

## Professional and Ethical Issues in Semantic Web

Pankaj Kumar 1 and Dr. A. K. Singh 2

1, 2 University Department of Mathematics, B. R. Ambedkar Bihar University, Muzaffarpur, Bihar, India

Correspondence should be addressed to Pankaj Kumar, [pankaj@glug4muz.org](mailto:pankaj@glug4muz.org) and Dr. A. K. Singh, [aksingh@brabu.net](mailto:aksingh@brabu.net)

Published Date: 8 August 2012

Article Link: <http://technical.cloud-journals.com/index.php/journal-of-computer-science-tech/issue/current>



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**Abstract** This paper highlights professional and ethical issues in semantic web environment. As in case of semantic web environment information is more visible to search engines and other websites and so it raises significant privacy issues for users providing personal data on a semantic website. This paper also highlights the importance of informed consent in a semantic web environment. Finally it explores the challenge for developers and designers of semantic web environment and potential approach to meeting these issues in an efficient way.

**Keywords** Semantic Web, RDF, OWL, Ethics, Privacy, Informed Consent

### 1. Introduction

The main aim of semantic web (1) is to develop a website in which data available on it becomes as much visible to other websites as it is visible to its users. The information available on such websites becomes much more sharable as compared to information available on traditional websites. So the privacy issue for users signing up on these websites becomes more critical. The information provided by users become available in the source code of the web pages in very systematic way so that they can be easily scrapped by crawlers and other websites. The information provided by users may even become available in the URL of the web pages of that website. So such situation may become problematic for users. Some of the sensitive information given by the users can also become accessible on other websites. So it may violet the consent given by the user at the time of creating account on that website. Therefore the ethical responsibility of designer and developer of such website become much more than as compared to traditional websites.

### 2. Introduction to Semantic Web

Traditionally Internet was developed as collection of static web pages. It was simply collection of documents. But now the Internet has become collection of data. The documents available on Internet are collection of data provided by users. Traditionally it was one way communication between the website owner and visitor. But now days, the information available on web pages mostly consists of information provided by visitors itself. So one visitor is interested in searching for information provided by other visitor. The main aim of semantic web is to develop this searching process easy and accurate. For this purpose, the methods of displaying information on web pages are being redefined. Therefore some advanced format of data representation has been defined such as RDF (2) (Resource Description Framework) and OWL (3) (Web Ontology Language). In addition to this, some frameworks have also been developed such as FOAF (4) (Friend of a Friend).

### 3. Privacy and Semantic Web

The method of integration of personal information in a semantic website is very critical. It should be done in such a way that the private information provided by the user should not be accessible by search engines or other websites. For this purpose the user should be provided with option to make his own information either private or public on such websites. Only information declared public by the user should be accessible by the search engines. The developers of such website must take care of the fact that any private data provided by the user should not become available in any data feed provided by such website. Similarly such information should also not be integrated in the URL of the web pages of that website. The main features of semantic web due to which the information on such website become more accessible are as follows:

- a. Universal Data Representation:** As all data will be represented with the help of universal data representation format and so they can be easily queried by other websites.
- b. Ease of Integration:** The integration of data in a semantic website is more easy and systematic. So the volume of data integrated into such website becomes much more as compared to traditional websites. So there will be more chance of sharing of private data from such website.
- c. Persistence of Data:** Due to easy reusability of data available on semantic website, the data becomes more distributed as compared to traditional websites. So it also becomes more persistent. So it may happen that even if data has been removed from the original web page it may remain available on other web pages. So this also increases the chances of sharing of private data item in such cases.

### 4. Informed Consent and Semantic Web

Informed consent (5) implies the agreement accepted by the user while signing up on a website. This concept has been taken from the field of medical practice and research. It is associated with the fundamental right of a person. As the risk of linkage of data in semantic web environment is much higher and so the chances of break of informed consent become more vulnerable in such cases. The informed consent in a semantic web environment should have following features:

- a. Disclosure:** It should disclose accurate information to the user. It should disclose both the benefit and harm which may occur to the user.
- b. Comprehensive:** The matter written in the agreement must be easy to comprehend by the user. It should also be complete in nature.
- c. Agreement:** The user must be provided clear opportunity to accept or deny the agreement. If

possible then the user must be provided to cancel the agreement after some time. However this facility is not easy to be implemented in a semantic web environment as once agreement is made between the user and the website owner then the information given by the user is shared by so many websites and become out of control from the original website. The method of agreement should be implemented in such a way that the user should be forced to read whole agreement before clicking on the “I Agree” button.

## 5. Exploring Solution in Semantic Web

The privacy and ethical issues are arising with the evolution of the semantic web. These issues will co-evolve along with the semantic web. In order to tackle with these issues the following points should be considered in a semantic web environment:

**a. Education of Developers:** The developers of semantic website should be educated from the point of the view that before making accessible any information given by the user, they should think twice about its nature. They must understand the situation and nature of information provided by the users. They must understand their responsibility before making public any data provided by the user on these websites.

**b. Education of Users:** The users must be educated from the point of view of importance of informed consent. They should be educated to read carefully the text written in the agreement before clicking on the “I Agree” button. They should also be educated about declaring their information private or public on a website.

## 6. Conclusion

The concept of semantic web has significantly raised the issue of ethics in the world of Internet. In today's world when everyone is busy in uploading personal information on web, the privacy of uploaded data has become a very sensitive issue due to easy sharing of information among websites. Now-a-days everyone is feeling secured after uploading scanned copy of his document on his account of a website. In addition to this everyone is also providing personal information such as Driving License Number, PAN Card Number, Educational Certificate Details etc. on website account. Uploading of such information are done from the point of view of backup of these information. But these information are also being shared to other websites in known or unknown way. And the implementation of semantic web technology has made this sharing more fast and accurate. So it has ultimately increased the responsibility of web developers to implement the concept of semantic web on websites in such a way that the personal information uploaded by users on a website must not be shared without their consent. The future of web from the point of view of implementation of semantic web technology is very exciting but professional and ethical issue about the user personal data must always be taken into consideration by web developers.

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