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(54) **METHOD AND APPARATUS FOR COST-SAVING TELEPHONE SERVICE**

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H04W 4/16	(2009.01)
H04M 7/00	(2006.01)

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USPC 455/406, 404.1, 435.1, 414.1; 709/223, 709/217; 370/352, 401; 379/207.07

See application file for complete search history.

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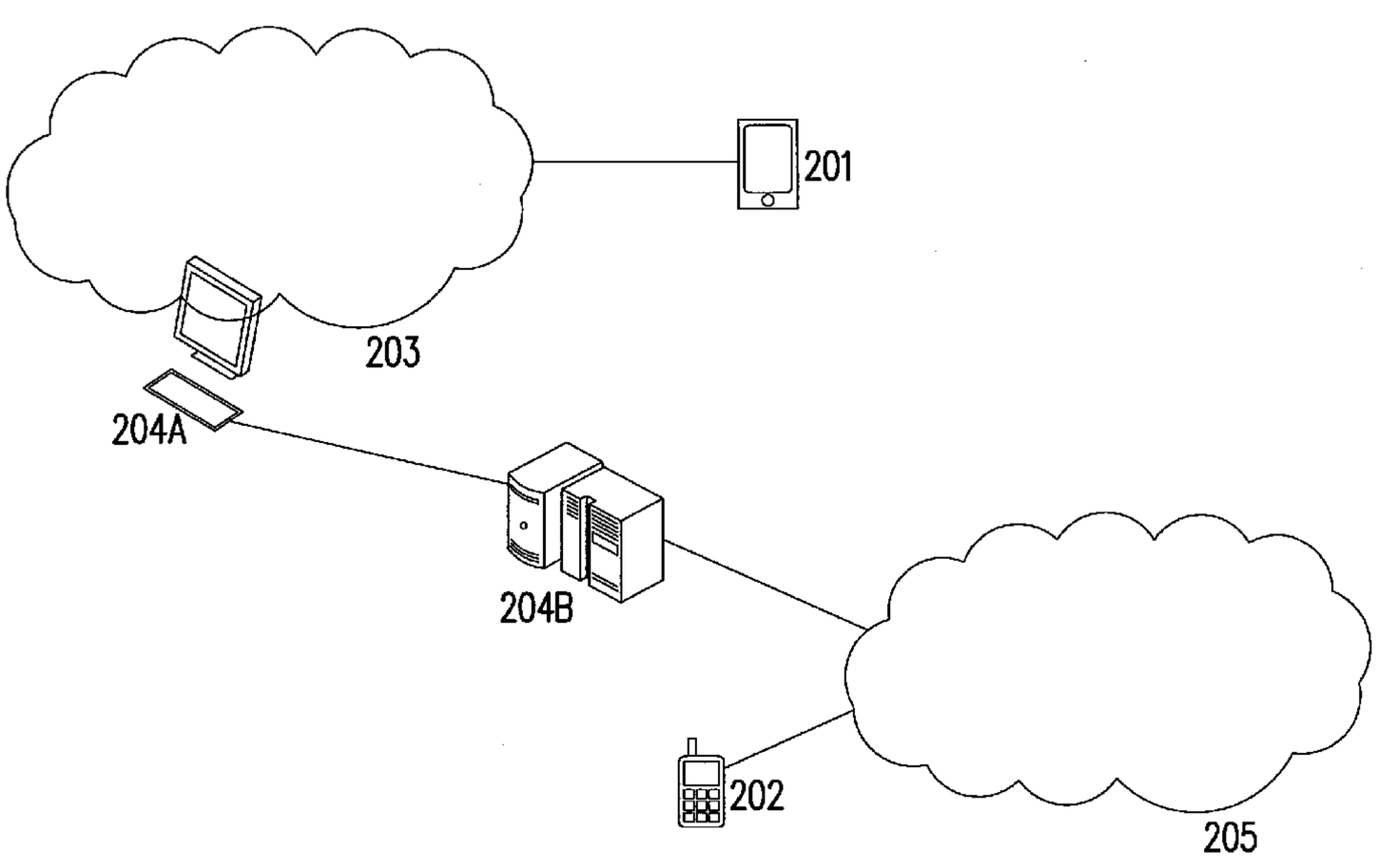
(57) **ABSTRACT**

The present invention provides a method for a cost-saving telephone service, comprising: receiving a request for telephoning a third party client device from a communication resources using device, wherein the communication resources using device and the third party client device are connected to a first and a second telephone service networks respectively; selecting a communication resources providing device from a plurality of client devices registered to the cost-saving telephone service and connected to the second telephone service network; and having the communication resources providing device telephone the third party client device through the second telephone service network such that the communication resources using device communicates with the third party client device via the communication resources providing device.

15 Claims, 4 Drawing Sheets



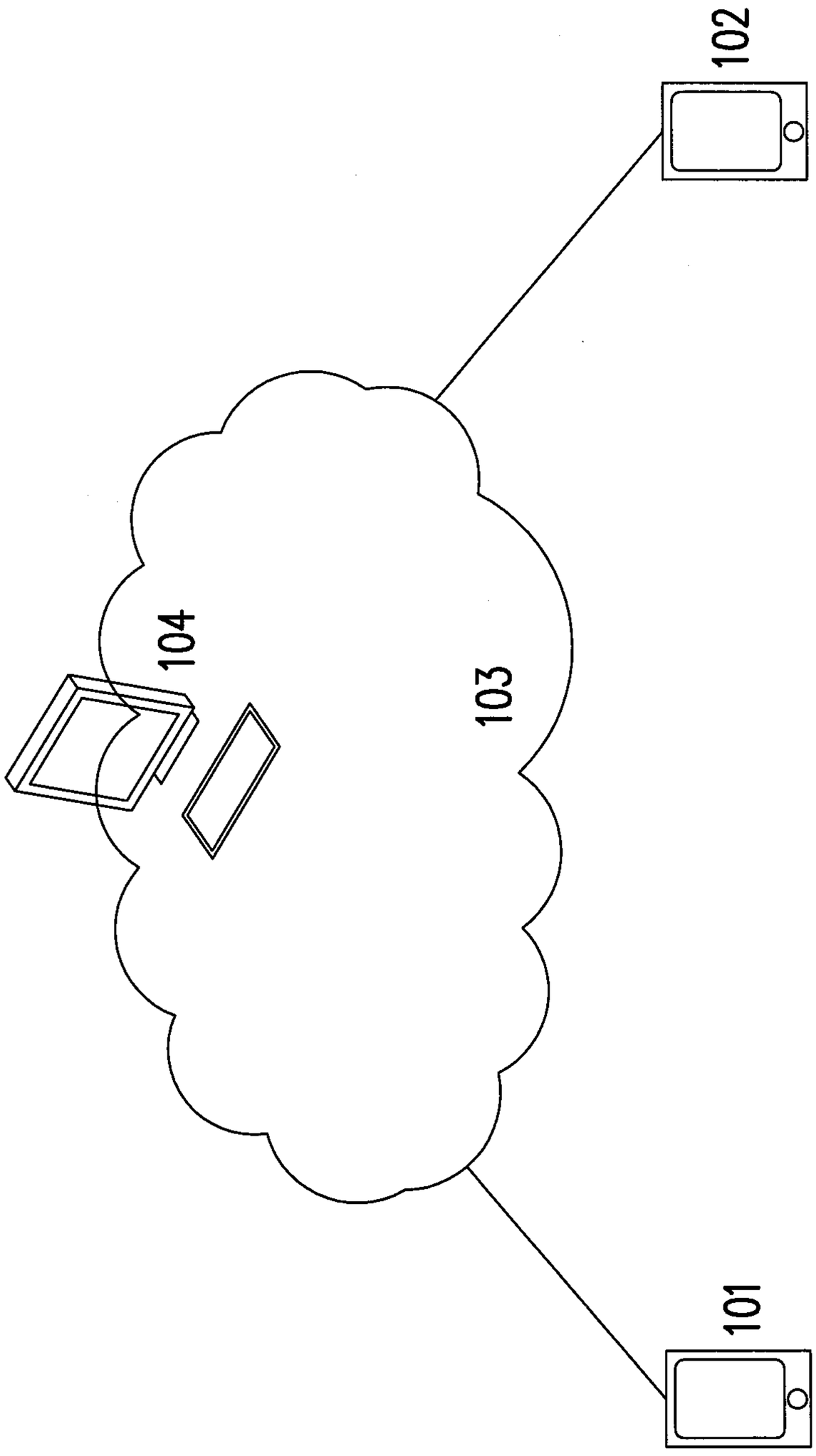


FIG. 1

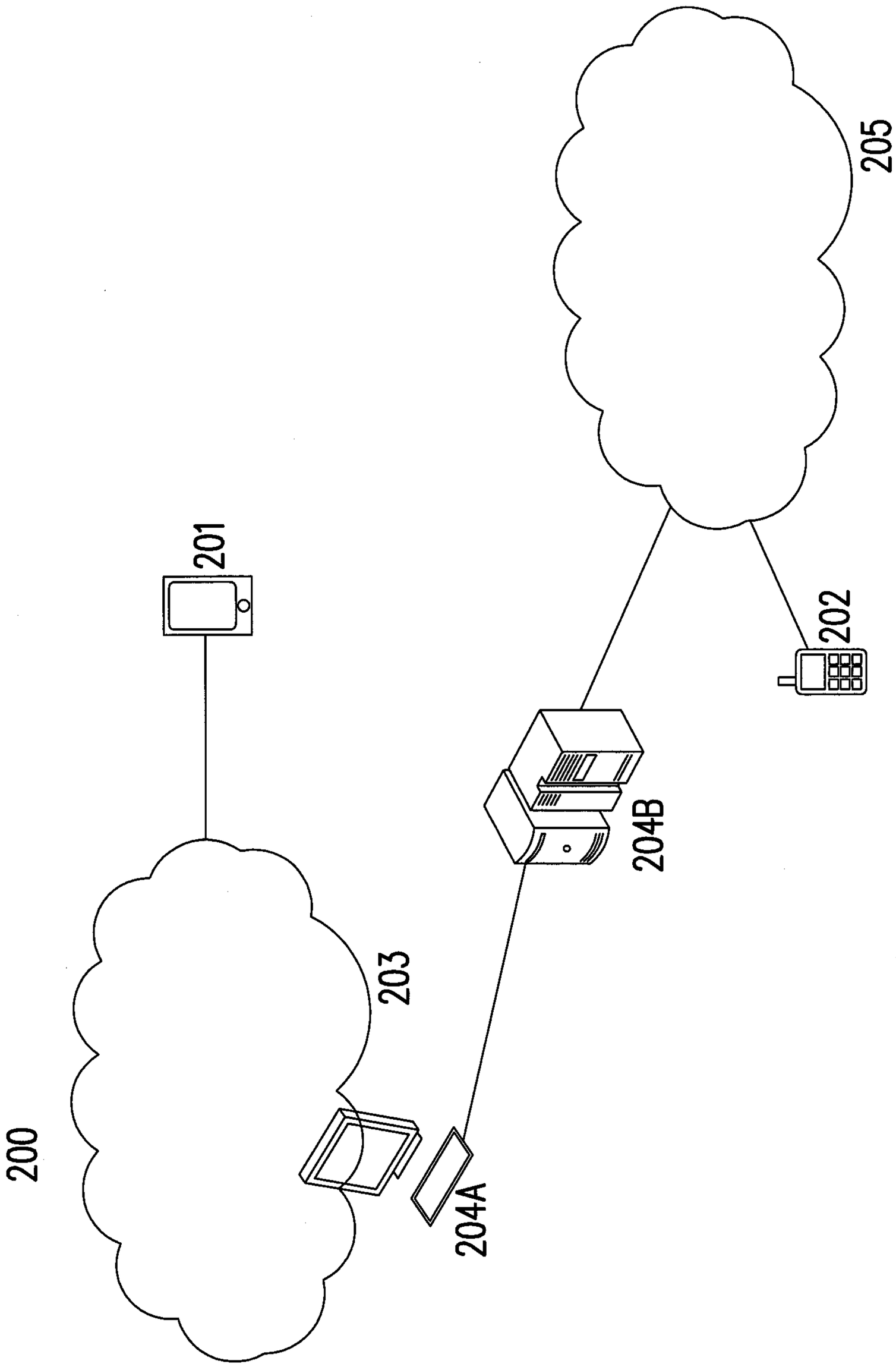


FIG. 2

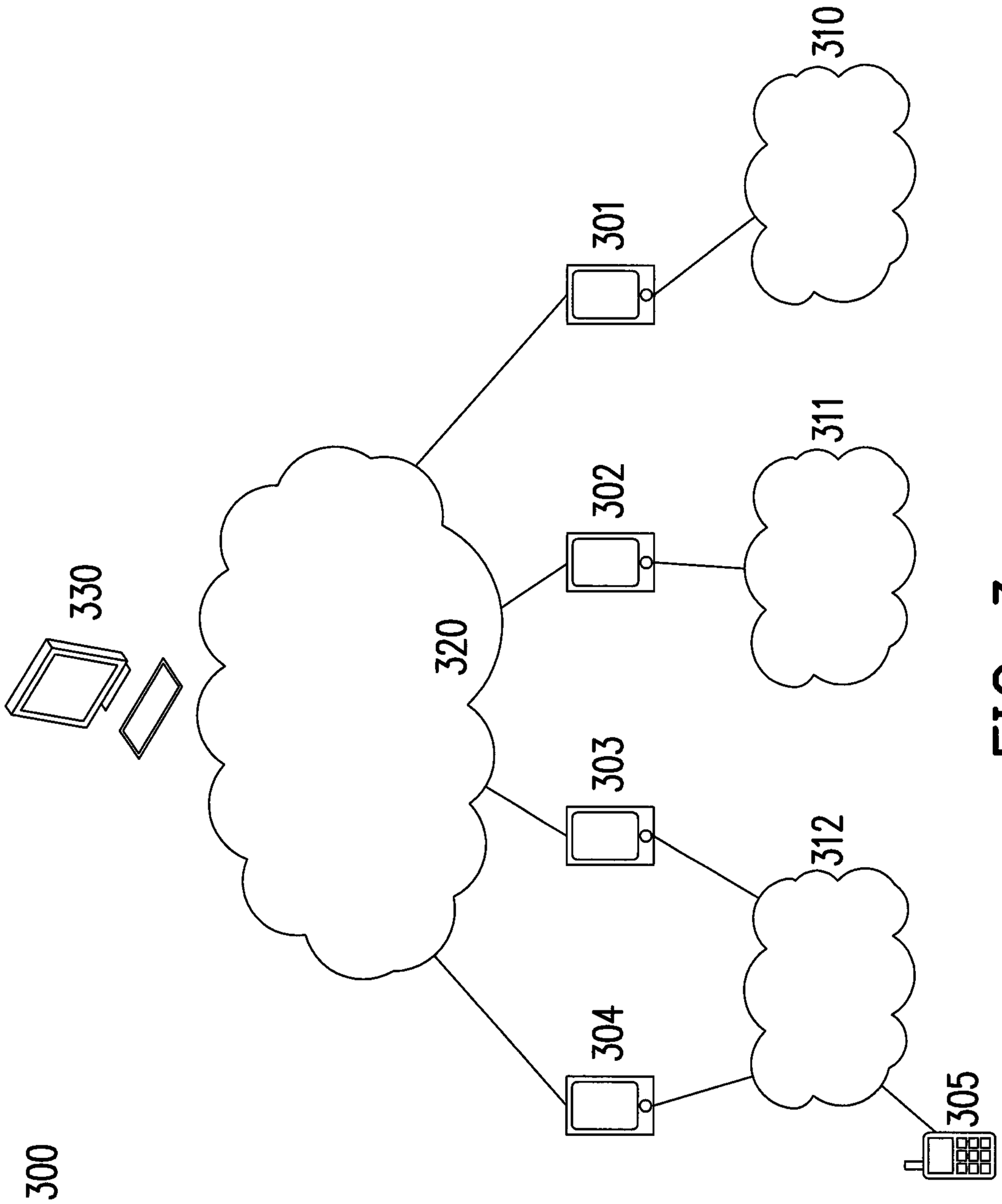


FIG. 3

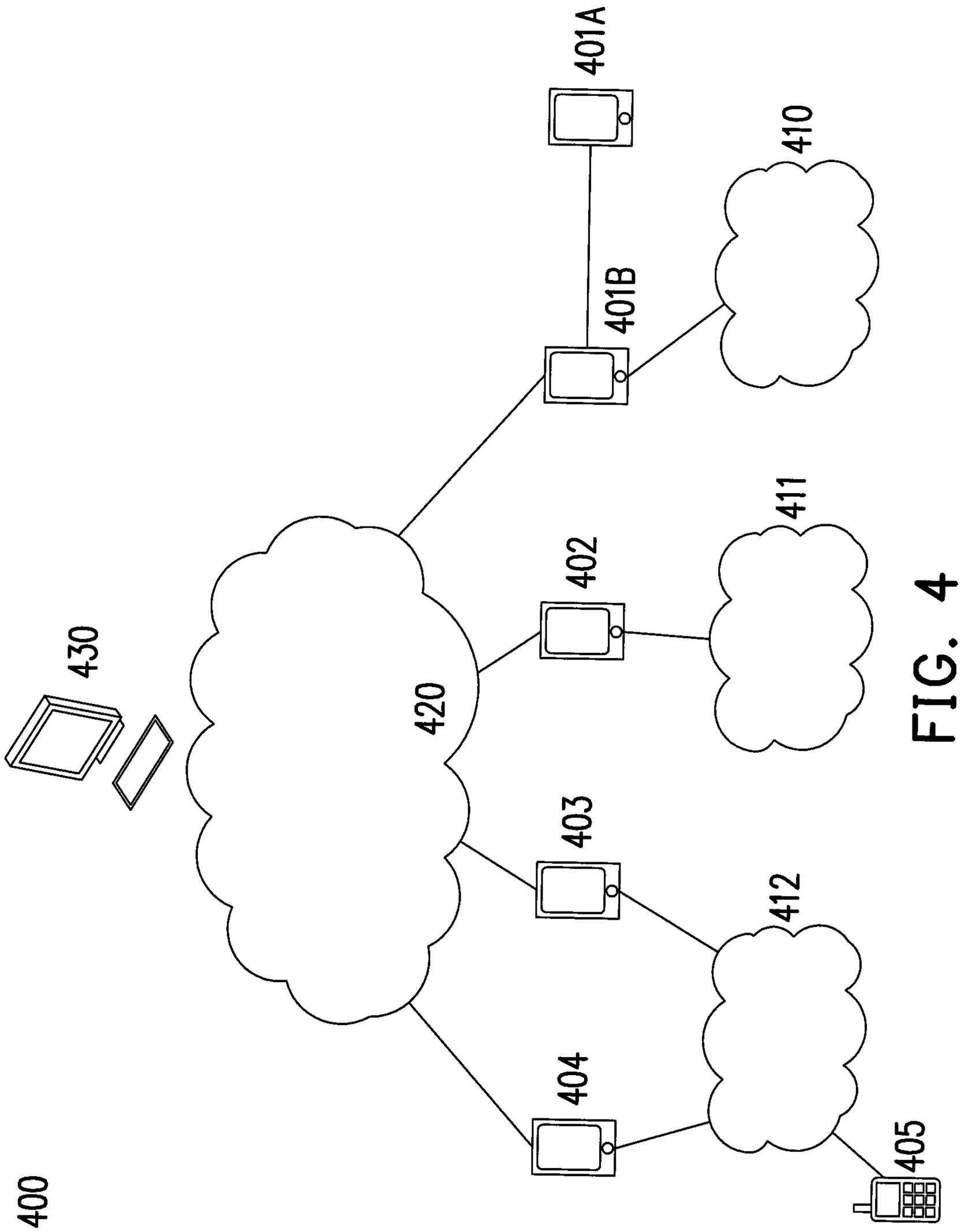


FIG. 4

METHOD AND APPARATUS FOR COST-SAVING TELEPHONE SERVICE

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the priority benefit of Taiwan application serial no. 102141002, filed on Nov. 12, 2013. The entirety of the above-mentioned patent application is hereby incorporated by reference herein and made a part of this specification.

BACKGROUND

1. Technical Field

The invention relates to a method and an apparatus for a telephone service, and particularly relates to a method and an apparatus for a cost-saving telephone service.

2. Related Art

Along with development of wireless communication technology and a development trend of miniaturization of electronic apparatuses, smart phones are greatly popularised, and become a mainstream of current mobile phones. A user can use the smart phone to connect a data network and a telephone service network at any time anywhere. Along with progress and popularisation of the wireless communication technology, although a phone call charge rate of the mobile phones has a declining trend year by year, various telecommunication practitioners still provide various promotional schemes for their long-term clients. However, the charging rate of phone calls between the telecommunication service providers (an inter-network charge rate) is still high. Therefore, various cost-saving communication software and services are vigorously developed, such as "Skype" or "Line". The common concept among such type of software is to provide a free or low-cost telephone service based on a characteristic that the electronic apparatus or the smart phone is connected to the data network.

Taking the software "Line" as an example, such type of communication software and service could be exemplarily characterized by FIG. **1**. In a communication network **100**, a smart phone **101** and a smart phone **102** are all installed with such communication software, and are registered to such service. During registration, client devices (e.g., the smart phones) provide telephone numbers thereof to the service. The smart phone **101** and the smart phone **102** are connected to a server **104** providing such communication service through a data network **103** (the Internet). In case that the users of the smart phone **101** and the smart phone **102** know existence of each other and agree a mutual communication there between (add each other as friends), the users of the smart phone **101** and the smart phone **102** can communicate with each other through the data network **103** and the server **104**, and the communication method includes a voice service. In this way, even if the smart phone **101** and the smart phone **102** are respectively connected to telephone service networks of different telecommunication service providers, the users of the smart phone **101** or the smart phone **102** can communicate with each other without making an expensive inter-network phone call.

In the aforementioned example, the smart phone **101** and the smart phone **102** are all required to install the same communication software and required to register on the same communication service; otherwise the communication or phone call between the smart phone **101** and the smart phone **102** cannot be implemented. However, the software "Skype" not only provides the communication method of the aforementioned example, but also integrates Type II Telecommunications services, i.e. the user can make cost-saving phone calls as long as the user registers to the communication service. As shown in FIG. **2**, in a communication network **200** of FIG. **2**, a smart phone **201** registers to a cost-saving telephone service (e.g., Skype). When the smart phone **201** intends to call a mobile phone **202** that does not register on the cost-saving telephone service, where the mobile phone **202** is connected to a telephone service network **205**, the smart phone **201** is connected to a server **204**A providing such communication service through a data network **203** (the Internet), and the server **204**A is connected to a machine room **204**B rented by the cost-saving telephone service provider, where the machine room **204**B is connected to the telephone service network **205**, such that the server **204**A can establish a communication connection between the smart phone **201** and the mobile phone **202** through the machine room **204**B. Certainly, in such service, the cost-saving telephone service provider still charges a service fee from the user to cover the cost of renting the machine room.

In the current technique, if two terminals of the cost-saving telephone service are not registered to the same cost-saving telephone service, such as the two smart phones to be communicated with each other are not installed with the same communication software, or one terminal of the phone call is not a smart phone, or one terminal of the phone call is a telephone using public switched telephone network, the cost-saving telephone service relies on the machine room rented from the telecommunication service provider by the cost-saving telephone service provider (i.e. a Type II telecommunication service). Such system structure is lack of flexibility and has a high cost, and the service users have to cover the cost of renting the machine room. The current cost-saving telephone technique does not fully integrate resources of the data network and the telephone service networks, and does not fully exploit the characteristic of the modern smart phone capable of simultaneously connecting the data network and the telephone service network.

SUMMARY

In order to fully integrate resources of a data network and a telephone service network, and to fully exploit a characteristic of modern smart phone capable of simultaneously connecting the data network and the telephone service network to facilitate users of a cost-saving telephone service to get a more comprehensive and low price cost-saving telephone service, the invention provides a method for a cost-saving telephone service, which includes following steps. A request for telephoning a third party client device is received from a communication resource using device, where the communication resource using device is a client device registered to the cost-saving telephone service, and is connected to a server through a data network, and the communication resource using device and the third party client device are respectively connected to a first telephone service network and a second telephone service network. A communication resource providing device is selected from a plurality of client devices registered to the cost-saving telephone service and connected to the second telephone service network, and the communication resource providing device is connected to the server through the data network. The communication resource providing device telephones the third party client device through the second telephone service network such that the communication resource using device communicates with the third party client device via the communication resource providing device.

Preferably, in the method for the cost-saving telephone service of the invention, the cost-saving telephone service has each of the client devices registered to the cost-saving telephone service provide a connected telephone number thereof and a name of a corresponding telephone service network to the cost-saving telephone service.

Preferably, in the method for the cost-saving telephone service of the invention, the cost-saving telephone service has each of the client devices registered to the cost-saving telephone service provide at least one of bandwidth data thereof and continuous positioning data thereof to the cost-saving telephone service.

Preferably, in the method for the cost-saving telephone service of the invention, the communication resource providing device is selected from the client devices registered to the cost-saving telephone service and connected to the second telephone service network according to at least one of the bandwidth data and the continuous positioning data provided by the client devices.

Preferably, in the method for the cost-saving telephone service of the invention, a user of the communication resource providing device is granted a right to actively cancel a communication between the communication resource using device and the third party client device, and the cost-saving telephone service records a call cancelling operation on a call cancelling record, and records the client device selected as the communication resource providing device in the communication.

Preferably, in the method for the cost-saving telephone service of the invention, the communication resource providing device is selected from the client devices registered to the cost-saving telephone service and connected to the second telephone service network according to the call cancelling record.

Preferably, in the method for the cost-saving telephone service of the invention, each of the client devices registered to the cost-saving telephone service is assigned with a corresponding communication service account, which is refillable to a user.

Preferably, the method for the cost-saving telephone service of the invention further includes following steps. A service fee is charged from the communication service account corresponding to the communication resource using device according to a session and a duration that the communication resource using device communicates with the third party client device via the communication resource providing device.

Preferably, the method for the cost-saving telephone service of the invention further includes following steps. A cost-saving communication service account corresponding to the communication resource providing device is refilled according to a session and a duration that the communication resource using device communicates with the third party client device via the communication resource providing device.

Preferably, in the method for the cost-saving telephone service of the invention, a charging rate being charged by the communication resource providing device is determined by a user of the client device selected as the communication resource providing device.

Preferably, in the method for the cost-saving telephone service of the invention, the communication resource providing device is selected from the client devices registered to the cost-saving telephone service and connected to the second telephone service network according to charging rates for providing communication resources that are determined by users of the client devices.

Preferably, in the method for the cost-saving telephone service of the invention, the request for telephoning the third party client device by the communication resource using device comes from a peer-to-peer connection device, and the peer-to-peer connection device is connected to the communication resource using device in a peer-to-peer manner through a wireless transmission technique.

Preferably, in the method for the cost-saving telephone service of the invention, the wireless transmission technique is one of Bluetooth, wireless fidelity, or a device-to-device communication.

The invention further provides a method for a cost-saving telephone service, which includes following steps. A request for telephoning a third party client device is proposed by a communication resource using device, where the communication resource using device is a client device registered to the cost-saving telephone service, and is connected to a server through a data network, and the communication resource using device and the third party client device are respectively connected to a first telephone service network and a second telephone service network. The communication resource using device communicates with the third party client device via a communication resource providing device, where the communication resource providing device is selected from a plurality of client devices registered to the cost-saving telephone service and connected to the second telephone service network, and the communication resource providing device is connected to the server through the data network, and the communication resource providing device telephones the third party client device through the second telephone service network.

The invention provides an apparatus for a cost-saving telephone service, which includes a server, and the server receives a request for telephoning a third party client device from a communication resource using device, where the communication resource using device is a client device registered to the cost-saving telephone service, and is connected to the server through a data network, and the communication resource using device and the third party client device are respectively connected to a first telephone service network and a second telephone service network. The server selects a communication resource providing device from a plurality of client devices registered to the cost-saving telephone service and connected to the second telephone service network, where the communication resource providing device is connected to the server through the data network. The server has the communication resource providing device telephone the third party client device through the second telephone service network such that the communication resource using device communicates with the third party client device via the communication resource providing device.

In order to make the aforementioned and other features and advantages of the invention comprehensible, several exemplary embodiments accompanied with figures are described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings are included to provide a further understanding of the invention, and are incorporated in and constitute a part of this specification. The drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

FIG. **1** is a schematic diagram of a communication network, in which a server and communication software collaborate to provide a cost-saving telephone service of the conventional technique.

FIG. **2** is a schematic diagram of another communication network, in which a server and communication software collaborate to provide a cost-saving telephone service of the conventional technique.

FIG. **3** is a schematic diagram of another communication network, in which a server and communication software collaborate to provide a cost-saving telephone service of a first embodiment of the invention.

FIG. **4** is a schematic diagram of another communication network, in which a server and communication software collaborate to provide a cost-saving telephone service of a second embodiment of the invention.

DETAILED DESCRIPTION OF DISCLOSED EMBODIMENTS

Although the invention is fully described below with reference of preferred embodiments and attached drawings, it will be apparent to those skilled in the art that various modifications and variations can be made to the structure of the invention without departing from the scope or spirit of the invention. Therefore, the following description is a broad disclosure to those skilled in the art, and the content thereof is not intended to be limiting of the invention.

A first embodiment of the invention is shown in FIG. **3**. In a communication network **300** of the present embodiment, a server **330** provides a cost-saving telephone service of the first embodiment of the invention. Smart phones **301**, **302**, **303** and **304** are a plurality of client devices registered to the cost-saving telephone service. Except for the smart phones, the cost-saving telephone service can also provide services to devices capable of connecting a data network, such as tablet computers, personal computers (PCs), etc. In the present embodiment, the client devices are directly or indirectly connected to the Internet **320**, and are connected to the server **330** providing the cost-saving telephone service.

Generally, the client devices registered to the cost-saving telephone service are all installed with client software corresponding to such service. After installation of the client software is completed, when the client software is executed for the first time, the client device is asked to perform a registration operation. In the registration operation, the client device is asked to provide contact information. For example, a smart phone is asked to provide a connected telephone number thereof and a name of a connected telephone service network (i.e. a telephone service provider, such as AT&T, Sprint, etc.), and a tablet computer or a PC provides an e-mail account of the user. In the present embodiment, the smart phone **301** is connected to a telephone service network **310**, the smart phone **302** is connected to a telephone service network **311**, and the smart phones **303** and **304** are connected to a telephone service network **312**.

It is assumed that the smart phones **301**, **302**, **303** and **304** are all in an on-line state (connected to the Internet, and execute the client software of the cost-saving telephone service) at a time point, and the user of the smart phone **301** wants to telephone a mobile phone **305** connected to the telephone service network **312**, where the mobile phone **305** is not registered to the cost-saving telephone service (the mobile phone **305** may not be installed with the client software, or the mobile phone **305** may not be a smart phone), and the user of the smart phone **301** does not want to make an expensive inter-network phone call. Therefore, the smart phone **301** provides the telephone number of the mobile phone **305** to the server **330** to request the cost-saving telephone service (i.e., the user of the smart phone **301** uses the client software of the cost-saving telephone service to telephone the mobile phone **305**). After the server **330** receives the request, the server **330** selects a client device from a plurality of client devices being registered to the cost-saving telephone service, on-line and connected to the telephone service network **312** to complete a connection service. In the present embodiment, the server **330** selects the smart phone **304** and makes the smart phone **304** telephone the mobile phone **305**, such that the smart phone **301** is connected to the mobile phone **305** through the server **330** and the smart phone **304**. In this way, resources of the Internet **320** and the telephone service network **312** are fully exploited, and the connection between the smart phone **304** and the mobile phone **305** is an intra-network communication, which may be cheap or even free.

In the present embodiment, the smart phone **301** is obviously a communication resource using device, and under a concept of "user-pays principle" the cost-saving telephone service can charge the user of the smart phone **301** according to a duration, a session, etc. that the smart phone **301** communicates with the mobile phone **305**. The cost-saving telephone service can create a communication service account corresponding to a client device when the client device is registered to the cost-saving telephone service, the user can refill the communication service account, and the cost-saving telephone service can directly charge the communication service account every time the service is ended. The user may refill the communication service account through on-line payment (via credit card, third party payment, etc.) or by purchasing a prepaid card from a physical store (for example, a convenience store), and a unit of refilling or charging of the cost-saving telephone service can be a real currency unit or a virtual currency unit.

In the present embodiment, the smart phone **304** is obviously a communication resource (bandwidth) providing device, and after the communication between the smart phone **301** and the mobile phone **305** is ended, the cost-saving telephone service pays the user of the smart phone **304** according to information such as a duration, a session, etc. of the communication between the smart phone **301** and the mobile phone **305**. The most direct way of the payment is to directly refill the communication service account corresponding to the smart phone **304**. In a pattern of the embodiment, a charging rate being charged is the same for each of the client devices. That is, when any of the client devices registered to the cost-saving telephone service is selected as the communication resource providing device in a communication request, the charging rate charged from the cost-saving telephone service is the same (though different session still have different valuation methods). In another pattern of the embodiment, the charging rate can be determined by the user of the client device, and a reason thereof is that the cost for each of the client devices obtaining a bandwidth is different, so that the charging rate required by each client device for lending the bandwidth is different. The cost-saving telephone service has a function of assisting the client device to manage a communicating time thereof. For example, the cost-saving telephone service obtains a free intra-network communication time remained in the communication service account of a client device to help the client device determine the charging rate for lending the bandwidth. In an extreme example, if one client device has run out of the free intra-network communication time during one time period, the client device can be set to unconditionally reject lending the communication resource through the cost-saving telephone service.

In the present embodiment, after the smart phone **304** is selected as the communication resource providing device during the communication between the smart phone **301** and

the mobile phone **305**, the user of the smart phone **304** is granted a right to actively cancel the communication between the smart phone **301** and the mobile phone **305** (through the client software), and a reason thereof is that the user of the smart phone **304** probably wants to use the bandwidth at the same time. The server **330** records information related to the call cancelling operation, such as a duration of the communication before the call cancelling operation, the client device that cancels the communication (the communication resource providing device), etc. for reference.

In the present embodiment, the cost-saving telephone service can also collect other information of the registered client devices, such as a bandwidth of each registered client device, continuous positioning data, etc. In the cost-saving telephone service of the present embodiment, after a server (for example, the server **330**) receives a communication request from a communication resource using device, the server selects a communication resource providing device from a plurality of client devices satisfying some conditions (e.g., being on-line and connected to a telephone service network the same with that of a receiver). The number the client devices satisfying the conditions is probably plural, and now the cost-saving telephone service makes a comprehensive assessment according to other information of the client devices satisfying the conditions, where the other information may include a bandwidth, a position, the historical call cancelling record, the charging rate of lending the bandwidth, etc. of each client devices.

In the aforementioned embodiment, though all of the client devices are smart phones, the cost-saving telephone service can also be provided to client devices that are not connected to the telephone service network, such as tablet computers PCs, etc. Obviously, the client device being unconnected to the telephone service network can only serve as a communication resource using device, and cannot be selected as a communication resource providing device. Moreover, for the communication between two client devices being both registered to the cost-saving telephone service, the two client devices can communicate with each other purely through the server as exemplarily shown in FIG. **3**. In FIG. **3**, the smart phone **301** and the smart phone **304** directly communicate with each other through the server **330** by using the bandwidth resource of the Internet.

A second embodiment of the invention is shown in FIG. **4**. In a communication network **400** of the present embodiment, a server **430** provides the cost-saving telephone service of the second embodiment of the invention. Smart phones **401**B, **402**, **403** and **404** are a plurality of client devices registered to the cost-saving telephone service, and the client devices are connected to the server **430** through the Internet **420**. In the present embodiment, the server **430** can provide all of the services mentioned in the first embodiment of the invention through the client software. The smart phone **401**B is connected to a telephone service network **410**, the smart phone **402** is connected to a telephone service network **411**, and the smart phones **403** and **404** are connected to a telephone service network **412**. In the present embodiment, a smart phone **401**A wants to communicate with a mobile phone **405** connected to the telephone service network **412**, and the smart phone **401**A can use a device-to-device (D2D) communication technique to connect to the smart phone **401**B, and logs in the cost-saving telephone service of the invention through the smart phone **401**B. Then, the smart phone **401**A provides a request for telephoning the mobile phone **405** to the cost-saving telephone service through the smart phone **401**B. After the server **430** receives the request, the server **430** selects the smart phone **404** from the client devices registered to the cost-saving telephone service and connected to the telephone service network **412**, and makes the smart phone **404** make an intra-network phone call to the mobile phone **405**, so as to implement the communication connection between the smart phone **401**A and the mobile phone **405**. In the present embodiment, not only the D2D communication technique can be used to connect the smart phone **401**A and the smart phone **401**B, but Bluetooth, wireless fidelity or other wireless communication techniques can also be used as well. Since the smart phone **401**A logs in the cost-saving telephone service through the smart phone **401**B, the server **430** authenticates whether the smart phone **401**B is registered to the cost-saving telephone service. Once the authentication is positively completed and the communication request is received, the cost-saving telephone service charges a service fee from the smart phone **401**B. As for the selection of the communication resource providing device of the present embodiment, the calculation of the service fee of the communication resource using device, or the charging rate charged by the communication resource providing device are all similar to the system of the first embodiment of the invention.

According to various embodiments of the invention, the method for the cost-saving telephone service fully integrates the resources of the data network and the telephone service networks without renting a machine room from a telephone service practitioner, and hence to provide inter-network and low cost telephone service.

It will be apparent to those skilled in the art that various modifications and variations can be made to the structure of the invention without departing from the scope or spirit of the invention. In view of the foregoing, it is intended that the invention cover modifications and variations of this invention provided they fall within the scope of the following claims and their equivalents.

What is claimed is:

1. A method for a cost-saving telephone service, which is performed by a server comprising:

receiving a request for calling a third party client device from a communication resource using device, wherein the communication resource using device is a first client device registered to the cost-saving telephone service of the server, and is connected to the server through a data network, the communication resource using device and the third party client device are respectively connected to a first telephone service network and a second telephone service network, and the first telephone service network and the second telephone service network are managed by different telephone service providers;

selecting a communication resource providing device from a plurality of second client devices registered to the cost-saving telephone service and connected to the second telephone service network, wherein the communication resource providing device is connected to the server through the data network; and

controlling the communication resource providing device to call the third party client device through the second telephone service network such that the communication resource using device communicates with the third party client device via the communication resource providing device without being charged with an inter-network charge rate.

2. The method for the cost-saving telephone service as claimed in claim **1**, wherein the cost-saving telephone service makes each of the client devices registered to the cost-saving telephone service provide a connected telephone number thereof and a name of a corresponding telephone service network to the cost-saving telephone service.

3. The method for the cost-saving telephone service as claimed in claim 1, wherein the cost-saving telephone service makes each of the client devices registered to the cost-saving telephone service provide at least one of bandwidth data thereof and continuous positioning data thereof to the cost-saving telephone service.

4. The method for the cost-saving telephone service as claimed in claim 3, wherein the step of selecting the communication resource providing device from the second client devices registered to the cost-saving telephone service and connected to the second telephone service network comprising:

selecting the communication resource providing device from the second client devices registered to the cost-saving telephone service and connected to the second telephone service network according to at least one of the bandwidth data and the continuous positioning data provided by the second client devices.

5. The method for the cost-saving telephone service as claimed in claim 1, wherein a user of the communication resource providing device is granted a right to actively cancel a communication between the communication resource using device and the third party client device, and the cost-saving telephone service records a call cancelling operation on a call cancelling record, and records the client device selected as the communication resource providing device in the communication.

6. The method for the cost-saving telephone service as claimed in claim 5, wherein the step of selecting the communication resource providing device from the second client devices registered to the cost-saving telephone service and connected to the second telephone service network comprising:

selecting the communication resource providing device from the second client devices registered to the cost-saving telephone service and connected to the second telephone service network according to the call cancelling record.

7. The method for the cost-saving telephone service as claimed in claim 1, wherein each of the client devices registered to the cost-saving telephone service is assigned with a corresponding communication service account, which is refillable to a user.

8. The method for the cost-saving telephone service as claimed in claim 7, further comprising charging a service fee from the communication service account corresponding to the communication resource using device according to a session and a duration that the communication resource using device communicates with the third party client device via the communication resource providing device.

9. The method for the cost-saving telephone service as claimed in claim 7, further comprising refilling a cost-saving communication service account corresponding to the communication resource providing device according to a session and a duration that the communication resource using device communicates with the third party client device via the communication resource providing device.

10. The method for the cost-saving telephone service as claimed in claim 9, wherein a charging rate being charged by the communication resource providing device is determined by a user of the client device selected as the communication resource providing device.

11. The method for the cost-saving telephone service as claimed in claim 10, wherein the step of selecting the communication resource providing device from the second client devices registered to the cost-saving telephone service and connected to the second telephone service network comprising:

selecting the communication resource providing device from the second client devices registered to the cost-saving telephone service and connected to the second telephone service network according to charging rates for providing communication resources that are determined by users of the second client devices.

12. The method for the cost-saving telephone service as claimed in claim 1, wherein the request for telephoning the third party client device by the communication resource using device comes from a peer-to-peer connection device, and the peer-to-peer connection device is connected to the communication resource using device in a peer-to-peer manner through a wireless transmission technique.

13. The method for the cost-saving telephone service as claimed in claim 12, wherein the wireless transmission technique is one of Bluetooth, wireless fidelity, or a device-to-device communication.

14. A method for a cost-saving telephone service, which is performed by a user, comprising:

proposing, by a communication resource using device, a request for calling a third party client device, wherein the communication resource using device is a first client device registered to the cost-saving telephone service of a server, and is connected to the server through a data network, the communication resource using device and the third party client device are respectively connected to a first telephone service network and a second telephone service network, and the first telephone service network and the second telephone service network are managed by different telephone service providers; and

communicating, by the communication resource using device, with the third party client device via a communication resource providing device without being charged with an inter-network charge rate, wherein the communication resource providing device is selected by the server from a plurality of second client devices registered to the cost-saving telephone service and connected to the second telephone service network, and the communication resource providing device is connected to the server through the data network, and the communication resource providing device calls the third party client device through the second telephone service network.

15. An apparatus for a cost-saving telephone service, comprising a server, wherein the server:

receives a request for calling a third party client device from a communication resource using device, wherein the communication resource using device is a first client device registered to the cost-saving telephone service of the server, and is connected to the server through a data network, the communication resource using device and the third party client device are respectively connected to a first telephone service network and a second telephone service network, and the first telephone service network and the second telephone service network are managed by different telephone service providers;

selects a communication resource providing device from a plurality of second client devices registered to the cost-saving telephone service and connected to the second telephone service network, wherein the communication resource providing device is connected to the server through the data network; and

controls the communication resource providing device to call the third party client device through the second

telephone service network such that the communication resource using device communicates with the third party client device via the communication resource providing device without being charged with an inter-network charge rate.

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