

DESCRIPTION

WEB SYSTEM, WEB SERVER, TERMINAL APPARATUS, WEB PAGE DISPLAY METHOD, AND COMPUTER-READABLE RECORDING MEDIUM

TECHNICAL FIELD

[0001]

The present invention relates to a web system, a web server, a terminal apparatus, and a web page display method for providing a web service, as well as a computer-readable recording medium having recorded thereon a program for realizing the same.

BACKGROUND ART

[0002]

In recent years, the use of web applications has increased at companies and the like due to increasing network speeds and improvements in server computer performance. In general, a web application is a software application that runs in a web browser installed in a terminal apparatus (e.g., see Patent Document 1).

[0003]

With a web application, processing proceeds while communication is performed between a web server on a network and the web browser in the terminal apparatus. Accordingly, a software application does not need to be installed in each terminal apparatus in accordance with the processing that needs to be performed, and it is possible to suppress the equipment cost at companies and the like.

[0004]

Also, with a web application, the terminal apparatus merely receives input data and displays information using the web browser, and the management, processing, and the like of input data is performed by the web server. Important data therefore does not remain in the terminal apparatus, and thus a web application facilitates an improvement in the level of security at companies and the like.

LIST OF PRIOR ART DOCUMENTS

PATENT DOCUMENT

[0005]

Patent Document 1: JP 2009-1697300A

DISCLOSURE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0006]

Incidentally, there are cases where the user of a web application desires to change the layout of UI components and the like on the screen in order to improve work efficiency, improve visibility, or the like. Also, at companies and the like, there are cases where a single terminal is used by multiple users, and in such cases, there is demand for the ability for each user to customize the layout on the screen.

[0007]

However, when using a web application, the display screen on the terminal apparatus is fixed by the program distributed by the web server, or by screen definitions registered on the terminal apparatus side. Accordingly, if the user desires to change the layout of UI components and the like on the screen, the program itself needs to be modified.

[0008]

On the other hand, if UI component layout definitions are registered on the terminal apparatus side, the user can change the layout by changing settings in the terminal apparatus. However, the user is forced to perform extra operations in this case, which is a disadvantage in terms of operational convenience. In particular, in the case where a single terminal apparatus is used by multiple users, each user needs to change the layout to their own layout after use by another user, which is bothersome.

[0009]

One example of an object of the present invention is to provide a web system, a web server, a terminal apparatus, a web page display method, and a computer-readable recording medium that solve the above-described problems and enable easily changing

user-specific screen layouts when using a web application, without requiring program modification and without forcing the user to perform a bothersome operation.

MEANS FOR SOLVING THE PROBLEMS

[0010]

In order to achieve the above object, a web system according to an aspect of the present invention is a web system including a terminal apparatus and a web server that provides a web service to the terminal apparatus,

the web server including:

a login processing unit that specifies a user who made a login request via the terminal apparatus;

a layout definition storage unit that stores a layout definition file for each user, the layout definition files each defining a layout of constituent elements of web pages used in the web service;

a file transmission unit that transmits, from among the stored layout definition files for each user, the layout definition file that corresponds to the user who made the login request, to the terminal apparatus; and

a constituent element storage unit that stores constituent elements that constitute the web pages, and

the terminal apparatus including:

a layout definition interpretation unit that specifies a layout of a web page designated by the user, based on the layout definition file that was transmitted from the web server;

a constituent element acquisition unit that acquires constituent elements needed in the specified layout from the constituent element storage unit of the web server; and

a screen display unit that arranges the acquired constituent elements in accordance with the specified layout, and displays the web page designated by the user on a screen.

[0011]

In order to achieve the above object, a web server according to an aspect of the

present invention is a web server that provides a web service to a terminal apparatus, the web server including:

- a login processing unit that specifies a user who made a login request via a terminal apparatus;

- a layout definition storage unit that stores a layout definition file for each user, the layout definition files each defining a layout of constituent elements of web pages used in the web service;

- a file transmission unit that transmits, from among the stored definition files for each user, the layout definition file that corresponds to the user who made the login request, to the terminal apparatus; and

- a constituent element storage unit that stores constituent elements that constitute the web pages.

[0012]

In order to achieve the above object, a terminal apparatus according to an aspect of the present invention is a terminal apparatus that receives provision of a web service from a web server, the terminal apparatus including:

- a layout definition interpretation unit that specifies a layout of a web page designated by a user, based on a layout definition file that was transmitted from the web server and defines a layout of constituent elements of web pages used in the web service;

- a constituent element acquisition unit that acquires constituent elements needed in the specified layout from among constituent elements of the web pages stored in advance in the web server; and

- a screen display unit that arranges the acquired constituent elements in accordance with the specified layout, and displays the web page designated by the user on a screen.

[0013]

Also, in order to achieve the above object, a web page display method according to an aspect of the present invention is a web page display method using a terminal apparatus and a web server that provides a web service to the terminal apparatus, the

web page display method including:

(a) a step of specifying, by the web server, a user who made a login request via the terminal apparatus;

(b) a step of, in the web server, transmitting, by the web server, from among layout definition files that are stored for respective users and each define a layout of constituent elements of web pages used in the web service, the layout definition file that corresponds to the user who made the login request, to the terminal apparatus;

(c) a step of specifying, by the terminal apparatus, a layout of a web page designated by the user, based on the layout definition file that was transmitted from the web server;

(d) a step of acquiring, by the terminal apparatus, constituent elements needed in the layout specified in step (c), from among constituent elements of the web pages stored in advance in the web server; and

(e) a step of arranging the constituent elements acquired in step (d) in accordance with the layout specified in step (c), and displaying the web page designated by the user on a screen.

[0014]

Furthermore, in order to achieve the above object, a first computer-readable recording medium according to an aspect of the present invention is a computer-readable recording medium having recorded thereon a program for provision of a web service to a terminal apparatus by a server computer,

the recorded program including commands for causing the server computer to execute:

(a) a step of specifying a user who made a login request via the terminal apparatus;

(b) a step of transmitting, from among layout definition files that are stored for respective users and each define a layout of constituent elements of web pages used in the web service, the layout definition file that corresponds to the user who made the login request, to the terminal apparatus; and

(c) a step of transmitting the constituent elements of the web page to the terminal

apparatus in accordance with an instruction from the terminal apparatus.

[0015]

Moreover, in order to achieve the above object, a second computer-readable recording medium according to an aspect of the present invention is a computer-readable recording medium having recorded thereon a program for reception of a web service from a web server by a computer,

the recorded program including commands for causing the computer to execute:

(a) a step of specifying a layout of a web page designated by a user, based on a layout definition file that was transmitted from the web server and defines a layout of constituent elements of web pages used in the web service;

(b) a step of acquiring constituent elements needed in the specified layout from among constituent elements of the web pages stored in advance in the web server; and

(c) a step of arranging the constituent elements acquired in step (b) in accordance with the layout specified in step (a), and displaying the web page designated by the user on a screen.

ADVANTAGEOUS EFFECTS OF THE INVENTION

[0016]

As described above, according to the present invention, it is possible to easily change user-specific screen layouts when using a web application, without requiring program modification and without forcing the user to perform a bothersome operation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

FIG. 1 is a block diagram showing a configuration of a web system according to an embodiment of the present invention.

FIG. 2 is a diagram showing an example of a layout definition file used in the embodiment of the present invention.

FIGS. 3A and 3B are diagrams showing examples of a web page displayed on a screen.

FIG. 4 is a sequence diagram showing operations in a web system according to the embodiment of the present invention.

FIG. 5 is a block diagram showing an example of a server computer that realizes a web server according to the embodiment of the present invention.

MODE FOR CARRYING OUT THE INVENTION

[0018]

Embodiment

Hereinafter, a web system, a web server, a terminal apparatus, a web page display method, and a program according to an embodiment of the present invention will be described with reference to FIGS. 1 to 4.

[0019]

System Configuration

First, the configurations of the web system, the web server, and the terminal apparatus of the present embodiment will be described with reference to FIG. 1. FIG. 1 is a block diagram showing the configuration of the web system of this embodiment of the present invention.

[0020]

As shown in FIG. 1, a web system 30 of the present Embodiment 1 includes a terminal apparatus 10 and a web server 20 that provides a web service to the terminal apparatus 10. In the example in FIG. 1, only one terminal apparatus 10 is shown for the sake of the description, but multiple terminal apparatuses 10 are used in actuality.

[0021]

Also, as shown in FIG. 1, the web server 20 includes a login processing unit 21, a file transmission unit 22, a layout definition storage unit 23, and a constituent element storage unit 24. Among these, the login processing unit 21 specifies a user 40 who made a login request via the terminal apparatus 10.

[0022]

The layout definition storage unit 23 stores a layout definition file for each user. A layout definition file is a file defining the layout of constituent elements of web pages

used in a web service. The constituent element storage unit 24 stores constituent elements that constitute web pages, such as image files, video files, text files, and UI components.

[0023]

The file transmission unit 22 specifies the layout definition file that corresponds to the user who made the login request, from among the layout definition files for respective users that are stored in the layout definition storage unit 23. The file transmission unit 22 then transmits the specified layout definition file to the terminal apparatus 10.

[0024]

Also, as shown in FIG. 1, the terminal apparatus 10 includes an input reception unit 11, a layout definition interpretation unit 12, a constituent element acquisition unit 13, a screen display unit 14, and a display apparatus 16. Among these, the input reception unit 11 receives input operations (e.g., the designation of a web page or the input of login information) from the user 40, which are input via an input device (not shown in FIG. 1) such as a touch panel, a keyboard, or a mouse. The display apparatus 16 is a liquid crystal display apparatus or the like.

[0025]

When a layout definition file is transmitted from the web server 20, the layout definition interpretation unit 12 receives the layout definition file, and specifies the layout of the web page designated by the user 40, based on the transmitted layout definition file.

[0026]

The constituent element acquisition unit 13 acquires, from the constituent element storage unit 24 of the web server 20, constituent elements needed in the layout specified by the layout definition interpretation unit 12. The screen display unit 14 arranges the constituent elements acquired by the constituent element acquisition unit 13 in accordance with the layout specified by the layout definition interpretation unit 12, and displays the web page designated by the user 40 on the screen of the display apparatus 16.

[0027]

Also, in the present embodiment, the layout definition interpretation unit 12, the constituent element acquisition unit 13, and the screen display unit 14 are realized by a later-described program, and constitute a portion of the web browser 15.

[0028]

In this way, in the web system 30, unlike an ordinary web system, the constituent elements such as UI components that constitute a web page, and the layout definitions that define the arrangement positions of the constituent elements on the web page are separate from each other, and are separately transmitted to the terminal apparatus 10. Also, the transmitted layout definitions are layout definitions that have been set with respect to the user who is logged in, and the user can view a desired screen layout for a web page by merely logging in.

[0029]

In other words, according to the web system 30, it is possible to easily change user-specific screen layouts when using a web application, without requiring modifications to the program for displaying the constituent elements of the web page, and without forcing the user to perform a bothersome operation.

[0030]

The following is a more specific description given with reference to FIGS. 2 and 3. FIG. 2 is a diagram showing an example of a layout definition file used in this embodiment of the present invention.

[0031]

As shown in FIG. 2, a layout definition file 50 has an area 51 for each web page. In the example in FIG. 2, one area 51 is from <screen> to </screen>. Also, the layout of constituent elements on a corresponding web page is defined in each area 51.

[0032]

Specifically, in each area 51, information specifying the constituent elements of the corresponding web page, the display positions of the constituent elements, and the sizes of the constituent elements are described in areas 52 from <widget> to </widget>. Also, in the example in FIG. 2, the information specifying the constituent elements of a

web page is a URL (Uniform Resource Locator) indicating the storage location of image files that are the constituent elements.

[0033]

FIGS. 3A and 3B each show an example of a web page displayed on a screen. As shown in FIGS. 3A and 3B, a screen 60a and a screen 60b show web pages indicating the same content, but the display positions of constituent elements 61 to 65 are different. According to the web system 30, even with the same web page, a different layout can be used for each user.

[0034]

Also, FIGS. 3A and 3B show an example in which the web system 30 is applied to the description of items from a retail store. In this example, the web server 20 transmits a web page regarding items to the terminal apparatus 10 held by a store employee (user), in accordance with a request from the store employee. The store employee can customize the display screen of the terminal apparatus 10 that they are using in order to more easily make items appealing to a customer, and thus an increase in sales can be expected.

[0035]

Also, in the case of the application shown in FIGS. 3A and 3B, a tablet-style information terminal is one specific example of the terminal apparatus 10. Note that there are no particular limitations on specific examples of the terminal apparatus 10 in the present embodiment, and other specific examples include a personal computer, a smartphone, a tablet-style terminal apparatus, and an electronic paper device.

[0036]

System Configuration

Next, operations of the web system 30, the web server 20, and the terminal apparatus 10 of this embodiment of the present invention will be described with reference to FIG. 4. FIG. 4 is a sequence diagram showing operations in the web system of this embodiment of the present invention.

[0037]

FIGS. 1 to 3 will be referenced when necessary in the following description.

Also, in the present embodiment, a web page display method is implemented by causing the web system 30 to operate. Accordingly, the following description of operations in the web system 30 will also serve as a description of the web page display method of the present embodiment.

[0038]

As shown in FIG. 4, first, the user 40 inputs login information including an ID and a password, and the input reception unit 11 of the terminal apparatus 10 receives the input of the login information and transmits the login information to the web server 20 (step A1).

[0039]

Next, in the web server 20, the login processing unit 21 receives the transmitted login information and performs login processing (step A2). Specifically, the login processing unit 21 determines whether or not the user 40 is to be allowed to log in based on the ID and the password included in the login information. In the case of allowing login, the login processing unit 21 notifies the ID of the user 40 to the file transmission unit 22 (step A3).

[0040]

Next, the file transmission unit 22 access the layout definition storage unit 23 and reads out the layout definition file that corresponds to the ID that was notified in step A3 (step A4). The file transmission unit 22 then transmits the layout definition file that was read out in step A4 to the terminal apparatus 10 (step A5).

[0041]

After step A5 is executed, in the terminal apparatus 10, the layout definition interpretation unit 12 receives the transmitted layout definition file. Thereafter, when the user 40 designates a web page, the input reception unit 11 requests the layout definition interpretation unit 12 to display the designated web (step A6).

[0042]

Next, the layout definition interpretation unit 12 interprets the layout definition file that was transmitted in step A5, and specifies the layout of the web page designated by the user 40 (step A7).

[0043]

The layout definition interpretation unit 12 then outputs the specified layout to the screen display unit 14 (step A8), and instructs the constituent element acquisition unit 13 to acquire the constituent elements that are needed in the specified layout (step A9).

[0044]

Next, after the instruction is given in step A9, the constituent element acquisition unit 13 requests the file transmission unit 22 of the web server 20 to transmit constituent elements, in order to acquire the necessary constituent elements (step A10).

[0045]

Next, in the web server 20, the file transmission unit 22 accesses the constituent element storage unit 24, reads out the constituent elements that were requested in step A10 (step A11), and transmits the constituent elements that were read out to the terminal apparatus 10 (step A12).

[0046]

Next, in the terminal apparatus 10, the constituent element acquisition unit 13 receives the constituent elements that were transmitted in step A12, and outputs the received constituent elements to the screen display unit 14 (step A13). Note that in the present embodiment, the screen display unit 14 may receive the constituent elements that were transmitted in step A12.

[0047]

The screen display unit 14 then arranges the constituent elements that were received from the web server 20 in accordance with the layout that was output in step A8, and displays the web page designated by the user 40 on the screen of the display apparatus 16 (step A14).

[0048]

Specifically, assume that the output layout is the layout for the “item information screen” shown in FIG. 2, for example. In this case, the screen display unit 14 creates fields for item information (overview), item popularity information, and the like, which are described in the layout, and displays the corresponding acquired image files at set

positions and instructed sizes in the fields.

[0049]

Effects of the Embodiment

As described above, in the present embodiment, the constituent elements such as UI components that constitute a web page, and the layout definitions that define the arrangement positions of the constituent elements on the web page are separate from each other, and are separately transmitted to the terminal apparatus 10. Accordingly, it is possible to easily change user-specific screen layouts without requiring modifications to the program for displaying the constituent elements, and without forcing the user to perform a bothersome operation, thus improving convenience for the user.

[0050]

Also, in the present embodiment, layout definition information does not need to be registered in the terminal apparatus in advance, and is managed by the web server 20, thus reducing the burden on the administrator of the web system 30. Also, since definitions for multiple web pages are set in the layout definition file, the burden on the administrator is reduced from this viewpoint as well.

[0051]

Furthermore, in the present embodiment, the corresponding layout definition file is selected when a user logs in, and therefore even if the same terminal apparatus 10 is used by multiple users, the screen layout can be easily changed.

[0052]

Program

A first program of the present embodiment need only be a program for causing a server computer to execute steps A2 to A5, A11, and A12 shown in FIG. 4. The web server 20 of the present embodiment can be realized by the first program being installed in the server computer and executed. In this case, the CPU (Central Processing Unit) of the server computer functions and performs processing as the login processing unit 21 and the file transmission unit 22. Also, a storage apparatus such as a hard disk included in the computer functions as the layout definition storage unit 23 and the constituent element storage unit 24.

[0053]

Also, a second program of the present embodiment need only be a program for causing a computer, particularly an information terminal that includes a web browser, to execute steps A1, A6 to A10, A13, and A14 shown in FIG. 4. The terminal apparatus 10 of the present embodiment can be realized by the second program being installed in the computer and executed. In this case, the CPU (Central Processing Unit) of the computer functions and performs processing as the layout definition interpretation unit 12, the constituent element acquisition unit 13, and the screen display unit 14. Also, examples of this computer (information terminal) include a tablet-style information terminal, a personal computer, a smartphone, and an electronic paper device.

[0054]

The following describes a server computer that realizes the web server 20 by executing the first program, with reference to FIG. 5. FIG. 5 is a block diagram showing an example of the server computer that realizes the web server of this embodiment of the present invention. Note that in the case where the information terminal that executes the second program is a personal computer, the configuration of this information terminal is similar to the server computer shown in FIG. 5.

[0055]

As show in FIG. 5, a server computer 110 includes a CPU 111, a main memory 112, a storage apparatus 113, an input interface 114, a display controller 115, a data reader/writer 116, and a communication interface 117. These units are connected via a bus 121 so as to enable data communication therebetween.

[0056]

The CPU 111 loads the program (code) of the present embodiment, which is stored in the storage apparatus 113, to the main memory 112, and carries out various types of operations by executing portions of the program in a predetermined sequence. The main memory 112 is typically a volatile storage apparatus such as a DRAM (Dynamic Random Access Memory). Also, the program of the present embodiment is provided in the state of being stored on a computer-readable recording medium 120. Note that the program of the present embodiment may be distributed over the Internet,

with which a connection is established via the communication interface 117.

[0057]

Also, besides a hard disk, specific examples of the storage apparatus 113 include a semiconductor storage apparatus such as a flash memory. The input interface 114 mediates the transmission of data between the CPU 111 and an input device 118 such as a keyboard or a mouse. The display controller 115 is connected to a display apparatus 119, and controls display performed by the display apparatus 119.

[0058]

The data reader/writer 116 mediates the transmission of data between the CPU 111 and the recording medium 120, and executes the reading out of programs from the recording medium 120 and the writing of the results of processing performed in the computer 110 to the recording medium 120. The communication interface 117 mediates the transmission of data between the CPU 111 and other computers.

[0059]

Also, specific examples of the recording medium 120 include general semiconductor storage devices such as a CF (Compact Flash (registered trademark)) card and an SD (Secure Digital) card, a magnetic storage medium such as a flexible disk, and an optical storage medium such as a CD-ROM (Compact Disk Read Only Memory).

[0060]

Although the present invention has been described above with reference to embodiments, the present invention is not limited to the above embodiments. The configuration and details of the present invention can be modified in various ways comprehensible by a person skilled in the art within the scope of the present invention.

[0061]

This application is based upon and claims the benefit of priority from Japanese patent application No. 2012-279884, filed on December 21, 2012, the disclosure of which is incorporated herein in its entirety by reference.

INDUSTRIAL APPLICABILITY

[0062]

As described above, according to the present invention, it is possible to easily change user-specific screen layouts when using a web application, without requiring program modification and without forcing the user to perform a bothersome operation. The present invention is useful to a web system for providing a web service.

REFERENCE SIGNS LIST

[0063]

- 10 Terminal apparatus
- 11 Input reception unit
- 12 Layout definition interpretation unit
- 13 Constituent element acquisition unit
- 14 Screen display unit
- 15 Web browser
- 20 Web server
- 21 Login processing unit
- 22 File transmission unit
- 23 Layout definition storage unit
- 24 Constituent element storage unit
- 30 Web system
- 40 User
- 50 Layout definition file
- 51 Area
- 52 Area
- 60a, 60b Screen
- 61-65 Constituent element
- 110 Server computer
- 111 CPU
- 112 Main memory
- 113 Storage apparatus
- 114 Input interface

115	Display controller
116	Data reader/writer
117	Communication interface
118	Input device
119	Display apparatus
120	Recording medium
121	Bus

CLAIMS

1. A web system comprising a terminal apparatus and a web server that provides a web service to the terminal apparatus,

the web server comprising:

a login processing unit that specifies a user who made a login request via the terminal apparatus;

a layout definition storage unit that stores a layout definition file for each user, the layout definition files each defining a layout of constituent elements of web pages used in the web service;

a file transmission unit that transmits, from among the stored layout definition files for each user, the layout definition file that corresponds to the user who made the login request, to the terminal apparatus; and

a constituent element storage unit that stores constituent elements that constitute the web pages, and

the terminal apparatus comprising:

a layout definition interpretation unit that specifies a layout of a web page designated by the user, based on the layout definition file that was transmitted from the web server;

a constituent element acquisition unit that acquires constituent elements needed in the specified layout from the constituent element storage unit of the web server; and

a screen display unit that arranges the acquired constituent elements in accordance with the specified layout, and displays the web page designated by the user on a screen.

2. The web system according to claim 1, wherein each of the layout definition files has an area for each of the web pages, and at least information specifying constituent elements of a corresponding web page, display positions of the constituent elements, and sizes of the constituent elements are described in each area.

3. A web server that provides a web service to a terminal apparatus, the web server comprising:

a login processing unit that specifies a user who made a login request via a terminal apparatus;

a layout definition storage unit that stores a layout definition file for each user, the layout definition files each defining a layout of constituent elements of web pages used in the web service;

a file transmission unit that transmits, from among the stored definition files for each user, the layout definition file that corresponds to the user who made the login request, to the terminal apparatus; and

a constituent element storage unit that stores constituent elements that constitute the web pages.

4. A terminal apparatus that receives provision of a web service from a web server, the terminal apparatus comprising:

a layout definition interpretation unit that specifies a layout of a web page designated by a user, based on a layout definition file that was transmitted from the web server and defines a layout of constituent elements of web pages used in the web service;

a constituent element acquisition unit that acquires constituent elements needed in the specified layout from among constituent elements of the web pages stored in advance in the web server; and

a screen display unit that arranges the acquired constituent elements in accordance with the specified layout, and displays the web page designated by the user on a screen.

5. A web page display method using a terminal apparatus and a web server that provides a web service to the terminal apparatus, the web page display method comprising:

(a) a step of specifying, by the web server, a user who made a login request via the terminal apparatus;

(b) a step of, in the web server, transmitting, by the web server, from among layout definition files that are stored for respective users and each define a layout of constituent elements of web pages used in the web service, the layout definition file that corresponds to the user who made the login request, to the terminal apparatus;

(c) a step of specifying, by the terminal apparatus, a layout of a web page designated by the user, based on the layout definition file that was transmitted from the web server;

(d) a step of acquiring, by the terminal apparatus, constituent elements needed in the layout specified in step (c), from among constituent elements of the web pages stored in advance in the web server; and

(e) a step of arranging the constituent elements acquired in step (d) in accordance with the layout specified in step (c), and displaying the web page designated by the user on a screen.

6. A computer-readable recording medium having recorded thereon a program for provision of a web service to a terminal apparatus by a server computer,

the recorded program including commands for causing the server computer to execute:

(a) a step of specifying a user who made a login request via the terminal apparatus;

(b) a step of transmitting, from among layout definition files that are stored for respective users and each define a layout of constituent elements of web pages used in the web service, the layout definition file that corresponds to the user who made the login request, to the terminal apparatus; and

(c) a step of transmitting the constituent elements of the web page to the terminal apparatus in accordance with an instruction from the terminal apparatus.

7. A computer-readable recording medium having recorded thereon a program for reception of a web service from a web server by a computer,

the recorded program including commands for causing the computer to execute:

(a) a step of specifying a layout of a web page designated by a user, based on a layout definition file that was transmitted from the web server and defines a layout of constituent elements of web pages used in the web service;

(b) a step of acquiring constituent elements needed in the specified layout from among constituent elements of the web pages stored in advance in the web server; and

(c) a step of arranging the constituent elements acquired in step (b) in accordance with the layout specified in step (a), and displaying the web page designated by the user on a screen.