US006789263B1

(12) **United States Patent**
Shimada et al.

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(45) **Date of Patent: Sep. 7, 2004**

(54) **DATA CONVERSION METHOD AND APPARATUS**

(75) Inventors: **Takao Shimada**, Yokohama (JP); **Naoko Iwami**, Machida (JP); **Tomohisa Kohiyama**, Yokohama (JP); **Mitsuo Hayashi**, Koshigaya (JP); **Yasuyuki Kuwahara**, Hadano (JP)

(73) Assignee: **Hitachi, Ltd.** (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **08/878,259**

(22) Filed: **Jun. 18, 1997**

Related U.S. Application Data

(63) Continuation-in-part of application No. 08/633,311, filed on Apr. 15, 1996.

(30) **Foreign Application Priority Data**

May 17, 1995 (JP) 7-118673
Jun. 27, 1995 (JP) 7-160972
Jul. 18, 1995 (JP) 7-181550
Jun. 20, 1996 (JP) 8-159487

(51) **Int. Cl.**[7] **H04N 7/173**

(52) **U.S. Cl.** **725/119**; 725/95; 725/105; 725/37; 709/246

(58) **Field of Search** 725/119, 118, 725/120, 114, 116, 91, 93, 97, 98, 105, 121, 95; 709/219, 203, 206, 207, 246; H04N 7/16, 7/173

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Primary Examiner—Chris Grant
(74) *Attorney, Agent, or Firm*—Sofer & Haroun, LLP

(57) **ABSTRACT**

A data conversion apparatus included an information input device, a holder for holding information designating a method of the conversion processing from input portion when the kind of the input information is examined and is judged as predetermined data for executing a data conversion processing, a convertor for executing the data in accordance with a predetermined rule, a synthesizer for generating new data by combining the input information with a predetermined data content, and an information output device for outputting the new data so generated. When the kind of the data is screen configuration data describing configuration of the screen output of an information processing unit, the predetermined rule adds a display area of the screen configuration and converts it to a screen configuration data capable of displaying a plurality of screen configurations on the same screen.

23 Claims, 39 Drawing Sheets

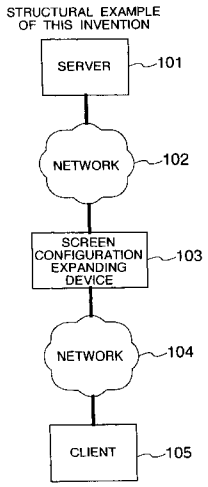


FIG. 1

STRUCTURAL EXAMPLE OF THIS INVENTION

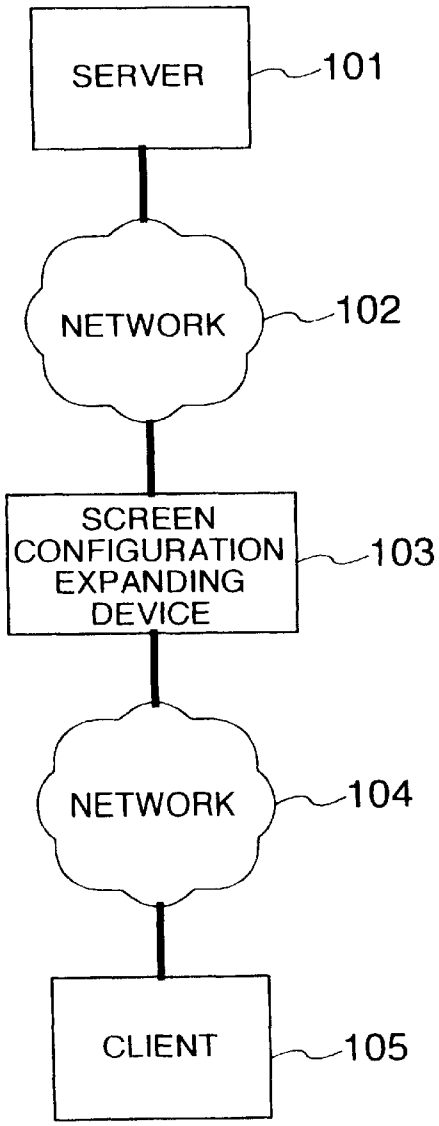


FIG. 4

STRUCTURAL EXAMPLE OF THIS INVENTION

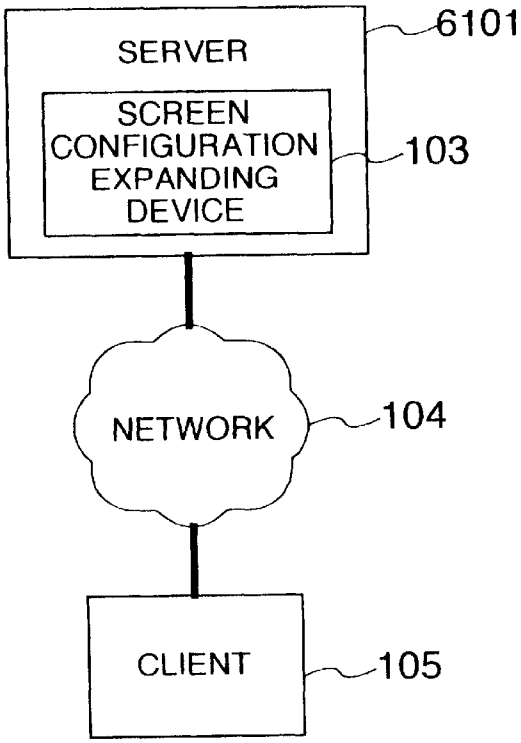


FIG. 2

EXAMPLE OF CONSTRUCTION OF SCREEN CONFIGURATION EXPANDING DEVICE

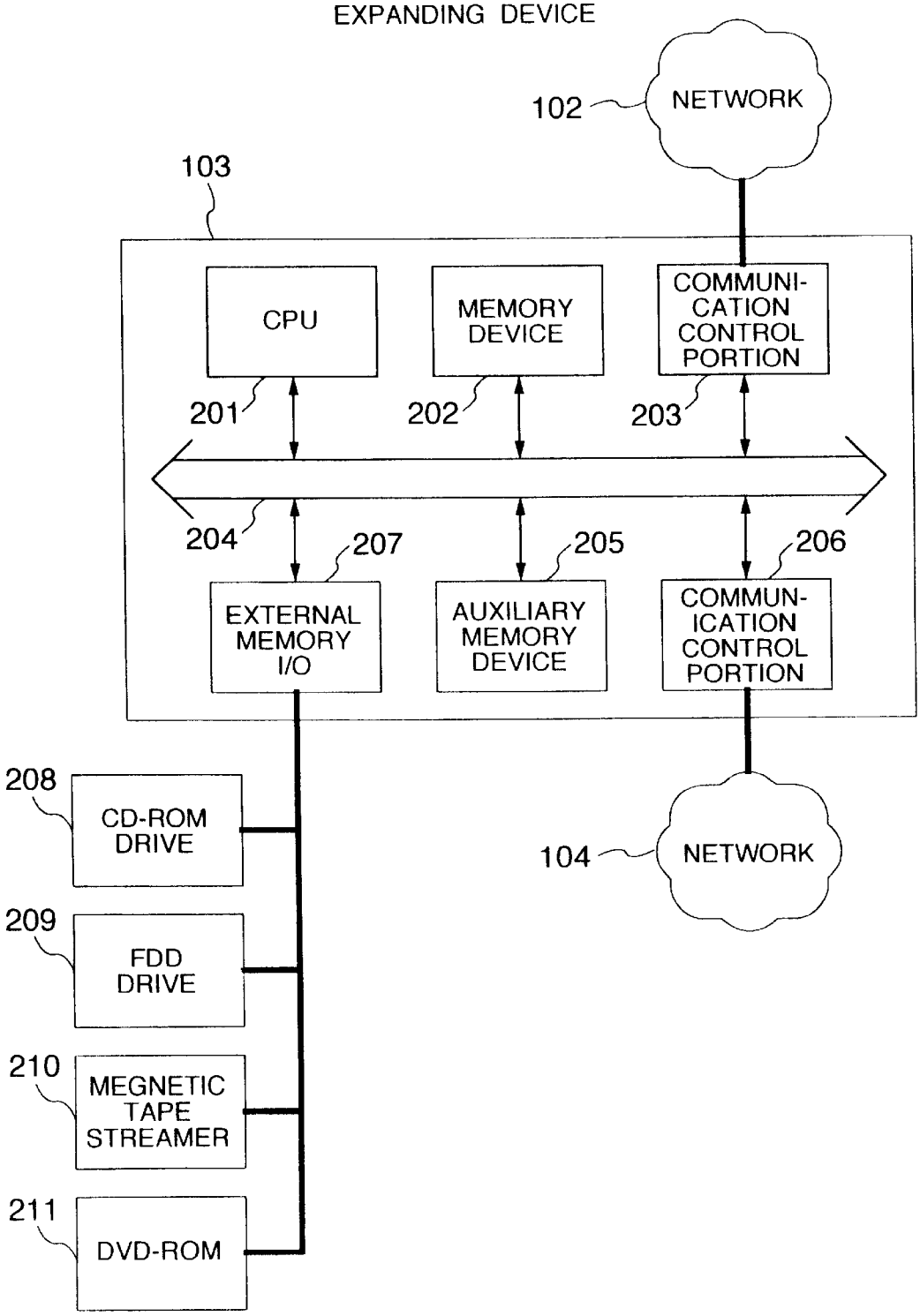


FIG. 3

EXAMPLE OF FUNCTIONAL BLOCK OF SCREEN CONFIGURATION EXPANDING DEVICE

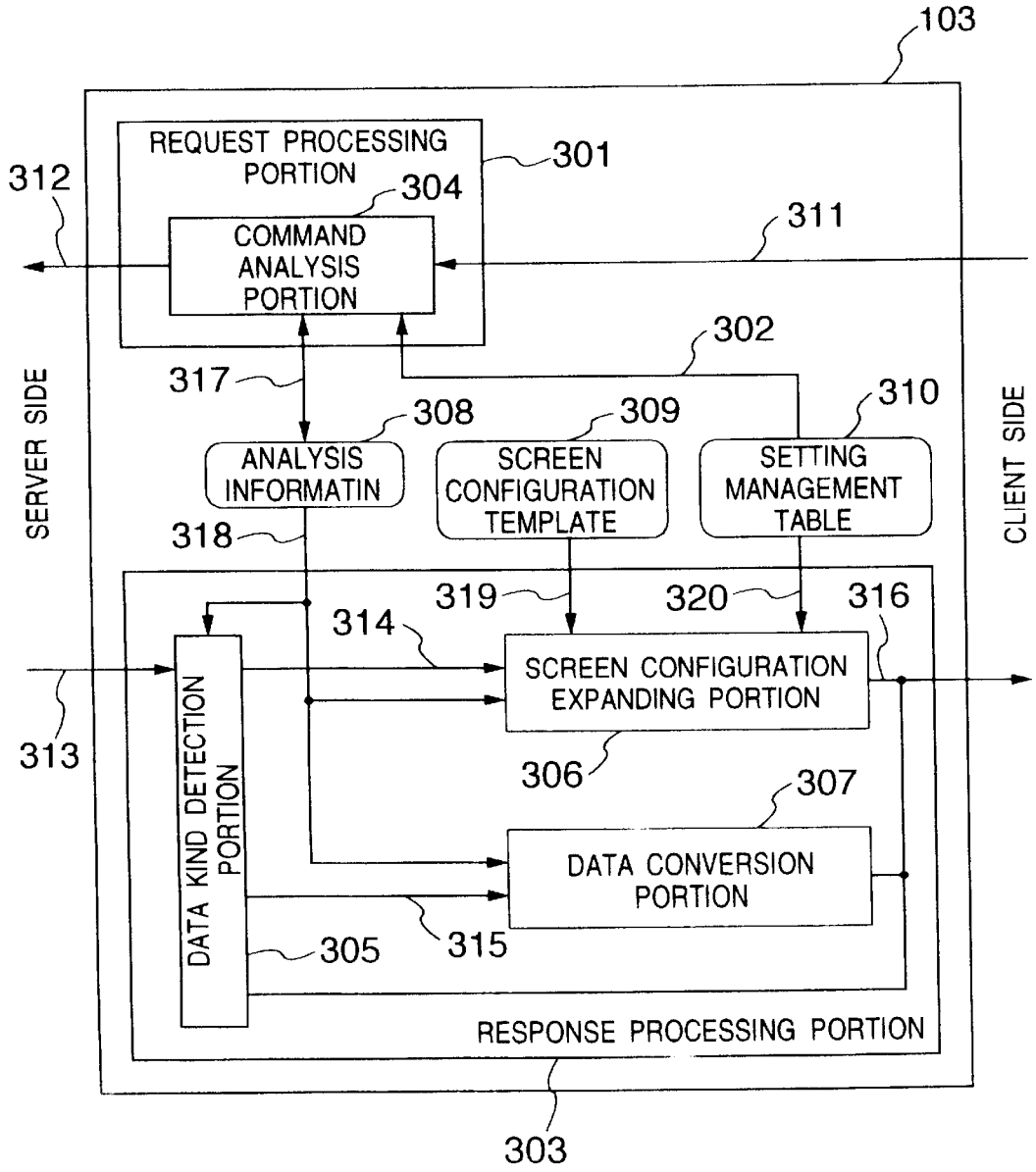


FIG. 5

EXAMPLE OF SCREEN CONFIGURATION DATA

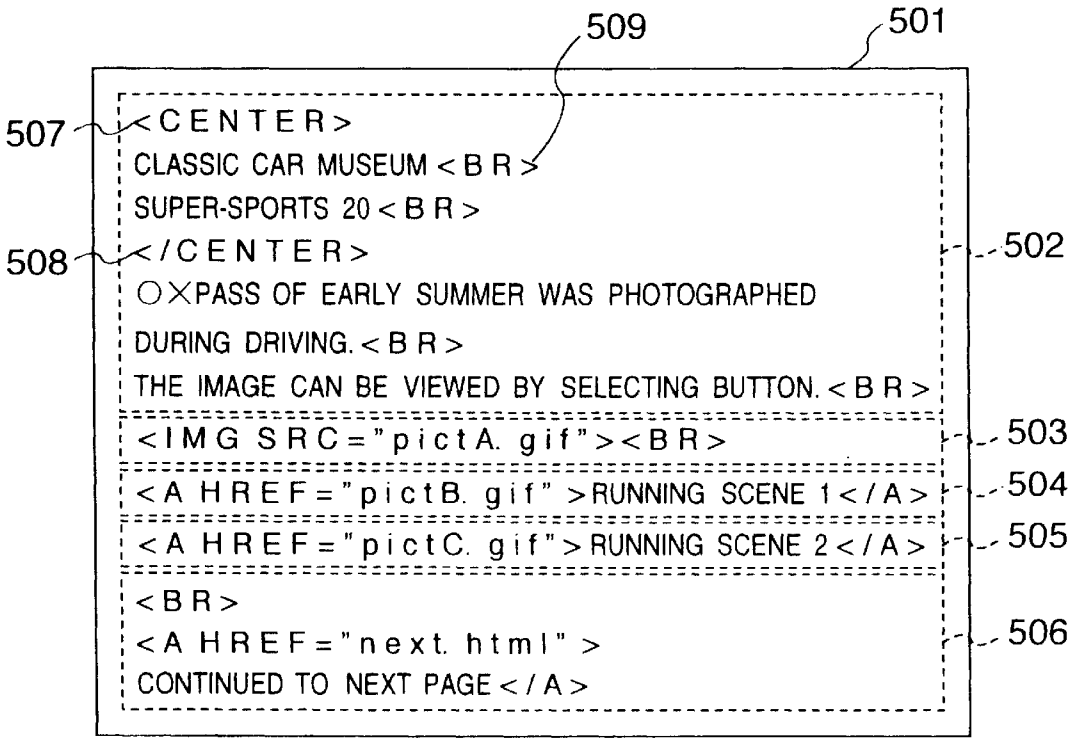


FIG. 6

DISPLAY EXAMPLE 1 OF CLIENT SCREEN

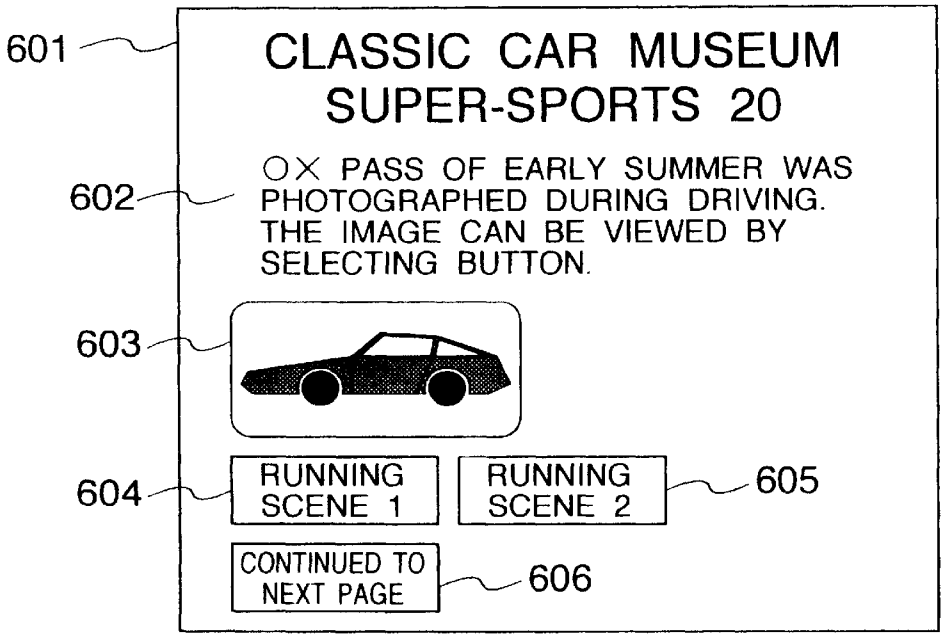


FIG. 7

DISPLAY EXAMPLE 2 OF CLIENT SCREEN

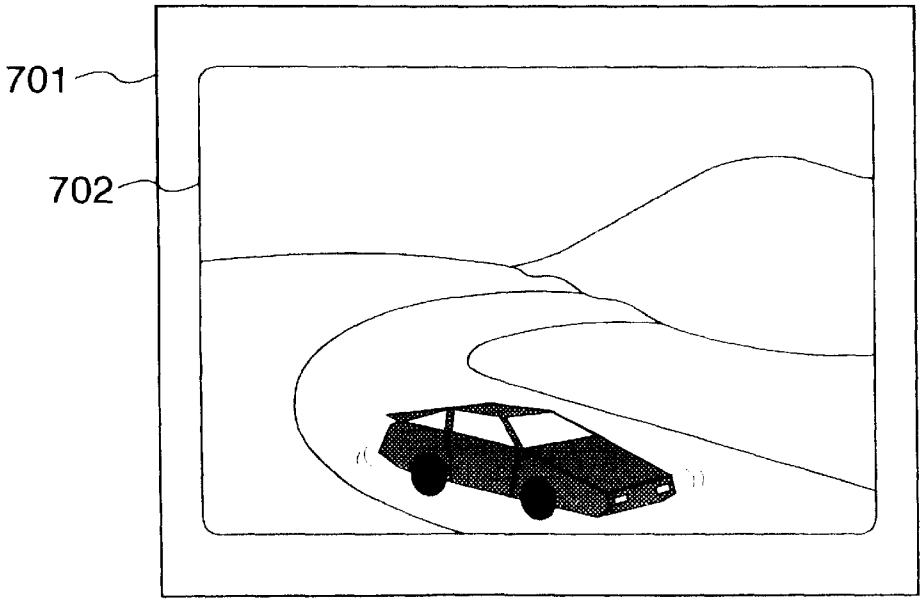


FIG. 8

EXAMPLE OF EXPANDED SCREEN CONFIGURATION DATA

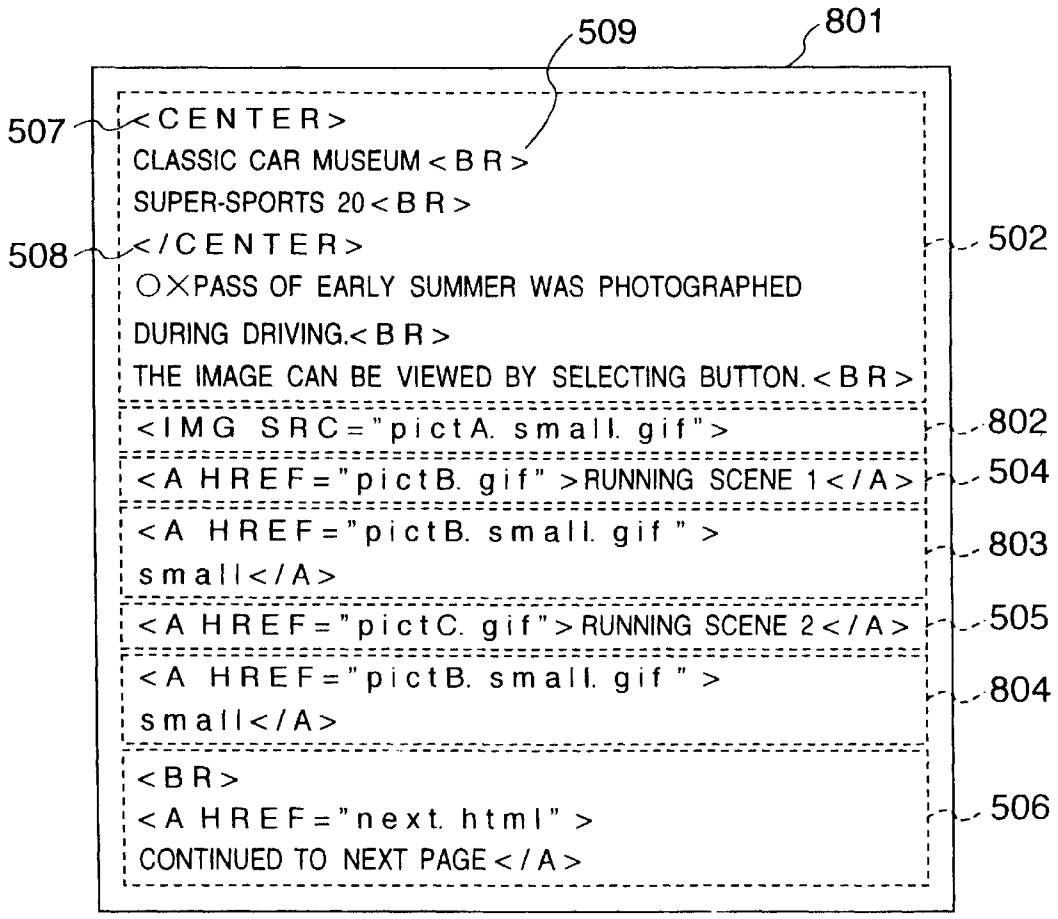


FIG. 9

DISPLAY EXAMPLE 1 OF CLIENT SCREEN UTILIZING DATA CONVERTING DEVICE

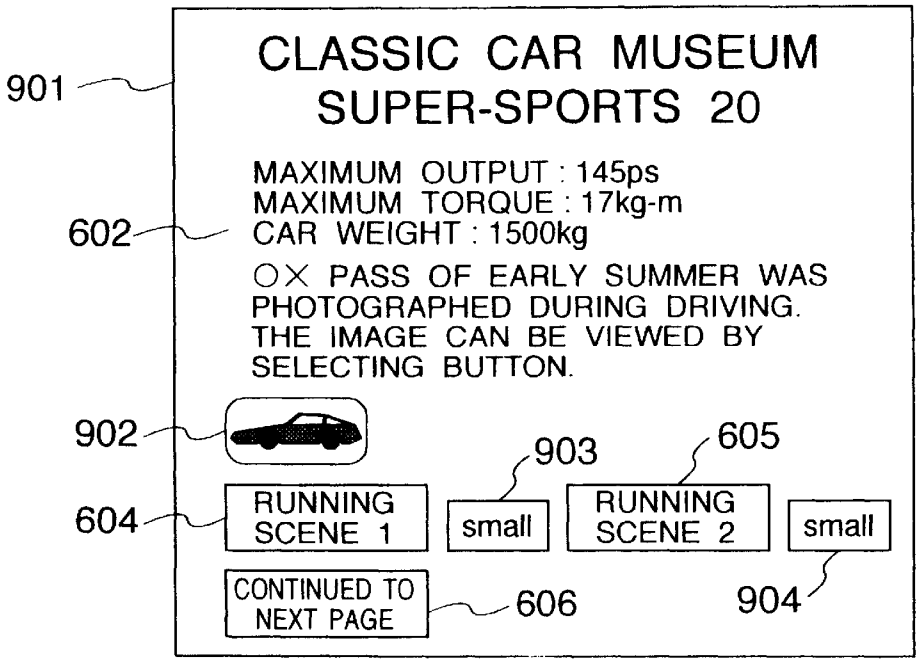


FIG. 10

DISPLAY EXAMPLE 2 OF CLIENT SCREEN UTILIZING DATA CONVERTING DEVICE

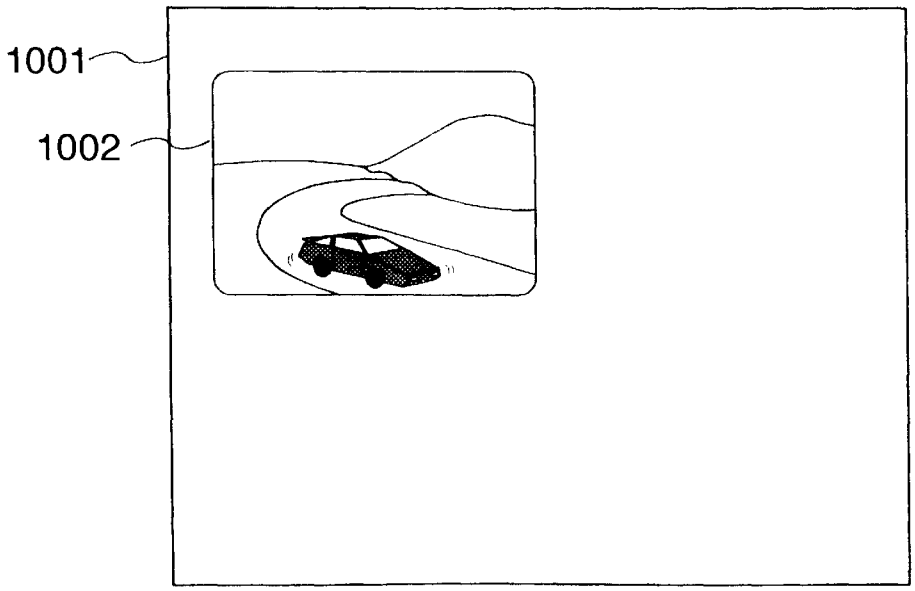


FIG. 11

EXAMPLE OF SCREEN CONFIGURATION TEMPLATE

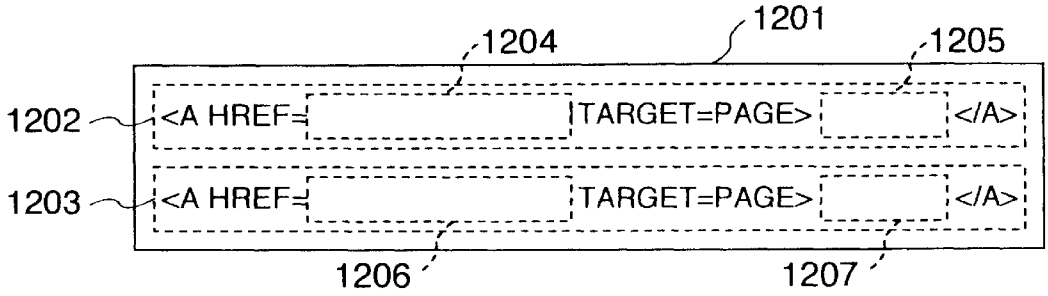


FIG. 12

EXAMPLE OF SETTING MANAGEMENT TABLE

1301

	SET NO.	UI BUTTON NAME	PAGE REFERENCE EXPANDER	CONFIGU-RATION EXPANDER	IMAGE REFERENCE EXPANDER
1302					
1303	1	NORMAL	. p-normal	. normal	NIL
1304	2	QUICK	. p-quick	. quick	. small

FIG. 13

EXAMPLE OF ADDITIONAL SCREEN CONFIGURATION DATA

1401

1402 <A HREF=menu.p-normal.html TARGET=PAGE>NORMAL</A>

1403 <A HREF=menu.p-quick.html TARGET=PAGE>QUICK</A>

FIG. 14

DISPLAY EXAMPLE OF ADDITIONAL SCREEN CONFIGURATION DATA

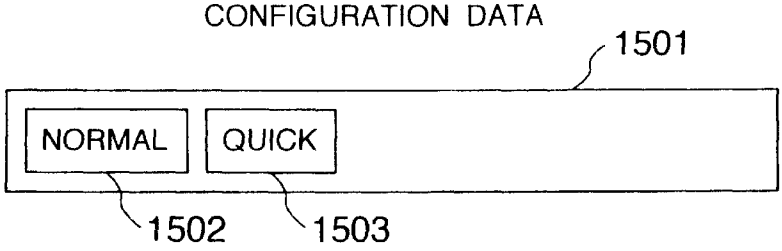


FIG. 15

EXAMPLE OF SCREEN CONFIGURATION TEMPLATE

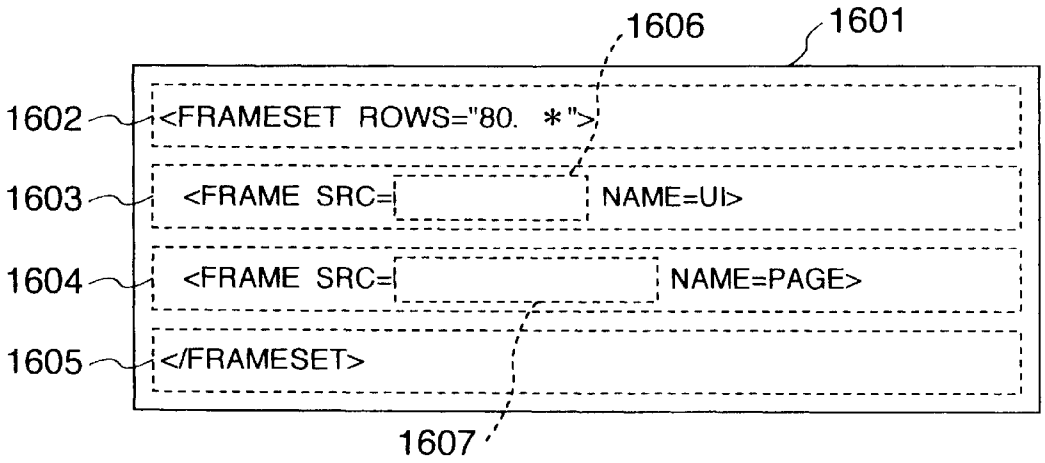


FIG. 16

EXAMPLE OF EXPANDED SCREEN CONFIGURATION DATA

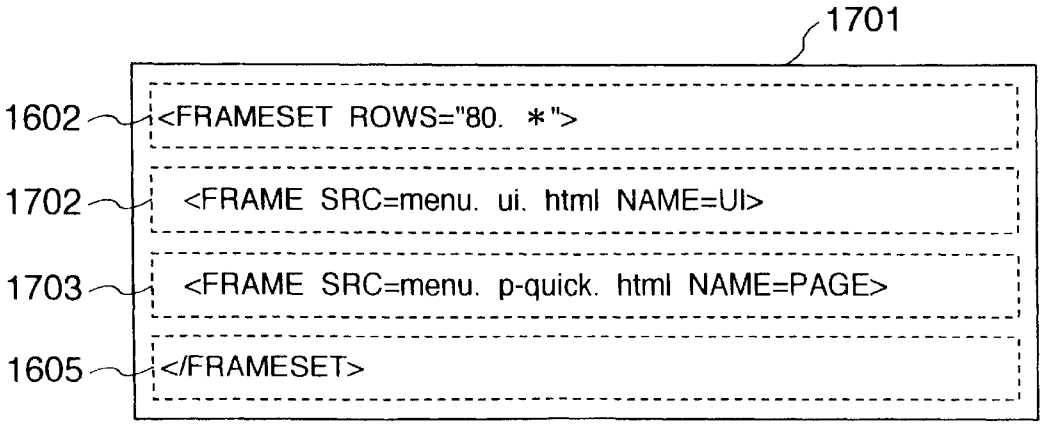


FIG. 17

EXAMPLE OF CONVERTED SCREEN CONFIGURATION DATA
(QUICK MODE)

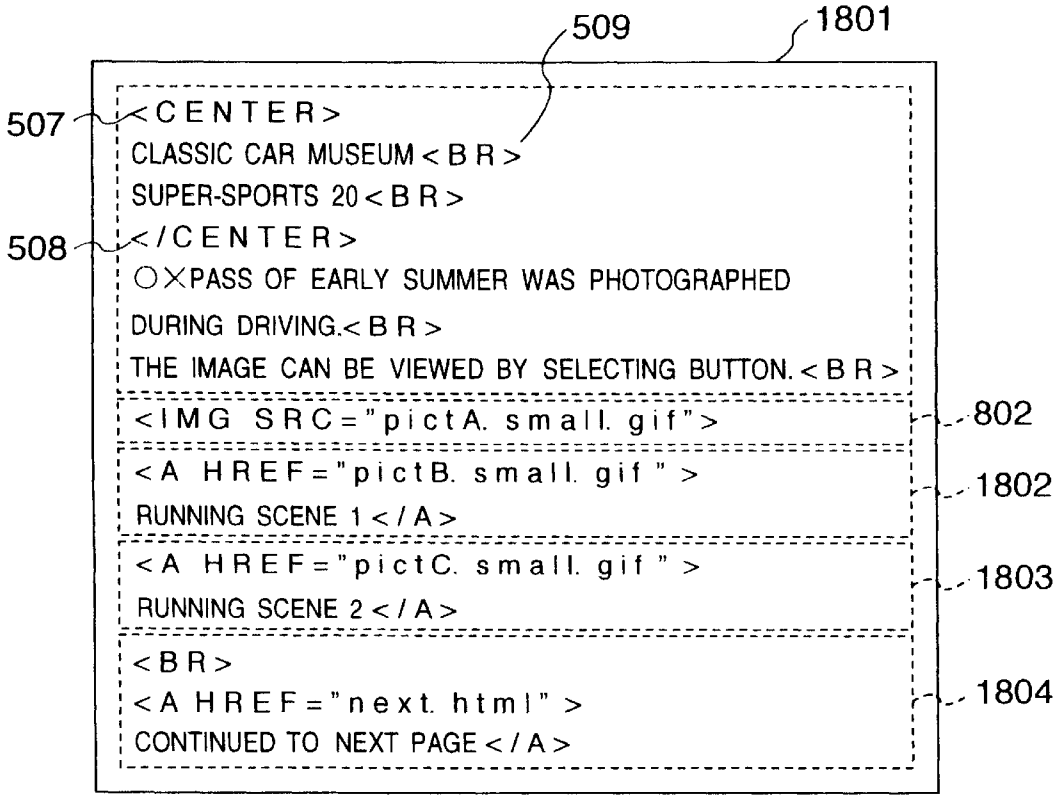


FIG. 18

EXAMPLE 1 OF CLIENT SCREEN

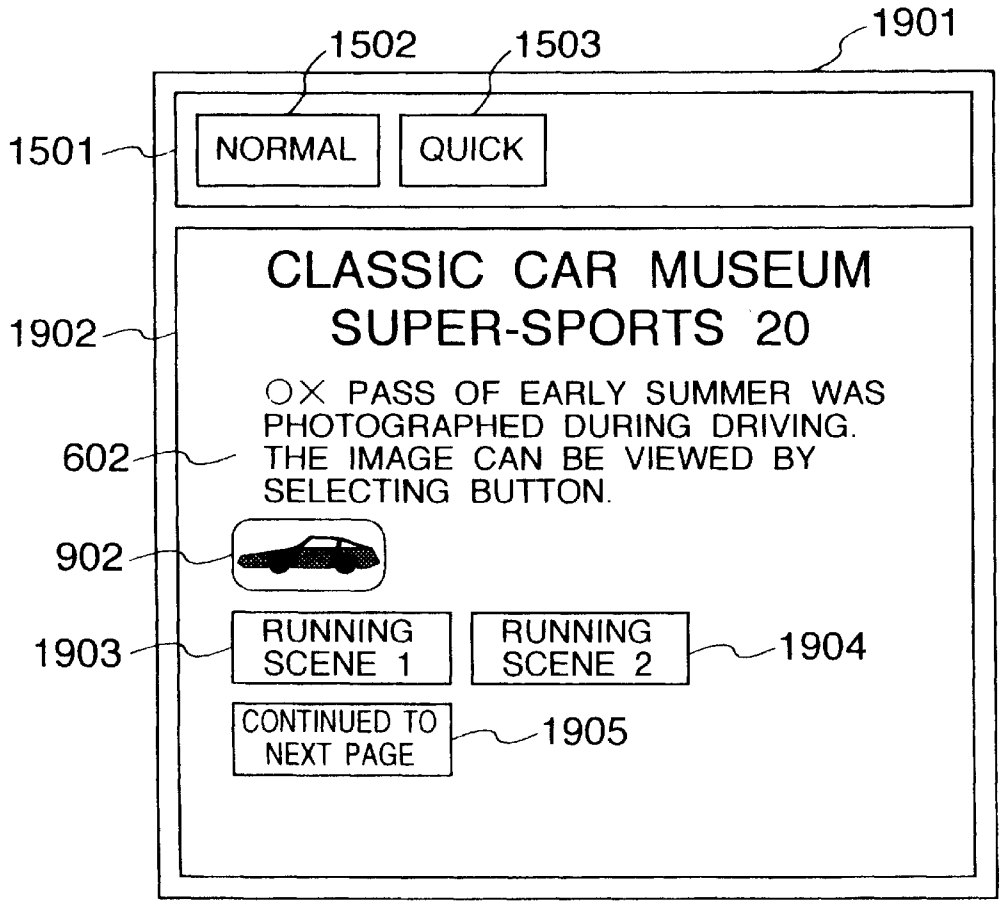


FIG. 19

EXAMPLE 2 OF CLIENT SCREEN

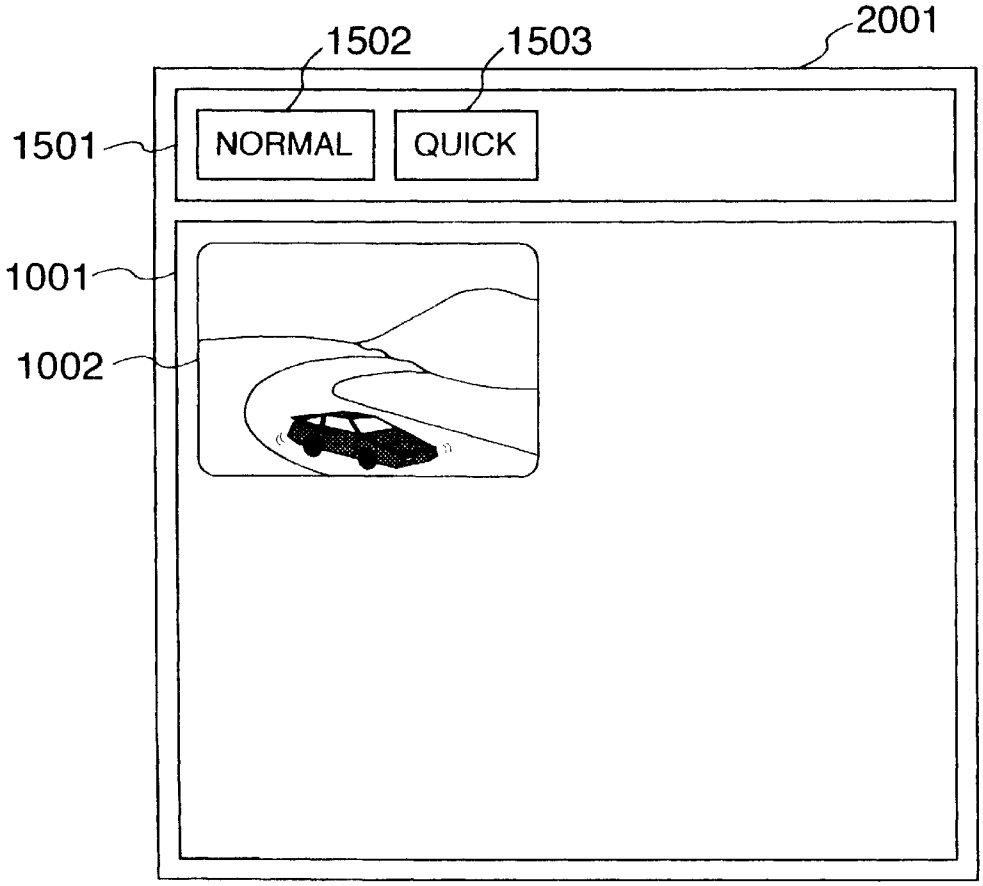


FIG. 20

EXAMPLE OF CONVERTED SCREEN CONFIGURATION DATA (NORMAL MODE)

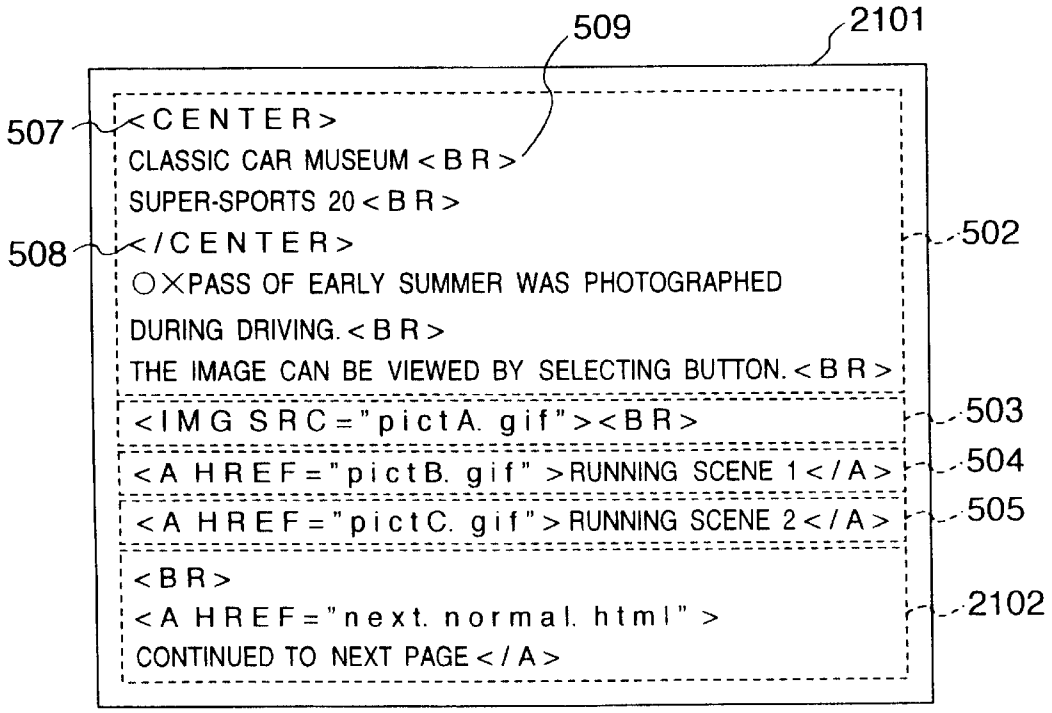


FIG. 21

EXAMPLE 3 OF CLIENT SCREEN

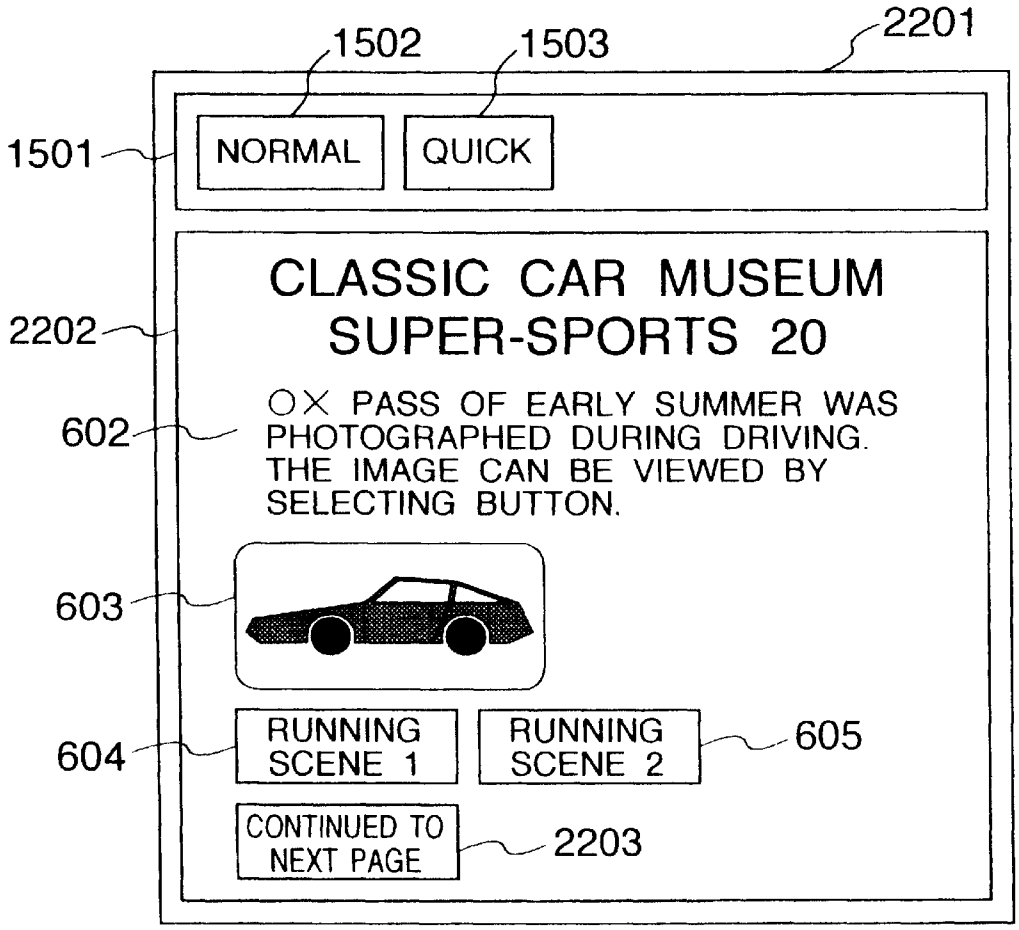


FIG. 22

DISPLAY EXAMPLE 4 OF CLIENT SCREEN

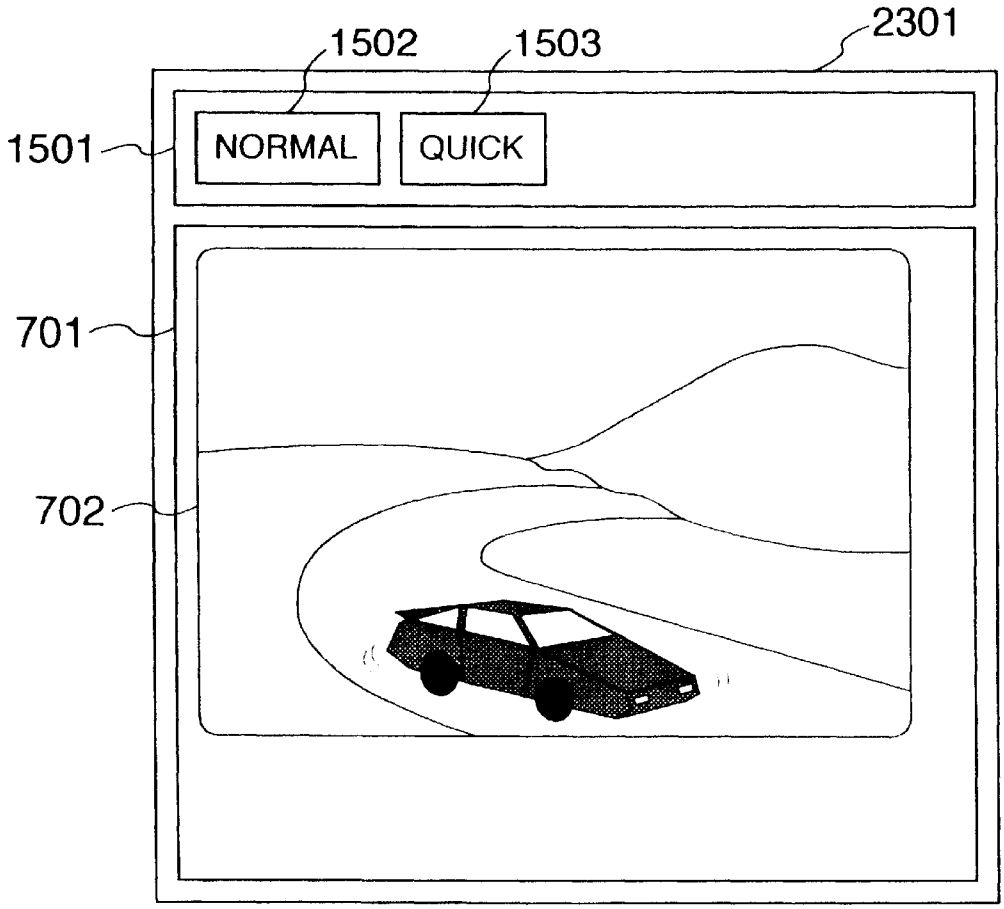


FIG. 23

EXAMPLE 5 OF CLIENT SCREEN

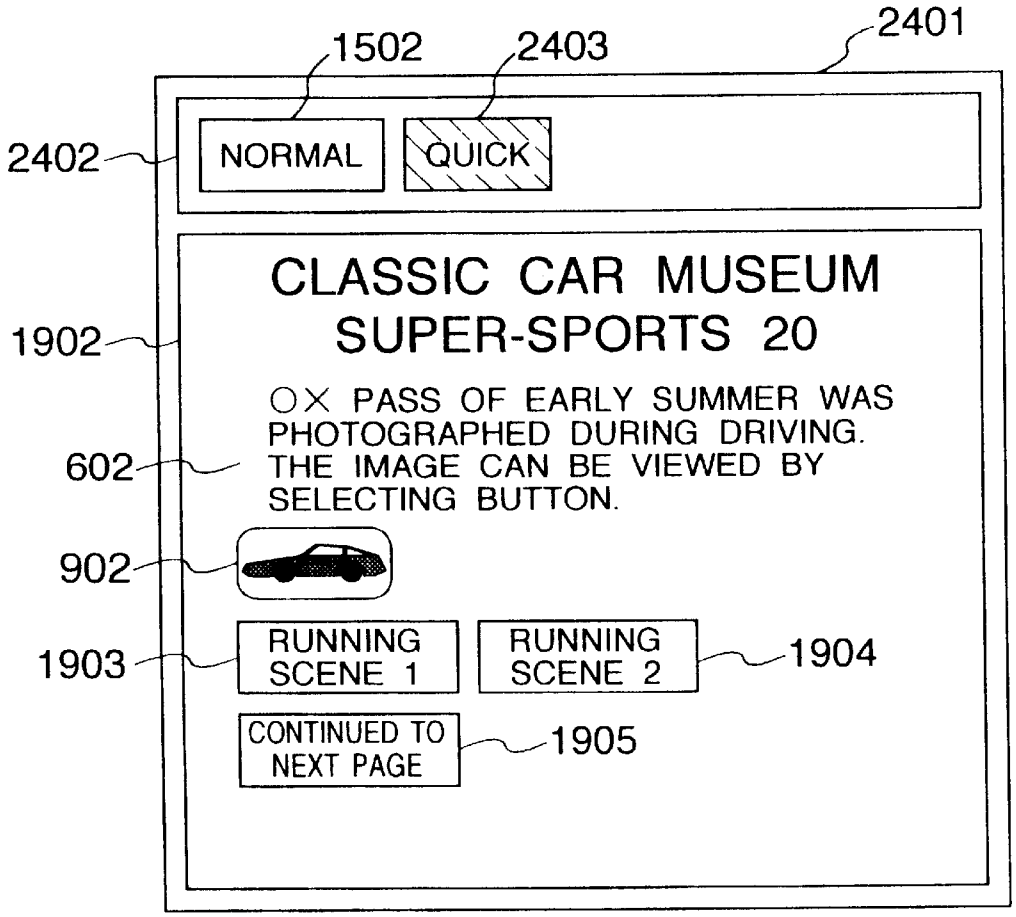


FIG. 24

EXAMPLE 6 OF CLIENT SCREEN

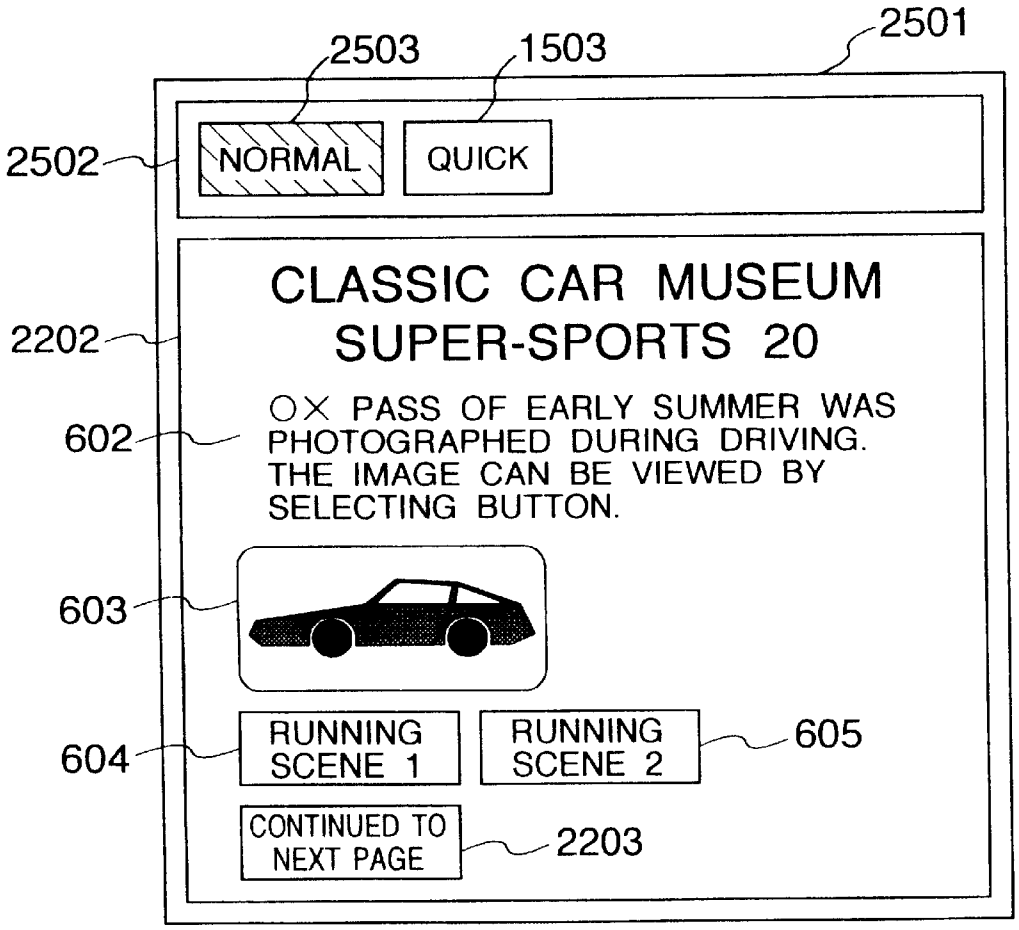


FIG. 25

EXAMPLE 7 OF CLIENT SCREEN

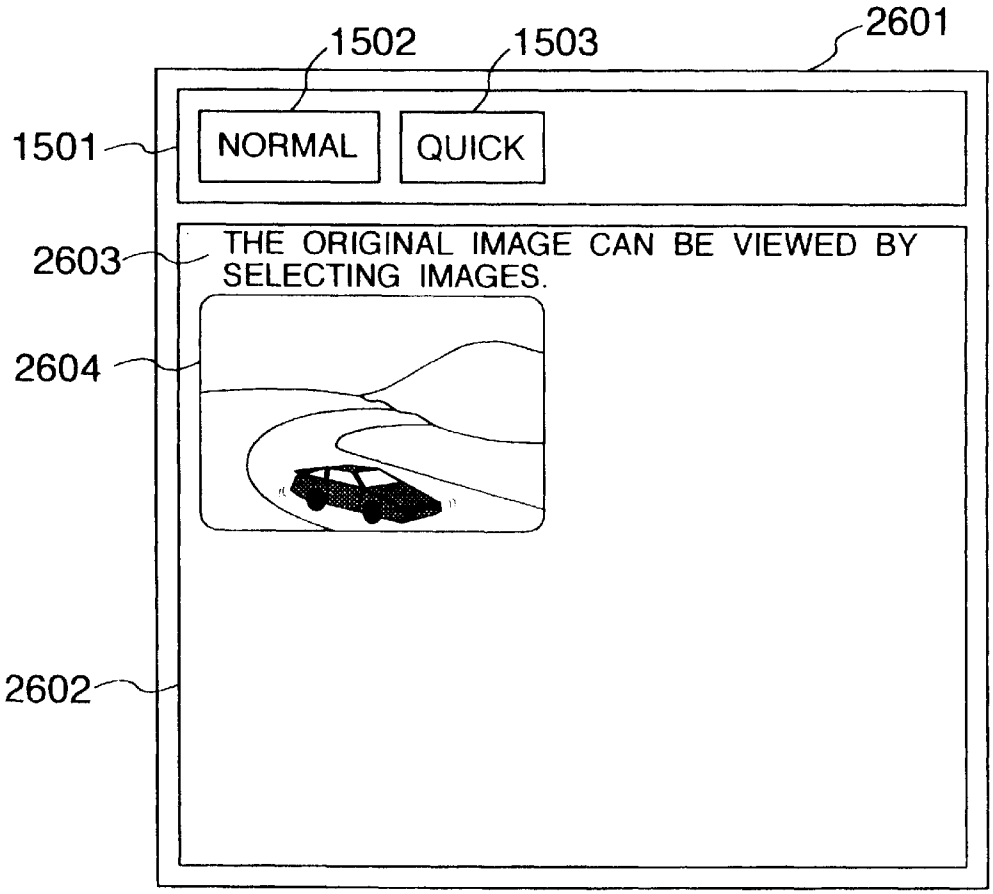


FIG. 26

EXAMPLE 8 OF CLIENT SCREEN

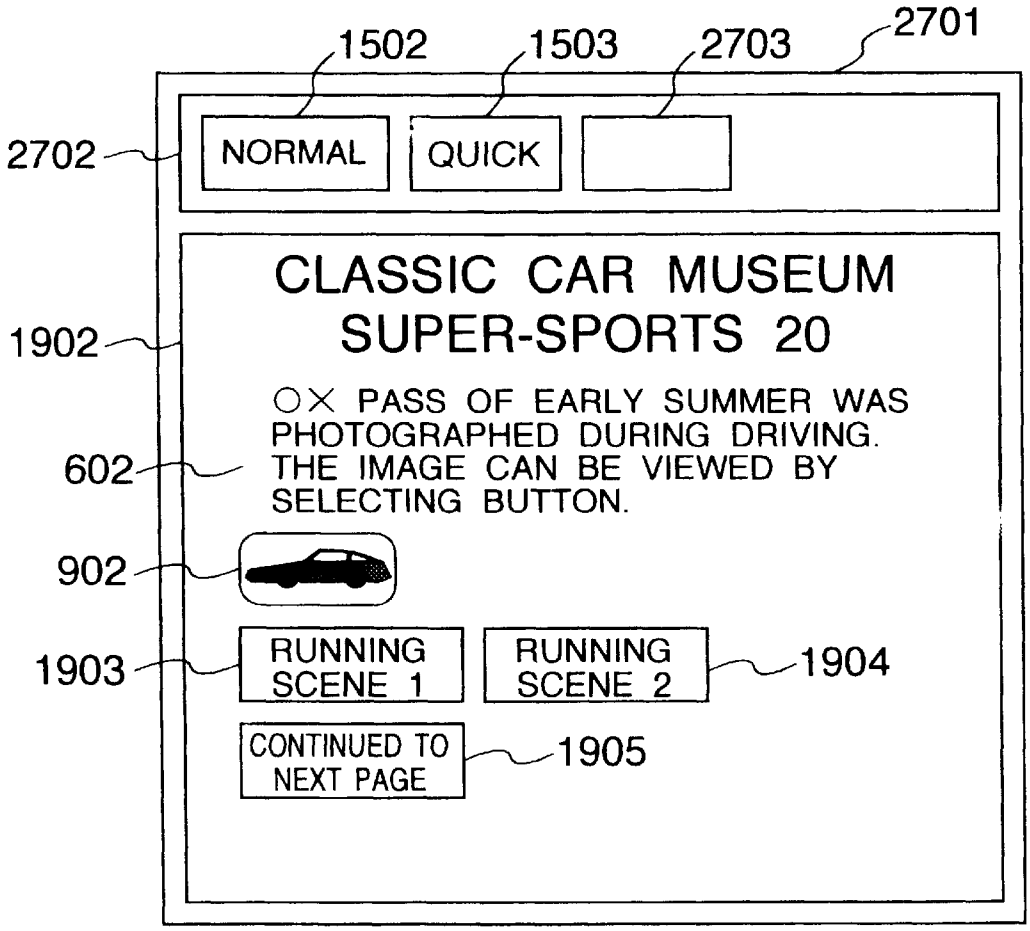


FIG. 27

EXAMPLE 9 OF CLIENT SCREEN

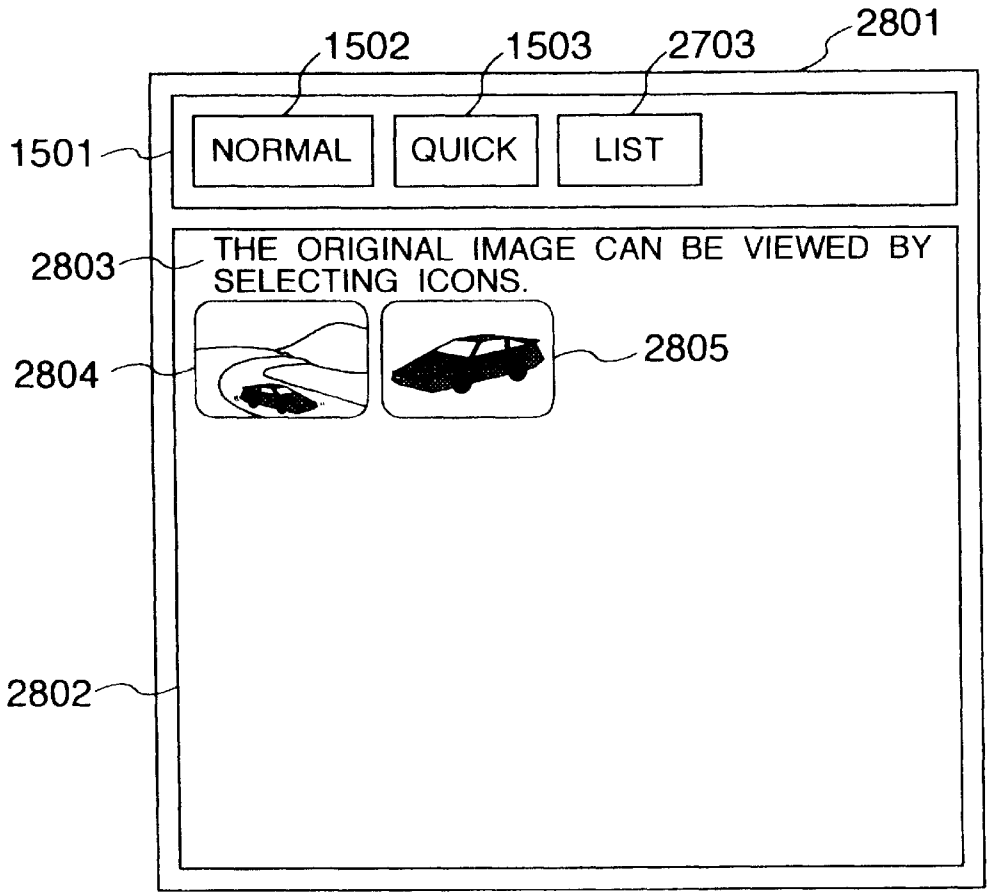


FIG. 28

EXAMPLE 10 OF CLIENT SCREEN

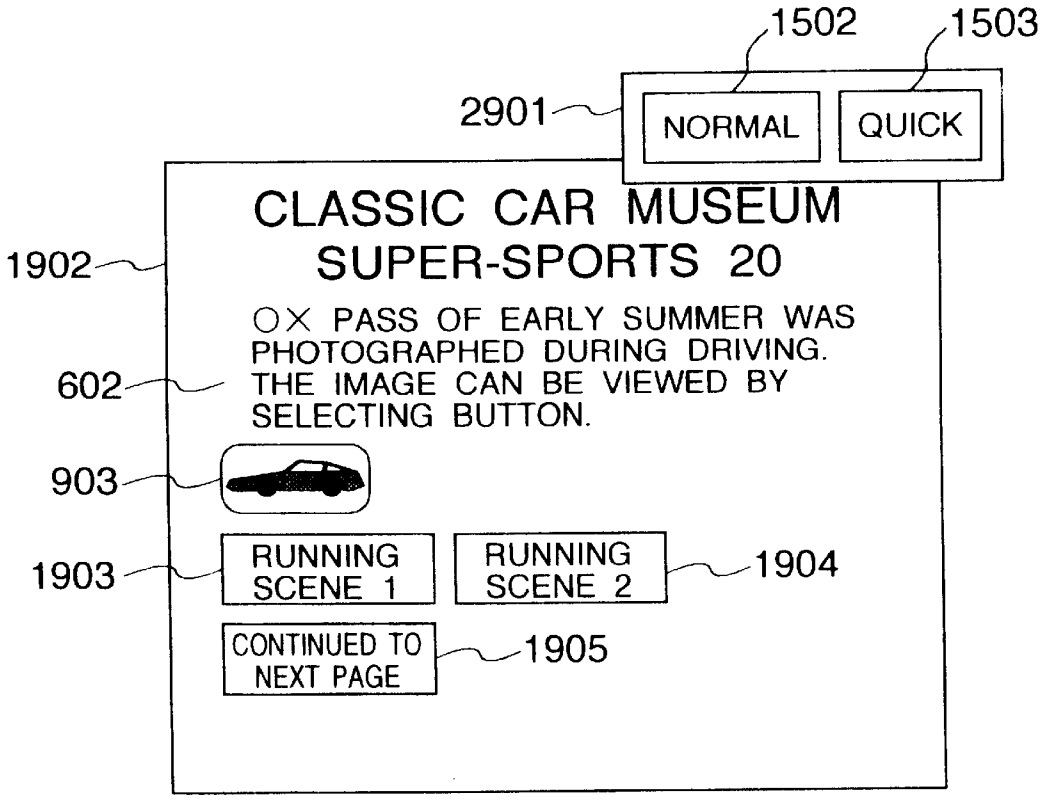


FIG. 29

EXAMPLE 11 OF CLIENT SCREEN

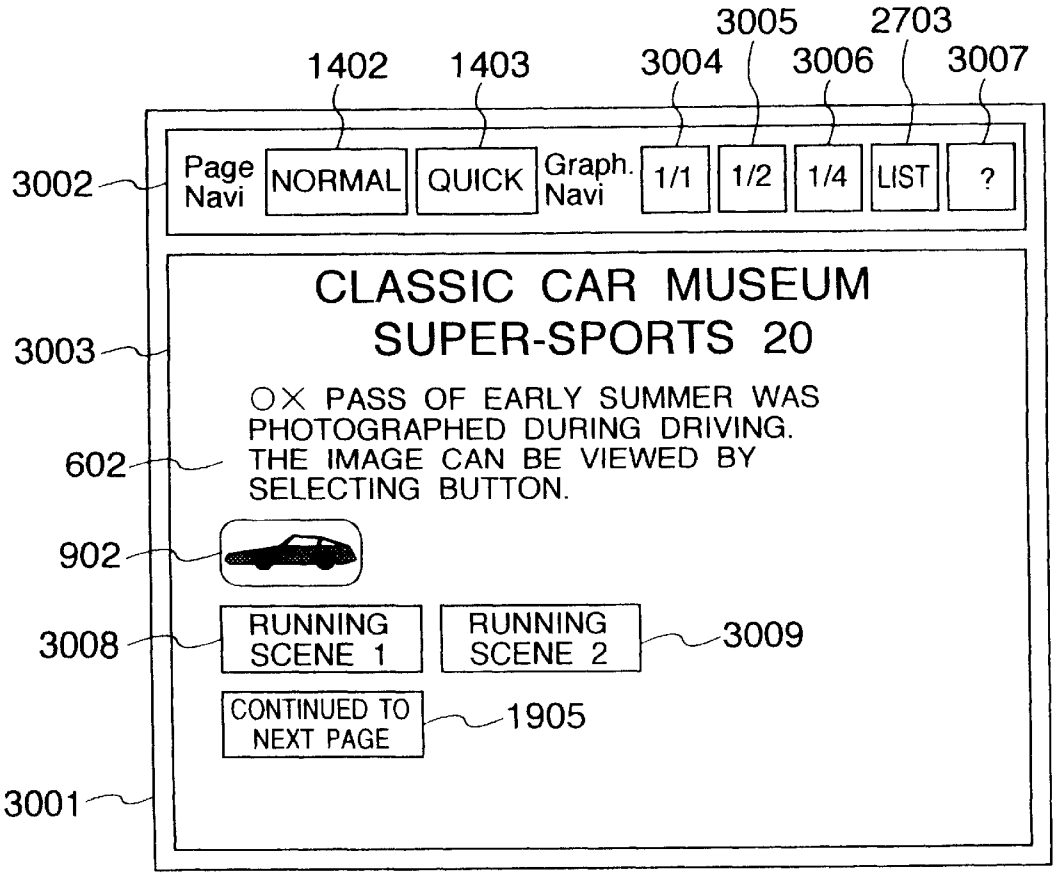


FIG. 30

PROCESSING FLOWCHART OF SCREEN CONFIGURATION EXPANDING DEVICE

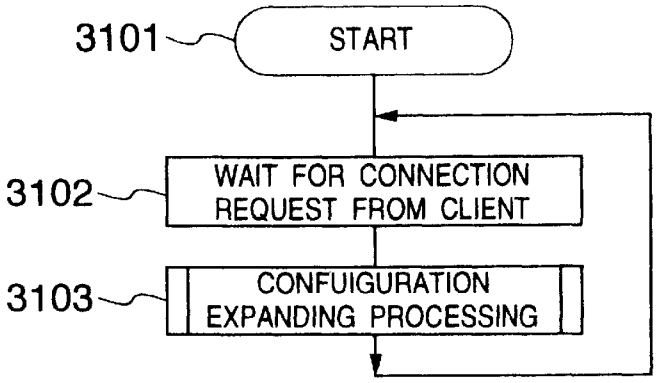


FIG. 32

FLOWCHART OF COMMAND ANALYSIS PROCESSING

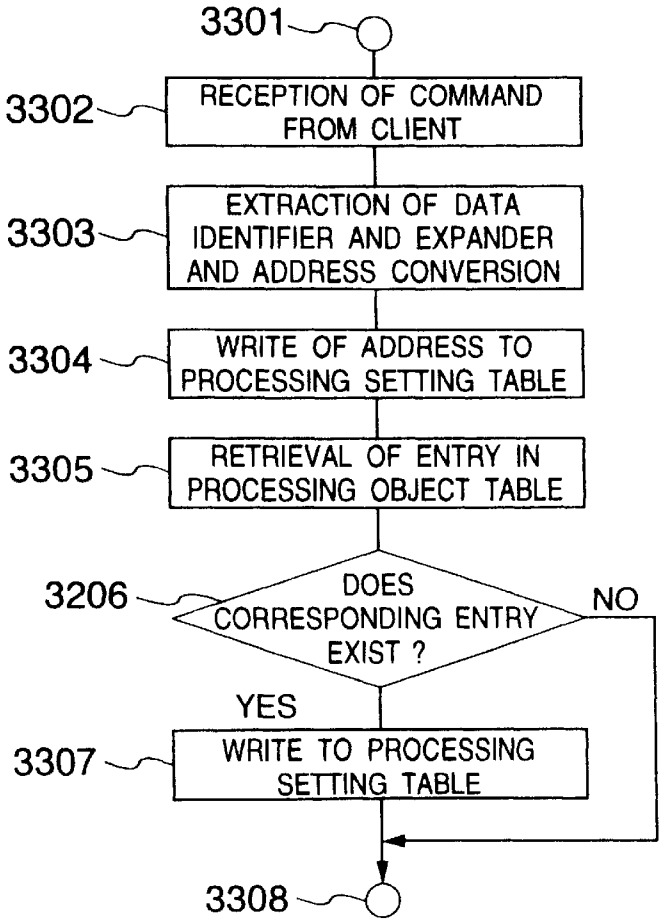


FIG. 31

FLOWCHART OF CONFIGURATION EXPANDING PROCESSING

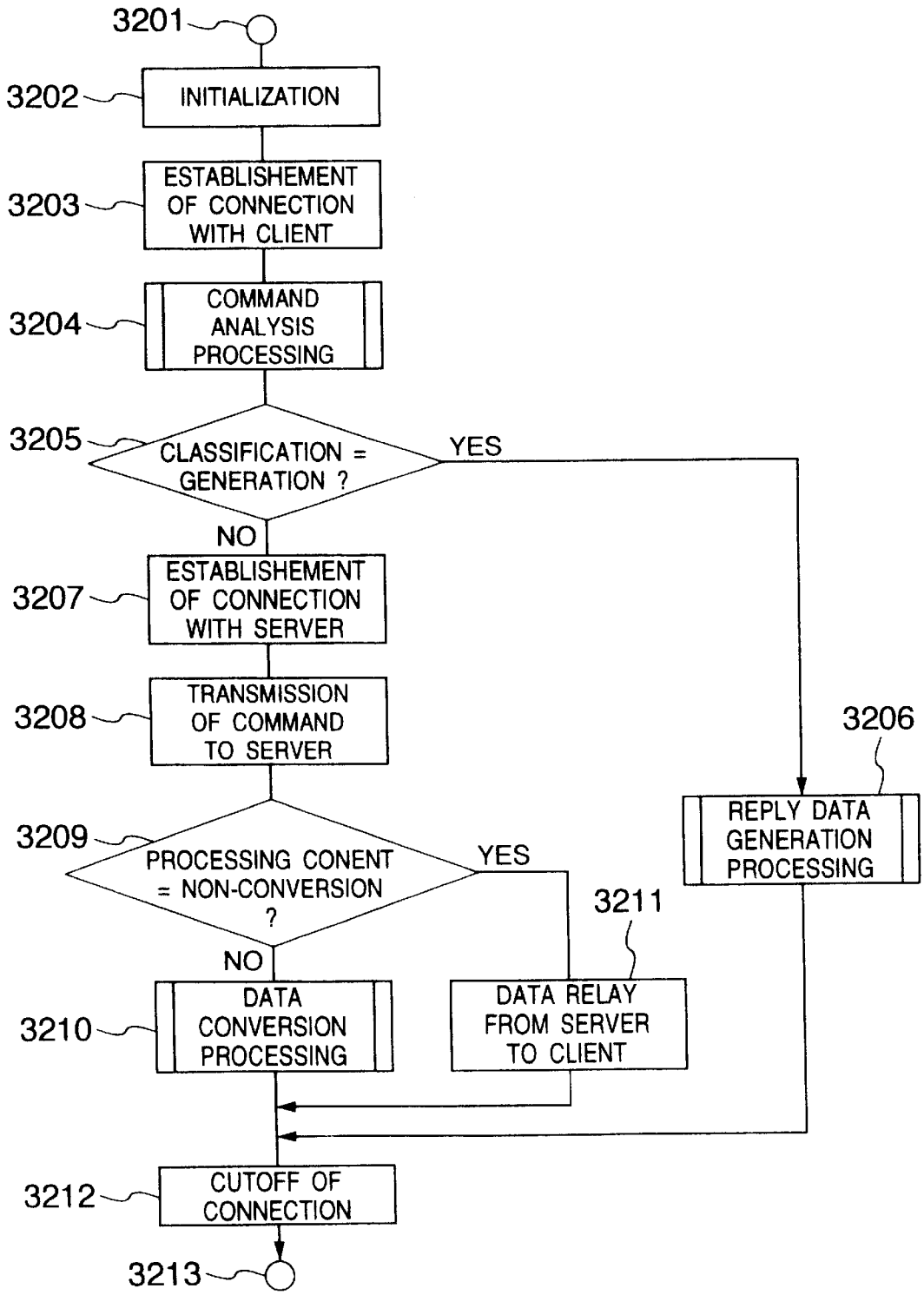


FIG. 33

FLOWCHART OF REPLY DATA GENERATION PROCESSING

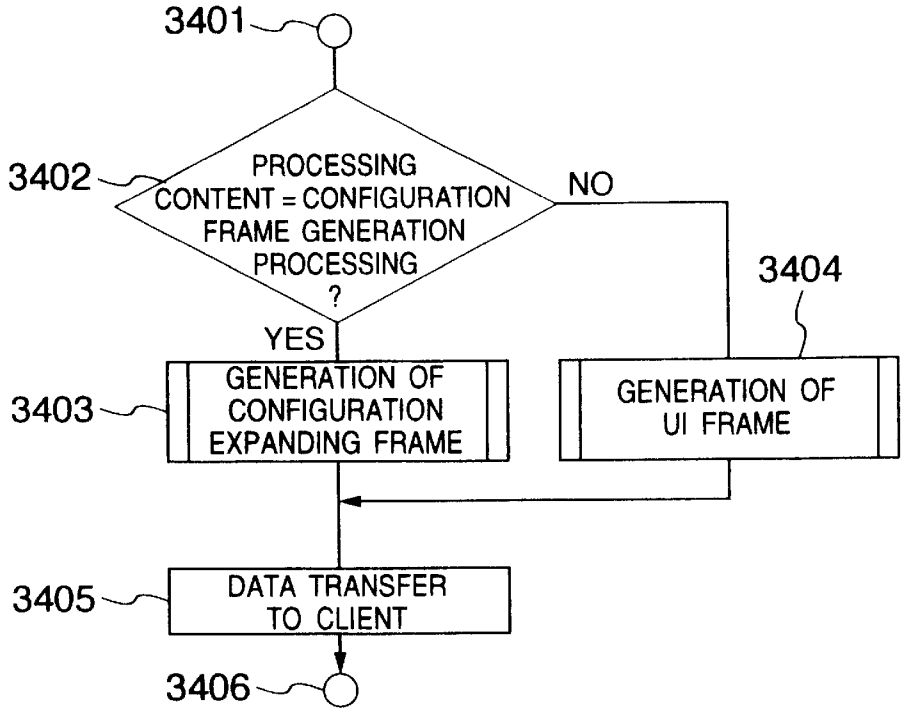


FIG. 34

FLOWCHART OF CONFIGURATION EXPANDING FRAME GENERATION

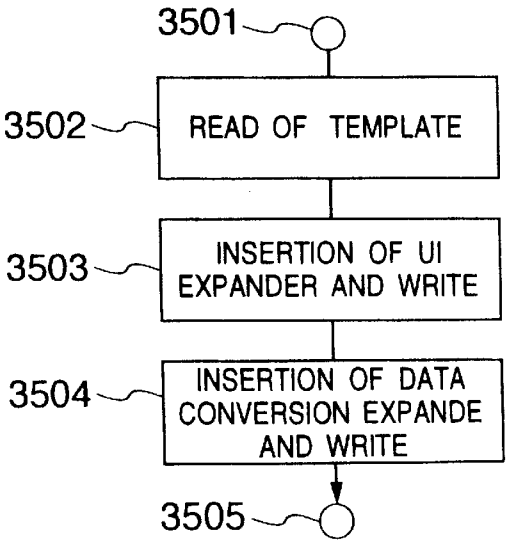


FIG. 35

FLOWCHART OF UI GENERATION

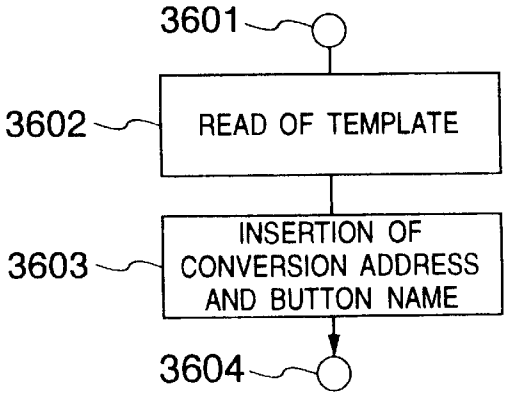


FIG. 36

FLOWCHART OF DATA CONVERSION PROCESSING

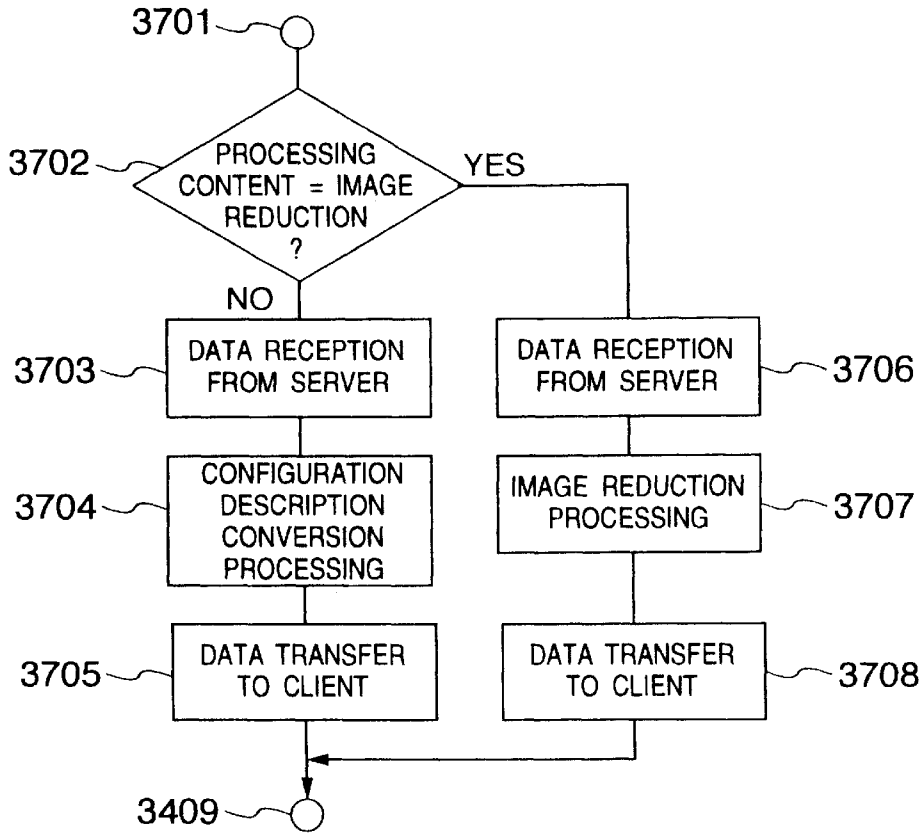


FIG. 37

EXAMPLE OF SETTING TABLE

3801

	ADDRESS	CLASSIFICATION	PROCESSING CONTENT	PARAMETER
3802				
3803	NIL	CONVERSION	NON-CONVERSION	NIL

FIG. 38

EXAMPLE OF PROCESSING OBJECT TABLE

3901

OBJECT DATA IDENTIFIER	EXPANDER	CLASSIFICATION	PROCESSING OBJECT	PARAMETER
. html	. normal	GENERATION	CONFIGURATION EXPANDED FRAME GENERATION	. p-normal
. html	/. quick	GENERATION	CONFIGURATION EXPANDED FRAME GENERATION	. p-quick
. html	. ui	GENERATION	UI FRAME GENERATION	NIL
. html	. p-normal	CONVERSION	CONFIGURATION DESCRIPTION CONVERSION	. p-normal
. html	. p-quick	CONVERSION	CONFIGURATION DESCRIPTION CONVERSION	. p-quick
. gif	. small	CONVERSION	IMAGE RADUCTION	1/2

3902 3903 3904 3905 3906 3907 3908

FIG. 39

EXAMPLE OF UI SETTING TABLE

4001

	NUMBER	INSERTED IDENTIFIER	BUTTON NAME
4002			
4003	1	. p-normal	NORMAL
4004	2	. p-quick	QUICK

FIG. 40

EXAMPLE OF CONVERSION RULE TABLE

4101

	TAG NAME	ATTRIBUTE	OBJECT DATA IDENTIFIER	INSERTED EXPANDER
4102				
4103	A	HREF	. html	[P1]
4104	A	HREF	. gif	[P2]
4105	IMG	SRC	. gif	[P3]

FIG. 41

EXAMPLE OF CONVERSION PARAMETER TABLE

4201

	MODE	[P1]	[P1]	[P1]
4202				
4203	. p-quick	. quick	. small	. small
4204	. p-normal	. normal	NIL	NIL

FIG. 42
PROCESSING SEQUENCE

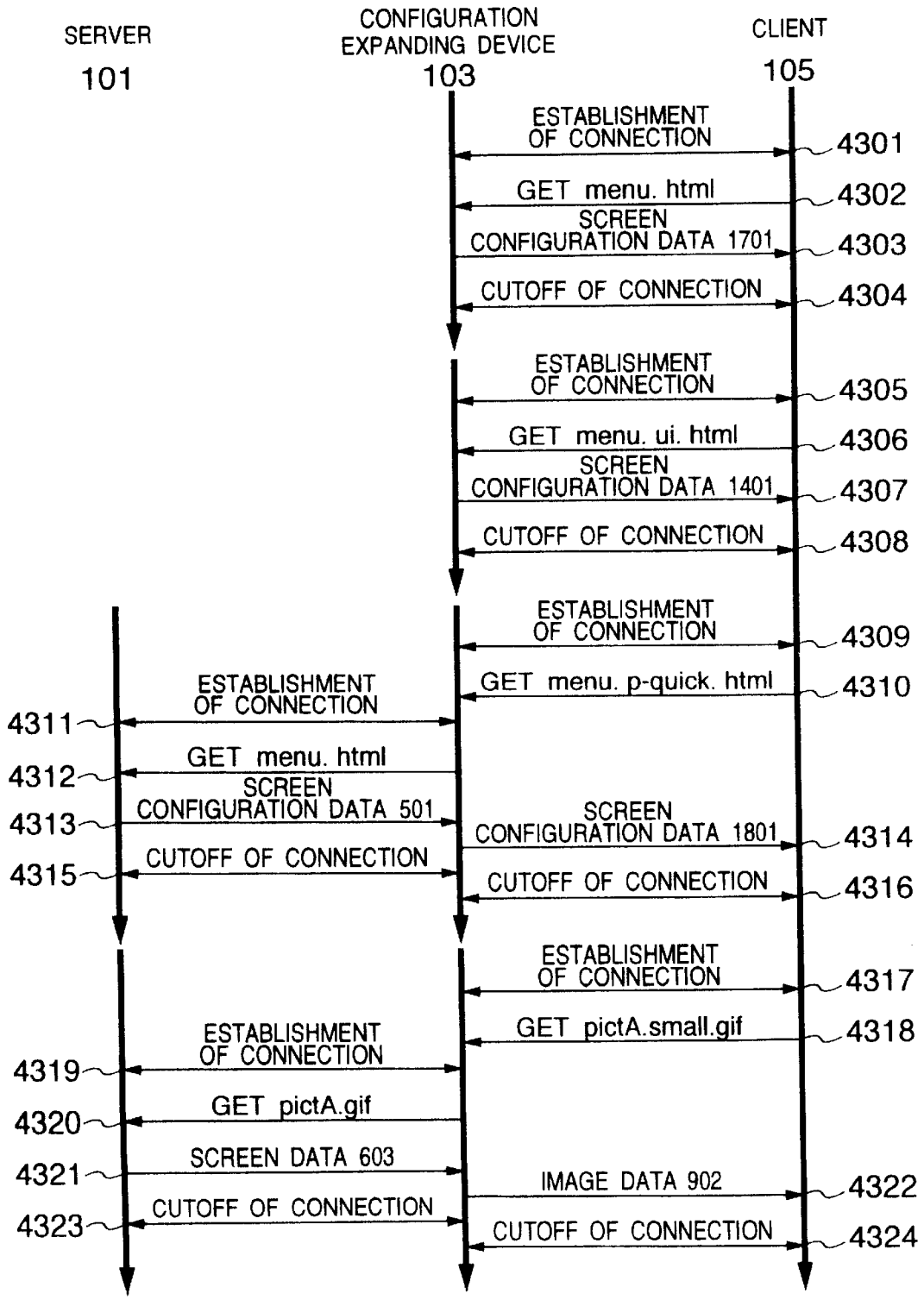


FIG. 43

EXAMPLE OF BUTTON TEMPLATE

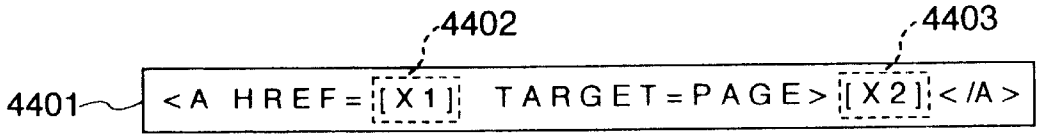


FIG. 44

PROCESSING SEQUENCE

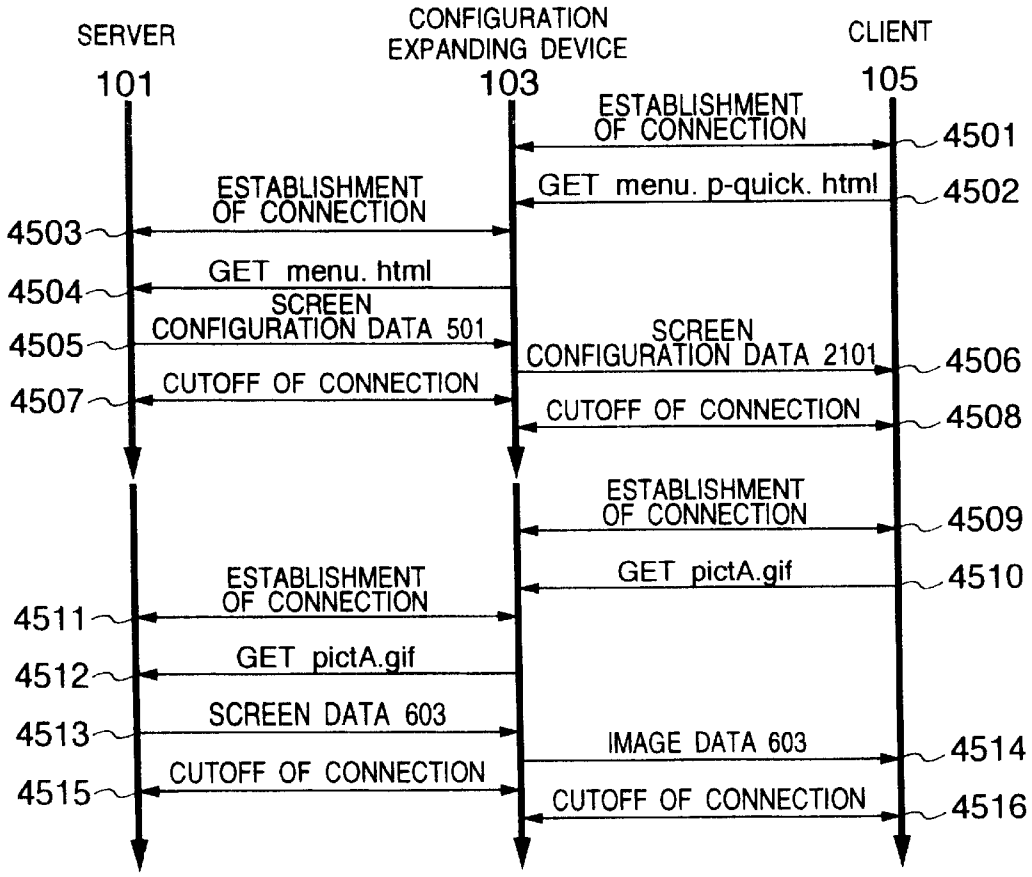


FIG. 45

EXAMPLE OF PROCESSING OBJECT TABLE

4601

	OBJECT DATA IDENTIFIER	EXPANDER	CLASSIFICATION	PROCESSING CONTENT	PARAMETER
3902					
3903	. html	. normal	GENERATION	CONFIGURATION EXPANDED FRAME GENERATION	. p-normal
3904	. html	NIL / . quick	GENERATION	CONFIGURATION EXPANDED FRAME GENERATION	. p-quick
4602	. gif	. thumb	GENERATION	THUMB NAIL BUTTON GENERATION	NIL
3905	. html	. ui	GENERATION	UI FRAME GENERATION	NIL
3906	. html	. p-normal	CONVERSION	CONFIGURATION DESCRIPTION CONVERSION	. p-normal
3907	. html	. p-quick	CONVERSION	CONFIGURATION DESCRIPTION CONVERSION	. p-quick
3908	. gif	. small	CONVERSION	IMAGE RADUCTION	1/2

FIG. 46

EXAMPLE OF CONVERSION PARAMETER TABLE

4701

4702	MODE	[P1]	[P1]	[P1]
4703	. p-quick	. quick	. thumb	. small
4704	. p-normal	. normal	NIL	NIL

FIG. 47

EXAMPLE OF CONVERTED SCREEN CONFIGURATION DATA (QUICK MODE)

509 4801

507 <CENTER>
CLASSIC CAR MUSEUM
SUPER-SPORTS 20
508 </CENTER> 502
○× PASS OF EARLY SUMMER WAS PHOTOGRAPHED
DURING DRIVING.
THE IMAGE CAN BE VIEWED BY SELECTING BUTTON.

<IMG SRC="pictA. small. gif"> 802

<A HREF="pictB. thumb. gif">
RUNNING SCENE 1 </A> 4802

<A HREF="pictC. thumb. gif">
RUNNING SCENE 2 </A> 4803

<A HREF="next. quick. html">
TO NEXT PAGE </A> 1804

FIG. 48

FLOWCHART OF RESPONSE DATA GENERATION PROCESSING

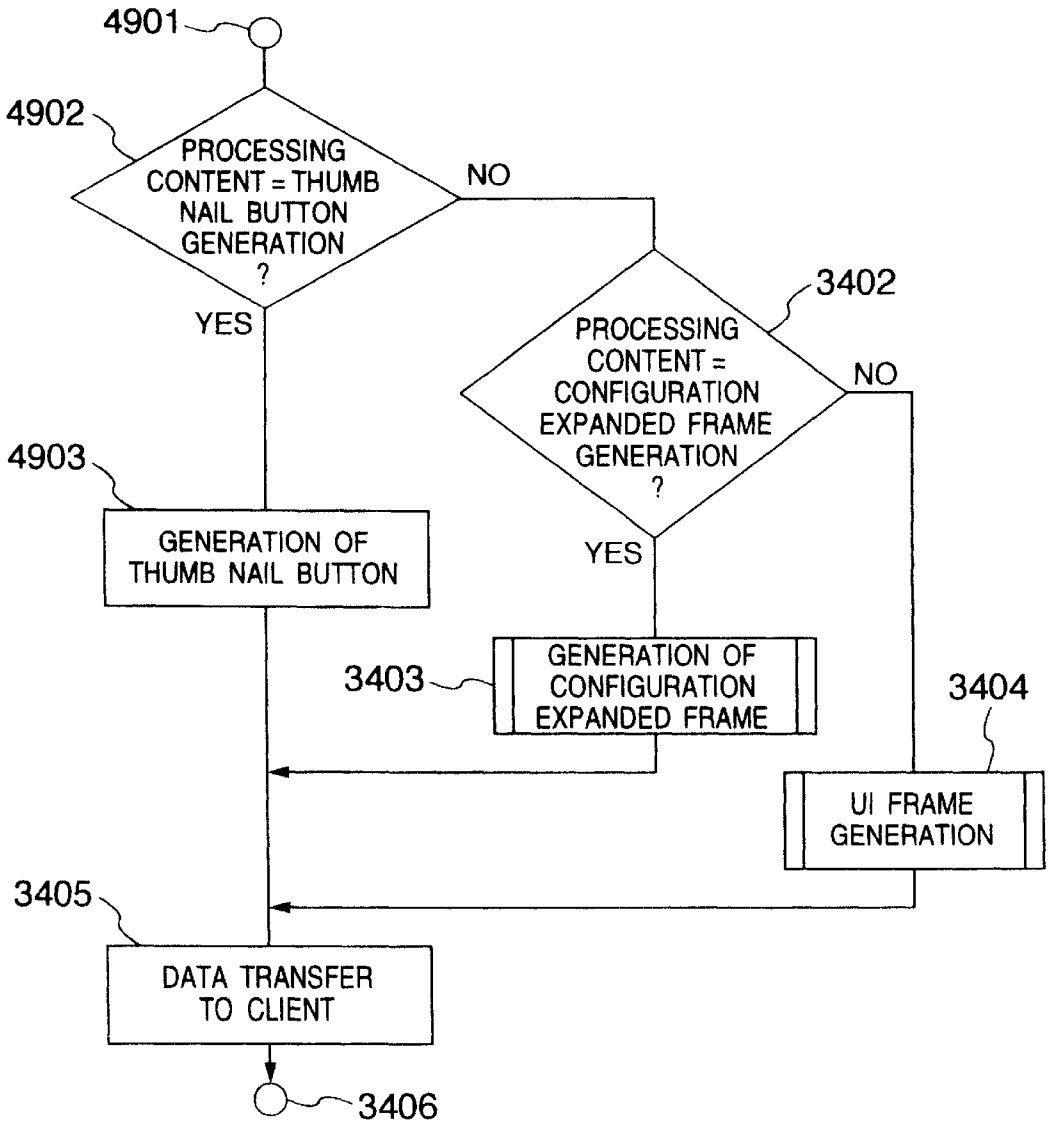


FIG. 49

EXAMPLE OF THUMB NAIL TIMPLATE

5001

ORIGINAL IMAGE CAN BE VIEWED BY SELECTING IMAGE
<A HREF=[x1]><IMG SRC=[x2]></A>

5002 5003

FIG. 50

EXAMPLE OF THUMB NAIL BUTTON SCREEN CONFIGURATION DATA

5101

ORIGINAL IMAGE CAN BE VIEWED BY SELSCTING IMAGE
<A HREF=pictB.gif><IMG SRC=pictB.small.gif></A>

5102

FIG. 51

EXAMPLE OF UI SETTING TABLE

5201

	NO.	INSERTION EXPANDER	BUTTON NAME
4002			
4003	1	. p-normal	NORMAL
4004	2	. p-quick	QUICK
5202	3	. list	LIST

FIG. 52

EXAMPLE OF PROCESSING OBJECT TABLE

3901

OBJECT DATA IDENTIFIER	EXPANDER	CLASSIFICATION	PROCESSING CONTENT	PARAMETER
. html	. normal	GENERATION	CONFIGURATION EXPANDED FRAME GENERATION	. p-normal
. html	NIL / . quick	GENERATION	CONFIGURATION EXPANDED FRAME GENERATION	. p-quick
. html	. ui	GENERATION	UI FRAME GENERATION	NIL
. html	. p-normal	CONVERSION	CONFIGURATION DESCRIPTION CONVERSION	. p-normal
. html	. p-quick	CONVERSION	CONFIGURATION DESCRIPTION CONVERSION	. p-quick
. gif	. small	CONVERSION	SCREEN REDUCTION	1/2
. gif	. tiny	CONVERSION	SCREEN REDUCTION	1/4
. html	. list	CONVERSION	LIST PAGE CONVERSION	NIL

3902 3903 3904 3905 3906 3907 3908 5302 5303

FIG. 53

EXAMPLE OF SCREEN CONFIGURATION DATA

5401

1402 <A HREF=menu.p-normal.html TARGET=PAGE>NORMAL</A>

1403 <A HREF=menu.p-quick.html TARGET=PAGE>QUICK</A>

5402 <A HREF=menu.list.html TARGET=PAGE>LIST</A>

FIG. 54

EXAMPLE OF LIST PAGE TEMPLATE

5501

ORIGINAL IMAGE CAN BE VIEWED BY SELECTING ICON. < B R >

[X1]

5502

FIG. 55

EXAMPLE OF THUMB NAIL TEMPLATE

5601

< A H R E F = [X 1] > < I M G S R C = [X 2] > < /A >

5602 5603

FIG. 56

EXAMPLE OF THUMB NAIL SCREEN CONFIGURATION DATA

5701

ORIGINAL IMAGE CAN BE VIEWED BY SELECTING ICON. < B R >

5702 < A H R E F = pictB.gif > < I M G S R C = pictB.tiny.gif > < /A >

5703 < A H R E F = pictB.gif > < I M G S R C = pictB.tiny.gif > < /A >

FIG. 57

EXAMPLE OF PROCESSING OBJECT TABLE

5801

OBJECT DATA IDENTIFIER	EXPANDER	CLASSIFICATION	PROCESSING CONTENT	PARAMETER
. html	. p-normal	CONVERSION	CONFIGURATION DESCRIPTION CONVERSION	. p-normal
. html	NIL / . p-quick	CONVERSION	CONFIGURATION DESCRIPTION CONVERSION	. p-quick
. gif	. small	CONVERSION	IMAGE REDUCTION	1/2

3902 3906 5802 3908

FIG. 58

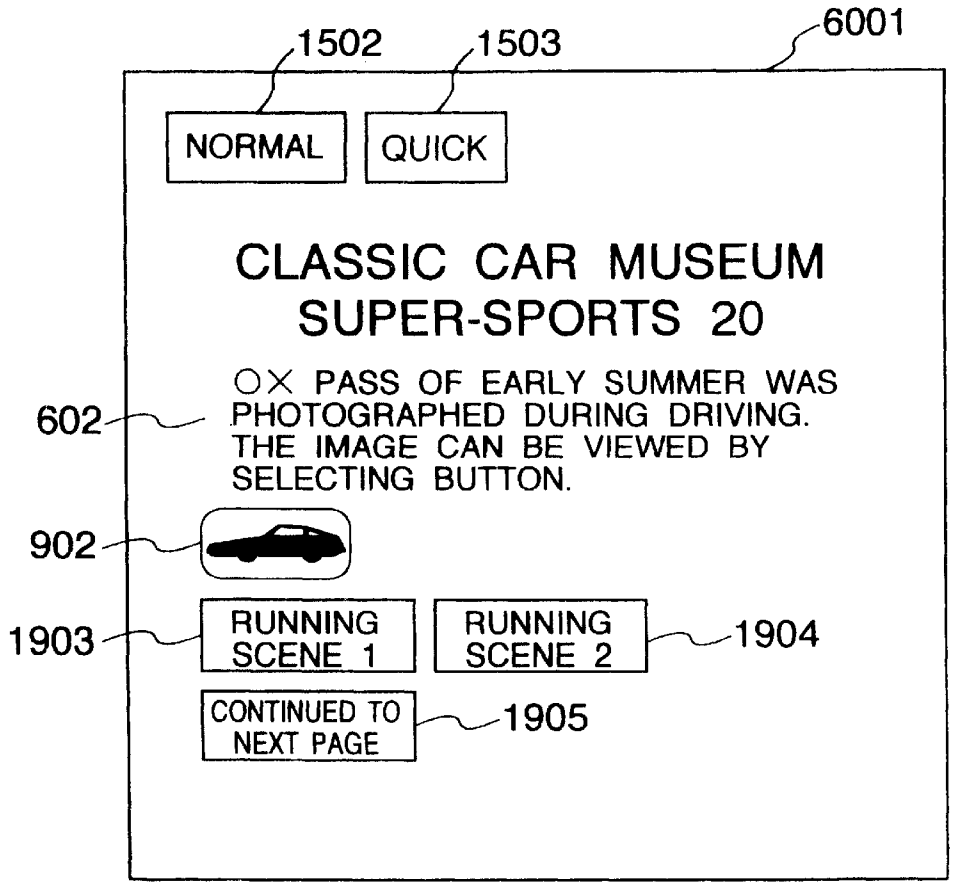
EXAMPLE OF SCREEN CONFIGURATION DATA

5901

```
< A HREF=menu.p-normal.html>NORMAL</A>                    5902
<A HREF=menu.p-quick.html>QUICK</A>                       5903
5904 < B R >
507 < C E N T E R >                                       509
CLASSIC CAR MUSEUM < B R >
SUPER-SPORTS 20 < B R >
508 < / C E N T E R >
○×PASS OF EARLY SUMMER WAS PHOTOGRAPHED
DURING DRIVING.< B R >
THE IMAGE CAN BE VIEWED BY SELECTING BUTTON. < B R >
<IMG SRC="pictA. small. gif">                             802
<A HREF="pictB. small. gif" >                             1802
RUNNING SCENE 1 < / A >
<A HREF="pictC. small. gif" >                             1803
RUNNING SCENE 2 < / A >
< B R >
<A HREF="next. html" >                                    1804
CONTINUED TO NEXT PAGE < / A >
```

FIG. 59

EXAMPLE OF CLIENT SCREEN



DATA CONVERSION METHOD AND APPARATUS

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of co-pending application Ser. No. 08/633,311 entitled as MULTIMEDIA DATA PROCESSING SYSTEM IN NETWORK filed by T. Shimada et al. on Apr. 15, 1996, the contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

This invention relates to a data converting device for converting the size, etc, of inputted data. More particularly, the present invention relates to a data converting device functioning as a relay for relaying multimedia data transmitted through a plurality of kinds of transmission media, such as image, speech data, sound-attached moving-picture data etc, a data transmission method, and an information storage medium storing a data conversion function.

In network systems in general, services are offered among a plurality of information processing units connected to the network.

In this case, the information processing unit on the service requesting side is referred to as a "client" and the information processing unit on the service offering side, a "server".

T. Berners-Lee et al., "Communications of ACM", Vol. 37, No. 8, pp. 76–82(1994) published by ACM Press describes an example of multimedia network systems for describing screen configuration mainly by character strings in a wide area network system.

Such a multimedia network system has spread in world-wide networks and access to world-wide information can be acquired by making access to the servers in the world.

The capacity of data handled in the multimedia network system, such as static images, moving images, speech, and so forth, is by far greater than that of texts.

Therefore, when the multimedia network system is utilized in the environment having a small network transmission capacity, the problem develops in that an extremely long time is necessary for the data transfer.

When the amount of data transmitted from the server to the client is reduced, the data access time can be reduced particularly when the transmission rate of the network is low, and the user can gain access to a greater amount of information within a predetermined time.

When the data converting device described above is used, the data access time can be reduced as a result of the reduction of the data transmission amount between the server and the client, but layout of the screen display is changed when button display is employed for indicating the reduction of a static image in the screen display, etc.

If layout of the screen display itself has information such as a table, such a change of layout means the loss of information and deteriorates appearance of the design. See FIG. **9** (**902**, **903** and **904**). In FIG. **8**, screen configuration data **801**, description **802** of the image tag, and descriptions **803** and **804** of the anchor tags are shown.

To look up the screen display in accordance with original screen configuration information transmitted by the server, the user of the client must stop utilization of the data converting device. Because the method of stopping the utilization of the data converting device requires the change of setting of the client, this operation is much more complicated than the normal button selection operations, and another problem arises in that operation efficiency drops when the user frequently desires to switch the utilization and to stop the data converting device.

When a large number of buttons for looking up the static image are disposed in the screen display, the display area of the screen becomes lack of information, and still another problem occurs in that the screen display becomes redundant for the user who seldom makes access to the additional buttons.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a data converting device which converts data transmitted from a server to data which considers performance of the client, a transmission medium connected to the client, etc, and causes the client to receive this data, a network system equipped with such a data converting device, and a data transmission method.

It is another object of the present invention to provide a data converting device which instructs a user of a client to control a conversion processing of multimedia data and enables the user to carry out the data conversion processing in accordance with this instruction, a network system equipped with such a network, and a data transmission method.

To accomplish the objects described above, a data relay apparatus connected between a server device and a client device includes a command analysis portion for analyzing a command inputted from the client device, which analysis portion reads out and stores conversion instruction information when the command contains the conversion instruction information instructing a predetermined data conversion processing; a request portion for deleting the conversion instruction information from the command and sending it to the server device; a detection portion for receiving data sent from the server device, which detection portion converts the data on the basis of the conversion instruction information stored and add the conversion instruction information to the reference address included in the description referring to a text data included in other data; and a transmission portion for transmitting the data and the result of the added information to the client device.

The conversion instruction information can contain a screen configuration command for instructing to divide the area of the screen displayed on the client device into a reception data display area for the data received from the server device and an operation area for the screen operation. The data relay apparatus can further contain a first expansion portion for expanding the display data from the server device on the reception data display area on the basis of the screen configuration command and a second expansion portion for expanding the operation buttons corresponding to another screen configuration command indicating contents of transformation on data in the operation area in accordance with the conversion instruction information on the basis of the screen configuration command from the client device. When the image data is contained in the response command, the conversion instruction information can be a deletion instruction command which instructs to delete a part of pixels of the image data in a predetermined pattern.

According to the present invention, there is also provided a data relay apparatus connected to a client device through a first network and to a server device through a second network, which includes means for analyzing a command

inputted from the client device, means for separating conversion instruction information from the command when the command contains the conversion instruction information instructing a conversion processing; means for transmitting the command after deletion of the conversion instruction information to the server device; means for receiving data responding to the command after deletion of the conversion instruction information from the server device; means for generating a conversion command by converting the data on the basis of the conversion instruction information; and means for transmitting the conversion command with the conversion instruction information to the client device.

According to the present invention, there is further provided a data transmission method of a network system including a data relay apparatus connected to a client device connected through a first network and to a server device through a second network, wherein the data relay apparatus analyzes a command inputted from the client device, deletes conversion instruction information from the command when the command contains the conversion instruction information instructing a conversion processing, and transmits the command to the server device, the server device which receives the command after deletion of the conversion instruction information transmits data responding to the command after deletion of the conversion instruction information, and the data relay apparatus which receives the data converts the data to generate a conversion command on the basis of the conversion instruction information, and transmits the conversion command with the conversion instruction information to the client device.

According to the present invention, there is further provided an information storage medium storing a data conversion function for data relay for use in a data relay apparatus connected to a client device through a first network and to a server device through a second network, wherein the information storage medium stores a program having a function of analyzing a command inputted from the client device, a function of deleting conversion instruction information from the command when the command contains the conversion instruction information instructing a conversion processing to the command, and transmitting the command to the server device, a function of receiving a data responding to the command after removal of the conversion instruction information from the server device, a function of generating conversion data by converting the data on the basis of the conversion instruction information, and a function of transmitting the conversion command with the conversion instruction information to the client device.

According to the present invention, there is further provided a data converting device having information output means for outputting the data after the conversion processing described above is executed and data that is newly generated.

When the kind of data is screen configuration data describing configuration of a screen output of an information processing unit, a predetermined rule provides not only mere data conversion but list display, etc. so that efficiency of grasping the content of data can be improved.

Existing servers and clients can be as such utilized. When a new function or functions are added to the present invention, these servers and clients need not be changed, and the maintenance cost can be kept low, in consequence. Since a specific server is not necessary, utility by the screen configuration expansion by the present invention can be improved for all the pages of a large number of servers to which access can be made by everyone of the world.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram showing an structural example of the present invention;

FIG. **2** is a block diagram showing an example of the construction of a screen configuration expanding device;

FIG. **3** is a functional block diagram showing an example of the screen configuration expanding device;

FIG. **4** is a block diagram showing a structural example of the present invention;

FIG. **5** shows an example of screen configuration data;

FIG. **6** shows an example **1** of client screen display;

FIG. **7** shows an example **2** of the client screen display;

FIG. **8** shows an example of expanded screen configuration data;

FIG. **9** shows an example **1** of client screen display utilizing a data converting device;

FIG. **10** shows an example **2** of client screen display utilizing the data converting device;

FIG. **11** shows an example of a screen configuration template;

FIG. **12** shows an example of a setting management table;

FIG. **13** shows an example of additional screen configuration data;

FIG. **14** shows a display example of the additional screen configuration data;

FIG. **15** shows an example of a screen configuration template;

FIG. **16** shows an example of expanded screen configuration data;

FIG. **17** shows an example of converted screen configuration data;

FIG. **18** shows an example of a client screen according to the present invention;

FIG. **19** shows another example of the client screen according to the present invention;

FIG. **20** shows an example of converted screen configuration data;

FIG. **21** shows another example of the client screen according to the present invention;

FIG. **22** shows still another example of the client screen according to the present invention;

FIG. **23** shows still another example of the client screen according to the present invention;

FIG. **24** shows still another example of the client screen according to the present invention;

FIG. **25** shows still another example of the client screen according to the present invention;

FIG. **26** shows still another example of the client screen according to the present invention;

FIG. **27** shows still another example of the client screen according to the present invention;

FIG. **28** shows still another example of the client screen according to the present invention;

FIG. **29** shows still another example of the client screen according to the present invention;

FIG. **30** is a flowchart of the processing of a configuration expanding device;

FIG. **31** is a flowchart of a configuration expanding processing;

FIG. **32** is a flowchart of a command analysis;

FIG. **33** is a flowchart of a response data generation processing;

FIG. **34** is a flowchart of configuration expanding frame generation;

FIG. **35** is a flowchart of UI frame generation;

FIG. **36** is a flowchart of a data conversion processing;

FIG. **37** shows an example of setting table;

FIG. **38** shows an example of a processing object table;

FIG. **39** shows an example of a UI setting table;

FIG. **40** shows an example of a conversion rule table;

FIG. **41** shows an example of a conversion parameter table;

FIG. **42** shows a processing sequence according to the present invention;

FIG. **43** shows an example of a button template;

FIG. **44** shows a processing sequence according to the present invention;

FIG. **45** shows an example of a processing object table;

FIG. **46** shows an example of conversion parameters;

FIG. **47** shows an example of converted screen configuration data;

FIG. **48** is a flowchart of a response data generation processing;

FIG. **49** shows an example of a thumb nail template;

FIG. **50** shows an example of a thumb nail button screen configuration data;

FIG. **51** shows an example of a UI setting table;

FIG. **52** shows an example of a processing object table;

FIG. **53** shows an example of screen configuration data;

FIG. **54** shows an example of a list page template;

FIG. **55** shows an example of a thumb nail template;

FIG. **56** shows an example of thumb nail button screen configuration data;

FIG. **57** shows an example of a processing object table;

FIG. **58** shows an example of screen configuration data; and

FIG. **59** shows an example of a client screen according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, preferred embodiments of the present invention will be explained with reference to the accompanying drawings.

(First Embodiment)

As shown in FIG. **1**, a system according to the first embodiment comprises a server **101**, networks **102** and **104**, a screen configuration expanding device **103** and a client **105**.

The server **101** is connected to the screen configuration expanding device **103** for effecting data conversion and relaying, through the network **102**, and the client **105** is connected to the screen configuration expanding device **103** through the network **104**. Data communication is made between the server **101** and the client **105** and in this instance, the screen configuration expanding device **103** executes expansion of the screen configuration and reduction of a data amount.

The term "expansion of the screen configuration" means the addition of a new screen display area to the screen configuration information which is received from the server **101** and contains data to be displayed and information on the configuration of the screen for displaying this data.

More concretely, expansion of the screen configuration in this embodiment means the addition of an interface, which accomplishes interactive communication between a user at the client **105** and the client screen, to the screen configuration information of the server **101**.

The server **101** stores screen configuration data **501** for defining the screen configuration of the client screen display **601** as shown in FIG. **5**.

Hereinafter, the content of the screen configuration data **501** will be explained with reference to the client **105** and the screen display **601**.

Incidentally, the following explanation will be given as if the server **101** and the client **105** directly communicated with each other for simplification by omitting the explanation of the portions which execute communication through the screen configuration expanding device **103**.

In FIG. **5**, descriptions at reference numerals **502**, **503**, **504**, **505** and **506** correspond to reference numerals **602**, **603**, **604**, **605** and **605** in FIG. **6**, respectively.

The text partitioned by [<] and [>] in the screen configuration data is referred to as a "tag". This tag is used for putting an effect to the text, or for representing burying of the data other than the text such as a static image, or for describing burying of the button which can be operated by the user of the client **105**.

The tag **507** [<CENTER>] and the tag **508** [</CENTER>] in the description **502** in FIG. **5** are the description for disposing the text between these two tags at the center at the time of screen display. The tag **509** [
] is the description instructing line feed. Due to these tag descriptions, the description **502** is displayed on the screen of the client **105** such as the text **602** shown in FIG. **6**.

[<IMG SRC="pictA, gif">] in the description **503** is a tag referred to as "imaging". Here, this tag describes that the data designated by [SRC=" "] is buried at this portion in the text. [pictA. gif] designated here is the address representing a static image. The client **105** requests the server **101** to transfer this pictA.gif, receives this data from the server **101** and displays it on the screen in succession to the text **602**, so that the static image **603** is finally displayed on the screen of the client **105** as shown in FIG. **6**.

[<A HREF="pictB. gif">]**0** and [</A>] in the description **504** are referred to as "anchor tags", and the portion encompassed by these tags becomes a button on the screen of the client **105**. When the user clicks this button, the client **105** transmits the transfer request of the data designated by [HREF=" "] in the anchor tag to the server. [pictB. gif] is the address representing the static image **702**. In the description **504**, a text [running scene **1**] encompassed by the anchor tags becomes the button **604** in FIG. **6** at the time of screen display. When the user selects this button, the client **105** transmits the transfer request of the static image **702** to the server **101**, and displays finally the static image **702** as shown in FIG. **7**.

The descriptions **505** and **506** are similar to the description **504**, and are only different in that the content of the text and the address of the data to be looked up at the time of the display of the button are different.

Here, the address of the data which the description **506** looks up is [next. html] and this is the screen configuration data in the same way as **501**.

In the multimedia network system described above, when the tail of the data address is [.gif], the data is the static image, and when the tail of the data address is [. html], the data is the screen configuration data.

Next, the explanation will be given on the communication method between the server and the client in the multimedia network system in this embodiment.

In this explanation, too, the explanation will be given on the assumption that the server **101** and the client **105** directly

communicate with each other without passing through the screen configuration expanding device **103**, for the purpose of simplification.

First, the client **105** transmits a command [GET menu. html] to the server **101**.

Here, [menu. html] is the address designating the screen configuration data **501**. Receiving this request, the server **101** transfers the screen configuration data **501** to the client **105**. When the client **105** receives the screen configuration data **501**, it analyzes this data.

The client **105** first analyzes the portion of the description **501** and displays the text on the screen. Next, the client **105** analyzes the portion of the description **503** and detects that other data are cited by the image tags and transmits a command [GET pictA.gif] requiring the transfer of [pictA. gif] to the server **101**.

Receiving this request, the server **101** returns [pictA. gif], that is, the static image **702**. Receiving this static image **702**, the client **105** displays the static image **702** on the screen in succession to the text display **502**.

Next, the client **105** analyzes the description **504**, detects the anchor tags and display the button **604**, i.e. [running scene **1**].

Similarly, the client **105** analyzes the descriptions **505** and **506** and displays the buttons **605** and **606** on the screen.

As described above, the client **105** displays various data on the screen as **601** in FIG. **6** by the screen configuration data.

Next, the concrete construction of the screen configuration expanding device according to the presents invention will be explained.

The screen configuration expanding device **103** shown in FIG. **2** comprises a CPU **201** for executing a predetermined processing, a memory device **202** for storing necessary information, inclusive of a program for operating this CPU **201**, a communication control portion **203** for controlling data communication between networks **102** and **104** and this expanding device **103**, an auxiliary memory device **205**, an external memory I/O **207** for reading out data from information storage media such as a CD-ROM **208**, a FD **209**, a magnetic tape **210**, a DVD **211**, etc, for storing the program for accomplishing the functions of the present invention, and a communication control portion **206**, connected to the network **104**, for receiving the program for accomplishing the functions of the present invention through the networks. These memory device **202**, communication control portions **203**, **206**, auxiliary memory device **205** and external memory I/O **207** are controlled by the command and the data that are sent from the CPU **201** through a bus **204**.

In FIG. **3**, the screen configuration expanding device **103** comprises a request processing portion **301** and a response processing portion **303**.

Reference numeral **301** denotes the request processing portion, which transfers the command sent from the client **105** to the server **101**.

The request processing portion **301** comprises a command analysis portion **304**.

The command analysis portion **304** analyzes the command **311** transferred from the client **105** and stores the result of this analysis as analysis information **308**. The command analysis portion **304** executes conversion of the command, whenever necessary. The command analysis portion **304** transfers the command as the analyzed command **312** to the server **101**.

After the command **312** is transferred to the server **101**, the screen configuration expanding device **103** transfer its processing to the response processing portion **303**.

When the request processing portion **301** does not transmit the command to the server **101** (this case will be explained later), the response processing portion **303** converts the data received from the server **101**, whenever necessary, and transfers it to the client **105**.

The response processing portion **303** comprises a data kind. detection portion **305**, a screen configuration expanding portion **306** and a data conversion portion **307**.

The data kind detection portion **305** receives the information which stipulates whether or not data conversion is to be made for the data sent thereto, from the analysis information portion **308**, and decides whether or not to execute conversion for the data sent from the sever on the basis of this information.

When the data **313** is the screen configuration data, the data kind detection portion **305** delivers the data **313** as the data **314** the screen configuration expanding portion **306**, and transfers the processing to the screen configuration expanding portion **306**.

When the data **313** is the data kind which the conversion object, the data kind which is the conversion object, the data kind detection portion **305** delivers the data **313** as the data **315** to the data conversion portion **307**, and transfer the processing to the data conversion portion **307**.

The screen configuration expanding portion **306** executes any one of the following three Processing in accordance with the analysis result of the command analysis portion **304**.

The first is a generation processing of the screen configuration data for generating new screen configuration data by using the screen configuration template **309**.

The second is a conversation processing of the screen configuration data for changing the tag content in the screen configuration data when the screen configuration expanding portion **306** receives the screen configuration data **314** form the data kind detection portion **305**.

These two processings will be described later. The screen configuration expanding portion **306** finally outputs any of the screen configuration data as the data **316**.

The data conversion portion **307** is the portion that executes the image data conversion processing similar to that of the screen configuration expanding device **103** explained in this embodiment, and has therein the conversion expander table **1101**.

Receiving the data **315** from the data kind detection portion **305**, the data conversion portion **307** outputs the data **315** as the data **316** in accordance with the information of the analysis information **308**.

The above explains the basic operation of the screen configuration expanding device **103**.

The operation of the screen configuration expanding device **103** will be successively explained with reference to concrete examples.

First, the screen configuration template **309** and the content of the set management table **310** will be explained.

In this embodiment, the screen configuration template **309** stores two templates shown in FIGS. **11** and **15**.

In FIG. **11**, reference numerals **1202** and **1203** denote incomplete anchor tag descriptions, and they have blank columns **1204**, **1205** and **1206**, **1207**, respectively. When these blank columns are filled, the anchor tag descriptions become complete anchor tag descriptions.

In FIG. **16**, reference numeral **1601** denotes the screen configuration template.

In FIG. **16**, reference numerals **1602**, **1603** and **1604** denote description for dividing the screen display of the client **105**. They are described as the frame description in

Lauta Lemay, "Teach Yourself More Web Publishing with HTML in a Week", Appendix D (1995), published by Prentice-Hall, Co.

First, the descriptions **1602** and **1605** describes that the client screen is divided into upper and lower two display areas.

The description **1603** is a description relating to the content of the upper area of the two display areas described above. Here, it describes that the content of the data address is to be displayed in this area. Further, this area is called "UI". This is one of the conversion instruction commands.

The description **1604**, too, is a description similar to **1603**. It describes that the name of the lower area is "PAGE". It does not become a complete description unless the blank column **1607** is filled.

In this embodiment, the content of the setting management table **310** is shown in FIG. **12**.

Reference numeral **1301** denotes the content of the setting management table **310**, reference numeral **1302** denotes the item content of the setting management table **310** and reference numerals **1303** and **1304** denote the table data of the setting management table **310**.

The operation of the screen configuration expanding device **103** in this embodiment will be explained below on the basis of the premise condition described above.

First, the client **105** transmits the command [GET menu. html] to the screen configuration expanding device **103** (response command).

Receiving this command, the screen configuration expanding device **103** transfers the processing to the request processing portion **301**. The request processing portion **301** receives this command as a command **311** and transfers the processing to the command analysis portion **304** so as to execute the analysis and conversion of the command. The command analysis portion **304** analyzes the data address designated by the command **311**, separates the expander contained in the setting management table **310** from the data address and stores it in the analysis information **308**. At this time, the command analysis portion **304** analyzes the tail of the data address, judges the data kind and stores it in the analysis information **308**.

In this embodiment, the character strings [.gif], [.html], etc, at the end of the data addresses are not called the expander.

Further, the command analysis portion **304** collates the analysis information **308** with the information of the setting management table **310** and executes the processing in accordance with the following three rules.

(Rule 1)

When the data kind in the analysis information is the screen configuration data and the expander is].ui], the processing is transferred from the request processing portion **301** to the response processing portion **303**, and the processing is transferred to the screen configuration expanding portion **306** in order to generate the additional screen configuration data.

This generation of the additional screen configuration data will be described later.

(Rule 2)

The processing is transferred from the request processing portion **301** to the response processing portion **303**, and to generate the expanded screen configuration data, the processing is transferred to the screen configuration expanding portion **306** of the response processing portion **303**.

The expanded screen configuration data will be described later.

(Rule 3)

In the cases other than those described above, the command **312** requiring the data address of the analysis information **308** is transmitted to the server **101** and the processing is transferred **6** to the data type detection portion **305** of the response processing portion **303**.

For example, since the content of the analysis information **308** is (address: menu. html, expander: nil, data kind: screen configuration data), this corresponds to the (Rule 2) described above.

Therefore, the request processing portion **301** transfers the processing to the response processing portion **303** and the screen configuration expanding port **306** starts generating the expanded screen configuration data.

The term "generation of the expanded screen configuration data" means that the screen configuration expanding portion **306** divides the display area of the screen of the client **105** into two from the information of the screen configuration template **309**, the setting management table **310** and the analysis information **30** and generates the screen configuration data for displaying two screen configuration data.

Next, the generation processing of the expanded screen configuration data by the screen configuration expanding portion **306** will be explained.

First, the screen configuration expanding portion **306** takes out the expanded screen configuration template **1601** stored in the screen configuration template **309**.

Further, the screen configuration expanding portion **306** describes the data address, which is the sum of the data address of the analysis information **308** and the expander [.ui] (which, in this embodiment, plays the role of the conversion instruction command for converting the command from the server by the relay device) in the blank column **1606**, describes also the data address, which is the sum of the data address of the analysis information **308** and the page reference expander of any of the table data of the setting management table **301**, in the blank column **1607**, and outputs them as the data **316**.

When the blank column **1607** is filled in this embodiment, the page reference expander of set No. **2** of the setting management table **1301** must be always added.

Because the data address of the analysis information **308** is [menu. tml] and the page reference expander of the set No. **2** of the setting management able **1301** is [.p-quick], the content of the data **316** is as shown in FIG. **16**.

In FIG. **16**, reference numeral **1701** denotes the expanded screen configuration data generated by the screen configuration expanding portion **306**. Reference numerals **1702** and **1703** denote the descriptions generated when the screen configuration expanding portion **306** fills the blank columns of **1606** of **1603** and **1607** of **1604**, respectively.

The screen configuration expanding portion **306** transfers the processing to the response processing portion **303**.

Next, the response processing portion **303** transfers the data **316** to the client **105**.

Receiving the data **316** as the screen configuration data **1701**, the client **105** analyzes its content.

In order to completely display the content of the screen configuration data **1701** on the screen, the client **105** must receive at least the data to which reference is made by the descriptions **1702** and **1703**.

First, the client **105** transmits the command [GET menu. ui. html] for requesting the transfer of [menu. ui. html] looked up by the description **1702** to the screen configuration expanding device **103**.

Receiving this command, the screen configuration expanding device **103** analyzes this command by the com-

mand analysis portion **304** of the request processing portion **301** and obtains the analysis information **308** (the address: menu. html, the expander: .ui, the data kind; screen configuration data)

The request processing portion **301** transfers the processing to the response processing portion **303** in accordance with the (Rule 1) and on the basis of this result, and starts the generation processing of the additional screen configuration data by the screen configuration expanding potion **306**.

The screen configuration expanding portion **306** takes out the additional screen configuration template **1202** from the screen configuration template **309**.

Next, the screen configuration expanding portion **306** serially fills the addresses as the sum of the data address of the analysis information and the page reference expander of each set number of the setting management table **1301** into the blank columns **1204** and **1206**.

Further, the screen configuration expanding portion **306** fills serially the UI button names of the data address setting management table **1301** of the analysis information into the blank columns **1205** and **1207**.

In this way, the screen configuration expanding portion **306** fills the blank columns of the additional screen configuration template **1202** by the processing described above and outputs them as the data **316**. Here, the data **316** has the content shown in FIG. **13**.

Referring to FIG. **14**, reference numeral **1501** denotes client screen display by the screen configuration data **1401**, and reference numerals **1502** and **1503** denote the button display by the anchor tag descriptions **1402** and **1403**, respectively.

Next, the client **105** transmits the command [GET menu. p-quick. html] requesting the transfer of [menu. p-quick. html] to which reference is made by the description **1703**, to the screen configuration expanding device **103**.

Receiving this command, the screen configuration expanding device **103** transmits the command [menu. html] to the server **101** in accordance with the (Rule 3) as a result of the processing of the request processing portion **301**, and transfers the processing to the response processing portion **303**.

At this time, the content of the analysis information is (address: menu. html, expander: p-quick, data kind: screen configuration data).

Receiving the command [menu. html], the server **101** transmits the screen configuration data **501** to the screen configuration expanding device **103**.

Receiving the screen configuration data **501**, the screen configuration expanding device **103** first delivers the screen configuration data **501** to the screen configuration expanding portion **306** by the data kind detection portion.

The screen configuration expanding portion **306** executes the conversion processing of the screen configuration data in accordance with the following rules.

(Rule A)

The configuration expander whose page reference expander is the same as that of the analysis information **308** in the setting management table **1301** is added to the data address of those anchor tags which refer to the screen configuration data among all the anchor tags contained in the screen configuration data.

(Rule B)

The image reference expander whose page reference expander is the same as that of the expander of the analysis information in the setting management table **1301** is added to the data address of those anchor tags and image tags which refer to the screen configuration data among all the anchor tags and image tags contained in the screen configuration data **314**.

Here, when the conversion data **314**, that is, the screen configuration data **501**, are converted in accordance with the rules described above, the result becomes as shown in FIG. **17**.

In FIG. **17**, reference numeral **1801** denotes the screen configuration data, and reference numerals **1802**, **1803** and **1804** denote the anchor tag descriptions, respectively.

The screen configuration expanding portion converts the data **314** in accordance with the rules described above and outputs them as the data **316**.

The screen configuration expanding portion **306** transfers the processing to the response processing portion **303**.

Next, the response processing portion **303** transfers the data **316** to the client **105**.

When receiving this data **316**, that is, the screen configuration data **1801**, the client **105** displays finally the content shown in FIG. **19** on the screen.

In FIG. **18**, reference numeral **1901** denotes client screen display of the screen configuration data **1701**, and reference numeral **1902** denotes client screen display of the screen configuration data **1801**.

In FIG. **18**, reference numerals **1903**, **1904** and **1905** denote button displays by the anchor descriptions **1802**, **1803** and **1804**, respectively.

In FIG. **18**, the process in which a static image **902** as a reduced image of the static image **603** is displayed in place of this static image **603** is the same as the operation of the screen configuration expanding device **103**, and it is the result of the data conversion by the data conversion portion **307** in accordance with the information of the analysis information **308**.

In this way, the processings when the client **105** transmits the command [GET menu. html] are all completed.

Next, when the user of the client **105** selects the button **1903** in the screen display **1901**, the client **105** transmits [GET pictA.small. gif] to the screen configuration expanding device **103**.

As a result, the content of FIG. **20** is finally displayed on the screen of the client **105**.

In FIG. **19**, reference numeral **2001** denotes the screen display of the client.

The screen display **2001** is entirely the same as the screen display of FIG. **10**. It has the same content as when the button **903** in the screen display **901** is selected in the system utilizing the data converting device **401**.

When the user of the client selects the button **1502** in the screen display **1901**, the client **105** transmits the command [GET menu.p-normal.html] to the screen configuration expanding device **103**.

As a result, the screen configuration expanding device **103** transmits the screen configuration data to the client **105** in accordance with the (Rule 3) in the same way as when it receives [GET menu.p-quick.html].

In FIG. **20**, reference numeral **2101** denotes the screen configuration data and reference numeral **2102** denotes the anchor tag description.

Receiving the screen configuration data **2101**, the client **105** finally displays the content of FIG. **22** on the screen.

In FIG. **21**, reference numeral **2201** denotes the client screen display, reference numeral **2202** denotes the screen display of the screen configuration data **2101** and reference numeral **2203** denotes the button display by the anchor tag description **2102**.

The screen display **2202** in FIG. **21** is entirely the same in appearance as the screen display **601**.

When the client user selects the button **604** in the screen display **2202**, the client **105** finally displays the content of FIG. **22** on the screen.

In FIG. **22**, reference numeral **2301** denotes the client screen display.

When the client user selects the button **1503** in the screen display **2202**, the client **105** transmits the command [GET menu.p-quick.html].

Since this case is entirely the same as the case when the client **1501** transmits [GET menu.html], the final screen display of the client **105** is the same as the screen display **1901**.

As described above, control can be made so that when the client **105** first gains access to the data or when the user selects the [QUICK] button, all the static images transferred to the client **105** are reduced, and when the user selects the [NORMAL] button, the static image data are not reduced in the same way as when the server **101** and the client **105** directly communicate with each other.

In this embodiment, the conversion function of the data conversion portion **307** has been explained only as the size change function of the static image, but the present invention can cope with all data conversion functions.

Examples of the data conversion systems that can be applied to the present invention include the conversion of moving image data to digest data, the conversion of speech data to digest data, translation of text data, and so forth.

Though this embodiment has the construction such that the additional screen configuration data are displayed at the upper portion of the screen, this position can be easily changed to the right or left or lower portions.

Though the number of the additional screen configuration data is only one in this embodiment, it can be easily changed to a plurality of numbers.

The content of the additional screen configuration data in this embodiment is the mode setting buttons for the data conversion, but any content can be added to the screen display by the present invention so long as they can be represented by the screen configuration data.

Examples include the notice and help to the users and advertisements of companies.

This embodiment makes it possible for the user of the client to reduce the data amount while keeping layout of the original screen display **601**.

Further, the client user can gain access at any time to the content similar to that of the screen display **601** and the access to the original data becomes easier.

Because the present invention keeps the format of the communication system and the screen configuration data according to the prior art, existing servers and clients can be as such utilized.

As described above, this embodiment provides the function of reducing the data amount and improving operability of the system by merely selecting the buttons at the upper portion of the screen and changing the mode without changing layout.

Change-over of the mode can be explicitly represented as shown in FIGS. **23** and **24** by changing the display method of the selected button at the time of selection of the buttons **1502** and **1503**.

In FIG. **23**, reference numeral **2401** denotes the client screen display, reference numeral **2402** denotes the screen display of the additional screen configuration data and reference numeral **2403** denotes the reversed button display.

In FIG. **24**, reference numeral **2501** denotes the client screen display, reference numeral **2502** denotes the screen display of the additional screen configuration data and reference numeral **2503** denotes the reversed button display.

According to this embodiment, the user can judge at a look the mode he is utilizing, and can be relieved from the confusion whether or not he is looking up the original.

The content shown in FIG. **25** can be displayed on the client **105** in place of the screen display **2001**.

In FIG. **25**, reference numeral **2601** denotes the client screen display, reference numeral **2602** denotes the screen display of the lower area of **2601**, reference numeral **2603** denotes the screen display of the text and reference numeral **2604** denotes the static image **1002** and also the button.

When the user selects the user button **2604** in the screen display **2601**, the screen display of the client **105** finally becomes similar to the screen display **2301**.

The first embodiment requires the operation of changing the mode and gaining again access to the same data in order to easily look up the original image from the state where the user refers to the reduced image. However, this embodiment can carry out the same operation by a single operation of selecting the buttons.

Furthermore, a [list] button can be added as shown in FIG. **26** by changing the additional screen configuration data.

In FIG. **26**, reference numeral **2701** denotes the client screen display, reference numeral **2702** denotes the screen display of the additional screen configuration data to which the [list] button is added, and reference numeral **2703** denotes the screen display of the [list] button.

The user can look up the list of the reduced images of the static image data referred to by the button on the screen displayed at the lower portion by selecting the [list] button.

When the user selects the button **2703** in the screen display **2701**, for example, the screen display of the client **105** becomes such as the one shown in FIG. **27**.

In FIG. **27**, reference numeral **2801** denotes the client screen display, reference numeral **2802** denotes the list display of the images, reference numeral **2803** denotes the text and reference numerals **2804** and **2805** denote the reduced static images, respectively.

The original images of the respective image can be looked up in the screen **2801** by selecting the buttons **2804** and **2805**, respectively.

It is possible to grasp the outline of a plurality of data by one operation, and is particularly effective when a large number of buttons for looking up the static image data exists on the same screen.

The third and fourth embodiments are effective not only when the object of the data conversion in the present invention is the static image but also when it is the moving image data.

For example, the third embodiment can provide the function such that when the button for looking up the moving image data exists, only the first frame of the moving image is displayed in the QUICK mode, and starting the reproduction of the moving image when this image is selected as the button.

The next embodiment can provide the function such that when a large number of buttons for looking up the moving image data exist, only the first frame of the moving image data is listed by selecting the [list] button.

Furthermore, the additional screen configuration data can be displayed as shown in FIG. **28**.

In FIG. **28**, reference numeral **2901** denotes a screen display by another window.

According to this embodiment, the user can dispose the mode change button at a desired position.

It is further possible to distinguish the static image buried in the client display screen from the static image looked up by the button, and to enable the user to select the separate reference modes.

The client display screen in this embodiment becomes such as the one shown in FIG. **29**.

In FIG. **29**, reference numeral **3001** denotes the client screen display and reference numeral **3002** denotes the screen display of the additional screen configuration data.

In FIG. **29**, reference numeral **3003** denotes the client screen display and reference numerals **3004**, **3005** and **3006** denote the buttons for designating the reference mode of the static image to be looked up by the buttons.

In FIG. **29**, further, reference numeral **3007** denotes the button for displaying the operation method.

This embodiment distinguishes the static image buried into the client display screen from the static image to be looked up by the buttons and enables the user to select the separate reference modes. Therefore, the operation can be carried out easily and flexibly in such a manner that the image buried in the screen display is reduced and only the static image to be looked up by the buttons always refers to the original.

Next, the operation for accomplishing the processing described above will be explained in further detail.

Although the present invention does not limit the kind of the data exchanged between the client **105** and the server **105** and the number of such data, the following premise will be assumed so as to simplify the explanation.

{Premise 1)

The kind of the data as the object of the operation of the screen configuration expanding device **103** is only the screen configuration data and the static image data. The end of the data address is always [.html] in the case of the screen configuration data and [.gif] in the case of the static image data.

Then, the explanation will be given on the operation of the network system of this embodiment shown in FIG. **1** with reference to the drawings.

In this embodiment, the screen configuration expanding de vice **103** executes the processing in accordance with the flowchart shown in FIG. **30**.

In FIG. **30**, reference numeral **3101** represents the start of the operation of the screen configuration expanding device **103**.

When activated, the screen configuration device **103** transfers the processing to the step **3102** and waits for the connection request from an indefinite client.

When the connection request arrives from the client, the screen configuration expanding device **103** transfers the processing to the step **3103** and executes the configuration expanding processing.

This configuration expanding processing **3103** will be explained later in further detail.

When this configuration expanding processing **3103** is completed, the screen configuration expanding device **103** again transfers the processing to the step **3102** and thereafter repeats the steps **3102** and **3103**.

Next, the concrete operations of the screen configuration expanding device **103** in this embodiment will be explained.

In the explanation which follows, the period during which the client **105** establishes the connection with the screen configuration expanding device **103** to transmit the command and cuts off this connection will be referred to as a "session".

The operation of the screen configuration expanding processing **103** in the session in which the client **105** establishes the connection with the configuration expanding device **103** to transit the command [GET menu. html] and then cuts off this connection will be explained.

This session will be hereinafter called the "session **1**).

First, the screen configuration expanding device **103** is activated and then waits for the connection request from an unspecific client at the step **3102**.

Next, the client **105** raises the connection request for the screen configuration expanding device **103** and transmits the command {GET menu. html].

Then, the screen configuration expanding device **103** receives the connection request from the client **105** and transfers the processing to the step **3103**.

After the configuration expanding processing at the step **3103** is completed, the processing is transferred to the step **3102**, and a new connection request from an unspecific client is awaited afresh.

Next, the processing content of the configuration expanding processing **3103** will be explained with reference to the flowchart of FIG. **31**. In FIG. **31**, reference numeral **3201** denotes the start of the configuration expanding processing **3103**.

Similarly, reference numeral **3202** denotes the step of an initialization processing, and the data necessary for the configuration expanding processing **3103** are initialized at this step.

In this embodiment, the screen configuration expanding device **103** initializes the setting table shown in FIG. **3** at the step **3202**.

In FIG. **37**, reference numeral **3801** denotes the setting table and reference numeral **3802** denotes the item name of the setting table **3801**. Reference numeral **3803** denotes the content of the setting table **3801**.

At the step **3202**, the screen configuration device **103** sets the content of the setting table **3801** to [address=nil, classification=conversion, processing content=non-conversion, parameter=nil] as represented by **3803**.

Next, the screen configuration expanding device **103** transfers the processing to the step **3203** and establishes the connection with the client.

The screen configuration expanding device **103** then transfers the processing to the step **3204** and executes the command analysis processing.

In this command analysis processing **3204**, the command from the client with which connection is established is received, and the content of the setting table is set by using the processing object able for confirming whether or not the command is the data as the processing object of the screen configuration expanding device **103**. The detail of the command analysis processing will be described later.

When the command analysis processing **3204** is completed, the screen configuration expanding device **103** transfers the processing to the step **3205** and judges whether or not the content of the item [classification] of the setting table **3801** is [generation].

When the judgement result at the step **3205** proves [YES], that is, true, the screen configuration expanding device **103** transfers the processing to the step **3206** and if the result is not [YES], it transfers the processing to the step **3207**.

At the step **3206**, the screen configuration expanding device **103** generates new screen configuration data for executing expansion for the page of the original and replies to the client.

The detail of this replay data generation processing **3206** will be described later.

At the step **3207**, on the other hand, the screen configuration expanding device **103** establishes the connection with the server storing the data of the [address] of the setting table.

Next, the screen configuration expanding device **103** transfers the processing to the step **3208**, transmits established at the step **3207**, and then transfers the processing to the step **3209**.

The command at this time is the one obtained by replacing the address portion of the command received from the client by the content of the item [address] of the setting table **3801**.

Next, the screen configuration expanding device **103** transfers the processing to the step **3209** and judges whether or not the item [processing content] of the setting table **3801** is [non-conversion).

When the result is [YES], that is, true, the screen configuration device **103** transfers the processing to the step **3211** and if not, transfers the processing to the step **3210**.

At the step **3210**, the screen configuration expanding device receives the data from the server, executes data conversion designated y the [processing content] of the setting table, and then transfers the processing to the step **3212**.

The detail of the data conversion processing **3210** will be described later.

On the other hand, the screen configuration expanding device **103** receives the data transmitted from the server at the step **3211**, transmits the data as such to the client, relays the data and then transfers the processing to the step **3212**.

Next, the screen configuration expanding device **103** cuts off the connection with the client, and the connection with the server when the processing is executed through the step **3207**, at the step **3212**, and then transfers the processing to the step **3213**.

At the step **3213**, the screen configuration expanding device **103** completes the configuration expanding processing **3103**. The above explains the operation of the screen configuration expanding device **103** in the configuration expanding processing **3103**.

Since the operation of the configuration expanding device **103** is the repetition of the configuration expanding processing **3103**, the explanation will be hereinafter given primarily on the operation of the configuration expanding processing **3103** when the operation of the screen configuration expanding device **103** is explained.

Here, the configuration expanding processing **3103** in (session **1**) will be explained.

The screen configuration expanding device **103** first initializes the content of the setting table **3801** at the step **3202** and then transfers the processing to the step **3203**.

At this time, the content of the setting table is as **3803** in FIG. **37**.

The screen configuration device **103** establishes the connection with the client **105** at the step **3203** and then transfers the processing to the step **3204**.

Next, the screen configuration expanding device **103** executes the command analysis processing **3204** at the step **3204**, sets the content of the setting table and transfers the processing to the step **3205**.

In this embodiment, the content of the setting table is set to [address=menu. html, classification=generation, processing content=generation of configuration expanding frame, parameter=.p-quick], and the process to this setting result will be later described.

Next, since the content of [classification] of the setting table **3801** is [generation] at the step **3205**, the result of judgement becomes [UES] and the screen configuration expanding device **103** transfers the processing to the step **3206**.

The screen configuration expanding device **103** generates the expanded screen configuration data **1701** shown in FIG. **16** at the step **3206**, and then transfers the processing to the step **3212**.

The detail of the processing of the step **3206** will be described later.

At the step **3212**, the screen configuration expanding device **103** cuts off the connection with the client **105** and transfers the processing to the step **3212**.

At the step **3213**, the screen configuration expanding device **103** completes the configuration expanding processing **3103**.

The above explains the operation of the configuration expanding processing of the screen configuration expanding device **103** in (session **1**).

Next, the detail of the command analysis processing **3204** will be explained.

The screen configuration expanding device **103** executes the command analysis processing **3204** in accordance with the flowchart shown in FIG. **32**.

In FIG. **32**, reference numeral **3301** represents the start of the command analysis processing.

At the step **3302**, the screen configuration expanding device **103** receives the command from the client which establishes the connection at the step **3203**.

Next, the screen configuration expanding device **103** extracts the data identifier and the expander from the address contained in the command so received at the step **3303**, removes the expander from the address if it exists, and transfers the processing to the step **3304**.

Here, the term "data identifier" represents a character string starting with the tail [.] and the term "expander" represents a character string starting with the tail [.] other than the data identifier.

For example, when the address of the received command is [menu. html], the data identifier is [.html] and the expander is [nil], and the address conversion is not effected.

On the other hand, when the address of the received command is [menu. quick. html], the data identifier is [.html] and the expander is [quick].

Next, the screen configuration expanding device **103** writes the address contained in the command received from the client into the item [address] of the setting table **3801** at the step **3304** and transfers the processing to the step **3305**.

Next, the screen configuration expanding device **103** judges whether or not the command is the processing object data by using the processing object table shown exemplarily in FIG. **38** at the step **3305**. This processing object table is stored in the memory device **202** shown in FIG. **2**.

In FIG. **38**, reference numeral **3901** represents the processing object table and reference numeral **3902** does the item name of this processing object table **3901**. Reference numerals **3903**, **3904**, **3905**, **3906**, **3907** and **3908** represent the entries of the processing object table.

It will be hereby assumed that the processing object table does not have the limitation of the number of entries.

At the step **3305**, the screen configuration expanding device **103** retrieves the entries where the data identifier and the expander extracted at the step **3303** correspond to the items [object data identifier] and [expander] in the processing object table, respectively, and then transfers the processing to the step **3306**.

Next, at the step **3306**, the screen configuration expanding device **103** judges whether or not the entries exist as a result of retrieval at the step **3305**. If the corresponding entries exist, the result proves [YES] and the processing proceeds to the step **3307**. If not, the processing proceeds to the step **3308**.

At the step **3307**, the screen configuration expanding device **103** writes the items [classification], [processing content] and [parameter] in the entries retrieved at the step **3305** into the items [classification], [processing content] and [parameter] in the setting table **3801**, and transfers the processing to the step **3308**.

The screen configuration expanding device **103** completes the command analysis processing at the step **3308**.

Next, the processing process of the command analysis processing **3204** when the client **105** transmits the command [GET menu. html] to the screen configuration expanding device **103** will be explained.

First, at the step **3301**, the screen configuration expanding device **103** starts the command analysis processing.

Next, the screen configuration expanding device **103** receives the command [GET menu. html] from the client **105** at the step **3302** and transfers the processing to the step **3303**.

Next, the screen configuration expanding device **103** extracts the expander and the data identifier from the address menu. html contained in the command [GET menu. html] and the result of this extraction becomes [data identifier= .html, expander=nil].

Because [expander=nil], the screen configuration expanding device **103** does not execute the address conversion.

Next, the screen configuration expanding device **103** retrieves the entry having [object data identifier=.html, expander=nil] in the processing object table **3901** at the step **3305**, and picks up the entry **3904** as the result of retrieval.

At the next step **3306**, the screen configuration device **103** confirms the existence of the corresponding entry and then transfers the processing to the step **3307**.

The screen configuration expanding device **103** then writes the content [classification], [processing content] and [parameter] of the entry **3904** into the items [classification], [processing content] and [parameter] of the setting table **3801** at the step **3308**.

As a result, the content of the setting table **3801** becomes [address=menu. html, classification=generation, processing content=generation of configuration expanded name, parameter=.[-quick].

The screen configuration expanding device **103** completes the command analysis processing at the step **3308**

The above explains the processing process of the command analysis processing **3204** when the client **105** transmits the command [GET menu. html] to the screen configuration expanding device **103**.

Next, the detail of the response data generation processing **3206** will be explained.

The screen configuration expanding device **103** starts the response data generation processing **3206** at **3401** in FIG. **33**.

The screen configuration expanding device **103** judges whether or not the content of the time [processing content] of the setting table **3801** is [generation of configuration expanded frame] at the step **3402**. If the result proves [YES], that is, true, the processing is transferred to the step **3403** and if not, to the step **3404**.

At the step **3043**, the screen configuration expanding device **103** executes the configuration expanded frame generation processing, generates the screen configuration data for replaying to the client establishing the connection, and transfers the processing to the step **3405**.

This screen configuration data is the screen configuration data for expanding the page of the address required by the client, and is so described as to synthesize a plurality of screen configuration data.

The detail of the operation of the configuration expanded frame generation processing **3403** will be described later.

On the other hand, the screen configuration expanding device **103** executes the UI frame generation processing at the step **3404**, generates the screen configuration data for replying to the client establishing the connection at the step **3203**, and transfers the processing to the step **3405**.

This screen configuration data is the one that describes the user interface for enabling the user to utilize a certain specific function when added to the page of the address required by the client.

The detail of the UI frame generation processing **3404** will be described later.

At the step **3405**, the screen configuration expanding device **103** transmits the screen configuration data generated at the step **3403** or **3404** to the client establishing the connection at the step **3203**, and transfers the processing to the step **3406**.

At the step **3406**, the screen configuration expanding device **103** completes the replay data generation processing.

The processing process of the replay data generation processing will be hereby explained about the case where the client **105** transmits the command [GET menu. html] to the screen configuration expanding device **103**.

In this case, the content of the setting table **3801** is [address=menu. html, classification=generation, processing content=generation of expanded configuration frame, parameter=.p-quick] in the command analysis processing **3204** as described already.

First, the screen configuration expanding device starts the replay data generation processing at the step **3401**.

At the next step **3402**, the screen configuration expanding device **103** judges whether or not the item [processing content] of the setting table **3801** is [generation of configuration expanded frame], and because this result proves [YE], it transfers the processing to the step **3403**.

At the step **3403**, the screen configuration expanding device **103** generates the screen configuration data **1701** and transfers the processing to the step **3405**.

The detail of the process for generating the screen configuration data **1701** by the configuration expanded frame processing **3403** will be described later.

At the step **3405**, the screen configuration expanding device **103** transmits the screen configuration data **1701** generated at the step **3403** to the client **105** and then transfer the processing to the step **3406**.

The above explains the processing process of the replay data generation processing when the client **105** transmits the command [GET menu. html] to the screen configuration expanding device **103**.

Next, the detail of the configuration expanded frame generation processing **3403** will be explained.

The screen configuration expanding device **103** executes the configuration expanded frame generation processing **3403** in accordance with the flowchart shown in FIG. **34**.

In FIG. **34**, reference numeral **3501** represents the start of the configuration expanded frame generation processing **3403**.

The screen configuration expanding device **103** first reads the screen configuration temperate as the model of the screen configuration data to be finally generated at the step **3502**, and transfers the processing to the step **3503**.

FIG. **15** shows an example of the screen configuration template used in this embodiment.

Two blank columns **1606** and **1607** are provided to the screen configuration template in this embodiment.

At the step **3503**, the screen configuration expanding device **103** inserts the expander [.ui] to the address set to the item [address] of the setting table **3801**, writes the result into the blank column **1601** and then transfers the processing to the step **3504**.

At the step **3504**, the screen configuration expanding device **103** inserts the expander set to the item [parameter] of the setting table **3801** to the address set to the item

[address] of the setting table **3801**, writes the result into the blank column **1607** and then transfers the processing to the step **3050**.

At the step **3505**, the screen configuration device **103** handles the data filling the two blank columns **1606** and **1607** of the screen configuration template **1601** as the resulting screen configuration data, and finishes the configuration expanded frame generation processing.

Here, the processing process of the configuration expanding frame generation processing will be explained about the case where the client **105** transmits the command [GET menu. html] to the screen configuration expanding device.

In this case, the content of the setting table **3801** is [address=menu.html, classification=generation, processing content=generation of configuration expanded frame, parameter=.p-quick] in the command analysis processing **3204** as already described.

First, the screen configuration device **103** starts generating the configuration expanded frame at the step **3501**.

At the step **3502**, the screen configuration expanding device **103** reads the screen configuration template **1601** and transfers the processing to the step **3503**.

At the step **3503**, the screen configuration expanding device **103** inserts the expander [.ui] to the content [menu. html] of the item [address] of the setting table **3801**, writes the result [menu. ui. html] into the blank column **1606** and then transfers the processing to the step **3504**.

At the step **3504**, the screen configuration expanding device **103** inserts the expander [.p-quick] (here, the expander is also the conversion instruction command for instructing to convert the command from the server at the screen configuration expanding device) set to the content [menu. html] of the item [address] of the setting table **3801**, writes the result [menu. p-quick.html] into the blank column **1607** and transfers the processing to the step **3505**.

At this time, as the two blank columns **1606** and **1607** are filled, the screen configuration template **1601** becomes the screen configuration data **1701** shown in FIG. **16**.

At the step **3505**, the screen configuration expanding device **103** handles the screen configuration data **1701** as the resulting screen configuration data and finishes the configuration expanded frame generation processing **3403**.

When the screen configuration expanding device **103** receives the command [GET menu.html] from the client **105** in the (session **1**) as described above, it transmits finally the screen configuration data to the client **105**.

FIG. **42** shows the mode of communication between the client **105** and the screen configuration expanding device **103** in the (session **1**).

The communication in the (session **1**) is represented by reference numerals **4301** to **4304**, and the step **3203** and communication **4301**, the step **3302** and communication **4302**, the step **3405** and communication **4303** and the step **3212** and communication **4304** correspond to one another, respectively.

Next, the operation of the screen configuration expanding device **103** will be explained about the processing continuing the (session **1**) by including the explanation of the UI frame generation processing **3404** and the data conversion processing **3210**.

When the client **105** receives the screen configuration data **1701** by the (session **1**), it analyzes the content and transmits the command requesting the screen configuration data [menu. ui. html] and [menu. p-quick. html] as the two constituent elements of the frame to the screen configuration expanding device **103**.

A series of processings from establishment till cutoff of the connection by the two commands transmitted, i.e. [GET menu. ui. html] and [GET menu. p-quick. html], are referred to as (session **2**) and (session **3**), respectively.

First, the operation of the screen configuration expanding device **103** in the (session **2**) will be explained.

After completion of the (session **1**), the screen configuration expanding device **103** waits for the connection request from an unspecific client **105** at the step **3102**.

The client **105** transmits the command [GET menu. ui. html] to the screen configuration expanding device **103**.

Here, the operation of the screen configuration expanding device **103** in the (session **2**) is the same as the operation in the (session **1**) up to the command analysis processing **3204**. Therefore, the operation of the screen configuration expanding device **103** will be explained from the step **3302** of the command analysis processing **3204**.

At the step **3302**, the screen configuration expanding device **103** receives the command [GET menu. ui. html] from the client **105**.

At the step **3303**, the screen configuration expanding device **103** extracts the data identifier [.html] and the expander [.ui] from the address [menu. ui. html] contained in the command so received, removes the expander [.ui] from the address to obtain [menu. html] and then transfers the processing to the step **3304**.

At the step **3304**, the screen configuration expanding device **103** writes the address [menu. html] converted at the step **3303** to the item [address] of the setting table **3801** and transfers the processing to the step **3305**.

At the step **3305**, the screen configuration expanding device **103** retrieves the entry having [object data expander=.html, expander=.ui] in the processing object table **3901**, and transfers the processing to the step **3306** by using the entry **3905** as the result of retrieval.

At the step **3306**, the configuration expanding device **103** transfers the processing to the step **3307** as the corresponding entry exists as a retrieval result.

At the step **3307**, the contents of the items [classification], [processing content] and [parameter] of the entry **3905** are written into the items [classification], [processing content] and [parameter] of the setting table **3801**, respectively, and the processing is transferred to the step **3308**.

As a result, the contents of the setting table **3801** become [address=menu. html, classification=generation, processing content=UI frame generation, parameter=nil].

At the step **3308**, the screen configuration expanding device **103** finishes the command analysis processing.

The screen configuration expanding device **103** transfers the processing to the step **3205** after the command analysis processing is completed.

Since the result of the step **3205** becomes [YES], the screen configuration expanding device **103** transfers the processing to the reply data generation processing.

Since the result of the step **3402** of the reply data generation processing **3206** is [NO], the screen configuration expanding device **103** transfers the processing to the step **3404**.

The detail of the UI frame generation processing **3404** will be hereby explained.

The screen configuration expanding device **103** describes the UI frame on the basis of the UI setting table shown in FIG. **39**.

The screen configuration expanding device **103** executes the UI frame generation processing **3404** in accordance with the flowchart shown in FIG. **35**.

In FIG. **35**, reference numeral **3601** represents the start of the UI frame generation processing.

First, at the step **3602**, the screen configuration expanding device **103** reads the template of the button description as the

model of the user interface portion, and then transfers the processing to the step **3603**.

FIG. **43** shows an example of the template used in this embodiment.

In FIG. **43**, reference numeral **4401** denotes the template and reference numerals **4402** and **4403** denote the blank columns of the template, respectively.

At the step **3603**, the screen configuration expanding device **103** generates the screen configuration data of the UI frame on the basis of the UI setting table shown in FIG. **39** and then transfers the processing to the step **3604**.

In FIG. **39**, reference numeral **4001** denotes the UI setting table, reference numeral **4002** denotes the item name of the UI setting table **4001**, and reference numerals **4003** and **4004** denote entries.

At the step **3603**, the screen configuration expanding device **103** executes the following processings for the entries of the UI setting table **4001**.

First, it inserts the expander registered to the item [insertion expander] of the entry to the content of the item [address] of the setting table **3801** and writes the result into the blank column **4402** of the template **4401**.

Next, it writes the content of the item [button name] of the entry into the blank column **4403** of the template **4401**.

The template **4401** the blank columns of which are filled is added to the UI frame generation result.

The screen configuration expanding device **103** executes the processing described above for each entry of the UI setting table **4401** and generates the screen configuration data of the UI frame including the number of buttons equal to the number of entries.

At the step **3603**, the screen configuration expanding device **103** finishes the UI frame generation processing **3404**.

The above explains the operation of the screen configuration expanding device **103** in the UI frame generation processing **3404**.

Next, the operation of the UI frame generation processing **3404** in the (session **2**) will be explained.

At the step **3602**, the screen configuration expanding device **103** read the template **4401**.

At the step **3603**, the screen configuration expanding device **103** executes the following processings for the two entries of the UI setting table **4001**.

First, this device **103** inserts the insertion expander [.p-quick] of the entry **4002** to the content of the address [menu. html] of the setting table **3801** to generate [menu. p-normal. html] and writes it into the blank column **4402**.

Next, the screen configuration expanding device **103** inserts the button name [NORMAL] of the entry **4002** to the blank column **4403**.

As a result, the blank columns **4402** and **4403** of the template **4401** are filled by the screen configuration expanding device **103**, and the template **4401** becomes [<HREF= menu. p-normal. html TARGET=PAGE>NORMAL</A].

The screen configuration expanding device **103** adds this to the screen configuration data generation result by the entry **4002**.

Next, the screen configuration expanding device **103** executes the processing similar to the one made for the entry **4002**, for the entry **4003** and fills the blank columns **4402** and **4403** of the template **4401** to generate [<HREF=menu. p-quick. html TARGET=PAGE>QUICK</A].

The screen configuration expanding device **103** adds the above to the screen configuration data generation result by the entry **4403**.

As a result of the processing described above, the screen configuration expanding device **103** converts **1041** in FIG. **13** to the screen configuration data generated by the UI frame generation processing.

At the next step **3604**, the screen configuration expanding device **103** finishes the UI frame generation processing **3404**.

The above explains the operation of the UI frame generation processing **3404** in the (session **2**).

Next, the screen configuration expanding device **103** transfers the processing to the step **3405**.

At this step **3405**, the screen configuration expanding device **103** transmits the screen configuration data **1401** to the client **105** and transfers the processing to the step **3406**.

At the step **3406**, the screen configuration expanding device **103** finishes the reply data generation processing and transfers the processing to the step **3212**.

At the step **3212**, the screen configuration expanding device **103** cuts off the connection with the client **105** and transfers the processing to the step **3213**.

At the step **3213**, the screen configuration expanding device **103** finishes the configuration expanding processing **3103** in the (session **2**).

Here, FIG. **42** shows the communication sequence between the screen configuration expanding device **103** and the client **105** in the same way as in the (session **1**).

In FIG. **42**, communication **4305**, **4306**, **4307** and **4308** are the communications in the (session **2**), and the communication **4305** and the step **3203**, the communication **4306** and the step **3302**, the communication **4307** and the step **3405**, and the communication **4308** and the step **3212** correspond to one another, respectively.

Next, the operation of the screen configuration expanding device **103** in the (session **3**) will be explained.

After the (session **2**) is completed, the screen configuration expanding device **103** waits for the connection request from an unspecific client at the step **3102**.

The client **105** transmits the command [GET menu. p-quick. html] to the screen configuration expanding device **103**.

Here, the operation of the screen configuration expanding device **103** in the (session **3**) till the command analysis processing **3204** is substantially the same as the operation in the (session **1**) and its command analysis processing **3204** is substantially the same as that of the (session **1**) and the (session **2**). Therefore, the detailed explanation will be omitted.

The screen configuration expanding device **103** set the content of the setting table **3801** to [address menu. html, classification=conversion, processing content=configuration description conversion, parameter=.p-quick] by the command analysis processing **3204** on the basis of the address in the command received from the client **105** and the processing object table **3901**.

When the command analysis processing **3204** is finished, the screen configuration expanding device **103** transfers the processing to the step **3205**.

Since the result of the step **3205** becomes [NO], the screen configuration expanding device **103** transfers the processing to the step **3207**.

At the step **3207**, the screen configuration expanding device **103** establishes the connection with the server **101** storing [menu. html] designated by the address of the setting table **3801**, and transfers the processing to the step **3208**.

At the step **3208**, the screen configuration expanding device **103** transmits the command [GET menu. html] obtained by replacing the address portion of the command received from the client **105** by the address of the setting table **3801**, and then transfers the processing to the step **3209**.

At the step **3209**, since the processing content of the setting table is [conversion], the screen configuration expanding device **103** sets the evaluation result [processing content=non-conversion] to [NO] and transfers the processing to the step **3210**.

The detail of the data conversion processing **3210** will be hereby explained.

The screen configuration expanding device **103** executes the data conversion processing in accordance with the flowchart shown in FIG. **36**.

In FIG. **36**, reference numeral **3701** represents the start of the data conversion processing **3210**.

At the step **3702**, the screen configuration expanding device **103** evaluates whether or not the processing content of the setting table **1** is the [image reduction] and if the result is [YES], that is, true, transfers the processing to the step **37076** and if not, to the step **3703**.

At the step **3703**, the screen configuration expanding device **103** receives the data from the server **101** and transfers the processing to the step **3704**.

The data which the screen configuration expanding device **103** receives from the server **101** at this time is the screen configuration data.

For, the processing content of the setting table **3801** at this step **3703** is [configuration description conversion] from the judgement result at the step **3702** and from the content of the setting table **3901** and in this case, the data identifier of the address in the command transmitted to the server **101** should be [.html].

Therefore, the data the server **101** transmits to the screen configuration expanding device **103** becomes the screen configuration data.

At the step **3704**, the screen configuration expanding device **103** executes the configuration description conversion processing for the data received from the server **101** and then transfers the processing to the step **3705**.

Here, the configuration description conversion processing **3704** will be explained.

The screen configuration expanding device **103** converts the screen configuration data received from the server **101** on the basis of the two tables.

One of them is the conversion rule table shown in FIG. **40** and represents the tag as the conversion object is the screen configuration data and its attribute.

In FIG. **40**, reference numeral **4101** denotes the conversion rule table, reference numeral **4202** denotes the item name of this conversion rule table **4101** and reference numerals **4103**, **4104** and **4105** denote the entries of the conversion rule table **4101**.

The other table is the conversion parameter table shown in FIG. **41**. This is used for fitting a concrete expander to the insertion expander as one of the items of the conversion rule table **4101**.

In FIG. **41**, reference numeral **4201** denotes the conversion parameter table, reference numeral **4202** denotes the item name of the conversion parameter table **4201** and reference numerals **4203** and **4204** denote the entries.

The screen configuration expanding device **103** first searches the entry whose mode content is the same as the parameter of the setting table **3801** in the conversion parameter table **4201**, and fits the contents of [P1], [P2] and [P2] of the entry to [P1], [P2] and [P3] of the conversion rule table **4101**.

Next, the screen configuration expanding device **103** executes the conversion for the description in which the entry, whose tag, attribute name and data identifier of the address of the attribute value coincide with those of the conversion rule tale **4101** in the screen configuration data received from the server **101**, exists, in such a manner as to insert the insertion expander of the corresponding entry into the address.

As described above, the screen configuration expanding device **103** inserts the expander designated by the parameters of the conversion parameter table **4204** and the parameters of the setting table **3801** to all the attribute values of the tags registered to the entry of the conversion rule table **4101** in the screen configuration data received from the server **101** by the configuration description conversion processing **3704**.

Next, at the step **3705**, the screen configuration expanding device **103** transmits the screen configuration data converted by the configuration description conversion processing to the client with which connection is established at the step **3203**, and then transfers the processing to the step **3709**.

On the other hand, the screen configuration expanding device **103** receives the data from the server **101** at the step **3706** and transfers the processing to the step **3707**.

At the step **3707**, the screen configuration expanding device **103** carries out the image reduction processing for the image data it receives from the server **101** in accordance with the parameters of the setting table **3801**, and then transfers the processing to the step **3708**.

The data the screen configuration device **103** receives is the static image.

At the step **3808**, the screen configuration expanding device **103** transmits the image data reduced at the step **3707** to the client which establishes the connection at the step **3203**, and then transfers the processing to the step **3709**.

At the step **3709**, the screen configuration expanding device **103** finishes the data conversion processing.

The above explains the detail of the data conversion processing **3210**.

Next, the data conversion processing **3210** of the screen configuration expanding device **103** in the (session **3**) will be explained.

Here, the content of the setting table **3801** is [address= menu. html, classification=conversion, processing content= configuration description conversion, parameter=.p-quick].

At the step **3702**, since the processing content of the processing table **3801** is [configuration description conversion], the screen configuration expanding device **103** evaluates [processing content=image reduction] for the setting table **3801**, sets the result to [NO] and transfers the processing to the step **3703**.

At the step **3703**, the screen configuration expanding device **103** receives the screen configuration data from the server **101** and transfers the processing to the step **3704**.

This data is the data received as the result of transmission of the command [GET menu. html] from the configuration expanding device **103** to the server **101** at the step **3208**. Therefore, it becomes the screen configuration data **501**.

At the next step **3704**, the screen configuration expanding device **103** executes the configuration description conversion processing for the screen configuration data **501** and transfers the processing to the step **3705**.

Here, the configuration description conversion processing **3704** of the screen configuration expanding device **103** in the (session **3**) will be hereby explained.

First, the screen configuration expanding device **103** selects the entry **4203** of the conversion parameter table **4201** in which the mode of the conversion parameter table **4201** coincides with the content of the parameter of the setting table **3801**.

Next, the screen configuration expanding device **103** fits the content of [P1=.quick], [P2=.small], [P3=.small] of the entry **4203** to [P1], [P2] and [P3] of the conversion rule table **4101**.

The screen configuration expanding device **103** then converts the screen configuration data **501** in accordance with the conversion rule table **4110**.

First, the screen configuration expanding device **103** confirms that the tag name of the description is [IMG], the attribute is [SRC] and the expander of the attribute value is [.gif] and that the description **503** corresponds to the entry **4105** of the conversion rule table in the screen configuration date **501**, and converts the attribute value [pictA. gif] of the description **503** to [pictA. small. gif].

Next, the screen configuration expanding device **103** confirms that the tag name of the description **504** is [A], the attribute is [HREF] and the expander of the attribute value is [.gif] and that the description corresponds to the entry **4104** of the conversion table, and then converts the attribute value [pictB. gif] of the description **504** to [pictB. small. gif].

Next, the screen configuration expanding device **103** confirms that the tag name of the description **505** is [A], the attribute is [HREF] and the expander of the attribute value is [.gif] and that the description corresponds to the entry **4104** of the conversion rule table, and then converts the attribute value [pictC. gif] of the description **504** to [pictc. small. gif].

Finally, the screen configuration expanding device **103** confirms that the tag name of the description **506** is [A], the attribute is [HREF] and the expander of the attribute value is [.html] and that the description corresponds to the entry **4103** of the conversion table, and converts the attribute value [next. html] of the description **504** to [next. quick. html].

In this way, the screen configurations expanding device **103** converts the screen configuration data **501** to the screen configuration data **1801**.

Next, the screen configuration expanding device **103** transmits the screen configuration data **1801** to the client **105** at the step **3705** and transfers the processing to the step **3709**.

At the step **3709**, the screen configuration expanding device **103** finishes the data conversion processing **3210**.

The above explains the detail of the data conversion processing of the screen configuration expanding device **103** in the (session **3**).

Next, at the step **3212**, the screen configuration expanding device **103** cuts of the connection between the server **101** and the client **105** and transfers the processing to the step **3213**.

At the step **3213**, the screen configuration expanding device **103** finishes the configuration expanding device **103** finishes the configuration expanding processing **3103**.

The above explains the detail of the configuration expanding processing **103** of the screen configuration expanding device **103** in the (session **3**).

Here, FIG. **42** shows the communication sequence between the screen configuration expanding device **103** and the client **105** in the same way as in the (session **1**) and the (session **2**).

In FIG. **42**, the communications **4309**, **4310**, **4311**, **4312**, **4313**, **4314**, **4315** and **4316** are the communications in the (session **3**).

The communication **4309** and the step **3203**, the communication **4310** and the step **3302**, the communication **4311** and the step **3207**, the communication **4312** and the step **3208**, the communication **4313** and the step **3703** and the communication **4314** and the step **3705** correspond to one another, respectively.

Similarly, the communication **4515** and **4516** correspond to the step **3212**.

When the (session **3**) is completed, the client **105** receives the screen configuration data **1801**.

Then, the client **105** recognizes that the description **802** in the screen configuration data **1801** is the description of the image tag, and transmits the command [GET pictA. small. gif] for acquiring the image data of the address designated by [SRC=] to the screen configuration expanding device **103**.

The period in which the client **105** transmits this command, receives finally the data and then cuts off the connection will be referred to as the (session **4**).

Hereinafter, the operation of the screen configuration expanding device **103** in this (session **4**) will be explained.

The operation of the screen configuration expanding device **103** in the (session **4**) is substantially the same as its operation in the (session **3**), and the data conversion processing at the step **3210** is a greatly different portion.

The processing up to the step **3210** will be briefly explained by using the communication sequence shown in FIG. **42**.

In FIG. **42**, the communication **4317**, **4318**, **4319**, **4320**, **4321**, **4322**, **4323** and **4324** are the communications in the (session **4**).

First, in the communication **4317**, the screen configuration expanding device **103** establishes the connection with the client **105** (step **3203**).

Next, in the communication **4318**, the screen configuration expanding device **103** receives the command [GET pictA. small. gif] from the client **105** (step **3302**).

Further, the screen configuration expanding device **103** sets the content of the setting table **3801** to [address=pictA. gif, classification=conversion, processing content=image reduction, parameter=1/2] by the processing from the step **3303** to the step **3308**.

The screen configuration expanding device **103** then establishes the connection with the server **101** by the communication **4319** (step **3207**).

Next, the screen configuration device **103** transmits the command [GET pictA. gif], which is generated by changing the command address received from the client **105** to the address of the setting table **3801**, to the server **101** by the communication **4320** (step **3208**).

Here, the data conversion processing **3210** of the screen configuration expanding device **103** in the (session **4**) will be explained.

The screen configuration expanding device **103** confirms that the processing content of the setting table **3801** is [image reduction] at the step **3702**, sets the evaluation result to [YES] and transfers the processing to the step **3706**.

The screen configuration expanding device **103** receives the image data **603** from the server **101** at the step **3706** (communication **4320**) and transfers the processing to the step **3707**.

At the step **3707**, the screen configuration expanding device **103** executes the image reduction processing of the image data **603** in accordance with the parameter [1/2] of the setting table, converts the image data **603** to the image data **902** and transfers the processing to the step **3708**.

The reduction processing can be accomplished by, for example, dividing the pixels of the image data into groups of four adjacent pixels of two pixels by two, selecting one typical pixel of each group and disposing it in accordance with the disposition of each group.

At the step **3708**, the screen configuration expanding device **103** transmits the image data **902** to the client **105** (communication **4322**) and transfers the processing to the step **3709**.

At the step **3709**, the screen configuration expanding device **103** finishes the data conversion processing **3210**.

The above explains the data conversion processing **3210** of the screen configuration expanding device **103** in the (session **4**).

Subsequent processings are substantially the same as those of the (session **3**).

The screen configuration expanding device **103** cuts off the connection with the server **101** and the client **105** by the communications **4323** and **4324** (step **3212**) and finishes the configuration expanding processing **3103**.

The above explains the operation of the screen configuration expanding device **103** in the (session **4**).

The client **105** displays the display **1901** on the screen through the processings from the (session **1**) to the (session **4**).

Here, the operation of the present invention will be explained about the case where the user of the client **105** selects the button **1903**.

When the user selects the button **1903**, the client **105** transmits the command [GET pictB. small. gif] to the screen configuration expanding device **103**.

The operation of the screen configuration expanding device **103** at this time is the same as that in the (session **4**).

The screen configuration device **103** receives the image data **702** from the server **101**, converts it to the image data **1002** by the data conversion processing, and transmits it to the client **105**.

Finally, the screen of the client **105** becomes such as the one represented by **2001**.

When the client **105** gains access to the page of the server **101** through the screen configuration expanding device **103**, the image data is automatically reduced, transferred and displayed, and when the button for looking up the image is selected, too, the image is automatically reduced, transferred and displayed.

The state where the image data bonded inside the page and the image data looked up by the button are referred to as a [QUICK mode].

The operation of the present invention will be explained about the case where the client user selects the button **1502** from the end state of the (session **4**).

When the user selects the button **1502**, the client transmits the command [GET menu. p-normal. html] to the screen configuration expanding device **103**.

The time from the transmission of the command to cutoff of the connection will be referred to as a (session **5**).

The operation of the screen configuration expanding device **103** in this (session **5**) is substantially the same as that in the (session **3**).

The operation of the screen configuration expanding device **103** in the (session **5**) will be briefly explained with reference to the sequence diagram of FIG. **44**.

In FIG. **44**, reference numerals **4501** to **4516** represent the communications among the server **101**, the configuration expanding device **103** and the client **105**.

In FIG. **44**, the communications **4501**, **4502**, **4503**, **4504**, **4505**, **4506**, **4501** and **4508** denote the communications in the (session **65**).

First, the screen configuration expanding device **103** establishes the connection with the client **105** by the communication **4501**

Next, the device **103** receives the command [GET menu. p-normal. html] from the client **105** by the communication **4502**.

The screen configuration expanding device **103** then sets the content of the setting table **3801** to [address=menu. html, classification=conversion, processing content=configuration description conversion, parameter=.p-normal] by the command analysis processing **3204**.

This content is different from the content of the setting table **3801** after completion of the command analysis processing **3204** in the (session **3**) only in the point [parameter=.p-quick].

Next, the screen configuration expanding device **103** transmits the command [GET menu. html] to the server **101** by the communication **4503**.

The device **103** then receives the screen configuration data **501** from the server **101** by the communication **4505**.

The screen configuration expanding device **103** converts the screen configuration data **501** by the configuration description conversion processing **3704**.

Since the parameter of the setting table **3801** is [.p-normal] in this instance, the screen configuration expanding device **103** writes the contents of [[P1]=normal, [P2]=nil and [P3]=nil]] of the table **4201** of the conversion parameter table **4201** into the content of [P1], [P2] and [P3] of the conversion rule table **4101**.

Here, "insertion expander=nil" in the conversion rule table **4101** means that conversion is not made.

Therefore, the screen configuration expanding device **103** executes conversion of the screen configuration data **501** in accordance with only the rule of the entry **4103**.

In other words, the screen configuration expanding device **103** inserts the expander [.normal] to the address of the description having [tag name=A, attribute=HREF, data identifier of address=.html].

In the screen configuration data **501**, it is only the description **506** that becomes the object of conversion described above. Therefore, the screen configuration expanding device **103** finally converts the screen configuration data **501** to the screen configuration data **2101**.

The screen configuration expanding device **103** then transmits the screen configuration data **2101** to the client **105** by the communication **4506**.

Next, in the communications **4507** and **4508**, the screen configuration expanding device **103** cuts off the connection with the server **101** and the client **105**, and finishes the processing.

The above explains the operation of the screen configuration expanding device **103** in the (session **5**).

In the (session **5**), the client **105** receives the screen configuration data **2101**, analyzes its content, recognizes the image tag description **503** and transmits the command {GET pictA. gif] to the screen configuration expanding device **103**.

The period from transmission of this command to cutoff of the connection will be referred to as a (session **6**).

Hereinafter, the operation of the screen configuration expanding device **103** in this (session **6**) will be explained briefly with reference to the sequence diagram of FIG. **44** in the same way as in the (session **5**).

In FIG. **44**, communications **4509**, **4510**, **4511**, **4512**, **4513**, **4514**, **4515** and **4516** are the communications in this (session **6**).

The operation of the screen configuration expanding device **103** in the (session **6**) is substantially the same as its operation in the (session **4**) up to the step **3208**.

First, the screen configuration expanding device **103** establishes the connection with the client **105** by the communication **4509**.

Next, the screen configuration expanding device **103** receives the command [GET pictA. gif] from the client **105** by the communication **4510**.

The screen configuration expanding device **103** sets the content of the setting table **3801** to [address=pictA. gif, classification=conversion, processing content=non-conversion, parameter=nil].

Next, the screen configuration expanding device **103** establishes the connection with the server **101** (step **3207**).

Next, the screen configuration expanding device **103** transmits the command [GET pictA.gif] to the server **101** (step **3208**).

Because the processing content of the setting table **3801** is "non-conversion", the screen configuration expanding device **103** sets the evaluation result to [YES] at the step **3209** and transfers the processing to the step **3211**.

At the step **3211**, the screen configuration expanding device **103** receives the image data **603** from the server **10** (communication **4513**), transmits it to the client **105** without conversion (communication **4514**) and transfers the processing to the step **3212**.

At the step **3212**, the configuration expanding device **103** cuts off the connection with the server **101** and the client **105** (communications **4515** and **4516**) and transfers the processing to the step **3213**.

At the step **3213**, the expanding device **103** finishes the configuration expanding processing **3103**.

The above explains the operation of the screen configuration expanding device **103** in the (session **6**).

The client **105** receives the screen configuration data **2101** and the image data **603** in the (session **5**) and (session **6**) and executes the screen display **2201**.

As described above, when the user of the client **105** selects the [NORMAL] button of the frame **1501** on the screen **1901**, the image in the page is transferred and displayed in the size of the original, and when the user selects the image lookup button, the image of the original is displayed.

The mode in which the image data in the page or the image data looked up by the button is displayed in the original size will be referred to as the [NORMAL mode].

Here, the operation of the present invention will be explained about the case where the user of the client **105** selects the button **604** of the screen **2201** after completion of the (session **6**).

When the user selects the button **604**, the client **105** transmits the command [GET pictB. gif] to the screen configuration expanding device **103**.

The operation of this expanding device **103** at this time is the same as its operation in the (session **6**).

The screen configuration expanding device **103** receives the image data **702** from the server **101** and transmits it to the client **105** without executing data conversion.

Finally, the screen of the client **105** becomes such as the one shown in FIG. **22**.

As described above, the client **105** can receive the image data in the size of the original by selecting the button **1502** on the screen **1901**.

When the user of the client **105** selects the button **1503** of the screen **2201**, the client **105** transmits the command [GET menu. p-quick html] to the screen configuration expanding device **103**.

In this case, since the expander of the entry **3904** of the processing object table **3901** is [nil/quick], the operation of the screen configuration expanding device **103** is exactly the same as when the client **105** transmits the command [GET menu. html], that is, its operation in the (session **3**).

In this case, therefore, the screen configuration expanding device **105** executes the same processing as in the (session **3**) and (session **4**), and the screen display of the client **103** becomes such as the one represented by **1901**.

As described above, the user of the client **105** can select the size of the image for a certain page by selecting the buttons [QUICK] and [NORMAL] at the upper portion of the screen.

Next, the operation when the user of the client **105** selects the button [to next page] for each of the screen **1901** after completion of the (session **4**) and the screen **2201** after completion of the (session **6**) will be explained.

First, the operation of the configuration expanding device **103** when the user of the client **105** selects the button **1905** on the screen **1901** after completion of the (session **4**) will be explained.

At this time, the client **105** transmits the command [GET next. quick. html] to the screen configuration expanding device **103**.

The operation of the configuration expanding device **103** in this case is substantially the same as its operation in the (session **1**) to (session **3**), and the difference exists in only that the screen configuration data changes from [menu. html] to [next. html].

Therefore, the UI frame inclusive of the button for changing over the mode is displayed finally at the upper portion of the screen of the client **105** in the same way as the screen **1901**, and the page of the [QUICK mode] which is obtained by converting the screen configuration data of the address [next. html] of the server **101** by the screen configuration expanding device **103** in the same way as in the (session **3**) by the configuration description conversion processing is displayed at the lower portion of the screen.

The operation of the screen configuration expanding device **103** when the user of the client **105** selects the button **2203** on the screen **2201** after completion of the (session **6**) will be explained.

At this time, the client **105** transmits the command [GET next. normal. html] to the screen configuration expanding device **103**.

The operation of the screen configuration expanding device **103** at this time is substantially the same as its operation in the (session **1**), (session **2**) and (session **5**). In the (session **1**), the parameter of the configuration expanded frame generation changes from [.p-quick] to [.p-normal], and the screen configuration data as the object changes from [menu. html] to [next. html] in each of these sessions.

Therefore, the UI frame inclusive of the button for changing over the mode is finally displayed at the upper portion of the screen of the client **105** in the same way as the screen **2201**, and the page of [NORMAL mode] obtained by converting the screen configuration data of the address [next. html] of the server **101** by the screen configuration expanding device **103** by the configuration description conversion processing is displayed at the lower portion of the screen.

When the client **105** gains access to the page of the server **101** through the configuration expanding device **103** or to a certain page in the [QUICK] mode or to other pages by selecting the button through the screen configuration expanding device **103**, the page, too, is displayed in the [QUICK mode]. When the first mode is the [NORMAL mode], the next page, too, becomes the [NORMAL] mode.

In other words, all of the server **101**, the screen configuration expanding device **103** and the client **105** can keep the mode for a series of the operations by the user without having specific information for retaining the mode.

This mode can be changed over at any time by the button of the UI frame displayed always at the upper portion of the screen.

The above explains the operation of the screen configuration expanding device **103** in this embodiment.

According to this embodiment, the user of the client **105** can change over either of the [QUICK mode] for displaying the image size by reducing its display size and the

[NORMAL mode] capable of looking up the image of the original, though a longer time is necessary till display, whenever necessary, by the configuration expanding device **103** when the user gains access to an arbitrary page.

Particularly because the screen configuration expanding device **103** need not insert a specific button into the page of the original for the data converting device **401**, disturbance of layout due to the insertion of the button into the page does not occur.

This effect of the present invention becomes greater when the number of buttons increases such as when the kind of the reduction of the size increases.

For example, the kind of image size reduction includes the reduction at 1/4 in length and width and 1/8 in length and width besides 1/2, and the explanation will be given on the case where the user can select the reduction ratio.

The data converting device **401** must prepare the buttons for selecting the reduction ratios so increased.

In other words, the data converting device **401** must insert the extra buttons such as [tiny] for the 1/8 reduction in length and width and [bit] for the 1/8 reduction in length and width in addition to the button [small] for the screen configuration data of the page.

When these three kinds of buttons are inserted for each button for gaining access to the image data, layout is markedly disturbed, the occupying ratio of the buttons for selecting the reduction ratios becomes greater on the screen, and the information amount per display area of the screen drops, too.

In contrast, even when the number of alternatives for selecting the image reduction ratios is increased in the screen configuration expanding device **103** as described above, the button to be increased is only the button for changing over the mode in the UI frame, and the buttons need not be inserted into the page to which the user gains access. Therefore, display of the page is not affected even when the number of kinds of image reduction is increased.

When the data converting device **401** is utilized in place of the screen configuration expanding device **103** and when the client makes access to a new page, the image data buried into the page is always reduced in size.

When the data converting device **401** is utilized, the user must select whether or not the data to be accessed next is the data of the reduced mode, but when the screen configuration expanding device **103** is utilized, the user can gain access to the image having a desired size by only the normal button selecting operation once the mode is set. In other words, the user need not confirm whether the data is the original data or the reduced image whenever he gains access to new data.

Further, it is possible to incorporate Japanese-to-English translation processing, data amount reduction processing of moving image data and data amount reduction processing of speech data into the screen configuration expanding device **103** of this embodiment, and in such a case, it is necessary to assemble the conversion processing and to change the contents of various tables and templates.

The following modifications can be made for the screen configuration expanding device **103**.

(Modification **81**): A thumb nail button generation processing is added afresh to the reply data generation processing of the screen configuration expanding device **103**.

The thumb nail button generation processing will be explained later.

(Modification **82**): The processing object table **3901** used by the configuration expanding device **103** is changed to the processing object table **4601** shown in FIG. **45**.

In FIG. **45**, reference numeral **4601** denotes the processing object table and reference numerals **4601** and **4602** denote the entries.

As can be appreciated by comparing FIG. **45** with FIG. **38**, the processing object table **4601** corresponds to the case where the entry **4602** is added to the processing object table **3901**.

As a result of the change of the processing object table, a new expander [. thumb] and [thumb nail button generation] as its processing content are registered.

(Modification **83**): The conversion table which the screen configuration expanding table **103** uses in the configuration description conversion processing **3704** is changed from **4201** to **4701** as shown in FIG. **46**.

In FIG. **46**, reference numeral **4701** denotes a conversion parameter table and **4702** denotes an entry.

The conversion parameter table **4701** is the one obtained by changing the entry **4203** of the conversion parameter table **4201** to the entry **4702**.

The particular difference between the entry **4203** and the entry **4702** is that the item [P2] is changed from [.small] to [.thumb].

Due to this change, the screen configuration expanding device **103** displays the thumb nail button but not the reduced image when the user of the client **105** selects the button for looking up the image data in the [QUICK mode].

The term "thumb nail button" represents the button for looking up a certain image and a button as a reduced image of the former.

The above explains the modification of the seventh embodiment of the present invention.

Next, the operation of the screen configuration expanding device **103** in this embodiment will be explained.

The explanation will be given from the state where the client **105** transmits the command [GET menu. html] in the same way as in the seventh embodiment.

When the client **105** transmits the command [GET menu. html] in this embodiment, the screen of the client **105** becomes the one represented by **2601**, and the operation of the configuration expanding device **103** up to this stage is substantially the same as its operation in the (session **1**) to the (session **4**). The difference lies only in a part of the processing of the portion corresponding to the (session **3**).

Therefore, the third session among the four sessions generated by the transmission of the command [GET menu. html] by the client **105** in this embodiment will be referred to as the (session **7**), and the operation of the screen configuration expanding device **103** in this (session **7**) will be explained.

Next, the screen configuration expanding device **103** in this (session **7**) will be explained.

The concrete operation of the screen configuration expanding device **103** in this embodiment is substantially the same as its operation in the (session **3**).

In the (session **3**) of the former embodiment, the screen configuration expanding device **103** receives the screen configuration data **501** of the address [menu. html] from the server **101** for the command [menu. p-quick. html] transmitted by the client **105**, converts this data **501** to the screen configuration data **1801** and transfers it to the client **105**.

In the (session **7**), the screen configuration expanding device **103** receives the configuration data **501** from the server **101** for the command [menu. p-quick. html] transmitted from the client **105**, converts the data **501** to the screen configuration data **4801** shown in FIG. **47** and transfers it to the client **105**.

In FIG. **47**, reference numeral **4801** denotes the screen configuration data and **4802** and **4803** denote the anchor tag descriptions for causing the client to display the buttons.

The screen configuration data **4801** is different from the screen configuration data **1801** in that the anchor tag

descriptions **1802** and **1803** are changed to the anchor tag descriptions **4802** and **4803**.

The screen configuration expanding device **103** executes the conversion of the configuration data by the configuration description conversion processing **3704**, and the difference of the conversion result results from the change of the conversion parameter table by (Modification **82**).

In the (session **7**), the content of the setting table is [address=menu. html, classification=conversion, processing content–configuration description conversion, parameter= .p-quick] in the same way as in the (session **3**). Therefore, the selected entry in the conversion parameter table **4701** used in this embodiment is the entry **4702**.

The screen configuration expanding device **103** writes the content of [P1], [P2] and [P3] of the entry **4702** into the parameters p{1], [P2] and [P3] of the conversion rule table **4101** and uses them as the conversion rule of the screen configuration data.

In the (session **7**), the value of [P2] is different from that of the (session **3**), and [P2]=[.thumb].

The item [P2] of the conversion parameter table represents the expander to be inserted into the address of the HREF attribute of the anchor tag. Therefore, the screen configuration expanding device **103** inserts [.thumb] into the address of the corresponding anchor tag.

In consequence, the screen configuration expanding device **103** converts the anchor descriptions **504** and **505** of the screen configuration data **501** to the anchor descriptions **4803** and **4803**, respectively, by the configuration description conversion processing **3704**.

As described above, in the (session **7**), the screen configuration expanding device **103** converts the screen configuration data **501** o the screen configuration data **4801** and transmits this data to the client **105**.

The above explains the operation of the screen configuration expanding device **103** in the (session **7**).

Thereafter, the client **105** receives the screen configuration data **4801**, analyzes its content, detects the image tag description **802** and transmits the command [pictA. small. gif] to the screen configuration expanding device **103**. The operation of this device **103** at this time is the same as its operation in (session **7**) in the seventh embodiment.

After the processing described above is completed, the client **105** finally displays the screen **2201**.

Here, the appearance on the screen is entirely the same as that in the seventh embodiment but in this embodiment, the result when the user of the client **105** selects the buttons **1903** and **1904** is different from that of the seventh embodiment.

Here, the operation of the screen configuration expanding device **103** when the user of the client **105** selects the button **1903** will be explained.

When the user of the client **105** selects the button **1903**, the client **105** establishes the connection with the screen configuration expanding device **103** so as to transmit the command [GET pictB. thumb. gif].

The time from the establishment of the connection till its cutoff will be referred to as a (session **8**).

The basic flow of the screen configuration expanding device **103** in this (session **8**) is substantially the same as that of the (session **1**) and the (session **2**).

In the (session **8**), the screen configuration expanding device **103** is not connected t the server but generates the data and replies it to the client **105** in the same way as in the (session **1**) and the (session **2**).

Hereinafter, the operation of the screen configuration expanding device **103** in the (session **8**) will be explained by picking up some steps as the essential points.

At the step **3203**, the screen configuration expanding device **103** establishes the connection with the client **105**.

Next, the screen configuration expanding device **103** receives the command [GET pictB. thumb. gif] from the client **105** in the command analysis processing at the step **3204**.

Because the object identifier of the address of the command described above is [.gif] and its expander is [.thumb], the screen configuration expanding device **103** detects the entry **4602** of the processing object table **4601** in the command analysis processing **3204** and sets the content of the setting table **3801** to [address=pictB. gif, classification= generation, processing content=thumb nail button generation, parameter=nil].

At the step **3205**, the screen configuration expanding device **103** confirms that the processing content of the setting table **3801** is [generation] and transfers the processing to the replay data generation processing of the step **3206**.

Here, the operation of the replay data generation processing **3206** in this embodiment will be explained.

Due to the (Modification **81**), the [thumb nail button generation processing] is added to the replay data generation processing in this embodiment, and the screen configuration expanding device **103** executes the processing in accordance with the flowchart shown in FIG. **48**.

In the flowchart of FIG. **48**, the step **4902** is added before the step **3402** of the flowchart of FIG. **33** and the step **4903** is added further to one of the branches of the step **4902**.

In FIG. **48**, the step **4901** represents the start of the replay data generation processing of the configuration expanding device **103** in this embodiment, and the expanding device **103** transfers the processing to the step **4902**.

At the step **4902**, the configuration expanding device **103** checks whether or not the processing content of the setting table **3801** is the [thumb nail button processing] and if this result is [YES], that is, true, the processing is transferred to the step **4903** and if not, to the step **3402**.

At the step **4903**, the configuration expanding device **103** executes the thumb nail button generation processing, and transfers the processing to the step **3405**.

The detail of the thumb nail generation processing will be described later.

Other steps in FIG. **48** are the same as those explained in the former embodiment.

The above explains the replay data generation processing **3206** of the configuration expanding device **103**.

Next, the detail of the thumb nail button generation processing **5903** will be explained.

In this thumb nail button generation processing, the screen configuration expanding device **103** generates the screen configuration data for display in the thumb nail button of the image data represented by the address of the setting table **3801** on the client **105**.

In the thumb nail button generation processing, the screen configuration expanding device **103** generates the screen configuration data of the thumb nail button by using the thumb nail template shown in FIG. **49**.

In FIG. **49**, reference numeral **5001** denote the thumb nail template and **5002** and **5003** denote the blank columns.

The screen configuration expanding device **103** first writes the content of the address of the setting table **3801** into the blank column **5002**.

Next, the screen configuration expanding device **103** inserts the expander [.small] into the address of the setting table **3801** and writes it into the blank column **5003** of the setting table.

The screen configuration expanding device **103** writes the address into the two blank columns **5002** and **5003** of the

thumb nail template **5001** as described above, and generates the screen configuration data of the thumb nail button.

The above explains the detail of the thumb nail button generation processing.

Here, the processing of the replay data generation processing **3206** in the (session **8**) inclusive of the processing in the thumb nail generation processing **4903** will be explained.

First, the screen configuration expanding device **103** starts the relay data generation processing **3206** at the step **4901** and transfers the processing to the step **4902**.

At the step **4902**, the screen configuration expanding device **103** confirms that the processing content of the setting table **3801** is the thumb nail button generation, sets the evaluation result to [YES] and transfers the processing to the step **4903**.

In the thumb nail button generation process of the step **4903**, the screen configuration expanding device **103** first reads the thumb nail template **5001**.

Next, the screen configuration expanding device **103** writes the address [pictB. gif] of the setting table **3801** into the blank column **5002** and further writes the address generated by inserting the expander [.small] into this address into the blank column **5003**.

As described above, the screen configuration expanding device **103** generates the screen configuration data of the thumb nail button shown in FIG. **50** on the basis of the template **5001** in the thumb nail generation processing **4903**.

In FIG. **50**, reference numeral **5101** denotes the screen configuration data of the thumb nail button and reference numeral **5102** denotes the anchor tag description inclusive of the image tag.

The screen configuration expanding device **103** finishes the thumb nail button generation processing and transfers the processing to the step **3405**.

At the step **3405**, the screen configuration expanding device **103** transmits the screen configuration data **5101** to the client **105**.

At the step **3406**, the screen configuration. expanding device **103** finishes the replay data generation processing **4901**.

The above explains the conversion data generation processing **4901** of the screen configuration expanding device **103** in the (session **8**).

The subsequent operations of the screen configuration expanding device **103** are the same as those of the (session **1**) and the (session **2**).

At the step **3212**, the screen configuration expanding device **103** cuts off the connection with the client **105** and at the step **3213**, it finishes the configuration expanding processing **3103**.

The above explains the operation of the screen configuration expanding device **103** in the (session **8**).

By the (session **8**), the client **105** receives the screen configuration data **5101** from the screen configuration expanding device **103**, analyzes its content and transmits the command [GET pictB. small. gif] to the screen configuration expanding device **103** from the description of the image tag in the description **5102**. The operation at this time is entirely the same as when the user pushes the button **1903** immediately after the (session **4**) in the seventh embodiment, and the client **105** finally receives the image data **1002**.

The client **105** receives the image data **1003** and finally displays **2601** of FIG. **25** on the screen.

Reference numeral **2604** denotes the image data **1002**. It is also the button that transmits the command [GET pict. gif].

Here, when the user of the client **105** selects the button **2604**, the client **105** transmits the command [GET pict. gif] to the screen configuration expanding device **103**.

The operation of the screen configuration expanding device **103** in this case is the same as its operation when the user of the client **105** selects the button **604** of the screen **2201** after completion of the (session **6**) in the former embodiment, and the client **105** finally displays the screen **2301**.

The above explains the operation of the screen configuration expanding device **103** in this embodiment.

Next, the effect of the present invention in this embodiment will be explained.

First, the effect of the present invention will be explained about the case where the user gains access to the page of the screen **1901** and selects the button **1903**, by way of example.

When the button **1903** is selected in the seventh embodiment as described above, the client **105** displays the screen **2001**.

In this case, when the user of the client **105** desires to gain access to the original image of the image **1002** in order to examine it in further detail, the user first returns to the screen **1901**, selects the button **1502**, changes the mode to the [NORMAL mode], then shifts to the screen **2201**, selects further the button **604** and then shifts to the screen **2301**. In this way, the user can view the image data **702** as the original of the image data **1002**.

In contrast, if the user of the client **105** desires to view the image data **702** as the original of the image data **1002** after looking up this image data **1002**, it is necessary for the user in this embodiment to first select the button **1903**, then to shift to the screen **2601** to view the image data **1002**, to further select the button **2604** to switch the screen to **2301**, and to watch the image data **2702**.

This difference will be compared in the number of operations of the button selection by the user from watching the image **1002** to watching the image **702**. The number of operations is three in the former case whereas it is one in the embodiment of the present invention. It can be thus appreciated that this embodiment can reduce the operation amount to 1/3.

This embodiment accomplishes a natural interface such that in the practical operation, the original image can be viewed by selecting the reduced image.

Though the effect of the present invention is explained above about the reduction of the static image in this embodiment by way of example, this embodiment can provide preview buttons for enabling the user of the client **105** to look up the original data for various data.

For instance, when the moving image data is placed on the server **101** and the screen configuration expanding device **103** has the "function of covering the first one frame of the moving image data to the static image data", the present invention can offer a [first one frame image of moving image data] button to the user of the client **105**. Accordingly, the user can easily gain access to the moving image data, whenever necessary, while watching the static image data as the aid of the content confirmation without effecting the transfer and display of large amounts of moving image data, which call for a long time.

As described above, the present invention can improve retrieval efficiency when large amounts of data, which need a long time for transfer and display, are retrieved.

In the embodiment described above, it is possible to display a [button for listing a plurality of image data capable of starting reference from a certain page] on the client **105**. (Modification **91**): The UI setting table **4001** is changed as shown in FIG. **51**. In FIG. **51**, reference numeral **5201**

denotes the UI setting table and reference numeral **5202** denotes the entry. The UI setting table **4001** corresponds to the table obtained by adding the entry **5202** to the UI setting table **4001**.

Owing to this modification, the screen configuration expanding device **103** adds the button having the name [list] when the UI name is generated in the UI frame generation processing **3404**.

(Modification **92**): [List page conversion processing] is added to the data conversion processing **3210**.

The term [list page conversion processing] means the processing which generates the list of the thumb nail buttons of all the image data that are looked up by the button for the screen configuration data of an arbitrary page from that page. The detail of this processing will be described later.

When the processing content of the setting table **3801** is the [list page conversion] in the data conversion processing **3210**, the screen configuration expanding device **103** executes the list page conversion processing, and when the processing content is [image reduction], it executes the image reduction processing **3707**, and executes the configuration description conversion processing **3704** at other times.

In the data conversion processing **3210**, the screen configuration expanding device **103** receives the data from the server **101** before each conversion processing and transmits the data to the client **105** after the conversion processing, in the same way as in the seventh embodiment.

(Modification **93**): The processing object table **3901** is changed as shown in FIG. **52**.

In FIG. **52**, reference numeral **5301** denotes the processing object table and reference numerals **5302** and **5303** denote the entry. The processing object table **5301** corresponds to the table that is generated by adding the. entries **5302** and **5303** to the processing object table **3901**.

Owing to the addition of the entry **5302**, the screen configuration expanding device **103** provides the image reduction function of 1/4 in length and width to the client.

When the client **105** insets [.tiny] into the address of the image data and transmits the command to the screen configuration expanding device **103**, the screen configuration expanding device **103** executes the image reduction processing **3707** in the same way as in the (session **7**) of the former embodiment but because the parameter at this time is [1/4], it reduces the data received from the server **101** to 1/4 in length and width and transmits it to the client **105**.

When [.list] is inserted into the address of the screen configuration data of the command received from the client **105** due to the addition of the entry **5305**, the screen configuration expanding device **103** executes the list page conversion processing for the screen configuration data received from the server **101** and then transmits it to the client **105**.

The above explains the change point of this embodiment with respect to the former embodiment.

The operation of the screen configuration expanding device **103** when the client **105** transmits the command [GET menu. html] in this embodiment is substantially the same as its operation in the seventh embodiment.

The difference of this embodiment from the former embodiment resides in that in the (session **2**) of the seventh embodiment, the screen configuration data **1401** is generated for the command [GET menu. ui. html] of the client **105** and is transmitted to the client **105** in the (session **2**) of the seventh embodiment whereas in this embodiment, the screen configuration data shown in FIG. **53** is generated.

In FIG. **53**, reference numeral **5401** denotes the screen configuration data and reference numeral **5402** denotes the another tag description.

In the UI frame generation processing **3404**, the screen configuration expanding device **103** generates the descriptions of the anchor tags, that is, the buttons, in the same number as the number of entries of the UI setting table **5201**.

The screen configuration expanding device **103** generates the screen configuration data **5201** of the UI frame by generating the content of the entry **5202** as the anchor tag description **5402** in addition to the case of the former embodiment.

In this session, the client **105** finally receives the screen configuration data **5201**.

The subsequent operations are exactly the same as the operations from the (session **3**) to the (session **4**)in the former embodiment, and the client **105** finally displays the screen **2701**.

Here, the operation when the user of the client **105** pushes buttons other than the button **2703** is **5**he same way as the state of the screen **1901** in the seventh embodiment.

When the user of the client **105** selects the button **2703** in the screen **1903**, the client **105** transmits the command [GET menu. list. html] to the screen configuration expanding device **103**.

The time from the transmission of this command till cutoff of the connection between the client **105** and the screen configuration expanding device **103** will be hereinafter called he (session **9**).

The operation of the screen configuration expanding device in the (session **9**) is substantially the same as the (session **3**) in the former embodiment but is different in that it executes the list page conversion processing but not the configuration description conversion processing **3704** for the screen configuration data **501** received from the server **101**.

The screen configuration expanding device **103** looks up the entries **5303** of the processing object table and sets the content of the setting table **3801** to [address=menu. html, classification=conversion, processing content=list page conversion, parameter=nil].

Due to this setting, the screen configuration expanding device **103** converts the image configuration data **501** received from the server **101** by the list page conversion processing and sends it to the client **105**.

Here, the detail of the list page conversion processing by the screen configuration expanding device **103** in this embodiment will be explained.

The screen configuration expanding device **103** first reads the template as the original of the screen configuration data of the list page shown in FIG. **54**.

In FIG. **54**, reference numeral **5501** denotes the template of the image configuration data and reference numeral **5502** denotes the blank column.

Next, the screen configuration expanding device **103** reads the template as the original of the screen configuration data of the thumb nail button shown in FIG. **55**.

In FIG. **55**, reference numeral **5601** denotes the template of the screen configuration data and reference numerals **5602** and **5603** denote the blank columns.

When the two blank columns **5602** and **5603** are filled, the template **5601** turns to the anchor tag description of the thumb nail button in the same way as the template **5001** in the former embodiment.

The screen configuration expanding device **103** analyzes the screen configuration data received from the server **101**, detects the anchor tag having the data identifier [.gif] for the address designated by [HREF] and executes the following processing for all such anchor tags.

The screen configuration expanding device **103** writes the address of the anchor tag so detected into the blank column

5602, writes the address generated by inserting the expander [.tiny] to the same address into the blank column **5603** and further writes the template **5601** having the buried blanks **5602** and **5603** into the blank column **5502**.

The screen configuration expanding device **103** repeats the operation described above and generates the list of the thumb nail buttons of the data to be looked up in the anchor tag for looking up the image of the screen configuration data received from the server **101**, that is, the screen configuration data of the list page.

In the (session **9**), the screen configuration expanding device **103** receives the screen configuration data **501** received from the server **101**.

Since the screen configuration data **501** contains the anchor tag descriptions **504** and **505** for looking up the image, the screen configuration expanding device **103** converts the screen configuration data **501** to the screen configuration data shown in FIG. **56** by the list page conversion processing described above.

In FIG. **56**, reference numeral **5701** denotes the screen configuration data and reference numerals **5702** and **5703** denote the anchor tag descriptions of the thumb nail button.

The screen configuration expanding device **103** transmits the screen configuration data **5701** to the client **105**, cuts off the connection with the server **101** and the server **101** and the client **105**, and finishes the configuration expanding processing.

The above explains the operation of the screen configuration expanding device **103** in the (session **9**).

The client **105** receives the screen configuration data **5701** by the (session **9**), analyzes its content, transmits the two commands [GET pictB. tiny. gif] and [GET pictC. tiny. gif], and receives pictB. gif, that is, the image obtained by reducing the image data **702** to 1/4 in length and width, and the image obtained by reducing pictC. gif to 1/4 in length and width as the respective results.

The client **105** displays the screen **2801** on the basis of these received data.

In FIG. **27**, reference numeral **2802** denotes the display result of the screen configuration data **5701** and reference numeral **2804** denotes the image generated by reducing the image data **702** to 1/4 in length and width and it is also a button for looking up the image data **702**.

Similarly, reference numeral **2805** denotes the image generated by reducing the image data of the address pictC. gif to 1/4 in length and width, and its also a button for looking up pict.C.gif.

The user of the client **105** can look up the respective original images by selecting the buttons **2804** and **2805**.

As described above, this embodiment provides the [list] button for watching the list page aligning the reduced images of the image data which can be looked up directly from the page displayed at present.

According to this embodiment, the user of the client **105** can confirm the content of the image directly looked up from an arbitrary page by pushing once the [list] button.

To represent its concrete example, the case where the present invention is not employed, the former embodiment and this embodiment will be compared with one another about the case where the user compares the images that can be looked up by the button from the page to which he first makes access and looks up the original of the image data that meets with his taste.

Here, the total access size of the image data will be calculated by assuming the size of the image data as image **603**=4, image **902**=1, the original of image looked up by button=16, its 1/2 reduced image in length and width=4 and its reduced image in length and width=1.

First, the operation of the client **105** when the present invention is not employed will be explained.

The client **105** displays the screen **601**.

The numerical value in the brackets [ ] represents the access size of the image data by the operation.

(Operation **11**): First, [running scene **1**] is selected and the image data **702** is looked up [**16**].

(Operation **12**): Return to the screen **601** [**4**].

(Operation **13**): [running scene **2**] is selected and the image data is looked up [**16**].

(Operation **14**): Return to the screen [**4**].

(Operation **15**): [running scene **1**] is again selected [**16**].

The total access size of the image data is 16+4+16+4+16=56.

The above is the operation of the client **105** when the present invention is not employed.

Next, the user's operation of the client **105** in the example described above in the former embodiment of the invention will be explained.

The client **105** displays the screen **1901**.

(Operation **21**): First, [running scene **1**] is selected and the image data **1002** is looked up [**4**].

(Operation **22**): Return to the screen **601** [**1**].

(Operation **23**): [running scene **2**] is selected and the image data (1/2 reduction in length and width) is looked up [**4**].

(Operation **24**): Return to the screen **601** [**1**].

(Operation **25**): The [NORMAL] button is selected and the screen is switched to **2201** [**4**].

(Operation **26**): [running scene **1**] is selected and the image data **702** is looked up [**16**].

The total access size of the image data is 4+1+4+1+4+16=30.

The above explains the operation of the client **105** in the former embodiment of the present invention.

Finally, the operation of the user of the client **105** in the example of the embodiment described above will be explained.

The client **105** displays the screen **2701**.

(Operation **31**): First, [list] is selected and the screen is switched to **2801** [**8**].

(Operation **32**): The button **2804** is selected and the image data **702** is looked up [**16**].

The total access size of the image data is 8+16=30.

The above explains the operation of the client **105** in this embodiment.

The examples given above represent that the number of times of the operations is small in this embodiment and the access size of the image data is also small.

This difference of the result becomes greater when the images that can be looked up from a certain page by the button is greater.

Therefore, this embodiment is extremely effective when the user of the client **105** looks up and selects a plurality of image data.

The functions equivalent to the above can be accomplished by adding the following three modifications without using the frame description.

(Modification **101**): The processing object table **3901** is changed as shown in FIG. **57**.

In FIG. **57**, reference numeral **5801** denotes the processing object table and reference numeral **5802** denotes the entry.

The processing object table **5801** is the one that is generated by removing the entries **3903**, **3904** and **3905** and changing the expander of the entry **3907** from [.p-quick] to [nil/.p-quick] to get the entry **5802** for the processing object table **3901**.

(Modification **102**): The UI frame generation processing **3404** is added to the data conversion processing **3210**. More concretely, the screen configuration expanding device **103** executes the UI frame generation processing **3404** between the step **3702** and the step **3707** and couples the screen configuration data generated by the UI frame generation processing **3404** and the screen configuration data converted by the configuration description conversion processing **3704** by inserting the <BR> tag at the step **3705**.

(Modification **103**): The screen configuration expanding device **103** removes [TARGET=PAGE] from the template **4401** used for the UI frame generation processing.

Since the attribute [TARGET] is not necessary when the frame description is not used, it is removed in this embodiment.

The above explains the modifications in this embodiment for the former embodiment.

Next, the operation of the screen configuration expanding device **103** in this embodiment will be explained.

First, the client **105** transmits the command [GET menu. html] to the screen configuration expanding device **103**.

The operations of the screen configuration expanding device **103** at this time are the same as a series of its operations from the (session **3**) to the (session **4**) in the former embodiment.

The screen configuration expanding device **103** receives the command [GET menu. html] from the client **105** by the command analysis processing **3204**, looks up the entry **5802** of the processing object table **5801** and sets the setting table to [address=menu. html, classification=conversion, processing content=configuration description conversion, parameter=.p-quick].

The content of the setting table is similar to that of the (session **3**) and the flow of the subsequent processings is fundamentally the same as that of the (session **3**), too.

Here, the difference of the processing of the screen configuration expanding device **103** in this embodiment from that of the expanding device **103** in the seventh embodiment lies in the result of the data conversion processing **3210**.

Here, the screen configuration expanding device **103** first generates the UI frame in the same way as in the former embodiment, receives the screen configuration data **501** from the server **101**, generates the screen configuration data **1801**, couples the UI frame, that has been generated already, and the screen configuration data by inserting the <BR> tag, generates the screen configuration data shown in FIG. **58** and transmits it to the client **105**.

In FIG. **58**, reference numeral **5901** denotes the screen configuration data and reference numerals **5902** and **5903** denote the anchor tag descriptions generated by the screen configuration expanding device **103** by the UI frame generation processing in this embodiment. Reference numeral **5904** denotes the <BR> tag inserted for coupling the screen configuration data of the UI frame and the screen configuration data **1801**.

Receiving the screen configuration data, the client **105** further receives the image data **902** and displays the screen shown in FIG. **59**.

In FIG. **59**, reference numeral **6001** denotes the screen display.

In the screen **6001**, the operation when the client **105** selects each button is functionally the same as that of the seventh embodiment, and this embodiment is different in that it does not use the frame description.

The above explains the operation of the screen configuration expanding device **103** in this embodiment.

Since this embodiment does not utilize the frame description, there is the problem that when the content of the page data to be accessed is great and when the page data must be partially viewed by scrolling it on the screen, the button for the mode selection disappears from the screen when scrolled.

On the other hand, the four sessions, in all, are necessary to display all the contents of the new page but in this embodiment, the processing can be completed by the two sessions. Therefore, this embodiment is effective when the cost for establishing and cutting off the connection on the network system is high.

The number of kinds of clients the present invention can utilize becomes greater in that this embodiment does not use the frame description, and versatility can be improved.

The relationship among these embodiments will be explained.

It is possible to change the content of the table for setting the concrete operations of the present invention and add the new data conversion function and the new data generation function **5**to the former embodiment, respectively.

As described above, the present invention can easily add new functions by changing the table to be looked up at the time of the operation of the present invention and adding afresh the data conversion processing and the data generation processing.

The functions of the respective embodiments can be easily combined.

For example, the user of the client can look up one thumb nail button or a plurality of thumb nail buttons, and this can be accomplished without using the frame description.

More concretely, the above can be easily accomplished by changing the UI frame processing method so that the display method of the buttons changes between the [QUICK mode] and the [NORMAL mode].

Similarly, when the client **105** has the function of displaying the UI frame on another window, the UI frame generation processing is changed to generate the screen configuration data so that the UI frame is displayed on another window.

Further, the above can be accomplished by changing the content of each table used by the screen configuration expanding device **103** for the processing.

In the information provision systems dispersed on the network, the resent invention can add and display new buttons and new information on the client screen without collapsing original page layout. Particularly when the data conversion is executed, ease-of-use of the users can be improved by concentrated gathering an providing the user interfaces at one lace.

The present invention makes it also possible to easily make access to the original data without changing setting of the client by accomplishing the mode switching function which the user of the client can select.

What is claimed is:

1. A data relaying apparatus connected between a server device and a client device, comprising:

a request processing portion, and

a response portion,

wherein said request processing portion includes a command analysis portion which analyzes a command, inputted from said client device, and which reads out and stores conversion instruction information when said command contains said conversion instruction information instructing a predetermined data conversion processing, and said request processing portion deletes said conversion instruction information from said command and sends said command to said server device,

wherein said response portion receives data requested with said command from said server device, converts said data on the basis of said conversion instruction information corresponding to said command, and sends said converted data to said client device.

2. A data relaying apparatus according to claim **1**, wherein said conversion instruction information contains a screen configuration command instructing to divide an area of the screen displayed on said client device into a reception data display area for data received from said server device and an operation area for a screen operation and to display them; and

wherein said data relaying apparatus further comprises:

a first expansion portion for expanding said data on said reception data display area on the basis of said screen configuration command; and

a second expansion portion for expanding operation buttons corresponding to another screen configuration command indicating contents of transformation on data in accordance with said conversion instruction information on said operation area on the basis of said screen configuration command from said client device.

3. A data relaying apparatus according to claim **2**, wherein said operation buttons displayed on said operation area includes a normal mode button corresponding to a first screen configuration command of changing a part of text included in said data not to transform image data included in said data, and a click mode button corresponding to a second screen configuration command of changing a part of text included in said data to transform image data included in said data.

4. A data relaying apparatus according to claim **3**, wherein said conversion instruction information is preserved for different data referred to by other data.

5. A data relaying apparatus according to claim **1**, wherein said conversion instruction information is a deletion instruction command which instructs to delete a part of pixels of image data in a predetermined pattern when said image data is contained in said data.

6. A data relaying apparatus according to claim **1**, wherein said conversion instruction information is a conversion instruction command which instructs to convert the size of said image data at a predetermined conversion ratio.

7. A data relaying apparatus according to claim **6**, which further comprises:

a data conversion portion for converting the size of said image data at a predetermined conversion ratio on the basis of said conversion instruction command.

8. A data relaying apparatus according to claim **1**, wherein said response portion decreases a part of said data received from said server device before sending said data to said client device in accordance with contents of said predetermined data conversion processing.

9. A data relaying apparatus connected to a client device through a first network and to a server device through a second network, comprising:

means for analyzing a command inputted from said client device;

means for checking whether or not a conversion instruction information is included in said command, the conversion instruction information instructing a conversion processing to said command, and reading out and storing said conversion instruction information from said command when said information is contained in said command;

means for transmitting said command from which said conversion instruction information is removed, to said server device;

means for receiving a response command responding to said command after removal of said conversion instruction information, from said server device;

means for generating a conversion command by converting said response command on the basis of said conversion instruction information; and

means for transmitting said conversion command with said conversion instruction information to said client device.

10. A data relaying apparatus according to claim **9**, wherein said conversion instruction information is a deletion instruction command for instructing to delete a part of pixels of image data in a predetermined pattern when said image data is contained in said response command.

11. A data relaying apparatus according to claim **10**, wherein said deletion instruction command is a command instructing to convert the size of said image data at a specific conversion ratio, and wherein said data relay apparatus further comprises:

means for analyzing said deletion instruction command;

means for converting the size of said image data at said specific conversion ratio; and

means for transmitting said converted data to said client device.

12. A data relaying apparatus according to claim **10**, wherein said deletion instruction command instructs to delete the number of pixels of said image data so as to reduce the size of said image data at a conversion ratio of 1/4 or 1/16.

13. A data relaying apparatus according to claim **10**, wherein said conversion instruction information contains a screen configuration command instructing to divide a screen displayed on said client device into a reception data display area for displaying data received from said server device and an operations screen area and to display them, and wherein said data relay apparatus further comprises:

means for expanding a response command from said server device and said reception data display area on the basis of said screen configuration command;

means for expanding operation buttons corresponding to said deletion instruction command in accordance with the instruction of said screen configuration command from said client device, in said operations screen area; and

means for transmitting to said client device.

14. A data transmission method of a network system having a data relay apparatus connected to a client device through a first network and to a server device through a second network, comprising the steps of:

analyzing, in said data relay apparatus, a command inputted from said client device, deleting conversion instruction information from said command when said conversion instruction information instructing conversion processing is contained in said command, and transmitting the result to said server device;

transmitting, in said server device receiving said command after removal of said conversion instruction information, a response command responding to said command after removal of said conversion instruction information to said data relay apparatus; and

converting, in said data relay apparatus receiving said response command, said response command and generating a conversion command on the basis of said conversion instruction information, and transmitting said conversion command with said conversion instruction information to said client device.

15. A data transmission method according to claim **14**, wherein said conversion instruction information is a deletion instruction command for instructing to delete the number of pixels of image data in a predetermined pattern when said response command contains said image data.

16. A data transmission method according to claim **15**, wherein said deletion instruction command is a command instructing to convert the size of said image data at a specific conversion ratio, and wherein,

said data relay apparatus analyzes said deletion instruction command and transmits said image data as the data generated by converting the size of said image data at said specific conversion ratio.

17. A data transmission method according to claim **14**, wherein said deletion instruction command executes conversion for deleting the number of pixels of said image data so that the size of said image data attains a conversion ratio of 1/4 or 1/16.

18. A data transmission method according to claim **14**, wherein said conversion instruction information contains a screen configuration command for instructing to divide the screen displayed on said client device into a reception data display area for displaying data received from said server device and said operations screen area and to display them, and wherein said data relay apparatus expands said response command received from said server device on said reception data display area on the basis of said screen configuration command, expands operation buttons corresponding to said deletion instruction command in accordance with the instruction of said screen configuration demand from said client device, in said operations screen area, and transmits them to said client device.

19. An information storage medium for storing a data conversion function for data relay, for use in a data relay apparatus connected to a client device through a first network and to a server device through a second network, wherein said information storage medium has a program code that can be read and executed by a computer in such a manner as to be loaded into said data relay apparatus, and said code has a function of analyzing a command inputted from said client device; a function of deleting conversion instruction information from a command when said command contains said conversion instruction information instructing the conversion processing, and transmitting said command to said server device; a function of receiving a response command responding to said command after removal of said conversion instruction information, from said server device; a function of generating a conversion command by converting said response command on the basis of said conversion instruction information; and a function of transmitting said conversion command with said conversion instruction information to said client device.

20. An information storage medium for a data conversion function according to claim **19**, wherein said code has a function of deleting the number of pixels of image data in a predetermined pattern when said response command contains said image data.

21. An information storage medium for a data conversion function according to claim **20**, wherein said conversion instruction information contains a screen configuration command instructing to divide the screen displayed on said client device into a reception data display area for displaying data received from said server device and said operations screen area and to display them, and said code has a function of expanding said response command from said server device in said reception data display area on the basis of said screen configuration command, a function of expanding operation buttons corresponding to said deletion instruction command in said operations screen area in accordance with instructions of said screen configuration command from said client device, and a function of transmitting said expanded information to said client device.

22. An information storage medium for a data conversion function according to claim **19**, wherein said information storage medium stores a program code, further having a function of analyzing said deletion instruction command, a function of converting the size of said response data at a specific conversion ratio, and a function of transmitting converted data to said client device.

23. An information storage medium for a data conversion function according to claim **19**, wherein, when said response data is image data, said code has a function of converting the size of said image data by deleting the number of pixels of said image data so as to attain a conversion ratio of 1/4 or 1/16.

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