

## ROAMING CONTROL PANEL

### FIELD OF INVENTION

5       The present invention relates to a method and system for allowing users to access a service provider's wireless LAN services in an intuitive and user-friendly manner while supporting a wide range of authentication & billing options.

### BACKGROUND

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The Internet consists of a large number of computers, devices and networks all interconnected via communications links. Users gain access to the Internet via communications service providers, which can be, among others, Internet service providers, wireless Internet service providers, mobile telephone service providers or fixed line service providers.

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Such communications service providers typically have a limited footprint, that is, they can only provide local access to the Internet in certain areas. For example, a mobile telephone service provider may only provide access to the Internet when the mobile telephone user is within the defined coverage area of the said service provider's mobile network. Another example would be  
20 an internet service provider that maintains a national telephone number to deliver Internet access nationwide, but is unable to provide a local access number for a subscriber who travels out of the country of service.

In order to provide local Internet services, communications service providers enter into  
25 bilateral or multilateral roaming agreements with each other where they provide local ("host") services to subscribers of the other operators ("guests"). Authentication and billing services are provided by the subscribers' "home" operator, which will then settle with an aggregator or the "host" operator directly.

30       There are a number of access mechanisms for providing roaming local internet access. The most common is via dial-up access, where at least one local access telephone (PSTN) number is provided to travellers to each region. Generally, dial-up roaming access is managed by client

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software that runs on the guest's computer. This software maintains a searchable database of access numbers for every region and will automatically dial an appropriate local access number based on the guest's indicated current location.

5           A new and emerging method for providing roaming internet access is the IEEE 802.11 series of Wireless LAN technologies, known as WLAN or WiFi "hot-spots." Because WLAN hotspots do not require the use of a telephone (PSTN) number, access is typically currently managed by having a "walled garden" that allows any user to connect to the hotspot, but not go beyond the boundaries of the hotspot. All traffic out of the hotspot is blocked, and all World-  
10   Wide Web (HTTP) requests are redirected to a "landing page" which allows guest identification via a username or password pair.

          There are a couple of problems with the existing method. First, a guest's native language may be different from that of the landing page, or a client may not be available in the guest's  
15   native language. This could potentially confuse the guest, thus leading to lost revenue and higher customer support costs.

          Another shortcoming of existing methods is that they generally require guests to follow a slightly different log-in procedure while they are roaming. Instead of merely entering their  
20   username and password as they do while they are at home, guests must now enter their username followed by a "domain" in the form username@domain. This additional information is required to allow the host service provider to identify the home provider communications company, but adds an additional burden to the user, and is non-intuitive.

## 25   **SUMMARY OF THE INVENTION**

          It is therefore a first object of the present invention to provide a method or system for wireless network or internet access which goes some way to overcoming the above mentioned disadvantages in the prior art or which will at least provide the public with a useful choice.

30           It is a second object of the invention to provide a method and a system that allows a roaming user to utilise the services of a service provider in an intuitive manner, whether or not the user has any pre-existing relationship with the service provider. The user operates a client

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system that is provided an identifier that identifies a login session. The client system provides the provided identifier to an authentication server system, together with information about the user's identity & billing relationship and a request to gain access to the Internet. The authenticating server verifies the billing relationship, referring some or all of the provided information to other  
5 servers as necessary, then grants or denies services to the requesting client system.

Accordingly in a first aspect the present invention consists in a system for providing wireless network or internet access comprising:

an interface configured to input a selection from predetermined service providers

a display configured to enable authentication to said selected service provider in a  
10 language and layout depending on said selection

a server allowing network or internet access depending on the success of said authentication.

Preferably said system further comprising a billing module configured to associate a cost with any authenticated network or internet access according to predetermined criteria and  
15 communicate said cost to said selected service provider to allow billing.

Preferably said display configured to provide an authentication web page substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

Preferably said display configured to provide information at least depending on said cost  
20 or said predetermined criteria.

In a second aspect the present invention consists in a system for providing wireless network or internet access configured to:

store predetermined service providers

input a selection from said predetermined service providers

25 attempt to authenticate to the selected service provider in a format dependant on said selection, and

allow network or internet access dependant on whether said authentication is successful.

Preferably said system further configured to input any further information dependant on said selection and optionally using said further information in said attempted authentication.

30 Preferably said system further comprising a RADIUS proxy allowing authentication with a RADIUS proxy server associated with said selected service provider.

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Preferably said system configured to communicate with a remote user terminal, wherein a user is able to select a service provider and can authenticate to the selected service provider using the service providers own web page on a remote user terminal.

Preferably said web page is substantially the same layout and language as would be  
5 experienced with direct network or internet access through said selected service provider.

Preferably said system configured to supply billing information to said selected service provider dependant on network or internet access provided.

Preferably said system configured to allow further attempts if said authentication is unsuccessful.

10 In a third aspect the present invention consists in a method of allowing access to the Internet for a user comprising the steps of:

storing predetermined service providers

inputting a selection from said predetermined service providers

attempting to authenticate to the selected service provider in a format dependant on said  
15 selection, and

allowing network or internet access dependant on whether said authentication is successful.

Preferably said method further comprising the step of inputting any further information dependant on said selection and optionally using said further information in said attempted  
20 authentication.

Preferably said method further comprising the step of authenticating between a local RADIUS proxy and a RADIUS proxy associated with said selected service provider.

Preferably said method configured to communicate with a remote user terminal, wherein a user is able to select a service provider and can authenticate to the selected service provider  
25 using the service providers own web page on a remote user terminal.

Preferably said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

Preferably said method configured to supply billing information to said selected service provider dependant on network or internet access provided.

30 Preferably said method configured to allow further attempts if said authentication is unsuccessful.

To those skilled in the art to which the invention relates, many changes in construction

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and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claims. The disclosures and the descriptions herein are purely illustrative and are not intended to be in any sense limiting.

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The invention consists in the foregoing and also envisages constructions of which the following gives examples.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

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The preferred forms of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 A flow diagram of the entire log-in process for a guest at a host operator using the access control panel to authenticate via a roaming agreement with a home operator

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Figure 2 Illustrates the "landing page" (displayed by the client) that greets a guest upon an attempt to access the host service provider network.

Figure 3 Illustrates the guest's home operator page (displayed by the client) that is used to provide native language support information, authenticate and bill for the network session via a roaming agreement with the home operator

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Figure 4 A block diagram illustrating an embodiment of the present invention that allows a user to gain access to the network via multiple authentication and billing options.

Figure 5 is a block diagram indicative of the hardware involved in the communication paths there between.

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### **PREFERRED MODE OF IMPLEMENTING THE INVENTION**

In a first preferred embodiment of the present invention a method and system for roaming users to access a host service provider's network is provided which utilises a variety of authentication methods in an intuitive and user-friendly manner. In this embodiment an interface and workflow is provided which greatly enhances ease-of-use by minimising the amount of technical knowledge required by users and providing the ability for support pages to be delivered in users' native languages. This reduces user confusion and customer support costs while

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facilitating the growth of the roaming Internet user market.

In one embodiment, the service gateway controlling network access assigns a unique identifier to the client (such as a Web browser or custom software) upon an access attempt. The  
5 identifier allows the service gateway to identify the unique login session. The client then allows the user to select a supported billing relationship, including, but not limited to, the user's home operator or clearinghouse which is affiliated with the host service provider, a mobile telephone service provider or a credit card account. The client provides the selected identifier together with  
10 the chosen billing relationship to the service gateway, which then determines the appropriate content that the client should display in order to collect any necessary information as shown in Figure 2.

Access option # 1 (100) could for example represent a selection of affiliated or supported home operators from which the user can one click select (102). Access option # 2 (104) could  
15 for example be a drop down box of supported or affiliated mobile telephone service providers from which the user could similarly one click select the provider which they already have a billing relationship with. It is necessary that each of the options the user is able to select are predetermined so that the service gateway is able to determine the appropriate remote servers to communicate with as well as further content required. If the users home operator is not affiliated  
20 then the credit card option e.g. access option # 3 (106) may still allow access.

### **Home Service Provider Selection**

In particular, if the user's chosen billing relationship allows identification of the user's  
25 home service provider, country of origin or preferred language, the service gateway can provide the client with general support information and specific login procedures (e.g. via a Web page) in the user's native language and in a format & layout that would be most familiar to the user as seen in Figure 3.

30 For example the user ID (200) would be entered along with the password (202) in a single frame where the user might click on login (206). An advantage to this embodiment of the present invention is that the home operator's login page is familiar to the user both in language and

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environment such that the user is easily able to gain access.

Once the appropriate content has been identified, the service gateway sends it to the client, along with the previously-assigned identifier, a second identifier that indicates the chosen  
5 billing relationship and instructions to the client to collect any further required information from the user. One skilled in the art would appreciate that the service gateway need not be a monolithic element – for example, the logic that determined the appropriate information to deliver to the client could reside on a separate system that communicated with the service gateway in a manner transparent to the client.

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### **Authentication**

Referring to Figure 1 once the guest has selected the home operator (300) and the user has entered the password and ID (302), the client logic appends the appropriate realm suffix (304) to  
15 the user ID according to the specific home operator selected. The service gateway then sends the credentials to the home operator radius proxy via the host's radius proxy (306). If the authentication is successful the customer is granted access (308) and can use the Internet in a normal fashion. If authentication is not successful the user is prompted for the ID and password again (310), optionally after a set number of attempts the user will be currently blocked.

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The client processes the server's instructions, displays the content to the user and collects any other required information from the user before returning all relevant information to the server for processing, including the identifiers provided by the server.

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Upon receipt of all necessary information required to successfully authenticate and bill the user via the selected billing mechanism, the service gateway will query various specialised upstream servers (which could include RADIUS or merchant servers), providing them with the necessary information to enable them to verify the user's credentials and return an appropriate result. Based on the outcome of this verification process, the service gateway will grant or deny  
30 the user's system access to the network.

### **Internet Access**

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Referring to Figure 4 the network server (400) includes the server engine (402) the host radius proxy (404) the host user database (406) which in turn communicate through the service control point (408) to the user's browser (410). Other communication includes links to the home radius proxy (412) the home user database (414) and other authentication servers (416). Once authentication takes place the server engine (402) allows access in that web page request etc from the user's browser (410) are passed through to the internet and the resulting data stream is passed back to the user's browser (410).

10 Referring to Figure 5 the hardware layout is illustrated. Interface (500) may for example represent the users own computer, a WAP phone or other WiFi capable data device. It is also possible that the hotspot could provide its own terminals with the facility through the present invention of billing for their use through the users home service provider. Wireless communication (502) between Interface (500) and server (504) occurs according to any of the  
15 proceeding embodiments of the present invention. Server (504) may communicate through the internet (506), network or other communication paths to a plurality of home service provider servers' (508), mobile phone service provider servers' (510), credit card service provider servers' (512) and any other affiliated service provider servers' or clearinghouse authentication servers'.

**CLAIMS:**

1. A system for providing wireless network or internet access comprising:  
an interface configured to input a selection from predetermined billing entities;  
5 a display configured to request authentication information for said selected billing entity in a language and layout depending on said selection;  
a communication link to said selected service provider, configured to send said authentication information to said selected billing entity and receive back either a verification or denial of an existing billing arrangement;  
10 a server allowing network or internet access depending on the verification of said authentication information.
2. A system as claimed in claim 1 further comprising a billing module configured to associate a cost with any authenticated network or internet access according to  
15 predetermined criteria and communicate said cost to said selected billing entity to allow billing.
3. A system as claimed in claim 2 wherein said display configured to provide an authentication web page substantially the same layout and language as would be  
20 experienced with direct network or internet access through said selected service provider.
4. A system as claimed in claim 3 wherein said display configured to provide information at least depending on said cost or said predetermined criteria.
- 25 5. A system for providing wireless network or internet access including control means having a stored program which when executed on said control means is characterised by:  
storing predetermined service providers  
receiving a user selection from said predetermined billing entities;  
30 requesting authentication information via billing entity a predetermined format dependant on said selection,  
attempting to authenticate to the selected billing entity using received authentication information, and

allow network or internet access dependant on whether said authentication is successful.

6. A system as claimed in claim 5 further configured to input any further  
5 information dependant on said selection and optionally using said further information in said attempted authentication.

7. A system as claimed in claim 5 further comprising a RADIUS proxy allowing authentication with a RADIUS proxy server associated with said selected billing entity.

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8. A system as claimed in claim 7 configured to communicate with a remote user terminal, wherein a user is able to select a billing entity and can authenticate to the selected billing entity using the billing entities own web page on a remote user terminal.

15 9. A system as claimed in claim 8 wherein said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

10. A system as claimed in claim 7 configured to supply billing information to said  
20 selected billing entity dependant on network or internet access provided.

11. A system as claimed in claim 8 configured to allow further attempts if said authentication is unsuccessful.

25 12. A method of allowing access to the Internet for a user comprising the steps of:  
storing predetermined service providers  
receiving a user selection from said predetermined billing entities,  
requesting authentication information via billing entity a predetermined format dependant on said selection,  
30 attempting to authenticate to the selected billing entity using received authentication information, and  
allowing network or internet access dependant on whether said authentication is successful.

13. A method as claimed in claim 12 further comprising the step of inputting any further information dependant on said selection and optionally using said further information in said attempted authentication.

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14. A method as claimed in claim 12 further comprising the step of authenticating between a local RADIUS proxy and a RADIUS proxy associated with said selected service provider.

10 15. A method as claimed in claim 14 configured to communicate with a remote user terminal, wherein a user is able to select a billing entity and can authenticate to the selected billing entity using the billing entities own web page on a remote user terminal.

15 16. A method as claimed in claim 15 wherein said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected billing entity.

17. A method as claimed in claim 15 configured to supply billing information to said selected billing entity dependant on network or internet access provided.

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18. A method as claimed in claim 16 configured to allow further attempts if said authentication is unsuccessful.