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DESCRIPTION



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An Email System, a Server, and an Email Transmitting and Receiving
Apparatus

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Technical Field

The present invention relates to an email system, a server, and an email transmitting and receiving apparatus for transmitting email receipts from receivers of emails to transmitters of the emails.

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Background Art

A method for transmitting email receipts is widely known; wherein, an email when transmitted by a transmitting side, is received and opened by the receiving side of the email; and a notice of an email receipt, which
15 indicates that the email has been received by the receiving side, is transmitted by the receiving side of the email to the transmitting side of the email. Through the notice of the email receipt, the user who transmitted the email can be made known that the receiver of the email has read the contents of the email.

20 In the above-mentioned email system, the notice of an email receipt (referred to as 'email receipt' hereinafter) is transmitted in an ordinary email format. However, in some cases, it is not necessary for email receipts to be transmitted immediately, such as in routine emails. In other words, users of the email system need to receive routine emails without any delay,
25 but they often do not have the need to receive email receipts immediately for emails sent to others.

In certain other cases, users of the email system do not feel the need to receive email receipts as and when a recipient reads an email, in other words, in real time; and may find it more convenient to check several

email receipts together at a time, rather than individual email receipts.

However, in the conventional email system, email receipts are processed without distinguishing ordinary emails from others. Therefore, the conventional email system is not able to meet the users' varied needs for
5 email receipts of various transmitted emails.

Disclosure of the Invention

The present invention has been made in the light of the above-mentioned drawbacks of the prior art, and it is an object of the present invention to
10 provide an email system with a notification function of email receipts, which can meet the varied needs of the users of the email system.

To solve the aforementioned problem, a mail system of the present invention comprises: a plurality of email client devices, which transmit and receive emails; a first storage means, which stores emails addressed to the
15 email client devices; a second storage means, which stores information concerning email receipts addressed to the email client devices; an email transmitting means, which transmits the emails stored by the first storage means to the email client devices, without waiting for operations to be carried out by users of the email client devices, and; an email receipt
20 transmitting means, which transmits the information concerning the email receipts stored by the second storage means to the email client devices, in response to requests which are transmitted by the email client devices following operations carried out by the users. According to the present invention, recipient email client devices can obtain emails addressed to
25 them immediately; and on the other hand, transmitter email client devices of emails can obtain their email receipts as and when they want to receive email receipts. This is the first mode of an email system of the present invention.

In the second mode of an email system of the present invention, in

addition to the characteristics of the first mode, the email receipt transmitting means may transmit the information concerning the email receipts in an email format to the email client devices.

5 In the third mode of an email system of the present invention, in addition to the characteristics of the first mode, the email receipt transmitting means may transmit the information concerning the email receipts in a data format that can be interpreted by a browser program stored by the email client devices.

10 In the fourth mode of an email system of the present invention, in addition to the characteristics of the first mode, the second storage means and the email receipt transmitting means may be installed in a server, which is equipped with the first storage means and the email transmitting means to provide a service of email distribution through a communication network to which the email client devices are connected.

15 In the fifth mode of an email system of the present invention, in addition to the characteristics of the first mode, the email client devices may be mobile stations connected to the mobile communication network; the email transmitting means may transmit the emails to the mobile stations through the mobile communication network, and; the email receipt transmitting
20 means may transmit the information concerning the email receipts to the mobile stations through the mobile communication network.

In the sixth mode of an email system of the present invention, in addition to the characteristics of the first mode, the first storage means and the email transmitting means may be installed in an email server, which
25 provides the service of email distribution through a first communication network to which the email client devices are connected, and; the second storage means and the email receipt transmitting means may be installed in an email receipt server connected to a second communication network, which is different from the first communication network.

In the seventh mode of an email system of the present invention, in addition to the characteristics of the sixth mode, the first communication network may be a mobile communication network; the email client devices are mobile stations connected to the mobile communication network, and;
5 the email transmitting means may transmit the emails to the mobile stations through the mobile communication network.

In the eighth mode of an email system of the present invention, in addition to the characteristics of the sixth mode, the second communication network may be the Internet, and; the email receipt
10 transmitting means may transmit the information concerning the email receipts to the email client devices through the Internet.

In the ninth mode of an email system of the present invention, in addition to the characteristics of the sixth mode, the first communication network may be a mobile communication network; the email client devices may be
15 mobile stations connected to the mobile communication network; the second communication network may be the Internet; the email transmitting means may transmit the emails to the mobile stations through the mobile communication network, and; the email receipt transmitting means may transmit the information concerning the email receipts to the email client
20 devices through the Internet.

In the tenth mode of an email system of the present invention, in addition to the characteristics of the sixth mode, each of the email client devices may comprise a means for indicating an address of the email receipt server in the second communication network as a destination address for email
25 receipts corresponding to emails, which each of the email client devices transmits.

A server of the present invention relays communications of emails transmitted and received between email client devices, and it comprises a receiving means, which receives email receipts addressed to the email

client devices; a storage means, which stores information concerning the email receipts which are received, with correspondence to identification information of each of the email client devices; an extracting means, which extracts the information concerning the email receipts stored by the storage means according to the identification information, in response to requests which are transmitted by the email client devices following operations carried out by users, and; an email receipt transmitting means, which transmits the information concerning the email receipts extracted by the extracting means, to the email client devices. This is the first mode of a server of the present invention.

In the second mode of a server of the present invention, in addition to the characteristics of the first mode, the email receipt transmitting means may transmit the information concerning the email receipts in an email format to the email client devices.

In the third mode of a server of the present invention, in addition to the characteristics of the first mode, the email receipt transmitting means may transmit the information concerning the email receipts in a data format that can be interpreted by a browser program stored by the email client devices, to the email client devices.

In the fourth mode of a server of the present invention, in addition to the characteristics of the first mode, the email client devices may be mobile stations connected to a mobile communication network; the email transmitting means may transmit the emails to the mobile stations through the mobile communication network, and; the email receipt transmitting means may transmit the information concerning the email receipts to the mobile stations through the mobile communication network.

Moreover, another server of the present invention comprises a receiving means, which receives email receipts addressed to email client devices which transmit and receive emails; a storage means, which stores

information concerning the email receipts which are received, with correspondence to identification information of each of the email client devices; an extracting means, which extracts the information concerning the email receipts stored by the storage means according to the
5 identification information, in response to requests which are transmitted by the email client devices following operations carried out by users, and; an email receipt transmitting means, which transmits the information concerning the email receipts extracted by the means, to the email client devices; and the server is connected to a second communication network,
10 which is different from a first communication network to which an email server for providing a service of email distribution and the email client devices are connected. This is the first mode of another server of the present invention.

In the second mode of another server of the present invention, in addition
15 to the characteristics of the first mode, the first communication network may be a mobile communication network, and; the email client devices may be mobile stations connected to the mobile communication network.

In the third mode of another server of the present invention, in addition to the characteristics of the first mode, the second communication network
20 may be the Internet.

In the fourth mode of another server of the present invention, in addition to the characteristics of the first mode, the first communication network may be a mobile communication network; the second communication network may be the Internet, and; the email clients may be mobile stations
25 connected to the mobile communication network.

An email transmitting and receiving apparatus of the present invention uses a service of email distribution provided by an email server, and the apparatus comprises an indicating means, which indicates an address of a server, which is different from the email server, in a communication

network as a destination address for email receipts corresponding to the emails, which the apparatus transmits.

Brief Description of the Drawings

5 Fig.1 is a block diagram showing the overall configuration of a system according to the first embodiment of the present invention.

Fig.2 is a block diagram showing the configuration of a mobile station according to the first embodiment of the present invention.

10 Fig.3 is a block diagram showing an email server according to the first embodiment of the present invention.

Fig.4 is a format chart showing an example of data storage in an email storage unit of an email server according to the first embodiment of the present invention.

15 Fig.5 is a format chart showing an example of data storage in an email receipt storage unit of an email server according to the first embodiment of the present invention.

20 Fig.6 is a sequence chart showing a series of operations for a mobile station to transmit an email and for an email server to store an email receipt corresponding to the email according to the first embodiment of the present invention.

Fig.7 is a sequence chart showing a series of operations for a mobile station to receive an email receipt, which is stored in an email server according to the first embodiment of the present invention.

25 Fig.8 is a block diagram showing the overall configuration of a system according to the second embodiment of the present invention.

Fig.9 is a sequence chart showing a series of operations for a mobile station to transmit an email and for an email receipt server to store an email receipt corresponding to the email according to the second embodiment of the present invention.

Fig.10 is a sequence chart showing a series of operations for a mobile station to receive an email receipt, which is stored in an email receipt server according to the second embodiment of the present invention.

5 Best Mode for Carrying out the Invention

In the following paragraphs, embodiments of the present invention, where an overall system is applied to a mobile communication network, are explained with reference to drawings. The embodiments are examples, and it will be readily understandable that the present invention is open to a
10 variety of modifications within its technical scope, and the following embodiments should not be interpreted as limiting the scope of the invention.

A: The First Embodiment

A-1: Configuration

15 First, a configuration of a particular system of the first embodiment will be explained below.

(1) Overall configuration of the email system

Fig. 1 is a block diagram showing the overall configuration of a system according to the first embodiment. As shown in Fig.1, the system contains
20 mobile stations 10A and 10B, mobile communication network 20, email server 25, Internet 30, and personal computer 40 (referred to as 'PC 40' hereinafter).

Mobile stations 10A and 10B are wireless communication terminals such as mobile phones and Personal Handy-phone Systems (PHSs), and they
25 can execute data communication and voice communication through mobile communication network 20. Each of the mobile stations 10A and 10B stores an email address, which is allotted to it for transmitting and receiving emails, and it functions as an email client, which transmits and receives emails. Since mobile station 10A and mobile station 10B have the

same configuration and functions, they are referred to as just 'mobile stations 10' hereafter, if there is no need to distinguish them from each other.

Mobile communication network 20 is a communication network, which provides mobile stations 10 with data communication service and voice communication service. Mobile communication network 20 contains base stations (not shown), switching stations (not shown), communication cables, which interconnect these stations (not shown), and so on. Mobile communication network 20 is connected to Internet 30 through a gateway device (not shown). There are many base stations set up with a certain interval between one another in mobile communication network 20, and each of the base stations executes wireless communication with mobile stations 10, which are in a wireless cell allotted to each base station. Each of the switching stations communicates with many of the base stations, and switches communication circuits for mobile stations 10 in the wireless cells of the base stations.

PC 40 is connected to Internet 30, and functions as an email client, which transmits and receives emails through Internet 30. For this purpose, PC 40 stores an email address, which is allotted to it. PC 40 comprises a display unit (not shown) for displaying various kinds of information such as email messages, a keyboard (not shown) by which a user of PC 40 composes emails, and so on, a communication unit (not shown) for executing data communication through Internet 30, a control unit (not shown) for controlling overall operations of PC 40, and so on.

Email server 25 is connected to mobile communication network 20, and relays email communication between email clients, namely, between mobile station 10A and mobile station 10B; or between one of mobile stations 10A/10B and PC 40.

(2) Configuration of mobile station 10

Next, the configuration of mobile station 10 is described below with reference to the diagram in Fig.2. As shown in Fig.2, mobile station 10 comprises radio communication unit 11, control unit 12, user interface unit 13, and bus 14, which interconnects these units.

5 Radio communication unit 11 comprises an antenna (not shown), communication control circuits (not shown), and so on, and executes wireless communication with the base station of mobile communication network 20. User interface unit 13 comprises a liquid crystal display unit (not shown) for displaying various kinds of information such as messages
10 of emails, a keypad (not shown) by which a user of mobile station 10 makes calls, composes emails, and so on, a microphone and a speaker (not shown) by which a user of mobile station 10 is able to carry out voice communication.

Control unit 12 controls operations of each of the components of mobile
15 station 10, and it comprises central processing unit (CPU) 121, read only memory (ROM) 122, and random access memory (RAM) 123. ROM 122 stores several kinds of programs such as control programs. CPU 121 reads out the control programs from ROM 122 and executes various kinds of control operations. During the control operations of CPU 121, RAM 123 is
20 used as the work area for the programs, and so on. The control programs, which are stored in ROM 122, contain a mailer program for making, transmitting, and receiving emails, as well as a voice communication program for providing voice communication function to mobile station 10. Details of operations, which CPU 121 executes in accordance with the
25 mailer program, are explained in the latter part of this description.

(3) Configuration of email server 25

Next, the configuration of email server 25 is explained below with reference to the block diagram in Fig.3. As shown in Fig.3, email server 25 comprises communication unit 251, control unit 252, subscriber

information storage unit 253, email storage unit 254, and bus 255, which interconnects these units.

Communication unit 251 comprises a connection interface (not shown) for connecting to mobile communication network 20, communication
5 control circuits (not shown), and so on, and it executes data communication through mobile communication network 20.

Control unit 252 comprises a CPU (not shown), a ROM (not shown), and a RAM (not shown), and it controls each unit of email server 25. The ROM stores several kinds of programs such as control programs. The CPU
10 reads out the control programs from the ROM and executes various kinds of control operations. The control programs, which are stored in the ROM, contain, for example, an email relay program for relaying emails, which are communicated between email clients. Details of operations, which the CPU executes, in accordance with the email relay program, are explained
15 in the latter part of this description.

Subscriber information storage unit 253 is a mass storage device such as a hard disk, and it stores information concerning subscribers of the data communication service in mobile communication network 20, such as telephone numbers and email addresses of mobile stations 10. Control unit
20 252 makes a call to mobile station 10 and transmits emails using the telephone numbers and the email addresses, which are stored in subscriber information storage unit 253.

Email storage unit 254 is a mass storage device such as a hard disk, and stores emails, which are addressed to mobile stations 10. Email storage
25 unit 254 has two storage areas, namely, email storage unit 254a for storing emails addressed to mobile stations 10, and email receipt storage unit 254b for storing email receipts for mobile stations 10.

Email storage unit 254a comprises many memory areas, called mailboxes, and each mobile station 10 is allotted a mailbox. When control unit 252

receives an email, addressed to mobile station 10, it temporarily stores the email data of the received email in a mailbox in email storage unit 254a, which corresponds to the receiver's email address of the email. The email data contain email addresses of the receivers of the email, email addresses
5 of the sender of the email, the transmission time and date of the email, a title of the email, and a text message of the email. Fig.4 is a format chart showing an example of data storage in email storage unit 254a. After control unit 252 stores the email data of the received email in the corresponding mailbox as mentioned above, it makes a call to one of
10 mobile stations 10, which is a receiver of the email, and transmits the stored email to another of mobile stations 10.

Emails, which are stored in email storage unit 254a (referred to as 'ordinary emails' hereinafter), are not emails of email receipts addressed to mobile stations 10. Email receipts are also transmitted and received in an
15 email format, but they are distinguishable from ordinary emails and stored in email receipt storage unit 254b.

Fig.5 is a format chart showing an example of data storage in email receipt storage unit 254b. As shown in Fig.5, email receipt storage unit 254b stores data of email receipts addressed to mobile stations 10, and the
20 data of email receipts are sorted by email addresses of mobile stations 10. Data of email receipts contain an email address of the receiver of the email receipt, an email address of the receiver of the received email, the receipt time and date at which the email is received, and a title of the received email. When control unit 252 receives an email receipt, which is addressed
25 to mobile station 10, it stores the email receipt in email receipt storage unit 254a according to the email address, which shows the receiver of the email receipt. Then control unit 252 extracts email receipts corresponding to mobile station 10, in response to a request for email receipts, which is sent from mobile station 10 through a request operation carried out by its user

and transmits the email receipts to mobile station 10. Namely, email receipts, which are stored in email receipt storage unit 254b, are not transmitted to mobile stations 10 immediately when they are received and are stored by email server 25 as ordinary emails as mentioned above (in a
5 push type distribution method), until users of mobile stations 10 make a request for them. And when email receipts are requested, they are transmitted to mobile stations 10 (in a pull type distribution method).

As explained above, in the first embodiment, ordinary emails as well as email receipts are transmitted and received by email clients in the email
10 format, but email server 25 carries out different processes of delivery for both. In this embodiment, when an email client transmits an email, the email client attaches distinction data to the email data of the email on the basis of which, email server 25 is able to distinguish ordinary emails from email receipts.

15 A-2: Operation

Next, operations of the system of the first embodiment with the above-mentioned configuration will be explained. As mentioned above, in the first embodiment, the operation of transmitting ordinary emails from email server 25 to mobile stations 10, and the operation of transmitting
20 email receipts from email server 25 to mobile stations 10 are different from each other. In email server 25 the operation used for transmitting ordinary emails is the same as the operation in the conventional system, hence, an explanation of the transmitting operation is omitted in this description. Following is an example of an email receipt transmission operation, which
25 is carried out when mobile station 10 transmits emails to PC 40 and mobile station 10 receives email receipts corresponding to the emails.

(1) Operation of transmission of emails by mobile station 10 and operation of storage of email receipts by email server 25

A series of operations, which start when an email is transmitted by mobile

station 10, and end when an email receipt transmitted by PC 40 corresponding to the email received from mobile station 10 is stored in email server 25, are explained below with reference to Fig.6. A user of mobile station 10 operates the keypad and starts the mailer program. Then,
5 the user operates the keypad and composes an email, which is addressed to the email address of PC 40. Mobile station 10 prepares an email following the key operation of the user (step S1).

Next, mobile station 10 makes a call to email server 25 following the user's request for transmission of the composed email, and transmits the
10 email, which is addressed to PC 40, to email server 25 (step S2).

Email server 25 receives the email from mobile station 10 (step S3), and transmits the email to PC 40 through mobile communication network 20 and Internet 30 (step S4).

PC 40 receives the email from email server 25 (step S5), and displays a
15 notice of email arrival in the display unit (not shown) to indicate that an email has arrived (step S6).

Next, when the user of PC 40 operates to open the email, PC 40 displays the email in the display unit following the user's operation, and at the same time, it transmits an email receipt, which is addressed to the email address
20 of mobile station 10, to Internet 30 (step S7). As explained above, when the email receipt is transmitted, distinction data for distinguishing email receipts are attached to the data of the email receipt.

Email server 25 receives the email receipt through Internet 30 and mobile communication network 20, and recognizes that it is not an ordinary email
25 but an email receipt after checking the attached distinction data. Then email server 25 stores the email receipt in a memory area in memory 254b in accordance with the email address of mobile station 10, which is the receiver of the email receipt, and ends the series of operations (step S8).

(2) Operation of download of email receipts by mobile station 10 from

email server 25

A series of operations, when mobile station 10 downloads email receipts from email server 25, are explained below with reference to Fig.7. First, a user of mobile station 10 operates the keypad of mobile station 10 and starts the mailer program at his/her convenient timing. Then, the user operates the keypad to download email receipts. Following the keypad operation of the user, mobile station 10 makes a call to email server 25, and transmits a request for email receipts, which contains the email address of mobile station 10 (step S11).

10 Email server 25 receives the request for email receipts from mobile station 10 (step S12).

Then, email server 25 extracts email receipts from a memory area of memory 254b, which corresponds to the received email address (step S13), and email server 25 transmits the email receipts to mobile station 10 (step S14).

Mobile station 10 receives the email receipts from email server 25 (step S15), displays the email receipts in the liquid crystal display unit, and ends the series of operations (step S16).

As explained above, according to the first embodiment, users can obtain email receipts at their convenient timings separately from ordinary emails. Therefore, the system can meet its users' demand to receive several email receipts all together at the same time, more flexibly.

B: The Second Embodiment

Next, the second embodiment of the present invention will be explained. As described in the above-mentioned first embodiment, email sever 25 comprises email receipt storage unit 254b. In the second embodiment, however, a certain server in Internet 30 comprises email receipt storage unit 254b. Fig.8 is a block diagram showing the overall configuration of a system according to the second embodiment. In Fig.8, the components,

which are the same as those in the first embodiment, are provided with the same symbols as in the first embodiment, and therefore, configuration explanations of those components are omitted.

The second embodiment and the first embodiment differ in their configuration of email server 25; as well as, in the existence of email receipt server 41 in Internet 30 which concentrates on providing storage and distribution services of email receipts. Email server 25 comprises email storage unit 254a as explained above, but it does not comprise email receipt storage unit 254b, and it does not provide email receipt distribution service, unlike in the first embodiment. In the second embodiment, on the other hand, email receipt server 41 comprises email receipt storage unit 254b, and provides email receipt distribution service instead of email server 25. To be more precise, email receipt server 41 comprises a communication unit (not shown) for executing data communication through Internet 30, a control unit (not shown) for controlling each component of email receipt server 41, email receipt storage unit 254b for storing data of email receipts, and a bus (not shown) for interconnecting these units.

Users of mobile stations 10 have a distribution service contract with email receipt server 41, which provides the distribution service of email receipts, and mobile station 10 stores in ROM 122 an Internet Protocol (IP) address of email receipt server 41 for using the distribution service.

A series of operations, executed when mobile station 10 transmits an email to PC 40, and another series of operations, executed when mobile station 10 receives an email receipt corresponding to the email, are examples of operations in the second embodiment, which are explained below. As shown in the sequence chart of Fig.9, first, a user of mobile station 10 operates the keypad of mobile station 10 and starts a mailer program. Then, the user operates the keypad and composes an email,

which is addressed to the email address of PC 40. Mobile station 10 makes an email following the key operation of the user (step S21).

Next, mobile station 10 makes a call to email server 25 following the user's request for transmitting the composed email, and transmits the email,

5 which is addressed to PC 40, to email server 25 (step S22). When mobile station 10 transmits the email, mobile station 10 reads out the IP address of email receipt server 41 stored in ROM 122 and attaches the IP address to the composed email so that an email receipt corresponding to the composed email can reach email receipt server 41.

10 Email server 25 receives the email from mobile station 10 (step S23), and transmits the email to PC 40 through mobile communication network 20 and Internet 30 (step S24).

PC 40 receives the email from email server 25 (step S25), and displays a notice of email arrival in the display unit (not shown) to indicate that an
15 email has arrived (step S26).

Next, when the user of PC 40 makes a request for receiving the email, PC 40 receives the email following the request and displays the email in the display unit. Then, PC 40 transmits an email receipt to email receipt server 41 using the IP address of email receipt server 41, which is attached to the
20 email (step S27). When PC 40 transmits the email receipt, PC 40 attaches the email address of mobile station 10 to the email receipt.

When email receipt server 41 receives the email receipt and the email address of mobile station 10, it stores the email receipt in a memory area in memory 254b according to the email address of mobile station 10, and
25 ends the series of operations (step S28).

Next, another series of operations, which are executed when mobile station 10 downloads email receipts from email receipt server 41, are explained below with reference to the sequence chart in Fig.10. First, a user of mobile station 10 operates mobile station 10 to start a mailer

program and to download email receipts. Following the keypad operation of the user, mobile station 10 establishes a communication connection with email receipt server 41 through mobile communication network 20 and Internet 30, and transmits a request for email receipts with the email address of mobile station 10 to email receipt server 41 (step S31).

Email receipt server 41 receives the request for email receipts (step S32).

Then, email receipt server 41 reads out email receipts from a memory area of memory 254b, which corresponds to the received email address (step S33), and transmits the email receipts to mobile station 10 through Internet 30 and mobile communication network 20 (step S34).

The email receipts are relayed by email server 25, and they are received by mobile station 10 (step S35).

When mobile station 10 receives the email receipts, mobile station 10 displays them in the liquid crystal display unit, and ends the series of operations (step S36).

As explained above, according to the second embodiment, users can also obtain email receipts at their convenience and independently of ordinary emails as in the first embodiment.

Email clients, who use distribution service of email receipts provided by email receipt server 41, are not limited to mobile stations 10, and they may be email clients who are connected to Internet 30 such as PC 40. Namely any email client who is able to connect to Internet 30 can use the distribution service of email receipt server 41 by making a contract for the distribution service, and the client can obtain email receipts at the client's convenience no matter what kind of server performs the distribution service of ordinary emails for the email client. Therefore, email receipt server 41 functions as a site where the distribution service of email receipts is provided, and an administrator of email receipt server 41 can concentrate on the distribution service of email receipts.

C: Modification

The embodiments mentioned above should not be interpreted as limiting the scope of the present invention, and the present invention can be embodied in various forms within its technical scope. Following are
5 examples of some of the modified forms of the present invention.

(1) Variation of email clients

In the first and second embodiments, email clients in mobile communication network 20 are mobile stations 10 such as mobile phones and PHSs. However, email clients of the present invention are not limited
10 to mobile stations, but any information device, which is connected to mobile stations 10, such as Personal Digital Assistant (PDA) or a personal computer, may function as an email client of the present invention.

Moreover, in the embodiments explained above, only email receipts, which correspond to emails transmitted from mobile stations 10 to PC 40,
15 are described. However, email receipts of the present invention do not necessarily correspond to those emails, but they correspond to emails communicated between mobile stations 10 in mobile communication network 20 or between PC 40 and another PC, which is not shown in the figures.

20 (2) Variation of transmitting timings of ordinary emails from an email server to an email client

In the first and second embodiments, when email server 25 receives an ordinary email addressed to mobile station 10, email server 25 transmits the ordinary email immediately, while at the same time storing the email
25 temporarily.

However, there is another method of email transmission, where an email client sends requests for emails to email server 25 periodically and automatically without the need for an input operation each time, and email server 25 distributes emails to the email client in response to the requests.

When the email client is PC 40, for example, this transmission method is often adopted. In a system using such a method, users of mobile stations, which are the email clients, do not have to carry out transmission operation for requests for emails either.

- 5 The email transmission method explained above, in which email server
25 transmits emails in response to periodical requests for email receipts transmitted by email clients, can also be applied to the present invention
(3) Variation of method for transmitting email receipts from an email server to an email client

- 10 In the first embodiment, email receipts from email server 25 to mobile stations 10 are made in an email format, but formats for email receipts of the present invention are not limited to the email format.

- For example, if a World Wide Web (WWW) browser program is installed in mobile station 10, mobile station 10 can read out email receipts, which
15 are stored in email server 25 using the browser program.

- Even in such a case, as in the first embodiment, PC 40, which receives emails from mobile station 10, transmits email receipts to email server 25 in the email format. However, email server 25, which receives the email receipts in the email format, stores in its memory, the email addresses
20 contained in the email receipts, the email addresses of receivers of corresponding emails, the times and dates of receipts of the corresponding emails, and the titles of the corresponding emails (namely data stored in email receipt storage unit 254b) in the Hyper Text Markup Language (HTML) format.

- 25 A series of operations executed when email server 25 provides email receipts to mobile station 10 are described below.

First, mobile station 10 starts a browser program following its user's operation, and connects to email server 25 using a Uniform Resource Locator (URL), which is allotted to email server 25 in advance. Email

server 25 reads out HTML data containing data of email receipts, which are addressed to mobile station 10, from its memory, and transmits the data to mobile station 10. Mobile station 10 receives and interprets the HTML data and displays the data in its liquid crystal display.

- 5 In the second embodiment as well, email receipt server 41 can adopt the above-mentioned method for providing email receipts using a browser program.

(4) Variation of transmission method of email receipts between email servers

- 10 In the first embodiment, the explanation focuses on the operations of email server 25, which provides email service to mobile stations 10; but the explanation does not include a description of the configuration and operations of the email server, (referred to as 'email server 100' hereinafter), which provides email service to PC 40.

- 15 In the instance that there is no need for users of mobile stations 10 to always receive email receipts immediately, it is also possible to apply the below described method for transmitting email receipts between email server 25 and email server 100.

- In the instance that email server 100 transmits email receipts received from PC 40, to email server 25, email server 100 does not transmit the email receipts to email server 25 immediately after it receives them from PC 40, but instead stores the email receipts transmitted from several PCs 40 until a predetermined transmitting time. When it is time for transmitting the email receipts, email server 100 transmits the email receipts collectively to email server 25. In a conventional system, it is common that control signals for detecting communication connections are periodically transmitted and received between email servers. In such a system, data of email receipts, which are stored in servers, can be attached to the control signals and transmitted along with the control signals.
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- 25

In the system explained above, the efficiency of network communication between email server 25 and email server 100 can be improved.

Moreover, also in the second embodiment email receipt server 41 can adopt the above-mentioned method for transmitting email receipts.

CLAIMS

1. An email system, said system comprising:
 - a plurality of email client devices, which transmit and receive emails;
 - 5 a first storage means, which stores emails addressed to said email client devices;
 - a second storage means, which stores information concerning email receipts addressed to said email client devices;
 - an email transmitting means, which transmits said emails stored by said
 - 10 first storage means to said email client devices, without waiting for operations to be carried out by users of said email client devices, and;
 - an email receipt transmitting means, which transmits said information concerning said email receipts stored by said second storage means to said email client devices, in response to requests which are transmitted by said
 - 15 email client devices following operations carried out by said users.
2. An email system according to claim 1, wherein:
 - said email receipt transmitting means transmits said information concerning said email receipts in an email format to said email client
 - 20 devices.
3. An email system according to claim 1, wherein:
 - said email receipt transmitting means transmits said information concerning said email receipts in a data format that can be interpreted by a
 - 25 browser program stored by said email client devices.
4. An email system according to claim 1, wherein:
 - said second storage means and said email receipt transmitting means are installed in a server, which is equipped with said first storage means and

said email transmitting means to provide a service of email distribution through a communication network to which said email client devices are connected.

5 5. An email system according to claim 1, wherein:

said email client devices are mobile stations connected to said mobile communication network;

said email transmitting means transmits said emails to said mobile stations through said mobile communication network, and;

10 said email receipt transmitting means transmits said information concerning said email receipts to said mobile stations through said mobile communication network.

6. An email system according to claim 1, wherein:

15 said first storage means and said email transmitting means are installed in an email server, which provides said service of email distribution through a first communication network to which said email client devices are connected, and;

20 said second storage means and said email receipt transmitting means are installed in an email receipt server connected to a second communication network, which is different from said first communication network.

7. An email system according to claim 6, wherein:

said first communication network is a mobile communication network;

25 said email client devices are mobile stations connected to said mobile communication network, and;

said email transmitting means transmits said emails to said mobile stations through said mobile communication network.

8. An email system according to claim 6, wherein:

said second communication network is the Internet, and;

said email receipt transmitting means transmits said information concerning said email receipts to said email client devices through the Internet.

9. An email system according to claim 6, wherein:

said first communication network is a mobile communication network;

said email client devices are mobile stations connected to said mobile communication network;

said second communication network is the Internet;

said email transmitting means transmits said emails to said mobile stations through said mobile communication network, and;

said email receipt transmitting means transmits said information concerning said email receipts to said email client devices through the Internet.

10. An email system according to claim 6, wherein:

each of said email client devices comprises a means for indicating an address of said email receipt server in said second communication network as a destination address for email receipts corresponding to emails, which each of said email client devices transmits.

11. A server for relaying communications of emails transmitted and received between email client devices, said server comprising:

a receiving means, which receives email receipts addressed to said email client devices;

a storage means, which stores information concerning said email receipts which are received, with correspondence to identification information of

each of said email client devices;

an extracting means, which extracts said information concerning said email receipts stored by said storage means according to said identification information, in response to requests which are transmitted by said email client devices following operations carried out by users, and;

an email receipt transmitting means, which transmits said information concerning said email receipts extracted by said extracting means, to said email client devices.

10 12. A server according to claim 11, wherein:

said email receipt transmitting means transmits said information concerning said email receipts in an email format to said email client devices.

15 13. A server according to claim 11, wherein:

said email receipt transmitting means transmits said information concerning said email receipts in a data format that can be interpreted by a browser program stored by said email client devices, to said email client devices.

20

14. A server according to claim 11, wherein:

said email client devices are mobile stations connected to a mobile communication network;

said email transmitting means transmits said emails to said mobile stations through said mobile communication network, and;

25 said email receipt transmitting means transmits said information concerning said email receipts to said mobile stations through said mobile communication network.

15. A server, said server comprising:

a receiving means, which receives email receipts addressed to email client devices which transmit and receive emails;

5 a storage means, which stores information concerning said email receipts which are received, with correspondence to identification information of each of said email client devices;

an extracting means, which extracts said information concerning said email receipts stored by said storage means according to said identification information, in response to requests which are transmitted by said email
10 client devices following operations carried out by users, and;

an email receipt transmitting means, which transmits said information concerning said email receipts extracted by said means, to said email client devices;

and said server is connected to a second communication network, which
15 is different from a first communication network to which an email server for providing a service of email distribution and said email client devices are connected.

16. A server according to claim 15, wherein:

20 said first communication network is a mobile communication network, and;

said email client devices are mobile stations connected to said mobile communication network.

25 17. A server according to claim 15, wherein:

said second communication network is the Internet.

18. A server according to claim 15, wherein:

said first communication network is a mobile communication network;

said second communication network is the Internet, and;
said email clients are mobile stations connected to said mobile communication network.

- 5 19. An email transmitting and receiving apparatus which uses a service of email distribution provided by an email server, said apparatus comprising:
an indicating means, which indicates an address of a server, which is different from said email server, in a communication network as a destination address for email receipts corresponding to said emails, which
10 said apparatus transmits.