

SemanticWeb.org – Grounding Technologies Evaluation

Semantic Web Community Portal Project

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1 Executive Summary

This document comprises the Content Analysis of Semantic Web.org – website (www.semanticweb.org). The analysis is a starting point to update the website into a decent Semantic Web driven web portal as a case study for the Semantic Web Community Portal Project. Therefore, the current content of the semanticweb.org - website is analyzed and ways to structure and represent it in a more sophisticated manner are discussed.

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2 Introduction

The aim of this document is to present the evaluation of the selected technologies and tools that may constitute the future building blocks of the semanticweb.org portal. This assessment is a very selective work as only a very limited number of technologies and tools are evaluated with the manpower resources dedicated to this task. The document is going to grow over time as the evaluation process progress. It is also highly probable that some new technologies will be added to this evaluation, because of the new requirements revealed with the “User Requirements” document. Some changes may also appear during the phase of the portal implementation.

The version 0.2 of this document explains the portal architecture. A list of the suggested technologies and tools fulfilling requirements of each of the architecture tier, which should be evaluated in the coming month with the names of the researchers responsible for carrying evaluation, has been provided. New technologies and tools may be added and some may be removed from this report while carrying out the evaluation work.

Each of the below mentioned technologies and tools could be itself a good material for the whole book, but the aim of the authors is to have their work practical and this document short and concise. The authors attempt to carry a comprehensive evaluation, not only limited to reading FAQs or white papers, but to the real testing based on the initial implementation of the selected features (components) of the portal. Conclusions from the authors’ work and advice regarding applicability of given technologies for the semanticweb.org portal are going to constitute the main part of this document. It has been also the intention of the authors to spend as much time as possible on evaluation and prototyping of various features of the portal with given technologies or tools and not on the production of the high level overviews that can be easily found anywhere. Links are provided to forward a reader for further reading.

The document is structured as follows. 3-tier and N-tier architecture are presented in the section 2 and explanation why the 3-tier architecture has been chosen for the procedure of technologies evaluation is clarified. Section 3 proposes the set of given



technologies that are going to be evaluated. Given technologies support particular tiers of the 3-tier architecture. Finally selected tools, which are going to be used for the implementation of the semanticweb.org portal capable to support technologies from section 3, are evaluated in section 4.



3 Architecture

During the course of evaluation of the technologies and tools suggested for the development of the semanticweb.org portal, the assumption is to be made that the portal is going to have the 3-tier architecture (see figure 1). The authors are trying to address the requirements of the presentation, application logic and resource management layers from the 3-tier architecture by evaluating technologies and tools that may constitute the future building blocks for each of these tiers.

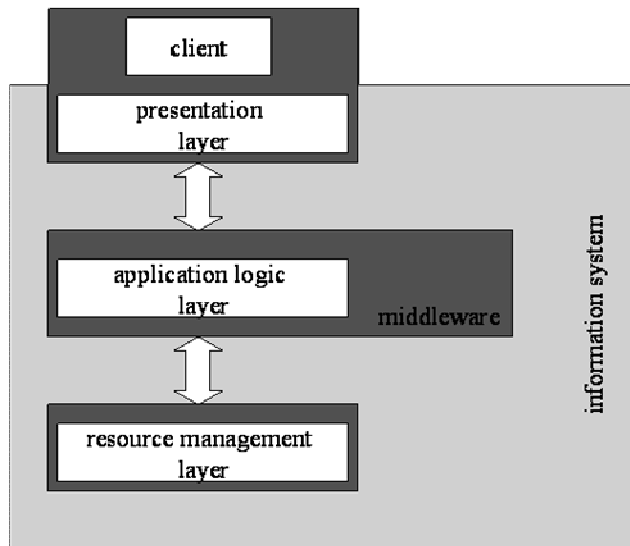


Figure 1: Three tier architecture [1]

The layers (tiers) are defined as follow:

- **Presentation layer** is responsible for the communication with the external entities as for example humans or other systems. In case of semanticweb.org portal these other systems will be mainly other semantic web enabled portals.
- **Application logic layer** is responsible for the processing of data before the results are ready to be delivered to the presentation layer. Application logic layer exposes services offered by the semanticweb.org portal.

- **Resource management layer** includes all the elements of the semanticweb.org portal, which are capable to preserve data as for example databases, repositories, file systems etc.

The reader should refer to Alfonso et al. book [1] to understand the complexity and advantages of the various types of tier architectures and the purpose of each of the layer in the 3-tier architecture.

While there is no harm to assume that the portal represents 3-tier architecture at the time while evaluating the technologies and tools, it can be easily predicted that the “User Requirements” analysis for the semanticweb.org portal will require the N-tier architecture to be used for the portal implementation (see figure 2).

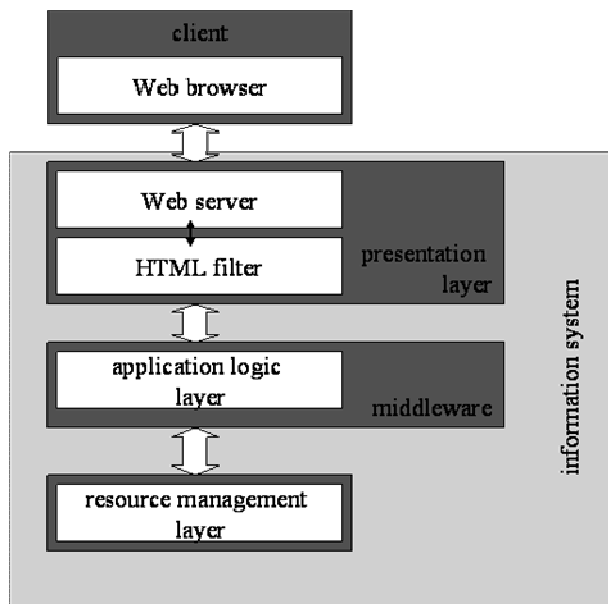


Figure 1: An N-tier system [1]

As presented by Alfonso et al. [1] the N-tier architecture is the result of applying the 3-tier model in its full generality and increased relevance of the Internet as an access channel. It is almost sure that the architecture of the semanticweb.org portal will

represent the web application architecture, which in its definition is the N-tier architecture. Also the potential requirement to enable the exchange of data with other semantic web portals (or saying more general with other information systems) indicates the necessity of the application logic layer or the resource management layer of the semanticweb.org portal to be able to communicate with the presentations layers of other portals. This automatically indicates that the N-tier architecture should be used.

J2EE (Java 2 Enterprise Edition) architecture is the example of the application of the N-tier model (the reader should notice that the authors do not refer here to particular J2EE implementation, but to architecture that has been developed with the Java Community Process [2]). The decision to select J2EE architecture is rather pragmatic than fully rational. There is a very competitive N-tier architecture offered by Microsoft with the .Net platform. Having limited number of manpower resources and already good familiarity of the J2EE platform, the authors decided not to sacrifice a couple of months only to understand the basics of .Net, but to go straight with the technology that is already partially well-known to them.



4 Technologies

A couple of technologies will be evaluated in the coming months. This section is structured around three layers of the 3-tier architecture, but the reader should remember, that finally the N-tier architecture is going to be used to build semanticweb.org portal (names of people carrying evaluation and testing has been provided in brackets).

This very selective list should be extended together with the increase of the experience and the practical skills of the authors of this overview. At this stage the technologies are analysed in separation, but some global conclusions should be included here in the future.

4.1 Presentation Layer

4.1.1 Java Server Pages – JSP (Michal Zaremba)

4.2 Application Logic Layer

4.2.1 Servlets (Michal Zaremba)

4.2.2 Enterprise Java Beans – EJB (Michal Zaremba)

4.2.3 OWL / RDF / RDFS APIs, Query Interfaces (Titi Roman)

4.3 Resource Management Layer

4.3.1 Repositories/Ontology-Repositories/Database Systems (Holger Lausen, Anna Zhdanova)

4.3.2 CMS Systems (Titi Roman)

4.3.3 Blogs, Wikis (Laurentiu Vasiliu)



5 Tools

Tools that are capable to work with the technologies discussed in section 3 are presented below. Again names of people carrying initial implementation and testing of the portal functionality with the given tools have been included in brackets.

The selection of tools has been based on several criteria. The tools must be open and free source. They need recognition by the community of software developers. They must be J2EE compatible or there must be some ways to use them with Java, as architecture of the semanticweb.org portal is going to be built on Java “standard”.

5.1.1 JSPs and Servlets container – Tomcat (Michal Zaremba)

5.1.2 Manipulating RDF and reasoning – Jena (Michal Zaremba)

5.1.3 Project build tool – Ant (Michal Zaremba)

5.1.4 Ontology server – Protégé server - (Holger Lausen)

5.1.5 CMS – Open CMS (Titi Roman)

5.1.6 Blogs – HP Blogs (Laurentiu Vasiliu)

5.1.7 Database system – Postgresql (Anna Zhdanova)

5.1.8 EJB container – JBoss (Michal Zaremba)

5.1.9 RDF store – Sesame (Holger Lausen)

5.1.10 Project IDE (Integrated Development Environment) – Eclipse (Everybody)



6 References

1. Gustavo Alfonso, Fabio Casati, Harumi Kuno, Vijay Machiraju, “Web Services. Concepts, Architectures and Applications”.
2. Java™ 2 Platform, Enterprise Edition 1.4 (J2EE 1.4) Specification;
<http://www.jcp.org/en/jsr/detail?id=151>

