REMOTE AIRLINE CHECK-IN USING A GLOBAL COMPUTER NETWORK

TECHNICAL FIELD

The present invention relates to the airline industry and, more particularly, to techniques for check-in of airline passengers for departing flights.

BACKGROUND

An airline ticket reserves a passenger's place on a particular flight. Although the ticket acts as a reservation, flights often are overbooked in anticipation of "no-show" passengers. For this reason, seat assignments typically are not confirmed until a passenger arrives at the airport for "check-in." Historically, "check-in" has required interaction between the passenger and a human ticketing or gate agent. More recently, however, airlines have installed automated devices that enable self-service check-in by certain passengers upon arrival at the airport. An example is the E-Service Center[SM] services offered to E-Ticket[SM] passengers by Northwest Airlines, of Minneapolis, Minnesota. Upon check-in, the passenger's reservation is confirmed, a seat is assigned on the pertinent flight, and a boarding pass bearing the seat assignment is issued. Ordinarily, automated check-in devices, like their human counterparts, require that check-in take place within a specified period of time prior to flight departure.

SUMMARY

The present invention is directed to systems and methods for remote airline check-in via a global computer network. The present invention can be configured to provide a passenger with remote access to an airline server via a global computer network, such as the Internet. The server, e.g., a web server, can be arranged to accept a check-in request from an airline passenger via the Internet. In response to the check-in request, the server confirms a seat assignment for the passenger on a designated flight. In particular, the airline server may record the confirmed seat assignment in a seat reservation system database.

The passenger can be located remotely from an airport terminal associated with departure of the designated flight. For example, the passenger may be attached to the network via a desktop or mobile computer located in the passenger's home, office, or automobile. Alternatively, the passenger may rely on a PDA or Internet-

equipped mobile telephone to access the airline server. As another example, especially for hotel guests, access to the airline server can be obtained using an interactive television system, e.g., as used for hotel check-out.

In other cases, the passenger may be located within the airport terminal associated with the departure of the designated flight. For example, the passenger may carry a computer, PDA, or mobile telephone, or make use of computers or other network appliances provided for public use within the terminal. In any event, the airline server may be located anywhere, including within the airport terminal or at a remote location. Network communication between the passenger and the airline server can take place using conventional network protocols such as TCP/IP.

With remote check-in, the passenger does not need to wait until arrival at the airport terminal for seat assignment confirmation. Instead, the passenger can complete the check-in process on a self-service basis from virtually anywhere, and reduce the amount of pre-boarding time needed at the airport terminal. Also, the passenger may have greater flexibility in selecting a seat assignment in advance of arrival. In particular, in some embodiments, the passenger may be permitted to complete remote check-in several hours before boarding the designated flight.

Upon confirmation of a seat assignment, the server communicates the confirmed seat assignment to the passenger via the global computer network. The passenger may print a boarding pass or record an electronic boarding pass for presentation to airline boarding personnel. The printed boarding pass may include information for verification of authenticity, either by visible inspection or optical scanning. An electronic boarding pass could be embodied as information that is transmitted from a handheld device, such as a PDA or mobile phone, carried by the passenger to a receiver operated by airline boarding personnel.

As a further alternative, the passenger may carry a programmable smart card that carries information indicating the seat assignment confirmation. The smart card may be embedded within an electronic device such as a phone or PDA. In other embodiments, the passenger may simply present identification which is cross-referenced against a seat assignment confirmation recorded by the airline server. The net result is the ability of the passenger to complete check-in remotely but verify the seat assignment confirmation upon arrival at the airport terminal.

Remote check-in also can provide advantages to airline personnel in terms of facilitating a more orderly check-in and boarding process. In particular, remote

check-in may promote advance confirmation of seat assignments by a significant number of passengers, reducing the number of passengers arriving for check-in in the final hour before flight departure. In other words, participation of passengers in the remote check-in process can reduce the level of activity and stress that often accompanies conventional check-in and boarding just before departure. Upon receipt of a number of advance seat assignment confirmations, airline personnel can better manage the passenger list and over-booking issues.

In some embodiments, the availability of remote check-in to passengers may be limited to a predetermined window of time in advance of flight departure. The window could extend, for example, from approximately six hours before flight departure to ninety minutes before flight departure.

Prohibiting check-in before a given time, e.g., six hours before flight departure, decreases the likelihood of excessive no-shows, and aids airline personnel in managing the check-in and boarding process. A passenger who completes check-in within six hours before flight departure should be more likely to show for the flight than a passenger who completes check-in a day before flight departure.

In particular, the later check-in occurs, the more information the passenger will have about his ability to arrive in time for flight departure. As a further consideration, with later check-in, the airline will be more certain about the particular aircraft that will serve the flight, and thereby be able to confirm seat assignments with greater certainty.

Prohibiting check-in after a given time, e.g., ninety minutes before flight departure, will avoid contention between passengers conducting remote check-in and airline personnel conducting conventional check-in. Again, this feature may aid airline personnel in managing the check-in and boarding process.

For passengers with a history of few no-shows, the check-in window could be extended to provided access to the remote check-in process at an earlier time, e.g., one or more days before flight departure. In this manner, application of the check-in process for individual customers can be made on a selective and customized basis. Historical information can be gathered from past flight records, and used to flag certain passengers as exhibiting low no-show risk. The flagged passengers may be permitted early check-in access, while passengers with little or no historical data or those with a history of frequent no-shows are given access during a common time window.

A system and method for remote check-in also may be configured to handle irregular operations ("IRROPS"). In particular, upon remote check-in, the airline server may access an airline reservation database to determine whether the designated flight as been canceled, delayed, or otherwise modified relative to original flight plans. By interfacing with conventional reservation systems or human booking agents, web server receives one or more alternative bookings for selection by the passenger.

In this manner, the passenger is both notified of the IRROPS event and given alternative options for travel. In some cases, the web server may generate a printable web page or other information that represents a voucher for amenities such as hotel stay, flight coupons, and the like for presentation by the passenger, particularly in the event of flight cancellation.

In one embodiment, the present invention provides a method for airline passenger check-in, the method comprising accepting a check-in request from an airline passenger via a global computer network, and confirming a seat assignment for the passenger on a designated flight in response to the check-in request.

In another embodiment, the present invention provides a system for airline passenger check-in, the system comprising a network client that transmits a check-in request from an airline passenger via a global computer network, and a network server that receives the check-in request via the global computer network, the server confirming a seat assignment for the passenger on a designated flight in response to the check-in request.

In a further embodiment, the present invention provides a method for airline passenger check-in, the method comprising accepting a check-in request via a global computer network, confirming a seat assignment on a designated flight in response to the check-in request, and generating a boarding pass for the designated flight at a location remote from an airport terminal associated with the designated flight.

In an added embodiment, the present invention provides a system for airline passenger check-in, the system comprising a network client that transmits a check-in request via a global computer network, a network server that receives the check-in request via the global computer network, the server confirming a seat assignment on a designated flight in response to the check-in request, and a device, located remotely from the airport terminal associated with the designated flight, that generates a boarding pass for the designated flight.

In another embodiment, the present invention provides a method for airline passenger check-in, the method comprising accepting a check-in request via a global computer network, comparing a time at which the check-in request is received to a permissible period of time, confirming a seat assignment on a designated flight in response to the check-in request in the event the time at which the check-in request is received is within the permissible period of time.

In a further embodiment, the present invention provides a system for airline passenger check-in, the system comprising a network client that transmits a check-in request via a global computer network, a network server that receives the check-in request via the global computer network, the server comparing a time at which the check-in request is received to a permissible period of time, and confirming a seat assignment on a designated flight in response to the check-in request in the event the time at which the check-in request is received is within the permissible period of time.

In an added embodiment, the present invention provides a method for airline passenger check-in, the method comprising accepting a check-in request via a global computer network, determining whether a designated flight associated with the check-in request has been delayed or canceled, and, if so , confirming a seat assignment on another flight in response to the check-in request.

In another embodiment, the present invention provides a system for airline passenger check-in, the system comprising a network client that transmits a check-in request via a global computer network, a network server that receives the check-in request via the global computer network, the server determining whether a designated flight associated with the check-in request has been delayed or canceled, and, if so , confirming a seat assignment on another flight in response to the check-in request.

DESCRIPTION OF DRAWINGS

FIG. 1 is a block diagram of a system for remote airline check-in using a global computer network;

FIG. 2 is a flow diagram of a method for remote check-in of airline passengers;

FIG. 3 is a flow diagram illustrating administration of a check-in time window as part of a remote check-in process;

FIG. 4 is a flow diagram illustrating administration of a selective check-in time window as part of a remote check-in process;

FIG. 5 is a flow diagram illustrating administration of an irregular operations dialog as part of a remote check-in process;

FIG. 6 illustrates an initial web browser window with a web page displayed to an airline passenger during remote check-in for entry of information for personal identification;

FIG. 7 illustrates a web browser window with a web page displayed to an airline passenger during remote check-in indicating retrieval of reservation records;

FIG. 8 illustrates a web browser window with a web page displayed to an airline passenger during remote check-in for selection of designated passengers;

FIG. 9 illustrates a web browser window with a web page displayed to an airline passenger during remote check-in for itinerary verification;

FIG. 10 illustrates a web browser window with a web page displayed to an airline passenger during remote check-in for security verification;

FIG. 11 illustrates a web browser window with a web page displayed to an airline passenger during remote check-in for notification of a contact information requirement;

FIG. 12 illustrates a web browser window with a web page displayed to an airline passenger during remote check-in for notification of ticket jacket disclaimers;

FIG. 13 illustrates a web browser window with a web page displayed to an airline passenger during remote check-in for notification of boarding pass printing instructions; and

FIG. 14 illustrates a web browser window with a web page displayed to an airline passenger upon completion of remote check-in.

Like reference numbers and designations in the various drawings indicate like elements.

DETAILED DESCRIPTION

FIG. 1 is a block diagram illustrating a system 10 for remote airline check-in using a global computer network, such as the world wide web 12. System 10 can be used to implement methods for providing remote check-in of airline passengers. With system 10, an airline passenger can complete the flight check-in process from virtually anywhere, and bypass interaction with a human check-in agent or electronic service center at the airport terminal. In this manner, the passenger can receive

confirmation of a seat assignment in advance of arrival at the airport terminal, if desired. At a minimum, remote check-in enables the passenger to reduce the amount of pre-boarding time needed at the airport terminal. In addition, advance check-in can facilitate a more orderly check-in and boarding process for airline personnel and passengers alike prior to flight departure.

As shown in FIG. 1, system 10 may include a number of passenger devices 14, 16, 18, 20, 22 connected to web 12. In the example of FIG. 1, passenger device 14 takes the form of an Internet-equipped mobile, i.e., wireless, telephone. Passenger device 16 takes the form of an interactive television system that incorporates a set-top box for access to web 12. Passenger device 18 is a desktop computer such as PC or Macintosh computer equipped for access to web 12. Passenger device 20 takes the form of a portable computer, such as a laptop PC or Macintosh computer. Passenger device 22 takes the form of a personal digital assistant (PDA), e.g., based on the Palm, Windows CE, or similar operating systems for small portable devices. Other future Internet appliances may be appropriate for use with system 10.

Access to web 12 also can be provided to passengers by internet kiosks 24 and other devices designed for use by the general public. Further, commercial users such as travel agencies, hotels, land transportation services, and the like may access web 12 on behalf of passengers via devices 26. The devices 26 used by commercial users may be similar to any of passenger devices 14, 16, 18, 20, 22, i.e., computers, PDA's, phones, interactive televisions, and the like. The check-in process could be viewed as a value-added service provided to passengers by commercial users. As a guest prepares to leave a hotel, for example, hotel personnel may offer to complete the remote check-in process and provide the guest with a boarding pass. Access to the internet check-in process by persons other than the passenger may require modifications in existing security practices.

With further reference to FIG. 1, system 10 also includes an airline server 28, e.g., a web server, that communicates with passenger devices 14, 16, 18, 20, 22, internet kiosks 24, and commercial user devices 26 via world wide web 12. Although the number of passenger devices, internet kiosks, and commercial users shown in FIG. 1 is limited for ease of illustration, the actual number can be virtually unlimited subject to bandwidth limitations of server 28 and web 12. Passengers accessing system 10 ordinarily will have reservations with the carrier operating airline web

server 28. In some embodiments, however, passengers may be allowed to access flight information and complete the check-in process for other carriers having cooperative relationships that permit sharing or coordination of reservation database information.

The passenger can be located remotely from the airport terminal, e.g., at home, the office, or in transit. The emergence of PDA's and Internet-equipped wireless phones, in particular, will enable a high level of mobile check-in. Thus, the passenger may even complete remote check-in at the airport, but with his own mobile device. The logic executed by airline web server 28 may be arranged, however, to limit the check-in process to a particular time window.

The window could extend, for example, from approximately six hours before flight departure to ninety minutes before flight departure. Thus, if a passenger attempts to check in prior to the start of the time window, he will be instructed to attempt check-in at a later time. If a passenger attempts to check in after the end of the time window, he will be instructed to complete conventional check-in at the airport, either by interaction with an electronic service center or a human airline agent. For so-called "red-eye" flights, the time window may span consecutive days.

System 10 also may include a database server 30 and an airline reservation database 32, along with a file server 34 and file archive 36 containing files organized by database 32. Database server 30 may communicate with a global reservation system 38, such as the Worldspan® computer reservation system (CRS), operated by Worldspan, of Atlanta, Georgia. Database server 30 also may communicate with electronic service centers 40 located within airport terminals, such as those offering E-Service Center^{SM} services to E-Ticket^{SM} passengers traveling on Northwest Airlines flights.

Communication between airline web server 28, passenger devices 14, 16, 18, 20, 22, internet kiosks 24, and commercial users 26 can take place over the Internet using conventional network protocols such as TCP/IP. Communication between airline web server 28, database server 30, airline reservation database 32, and electronic service center 40 also may take place using TCP/IP. In most embodiments, database server 30, airline reservation database 32, and electronic service center 40 are attached to a private local or wide area network maintained by the airline. In some embodiments, however, electronic service centers 40 can be equipped to access

database server 30 indirectly through airline web server 28 and web 12, as indicated by reference numeral 42.

A firewall preferably is provided as a security measure. The firewall separates database server 30 and file server 34 from web server 28 to avoid unauthorized intrusions into the information maintained for passengers. Due to its nature as a repository of information concerning personal accounts and travel plans, the security and confidentiality of database 30 and file archive 36 is a serious concern. To promote increased security and confidentiality of client information, web pages generated by web server 26 can be communicated to producers 14, 16, 18, 20 using public key encryption mechanisms such as SSL.

Commercial users such as travel agencies may communicate with airline web server 28 via web 12 and device 46. Commercial user device 46 may access global reservation system 38, however, via dial-up or dedicated access, as indicated by reference numeral 44. Similarly, database server 30 may communicate with global reservation system 38 via dial-up or dedicated access, as indicated by reference numeral 46. Access to file server 34 by global reservation system 38 also may take place over a dial-up or dedicated connection, as indicated by reference numeral 48.

In operation, web server 28 interacts with database server 30 and file server 34 to assemble content that is organized by airline reservation database 32 and stored in file archive 36 for access by passengers associated with passenger devices 14, 16, 18, 20, 22 and internet kiosks 23, and commercial users 26. The information may include both textual and graphic web page content that is relatively unchanging, as well as passenger record information that is stored for individual passengers and displayed on particular web pages generated by airline web server 28.

Web server 28 retrieves passenger record information for presentation to the passenger during completion of the check-in process. In some embodiments, web server 28 may interact with database server 30 and airline reservation database 32 to verify that the designated flight is on schedule. In particular, system 10 can be configured to handle irregular operations ("IRROPS") such as flight cancellations, delays, and the like. Web server 28 interfaces with the conventional reservation services provided internally by the airline, e.g., automated reservation software and/or human booking agents.

Also, in some embodiments, interaction with global reservation system 38 can be exploited to provide travel options with other airline carriers. In this manner, web

server 28 receives one or more alternative bookings for selection by the passenger and presents them to the passenger on a remote basis. Consequently, the passenger is both notified of the IRROPS event and given alternative options for travel. In some cases, web server 28 may generate a printable web page or other information that represents a voucher for amenities such as hotel stay, flight coupons, and the like for presentation by the passenger, particularly in the event of flight cancellation.

Again, the devices used by passengers and commercial users the form of personal computers, Macintosh computers, PDA's, interactive televisions, mobile phones, and the like, provided such devices are equipped with telecommunications services for access to web 12. The devices can be connected to world wide web 12 directly or via an internet service provider, and communicate using a network protocol such as TCP/IP. Each device preferably executes a graphical viewing application such as a web browser to access resources residing on other computers attached to web 12. In particular, the web browser may permit passengers and commercial users to view HTML web pages generated by web server 26. Other user interface applications may be useful in accessing airline server 28 provided the information is presented in a user-interactive format.

Web server 26 may take the form of a single web server or multiple web servers connected to a database server 30 and file server 34 or multiple mirrored servers. Web server 26 executes server page scripts. The scripts can be written as Lotus Notes forms, Active Server Pages (ASP), CGI scripts, Java servlets, or in other server-side scripting languages suited to building and maintenance of database-driven web sites. If dynamic graphic content is desired, client-side scripts may execute on individual devices 14, 16, 18, 20, 22, 24, 26. With the platform diversity and relative thinness of some of the different client devices 14, 16, 18, 20, 22, 24, 26, however, it will be desirable to use server side scripting to provide most of the processing overhead.

Web server 28 interacts with database server 30 to provide passengers with access to information contained in airline reservation database 30. Web server 26 assembles the necessary content for web pages requested by passenger devices 14, 16, 18, 20, 22, internet kiosk 24, and commercial user devices 26, and accepts information from the devices for addition to database 32. Database server 30 may be any type of database server suitable for web-oriented database applications, e.g., an OLEDB or ODBC driver.

In response to queries from web server 28, database server 30 locates appropriate records within airline reservation database 32. Web server 28 then retrieves the information associated with the records from file archive 36 via file server 34, and processes the information to produce the content of a web page presented to the respective passenger or commercial user via devices 14, 16, 18, 20, 22, 24, 26.

The information retrieved from airline database 32 is generally limited to records associated with the individual passenger requesting remote check-in. In some cases, however, persons other than the passenger may be given authorization to conduct the remote check-in process scope of information available to particular producers based on relevance or personal interest. For example, corporate travel staff may be given authorization to access information for a number of different corporate passengers.

In this case, airline server 28 may retrieve multiple records from database 32, and generate web pages representing the content. The corporate travel staff person could then complete the remote check-in process for multiple passengers and issue their boarding passes for them. Similarly, in some embodiments, a travel agent could be authorized to complete remote check-in for multiple customers. Time restrictions on the check-in process may limit the use of remote check-in by travel agents to the extent boarding passes need to be printed and sent by courier or picked up by passenger. In some embodiments, however, remote check-in may not require the passenger to carry a paper boarding pass.

In operation, devices 14, 16, 18, 20, 22, 24, 26 access airline web server 28 via one or more URL's and, by web page interaction, request access to information stored in database 32. In one embodiment, each passenger access particular information by entry of information such as a passenger name and/or user number such as a so-called "frequent flyer" number. In response to entry of the passenger information, airline web server 28 may present one or more web pages detailing the current status of the passenger's flight itinerary, and providing on-line service options such as booking, rebooking, mileage status, and remote check-in.

The dialog driven by the web pages can be aided by conventional input media such as check boxes, radio dials, text entry boxes, and the like. Also, web browser access can provide the advantage of retaining information for use in text entry boxes each time the passenger access a web site. In this manner, the passenger need not

remember the information, which can advantageous when the passenger is accessing web server 28 while away from the home or office.

The information provided by web server 28 can be presented in a text or graphic format, and may include hypertext links to additional informational items. Also, the information may include downloadable files, e.g., in PDF format, that convey additional information. Examples of documents that could be conveyed to passengers as downloadable files are flight receipts, account status reports, and the like. In response to selection of the remote check-in process by the passenger, airline web server 28 kicks off a series of interactive web pages requesting user input. A first web page, for example, may request the entry of the passenger name and frequent flyer number. Subsequent web pages drive entry of content necessary to complete the check-in process.

FIG. 2 is a flow diagram of a method for remote check-in of airline passengers. In particular, FIG. 2 illustrates the manner in which a passenger accessing airline web server 28 traverses a series of web pages to complete the remote check-in process. The method depicted in FIG. 2 is purely exemplary and may be susceptible to a number of different embodiments. In the example of FIG. 2, a passenger or commercial user first accesses a home page ("NW Webpage") for the airline, as indicated by block 50. At the home page, the user clicks on an appropriate icon to access an Internet check-in site. Upon access to the Internet check-in site, as indicated by block 52, the user enters his name, the originating city or airport for the pertinent flight, and a credit card number, passenger name record, or frequent flyer number, e.g., a Norwest Airlines Worldperks number.

As indicated by block 54, entry of personal information may be followed by presentation of a web page conveying information about the originating airport. A web page may be presented with a "please wait" message, as indicated by block 56, while web server 28 interacts with database server 30 to retrieve the appropriate passenger name record. The airport information and "please wait" message can be integrated in a single web page. In most embodiments, for security reasons, only single-party passenger name records may be retrieved, as indicated by line 57. In some embodiments, however, a multi-party passenger name record may be retrieved, as indicated by line 58. Line 58 is dashed to indicate that it is optional in the process shown in FIG. 2. If a multi-party passenger name record is retrieved, a web page is

generated that requests selection of a particular passenger or passengers from the passenger name record, as indicated by block 59. If a single party passenger name record is retrieved, or upon selection of a passenger from a multi-party passenger name record, web server 28 generates a web page that displays the appropriate passenger name record(s), as indicated by block 60.

With display of the passenger name record, the user may be asked to verify security questions 1 and 2, i.e., whether bags being carried or check on the flight have been with the passenger since they were packed, and whether any person unknown to the passenger has asked him to carry any items. This operation is indicated by block 62. When the passenger himself executes the remote check-in process, which will take place in most cases, he can personally answer the questions. When a travel agent, commercial user, or other person completes remote check-in, however, the process could be modified to reserve the security questions for the passenger's arrival at the airport, or provide some other form of security verification. A user may request that the security questions be reworded, as indicated by block 64.

If international travel is involved, airline web server 28 also may present a web page that requests entry of contact and notification information, as indicated by block 66. Upon completion of the steps indicated by blocks 62, 64, and 66, web server 28 generates a web page that presents ticket jacket disclaimer information, as indicated by block 68. Such information may be set forth within the page, or provided by hypertext link access. Next, web server 28 may generate a web page with instructions for printing a boarding pass, as indicated by block 70, and drives the printing of the boarding pass and a flight receipt on a printer, as indicated by block 72.

If device 14, 16, 18, 20, 22, 24, 26 is not equipped with a printer, however, other steps such as the programming of a smart card or simply the recordation of a seat assignment confirmation in airline reservation database 32 may suffice. In this case, the user may present the smart card, or the device in which the smart card or other media is held, to a reader used by airline personnel for transfer of information, e.g., optically, mechanically, by wireless transmission, or otherwise. Alternatively, the passenger may simply present identification, e.g., a driver's license, credit card, or frequent flyer card, to airline boarding personnel at the gate. Upon identification, airline personnel may verify that a seat assignment confirmation has been made by accessing airline database server 30, or some other electronic record indicating completion of check-in for the particular passenger. Finally, a web page indicating

completion of the remote check-in process is presented, as indicated by block 74, and the user is redirected to the airline home page, as indicated by loop 76.

Upon completion of the remote check-in process, airline web server 28 interacts with database server 30 to update airline reservation database 32 with the pertinent seat assignment confirmation. In this manner, airline web server 28 provides a record of the seat assignment for reference by airline personnel operating terminal devices 49 that access database server 30. Thus, airline personnel may manually access operating terminal devices 49 upon passenger arrival to verify seat assignment confirmation. Alternatively, reader devices such as bar code scanners, smart card readers, magnetic stripe readers, wireless receivers, and the like may interact with media carried by the passenger, and interface with database server 30 or an electronic record of seat assignment confirmations maintained at the departure gate or elsewhere to quickly verify that check-in has been completed as the passenger boards the flight. Airline reservation database 32 is selectively replicated to global reservation system 38, and thereby make a record of the confirmed seat assignment available to other airline carriers and travel agents.

The process depicted in FIG. 2 may be susceptible to a number of modifications. For example, the process may permit the passenger to book upgrades, change seat assignments, enter passport information, and handle changes in the event of irregular operations such as flight delays or cancellations. As another example, web server 28 can be arranged to apply a time window as discussed above to limit passengers' access to remote check-in process. Again, access may be restricted earlier than a first predetermined time before flight departure and later than a second predetermined time before flight departure. In addition, airline web server 28 also can be configured to distinguish between different passengers to provide different time windows on a selective basis.

For passengers with a history of few no-shows, for example, the check-in window could be extended to provided access to the remote check-in process at an earlier time. On the other hand, passengers with a history of frequent no-shows could be limited to a more restricted time window that starts later and/or has a shorter duration. The criteria for providing an earlier or later or later check-in time window could be based not only on number of no-shows, but number of no-shows as a percentage of number of flights. Also, for more reliable historical information, passengers eligible for a longer check-in window, i.e., earlier check-in access, could

be subject to a minimum number of flights in the flight history. Thus, passengers could become eligible for early check-in over time as they accumulate additional flights and favorable no-show statistics.

As an example, a passenger who has traveled twenty times in the preceding year, and has not had any no-shows, could be permitted to complete the remote check-in process hours, and perhaps days, before the start of the regular time window. Each of the customers having an acceptable no-show history could be given access at the same amount of time before the regular window opens for other passengers. Alternatively, the amount of time permitted before the regular time window could be selectively calculated based on the no-show history. In this manner, passengers with exceptional no-show histories could be given access to remote check-in before passengers with merely "good" no-show histories, while the latter passengers are still given access earlier than the regular check-in window. Historical information can be gathered from past flight records, and used to flag certain passengers as exhibiting low no-show risk. The flagged passengers may be permitted early check-in access, while passengers with little or no historical data or those with a history of frequent no-shows are given access during a common time window.

FIG. 3 is a flow diagram illustrating administration of a check-in time window as part of a remote check-in process. Upon entry of passenger identification, e.g., frequent flyer number, credit card number, passenger name record, or the like, as indicated by block 77, web server 28 interacts with database server 30 to retrieve the appropriate passenger name record, as indicated by block 79. Web server 28 then executes logic to determine whether the present time of access by the passenger is greater than a predetermined number of hours X (or fraction thereof) prior to departure, as indicated by block 81. If so, web server 28 denies access to the remote check-in process and advises the passenger that it is too early for remote check-in for the designated flight, as indicated by block 83. If the access time is not too early, it is determined whether the present access time is less than a predetermined number of hours Y (or fraction thereof) prior to departure, as indicated by block 85. If so, web server 28 denies access to the remote check-in process and advises the passenger that it is too late for remote check-in for the designated flight, as indicated by block 87. If not, the passenger is permitted to proceed to check-in, as indicated by block 89.

FIG. 4 is a flow diagram illustrating administration of a selective check-in time window as part of a remote check-in process. Upon entry of passenger

identification, as indicated by block 91, web server 28 interacts with database server 30 to retrieve the appropriate passenger name record, as indicated by block 93. Web server 28 then determines whether the designated passenger has been flagged as eligible for an early check-in window based on historical no-show information or other criteria, as indicated by block 93. Other criteria could even include the payment by the passenger of a fee, or membership in a mileage-based category, for early time window eligibility. If the passenger is not flagged for an early time window for check-in, web server 28 executes a time window determination substantially according to that depicted in FIG. 3. This determination is indicated by blocks 97, 99, 101, 103, and 105.

If the passenger is flagged for an early check-in window, however, web server 28 executes logic to determine whether the present time of access by the passenger is greater than a predetermined number of hours X + Z (or fraction thereof) prior to departure, as indicated by block 107. The Z hours indicates the added amount of time provided to the passenger prior to the standard time X in advance of flight departure. If so, web server 28 denies access to the remote check-in process and advises the passenger that it is too early for remote check-in for the designated flight, as indicated by block 99. If the access time is not too early, it is determined whether the present access time is less than a predetermined number of hours Y (or fraction thereof) prior to departure, as indicated by block 109. If so, web server 28 denies access to the remote check-in process and advises the passenger that it is too late for remote check-in for the designated flight, as indicated by block 103. If not, the passenger is permitted to proceed to check-in, as indicated by block 105.

FIG. 5 is a flow diagram illustrating administration of an irregular operations dialog as part of a remote check-in process. Upon entry of passenger identification, as indicated by block 111, web server 28 interacts with database server 30 to retrieve the appropriate passenger name record, as indicated by block 113. Web server 28 then parses the record to identify irregular operations ("IRROPS"), such as flight cancellation or delay, as indicated by block 115. If there is no indication of IRROPS, the passenger is permitted to proceed with remote check-in in the ordinary course. If there is an indication of IRROPS, web server 28 retrieves an alternative itinerary, as indicated by block 119. The alternative itinerary can be loaded into database 32 automatically or by human booking agents. If the passenger indicates that the alternative itinerary is acceptable, as indicated by block 121, web server 28 transmits

information for the printing or other recording of an amenity coupon, as indicated by block 123. Upon presentation of the amenity coupon to airline personnel, the passenger may obtain amenities such as prepaid phone cards, meal vouchers, and the like.

If the alternative itinerary is unacceptable, web server 28 queries database server 30 for added itinerary options, as indicated by block 125 of FIG. 5. If the alternative options are acceptable, as indicated by block 127, the passenger proceeds to receive the amenity coupon and complete check-in, as indicated by blocks 123 and 117, respectively. If not, the passenger receives an amenity coupon, as indicated by block 129, but is instructed to see airline personnel such as a booking or gate agent, as indicated by block 131.

FIGS. 6-14 illustrate various web pages generated during an exemplary remote check-in process. Such web pages could be displayed via desktop computers, laptop computers, interactive televisions, PDA's, Internet-equipped mobile phones, and other Internet appliances. For some devices, however, the web content may be truncated, abridged, formatted, or otherwise altered to facilitate display and perhaps conserve transmission bandwidth. FIG. 6, for example, illustrates an initial web browser window with a web page 78 displayed to an airline passenger during remote check-in for entry of information for personal identification. As shown in FIG. 6, web page 78 may include text entry boxes for entry of first name, last name, flight departure city, as well as a frequent flyer number, credit card number, or confirmation number, i.e., passenger name record number.

FIG. 7 illustrates a web browser window with a web page 80 displayed to an airline passenger during remote check-in indicating retrieval of reservation records. Web page 80 indicated that the pertinent reservation is being retrieved, and may include selected informational messages, if desired. FIG. 8 illustrates a web browser window with a web page 82 displayed to an airline passenger during remote check-in for selection of a designated passenger. In the event a multiple passenger name record is retrieved, for example, the user selects the pertinent passenger from a list of several passengers, e.g., using check box input media presented on the web page. In the example of FIG. 8, however, a single-party passenger name record is retrieved. Checking the box with input media such as a mouse, trackball, stylus, keyboard, and the like indicates that the passenger name displayed for check-in is correct.

FIG. 9 illustrates a web browser window with a web page 84 displayed to an

airline passenger during remote check-in for itinerary verification. As shown in FIG. 9, upon passenger selection, web page 84 presents the pertinent passenger itinerary information including departure city, arrival city, flight numbers, departure and arrival times, and travel dates. The displayed itinerary also may permit the passenger to verify that the proper frequent flyer number has been added to the record. The passenger clicks the "Continue" button, after reviewing the itinerary, to complete the check-in process.

As further indicated in FIG. 9, seat assignments are shown for each of the flights. The seat assignments can be assigned automatically via reservation application software or entered manually by a human booking or travel agent. In either case, web server 28 can be arranged to generate additional web pages that permits the passenger to change the assigned seat. In some embodiments, web server 28 may generate web pages that provide a textual list of available seats, a graphical indication of available seats at locations within the aircraft, or a combination of both.

FIG. 10 illustrates a web browser window with a web page 86 displayed to an airline passenger during remote check-in for security verification. For example, web page 86 asked the customary questions "Has anyone unknown to you asked you to carry an item on this flight?," and "Will any of the items you are traveling with be out of your immediate control from the time you packed them until you board the aircraft?" Check boxes in the web page permit the passenger to answer "yes" or "no" to the questions. The particular questions will conform to applicable government regulations and may change from time-to-time, and be different from region-to-region. .

FIG. 11 illustrates a web browser window with a web page 88 displayed to an airline passenger during remote check-in for notification of a contact information requirement in the event of international travel. Web page 88 simply advises the passenger of the need to complete such information upon arrival at the airport. Alternatively, web page 88 may permit online entry of such information.

FIG. 12 illustrates a web browser window with a web page 90 displayed to an airline passenger during remote check-in for notification of ticket jacket disclaimers. As shown in FIG. 12, web page 90 also may provide hypertext links to other informational pages.

FIG. 13 illustrates a web browser window with a web page 92 displayed to an airline passenger during remote check-in for notification of boarding pass printing

instructions. When the user clicks on the continue button, a web page with boarding pass information is presented. If the user device is equipped with a printer, the user may simply click on the print icon in the web browser toolbar and print a hard copy of the boarding pass to take to the airport.

FIG. 14 illustrates a web browser window 94 displayed to an airline passenger upon completion of remote check-in. Web page 94 indicates completion and provides a "continue" link that may direct the user back to the airline home page.

CLAIMS:

1. A method for airline passenger check-in, the method comprising:

accepting a check-in request from an airline passenger via a computer network;

comparing a time at which the check-in request is received to a permissible period of time; and

confirming a seat assignment for the passenger on a designated flight in response to the check-in request in the event the time at which the check-in request is received is within the permissible period of time.

2. The method of claim 1, further comprising refusing to confirm a seat assignment when the check-in request is received more than a first predetermined period of time prior to departure of the designated flight or less than a second predetermined period of time prior to departure of the designated flight.

3. The method of claim 1, further comprising designating different permissible periods of time for different passengers.

4. The method of claim 1, further comprising designating different permissible periods of time for different passengers based past no-show history for the respective passengers.

5. The method of claim 1, wherein the passenger is located remotely from an airport terminal associated with departure of the designated flight, the method further comprising accepting the check-in request at a server located remotely from the passenger.

6. The method of claim 1, further comprising:

determining whether a designated flight associated with the check-in request has been delayed or canceled; and

if so, confirming a seat assignment on another flight in response to the check-in request.

7. The method of claim 1, further comprising accepting the check-in request at a server located remotely from an airport terminal associated with departure of the designated flight.

8. The method of claim 1, wherein the computer network is the Internet, the method further comprising accepting the check-in request at a web server attached to the world wide web.

9. The method of claim 1, further comprising recording the confirmed seat assignment, modifying a seat reservation system database to indicate the confirmed seat assignment, and communicating the confirmed seat assignment to the passenger via the computer network.

10. The method of claim 1, further comprising printing information indicative of the confirmed seat assignment on a printer associated with the passenger, and printing security indicia with the printed information to verify authenticity of the confirmed seat assignment.

11. The method of claim 1, wherein the passenger transmits the check-in request from one of a desktop computer, a mobile computer, a PDA, a mobile telephone, and an interactive television.

12. A system for executing a method for airline passenger check-in according to any of claims 1-12, the system comprising:

a network client that transmits the check-in request from an airline passenger via a computer network; and

a network server that receives the check-in request via the computer network, compares a time at which the check-in request is received to the permissible period of time, and confirms a seat assignment for the passenger on the designated flight in response to the check-in request in the event the time at which the check-in request is received is within the permissible period of time.

13. A computer readable medium storing program code that, when executed, causes one or more programmable processors to execute the method of any of claims 1-11.

14. A method for airline passenger check-in, the method comprising:

accepting a check-in request via a computer network;

determining whether a designated flight associated with the check-in request has been delayed or canceled; and

if so, confirming a seat assignment on another flight in response to the check-in request.

15. A system for executing a method for airline passenger check-in according to claim 14, the system comprising:

a network client that transmits the check-in request via the computer network;

a network server that receives the check-in request via the computer network, the server determining whether the designated flight associated with the check-in request has been delayed or canceled, and, if so, confirming the seat assignment on another flight in response to the check-in request.

16. A computer readable medium storing program code that, when executed, causes one or more programmable processors to execute the method of claim 14.