(iii) identifying within said questionnaire design computer program a branching path in said questionnaire for each possible response to each question of said series of questions.	In response to the access by the user, server computer 121 transmits a card deck to cellular telephone 100 over data capable cellular telephone network 110. As explained more completely below, a card deck includes one or more cards, and each card is interpreted by the client module to generate a user interface screen. In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the display screen. Rossmann p. 9, lines 1-8
CLAIM 4	
4. The method for managing data of claim 1 wherein step (b) includes the substeps of: (b) tokenizing said questionnaire thereby producing a plurality of tokens representing said questionnaire by:	In response to the access by the user, server computer 121 transmits a card deck to cellular telephone 100 over data capable cellular telephone network 110. As explained more completely below, a card deck includes one or more cards, and each card is interpreted by the client module to generate a user interface screen. In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the display screen. Rossmann p. 9, lines 1-8 In response to entry of the purchase order number, the client process transmits a request to server computer 121 for the particular purchase order. Specifically, the client process appends the entered data to a resource locator and transmits a message containing the resource locator to server computer 121. Server computer 121, in response to the message, retrieves the appropriate purchase order and **transmits the purchase order as a card deck** to the client process in cellular telephone 100 over airnet network 150. **The client process interprets the card deck** and generates a screen display 209 (Fig. 2F). Initially, fax key 208 is not highlighted in screen display 209.

Notice that screen display 209 includes multi-display screen card indicator 203 to show the user that the purchase order screen contains more information that can be displayed at one time on display screen 105.

After the user reviews the purchase order, the user presses the key sequence for fax key 208 and in response, fax key 208 is highlighted as illustrated in Figure 2F.
Rossmann, p. 10, lines 38-48

In addition, the client process using the information transmitted from server computer 121, **i.e., the cards, generates a wide-variety of user interfaces as illustrated in Figures 2A to 2H.**
Rossmann p. 11, lines 15-16

Preferably, each data type is compressed to facilitate optimal transfer over the two-way data communication network. For example, the verbs in the telephone interaction description language are compressed using a binary **tokenization**. Graphics are compressed using run length limited compression and text is compressed using anyone of the well-known techniques for text compression.
Rossmann p. 14, lines 55-58

Instructions in the telephone interaction description language and in the terminal interaction language are grouped into **a deck and a card**. Each deck includes one or more cards. A card includes the information, i.e., a set of telephone interaction description language, required to generate a screen. As indicated above, a screen can be larger than the 5 number of lines in a display screen. Other equivalent terms for a card include a page and an atomic interaction. Thus, a card deck is simply a group of screens. The number of cards in a card deck is selected to facilitate efficient use of the resources in the two-way data communication device and in the airnet network.
Rossmann p. 15, lines 2-7

For example, if the user of cellular telephone 700 requested a fax as in Figure 2F, the HTTP request identifies a common gateway interface application in CGI programs 761 that accepts as input data the telephone number and grabs the information to be faxed. The CGI application generates an e-mail transmission to the fax gateway. **Similarly, for a stock quote**, server 749, in response to the HTTP request, launches a common gateway interface application that sends out a stock query over Internet 140 to a stock quote service provider using the ticker tape symbol passed as input data by server 749 to the common gateway interface application. When the response to the stock query is received,

	the common gateway interface application builds a PIDL deck that includes the data in the response to the stock query. The interface presented in Table 7 for TIL manager module 1403 is designed with the assumption that TIL is a direct tokenization of PIDL as described in Appendix I. Rossmann p. 15, lines 56-57
(i) assigning at least one token to each question of said series of questions;	Specifically, the application accessed on server computer 121 generates the card deck and so in turn defines each of the various user interfaces. Each user interface permits the user to identify a particular selection. Each particular selection could result in generation of a different user interface with different selections. Thus, the user interfaces are limited only by the applications accessible to the two-way data communication device. Rossmann p. 11, lines 21-24 In response to the access by the user, server computer 121 transmits a card deck to cellular telephone 100 over data capable cellular telephone network 110. As explained more completely below, a card deck includes one or more cards, and each card is interpreted by the client module to generate a user interface screen. In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the display screen. Rossmann p. 9, lines 1-8
(ii) assigning at least one token to each response called for in said series of questions to identify the type of response required; and	The home key is associated with a pointer, that in one embodiment is a resource locator, and the card addressed by the pointer is displayed by the client process when the home key is selected by the user. Specifically, if the pointer is to a card in the current deck, the client process simply displays that card. If the pointer is to other than a card in the current deck, the client process in cellular telephone 100 retrieves the deck containing the card at the location identified by the pointer. The location could be, for example, either a memory in cellular telephone 100, or a memory in computer 121. Rossmann p. 9, line 59-p. 10, line 5

	Specifically, the application accessed on server computer 121 generates the card deck and so in turn defines each of the various user interfaces. Each user interface permits the user to identify a particular selection. Each particular selection could result in generation of a different user interface with different selections. Thus, the user interfaces are limited only by the applications accessible to the two-way data communication device. Rossmann p. 11, lines 21-24
(iii) assigning at least one token to each branch in said questionnaire to identify the required program control associated with said branch.	The client process in cellular telephone 100 interprets the first card in the card deck from computer 141 and generates screen display 400 (Fig. 4A). When the user presses a predetermined key, cellular telephone 100 displays screen display 401 (Fig. 4B). Screen display 401 provides the user with a series of choices that group services alphabetically. When the user depresses the seven key on the keypad of cellular telephone 100, cellular telephone 100 displays a list of the services that have letters P, R, or S as the first letter in the service name. In this embodiment, screen displays 401 and 402 are a single card, e.g., a single screen. Each of the various services associated with a key has an index and when a particular choice is made by the user, the choice defines an index. The client process then displays all of the services with the index that corresponds to the index defined by the user's choice. In screen display 402, the user is given a series of choices of services that are available to the user under tab seven. Initially, item three in screen display 402 is not highlighted. In this example, the user depresses the three key on the keypad of cellular telephone 100 to select the stock quotes and item three in screen display 402 is highlighted. In response to this selection, cellular telephone 100 transmits a request for a stock quote, i.e., a message including a resource locator, over cellular telephone network 100 and internet 140 to service provider 141. In response to the request, service provider computer 141 executes the application addressed by the resource locator. The application retrieves a card deck that, in turn is transmitted to cellular telephone 100. The card deck includes a display card and an entry card. Upon receiving the card deck, the client process in cellular telephone 100 interprets the display card and generates screen display 403 (Fig. 40). When the user depresses a predetermined key, entry screen display 406 (Fig. 4E) is generated on display screen 105 of cellular telephone 100. Initially, the box with letters SUNW in screen display 406 is empty. The

	letters SUNW are entered in the box by the user to indicate the ticker symbol of the stock for which the user wants information. After the user has entered the stock ticker symbol, the user presses the predetermined key to indicate that the entry is complete. In response to the entry by the user, the client module appends the stock ticker symbol to the resource locator and transmits the resource locator to service provider computer 141 which, in turn, executes an application addressed by the resource locator to retrieve the latest stock market information for the stock ticker symbol. Service provider 141 uses the retrieved information to generate a card deck that contains the information and then transmits the card deck to cellular telephone 100. Rossmann p. 12, lines 25-52 A database is a collection of related objects. Each object has associated attributes, and each attribute assumes one or more values at any given time. Special values are used internally to represent NULL, NIL, EMPTY, UNKNOWN, and similar values. Each object is identified by at least one "key." Some keys are "global" in that they are normally unique within the entire database; other keys are "local" and are unique only within a proper subset of the database. A database is "hierarchical" if the objects are related by their relative position in a hierarchy, such as a file system hierarchy. Hierarchies are often represented by tree structures. The target database includes file descriptor objects, directory descriptor objects, directory services objects, printer job objects, or other objects. The target database is distributed in that entries are kept in the replicas 56 on different computers 40. Each replica 56 in the target database contains at least some of the same variables or records as the other replicas 56. The values stored in different replicas 56 for a given attribute are called "corresponding values." In general, corresponding values will be equal. Falls at Col. 7, lines 24-43 An object is an instance of an object class. The target database contains objects that are defined according to the schema 84 and the particulars of the network 10. Some of these objects may represent resources of the network 10. The target database is a "hierarchical" database because the objects in the database are connected in a hierarchical tree structure. Objects in the tree that can contain other objects are called "container objects" and must be instances of a container object class. Falls at Col. 8, lines 41-49
CLAIM 5	

5. A method for modifying a questionnaire used in data management according to the method of claim 1 including the steps of: (a) making at least one incremental change to a portion of the questionnaire;	Thus, the client module only interprets this information and interacts appropriately with the hardware of the two-way data communication device. Consequently, to update an application requires only **changes** on the server computer and not changes in each two-way data communication device that communicates with that server computer. This invention eliminates the usual requirement for distribution of application software, and application software updates to the end user of the two-way data communication device. Rossmann p. 4, lines 47-51
(b) tokenizing said at least one incremental change to said questionnaire;	For local services, like local message store, there are two basic approaches that can be used. First, local services are implemented in a CGI-like manner. Each local service has an entry point which is called with an argument list. A TIL deck is returned via the event manager. From that point on, the TIL deck is processed in the standard manner. This approach limits local services to the same constraints as remote services. A less restrictive approach is to allow the local service to field events instead of the standard event loop. The local service would construct TIL cards on-the-fly and feed them to user interface manager 1406. Note that the local service would need to cooperate with the standard event loop with regard to the history, the pushed card list, and any other state that is normally managed by the event loop. Table 4 is a listing of processes for the architecture for navigation manager module 1401. Rossmann p. 26, lines 37-44
(c) transmitting at least a portion of said tokens resulting from step (b) to a remote loosely networked computing device, said transmitted tokens comprising less than the entire tokenized questionnaire; and,	For local services, like local message store, there are two basic approaches that can be used. First, local services are implemented in a CGI-like manner. Each local service has an entry point which is called with an argument list. A TIL deck is returned via the event manager. From that point on, the TIL deck is processed in the standard manner. This approach limits local services to the same constraints as remote services. A less restrictive approach is to allow the local service to field events instead of the standard event loop. The local service would construct TIL cards on-the-fly and feed them to user interface manager 1406. Note that the local service would need to cooperate with the standard event loop with regard to the history, the pushed card list, and any other state that is normally managed by the event loop. Table 4 is a listing of processes for the architecture for navigation manager module 1401. Rossmann p. 26, lines 37-44
(d) incorporating said transmitted tokens into said	Thus, the client module only interprets this information and interacts appropriately with the hardware of the two-way data communication device. Consequently, to update an application requires only **changes** on

questionnaire at said loosely networked remote computing device, thereby modifying said questionnaire.	the server computer and not changes in each two-way data communication device that communicates with that server computer. This invention eliminates the usual requirement for distribution of application software, and application software updates to the end user of the two-way data communication device. Rossmann p. 4, lines 47-51 For local services, like local message store, there are two basic approaches that can be used. First, local services are implemented in a CGI-like manner. Each local service has an entry point which is called with an argument list. A TIL deck is returned via the event manager. From that point on, the TIL deck is processed in the standard manner. This approach limits local services to the same constraints as remote services. A less restrictive approach is to allow the local service to field events instead of the standard event loop. The local service would construct TIL cards on-the-fly and feed them to user interface manager 1406. Note that the local service would need to cooperate with the standard event loop with regard to the history, the pushed card list, and any other state that is normally managed by the event loop. Table 4 is a listing of processes for the architecture for navigation manager module 1401. Rossmann p. 26, lines 37-44
CLAIM 6	
6. A method for managing data according to claim 1, wherein said first wireless modem or wireless LAN network connection and said second wireless modem or wireless LAN network connection are a same wireless modem or wireless LAN network connection.	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone, any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and 140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37
CLAIM 7	
7. The method of claim 1 further including performing at least the steps (c)-	Each wireless communication device 100 that includes this invention can communicate over airnet network 150 with any server computer 121, 131, and 141 on airnet network 150 that includes at least one application that communicates and interacts with the processes of this

(k) for at least two different remote computing device types using the same tokens.	invention that are included within device 100. Thus, device 100 can access information on the computer network and provide information to the computer network. Similarly, a two-way pager 101, and a telephone 102 with a modem 103, that each include this invention, can communicate over airnet network 150 with any of server computers 121, 131, and 141 that includes at least one application that communicates and interacts with the processes of this invention that are included within devices 101 and 102. Rossmann p. 6, lines 38-44
CLAIM 8	
8. A method for managing data transfers between computers including the steps of:	As indicated above, the two-way data communication device of this invention utilizes a client module to transmit a message including a resource locator selected by the user over the two-way data communication network to a server on a server computer on the computer network. For example, the computer network can be a corporate wide area network, a corporate local area network, the Internet, or any combination of computer networks. The server processes the message, i.e., executes the application addressed by the resource locator and transmits a response over the two-way data communication network to the two-way data communication device, which stores the response in a memory. The client module interprets the response and generates a user interface using information in the response. In one embodiment, the user interface includes at least one user data input option that is associated with a resource locator. Rossmann p. 4, lines 1-9
(a) creating a questionnaire at a first site in a first computer;	In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the display screen. Rossmann p. 9, lines 4-8 When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs. Rossmann p. 9, lines 15-18

	In response to entry of the purchase order number, the client process transmits a request to server computer 121 for the particular purchase order. Specifically, the client process appends the entered data to a resource locator and transmits a message containing the resource locator to server computer 121. Server computer 121, in response to the message, retrieves the **appropriate purchase order** and transmits the purchase order as a card deck to the client process in cellular telephone 100 over airnet network 150. The client process interprets the card deck and generates a screen display 209 (Fig. 2F). Initially, fax key 208 is not highlighted in screen display 209. Notice that screen display 209 includes multi-display screen card indicator 203 to show the user that the purchase order screen contains more information that can be displayed at one time on display screen 105. After the user reviews the purchase order, the user presses the key sequence for fax key 208 and in response, fax key 208 is highlighted as illustrated in Figure 2F. Rossmann p. 10, lines, 38-48 For simplicity, in this embodiment, each card is a single operation. Herein, an operation is defined as a related set of actions such that the user does not encounter an unanticipated delay in moving from one action to the next, i.e., the user does not have to wait for client module 702 to retrieve another card deck from computer 743. Also, a deck may include definitions of soft keys that stay in force while the deck is active, i.e., being executed by the cellular telephone microcontroller. Rossmann p. 15, lines 8-12
(b) tokenizing said questionnaire, thereby producing a tokenized questionnaire;	In response to entry of the purchase order number, the client process transmits a request to server computer 121 for the particular purchase order. Specifically, the client process appends the entered data to a resource locator and transmits a message containing the resource locator to server computer 121. Server computer 121, in response to the message, retrieves the appropriate purchase order and **transmits the purchase order as a card deck** to the client process in cellular telephone 100 over airnet network 150. **The client process interprets the card deck** and generates a screen display 209 (Fig. 2F). Initially, fax key 208 is not highlighted in screen display 209. Notice that screen display 209 includes multi-display screen card

indicator 203 to show the user that the purchase order screen contains more information that can be displayed at one time on display screen 105.

After the user reviews the purchase order, the user presses the key sequence for fax key 208 and in response, fax key 208 is highlighted as illustrated in Figure 2F.
Rossmann, p. 10, lines 38-48

In addition, the client process using the information transmitted from server computer 121, **i.e., the cards, generates a wide-variety of user interfaces as illustrated in Figures 2A to 2H.**
Rossmann p. 11, lines 15-16

Preferably, each data type is compressed to facilitate optimal transfer over the two-way data communication network. For example, the verbs in the telephone interaction description language are compressed using a binary **tokenization**. Graphics are compressed using run length limited compression and text is compressed using anyone of the well-known techniques for text compression.
Rossmann p. 14, lines 55-58

Instructions in the telephone interaction description language and in the terminal interaction language are grouped into **a deck and a card**. Each deck includes one or more cards. A card includes the information, i.e., a set of telephone interaction description language, required to generate a screen. As indicated above, a screen can be larger than the 5 number of lines in a display screen. Other equivalent terms for a card include a page and an atomic interaction. Thus, a card deck is simply a group of screens. The number of cards in a card deck is selected to facilitate efficient use of the resources in the two-way data communication device and in the airnet network.
Rossmann p. 15, lines 2-7

For example, if the user of cellular telephone 700 requested a fax as in Figure 2F, the HTTP request identifies a common gateway interface application in CGI programs 761 that accepts as input data the telephone number and grabs the information to be faxed. The CGI application generates an e-mail transmission to the fax gateway. **Similarly, for a stock quote**, server 749, in response to the HTTP request, launches a common gateway interface application that sends out a stock query over Internet 140 to a stock quote service provider using the ticker tape symbol passed as input data by server 749 to the common gateway interface application. When the response to the stock query is received, the common
gateway interface application builds a PIDL deck that includes the data

	in the response to the stock query. The interface presented in Table 7 for TIL manager module 1403 is designed with the assumption that TIL is a direct tokenization of PIDL as described in Appendix I. Rossmann p. 15, lines 56-57
(c) bringing a remote computer into electronic communication with said first computer;	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone, any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and 140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37 For example other two-way data communication networks for cellular telephones that may be used include TDMA, CDMA, and GSM circuit switched data networks; and the AMPS analog cellular network with a modem. Similarly, for two-way pagers, two-way data communication networks include PACT, or other priority two-way paging networks with data transport capability. Rossmann p. 14, lines 35-38 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use

	and appearance with the selected portion of the actual network. Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29

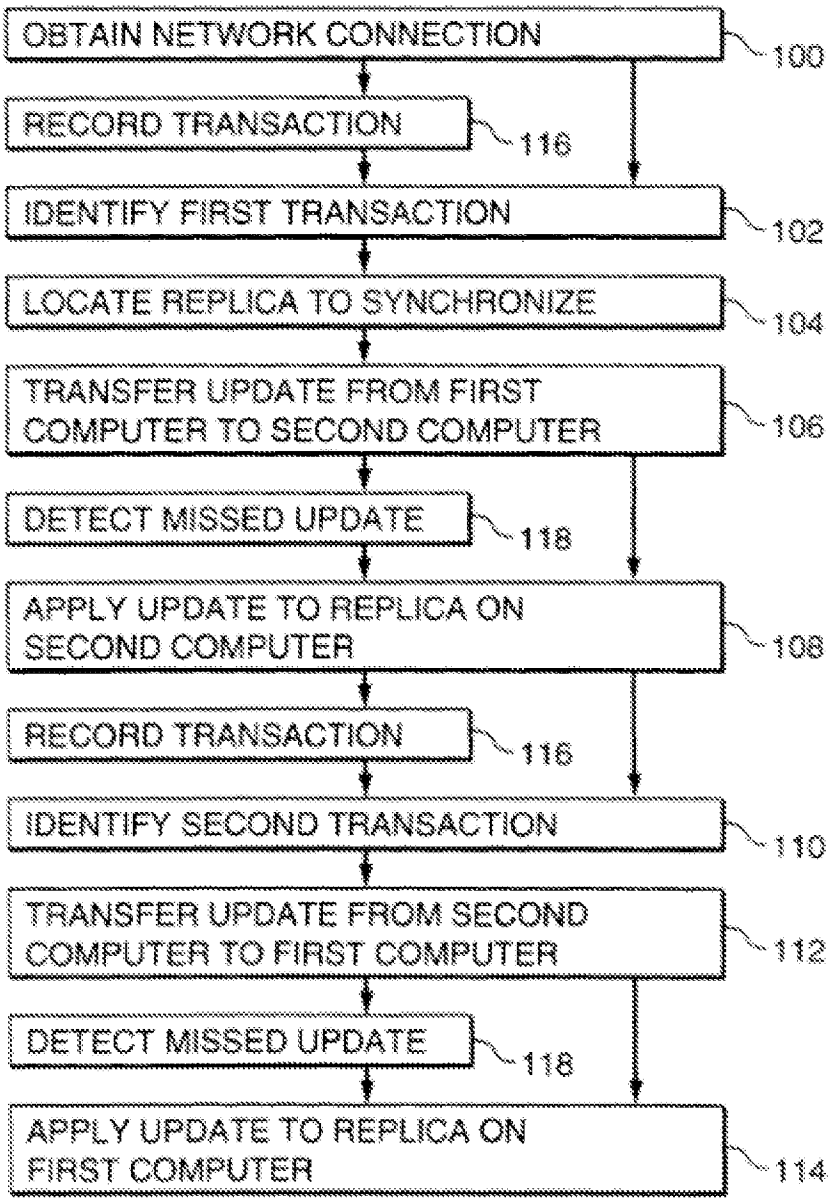


FIG. 4

(d) transmitting said tokenized questionnaire to said remote computer;	In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the display screen. Rossmann p. 9, lines 4-8

Preferably, each data type is compressed to facilitate optimal transfer over the two-way data communication network. For example, the verbs in the telephone interaction description language are compressed using a binary **tokenization**. Graphics are compressed using run length limited compression and text is compressed using anyone of the well-known techniques for text compression. Rossmann p. 14, lines 55-58

Instructions in the telephone interaction description language and in the terminal interaction language are grouped into **a deck and a card**. Each deck includes one or more cards. A card includes the information, i.e., a set of telephone interaction description language, required to generate a screen. As indicated above, a screen can be larger than the 5 number of lines in a display screen. Other equivalent terms for a card include a page and an atomic interaction. Thus, a card deck is simply a group of screens. The number of cards in a card deck is selected to facilitate efficient use of the resources in the two-way data communication device and in the airnet network.
Rossmann p. 15, lines 2-7

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention.
Falls at Abstract

The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network.

Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does

	not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(e) removing said remote computer from electronic communication with said first computer;	For simplicity, in this embodiment, each card is a single operation. Herein, an operation is defined as a related set of actions such that the user does not encounter an unanticipated delay in moving from one action to the next, i.e., the user does not have to wait for client module 702 to retrieve another card deck from computer 743. Also, a deck may include definitions of soft keys that stay in force while the deck is active, i.e., being executed by the cellular telephone microcontroller. Rossmann p. 15, lines 8-12 For example other two-way data communication networks for cellular telephones that may be used include TDMA, CDMA, and GSM circuit switched data networks; and the AMPS analog cellular network with a modem. Similarly, for two-way pagers, two-way data communication networks include PACT, or other priority two-way paging networks with data transport capability. Rossmann p. 14, lines 35-38

	After the transaction is logged, processing transfers to transmit result 1317. In transmit result 1317, ANT request processor 1204 returns the deck to client 702. After the deck is transmitted, ANT request processor 1204 is terminated. Rossmann p. 26, lines 5-6. Routine NM_lnit initializes network manager module 1402 and so is called before any other calls in network manager module 1402. Routine NM_ Terminate closes processing of network manager module 1402 and so is called after all other calls in network manager module 1402. Rossmann p. 28, lines 39-41

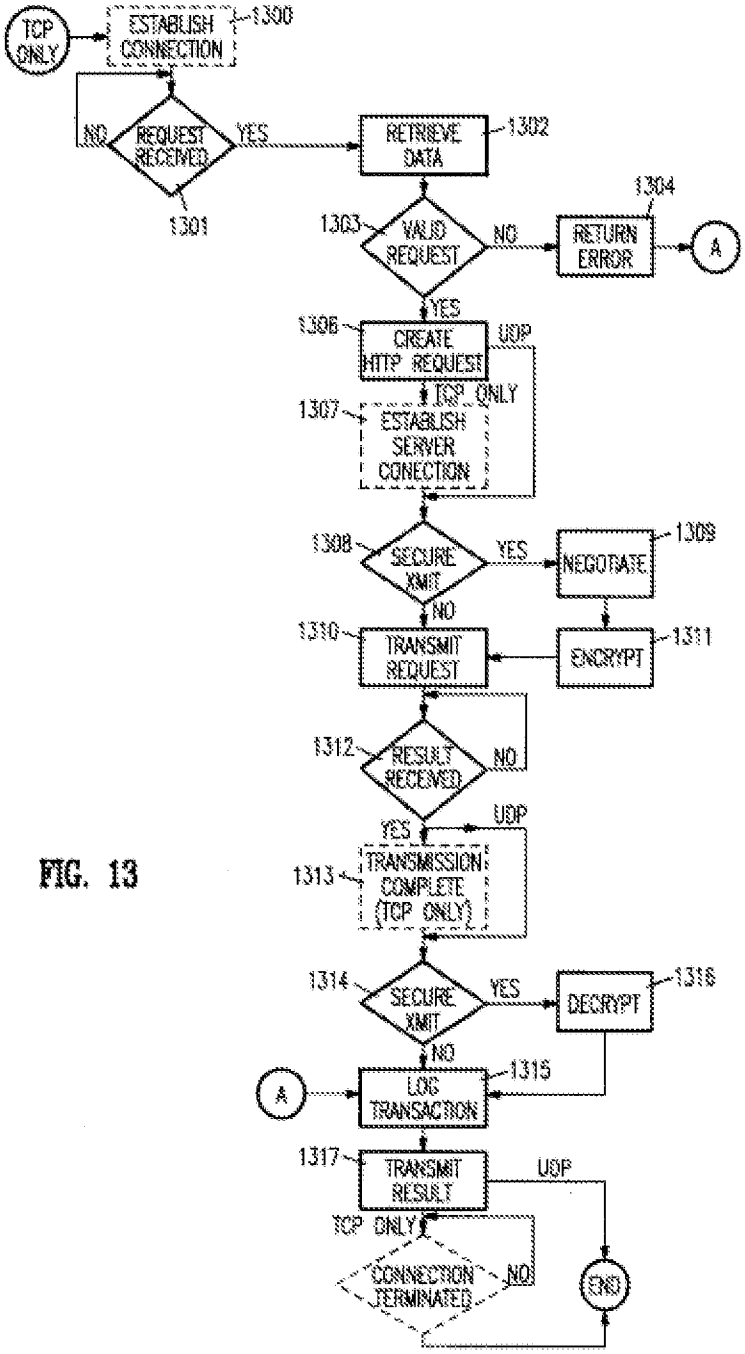


FIG. 13

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to

	the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29 With reference to FIG. 2, at least two of the computers 28 are disconnectable computers 40 configured according to the present invention. Each disconnectable computer 40 includes a database manager 42 which provides a location independent interface to a distributed hierarchical target database embodied in convergently consistent replicas 56. Falls at 7:16-21
(f) within said remote computer, using said transmitted tokenized questionnaire to obtain at least one user response;	For simplicity, in this embodiment, each card is a single operation. Herein, an operation is defined as a related set of actions such that the user does not encounter an unanticipated delay in moving from one action to the next, i.e., the user does not have to wait for client module 702 to retrieve another card deck from computer 743. Also, a deck may include definitions of soft keys that stay in force while the deck is active, i.e., being executed by the cellular telephone microcontroller. Rossmann p. 15, lines 8-12

	The client process in cellular telephone 100 interprets the display card that includes image and text data and generates screen display 300 on display screen 105 (Fig. 3A). Screen display 300 includes a home key 301, and an info key 302. When the user selects home key 301, the user is returned to the home screen. Info key 302 functions in a manner similar to that described above for info key 205. When the user presses a predetermined key, the client process interprets the choice card and a second screen display 304 (Fig. 3B) is driven on display screen 105. Screen display 304 is a menu of the personal information that is stored on *server* computer 131 for use by the user of cellular telephone 100. Multi-display screen card indicator 203, e.g., the hand with a finger pointing down, illustrates to the user that the list has additional items that appear on the next screen display. Screen display 304 also indicates the number of E-mail messages, faxes, and voice messages waiting for the user. Rossmann p. 11, lines 43-52
(g) storing said at least one user response within said remote computer;	This invention allows for the first time two-way communications devices such as cellular telephones, two-way pagers, and telephones to become open application platforms which in turn empowers software developers to deliver value-added applications and services to any two-way communication device that incorporates the principles of this invention. This is a radical shift from the current situation where telephones and two-way pagers are closed, proprietary systems. Consequently, an even playing field is created for the market to invent new uses for two-way communication devices and for two-way communication networks. Any entity from corporations to individuals can make new applications available to the installed base of two-way data communication devices that include this invention without physical modification or addition to the two-way communication device. Years after purchase, a two-way communication device incorporating this invention will run all the applications which were developed since its purchase. Rossmann p. 3, lines 41-49 When the user selects the at least one user data input option, the client module interprets the selection and if required, appends any input data to the resource allocator associated with the at least one user data input option. The client module transmits a message including the resource locator with any appended input data to the server computer. Alternatively, the resource locator with any appended data can be addressed to another server computer, or can address an object stored in the two-way communication device. If the resource locator addresses an object on a server computer, the client module provides the message to

	the network interface module which in turn transmits the message over the two-way data communication network. Rossmann p. 4, lines 15-21 An important aspect of this invention is that the message includes all information necessary for the client module to generate the user interface and a particular user interface can be independent from other user interfaces. Unlike prior art systems that gave the user a predetermined menu from which to select items, or limited the user to an E-mail like format, according to the principles of this invention, the user interfaces and possible interactions available to the user are determined only by the applications that developers make available. The possible interactions and user interfaces for one application can be totally different and independent from the possible interactions and user interfaces of another application. Thus, a cellular telephone, two-way pager, and a telephone all truly become an open platform. Rossmann at p. 4, lines 29-35 In response to the access by the user, server computer 121 transmits a card deck to cellular telephone 100 over data capable cellular telephone network 110. As explained more completely below, a card deck includes one or more cards, and each card is interpreted by the client module to generate a user interface screen. In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the display screen. Rossmann p. 9, lines 1-8 When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs. Rossmann p. 9, lines 15-18
(h) modifying said questionnaire with incremental changes at a second computer	Thus, the client module only interprets this information and interacts appropriately with the hardware of the two-way data communication device. Consequently, to update an application requires only **changes** on the server computer and not changes in each two-way data

located at a second site;	communication device that communicates with that server computer. This invention eliminates the usual requirement for distribution of application software, and application software updates to the end user of the two-way data communication device. Rossmann p. 4, lines 47-51
(i) placing said remote computer into electrical communication with said second computer;	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone, any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and 140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37 For example other two-way data communication networks for cellular telephones that may be used include TDMA, CDMA, and GSM circuit switched data networks; and the AMPS analog cellular network with a modem. Similarly, for two-way pagers, two-way data communication networks include PACT, or other priority two-way paging networks with data transport capability. Rossmann p. 14, lines 35-38 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network.

Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer.
Falls at 3:16-35

Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established.
Falls at 4:7-14

In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer.
Falls at 5:21-31

More generally, the present invention provides a basis for a family of distributed software applications utilizing the target database by providing capabilities which support replication, distribution, and disconnectability.
Falls at 7:53-8:1.

Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods.
Falls at 13:60-65

Merging occurs when two replicas 56 are resynchronized after the

	computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 With reference to FIGS. 1 through 4 and particular focus on FIG. 4, a method of the present invention for synchronizing transactions in the network 10 of connectable computers 28 is illustrated. The transactions target entries in a distributed hierarchical database that contains convergently consistent replicas 56 residing on separate computers 28 in the network 10. The method comprises the following computer-implemented steps. A connecting step 100 uses the replica manager 46 and network link manager 50 to establish a network connection between a first computer 36 and a second computer 38. For purposes of illustrating the method, the first computer 36 shown in FIG. 1 is a client computer 20 and the second computer 38 is a server computer 16. However, a server and a client, or two servers, or two clients, may also be synchronized and otherwise managed according to the present invention. 35:47-63 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18

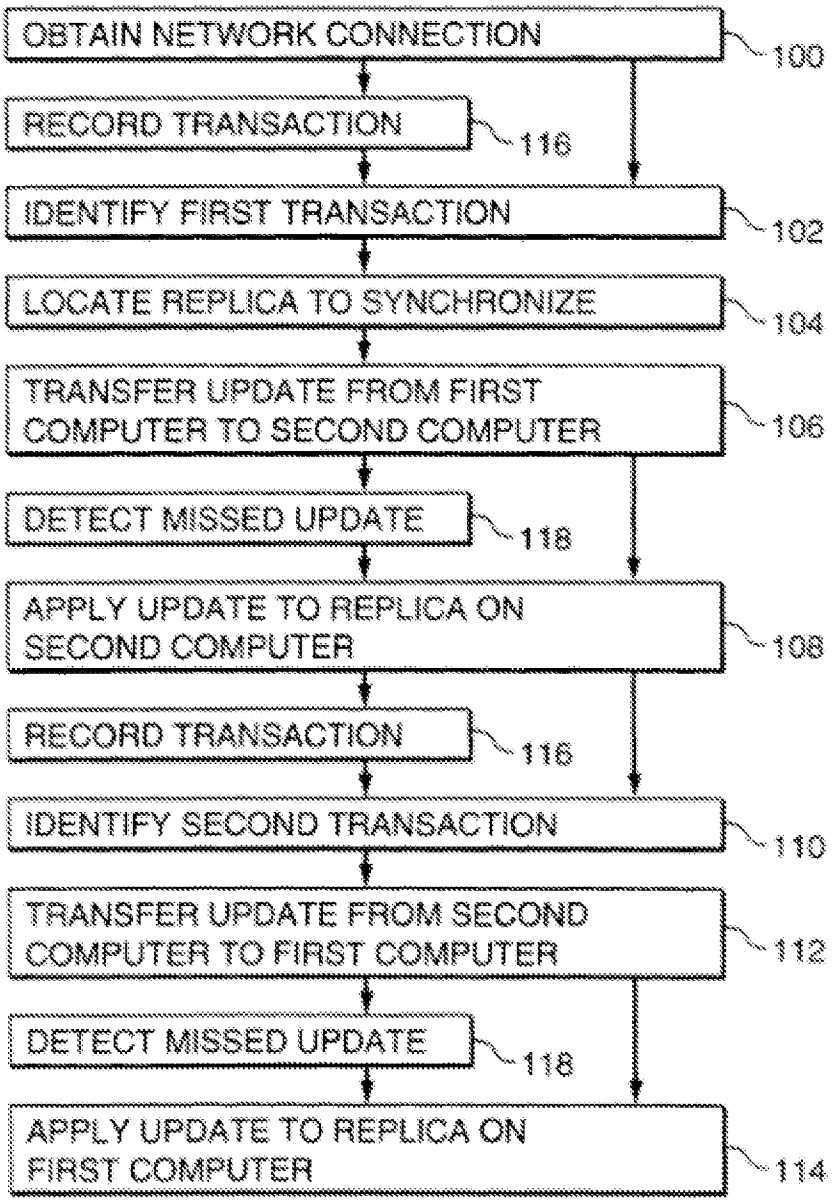


FIG. 4

(j) transmitting said incremental changes from said second computer to said remote computer;	This invention allows for the first time two-way communications devices such as cellular telephones, two-way pagers, and telephones to become open application platforms which in turn empowers software developers to deliver value-added applications and services to any two-way communication device that incorporates the principles of this invention. This is a radical shift from the current situation where telephones and two-way pagers are closed, proprietary systems. Consequently, an even playing field is created for the market to invent new uses for two-way communication devices and for two-way

	communication networks. Any entity from corporations to individuals can make new applications available to the installed base of two-way data communication devices that include this invention without physical modification or addition to the two-way communication device. Years after purchase, a two-way communication device incorporating this invention will run all the applications which were developed since its purchase. Rossmann p. 3, lines 41-49 For local services, like local message store, there are two basic approaches that can be used. First, local services are implemented in a CGI-like manner. Each local service has an entry point which is called with an argument list. A TIL deck is returned via the event manager. From that point on, the TIL deck is processed in the standard manner. This approach limits local services to the same constraints as remote services. A less restrictive approach is to allow the local service to field events instead of the standard event loop. The local service would construct TIL cards on-the-fly and feed them to user interface manager 1406. Note that the local service would need to cooperate with the standard event loop with regard to the history, the pushed card list, and any other state that is normally managed by the event loop. Table 4 is a listing of processes for the architecture for navigation manager module 1401. Rossmann p. 26, lines 37-44
(k) modifying said transmitted tokenized questionnaire in said remote computer with said incremental changes, thereby creating a modified tokenized questionnaire;	Thus, the client module only interprets this information and interacts appropriately with the hardware of the two-way data communication device. Consequently, to update an application requires only **changes** on the server computer and not changes in each two-way data communication device that communicates with that server computer. This invention eliminates the usual requirement for distribution of application software, and application software updates to the end user of the two-way data communication device. Rossmann p. 4, lines 47-51 For local services, like local message store, there are two basic approaches that can be used. First, local services are implemented in a CGI-like manner. Each local service has an entry point which is called with an argument list. A TIL deck is returned via the event manager. From that point on, the TIL deck is processed in the standard manner. This approach limits local services to the same constraints as remote services. A less restrictive approach is to allow the local service to field events instead of the standard event loop. The local service would construct TIL cards on-the-fly and feed them to user interface manager 1406. Note that the local service would need to cooperate with the standard event loop with regard to the history, the pushed card list, and

	any other state that is normally managed by the event loop. Table 4 is a listing of processes for the architecture for navigation manager module 1401. Rossmann p. 26, lines 37-44
(l) removing said remote computer from electronic communication with said second computer;	For simplicity, in this embodiment, each card is a single operation. Herein, an operation is defined as a related set of actions such that the user does not encounter an unanticipated delay in moving from one action to the next, i.e., the user does not have to wait for client module 702 to retrieve another card deck from computer 743. Also, a deck may include definitions of soft keys that stay in force while the deck is active, i.e., being executed by the cellular telephone microcontroller. Rossmann p. 15, lines 8-12 For example other two-way data communication networks for cellular telephones that may be used include TDMA, CDMA, and GSM circuit switched data networks; and the AMPS analog cellular network with a modem. Similarly, for two-way pagers, two-way data communication networks include PACT, or other priority two-way paging networks with data transport capability. Rossmann p. 14, lines 35-38 After the transaction is logged, processing transfers to transmit result 1317. In transmit result 1317, ANT request processor 1204 returns the deck to client 702. After the deck is transmitted, ANT request processor 1204 is terminated. Rossmann p. 26, lines 5-6. Routine NM_lnit initializes network manager module 1402 and so is called before any other calls in network manager module 1402. Routine NM_ Terminate closes processing of network manager module 1402 and so is called after all other calls in network manager module 1402. Rossmann p. 28, lines 39-41

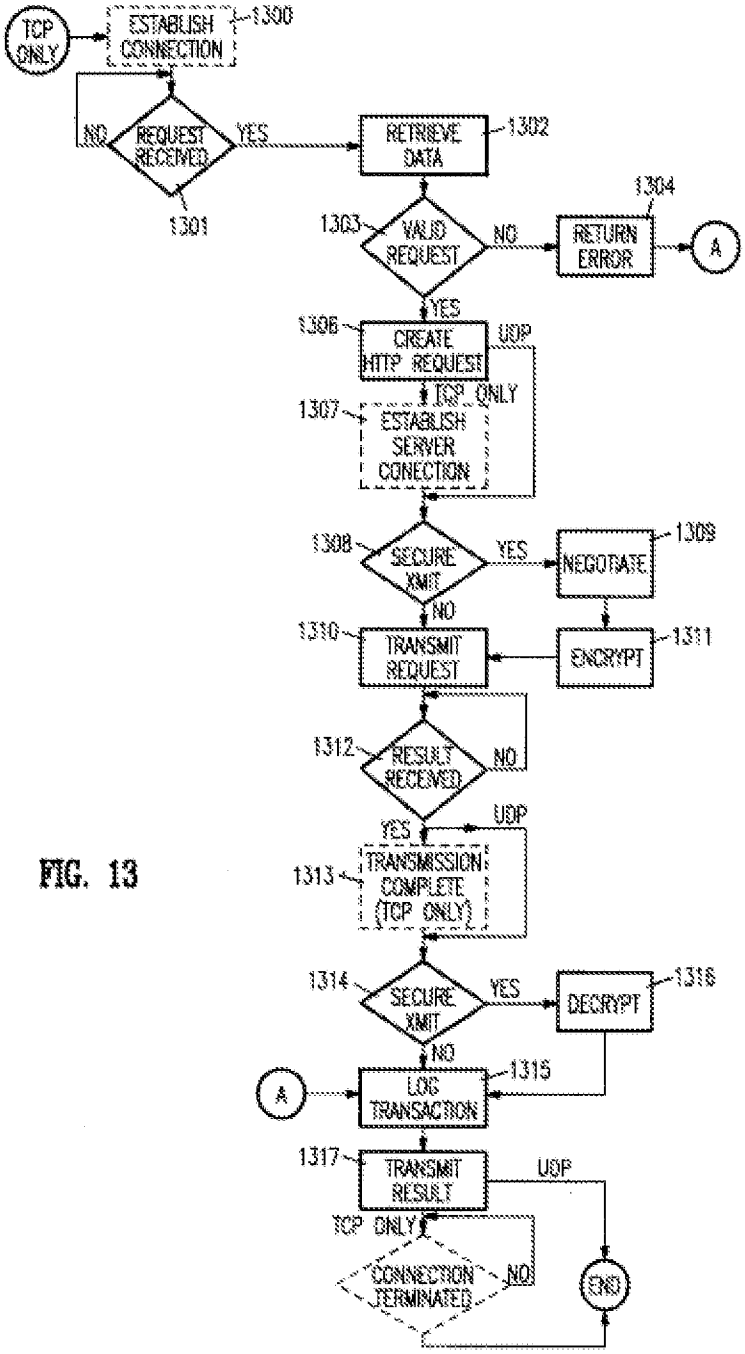


FIG. 13

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to

	the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object

	processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(m) within said remote computer, using said modified tokenized questionnaire to obtain at least one additional user response;	When the user selects the at least one user data input option, the client module interprets the selection and if required, appends any input data to the resource allocator associated with the at least one user data input option. The client module transmits a message including the resource locator with any appended input data to the server computer. Alternatively, the resource locator with any appended data can be addressed to another server computer, or can address an object stored in the two-way communication device. If the resource locator addresses an object on a server computer, the client module provides the message to the network interface module which in turn transmits the message over the two-way data communication network. Rossmann p. 4, lines 15-21 An important aspect of this invention is that the message includes all information necessary for the client module to generate the user interface and a particular user interface can be independent from other user interfaces. Unlike prior art systems that gave the user a predetermined menu from which to select items, or limited the user to an E-mail like format, according to the principles of this invention, the user interfaces and possible interactions available to the user are determined only by the applications that developers make available. The possible interactions and user interfaces for one application can be totally different and independent from the possible interactions and user interfaces of another application. Thus, a cellular telephone, two-way pager, and a telephone all truly become an open platform. Rossmann at p. 4, lines 29-35 In response to the access by the user, server computer 121 transmits a card deck to cellular telephone 100 over data capable cellular telephone network 110. As explained more completely below, a card deck includes one or more cards, and each card is interpreted by the client module to generate a user interface screen. In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the

	display screen. Rossmann p. 9, lines 1-8
(n) placing said remote computer into electronic communication with a server;	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone, any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and 140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37 For example other two-way data communication networks for cellular telephones that may be used include TDMA, CDMA, and GSM circuit switched data networks; and the AMPS analog cellular network with a modem. Similarly, for two-way pagers, two-way data communication networks include PACT, or other priority two-way paging networks with data transport capability. Rossmann p. 14, lines 35-38 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Those of skill in the art will appreciate that other remote procedure call

	mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29

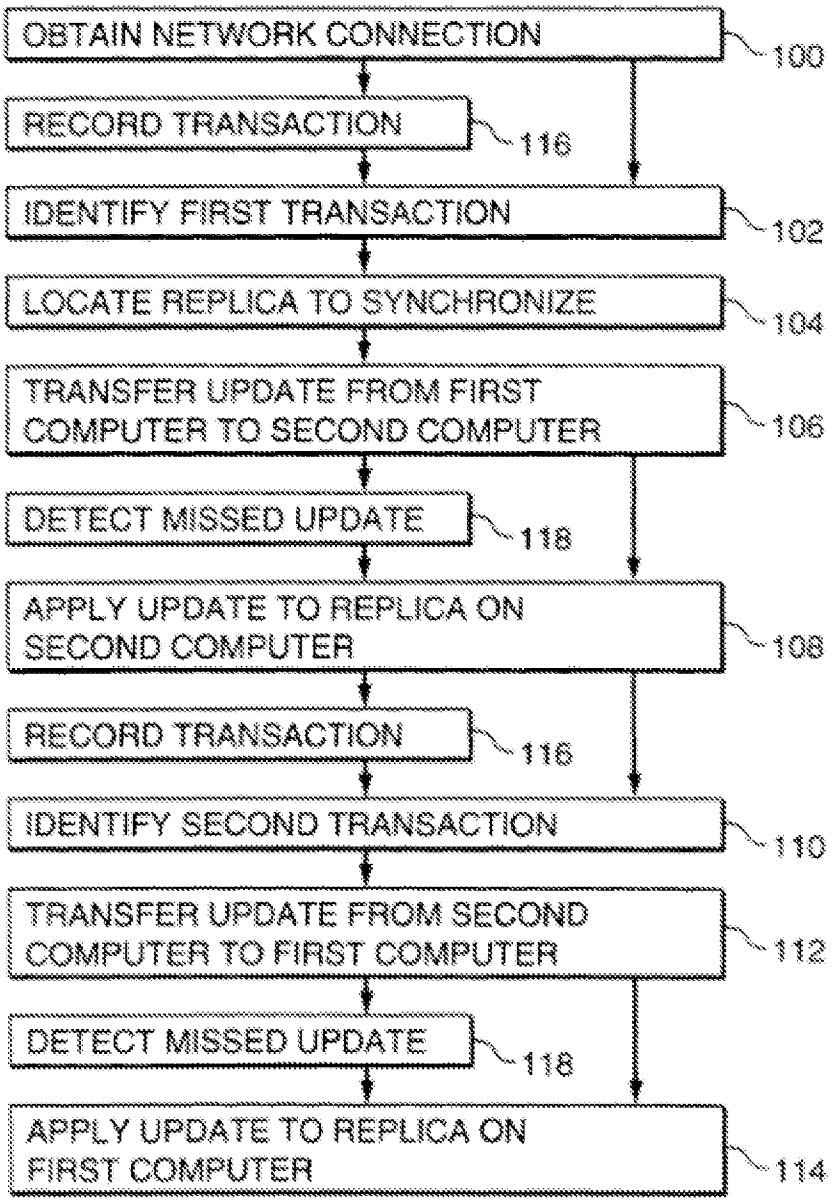


FIG. 4

(o) transmitting said at least one user response to said server;	When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs. Rossmann p. 9, lines 15-18 The user scrolls the screen display line by line until screen display 305 is

	on display screen 105. Initially, the fourth item in the menu is not highlighted. In this example, the user presses the four key on the keypad of cellular telephone 100 to view the user's schedule. In response to the key press, the client module in cellular telephone 100 transmits a message, including a resource locator associated with the menu item selected by pressing the four key, to server computer 131 using data capable cellular telephone network 110 and corporate local area network 130. In response to the message, server computer 131 executes the application identified in the resource locator. Upon completion of the execution, server computer 131 transmits, over corporate local area network 130 and data capable cellular telephone network 110 to cellular telephone 100, a card deck that includes a choice card that describes the user's schedule for that day. Rossmann p. 11, line 53 – Rossmann p. 12, line 2 As indicated above, each interaction with the user of cellular telephone 700 is described by a deck or a series of decks. Logically, the user retrieves a terminal interaction language deck stored in a memory 716 of cellular telephone 700 after receipt from computer 743 over CDPD network 710. The user reviews the information displayed by cards in the deck and makes choices and/or enters requested information and then requests another deck, as described above with respect to Figures 2A to 2H, for example. Rossmann p. 15, lines 23-27
(p) transmitting said at least one additional user response to said server;	When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs. Rossmann p. 9, lines 15-18 The user scrolls the screen display line by line until screen display 305 is on display screen 105. Initially, the fourth item in the menu is not highlighted. In this example, the user presses the four key on the keypad of cellular telephone 100 to view the user's schedule. In response to the key press, the client module in cellular telephone 100 transmits a message, including a resource locator associated with the menu item selected by pressing the four key, to server computer 131 using data capable cellular telephone network 110 and corporate local area network 130. In response to the message, server computer 131 executes the

	application identified in the resource locator. Upon completion of the execution, server computer 131 transmits, over corporate local area network 130 and data capable cellular telephone network 110 to cellular telephone 100, a card deck that includes a choice card that describes the user's schedule for that day. Rossmann p. 11, line 53 – Rossmann p. 12, line 2 As indicated above, each interaction with the user of cellular telephone 700 is described by a deck or a series of decks. Logically, the user retrieves a terminal interaction language deck stored in a memory 716 of cellular telephone 700 after receipt from computer 743 over CDPD network 710. The user reviews the information displayed by cards in the deck and makes choices and/or enters requested information and then requests another deck, as described above with respect to Figures 2A to 2H, for example. Rossmann p. 15, lines 23-27
(q) storing said transmitted at least one user response and said at least one additional user response at said server;	The server processes the message, i.e., executes the application addressed by the resource locator and transmits a response over the two-way data communication network to the two-way data communication device, which **stores** the response in a memory. Rossmann p. 4, lines 5-7 When the user presses a predetermined key, the client process interprets the choice card and a second screen display 304 (Fig. 3B) is driven on display screen 105. Screen display 304 is a menu of the personal information that is stored on *server* computer 131 for use by the user of cellular telephone 100. Multi-display screen card indicator 203, e.g., the hand with a finger pointing down, illustrates to the user that the list has additional items that appear on the next screen display. Screen display 304 also indicates the number of E-mail messages, faxes, and *voice* messages waiting for the user. Rossmann p. 11, lines 47-52 Computer 743 may contain **stored** static telephone interaction description language decks. Computer 743 also generates telephone interaction description language decks in response to data from, or choices made by, the user of cellular telephone 700. Rossmann p. 15, lines 13-15
(r) preparing a report using any of said at least one user response and said at least one additional user response; and,	When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs.

	Rossmann p. 9, lines 15-18 When server computer 121 receives the information, server computer 121 executes a common gateway interface application (CGI) pointed to by the resource locator. The CGI application grabs the necessary information and transmits the information via e-mail to a fax gateway. The fax gateway, upon receipt of the e-mail, converts the information to a fax and sends the information to the specified telephone number. Thus, cellular telephone 100 requires neither a printer connection nor a print driver, but yet can print using the facsimile machine at ABC Designs. Rossmann p. 11, lines 4-8 The user scrolls the screen display line by line until screen display 305 is on display screen 105. Initially, the fourth item in the menu is not highlighted. In this example, the user presses the four key on the keypad of cellular telephone 100 to view the user's schedule. In response to the key press, the client module in cellular telephone 100 transmits a message, including a resource locator associated with the menu item selected by pressing the four key, to server computer 131 using data capable cellular telephone network 110 and corporate local area network 130. In response to the message, server computer 131 executes the application identified in the resource locator. Upon completion of the execution, server computer 131 transmits, over corporate local area network 130 and data capable cellular telephone network 110 to cellular telephone 100, a card deck that includes a choice card that describes the user's schedule for that day. Rossmann p. 11, line 53 – Rossmann p. 12, line 2 As indicated above, each interaction with the user of cellular telephone 700 is described by a deck or a series of decks. Logically, the user retrieves a terminal interaction language deck stored in a memory 716 of cellular telephone 700 after receipt from computer 743 over CDPD network 710. The user reviews the information displayed by cards in the deck and makes choices and/or enters requested information and then requests another deck, as described above with respect to Figures 2A to 2H, for example. Rossmann p. 15, lines 23-27
(s) displaying at least a portion of said report on a visually perceptible medium;	When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs.

	Rossmann p. 9, lines 15-18 When server computer 121 receives the information, server computer 121 executes a common gateway interface application (CGI) pointed to by the resource locator. The CGI application grabs the necessary information and transmits the information via e-mail to a fax gateway. The fax gateway, upon receipt of the e-mail, converts the information to a fax and sends the information to the specified telephone number. Thus, cellular telephone 100 requires neither a printer connection nor a print driver, but yet can print using the facsimile machine at ABC Designs. Rossmann p. 11, lines 4-8 The user scrolls the screen display line by line until screen display 305 is on display screen 105. Initially, the fourth item in the menu is not highlighted. In this example, the user presses the four key on the keypad of cellular telephone 100 to view the user's schedule. In response to the key press, the client module in cellular telephone 100 transmits a message, including a resource locator associated with the menu item selected by pressing the four key, to server computer 131 using data capable cellular telephone network 110 and corporate local area network 130. In response to the message, server computer 131 executes the application identified in the resource locator. Upon completion of the execution, server computer 131 transmits, over corporate local area network 130 and data capable cellular telephone network 110 to cellular telephone 100, a card deck that includes a choice card that describes the user's schedule for that day. Rossmann p. 11, line 53 – Rossmann p. 12, line 2 As indicated above, each interaction with the user of cellular telephone 700 is described by a deck or a series of decks. Logically, the user retrieves a terminal interaction language deck stored in a memory 716 of cellular telephone 700 after receipt from computer 743 over CDPD network 710. The user reviews the information displayed by cards in the deck and makes choices and/or enters requested information and then requests another deck, as described above with respect to Figures 2A to 2H, for example. Rossmann p. 15, lines 23-27
(t) performing at least steps (d)-(p) using at least two different remote computing device types using the same tokens.	Each wireless communication device 100 that includes this invention can communicate over airnet network 150 with any server computer 121, 131, and 141 on airnet network 150 that includes at least one application that communicates and interacts with the processes of this invention that are included within device 100. Thus, device 100 can access information on the computer network and provide information to

	the computer network. Similarly, a two-way pager 101, and a telephone 102 with a modem 103, that each include this invention, can communicate over airnet network 150 with any of server computers 121, 131, and 141 that includes at least one application that communicates and interacts with the processes of this invention that are included within devices 101 and 102. Rossmann p. 6, lines 38-44
CLAIM 9	
9. The method for managing data transfers between computers according to claim 8 wherein said first computer and said second computer are a same computer.	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone, any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and 140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37
CLAIM 10	
10. The method for managing data transfers between computers according to claim 9 wherein said server and said first computer are said same computer.	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone, any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and 140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37
CLAIM 11	
11. A method for collecting survey data from a user comprising the steps of:	As indicated above, the two-way data communication device of this invention utilizes a client module to transmit a message including a resource locator selected by the user over the two-way data communication network to a server on a server computer on the computer network. For example, the computer network can be a corporate wide area network, a corporate local area network, the Internet, or any combination of computer networks.

	The server processes the message, i.e., executes the application addressed by the resource locator and transmits a response over the two-way data communication network to the two-way data communication device, which stores the response in a memory. The client module interprets the response and generates a user interface using information in the response. In one embodiment, the user interface includes at least one user data input option that is associated with a resource locator. Rossmann p. 4, lines 1-9
(a) creating a questionnaire comprising a series of questions;	In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the display screen. Rossmann p. 9, lines 4-8 When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs. Rossmann p. 9, lines 15-18 In response to entry of the purchase order number, the client process transmits a request to server computer 121 for the particular purchase order. Specifically, the client process appends the entered data to a resource locator and transmits a message containing the resource locator to server computer 121. Server computer 121, in response to the message, retrieves the **appropriate purchase order** and transmits the purchase order as a card deck to the client process in cellular telephone 100 over airnet network 150. The client process interprets the card deck and generates a screen display 209 (Fig. 2F). Initially, fax key 208 is not highlighted in screen display 209. Notice that screen display 209 includes multi-display screen card indicator 203 to show the user that the purchase order screen contains more information that can be displayed at one time on display screen 105. After the user reviews the purchase order, the user presses the key

	sequence for fax key 208 and in response, fax key 208 is highlighted as illustrated in Figure 2F. Rossmann p. 10, lines, 38-48 For simplicity, in this embodiment, each card is a single operation. Herein, an operation is defined as a related set of actions such that the user does not encounter an unanticipated delay in moving from one action to the next, i.e., the user does not have to wait for client module 702 to retrieve another card deck from computer 743. Also, a deck may include definitions of soft keys that stay in force while the deck is active, i.e., being executed by the cellular telephone microcontroller. Rossmann p. 15, lines 8-12
(b) tokenizing said questionnaire; thereby producing a plurality of tokens representing said questionnaire;	In response to entry of the purchase order number, the client process transmits a request to server computer 121 for the particular purchase order. Specifically, the client process appends the entered data to a resource locator and transmits a message containing the resource locator to server computer 121. Server computer 121, in response to the message, retrieves the appropriate purchase order and **transmits the purchase order as a card deck** to the client process in cellular telephone 100 over airnet network 150. **The client process interprets the card deck** and generates a screen display 209 (Fig. 2F). Initially, fax key 208 is not highlighted in screen display 209. Notice that screen display 209 includes multi-display screen card indicator 203 to show the user that the purchase order screen contains more information that can be displayed at one time on display screen 105. After the user reviews the purchase order, the user presses the key sequence for fax key 208 and in response, fax key 208 is highlighted as illustrated in Figure 2F. Rossmann p. 10, lines 38-48 In addition, the client process using the information transmitted from server computer 121, **i.e., the cards, generates a wide-variety of user interfaces as illustrated in Figures 2A to 2H.** Rossmann p. 11, lines 15-16 Preferably, each data type is compressed to facilitate optimal transfer over the two-way data communication network. For example, the verbs in the telephone interaction description language are compressed using a binary **tokenization**. Graphics are compressed using run length limited compression and text is compressed using anyone of the well-known

	techniques for text compression. Rossmann p. 14, lines 55-58 Instructions in the telephone interaction description language and in the terminal interaction language are grouped into **a deck and a card**. Each deck includes one or more cards. A card includes the information, i.e., a set of telephone interaction description language, required to generate a screen. As indicated above, a screen can be larger than the 5 number of lines in a display screen. Other equivalent terms for a card include a page and an atomic interaction. Thus, a card deck is simply a group of screens. The number of cards in a card deck is selected to facilitate efficient use of the resources in the two-way data communication device and in the airnet network. Rossmann p. 15, lines 2-7 For example, if the user of cellular telephone 700 requested a fax as in Figure 2F, the HTTP request identifies a common gateway interface application in CGI programs 761 that accepts as input data the telephone number and grabs the information to be faxed. The CGI application generates an e-mail transmission to the fax gateway. **Similarly, for a stock quote**, server 749, in response to the HTTP request, launches a common gateway interface application that sends out a stock query over Internet 140 to a stock quote service provider using the ticker tape symbol passed as input data by server 749 to the common gateway interface application. When the response to the stock query is received, the common gateway interface application builds a PIDL deck that includes the data in the response to the stock query. The interface presented in Table 7 for TIL manager module 1403 is designed with the assumption that TIL is a direct tokenization of PIDL as described in Appendix I. Rossmann p. 15, lines 56-57
(c) storing said plurality of tokens on a computer readable medium on a first computer;	In response to entry of the purchase order number, the client process transmits a request to server computer 121 for the particular purchase order. Specifically, the client process appends the entered data to a resource locator and transmits a message containing the resource locator to server computer 121. Server computer 121, in response to the message, retrieves the appropriate purchase order and **transmits the purchase order as a card deck** to the client process in cellular telephone 100 over airnet network 150. **The client process interprets the card deck** and generates a screen display 209 (Fig. 2F). Initially, fax key 208 is not highlighted in screen display 209. Notice that screen display 209 includes multi-display screen card

	indicator 203 to show the user that the purchase order screen contains more information that can be displayed at one time on display screen 105. After the user reviews the purchase order, the user presses the key sequence for fax key 208 and in response, fax key 208 is highlighted as illustrated in Figure 2F. Rossmann p. 10, lines 38-48 In addition, the client process using the information transmitted from server computer 121, **i.e., the cards, generates a wide-variety of user interfaces as illustrated in Figures 2A to 2H.** Rossmann p. 11, lines 15-16 Preferably, each data type is compressed to facilitate optimal transfer over the two-way data communication network. For example, the verbs in the telephone interaction description language are compressed using a binary **tokenization**. Graphics are compressed using run length limited compression and text is compressed using anyone of the well-known techniques for text compression. Rossmann p. 14, lines 55-58 Instructions in the telephone interaction description language and in the terminal interaction language are grouped into **a deck and a card**. Each deck includes one or more cards. A card includes the information, i.e., a set of telephone interaction description language, required to generate a screen. As indicated above, a screen can be larger than the 5 number of lines in a display screen. Other equivalent terms for a card include a page and an atomic interaction. Thus, a card deck is simply a group of screens. The number of cards in a card deck is selected to facilitate efficient use of the resources in the two-way data communication device and in the airnet network. Rossmann p. 15, lines 2-7
(d) placing a handheld remote computing device into electronic communication with said first computer;	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone, any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and 140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37

	For example other two-way data communication networks for cellular telephones that may be used include TDMA, CDMA, and GSM circuit switched data networks; and the AMPS analog cellular network with a modem. Similarly, for two-way pagers, two-way data communication networks include PACT, or other priority two-way paging networks with data transport capability. Rossmann p. 14, lines 35-38 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29

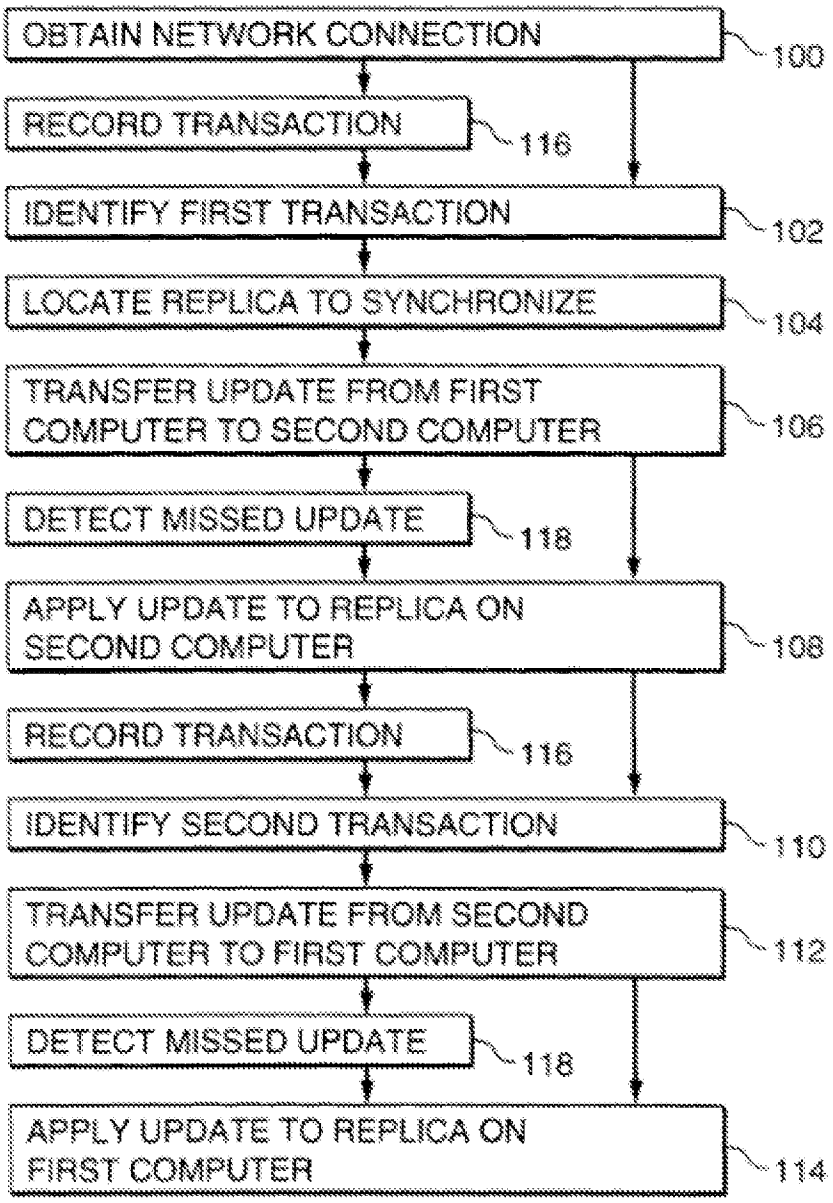


FIG. 4

(e) transmitting said plurality of tokens to said handheld remote computing device;	In the embodiment illustrated in Figure 2A, the initial card deck transmitted to cellular telephone 100 includes an introductory display card and a choice card. Figure 2A is an example of introductory screen display 200 that is generated on display screen 105 by the client process in cellular telephone 100 by interpreting the display card. As used herein, a display screen is the physical display apparatus in a two-way communication device. A screen display is the image presented on the display screen. Rossmann p. 9, lines 4-8

Preferably, each data type is compressed to facilitate optimal transfer over the two-way data communication network. For example, the verbs in the telephone interaction description language are compressed using a binary **tokenization**. Graphics are compressed using run length limited compression and text is compressed using anyone of the well-known techniques for text compression.
Rossmann p. 14, lines 55-58

Instructions in the telephone interaction description language and in the terminal interaction language are grouped into **a deck and a card**. Each deck includes one or more cards. A card includes the information, i.e., a set of telephone interaction description language, required to generate a screen. As indicated above, a screen can be larger than the 5 number of lines in a display screen. Other equivalent terms for a card include a page and an atomic interaction. Thus, a card deck is simply a group of screens. The number of cards in a card deck is selected to facilitate efficient use of the resources in the two-way data communication device and in the airnet network.
Rossmann p. 15, lines 2-7

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention.
Falls at Abstract

The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network.

Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and

	inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(f) taking said handheld remote computing device out of electronic communication with said first computer;	For simplicity, in this embodiment, each card is a single operation. Herein, an operation is defined as a related set of actions such that the user does not encounter an unanticipated delay in moving from one action to the next, i.e., the user does not have to wait for client module 702 to retrieve another card deck from computer 743. Also, a deck may include definitions of soft keys that stay in force while the deck is active, i.e., being executed by the cellular telephone microcontroller. Rossmann p. 15, lines 8-12 For example other two-way data communication networks for cellular telephones that may be used include TDMA, CDMA, and GSM circuit switched data networks; and the AMPS analog cellular network with a modem. Similarly, for two-way pagers, two-way data communication networks include PACT, or other priority two-way paging networks with data transport capability. Rossmann p. 14, lines 35-38

	After the transaction is logged, processing transfers to transmit result 1317. In transmit result 1317, ANT request processor 1204 returns the deck to client 702. After the deck is transmitted, ANT request processor 1204 is terminated. Rossmann p. 26, lines 5-6. Routine NM_lnit initializes network manager module 1402 and so is called before any other calls in network manager module 1402. Routine NM_ Terminate closes processing of network manager module 1402 and so is called after all other calls in network manager module 1402. Rossmann p. 28, lines 39-41

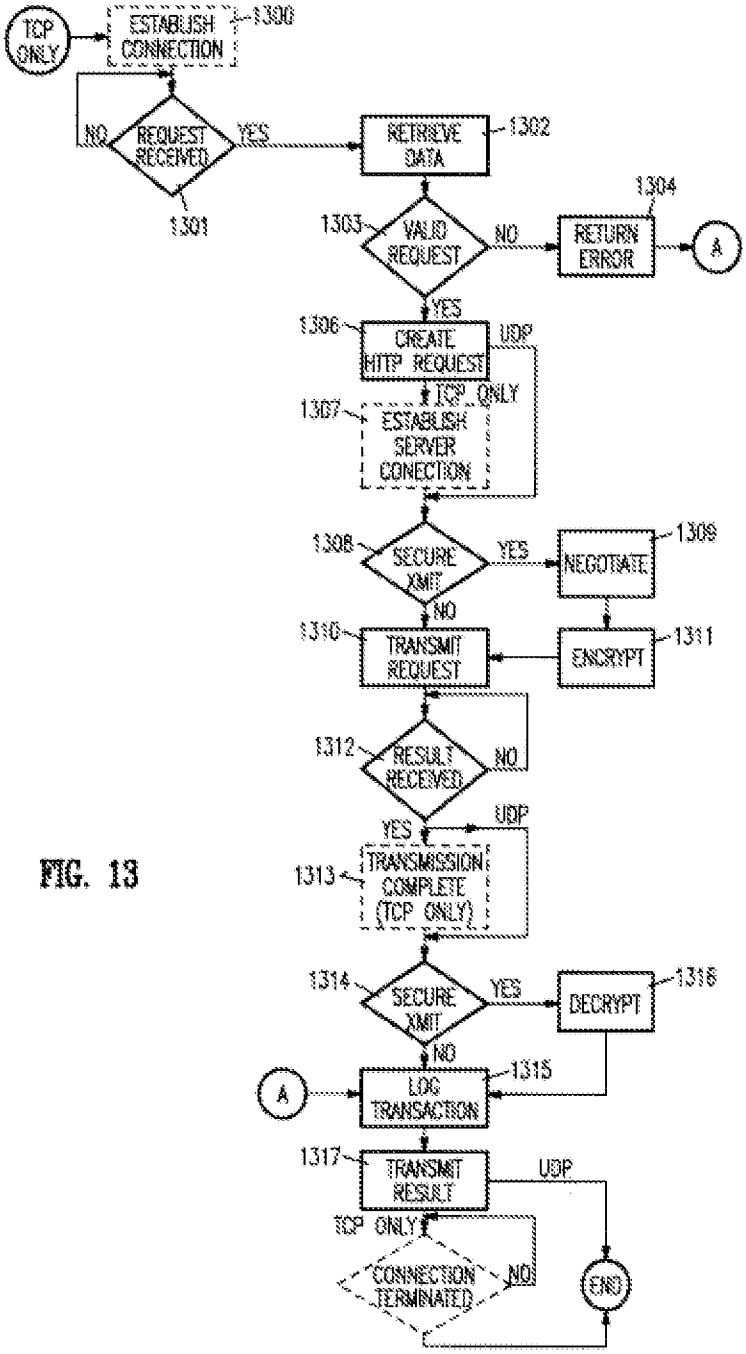


FIG. 13

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to

	the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29 With reference to FIG. 2, at least two of the computers 28 are disconnectable computers 40 configured according to the present invention. Each disconnectable computer 40 includes a database manager 42 which provides a location independent interface to a distributed hierarchical target database embodied in convergently consistent replicas 56. Falls at 7:16-
(g) after said handheld remote computing device has been taken out of electronic communication with said first computer,	After the transaction is logged, processing transfers to transmit result 1317. In transmit result 1317, ANT request processor 1204 returns the deck to client 702. After the deck is transmitted, ANT request processor 1204 is terminated. Rossmann p. 26, lines 5-6. Routine NM_lnit initializes network manager module 1402 and so is called before any other calls in network manager module 1402. Routine

	NM_ Terminate closes processing of network manager module 1402 and so is called after all other calls in network manager module 1402. Rossmann p. 28, lines 39-41 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31

	Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(g1) executing at least a portion of said plurality of tokens representing said questionnaire on said handheld remote computing device to collect a response from a user, and,	For simplicity, in this embodiment, each card is a single operation. Herein, an operation is defined as a related set of actions such that the user does not encounter an unanticipated delay in moving from one action to the next, i.e., the user does not have to wait for client module 702 to retrieve another card deck from computer 743. Also, a deck may include definitions of soft keys that stay in force while the deck is active, i.e., being executed by the cellular telephone microcontroller. Rossmann p. 15, lines 8-12 The client process in cellular telephone 100 interprets the display card that includes image and text data and generates screen display 300 on display screen 105 (Fig. 3A). Screen display 300 includes a home key 301, and an info key 302. When the user selects home key 301 , the user is returned to the home screen. Info key 302 functions in a manner similar to that described above for info key 205. When the user presses a predetermined key, the client process interprets the choice card and a second screen display 304 (Fig. 3B) is driven on display screen 105. Screen display 304 is a menu of the personal information that is stored on *server* computer 131 for use by the user of cellular telephone 100. Multi-display screen card indicator 203, e.g., the hand with a finger pointing down, illustrates to the user that the list has additional items that appear on the next screen display. Screen display 304 also indicates the number of E-mail messages, faxes, and *voice* messages waiting for the user. Rossmann p. 11, lines 43-52 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer

	was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28

	is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(g2) storing within said remote computing device said response from the user;	The server processes the message, i.e., executes the application addressed by the resource locator and transmits a response over the two-way data communication network to the two-way data communication device, which **stores** the response in a memory. Rossmann p. 4, lines 5-7 When the user presses a predetermined key, the client process interprets the choice card and a second screen display 304 (Fig. 3B) is driven on display screen 105. Screen display 304 is a menu of the personal information that is stored on *server* computer 131 for use by the user of cellular telephone 100. Multi-display screen card indicator 203, e.g., the hand with a finger pointing down, illustrates to the user that the list has additional items that appear on the next screen display. Screen display 304 also indicates the number of E-mail messages, faxes, and *voice* messages waiting for the user. Rossmann p. 11, lines 47-52 Computer 743 may contain **stored** static telephone interaction description language decks. Computer 743 also generates telephone interaction description language decks in response to data from, or choices made by, the user of cellular telephone 700. Rossmann p. 15, lines 13-15 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select

	data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-
(h) placing said handheld remote	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone,

computing device into electronic communication with a second computer;	any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and 140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37 For example other two-way data communication networks for cellular telephones that may be used include TDMA, CDMA, and GSM circuit switched data networks; and the AMPS analog cellular network with a modem. Similarly, for two-way pagers, two-way data communication networks include PACT, or other priority two-way paging networks with data transport capability. Rossmann p. 14, lines 35-38 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or

	the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 More generally, the present invention provides a basis for a family of distributed software applications utilizing the target database by providing capabilities which support replication, distribution, and disconnectability. Falls at 7:53-8:1. Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 With reference to FIGS. 1 through 4 and particular focus on FIG. 4, a method of the present invention for synchronizing transactions in the network 10 of connectable computers 28 is illustrated. The transactions target entries in a distributed hierarchical database that contains

	convergently consistent replicas 56 residing on separate computers 28 in the network 10. The method comprises the following computer-implemented steps. A connecting step 100 uses the replica manager 46 and network link manager 50 to establish a network connection between a first computer 36 and a second computer 38. For purposes of illustrating the method, the first computer 36 shown in FIG. 1 is a client computer 20 and the second computer 38 is a server computer 16. However, a server and a client, or two servers, or two clients, may also be synchronized and otherwise managed according to the present invention. Falls at 35:47-63 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18

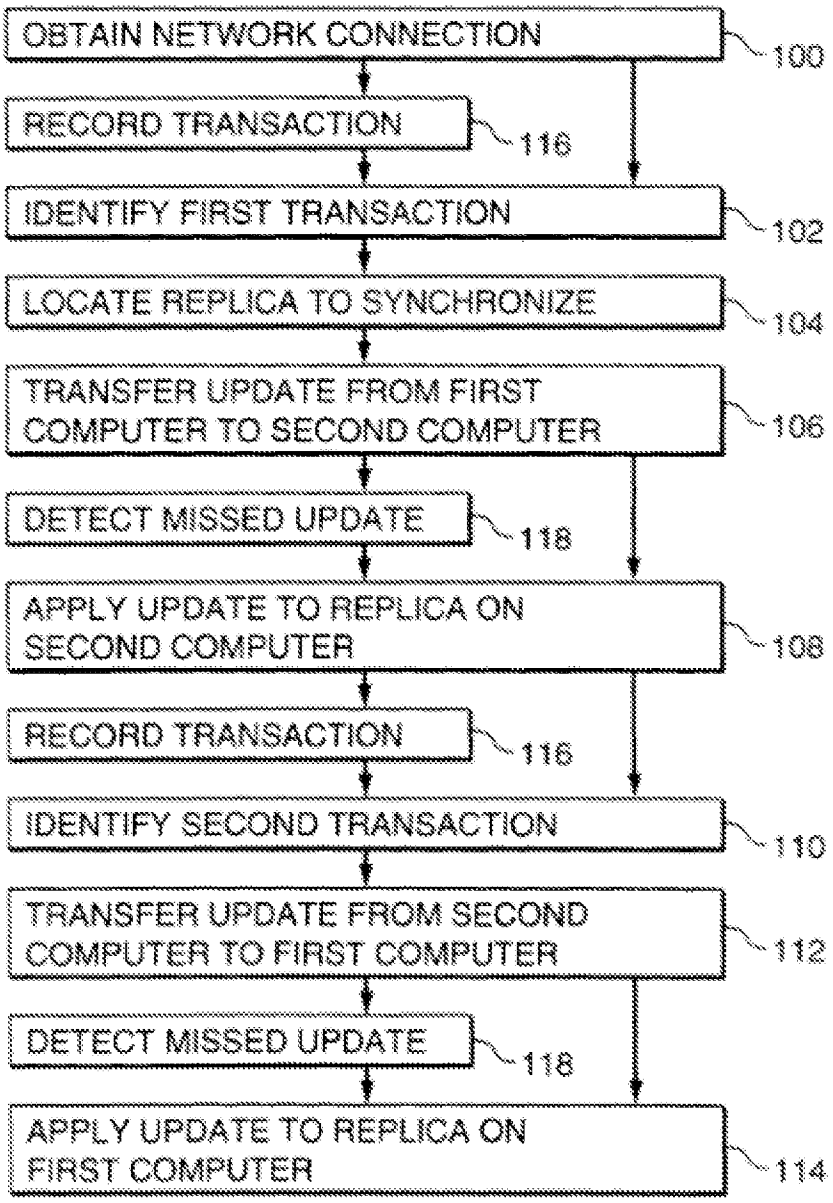


FIG. 4

(i) transmitting at least a portion of said response stored within said handheld remote computing device to said second computer; and,	When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs. Rossmann p. 9, lines 15-18 The user scrolls the screen display line by line until screen display 305

	is on display screen 105. Initially, the fourth item in the menu is not highlighted. In this example, the user presses the four key on the keypad of cellular telephone 100 to view the user's schedule. In response to the key press, the client module in cellular telephone 100 transmits a message, including a resource locator associated with the menu item selected by pressing the four key, to server computer 131 using data capable cellular telephone network 110 and corporate local area network 130. In response to the message, server computer 131 executes the application identified in the resource locator. Upon completion of the execution, server computer 131 transmits, over corporate local area network 130 and data capable cellular telephone network 110 to cellular telephone 100, a card deck that includes a choice card that describes the user's schedule for that day. Rossmann p. 11, line 53 – Rossmann p. 12, line 2 As indicated above, each interaction with the user of cellular telephone 700 is described by a deck or a series of decks. Logically, the user retrieves a terminal interaction language deck stored in a memory 716 of cellular telephone 700 after receipt from computer 743 over CDPD network 710. The user reviews the information displayed by cards in the deck and makes choices and/or enters requested information and then requests another deck, as described above with respect to Figures 2A to 2H, for example. Rossmann p. 15, lines 23-27
(j) forming a visually perceptible report from any of said at least a portion of said response so transmitted.	When the user presses a predetermined key, or key sequence, the client process in cellular telephone 100 interprets the next card in the card deck, i.e., the choice card, and in turn generates a menu 201 (Fig. 2B) of items that can be accessed by the user. In this embodiment, each of the menu items is available on server computer 121 to the user who, in this example, is a representative of XYZ corporation visiting ABC Designs. Rossmann p. 9, lines 15-18 When *server* computer 121 receives the information, *server* computer 121 executes a common gateway interface application (CGI) pointed to by the resource locator. The CGI application grabs the necessary information and transmits the information via e-mail to a fax gateway. The fax gateway, upon receipt of the e-mail, *converts* the information to a fax and sends the information to the specified telephone number. Thus, cellular telephone 100 requires neither a printer connection nor a print driver, but yet can print using the facsimile machine at ABC Designs. Rossmann p. 11, lines 4-8 The user scrolls the screen display line by line until screen display 305 is on display screen 105. Initially, the fourth item in the menu is not

	highlighted. In this example, the user presses the four key on the keypad of cellular telephone 100 to view the user's schedule. In response to the key press, the client module in cellular telephone 100 transmits a message, including a resource locator associated with the menu item selected by pressing the four key, to server computer 131 using data capable cellular telephone network 110 and corporate local area network 130. In response to the message, server computer 131 executes the application identified in the resource locator. Upon completion of the execution, server computer 131 transmits, over corporate local area network 130 and data capable cellular telephone network 110 to cellular telephone 100, a card deck that includes a choice card that describes the user's schedule for that day. Rossmann p. 11, line 53 – Rossmann p. 12, line 2 As indicated above, each interaction with the user of cellular telephone 700 is described by a deck or a series of decks. Logically, the user retrieves a terminal interaction language deck stored in a memory 716 of cellular telephone 700 after receipt from computer 743 over CDPD network 710. The user reviews the information displayed by cards in the deck and makes choices and/or enters requested information and then requests another deck, as described above with respect to Figures 2A to 2H, for example. Rossmann p. 15, lines 23-27
CLAIM 12	
12. A method for collecting survey data from a user according to claim 11, wherein step (j) comprises the step of printing a report from any of said response to transmitted.	When *server* computer 121 receives the information, *server* computer 121 executes a common gateway interface application (CGI) pointed to by the resource locator. The CGI application grabs the necessary information and transmits the information via e-mail to a fax gateway. The fax gateway, upon receipt of the e-mail, *converts* the information to a fax and sends the information to the specified telephone number. Thus, cellular telephone 100 requires neither a printer connection nor a print driver, but yet can print using the facsimile machine at ABC Designs. Rossmann p. 11, lines 4-8
CLAIM 13	
13. A method for collecting survey data from a user according to claim 11, wherein said first computer and said second computer are a same computer.	According to the principles of this invention, a novel airnet network 150, i.e., a two-way data communication network, interconnects anyone, any combination, or all of two-way data communication devices 100,101, or 102, that each include this invention, with a wide variety of computer networks 120, 130, and 140, for example. As explained more completely below, each two-way data communication device 100, 101, and 102 can be configured to transmit data to and receive data from any desired combination of computers on computer networks 120, 130, and

	140. Airnet network 150 is the two-way data communication path from the two-way data communication device to the particular computer that is accessed by the user of that two-way data communication device. Rossmann p. 6, lines 31-37
CLAIM 14	
14. A method for modifying a questionnaire used in data management according to the method of claim 11, further comprising the steps of: (k) making at least one incremental change to a portion of said questionnaire;	Thus, the client module only interprets this information and interacts appropriately with the hardware of the two-way data communication device. Consequently, to update an application requires only **changes** on the server computer and not changes in each two-way data communication device that communicates with that server computer. This invention eliminates the usual requirement for distribution of application software, and application software updates to the end user of the two-way data communication device. Rossmann p. 4, lines 47-51
(l) tokenizing said at least one incremental change to said questionnaire;	For local services, like local message store, there are two basic approaches that can be used. First, local services are implemented in a CGI-like manner. Each local service has an entry point which is called with an argument list. A TIL deck is returned via the event manager. From that point on, the TIL deck is processed in the standard manner. This approach limits local services to the same constraints as remote services. A less restrictive approach is to allow the local service to field events instead of the standard event loop. The local service would construct TIL cards on-the-fly and feed them to user interface manager 1406. Note that the local service would need to cooperate with the standard event loop with regard to the history, the pushed card list, and any other state that is normally managed by the event loop. Table 4 is a listing of processes for the architecture for navigation manager module 1401. Rossmann p. 26, lines 37-44
(m) transmitting at least a portion of said tokens resulting from step (k) to said remote handheld computing device, said transmitted tokens comprising less than the entire tokenized questionnaire; and,	For local services, like local message store, there are two basic approaches that can be used. First, local services are implemented in a CGI-like manner. Each local service has an entry point which is called with an argument list. A TIL deck is returned via the event manager. From that point on, the TIL deck is processed in the standard manner. This approach limits local services to the same constraints as remote services. A less restrictive approach is to allow the local service to field events instead of the standard event loop. The local service would construct TIL cards on-the-fly and feed them to user interface manager 1406. Note that the local service would need to cooperate with the standard event loop with regard to the history, the pushed card list, and

	any other state that is normally managed by the event loop. Table 4 is a listing of processes for the architecture for navigation manager module 1401. Rossmann p. 26, lines 37-44
(n) incorporating said transmitted tokens into said questionnaire at said remote computing device, thereby incrementally changing said questionnaire.	Thus, the client module only interprets this information and interacts appropriately with the hardware of the two-way data communication device. Consequently, to update an application requires only **changes** on the server computer and not changes in each two-way data communication device that communicates with that server computer. This invention eliminates the usual requirement for distribution of application software, and application software updates to the end user of the two-way data communication device. Rossmann p. 4, lines 47-51 For local services, like local message store, there are two basic approaches that can be used. First, local services are implemented in a CGI-like manner. Each local service has an entry point which is called with an argument list. A TIL deck is returned via the event manager. From that point on, the TIL deck is processed in the standard manner. This approach limits local services to the same constraints as remote services. A less restrictive approach is to allow the local service to field events instead of the standard event loop. The local service would construct TIL cards on-the-fly and feed them to user interface manager 1406. Note that the local service would need to cooperate with the standard event loop with regard to the history, the pushed card list, and any other state that is normally managed by the event loop. Table 4 is a listing of processes for the architecture for navigation manager module 1401. Rossmann p. 26, lines 37-434

D. CLAIMS 1-14 OF THE '816 PATENT ARE RENDERED OBVIOUS BY BENIGNO IN VIEW OF FALLS AND THE KNOWLEDGE OF A PERSON OF ORDINARY SKILL IN THE ART

Please see the below claim chart that applies the teachings of Benigno in view of Falls to claims 1-14 of the '816 patent.

Reasons to Combine:

It would have been obvious to a person of ordinary skill in the art to combine the teachings of Falls with the teachings of Benigno because, Falls provides a method improving synchronization between databases that communicate. It is vitally important to maintain consistency within the medical records of Benigno, which explains the questionnaire and the updates provided by a doctor and the nurse. Benigno at 11:22-26 and FIGs. 1a and 1b. Falls

allows for an improved method of synchronization of the medical questionnaires even "over slow links, such as mobile computing modems." Falls at 37:19-24. Further, Falls details a system that can be "scaled up" to provide medical solutions across multiple fields, nurses, and doctors, to facilitate the wide adoption of standardized care advocated by Benigno. Falls at 37:24-27; *see also* Benigno at 46:16-28 and FIG. 1a. So, a person of ordinary skill in the art looking to improve synchronization between a mobile device and a server, especially in light of the "slow links" associated with mobile communications at the time of the filing of the '816 patent, would be motivated to combine Benigno and Falls to achieve the predictable result of synchronized questionnaires.

Brief Description of Application within Charts Below:

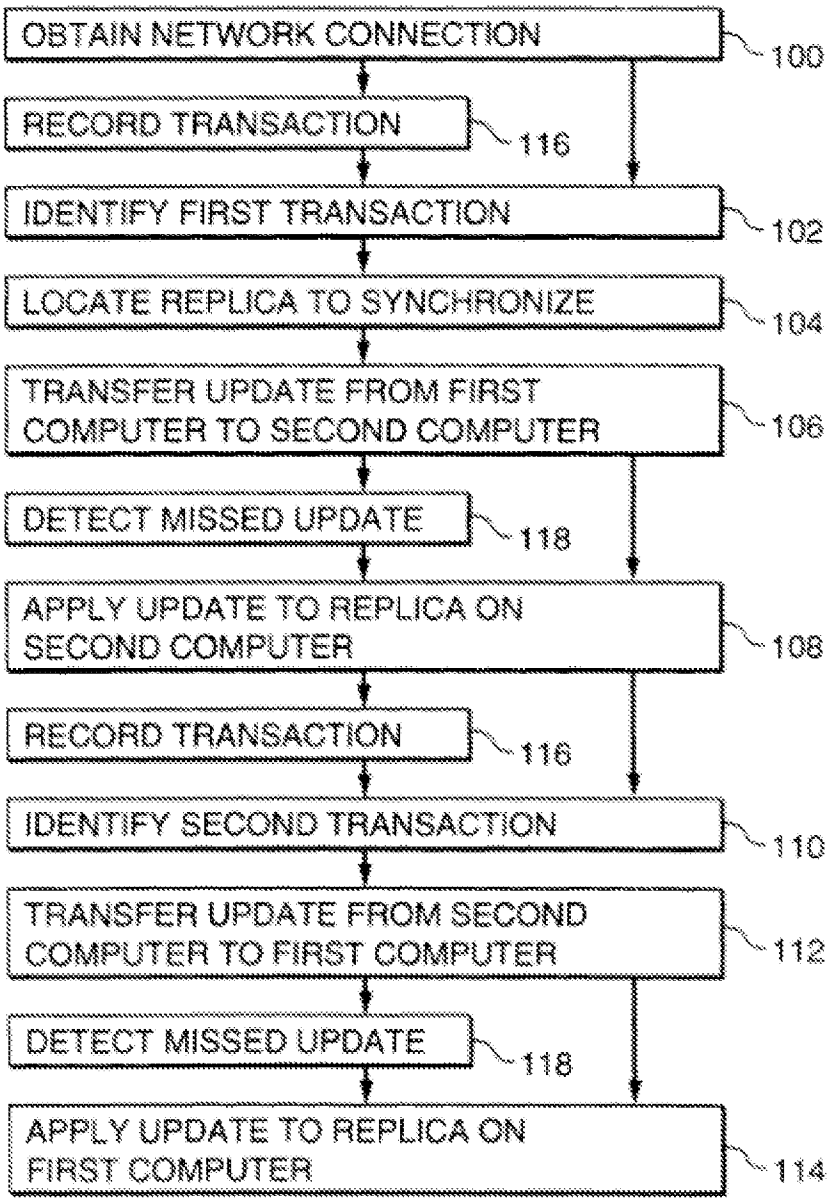
Benigno teaches a questionnaire based on creating a standard of care for treatment of patients that keeps nurses and doctors in constant communication. Benigno at 46:4-9 and 22-24. The nurse is able to answer questions in the questionnaire and based on the responses provided by the patient, the information is updated in the server and subsequent questions are asked. Benigno at 12:17-31. This also allows for individual questions to be used throughout multiple questionnaires, thereby increasing efficiency of the questionnaire database. *Id.* The individual questions are "tokenized representations" that are communicated between the server and the mobile device via wireless network connections. Benigno at 19:10-24, 13:1-10, and 46:4-9. The mobile device can be disconnected from the network communications due to losing the connection as is inevitable in wireless communication or due to the nurse closing the connection. Benigno at 46:4-24 and FIG.1. The nurse can continue to input data into the questionnaire, even though the system is disconnected from the network communications, further, when combined with Falls, the combination further teaches that the questionnaire can continue to be used and a "virtual network" will allow the mobile device to continue normal operations when there is no network connection. Benigno at 46:16-28; Falls at Abstract and 3:16-35. The questionnaire can then be synchronized upon reestablishing the network connection. Falls at Abstract and 3:16-35. The questionnaire is then stored. Benigno at 23:10.

CLAIM 1	Teachings From Benigno in view of Falls
1. A method for managing data including	A self-analyzing system for suggesting deviation from a current clinical pathway and entry into an alternative clinical pathway based

the steps of:	upon historical information about the results of actions. Systems for tracking clinical pathway outcomes based on data collected post-treatment. …. A questionnaire computer language and subsystem are used in various stages of the systems of the invention. Corresponding methods are also disclosed. Benigno at Abstract
(a) creating a questionnaire comprising a series of questions;	Assessment of the patient's condition is performed using a questionnaire or form generated based upon the current patient's customized and changeable clinical pathway. Benigno at 9:31-10:2 Another aspect of the invention involves a new questionnaire format, which may be used as one way of collecting the data to be analyzed according to the present invention. This questionnaire format allows stable acute care caregivers the ability to closely track and instantly inform a patient's physician of that patient's condition. The format, as it applies to a particular patient, also provides the clinical pathway for the patient, as described *infra.* With the present invention, stable acute care providers receive updated orders about the patient on a visit by visit basis and physicians are able to track the progress of their patients instantly. The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:17-31
(b) tokenizing said questionnaire; thereby producing a plurality of tokens representing said questionnaire;	In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24 One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention.

	Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10
(c) establishing a first wireless modem or wireless LAN network connection with a remote computing device;	The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard

	telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29

	 *FIG. 4*
(d) transmitting said plurality of tokens to a remote computing device via said first wireless modem or wireless LAN network connection;	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again

communicate with server 402, in order to obtain the most current instructions and data.
Benigno at 46:13-14

Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401.
Benigno at 46:22-24

In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached.
Benigno at 46:30-47:4

Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.
Benigno at 47:6-13

Therefore, it would be highly desirable to have a system permitting the capability to provide home care and direct information communication to the physician and his or her staff in real time, so as to reduce the recovery period and the risk of complications.
Benigno at 6:26-29

The nurse or caregiver then sees the patient almost immediately at home and tracks the patient at home one or more times per day using the system and the information is used to create and update the clinical pathway database records for the patient. Real-time communication systems of the invention allow supervision by the physician, while not requiring the supervision to occur in a hospital setting.
Benigno at 9:26-31

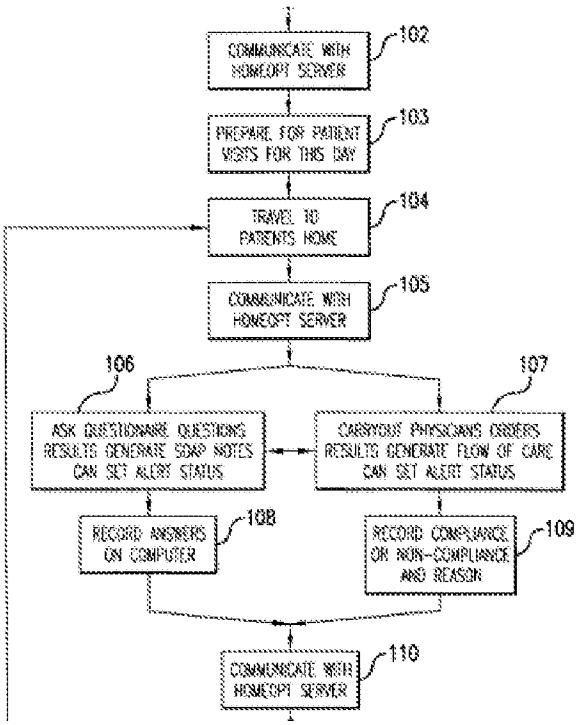
The communications subsystems of the invention are important to its

	capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network,

	the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(e) terminating said first wireless modem or wireless LAN network connection with said remote computing device;	In step 102, the nurse, 5 using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data.

	Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations

	that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29 With reference to FIG. 2, at least two of the computers 28 are disconnectable computers 40 configured according to the present invention. Each disconnectable computer 40 includes a database manager 42 which provides a location independent interface to a distributed hierarchical target database embodied in convergently consistent replicas 56. Falls at 7:16-21
(f) after said first wireless modem or	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection

wireless LAN network connection is terminated, executing at least a portion of said plurality of tokens representing said questionnaire at said remote computing device to collect a response from a user;	mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored, gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28  A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract

The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network.

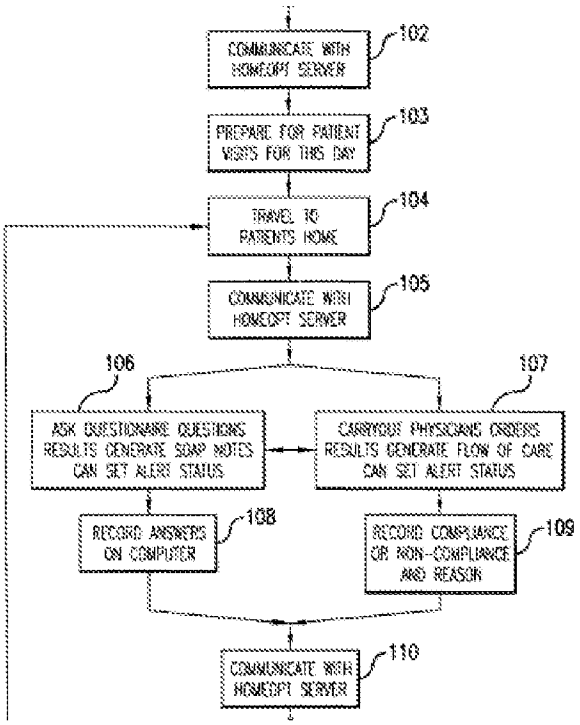
Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer.
Falls at 3:16-35

In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer.
Falls at 5:21-31

Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection.
Falls at 16:35-37

In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash

	handling and retries also make locks optional. Falls at 37:11-18
(g) establishing a second wireless modem or wireless LAN network connection between said remote computing device and a server;	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13



Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402.
Benigno at 47:20-27

In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered.
Benigno at 47:29-30

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention.

	Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 More generally, the present invention provides a basis for a family of distributed software applications utilizing the target database by providing capabilities which support replication, distribution, and

	disconnectability. Falls at 7:53-8:1. Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 With reference to FIGS. 1 through 4 and particular focus on FIG. 4, a method of the present invention for synchronizing transactions in the network 10 of connectable computers 28 is illustrated. The transactions target entries in a distributed hierarchical database that contains convergently consistent replicas 56 residing on separate computers 28 in the network 10. The method comprises the following computer-implemented steps. A connecting step 100 uses the replica manager 46 and network link manager 50 to establish a network connection between a first computer 36 and a second computer 38. For purposes of illustrating the method, the first computer 36 shown in FIG. 1 is a client computer 20 and the second computer 38 is a server computer 16. However, a server and a client, or two servers, or two clients, may also be synchronized and otherwise managed according to the present invention. 35:47-63 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18

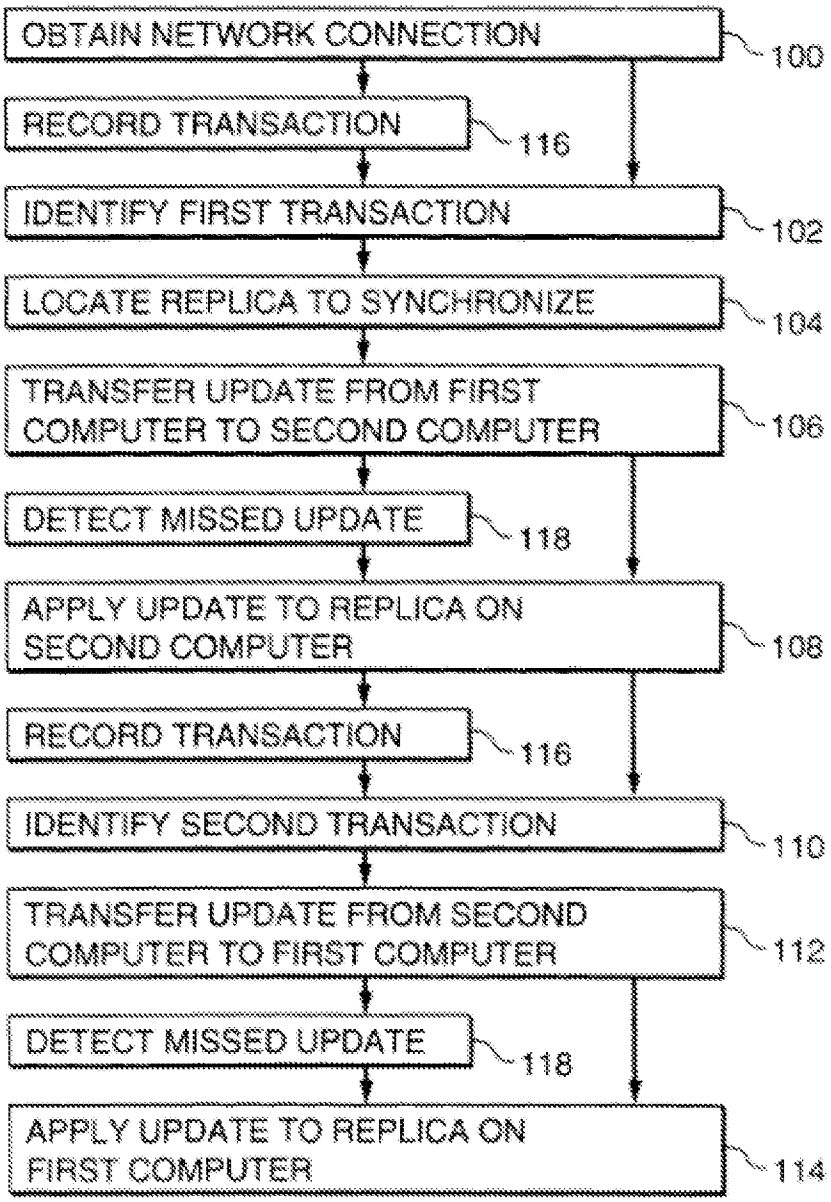


FIG. 4

(h) after said second wireless modem or wireless LAN network connection is established, transmitting at least a portion of said response from the user to said server via said second wireless modem	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or

or wireless LAN network connection; and	105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored, gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the

	changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(i) storing said transmitted response at said server.	The questionnaire and its answers are all stored. Benigno at 23:10 In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the

	client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored, gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28
CLAIM 2	
2. The method for managing data of claim 1 further comprising the step of: (j) translating said response to a format recognizable by a particular computer program; and	The important features of the system of the invention include the use of a computerized or electronic interface between the skilled nurse/caregiver, the patient, and the physician. In addition, the invention relies upon specialized software subsystems that allow the use of the interface, allow immediate translation from questionnaire into on-screen formats which can be read by a physician or staff, and allow prequalifying of patients during the pre-operative period for appropriate *(i.e.,* earlier or later than the average) release and stable acute care. Benigno at 10:20-26 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 A major portion of the communication system of the invention is used to handle connections by physicians and nurses to the system. In one embodiment, data is converted internally to a more efficient format than the external standard HL7 protocol. All communications are coordinated by the server 402 of the system. When a physician or nurse requests information from a source 404 outside of the system, the information may be retrieved from an outside information server 403. Of course, both servers 402, 403 could be implemented on a single machine, if desired. The outside information server 403 contains a translation mechanism for handling translation to and from internal representations based on HL7. By interfacing with HL7, the system of the invention is capable of accessing patient information from existing HL 7 external clients 404, as well as serving such information to HL 7 systems requesting it. Benigno at 30:6-17

(k) accessing the translated response from a computer executing said particular computer program.	The important features of the system of the invention include the use of a computerized or electronic interface between the skilled nurse/caregiver, the patient, and the physician. In addition, the invention relies upon specialized software subsystems that allow the use of the interface, allow immediate translation from questionnaire into on-screen formats which can be read by a physician or staff, and allow prequalifying of patients during the pre-operative period for appropriate *(i.e.,* earlier or later than the average) release and stable acute care. Benigno at 10:20-26 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 A major portion of the communication system of the invention is used to handle connections by physicians and nurses to the system. In one embodiment, data is converted internally to a more efficient format than the external standard HL7 protocol. All communications are coordinated by the server 402 of the system. When a physician or nurse requests information from a source 404 outside of the system, the information may be retrieved from an outside information server 403. Of course, both servers 402, 403 could be implemented on a single machine, if desired. The outside information server 403 contains a translation mechanism for handling translation to and from internal representations based on HL7. By interfacing with HL7, the system of the invention is capable of accessing patient information from existing HL 7 external clients 404, as well as serving such information to HL 7 systems requesting it. Benigno at 30:6-17
CLAIM 3	
3. The method for managing data of claim 1 wherein step (a) includes the substeps of: (a)	Assessment of the patient's condition is performed using an questionnaire or form generated based upon the current patient's customized and changeable clinical pathway. In the stable acute care *(e.g.,* "home") setting or facility, the nurse provider can assess the

creating a questionnaire by:	patient and send information regarding the patient by using the questionnaire. The questionnaire itself will create a SOAP (Subjective, Objective, Analysis, Plan) note. The SOAP note is known to those of ordinary skill in the art as the means whereby a physician describes the patient's status and care plan. Benigno at 9:31-10:7
(i) entering a series of questions into a questionnaire design computer program;	The important features of the system of the invention include the use of a computerized or electronic interface between the skilled nurse/caregiver, the patient, and the physician. In addition, the invention relies upon specialized software subsystems that allow the use of the interface, allow immediate translation from questionnaire into on-screen formats which can be read by a physician or staff, and allow prequalifying of patients during the pre-operative period for appropriate *(i.e.,* earlier or later than the average) release and stable acute care. Benigno at 10:20-26 The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:24-31 As each patient is added to the system, a copy of the base questionnaire for their procedure is produced and offered to the physician or system operator for change. The base questionnaire is simply a set of the clinical pathway node structures as described above. As individual questions are changed, they are versioned, *e.g.,* by incrementing a version number. Versioning of the question can also include further information, such as date and time of the change, identity of the party making the change, original question text, etc., such that the system can provide a suitable audit trail to review all changes in any particular questionnaire. Benigno at 19:28-20:4 As noted above, a predefined preliminary set of these correlation searches may be entered manually and the system is configured to search this problem space automatically. The correlation matrix potentially includes all combinations of all questions in the questionnaire versus all recorded outcomes.

	Benigno at 21:10-13 For use in the system, a questionnaire (again representing the default clinical pathway) is also developed specifically for each procedure. The questionnaire is later processed by the computer software to develop a SOAP note for the patient. When the patient is visited by the nurse, the SOAP note is generated by the computer for that visit and/or procedure. In a similar fashion, events such as IV hydration and IV meds and the use of H2 blockers such as TAGAMET® are also addressed for each procedure. Often, the decision elements or points which yield daily progress notes are similar from one procedure to another. Additionally, an order sheet may be created and may be modified by the physician or the nurse on a daily basis and the orders on the order sheet are determined from the initial order sheet that was created. In this fashion, the initial order sheet is essentially a clinical pathway printout, or at least a decision data element and subsequent data element printout. In essence, the system creates a universal protocol template and, often, only minor changes are needed for each procedure for a specific plan. The data elements tracked in the model include, but are not required to include and are not limited to, appropriate procedures, restrictive criteria for patients, insurance information, pre-operative education, the clinical pathway, daily order sheets for subsequent orders, the questionnaire developed to determine specific notes, and daily progress sheets created to track the fluids, IV's, or medications given. Benigno at 37:5-24
(ii) identifying within said questionnaire design computer program the type of response allowed for each question of said series of questions; and	The important features of the system of the invention include the use of a computerized or electronic interface between the skilled nurse/caregiver, the patient, and the physician. In addition, the invention relies upon specialized software subsystems that allow the use of the interface, allow immediate translation from questionnaire into on-screen formats which can be read by a physician or staff, and allow prequalifying of patients during the pre-operative period for appropriate *(i.e.,* earlier or later than the average) release and stable acute care. Benigno at 10:20-26 The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are saved in the

clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires.
Benigno at 12:24-31

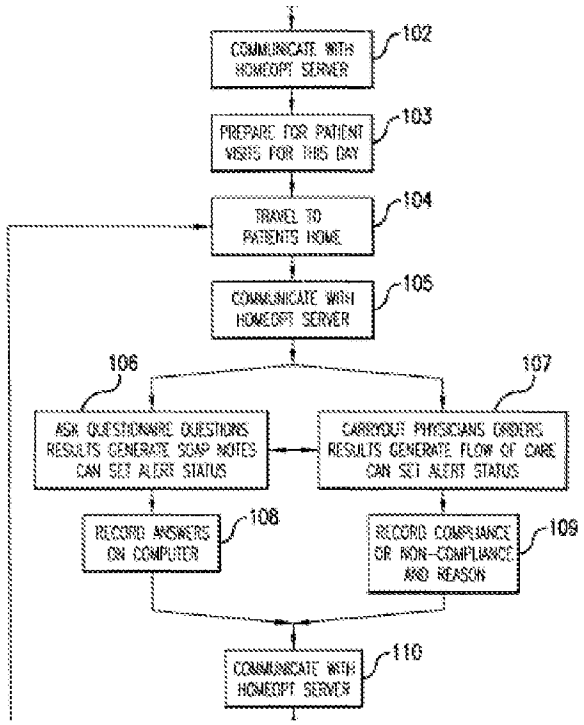
As each patient is added to the system, a copy of the base questionnaire for their procedure is produced and offered to the physician or system operator for change. The base questionnaire is simply a set of the clinical pathway node structures as described above. As individual questions are changed, they are versioned, *e.g.,* by incrementing a version number. Versioning of the question can also include further information, such as date and time of the change, identity of the party making the change, original question text, etc., such that the system can provide a suitable audit trail to review all changes in any particular questionnaire.
Benigno at 19:28-20:4

For use in the system, a questionnaire (again representing the default clinical pathway) is also developed specifically for each procedure. The questionnaire is later processed by the computer software to develop a SOAP note for the patient. When the patient is visited by the nurse, the SOAP note is generated by the computer for that visit and/or procedure. In a similar fashion, events such as IV hydration and IV meds and the use of H2 blockers such as TAGAMET® are also addressed for each procedure. Often, the decision elements or points which yield daily progress notes are similar from one procedure to another. Additionally, an order sheet may be created and may be modified by the physician or the nurse on a daily basis and the orders on the order sheet are determined from the initial order sheet that was created. In this fashion, the initial order sheet is essentially a clinical pathway printout, or at least a decision data element and subsequent data element printout.

In essence, the system creates a universal protocol template and, often, only minor changes are needed for each procedure for a specific plan. The data elements tracked in the model include, but are not required to include and are not limited to, appropriate procedures, restrictive criteria for patients, insurance information, pre-operative education, the clinical pathway, daily order sheets for subsequent orders, the questionnaire developed to determine specific notes, and daily progress sheets created to track the fluids, IV's, or medications given.
Benigno at 37:5-24

(iii) identifying within said questionnaire design computer program a branching path in said questionnaire for each possible response to each question of said series of questions.	This method of representation was chosen to allow for complete flexibility in the representation of the clinical pathway. This structure is what allows the pathway representation to be a dynamic tree as opposed to a simple sequentially-followed set of instructions. In other words, future actions in the clinical pathway can be machine encoded directly into the questionnaire without requiring human intervention to determine the appropriate course of action during the administering of the pathway to a patient. In one embodiment, the invention provides a system for manipulation and analysis of data related to clinical pathways, comprising a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway and at least one, preferably a plurality of, subsequent decision data elements, corresponding to available subsequent decision points within the clinical pathway, a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, processing means, including a storage device, for performing the steps of selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the subsequent decision data elements within the clinical pathway database. This will allow the changing of the physical layout of the tree. In other words, it is possible to include totally new decision points, or totally remove decision points from a clinical pathway. This differs from existing systems which simply take a fixed tree and attempt to find individualized parameters within that tree. Benigno at 13:12-14:5 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24 For use in the system, a questionnaire (again representing the default clinical pathway) is also developed specifically for each procedure. The questionnaire is later processed by the computer software to develop a SOAP note for the patient. When the patient is visited by the nurse, the SOAP note is generated by the computer for that visit

	and/or procedure. In a similar fashion, events such as IV hydration and IV meds and the use of H2 blockers such as TAGAMET® are also addressed for each procedure. Often, the decision elements or points which yield daily progress notes are similar from one procedure to another. Additionally, an order sheet may be created and may be modified by the physician or the nurse on a daily basis and the orders on the order sheet are determined from the initial order sheet that was created. In this fashion, the initial order sheet is essentially a clinical pathway printout, or at least a decision data element and subsequent data element printout. In essence, the system creates a universal protocol template and, often, only minor changes are needed for each procedure for a specific plan. The data elements tracked in the model include, but are not required to include and are not limited to, appropriate procedures, restrictive criteria for patients, insurance information, pre-operative education, the clinical pathway, daily order sheets for subsequent orders, the questionnaire developed to determine specific notes, and daily progress sheets created to track the fluids, IV's, or medications given. Benigno at 37:5-24 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27



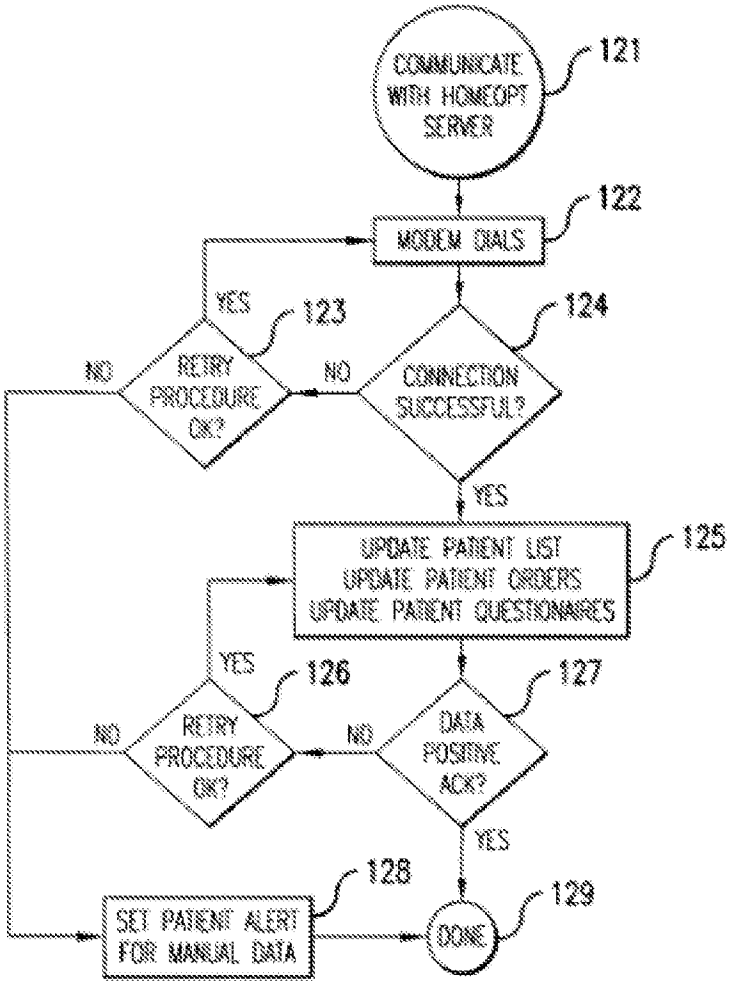
Benigno at FIG 1A

CLAIM 4	
4. The method for managing data of claim 1 wherein step (b) includes the substeps of: (b) tokenizing said questionnaire thereby producing a plurality of tokens representing said questionnaire by:	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be

	information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24
(i) assigning at least one token to each question of said series of questions;	Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10
(ii) assigning at least one token to each response called for in said series of questions to identify the type of response required; and	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the

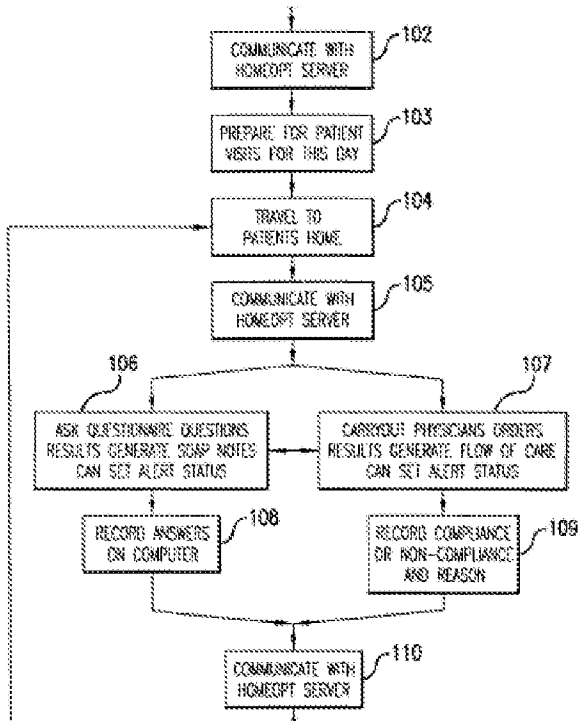
	language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24
(iii) assigning at least one token to each branch in said questionnaire to identify the required program control associated with said branch.	This method of representation was chosen to allow for complete flexibility in the representation of the clinical pathway. This structure is what allows the pathway representation to be a dynamic tree as opposed to a simple sequentially-followed set of instructions. In other words, future actions in the clinical pathway can be machine encoded directly into the questionnaire without requiring human intervention to determine the appropriate course of action during the administering of the pathway to a patient. In one embodiment, the invention provides a system for manipulation and analysis of data related to clinical pathways, comprising a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway and at least one, preferably a plurality of, subsequent decision data elements, corresponding to available subsequent decision points within the clinical pathway, a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, processing means, including a storage device, for performing the steps of selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the subsequent decision data elements within the clinical pathway database. This will allow the changing of the physical layout of the tree. In other words, it is possible to include totally new decision points, or totally remove decision points from a clinical pathway. This differs from existing systems which simply take a

	fixed tree and attempt to find individualized parameters within that tree. Benigno at 13:12-14:5
CLAIM 5	
5. A method for modifying a questionnaire used in data management according to the method of claim 1 including the steps of: (a) making at least one incremental change to a portion of the questionnaire;	Daily communication includes SOAP notes, notification of whether the patient received appropriate IV medications and intravenous fluids, as well as the ability to communicate with nurses, and nurse communications with physicians for order changes. Benigno at 11:22-26 The system is constantly evaluating itself. As the system finds new correlating factors, they are put in place to aid in determining changes to be made to the current or default clinical pathway. In addition, as correlations are determined between clinical pathway decisions and significant outcomes *(i.e.,* outcomes of interest), changes can be made to the default pathway to optimize systematically the clinical pathway toward the desired results. These changes can be automatically made or can be presented to the physician, system administrator, or other user for approval. Benigno at 21:22-29 In addition, the present invention provides a client / server system for manipulation and analysis of data related to clinical pathways, comprising a communication network, a client workstation in communication with the communication network, wherein the client workstation comprises means for generating at least one signal corresponding to a clinical pathway decision and transmitting the at least one decision signal over the communication network, and means for receiving at least one signal corresponding to a clinical pathway modification from the communication network, and means for outputting the at least one modification signal to a signal processing means, a server on the communication network, wherein the server comprises a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to at least one available subsequent decision point within the clinical pathway, and a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and processing means, in communication with the communication network, the client workstation, and the server, for performing the steps of receiving the at least one decision signal from the communication network, based on the received decision signal,

	selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, then generating at least one signal corresponding to a clinical pathway modification of the subsequent decision data elements in the clinical pathway database, and transmitting the at least one clinical pathway modification signal over the communication network to the receiving means of the client workstation. Benigno at 14:7-15:2  Benigno at FIG. 1B
(b) tokenizing said at	One significant benefit of the invention is that the data gathered about

least one incremental change to said questionnaire;	various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24
(c) transmitting at least a portion of said tokens resulting from step (b) to a remote loosely networked computing device, said transmitted tokens comprising less than the entire tokenized questionnaire; and,	Therefore, it would be highly desirable to have a system permitting the capability to provide home care and direct information communication to the physician and his or her staff in real time, so as to reduce the recovery period and the risk of complications. Benigno at 6:26-29 The nurse or caregiver then sees the patient almost immediately at home and tracks the patient at home one or more times per day using the system and the information is used to create and update the clinical pathway database records for the patient. Real-time communication systems of the invention allow supervision by the

	physician, while not requiring the supervision to occur in a hospital setting. Benigno at 9:26-31 The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer

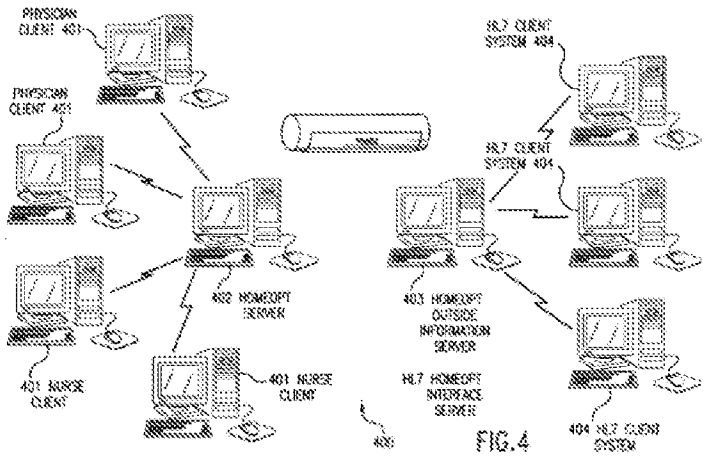
	401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30  Benigno at FIG 1A
(d) incorporating said transmitted tokens into	Daily communication includes SOAP notes, notification of whether the patient received appropriate IV medications and intravenous

said questionnaire at said loosely networked remote computing device, thereby modifying said questionnaire.	fluids, as well as the ability to communicate with nurses, and nurse communications with physicians for order changes. Benigno at 11:22-26 The system is constantly evaluating itself. As the system finds new correlating factors, they are put in place to aid in determining changes to be made to the current or default clinical pathway. In addition, as correlations are determined between clinical pathway decisions and significant outcomes *(i.e.,* outcomes of interest), changes can be made to the default pathway to optimize systematically the clinical pathway toward the desired results. These changes can be automatically made or can be presented to the physician, system administrator, or other user for approval. Benigno at 21:22-29 In addition, the present invention provides a client / server system for manipulation and analysis of data related to clinical pathways, comprising a communication network, a client workstation in communication with the communication network, wherein the client workstation comprises means for generating at least one signal corresponding to a clinical pathway decision and transmitting the at least one decision signal over the communication network, and means for receiving at least one signal corresponding to a clinical pathway modification from the communication network, and means for outputting the at least one modification signal to a signal processing means, a server on the communication network, wherein the server comprises a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to at least one available subsequent decision point within the clinical pathway, and a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and processing means, in communication with the communication network, the client workstation, and the server, for performing the steps of receiving the at least one decision signal from the communication network, based on the received decision signal, selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, then generating at least one signal corresponding to a clinical pathway modification of the subsequent decision data elements in the clinical pathway database, and transmitting the at least one clinical pathway

	modification signal over the communication network to the receiving means of the client workstation. Benigno at 14:7-15:2 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30
CLAIM 6	
6. A method for managing data according to claim 1, wherein said first wireless modem or wireless LAN network connection and said second wireless modem or wireless LAN network connection are a same wireless modem or wireless LAN network connection.	The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place

	via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13
CLAIM 7	
7. The method of claim 1 further including performing at least the steps (c)-(k) for at least two different remote computing device types using the same tokens.	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10

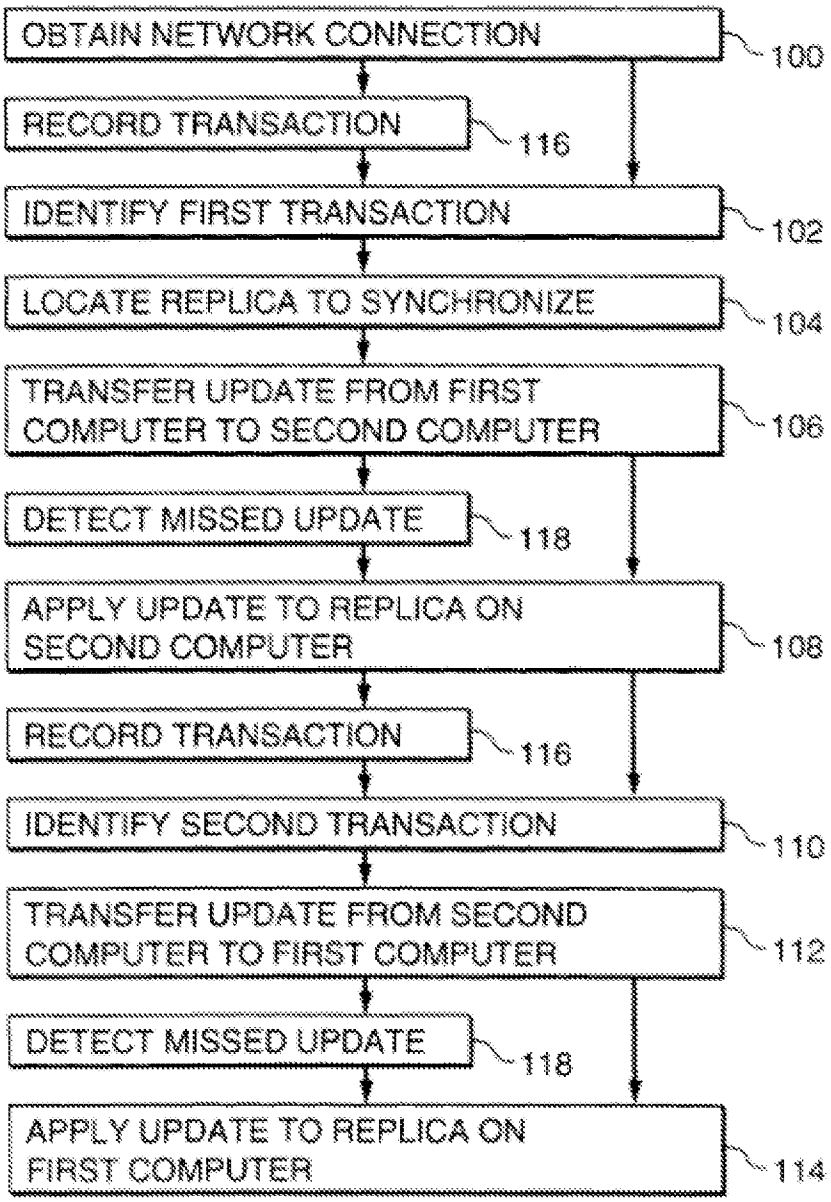
	In a further embodiment, the present invention provides a system for assessing utilization of medical resources based upon manipulation and analysis of statistical data related to clinical pathways, comprising a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to available subsequent decision points within the clinical pathway, a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and, for each of the previously selected subsequent decision data elements, a utilization value corresponding to the decision data element processing means, including a storage device, for performing the steps of selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, and statistical processing means, in communication with the clinical pathway database and the historical clinical pathway database, for performing the steps of accessing the historical clinical pathway database, computing pathway utilization value based on the accessed utilization values in the database, generating at least one signal corresponding to the pathway utilization value, and outputting the at least one utilization value signal to a signal processing means. Benigno at 15:18-16:7 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24 In step 304, a new patient record is created, using for example the client computer 401 and the server 402. This record may be stored on the server 402, or at any other external location. In step 305, a criteria questionnaire is administered on the client computer 401, in order to determine whether the patient satisfies the criteria to be eligible for, for example, home health care. Examples of such criteria and conditions have been previously described elsewhere. Benigno at 49:10-15

	 Benigno at FIG. 4
CLAIM 8	
8. A method for managing data transfers between computers including the steps of:	A self-analyzing system for suggesting deviation from a current clinical pathway and entry into an alternative clinical pathway based upon historical information about the results of actions. Systems for tracking clinical pathway outcomes based on data collected post-treatment. …. A questionnaire computer language and subsystem are used in various stages of the systems of the invention. Corresponding methods are also disclosed. Benigno at Abstract
(a) creating a questionnaire at a first site in a first computer;	Assessment of the patient's condition is performed using a questionnaire or form generated based upon the current patient's customized and changeable clinical pathway. Benigno at 9:31-10:2 Another aspect of the invention involves a new questionnaire format, which may be used as one way of collecting the data to be analyzed according to the present invention. This questionnaire format allows stable acute care caregivers the ability to closely track and instantly inform a patient's physician of that patient's condition. The format, as it applies to a particular patient, also provides the clinical pathway for the patient, as described *infra*. With the present invention, stable acute care providers receive updated orders about the patient on a visit by visit basis and physicians are able to track the progress of their patients instantly. The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are

	saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:17-31
(b) tokenizing said questionnaire, thereby producing a tokenized questionnaire;	In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra)*. … Question ID is the identifier of the question itself. Benigno at 19:10-24 One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10
(c) bringing a remote computer into electronic communication with said	The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a

first computer;	suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network.

	Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29

	 *FIG. 4*
(d) transmitting said tokenized questionnaire to said remote computer;	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again

communicate with server 402, in order to obtain the most current instructions and data.
Benigno at 46:13-14

Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401.
Benigno at 46:22-24

In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached.
Benigno at 46:30-47:4

Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.
Benigno at 47:6-13

Therefore, it would be highly desirable to have a system permitting the capability to provide home care and direct information communication to the physician and his or her staff in real time, so as to reduce the recovery period and the risk of complications.
Benigno at 6:26-29

The nurse or caregiver then sees the patient almost immediately at home and tracks the patient at home one or more times per day using the system and the information is used to create and update the clinical pathway database records for the patient. Real-time communication systems of the invention allow supervision by the physician, while not requiring the supervision to occur in a hospital setting.
Benigno at 9:26-31

The communications subsystems of the invention are important to its

	capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network,

	the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(e) removing said remote computer from electronic communication with said first computer;	In step 102, the nurse, 5 using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14

Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401.
Benigno at 46:22-24

In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached.
Benigno at 46:30-47:4

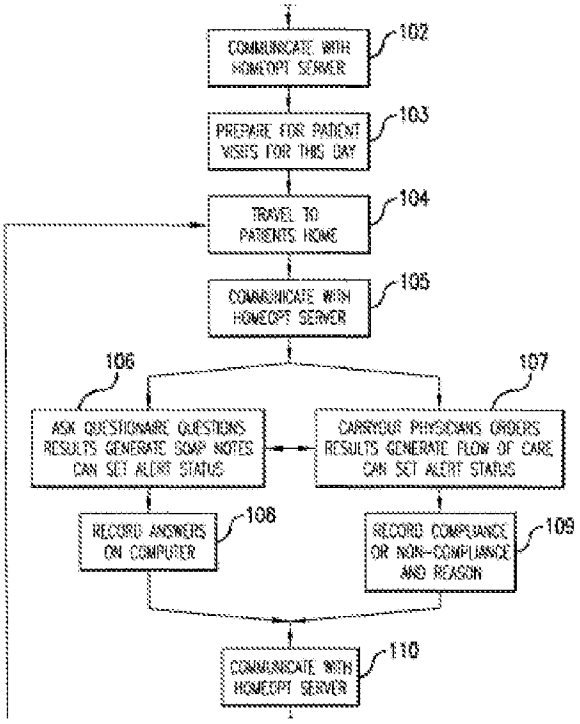
Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.
Benigno at 47:6-13

Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402.
Benigno at 47:20-27

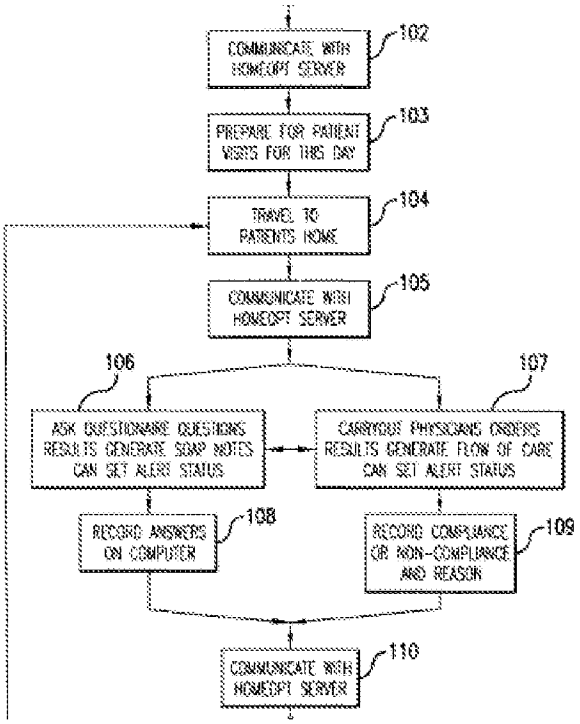
In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered.
Benigno at 47:29-30

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that

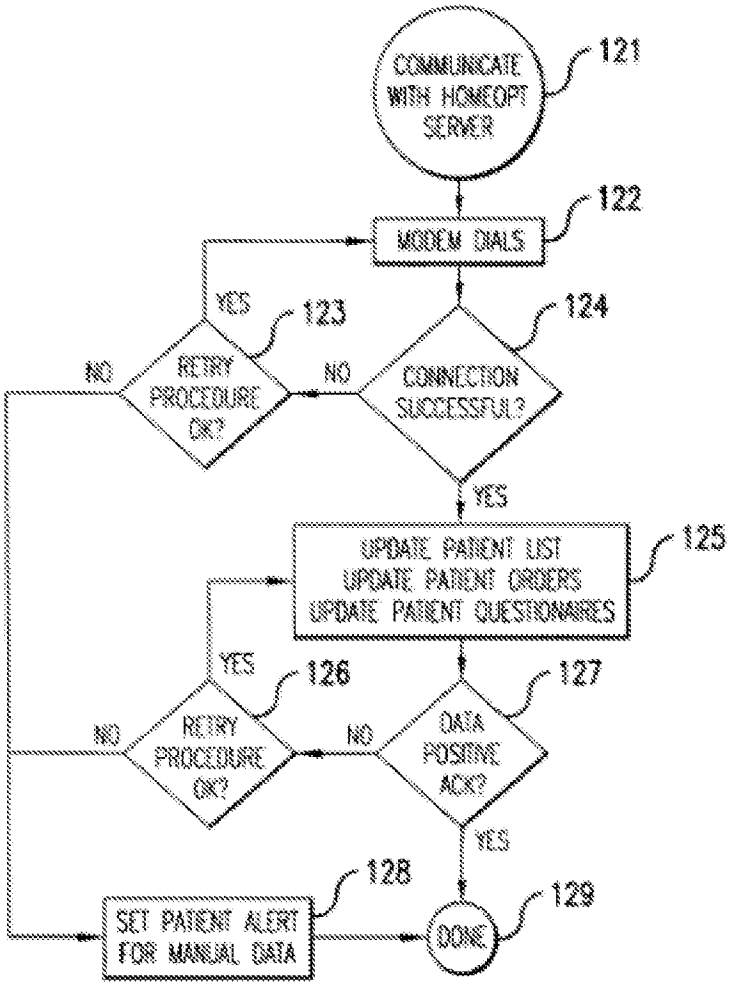
	computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29 With reference to FIG. 2, at least two of the computers 28 are disconnectable computers 40 configured according to the present invention. Each disconnectable computer 40 includes a database manager 42 which provides a location independent interface to a distributed hierarchical target database embodied in convergently consistent replicas 56. Falls at 7:16-21
(f) within said remote computer, using said transmitted tokenized questionnaire to obtain at	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by

least one user response;	the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28  A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate

	disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18

(g) storing said at least one user response within said remote computer;	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28 
(h) modifying said questionnaire with incremental changes at a second computer located at a second site;	Daily communication includes SOAP notes, notification of whether the patient received appropriate IV medications and intravenous fluids, as well as the ability to communicate with nurses, and nurse communications with physicians for order changes. Benigno at 11:22-26 The system is constantly evaluating itself. As the system finds new

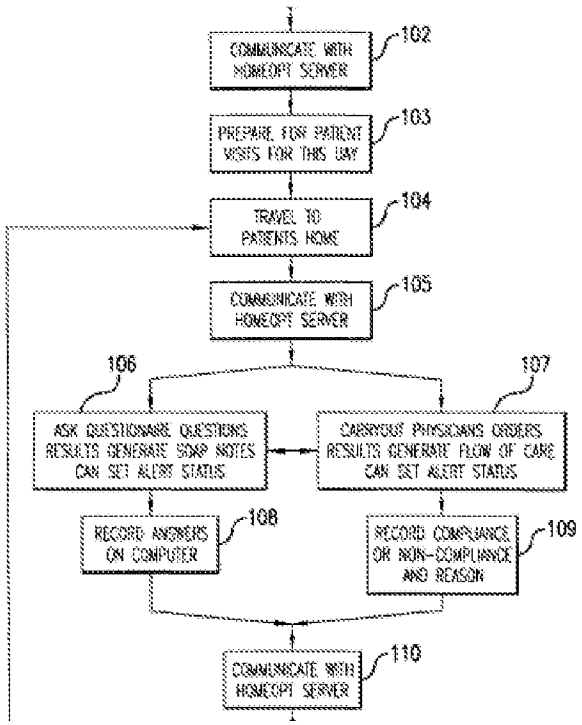
	correlating factors, they are put in place to aid in determining changes to be made to the current or default clinical pathway. In addition, as correlations are determined between clinical pathway decisions and significant outcomes *(i.e.,* outcomes of interest), changes can be made to the default pathway to optimize systematically the clinical pathway toward the desired results. These changes can be automatically made or can be presented to the physician, system administrator, or other user for approval. Benigno at 21:22-29 In addition, the present invention provides a client / server system for manipulation and analysis of data related to clinical pathways, comprising a communication network, a client workstation in communication with the communication network, wherein the client workstation comprises means for generating at least one signal corresponding to a clinical pathway decision and transmitting the at least one decision signal over the communication network, and means for receiving at least one signal corresponding to a clinical pathway modification from the communication network, and means for outputting the at least one modification signal to a signal processing means, a server on the communication network, wherein the server comprises a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to at least one available subsequent decision point within the clinical pathway, and a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and processing means, in communication with the communication network, the client workstation, and the server, for performing the steps of receiving the at least one decision signal from the communication network, based on the received decision signal, selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, then generating at least one signal corresponding to a clinical pathway modification of the subsequent decision data elements in the clinical pathway database, and transmitting the at least one clinical pathway modification signal over the communication network to the receiving means of the client workstation. Benigno at 14:7-15:2

	 Benigno at FIG. 1B
(i) placing said remote computer into electrical communication with said second computer;	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out

orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401.
Benigno at 46:22-24

In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached.
Benigno at 46:30-47:4

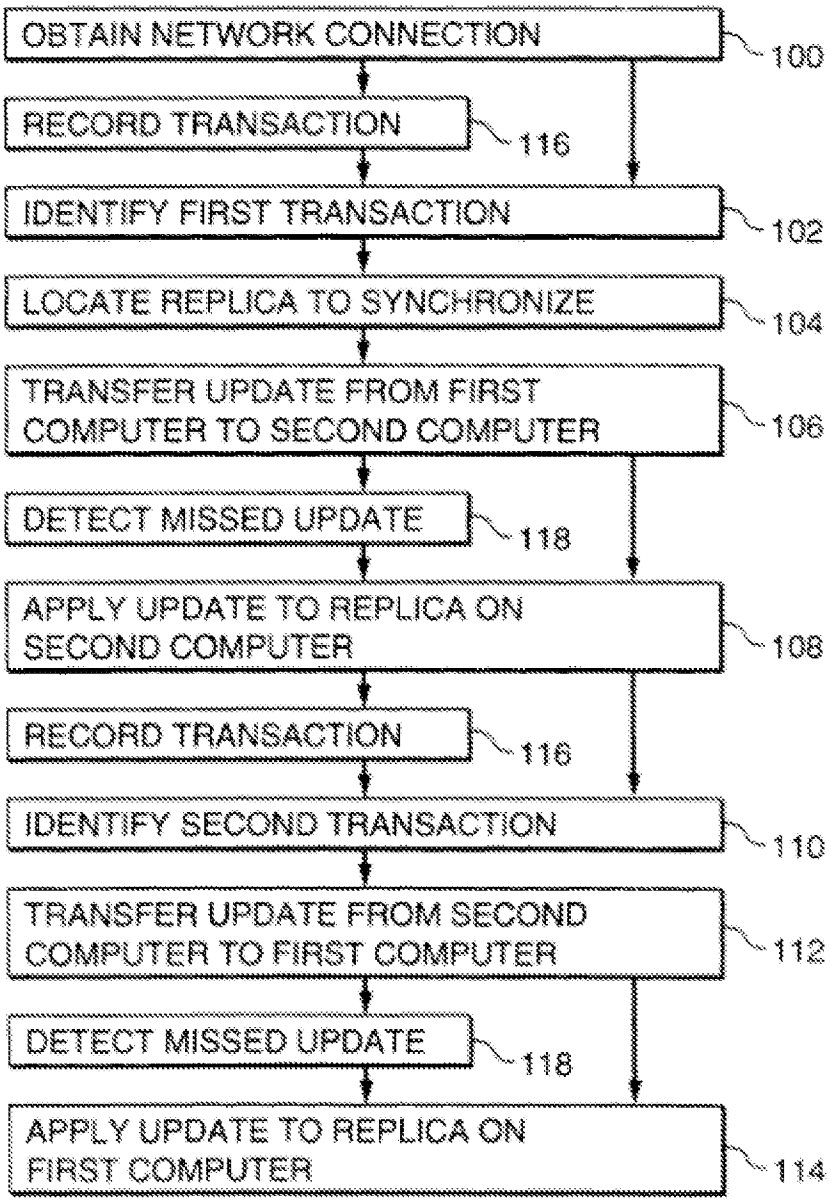
Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.
Benigno at 47:6-13



	Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35

	Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 More generally, the present invention provides a basis for a family of distributed software applications utilizing the target database by providing capabilities which support replication, distribution, and disconnectability. Falls at 7:53-8:1. Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 With reference to FIGS. 1 through 4 and particular focus on FIG. 4, a method of the present invention for synchronizing transactions in the network 10 of connectable computers 28 is illustrated. The transactions target entries in a distributed hierarchical database that contains convergently consistent replicas 56 residing on separate

	computers 28 in the network 10. The method comprises the following computer-implemented steps. A connecting step 100 uses the replica manager 46 and network link manager 50 to establish a network connection between a first computer 36 and a second computer 38. For purposes of illustrating the method, the first computer 36 shown in FIG. 1 is a client computer 20 and the second computer 38 is a server computer 16. However, a server and a client, or two servers, or two clients, may also be synchronized and otherwise managed according to the present invention. 35:47-63 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18

	 *FIG. 4*
(j) transmitting said incremental changes from said second computer to said remote computer;	Therefore, it would be highly desirable to have a system permitting the capability to provide home care and direct information communication to the physician and his or her staff in real time, so as to reduce the recovery period and the risk of complications. Benigno at 6:26-29 The nurse or caregiver then sees the patient almost immediately at home and tracks the patient at home one or more times per day using the system and the information is used to create and update the

clinical pathway database records for the patient. Real-time communication systems of the invention allow supervision by the physician, while not requiring the supervision to occur in a hospital setting.
Benigno at 9:26-31

The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter.
Benigno at 11:14-19

In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link.
Benigno at 46:4-9

In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data.
Benigno at 46:13-14

Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401.
Benigno at 46:22-24

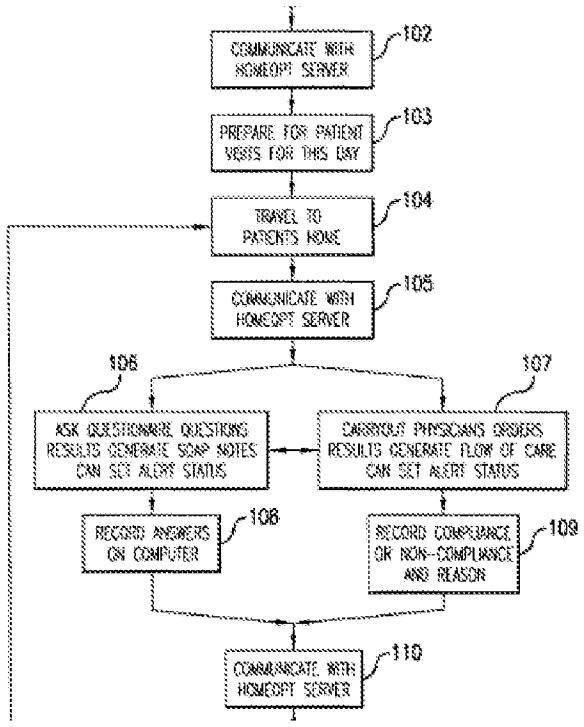
In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached.
Benigno at 46:30-47:4

Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the

processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.
Benigno at 47:6-13

Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402.
Benigno at 47:20-27

In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered.
Benigno at 47:29-30



Benigno at FIG 1A

A method and apparatus are disclosed for synchronizing transactions

	in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37

	In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(k) modifying said transmitted tokenized questionnaire in said remote computer with said incremental changes, thereby creating a modified tokenized questionnaire;	Daily communication includes SOAP notes, notification of whether the patient received appropriate IV medications and intravenous fluids, as well as the ability to communicate with nurses, and nurse communications with physicians for order changes. Benigno at 11:22-26 The system is constantly evaluating itself. As the system finds new correlating factors, they are put in place to aid in determining changes to be made to the current or default clinical pathway. In addition, as correlations are determined between clinical pathway decisions and significant outcomes *(i.e.,* outcomes of interest), changes can be made to the default pathway to optimize systematically the clinical pathway toward the desired results. These changes can be automatically made or can be presented to the physician, system administrator, or other user for approval. Benigno at 21:22-29 In addition, the present invention provides a client / server system for manipulation and analysis of data related to clinical pathways, comprising a communication network, a client workstation in communication with the communication network, wherein the client workstation comprises means for generating at least one signal corresponding to a clinical pathway decision and transmitting the at least one decision signal over the communication network, and means for receiving at least one signal corresponding to a clinical pathway modification from the communication network, and means for outputting the at least one modification signal to a signal processing means, a server on the communication network, wherein the server comprises a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to at least one available subsequent decision point within the clinical pathway, and a historical clinical pathway database for storing previously selected subsequent decision data elements,

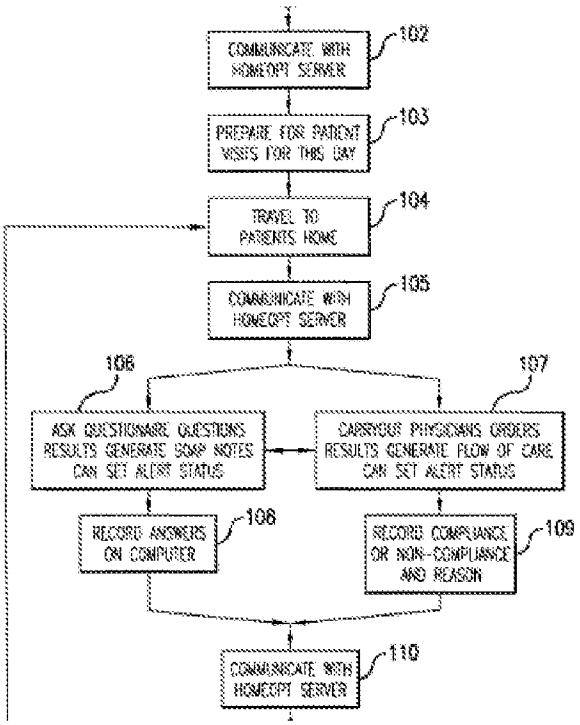
	selected corresponding to the initial procedure decision data element, and processing means, in communication with the communication network, the client workstation, and the server, for performing the steps of receiving the at least one decision signal from the communication network, based on the received decision signal, selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, then generating at least one signal corresponding to a clinical pathway modification of the subsequent decision data elements in the clinical pathway database, and transmitting the at least one clinical pathway modification signal over the communication network to the receiving means of the client workstation. Benigno at 14:7-15:2 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30
(l) removing said remote	In step 102, the nurse, 5 using the client computer 401 (Figure 4)

computer from electronic communication with said second computer;	communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and

	forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set. Falls at 16:24-29 With reference to FIG. 2, at least two of the computers 28 are

	disconnectable computers 40 configured according to the present invention. Each disconnectable computer 40 includes a database manager 42 which provides a location independent interface to a distributed hierarchical target database embodied in convergently consistent replicas 56. Falls at 7:16-21
(m) within said remote computer, using said modified tokenized questionnaire to obtain at least one additional user response;	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Benigno at 46:16-20
(n) placing said remote computer into electronic communication with a server;	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the

processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.
Benigno at 47:6-13



Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402.
Benigno at 47:20-27

In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered.
Benigno at 47:29-30

A method and apparatus are disclosed for synchronizing transactions

	in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a

corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer.
Falls at 5:21-31

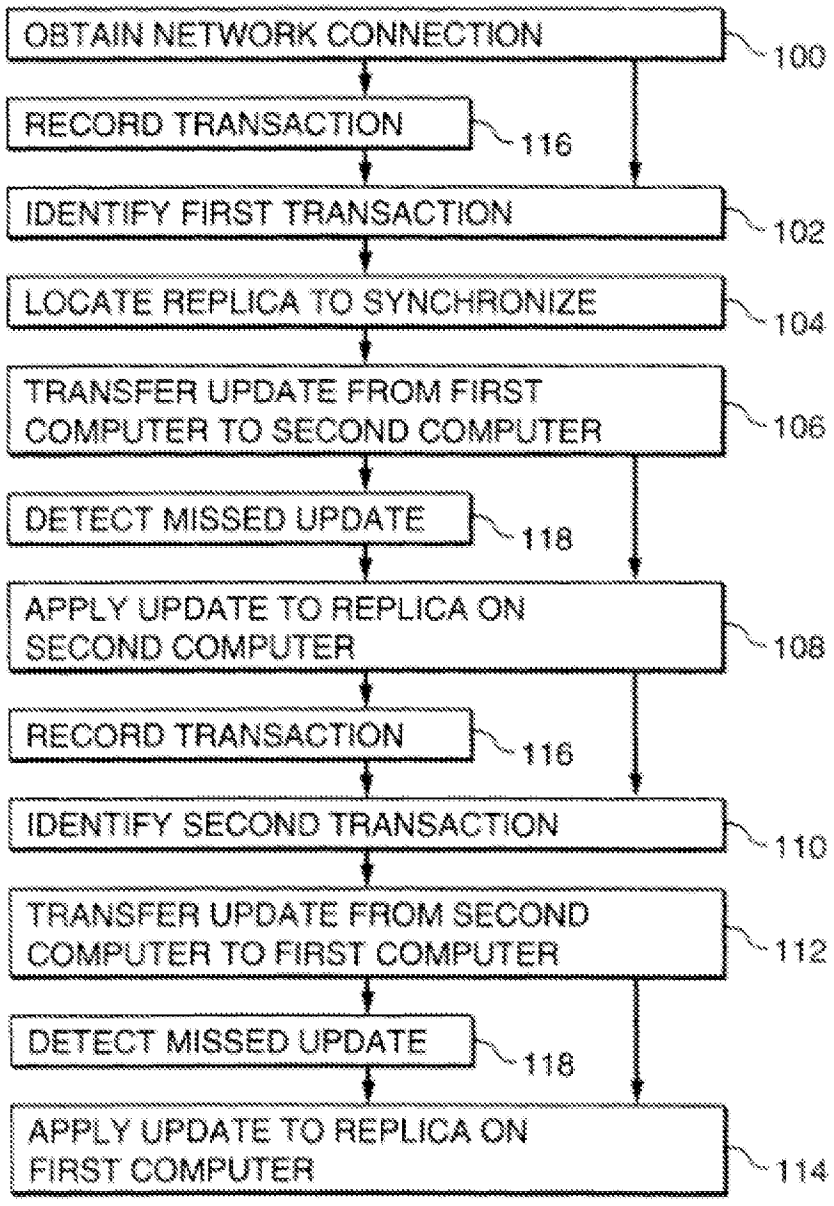
More generally, the present invention provides a basis for a family of distributed software applications utilizing the target database by providing capabilities which support replication, distribution, and disconnectability.
Falls at 7:53-8:1.

Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods.
Falls at 13:60-65

Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection.
Falls at 16:35-37

With reference to FIGS. 1 through 4 and particular focus on FIG. 4, a method of the present invention for synchronizing transactions in the network 10 of connectable computers 28 is illustrated. The transactions target entries in a distributed hierarchical database that contains convergently consistent replicas 56 residing on separate computers 28 in the network 10. The method comprises the following computer-implemented steps. A connecting step 100 uses the replica manager 46 and network link manager 50 to establish a network connection between a first computer 36 and a second computer 38. For purposes of illustrating the method, the first computer 36 shown in FIG. 1 is a client computer 20 and the second computer 38 is a server computer 16. However, a server and a client, or two servers, or two clients, may also be synchronized and otherwise managed according to the present invention.
35:47-63

In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means

	may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18  *FIG. 4*
(o) transmitting said at least one user response to said server;	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can

	be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a

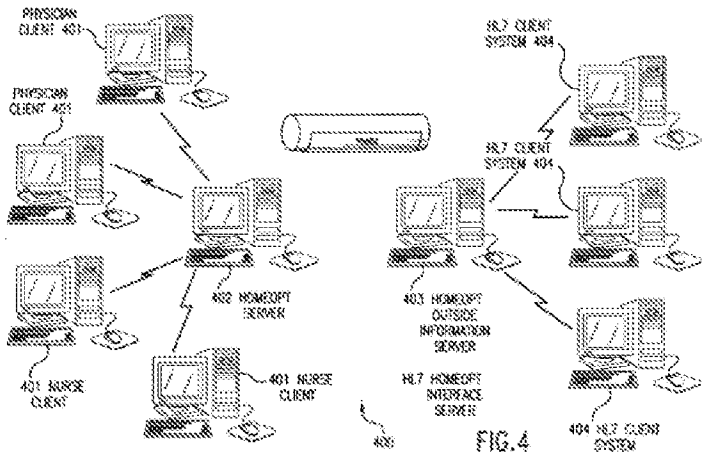
	network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(p) transmitting said at least one additional user response to said server;	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Benigno at 46:16-20
(q) storing said transmitted at least one user response and said at least one additional user response at said server;	The questionnaire and its answers are all stored. Benigno at 23:10 In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of

	such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28
(r) preparing a report using any of said at least one user response and said at least one additional user response; and,	The system includes means for … outputting the signal to a signal processing means. Suitable signal processing means include, a communication network, a computer, a storage medium, a display, a printer, or the like. Benigno at 28:26-29:1
(s) displaying at least a portion of said report on a visually perceptible medium;	The system includes means for … outputting the signal to a signal processing means. Suitable signal processing means include, a communication network, a computer, a storage medium, a display, a printer, or the like. Benigno at 28:26-29:1
(t) performing at least steps (d)-(p) using at least two different remote computing device types using the same tokens.	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10

In a further embodiment, the present invention provides a system for assessing utilization of medical resources based upon manipulation and analysis of statistical data related to clinical pathways, comprising a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to available subsequent decision points within the clinical pathway, a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and, for each of the previously selected subsequent decision data elements, a utilization value corresponding to the decision data element processing means, including a storage device, for performing the steps of selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, and statistical processing means, in communication with the clinical pathway database and the historical clinical pathway database, for performing the steps of accessing the historical clinical pathway database, computing pathway utilization value based on the accessed utilization values in the database, generating at least one signal corresponding to the pathway utilization value, and outputting the at least one utilization value signal to a signal processing means.
Benigno at 15:18-16:7

In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra)*.
…
Question ID is the identifier of the question itself.
Benigno at 19:10-24

In step 304, a new patient record is created, using for example the client computer 401 and the server 402. This record may be stored on the server 402, or at any other external location. In step 305, a criteria questionnaire is administered on the client computer 401, in order to determine whether the patient satisfies the criteria to be eligible for, for example, home health care. Examples of such criteria and conditions have been previously described elsewhere.
Benigno at 49:10-15

	 Benigno at FIG. 4
CLAIM 9	
9. The method for managing data transfers between computers according to claim 8 wherein said first computer and said second computer are a same computer.	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4

	Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30
CLAIM 10	
10. The method for managing data transfers between computers according to claim 9 wherein said server and said first computer are said same computer.	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24

	In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30
CLAIM 11	
11. A method for collecting survey data from a user comprising the steps of:	A self-analyzing system for suggesting deviation from a current clinical pathway and entry into an alternative clinical pathway based upon historical information about the results of actions. Systems for tracking clinical pathway outcomes based on data collected post-treatment. …. A questionnaire computer language and subsystem are used in various stages of the systems of the invention. Corresponding

	methods are also disclosed. Benigno at Abstract
(a) creating a questionnaire comprising a series of questions;	Assessment of the patient's condition is performed using an questionnaire or form generated based upon the current patient's customized and changeable clinical pathway. Benigno at 9:31-10:2 Another aspect of the invention involves a new questionnaire format, which may be used as one way of collecting the data to be analyzed according to the present invention. This questionnaire format allows stable acute care caregivers the ability to closely track and instantly inform a patient's physician of that patient's condition. The format, as it applies to a particular patient, also provides the clinical pathway for the patient, as described *infra.* With the present invention, stable acute care providers receive updated orders about the patient on a visit by visit basis and physicians are able to track the progress of their patients instantly. The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:17-31
(b) tokenizing said questionnaire; thereby producing a plurality of tokens representing said questionnaire;	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any

	general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra)*. … Question ID is the identifier of the question itself. Benigno at 19:10-24
(c) storing said plurality of tokens on a computer readable medium on a first computer;	Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10
(d) placing a handheld remote computing device into electronic communication with said first computer;	The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19

In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link.
Benigno at 46:4-9

Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.
Benigno at 47:6-13

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention.
Falls at Abstract

The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network.

Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and

methods.
Falls at 13:60-65

A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set.
Falls at 16:24-29

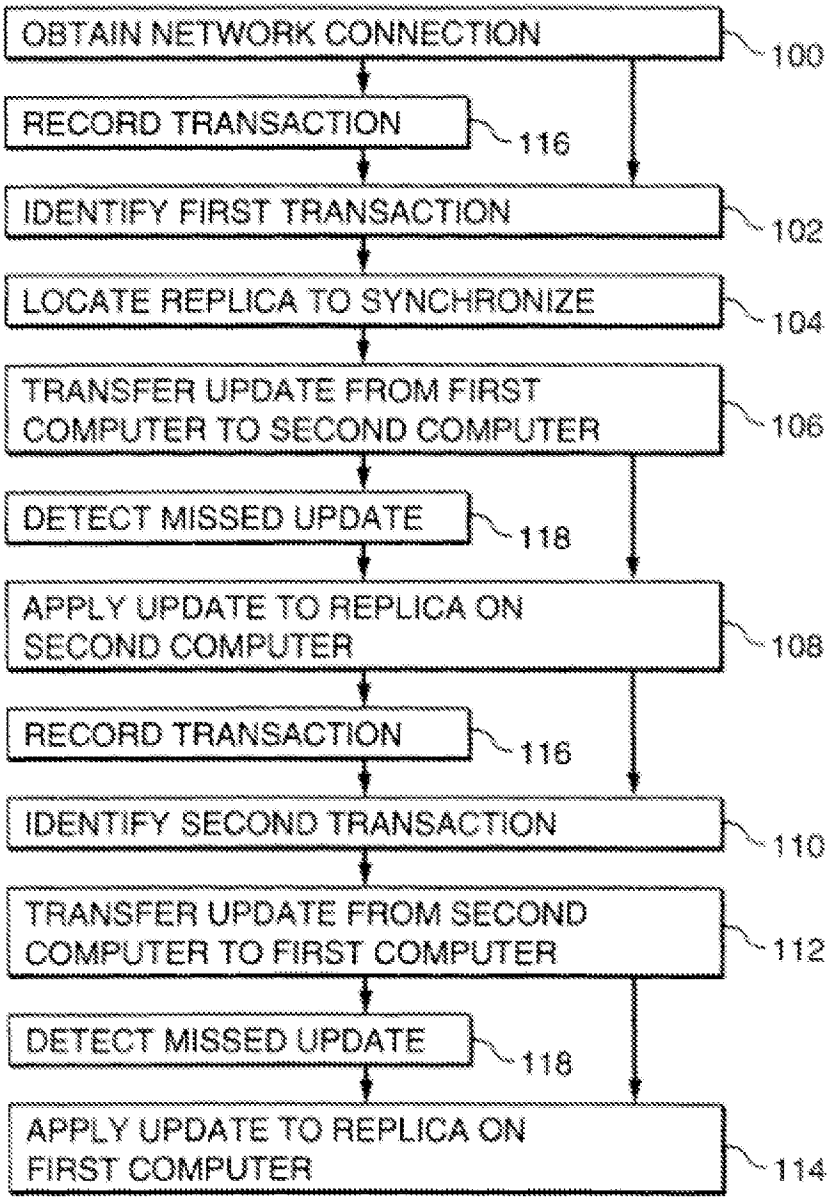


FIG. 4

(e) transmitting said plurality of tokens to said handheld remote computing device;	Therefore, it would be highly desirable to have a system permitting the capability to provide home care and direct information communication to the physician and his or her staff in real time, so as to reduce the recovery period and the risk of complications. Benigno at 6:26-29 The nurse or caregiver then sees the patient almost immediately at home and tracks the patient at home one or more times per day using the system and the information is used to create and update the clinical pathway database records for the patient. Real-time communication systems of the invention allow supervision by the physician, while not requiring the supervision to occur in a hospital setting. Benigno at 9:26-31 The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on

	the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to

	disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(f) taking said handheld remote computing device out of electronic	In step 102, the nurse, 5 using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during

communication with said first computer;	visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27

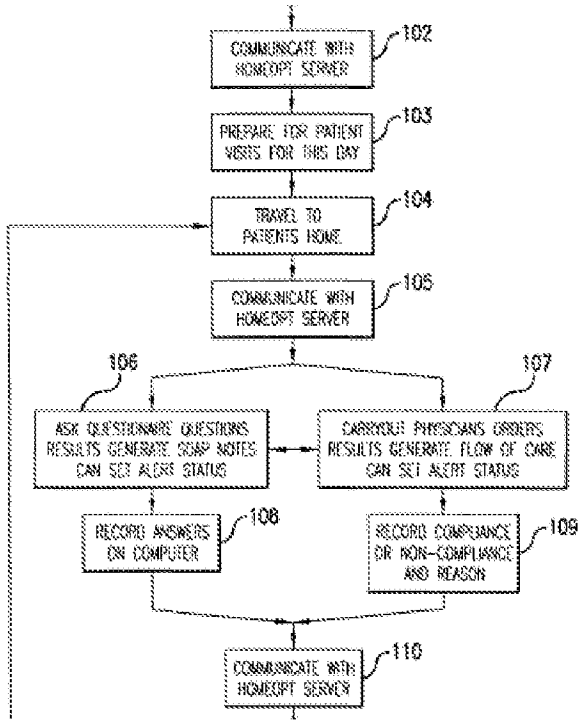
In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered.
Benigno at 47:29-30

A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention.
Falls at Abstract

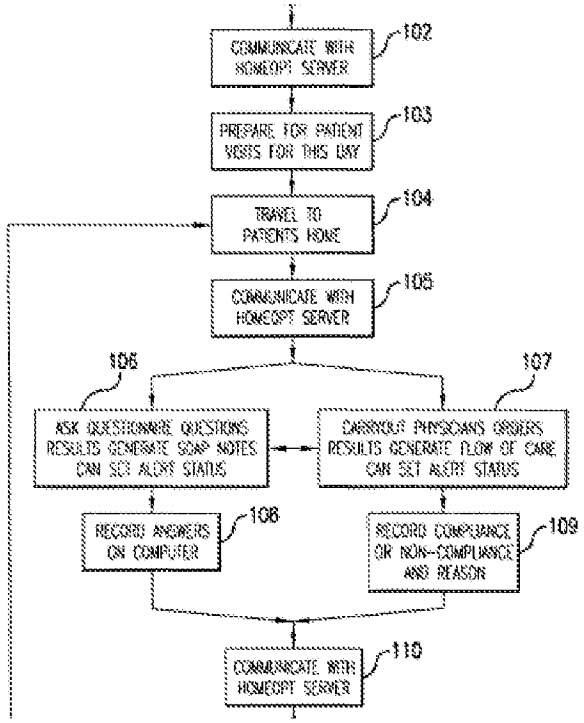
The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network.

Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer.
Falls at 3:16-35
A merge process according to the present invention includes merging location sets when disconnected disconnectable computers are first connected or reconnected. For instance, merging location sets normally occurs when a computer new to the network starts up and merges into an existing location set.
Falls at 16:24-29

With reference to FIG. 2, at least two of the computers 28 are disconnectable computers 40 configured according to the present invention. Each disconnectable computer 40 includes a database

	manager 42 which provides a location independent interface to a distributed hierarchical target database embodied in convergently consistent replicas 56. Falls at 7:16-
(g) after said handheld remote computing device has been taken out of electronic communication with said first computer,	In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14  Benigno at FIG 1A A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the

	invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(g1) executing at least a portion of said plurality of tokens representing	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source

said questionnaire on said handheld remote computing device to collect a response from a user, and,	corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28  Benigno at FIG 1A A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate

	disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18

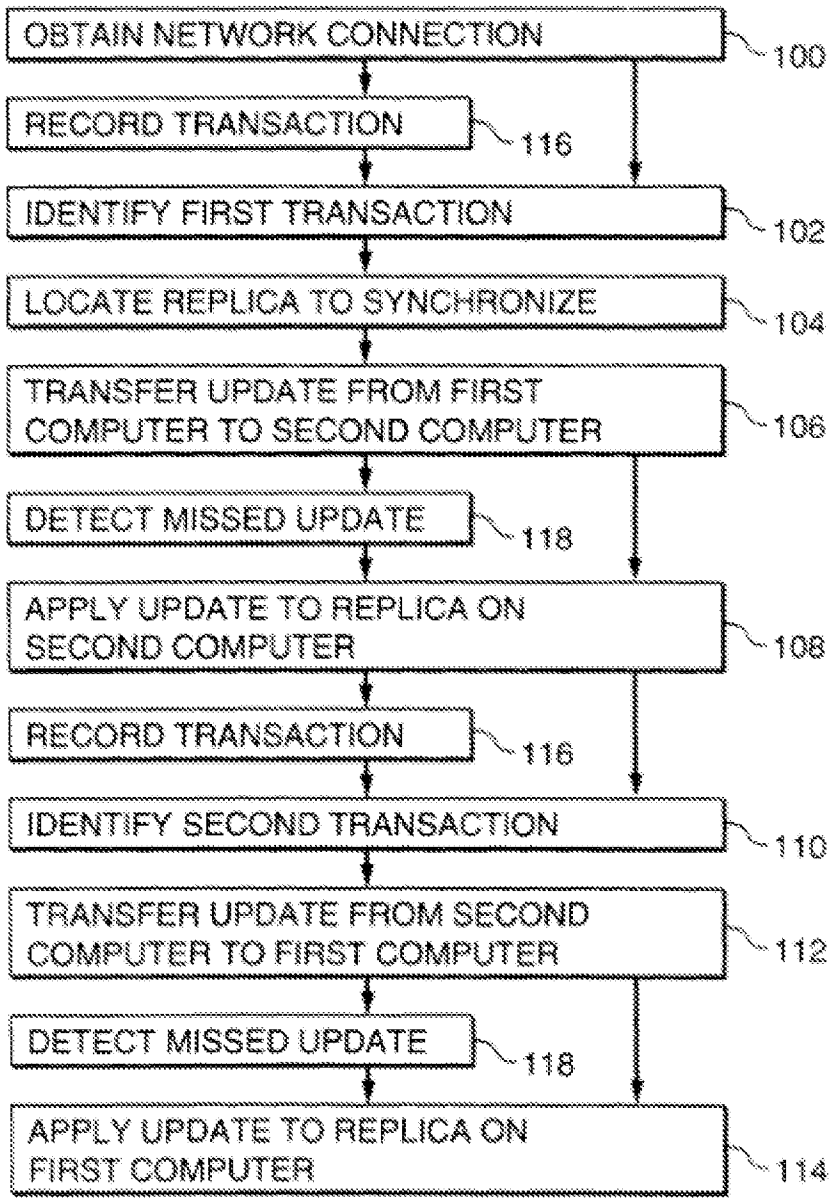
(g2) storing within said remote computing device said response from the user;	In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:25-28 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a

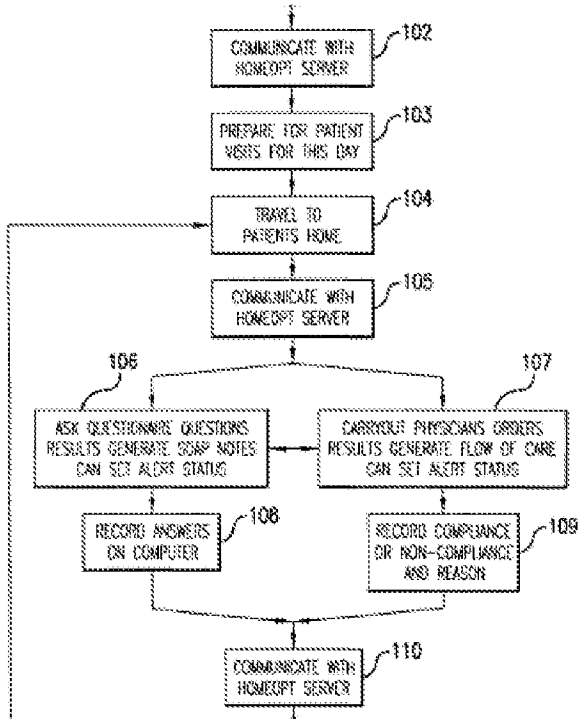
	corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(h) placing said handheld remote computing device into electronic communication with a second computer;	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all

	patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30

	A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 Each computer's replica manager communicates with the device controller of that computer and with the network link. Each replica manager also communicates with a database manager on its computer. The database manager can send database transactions to the device controller only through the replica manager, allowing the replica managers to log transactions and to synchronize the transactions after the network connection is re-established. Falls at 4:7-14 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that

	targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 More generally, the present invention provides a basis for a family of distributed software applications utilizing the target database by providing capabilities which support replication, distribution, and disconnectability. Falls at 7:53-8:1. Those of skill in the art will appreciate that other remote procedure call mechanisms may also be employed according to the present invention. Suitable network connections 52 may be established using packet-based, serial, internet compatible, local area, metropolitan area, wide area, and wireless network transmission systems and methods. Falls at 13:60-65 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37 With reference to FIGS. 1 through 4 and particular focus on FIG. 4, a method of the present invention for synchronizing transactions in the network 10 of connectable computers 28 is illustrated. The transactions target entries in a distributed hierarchical database that contains convergently consistent replicas 56 residing on separate computers 28 in the network 10. The method comprises the following computer-implemented steps. A connecting step 100 uses the replica manager 46 and network link manager 50 to establish a network connection between a first computer 36 and a second computer 38. For purposes of illustrating the method, the first computer 36 shown in FIG. 1 is a client computer 20 and the second computer 38 is a server computer 16. However, a server and a client, or two servers, or two clients, may also be synchronized and otherwise managed according to the present invention. 35:47-63 In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor

	82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18  *FIG. 4*
(i) transmitting at least a portion of said response stored within said handheld remote	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by

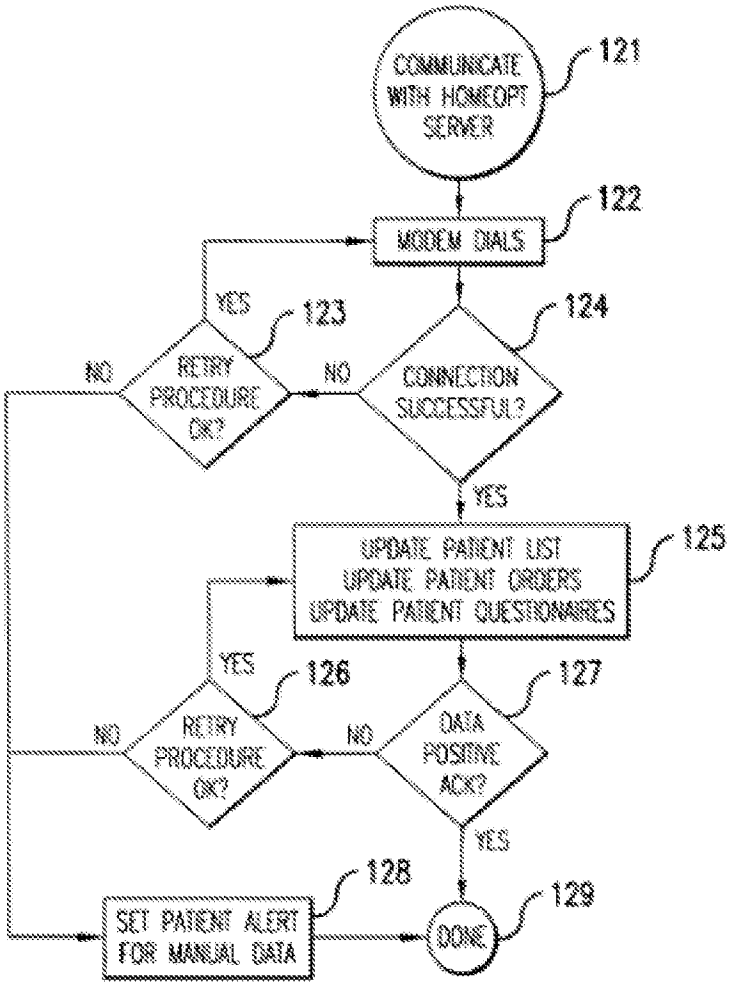
computing device to said second computer; and,	the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28  Benigno at FIG 1A In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 A method and apparatus are disclosed for synchronizing transactions in a disconnectable network. Each transaction includes operations

	that were performed on a database replica on one computer while that computer was disconnected from another computer and hence from that other computer's replica. Transaction synchronization, which occurs after the computers are reconnected, transfers information from each computer to the other computer and applies updates to both replicas as appropriate. Transaction logs and clash handling tools may be used with the invention. Falls at Abstract The present invention provides a system and method which facilitate disconnected mobile computing in several ways. Prior to disconnection, the invention allows network administrators or users to readily select data that should be copied from a network to a mobile computer by simply identifying one or more target database subtrees. During disconnected operation of the mobile computer, the invention presents the user with a "virtual network" environment that is consistent in use and appearance with the selected portion of the actual network. Finally, upon reconnection of the mobile computer to the network, the invention synchronizes operations performed on the mobile computer during the disconnected interval with operations performed on the network during that interval. Synchronization is both substantially automatic and transactional, so minimal user intervention is needed and inconsistent internal states are avoided. Moreover, synchronization does not routinely discard any of the changes made on either the network or the mobile computer. Falls at 3:16-35 In operation, the replica managers synchronize transactions upon reconnection in the following manner. Using the network link, a network connection is created between the mobile computer and a network computer. The network computer need not be the network computer from which the mobile computer was disconnected. The replica manager on the mobile computer identifies a transaction that targets an object in a replica on the mobile computer, and locates a corresponding replica that resides on the network computer. The mobile computer then transfers an update based on the transaction over the network connection to the network computer. Falls at 5:21-31 Merging occurs when two replicas 56 are resynchronized after the computers 28 on which the replicas 56 reside are reconnected following a period of disconnection. Falls at 16:35-37

	In summary the present invention provides a system and method for properly synchronizing transactions when a disconnectable computer 28 is reconnected to the network 10. The invention is not limited to file system operations but can instead be extended to support a variety of database objects by using the schema 84, object distributor 82, object processor 86, and other modules. Clash handling means may be used to identify potentially conflicting database changes and allow their resolution by either automatic or manual means. Clash handling and retries also make locks optional. Falls at 37:11-18
(j) forming a visually perceptible report from any of said at least a portion of said response so transmitted.	The system includes means for … outputting the signal to a signal processing means. Suitable signal processing means include, a communication network, a computer, a storage medium, a display, a printer, or the like. Benigno at 28:26-29:1
CLAIM 12	
12. A method for collecting survey data from a user according to claim 11, wherein step (j) comprises the step of printing a report from any of said response to transmitted.	The system includes means for … outputting the signal to a signal processing means. Suitable signal processing means include, a communication network, a computer, a storage medium, a display, a printer, or the like. Benigno at 28:26-29:1
CLAIM 13	
13. A method for collecting survey data from a user according to claim 11, wherein said first computer and said second computer are a same computer.	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24

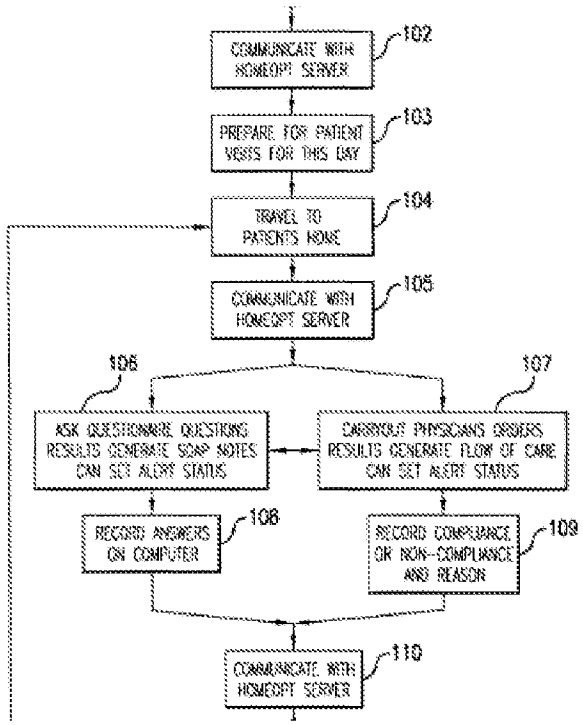
	In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30
CLAIM 14	
14. A method for modifying a questionnaire used in data management according to the method of claim 11, further	Daily communication includes SOAP notes, notification of whether the patient received appropriate IV medications and intravenous fluids, as well as the ability to communicate with nurses, and nurse communications with physicians for order changes. Benigno at 11:22-26

comprising the steps of: (k) making at least one incremental change to a portion of said questionnaire;	The system is constantly evaluating itself. As the system finds new correlating factors, they are put in place to aid in determining changes to be made to the current or default clinical pathway. In addition, as correlations are determined between clinical pathway decisions and significant outcomes *(i.e.,* outcomes of interest), changes can be made to the default pathway to optimize systematically the clinical pathway toward the desired results. These changes can be automatically made or can be presented to the physician, system administrator, or other user for approval. Benigno at 21:22-29 In addition, the present invention provides a client / server system for manipulation and analysis of data related to clinical pathways, comprising a communication network, a client workstation in communication with the communication network, wherein the client workstation comprises means for generating at least one signal corresponding to a clinical pathway decision and transmitting the at least one decision signal over the communication network, and means for receiving at least one signal corresponding to a clinical pathway modification from the communication network, and means for outputting the at least one modification signal to a signal processing means, a server on the communication network, wherein the server comprises a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to at least one available subsequent decision point within the clinical pathway, and a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and processing means, in communication with the communication network, the client workstation, and the server, for performing the steps of receiving the at least one decision signal from the communication network, based on the received decision signal, selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, then generating at least one signal corresponding to a clinical pathway modification of the subsequent decision data elements in the clinical pathway database, and transmitting the at least one clinical pathway modification signal over the communication network to the receiving means of the client workstation. Benigno at 14:7-15:2

	 Benigno at FIG. 1B
(l) tokenizing said at least one incremental change to said questionnaire;	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31

	Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24
(m) transmitting at least a portion of said tokens resulting from step (k) to said remote handheld computing device, said transmitted tokens comprising less than the entire tokenized questionnaire; and,	Therefore, it would be highly desirable to have a system permitting the capability to provide home care and direct information communication to the physician and his or her staff in real time, so as to reduce the recovery period and the risk of complications. Benigno at 6:26-29 The nurse or caregiver then sees the patient almost immediately at home and tracks the patient at home one or more times per day using the system and the information is used to create and update the clinical pathway database records for the patient. Real-time communication systems of the invention allow supervision by the physician, while not requiring the supervision to occur in a hospital setting. Benigno at 9:26-31 The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19

	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of

	care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30  Benigno at FIG 1A
(n) incorporating said transmitted tokens into said questionnaire at said remote computing device, thereby incrementally changing said questionnaire.	Daily communication includes SOAP notes, notification of whether the patient received appropriate IV medications and intravenous fluids, as well as the ability to communicate with nurses, and nurse communications with physicians for order changes. Benigno at 11:22-26 The system is constantly evaluating itself. As the system finds new correlating factors, they are put in place to aid in determining changes to be made to the current or default clinical pathway. In addition, as correlations are determined between clinical pathway decisions and significant outcomes *(i.e.,* outcomes of interest), changes can be made to the default pathway to optimize systematically the clinical pathway toward the desired results. These changes can be automatically made or can be presented to the physician, system administrator, or other user for approval. Benigno at 21:22-29

	In addition, the present invention provides a client / server system for manipulation and analysis of data related to clinical pathways, comprising a communication network, a client workstation in communication with the communication network, wherein the client workstation comprises means for generating at least one signal corresponding to a clinical pathway decision and transmitting the at least one decision signal over the communication network, and means for receiving at least one signal corresponding to a clinical pathway modification from the communication network, and means for outputting the at least one modification signal to a signal processing means, a server on the communication network, wherein the server comprises a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to at least one available subsequent decision point within the clinical pathway, and a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and processing means, in communication with the communication network, the client workstation, and the server, for performing the steps of receiving the at least one decision signal from the communication network, based on the received decision signal, selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, then generating at least one signal corresponding to a clinical pathway modification of the subsequent decision data elements in the clinical pathway database, and transmitting the at least one clinical pathway modification signal over the communication network to the receiving means of the client workstation. Benigno at 14:7-15:2 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13

	Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30

E. CLAIMS 1-14 OF THE '816 PATENT ARE RENDERED OBVIOUS BY BENIGNO IN VIEW OF RAPPAPORT AND THE KNOWLEDGE OF A PERSON OF ORDINARY SKILL IN THE ART

Please see the below claim chart that applies the teachings of Benigno in view of Rappaport to claims 1-14 of the '816 patent.

Reasons to Combine:

A person of ordinary skill in the art would recognize that Benigno teaches that a mobile device that connects to a server and transmits information between the two devices. *See* Benigno at 11:14-19, 46:4-9, and 47:6-13. It would have been obvious to combine Benigno with Rappaport so that when a connection fails, as will predictably happen, the device can reconnect and send the information upon reconnection. This would motivate a person of skill in the art to make the combination since disconnections are a common occurrence and Rappaport teaches a method of reconnection. *See* Rappaport at Abstract.

Brief Description of Application within Charts Below:

Benigno teaches a questionnaire based on creating a standard of care for treatment of patients that keeps nurses and doctors in constant communication. Benigno at 46:4-9 and 22-24. The nurse is able to answer questions in the questionnaire and based on the responses provided by the patient, the information is updated in the server and subsequent questions are asked. Benigno at 12:17-31. This also allows for individual questions to be used throughout multiple questionnaires, thereby increasing efficiency of the questionnaire database. *Id.* The individual

questions are "tokenized representations" that are communicated between the server and the mobile device via wireless network connections. Benigno at 19:10-24, 13:1-10, and 46:4-9. The mobile device can be disconnected from the network communications due to losing the connection as is inevitable in wireless communication or due to the nurse closing the connection. Benigno at 46:4-24 and FIG.1. The nurse can continue to input data into the questionnaire, even though the system is disconnected from the network communications, further, when combined with Rappaport, the combination further teaches that the questionnaire can continue to be used while real-time data communications are prioritized over data communications, allowing the mobile device to continue normal operations when there is no network connection. Benigno at 46:16-28; Rappaport at 7:44-63 and 2:44-58. The questionnaire is then stored. Benigno at 23:10.

CLAIM 1	**Teachings From Benigno in view of Rappaport**
1. A method for managing data including the steps of:	A self-analyzing system for suggesting deviation from a current clinical pathway and entry into an alternative clinical pathway based upon historical information about the results of actions. Systems for tracking clinical pathway outcomes based on data collected post-treatment. …. A questionnaire computer language and subsystem are used in various stages of the systems of the invention. Corresponding methods are also disclosed. Benigno at Abstract
(a) creating a questionnaire comprising a series of questions;	Assessment of the patient's condition is performed using a questionnaire or form generated based upon the current patient's customized and changeable clinical pathway. Benigno at 9:31-10:2 Another aspect of the invention involves a new questionnaire format, which may be used as one way of collecting the data to be analyzed according to the present invention. This questionnaire format allows stable acute care caregivers the ability to closely track and instantly inform a patient's physician of that patient's condition. The format, as it applies to a particular patient, also provides the clinical pathway for the patient, as described *infra.* With the present invention, stable acute care providers receive updated orders about the patient on a visit by visit basis and physicians are able to track the progress of their patients instantly. The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file.

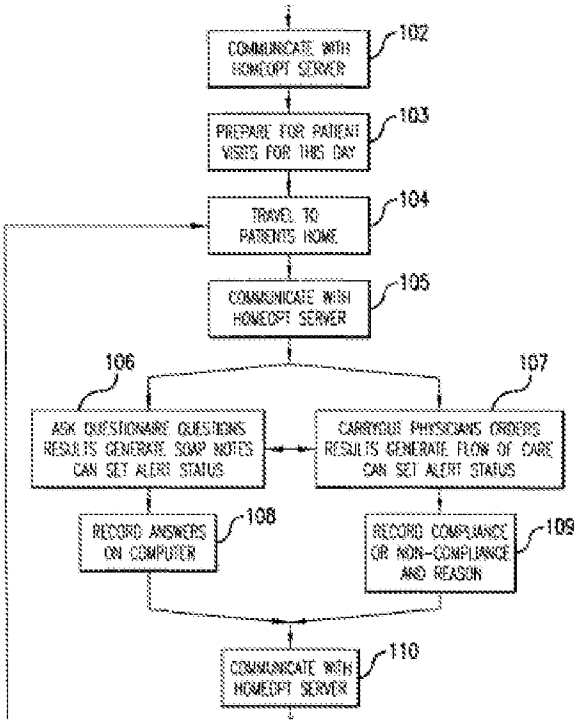
	Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:17-31
(b) tokenizing said questionnaire; thereby producing a plurality of tokens representing said questionnaire;	In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra)*. … Question ID is the identifier of the question itself. Benigno at 19:10-24 One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10
(c) establishing a first wireless modem or wireless LAN network connection with a remote	The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the

computing device;	invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13
(d) transmitting said plurality of tokens to a remote computing device via said first wireless modem or wireless LAN network connection;	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on

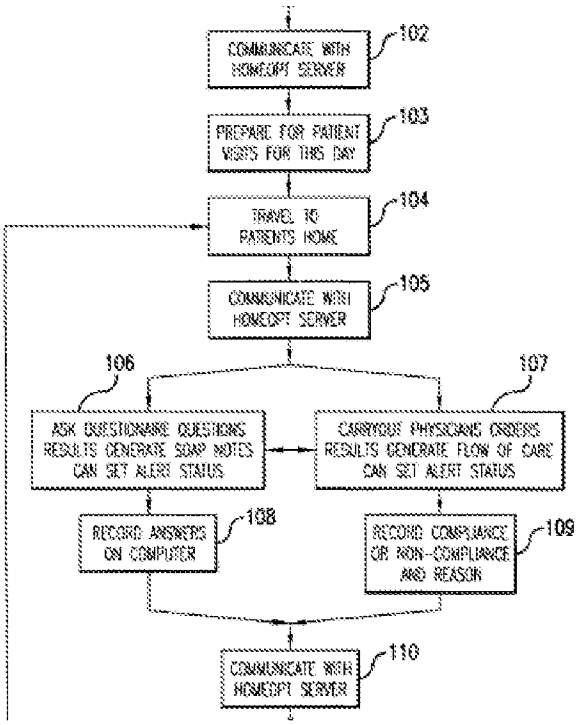
	the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Therefore, it would be highly desirable to have a system permitting the capability to provide home care and direct information communication to the physician and his or her staff in real time, so as to reduce the recovery period and the risk of complications. Benigno at 6:26-29 The nurse or caregiver then sees the patient almost immediately at home and tracks the patient at home one or more times per day using the system and the information is used to create and update the clinical pathway database records for the patient. Real-time communication systems of the invention allow supervision by the physician, while not requiring the supervision to occur in a hospital setting. Benigno at 9:26-31 The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401

	by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30
(e) terminating said first wireless modem or wireless LAN network connection with said remote computing device;	In step 102, the nurse, 5 using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may

	be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30 Based on the above, in general, when a request for a new session (voice, data) is received (in step 10), a connection will be established for the new session (affirmative result in step 11) if there are fewer than C-Ch active sessions in the cell. As described above, time-sensitive sessions may be afforded priority. For instance, preferably, voice sessions are given preemptive priority over data sessions for using channel resources. Since voice sessions must be transmitted or received on a real time basis, reconnection attempts for voice sessions are preferably not allowed. When a voice session arrives and finds all channels C occupied, an active data session (if any are present) is preferably suspended (step 12) (or possibly terminated) to accommodate it. More specifically, when a voice session arrives in a cell in which all channels are occupied and fewer than H sessions are in suspension, and, at least, one active session is of data type, an arriving voice session will obtain a connection (step 13) but an active data session will be suspended (step 12). The choice of which data session to be suspended or be terminated is assumed to be random. Rappaport at 7:44-63 In a network that employs an admission control protocol according to the present invention, voice calls, for example (or other time-sensitive stream traffic) may preempt resources of time-insensitive data calls, which result in suspended sessions that do not result in session failures. Priority access for hand-offs of active sessions with respect to new call sessions can also be accommodated. Mobile users that have some autonomy or who are perhaps exchanging time-insensitive

	data with a remote site can continue to function essentially undisturbed by link failures since the connectivity and reconnection procedures are managed by the network in a manner that is transparent to the end users. Mobile computing sessions and delay-insensitive data communications, for example, will be able to continue, largely unaware of link failures. Rappaport at 2:44-58
(f) after said first wireless modem or wireless LAN network connection is terminated, executing at least a portion of said plurality of tokens representing said questionnaire at said remote computing device to collect a response from a user;	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored, gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28 
(g) establishing a second	In step 102, the nurse, using the client computer 401 (Figure 4)

wireless modem or wireless LAN network connection between said remote computing device and a server;	communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13

	 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30
(h) after said second wireless modem or wireless LAN network connection is established, transmitting at least a portion of said response from the user to said server via said second wireless modem or wireless LAN network	In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of

connection; and	such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4
(i) storing said transmitted response at said server.	The questionnaire and its answers are all stored. Benigno at 23:10 In step 106 and 108, the client computer 401, via the questionnaire language previously described, or through any other data collection mechanism, may obtain data from the nurse or other source corresponding to the clinical pathway to be followed, as dictated by the physician. As a result, SOAP notes may be generated, alerts can be generated, etc., for ultimate retransmission to the server 402. Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. The results of such orders may generate a flow of care to be followed by the nurse, and/or may generate alerts, etc. In step 109, the nurse records in the client computer 401 compliance or non-compliance with the orders. If noncompliance, the reasons are also stored. gain, all such stored data may later be transmitted back to the server 402. Benigno at 46:16-28
CLAIM 2	
2. The method for managing data of claim 1 further comprising the step of: (j) translating said response to a format recognizable by a particular computer	The important features of the system of the invention include the use of a computerized or electronic interface between the skilled nurse/caregiver, the patient, and the physician. In addition, the invention relies upon specialized software subsystems that allow the use of the interface, allow immediate translation from questionnaire into on-screen formats which can be read by a physician or staff, and allow prequalifying of patients during the pre-operative period for

program; and	appropriate *(i.e.,* earlier or later than the average) release and stable acute care. Benigno at 10:20-26 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 A major portion of the communication system of the invention is used to handle connections by physicians and nurses to the system. In one embodiment, data is converted internally to a more efficient format than the external standard HL7 protocol. All communications are coordinated by the server 402 of the system. When a physician or nurse requests information from a source 404 outside of the system, the information may be retrieved from an outside information server 403. Of course, both servers 402, 403 could be implemented on a single machine, if desired. The outside information server 403 contains a translation mechanism for handling translation to and from internal representations based on HL7. By interfacing with HL7, the system of the invention is capable of accessing patient information from existing HL 7 external clients 404, as well as serving such information to HL 7 systems requesting it. Benigno at 30:6-17
(k) accessing the translated response from a computer executing said particular computer program.	The important features of the system of the invention include the use of a computerized or electronic interface between the skilled nurse/caregiver, the patient, and the physician. In addition, the invention relies upon specialized software subsystems that allow the use of the interface, allow immediate translation from questionnaire into on-screen formats which can be read by a physician or staff, and allow prequalifying of patients during the pre-operative period for appropriate *(i.e.,* earlier or later than the average) release and stable acute care. Benigno at 10:20-26 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing

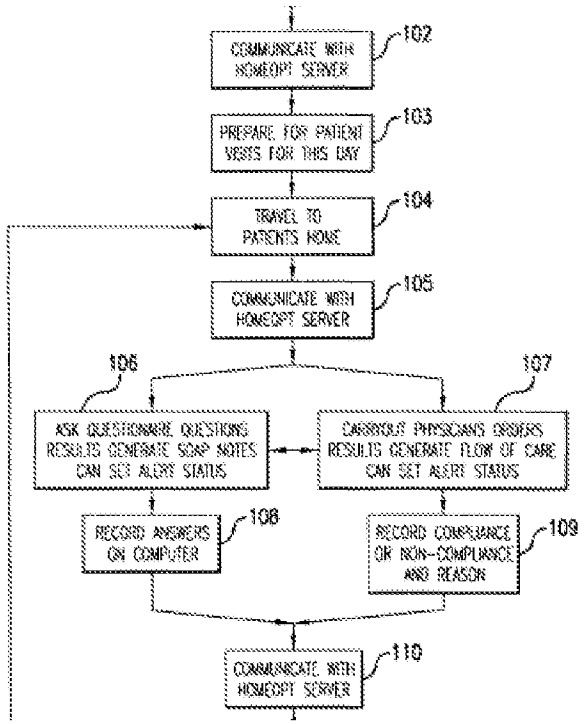
	complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 A major portion of the communication system of the invention is used to handle connections by physicians and nurses to the system. In one embodiment, data is converted internally to a more efficient format than the external standard HL7 protocol. All communications are coordinated by the server 402 of the system. When a physician or nurse requests information from a source 404 outside of the system, the information may be retrieved from an outside information server 403. Of course, both servers 402, 403 could be implemented on a single machine, if desired. The outside information server 403 contains a translation mechanism for handling translation to and from internal representations based on HL7. By interfacing with HL7, the system of the invention is capable of accessing patient information from existing HL 7 external clients 404, as well as serving such information to HL 7 systems requesting it. Benigno at 30:6-17
CLAIM 3	
3. The method for managing data of claim 1 wherein step (a) includes the substeps of: (a) creating a questionnaire by:	Assessment of the patient's condition is performed using an questionnaire or form generated based upon the current patient's customized and changeable clinical pathway. In the stable acute care *(e.g.,* "home") setting or facility, the nurse provider can assess the patient and send information regarding the patient by using the questionnaire. The questionnaire itself will create a SOAP (Subjective, Objective, Analysis, Plan) note. The SOAP note is known to those of ordinary skill in the art as the means whereby a physician describes the patient's status and care plan. Benigno at 9:31-10:7
(i) entering a series of questions into a questionnaire design computer program;	The important features of the system of the invention include the use of a computerized or electronic interface between the skilled nurse/caregiver, the patient, and the physician. In addition, the invention relies upon specialized software subsystems that allow the use of the interface, allow immediate translation from questionnaire into on-screen formats which can be read by a physician or staff, and allow prequalifying of patients during the pre-operative period for

	appropriate *(i.e.,* earlier or later than the average) release and stable acute care. Benigno at 10:20-26 The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:24-31 As each patient is added to the system, a copy of the base questionnaire for their procedure is produced and offered to the physician or system operator for change. The base questionnaire is simply a set of the clinical pathway node structures as described above. As individual questions are changed, they are versioned, *e.g.,* by incrementing a version number. Versioning of the question can also include further information, such as date and time of the change, identity of the party making the change, original question text, etc., such that the system can provide a suitable audit trail to review all changes in any particular questionnaire. Benigno at 19:28-20:4 As noted above, a predefined preliminary set of these correlation searches may be entered manually and the system is configured to search this problem space automatically. The correlation matrix potentially includes all combinations of all questions in the questionnaire versus all recorded outcomes. Benigno at 21:10-13 For use in the system, a questionnaire (again representing the default clinical pathway) is also developed specifically for each procedure. The questionnaire is later processed by the computer software to develop a SOAP note for the patient. When the patient is visited by the nurse, the SOAP note is generated by the computer for that visit and/or procedure. In a similar fashion, events such as IV hydration and IV meds and the use of H2 blockers such as TAGAMET® are also addressed for each procedure. Often, the decision elements or points which yield daily progress notes are similar from one procedure to another. Additionally, an order sheet may be created and may be modified by the physician or the nurse on a daily basis and the orders on the order sheet are determined from the initial order

	sheet that was created. In this fashion, the initial order sheet is essentially a clinical pathway printout, or at least a decision data element and subsequent data element printout. In essence, the system creates a universal protocol template and, often, only minor changes are needed for each procedure for a specific plan. The data elements tracked in the model include, but are not required to include and are not limited to, appropriate procedures, restrictive criteria for patients, insurance information, pre-operative education, the clinical pathway, daily order sheets for subsequent orders, the questionnaire developed to determine specific notes, and daily progress sheets created to track the fluids, IV's, or medications given. Benigno at 37:5-24
(ii) identifying within said questionnaire design computer program the type of response allowed for each question of said series of questions; and	The important features of the system of the invention include the use of a computerized or electronic interface between the skilled nurse/caregiver, the patient, and the physician. In addition, the invention relies upon specialized software subsystems that allow the use of the interface, allow immediate translation from questionnaire into on-screen formats which can be read by a physician or staff, and allow prequalifying of patients during the pre-operative period for appropriate *(i.e.,* earlier or later than the average) release and stable acute care. Benigno at 10:20-26 The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:24-31 As each patient is added to the system, a copy of the base questionnaire for their procedure is produced and offered to the physician or system operator for change. The base questionnaire is simply a set of the clinical pathway node structures as described above. As individual questions are changed, they are versioned, *e.g.,* by incrementing a version number. Versioning of the question can also include further information, such as date and time of the change, identity of the party making the change, original question text, etc.,

	such that the system can provide a suitable audit trail to review all changes in any particular questionnaire. Benigno at 19:28-20:4 For use in the system, a questionnaire (again representing the default clinical pathway) is also developed specifically for each procedure. The questionnaire is later processed by the computer software to develop a SOAP note for the patient. When the patient is visited by the nurse, the SOAP note is generated by the computer for that visit and/or procedure. In a similar fashion, events such as IV hydration and IV meds and the use of H2 blockers such as TAGAMET® are also addressed for each procedure. Often, the decision elements or points which yield daily progress notes are similar from one procedure to another. Additionally, an order sheet may be created and may be modified by the physician or the nurse on a daily basis and the orders on the order sheet are determined from the initial order sheet that was created. In this fashion, the initial order sheet is essentially a clinical pathway printout, or at least a decision data element and subsequent data element printout. In essence, the system creates a universal protocol template and, often, only minor changes are needed for each procedure for a specific plan. The data elements tracked in the model include, but are not required to include and are not limited to, appropriate procedures, restrictive criteria for patients, insurance information, pre-operative education, the clinical pathway, daily order sheets for subsequent orders, the questionnaire developed to determine specific notes, and daily progress sheets created to track the fluids, IV's, or medications given. Benigno at 37:5-24
(iii) identifying within said questionnaire design computer program a branching path in said questionnaire for each possible response to each question of said series of questions.	This method of representation was chosen to allow for complete flexibility in the representation of the clinical pathway. This structure is what allows the pathway representation to be a dynamic tree as opposed to a simple sequentially-followed set of instructions. In other words, future actions in the clinical pathway can be machine encoded directly into the questionnaire without requiring human intervention to determine the appropriate course of action during the administering of the pathway to a patient. In one embodiment, the invention provides a system for manipulation and analysis of data related to clinical pathways, comprising a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway and at least one, preferably a plurality of, subsequent

	decision data elements, corresponding to available subsequent decision points within the clinical pathway, a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, processing means, including a storage device, for performing the steps of selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the subsequent decision data elements within the clinical pathway database. This will allow the changing of the physical layout of the tree. In other words, it is possible to include totally new decision points, or totally remove decision points from a clinical pathway. This differs from existing systems which simply take a fixed tree and attempt to find individualized parameters within that tree. Benigno at 13:12-14:5 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24 For use in the system, a questionnaire (again representing the default clinical pathway) is also developed specifically for each procedure. The questionnaire is later processed by the computer software to develop a SOAP note for the patient. When the patient is visited by the nurse, the SOAP note is generated by the computer for that visit and/or procedure. In a similar fashion, events such as IV hydration and IV meds and the use of H2 blockers such as TAGAMET® are also addressed for each procedure. Often, the decision elements or points which yield daily progress notes are similar from one procedure to another. Additionally, an order sheet may be created and may be modified by the physician or the nurse on a daily basis and the orders on the order sheet are determined from the initial order sheet that was created. In this fashion, the initial order sheet is essentially a clinical pathway printout, or at least a decision data element and subsequent data element printout. In essence, the system creates a universal protocol template and, often, only minor changes are needed for each procedure for a specific plan. The data elements tracked in the model include, but are

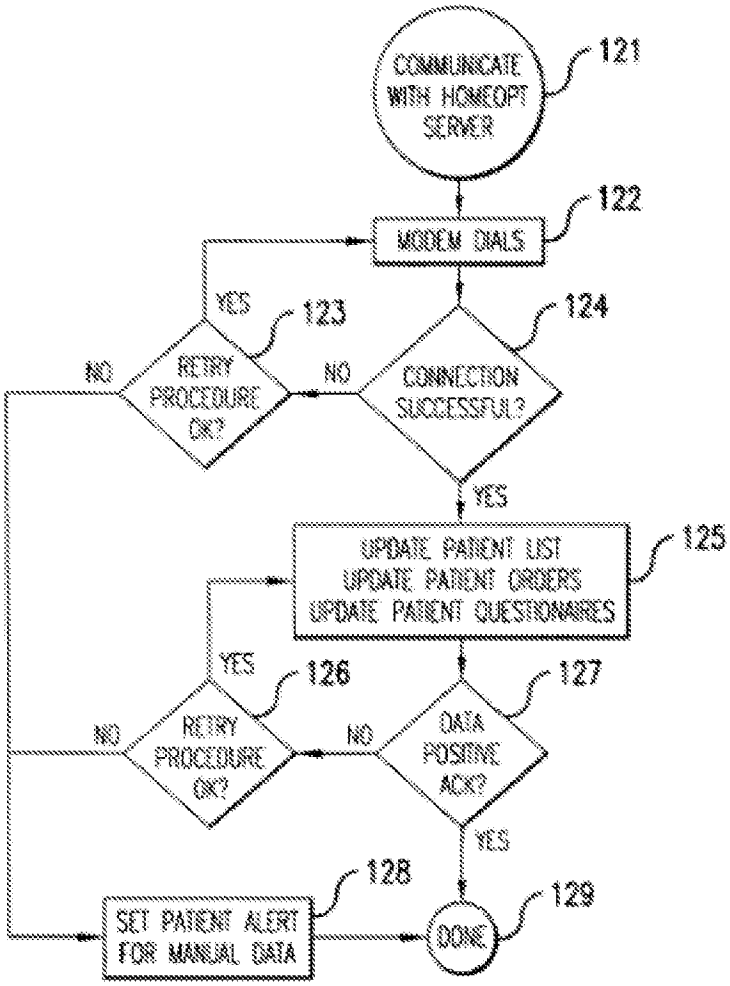
	not required to include and are not limited to, appropriate procedures, restrictive criteria for patients, insurance information, pre-operative education, the clinical pathway, daily order sheets for subsequent orders, the questionnaire developed to determine specific notes, and daily progress sheets created to track the fluids, IV's, or medications given. Benigno at 37:5-24 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27  Benigno at FIG 1A
CLAIM 4	
4. The method for managing data of claim 1 wherein step (b) includes the substeps of: (b)	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of

tokenizing said questionnaire thereby producing a plurality of tokens representing said questionnaire by:	this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24
(i) assigning at least one token to each question of said series of questions;	Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10

(ii) assigning at least one token to each response called for in said series of questions to identify the type of response required; and	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24
(iii) assigning at least one token to each branch in said questionnaire to identify the required program control associated with said branch.	This method of representation was chosen to allow for complete flexibility in the representation of the clinical pathway. This structure is what allows the pathway representation to be a dynamic tree as opposed to a simple sequentially-followed set of instructions. In other words, future actions in the clinical pathway can be machine encoded directly into the questionnaire without requiring human intervention to determine the appropriate course of action during the administering of the pathway to a patient. In one embodiment, the invention provides a system for manipulation

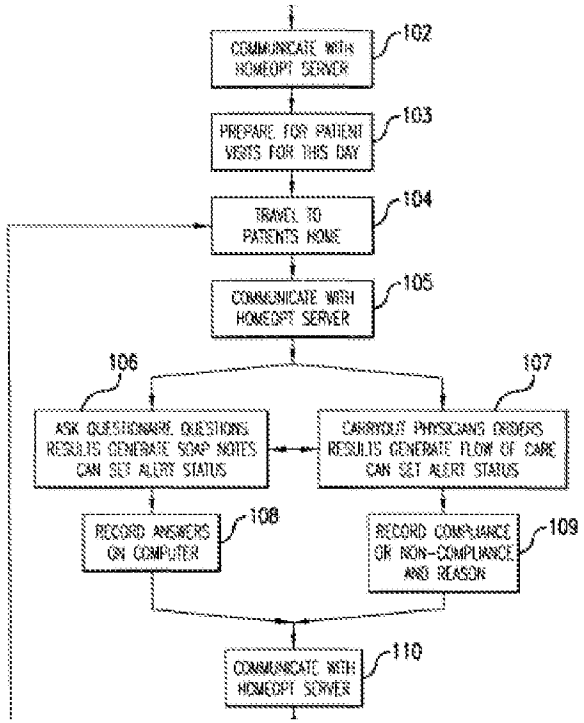
	and analysis of data related to clinical pathways, comprising a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway and at least one, preferably a plurality of, subsequent decision data elements, corresponding to available subsequent decision points within the clinical pathway, a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, processing means, including a storage device, for performing the steps of selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the subsequent decision data elements within the clinical pathway database. This will allow the changing of the physical layout of the tree. In other words, it is possible to include totally new decision points, or totally remove decision points from a clinical pathway. This differs from existing systems which simply take a fixed tree and attempt to find individualized parameters within that tree. Benigno at 13:12-14:5
CLAIM 5	
5. A method for modifying a questionnaire used in data management according to the method of claim 1 including the steps of: (a) making at least one incremental change to a portion of the questionnaire;	Daily communication includes SOAP notes, notification of whether the patient received appropriate IV medications and intravenous fluids, as well as the ability to communicate with nurses, and nurse communications with physicians for order changes. Benigno at 11:22-26 The system is constantly evaluating itself. As the system finds new correlating factors, they are put in place to aid in determining changes to be made to the current or default clinical pathway. In addition, as correlations are determined between clinical pathway decisions and significant outcomes *(i.e.,* outcomes of interest), changes can be made to the default pathway to optimize systematically the clinical pathway toward the desired results. These changes can be automatically made or can be presented to the physician, system administrator, or other user for approval. Benigno at 21:22-29 In addition, the present invention provides a client / server system for manipulation and analysis of data related to clinical pathways, comprising a communication network, a client workstation in

	communication with the communication network, wherein the client workstation comprises means for generating at least one signal corresponding to a clinical pathway decision and transmitting the at least one decision signal over the communication network, and means for receiving at least one signal corresponding to a clinical pathway modification from the communication network, and means for outputting the at least one modification signal to a signal processing means, a server on the communication network, wherein the server comprises a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to at least one available subsequent decision point within the clinical pathway, and a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and processing means, in communication with the communication network, the client workstation, and the server, for performing the steps of receiving the at least one decision signal from the communication network, based on the received decision signal, selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, then generating at least one signal corresponding to a clinical pathway modification of the subsequent decision data elements in the clinical pathway database, and transmitting the at least one clinical pathway modification signal over the communication network to the receiving means of the client workstation. Benigno at 14:7-15:2

	 Benigno at FIG. 1B
(b) tokenizing said at least one incremental change to said questionnaire;	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31

	Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra).* … Question ID is the identifier of the question itself. Benigno at 19:10-24
(c) transmitting at least a portion of said tokens resulting from step (b) to a remote loosely networked computing device, said transmitted tokens comprising less than the entire tokenized questionnaire; and,	Therefore, it would be highly desirable to have a system permitting the capability to provide home care and direct information communication to the physician and his or her staff in real time, so as to reduce the recovery period and the risk of complications. Benigno at 6:26-29 The nurse or caregiver then sees the patient almost immediately at home and tracks the patient at home one or more times per day using the system and the information is used to create and update the clinical pathway database records for the patient. Real-time communication systems of the invention allow supervision by the physician, while not requiring the supervision to occur in a hospital setting. Benigno at 9:26-31 The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19

	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients assigned to the nurse, as would be indicated on a list maintained on the computer 401 (as communicated from the server 402), then steps 104-110 may be repeated for each of the remaining patients. After all patients have been processed by the nurse, the final step 112 is reached. Benigno at 46:30-47:4 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of

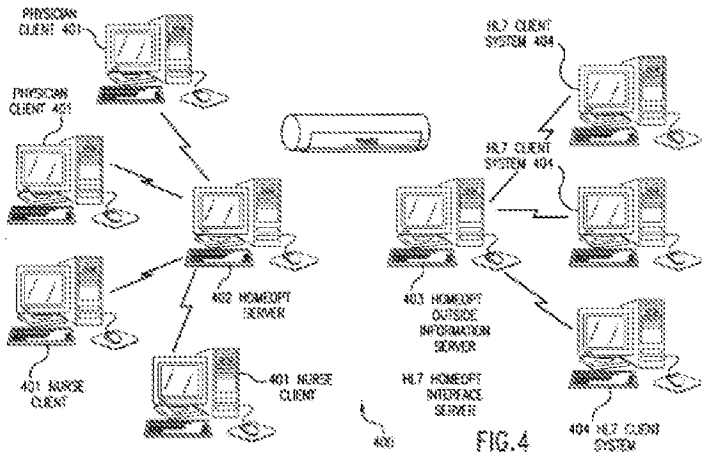
	care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30  Benigno at FIG 1A
(d) incorporating said transmitted tokens into said questionnaire at said loosely networked remote computing device, thereby modifying said questionnaire.	Daily communication includes SOAP notes, notification of whether the patient received appropriate IV medications and intravenous fluids, as well as the ability to communicate with nurses, and nurse communications with physicians for order changes. Benigno at 11:22-26 The system is constantly evaluating itself. As the system finds new correlating factors, they are put in place to aid in determining changes to be made to the current or default clinical pathway. In addition, as correlations are determined between clinical pathway decisions and significant outcomes *(i.e.,* outcomes of interest), changes can be made to the default pathway to optimize systematically the clinical pathway toward the desired results. These changes can be automatically made or can be presented to the physician, system administrator, or other user for approval.

	Benigno at 21:22-29 In addition, the present invention provides a client / server system for manipulation and analysis of data related to clinical pathways, comprising a communication network, a client workstation in communication with the communication network, wherein the client workstation comprises means for generating at least one signal corresponding to a clinical pathway decision and transmitting the at least one decision signal over the communication network, and means for receiving at least one signal corresponding to a clinical pathway modification from the communication network, and means for outputting the at least one modification signal to a signal processing means, a server on the communication network, wherein the server comprises a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to at least one available subsequent decision point within the clinical pathway, and a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and processing means, in communication with the communication network, the client workstation, and the server, for performing the steps of receiving the at least one decision signal from the communication network, based on the received decision signal, selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, then generating at least one signal corresponding to a clinical pathway modification of the subsequent decision data elements in the clinical pathway database, and transmitting the at least one clinical pathway modification signal over the communication network to the receiving means of the client workstation. Benigno at 14:7-15:2 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.

	Benigno at 47:6-13 Assuming the connection between the client computer 401 and server 402 is successful in step 124, then in step 125 the patient list, patient orders and patient questionnaire is updated. Specifically, the client computer 401 sends information to the server 402 regarding the actions that the nurse has taken (as input into the client computer 401 by the nurse), and the server 402 sends to the client computer 401 the updated patient list, patient orders, patient questionnaires, flow of care, etc. Other data as appropriate may also be transmitted back and forth between the client computer 401 and the server 402. Benigno at 47:20-27 In step 127, if the data has been correctly exchanged between the client computer 401 and server 402, then final step 129 is encountered. Benigno at 47:29-30
CLAIM 6	
6. A method for managing data according to claim 1, wherein said first wireless modem or wireless LAN network connection and said second wireless modem or wireless LAN network connection are a same wireless modem or wireless LAN network connection.	The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc.

	Benigno at 47:6-13
CLAIM 7	
7. The method of claim 1 further including performing at least the steps (c)-(k) for at least two different remote computing device types using the same tokens.	One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10 In a further embodiment, the present invention provides a system for assessing utilization of medical resources based upon manipulation and analysis of statistical data related to clinical pathways, comprising a clinical pathway database for storing an initial procedure decision data element, corresponding to a decision point within the clinical pathway, and at least one subsequent decision data element corresponding to available subsequent decision points within the clinical pathway, a historical clinical pathway database for storing previously selected subsequent decision data elements, selected corresponding to the initial procedure decision data element, and, for each of the previously selected subsequent decision data elements, a utilization value corresponding to the decision data element processing means, including a storage device, for performing the

	steps of selecting one of the at least one subsequent decision data elements, comparing the selected subsequent decision data element with the previously selected subsequent decision data elements stored in the historical clinical pathway database, and based upon predetermined correlation criteria, modifying the at least one subsequent decision data elements within the clinical pathway database, and statistical processing means, in communication with the clinical pathway database and the historical clinical pathway database, for performing the steps of accessing the historical clinical pathway database, computing pathway utilization value based on the accessed utilization values in the database, generating at least one signal corresponding to the pathway utilization value, and outputting the at least one utilization value signal to a signal processing means. Benigno at 15:18-16:7 In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra)*. … Question ID is the identifier of the question itself. Benigno at 19:10-24 In step 304, a new patient record is created, using for example the client computer 401 and the server 402. This record may be stored on the server 402, or at any other external location. In step 305, a criteria questionnaire is administered on the client computer 401, in order to determine whether the patient satisfies the criteria to be eligible for, for example, home health care. Examples of such criteria and conditions have been previously described elsewhere. Benigno at 49:10-15

	 Benigno at FIG. 4
CLAIM 8	
8. A method for managing data transfers between computers including the steps of:	A self-analyzing system for suggesting deviation from a current clinical pathway and entry into an alternative clinical pathway based upon historical information about the results of actions. Systems for tracking clinical pathway outcomes based on data collected post-treatment. …. A questionnaire computer language and subsystem are used in various stages of the systems of the invention. Corresponding methods are also disclosed. Benigno at Abstract
(a) creating a questionnaire at a first site in a first computer;	Assessment of the patient's condition is performed using a questionnaire or form generated based upon the current patient's customized and changeable clinical pathway. Benigno at 9:31-10:2 Another aspect of the invention involves a new questionnaire format, which may be used as one way of collecting the data to be analyzed according to the present invention. This questionnaire format allows stable acute care caregivers the ability to closely track and instantly inform a patient's physician of that patient's condition. The format, as it applies to a particular patient, also provides the clinical pathway for the patient, as described *infra*. With the present invention, stable acute care providers receive updated orders about the patient on a visit by visit basis and physicians are able to track the progress of their patients instantly. The questionnaire system in conjunction with the other components of the systems of the invention allows the close communication required between home care givers and physicians in this kind of situation and solves various problems of the prior art. Statements of the language used to create each questionnaire are

	saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:17-31
(b) tokenizing said questionnaire, thereby producing a tokenized questionnaire;	In one embodiment of the present invention, clinical pathway database models a decision tree comprising various decision nodes. These nodes are stored as either text or tokenized representations of the Questionnaire Language ("QL") statements *(see infra)*. … Question ID is the identifier of the question itself. Benigno at 19:10-24 One significant benefit of the invention is that the data gathered about various clinical pathways and their successfulness can be catalogued. The data can be repackaged and manipulated as needed and is believed to be of significant value in and of itself. The gathering of this data as it pertains to the heretofore nonexistent stable acute care patient class is an important advantage of the invention. Benigno at 10:14-18. Statements of the language used to create each questionnaire are saved in the clinical pathway database as opposed to a simple flat file. Entire questionnaires are versioned, and may be easily modified, or recalled from earlier versions. Questions once entered may be reused in many questionnaires. Benigno at 12:27 -31 Each individual question within the questionnaire may be represented by statements in a "questionnaire language". This language is "turing complete" meaning that anything that can be accomplished by any general purpose programming language may be accomplished by the language that represents the questions. This allows the questions to contain data, storage, and logical information about the data within each question, and allows the attachment of significant information to each question within the questionnaire. An example would be information associated with a particular drug. Dosages, appropriate application times and such can be encoded within the question that asks if the drug is to be administered. Benigno at 13:1-10
(c) bringing a remote computer into electronic communication with said	The communications subsystems of the invention are important to its capability of providing stable acute care and tracking clinical pathways. Point of service communication at home using either a

first computer;	suitable electronic or computerized device is provided by the invention. The computer can be put into communication with a data storage / server computer via any suitable means, including a modem or network adapter. Benigno at 11:14-19 In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 Steps 102, 105 and 110, wherein the client computer 401 communicates with the server 402, are each described in further detail in steps 121-129, depicted in Figure lB. In step 121, the processes commences. In step 122, the modem on the client computer 401 dials into the server 402. Again, this assumes that the computer 401 and server 402 are to be connected via modem and standard telephone lines. Again, it will be understood that this connection may be accomplished in a variety of ways, including over telephone lines, via a wireless connection (cellular or otherwise), via the Internet, etc. Benigno at 47:6-13
(d) transmitting said tokenized questionnaire to said remote computer;	In step 102, the nurse, using the client computer 401 (Figure 4) communicates with the server 402, in order to obtain updated pathway instructions, etc., regarding what steps to perform during visit(s) for one or more patient(s). The communication can take place via modern and standard phone lines, via wireless transmission (e.g., cellular, etc.), via the Internet, or via any other communication link. Benigno at 46:4-9 In step 105, the nurse, through client computer 401, may again communicate with server 402, in order to obtain the most current instructions and data. Benigno at 46:13-14 Alternatively, or in addition, in step 107 the nurse may carry out orders created by the physician and transmitted in steps 102 and/or 105 from the server 402 to the client computer 401. Benigno at 46:22-24 In step 110, the client computer 401 communicates with the server 402, in order to update both the computer 401 and server 402 as in steps 102 and 105. In step 111, if there are additional patients