Chapter 3
Semantic Web–Linked Data and Libraries

Wasim Rahaman
https://orcid.org/0000-0003-1233-0536
Indian Institute of Management, Ahmedabad, India

ABSTRACT

The present society is considered an information society. A society where the creation, distribution, use, integration, and manipulation of digital information have become the most significant activity in all aspects. Information is producing from every sector of any society, which has resulted in an information explosion. Modern technologies are also having a huge impact. So managing this voluminous information is really a tough job. Again WWW has opened the door to connect anyone or anything within a fraction of a second. This study discussed the Semantic Web and linked data technologies and their effect and application to libraries for the handling of various types of resources.

INTRODUCTION

The modern world is the information-centric world. The central development of a society is based on how much information it has.This is no new concept. Since the ancient period, the upper-class people used to keep the information very secret to them only. But after developing new technologies, getting information is very easy job now. Presently people have become accustomed to digital information. In the beginning, digital resources are available through computers only. The WWW has opened the doors towards anything or to reach anybody with just a single click. The revolution brings new channels such as tabs, mobile apps as well as various new web technologies like; markup languages, programming languages, web servers, databases, web versions etc. are giving more opportunity to access more resources. Again, the interlinking between the similar concepts and presenting it through the AI (artificial intelligence) technique is making the web world more dynamic.

Libraries are becoming the information centres where resources are not limited inside the library only. These technologies have affected to overall housekeeping works in libraries, especially the procurement of document types has extended to electronic and digitised materials. Managing these materials is also

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becoming more challenging day by day. These technologies are the perfect solution to those challenges. MARC, ISBD, WebOPAC, Dublin Core, Union Catalogue, OAI-PMH etc. are the common technologies libraries are using for storing, managing, retrieval and disseminating the various resources to serve its users.

OBJECTIVES OF THE STUDY

The followings are the core objectives of this study to aware of

- The semantic web and linked data in brief.
- Why, when and how the web and linked data became the semantic web and linked open data.
- Components of the semantic web and linked data; its framework, standards, languages etc.
- The architecture of the web of stack of the semantic web.
- The advantages and disadvantages of the semantic web and linked data.
- The application of semantic web and linked data in the LIS field.

COVERAGE OF THE STUDY

The semantic web and linked data technology are completely a part of the WWW which belongs to the computer science and communication engineering discipline. Library professionals got a huge benefit as the traditional libraries are moving towards digital environments. This study is limited to the concept, architecture, required standards, required languages, and some related concepts, advantages & disadvantages and applications of semantic web and linked data only in the field of library & information science and library professionals to impede the lengthiness and expansion.

LITERATURE REVIEW

A lot of studies were done on the semantic web, linked data and its application in libraries. Some of them are highlighted here. Bakshi and Karger (2005) illustrated the tools built into the Haystack information management from the semantic web. Horrocks (2008) stated the process of RDF and OWL as the standard format for sharing and integration of information and knowledge. The general introduction to some ontology languages and its role in the semantic web (Antoniou et al., 2005). Bizer et al. (2009) refer to the concepts and principles of linked data and situate these within the broader context of related technological developments. Bizer et al. (2008) outlined the technical context in which linked data is situated and the development in the past years through initiatives. The possibilities of representing the most prevalent form of MARC, MARC21 as RDF for the Semantic web (Styles & Ayers, n.d.). Macgregor (2009) illustrated the application of semantic web and related technology to discover a variety of e-resources.

Gonzales (2014) stated the possible framework that will connect the library resources to the web and make them accessible to the mass readers. Halla (2013) elaborated the linked data based cataloguing as well as to overcome the drawback of MARC-based cataloguing. Baker (2012) described the issues

around the Dublin Core and to ensure that library data meet traditional standards for quality consistency and interoperable to other data sources in the linked data environment. Yadagiri and Ramesh (2013) discussed the concept of the semantic web and its related components and its benefits to library functions for providing effective library services. Hallo et al. (2014) pointed out the process to publish library metadata on the web using linked data technologies. Schilling (2011) expressed the relation and future of the library metadata and linked data.

METHODOLOGY

Descriptive methods of research have been followed here. Starting with a concept followed by the objectives and the scope of the study were demarcated. A review of the related literature has been done then. A brief discussion, need for these technologies so far with a history of these concepts, technology requirement, standards, languages, syntax, semantics etc., the advantages and disadvantages, some related concepts and the application of these technologies in the field of LIS was discussed. The conclusion was drawn based on the cases studied here.

SEMANTIC WEB

Before getting in touch with the semantic web, it is required to know well about the web. The semantic web is the extension of the web. It is a space, where any information can be shared worldwide. The English scientist Tim Berners-Lee invented this in 1990 to share information all over the world. Initially, it is written in HTML and published text information only through the internet by providing a unique locator ID for retrieval. Later it also started sharing images, videos and other file formats with various hyperlinks for connecting and go through the related information. It works via a data transfer protocol like HTTP through which data were transmitted to the end-user. As technology grows, the web has been grown to the semantic web to provide better access and reuse to the resources.The semantic web is a technology that represents information about some data which is interlinked to some related concepts in respect to the data (Bakshi & Karger, 2005).

LINKED DATA

Linked data is a method, by which some data are interlinked to each other in the web for providing a better answer to the search queries through browsers. This technology builds with the help of web technologies. In the beginning, the web provides the document search. One can retrieve the documents on the web according to the person's query. But after developing the linking technology, users can retrieve related data from the query instead of documents and with the search results, some interlinks also appeared by which users can look over some related concepts to their area of interests (Campbell, Lorna & MacNeill, 2010).