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New Provisional Patent Application:

Inventor(s) : **Kleinrock et al**

Filed : **Herewith**

For : **AUTOMATIC USER TRACKING AND SECURITY IN NETWORKS**

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TRANSMITTAL LETTER FOR

PROVISIONAL PATENT APPLICATION

Assistant Commissioner for Patents
Washington, D.C. 20231
Box: **Provisional** Patent Application

Sir:

Transmitted herewith is the above-noted Provisional patent application, including the following:

☒ **Six (6)** pages Specification, including **Attachments A-H**

☒ **Seven (7)** sheets of informal Drawings

☐ Verified Statement Claiming Small Entity Status

☒ Check in the amount of **$150.00**

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FEE COMPUTATION

Basic Filing Fee.....**$ 150.00**

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TOTAL FILING FEE .....**$ 150.00**

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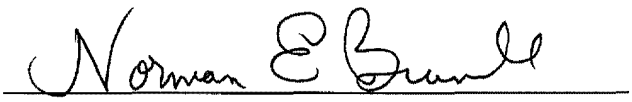
Respectfully submitted,



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Automatic User Tracking & Security in Networks

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Cross Reference to Related Applications

This application is related to US App. Serial No. 08/816,174, a copy of the disclosure of which is attached hereto as attachment H.

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention is related to network communications and, in particular, to improvements in DHCP providing for automatic user tracking and security.

2. Description of the Prior Art:

Dynamic Host Configuration Protocol (DHCP)

Dynamic Host Configuration Protocol (DHCP) was developed as a means of allowing network administrators to assign TCP/IP configuration parameters automatically to the client computers in their networks. Because DHCP relieves network administrators of the time consuming task of manually configuring each computer on the network, it has been well received and is currently used in 40 to 60 percent of enterprise networks today.

DHCP was designed to assign IP settings to any user joining a network, without any user authentication, from a pre-defined range of IP addresses. Since DHCP assigns IP addresses indiscriminately (without, for example, manually entering a MAC address for a lease reservation), it does not allow for the tracking of individual end-users. This can make tracing and diagnosing network problems very difficult for the NSP.

DHCP in the Network Service Provider Network

Under this scenario, each NSP deploys its own DHCP server to perform network configuration tasks. Any DHCP client can obtain the necessary network configuration settings to gain network access from a DHCP server (unless manual reservations are employed). Thus, if a DHCP approach is employed by the NSP, each user must be authenticated or the NSP will not be able to deny access to an unauthorized user. DHCP can also create problems with user traceability. Since clients are given an IP address from a pool of available addresses, the network administrator does not know who is using each IP address.

The traceability issue can be solved by binding MAC addresses to permanent DHCP leases (e.g., manual reservations). Several cable NSPs are using this approach. This, however, requires the NSP to manually track each user's MAC address. This approach forces the user to call a customer service representative at the NSP with his new MAC address each time he changes computers or network interface cards (NIC). This process of tracking MAC addresses requires manual intervention and is burdensome for the NSP; it is not a scalable solution for managing millions of subscribers.

The DHCP approach generally leads to either lengthy customer support calls or worse, on-site visits to the subscribers' homes to set configuration parameters. This process is not complete once the initial customer configuration has been established. The configuration process must be repeated each time the subscriber changes or upgrades his computer or network interface card. This places a substantial and costly customer support burden on the NSP trying to roll out residential broadband service.

SUMMARY OF THE PRESENT INVENTION

In accordance with the present invention, automatic user tracking and security is provided by detecting a unique indicator of the user attempting to access the network, such as the MAC address, and then translating subsequent packets received from that user in accordance with data stored in a server.

In one embodiment of the present invention, the first time a subscriber accesses his residential network, the Nomadix

solution has the ability to redirect that user to a sign-in page on his browser. Nomadix refers herein to the assignee of the present invention. Then, our adaptive networking technology creates a database that automatically records the user's MAC address once an existing customer database or security server (such as RADIUS or TACACS) authenticates the user. The Nomadix databases have been built to easily integrate with these subscriber access systems. Like a router, the Nomadix technology continues to track the IP and MAC settings for each user on the network, eliminating the need for further sign-ins. This allows the NSP to trace network problems and track usage.

In addition, the underlying dynamic NAT approach used to translate static IP addresses can create an additional layer of security for subscribers, since their private IP information never gets transmitted over the public Internet.

BRIEF DESCRIPTION OF THE DRAWINGS AND ATTACHMENTS.

All Figures and attachments hereto are incorporated herein as additional background and disclosure materials.

Fig. 1 is a flow chart diagram of the automatic user tracking and security technology of the present invention.

Fig. 2 is a block diagram of the integration of the USG of the present invention in an Ethernet over ADSL environment.

Fig. 3 is a block diagram illustration of ATM over ADSL using a Bridging Modem.

Fig. 4 is a block diagram illustration of PPP over ATM over ADSL using a Routing Modem from a home User to the NSP.

Fig. 5 is a block diagram illustration of PPP over ATM over ADSL using a Routing Modem from a home User to a corporate server.

Fig. 6 is a block diagram illustration of PPP over Ethernet over ADSL using RedBack technology from a home User to the NSP.

Fig. 7 is a block diagram illustration of Ethernet over ADSL from a user to an Internet Gateway.

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