PCT

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(54) Title: SCHEDULING APPLICATION
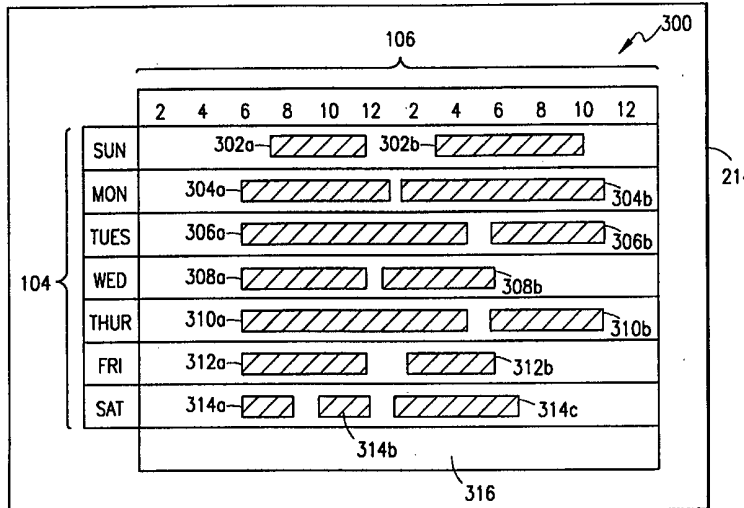
(57) Abstract

Scheduling and controlling arrangements, apparatus and methods are provided for use with different computer telephony applications and related devices in the form of an Active X control, or Java applet, Javabean, or like program. The scheduling and controlling arrangement, for example, is configured to allow for non–contiguous business hours to be entered for each day of the week. The business hours are displayed using a graphical user interface (GUI) that allows for entry of user inputs and/or selection of existing graphical representations of a business hours block of time. Summary details are also provided in a textual format along with the graphical representation. The scheduling and controlling arrangement is especially useful for non–traditional business and home environments that require selective automated or semi–automated control of telephony call routing activities at different times of the day and night.

-1-

SCHEDULING APPLICATION

5   **BACKGROUND OF THE INVENTION**

Technical Field of the Invention

The present invention relates generally to software applications for use in computer telephony systems, and more specifically to improved methods and arrangements for defining and graphically depicting scheduled telephony service

10   events associated with a scheduling and controlling process that routes calls.

Description of Related Art

Time management has always been an important factor in business. The increasingly automated information age has further increased the need for time management tools that can be used to schedule when specific tasks, events, programs,

15   services, etc., are to be conducted or otherwise permitted to occur.

Automated scheduling and controlling software/hardware arrangements are often used to accomplish certain tasks during specified periods of time (e.g., date, day, time, etc.). The event that is scheduled and controlled by the software/hardware arrangement can vary greatly depending upon the activity. Thus, for example, in

20   certain scheduling and controlling applications a specific automated task may be conducted, such as, initiating an automated daily backup of data, or otherwise interfacing with one or more other applications and/or devices. In other examples, rather than initiating an action, the scheduling and controlling application is configured to allow controlled activities to proceed. By way of example, in a

25   computer network the scheduling and controlling application can be configured to allow access to various resources during a specified period of time.

In a business environment having shared computing resources, a scheduling and controlling application is typically employed to manage and control access to these resources by setting "business hours" during which access to at least one of the

30   shared resources is allowed. For example, during specified business hours employees

-2-

may be allowed to access computer-based telephony services.

With this in mind, FIGURE 1 depicts a graphical display 100 associated with an exemplary scheduling and controlling application, as displayed on a display device 102 within a computer system. In this exemplary embodiment, the scheduling and controlling application includes a graphical user interface (GUI) that allows a user to view and control the setting of the business day 108 through a calender-like table. As shown, within display 100, there are a plurality of rows 104, each of which is associated with a specific day of the week, and a range of hours 106 associated with the 24 hours in each of the days. Within each of the plurality of rows 104, business hours 108 are defined and represented by a contiguous block of hours for each day of the week.

Thus, for example, on Sunday business hours 108a run from 12:00 PM to 5:00 PM. Similarly, on Monday through Friday, business hours 108b-f, respectively, have been set to run from 9:00 AM to 5:00 PM. On Saturday, business hours 108g are set to run from 10:00 AM to 5:00 PM

During business hours 108a-g, access to various resources, such as, for example, a telephony system is allowed. Outside of business hours 108a-g access would not be permitted.

One of the shortcomings with such "business hours" scheduling and controlling applications is that the business day has traditionally been considered to correspond, more or less, to the actual business day, and as such, the scheduled business hours are only allowed to be entered in a contiguous block for each day. While this business hours constraint may be acceptable for larger and/or more traditional business environments, for non-traditional businesses or even within home environments, the inflexibility of such scheduling and controlling applications presents undesirable limitations.

Additionally, determining the exact start and/or stop times associated with the business hours 108a-g from the table format on the display device 102 (as in FIGURE 1) can be difficult. Indeed, the user typically needs to open another more specific scheduling window to determine the exact times. For non-traditional, more dynamic scheduling environments, this is an added burden.

-3-

Further, such scheduling and controlling applications have traditionally been designed and packaged for use with particular applications and arrangements. Since no generic or otherwise reusable scheduling and controlling tool has been made available that can be incorporated into different products, manufacturers are required to develop software to meet the specific needs of their particular product. The resulting scheduling and controlling applications tend, therefore, to be somewhat inflexible, and often lack graphical user interfaces that can make an application more user-friendly.

Thus, as can be appreciated, there is a need for improved scheduling and controlling applications/tools that are more flexible, and can be configured to support non-traditional and/or non-contiguous business hours and practices. Preferably, the scheduling and controlling applications will be significantly powerful enough, user-friendly and readily configurable for use with a variety of products. There is a particular need for scheduling and controlling applications that can be used to schedule and control telephone operations in a computer telephony system.

SUMMARY OF THE INVENTION

The present invention provides improved scheduling and controlling methods and arrangements that are flexible and configurable. As such, the improved scheduling and controlling methods and arrangements can be used to support non-traditional and/or non-contiguous business hours and practices. Additionally, the scheduling and controlling methods and arrangements are preferably user-friendly and readily configurable for use with a variety of products, including computer telephony systems.

Thus, in accordance with certain embodiments of the present invention, an arrangement is provided for use in a telephony system. The arrangement includes a processor, an input device for providing user inputs to the processor, and an output device for displaying data generated by the processor. Computer instructions within the processor provide a scheduler that is configured to receive the user inputs and to generate data relating to non-contiguous business hour events. The non-contiguous business hour events are associated with at least one day of the week. The computer

-4-

instructions further provide a graphical user interface (GUI) that is configured to display the data relating to non-contiguous business hour events on the output device.

In accordance with still further embodiments of the present invention, the scheduler is also configured to generate data relating to non-contiguous business hour events associated a plurality of days, and the graphical user interface (GUI) is further configured to simultaneously display the data relating to non-contiguous business hour events for at least a portion of the plurality of days on the output device. In other embodiments, the arrangement further includes computer instructions that provide a controller that is configured to generate commands suitable for causing at least one change in a controlled event. For example, the commands can be provided to an application running on the processor or a another device.

The computer instructions, in accordance with certain preferred embodiments are provided as an Active X programmed control, a Java program, or a like portable and/or reusable set of instructions.

The above stated needs and others are also met by a method for use in a computer telephony system. The method includes the steps of receiving user inputs, generating data relating to non-contiguous business hour events associated with at least one day of the week in response to the user inputs, and displaying data relating to the non-contiguous business hour events on the output device. The method can also include the step of generating commands suitable for causing at least one change in a controlled event.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the methods and arrangements in accordance with certain embodiments of the present invention may be had by reference to the following detailed description when taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a diagram depicting a graphical user interface (GUI) display associated with a conventional scheduling and controlling application;

FIGURE 2 is a block diagram depicting an exemplary computer telephony system suitable for running an improved scheduling and controlling application, in

accordance with certain embodiments of the present invention;

FIGURE 3 is a diagram depicting a graphical user interface (GUI) display associated with an improved scheduling and controlling application, in accordance with certain embodiments of the present invention;

FIGURE 4 is a flow-chart diagram depicting a process for use in an improved scheduling and controlling application to selectively control scheduled events, in accordance with certain embodiments of the present invention; and

FIGURE 5 is a block diagram depicting an exemplary improved scheduling and controlling application, in accordance with certain embodiments of the present invention.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

FIGURE 2 is a block diagram depicting an exemplary computer system 120, such as, for example, a contemporary personal computer (PC) or like arrangement that is suitable for providing computer telephony services.

Within computer system 120 there is at least one processor 200 that is connected to a primary memory 202 through a first bus 204. Processor 200, for example, can be a microprocessor, such as a Pentium II microprocessor available from Intel Corporation of Santa Clara, California. Processor 200 is configured to access primary memory 202 through first bus 204. Primary memory 202 includes random access memory (RAM), such as, dynamic random access memory (DRAM), which is configured to store data associated with at least one application 220 that runs on processor 200.

As shown in FIGURE 2, first bus 204 is further interfaced to a second bus 208,

-6-

through a bus interface (I/F) 206. By way of example, second bus 208 can be a Universal Serial Bus (USB), a Peripheral Component Interconnect (PCI) bus, an Industry Standard Architecture(ISA)bus, or other similar bus.

A plurality of devices can be connected to second bus 208. For example, as depicted, a secondary memory 210 can be connected to second bus 208 to provide additional data storage. Secondary memory 210 can include, for example, additional RAM, DRAM, static random access memory (SRAM) (e.g., flash memory), a disk or tape drive and associated magnetic or optomagnetic storage medium, an optical storage drive and optical storage medium, or other like storage device and/or other type of computer readable medium.

At least one input device 212 is also connected to second bus 208 and configured to accept inputs from an operator. Input device 212 can include, for example, a keyboard device, a mouse device, a trackball device, a pen device, a pointing device, a touch sensitive input device, a microphone device, or other like input device. The inputs from input device 212 are then provided to processor 200, application 220, or any of the other applicable connected devices in FIGURES 1 and 2.

At least one output device 214 is also connected to second bus 208. Output device 214 is configured to generate an output suitable for use by a user (with or without additional devices) in response to one or more signals from processor 200. By way of example, output device 214 can include a cathode-ray tube (CRT) generated display, flat panel display, a printer, an audio monitor, or other like devices. In accordance with certain preferred embodiments of the present invention, output device 214 includes a display device such as a CRT or flat panel display.

Computer system 120 is also configured to access an external network 216 through a network interface 218. External network 216 can be a public switched telephone network (PSTN), for example, or a local area network (LAN) that provides access to other resources, including an intranet or the Internet. Thus, when, for example, external network 216 is a PSTN, then network interface 218 can include a communications switching device that is part of a telephony system along with computer system 120.

-7-

Although second bus 208 is depicted as connecting several different devices to first bus 204 and processor 200, it is to be understood that this is only an exemplary configuration, and that certain additional embodiments in accordance with the present invention use a plurality of buses, direct interfaces, and/or shared interfaces between

5   the various devices. Further, it is to be understood that additional devices can be connected to or otherwise provided in computer system 120.

Application 220, for example, as graphically depicted in the block diagram in FIGURE 2, is (or includes) an incorporated scheduling and controlling application, in accordance with the various embodiments of the present invention. In certain

10   preferred embodiments of the present invention, application 220 is configured to provide computer telephony services.

The following description of the various features and improvements presented by application 220 is intended to teach those skilled in the art how to practice the present invention. As such, various well known programming techniques, procedures,

15   and/or operations are not described in detail so as to avoid unnecessarily complicating the description of the present invention. Furthermore, those skilled in the art will recognize that several different and equivalent software and/or hardware arrangements can benefit by incorporating various features of the present invention.   Reference is now made to FIGURE 3, which shows an exemplary display 300. Display 300 is

20   displayed on output device 214 (see FIGURE 2). Display 300 is similar to display 100, except that several key improvements have been made to provide a more detailed and flexible graphical user interface (GUI) within scheduling and controlling application 220. These improvements to the GUI and other provisions within scheduling and controlling application 220 are designed to meet the diverse needs of

25   different environments, such as, those associated with non-traditional businesses, small businesses and homes. Application 220, in certain preferred embodiments is especially useful in meeting the computer telephony needs of such users by allowing control over the routing of calls (outgoing and/or incoming) during various times of the day or night.

30   As demonstrated by display 300, application 220 is configured to allow the user to input and define non-contiguous business hours within a single day 104. For

-8-

example, as depicted the business hours 302 for Sunday include business hours 302a that run from 7:45 AM through 11:45 AM and business hours 302b that from 3:00 PM through 10:00 PM. On Monday business hours 304a-b also present a non-contiguous block of time, namely, business hours 304a run from 5:45 AM through 12:15 PM and business hours 304b run from 1:00 PM through 11:00 PM. Similarly, the remaining days of the week 104 (i.e., Tuesday through Saturday) each include non-contiguous business hours. Indeed, Saturday includes business hours 314a, 314b, and 314c.

Thus, in accordance with certain embodiments of the present invention, the defined business hours for any given day can be either contiguous or non-contiguous. This provides flexibility to the user, in that each day can include selectable business hours having multiple start and stop times. As such, a controlled event can be better adapted to meet the specific needs of the user.

In accordance with still further embodiments of the present invention, display 300 also includes a summary display 316, in which more detailed information is displayed for a selected business hours. For example, using a mouse input device 212, a user can select a day or specific business hours by placing a curser over the applicable section of display 300 and then clicking a mouse button. The exact starting and stopping times for the selected business hours or current business hours (e.g., based on the current date/time) are displayed in textual format in summary display 316. Thus, for example, business hours for Thursday would be displayed as a text string that reads "7:45 AM-4:45 PM, 5:30 PM-11:00PM". Furthermore, other related information can also be displayed in summary display 316, such as, for example, the status of or identifiers for the current date/time, the controlled event/events, effected applications, devices, users, etc.

FIGURE 4 depicts a process 400 for controlling a scheduled event, such as, call routing, using computer telephony system 120 and scheduling and controlling application 220. In step 402, an activity or service is requested, for example, by a user, device and/or application. Scheduling and controlling application 220, having been installed and set-up for the appropriate business hours and configured to support the desired actively or service, then determines if the activity or service is allowed in the subsequent steps. Thus, in step 404, scheduling and controlling application 220

determines the date/time, for example, through the operating system (e.g., Windows 95, etc.). In step 406, scheduling and controlling application 220 determines if the business hours are set-up to allow for the requested activity or service. If the request is during business hours then the calling application, device, or the like, is allowed to conduct the activity or access/provide the requested service. If the request is made during non-business hours, then the calling application, device, or the like, is not allowed to conduct the activity or access/provide the requested service.

In accordance with certain preferred embodiments of the present invention, scheduling and controlling application 220 can be an Active X control or Java program (i.e., a reusable component with a published and documented interface) that can be used in container types of applications programmed to house Active X controls, and/or run Java programs, as the case may be. FIGURE 5 is a block diagram depicting an exemplary scheduling and controlling application 220, in accordance with certain embodiments of the present invention. As shown, scheduling and controlling application 220 includes a graphical user interface (GUI) 502 that is configured to receive inputs from a user and/or device and to output information that is displayed on an output device 214. Associated with GUI 502 is a scheduler 504 and a controller 506. Scheduler 504 is configured to store/retrieve data relating to the business hours in/from memory 202, and to determine when an activity can be conducted, for example, as in process 400. Controller 506 is configured to provide an interface with other applications and/or devices, for example, to pass on requests and determinations associated with process 400 embodied within scheduler 504.

As will be recognized by those skilled in the art, the innovative concepts described in the present application can be modified and varied over a wide range of applications. Accordingly, the scope of patented subject matter should not be limited to any of the specific exemplary teachings discussed.

-10-

WHAT IS CLAIMED IS:

1.   An arrangement for use in a computer telephony system, the arrangement comprising:

a processor;

an input device connected to provide user inputs to the processor;

an output device connected to the processor and configured to display data generated by the processor;

a scheduler, within the processor, configured to receive the user inputs and to generate data relating to non-contiguous business hour events associated with at least one day of the week; and

a graphical user interface (GUI), within the processor, configured to display the data relating to non-contiguous business hour events on the output device.

2.   The arrangement as recited in claim 1, wherein the scheduler is further configured to generate data relating to non-contiguous business hour events associated a plurality of days, and the graphical user interface (GUI) is further configured to simultaneously display the data relating to non-contiguous business hour events for at least a portion of the plurality of days on the output device.

3.   The arrangement as recited in claim 1, further comprising, within the processor, a controller that is configured to generate commands suitable for causing at least one change in a controlled event.

4.   The arrangement as recited in claim 3, wherein the scheduler, GUI and controller are included in an Active X programmed control.

5.   The arrangement as recited in claim 3, wherein the scheduler, GUI and controller are included in a Java program.

6.   An apparatus for use in a computer telephony system having a processor, an input device connected to provide user inputs to the processor, and an

-11-

output device connected to the processor and configured to display data generated by the processor, the apparatus comprising:

a scheduler suitable for operation substantially within the processor, the scheduler being configured to receive the user inputs and to generate data relating to non-contiguous business hour events associated with at least one day of the week; and

a graphical user interface (GUI)suitable for operation substantially within the processor, the GUI being configured to display data relating to non-contiguous business hour events on the output device.

7.   The apparatus as recited in claim 6, wherein the scheduler is further configured to generate data relating to non-contiguous business hour events associated a plurality of days, and the graphical user interface (GUI) is further configured to simultaneously display the data relating to non-contiguous business hour events for at least a portion of the plurality of days on the output device.

8.   The apparatus as recited in claim 6, further comprising:

a controller suitable for operation substantially within the processor, the controller being configured to generate commands suitable for causing at least one change in a controlled event.

9.   The apparatus as recited in claim 8, wherein the scheduler, GUI and controller are included in an Active X programmed control.

10.   The apparatus as recited in claim 8, wherein the scheduler, GUI and controller are included in a Java program.

11.   A computer readable medium comprising computer instructions for use in a computer telephony system having a processor, an input device connected to provide user inputs to the processor, and an output device connected to the processor and configured to display data generated by the processor, the instructions comprising:

-12-

a scheduler suitable for operation substantially within the processor, the scheduler being configured to receive the user inputs and to generate data relating to non-contiguous business hour events associated with at least one day of the week; and

5   a graphical user interface (GUI)suitable for operation substantially within the processor, the GUI being configured to display data relating to non-contiguous business hour events on the output device.

12.   The computer readable medium as recited in claim 11, wherein the
10   scheduler is further configured to generate data relating to non-contiguous business hour events associated a plurality of days, and the graphical user interface (GUI) is further configured to simultaneously display the data relating to non-contiguous business hour events for at least a portion of the plurality of days on the output device.

15   13.   The computer readable medium as recited in claim 11, wherein the instructions further comprise:

a controller suitable for operation substantially within the processor, the controller being configured to generate commands suitable for causing at least one change in a controlled event.

20

14.   The computer readable medium as recited in claim 13, wherein the scheduler, GUI and controller include Active X programmed instructions.

15.   The computer readable medium as recited in claim 13, wherein the
25   scheduler, GUI and controller include Java program instructions.

16.   A method for use in a computer telephony system having a processor, an input device connected to provide user inputs to the processor, and an output device connected to the processor and configured to display data generated by the
30   processor, the method comprising:

receiving user inputs;

-13-

generating data relating to non-contiguous business hour events associated with at least one day of the week in response to the user inputs; and

displaying data relating to the non-contiguous business hour events on the output device.

17.   The method as recited in claim 16, wherein the steps of receiving user inputs and generating data   further comprise generating data relating to non-contiguous business hour events associated a plurality of days, and the step of displaying data further comprises simultaneously displaying data relating to the non-contiguous business hour events for at least a portion of the plurality of days on the output device.

18.   The method as recited in Claim 16, further comprising generating commands suitable for causing at least one change in a controlled event.

	2	4	6	8	10	12	2	4	6	8	10	12	
SUN													108a
MON													108b
TUES													108c
WED													108d
THUR													108e
FRI													108f
SAT													108g

106

100

102

104
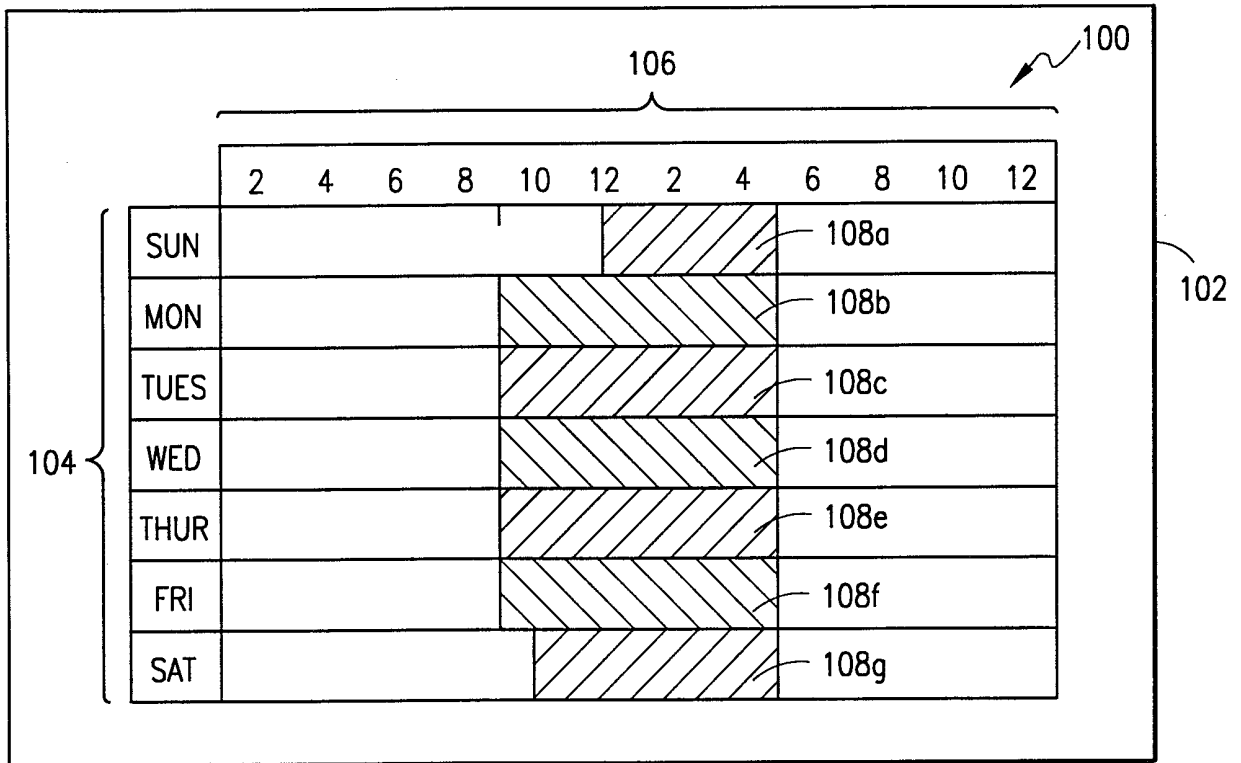
FIG. 1

(PRIOR ART)
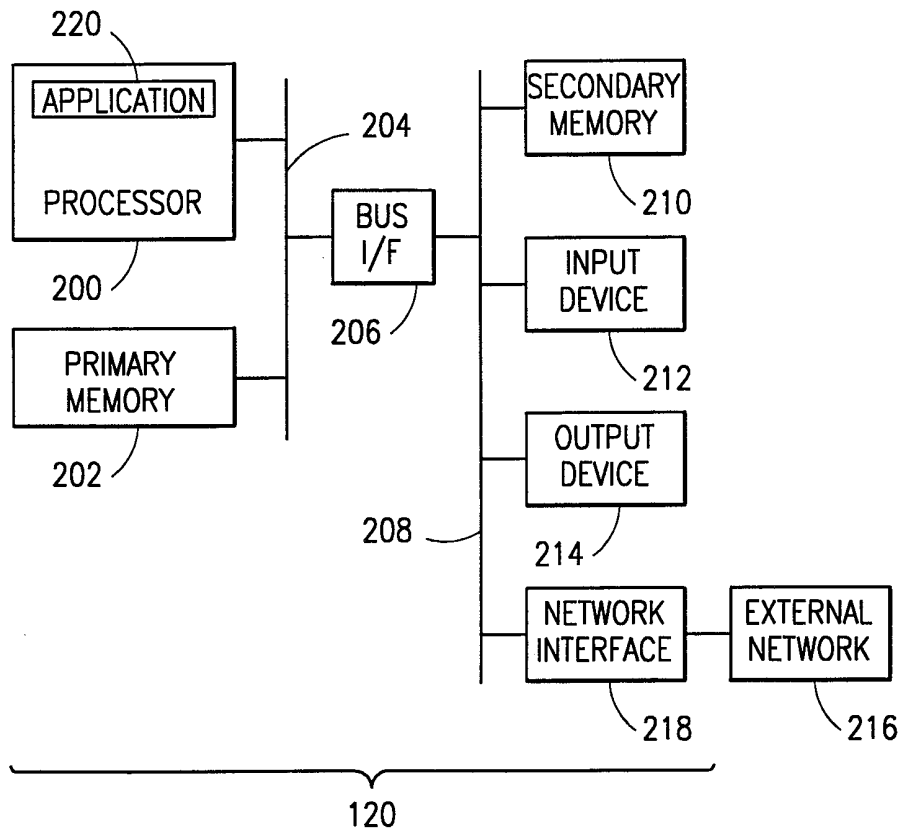
FIG. 2
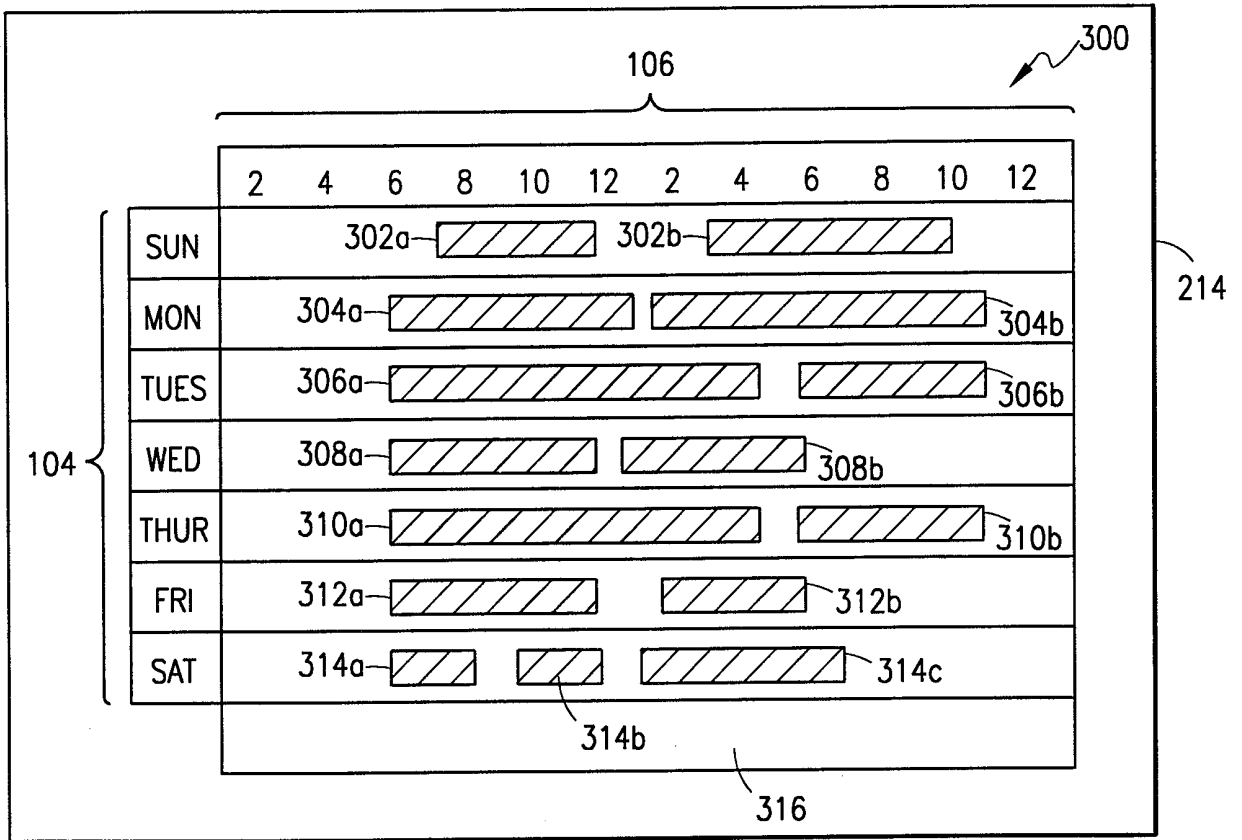
FIG. 3
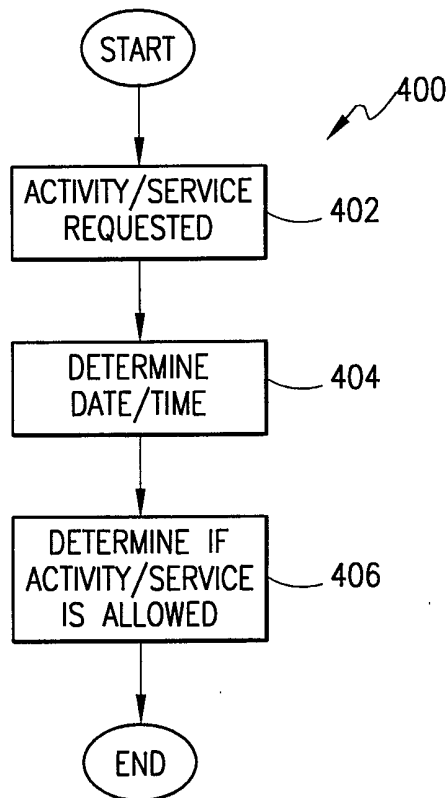
FIG. 4

FIG. 5

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7   H04Q3/545   H04M3/432

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7   H04Q   H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 805 444 A (SEYMOUR JAMES M) 8 September 1998 (1998-09-08)	1-3,6-8, 11-13, 16-18
Y	column 2, line 29 -column 3, line 10 column 3, line 38 - line 54 column 4, line 51 -column 8, line 34 column 10, line 6 - line 57 column 11, line 50 -column 29, line 45 ---	5,10,15
Y	WO 98 13753 A (WEBMAN TECHNOLOGIES INC ;HSEUSH WENWEY (US); MA ANTHONY (US); WANG) 2 April 1998 (1998-04-02) page 1, line 1 -page 2, line 21 ---	5,10,15
A	US 5 734 709 A (NORMAN VICTOR LEE ET AL) 31 March 1998 (1998-03-31) column 5, line 28 -column 6, line 25 figures 3,4,6 ---	1-18

-/--

| X | Further documents are listed in the continuation of box C. | | X | Patent family members are listed in annex. |

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 December 1999	12/01/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Chassatte, R

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		·
Category °	Citation of document. with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 323 314 A (BABER RON L ET AL) 21 June 1994 (1994-06-21) column 2, line 19 - line 59 ---	1-18
A	WO 98 21870 A (ROLM SYSTEMS) 22 May 1998 (1998-05-22) page 1, line 18 -page 2, line 5 -----	1-18

1

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

Patent document cited in search report		Publication date	Patent family member(s)		Publication date	-
US 5805444	A	08-09-1998	NONE			
WO 9813753	A	02-04-1998	AU	4654797 A	17-04-1998	
US 5734709	A	31-03-1998	NONE			
US 5323314	A	21-06-1994	NONE			
WO 9821870	A	22-05-1998	US	5872841 A	16-02-1999	