WiSyMon: Managing Systems Monitoring Information in Semantic Wikis

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ABSTRACT

The work presented in the poster describes our collaborative approach to managing systems monitoring information in a Semantic Wiki. This allows to extend the applicability of managing systems monitoring information from IT personnel to IT-knowledgeable users (e.g., developers, or researchers). Semantic relations edited in the Semantic Wiki are translated into systems monitoring configuration files used by an external application. Information about the status of services and hosts is inserted into the Wiki.

Categories and Subject Descriptors

C.2.3 [**Computer-Communication Networks**]: Network Operations—*Network Monitoring*; H.5.3 [**Information Interfaces and Presentation**]: Group and Organization Interfaces; K.6.2 [**Management of Computing and Information Systems**]: Installation Management

General Terms

Semantic Wiki, Collaboration, IT Service Management, Systems Monitoring, Services Monitoring, Network Monitoring

1. INTRODUCTION

The **IT Service Management** (ITSM) discipline supports business by providing IT services. There exist several frameworks, which give recommendations and best practices for implementing IT processes and services. ITIL, originally developed by the British government, is the currently most widely used ITSM framework [3, 6]. Configuration Management [7] is the process within ITIL responsible for describing all entities (named configuration items (CIs)) used for providing IT services, as well as their relationships (e.g., an application is run on a certain server). The configuration management database (CMDB) is the logical database containing information about all configuration items [6]. **Systems Monitoring** tools are used for checking hosts, services and network devices for availability and compliance with service

level agreements (SLAs) [8]. The freely available Nagios[1] [2] software is used as the system monitoring solution in this work. It provides a Web-based frontend, where the status of services and hosts is shown as well as a graphical representation of running and failed services and hosts. Nagios also can be configured to send notifications about status changes in services and hosts to the person or group responsible. **Semantic Wikis** are an extension to standard Wiki software, which allow explicit semantic statements [9]. These semantic statements allow for automatic processing of information found in Wiki articles and the relations between articles. The work presented in the poster builds on top of MediaWiki [1], Semantic MediaWiki [10] and SMW+[2], using Semantic MediaWiki as a platform for expressing information about services and hosts as well as relationships between services and hosts in a machine-processable way. The information stored in the Semantic Wiki are translated into configuration files for systems monitoring software. By using a Semantic Wiki for storing systems monitoring information, this information can be edited collaboratively, which allows users, in contrast to only systems administrators, to register for relevant services and hosts. This allows for a more flexible, agile and collaborative approach to IT service management as outlined in [5].

2. PROBLEM DESCRIPTION

In centrally managed IT environments, services and hosts are managed and monitored by IT department members who provide services to customers (either internal or external ones). There exists a clear separation between the provider of a service and the customer, e.g., at financial institutions where computers are used for looking up financial data but the services for doing so are provided by a centralized IT department. While there exist systems monitoring solutions in this kind of environment, they are used mainly by the IT staff and only in a very limited form (e.g., a basic status board which lists unavailable services) by non-IT employees. When looking at organisations with a strong emphasis on IT, e.g., software development companies, or research institutions, it can be seen that services and hosts are often maintained or co-maintained by developers or researchers. In these highly agile environments, non-mission-critical services and hosts are hard to track for the IT department because they are often put up for internal testing purposes

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[1] http://www.nagios.org/
[2] http://wiki.ontoprise.com/

or for testing ongoing work with project partners. With regard to systems monitoring, this leads to a situation where services and hosts are either over-monitored (non-important services and hosts are unnecessarily monitored) or under-monitored (important services and hosts are not monitored) due to lack of communication and collaboration between the IT department, which runs the systems monitoring application, and the persons running the services and hosts. While over-monitoring puts an unnecessary burden on IT staff due to unnecessarily reacting to status changes, under-monitoring means that failing critical services and hosts are not detected by systems monitoring.

3. SOLUTION

In order to solve the problem of over- and under-monitoring, a platform for collaboratively editing systems monitoring information in a Semantic Wiki is introduced, extending our work on the collaborative editing of configuration management information described in [5]. Information about configuration items is stored in Wiki articles and relations between configuration items are expressed as relations in a Semantic Wiki. System monitoring information is added in Semantic MediaWiki syntax and, in conjunction with information about relations between service and hosts stored as semantic relations (e.g., a service runs on a host, or a host depends on a network switch), translated into a configuration file for an external systems monitoring application. The platform enables users and system administrators to register for notifications about changes in services and hosts, e.g., failing services or unavailable hosts. The **architecture** of WiSyMon consists of an export component and a notification component, which are built on top of MediaWiki, Semantic MediaWiki and SMW+. The export component translates systems monitoring information from Semantic Wiki relations into text-based configuration files processable by an external systems monitoring application. While there exist several systems monitoring applications, both, available freely and commercially, for this work, the open-source Nagios application is used. The notification component updates the Wiki articles of services and hosts with status information from the external systems monitoring application. An ontology [4, 9] is used as the data model of WiSyMon. The **procedure** for adding a service or host for being monitored consists of the following steps: 1.) Create a Wiki article for the configuration item which should be monitored; 2.) Add a relation to the Wiki article indicating what to monitor (service, host, protocol), whom to notify in case of a status change of the monitored entity, and when to monitor (e.g., 24x7); 3.) Save the Wiki article; 4.) If necessary, resolve issues found while translating the semantic relations to systems monitoring configuration files (e.g., add a Wiki article for a referenced service which does not exist yet).

4. RELATED WORK

There exist several graphical, Web-based front-ends for configuring the Nagios systems monitoring software (e.g., Lilac Configurator[3], Monarch[4], and NCPL[5]). There also exists software for the management of CMDBs, which is able to export systems monitoring configuration files to Nagios (e.g.,

i-doit[6]). However, none of these solutions integrates into a Semantic Wiki and none supports the use in a collaborative environment.

5. CONCLUSION AND FUTURE WORK

In our poster, we described WiSyMon, a framework for collaboratively editing systems management information in a Semantic Wiki. An infrastructure for exporting configurations and importing status information to and from an external systems monitoring application was introduced. In the future, we are planning to add additional features into the collaborative Semantic Wiki-based systems management framework. Features will include a component for automatically gathering information about hardware and software configurations from computers over the network. Furthermore, the systems monitoring component will be extended to interface with status information gathered from agents installed on monitored hosts (e.g., CPU load, available hard disk space). In addition, privacy and security considerations will be addressed.

6. ACKNOWLEDGEMENTS

7. REFERENCES

[1] D. J. Barrett. *MediaWiki (Wikipedia and Beyond)*. O'Reilly Media, 1st edition, Oct. 2008.

[2] W. Barth. *Nagios: System and Network Monitoring*. No Starch Press, 1st edition, Dec. 2005.

[3] B. Clacy and B. Jennings. Service Management: Driving the Future of IT. *Computer*, 40(5):98–100, 2007.

[4] T. R. Gruber. Toward Principles for the Design of Ontologies Used for Knowledge Sharing. *Int. J. Hum.-Comput. Stud.*, 43(5-6):907–928, 1993.

[5] F. Kleiner and A. Abecker. Towards a Collaborative Semantic Wiki-based Approach to IT Service Management. 2009. Accepted at I-SEMANTICS 2009.

[6] P. T. Köhler. *ITIL: Das IT-Servicemanagement Framework (Xpert.Press)*. Springer, Berlin, 2nd edition, 2007. In German.

[7] S. Lacy and I. Macfarlane. *Service Transition, ITIL, Version 3 (ITIL)*. Stationery Office Books, 2007.

[8] C. Rudd and V. Lloyd. *Service Design, ITIL, Version 3 (ITIL)*. Stationery Office Books, 2007.

[9] S. Staab and R. Studer. *Handbook on Ontologies. (International Handbooks on Information Systems)*. Springer, Berlin, 1st edition, 2003.

[10] M. Völkel, M. Krötzsch, D. Vrandečić, H. Haller, and R. Studer. Semantic Wikipedia. In *WWW '06: Proceedings of the 15th International Conference on World Wide Web*, pages 585–594, New York, NY, USA, 2006. ACM.

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[3]http://www.lilacplatform.com/

[4]http://sourceforge.net/projects/monarch/

[5]http://sourceforge.net/projects/ncpl/

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[6]http://www.i-doit.org/