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(54) **MOBILE GATEWAY INTERFACE**

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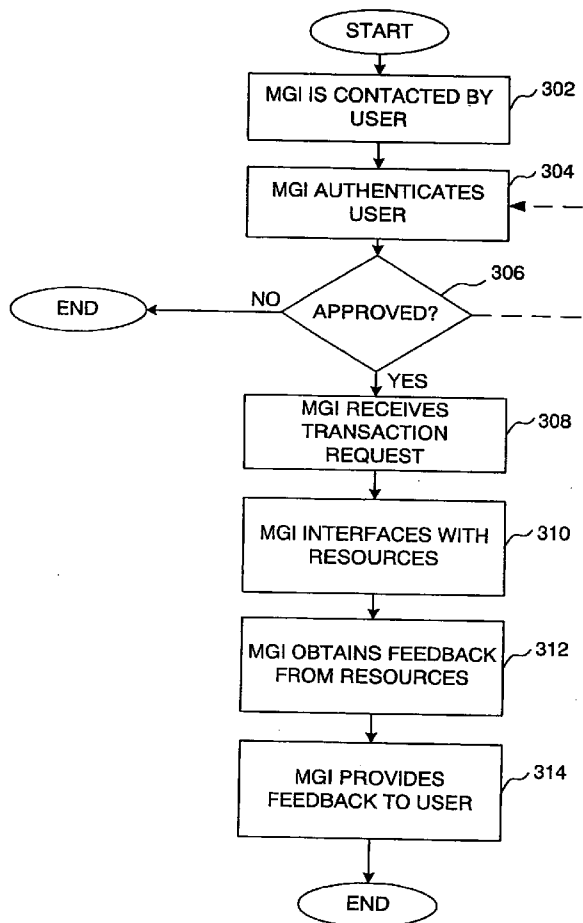   (US)

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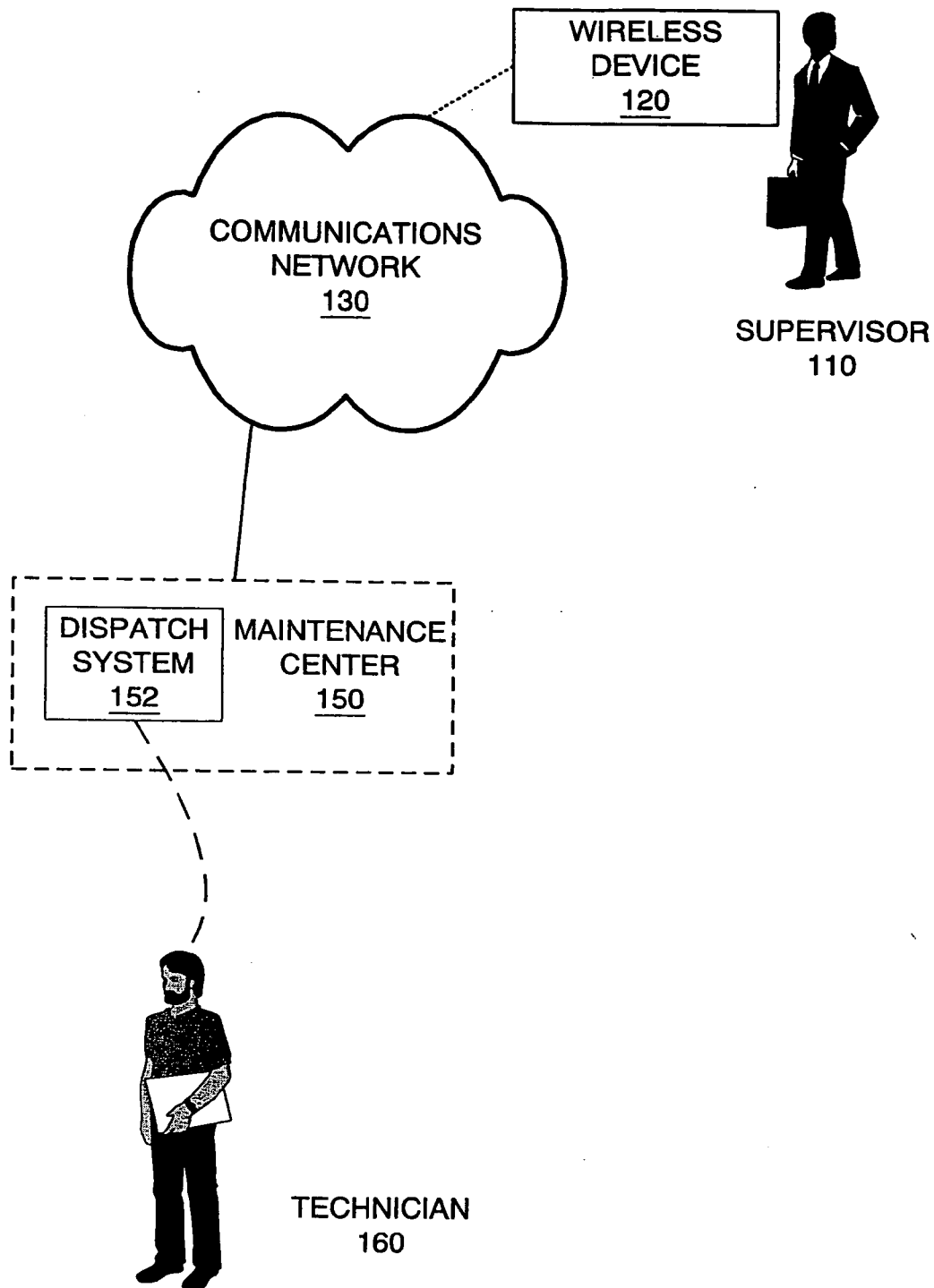**BLOOMFIELD, CT 06002 (US)**

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(57)   **ABSTRACT**

A mobile gateway interface that enables a supervisor to
conduct typical office transactions via a remote device while
the supervisor is away from the office. The remote device
can be one of several items, including, for example, wireless
telephones, interactive pagers, personal digital assistants,
laptop computers with wireless modem, and the like. The
supervisor uses the remote device to log into the mobile
gateway interface. After the authentication process, the
supervisor makes a transaction request through the remote
device. A transaction server, which is part of the mobile
gateway interface, interacts with one or more resources to
process or execute the transaction request. The resources can
include an intranet, the Internet, and various legacy systems.
Preferably, the mobile gateway interface includes one or
both voice and front-end data servers that facilitate the
authentication process and execution of the transaction
request.

WIRELESS
DEVICE
120

SUPERVISOR
110

COMMUNICATIONS
NETWORK
130

DISPATCH
SYSTEM
152

MAINTENANCE
CENTER
150

TECHNICIAN
160

FIG. 1
KNOWN ART

220   230

226

225

224

223

WIRELESS DATA
NETWORK
233

WIRELESS VOICE
NETWORK
232

222

221

PSTN
231

Other   NMA

ITP   PMA

FO   IDS

FOSS   MTR

WASSP   ESP

LQS   OSIP

OSPCM   OPEDS

SIMS

Intranet
280

Network Web Server

DATA
FRONT-END
244

VOICE
FRONT-END
242

TRANSACTION
SERVER
246

MGI
240

Internet
270

Phone Directory

Email

Weather

Stock Quotes

Driving Directions

FIG. 2

START

MGI IS CONTACTED BY USER — 302

MGI AUTHENTICATES USER — 304

APPROVED? — 306

NO

END

YES

MGI RECEIVES TRANSACTION REQUEST — 308

MGI INTERFACES WITH RESOURCES — 310

MGI OBTAINS FEEDBACK FROM RESOURCES — 312

MGI PROVIDES FEEDBACK TO USER — 314

END

FIG. 3

WIRELESS
COMMUNICATIONS
NETWORK
430

WIRELESS
DEVICE
420

SUPERVISOR
410

VOICE
FRONT-END
242

DATABASE
248

DATA
FRONT-END
244

TRANSACTION
SERVER
246

MGI 240

RESOURCES 450

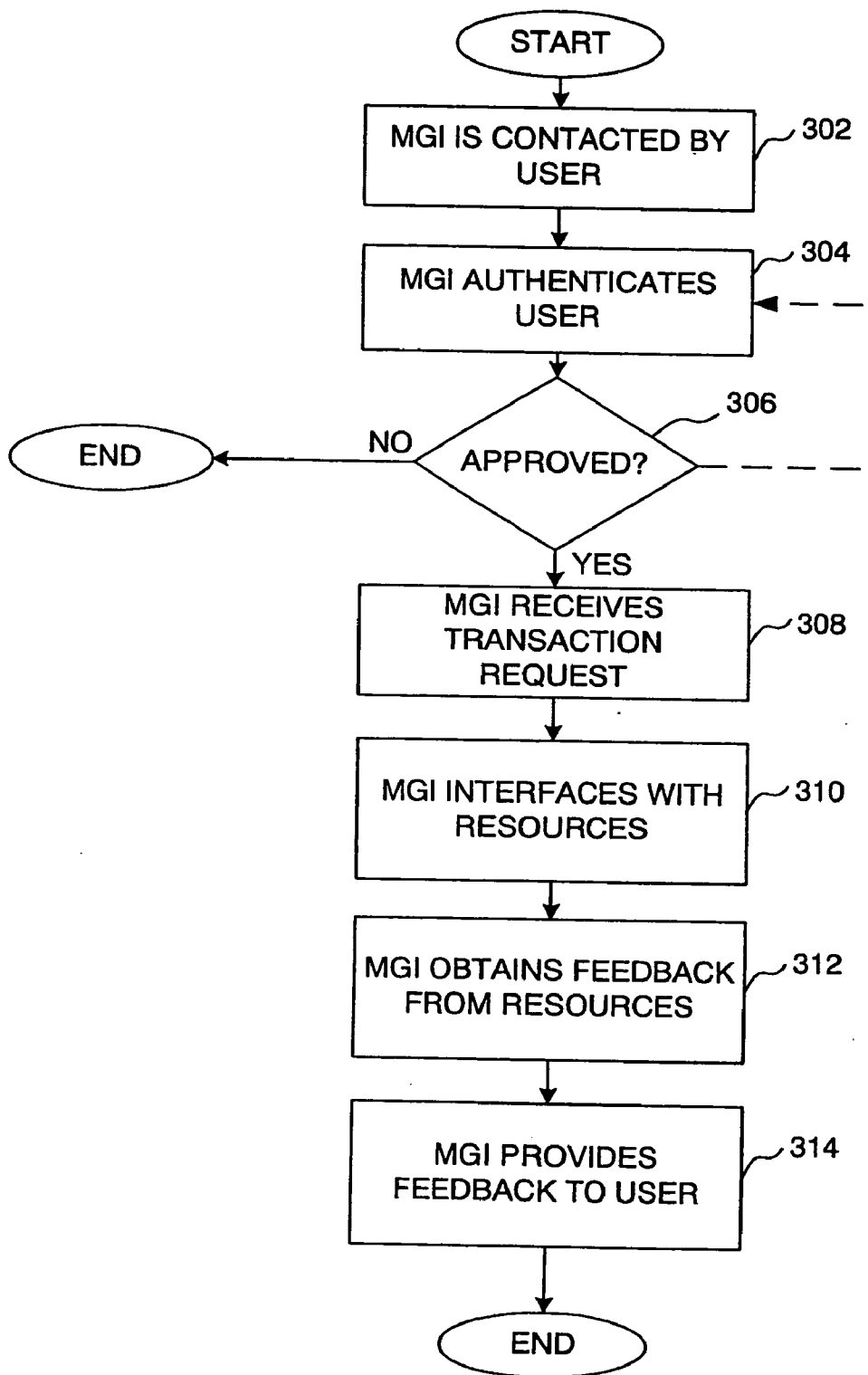DISPATCH
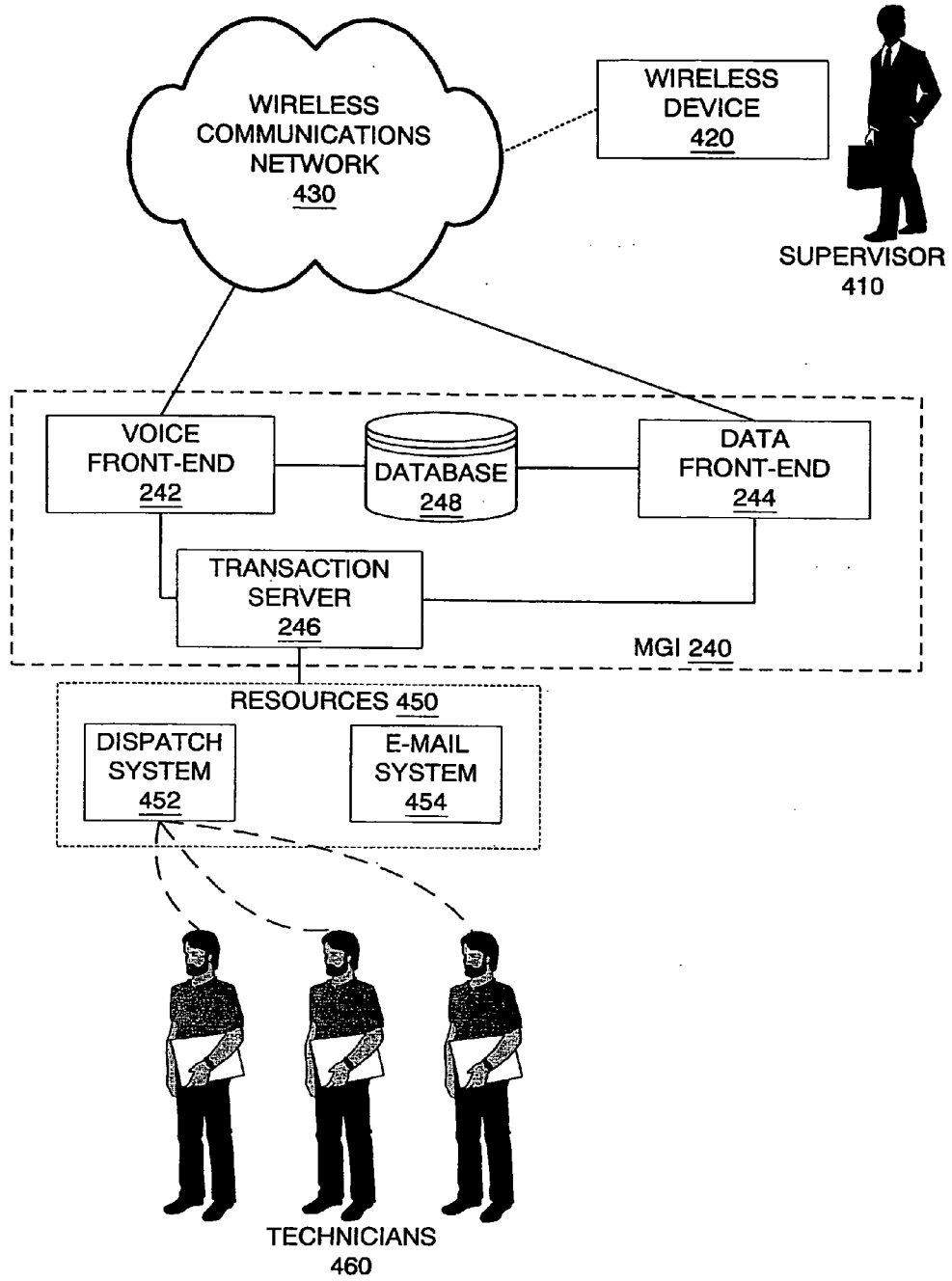SYSTEM
452

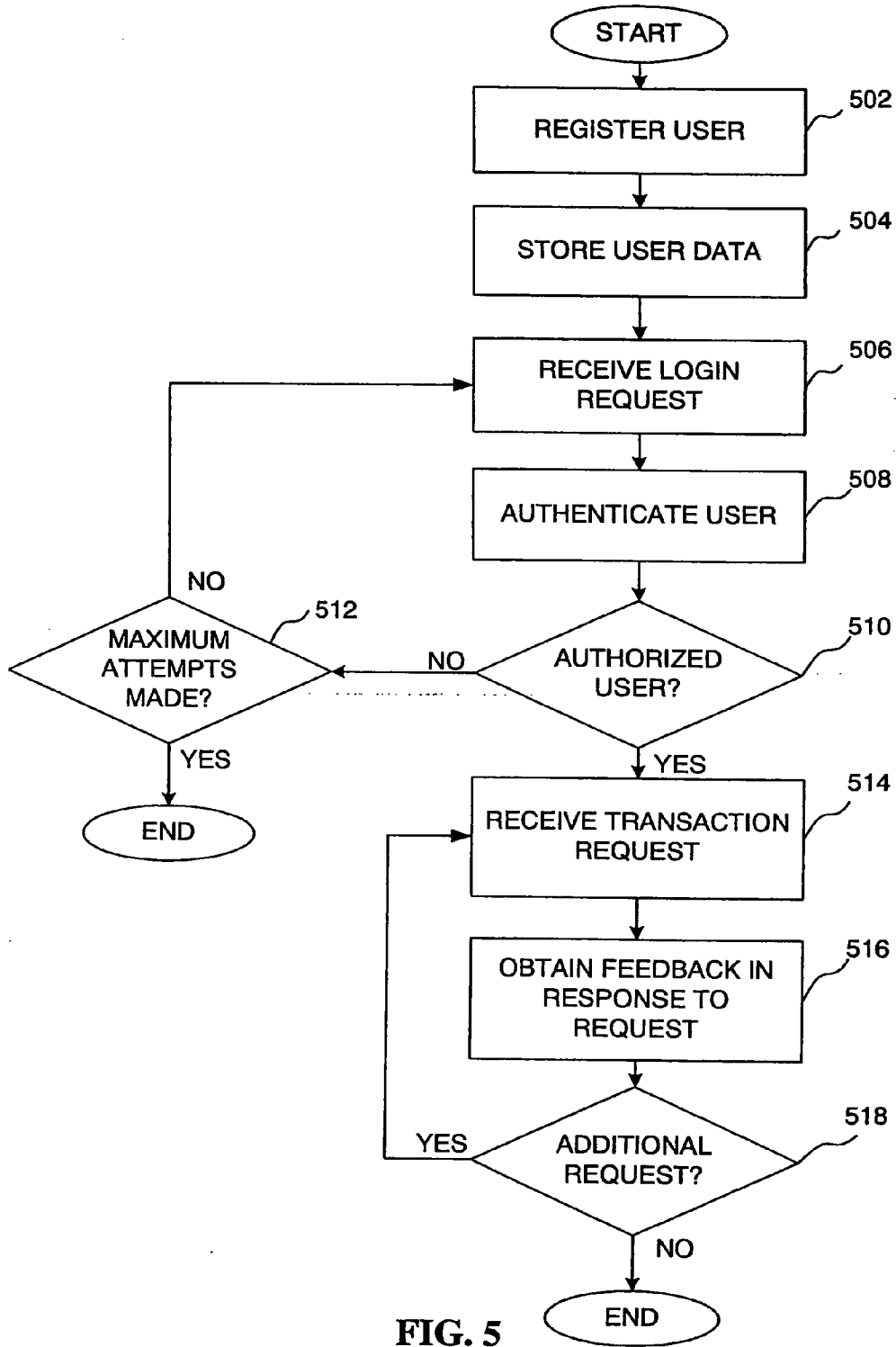E-MAIL
SYSTEM
454

TECHNICIANS
460

FIG. 4

FIG. 5

MOBILE GATEWAY INTERFACE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 10/028,271 filed Dec. 28, 2001, the contents of which are incorporated by reference herein in their entirety.

FIELD OF THE INVENTION

[0002] The present invention relates generally to the field of work force management and, more particularly, to systems and methods that enable supervisors to perform typical office transactions while being away from the office.

BACKGROUND OF THE INVENTION

[0003] In most industries in which technicians are dispatched to field locations to provide services to customers, their supervisors are available in home offices to provide them with support, coordinate projects, and perform various office transactions. The supervisors have access in their offices to a number of resources, including various legacy systems, a company intranet, e-mail accounts, the Internet, and the like. Through these resources, the supervisors can perform various transactions, including those associated with the supervision of the technicians. For example, a supervisor may use a dispatch system, which is one of the resources, to determine which technician is closest to a particular field location.

[0004] The dispatch system and all such resources become unavailable to the supervisor when the supervisor himself is in the field. The supervisor may be in the field to respond to customer calls, provide training to new technicians, attend meetings, or for other reasons. As the resources are unavailable to him while he is on the road, the supervisor's ability to supervise his technicians becomes severely challenged. Currently, the supervisor must rely on someone else, perhaps another supervisor who is in the office, to obtain the needed information from the office resources.

[0005] FIG. 1 is a schematic diagram showing a known method for a supervisor to obtain information from the resources in the office while the supervisor is away from the office. Supervisor 110 is at a field location away from the office at which dispatch system 152 is located. Supervisor 110 needs to know the whereabouts of technician 160. Supervisor 110 uses communications device 120, e.g., a wireless telephone, to call maintenance center 150. During a voice communications session via communication network 130, a colleague of supervisor 110 at maintenance center 150 obtains the name of technician 160 from supervisor 110. The colleague then consults dispatch system 152 from which information associated with technician 160 is obtained. The information may include, for example, the last dispatch time, the GPS coordinates of technician 160's current location, how many jobs technician 160 has been scheduled to perform that day, and so on. The colleague then conveys the information to supervisor 110 during the voice communications session.

[0006] On any given day, maintenance center 150 may be flooded with calls from supervisor 110 and hundreds of other supervisors attempting to obtain similar or the same information from dispatch system 152. Thus, the known method often results in significant time wasted by supervisor 110 and his colleagues. This known method is therefore highly inefficient. Accordingly, there is a need for a system and method that would enable supervisor 110 to access resources in the office directly.

SUMMARY OF THE INVENTION

[0007] The present invention is a system and method that enables a user (e.g., a supervisor) to conduct typical office transactions on office resources while the user is away from the office. Using a remote device, the user of the invention interacts with the resources in the office through a mobile gateway interface (MGI). The remote device can be any one of several types of devices including, for example, a desktop computer, a wireline telephone, a wireless telephone, a wireless personal digital assistant (PDA), an interactive pager (I-pager), a laptop computer with a wireless modem, and the like.

[0008] In one embodiment, the remote device is a telephone. Using the telephone, the user dials a telephone number associated with the MGI. The MGI includes a front-end voice server and a transaction server. The front-end voice server interfaces between the telephone and the transaction server. The front-end voice server interprets a spoken command from the user and translates the spoken command into a transaction request that can be understood by the transaction server. When the transaction server receives the transaction request, the transaction server interacts with various resources in the office. The various resources can include, for example, various legacy systems, a company intranet, e-mail accounts, the Internet, and the like. After the transaction server has executed the transaction request, the transaction server provides feedback to the front-end voice server in response to the transaction request. The front-end voice server translates the feedback into a speech segment that can be heard by the user on the telephone. Thus, through the MGI, the user can perform typical office transactions as if the user were in the office.

[0009] Preferably, in addition to speech recognition, the front-end voice server is adapted to perform voice authentication and speech synthesis functions. The front-end voice server authenticates the user based on a voice exemplar previously provided by the user. Using speech synthesis, the voice server provides a menu of operations from which the user can select. By speaking into the telephone the user selects an operation and provides any additional data needed for the operation. Using speech recognition, the front-end voice server prepares a transaction request based on the spoken user input. The transaction request is forwarded to the back-end system resources via the MGI. The back-end system resources respond to the transaction request with a feedback. The MGI forwards the feedback to the front-end voice server. The voice server formats the feedback and outputs the feedback to the telephone. Preferably, the feedback may be a synthesized speech segment that can be reproduced by a speaker of the telephone. Alternatively, the feedback can be represented as text which can be presented on a display of the telephone.

[0010] In another embodiment in which the remote device is a computer, PDA, I-pager, or another data processing device, the MGI includes a front-end data server that is

coupled with the transaction server. Through the front-end data server, the transaction server interfaces between the remote device and the resources, permitting the user to conduct typical office transactions using the remote device. Like the front-end voice server, the front-end data server is preferably adapted to determine whether the user is an authorized user of the system before access to the transaction server is granted. The authentication process can be performed using one of several methods. For example, the front-end data server can be adapted to recognize certain pre-approved passwords.

[0011] In an exemplary system adaptable for a telephone company, the resources can include all legacy systems associated with the telephone company. The exemplary system provides at least the following benefits to the telephone company:

[0012] supervisors are available in the field without losing their abilities to perform office transactions using the resources in their offices;

[0013] technicians have more access to their supervisors;

[0014] increased safety awareness can be obtained among the technicians due to the presence of their supervisors in the field;

[0015] increased efficiency can be expected from the technicians due to increased availability of the supervisors in the field;

[0016] faster response time to customers can be achieved due to the availability of supervisors to work on field projects; and

[0017] mentoring opportunities between supervisors and technicians can be increased.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 is a schematic diagram showing a known method that enables a supervisor to obtain information from a legacy system.

[0019] FIG. 2 is a schematic diagram showing a high-level view of the system architecture of an embodiment of the invention.

[0020] FIG. 3 is a flow diagram illustrating exemplary steps that could be used to implement an embodiment of the invention.

[0021] FIG. 4 is a schematic diagram showing the system architecture of a preferred embodiment of the invention.

[0022] FIG. 5 is a flow diagram illustrating exemplary steps that could be used to implement a preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0023] FIG. 2 is a schematic diagram showing a high-level view of the system architecture of an embodiment of the invention.

[0024] Desktop computer 221, wireline telephone 222, wireless telephone 223, PDA 224, I-pager 225, and laptop computer 226 that can be used to implement the invention. Desktop computer 221 and wireline telephone 222 can

access MGI 240 via PSTN 231. Wireless telephone 223 can access MGI 240 via wireless voice network 232. PDA 224, I-pager 225, and laptop computer 226 can access MGI 240 via wireless data network 233. Hereinafter, each of desktop computer 221, wireline telephone 222, wireless telephone 223, PDA 224, I-pager 225, and laptop computer 226 is alternatively referred to as remote device 220. Similarly, each of PSTN 231, wireless voice network 232, and wireless data network 233 is hereinafter alternatively referred to as communications network 230.

[0025] MGI 240 includes front-end voice server 242, front-end data server 244, and transaction server 246. Transaction server 246 has access to various resources. For example, through Internet 270, a user of the invention can review a telephone directory, manage an e-mail account, learn about the weather conditions, receive stock quotes, obtain driving directions, etc., by using remote device 220. Similarly, through Intranet 280 and its associated network web server, the user can access one or more legacy systems using remote device 220. In the context of a telephone company, the legacy systems can include the following systems:

[0026] Security Information Management System (SIMS);

[0027] Outside Plant Construction Management System (OSPCM);

[0028] Loop Qualification System (LQS);

[0029] Work Activity Statistical Sampling Process (WASSP);

[0030] Fleet Operations Support System (FOSS);

[0031] Fleet Optimizer (FO);

[0032] Integrated Technician Performance (ITP);

[0033] Network Monitoring and Analysis (NMA);

[0034] Proactive Maintenance Administration (PMA);

[0035] Integrated Dispatch System (IDS);

[0036] Mechanized Time Reporting (MTR);

[0037] Employee Scheduling Program (ESP);

[0038] Open System Interconnect Platform (OSIP);

[0039] Outside Plant Engineering Design System (OPEDS); and the like.

[0040] It is noted that without Intranet 280, one or more of the SIMS, OSPCM, LQS, WASSP, FOSS, FO, ITP, NMA, PMA, IDS, MTR, ESP, OSIP, OPEDS, and the like can be adapted to be accessed by transaction server 246 directly, i.e., without going through the network web server.

[0041] FIG. 3 is a flow diagram illustrating exemplary steps that could be used to implement an embodiment of the invention. To explain and illustrate the invention, FIG. 3 is discussed in connection with the structure shown in FIG. 2. The method of FIG. 3, however, is not to be considered as limited to or constrained by the structure of FIG. 2 or any other structure.

[0042] In step 302, a user (e.g., a supervisor) uses remote device 220 (i.e., one of devices 221, 222, 223, 224, 225, 226 or other similar devices) to establish a communications

session with MGI **240**. Depending on the type of remote device **220** used by the user, one or more of PSTN **231**, wireless voice network **232**, and wireless data network **233** can be involved in the communications session.

[0043] In step **304**, MGI **240** authenticates the user. Authentication can be performed in one of several ways. For example, if either wireline telephone **222** or wireless telephone **223** is used to contact MGI **240**, the authentication process is performed by front-end voice server **242**. MGI **240** can be contacted by, for example, dialing a telephone number associated with MGI **240** using the telephone. Front-end voice server **242** prompts the user to identify himself. Preferably, front-end voice server **242** is a voice-enabled platform that has at least two capabilities. First, front-end voice server **242** can analyze whether the voice of the user matches a known voice exemplar of an authorized user. Second, front-end voice server **242** can associate spoken commands provided by the user with transaction requests, which are then provided by front-end voice server **242** to transaction sever **246**.

[0044] A different authentication method may be employed. For example, front-end data server **244** may be used to authenticate the user. One authentication process may involve remote device **220** sending identity information associated with the user to front-end data server **244**. For example, wireless telephone **223** may send its mobile identification number (MIN) to front-end data server **244**. Upon receiving the MIN, front-end data server **244** asks the user to provide a password. The supervisor can enter the password using the keypad of wireless telephone **223**. The user is authenticated if the password is in fact associated with the MIN in a database accessible by front-end data server **244**. In lieu of the MIN, the user can enter a user ID to identify himself before providing the password.

[0045] In step **306**, a determination is made as to whether the user is an authorized user of the system. If the user is authenticated as an authorized user, either by front-end voice server **242** or front-end data server **244**, or both, the process goes to step **308**. Otherwise, the process ends and the user is denied access. It is noted that provisions can be made to permit the user more than one opportunity to login. For example, as shown in FIG. **3** by the dashed arrow connecting step **306** back to step **304**, after failing one login attempt, the user may be given another opportunity to return to step **304** to login. Preferably, no more than three attempts are allowed to ensure security.

[0046] In step **308**, MGI **240** receives a transaction request from the user. Here, if remote device **220** were a telephone (e.g., one of wireline telephone **222** and wireless telephone **223**), the user simply provides a spoken command into remote device **220**. If the spoken command is recognized by MGI **240** (through front-end voice server **242**), a valid transaction request is received by transaction server **246**. For discussion purposes, assume that the spoken command is "Locate John Doe," and that John Doe is one of the technicians supervised by the user. It must be noted that provisions can be made to enable the user to enter the command using the keypad of remote device **220**.

[0047] In step **310**, transaction server **246** interfaces with an appropriate element of the resources. For example, through Intranet **280**, transaction server **246** can interact with the Integrated Dispatch System, which is a dispatch system that has information about John Doe.

[0048] In step **312**, transaction server **246** obtains a feedback from the resources. For example, transaction server **246** reviews information available on the IDS to determine the location of John Doe. Based on the review, the feedback from the IDS may indicate that John Doe is located at 123 Maple Avenue.

[0049] In step **314**, MGI **240** provides the feedback to the user. Front-end voice server **242** translates "123 Maple Avenue" to a voice string before the feedback is transmitted to wireless telephone **223** or wireline telephone **222**. Finally, the user receives the desired information over remote device **220**. For example, the user hears "John Doe is currently at 123 Maple Avenue."

[0050] It must be noted that the above illustration is a simplified, exemplary transaction in which the user only speaks once to obtain the desired information. In most transactions, it may require several interactions between the user and MGI **240** before a transaction request can be successfully responded to. For example, following the establishment of a communications session between remote device **220** and MGI **240**, exchanges that occur between the user and MGI **240** may include the following exemplary "conversation."

[0051] MGI **240**: "Good morning! Please identify yourself."

[0052] The user: "Tom Katz."

[0053] MGI **240**: "Hello, Tom Katz. Please say your password."

[0054] The user: "Mickey Mouse."

[0055] MGI **240**: "I'm sorry. The password you just told me is not recognized."

[0056] The user: "Donald Duck."

[0057] MGI **240**: "How may I help you today?"

[0058] The user: "Locate Technician."

[0059] MGI **240**: "I will search the dispatch system. Please provide the name of the technician."

[0060] The user: "John Doe."

[0061] MGI **240**: "John Doe is currently at 123 Maple Avenue. Would you like to make another transaction?"

[0062] The user: "No."

[0063] MGI **240**: "Good Bye."

[0064] FIG. **4** is a schematic diagram showing the system architecture of a preferred embodiment of the invention. In this embodiment, the system of the invention includes wireless device **420**, wireless communications network **430**, MGI **240**, and resources **450**.

[0065] MGI **240** includes front-end voice server **242**, front-end data server **244**, transaction server **246**, and database **248**. Transaction server **246** is preferably an XML server. Each of front-end voice server **242** and front-end data server **244** has access to database **248**. Database **248** has, among other user information, identity information of authorized users. The identity information may include, for example, user IDs, passwords, and voice exemplars associated with the authorized users.

[0066] An exemplary front-end voice server **242** is the VoCarta application of Datria System, Inc. of Englewood, Colo. Preferably, front-end voice server **242** is powered by voice recognition and authentication engines which are available from Nuance Communications of Menlo Park, Calif. An exemplary front-end data server **244** is that which is available Broadbeam Corporation of Princeton, N.J.

[0067] Wireless communications network **430** can be either a wireless voice network (if wireless device **420** is a wireless telephone) or a wireless data network (if wireless device **420** is a wireless device other than a wireless telephone), or both.

[0068] Supervisor **410** is a user of the invention. Technicians **460** are members of a work force that is associated with supervisor **410**. For example, supervisor **410** and technicians **460** may be employees of a telephone company. Technicians **460** are present at various field locations responding to service calls. Supervisor **410**, who is normally at the home office of the telephone company, is currently away from the home office. Supervisor **410** is equipped with wireless device **420**. Wireless device **420** can be, as stated above, a wireless telephone, an I-pager, a PDA, a computer with a wireless modem, and the like. Preferably, wireless device **420** is a wireless telephone, in which case wireless communications network **230** is a wireless telephone network.

[0069] Resources **450** can include any number of computer networks including the Internet, the company's Intranet, and various legacy systems. For discussion purposes, assume that resources **450** include dispatch system **452** and e-mail system **454**. As discussed above and as illustrated in FIG. **2**, resources **450** can include a much larger number of systems which are accessible to supervisor **410** via MGI **240**.

[0070] FIG. **5** is a flow diagram illustrating exemplary steps that could be used to implement the preferred embodiment of the invention. To explain and illustrate the preferred embodiment of the invention, FIG. **5** is discussed in connection with the structure shown in FIG. **4**. The method of FIG. **5**, however, is not to be considered as limited to or constrained by the structure of FIG. **4** or any other structure. For discussion purposes, assume that wireless device **420** is a wireless telephone.

[0071] In step **502**, authorized users of the invention are registered. An authorized user may be, for example, supervisor **410** shown in FIG. **4**. The registration process can include the provision of a user ID to supervisor **410**. The user ID is then associated with user information of supervisor **410**. The user information can include identity information of supervisor **410** such as, for example, his full name, his department, names of technicians under his supervision, a password, a voice exemplar, the MIN of wireless device **420**, etc. Preferably, the user information further includes other information including which elements of resources **450** supervisor **410** is permitted to access remotely using wireless device **420**.

[0072] In step **504**, the information obtained or created in step **502** is stored in a place that is accessible to MGI **240**. Preferably, the information is stored in database **248**. Database **248** may be any memory device that can be adapted to store the information so that the information is accessible to front-end voice server **242** and front-end data voice server **244**.

[0073] In step **506**, MGI **240** receives a login request from supervisor **410**. Preferably, the login request is received by MGI **240** as soon as a wireless communications session is established between MGI **240** and wireless device **420**. Along with or as a part of the login request, the user ID of supervisor **420** is provided to MGI **240**. Supervisor **420** can provide his user ID by speaking into wireless device **420** or by keying it in using the keypad of wireless device **420**. Alternatively, the MIN of wireless device **420** may be used as the user ID. The MIN can preferably be provided to MGI **240** automatically upon the establishment of the wireless communications session. If the MIN is used as the user ID, precautions should be taken to ensure that supervisor **410** has exclusive use of wireless device **420**.

[0074] In step **508**, MGI **240**, through one or both of front-end voice server **242** and front-end data server **244**, authenticates supervisor **410** or otherwise determines whether the login request is received from an authorized user. MGI **240** can prompt supervisor **410** to provide a password (by speaking into or entering through the keypad of wireless device **420**). If front-end voice server **242** is adapted to recognize the voice of authorized users, then supervisor **410** may simply speak a word or two, for example, his name. Preferably, front-end voice server **242** is a voice-enabled platform that can analyze whether the voice of supervisor **410** matches a known voice exemplar of an authorized user, which is stored in database **248**. Alternatively, as discussed above, front-end data server **244** may be used to authenticate supervisor **410** based on, among other information, the password, the user ID, and the MIN of wireless device **420**.

[0075] In step **510**, a determination is made on whether supervisor **410** is an authorized user of the system. If supervisor **410** is authenticated as an authorized user, either by front-end voice server **242** or front-end data server **244**, or both, the process goes to step **514**. Otherwise, the process goes to step **512**, in which supervisor **410** may be given one or more opportunities to enter the correct password or other identity information. The process then repeats steps **506** through **512**. Preferably, after a total of three unsuccessful attempts, supervisor **410** is denied access and the process ends.

[0076] In step **514**, MGI **240** receives a transaction request from supervisor **410**. Here, supervisor **410** simply provides a spoken command into wireless device **420**. If the spoken command is recognized by front-end voice server **242** as a valid transaction request, the transaction request is forwarded to transaction server **246**. For discuss purposes, assume that the transaction request is "Check E-Mails."

[0077] In step **516**, transaction server **246** obtains a feedback from an appropriate element of resources **450** in response to the transaction request. For example, recognizing that supervisor **410** wishes to check his e-mails, transaction server **246** interacts with e-mail system **454** (see FIG. **4**). While logging to e-mail system **454**, supervisor **410** can review, forward, reply, and compose e-mails. One or both front-end voice server **242** and front-end data server **244** may interact with wireless device **420** multiple times to receive further spoken commands from supervisor **410** and to provide voice responses or feedbacks to supervisor **410**. Preferably, supervisor **410** can also interact with MGI **240** by keying the transaction requests in addition to using his voice.

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[0078] In step **518**, upon receiving a command from supervisor **410** to terminate access to e-mail system **454**, MGI **240** asks supervisor **410** whether he wishes to access a different element of resources **450**. If supervisor **410** wishes to perform further transactions, the process repeats step **514** through **518**. If the supervisor **410** does not have further transaction requests, the process ends.

[0079] It must be noted that the above illustration is a simplified, exemplary transaction that shows how a simple transaction may be performed by supervisor **410**. Supervisor **410** can perform other transactions using, among other resources, dispatch system **452**. As discussed above in conjunction with FIGS. **2** and **3**, a large number of different elements or systems can be included as part of resources **450** through which supervisor **410** can conduct transactions using wireless device **420**.

[0080] An exemplary implementation of MGI **240** has the following characteristics.

[0081] Characteristic No. 1. The MGI Pilot is adapted to serve between about 50 and about 60 supervisors. Provisions for the full-scale system can be made to accommodate 1,200 or more supervisors.

[0082] Characteristic No. 2. The MGI platform is developed based at least in part on input received from (a) the NOSG staff with regards to the functionality of the platform; (b) software developers and the companies of the supervisors to determine the flow of data from start to finish; (c) the supervisors and the field managers to prioritize the transaction list from most important to least important; (d) SME's of the required systems involved in the MGI platform, which include the IDS, the FO, the PMA, and e-mail systems.

[0083] Characteristic No. 3. The MGI can be utilized from anywhere in the wireless coverage area within which the wireless telephones of the supervisors function. The MGI has provisions so that it is scalable to include wireless devices other than wireless telephone. Other wireless devices include, for example, PDAs, I-pagers, and wireless personal computers.

[0084] Characteristic No. 4. The MGI system supports at least the following supervisor users: (a) I&M (Installation and Maintenance) managers who use the IDS, GPS and PMA systems; and (b) I&M managers who use any e-mail systems.

[0085] Characteristic No. 5. The MGI platform enables each supervisor to perform one or more of the following tasks or transactions:

[0086] (a) locate any technician within the work force;

[0087] (b) query load;

[0088] (c) create a PMA ticket;

[0089] (d) identify technicians on high time;

[0090] (e) obtain details about any technician and associated vehicle;

[0091] (f) assign a new vehicle to a technician;

[0092] (g) update a technician's temporary schedule;

[0093] (h) complete a safety and service defect form;

[0094] (i) complete a safety observation form;

[0095] (j) find the nearest technician;

[0096] (k) obtain loop qualification system data to determine if customer loop can carry a DSL signal.

[0097] (l) manage e-mail accounts;

[0098] (m) complete a quality review form;

[0099] (n) make sales referrals; and

[0100] (o) find out what time a technician leaves his or her work center.

[0101] Each of these transactions are separately discussed in the following paragraphs. As used hereinafter, the term "system" is synonymous with the MGI platform.

[0102] 5(a). Technician Location. The supervisor has the capability to query the system for the latest information on any technicians in his or her maintenance center, as well as technicians associated with a different maintenance center. The system returns the following data or feedback in respond to the query for an individual technician:

[0103] name of the technician;

[0104] address of the technician's previous job;

[0105] address of the technician's current job;

[0106] time dispatched on the current job;

[0107] actual location of the technician obtained from the GPS system;

[0108] duration at actual location;

[0109] status of the technician's vehicle ignition system and the amount of time the ignition system is on;

[0110] whether the current job is a trouble ticket or a service order; and

[0111] if the current job is a service order, the number of lines involved.

[0112] 5(b). Load. The supervisor has the capability to query the system for information regarding the load for their group, other groups in the same maintenance center, or the entire maintenance center on any given day including the current day and the following day. In the query, the supervisor identifies one or more groups by specific names, day of the week, district, or management area. In response to the query, the system returns the following feedback associated with each group:

[0113] the number of jobs available for dispatch;

[0114] category breakdown (number of service order or trouble ticket jobs);

[0115] the number of customer desired due date (CDDD) jobs remaining each of which is characterized by an order number and a location;

[0116] the number of competitive local exchange carrier (CLEC) jobs left to do in IDS each of which is characterized by an order number and a location; and

[0117] an average number of jobs per scheduled technician;

[0118] 5(c). PMA Ticket. The supervisor has the capability to create a proactive maintenance action ticket. The specific ticket types may include a helping ticket and a routine ticket.

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[0119] 5(d). Technician High Time. The supervisor has the capability to query the system to determine which technicians within his group or other groups within his district are running over the allotted time for the current job. In response to the query, the system returns a feedback for each technician. The feedback includes the name of the technician and the number of minutes of the technician's high time.

[0120] 5(e). Technician/Vehicle Detail. The supervisor has the capability to obtain technician or vehicle details by submitting one of the following search terms: a technician name, a vehicle number, a license plate number, and an address and time per individual technician. In response, the system returns the following feedback based upon the initial search criteria: the technician's name; the vehicle number; the vehicle license number; the technician's current street address; and the state of the license plate.

[0121] 5(f). Assignment of New Vehicle. The supervisor has the capability to assign a new or permanent vehicle to a technician. For a temporary reassignment, the supervisor provides the technician's name and new vehicle number. The system designates a temporary assignment that is effective for the remainder of the day. For a permanent assignment, the supervisor provides the technician's name and a new vehicle number. In response, the system returns the following feedback: validation of name and vehicle number, and confirmation of change in vehicle.

[0122] 5(g). Temporary Update of Technician's Schedule. The supervisor has the capability to change the current schedule for a technician. The supervisor provides the technician's name to the system. In response, the system returns the following feedback: the technician's name; the output of current status; and the output of new status.

[0123] 5(h). Safety and Service Defect Form. The supervisor has the capability to complete a safety and service defect form based upon the inspection performed. The supervisor enters the required data for each form. This information can be published to the district web page. The Safety and Service defect forms can be maintained in a local database. In response, the system returns a feedback which includes a confirmation of a successful form.

[0124] 5(i). Safety Observation Form. The supervisor has the capability to enter comments about a technician safety observation. The supervisor provides the name of the technician and the extent of the technician's safety observation. This information can be published to the district web page. In response, the system returns a feedback which includes a confirmation of a successful form.

[0125] 5(j). Locate the Nearest Technician. The supervisor has the capability to enter a street address or ticket number to locate the nearest technician. In response, the system returns a feedback which includes the technician's name, the technician current location, and the distance from the street address associated with a ticket. The system can also provide the second and the third closest technicians. It is noted that this functionality may require enhancements be made to the FO system.

[0126] 5(k). Obtain LOS. The supervisor has the capability to enter a telephone number and retrieve the loop qualification results for a potential ADSL line. In response, the system returns a feedback which includes an answer which is either affirmative or negative.

[0127] 5(l) Email Access. The supervisor has the capability to manage e-mail accounts from the field. The supervisor is able to select new or old mail from his or her inbox. The basic functions allowed should include Read (including Next, Previous, First, Last, and Again), Skip, Save, Delete, Reply (or Reply All), and Mark Unread. In response, the system returns a feedback which includes the following data for each message: the name of the sender; time sent and date if other than the present day; the subject; the priority (high, medium, or low); the body of message; the file name of any attachments. In addition, the system can also return the following for an e-mail REPLY: record response and deliver as a ".wav" file attachment; deliver as interpreted text message; allow for message to be recorded, played back, re-recorded, paused, resumed, delayed and aborted; and optionally mark as high priority.

[0128] 5(m). Quality Review Form. The supervisor has the capability to complete a quality review form. This form can be published to the district web page and stored in a database. The supervisor enters the technician's name as well as information related to the quality review. In response, the system returns a feedback which includes a confirmation of a successful form.

[0129] 5(n). Sales Referrals. The supervisor has the capability to enter information to an appropriate business sales office about a potential sales opportunity associated with a customer. The supervisor enters the telephone number, the best time to call the customer, and the products or services of interest to the customer. In response, the system distributes the information to the correct sales office via e-mail. The customer can be categorized as an individual, a small business, a large business, and the like.

[0130] 5(o). Out of Gate Query. The supervisor has the capability to query the system to determine what time a technician leaves the work center. In response, the system returns a feedback which includes the following data for an individual technician: the technician's last name; the technician's first name; and the out of gate time. In addition, the supervisor has the capability to query the system to determine the average out of gate time for a group of technicians. In response, the system returns a feedback which includes the average out of gate time for the group of technicians.

[0131] Characteristic No. 6. Administration for the MGI platform is done via the MGI Profile Interface. This desktop interface is available for the system administrator and the supervisors. The administrator has the ability to login, change a password, add, modify, or delete a profile of a supervisor or an administrator. All users (including administrators and supervisors) use their common user ID (CUID) and password to enter the various areas of the MGI, according to their pre established user profiles.

[0132] 6(a). Administrator Login. For administrator logins, the system displays the MGI Profile Interface login GUI to the administrator. During login, the system verifies user access to MGI Profile Interface Administration. The system edits and checks required data fields for the CUID and password. The system modifies password characters supplied using asterisk masking. Based upon the administrator's CUID and password, the system validates the user and grants access or denies further access to controlled areas of the system. The system validates the administrator and returns a feedback which includes either successful or a

failed login attempt notification. Upon successful submission of login credentials, the system grants the administrator access to other security-controlled areas of MGI Administration. In the event of an unsuccessful login, the existing CUID and password on screen data are cleared. The administrator is allowed to re-enter the CUID and password data after an initial unsuccessful login. If the administrator fails to login, for example, three consecutive attempts, the system disables or ignores any further attempt made by the administrator. Rules for editing the CUID and Password are summarized as follows:

Admin Login Edit Rules

Entity Name	Format	Length (number of characters)	Validation/Range
CUID	Alpha	7	No Vowels Allowed
Password	Alphanumeric with special characters	8–12	A password must contain at least one alphabetic, one numeric, and one special character. The valid special characters are: ,./<>?;':[ ]{ }\\\|=– '~!@#$% &*( )_+

[0133] 6(b). Changing Administrator Password. After successful login, the administrator has the capability to change passwords at any time. For a particular administrator, changing the passwords in the MGI system does not interfere or impact interactions with other company systems. The system checks the data fields associated with the existing password, the new password, and a redundant typing of the new password. The system modifies password characters supplied with asterisk masking. The system verifies by comparison that the user supplied new and redundant passwords are equivalent and informs the administrator if there are any discrepancies. Once the administrator enters the new and old passwords, the administrator has the capability to submit a change password request with the supplied data. When the administrator requests to change the password, the system conducts old password validation based upon the original password and CUID provided by the administrator during initial login. The system returns a feedback which includes a successful or failed password change attempt. If the change is successful, the system returns a feedback which includes a visual confirmation. In the event of an unsuccessful password change, the system notifies the administrator. The CUID and password fields are cleared. Then, the administrator is permitted to re-enter the password information and resubmit the password change request.

Password Change Edit Rules

Entity Name	Format	Length	Validation/Range
Current Password New Password Redundant New Password	Alphanumeric with special characters	8–12	A password must contain at least one alphabetic, one numeric, and one special character. The valid special characters are: ,./<>?;':[ ]{ }\\\|=– '~!@#$% &*( )_+

[0134] 6(c). Adding a Supervisor. To add or authorize access to a supervisor, the system displays the MGI Platform Interface. The administrator logs in to the system as detailed above. The system displays the CUID field. Based upon the information provided in the field, the system creates a profile. The system generates a feedback which includes a confirmation to the administrator indicating a successful addition to the system. The system updates the front-end database that a new user has been added to the system. Rules for adding a supervisor to the system are as follows:

Adding a Supervisor

Entity Name	Format	Length	Validation/Range
CUID	Alpha	7	No vowels allowed
State	Alphabetic	2	Two letter state abbreviation.

[0135] 6(d). Modifying a Supervisor Profile. To modify a supervisor profile, the system displays the MGI Platform Interface. The administrator logs in to the system as detailed above. The system displays a field for the administrator to enter a search criterion of a supervisor whose profile is to be modified to display the supervisor's profile. The system gives the administrator the capability to search for a supervisor profile based upon one or more of the following criteria related to the supervisor, including, CUID, Last Name, GPS Database, IDS Database, and State. The system displays the results of the profile search or display the results. The system gives the functionality to select a profile and edit either one profile or a group of profiles, as needed. The administrator edits the profile as needed. The system saves and updates the modification to the profile. The system generates a feedback which includes a confirmation to the administrator indicating a successful modification to the profile. The system generates notification to the front-end indicating modification in the profile.

[0136] 6(e). Deleting a Supervisor Profile. To delete a supervisor profile, the system displays the MGI Platform Interface. The administrator logs in to the system as detailed above. The system displays a field for the administrator to enter a search criterion of a supervisor whose profile is to be modified to display the supervisor's profile. The system gives the administrator the capability to search for a supervisor profile based upon one or more of the following criteria related to the supervisor, including, CUID, Last Name, First Name, City, and State. The system displays the results of the profile search. The system displays a profile for deletion. The system displays a message re-confirming the profile delete. The system deletes the profile from the MGI system. The system generates a feedback which includes a confirmation to the administrator indicating a successful profile deletion. The system generates a notification to the front-end indicating a user has been deleted from the system.

[0137] 6(f). Adding a New Administrator. To add a new administrator, the system displays the MGI Platform interface to the administrator. The administrator logs in to the system as detailed in section above. The system displays a field to enter the CUID. This CUID serves as the basis of the

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administrator profile. The system sends or displays a feed-back which includes a confirmation of the added new administrator.

[0138] 6(g). Modifying an Existing Administrator Profile. To modify an existing administrator's profile, the system displays the MGI Platform interface to the administrator. The administrator logs into the system as detailed above. The system displays a field to enter the CUID for modifi-cation. The system displays an editable profile, based upon the CUID. The system saves the edited existing administra-tor profile.

[0139] 6(h). Deleting an Existing Administrator Profile. To delete an existing administrator profile, the system displays the MGI platform interface to the administrator. The admin-istrator logs into the system as detailed above. The system prompts the administrator to enter the CUID for deletion. The system generates a feedback which includes a confir-mation message prior to deletion. The system deletes the entered CUID and saves the information accordingly.

[0140] 6(i). Supervisor Login. To enable a supervisor to login, the system displays the MGI Profile Interface login GUI to the supervisor. During login, the system verifies user access to MGI Profile Interface. The system edits and checks required data fields for the CUID and password. The system modifies password characters supplied using asterisk mask-ing. Based upon the supervisor's CUID and password, the system validates the user and grants access or denies further access to controlled areas of the system. The system vali-dates the supervisor and returns a feedback which includes an indication on either successful or a failed login attempt notification. Upon successful submission of login creden-tials, the system grants the supervisor access to other secu-rity-controlled areas of MGI Profile Interface (namely, pro-file modification and change password). In the event of an unsuccessful login, the existing CUID and password on screen data are cleared. The supervisor is allowed to re-enter the CUID and password data after an initial unsuccessful login. If the supervisor fails to login for three consecutive attempts, the system disables further attempts. Rules for supervisor login edit are as follows:

Supervisor Login Edit Rules

Entity Name	Format	Length	Validation/Range
CUID	Alpha	7	No Vowels Allowed
Password	Alphanumeric with special characters	8–12	A password must contain at least one alphabetic, one numeric, and one special character. The valid special characters are: ,./<>?;':[ ]{ }\\|=– '~!@#$% &*( )_+

[0141] 6(j). Changing Supervisor Password. After suc-cessful login, the supervisor has the capability to change passwords at any time. For a particular supervisor, changing the passwords in the MGI system does not interfere or impact interactions with other company systems. The sys-tem checks the data fields associated with the existing password, the new password, and a redundant typing of the new password. The system modifies password characters supplied with asterisk masking. The system verifies by

comparison that the user supplied new and redundant pass-words are equivalent and inform the supervisor if there are any discrepancies. Once the supervisor enters the new and old passwords, the supervisor has the capability to submit a change password request with the supplied data. When the supervisor requests to change the password, the system conducts old password validation abased upon the original password and CUID provided by the supervisor during initial login. The system returns a feedback which includes a successful or failed password change attempt. If the change is successful, the system returns a visual confirma-tion. In the event of an unsuccessful password change, the system notifies the supervisor. The CUID and password fields are cleared. Then, the supervisor will be permitted to re-enter the password information and resubmit the pass-word change request.

Password Change Edit Rules

Entity Name	Format	Length	Validation/Range
Current Password New Password Redundant New Password	Alphanumeric with special characters	8–12	A password must contain at least one alphabetic, one numeric, and one special character. The valid special characters are: ,./<>?;':[ ]{ }\\|=– '~!@#$% &*( )_+

[0142] 6(k). Modifying a Supervisor Profile. To modify a supervisor profile, the system displays the MGI Platform Interface. The supervisor logs in to the system as detailed above. The Supervisor selects the "Modify Profile" option from the MGI Platform Interface option. The Supervisor has the capability to edit one or more elements of his/her profile, including: First name; Last name; Middle Initial; Telephone number; interactive pager address; Pager number; Email address; Group ID number; and Mobile phone number. The system saves and updates the modifications to the profile. The system generates a feedback which includes a confir-mation to the administrator and supervisor indicating a successful modification to the profile. The system generates notification to the front-end indicating a change to the supervisor's profile. If the supervisor fails to supply the correct information to change the profile, the system gen-erates a message reflecting the problem with the attempted change.

[0143] The foregoing disclosure of the preferred embodi-ments of the present invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many variations and modifications of the embodi-ments described herein will be obvious to one of ordinary skill in the art in light of the above disclosure. The scope of the invention is to be defined only by the claims appended hereto, and by their equivalents.

[0144] Further, in describing representative embodiments of the present invention, the specification may have pre-sented the method and/or process of the present invention as a particular sequence of steps. However, to the extent that the method or process does not rely on the particular order of steps set forth herein, the method or process should not be limited to the particular sequence of steps described. As one

of ordinary skill in the art would appreciate, other sequences of steps may be possible. Therefore, the particular order of the steps set forth in the specification should not be construed as limitations on the claims. In addition, the claims directed to the method and/or process of the present invention should not be limited to the performance of their steps in the order written, and one skilled in the art can readily appreciate that the sequences may be varied and still remain within the spirit and scope of the present invention.

What is claimed is:

1. A method for enabling a supervisor to perform office transactions from a field location comprising the steps of:

receiving a login request from a supervisor through a remote device;

determining whether the supervisor is an authorized user;

receiving a transaction request from the supervisor if the supervisor is an authorized user;

interacting with one or more resources to execute the transaction request; and

providing a feedback to the supervisor in response to the transaction request through the remote device.

2. The method of claim 1, wherein the remote device is a telephone.

3. The method of claim 2, wherein the login request includes one or more of a user ID and a password spoken by the supervisor.

4. The method of claim 3, further comprising the step of comparing characteristics of the supervisor's voice with voice exemplars of authorized users.

5. The method of claim 2, wherein the transaction request is a spoken command provided by the supervisor.

6. The method of claim 1, wherein the remote device is a wireless device.

7. The method of claim 6, wherein the login request includes a mobile identification number associated with the wireless device.

8. The method of claim 6, further comprising the step of comparing the mobile identification number with registered mobile identification numbers associated with authorized users.

9. The method of claim 1, wherein the resources include one or more of a legacy system, an Intranet, and the Internet.

10. The method of claim 1, wherein the resources includes one or more of a security information management system, an outside plant construction management system, a loop qualification system, a work activity statistical sampling system, a fleet operations support system, a fleet optimizer system, an integrated technician performance system, a network monitoring and analysis system, a proactive maintenance administration system, an integrated dispatch system, a mechanized time reporting system, an employee scheduling program, an open system interconnect platform, and an outside plant engineering design system.

11. A system for enabling a supervisor to perform office transactions comprising:

a remote device operable by the supervisor from a field location;

a mobile gateway interface adapted to interface with the remote device during a communications session; and

one or more resources adapted to interact with the remote device through the mobile gateway interface during the communications session,

wherein the supervisor performs an office transaction through the resources using the remote device via the mobile gateway interface, wherein the office transaction involves one or more technicians associated with the supervisor.

12. The system of claim 11, wherein the mobile gateway interface is adapted to determine whether the supervisor is an authorized user of the system.

13. The system of claim 12, wherein the mobile gateway interface comprises one or more of a front-end voice server, a front-end data server, and a transaction server.

14. The system of claim 13, wherein the mobile gateway interface further comprises a database, wherein the database is accessible by one or both of the front-end voice server and the front-end data server, and wherein the database includes user information associated with the supervisor.

15. The system of claim 13, wherein the transaction server processes a transaction request received from the supervisor using the remote device if the supervisor is an authorized user of the system.

16. A mobile gateway interface for enabling supervisors to perform office transactions by using a remote device at a field location comprising:

one or more front-end servers adapted to determine whether a supervisor who submits a login request through the remote device during a communications session is an authorized user; and

a transaction server coupled to the front-end servers, wherein the transaction server interfaces between the remote device and one or more resources during the communications session to process a transaction request received from the supervisor if the supervisor is an authorized user, and wherein the resources are related to technicians associated with the supervisor.

17. The mobile gateway interface of claim 16, wherein the resources includes one or more of a security information management system, an outside plant construction management system, a loop qualification system, a work activity statistical sampling system, a fleet operations support system, a fleet optimizer system, an integrated technician performance system, a network monitoring and analysis system, a proactive maintenance administration system, an integrated dispatch system, a mechanized time reporting system, an employee scheduling program, an open system interconnect platform, and an outside plant engineering design system.

18. The mobile gateway interface of claim 16, wherein one of the front-end servers is a voice server.

19. The mobile gateway interface of claim 16, wherein one of the front-end servers is a data server.

20. The mobile gateway interface of claim 16, further comprising a database accessible to the front-end servers, wherein the database includes user information associated with authorized users of the mobile gateway interface.

21. A method for performing office transactions using a remote device comprising the steps of:

registering user information associated with one or more authorized supervisors;

receiving a login request from a supervisor, wherein the login request includes identity information associated with the supervisor;

reviewing the identity information to determine whether the identity information matches the user information; and

allowing the supervisor to perform a transaction using one or more resources related to technicians if the supervisor is an authorized supervisor.

22. The method of claim 21, wherein the transaction relates to one or more of

(a) locating a technician;

(b) querying load associated with a technician;

(c) creating a proactive maintenance action ticket;

(d) identifying a technician on high time;

(e) obtaining details about a technician and a vehicle associated with the technician;

(f) assigning a new vehicle to a technician;

(g) updating a technician's temporary schedule;

(h) completing a safety and service defect form;

(i) completing a safety observation form;

(j) finding a technician nearest to a field location;

(k) obtaining loop qualification results;

(l) managing e-mail accounts;

(m) completing a quality review form;

(n) making sales referrals; and

(o) finding out what time a technician leaves a work center.

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