

# Research and Application of Web Development Based on ASP.NET 2.0+Ajax

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**Abstract**-Ajax is a new concept of web application development proposed in 2005. It is the acronym of Asynchronous JavaScript and XML. Once Ajax appeared, it is rapidly applied to the fields of web development. Ajax application is different from the traditional web development model, using asynchronous interaction. The client unnecessarily waits while the server processes the data submitted. So the use of Ajax can create web user interface which is direct, highly available, richer, more dynamic and closer to a local desktop application. This article introduces the main technology and superiority of Ajax firstly, and then practices web development using ASP.NET 2.0 + Ajax. In this paper, Ajax is applied to the website pass, which enables user to have better registration experience and enhances the user's enthusiasm. The registration functions are enhanced greatly as well. The experiments show that the Ajax web application development model is superior to the traditional web application development model significantly.

## I. INTRODUCTION

The functional richness and rapid responsiveness of desktop application are always goals of web application development. Java-based desktop applications with the advantage of one-site compiling but multi-sites running sweep the markets of enterprise desktop application since Sun Microsystems proposed Java in May 1995. But in Feb.2005, when the Ajax emerges and rapidly applies to the fields of web development, the new generation of internet application system can respond more agilely, interact more rapidly, make user-experience bountifully. The web2.0 application based on Ajax becomes a powerful competitor to Java-based desktop application [1].

At present Ajax is the representation of the new-emerging network development technology and is becoming research focus in the web2.0 application fields. Ajax is not a technical experimental commodity. It can be practiced in the real world applications. Internationally, Google has used the Ajax technique incisively. Such as Google Map, using the cursor to move in scale line to enlarge or reduce the map, responding immediately and not waiting for pages update completely. Another example is Google Suggest, according to the input -content, the related content will be updated immediately. They are all this kind of new web applications. Ajax is suitable for application of various scales from simple single-function such as Google Suggest to extremely complex-function such as Google Maps. Although Ajax is not very convenient in the development just now, successively

some mainstream companies already have developed the tools for Ajax therefore. Google launches CWT. Microsoft Corporation actively devotes to developing more perfect Ajax applications as well. Following the 2006, a testing-tool which supports Ajax development was released in the market. Recently Microsoft publishes the first official edition of this toolkit: ASP.NET AJAX 1.0. The Borland Company announces that Delphi2007 will fully support the Ajax development [2-4]. The application of Ajax technology will become more and more conveniently. Ajax technology will bring a new revolution into the web development.

## II. AJAX TECHNOLOGY

### A. Ajax Definition

Ajax is the acronym of Asynchronous JavaScript and XML. It is not a new language or single technology but actually composed of several kinds of vigorous technologies with new powerful ways. These technologies include JavaScript, XHTML, CSS, DOM, XML, XMLHttpRequest and XSTL. Among them XHTML and CSS can be used for carrying out standardized format; DOM for realizing dynamic display and interaction; XML and XSTL for carrying out the data exchange and processing; the XMLHttpRequest object for reading asynchronous data; JavaScript for bundling and processing all the data[5].

### B. Ajax Technological Superiority

The traditional web application development model takes synchronous interaction. Firstly the user stimulates HTTP request to the web server on the interface. Secondly the server analyses the contents requested by user and then carries out the response task. Finally the server returns the results to the user. Due to it bases on a request-wait-request model, the browser displays blank pages and user must wait until the server returns data pages and redraws them in the cycle. Because users cannot receive the feedback immediately, they feel it different from desktop applications. This is an incoherent user's experience and is also the reason that the interaction of web application is unsatisfied in certain situations. Ajax, using asynchronous interaction, is different from the traditional web application development model. The client unnecessarily waits while the server processes the data submitted. Since the sending and receiving of the data are

completed in the backstage, the displayed contents of browser can not be scintillated, delayed or disappeared. The “Bai Ping” phenomenon is not appeared as well. The advantages of Ajax application are manifested in the following aspects:

1) To reduce the server burden. The basic idea of Ajax is to read data according to the needs. Therefore, it is the greatest possible to reduce burdens which bring to server because of the redundant requests and responses.

2) To make a better user’s experience. Not to refurbish and update pages, so that to reduce the users’ practical and psychological latency time.

3) To save the cost of renting space and bandwidth. Some tasks that the server has to do in the past are shifted to the client. It takes advantage of handling abilities of client which does not been exploited before. So to reduce the burden of the server and bandwidth.

4) Not to require plug-in or download the specified programs. The reason is that the technology is based on standardization and is widely supported.

5) To cause interface separating from application in the web development. That is to say, the data separates from the presentation [6].

Evidently, Ajax makes web application not only to retain the merits of the B / S structure, but also to own the powerful features and perfect user’s experience that the C/S structure had. It has greatly improved the interaction and availability of web applications and has made web application more dynamic and intelligent. Ultimately it is widely approved by the users and the markets.

### C. Ajax Working Principle

The Ajax working principle is based on its web interactive model. It adds a middle layer between the user and the server. The middle layer is commonly called the Ajax engine that is composed of a series of JavaScript code. Ajax engine’s responsibilities include structuring the user’s operational interface and communicating with the server. The Ajax engine allows the interaction of the users and the applications to asynchronously work, namely does not need to visit the server directly. Therefore users will never face a Bai Ping and the sandglass during the server processing data. The Users’ operation changes from traditionally submitting the tables for arouse an HTTP request to using JavaScript to recall the Ajax engine. Users’ response has not to wait until the server completely finishes processing task. Simple data checking and data processing, even some navigation functions realizing are all given to Ajax engine to process directly [7]. If the Ajax engine needs to gain the new data from the server or loads additional interface code, usually an asynchronous request will be stimulated by the XML form. The users’ feels are not interrupted entirely. The comparison between Ajax web application development model and the traditional web application development model is shown in Fig. 1.

## III. USING ASP.NET 2.0 TO REALIZE THE AJAX WEB DEVELOPMENT

### A. Introduction of ASP.NET AJAX

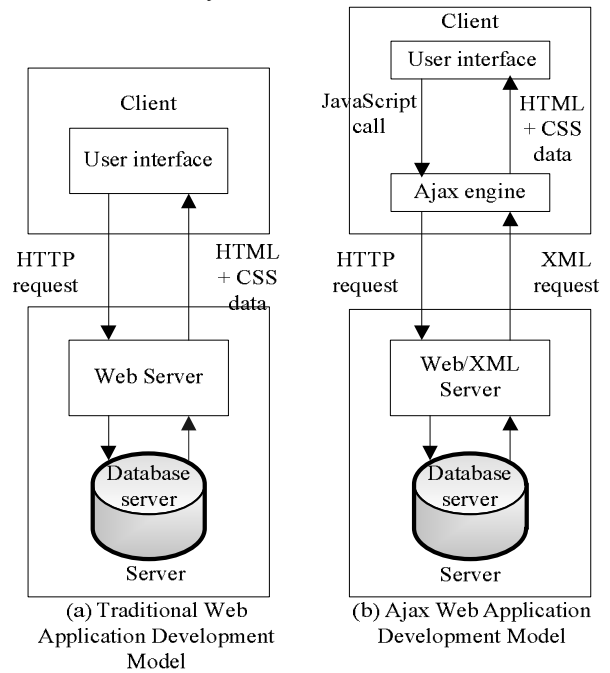


Fig. 1. The comparison between Ajax web application development model and the traditional web application development model

Microsoft ASP.NET AJAX, which is lunched by Microsoft Company, is the perfect package of Ajax technology and is the visible Ajax application framework. It has added the JavaScript (a cross-browser language) and has made JavaScript ingeniously expand to the OOD (oriented object development), providing the support of the OOD. It has integrated with server-based ASP.NET 2.0 platform, providing the client / server components closely integrating with ASP. NET and supporting types of automatic conversion method [8]. Therefore, the user’s experience and the efficiency of the application program are enhanced by using of ASP.NET AJAX.

Microsoft launches the latest Ajax framework, that is ASP.NET AJAX 1.0, and provides free services. This framework is primarily composed of ASP.NET 2.0 AJAX Extensions 1.0 and ASP.NET AJAX Control Toolkit. In addition, they provide constantly updated CTP [9].

### B. Research on Web Application Example Based on Ajax Model

At present, websites popularly use website pass to register user. This pass is a typical interactive application. Users must be authorized to use some services by the system. So it is necessary to apply for the website pass.

#### 1) Website Pass Development under the Traditional Model

Take the sohu website pass as an example, as shown in Fig. 2. We can observe that the text box does not make any effect or suggestion. The interface is not rich and beautiful enough. Users usually bore to register. When users set password, the system may inform whether legitimate or not only after the text box lost focus. Because it cannot remind immediately, users need to constantly try and often feel frustrate. It is a kind

of unfriendly user's experience. It is because the traditional website forces users to enter the submit / wait / re-display mode. Users' operation always synchronizes with the server's "thinking time". This inconsecutive model not only reduces efficiency, but also greatly weakens the user's experience [10].



Fig. 2. Sohu Pass registration interface

2) Website Pass Development Based on ASP.NET AJAX

In view of the imperfection of the website pass based on traditional development model, a more direct, abundant, sensitive and highly interactive website pass could be developed by ASP.NET AJAX1.0 which is lately promoted.

Our design has mainly made the text box with watermark effect, which makes the interface more beautiful-looking. Here password strength progress strip is increased to provide immediate reminding function. Therefore the user's experience will be improved. Hidden calendar which causes the interface richer is also increased. When input date such as birthday users can feel more convenient. The design process is shown in Fig. 3.

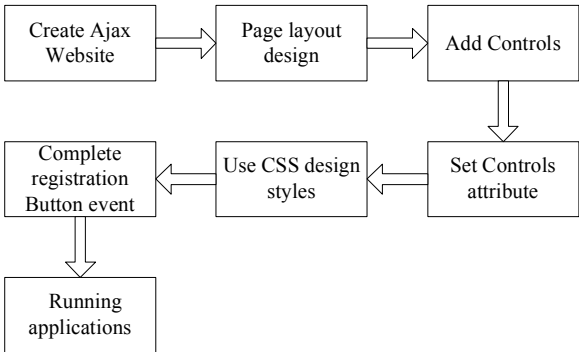


Fig. 3. Using Ajax to realize the website pass.

A part of the client code as follows:

```
<link href="StyleSheet.css" rel="stylesheet" type="text/css" />
.....
<asp:ScriptManager ID="ScriptManager1" runat="server" />
.....
<ajaxToolkit:PasswordStrength ID="PasswordStrength2"
runat="server"
```

```
TargetControlID="TextBox2"
StrengthIndicatorType="BarIndicator"
DisplayPosition="RightSide"
MinimumNumericCharacters="1"
PrefixText=" Strength instructions: "
PreferredPasswordLength="8"
BarIndicatorCssClass="bartype"
BarBorderCssClass="barborder"
TextStrengthDescriptions=" Too bad; not enough; general;
precisely; ">
</ajaxToolkit:PasswordStrength>
.....
<ajaxToolkit:TextBoxWatermarkExtender
ID="TextBoxWatermarkExtender1" runat="server"
TargetControlID="TextBox4"
WatermarkText=" Input Username"
WatermarkCssClass="water1">
</ajaxToolkit:TextBoxWatermarkExtender>
.....
<ajaxToolkit:CalendarExtender ID="CalendarExtender1"
runat="server"
TargetControlID="TextBox1"
CssClass="MyCalendar"
Format="yyyy-MM-dd">
</ajaxToolkit:CalendarExtender>
.....
```

In the style table design various style, the code as follows.

```
.barborder
{border-style:solid;
border-width:0.5px;
.....}
.water1 {.....}
.MyCalendar .ajax__calendar_container
{.....}
```

Realization effect and analysis:

After the procedure movement, as the figure 4 shows:

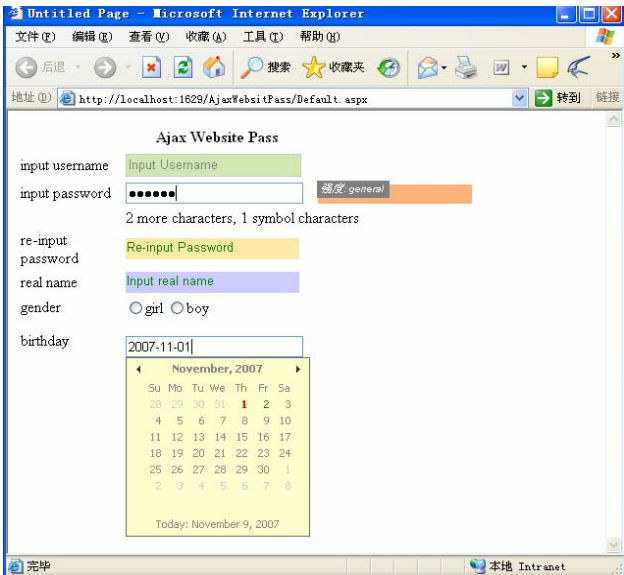


Fig. 4. Ajax Pass registration interface

In Fig. 4, we can see each text box is filled with different colors and keynotes when the user opens registration interface. This is the watermark effects that we expect in advance. If users select a particular text box to input the content, the pattern of these watermark characterizations will disappear. If no, after the text box lost focus the watermark will come back. This kind of effect can enhance the users' registration enthusiasm. "Password" text box is the most characteristic application in this website pass. If users set a simple password such as "8888", the information of password strength will be immediately appeared with the progress-strip. Changing the password into complex one such as "dgfg12453", at this time both of the progress and information of the progress-strip have been changed. When inputting character, user may examine the password strength simultaneously, not to wait to examine until the text box loses focus. The system's immediate reminding function is of very convenient, effective and quick. If user input birthday, the calendar appears for user's choice after click the text box. It makes the interface more dynamic. User's experience is improved.

#### IV. CONCLUSIONS

Through researching the Ajax website pass example in this article, the most prominent characterization of Ajax technology--partly renovate is embodied. This website pass is more direct, more sensitive, more interactive and richer than the traditional one. So Ajax has become the mainstream of web application development technology. The Ajax development has already been adopted and vigorously promoted in web application fields. Such as IBM, Oracle, Yahoo, BEA, Red Hat, Novell and other famous companies all start the projects of the Open Ajax. They dedicate to developing the powerful development tools for developing Ajax. Ajax is not only a new tool in the developer toolkit, but also a variation of the writing way of web application software. To a great extent, it is undoubted that Ajax will enrich the internet applications software platform in the future.

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