IRONPORT®

2007

INTERNET SECURITY TRENDS FOR 2007

A REPORT ON SPAM, VIRUSES AND SPYWARE

BY TOM GILLIS

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“the spam problem would be eliminated.”

SPAM IS
BACK

Introduction

The year 2006 was extremely active for messaging security. Most notably, spam is back. At a speech at Comdex in 2004, Bill Gates predicted that the "spam problem would be eliminated." In 2005, industry analysts and pundits observed a marked decrease in the growth rate of spam, and some major networks such as AOL even reported a modest decrease in spam volumes. Spam filter efficacy was high enough worldwide that many end users might have agreed with Mr. Gates's pronouncement that the spam problem was solved. But in the final months of 2005, the spammers returned with a vengeance. Spam volumes surged in the second and fourth quarters, causing a 200 percent increase in spam volume for the year. Most of this volume increase was driven by advanced image-based spam, which is very effective at evading first-generation filters. Image-based spam is typically 10 times larger than text spam, so the resulting mail throughput (measured in Mbps) more than tripled in 2006, meaning that email gateways around the world needed 300 percent more capacity in 2006 than they did in 2005. And this surge continues. In 2007, spam volume will again more than double, and spam throughput is expected to again triple, putting strain on global email infrastructure and causing disruptions in legitimate email delivery.

Viruses are a popular tool used by spammers to facilitate delivery of their messages. In 2006, virus writer tactics shifted, while 2004 and 2005 were marked by massive outbreaks that created front-page news. The problem with these attacks is that they created such notoriety that it inhibited their effectiveness. In 2006, the frequency and size of outbreaks decreased, but the sophistication and maliciousness increased. Instead of using exotic attachment types that could be fairly easily blocked, virus writers began embedding harmful executables in common business file types such as Microsoft Word and Excel files. Also, virus writers introduced new, highly polymorphic viruses that created many variants in a short time, thwarting the efforts of signature vendors.

Spyware, or malware, also flourished in 2006. Two major tactical shifts were observed in malware delivery during the year. The first was the increase in "site poisoning," in which malware designers find ways to embed their malicious code into otherwise legitimate sites. The infection of myspace.com, which resulted in the infection of millions of consumer PCs, was a high-profile example. The second tactical shift was the introduction of "site spamming," in which malware authors create sites designed to distribute malware, and then drive traffic to those sites using spam and phishing techniques. An excellent example of this tactic was the activity surrounding the VML exploit, where massive spam attacks drove users to malware-infected sites. This attack was an example of the sophisticated use of blended threats that combine email and Web technologies in a coordinated attack.

“FIGHTING SPAM will continue to be a top priority in 2007.”

—THE RADICATI GROUP

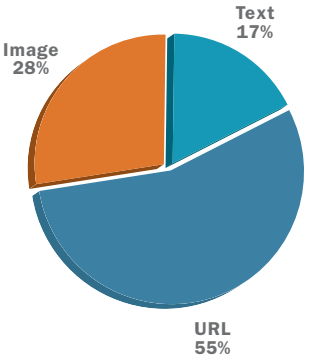
Technological Innovation by Criminals: Money and Mayhem

The reason that Bill Gates and others have grossly underestimated the growth of spam, viruses and other threats is that they have underestimated the motivation of the perpetrators. In 2006, the bad guys got a business plan and deployed enormous amounts of technical resources into designing and executing highly organized global networks that carry out spam, virus and spyware attacks—collectively referred to as malware attacks. Adam Smith, the 18th-century economist, brilliantly described the forces of capitalism as an invisible hand guiding individuals to collectively make optimal choices that would benefit society as a whole. True to Smith's predictions, the power of profit has fueled remarkable innovation in malware creation and delivery; however, since the perpetrators don't bear the full cost of their actions, malware is a problem that appears unbounded. Thus spam volumes have doubled and tripled annually, with no end in sight. The result is that the costs of this increased malware volume are borne by email receivers, not spammers.

The profits come in a variety of forms. In 2004 and 2005, the majority of spam was "grey mail," unsolicited email that actually advertised legitimate products such as low-interest mortgages, herbal remedies and ergonomic mice. The retailers then pay spammers on a "per-clickthrough" basis for attracting customers to these legitimate offers. Many legitimate and well-known brands sell products online using an "affiliate" model, where the retailer pays the affiliate for traffic, but has little control over how the affiliate generates this traffic. Thus spammers get paid real money for generating real leads by using illicit or outright illegal spam techniques.

In 2006, this mix shifted significantly. Stock spam surged from less than 10 percent of spam in 2005 to more than 30 percent of spam in 2006. The result is that both pharmaceutical spam and stock spam are now neck and neck for the most widely sent type of spam today.

The "call to action" in spam messages also changed. In 2005, 85 percent of spam contained a URL, while only 10 percent contained text and 5 percent were image based. In 2006, spam messages shifted and are now 55 percent URL based, 17 percent text based and 28 percent image based.



URLS LEAD THE "CALL TO ACTION" IN TODAY'S SPAM MESSAGES"

Two classes of spam in particular have surged. The first is spam associated with "pump-and-dump" scams (see Figure 1). A spammer will take a position—for example, to purchase a lightly traded stock with a small market capitalization. The spammer will then send out millions of spam emails containing spurious "research" stating that this stock is undervalued and is expected to rise. An example is shown in Figure 1: bogus research promoting Goldmark Industries, a real firm traded under "GDKI.PK." These spam attacks typically involve a billion messages. Say that only 1 percent of the spam messages make it through spam filters, and only 1 percent of those that make it through are actually read. Of the people who read the spam, perhaps only 1 percent are innocent and gullible enough to actually go to their online trading account to take a chance and buy a few shares. Even with such a low percentage of actual transactions, enough demand for the stock is created to materially move the stock price up. When the stock rises, the spammer sells their holding in Goldmark Industries, making a significant, very easy profit. A German university studied this issue and concluded that "the spammers who buy low-priced stock before sending the emails typically see a return of between 4.9 percent and 6 percent when they sell."

FIGURE 1: PUMP-AND-DUMP SPAM

The second class of spam that has surged is spam associated with illegal pharmaceuticals. While the drug-trafficking industry is hard to measure, it is clearly a multibillion-dollar industry. And this industry is loaded with inefficiencies resulting from the many difficulties, most put in place by law enforcement, that separate narcotics suppliers from narcotics consumers. Suddenly, the Internet has created a means to connect illicit offshore narcotics suppliers with a global audience of narcotics consumers. The connection between supplier and consumer is much smoother using online sales, since it is relatively safe for the narcotics consumer and relatively easy for the supplier to avoid detection. Thus a huge percentage of the multibillion-dollar drug-trafficking industry has moved online, as well as the sophisticated global organizations that support this crime. Since these "pharma" sites move around frequently, they rely on spam email to attract customers. Pharma spam is fueling much of the growth in spam, as well as the associated viruses and malware.

Spam Trends

End users may have perceived that in 2005 the spam problem was "solved" as a result of fairly accurate filters and modest volume growth, but that perception crumbled in 2006. Spam volumes more than doubled in 2006. Figure 2 shows this growth of spam message volume.

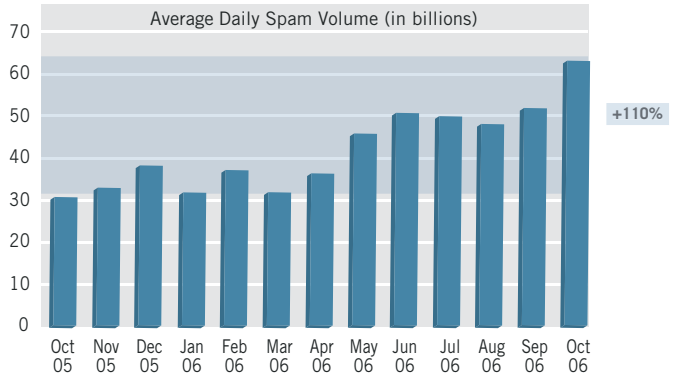


FIGURE 2: SPAM VOLUME DOUBLES IN 12 MONTHS

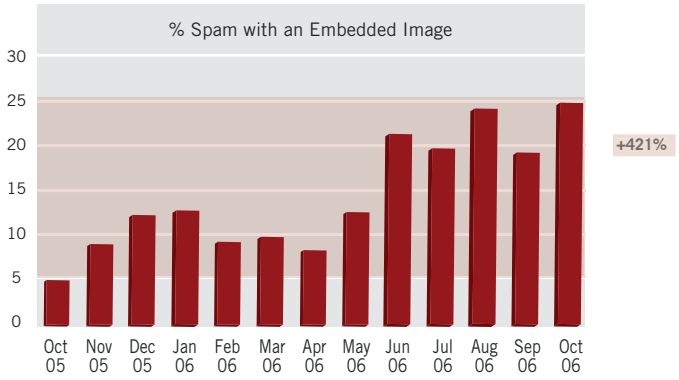


FIGURE 3: IMAGE SPAM DRIVES OVERALL SPAM VOLUME INCREASES

The surges in overall spam volume correlate very strongly with increases in image-based spam, shown in Figure 3.

A typical image spam message is about 30 KB, compared with 3 KB for a typical text spam. This order of magnitude increase in message size has caused spam throughput to roughly triple in the past 12 months. Thus an enterprise IT staff that had a system running reliably at 33 percent of capacity 12 months ago will find that same system overwhelmed with incoming spam, causing queue backups and major delays in legitimate corporate mail. Figure 4 represents the increase in data volume of spam.

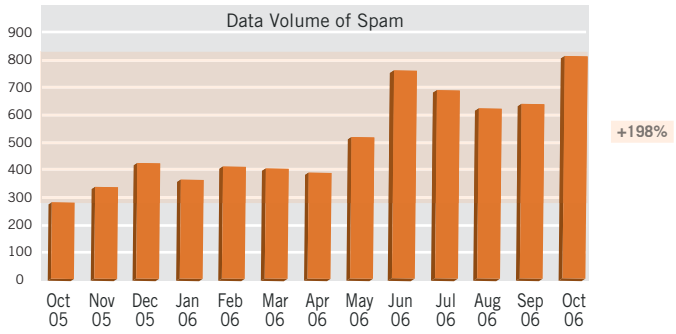


FIGURE 4: THROUGHPUT REQUIRED AT THE MAIL GATEWAY TRIPLED IN 12 MONTHS

Reputation filtering is the best defense against this latest wave of high-volume spam assaults. A state-of-the-art reputation system, such as an IronPort® appliance, can block up to 90 percent of incoming spam at the connection level. Blocking at the connection level means that the message is never actually accepted, saving network bandwidth, firewall capacity and email security appliance capacity. While incoming spam data might triple, actual load on a properly tuned IronPort appliance will increase very little.

Another important trend is the increasing frequency of rapid-outbreak spam attacks. Spammers are adopting techniques used by virus writers for years. Spammers will develop a new strain or variant of spam. They might send out a very limited trial quantity to see how effective the new strain is against spam filters. Once spammers are confident that they have created a content set that will get through most spam filters, they will launch a very large-scale attack. Figure 5 shows the efficacy of a typical spam filter over time.

The large drop in efficacy shown in the example on November 16 occurred during a four-hour window when a new spam attack was launched on a very large scale. Stopping this type of rapid-outbreak spam requires a near-real-time response from a spam filter. Mechanisms must exist to capture samples of missed spam, generate new rules and push these rules out to customers in an automated, efficient manner. Traditional spam filters rely on rules on signatures that are inherently reactive. Samples of new spam need to be captured and analyzed to create new rules and signatures.

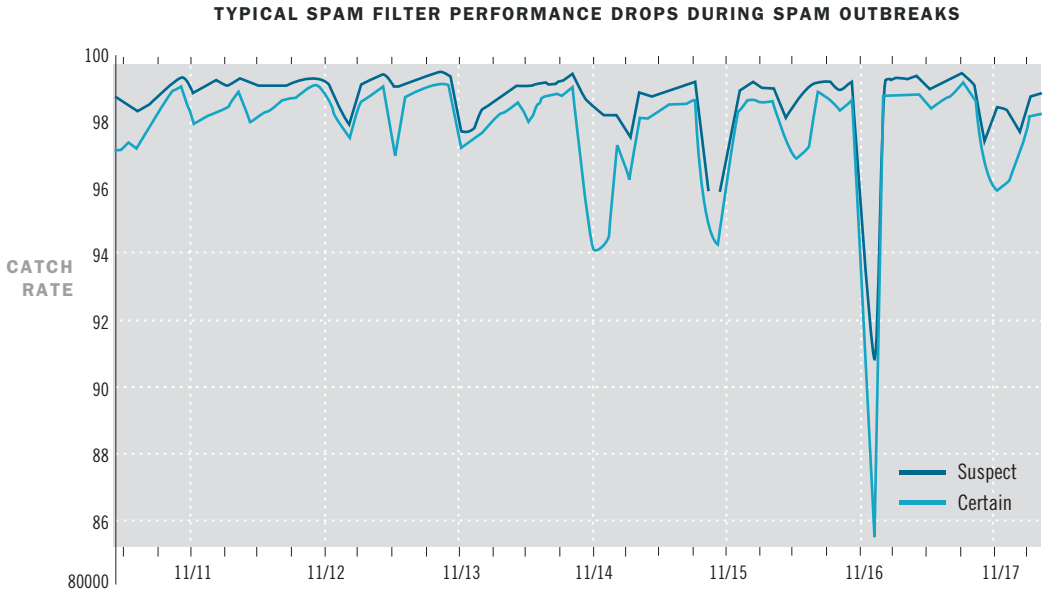


FIGURE 5: THE IMPACT OF A RAPID-OUTBREAK SPAM

Investigative Report

The analysts at the IronPort Threat Operations Center (TOC) recently performed an in-depth analysis of a spam attack, which provided a remarkable insight into the scale and global scope of the organizations behind these problems. The TOC analysts started with a single spam message offering online medications from www.mitherda.com. A sample of the spam message is shown in Figure 6.

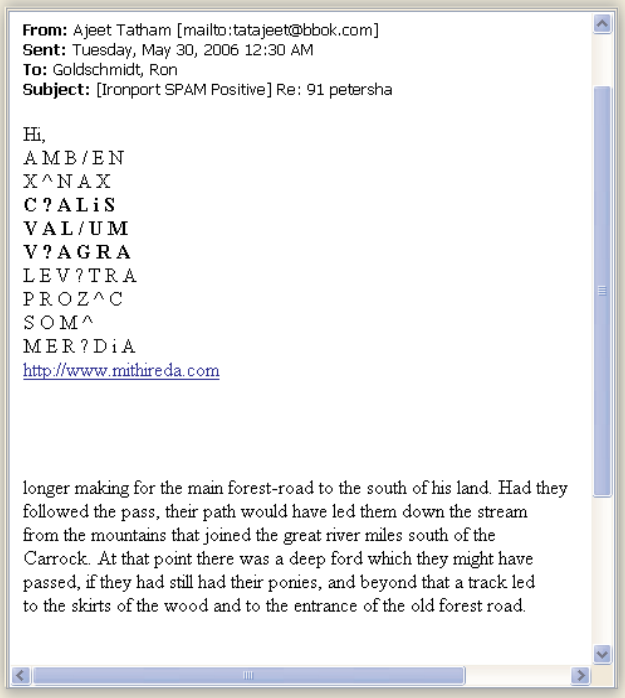


FIGURE 6: "PHARMA" SPAM

IronPort's threat-clustering technology analyzed billions of spam messages captured by the IronPort SenderBase® Network, and identified the common characteristics that linked billions of seemingly independent and random spam messages into a single, global spam attack. The attack consisted of more than 1.5 billion messages—approximately 5 messages for every man, woman and child in the United States. The spam was sent from more than 100,000 different mail servers operating from 119 different countries. These spam servers are actually consumer PCs that have been infected by either a virus or spyware and use "zombies" to relay spam. The IronPort TOC analysts found more than 2,000 different variants of this message that could all be correlated to the same spam attack. These 2,000-plus variants were introduced over a two-week period, changing the content of the spam message roughly every 12 minutes to evade signature-based spam filters. Similarly, the URLs used in the spam attacks rotated through 1,500 different domains, a new one roughly every 15 minutes to evade the URL blacklists typically used by traditional spam filters. The thousands of rotating URLs pointed to approximately 100 different Web servers. These servers were serving any one of 15 different websites, each with a unique look and feel, but all with telltale attributes or "fingerprints" that allowed the IronPort TOC analysts to connect them with the same attack. The 15 websites shared a common payment processing and customer support system operated by a single organization. The total attack of more than 1.5 billion messages was ultimately traced back to a single entity.

Spam attacks of this scale became routine in 2006. Spammers have proved to be very adept at randomizing their messages into thousands of permutations. However, by using sophisticated security modeling techniques, the IronPort TOC analysts are able to thwart the attack by identifying and tracking the command and control infrastructure behind the attack. A summary of these statistics is shown in Figure 7.

The IronPort TOC team then did a detailed analysis of this particular attack in an effort to better understand the source of these attacks. A sample of two of the websites used is shown in Figure 8.

The websites are very legitimate looking, including remarkable detail and background information.

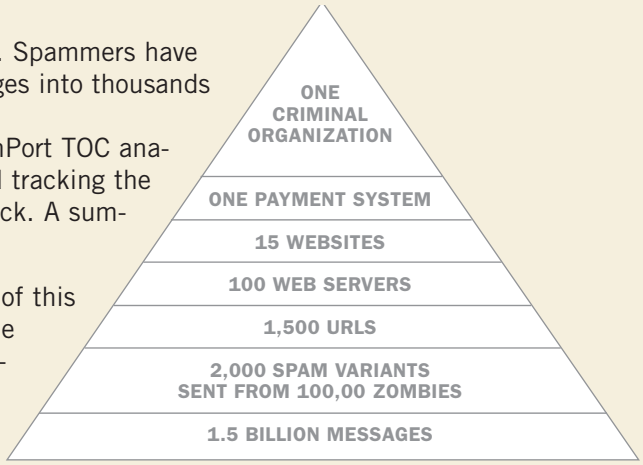


FIGURE 7: HIERARCHY OF A SPAM ATTACK

FIGURE 8: TWO ILLEGAL PHARMA SITES USED IN SPAM ATTACK–VERY DIFFERENT LOOK AND FEEL, SAME INFRASTRUCTURE, SAME SPAMMERS

One of the sites, My Canadian Pharmacy, has a long section about the two founders—Canadian doctors who are frustrated by U.S. regulations that deny American citizens access to low-cost pharmaceuticals. These doctors then supposedly endeavored to create a site that would provide access to affordable medications for all. The background includes photographs of distinguished-looking doctors and their impressive medical resumés. The website includes an office address in Canada. Everything on the website is a forgery, however. Figure 9 shows a photograph taken at the actual Canadian address — a vacant lot in a rough part of Toronto next to a Subway sandwich shop.

The website for "My Canadian Pharmacy" was actually hosted by a firm in California whose address is a Post Office box (number 236), shown in Figure 10. The IronPort TOC analysts researched further and ordered some Viagra tablets from "My Canadian Pharmacy." The tablets arrived in a plastic bag inside a hand-addressed white envelope. The return address of the envelope and the postmark indicated that the tablets had actually been sent from an apartment in Mumbai, India, very near a pharmaceuticals plant with a reputation for producing knock-off drugs. A photo of the address in India is shown in Figure 11.

FIGURE 9: PHOTO OF PURPORTED ADDRESS OF "MY CANADIAN PHARMACY" HEADQUARTERS

FIGURE 10: THE CALIFORNIA ADDRESS OF THE WEB HOST FOR "MY CANADIAN PHARMACY"

FIGURE 11: THE ACTUAL SOURCE OF THE PILLS FROM "MY CANADIAN PHARMACY"—A RESIDENTIAL APARTMENT IN MUMBAI, INDIA

FIGURE 12: THE ACTUAL TABLETS—TESTED TO CONTAIN PILL BINDER, NOT VIAGRA

The actual tablets are shown in Figure 12. Lab test results showed the tablets have the correct shape, color and markings of Viagra, but contain only inert pill binder. No Viagra exists in these pills.

In summary, this case study shows that a typical spam attack now involves billions of messages using very sophisticated randomization techniques. Spammers have established a very elaborate infrastructure that spans the globe–with spam in this case delivered from 100,000 different servers in 119 different countries, and websites and operations that weave through Canada, California and India. The global reach and technical sophistication of this case illustrate how highly organized the entities that create spam have become. IronPort TOC analysts believe that the majority of new, sophisticated spam is coming from highly professional groups with strong links to organized crime. This case also illustrates how much reliance spammers place on both email and Web technology to complete these transactions. A coordinated defense system that combines both SMTP and HTTP defense systems will yield the maximum protection against these threats. The SMTP system filters mail by looking for spam identifiers as well as dangerous URLs. The HTTP system can also scan for illicit URLs that might have made it through the spam filter but that can be blocked on the way out. Also, the HTTP system can ensure that any traffic to the suspect sites does not include spyware or malware executables.

Behind the Scenes

AN INFINITE SUPPLY OF ZOMBIES

Spammers use infected PCs, or "zombies," to obfuscate the IP address of the server sending the spam. This technique is very effective for avoiding traditional blacklists, and it keeps spam delivery costs near zero. Since more than 80 percent of spam is sent from zombies, many ISPs have attempted to control the spread of zombies. But this task is very difficult. Nearly every PC has some level of virus vulnerability. And these viruses are primarily designed to create new zombie networks. Most of the new zombies have been found in nations that are just rolling out their broadband networks, have large populations of old and unprotected PCs and therefore have the greatest virus vulnerability. Figure 13 shows a graph of the geographic distribution of zombies used in a single large-scale spam attack.

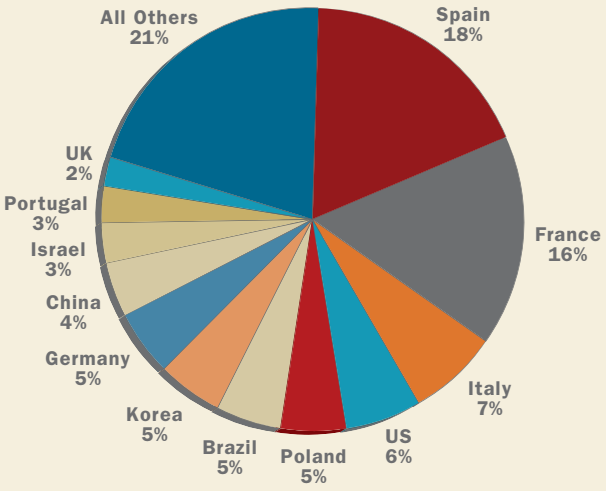


FIGURE 13: A SINGLE SPAM ATTACK USES ZOMBIES FROM MORE THAN 100 DIFFERENT COUNTRIES

HIT-AND-RUN ZOMBIE ATTACKS

The average life span of a zombie in 2006 was less than 30 days. Spammers will make extensive use of a zombie for a few days, until the zombie becomes widely detected and blocked by traditional spam filters. Most traditional spam filters take days to react and update their rules to block a zombie, and by then the spammer has moved on to another fresh, new zombie. The distribution is shown in Figure 14.

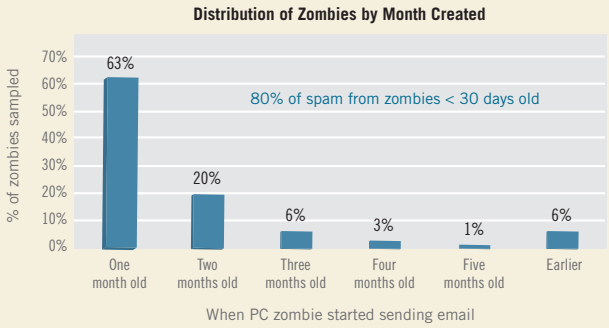


FIGURE 14: MOST ZOMBIES LAST LESS THAN 30 DAYS

AN INFINITE SUPPLY OF URLS

Spammers rotate through URLs as often as every few hours to avoid detection by traditional URL blacklists. Figure 15 shows a huge spike in the number of new URLs registered, as well as a spike in URLs that were dropped. Spammers often register a URL and then drop it before they even have to pay for use of the URL.

FIGURE 15: SPAMMERS REGISTER AND THEN DROP SPAM URLS WITHIN HOURS (SOURCE: IPWALK.COM)

Virus Trends

Although the Internet experienced fewer large-scale virus outbreaks in 2006, these outbreaks were much more targeted, sophisticated and malicious. The monthly average of new virus outbreaks, including virus variants, dropped from 21 in 2005 to 11 in 2006, a 47 percent decrease. However, several disturbing trends emerged:

URL-BASED VIRUSES. URL-based viruses increased from 3 in 2005 to 13 in 2006. URL-based viruses are extremely potent because they propagate via email. The email contains only a URL and a subject line that entices a user to click. It is very difficult for a traditional email security system to detect these messages because they look so legitimate. They do not contain an attachment that traditional email antivirus systems can scan. Instead, they use social engineering to entice end users to click the link, thereby delivering the virus payload via the Web. Since more and more companies are deploying sophisticated defenses on Port 25 of their network, virus writers are increasingly turning to port 80—the HTTP (Web) port—as an easy way into the corporate network.

MACRO-BASED VIRUSES. Macro-based viruses increased from zero outbreaks in 2005 to 15 outbreaks in 2006. Macro-based viruses are viruses that reside inside Microsoft files such as Word and Excel files. These viruses can be very potent, since many email administrators rely on attachment file type filtering to limit exposure to new outbreaks. Furthermore, Word and Excel files are much more familiar to end users, resulting in higher open and infection rates than more esoteric attachment file types.

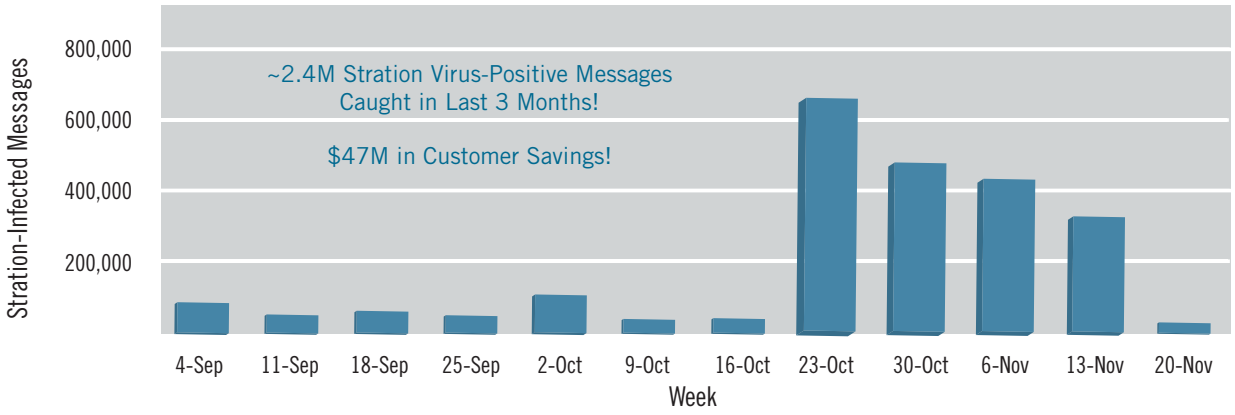
EMAIL-BORNE SPYWARE. Email-borne spyware continues to flourish. As another example of blended threats, email has become a preferred distribution vector for spyware. Six of the ten largest virus outbreaks contained some form of spyware. Most of this spyware involved Trojans that open a back door on an infected PC and download very harmful code, such as rootkits. From 2005 through 2006, email-borne spyware increased by more than 200 percent, a pace consistent with spyware growth from 2004 to 2005. Clearly, the widespread prevalence of spyware in viruses supports one of the macro trends highlighted by this report—that these threats are coming from the same sources and that the current state of the art for attackers is to blend these email and Web techniques.

MULTIPLE VARIANTS. Virus writers are using multiple variants of the same virus to evade signature vendors. A great example of this was the Stration virus

RESPOND FASTER. REDUCE VULNERABILITY.

The best defense for a rapid polymorphic virus is to employ a preventive outbreak control system before signature-based scanning. IronPort Virus Outbreak Filters™ stopped more than 2.4 million copies of the Stration virus, responding an average of 5 hours and 43 minutes ahead of the fastest signature vendors. The IronPort TOC produced a series of 14 targeted outbreak rules that identified and quarantined the outbreak during the vulnerability window.

of 2006. Between September and November 2006, virus writers released waves of variants of the Stration virus, designed to induce customers to open messages by claiming to be security alerts or updates. Many of these variants contained spam engines that were used to propagate the virus by spamming out new copies. Figure 16 shows the early proof-of-concept phase of the virus in September, with volume mushrooming in October during the bulk of the outbreak.



Assumes 10% of messages opened and $200 per-desktop cleanup costs

FIGURE 16: THE MANY VARIANTS OF THE STRATION VIRUS FLOWED FOR SEVERAL WEEKS. THE IRONPORT TOC COUNTED 59 SEPARATE MUTATIONS THAT OCCURRED DURING THIS 12-WEEK PERIOD.

The many variants of this virus caused signature vendors long delays in producing signatures, creating vulnerability periods for many corporations.

Virus Metrics

IronPort's TOC saw a slight decrease in the number of virus outbreaks propagating around the world in 2006:

- The IronPort TOC saw a small increase in the number of virus outbreak rules written during 2006 compared with 2005. In 2005, an average of 70 rules were written each month, for a total of 847. In 2006, the TOC wrote an average of 74 rules each month, for a total of 888. See Figure 17.
- The number of qualified outbreaks seen by the IronPort TOC remained fairly stable from 2005 to 2006. In 2005, IronPort saw 132 qualified virus

FIGURE 17: NUMBER OF VIRUS OUTBREAK RULES WRITTEN BY IRONPORT'S THREAT OPERATIONS CENTER

outbreaks, for an average of 11 outbreaks per month. In 2006, this number dropped slightly to 123 qualified outbreaks, for an average of 10.2 outbreaks per month. See Figure 18.

- A comparison of the top three virus outbreaks in 2005 and 2006 follows:

2005	2006
Mytob	Stration
Bagle	Bagle
Sober	Mytob

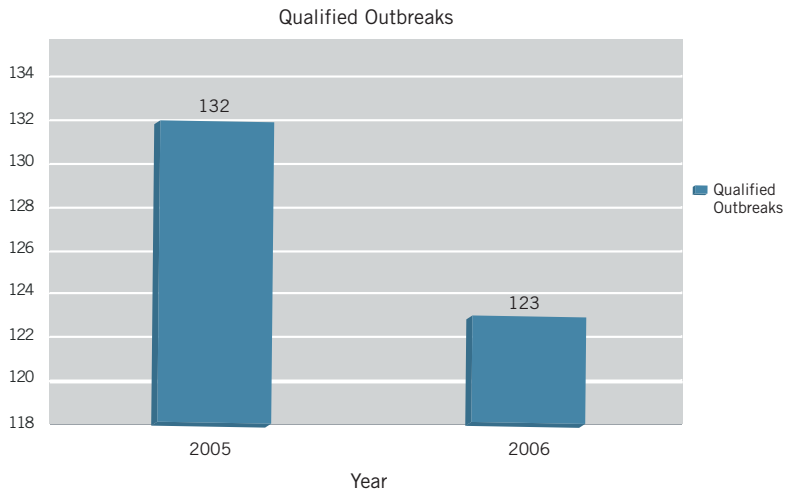


FIGURE 18: NUMBER OF QUALIFIED VIRUS OUTBREAKS AS SEEN BY IRONPORT'S THREAT OPERATIONS CENTER

While it may seem confusing that the number of rules increased while the number of qualified outbreaks decreased, there is an easy explanation. Today's viruses require IronPort's TOC to be more aggressive when writing rules, perhaps duplicating some rules for what turns out to be the same outbreak. Additionally, a new trend is also emerging. In 2006 the TOC saw more and more small scale Trojan attacks (or phishing attacks with a Trojan attached) and less big scale outbreaks. This equated to less qualified outbreaks. The expectation for 2007 follows the same course. The number of traditional, large-scale, self-replicating virus outbreaks will likely decrease. This decline, however, will be negated by the proliferation of smaller, more malicious outbreaks that use URLs and common file types such as Word and Excel to spread, as mentioned previously. In 2007, an increasing number of viruses will carry spyware payloads by which hackers can take over infected machines to steal personal and confidential information and convert these machines into botnets for use as spam, spyware and virus vectors.

“WEB-TRAFFIC-BORNE MENACES LIKE

SPYWARE

are creating an all-time high concern among organizations.”

—**BRIAN BURKE**
RESEARCH MANAGER, IDC

Spyware Trends

Spyware continued to spread in 2006. The IronPort TOC staff performed a study of spyware infection rates in corporate environments. This study found that more than 48 percent of corporate PCs were infected with some type of malware. Of these infected machines, adware and tracking cookies were clearly the most prevalent infections. However, Trojans and system monitors still represented more than 7 percent of the infections, a shockingly high infection rate given the malicious nature of these two types of threats. See Figure 19 for a breakdown.

FIGURE 19: ENTERPRISE MACHINES INFECTED BY MALWARE

Global Infection Rates	Adware	Trojans	System Monitors	Tracking Cookies
Enterprise	48%	7%	5%	77%

These numbers are surprisingly high given that 65 percent of these same enterprises surveyed had deployed some type of desktop-based, anti-spyware system. Clearly, desktop-based, first-generation malware defenses are not sufficient to protect corporate networks.

Breaking these numbers down by geography gives us the top regions where enterprises are the most infected by malware. Not surprisingly, North America and the United Kingdom hold the top two positions. A detailed breakdown is shown in Figure 20.

FIGURE 20: ENTERPRISE INFECTIONS BY TYPE OF MALWARE AND GEOGRAPHY

Region	Adware	Trojans	System Monitors	Tracking Cookies
North America	66.7%	9.8%	7.0%	89.4%
UK	46.4%	6.8%	4.8%	74.5%
Germany	43.3%	6.3%	4.5%	69.5%
France	38.7%	5.7%	4.0%	62.1%
Japan	43.4%	6.3%	4.5%	69.7%
China	55.3%	8.1%	5.8%	89.0%
ANZ	39.9%	5.8%	4.1%	64.1%
Other	49.7%	7.3%	5.2%	79.9%

Spyware writers are achieving these infection rates by using two principal tactics:

SITE POISONS. The first is called site poisoning, which is the surreptitious delivery of spyware on legitimate websites. Site poisoning can be done in a variety of manners. The brute-force method is to hack into a site and explicitly post malware on the site. The malware is typically posted in a manner that takes advantage of a browser vulnerability that tricks the browser into downloading the harmful malware payload.

A newer and more devious problem is site poisoning from linked content. In today's era of Web services, many sites pull content and code from other websites. Often a site may reference another site, which in turn references other sites. RSS feeds and advertisements are frequently set up in this manner. One of the most notable examples of site poisoning was when myspace.com was found to be delivering malware.

In July 2006, myspace.com served an ad for deckoutyourdeck.com. The ad attempted to download a file called "exp.wmf," a Windows metafile image. Six months earlier, in January 2006, Microsoft had issued a patch to fix a critical vulnerability in Internet Explorer that allowed .wmf files to cause the browser to download harmful code without prompting the end user. While the patch had been in existence for nearly six months, the population of unpatched IE browsers is still quite large, so malware authors were still using this exploit to deliver malicious code. This particular exploit attempted to deliver an adware in the Purity Scan family. The ad was served by springfusion.com, a relatively new ad network that claimed no direct responsibility for the ad. Controlling content that comes from external sites is an ongoing challenge for legitimate websites.

SITE SPAMMING. The second tactic adopted by spyware writers is called site spamming. Site spamming involves the creation of bogus sites designed to deliver malware. Often the site might look legitimate, such as "Mrs. Hall's Second Grade Class," a fake financial institution or a counterfeit version of a well-known legitimate site such as yahoo.com. A good example of this activity was observed by the IronPort TOC around the VML (Vector Markup Language) exploit in Microsoft Internet Explorer. On September 18, 2006, an IE exploit was seen in the wild that took advantage of the VML vulnerability. The exploit forced a buffer overflow in an IE browser and introduced shellcode. If a system was exploited, it allowed the execution of arbitrary code. This vulnerability was seen even in a fully patched Microsoft Windows XP SP2 system.

Initially a proof-of-concept exploit was seen at a few sites that did not distribute any malware packages. As expected, several sites were soon seen hosting this exploit. Exploited systems experienced a significant amount of malware packages, including everything from Trojans, system monitors, and browser hijackers to adware applications. IronPort's own testing of live systems uncovered approximately 30 malware packages coming from just one site. Examples of some of these packages are:

- Trojan-Downloader-AC2
- Trojan-Backdoor-SkyAffiliate
- enBrowser
- Ezula iLookup
- Trojan-Backdoor-Rustock

Sites that were seen hosting the exploit were typically low-volume, relatively obscure adult or gaming sites. To drive traffic to these sites, IronPort observed a large volume of spam messages that contained URLs pointing to sites known to be

hosting the exploit. Two examples of these spam messages are shown in the following figures. Figure 21 is a phishing email advertising Commonwealth Bank, a fictitious Australian bank.

Shortly after the Commonwealth Bank phishing emails, IronPort detected a forged Yahoo greeting card, shown in Figure 22, that linked to infected sites.

From: Commonwealth Bank Group <ssjhcl@konkurrence-siden.dk>
Subject: [SPAM] Commonwealth Bank Group offers 11% p.a. on Term Deposits for Current Customers!
Date: Thu Sep 21 10:05:12 2006
To:

It seems Commonwealth Bank is doing really well this year, the highest deposit rate I.ve ever seen in Australia. Just quoting the found at Wealth Creator Magazine.s website:

If you want competitive returns and you don.t need instant access to y cash, you can get a competitive 8.95% p.a. on Term Deposits at the Commonwealth Bank for amounts from $3,000 for 12 months, and 10 for amounts of $5,000 and over.

We are proud to have you as a member of our bank and would love to off time-limited Commonwealth Bank.s anniversary rate!
http://www.wealthcreatorau.net/commpromo.html

Isn.t amazing? But they limit the offer to the current customers, that one sad point. If you are one of them I feel jealous for you.

Again all the details are on the magazine.s portal, the direct link to this news: http://www.wealthcreatorau.org/commpromo.html

FIGURE 21: PHISHING EMAIL THAT DRIVES TRAFFIC TO A MALWARE SITE

This message is an example of excellent social engineering. End users will be hard pressed to discover that this is a forgery and will likely click the link and infect their machines.

This site-spamming incident is a perfect example of malware writers using blended threats, email, and Web technology to deliver very sophisticated and very effective coordinated attacks.

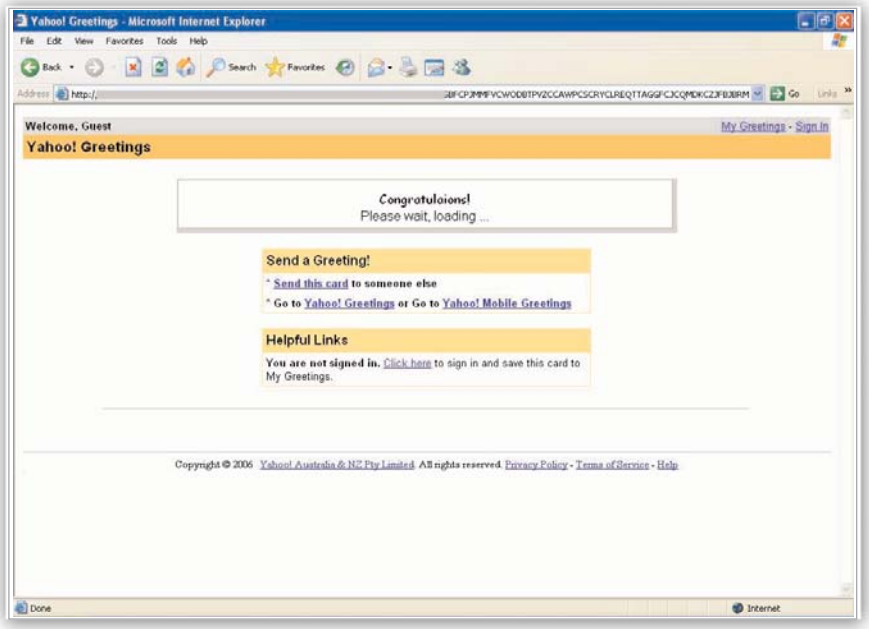


FIGURE 22: A FORGED YAHOO GREETING CARD DRIVING TRAFFIC TO A MALWARE SITE

IronPort powers and protects your network infrastructure with Web security, Email security and Security management appliances.

WEB SECURITY

The IronPort S-Series™ is the industry's fastest Web security appliance—providing a network perimeter defense for the broadest range of spyware and Web-based malware.

EMAIL SECURITY

The IronPort C-Series™ and IronPort X-Series™ email security appliances are in production at eight of the ten largest ISPs and more than 20 percent of the world's largest enterprises. These industry-leading systems have a demonstrated record of unparalleled performance and reliability.

SECURITY MANAGEMENT

The IronPort M-Series™ security management appliances centralize and consolidate important policy and runtime data, providing administrators and end-users with a single interface for managing their application-specific security systems.

Winning the Fight with Best Practices

There are no silver bullets to eliminate the flaws found in email. The ultimate answer will likely emerge as a cocktail of many complementary solutions. The sustained viability of email demands a convergence of market-driven research and technological development with the willingness of email administrators to embrace a new kind of transmission environment built on adopted best practices, sender identity verification and reputation authentication. The following best practices are just a start in helping organizations begin to reduce the amount of email and Web threats from attacking their network:

MANAGE OUTGOING EMAIL. Corporations should block all outgoing mail that doesn't go through one of their SMTP email gateways. This practice allows IT staff to implement policy filtering on outgoing mail and dramatically reduce the spread of viruses and spam from compromised machines.

MANAGE BOUNCES. Carefully manage bounces. Bounce messages should always be delivered as delayed bounces. Delayed bounces are separate emails sent to the sender that notify him or her of an invalid address. Bouncing messages during the SMTP conversation exposes the corporate directory to spammers looking to harvest valid addresses. Also, sophisticated commercial solutions have built-in defenses against directory harvest attacks. These defenses stop accepting mail from a given sender if that sender has exceeded a certain number of invalid addresses. It's an important security safeguard.

SEGMENT EMAIL. New generations of email gateways are able to place different classes of traffic on different outbound IP addresses. Corporations should use one set of IP addresses for transactional email, another for employee email, and yet another for bounce messages. If any of these various traffic types induce deliverability problems, the IP segmentation creates "watertight compartments" that contain the damage to only that class of traffic. The best example is the growing instance of spammers sending messages with a bounce address of a known spam trap. If the corporation bounces the message, they end up on a blacklist that can be very difficult to get off. If the traffic is segmented, then the only thing that gets blocked is the bounce IP, and corporate mail is unaffected.

PROTECT YOUR REPUTATION. If your company is doing any email marketing, check with an email reputation service such as IronPort's SenderBase (www.senderbase.org) to measure the complaint rates associated with the marketing mail. Segmenting email traffic (see above) makes it much easier to resolve marketing-generated issues as opposed to employee-generated issues. Most leading reputation services will have some type of program to provide a report that reflects how major ISPs regard mail from your company's IP addresses.

MANAGE YOUR REPUTATION. DomainKeys Identified Mail is a method for email authentication. It offers almost end-to-end integrity from a signing mail transfer agent (MTA) to a verifying MTA. In most cases the signing MTA acts on behalf of the sender, and the verifying MTA acts on behalf of the receiver.

The DomainKeys specification has adopted aspects of Identified Internet Mail to create an enhanced protocol called DomainKeys Identified Mail (DKIM). This merged specification is the basis for an IETF Working Group that plans to guide the specification toward becoming an IETF standard.

DEFINE EMAIL POLICIES. When defining email policies, make them specific to certain groups within the company. For example, adding a disclaimer footer might be a global action, but scanning for a key word such as "proprietary" or "confidential" will yield very high false-positive rates unless it is put into a more fine-grained filter such as "scan all mail from engineering going to these five competitors for the following 20 words: proprietary, confidential, project x, project y, etc."

DEPLOY A SOLUTION. Deploy a preventive security solution and advanced spam filtering technology that uses real-time data to stay ahead of spam without inducing false positives.

The future is now. A new generation of applications will convert sending and receiving gateways into efficient checkpoints, where email will either earn the imprimatur of legitimacy or be cast aside as noncompliant. In other words, senders who don't play by the rules simply won't be allowed to play.

Conclusion

At the highest level, 2006 saw an increase in both the sophistication and the volume of Internet security threats. Spammers created triple the volume of image-based spam. This threat has a dual effect on infrastructure: incoming mail throughput has increased four times faster than Moore's law (the typical increase in server throughput), and at the same time the processing required to detect the more sophisticated spam has also increased by more than 100 percent. The net result is a massive jump in throughput required at the email gateway to keep legitimate email flowing. This jump in required throughput has led to email delays, and a huge increase in spam appearing in mail boxes, prompting many end users to conclude that "spam is back."

Virus writers shifted from the mass-mailer tactics of previous years to more stealthy attacks embedded in office documents, and with highly polymorphic outbreaks. Malware writers found new ways to deliver a steadily increasing array of harmful code, such as key loggers and system monitors.

Internet Explorer vulnerabilities have allowed malware code to propagate undetected by the end user. Also, malware authors developed effective spam and phishing techniques to drive traffic to infected sites, resulting in desktop infection rates of over 50 percent corporations worldwide.

Trends point to a single overarching theme. Spam, viruses, phishing and malware are tools used by well-organized global entities that are profiting from a variety of criminal activities including drug trafficking, fraud and identity theft.

To combat these sophisticated threats, enterprise security officers need to evaluate solutions that have strong email and Web capabilities. An email appliance and a Web security gateway that work together and share a common threat database is the best way to defend against the sophisticated new generation of threats on the Internet.

2007 PREDICTIONS

SPAM

In 2007, spam volume, particularly image spam, will again more than double, and bandwidth consumed by spam is expected to again triple, putting strain on global email infrastructure and causing disruptions in legitimate email delivery In addition, email administrators need to pay special attention to the release of Microsoft Vista which may present additional vulnerabilities to be discovered and exploited.

VIRUS

In 2007 the number of traditional, large-scale, self-replicating virus outbreaks will likely decrease. This decline, however, will be negated by the proliferation of smaller, more malicious outbreaks that use URLs and common file types such as MS word and excel to spread. In 2007, an increasing number of viruses will carry spyware payloads by which hackers can take over infected machines to steal personal and confidential information and convert these machines into botnets for use as spam, spyware and virus vectors.

SPYWARE/MALWARE

In 2007, the malware market will become more commercialized as sophisticated organized crime groups fund development to generate profit. In addition, organized attacks motivated by political or economic interests will rise and potentially create homeland security threats.

Despite the social and legal ramifications, legitimate businesses are willing to utilize new methods to increase advertising revenues. Video formats on social networking sites and media download sites will increase malware distribution opportunities.

About the Author

TOM GILLIS is a recognized leader in the dynamically charged and high-growth email and Web security industry, and has in-depth knowledge of the challenges surrounding secure network infrastructure. An influential and frequent conference and panel presenter, Gillis has made invaluable contributions to the email and Web community, including the SMTPi framework for secure email as well as author of the book *Get the Message*. Gillis has held positions at iBEAM Broadcasting, SGI, and Boston Consulting Group (BCG), and is currently the chief marketing officer for IronPort Systems. Tom graduated with distinction from Harvard Business School's MBA program. He also graduated magna cum laude with an MSEE from Northwestern University and a BSEE from Tufts University.

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IronPort Systems is the leading email and Web security products provider for organizations ranging from small businesses to the Global 2000. IronPort provides high-performance, easy-to-use and technically innovative products for those faced with the monumental task of managing and protecting their mission-critical networks from Internet threats.