent solutions for Web-Data Extraction, Management & Accessibility. The data are extracted and aggregated from various Web sources and presented in a personalised and structured form to the user. REWERSE comprises 27 leading research and industry organisations and was launched in March 2004."

readiness for an industrial audience and the specific audience at the KM Europe 2004 and potential benefit for the provider of the demo. The following demos were selected:

- Personal Publication Reader: The Personal Publication Reader is an application developed in cooperation between the research center L3S in Hannover and the Database and Artificial Intelligence Group (DBAI) in Vienna (both REWERSE participants). The reader application generates a personalised collection of publications. The data are extracted from diverse Web sources using the web extraction tool Lixto and then combined with user information. The Personal Publication Reader provides a personal interface to the publications and is based on the Personal Reader framework. In 2005 the demo was able to secure third place in the Semantic Web Challenge which is a sign for the good quality of the demos at the REWERSE exhibition stand.

  (http://www.personal-reader.de)

  The demo was presented by Prof. Nicola Henze (research center L3S Hannover – REWERSE participant).

- Web Data Extraction and Integration with Lixto: The Lixto Suite is a web data extraction and transformation tool for retrieving, structuring, and converting information from various sources to various customer devices and enterprise applications. The Demo illustrated web data extraction in the context of the Semantic Web. In particular, the demonstrated application covered extraction of publication data that is used in the Personal Publication Reader.

  (http://www.dbai.tuwien.ac.at; http://www.lixto.com)

  The demo was presented by Dr. Robert Baumgartner who is member of the DBAI group in Vienna (REWERSE participant) and Lixto Software GmbH, Vienna.

- GoPubMed: GoPubMed represents an ontology-based literature search application and presents query results received from PubMed in a semantically structured tree. PubMed, a service of the National Library of Medicine, includes over 15 million citations for biomedical articles back to the 1950's.

  (http://www.gopubmed.org)

  The demo was presented by Andreas Doms (Biotec, TU Dresden – REWERSE participant).

- The rule verification and validation tool VALENS: VALENS Enterprise Edition is a tool that offers functionality to assess the quality of a set of (logical) rules. The rules can be verified to check their logical correctness, visualized to increase understanding of the rules, and validated to see if the behavior of the rules conforms to the desired behavior of the rules.

  (http://www.librt.com)

  The demo was a self-running demo provided by LibRT, Amsterdam (REWERSE participant).

- webXcerpt Information Manager: The Information Manager supports the user in structuring information from the Web and building up of a personal knowledge base. The collected information can be used for further Web researches.

  (http://www.webxcerpt.com)

  The demo was presented by Dr. Heribert Schütz (webXcerpt Software GmbH, Munich – REWERSE participant)

Each of the demos took between 10 and 20 minutes and was shown on demand. The original plan of having a timetable for specific presentation times of the demos was given up as making the demo presentations dependent on the interest of the conference audience appeared as a better solution, in particular as two laptops could be used at the same time for showing the demos.

The REWERSE presentation took place on the second day of the conference (9 Nov 04, 10:30 – 11:30) The presentation was developed and held in cooperation by Prof. Henze (Hannover) and Prof. Gottlob (Vienna). TTA assisted the cooperation and the preparation of the joint presentation by observing the deadlines for material which had to be delivered to the KM Europe organisers and by providing feedback.

The title of the presentation was "Web Data Management powered by Rules and Reasoning in the Semantic Web: Intelligent Solutions for Web Data Extraction, Management & Accessibility". The presentation discussed recent advancements in web data management based on Semantic Web technologies. In the first part, the Personal Publication Reader (http://www.personal-reader.de) was demonstrated. In the second part, the presentor explored how data can be extracted from continuously changing Web pages and transformed into XML, RDF, and other formats. As an example, the Web data extraction tools "Lixto Visual Wrapper" and "Lixto Transformation Server" were used, as this particular wrapper was also implemented within the Personal Publication Reader project.

3.   EVENT – RESULTS and RESPONSE

3.1.   Participants and contact possibilities

The Ark Group (Organizer of the KM Europe) registered about 1200 visitors at the conference. Many participants also visited the REWERSE exhibition stand and showed great interest in the topics. Nevertheless, no concrete cooperations could be established. One reason for this lack of concrete cooperations might lie in the fact that the Knowledge Management community was most likely not the perfect target group for Semantic Web/REWERSE technologies. Additionally, the REWERSE project was still in its early stage and concrete cooperations are more likely to be achieved with more mature results. What was possible was the collection of contact details of potentially interested professionals and academics. These contacts were useful regarding the participants acquisition for the Semantic Web Days 2005.

In addition, the location within the EU Village gave the possibilities for contacts to other EU projects. Contact details as well as experiences and presentation slides could be exchanged with the EU projects present at the KM Europe 2004. Due to the small number of exhibitors in the EU Village, contact possibilities were restricted in the aspect of quantity. The general exhibition contained a high number of company exhibition stands and contacts could also be established with exhibitors presenting companies.

3.2.   Participants feedback for demos and exhibition stand

The response to the REWERSE exhibition stand and demos was relatively high. Visitors showed special interest in applications such as GoPubMed and Personal Publication Reader. In fact, the REWERSE exhibition stand was the best visited exhibition stand in the row of EU Village projects and small company projects. The fact that five members from the REWERSE network were often standing in front of the REWERSE exhibition stand probably made the exhibition stand more attractive. Also, the fact that the literature holders were placed well visible at front of the exhibition stand was like an invitation to get more information. In addition, some of the visitors showed special interest in smaller exhibition stands and

companies because the bigger companies or institutions can be found at most conferences and fairs and are therefore well-known anyway. Many of the visitors stopping at the REWERSE exhibition stand also spent there a considerable time discussing and asking for information. Furthermore, they were interested in an exchange of contacts. Visitors at the REWERSE exhibition stand had either more general questions regarding the definition and usefulness of the Semantic Web (that is why it is needed) or they required a short overview of the project REWERSE or they asked specific questions about the applications presented at the exhibition stand. For instance, they would be interested if an application such as GoPubMed could be applied also in a different context such as handling large data sets of patient records or research results to be used in official expertises for insurance cases.

The expenditure (1,5 person months of the TTA activity group in addition to the person months of the REWERSE members for preparing the demos, the REWERSE presentation, and the participation itself) was adequate regarding the success. The costs mount up to about 9.200 € The costs for the exhibition stand itself including the furniture, accessories and the technical equipment added up to 6000 € Furthermore, the production of the working group factsheets, the REWERSE poster, the joint flyer and a reprint of the general REWERSE flyer required the spending of another 3.200 € REWERSE and the Network of Excellence Knowledge Web shared the costs for the production of the joint flyer. In addition to the costs listed above, one would need to calculate also the travel costs of the REWERSE members participating in the KM Europe event to be able to judge the overall costs of the KM Europe 2004 event.

It is important to note here that some of the expenses include a long-term investment. This is the case for the factsheets, the joint flyer, and the REWERSE poster which can been employed well beyond the KM Europe. For example, factsheets, the flyer, and also the poster has been reused at events such as the CeBIT and the Semantic Web Days 2005. In a similar way the development of the demos constitute a long-term investment as those demos were then also shown at other opportunities.

3.3. Presentation

With 50 participants the presentation "Web Data Management powered by Rules and Reasoning in the Semantic Web: Intelligent Solutions for Web Data Extraction, Management & Accessibility" was very well visited. A great proportion of the participants (90%) were from companies. Only 10% of the participants belonged to the group of academics. The majority of the participants (see illustration 1 on the following page) had positions as managers, CEOs, and consultants. Another big group were software specialists. Furthermore, there were assistants as well as architects, analysts, and several more. Mostly, they worked in the field of knowledge management and information management.

positions

Legend:
- Consultants
- CEOs
- Researcher
- Other (assistants, undefined positions)
- Manager
- Software Specialists
- Analysts
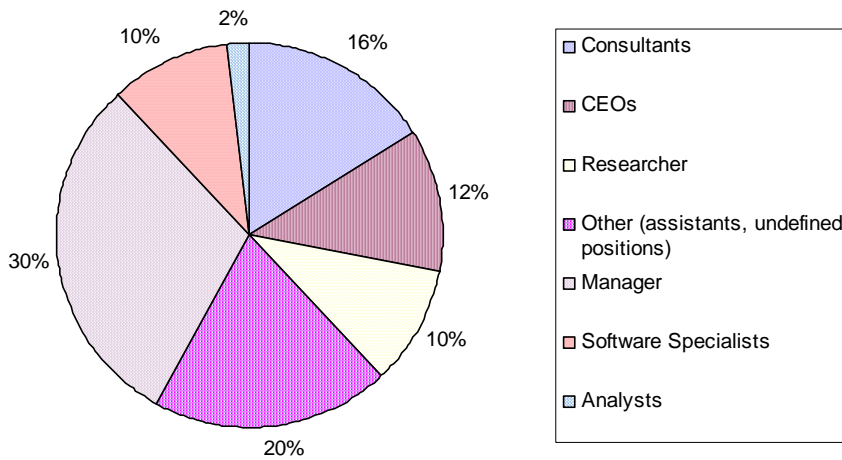
Large-scale enterprises like Oracle Corporation, Reuters Ltd, SAP AG, BASF AG, and a number of smaller companies in the IT field were present. Besides universities, also museums and other public institutions were listed among the presentation participants list. Regarding countries, the majority of participants came from the UK or Netherlands (see illustration 2). Additionally, there were participants from France, Germany, Belgium, Norway, and even from overseas (e.g. South Africa and Brazil)[9].
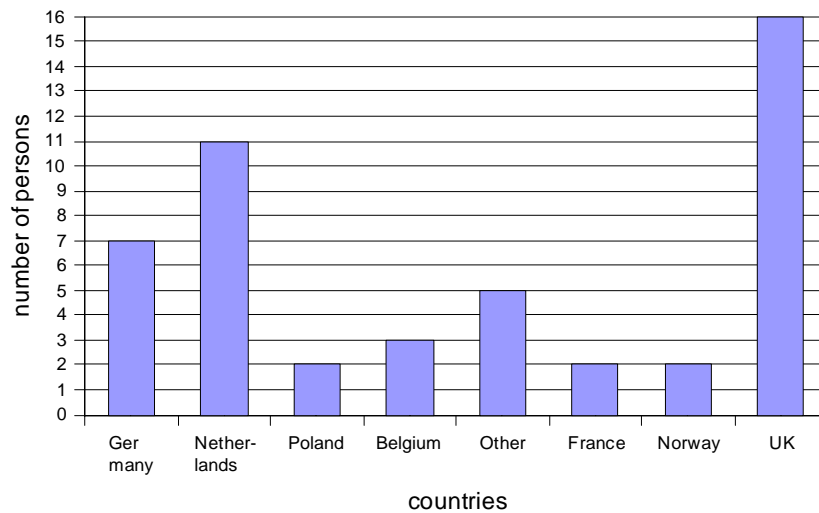
llustration 1: countries of origin of participants

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[9] Information regarding the participants at the presentation was provided by the Ark Group.

4. LESSONS LEARNED

4.1. General

It is important to pay more attention to how the organizers of the conference present REWERSE/REWERSE TTA and how they arrange everything. The experiences with the organizers at the KM Europe were mixed as described in the following.

Problems which occured:

1. The catalogue which was printed for the KM Europe contained several inadvertences. For instance, the REWERSE presentation text had been cut in an unfortunate way so that one of the presenters was not mentioned. Furthermore, the profile of REWERSE was not the actual one which had been sent to the KM Europe organizers by TTA on time, but something else which had maybe been taken from the website and which even had a wrongly spelled address in it.

2. The REWERSE presentation which took place on the second day was not announced on the notice board at the entrance of the lecture hall until someone pointed it out shortly before the presentation started.

3. TTA was required by the furniture company serving the KM Europe 2004 to buy carpet covering the floor of the exhibition stand. At the conference itself, other exhibition stands nearby did not have a carpet. One could suppose that TTA received wrong information regarding this issue and therefore had unnecessary costs.

4. Prior to the conference, TTA was provided with quite a number of different contact persons for various aspects of the conference. This fact added at points to a lack of clarity who is the relevant person to talk to.

5. TTA needed to order several items of equipment for the exhibition stand (furniture, badges, electrical fittings, fascia name boards, Internet connection...). Unfortunately it was necessary to order almost each item from a different company and always separately, which made the whole procedure complicated. A complete package would have been a more convenient solution. As a result, TTA decided for the Semantic Web Days in October 2005 to organize the exhibition by offering packages containing the most important items to the exhibitors.

Generally it is to say that these problems have lead to a higher amount of organisational work for the TTA activity group. Apart from that, the organizing committee of the KM Europe 2004 has been very helpful and friendly at all times.

4.2. The exhibition stand – possibilities for improvement

The visibility of the exhibition stand was very good when considering the location of the exhibition stand. The original location for the EU-Village and consequently also the REWERSE exhibition stand would have been located along the border of the exhibition grounds and would have offered therefore not a good location for attracting attention. The actual position at the conference was excellent as the REWERSE exhibition stand was, although also located on the edge of the main exhibition area,

on the way to the "restaurant" area and therefore next to a central route taken by the participants. The experience shows that the location of a exhibition stand can play an important part and that it is advisable to pay considerable attention to this aspect.

Regarding the visibility of the exhibition stand itself, also the decoration of the exhibition stand played a role. For this purpose, the REWERSE poster had been produced. For the exhibition stand it was decided to choose the blue version of the poster. The size chosen was DIN A1, but the effect of the poster could have been better displayed in DIN A0. Moreover, the color orange (instead of blue) chosen for the poster would also have appeared more distinctive. In the same way, beamers can serve as eye catcher. In fact, regarding the exhibition stand at the KM Europe 2004, this purpose was more or less the sole purpose of the beamer as the applications could also have been easily demonstrated just using a laptop. The decision to use a beamer hence depends to some extent also on the size of the exhibition stand. The exhibition stand available for REWERSE at the KM Europe covered an area of 6 square meters, that is, a size for which a beamer would not have been really necessary. Regarding the furniture we had normal chairs and tables, but it became evident that high exhibition stand tables and stools are more appropriate and convenient for an exhibition environment.

As for technical issues, one important aspect one needs to pay attention to is a working Internet connection. Preferable are Internet connections which are easy to set up and work reliably. Due to problems when setting up the Internet connection based on an ISDN connection using a modem, it became soon clear that ISDN is not a good solution in such a case, but that it is far easier to buy bandwidth. Also, it turned out that Internet connectivity is required for at least two laptops at the exhibition stand. When one of the laptops is used for showing a demo, another one can also be used by exhibition stand representatives who are not demonstrating at that specific moment. Due to the high number of devices, it is required to have at least a 6x socket for connecting all the devices to power.

It is essential to give an idea of corporate identity to the participant visiting the exhibition stand. REWERSE is the "umbrella" and this idea needs to be brought across better. Among all the demos it would have been consequently useful to have a short overview presentation of REWERSE to introduce the project professionally. Discussions with participants often started with an introduction to REWERSE and a professional presentation of the project with slides could have supported the discussion in quite a number of cases.

Another issue is the presentation of the different working groups of REWERSE. Presenting all eight working groups and the activities of REWERSE gives an overall picture of the whole project, but might also overload the visitor with too much information. Another possibility would be focusing on particular working groups. For instance, depending on the target group one could separate the working groups on applications from the working groups on theories and present them also separately (demo, paper, other information material and presenter). Altogether, it could be said that it is more effective to present less. Three posters and three demos would be enough in a case like the KM Europe 2004. Additional material about other projects in REWERSE could be offered, but not all at the same time. Experience at the KM Europe 2004 showed that there was too much material offered. It was even almost impossible to fit all material into the literature holders.

4.3. Presentation

It is important to balance company and REWERSE topics in a REWERSE presentation. Additionally, it would be important to take care that the idea of REWERSE as an "umbrella" is represented within the talk. As REWERSE is a cooperative project, it can be considered as very positive when it is possible to present joint projects by REWERSE members at the workshop. This was the case at the KM Europe 2004 and the cooperation aspect was also stressed by the factor that two REWERSE members presented. Moreover, the focus of the

presentation on applications and practical aspects, organized for the KM Europe 2004, can be termed as positive when considering an industrial audience.

4.4   TTA impulses

One of the impulses for TTA activities consisted in the realization that press work and press contacts are essential for technology transfer activities. At the conference TTA members were addressed by a representative of Cordis (Community Research and Development Information Service) and it was concluded to start testing the use of Cordis (http://www.cordis.lu) as publication possibility for REWERSE. One of the advantages of Cordis lies in the fact that journalists also from other magazines might use this news service as resource for their own articles. Consequently, TTA placed an announcement for the Semantic Web Days in October 2005 on the Cordis platform.

The press work TTA did in prior to the conference was not as successful as expected. Although it was tried to place the press release in several papers and magazines, none published it with the exception of the Austrian paper "Der Standard". TTA deduced from this experience that it is essential firstly to build up personal press contacts. Also the fact that TTA was not able to purchase the subject again and did not contact the press often enough, did not help in promoting the event through the press. Personal contacts with the press are vital and these contacts were not strong enough before the KM Europe 2004. Additionally, it is difficult to market an event taking place in the Netherlands as the KM Europe 2004 was an event not relevant enough to draw big attention also in the German press. Another factor lies in the nature of press work itself. For TTA the local press (Munich and Germany) is the easiest to reach and should be the place to start with. For international press, partners in the respective countries should be sought as cooperation partners. The REWERSE participant Vienna, for instance, had good contacts to the daily paper "Der Standard" (http://www.derstandard.at) and was therefore able to place a press release in which the participation of the University of Vienna at the KM Europe 2004 was mentioned. Generally it is to wish that every REWERSE partner would put more effort into using the public relation departments of their universities to help placing press releases regarding REWERSE.

5. Conclusion

The participation at the KM Europe 2004 was profitable when considering the necessary input and the results achieved. The great interest gave motivation for a bigger event such as the Semantic Web Days 2005. Additionally, experience gained at the KM Europe would help the preparation and organization of future events.

Altogether TTA decided not to take part in the KM Europe in future years because this community is not the perfect target group for REWERSE and the topics are too widespread. The conference was modified last year and is now called "Knowledge, Content & Collaboration Europe" (KCC Europe). KCC Europe is an event where knowledge management (KM), content management (CM), and collaborative-working tools and techniques converge, which is not directly a focus of interest for the work of REWERSE. TTA wants to focus its conference participation on more content-relevant conferences such as the Semantics (conference in Vienna), WWW, XTECH, or ESWC. As the work done in REWERSE is still very research focused, conferences or fairs which draw participants who are also interested in technical details would bear better chances for cooperation possibilities for REWERSE. Very application specific conferences might make sense if they are particularly relevant for one of REWERSE working groups such as the working group on Bioinformatics.

The KM Europe 2004 also demonstrated that the best way to involve REWERSE members in TTA activities lies in concrete activities which are also of benefit for the respective REWERSE member (such as the factsheets, demos, and the presentation). Furthermore, material produced for the KM Europe 2004 also had a long-term effect. The necessity to present REWERSE in an industrial context can be seen as a training to improve presentations of REWERSE and provides one with basic material for such presentations. Profiles designed and written for REWERSE can be used in other contexts and information material such as the factsheets would also find other possibilities for being distributed. In fact, the factsheets have been used at various other events by REWERSE members such as PPSWR 05, ESWC 05, ISCW 05, and the Semantic Web Days which took place in Munich in October 2005.

In general, it is important to be present as much as possible at industry-focused conferences similar to the KM Europe 2004 as these conferences offer excellent platforms to meet professionals.

6. APPENDIX

6.1. REWERSE flyer

6.2. Factsheet

REWERSE
reasoning on the web

Towards a Semantic Web for Bioinformatics

Abstract

With the explosion of online accessible bioinformatics data and tools, systems integration has become very important for further progress. Currently, bioinformatics relies heavily on the Web. But the Web is geared towards human interaction rather than automated processing. The vision of a Semantic Web facilitates this automation by annotating web content and by providing adequate reasoning languages.

Mission

Biologists wish to understand protein function from their sequences and structure (Fig. 1). The bioinformatics group of REWERSE brings 9 European groups together, which have a strong background in the use of rules and reasoning for biological data on sequence, structure, and function.

They deploy rules and reasoning for ontologies and text mining, gene expression data analysis, metabolic pathways, structure prediction and protein interaction. Enabling these tools on the Web sets the foundation for a Semantic Web for bioinformatics.

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CGCCAGCTGGACGGGCAC
ACCATGAGGCTGCTGACC
CTCCTGGGCCTTCTG...
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↓
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TDQAAFDTNIVTLTRFVM
EQGRKARGTGEMTQLLNS
LCTAVKAISTAVRKAGIA
HLYGIAGSTNVTGDQVKK
LDVLSNDLVINVLKSSFA
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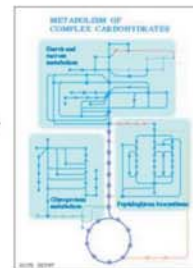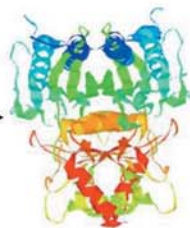
Fig 1: Sequence-Structure-Function. Biologist wish to go from DNA and protein sequences to structural information to understand the proteins' function

Use Scenarios

Consider a biologist working on osteoporosis, a major bone disease affecting millions of people. To target osteoporosis, understanding the balance between cells, which produce bone substance, and cells called osteoclasts (Fig. 2), which consume it, is important. Imagine that a scientist has measured the gene expression levels of osteoclasts during cell differentiation. Dozens of genes appear interesting and require further annotation to reveal any details. Numerous PhD students spend days in front of the computer using the internet to collect information on these genes. They wish to learn whether the proteins resulting from the expressed genes are similar to any known proteins with known function, which domains the proteins consist of, which interaction

partners these proteins have, which metabolic pathways they are involved in, which cellular locations the proteins mostly occur in, references to the most suitable articles on these proteins, etc.. All this information taken together, may lead to insights into which proteins may be suitable targets to treat bone-related diseases.

Much of the needed information and analysis tools are accessible over the Web. However, they are designed for low-throughput human use and not for high-throughput automated use. The vision of a Semantic Web for bioinformatics transparently integrates some of these resources through the use of mark-up languages, ontologies, and rules. In such a bioinformatics Semantic Web, the

biologist provides the identifiers of the experimentally determined genes to a rule-based workflow, which integrates various information sources.

A service for protein threading will determine the structural domains for the genes. Among others this service determines a number of overexpressed small GTPases, which act as molecular switches in signalling. A service for protein interactions determines potential interaction partners of the GTPases.

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More information available at
http://rewerse.net/a2

It highlights for example the proteins de/activating the GTPases. Some of experimentally proteins play a role in the MAPK signalling pathway. A rule-based service allows the biologist to ask queries over the signalling pathway to determine whether the expressed proteins are essential or not. Another service determines the relevant literature for the overexpressed genes and uses an ontology to annotate the function, processes, and cellular locations of the genes. The biologist uses rules to reason over these ontologies. He or she uses the ontology to retrieve scientific articles, which are relevant for osteoporosis, but not postmenopausal osteoporosis, and which mentions any positive regulation of protein kinase activity such as MAPK or JUNK.

Description of Research

The bioinformatics group of REWERSE will build prototype applications to demonstrate the idea of a rule-based Web for bioinformatics. It brings groups together which have used a host of of rule-based techniques such as constraints for structure prediction (Jena, Lisbon), logic programming for systems integration, to reason over metabolic pathways and to classify expression data (Dresden, Paris, Bucarest, Edinburgh), and ontologies to annotate expression data and for text-mining (Dresden, Bucarest, Edinburgh, Manchester, Linköping). The working group will build on some of these existing tools and integrate them with rule-based Web technologies to demonstrate the idea of a Semantic Web for bioinformatics.
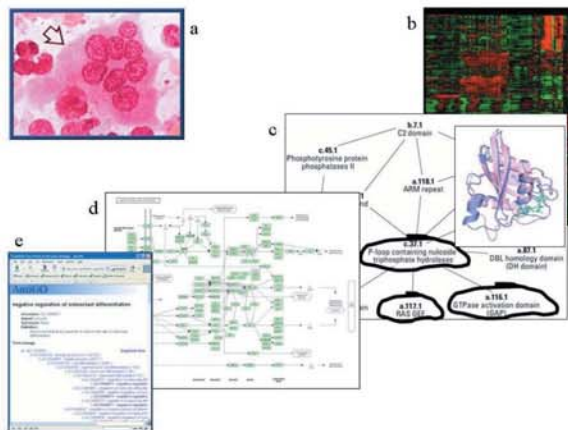

Fig2: Osteoclasts are cells which digest bone substance and are therefore important for bone-related diseases such as Osteoporosis. The figure a shows a large cell with separately identifiable, multiple nuclei. To understand osteoclasts various experimental and in-silico techniques are used:

Gene expression data captures the activity of genes. Figure b shows the result of a screen of many genes over a period of time. Red indicates over expression. The genes are grouped according to the similarity of their expression profiles. For the overexpressed gene products structural domains and their interaction partners are found (figure c). Among others small GTPases, which act as molecular switches, are found. The inset in figure c shows the superposition of two GTPases, one of which is switched on, the other off. The difference can be seen in the different conformations of the chains in the front. Some of the overexpressed gene products are relevant for human MAPK signalling pathway according to Kegg (www.genome.jp/kegg/) depicted in figure d. Finally, ontologies are used to annotate the data. Figure e shows the definition of "negative regulation of osteoclast differentiation" according to GeneOntology,

www.geneontology.org

Tools & Technologies

All of the groups involved in the bioinformatics group have developed rule- and Web-based bioinformatics tools. Dresden has developed an ontology-based literature search engine (www.gopubmed.org) and a database to determine protein structure interactions. Jena has developed tools using constraints for structure prediction. Lisbon has used constraints for structure prediction and has developed the docking package Bigger. Paris has developed a rule-based reasoning engine for metabolic pathways

http://contraintes.inria.fr/BIOCHAM/

Edinburgh has developed an ontology for tissues and linked it to in-situ gene expression data. Bucarest has used rules and inductive logic programming for characterizing differentially expressed genes in microarray data. Manchester has developed a host of tools to analyse, maintain and deploy biomedical ontologies. Linköping has developed tools to merge and maintain ontologies.

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6.3. REWERSE Poster
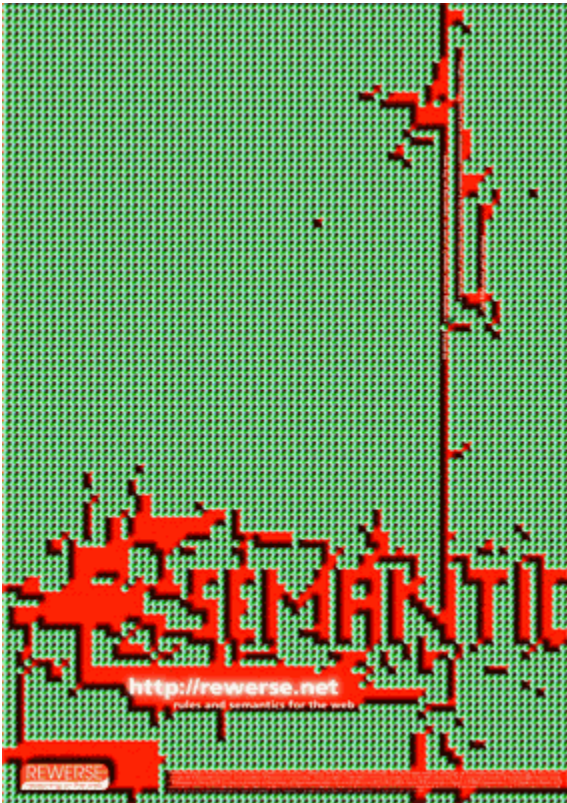
6.4. Joint Flyer

Joint Activities

Industry
- Setting up an Ontology Outreach Authority (OOA) for supporting the industry in taking up Ontology languages and tools.
- Creating a Pan-European network of industrial competence centres for industrial-level education on Semantic Web issues.

Education
- Setting up a Virtual Institute for Semantic Web Education (VISWE) which will be an information access and dissemination point for ontology and reasoning languages researchers, engineers, application and content developers in both academic and industrial institutions. An important dissemination tool will be a Web-based platform for course material.
- Joint workshops at conferences and other events.

Research
- Exchange on Semantic Web language extensions
- Common developement of use-cases for reactive systems
- Discussions on foundations of Web Service Execution
- Knowledge Web aims to set up the Virtual Research Center for coordination of research on Semantic Web and Semantic Web Services
- Coordination of joint research including mutual invitation of researchers

Cross-Network
- Linking related networks for collaboration and dissemination which includes cross-linking on Websites, joint creation of promotional material such as flyers, press releases and articles. A major activity is the organisation of joint awareness events for industry.

Project Facts

Knowledge Web
Network of Excellence funded by EU 6th Framework Program
Project Reference: FP6-507482
7M€ for 4 years (2004-2007)
18 participating universities and companies
Co-ordinated by Prof. Dieter Fensel, University of Innsbruck, AT

REWERSE
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Co-ordinated by Prof. François Bry, Ludwig-Maximilians-Universität München, DE

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## Networks of Excellence on Semantic-Web Technologies

Web and Semantics Advanced Technologies

Most of today's Web content is only suitable for human consumption. Retrieving information is often a very time-consuming activity as one of the main obstacles at present is that the meaning of documents on the Web is not machine-accessible.

The aims of the Networks of Excellence Knowledge Web and REWERSE are to develop technologies for representing Web content in a form that can more easily be processed by machines and for automatically conducting inferences based on the Web content.

These activities being part of the Semantic Web effort offer technologies which already can be integrated in the existing Web. A major goal of both networks is to strengthen the European Industry in an essential field of today's information technologies.
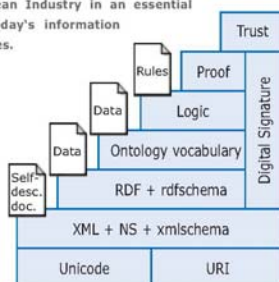
The Semantic Web Tower

Mission Statement
Semantic Web, the next generation Web, aims to add machine understandable and processable semantic information to the current Web which can be accessible by both humans and computers. The mission of Knowledge Web (in short KW) is to strengthen the European software industry in one of the most important areas of current computer technology: Semantic Web enabled eWork and eCommerce.

Three Clusters:
KW concentrates its efforts around the outreach of the Semantic Web technology to industry. Naturally, this includes education and research efforts to ensure the durability of impact and support of industry. Therefore, the main infrastructure of KW to facilitate this transfer is:

- **Outreach to Industry – Industrial Cluster:**
Industry requires immediate support in taking up this complex and new technology. Languages and interfaces need to be standardized to reduce the effort and provide scalability to solutions. KW aims to set up an Ontology Outreach Authority (OOA) to push an Ontology language, tool, and method set that cover all the major tasks in working with ontologies.

- **Outreach to Education – Education Cluster:**
KW aims to establish a Virtual Institute for Semantic Web Education (VISWE) which acts as the principal focus for educational activities on the Semantic Web. KW designs and delivers courses to provide up-to-date learning materials, curricula and, ultimately, new degree programmes.

- **Coordination of Research – Research Cluster:**
KW coordinates the research capabilities of the leading research groups in Europe to maintain this research area and to provide European industry with important stimuli ensuring its further progress and development. Therefore, KW aims to establish a Virtual Research Centre to further the coordination of research, especially in Semantic Web and Semantic Web Services areas.

http://knowledgeweb.semanticweb.org

Mission Statement
The objective of REWERSE is to establish Europe as a leader in reasoning languages for the Web by networking and structuring a scientific community, and by providing tangible technological bases for an industrial software development of advanced Web systems and applications.

The goal will be achieved by:
- developing a coherent and complete, yet minimal, collection of inter-operable reasoning languages for the Web;
- testing these languages on context-adaptive Web systems and Web-based decision support systems;
- bringing the proposed languages to the level of open pre-standards.

REWERSE Working Groups
Rule Markup Languages
Towards unified markup and tools for reasoning Web languages.
Policy Specification, Composition, and Conformance
Towards user-friendly high-level specifications for complex Web systems.
Composition and Typing
Towards methods and rules for software interoperability in the Web context.
Reasoning-aware Querying
Towards a query and transformation language for the Web with reasoning capabilities.
Evolution and Reactivity
Towards specifying the evolution of Web- based data repositories.
Web-based Decision Support for Event, Temporal, and Geographical Data
Enhancing event, temporal, and location reasoning on the Web.
Towards a Bioinformatics Semantic Web
Adding semantics to the Bioinformatics Web.
Personalised Information Systems
Towards user-adapted Web information and teaching systems.

Additionally, REWERSE disseminates its excellence through **Education and Training** and **Technology Transfer** activities.

http://rewerse.net