

APPLICATION OF WEB 2.0 AND WEB 3.0: AN OVERVIEW

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ABSTRACT

The paper summarizes an overview of the application of Web 2.0 and Web 3.0. It discusses the evolution of different phases of Web 2.0 and Web 3.0 in particular. Various tools, features, pros and cons of Web 2.0 are elaborated. Particularly, technologies of Web 3.0 like its need, fundamentals, structure, objectives, components, advantages are mentioned. Web 1.0 sites are driven and the user has no way to increase their involvement or interact with the interface. Web 2.0 sites allow for user interaction and participation by having a user-friendly interface where one can edit and publish the existing information. The term Web 3.0 describes sites where computers will be generating raw data on their own. A comparative study of the each stage of Web is done.

Keywords: Web 2.0, Web 3.0, Evolution, Technologies

1. INTRODUCTION

We Ever since the invention of Web by Tim-Berners Lee in the year 1989, it has rapidly expanded and evolved indifferent phases, namely, Web 1.0, Web 2.0 and Web 3.0. The transition from Web 1.0 to Web 2.0 was a significant phase in terms of information because Web 1.0 is all about one-way information, while Web 2.0 is a two-way model. The advent of various networking sites, such as Blogger, Twitter and Facebook, during the phase of Web 2.0, has revolutionized the way in which the information can be shared and collaborated among multiple users. The next generation Web, known as Web 3.0, is the combination of the features of both the phases and contains a few more features. This article discusses the evolution of different phases of Web, in general, and Web 2.0 and Web 3.0 and its technologies, in particular.

WWW was invented by Tim Benrers-Lee in the year 1989. It was created as an interface for the Internet. The main idea behind its creation was to allow users share information among themselves. He named it as 'Semantic Web'. Web 1.0 was a phase in which the Internet could be used only as a source of information, with no place for contribution or modification of the available information. In other words, Web 1.0 was like a traditional library. It has been metaphorically described as "Read Only Internet". Its main focus was on building the Web for making it easily accessible to users. Its key areas were centered on protocols like Hyper Text Transfer Protocol (HTTP), Open Standard Markup language like Hyper Text Markup Language (HTML) and Xtensible Markup Language (XML). The first generation Web browsers – called as Internet Service Providers (ISPs) – were used for accessing the Internet.

2 EVOLUTION OF WEB 1.0, 2.0 AND 3.0

Web 1.0 was all about having a website. In the beginning, only dial up connections were available and bimodal communication was difficult. The early adopters of this were the software publishers who wished to test their multi-channel business strategies by launching online stores and meeting the tomerdirectly for the first time. During this phase, service provider models emerged and the computing industry started moving from client service software to Software-as-a-Service (SaaS) models. Gradually, Web 2.0, which has revolutionized the very nature of the Internet, emerged. Web 2.0 is supported by broadband super-speed connections and as a result, bimodal communication has become easy. With Web 2.0, the Internet has acquired a new face. It is being considered a destination for making online purchases and even sales. It has become a meeting point for people by forming online communities through social networking sites. Through these communities and sites, it is possible to share information, get connected to the old acquaintances and make new friends. Apart from this, one can watch videos, play online games, etc. It is beneficial, especially to marketers who are into viral marketing.

Industry experts opine that Web 3.0 can be even more significant when compared to Web 2.0 because of its potential to bring about a change and create opportunities for the software industry. Through Web 3.0 is in the initial phase, still it is able to revolutionize the way in which users experience the Internet. As earlier said, with Web 3.0, the users can access the Web on different devices, such as mobile phone, television, etc. The speed at which Web 2.0 transforms itself to Web 3.0 depends largely on the capacity of Web infrastructure. The high-speed broadband, which supported the Web 2.0 browsers, are not suitable for Web 3.0 and this is because Web 3.0 requires multiplex broadband networks.

Web 1.0 is retronym for the state of World Wide Web (WWW) wherein web pages were not interactive, but static and non-interactive. It was just sending an e-mail and replying. The evolution happened post 2003 – the Era of Web 2.0.

3 WEB 2.0

The transition of Web1.0 to Web 2.0 is experienced due to rapid speed of the information technology. Web 2.0 is the interactive version of web-based communities and social networking websites like Facebook, Orkut, LinkedIn, etc. It also included video sharing, wikis, blogs, mashups, etc. The second generation of web is commonly referred as Web 2.0. The term ‘Web2.0’ is commonly associated with web applications that facilitate interactive information sharing, interoperability, user-centered design, and collaboration on the World Wide Web. (http://en.wikipedia.org/wiki/Web_2.0) Examples of Web 2.0 include web-based communities, hosted services, web applications, social networking sites, video sharing sites, wikis, blogs, mashups, and folksonomies.

In Web 2.0, the user can, not only receive information, but also contribute and modify the available content. It is also referred to as ‘Read-Write Internet’. Web 2.0 is a term coined by Dale Dougherty, Vice-President of O’Reilly Media, in 2003. It refers to second generation of Internet-based services, such as social networking sites, wikis, communication tools and folksonomies, which emphasize on online collaboration and sharing of information among users. It also marked the emergence of ‘Mobile Internet’, i.e., accessing the Internet through mobile devices, which contributed heavily to the adoption and growth of the Web.

3.1 Tools of web 2.0

There are many communities where people interact, share knowledge and learn. The important and most popular communities are:

3.1.1 Social Networks

Social networks sites (SNS) are web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and

nomenclature of these connections may vary from site to site. (<http://jcmc.indiana.edu/vol13/issue1/boyd.ellison.html>)

3.1.1.1 Facebook and Orkut

These are general social networking website where people just interact with friends, relatives, teachers and mentors too. There are many such SNS available.

3.1.1.2 LinkedIn, Apna Circle, Eacademy, etc.

These are professional SNS, especially for business and professional purposes.

3.1.1.3 Twitter

The most popular websites, most of the celebrities and business leaders tweet on this. This is micro blogging and short update website.

3.1.2 Blogs

Generally, blog is type of website maintained by an individual, wherein an individual can share thoughts, photos and videos about events and some cases where other people can comment on it. It is also a shared online journal where people share their personal knowledge and experience on various issues. Almost all the blogs have comment feature-enabled. There are many websites like, eblogger, blogger and google blog, etc.

3.1.3 Micro Blogging

These are SNS wherein the user can write short thoughts about 140 words and other people can follow the blogs. Twitter is most popular micro blogging SNS. It got immense popularity due to events like 26/11 terrorist stack on Mumbai.

3.1.4 RSS and Aggregators

RSS means – Really Simple Syndication. It is a family of web feed formats used to publish frequently updated works – such as blog entries, news headlines, audio, and video – in a standardized format. With this small RSS, the person can have updated real-time information. (<http://en.wikipedia.org/wiki/RSS>)

3.1.5 Video Sharing

YouTube is again the most popular website wherein people can share video, download videos and comment on them. People share knowledge and experience via YouTube.

3.1.6 Photo Sharing

Flickr is a website that is popular for photo sharing service and also to comment on photos.

3.1.7 Wiki

Wiki is a website that allows the easy creation and editing of any number of interlinked web pages via a web browser using a simplified markup language. They are typically powered by wiki software and are often used to create collaborative websites, to power community websites, for personal note taking, in corporate intranets, and in knowledge management systems. (<http://en.wikipedia.org/wiki/Wiki>) Wiki can used as a dictionary, knowledge bank, etc.

3.1.8 Podcast

Podcasts are digital media files which may be audio or video that can be downloaded through web by I-pod and I-pod like devices using Internet service. There are websites available like podcasting- tools.com which provide podcasting services.

3.1.9 Bookmarks

New web browsers have bookmarks options wherein users can bookmark their favorite websites so that it will be easy for them to access when necessary.

3.2 Features of web 2.0

- Users can modify the available content.
- Using Web pages to link different users.
- Content can be shared more efficiently.
- Information can be obtained by subscribing to a Web pages's RSS. Apart from this, the subscriber can receive updates on any development in the Web page as long as there is access to the Internet.
- It allows one to access Internet through not only the computer but also mobiles, television, etc.

3.3 Pros and Cons of Web 2.0

Web 2.0 is highly interactive and lot of Gen X and Y are getting well-versed with it. Using Web 2.0 has many advantages as well as many disadvantages.

3.3.1 Some Pros

- It helps in faster and interactive communication.
- Thousands of Gen Y are getting attracted towards SNS as it is the need of the hour to stay fresh in corporate interaction.
- Individual's identity and credibility can be checked on SNS.
- Employers are getting potential talent from SNS with very small investment.
- Individuals can create their own brand via social networking.
- Sharing of information is very easy due to Web 2.0
- Social networking sites are a type of stress busters wherein individuals can interact with his/her friends, classmates and peers and get relaxed.
- Sharing photos, videos and heavy files has become easy due to social networking.
- Social networking sites have become marketing tool for small businesses.

3.3.2 Some Cons

- Safety of the data on web is the biggest problem as hackers are breaking into legitimate accounts on social networking sites.
- Credibility of information on the websites is still questionable.
- Web 2.0 is one of waste of time as it is distracting employees and killing productivity.
- Employees may post confidential data of the company on the websites and can put unwanted comment about the company.
- Privacy of individual's data is questionable.
- SNS sometimes can be a nuisance as unwanted people keep sending messages, try to add to network or try to chat.

4 ORIGIN AND DEFINITION OF WEB 3.0

Web 3.0 refers to a supposed third generation of Internet-based services that collectively comprise what might be called ‘intelligent Web’, such as those using semantic Web, microformats, natural language search, data-mining, machine learning, recommendation agents and artificial intelligence technologies. As per the Wikipedia, an online encyclopedia, “Web 3.0 is a third generation of Internet-based Web services, which emphasize machine-facilitated understanding of information in order to provide a more productive and intuitive user experience.”

Nova Spivack, CEO of Radar Networks, one of the leading voices of the new age Internet, defines Web 3.0 as the third decade of the Web (2010-2020) during which there would be several major complementary technology trends which will each reach a new level of maturity simultaneously. In other words, it can be explained as third-generation of the Web which is enabled by a combination of various emerging technologies like:

- Transformation of the Web from a network of separate applications and content repositories to a seamless and interoperable one.
- Ubiquitous connectivity, adoption of broadband networks and access to Internet through mobile devices.
- Network computing, SaaS business models, interoperability of Web services, distributed computing, grid computing and cloud computing.
- Open technologies, open APIs and protocols, open data formats, open-source software platforms and open data.
- Open identity, open reputation, roaming portable identity and personal data.
- The intelligent Web, semantic Web technologies, such as Resource Description Framework (RDF), Web Ontology Language (OWL), Semantic Web Rule Language (SWRL), SPARQL-SPARQL Protocol and RDF Query Language, Gleaning Resource Descriptions from Dialects of Languages (GRDDL), semantic application platforms and statement-based datastores.
- Distributed databases, the ‘World Wide Database’, and
- Intelligent applications, natural language processing, machine learning, machine reasoning, and autonomous agents.

4.1 Need for web 3.0

When we browse the Web for some information, it first displays links of some websites, which may or may not be apt for us. One has to try using various combinations of keywords to get the relevant information. The Web only scans for the keywords specified by the user. Therefore, it is very important to have a platform that reduces the time spent in searching the solutions and help us to arrive at a better solution. In Web 2.0, the answers are displayed in all the contexts, except the actual one which the user is searching. This difficulty can be overcome in Web 3.0 as it helps the user to arrive at the answer which he wants.

Web 3.0 is an answer to the problems mentioned above. The whole process of search is expected to change once Web 3.0 is brought in to the picture. This can help in the speedy gathering of information from the Internet. With its help, the system can be better equipped to provide the required information to the users by searching, organizing and presenting only the relevant information. The era of Web 3.0 can be said an ‘age of artificial intelligence’.

4.2 Fundamentals of web 3.0

Some experts say that Web 3.0 is like a personal assistant which has information about practically everything. This is the reason that it is also called a ‘giant database’. In Web 2.0, the Internet has been used as a means for providing connection between people while in Web 3.0, it is used to make connections with information. This can be better explained with the following example. If one wishes to go on a vacation with an estimated budget

of \$3,000, by using the current Web technologies, one has to browse through some sites to get the required information about the expenses to be incurred on travel package, place of stay, sightseeing, etc. By browsing various sites, one can compare the rates offered by different travel agents. This is certainly a cumbersome and time-consuming process.

However, with Web 3.0, one can reduce time that is spent on browsing different sites as the Internet would do all the work, even when the search parameters are narrowly specified. The Web browser will gather, analyze and present the information in a way that will make the comparison easier. This happens as Web 3.0 can understand the information available on the Web. A Web 3.0 search engine not only looks for the keywords specified, but also interprets the context in which they are presented. It can provide relevant results along with some suggestions for searching more data.

Web 3.0 is also called the 'Internet of Services'. Besides the human readable part of the Web, there will be machine accessible services which can be combined/orchestrated to higher level of services.

4.3 Structure of web 3.0

Web 3.0 has a totally different structure when compare to the earlier versions of the Web. The basic structure is characterized by semiotics and semantics. Semantics refers to the study of meaning in communication, whereas, semiotics is the study of sign processes (semiosis), or signification and communication, signs and symbols, both individually and grouped into sign systems. It includes the study of how a meaning is constructed and understood. "Semantics can be very useful to the user as it helps him in arriving at the right answer for his query.

4.4 Objectives of web 3.0

The following are the basic objectives of Web 3.0:

- To provide a ubiquitous Web which facilitates accessibility of the net to anywhere and anytime with the available device.
- To break the barriers, such as bandwidth constraints, poor display on mobile devices, and reducing the cost of the devices which are involved with it.

4.5 Components of web 3.0

Web 3.0 comprises two main platforms: Semantic technologies and social computing environment. Web 3.0 adopts the semantic technologies and open standards which can be applied to the current Web. The main focus of social computing environment is on human-machine synergy which is required in organizing a large number of social Web communities.

4.6 Advantages of web 3.0

4.6.1 Improves Data Management

Management of data in websites is a complex process, as combining data from various structures requires knowledge of many applications and, in some cases, the computer may or may not be able to understand some data. In such cases, it becomes very difficult to link data for obtaining the required input. This problem can be resolved to some extent with the adoption of semantic Web because it first describes the relationship between different sets of data which makes it easier for the computer to understand the relationship and integrates them easily for obtaining the desired output.

4.6.2 Web 3.0 supports accessibility of Mobile Internet

Globally, the number of subscribers for mobile devices was likely to touch four billion by the end of 2008. The global mobile penetration rate was expected to touch 50% during the same period. However, with the advent of

3G technologies, which facilitates easy access of Internet in the mobile devices, this figure is likely to touch the rate of 60%. Hence, the demand is likely to be increased for Web 3.0 because of its superior quality. It is expected to play a very important role in enhancing the accessibility of the Internet through mobile devices. Web 3.0 is based on Cascading Style Sheet (CSS) Standard, which helps in reducing the size of the page to less than 20kb.

4.6.3 Web 3.0 Stimulates Creativity and Innovation

The main point in Web 3.0 is the flexibility of linking different databases. The information and knowledge datasets can be utilized equally by the systems, as well as human beings, thereby enhancing their efficiency. This encourages innovation processes which, in turn, help in the generation of ideas and also in R&D to create a new model.

4.6.4 Web 3.0 Encourages Factor of Globalization Phenomena

Web 3.0 aims at building and standardizing various data structures through a common programming language known as Resource Description Framework (RDF). This is the standard model for exchanging data on the Web. RDF is written in XML, which facilitates easy exchange of information among different systems. This breaks the barriers bandwidth, poor display of Web on mobile devices, etc.

4.6.5 Web 3.0 Enhances Customers' Satisfaction

With the help of 'Artificial Intelligence', Web 3.0 helps the organization to improve the level of their customers' satisfaction in terms of Customer Relationship Management (CRM). Through this, customers can have access to entire information about the product that is being offered by the company on its Web page. This improves the company's image in the market and as a result, more customers can be attracted.

4.6.6 Web 3.0 Helps to Organize Collaboration in Social Web

Nowadays, most people have registered themselves with the various social networking sites. Many Weblogs have emerged as a part of these sites. By Web 3.0, the information available can be linked through RDF. This process helps in creating a list of conversations across blogs and mailing lists.

With Web 3.0, the users can experience a totally novel form of Internet because it can be accessed on different devices. It also offers a rich application tier with more logic.

4.7 Web 3.0 Technologies

In today's Internet dominated world, every business organization has recognized the need for having an effective Web 3.0 site. In the present always-on world, a company's website plays a very critical role in competing with others and in attaining success. The following are some of the technologies employed in Web 3.0:

- Artificial Intelligence.
- Automated reasoning.
- Cognitive architecture.
- Composite applications.
- Distributed computing.
- Knowledge representation.
- Ontology (computer service).
- Recombinant text.
- Scalable vector graphics.
- Semantic Web.
- Semantic wiki, and
- Software agent.

Some of the examples of Web 3.0 sites are iGoogle, Net Vibes, Dig, Flickr, Delicious.

5 CONCLUSION

Ever since the invention of Web in 1989 by Tim Berners-Lee it continued to develop and Web 3.0 is another step in this process. Web 2.0 is very helpful for employees in organizations to learn, interact and communication fast. The tools of Web 2.0 allow people to chat online, share thoughts using blogs and also to share videos. The main purpose of Web 3.0 is to extend the ability of application to maximize the benefits obtained from resources available from WWW community with the help of linked data, devices and people across the Web. In a Web 3.0 world, the Internet will be totally different to the users as the content and applications can easily accessed at their, thus breaking away from the traditional format.

| | Web 1.0 | Web 2.0 | Web 3.0 |
|---------------|--------------------|--------------------|---------------------|
| Communication | Broadcast | Interactive | Engaged / Invested |
| Information | Static / Read-only | Dynamic | Portable & Personal |
| Focus | Organization | Community | Individual |
| Personal | Home Pages | Blogs / Wikis | Lifestreams |
| Content | Ownership | Sharing | Curation |
| Interaction | Web Forms | Web Applications | Smart Applications |
| Search | Directories | Keywords / Tags | Context / Relevance |
| Metrics | Page Views | Cost Per Click | User Engagement |
| Advertising | Banners | Interactive | Behavioral |
| Research | Britannica Online | Wikipedia | The Semantic Web |
| Technologies | HTML / FTP | Flash / Java / XML | RDF / RDFS / OWL |

Figure 2: Comparison between web 1.0, 2.0 and 3.0

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