

METHOD, APPARATUS AND SYSTEM FOR QUEUE MESSAGING

Field of the Invention

5 The present invention relates to a queue messaging system, and more particularly to a queue messaging system that operates in association with a communication system.

Background of the Invention

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Whenever a limited number of service counters at a service center provide service to the public, a queue can result and often does. This is evident for example, at banks, post offices, and medical clinics. For an individual, queuing is a cause of much frustration as the time spent
15 queuing can be more fruitfully used performing other tasks. From an economic standpoint, queuing is a waste of human resources as such resources can be better utilized more productively. The expectation of the general public is that they should not have to queue, and should be served by counter staff upon arrival at a service center. From a service
20 provider's point of view this is not economically viable when service has to be provided by counter staff. Hence, a compromise between the expectations of the public and the ability of the service provider results in queues. With a queuing system, the service provider must also be mindful of the negative impression imparted to the public when long
25 queues are visible at their service centers. Hence the need for methods of managing queues.

A development beyond simply having people stand in line, is a relatively common queue management method or system which allows a user arriving at a service center to reserve a queue number by taking a
30 queue ticket from a queue number dispenser. The queue numbers run sequentially, and the user then waits until the queue number displayed on his ticket is announced or displayed. The user then proceeds to a

service counter, as may be indicated by an annunciator, such as a public address system or a display, and is served by the counter staff.

An enhancement of this method provides an indication of the current queue number that is being served on the ticket and, in some cases, also includes an estimate of the queuing or waiting time after
5 which the user's queue number may be served.

A disadvantage of this method is the need for the user to come to, and remain, at the service center within earshot and/or view of the queue number annunciator. Consequently, people in a queue are
10 unable to attend to other activities away from the service center. While some service providers provide queue number annunciators at various locations within their premises, aside from the service center, such as at a cafeteria, the user is still unable to leave the premises of the service provider while waiting his turn to be served.

Another disadvantage of this system is the need for the service
15 provider to provide suitable accommodation for people to spend their waiting time. Such accommodation can include seats, air-conditioning and/or heating, vending machines, and even entertainment like television sets and/or piped in music. Hence, individuals waste time in
20 queues, and service providers waste resources accommodating queues in order to preserve their customers.

With the advent of one-way communication devices such as pagers, PCT Patent application no. PCY/SE96/00931, assigned to Abbela Elektronik AB of Sweden, discloses a method where a user
25 registers upon arrival at a service center, and after the registration process, is provided with a pager. The user may then leave the service center of the service provider. When a member of the counter staff becomes available, the user is notified via the pager, and the user returns to the service center and is duly served by the counter staff.

30 A disadvantage of this method is the need for a registration process, in order to avoid loss or damage to the issued pagers. Another disadvantage is that the user is unable to determine the status of the

queue remotely, aside from status messages that are sent to the individual via the pager as preset by the service provider. Yet another disadvantage is the cost to the service provider of purchasing and maintaining a substantial number of paging devices. Still a further
5 disadvantage is that the user(s) may not be familiar with the operation of the pager, and resources will need to be expended to instruct users on the operation of the pager upon issuance. Alternatively, an individual who is unfamiliar with the issued pager may not be able to view the queue messages on the pager, thus defeating the purpose of
10 issuing the pager.

European patent application no. 99121406.5, assigned to Sony International GmbH, teaches a method which supports conventional reservation of queue numbers at a service center, and additionally, allows a user to remotely request and receive a queue number using a
15 short message service (SMS) on a cellular phone. It also notifies the user via SMS when his queue number is approaching, and allows the user to cancel a reservation using SMS.

A disadvantage of this method is remote reservation of queue numbers can be easily abused. Anyone with access to an SMS service
20 can make one or more fictitious reservations and trace-ability of this type of reservations is difficult, as the equivalent of a queue ticket is not provided to the user making the reservation. While owners of subscription based cellular services can be held accountable since their cellular phone numbers can be captured, cellular phone users who
25 utilize stored value calling card services are not traceable and hence cannot readily be held accountable.

Further, there are now websites on the Internet provided by cellular phone service providers, or third parties, that support SMS messaging. Hence, here again is another potential for abuse of the Sony
30 method, as senders of the fictitious queue reservations will be difficult to identify.

Such abuse can overload a queuing system, adversely affecting its efficiency and reliability. While measures can be implemented to limit fictitious reservations, such measures will necessarily increase the complexity of the system, and hence the associated costs.

5 Another disadvantage of the Sony method is that a notification of an approaching queue number is sent to an individual's cellular phone based on a preset notification period. Hence, after making a remote reservation, the user must wait for one or more notifications from the system for updates on the status of the queue.

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Brief Summary of the Invention

The present invention seeks to provide a method, apparatus and system for a queue messaging service, which overcomes or at least
15 reduces the abovementioned problems of the prior art.

Accordingly, in one aspect, the present invention provides a queue messaging system comprising:

a user interface for receiving a queue number reservation request from a user and in response providing the user a reserved queue
20 number, and the user interface for the user to optionally provide a user identifier (ID) associated with the user's communication unit and a user selected notification queue number that precedes the reserved queue number;

an output for coupling to a communication device; and

25 a controller coupled to the user interface and the output, for receiving the queue number reservation request and providing the reserved queue number to the user interface for presentation to the user, the controller for providing a user selectable option to the user interface for the user to provide the user ID and the notification queue
30 number, and the controller, in response to receiving the user ID and the notification queue number from the user interface, monitoring current queue number being served, and for providing the user ID and a

notification message to the communication device for transmission to the user's communication unit when the current queue number being served is the notification queue number.

In another aspect the present invention provides a queue
5 messaging system comprising:

a controller for operably coupling to a user interface to receive a queue number reservation request from a user, and to provide a reserved queue number, and a user selectable option for the user to provide a user ID and a user selected notification queue number, the
10 controller for operably coupling to a queue management system to receive a current queue number being served, where in response to receiving the user ID and the user selected notification queue number the controller monitors receipt of the current queue number being served, and the controller for operably coupling to a communication
15 device wherein when the current queue number being served is the user selected notification queue number, the controller causing the communication device to transmit the user ID and a notification message to a user communication unit having the user ID assigned thereto.

20 In yet another aspect the present invention provides a queuing system comprising:

a user interface for receiving a queue number reservation request from a user having a personal communication unit, and in response providing the user with a reserved queue number in a predetermined
25 sequence of queue numbers, and the user interface for optionally receiving a user identifier (ID) associated with the personal communication unit and a user selected reserved queue number;

a queue serving interface for providing a next reserved queue number indicator when one of the reserved queue numbers in the
30 predetermined sequence of queue numbers is to be served;

a queue management system coupled to the user interface and the queue servicing interface, the queue management system for

receiving the queue number reservation request and for providing the reserved queue number, and for receiving the next reserved queue number indicator and providing a current queue number to be served; and

5 a queue messaging system coupled to the user interface and queue management system, the queue messaging system for receiving the user ID and the user selected reserved queue number, and for monitoring the current queue number, the queue messaging system for providing the user ID and a notification message to a communication
10 device adapted to communicate with the personal communication unit, when the current queue number is the user selected reserved queue number, the queue messaging system for receiving a queue update request message from the communication device when the user sends a queue update request to the communication device via the personal
15 communication unit, and in response the queue messaging system providing the current queue number to the communication device for transmission to the personal communication unit.

In still another aspect the present invention provides a system for providing a queue messaging service, the system comprising:

20 a queue messaging server for coupling to at least one wireless communication system, for storing subscriber details of a plurality of client subscriber systems, and for providing queue messaging services to wireless communication units operable on the at least one wireless communication system; and

25 each of the plurality of client subscriber systems being coupled to communicate with the queue messaging server via a communication network, the each of the plurality of client subscriber systems for coupling to a queue management system that manages at least one queue of users, and for communicating with the queue messaging
30 server to provide queue messaging services to the at least one queue of users having the wireless communication units.

In yet still another aspect the present invention provides a method for providing a queue messaging service, the method comprising the steps of:

- a) providing a notification option to a user;
- 5 b) receiving user contact information and a user selected queue notification condition;
- c) monitoring a queue for the user selected queue notification condition; and
- d) providing a notification to the user using the user contact
- 10 information when the user selected queue notification condition is satisfied.

In a further aspect the present invention provides a method for providing a queue messaging service, the method comprising the steps of:

- 15 a) receiving a subscriber identifier (ID), a user ID and a queue notification message from a subscriber;
- b) when the subscriber ID and user ID is valid, providing the queue notification message for transmission to a communication unit having the user ID assigned thereto;
- 20 c) upon receiving a response from the communication unit, sending a queue update request to the subscriber using the subscriber ID; and
- d) when current status of a queue is received, providing the current status of the queue for transmission to the communication unit.

25 Brief Description of the Drawings

An embodiment of the present invention will now be fully described, by way of example, with reference to the drawings of which:

- FIG. 1 shows functional block diagram of a queuing system that
- 30 includes a queue messaging system in accordance with the present invention;

FIG. 2 shows a flowchart detailing the operation of the queuing system in FIG. 1 when receiving a queue number reservation;

FIG. 3 shows a flowchart detailing the operation of the queuing system in FIG. 1 after a reserved queue number has been served;

5 FIG. 4 shows a functional block diagram of a system for providing queue messaging service in accordance with the present invention;

FIG. 5 shows a functional block diagram another system for providing queue messaging service in accordance with the present invention; and

10 FIG. 6 shows a flow chart detailing operation of the systems in FIGS. 4 and 5.

Detail Description of the Drawings

15 A queue messaging system operates with a queue management system and a cellular telephone system that supports the communication of short message services (SMS). When a user arrives at a service center of a service provider, the user indicates his arrival by pressing a switch. The queue management system detects this, reserves
20 a queue number for the user, and presents the reserved queue number to the user. The queue messaging system then provides the user with the option of entering his cellular telephone number for notification, and entering an indication of when he wants to be notified by selecting a queue number that precedes the reserved queue number. After
25 providing this information, a queue ticket is provided to the user by the queue management system, and the user may then leave the service center. Later, when the queue messaging system detects that the current queue number being served is the user selected queue number for notification, the queue messaging system sends a notification
30 message via SMS to the user's cellular telephone indicating that the selected queue number is being served. In addition, when the user sends a reply to the notification message, the queue messaging system

obtains the current queue number from the queue management system and transmits it to the user's cellular telephone. In this way the user can get an update as to the current queue number. Further, the user can then send subsequent replies to get further updates.

5 The present invention advantageously allows a user having a cellular telephone to reserve a queue number and receive notification on his cellular telephone at a user-selected point in the queue. Subsequently, upon the user's request, the user can obtain updates of the current queue number on his cellular telephone. As the user must
10 present himself at the service provider's premises to make a queue number reservation, the system is less prone to abuse.

FIG. 1 shows a queuing system 100 comprising a queue management system 105, substantially similar to that known in the art. The queue management system 105 is coupled to a queue messaging
15 system 110 in accordance with the present invention. The queue management system 105 includes a user interface 115 to receive input physically entered by a user, and provides information to the user via a display 125 and a print out, such as a queue ticket, from a printer 135. The user interface 115 comprises a speaker or audio transducer 120,
20 the display 125 such as a cathode ray tube (CRT) monitor or a liquid crystal display (LCD) unit, an input device 130 such as a series of switches, a keypad and/or a keyboard, and the printer 135. The input device 130 includes a switch that a user can activate to obtain a queue ticket indicating a reserved queue number. The numeric keypad and/or
25 keyboard allow a user to enter a cellular telephone number, and to select a queue number, on occurrence of which the user wants to be notified.

The user interface 115 is coupled to a queue manager 140 which is also coupled to a public display unit 145 for displaying current queue
30 numbers to be served, and a public announcement system 150 to provide an audio alert tone when the current queue number changes, and for making other announcements. In addition, an input device for

counter staff 155 is coupled to the queue manager 140 for the counter staff to indicate to the queue manager 140 that a particular counter is ready to service the next reserved queue number. The input device for counter staff 155 can also be used for entering particular queue
5 numbers that are not served in sequence. An example is a collection counter where items that were previously requested in a particular sequence may not be ready for collection in the same sequence.

The queue manager 140 typically comprises a computer that is programmed to manage the issuance of queue tickets, to identify the
10 next available customer station, and to cause the next queue number to be served to be displayed, as is known in the art.

In accordance with the present invention, the queue messaging system 110 comprises a controller 160 coupled to a memory 165 and a cellular telephone 170. In its simplest form the queue messaging system
15 can comprise a personal computer connected to a cellular telephone which is well known in the art, and provides such functionality as SMS, email and other Internet related services. However, here the program stored in the memory 165 and executed by the controller 160 controls the operation of the cellular phone 170.

20 With reference to FIG. 2, the operation 200 of the queue messaging system 110 in conjunction with the queue management system 105 to provide notification to a user starts 205 with the queue manager 140 monitoring 210 receipt of a queue number reservation request. When a user arrives at a service center and activates a queue number request
25 button of the input 130, the queue manager 140 detects this, determines the next queue number available for reservation, reserves the next queue number 215 and provides 220 the reserved queue number for presentation on the display 125.

In addition, the queue manager 140 also provides the reserved
30 queue number to the controller 160 of the queue messaging system 110. Upon receipt of the reserved queue number, the controller 160 causes the queue manager 140 to provide 225 the user with an option

for notification. This may be accomplished by the queue manager 140 providing a notice to the user on the display 125 describing the availability of a notification feature, informing the user what he is required to do, indicating the information required from the user, and
5 any limitations of the service. In addition any disclaimers that a service provider wants the user to be aware of in relation to the notification feature could be provided here.

If the user does not select 230 the notification feature, the queue management system 105 causes the printer 135 to print 232 a queue
10 ticket with the reserved queue number thereon, and the queue messaging system 110 returns to monitoring 210 receipt of queue number reservations requests. However, when the user selects 230 the notification feature via the input 130, he is prompted via the display 125 to provide his cellular telephone number, also referred to herein as
15 user identifier (ID), and an indication of when he wants the notification to be sent to him. At this point there is the option for the printer to print 234 a queue ticket indicating that the user has selected the notification feature. The ticket can be used for verification, and can thus control instances of abuse.

20 When the user enters his cellular telephone number, the queue messaging system 110 operating with the queue manager 140, gets 235 the cellular telephone number or user ID from the input 130 and stores it in a database in the memory 165. The user then provides an indication of when he wants the notification to be sent to him, and
25 enters his selection via the input 130. The user's selection can be dependent on a particular condition occurring, such as a particular queue number being served. For example, the user can select any queue number between the current queue number being served and the user's reserved queue number. This provides a user selected notification
30 queue number to the queue messaging system 110. The queue messaging system 110 then gets 240 the user's selected notification queue number from the queue manager 140 and stores the user

selected notification queue number in the database in memory 165. Here again is an option to have the printer print 242 a queue ticket now with the user's cellular telephone number and the user's selected notification number. The additional user information can be useful for
 5 verification and again, provides a means for controlling abuse of the queue messaging system.

A further abuse control feature can include preventing a cellular telephone from being used for notification for more than one reserved queue number. This can be accomplished by the controller 160
 10 checking the cellular telephone numbers in the database prior to enabling the notification feature for a current notification request.

The queue messaging system 110 monitors the current queue number being served by monitoring 245 the current queue numbers provided by the queue manager 140. This is accomplished by the
 15 controller 160 accessing the database and comparing each current queue number from the queue manager 140 with the user selected notification queue number stored in the database. When the current queue number becomes the user's selected notification queue number, the controller 160 causes the cellular telephone 170 to transmit 250 a
 20 notification message to the user's cellular telephone using SMS, for example. The notification message can include information indicating the service provider, a short note indicating that the current queue number is the user's selected notification queue number, and perhaps a time stamp indicating when the current queue number at the service
 25 center became the user's selected notification queue number. The operation 200 then returns to monitoring 210 receipt of the next queue number reservation request, and proceeds as described above.

TABLE 1 below shows a part of the database in the memory 165. The first column indicates the time at which a user arrived and
 30 obtained a queue number, shown in column two, from the queue management system 105. Column three indicates the user's cellular telephone number on which the user wants to be notified, while column

four shows the user selected queue number indicating the point in the queue when the user wants to be notified. Column five provides the time when the queue number is served, for example, by a counter staff at the service center.

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START QUEUE TIME	QUEUE NO.	CELLULAR TELEPHONE NO.	NOTIFICATION QUEUE NO.	SERVED TIME
8:30AM	43	NA	NA	8:32 AM
8:40 AM	44	NA	NA	9:00 AM
:	:	:	:	:
8:45 AM	50	962-3495	44	9:20 AM
:	:	:	:	:
8:50 AM	53	934-9876	50	9:35 AM
:	:	:	:	:
9:00 AM	55	972-4168	53	10:00 AM
:	:	:	:	:

TABLE 1

From TABLE 1, a user requested a queue number reservation at 8:30 AM and was assigned queue number 43. For the purposes of this description, this user is now designated User 43, all subsequent users are similarly designated. The User 43 did not select the notification option and therefore did not provide a cellular telephone number or a notification queue number. The User 43 was served at 8:32 AM.

The next user, User 44 has similar data in the TABLE 1. It will be observed that User 43 was the first in the queue and that therefore there was no need for notification. Similarly, User 44 arrived when User 43 was being served and User 44 did not select the notification feature. However, when User 50 arrives at 8:45 AM, User 43 is being served, and User 50 chooses to use the notification feature. User 50 provides his cellular telephone number 962-3495 and selects queue number 44 via the input 130, then leaves the service center. Later, User 44 is served at 9:00 AM, User 50 receives a notification message from the queue messaging system 110, and User 50 then returns to the service center

and is served at 9:20 AM. Without the present invention User 50 would have had to wait from 8:45 AM to 9:20 AM, a total of thirty-five minutes at the service center. However, with the present invention as described, User 50 advantageously reduced his waiting time at the service center
5 to less than twenty minutes. Assuming the user required a travel time of ten minutes to and from the service center, and a waiting time of five minutes upon arrival, this leaves a total of twenty minutes during which time User 50 could perform other tasks away from the service center.

10 With reference to FIG. 3 the operation 300 of the queue messaging system 110 when providing queue update information to a user starts 305 with the controller 160 monitoring 310 receipt of a queue update request from the user via the cellular telephone 170. The user, after receiving the notification message, as described earlier, on his cellular
15 telephone, can simply reply to the notification message using the reply feature on his cellular telephone. The reply feature on a cellular telephone is known in the art and no further elaboration on the operation of this feature is provided herein.

When the cellular telephone 170 receives a reply call from the
20 user's cellular telephone, the cellular telephone 170 communicates that a call is received and provides the telephone number of the calling party, in this case the user's telephone number, to the controller 160. The controller 160 accesses the database, determines 315 whether the user's telephone number matches one in the database. When the
25 telephone number does not match, then it is deemed as invalid and the operation 300 returns to monitoring 310 receipt of queue update requests.

In a preferred embodiment, the cellular telephone 170 is a dedicated communication device that is used solely by the queue
30 messaging system 100. The cellular phone 170 is operational on a cellular telephone service and supports SMS. Consequently, any received calls are likely to be queue update requests, as only users who

have received a prior notification message would have the telephone number of the cellular telephone 170. It will be appreciated by one skilled in the art that the telephone number of the calling party is provided to a cellular telephone of a called party upon receiving a call
5 from the calling party, as is known in the art, and is sometimes referred to as the caller ID feature by cellular telephone service providers.

When the controller 160 accesses the database and determines
315 that the user's telephone number matches one in the database, and that it matches one that has been sent a prior notification, then a
10 further determination is made 320 as to whether the user's telephone number has been used for previous queue update requests, and if so, has the number of queue update requests exceeded a preset limit. This can be implemented by having an additional column in TABLE 1 that tracks or records the number of queue update requests processed for
15 requests from the particular user telephone number. A comparison by the controller 160 with reference to this entry in the database and the preset limit can be used to determine whether the preset limit has been reached. When the number of queue update requests processed for the user's telephone number has been reached, the controller 160
20 generates and provides a message to the cellular telephone 170 for transmission 325 to the user's cellular telephone. The message informs the user that his allowed number of queue update requests has been reached.

When the controller 160 determines 320 that the number of queue
25 update requests processed for the particular user's telephone number has not been reached, the controller 160 gets 330 the current queue number being served from the queue manager 140, if the current queue number has not already been provided by the queue manager 140. The controller 160 subsequently provides the current queue number to the
30 cellular telephone 170 for transmission to the user's cellular telephone. The operation 300 then returns to monitoring 310 receipt of another queue update request, and continues as described.

The queue messaging system described above can be used in stand-alone queue management systems. For example, an existing queue management system be adapted and retrofitted with the queue messaging system. Alternatively, a queue management system can have
5 the queue messaging system integrated therein, and provided as a system at a service center.

Another embodiment of the present invention, which will be described below, is based on a queue messaging service provider-subscriber model. Here, a service provider provides a queue messaging
10 service to subscribers who have an existing queue management system. Unlike the stand-alone systems, the queue messaging system is not part of, and not co-located with, a queue management system at a service center. Instead, a client server approach is adopted in implementation. The queue messaging service provider provides a
15 queue-messaging server portion and queue-messaging client portions are provided at the service centers. The queue-messaging server portion is coupled to a cellular telephone system, and via communication with the queue-messaging client portions, the queue-messaging server portions provides notification and update information to user's cellular
20 telephones using the SMS of the cellular telephone system.

One method of providing such a queue messaging service is a system where a cellular telephone service provider provides the queue messaging, a description of such a system now follows.

With reference to FIG. 4 a cellular telephone system 400 includes a
25 controller 405 having a queue messaging system 450 with a queue-messaging server portion 465, in accordance with the present invention. The controller 405 determines the operation of the system and is coupled to a memory 410 which stores software programs that are executed by the controller 405, and stores subscriber databases and
30 the like. The controller 405 is also coupled to a transceiver 415, which in turn is coupled to an antenna 420. The controller 405 can include

Artuse™ SMS Center products by Nokia of Finland to support the queue-messaging server portion 465.

The controller 405, the memory 410, the transceiver 415 and the antenna 420 are representative functional blocks of a cellular telephone infrastructure and are shown simplified for the purpose of this description, as will be appreciated by one skilled in the art.

The cellular telephone system 400 further includes subscriber cellular telephones 430, 435 and 440 that provide typical cellular telephone services as are known in the art, in particular, including SMS. The cellular telephone 430 is coupled to a queue management system 455 at a service center, and the queue management system 455 includes a queue-messaging client portion 460. The queue management system 455 is a subscriber of the queue messaging service that is provided by the queue messaging system 450. To access the queue messaging service, the queue-messaging client portion 460 communicates with the queue-messaging server portion 465. Dependent on a subscriber's queue management system 455, the queue-messaging client portion 460 can comprise software and or/hardware. The queue-messaging client portion 460 operates with the queue management system 455 to provide the option for user notification, that includes obtaining and storing the user details for notification and monitoring current queue numbers, and communicating with the queue-messaging server portion 465 to effect the user notification and provide queue updates. The operation of the queue-messaging server portion 465 will be described in more detail later with reference to FIG. 6.

Another method of providing such a queue messaging service based on the client-server model is a system where a host computer on the Internet provides the queue messaging service. A description of such a system now follows.

With reference to FIG. 5 a cellular telephone system with Internet connectivity 500 is coupled via the Internet 556 to a host computer 570

that host a queue messaging system with a queue-messaging server portion 565, in accordance with the present invention. The system 500 includes a controller 505 which determines the operation of the cellular telephone system, the memory 410 coupled to the controller 505 for
5 storing software programs that are executed by the controller 505 and for storing subscriber databases and the like. The transceiver 415 is coupled to the controller 505 and to the antenna 420. The controller 505 can include SMS Server Systems by WapMX.com Limited of the United Kingdom that supports the queue-messaging server portion 565.

10 As before, the controller 505, the memory 410, the transceiver 415 and the antenna 420 are representative functional blocks of a cellular telephone infrastructure and are shown simplified for the purpose of this description, as will be appreciated by one skilled in the art. The cellular telephone system 500 further includes cellular telephones 530,
15 535, 540, 545, 550 and 555, that provide typical cellular telephone services as are known in the art, in particular, including SMS.

Queue management systems 557, 558 and 559 are located at different service centers, the queue management systems 557, 558 and 559 having queue-messaging client portions 560A, 560B and 560C,
20 respectively. In addition, the queue management systems 557, 558 and 559 are coupled to the Internet 556.

The queue-messaging server portion 565 in the host computer 570 communicates with queue-messaging client portions 560, 560A and 560B and the controller 505 via the Internet 556 to provide the queue
25 messaging service to users having the cellular telephones 530, 535, 540, 545, 550, 555. The queue management systems 557, 558, 559 and the host computer 570 and the controller 505, each comprise one or more computers that are coupled to the Internet 556. In addition, the host computer 570 has access, via the Internet 556, to the controller
30 505 to utilize SMS services of the cellular telephone system 500.

The queue management systems 557, 558 and 559 subscribe to the queue messaging service provided by the queue messaging system

570. For example, the queue management systems 557, 558 and 559 can be located in medical clinics, dental clinics, government departments, utility companies and banks. Dependent on the queue management systems 557, 558 and 559, the queue-messaging client portions 560, 560A and 560B can comprise software and or/hardware. In one form queue-messaging client portions 560, 560A and 560B can comprise any of the known Internet web browser applications, such as Internet Explorer by Microsoft Inc. or Netscape Navigator by Netscape Communications Corporation, both of the USA. The client portions 560, 560A and 560B provide support for the queue management systems 580, 585 and 590 for user notification that includes obtaining and storing the user details for notification, and monitoring current queue numbers; and for communicating with the queue-messaging server portion 565 to effect the user notification and provide queue updates via SMS of the cellular telephone system 500, to the cellular telephones 530, 535, 540, 545, 550 and 555.

Here, the queue messaging system at the host computer 570 provides the queue messaging service to its subscribers, the queue management systems 557, 558 and 559 who have a queue-messaging client installed. Hence, new subscribers with Internet connectivity need to only install a queue-messaging client portion, and do not need to have a cellular telephone, nor subscribe to service on the cellular telephone system 500. The operation of the queue-messaging server portion 565 will be described in more detail later with reference to FIG. 6.

Referring now to FIG. 6, the operation 600 of the server portions 465 and 565 starts 605 by monitoring for 610 receipt of a subscriber ID, user ID and a notification message. A subscriber comprises entities that have subscribed to the queue messaging service. For example, in the FIG. 4 the subscriber comprises a queue management system 455 with the queue-messaging client portion 460 installed, and in FIG. 5 the subscriber comprises the queue management system 557 with the

queue-messaging client 560A installed. The subscriber ID is a unique identifier assigned to a subscriber and can comprise the cellular telephone number of the cellular telephone 430 in FIG. 4, while in FIG. 5 the subscriber ID can comprise an email address or an Internet protocol (IP) address assigned to the client 557. The user ID is the cellular telephone number of users who queue at the subscriber's premises and select the notification feature, and the notification message is similar to that described earlier. From the earlier part of this description, it will also be appreciated that the subscriber ID, user ID and the notification message are transmitted by a subscriber to the queue messaging system when a user arrives at a service center, makes a queue number reservation request, and uses the notification feature.

Upon receiving the subscriber ID, user ID and the notification message, the queue messaging systems 450 in FIG. 4 and the host computer 570 in FIG. 5, determines whether the subscriber ID is valid i.e. is it in a subscriber database. When the subscriber ID is not located in the subscriber database, the operation 600 returns to monitoring receipt of a subsequent transmission of subscriber ID, user ID and notification message. However, when the subscriber ID is valid, the user ID is appropriately stored in the subscriber database, and the queue messaging systems (450 in FIG. 4 and the host computer 570), causes the notification message to be transmitted via the transceiver 415 and antenna 420 to the user's cellular telephone, using the user ID.

The queue messaging systems (450 in FIG. 4 and the host computer 570) then monitor receipt of a reply from the user's cellular telephone by the transceiver 415 in FIG. 4 or the transceiver 415 and the controller 505 in FIG. 5. When a reply is received within a predetermine time, the queue messaging systems (450 in FIG. 4 and the host computer 570 in FIG. 5) treats the reply as a queue update request, and causes a queue update request to be transmitted to the subscriber using the subscriber ID.

Upon transmission of the queue update request, the queue messaging systems (450 in FIG. 4 and the host computer 570 in FIG. 5) monitor 640 receipt of an update notification message from the subscriber. And, when the update notification message is received, the queue messaging systems (450 in FIG. 4 and the host computer 570 in FIG. 5) causes a queue update notification to be transmitted to the user's cellular telephone using the user ID. A subsequent determination 650 is then made as to whether the number of queue update requests associated with the particular user ID has reached a preset allowed limit. When it has, then the respective user ID is removed 655 from the database and the operation 600 returns to monitoring 610 receipt of further subscriber ID, user ID and notification message. However, when it has not, then the operation 600 returns to monitoring 630 receipt of further queue update request from the user.

The present invention, advantageously allows a service provider to provide the queue messaging service to a variety of subscribers. In one embodiment the service provider is the cellular telephone service provider, and in another embodiment the service provider is a host computer on the Internet.

Hence, the present invention, as described, provides a queue messaging system that allows a user to receive notification on his cellular telephone when the current queue number being served reaches a user selected queue number. In addition, the user can conveniently obtain updates of the current queue number.

This is accomplished by a queue messaging system that provides a user, when making a queue number reservation, with the option of using a notification feature and providing the user's cellular telephone number and a user selected notification queue number. When the current queue number being served becomes the user selected notification queue number, the queue messaging system sends a notification to the user on his cellular telephone. In addition, when the user replies to the notification, the user obtains updates on the current

queue number. The present invention as described, advantageously allows a user to leave the premises of a service provider after reserving a queue number and selecting notification via the user's cellular telephone. In addition, there is no need to issue users with

5 communication devices, as a user's cellular telephone is used to provide the notification at a time selected by the user. Further, as a queue number reservation can be made only by a user who physically presents himself at a service provider's premises, the system is less prone to abuse.

10 Therefore, the present invention provides a method and apparatus for a queue messaging system which overcomes or at least reduces the abovementioned problems of the prior art.

It will be appreciated that although only particular embodiments of the invention have been described in detail, various modifications and
15 improvements can be made by a person skilled in the art without departing from the scope of the present invention.

Claims

1. A queue messaging system comprising:

5 a user interface for receiving a queue number reservation request from a user and in response providing the user a reserved queue number, and the user interface for the user to optionally provide a user identifier (ID) associated with the user's communication unit and a user selected notification queue number that precedes the reserved queue number;

an output for coupling to a communication device; and

10 a controller coupled to the user interface and the output, for receiving the queue number reservation request and providing the reserved queue number to the user interface for presentation to the user, the controller for providing a user selectable option to the user interface for the user to provide the user ID and the user selected notification queue number, and the controller, in response to
15 receiving the user ID and the user selected notification queue number from the user interface, monitoring current queue number being served, and for providing the user ID and a notification message to the communication device for transmission to the user's communication unit when the current queue number being served is the user selected notification queue number.

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2. A queue messaging system in accordance with claim 1 further comprising an input coupled the controller, the input for coupling to the communication device, wherein the controller receives a queue update request message from the communication device when the user sends a queue update
25 request to the communication device via the user's communication unit, and in response the controller provides the current queue number to the communication device for transmission to the user's communication unit.

3. A queue messaging system in accordance with claim 2 further comprising a memory for storing a user identifier (ID) of the user's communication unit, and the user selected notification queue number.

5 4. A queue messaging system in accordance with claim 3 wherein the user's communication unit is a wireless communication unit.

5. A queue messaging system in accordance with claim 4 wherein the wireless communication unit is a cellular telephone.

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6. A queue messaging system in accordance with claim 5 wherein the cellular telephone supports short message service.

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7. A queue messaging system in accordance with claim 6 wherein the controller and the user interface comprise a computer.

8. A queue messaging system in accordance with claim 1 wherein the queue number reservation request comprises a physical actuation by the user on the user interface.

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9. A queue messaging system comprising:

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a controller for operably coupling to a user interface to receive a queue number reservation request from a user, and to provide a reserved queue number, and a user selectable option for the user to provide a user ID and a user selected notification queue number which precedes the reserved queue number, the controller for operably coupling to a queue management system to receive a current queue number being served, where in response to receiving the user ID and the user selected notification queue number the controller monitors receipt of the current queue number being served, and the controller for operably coupling to a communication device wherein when the current queue number being served is the user selected notification queue number, the

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controller causing the x communication device to transmit the user ID and a notification message to a user communication unit having the user ID assigned thereto.

5 10. A queuing system comprising:

a user interface for receiving a queue number reservation request from a user having a personal communication unit, and in response providing the user with a reserved queue number in a predetermined sequence of queue numbers, and the user interface for optionally receiving a user identifier (ID) associated
10 with the personal communication unit and a user selected reserved queue number which precedes the reserved queue number;

a queue servicing interface for providing a next reserved queue number indicator when one of the reserved queue numbers in the predetermined sequence of queue numbers is to be served;

15 a queue management system coupled to the user interface and the queue servicing interface, the queue management system for receiving the queue number reservation request and for providing the reserved queue number, and for receiving the next reserved queue number indicator and providing a current queue number to be served; and

20 a queue messaging system coupled to the user interface and queue management system, the queue messaging system for receiving the user ID and the user selected reserved queue number, and for monitoring the current queue number, the queue messaging system for providing the user ID and a notification message to a communication device adapted to communicate with
25 the personal communication unit, when the current queue number is the user selected reserved queue number, the queue messaging system for receiving a queue update request message from the communication device when the user sends a queue update request to the communication device via the personal communication unit, and in response the queue messaging system providing
30 the current queue number to the communication device for transmission to the personal communication unit.

11. A queuing system in accordance with claim 10 further comprising a memory for storing the user ID and the user selected reserved queue number.

5 12. A queue messaging system in accordance with claim 11 wherein the personal communication unit is a wireless communication unit.

13. A queue messaging system in accordance with claim 12 wherein the wireless communication unit is a cellular telephone.

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14. A queue messaging system in accordance with claim 13 wherein the cellular telephone supports short message service.

15 15. A queue messaging system in accordance with claim 10 comprises a computer.

16. A queue messaging system in accordance with claim 10 wherein the queue number reservation request comprises a physical actuation by the user on the user interface.

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17. A queue messaging system in accordance with claim 10 further being coupled to at least one wireless communication system, for storing subscriber details of a plurality of client subscriber systems, and for providing queue messaging services to wireless communication units operable on the at least one wireless communication system; and

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each of the plurality of client subscriber systems being coupled to communicate with the queue messaging system via a communication network, the each of the plurality of client subscriber systems for coupling to the queue management system that manages at least one queue of users, and for communicating with the queue messaging system to provide queue messaging

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services to the at least one queue of users having the wireless communication units.

18. A queue messaging system for providing a queue messaging service in accordance with claim 17 wherein the communication network comprises the Internet.

19. A queue messaging system for providing a queue messaging service in accordance with claim 17 wherein the communication network comprises a cellular telephone network.

20. A queue messaging system for providing a queue messaging service in accordance with claim 18 wherein the cellular telephone network supports short message service.

21. A method for providing a queue messaging service, the method comprising the steps of:

- a) providing a reserved queue number to a user;
 - b) providing a notification option to the user;
 - 20 b) receiving user contact information and a user selected queue notification condition;
 - c) monitoring a queue for the user selected queue notification condition; and
 - d) providing a notification to the user using the user contact information
 - 25 when the user selected queue notification condition is satisfied;
- wherein the user selected notification condition is a user selected notification queue number that precedes the reserved queue number.

22. A method in accordance with claim 21 further comprising the steps of:

- e) receiving a reply from the user;

- f) determining current status of the queue; and
- g) providing the current status of the queue to the user using the user contact information.

5 23. A method in accordance with claim 22 further comprising the steps of:

- h) receiving subsequent replies from the user; and
- i) repeating steps (f) and (g) after each subsequent reply.

24. A method in accordance with claim 21 further comprising, after step (b)
10 the step of storing the user contact information and the user selected queue notification condition.

25. A method in accordance with claim 21 further comprising, after step (b)
the step of printing a queue ticket.

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