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(71) Applicant *(for all designated States except US)*: **PARADOX SOFTWARE LIMITED** [GB/GB]; 15 Laburnam Close, London N11 3NR (GB).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **MRSIC-FLOGEL** [HR/GB]; 121 Beaufort Mansions, Beaufort Street, London SW3 5AE (GB).

(74) Agents: **R.G.C. JENKINS & CO.** et al.; 26 Caxton Street, London SW1H 0RJ (GB).

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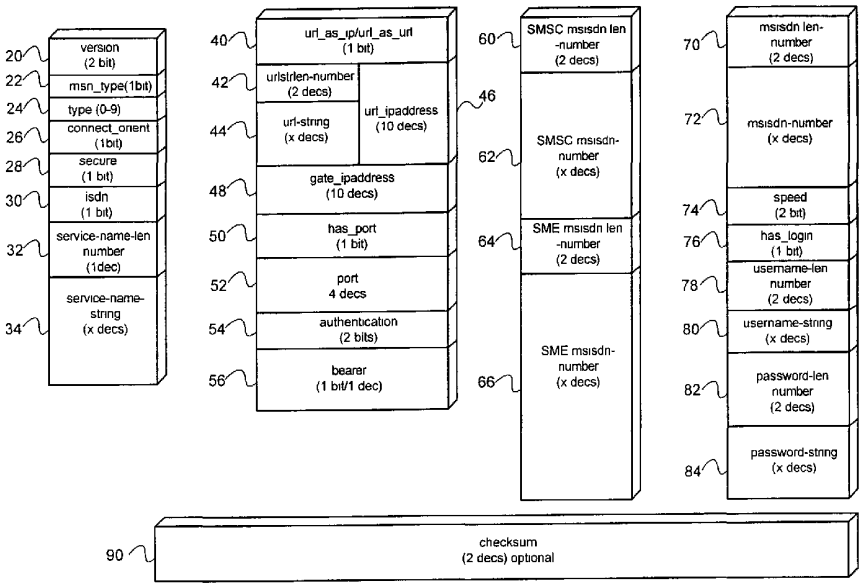

(57) Abstract: According to the present invention there are provided methods of, computer programs for and apparatus for providing a data processing device with a plurality of parameters, the parameters being for use in the data processing device accessing a remote data resource, the method comprising the following steps: a) entering a data string into the data processing device using a human-machine interface of the data processing device; b) the data processing device obtaining the plurality of parameters on the basis of the data string, c) storing the plurality of parameters in the data processing device. Methods of, computer programs for and apparatus for encoding and for decoding a data string are also provided as well as methods of, computer programs for and apparatus for accessing remote data resources.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Data Communications

Field of the Present Invention

The present invention relates to methods of, computer programs for, and apparatus for providing data processing devices with communications parameters. More particular, but not exclusively, the present invention relates to methods of, computer programs for, and apparatus for providing mobile data processing devices with communications parameters to enable them to access remote data resources.

Background of the Present Invention

When establishing a data communications link from a local data processing device to a remote data processing device, to access remote data resources for example, various communications settings are normally required. For instance, some or all of the following may need to be specified: a telecommunications protocol, a data transfer rate (or baud rate), network identities of the remote data processing device, a name or identifier of the user of the local data processing device, a name or identifier of a data resource to be accessed at the remote data processing device, a password or other authorisation/ authentication parameters etc. For example, a user may wish to access an Internet site using a home or office personal computer (PC). Typically, the user will run browser software on the PC and will instruct the browser software to establish a communications link to a network access server

of an Internet Service Provider (ISP) using a modem and associated telecommunications software. The user will normally be required to specify the phone number of a modem bank connected to the ISP's network access server and will also be required to specify a user name and password. For convenience, this information may be pre-stored in the PC, and all the user will need to specify in order to access a remote data resource is an identifier of that remote data resource, such as a Universal Resource Locator (URL).

Mobile or wireless devices, such as mobile phones and personal digital assistants (PDAs) with telecommunications capabilities are widely available. In general, similar settings will need to be specified when using a mobile or wireless device to establish a communications link with a remote data processing device as when using a fixed device such as a fixed PC. However, due to the mobility and limited storage of mobile or wireless devices, it is less likely that many of the settings will be pre-stored and more likely that many of the settings will need to be specified on a periodic or per communications session basis. For example, mobile and wireless devices are available which conform to the Wireless Application Protocol (WAP) specification. Users wishing to establish a communications link from a WAP-enabled device to access a data resource at a remote data processing device may need to specify up to about 20 different settings. Manually entering this information on devices such as mobile phones, which do not in general have the benefits of large screens, fully featured keypads and graphical user interfaces, can present a problem.

Nokia™ have developed a protocol called Smart Messaging which enables remote configuration of communications settings for mobile phones such as Internet access parameters, electronic mail settings, Short Message Service (SMS) settings, Telnet settings, terminal settings, World Wide Web (WWW) settings, File Transfer Protocol (FTP) settings, Internet settings, telephone settings and WWW autofetch settings. Phone.com™ have developed a similar "over the air" service for provisioning mobile phones.

One problem with the "over the air" approach to provisioning is that it requires interaction between the user of the mobile phone, or other communications device, and the provider of the "over the air" settings, which significantly restricts the freedom and choice of the user.

Summary of the Present Invention

According to a first aspect of the present invention there is provided a method of providing a data processing device with a plurality of parameters, the parameters being for use in the data processing device accessing a remote data resource, the method comprising the following steps:

a) entering a data string into the data processing device using a human-machine interface of the data processing device;

b) the data processing device obtaining the plurality of parameters on the basis of the data string,

c) storing the plurality of parameters in a data store accessible to the data processing device.

According to a second aspect of the present invention there is provided a method of providing a data processing device with one or more parameters, the parameters being for use in the data processing device accessing a remote data resource, the data string comprising at least one of the parameters encoded using an encoding algorithm, the method comprising the following steps:

a) entering a data string into the data processing device using a human-machine interface of the data processing device ;

b) the data processing device obtaining the one or more parameters on the basis of the data string,

c) storing the one or more parameters in a data store accessible to the data processing device.

According to a third aspect of the present invention there is provided a method of accessing a remote data resource using a data processing device, the method comprising the following steps:

a) entering a data string into the data processing device using a human-machine interface of the data processing device ;

b) the data processing device obtaining a plurality of parameters on the basis of the data string, the parameters being for use in the data processing device accessing a remote data resource,

c) accessing the remote data resource using the obtained parameters.

An advantage of the first, second and third aspects above is the ability of the ability of the user of a mobile phone or other communications device to

self-provision using a single data string or code which may be obtained from any source, such as conventional print media or from friends.

Preferably, the data string is a single decimal number or a plurality of decimal numbers separated by a non-numeric character. One advantage of this is that the decimal code is suited to manual entry into a numeric keypad, such as found on mobile phones.

According to a fourth aspect of the present invention there is provided a method of encoding one or more parameters for inclusion in at least part of a data string, the data string being for user input into a data processing device, the one or more parameters being for use in the data processing device accessing a remote data resource, the encoding being performed using an encoding algorithm.

According to a fifth aspect of the present invention there is provided a method of decoding at least part of a data string to obtain one or more parameters, the data string being for user input into a data processing device, the one or more parameters being for use in the data processing device accessing a remote data resource, the decoding being performed using a decoding algorithm.

Preferably, the encoding method functions to compress and/or encrypt the parameters for provisioning and the decoding method functions to decompress and/or decrypt the code. An advantage of compressing the parameters is that the data string or code may require substantially less keypresses to enter into a mobile phone or other communications device than

the corresponding unencoded parameters. An advantage of encrypting the parameters is that the encoding method cannot be easily reverse-engineered by third parties thus preventing third parties from generating data strings or codes which may be decoded using decoding methods for provisioning communications devices.

Also preferably, the encoded data string comprises a checksum for use in validating the data string. An advantage of this is that the validity of the parameters may be checked by the communications device without establishing or attempting to establish a communications link using erroneous parameters.

Computer programs and data processing devices for performing the methods of the above aspects are also provided.

There now follows, by way of example only, a detailed description of preferred embodiments of the present invention in which:

Brief Description of Diagrams

Figure 1 shows a typical arrangement of data processing devices for providing a WAP-enabled data processing device with access to a remote data resource;

Figure 2 is a schematic diagram showing structured data types for provisioning a WAP-enabled data processing device according to an embodiment of the present invention; and

Figure 3a to f show a user interface of a WAP-enabled data processing device as used in an embodiment of the present invention.

Detailed Description of Embodiments of the Present Invention

Figure 1 shows a typical arrangement of data processing devices for providing a WAP-enabled data processing device with access to a remote data resource, wherein WAP-enabled mobile phone 10 passes a service request message to obtain content or a service at remote content server (or origin server) 16 via base station transceiver 12 of a cellular mobile network and WAP gateway (or WAP proxy) 14. There are many bearers with which WAP-enabled mobile phone 10 may communicate with WAP gateway 14. Cellular networks conforming to the Global System for Mobile Communications (GSM) currently use Circuit Switched Data (CSD) or Short Message Service (SMS) as a bearer for data communications. An embodiment of the present invention will be described for provisioning a data processing device with parameters enabling access to remote data resources using either of these two bearers.

To provision WAP-enabled mobile phone 10, many parameters may need to be configured, some of which will depend on which bearer is used to provide the data communications service. With GSM/CSD, an Internet Protocol (IP) address for gateway server 14 will need to be specified as will a telephone number (i.e. a Mobile Station International Service Directory Number (MSISDN)) corresponding to a modem or modem bank associated with gateway 14. In certain circumstances, further information is needed such as a port number of gateway 14, an authentication type – for example the

Challenge Access Protocol (CHAP) or the Password Access Protocol (PAP), an authentication name, an authentication secret, a call type (i.e. analogue or Integrated Services Digital Network (ISDN)), a call speed (i.e. a baud rate), a gateway authentication name, a gateway authentication secret and an ISP name.

With GSM/SMS, an MSISDN of a Short Messaging Entity (SME) associated with gateway server 14 will need to be specified as well as an MSISDN corresponding to an SMS Centre (SMSC). In certain circumstances, a port number corresponding to gateway server 14 will also need to be specified. It will be appreciated that various other parameters will need to be specified for other data networks and bearer services depending upon the data network type and bearer type used for access.

As well as an network address for gateway 14 and various parameters relating to the bearer service, a URL corresponding to the content maintained on content server 16 will also need to be specified and, preferably, a user-friendly name for use as a recognition handle by a user of mobile phone 10. Other parameters may also be specified relevant to content server 16 such as bookmark URLs or user identification parameters.

Figure 2 is a schematic diagram showing structured data types for provisioning a WAP-enabled data processing device according to an embodiment of the present invention. According to the present invention, the various parameters which need to be provided to mobile phone 10 to enable access of a remote data resource at origin server 16 are encoded using an encoding algorithm. The encoding algorithm uses a predetermined parameter

structure to group all the parameters to be provided into a single decimal number or code. The encoding algorithm also uses compression techniques to reduce the amount of data required to specify certain of the parameters and, optionally, encryption techniques to prevent the encoding method from being reverse-engineered by a third party. This is to prevent codes being generated for provisioning access to arbitrary WAP content or services by third parties without permission. Techniques for compression and encryption will be described in greater detail below.

Figure 2 shows the characteristic data structures used by the encoding algorithm of the present invention. Each of the parameters that may need to be provided to mobile phone 10 are shown as individual data blocks. The data blocks are arranged into four columns for ease of presentation. The first column relates to general parameters relevant to the provision. The second column relates to network addresses and other information relevant to gateway server 14 and content server 16. The third and fourth columns relate to bearer parameters. In particular, the third column relates to GSM/SMS as the bearer type, and the fourth column relates to GSM/CSD as the bearer type. Finally, a further data block 90 is shown for optionally providing a checksum of all the parameters specified in the data blocks of columns 1 to 4.

Data block 20 is a two bit version number corresponding to the version of the encoding algorithm used. Data block 22 is a one bit MSISDN type which is a flag representing whether or not international prefixes (such as +44 for the UK or +358 for Finland) are to be used when specifying MSISDNs such

as the MSISDN of the SMSC or the MSISDN of a dial-up modem or modem bank. Data block 24 is a single decimal digit representing an encoding type.

Depending on the encoding type, various of the parameters required by mobile phone 10 may be set to default values so that the code may be shortened. According to one encoding type, the user friendly service name may be set by default to "WAP Service" or a name corresponding to a WAP service provider such as "In Hand"™. By defaulting the user friendly service name, it is possible to omit data blocks 32 and 34 to be described below. In a similar fashion, depending upon the encoding type, various other parameters required by mobile phone 10 may be set to default values.

According to another encoding type, the user-friendly service name may contain a default prefix or suffix such as "In Hand" or "WAP Service". Thus, a service name will still be encoded using the encoding algorithm but will represent only part of the service name provided to mobile phone 10.

It will be appreciated that, by using encoding types, any of the data blocks set out in Figure 2, other than data block 20 and 24 themselves, may be given default values whether in part or in whole.

Data block 26 is a one bit flag representing whether the GSM/CSD bearer operates in connection-oriented mode or connectionless mode. GSM/SMS is always connectionless. Data block 28 is a one bit flag representing whether a security protocol such as the Wireless Transport Layer Security protocol (WTLS) is used or not. Data block 30 is a one bit flag representing whether GSM/CSD uses ISDN links or an analogue modem link.

Data blocks 32 and 34 represent the user-friendly service name given to the provisioned communications parameters. Data block 32 is a one decimal digit representing the length of the service name string to be provided in data block 34. The actual length of the service name string is twice the number specified in data block 32. Thus, a service name link of 5 indicates that a service name string of 10 characters is expected. Thus, the maximum number of characters that may be specified using a one decimal service name length is 18 characters. In comparison to having a two decimal code representing the service name length, a saving of one decimal is made when the service name string contains an even number of characters. Data block 34, representing the service name string itself, is a decimal number representing an alphanumeric service name. Only the 26 letters of the English alphabet plus certain other characters such as "-", "/", "." and " " (ie. a space) may be used. Thus, each character may be specified by a numeral between 0 and 29. With a string of characters, it is possible to take the most significant digits of numerals representing the characters (which will be either 0, 1, or 2) in pairs and combine each pair into a single representative decimal digit between 0 and 8. The least significant digits, on the other hand, cannot be compressed in this way. Thus, it is possible to compress a two character service name string, which would normally take four decimal numbers to represent, into a three decimal number.

Data block 40 is a one bit flag representing whether the URL specifying the data resource to be accessed is represented in dotted decimal IP notation

(i.e. x.x.x.x) or as a domain name (i.e. abc.com/content.wml). Data blocks 42 and 44 are relevant where the data resource is represented as a URL in domain name form. Data block 42 is a two decimal digit number representing the length of the URL string to be provided in data block 44. Data block 44 is a decimal number representing an alphanumeric URL string which may be compressed in the same manner as has been described above with respect to the service name string. Data block 46 is the URL representing the data resource in dotted decimal notation. However, a similar compression technique may be used here as well. IP dotted decimal notation represents four two digit hexadecimal numbers in decimal form. Thus, there are four decimal numbers each ranging from 0 to 255. Note that the dots can obviously be omitted. The most significant digit of the decimal numbers range between 0 and 2. Thus, the most significant digits can be taken in pairs and each pair represented as a single decimal number between 0 and 8 as above. The least significant two digits of each decimal number between 0 and 255 cannot be compressed in this way. Thus, a dotted decimal notation which would normally take twelve decimals (omitting the dots) may be represented with only 10 decimal numbers.

Data block 48 represents the IP address in dotted decimal notation of gateway server 14. This data block is compressed as has been described above with reference to data block 46. Data block 50 is a one bit flag representing whether a port number is to be specified for the gateway server. If so, data block 52 is a four decimal code representing the port number. Data block 54 is

a two bit code representing which type of authentication is used – for example, CHAP or PAP etc. Data block 56 is a one bit flag representing the bearer type to be used – i.e. GSM/CSD or GSM/SMS. For networks which accommodate more than two bearer types, a single decimal number may be used to represent which bearer type is used, thus giving ten bearer type option instead of two.

If the bearer type is GSM/SMS, then data block 60, 62, 64 and 66 are used. Data block 60 is a two decimal digit number representing the length of the MSISDN of the SMSC in two decimal numbers. Data block 62 is the MSISDN of the SMSC. Note that this will either be represented in international format or in local format depending upon the value set in data block 22. Data block 64 is a two decimal digit number representing length of the MSISDN of the Short Messaging Entity (SME) associated with gateway server 14. Data block 66 is the MSISDN of the SME itself. Note that these MSISDN numbers cannot individually be compressed.

If the bearer type is GSM/CSD, then data block 70, 72, 74, 76, 78, 80, 82 and 84 are used. Data block 70 is a two decimal digit number representing length of the MSISDN of the dial-up modem or modem bank. Data block 72 is the MSISDN of the modem or modem bank itself. Data block 74 is a two bit number representing the speed or baud rate of the modem connection. Data block 76 is a one bit flag representing whether the modem connection requires a log in user name and password. If so, data block 78, 80, 82 and 84 are required. Data block 78 is a two decimal digit number representing length of the user name. Data block 80 is a decimal number representing the

alphanumeric user name string itself which is compressed as has been described above with reference to the service name string. Data block 82 is a two decimal digit number representing length of the password. Data block 84 is a decimal number representing the alphanumeric password itself, which is compressed as has been described above.

Finally, data block 90 is an optional checksum, preferably using two decimal digits, computed over all of the previous parameters if specified. This may be used to verify that the decimal code presents a valid set of parameters for provision to mobile phone 10.

When generating a single decimal code representing the various parameters required by mobile phone 10, whether some are provided by default or not, the various data blocks shown in Figure 2 may be ordered in any manner. Preferably data blocks which are not whole decimal digits, for example data block 20 which is a two bit data element and data block 22 which is a one bit flag, are aggregated in a predetermined order and represented as one or more decimal digits. Thus, it can be seen that the various parameters required by mobile phone 10 may be represented by a relatively short decimal number or code. For example, using an encoding type which sets as default the user friendly service name, the network address of the data resource identifier at content server 16, uses GSM/CSD as the bearer and sets default values for other bearer and service-related parameters, the only substantial data item to be included in the code is the MSISDN of the dial-up modem or modem bank of gateway server 14. Thus, decimal codes of length between 8 and 20 may be

used to represent all the parameters required to be provided to mobile phone 10. In general cases it is expected that decimal codes of length around 40 to 60 will be required to specify all the parameters in full.

It will be appreciated that the structuring and compression of the parameters required achieves a form of encryption in itself. However, known techniques of lossless encryption may also be used by the encoding algorithm to generate a decimal code. For example, individual decimals may be mapped uniquely in a one-to-one mapping to other decimals, and neighbouring decimals in a decimal number may be combined together in turn (with the final decimal being added to the first decimal) to generate an encrypted decimal number. Furthermore, compression techniques may be applied to the decimal number as a whole, rather than to each data block individually as has been described above, thus resulting in further reduction of the length of decimal number required to provision mobile phone 10.

The encoding may be performed by a suitable data processing device such as a PC taking as its input the various parameters required and producing as an output the decimal code. For the decimal code to be used for provisioning mobile phone 10, a corresponding decoding algorithm may be included in the application program operated by mobile phone 10. For example, the decoding algorithm may be included in the WAP browser application operated by mobile phone 10. Thus, a decimal code representing required parameters may be entered into mobile phone 10 and decoded into the various parameters by the browser application.

Figure 3a to f show a user interface of mobile phone 10 for entering decimal codes according to the present invention. Figure 3a shows a screen 100 and a keypad 102 of mobile phone 10. Screen 100 presents to a user of mobile phone 10 a standard menu option for selecting one of five profiles for accessing remote data resources such as WAP services or content. By selecting Profile 1 using keypad 102 the user is presented with a screen as shown in Figure 3b. In Figure 3b screen 100 presents three options to a user to be performed in respect of Profile 1. Firstly the user may activate the profile (if one has been stored) and thereby access the remote data resource thereby provisioned. Secondly, the user may configure Profile 1 with new parameters for accessing the remote data resource (if no profile has been prestored). Thirdly, the user may edit previously stored profile settings. By selecting the "Configure" menu option, the user is presented with a configuration menu screen such as shown in Figure 3c. Figure 3c shows two options that may be performed in respect of Profile 1. Firstly, the user may enter a Service Code in accordance with the present invention. Alternatively, the user may use a Configuration Wizard to manually, and more laboriously, enter each of the required parameters one by one. By selecting the "Enter Service Code" option the user is presented with a screen as shown in Figure 3d. Using the keypad, the user enters the decimal code according to the present invention and selects "OK" when finished. Mobile phone 10 may then present a screen such as shown in Figure 3e indicating that a new service setting has been saved in Profile 1 and querying whether user would like to activate the profile. If,

however, a checksum such as shown in data block 90 has been used and an error has been detected in the service code entered by the user, a screen such as shown in Figure 3f may be presented to the user, indicating that an error has been detected in the code entered.

In a further embodiment of the present invention, the decimal codes used to provision mobile phone 10 may be divided into two or more decimal numbers separated by a suitable separating character such as a dot. In a further embodiment of the present invention, the code generated by the encoding algorithm is an alphanumeric code such as a hexadecimal code, an alphabetic-only code or a full alphanumeric code rather than a decimal code. This clearly results in a shortening of the number of characters required to represent the same communication settings. However, the alphanumeric characters are less suited to entry using a numeric keypad of a communications device such as a mobile phone.

In a further embodiment of the present invention, the decimal code, or alphanumeric code, may be used by the communications device to access a server for obtaining the various parameters required to access the remote data resource. The server comprises a pre-configured database mapping the decimal or alphanumeric codes to the various parameters required to be provided. In response to a service request message received from the communications device including the code, the server provides the various parameters required to access the remote data resource. In a variant of this embodiment, the server may use a decoding algorithm as described above to generate the parameters

required, rather than a database. In a further variant, the communications device itself is pre-configured with a database mapping the decimal or alphanumeric codes to the various parameters required. The database may be present in the Subscriber Identity Module (SIM) of a communications device or in a data store of the communications device itself. Thus, in all three variants of this embodiment of the present invention, the communications device need not use a decoding algorithm to obtain the required parameters on the basis of the code. Furthermore, in the two cases using a database, no encoding needs be performed.

It will be understood that the present invention is not limited to provisioning WAP-enabled mobile phones with parameters for accessing remote data resources using GSM/SMS or GSM/CSD. The present invention is applicable to provisioning any data processing device, whether wired or wireless, and whether fixed or mobile, with parameters for accessing remote data resources using any type of data network, whether circuit-switched (such as a Public Switched Telephone Network (PSTN)) or packet-switched (such as an Internet Protocol (IP) network) and whether fixed or cellular (such as GSM networks or Personal Handyphone System (PHS) networks), and any bearer service supported by the data network. For example, GSM networks will shortly be able to use High Speed Circuit-Switched Data (HSCSD), Unstructured Supplementary Services Data (USSD) and General Packet Radio Service (GPRS) as bearers. Furthermore, third generation cellular networks such as Universal Mobile Telecommunications Service (UMTS) and other

systems whether based on time division multiple access (TDMA) or code division multiple access (CDMA) will also be suitable for application of the present invention.

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CLAIMS:

1. A method of providing a data processing device with a plurality of parameters, the parameters being for use in the data processing device accessing a remote data resource, the method comprising the following steps:

a) entering a data string into the data processing device using a human-machine interface of the data processing device ;

b) the data processing device obtaining the plurality of parameters on the basis of the data string,

c) storing the plurality of parameters in a data store accessible to the data processing device.

2. A method according to any preceding claim, wherein the data string comprises an single alphanumeric data string.

3. A method according to any preceding claim, wherein the data string comprises a single decimal number or a plurality of decimal numbers separated by a non-numeric character.

4. A method according to any preceding claim, wherein the data string comprises one or more of the plurality of parameters encoded using an encoding algorithm.

5. A method according to any preceding claim when dependent on claim 4, wherein the encoding algorithm compresses the size of data required to represent the one or more parameters encoded.

6. A method according to any preceding claim when dependent on claim 4, wherein the encoding algorithm encrypts the data representing the one or more parameters encoded.

7. A method according to any preceding claim when dependent on claim 4, wherein the one or more of the plurality of parameters may be obtained from the data string by decoding at least part of the data string using a decoding algorithm.

8. A method according to claim 7, wherein the data processing device is adapted to decode at least part of the data string using the decoding algorithm.

9. A method according to any preceding claim, wherein the plurality of parameters includes an identifier corresponding to the remote data resource.

10. A method according to any preceding claim, wherein the plurality of parameters includes a name for identifying the plurality of parameters.

11. A method according to any preceding claim, wherein the plurality of parameters includes an identifier corresponding to a gateway or proxy through which access to the remote data resource may be provided.

12. A method according to any preceding claim, wherein the plurality of parameters includes an identifier corresponding to an interface to a service provider through which access to the remote data resource may be provided.

13. A method according to any preceding claim, wherein the data string comprises a data element for validating the data string.

14. A method according to any preceding claim, wherein the data processing device is a mobile communications device.

15. A computer program for performing the method of any preceding claim.

16. A data processing device adapted to be provisioned with the plurality of parameters in accordance with the method of any of claims 1 to 14.

17. A method of providing a data processing device with one or more parameters, the parameters being for use in the data processing device accessing a remote data resource, the data string comprising at least one of the parameters encoded using an encoding algorithm, the method comprising the following steps:

a) entering a data string into the data processing device using a human-machine interface of the data processing device ;

b) the data processing device obtaining the one or more parameters on the basis of the data string,

c) storing the one or more parameters in a data store accessible to the data processing device.

18. A method according to claim 17, wherein the data string comprises a data element for validating the data string.

19. A method according to claim 17 or claim 18, wherein the data processing device is a mobile communications device.

20. A computer program for performing the method of any of claims 17 to 19.

21. A data processing device adapted to be provisioned with the one or more parameters in accordance with the method of any of claims 17 to 19.

22. A method of encoding one or more parameters for inclusion in at least part of a data string, the data string being for user input into a data processing device, the one or more parameters being for use in the data processing device accessing a remote data resource, the encoding being performed using an encoding algorithm.

23. A method according to claim 22, wherein the data processing device is adapted to decode at least part of the data string using a decoding algorithm.

24. A method according to claim 22 or any preceding claim when dependent on claim 22, wherein the encoding algorithm reduces the size of data required to represent the one or more parameters.

25. A method according to claim 22 or any preceding claim when dependent on claim 22, wherein the encoding algorithm encrypts the data representing the one or more parameters.

26. A method according to claim 22 or any preceding claim when dependent on claim 22, wherein the data string comprises a data element for validating the data string.

27. A method of decoding at least part of a data string to obtain one or more parameters, the data string being for user input into a data processing device, the one or more parameters being for use in the data processing device accessing a remote data resource, the decoding being performed using a decoding algorithm.

28. A method according to claim 27, wherein the data processing device is adapted to decode at least part of the data string using the decoding algorithm.

29. A method according to claim 27 or any preceding claim when dependent on claim 27, wherein the decoding algorithm enlarges the size of data required to represent the one or more parameters.

30. A method according to claim 27 or any preceding claim when dependent on claim 27, wherein the decoding algorithm decrypts the data representing the one or more parameters.

31. A method according to claim 27 or any preceding claim when dependent on claim 27, wherein the decoding algorithm checks the validity of the data string using a data element comprised in the data string.

32. A method according to claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27, wherein the data string comprises a single alphanumeric data string.

33. A method according to claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27, wherein the data string comprises a single decimal number or a plurality of decimal numbers separated by a non-numeric character.

34. A method according to claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27, wherein the one or more parameters includes an identifier corresponding to the remote data resource.

35. A method according to claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27, wherein the one or more parameters includes a name for identifying the plurality of parameters.

36. A method according to claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27, wherein the one or more

parameters includes an identifier corresponding to a gateway or proxy through which access to the remote data resource may be provided.

37. A method according to claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27, wherein the one or more parameters includes an identifier corresponding to an interface to a service provider through which access to the remote data resource may be provided.

38. A method according to claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27, wherein the data processing device is a mobile communications device.

39. A computer program for performing the method of claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27.

40. Apparatus adapted to perform the method of claim 22 or claim 27 or any preceding claim when dependent on claim 22 or claim 27.

41. A method of accessing a remote data resource using a data processing device, the method comprising the following steps:

a) entering a data string into the data processing device using a human-machine interface of the data processing device;

b) the data processing device obtaining a plurality of parameters on the basis of the data string, the parameters being for use in the data processing device accessing a remote data resource,

c) accessing the remote data resource using the obtained parameters.

42. A computer program for performing the method of claim 41.

43. Apparatus adapted to perform the method of claim 41.

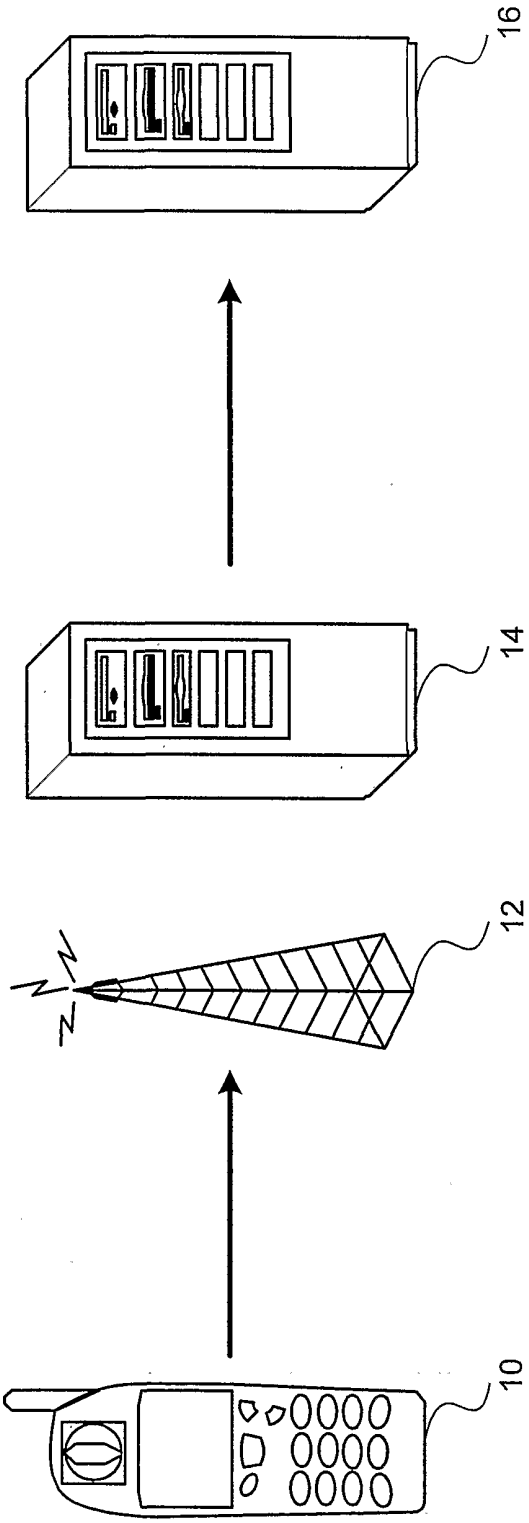

Figure 1

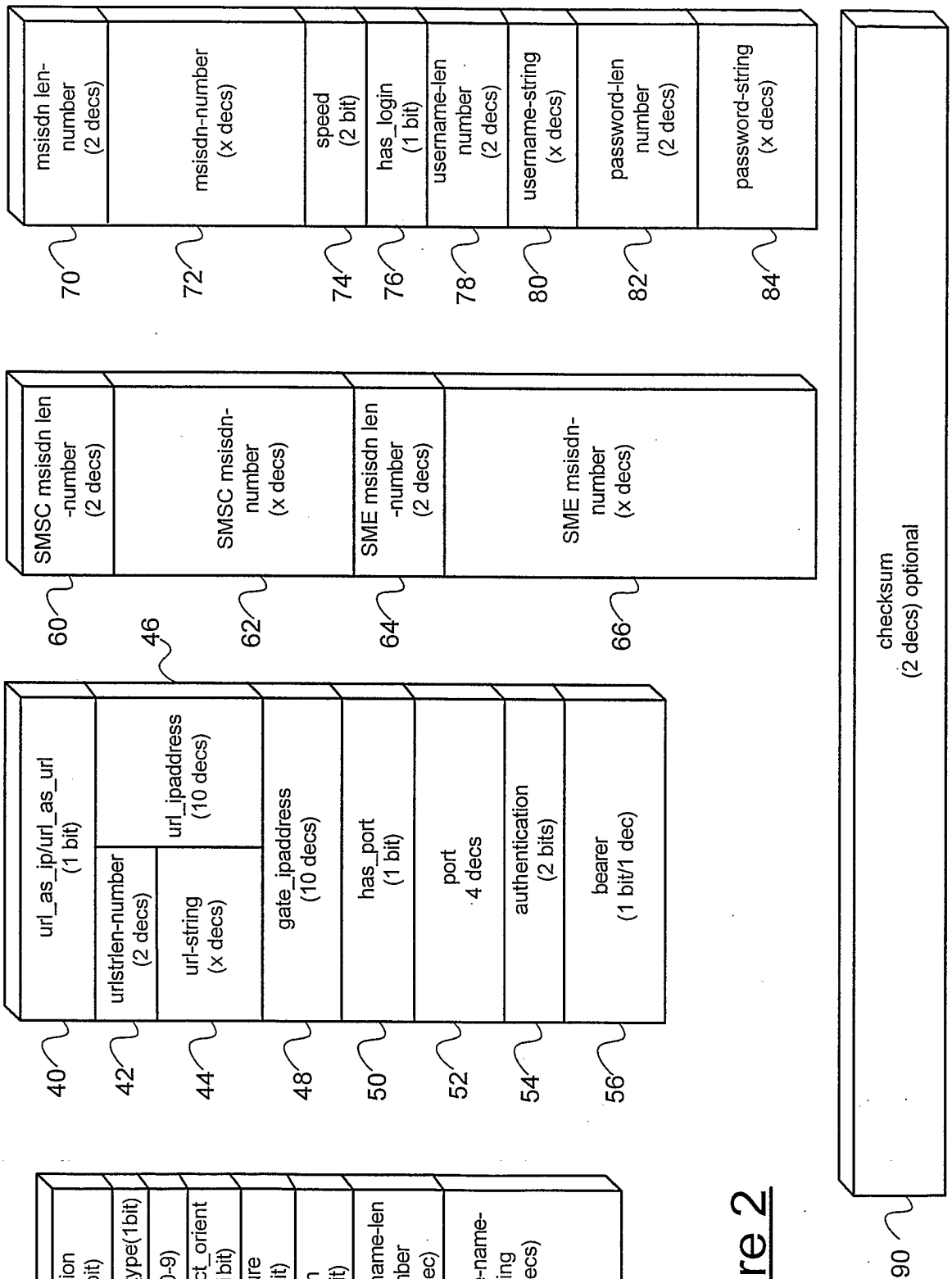
version (2 bit)
msn_type(1bit)
type (0-9)
connect_orient (1bit)
secure (1 bit)
isdn (1 bit)
service-name-len number (1dec)
service-name-string (x decs)
20
22
24
26
28
30
32
34
url_as_ip/url_as_url (1 bit)
urlstrlen-number (2 decs)
url-string (x decs)
url_ipaddress (10 decs)
gate_ipaddress (10 decs)
has_port (1 bit)
port 4 decs
authentication (2 bits)
bearer (1 bit/1 dec)
40
42
44
48
50
52
54
56
46
SMSC msisdn len -number (2 decs)
SMSC msisdn-number (x decs)
SME msisdn len -number (2 decs)
SME msisdn-number (x decs)
60
62
64
66
msisdn len-number (2 decs)
msisdn-number (x decs)
speed (2 bit)
has_login (1 bit)
username-len number (2 decs)
username-string (x decs)
password-len number (2 decs)
password-string (x decs)
70
72
74
76
78
80
82
84
checksum (2 decs) optional
90

Figure 2

Figure 3a

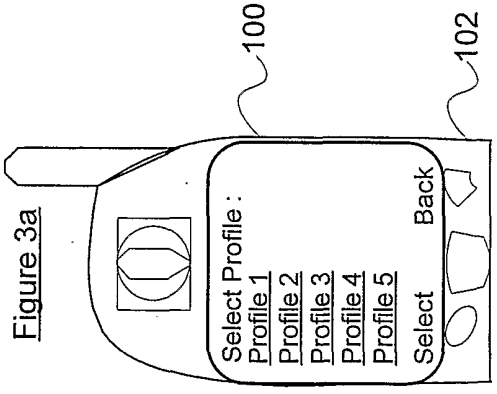

Figure 3b

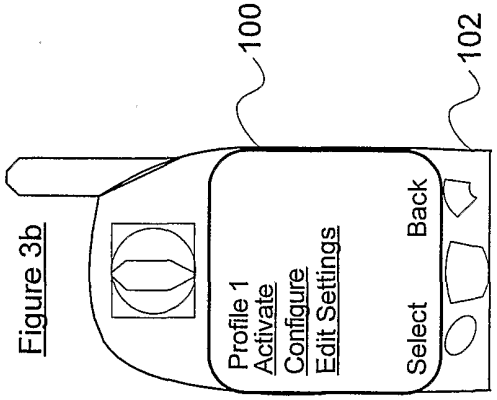

Figure 3c

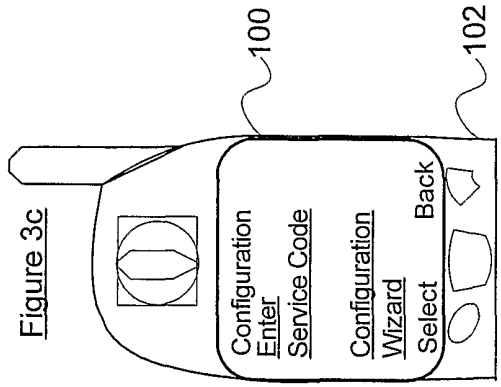

Figure 3d

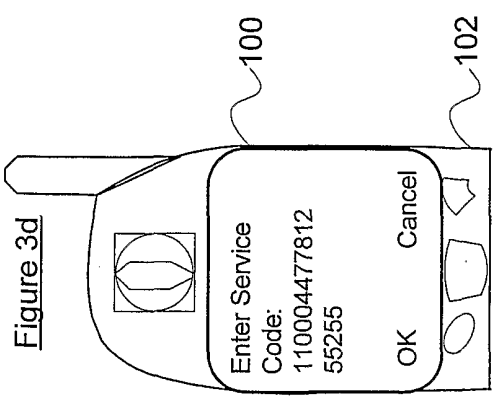

Figure 3e

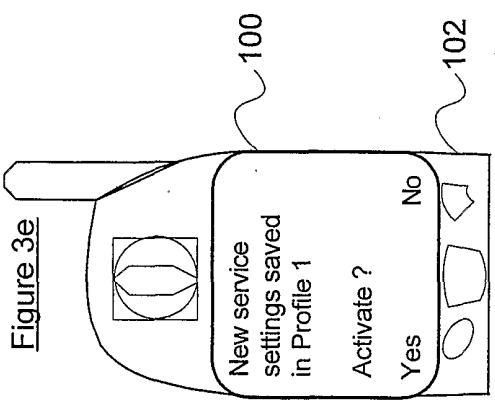

Figure 3f