

Method of Transferring Status Data, Server
Computer, and Service Control Point

This invention relates to a method of transferring status data of an application program as set forth in the preamble of claim 1, to a server computer as set forth in the preamble of claim 11, and to a service control point as set forth in the preamble of claim 13.

The invention starts from the usual transfer of status data of Internet applications.

An application program which provides an E-mail service for a group of subscribers, for example, is executed by a server computer of the Internet. If one of the subscribers wants to retrieve status data of the application program, it is necessary to establish a connection between a client computer of the subscriber, which contains a corresponding client application program, and the server computer via the Internet. The computer sets up a connection via an access network, for example a telephone network, to a gateway computer, which permits access to the Internet.

Communication between the client computer and the server computer is carried out using the TCP/IP protocol stack (Transmission Control Protocol/Internet Protocol). Then, status data of the server application program running on the server computer, for example information as to whether new E-mail messages have arrived for the subscriber, are sent over the Internet to the client application program running on the client computer, and subsequently output by the client application program to the subscriber.

One disadvantage of this transfer method is that it takes up a great deal of the subscriber's time: To obtain the status information of the application program, the subscriber must boot his client computer, start the client application program, and set up a connection to the Internet.

The invention has for its object to expedite the transfer of status data of application programs running on a server computer of a computer network.

This object is attained by a method of transferring status data of an application program according to the teaching of claim 1, a server computer according to the teaching of claim 11, and a service control point according to the teaching of claim 13.

The invention is based on the idea to send status data of the application program from a service control point

of a telephone network in a message over the telephone network to a telephone terminal of the subscriber. This permits an efficient, fast, and low-cost transmission of the status data to the subscriber, and a connection between the client computer and the server computer has to be set up only if it is apparent from the status data that this is worthwhile.

The advantage of the invention is that, on the one hand, the status data are output to the subscriber via a less costly and constantly ready-to-receive terminal, which, for example, need not be booted to receive the status data. Such a terminal is also lighter and has considerably smaller dimensions, so that it can be more readily carried by the subscriber. This increases a subscriber's availability, so that the subscriber is more currently informed. On the other hand, the time-consuming and costly establishment of a connection from the subscriber to the computer network is eliminated. The terminal need not process the protocols of the computer network, so that it can be of a much simpler design.

Further advantageous features of the invention are defined in the subclaims.

The invention will become more apparent from the following description of two embodiments when taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a block diagram of a communications system with a server computer according to the invention and a service control point according to the invention;

Fig. 2 is a functional diagram of the server computer according to the invention, the service control point according to the invention, and the communications relationship existing between the two for a first embodiment; and

Fig. 3 is a functional diagram of the server computer according to the invention, the service control point according to the invention, and the communications relationship existing between the two for a second embodiment.

Fig. 1 shows a telephone network TNET, a data network DATNET, a telephone terminal TE, a client computer CLIENT, and two server computers SERV1 and SERV2. The client computer CLIENT and the telephone terminal TE are associated with a subscriber A.

The telephone network TNET is an ISDN communications network (ISDN = Integrated Services Digital Network). It can be any communications network which permits voice or video communication in real time, such as a conventional analog telephone network, a mobile radio

network, for example a network based on the GSM standard (GSM = Global System for Mobile Communications), or a telephone network in which a subscriber can be reached via different types of terminals (wireline terminal, mobile terminal, cordless terminal), as is the case with a PCS system (PCS = Personal Communications System), for example. The telephone terminal TE is an ISDN telephone, but it could also be an analog telephone, a video telephone, or a mobile telephone.

The data network DATNET is based on one or more packet networks, for example an ATM network (ATM = Asynchronous Transfer Mode), via which computers communicate using the TCP/IP protocol stack. The data network DATNET is formed by the Internet, for example.

Via the access point POP, access can be obtained to the data network DATNET over a transmission link of the telephone network TNET.

The number of computers CLIENT, SERV1, and SERV2 was chosen by way of example. The computer CLIENT is a conventional computer equipped with an interface module for communication over the telephone network TNET, i.e., a computer with an ISDN card or a modem. Each of the computers SERV1 and SERV2 is a powerful computer equipped with an interface card for communication over the data network DATNET, for example with an ATM card or at least one frame relay card. The computers CLIENT,

SERV1, and SERV2 communicate over the lower-level transmission paths of the data network DATNET and the telephone network TNET using the TCP/IP protocol, with the telephone network TNET performing the function of an access network to the data network DATNET. The computers CLIENT, SERV1, and SERV2 and the lower-level transmission paths thus form a computer network COMPNET.

The telephone network TNET comprises a service control point SCP, a service support system IP, and several exchanges, of which two specially designed exchanges SSP1 and SSP2 are shown by way of example.

The exchanges SSP1 and SSP2 are service switching points which communicate with the service switching point SCP via the Signaling System No. 7 using the INAP protocol (INAP = Intelligent Network Application Part). The service switching points SSP1, SSP2 and the service control point SCP incorporate a service switching function and a service control function, respectively, in accordance with the IN architecture (IN = Intelligent Network). It is also possible for the service control point SCP and the service switching point SSP1, SSP2 to communicate using other protocols, such as the CAP protocol (CAP = Camel Application Part) if the telephone network TNET is a mobile radio network. The functions of the service control point SCP may also be incorporated into the control of an

exchange and provide the following service for this exchange.

The service support system IP communicates with the service control point SCP via the Signaling System No. 7 (or DSS1) and is controlled by this signaling system. In response to a control instruction from the service control point SCP, the service support system IP generates announcement texts or texts to be displayed, which it sends over the telephone network TNET to a telephone terminal of the telephone network TNET. The service support system IP may also be integrated with the service control SCP.

The server computer SERV1 executes an application program. Status data of the application program are transferred as follows.

Status data to be assigned to subscriber A of the telephone network TNET in accordance with an assignment scheme are determined, and sent in a message STAT to the service control point SCP of the telephone network TNET. Furthermore, the telephone terminal TE is determined as the telephone terminal assigned to subscriber A. In the case of PCS or mobile subscribers, this is implemented using a location register, for example.

Advantageously, the message STAT is transferred over the Internet, i.e., the service control point SCP has

an Internet access. It is also possible, of course, to transmit this message over another transmission medium, such as an X.25 point-to-point connection.

The service control point SCP then causes the service support system IP to send a message ANN containing the status data over the telephone network TNET to the terminal TE. The message ANN is transferred as a voice message over a voice channel, e.g. an ISDN B channel, or as a text to be displayed, e.g. over an ISDN D channel, through the telephone network TNET to the terminal TE.

A first embodiment of the detailed operation of the transfer method, the service control point SCP, and the server computer SERV1 will now be explained with reference to Fig. 2.

Fig. 2 shows the service control point SCP, the server computer SERV1, the service switching point SSP1, the service support system IP as well as the telephone terminal TE and the client computer CLIENT, which are associated with subscriber A.

The server computer SERV1 is a computer with a system platform and applications which, from a functional point of view, implement, among other things, two communications units KOM1, KOM2 and two control units APP, STDEL.

The control unit APP executes an application program and represents, for example, the process which executes the application program. The application program is preferably an Internet application, for example a program which provides an E-mail service for subscriber A (E-mail server). The application program may also be a program which provides an information service, for example.

The communications unit KOM1 supports the control unit APP in communicating with other computers of the computer network COMPNET. It has hardware and software resources TCP/IP_P for processing the TCP/IP protocol stack. Via the communications unit KOM1, the control unit APP exchanges TCP/IP messages TCP/IP_M with, e.g., the server computer CLIENT, thus rendering the service provided by it.

The communications unit KOM2 supports the control unit STDEL in communicating with the service control point SCP of the telephone network TNET. It has hardware and software resources TCP/IP_P for processing the TCP/IP protocol stack and resources INAP_P for processing the INAP protocol. Via the communications unit KOM2, the control unit APP exchanges INAP messages with the service control point SCP, which are transported using

the transmission service provided by the TCP/IP protocol.

The control unit STDEL determines for one or more subscribers of the telephone network TNET those status data of the application program of the control unit APP which are assigned to the one or more subscribers in accordance with an assignment scheme, and assigns

the determined status data to the one or more subscribers.

The assignment scheme assigns particular status data of the application program to particular subscribers of the telephone network. Status data to be determined for a subscriber are, for example, the event that new E-mail messages have arrived for a subscriber, the number of new E-mail messages, the priority of the E-mail messages, or the senders of the new E-mail messages. Further examples of such status data are the event that new information is retrievable, the field of topics or the priority of the new information.

To determine the status data, the control unit STDEL interrogates the control unit APP at regular intervals for the status data assigned to the one or more subscribers by the assignment scheme. For each subscriber, the control unit STDEL sends to the control unit APP a query which specifies the user identification assigned to the subscriber and the type

of status data to be retrieved. The specification of a user identification can be dispensed with if the control unit only provides a service for a single subscriber or a nonpersonalized service. The control unit STDEL then assigns the status data received from the control unit APP in response to the query to the subscriber for whom this query was sent.

The user identification is contained in the assignment scheme, or the control unit STDEL contains a list which assigns the subscriber identifications of the one or more subscribers to user identifications of the application program. A subscriber identification is the telephone number of a subscriber. It may also be a logical, terminal-independent subscriber identification, such as an UPT identification. The user identification is the subscriber's E-mail address, but it may also be a password chosen by an operator or a subscriber which identifies a client to the application program.

Instead of being queried at regular intervals, the control unit APP may notify the control unit STDEL of changes in status data, whereupon the STDEL starts the query. It is also possible to implement the assignment of subscriber identifications to user identifications in the service control point SCP.

Another possibility of determining the status data is for the control unit STDEL to monitor the control unit

APP, to capture the status data of the latter, and to filter out the status data assigned to the subscribers in accordance with the assignment scheme.

A further possibility of determining the status data is for the control unit APP to send status data to the control unit STDEL, which then assigns the status data to the subscribers based on the information sent along, such as user identifications in accordance with the assignment scheme.

The control unit STDEL then sends the determined status data, indicating the subscriber they are assigned to, via the communications unit KOM2 to the service control point SCP. It thus sends a message STATM, for example, which contains a subscriber identification and the status data determined for the latter. Such messages are sent whenever the status data filtered out for a subscriber change. It is also possible to send the status data assigned to a subscriber to the service control point SCP periodically.

It is also possible for the control unit STDEL to determine status data for subscribers of different telephone networks or to cooperate with different service control points of the telephone network TNET. In that case, the control unit additionally determines on the basis of the assigned subscriber identification to which service control point it has to send the determined status data.

The service control point SCP consists of a computer with a system platform and applications which, together with the service support system IP and the service switching points SSP1 and SSP2, provide one or more services in the telephone network TNET. The service or one of the services provides the means for the transfer of status data of an application program executed by the server computer SERV1. From a functional point of view, the service control point SCP contains two communications units KOM3 and KOM4 and a control unit CONTR.

The operation of the communications unit KOM4 corresponds to the that of the communications unit KOM2. Via the communications unit KOM4, the control unit CONTR can exchange INAP messages with server computers of the computer network COMPNET, these INAP messages being transported using the transmission service provided by the TCP/IP protocol.

The communications unit KOM3 provides a communications service which permits the control unit CONTR to communicate with the service switching points SSP1 and SSP2 and the service support system IP. It contains hardware and software resources SS7_P for processing the protocol stack of the Signaling System No. 7, and resources INAP_P for processing the INAP protocol. Via the communications unit KOM3, the control unit APP exchanges INAP messages with the service switching

points SSP1 and SSP2 and the service support system IP of the service control point, these INAP messages being transported using the transmission service provided by the No. 7 Signaling System.

The control unit CONTR receives status data from the server computer SERV1 and causes messages containing the status data to be sent to associated telephone terminals of the telephone network TNET. The control unit CONTR comprises two control units ANSEND and STREC and a data base DBST.

The control unit STREC receives from the server computer SERV1 messages containing status data and data about a subscriber of the telephone network TNET assigned to these status data, for example the subscriber identification, and stores these status and subscriber data in the database DBST. It is also possible for the control unit STREC to receive such messages from two or more server computers of the computer network COMPNET and route status data of different application programs executed by different server computers to telephone terminals of the telephone network TNET.

The database DBST contains status data assigned to subscribers. When the control unit receives status data for a subscriber, the status data already stored for the subscriber are overwritten by these more up-to-date status data. It is also possible for the control unit

STREC to store status data already assigned to terminal identifications, so that they will be received from the control unit STREC in this assigned form, or to carry out this assignment itself.

The control unit ANSEND controls the sending of messages containing status data over the telephone network TNET to telephone terminals of the telephone network TNET. It reads the status data assigned to a subscriber of the telephone network TNET from the database DBST, determines a telephone terminal assigned to this subscriber, for example the terminal TE, and sends to the service support system IP a control message CANN which causes the service support system IP to send a message ANN containing the status data to the telephone terminal determined. If the subscriber identification used is a telephone number, the assigned terminal need not be determined, of course.

The reading and sending of the status data is controlled by the condition of the telephone terminal assigned to the associated subscriber: When the subscriber goes off-hook, so that the terminal changes to the busy condition, this change of status is detected by the associated service switching point, for example the service switching point SSP1, and a trigger message TRIG is sent to the control unit ANSEND. The trigger message TRIG contains the number of this terminal. Upon reception of the trigger message TRIG, the control unit ANSEND checks whether the

terminal number is assigned to a subscriber for whom status data are contained in the database DBST. If that is the case, the control unit ANSEND will read out the associated status data and cause the message ANN to be sent to this telephone terminal, for example the telephone terminal TE.

The reading and sending of status data may also be controlled by other events. One possibility is to send the status data in response to a request message from a telephone terminal. Another possibility is to send the status data as soon as new status data for a subscriber are received from the control unit STREC. In that case, the database DBST can be dispensed with, and advantageously, a text to be displayed is sent as the message ANN to the telephone terminal.

A second embodiment of the detailed operation of the transfer method, the service control point SCP, and the server computer SERV1 will now be explained with reference to Fig. 3.

Fig. 3 shows a service control point SCP', a server computer SERV1', the service switching point SSP1, the service support system IP as well as the telephone terminal TE and the client computer CLIENT, which are associated with subscriber A.

The server computer SERV' is constructed like the server computer SERV1 except that the control unit

STDEL and the communications unit KOM2 are not present. The service control point SCP' is constructed like the service control point SCP except that the control unit STREC and the communications unit KOM4 have been replaced by a control unit STREQ and a communications unit KOM4', respectively, with the control units ANSEND, STREQ and the database DBST now forming a control unit CONTR'.

The function of the communications unit KOM4' corresponds to that of the communications units KOM1: The communications unit KOM4' provides to the control unit CONTR' a communications service via which the control unit CONTR' can exchange messages with the computers of the computer network COMPNET using the transport service provided by the TCP/IP protocol.

The control unit STREQ determines for one or more subscribers of the telephone network TNET those status data of the application program of the control unit APP which are assigned to these one or more subscribers in accordance with an assignment scheme, assigns the determined status data to the one or more subscribers, and stores these data in the database DBST.

The determination of the status data and the assignment of the determined status data to the one or more subscribers are carried out by the control unit STREQ

in basically the same way as by the control unit STDEL of Fig. 2:

The control unit STREQ interrogates the control unit APP at regular intervals for the status data assigned to the one or more subscribers in accordance with the assignment scheme by sending one or more request messages REQM via the communications units KOM4' and KOM1 to the control unit APP. The contents of the request messages REQM correspond to those of the queries by the control unit STDEL of Fig. 2. On reception of a request message REQM, the control unit APP sends to the control unit STREQ a reply message STATM' containing the requested status data. The control unit STREQ then assigns the received status data to a subscriber of the telephone network TNET and stores these data in the database DBST. Instead of regular queries, the alternatives described for the control unit STDEL of Fig. 2 are possible.

It is also possible for the control unit STREQ to request such status data from different server computers of the computer network COMPNET.

Patent Claims

1. A method of transferring status data of an application program which is executed by a server computer (SERV1; SERV1') of a computer network (COMPNET),
c h a r a c t e r i z e d i n that those status data of the application program which are to be assigned to a particular subscriber (A) of a telephone network (TNET) in accordance with an assignment scheme are determined, that the determined status data are sent from the server computer (SERV1; SERV1') of the computer network to a service control point (SCP; SCP') of the telephone network, and that the service control point (SCP; SCP') causes a message (ANN) containing the determined status data to be sent over the telephone network (TNET) to a telephone terminal (TE) of the particular subscriber (A), to whom the determined status data are assigned in accordance with the assignment scheme.



2. A method as claimed in claim 1, characterized in that the server computer (SERV1) sends the message (STATM) containing the determined status data to the

3. A method as claimed in claim 1, characterized in that the server sends the message containing the determined status data to the service control point periodically.
4. A method as claimed in claim 1, characterized in that the service control point (SCP; SCP') stores the received status data as long as they are up to date.
5. A method as claimed in claim 1, characterized in that the service control point (SCP; SCP') causes the message (ANN) to be sent to the telephone terminal (TE) when the telephone terminal is activated for use.
6. A method as claimed in claim 1, characterized in that the service control point causes the message to be sent to the telephone terminal in response to a request message from the telephone terminal.
7. A method as claimed in claim 1, characterized in that the service control point causes the message to be sent to the telephone terminal periodically.
8. A method as claimed in claim 1, characterized in that the message (ANN) sent to the telephone terminal (TE) is a recorded announcement.



9. A method as claimed in claim 1, characterized in that the message sent to the telephone terminal is a text to be displayed.

10. A method as claimed in claim 1, characterized in that the message (ANN) is generated by a service support system (IP).

11. A server computer (SERV1) comprising a first communications unit (KOM1) for communication with computers (SERV2, CLIENT) of a computer network (COMPNET) and a first control unit (APP) for executing an application program,
c h a r a c t e r i z e d i n that the server computer (SERV1) further comprises a second communications unit (KOM2) for communication with a service control point (SCP) of a telephone network (TNET), and a second control unit (STDEL) adapted to determine those status data of the application program which are to be assigned to a particular subscriber of the telephone network in accordance with an assignment scheme, and to cause the determined status data to be sent from the server computer (SERV1) of the computer network (COMPNET) to the service control point (SCP) of the telephone network (TNET).

12. A server computer (SERV1) as claimed in claim 11, characterized in that the server computer is an Internet server computer and is connected to the



computers of the computer network (COMPNET) via the Internet (DATNET).

13. A service control point (SCP; SCP') for providing one or more services in a telephone network (TNET), characterized in that the service control point (SCP; SCP') comprises a communications unit (KOM4; KOM4') for communication with a server computer (SERV1; SERV1') of a computer network (COMPNET) and a control unit (CONTR, CONTR') adapted to receive from the server computer (SERV1; SERV1') of the computer network status data of an application program which is executed by the server computer

(SERV1; SERV1'), and to cause a message (ANN) containing the received status data to be sent over the telephone network (TNET) to a telephone terminal (TE) of a subscriber of the telephone network to whom the status data are to be assigned in accordance with an assignment scheme.

14. A service control point (SCP; SCP') as claimed in claim 13, characterized by being connected to one or more service switching points (SSP1, SSP2) of the telephone network (TNET).

15. A service control point as claimed in claim 13, characterized by being integrated with an exchange of the telephone network.

