

# Handling of Task Hierarchies on the Nepomuk Social Semantic Desktop

Marko Brunzel<sup>1</sup> and Roland M. Mueller<sup>2</sup>

<sup>1</sup> DFKI GmbH–German Research Center for Artificial Intelligence, Kaiserslautern  
marko.brunzel@dfki.de

<sup>2</sup> University of Twente, Enschede, The Netherlands  
r.m.mueller@utwente.nl

**Abstract.** The idea of the Semantic Web is becoming more and more reality. Recent developments in Semantic Desktop research bring semantically enriched data onto the knowledge workers desktop environment. A crucial application for today’s knowledge worker is task management, which goes beyond simple ToDo lists.

In this paper we explain why task management applications in social semantic environments need an appropriate user interface to take advantage of the opportunities ahead. Then we propose the usage of an UI which is tailored towards the underlying data schema: the task management ontology.

One challenge for task management based on flexible semantic schemas in social environments is to scope on what should be shared and what not. Sharing and transfer of semantic, graph-represented information is highly desired. We propose WYSIWYS: What You See Is What You Share. This paradigm gives the human user an interface where he/she maintains control over what is shared and what not.

## 1 Introduction

Recent developments in the Semantic Web research field address the usage of semantics on the desktop. The Nepomuk [3] project aims to implement the Social Semantic Desktop. The core message of the social semantic desktop is that arbitrary information pieces, like existing desktop resources, can be associated semantically with each other.

Task management is especially important for today’s knowledge workers. Nepomuk task management is a knowledge-management application that provides a generic infrastructure that handles tasks and integrates task-related information from different sources. Nepomuk task management is based on the Task Model Ontology (TMO) [1]. The TMO aims to provide a shared schema where the relevant entities of the task domain are captured. By using the Nepomuk Social Semantic Desktop, the user will obtain a graph of associated information artifacts. The knowledge worker’s tasks are part of this graph.

Handling task hierarchies is encompassed by the issues of (1) visualization and (2) editing. For collaborative tasks, additionally (3) scoping of the parts

to be shared is a challenge. The exchange of granular information, which is represented by an RDF graph, bears the problem of how the information to be shared should be separated from what should be kept private. In this paper we propose WYSIWYS: What You See Is What You Share. WYSIWYS is about providing a UI where the information to be shared can be displayed at a glance.

Task Management in a social environment requires ad-hoc sharing of tasks and related information. For information which is based on RDF data this comes down to the challenge of determining an appropriate sub-graph from the overall RDF-graph within a repository. This can be done by statically defining what should belong to a compound instance. But for the ad-hoc sharing of tasks, a static, fixed closure is not sufficient. There are plenty exceptions expected, where more or less information should be exchanged. The proposed UI paradigm can help in such a situation by providing the user with a content oriented visualization. The knowledge worker can determine the closure that should be exchanged in a flexible manner. Predefined rules of what to include can still be used as the default but can be easily superseded by the user.

## 2 The DisTREEbute UI

In the case of semantically-represented data on the desktop, the problem of ad-hoc publication and sharing emerges. In the following, we shall present the user interface and visualization for ad-hoc ontology sharing. The aim of the prototype *DisTREEbute*<sup>1</sup> is a compact visualization of entire task hierarchies, which are described based on a domain ontology.

Solutions for ontology visualization and ontology user interfaces can be classified in a continuum between two extremes: generic RDF visualizations and special domain user interfaces. Both alternatives have their drawbacks. Generic RDF visualizations normally do not confer to the specific usage patterns in a scenario and have low usability. Special tailored user interfaces are rigid, can't be customized to changing ontologies, and do not fit to the circumstances and requirements of the Social Semantic Desktop. The DisTREEbute prototype can be positioned in the middle of this continuum: on the one hand it is flexible and customizable for changing ontologies, on the other hand it has built-in domain logic which improves the visualization and usability. The visualization of an instance in the hierarchy can be adjusted according to a domain ontology.

In Figure 1 a screenshot of DisTREEbute is shown. By selecting a start node in the ontology graph, a hierarchy is obtained. The most important element of the task hierarchy is the task with its name and an automatically created invisible ID. The task names are displayed directly as nodes. For other properties that have a maximum cardinality of 1 (e.g. the *task state*) there are corresponding sub-nodes who display the name and the value of the property. For properties that have a cardinality of more than one value, *grouping nodes* bundle together all properties of a certain type. Often not all possible properties have values.

---

<sup>1</sup> Scottish for distribute.

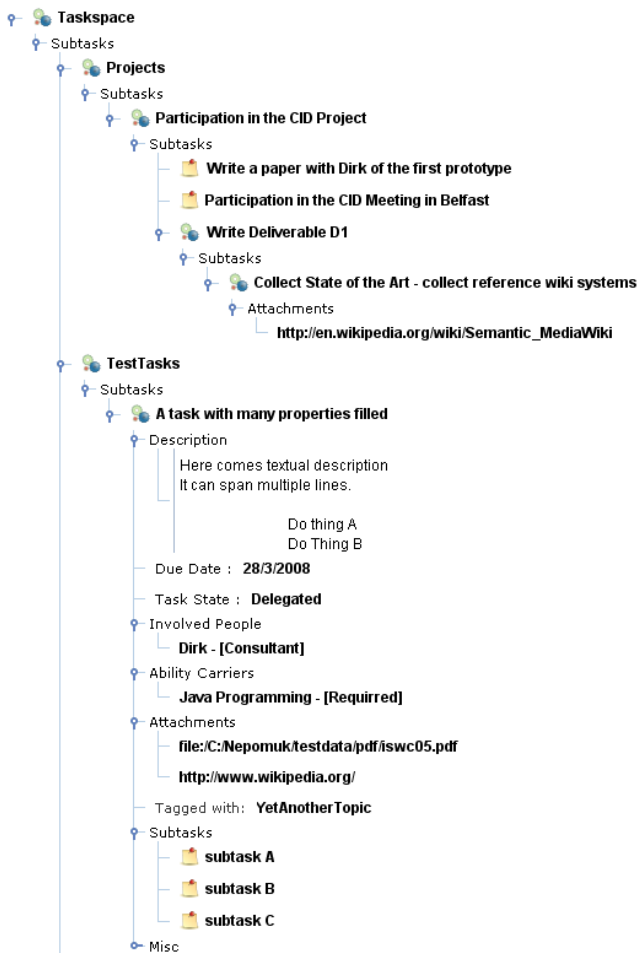


Fig. 1. Screenshot of DisTREEbute

DisTREEbute considers this sparseness of the instances and shows only used properties.

The main feature of the user interface is the view definition: this scoping follows the principle "What You See Is What You Share" or WYSIWYS. The user can expand or collapse parts of the task hierarchies and thereby determine the scope of the shared ontology instances. Therefore, the scope of the displayed and subsequently shared information can be determined by two principles:

1. By unfolding (expanding) and folding (collapsing) the task hierarchy, the scope can be broadened and narrowed by a all children of a node.
2. By checking (selecting) and / unchecking (unselecting) checkbox the scope can be determined on the properties and individual children.

After the selection, the selected items, resp. the RDF statements which are underlying the selected items, might be sent to another participant or shared within a group of people.

### 3 Related Work

Today's work is in majority collaborative work. For collaboration and remote desktop sharing, the principle What You See is What I See (WYSIWIS) is known [4]. In contrast to WYSIWIS, in our approach only fragments of the task hierarchy should be shared and there is only a partly overlap of ontologies. Both sides could be partially different ontologies.

Regarding the display of semantic information, the Tabulator Redux system developed by Berners-Lee et al. [2] is relevant. Tabulator Redux allows to display RDF data as hierarchies.

### 4 Conclusions and Future Work

In this paper we proposed the WYSIWYS (*What You See Is What You Share*) paradigm which can be applied to determine what parts of a hierarchy, respectively graph, should be shared with remote collaborators.

RDF-Graphs in social settings raise new and difficult issues concerning the privacy of the information. WYSIWYS can be used to determine a sub-graph which can be transferred to another person. By using a UI according to WYSIWYS, the user stays in charge of what is shared. WYSIWYS therefore tackles a major security and privacy issue for the emerging field of social-semantic information exchange. DisTREEbute provides a prototypical implementation of the WYSIWYS paradigm and visualizes tasks which are based on the Nepomuk Task Management Ontology.

**Acknowledgements.** This work was supported by the European Union IST fund (Grant FP6-027705, project NEPOMUK).

### References

1. Bernardi, A., Brunzel, M., Grebner, O., Ong, E., Riss, U., Roth-Berghofer, T.: Task Management Model, Technical report, Deliverable 3.1 of Project Nepomuk, [http://nepomuk.semanticdesktop.org/xwiki/bin/download/Main1/D3-1s/D3.1\\_v10\\_NEPOMUK\\_Task\\_Management\\_Model.pdf](http://nepomuk.semanticdesktop.org/xwiki/bin/download/Main1/D3-1s/D3.1_v10_NEPOMUK_Task_Management_Model.pdf)
2. Berners-Lee, T., Hollenbach, J., Lu, K., Presbrey, J., Prud'ommeaux, E., schraefel, mc.: Tabulator Redux: Browsing and writing linked data. In: WWW 2008, Workshop: Linked Data on the Web (LDOW 2008) (2008)
3. Groza, T., Handschuh, S., Moeller, K., Grimnes, G., Sauer mann, L., Minack, E., Mesnage, C., Jazayeri, M., Reif, G., Gudjonsdottir, R.: The nepomuk project - on the way to the social semantic desktop. In: Pellegrini, T., Schaffert, S. (eds.) Proceedings of I-Semantics 2007, pp. 201–211, JUCS (2007)
4. Stefik, M., Bobrow, D.G., Foster, G., Lanning, S., Tatar, D.: Wysiwis revised: early experiences with multiuser interfaces. ACM Trans. Inf. Syst. 5(2), 147–167 (1987)