The Organiser - A Semantic Desktop Agent based on NEPOMUK

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Abstract. In this paper we introduce our NEPOMUK-based Semantic Desktop for the Windows platform. It uniquely features an integrative user interface concept which allows a user to focus on personal information management while relying on the Property Projection agent for semi-automated file management.

Keywords: Semantic Desktop, Personal Information Management

1 Introduction

In recent years, mobile cloud computing [5] has created a paradigm shift in the use of electronic devices. It is now common for people to consume and produce content using multiple devices, online platforms and communication channels. However, productive and collaborative work is becoming increasingly fragmented across different mobile platforms, social networks and collaboration platforms [1].

Different devices and applications often come with their separate methods of organizing and storing information. Thus, considerable effort has to be made to represent a single piece of information in multiple systems. In our case, the ISWC 2014 conference is being represented in five different entities: a calendar event, a shared folder in the hierarchical file system, a notes list, a bookmarks folder and a task list.

There is a need for active support by computers in the creation and filtering process of personal and group information. It has to provide a consolidated view on data and blend the boundaries between workstations, mobile devices and web services. Semantic Web technologies, specifically the Semantic Desktop [6], offer a suitable platform for this purpose.

2 Our Solution

To solve this problem we have created the *Organiser*[1], a Semantic Desktop agent based on the NEPOMUK ontologies [4]. It integrates personal information such as contacts, events and notes from cloud services with the local file system and thus, provides a consolidated view.

[1] Demo video: http://www.semiodesk.com/media/2014/0714-organiser-intro

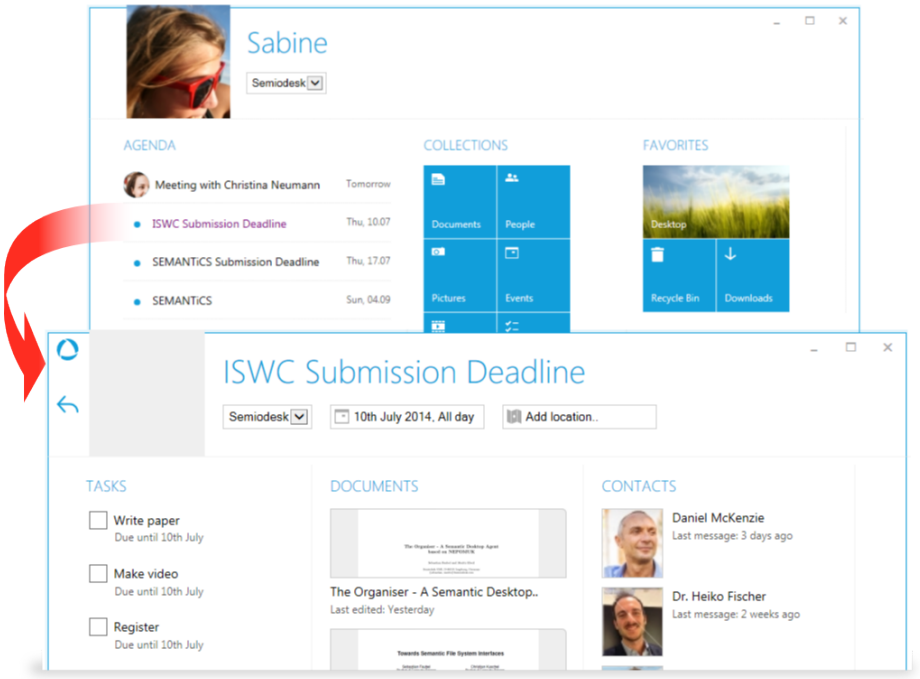

Fig. 1. Upcoming events are easily accessible from the Organiser's dashboard.

The application's dashboard is shown in figure 1. It serves as an entry point into exploring resources and provides quick access to resource collections (i.e. documents, pictures, events, etc.) and the local file system. Most prominently, it features an activity control (agenda and journal) which allows a user to plan into the future. Because future activities also serve as containers for files and related information, the dashboard provides quick access to all resources which are relevant to the user at a certain time.

Moreover, all resources can act as containers for relevant files and information. The displayed relations in the *resource view* can be hyperlinks to other resources, which enables browsing for interesting files and information. In order to assist a user in adding reasonable relations to a newly created resource, the Organiser actively analyzes the resource's properties and provides suggestions; such as to relate a collection of pictures to an event if they were taken at the time of the event. A user may accept or decline those suggestions.

Another feature of the resource view is, that it does not only consolidate already existing relations, but it also offers the ability to create new content. When adding new files, such as office documents, a file system path is being generated from the metadata of the file and the context of the resource it was created in.

2.1 File System Abstraction using Property Projection

The hierarchical file system is the de facto standard for organizing and sharing files in a productive computing environment. In order to support a soft transition away from the static file system as a primary means of organizing and browsing files, we have developed the *Property Projection* method: A Semantic Web agent that is capable of learning how resource metadata is being projected into the path component of a URI, either by analyzing existing file systems or through interactive user input (figure 2).

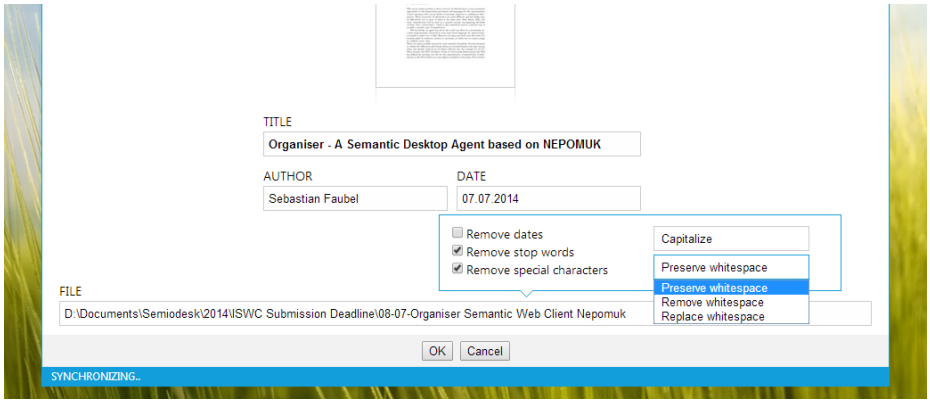

Fig. 2. Training the PropertyProjection agent interactively.

Once a projection schema has been learned, the agent can suggest storage locations for files being created in the context of a resource. This allows a user to shift from working with the static file system folders to working with resources such as contacts, events, notes or tasks that have temporal relevance to his or her activities.

The agent can formalize the schematic generation of URIs using the Property Projection Ontology. Based on the Path Projection Ontology [3], the revised ontology provides a vocabulary for the following features:

- Generating readable URIs from metadata (conforming to RFC 2396 [2])
- Generating names and titles for resources from metadata

URI schemes can be shared with other compatible agents on a global scale. This can improve overall team productivity, since a common file organization schema removes the burden to choose a storage location, and helps co-workers spend less time on looking for misfiled information.

2.2 Implementation

The Organiser is implemented using *Trinity*, our Semantic Web application development platform for .NET/Mono. It features a Semantic Object Mapping

mechanism that allows to define an object oriented abstraction layer on top of a RDF triple store. This layer promotes the use of common development methods, proven application design patterns, and significantly increases the compatibility to existing APIs.

Although the Organiser's user interface is currently implemented using WPF, the consequent use of the MVVM design pattern allows for reimplementation using other technologies such as HTML and JavaScript. The interface is laid out in such a way, that it can be used on touch screens and may be scaled down to the resolution of current smartphones.

Metadata from the file system and cloud services is gathered in the background by *Ubiquity*, a metadata extraction and synchronisation service. All changes to the extracted resources made in the Organiser are mirrored back to the metadata of the respective resource.

3 Conclusions / Future Work

The Organiser concept was refined over multiple iterations and the software is nearing completion. Only final usability tests and some connectivity and format extensions are missing.

A focus in the future is to implement the Organiser for mobile devices like Tablets and Smartphones. Because they accompany the user most of the time, we want them to act as a conduit to bring the seemingly virtual planning and organisation of the desktop into the everyday world of the user. Achieving a convergence of the user's data on mobile devices and the Desktop PC can lead to device independent productivity.

References

1. Ofer Bergman, Ruth Beyth-Marom, and Rafi Nachmias. The project fragmentation problem in personal information management. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '06, pages 271–274, New York, NY, USA, 2006. ACM.
2. T. Berners-Lee. RFC 2396: Uniform Resource Identifiers (URI). Technical report, MIT, 1998.
3. Sebastian Faubel and Christian Kuschel. Towards semantic file system interfaces. In Christian Bizer and Anupam Joshi, editors, *International Semantic Web Conference (Posters & Demos)*, volume 401 of *CEUR Workshop Proceedings*. CEUR-WS.org, 2008.
4. Tudor Groza, Siegfried Handschuh, Knud Moeller, Gunnar Grimnes, Leo Sauermann, Enrico Minack, Cedric Mesnage, Mehdi Jazayeri, Gerald Reif, and Rosa Gudjónsdóttir. The nepomuk project - on the way to the social semantic desktop. In Tassilo Pellegrini and Sebastian Schaffert, editors, *Proceedings of I-Semantics' 07*, pages 201–211. JUCS, September 2007.
5. Fangming Liu, Peng Shu, Hai Jin, Linjie Ding, Jie Yu, Di Niu, and Bo Li. Gearing resource-poor mobile devices with powerful clouds: architectures, challenges, and applications. *IEEE Wireless Commun.*, 20(3):1–0, 2013.

6. Leo Sauermann, Ansgar Bernardi, and Andreas Dengel. Overview and outlook on the semantic desktop. In *Proceedings of the 1st Workshop on The Semantic Desktop at the ISWC 2005 Conference*, 2005.