Advanced Protection Against Phishing Pages By Using Multi-Usage Browser

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Abstract— Phishing is a criminal mechanism employing both social engineering and technical subterfuge to steal consumers' personal identity data and financial balance credentials. Social engineering schemes use spoofed e-mails purporting to be from legitimate businesses and agencies, designed to lead clientele to counterfeit websites that trick recipients into divulging financial data such as usernames and passwords. Technical subterfuge patterns plant crime ware onto PCs to steal credentials directly, often using methods to intercept consumers online account user names and passwords -- and to corrupt local navigational infrastructures to misdirect consumers to counterfeit websites (or authentic websites through phisher-controlled proxies used to monitor and intercept consumers' keystrokes). This project provides the anti-phishing technique in the form of browser where a webpage is filtered at three levels, as URL filtering, server address filtering and Action content filtering which may provide more accuracy in identifying phishing pages and to block it. In this anti phishing technique here they contain list of phishing sites helps in taking decision about the site weather it is an genuine site or not. Based on this report analysis each site will been decided to be processed or not.

Index Terms— Anti-Phishing , Database Matching,Domain Name System ,Multipurpose Browser , plug-in , pop-up, Server Authentication Filtering,Prevent Phishing, Url Filtering.

1 INTRODUCTION

One of the primary goals of phishing is to illegally carry out fraudulent financial transactions on behalf of users using a forged email that contains a URL pointing to a fake web site masquerading as an online bank or a government entity. A phisher may lure a victim into giving his/her Social Security Number, full name, & address, which can then be used to apply for a credit card on the victim's behalf.

Attacker uses replica of original website as a bait that is send to the user. When user grabs the bait by attraction and submitting his useful information attacker pulls the bait means saves the data for its own use criminally. In general, phishing attacks are performed with the following four steps:

1)A mock web site which looks exactly like the legitimate Web site is set up by phisher .
2)Phisher then send link to the fake web site in large amount of spoofed e-mails to target users in the name of legitimate companies and organizations, demanding to convince the potential victims to visit their web sites.
3)Victims visit the fake web site by clicking on the link and input its useful information there.
4)Phishers then thieve the personal information and perform their fraud such as transferring money from the victims' account.

There are thousands of fake phishing websites established on-screen every day, luring a number of customers. According to a phishing activity trend report published by Anti-phishing working group on 23 2013, a lot of phishing attacks were done in first half of year 2013 as can be seen from fig 1.1. The number of unique phishing reports submitted to APWG in H1, 2012 reached a high of 36,983 in March, dropping to the half year quiet of 20,908 in April.

The report also portrayed that Financial Services continued to be the most targeted industry sector in the first half of 2013 as can be seen from figure.

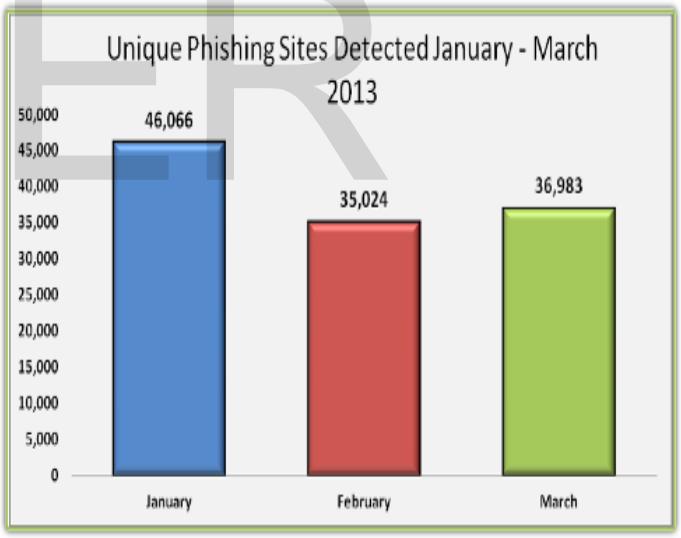

Fig 1.1 Phishing activity trend report

Seeing financial service sector and payment service sectors deals with money transactions it can be concluded that main objective of phishers is to steal financial details of victims and misuse that for their own gain. Retail sector appears to be third most vulnerable and classified as the least vulnerable to phishing attacks.

So phishing attacks are evolving as one of the major area where immediate concern is needed as it is affecting all the major sectors of industry creating a lot of loss.

From the above figure it can be seen that .com sites are most vulnerable to phishing attacks. The figure also depicts that .net domain sites are also largely used by phisher for

attack so it can be concluded that commercial site users becomes large victim of phishing attacks.

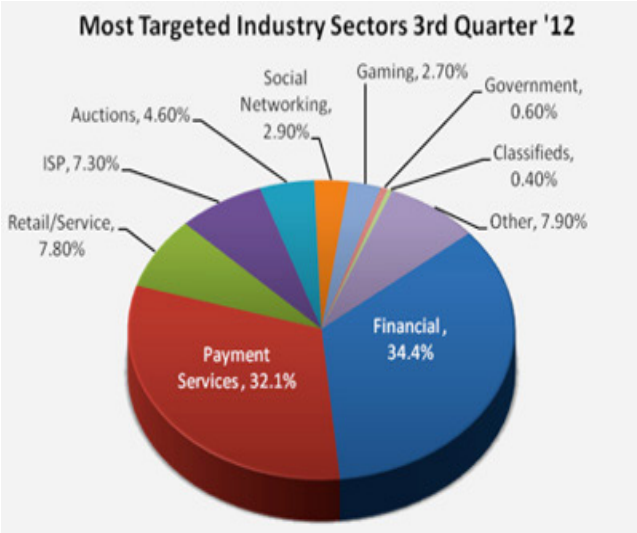

Fig 1.2 Industry sector area wise affect of Phishing

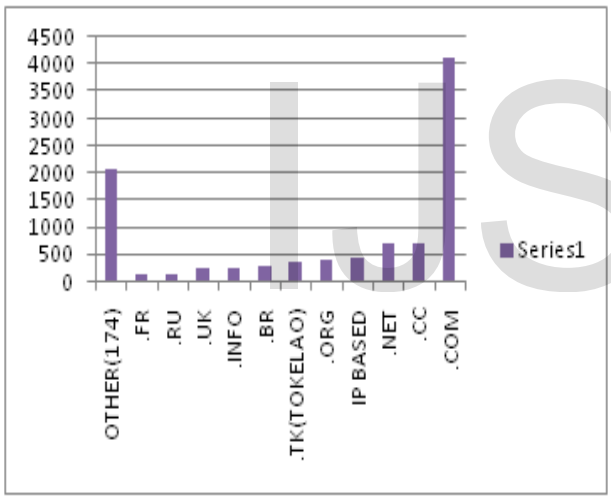

Fig 1.3 Domain name wise affect of Phishing

Types of Phishing Attacks

Phishing attacks can be classified into various types according to the way attack is done. According to many researchers the various types of phishing attacks has been described below.

A. Deceptive Phishing

Messages about the need to verify account statistics, system failure requiring users to re-enter their information, fictional account charges, undesirable account changes, new liberate services requiring quick action, and many other scams are disseminate to a wide group of recipients with the hope that the victim will respond by clicking a link to or signing onto a bogus site where their confidential information falls in this category.

B. Malware-Based Phishing

Refers to scams that involve running malicious software on users' computers. Malware can be introduced as an email attachment, as a downloadable file from a web site, or by exploiting known safety vulnerabilities.

C. Web Trojans

They pop-up invisibly when users are attempting to log in. They gather the user's credentials locally and transmit them to the phisher.

D. Hosts File Poisoning

When a user types a URL to visit a website it must first be translated into an IP address before it is transmitted over the Internet. The majority of SMB(small and medium business organizations) users' PCs running a operating system look up these "host names" in their "hosts" file before undertaking a Domain Name System (DNS) lookup. By "poisoning" the hosts file, hackers have a mock address transmitted, taking the user unwillingly to a fake website where their information can be stolen.

E. System Reconfiguration Attacks

Modify settings on a user's PC for malicious purposes. For example: URLs in a favourite file might be modified to direct users to look alike websites. For example: a Mail website URL may be reformed from "www.gmail.com" to "www.gmai1.com".

F. DNS-Based Phishing ("Pharming")

With a pharming scheme, hackers damage with a company's hosts files or (DNS)domain name system so that requests for URLs or name service return a bogus address and subsequent communications are directed to a fake site.

G. Content-Injection Phishing

It describes the situation where hackers replace part of the content of a legitimate site with false content designed to mislead or misdirect the user into giving up their confidential information to the hacker. For example, phisher may insert malicious code to log user's credentials or an overlay which can secretly collect information and deliver it to the phisher.

H. Man-In-The-Middle Phishing

In these attacks phisher positions themselves between the user and the legitimate website or system. They verify the information being entered but continue to pass it on so that users' transactions are not affected. Later they can retail or use the information or credentials collected when the user is not active on the system.

I. Search Engine Phishing

Occurs when phishers create websites with attractive (often too attractive) sounding offers and have them indexed legitimately with explore engines. Users find the sites in the normal course of searching for products or services and are fooled into giving up their information. For example, profiteer have set up false banking sites offering lower credit costs or better interest rates than other banks.

J. Anti-Phishing

Anti-phishing refers to the method employed in order to detect and prevent phishing strikes. Anti-phishing protects users from phishing. A lot of effect has been done on anti-phishing devising various anti-phishing techniques. Some procedures works on emails, some works on characteristics of web sites and some on URL of the websites. Many of these techniques focus on support clients to recognize & filter various types of phishing attacks. In typical anti-phishing techniques can be classified into following four categories [1].

K. Content Filtering

In this policy Content/email are filtered as it enters in the victim's mail box using machine learning methods, such as Bayesian Additive Regression Trees (BART) or Support Vector Machines (SVM).

L. Black Listing

Blacklist is collection of known phishing Web sites/addresses published by trusted entities like Google's and Microsoft's black list. It requires both a consumer & a server component. The client component is realized as either an email or browser plug-in that interacts with a server component, which in this case is a unrestricted Web site that provides a list of known phishing sites.

M. Symptom-Based Prevention

Symptom-based avoidance analyses the content of each Web page the user visits and generates phishing alerts according to the type and number of symptoms detected.

N. Domain Binding

It is an client's browser based techniques where sensitive information (e.g. name, password) is bind to a particular domains. It give notice the user when he visits a domain to which user credential is not bind.

2. RELATED WORKS

General Survey:

In spite of lot of work that has been done on implementing better and efficient tools on phishing detection and prevention, still it is very hard to completely eradicate the problem and to estimate no. of users that actually caught in bait of phishing as victim. In 2007, Moore and Clayton estimated the number of phishing victims by examining web server logs that 311,449 people fall for phishing scams annually, costing around 350 million dollars . There are various techniques which defend against phishing. Some techniques give e-mail level protection and some provide security toolbars embedded with anti-phishing tools.

There are a lot of indicators that identifies and distinguish legitimate sites from phishing sites. These indicators has been clustered into six criteria with their parameters of indication respectively as shown in table such as web link based identity, encryption and security based source code and client side verification based, page layout and content based, web address bar based and social human factor based.

In Identity Based Anti Phishing Techniques This technique follows mutual authentication methodology where both user and online entity validates each other's identity during handshake. It is an anti-phishing technique that integrates partial credentials sharing and client filtering technique to prevent phishers from easily masquerading as legitimate online entities. As mutual authentication is followed, there would be no need for users to re-enter their credentials. Therefore passwords are never exchanged between users and online entities except during the initial account setup process. In identity based anti-phishing if a hacker gain access to the client computer and disable the browser plug-in then method will be compromise against phishing detection.

In Character Based Anti Phishing Approach Many time phishers tries to steal information of users by convincing them to click on the hyperlink that they embed into phishing email. A hyperlink has a structure as follows. <ahref="URI"> Anchor text <\a> where 'URI' (universal resource identifiers) provides the actual link where the user will be directed and 'Anchor text' is the text that will be displayed in user's Web browser and represents the visual link. Character based antiphishing technique uses characteristics of hyperlink in order to detect phishing links. Link guard is a tool that implements this technique. After analyzing many phishing websites, the hyperlinks can be classified into various categories as shown in fig 6. For detection of phishing sites Link Guard, first extracts the DNS names from the actual and the visual links and then compares the actual and visual DNS names, if these names are not the same, then it is phishing of category 1 If dotted decimal IP address is directly used in actual DNS, it is then a possible phishing attack of category. Link Guard may result in false positives, since using spotted fraction IP addresses instead of domain names may be desirable in some special circumstances.

In Content Based Anti-Phishing Approach the Gold Phish tool implements this technique and uses google as its search engine this mechanism gives higher rank to well-established web sites. It has been observed that phishing web pages are active only for short period of time and therefore will acquire low rank during internet search and this becomes basis for content based anti-phishing approach. The design approach can be broken down into three major steps. The first step is to capture an image of the current website in the user's web browser.

The second step is to use optical character recognition techniques to convert the captured image into computer readable text. The third step is to input the converted text into a search engine to retrieve results and analyse the page rank. Gold Phish delays the rendering of a webpage. It is also vulnerable to attacks on Google's PageRank algorithm and Google's search services web link based identity, encryption and security based source code and client side verification based, page layout and content based, web address bar based and social human factor based.

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3. Existing System:

The most of the anti-phishing techniques focus on contents of web age, URL and email. Character based anti-phishing approach may result in false positive but content based approach never results in false positive. Attribute based approach consider almost all major areas vulnerable to phishing so it can be best anti-phishing approach that can detect known as well as unknown phishing attack. Identity based anti-phishing approach may fails if phisher gets physical access to client's computer In Content Based Anti-Phishing Approach Gold Phish tool implements this technique and uses google as its search engine This mechanism gives higher rank to well-established web sites. It has been observed that phishing web pages are active only for short period of time and therefore will acquire low rank during internet search and this becomes basis for content based anti-phishing approach. The design approach can be broken down into three major steps. The first step is to capture an image of the current website in the user's web browser. The second step is to use optical character recognition techniques to convert the captured image into computer readable text. The third step is to input the converted text into a search engine to retrieve results and analyse the page rank.

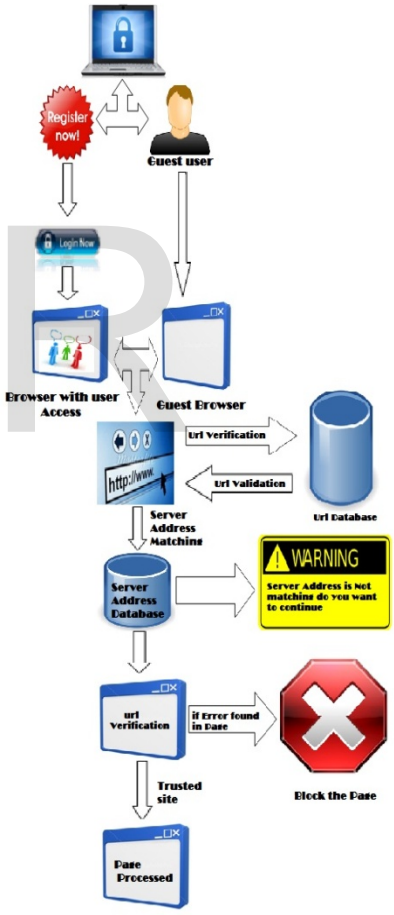
Disadvantage: Gold Phish delays the rendering of a webpage. It is also vulnerable to attacks on Google's Page Rank algorithm and Google's search service.

4. Proposed System:

In this project to overcome the disadvantages in existing system an browser will be created to reduce the usage of plug-in so anti phishing technique will be included as default one and the browser will include user authentication for making authenticated users to access the resources .browser also includes various application which may helps in LAN communication . In phishing filter method there will be three level of filtering which may prevent from various methods of phishing attacks.

The filtering methods are Url filtering which may verify the domain is genuine. In server address matching they verify the domain matches to the server address and third level filtering is server address filtering which may verify any threatening link or page routing is found they will block the site from usage .

ARCHITECTURE



Module Description

To construct modules for preventing phishing pages by three level filtering methods using multipurpose browser is divided in to

A. Multipurpose Browser
B. Url Database and Filtering
C. Server Address database and verification
D. Server Authentication filtering
E. Report Analysis

A. Multipurpose Browser

In this project the main view is to prevent phishing pages and to overcome plug-in problems where to recover it an browser is created with the various applications involved in it they are,

a. Server Control with Client Browser
b. Chat application
c. User Authentication

a. Server Control with Client Browser:

The Browser is created for client sever communication here one server browser will been designed where it may provide access over the client browsers. Through this server it may verify each action carried out by the client servers.

b. Chat Application:

The system which are been connected in the LAN or connected in wireless can able to communicate and also can make data and content transfer using this application which have been included in Browser the user want to communicate with browser has to be registered in server.

c. User Authentication:

The client who are all try to access resources from server or the user who wants to communicate with others want to be registered and then they want to be Authenticated.

A. Url Database Filtering:

The phishing attack can occur by making an website similar to original site and changing some spelling compared to original Url (Eg: www.gmail.com it can be given as www.gmaill.com) this may cause user to provide there details in some other fraudulent site so someone can access the account so avoid this in this module an database will be created with the browser which may contain the domain address of important and most used sites.

Through this when ever user go through an Url it will been verified with the database and provides report. In case it was an new site it will been continued with user verification.

B. Server Address database and verification:

In this module another database will been created where it will contain specific server address of the website which may requires user details in this case when an Url filtering carried out if they found any authentication content or user detail requirements they verified with the server address database . they will be matched with each other if match not found then they will send error report to user so they can prevent from the phishing attack.

C. Server Authentication Filtering:

If an new site have been entered by the user that may not been in database in this case server authentication filtering will been carried out here the action content of the web page will been verified there is an standard format in providing the server address if the server address seemed to be received to some other specific Email it will been analyzed and then they made to process if they found any threat they will be moved to report analysis.

D. Report Analysis:

It is the final step carried out in this anti phishing technique here they contain list of phishing sites helps in taking decision about the site weather it is an genuine site or not. Based on this report analysis each site will been decided to be processed or not.

5. CONCLUSION AND FUTURE WORK

This project has been developed to browser communication and to prevent and protect from phishing sites. To prevent from the various phishing techniques three level filtering has to be done. Browser and url filtering method has been created so that database will been created which may verify as the first level. In the future work server address filtering , server address database and matching will been processed so that report analysis can be done so they may provide more accuracy from preventing from the phishing sites.

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