

SPECIFICATION

TELEPHONE TOLL SHARING METHOD

TECHNICAL FIELD

The present invention relates to a telephone toll sharing method used in a network including plural (telephone) exchanges covering plural caller terminals and also plural called party terminals, and in particular, relates to a method for optionally charging a generated toll based on a *specified-telephone-number connection* to both the caller and the called party.

BACKGROUND ART

In a network comprising (telephone) exchanges covering plural caller and called parties, a caller generally pays the total toll. However, another system for charging a toll to the called party has practically been used. For example, there are known (i) a *collect call system* in which an operator mediates between the caller and the called party at the connection, or (ii) an automatic called-party charged service (e.g., a *toll free service*) in which when a caller dials a specified identification number for charging the called side, the called party pays the total toll. Regarding the *toll free service* and the like, for example, S. Murase, M. Ikejiri, and I. Takei, "Customization of Services and Customer Control", *NTT Technical Journal*, Vol. 1, No. 9, pp. 16-20, December, 1989; or H. Kamisaka and S. Amiya, "Toll Free Service, Pioneer of the IN Service", *NTT Technical Journal*, Vol. 1, No. 9, pp. 21-26, December 1989, may be mentioned. In these conventional services, the toll is totally charged to either the caller or the called party. Therefore, there has been a problem in which a disproportionate burden is imposed on one side, i.e., on the caller or on the called party, which may result in perceptions that the system of charges is unfair.

An invention for solving such a problem and for having a toll shared between

the caller and the called party is disclosed, for example, in Japanese Patent Application, First Publication, Sho 63-115452. In the system disclosed in the publication, toll sharing control information for a subscriber as a subject for toll sharing between a *caller* subscriber and a *called* subscriber is previously stored in a subscriber information storage device in the exchange. When a control for connection is performed in response to a connection request from a caller subscriber, if a toll sharing control information item is included in information read out from the subscriber information storage device of the caller or called subscriber, the relevant caller and called subscribers are connected and the incurred toll is shared between the subscribers according to specified logical rules.

To explain in more detail, the toll sharing control information set and stored for each subscriber is composed of: (A) caller/called party priority information when sending a call, (B) caller/called party priority information when receiving a call, (C) a share rate when sending a call, and (D) a share rate when receiving a call; and toll shares of the caller and the called party are determined based on these toll sharing control information items, according to specified logical rules.

As logical rules, the following are described in the embodiment.

- (1) Called subscriber preferred type for taking priority over the toll sharing control information of the called side. (If a called-side preferred mode is assigned to both caller and called sides, the share ratio of the called side is adopted.)
- (2) Caller subscriber preferred type for taking priority over the toll sharing control information of the caller side. (If a caller-side preferred mode is assigned to both caller and called sides, the share ratio of the caller side is adopted.)
- (3) Caller/called side comparison type 1 (agreement type: if the caller-side preferred mode is assigned to the caller side and the called-side preferred mode is assigned to the called side, a call (for communication) is accepted only when the share ratios of both sides agree with each other).
- (4) Caller/called side comparison type 2 (disagreement type: if the caller-side

preferred mode is assigned to the caller side and the called-side preferred mode is assigned to the called side, and if the share ratios of both sides disagree with each other, then a call (for communication) is accepted only when the charge rate of the caller side is higher at a caller/called side share ratio registered in the toll sharing control information of the caller side and the toll is determined according to the toll sharing control information which was previously registered and designated by the caller-side subscriber.

(5) Equal-charge ratio type. (If toll sharing control information is registered, the toll is charged at an even share ratio such as "1/2" for each side.)

In these known examples, all the callers are treated equally by a called party without particular designation (by the called party) of a caller who will share the toll. That is, the called side does not designate callers who should share the toll; thus, there has been a problem in which calls from unspecified callers, including those who do not wish to have the charge shared with the called party, are equally subjected to the shared charge.

Additionally, as described above, the toll sharing method disclosed in the above publication uses various kinds of logical rules, which has produced a problem in that the toll sharing method becomes very complicated because: (i) different toll sharing methods may be employed according to manners for registering toll sharing control information of the caller and toll sharing control information of the called party; or (ii) connection of a call may be prohibited when toll sharing control information of the caller side does not agree with that of the called side.

DISCLOSURE OF INVENTION

It is an object of the present invention to solve the above-mentioned problems, regarding a call of a specified telephone number sent from a toll area designated by a called party, by previously storing toll charge information relating to the relevant caller and called party, and to provide a toll sharing method by which it is possible to impose

the shared toll only on calls sent from toll area(s) permitted by the called side, based on conditions designated by the called side.

To achieve the above object, the present invention provides a toll sharing method employed in a network providing plural telephone exchanges which cover plural caller terminals and plural called terminals, said method used in specified-telephone-number connection in which a call with a specified telephone number different from general subscriber-telephone numbers, sent from a toll area which was previously designated among plural toll areas by a called party, is received via a subscriber-telephone number which was previously designated by the called party, said method characterized by comprising the steps of setting and storing toll charge information relating to a caller and/or a called party with respect to a predetermined toll in the specified-telephone-number connection; and apportioning the toll between the caller and the called party based on the stored toll charge information.

The following are more practical methods for implementation.

- (1) A second called party, to which the call relating to the specified telephone number is connected via routing if the call cannot be connected to the expected called party, is previously designated, and when the call is connected, not to the first called party, but to the second called party via routing:

if a toll up to the second called party is higher than a toll up to the first called party, then the toll up to the first called party is charged to the caller and a difference is obtained by subtracting the toll up to the first called party from the toll up to the second called party, wherein all of a toll corresponding to the difference is charged to the called party, or a part of the toll corresponding to the difference is charged to the called party and the remaining part is charged to the caller party; and

if the toll up to the second called party is equal to or less than the toll up to the first called party, then all the toll up to the second called party is charged to the caller.

In addition, a share ratio between the caller and the called party with respect to the toll of the difference may be determined or changed based on a condition of calling

in a specified period of time or from a specified area.

(2) Similarly, a second called party, to which the call relating to the specified telephone number is connected via routing if the call cannot be connected to the expected called party, is previously designated, and when the call is connected, not to the first called party, but to the second called party via routing, a toll up to the second called party is charged to one of the caller and the called party based on the toll charge information.

Here, determination that whether the caller side or the called side pays the total charge may be performed based on a condition of calling in a specified period of time, calling from a specified area, or calling from a subscriber-telephone number which was previously registered.

(3) In the specified-telephone-number connection, plural distance areas are assigned with respect to each toll area as a starting point, and a flat toll is applied with respect to each distance area, and

a toll from the toll area of the caller to a predetermined distance area selected from among the plural distance areas is charged to the caller,

a toll corresponding to the difference obtained by subtracting the toll up to the predetermined distance area from a toll up to the subscriber-telephone number which was previously designated is charged to the called party; and

if the toll up to the subscriber-telephone number previously designated is equal to or less than the toll up to the predetermined distance area, then all the toll up to the subscriber-telephone number is charged to the caller.

According to the above invention, when a caller dials the specified telephone number, the toll can be shared, only for a call sent from a toll area permitted by a called party, with conditions designated by the called party. Therefore, this method is very effective, for example, in sales promotion, order reception, and customer service for telemarketing.

Additionally, in the specified-telephone-number connection, before the caller

and the called party is connected via the call, advance information relating to the relevant toll may be communicated to the exchange which covers the caller, and guidance for notifying the caller of the advance information may be sent from the exchange. In this way, the caller can previously obtain toll information and can have a telephone conversation without anxiety; thus, it is possible to prevent the toll charged to the caller side from unexpectedly increasing.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows an exemplary system arrangement in the embodiment according to the present invention.

Fig. 2 is an operational flowchart of the point toll-sharing method in the embodiment according to the present invention.

Fig. 3 is a schematic diagram (1) showing implementation of the point toll-sharing method.

Fig. 4 is a schematic diagram (2) showing implementation of the point toll-sharing method.

Fig. 5 is a schematic diagram showing implementation of a called party selectively charged method.

Fig. 6 is a schematic diagram showing implementation of a toll sharing method based on the MBI (Message Billing Index).

MODES FOR CARRYING OUT THE INVENTION

Hereinbelow, preferred embodiments of the present invention will be explained in detail with reference to the drawings.

In the toll sharing method according to the present invention, when connection (of a call) is performed by converting a specified telephone number different from a general subscriber-telephone number into any subscriber-telephone number, toll charge information of a caller and/or a called party with respect to a toll generated with

such *specified-telephone-number connection* is previously stored, and an actual toll is shared between both caller and called party according to the toll charge information.

There are three specific examples of this, as follows.

(a) **Point toll-sharing method**

When the *actual* called party is changed for certain reasons of the called side, if a toll relating to the actual called party (after the change) becomes higher than a toll relating to the original (or originally-expected) called party (before the change), then a toll share from the caller to the original called party is paid by the caller side and only a toll share corresponding to the shortfall is paid by the called side.

(b) **Called party selectively charged method**

Information relating to the charged side, that is, whether the caller side or the called side pays the toll, is registered by the called side, and the charged side is decided based on the information.

(c) **MBI toll sharing method**

Toll shares are determined based on the MBI (Message Billing Index). Here, effective seconds for telephone conversation per 10 yen are determined for each specified distance so as to establish plural steps, the steps being called "*MBI 1*", "*MBI 2*", and the like. For example, *MBI 1* means "3 minutes/10 yen", *MBI 2* means "90 seconds/10 yen", etc. That is, *MBI 1* is assigned to the inside of each toll area, and *MBI 2 or more* is assigned to any two toll areas, according to the distance between the areas.

Hereinbelow, the above three kinds of toll sharing methods will be explained in detail.

(a) **Point toll-sharing method**

The following are examples of known services for changing the expected called party.

(1) **Rerouting service:** Service for automatically connecting to another called

party in a predetermined period of time, such as a period other than business hours.

(2) **Expanded area service:** Expanded area information over plural areas is previously registered, for example, information that plural lines are assigned to *Tokyo* as the first candidate (i.e., *the parent*); other plural lines are assigned to *Nagoya* as the second candidate (i.e., *child 1*); and yet other plural lines are assigned to *Osaka* as the third candidate (i.e., *child 2*). When a caller dials a specified telephone number, the lines belonging to *the parent* are first searched for a vacant line via which the call will be connected. If no vacant line was found, lower-ranked lines (i.e., belonging to each *child*) are searched in turn for a vacant line via which the call will be connected. (If no vacant line was finally found, the "busy" signal is returned.)

In the point toll-sharing method explained here, when the called party is routed using the above rerouting or expanded area service, if a toll up to the *second* called party (that is, the *actual* called party after the change) becomes higher than a toll up to the *first* called party (that is, the *original* called party before rerouting in the case of the rerouting service; whereas it is *the parent* in the case of the expanded area service), then the toll up to the first called party is charged to the caller side while the remaining toll is charged to the called side. In addition, regarding the toll share charged to the called side, it is also possible to apportion the difference due to the rise in the total toll based on a condition such as calling in a specified period of time or from a specified area, and to make the toll shared between both caller and called sides at a share ratio.

Hereinafter, an actual example with respect to the point toll-sharing method will be described.

Fig. 1 shows an exemplary system arrangement for realizing the present invention.

In the figure, reference numeral 1 indicates a control station. In the station, information items relating to connection of a call using a specified telephone number, which is sent from an exchange to which the caller (i.e., subscriber) belongs, are stored.

The information items, such as, (i) a period of time, (ii) permissible area for telephone calls (i.e., one or more toll areas: a "toll area" indicates an area wherein the same charge rate is imposed, for example, *Tokyo* (area code: 03), *Kawasaki* (area code: 044), etc.), and (iii) a subscriber-telephone number corresponding to the specified telephone number, are previously designated by any called party. In addition, in the above-described case in which the difference due to the rise in the total toll is apportioned based on a condition such as calling in a specified period of time or from a specified area; and the toll is shared between both caller and called sides at a share ratio, information with respect to the above condition and the share ratio is also stored in control station 1.

The control station 1 converts any specified telephone number, sent from a toll area which was previously designated by a called party, into a subscriber-telephone number, which was also previously designated by the called party, with reference to the above registered information. The control station 1 also monitors and manages the vacant/occupied state of each line with respect to all subscriber-telephone numbers designated by the called party.

Reference numerals 2, 3, and 3' indicate plural exchanges which are connected to and cover plural caller terminals and plural called terminals (of subscribers), reference numeral 4 indicates a common signal network, reference numeral 5 indicates a terminal at the caller side (i.e., any communication device such as a telephone set or a facsimile machine), reference numerals 6 and 6' indicate terminals at the called side (i.e., any communication devices such as a telephone set or a facsimile machine), and reference numerals 7, 8 and 8' indicate areas covered by exchanges 2, 3, and 3', respectively. Next, reference numerals 9-11, and 11' indicate lines for connecting control station 1 and exchanges 2, 3, and 3' via common signal network 4 and for exchanging control signals for communicating information between the control station and each exchange; reference numeral 12 indicates a relay line for mutually connecting exchanges 2 and 3; and reference numeral 12' indicates a relay line for mutually

connecting exchanges 2 and 3'. In the following explanation, terminals 5, 6, and 6' are assumed to be telephone sets.

Fig. 2 is an operational flowchart of the point toll-sharing method in the present embodiment.

When a user dials a specified telephone number (e.g., logical number "0AB0-*****", here, "0AB0" means, for example, "0570") by using telephone set 5 (see step 21), the terminal of the user is connected to exchange 2 which can access control station 1, and the specified telephone number is transmitted to the exchange 2. The exchange 2 sends the above specified telephone number and area information of the caller (for example, the subscriber-telephone number of the caller) to control station 1 via common signal network 4 (see step 22).

The control station 1 refers to and compares (i) the received specified telephone number and area information of the caller and (ii) information previously registered by a called party, such as a possible period of time for connection, permissible area(s) for telephone calls, etc., and converts the specified telephone number received from exchange 2 into a general subscriber-telephone number (i.e., a physical number) which is previously registered by the called party (see step 23). Here, it is assumed that the telephone set corresponding to the converted telephone number is telephone set 6 in Fig. 1. The control station 1 then judges whether or not re-conversion of the number is necessary for a reason such as the connection to the telephone set corresponding to the above converted telephone number being impossible (see step 24). If it is unnecessary to change the subscriber-telephone number, regular operations for connecting to the telephone set of the subscriber-telephone number is performed (see step 25).

If the subscriber-telephone number must be changed, control station 1 performs conversion into another subscriber-telephone number. That is, the telephone set (or terminal) corresponding to a subscriber-telephone number obtained the re-conversion (i.e., a subscriber-telephone number *after rerouting* in the case of the

rerouting service; or the number belonging to *a child*, which was found not to be busy, in the case of the expanded area service) is determined as the telephone set for connection (which corresponds to telephone set 6' in Fig. 1) (see step 26).

After the telephone set for connection is determined, control station 1 informs exchange 2 at the caller side of (i) the number of the called side after the change and (ii) toll information (the number of seconds for a toll with respect to connection up to telephone set 5). The exchange 2 sends a guidance indicating toll charge information to the terminal at the caller side before establishing, by using the communicated subscriber-telephone number, connection to the called-side telephone set; thus, after the guidance is transmitted, the exchange 2 performs connection to telephone set 6' at the called side (see step 27).

Control station 1 compares a toll relating to the original called party (i.e., telephone set 6 in Fig. 1) and a toll relating to the called party after the change (i.e., telephone set 6' in Fig. 1). If the toll of the original called party is equal to or greater than the toll of the called party after the change, the control station 1 selects the basic toll type (that is, the caller pays the total toll) without charging shared tolls.

On the other hand, if the toll of the original called party is less than that of the called party after the change, the control station 1 selects the shared toll type, that is, an amount corresponding to the toll from telephone set 5 to telephone set 6 is charged to the caller side, while the remaining amount (i.e., the difference) of the toll is charged to the called side (see step 28). In addition, according to a preset condition (such as calling in a specified period of time or from a specified area, as described above), the charge at the called side may be apportioned to allow the toll to be shared between both caller and called sides at a specified share ratio.

In an exemplary case of the above-explained point toll-sharing method, as shown in a schematic diagram of the toll sharing method in Fig. 3, if the toll from the caller (i.e., telephone set 5) to the actual called party connected via rerouting (i.e., telephone set 6') is 90 yen while the toll from the caller (i.e., telephone set 5) to the

original called party (i.e., telephone set 6) is 70 yen, then the caller pays 70 yen while the called party pays 20 yen ($90 \text{ yen} - 70 \text{ yen} = 20 \text{ yen}$). In addition, according to the preset condition, the charge "20 yen" to the called party may be apportioned in an exemplary manner as shown in Fig. 4, such that the caller pays 80 yen while the called party pays 10 yen.

Accordingly, all or a part of the increased toll due to the change (or rerouting) is charged to the called party. Therefore, if the called party is changed, the caller only pays a toll which would be generated in the case of no change (or rerouting) or an increased amount of the total toll; thus, more fair and flexible toll charge for the users can be established.

(b) Called party selectively charged method

In the called party selectively charged method, information relating to the charged side, that is, whether the caller side or the called side pays the total charge relating to a call sent and connected to a called party via a specified telephone number, is previously designated and registered for each called party in control station 1. Then, the charged side (relating to the total toll) is decided based on the registered information for each call connected to a called party in a manner similar to the above item (a).

A schematic diagram of this method is shown in Fig. 5. According to this method, it is possible, regarding a call connected to a specified called party by using the rerouting service or the expanded area service as explained in item (a), to charge the total toll to the called side or the caller side based on designation of the called party (i.e., registration in the control station).

In addition, regarding the designation for each called party, it is also possible to designate a called party with an additional condition relating to the charged side (i.e., whether the caller side or the called side pays the total charge) based on a condition such as calling in a specified period of time or from a specified area, or calling with a subscriber-telephone number which was previously registered.

In a case in which the called side pays the total toll, it is also possible to send a guidance message such as "all of the toll is paid by our side" to the caller side.

(c) **Toll sharing method based on the MBI**

In this type of toll sharing method, when connection of a telephone call is performed by converting a specified telephone number, sent from a toll area which was previously designated by a called party, into any subscriber-telephone number which was also designated by the called party, regardless of change or no-change of the called party, a toll share up to a specified MBI area (which was registered in control station 1 by a called party) is charged to the caller side, while the remaining share is charged to the called side. Here, the called side previously designated and registered any subscriber-telephone number, and if a toll from the caller to the area corresponding to the subscriber-telephone number is equal to or less than a toll calculated based on the specified MBI registered as described above, the total toll of the from the caller to the area corresponding to the subscriber-telephone number (which was designated by the called party) is charged to the caller side.

A schematic diagram of this method is shown in Fig. 6. According to this method, for example, when *MBI 1* (3 minutes/10 yen) is previously registered as the specified MBI, if "20 yen" occurs as a toll for a call of less than 3 minutes in the daytime, "10 yen" of the "20 yen" is charged to the caller side while the remaining "10 yen" (i.e., $20 \text{ yen} - 10 \text{ yen} = 10 \text{ yen}$) is charged to the called side. Therefore, in this toll sharing method, the caller pays a share which is less than a fixed charge regardless of the area of the called side; thus, the caller can have a telephone conversation without worrying about the toll.

According to the present embodiment explained above, when a caller dials a specified telephone number, by having a toll shared between the caller and the called party based on toll charge information registered by the called party in the network, the toll can be shared with conditions designated by the called party, with respect to a caller and an object area designated by a called party. Therefore, when a call is

connected via rerouting, a toll can be shared with respect to the *first* and the *second* called parties according to conditions designated by the called side. Accordingly, it is possible to prevent the toll charge to the caller side from increasing unexpectedly.

Additionally, when a call is connected via rerouting (based on a condition), it is possible to designate the called party to pay the toll charge. Therefore, for example, in a mail-order system using telephone lines, it is possible to designate an order reception center, which is the first called party, as a target of the caller-side charge and to designate another reception office working after product being sold is sold-out, which is the second called party, (that is, regarding a call after sell-out) as a target of the called-side charge. It is further possible to charge a toll up to a specified toll area to the caller side and to charge the remaining toll corresponding to the remaining section to the called side. Accordingly, it is possible, for example, to decrease a toll charged to a user in a residence area without any access point with respect to telecomputing (or communication services for personal computers) or the Internet. Furthermore, information relating to the toll charge (i.e., guidance information) is communicated to a called party before connecting a relevant call; thus, the caller can obtain plain toll information. Accordingly, the caller can have a telephone conversation without anxiety, and it is possible to prevent the toll charged to the caller side from increasing unexpectedly.



CLAIMS

1. A toll sharing method employed in a network providing plural telephone exchanges which cover plural caller terminals and plural called terminals, said method used in specified-telephone-number connection in which a call with a specified telephone number different from general subscriber-telephone numbers, sent from a toll area which was previously designated among plural toll areas by a called party, is received via a subscriber-telephone number which was previously designated by the called party, said method characterized by comprising the steps of:

setting and storing toll charge information relating to a caller and/or a called party with respect to a predetermined toll in the specified-telephone-number connection; and

apportioning the toll between the caller and the called party based on the stored toll charge information.

2. A toll sharing method as claimed in claim 1, characterized in that:

in the specified-telephone-number connection, a second called party, to which the call relating to the specified telephone number is connected via routing if the call cannot be connected to the expected called party, is previously designated, and

when the call is connected, not to the first called party, but to the second called party via routing,

if a toll up to the second called party is higher than a toll up to the first called party, then the toll up to the first called party is charged to the caller and a difference is obtained by subtracting the toll up to the first called party from the toll up to the second called party, wherein all of a toll corresponding to the difference is charged to the called party, or a part of the toll corresponding to the difference is charged to the called party and the remaining part is charged to the caller party; and

if the toll up to the second called party is equal to or less than the toll



up to the first called party, then all the toll up to the second called party is charged to the caller.

3. A toll sharing method as claimed in claim 2, characterized in that a share ratio between the caller and the called party with respect to the toll of the difference is determined based on a condition of calling in a specified period of time or from a specified area.

4. A toll sharing method as claimed in claim 1, characterized in that:
in the specified-telephone-number connection, a second called party, to which the call relating to the specified telephone number is connected via routing if the call cannot be connected to the expected called party, is previously designated, and
when the call is connected, not to the first called party, but to the second called party via routing, a toll up to the second called party is charged to one of the caller and the called party based on the toll charge information.

5. A toll sharing method as claimed in claim 4, characterized in that determination of whether the caller side or the called side pays the total charge is performed based on a condition of calling in a specified period of time, calling from a specified area, or calling from a subscriber-telephone number which was previously registered.

6. A toll sharing method as claimed in claim 1, characterized in that:
in the specified-telephone-number connection, plural distance areas are assigned with respect to each toll area as a starting point, and a flat toll is applied with respect to each distance area, and
a toll from the toll area of the caller to a predetermined distance area selected from among the plural distance areas is charged to the caller, and a toll corresponding to the difference obtained by subtracting the toll up to the predetermined distance area



from a toll up to the subscriber-telephone number which was previously designated is charged to the called party; and

if the toll up to the subscriber-telephone number previously designated is equal to or less than the toll up to the predetermined distance area, then all the toll up to the subscriber-telephone number is charged to the caller.

7. A toll sharing method as claimed in claim 6, characterized in that effective seconds for telephone conversation per predetermined monetary unit are determined for each specified distance so as to establish plural steps, and the plural distance areas are determined according to the established plural steps.

8. A toll sharing method as claimed in any one of claims 1-7, characterized in that in the specified-telephone-number connection, before the caller and the called party is connected via the call, advance information relating to the relevant toll is communicated to the exchange which covers the caller, and guidance for notifying the caller of the advance information is sent from the exchange.