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(54) **NETWORK-BASED MEDICAL PATIENT SERVICING SYSTEM**

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(52) **U.S. Cl.**

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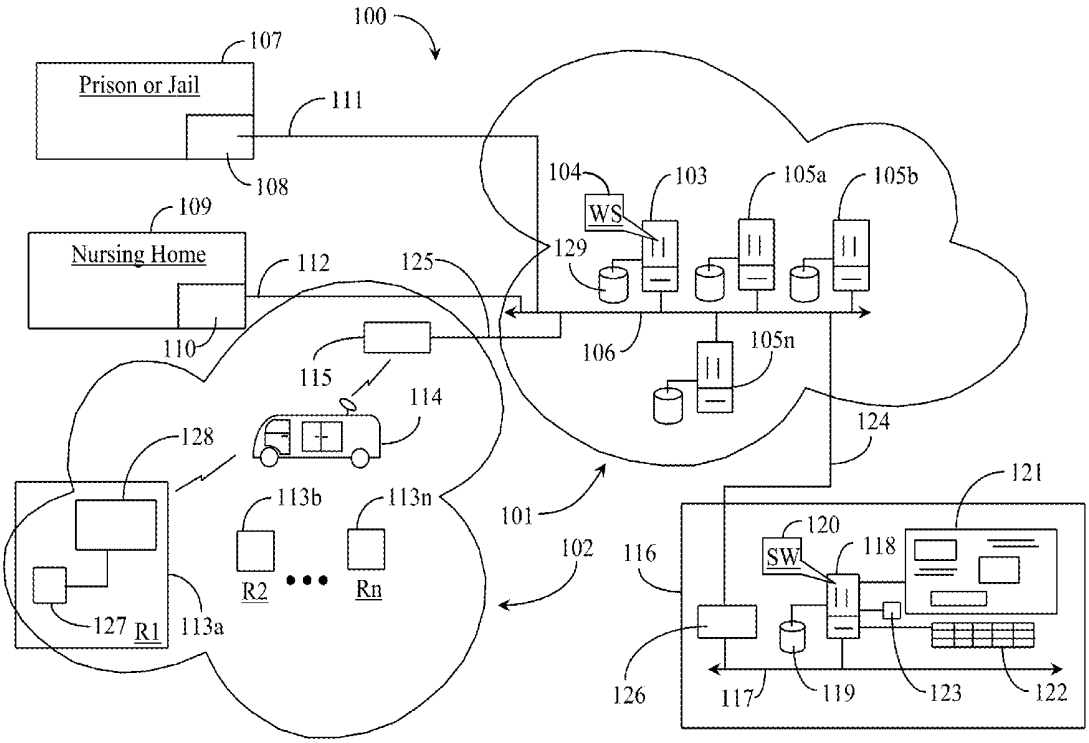
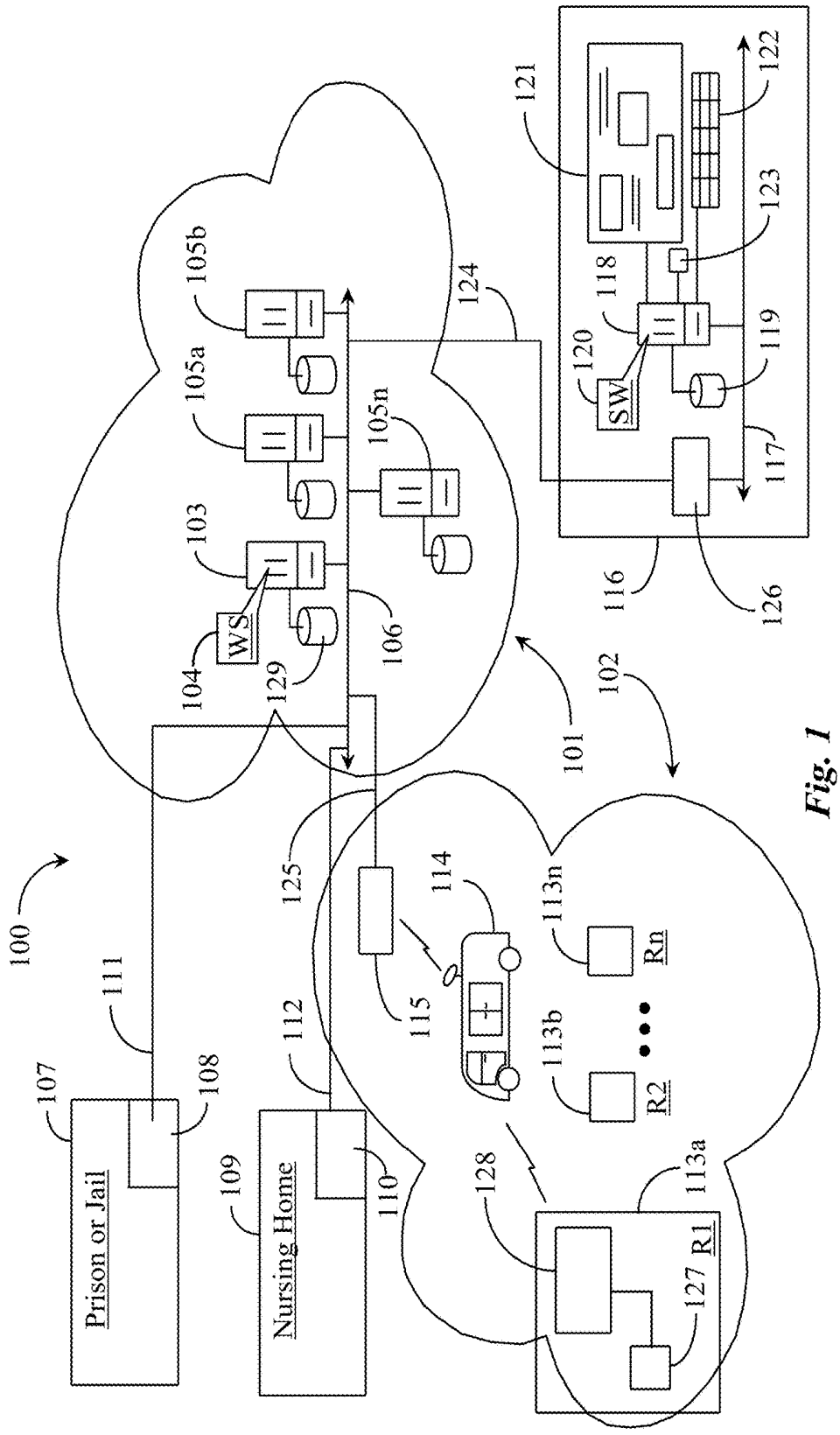
(57) **ABSTRACT**

A system has a server having a processor and a data repository, executing software from a non-transitory medium, providing an interactive interface on a display, a plurality of appointment icons in the interactive interface, each appointment icon representing a medical appointment, each appointment scheduled for a date and a time at a geographically remote location from the Internet-connected server and display, and having indicia enabled to display in color, individual colors indicating status, and a computerized appliance capable of video conferencing at the geographically remote location of one of the scheduled appointments, the computerized appliance operable by the patient or by a medical assistant to signal to the Internet-connected server a change in status of the appointment, the color of the visible indicia of the appointment icon associated with the appointment changing to a different color in the interface in response to the change in status.




100
101
102
103
104
105a
105b
105n
106
107
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110
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112
113a
113b
113n
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
Prison or Jail
Nursing Home
WS
SW
R1
R2
Rn

Fig. 1

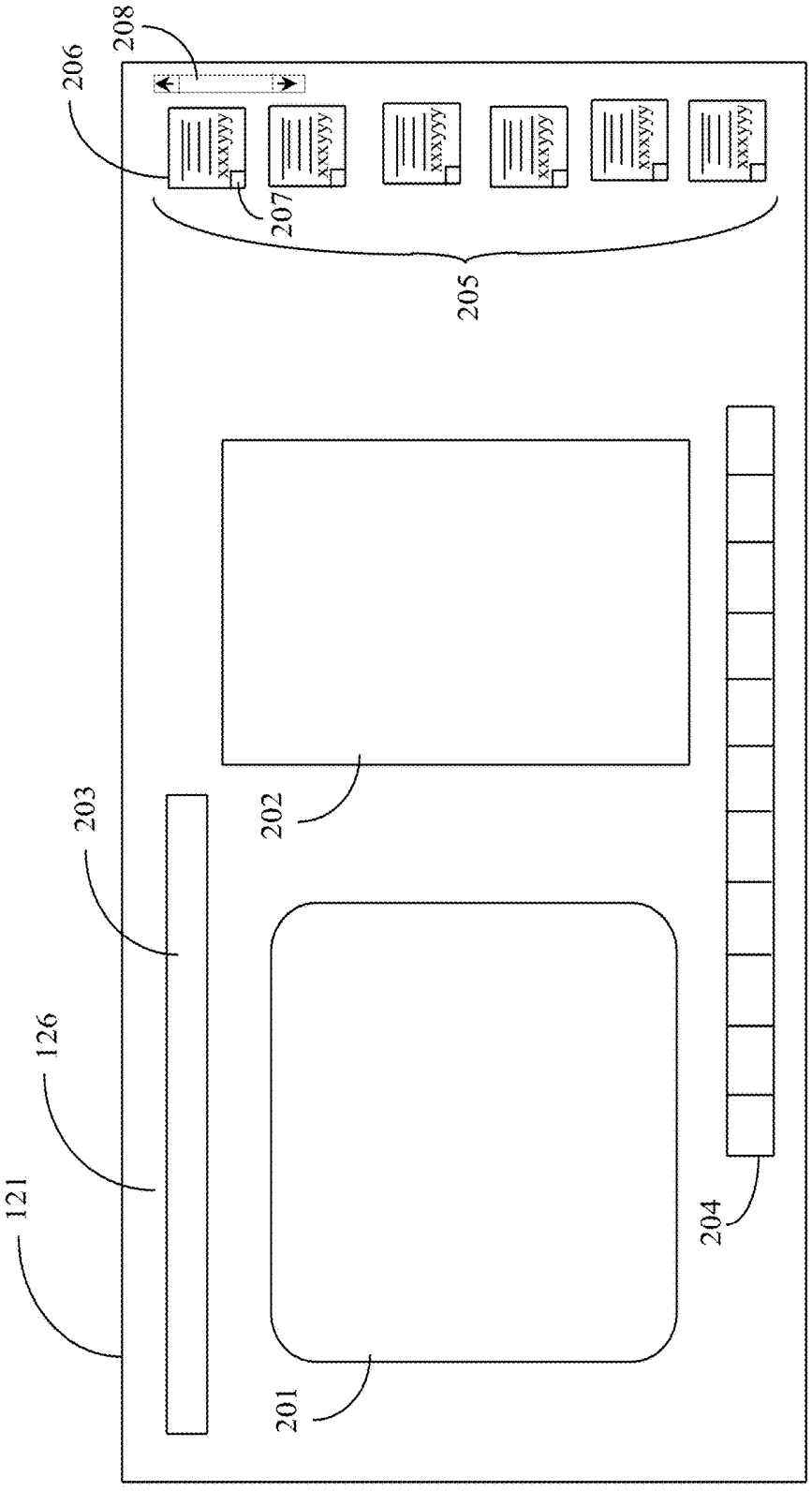

Fig. 2

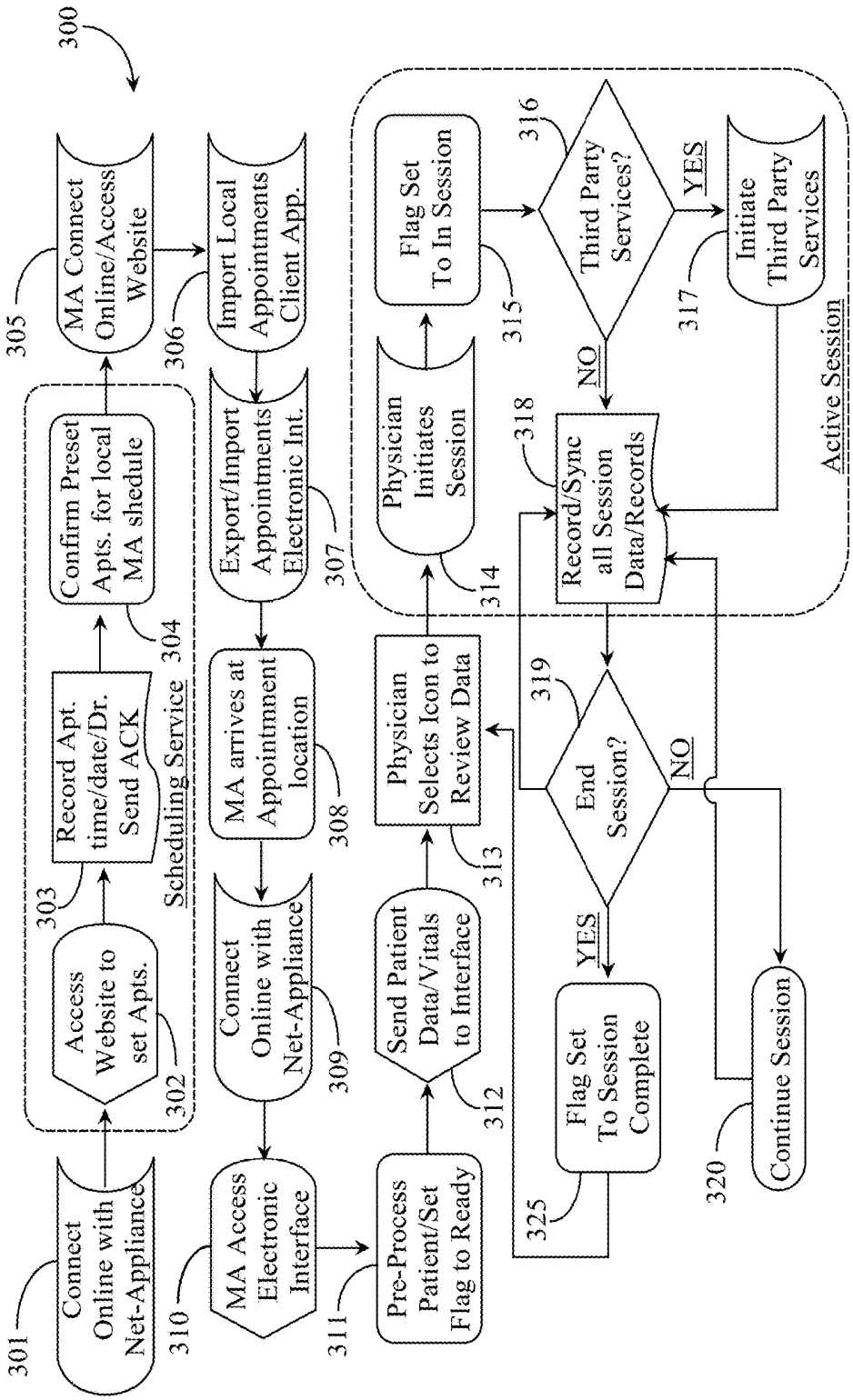
300
301
Connect Online with Net-Appliance
302
Access Website to set Apts.
303
Record Apt. time/date/Dr. Send ACK
304
Confirm Preset Apts. for local MA shedule
Scheduling Service
305
MA Connect Online/Access Website
306
Import Local Appointments Client App.
307
Export/Import Appointments Electronic Int.
308
MA arrives at Appointmnent location
309
Connect Online with Net-Appliance
310
MA Access Electronic Interface
311
Pre-Process Patient/Set Flag to Ready
312
Send Patient Data/Vitals to Interface
313
Physician Selects Icon to Review Data
314
Physician Initiates Session
315
Flag Set To In Session
316
Third Party Services?
YES
317
Initiate Third Party Services
NO
318
Record/Sync all Session Data/Records
319
End Session?
YES
325
Flag Set To Session Complete
NO
320
Continue Session
Active Session

Fig. 3

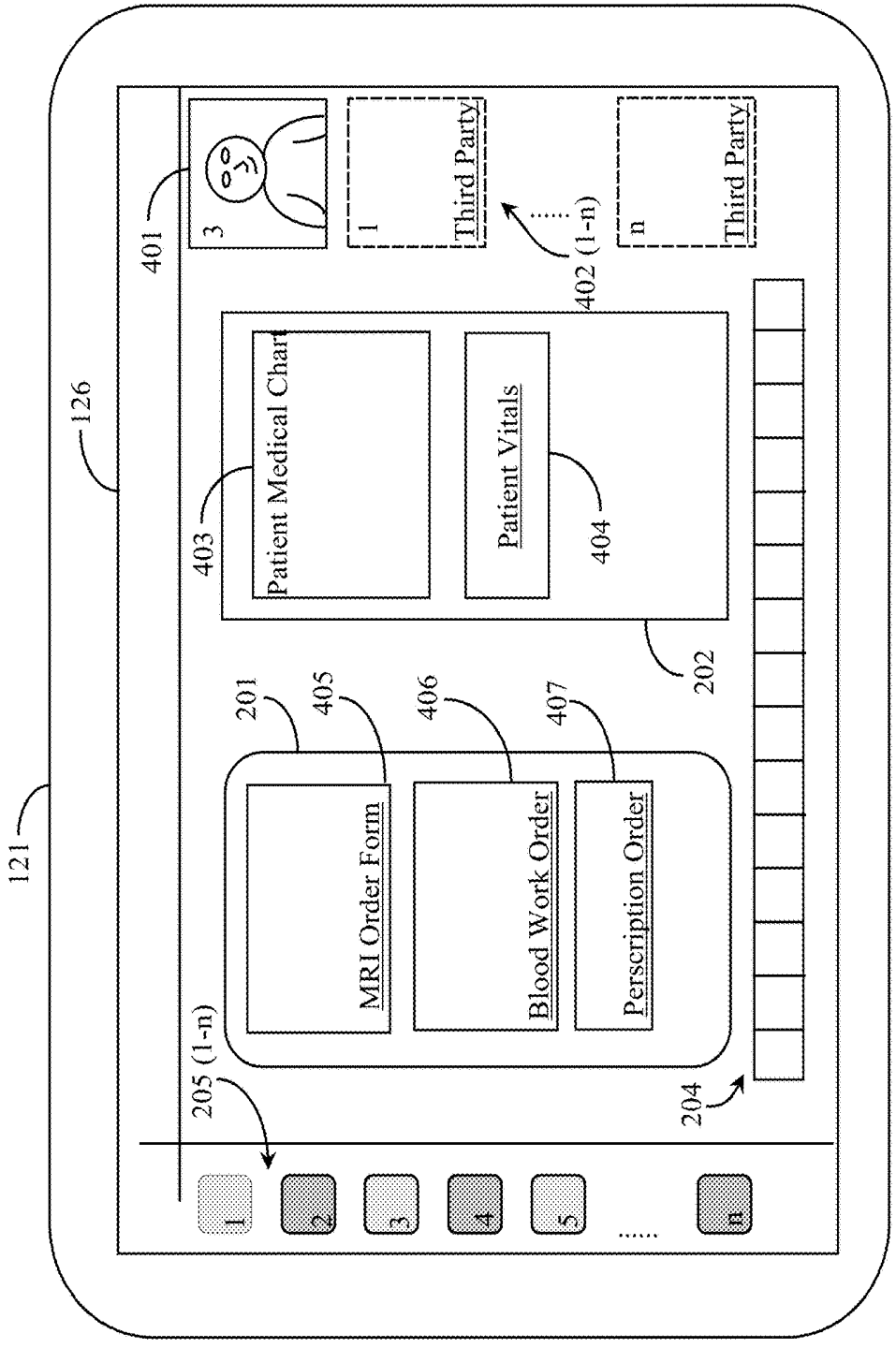
121
126
401
3
1
Third Party
n
Third Party
402 (1-n)
403
Patient Medical Chart
Patient Vitals
404
202
201
405
406
407
MRI Order Form
Blood Work Order
Perscription Order
205 (1-n)
204
1
2
3
4
5
n

Fig. 4

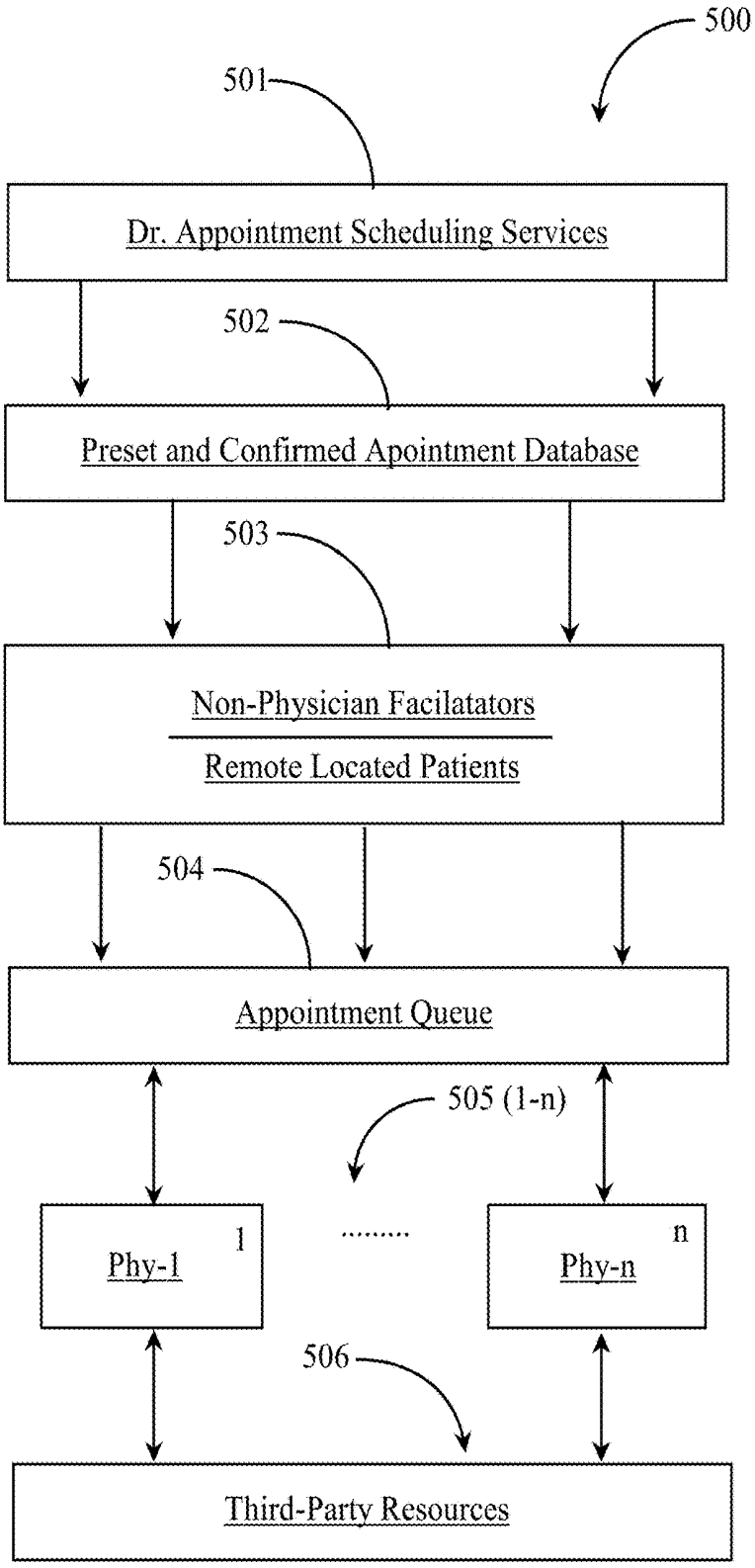
500
501
Dr. Appointment Scheduling Services
502
Preset and Confirmed Apointment Database
503
Non-Physician Facilatators
Remote Located Patients
504
Appointment Queue
505 (1-n)
Phy-1
1
.....
Phy-n
n
506
Third-Party Resources

Fig. 5

NETWORK-BASED MEDICAL PATIENT SERVICING SYSTEM

CROSS-REFERENCE TO RELATED DOCUMENTS

[0001] The present application is a continuation of co-pending application Ser. No. 13/46,574, filed May 8, 2012, which claims priority to a U.S. provisional patent application, Ser. No. 61/614,332, filed on Mar. 22, 2012 and entitled "REMOTE DELIVERY OF PHYSICIAN-DIRECTED MEDICAL SERVICES". Disclosure of the parent applications is incorporated herein in its entirety at least by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention is in the field of medical services including delivery of services over a network and pertains particularly to methods and apparatus for serving remote-located patients through a network interface.

2. Discussion of the State of the Art

[0003] In the field of medical services, patients currently in need of medical assistance come to a doctor's office, to an emergency room, or to an urgent care center where a physician on duty may examine, diagnose, and treat the patient's medical problems or conditions. This service model, necessitated traditionally in part by a need for expensive and sometimes cumbersome equipment, is a "horizon-limited" model, wherein a physician may serve a clientele in a limited geographic region. For example, a primary-care physician in a specific region will typically have clientele domiciled within that general region. Other types of physicians that specialize in chronic illnesses such as cancer may see patients that are not from the local region and therefore must travel sometimes significant distances to make a scheduled appointment or several such appointments and thus incur relative expenses such as gas, hotel, and like expenses.

[0004] More recently, and with the advance of wide-area-network connectivity such as the Internet, physicians who are typically specialists in some types of surgery, or specializing in oncology services with access to appropriate telecommunications and multimedia equipment have conducted remote teleconference sessions including multimedia with certain patients who may be in need of such services.

[0005] The inventor is aware of a U.S. Pat. No. 7,912,733 issued on Mar. 22, 2011 to Leon M. Clements as first-named inventor, hereinafter referred to as Clements. Clements proposes a remote medical services delivery suite that enables patients having scheduled medical appointments to travel to local or near-by regional medical clinics that are equipped with remote patient services work stations where the patients, with the aid of an onsite registered nurse (RN) or other medically trained staff, may connect to and receive remote physician services from an off-site physician operating from a specialized physician workstation.

[0006] One challenge with the system provided by Clements is a requirement that patients must travel to or be a resident of a local or near-regional medical facility equipped with the required multimedia apparatus and network-access facilities in order to participate in the system. Moreover, physician's facilities are required that have specialized physician workstations including full multimedia capabilities. One or more specialized medical access servers are provided and deployed on the network in the regions that are serviced in order to enable successful servicing of patient's medical needs in Clements.

[0007] Another limitation of the system of Clements is a requirement that certain non-portable medical evaluation equipment is required to be maintained onsite in specialized patient clinics where the patients must travel to access services. Other limitations exist in the system of Clements as well, which will become apparent to the skilled artisan considered in the light of the present invention.

[0008] Therefore, what is clearly needed is a network-based medical patient servicing system that solves the problems mentioned above. Such a system would increase access to immobile or travel-limited patients in a manner not dependant on location and stationary equipment.

SUMMARY OF THE INVENTION

[0009] In one embodiment of the invention a system is provided, comprising an Internet-connected server having a processor and a connected data repository, executing software from a non-transitory medium, providing an interactive interface on a display, and coupled to an audio output device, and to input apparatus comprising at least a microphone, a keyboard and a pointer, a plurality of appointment icons in the interactive interface, each appointment icon representing a medical appointment made by a patient or a person acting on behalf of the patient, each appointment scheduled for a date and a time at a geographically remote location from the Internet-connected server and display, and having visible indicia enabled to display in color, individual colors indicating status of the associated appointment, and a computerized appliance capable of video conferencing at the geographically remote location of one of the scheduled appointments associated with one of the appointment icons, the computerized appliance operable by the patient at the geographically remote location or by a medical assistant at the geographically remote location to signal to the Internet-connected server a change in status of the appointment, the color of the visible indicia of the appointment icon associated with the appointment changing to a different color in the interface in response to the change in status.

[0010] In one embodiment the medical assistant at the geographically remote location performs pre-appointment tasks, and, using the computerized appliance, updates status of the appointment, such as readiness, and signals changes to the Internet-connected server, where status is indicated in the interactive interface. Also, in one embodiment the plurality of appointment icons is arranged in a chronological queue in the display, and color of icon and position in the chronological queue changes as status changes. IN one embodiment a physician attending the display is enabled to change an appointment status using the input apparatus, and the color of the visible indicia of the associated appointment icon changes in response to the change in status. And in one embodiment a first color indicates a status that an associated appointment session is ready to begin.

[0011] In one embodiment selecting an appointment icon displaying the first color by a physician attending the display starts the appointment session and initiates a video conference between the computerized appliance and the Internet-connected server, enabling interaction between the patient or

the medical assistant and the physician attending the display. Also, in one embodiment, upon the physician initiating the appointment session and video conference, medical data regarding the patient associated in the appointment is retrieved from the data repository and displayed for the physician attending the display. Also, in one embodiment the appointment indicia further display text comprising identification of the patient associated with the appointment, and a date and time for the appointment. In one embodiment the computerized appliance is one of a laptop computer, a notebook computer, a pad device, or a portable desktop computer. And in one embodiment the computerized appliance is enabled to connect to one or more medical devices including imaging devices, acoustic measurement devices, blood pressure measurement devices, body temperature measurement devices, and weight measurement devices, and is enabled to receive medical data from the connected devices, and to transmit the medical data to the Internet-connected server, and wherein the pre-appointment activity includes the medical data from one or more of the medical devices.

[0012] In another aspect of the invention a method is provided, comprising displaying appointment icons in an interactive display, coupled to an Internet-connected server having a processor and coupled to a data repository, an audio output device, input apparatus comprising at least a microphone, a keyboard and a pointer, each appointment icon representing a medical appointment made by a patient or a person acting on behalf of the patient, each appointment scheduled for a date and a time at a geographically remote location from the Internet-connected server and display, and each appointment icon having visible indicia enabled to display in color, individual colors indicating status of the associated appointment, and enabling the patient at the geographically remote location or a medical assistant at the geographically remote location to signal to the Internet-connected server a change in status of the appointment, the color of the visible indicia of the appointment icon associated with the appointment changing to a different color in the interface in response to the change in status.

[0013] In one embodiment o the method comprises the medical assistant at the geographically remote location performing pre-appointment tasks, and, using the computerized appliance, updating status of the appointment, such as readiness, and signaling changes to the Internet-connected server, where status is indicated in the interactive interface. Also, in one embodiment the method comprises arranging the plurality of appointment icons in a chronological queue in the display and changing the color of appointment icons and position in the chronological queue as status changes. IN one embodiment the method comprises changing an appointment status by the physician attending the display using the input apparatus and changing the color and position in the chronological queue of the visible indicia of the associated appointment icon in response to the change in status. And in one embodiment the method comprises indicating associated appointment is ready to begin by changing the color to a first color.

[0014] In one embodiment the method comprises selecting an appointment icon displaying the first color by the physician attending the display, resulting in initiating a video conference between the computerized appliance and the Internet connected server, enabling interaction between the patient or the medical assistant and the physician attending the display. In one embodiment the method comprises retrieving and displaying medical data regarding the patient associated in the appointment from the data repository. In one embodiment the method comprises displaying in the appointment icon text identifying the patient associated with the appointment, and a date and time for the appointment. In one embodiment the computerized appliance is one of a laptop computer, a notebook computer, a pad device, or a portable desktop computer. And in one embodiment the method comprises enabling the computerized appliance to connect to one or more of imaging devices, acoustic measurement devices, blood pressure measurement devices, body temperature measurement devices, and weight measurement devices, to receive data from the connected devices, and to transmit the data to the Internet-connected server.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0015] FIG. **1** is an architectural overview of a patient-servicing network according to an embodiment of the present invention.

[0016] FIG. **2** is an example of an interactive interface to be used by a physician in an embodiment of the present invention.

[0017] FIG. **3** is a process flow chart depicting steps for obtaining appointments and servicing those appointments according to an embodiment of the present invention.

[0018] FIG. **4** is an exemplary screen shot of the electronic interface of FIG. **1** including appointment and third-party session queues according to an embodiment of the present invention.

[0019] FIG. **5** is a process interaction chart depicting patient services interaction according to a further embodiment of the present invention.

DETAILED DESCRIPTION

[0020] The present inventors provide a medical patient servicing system that enables patients who are logistically remote or challenged, to participate in physician-mediated appointments without leaving their residential premise. The present invention is described in enabling detail using the following examples, which may describe more than one relevant embodiment falling within the scope of the present invention.

[0021] FIG. **1** is an architectural overview of a patient-servicing network **100** according to an embodiment of the present invention. Service network **100** includes an Internet network **101** and a connected sub network **102**, which may be a wireless network such as a wireless fidelity (WiFi) network. Internet network **101** is further characterized by an Internet backbone **106**. Internet backbone **106** represents all of the lines, equipment, and access points that make up the Internet network as a whole including connected sub-networks. Therefore, there are no geographic limitations to the practice of the present invention.

[0022] Internet backbone **106** supports a Web server **103**. Web server **103** includes a processor and a connected data repository **129**. Server **103** includes a processor and software executing on the processor from a non-transitory medium, the software having access to all of the data required to enable function as a Web server. Server **103** is adapted to serve Web pages and may be maintained by a

third-party Web-hosting service. In this example, a Website (WS) **104** is hosted on server **103**. Website **104** is an access point for initiating services of the present invention.

[0023] Other Web servers or mirror servers are illustrated in this example including Web servers **105***a*, **105***b*, and **105***n*. Each Web server **105**(*a-n*) includes a processor (not explicitly illustrated) and a connected data repository. Web servers **105**(*a-n*) are assumed in this example to include software executing from their respective processors from a non-transitory physical medium, the software having access to all of the data and instruction required to function as a Web server. WS **104** may be served upon request on server **103** and or any one of or any combination of servers **105**(*a-n*). Backbone **106** carries Internet inter-communication between server **103** and other Internet-connected servers such as servers **105**(*a-n*). The servers illustrated herein represent the plethora of servers in the Internet that host private, public, social, commercial, and government Websites that provide data, functions and a broad variety of services.

[0024] An institution **107** illustrated in this example is in one instance a prison or jail facility. Facility **107** may be any type of housing provided for holding institutionalized persons or inmates. Facility **107** represents one of a large number of prisons, jails, or like institutions both in the US and around the world. Facility **107** is typically managed under a government jurisdiction or department. The government jurisdictions overseeing facilities like facility **107** are required to provide medical services for the inmates in many or most cases. Such facilities may include one or more common areas **108** where inmates undergoing in-house medical treatments may be transported for the purpose of obtaining medications, exams, or other procedures that might be performed on site such as by a nurse or physician. Area **108** may be a waiting area with one or more exam rooms where patients may be processed for medical exams, prescriptions, dental services and the like. Area **108** is not required to have resident medical equipment or physician-trained personnel in order to practice the present invention. Where such facilities like facility **107** have medical equipment, and personnel, such apparatus and personnel may be leveraged or not leveraged in conjunction with practice of the present invention.

[0025] An institution **109** is illustrated in this example as a nursing home. Facility **109** may be an assisted living community, a mental institution, or any other facility that houses disabled, retired, or elderly persons and provides these persons with living arrangements. Persons residing at facility **109** may be limited in their mobility and transportation options. Facility **109** may include one or more common areas **110** where residents undergoing in-house medical treatments may be transported for the purpose of obtaining medications, exams, or other procedures that might be performed on site such as by a nurse or physician. Area **110** may be a waiting area with one or more exam rooms where patients may be processed for medical exams, prescriptions, dental services and the like. Area **110** is not required to have resident medical equipment or physician-trained personnel in order to practice the present invention. Where such facilities like facility **109** have medical equipment, and personnel, such apparatus and personnel may be leveraged or not leveraged in conjunction with practice of the present invention.

[0026] A number of private residences, R1-Rn, also characterized by element numbers **113** (*a-n*) with private residence **113***a* expanded for view. Private residences **113**(*a-n*) represent literally millions of such personal domiciles in the US and worldwide, where families reside. Private residences may also be duplexes, apartment buildings, or condominium buildings containing a number of private residences. In a preferred aspect of the present invention, one or more non-physician medical assistants may be dispatched to various locations as determined by location information in a schedule for appointments, which are preset by patients requiring medical evaluation or assistance, or by persons acting on behalf of those patients. As such, appointments that facilitate remote physician mediation are processed onsite according to location information of each appointment. Non-physician assistants may be medical assistants (MAs) having at least some medical training. A registered nurse (RN) or an emergency medical technician (EMT) might be qualified to function as a non-physician assistant in this example.

[0027] For facilities like facility **107** and facility **109**, appointments may be held in common areas **108** and **110** respectively. Such appointments may also be held in individual cells, rooms, apartments, suites, or other living arrangements within each facility. For private residences, appointments are held within the residences on location or within a medically equipped mobile unit, which in this example is a van **114**. One or more non-physician assistants may drive van **114** to appointment locations such as residence **113***a*. In one embodiment, van **114** may also respond to facilities like facility **107** and facility **108**. Van **114** is medically equipped in a preferred embodiment and also equipped with all of the networking equipment and software to enable wireless access to Internet **101**.

[0028] In this example, facility **107** and facility **109** both have connectivity to Internet **101**, more specifically to backbone **106** through Internet access lines **111** and **112** respectively. Where such facilities include adequate medical equipment and Internet access capability, non-physician assistants may not require a medically equipped van like van **114**. Residences typically do not contain adequate medical equipment, and may not have adequate or any Internet connectivity. Therefore, van **114** may be used to provide both medical equipment and supplies, but also Internet and communications capabilities for interfacing with a remote physician during location-based appointments. Van **114** represents all types of medically equipped vehicles that may provide communications interfaces and Internet access for at least the non-physician assistants arriving at individual domiciles such as residences **113** (*a-n*) or at facilities **107** and **109**.

[0029] In this example, van **114** brokers a wireless Internet access by providing mobile wireless fidelity (WiFi) so that all appointments are conducted over an Internet connection. Van **114** in many embodiments is equipped to provide a local Wi-Fi system to engage with portable appliances in the vicinity of the van, and to provide broadband Internet access through one or more base stations **115** supported by Internet backbone **106**. Base station **115** may connect to the Internet backbone through network access line **125** in any of a wide variety of known techniques.

[0030] In FIG. **1** a medical device **127** is illustrated connected to a network-capable appliance **128**. Peripheral medical device **127** may be one of an imaging device, an acoustic measurement device, a blood pressure measurement device, a body temperature measurement device, a

weight measurement device, or other device. In addition to a processor and connected or internal data repository, network-capable appliance **128** includes an adequate display screen or monitor, a means for data input, and a networking card or circuitry enabling Internet connection through van **114** or some other access point such as a pre-existing broadband network. Network-capable appliance **128** is brought to appointments and is operated by one or more non-physician assistants.

[0031] It is important to note herein that one or more network-capable appliances may be brought to onsite appointments and may be leveraged for conducting remote wireless appointment sessions between patients and remote physicians. Network-capable appliance **128** may be one of a laptop computer, a notebook computer, an iPad, or a portable desktop computer. In a preferred embodiment, appliance **128** is adapted to dock or otherwise connect to one or a number of different peripheral medical devices **127**. Many medical procedures may be performed with relatively simple devices such as blood pressure cups, diabetes testing devices, ultrasound devices, blood oxygen measurement devices, skin analysis devices, and the like.

[0032] Such current and future envisioned peripheral devices may leverage powerful computing platforms and displays of appliances like network-capable appliance **128**. Connection between a peripheral medical device and a network-capable appliance may be achieved through such as universal serial bus (USB) docking (wired or wireless), serial port connection, or other adapters for providing digital paths between the device and appliance including power from the host device. Likewise, many peripheral devices might be powered independently and may leverage the network-capable appliance solely for collecting and uploading medical data taken by such a device during an examination for example. In one example, advances in imaging software have enabled an application for imaging the skin of a patient through the camera function of a device like an Android device or iPhone. Therefore, in many instances applications for working with peripheral devices and for on-board devices may be provided to reside and execute from a non-transitory medium on the host-device processor.

[0033] In this example, non-physician assistants may bring appliances and peripherals into residences as illustrated at residence **113***a*, or patients may enter van **114** to conduct a medical appointment. Moreover, non-physician assistants may bring network-capable appliances and peripheral medical devices into the common areas of facilities **107** and **109**. In this variation, several appointments may be run concurrently at the facilities where a number of patients are scheduled for appointments on a same day and each patient comes to the common area for their appointments. Patients may still enter van **114** for an appointment if the van is available at the location such as may be the case with med-van outreach services for the homeless, for example. Otherwise, wireless connectivity of each facility and in-house medical equipment might be utilized in addition to non-physician assistant ported appliances and medical peripheral devices without departing from the spirit and scope of the present invention. In more robust embodiments the non-physician assistant may have considerable portable equipment for medical assessment, and such equipment may communicate via a provided WiFi from van **114**, or the non-physician assistant may use an appliance that connects to the WiFi to which such equipment may connect and communicate. There are many possibilities.

[0034] A central facility **116** is illustrated in this example and may be a single room or a multi-tenant facility having a Local Area Network (LAN) **117** connected to Internet **101** through a modem **126** through Internet access line **124**. There are a variety of ways familiar to a skilled person that this connection and communication may be implemented. LAN **117** supports at least one computerized appliance **118**, typically a LAN-connected workstation or other type of network-capable appliance that is operated by one or more physicians. Appliance **118** includes a processor (not illustrated) and a data repository **119**. Data repository **119** contains patent information, medical chart information, and other data deemed important to reference or access during a remote appointment session.

[0035] LAN-connected appliance **118** further includes a display monitor or screen **121**, an input mechanism **122** such as a keyboard, and an output mechanism such as a back-up memory or storage device **123**. Appliance **118** may execute software **120** from a non-transitory physical medium connected to or residing on the processor of the appliance. SW **120** is adapted to drive an electronic interface **121**. Electronic interface **121** is executed and running during the physician's shift to enable the physician to mediate onsite appointments facilitated by the one or more non-physician assistants. Appliance **118** executing software **120** provides and drives an electronic interactive interface **126**, also illustrated in display monitor **121**.

[0036] Non-physician assistants such as an MA, for example, may arrive at a facility or residence in an equipped van such as van **114** for example. In a minimalist embodiment there may be no equipped van, but a medical assistant may arrive with a hand-held device, such as an iPad™, and one or more instruments such as equipment to measure blood pressure, temperature, heart rate, and the like, to provide data for vital signs for the physician's use. This equipment may connect directly to the iPad™ as described further above, or there may be a program executing on the iPad™ for the MA to manually enter data to be communicated to server **103** and thence to the doctor operating at central facility **116**. An important piece of equipment for the MA is image-capture and ability to communicate images, either as still images or preferably as video, to Internet server **103** and subsequently to a physician using interface **126** at central facility **116**.

[0037] In one embodiment of the present invention, SW **120** executes from an Internet-connected server and both physicians and non-physician assistants have access to the interface by connecting to the Internet and Website **104**. In another embodiment, software **120** runs on the physician's workstation or appliance **118** and is accessed by the medial assistants at each scheduled appointment time. In a preferred embodiment, physicians and assistants enjoy full bi-directional communication through text, video, and sound. Files may be transferred back and forth over the network in real time. Devices and assistant input at the patient's end provide the physician with adequate exam data. Charts and other records may be served or imported into electronic interface **126**.

[0038] FIG. **2** is an example of an interactive electronic interface **126** usable by a physician in an embodiment of the present invention. Electronic interface **126**, in display on screen **121**, is personalized to the attending physician in a

preferred embodiment and functions as the attending physician's command center. The physician may interact with, diagnose, and treat patients in a selectable order. Electronic interface **126** is an interactive interface implemented with a plurality of interactive links and or buttons that enable initiation of various interactive functions. The physician may interact with electronic interface **126** via touch screen, keyboard and a pointer device, voice input, or other supported input technologies.

[0039] Interface **126** includes a header bar **203** that may display an enterprise logo, enterprise information, names of physicians, and other medical professionals associated with the enterprise, emergency medical services and the like. A video window **201** is provided for real-time video conferencing with patients and medical assistants. Electronic interface **126** includes a data display window **202**. Window **202** may display data, both graphic data such as patient imaging records and text, such as patient chart data, email, messaging, alerts, and the like. For example, window **202** might display a patient's medical chart while a medical session is in progress, as needed. A menu bar **204** provides a plurality of interactive links, from which a physician may select to link to and use textbooks, medical journals, case studies, medical dictionaries, a calculator, and to activate a browser to browse Internet content for further information as may be needed in a medical session.

[0040] It will be apparent to the skilled artisan that electronic interface **126** may support a single interactive window for displaying data, video with sound, or two or more interactive windows without departing from the spirit and scope of the present invention. Universal data display windows (window assigned to contain display multiple different types of data) such as windows **201** and **202** may also be detached from their anchors and moved to another location, or to "float" outside of the visible boundary of the interface. Sessions may be conducted through such windows and multiple views, of different aspects of a session may be presented and displayed simultaneously and moved to any location on the physical screen **121**. Windows **201** and **202** may also be minimized or expanded in display. Session data such as real time imaging data, video with sound, sequential slides in a slide show, live teleconference, may be recorded automatically as it is received and paused or play back for review at the direction of the attending physician.

[0041] In practice of the invention persons in need of medical attention, or other persons such as caregivers and institutional personnel may schedule an appointment for a medical session with a physician associated with the enterprise. These appointments such as appointment **206**, may be made through a publicized website such as website **104** (FIG. **1**). Active appointments, as well as, pending and completed appointments represented collectively herein as indicia **205** may be physically characterized by interactive boxes, windows, or icons displayed within electronic interface **126**. In one embodiment an icon **205** may list some information as text, such as the patient's name, gender and age, and the date and time for the session. In one embodiment, each appointment representation such as appointment **206** may include a visible indicator such as a flag **207**.

[0042] The flags may be in color, such that Green, which may indicate, in certain embodiments, that the non-physician assistant such as an MA is ready to initiate a session with the physician. The physician may click or double-click on the icon to establish or accept the session. A yellow flag may be initiated to replace the green flag indicating that an established session is on hold. The physician may return to a session placed on hold by a single click or keyboard stroke action. A red flag might be used in certain embodiments to indicate a higher priority session. Flags may change color in an automated fashion or be initiated to change color manually.

[0043] Color changes to flags associated with active appointments might be communicated in one of several ways by a non-physician assistant or MA, such as by requesting a color change through a mobile client application executed to run from a non-transitory medium on a processor coupled or otherwise integrated with a portable or handheld network-capable appliance carried to the location of the appointment such as appliance **128** of FIG. **1** (application not illustrated). In one embodiment, where a client application is provided, the non-physician assistant may manually implement a color change (where allowed). A flag exhibiting or set to transparency or no color may be used to indicate that an appointment session is completed, has been or requires rescheduling, or is currently scheduled for that clinic day but not yet pending on the appointment calendar. Another color may be used to indicate that a patient and MA are in a virtual waiting room or queue, but not yet engaged. In another embodiment, a color such as orange may indicate that a patient is currently under exam by the non-physician assistant for vitals, the results of which may be immediately forwarded to the attending physician just before the physician accepts the active session. Tasks that do not require physician oversight are completed before the physician accepts the appointment.

[0044] Appointment indicia **205** may appear automatically in interface **126** such as by automated data import function. Indicia **205** may present within a virtual queue analogous to a telephony queue where additional data to the patient is available such as estimated waiting time for physician participation, and so on. Initiation or selection of an appointment such as appointment **206** will cause any live video feed sourced from the location of the patient and MA to be displayed in window **201**. The MA, patient and the physician may interact through live two-way video call, or video chat. Prior to the beginning of an active live session, the physician may retrieve, or otherwise be served a patient's current medical chart detailing all of the latest medical information about the patient and display it in a data presentation window such as **202** to familiarize with the state of the patient before the live session.

[0045] During an active session the doctor may switch to current vital signs in window **202**, and there may be an input for the doctor to switch between the two. Alternatively, both may be exhibited in a portion of window **202** and the doctor may resize them and scroll each as well. Moreover, additional windows containing such data may be launched through interaction with the electronic interface. A physician mediating a live session may also access further information, such as from case studies or web sites by using interactive links in menu bar **204** as may be required. The physician may, as a session progresses, query the patient, ask the MA to perform certain procedures to provide further information, such as asking the MA to zoom in or re-focus the image device at the patient's end to examine a wound, for example.

[0046] One or more links available within menu bar **204** may cause requested electronic forms like receipts, prescrip-

tions, medical work orders, or the like to pop-up in display or in their own windows for physician use in prescribing medications, performing evaluations, making recommendations, etc. Such forms, where required, may be digitally signed by the physicians and electronically received by the non-physician assistant. The physician may also interact with third parties through interface **126** such as with other physicians, specialists, pharmacists, radiologists, and other parties as may be required.

[0047] In one embodiment, there may be one or more links on tool bar **204** or otherwise within interface **126** for dispatching an emergency vehicle to take a patient to a hospital emergency room. At the end of a session the doctor may update the patient's medical chart, and provide specific instructions and "doctor's orders" for the patient, which may be printed out by the MA using local equipment carried either by the MA or in van **114**. In a preferred embodiment, all procedure and activity of a live session is recorded and saved with all demographic info for easy cross-reference and retrieval in future appointments or as may be required by professionals on a team working with the patient. Such recorded data may be stored in repository **129** at server **103** in a database, which may be made available to the physicians on duty and other persons and institutions authorized to see and use the information. In one embodiment, patient records and recorded session data including patient record updates may be stored on a cloud computing network such that the information may be backed up in two or more repositories. Such services may be provided by a third-party without departing from the spirit and scope of the present invention.

[0048] FIG. **3** is a process flow chart **300** depicting steps for obtaining appointments and servicing those appointments according to an embodiment of the present invention. At step **301**, a patient or a person acting on behalf of the patient such as a family member, or caretaker may connect online such as on the Internet network using a network-capable appliance. The network-capable appliance may be one of a cellular telephone, a laptop computer, a notebook computer, an android device, an iPad, or a portable computer. Once connected, the patient or other person authorized to schedule an appointment on behalf of the patient, navigates to and accesses a Website (WS) at step **302**. The Website of step **302** is analogous to Website **104** on server **103** of FIG. **1** to schedule one or more appointments. Registration services may be performed for the patient if the patient is not already registered and authorized to use the Website service for scheduling appointments.

[0049] At step **303**, Web services record the requested appointment time and date, along with other appointment particulars such as the attending physician or physicians, the reason for scheduling the appointment, for example, initial exam, follow up evaluation, doctor consultation, etc. The scheduling function of the Web service performs a lookup in a scheduling database analogous to a database in repository **129** of FIG. **1** to access available appointment times according to the particular requirements of the session. A patient or person acting on behalf of that patient may access the Website from any network access point including from home, from work, while traveling, or from any location providing Internet access. Patient identification and authentication information may be required to set an appointment.

[0050] In one embodiment, patients may set appointments without registration or authentication procedures. These services may be performed for the patient at a first session and can be used to authenticate the patient for further appointments. After setting an appointment, the system automatically sends an acknowledgement (ACK) back to the network appliance used to set the appointment. Moreover, any pre-appointment information particular to the medical service sought may be sent back with the acknowledgement. For example, a first session may require that a patient or caregiver prepare a list of current medications and supplements. Other such pre-appointment requirements may be communicated at the time of setting of the appointment.

[0051] At step **304**, some time after the appointment is set but before the date and time of the appointment, the Web service may contact the patient and, or caretaker that set the appointment to confirm the date and time of the appointment to ensure the patient will be available for remote session medical services. The patient or caregiver may have the option of canceling the appointment and may set a new appointment. Confirmation may be made by alert, message, telephone call, or other communication methods. In one embodiment, the Web service may additionally add the appointment to a calendar-based alert system to give the patient or caregiver a reminder before the scheduled time and day of the appointment. In one embodiment, scheduling and appointment confirmation is performed by a third-party contact service. In another embodiment the service is an integrated part of the physician's services and may be performed by onsite receptionists, or other doctor staff. Third party provisioning expands the opportunity to reach more patients and to schedule work for more physicians from private practice offices and from facilities belonging to different provider networks.

[0052] At step **305**, a non-physician assistant such as a medical assistant (MA) may connect online using any network-capable appliance and access the Website of step **302** before the day appointments made through the site are scheduled. The MA is charged with traveling locally to patient locations whom have appointments scheduled on that day. As described previously, there may be one or more than one MA that travels to an appointment location, for example, to facilitate remote appointment sessions. At step **306**, the MA may import locally set appointments into a client application running on a hand-held network-capable appliance used by the MA. The MA may also import preset and confirmed appointments into other applications running on any network-capable appliance. In a preferred embodiment the appliance is portable or mobile such as an iPad, smart phone, or other such device.

[0053] The MA imports all of the appointments that can reasonable are met relative to the MA traveling to and arriving at the patient location or facility where patients are scheduled. Rules may be provided to enable system estimation of travel time, expected session length, and the like to insure the MA does not have too many appointments to meet all of them. The appointments are confirmed with the patient or caregiver to reduce the risk that the MA will travel to a location and find that the appointment is cancelled or that the patient is not there.

[0054] The client application running from a non-transitory medium associated with the processor of the network-capable appliance used by the MA may include further provisions for accessing GPS assisted directional services so the MA may map all of the day's appointment locations and get directions to and from each appointment. In one embodi-

ment, messaging may be used to communicate to patients and caregivers if an MA, for example, is running behind schedule for any one appointment location. Once the MA has all of his or her appointments to run for the day, the same appointment list may be simultaneously exported or imported into a physician-centric electronic interface such as interface **126** of FIG. **2** at step **307**. In this way, a physician has notification of the appointment calendar for that day. In this case, the appointments may be entered into an appointment queue visible in the electronic interface used by the physician to establish the remote sessions.

[0055] It is noted herein that if the number of appointment locations for a day are located at a facility such as a jail or nursing home, then the system may account for less travel time for the MA and may allow more appointments to be scheduled for that day. In one embodiment, travel optimization is performed at the Website for a number of preset appointments for an MA at the time of scheduling or during confirmation. Such optimization may suggest a different order of appointments relative to the chronology of appointment times to reduce redundant travel routes for the MA and to potentially add one or more appointments to the workload. A third-party satellite mapping service that the MA has access to may perform travel optimization before or at the onset of travel to the scheduled appointment locations.

[0056] In step **308**, the MA arrives at an appointment location. The location may be at a facility such as a jail, or nursing home, or at a private residence such as a home or apartment. In one embodiment, persons traveling may schedule and receive services at a hotel room, airport, or other public locations. The MA may arrive to an appointment location in a medically equipped van that also provides connectivity services to the Internet such as wireless fidelity (WiFi) services.

[0057] It is noted herein that more than one MA may be traveling together running the same appointment calendar without departing from the spirit and scope of the present invention. The MA may arrive to an appointment location that already has wireless Internet connectivity without a special van or vehicle. One or more MAs might carry hand-held or portable network-capable appliances and portable medical equipment adapted to work with those appliances to appointment locations without requiring a van or other special vehicle. Appointments may be carried on wherever there is a good access to the network. In one embodiment, Internet connectivity state is assessed of the patient location at the time the appointment is set giving the system ample time to determine if a network-access Van will be required at one or more locations.

[0058] At step **309**, the MA connects online with a network-capable appliance and or other portable equipment such as video and sound equipment that may or may not be integrated with the particular appliance used to access the Internet. At step **310**, the MA accesses the physician-centric electronic interface that includes an appointment queue or calendar containing the preset and confirmed appointments set for the MA and remote physician. The MA may, in one embodiment, preprocess the patient at step **311** before a session is established by while the MA is online and connected to the doctor's electronic interface. Such preprocessing may include taking of vital signs like blood pressure, oxygen saturation, insulin levels, weight, patient complaints, or any other vitals that may be appropriate for the MA to take using portable medical equipment adapted to work with the MAs connected appliance.

[0059] In one embodiment, some medical appliances may be standalone devices that can be used to take information and the MA might input such data into the client application, which in turn may upload the information to the electronic interface for the attending physician before or during the appointment. Also, in step **311**, the MA, having completed the pre-evaluation including vitals, etc. might manually set a flag for the appointment to ready. Such action communicates the state of the appointment directly to the physician's electronic interface relative to the appointment in queue. The physician then knows that the MA is ready to have the physician accept the appointment and establish a remote session. The patient information taken during step **311** may be uploaded to the electronic interface at step **312**. Such data may include an indication icon or balloon associated visibly with the flag on the appointment icon resting in the visible queue.

[0060] In one embodiment, in addition to taking new vitals and initial information for upload to the physician for the current session, the MA (if medically authorized) may use the electronic interface sans physician to review, read, or interact with the patient's historical medical chart, which may include history of vital signs like temperature, blood Pressure, heart rate, pulse, the patient's chief complaint, history of the present illness, review of symptoms, such as those affecting the head, ears, eyes, nose, throat, cardiac signs, respiratory function, musculoskeletal information, condition of skin, condition of abdomen, genitourinary information, and pain. However, in a preferred embodiment, the physician has priority over access to and the ability to modify or change such patient data that will be part of the patient's record.

[0061] At step **313**, the physician may select the icon associated with pre-evaluation or vitals to review the data before accepting the appointment. The physician may also access other information from other information sources connected to the network and review such data before accepting an appointment. After data review, the physician accepts the appointment at step **314**, thus initiating a session over the network between the patient and MA and the physician. This may be accomplished by double clicking the appointment box or icon in queue. When the session legs are established and the connection or session is active, the system may set a new flag indicating that the appointment is currently in session at step **315**. The new "in session" flag may replace the former "ready flag" of step **311**. In this way all parties to the appointment queue, which could include more than one doctor operating from different electronic interfaces can see the current state for that appointment as being in session. In this way, session interruptions are less likely to occur.

[0062] During a session, it might be prudent for the physician to bring in or consult with third parties. The physician may determine, at step **316** whether to engage in third-party services on behalf of the patient. A third-party service might be adding a second physician associated with another facility for a supporting or consulting role. A third party might be a radiologist, a pharmacist, a lab technician, or another physician that will get a referral for one or more future appointments. In one embodiment, a session may include a team of specialists that may be conferring on

behalf of the patient such as a tumor board deciding on a treatment strategy for a cancer patient currently in session with the oncologist. One or more third parties may be conference in using video conferencing software integrated with the electronic interface. Such conferencing may be performed in session with or without transparency too the patient.

[0063] If at step **316**, the physician determines not to add any third-party services, the session continues and the system records and syncs (where applicable) all of the session data and available new records at step **318**. Such documentation occurs automatically through the data session as new data and files become apparent. In one embodiment, recorded audio from the patient, MA, and doctor rendered as one or more text transcripts that are later retrievable. At step **316** if the physician determines to bring in third-party services, then at step **317** the physician may initiate such services. The process then resolves to step **318** and the session information and interaction data is recorded. It is important to mention that a session may be conducted between a patient and a doctor where the MA either drops out of the session to pre-evaluate the next patient or simply participates until the patient and doctor are comfortable. Moreover, a session may include family members or other support personnel at the patient location.

[0064] In other embodiments, the MA and physician may review patient's history, medical charts, and evaluation questions and answers together with or without the active participation of the patient including review of any current or historical laboratory results like blood. Urine, EKG (report and actual tracing), biologic cultures, Xrays, and on-site lab results like glucose, urinalysis, strep test, O2 saturation, and pregnancy test.

[0065] At step **319**, the physician may determine to end the current session and move to accept a next session flagged ready for initiation. If at step **319** the physician determines to end the current session, a flag may be set at step **325** to indicate that the session is complete. The process may then resolve back to step **313** where the physician selects a next appointment icon to review a next patient's data, the process looping for each session. If the physician determines not to end a session, the process moves to step **320** and the current session is continued, and the remaining session data is recorded and synced at step **318**. In any case, when a session ends, the remaining data not yet recorded is recorded including the time of session close. Other data may be included in closing data such as total time the session lasted.

[0066] In a typical session, the physician identifies himself to the patient and MA. The MA may conform the identification of the attending physician. The physician may also confirm the identification of the MA. The MD may also confirm the patient's identification. In one embodiment of the invention, a physician may order third party services such as new scans, blood work, cultures biopsies, prescribe medications, and make other orders that involve third-party or onsite (physician's facility) medical services. If during a session a patient experiences sudden health problems that cannot be resolved at the patient's location, the physician may order an ambulance and make a referral to a local hospital where adequate physicians and equipment are available such as through emergency services (ER).

[0067] FIG. **4** is an exemplary screen shot of the electronic interface **126** of FIG. **1** including appointment and third-party session queues according to an embodiment of the present invention. Electronic interface **126** is shown in display on device screen **121**. Interface **126** is, in a preferred embodiment, personalized for a physician that attends remote appointments over a network such as the Internet. Interface **126** includes data/graphics windows **201** and **202**. Each window may display one or a number of items that may be read only items or items that may be edited by the physician. In this example, window **201** contains an interactive magnetic resonance imaging (MRI) order form **405**.

[0068] MRI form **405** contains form fillable lines and is electronically signable. A physician may, during a session, call up form **405** fill it out and sign it during the session. The form may then be electronically forwarded to a third party by electronic message such as email or by electronic fax. The patent may also receive the form through the MA facilitating the session and the form can be printed at the location of the patient using patient equipment or a portable printer provided by the MA. Order forms for any other radiologic procedures may be initiated, filled out and delivered in the same manner as described above.

[0069] Window **201** contains a blood work order form **406**. Blood work order **406** is an interactive electronic form that may also be filled out and signed by the physician. Form **406** may be delivered to the patient and printed out at the patient location. Window **201** contains a prescription order **407** for medication. Prescription order form **407**, like other electronic forms, may be filled out and delivered by the physician during the interactive session. The physician may fill out form **407** and electronically mail or fax the order to the pharmacy on file for the patient or to any other pharmacy that might be determined based on the patient's location and level of transportation capability. In one embodiment, if the patient is located in a facility that has a pharmacy, the order may be electronically faxed to the pharmacy in the institution that is housing the patient.

[0070] Window **202** contains a patient's medical chart **403**. Medical chart **403** may be any type of electronic text document with graphics as required to describe the patient demographics, medical conditions, possible allergies to medications, and current medications the patient is taking. A medical chart may be initiated by the physician during a session or before accepting the session if prior review of information is desired before talking with the patient. Window **202** also contains a chart **404** detailing the patient's current vital signs as taken by the MA before beginning the appointment session. The MA may forward patient vitals and other like information about the patient into the electronic interface where the data is associated with a session icon in queue before the physician accepts the appointment.

[0071] The physician may right click, for example, on an appointment icon and see via drop down menu, the documents that are available to the physician for review without requiring the physician to accept the appointment and initiate the session. This state is possible because the MA has access to the electronic interface for uploading the data regardless of whether the physician is currently using the interface to interact. This gives the physician time to review them before beginning the session. The electronic interface may reside on the physician's personal device or desktop. The electronic interface may instead reside on a sever where one or more physicians may or may not be working within the electronic interface. Window **201** and or **202** may also contain multimedia such as video clips taken of the patient, slide shows of pictures taken of the patient, or third-party

multimedia information that can be displayed in either or both windows for educational purposes (for the patient and or MA to view).

[0072] In this example, appointment icons **205** (**1**-n) are arranged in a queue and displayed in the sidebar of electronic interface **126**. In a preferred embodiment a non-physician assistant or MA facilitates the initiation of a session at the patient location by brining the required medical equipment (medical device peripherals) and network-capable appliance, and pre-staging the patient before the remote physician accepts the appointment. Pre-staging may include taking patient vital signs and filling out forms such as questionnaires about current conditions, pain levels, past surgeries, allergies to medications, and general information. All of the pre-staging data may be uploaded to a server and stored in a data repository that us accessible to the electronic interface. In one embodiment, the data at the network appliance of the MA at the patient's location may be "served" to the electronic interface on demand by the physician by right clicking on any of icons **205** (**1**-n). In another embodiment, the MA appliance and the physician's appliance sync data so that the patient has the correct information to review and the physician has the correct information to review.

[0073] Icons **205** (**1**-n) may be flagged or present in color according to a pre-determined color scheme that enables visual indication of the current state or stage of the appointment. In this example, there are two appointments in queue that are in session simultaneously. These are appointment **3** and appointment **5** in this example. Appointment **3** is colored yellow, in this example, indicating that the appointment is currently in session with a physician using electronic interface **126**. A real-time video **401** of the MA for the patient is presented at the far-right corner of the interface. The same video may also show the patient instead of the MA or both the patient and the MA. The patient and MA may switch places in video **401** when required. More detailed video or pictures may be taken of the patient condition such as a wound, rash, bite, or any other physical abnormality that the physician might evaluate through high-resolution video.

[0074] Appointment number **5** is also yellow indicating that patient **5** is in session with a physician. In one embodiment, there may be two or more physicians working the queue containing icons **205** (**1**-n). Each physician would operate with a personalized version of the interface so the physicians would not see each other's patient data. However, the shared appointment queue is visible in the side bar of each personalized version of the physician's interface. In this case, data about patient number **5** is visible in the interface of the other physician currently running appointment **5**. Appointment number **1** in the queue is grayed out indicating that the appointment has been completed. It may drop out of queue shortly after or immediately after it is terminated or closed.

[0075] Color-coding the appointment icons or setting visual flags aids physicians when working their own queue or a shared queue of appointments. For example, a physician would select a green appointment icon to initiate a fresh session. Icons **2**, **4**, and n are color-coded or flagged green indicating that the patients are ready to begin a remote session. Appointments in queue may be run in sequential order or worked, as they appear ready for session. For example, two patients may have 9AM appointments where one is successfully pre-processed for session before another so the green flag would indicate that state. Another color such as blue, for example, may be used to represent an appointment that is still being pre-processed by an MA. The color red may be used to indicate a medical urgency or priority. Appointments may be run by priority and by one or more physicians using personalized versions of the interface without departing from the spirit and scope of the present invention.

[0076] In this example, electronic interface **126** includes several third-party video windows **402** (**1**-n). Third-party windows **402** (**1**-n) enable physicians to teleconference with third parties while in session with a patient and MA. Link bar **204** may contain video conference call numbers that enable the physician to call third party practitioners including other physicians, radiologists, pharmacists, surgeons, other family members of the patient, and so on. In one embodiment, link bar **204** is somewhat personalized to the patient in session. For example, the third-party contacts that the physician might bring into a session through videoconference would be those that would be relevant to the patient and/or patient's condition and insurance setup. For example, if the physician attending the patient via remote session is the patient's oncologist, a third-party relevant to the patient may be the patient's primary care physician. The relevant third-party links may appear in tool bar or link bar **204** when the physician initiates the session.

[0077] In one embodiment, videoconferences may be initiated during a remote session with a patient and MA where the event is scheduled to occur during the session. In this embodiment, a team of physicians may join the session with the attending physician for the purpose of evaluating a complex case, giving second opinions, setting up other appointments, and so on. In one embodiment, the physician executes his or her electronic interface from his or her personal appliance such as an iPad™. The MA may execute his or her own application with a similar interface at the patient location. A server analogous to a game server or cloud server may then be utilized to sync the activities and interactions performed at each interface similar to a gaming environment. Data and files from the patient location may be uploaded to the server and then accessed by the physician and the MA may access files and data from the physician. In a preferred embodiment, the interaction between the physician and patient/MA is in real time during the remote session.

[0078] In one embodiment using the color-coding schema, a physician may set the color of an appointment icon or a flag associated with the icon to purple, for example, to indicate the session is active but the physician has left the session temporarily and will be back shortly. In one embodiment, pre-determined text indications are used to flag appointment icons instead of colors. One physician may also attend more than one remote session simultaneously by toggling back and forth between open sessions. In all embodiments, appropriate security protocols are observed such as authentication and login requirements, secure socket layer (SSL), virus protection, and data encryption where required.

[0079] Generally speaking, all of the functions a doctor may perform in a conventional setting, seeing patients in treatment rooms at a doctor's office, an urgent care facility or at an emergency room, the doctor may perform with the help of the MA and portable equipment in embodiments of the present invention. The doctor, in embodiments of this

invention, however, is no longer "horizon limited", and he or she may work far more efficiently and effectively. Moreover, the interaction occurring through a digital medium allows all activity and procedures to be recorded in real time with data backup, and for the doctor to have immediate access to internet-connected and local network connected information sources.

[0080] A doctor may see more patients and provide service to a greater number of people over time. By the virtue of Internet connectivity, doctors may operate in parts of the world where expenses are less than many other regions, and doctors may also specialize. The appointments web site doctors may be prioritized by skill and specialization as appointments are scheduled. A particular benefit of systems in embodiments of the present invention is in provision of full medical services to inmates of prisons and jails, and to residences of nursing homes and other residential facilities. It is well known that transporting such persons to an emergency room or an urgent care facility can be very expensive, and in some cases dangerous to the patient and/or the public.

[0081] The skilled person will understand and be aware that the elements of the invention and their interconnection and interaction in various embodiments may differ from the examples provided and described in a variety of ways, but still be within the spirit and scope of the invention. For example, there are many choices that may be made in vehicles that may be dispatched to provide Internet or more direct communication between remote sites where patents may interact with the system. There are variations in the sort of communication systems, which may, for example be Bluetooth™, WiFi,

[0082] Satellite and other sorts. There are a wide variety of portable medical devices that a MA may use in the field and a wide variety of ways such devices may be used and may communicate information and data.

[0083] FIG. **5** is a process interaction chart **500** depicting patient services interaction according to a further embodiment of the present invention. In one embodiment a third-party service **501** may provide doctor appointment scheduling services for patients and facilities. Such services may help find insurance approved physicians for patients and further initiate scheduling of remote appointments. Block **502** underscores the activity of the service in presetting and then later confirming all appointments, such appointments stored on the network in a database or repository for later distribution and sync operations.

[0084] Non-physician assistants such as MAs or RNs may access preset and confirmed appointment lists for a work period. The service may utilize mapping services and GPS location information to help plan an efficient route for non-physician assistants to "run" the appointments. Block **503** represents the non-physician facilitators at the remote patient locations. An MA may at the start of a workday download his or her appointments for that day. Travel time and other break periods are worked into the schedule so that the MA is not overutlilized or underutilized with respect to the number of locations (patients) visited. One with skill in the art will appreciate that if the MA is dispatched to a facility where all of the day's patients are facilitated, the MA may take more patients because there is no travel time from location to location.

[0085] Block **504** represents an appointment queue that appears in the physician's electronic interface. In one embodiment, one or more MAs may be assigned to a physician and those preset and confirmed appointments show up in queue on the scheduled day of service. Visual indication techniques such as flagging enables the physician to see which appointments are ready for a session and which are not yet ready to begin. An MA and patient may experience a waiting period between an indication of ready (flag set by MA) and when the physician accepts the session similar to a waiting room at a clinic. In this regard, music may be played over the MA interface including advertising. The queue may include an estimated waiting time (EWT) for a physician to respond. The EWT may be communicated from the system to the MA interface before the appointment is accepted.

[0086] Physicians **505** (**1**-n) represent physicians who may work a queue of appointments in an embodiment of a shared appointment queue. There is some advantage to having more than one physician share a queue in that more appointments can be conducted and completed in a smaller amount of time. Scenarios may include an office where more than one primary care physician is approved for seeing any one patient similar to a walk-in clinic where the patient does not know which of the onsite doctors will see them. On the other hand, there may be just one physician working a queue set up for that physician. Physicians are not required to be onsite at a physical medical facility in order to take appointments. In one embodiment, a physician using an iPad™ or another hand-held or portable network-capable appliance may connect online, access the electronic interface, and run appointments from home or from another location. Patient records, and other source data required in a session may be accessed from a computing cloud service or from a connected server.

[0087] Block **506** represents a third-party resource bar analogous to link bar **204** of FIG. **2**. In one embodiment, there may be a mix of links or addresses or numbers, some of which connect to patient neutral third parties and some of which may connect to patient centric third parties. Patient neutral parties may include new physicians or other medical practitioners that the patient may consult with and may or may not set an appointment with. Patient centric third parties might include the patient's boss, family member or members, physicians known to and previously used by the patient, etc. The resource bar may also include scientific and medical news, latest study data, or other resources that may be used by and shared among medical professionals. There are many possibilities.

[0088] It will be apparent to one with skill in the art that the remote medical patient servicing system of the invention may be provided using some or all of the mentioned features and components without departing from the spirit and scope of the present invention. It will also be apparent to the skilled artisan that the embodiments described above are specific examples of a single broader invention that may have greater scope than any of the singular descriptions taught. There may be many alterations made in the descriptions without departing from the spirit and scope of the present invention.

What is claimed is:

1. A system comprising:

an Internet-connected server having a processor and a connected data repository, executing software from a non-transitory medium, providing an interactive interface on a display, and coupled to an audio output device, and to input apparatus comprising at least a microphone, a keyboard and a pointer;

a plurality of appointment icons in the interactive interface, each appointment icon representing a medical appointment made by a patient or a person acting on behalf of the patient, each appointment scheduled for a date and a time at a geographically remote location from the Internet-connected server and display, and having visible indicia enabled to display in color, individual colors indicating status of the associated appointment; and

a computerized appliance capable of video conferencing at the geographically remote location of one of the scheduled appointments associated with one of the appointment icons, the computerized appliance operable by the patient at the geographically remote location or by a medical assistant at the geographically remote location to signal to the Internet-connected server a change in status of the appointment, the color of the visible indicia of the appointment icon associated with the appointment changing to a different color in the interface in response to the change in status.

2. The system of claim **1** wherein the medical assistant at the geographically remote location performs pre-appointment tasks, and, using the computerized appliance, updates status of the appointment, such as readiness, and signals changes to the Internet-connected server, where status is indicated in the interactive interface.

3. The system of claim **2** wherein the plurality of appointment icons is arranged in a chronological queue in the display, and color of icon and position in the chronological queue changes as status changes.

4. The system of claim **1** wherein a physician attending the display is enabled to change an appointment status using the input apparatus, and the color of the visible indicia of the associated appointment icon changes in response to the change in status.

5. The system of claim **1** wherein a first color indicates a status that an associated appointment session is ready to begin.

6. The system of claim **5** wherein selecting an appointment icon displaying the first color by a physician attending the display starts the appointment session and initiates a video conference between the computerized appliance and the Internet-connected server, enabling interaction between the patient or the medical assistant and the physician attending the display.

7. The system of claim **6** wherein, upon the physician initiating the appointment session and video conference, medical data regarding the patient associated in the appointment is retrieved from the data repository and displayed for the physician attending the display.

8. The system of claim **1** wherein the appointment indicia further display text comprising identification of the patient associated with the appointment, and a date and time for the appointment.

9. The system of claim **1**, wherein the computerized appliance is one of a laptop computer, a notebook computer, a pad device, or a portable desktop computer.

10. The system of claim **1**, wherein the computerized appliance is enabled to connect to one or more medical devices including imaging devices, acoustic measurement devices, blood pressure measurement devices, body temperature measurement devices, and weight measurement devices, and is enabled to receive medical_data from the connected devices, and to transmit the medical data to the Internet-connected server, and wherein the pre-appointment activity includes the medical data from one or more of the medical devices.

11. A method comprising:

displaying appointment icons in an interactive display, coupled to an Internet-connected server having a processor and coupled to a data repository, an audio output device, input apparatus comprising at least a microphone, a keyboard and a pointer, each appointment icon representing a medical appointment made by a patient or a person acting on behalf of the patient, each appointment scheduled for a date and a time at a geographically remote location from the Internet-connected server and display, and each appointment icon having visible indicia enabled to display in color, individual colors indicating status of the associated appointment; and

enabling the patient at the geographically remote location or a medical assistant at the geographically remote location to signal to the Internet-connected server a change in status of the appointment, the color of the visible indicia of the appointment icon associated with the appointment changing to a different color in the interface in response to the change in status.

12. The method of claim **11** comprising the medical assistant at the geographically remote location performing pre-appointment tasks, and, using the computerized appliance, updating status of the appointment, such as readiness, and signaling changes to the Internet-connected server, where status is indicated in the interactive interface.

13. The method of claim **11** comprising arranging the plurality of appointment icons in a chronological queue in the display and changing the color of appointment icons and position in the chronological queue as status changes.

14. The method of claim **11** comprising changing an appointment status by the physician attending the display using the input apparatus and changing the color and position in the chronological queue of the visible indicia of the associated appointment icon in response to the change in status.

15. The method of claim **11** comprising indicating associated appointment is ready to begin by changing the color to a first color.

16. The method of claim **15** comprising selecting an appointment icon displaying the first color by the physician attending the display, resulting in initiating a video conference between the computerized appliance and the Internet connected server, enabling interaction between the patient or the medical assistant and the physician attending the display.

17. The method of claim **16** comprising retrieving and displaying medical data regarding the patient associated in the appointment from the data repository.

18. The method of claim **11** comprising displaying in the appointment icon text identifying the patient associated with the appointment, and a date and time for the appointment.

19. The method of claim **11**, wherein the computerized appliance is one of a laptop computer, a notebook computer, a pad device, or a portable desktop computer.

20. The method of claim **11**, comprising enabling the computerized appliance to connect to one or more of imaging devices, acoustic measurement devices, blood pressure measurement devices, body temperature measurement

devices, and weight measurement devices, to receive data from the connected devices, and to transmit the data to the Internet-connected server.

* * * * *

专利名称(译)	基于网络的医疗病人服务系统		
公开(公告)号	US20190236499A1	公开(公告)日	2019-08-01
申请号	US16/375682	申请日	2019-04-04
[标]申请(专利权)人(译)	REYES DAVID		
申请(专利权)人(译)	REYES，DAVID		
当前申请(专利权)人(译)	REYES，DAVID		
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IPC分类号	G06Q10/06 G16H40/20 G06Q50/22 A61B5/00 G16H10/60		
CPC分类号	G06Q10/06 G16H40/20 G06Q50/22 A61B5/0022 A61B5/021 A61B5/0205 A61B5/01 G16H40/67		
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摘要(译)

系统具有服务器，该服务器具有处理器和数据存储库，从非暂时性介质执行软件，在显示器上提供交互式界面，在交互式界面中提供多个约会图标，每个约会图标代表医疗预约，每个约会安排在距离互联网连接的服务器和显示器的地理位置偏远的位置的日期和时间，并且具有能够显示颜色的标记，指示状态的单独颜色，以及能够在地理上远程位置处进行视频会议的计算机化设备。在预约的预约中，由患者或医疗助理操作的计算机化设备向连接因特网的服务器发信号通知预约状态的变化，与预约相关联的预约图标的可见标记的颜色变为界面中的不同颜色以响应状态的变化。