

## **Web 3.0: Possible Avenues for Future Libraries**

**Veeresh Awari**

**Krishnamurthy, C**

### **Abstract**

*The term web 3.0 is best used to explain the next era of web computing and the new information age. Web 3.0 technology allows people to create, share collaborate and communicate. Web 3.0, the semantic web relies on highly structured metadata that allow computers to understand the relationships between objects. Semantic web offers solutions to many of the issues that plague libraries. This paper describes web 3.0 technology and its applications to libraries that we can call as library 3.0. Library 3.0 refers to Libraries using technologies such as the semantic web, cloud computing, mobile devices, RDA tags and re-envisioning use of established technologies such as federated search, to facilitate user generated content and collaboration to promote and make library collections accessible.*

**Keywords :** Web 3.0, Library 3.0, semantic web, intelligent web

### **1. Introduction**

We have been experiencing applications of vibrant and dynamic technologies in Web 2.0 generation which stimulated our expectations and demanding more computing and analyzing intelligence from next generation of the Web. Since, Web 2.0 has been working with the aim to give social synchronization through groups, wikis, blogs, communities, forums and social networks. It brings individual whether a professional or general in contact with known and unknown people. In this people are sharing their thoughts, comments, feedbacks and scraps to be remained in touch with each others. Therefore, in broader sense we can say that Web 2.0 is bringing Individuals together and information scattered all over the web. Whereas it is being expected that Web 3.0 will bring information together. Application of mashup technologies will give us the virtual world of Information in which web will be strengthened with more computing and analyzing powers through artificial intelligence. In Web 3.0 all created profiles and browsing history of an individual put together, on basis of analyzing the contents, computer will come out with the result needed by that particular individual. In this sense, two individuals will get different output while searching on a same query. Web will produce the result by knowing searcher's flavor of information through analyzing his/her profiles and browsing history. Web 3.0 will work with more web semantic technologies, today hidden web or invisible web is a matter of concern and it is also being expected that it will not be there in Web 3.0.

### **2. Concept of web 1.0, 2.0, and 3.0**

The World Wide Web (WWW) is the most prominent part of the internet and largest transformable information construct that its idea was introduced by Tim Burners Lee in 1989 at first. Much progress has been made since the invention of web and related technologies in the past two decades. Web 1.0 as a web of cognition (cognition is the necessary pre-requisite to communicate and the precondition to cooperate), web 2.0 as a web of communication and web 3.0 as a web of co-operation.

Web 1.0 is the first generation of the web which according to Berners – Lee, could be considered the read-only web and also as a system of cognition. Web 1.0 began as an information place for business to broadcast their information to people. The web 1.0 provided a limited user interactions or content contributions and only allowed to search the information and read it. "The

goal of early website was to establish an online presence and make their information available to any one at anytime”.

Web 2.0 was defined by Dale Dougherty in 2004 as a read and write web. A key element of this technology is that it allows people to create, share, collaborate and communicate. Web 2.0 allows assembling and managing large global crowds with common interests in social interactions. Web 2.0 applications include wikis, blogs, social networking, folksonomies, podcasting, & content hosting services.

Web 3.0 and semantic web are terms used synonymously to describe various evolutions of web usage and interaction along several paths. These include transforming web into a largest database, a move towards making content accessible by multiple non-browser applications, the leveraging of artificial intelligence technologies. Web 3.0 is a web where the concept of website or webpage disappears, where data is not owned but instead shared, where services show different views for the same web/the same data.

| Sl no | Web 1.0   | Web 2.0   | Web 3.0   |
|-------|---|---|---|
| 1.    | Static one way publishing no real interaction between readers or publishers | Two way communication through social networking blogging, wikis, tagging user generated content | Artificial intelligence and the web learning what you want and developing you a personalized web experience (consolidating dynamic content) |
| 2.    | Information Sharing   | Interaction   | Immersion   |
| 3.    | Connect information   | Connect people  | Connect knowledge   |
| 4.    | Reading   | Reading /writing  | Portable personal web   |
| 5.    | Focused on companies  | Focused on communities  | Focused on the individual   |
| 6.    | The web   | The social web  | The semantic web  |
| 7.    | Content management system   | Wikis wikipedia   | Semantic wikis, semantic media wiki, dbpedia, Rhizome   |

### 3. WEB 3.0 TOOLS

- **Unicode and URI:** Unicode is used to represent of any character uniquely whatever this character was written by any language and URI's (Uniform Resource Identifier's) are unique identifiers for resources of all types.
- **Resource Description Format (RDF):** RDF is a simple data model that uses URI's to identify web based resources and describes relationships between the resources in terms of named properties and values. Generally, the RDF family supports interoperability at the semantic level. RDF developments consist of the base web language so that agents are able to make logical inferences to perform functions based on metadata.
- **XML:** Extensible Markup Language: XML is used as the format for transferring data between the server and client and used as a base syntax for other technologies developed for the upper layers of the semantic web.
- **Ontology:** Ontology is a formal representation of knowledge as a set of concepts within a domain, and the relationship between those concepts. Ontology can be defined as a collection of terms used to describe a specific domain with the ability of inference. Ontology gives richer semantic relationships between terms and thoughts of knowledge and which

ensures more standardization in managing the web contents instead of merely indexing terms.

- **RDF Scheme:** RDF Scheme provides a predefined, basic type system for RDF models. It describes classes and properties of the resources in the basic RDF model. RDF schema provides a simple reasoning frame work to infer types of resources.
- **SPARQL:** A recent development for web 3.0 to make easier queries and searches within RDF. SPARQL is designed for use at the scale of the web, and thus enables queries over distributed data sources, independent of format.
- **Application Programming Interface (API):** API is a source code interface providing by an operating system, library or service to support requests made by computer programs. API is a software communication interface, which is a set of functions and procedures that allow different software to communicate with each other. This way software can be used to generate different applications, exploiting its functions without having to reprogram everything again.
- **Mashups:** Mashup is a hybrid of blogs, wikis, streaming media, content aggregators, instant messaging and social networks. Mashup in library environment remembers a user when they log in and it allows users to edit OPAC data and metadata saves the user's tags, IM conversations with librarians, wiki entries with other users. Where the users will be able to make all or part of their profile public; users can see what other users have similar items checked out, borrow and lend tags, and a giant user-driven catalogue is created and mashed with the traditional catalogue.
- **AJAX:** Asynchronous Javascript and XML is a combination of XML and Javascript that allows for the creation of dynamic web applications that are executed on the client, thus reducing data traffic and other server's work load.

#### 4. Applications of web 3.0 technology to libraries (Library 3.0)

- 4.1. **Federated search:** federated searching is also known as meta searching, broadcast searching, cross searching and a variety of other names, is the ability to search multiple information resources from a single interface and return an integrated set of results. Federated searching allows users to search simultaneously multiple web resources and subscription based bibliographic databases from a single interface. To achieve that, and retrieve results from each separate source. The return results are then grouped together and presented to the user in a unified way.
- 4.2. **Cloud computing:** Cloud computing is internet based computing whereby shared resources, software, and information are provided to computers and other devices on demand like electricity grid. The advantage of cloud computing for libraries is the possible reduction in the cost of computing and the ease of connectivity between library services encouraging greater collaboration as well as unlimited storage capacity. The move to cloud computing relies on improved internet speed and connectivity.
- 4.3. **Semantic Web:** Semantic web will provide us with the option to share, unite, search and organize the web information in easy manner. Sharing and organizing information available in every corner of the web, which is the main aim of this generation and expected to be achieved with the help of semantic web technologies.
- 4.4. **OPAC:** In library 3.0, Web OPACs of various libraries which are forming a part of visible or invisible web would be brought together. Metadata of contents (contents in any

format) would seamlessly accessible and searchable from single user friendly interface, just the way a 'Portal' provides one stop shop for various contents in present generation.

- 4.5. **Ontologies:** These are the techniques to give richer semantic relationships between terms and thoughts of knowledge. These give more standardization in managing the web contents instead of merely indexing the terms. Ontology aims at how the information is organized rather than organizing the information. Librarians can adopt various ontological techniques to define the web contents in more professional as well as personal manner.
- 4.6. **Ubiquitous contents or User Generated Content (UGC):** The ubiquitous computing offers various contents which can be used or re-used frequently and will also not get absolute in near future. The contents of this generation need to be created in various formats and can also be easily shared, transferred and accessible through all modes of communication. Ubiquitous contents are the personal contents of the people persistently stored on the web in form of movies, blog posts, RSS feeds, wikis, stories, articles, music, games, etc. These are always there on the web and accessible from everywhere over the Internet through all mobile and Internet accessible devices.
- 4.7. **GeoTagging:** This helps users to find specific information located at specific location. It is simply a marking of various media or digital contents like images, photographs, video, websites or RSS feed etc. Most of the cell phones and mobile devices have GPS (Global Positioning System) facilities, which allowing users to add metadata exactly where the data or image or video was created. So tagging helps users to mark their information in which they are interested for.
- 4.8. **Virtual Reference Service:** Since technology is developing very fast in all domains, librarians are more determined to serve the users who are away from the libraries. In virtual reference service, apart from helping the users in personal or telephonic way, librarians are now developing the contents which can easily be transferable and readable in cell phones and other mobile devices to help the users at any point of time.

## 5. Small steps towards Web 4.0

Web 4.0 is also known as "symbiotic web". It is still an underground idea in progress and we can't define it exactly how it would be. The dream behind of the symbiotic web is interaction between humans and machines in symbiosis.

Using web 4.0 it will be possible to build more powerful interfaces such as more controlled interfaces, machines would be clever on reading the contents of the web, and react in the form of executing and deciding what to execute first to lead the websites fast with superior quality and performances and build more commanding interfaces (Hemanth, 2010). Web 4.0 will be the read-write-execution-concurrency web. It achieves a critical mass of participation in online networks that deliver global transparency, governance, distribution, participation, collaboration into key communities such as industry, political, social and other communities (Morcus, cake 2008).

## 6. Conclusion

We are in the unorganized set of web contents these days but in library 3.0 to establish these unorganized web contents into a systematic and organized way. The most important sphere of library 3.0 is to establish a semantic relationship between all available web contents to ensure

seamless accessibility, search-ability, availability and usability. Librarians need to be more inclined towards the use of latest tools and technology to create virtual library system. But basic aim remains the same i.e. 'right information to the right user at the right time'.

All together, the use of these web 3.0 technologies and applications along with others not yet invented (web 3.0 and 4.0), will constitute a meaningful and substantive change in the history of libraries. The Library's collection will change, becoming more interactive, and fully accessible. The library's services will change focusing more on the facilitation of information transfer and information library rather than providing controlled access to it. Web 3.0 is still in its infancy stage, it is difficult to know just how it will affect libraries at this time. In some cases it might require librarians to be able to process and disseminate information in real time as well.

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| Author's Profile        |  |
|-------------------------|--|
| <b>Veeresh Awari</b>    | Assistant Librarian (Gst)<br>Karnatak University, Dharwad<br>veereshalis@gmail.com |
| <b>Krishnamurthy, C</b> | Assistant Professor<br>DLIS, Karnatak University, Dharwad<br>jrkrishna@gmail.com   |