



# Ethical Hacking and Countermeasures

Version 6



## Module XII

### Phishing

Nov 27, 2007 3:15 pm US/Pacific

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## Warning Signs Of An Online Phishing Scam



Reporting  
**Jeanette Pavini**

(CBS 5) A Bay Area woman says she got phished -- then dozens of her friends and family were drawn into the scam. It all started with an email that was supposedly from her internet provider.

"It said that if I didn't respond to it and give my user name and password that they were going to delete my account," Nancy Chung Hooper told us.

Without thinking, Hooper provided that information. She only realized she'd been phished, when her family's email access was blocked. So she called Comcast.

"I told them I had responded to this email which seemed odd and they said well you shouldn't have, but they didn't give me any feedback on what I should do other than reset my password," Hooper said.

She thought the problem was solved, until her mother-in-law called.

"She said there's something wrong, we got this email and it says you're in Nigeria and you need \$2,000 and you're going to go to jail."

Posing as Nancy, the scammers sent that email to everyone in her address book -- about 200 people.

"It became kind of a running joke. but it wasn't a joke to me in that my email account which is my lifeline and link to so many different people was basically sabotaged," Hooper said.

Source: <http://cbs5.com/>

# Module Objective

This module will familiarize you with:

Introduction

Reasons for Successful Phishing

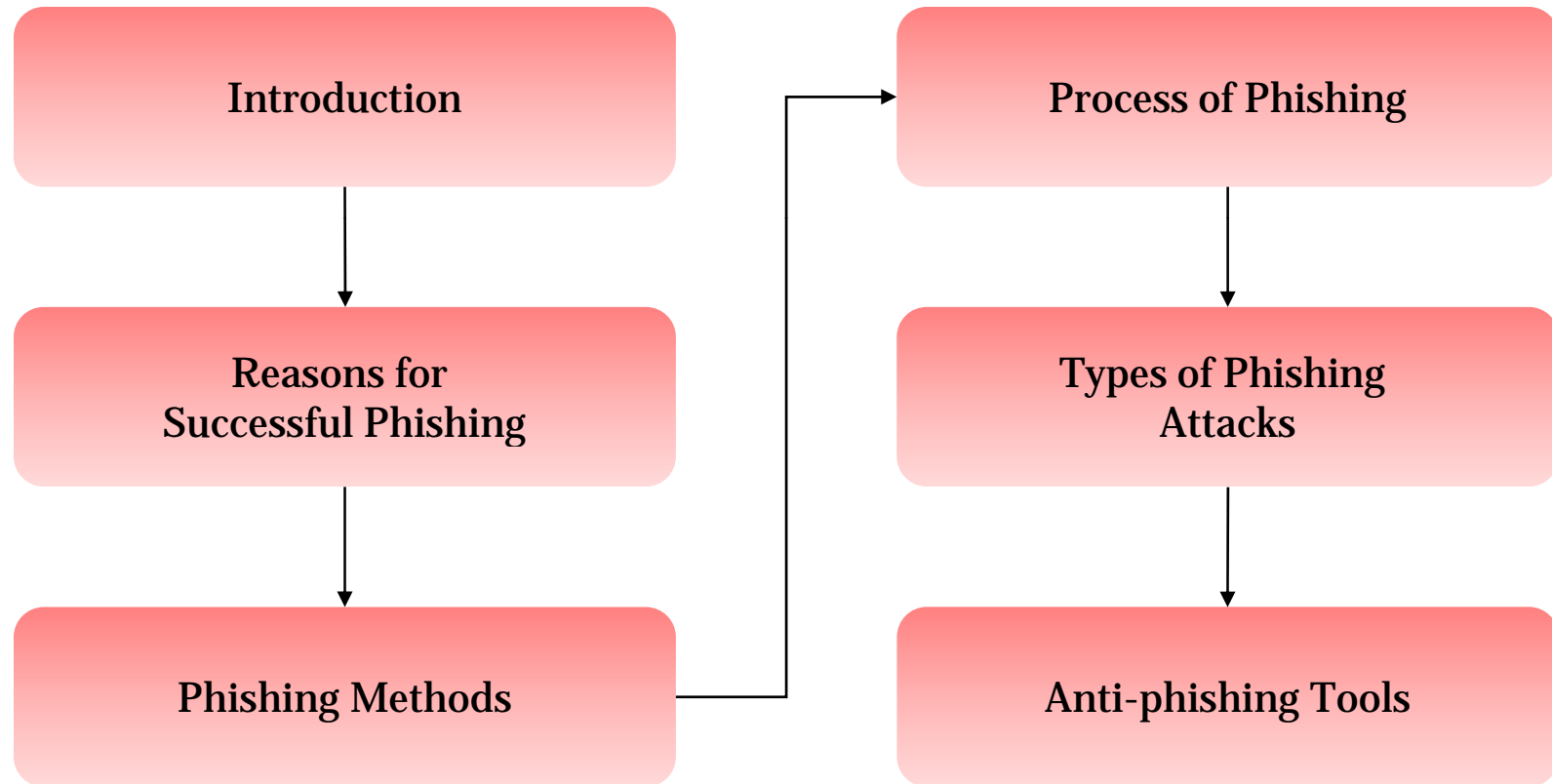
Phishing Methods

Process of Phishing

Types of Phishing Attacks

Anti-phishing Tools

# Module Flow





# Phishing- Introduction



## Phishing attacks unleashed on UK banks

18 Feb 2008 08:29

### **Analysts have warned the attacks could mark the emergence of a new threat from the Storm botnet**

Leading UK banks have been targeted by online criminals who used Storm botnets to unleash phishing attacks.

The attacks could mark the emergence of a new threat from the Storm botnet, according to a report from security company RSA's Anti-Fraud Command Center (AFCC).

UK financial institutions were the second most targeted in the world last month, accounting for 15 percent of global banking brands targeted, behind the US with 61 percent.

Attackers [used the Storm botnet](#) as a fast flux-network, frequently rotating the IP address of the infected computers sending out the phishing content, making them much more difficult to track down.

RSA analysts warn the [Storm botnet](#) could now be used as the infrastructure behind a new surge of fast-flux phishing attacks.

Source: <http://www.zdnet.co.uk>

# Introduction

Phishing is an Internet scam where the user is convinced to give valuable information

Phishing will redirect the user to a different website through emails, instant messages, spywares etc.

Phishers offer illegitimate websites to the user to fill personal information

The main purpose of phishing is to get access to the customer's bank accounts, passwords and other security information

Phishing attacks can target the audience through mass- mailing millions of email addresses around the world



# Reasons for Successful Phishing

## Lack of knowledge

- Lack of computer system knowledge by the user (as how the emails and web works) can be exploited by the phishers to acquire sensitive information
- Many users lack the knowledge of security and security indicators

## Visual deception

- Phishers can fool users by convincing them to get into a fake website with the domain name slightly different from the original website which is difficult to notice
- They use the images of the legitimate hyperlink, which itself helps as a hyperlink to an unauthorized website
- Phishers track the users by using the images in the content of a web page that looks like a browser window
- Keeping an unauthorized browser window on top of, or next to a legitimate window having same looks, will make the user believe that they are from the same source
- Setting the tone of the language same as the original website





# Reasons for Successful Phishing (cont'd)

## Not giving attention to Security Indicators

- Users don't give proper attention to read the warning messages or security indicators
- In the absence of security indicators it will be easy to insert spoofed images which will go unidentified by the users



# Phishing Methods

## Email and Spam

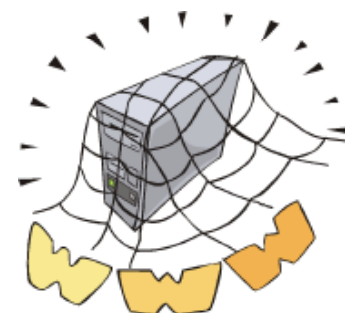
- Most of the phishing attacks are done through email
- Phishers can send millions of emails to valid email addresses by using the techniques and tools opted by spammers
- Phishing emails provide a sense of urgency in the minds of the user to give the important information
- Phishers take the advantage from SMTP flaws by adding fake “Mail from” header and incorporate any organization of choice
- Minor changes are made in the URL field by sending mimic copies of legitimate emails



# Phishing Methods (cont'd)

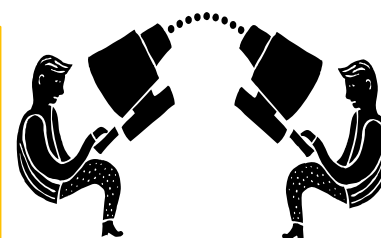
## Web-based Delivery

- This type of attack is carried out by targeting the customers through a third party website
- Providing malicious website content is a popular method of phishing attacks
- Keeping fake banner advertisements in some reputed websites to redirect the customers to the phishing website is also a form of web based delivery



## IRC and Instant Messaging

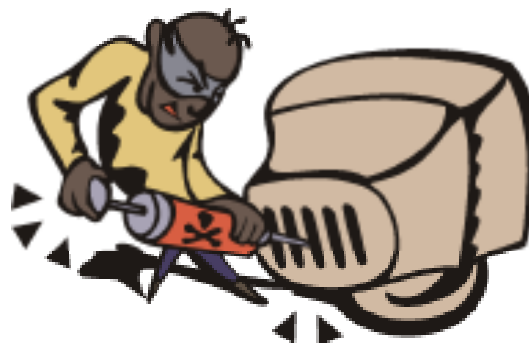
- IRC and IM clients allow for embedded dynamic content
- The attackers send the fake information and links to the users through IRC and IM



# Phishing Methods (cont'd)

## Trojaned Hosts

- Trojan is a program that gives complete access of host computer to phishers after being installed at the host computer
- Phishers will make the user to install the trojaned software which helps in email propagating and hosting fraudulent websites

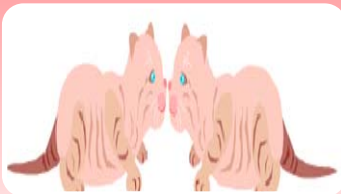


# Process of Phishing

The process involved in building a successful phishing site is:



Registering a fake domain name



Building a look alike website



Sending emails to many users



# Types of Phishing Attacks

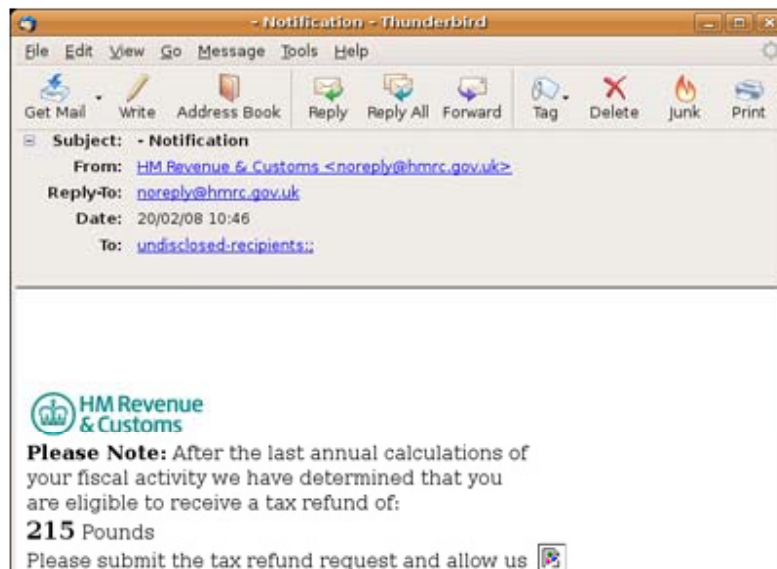
## HMRC data debacle used to bait phishing lure

By [John Leyden](#)

Published Friday 22nd February 2008 13:23 GMT

A phishing attack targeting victims of the HMRC data loss debacle has been spotted on the net. The bogus emails offering recipient the false opportunity to claim a tax refund of £215 from the UK Government over the potential exposure of confidential data. The email contains a web link to a suspect site, reports security firm McAfee, which spotted the ruse.

The play takes advantage of the loss of computer discs by HM Revenue and Customs containing the confidential details of 25 million child benefit recipients, including bank and building society details, NI numbers, addresses and child records. The attack follows more than two months after UK Chancellor Alistair Darling announced the loss, so arguably fraudsters have been slow off the mark.



Source: <http://www.theregister.co.uk>

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# Man-in-the-Middle Attacks

In this attack, the attacker's computer is placed between the customer's computer and the real website. This helps the attacker in tracking the communications between the systems

This attack supports both HTTP and HTTPS communications

In order to make this attack successful, the attacker has to direct the customer to proxy server rather than the real server

The following are the techniques used to direct the customer to proxy server:

- Transparent Proxies located at the real server captures all the data by forcing the outbound HTTP and HTTPS traffic towards itself
- DNS Cache Poisoning can be used to disturb the normal traffic routing by establishing false IP address at the key domain names
- Browser proxy configuration is used to set a proxy configuration options by overriding the users web browser settings



# URL Obfuscation Attacks

The user is made to follow a URL by sending a message which navigates them to the attacker's server

The different methods of URL obfuscation include:

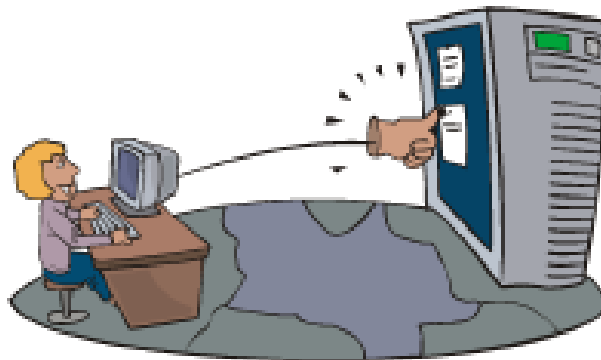
- Making few changes to the authorized URL's which makes difficult to identify it as a phishing site
- Giving friendly login URL's to the users which negates the complexity of authentication that navigates them to the look-a-like target URL
- Many third party organizations offer to design shorter URL's for free of service, which can be used to obfuscate the true URL
- The IP address of a domain name can be used as a part of the URL to obfuscate the host and also to bypass content filtering systems



# Cross-site Scripting Attacks

This type of attack makes use of custom URL or code to inject into a valid web-based application URL or imbedded data field

Most of the CSS attacks are carried out using URL formatting



# Hidden Attacks

Attacker uses the HTML, DHTML, or other scriptable code to:

- Change the display of rendered information by interpreting with the customers' web browser
- Disguise content as coming from the real site with fake content

Methods used for hidden attacks are:

- Hidden Frame:
  - Frames are used to hide attack content with their uniform browser support and easy coding style
- Overriding Page Content
- Graphical Substitution



# Client-side Vulnerabilities

Most customers are vulnerable towards the phishing attacks while they browse the web for any software

These client side vulnerabilities can be exploited in a number of ways similar to the worms and viruses

The anti virus software are not useful for these vulnerabilities as they are harder to identify



# Deceptive Phishing

The common method of deceptive phishing is email

Phisher sends a bulk of deceptive emails which command the user to click on the link provided

Phisher's call to action contains daunting information about the recipient's account

Phisher then collects the confidential information given by the user



# Malware-Based Phishing

In this method, phishers use malicious software to attack on the user machines

This phishing attack spreads due to social engineering or security vulnerabilities

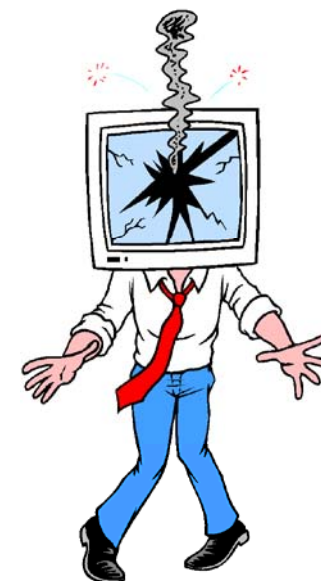
In social engineering, the user is convinced to open an email attachment that attracts the user regarding some important information and download it containing some malwares

Exploiting the security vulnerabilities by injecting worms and viruses is another form of malware based phishing



## Keyloggers and Screenloggers

- It is a program that installs itself into the web browser or as a device driver that monitors the input data and sends it to the phishing server
- It monitors the data and sends to a phishing server
- The techniques used by keyloggers and screenloggers are:
  - Key logging is used to monitor and record the key presses by the customer
  - The device driver monitoring the keyboard and mouse inputs by the user
  - The screen logger monitoring both the user inputs and the display



# Malware-Based Phishing (cont'd)

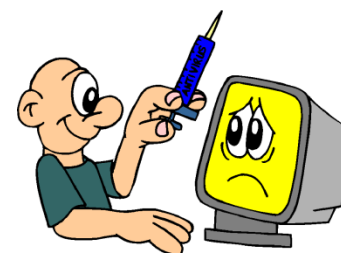
## Web Trojans

- These malicious programs are popped up over the login screen when the user is entering information on the website
- The information is entered locally rather than on the web site which is later transmitted to the phisher



## Hosts File Poisoning

- The Operating systems consists of 'hosts' file which checks the host names before a DNS lookup is performed
- It is the modification of the host file to make the user navigate to an illegitimate website and give confidential information
- This allows the phishers to modify the host file to redirect the user





## System Reconfiguration Attacks

- This attack is used to reconfigure the setting at the user computer
- The systems DNS server is modified with a faulty DNS information by poisoning the host file
- It Changes the proxy server setting on the system to redirect the user's traffic to other sites



# DNS-Based Phishing

DNS based phishing is used to pollute the DNS cache with incorrect information which directs the user to the other location

This type of phishing can be done directly when the user has a misconfigured DNS cache

The user's DNS server can be changed with a system reconfiguration attack



# Content-Injection Phishing

In this attack, a malicious content is injected into a legitimate site

This malicious content can direct the user to some other site or it can install malwares on the computer

## Types of content-injection phishing are:

- Hackers replace the legitimate content with malicious content by compromising a server through security vulnerability
- Malicious content can be injected into a site using a cross-site scripting vulnerability
- Illegitimate actions can be performed on a site using an SQL injection vulnerability



# Search Engine Phishing

The phishers create an identical websites for fake products and get the pages indexed by the search engine

Phishers convince the user to give their confidential information by providing interesting offers

The major success in search engine phishing comes from online banking and online shopping



## Phishing attack plunders Monster.com

By Brian Bergstein, Associated Press

BOSTON — A recently disclosed fraud involving hundreds of thousands of people on the Monster.com jobs website reveals the perils of leaving detailed personal information online, security analysts say.

Before the scheme was uncovered last week by researchers at Symantec, con artists had filched legitimate user names and passwords from recruiters who search for job candidates on Monster. Then with access into the Monster system, the hackers grabbed resumes and used information on those documents to craft personalized "phishing" e-mails to job seekers.

"What phishers are trying to do these days is make them as realistic as possible, by adding specific information," said Patrick Martin, a Symantec product manager. "If they know you've submitted a resume to Monster, that makes it (seem) a little more legitimate."

If the recipients took the bait, they had spyware or other malicious programs secretly installed on their computers. But even if the phishing attempt wasn't successful, the names, addresses and other details on the resumes can themselves be lucrative.

A server in the Ukraine used in the scheme held 1.6 million entries. Because of duplications, Symantec said those files actually held personal information for "several hundred thousand" job seekers. Another anti-virus firm, Authentium Inc., said it parsed the same data and counted 1.2 million people.

Symantec said it relayed details to Monster.com so it could disable the compromised recruiter accounts. But the security company also advised Web users to limit their exposure to such frauds by reducing the amount of personal information they post on the Internet.

That advice was echoed in other corners. Ron O'Brien, senior security analyst for Sophos PLC, suggested that job seekers provide only minimal details about themselves on job sites, and then reveal deeper information only for queries that prove to be legitimate.

The same standards should apply on social networking sites such as Facebook that ask for a wealth of information, O'Brien said.

"With very little effort, I could put together a profile of you that includes such information as your home address, your home phone number, your e-mail address, your birthday," O'Brien said. "We need to kind of take a step back and decide whether it's really required for us to provide all the information requested of us. ... We have become a nation of people who want to be cooperative."

Other security specialists said Monster might share the blame if it doesn't ensure that people with access to its system use "strong" passwords that are frequently changed or hard to guess.



- ◆ [Digg](#)
- ◆ [del.icio.us](#)
- ◆ [Newsvine](#)
- ◆ [Reddit](#)
- ◆ [Facebook](#)
- ◆ [What's this?](#)

Source: <http://www.usatoday.com>

# Phishing Statistics: March 2008

## Current Phishing Targets

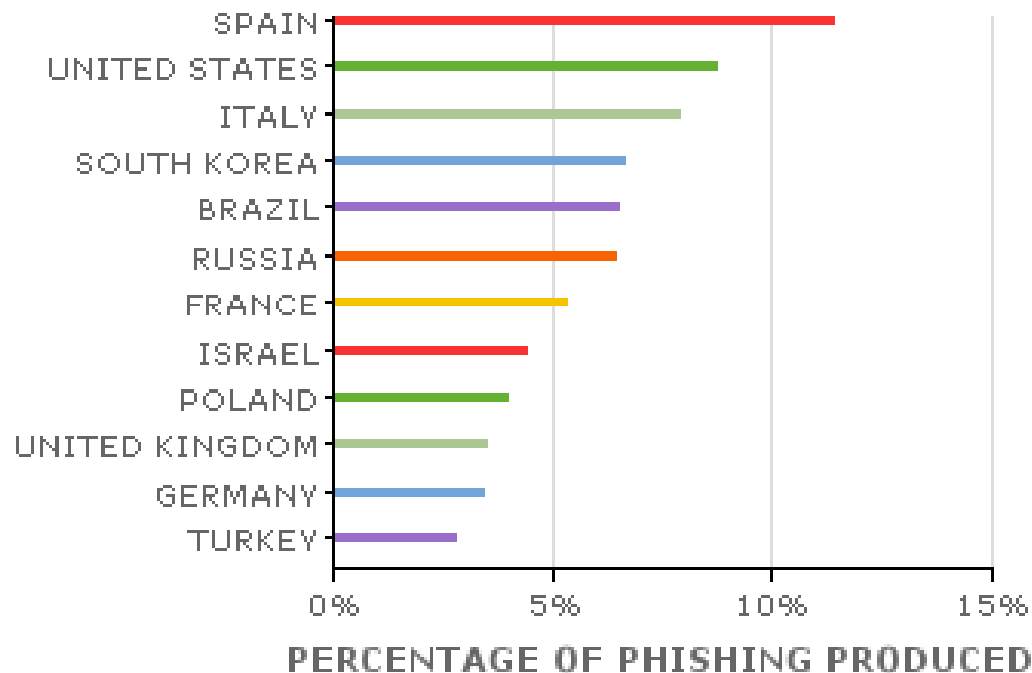
HALIFAX	30.50%
HSBC	29.10%
WACHOVIA	18.00%
BANCORPSOUTH	6.50%
GOOGLE ADWORDS	4.10%
PAYPAL	3.20%
BANK OF AMERICA	2.80%
VISA	2.40%
EBAY	2.40%
OTHER INSTITUTIONS	1.00%



Source: <http://www.marshal.com/>

# Phishing Statistics: March 2008 (cont'd)

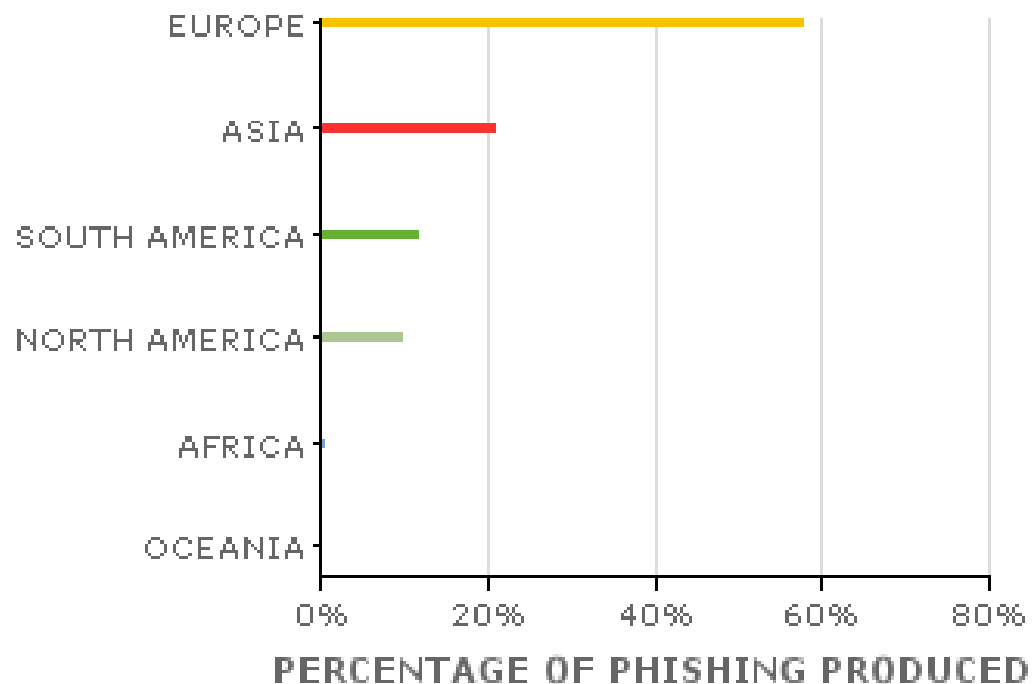
## Phishing Sources by Country



Source: <http://www.marshal.com/>

# Phishing Statistics: March 2008 (cont'd)

## Phishing Sources by Continent

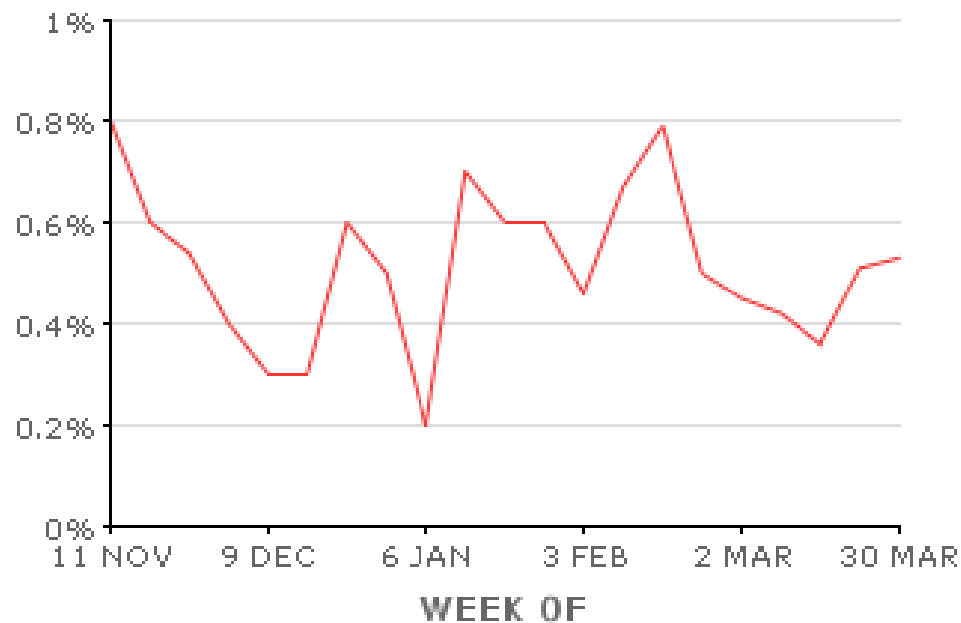


Source: <http://www.marshall.com/>



# Phishing Statistics: March 2008 (cont'd)

## Phishing Percentage over Time



Source: <http://www.marshal.com/>

# Anti-Phishing

Phishing attacks are prevented by anti-phishing software

Anti-Phishing Software detects the phishing attacks in the website or in the customer's email

These software's display the real website domain that the customer is visiting by residing at the web browsers and email servers, as an integral tool

Phishing attacks can be prevented both at the server side and at the client side





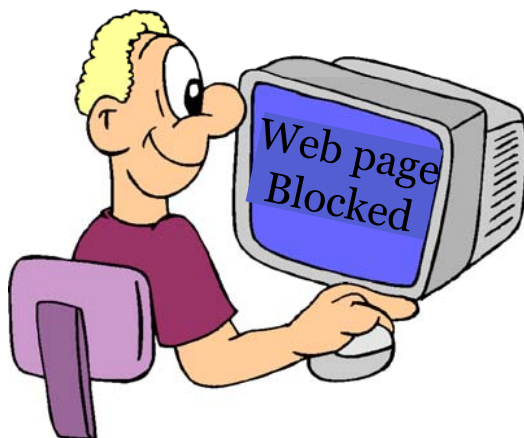
# Anti-Phishing Tools

# PhishTank SiteChecker

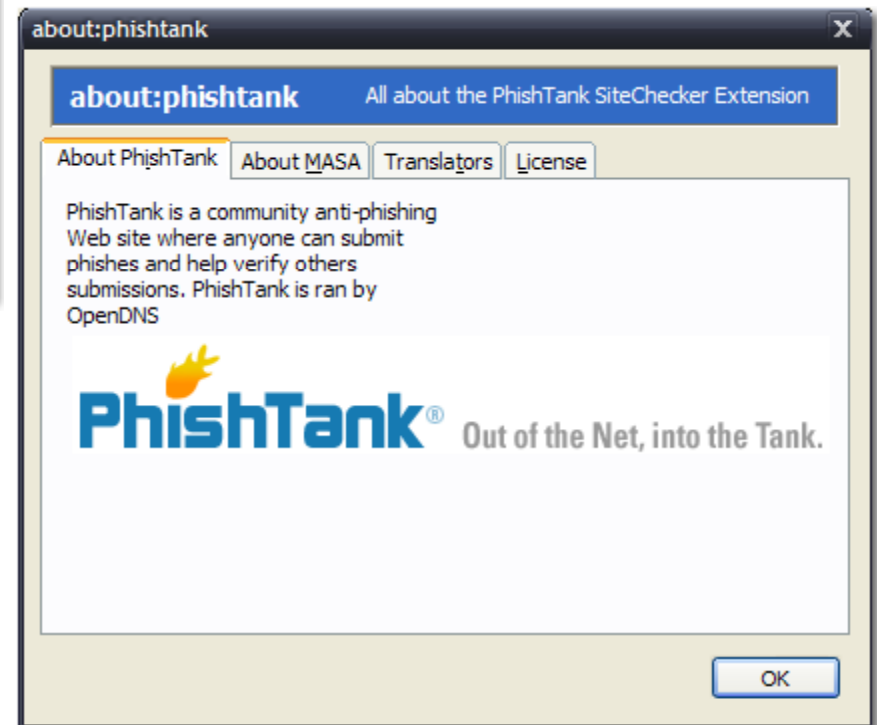
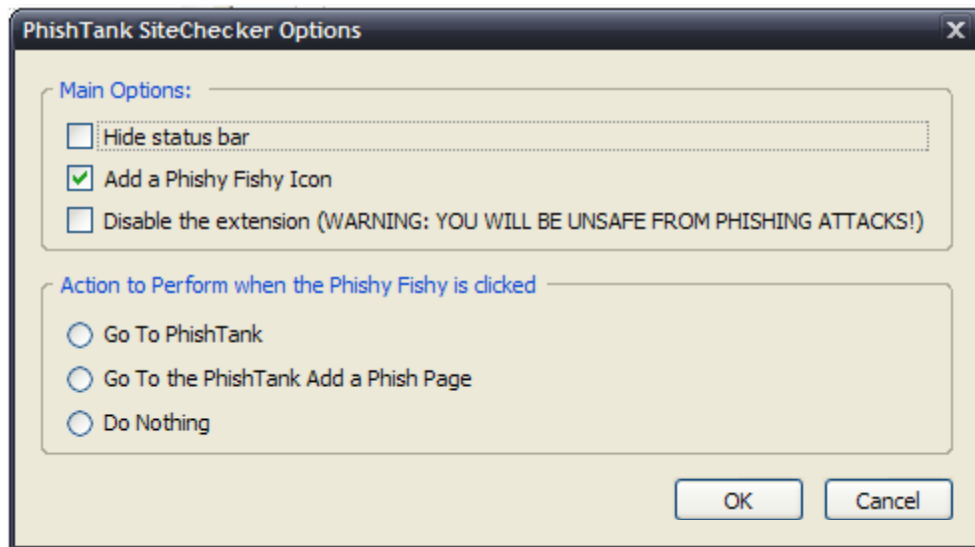
PhishTank SiteChecker blocks the phishing pages with reference to the data present in the phish tank

It is an extension of firefox, SeaMonkey, Internet Explorer, Opera, Mozilla, and Flock

The SiteChecker checks the current site the user is in, against a database of PhishTank



# PhishTank SiteChecker: Screenshot



NetCraft tool alerts the user when connected to the phishing site

When the user connects to a phishing site it blocks the user by showing a warning sign

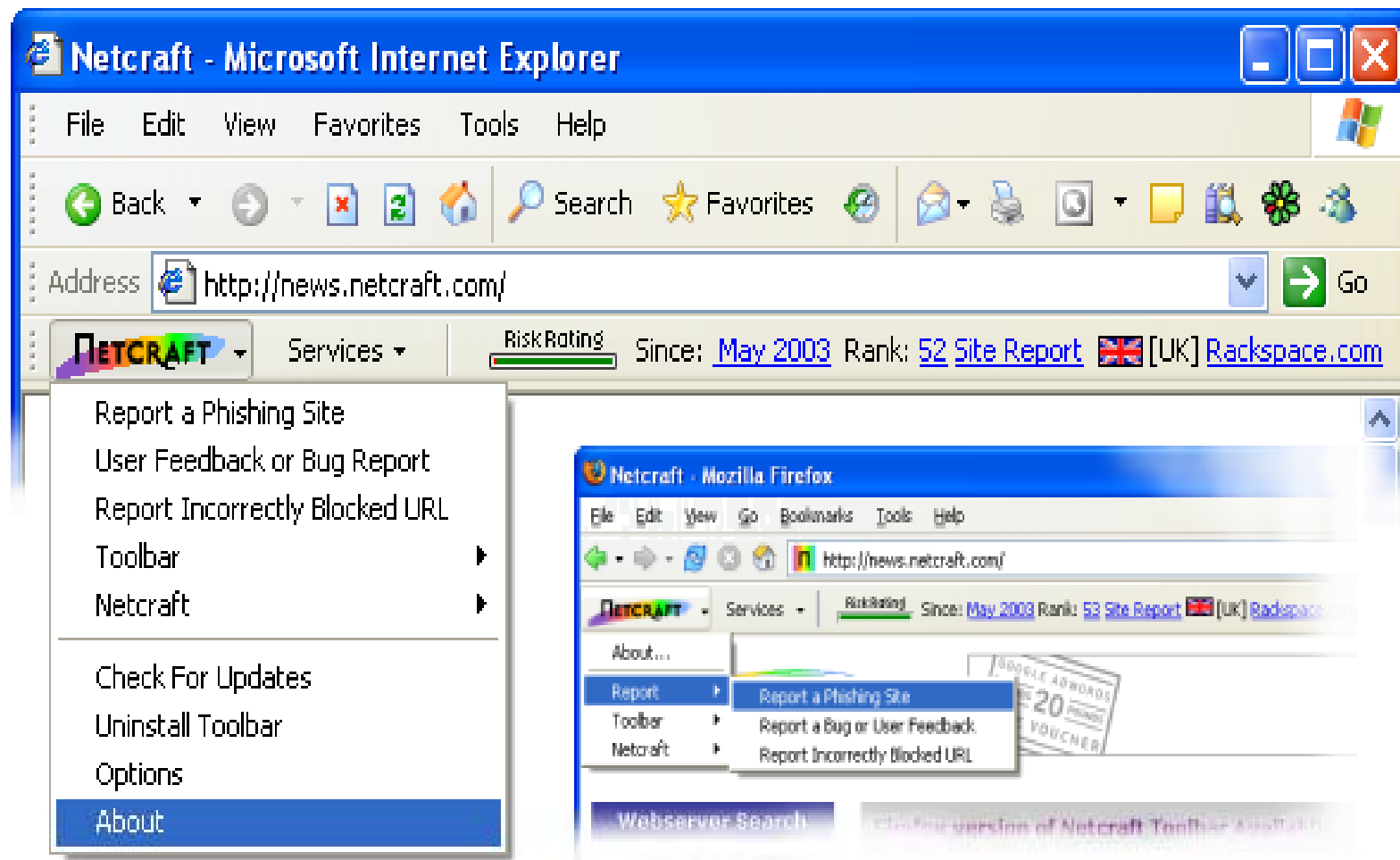
It traps suspicious URLs in which the characters have no common purpose other than to deceive the user

It imposes the browser navigational controls in all windows to protect against the pop ups which hides the navigational controls

It displays the countries hosting the sites to detect fraudulent URLs



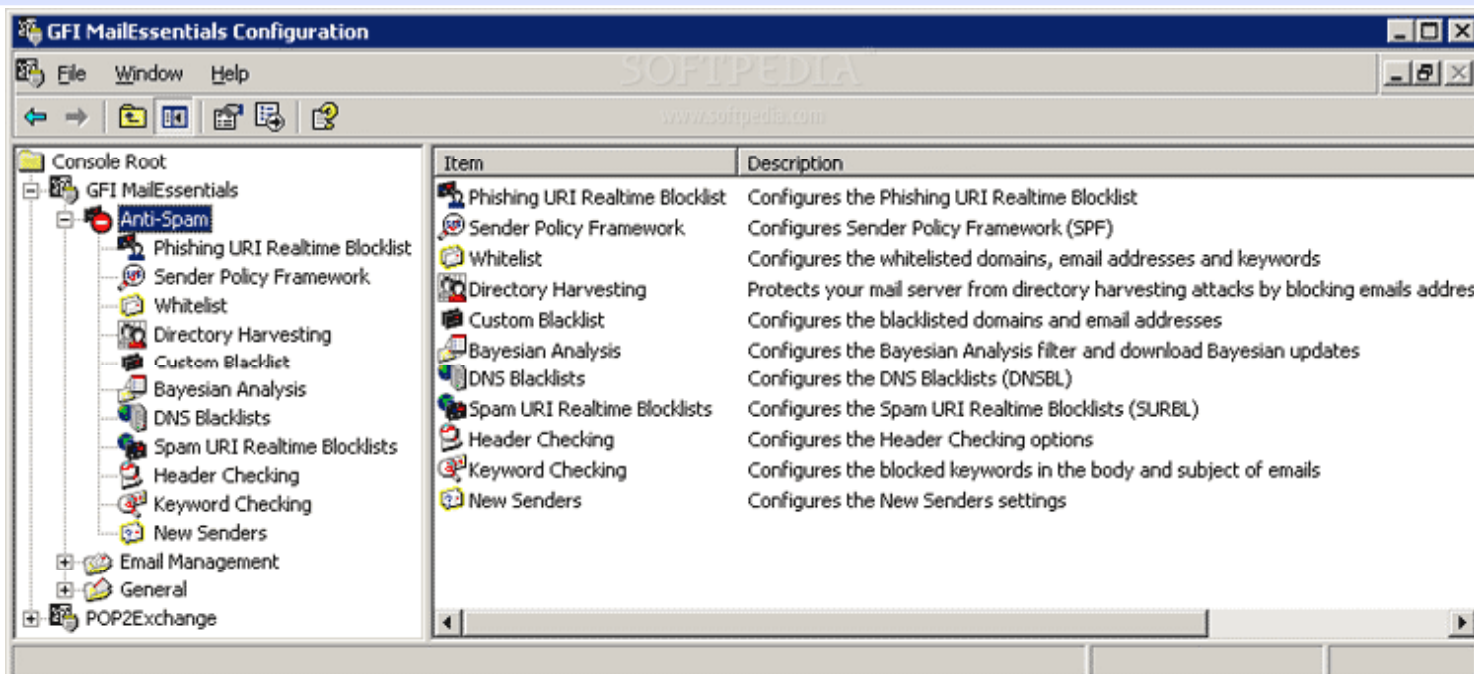
# NetCraft: Screenshot



GFI MailEssentials' anti-phishing module detects and blocks threats posed by phishing emails

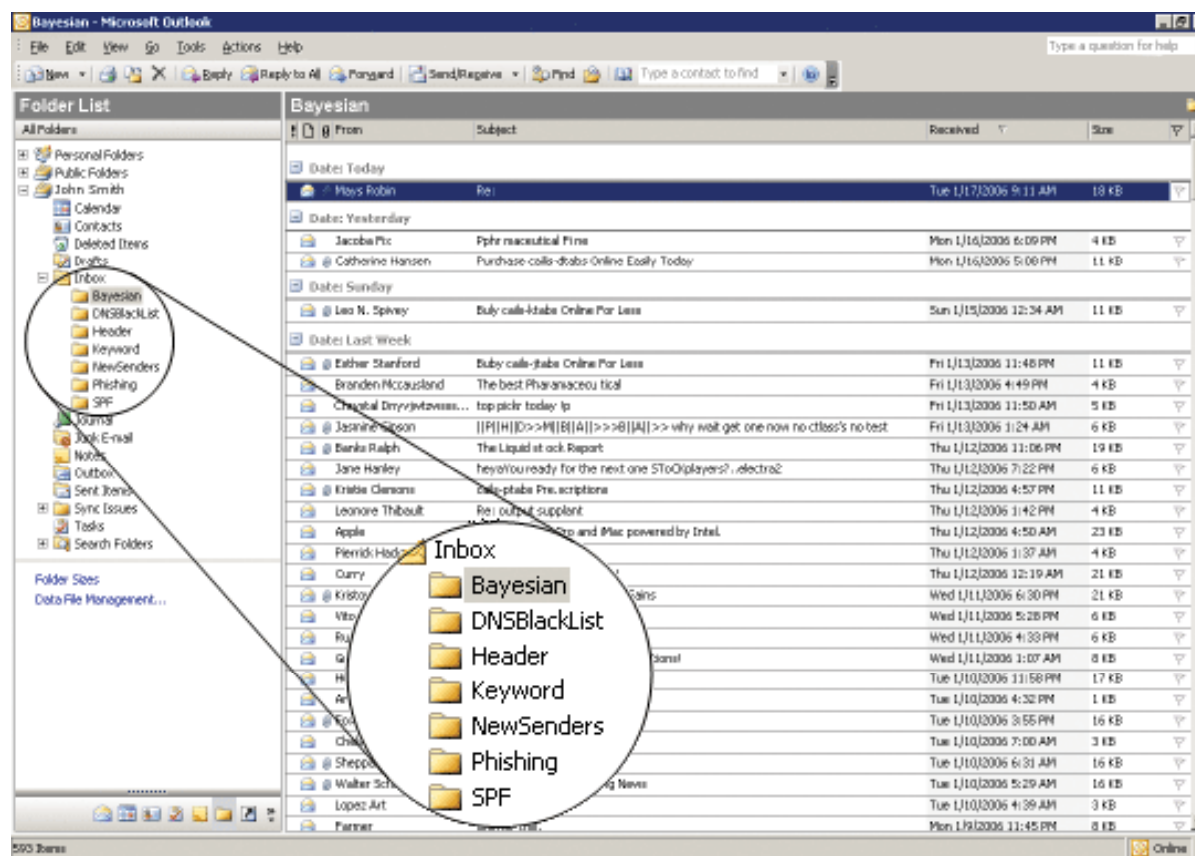
It updates the database of blacklisted mails which ensures the capture of all latest phishing mails

It also checks for typical phishing keywords in every email sent to the organization





# GFI MailEssentials: Screenshot

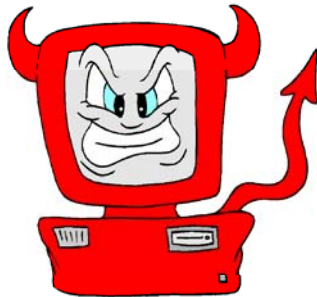


# SpoofGuard

spoofGuard prevents a form of malicious attacks, such as web spoofing and phishing

It places a traffic light at the users browser toolbar that turns from green to yellow to red when navigated to a spoof site

When the user enters private data into a spoofed site, spoofguard saves the data and warns the user

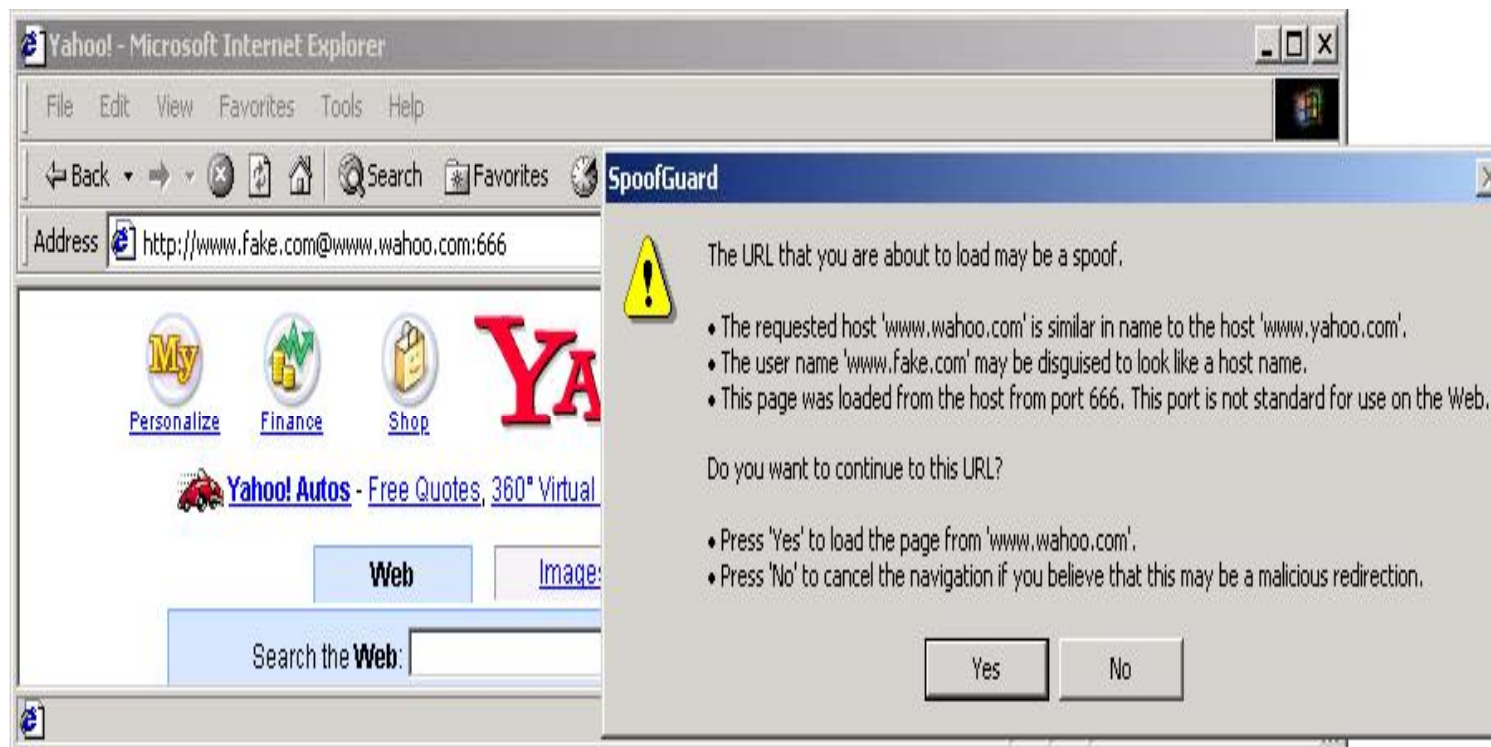


# SpoofGuard: Screenshot 1

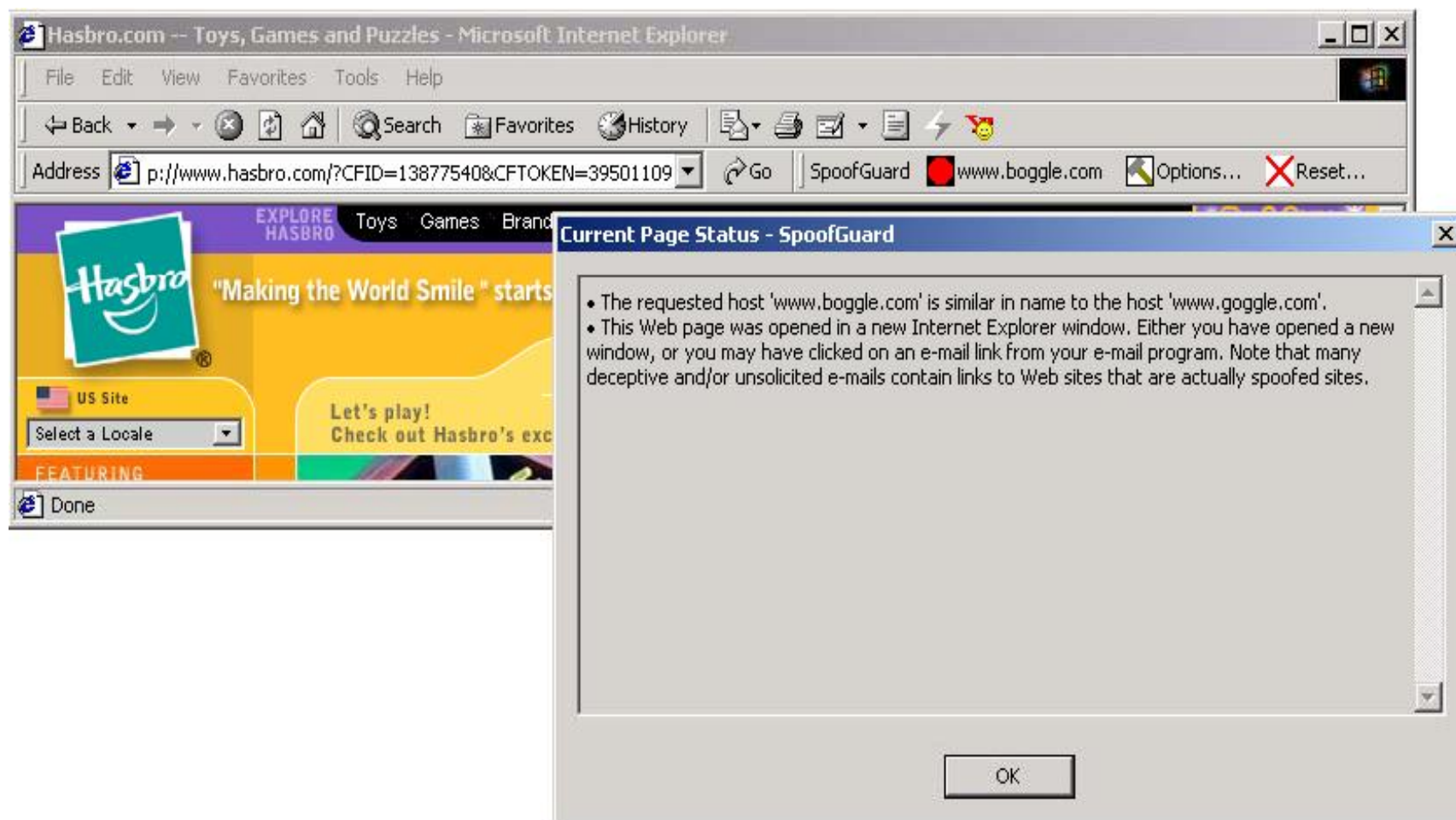
**Options - SpoofGuard**

Total Alert Level	3	Sets the threshold SpoofGuard uses before flagging a Web site.	OK Cancel
Host Name Check Weight	5	Compares the current host name with SpoofGuard's stored list of previously visited host names.	
Host Name Check Sensitivity	2	Edit Distance tolerance—the number of inserts or deletes required to change one host name into another.	
URL Check Weight	3	Examines the URL for possible spoofing.	
Password Fields Check Weight	4	Examines the HTML document for password input fields.	
Unencrypted Password Check Weight	5	Checks for unencrypted password fields.	
Links Check Weight	4	Examines the links on the current page using the URL check.	
Links Check Sensitivity	10	Minimum Threshold to be considered a suspicious link.	
Image Check Weight	2	Compares images on the current page with SpoofGuard's stored images of previously visited pages.	
Maximum Host Name History Entries	999	Stores host names in a list in order to perform the Host Name Check.	
Email Referral Check Weight	1	Checks for pages that you may have been referred to by an email link.	
<input checked="" type="checkbox"/> Enable Confirmation Warning		Requests confirmation before navigating to a page that triggers the "Total Alert Level" threshold.	
<input checked="" type="checkbox"/> Save Image Hashes		Allows maintaining a list of image hashes with which SpoofGuard performs the Image Check.	
<input checked="" type="checkbox"/> Enable Password Protection		Keeps track of your passwords and displays a warning when you try to input the same username and password on different sites.	

# SpoofGuard: Screenshot 2



# SpoofGuard: Screenshot 3



# Phishing Sweeper Enterprise

It installs phishing sweeper products throughout the organization

It is an effective utility for spam and spoofed emails

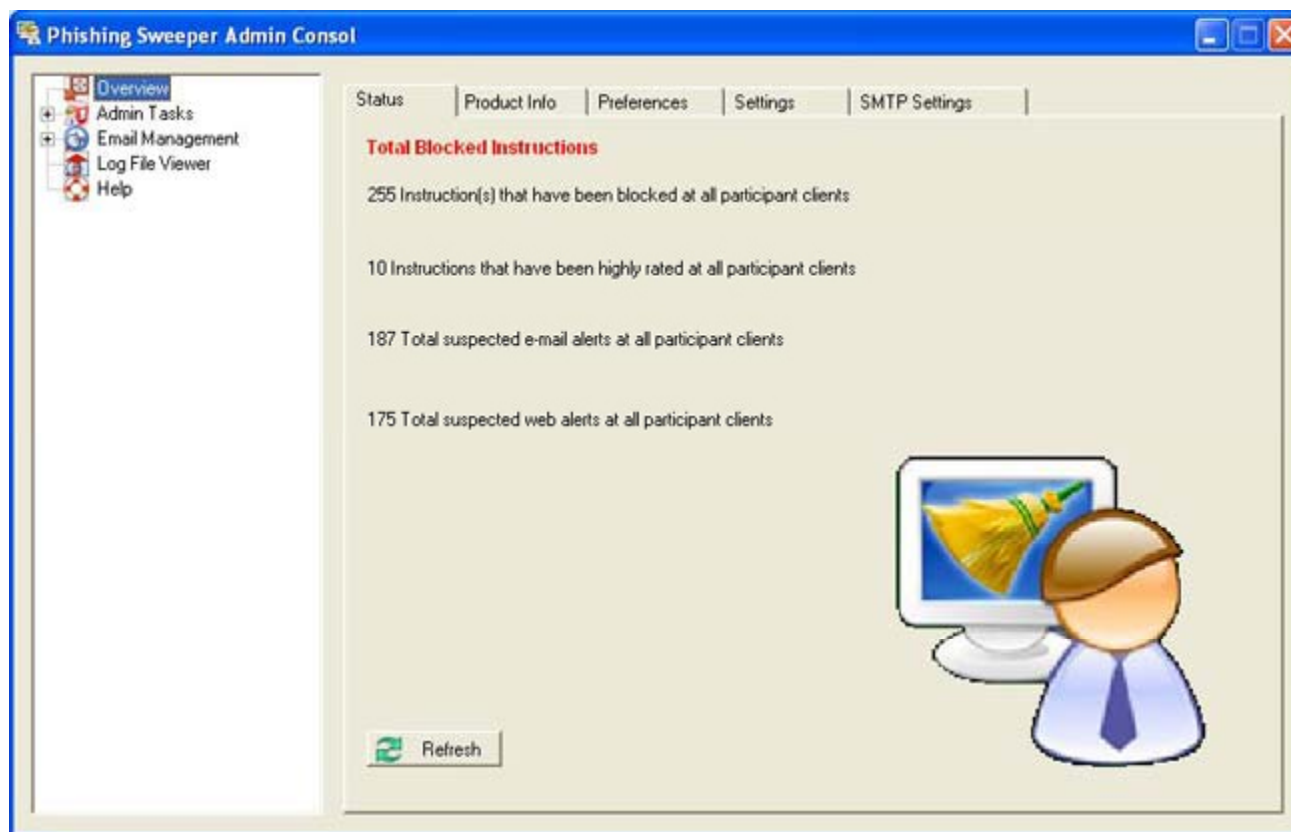
It allows to create groups of users with different policies, produce customized reports, install phishing updates, and view the status of all clients

It provides mail protection, WebSite Protection, Alerts, and Logs





# Phishing Sweeper Enterprise: Screenshot



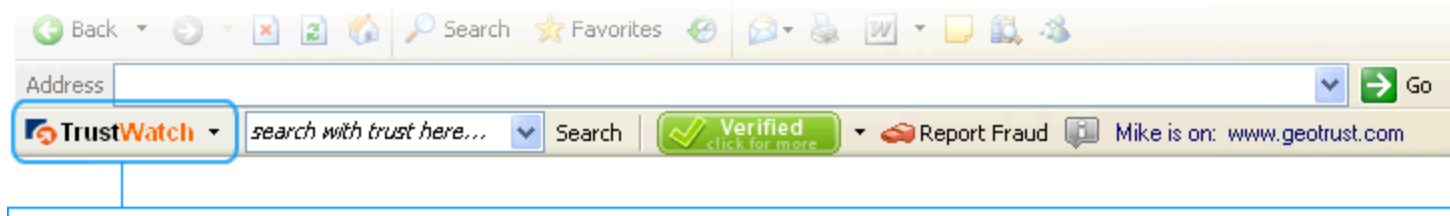


TrustWatch performs a trusted search with built in search box

Intimates the user whether the site is verified and warns for the caution

It provides personal security ID to prevent from toolbar spoofing

Reports the suspected fraudulent sites and indicates the real site the user is in





ThreatFire provides behavior based security monitoring solution protecting from unsafe programs

It continuously analyses the programs and processes on the system and if it finds any suspicious actions, it alerts the user

It can be used with the normal antivirus programs or firewalls which adds an additional level of security for the system



# ThreatFire: Screenshot

The screenshot shows the ThreatFire PC Tools interface. The title bar reads "PC Tools ThreatFire" with standard window controls. On the right of the title bar are links for "Smart Update" and "Help".

**Security Status**

ThreatFire Protection is **ON**  
 Protect your PC from malicious activity

**ThreatFire Protection**

	Today	Last 7 Days	Last 30 Days	Last 90 Days	Total
	<u>Your Protection</u>		<u>Community Protection</u>		
Events Analyzed			55		894,169,542,425
Programs Examined			1		1,129,819,945
Suspicious Activities Detected			0		24,979,593
Malware Blocked			0		1,644,784

On the left sidebar, there are buttons for: Security Status, Start Scan, Threat Control, Advanced Rules, Settings, and Upgrade Now.

At the bottom left is the "PC Tools Software" logo with the tagline "Essential tools for your PC". At the bottom center is a "Free Edition, upgrade now" link. At the bottom right is the version information: "Version 3.0.4 © 2007 PC Tools, All Rights Reserved".

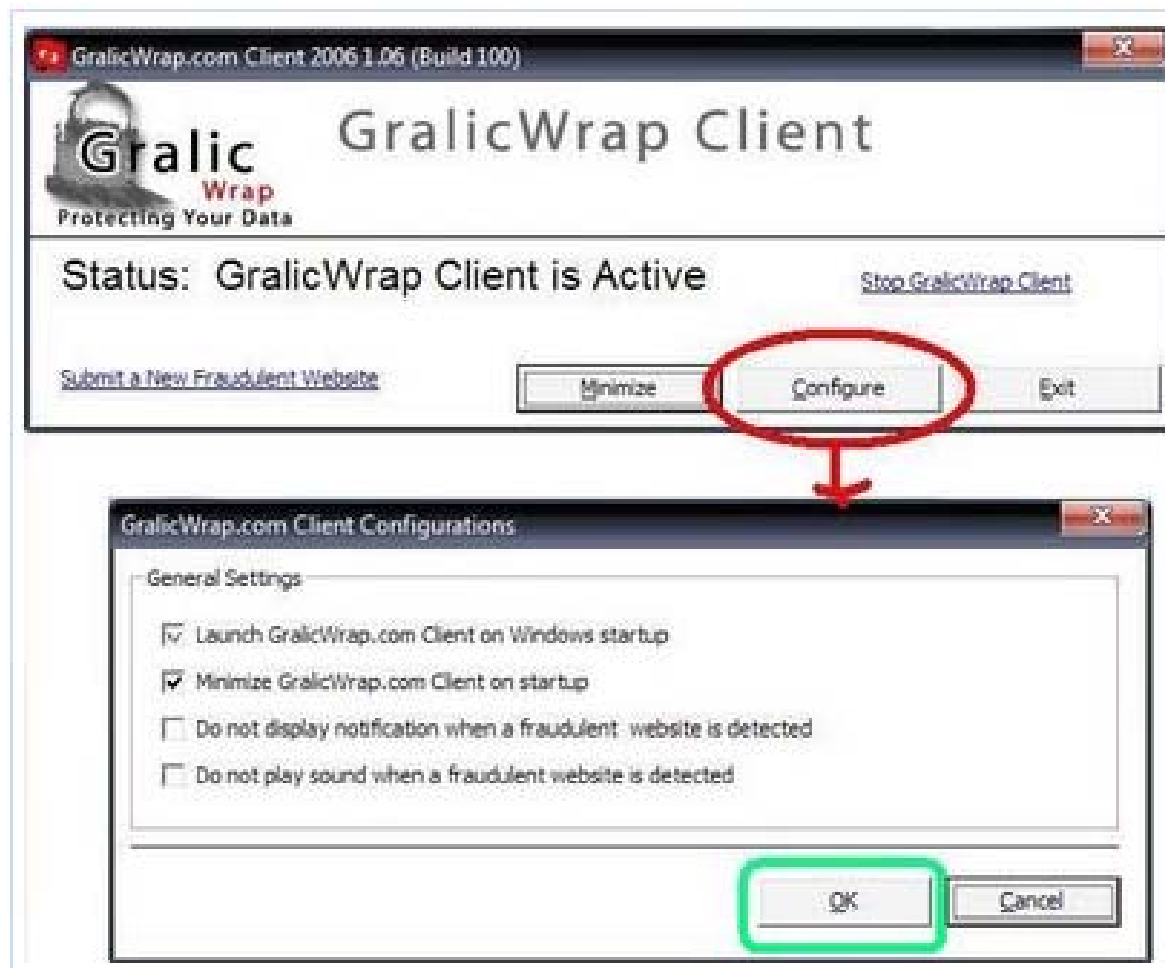
GralicWrap automatically stops loading the fraudulent websites to prevent data theft

The private data of the user is protected from distributing it to the third party

It updates the fraudulent database automatically at the users system



# GralicWrap: Screenshot



# Spyware Doctor

Spyware Doctor is an adware and spyware utility which identifies and clears many potential adware, trojans, keyloggers, spyware and other malware of the system

It also features browser monitoring, immunization against ActiveX controls, and automatic cookie deletion



# Spyware Doctor: Screenshot



# Track Zapper Spyware-Adware Remover

Spyware remover is an Adware, SpyWare, Key Loggers, Trojans, Dialers, Hijackers, Trackware, and Thiefware removal utility with multi-language support

It scans the primary memory, registry, and drives for the known adwares and spywares and lets the user to remove safely from the system

It also features spywatch which monitors and watches the memory



# Track Zapper Spyware-Adware Remover: Screenshot





# AdwareInspector

Adwareinspector is a program which removes all adwares, spywares, viruses, Dialers, and hijackers that are present in the user's computer

It consists of a database of many fingerprints of spyware adware, trojans, and worms that are updated automatically to alert from latest dangers

It can be set for automatic updating or manual updating



# AdwareInspector: Screenshot



Email-Tag.com is used to protect the email accounts, protect the computer, and hide the email address

Using this technique, the user's accounts will be invisible for the spammers

It will generate an email-tag image using the preset templates

Automated email harvesters will read the text and recognizes email address formats and adds them to their spam database

The spammers can be deceived by using images instead of text for email address as email harvesters cannot read images



# Email-Tag.com: Screenshot

Domain	<input type="text" value="AOL"/>	<input type="text" value=".com"/>
Template	<input type="text" value="Blue Background"/>	
Email Handle	<input type="text"/>	
Text Colour	<input type="text" value="White"/>	<input type="text" value="#FFFFFF"/> <input type="color" value="#D3D3D3"/>
<input type="button" value="Create Email Tag"/>		

# Summary

Phishing is an Internet scam where the user is convinced to give valuable information

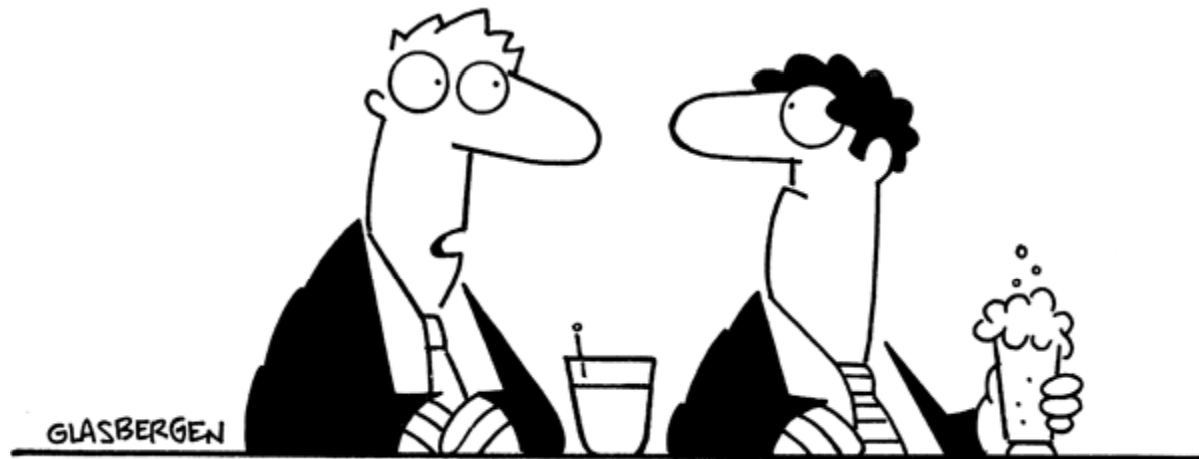
Lack of computer system knowledge by the user (as how the emails and web works) can be exploited by the phishers to acquire sensitive information

Most of the phishing attacks are done through email

Trojan hosts is a software that is installed at the customer's computer which allows the phishers to access the user's information

Phishing attacks are prevented by anti-phishing software

Copyright 2005 by Randy Glasbergen.  
[www.glasbergen.com](http://www.glasbergen.com)



**“While I was thinking outside of the box, someone changed the password and now I can’t get back in!”**

Copyright 2003 by Randy Glasbergen.  
[www.glasbergen.com](http://www.glasbergen.com)



**“We found a solution to your spam problem.  
We replaced all of the keys with ‘delete’ buttons.”**