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Description

Method and switching arrangement for establishing telecommunication connections in a communication network, between subscriber stations
5 connected to it and/or separate networks.



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The invention refers to a method and a switching arrangement for establishing telecommunication connections in a communication network, in particular a public switching network or system, between subscriber stations that are part
10 of different subscriber groups of at least one subscriber system, and/or from and to respectively separate networks (third-party networks) of at least one network system, in which the subscriber groups in question and the separate networks are connected to the aforementioned communication network via separate connection devices, in which subscriber stations of the subscriber
15 groups in question and the separate networks in question are connected via communication paths that are separate from standard communication paths.

In order to create telecommunication connections of the type described above it is usual to provide so-called dedicated lines, that is, semi-permanent
20 connections between the individual subscriber groups of a subscriber system within the communication network, through which the subscriber groups in question can be connected to each other. This applies correspondingly if separate networks (so-called third-party networks) instead of subscriber groups are connected to the communication network in question. Therefore
25 such connections are load-independent of the other part of the communication network, however, it also means that in the communication network in question resources will have to be permanently committed at the controlling side for monitoring the connection of the semi-permanent connections in question. From the point of view of an efficient utilisation of control devices of

the communication network in question, this is occasionally deemed to be a disadvantage.

Even though it is possible to establish, within the communication network in question, telecommunication connections between subscriber stations that are part of different subscriber groups of at least one subscriber system, the subscriber groups of which are connected to the communication network via separate connection devices, in the way of telecommunication connections of usual subscriber stations that are connected to the telecommunication network in question. However, that means that the numbering plan of the communication network in question has to be taken into account by each calling subscriber station, even those of the subscriber groups of the subscriber system in question. For example, if two subscriber groups of a subscriber system are connected to a communication network, such as the public switched network, at locations that are at a great distance from each other, e.g. in Hamburg and München, this would mean that, within the course of establishing a connection, the subscriber stations of the two aforementioned subscriber groups would have to provide the dialling information that is decisive for dialling long distance in the communication network in question. This applies correspondingly, if separate networks (so-called third-party networks) instead of subscriber groups are connected to the communication network in question. However, this is related to undesirable additional work for the subscriber stations of the subscriber group in question and for the respective establishing of the connection respectively.

Therefore, the invention is based on the task of showing a way how to establish, in a relatively simple manner, telecommunication connections between subscriber stations that are part of different subscriber groups of at least one subscriber system, the subscriber groups of which are connected to a communication network, in particular a public switched network or system

via separate connection devices, and/or from and to respectively separate networks (third-party networks) that are connected with the communication network in question via separate connection devices, without constantly having to utilise resources of control devices of the communication network in question and also without having to take into account the numbering plan of the communication network in question within the subscriber stations of the aforementioned subscriber groups and within the separate networks.

In accordance with the invention the task described above is solved by a method of the aforementioned type, in such way that starting from the separate connection devices, telecommunication connections between subscriber stations are created in the aforementioned communication network, which are part of the subscriber groups connected to the aforementioned connection device, and/or from and to the aforementioned separate networks respectively, only according to the markers individually designating the subscriber groups in question and/or the aforementioned separate networks.

The invention is characterised by the advantage that in the aforementioned communication network telecommunication connections between subscriber stations, which are part of different subscriber groups of at least one subscriber system, the subscriber groups of which are connected to the communication network via separate connection devices, and/or from and to separate networks respectively, which are connected to the communication network via separate connection devices, can be established in a particularly simple manner, by having to take into consideration only the individual markers for the subscriber groups in question and thus the subscriber system comprising these or the separate networks in question, without this otherwise resulting in an excessive load for the resources, such as controllers of the respective communication network, for monitoring the connection. In this, the numbering plan of the communication network in question does not play a role

in establishing the aforementioned communication connections, neither on the side of the subscriber stations of the individual subscriber groups nor on the side of the separate networks in question itself. For example, the aforementioned individual markers can be identified in each case upon the occurrence of corresponding connection requests coming from the
5 *aforementioned subscriber groups or from the separate networks in the*
aforementioned connection devices, or they can be made available by them on the basis of the identification of connection requests from the subscriber groups or separate networks in question. Furthermore, security aspects in the
10 process of establishing the telecommunication connections in question can be taken into account in a relatively simple manner that is through the reservation of pre-determined connection paths, which may be used for establishing the telecommunication connections in question.

15 It will be practical to recognise, within the connection devices, connection requests, originating from the subscriber group in question and/or the separate network in question, to another subscriber group of the same subscriber system and/or to another separate network of the network system in question, on the basis of a group or system recognition provided within the
20 course of the establishing of the connection in question. This has the advantage of low identification expense for establishing of the aforementioned telecommunication connection.

25 Preferably the dialling information will be taken into account, which is provided in the connection device in question by subscriber stations of the aforementioned subscriber groups and/or by the separate networks and which concerns the communication connection in question to be established, the dialling information corresponding only to the numbering plan of the subscriber system comprising the subscriber groups in question and/or corresponding
30 only to the numbering plan of the network system comprising the separate

networks in question. This results in the advantage that in a particularly simple manner, the individual subscriber groups and separate networks respectively have to take into account only the numbering plan pertaining to the subscriber groups of the subscriber system in question or the separate networks of the network system in question, in order to establish requested connections between the subscriber stations of these subscriber groups or the aforementioned networks.

Preferred for the execution of the method in accordance with the invention is a switching arrangement, in which subscriber groups of at least one subscriber system, each comprising a number of subscriber stations and/or separate networks (third-party networks) of at least one network system, are connected to a communication network, in particular a public switched network, via separate connection devices. In accordance with this invention, this switching arrangement is characterised by the fact that markers or dialling information recognition and connection control devices are provided in the connection devices in question, which, within the aforementioned communication network for the communication connection to be established, designate a connection path, which can be set up within the communication network, solely on the basis of the marker and/or dialling information provided by the subscriber stations of the subscriber groups in question and/or via the respective separate network and referring to at least one subscriber station of another subscriber group of the same subscriber system or another separate network of the respective network system that is connected to the communication network in question. This results in the advantage of particularly low switching-technical expense for the execution of the method in accordance with the invention.

Preferably, the markers and the dialling information recognition and connection control devices have memory tables, in which control information

is stored that lists certain connection paths in the aforementioned communication network, which control information can be activated upon the recognition of certain respective markers and dialling information respectively. In this way telecommunication connections can be established in an advantageous manner between a great number of subscriber groups of a subscriber system and from/to separate networks in the stated communication network respectively, without subjecting its controllers in an undesirable way to constant loads for monitoring a connection.

- 10 Using an illustration, the invention is explained in more detail in the following with reference to an embodiment of a switching arrangement for the execution of the method in accordance with the invention.

The illustration in general indicates a communication network KN, which may be in particular a public switched network or system as it is used, for example, as EWSD switching system. The communication network KN in question could, for example, be a countrywide communication system. The communication network KN in question can include several switching locations with their own control devices, which are connected to each other.

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In this embodiment, subscriber groups of two subscriber systems, each of which groups comprises several subscriber stations (not shown) and or separate networks (third-party networks) are connected to the communication network KN, which can be operated as individual subscriber switching networks or as transit communication networks. The respective separate networks can be extension networks or even separate public switched networks that are, for example, operated by another operator than that of the aforementioned communication network KN. If subscriber systems and subscriber groups are referred to in the following, then this will include the respective separate networks as well. A separate network thus corresponds to

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a subscriber group and a number of organisationally or otherwise related separate networks form a network system correspond to a subscriber system. At this point it should also be noted that a subscriber system in principle can also include a separate network or even a network system, for example in the case that the subscriber groups of the respective subscriber system are connected to separately planned communication networks that are very distant from each other, so that the establishing of intercontinental connections between subscriber groups becomes necessary for the subscriber system in question.

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One subscriber system, hereinafter called the second subscriber system, comprises the subscriber groups A1 and A2; another subscriber system, hereinafter called first subscriber system, comprises the subscriber groups B1, B2 and B3. In principle any number of subscriber systems can be planned, each of which comprise at least two subscriber groups of subscriber stations. For example, a subscriber system may comprise subscriber groups with subscriber stations of one company or an association of companies. The subscriber groups in question could be connected to the communication network KN at locations that are far away from each other, for example in Hamburg and München, as it has been mentioned at the beginning.

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The individual subscriber groups A1 and A2 as well as B1, B2 and B3 are connected to the communication network KN via separate connection devices T1, T2 and T3 respectively. In this case the subscriber groups A1 and B1 are connected jointly to the connection device T1 via connection lines LA1 and LB1 respectively and via T1 to the communication network KN. In the same manner the subscriber groups A2 and B2 are connected to the connection device T2 via the connection lines LA2 and LB2 respectively and via T2 to the communication network KN. The subscriber group B3 is connected to the

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connection device T3 via connection line LB3 and via T3 to the communication network KN.

The connection devices T1, T2 and T3 each have a marker or dialling
5 information recognition device D1, D2 and D3 respectively and a connection control device R1, R2 and R3 respectively. The functions of these devices will be explained in more detail later on. In this case the connection control devices R1, R2 and R3 can only be connected via two connection paths C13 and C23 within the communication network KN, which is illustrated by the
10 intermittent line for these connection paths. Originally, the respective connection control devices R1, R2 and R3 are not constantly connected to each other, as this is, however, the case in the case of the semi-permanent connections mentioned at the beginning. Rather, as will become clear later on, the respective connection paths C13 and C23 will only be established or
15 switched through, if there is a corresponding need between subscriber stations of different subscriber groups of a subscriber system. In principle additional corresponding connection paths corresponding to the aforementioned connection paths can be made available in the communication network KN, if there is a need (for example determined by the
20 respective traffic load). For that the administration in the communication network KN can be arranged in such way that all connection paths, that are to be utilised as separate connection paths for telecommunication connections between subscriber groups of the aforementioned subscriber systems, are reserved for such connections, that is, will not be available for other
25 connections within the communication network KN, that is, will not be available to be utilised as normal connection paths within the communication network. It would be advisable to provide memory tables within the aforementioned markers and dialling information recognition and connection control devices respectively, in which certain routing or control information is
30 stored that provides pre-determined connection paths in the communication

network KN, which information can be activated upon the recognition of certain markers and/or dialling information, in order to then establish or switch through the connection paths in question.

- 5 The following explains in greater detail the method in accordance with the invention, according to which the switching arrangement described works and operates respectively.

10 If telecommunication connections between subscriber stations of the two subscriber groups B1 and B3 that are part of the first subscriber system are to be established with regard to the switching configuration shown in Fig. 1, it will be sufficient to recognise in one of the marker or dialling information recognition device D1 or D3 of the two connection devices T1 and T3, that is responsible for the setting up of the connection in the communication network
15 KN and that is connected to the respective subscriber group B1 or B3, that this concerns a connection request to the respective other subscriber group of the respective first subscriber system. In this case it is sufficient to activate the routing or connection control information in the pertaining marker or dialling information recognition and connection control device D1, R1 and D3, R3
20 respectively of the connection device T 1 or T3, in order to set up the respective desired telecommunication connection to the other subscriber group B3 or B1 on the connection path C13 within the communication network KN. The connection control devices R1 and R3 of the markers or dialling information recognition and connection control devices D1, R1 and D3, R3
25 respectively, here establish the desired telecommunication connection within the communication network KN between the two subscriber groups B1 and B3 that are part of the first subscriber system or initiate this setting up process, without the subscriber stations of the respective connection groups B1, B3 having to contribute anything except the aforementioned marker. The
30 numbering plan of the communication network KN itself, with regard to the

providing of the aforementioned marker, does not play a role for the subscriber stations in question. The respective numbering plan of the communication network KN is only decisive for the connection control devices R1, R3 of the aforementioned connection devices T1, T3 and is taken into
5 consideration there as well.

A situation completely corresponding to the situation explained above also exists, if connections are to be established between subscriber stations of the two subscriber groups B2 and B3 that are part of the first subscriber system in
10 question. In that case the connection is established via the direct connection path C23, within the communication network KN, indicated in the drawing, between subscriber stations of the two subscriber groups B2 and B3 that are part of the first subscriber system.

15 Now the case will be considered, in which telecommunication connections between subscriber stations of the subscriber group B1 and B2 of the first subscriber system indicated in the drawing. In that case the marker or group identification determined in the respective dialling information recognition device D1, D2 or D3 will not be sufficient for establishing the respective
20 desired telecommunication connection within the communication network KN, because in this case no direct communication connection path between the two subscriber groups B1 and B2 of the first subscriber system in question has been determined. Therefore the respective group identification in accordance with the invention will be replaced or supplemented by the dialling
25 information that designates the respective desired subscriber station to be called in the corresponding subscriber group of the respective subscriber system. For that reason the markers or dialling information recognition and connection control devices D1, R1 as well as D2, R2 and D3, R3 contain, in their aforementioned memory tables, control information stating certain
30 connection paths within the communication network KN, which can be

activated upon the recognition of the respective particular dialling information and that lead to the establishing of the respectively required telecommunication connection within the communication network KN. The dialling information mentioned above is not changed in the communication
5 network, but is forwarded unchanged.

If the dialling information in question of subscriber stations of the subscriber group B1, for example, includes the number '2' in accordance with a traffic separation figure, then a telecommunication connection to the connection
10 control device R1 is initially set up via the connection path C13 to the connection control device R3 as the, in this case, only available connection control device for the subscriber group B1, and from this connection control device R3 the telecommunication connection is then set up via the connection path C23 to the connection control device R2. In this case, too, the subscriber
15 stations of the individual subscriber groups B1 and B2, that are part of the aforementioned first subscriber system, do not have to provide dialling information concerning the numbering plan of the communication network KN in order to be connected by the communication network KN. It is sufficient if the respective provided dialling information takes into consideration the
20 numbering plan of the subscriber system, of which the subscriber groups are a part, between which a telecommunication connection has to be established.

A situation completely corresponding to the last explained situation also exists, if telecommunications connections are to be established between
25 subscriber stations of the two subscriber groups A1 and A2 that are part of the second subscriber system in question. In that case the setting up of the connection is completely analogous via the connection paths C13 and C23, within the communication network KN, indicated in the drawing, between the two subscriber groups A1 and A2 that are part of the second subscriber
30 system.

- It is relatively easy to flexibly adjust the processes described above with regard to the establishing of communication devices between subscriber groups, that each are part of a subscriber system, to a changed affiliation situation, for example, if the subscriber stations of a subscriber group of a subscriber system change to another subscriber system. In that case, corresponding adjustments have to be made only in the aforementioned marker and dialling information and connection control devices.
- Finally, it should be mentioned that for reasons of simplification the drawing shows the subscriber groups that are part of different subscriber systems, such as the subscriber group A1, B1 and A2, B2 connected to the communication network KN via a joint connection device T1 and T2 respectively. Of course, the individual subscriber groups can also be connected to the communication network KN via their own connection devices, as for example in the case of the EWSD switching system mentioned at the beginning, to the connection devices designated with PA (Primary rate Access) or ISUP (Integrated Services digital network User Part). In this connection it should be pointed out once more that the subscriber group in question also can be a separate network (third-party network) as it had been mentioned before.

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Patent Claims

1. Process for the establishing of telecommunication connections within a communication network, in particular a public switched network or system, between subscriber stations that are part of different subscriber groups of at least one subscriber system, and/or from and to respectively separate networks (third-party networks) of at least one network system, in which the respective subscriber groups and the separate networks are connected to the aforementioned communication network via separate connection devices, in which subscriber stations of the respective subscriber groups and the respective separate networks are connected via communication paths that are separated from standard communication paths, characterised by the fact, that within the aforementioned communication network (KN) and starting from the separate connection devices (T1, T2, T3), telecommunication connections between subscriber stations are established, which are part of the subscriber groups (A1, A2; B1, B2, B3) that are connected to the aforementioned connection devices (T1, T2, T3), and/or from and to respectively the aforementioned separate networks, only in accordance with the markers that individually designate the respective subscriber groups (A1, A2; B1, B2, B3) and/or the aforementioned separate networks.
2. Process in accordance with Claim 1, characterised by the fact, that connection requests to another subscriber group of the same subscriber system and/or to another separate network of the network system in question originating from the subscriber group (A1, A2; B1, B2, B3) in question and/or the respective separate network, in each case are recognised in the connection devices (T1, T2, T3) on the basis of a group or system

identification that is provided in the course of establishing of the connection in question.

3. Process in accordance with Claim 1 or 2, characterised by the
5 fact, that dialling information, that has been provided to the respective connection device (T1, T2, T3) by subscriber stations of the aforementioned subscriber groups (B1, B2, B3) and/or by the separate networks and that relates to the respective communication connection to be established, is taken into account only according to the numbering plan of the subscriber system
10 comprising the respective subscriber groups (B1, B2, B3) and/or only according to the numbering plan of the network system comprising the respective separate networks.

4. Switching arrangement for the execution of the process in accordance
15 with one of the Claims 1 to 3, in which subscriber groups (A1, A2; B1, B2, B3), each comprising a number of subscriber stations, of at least one subscriber system and/or separate networks (third-party network) of at least one network system are connected to a communication network (KN), in particular a public switched network or system, via separate connection devices (T1, T2, T3),
20 characterised by the fact, that markers or dialling information recognition and connection control devices (D1, D2, D3; R1, R2, R3) are provided in the connection devices in question, which, within the aforementioned communication network (KN) for the communication connection to be established, designate a connection path, which can be set
25 up within the communication network, solely on the basis of the marker and/or dialling information provided by the subscriber stations of the subscriber groups (A1, A2; B1, B2, B3) in question and/or via the respective separate network and referring to at least one subscriber station of another subscriber group of the same subscriber system or another separate network of the

respective network system that is connected to the communication network (KN) in question.

5. 5. Switching arrangement in accordance with Claim 4, c h a r a c t e r -
5 i s e d b y t h e f a c t, that the markers or dialling information
recognition and connection control devices (D1, D2, D3; R1, R2, R3)
have memory tables, in which certain connection paths (C12, C23) have
been stored that provide control information in the aforementioned
communication network (KN), which can be activated upon the
10 recognition or certain markers and dialling information respectively.