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Secure system to Anonymous Blacklisting

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Abstract— **In this paper the secure system adds a layer of accountability to any publicly known anonymizing network is proposed. Servers can blacklist misbehaving users while maintaining their privacy and this system shows that how these properties can be attained in a way that is practical, efficient, and sensitive to the needs of both users and services. This work will increase the mainstream acceptance of anonymizing networks such as Tor, which has, thus far, been completely blocked by several services because of users who abuse their anonymity. In future the Nymble system can be extended to support Subnet-based blocking. If a user can obtain multiple addresses, then nymble-based and regular IP-address blocking not supported. In such a situation subnet-based blocking is used. Other resources include email addresses, client puzzles and e-cash, can be used, which could provide more privacy. The system can also enhanced by supporting for varying time periods.**

Index Terms—Anonymous networks, security, IP address blocking

I. INTRODUCTION

Anonymity typically refers to the state of an individual's personal identity, or personally identifiable information, being publicly unknown. There are many reasons why a person might choose to obscure their identity and become anonymous. The term anonymous message typically refers to a message which is, for example, transmitted over some form of a network that does not carry any information about its sender and its intended recipient. It is therefore unclear if multiple such messages have been sent by the same sender or if they have the same intended recipient. The problem of determining whether or not the identity of a communication partner is the same as one previously encountered is the problem of authentication.

The Internet is essentially done anonymously, using unidentifiable pseudonyms. While these names can take on an identity of their own, they are frequently separated from and anonymous from the actual author, and according to the University of Stockholm creating more freedom of expression, and less accountability. The online encyclopedia Wikipedia is collaboratively written mostly by authors using either unidentifiable pseudonyms or IP address identifiers, although a few have used identified pseudonyms or their real names.

Full anonymity on the Internet, however, is not guaranteed since IP addresses, in principle, can be tracked, allowing to identify the computer from which a certain post was made, albeit not the actual user. Anonymizing services such as I2P - The Anonymous Network or Tor address the issue of IP tracking. Their distributed technology approach may grant a higher degree of security than centralized anonymizing services where a central point exists that could disclose one's identity.

Anonymity is a result of not having identifying characteristics (such as a name or description of physical appearance) disclosed. This can occur from a lack of interest in learning the nature of such characteristics, or through intentional efforts to hide these characteristics. An example of the former would include a brief encounter with a stranger, when learning the other person's name is not deemed necessary. An example of the latter would include someone hiding behind clothing that covers identifying features like hair color, scars, or tattoos, in order to avoid identification.

Anonymity may also be created through a gradual eroding of ownership information, such as the passage of time and loss of attribution to a saying. For example, the quote, "Ignorance is Bliss" originally had a known author, but, over time, information on author's identity was obscured and has disappeared.

An anonymity network enables users to access the Web while blocking any tracking or tracing of their identity on the Internet. This type of online anonymity moves Internet traffic through a worldwide network of volunteer servers. Anonymity networks prevent traffic analysis and network surveillance - or at least make it more difficult.

Anonymizing networks such as Crowds and Tor route traffic through independent nodes in separate administrative domains to hide the originating IP address. Unfortunately, misuse has limited the acceptance of deployed anonymizing networks. The anonymity provided by such networks prevents website administrators from blacklisting individual malicious users' IP addresses; to thwart further abuse, they blacklist the entire anonymizing network. Such measures eliminate malicious activity through anonymizing networks at the cost of denying anonymous access to honest users. In other words, a few "bad apples" can spoil the fun for all. Some approaches for blacklisting abusive users are based on pseudonyms. In these systems, of which Nym seems most relevant, users are required to log into websites using an assigned pseudonym, thus assuring a level of accountability. Unfortunately, this

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approach results in pseudonymity for all users ideally, honest users should enjoy full anonymity, and misbehaving users should be blocked.

The goal of [1] is to block misbehaving users in anonymizing networks and providing fast authentication by maintaining privacy. Nymble, a system in which servers can "blacklist" misbehaving users, thereby blocking users without compromising their anonymity. In this paper the Nymble system is implemented. In Nymble, users acquire an ordered collection of nymbles, to connect to Websites. By obtaining a seed for nymble the servers blacklist anonymous users without knowledge of their IP addresses. If the user misbehaves at a server, then that user is blacklisted for the rest of the day and their connections are made unlinkable. In this paper IP address is used as resource for blocking, if other resource like email address is used then blacklisting is not supported. This system does not support for varying linkability windows and not protect against side-channel attacks.

Pseudonym systems allow users to interact with multiple organizations anonymously using pseudonyms. The pseudonyms cannot be linked, but are formed and used by user to prove an organization about his relationship. The main intention of this paper is to motivate users, not to share their identity. In [2], the trusted center's involvement is minimal. The Model presented in this paper have many merits such as the users are motivated not to share their identity thereby increasing the protection of users IP address. By using this system the Certificate Authority work is less.CA is needed only to prove about user identity as true. The pseudonym made unlinkable by providing different pseudonyms. The system is needed to protect against two main attacks they are Credential forgery and User identity compromise or pseudonym linking. The main drawbacks of this method is it weakens the anonymity by providing pseudonyms to all users.

In [3], The main objective of this paper is to enable efficient membership revocation in anonymous settings. This method well supported with applications related with granting and revoking privileges. The main advantage of this paper is the operation cost does not depend on the number of accumulated values. The cost of membership verification increase only by a small constant factor, less than 2.The properties such as correctness, traceability, anonymity and linkability also provided.The updation of user credentials must be done frequently.

In [4], a new revocation method is constructed for group signatures. This method offers constant-length signatures and there exist constant work for signer. Group signatures are anonymous in that no one, with the exception of a designated group manager, can determine the identity of the signer. This paper is based on explicit revocation and it does not rely on time periods. The CRL-based revocation scheme is implemented in this paper. The revocation method executed when member leaves and the revocation list is then published. The merits of this method is that the group signature is of fixed size and a signer performs a constant amount of work in generating a signature. The drawbacks are while using double discrete logarithm, more exponentiations are required. So more expensive for implementing SIGN and VERIFY methods. CRL information is also affected by the number of revoked users.

[5] supports for selective linking of the existing signatures of a misbehaving user without violating the privacy of group members. It incorporates the traceability factors such as User tracing to check whether a signature was issued by a given user, Signature opening to reveal the signer of a given signature and Signature claiming describe that the signer of a signature provably claims a given signature that it has signed. The generic application of this method is transforming an anonymous system to one with fair privacy. This scheme well supported with mix-network. The system does not support Backward Unlinkability.

II. PROBLEM DEFINITION

Anonymizing networks such as Tor allow users to access Internet services privately by using a series of routers to hide the client's IP address from the server. The success of such networks, however, has been limited by users employing this anonymity for abusive purposes such as defacing popular Web sites. Web site administrators routinely rely on IP- address blocking for disabling access to misbehaving users, but blocking IP addresses is not practical if the abuser routes through an anonymizing network. As a result, administrators block all known exit nodes of anonymizing networks, denying anonymous access to misbehaving and behaving users alike. Anonymizing networks route traffic through independent nodes in separate administrative domains to hide a client's IP address. Unfortunately, some users have misused such networks under the cover of anonymity, users have repeatedly defaced popular Web sites. Web site administrators cannot blacklist individual malicious users' IP addresses, they blacklist the entire anonymizing network. Such measures eliminate malicious activity through anonymizing networks at the cost of denying anonymous access to behaving users.

III. PROPOSED SYSTEM

In Nymble, users acquire an ordered collection of nymbles, a special type of pseudonym, to connect to Websites. Without additional information, these nymbles are computationally hard to link, and hence, using the stream of nymbles simulates anonymous access to services. Web sites, however, can blacklist users by obtaining a seed for a particular nymble, allowing them to link future nymbles from the same user those used before the complaint remain unlinkable. Servers can therefore blacklist anonymous users without knowledge of their IP addresses while allowing behaving users to connect anonymously.

This system ensures that users are aware of their blacklist status before they present a nymble, and disconnect

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immediately if they are blacklisted. Although this work applies to anonymizing networks in general, and consider Tor for purposes of exposition. In fact, any number of anonymizing networks can rely on the same Nymble system, blacklisting anonymous users regardless of their anonymizing networks of choice. Nymble, which provides all the following properties: anonymous authentication, backward unlinkability, subjective blacklisting, fast authentication speeds, rate-limited anonymous connections, revocation auditability (where users can verify whether they have been blacklisted), and also addresses the Sybil attack to make its deployment practical.

IV. RESULTS AND DISCUSSION

To participate in the Nymble system, a server with identity Sid initiates a type-Auth channel to the NM, and registers with the NM according to the Server Registration protocol below. Each server may register at most once in any likability window. Logins may be used to provide credentials when creating a client connection. Whether or not logins are required depends on the method calls used to start the server or create the connection. For example, you might need logins for pooling. If you do not use logins, you must track and specify the user credentials manually.

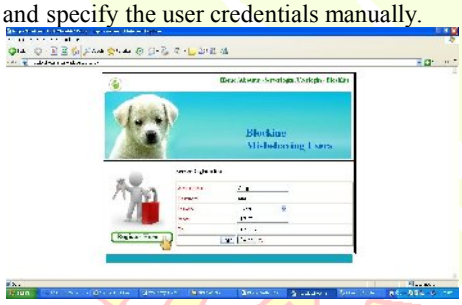

Fig.1. Server Registration Details

This page is used for server registration by entering details such as server name, password and the duration period.

Fig.2. User Registration Details

The user registration page is used for new user to login this application by providing full personal details. It checks the user name and password of particular user and if it is valid then allow user to navigate into nymble system.

The blocked message page is displayed when the user misbehaviour is identified by server and therefore the server end the user connection.

Fig.3. Blacklist Status

V. CONCLUSION

In this paper the secure system adds a layer of accountability to any publicly known anonymizing network is proposed. Servers can blacklist misbehaving users while maintaining their privacy and this system shows that how these properties can be attained in a way that is practical, efficient, and sensitive to the needs of both users and services. This work will increase the mainstream acceptance of anonymizing networks such as Tor, which has, thus far, been completely blocked by several services because of users who abuse their anonymity. In future the Nymble system can be extended to support Subnet-based blocking. If a user can obtain multiple addresses, then nymble-based and regular IP-address blocking not supported. In such a situation subnet-based blocking is used. Other resources include email addresses, client puzzles and e-cash, can be used, which could provide more privacy. The system can also enhanced by supporting for varying time periods.

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