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Process for making connections and accounting for connections in telecommunication systems

The invention relates to a process for making connections and accounting for connections in telecommunication systems for certain called numbers individually selectable by the subscriber according to the preamble of patent claim 1.

For several telecommunication systems there is the need to apply a special, e.g. reduced rate to telecommunication connections for called numbers that are individually selectable by the subscriber. This aim is usually achieved in that the subscriber informs his/her system operator of individual called numbers to which the special reduced rate should apply. The data provided by the subscriber must be acquired by the system operator and be entered into his accounting system. When the subscriber's call data / fee data in one system has been acquired, the accounting system evaluates this data, wherein based on the supply of the recorded customer data a corresponding fee account for selected called numbers is prepared. The management of the data provided by the client involves a high degree of administrative effort for the system operator; for this reason a special handling routine for accounting systems is sought.

Known methods also show disadvantages for the subscriber; although the subscriber will, as a rule, only seldom change the selected called numbers to which special rates apply, a change is nevertheless inconvenient since the subscriber must inform the system operator of each change in the desired called number either orally or in writing.

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In some cases the changed called number is not "switched" immediately but with a certain delay.

It is the objective of the present invention to provide a process for making connections and accounting for connections in telecommunication systems for certain called numbers individually selectable by the subscriber which is more convenient for customers than known methods and promises reduced administrative efforts and fee accounting efforts to the system operator.

The said problem is solved by the features specified in the characterising part of claim 1.

The invention is based on enabling the subscriber to record him/herself individual, frequently used called numbers in a data bank of the telecommunication system and use them later on through a simple dialling procedure carried out via his/her terminal. For the data entry, i.e. the indication of the desired called numbers, through the usual dialling procedure the subscriber initiates a call formation to a service code determined in the system. In this case, in a first variant the dial information in addition to the service code contains the called number to be programmed which is to be recorded in the subscriber's individual data bank. By dialling the service code the connection to a special service technology in the system is switched. A data bank entry, in which the called number is recorded for which the special rate shall apply is created for the subscriber on the basis of his individual called number that is known to the system.

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As an alternative it is intended that the subscriber merely dials the system service through entering the service code and that the called number is requested via a voice-output unit or the like. The subscriber can then enter the desired called number through subsequent dialling.

The entry of subscriber-related data into the data bank of a selected service control point does not require a previous application to the system operator for this service.

After in this way a data bank entry was created in the system for the subscriber, the subscriber can use the service as often as desired through an abbreviated call number allocated to the entered called number. Usually, the abbreviated call number is known in advance and is invariably allocated to the service code for programming of the data entry. In this respect, each call formation initiated through dialling the abbreviated call number leads to the specialised system technology. On the basis of the subscriber's number the latter then searches for the subscriber entry recorded in its data bank under the abbreviated call number. Once the search is successful, the connection is further made to the called party on the basis of the called number allocated to the entry.

Thus, finally a connection is made between the calling subscriber and the desired called party. The processing of the service logic does not cause any delay in the call formation conceivable by the subscriber. The service code allocated by the system which was dialled by the

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subscriber can be substantially shorter than the call number allocated to the called party.

A call data set is prepared for the connection as for any other outgoing connection of the subscriber which allows that the

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connection is accounted for accordingly. Owing to the fact that the specially called number, namely the service code, is contained therein as a called information, the accounting system can apply the special rate to the said connection.

The process described here combines the possibility of an intelligent call conversion according to individual subscriber parameters and a simple subscriber-oriented accounting mechanism. The subscriber him/herself can record the information required for his/her service in the system which does not involve any administrative step on the part of his/her system operator.

At the same time, the process allows the subscriber to facilitate the dialling of frequently called parties through abbreviated call numbers managed in the telecommunication system.

By combining the above mechanism and processes based on conventional accounting systems it is achieved to support a special fee accounting for numbers called by individual subscribers.

The process does not require any special hardware equipment and supports random telecommunication systems and installations where the transfer of called numbers and original call numbers for making a connection is assured. Examples are, in particular, public systems using ISDN (ISUP) or TUP signalling and private systems using Q-SIG or ISDN (DSSI) signalling. However, older systems using e.g. R2, IKZ50 dial methods are, as a rule, also suitable. The public or private system can support

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analogue or digital transmission techniques, transmit telephony or data and form fixed networks or radio networks.

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The service logic of the process is based on a central service control point and a service data bank which communicates with the switching points of the telecommunication systems and controls the latter. This basic aspect is typically realised by the IN (Intelligent Network) technology.

The present invention is now explained in detail on the basis of an example, Tables 1 and 2 and Figures 1 and 2. The example is based on a mobile telecommunication system with GSM standard.

According to Figure 1 the specific called numbers desired by the subscriber are entered as follows:

Step 1:
The subscriber who has the number R dials a service code P1 for programming, followed by a called number Z1. If the nearest subscriber switching point has no IN function, the service code P1 initially serves for addressing a suitable IN switching point in order to make the connection between the subscriber' station (in the present example the air interface of a radio network) and the IN switching point (IN-SSP).

In the example:
The subscriber having the number 0171-xx.. dials the service code, e.g. 01704 followed by the called number 0228-yy..

Step 2:
The dialled service code P1 is recognised in the IN switching point (IN-SSP), and then a message containing

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all relevant information, namely subscriber's number R and called number Z1 is sent to the service control point (SCP).

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In the example:
The dialled service code 01704 is recognised in the integrated GSM/IN switching point, and a message containing all relevant information, subscriber's number 0171-xx.. and called number 0228-yy.. is sent to the IN service control point.

Step 3:
The service control point (SCP) recognises the specific service on the basis of the service code P1. In a first step it is determined whether a data bank entry already exists for the subscriber with number R. If this is not the case, a new data bank entry is created for the said subscriber. In this respect, it is determined in a global table stored in the data bank which possible entries 1 to m of the subscriber are concerned.

In the example:
The service control point creates a subscriber entry for the subscriber 0171-xx.. in its data bank. For this entry the called number 0228-yy.. is stored under a first abbreviated call number N1 (= e.g. 01701).

Table 1: Allocation of codes for programming and use of service

Entry number	Service code for programming	Abbreviated call number (service code for use)
1	01704	01701
2	P2	N2
...	...	...
m	Pm	Nm

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The service control point (SCP) then creates a new subscriber entry for the subscriber with number R in its data bank (Table 2). For this entry as a first called number the called number

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Z1 (=0228-yy..) is recorded according to entry 1 found in Table 1. Thus the following permanent data bank entry for the individual subscriber is created in the data bank of the IN service control point:

Table 2: Subscriber data bank. Data bank structure for entries for individual subscribers

Subscriber's number	Called number 1	Called number 2	Called number ..	Called number m
0171-xx..	0228-yy..	Z2	...	Zm
...	...	...	...	...
...	...	...	...	...
...	...	...	...	...

Step 4:
The IN-IP (Intelligent Peripheral) of the switching point creates an acknowledging announcement for the subscriber to indicate that the data bank entry has been processed successfully and mentions the abbreviated call number N1 allocated to the entered called number Z1.

In the example:
The IN-IP of the switching point creates e.g. the announcement "Thank you, your called number 0228-yy.. was successfully entered. You can now use it by dialling 01701".

According to another embodiment of the invention the subscriber is offered an alternative user surface. In order to facilitate the handling of this service for the subscriber it is intended that initially the subscriber dials only the short service code, e.g. 01704 which initiates the IN service. The subscriber

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is then requested through the voice-output function of the intelligent network (Intelligent Peripheral) to enter the called number. Such entry is typically carried out e.g. via DTMF dial tones which are transmitted in the voice band. The called number called in by the IP is then processed in the IN service control point according to above steps 2 to 4.

The service according to the invention is used by the subscriber as illustrated in Figure 2:

Step 1:
The mobile radio subscriber with the number R dials the service code N1 which was allocated to a previous programmed called number. If the subscriber switching point has no IN function, the service code initially serves for addressing a suitable IN switching point in order to make the connection between the subscriber' station (in the present example the air interface of a radio network) and the IN switching point (IN-SSP).

In the example:
The mobile radio subscriber with the number 0171-xx.. dials the abbreviated call number 01701.

Step 2:
The dialled service code N1 is recognised in the IN switching point, and then a message containing all relevant information (service code N1, subscriber's number R) is sent to the IN service control point.

In the example:

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The dialled abbreviated call number 01701 is recognised in the integrated GSM/IN switching point and a message containing all relevant data is sent to the IN service control point.

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Step 3:
Based on Table 1 (see above) the service control point recognises that the service described here and the desired first called number Z1 are concerned. Then, on the basis of the subscriber's data in the entry for the number R the first called number Z1 is selected from the subscriber data bank in Table 2. Through this call number the service control point initiates the further call connection to the party with call number Z1.

In the example:
The service control point searches for the entry corresponding to the subscriber number 0171-xx.. . Once the search is successful, the control point reads the called number 0228-yy.. from the subscriber entry allocated to the abbreviated call number 01701 and initiates the further call completion.

Step 4:
The IN switching point then makes the connection between the calling subscriber and the called number Z1.

In the example:
The called number 0228-yy.. is dialled as a called number by the service control point and the switching point.

For each outgoing connection including connections made by using the abbreviated call numbers a call data set is created in the telecommunication system. Based on the abbreviated call number contained in this data set the accounting system recognises that a connection was made by using the process according to the invention. It is a basic function of modern accounting systems to apply.

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rates depending on the called number allocated to the abbreviated call number and, if necessary, on further parameters. Therefore, it is possible

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to apply a special rate to the service code and/or abbreviated call number N1 which was used as dial information for the call to the called number Z1 and to offer the customer a special accounting type for connections made through the abbreviated call numbers.

It is an advantage of the described process that the subscriber him/herself, without "active" participation of the system operator, can record his/her desired call numbers to which a special rate should apply. The recorded data can be changed by the customer at random, but within a predetermined period of time, e.g. twice per month. The process is suitable for mobile radio networks and for fixed networks and can be realised by the operator without large efforts. It is important that after successful installation of this service, no further administrative work is required by the system operator. The modern, largely used IN switching technique allows a simple implementation of the said process since the basic requirements already exist.

Modifications of existing integrated switching systems for administration, accounting and marketing support are not expected.

Used abbreviations and terms:

IN Intelligent Network

IP Intelligent Peripheral (unit for announcements and e.g.
DTMF recognition)

SSP Service switching point

SCP Service control point

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PATENT CLAIMS

1. Process for making connections and accounting for connections in telecommunication systems for certain called numbers individually selectable by the subscriber, where the subscriber can inform the telecommunication system operator of a limited number of called numbers to which a special rate shall apply, characterised in that the subscriber him/herself records an individually selected called number in a data bank provided in an internal service control point (SCP) of the system by dialling an internal service code, in the data bank an abbreviated call number is allocated to the called number which the subscriber can then dial as often as desired, wherein after dialling the abbreviated call number the corresponding called number is determined in the data bank and a connection is made to the said called number, and all calls made via the abbreviated call number are billed according to the special rate applied to the said abbreviated call number.

2. Process according to claim 1, characterised in that the subscriber enters his/her selected called numbers via the keys of his/her telecommunication terminal.

3. Process according to claim 1 or 2, characterised in that the data bank contains a global data set which mainly comprises the following information:

- number of possible entry (1-m),
- possible service codes for programming of the data bank entries by the subscriber (P1-Pm),
- abbreviated call numbers allocated to the service codes (N1-Nm).

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4. Process according to any of claims 1 to 3, characterised in that the data bank contains a data set for the individual subscriber which mainly comprises the following information:

- subscriber's number (R)
- called numbers (Z1-Zm) entered by the subscriber and allocated to the abbreviated call numbers (N1-Nm).

5. Process according to any of claims 1 to 4, characterised in that for the purpose of programming the data bank entries the service code (P1-Pm) selected by the subscriber and subsequent called number (Z1-Zm) is recognised by the switching point (IN-SSP) and the service code (P1-Pm) together with the subscriber's number (R) and the called number (Z1-Zm) is transmitted to the service control point (SCP).

6. Process according to any of claims 1 to 5, characterised in that a check is carried out at the service control point as to whether a data bank entry is already available and that, if this is not the case, a new data bank entry for the subscriber's number (R) is made and the called number (Z1-Zm) is recorded in the data bank under a continuous entry number (1-m).

7. Process according to any of claims 1 to 6, characterised in that for use of the service the abbreviated call number (N1-Nm) dialled by the subscriber is recognised by the switching point (IN-SSP) and that the abbreviated call number (N1-Nm) together with the subscriber's number (R) is transferred to the service control point (SCP).

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8. Process according to any of claims 1 to 7, characterised in that on the basis of the subscriber's number (R) and the abbreviated call number (N1-Nm) at the service control point

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(SCP) the corresponding entry number (1-m) and called number (Z1-Zm) recorded in the data bank is determined and the connection to the called number (Z1-Zm) is made.

9. Process according to any of claims 1 to 7, characterised in that the accounting system recognises a connection made on the basis of the abbreviated call number (N1-Nm) and the connection is accounted for by taking into consideration the abbreviated call number as well as additional other parameters, if necessary.

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