

Web Front Technology: Interstage Interaction Manager

● Masashi Ogawa

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An application with a user interface that allows an end user to directly perform reference or input operations is called a front application. One product in Japan to mention that offers various functions for the building and execution of front applications in a Web environment is Interstage Interacting Manager. Web front applications may be used in many different situations and are required to provide convenience such as operability and response according to the situation of use. To implement user interfaces suited for various business situations, Interstage Interaction Manager employs Web front technologies including Ajax and mashup. This paper describes the technological points and their effects.

1. Introduction

Front applications provided with user interfaces can be potentially used in many different situations and the most appropriate interface may vary depending on the situation of use or its user. Some applications may be suitable for power users who need to make quick inputs by using the keyboard only and without the mouse and some other applications may show candidates for values to be input or related

information to prevent novice users from making wrong inputs.

Interstage Interaction Manager (hereafter abbreviated as “IIM”) employs Web front technologies such as Ajax and mashup to implement user interfaces suited for these diversified business situations.

Figure 1 outlines IIM. Using Ajax and mashup functions of IIM allows developers to efficiently build user-friendly Web front

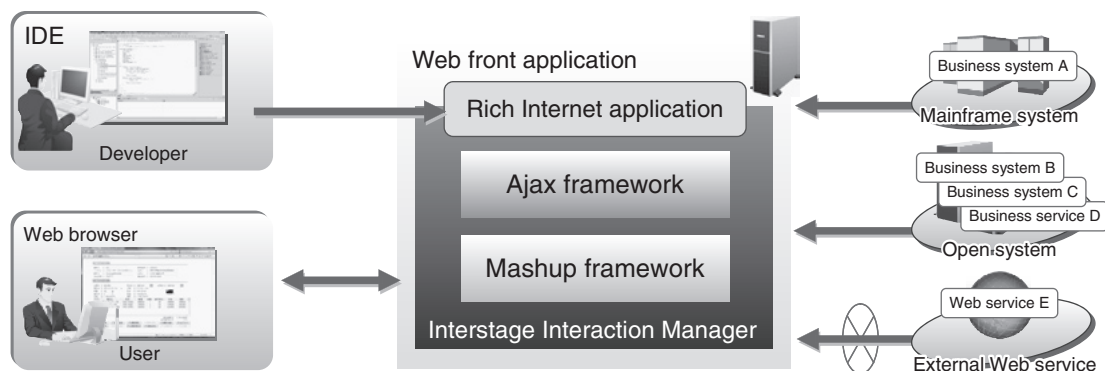


Figure 1
Interstage Interaction Manager.

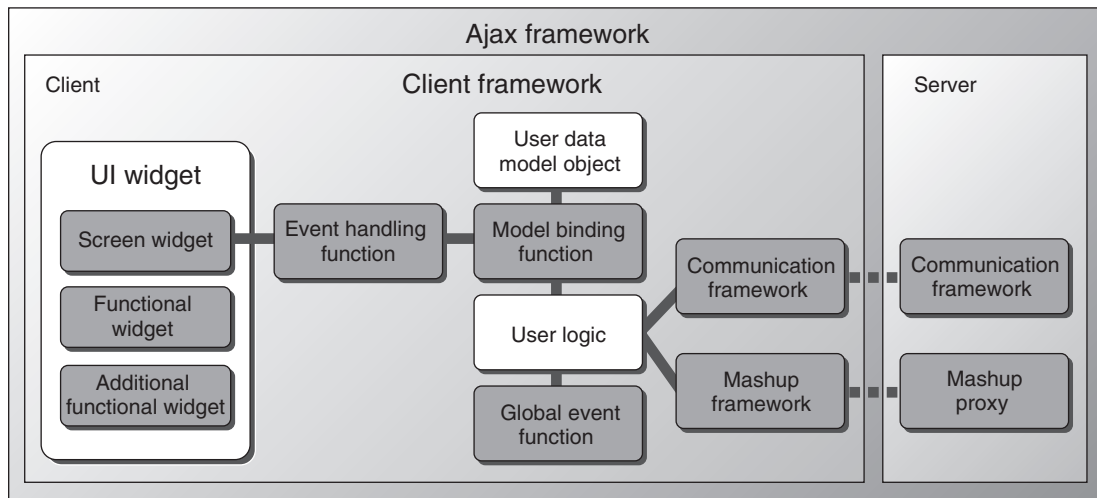


Figure 2
Ajax framework and mashup framework of IIM.

applications linked with the existing business systems and Web services and to promptly offer those services to users via common Web browsers.

IIM incorporates some methods and technologies for improving the user-friendliness of Ajax and mashup functions. The following sections explain the technological points and their effects.

2. SOA front

Service oriented architecture (SOA) is already being proposed by many vendors, and products compliant with this architecture are being provided. However, many of them are service integration products based on a service bus or business process management (BPM), broadened to include business processes.

Meanwhile, the interfaces of all applications are front ends and front is a decisive factor in user satisfaction. One approach that focuses on this point is the use of SOA front.

SOA front requires a tangible effect to be produced by improving the convenience of users or to allow quick and intuitive improvement to be made by integrating the screens of systems currently in use with other systems that are

scattered. To meet these requirements, IIM uses standard Web technologies to provide the following frameworks, which are shown in **Figure 2**.

- Ajax framework
- Mashup framework

3. Ajax framework

Ajax, which stands for Asynchronous JavaScript and XML, is a technology that uses JavaScript and XML to asynchronously transmit data and implements UI thereby improving the convenience of users. For example, it makes operations simpler and improves response and operability. The Ajax framework comprises a framework on the client and a Communication Framework between the client and server, which is shown in Figure 2, and makes development simpler.

In some existing Web systems, the user may be stressed by the fact that operation screens contain many input fields that may make them difficult to see or that the operation screens have a waiting time before the next screen is displayed. Using Ajax, which is a tool to implement rich screens on the Web, allows intuitive and user-friendly operation. This leads to improved

working efficiency or asynchronous partial screen rewriting, which allows continuous operation and thinking, thereby realizing a comfortable working environment. IIM provides an Ajax framework, input auto complete, automatic focus movement, function key assignment and various widgets including table and calendar widgets, thereby offering comfortable operability to users and efficient development to developers.

Ajax applications, which are mainly implemented by JavaScript in the Presentation Layer, are prone to becoming complicated groups of codes depending on how they are developed. For this reason, a mechanism has been provided in relation to development in the Presentation Layer to allow development of the presentation logic in the MVC model as shown in **Figure 3**. This is done to improve maintainability by improving readability or localizing the impact of modifications or to realize higher quality of applications by standardizing the development methods. The following functions are offered to support the mechanism:

- 1) Event handling function
 - Collectively manages the event listener of the individual screen widget and calls appropriate user logic at the time of operation
 - Automatically synchronizes the updated data
- 2) Model binding function

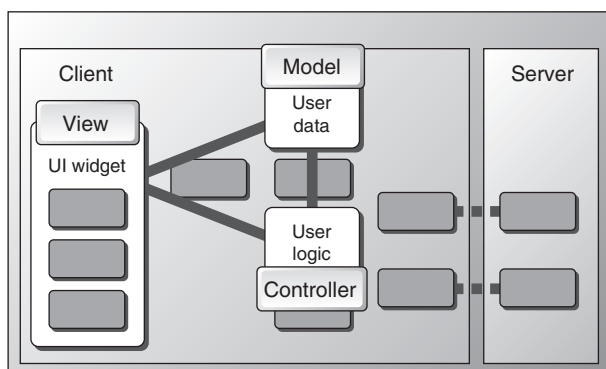


Figure 3
IIM client framework MVC model.

- Updates the model object data rather than screen display by user logic

In addition, for simpler development, the Communication Framework (a framework for calling business logic described in Java on the server asynchronously from JavaScript that runs on the Web browser), which assists the communication between the client JavaScript application and server, is provided.

Furthermore, for greater user-friendliness, a global event control function that allows the detection of keydown, keypress and keyup events with reference to the function keys between F1 and F12 is provided.

High-performance screens can be created by describing these widgets, functions and UI widgets in HTML or JSP.

4. Mashup framework

As a technology to create new services by combining services on the Web and to take out only the desired services for processing for ease of use, mashup technology has been studied for application to corporate systems because of its usefulness.

IIM has implemented mashups on the client in order to increase the compatibility with development in Ajax.

Mashups on the client usually pose challenges including the complexity of event handling on the client and Same Origin Policy. The mashup framework offered by IIM, however, is located above the Ajax framework and inherits the characteristics and advantages of Ajax, which allow use of the functions mentioned in the previous section. The mashup proxy function has successfully solved those challenges by allowing access without being affected by the Same Origin Policy.

Figure 4 shows an overview of a mashup proxy. A mashup proxy is equipped with many functions as shown below in addition to the capability to overcome the Same Origin Policy, which makes it perfectly secure.

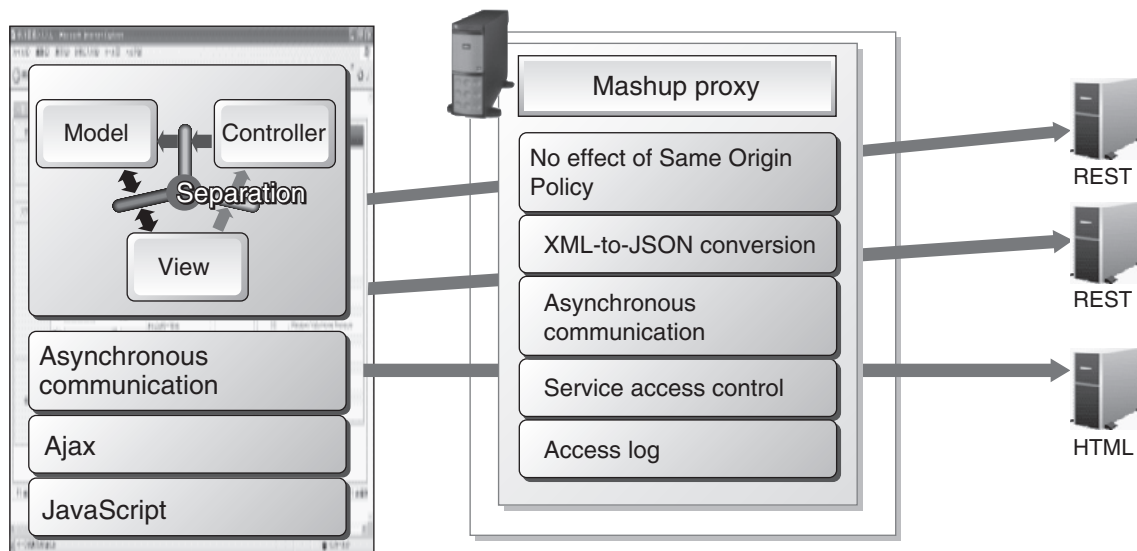


Figure 4
Mashup proxy.

- Inhibition of access to unmanaged services by managing the services at the access destination
- Security functions including the capability to track any error generated, made possible by outputting access logs
- Automatic conversion of XML data from the Web services to JSON^{note 1)} format
- Web service connection adapter (HTML, REST^{note 2)} [RSS, ATOM]) allowing access simply by setting URL

Mashups on the client are developed mainly in the Presentation Layer, which minimizes the impact on business logic and allows greater convenience for existing applications.

Studying how corporate systems are used reveals that many systems are not Web services. In reality, many of the systems used in corporations are Web applications.

The mashup framework does not require Web applications to be turned into Web services for incorporating data by using them as mashup sources. It is a scraping tool that incorporates

note 1) Abbreviation of JavaScript Object Notation.

note 2) Abbreviation of Representation State Transfer.

the data in this way.

A scraping tool allows the necessary part of a Web application screen (HTML) to be taken out so as to incorporate it into a mashup application as data.

Effective utilization of the existing assets in a corporation is very important and the mashup framework offers one way to do this.

In addition, Eclipse plugins as shown below are provided and they allow intuitive development.

- Scraping tool to cut the necessary part out of a screen (HTML) by mouse operation
- Ajax page editor to allow GUI widgets to be arranged, moved and resized by mouse operation

Using Ajax page editor allows screen design and development to be conducted through intuitive operation while checking execution images, thereby further improving development efficiency.

5. Characteristics and effects of IIM

The following summarizes the characteristics and effects of IIM.

- 1) Improvement of user convenience by Ajax
 - Continuous operation and thinking by asynchronous communication
 - Equipment with many functions and widgets including input auto complete, automatic focus movement and function key assignment, providing comfortable operability for users and efficient development for developers
 - Standardization of development methods by development in the MVC model
- 2) Mashup at front using Ajax
 - Incorporation of advantages of Ajax
 - Effective utilization of existing assets by simple application of existing HTML screens
 - Permission of access from Ajax to sites in other domains and restraint on unauthorized access at the same time
- 3) Enhancement of development environment
 - Integrated development environment plugins

- Improvement of development efficiency by Ajax page editor allowing intuitive operation

6. Conclusion

One way to introduce SOA proposed by Fujitsu as part of SOA is to improve user convenience. Interstage Interaction Manager, which is currently sold in the Japanese market, employs Ajax, a rich Internet application (RIA), and pursues the most appropriate operation environment without the need for plugins to the client PC in order to improve user convenience. In addition, the mashup framework has allowed quick development of a user-friendly operation environment combining Ajax and mashup. Support for the open source Eclipse has expanded the circle of developers and made it possible to integrate existing systems and implement rich interfaces more simply and in a shorter period of time.



Masashi Ogawa
Fujitsu Ltd.

Mr. Ogawa received a B.Eng. degree in Business Administration from Chiba Institute of Technology, Chiba, Japan in 1990. He joined Fujitsu Ltd., Kawasaki, Japan in 1990 and has been engaged in development of corporate IT applications, and development of Portal applications.

E-mail: ogawa.masash-02@jp.fujitsu.com