Web 2.0 Proxy: Upgrading Websites from Web 1.0 to Web 2.0

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Abstract: - Since the term "Web 2.0" appears, a new generation of Web is coming. There are many 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, by introducing the Web 2.0 Proxy, to upgrade websites from Web 1.0 to Web 2.0. The Web 2.0 Proxy combines the original Web 1.0 web page with the additional Web 2.0 information together on the fly. Therefore, the developers need not to rewrite their websites, and the users are able to experience the additional Web 2.0 functions. In the paper, we have implemented the tag and comment functionalities of Web 2.0.

Key-Words: Web 2.0, Proxy, 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 concept. 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 though 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", 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 [2] and the relationship of the developing between Web 2.0 and semantic web [3] are the most popular subjects. Although Web 2.0 has many positive effects, it also brings new problems. The gallop developing of Web design supports more powerful functions and resplendent interactions, but the change in paradigm brings new challenges to people with disabilities. A discussion of how to build an accessible web [4], [5], [6] 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 of most people. That is information sharing and content of website can be changed by every user's participation. One of the most famous examples is WIKIPEDIA[7], 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[8]. It is a bookmarkers 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.

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 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

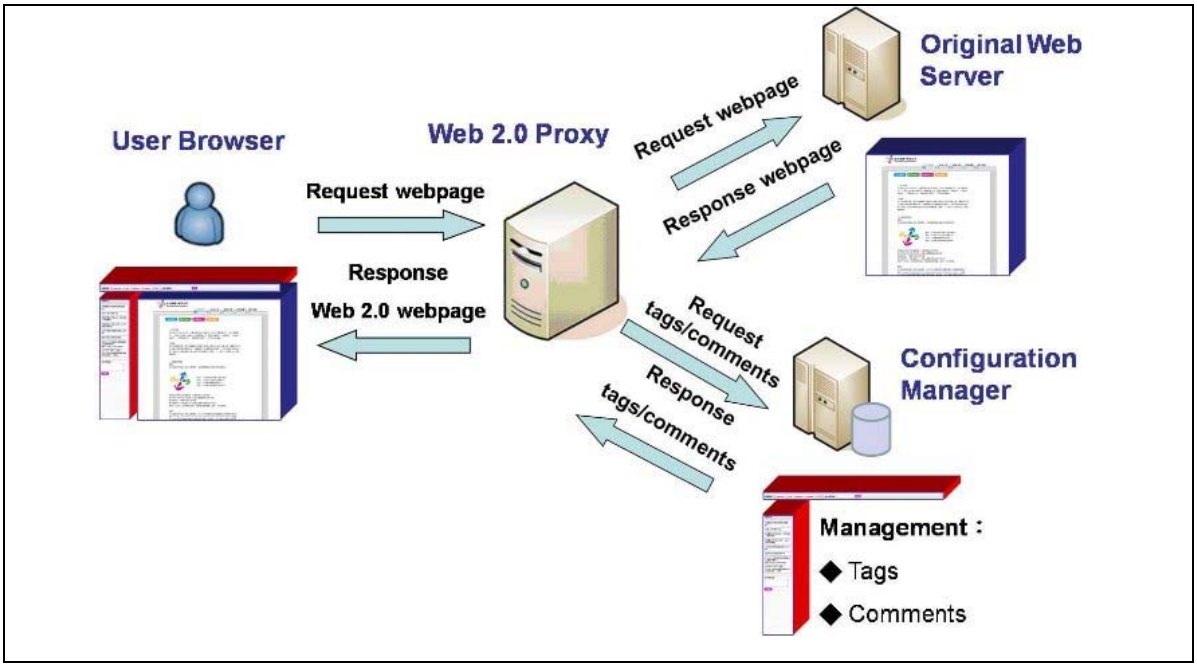

Fig.1 Overall Architecture of Web 2.0 Proxy

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 introduce the Web 2.0 proxy framework in Section 2. Detailed descriptions of the system design are illustrated in Section 3. In Section 4, the system result example is shown. Finally, the paper concludes in Section 5.

2 Proxy 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

Under the regular HTTP transactions, the User Browser sends a HTTP request to the Original Web Server (OWS), and the OWS replies a HTTP response to the User Browser. Then the User Browser receives the original web page content. Base on the architecture of the traditional HTTP transactions, we append another two components: Web2.0 Proxy (W2P) and Configuration Manager to generate the new architecture as shown in Fig.1.

In the diagram, it illustrates the new architecture we proposed with the communications among components. In the figure, when User Browser sends a HTTP request, W2P will receive the request. Then W2P not only request original web page form the OWS but also request the information which related to the original web page from the Configuration Manager. Finally W2P sends the combined information to the User Browser. Hence, User Browser receives a new version of Web 2.0 web page which includes original contents and additional information (which indicates tags and comments in our current implementation).

2.2 System Components

The Proxy framework has two main components: Web 2.0 Proxy (W2P) and the Configuration Manager. The descriptions of them are as following.

2.2.1 Web 2.0 Proxy

W2P is quite similar to general HTTP proxy servers which serves the requests of its clients by forwarding requests to other web servers, but different in two parts. First, W2P will send a HTML frame page back to the clients. The Web 2.0 HTML frame page (shown in Fig.2) contains three web page URLs, original web page, tag web page and comment web page. These URLs are appended a signal "@@". Tag and comment web page will be supported by Configuration Manager. Second, W2P also adds a signal "@@" in the URLs of the original HTML response in order to distinguish the first HTTP request from clients.

There are two kinds of URLs of the HTTP request received by W2P. One is the normal URL without the signal "@@". If W2P receives a request with such URL, it will send the Web 2.0 frame page back to User Browser. The other is the special URL

```
<HTML>
<HEAD>
<TITLE> Web 2.0 </TITLE>
</HEAD>
<FRAMESET rows=10%,90%>

<FRAME src= http://@@web20proxy/tag.html?original_URL name="tag" >

<FRAMESET cols=20%,80%>

<FRAME src= http://@@web20proxy/comment.html?original_URL name="comment" >
<FRAME src= http://@@original_URL name="original_page" >

</FRAMESET></FRAMESET>
</HTML>
```

Fig.2 Web 2.0 HTML frame page responded by Web 2.0 Proxy

with the signal "@@". If W2P receive the special URL, it will forward the request to the corresponding web server, and send the response web page in which W2P adds the signal "@@" to all the URLs.

2.2.2 Configuration Manager

Configuration Manager contains two subcomponents: a web server and a database server. We use MySQL server as our DB server. The DB server contains about 10 tables which store web page data, related tag data and related comment data. It supports all data which the system needs. We use Apache Tomcat as our web server. It contains only two web pages: tag page and comment page. These two web pages both support two functions. The first function is to display the related tags or comments which are related to the original web page.

The second function is that users can add new tags and comments through the web page. When Web 2.0 Proxy request a tag or comment web page with a URL as parameter, the web page will send the tag or comment web page with the URL related tags or comments back to it. Briefly speaking, Configuration Manager is responsible for data storing and data packing.

2.3 System Flow

Fig.3 illustrates the HTTP transaction scenario after using Web 2.0 Proxy. The scenario contains four steps, and we will explain them as follow:

Step1: A user type a web page URL on the browser, and the User Browser sends a HTTP request to Web 2.0 Proxy. Because that the URL of the request doesn't contain the signal "@@", Web 2.0 Proxy will send the Web 2.0 HTTP frame page back to the User Browser. After receiving the frame page, User Browser will send the other three HTTP requests to Web 2.0 Proxy as Step2、Step3 and Step4.

Step2: The browser sends the HTTP request of the original web page to Web 2.0 Proxy. Because that the URL of the request contains the signal "@@", Web 2.0 Proxy will forward the request to the corresponding web server and receive the response data. Then Web 2.0 Proxy adds the signal "@@" to all of URLs of the response web page, including the image URLs or hyperlink URLs. After that, Web 2.0 Proxy sends the response web page to the User Browser. The web page may contain some pictures, XML files or CSS files, so User Browser will also send the requests for these files to W2P. Because those URLs are appended the signal "@@", the request scenario will as the same as the Step2.

Step3: The browser sends the HTTP request of the tag web page to W2P. Because that the URL of the request contains the signal "@@", W2P will forward the request to the Web 2.0 Web Server. Web 2.0 Web Server query the related tag data from Web 2.0 DB Server, and then responses the tag web page to W2P. Finally, W2P responses the tag web page back to User Browser.

Step4: similar to Step3. The difference between them is that it returns the comment web page rather than tag web page. In fact, Step2, Step3 and Step4 may occur with another sequence simultaneously.

The structure of this frame page is shown in figure 4. There is a tag webpage on the top, a comment webpage on the left side, and the original webpage on the right side.

As figure 5, let's take google.com for example. First of all, there is a user request a google.com webpage through our Web 2.0 proxy. Because this is the first request of google.com, it contains no "@@"

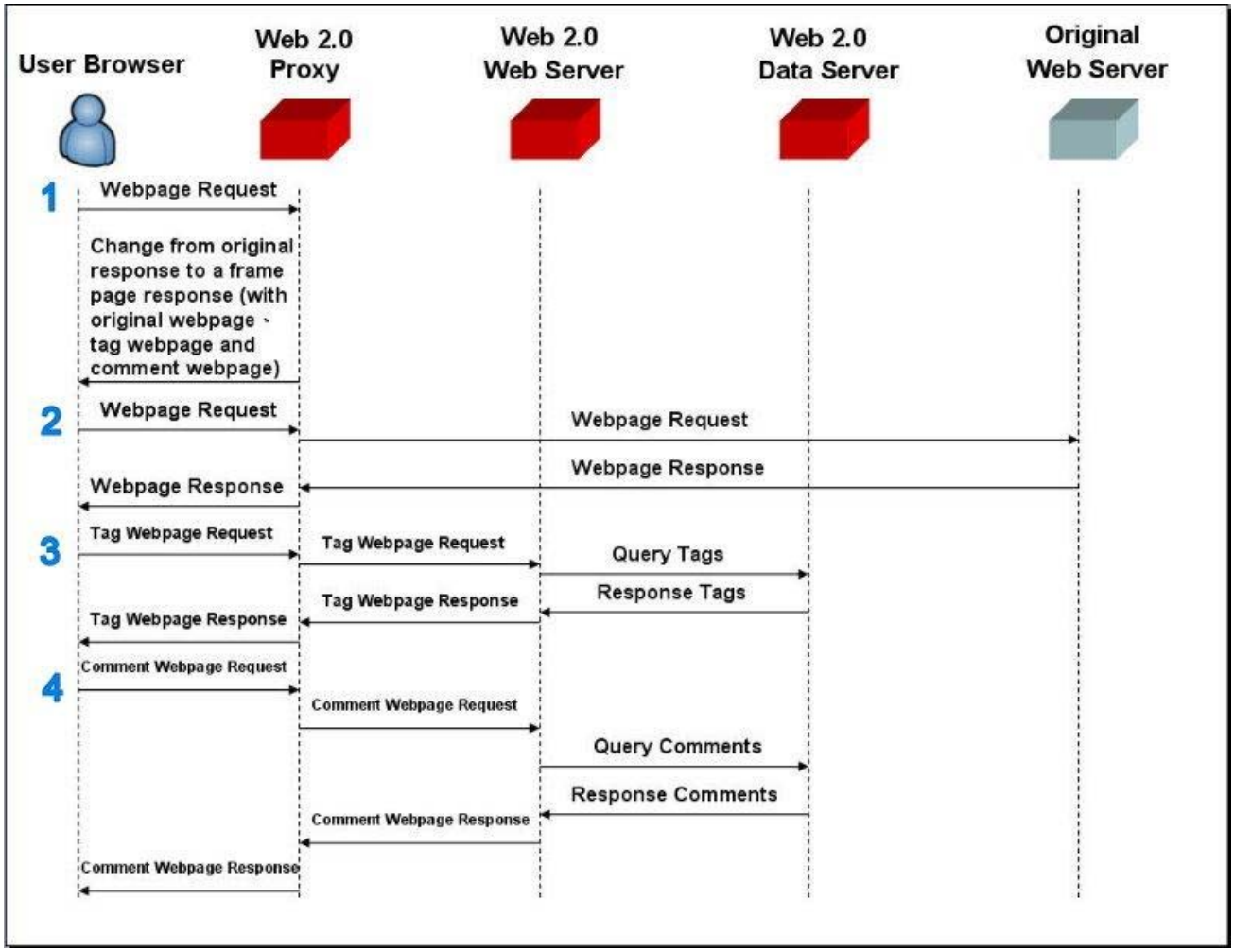

Fig.3 HTTP transaction sequence diagram after using Web 2.0 Proxy

signal. Without the signal, Web 2.0 proxy will return the fame page directly.

After that, the original webpage request is sent, as figure 6. In this time, the request contains "@@" signal, so we simply remove the signal and redirect this request to google.com. We may notice that, the response pages sent by proxy is not the same as the response pages sent by Google. There are several "@@" signal inserted into the response.

In the webpage of google.com, there may be several images, javascript, or css files need to be downloaded. As figure 7, now, these download url also contain the "@@" signals, so the proxy also remove the signals and forward them. We should notice that, if there is a hyperlink in the original webpage, it will not contain the "@@" signal. So it will be treated as the first request, and the new page will displayed with the related tag and comment information.

Finally, as figure 8, the tag and comment webpage requests are sent to our Web 2.0 web server. The same, they are not the first request, so they contain the "@@" signals.

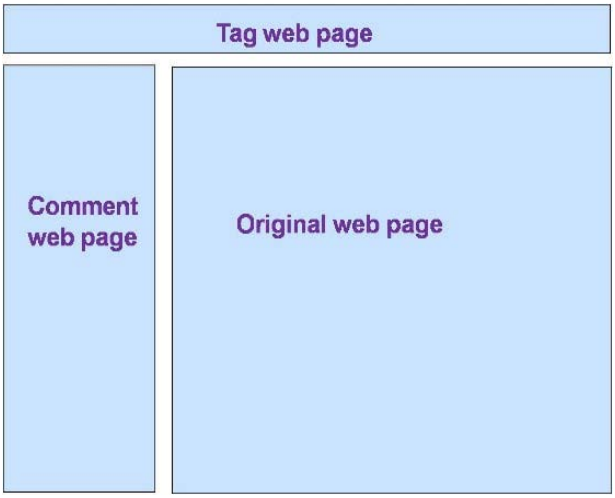

Fig.4 Frame page structure

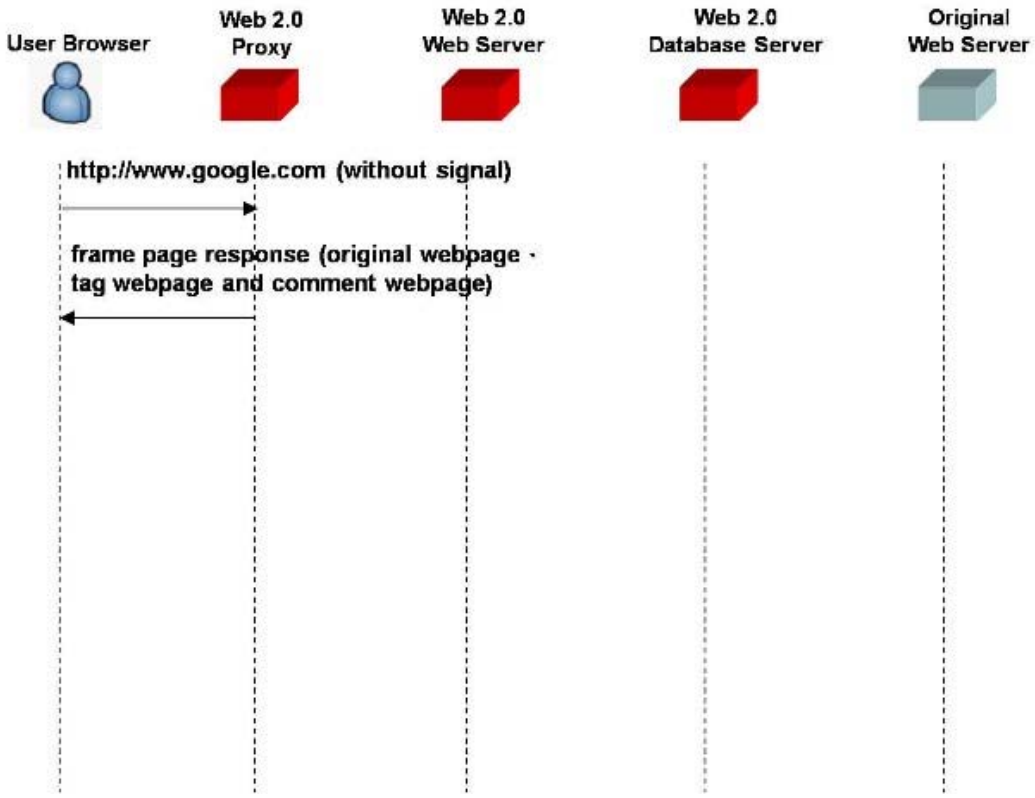

Fig.5 Google.com webpage example (1)

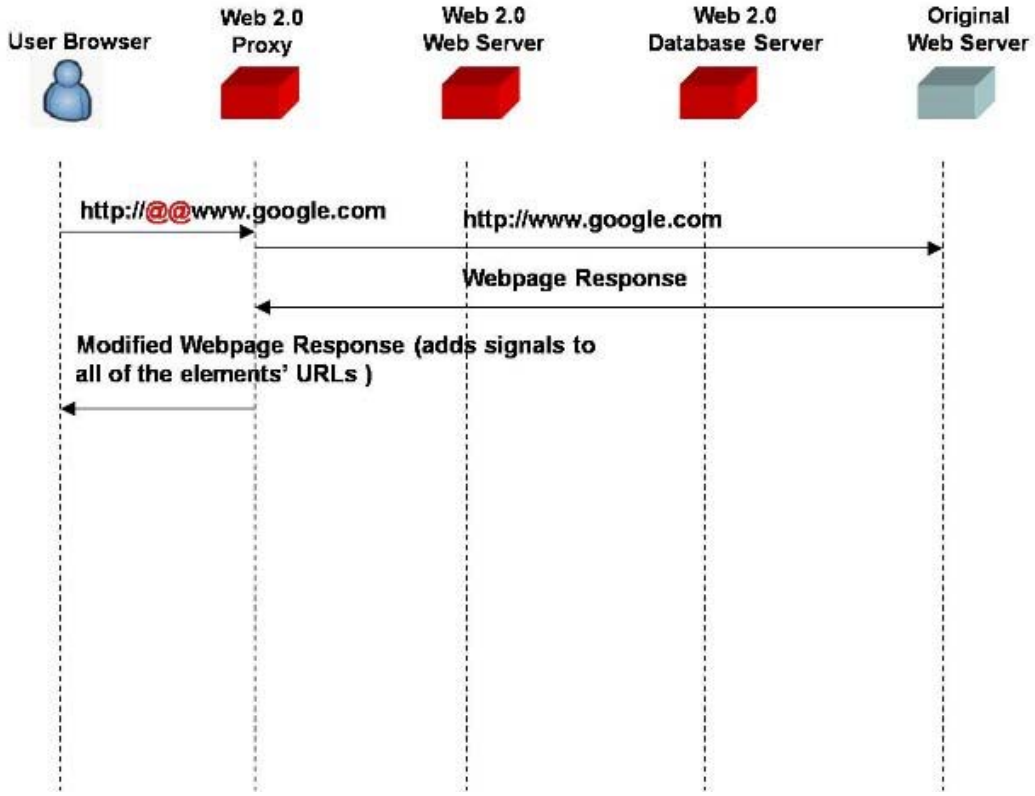

Fig.6 Google.com webpage example (2)

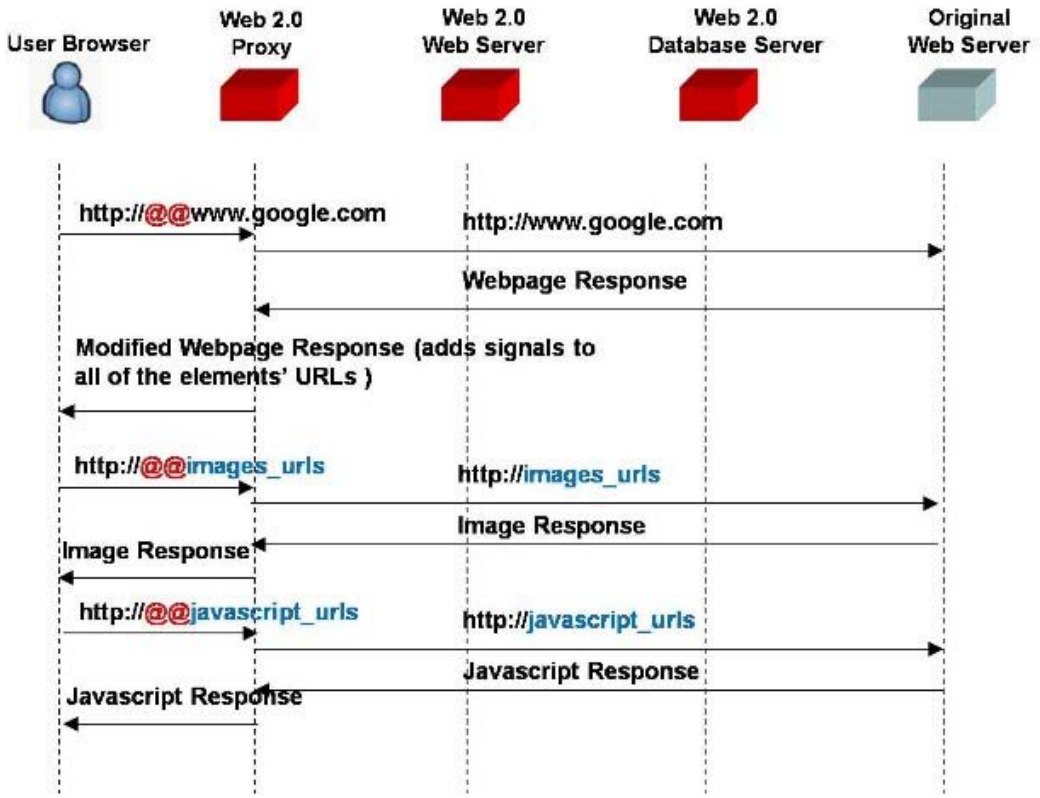

Fig.7 Google.com webpage example (3)

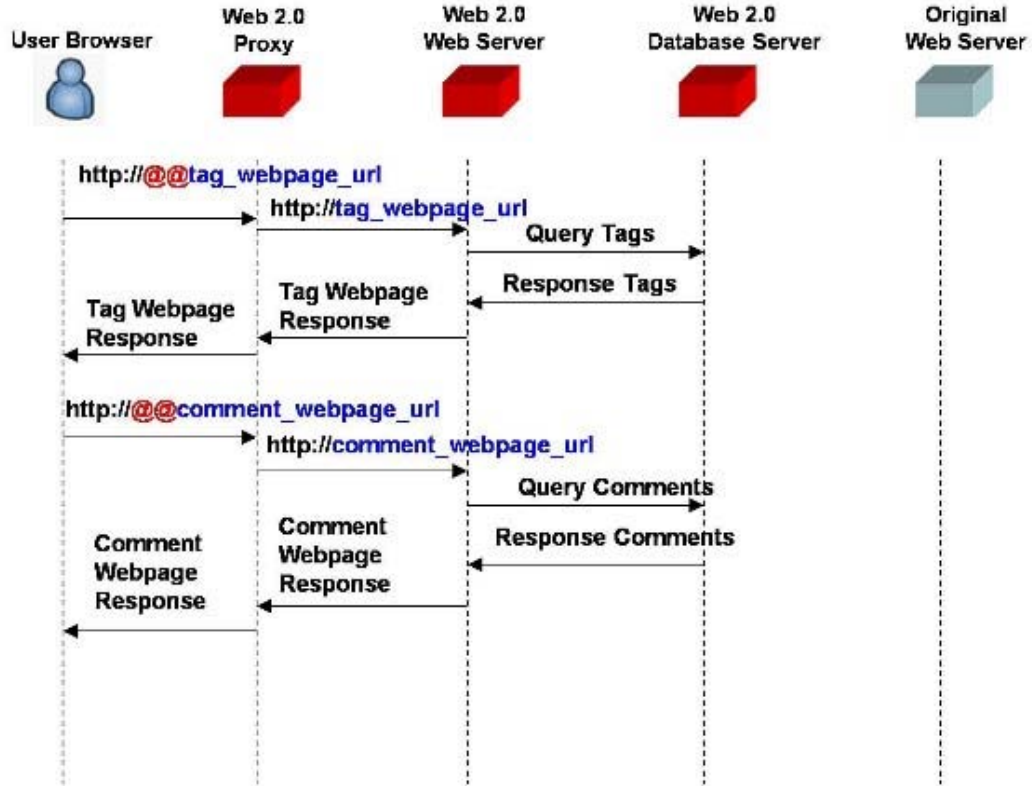

Fig.8 Google.com webpage example (4)

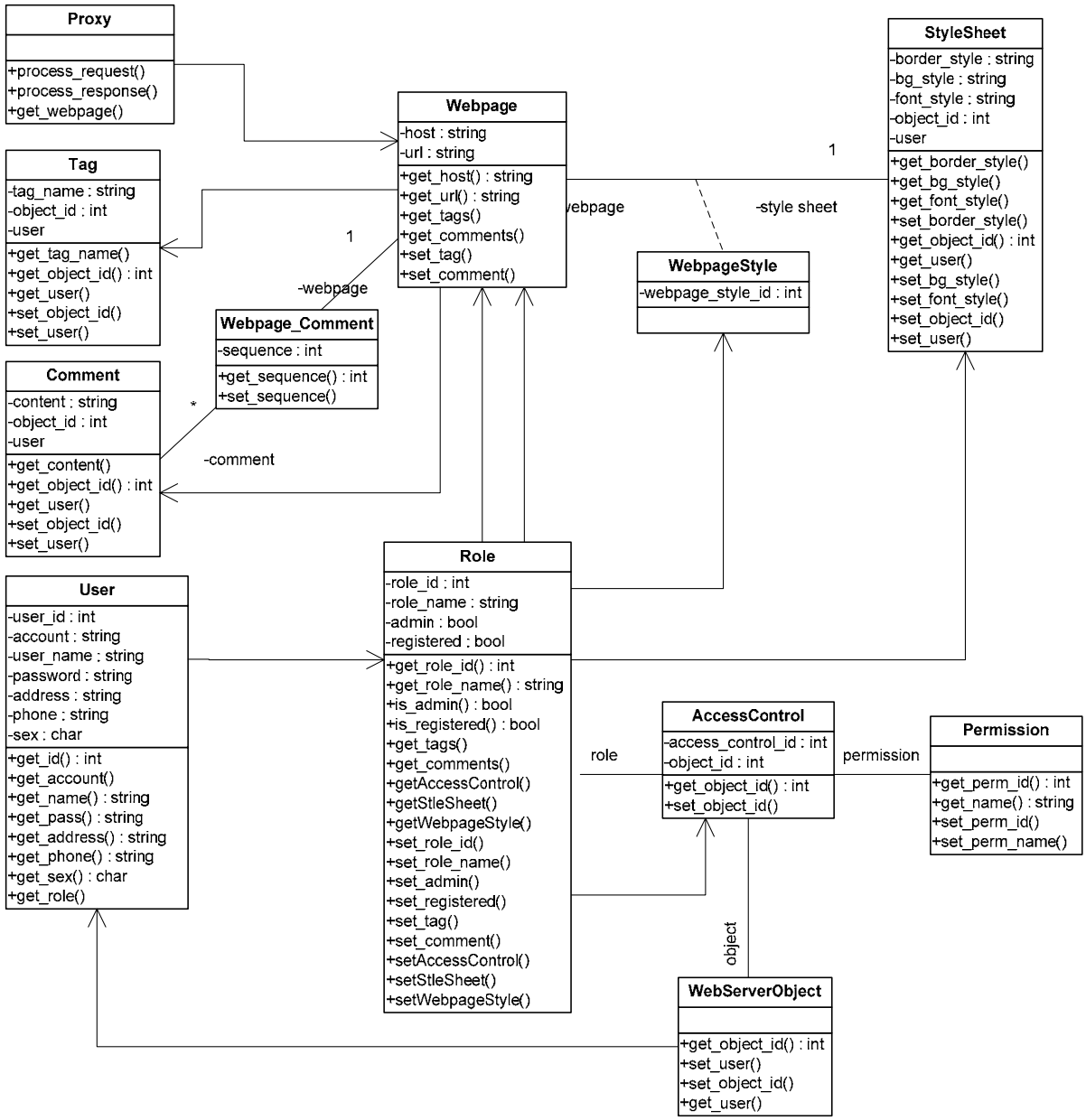

Fig.9 Web Server Class diagram

3 Detailed System Design

The class diagram of Web server is shown in fig.9. In the figure, each webpage which contains the additional tag and comment will have an instance of class Webpage. Through this instance, The class Proxy and class Role are able to access the information of tags and comments. We may notice that, between each of the comment in the Webpage, there is a sequence attribute maintaing the order relationship of comments. Once the comments are aquired based on the webpage, the comments will be reordered to follow the sequence number. After that, the comments will be displayed on the comment webpage in order.

The class StyleSheet indicates the style sheet of comment and tag webpages. New style sheets can be added by different user with several roles. Also, the webpage can be related to one of these style sheets.

We adopt RBAC (Role based access control) mechanism to conduct the authorization of our susyem. Each user is able to play with different roles, and each action performed by some roles to some objects will be checked by the Role, WebServerObject, and Permission relationship recorded in the AccessControl table. Finally, WebServerObject records the object owner.

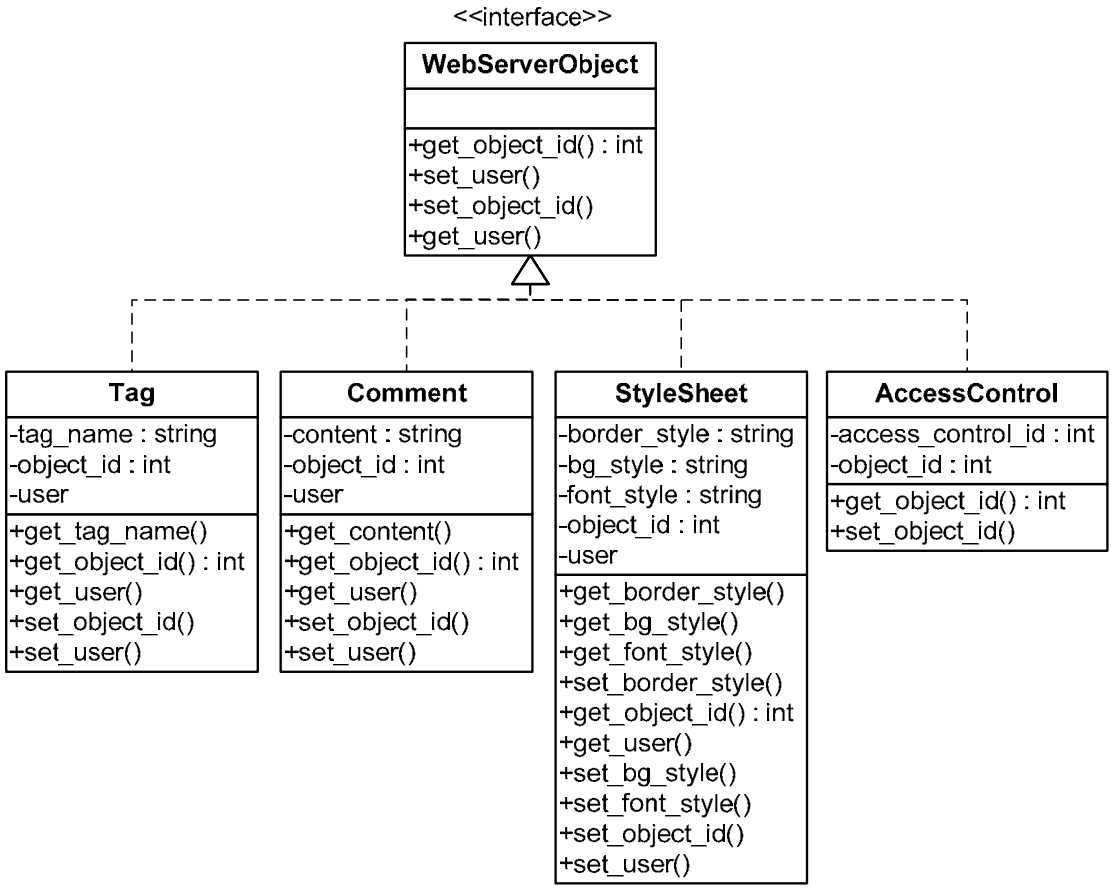

Fig.10 Web Server Object Class diagram

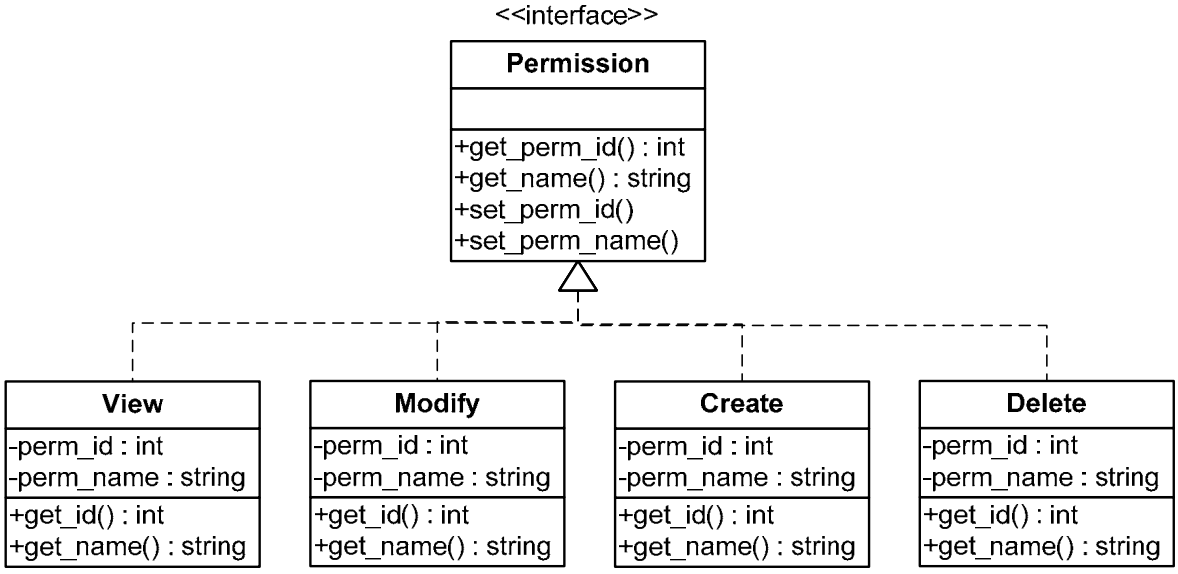

Fig.11 Permission Class diagram

As shown in fig. 10, the WebServerObject is an interface, and class Tag, class Comment, class StyleSheet, and class AccessConrol inplement the WebServerObject. In other words, Tag, Comment, StyleSheet, and AccessControl are four main classed in Web Server.

As shown in fig. 11, similary, the Permission is an interface, There are four permission classes implement this interface, including View, Modify, Create, and Delete.

4 System Results

Before using Web 2.0 Proxy, users should set the proxy server in their browser. Then W2P can serve these users. Fig.12 shows original Web 1.0 web page without using W2P. Fig.13 shows the web page after using W2P. It contains three parts. The top one is the tag web page. The left one is the comment web page. The right one is the original web page. The tag web page not only shows the related tags but also support a HTML form to allow users to add new tags, so does comment web page. In our system, W2P is implemented in Java code, and the Configuration Manager is implemented in JSP code.

Fig.12 Original Web 1.0 web page: http://www.worldses.org/journals/index.html

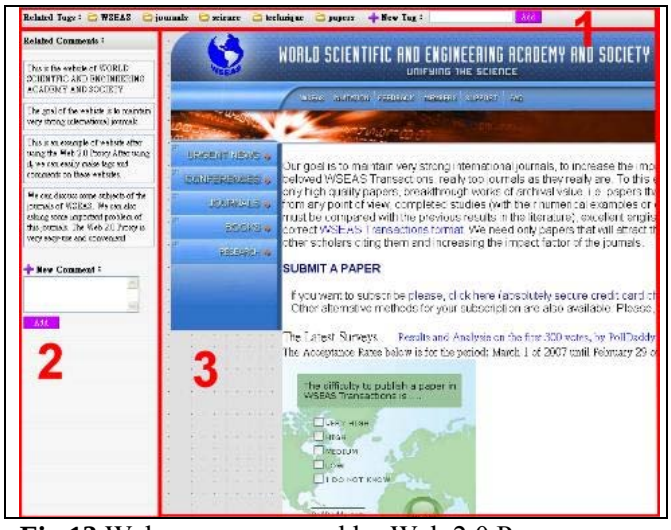

Fig.13 Web page processed by Web 2.0 Proxy

Fig. 14 and Fig.15 show the tags region and comment region respectively as followings.

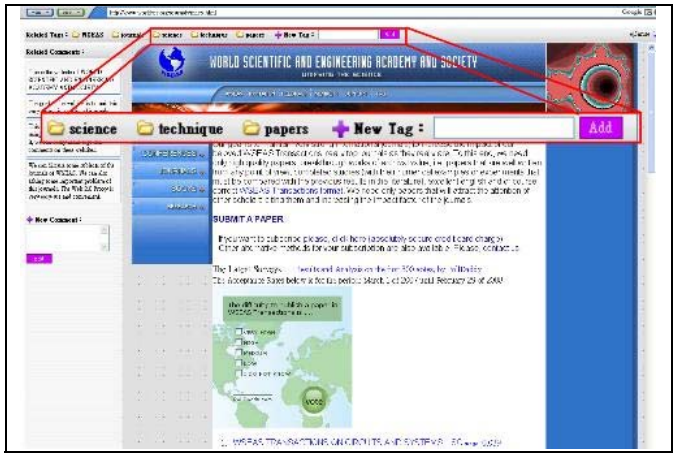

Fig.14 Web page with tags

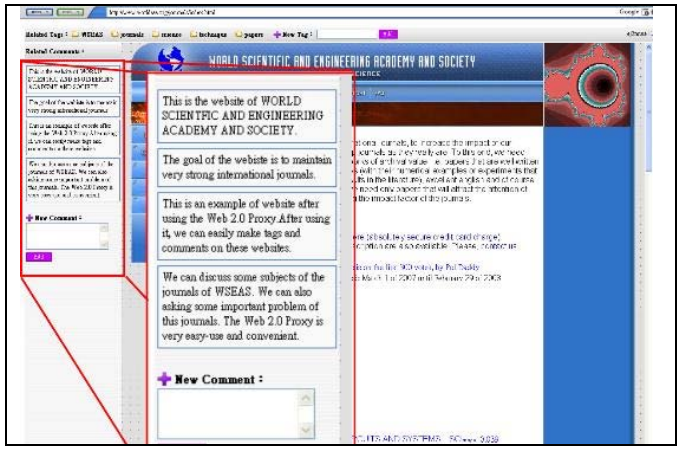

Fig.15 Web page with comments

5 Conclusion and Future Work

In the paper, our Proxy framework provides two contributions. First, the Proxy framework supports a simple method to allow the traditional Web 1.0 websites to append two functions. These two functions can create and share tags/comments. They are the most simple and common ways to share information in Web 2.0.

Secondly, the Proxy framework displays a user friendly interface which integrates the original web content with the associated tags and comments closely. Therefore, the web page developers do not need to modify the original Web 1.0 web pages in order to upgrade them into Web 2.0 version.

Although the W2P framework presents reasonable results, it still has difficulties to conquer. The HTML language is not restricted defined. Many web page designers do not write sophisticated, adequate HTML code. Thus, it is hard to add the signal "@@" to the source code of a HTML page. Regarding the issue, we do not have a proper method to solve it yet. It will be our future work.

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