Microsoft

An in-depth perspective on software vulnerabilities and exploits, malware, potentially unwanted software, and malicious websites

Microsoft Security Intelligence Report

Volume 14

July through December, 2012

Worldwide Threat Assessment

Microsoft Security Intelligence Report

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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 2012, 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.

Throughout the report, half-yearly and quarterly time periods are referenced using the *n*H*yy* or *n*Q*yy* formats, where *yy* indicates the calendar year and *n* indicates the half or quarter. For example, 1H12 represents the first half of 2012 (January 1 through June 30), 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. In this report, any threat or group of threats sharing a common unique base name is considered a family for the sake of presentation. This includes threats that may not otherwise be considered families according to common industry practices, such as adware programs and generic detections.

Infection rates are given using a metric called *computers cleaned per mille* (CCM), which represents the number of computers cleaned for every 1,000 executions of the MSRT. For example, if the 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 ÷ 50,000 × 1,000). For periods longer than a quarter, the CCM is averaged for all quarters contained in the period.

Executive Foreword

Welcome to Volume 14 of the *Microsoft Security Intelligence Report*. Over the past six and a half years we've published literally thousands of pages of threat intelligence in this report. Categories of focus continue to include trends and insights on security vulnerabilities, exploit activity, malware and potentially unwanted software, spam, phishing, malicious websites, and security trends from 105+ locations around the world.

Volume 14 contains the latest intelligence with analysis completed, focused on the second half of 2012 and inclusive of trend data going back a year or more. To summarize across the findings of hundreds of pages of new data: industry-wide vulnerability disclosures are down, exploit activity has increased in many parts of the world, several locations with historically high malware infection rates saw improvements but the worldwide malware infection rate increased slightly, Windows 8 has the lowest malware infection rate of any Windows-based operating system observed to date, Trojans continue to top the list of malware threats, spam volumes went up slightly, and phishing levels remained consistent.

We've also included some new, previously unpublished data in this volume of the report that helps quantify the value of using antimalware software. Characterizing the value of security software in a way that resonates relative to other IT investments persists as a challenge for many organizations; especially those who have successfully avoided a security crisis for a long period of time. And, the efficacy of antimalware software is often the source of discussion by Security professionals. Based on telemetry from hundreds of millions of systems around the world, Volume 14 returns the data on malware infection rates for unprotected systems versus systems that run antimalware software. The verdict is in: systems that run antimalware software have significantly lower malware infection rates, even in locations with the highest malware infection rates in the world. This data will likely help many people understand the value of using antimalware software – which we continue to consider a best practice and strongly recommend to all of our customers.

I hope you find this volume of the *Microsoft Security Intelligence Report* useful and enlightening. I also encourage people to visit microsoft.com/sir which includes a variety of additional information.

Adrienne Hall
General Manager, Trustworthy Computing
Microsoft

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

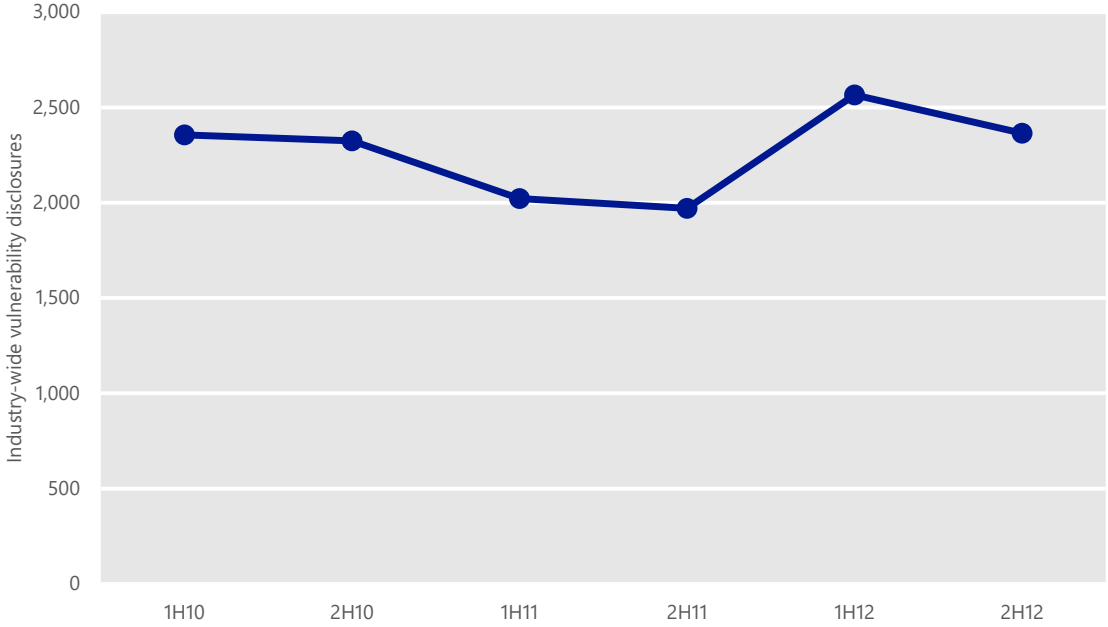
A *disclosure*, as the term is used in the *Microsoft Security Intelligence Report*, is the revelation of a software vulnerability to the public at large. Disclosures can come from a variety of sources, including publishers of the affected software, security software vendors, independent security researchers, and even malware creators.

The information in this section is compiled from vulnerability disclosure data that is published in the National Vulnerability Database (NVD), the US government repository of standards-based vulnerability management data at nvd.nist.gov. The NVD represents all disclosures that have a published CVE (Common Vulnerabilities and Exposures) identifier.[1]

Figure 1 illustrates the number of vulnerability disclosures across the software industry for each half-year period since 1H10. (See "About this report" on page v for an explanation of the reporting period nomenclature used in this report.)

[1] CVE entries are subject to ongoing revision as software vendors and security researchers publish more information about vulnerabilities. For this reason, the statistics presented here may differ slightly from comparable statistics published in previous volumes of the *Microsoft Security Intelligence Report*.

Figure 1. Industry-wide vulnerability disclosures, 1H10–2H12



- Vulnerability disclosures across the industry were down 7.8 percent from 1H12, primarily because of a decrease in application vulnerability disclosures. (See "Operating system, browser, and application vulnerabilities" on page 21 for more information.) Despite this decline, vulnerability disclosures were up 20.0 percent in 2H12 compared to 2H11, a year prior.
- An increase in application vulnerability disclosures in 1H12 interrupted a trend of consistent period-over-period decreases dating back to 2H09. It remains to be seen whether the decrease in 2H12 marks a return to this trend. Overall, however, vulnerability disclosures remain significantly lower than they were prior to 2009, when totals of 3,500 disclosures or more per half-year period were not uncommon.

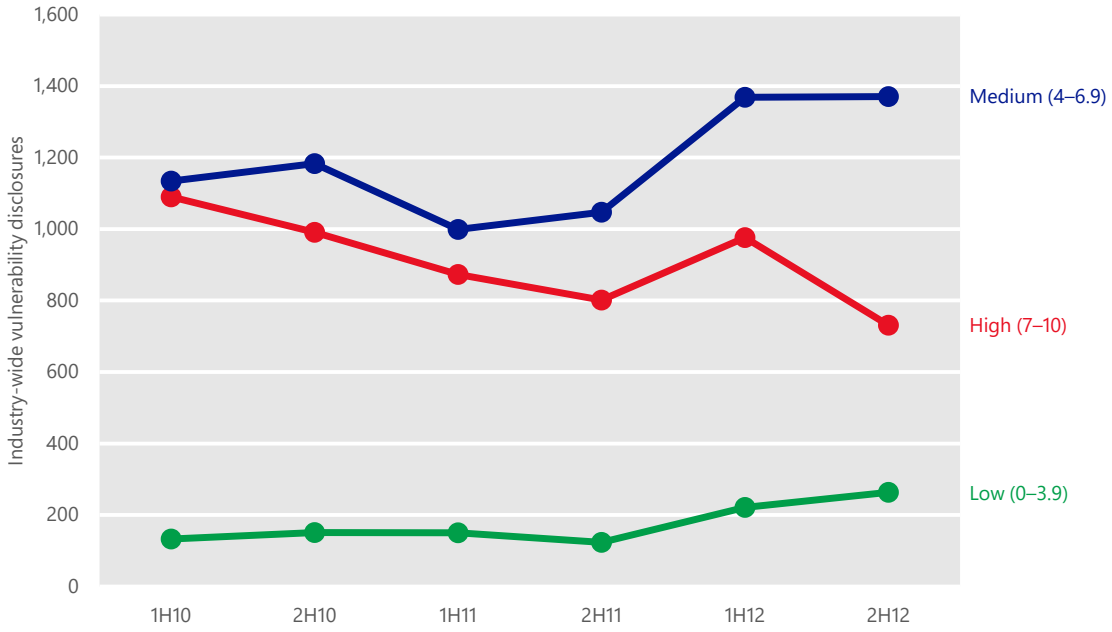
  For a ten-year view of the industry vulnerability disclosure trend, see the entry "Trustworthy Computing: Learning About Threats for Over 10 Years–Part 4" (March 15, 2012) at the Microsoft Security Blog at blogs.technet.com/security.

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.)

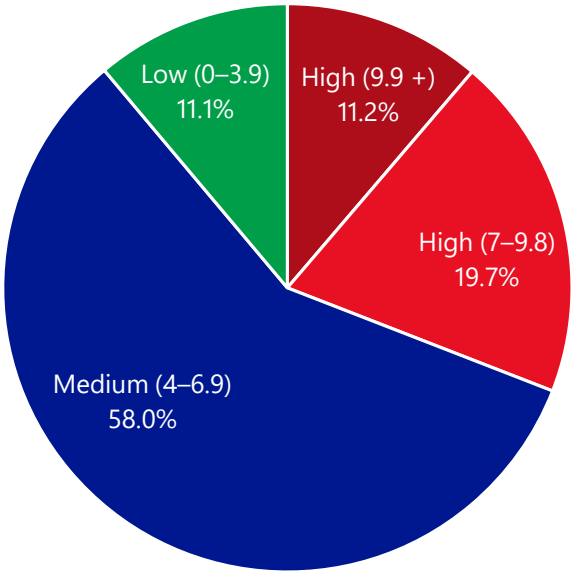
Figure 2. Industry-wide vulnerability disclosures by severity, 1H10–2H12



- The overall decrease in industry-wide vulnerability disclosures shown in Figure 1 was caused entirely by a decrease in high-severity vulnerabilities, shown in Figure 2, which declined 25.1 percent from 1H12. High-severity vulnerabilities accounted for 30.9 percent of total disclosures in 2H12, compared to 38.0 percent in the previous period.
- Medium-severity vulnerability disclosures remained stable, increasing 0.1 percent from 1H12. Medium-severity vulnerabilities accounted for 58.0 percent of total disclosures in 2H12.
- Low-severity vulnerability disclosures increased 19.0 percent from 1H12 but remained relatively low, accounting for 11.1 percent of total disclosures in 2H12.
- Mitigating the most severe vulnerabilities first is a security best practice. Vulnerabilities that scored 9.9 or greater represent 11.2 percent of all vulnerabilities disclosed in 2H12, as Figure 3 illustrates. These figures are a slight increase from 1H12, when vulnerabilities that scored 9.9 or greater accounted for 9.7 percent of all vulnerabilities. Vulnerabilities that scored

between 7.0 and 9.8 decreased to 19.7 percent in 2H12, down from 29.0 percent in 1H12.

Figure 3. Industry-wide vulnerability disclosures in 2H12, by severity

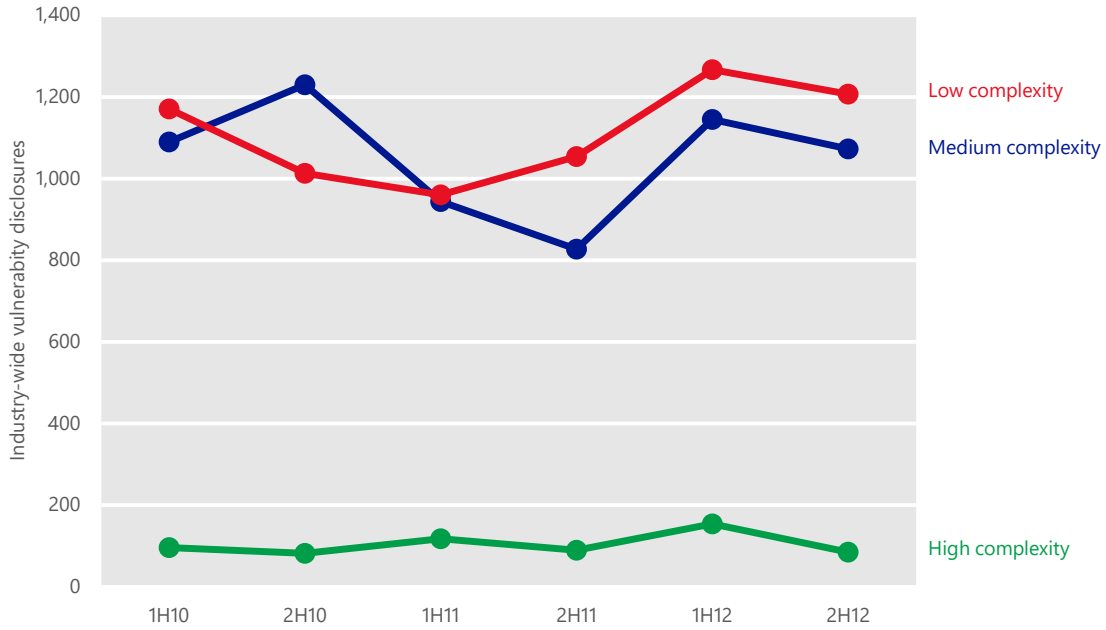


Vulnerability complexity

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 1H10. Note that Low complexity in Figure 4 indicates greater risk, just as High severity indicates greater risk in Figure 2.

Figure 4. Industry-wide vulnerability disclosures by access complexity, 1H10–2H12



Low complexity indicates the greatest risk; High complexity indicates the least risk.

- Vulnerability disclosures in each of the three complexity classifications decreased by a roughly similar amount, as shown in Figure 4.
- Disclosures of Low-complexity vulnerabilities—those that are the easiest to exploit—accounted for 51.0 percent of all disclosures in 2H12, a slight increase from 49.4 percent in 1H12.
- Disclosures of Medium-complexity vulnerabilities accounted for 45.4 percent of all disclosures in 2H12, compared to 44.6 percent in 1H12.
- Disclosures of High-complexity vulnerabilities fell to 3.6 percent of all disclosures in 2H12, down from 6.0 percent in 1H12.

Operating system, browser, and application vulnerabilities

Comparing operating system vulnerabilities to non-operating system vulnerabilities that affect other components requires determining whether a particular program or component should be considered part of an operating system. This determination is not always simple and straightforward, given the componentized nature of modern operating systems. Some programs (media players, for example) ship by default with some operating system software but

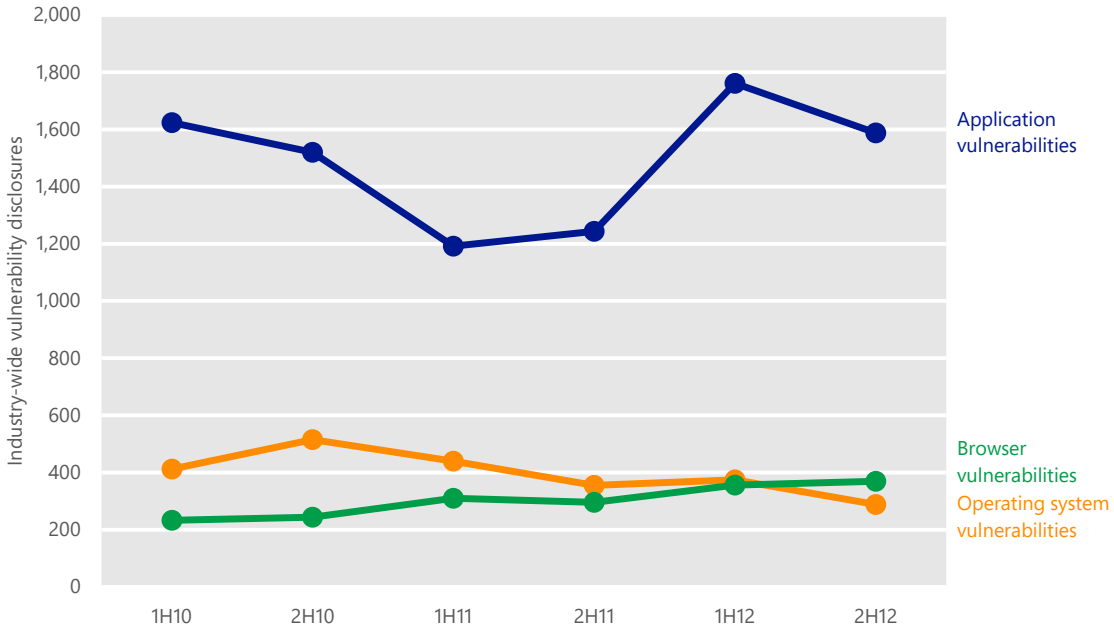
can also be downloaded from the software vendor's website and installed individually. Linux distributions, in particular, are often assembled from components developed by different teams, many of which provide crucial operating functions such as a GUI or Internet browsing.

To facilitate analysis of operating system and browser vulnerabilities, the *Microsoft Security Intelligence Report* distinguishes among three different kinds of vulnerabilities:

- *Operating system vulnerabilities* are those that affect the Linux kernel, or that affect components that ship with an operating system produced by Microsoft, Apple, or a proprietary Unix vendor, and are defined as part of the operating system by the vendor, except as described in the next paragraph.
- *Browser vulnerabilities* are those that affect components defined as part of a web browser, including web browsers that ship with operating systems such as Internet Explorer and Apple's Safari, along with third-party browsers such as Mozilla Firefox and Google Chrome.
- *Application vulnerabilities* are those that affect all other components, including executable files, services, and other components published by operating system vendors and other vendors. Vulnerabilities in open source components that may ship with Linux distributions (such as the X Window System, the GNOME desktop environment, GIMP, and others) are considered application vulnerabilities.

Figure 5 shows industry-wide vulnerabilities for operating systems, browsers, and applications since 1H10.

Figure 5. Industry-wide operating system, browser, and application vulnerabilities, 1H10–2H12

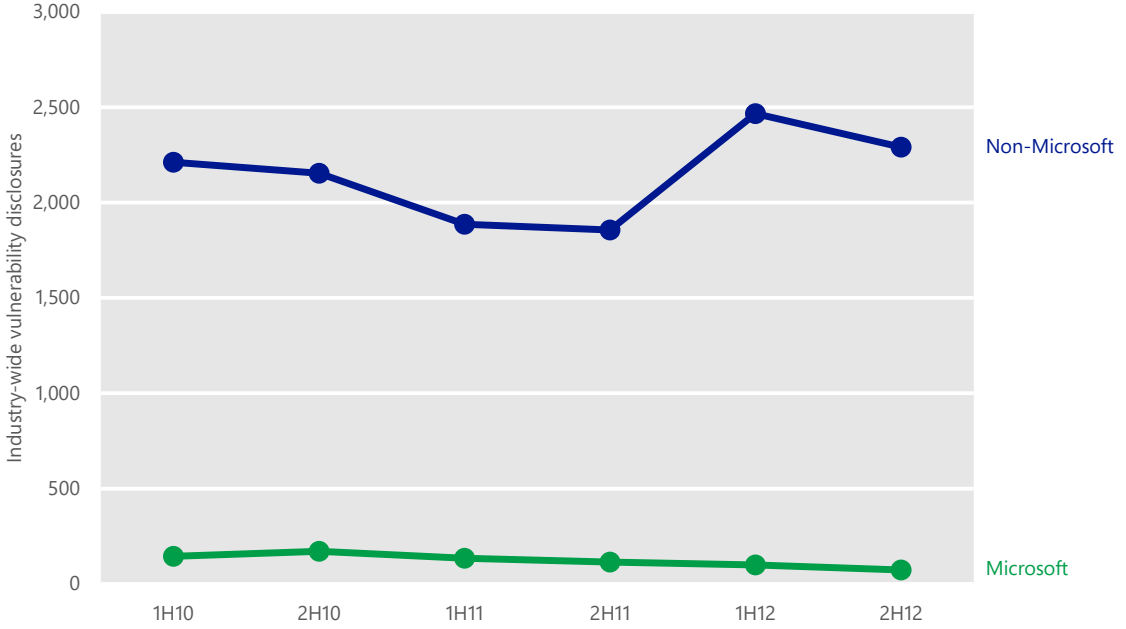


- After increasing significantly in 1H12, application vulnerability disclosures decreased 23.0 percent in 2H12, which accounted for nearly the entire decline in industry-wide vulnerability disclosures observed for the period. Application vulnerability disclosures accounted for 70.7 percent of total disclosures for the period.
- Operating system vulnerability disclosures dropped to their lowest level since 2003, although vulnerabilities in web browsers continued a multi-year trend upwards. In previous periods, disclosures of operating system vulnerabilities routinely outnumbered those of browser vulnerabilities; however, in 2H12 browser vulnerability disclosures accounted for 16.4 percent of total disclosures, compared to just 12.8 percent for operating system vulnerability disclosures.

Microsoft vulnerability disclosures

Figure 6 shows vulnerability disclosures for Microsoft and non-Microsoft products since 1H10.

Figure 6. Vulnerability disclosures for Microsoft and non-Microsoft products, 1H10–2H12



- Disclosures of vulnerabilities in Microsoft products in 2H12 fell 26.3 percent to their lowest level since 2005.
- Overall, disclosures of vulnerabilities in Microsoft products accounted for 3.1 percent of all disclosures across the industry, down from 3.9 percent in 1H12.

Guidance: Developing secure software

The Security Development Lifecycle (www.microsoft.com/sdl) is a free 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 the number and severity of 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 typically without their 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. In addition, 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.[2]

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.[3]

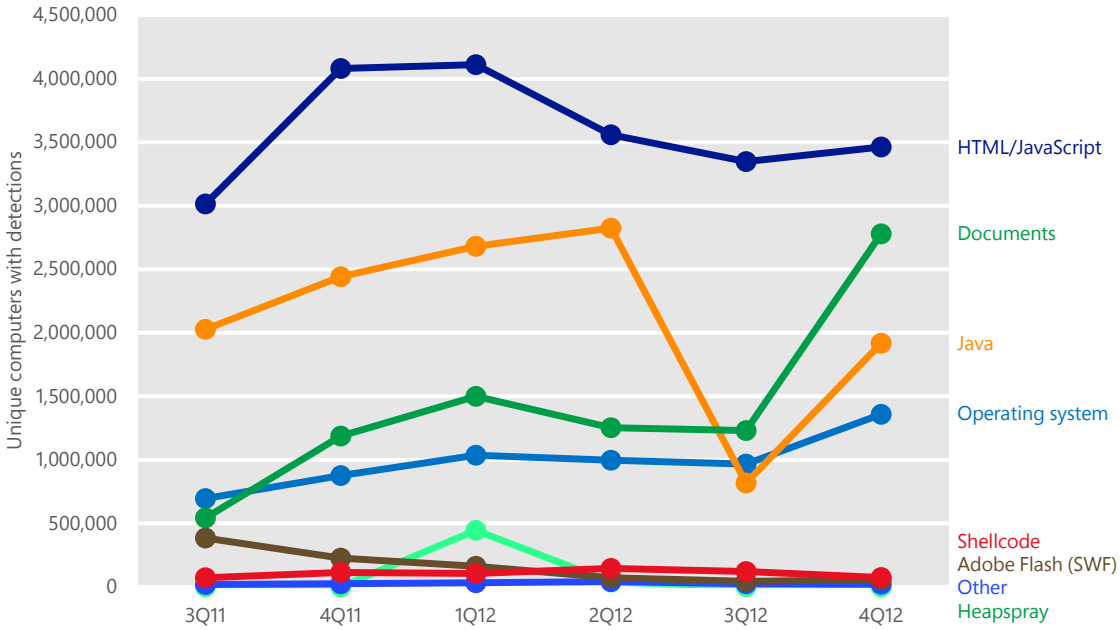
Microsoft security products can detect and block exploit attempts whether the affected computer is vulnerable to them or not. (For example, the CVE-2010-2568 vulnerability has never affected Windows 8, but if a Windows 8 user receives a malicious file that attempts to exploit that vulnerability, Windows Defender should detect and block it anyway.) Therefore, the statistics presented here should not be interpreted as evidence of successful exploit attempts, or of the relative vulnerability of computers to different exploits.

Figure 7 shows the prevalence of different types of exploits detected by Microsoft antimalware products each quarter from 3Q11 to 4Q12, by number of unique computers affected. (See "Appendix B: Data sources" on page 87 for more information about the products and services that provided data for this report.)

[2] See the Microsoft Security Update Guide at www.microsoft.com/security/msrc/whatwedo/securityguide.aspx for guidance to help protect your IT infrastructure while creating a safer, more secure computing and Internet environment.

[3] See technet.microsoft.com/security/bulletin to search and read Microsoft Security Bulletins.

Figure 7. Unique computers reporting different types of exploits, 3Q11–4Q12



- Computers that report more than one type of exploit are counted for each type detected.
- Detections of individual exploits often rise and fall significantly from quarter to quarter as exploit kit distributors add and remove different ones from their kits. This can also have an effect on the relative prevalence of different exploit types, as shown in Figure 7.
- The number of computers reporting exploits delivered through HTML or JavaScript remained high during the second half of 2012, primarily driven by the continued prevalence of the multiplatform exploit family Blacole. (More information about Blacole is provided in the next section.)
- Exploits that target vulnerabilities in document readers and editors rose sharply in 4Q12, driven by increased detections of Win32/Pdfjsc. See "Document parser exploits" on page 31 for more information about these exploits.
- Detections of Java exploits fell in 3Q12 to less than a third of their 2Q12 total, but then made up about half of the difference in 4Q12 to become the third most commonly detected type of exploit during the second half of the year. See "Java exploits" on page 28 for more information.

- After falling slightly for two quarters, detections of operating system exploits increased by more than a third from 3Q12 to 4Q12, led by CVE-2010-2568 (MS10-046), CVE-2010-1885 (MS10-042), and Unix/Lotoor. See "Operating system exploits" on page 32 for more information.

Exploit families

Figure 8 lists the exploit-related families that were detected most often during the second half of 2012.

Figure 8. Quarterly trends for the top exploit families detected by Microsoft antimalware products in 2H12, by number of unique computers with detections, shaded according to relative prevalence

Exploit	Platform or technology	1Q12	2Q12	3Q12	4Q12
Win32/Pdfjsc*	Documents	1,430,448	1,217,348	1,187,265	2,757,703
Blacole	HTML/JavaScript	3,154,826	2,793,451	2,464,172	2,381,275
CVE-2012-1723*	Java	—	—	110,529	1,430,501
Malicious IFrame	HTML/JavaScript	950,347	812,470	567,014	1,017,351
CVE-2010-2568 (MS10-046)	Operating system	726,797	783,013	791,520	1,001,053
CVE-2012-0507*	Java	205,613	1,494,074	270,894	220,780
CVE-2011-3402 (MS11-087)	Operating system	42	24	66	199,648
CVE-2011-3544*	Java	1,358,266	803,053	149,487	116,441
ShellCode*	Shell code	105,479	145,352	120,862	73,615
JS/Phoex	Java	274,811	232,773	201,423	25,546

* This vulnerability is also used by the Blacole kit; the totals given here for this vulnerability exclude Blacole detections.

- Detections of Win32/Pdfjsc, a detection for specially crafted PDF files that exploit vulnerabilities in Adobe Reader and Adobe Acrobat, more than doubled from 3Q12 to 4Q12. It was the most commonly detected exploit during the last quarter of the year and the second most common for the half-year period overall. See page 31 for more information about Pdfjsc.
- Blacole is Microsoft's detection name for components of the so-called "Blackhole" exploit kit, which delivers malicious software through infected webpages. Blacole was the most commonly detected exploit family in the second half of 2012. Prospective attackers buy or rent the Blacole kit on hacker forums and through other illegitimate outlets. It consists of a collection of malicious webpages 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

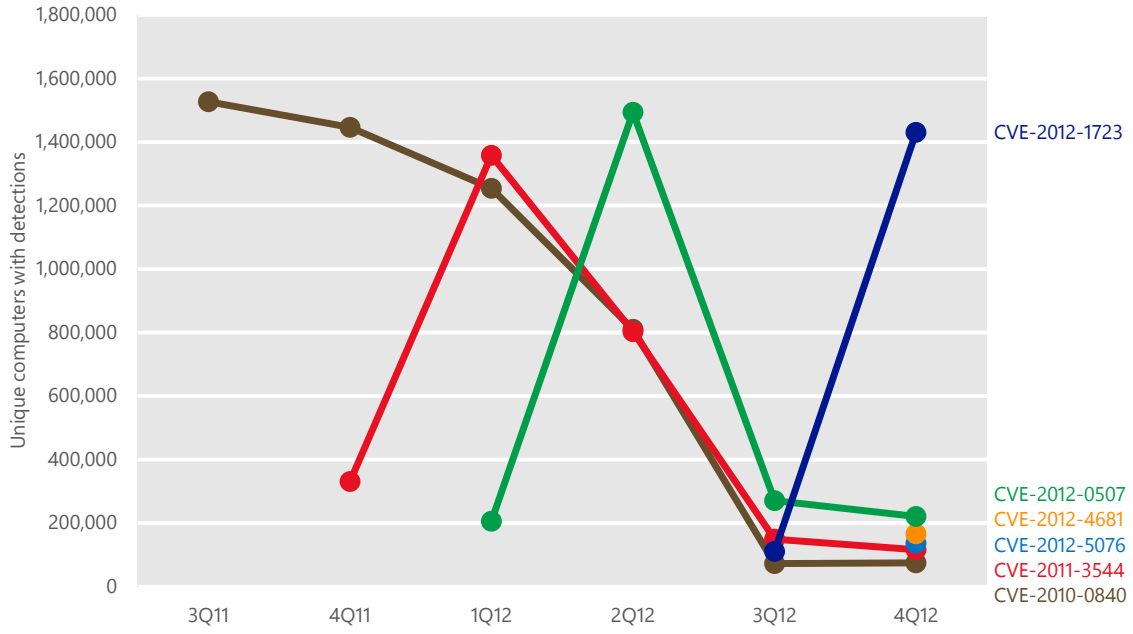
other popular products and components. When the attacker loads the Blacole kit on a malicious or compromised web server, visitors who don't have the appropriate security updates installed are at risk of infection through a drive-by download attack. (See page 78 for more information about drive-by download attacks.)

- Detections of exploits that target CVE-2011-3402, a vulnerability in the way the Windows kernel processes TrueType font files, increased in 4Q12 when they were added to the so-called Cool exploit kit. See page 34 for more information.

Java exploits

Figure 9 shows the prevalence of different Java exploits by quarter.

Figure 9. Trends for the top Java exploits detected and blocked by Microsoft antimalware products in 2H12



- CVE-2012-1723 accounted for most of the Java exploits detected and blocked in 4Q12. Like CVE-2012-0507, which was exploited heavily in 2Q12, CVE-2012-1723 is a type-confusion vulnerability in the Java Runtime Environment (JRE), which is exploited by tricking the JRE into treating one type of variable like another type. Oracle confirmed the existence of the vulnerability in June 2012 and published a security update to address it the same month. The vulnerability was observed being exploited in the wild

beginning in early July 2012, and exploits for the vulnerability were added to the Blacole exploit kit shortly thereafter.

For more information about this exploit, see the entry "The rise of a new Java vulnerability - CVE-2012-1723" (August 1, 2012) at the Microsoft Malware Protection Center (MMPC) blog at blogs.technet.com/mmpc.

- CVE-2012-0507, which accounted for the largest number of Java exploits detected and blocked in 3Q12, was detected in much greater numbers during 2Q12; exploits of this vulnerability then declined significantly, apparently in favor of the more recently discovered CVE-2012-1723, which was added to the Blacole kit in 2H12. Detections of CVE-2012-0507 exploits continued to decline in 4Q12.

  CVE-2012-0507 allows an unsigned Java applet to gain elevated permissions and potentially have unrestricted access to a host system outside its sandbox environment. Oracle released a security update in February 2012 to address the issue. The CVE-2012-0507 vulnerability is a logic error that allows attackers to run code with the privileges of the current user, which means that an attacker can use it to perform reliable exploitation on other platforms that support the JRE, including Apple Mac OS X, Linux, VMWare, and others. On Mac OS X, CVE-2012-0507 exploits have been observed to install MacOS_X/Flashback, a trojan that gained notoriety in early 2012.

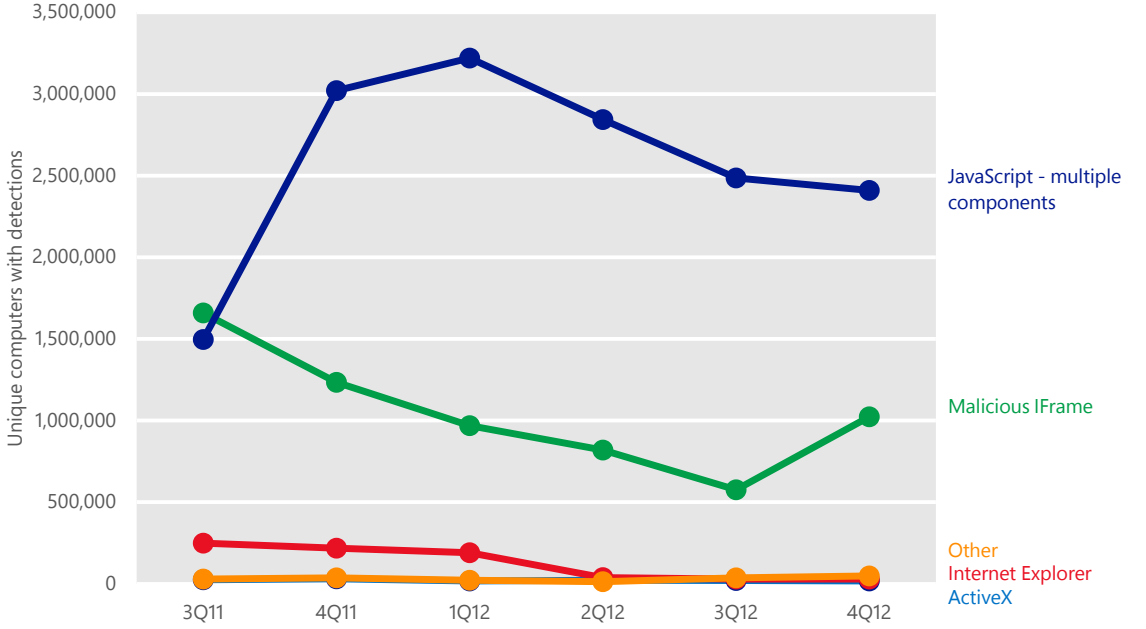
  For more information about this vulnerability, see the entry "An interesting case of JRE sandbox breach (CVE-2012-0507)" (March 20, 2012) at the MMPC blog.

- Detections of exploits targeting CVE 2011-3544 and CVE-2010-0840, two vulnerabilities with significant exploitation in the first half of the year, declined by large amounts in 2H12. Both are cross-platform vulnerabilities that were formerly targeted by the Blacole kit but have been removed from more recent versions of the kit.

HTML and JavaScript exploits

Figure 10 shows the prevalence of different types of HTML and JavaScript exploits during each of the six most recent quarters.

Figure 10. Types of HTML and JavaScript exploits detected and blocked by Microsoft antimalware products, 3Q11–4Q12

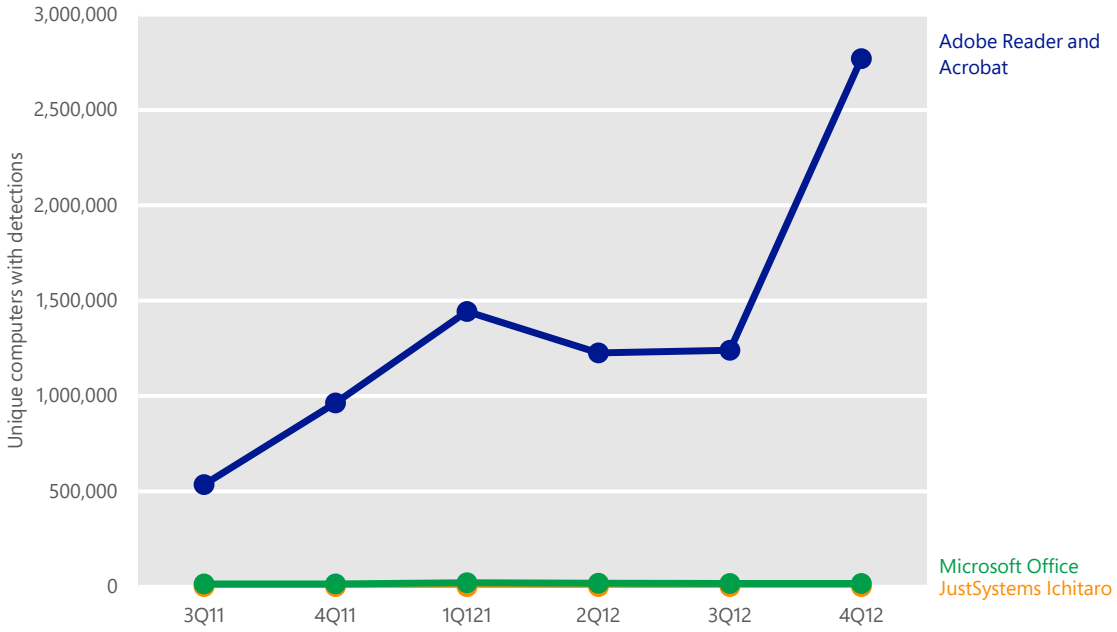


- The use of malicious JavaScript code designed to exploit one or more web-enabled technologies declined in both the third and fourth quarters. However, these exploits continued to account for most of the HTML and JavaScript exploits detected in 2H12, primarily because of the Blacole exploit kit. (See page 27 for more information about Blacole.)
- Detections of exploits that involve malicious HTML inline frames (IFrames) continued their multi-quarter decline in 3Q12, then nearly doubled from 3Q12 to 4Q12. These exploits are typically generic detections of inline frames that are embedded in webpages and link to other pages that host malicious web content. These malicious pages use a variety of techniques to exploit vulnerabilities in browsers and plug-ins; the only commonality is that the attacker uses an inline frame to deliver the exploits to users. The exact exploit delivered and detected by one of these signatures may be changed frequently. The increase in detections in 4Q12 may have been caused in part by spam campaigns that distributed HTML attachments containing malicious IFrames to recipients in email messages that purported to come from well-known organizations, in a manner similar to phishing.
- Detections of exploits that target ActiveX, Internet Explorer, and other browser vulnerabilities remained 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 11 shows the prevalence of different types of document parser exploits during each of the six most recent quarters.

Figure 11. Types of document parser exploits detected and blocked by Microsoft antimalware products, 3Q11–4Q12



- Detections of exploits that affect Adobe Reader and Adobe Acrobat more than doubled from 3Q12 to 4Q12. Almost all of these exploits were detected as variants of the generic exploit family Win32/Pdfjsc, as shown in Figure 12.

Figure 12. Top document parser exploit families detected by Microsoft antimalware products in 4Q12, by number of unique computers with detections

	Exploit	Delivery	Affected component	Computers with detections
1	Win32/Pdfjsc	PDF	Adobe Acrobat	2,757,703
2	CVE-2010-0188	PDF	Adobe Acrobat	5,813
3	CVE-2011-0097	Office document	Microsoft Office	3,917
4	Win32/Pidief	PDF	Adobe Acrobat	3,719
5	Win32/Wordinvop	Office document	Microsoft Word	3,632

Pdfjsc is a generic detection for PDF files that contain malicious JavaScript designed to exploit vulnerabilities in different versions of Adobe Reader and

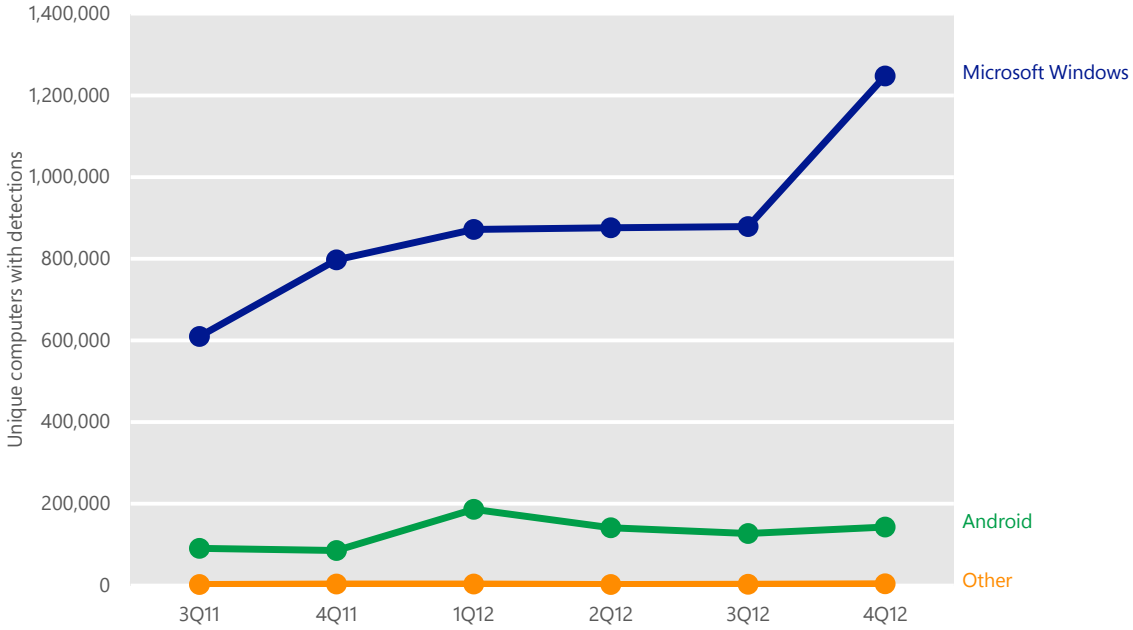
Adobe Acrobat. The rise in detections observed in 4Q12 may be caused by increased use of this technique by a number of exploit kits, including Blacole.

- 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 13 shows the prevalence of different exploits against operating system vulnerabilities that were detected and removed by Microsoft antimalware products during each of the past six quarters.

Figure 13. Exploits against operating system vulnerabilities detected and blocked by Microsoft antimalware products, 3Q11–4Q12

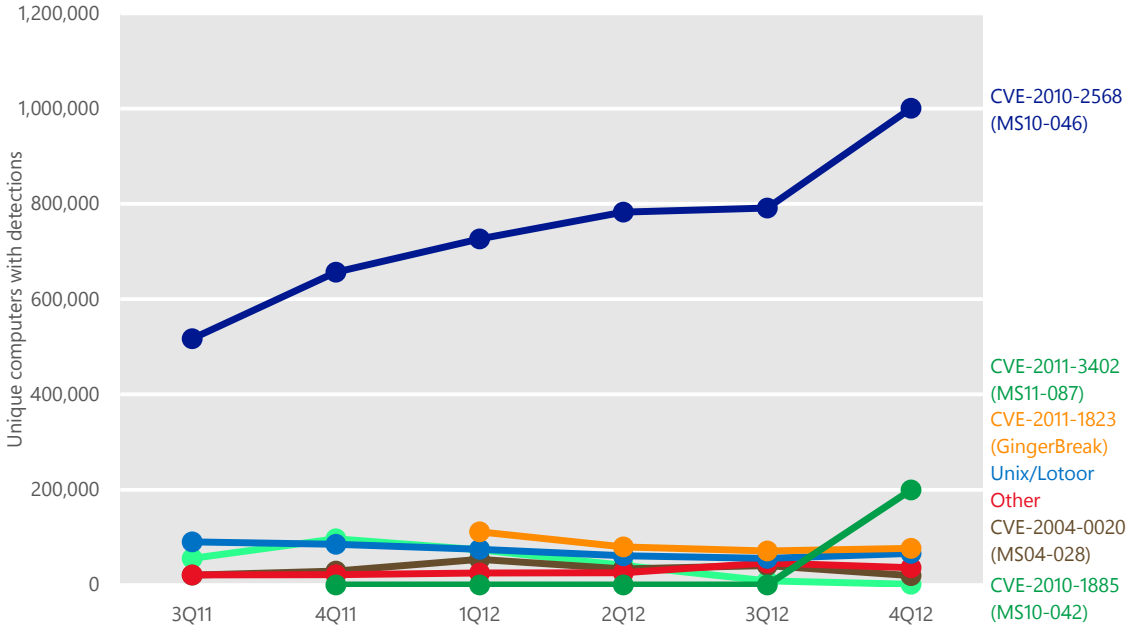


- Detections of exploits that affect Microsoft Windows increased 42 percent from 3Q12 to 4Q12, because of increased detections of exploits that target a pair of vulnerabilities, CVE-2010-2568 and CVE-2011-3402. See Figure 14 for more information about these exploits.
- Detections of exploits that affect the Android mobile operating system published by Google and the Open Handset Alliance accounted for about 11

percent of operating system exploit detections in 2H12. Microsoft security products detect these threats when Android devices or storage cards are connected to computers running Windows, or when Android users unknowingly download infected or malicious programs to their computers before transferring the software to their devices. See page 34 for more information about these exploits.

For another perspective on these exploits and others, Figure 14 shows trends for the individual exploits most commonly detected and blocked or removed during each of the past six quarters.

Figure 14. Individual operating system exploits detected and blocked by Microsoft antimalware products, 3Q11–4Q12, by number of unique computers exposed to the exploit



- Detections of exploits that target CVE-2010-2568, a vulnerability in Windows Shell, increased by 26.5 percent from 3Q12 to 4Q12, and accounted for more than 85 percent of Windows exploit detections in the second half of the year. 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. Microsoft released Security Bulletin MS10-046 in August 2010 to address this issue.

  The vulnerability was first discovered being used by the malware family Win32/Stuxnet in mid-2010. It has since been exploited by a number of other malware families, many of which predated the disclosure of the

vulnerability and were subsequently adapted to attempt to exploit it. The 4Q12 increase suggests that attackers have begun to target CVE-2010-2568 more aggressively, particularly on computers in Asia, as Figure 15 shows.

Figure 15. Countries and regions with the most detections of exploits targeting CVE-2010-2568 in 4Q12

Rank	Country or region	Computers
1	India	166,567
2	Indonesia	120,937
3	Vietnam	115,664
4	Pakistan	64,447
5	Mexico	44,613
6	Philippines	35,058
7	Turkey	32,852
8	Saudi Arabia	23,953
9	Thailand	23,164
10	Brazil	18,627

Rank	Country or region	Computers
11	Algeria	18,103
12	Ukraine	18,050
13	Egypt	17,030
14	Russia	16,080
15	Colombia	15,704
16	Bangladesh	15,049
17	United States	11,157
18	Morocco	9,224
19	Tunisia	9,160
19	Iraq	9,160

- Detections of exploits that target CVE-2011-3402, which had numbered less than 100 in each quarter since the vulnerability was discovered, increased to nearly 200,000 in 4Q12. CVE-2011-3402 is a vulnerability in the way the Windows kernel processes TrueType font files. An attacker exploits the vulnerability by encouraging a user to open a specially crafted document or visit a malicious webpage that embeds TrueType font files, which enables the attacker to run arbitrary code in kernel mode. Microsoft released Security Bulletin MS11-087 in December 2011 to address this issue.

  CVE-2011-3402 is targeted by exploits in the so-called Cool exploit kit, which first appeared in October 2012 and is often used in *ransomware* schemes in which an attacker locks a victim's computer or encrypts the user's data and demands money to make it available again. Recent versions of the Blacole kit may also include exploits that target the vulnerability. Together, the Cool and Blacole kits are likely responsible for most or all of the increase in CVE-2011-3402 detections.

- Most detections that affect Android involve a pair of exploits that enable an attacker or other user to obtain root privileges on vulnerable Android devices. Device owners sometimes use such exploits intentionally to gain access to additional functionality (a practice often called *rooting* or

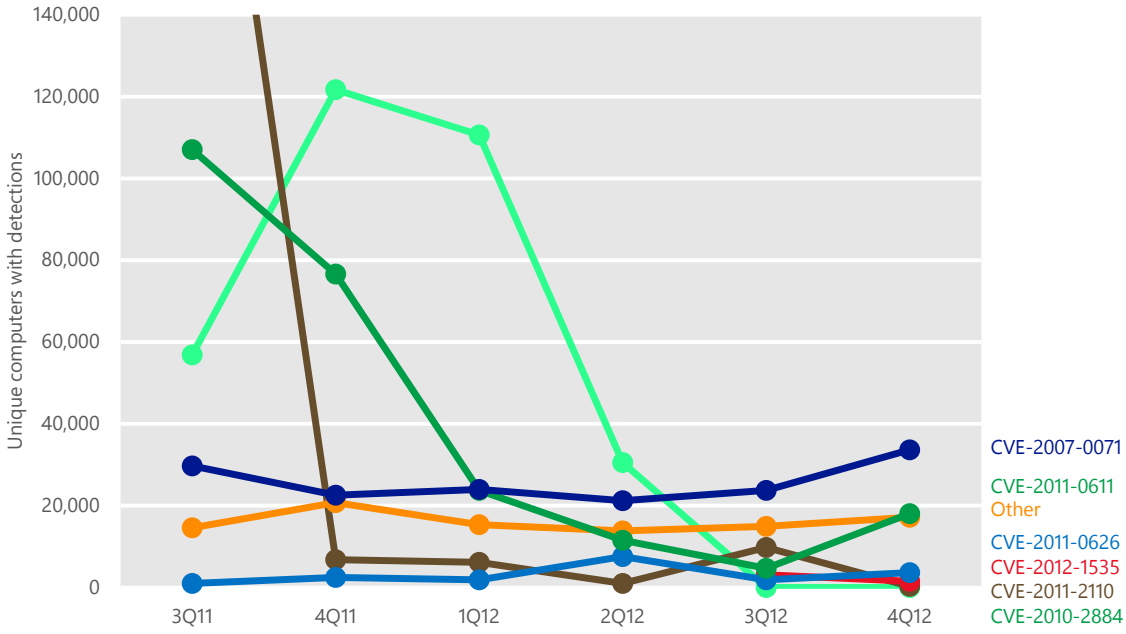
jailbreaking), but these exploits can also be used by attackers to infect devices with malware that bypasses many typical security systems.

- CVE-2011-1823 is sometimes called the GingerBreak vulnerability because of its use by a popular rooting application of that name (detected separately as Exploit:AndroidOS/GingerBreak). It is also used by AndroidOS/GingerMaster, a malicious program that can allow a remote attacker to gain access to the mobile device. GingerMaster may be bundled with clean applications, and includes an exploit for the CVE-2011-1823 vulnerability disguised as an image file. Google published a source code update in May 2011 that addressed the vulnerability.
- Unix/Lotoor is an exploit family dropped by TrojanSpy:AndroidOS/DroidDream.A, a malicious program that often masquerades as a legitimate Android application and can allow a remote attacker to gain access to the device. Google published a source code update in March 2011 that addressed the vulnerability.

Adobe Flash Player exploits

Figure 16 shows the prevalence of different Adobe Flash Player exploits by quarter.

Figure 16. Adobe Flash Player exploits detected and blocked by Microsoft antimalware products, 3Q11–4Q12, by number of unique computers exposed to the exploit



- Detections of exploits that target Adobe Flash Player remained at a relatively low level throughout the second half of 2012. No one vulnerability accounted for most of the exploits, unlike in previous quarters.
- CVE-2007-0071, an invalid pointer vulnerability in some releases of Adobe Flash Player versions 8 and 9, accounted for the largest number of Adobe Flash Player exploitation attempts detected in 3Q12 and 4Q12. Adobe released Security Bulletin APSB08-11 on April 8, 2008 to address the issue. Detections increased 58.5 percent between 2Q12 and 4Q12, probably because of the popularity of exploits for the vulnerability in exploit kits.
- CVE-2011-0611 accounted for the second largest number of Adobe Flash Player exploitation attempts detected in 2H12. CVE-2011-0611 was discovered in April 2011 when it was observed being exploited in the wild; Adobe released Security Bulletin APSB11-07 on April 15 and Security Bulletin APSB11-08 on April 21 to address the issue. Detections of CVE-2011-0611 exploits nearly tripled between 3Q12 and 4Q12, but remained well below levels observed in earlier quarters.
- Detections of exploits that target CVE-2010-2884, the most commonly targeted vulnerability in 1H12, declined to very low levels in the second half of the year. CVE-2010-2884 was discovered in the wild in September 2010 as a zero-day vulnerability, and Adobe released Security Bulletin APSB10-22 the same month to address the issue. The decline is likely caused by more computers receiving the security update combined with an overall saturation of exploitable targets.

Malware and potentially unwanted software

Except where specified, the information in this section was compiled from telemetry data that was generated from more than 1 billion computers worldwide and some of the busiest services on the Internet. (See "Appendix B: Data sources" on page 87 for more information about the telemetry used in this report.)

Global infection rates

The telemetry data generated by Microsoft security products from computers whose administrators or users choose to opt in to provide data to Microsoft 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]

Figure 17. Trends for the locations with the most computers reporting detections and removals by Microsoft desktop antimalware products in 2H12

	Country or region	1Q12	2Q12	3Q12	4Q12	Chg. 1H–2H
1	United States	9,407,423	12,474,127	9,647,906	8,959,660	-15.0% ▼
2	Brazil	3,715,163	3,333,429	3,528,282	4,458,573	13.3% ▲
3	Korea	2,137,136	2,820,641	2,019,828	3,259,183	6.5% ▲
4	Russia	2,580,673	2,510,591	2,294,438	2,505,561	-5.7% ▼
5	Turkey	1,924,387	1,911,837	1,925,421	1,900,570	-0.3% ▼
6	China	1,889,392	2,000,576	1,917,106	1,770,264	-5.2% ▼
7	France	1,677,242	1,555,522	1,530,048	1,951,247	7.7% ▲
8	Germany	1,544,774	1,486,309	1,561,074	1,586,739	3.9% ▲
9	India	1,254,378	1,287,945	1,519,086	1,544,008	20.5% ▲
10	United Kingdom	1,648,801	1,509,488	1,460,015	1,516,078	-5.8% ▼

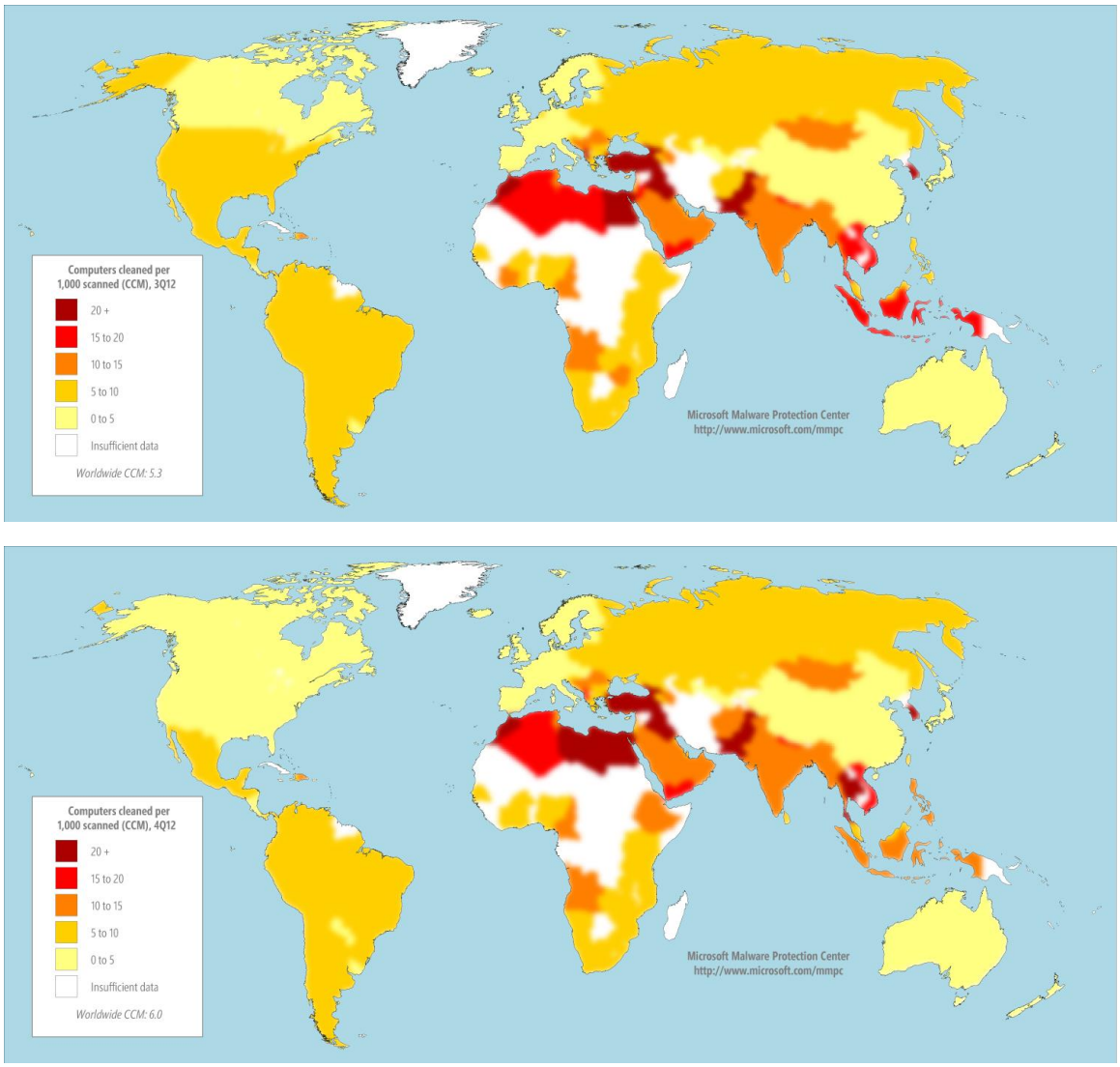
[4] For more information about this process, see the entry "Determining the Geolocation of Systems Infected with Malware" (November 15, 2011) on the Microsoft Security Blog (blogs.technet.com/security).

- 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 the United States fell 7.1 percent in the fourth quarter, and ended the year down 4.8 percent from 1Q12. Fewer detections of the trojan families Win32/Tracur and Win32/Sirefef and the exploit family Blacole were the largest contributors to the decline.
- Detections in Brazil were up 20.0 percent over 1Q12, primarily because of detections of the adware family Win32/DealPly in the fourth quarter. Detections of the potentially unwanted software families Win32/Keygen and Win32/Protlerdob also increased significantly through the end of the year. Protlerdob is a software installer with a Portuguese-language user interface. It presents itself as a free movie download but bundles with it a number of potentially unwanted software programs, including DealPly.

  Keygen is a detection for tools that generate keys for various software products. Such tools are often distributed by software pirates to enable users to run software illegally. Attackers often package Keygen tools into bundles with malware alongside or instead of pirated software or media. (See "Deceptive downloads: Software, music, and movies" on page 1 of *Microsoft Security Intelligence Report, Volume 13 (January–June 2012)* for more information about Keygen and the threats users face from unsecured software distribution channels.)
- Detections in Korea rose 52.5 percent between 1Q12 and 4Q12 because of increased detections of the rogue security software family Win32/Onescan. See page 40 for more information about the infection rate in Korea.
- Detections in Russia were down 2.9 percent from 1Q12, after a trend of declining detections reversed in the fourth quarter because of increased detections of Keygen and the exploit family Win32/Pdfjsc.
- A number of adware families including DealPly and Win32/Hotbar along with the potentially unwanted software family Win32/Zwangi contributed to a 16.3 percent rise in detections in France from 1Q12 to 4Q12.
- Detections increased significantly in India beginning in the third quarter, which contributed to a 23.1 percent increase from 1Q12 to 4Q12. Growth in detections of Keygen, the generic family INF/Autorun, and the virus family Win32/Sality all contributed to the increase.

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). Normalizing the data this way makes it possible to compare malware infection rates of different locations without skewing the data because of differences in populations and install bases. See the *Microsoft Security Intelligence Report* website for more information about the CCM metric.

Figure 18. Infection rates by country/region in 3Q12 (top) and 4Q12 (bottom), by CCM

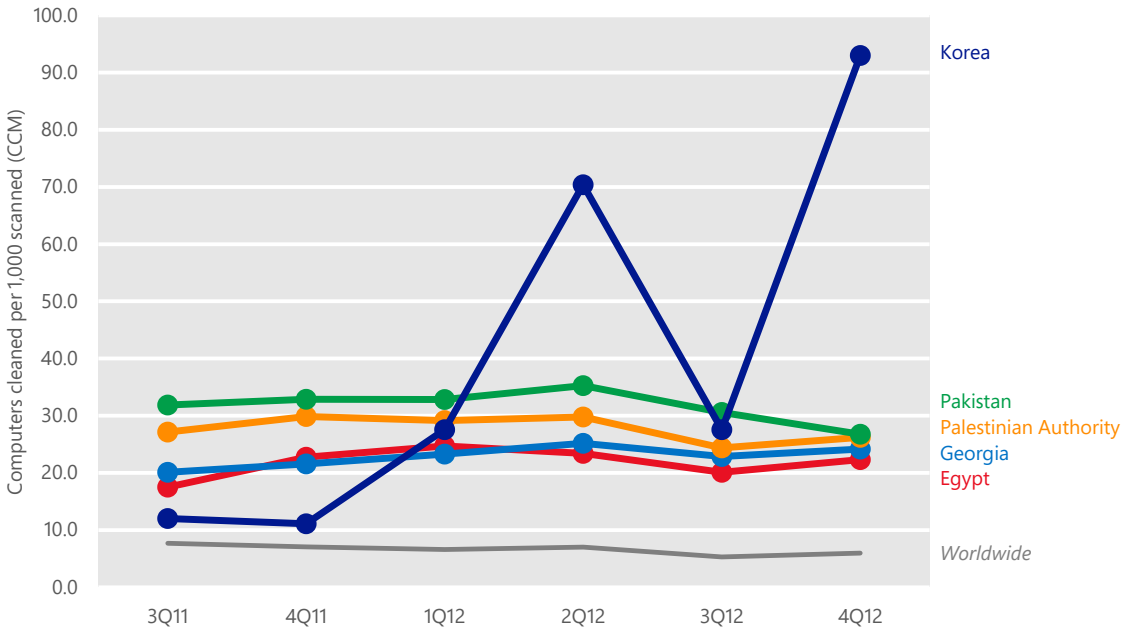


Detections and removals in individual countries/regions can vary significantly from quarter to quarter. Increases in the number of computers with detections

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 2H12.

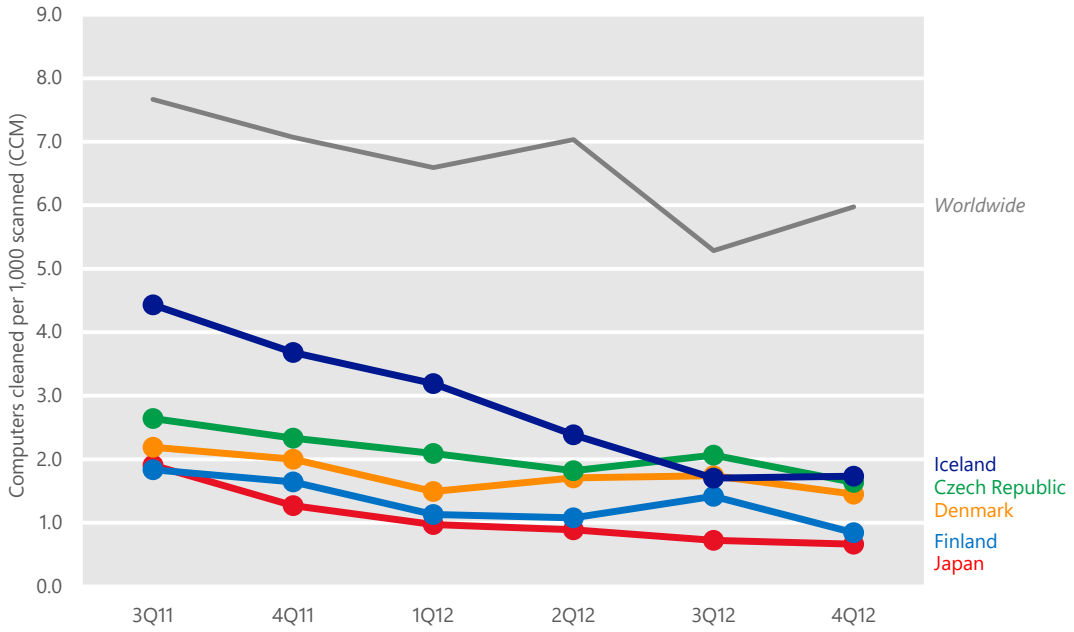
Figure 19. Trends for the five locations with the highest malware infection rates in 2H12, by CCM (100,000 MSRT executions minimum)



- After decreasing from 70.4 in the second quarter to 27.5 in the third quarter, the CCM in Korea ended the year with an infection rate of 93.0, nearly three and a half times that of the next highest location. These spikes are mostly artifacts caused by the addition to the MSRT of detections for two families that have been highly prevalent in Korea, Win32/Pluzoks in March 2012 and Win32/Onescan in October. In both cases, detections increased significantly but temporarily as the MSRT detected and removed infections that may have been resident on some computers for several months or even years. (See "Rogue security software" on page 52 for more information about Onescan in Korea.)

- Pakistan, the location with the second highest infection rate in 1H12, remained in second place during the second half of the year. However, its CCM decreased from 35.3 in 2Q12 to 26.8 in 4Q12, which made it one of the locations showing the most improvement in 2H12. (See page 42 for more information.)
- Infection rates in the Palestinian territories, Georgia, and Egypt all increased slightly in 4Q12 after small decreases from 2Q12 to 3Q12. The virus family Win32/Sality was the most commonly detected family in all three locations.

Figure 20. Trends for locations with low malware infection rates in 2H12, by CCM (100,000 MSRT executions minimum)[5]

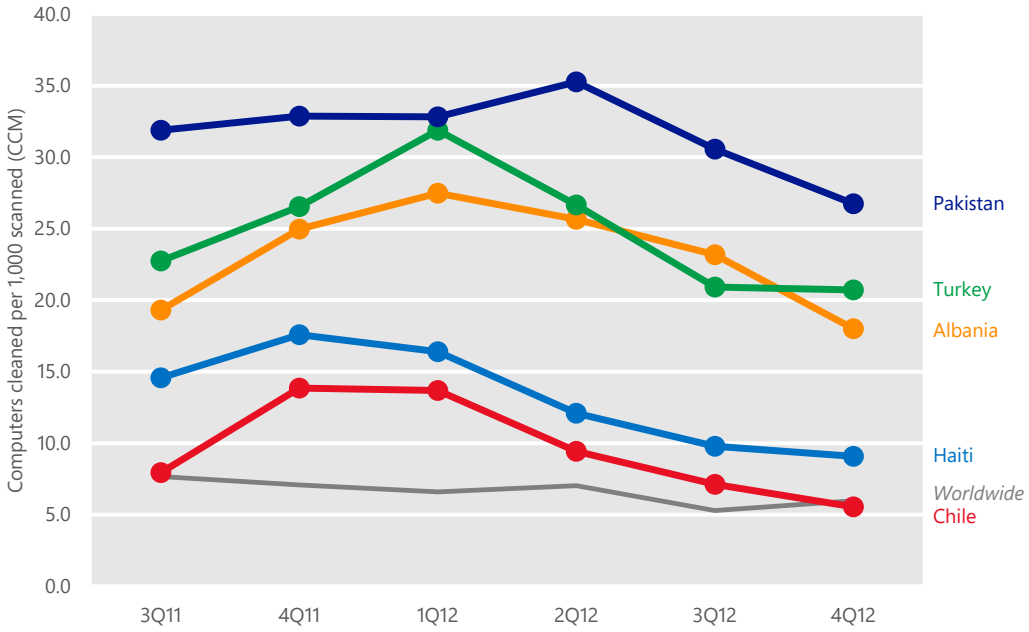


- Trends for the locations with the lowest infection rates in the second half of the year were consistent with previous periods. Denmark, Finland, and Japan (which had the lowest infection rates in 2H12) were also on the list in 1H12, and Iceland had the fourth lowest infection rate of the period following a long period of improvement. The worm family Win32/Conficker, the password stealing trojan Win32/Zbot, and the virus family Win32/Sality were among the families with the largest detection decreases in Iceland in 2H12.

[5] Figure 20 excludes China, which would otherwise rank among the locations with the lowest infection rates. Microsoft considers the MSRT telemetry from China unreliable for a number of reasons, including the relatively low prevalence of many of the global threats the MSRT monitors compared to the more localized threats that dominate the malware landscape in China. See the entry "The Threat Landscape in China: A Paradox" (March 11, 2013) on the Microsoft Security Blog at blogs.technet.com/security for more information, and see the "Regional Threat Assessment" section of the *Microsoft Security Intelligence Report* website for a more in-depth perspective on the threat landscape in China.

- Historically, Nordic countries such as Norway, Finland, and Iceland have had some of the lowest malware infection rates in the world. Japan also typically experiences a low infection rate.
- The CCM in Finland increased from 1.1 in 2Q12 to 1.4 in 3Q12, mostly because of a rise in Win32/Keygen detections, but declined to 0.8 in 4Q12.[6]

Figure 21. Trends for the five locations with the most significant infection rate improvements from 1H12 to 2H12, by CCM (100,000 MSRT executions minimum per quarter)



- Fewer detections of the virus family Win32/Sality, the sixth most commonly detected threat family worldwide in 4Q12, played a part in most of the declining trends shown in Figure 21.
- The infection rate in Pakistan declined to 26.8 in 4Q12 after peaking at 35.3 in 2Q12. Fewer detections of the virus families Sality and Win32/Chir and the trojan family Win32/Ramnit accounted for part of the decline.
- Fewer detections of Sality also improved the infection rates in Albania, as did a reduction in detections of the backdoor family Win32/IRCbot in 4Q12.
- The infection rate in Turkey improved significantly because of fewer detections of Sality and the worm family Win32/Helompy, which tends to be more prevalent on computers in Turkey than elsewhere.

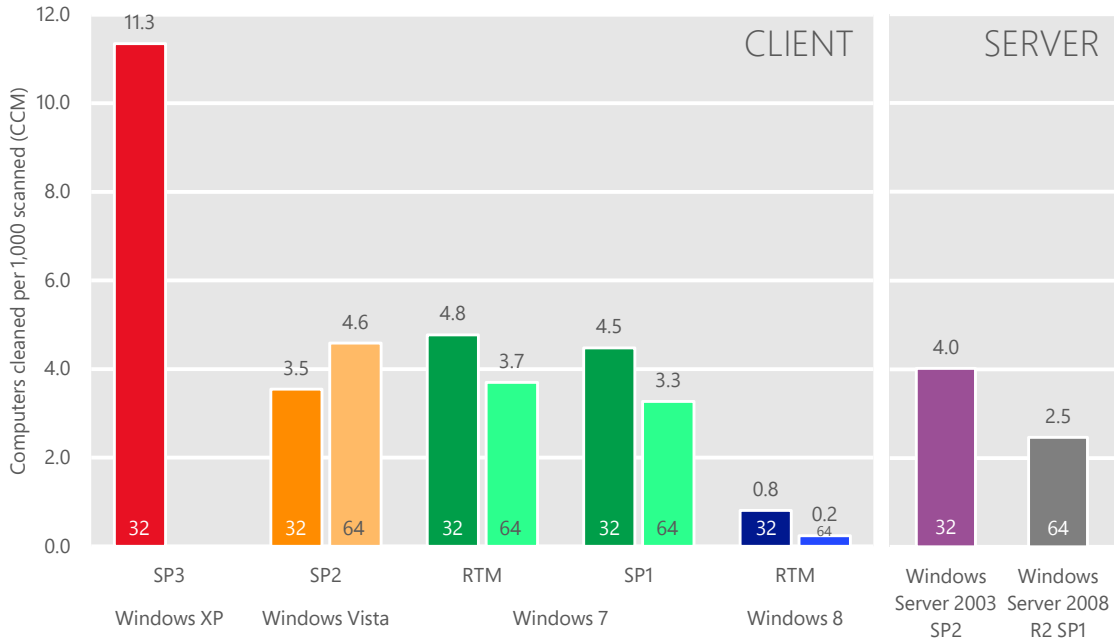
[6] See www.microsoft.com/download/details.aspx?id=28968 for a case study of one Finnish telecom provider's use of Microsoft security data to remove botnet devices from its network.

- Steady reductions in detections of Sality, the worm families Win32/Vobfus and Win32/Dorkbot, and the password stealer Win32/Zbot helped Haiti improve its infection rate from 16.4 at the beginning of the year to 9.1 in the 4th quarter.
- Chile, which began the year with a CCM of 13.7, improved each quarter to close out the year with a CCM of 5.6. A drastic decline in Zbot detections throughout the year was responsible for much of the improvement.

Operating system infection rates

The features and updates that are available with different versions of the Windows operating system and 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 4Q12.

Figure 22. Infection rate (CCM) by operating system and service pack in 4Q12



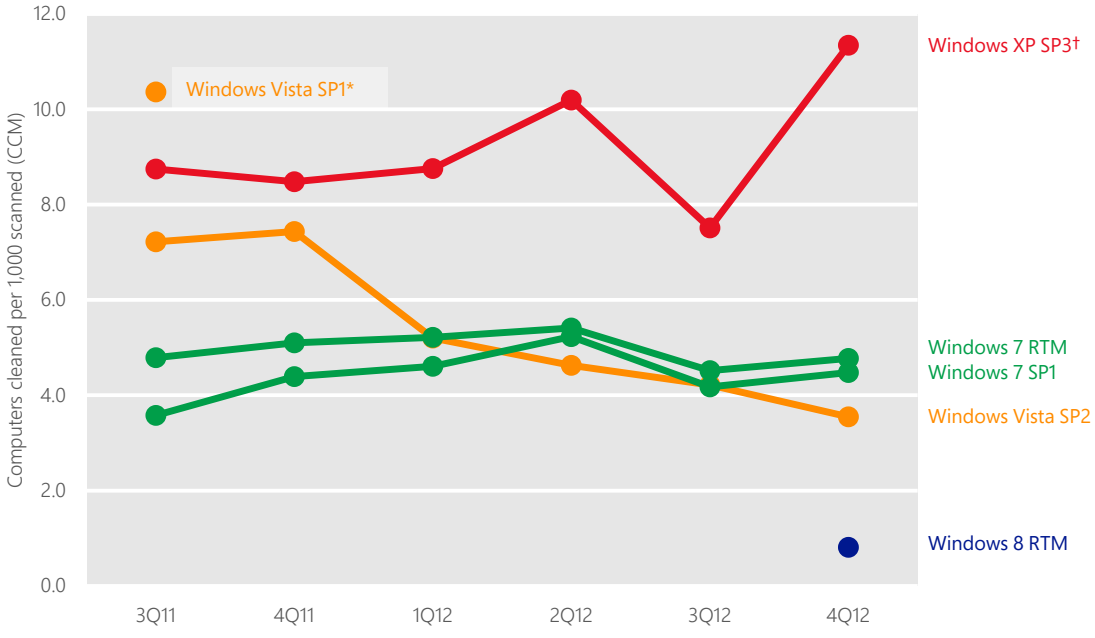
"32" = 32-bit edition; "64" = 64-bit edition. SP = Service Pack. RTM = release to manufacturing. Operating systems with at least 0.1 percent of total MSRT executions in 4Q12 shown.

- This data is normalized; that is, 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 8 RTM computers).

- As in previous periods, infection rates for more recently released operating systems and service packs tend to be lower than infection rates for earlier releases, for both client and server platforms.
- RTM and Windows Server 2008 R2 SP1 have the lowest infection rates on the chart, and the infection rate for Windows XP SP3 is the highest by a significant margin. (The volume of MSRT executions on Windows Server 2012 wasn't sufficient for reliable measurement by the end of 4Q12.)
- Windows 8, which was released to the general public in 4Q12, had the lowest infection rate of any platform by a significant margin, with a CCM of 0.8 for the 32-bit edition and 0.2 for the 64-bit edition. Windows 8 includes a new version of Windows Defender that provides real-time antimalware protection out of the box, which is probably a significant contributor to this difference. (See "Running unprotected: Measuring the benefits of real-time security software" on page 1 for an analysis of the infection rate differences between computers with and without up-to-date real-time antimalware protection.)

Figure 23. Infection rate (CCM) trends for supported 32-bit client versions of Windows, 3Q11–4Q12



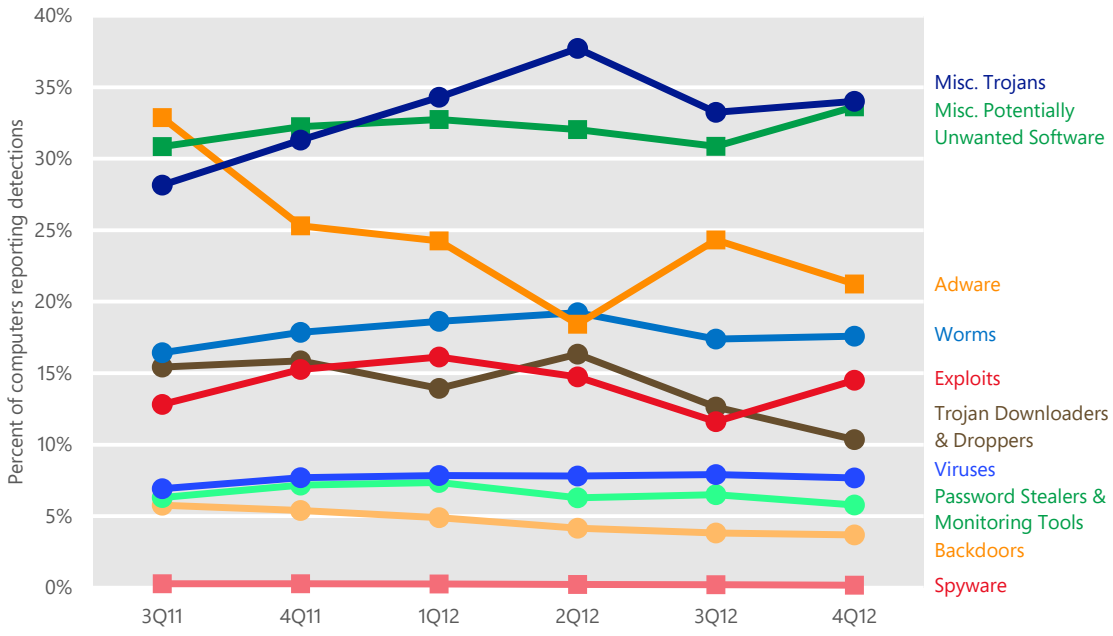
* Support ended July 12, 2011. †Extended support for Windows XP ends April 8, 2014.

- The infection rate for Windows XP SP3 increased significantly in 4Q12 primarily because of increased detection of the rogue security software family Win32/Onescan in Korea, where Windows XP retains a larger market share than in most other large countries and regions. (See "Rogue security software" on page 52 for more information about Onescan in Korea.)
- The infection rate for Windows Vista has declined moderately over the past several periods, which may be because attackers have shifted their efforts to Windows 7 as the newer operating system release has gained market share.

Threat categories

The 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, 3Q11–4Q12, 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.

- The Miscellaneous Trojans category remained the most commonly detected threat category in 4Q12, led by Win32/Sirefef, the rogue security software family Win32/Onescan, and the generic detection JS/IframeRef.
- Detections of Miscellaneous Potentially Unwanted Software increased in 4Q12 to nearly equal Miscellaneous Trojans, which was caused primarily by increased reports of product key generators detected as Win32/Keygen. The generic detections Win32/Obfuscator and INF/Autorun were also prevalent threats in this category.

  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 and Microsoft antimalware products detect and block these attempts even when they would not be successful.
- Adware returned to third place in 2H12 because of increased detections of Win32/Hotbar and a new family, Win32/DealPly, in the 4th quarter.
- Detections in the Exploits category increased in 4Q12 after two quarters of small declines because of increased detections of Blacole, Win32/Pdfjsc, and Win32/CplLnk.

Threat categories by location

Significant differences exist 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 as well as 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 4Q12.

Figure 25. Threat category prevalence worldwide and in the 10 locations with the most detections in 4Q12

Category	Worldwide	US	Brazil	Russia	Korea	France	Turkey	China	Germany	India	UK
Adware	21.2%	20.8%	40.8%	9.3%	32.6%	41.1%	11.1%	3.8%	18.8%	14.6%	23.9%
Misc. Potentially Unwanted Software	33.6%	20.0%	38.0%	50.0%	9.7%	34.1%	38.7%	49.0%	29.2%	38.6%	30.5%
Misc. Trojans	34.0%	43.9%	17.1%	37.1%	75.6%	20.0%	34.7%	32.1%	27.2%	34.7%	29.8%
Worms	17.6%	5.6%	15.7%	17.5%	3.1%	9.4%	34.7%	12.5%	9.2%	39.9%	6.8%
Trojan Downloaders & Droppers	10.4%	9.6%	16.7%	12.6%	9.1%	9.2%	10.0%	14.5%	7.1%	5.5%	9.5%
Exploits	14.5%	23.0%	4.8%	14.2%	4.2%	11.7%	9.0%	6.4%	27.0%	14.6%	23.8%
Viruses	7.7%	2.0%	6.6%	5.5%	1.4%	1.8%	16.5%	15.2%	2.8%	23.8%	3.1%
Password Stealers & Monitoring Tools	5.8%	5.2%	10.5%	5.0%	2.7%	3.5%	4.8%	3.5%	8.8%	7.6%	6.2%
Backdoors	3.7%	2.7%	2.5%	2.9%	1.4%	2.4%	5.0%	6.3%	2.5%	6.4%	3.0%
Spyware	0.2%	0.3%	0.0%	0.2%	0.0%	0.1%	0.0%	1.2%	0.2%	0.1%	0.1%

Totals for each location may exceed 100% 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 37, the locations in the table are ordered by number of computers reporting detections in 2H12.
- Exploits were unusually common in the United States, the United Kingdom, and Germany, with Blacole and Win32/Pdfjsc among the most common exploit families detected. Detections of Pdfjsc increased 141 percent in Germany between 3Q12 and 4Q12, and detections of Blacole went up 9.4 percent in the UK.
- Adware was unusually common in Brazil and France, with adware detected on more than 40 percent of computers reporting detections in each location. The most commonly detected family in France in 3Q12 was Win32/EoRezo, an adware program that delivers French-language advertisements. The Miscellaneous Potentially Unwanted Software category

was also unusually prevalent in Brazil, with Win32/Keygen the most commonly detected threat in the category in 4Q12.

- Families in the Miscellaneous Trojans category were detected on 75.6 percent of all computers that reported detections in Korea, mostly because of Win32/Onescan. (See "Rogue security software" on page 52 for more information about Onescan in Korea.)
- As in 1H12, the Miscellaneous Potentially Unwanted Software category was especially prevalent in Russia, led by Keygen and Win32/Pameseg. 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.
- Keygen was detected on almost half of the computers reporting detections in China, making the Miscellaneous Potentially Unwanted Software category especially prevalent there. Spyware was also unusually prevalent in China, led by Win32/CnsMin. Although Spyware was the least prevalent category in China, it was more than six times as prevalent there as in the world overall.
- Worms were unusually prevalent in Turkey and India, led by INF/Autorun.

See "Appendix C: Worldwide infection rates" on page 89 for more information about malware around the world.

Threat families

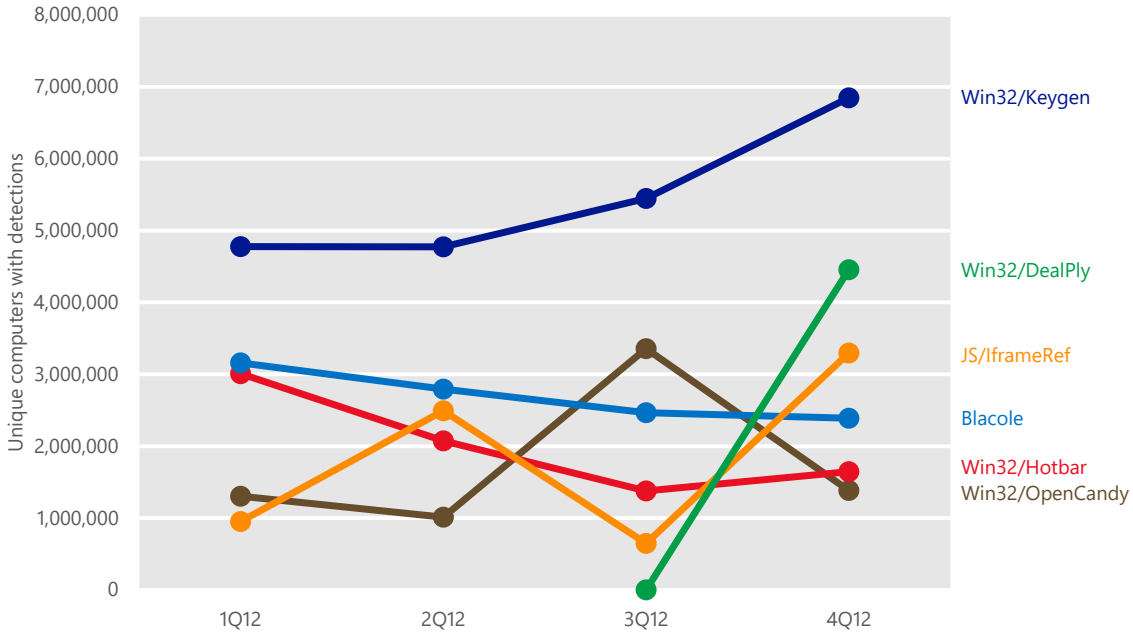
Figure 26 lists the top 10 malware and potentially unwanted software families that were detected on computers by Microsoft antimalware products in the fourth quarter of 2012, with other quarters included for comparison.

Figure 26. Quarterly trends for the top 10 malware and potentially unwanted software families detected by Microsoft antimalware products in 2H12, shaded according to relative prevalence

	Family	Most significant category	1Q12	2Q12	3Q12	4Q12
1	Win32/Keygen	Misc. Potentially Unwanted Software	4,775,464	4,775,243	5,448,253	6,845,681
2	INF/Autorun	Misc. Potentially Unwanted Software	3,316,107	3,510,816	3,293,134	3,604,651
3	Blacole	Exploits	3,157,580	2,794,300	2,464,753	2,387,852
4	Win32/OpenCandy	Adware	1,304,390	1,011,980	3,358,270	1,382,133
5	Win32/DealPly	Adware	—	—	—	4,454,344
6	Win32/Sality	Viruses	2,101,968	2,097,663	1,911,592	2,093,211
7	Win32/Obfuscator	Misc. Potentially Unwanted Software	1,393,148	1,851,304	1,762,317	2,221,140
8	Win32/Pdfjsc	Exploits	1,431,288	1,217,813	1,187,797	2,760,030
9	JS/IframeRef	Misc. Trojans	952,111	2,493,830	646,607	3,296,531
10	Win32/Dorkbot	Worms	1,883,642	2,055,244	1,758,243	2,095,793

For a different perspective on some of the changes that have occurred throughout the year, Figure 27 shows the detection trends for a number of families that increased or decreased significantly over the past four quarters.

Figure 27. Detection trends for a number of notable malware and potentially unwanted software families in 2012



- Detections of Win32/Keygen, the most commonly detected family overall in 2H12, increased each quarter, from 4.8 million computers in 2Q12 to 6.8

million in 4Q12. Keygen is a detection for tools that generate keys for various software products, which may allow users to run the products illegally.

- The adware detection Win32/DealPly, which first appeared in 4Q12, quickly became the second most common detection of the quarter. DealPly is an adware program that displays offers that are related to the user's web browsing habits. It has been observed being bundled with certain third-party software installation programs, including Win32/Protlerdob.
- Detections of the generic family JS/IframeRef increased fivefold in 4Q12 after falling off significantly between 2Q12 and 3Q12. IframeRef is a generic detection for specially formed HTML inline frame (IFrame) tags that redirect to remote websites that contain malicious content. The increased IframeRef detections in 2Q12 and 4Q12 resulted from the discovery of a pair of widely used new variants in April and November 2012. (In January 2013, these variants were reclassified as Trojan:JS/Seedabutor.A and Trojan:JS/Seedabutor.B, respectively.)

Threat families by platform

Malware does not affect all platforms equally. Some threats are spread by exploits that are ineffective against one or more operating system versions. Some threats are more common in parts of the world where specific platforms are more or less popular than elsewhere. In other cases, differences between platforms may be caused by simple random variation. Figure 28 demonstrates how detections of the most prevalent families in 4Q12 ranked differently on different operating system/service pack combinations.

Figure 28. The malware and potentially unwanted software families most commonly detected by Microsoft antimalware solutions in 4Q12, and how they ranked in prevalence on different platforms

Rank 4Q12	Family	Most significant category	Rank (Windows 8 RTM)	Rank (Windows 7 SP1)	Rank (Windows Vista SP2)	Rank (Windows XP SP3)
1	Win32/Keygen	Misc. Potentially Unwanted Software	1	1	10	5
2	Win32/DealPly	Adware	15	2	1	9
3	INF/Autorun	Misc. Potentially Unwanted Software	3	3	14	3
4	JS/IframeRef	Misc. Trojans	2	7	8	2
5	Win32/Pdfjsc	Exploits	20	4	3	7
6	Blacole	Exploits	17	5	6	6
7	Win32/Onescan	Misc. Trojans	84	16	24	1
8	Win32/Obfuscator	Misc. Potentially Unwanted Software	5	6	12	12
9	Win32/Dorkbot	Worms	13	8	23	10
10	Win32/Sality	Viruses	11	12	41	4
14	Win32/Zwangi	Misc. Potentially Unwanted Software	54	17	2	35

- Windows 7 is the most widely used consumer operating system worldwide, and the most prevalent families on Windows 7 SP1 tended to be the same families that were prevalent overall.
- The rogue security software family Win32/Onescan was the most commonly detected family on Windows XP SP3 in 4Q12 but ranked much lower on other platforms. Detections of Onescan were highly concentrated in Korea, where use of Windows XP remains relatively higher than in the rest of the world.
- Microsoft real-time antimalware products detect and block threats that attempt to infect computers even if those attempts would not have succeeded otherwise. The generic family INF/Autorun, which propagates by using a technique that is ineffective on Windows 7 and Windows 8, was

nevertheless the 3rd most commonly detected threat family on those platforms in 4Q12.[7]

Rogue security software

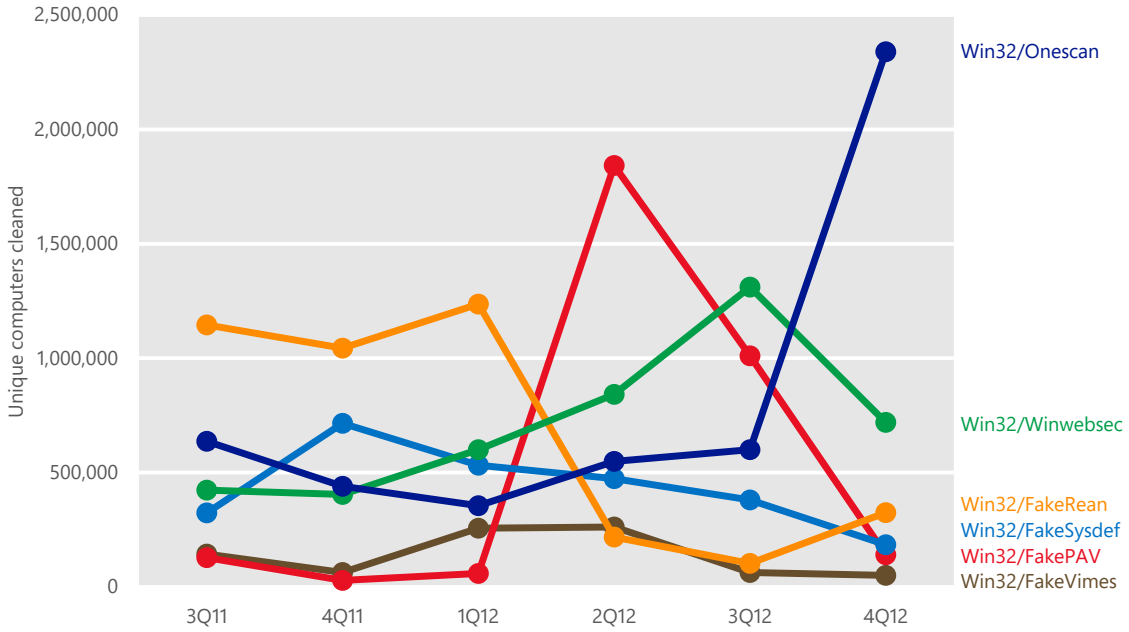
Rogue security software has become one of the most common methods that attackers use to swindle money from victims. Rogue security software, also known as *scareware*, is software that appears to be beneficial from a security perspective but provides limited or no security, generates erroneous or misleading 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 so-called "full version" of the software to remove the nonexistent 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 general audiences about rogue security software.)

Figure 29. False branding used by a number of commonly detected rogue security software programs

Figure 30 shows detection trends for the most common rogue security software families detected in 2H12.

[7] Recent changes to Windows XP and Windows Vista, which have been available as automatic updates on Microsoft update services since 2011, make the technique ineffective on those platforms as well. See support.microsoft.com/kb/971029 for more information.

Figure 30. Trends for the most common rogue security software families detected in 2H12, by quarter



- Detections of Win32/Onescan nearly quadrupled in 4Q12 after Microsoft added detection signatures for the family to the MSRT in October 2012. 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 31. A variant of Win32/Onescan, a Korean-language rogue security software program

As shown in Figure 32, the overwhelming majority of Onescan detections occurred in Korea, where Onescan was the most commonly detected family by a considerable margin. In 4Q12, when detection signatures for the family were added to the MSRT, more than 98 percent of Onescan detections were in Korea.

Figure 32. The 5 locations with the most Win32/Onescan detections in 3Q12 (left) and 4Q12 (right)

Country or region	Computers (3Q12)
Korea	573,763
China	9,180
United States	6,036
Canada	1,523
Japan	1,402

Country or region	Computers (4Q12)
Korea	2,299,917
United States	11,071
China	5,665
Japan	3,978
Australia	2,811

- Win32/Winwebsec was the second most commonly detected rogue security software family in the second half of the year despite detections decreasing by nearly half from 3Q12 to 4Q12. Winwebsec has been distributed under a variety of names, with the user interface and other details varying to reflect

each variant's individual branding; currently prevalent names include AVASoft Professional Antivirus, Smart Fortress 2012, Win 8 Security System, and several others. These different distributions of the trojan use various installation methods, with file names 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 "Mac Defender" rogue security software program for Apple Mac OS X that first appeared in May 2011.

- Detections of Win32/FakePAV, which peaked at 1.8 million infected computers in 2Q12, declined to fewer than 200,000 computers by 4Q12. FakePAV has also been distributed under many names, including Windows Threats Destroyer, Windows Firewall Constructor, Windows Attacks Preventor, and Windows Basic Antivirus. FakePAV frequently spreads by masquerading as Microsoft Security Essentials on malicious and compromised webpages; it presents a graphic that resembles a genuine Microsoft Security Essentials window and claims to have discovered several infections on the target computer. Recent variants have included large amounts of irrelevant text, such as excerpts from William Shakespeare's *Romeo and Juliet*, in the installation package in an apparent effort to obfuscate the files and avoid detection by antimalware software.

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 2H12.

Figure 33. Quarterly trends for the top 10 families detected on domain-joined computers in 2H12, by percentage of domain-joined computers reporting detections

	Family	Category	1Q12	2Q12	3Q12	4Q12
1	JS/IframeRef*	Misc. Trojans	2.3%	11.3%	1.7%	13.6%
2	Win32/Conficker	Worms	12.7%	10.8%	9.7%	9.8%
3	Win32/Keygen	Misc. Potentially Unwanted Software	5.5%	5.3%	6.2%	6.9%
4	INF/Autorun	Misc. Potentially Unwanted Software	7.5%	7.0%	6.2%	6.6%
5	Blacole*	Exploits	7.0%	5.4%	5.0%	5.1%
6	JS/BlacoleRef*	Misc. Trojans	3.3%	4.1%	5.8%	4.2%
7	Win32/Zbot*	Password Stealers & Monitoring Tools	3.5%	3.4%	3.4%	3.7%
8	Win32/Sirefef*	Misc. Trojans	2.6%	3.5%	4.3%	3.5%
9	Win32/Dorkbot*	Worms	3.4%	3.2%	2.6%	3.1%
10	Win32/Pdfjsc*	Exploits	0.5%	4.0%	0.6%	0.5%

* In the second half of 2012, 7 out of the top 10 threats affecting enterprises were delivered through websites.

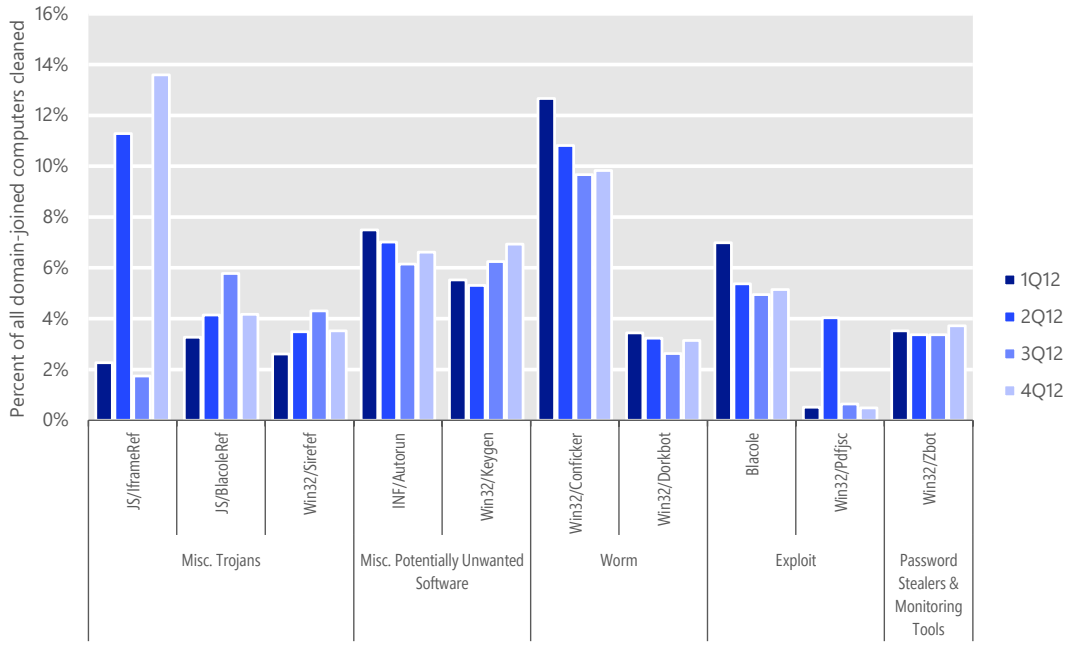
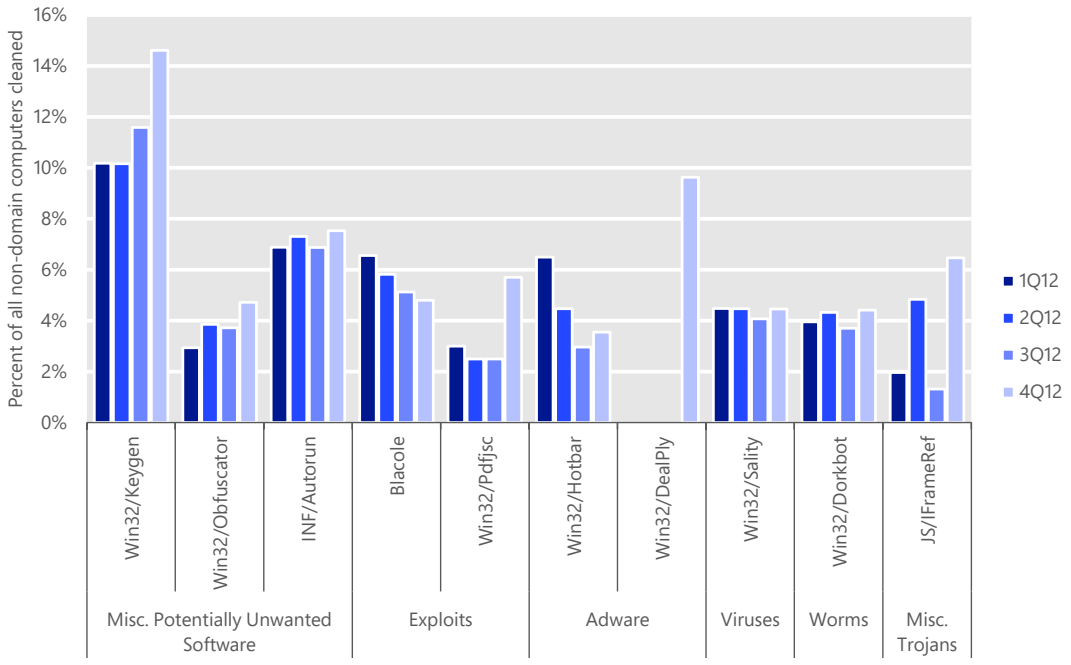


Figure 34. Quarterly trends for the top 10 families detected on non-domain computers in 2H12, by percentage of non-domain computers reporting detections

	Family	Category	1Q12	2Q12	3Q12	4Q12
1	Win32/Keygen	Misc. Potentially Unwanted Software	10.2%	10.2%	11.6%	14.6%
2	Win32/DealPly	Adware	—	—	—	9.6%
3	INF/Autorun	Misc. Potentially Unwanted Software	6.9%	7.3%	6.9%	7.5%
4	JS/IframeRef	Misc. Trojans	2.0%	4.8%	1.3%	6.5%
5	Win32/Pdfjsc	Exploits	3.0%	2.5%	2.5%	5.7%
6	Blacole	Exploits	6.6%	5.8%	5.1%	4.8%
7	Win32/Obfuscator	Misc. Potentially Unwanted Software	2.9%	3.9%	3.7%	4.7%
8	Win32/Sality	Viruses	4.5%	4.5%	4.1%	4.5%
9	Win32/Dorkbot	Worms	4.0%	4.3%	3.7%	4.4%
10	Win32/Hotbar	Adware	6.5%	4.5%	3.0%	3.6%



- Six families are common to both lists, notably the generic families Win32/Keygen and INF/Autorun and the exploit family Blacole. Keygen, the most commonly detected family on non-domain computers in 2H12, was detected on about twice as many non-domain computers as domain-joined computers, although it was prevalent enough on the latter to rank third on the domain-joined list in both quarters.

- Detections in the Worms category remained high for domain-joined computers, led by Win32/Conficker, which declined slightly over the course of the year but remained the second most commonly detected family on domain-joined computers. See "How Conficker continues to propagate" in *Microsoft Security Intelligence Report, Volume 12 (July–December 2011)* for more information.
- Detections of the exploit family Win32/Pdfjsc, which targets a vulnerability in some versions of Adobe Acrobat and Adobe Reader, increased significantly on domain-joined computers in 4Q12. The use of the PDF format to store and transfer documents is common in many enterprise environments, although in this case the prevalence of the exploit may have more to do with its use by the Blacole exploit kit and others. (See page 27 for more information about Blacole.)
- Detections of adware are typically much more common on non-domain computers than on domain-joined computers. The adware program Win32/DealPly was the second most commonly detected threat family on non-domain computers in 4Q, with another adware program, Win32/Hotbar, ranking 10th. By contrast, none of the top 10 families detected on domain-joined computers were adware families.

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.

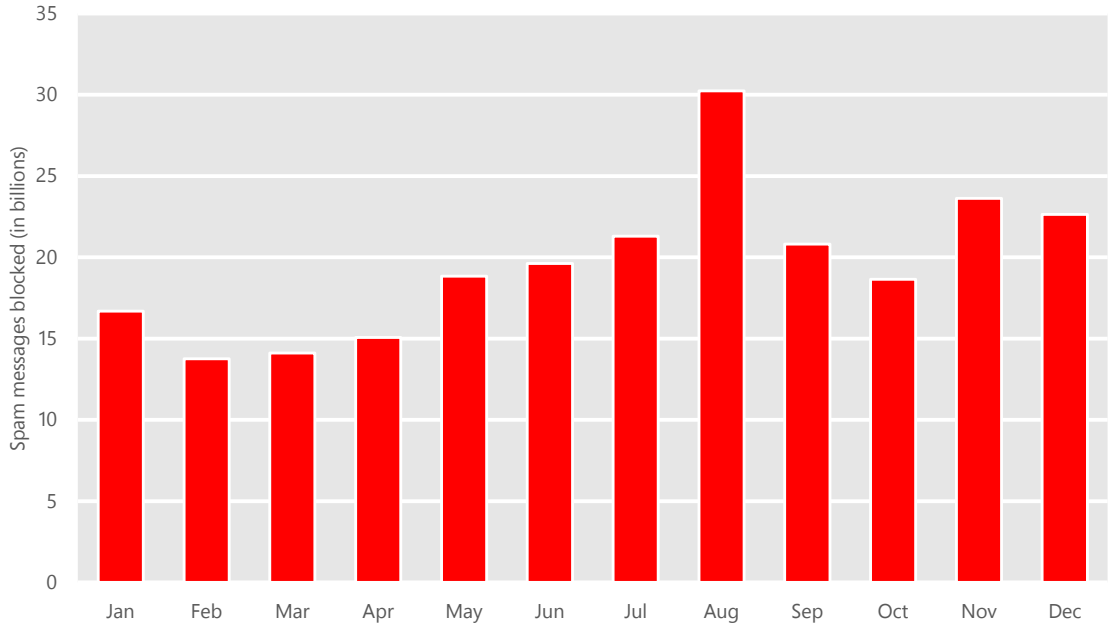
Email threats

More than 75 percent 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

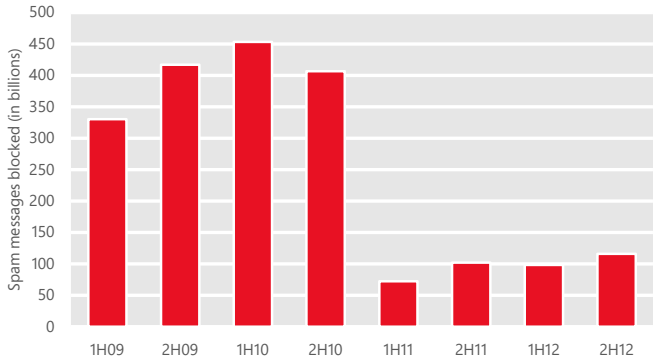
The information in this section of the *Microsoft Security Intelligence Report* is compiled from telemetry data provided by Exchange Online Protection, which provides spam, phishing, and malware filtering services for thousands of Microsoft enterprise customers that process tens of billions of messages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

Figure 35. Messages blocked by Exchange Online Protection each month in 2012



- Blocked mail volumes in 2H12 were up slightly from 1H12, but remain well below levels seen prior to the end of 2010, as shown in Figure 36. The dramatic decline in spam observed over the past two years has occurred in the wake of successful takedowns of a number of large spam-sending

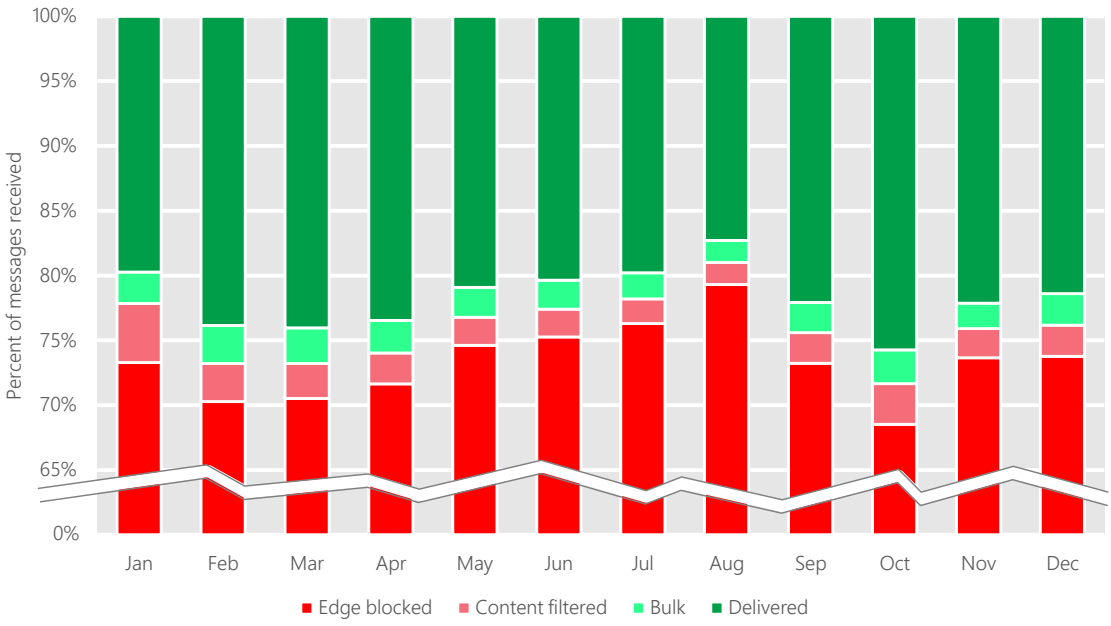
Figure 36. Messages blocked by Exchange Online Protection each half-year period, 1H09–2H12



botnets, notably Cutwail (August 2010) and Rustock (March 2011).[8] In 2H12, about 1 in 4 email messages were delivered to recipients' inboxes without being blocked or filtered, compared to just 1 in 33 messages in 2010.

Exchange Online Protection 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 37. Percentage of incoming messages blocked, categorized as bulk email, and delivered, January–December 2012



- Between 68.5 and 79.3 percent of incoming messages were blocked at the network edge each month in 2H12, which means that only 20.7 to 31.5

[8] For more information about the Cutwail takedown, see *Microsoft Security Intelligence Report, Volume 10 (July-December 2010)*. For more information about the Rustock takedown, see "Battling the Rustock Threat," available from the Microsoft Download Center.

percent of incoming messages had to be subjected to the more resource-intensive content filtering process. Between 8 and 10 percent of the remaining messages (1.7 to 3.1 percent of all incoming messages) were filtered as spam each month.

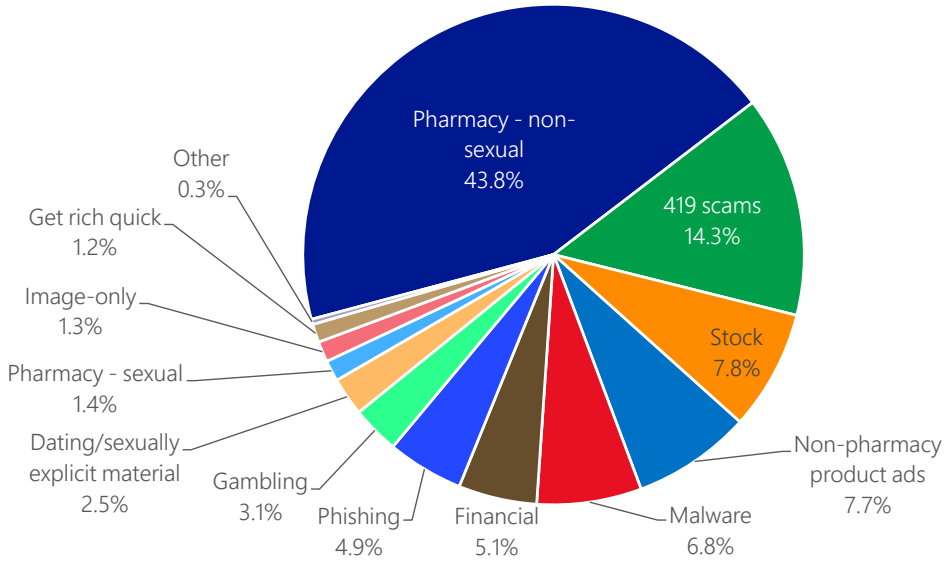
- Exchange Online Protection identifies bulk email messages that some users consider unwanted but that aren't categorized as spam by edge blocks or content filters. These messages typically include email newsletters, advertisements, and marketing messages that users claim they never asked for, or don't remember subscribing to. Exchange Online Protection flags these messages as bulk in an incoming header so customers and individual users can use rules in Microsoft Outlook or Exchange to filter, move, or deliver them as desired.

  Bulk email volumes did not vary significantly from month to month in 2H12. Between 8 and 11 percent of all delivered messages were categorized as bulk each month.

Spam types

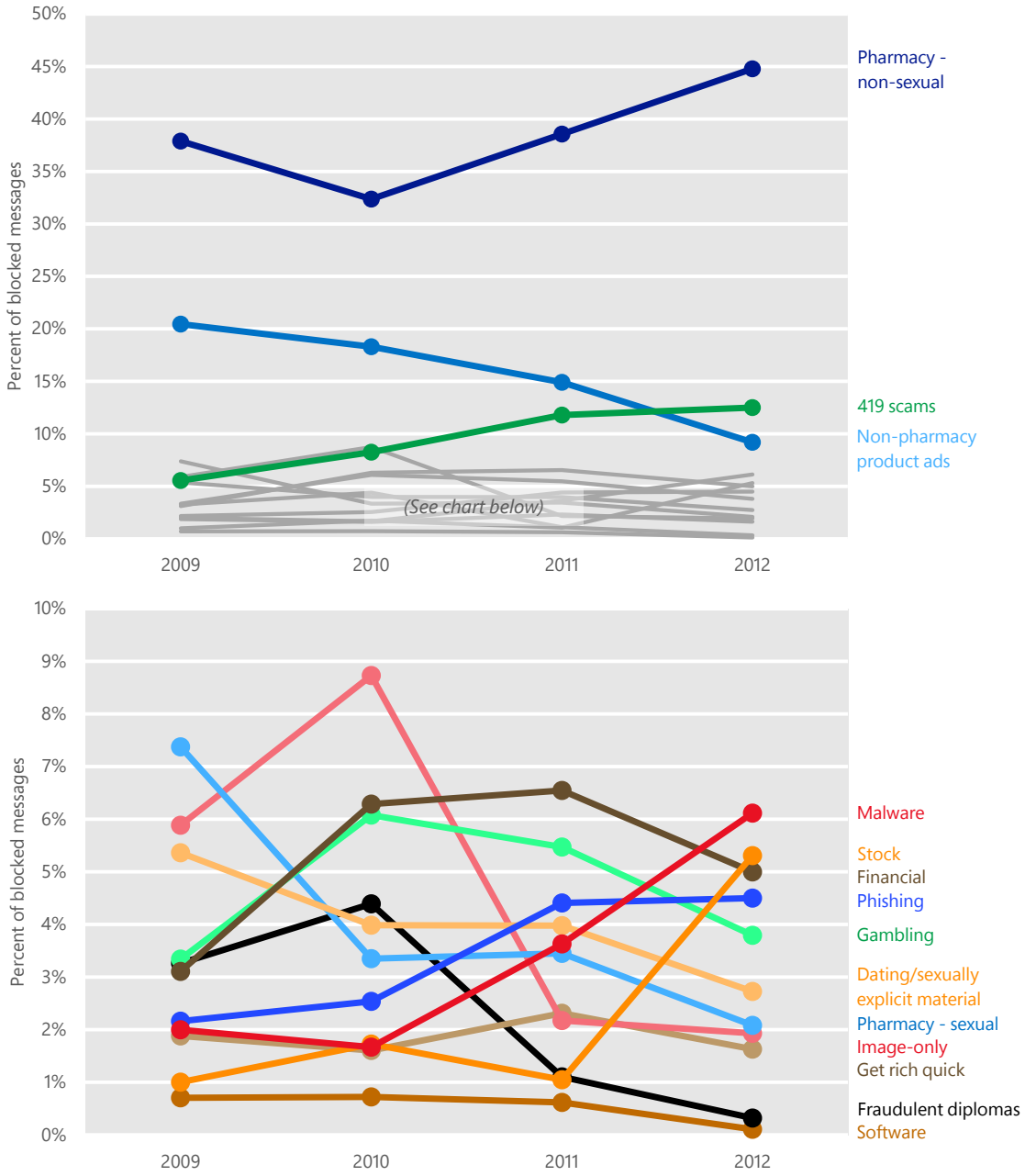
The Exchange Online Protection content filters recognize several different common types of spam messages. Figure 38 shows the relative prevalence of the spam types that were detected in 2H12.

Figure 38. Inbound messages blocked by Exchange Online Protection filters in 2H12, by category



- Advertisements for non-sexual pharmaceutical products accounted for 43.8 percent of the messages blocked by Exchange Online Protection content filters in 2H12, a slight decrease from 46.7 percent in 1H12.
- Spam messages associated with advance-fee fraud (so-called 419 scams) accounted for 14.3 percent of messages blocked, an increase from 9.1 percent in 1H12. 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 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.
- Stock-related spam, which accounted for less than 1 percent of the total in 1H12, rose to 7.8 percent in 2H12 because of a large increase beginning in September. Such messages are typically used in so-called pump-and-dump schemes designed to temporarily increase the share price of a low-priced stock issue in which the spammer owns shares.

Figure 39. Inbound messages blocked by Exchange Online Protection content filters, 2009–2012, by category



- Advertisements for non-sexual pharmaceutical products have accounted for the largest share of spam for the past several years, increasing from about one-third of all spam in 2010 to almost one-half in 2012.
- Other categories that have been trending up include 419 scams, which have more than doubled as a percentage of the whole since 2009; spam that

contains malicious attachments; and phishing messages. (See "Malicious websites" beginning on page 65 for more information about phishing.)

- Spam messages that included images and no text, which spammers sometimes send in an effort to evade detection by antispam software, have decreased significantly since 2009. Other categories that have been trending down include non-pharmacy product ads, sexually related pharmaceutical ads, and ads for sexually explicit material or dating services.

Guidance: Defending against threats in email

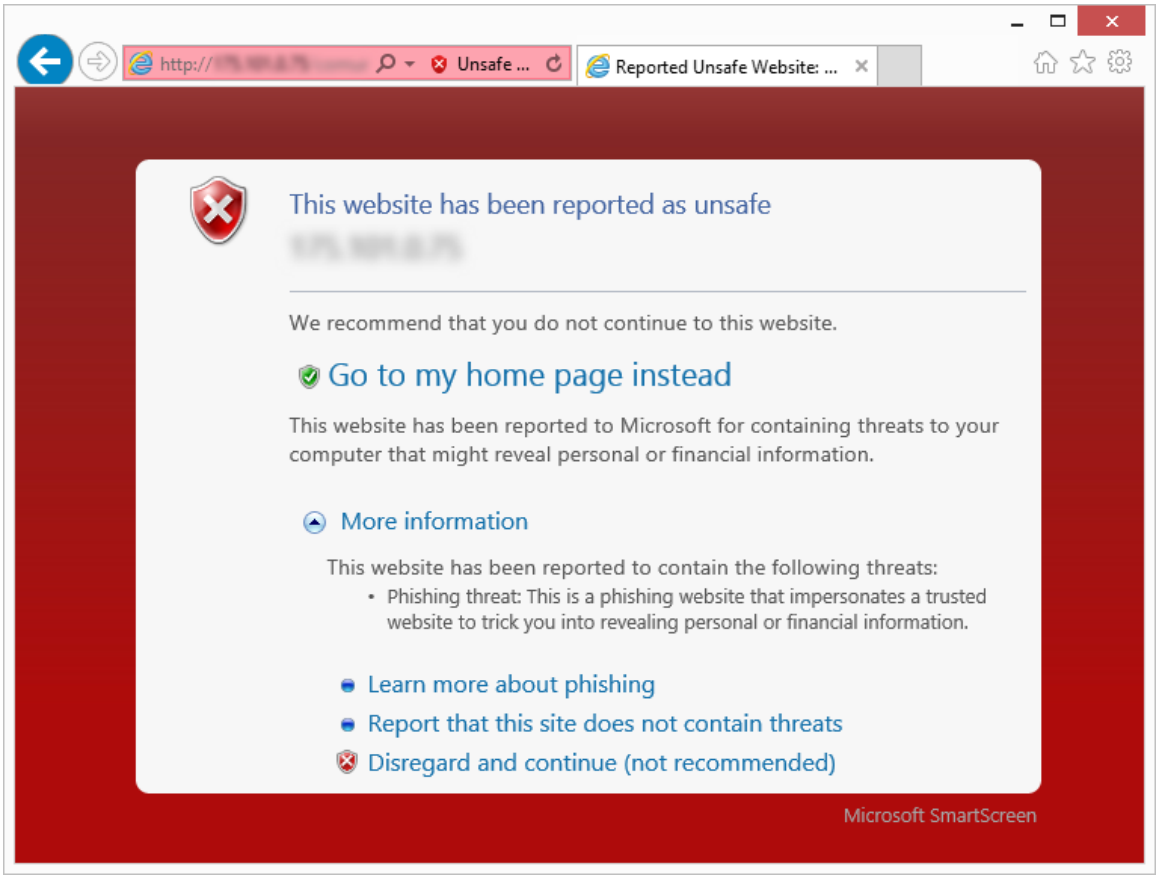
In addition to using a filtering service such as Exchange Online Protection, organizations can take a number of steps to reduce the risks and inconvenience of unwanted email. Such steps include implementing email authentication techniques and observing best practices for sending and receiving email. 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 to be completely legitimate and often provide no outward indicators of their malicious nature, even to experienced computer users. In many cases, these sites are legitimate websites that have been compromised by malware, SQL injection, or other techniques in an effort by attackers to take advantage of the trust users have invested in them. 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 versions 8 through 10) and 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 87 for more information about the products and services that provided data for this report.)

Figure 40. SmartScreen Filter in Internet Explorer blocks reported phishing and malware distribution sites to protect users



Phishing sites

Microsoft gathers information about phishing sites and impressions from *phishing impressions* that are 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 41.

Figure 41. How Microsoft tracks phishing impressions

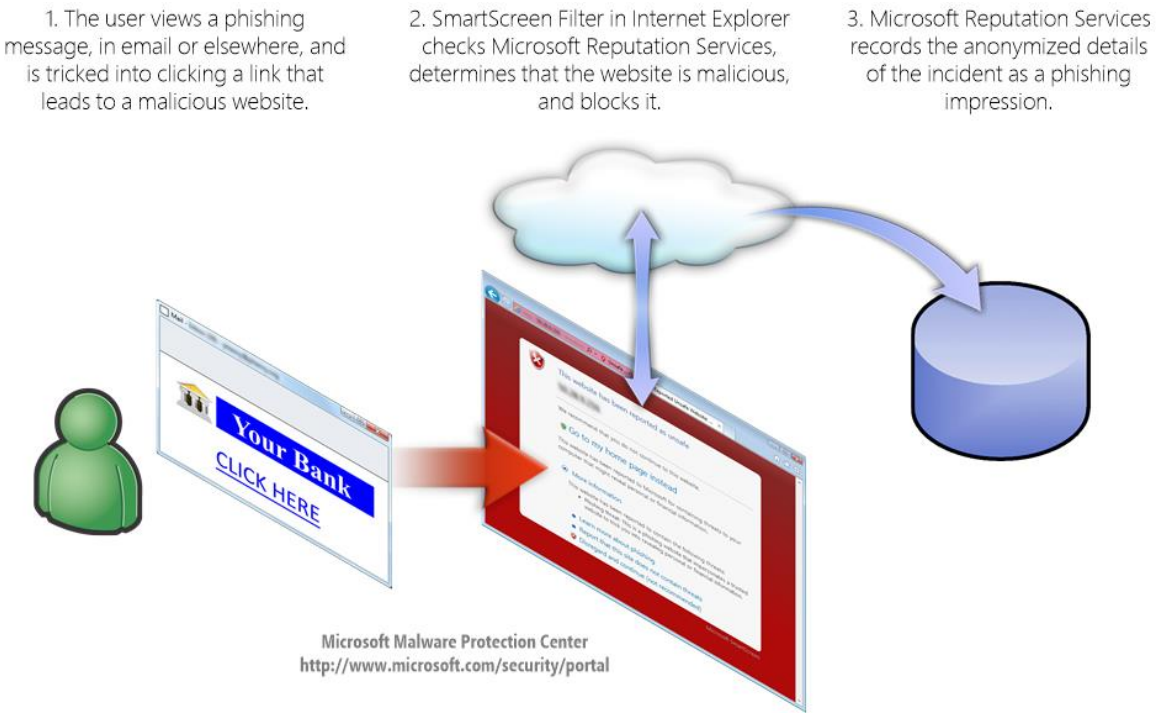
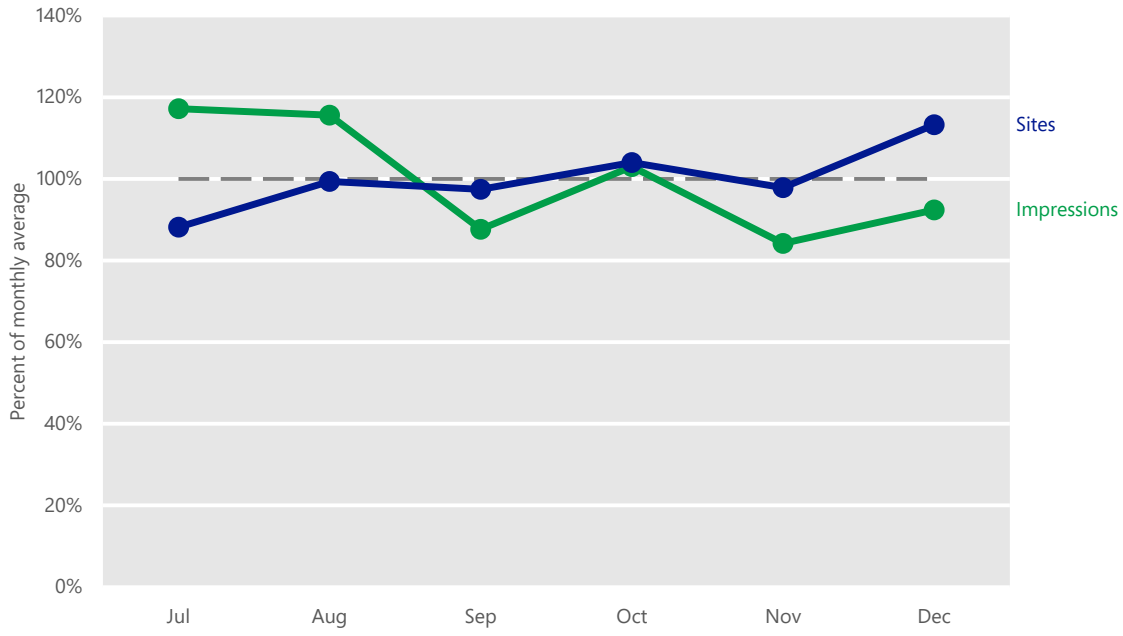


Figure 42 compares the volume of active phishing sites in the Microsoft Reputation Services database each month with the volume of phishing impressions tracked by Internet Explorer.

Figure 42. Phishing sites and impressions tracked each month, July–December 2012, relative to the monthly average for each



- The numbers of active phishing sites and impressions rarely correlate strongly with each other; some types of sites tend to draw many more impressions per site than others, as shown in Figure 43 and Figure 44, and phishers sometimes engage in campaigns that temporarily drive more traffic to each phishing page without necessarily increasing the total number of active phishing pages they maintain at the same time. Nevertheless, both sites and impressions were mostly stable throughout 2H12, with both remaining between 80 and 120 percent of their 2H12 average each month.

Target institutions

Figure 43 and Figure 44 show the percentage of phishing impressions and active phishing sites, respectively, recorded by Microsoft during each month from July to December 2012 for the most frequently targeted types of institutions.

Figure 43. Impressions for each type of phishing site each month, July–December 2012, as reported by SmartScreen Filter

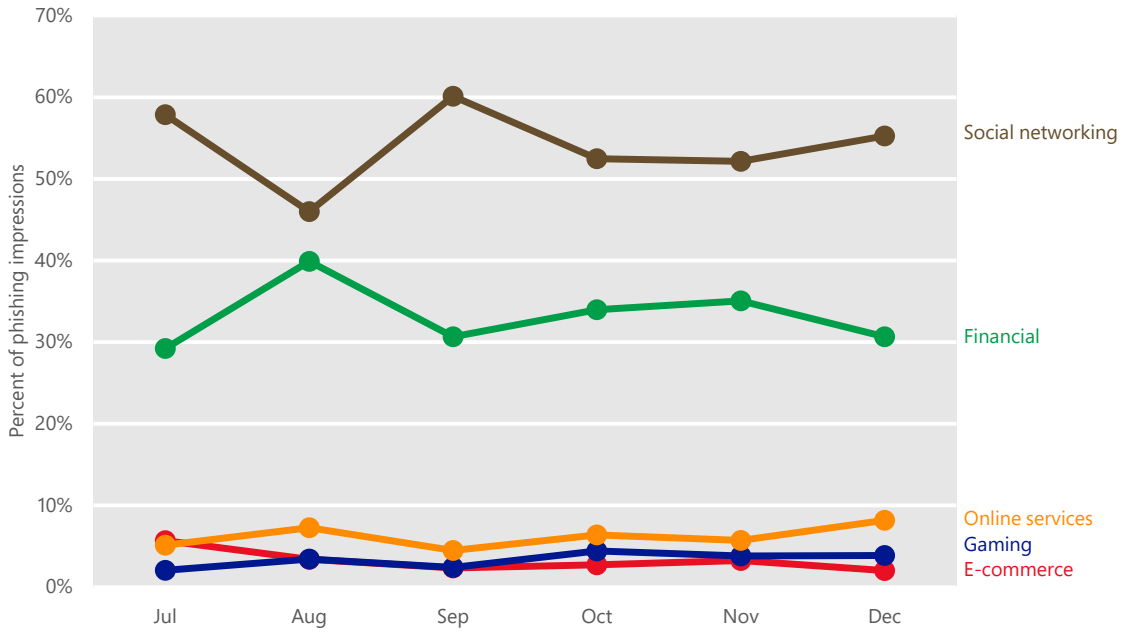
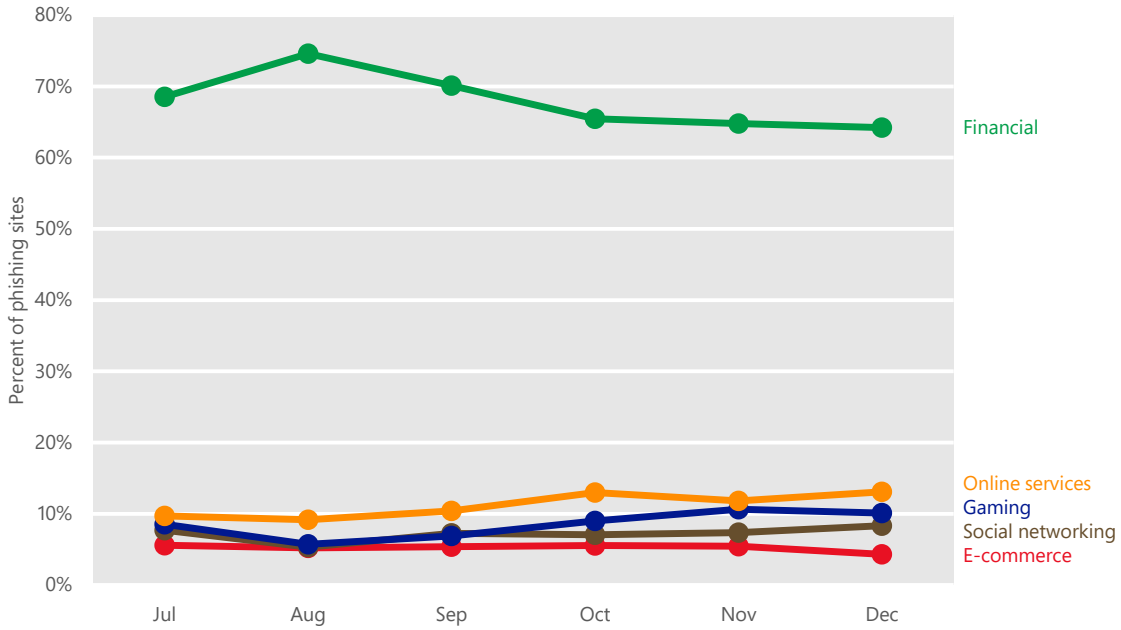


Figure 44. Active phishing sites tracked each month, July–December 2012, by type of target



- Phishing sites that targeted social networks received the largest number of impressions each month in 2H12, and accounted for most of the impressions recorded each month except August. Despite the number of impressions, sites that targeted social networks only accounted for between 5.3 and 8.3 percent of active phishing sites each month. Most social networking activity involves a small number of very popular websites, so phishers can target large numbers of victims without having to maintain many different phishing sites.
- Sites that targeted financial institutions accounted for between 64.2 and 74.6 percent of active phishing sites each month in 2H12. Unlike social networks, financial institutions targeted by phishers can number in the hundreds and customized phishing approaches are required for each one. Still, the potential for direct illicit access to victims' bank accounts means that financial institutions remain perennially popular phishing targets, and they received the second-largest number of impressions each month during the period.

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.

To provide a more accurate perspective on the phishing and malware hosting landscape, the methodology used to calculate the number of Internet hosts in each country or region has been revised. For this reason, the statistics presented here should not be directly compared to findings in previous volumes.

Figure 45. Phishing sites per 1,000 Internet hosts for locations around the world in 3Q12 (top) and 4Q12 (bottom)

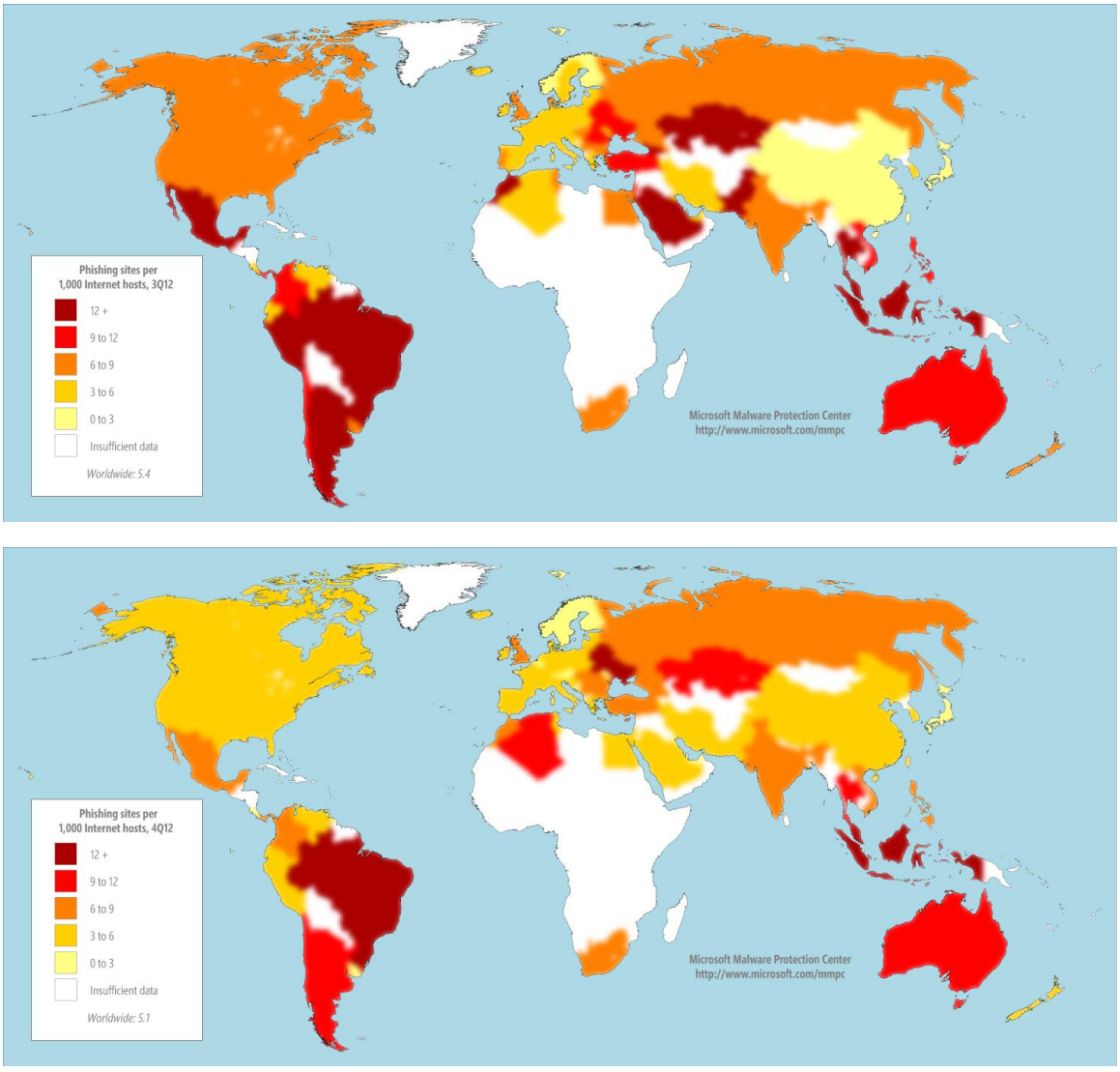
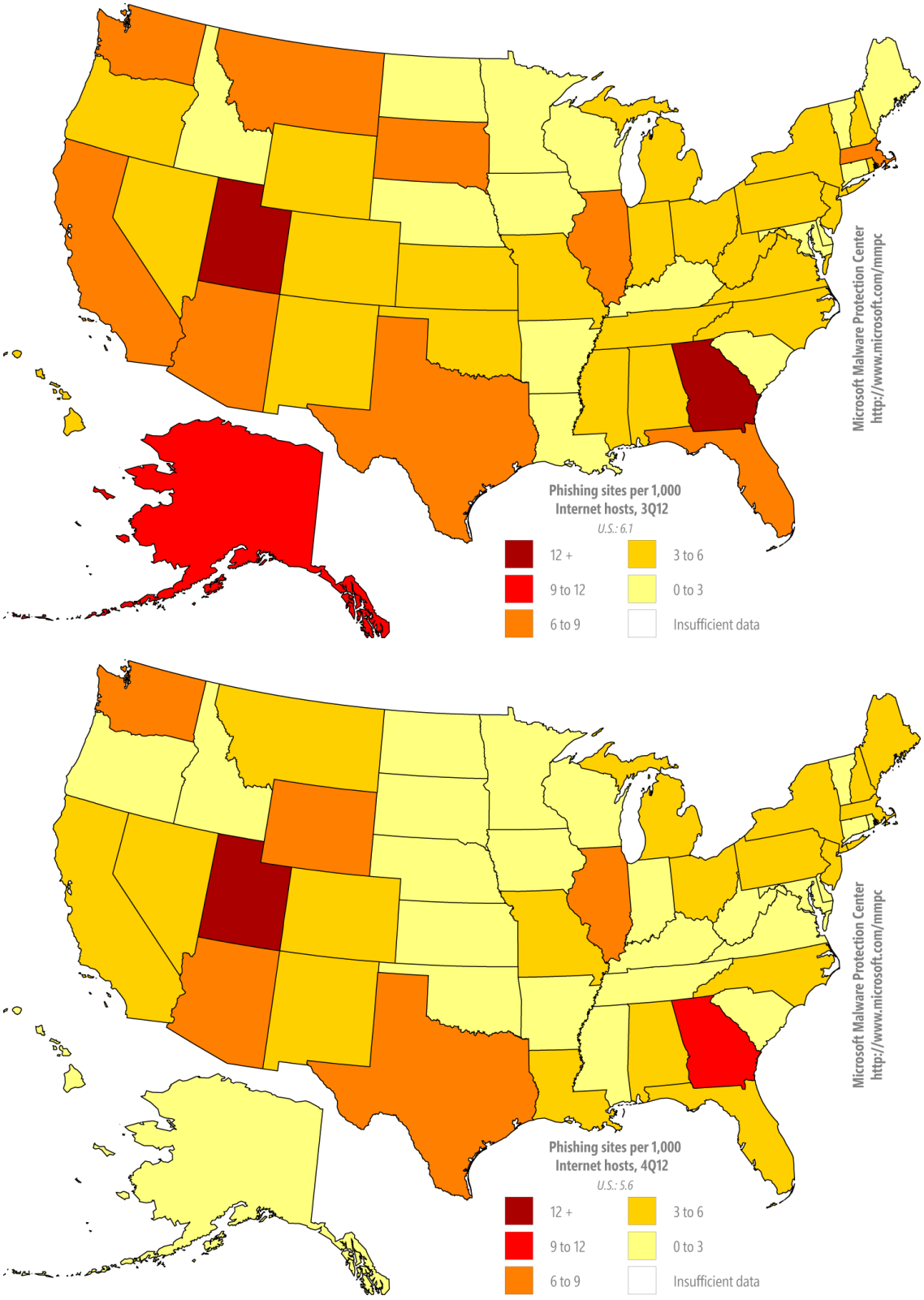


Figure 46. Phishing sites per 1,000 Internet hosts for US states in 3Q12 (top) and 4Q12 (bottom)



- SmartScreen Filter detected 5.4 phishing sites per 1,000 Internet hosts worldwide in 3Q12, and 5.1 per 1,000 in 4Q12.
- Locations with higher than average concentrations of phishing sites include Brazil (12.6 per 1,000 Internet hosts in 4Q12), Australia (9.1), and Russia (8.3). Locations with low concentrations of phishing sites include Japan (1.8), Finland (1.9), and Sweden (2.8).
- In the United States, as a general rule, states with more Internet hosts tend to have higher concentrations of phishing sites as well, although there are plenty of exceptions.
- Those US states with the highest concentrations of phishing sites include Utah (17.4 per 1,000 Internet hosts in 4Q12), Georgia (11.0), and Arizona (8.6). States with low concentrations of phishing sites include Vermont (0.7), Nebraska (0.9), and Rhode Island (1.0).

Malware hosting sites

SmartScreen Filter in Internet Explorer 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 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 47. SmartScreen Filter in Internet Explorer displays a warning when a user attempts to download an unsafe file

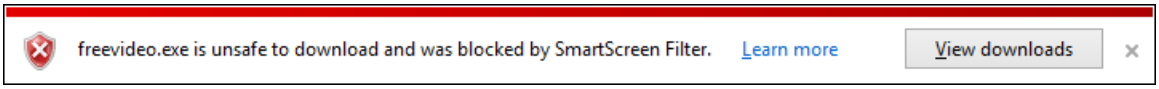
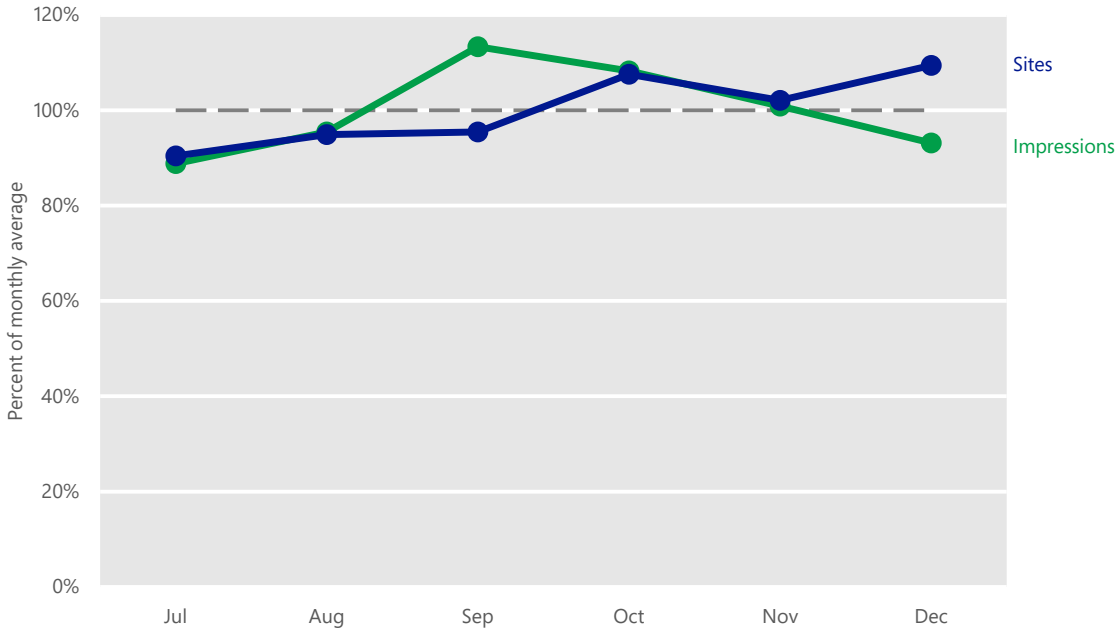


Figure 48 compares the volume of active malware hosting sites in the Microsoft Reputation Services database each month with the volume of malware impressions tracked by Internet Explorer.

Figure 48. Malware hosting sites and impressions tracked each month in 2H12, relative to the monthly average for each



- As with phishing, malware hosting sites and impressions were stable throughout the period, with both remaining between 88 and 113 percent of their 2H12 average each month.

Malware categories

Figure 49 and Figure 50 show the types of threats hosted at URLs that were blocked by SmartScreen Filter in 2H12.

Figure 49. Categories of malware found at sites blocked by SmartScreen Filter in 2H12, by percent of all malware impressions

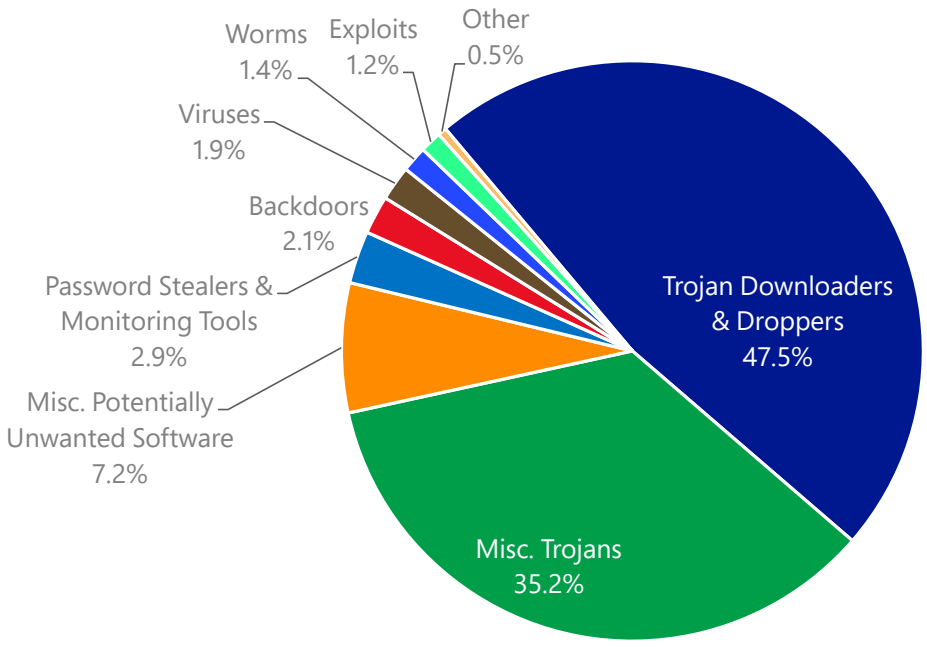


Figure 50. Top families found at sites blocked by SmartScreen Filter in 2H12, by percent of all malware impressions

	Family	Category	Percent of malware impressions
1	Win32/Swisyn	Trojan Downloaders & Droppers	20.8%
2	Win32/Meredrop	Misc. Trojans	10.7%
3	Win32/Microjoin	Trojan Downloaders & Droppers	7.1%
4	Win32/Rimod	Misc. Trojans	5.3%
5	Win32/Dynamer	Misc. Trojans	4.7%
6	Win32/Obfuscator	Misc. Potentially Unwanted Software	4.4%
7	Win32/Dowque	Trojan Downloaders & Droppers	3.9%
8	Win32/Malagent	Misc. Trojans	2.1%
9	Win32/QBundle	Trojan Downloaders & Droppers	2.1%
10	Java/SMSer	Misc. Trojans	1.8%
11	Win32/Kuluoz	Trojan Downloaders & Droppers	1.7%
12	Win32/VB	Worms	1.6%
13	Win32/Xolondox	Trojan Downloaders & Droppers	1.6%
14	Win32/Small	Trojan Downloaders & Droppers	1.5%
15	VBS/Startpage	Misc. Trojans	1.4%

- Most of the families on the list are generic detections for a variety of threats that share certain identifiable characteristics. Eight of the families on the list were also among the top 15 families found at sites blocked by SmartScreen Filter in 1H12, including 4 of the top 5.
- Win32/Swisyn, the family responsible for the most malware impressions in 2H12, is a family of trojans that drops and executes malware on infected computers. These files may be embedded as resource files, and are often bundled with legitimate files in an effort to evade detection. Sites that hosted Swisyn accounted for 20.8 percent of malware impressions in 2H12, a decrease from 24.1 percent in 1H12.
- Win32/Meredrop, in second place, is a generic detection for trojans that drop and execute multiple forms of malware on local computers. 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. Sites that host Meredrop accounted for 10.7 percent of malware impressions in 1H12, an increase from 9.0 percent in 2H11.
- Win32/Rimod, which was not among the top 15 families found at sites blocked by SmartScreen Filter in 1H12, ranked fourth in 2H12. Rimod is a generic detection for certain files that change various security settings in the computer. It is dropped by some variants of Swisyn.
- The generic detection Win32/Bumat, which was third on the 1H11 list, was not among the top 15 families found at sites blocked by SmartScreen Filter in 2H12.

Global distribution of malware hosting sites

As with phishing sites, Figure 51 and Figure 52 show the geographic distribution of malware hosting sites reported to Microsoft in 2H12.

Figure 51. Malware distribution sites per 1,000 Internet hosts for locations around the world in 3Q12 (top) and 4Q12 (bottom)

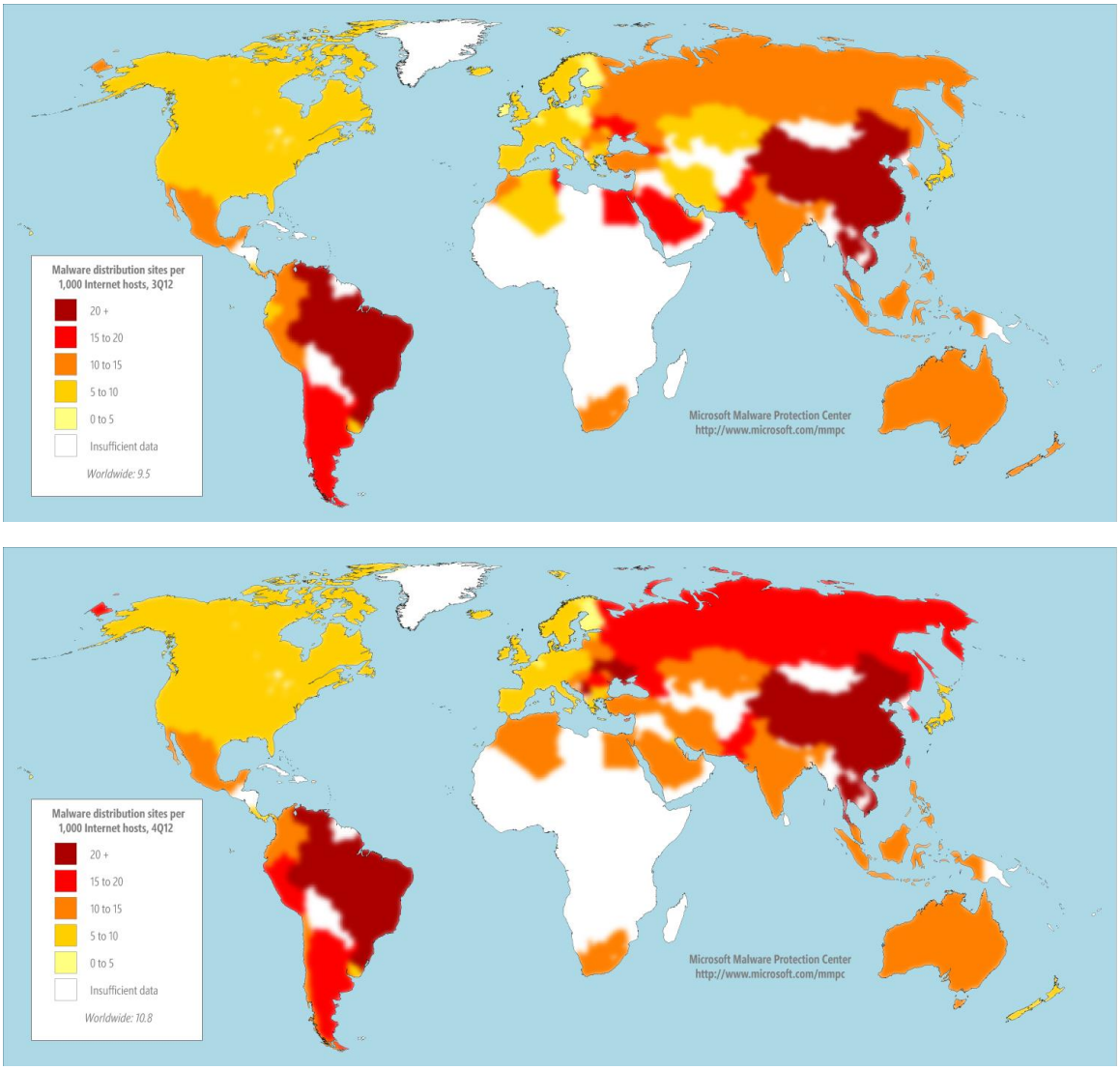
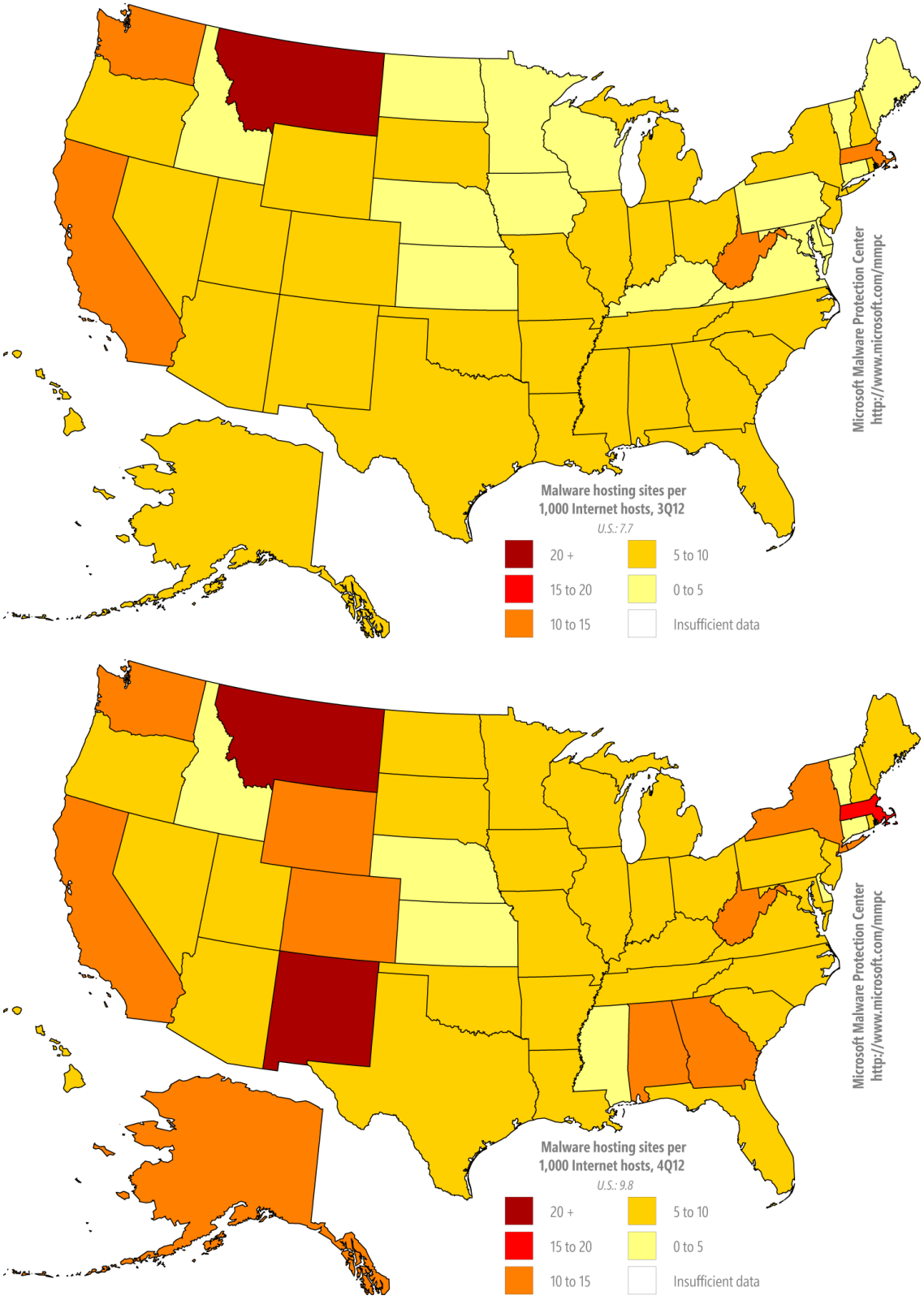
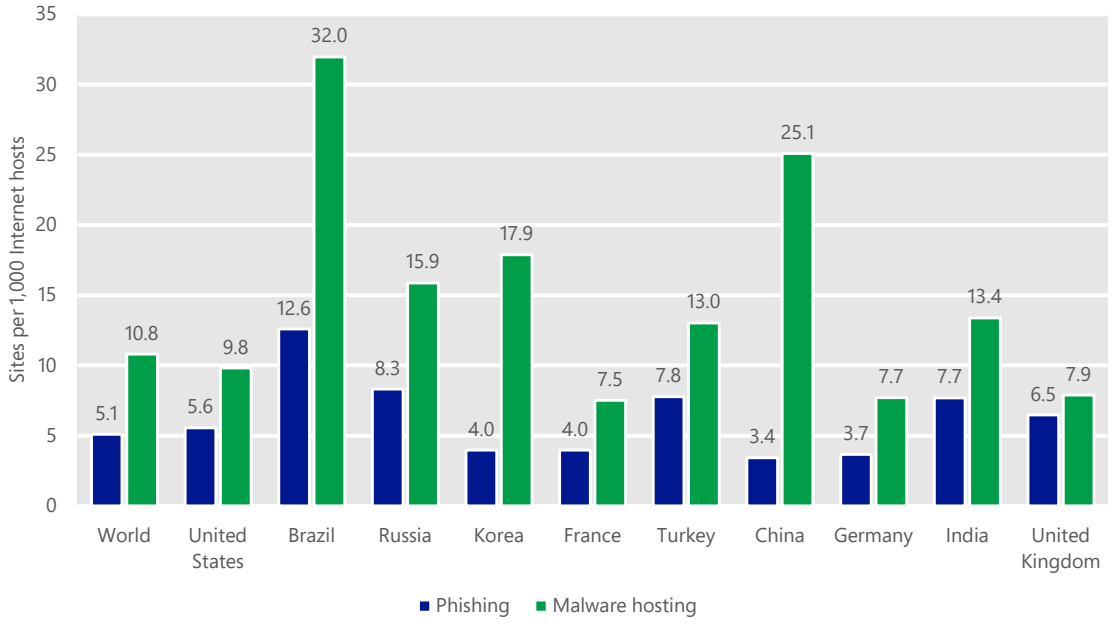


Figure 52. Malware distribution sites per 1,000 Internet hosts for US states in 3Q12 (top) and 4Q12 (bottom)



- Sites that host malware were significantly more common than phishing sites in 2H12. SmartScreen Filter detected 9.5 malware hosting sites per 1000 Internet hosts worldwide in 3Q12, and 10.8 per 1000 in 4Q12.
- China, which had a lower than average concentration of phishing sites (3.4 phishing sites per 1000 Internet hosts in 4Q12), also had a very high concentration of malware hosting sites (25.1 malware hosting sites per 1000 hosts in 4Q12). Other locations with large concentrations of malware hosting sites included Brazil (32.0), Korea (17.9), and Russia (15.9). Locations with low concentrations of malware hosting sites included Japan (5.3), Sweden (5.4), and Poland (6.1).
- Unlike with phishing sites, no significant correlation was observed among US states between number of hosts and malware hosting site concentration.
- US states with high concentrations of malware hosting sites include New Mexico (34.6 per 1000 Internet hosts in 2Q12), Montana (22.0), and Massachusetts (15.1). States with low concentrations of malware hosting sites include Idaho (3.2), Delaware (3.3), and Kansas (3.3).

Figure 53. Phishing and malware hosting sites worldwide and for 10 prominent locations, 4Q12



Drive-by download sites

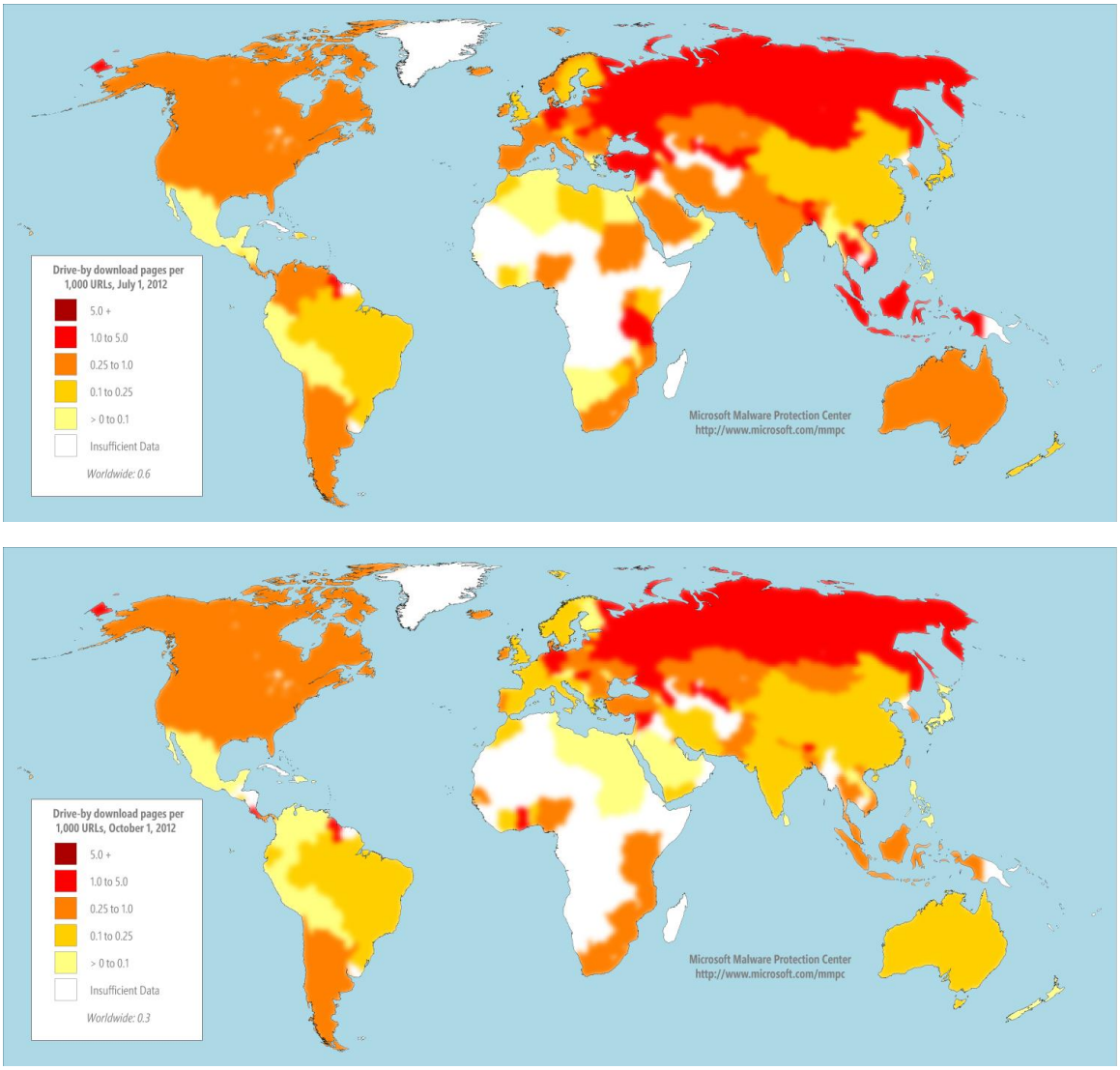
A *drive-by download* site is a website that hosts one or more exploits that target vulnerabilities in web browsers and browser add-ons. Users with vulnerable

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 54 shows the concentration of drive-by download pages in countries and regions throughout the world at the end of 3Q12 and 4Q12, respectively.

Figure 54. Drive-by download pages indexed by Bing at the end of 3Q12 (top) and 4Q12 (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.
- Significant locations with high concentrations of drive-by download URLs in both quarters include Azerbaijan, with 3.9 drive-by URLs for every 1,000 URLs tracked by Bing at the end of 4Q12; Syria, with 3.8; and Uzbekistan, with 3.2.

Guidance: Protecting users from unsafe websites

One of the best ways organizations can protect their users from malicious and compromised websites is 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

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