

Microsoft Security Intelligence Report

Volume 12

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WORLDWIDE THREAT ASSESSMENT

Microsoft Security Intelligence Report

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Authors

Dennis Batchelder
Microsoft Protection
Technologies

Shah Bawany
Microsoft Windows Safety
Platform

Joe Blackbird
Microsoft Malware
Protection Center

Eve Blakemore
Microsoft Trustworthy
Computing

Joe Faulhaber
Microsoft Malware
Protection Center

Sarmad Fayyaz
Bing

David Felstead
Bing

Paul Henry
Wadeware LLC

Nitin Kumar Goel
Microsoft Security
Response Center

Jeff Jones
Microsoft Trustworthy
Computing

Jimmy Kuo
Microsoft Malware
Protection Center

Marc Lauricella
Microsoft Trustworthy
Computing

Ken Malcolmson
Microsoft Trustworthy
Computing

Nam Ng
Microsoft Trustworthy
Computing

Mark Oram
Microsoft Trustworthy
Computing

Daryl Pecelj
Microsoft IT Information
Security and Risk
Management

Dave Probert
Microsoft Security
Engineering Center

Tim Rains
Microsoft Trustworthy
Computing

Frank Simorjay
Microsoft Trustworthy
Computing

Holly Stewart
Microsoft Malware
Protection Center

Matt Thomlinson
Microsoft Trustworthy
Computing

Scott Wu
Microsoft Malware
Protection Center

Terry Zink
Microsoft Forefront Online
Protection for Exchange

Contributors

Doug Cavit
Microsoft Trustworthy
Computing

Chris Compton
Microsoft Trustworthy
Computing

Mike Convertino
Microsoft Trustworthy
Computing

Enrique Gonzalez
Microsoft Malware
Protection Center

Heather Goudey
Microsoft Malware
Protection Center

Roger Grimes
Microsoft IT Information
Security and Risk
Management

Satomi Hayakawa
CSS Japan Security
Response Team

Jenn LeMond
Microsoft IT Information
Security and Risk
Management

Le Li
Microsoft Windows Safety
Platform

Jenner Mandel
Microsoft Trustworthy
Computing

Hideya Matsuda
CSS Japan Security
Response Team

Patrick Nolan
Microsoft Malware
Protection Center

Takumi Onodera
Microsoft Premier Field
Engineering, Japan

Anthony Penta
Microsoft Windows Safety
Platform

Kathy Phillips
Microsoft Legal and
Corporate Affairs

Hilda Larina Ragragio
Microsoft Malware
Protection Center

Laura A. Robinson
Microsoft IT Information
Security and Risk
Management

Richard Saunders
Microsoft Trustworthy
Computing

Jasmine Sesso
Microsoft Malware
Protection Center

Adam Shostack
Microsoft Trustworthy
Computing

**Maarten Van
Horenbeeck**
Microsoft Trustworthy
Computing

Henk van Roest
CSS Security EMEA

Patrik Vicol
Microsoft Malware
Protection Center

Steve Wacker
Wadeware LLC

Dan Wolff
Microsoft Malware
Protection Center

Table of Contents

About this report.....	v
Trustworthy Computing: Security engineering at Microsoft	vi
Worldwide threat assessment.....	7
Vulnerabilities	9
Industry-wide vulnerability disclosures.....	9
Vulnerability severity.....	10
Vulnerability complexity	12
Operating system, browser, and application vulnerabilities.....	13
Microsoft vulnerability disclosures	14
Guidance: Developing secure software.....	15
Exploits	16
Java Exploits	18
HTML and JavaScript exploits.....	19
Document parser exploits.....	21
Operating system exploits	22
Adobe Flash Player exploits.....	24
Exploit effectiveness with the Enhanced Mitigation Experience Toolkit.....	26
Malware and potentially unwanted software	29
Global infection rates.....	29
Operating system infection rates	36
Threat categories.....	39
Threat categories by location.....	41

Threat families.....	42
Rogue security software	45
Home and enterprise threats	50
Guidance: Defending against malware.....	54
Email threats	55
Spam messages blocked	55
Spam types.....	58
Guidance: Defending against threats in email.....	61
Malicious websites.....	62
Phishing sites	63
Target institutions.....	65
Global distribution of phishing sites.....	67
Malware hosting sites.....	69
Malware categories	70
Global distribution of malware hosting sites.....	72
Drive-by download sites.....	74
Guidance: Protecting users from unsafe websites.....	76
Appendixes.....	77
Appendix A: Threat naming conventions	79
Appendix B: Data sources	81
Appendix C: Worldwide infection rates.....	83
Glossary.....	88
Threat families referenced in this report.....	95

About this report

The *Microsoft® Security Intelligence Report (SIR)* focuses on software vulnerabilities, software vulnerability exploits, and malicious and potentially unwanted software. Past reports and related resources are available for download at www.microsoft.com/sir. We hope that readers find the data, insights, and guidance provided in this report useful in helping them protect their organizations, software, and users.

Reporting period

This volume of the *Microsoft Security Intelligence Report* focuses on the third and fourth quarters of 2011, respectively, with trend data for the last several years presented on a quarterly basis. Because vulnerability disclosures can be highly inconsistent from quarter to quarter and often occur disproportionately at certain times of the year, statistics about vulnerability disclosures are presented on a half-yearly basis, as in previous volumes of the report.

Throughout the report, half-yearly and quarterly time periods are referenced using the *nHyy* or *nQyy* formats, where *yy* indicates the calendar year and *n* indicates the half or quarter. For example, 2H11 represents the second half of 2011 (July 1 through December 31), and 4Q11 represents the fourth quarter of 2011 (October 1 through December 31). To avoid confusion, please note the reporting period or periods being referenced when considering the statistics in this report.

Conventions

This report uses the Microsoft Malware Protection Center (MMPC) naming standard for families and variants of malware and potentially unwanted software. For information about this standard, see “[Microsoft Malware Protection Center Naming Standard](#)” on the MMPC website.

Trustworthy Computing: Security engineering at Microsoft

Amid the increasing complexity of today's computing threat landscape and the growing sophistication of criminal attacks, enterprise organizations and governments are more focused than ever on protecting their computing environments so that they and their constituents are safer online. With more than a billion systems using its products and services worldwide, Microsoft collaborates with partners, industry, and governments to help create a safer, more trusted Internet.

Microsoft's Trustworthy Computing organization focuses on creating and delivering secure, private, and reliable computing experiences based on sound business practices. Most of the intelligence provided in this report comes from Trustworthy Computing security centers—the Microsoft Malware Protection Center (MMPC), Microsoft Security Response Center (MSRC), and Microsoft Security Engineering Center (MSEC)—which deliver in-depth threat intelligence, threat response, and security science. Additional information comes from product groups across Microsoft and from Microsoft IT (MSIT), the group that manages global IT services for Microsoft. The report is designed to give Microsoft customers, partners, and the software industry a well-rounded understanding of the threat landscape so that they will be in a better position to protect themselves and their assets from criminal activity.

Worldwide threat assessment

Vulnerabilities

Vulnerabilities are weaknesses in software that enable an attacker to compromise the integrity, availability, or confidentiality of the software or the data that it processes. Some of the worst vulnerabilities allow attackers to exploit the compromised system by causing it to run malicious code without the user's knowledge.

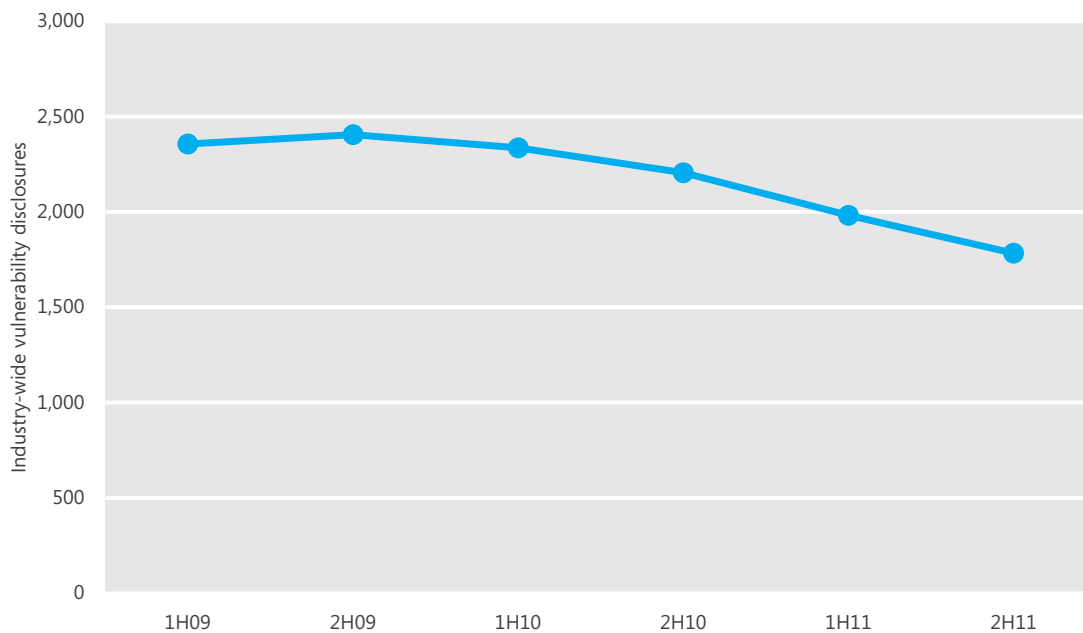
Industry-wide vulnerability disclosures

A *disclosure*, as the term is used in the *Microsoft Security Intelligence Report*, is the revelation of a software vulnerability to the public at large. It does not refer to any type of private disclosure or disclosure to a limited number of people. Disclosures can come from a variety of sources, including the software vendor, security software vendors, independent security researchers, and even malware creators.

The information in this section is compiled from vulnerability disclosure data that is published in the National Vulnerability Database (nvd.nist.gov), the U.S. government repository of standards-based vulnerability management. It represents all disclosures that have a CVE (Common Vulnerabilities and Exposures) identifier.

Figure 1 illustrates the number of vulnerability disclosures across the software industry for each half-year period since 1H09. (See "About this report" on page v for an explanation of the reporting period nomenclature used in this report.)

Figure 1. Industry-wide vulnerability disclosures, 1H09–2H11

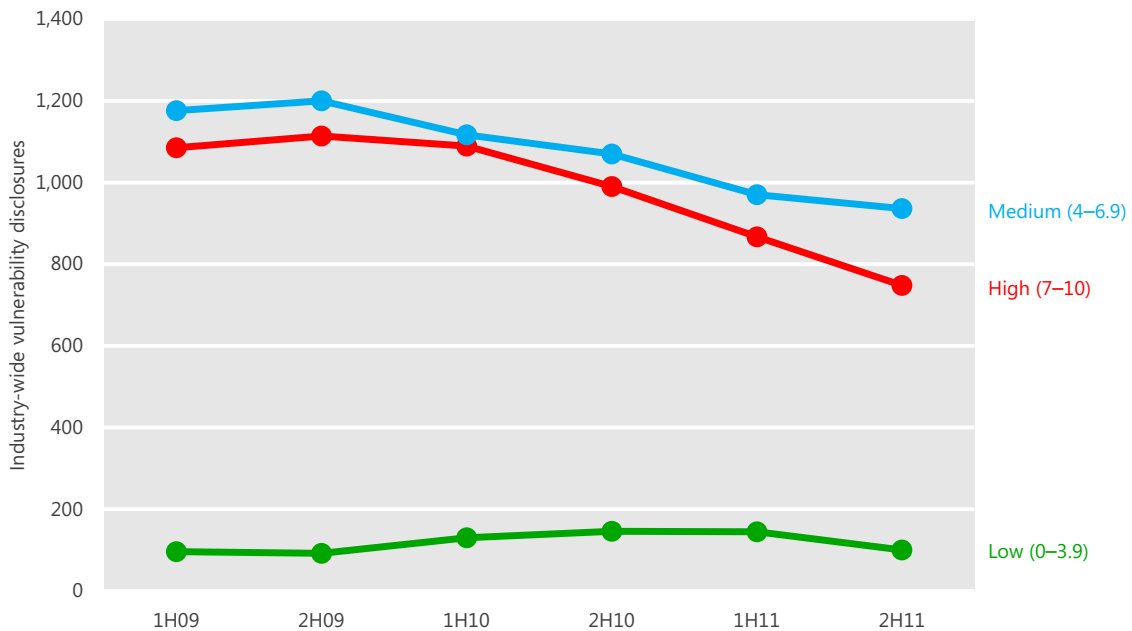


- Vulnerability disclosures across the industry in 2H11 were down 10.0 percent from 1H11, and down 24.3 percent from 1H09.
- This decline continues an overall trend of moderate declines since 2006. This trend is likely because of better development practices and quality control throughout the industry, which results in more secure software and fewer vulnerabilities from major vendors, who are most likely to have their vulnerabilities associated with a distinct CVE identifier. (See [Protecting Your Software](#) in the “Managing Risk” section of the *Microsoft Security Intelligence Report* website for additional details and guidance about secure development practices.)

Vulnerability severity

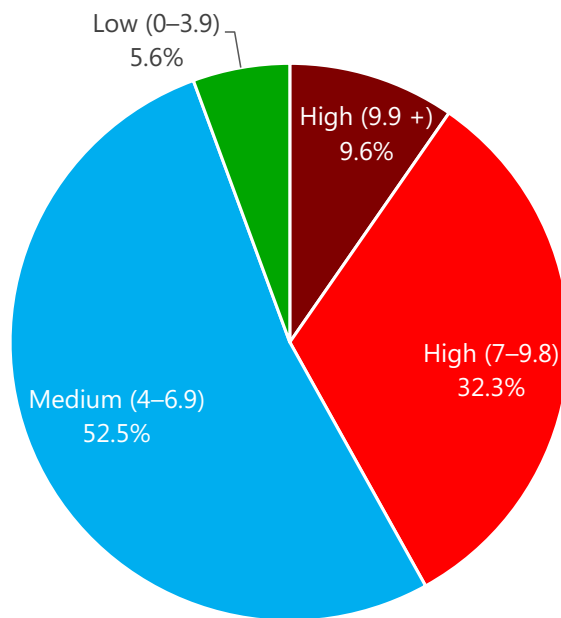
The Common Vulnerability Scoring System (CVSS) is a standardized, platform-independent scoring system for rating IT vulnerabilities. The CVSS base metric assigns a numeric value between 0 and 10 to vulnerabilities according to severity, with higher scores representing greater severity. (See [Vulnerability Severity](#) at the *Microsoft Security Intelligence Report* website for more information.)

Figure 2. Industry-wide vulnerability disclosures by severity, 1H09–2H11



- The overall vulnerability severity trend has been a positive one. All three CVSS severity classifications decreased between 1H11 and 2H11, with the Medium and High-severity classifications continuing a trend of declining disclosures in every period since 2H09.
- Medium-severity vulnerabilities again accounted for the largest number of disclosures at 936, a 3.5 percent decrease from 1H11.
- High-severity vulnerabilities decreased 31.0 percent from 1H11, continuing a near-constant rate of decline since 1H10.
- Low-severity vulnerabilities, which had increased slightly over the past several periods, decreased 13.7 percent from 1H11.
- Mitigating the most severe vulnerabilities first is a security best practice. High-severity vulnerabilities that scored 9.9 or greater represent 9.6 percent of all vulnerabilities disclosed in 2H11, as Figure 3 illustrates. This figure was down from 10.6 percent of all vulnerabilities in 1H11.

Figure 3. Industry-wide vulnerability disclosures in 2H11, by severity

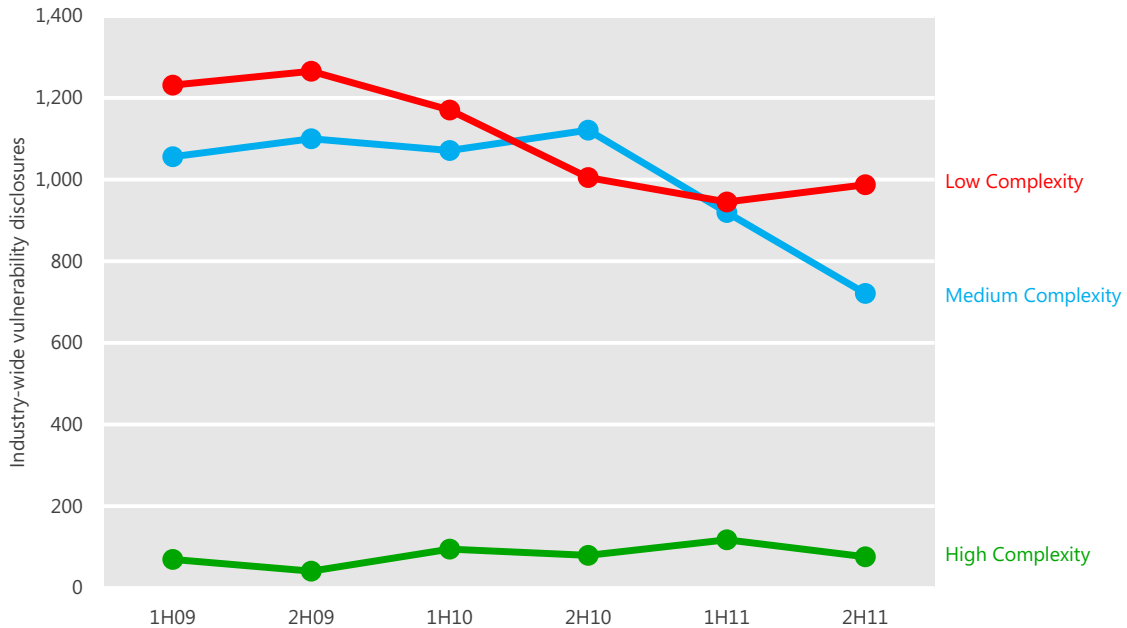


Vulnerability complexity

Some vulnerabilities are easier to exploit than others, and vulnerability complexity is an important factor to consider in determining the magnitude of the threat that a vulnerability poses. A High-severity vulnerability that can only be exploited under very specific and rare circumstances might require less immediate attention than a lower-severity vulnerability that can be exploited more easily.

The CVSS assigns each vulnerability a complexity ranking of Low, Medium, or High. (See [Vulnerability Complexity](#) at the *Microsoft Security Intelligence Report* website for more information about the CVSS complexity ranking system.) Figure 4 shows complexity trends for vulnerabilities disclosed since 1H09. Note that Low complexity indicates greater risk, just as High severity indicates greater risk in Figure 2.

Figure 4. Industry-wide vulnerability disclosures by access complexity, 1H09–2H11



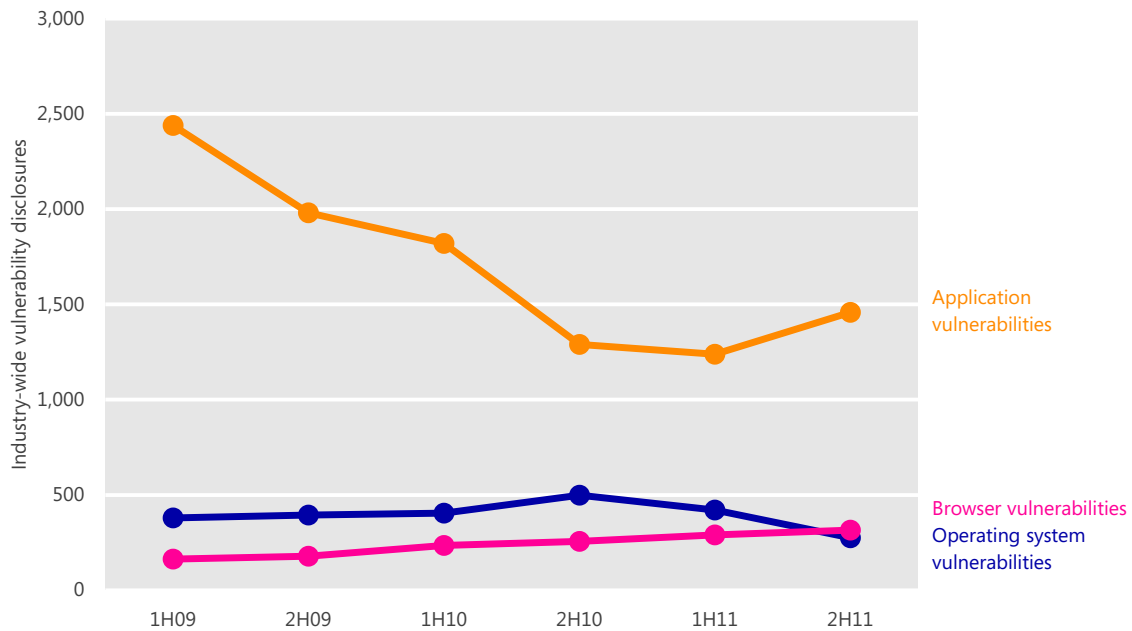
- Low-complexity vulnerabilities—those that are the easiest to exploit—accounted for 55.3 percent of all disclosures in 2H11. A total of 987 Low-complexity vulnerabilities were disclosed in 2H11, an increase from 945 in 1H11 but less than the 1,005 disclosed in 2H10.
- Medium-complexity vulnerabilities amounted for 40.4 percent of disclosures in 2H11. Disclosures of Medium-complexity vulnerabilities have decreased significantly over the past year, from 1,121 in 2H10 to 721 in 2H11.
- High-complexity vulnerability disclosures declined slightly to 76 in 2H11, a decrease from 118 in 1H11. Disclosures of High-complexity vulnerabilities have been stable or slightly increasing over the past several years, but still only account for 4.3 percent of all vulnerabilities disclosed in 2H11.

Operating system, browser, and application vulnerabilities

Figure 5 shows industry-wide vulnerabilities for operating systems, browsers, and applications since 1H09. (See [Operating System, Browser, and Application Vulnerabilities](#) at the *Microsoft Security Intelligence Report* website for an

explanation of how operating system, browser, and application vulnerabilities are distinguished.)

Figure 5. Industry-wide operating system, browser, and application vulnerabilities, 1H09–2H11

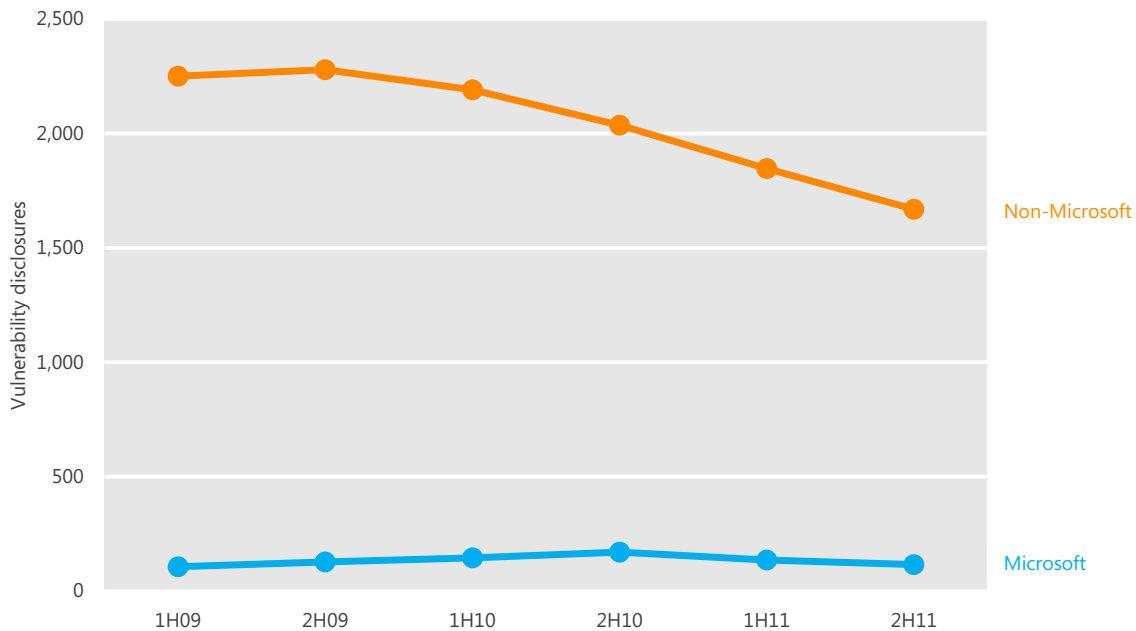


- Disclosures of application vulnerabilities increased 17.8 percent in 2H11, halting a trend of declining disclosures that extends back several periods. In all, applications accounted for 71.2 percent of all vulnerability disclosures in 2H11.
- Operating system vulnerability disclosures decreased 34.7 percent in 2H11, and ranked below browser vulnerability disclosures for the first time since at least 2003.
- Disclosures of vulnerabilities in web browsers increased 8.6 percent in 2H11, continuing a trend of small increases over each of the last several periods.

Microsoft vulnerability disclosures

Figure 6 charts vulnerability disclosures for Microsoft and non-Microsoft products since 1H09.

Figure 6. Vulnerability disclosures for Microsoft and non-Microsoft products, 1H09–2H11



- Vulnerabilities in Microsoft products accounted for 6.4 percent of all vulnerabilities disclosed in 2H11, a decrease from 6.8 percent in 1H11.
- Vulnerability disclosures for Microsoft products have generally remained stable over the past three years, though Microsoft’s percentage of all disclosures industry-wide has increased slightly, primarily because of the overall decline in vulnerability disclosures across the industry.

Guidance: Developing secure software

The Security Development Lifecycle (www.microsoft.com/sdl) is a software development methodology that incorporates security and privacy best practices throughout all phases of the development process with the goal of protecting software users. Using such a methodology can help reduce vulnerabilities in the software and help manage vulnerabilities that might be found after deployment. (For more in-depth information about the SDL and other techniques developers can use to secure their software, see [Protecting Your Software](#) in the “Managing Risk” section of the *Microsoft Security Intelligence Report* website.)

Exploits

An *exploit* is malicious code that takes advantage of software vulnerabilities to infect, disrupt, or take control of a computer without the user's consent and usually without the user's knowledge. Exploits target vulnerabilities in operating systems, web browsers, applications, or software components that are installed on the computer. In some scenarios, targeted components are add-ons that are pre-installed by the computer manufacturer before the computer is sold. A user may not even use the vulnerable add-on or be aware that it is installed. Some software has no facility for updating itself, so even if the software vendor publishes an update that fixes the vulnerability, the user may not know that the update is available or how to obtain it, and therefore remains vulnerable to attack.

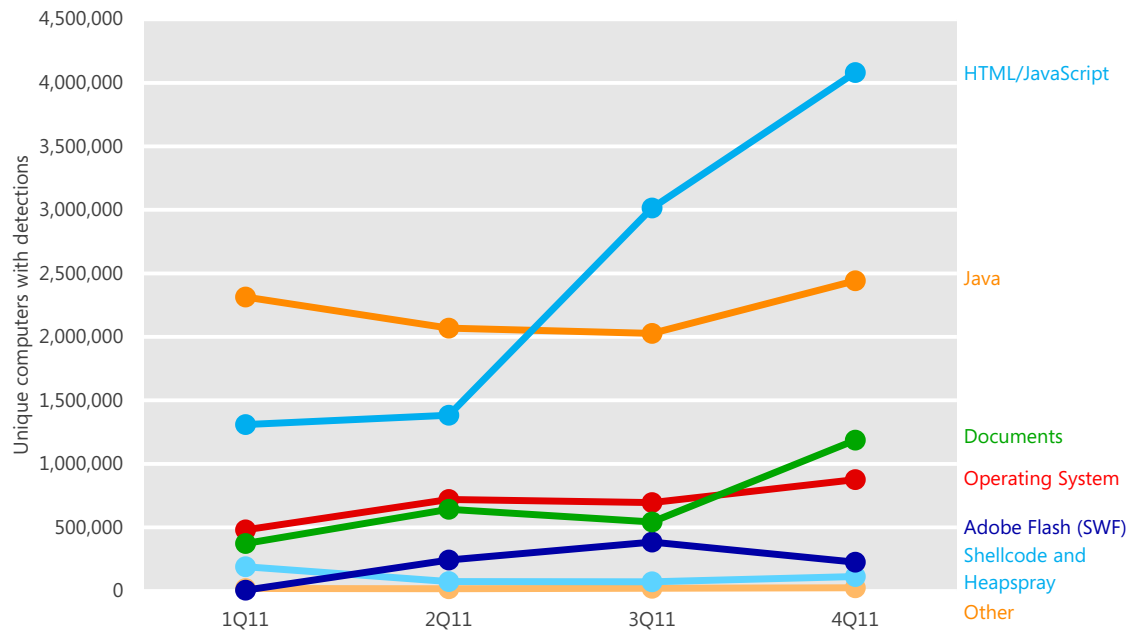
Software vulnerabilities are enumerated and documented in the Common Vulnerabilities and Exposures (CVE) list (cve.mitre.org), a standardized repository of vulnerability information. Here and throughout this report, exploits are labeled with the CVE identifier that pertains to the affected vulnerability, if applicable. In addition, exploits that affect vulnerabilities in Microsoft software are labeled with the Microsoft Security Bulletin number that pertains to the vulnerability, if applicable.¹

Figure 7 shows the prevalence of different types of exploits detected by Microsoft antimalware products each quarter in 2011, by number of unique computers affected.² (See “Appendix B: Data sources” on page 81 for more information about the products and services that provided data for this report.)

¹ See www.microsoft.com/technet/security/Current.aspx to search and read Microsoft Security Bulletins.

² In previous volumes of the *Microsoft Security Intelligence Report*, individual attack counts, rather than unique computers, were often used to report exploit data. Comparison of the exploit figures in this volume with corresponding figures in previous volumes is not appropriate.

Figure 7. Unique computers reporting exploits each quarter in 2011, by targeted platform or technology



- The number of computers reporting exploits delivered through HTML or JavaScript increased steeply in the second half of 2011, due primarily to the emergence of [JS/Blacole](#), a family of exploits used by the so-called “Blackhole” exploit kit to deliver malicious software through infected web pages. Prospective attackers buy or rent the Blacole kit on hacker forums and through other illegitimate outlets. It consists of a collection of malicious web pages that contain exploits for vulnerabilities in versions of Adobe Flash Player, Adobe Reader, Microsoft Data Access Components (MDAC), the Oracle Java Runtime Environment (JRE), and other popular products and components. When the attacker installs the Blacole kit on a malicious or compromised web server, visitors who don’t have the appropriate security updates installed are at risk of infection through a drive-by download attack. (See page 74 for more information about drive-by download attacks.)

For more information about Blacole, see the following entries in the MMPC blog at blogs.technet.com/mmpc:

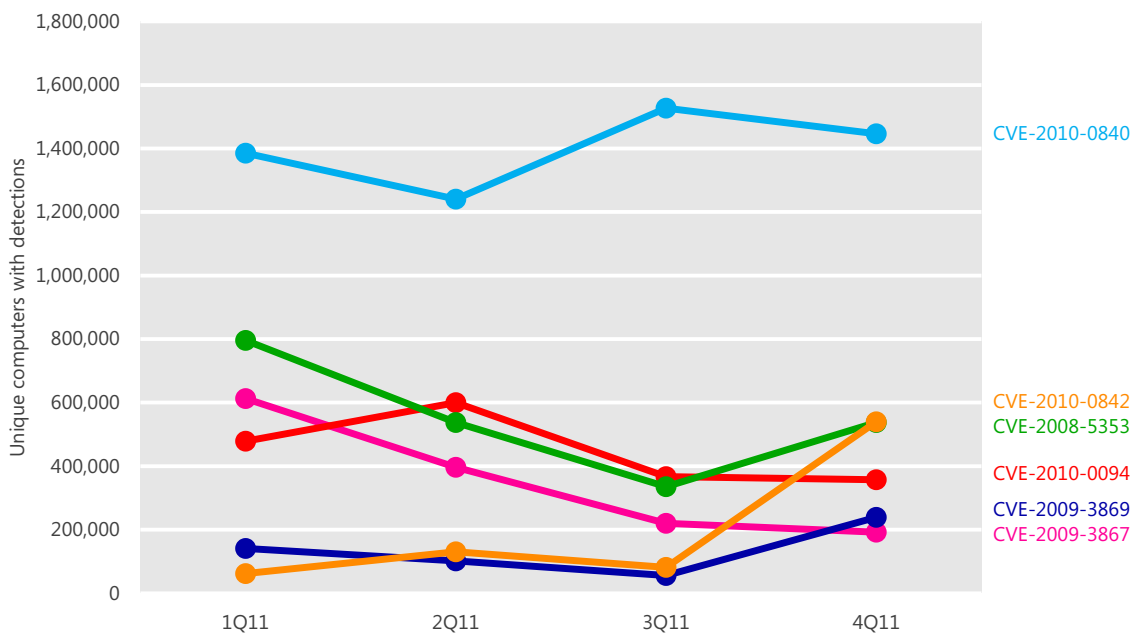
- [Get gamed and rue the day](#) (October 25, 2011)
 - [Disorderly conduct: localized malware impersonates the police](#) (December 19, 2011)

- [Plenty to complain about with faux BBB spam](#) (January 12, 2012)
- Java exploits, formerly the most commonly observed type of exploits, were relegated to second place in 3Q11 and 4Q11 because of the rise in HTML/JavaScript exploits; despite this, the number of computers reporting Java exploit detections remained at a high level during 3Q11 and 4Q11, and actually increased overall from the first half of the year.
- Detections of exploits that target vulnerabilities in document readers and editors increased in 4Q11, making them the third most commonly detected type of exploit during the quarter, due primarily to a rise in exploits that target older versions of Adobe Reader.

Java Exploits

Figure 8 shows the prevalence of different Java exploits by quarter.

Figure 8. Unique computers reporting Java exploits each quarter in 2011



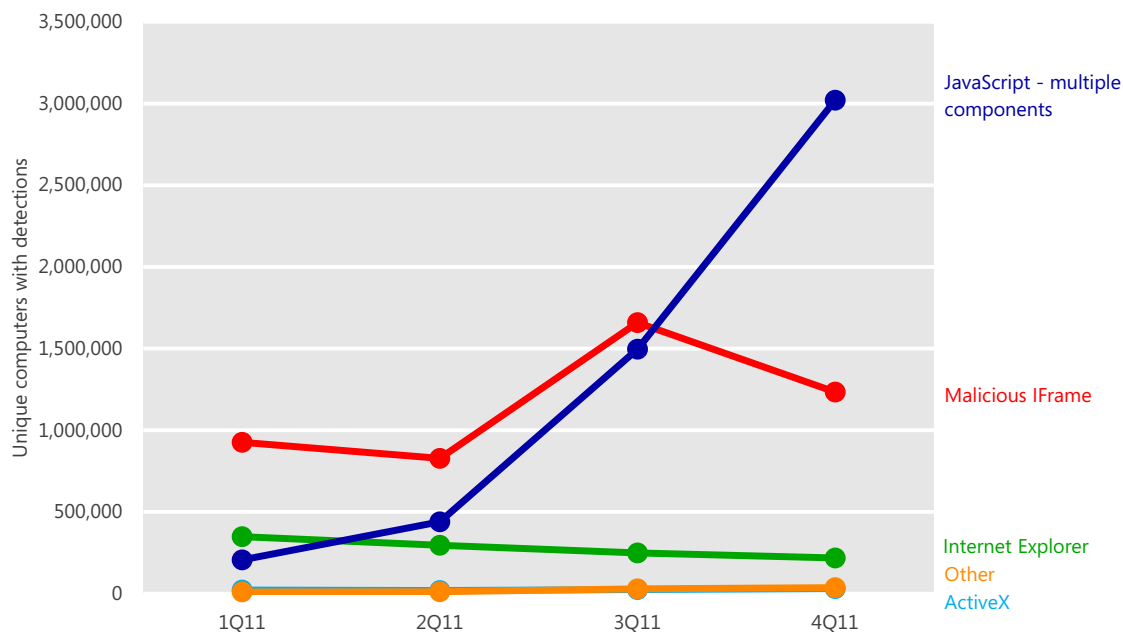
- As in previous periods, many of the more commonly exploited Java vulnerabilities are several years old, as are the security updates that have been released to address them.

- The most commonly exploited Java vulnerability throughout 2011 was [CVE-2010-0840](#), a Java Runtime Environment (JRE) vulnerability first disclosed in March 2010 and addressed with an Oracle security update the same month. The CVE-2010-0840 vulnerability is exploited by the [JS/Blacole](#) exploit kit and the trojan downloader family [Java/OpenConnection](#).
- [CVE-2010-0842](#), which saw significantly increased exploitation beginning in 4Q11, is also associated with the Blacole kit.
- [CVE-2008-5353](#), the third most commonly exploited Java vulnerability in 3Q11 and 4Q11, was first disclosed in December 2008. This vulnerability affects JVM version 5 up to and including update 22, and JVM version 6 up to and including update 10. It allows an unsigned Java applet to gain elevated privileges and potentially have unrestricted access to a host system, outside its “sandbox” environment. Sun Microsystems released a security update that addressed the vulnerability on December 3, 2008.
- [CVE-2010-0094](#) was the second most commonly exploited Java vulnerability in 2Q11, but declined to fourth by 4Q11. This vulnerability was first disclosed in December 2009, and affects JRE versions up to and including update 18 of version 6. CVE-2010-0094 allows an unsigned Java applet to gain elevated privileges and potentially have unrestricted access to a host system, outside its sandbox environment. Oracle released a security update that addressed the vulnerability in March 2010.

HTML and JavaScript exploits

Figure 9 shows the prevalence of different types of HTML and JavaScript exploits during each of the four most recent quarters.

Figure 9. Types of HTML and JavaScript exploits detected and blocked by Microsoft antimalware products each quarter in 2011

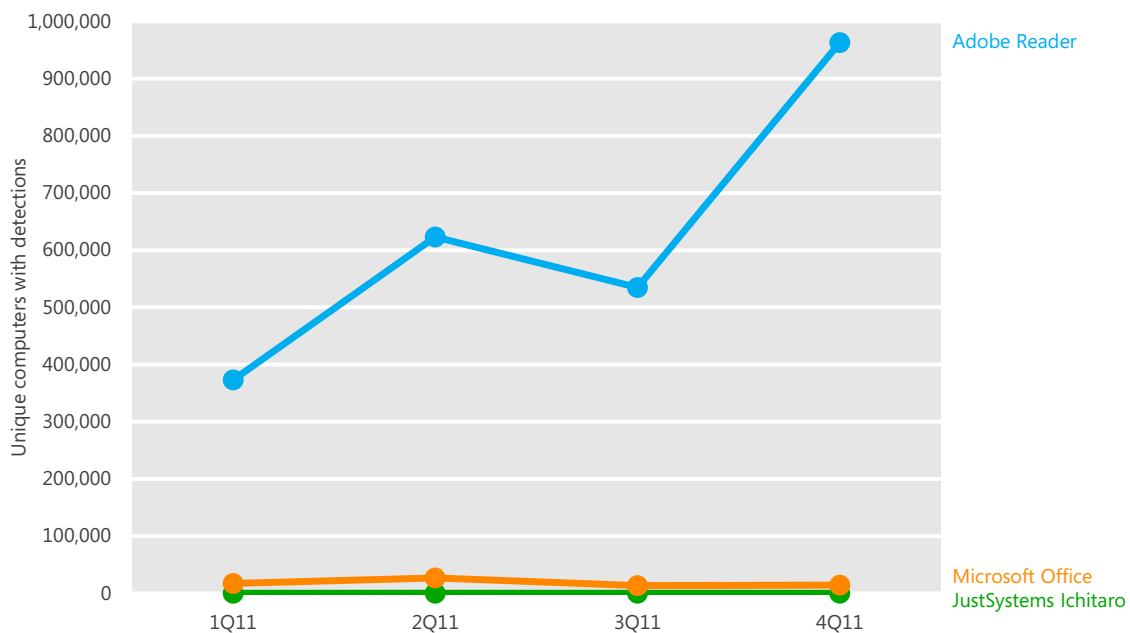


- The use of malicious JavaScript code designed to exploit one or more web-enabled technologies increased significantly in the second half of 2011, due primarily because of [JS/Blacole.A](#), a malicious script that attempts to load a number of exploits associated with the [Blacole](#) exploit kit.
- Exploits that involve malicious HTML inline frames (IFrames) increased in the second half of 2011, although detections in 4Q11 were down from 3Q11. These exploits are typically generic detections of inline frames that are embedded in web pages and link to other pages that host malicious web content. These malicious pages use a variety of techniques to exploit vulnerabilities in browsers and plugins; the only commonality is that the exploit can be delivered through an inline frame. The exact exploit delivered and detected by one of these signatures may be changed frequently.
- Detections for specific Windows® Internet Explorer® exploits declined slowly throughout 2011.
- ActiveX® and other types of browser exploitation remain comparatively low.

Document parser exploits

Document parser exploits are exploits that target vulnerabilities in the way a document editing or viewing application processes, or parses, a particular file format. Figure 10 shows the prevalence of different types of document parser exploits during each of the four most recent quarters.

Figure 10. Types of document parser exploits detected and blocked by Microsoft antimalware products each quarter in 2011

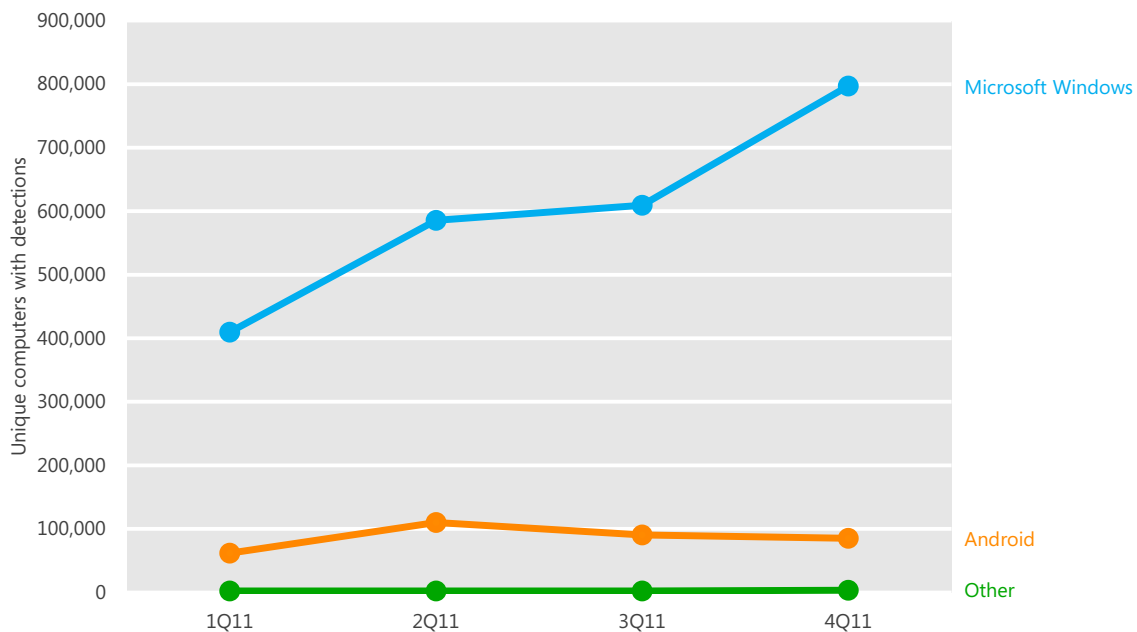


- Exploits that affect Adobe Reader and Adobe Acrobat accounted for most document format exploits detected throughout the last four quarters. Most of these exploits were detected as variants of the generic exploit family [Win32/Pdfjsc](#). As with many of the exploits discussed in this section, Pdfjsc variants are known to be associated with the [JS/Blacole](#) exploit kit. In most cases, the vulnerabilities targeted by these exploits had been addressed with security updates or new product versions several months or years earlier.
- Exploits that affect Microsoft Office and Ichitaro, a Japanese-language word processing application published by JustSystems, accounted for a small percentage of exploits detected during the period.

Operating system exploits

Although most operating system exploits detected by Microsoft security products are designed to affect the platforms on which the security products run, computer users sometimes download malicious or infected files that affect other operating systems. Figure 11 shows the prevalence of different exploits against operating system vulnerabilities that were detected and removed by Microsoft antimalware products during each of the past four quarters.

Figure 11. Exploits against operating system vulnerabilities detected and blocked by Microsoft antimalware products each quarter in 2011

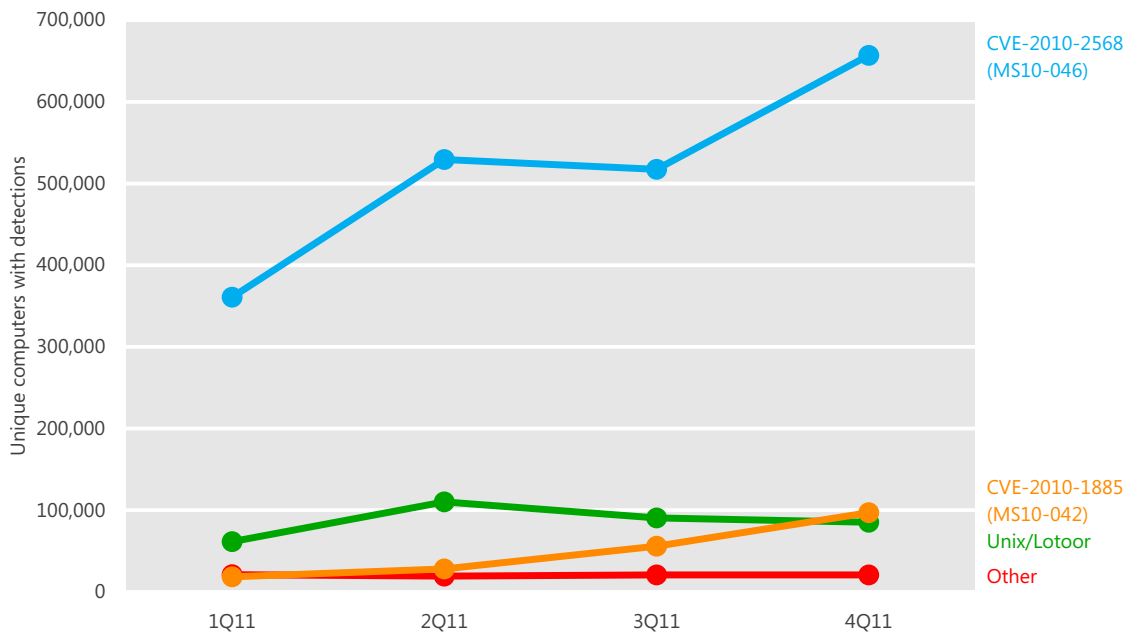


- Exploits that target Windows increased throughout 2011, almost entirely because of an increase in detections of exploit attempts that target [CVE-2010-2568](#), a vulnerability in Windows Shell addressed by Microsoft Security Bulletin [MS10-046](#). See Figure 12 on page 23 for more information about these exploits. Exploits that affect the Android mobile operating system published by Google and the Open Handset Alliance were detected in significant volume throughout 2011. Microsoft security products detect these threats when Android users download infected or malicious programs to their computers before transferring the software to their devices. The increase in

Android-based threats has been driven primarily by [Unix/Lotoor](#), a detection for programs that attempt to exploit certain vulnerabilities in order to gain root access to the device. Lotoor is dropped by the trojan family [AndroidOS/DroidDream](#), which often masquerades as a legitimate Android application. Google published a [security update](#) in March 2011 that addressed the vulnerability.

For another perspective on these exploits and others, Figure 12 shows trends for the individual exploits most commonly detected and blocked or removed in 2011.

Figure 12. Individual operating system exploits detected and blocked by Microsoft antimalware products each quarter in 2011, by number of unique computers exposed to the exploit

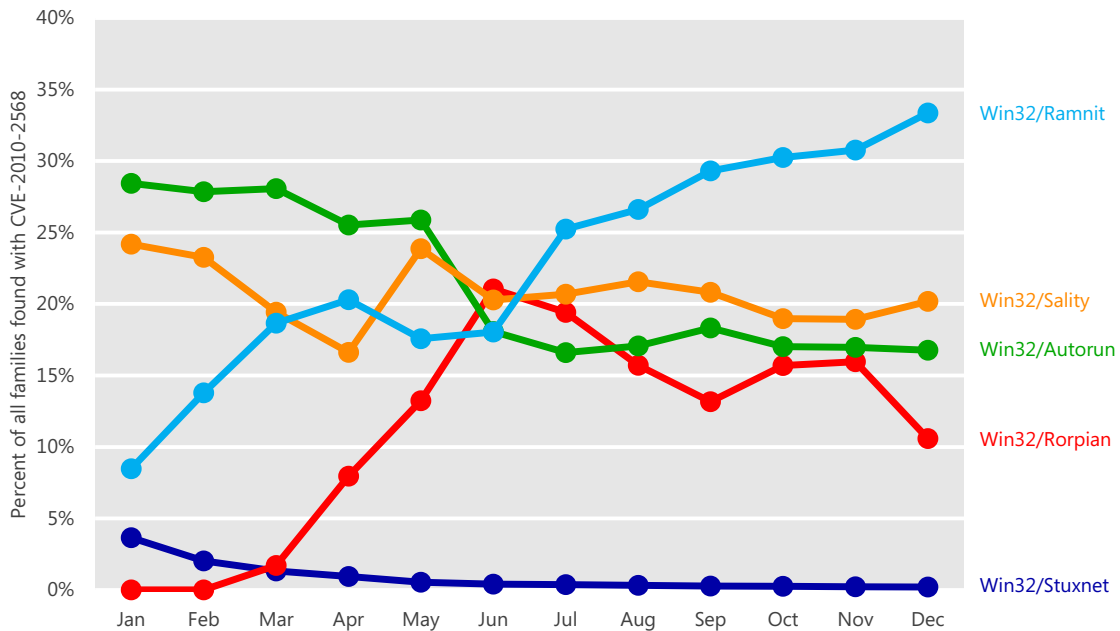


- Exploits that target [CVE-2010-2568](#), a vulnerability in Windows Shell, increased significantly throughout 2011, and were responsible for nearly the entire increase in Windows exploit detections seen throughout the year. Microsoft issued [Security Bulletin MS10-046](#) in August 2010 to address the vulnerability.

An attacker exploits CVE-2010-2568 by creating a malformed shortcut file that forces a vulnerable computer to load a malicious file when the shortcut icon is displayed in Windows Explorer. The vulnerability was first discovered being used by the malware family [Win32/Stuxnet](#) in mid-2010, and it has

since been exploited by a number of other families, many of which predated the disclosure of the vulnerability and were subsequently adapted to attempt to exploit it.

Figure 13. Families commonly found with CVE-2010-2568 in 2011

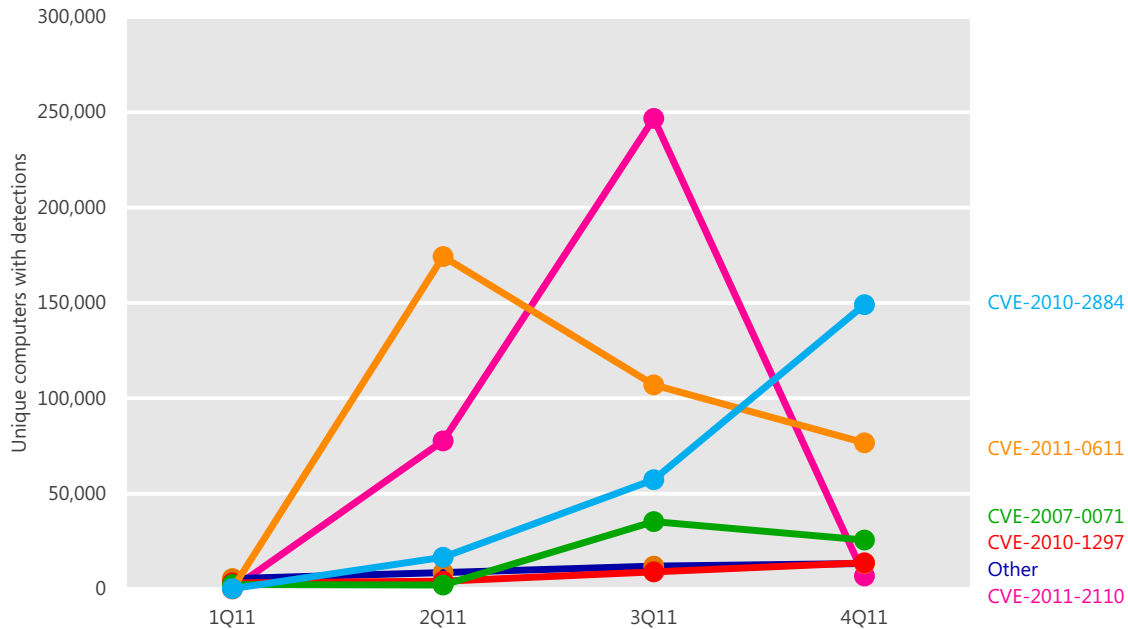


- Exploits targeting [CVE-2010-1885](#), a vulnerability that affects the Windows Help and Support Center in Windows XP and Windows Server 2003, declined to a low level in 1Q11 after dominating for much of 2010, then increased gradually throughout 2011. Microsoft issued [Security Bulletin MS10-042](#) in July 2010 to address the issue.

Adobe Flash Player exploits

Figure 14 shows the prevalence of different Adobe Flash Player exploits by quarter.

Figure 14. Adobe Flash Player exploits detected and blocked by Microsoft antimalware products each quarter in 2011, by number of unique computers exposed to the exploit



- Exploitation of Adobe Flash Player vulnerabilities increased significantly between 1Q11 and 3Q11, which can be attributed to two zero-day vulnerabilities discovered in the second quarter, CVE-2011-0611 and CVE-2011-2110. Detections of both exploits decreased in 4Q11, while detections of exploits targeting an older vulnerability, CVE-2010-2884, increased.
- [CVE-2011-0611](#) was discovered in April 2011 when it was observed being exploited in the wild, typically in the form of malicious .zip files attached to spam email messages that purported to contain information about the Fukushima Daiichi nuclear disaster in Japan. Adobe released [Security Bulletin APSP11-07](#) on April 15 and [Security Bulletin APSP11-08](#) on April 21 to address the issue. On the same day the security update was released, attacks that targeted the vulnerability skyrocketed and remained high for several days, most of which were detected on computers in Korea. About a month later, a second increase in attacks was observed, affecting multiple locations. After peaking in 3Q11, detections of CVE-2011-0611 exploits declined to negligible levels in the fourth quarter.
- [CVE-2011-2110](#) was discovered in June 2011, and Adobe released Security Bulletin [APSP11-18](#) on June 15 to address the issue. As with CVE-2011-0611,

attacks that targeted the vulnerability spiked after the security update was released, again with most of the targeted computers located in Korea. CVE-2011-2110 is also exploited by the [JS/Blacole](#) exploit kit, which explains its continued prevalence in 2011.

- [CVE-2010-2884](#) was discovered in the wild in September 2010 as a zero-day vulnerability, and Adobe released Security Bulletin [APSB10-22](#) on September 20 to address the issue. As with CVE-2011-0611 and CVE-2011-2110, significant exploitation of the vulnerability began in 2Q11, which suggests that exploit kits may be responsible for the increase.

Exploit effectiveness with the Enhanced Mitigation Experience Toolkit

Recent versions of Windows, including Windows Vista® and Windows 7, include security enhancements that make vulnerabilities significantly harder to exploit than in older releases. Similarly, recent releases of many popular software programs offer security features that make those releases much less vulnerable to successful exploitation. Microsoft recommends using the most recent versions of Windows and applications when practical, to take advantage of the built-in security functionality they offer.³

In some cases, though, individuals and organizations cannot deploy recent software versions for a variety of reasons, or want to take advantage of modern security improvements in advance of a planned upgrade. For these customers, as well as for users of the latest software versions who want to take advantage of additional security improvements, Microsoft offers the [Enhanced Mitigation Experience Toolkit](#) (EMET) at no charge from the Microsoft Download Center (www.microsoft.com/download).

EMET provides system administrators with the ability to deploy security mitigation technologies such as Address Space Layout Randomization (ASLR), Data Execution Prevention (DEP), Structured Exception Handler Overwrite Protection (SEHOP), and others to selected installed applications. These technologies function as special protections and obstacles that an exploit author must defeat to exploit software vulnerabilities. These security mitigation technologies do not guarantee that vulnerabilities cannot be exploited. However,

³ For more information about some of the security features in Windows and other Microsoft products, see [“Mitigating Software Vulnerabilities,”](#) available from the Microsoft Download Center.

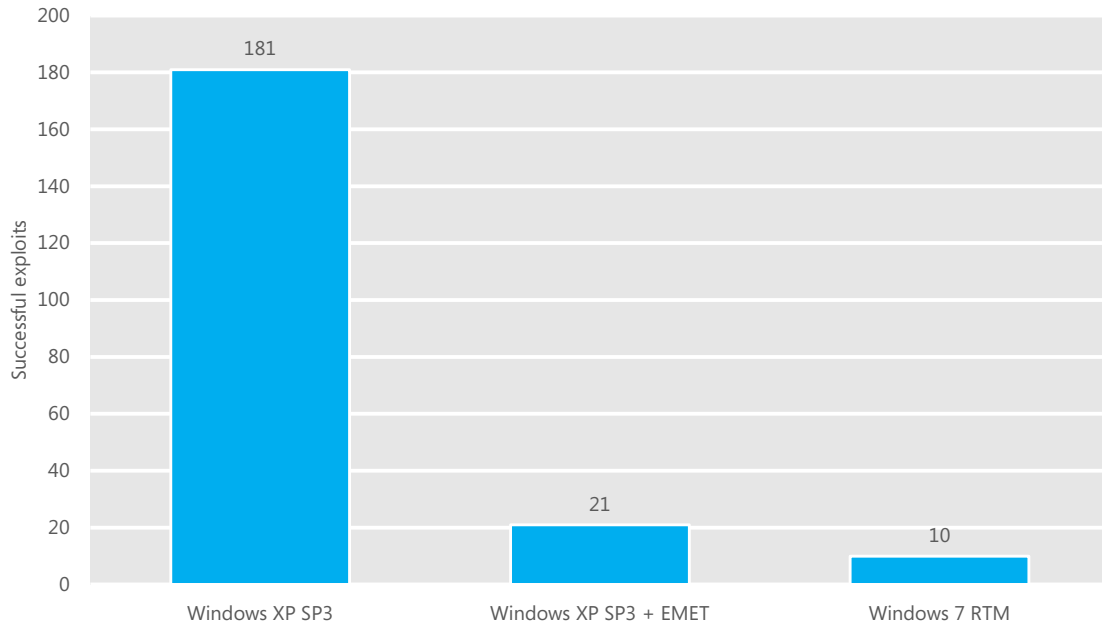
they make exploitation more difficult. EMET 2.1 is compatible with supported versions of Windows XP, Windows Vista, Windows 7, Windows Server® 2003, Windows Server 2008, and Windows Server 2008 R2.

Figure 15. The Enhanced Mitigation Experience Toolkit (EMET), version 2.1



To assess the effectiveness of EMET in addressing a number of commonly exploited vulnerabilities, Microsoft researchers collected a sample of 184 application exploits that had been sent to Microsoft from customers worldwide. All exploits targeted vulnerabilities in popular applications running on one or more versions of Windows. The researchers tested each exploit against Windows XP SP3 in an out-of-the-box configuration, Windows XP SP3 with EMET deployed, and the release-to-manufacturing (RTM) version of Windows 7 in an out-of-the-box configuration. Figure 16 shows the results of these tests.

Figure 16. The effectiveness of 184 exploits for popular applications on Windows XP, Windows XP with EMET deployed, and Windows 7



- By a large margin, the highest success rates for the exploits tested involved Windows XP without EMET installed. All but three of the 184 exploits tested succeeded on Windows XP in this configuration.
- Deploying EMET drastically reduces the effectiveness of exploits on Windows XP. Only 21 of 184 exploits succeeded on Windows XP with EMET deployed.
- Ten of the 184 exploits tested succeeded on Windows 7 RTM.

It should be recognized that the results of an exercise such as this one are influenced by the specific exploits being actively used in the wild at the time the exercise is conducted. Nevertheless, the data suggests that system administrators can significantly reduce their attack surface now by upgrading to the latest versions of their operating system and application software by deploying EMET, or both.

Malware and potentially unwanted software

Except where specified, the information in this section was compiled from telemetry data that was generated from more than 600 million computers worldwide and some of the busiest services on the Internet. (See “Appendix B: Data sources” on page 81 for more information about the telemetry used in this report.)

Global infection rates

The telemetry data generated by Microsoft security products from administrators or users who choose to opt in to data collection includes information about the location of the computer, as determined by IP geolocation. This data makes it possible to compare infection rates, patterns, and trends in different locations around the world.⁴

⁴ For more information about this process, see the entry “[Determining the Geolocation of Systems Infected with Malware](http://blogs.technet.com/security)” (November 15, 2011) on the Microsoft Security Blog (blogs.technet.com/security).

Figure 17. The locations with the most computers reporting detections and removals by Microsoft desktop antimalware products in 2H11

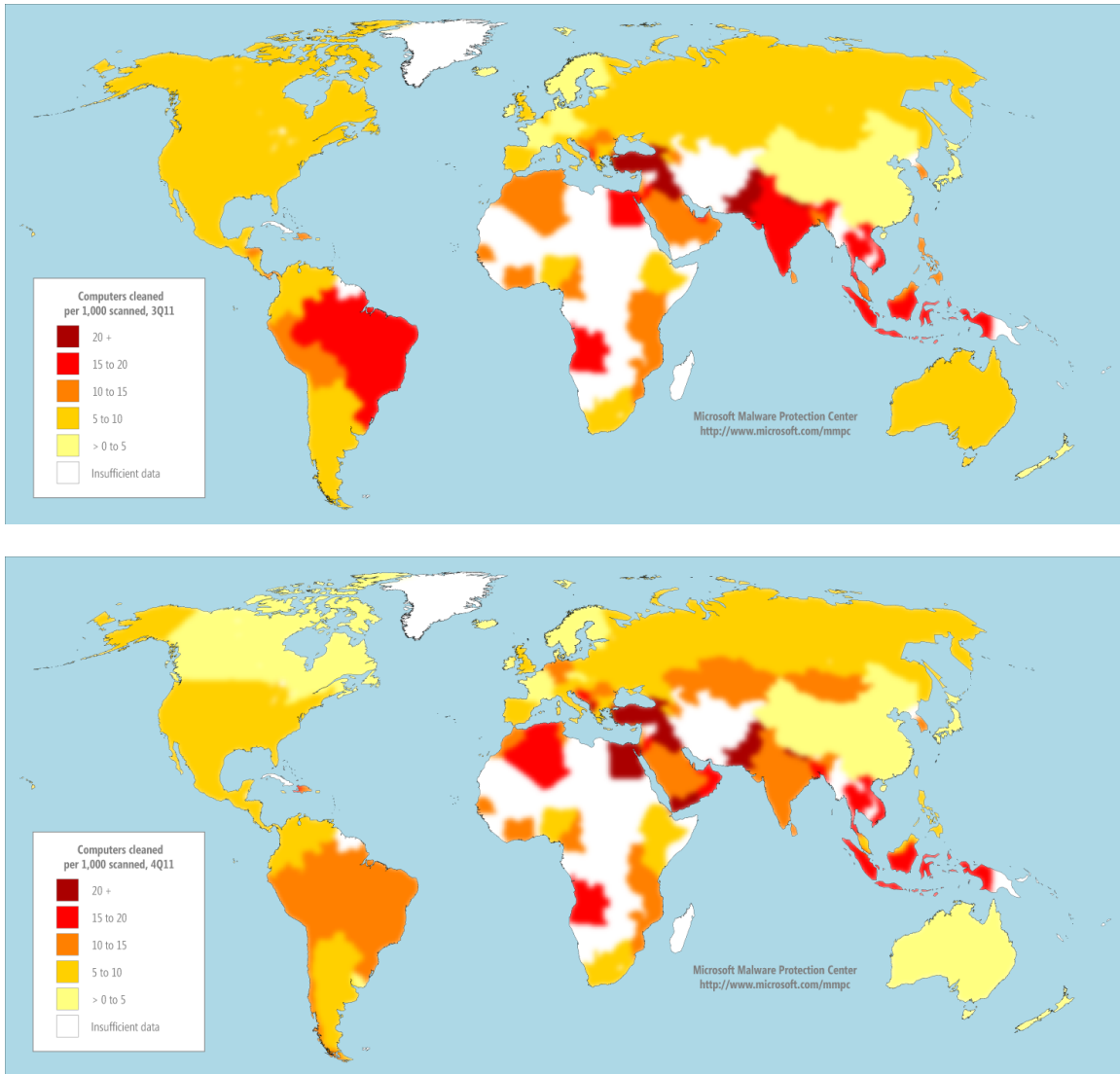
	Country/Region	3Q11	4Q11	Chg. 3Q to 4Q
1	United States	10,293,718	10,122,222	-1.7% ▼
2	Brazil	3,969,106	3,810,308	-4.0% ▼
3	Russia	1,808,380	2,323,182	28.5% ▲
4	France	2,254,527	2,053,267	-8.9% ▼
5	Germany	1,477,340	1,926,096	30.4% ▲
6	China	2,179,211	1,814,082	-16.8% ▼
7	Korea	1,684,479	1,741,551	3.4% ▲
8	Turkey	1,359,815	1,591,529	17.0% ▲
9	United Kingdom	1,669,737	1,568,287	-6.1% ▼
10	Italy	1,206,092	1,382,590	14.6% ▲

- In absolute terms, the locations with the most computers reporting detections tend to be ones with large populations and large numbers of computers.
- Detections in Germany increased 30.4 percent from 3Q11 to 4Q11, primarily because of significantly increased detections of [Win32/EyeStye](#), a family of trojans that attempt to steal sensitive data and send it to an attacker. Detection signatures for EyeStye were added to the MSRT in October 2011; within the first 10 days thereafter, more than half of the EyeStye infections detected and removed by the MSRT were in Germany. Germany also saw increased detections of the exploit family [JS/Blacole](#) and the generic detection [Win32/Keygen](#).
- Detections in Russia increased 28.5 percent from 3Q11 to 4Q11. Families contributing to the increase include [Win32/Pameseg](#), a potentially unwanted software program with a Russian language user interface; [Win32/Vundo](#), a family of trojans that display out-of-context advertisements; and the Blacole exploit family.
- Detections in Turkey increased 17.0 percent from 3Q11 to 4Q11, driven by small increases in a number of widespread families, including Keygen, [JS/Pompop](#), [Win32/Sality](#), and [Win32/Autorun](#).
- Detections in Italy increased 14.6 percent from 3Q11 to 4Q11, with increases in EyeStye, Keygen, and [Win32/Zbot](#).

- Detections in France decreased 8.9 percent from 3Q11 to 4Q11, primarily because of fewer detections of a number of adware and adware-related families, including [Win32/ClickPotato](#), [Win32/Hotbar](#), [Win32/Zwangi](#), [Win32/ShopperReports](#), [Win32/OfferBox](#), and [Win32/OpenCandy](#).
- Detections in China decreased 16.8 percent from 3Q11 to 4Q11. This decrease follows a 15.7 percent increase from 2Q11 to 3Q11, driven by a large increase in detections of the adware family [Win32/Rugo](#). Detections of Rugo then dropped in the fourth quarter, explaining much of the overall decrease.

For a different perspective on infection patterns worldwide, Figure 18 shows the infection rates in locations around the world in *computers cleaned per mille* (CCM), which represents the number of reported computers cleaned for every 1,000 executions of the Microsoft Malicious Software Removal Tool (MSRT). (See the [Microsoft Security Intelligence Report website](#) for more information about the CCM metric.)

Figure 18. Infection rates by country/region in 3Q11 (top) and 4Q11 (bottom), by CCM



Detections and removals in individual countries/regions can vary significantly from quarter to quarter. Increases in the number of computers with detections can be caused not only by increased prevalence of malware in that location, but also by improvements in the ability of Microsoft antimalware solutions to detect malware. Large numbers of new antimalware product or tool installations in a location also typically increase the number of computers cleaned in that location.

The next three figures illustrate infection rate trends for specific locations around the world, relative to the trends for all locations with at least 100,000 MSRT executions each quarter in 2H11.

Figure 19. Trends for the five locations with the highest infection rates in 4Q11, by CCM (100,000 MSRT executions minimum)

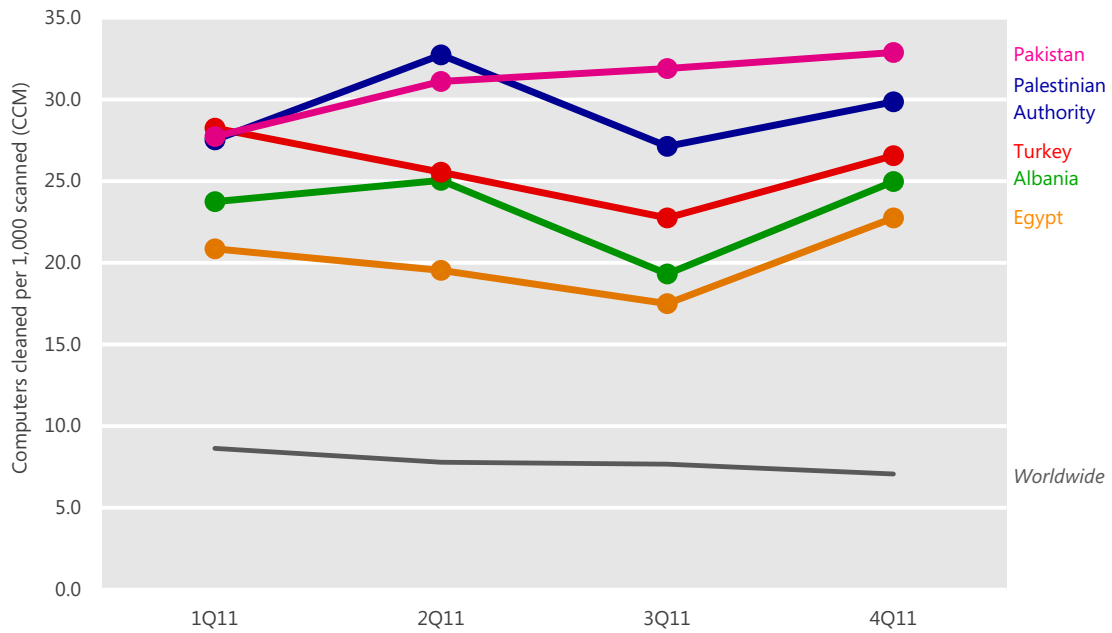
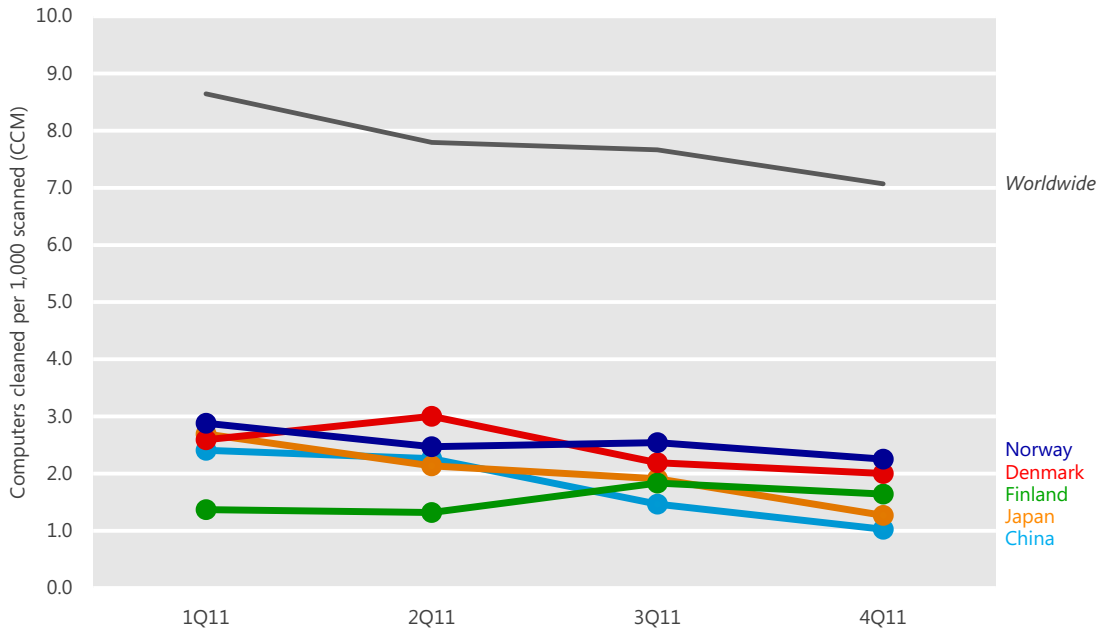


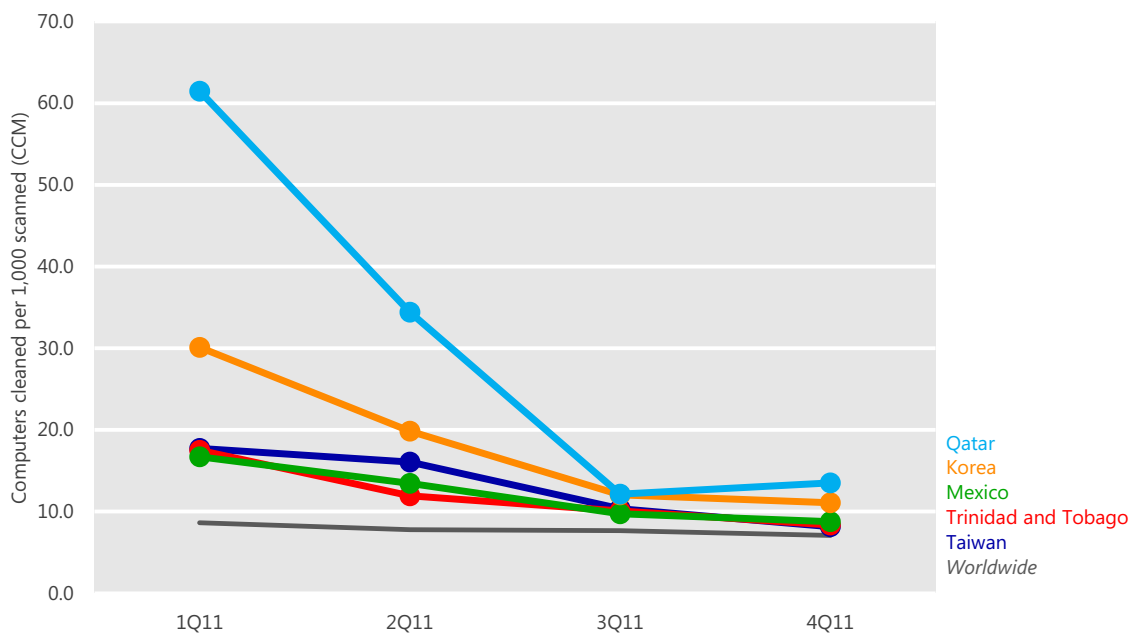
Figure 20. Trends for the five locations with the lowest infection rates in 4Q11, by CCM (100,000 MSRT executions minimum)



- The five locations with the highest infection rates in 4Q11 each had a CCM between 22.7 and 32.9, compared to a worldwide 4Q11 CCM of 7.1. Pakistan, the Palestinian territories, and Turkey were also among the five most infected locations in 2Q11, while Albania and Egypt are new to the top five.
 - Pakistan has seen significant increases in a pair of file infectors, [Win32/Ramnit](#) and [Win32/Sality](#). Ramnit detections in Pakistan increased by more than 900 percent between 1Q11 and 4Q11, while detections of Sality more than doubled.
 - Albania and Egypt also saw an increase in Sality detections, along with increases in a number of worms, notably [Win32/Rimecud](#), [Win32/Autorun](#), [Win32/Helompy](#), and [Win32/Conficker](#). Detections of [Win32/Dorkbot](#) also increased significantly in Albania during the second half of the year.
- Four of the five locations with the lowest infection rates in 4Q11 were also on the list in 2Q11, with Denmark taking the place of Sweden. All five had 4Q11 infection rates between 1.3 and 2.3, compared to the worldwide average of 7.1.

- Historically, Nordic countries such as Denmark, Norway, and Finland have typically had some of the lowest infection rates in the world. Japan also usually experiences a low infection rate.
- Although China is one of the locations with the lowest infection rates worldwide as measured by CCM, a number of factors that are unique to China are important to consider when assessing the state of computer security there. The malware ecosystem in China is dominated by a number of Chinese-language threats that are not prevalent anywhere else. The CCM figures are calculated based on telemetry data from the MSRT, which tends to target malware families that are prevalent globally. As a result, many of the more prevalent threats in China are not represented in the data used to calculate CCM. For a more in-depth perspective on the threat landscape in China, see the “[Regional Threat Assessment](#)” section of the *Microsoft Security Intelligence Report* website.

Figure 21. Trends for five locations with significant infection rate improvements in 2H11, by CCM (100,000 MSRT executions minimum per quarter)



- Qatar exhibited the most dramatic improvement, from 61.5 in 1Q11 to 13.5 in 4Q11. Qatar as well as Trinidad and Tobago both have relatively few computers overall and are therefore prone to display large statistical variances of this sort from time to time. For Qatar, much of the reduction is the result of

steep declines in detections of the worm family [Win32/Rimecud](#), which was responsible for the relatively high CCM in 1Q11. Trinidad and Tobago experienced a general decline in a number of prevalent adware families, including [Win32/OpenCandy](#), [Win32/ClickPotato](#), and [Win32/ShopperReports](#).

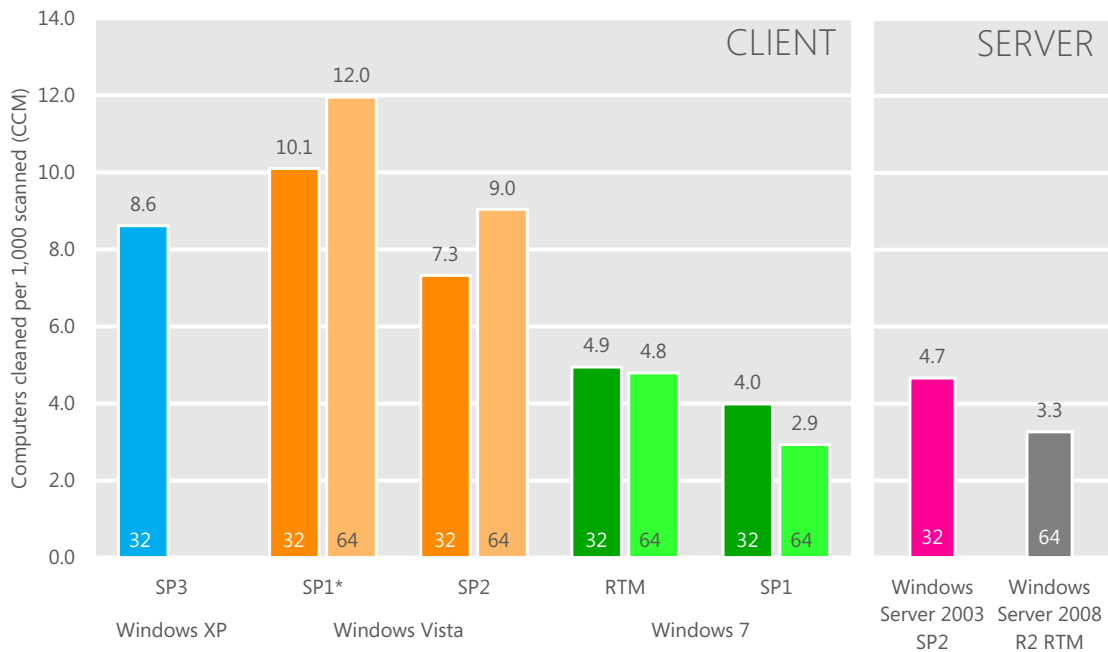
- Among populous countries and regions, Korea improved the most, going from 30.1 in 1Q11 to 11.1 in 4Q11. Significant decreases in detections of Rimecud, [Win32/Frethog](#), and [Win32/Parite](#) were responsible for much of this improvement.
- Mexico improved from 16.7 in 1Q11 to 8.8 in 4Q11, with significant declines in detections of OpenCandy, Rimecud, and [JS/Pornpop](#).
- Taiwan improved from 17.7 in 1Q11 to 8.2 in 4Q11, with significant declines in detections of Frethog, OpenCandy, [Win32/Taterf](#), and [Win32/Agent](#).

For a more in-depth perspective on the threat landscape in any of these locations, see the “[Regional Threat Assessment](#)” section of the *Microsoft Security Intelligence Report* website.

Operating system infection rates

The features and updates that are available with different versions of the Windows operating system, along with the differences in the way people and organizations use each version, affect the infection rates for the different versions and service packs. Figure 22 shows the infection rate for each currently supported Windows operating system/service pack combination that accounted for at least 0.1 percent of total MSRT executions in 4Q11.

Figure 22. Infection rate (CCM) by operating system and service pack in 4Q11

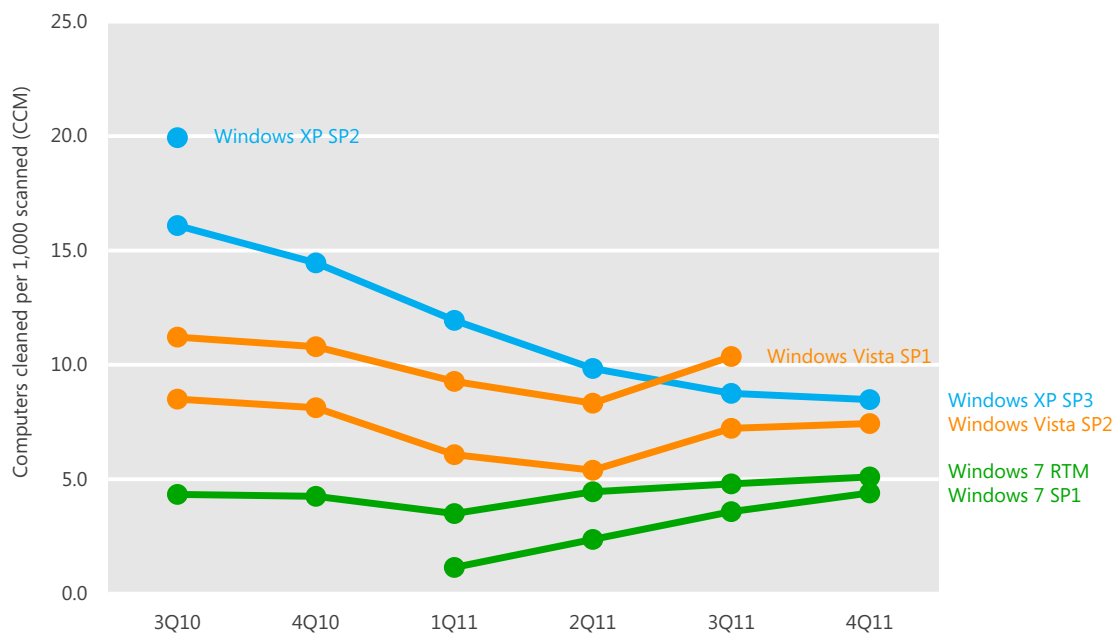


"32" = 32-bit edition; "64" = 64-bit edition. SP = Service Pack. RTM = release to manufacturing. Operating systems with at least 0.1 percent of total executions in 4Q11 shown. *Service pack not supported in 4Q11.

- This data is normalized: the infection rate for each version of Windows is calculated by comparing an equal number of computers per version (for example, 1,000 Windows XP SP3 computers to 1,000 Windows 7 RTM computers).
- As in previous periods, infection rates for more recently released operating systems and service packs tend to be lower than earlier ones, for both client and server platforms. Windows 7 SP1 and Windows Server 2008 R2, the most recently released Windows client and server versions, respectively, have the lowest infection rates on the chart. The exception is Windows XP SP3, which displayed a lower infection rate than the 32- and 64-bit editions of Windows Vista SP1 and the 64-bit edition of Windows Vista SP2. As the user base of Windows XP continues to decline in favor of newer versions of Windows, malware writers may be refocusing their efforts away from the older platform as well, which could be a factor in this discrepancy.
- Infection rates for the 64-bit editions of Windows Vista and Windows 7 have increased since the first half of 2011. For the first time, infection rates for the 64-bit editions of Windows Vista SP1 and SP2 were higher than for the

corresponding 32-bit versions of those platforms in 2H11, and infection rates for both the 32- and 64-bit editions of Windows 7 RTM were almost identical. This data may indicate the increasing acceptance of 64-bit platforms by mainstream users. In the past, 64-bit computing tended to appeal to a more technically savvy audience than the mainstream, and the infection rates for 64-bit platforms were typically much lower than for their 32-bit counterparts, perhaps because 64-bit users tended to follow safer practices and keep their computers more up-to-date than the average user. Over the past several years, 64-bit computing has become more mainstream, and the infection rates for 64-bit platforms have increased at the same time. Malware authors may also be targeting 64-bit platforms more as they become more popular, which could affect infection rates.

Figure 23. Infection rate trends for currently and recently supported 32-bit version of Windows XP, Windows Vista, and Windows 7, 3Q10–4Q11



- This chart shows infection rates for supported versions of Windows only. Support for Windows XP SP2 was retired on July 13, 2010. Support for Windows Vista SP1 was retired on July 12, 2011.
- Infection rates for all of the supported 32-bit versions of Windows increased slightly during the second half of the year except for Windows XP, for which the infection rate decreased slightly. Microsoft added signatures for a number

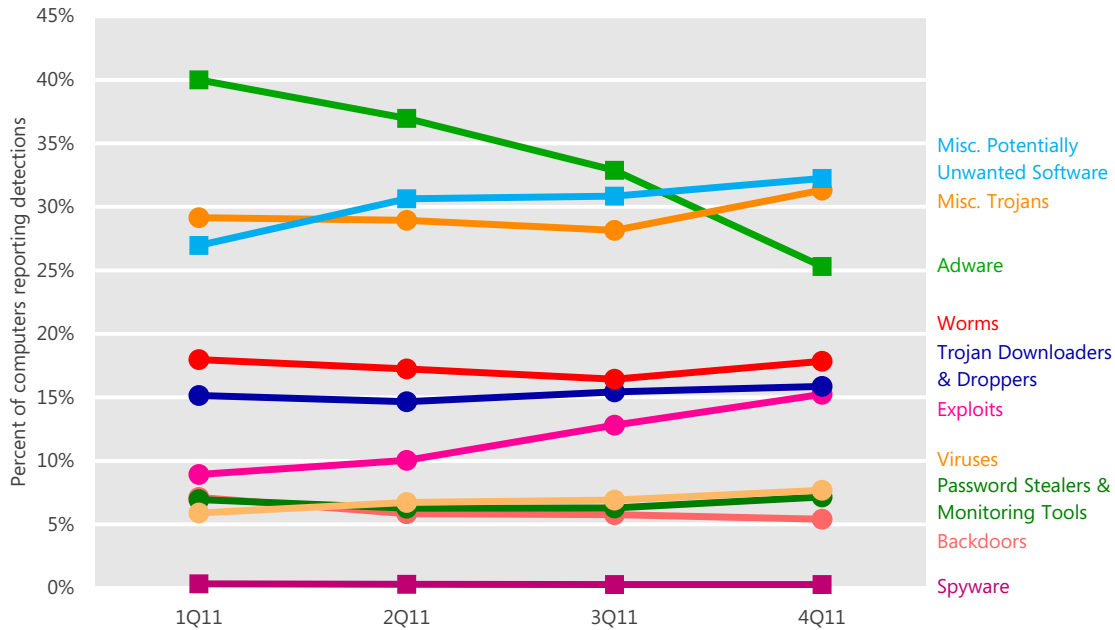
of prevalent malware families to the MSRT in 2H11, including [Win32/Tracur](#) (July 2011), [Win32/Bamital](#) (September 2011), and [Win32/EyeStye](#) (October 2011). Detections of these families increased significantly on all of the supported platforms after MSRT coverage was added, which contributed to the higher infection rates seen in 3Q11 and 4Q11. On Windows XP, however, the increase was offset by decreased detections of families that abuse the Autorun feature in Windows, following the February 2011 release of a security update that changed the way Autorun works on Windows XP and Windows Vista to match its functionality in Windows 7. (For more information about this change, see “[Defending Against Autorun Attacks](#)” (June 27, 2011) on the Microsoft Security Blog at blogs.technet.com/security.)

- Windows 7 RTM and SP1 have consistently shown lower infection rates than other platforms since their introduction, although increased detections of EyeStye, Bamital, Tracur, and a few other families have contributed to a rise in the infection rate on Windows 7 computers, as with other platforms.

Threat categories

The Microsoft Malware Protection Center (MMPC) classifies individual threats into types based on a number of factors, including how the threat spreads and what it is designed to do. To simplify the presentation of this information and make it easier to understand, the *Microsoft Security Intelligence Report* groups these types into 10 categories based on similarities in function and purpose.

Figure 24. Detections by threat category each quarter in 2011, by percentage of all computers reporting detections



Round markers indicate malware categories; square markers indicate potentially unwanted software categories.

- Totals for each time period may exceed 100 percent because some computers report more than one category of threat in each time period.
- Adware, the most commonly detected category during the first three quarters, fell to 3rd in 4Q11, continuing a year-long trend of decline. Decreased detections of several highly prevalent adware families, notably [Win32/OpenCandy](#), [Win32/ClickPotato](#), and [Win32/ShopperReports](#), were chiefly responsible for the decline. (See “Threat families” on page 42 for more information.)
- Miscellaneous Potentially Unwanted Software rose from 3rd in 1Q11 to 1st in 4Q11, led by the generic detection [Win32/Keygen](#), a tool that generates keys for illegally obtained versions of various software products.
- Exploits increased from 8.9 percent of computers with detections in 1Q11 to 15.3 percent in 4Q11, partially because of increased detections of exploits associated with the [JS/Blacole](#) exploit kit, a malicious JavaScript that loads a series of other exploits to deliver a payload. If a vulnerable computer browses a compromised website that contains the exploit kit, various malware may be downloaded and run.

Threat categories by location

There are significant differences in the types of threats that affect users in different parts of the world. The spread of malware and its effectiveness are highly dependent on language and cultural factors, in addition to the methods used for distribution. Some threats are spread using techniques that target people who speak a particular language or who use online services that are local to a specific geographic region. Other threats target vulnerabilities or operating system configurations and applications that are unequally distributed around the globe.

Figure 25 shows the relative prevalence of different categories of malware and potentially unwanted software in several locations around the world in 4Q11.

Figure 25. Threat category prevalence worldwide and in 10 individual locations in 4Q11

Category	World	US	Brazil	Russia	France	Germany	China	Korea	Turkey	UK	Italy
Adware	37.0%	30.9%	18.5%	5.4%	53.0%	18.8%	9.9%	57.5%	36.6%	32.3%	34.4%
Misc. Potentially Unwanted Software	30.6%	19.6%	36.4%	57.2%	28.4%	23.4%	48.3%	21.1%	33.9%	23.8%	31.2%
Misc. Trojans	28.9%	38.5%	25.3%	39.1%	16.8%	40.8%	29.5%	33.7%	27.8%	34.8%	25.7%
Worms	17.2%	5.7%	22.0%	17.2%	8.6%	7.2%	12.1%	10.4%	34.1%	6.2%	12.7%
Trojan Downloaders & Droppers	14.7%	20.8%	26.1%	14.3%	9.1%	9.4%	12.8%	17.2%	11.9%	13.2%	10.5%
Exploits	10.0%	26.3%	9.7%	17.4%	6.6%	16.7%	13.9%	13.9%	6.6%	23.1%	14.0%
Viruses	6.7%	2.3%	9.3%	6.4%	2.2%	2.0%	8.7%	4.5%	16.6%	5.3%	2.3%
Password Stealers & Monitoring Tools	6.3%	5.2%	20.4%	4.2%	3.8%	8.5%	4.4%	3.8%	6.1%	5.3%	11.0%
Backdoors	5.8%	6.3%	5.0%	4.3%	2.8%	4.3%	6.6%	2.9%	4.6%	4.0%	4.1%
Spyware	0.3%	0.3%	0.1%	0.3%	0.1%	0.2%	1.8%	0.2%	0.1%	0.2%	0.1%

Totals for each location may exceed 100 percent because some computers reported threats from more than one category.

- Within each row of Figure 25, a darker color indicates that the category is more prevalent in the specified location than in the others, and a lighter color indicates that the category is less prevalent. As in Figure 17 on page 30, the locations in the table are ordered by number of computers reporting detections in 2H11.
- The United States and the United Kingdom, two predominantly English-speaking locations that also share a number of other cultural similarities, have similar threat mixes in most categories.
- In Russia, the Miscellaneous Potentially Unwanted Software category is especially prevalent, led by [Win32/Pameseg](#) and [Win32/Keygen](#). Pameseg is a family of installers that require the user to send a text message to a premium number to successfully install certain programs, some of which are otherwise available for free. Currently, most variants target Russian speakers.
- Brazil has long had higher-than-average detections of Password Stealers & Monitoring Tools because of the prevalence of malware that targets customers of Brazilian banks, especially [Win32/Bancos](#) and [Win32/Banker](#).
- Worms were especially prevalent in Turkey in 4Q11 due to [Win32/Helompy](#), which was detected on more than five times as many computers in Turkey in 4Q11 as in any other individual location. Helompy is a worm that spreads via removable drives and attempts to capture and steal authentication details for a number of different websites or services, including Facebook and Gmail. The worm contacts a remote host to download arbitrary files and to upload stolen details.

See “Appendix C: Worldwide infection rates” on page 83 for more information about malware around the world.

Threat families

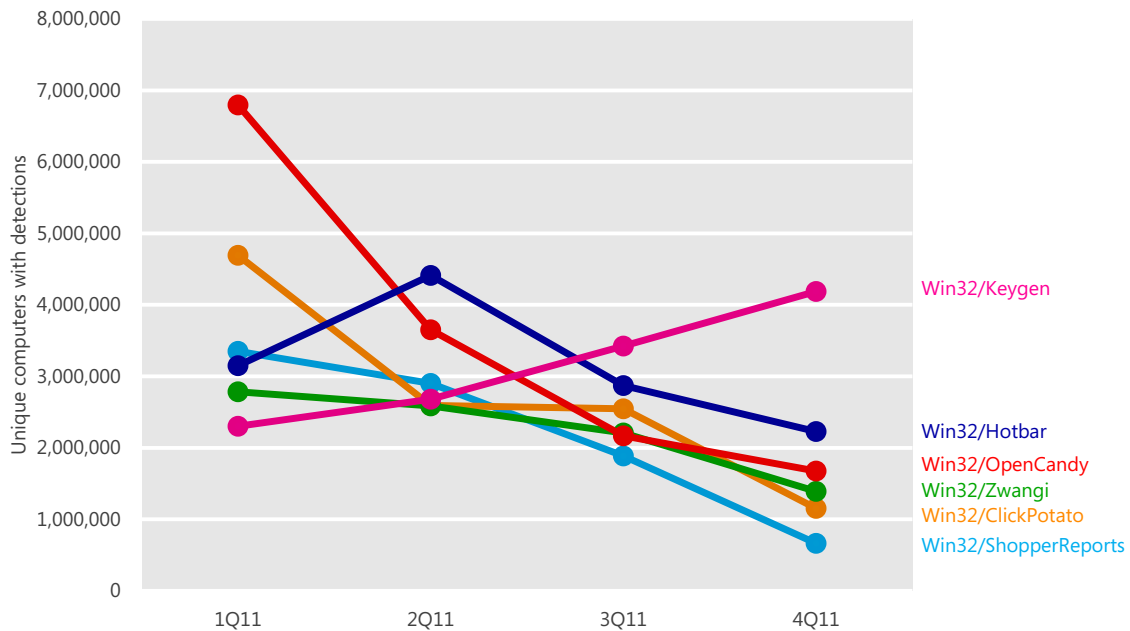
Figure 26 lists the top 10 malware and potentially unwanted software families that were detected on computers by Microsoft antimalware products in the second half of 2011.

Figure 26. Quarterly trends for the top 10 malware and potentially unwanted software families detected by Microsoft antimalware products in 3Q11 and 4Q11, shaded according to relative prevalence

Family	Most Significant Category	1Q11	2Q11	3Q11	4Q11
Win32/Keygen	Misc. Potentially Unwanted Software	2,299,870	2,680,354	3,424,213	4,187,586
JS/Pornpop	Adware	4,706,968	4,330,510	3,944,489	3,906,625
Win32/Autorun	Worms	3,718,690	3,677,588	3,292,378	3,438,745
Win32/Hotbar	Adware	3,149,677	4,411,501	2,870,465	2,226,173
Win32/Sality	Viruses	1,502,172	1,686,745	1,728,966	1,951,118
Win32/Conficker	Worms	1,859,498	1,790,035	1,614,368	1,704,736
Win32/OpenCandy	Adware	6,797,012	3,652,658	2,166,625	1,676,753
Win32/Zwangi	Misc. Potentially Unwanted Software	2,785,111	2,586,630	2,207,208	1,388,938
Win32/ClickPotato	Adware	4,694,442	2,592,125	2,545,842	1,153,203
Win32/ShopperReports	Adware	3,348,949	2,902,430	1,886,696	662,632

For a different perspective on some of the changes that have taken place throughout the year, Figure 27 shows the detection trends for a number of families that increased or decreased significantly in 2011.

Figure 27. Detection trends for a number of notable families in 2011



- [Win32/Keygen](#) was the most commonly detected family in 4Q11, and one of only two families in the top 10 with more detections in the fourth quarter of the year than in the first. Keygen is a generic detection for tools that generate keys for illegally obtained versions of various software products.
- [JS/Pornpop](#), the second most commonly detected family in 4Q11, is a detection for specially crafted JavaScript-enabled objects that attempt to display pop-under advertisements in users' web browsers. Initially, JS/Pornpop appeared exclusively on websites that contained adult content; however, it has since been observed to appear on websites that may contain no adult content whatsoever. First detected in August 2010, it grew quickly to become one of the most prevalent families in the world.
- Keygen, [Win32/Autorun](#), and [Win32/Sality](#) were the only families in the top ten with more detections in 4Q11 than in 3Q11. Sality is a family of polymorphic file infectors that target executable files with the extensions .scr or .exe. Win32/Autorun is a generic detection for worms that spread between mounted volumes using the Autorun feature of Windows. Recent changes to the feature in Windows XP and Windows Vista have made this technique less effective, but attackers continue to distribute malware that attempts to target it.
- Detections of [Win32/OpenCandy](#), the most commonly detected family in 1Q11, declined steeply thereafter; it ranked seventh in 4Q11. OpenCandy is an adware program that may be bundled with certain third-party software installation programs, for which detection was first added in February 2011. Some versions of the OpenCandy program send user-specific information without obtaining adequate user consent, and these versions are detected by Microsoft antimalware products. Detections have declined as third-party software developers have increased their use of versions that do not exhibit these behaviors.
- Other families that declined in the second half of the year include the adware families [Win32/Hotbar](#), [Win32/ClickPotato](#), and [Win32/ShopperReports](#), and the potentially unwanted software family [Win32/Zwangi](#). Hotbar, ClickPotato, and ShopperReports are three related families that are often found together, and which display targeted advertisements to users based on browsing habits.

Rogue security software

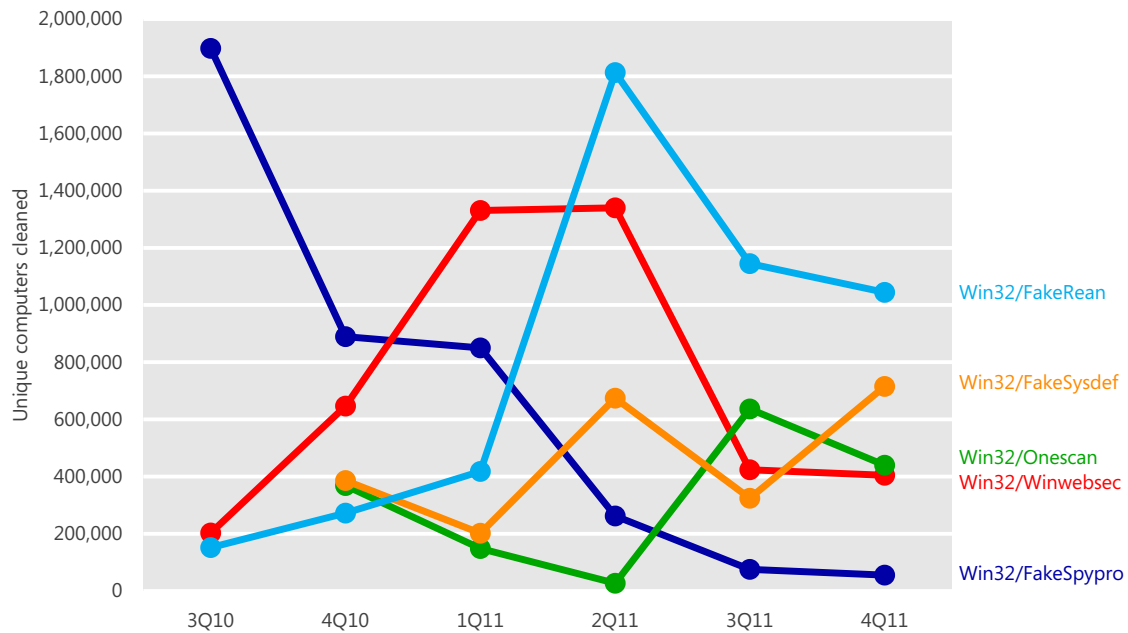
Rogue security software has become one of the most common methods that attackers use to swindle money from victims. Rogue security software, also known as *scareware*, is software that appears to be beneficial from a security perspective but provides limited or no security, generates erroneous or misleading alerts, or attempts to lure users into participating in fraudulent transactions. These programs typically mimic the general look and feel of legitimate security software programs and claim to detect a large number of nonexistent threats while urging users to pay for the “full version” of the software to remove the threats. Attackers typically install rogue security software programs through exploits or other malware, or use social engineering to trick users into believing the programs are legitimate and useful. Some versions emulate the appearance of the Windows Security Center or unlawfully use trademarks and icons to misrepresent themselves. (See www.microsoft.com/security/resources/videos.aspx for an informative series of videos designed to educate a general audience about rogue security software.)

Figure 28. False branding used by a number of commonly detected rogue security software programs



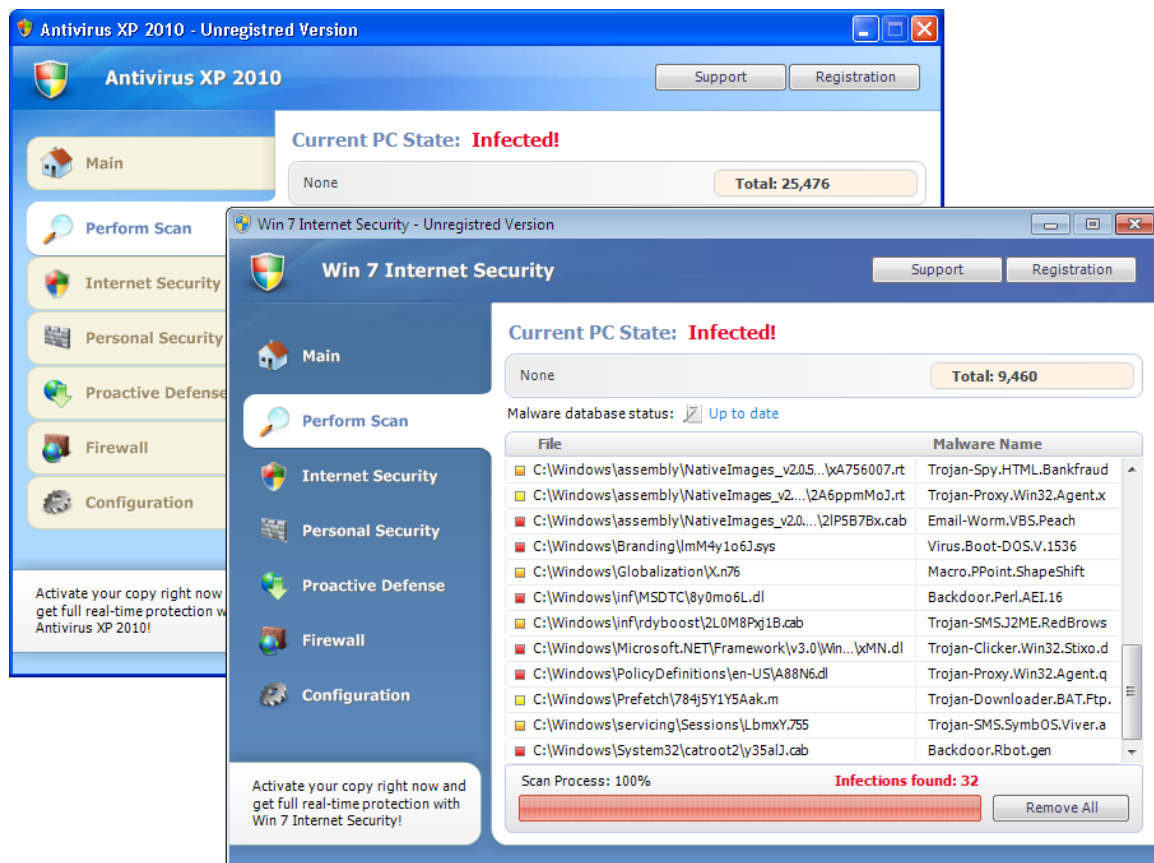
Figure 29 shows detection trends for the most common rogue security software families detected in 2H11.

Figure 29. Trends for the most common rogue security software families detected in 2H11, by quarter



- Detections of [Win32/FakeRean](#) decreased significantly after 2Q11, but it remained the most commonly detected rogue security software program during the third and fourth quarters of the year. FakeRean has been distributed with several different names. The user interface and some other details vary to reflect each variant’s individual branding. Current variants of FakeRean choose a name at random, from a number of possibilities determined by the operating system of the affected computer. Signatures for FakeRean were added to the MSRT in August 2009.

Figure 30. Typical Win32/FakeRean variants on Windows XP and Windows 7

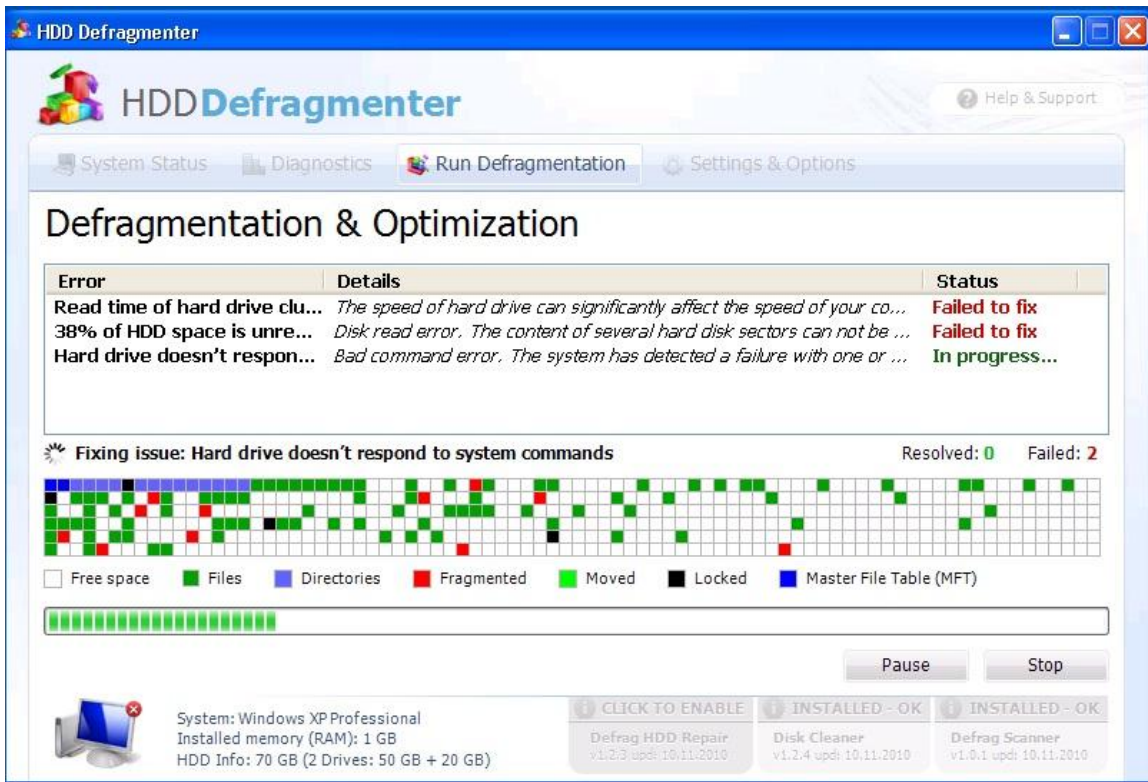


For more information about FakeRean, see the following entries in the MMPC blog (blogs.technet.com/mmpc):

- [Win32/FakeRean and MSRT](#) (August 11, 2009)
- [Win32/FakeRean is 33 rogues in 1](#) (March 9, 2010)
- [When imitation isn't a form of flattery](#) (January 29, 2012)
- [Win32/FakeSysdef](#), the second most commonly detected rogue security software program in 4Q11, was first detected in late 2010, and signatures for the family were added to the MSRT in August 2011. Unlike most rogue security software families, FakeSysdef does not claim to detect malware infections. Instead, it masquerades as a performance utility that falsely claims to find numerous hardware and software errors such as bad hard disk sectors, disk fragmentation, registry errors, and memory problems. Like other rogue

security software families, it claims that the user must purchase additional software to fix the nonexistent problems.

Figure 31. Win32/FakeSysdef pretends to find computer problems and offers to fix them for a fee



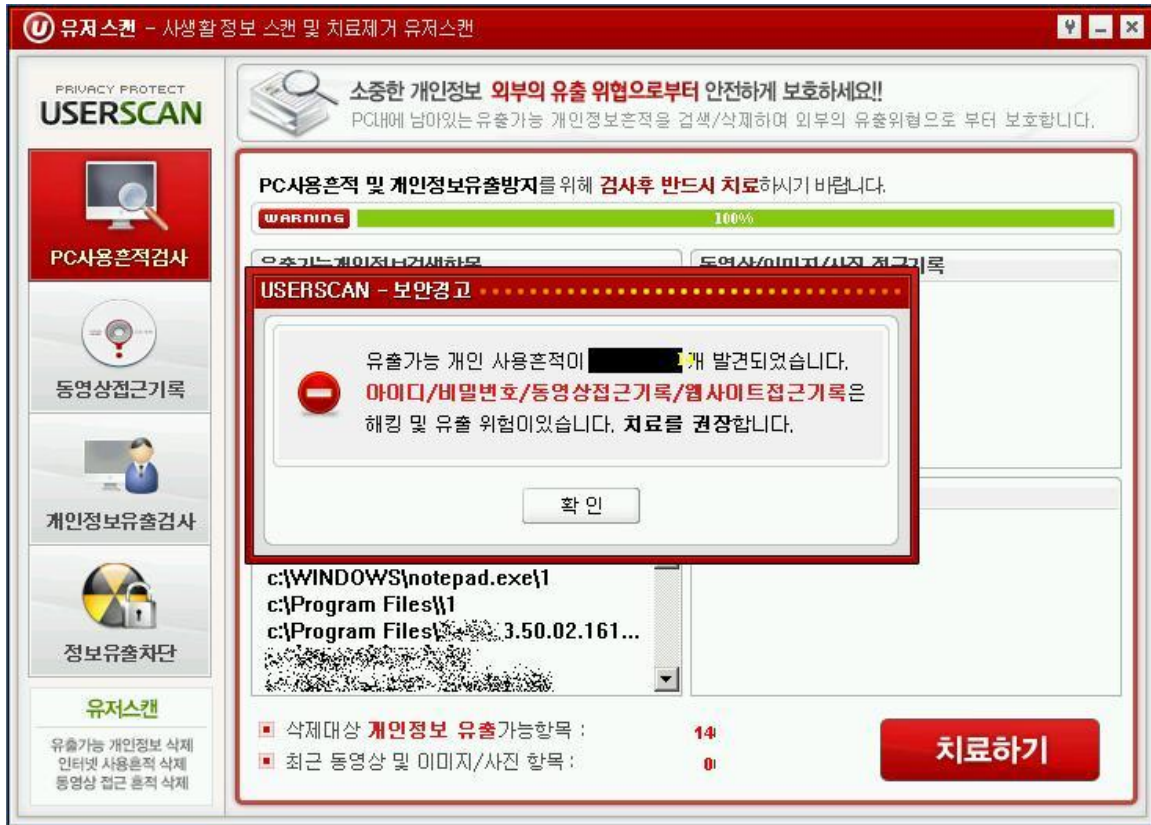
Like FakeRean, FakeSysdef uses a large number of aliases, which are often tailored to the operating system version it is running on.

For more information about FakeSysdef, see the following entries in the MMPC blog (blogs.technet.com/mmpc):

- [FakeSysdef: We can defragment that for you wholesale! / Diary of a scamware](#) (December 1, 2010)
- [How to defang the Fake Defragmenter](#) (March 19, 2011)
- [MSRT August '11: FakeSysdef](#) (August 10, 2011)
- Detections of [Win32/Onescan](#) increased from the first half of the year to the second. Onescan is a Korean-language rogue security software distributed under a variety of names, brands, and logos. The installer selects the branding

randomly from a defined set, apparently without regard to the operating system version.

Figure 32. Win32/Onescan, a Korean-language rogue security software program



- Detections of [Win32/Winwebsec](#) declined significantly in 3Q11, although it remains one of the more widely detected rogue security software programs worldwide. Winwebsec has also been distributed under many names, with the user interface and other details varying to reflect each variant's individual branding. These different distributions of the trojan use various installation methods, with filenames and system modifications that can differ from one variant to the next. The attackers behind Winwebsec are also believed to be responsible for [MacOS_X/FakeMacdef](#), the highly publicized "Mac Defender" rogue security software program for Apple Mac OS X that first appeared in May 2011. Detections for Winwebsec were added to the MSRT in May 2009.

Home and enterprise threats

The usage patterns of home users and enterprise users tend to be very different. Enterprise users typically use computers to perform business functions while connected to a network, and may have limitations placed on their Internet and email usage. Home users are more likely to connect to the Internet directly or through a home router and to use their computers for entertainment purposes, such as playing games, watching videos, shopping, and communicating with friends. These different usage patterns mean that home users tend to be exposed to a different mix of computer threats than enterprise users.

The infection telemetry data produced by Microsoft antimalware products and tools includes information about whether the infected computer belongs to an Active Directory® Domain Services domain. Such domains are used almost exclusively in enterprise environments, and computers that do not belong to a domain are more likely to be used at home or in other non-enterprise contexts. Comparing the threats encountered by domain-joined computers and non-domain computers can provide insights into the different ways attackers target enterprise and home users and which threats are more likely to succeed in each environment.

Figure 33 and Figure 34 list the top 10 families detected on domain-joined and non-domain computers, respectively, in 4Q11.

Figure 33. Top 10 families detected on domain-joined computers in 4Q11, by percentage of domain-joined computers reporting detections

	Family	Most Significant Category	1Q11	2Q11	3Q11	4Q11
1	Win32/Conficker	Worms	17.8%	15.8%	14.7%	13.5%
2	Win32/Autorun	Worms	11.7%	11.1%	9.3%	8.5%
3	JS/Blacole	Exploits	—	—	2.3%	6.4%
4	Win32/Keygen	Misc. Potentially Unwanted Software	2.9%	3.5%	4.6%	5.0%
5	Win32/Dorkbot	Worms	0.0%	0.6%	2.9%	3.7%
6	Win32/Zbot	Password Stealers & Monitoring Tools	1.8%	1.7%	2.2%	3.6%
7	Win32/RealVNC	Misc. Potentially Unwanted Software	4.5%	4.4%	4.1%	3.4%
8	JS/Redirector	Misc. Trojans	0.9%	0.9%	1.5%	3.3%
9	JS/Pornpop	Adware	4.4%	3.9%	3.5%	3.2%
10	Java/CVE-2010-0840	Exploits	3.3%	3.1%	4.1%	3.2%

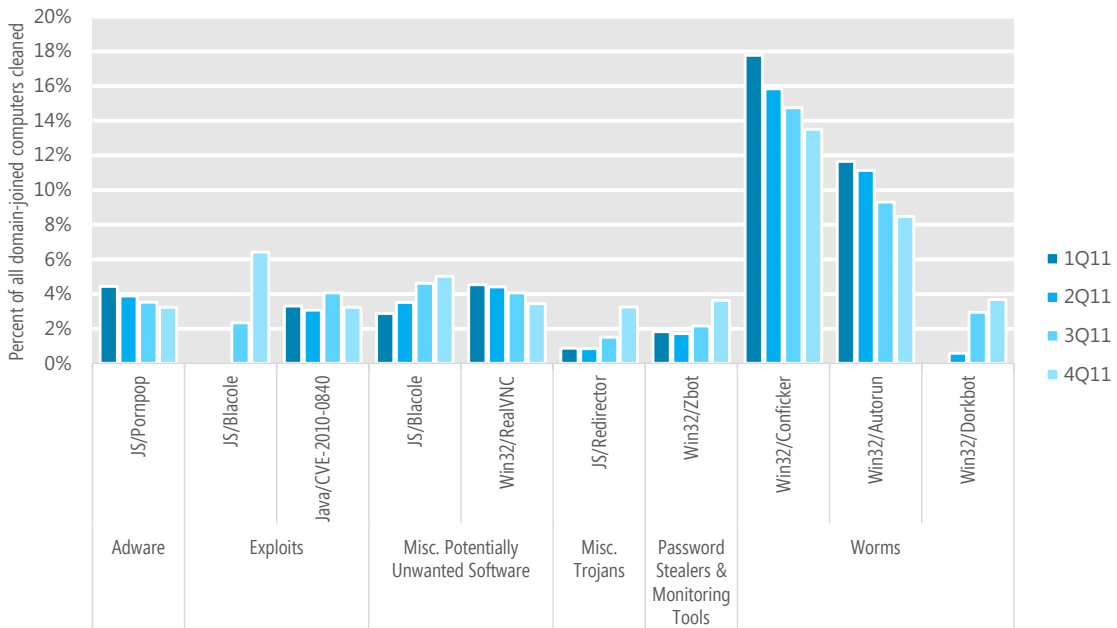
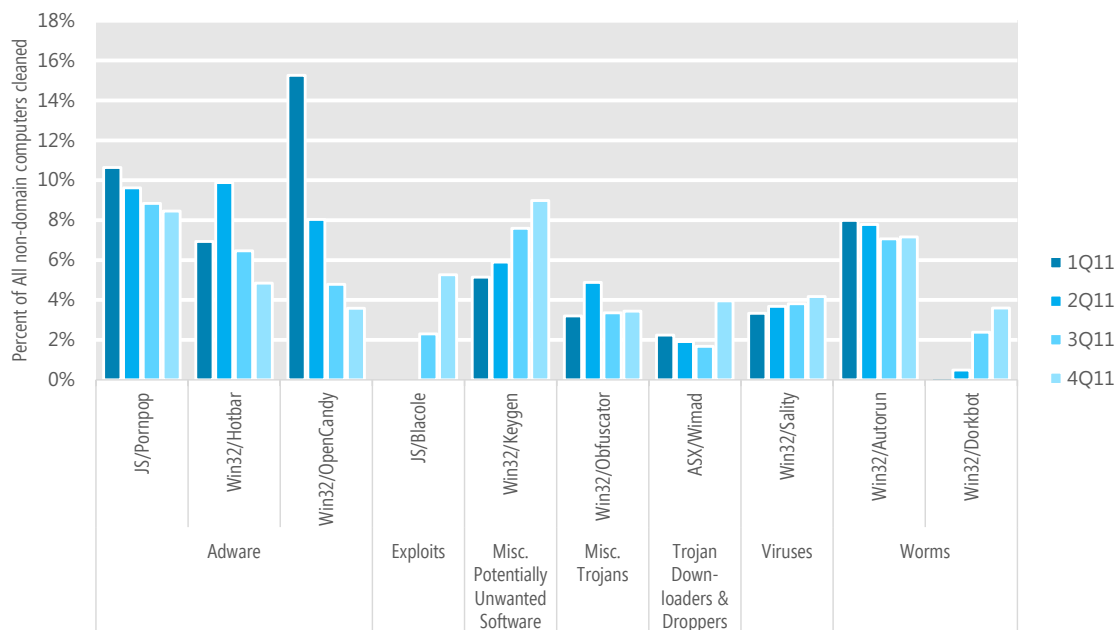


Figure 34. Top 10 families detected on non-domain computers in 4Q11, by percentage of non-domain computers reporting detections

	Family	Most Significant Category	1Q11	2Q11	3Q11	4Q11
1	Win32/Keygen	Misc. Potentially Unwanted Software	5.1%	5.9%	7.6%	9.0%
2	JS/Pornpop	Adware	10.6%	9.6%	8.8%	8.5%
3	Win32/Autorun	Worms	8.0%	7.8%	7.1%	7.2%
4	JS/Blacole	Exploits	0.0%	0.0%	2.3%	5.3%
5	Win32/Hotbar	Adware	6.9%	9.9%	6.5%	4.8%
6	Win32/Sality	Viruses	3.3%	3.7%	3.8%	4.2%
7	ASX/Wimad	Trojan Downloaders & Droppers	2.2%	1.9%	1.7%	4.0%
8	Win32/Dorkbot	Worms	0.0%	0.5%	2.4%	3.6%
9	Win32/OpenCandy	Adware	15.3%	8.0%	4.8%	3.6%
10	Win32/Obfuscator	Misc. Potentially Unwanted Software	3.2%	4.9%	3.4%	3.4%



- Five families are common to both lists, notably the generic families [Win32/Keygen](#) and [Win32/Autorun](#) and the exploit family [JS/Blacole](#).
- Other families that were prevalent on domain-joined computers during at least one quarter in 2011 included the worm family [Win32/Rimecud](#), the generic detection [Win32/Obfuscator](#), and the adware family

[Win32/OpenCandy](#). Families that were prevalent on non-domain computers during at least one quarter included the potentially unwanted software family [Win32/Zwangi](#) and the adware family [Win32/ClickPotato](#).

- The worm family [Win32/Dorkbot](#), ranked fifth on domain-joined computers and eighth on non-domain computers in 4Q11, affected both types of computers about equally during the third and fourth quarters. Dorkbot is an IRC-based botnet family with rootkit capability and password stealing functionality. For more information, see the entry “[MSRT March 2012: Breaking bad](#)” (March 13, 2012) on the MMPC blog at blogs.technet.com/mmpc.
- Detections of worm family [Win32/Conficker](#), the most commonly detected family on domain-joined computers during each quarter in 2011, declined slowly throughout the year. After being detected on 17.8 percent of domain-joined computers reporting detections in 1Q11, Conficker detections declined in each successive quarter, to a low of 13.5 percent in 4Q11. (See “**Error! Reference source not found.**” on page **Error! Bookmark not defined.** for more information.) Similarly, detections of the generic family [Win32/Autorun](#) decreased on domain-joined computers during each quarter in 2011.
- Families that were significantly more prevalent on domain-joined computers include Conficker, the botnet family [Win32/Zbot](#), and the potentially unwanted software program [Win32/RealVNC](#). RealVNC is a program that enables a computer to be controlled remotely, similar to Remote Desktop Services. It has a number of legitimate uses, but attackers have also used it to gain control of users’ computers for malicious purposes.
- [Java/CVE-2010-0840](#), an exploit that targets a vulnerability in older versions of Oracle Java SE and Java for Business, was the tenth most commonly detected threat on domain-joined computers. See “Java Exploits” on page 18 for more information about this exploit.
- Detections on non-domain computers have historically tended to be dominated by adware, but a decline in detections of a number of prevalent adware families has led to a more diverse mix of threat categories during the second half of the year. The adware families ClickPotato and [Win32/ShopperReports](#) are among the families that no longer appear on the top-10 list for non-domain computers.
- Families that were significantly more prevalent on non-domain computers include the adware families [JS/Pornpop](#) and [Win32/Hotbar](#) and the generic detection [ASX/Wimad](#). Wimad is a detection for malicious files in the Advanced Stream Redirector (ASX) format used by Windows Media® Player.

Guidance: Defending against malware

Effectively protecting users from malware requires an active effort on the part of organizations and individuals. For in-depth guidance, see [Protecting Against Malicious and Potentially Unwanted Software](#) in the “Mitigating Risk” section of the *Microsoft Security Intelligence Report* website.

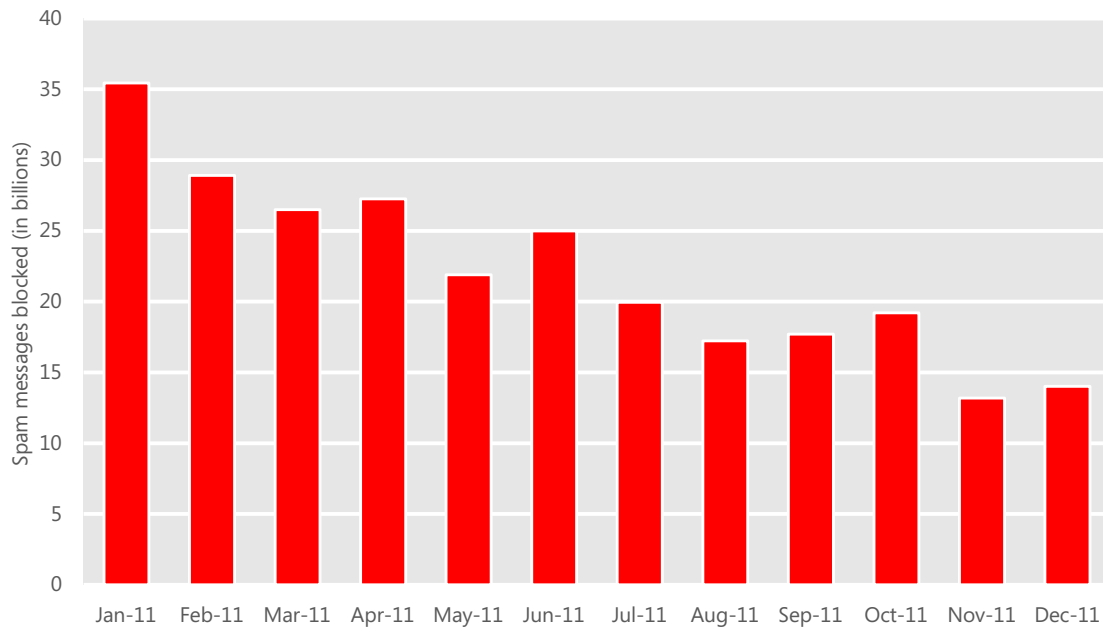
Email threats

Most of the email messages sent over the Internet are unwanted. Not only does all this unwanted email tax recipients' inboxes and the resources of email providers, but it also creates an environment in which emailed malware attacks and phishing attempts can proliferate. Email providers, social networks, and other online communities have made blocking spam, phishing, and other email threats a top priority.

Spam messages blocked

The information in this section of the *Microsoft Security Intelligence Report* is compiled from telemetry data provided by Microsoft Forefront® Online Protection for Exchange (FOPE), which provides spam, phishing, and malware filtering services for thousands of Microsoft enterprise customers that process tens of billions of messages each month.

Figure 35. Messages blocked by FOPE each month in 2011

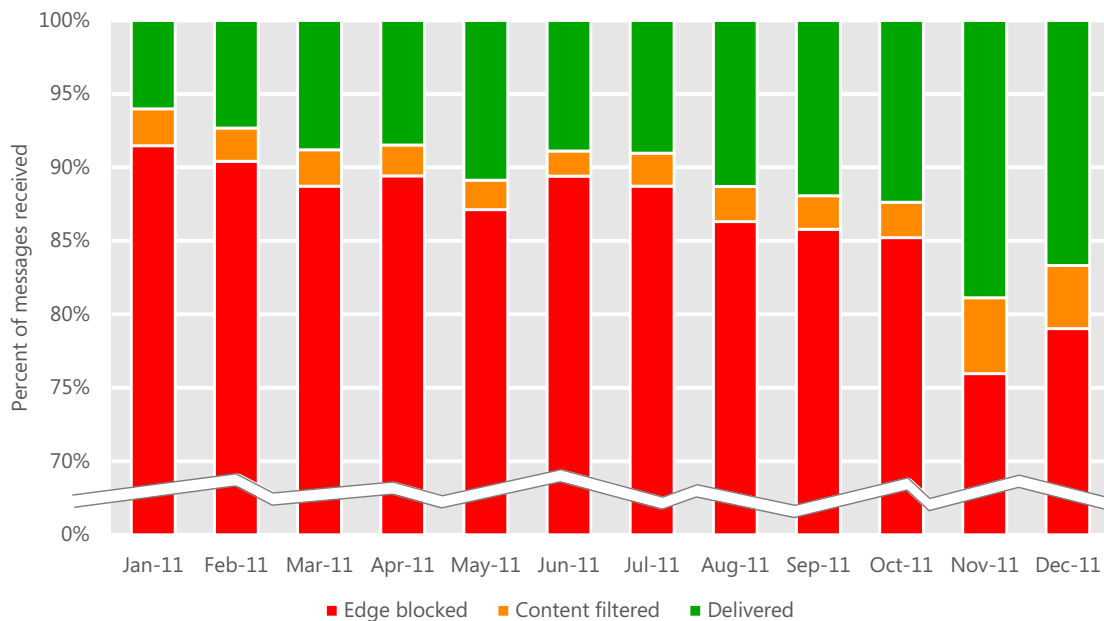


- FOPE blocked 14.0 billion messages in December 2011, less than half of the amount blocked in January. The significant decline in blocked messages seen throughout 2011 is likely attributable to several factors, including the following:
 - Takedown actions waged against a number of high-volume botnets, including the Rustock botnet in March and the Kelihos botnet in September, seem to have had a significant impact on the ability of spammers to distribute their messages to wide audiences. (For more information about the Rustock takedown, see “[Battling the Rustock Threat](#),” available from the Microsoft Download Center at www.microsoft.com/download.)
 - As filtering improvements and high-profile takedowns have made it more difficult for spammers to get their messages out, they have adapted their methods in a continual effort to stay one step ahead of spam fighters. Many spammers have shifted from botnet-based delivery to a method some call *snowshoe spam*, whereby spam is distributed in lower volumes from a wider range of IP addresses in an effort to avoid detection. Snowshoe spam is often sent from IP addresses that the spammers have leased legitimately from commercial Internet service providers (ISPs), and

can be difficult for automated blocks and filters to distinguish from legitimate bulk email, such as opt-in newsletters and mailing lists.⁵

FOPE performs spam filtering in two stages. Most spam is blocked by servers at the network edge, which use reputation filtering and other non-content-based rules to block spam or other unwanted messages. Messages that are not blocked at the first stage are scanned using content-based rules, which detect and filter many additional email threats, including attachments that contain malware.

Figure 36. Percentage of incoming messages blocked by FOPE using edge-blocking and content filtering in 2011



- Between 76 and 92 percent of incoming messages were blocked at the network edge each month, which means that only 8 to 24 percent of incoming messages had to be subjected to the more resource-intensive content filtering process.
- The overall decline in spam blocked between January and December, shown in Figure 35, has disproportionately affected spam blocked at the network edge. Overall, the total volume of content-filtered spam decreased for most of the year, even as the share of content-filtered spam increased relative to edge-blocked spam. This trend reversed in October, as the total volume of content-

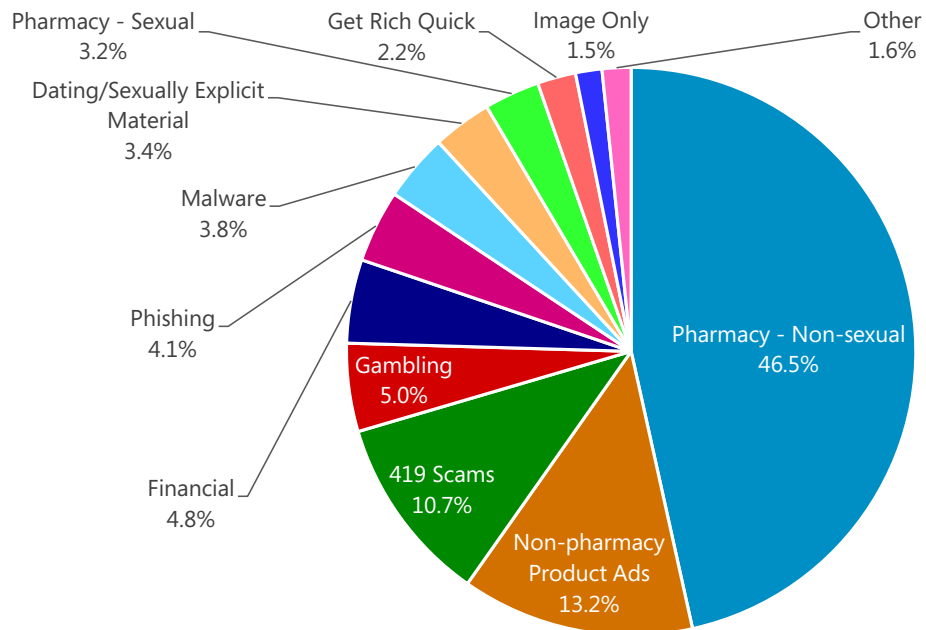
⁵ See blogs.msdn.com/b/tzink/archive/2011/11/22/what-snoeshoe-spam-looks-like.aspx for more information about snowshoe spam and related concepts.

filtered spam began to increase, possibly in response to the takedown of the Kelihos botnet in September and to the overall trend in favor of more snowshoe spam.

Spam types

The FOPE content filters recognize several different common types of spam messages. Figure 37 shows the relative prevalence of the spam types that were detected in 2H11.

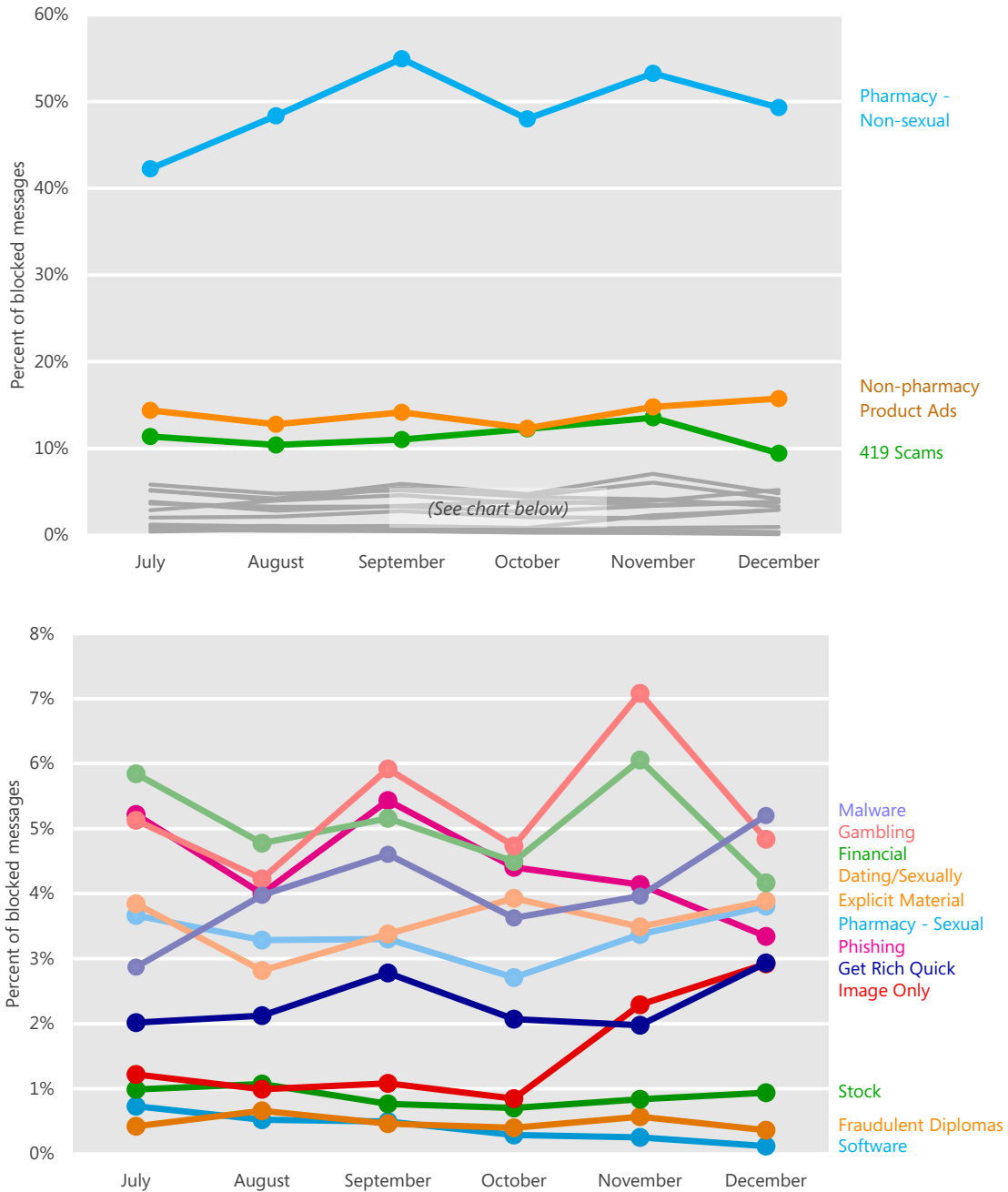
Figure 37. Inbound messages blocked by FOPE filters in 2H11, by category



- Advertisements for pharmaceutical products accounted for almost half of the spam blocked by FOPE content filters in 2H11. The largest total category of spam by a wide margin involved nonsexual pharmaceutical products at 46.5 percent of the total, an increase from 28.0 percent in 1H11. Sexually related pharmaceutical advertisements accounted for 3.2 percent of the total, a decrease from 3.8 percent in 1H11.

- Advertisements for non-pharmaceutical products accounted for an additional 13.2 percent of messages blocked, a decrease from 17.2 percent in 1H11.
- Spam messages associated with advance-fee fraud (so-called “419 scams”) accounted for 10.7 percent of messages blocked, a decrease from 13.2 percent in 1H11. An advance-fee fraud is a common confidence trick in which the sender of a message purports to have a claim on a large sum of money, but is unable to access it directly for some reason, typically involving bureaucratic red tape or political corruption. The sender asks the prospective victim for a temporary loan to be used for bribing officials or for paying fees to get the full sum released. In exchange, the sender promises the target a share of the fortune amounting to a much larger sum than the original loan, but does not deliver.

Figure 38. Inbound messages blocked by FOPE content filters each month in 2011, by category



- Advertisements for non-sexual pharmaceutical products accounted for 46.5 percent of the spam messages blocked by FOPE content filters in 2H11.

- Together, non-pharmaceutical product advertisements (13.2 percent) and advertisements for non-sexual pharmaceutical products accounted for the majority of the spam messages blocked by FOPE content filters in 2H11. Along with 419 scams (10.7 percent), these categories accounted for more than 70 percent of the spam messages that were blocked during the period.
- In an effort to evade content filters, spammers sometimes send messages that consist only of one or more images, with no text in the body of the message. Image-only spam messages decreased to 1.5 percent of the total in 2H11 overall, from 3.1 percent in 1H11 and 8.7 percent in 2010. However, image-only spam increased from 0.8 percent in October to 2.1 percent in November and 2.9 percent in December, suggesting that the recent lull may have been temporary.
- Other spam categories that showed significant month-to-month increases in 2H11 included gambling advertisements and financial spam, both of which displayed moderate spikes in November. In both cases, however, the magnitude of the increase was not significantly larger than the month-to-month fluctuations observed throughout the period.

Guidance: Defending against threats in email

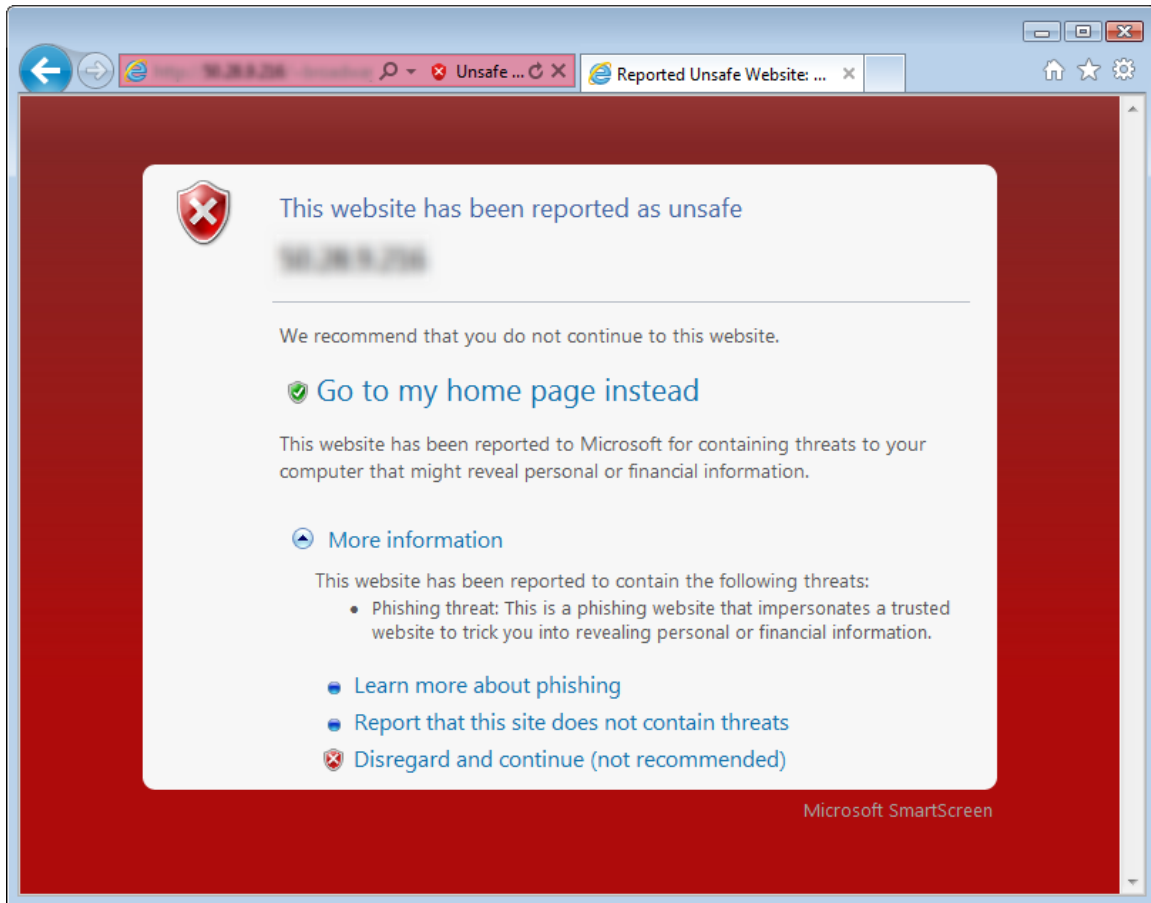
In addition to using a filtering service such as FOPE, organizations can take a number of steps to reduce the risks and inconvenience of unwanted email. Such steps include implementing email authentication techniques and observing best practices for sending and receiving email. For in-depth guidance, see [Guarding Against Email Threats](#) in the “Managing Risk” section of the *Microsoft Security Intelligence Report* website.

Malicious websites

Attackers often use websites to conduct phishing attacks or distribute malware. Malicious websites typically appear completely legitimate and often provide no outward indicators of their malicious nature, even to experienced computer users. To help protect users from malicious webpages, Microsoft and other browser vendors have developed filters that keep track of sites that host malware and phishing attacks and display prominent warnings when users try to navigate to them.

The information in this section is compiled from a variety of internal and external sources, including telemetry data produced by SmartScreen® Filter (in Windows Internet Explorer 8 and 9), the Phishing Filter (in Internet Explorer 7), from a database of known active phishing and malware hosting sites reported by users of Internet Explorer and other Microsoft products and services, and from malware data provided by Microsoft antimalware technologies. (See “Appendix B: Data sources” on page 81 for more information about the products and services that provided data for this report.)

Figure 39. SmartScreen Filter in Internet Explorer 8 and 9 blocks reported phishing and malware distribution sites to protect the user



Phishing sites

Microsoft gathers information about phishing sites and impressions from *phishing impressions* generated by users who choose to enable the Phishing Filter or SmartScreen Filter in Internet Explorer. A phishing impression is a single instance of a user attempting to visit a known phishing site with Internet Explorer and being blocked, as illustrated in Figure 40.

Figure 40. How Microsoft tracks phishing impressions

1. The user views a phishing message, in email or elsewhere, and is tricked into clicking a link that leads to a malicious website.

2. SmartScreen Filter in Internet Explorer checks the Microsoft URL Reputation Service, determines that the website is malicious, and blocks it.

3. The URL Reputation Service records the anonymized details of the incident as a phishing impression.

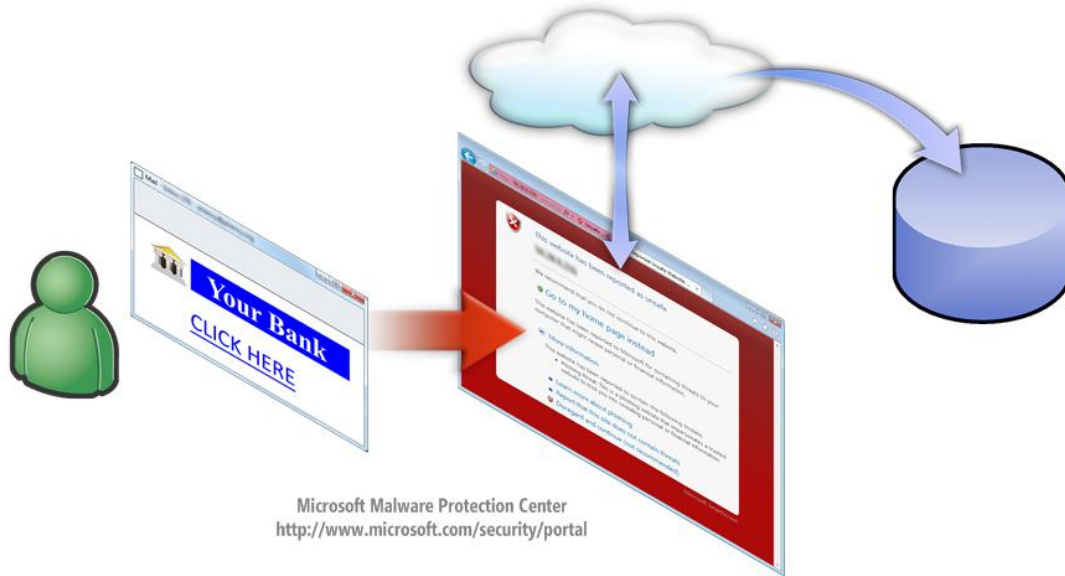
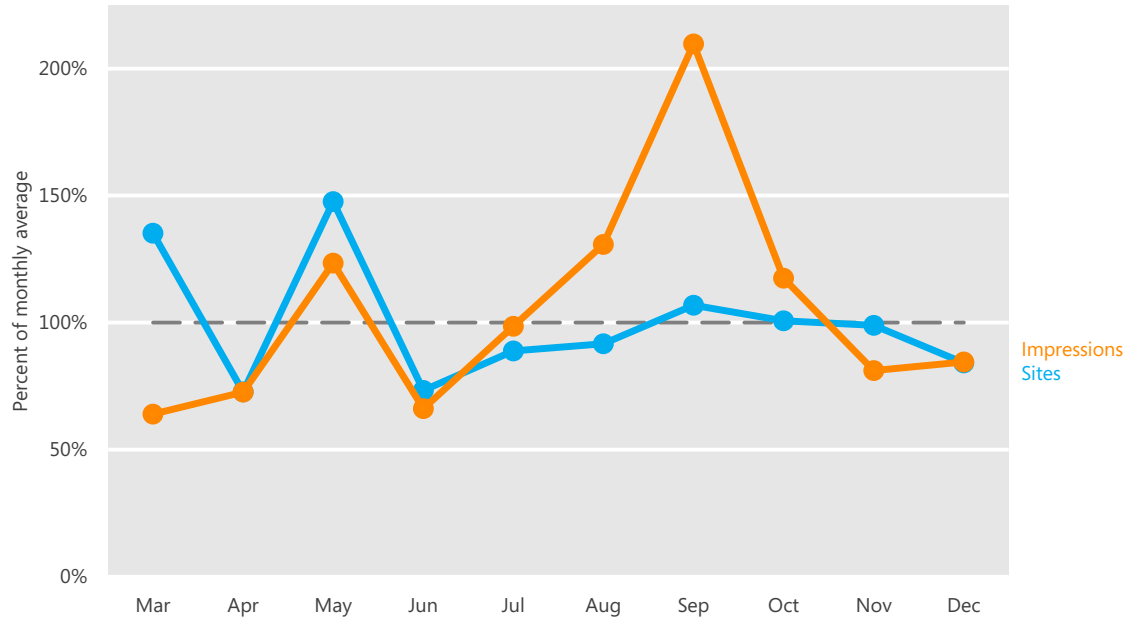


Figure 41 compares the volume of active phishing sites in the Microsoft URL Reputation Service database each month with the volume of phishing impressions tracked by Internet Explorer.

Figure 41. Phishing sites and impressions tracked each month from March to December 2011 relative to the monthly average for each



- Phishers often engage in discrete campaigns that are intended to drive more traffic to each phishing page, without necessarily increasing the total number of active phishing pages they maintain at the same time. A large spike in impressions was observed in September, when the number of impressions rose to more than twice the monthly average for the period, primarily because of a small number of very effective campaigns targeting social networks. At the same time, the number of active phishing sites tracked did not increase significantly.
- Most phishing sites only last a few days, and attackers create new ones to replace older ones as they are taken offline, so the list of known phishing sites is prone to constant change without significantly affecting overall volume. This phenomenon can cause significant fluctuations in the number of active phishing sites being tracked, like the one seen between March and June.

Target institutions

Figure 42 and Figure 43 show the percentage of phishing impressions and active phishing sites, respectively, recorded by Microsoft during each month from August to December 2011 for the most frequently targeted types of institutions.

Figure 42. Impressions for each type of phishing site each month from August to December 2011, as reported by SmartScreen Filter

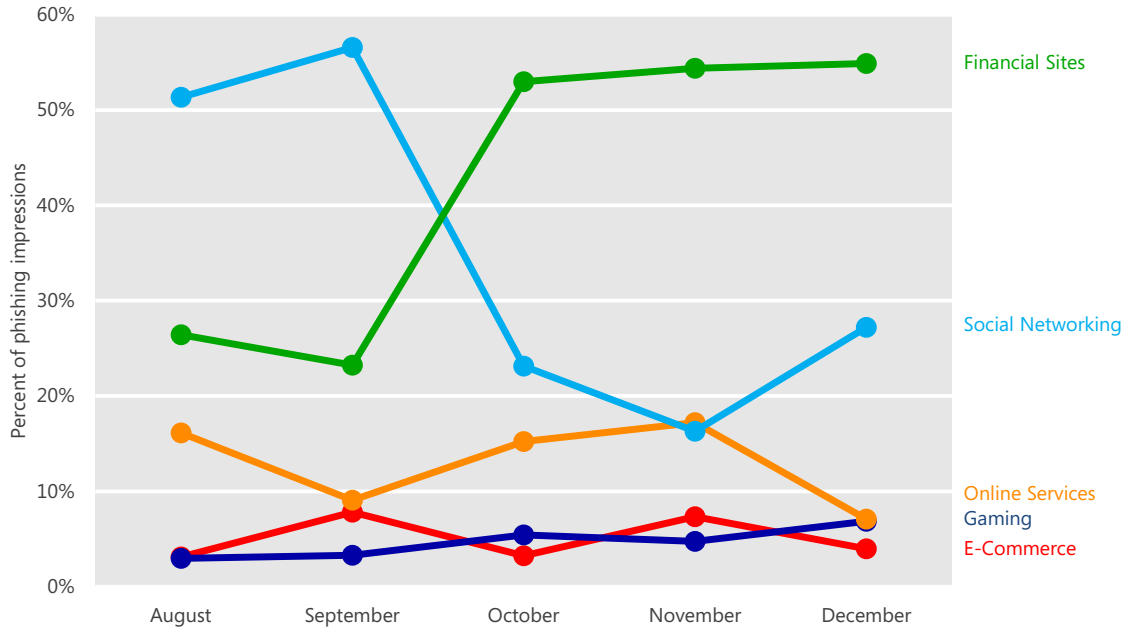
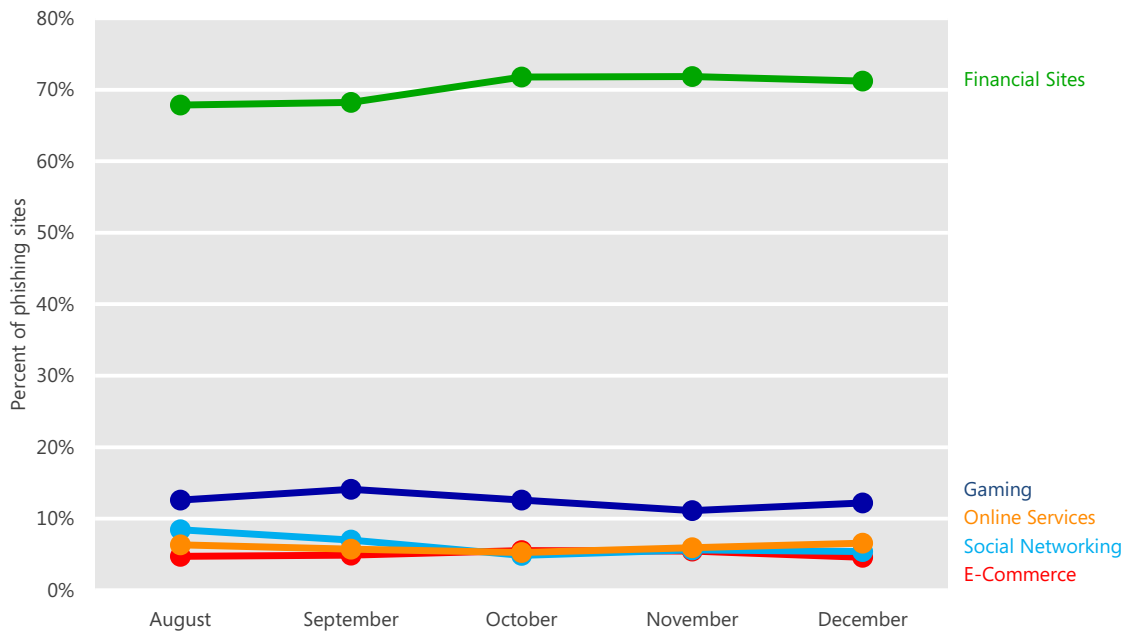


Figure 43. Active phishing sites tracked each month from August to December 2011, by type of target

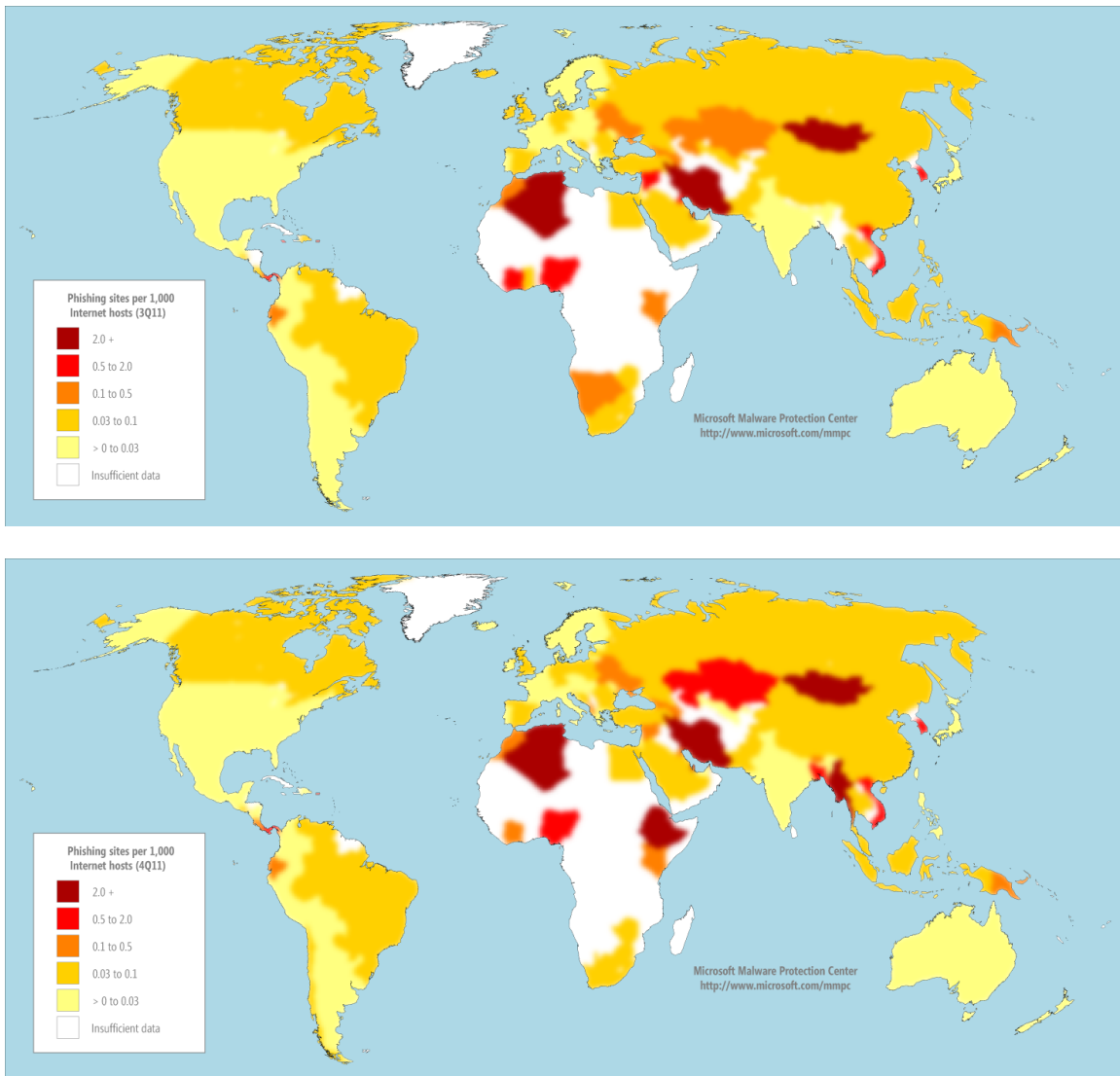


- Impressions by category tend to fluctuate more between successive months than do sites, because of the aforementioned campaign effect, in which phishers sometimes engage in short periods of intense activity designed to drive traffic to a small number of sites.
- Phishing sites that targeted financial institutions accounted for an average of 70.4 percent of active phishing sites tracked from August to December 2011, although they accounted for just 34.8 percent of impressions. Financial institutions are relatively inefficient targets for phishers, because the number of possible institutions to target can number in the hundreds or more even within a relatively small population of Internet users. Nevertheless, the potential for direct illicit access to victims' bank accounts make financial institutions a tempting target for many criminals, and they continue to receive the largest or second-largest number of impressions each month.
- By contrast, the number of popular social networking sites is much smaller, so phishers who target social networks can effectively target many more people per site. Social networks accounted for just 6.1 percent of phishing sites between August and December 2011 on average, but garnered 43.7 percent of impressions. Much of this traffic was because of a period of increased phishing activity in September targeting social networks, as mentioned on page 65.
- This phenomenon also occurs on a smaller scale with online services and gaming sites. A small number of online services account for most traffic to such sites, so phishing sites that targeted online services garnered 12.0 percent of impressions with just 6.0 percent of sites. Online gaming traffic tends to be spread out among a larger number of sites, so phishing sites that targeted online gaming destinations accounted for 12.5 percent of active sites but gained just 4.1 percent of impressions.

Global distribution of phishing sites

Phishing sites are hosted all over the world on free hosting sites, on compromised web servers, and in numerous other contexts. Performing geographic lookups of IP addresses in the database of reported phishing sites makes it possible to create maps that show the geographic distribution of sites and to analyze patterns.

Figure 44. Phishing sites per 1,000 Internet hosts for locations around the world in 3Q11 (top) and 4Q11 (bottom)



- Locations with smaller populations and fewer Internet hosts tend to have higher concentrations of phishing sites, although in absolute terms most phishing sites are located in large, industrialized countries/regions with large numbers of Internet hosts.
- Significant locations with unusually high concentrations of phishing sites include Mongolia, with 5.6 phishing sites per 1,000 hosts in 4Q11; Iran, with 2.4; and Korea, with 0.6.

Malware hosting sites

SmartScreen Filter in Internet Explorer 8 and 9 helps provide protection against sites that are known to host malware, in addition to phishing sites. SmartScreen Filter uses URL reputation data and Microsoft antimalware technologies to determine whether those sites distribute unsafe content. As with phishing sites, Microsoft keeps track of how many people visit each malware hosting site and uses the information to improve SmartScreen Filter and to better combat malware distribution.

Figure 45. SmartScreen Filter in Internet Explorer 8 (top) and Internet Explorer 9 (bottom) displays a warning when a user attempts to download an unsafe file

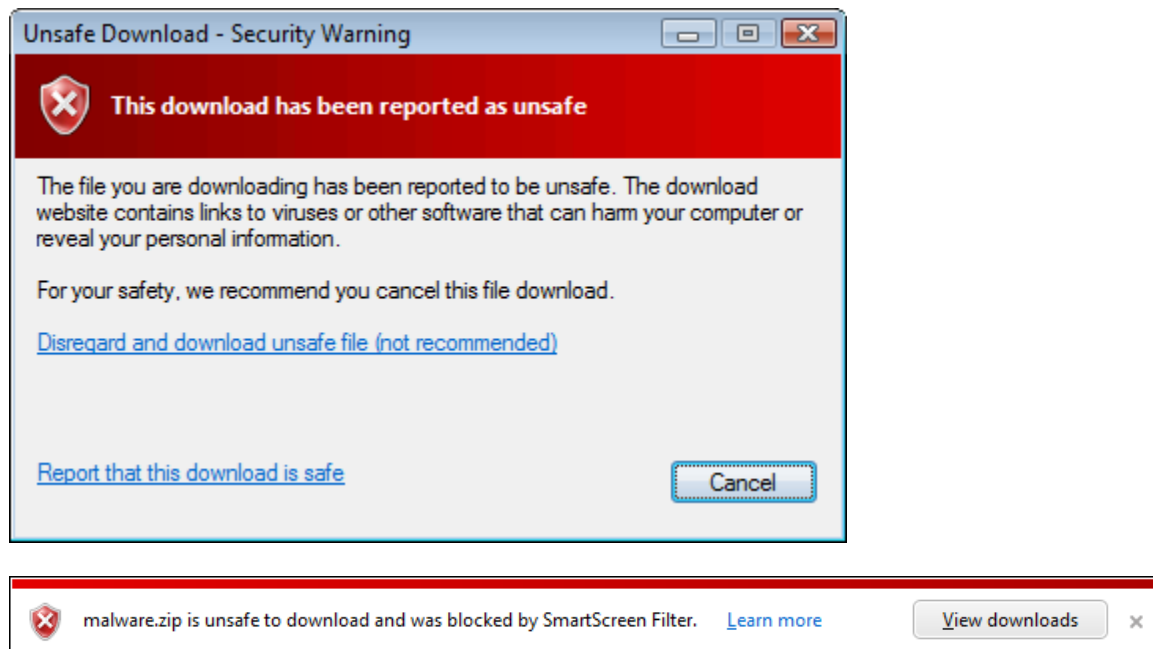
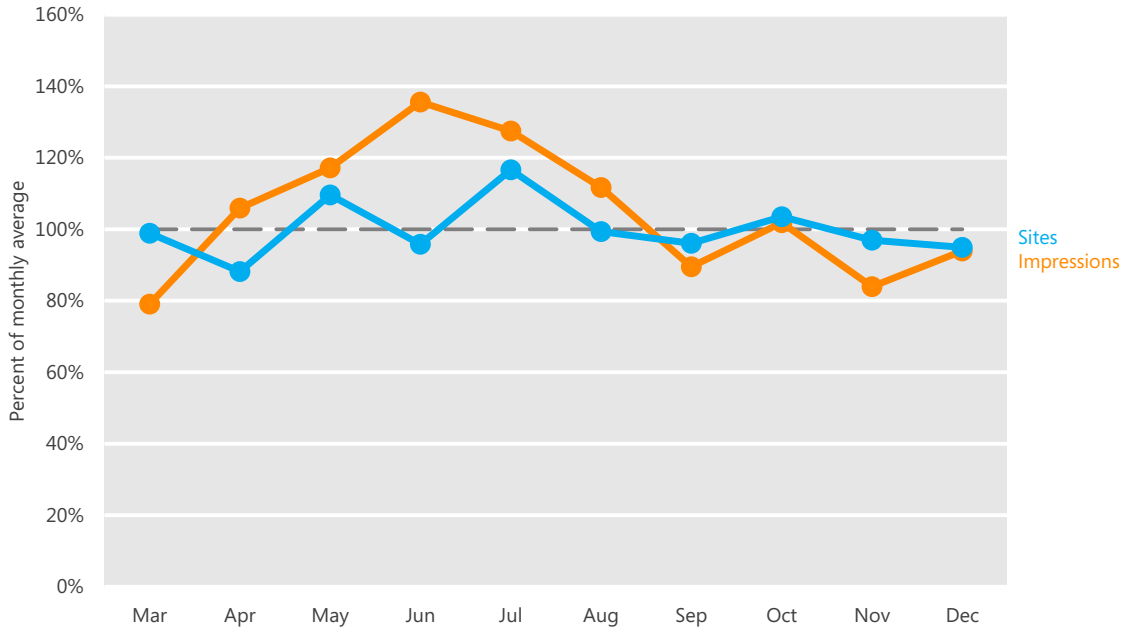


Figure 46 compares the volume of active malware hosting sites in the Microsoft URL Reputation Service database each month with the volume of malware impressions tracked by Internet Explorer.

Figure 46. Malware hosting sites and impressions tracked each month from March to December 2011, relative to the monthly average for each



- As with phishing, malware hosting impressions and active sites rarely correlate strongly with each other, and months with high numbers of sites and low numbers of impressions (or vice versa) are not uncommon.

Malware categories

Figure 47 and Figure 48 show the types of threats hosted at URLs that were blocked by SmartScreen Filter in 2H11.

Figure 47. Categories of malware found at sites blocked by SmartScreen Filter in 2H11, by percent of all malware impressions

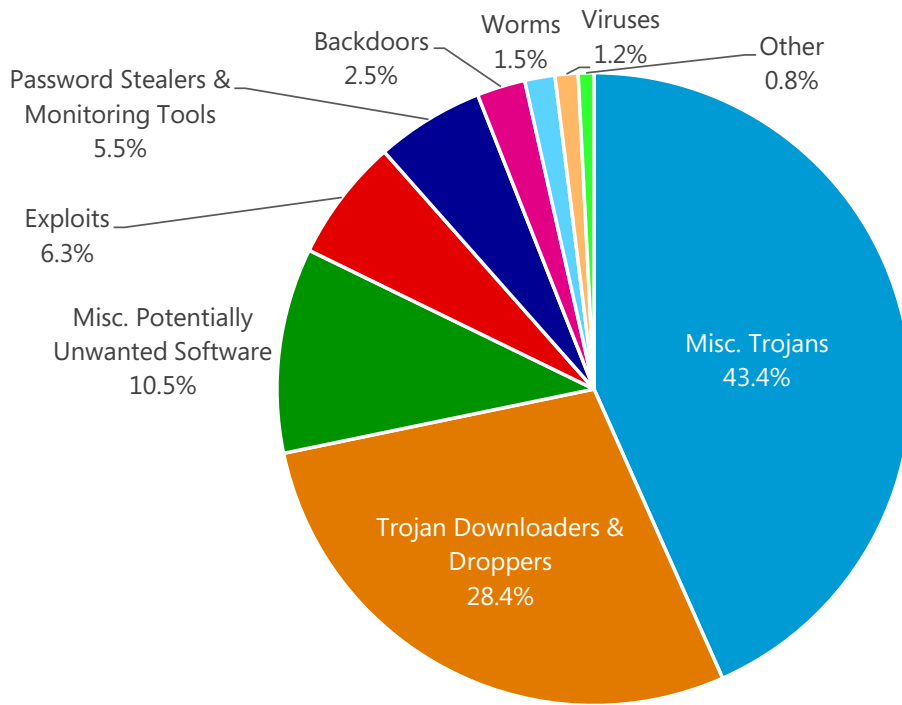


Figure 48. Top families found at sites blocked by SmartScreen Filter in 2H11, by percent of all malware impressions

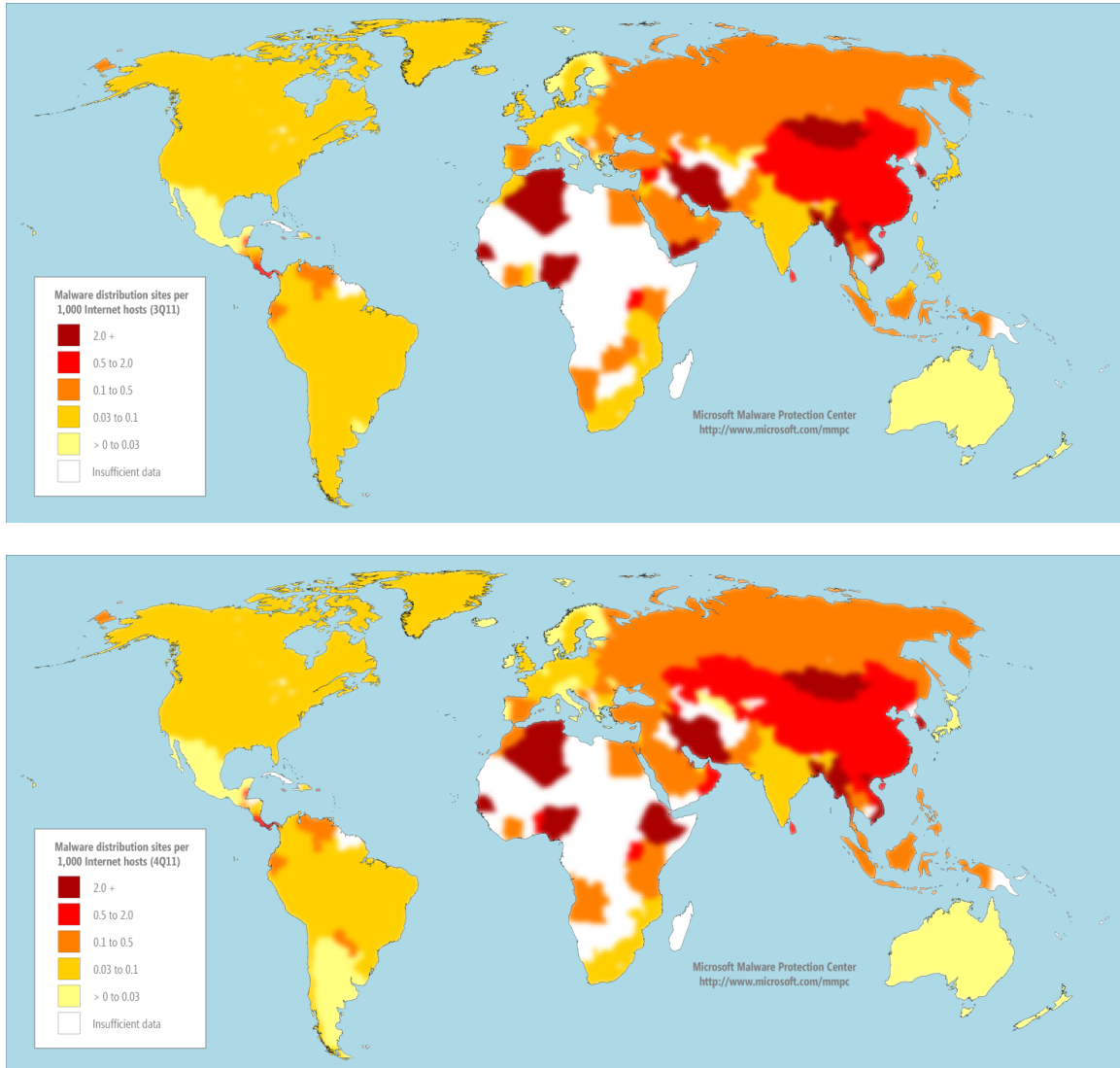
	Family	Most Significant Category	Percent of Malware Impressions
1	Win32/Startpage	Misc. Trojans	15.7%
2	Win32/Swisyn	Trojan Downloaders & Droppers	10.4%
3	Win32/Banload	Trojan Downloaders & Droppers	5.8%
4	Win32/Dynamer	Misc. Trojans	5.1%
5	Win32/Obfuscator	Misc. Potentially Unwanted Software	4.5%
6	JS/ShellCode	Exploits	3.9%
7	Win32/Microjoin	Trojan Downloaders & Droppers	2.1%
8	Win32/Malf	Trojan Downloaders & Droppers	2.0%
9	Win32/VB	Worms	1.9%
10	Win32/Sisproc	Misc. Trojans	1.8%
11	Win32/Meredrop	Misc. Trojans	1.8%
12	Win32/Delf	Trojan Downloaders & Droppers	1.6%
13	Win32/Pdfjsc	Exploits	1.4%
14	Win32/Agent	Misc. Trojans	1.4%
15	Win32/BaiduSobar	Misc. Potentially Unwanted Software	1.4%
16	Win32/Bulilit	Trojan Downloaders & Droppers	1.3%
17	Win32/Sirefef	Misc. Trojans	1.3%

- Most of the families on the list are generic detections for a variety of threats that share certain identifiable characteristics.
- [Win32/Startpage](#), the family responsible for the most malware impressions in 2H11, is a generic detection for malware that changes the home page of an affected user's web browser without consent.
- [Win32/Swisyn](#), in second place, is a family of trojans that drops and executes files on an infected computer. These files may be embedded as resource files, and are often bundled with legitimate files in an effort to evade detection.

Global distribution of malware hosting sites

Figure 49 shows the geographic distribution of malware hosting sites reported to Microsoft in 2H11.

Figure 49. Malware distribution sites per 1,000 Internet hosts for locations around the world in 3Q11 (top) and 4Q11 (bottom)



- As with phishing sites, locations with smaller populations and fewer Internet hosts tend to have higher concentrations of phishing sites, although in absolute terms most phishing sites are located in large, industrialized countries/regions with large numbers of Internet hosts.

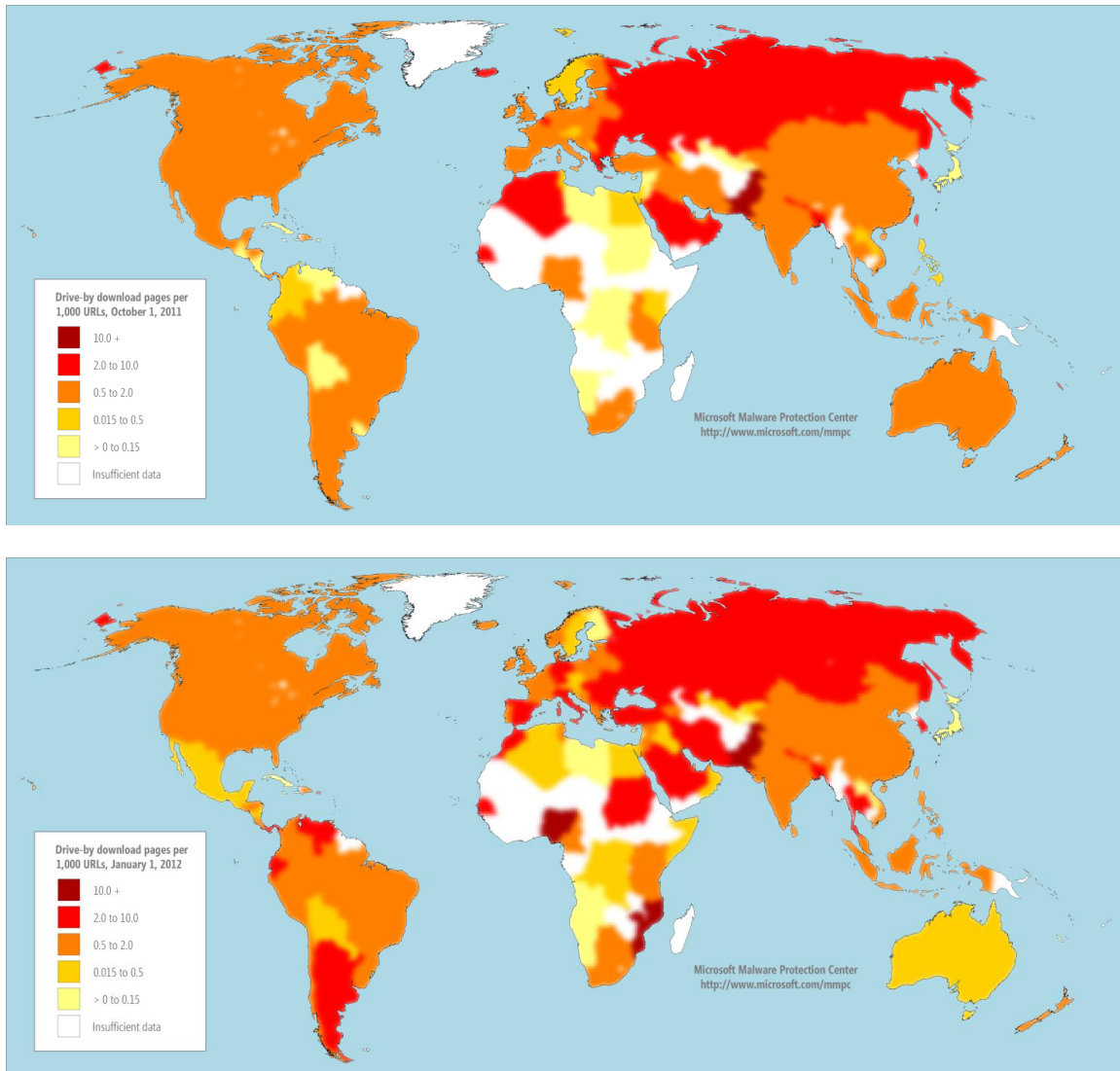
Drive-by download sites

A *drive-by download* site is a website that hosts one or more exploits that target vulnerabilities in web browsers and browser add-ons. Users with vulnerable computers can be infected with malware simply by visiting such a website, even without attempting to download anything.

Search engines such as Bing have taken a number of measures to help protect users from drive-by downloads. Bing analyzes websites for exploits as they are indexed and displays warning messages when listings for drive-by download pages appear in the list of search results. (See [Drive-By Download Sites](#) at the *Microsoft Security Intelligence Report* website for more information about how drive-by downloads work and the steps Bing takes to protect users from them.)

Figure 50 shows the concentration of drive-by download pages in countries and regions throughout the world at the end of 3Q11 and 4Q11, respectively.

Figure 50. Drive-by download pages indexed by Bing.com at the end of 3Q11 (top) and 4Q11 (bottom), per 1000 URLs in each country/region



- Each map shows the concentration of drive-by download URLs tracked by Bing in each country or region on a reference date at the end of the associated quarter, expressed as the number of drive-by download URLs per every 1,000 URLs hosted in the country/region. This snapshot approach contrasts with the accumulative approach used to report drive-by downloads in previous volumes of the *Microsoft Security Intelligence Report*, which accounted for every drive-by URL detected at any point during the relevant period. This new

approach is intended to more accurately reflect the short-lived nature of most drive-by URLs; however, comparisons between the data presented here and data presented in previous volumes is not appropriate and should be avoided.

- Significant locations with unusually high concentrations of drive-by download URLs in both quarters include Pakistan, with 5.8 drive-by URLs for every 1,000 URLs tracked by Bing at the end of 4Q11; Saudi Arabia, with 3.3; Romania, with 2.7; and Korea, with 2.1.

Guidance: Protecting users from unsafe websites

Organizations can best protect their users from malicious and compromised websites by mandating the use of web browsers with appropriate protection features built in and by promoting safe browsing practices. For in-depth guidance, see the following resources in the “Managing Risk” section of the *Microsoft Security Intelligence Report* website:

- [Promoting Safe Browsing](#)
- [Protecting Your People](#)

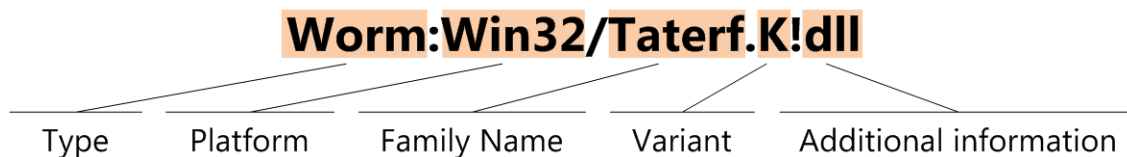
Appendixes

Appendix A: Threat naming conventions

The MMPC malware naming standard is derived from the Computer Antivirus Research Organization (CARO) Malware Naming Scheme, originally published in 1991 and revised in 2002. Most security vendors use naming conventions that are based on the CARO scheme, with minor variations, although family and variant names for the same threat can differ between vendors.

A threat name can contain some or all of the components seen in Figure 51.

Figure 51. The Microsoft malware naming convention



The *type* indicates the primary function or intent of the threat. The MMPC assigns each individual threat to one of a few dozen different types based on a number of factors, including how the threat spreads and what it is designed to do. To simplify the presentation of this information and make it easier to understand, the *Microsoft Security Intelligence Report* groups these types into 10 categories. For example, the TrojanDownloader and TrojanDropper types are combined into a single category, called Trojan Downloaders & Droppers.

The *platform* indicates the operating environment in which the threat is designed to run and spread. For most of the threats described in this report, the platform is listed as “Win32,” for the Win32 API used by 32-bit and 64-bit versions of Windows desktop and server operating systems. (Not all Win32 threats can run on every version of Windows, however.) Platforms can include programming languages and file formats, in addition to operating systems. For example, threats in the ASX/Wimad family are designed for programs that parse the Advanced Stream Redirector (ASX) file format, regardless of operating system.

Groups of closely related threats are organized into *families*, which are given unique names to distinguish them from others. The family name is usually not related to anything the malware author has chosen to call the threat. Researchers use a variety of techniques to name new families, such as excerpting and modifying strings of alphabetic characters found in the malware file. Security vendors usually try to adopt the name used by the first vendor to positively identify a new family, although sometimes different vendors use completely different names for the same threat, which can happen when two or more vendors discover a new family independently. The MMPC Encyclopedia (www.microsoft.com/mmpc) lists the names used by other major security vendors to identify each threat, when known.

Some malware families include multiple components that perform different tasks and are assigned different types. For example, the Win32/Frethog family includes variants designated PWS:Win32/Frethog.C and TrojanDownloader:Win32/Frethog.C, among others. In the *Microsoft Security Intelligence Report*, the category listed for a particular family is the one that Microsoft security analysts have determined to be the most significant category for the family (which, in the case of Frethog, is Password Stealers & Monitoring Tools).

Malware creators often release multiple *variants* for a family, typically in an effort to avoid being detected by security software. Variants are designated by letters, which are assigned in order of discovery—A through Z, then AA through AZ, then BA through BZ, and so on. A variant designation of “gen” indicates that the threat was detected by a generic signature for the family rather than as a specific variant. Any additional characters that appear after the variant provide comments or additional information.

In the *Microsoft Security Intelligence Report*, a threat name that consists of a platform and family name (for example, “Win32/Taterf”) is a reference to a family. When a longer threat name is given (for example, “Worm:Win32/Taterf.K!dll”), it is a reference to a more specific signature or to an individual variant. To make the report easier to read, family and variant names have occasionally been abbreviated in contexts where confusion is unlikely. Thus, Win32/Taterf would be referred to simply as “Taterf” on subsequent mention in some places, and Worm:Win32/Taterf.K simply as “Taterf.K.”

Appendix B: Data sources

Data included in the *Microsoft Security Intelligence Report* is gathered from a wide range of Microsoft products and services. The scale and scope of this telemetry data allows the report to deliver the most comprehensive and detailed perspective on the threat landscape available in the software industry:

- [Bing](#), the search and decision engine from Microsoft, contains technology that performs billions of webpage scans per year to seek out malicious content. After such content is detected, Bing displays warnings to users about it to help prevent infection.
- [Windows Live Hotmail](#) has hundreds of millions of active email users in more than 30 countries/regions around the world.
- [Forefront Online Protection for Exchange](#) (FOPE) protects the networks of thousands of enterprise customers worldwide by helping to prevent malware from spreading through email. FOPE scans billions of email messages every year to identify and block spam and malware.
- [Microsoft Forefront Endpoint Protection](#) is a unified product that provides protection from malware and potentially unwanted software for enterprise desktops, laptops, and server operating systems. It uses the Microsoft Malware Protection Engine and the Microsoft antivirus signature database to provide real-time, scheduled, and on-demand protection.
- [Windows Defender](#) is a program that is available at no cost to licensed users of Windows that provides real-time protection against pop-ups, slow performance, and security threats caused by spyware and other potentially unwanted software. Windows Defender runs on more than 100 million computers worldwide.
- The [Malicious Software Removal Tool](#) (MSRT) is a free tool that Microsoft designed to help identify and remove prevalent malware families from customer computers. The MSRT is primarily released as an important update through Windows Update, Microsoft Update, and Automatic Updates. A version of the tool is also available from the Microsoft Download Center. The MSRT was downloaded and executed more than 600 million times each

month on average in 2H11. The MSRT is not a replacement for an up-to-date antivirus solution because of its lack of real-time protection and because it uses only the portion of the Microsoft antivirus signature database that enables it to target specifically selected, prevalent malicious software.

- [Microsoft Security Essentials](#) is a free real-time protection product that combines an antivirus and antispyware scanner with phishing and firewall protection.
- The [Microsoft Safety Scanner](#) is a free downloadable security tool that provides on-demand scanning and helps remove malware and other malicious software. The Microsoft Safety Scanner is not a replacement for an up-to-date antivirus solution, because it does not offer real-time protection and cannot prevent a computer from becoming infected.
- [SmartScreen Filter](#), a feature in Internet Explorer 8 and 9, offers users protection against phishing sites and sites that host malware. Microsoft maintains a database of phishing and malware sites reported by users of Internet Explorer and other Microsoft products and services. When a user attempts to visit a site in the database with the filter enabled, Internet Explorer displays a warning and blocks navigation to the page.

Figure 52. US privacy statements for the Microsoft products and services used in this report

Product or Service	Privacy Statement URL
Bing	privacy.microsoft.com/en-us/bing.msp
Windows Live Hotmail	privacy.microsoft.com/en-us/fullnotice.msp
Forefront Online Protection for Exchange	https://admin.messaging.microsoft.com/legal/privacy/en-us.htm
Windows Defender	www.microsoft.com/windows/products/winfamily/defender/privacypolicy.msp
Malicious Software Removal Tool	www.microsoft.com/security/pc-security/msrt-privacy.aspx
Forefront Endpoint Protection	www.microsoft.com/download/en/details.aspx?id=23308
Microsoft Security Essentials	windows.microsoft.com/en-US/windows/products/security-essentials/privacy
Microsoft Safety Scanner	www.microsoft.com/security/scanner/en-us/Privacy.aspx
Windows Internet Explorer 9	windows.microsoft.com/en-US/internet-explorer/products/ie-9/windows-internet-explorer-9-privacy-statement

Appendix C: Worldwide infection rates

“Global infection rates,” on page 29, explains how threat patterns differ significantly in different parts of the world. Figure 53 shows the infection rates in locations with at least 100,000 quarterly MSRT executions in 2011, as determined by geolocation of the IP address of the reporting computer.⁶ CCM is the number of computers cleaned for every 1,000 executions of MSRT. See the [Microsoft Security Intelligence Report website](#) for more information about the CCM metric and how it is calculated.

For a more in-depth perspective on the threat landscape in any of these locations, see the “[Regional Threat Assessment](#)” section of the *Microsoft Security Intelligence Report* website.

Figure 53. Infection rates (CCM) for locations around the world in 2011, by quarter

Country/Region	1Q11	2Q11	3Q11	4Q11
Albania	23.7	25.0	19.3	25.0
Algeria	20.8	16.2	14.2	17.3
Angola	21.4	20.1	18.6	16.1
Argentina	11.4	11.1	8.3	8.3
Armenia	9.2	8.0	6.9	6.8
Australia	5.3	4.6	5.3	4.6
Austria	4.6	3.4	3.9	8.4
Azerbaijan	11.4	10.6	10.3	11.7
Bahamas, The	17.4	14.3	12.0	10.6
Bahrain	16.5	19.2	18.0	15.6
Bangladesh	13.0	13.7	14.9	16.9
Barbados	7.5	6.4	5.4	4.6

⁶ For more information about this process, see the entry “[Determining the Geolocation of Systems Infected with Malware](#)” (November 15, 2011) on the Microsoft Security Blog (blogs.technet.com/security).

Country/Region	1Q11	2Q11	3Q11	4Q11
Belarus	6.0	6.0	6.3	5.6
Belgium	6.4	5.6	6.1	4.7
Bolivia	13.3	14.3	13.9	13.0
Bosnia and Herzegovina	18.4	16.4	13.4	15.8
Brazil	19.2	18.8	17.2	14.0
Brunei	14.4	12.9	9.6	9.1
Bulgaria	13.9	10.7	8.3	9.0
Cambodia	9.2	12.0	12.4	11.5
Cameroon	15.3	11.3	11.3	12.8
Canada	4.4	5.2	5.8	4.3
Chile	15.4	10.8	7.9	13.9
China	2.4	2.3	1.5	1.0
Colombia	11.8	11.5	8.7	7.8
Costa Rica	11.8	8.9	6.4	5.8
Côte d'Ivoire	15.3	12.7	12.9	13.3
Croatia	14.5	10.9	8.1	10.0
Cyprus	15.1	10.9	9.6	8.0
Czech Republic	5.2	2.9	2.6	2.3
Denmark	2.6	3.0	2.2	2.0
Dominican Republic	18.9	16.7	14.8	14.0
Ecuador	14.2	11.2	9.0	8.6
Egypt	20.9	19.5	17.5	22.7
El Salvador	13.6	10.7	8.1	6.5
Estonia	6.6	4.9	4.8	4.0
Ethiopia	10.2	10.9	9.8	9.2
Finland	1.4	1.3	1.8	1.6
France	6.0	5.0	4.2	3.8
Georgia	22.7	21.6	20.1	21.6
Germany	3.6	3.2	3.3	11.0
Ghana	13.7	11.5	10.5	11.6
Greece	13.0	10.1	9.5	8.5
Guadeloupe	14.8	13.0	9.7	9.1
Guatemala	12.4	10.7	8.8	7.1

Country/Region	1Q11	2Q11	3Q11	4Q11
Haiti	—	—	14.6	17.6
Honduras	15.0	12.4	10.2	9.4
Hong Kong SAR	8.9	7.9	5.6	4.4
Hungary	8.7	6.9	5.9	5.1
Iceland	6.8	4.7	4.4	3.7
India	15.2	15.9	15.0	13.8
Indonesia	16.2	18.4	18.7	18.6
Iran	9.1	10.0	10.0	10.6
Iraq	13.1	18.0	20.5	22.0
Ireland	5.9	4.7	4.8	3.8
Israel	15.1	12.1	9.2	9.5
Italy	7.8	6.4	5.2	9.0
Jamaica	16.2	12.5	9.0	9.1
Japan	2.7	2.1	1.9	1.3
Jordan	17.6	18.5	15.3	16.0
Kazakhstan	10.1	8.8	7.9	10.2
Kenya	13.0	11.4	10.5	9.5
Korea	30.1	19.8	12.0	11.1
Kuwait	17.0	15.5	12.8	12.0
Latvia	11.9	9.2	7.0	6.8
Lebanon	15.4	15.8	12.7	12.3
Lithuania	13.5	10.7	7.9	7.7
Luxembourg	4.2	3.2	3.2	3.1
Macao SAR	6.9	5.8	4.6	3.0
Macedonia, FYRO	20.2	14.4	12.5	15.1
Malaysia	13.4	12.0	10.2	9.0
Malta	8.7	6.0	5.6	4.5
Martinique	13.5	10.3	8.4	7.7
Mauritius	12.0	12.1	10.8	9.2
Mexico	16.7	13.5	9.7	8.8
Moldova	7.4	6.7	6.0	6.5
Mongolia	10.7	10.8	9.2	11.2
Morocco	14.4	13.1	12.0	12.3

Country/Region	1Q11	2Q11	3Q11	4Q11
Mozambique	18.1	14.3	12.6	12.0
Nepal	18.9	23.7	24.0	22.4
Netherlands	4.6	5.3	6.6	13.1
New Zealand	5.7	5.1	4.8	3.8
Nicaragua	11.6	9.2	6.7	5.7
Nigeria	13.1	10.6	9.3	8.5
Norway	2.9	2.5	2.5	2.3
Oman	19.3	18.1	14.4	15.5
Pakistan	27.7	31.1	31.9	32.9
Palestinian Authority	27.5	32.7	27.1	29.9
Panama	15.8	12.8	10.8	9.6
Paraguay	8.9	7.7	6.7	6.3
Peru	16.8	13.7	10.3	10.0
Philippines	11.7	11.0	10.3	9.6
Poland	14.1	11.4	8.7	8.9
Portugal	11.5	9.8	8.9	8.9
Puerto Rico	13.4	10.7	8.0	6.9
Qatar	61.5	34.4	12.1	13.5
Reunion	11.9	11.1	7.9	7.4
Romania	16.5	15.3	14.0	13.8
Russia	6.7	6.0	6.1	7.2
Saudi Arabia	16.4	16.2	14.3	14.1
Senegal	15.1	13.0	10.1	10.4
Serbia	16.0	15.6	13.3	14.4
Singapore	12.6	9.0	6.9	5.7
Slovakia	9.6	6.1	4.2	3.6
Slovenia	9.0	6.3	5.0	4.6
South Africa	13.4	10.6	9.4	8.1
Spain	13.2	11.4	6.9	7.6
Sri Lanka	11.3	12.0	11.3	10.8
Sudan	14.8	16.7	16.6	16.3
Sweden	2.8	2.4	2.7	2.5
Switzerland	3.5	2.8	2.8	2.3

Country/Region	1Q11	2Q11	3Q11	4Q11
Syria	11.2	14.0	15.9	15.9
Taiwan	17.7	16.1	10.4	8.2
Tanzania	17.6	13.6	11.6	10.2
Thailand	18.0	19.6	19.4	17.9
Trinidad and Tobago	17.5	11.9	10.1	8.4
Tunisia	16.0	13.6	11.2	13.2
Turkey	28.2	25.5	22.7	26.6
Uganda	16.9	15.0	12.0	11.6
Ukraine	7.4	6.6	6.3	7.1
United Arab Emirates	18.9	16.7	15.1	16.0
United Kingdom	5.1	5.1	5.5	5.1
United States	5.6	5.6	9.4	5.5
Uruguay	6.1	6.1	5.3	4.0
Venezuela	9.8	8.5	7.5	7.1
Vietnam	12.8	15.8	16.3	16.5
Yemen	20.4	21.7	—	20.5

Glossary

For additional information about these and other terms, visit the MMPC glossary at www.microsoft.com/security/portal/Threat/Encyclopedia/Glossary.aspx.

419 scam

See *advance-fee fraud*.

ActiveX control

A software component of Microsoft Windows that can be used to create and distribute small applications through Internet Explorer. ActiveX controls can be developed and used by software to perform functions that would otherwise not be available using typical Internet Explorer capabilities. Because ActiveX controls can be used to perform a wide variety of functions, including downloading and running programs, vulnerabilities discovered in them may be exploited by malware. In addition, cybercriminals may also develop their own ActiveX controls, which can do damage to a computer if a user visits a webpage that contains the malicious ActiveX control.

Address Space Layout Randomization (ASLR)

A security feature in recent versions of Windows that randomizes the memory locations used by system files and other programs, which makes it harder for an attacker to exploit the system by targeting specific memory locations.

advance-fee fraud

A common confidence trick in which the sender of a message purports to have a claim on a large sum of money but is unable to access it directly for some reason, typically involving bureaucratic red tape or political corruption. The sender asks the prospective victim for a temporary loan to be used for bribing officials or for paying fees to get the full sum released. In exchange, the sender promises the target a share of the fortune amounting to a much larger sum than the original loan, but does not deliver. Advance-fee frauds are often called *419 scams*, in reference to the article of the Nigerian Criminal Code that addresses fraud.

adware

A program that displays advertisements. Although some adware can be beneficial by subsidizing a program or service, other adware programs may display advertisements without adequate consent.

ASLR

See *Address Space Layout Randomization (ASLR)*

backdoor trojan

A type of trojan that provides attackers with remote unauthorized access to and control of infected computers. Bots are a subcategory of backdoor trojans. Also see *botnet*.

botnet

A set of computers controlled by a “command-and-control” (C&C) computer to execute commands as directed. The C&C computer can issue commands directly (often through Internet Relay Chat [IRC]) or by using a decentralized mechanism, such as peer-to-peer (P2P) networking. Computers in a botnet are often called nodes or zombies.

buffer overflow

An error in an application in which the data written into a buffer exceeds the current capacity of that buffer, thus overwriting adjacent memory. Because memory is overwritten, unreliable program behavior may result and, in certain cases, allow arbitrary code to run.

C&C

Short for *command and control*. See *botnet*.

CCM

Short for *computers cleaned per mille* (thousand). The number of computers cleaned for every 1,000 executions of MSRT. For example, if MSRT has 50,000 executions in a particular location in the first quarter of the year and removes infections from 200 computers, the CCM for that location in the first quarter of the year is 4.0 ($200 \div 50,000 \times 1,000$).

clean

To remove malware or potentially unwanted software from an infected computer. A single cleaning can involve multiple disinfections.

Data Execution Prevention (DEP)

A security technique designed to prevent buffer overflow attacks. DEP enables the system to mark areas of memory as non-executable, preventing code in those memory locations from running.

definition

A set of signatures that antivirus, antispysware, or antimalware products can use to identify malware. Other vendors may refer to definitions as DAT files, pattern files, identity files, or antivirus databases.

DEP

See *Data Execution Prevention (DEP)*

disclosure

Revelation of the existence of a vulnerability to a third party.

disinfect

To remove a malware or potentially unwanted software component from a computer or to restore functionality to an infected program. Compare with *clean*.

downloader/dropper

See *trojan downloader/dropper*.

exploit

Malicious code that takes advantage of software vulnerabilities to infect a computer or perform other harmful actions.

firewall

A program or device that monitors and regulates traffic between two points, such as a single computer and the network server, or one server to another.

generic

A type of signature that is capable of detecting a variety of malware samples from a specific family, or of a specific type.

IFrame

Short for *inline frame*. An IFrame is an HTML document that is embedded in another HTML document. Because the IFrame loads another webpage, it can be used by criminals to place malicious HTML content, such as a script that downloads and installs spyware, into non-malicious HTML pages that are hosted by trusted websites.

in the wild

Said of malware that is currently detected on active computers connected to the Internet, as compared to those confined to internal test networks, malware research laboratories, or malware sample lists.

Internet Relay Chat (IRC)

A distributed real-time Internet chat protocol that is designed for group communication. Many botnets use the IRC protocol for C&C.

keylogger

A program that sends keystrokes or screen shots to an attacker. Also see *password stealer (PWS)*.

malware

Any software that is designed specifically to cause damage to a user's computer, server, or network. Viruses, worms, and trojans are all types of malware.

malware impression

A single instance of a user attempting to visit a page known to host malware and being blocked by SmartScreen Filter in Internet Explorer 8 or 9. Also see *phishing impression*.

monitoring tool

Software that monitors activity, usually by capturing keystrokes or screen images. It may also include network sniffing software. Also see *password stealer (PWS)*.

password stealer (PWS)

Malware that is specifically used to transmit personal information, such as user names and passwords. A PWS often works in conjunction with a *keylogger*. Also see *monitoring tool*.

payload

The actions conducted by a piece of malware for which it was created. Payloads can include, but are not limited to, downloading files, changing system settings, displaying messages, and logging keystrokes.

peer-to-peer (P2P)

A system of network communication in which individual nodes are able to communicate with each other without the use of a central server.

phishing

A method of credential theft that tricks Internet users into revealing personal or financial information online. Phishers use phony websites or deceptive email messages that mimic trusted businesses and brands to steal personally identifiable information (PII), such as user names, passwords, credit card numbers, and identification numbers.

phishing impression

A single instance of a user attempting to visit a known phishing page with Internet Explorer 7, 8, or 9, and being blocked by the Phishing Filter or SmartScreen Filter. Also see *malware impression*.

polymorphic

A characteristic of malware that can mutate its structure to avoid detection by antimalware programs, without changing its overall algorithm or function.

pop-under

A webpage that opens in a separate window that appears beneath the active browser window. Pop-under windows are commonly used to display advertisements.

potentially unwanted software

A program with potentially unwanted functionality that is brought to the user's attention for review. This functionality may affect the user's privacy, security, or computing experience.

remote control software

A program that provides access to a computer from a remote location. Such programs are often installed by the computer owner or administrator and are only a risk if unexpected.

rogue security software

Software that appears to be beneficial from a security perspective but that provides limited or no security capabilities, generates a significant number of erroneous or misleading alerts, or attempts to socially engineer the user into participating in a fraudulent transaction.

rootkit

A program whose main purpose is to perform certain functions that cannot be easily detected or undone by a system administrator, such as hiding itself or other malware.

SEHOP

See *Structured Exception Handler Overwrite Protection (SEHOP)*.

signature

A set of characteristics that can identify a malware family or variant. Signatures are used by antivirus and antispysware products to determine whether a file is malicious or not. Also see *definition*.

social engineering

A technique that defeats security precautions by exploiting human vulnerabilities. Social engineering scams can be both online (such as receiving email messages that ask the recipient to click the attachment, which is actually malware) and offline (such as receiving a phone call from someone posing as a representative from one's credit card company). Regardless of the method selected, the purpose of a social engineering attack remains the same—to get the targeted user to perform an action of the attacker's choice.

spam

Bulk unsolicited email. Malware authors may use spam to distribute malware, either by attaching the malware to email messages or by sending a message containing a link to the malware. Malware may also harvest email addresses for spamming from compromised machines or may use compromised machines to send spam.

spyware

A program that collects information, such as the websites a user visits, without adequate consent. Installation may be without prominent notice or without the user's knowledge.

Structured Exception Handler Overwrite Protection (SEHOP)

A security technique designed to prevent exploits from overwriting exception handlers to gain code execution. SEHOP verifies that a thread's exception handler list is intact before allowing any of the registered exception handlers to be called.

tool

Software that may have legitimate purposes but may also be used by malware authors or attackers.

trojan

A generally self-contained program that does not self-replicate but takes malicious action on the computer.

trojan downloader/dropper

A form of trojan that installs other malicious files to a computer that it has infected, either by downloading them from a remote computer or by obtaining them directly from a copy contained in its own code.

virus

Malware that replicates, typically by infecting other files in the computer, to allow the execution of the malware code and its propagation when those files are activated.

vulnerability

A weakness, error, or poor coding technique in a program that may allow an attacker to exploit it for a malicious purpose.

wild

See *in the wild*.

worm

Malware that spreads by spontaneously sending copies of itself through email or by using other communication mechanisms, such as instant messaging (IM) or peer-to-peer (P2P) applications.

Threat families referenced in this report

The definitions for the threat families referenced in this report are adapted from the Microsoft Malware Protection Center encyclopedia (www.microsoft.com/security/portal), which contains detailed information about a large number of malware and potentially unwanted software families. See the encyclopedia for more in-depth information and guidance for the families listed here and throughout the report.

Win32/Agent. A generic detection for a number of trojans that may perform different malicious functions. The functionality exhibited by this family is highly variable.

Win32/Autorun. A family of worms that spreads by copying itself to the mapped drives of an infected computer. The mapped drives may include network or removable drives.

Win32/BaiduSobar. A Chinese-language web browser toolbar that delivers pop-up and contextual advertisements, blocks certain other advertisements, and changes the Internet Explorer search page.

Win32/Bamital. A family of malware that intercepts web browser traffic and prevents access to specific security-related websites by modifying the Hosts file. Bamital variants may also modify specific legitimate Windows files in order to execute their payload.

Win32/Bancos. A data-stealing trojan that captures online banking credentials and relays them to the attacker. Most variants target customers of Brazilian banks.

Win32/Banker. A family of data-stealing Trojans that captures banking credentials such as account numbers and passwords from computer users and relays them to the attacker. Most variants target customers of Brazilian banks; some variants target customers of other banks.

Win32/Banload. A family of trojans that download other malware. Banload usually downloads Win32/Banker, which steals banking credentials and other sensitive data and sends it back to a remote attacker.

JS/Blacole. An exploit pack, also known as *Blackhole*, that is installed on a compromised web server by an attacker and includes a number of exploits that target browser software. If a vulnerable computer browses a compromised website containing the exploit pack, various malware may be downloaded and run.

Win32/Bulilit. A trojan that silently downloads and installs other programs without consent. Infection could involve the installation of additional malware or malware components to an affected computer.

Win32/ClickPotato. A program that displays pop-up and notification-style advertisements based on the user's browsing habits.

Win32/Conficker. A worm that spreads by exploiting a vulnerability addressed by Security Bulletin [MS08-067](#). Some variants also spread via removable drives and by exploiting weak passwords. It disables several important system services and security products, and downloads arbitrary files.

Java/CVE-2010-0840. A detection for a malicious and obfuscated Java class that exploits a vulnerability described in CVE-2010-0840. Oracle Corporation addressed the vulnerability with a security update in March 2010.

Win32/Delf. A detection for various threats written in the Delphi programming language. The behaviors displayed by this malware family are highly variable.

Win32/Dorkbot. A worm that spreads via instant messaging and removable drives. It also contains backdoor functionality that allows unauthorized access and control of the affected computer. Win32/Dorkbot may be distributed from compromised or malicious websites using PDF or browser exploits.

AndroidOS/DroidDream. A malicious program that affects mobile devices running the Android operating system. It may be bundled with clean applications, and is capable of allowing a remote attacker to gain access to the mobile device.

Win32/Dynamer. A generic detection for a variety of threats.

Win32/EyeStye. A trojan that attempts to steal sensitive data using a method known as *form grabbing*, and sends it to a remote attacker. It may also download and execute arbitrary files and use a rootkit component to hide its activities.

MacOS_X/FakeMacdef. A rogue security software family that affects Apple Mac OS X. It has been distributed under the names MacDefender, MacSecurity, MacProtector, and possibly others.

Win32/FakeRean. A rogue security software family distributed under a variety of randomly generated names, including Win 7 Internet Security 2010, Vista Antivirus Pro, XP Guardian, and many others.

Win32/FakeSpypro. A rogue security software family distributed under the names Antivirus System PRO, Spyware Protect 2009, and others.

Win32/FakeSysdef. A rogue security software family that claims to discover nonexistent hardware defects related to system memory, hard drives, and overall system performance, and charges a fee to fix the supposed problems.

Win32/Frethog. A large family of password-stealing trojans that target confidential data, such as account information, from massively multiplayer online games.

Win32/Helompy. A worm that spreads via removable drives and attempts to capture and steal authentication details for a number of different websites or online services, including Facebook and Gmail.

Win32/Hotbar. Adware that displays a dynamic toolbar and targeted pop-up ads based on its monitoring of web-browsing activity.

Win32/Keygen. A generic detection for tools that generate product keys for illegally obtained versions of various software products.

Unix/Lotoor. A detection for specially crafted Android programs that attempt to exploit vulnerabilities in the Android operating system to gain root privilege.

Win32/Malf. A generic detection for malware that drops additional malicious files.

Win32/Meredrop. A generic detection for trojans that drop and execute multiple forms of malware on a local computer. These trojans are usually packed, and may contain multiple trojans, backdoors, or worms. Dropped malware may connect to remote websites and download additional malicious programs.

Win32/Microjoin. A generic detection for tools that bundle malware files with clean files in an effort to deploy malware without being detected by security software.

Win32/Obfuscator. A generic detection for programs that have had their purpose disguised to hinder analysis or detection by antivirus scanners. Such programs commonly employ a combination of methods, including encryption, compression, anti-debugging and anti-emulation techniques.

Win32/OfferBox. A program that displays offers based on the user's web browsing habits. Some versions may display advertisements in a pop-under window. Win32/OfferBox may be installed without adequate user consent by malware.

Win32/Onescan. A Korean-language rogue security software family distributed under the names One Scan, Siren114, EnPrivacy, PC Trouble, My Vaccine, and many others.

Win32/OpenCandy. An adware program that may be bundled with certain third-party software installation programs. Some versions may send user-specific information, including a unique machine code, operating system information, locale, and certain other information to a remote server without obtaining adequate user consent.

Win32/Pameseg. A fake program installer that requires the user to send SMS messages to a premium number to successfully install certain programs.

Win32/Parite. A family of viruses that infect .exe and .scr executable files on the local file system and on writeable network shares.

Win32/Pdfjsc. A family of specially crafted PDF files that exploit Adobe Acrobat and Adobe Reader vulnerabilities. Such files contain malicious JavaScript that executes when the file is opened.

JS/Pornpop. A generic detection for specially-crafted JavaScript-enabled objects that attempt to display pop-under advertisements, usually with adult content.

Win32/Ramnit. A family of multi-component malware that infects executable files, Microsoft Office files, and HTML files. Win32/Ramnit spreads to removable drives and steals sensitive information such as saved FTP credentials and browser cookies. It may also open a backdoor to await instructions from a remote attacker.

Win32/RealVNC. A management tool that allows a computer to be controlled remotely. It can be installed for legitimate purposes but can also be installed from a remote location by an attacker.

JS/Redirector. A detection for a class of JavaScript trojans that redirect users to unexpected websites, which may contain drive-by downloads.

Win32/Rimecud. A family of worms with multiple components that spread via fixed and removable drives and via instant messaging. It also contains backdoor functionality that allows unauthorized access to an affected system.

Win32/Rugo. A program that installs silently on the user's computer and displays advertisements.

Win32/Rustock. A multi-component family of rootkit-enabled backdoor trojans that were first developed around 2006 to aid in the distribution of spam email.

Win32/Sality. A family of polymorphic file infectors that target executable files with the extensions .scr or .exe. They may execute a damaging payload that deletes files with certain extensions and terminates security-related processes and services.

JS/ShellCode. A generic detection for JavaScript-enabled objects that contain exploit code and may exhibit suspicious behavior. Malicious websites and malformed PDF documents may contain JavaScript that attempts to execute code without the affected user's consent.

Win32/ShopperReports. Adware that displays targeted advertising to affected users while browsing the Internet, based on search terms entered into search engines.

Win32/Sirefef. A rogue security software family distributed under the name Antivirus 2010 and others.

Win32/Sisproc. A generic detection for a group of trojans that have been observed to perform a number of various and common malware behaviors.

Win32/Startpage. A detection for various threats that change the configured start page of the affected user's web browser, and may also perform other malicious actions.

Win32/Stuxnet. A multi-component family that spreads via removable volumes by exploiting the vulnerability addressed by Microsoft Security Bulletin [MS10-046](#).

Win32/Swisyn. A trojan that drops and executes arbitrary files on an infected computer. The dropped files may be potentially unwanted or malicious programs.

Win32/Taterf. A family of worms that spread through mapped drives to steal login and account details for popular online games.

Win32/Tracur. A trojan that downloads and executes arbitrary files, redirects web search queries to a malicious URL, and may also install other malware.

Win32/VB. A detection for various threats written in the Visual Basic® programming language.

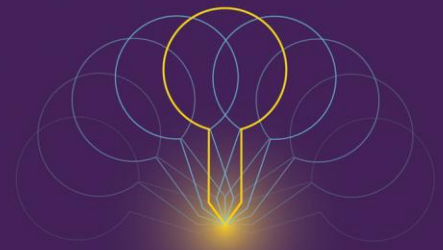
Win32/Vundo. A multiple-component family of programs that deliver pop-up advertisements and may download and execute arbitrary files. Vundo is often installed as a browser helper object (BHO) without a user's consent.

ASX/Wimad. A detection for malicious Windows Media files that can be used to encourage users to download and execute arbitrary files on an affected machine.

Win32/Winwebsec. A rogue security software family distributed under the names Winweb Security, System Security, and others.

Win32/Zbot. A family of password stealing trojans that also contains backdoor functionality allowing unauthorized access and control of an affected computer.

Win32/Zwangi. A program that runs as a service in the background and modifies web browser settings to visit a particular website.



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Microsoft®

One Microsoft Way
Redmond, WA 98052-6399
microsoft.com/security