

## Web 2.0 Toolbar: Providing Web 2.0 Services for Existence Web Pages

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### Abstract

Since the term “Web 2.0” appears, a new generation of Web is coming. There are many technical articles referring to how to design a Web 2.0 website. However, the traditional Web 1.0 websites are still multitudinous currently. The developers of the traditional Web 1.0 website may not have adequate techniques to reconstruct the websites into Web 2.0 timely. Rebuilding a website often takes tremendous efforts. A simple and effective strategy to upgrade the websites is essential. The paper attempts to provide a flexible framework, Web 2.0 Toolbar, to upgrade websites from Web 1.0 to Web 2.0. The Web 2.0 Toolbar combines the original Web 1.0 web page and additional Web 2.0 information together on the fly. Therefore, the website developers need not to rewrite their websites, and the users will be able to experience additional Web 2.0 functions. In the paper, we have implemented tag, and comment functionalities of Web 2.0.

*Key-Words:* Web 2.0, Toolbar, web page

### 1. Introduction

The term “Web 2.0” has been discussed a lot in recent years [1]. About the term “Web 2.0”, it is not a technical noun but more suitable to be a collective concept describing the technical features and social behaviors of some of the famous Web 2.0 websites. It begins to be hot in the opening talk of the first Web 2.0 conference. Tim O’Reilly and John Battelle summarized what they thought as the themes of Web 2.0. They both agreed that the Web had become a platform, with software above the level of a single device, leveraging the power of the “Long Tail” [2], and with data as a driving force.

There has been a dramatic proliferation of research concerned with Web 2.0. For examples, how to combine the powerful Web 2.0 and multimedia [3] as well as the relationship of the development between Web 2.0 and semantic web [4] are the most popular subjects. Although Web 2.0 has many positive effects, it also brings new problems. The gallop development of Web design supports more powerful functions and resplendent interactions. However, the changes in paradigm bring new challenges to people with disabilities. A discussion of how to build an accessible web [5], [6], [7] also becomes an important subject. These subjects are tip of the iceberg, beside there is a mass of subjects about Web 2.0. “Web 2.0” has numerous definitions, but one of them obtains the identification from most people. That is, the information sharing and the content of website can be changed by every user’s participation.

One of the most famous examples is WIKIPEDIA [8], which is a free, open and on-line encyclopedia. Every user can edit the content of the on-line encyclopedia. Another famous Web 2.0 website is del.icio.us [9]. It is a bookmark sharing website. Every user can make bookmarkers for articles and share their bookmarkers to other users. Web 2.0 websites often provide functionalities permitting users to share their knowledge on it.

Unfortunately, most researches put attentions on how to take advantage of technique for building a powerful Web 2.0 website. The paper focuses on how to provide a simple method allowing the Web 1.0 websites to achieve the functionality of information sharing. The method must be easy enough to allow the Web 1.0 website developers to handle it lightly. In addition, the interface of the functionality should be very friendly, and it must combine to the original web page closely.

In general, there are three approaches to construct a Web 2.0 website. One is to build a new Web 2.0 website from the scratch. Another one is to rewrite the

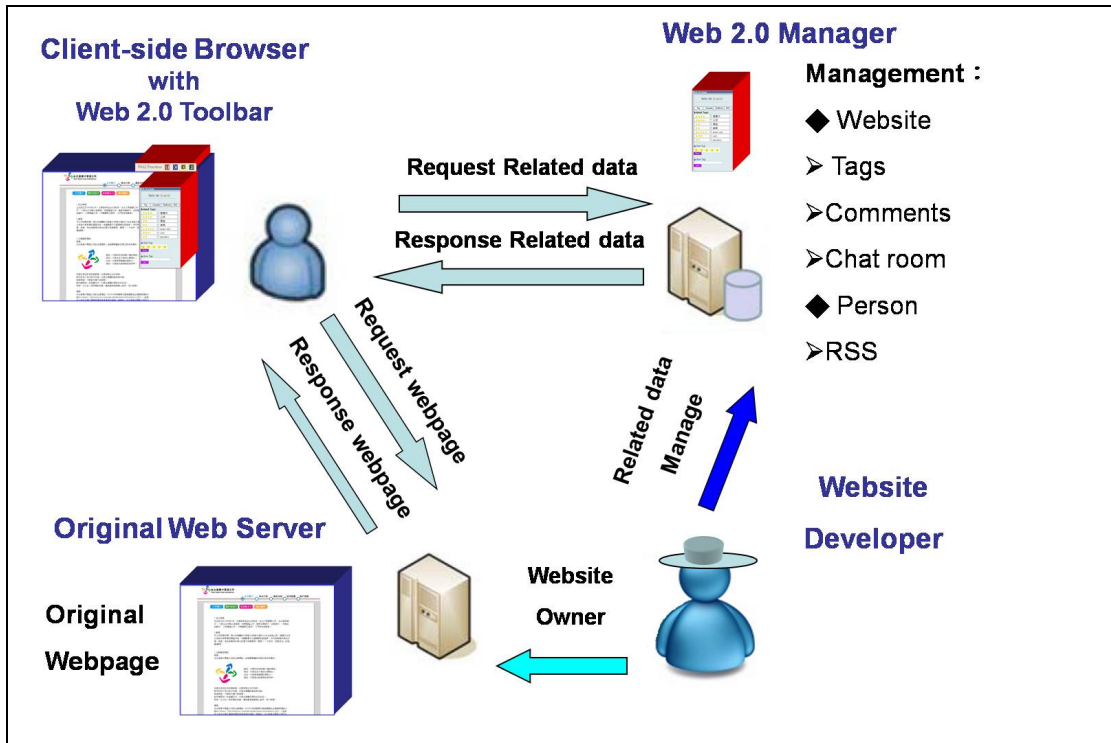


Figure 1. Overall Architecture of Web 2.0 Toolbar

page of Web 1.0 website. The third one is to enhance a traditional Web 1.0 website into Web 2.0 website. Both the first two ways often takes a lot of time and needs some new skills about Web 2.0. In the paper, we focus on the third method. Until now, there is no effective method to achieve the goal. Hence, the paper proposes an easy way to upgrade those Web 1.0 websites without rebuilding them. The only thing they have to do is to ask their users to use the Web2.0 proxy in their browsers. The method not only supports a very simple way but also satisfies the needs of both web developers and users.

In the following sections of the paper, we first elaborate the design of the overall Web 2.0 toolbar framework. In section 2, detailed descriptions of the system components are illustrated. In Section 3, the system results of a simple example are provided. Finally, the paper concludes in Section 4.

## 2. Toolbar Framework for Web 2.0

We describe the overall architecture, components, and sequence diagram of the system we proposed in this chapter. We introduce the overall system architecture as followings.

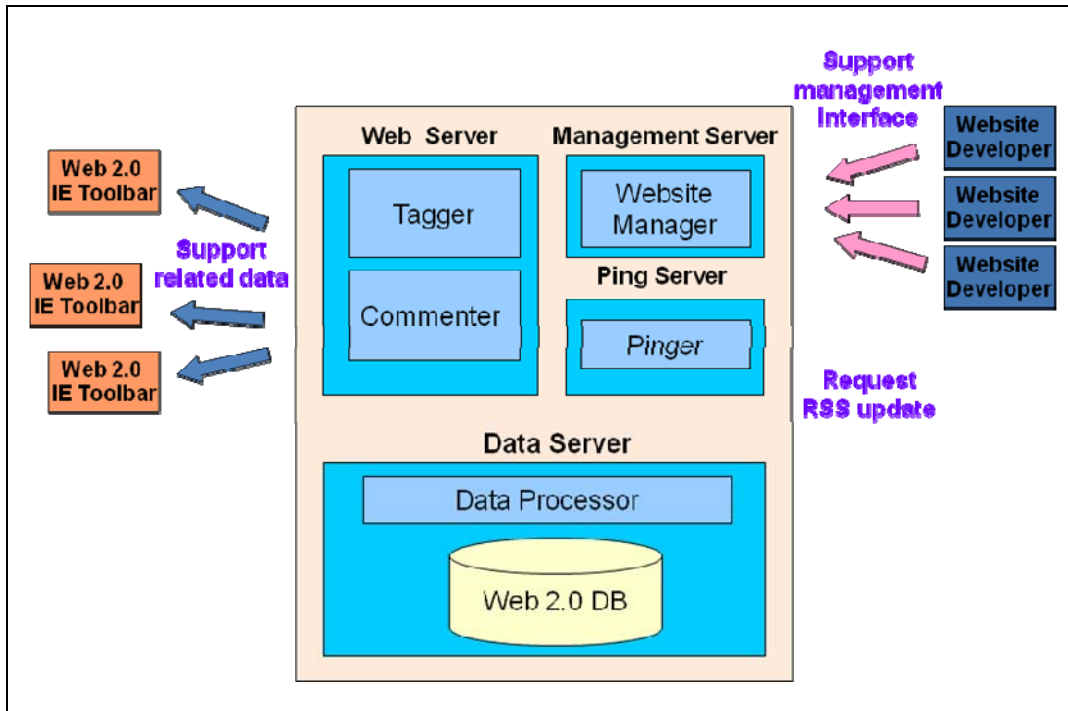
### 2.1. System Architecture

In regular HTTP transactions, the Client-side Browser sends a HTTP request to the Original Web Server, and the Original Web Server sends a HTTP response back to the Client-side Browser. After that, the Client-side Browser will receive the original web page content. Base on the architecture of the traditional HTTP transaction, we append another two components: Web 2.0 Toolbar and Web 2.0 Manager to form the new architecture.

Fig.1 illustrates the new architecture we proposed with the communications between each component. In the aspect of the user, when the Client-side Browser sends a HTTP request to the Original Web Server, Web 2.0 Toolbar can obtain the URL of this HTTP request and acquire the information which is related to the original web page from Web 2.0 Manager.

By this way, the Client-side Browser not only receives the original web page from the Original Web Server but also gets the information related to this web page. Hence, the users will see a new appearance of the web page which includes original contents and additional Web 2.0 functions (which indicates tags, and comments).

In the aspect of the Website Developer, the Original Website and additional functions seem be built together but can be managed separately. The Website



**Figure 2.** Subcomponents of Web 2.0 Manager

Developer logs in to Web 2.0 Manager and take over the information (tags and comments) related to their website. Web 2.0 Manager supports Web 2.0 information management to create, update, and delete tags/comments.

## 2.2. System Components

The Proxy framework has two main components: Web 2.0 Toolbar (W2T) and Web 2.0 Manager. The descriptions of them are as followings.

### 2.2.1. Web 2.0 Toolbar

The relationship of the Client-side Browser and the Original Web Server is a client/server model. The architecture of Web 2.0 Toolbar and Web 2.0 Manager is similar. Web 2.0 Toolbar not only plays the role of a client but also acts as a coordinator between the Client-side Browser and Web 2.0 Manager.

There are three major works which Web 2.0 Toolbar deals with. First, it extracts the URL of the web page which the Client-side Browser is handling currently. Second, it communicates to the Web 2.0 Manager. The Web 2.0 Toolbar sends the HTTP request with extracted URL as parameter to the Web 2.0 Manager and takes the relevant information back. Third, Web 2.0 Toolbar integrates the original web

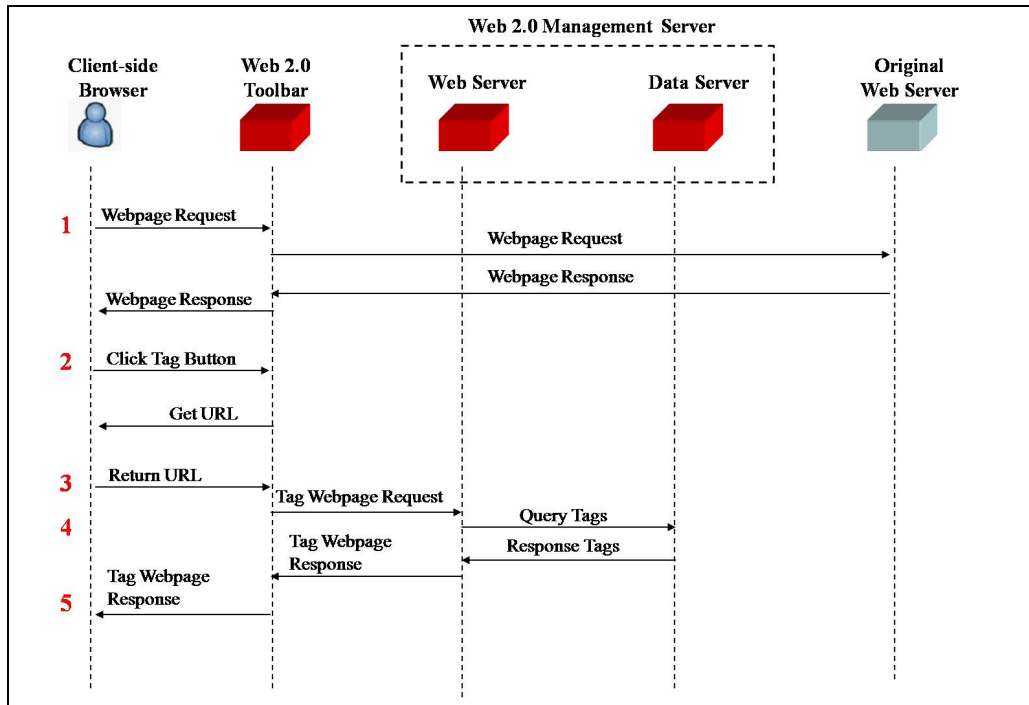
page and the additional relevant information together. Accurately speaking, Web 2.0 Toolbar appends the additional data to the original HTML page.

### 2.2.2. Web 2.0 Manager

Web 2.0 Manager contains four subcomponents: Web 2.0 Server, Data Server, Management Server, and Ping Server. All of them are illustrated in Fig.2.

Data Server contains two parts, Web 2.0 DB and Data Processor. Web 2.0 DB is a database to store all entries of the web pages and other relevant information. It supports all data which the system needs. Data Processor has the knowledge of both the object representation and the database schema. It supports an interface to access Web 2.0 DB for the other three subcomponents. Data Processor and Web 2.0 DB have keen sense of responsibility to manage all data. Web 2.0 Server is a HTTP web server. It consists of four parts, Tagger, and Commenter. We will introduce them one by one as followings.

Tagger supplies three functions which are creating, rating tags for each web page and viewing these tags as well as the rates of each web page. Tagger processes the tag-related data by Data Processor and delivers it to Web 2.0 Toolbar. The operation of Commenter is quite similar as Tagger. However, the different between the Data Processor and the Commenter that Commenter processes comments, not tags.



**Figure 3.** HTTP transaction sequence diagram of the Web 2.0 Toolbar operation process

Once an updating event happens, the Ping Server will modify the related data in Web 2.0 DB through Data Processor. Management Server supports the Website Developers who have already registered to the Web 2.0 Manager to manage all kinds of data stored in Web 2.0 DB. Website Developers can create/update/delete the tags and comments related to their web page.

### 2.32. System Flow

Fig.3 illustrates the sequential flow of the Web 2.0 Toolbar operation process. The scenario contains five steps, and we explain them as followings:

**Step1:** A user types a web page URL on the Client-side Browser, and the Client-side Browser sends a HTTP request to the Original Web Server and gets the Web page response content.

**Step2:** the user clicks the tag button to acquire tag service (comment).

**Step3:** Web 2.0 Toolbar sends a request to query the URL of the current web page and obtains the response value.

**Step4:** Web 2.0 Toolbar sends the HTTP request of the tag web page to Web 2.0 Server. Then Web 2.0 Server queries the related tag information from Data Server, and responses the Tag Webpage to Web 2.0 Toolbar.

**Step5:** Web 2.0 Toolbar appends the Tag Webpage content into the current web page of Client-side Browser.

Other functions for Comment Webpage is similar to this flow. The difference between them is that they return the corresponding web content rather than tag information.

### 3. System Results

Before using Web 2.0 Toolbar, users should download the toolbar in their computer and install it. Currently, we implement the toolbar as an IE plug-in. After the installation, Web 2.0 Toolbar can serve these users. Fig.4 shows original Web 1.0 webpage without using Web 2.0 Toolbar. Fig.5 shows the webpage after using Web 2.0 Toolbar. It appends four function buttons on the right-top region of IE. After clicking one of these buttons to start Web 2.0 Toolbar, there is an additional float window on this web page, and the floating window contains one login interface and one function interface for corresponding function, which is shown in Fig.6. Finally, Fig.7, Fig.8, Fig.9 and Fig.10 show the functions of tag, and comment corresponding.

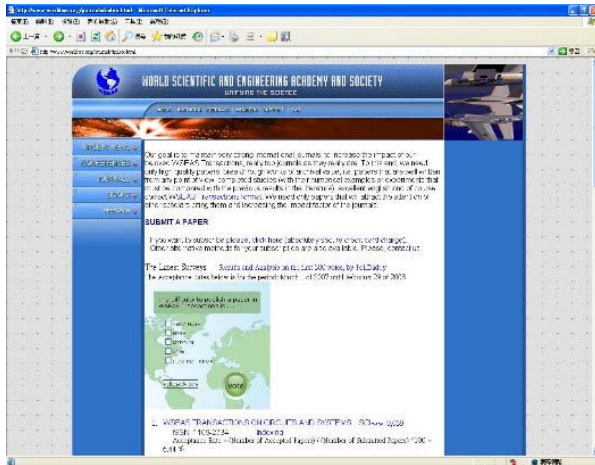


Figure 4. Original Web 1.0 web page:  
<http://www.worldses.org/journals/index.html>

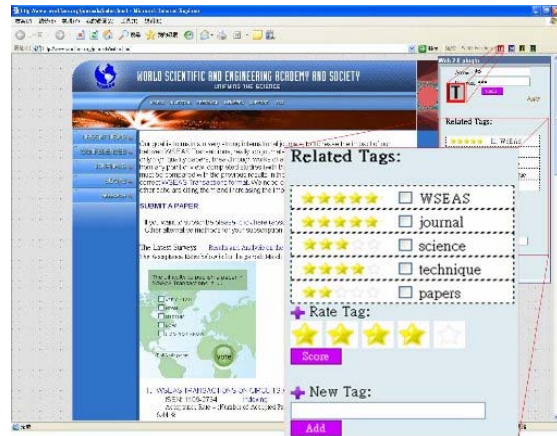


Figure 7. Web page with Web 2.0 Toolbar with tags

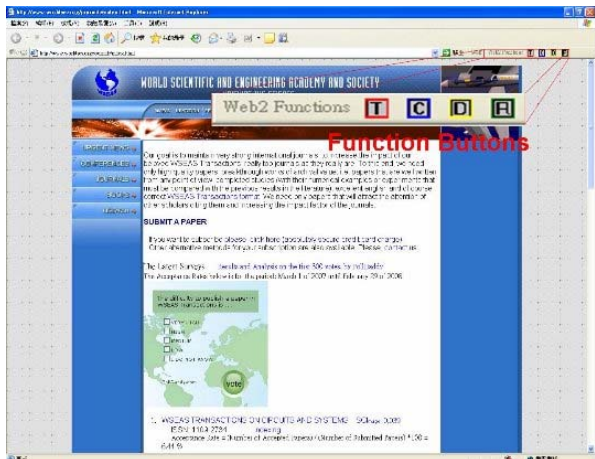


Figure 5. Webpage with Web 2.0 Toolbar

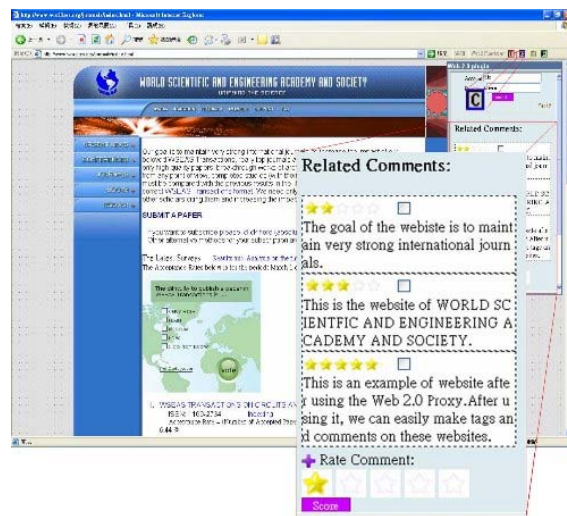


Figure 8. Web page with Web 2.0 Toolbar with comments

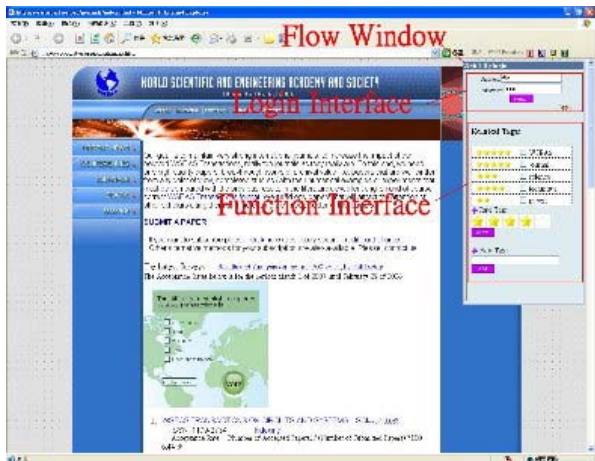


Figure 6. Using Web 2.0 Toolbar

## 4. Conclusion and Future Work

In the paper, our Toolbar framework has two contributions. First, the Toolbar framework supports a simple method to allow traditional Web 1.0 websites to append two functions; (1) Making and sharing tags. (2) Making and sharing comments. They are the most simple and common ways to share information in Web 2.0.

Second, the Toolbar framework displays a friendly interface which integrates original web content and the related information in the floating window closely. So that the web page developer do not have to modify the original Web 1.0 web pages to upgrade the website to Web 2.0 version.

The paper has already presented a feasibility framework to upgrade websites from Web 1.0 to Web 2.0. The further directions of this study will be separated to four parts.

First, besides IE, there is still 24.74% usage market share on the other browsers (according the browser market share survey [10]). Firefox has 17.28%, and Safari has 5.73% market share. So we have to port the Toolbar framework to other browser to serve more users. Using the framework to make Web 2.0 Firefox Toolbar or Web 2.0 Safari Toolbar is possible.

Second, we can enhance these four existent functions. For examples, it can support additional AI or Data Mining [11][12] mechanism to help users to automatic tagging.

Third, we can gather statistics of tags and comments. By counting the number of tags/comments which are made by each specific user, we can encourage users to make more tags/comments. By counting the number of tags/comments related to a web page, we can judge that whether the information of a web page is worthy or not.

The final direction is that we can use our system for special-purpose service. For example, we can provide movie, food or education services. In this application, only the professionals are allowed to make tags and comments. In this way, the information will be more meaningful to users.

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