

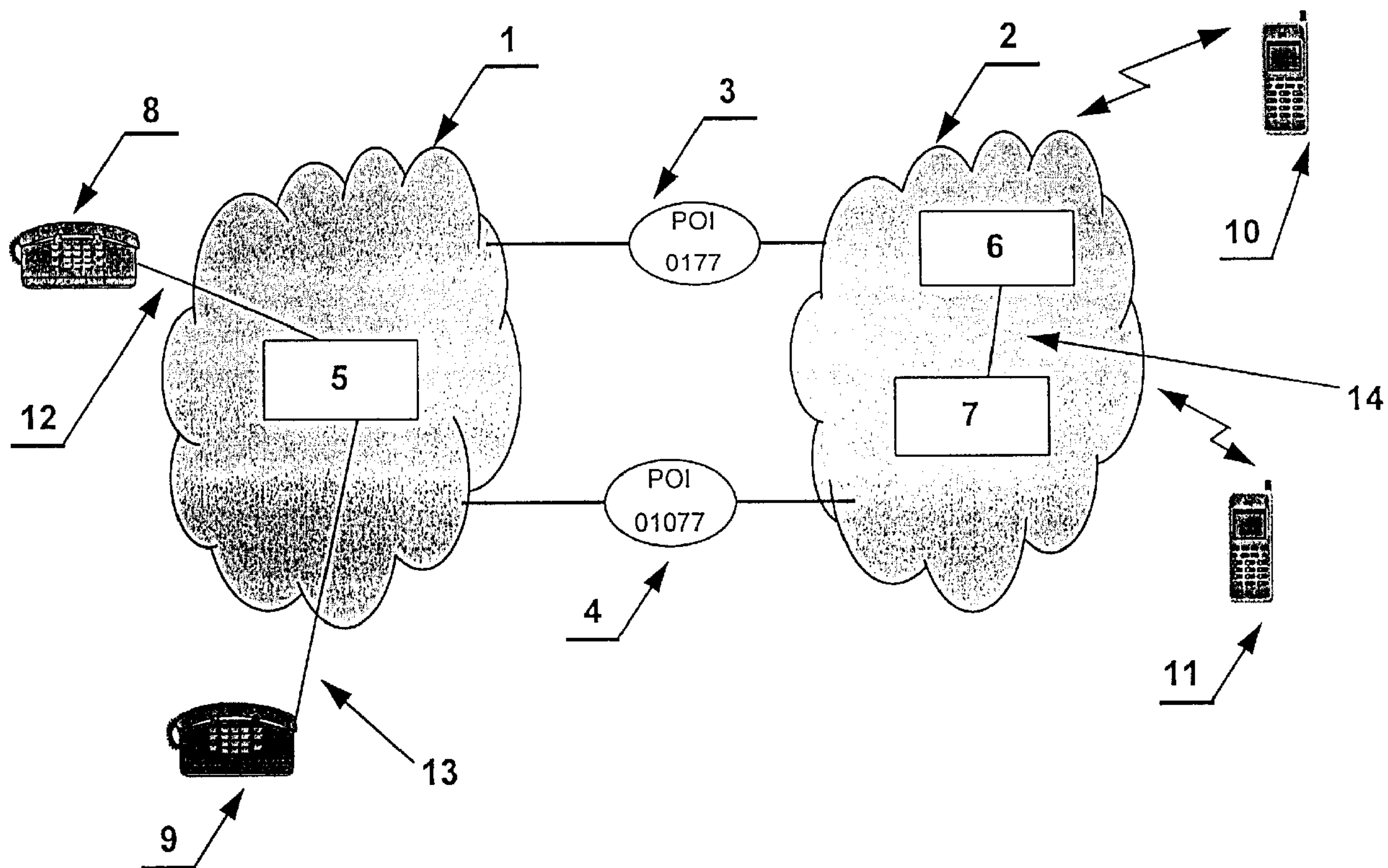


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(54) Titre : PROCEDE ET DISPOSITIF POUR LE DECOMPTE DE TAXES DANS DES RESEAUX DE
TELECOMMUNICATION

(54) Title: METHOD AND DEVICE FOR CALCULATING CHARGES IN TELECOMMUNICATIONS NETWORKS



(57) Abrégé/Abstract:

The invention relates to a method for calculating charges in fixed networks and mobile radiotelephone networks, wherein at least one point to detect charges is arranged in the mobile radio network through which the charges corresponding to the fixed network or the mobile radio network are calculated on the basis of credit accounts prepaid by the final user. Preferably, the charges for fixed networks and mobile radio networks are only calculated in the mobile radio network. Optionally, a voicemail box (VMB) can be selected by means of area code lists in the terminals.



The invention relates to a method for calculating charges in fixed networks and mobile radiotelephone networks, wherein at least one point to detect charges is arranged in the mobile radio network through which the charges corresponding to the fixed network or the mobile radio network are calculated on the basis of credit accounts prepaid by the final user. Preferably, the charges for fixed networks and mobile radio networks are only calculated in the mobile radio network. Optionally, a voicemail box (VMB) can be selected by means of area code lists in the terminals.

Method and device for calculating charges
in telecommunications networks

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The invention relates to a method for calculating charges in telecommunications networks.

Further, the invention relates to a device for executing the method according to the invention.

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Methods for calculating charges in telecommunications networks are prior-known.

The object of our own European patent application 96199 966.8, not prior-published, is a method for feeding credit or rendering-usable a telephone card for at least one cellular phone, that can be used in a mobile radio network, possibly together with a fixed telephone network, in which the telephone card is not itself fed the credit, but is fed a stipulated value
15 only in the network. The feeding of this telephone card can be performed in a services platform, for example a services platform for intelligent networks (IN), in a Service Mode such as VASS (Value Added Services System) or in the mobile exchange station (MSC). There the telephone card is fed via telephone by the customer himself over a special call number.

The non-prior published European patent application describes for this a stipulated
20 process course and also a security checking which is carried out in different testing steps. The non-prior published process occurs with the aid of a credit card which is issued in cooperation with a third party who appears as issuer.

In the non-prior-published European patent application of our own there is furthermore described a device for the execution of the process there, which comprises a mobile telephone
25 network, which cooperates if need be with a fixed telephone network, in which there are contained: NIM, MSC, HLR, VMSC, SMSC, a services platform, for example VASS, AdC with Gc-A, CSC, BSC, BTS, a credit card system (Credit Card System), and at least one Handy with a telephone card which is to be made refeedable or reusable, possibly with inclusion of a fixed network telephone.

30 Furthermore, refeedable throw-away cards were appraised as state of the art in the specification of our own above-mentioned European patent application.

From EP 0 698 987 A2 and in GB-A-2 215 897 A there are likewise described processes for making telephone cards reusable.

WO 93/03571 A relates generally to a process for the prepayment of
35 telecommunication charges.

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From DE-A-43 12 362 A1 there is prior-known a mobile radio network with a radio exchange center and a subscriber data file, by means of which incoming calls are selected of such mobile radio subscribers to which in each
5 case a credit account is allocated and with, network elements of an intelligent network by means of which the selected call are exchanged and charged.

From DE-A-44 12 727 A1 there is prior-known a device for the calculating of charges in a mobile radio
10 system. For the calculating of charges in such a mobile radio system, in which a plurality of mobile radio stations, base stations and mobile radio exchange stations are provided, the mobile radio exchange stations are connectable with a debit center. The debit center receives in each case
15 pre-fed amounts from a banking institution from which charges can be debitted. In the claiming of services by the mobile station these amounts are booked. The pre-feeding occurs with use of an intelligent network, in which the debit center is constructed as part of a service control
20 center and is connectable with transmission arrangements from a monetary institution, and in which the mobile radio exchange centers execute the functions of the service access exchange centers of the intelligent network.

DE-A-44 19 651 A1 likewise relates to a process
25 and to a device for the calculating of charges for a connection sought by a subscriber over a mobile station in a cellular mobile radio network. There, in time context with the build-up, with the existence, and with the termination of the connection basic data which relate to origin and
30 goal, type of service, beginning and end, are transferred from a mobile exchange center allocated in each case to the mobile station to a charge detection station. The charge detection station asks subscriber data from a data bank

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appropriate for the subscriber, these subscriber data containing information concerning the credit of the subscriber. In the charge detection center, during the connection charges to be debited are continuously calculated
5 from the basic data and debited from the credit.

Underlying the invention is the problem of creating a process which permits in particular the simple use of all charging possibilities of the mobile radio fixed-network account from the fixed network and the mobile radio
10 network.

Further underlying the invention is the challenge of creating a device for the implementation of the process of the invention.

According to a broad aspect of the invention there
15 is a method for calculating charges in telecommunications networks where, for joint calculation of telephone charges which are accumulating in a network interconnected with at least one fixed-line network and at least one mobile network in a telecommunications line between at least two
20 telecommunications terminal devices, the charges are debited against at least one prepaid and top up charge account in one or in several of the interconnected networks, with the respective fixed-line networks and the mobile networks being interconnected via at least one each, preferably via several
25 points of interconnection, POI, and that the connection of terminal devices in each of the interconnected networks is effected via at least one each switching center with at least one each billing center being connected in the mobile networks and/or the fixed-line networks via which the
30 charges in the interconnected networks are ascertained, and that each subscriber's terminal device communicates with one of the switching centers via a telecommunications line and

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that, for each connection, specific data of the relevant subscriber's terminal device which will be included in the billing are interrogated from a subscriber's register which, for instance, is established in the mobile network, with a
5 connection from the fixed-line network or the mobile network not covered by a credit balance being prevented by the transmission of the data to the billing center and the request for the subscriber's data from the data bank system taking place already upon the request for a line and that,
10 in case of lack of credit balance, the establishment of the required connection does not happen or that a connection to the CSC, Customer Service Center, is established, with a fixed-line or mobile network call number assigned to the subscriber being entered into a data record as a reference
15 number.

The process of the invention is based on a charging by means of rechargeable pre-paid credit accounts, in the fixed network and in the mobile radio network, and it relates to a cost-effective execution of a fixed network/mobile radio integration. This integration occurs through the assigning of one or several mobile radio numbers to one and several fixed network call numbers.

A further advantage lies in the easy handling, and, namely, both from the viewpoint of the network operator, and also from the viewpoint of the end-customer.

A special advantage lies in the possibility of self-administration of the process by the customer, therefore, for example, in the rechargeability of his account and in the use of the service centers called upon. The allocation of the mobile radio and fixed network numbers, there, can be subjected to various allocation profiles time-wise and geographically conditioned by the mobility of the subscriber, therefore can be different according to place, time, and claimed end part. According to the invention, the call number allocation, and therewith the allocation profiles, can be altered and changed by the customer.

The telecommunication apparatuses do not need to be in the same telecommunication network in order to utilize the advantages of the telecommunication connections according to the invention, with which it must be a matter of at least two telecommunication apparatuses which are bound in each case in one telecommunication network and have at their disposal a connection to the particular communicating unit of the telecommunication network.

Insofar as in the application documents the term "telecommunication end apparatuses" is used, there are meant thereby commercially usual fixed network telephones, telefax apparatuses, mobile radio apparatuses, etc., as well as combinations of these end apparatuses.

By a telecommunication connection, there, is meant there a message connection between at least two points, which can be achieved both over a cable connection such as television cables, local cables, subscriber cables, district cables, garden cables, CATV cables, or over a cableless connection such as GSM 900, GSM 18000, DECT, CTS, radio relay connections, acoustic or optical signal transmission, or via a combination of these message connections.

Within this network interconnection, according to the invention, there is arranged at least one charge-detection station in the mobile radio network, and same is connected with the exchange center via a telecommunication connection.

In principle there suffices there the linking of a fixed network and of a mobile radio network over one, preferably over a large number of network connection points. It is also possible there to link the different networks with one another via network connection points in such manner that there occurs an integration of the network connecting points for all the traffic

flows coming in question.

Each subscriber end apparatus communicates there with an exchange center over one of the above-described telecommunication connections.

The fixed network may consist of one, two, or of a number of local networks which
5 are coupled over a trunk connection.

For each connection, data are inquired from a subscriber register which is deposited in the mobile radio network, which data are relevant for the calculation of charges. It is possible with the aid of the process of the invention to use different charge models for different subscribers or groups of subscribers.

10 A connection out of the fixed network or the mobile radio network that is not covered by a credit can be prevented with the process of the invention in a simple manner by the means that transmission of the data to the charge detection center and the request for the subscriber data from the data bank occur already when a connection is requested and that in the absence of credit, the setting up of the requested connection is omitted, or that a
15 connection to the CSC (Customer Service Center) is established.

The process of the invention can be applied alternatively to conventional charge determinations. Thus, for example, the network operator can give the individual subscribers the choice as to by which process the charges are to be handled. The process of the invention has, furthermore, the advantage that it uses essentially the structures of the existing mobile
20 radio networks and of the fixed networks, and it requires only a slight additional expenditure.

Further, the process of the invention offers to every user of a subscriber network the free choice of a lasting presetting or also of an individual case. Each subscriber communication end apparatus that wants to establish a connection to a connection in another subscriber network, can carry this out with the aid of a connection network operator
25 identification number, for example 01077.

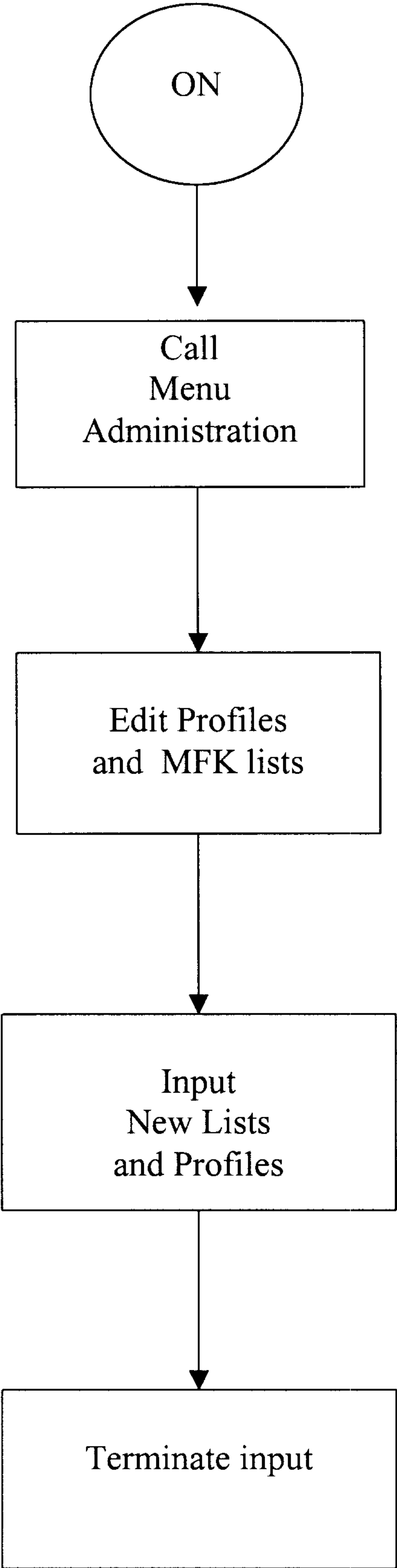
In case a subscriber changes location, then the preselection lists and the appertaining profiles are, under some circumstances, no longer optimally fitting for a connection build-up from the new locality. The invention, therefore, provides that in the case of a location change or in the case of the first utilization with a telecommunication end apparatus executed in this
30 manner, a report is issued to the mobile radio network. This report contains all the important data to make it possible to sent the incoming calls correctly to the subscriber. Thus, for example, it can be established with the aid of the CLI where the subscriber is located at the time this report is made. The information can be used to recheck the data sets in the data bank, and, if necessary, to calculate new preselection lists for the end apparatus.

If the subscriber should already have stopped at this location and have stored profiles that must be used as a basis for telephone traffic from the new location, then by automatic detection and adaptation an optimal constellation is created, from which the customer can again, without more expenditure, automatically build up the most favorable connection.

The self-administration can be represented as follows:

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The invention is suited especially for the use of an integrated telecommunication apparatus, such as, for example, a DECT-GSM Dual Mode end apparatus. A connection between end apparatuses can be established via different
5 paths. There in each case other connecting networks are involved. The processes and devices proposed here provide an automatic selection of the most favorable constellation of the networks involved for the customer at the time of the conversation build-up and the networks involved in this
10 connection. For this the preselection numbers of the possible VNB are downloaded into the end apparatus of the customer and stored. According to an algorithm, in the input of the preselection, there is sought the most favorable VNB correspondingly for this connection and the
15 connection for this is formed with the desired target address to the target subscriber network.

According to another broad aspect of the invention there is provided a device for putting into practice the aforesaid method, where, for joint calculation of telephone
20 charges which are accumulating in a telecommunications connection between at least two telecommunications terminal devices in a network interconnected with at least one fixed-line network and at least one mobile network the charges can be debited against at least one prepaid top-up charge
25 account in one or in several of the interconnected networks, with the respective fixed-line networks and the mobile networks being interconnective via at least one each, preferably via several points of interconnection, POI, and that the connection of terminal devices in each of the
30 interconnected networks can be made via at least one each switching center, with at least one each automatic message accounting point being placed in the mobile networks or the fixed-line networks via which the charges in the

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interconnected networks can be ascertained, and that each terminal device communicates with one of the switching centers via a telecommunications line; wherein for each connection specific data of the relevant subscriber's terminal device which can be included in the billing can be interrogated from a subscriber's register which, for instance, is established in the mobile network, and a connection from the fixed-line network or the mobile network not covered by a credit balance can be prevented by the transmission of the data to the automatic message accounting point and the request for the subscriber's data from the data bank system taking place already upon the request for a line and that, in case of lack of credit balance, the establishment of the required connection does not happen or that a connection to the CSC, Customer Service Center, can be established, permitting a fixed-line or mobile network call number assigned to the subscriber to be entered into a data record as a reference number.

According to yet another aspect, the invention provides for a method for calculating charges in telecommunication networks, the method comprising: calculating together telephone charges that accrue in a network concatenated from at least one fixed network and from at least one mobile radio network in a telecommunication connection between at least two telecommunication end apparatuses, debiting charges from at least one prepaid and rechargeable charge account in one or in several of the networks, linked with one another, linking fixed networks and respective mobile radio networks with one another over in each case at least one, preferably over several network connection points (POI), wherein connection of subscriber end apparatuses in each of the networks is carried out in each of the networks linked with one another

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over in each case at least one exchange center, engaging at least one of the mobile radio networks and the fixed networks with at least one charge detection station, over which the charges in the linked networks are detected, each
5 subscriber end apparatus communicating with one of the exchange centers over a telecommunication connection, wherein for each connection, from a subscriber register which is included in the mobile radio network, determining specific data of the subscriber end apparatus which are
10 included in the charge calculation in which, from the fixed network or from the mobile radio network which is not covered, preventing a credit by transmitting the data to the charge detection station, and by requesting subscriber data from a data bank initially upon a request for a connection,
15 and if credit is lacking, performing at least one of omitting a building-up of a requested connection and establishing a connection to a CSC (Customer Service Center), in which case a fixed-network or mobile radio call number is registered as a reference number in a data set;
20 and wherein call number allocation as well as allocation profiles are administered in a network-overlapping fashion by a subscriber via self-administration, in which, for purposes of self-administration, there is set by the subscriber, for every subscriber, a data set which links one
25 or more mobile radio call numbers with one or more fixed network call numbers, in which the call numbers are stored in lists and altered, activated and deactivated by the subscriber from the fixed network or from the mobile-radio network in each case from a telecommunication arrangement of
30 the subscriber or from a foreign telecommunication arrangement.

The invention is suited especially for the use of an integrated telecommunication end apparatus, such as, for

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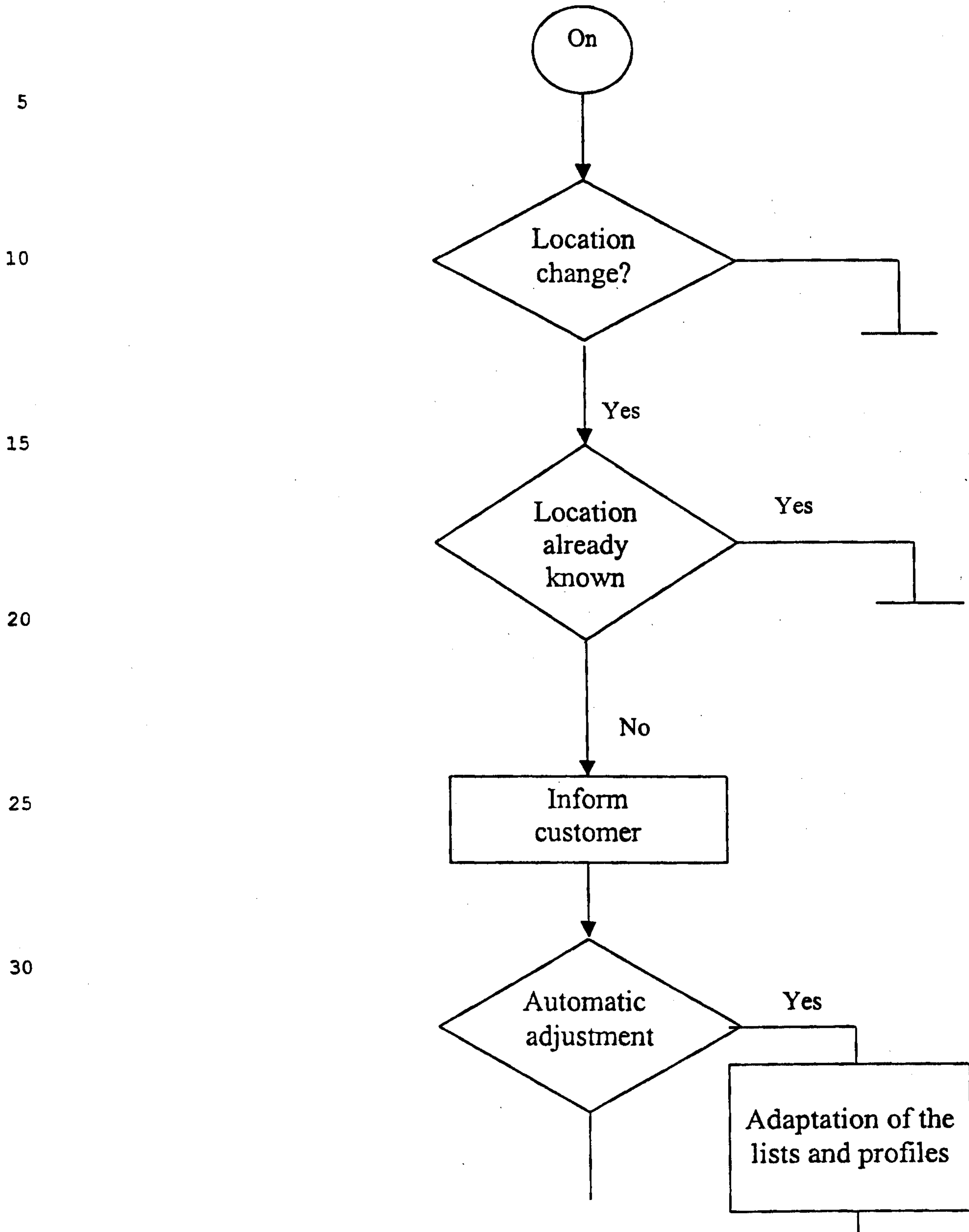
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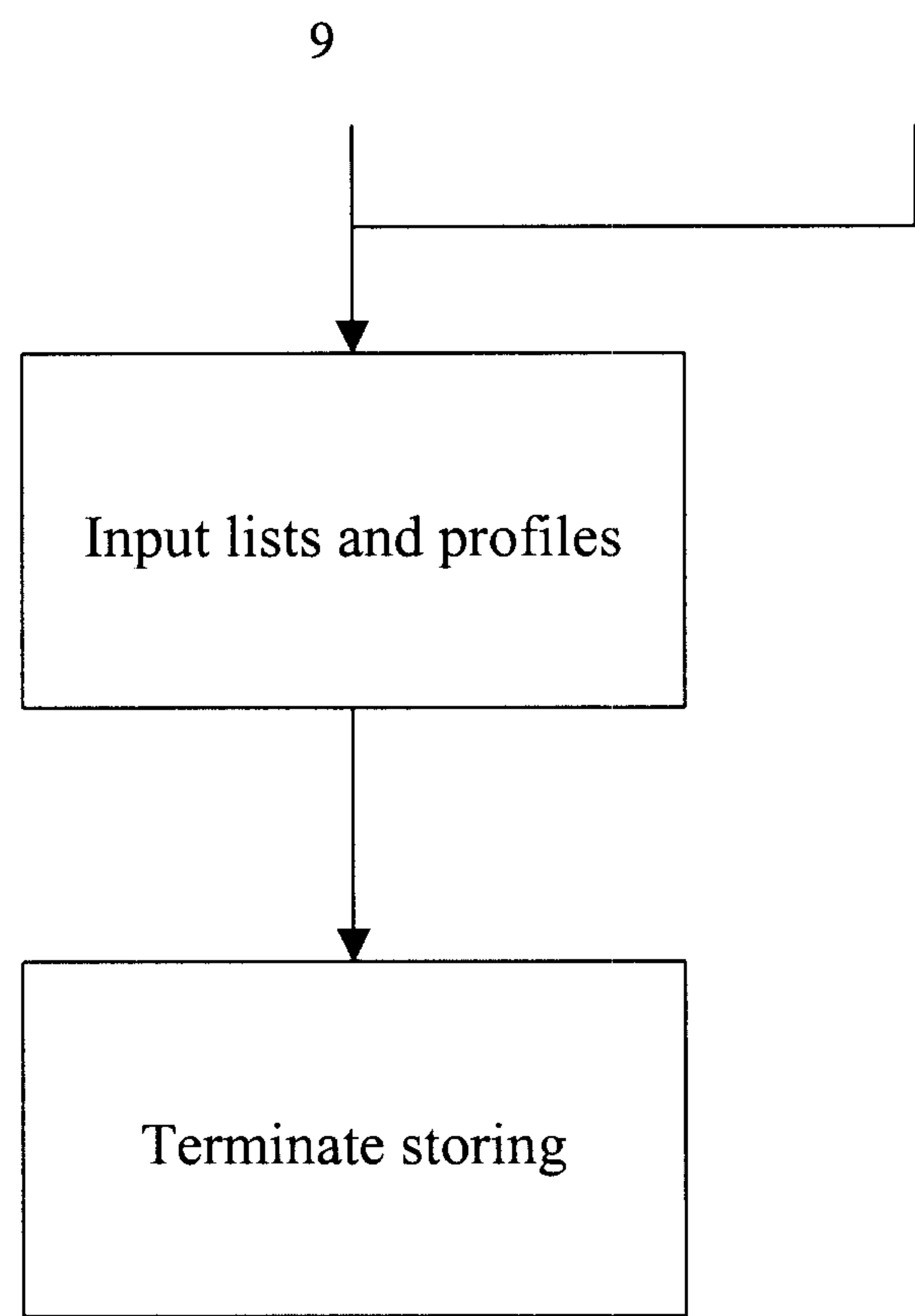
example, a DECT-GSM Dual-Mode end apparatus. A connection between end apparatuses can be established over different paths. There, in each case, other connecting networks are involved.

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The mobility can be represented as follows:





For the downloading of the preselection numbers for the telecommunication transmitting apparatuses there is provided, according to the invention, a data bank which can be implanted into one or several networks or network parts. Further, a computer must access this data bank if necessary and send the corresponding data to the subscriber over suitable transmission paths and thus actualize the data sets in the end apparatus. The transmission is possible, for example, via signaling systems such as SMA, USSD, via data channels such as 9.6 kbit/s etc., as well as via DTMF tones. A precondition for this is that the end apparatus is conceived in such manner that an operation is possible both over the TNB network, and also over the VNB network. Such end apparatuses are already known and are designated as dual-mode end apparatuses or as multi-mode end apparatuses.

In the drawing the invention is illustrated with the aid of examples of execution-in-part schematically. In the drawing:

Fig. 1 shows a fixed network linked with a mobile radio network, in schematic representation,

Fig. 2 a drawing similar to Fig. 1, to be sure with two fixed networks constructed as local networks, which are coupled over a trunk connection and which on their part are integrated with a mobile radio network via a telecommunication connection constructed as a message connection;

Fig. 3 a detail from a network;

Fig. 4 the use of integrated telecommunication end apparatuses;

Fig. 5 the use of end apparatuses in the case of geographic relocation with use both in a TNB network as well as also in a VNB network and

Fig. 6 the location change of a subscriber.

In the form of execution according to Fig. 1 there is designated with the reference number 1 an only schematically indicated fixed network, while 2 represents a mobile radio network.

The fixed network 1 and the mobile radio network 2 are linked with one another in the form of execution represented over two network connections 3 and 4. These network connections are also designated with POI = Point of Interconnection. The fixed network 1 and the mobile radio network 2 can, of course, be connected over a large number of such POIs, so that the different networks are linked with one another over POIs, so that there occurs an integration of the network connecting points for all traffic flows coming in question.

In the interest of clearer representation, in Fig. 1 for the fixed network 1 and for the mobile radio network 2 there is represented in each case only one exchange center 5 or 6, respectively.

5 The mobile radio network 2 has at its disposal, further, a charge detection station 7 for the execution of the process according to the invention.

Each subscriber end apparatus 8 or 9, respectively, of the fixed network 1, or 10 or 11 of the mobile radio network 2, communicates with one of the exchange centers 5 or 6 via a telecommunication connection 12 or 13, or on the radio path.

10 The charge detection unit 7 in the mobile radio network 2 is connected via a telecommunication connection 14 with the exchange center 6.

In the form of execution according to Fig. 2 the same reference numbers are used for parts of the same function. The fixed network consists in this case of the two local networks 1a and 1b, which are coupled over a trunk connection 15.

15 The local networks 1a and 1b can have different location preselections. 2, the local network 1a is coupled with the mobile radio network 2 by the network connections 3a and 3b, respectively, and the local network 1b is coupled by means of the network connections 4a and 4b, respectively. For this reason there are represented altogether four POIs in Fig. 2. obviously also in this case the number of POIs can be considerably greater than is evident from Fig. 2.

20 The local networks 1a and 1b have exchange centers 5a and 5b, respectively, while the mobile radio network 2 has two exchange centers 6a and 6b, respectively, which are coupled with one another by a telecommunication connection 16. Instead of in each case two network connections 5a, 5b or 6a, 6b, the number of these network connection centers can also be smaller or considerably greater than represented.

25 From Fig. 2 it is further to be perceived that to the network connection center 6a of the mobile network 2 there is allocated a charge detection station 7, which again stands in connection over a telecommunication connection 14 with the allocated exchange center 6a. Obviously the number of charge detection stations can be greater than represented. For example, it is possible to assign such a charge detection station also to the exchange center 30 6b.

From Fig. 2 it is to be learned that the mobile radio network 2 represents a connecting network, since in the represented form of execution it connects two telecommunication end apparatuses 10 and 11, if need be of course also a large number of telecommunication end

apparatuses which in each case are connected to one of the subscriber networks. Each user of a telecommunication network has the opportunity to select the connection network operator over a lasting presetting or, in the individual case, also to select it freely.

Each subscriber communication end apparatus, 8, 9 or 10, 11, which wants to build up
5 a connection to another subscriber network, can carry this out with the aid of a connection network operator identification number, for example 01077, (Fig. 2), while this connection network operator identification in the form of execution for example according to Fig. 1 is 0177.

For each connection data are asked from a subscriber register that is implanted in the
10 mobile radio network 2, which data are relevant for the charge calculation in the charge detection station 7. With the aid of the process of the invention it is possible to use different charge models as a basis for different subscribers or subscriber groups.

The self-administration already described at the outset allows the customer to change the allocation of the mobile radio or fixed network numbers over time and/or geographically,
15 as conditioned by the mobility of the subscriber. There, both the call number allocation and also the allocation profiles can be changed and controlled by the customer. For this purpose there is allocated to each customer a data set which links one or more mobile radio call numbers with one or more fixed network call numbers. Moreover, a fixed network or mobile radio call number assigned to the subscriber is registered as reference number. In this manner
20 it is achieved that several call numbers from the mobile radio network 2 and from the fixed network 1 can use a common rechargeable credit account for prepaid telecommunication connections which is governed in the charge detection station 7. The call numbers can be stored in lists and can be altered, activated and deactivated at any time by the customer himself from the fixed network 1 or from the mobile radio network 2 in each case from his own or
25 from a foreign telecommunication arrangement. There the administration of these data can also be done from the fixed network 1 over a cost-free mobile radio number and/or over a corresponding service number. The customer's authorization can occur over CLI and/or over a personal secret number (PIN).

Fig. 3 shows in schematic representation the linking of a fixed network 1 to the data
30 administration or to the charge calculation.

In Fig. 4 there is illustrated the use of an integrated telecommunication apparatus such as, for example, a DECT-GSM Dual-Mode end apparatus. In Fig. 4 three such telecommunication transmitting apparatuses are represented and marked with the letters A, B and C.

The end apparatus A is connected to a subscriber network TNB1, end apparatus B is connected to a subscriber network TNB2 and end apparatus C to a subscriber network TNB3. These subscriber networks TNB1, TNB2 and TNB3 are linked with one another, for example, over exchange network operators VNH1, VNB2 and VNB3. Here it can be a matter of fixed
5 networks constructed as local networks and/or of mobile radio networks.

A connection between the end apparatus A and the end apparatus B or the end apparatus C can occur in various ways. There in each case other connection networks are involved. The process proposed here provides an automatic selection of the most favorable constellation of the networks involved at the time of the conversation build-up for the customer
10 and for the networks involved in this connection. For this the preselection numbers of the possible VNB are downloaded and stored into the end apparatus of the customer. By an algorithm in the input of the preselection the VNB most favorable for this connection is correspondingly sought and the connection is forwarded to this with the desired target address with the target subscriber network.

For the downloading of the preselection numbers for the subscriber communication
15 apparatuses A, B and C there is provided according to the invention a data bank system which can be implanted in one or several networks or network parts. Further, a computer must, if necessary, access this data bank and send the corresponding data to the subscriber over suitable transmission paths and in this way actualize the data sets in the end apparatus A,
20 B or C. The transmission is possible, for example, over signaling systems such as SMS, USSD, over data channels such as 9.6 kbit/s etc., as well as over DTMF-tones (Fig. 5). A precondition for this is that the end apparatus A, B or C is conceived in such manner that operating it is possible both over the TNB network and also over the VNB network. Such end apparatuses are already known and are designated as Dual-Mode end apparatuses or
25 Multi-Mode end apparatuses.

In Fig. 6 the location change of a subscriber is schematically represented. The subscriber A, originally arranged in TNB1, changes his location and is therewith supplied in TNB2.

Subscriber B is still arranged in TNB2.

30 The above-mentioned preselection lists and the allocation profiles belonging to them are no longer optimally adjusted for a connection build-up from the new locality. The invention, therefore, provides the following process.

First of all in the case of a location change with a telecommunication apparatus executed in this manner a report occurs to the mobile radio network. This report contains all the important data to make it possible to deliver incoming calls to the subscriber, in the present case A. Thus, for example, with the aid of the CLI it can be established where the subscriber is located at the time the report is made. The information can be used to recheck the data sets in the data bank and, if need be, to calculate new preselection lists for the end apparatus A. If the subscriber A should already have stopped in this location and have stored allocation profiles that must be used as the basis for telephone traffic from the new location, then by automatic detection and adaptation an optimal constellation is created, from which the end subscriber A can again build up the most favorable connection without more expenditure. The features to be seen described in the abstract, in, the patent claims, and in the specification, as well apparent from the drawing can be used both individually and also in arbitrary combinations for the accomplishment of the invention.

List of reference numbers
List of abbreviations

	1	Fixed network, local network
5	1a	" , "
	1b	" , "
	2	Mobile radio network
10	3	Network connection
	3a	" "
	3b	" "
	4	" "
15	4a	" "
	4b	" "
	5	Exchange center 5a " "
	5b	" "
20	6	" "
	6a	" "
	6b	" "
25	7	Charge detection station
	8	Subscriber end apparatus
	9	" "
30	10	" "
	11	" "
35	12	Communication connection, Telecommunication connection

13 " " " "

14 " " "

5

15 Trunk connection

16 Telecommunication connection

10 A Telecommunication end apparatus

B " " "

C " " "

TNBI Subscriber network

15

TNB2 " "

TNB3 " "

VNB1 Exchange network operator

VNB2 " " "

20

VNB3 " " "

AB Call answerer

ACD Automatic Call Distribution

25

A-CLI ...

AdC Administration Center

AdC-Command ...

AdC-Command Interface ...

av average

30

BH Busy Hour

BHCA Busy Hour Call Attempts

BSC Base Station Controller

BTS Base transceiver Station

35

TRANSLATION

	Call record type	...
	Call Ticket	...
	CASS	Customer Administration and Services System
	CATV-Kabel	CATV Cable
5	CC	Credit Card
	CCard	Credit Card
	Central Memory Tree	
	Selection Analysis	...
10	CF	Call Forwarding
	CF-Leg	...
	CF-Fall	...
	CDR	Call Data Record
	CLI	Calling Line Identity
15	CLIP	Calling Line Identification Presentation
	CLIR	Calling Line Identification Restriction
	cpc	calling party Category
	cpc ordinary	...
	Credit Card System	Credit card system
20	CSC	Customer Service Center
	DAT-Tape	Digital Audio Tape
	DECT	...
	DTMF	Dual Tone Multi Frequency
25	dummy Ansage	Dummy announcement
	EGN	Individual conversation proof
	EoY	End of Year
	E-Plus Subscription	...
30	EPM	E-Plus mobile radio
	EPS	E-Plus Service
	Erl	Erlang (sic)
	ExpDate	Expiry Date
35	Forwarding indicators	...
	Forwarding-Leg B-C	...
	TRANSLATION	

	Fraud	...
	ftam	file transfer access and management
	ftp	file transfer protocol
5	GC	Green Card=Rechargeable telephone card Proper name
	GC-WA	Green Card - Workaround
	GICC	German ISO-8583 Credit Card
	GSM	Group Special Mobile
	GZS	Association for payment systems
10	HLR	Home Location Register
	HLR barred	...
	Hotline	...
	HP01	Computer for Application Workaround
15	ID	Identification
	IMSI	International Mobile Subscriber Identity
	IN	Intelligent Network
	IP	Intelligent Peripheral
20	ISDN	...
	IVR	Interactive Voice Response
	LAN	Local Area Network
25	MAIS	Marketing Information system
	MAP	Mobile Application Part
	MO	Mobile Originated
	MOC	Mobile Originated Call
	MSC	Mobile Switching Center
30	MSC-CDR	...
	MSISDN	Mobile Subscriber ISDN
	MTC	...
	NIM	Network Interface Manager
35	NO	Network Operator

TRANSLATION

	OCCF	Operator Controlled Call Forwarding
	Offset	...
	OMC	operation and Maintenance Center
5	OMC-LAN	...
	ordinary subscriber	...
	overflow or night	...
	transfer announcement	...
10		
	Payphone	...
	pcs	pieces
	PIN	Personal Identification Number
	PLZ	Zip code
15	PoS	Point of Sale
	Posting date	...
	Premium Rate Number	...
	PSTN	Public Switched Telephone Network
	PUK	Personal Unblocking Key (associated to
20		the SIM card)
	Queuing	...
	SAP	Standard Applications Programs
	sec	second
25	SecNo	Security Number
	SIM	Subscriber Identity Module
	SMS	...
	SMSC	Short Message Service Center
	SMT	Short Message Terminated

TRANSLATION

	SP	Service Provider
	SS7	Signalling System No. 7
	Spec.	Specification
	Subscriber data	...
5	SubState	Subscription State
	tbd	...
	TC	Tariff Class
	TC=62	...
	TCP/IP	Transmission Control Protocol/Internet Protocol
10	Timeguard	...
	TM	Tariff Model
	TN, Tln.	Subscriber
	USSD	...
15	VANG	Verbal Announcement Generator
	VASS	Value Added Services System
	VASS barred	...
20	WA	Workaround (of the AdC)
	VMB	Voicemail Box
	VMS	Voicemail System
	VMSC	Voicemail Service Center
25	Voucher	...
	Voucher data	...
	TRANSLATION	

VU Sales support (department)

WA Workaround

17799+GC-Rufnummer 17799+GC call number

5 Bibliography

10 EP 0 698 987 (patent family: ZA 95 06 867) European patent
application 96 119 966.8

GB-A 2 215 897

15 WO 93/03571 (patent family: US-PS 5,265,155
AU 2 417 792
US-PS 5,440,621)

20 DE-OS 43 12 362 (patent family: EP 0 630 165
US-PS 5,592,535)

DE-OS 44 12 727

DE-OS 44 19 651

TRANSLATION

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CLAIMS:

1. A method for calculating charges in telecommunication networks, the method comprising: calculating together telephone charges that accrue in a network concatenated from at least one fixed network and from at least one mobile radio network in a telecommunication connection between at least two telecommunication end apparatuses, debiting charges from at least one prepaid and rechargeable charge account in one or in several of the networks, linked with one another, linking fixed networks and respective mobile radio networks with one another over in each case at least one, preferably over several network connection points (POI), wherein connection of subscriber end apparatuses in each of the networks is carried out in each of the networks linked with one another over in each case at least one exchange center, engaging at least one of the mobile radio networks and the fixed networks with at least one charge detection station, over which the charges in the linked networks are detected, each subscriber end apparatus communicating with one of the exchange centers over a telecommunication connection, wherein for each connection, from a subscriber register which is included in the mobile radio network, determining specific data of the subscriber end apparatus which are included in the charge calculation in which, from the fixed network or from the mobile radio network which is not covered, preventing a credit by transmitting the data to the charge detection station, and by requesting subscriber data from a data bank initially upon a request for a connection, and if credit is lacking, performing at least one of omitting a building-up of a requested connection and establishing a connection to a CSC (Customer Service Center), in which case a fixed-network or mobile radio call

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number is registered as a reference number in a data set;
and

wherein call number allocation as well as
allocation profiles are administered in a network-
5 overlapping fashion by a subscriber via self-administration,
in which, for purposes of self-administration, there is set
by the subscriber, for every subscriber, a data set which
links one or more mobile radio call numbers with one or more
fixed network call numbers, in which the call numbers are
10 stored in lists and altered, activated and deactivated by
the subscriber from the fixed network or from the mobile-
radio network in each case from a telecommunication
arrangement of the subscriber or from a foreign
telecommunication arrangement.

15 2. A method according to claim 1, further including
allocating at least one of the mobile-radio and fixed
network numbers to different allocation profiles conditioned
in at least one of time and geographically by a mobility of
the subscriber.

20 3. A method according to claim 1 or 2, characterized
in that a user of an end apparatus selects the connection
network operator (VNB) over a permanent presetting freely
and flexibly, in which each telecommunication end apparatus
that wants to build up a connection for a connection in
25 another subscriber network carries this out with the aid of
a connection network operator identification number.

4. A method according to claim 1 or 2, wherein
several call numbers from the mobile-network and from the
fixed network use a common, rechargeable credit account for
30 prepaid telecommunication connections.

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5. A method according to claim 1 or 2, wherein the administration of the data takes place over at least one of a cost-free mobile radio number and over a corresponding service number from the fixed network, while the authentication of the subscriber occurs over at least one of a CLI and a personal secret number.

6. A method according to claim 1 or 2, wherein for the charging of the mobile-radio network the following process steps are carried out:

10 a. for the charging of the mobile radio-fixed network account (MFK) the subscriber selects from his end apparatus a separate cost-free service number, said end apparatus comprising a cellular phone; thereby a connection is established to the corresponding system;

15 b. the subscriber selects per menu the point "charging via credit card";

c. the system informs the subscriber that he will carry out a charging up a certain amount so that the announcement can be flexibly formed;

20 d. if through the actual charging exceeds of the maximal credit limit of the MFK to be charged, then the charge, if need be, is rejected;

e. the identification of the caller occurs over MSISDN, and the subscriber must give his secret number;

25 f. the subscriber makes the following inputs:

credit card number

expiration date of the credit card

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g. the system checks the allocation MSISDN and the credit card number;

h. if the checking is successful, the system switches into an authorization inquiry to the blocking data file; the blocking data file is brought up to date every day;

i. if the subscriber is not listed in the blocking data file, the charge detection station receives a clearance for the charging;

10 j. the system transfers the amount to the account of the rechargeable MFK of the subscriber;

k. as soon as the last input digit has been correctly input, the charging holds as conclusively initiated by the subscriber; the subscriber receives at the end of the conversation or later a report as to whether the charging was successful or not.

7. A method according to claim 1 or 2, wherein for the security check by the system the following process steps are carried out:

20 a) charging only from the cellular phone using identification of the telephone number via MSISDN;

b) input of the secret number;

c) checking of the allocation MSISDN and credit card number;

25 d) authorization online over the blocking data file.

8. A method according to claim 1 or 2, wherein an automatic selection of the connection is carried out at the

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time of the conversation build-up for the subscriber, and for the networks involved in this connection for the purpose of achieving the most favorable constellation, in such manner that the preselection numbers of the possible VNB are
5 downloaded into the end apparatus of the subscriber and stored, wherein according to an algorithm, in the input of the preselection the most favorable VNB is correspondingly sought for this connection and the connection to this is forwarded with the desired target address to the desired
10 target subscriber network.

9. A method according to claim 1 or 2, wherein for the charging of the fixed network the following process steps are carried out:

a. for the charging of the mobile radio-fixed
15 network account (MFK) the subscriber selects from his end apparatus a separate, charge-free service number, said end apparatus comprising a fixed network telephone; thereby a connection is established to the corresponding system;

b. the subscriber selects per menu the point
20 "Charging via credit card";

c. the system informs the subscriber that he will carry out his charging up a certain amount so that the announcement can be flexibly formed;

d. if through the actual charging there occurs an
25 exceeding of the maximal credit limit of the MFK to be charged, then if need be, the charging is rejected;

e. the identification of the caller occurs over MSISDN, and the subscriber must give his secret number;

f. the subscriber makes the following inputs:

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credit card number

expiration date of the credit card

g. the system checks the allocation MSISDN and the credit card number;

5 h. if the checking is successful, the system switches into an authorization inquiry with the blocking data file; the blocking data file is brought up to date every day;

10 i. if the subscriber is not listed in the blocking data file, the charge detection station receives a clearance for the charging;

15 j. the system transfers the amount to the account of the rechargeable MFK of the subscriber; as soon as the last input digit has been correctly input, the charge holds as conclusively initiated by the subscriber; the subscriber receives at the end of the conversation or later a report as to whether the charging was successful or not.

10. A method according to claim 1 or 2, wherein the at least one mobile-radio and one fixed network, essentially
20 contain at least two telephone communication end apparatuses which are allocated to the telecommunication networks, with at least one exchange center in the fixed network-mobile radio integration, at least one, preferably several network connection points (POI) between fixed network and mobile
25 radio network, at least one charge detection station in one of the networks coupled with one another, in which for the particular subscriber an account rechargeable by said subscriber is administered, in which each subscriber end apparatus communicates with an exchange center over a
30 telecommunication connection.

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11. A method according to claim 10, wherein at least one of the fixed network and the mobile radio network include two or more local networks, in which both the fixed networks and also the mobile radio networks are coupled with one another in each case by several network connection points (POI) and in at least the mobile radio network there is arranged a charge detection station which is connected to an exchange station.

12. A method according to claim 10 wherein the mobile radio network and the fixed network which are linked with one another, contain essentially NIM, MSC, HLR, VMSC, SMCSC, a service platform, including a Service Mode, AdC with GcWA, CSC, BSC, BTS, Credit Card System and at least one cellular phone which is provided without or with rechargeable or reusable telephone card.

SMART & BIGGAR
OTTAWA, CANADA
PATENT AGENTS

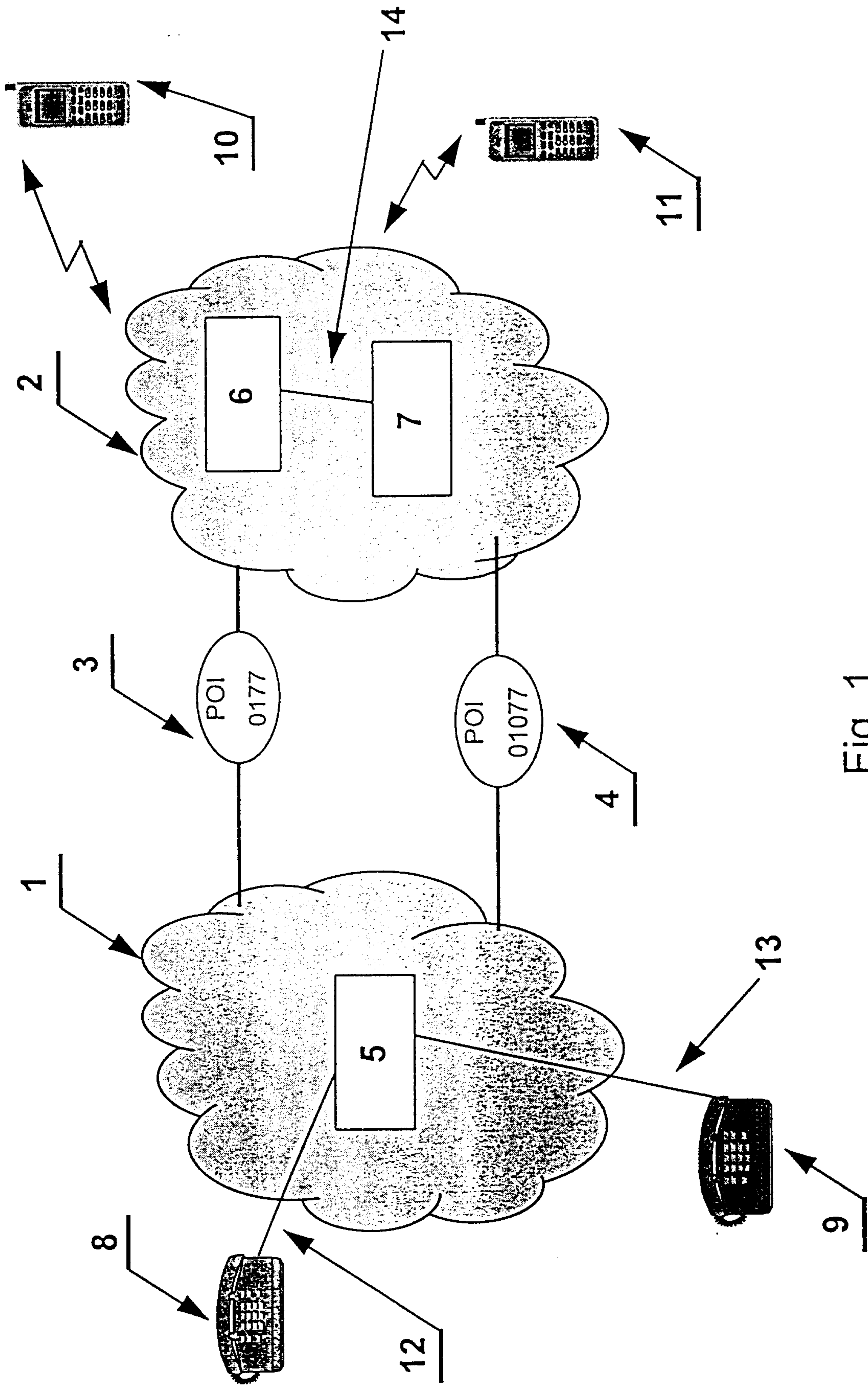


Fig. 1

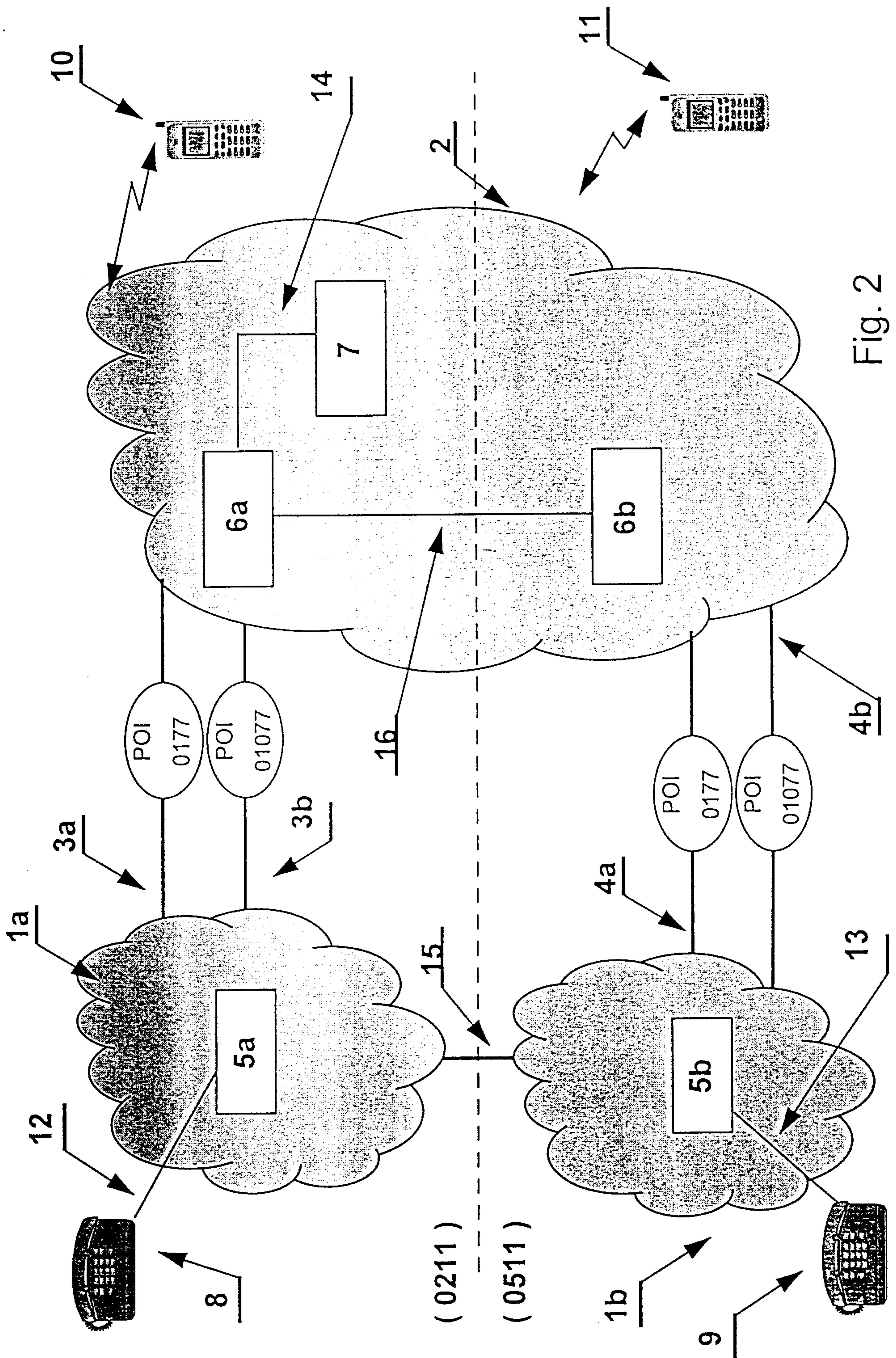


Fig. 2

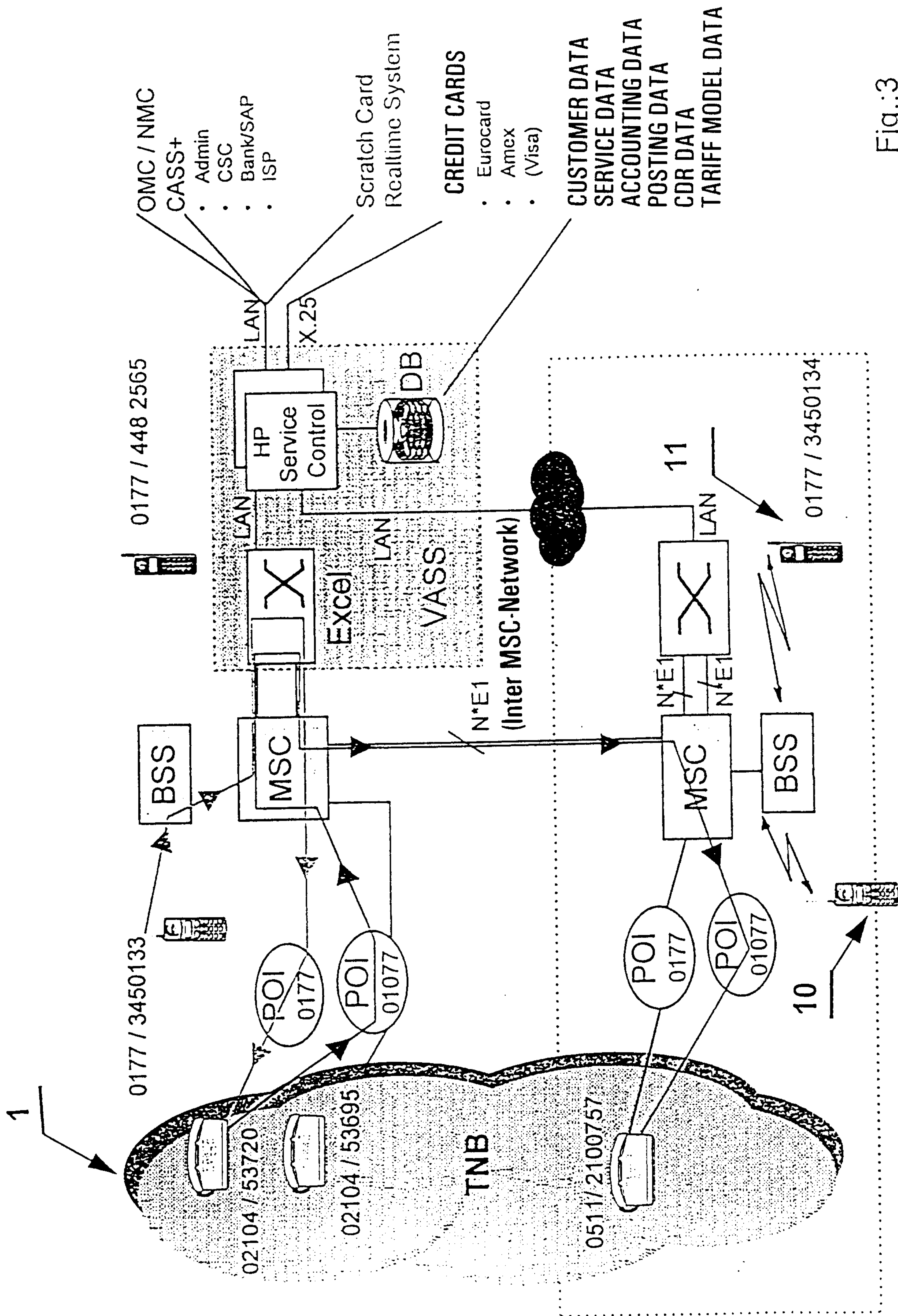


Fig.:3

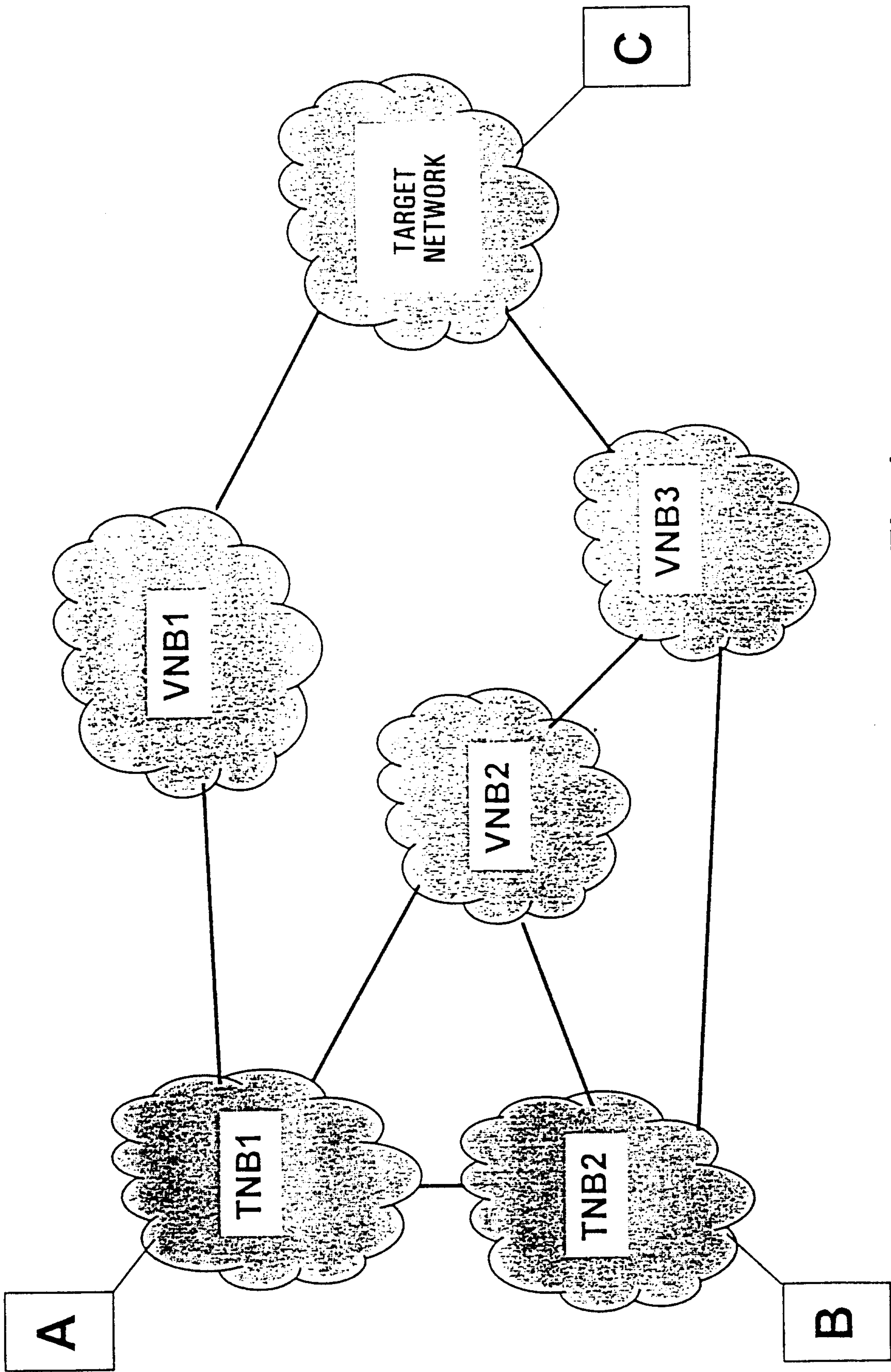


Fig.4

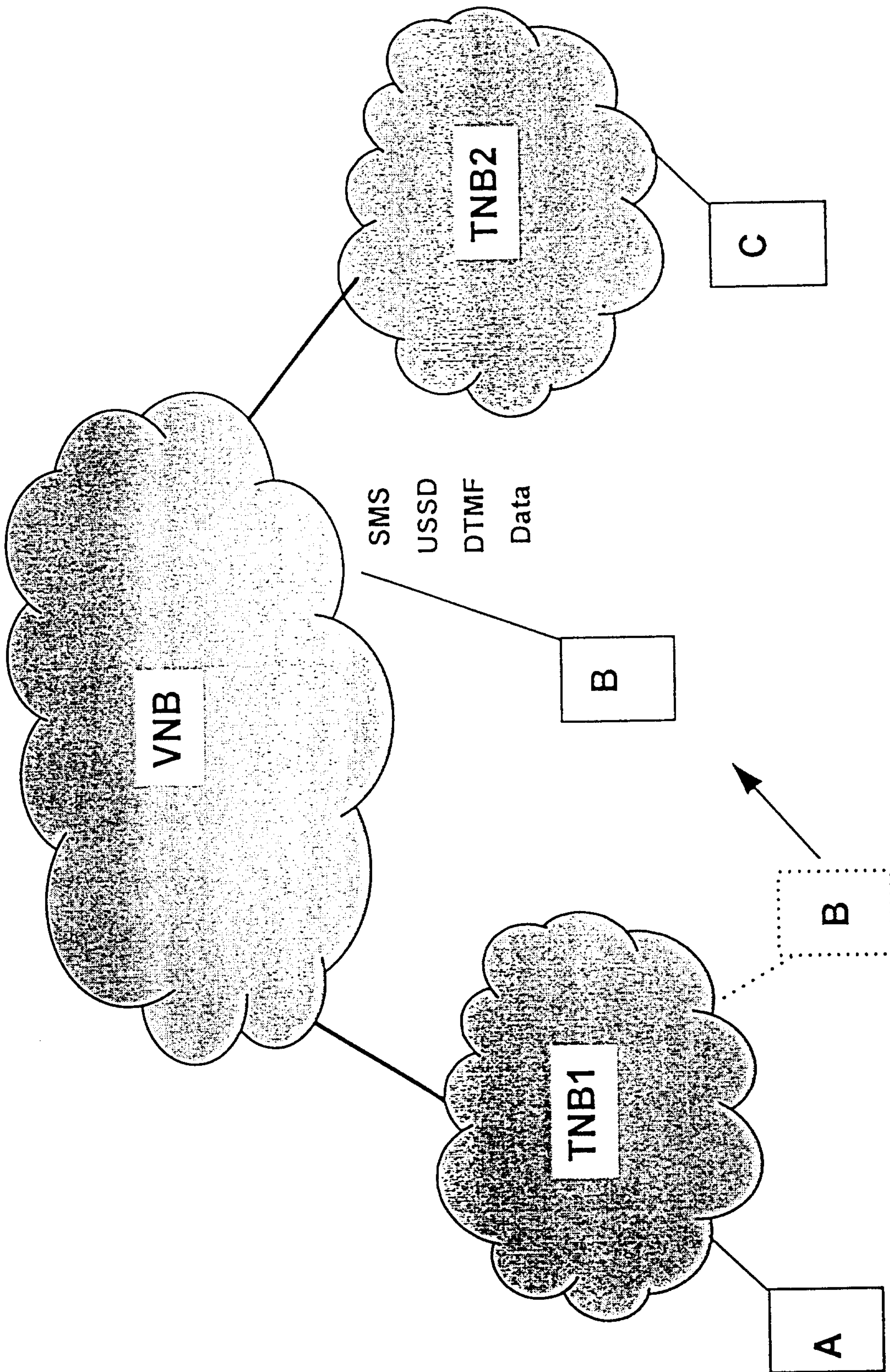


Fig. 5

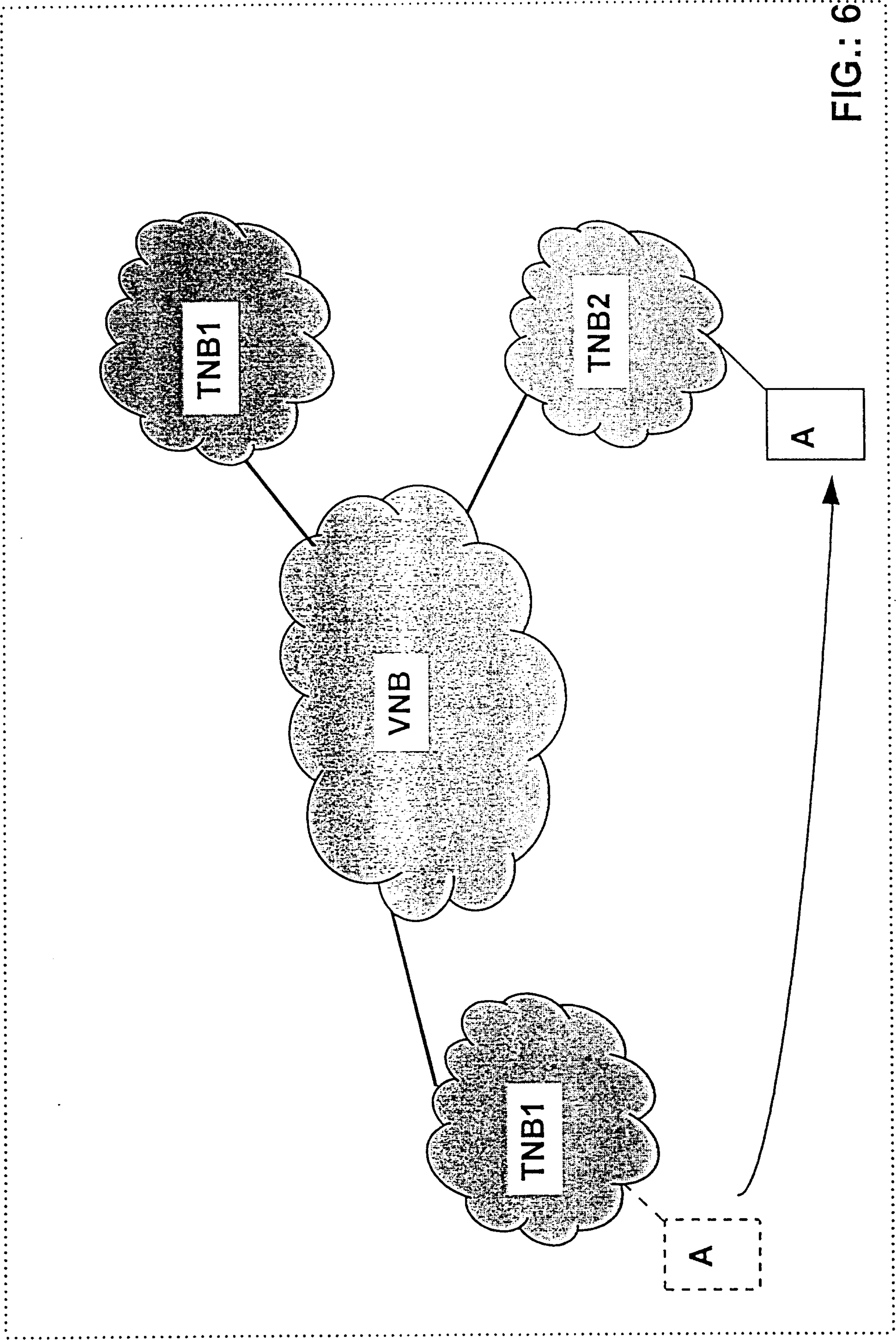


FIG.: 6

