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### Patent claims

1. A method of providing functions in a (first) terminal (TER) for a telecommunications network, whereby the terminal (TER) can be connected via at least a first connection (VC) to at least a first communications peer device (CP), and whereby the functions can be produced in the terminal (TER) with the help of data which are loaded from a data supply device (CS) into the terminal (TER),  
**characterized in that** a second connection (VL) is established via a subscriber's line, in parallel with the first connection (VC) between the terminal (TER) and the data supply device (CS), and that the data are transmitted from the data supply device (CS) to the terminal (TER) via the second connection (VL).
2. A method as claimed in claim 1, characterized in that a dedicated line is used for the second connection (VL).
3. A method as claimed in claim 1, characterized in that a virtual line is used for the second connection (VL).
4. A method as claimed in claim 1 or 2, characterized in that a packet-switched connection is used as the second connection (VL).
5. A method as claimed in one of claims 1 - 4, characterized in that a subscriber's line of an ISDN telecommunications network is used as the subscriber's line and the second connection (VL) is maintained on the D-channel of the subscriber's line.

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6. A method as claimed in one of claims 1 - 3, characterized in that a subscriber's station of a mobile telecommunications network is used as the subscriber's line, and the second connection (VL) is maintained on a data channel of the subscriber's station.

7. A method as claimed in one of claims 1 - 3, characterized in that a subscriber's station of a mobile telecommunications network is used as the subscriber's line, and the second connection (VL) is maintained with the help of messages from a Short Message Service, which are exchanged via the subscriber's line.

8. A method as claimed in claim 1, characterized in that in addition to the (first) terminal (TER) the method uses a second terminal, which can at least be connected via a third connection to a second communications peer device, that second functions can be produced in the second terminal with the help of data which are loaded into the second terminal from the data supply device (CS), or from a comparable second data supply device, that the second functions are tuned to the functions which are produced in the first terminal (TER), that parallel to the third connection a fourth connection, which is comparable to the second connection (VL), is established via a subscriber's line between the second terminal and the data supply device (CS) or the second data supply device, and that the data are transmitted from the data supply device (CS) or the second data supply device to the second terminal via the fourth connection.

9. A terminal (TER) for a telecommunications network with devices for providing functions in the terminal (TER), which can be connected via at least a first connection (VC) to at least a first communications peer device (CP), and is





able to produce the functions with the help of data received by the terminal (TER) from a data supply device (CS), characterized in that a second connection (VL) can be established between the terminal (TER) and the data supply device (CS) in parallel with the first connection (VC), and that the terminal (TER) is able to receive the data from the data supply device (CS) via the second connection (VL).

10. A data supply device (CS) for providing data to carry out functions in a terminal (TER) for a telecommunications network, where a connection (VL) can be established between the data supply device (CS) and the terminal (TER) via a subscriber's line, and the data supply device (CS) is able to transmit the data to the terminal (TER) via the connection (VL), characterized in that the connection (VL) can be established as a dedicated line or a virtual line.



A method of producing functions in a  
terminal for a telecommunications network,  
and a terminal and data supply device therefor ✓

The present invention concerns a method of providing functions in a terminal for a telecommunications network in accordance with the characterizing clause of claim 1, as well as a terminal for that purpose in accordance with the characterizing clause of claim 9, and a data supply device for that purpose in accordance with the characterizing clause of claim 10.

Terminals for telecommunications networks, and telephone sets in particular are equipped with different functions which simplify or ease the operation of the terminals. Many of these functions are built into the terminals and are immediately available, e.g. redialing, whereby a previously dialed telephone number can be repeated by once pressing a special redialing key. However, the terminals must be specifically programmed before other functions can be used, e.g. a telephone number of several digits can be entered and stored for a one-touch dialing key in the terminal, and can be recalled by pressing said key.

Terminals for mobile radio telecommunication networks are known which can show the name of a calling party on a display device. To that end the telephone number and the name of the calling party must be entered into the memory of such a terminal by its user. An incoming call in mobile radio telecommunication networks transmits the telephone number of the calling party, so that the terminal can find the name of the calling party in its memory by comparing the transmitted telephone number with the stored telephone number, and show it on the display device.



More extensive and individually adaptable functions of a terminal, such as an operating surface, are difficult to arrange with the means of a terminal since a terminal only offers a few special keys in addition to a numerical keyboard. For that reason the adaptable functions of a terminal are often configured on a data processing device, e.g. a personal computer which in addition to the extensive keyboard also has a graphic input device, e.g. a mouse. The configured functions are then loaded as a software packet from the data processing device to the terminal via an interconnecting line.

In many mobile radio telecommunication networks it is furthermore possible with the first log-on of a terminal in such a mobile radio telecommunication network by using the so-called Short Message Service (SMS), to load software from a server into the terminal, particularly software for the configuration of an operating surface of a terminal. The terminal then displays e.g. the name of the service provider whereby the terminal can make use of the telecommunication services of the mobile radio telecommunication networks. By specifically dialing the server and by making a specific request, the terminal can also download further or modified software from the server via the Short Message Service. However during such software downloading the terminal is not available for its principal usage, namely the processing of incoming or outgoing calls, since the downloaded software involves the operation of the terminal and must first be integrated into the other software of the terminal for that reason, before calls can be processed once again.

The object of the invention is to provide functions in a terminal for a telecommunications network by means of data which can be loaded from a data supply device.



This object is achieved by a method according to the technical principle of claim 1, a terminal according to the technical principle of claim 9, and a data supply device with the technical principle of claim 10. Other advantageous configurations of the invention can be found in the dependent claims and in the specification.

The invention and its advantages are illustrated in the following with the help of the drawing, wherein the figure shows an example of an arrangement according to the invention comprising a terminal TER and a server CS which are interconnected by a connection VL.

The figure illustrates an example of an arrangement whereby the invention can be carried out. A connection VL, which is illustrated by a bold broken line, connects a terminal TER to a server CS. The terminal TER contains a central control unit MP which controls the functions of the terminal TER, a display device DIS which is used to visualize information, a keyboard KEY whereby the terminal TER can be operated, and a memory unit MEM in which data for the basic functions and data for special functions are stored. Here the telecommunications network is symbolically illustrated by an exchange VST and may comprise further nodal points and connection lines. The server CS represents for example a data supply device that is able to provide data. The data supply device may be a single computer or even a network of several computers. In addition a connection VC is illustrated which is also conducted via the exchange VST and connects the terminal TER to a communications partner CP, e.g. another terminal. The terminal TER has the basic functions of a telephone set, such as number dialing, voice input and voice output. After data have been loaded, the terminal TER can provide other special functions such as special information on the display.



device DIS, or a special layout thereof. The special functions can be carried out immediately as soon as received by the control unit MP, or they can also be stored in the memory unit MEM for later use.

The terminal TER is able to exchange data with the server CS via the connection VL. The latter can be established before, after and during a connection VC to the communications partner CP, and is independent of the connection VC to the communications partner CP. In this way the server CS is able to supply data to the terminal TER at any time. The connection VL may be a voice connection via a separate subscriber's line. However, the connection VC to the communications partner CP and the connection VL can also be respectively established on a channel of a jointly used subscriber's line to the terminal TER. The channel for the connection VL can be a B-channel in an ISDN subscriber's line e.g., or an in-band signalling channel which is independent of the channel used for the connection VC to the communications partner CP.

However it is also possible to establish the connection VL as a virtual connection. Virtual connections are logical connections in a telecommunication network between partners who are connected to the telecommunications network.

Virtual connections are normally used in packet-switched telecommunications networks, such as e.g. ATM networks, X.25 networks and in the channels of ISDN networks. For example a virtual connection is established in a packet-switched telecommunications network by transmitting information to the telecommunications network via the desired target of the virtual connection. The telecommunications network then evaluates this information



in a way so that it is able to transmit data packets to the desired target via the virtual connection. If no data packet needs to be transmitted to the target during a period of time, the transmission capacity of the packet-switched telecommunications network can be used to transmit data packets between other sources and targets of the telecommunications network. A virtual connection only occupies the transmission capacity of a telecommunications network when it is used for a transmission, unless a fixed transmission capacity is reserved in the telecommunications network for a potential transmission via the virtual connection.

If a virtual connection must be established from a source point to a target point via a nodal point, it can also be established by storing path-finding information for the virtual connection in the source point or in the nodal point. For example, an address information about the target point can be stored in the source point of a virtual connection, so that the virtual connection can be converted to a real connection at any time, e.g. by establishing a call connection from the source point to the target point. However information may also exist in the nodal point, whereby the nodal point is able to route data received from the source point to the target point. Thus in the present example at least the address, e.g. a telephone number of the respective partner must be stored in one of said terminal points, namely terminal TER or server CS, or an assignment reference between the terminal TER and the server CS has been stored in the exchange VST, which is therefore in a position to route data from the terminal TER to the server CS, or route data from the server CS to the terminal TER.

A system comprising a service provision device and a terminal into which control data can be loaded has been



achieved by Alcatel Telecom in their ADSI (Analog Display Services Interface) product line. The section "Alcatel 1461" in Alcatel Telecom's publication 3CL 00300 0001 TQZZA-Ed. 1-DC/10/96 describes how a user with a terminal, in this case an Alcatel ADSI terminal called "Alcatel 2595", logs on to the service provision device via a subscriber's line, where he makes a selection from prefabricated service packets. These service packets are written in a language which the ADSI terminal can interpret, and are loaded from the service provision device to the ADSI terminal via the subscriber's line. The ADSI terminal performs the functions contained in the service packets, so that by interacting the ADSI terminal and service provision device offer a service to the user. In this case the ADSI terminal functions as a user-friendly interface to the service provision device, namely a "Services Interface", but not as a telephone set with added feature functions. Typical terminal functions, such as e.g. a personal telephone book or the display of the caller's name with an incoming call mentioned in the beginning, must be specifically programmed in the ADSI terminal, because the ADSI terminal must offer these functions without the help of the service provision device. This is made clear in Alcatel Telecom's publication 3CL 00301 0001 TQZZA-Ed. 2-DC/10/96 which specifically concerns the ADSI terminal "Alcatel 2595" in the "Directory" and "Caller Identification Management" sections. However the present invention is able to provide such typical terminal functions jointly via the terminal TER and the server CS, as will be explained in greater detail in the following.

The terminal TER is able to request data from the server CS via the connection VL. For example, if the server CS stores information about the current status of charges accumulated by the terminal TER of the subscriber's station during a period of time, the terminal TER is able to request



information about charges from the server CS, e.g. triggered by a time control during times of low network load. This information about charges is then transmitted by the server CS, it is received by the control unit MP and routed to the display device DIS, where it is shown.

On the other hand the server CS itself is able to provide messages to the terminal TER. A user of the server CS, e.g. a provider of telecommunication services, can input a message text into the server CS, e.g. a message text with the current charges for the telecommunications network. The server CS then transmits the message text to the terminal TER which shows it on the display device DIS.

The terminal TER can furthermore be equipped with functions that are produced by the server CS as executable programs or program modules, e.g. so-called macros, and are then loaded into the terminal TER via the connection VL. The terminal TER stores these programs in its memory MEM and in order to provide functions it can recall the programs at any time from its memory MEM and execute them in the control unit MP.

Terminals are known which are able to download software from an external source, or which can be remotely configured. The software is downloaded from the external source to the terminal by means of a special process, and is stored in the terminal for later use. If a subscriber's line is used for the downloading process, such as is the case e.g. with the terminal known from P44 28 068, the terminal can no longer be accessed by other callers during the downloading process. However, since the connection VL from the terminal TER to the server CS can be parallel to the connection VC of the communications partner CP, the terminal TER is able to simultaneously load data for



\* functions and provide communication with the communications partner CP. The terminal TER is therefore still accessible via the connection VC during a downloading process. The user himself must furthermore start every downloading process by means of a special operation of the terminal, the user must therefore know which external source is able to provide software to the terminal, and how to start a downloading process in the terminal. Using the services of the ADSI service provision device is only possible for the ADSI terminal mentioned earlier, after the ADSI service provision device has registered the ADSI terminal and controls its access. The above mentioned publications about ADSI technology do not clarify whether the user is required to perform a special operation of the ADSI terminal, e.g. the input of an identification code or a password, or whether the ADSI terminal logs on by itself to the ADSI service provision device without any operator intervention.

Since the server CS is able to provide functions to the terminal TER via a subscriber's line, the user of the terminal TER does not need to possess the server CS or be in its immediate vicinity. The user can e.g. instruct a third party, e.g. the already mentioned service provider, to configure functions for the terminal TER in the server CS, and to load these functions as data from the server CS to the terminal TER via the connection VL. In that case the user of the terminal TER does not need to acquire knowledge about the programming of his terminal TER. A function could be e.g. the programming of a call number on a one-touch dialing key mentioned in the beginning, or the read-out of special information on the display device DIS, or a special configuration of the read-out on the display device DIS as well. The service provider can also service functions in the server CS, i.e. to adapt itself to current requirements or to correct possible errors which occurred in the



functions. The data of the processed functions are then again loaded by the server CS to the terminal TER.

The invention offers other advantageous possibilities when another connection is established between the terminal TER and a further target, in parallel with connection VL. The figure illustrates such a connection in the form of connection VC to the communications partner CP. The terminal TER is able to access data of the server CS via the connection VL, both in parallel with an incoming call from the communications partner CP as well as in parallel with an outgoing call to the communications partner CP, and while the connection to the communications partner CP prevails.

If the terminal TER is connected to an ISDN telecommunications network, or to a telecommunications network with CLASS (Custom Local Area Signalling Service) features, the terminal TER is able to receive a so-called CLIP (Calling Line Identification Presentation) message when the communications partner CP makes a call via the connection VC. The CLIP message transmits the telephone number of the calling party. Since the basic functions of a telephone set are available in the terminal TER, the control unit MP can directly show the CLIP message on the display device DIS and the operator can accept the call. However, merely showing a telephone number on the display device DIS does not clearly inform the operator of the terminal TER of the name of the communications partner CP. By pressing one of the keys on the keyboard KEY, the operator can e.g. activate the transmission of an inquiry message with the telephone number information from the CLIP message to the server CS via the connection VL. The server CS then replies with a message containing the name of the calling communications partner CP, so that the terminal TER is able to show this name on the display device DIS. However it is



also possible for the terminal TER to automatically send such a name request to the server CS with every incoming call, without any prior intervention by the operator, thus enhancing its ease of operation.

The terminal TER is furthermore able to utilize the data of the server CS before a call is made. An address book containing the names and telephone numbers of a selected circle of persons could e.g. be stored in the server CS, and is configured for the terminal TER. The operator can access the contents of the address book through interaction between the terminal TER and the server CS. In that case inquiries about data are sent to the server CS, and the server CS replies with the appropriate data. By pressing a key on the keyboard KEY, the operator can send inquiries about data to the server CS. As a function of the respective key pressed by the operator, the inputs in the address book, e.g. names and addresses of calling partners, are sent as data by the server CS to the terminal TER where they are shown on the display device DIS. The operator is then able to select an address book input each time he presses a key on the keyboard KEY. The terminal TER inquires with the server CS about the telephone number of the subscriber's station belonging to this input, and uses the telephone number to make a call to the subscriber's station.

With the help of the data of server CS as a function of previous operating steps taken by the operator, the terminal TER is able to change the distribution of functions on the keys of the keyboard KEY, which can be recalled in each case by pressing individual keys of the terminal TER. The current distribution of functions on the keys is then indicated e.g. by showing symbols or text on the display device DIS. A menu is thus available to the operator which



is updated to the current situation with the data of the server CS. In this way the functions of the terminal TER are offered to the operator through the interaction of the server CS and the terminal TER.

The featured functions of the terminal TER can also be utilized during a connection with a communications partner CP. For example, if the terminal TER is used in an ISDN telecommunications network, a third communications partner can announce his desire to make a call to the terminal TER by means of the "call waiting" ISDN feature. In that case the terminal TER receives a message with the telephone number of the calling third communications partner, which it can translate into a name that is shown on the display device DIS, as already described earlier in conjunction with the CLIP message.

The central data holding and data support in the server CS make it possible to jointly adapt the functions for a single terminal TER, as well as for groups of such terminals, to the changing requirements of a centralized location. The data for these functions are either recalled only when needed, e.g. for an incoming call, or they are loaded into the terminal TER within the framework of a software update prompted by the operator or the service provider. In this way the operator always has current data available for his terminal TER.

If the packet-switched telecommunications network is an ISDN telecommunications network, a pure data exchange usually takes place in a so-called D-channel of a connection line, the exchange of voice information takes place in a B-channel. The connection VL between the terminal TER and the server CS can also be established via the D-channel. This connection can be reestablished as a separate data



connection for each request of data, or permanently as a virtual connection as well. Such a virtual connection is provided within the framework of the European ISDN protocol "E-DSS1".

If the telecommunications network is a mobile radio telecommunications network and the terminal TER is therefore a terminal for a mobile radio telecommunications network, the connection VL can be maintained in a data channel, e.g. a service channel. In that case the exchange VST is a mobile radio exchange, which is called an MSC (Mobile Services Switching Center) by the GSM (Global System for Mobile Communications) standard. The section of connection VL from the exchange VST to the terminal TER is then formed with the help of a so-called BSC (Base Station Control) and at least one BTS (Base Transceiver Station), which is controlled by the BSC and maintains a radio path to the terminal TER. Ideally the server CS is located close to the exchange VST so that the connection VL only occupies short line sections and few devices within the mobile radio telecommunications network. But it is also possible for the terminal TER to be moved out of the capture range of the mobile radio exchange VST. In that case the connection VL can be established via other devices of the mobile radio telecommunications network that are not illustrated in the figure, particularly via an exchange which is comparable to the exchange VST. In that way the terminal TER is able to receive data continuously from the server CS as already explained, and thus provide e.g. special functions or added feature functions. Since in a mobile radio telecommunications network the connection VL from the terminal TER to the server CS can also be in parallel with the connection VC to the communications partner CP, the terminal TER is simultaneously able to load data for



functions and provide communication with the communications partner CP.

However the server CS is also able to maintain the connection VL to the terminal TER via a so-called SMS (Short Message Service) of a mobile radio telecommunications network. Within the framework of a connection VL via the Short Message Service, the service features of the terminal TER are also applicable, they were already mentioned in conjunction with a connection VL in the service channel of a mobile radio telecommunications network, particularly the simultaneous loading of data for functions and for communicating with the communications partner CP.

The invention also proves to be advantageous when a subscriber uses several terminals in order to engage some telecommunication services. In that case the subscriber can especially appreciate if every one of these terminals provides the same or at least similar functions, e.g. if in each of these devices the functions are available on keys that are as identical as possible, or it has a similar menu. This is achieved in that each device of a server interacts in a way already described by means of the terminal TER and the server CS.

If a subscriber engages both the services of a mobile radio telecommunications network as well as the services of a line-conducted telecommunications network, e.g. an ISDN telecommunications network, by using a terminal that is suitable for the respective telecommunications network, a server is able to maintain a virtual connection in parallel with each one of these terminals, e.g. a connection via a Short Message Service in the mobile radio telecommunications network, and a connection via an ISDN D-channel in the line-conducted telecommunications network. In addition to the



terminal TER, the server CS in the figure is e.g. able to provide data for functions to a second terminal which is not illustrated in the figure, via another connection that is comparable to the connection VL and is not illustrated either in the figure. In that case both terminals, namely terminal TER and the second terminal, can provide the already mentioned feature functions, e.g. translating a CLIP message with the telephone number of a caller into the name of the caller. Because the server CS provides data to both terminals, said data can be centrally supported in the server CS, or can be supplemented by entering new data for new functions.

Each of the two telecommunications networks can also have its own server, particularly if the functions to be provided by the respective telecommunications networks or the respective terminal must be specially adapted, or if the telecommunications networks have very different infrastructures, so that a connection between the terminals of different telecommunications networks and a common server can only be maintained with difficulty. In that case e.g. a further server, which is not illustrated in the figure, can provide data for functions to the second terminal instead of the server CS. If both servers are then tuned to each other with regard to the output volume and the configuration of the functions to be provided by the respective terminals, even though both servers interact individually with the respective terminals and utilize different connections, the operator however has the same or at least similar functions available in both terminals.

