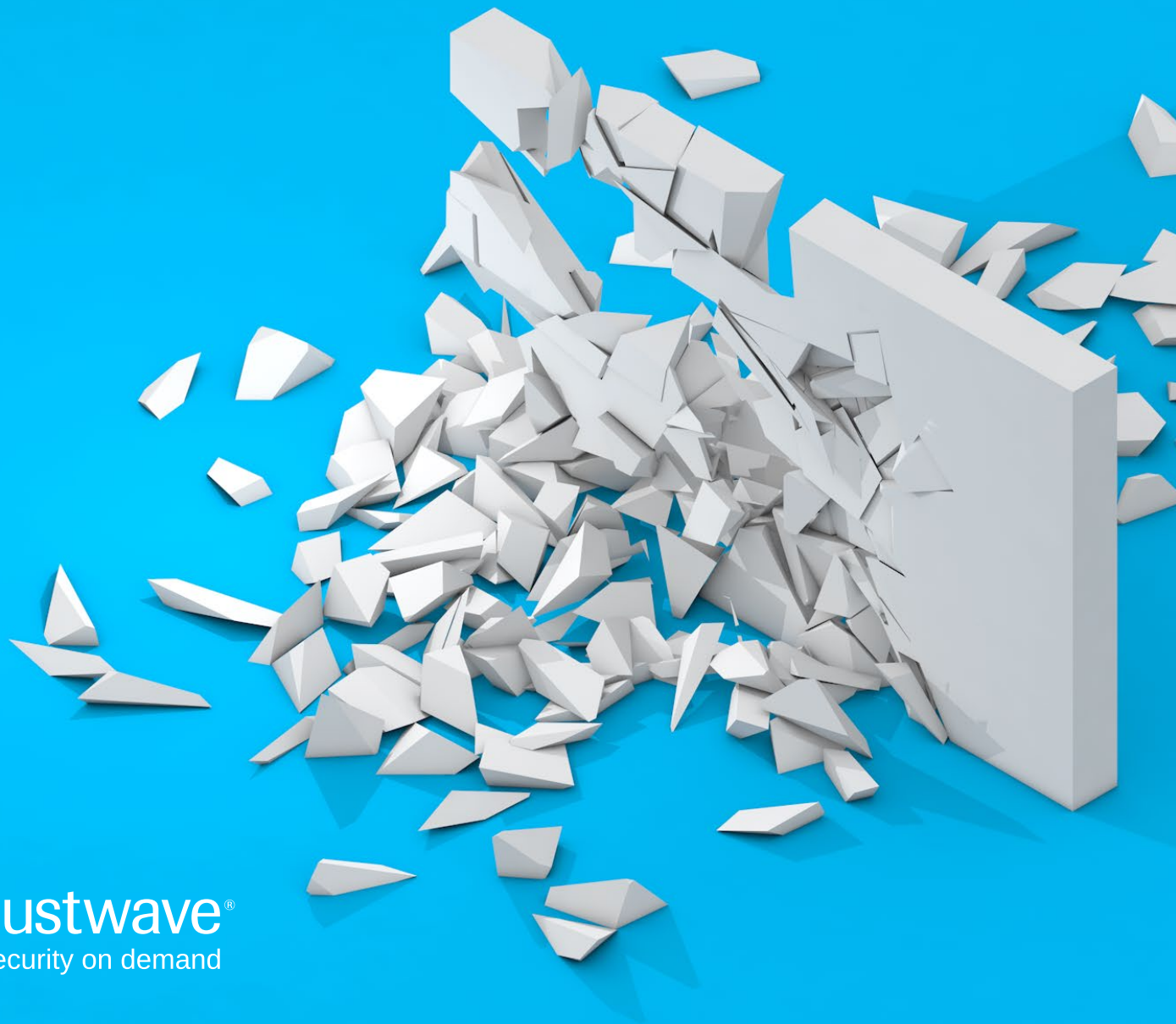
2014 TRUSTWAVE GLOBAL SECURITY REPORT



Trustwave®
Smart security on demand

EXECUTIVE SUMMARY

Here we present key insights and recommendations based on our analysis of 691 data breach investigations conducted in 2013 and threat intelligence from our global security operations centers, telemetry from security technologies and research.

Key Insights

Data and Systems Targeted

- Our volume of data breach investigations increased 54 percent in 2013, compared to 2012
- 45 percent of data thefts involved non-payment card data
- E-commerce made up 54 percent of assets targeted
- Point-of-sale (POS) breaches accounted for 33 percent of our investigations

Victims of Compromise

- 59 percent of victims reside in the United States, 14 percent in the United Kingdom and 11 percent in Australia
- Retail was the top industry compromised, making up 35 percent of the attacks we investigated

Intrusion Methods

- 85 percent of the exploits detected were of third party plug-ins, including Java, Adobe Flash and Adobe Acrobat/Reader
- Blackhole remained the most prevalent exploit kit at 49 percent—15 percent less than in 2012
- Weak passwords contributed to 31 percent of compromises we investigated
- Spam made up 70 percent of inbound mail, 5 percent less than in 2012

Application Vulnerabilities

- 96 percent of applications scanned by Trustwave harbored one or more serious security vulnerabilities
- E-commerce and website compromises rose by 5 percent from 2012
- The median number of vulnerabilities per application was 14
- 100 percent of the mobile applications we tested contained at least one vulnerability

Detecting a Compromise

- 71 percent of compromise victims did not detect the breach themselves
- Self-detection can shorten the timeline from detection to containment from 14 days to 1 day
- The median number of days from initial intrusion to detection was 87
- The median number of days from detection to containment was seven

Action Plan

- Protect users from themselves and educate your staff and employees on best security practices
- Annihilate weak passwords by implementing and enforcing strong authentication policies and practices
- Attackers are diversifying their methods and targets, so assess data protection across all assets—endpoints, networks, applications and databases
- Use penetration testing to evaluate how resilient your systems are to compromise
- Develop, institute and rehearse an incident response plan, and identify which events or indicators of compromise should trigger the plan

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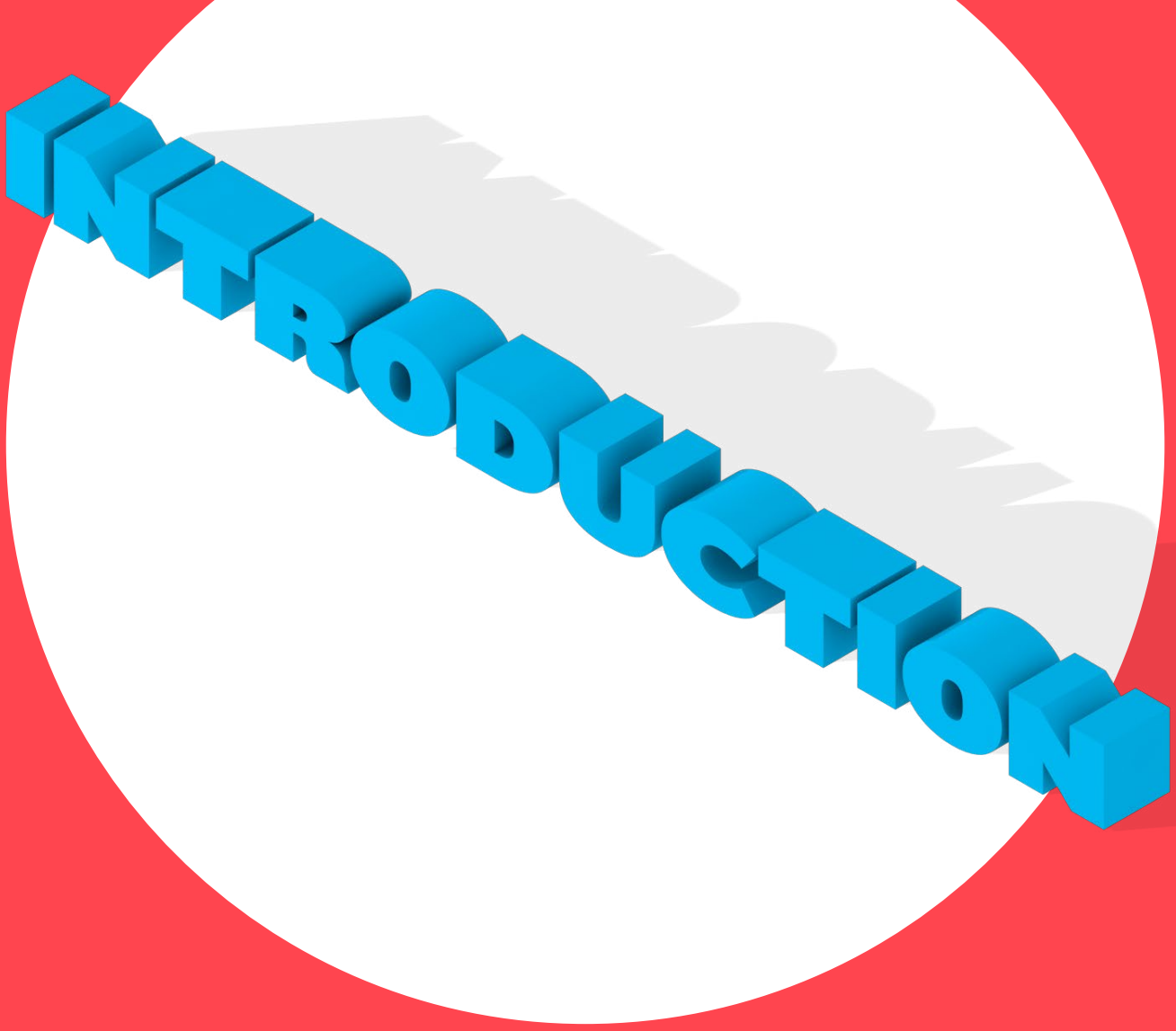
INTRODUCTION – KEY INSIGHTS & ACTION PLAN



The 2014 Trustwave Global Security Report is back for another year, and we couldn't be prouder of this year's edition. We again lean on hard evidence gathered from hundreds of data breach investigations conducted last year – 691 to be exact, spread across industries and the world – as well as threat intelligence gathered from our products and security operations centers. Using that evidence, we zero in on the critical components of a compromise that matter to you, including attackers, entry points, vulnerabilities and exploits, indicators of compromise and targets.

Each reader will consume the data contained in this report in different ways. Our hope is that you use it to help accomplish security goals that will allow your organization to stay better protected and grow. Here is how we laid out this year's report: This introduction and summary provides an overview of our key findings and then suggests a five-step action plan for your organization. Section 1 focuses on the trends surrounding victims, attackers and their locations. Section 2 – the biggie – deconstructs and deciphers the massive amount of threat intelligence we uncovered in 2013. Section 3 details how cybercrime is uniquely impacting different regions of the world.

DATA AND SYSTEMS TARGETED BY ATTACKERS

THE VOLUME OF DATA BREACH INVESTIGATIONS INCREASED 54 PERCENT OVER 2012.

—

Trustwave conducted 691 investigations in 2013, compared to 450 in 2012.

45 PERCENT OF DATA THEFTS INVOLVED NON-PAYMENT CARD DATA.

45%

While payment card data continues to top the list of the types of data compromised, we saw a 33 percent increase in the theft of sensitive and confidential information such as financial credentials, internal communications, personally identifiable information and various types of customer records.

E-COMMERCE MADE UP 54 PERCENT OF ASSETS TARGETED.

54%

POS

POINT-OF-SALE (POS) BREACHES ACCOUNTED FOR 33 PERCENT OF OUR INVESTIGATIONS.

33%

59%

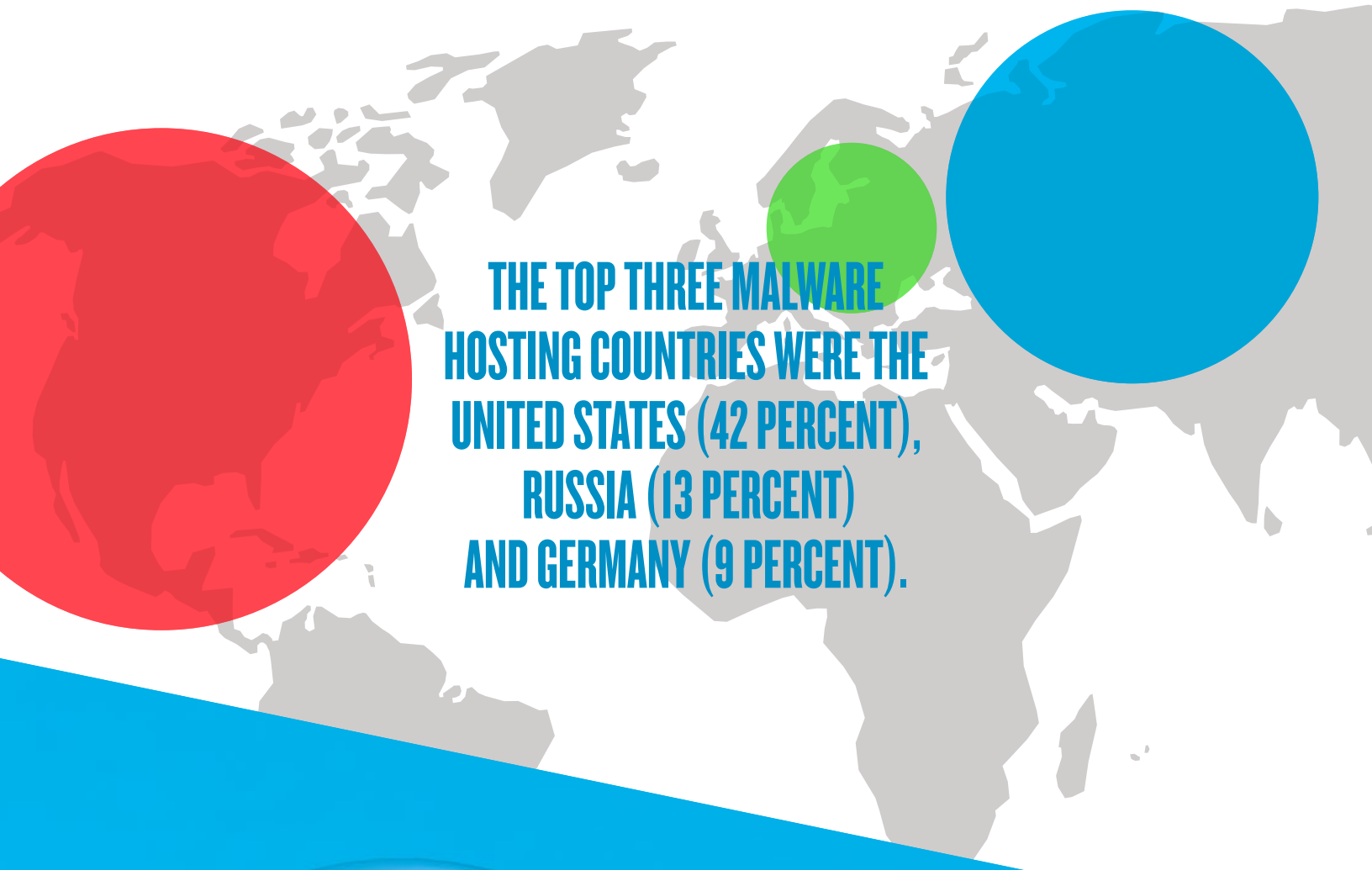
OF VICTIMS RESIDE IN THE UNITED STATES

When ranking the top ten victim locations in our investigations, 59 percent of victims reside in the United States, making the country more than four times as common as the next closest victim location, the United Kingdom, at 14 percent. Australia ranked third, at 11 percent.

Retail once again was the top industry compromised, making up 35 percent of the attacks we investigated in 2013. Food and beverage ranked second at 18 percent and hospitality ranked third at 11 percent.

RETAIL

35%

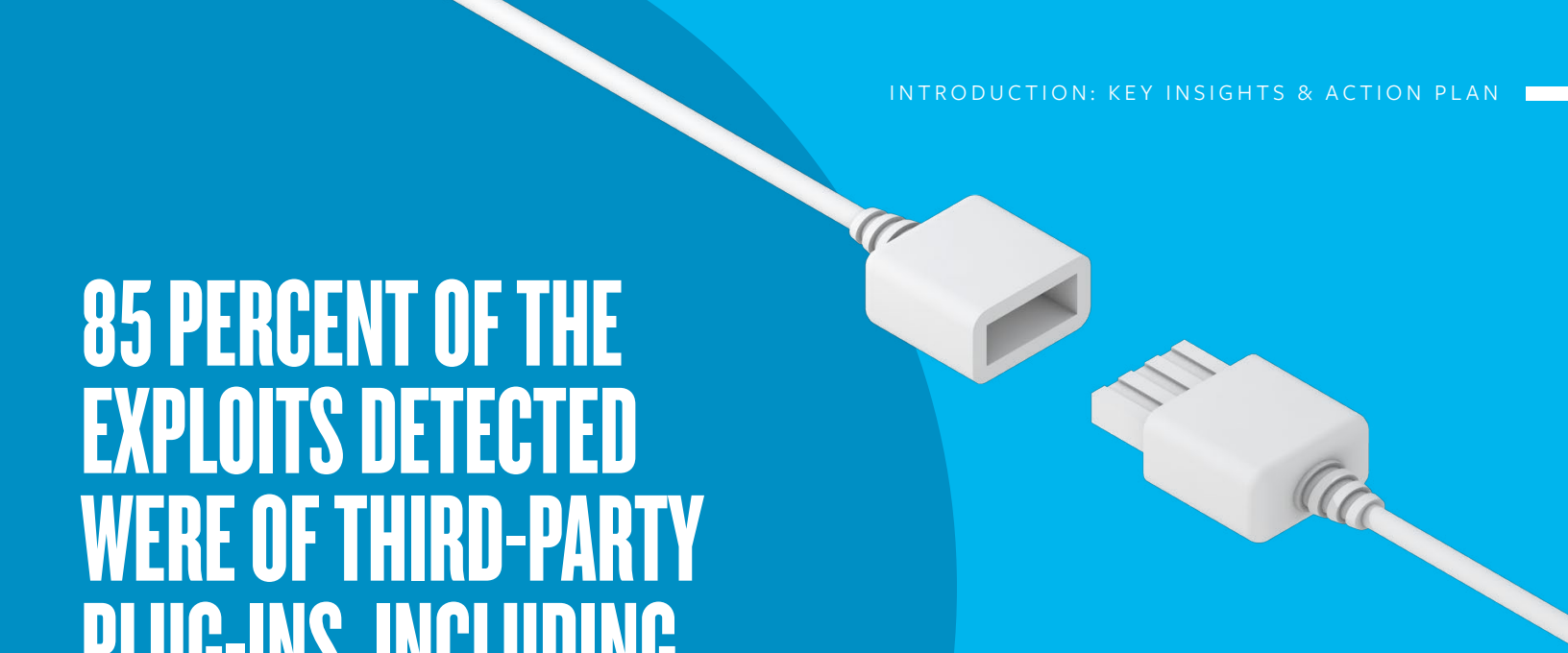


THE TOP THREE MALWARE HOSTING COUNTRIES WERE THE UNITED STATES (42 PERCENT), RUSSIA (13 PERCENT) AND GERMANY (9 PERCENT).

CRIMINALS RELIED MOST ON JAVA APPLETS AS A MALWARE DELIVERY METHOD

78 percent of exploits we detected took advantage of Java vulnerabilities.

85 PERCENT OF THE EXPLOITS DETECTED WERE OF THIRD-PARTY PLUG-INS, INCLUDING JAVA AND ADOBE FLASH, ACROBAT AND READER.



85%

BLACKHOLE TOPPED THE LIST OF MOST PREVALENT EXPLOIT KITS AT 49 PERCENT

However, the arrest of its creator and a lack of updates to the kit spurred a 15 percent decline in Blackhole's prevalence. We expect the second-most prevalent exploit kit, Magnitude at 31 percent, to fill the gap.

WEAK PASSWORDS OPENED THE DOOR FOR THE INITIAL INTRUSION IN 31 PERCENT OF COMPROMISES.

59 PERCENT OF MALICIOUS SPAM INCLUDED ATTACHMENTS

41 percent included malicious links

SPAM MADE UP 70 PERCENT OF INBOUND MAIL

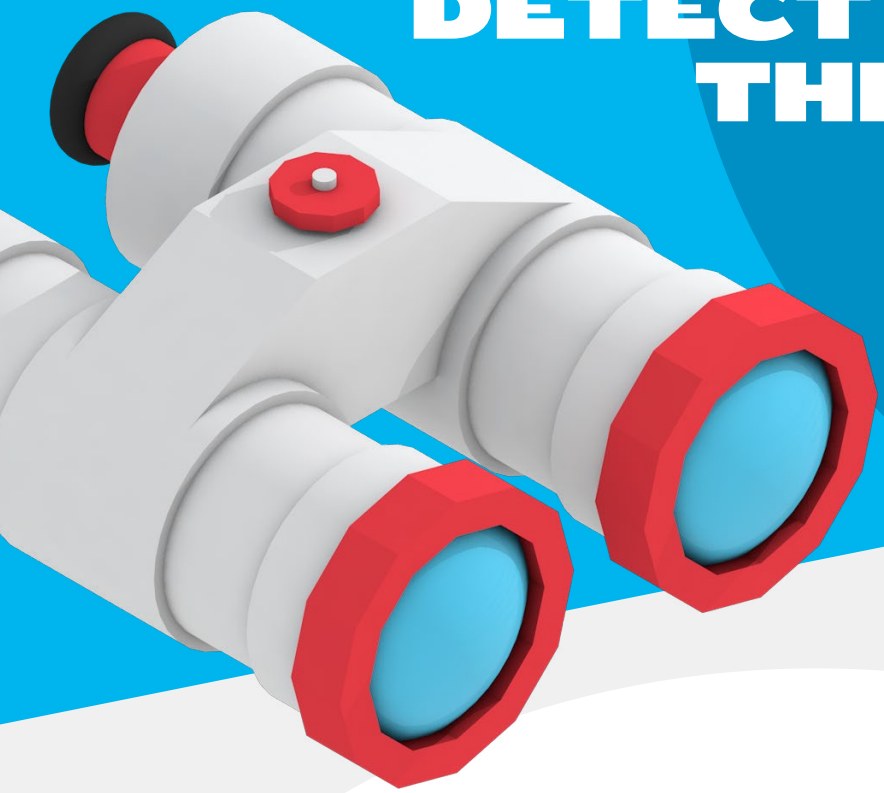
—

However, malicious spam dropped 5 percent in 2013.

96 PERCENT OF APPLICATIONS SCANNED BY TRUSTWAVE HARBORED ONE OR MORE SERIOUS SECURITY VULNERABILITIES.

96%

71 PERCENT OF COMPROMISE VICTIMS DID NOT DETECT BREACHES THEMSELVES.



THE DATA DEMONSTRATES HOW CRITICAL SELF-DETECTION IS IN SHORTENING THE TIMELINE TO CONTAINMENT.

For example, the median number of days it took organizations that self-detected a breach to contain the breach was one day, whereas it took organizations 14 days to contain the breach when it was detected by a third party.

MEDIAN NUMBER OF DAYS FROM INITIAL INTRUSION TO DETECTION WAS 87 DAYS.

MEDIAN NUMBER OF DAYS FROM DETECTION TO CONTAINMENT WAS SEVEN DAYS.

1

Attackers continue to use malicious links and attachments as a method of entry into a business. Protect users from themselves: Educate employees on best security practices, including strong password creation and awareness of social engineering techniques like phishing. Invest in gateway security technologies as a fallback to automate protection from threats such as zero-day vulnerabilities, targeted malware and malicious email.

PROTECT USERS FROM THEMSELVES

2

ANNIHILATE WEAK PASSWORDS

Weak or default passwords contributed to one third of compromises investigated by Trustwave. Annihilate weak passwords: Implement and enforce strong authentication policies. Thirty percent of the time, an attacker gains access because of a weak password. Strong passwords—consisting of a minimum of seven characters and a combination of upper and lower case letters, symbols and numbers—play a vital role in helping prevent a breach. Even better are passphrases that include eight to 10 words that are not published (such as well-known quotations). Businesses should also deploy two-factor authentication for employees who access the network. This forces users to verify their identity with information other than simply their username and password, like a unique code sent to a user's mobile phone.

3

PROTECT THE REST

We saw attackers diversifying the types of data they target. It's not just about payment card data anymore. Protect the rest: Secure all of your data, and don't lull yourself into a false sense of security just because you think your payment card data is protected. Assess your entire set of assets—from endpoint to network to application to database. Any vulnerability in any asset could lead to the exposure of data. Combine ongoing testing and scanning of these assets to identify and fix flaws before an attacker can take advantage of them.

4

Just about every single data point in this report can help you understand the real threats against your organization. Model the threat and test your systems' resilience to it with penetration testing. Pitting a security expert against your network hosts, applications and databases applies a real-world attacker's perspective to your systems (a threat model). A penetration test transcends merely identifying vulnerabilities by demonstrating how an attacker can take advantage of them and expose data.

MODEL THE THREAT

5

Victims that identify a breach on their own detect it sooner and reduce clean-up time by two weeks. Plan your response: Develop, institute and rehearse an incident response plan. Identify what sorts of events or indicators of compromise will trigger your incident response plan. A plan will help make your organization aware of a compromise sooner, limit its repercussions and shorten its duration.

PLAN YOUR RESPONSE

SECTION 1 – DATA COMPROMISE

LOCATIONS: VICTIMS & ATTACKERS

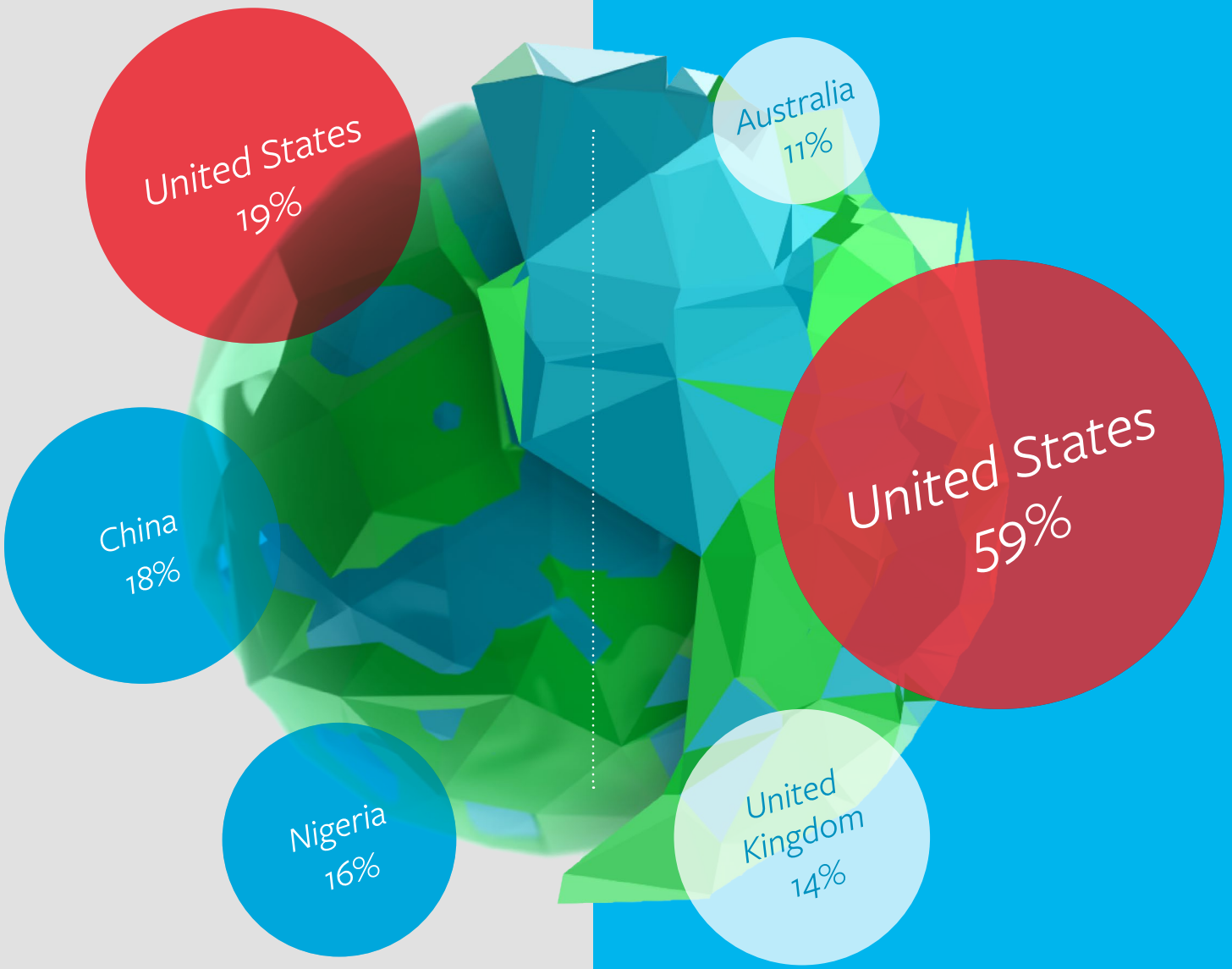
Trustwave investigated 691 breaches across 24 countries in 2013—an increase of 53.6 percent over 2012 (450 cases). In the majority of cases we investigated, attackers targeted payment card data. A global, thriving underground provides for quick monetization of stolen data—no matter where the victim or attacker resides. As long as criminals can make money by stealing data and selling that sensitive information on the black market, we don't expect data compromises to subside.

Meanwhile, we don't suggest that large populations of criminal hackers reside in any of the countries listed in the Attack Source IP Addresses chart on the next page or that these countries are engaging in state-sponsored hacking. The United States, for example, tops the list of attack source IP addresses. This may be a result of foreign attackers adapting to businesses blocking connections from foreign IP addresses by compromising other assets within the target country and using them as "jump servers" to launch attacks against primary targets.

59% of victims reside in the United States, more than four times as many as in the second most common victim location, the United Kingdom.

ATTACK SOURCE IP ADDRESSES

LOCATION OF VICTIMS



19%	United States	4%	Germany
18%	China	4%	United Kingdom
16%	Nigeria	4%	Japan
5%	Russia	3%	France
5%	Korea	3%	Taiwan

19% Other Countries

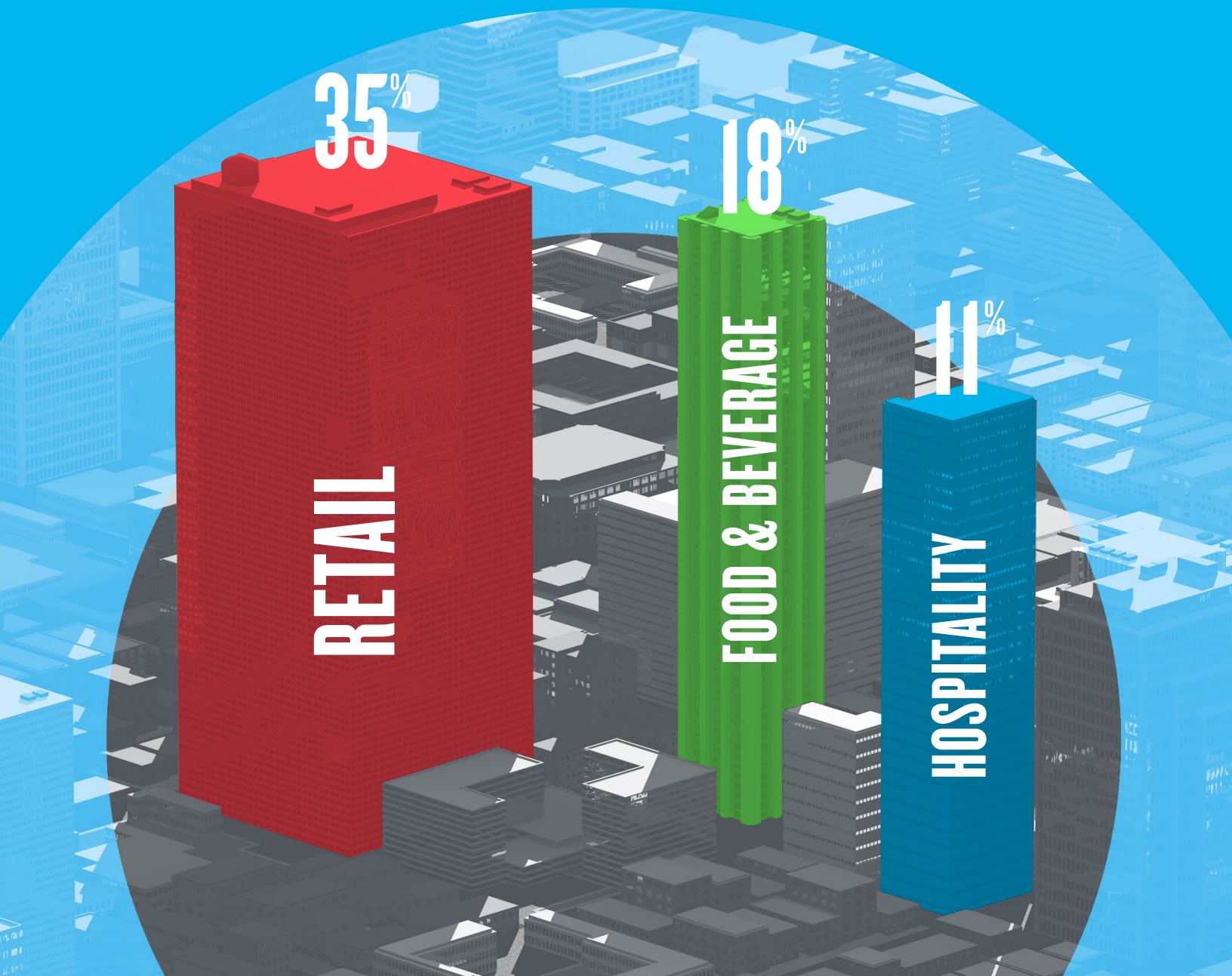
59%	United States	1%	Mauritus
14%	United Kingdom	1%	New Zealand
11%	Australia	1%	Ireland
2%	Hong Kong	1%	Belgium
2%	India	1%	Canada

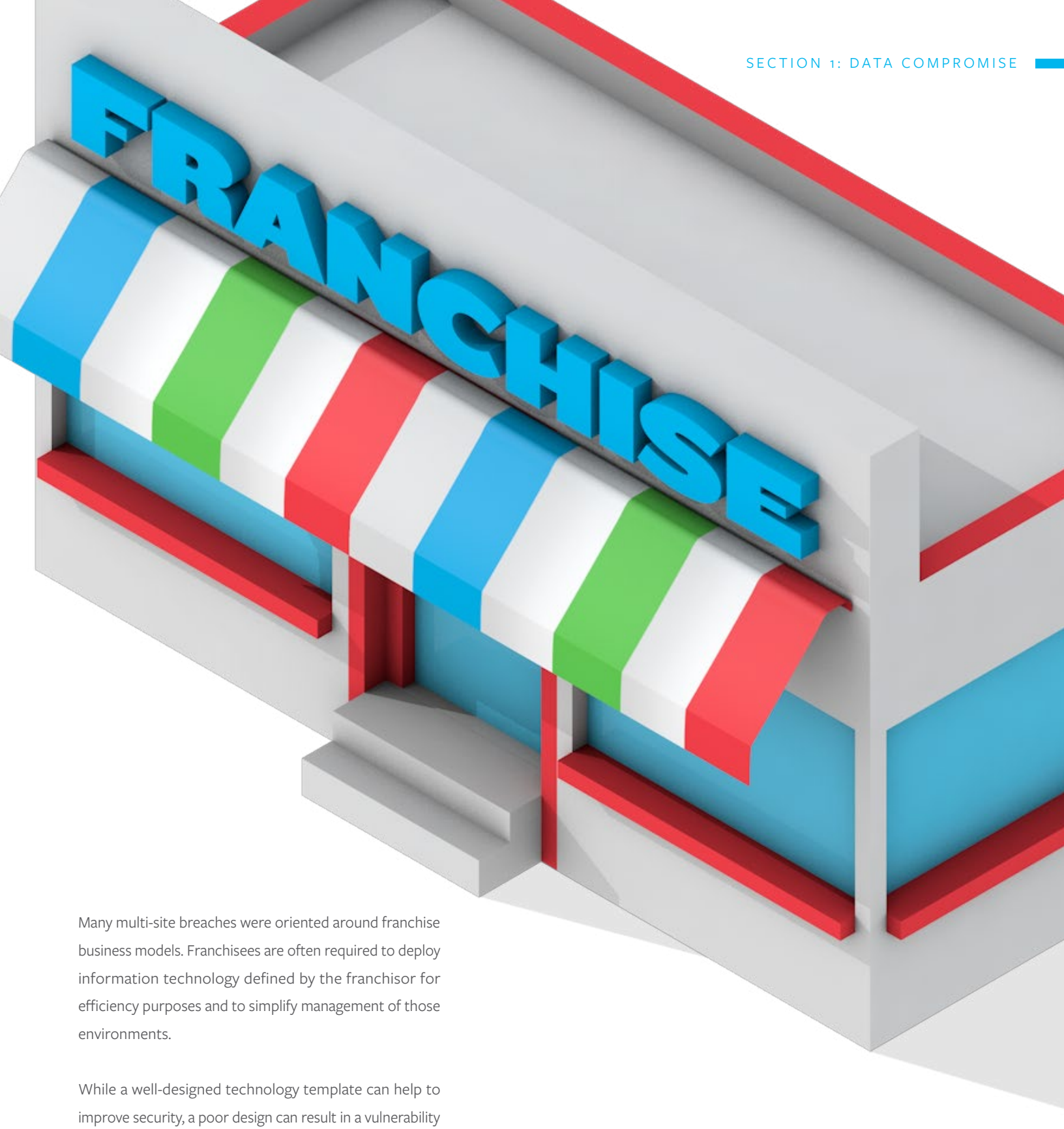
7% Other Countries

COMPROMISES BY INDUSTRY

35%	Retail	6%	Technology
18%	Food and Beverage	4%	Entertainment
11%	Hospitality	3%	Transportation
9%	Finance	2%	Health care
8%	Professional services	4%	Other

Every year that we produce the Trustwave Global Security Report, retail, food and beverage and hospitality jostle for position as the most frequently compromised industries. Retail once again led the pack in 2013 at 35 percent, a decrease of 10 percent over 2012. Food and beverage industry breaches accounted for 18 percent of the total, a five percent decrease from 2012.





Many multi-site breaches were oriented around franchise business models. Franchisees are often required to deploy information technology defined by the franchisor for efficiency purposes and to simplify management of those environments.

While a well-designed technology template can help to improve security, a poor design can result in a vulnerability present across potentially thousands of locations. If an attacker discovers and takes advantage of a flaw at one franchise, they can replicate the exploit at other locations.

FRANCHISE BREACH TYPES

1

By breaching a single location, attackers take advantage of the multi-protocol label switching (MPLS) network used by many franchisors to connect individual locations with the corporate headquarters. The intruder can then advance quickly throughout the environment and other connected, remote locations or the headquarters.

FRANCHISE ↓ ↓ ↓ HEADQUARTERS

2

HEADQUARTERS ↓ ↓ ↓ ALL LOCATIONS

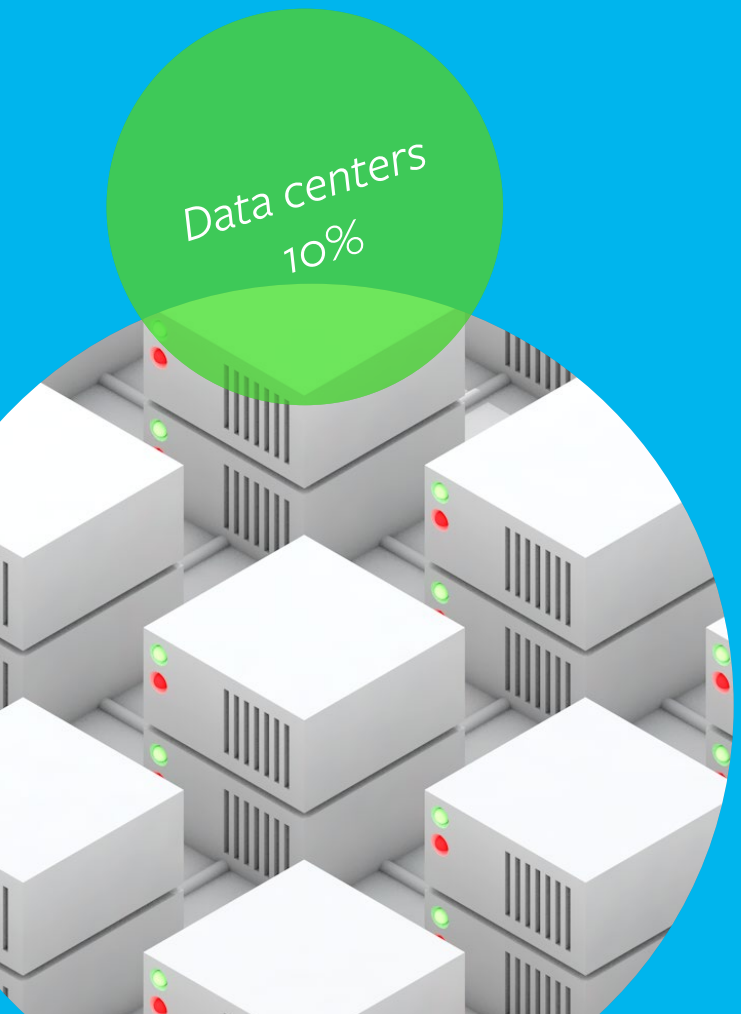
Attackers compromise the corporate headquarters and pivot from there to multiple locations.

3

Attackers compromise, for example, a third-party point-of-sale (POS) integration firm used by most or all of the franchises. This enables them to pivot to multiple locations.

THIRD PARTY ↓ ↓ ↓ ALL LOCATIONS

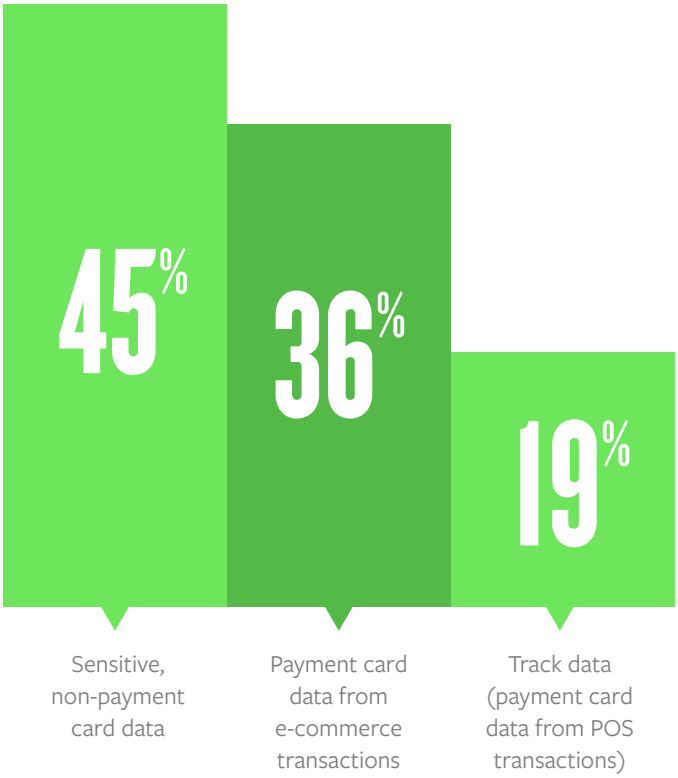
ASSETS TARGETED



The year ended with media coverage of high-profile POS compromises at large retailers, and the Trustwave data showed that POS-related breaches accounted for 33 percent of our investigations. However, e-commerce/website breaches are still in top position, accounting for 54 percent of Trustwave investigations, with corporate infrastructure breaches accounting for 10 percent. We expect compromises of both e-commerce and POS systems to continue to dominate our investigations through 2014 and beyond.

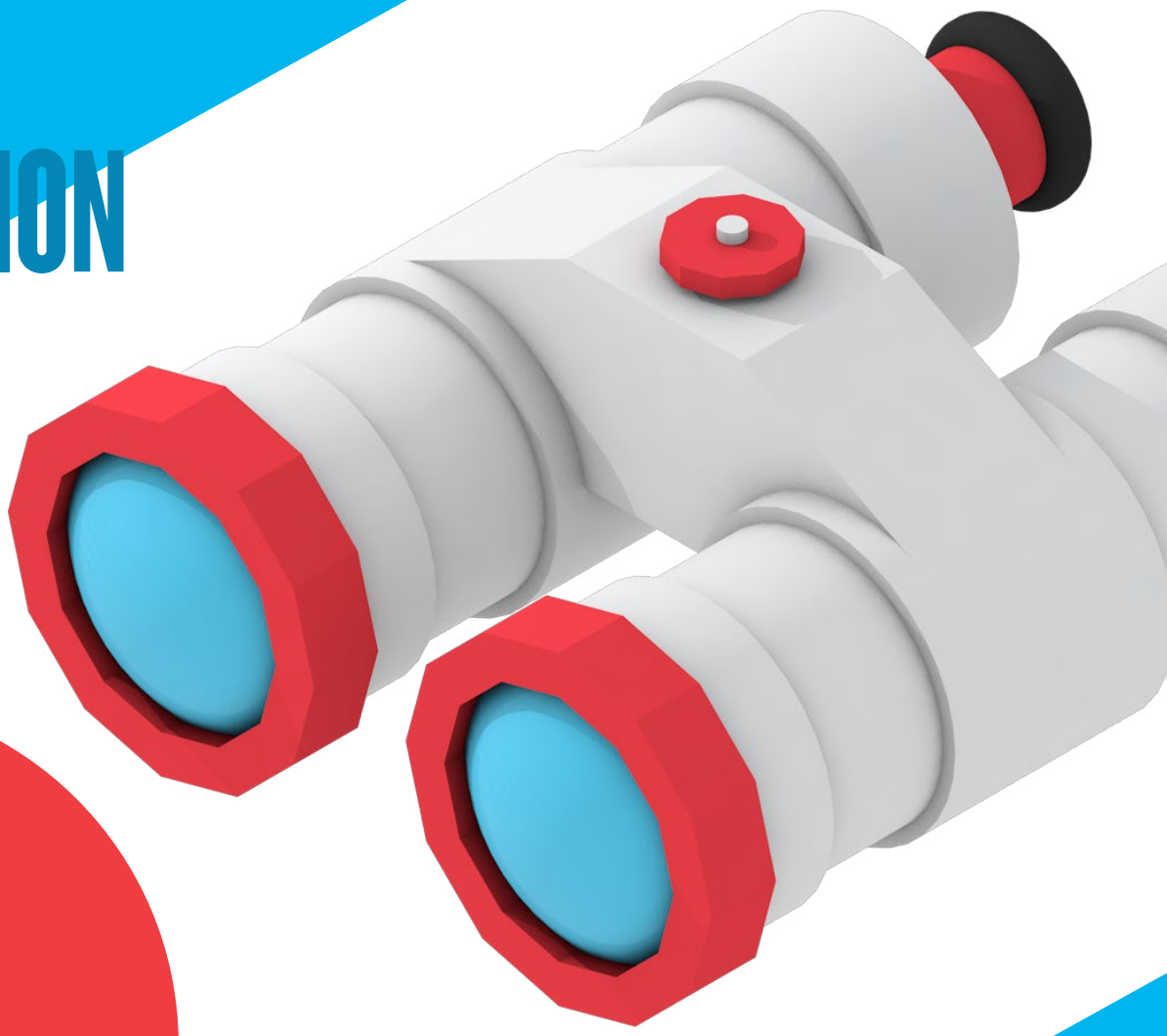
DATA TYPES

45% of data theft in our 2013 investigations involved non-payment card data. Get to know all your confidential and sensitive data—understand where it lives and ensure that it is being protected as it is being accessed, shared, stored and moved so you can keep it out of the hands of attackers.



Not surprisingly, payment card data still tops the list when it comes to data theft. However, in 2013, we saw another noteworthy trend playing out in parallel. Our investigations showed an increase of 33 percent of cases involving the theft of non-payment card data, including sensitive and confidential information, such as financial credentials, internal communications, merchant ID numbers, and other personally identifiable information (PII). If this data set speaks to broader trends, it appears that attackers are more aggressively setting their sights on other types of confidential data, and businesses that don't process payment cards should prepare to take action. Particularly notable in our analysis of data theft in 2013 is a 22 percent increase in the theft of financial account credentials.

BREACH DETECTION



71%

OF VICTIMS DID NOT DETECT A BREACH THEMSELVES

58% Regulatory, card brands, merchant banks
29% Self-detection
7% Other third-party
3% Public detection
3% Law enforcement

Self-detection of breaches remains low. Seventy-one percent of the time in 2013, victims did not detect their own compromises. However, breaches that were self identified led to shorter durations, which cut down on the time an attacker could siphon data from compromised systems and helped limit the repercussions.

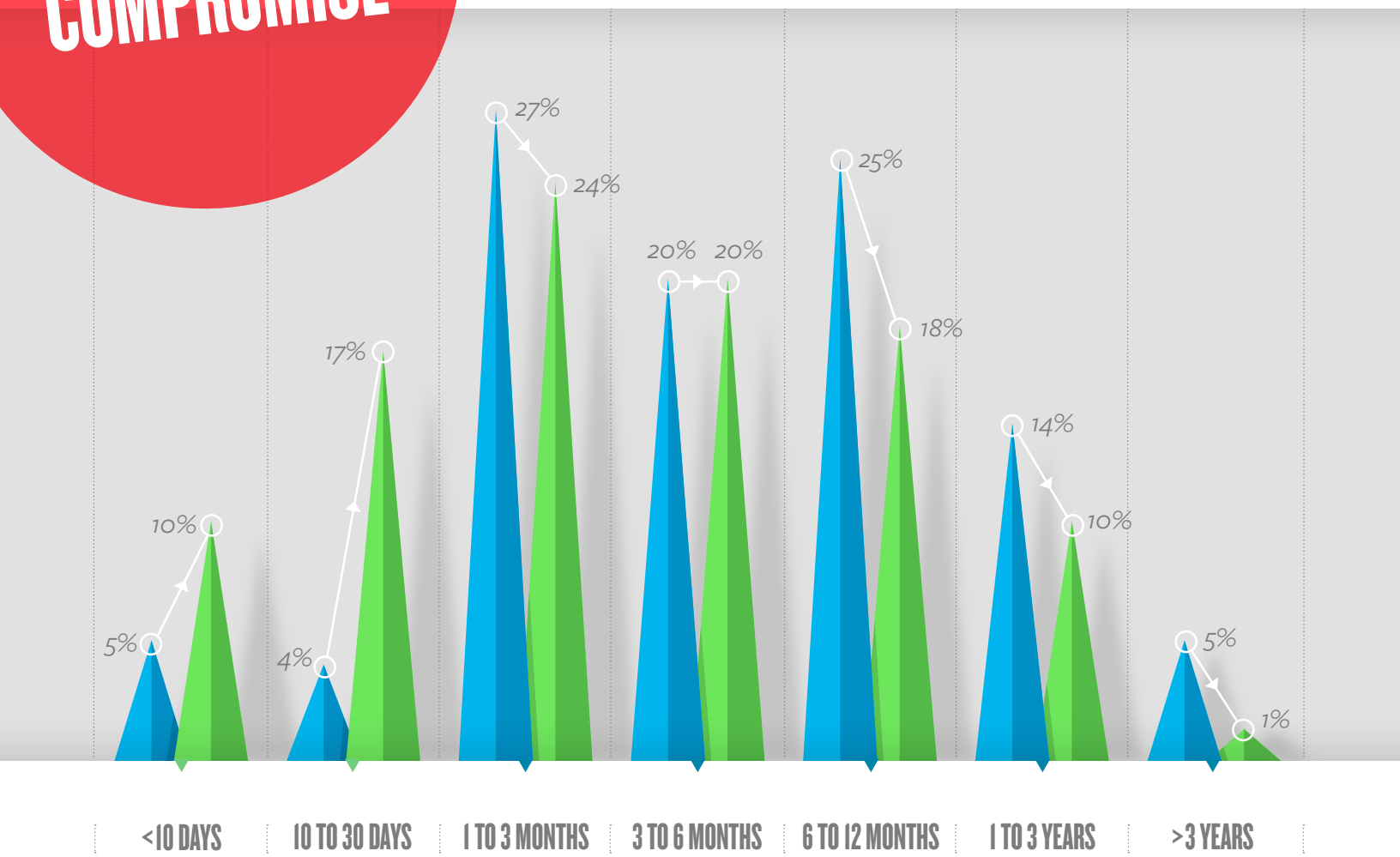
UPON DISCOVERY OF A BREACH, 67% OF VICTIMS WERE ABLE TO CONTAIN IT WITHIN 10 DAYS, A RELATIVELY ENCOURAGING STATISTIC

From 2012 to 2013, there was a decrease in the amount of time an organization took to contain a breach. In half of the compromises investigated by Trustwave, the victim contained the breach within four months of the initial intrusion. Seventy-one percent of breaches in 2013 (a 15 percent increase over 2012) were contained within six months.

DURATION OF COMPROMISE

INTRUSION TO CONTAINMENT

2012 2013



INTRUSION TO DETECTION 2013

<10 DAYS	10 TO 30 DAYS	1 TO 3 MONTHS	3 TO 6 MONTHS	6 TO 12 MONTHS	1 TO 3 YEARS	>3 YEARS
14%	15%	29%	21%	13%	8%	1%

DETECTION TO CONTAINMENT 2013

<10 DAYS	10 TO 30 DAYS	1 TO 3 MONTHS	3 TO 6 MONTHS	6 TO 12 MONTHS	1 TO 3 YEARS	>3 YEARS
67%	14%	14%	4%	1%	0%	0%

The sum of values may not equal 100 percent due to rounding

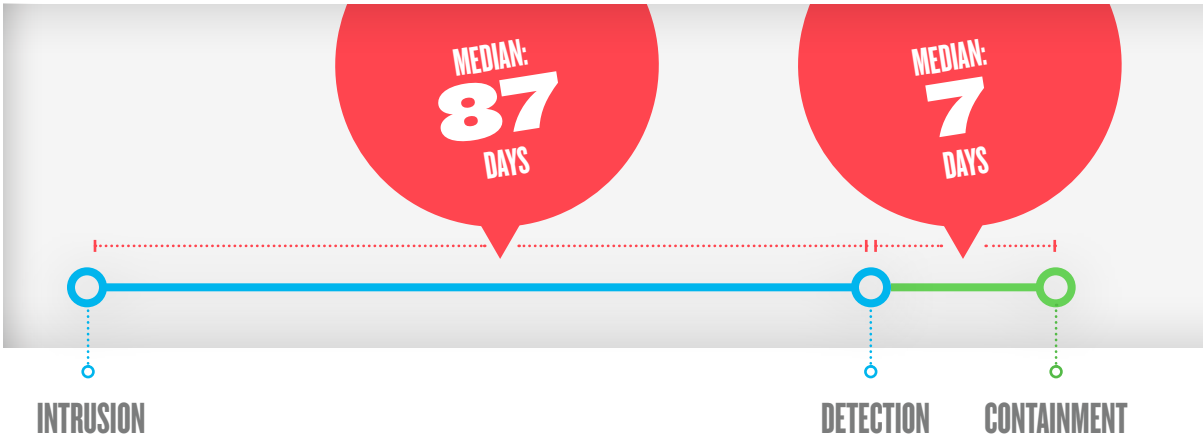
MEDIAN DURATIONS + DETECTION METHOD

In some cases, Trustwave investigators gathered relevant data to determine the median durations between three milestones in a compromise: intrusion to detection, detection to containment and intrusion to containment. Victims that detect a breach on their own do so sooner, respond to it faster and contain it more quickly.

OVERALL

Intrusion to Containment Median: **114 DAYS**

The median number of days between the date of the initial intrusion and containment of the breach was 114 days, meaning half of compromise victims contained a breach within approximately four months of the initial intrusion.*



INTRUSION TO DETECTION

SELF DETECTED — *31.5 days*

THIRD PARTY — *108 days*

The median number of days from the date of the initial intrusion to the date of detection was 87, meaning that half of compromise victims became aware of a breach within approximately three months of the initial intrusion.

DETECTION TO CONTAINMENT

SELF DETECTED — *1 day*

THIRD PARTY — *14 days*

The median number of days from the date of detection to the date of containment was approximately seven, which means half of compromise victims contained a breach within a week of its detection—a relatively encouraging statistic.

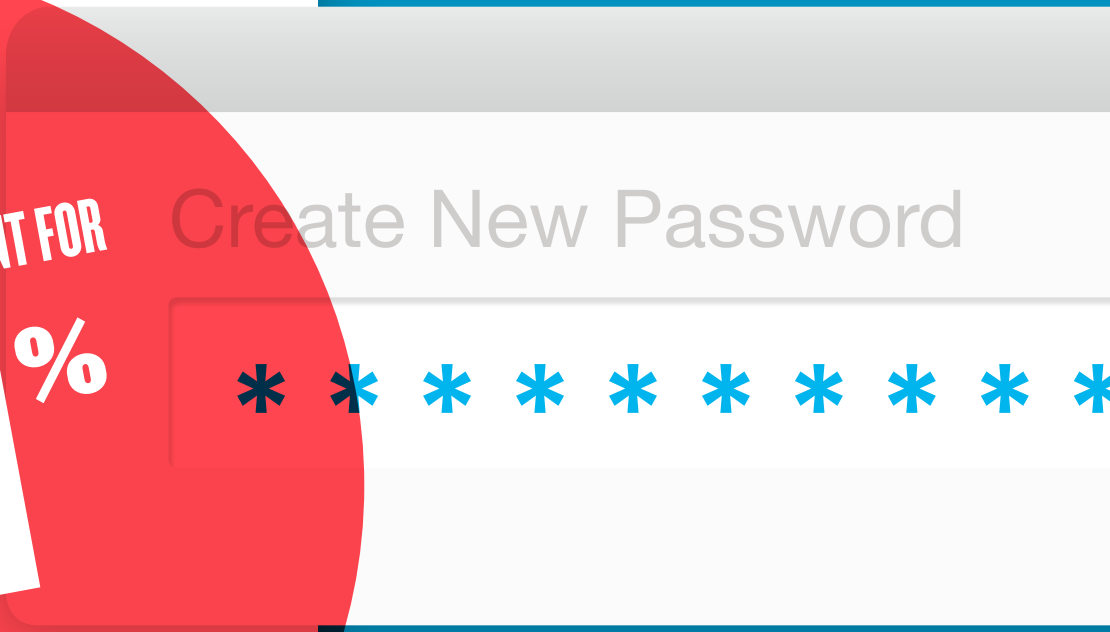
*In the past, we've reported the mean amount of time between the initial intrusion and detection of a breach. Trustwave believes the median is a more meaningful average in these cases, so that outliers don't skew the data. In the interest of comparing 2013 with 2012, however, the mean in 2013 was 134 days compared to 210 days in 2012, a reduction of approximately 2 1/2 months.

METHODS OF INTRUSION

To steal data, attackers must first gain access to the target system. They may slip in through numerous means: weak login credentials, poor authentication controls, SQL injection, remote file inclusion, etc.

- *31% Weak passwords**
- *25% Unknown†*
- *12% File upload flaw*
- *10% Vulnerable off-the-shelf software‡*
- *8% SQL injection*
- *6% Phishing*
- *4% Authorization flaw*
- *4% Remote file inclusion, physical access or directory traversal*

In addition to brick-and-mortar locations, databases involved in e-commerce payments continue to be common targets of attack. As has been the case for more than 15 years, poor coding and data storage practices have left sites vulnerable to SQL injection, whereby criminal hackers gain access to cardholder data stored in databases.



* Includes passwords from VPN, SSH, remote desktop, application administration, etc.

† Insufficient evidence to determine the mechanism of intrusion (due to poor logging practices or an attacker adept at covering their tracks)

‡ Includes unpatched software and zero-day attacks

INDICATORS OF COMPROMISE

Breach activity does not transpire in a vacuum. Interaction with the compromised system must take place, and this process frequently leaves behind footprints of the activity occurring. These clues are commonly referred to as indicators of compromise (IOCs).

Monitoring systems for indicators of compromise and responding appropriately is critical to reducing the timeframe and potential impact of a breach. In cases of self-detection, an organization can take action much sooner, but an organization detects the breach itself in only about a third of cases.

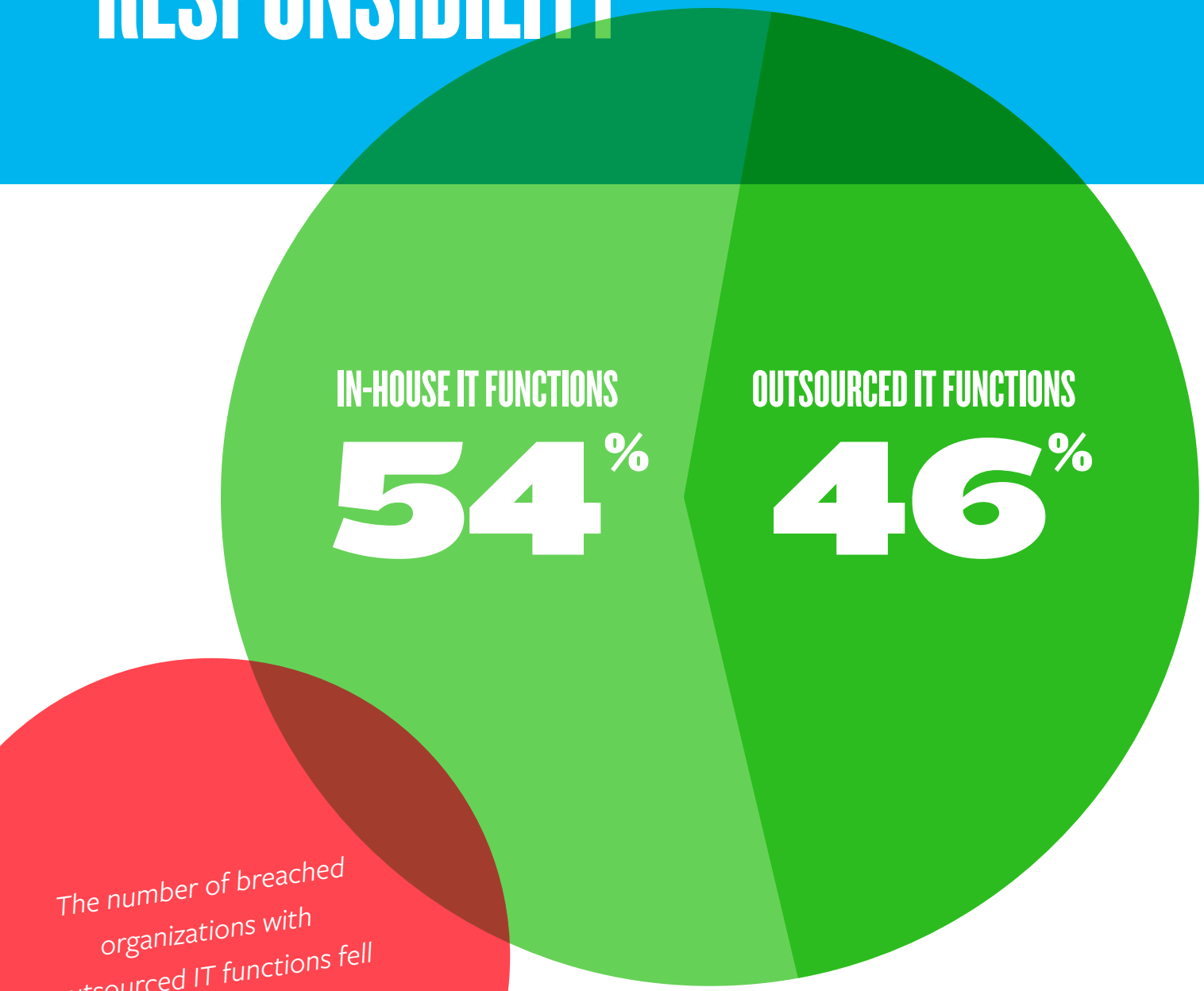
The top 10 indicators of compromise are what Trustwave sees most frequently, and we've included recommendations for how to respond to them. If a business observes any one IOC, they should also review systems for any additional IOCs. The more IOCs present on the system, the more likely the system may be compromised.

Learning to recognize IOCs can help in the self-detection of a breach

INDICATOR	RESPONSE
Anomalous account activity	Disable or remove rogue accounts. Require complex passwords and consider a two-factor authentication solution.
Unexplained or suspicious outbound data	Shut down unnecessary ports.
New and/or suspicious files dropped	Create a forensic copy of suspicious file(s) for later analysis and then remove or isolate the file(s).
Geographic anomalies in logins	Disable or remove associated accounts. If possible, remove remote access to systems.
Unexplained or suspicious changes to the Windows Registry	Make a forensic image of the system for later analysis. Wipe and rebuild the system.
Evidence of log tampering	Back up logs, validate whether they've been tampered with and alert relevant staff.
Evidence of tampering with anti-virus services	Update and run AV scans, back up and review logs.
Anomalous service activity (services added, stopped or paused)	Remove or deactivate anomalous services and associated executables.
Interruption in the payment processing flow (e-commerce)	Review and restore payment gateway software to original configuration. Verify that no code has been added to shopping cart software.
Unexplained access to administration consoles or web admin (e-commerce)	Change passwords using password complexity requirements. Lock down access to trusted networks only.

SYSTEM ADMINISTRATION RESPONSIBILITY

The number of breached organizations with outsourced IT functions fell 17 percent in 2013 to 46 percent. This drop speaks to the complexity and difficulty of properly securing an organization against attack, monitoring for signs of a compromise and then responding appropriately to any potential incidents. Detecting malicious activity or a breach is a highly specialized skill—even within the IT field—and requires a team of professional security experts.



The number of breached organizations with outsourced IT functions fell 17% in 2013 to 46%.

SECTION 2 – THREAT INTELLIGENCE

MOTIVATIONS

MONEY

Of all motivations for cybercrime, financial gain is still the most common incentive. Criminals use numerous methods to monetize attacks. Sometimes, it is as simple as forcing a bank wire transfer or stealing credit card information, and in other cases, non-payment-related data has value. For instance, email credentials have a specific value and are frequently bought and sold in underground markets.

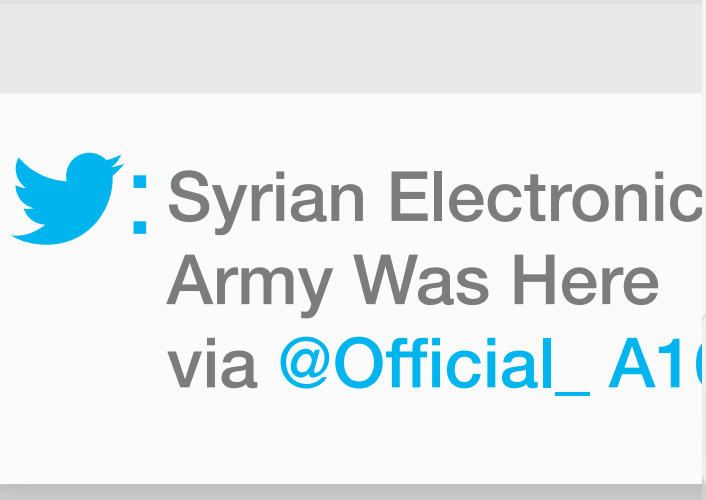
ESPIONAGE

2013 saw increasing focus on attacks motivated by corporate or government espionage. A good example of this was "APT1," an advanced persistent threat (APT) campaign discovered early in the year, allegedly originating from China and state sponsored. APT attacks are generally complex, targeted attacks carried out against specific organizations by highly skilled individuals. Through the PRISM revelations leaked by former National Security Agency contractor Edward Snowden, the United States was implicated in several cyber espionage campaigns. Due to these allegations, many technology companies extended their products to include better security controls, like encryption and two-factor authentication.

MOTIVATIONS

HACKTIVISM

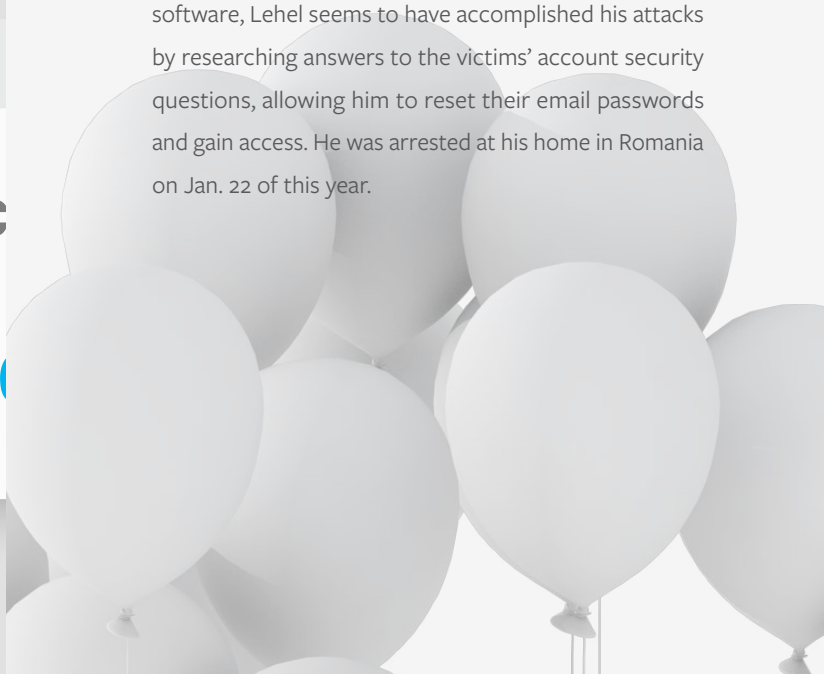
Political motivations for hacking also remained high in 2013. The Syrian Electronic Army (SEA) formed in 2011 and claims to be a collective that supports Syrian President Bashar al-Assad. Throughout 2013, the group claimed responsibility for attacks on a variety of high-profile media outlets and several official Microsoft Twitter feeds, all with the goal of spreading its political message.



NARCISSISM

A final motivation is less pragmatic and more psychological. Some attacks seem to be driven only by a desire for attention, with no obvious financial or ideological reward for the perpetrator.

One such example from last year is Marcel Lehel, who also goes by the alias "Guccifer." Lehel, a Romanian in his early 40s, gained media attention on multiple occasions by obtaining access to the email accounts of celebrities and high-profile political figures, and then publicly sharing his discoveries. Rather than exploiting vulnerabilities in software, Lehel seems to have accomplished his attacks by researching answers to the victims' account security questions, allowing him to reset their email passwords and gain access. He was arrested at his home in Romania on Jan. 22 of this year.



NARRATIVE OF A MALICIOUS CAMPAIGN

Depending on a criminal's objective, their plan of attack will vary. With enough determination, skills and funding, they may develop truly innovative attacks themselves. Others will go shopping for the tools they need.

An attacker normally progresses through three steps when developing and executing a malicious campaign.

CHOOSING AND OBFUSCATING THE PAYLOAD

Depending on the attacker's exact objective, underground markets offer a variety of malware strains from which to choose.

A malicious campaign's success normally depends on remaining undetected by security vendors for as long as possible. Once a payload has been selected, an attacker typically browses underground markets for "crypting" services that obfuscate and alter the payload to avoid detection by common anti-virus engines.

MALWARE STRAIN	DESCRIPTION
PASSWORD STEALERS	'Sniffs' passwords from well-known sites or common protocols (e.g. FTP clients and SSH clients) used by the victim.
BANKING TROJANS	Steals banking information from the victim's machine. Some variants inject code in the browsers of infected machines to exfiltrate credentials for popular banks or generate fraudulent transactions.
DDOS BOTS	Used for distributed denial-of-service (DDOS) attacks against online services. A botnet gets its strength, and therefore value, from the number of infected machines that comprise the bot.
RANSOMWARE	Takes full control of a victim's computer and encrypts all files that reside on the machine, rendering it unusable and inaccessible without the encryption key.
FAKE UPDATES OR ANTI-VIRUS	Similar to ransomware, relies on social engineering techniques to fool victims into thinking their machines are infected with malware.
CRYPTO-CURRENCY MINER	Uses the victim's computer resources, when not in use, to mine crypto-currencies on the cybercriminal's behalf.
POINT-OF-SALE MALWARE	Steals credit or debit card data from POS systems, such as card readers.
SPAMBOTS	Distributes spam messages to email addresses or on social networking websites.

DELIVERING THE PAYLOAD (EXPLOIT KITS)

Exploit kits take advantage of the latest known vulnerabilities in web browsers and third-party plug-ins (e.g. Java, Flash and PDF readers) to deliver a malicious payload. Once the campaign infrastructure is up and running, the attacker needs victims. To infect as many machines as possible, the attacker needs to redirect traffic to the exploit kit landing page. This traffic can also be bought on the underground market.

First, criminals must purchase traffic that is relevant to the payload they're delivering. Second, they need to ensure the traffic comes from users that meet their requirements, such as a particular socioeconomic status. Banking trojans and ransomware campaigns, for example, require targets from wealthier countries that can afford to pay ransomware fees or are more likely to have bank accounts with higher balances.

An exploit kit's success depends upon the traffic being redirected to its landing page by using relevant web browsers or operating systems that are unpatched against certain vulnerabilities. For example, only Windows machines that use Internet Explorer or older versions of Firefox may be redirected.

Most of these sellers use a traffic distribution system (TDS) to receive the live traffic and distribute it to different campaigns—mostly malicious landing pages or legitimate web pages infected with malicious IFrames (code snippets that redirect users elsewhere). Kits are also sold that scan online hosts for vulnerabilities and then infect pages with redirection scripts. Both of these methods are typically used when the payload is DDOS or spambot malware, where the traffic quantity outweighs quality.

MAINTAINING AND MONETIZING THE CAMPAIGN

The longer a campaign stays active, the more data a criminal can collect and sell. Legitimate hosting services will shut down a server that hosts malicious content as soon as it is discovered. Instead, cybercriminals often opt for 'bulletproof hosting' services, which place few restrictions on hosted content. Reports of abuse or offensive material to these services are mostly ignored. Typically, bulletproof hosting services furnish secure, physical locations for servers in lesser known countries—and even inside bunkers.

Once the campaign is up and running and the attacker succeeds in harvesting victims, the attention is then focused on monetizing the campaign. This may include leveraging a botnet to sell DDOS services, extorting a business, stealing banking or credit card information or disclosing proprietary information through the use of backdoors.

WEB THREATS

ZERO-DAYS

Zero-day vulnerabilities and corresponding exploits are one of the most sought-after items in underground markets. A stable zero-day exploit for a popular browser or plug-in can easily fetch the equivalent of hundreds of thousands of U.S. Dollars.

Attackers typically use either server-side zero-day or client-side zero-day exploits. Criminals use server-side zero-day vulnerabilities to infiltrate organizations by directly attacking their servers. Client-side zero-day vulnerabilities enable infection of end-user machines, and through those compromised machines, an attacker can then pivot to other areas of an organization's systems.

Throughout the past year, we've seen a growing number of "premium" exploit kit developers using zero-day exploits to entice customers to pay monthly kit rental fees of up to $10,000 USD. A premium exploit kit, however, can attract a significant amount of exposure, which shortens the amount of time it truly lives as a zero-day. A zero-day exploit used on a single target can remain under the radar and undetected for longer than one that is packaged in a kit and rented by multiple attackers. The average lifespan of a zero-day before it is discovered or disclosed is more than 100 days.

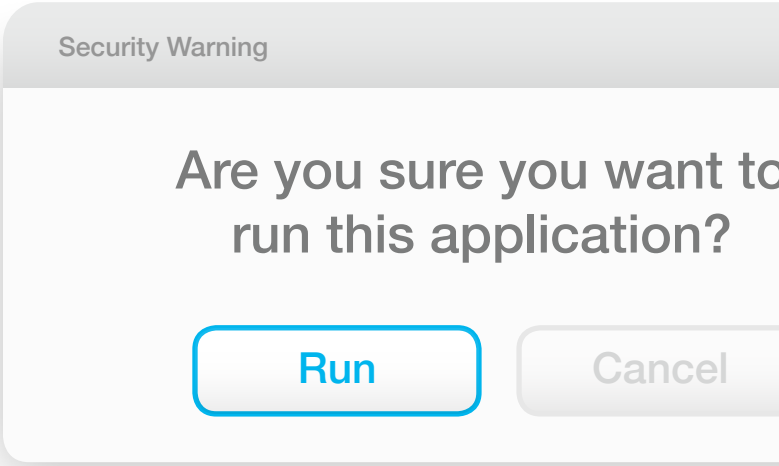
CLIENT SIDE ZERO-DAY EXPLOITS

The table below chronologically summarizes client-side zero-day vulnerabilities exploited in the wild in 2013.

SOFWARE	CVE NUMBER
ORACLE JAVA	CVE-2013-0422
ADOBE FLASH PLAYER	CVE-2013-0633
ADOBE FLASH PLAYER	CVE-2013-0634
ADOBE FLASH PLAYER	CVE-2013-0648
ADOBE READER	CVE-2013-0640
ADOBE READER	CVE-2013-0641
INTERNET EXPLORER	CVE-2013-1347
ORACLE JAVA	CVE-2013-1493
INTERNET EXPLORER	CVE-2013-3163
MICROSOFT OFFICE (TIFF)	CVE-2013-3906
INTERNET EXPLORER	CVE-2013-3918
INTERNET EXPLORER	CVE-2013-3893
INTERNET EXPLORER	CVE-2013-3897

In the wild, attackers coupled CVE-2013-0633 with CVE-2013-0634, a buffer memory corruption and sandbox escape flaw, respectively; and CVE-2013-0640 with CVE-2013-0641, also known as "MiniDuke"—a memory corruption flaw followed by a sandbox escape vulnerability.

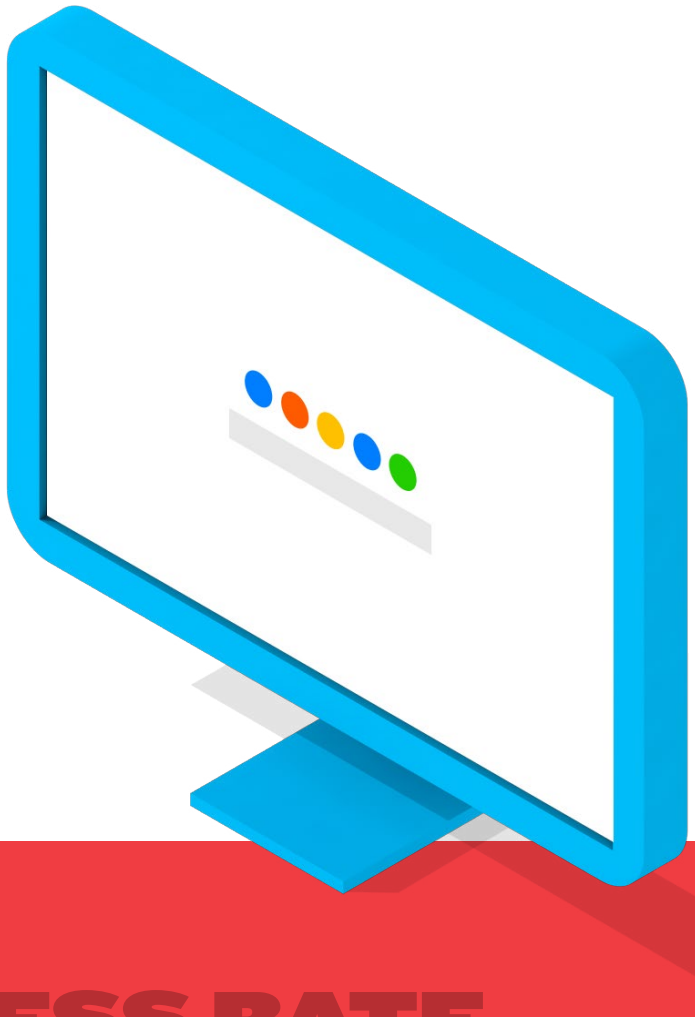
In terms of 2013 zero-day vulnerabilities, attackers seemed to transfer their attention from Oracle Java to Adobe Flash. We attribute the shift to Oracle's introduction of Click-2-Play, which requires users to allow the execution of an applet (via a security pop-up) every time they try to load a web page with an embedded applet.



This simple measure alerts users to potentially malicious activity and requires them to take action to allow the application to run, which has significantly decreased the percentage of successful exploits in Java technology.

We expect Adobe Flash to maintain its popularity with attackers through 2014.

WEB CLIENT-SIDE THREATS



One of the main methods of infecting a victim's machine is an exploit kit. Each kit contains an arsenal of exploits for web browsers and third-party plug-ins (e.g. Java, Flash and PDF readers).

THE SUCCESS RATE OF AN EXPLOIT DEPENDS ON SEVERAL FACTORS:

1. *The prevalence of the vulnerable application*
2. *The stability of the exploits and their ability to run on a wide range of systems*
3. *The patching method of the vulnerable application: automatic versus manual updates*

The table lists the most prevalent exploits detected by the Trustwave Secure Web Gateway anti-malware technology throughout 2013, whether zero-day or otherwise. In all, 85 percent of the exploits detected in 2013 were of third-party plug-ins, including Java and Adobe Flash and Acrobat Reader.

MOST PREVALENT EXPLOITS DETECTED

NAME	CVE	%
GENERIC MALICIOUS JAVA	VARIOUS JAVA VULNERABILITIES	78%
MICROSOFT INTERNET EXPLORER IEPEERS.DLL VULNERABILITY	CVE-2010-0806	11%
GENERIC JIT SPRAY	VARIOUS FLASH VULNERABILITIES	5%
INTERNET EXPLORER VML SHAPE USE AFTER FREE VULNERABILITY	CVE-2013-2551	3%
GENERIC MALICIOUS PDF	VARIOUS ADOBE PDF VULNERABILITIES	2%
INTERNET EXPLORER 8 CGENERICELEMENT USE AFTER FREE VULNERABILITY	CVE-2013-1347	<1%
MSXML ACTIVEX REMOTE CODE EXECUTION VULNERABILITY	CVE-2012-1889	<1%

In terms of client-based, non-zero-day exploits, Java seemed to lead the pack in 2013. Cybercriminals found Java applets to be the best and most reliable vector to deliver malware to client machines. According to Oracle, Java runs on three billion devices. Many of these devices that exist in enterprise environments are not updated automatically due to various enterprise constraints (e.g. custom-built applications that require a specific version of Java). In addition, Java exploits are predominantly browser-independent and work across multiple platforms.

The success rate of exploiting machines that are running Java applets is so high that most, if not all, exploit kits include Java exploits. Some kits even consist solely of Java applet exploits, such as the "Gongda" exploit kit.

Generic Malicious Java: The most exploited Java vulnerabilities in 2013 included CVE-2012-1723, CVE-2012-4681, CVE-2012-0507, CVE-2013-0431 and CVE-2013-1493

Generic JIT Spray: The most exploited Flash vulnerabilities included CVE-2013-0634, CVE-2013-0633 and CVE-2013-5329, which became prevalent in Dec. 2013

Generic Malicious PDF: The most exploited PDF vulnerabilities included well-known and established CVE-2007-5659, CVE-2009-0927 and CVE-2010-0188, as well as the newer CVE-2012-0775 and CVE-2013-0640

WEB SERVER-SIDE THREATS

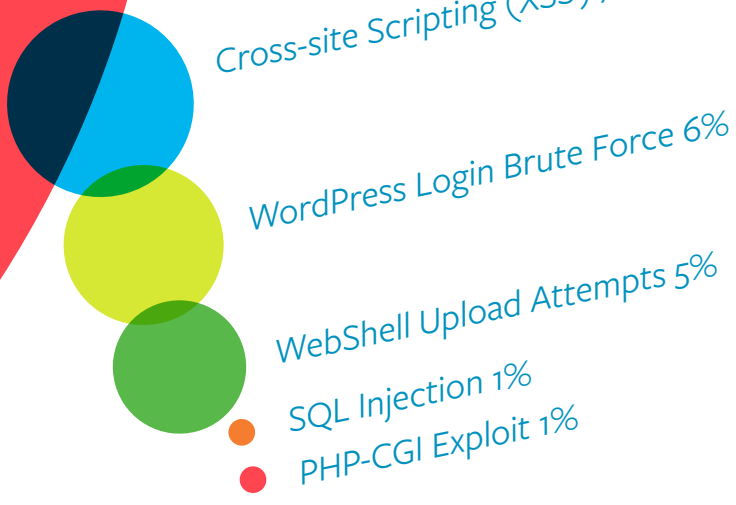
The Trustwave research team gathers, correlates and analyzes web threat information from multiple alerts from Trustwave Managed Web Application Firewall customers, web attack alerts from Trustwave Managed Security Services customers and data from web honeypot systems. By correlating this information, we are able to identify the top attack categories.

TOP WEB ATTACK CATEGORIES

The chart here highlights the top attack categories seen during 2013. As seen, TimThumb injection, at 80 percent, stands out as the most prevalent attack.

TIMTHUMB INJECTION

80%



WordPress TimThumb Remote Code Injection: (CVE-2011-4106)

While patches were made available when TimThumb was discovered three years ago, many WordPress sites still remain vulnerable due to poor patching or the vulnerability's inclusion in many third-party plug-ins. Weak input validation within the TimThumb plug-in for WordPress allows remote attackers to upload PHP files to the system and then execute code. The goal of this attack is most often to install a web shell backdoor or IRC botnet client code.

Cross-Site Scripting (XSS)

During the course of the year, 7 percent of web server attacks we identified were XSS attacks with the following objectives:

Proof-of-concept testing

Defacements

Cookie theft

Phishing

Data exfiltration

WordPress Login Brute Force Attacks

We identified an increase in brute force attacks aimed at WordPress administrator logins (e.g. /wp-login.php). Many sites were compromised because the default password for the admin account had not been changed, and no additional authentication protection measures had been implemented.

Web Shell Upload Attempts

Web shells provide attackers with the ability to execute operating system commands or install other malicious software. This past year, Trustwave handled a case wherein an attacker exploited a directory traversal flaw in ColdFusion to install a web shell and then downloaded a malicious IIS module that captured credit card data as it was submitted to the application.

SQL Injection (SQLi)

There were three main SQLi attack categories identified in 2013. The first consisted of botnets probing for SQL vulnerabilities, typically by injecting single quotes into parameters and looking for an SQL error message. The other two categories consisted of attackers either dumping credentials or inserting new credentials into a backend database.

PHP-CGI Exploit Attempts

Attacks against PHP vulnerability CVE-2012-1823 was another attack category we identified in 2013. We observed widespread scanning and exploitation attempts for this particular vulnerability, which allows attackers to execute operating system-level code or to execute remote PHP files.

OPTIMIZE PATCHING PROCESSES AND VIGILANTLY MONITOR FOR NEW VULNERABILITIES

These findings highlight attackers' continued use of automation to scan for targets that are susceptible to publicly known vulnerabilities. It's usually not a matter of if a website will be attacked, but when. An organization must vigilantly monitor for new vulnerabilities in the commercial software it uses and optimize its patching processes to enable time-to-fix efficiency. Organizations also need to use real-time monitoring and defense for their web applications (e.g. web application firewalls) to quickly identify attacks and respond.

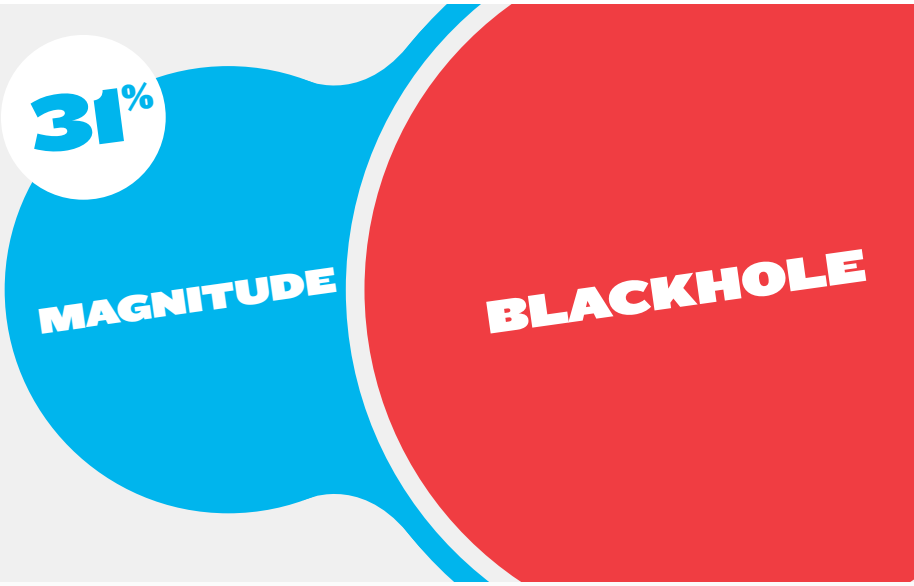
TOP 10 PREVALENT EXPLOIT KITS

Trustwave Secure Web Gateway filtered millions of malicious URLs throughout 2013. Most of these URLs were part of malicious campaigns that used exploit kits to deliver malware. Similar to 2012, the data shows that 2013 also was a big year for the popular "Blackhole" exploit kit.

BLACKHOLE 49%

While Blackhole maintained its first-place ranking with 49 percent prevalence in 2013, the October arrest of its creator, nicknamed "Paunch," brought on a decline in its usage, compared to 2012's 60 percent prevalence, due to a lack of updates and an increase in detection rates. We suspect that without anyone taking ownership of the kit, it will eventually disappear.

"Magnitude," formerly known as PopAds, is a new kit that is poised to unseat Blackhole as the leading exploit kit. First seen at the beginning of 2013, Magnitude's prevalence has led some security researchers to refer to it as "the new Blackhole." A contributing factor to this is that the group behind the Cutwail spambot now uses Magnitude instead of Blackhole for propagation purposes.

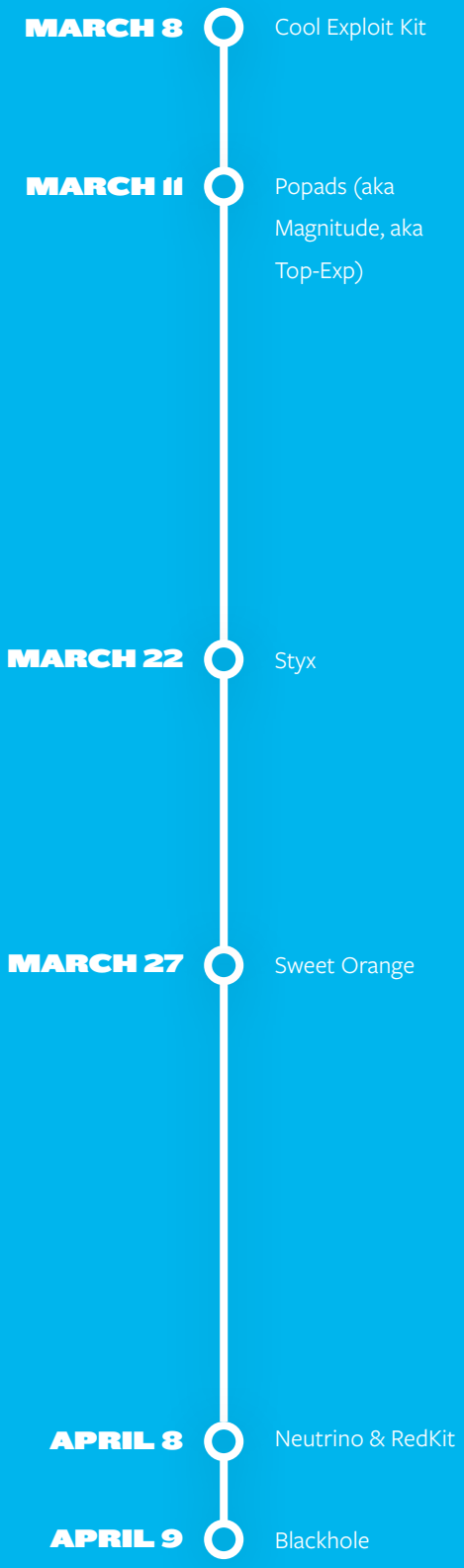


"Cool," another exploit kit allegedly developed by Paunch and his crew, was developed as a premium offering consisting of higher-grade exploits, including zero-days. As a result, its $10,000 USD rental price far exceeded Blackhole's monthly $500 to $700 fee. However, Cool has practically disappeared from our telemetry since last October for many of the same reasons Blackhole's prevalence declined.

The "Redkit" exploit kit was one of the leading kits in 2012, but saw an overall fall in prevalence in 2013. In October, however, its frequency jumped and continued at a high rate through the end of 2013. Like Magnitude, we expect Redkit to help fill the demand created by the declining use of Blackhole.

*Other exploit kits including Angler, Neutrino, SofosFO, BleedingLife, Eleonore, Gondad, DotkaChef and CrimeBoss made up 8 percent of exploit kits filtered by Trustwave Secure Web Gateway

VULNERABILITY ONBOARDING



ONE SIZE EXPLOIT FITS ALL

An exploit kit's main purpose is to help infect as many machines as possible without detection. The latter is mainly what makes each exploit kit unique—the obfuscation and evasion methods used to elude security products. Exploit kits target the same type of victims who tend to use the same software. This means that a successful exploit will work as well for one kit as any other.

Exploit kit writers understand this, so along with keeping track of newly published vulnerabilities, zero-day or otherwise, they also keep track of other kits. Tracking certain exploits and their inclusion in different kits at different times illustrates this point.

For example, almost every Java vulnerability discovered in an exploit kit during 2013 was also spotted in at least one more active exploit kit within the following week. For example CVE-2013-1493, a Java flaw that worked on both version 1.6 and 1.7, was first observed in the Cool exploit kit on March 8 and found its way into other active exploit kits around the same time.

Within the span of one month, eight different exploit kits that comprised the majority of active kits during that time each included an exploit for this vulnerability. Many of these were nearly exact copies of one another in terms of the exploit itself. Trustwave observed this repeating pattern throughout the year with several other Java vulnerabilities.

MICROSOFT SILVERLIGHT PLUG-IN

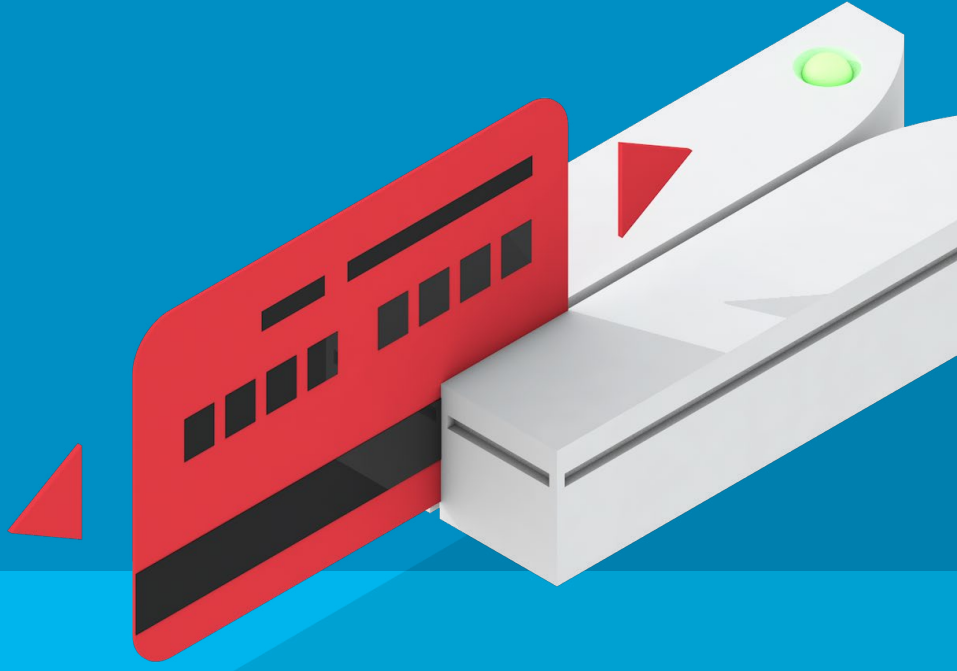
VULNERABILITY:

CVE-2013-0074

VULNERABILITY:

CVE-2013-3896

An intriguing exploit that shared a similar pattern incorporated two, different vulnerabilities: CVE-2013-0074 and CVE-2013-3896. Both vulnerabilities targeted Microsoft's Silverlight plug-in, previously ignored by the exploit kit community. The Silverlight framework was first introduced in 2007, but its first vulnerability wasn't reported until 2010. Still, Trustwave did not see evidence of any Silverlight vulnerabilities in exploit kits until these two flaws were coupled together and integrated into virtually all active exploit kits in 2013. Within a month, Silverlight became the most popular target for exploitation. To make matters worse, integrating this exploit into a kit was so simple that developers could use the same .dll file across all versions. They merely added their own methods of obfuscation and evasion to the code.



MALWARE

During our data compromise investigations in 2013, Trustwave encountered a large number of malicious files. These investigations generally fell into one of two categories: POS and e-commerce. While both types of data breaches target payment card data, each uses different techniques. POS cases involve the targeting of specific devices, such as cash registers and credit and debit card readers, while e-commerce cases involve the targeting of servers and backend databases that host the card data.

MALWARE HOSTING

While network attacks are active, malware hosting is more passive. Malware is typically hosted on web servers and distributed to targets through attacks like phishing and drive-by downloads. Malware includes executable binaries, as well as malicious documents and compressed files.

Trustwave found that the United States outpaced all other countries with a total of 42 percent of malware hosted there in 2013. Russia followed second with 13 percent, and Germany came in third at 9 percent. We suspect that the majority of malware hosted in the United States is done on compromised servers.

UNITED STATES 42%

RUSSIA 13%

GERMANY 9%

CHINA 7%

UNITED KINGDOM 4%

NETHERLANDS 3%

FRANCE 2%

ITALY 2%

TURKEY 2%

OTHER COUNTRIES 16%

POINT-OF-SALE MALWARE

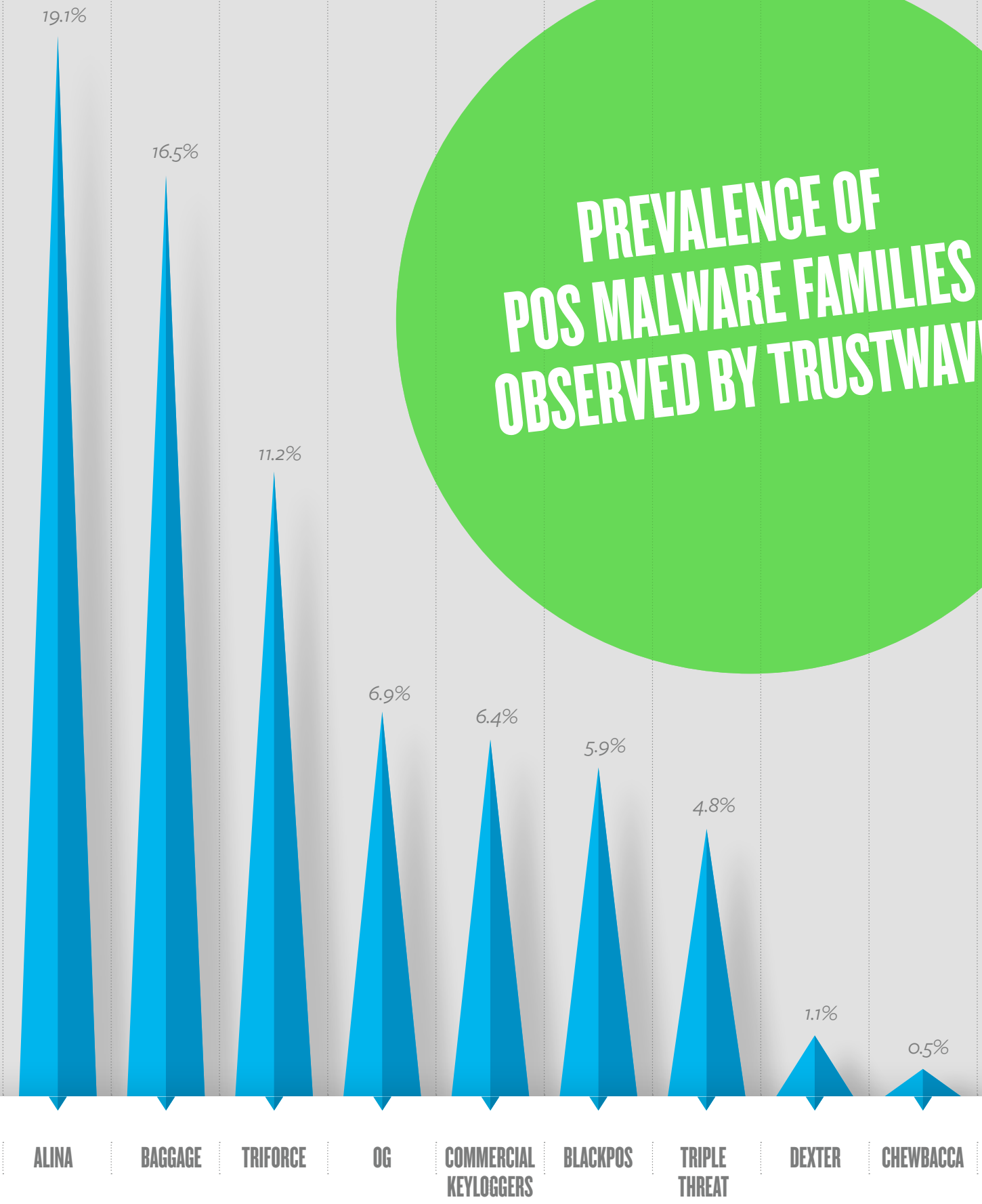
As a PCI Forensic Investigator (PFI), Trustwave examines a substantial number of breaches involving payment card data and examines a large amount of malware that targets POS devices. POS malware is any malicious file that is designed to steal track data (the sensitive information stored in the magnetic stripe of a payment card), either from memory or the physical disk of the machine. Typically a malware sample will fit into a "family" that shares certain characteristics and is likely authored by the same individual(s). A malware family has a number of commonalities that make it unique when compared to other families.

As part of our investigations, Trustwave tracks the evolution of these families over extended periods of time. In the past year, POS malware evolved substantially compared to previous years. While parsing track data from memory and logging keystrokes on the victim's machine is nothing new, we noted new developments in data exfiltration processes and command-and-control (C&C) functionality. We also saw evidence of more authors automating the installation and control of their malware in 2013. While Trustwave discovered a number of new POS malware families exhibiting botnet-like tendencies, a number of well-known, older families also made an appearance.

WHAT IS A MEMORY DUMPER OR KEYLOGGER?

A memory dumper is malware that can read the memory of a chosen process on a victim's computer and parse sensitive information from it because that data is often temporarily stored in memory in an unencrypted state. Malicious files known as keyloggers record what end-users type on their keyboard. Some less advanced card-reader devices also appear to the computer to be a keyboard and a keylogger records the data inputted through those devices.

PREVALENCE OF POS MALWARE FAMILIES OBSERVED BY TRUSTWAVE



*Other: 27.6%

ALINA

Debuting in late 2012, Alina surprised many, because it was one of a small number of POS malware families that included a C&C structure, encrypted the data it exfiltrated, blacklisted common Windows processes and installed itself to a randomly chosen name.

BAGGAGE

A trait of the Baggage malware family is a keylogging binary with built-in exfiltration, which takes place via either SMTP or FTP.

TRIFORCE

The Triforce malware family includes three executables: a memory dumper, a control binary responsible for persistence (defined as malware's ability to remain active even after a reboot of the infected system) and a "Perl2Exe" binary that encrypts any discovered track data. Trustwave first came across the Triforce family in early 2013.

OG

The OG malware family is among the oldest that Trustwave analyzed in its 2013 investigations. Like Triforce, OG consists of three executables: "searcher.dll," "sr.exe" and "rdasrv.exe." We've seen a significant decrease in its use over the years due to an increase in detections and general awareness.

COMMERCIAL KEYLOGGERS

In some cases, criminals forgo developing their own malware and, instead, opt for commercial products to aid in their attacks against POS systems. Attackers often choose these tools due to the minimal effort required to install and configure them.

BLACKPOS

The BlackPOS malware family garnered notoriety in 2013 and originated as a branch-off from a previous family known as "mmon." What made BlackPOS novel was its inclusion of exfiltration and persistence capabilities, which were not part of the mmon family.

TRIPLE THREAT

Similar to the Triforce and OG families, the Triple Threat malware combines three pieces. Like OG, Triple Threat makes use of sr.exe and searcher.dll binaries to perform memory dumping, but unlike OG, it uses a binary scripted in AutoIt—a freeware scripting language typically used for automating tasks in a Windows environment.

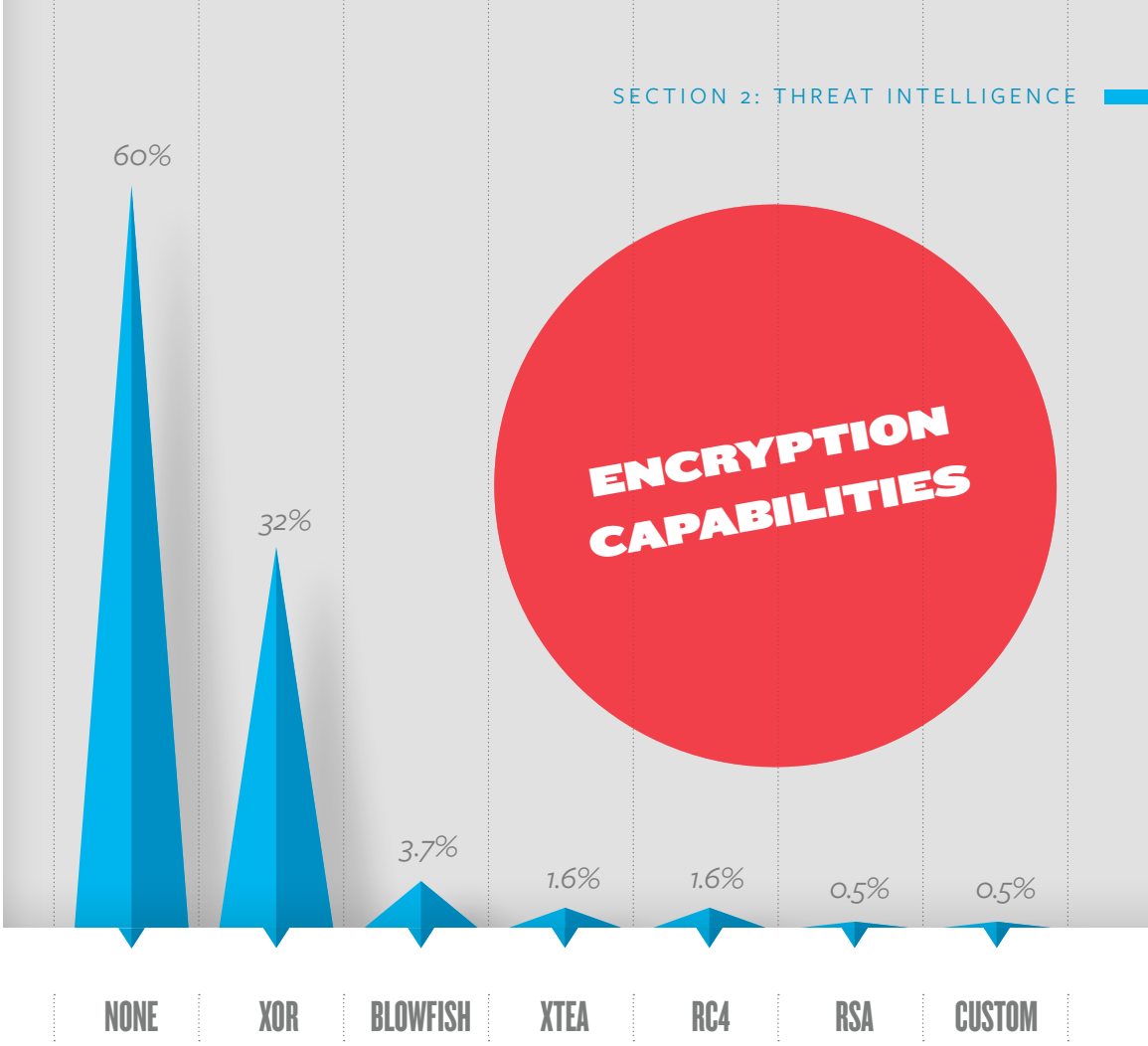
DEXTER

Dexter is one of the most well-known families of memory dumpers. In addition to its memory dumping functionality, Dexter is unique in that it performs process-injection, logs keystrokes and includes a C&C structure.

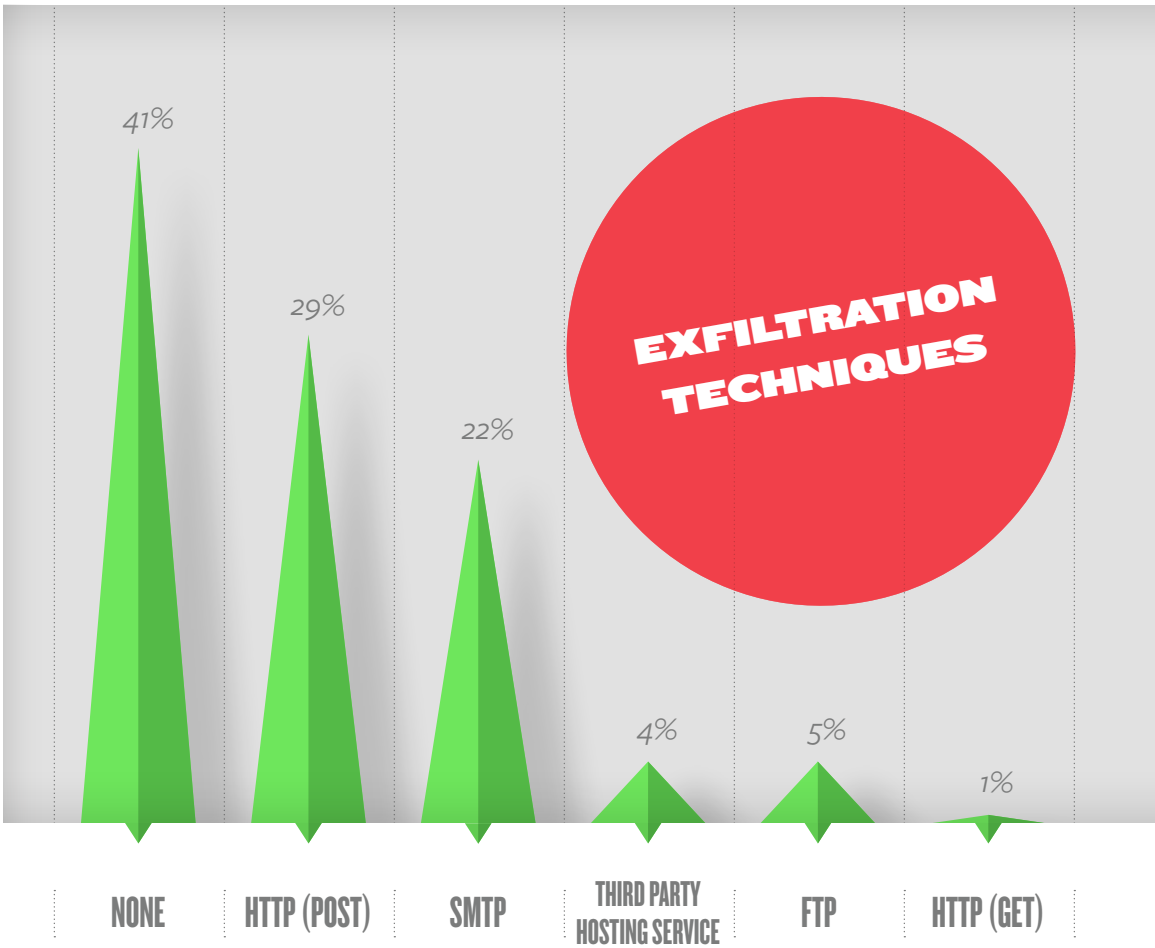
CHEWBACCA

What separates Chewbacca, a memory dumper, from its peers is its ability to exfiltrate data over the anonymized Tor network. Similar to Dexter, Chewbacca also includes a keylogging component. This malware arrived late in 2013.

Overall, Trustwave sees few malware authors who build encryption of exfiltrated data functions into their POS malware. When data encryption capabilities are included to prevent detection of sensitive data leaking out of the network, it is most commonly the "exclusive OR" (XOR) operation. Only a few samples used encryption routines that were stronger than the simplistic XOR technique.

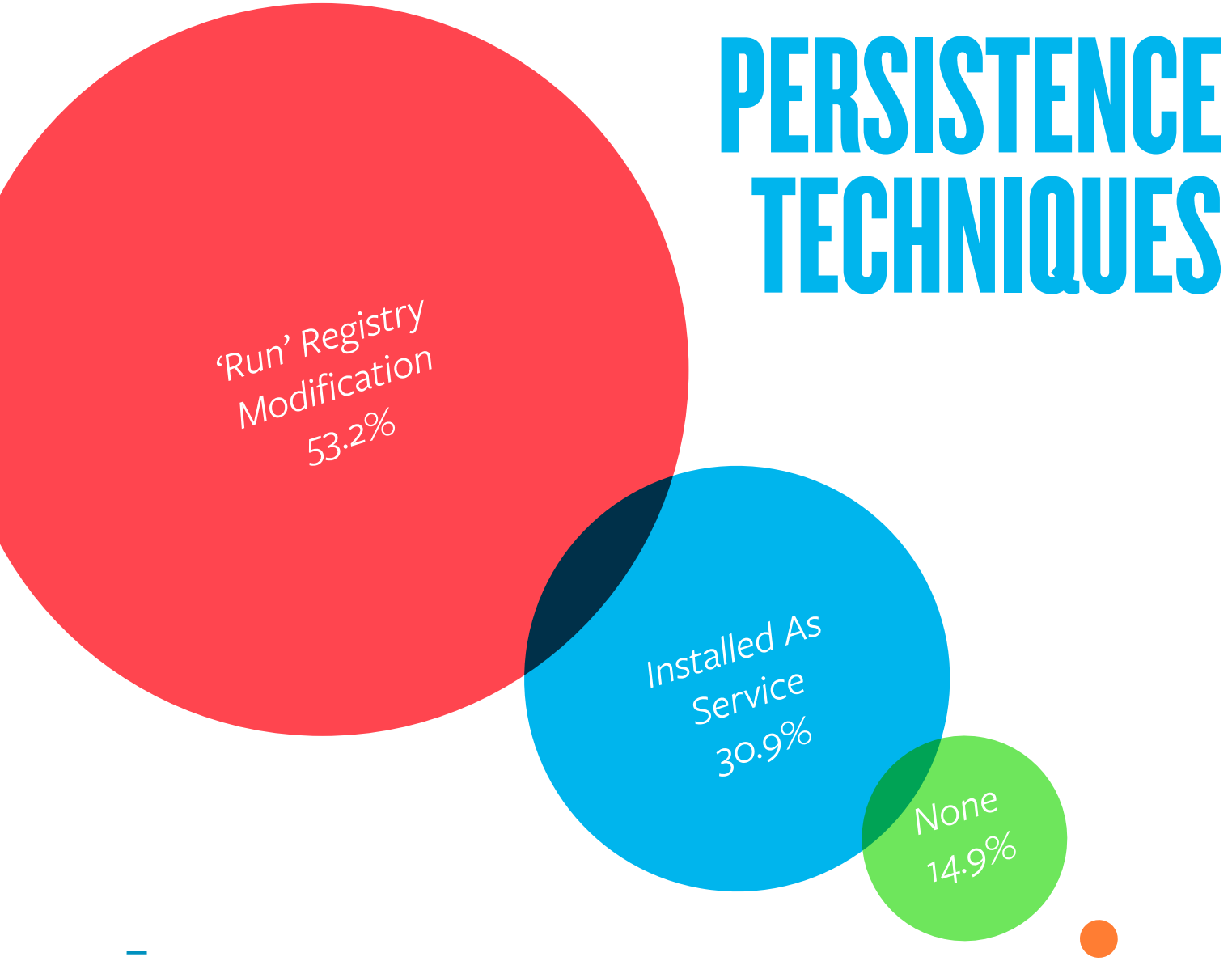


While we noticed some malware in 2013 that allows for the exfiltration of data from a compromised system to an external C&C server, exfiltration methods did not change much from 2012. Large amounts of malware do not perform automated exfiltration, leaving the data on disk to be extracted manually.



*The sum of values in these charts may not equal 100 percent due to rounding

PERSISTENCE TECHNIQUES

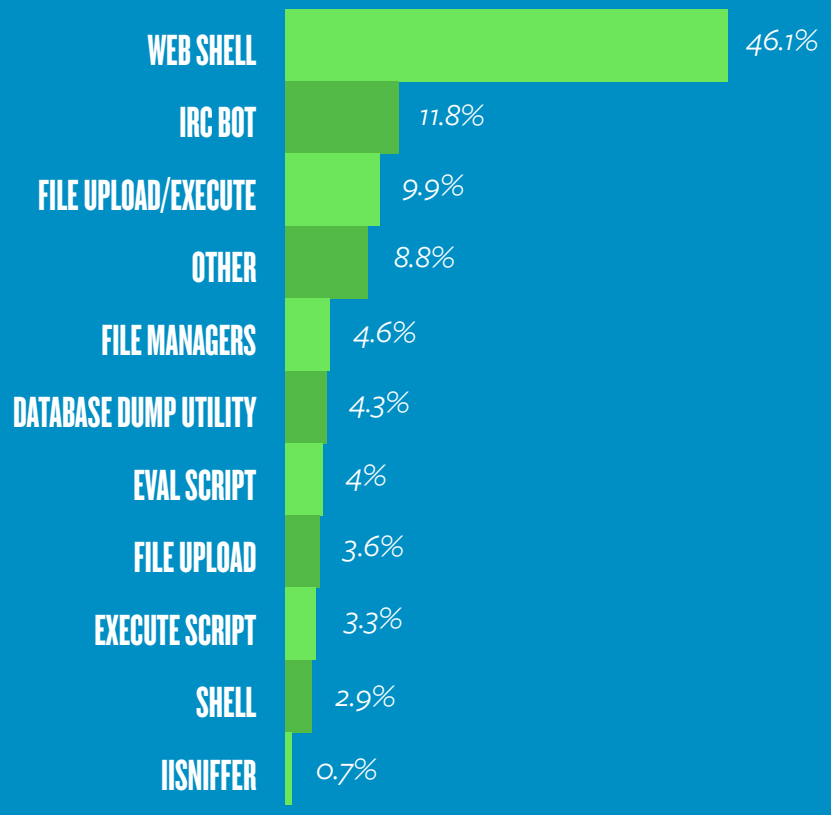


Like exfiltration and encryption methods, malware persistence mechanisms did not change significantly from 2012 to 2013. Persistence isn't necessary if a binary's purpose is to execute only once and then alert the attacker to the presence or absence of track data. The Windows registry 'Run' key, along with malware installed as a service, are still the most prevalent methods.

*The sum of values may not equal 100 percent due to rounding

E-COMMERCE MALWARE

Using common techniques such as SQL injection, directory traversal and file upload flaws, attackers continue to install malicious files onto web servers. Trustwave investigated 5 percent more e-commerce and website compromises in 2013 than in 2012. Even with the slight increase in e-commerce breaches, attackers mostly relied on the same tried-and-true malware they have used for years. In the next few pages, each type of e-commerce malware will be reviewed, in order of prevalence.



E-COMMERCE MALWARE

WEB SHELL

A web shell is a file written in a web language (e.g., PHP, ColdFusion and ASP.net) that allows an attacker to carry out malicious activities. Web shells are controlled directly by the attacker via an interface.

IRC BOT

While IRC bots are nothing new, they continue to pose a threat. An attacker will infect the web server with an IRC bot via SQL injection or other web-based attacks. The attacker will then add the victim's web server to a botnet and take command of it remotely via the IRC system. Bot masters then instruct the victim bots, or 'zombie' machines, to execute tasks such as:

- deliver an email
- execute commands
- scan a range of ports
- perform a TCP flood attack
- perform a UDP flood attack
- download files
- initiate a reverse-connect shell.

FILE UPLOAD/EXECUTE

Combining capabilities of file upload and execute scripts (discussed separately) gives attackers the option to execute commands on the operating system and the ability to upload files. This type of web malware is often preferred by attackers who desire the functionality of a web shell, but with a smaller footprint.

FILE MANAGERS

An attacker uses a file manager maliciously to gain full control of the targeted web server's file system, enabling them to list, create, copy, delete and move files or directories. Coding a file manager typically requires much more effort, because an interface must be available to the attacker for it to function.

DATABASE DUMP UTILITY

While Trustwave doesn't see many database dump utilities, they are, nonetheless, powerful. Database dump utilities are often custom-created for a web server's backend database. Attackers use their knowledge of the database structure to dump specific, sensitive records when executed.

EVAL SCRIPT

An eval script is simply a utility that evaluates a supplied string in the PHP language (i.e. the script executes any PHP code supplied to it).

FILE UPLOAD

We notice that criminals often use file upload scripts as an initial pivot point for an attack. File upload scripts simply allow an attacker to upload a file to the victim web server, often via a simple form.

EXECUTE SCRIPT

Similar to an eval script, an execute script will execute a command on the targeted operating system by using built-in functionality from the scripting language (e.g. ColdFusion, ASP.net and PHP). Execute scripts typically require more code than the less sophisticated eval scripts. Because they provide full access to the victim machine, however, an attacker will often accept the trade-off.

SHELL

Shell malware provides a backdoor shell to the web server's underlying operating system. All of the shells Trustwave discovered as a part of its e-commerce breach investigation cases were found to be reverse-connect shells, which means they connected outbound to the attacker's server on a specified port. This type of malware is especially dangerous, because it provides full access to the entire server.

IISNIFFER

Also referred to as "isn," IISniffer was discovered in several forensic cases in 2013. IISniffer malware is installed as a module on an internet information service (IIS) instance and will log all POST requests made in a cleartext file. This includes POST requests made over HTTPS. The attacker can then pull these log files remotely by supplying a specific GET request to the infected Microsoft Windows web server.

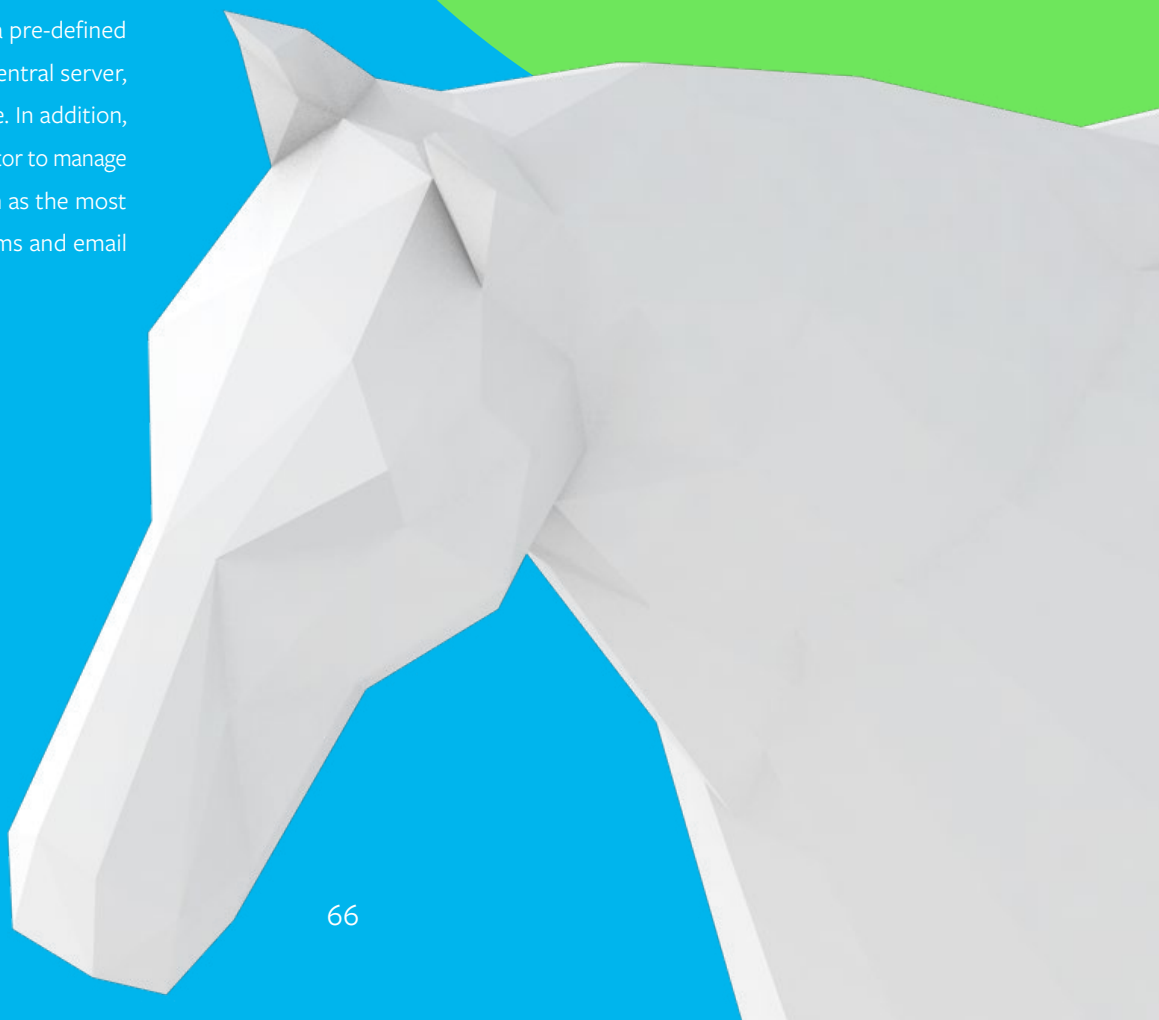
We've seen a number of advances in the evolution of POS malware this year with a greater emphasis on command and control. With the prevalence of POS malware families, such as Dexter and Alina, we expect such trends to continue. By removing the burden of manual control for this type of POS malware, attackers have significantly decreased the cost of obtaining sensitive track data, and we expect to see continued advances in malware automation. In terms of malware that targets e-commerce systems, the most notable development was IISniffer malware, which evaded detection for a number of months due to its targeted nature.

ATTACKERS HAVE SIGNIFICANTLY DECREASED THE COST OF OBTAINING SENSITIVE TRACK DATA.

PONY BOTNET

A botnet is a collection of machines infected with the same malware and typically controlled from a C&C server. Botnets generally target a large variety of victims rather than a specific organization.

The Pony botnet's main objective is credential theft. Once the client malware is installed, it begins monitoring web traffic for login information and collects the data for exfiltration. The malware also collects credentials from web browsers and other programs with "remember my password" features. The botnet periodically takes all the credentials it has gathered, encrypts them with a pre-defined password and sends them to the central server, where they are stored in a database. In addition, Pony's control panel allows the operator to manage the botnet and view statistics, such as the most popular browsers, operating systems and email software in use among its victims.



PONY THROUGH 2013

The Pony botnet gained popularity over the last few years due to the quality, size and efficiency of the bot itself. It is written in pure assembly code, making it extremely efficient and compact.

At the beginning of 2013, the source code for Pony's client malware and control server was publicly leaked. This led to a large increase in the number of detections in the wild, including several hundred different instances observed through the end of the year.

POPULARITY

PONY UPGRADE

The Pony botnet continues to be updated. In September 2013, we encountered a version of Pony that was upgraded to steal virtual currency wallets. This feature supports 30 different virtual currencies—from popular currencies like Bitcoin and Litecoin, to more obscure currencies, such as YACoin and QuarkCoin. The feature matches well with Pony's original purpose of stealing credentials. Ownership of these virtual coins is stored as files on the client computer's file system, and they are exfiltrated much like other credentials that the Pony bot is capable of obtaining.

The Pony botnet seems as popular now as it was at the beginning of 2013. With the source code freely available, attackers may continue to upgrade it to suit their needs, so we don't anticipate Pony disappearing any time soon.

PONY BOTNET PASSWORD ANALYSIS

Between June 2013 and January 2014, Trustwave researchers identified several Pony botnet controllers designed to steal passwords along with other personal and financial information. By examining the cache of stolen credentials, we present a rarely seen view into the password habits of real-world users.

Because Pony captures credentials for users across multiple services, we can compare how often users duplicate passwords across these services. Since botnet attack victims are far more diverse than the average corporation, they are not constricted by organizational password complexity requirements or other limitations on password reuse. We can also attempt to identify password trends across regions.

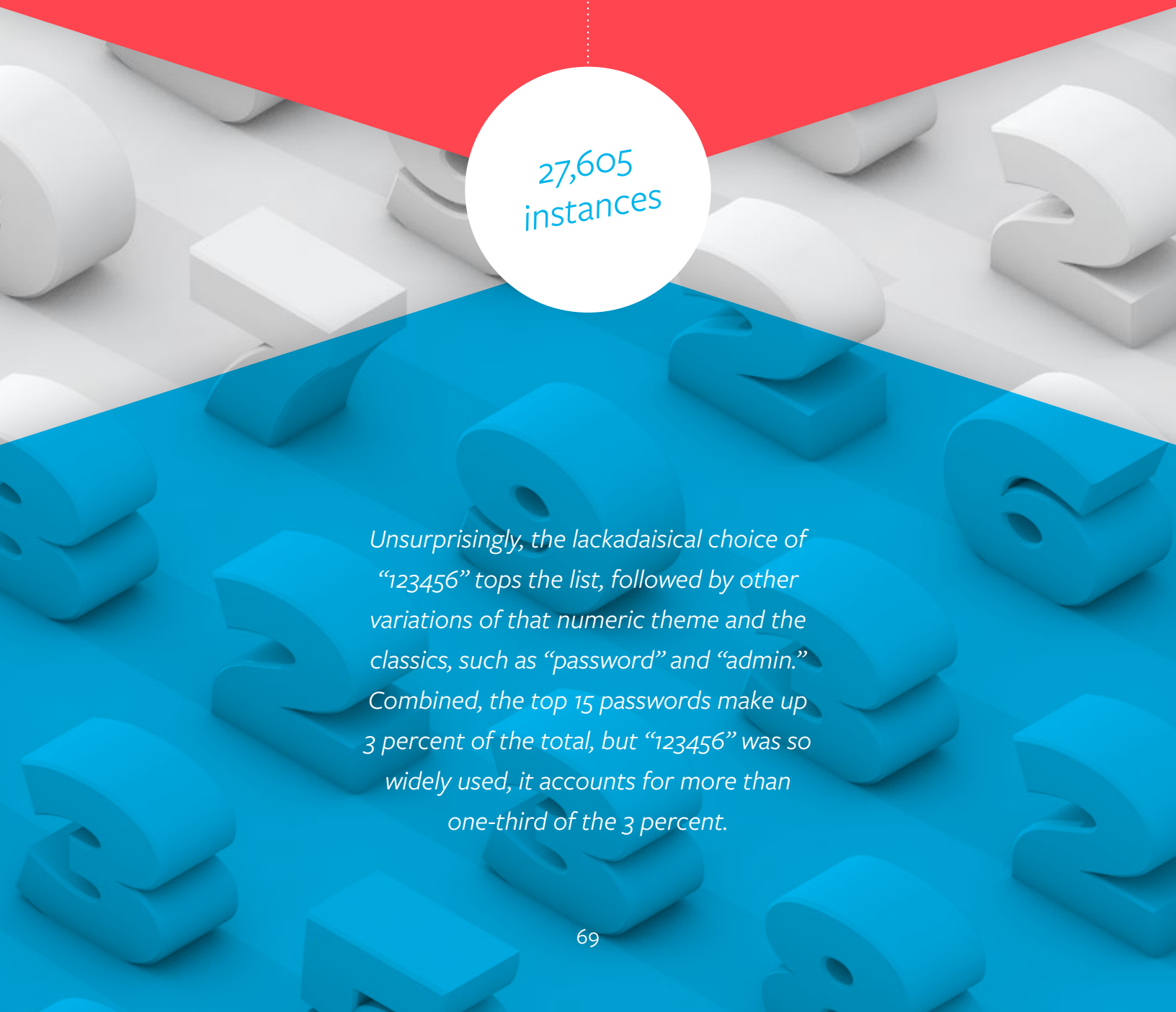
Human nature leads all of us to make similar choices for easy-to-remember passwords. This trend is apparent by looking at the 15 most common passwords in the collection.

PASSWORD	INSTANCES
123456	27,605
123456789	8867
1234	4341
password	4006
12345	3593
12345678	3592
admin	3019
123	2232
111111	2172
1234567	2013
1	1675
1234567890	1603
00000	1531
123123	1451
654321	1110

MOST PREVALENT PASSWORD:

123456

27,605 instances



Unsurprisingly, the lackadaisical choice of "123456" tops the list, followed by other variations of that numeric theme and the classics, such as "password" and "admin." Combined, the top 15 passwords make up 3 percent of the total, but "123456" was so widely used, it accounts for more than one-third of the 3 percent.

While the data is largely universal, we were curious to identify any significant regional trends. Identifying the exact geo-location of infected users is generally inconsistent, but we worked around this by using the top-level domain (TLD) for the services to obtain geographical information. The results for top password selection were surprisingly consistent across geography and language.

—

To study the password data for additional trends, we normalized the web-based credentials and stripped the account names from email addresses. This resulted in a list of nearly 1.5 million unique account names.

The inherent difficulty in recalling which password was used for which service often leads users to reuse passwords. Nearly 25 percent of the usernames had passwords stored for multiple sites. We compared these to see how frequently passwords are reused. The data shows that 15 percent of unique account names used identical passwords across more than one service.

Some common account names are frequently reused, but almost certainly not by the same person. Despite the different users, common account names inspire common passwords. For example, the username 'admin' appears 17,081 times, often using very weak, shared passwords.

Top 5 'admin' user passwords were "admin" (2,619), "123456" (506), "mysoul16" (283), "1234" (241) and "password" (168).

TOP COMROMISED PASSWORDS BY COUNTRY

Brazil (.br): 123456

China (.cn): 123456

France (.fr): devile

Germany (.de): qwer1234

India (.in): 123456

Indonesia (.in): 123456

Israel (.il): 123456

Japan (.jp): viscount

Mexico (.mx): 123456

Pakistan (.pk): 123456

Philippines (.ph): 123456

Poland (.pl): wojciech

Russia (.ru): 123456

South Korea (.kr): 1234

Thailand (.th): 123456

United Kingdom (.uk): password

United States (.us): 123456

INTRUSION DETECTION SYSTEM ALERTS ANALYSIS

Active malware, exploit attempts and automated vulnerability and port scanners generated many alerts from Trustwave Managed IDS sensors in 2013. While not every alert is an indication of a threat, an analysis of these alerts provides insight into the types of threats organizations see on a daily basis. The following analysis is based on a sample of more than 10,000 IDS alerts generated in the third quarter of 2013.

Typical attacks observed by IDS include exploit attempts against common network-based services, such as File Transfer Protocol (FTP), Remote Desktop Protocol (RDP), Server Message Block Protocol (SMB) and Simple Network Management Protocol (SNMP).

Web applications also serve as popular attack vectors that are often exploited via web-based attacks, such as SQL injection (SQLi), cross-site scripting (XSS), known vulnerable web software components and sensitive data disclosure.

NETWORK-BASED ATTACKS

NAME	CVE	CVSS SCORE
MICROSOFT WINDOWS SNMP SERVICE BUFFER OVERFLOW	CVE-2006-5583	10.0
CISCO IOS SNMP MALFORMED MESSAGE DENIAL OF SERVICE	CVE-2004-0714	5.0
PHP PHP-CGI INFORMATION DISCLOSURE	CVE-2012-1823	7.5
MICROSOFT INTERNET EXPLORER SETMOUSECAPTURE USE AFTER FREE	CVE-2013-3893	9.3
MICROSOFT WINDOWS PLUG AND PLAY (PNP) SERVICE BUFFER OVERFLOW	CVE-2005-1983	10.0
ADOBE SUITE .PNG FORMAT HANDLING BUFFER OVERFLOW	CVE-2007-2365	9.3
OPENSSL SSL_GET_SHARED_CIPHERS FUNCTION BUFFER OVERFLOW	CVE-2006-3738	10.0
MYSQL CHECK_SCRAMBLE_323 FUNCTION AUTHENTICATION BYPASS	CVE-2004-0627	10.0
MICROSOFT WINDOWS ANIMATED CURSOR CODE BUFFER OVERFLOW	CVE-2007-0038	9.3
MICROSOFT SQL SERVER RESOLUTION SERVICE BUFFER OVERFLOW	CVE-2002-0649	7.5

Although the threat landscape is always evolving, the latest threats are not always the most prevalent. The table to the left highlights the top 10 most common exploit attempts seen by Trustwave Managed IDS sensors.

Despite the number of vulnerabilities published on a daily basis, it's interesting to observe alerts for flaws that date back five years or more, because most, if not all, of these systems have probably been patched against these older weaknesses. These exploit alerts are likely generated from older malware, not by attackers attempting to exploit these vulnerabilities today.

MALWARE-BASED OUTBOUND DETECTIONS

Malware typically generates enough network traffic to present several opportunities for an IDS to detect its presence. As previously mentioned, even the most seemingly minor mistakes in spelling or protocol violations can be enough to set off an alarm. At the network layer, Trustwave Managed IDS sensors can identify a number of malware characteristics that enable us to identify the top most detected threats.

MALWARE TRAFFIC DETECTED

73%	*Win32/Pushdo.S Trojan*
11%	*Win32/GameVance Adware*
10%	*MS-SQL Slammer Worm A/B*
2%	*Delf/Troxen/Zema Trojan*
2%	*Win32/OpenCandy Adware*
1%	*Win32/Rovnix Trojan*
<1%	*CryptoLocker Ransomware*
<1%	*Win32/Rshot Backdoor*
<1%	*Win32/Oliga Trojan*
<1%	*Win32/Gapz Trojan*

Malware calling home to a remote server to receive instructions or exfiltrate data will trigger malware-based, outbound detections. Our IDS sensors generated a number of alerts based on signatures that detected different stages and components of different exploit kits.

SPAM & EMAIL THREATS

EMAIL

Email's ubiquity ensures that it remains a perennial favorite for attackers to distribute their wares. Last year, we saw an ongoing range of both mass and targeted attacks distributed via email.

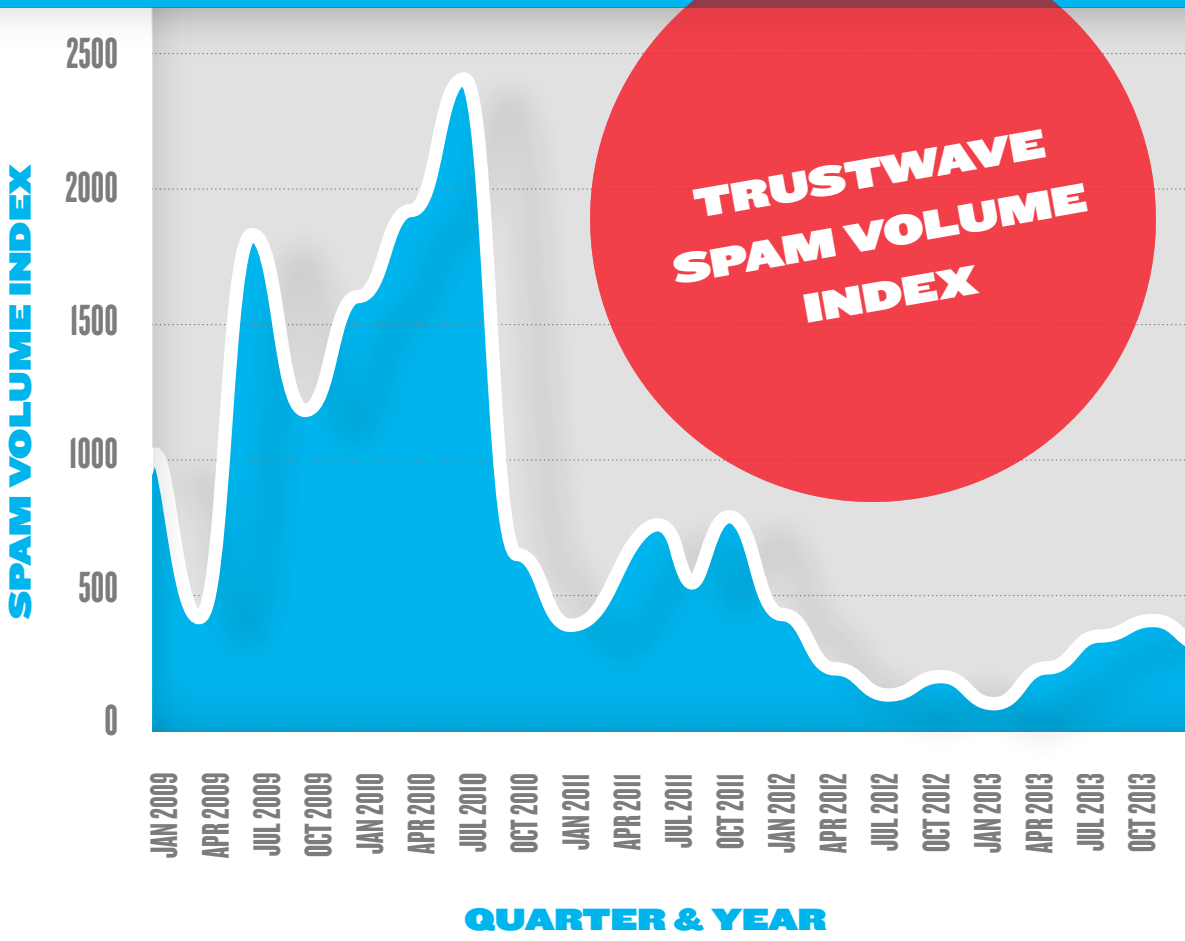
KEY POINTS

- *Spam remains at relatively low levels, but still represents 70 percent of inbound email*
- *One in 23 spam messages is malicious*
- *One in 38 spam messages contains a malicious attachment*
- *Mass-spammed data-stealing malware families were rampant in 2013*
- *Email remains a popular way of infiltrating networks in targeted attacks*

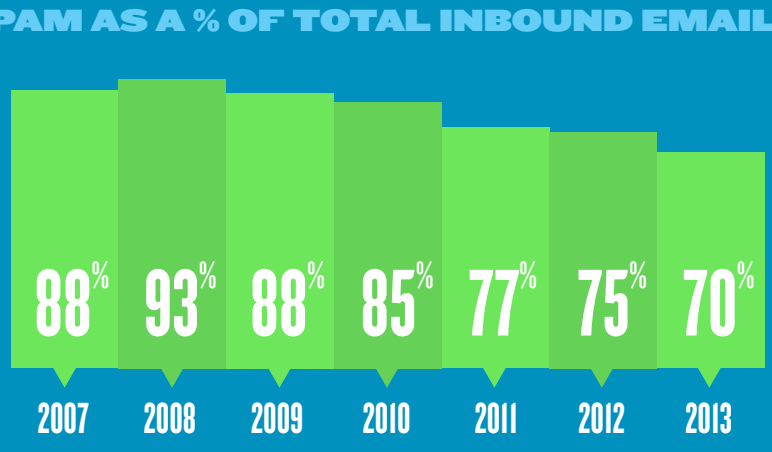
SPAM VOLUME

Spam volume remained at relatively low levels throughout 2013. We measure spam output through a proxy known as the Spam Volume Index (SVI), which tracks changes in the weekly quantity of spam received by a representative bundle of domains. Overall, the SVI rose during 2013, but from a very low base. By the end of 2013, the index sat at the same level as the beginning of 2012—about a quarter the levels seen at the index's peak in 2010.

More than 90 percent of the spam we identify originates from botnets. The prevalence of spam has dropped, because many botnets have been dismantled through coordinated efforts by security firms, government agencies and law enforcement. Meanwhile, longstanding botnets still actively spam despite multiple takedown attempts, and we continue to observe signs of newer botnets. Suffice it to say that we expect the problem of spam to linger.

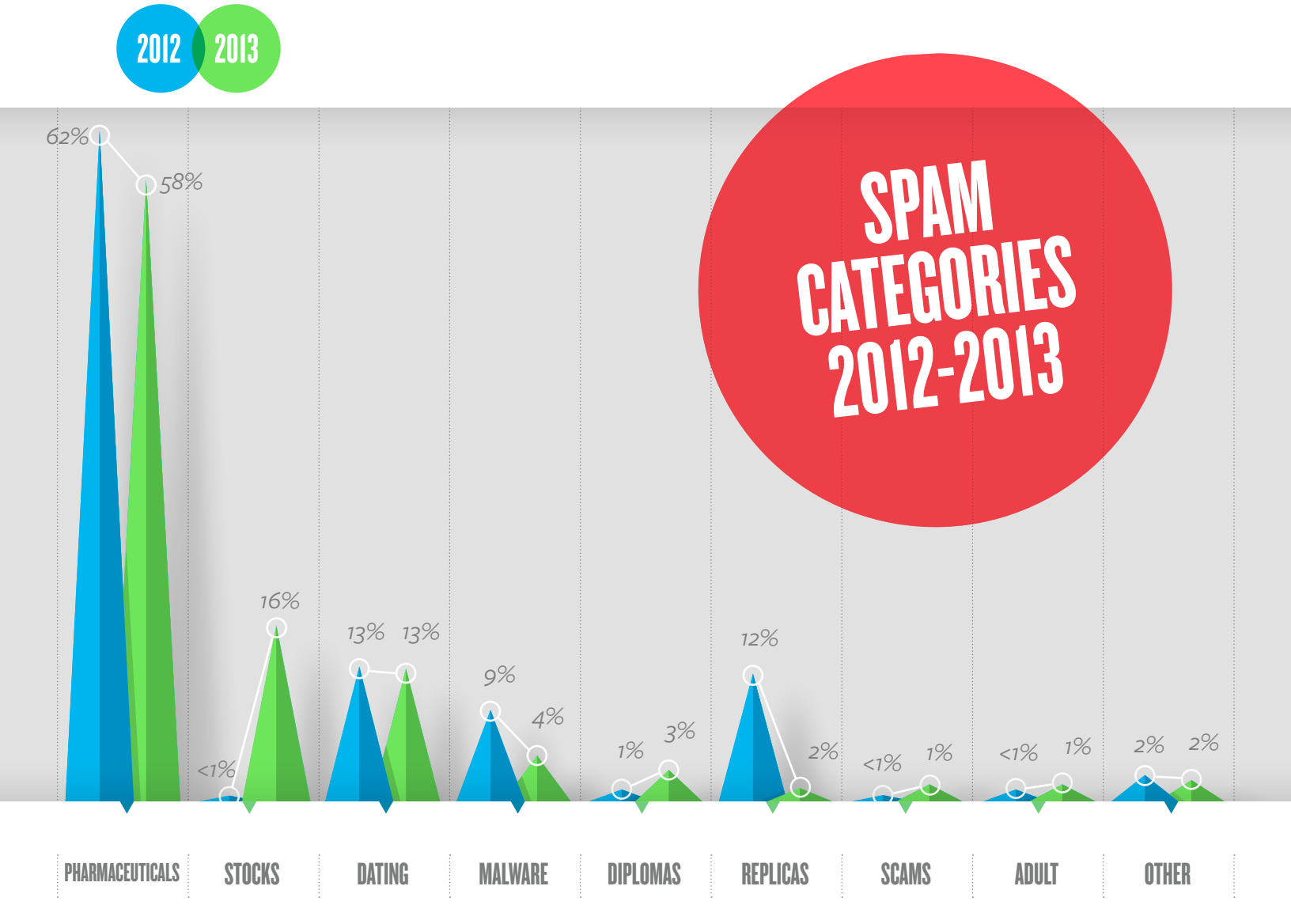


Spam still makes up around 70 percent of a typical organization's inbound email, meaning they must continue to devote resources to dealing with unwanted messages.



SPAM CATEGORIES

As usual, pharmaceutical promotions comprised the majority of spam categories we identified in 2013, making up 58 percent of total spam. Stock spam rose from very little in 2012 to 16 percent in 2013, when the Kelihos botnet resurrected itself and started its "pump and dump" stock campaigns. In these cases, penny stocks are advertised in mass spam messages with the aim of the senders profiting from a rise in the stock price.



MALICIOUS SPAM

The bulk of malicious spam is mass emailed by botnets in a manner similar to campaigns that promote pills, stocks or adult content. The difference is that it includes a malicious payload, such as an attachment for the user to execute or a link that takes the user to a web page hosting malicious code (usually an exploit kit). The Cutwail botnet, in particular, is responsible for a large amount of malicious spam.

Malicious spam dropped from 9 percent in 2012 to 4 percent in 2013, largely due to a decline in the amount of spam with malicious hyperlinks leading to exploit kits. In particular, the October 2013 arrest of the Blackhole exploit kit author, "Paunch," had a big impact. Despite its decline in 2013, malicious spam is still a concern. Spam with executable attachments experienced a negligible decrease last year from 2.8 percent of all spam in 2012 to 2.6 percent in 2013. Spam that included malicious links fell from 5.9 percent of all spam in 2012 to 1.8 percent in 2013.

Some of the top subject lines give an idea of the range of ploys involved:

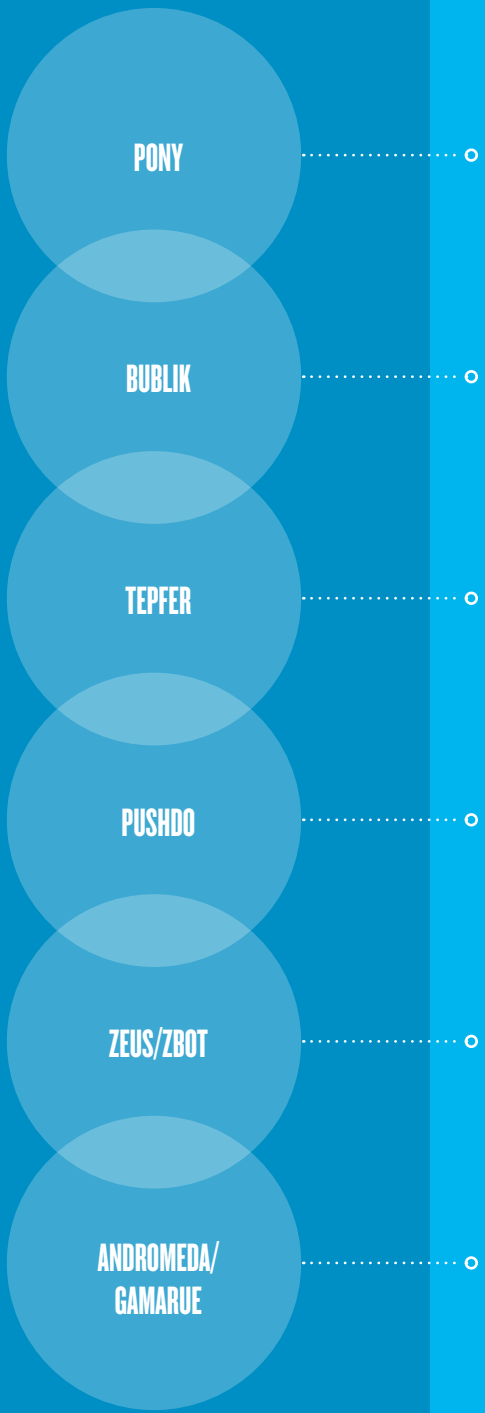
Top Spam Malware Subject Lines

Your Inbox

- Some important information is missing
- Bank Statement. Please read
- Important - Payment Overdue
- ATTN: Early 2013 Tax Return Report!
- ATTN: Important Bank Documents
- Important Bank Documents
- IRS: Early 2013 Tax Return Report!
- New Fax Message on [date]
- Payroll Invoice
- You have 1 message
- Important Information for Employers
- Mail - Lost / Missing package

In terms of malicious spam alone, 59 percent includes attachments and 41 percent includes links. Throughout 2013, Trustwave performed many mock spear phishing attacks for clients. These revealed that, on average, 33 percent of victims opened the email and clicked on the targeted link. Of those that opened the email, 80 percent used their corporate credentials to log in to the fraudulent site.

TOP SPAMMED MALWARE FAMILIES



Data stealer, passwords, DDOS, malware loader

Data stealer, online banking

Data stealer, passwords

Malware loader, often loads Cutwail

Data stealer, online banking, passwords

Malware loader, backdoor

For spam, 2013 was the year of the data thief, as we saw a preponderance of spammed online banking and data-stealing malware families.

During 2013, we also saw an increase in spammed messages with malicious .cpl file attachments, particularly banking malware targeting Brazilian users. CPL files are DLL applets used by the Windows Control Panel. Unlike normal DLLs, they can run in Windows with just a double click, hence their allure for attackers.

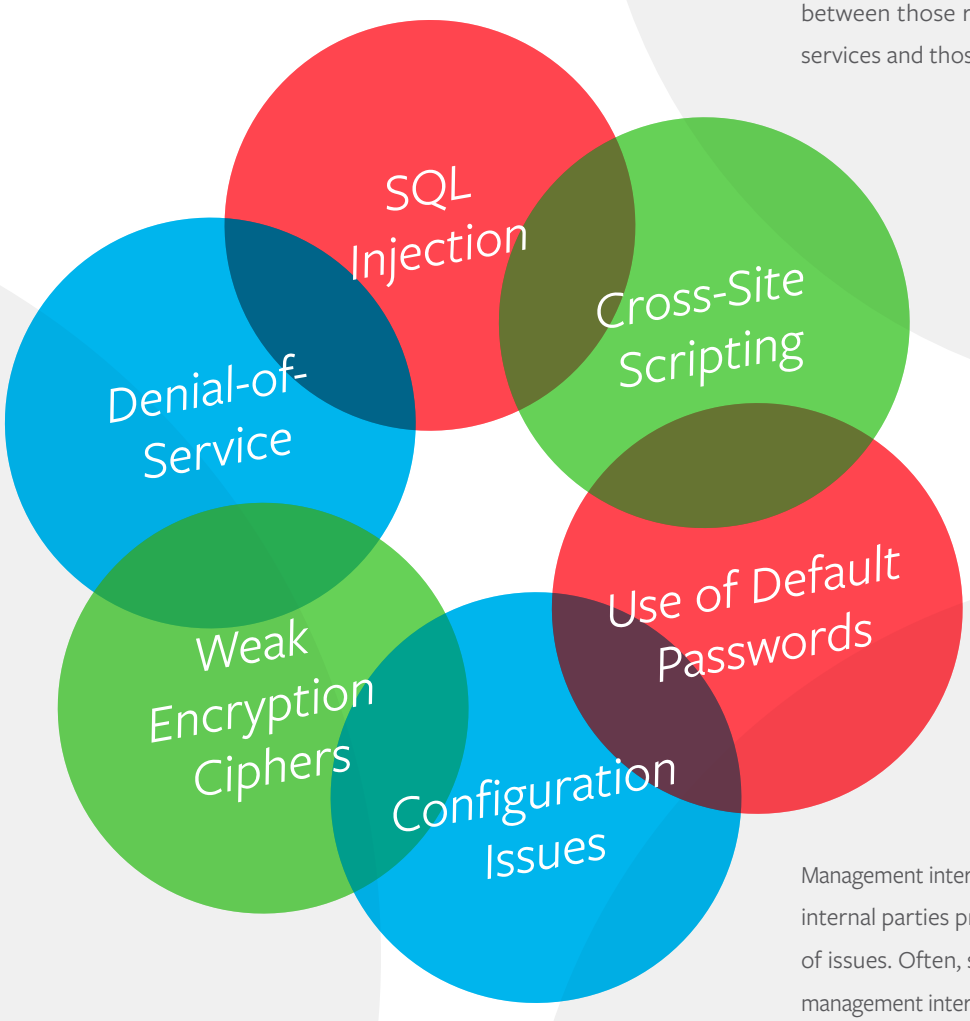
INTERNAL & EXTERNAL VULNERABILITY SCAN ANALYSIS

Based on a sample of scans conducted by the TrustKeeper Scan Engine, Trustwave determined the top vulnerabilities by combining their risk with their frequency of observation.

TOP 6 VULNERABILITIES IN TERMS OF FREQUENCY & SEVERITY

Detected by Trustwave Vulnerability Scanner

Web-based vulnerabilities, such as SQL injection and cross-site scripting, remain prevalent, because web-based services are the most commonly exposed to the internet and their implementations vary widely. In addition, there is often a disconnect between those responsible for developing the services and those tasked with securing them.



Remotely accessible services are often configured with client compatibility in mind, but this can have security consequences. Such is the case with SSL/TLS services, which are commonly configured to allow connections that use weak encryption ciphers or, in the worst case, no encryption at all. These types of communications are susceptible to man-in-the-middle attacks, in which attackers can intercept and tamper with sensitive data.

Management interfaces left opened and exposed to internal parties present another common source of issues. Often, software packages with remote management interfaces are installed and configured to use a default set of credentials. These interfaces are left exposed post-installation with the default accounts intact. While this often translates to web administration consoles, it also includes administrative services, like SNMP and SSH, where detecting default or easily-guessed credentials can be equally trivial.

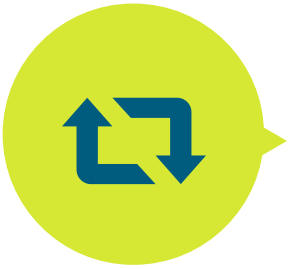
MOST VULNERABLE SOFTWARE

We conducted analysis on some of the applications most commonly detected by the TrustKeeper Scan Engine to determine the percentage of the install base currently using unsupported versions.

The chart below measures the percentage of scanned application instances where an unsupported version of that application was discovered.

APPLICATION	PERCENTAGE OF INSTANCES
Sendmail	*70%*
PHP	*39%*
MySQL	*28%*
phpMyAdmin	*21%*
BIND	*17%*
OpenSSL	*13%*
Apache HTTP Server	*11%*
Microsoft IIS	*2%*

FACTORS THAT CONTRIBUTE TO THE USE OF UNSUPPORTED VERSIONS OF AN APPLICATION CAN INCLUDE:



Applications that have extended support periods, such as Microsoft IIS, tend to have fewer unsupported instances. Initial installations are more likely of a currently supported version, and administrators have more time to prepare for upgrades to the latest versions.

Upgrades to applications that depend on other applications can often break compatibility. This is especially true for commercially available and custom web applications that might depend on older versions of other applications, such as PHP and OpenSSL, to function properly.

Applications that have a low volume of recently disclosed vulnerabilities, such as Sendmail, tend to be neglected in upgrade efforts since they are less likely to cause compliance issues.

2013 DATABASE SECURITY TRENDS

The Trustwave list of top database vulnerabilities shows a significant overlap with the OWASP Top 10. That shouldn't come as a surprise. Database servers are applications themselves. In 2013, all of the major database vendors (listed below) fixed and released patches for various vulnerabilities. The notable exception was Microsoft, which did not experience any known vulnerabilities in its SQL Server offerings. We analyzed the list of fixed issues for each product and categorized them into one or multiple classes of vulnerabilities.

VULNERABILITY CATEGORY	RISK	ORACLE DATABASE	SYBASE ASE	DB2 LUW	MYSQL	MICROSOFT SQL SERVER
PRIVILEGE ESCALATION	HIGH	4	4	2	11	0
BUFFER OVERFLOW	HIGH	6	2	1	6	0
UNUSED FEATURES	MEDIUM	3	2	3	9	0
DENIAL OF SERVICE	MEDIUM	4	2	3	54	0
SQL INJECTION IN THE DATABASE	HIGH	0	2	0	0	0
PASSWORD ISSUES	HIGH	0	1	0	0	0
EXCESSIVE PRIVILEGES	MEDIUM	0	0	0	1	0
UNENCRYPTED DATA	MEDIUM	1	0	0	0	0
CONFIGURATION MANAGEMENT	MEDIUM	1	2	0	1	0
TOTAL ISSUES FIXED		15	12	5	67	0

Any one fix may remedy multiple vulnerabilities

Oracle 10g went out of support. 12c saw its first patches

Sybase was acquired by SAP and thereby acquired the SAP patch naming conventions. Sybase ASE 15 went out of support

Extended support for SQL Server 2000 ended in April

WHY RUNNING OUTDATED & UNPATCHED DATABASES IS DANGEROUS

Database servers are some of a company's most important assets, but they are often neglected when it comes to patches and upgrades. A typical patch cycle for an organization's database servers is three to six months and sometimes up to 12 months. In addition, out-of-support systems pose a particularly high risk, because many of the issues fixed for current versions continue to exist in the out-of-support versions, which open them to exploitation.

NETWORK DEFENSE FAILURES

Trustwave analyzed attack statistics from more than 2,300 manual network penetration tests and vulnerability statistics from more than 1.2 million automated scans across thousands of organizations. From this analysis, we were able to determine the top trends from 2013, as well as the 10 highest impact issues from the past year.

The oldest, tried-and-true vulnerabilities are still present in most environments and useful to attackers. It is interesting to note that at least two issues in this year's top 10 originally appeared in the first SANS Top 10 Most Critical Internet Security Threats for 2000-2001.

MAN-IN-THE-MIDDLE ATTACKS ARE ALIVE, WELL AND QUITE DANGEROUS

If you attended a security conference in 2013, you likely noticed one or more talks about new methods to weaponize existing man-in-the-middle (MitM) techniques. Trustwave has also noticed this trend since it's one of the most popular exploit vectors across all of our network penetration tests. There are many methods for interception of traffic, including ARP cache poisoning, name resolution poisoning and wireless attacks like Karma.

LEGACY ATTACKS

In 2013, our network penetration tests also documented an abundance of networks and systems that are still vulnerable to legacy attack vectors, some over a decade old. These were often related to layer-2 attacks, unencrypted protocols, legacy protocols and misconfigured network access rules.

LAYER 2

Attacks, such as ARP Spoofing, ARP cache poisoning and other vectors at low-protocol layers, allow for passive and active MitM attacks. These remain a high impact for most organizations, because they allow everything from credential theft to session theft and direct data theft.

UNENCRYPTED PROTOCOLS

Protocols that transmit sensitive information in cleartext remain an issue for many organizations despite secure replacements for many of these protocols that have existed for years. These protocols are widely known to be vulnerable to passive and active attacks, from simple eavesdropping to session theft.

LEGACY PROTOCOLS

Legacy protocols such as UNIX "r" services, like 'rsh' or 'rlogin,' are still found in abundance. For years, these protocols have been well documented to be rife with authentication bypass and other attack vectors.

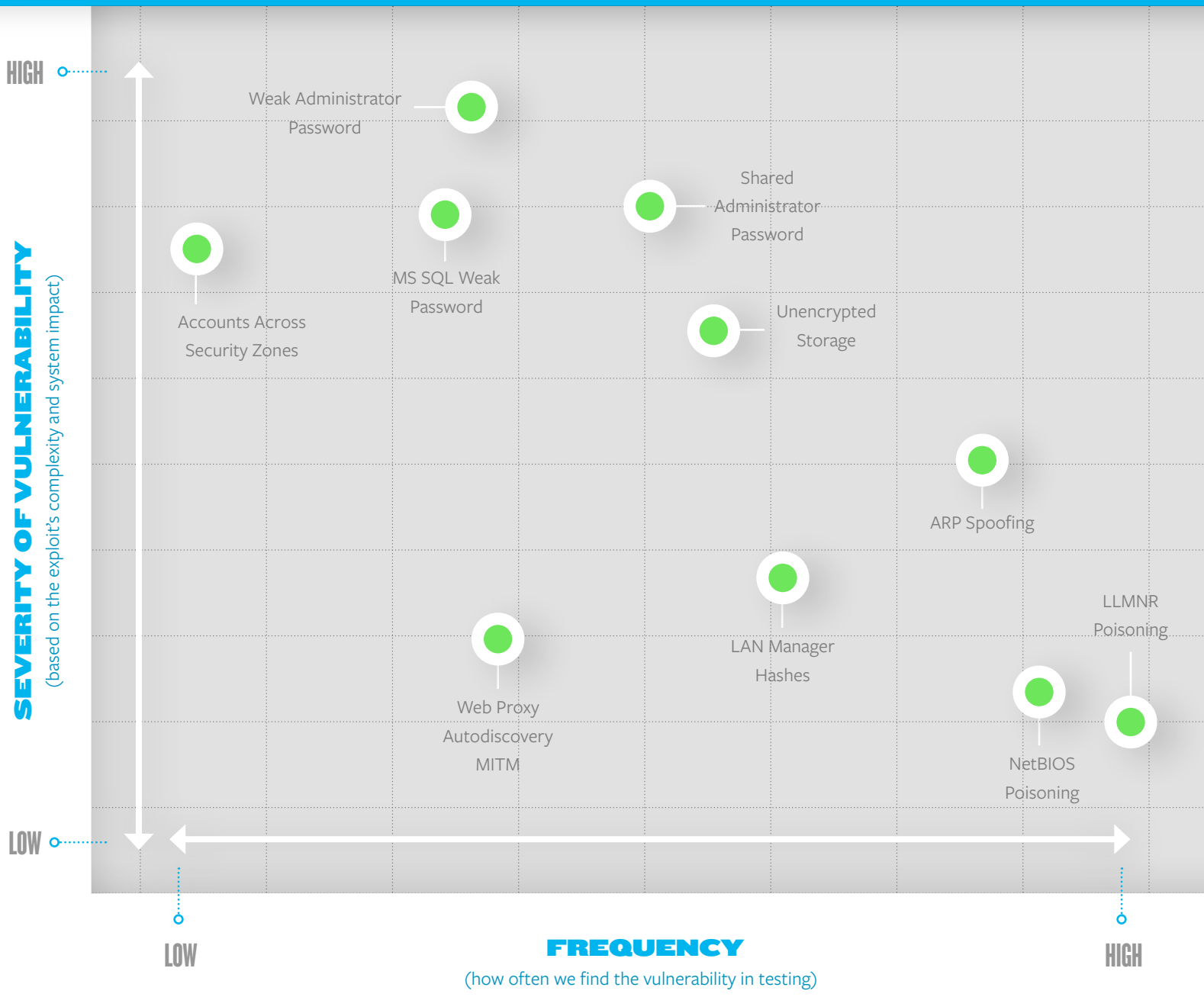
MISCONFIGURED NETWORK ACCESS RULES

Network access control devices, such as routers and firewalls, are often implemented and configured incorrectly. Our analysis shows a number of cases where organizations not only implemented the wrong type of device to save money but also implemented it with a seeming disregard for established security practices.

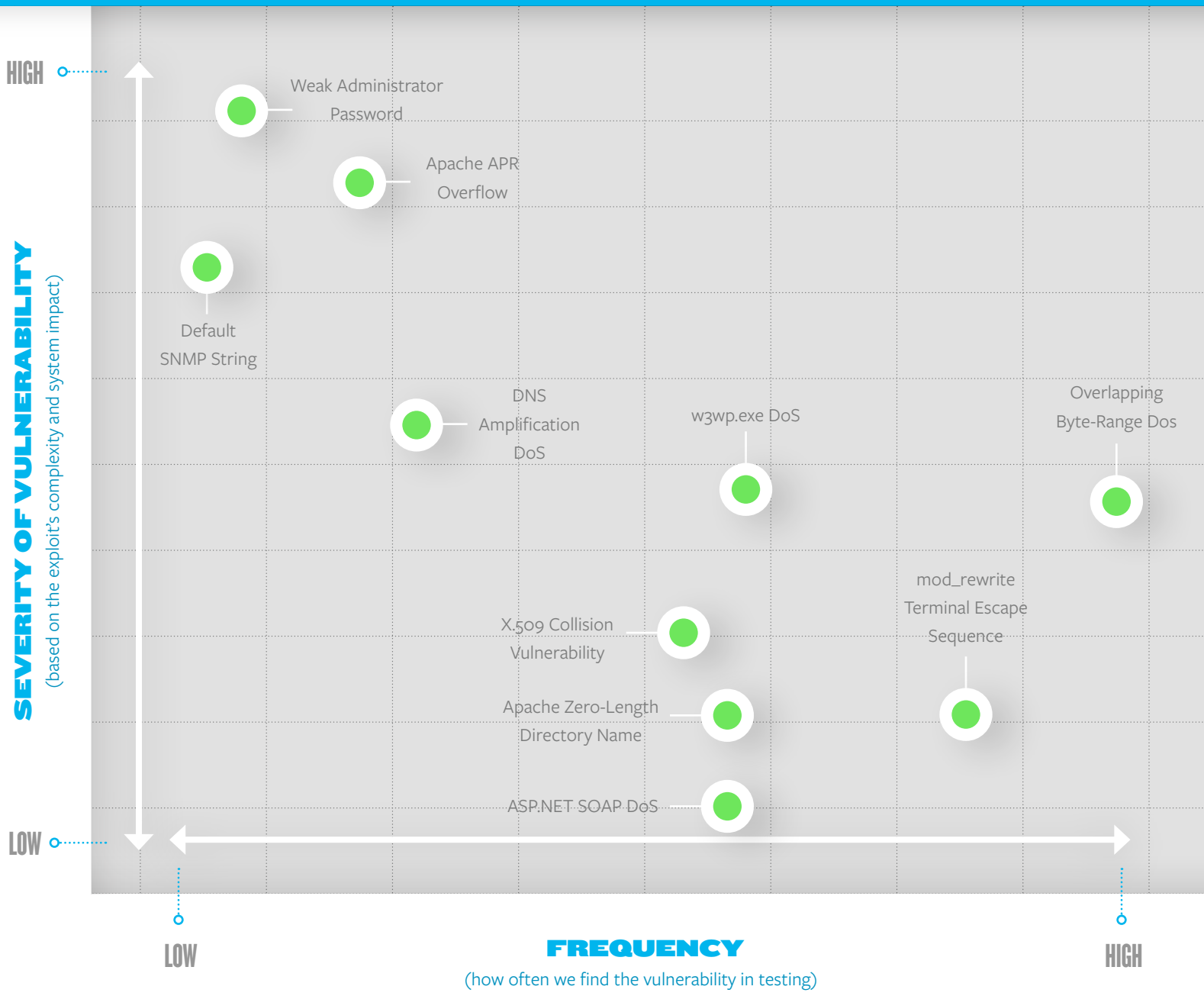
Access control rules that permit all protocols for all systems were commonly seen and essentially render filtering devices useless. Many configurations also ignore any kind of egress filtering, which can allow for virus/worm propagation and provide an attacker with an easy exfiltration channel.

TOP 10 INTERNAL NETWORK PENETRATION TEST VULNERABILITIES

Trustwave analyzed the results of all 2013 network penetration tests and compiled top 10 lists based on a combination of the frequency we observed the vulnerability and its severity.



TOP 10 EXTERNAL NETWORK PENETRATION TEST VULNERABILITIES



APPLICATION DEFENSE FAILURES

Often, the focus during the design process of an application is on functionality and usability with the expectation that users will only use the application as intended. Developers often fail to realize that users may, either inadvertently or intentionally, misuse the functionality of the application. The consequences can range from minor to severe, and sometimes even seemingly small vulnerabilities can result in massive security breaches.

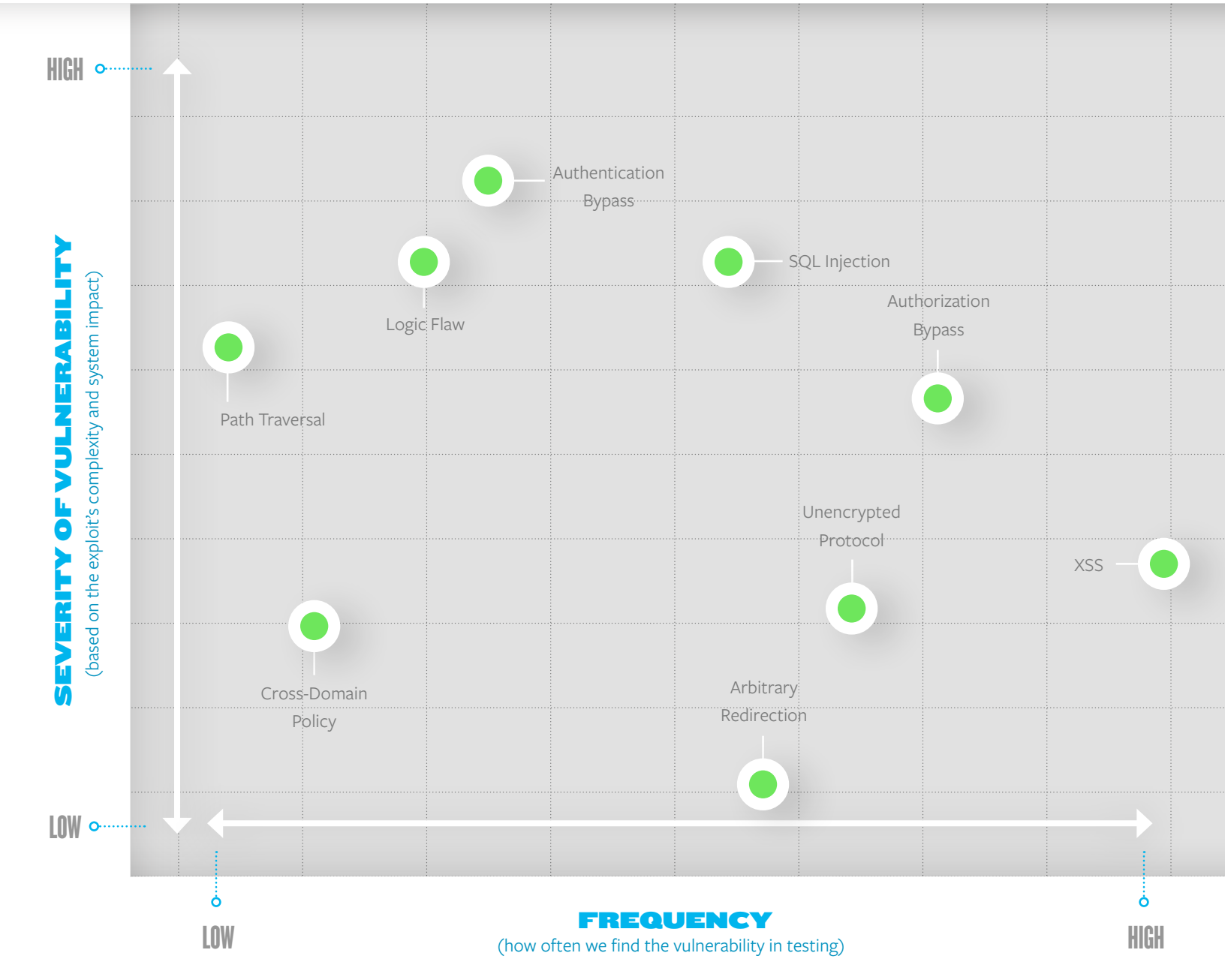
96 percent of applications scanned by Trustwave in 2013 harbored one or more serious security vulnerabilities (compared to 99% in 2012). The median number of vulnerabilities per application increased from 13 in 2012 to 14 in 2013. Cross-site scripting (25%), information leakage (23%), authentication and authorization (15%) and session management (13%) vulnerabilities made up three-fourths of security flaws most frequently found in our security scanning.

TOP 10 WEB APPLICATION PENETRATION TEST VULNERABILITIES

Most of the items in the top 10 list have previously held a place on our list in prior annual reports and should not be a surprise to any security professionals. However, there are two significant exceptions.

Weak cross-domain policies for Adobe Flash are configuration flaws that allow a Flash file running from any website to steal data from the vulnerable site. The security implications are similar to cross-site scripting. The cross-domain policy is a powerful tool for integrating multiple websites across multiple domains and potentially across multiple organizations. However, misconfiguration of the policy has become so common that the vulnerability ranks with the other, far more generic and more traditional, vulnerabilities.

The second notable vulnerability is sensitive data stored unencrypted. While this is a common finding for source code reviews, it is very difficult to identify in a traditional application penetration test since direct data access is typically not available. Its presence on the list is entirely due to the exploitation of other vulnerabilities, such as SQL injection or path traversal.



MOBILE APPLICATIONS

Mobile applications are becoming the norm rather than the exception. Not only are enterprises creating mobile versions of their customer- and public-facing applications, they are also moving their internal applications to support mobile devices. With this trend, Trustwave has started conducting two distinctive mobile security tests:

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Applications – Testing individual applications, including e-commerce, banking, games and point of sale

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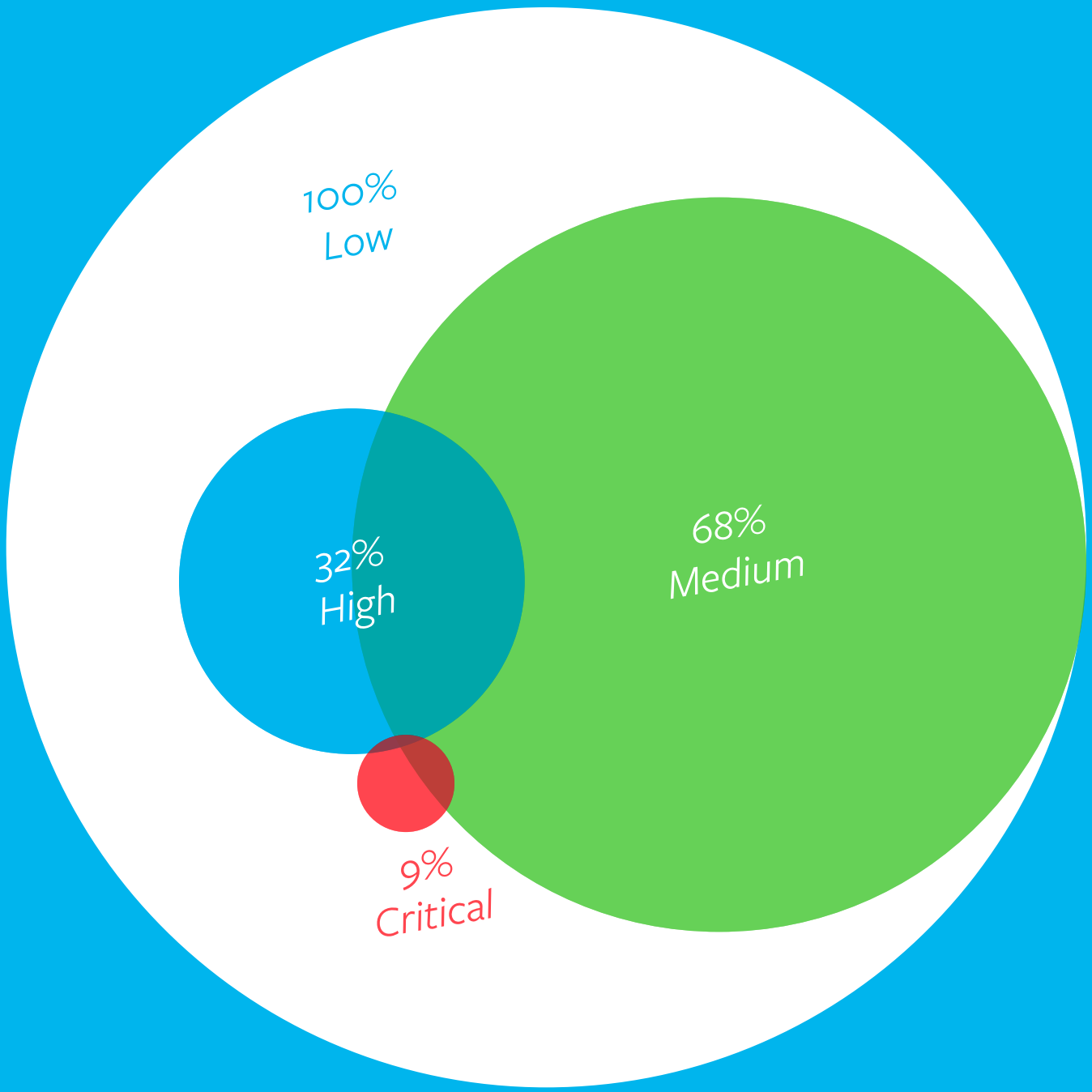
Platforms – Testing platforms, mobile device management (MDM) and secure container solutions used to manage and protect data on a mobile device

PERCENTAGE OF APPLICATIONS WITH AT LEAST ONE VULNERABILITY OF VARYING SEVERITY

Nearly all mobile application testing in 2013 was on either iOS (47%) or Android (48%). A much smaller percentage was on other platforms: Windows and BlackBerry 10 (5% combined).



One of the drivers behind this increase in mobile testing, especially of MDM and secure containers, is the increase in bring-your-own-device (BYOD) policies. Two primary technologies have emerged to help organizations accommodate a wide selection of devices and multiple operating systems. MDM products allow devices to be administrated, either through an endpoint app installed by the user or through features in the device's operating system. Secure containers are storage facilities intended to limit access to the data of one or more user apps. The container is a virtual storage location implemented as an encrypted file on the device's flash storage.

Based on last year's Trustwave testing, using MDMs and secure containers to enforce BYOD policies is not the panacea they are intended to be. MDM solutions are good at managing applications on a device, but have difficulty separating corporate from personal data. They also cannot detect "rooting" or "jail-breaking" activities, which can put sensitive data in jeopardy. Using an MDM solution can also have a paradoxical effect on application development. Developers who assume their application will only run on a protected device may be less likely to enforce strong coding or secure design practices.

Over the past year, Trustwave has tested many widely used MDM and secure container solutions at the behest of some of our largest clients. In almost all cases, our teams were able to bypass root or jailbreak detection, discover offline encryption keys or obtain access to the sensitive data that the security tool was meant to protect. Growth in MDM and secure container use indicates that sensitive data that was once only used on desktops or servers is now available on mobile devices. This represents a significant change in the threat model for most organizations.

FINDINGS BY PLATFORM

	IOS	ANDROID
CRITICAL	2%	0%
HIGH	12%	17%
MEDIUM	13%	15%
LOW	47%	47%
INFO	26%	21%

MOST COMMON MOBILE VULNERABILITIES

The root cause of most mobile vulnerabilities is the assumption that data is safe because an internal application is being used on an internal network.

Information Leakage

Vulnerabilities related to information leakage represent 68 percent of the findings in mobile application tests. This includes simple caching issues that expose personally identifiable information (PII) to insecure storage of cryptographic materials (including private keys and offline decryption keys), as well as cardholder data.

Integrity Flaws

Integrity flaws accounted for 21 percent of all mobile findings. These include the ability to alter calls to backend systems with techniques like user-defined prices or replay attacks. Other integrity flaws were related to attacks on session management.

Physical or Network Access

The most successful attack vector against mobile devices is still surreptitious physical or network access that allows malicious code to be installed and run on the device. As of this writing, an iOS device requires physical access to obtain information or install code, but with the increase in malware, an Android device can be exploited remotely.

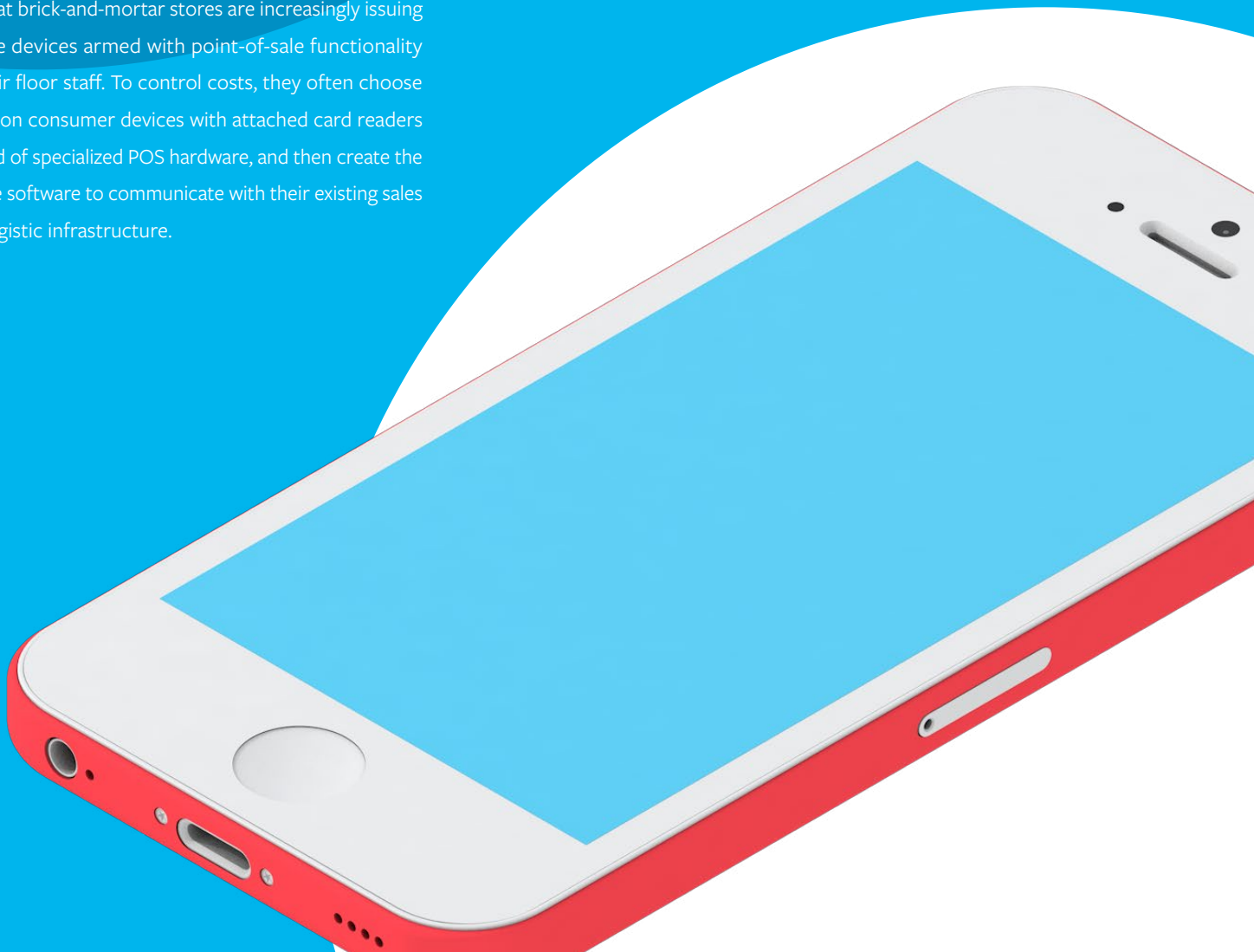
Insecure Storage and Transmission

For non-POS mobile applications, the biggest issues are storage and transmission of critical information in a non-secure manner. Banking, retail and even gaming applications will accept and store PII in unsecured databases on the device (often SQLite databases) or transmit the data insecurely, either using a plaintext connection or with improperly configured encryption. Data can also be stored unencrypted in the device's system caches, which can be retrieved by an attacker who wouldn't require more than brief access to a device. Add to this any operating system-level issues, such as the Apple SSL\TLS "Goto fail" bug, and securing mobile communications on a potentially hostile network becomes difficult.

WHEN YOUR MOBILE DEVICE IS YOUR POS SYSTEM

Retailers looking to improve service levels and reduce queue times at brick-and-mortar stores are increasingly issuing mobile devices armed with point-of-sale functionality to their floor staff. To control costs, they often choose common consumer devices with attached card readers instead of specialized POS hardware, and then create the mobile software to communicate with their existing sales and logistic infrastructure.

Trustwave has noted that many developers make assumptions that leave these mobile POS devices and applications insecure and open to attack. For example, businesses will often initially choose the most inexpensive card reader, only to later discover that they need more hardware to do proper encryption key management. Many then will choose to encrypt cardholder data using software on the mobile device, assuming that it is physically safe—a very dangerous assumption made by almost all mobile POS applications Trustwave tested. This illustrates the root cause of most mobile vulnerabilities—the assumption that data is safe because an internal application is being used on an internal network.



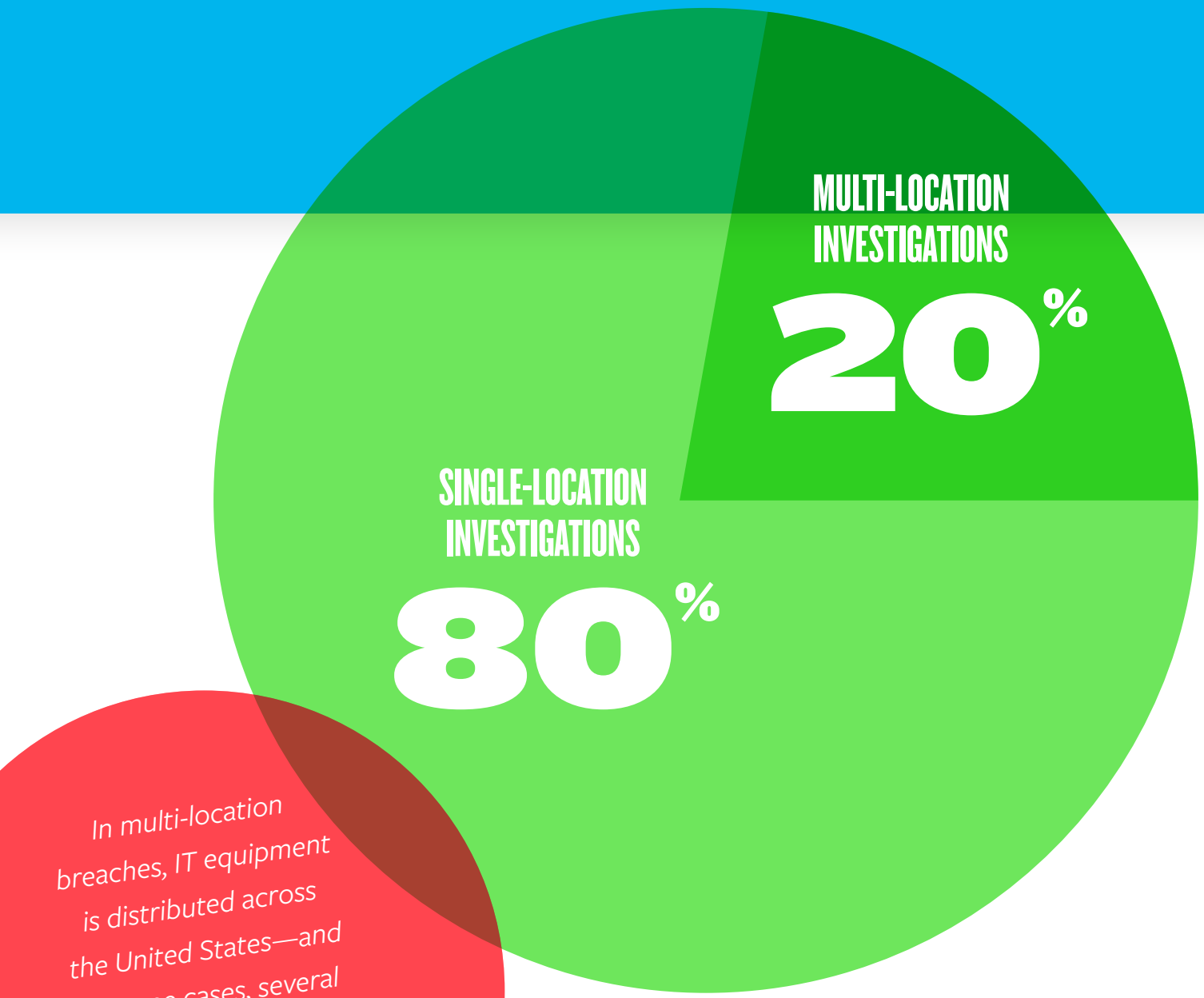
SECTION 3 – REGIONAL PERSPECTIVES

NORTH AMERICA

The majority of data breaches investigated by Trustwave, both in terms of the number and magnitude, occured in the United States. The majority of U.S. breaches involved brick-and-mortar hospitality and retail businesses with large, nationwide payment networks.

ISOLATED STATISTICS

Throughout 2013, we observed more breaches that involved victim businesses that process high volumes of cardholder data, especially those with a multi-location and/or franchise presence.

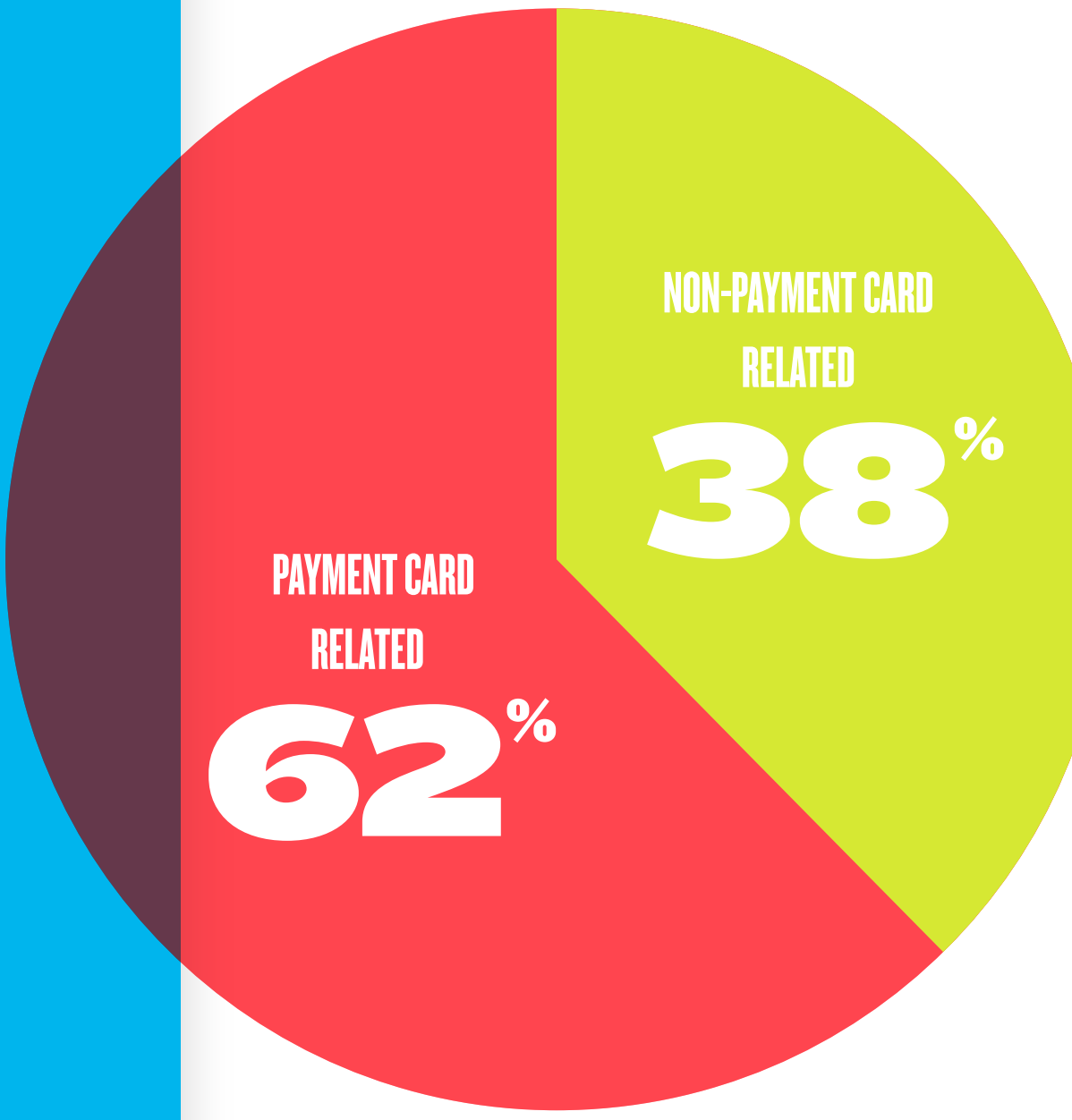


In multi-location breaches, IT equipment is distributed across the United States—and in some cases, several countries, making the footprint of these networks sizeable.

AN INCREASE IN NON-PAYMENT CARD INVESTIGATIONS

Trustwave observed an increase in non-payment card related investigations in 2013. In part, we attribute this rise to a heightened awareness of cybersecurity issues that might have gone under-detected or at least uninvestigated by third-party experts in the past. Approximately 38 percent of Trustwave's 2013 caseload in North America consisted of non-payment card investigations. Still, payment-card-related breaches dominated our caseload.

U.S. INCIDENT RESPONSE CASE TYPES



DISPATCH FROM THE FIELD: UNITED STATES SECRET SERVICE

U.S. SECRET SERVICE
—
NORTH TEXAS ELECTRONIC CRIMES TASK FORCE
—
STEVEN BULLITT - ASSISTANT TO THE SPECIAL AGENT IN CHARGE
—
DALLAS FIELD OFFICE

This year is the 30th anniversary of when the U.S. government first specifically criminalized unauthorized access to computers and access device fraud, and assigned the Secret Service authority to investigate these alleged crimes. Over the past three decades, the Secret Service has continuously innovated in how it investigates cybercrimes to keep pace with the changing use of information technology and criminals' efforts to exploit this technology. Fundamental to the approach of the Secret Service is to maintain close and constant collaboration with all potential stakeholders, not only in investigating, but also in detecting and preventing crimes and minimizing fraud losses and associated damages.

In 1995, the Secret Service created the New York Electronic Crimes Task Force (ECTF) to bring together law enforcement, private industry and academia to share information, stop emerging threats and aggressively investigate incidents. Recognizing the success of this model, in 2001, Public Law 107-56 directed the Secret Service to establish a network of Electronic Crimes Task Forces (ECTFs) for the purpose of preventing, detecting and investigating various forms of electronic crimes, including potential terrorist attacks against critical infrastructure and financial payment systems. Today the Secret Service operates 35 ECTFs throughout the United States, as well as London and Rome.

The Secret Service has investigated numerous and significant cyberintrusions, including recent incidents affecting major U.S. retailers. From this experience,

the Secret Service has witnessed the value of companies developing effective cyber incident response plans. The North Texas Electronic Crimes Task Force has seen this firsthand while working with local companies. The transnational criminals responsible for major data breaches are sophisticated adversaries that carefully research their targets. An effective incident response plan not only assists law enforcement in investigating and bringing to justice these criminals, but also may deter attackers from targeting a particular business.

The importance of an incident response plan has long been recognized; however, many organizations remain focused on trying to close vulnerabilities rather than detecting and deterring threats through effective response planning. Businesses can reference numerous resources to guide incident response planning, including the recently published NIST's Improving Critical Infrastructure Cybersecurity framework. Based on our experience investigating major intrusions, the essential element of incident response planning is building the right team and developing the necessary relationships prior to a breach.

Critical to a company's incident response team are third-party partners that have experience in managing these events. These partners are essential to a victim company's efforts to rapidly containing the incident while conducting an investigation to determine the impact – and then reporting on these results. Businesses always should create these relationships prior to an incident occurring. Organizations should pay special attention to developing the following three relationships:

Outside Legal Counsel: Companies often hire outside legal counsel to assist with risk and remediation procedures, such as compliance requirements, data breach disclosure laws, industry standards, regulations and any other U.S. or foreign legal requirements.

Outside Cyber Incident Response and Forensic Company: Third-party forensic firms will contain the breach and collect sensitive electronic data (evidence) in a forensically sound manner.

Law Enforcement: Unauthorized access to computers is a federal crime in the United States and in most other countries. Individuals who are aware of crimes have a responsibility to report these incidents to an appropriate law enforcement agency.

EUROPE, MIDDLE EAST & AFRICA (EMEA)

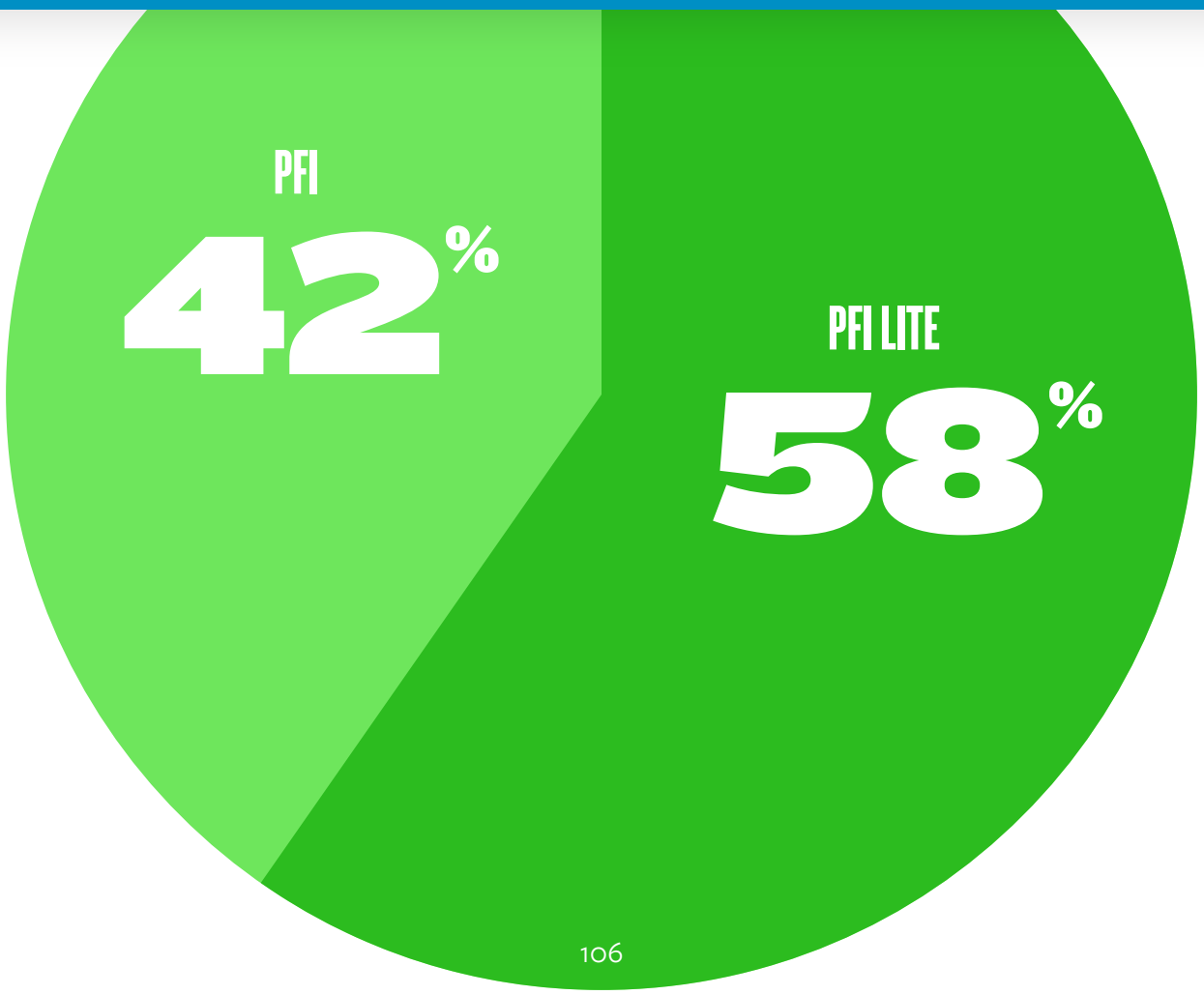
The EMEA region covers approximately 100 countries, two billion people and 50 million square kilometers. Trustwave's first-hand experiences are concentrated within a subset of that, primarily the U.K. and Ireland, Western Europe, Southern Africa, the Nordic countries and a handful of countries in Eastern Europe and the Middle East.

ISOLATED STATISTICS

The majority of our EMEA caseload in the previous year was of compromises involving payment card data. The payment card-related investigations are of two types, either a PCI Forensic Investigation (PFI) or PFI Lite, a new type of investigation introduced by Visa Europe and now in its second year.

A PFI Lite project is part investigation and part remediation. The merchant that is the subject of the forensic investigation is required to move to a fully hosted solution that sends cardholder data directly from their customers' browsers to the servers of a PCI compliant-payment service provider. The merchant site does not have access to cardholder data at any point during the transaction.

EMEA PAYMENT CARD CASE TYPES



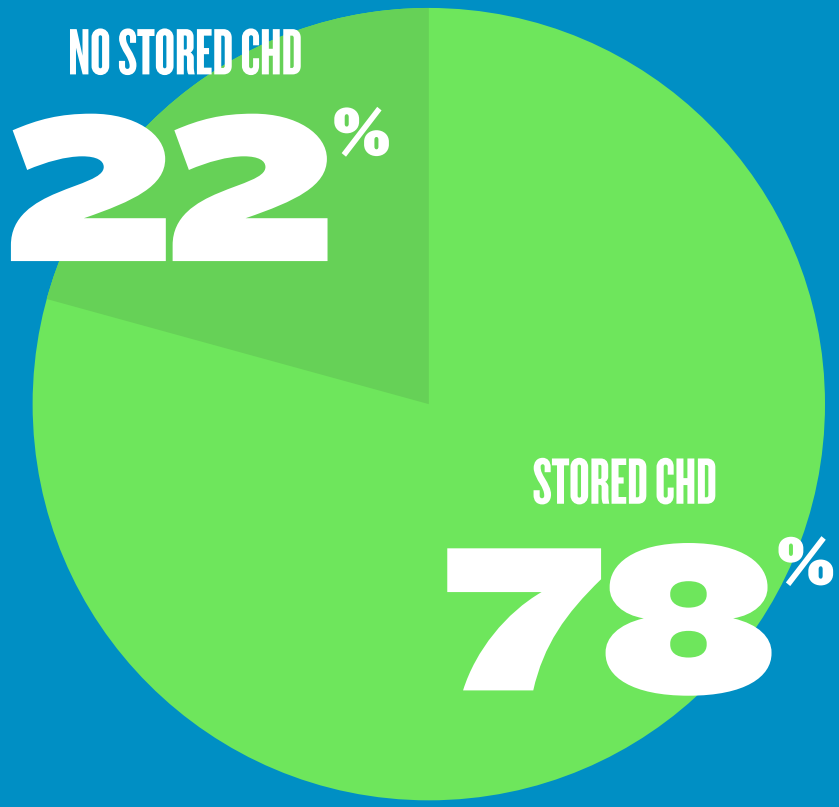
THE ADDED RISK OF STORING CARDHOLDER DATA (CHD)

Our EMEA breach investigations involved both merchants who were storing cardholder data (78 percent), as well as those who were not (22 percent). If a merchant stores cardholder data, they likely do so for a certain period of time – either on purpose or not. This means that not only is a certain amount of data at risk as the result of an ongoing compromise, but so is an additional volume of data, dating back to the beginning of the storage period, before the compromise began.

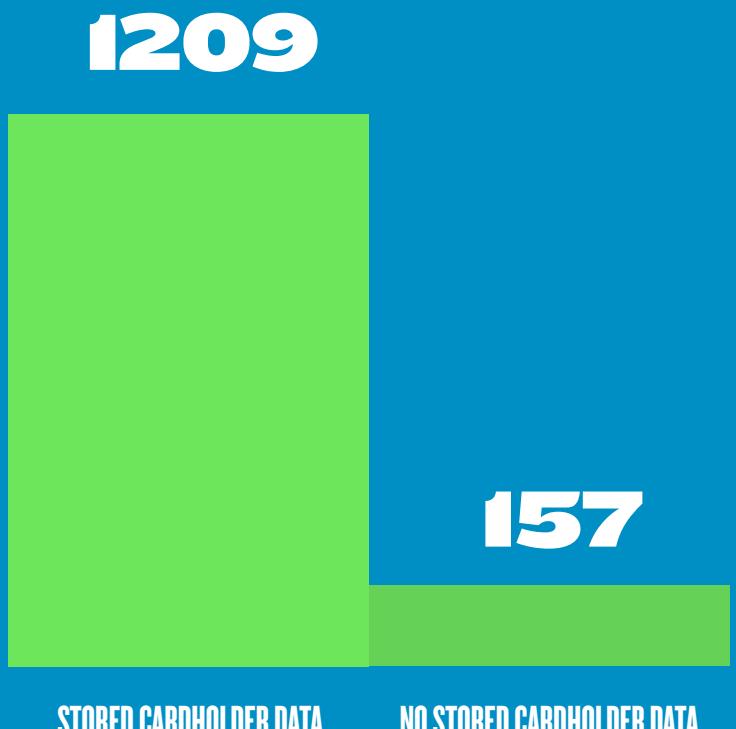
In some of our cases, merchants whose stored cardholder data was compromised were not aware that they were storing such information. If cardholder data is stored unknowingly by merchants, this is usually due to either third parties (such as web hosts) storing the data without notifying the merchant, or logging functionality in the merchant's environment having been turned on for troubleshooting purposes.

Regardless, the merchants in our investigations found to be storing cardholder data had more of their data exposed. The chart [below right] illustrates the number of days' worth of data at risk in investigations involving stored cardholder data versus ones that do not.

EMEA PAYMENT CARD BREACH CASES



DAYS' WORTH OF DATA AT RISK



NOTABLE EVENTS & COMPROMISES IN EMEA

EMV SMART CARD

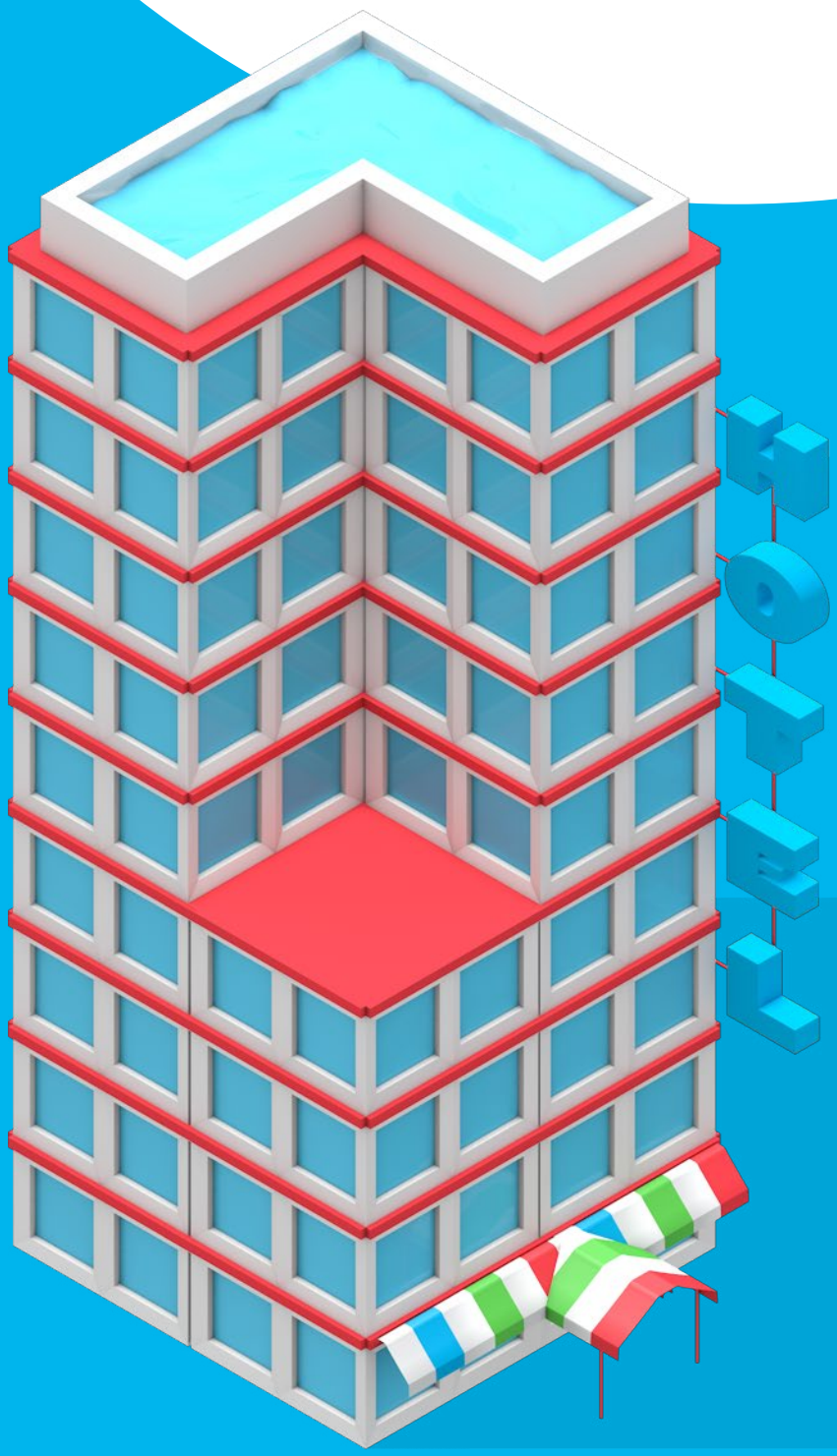
(CHIP-BASED PAYMENT CARD-RELATED COMPROMISES)

There is a common misconception that chip-based transactions on a PIN Transaction Security (PTS)-compliant PIN Entry Device (PED) give little opportunity for attackers to compromise data. However, the security focus of PTS is only the PIN, not other cardholder data, such as account numbers or expiration dates.

Following the implementation of a 2008 Visa Europe mandate requiring different security codes on the magnetic stripe and on the chip, it is not possible to clone a credit or debit card from chip data. For example, if an attacker captures data from the magnetic stripe, they will have the stripe's CVV code, but not the chip's iCVV code. Writing the data from a chip onto the magnetic stripe of a forged card will result in any attempted purchases with that card being declined. However, forgers can extract the full card number and expiration dates from chip data. This can allow attackers to use stolen card numbers to make purchases from e-commerce sites that do not require the CVV2 security code to authorize a transaction. Online retailers requiring the CVV2 will limit the value (to criminals) of standalone card numbers and expiration dates.

The security focus of PTS is only the PIN, not the cardholder data.

HOSPITALITY INTERMEDIARIES ATTRACT HACKER ATTENTION



Last year, Trustwave investigated a small number of compromises of hotel booking services. These business-to-business service providers allow hotels to communicate availability and pricing information to travel websites or agencies. They also send booking and payment data back to the hotel, allowing them to accept bookings from a wide range of global travel sites.

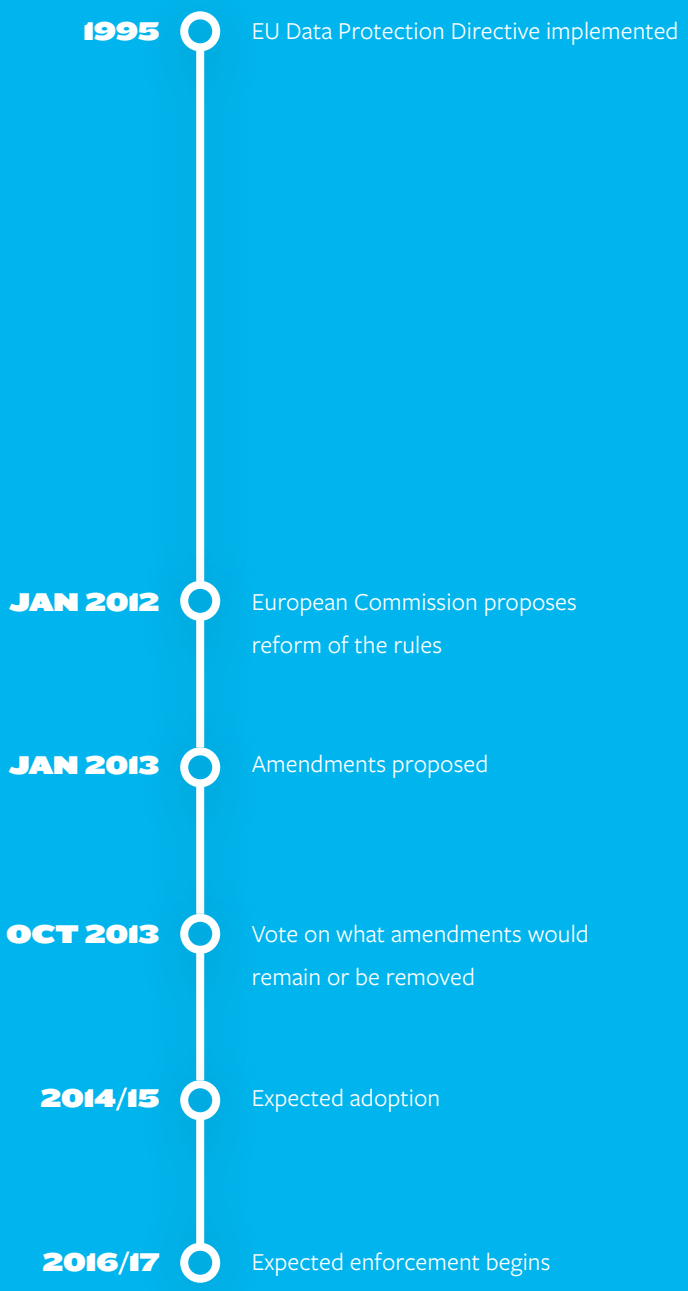
To provide the conduit between the various hotels and travel agencies and online travel-booking sites for, example, the booking services adopted an insecure approach. This included storing cardholder data from the time of booking to a set time after checkout (e.g. for the purposes of cancellation fees). This created a large store of valuable cardholder data.

Regulators traditionally have not focused on booking service providers because they do not process payments themselves. A lack of awareness to the amount of cardholder data that traverses these services' networks has resulted in a lack of appropriate security controls.

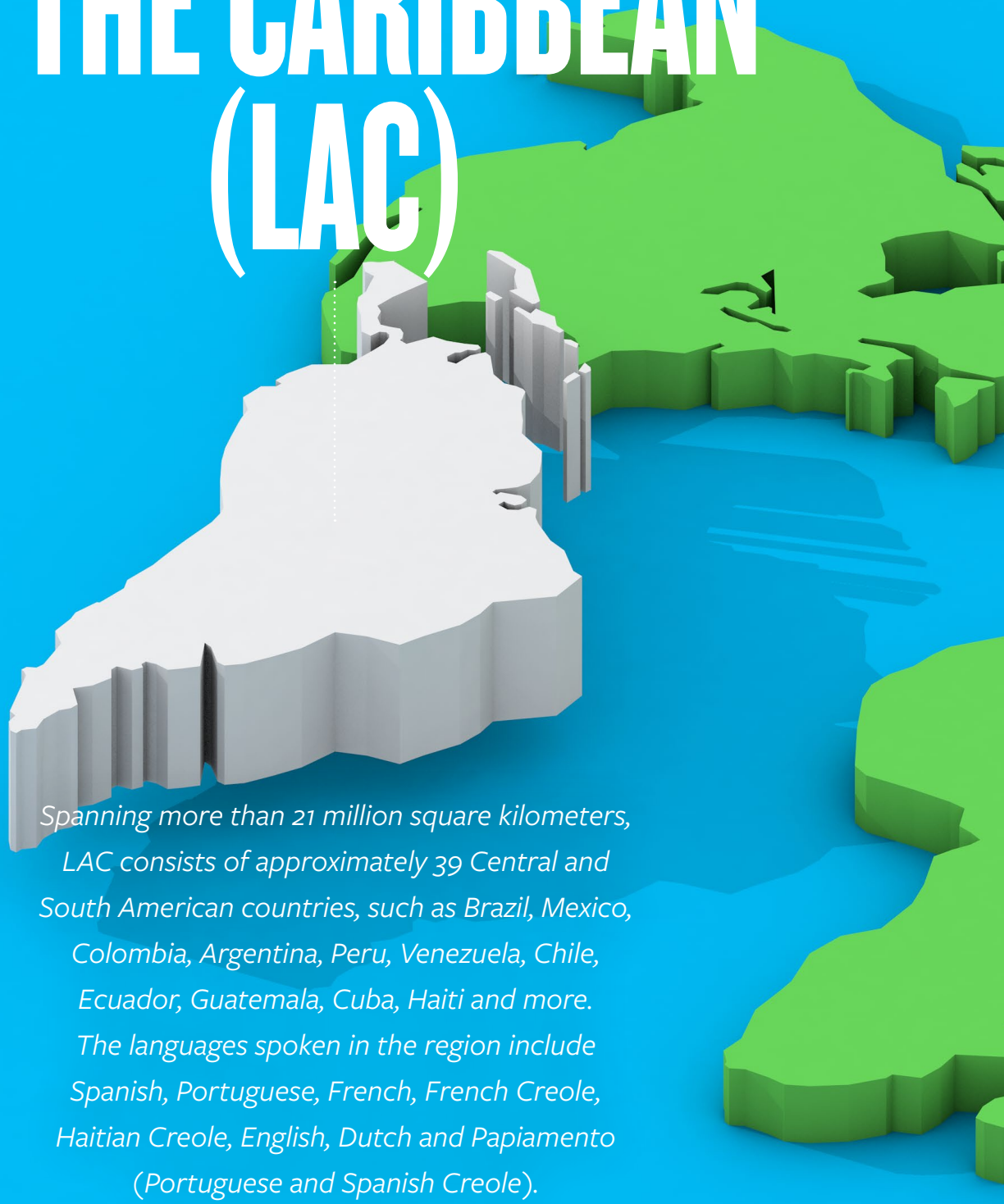
REGULATION

A major focus in the European Union is the proposed General Data Protection Regulation (originally proposed in January 2012). At time of writing, the European Council expects to adopt the regulation later this year. There would be a grace period of two years, while businesses adopt and implement the requirements. If and when lawmakers approve the regulation, the potential impact on information security strategies is likely to be significant.

EU GENERAL DATA PROTECTION REGULATION TIMELINE

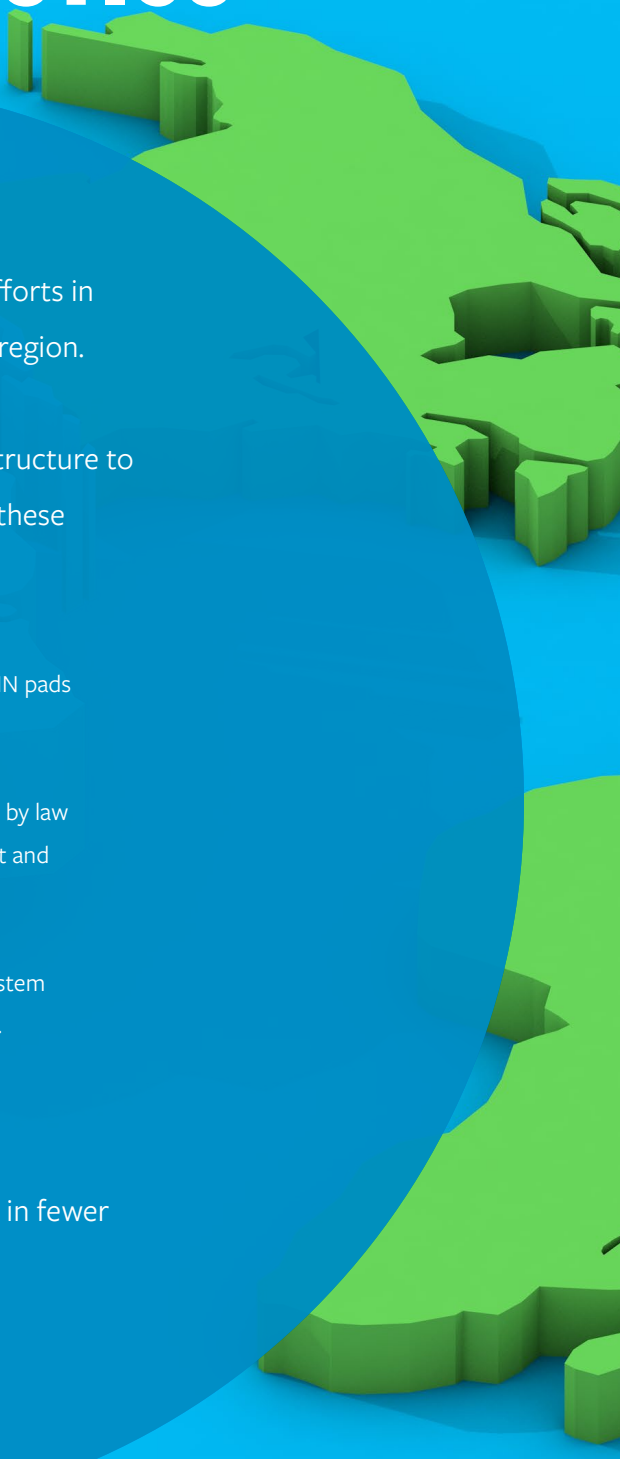


LATIN AMERICA & THE CARIBBEAN (LAC)



Spanning more than 21 million square kilometers, LAC consists of approximately 39 Central and South American countries, such as Brazil, Mexico, Colombia, Argentina, Peru, Venezuela, Chile, Ecuador, Guatemala, Cuba, Haiti and more. The languages spoken in the region include Spanish, Portuguese, French, French Creole, Haitian Creole, English, Dutch and Papiamento (Portuguese and Spanish Creole).

ISOLATED STATISTICS



In 2013, Brazil and Mexico continued efforts in adopting EMV chip technology in the region.

Mexico has migrated its credit card infrastructure to support EMV. In the past two years, these actions have included:

—

Support for EMV chip in almost all deployed PIN pads and ATMs.

—

Two-factor authentication (dynamic) required by law for transactions conducted over the internet and mobile devices.

—

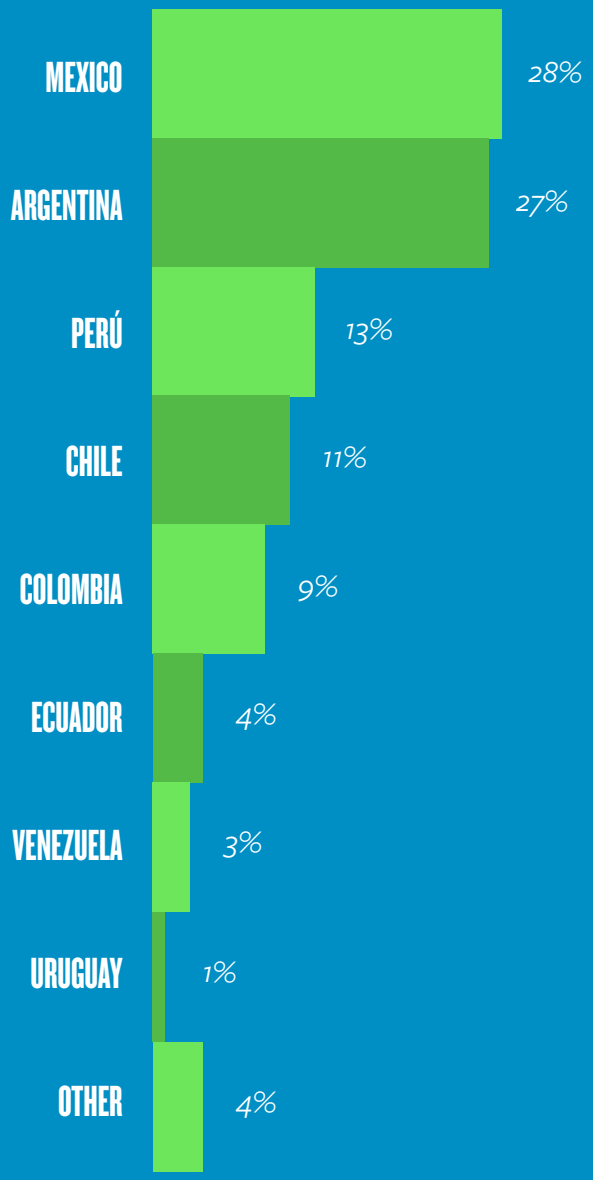
Strengthened the fraud alert notification system among financial institutions nationwide.

Officials believe these actions will result in fewer criminals cloning cards.

PASSWORD ANALYSIS OF PONY BOTNET VICTIMS

In 2013, Trustwave discovered a Pony botnet controller that contained nearly two million compromised login accounts, many for popular websites. Using the sites' top-level domain as a unique differentiator, we conducted an analysis of passwords specific to Spanish-speaking countries within the LAC region. Trustwave excluded email services with non-country specific domains because there is no easy way to identify the account holder's country of origin.

PONY BOTNET STATISTICS PER SPANISH-SPEAKING COUNTRY (2013)



This Pony botnet data suggests that poor password practices may be universal, transcending language and region. The top three passwords are commonly seen in other languages. Meanwhile, we also analyzed common base words—phrases that typically begin a password—and listed the top 10.

Total entries:
26,536

Total unique entries:
18,012

TOP 10 PASSWORDS

PASSWORD	INSTANCES
123456	279 (1.05%)
1234	111 (0.42%)
12345678	73 (0.28%)
ronald123!	68 (0.26%)
123456789	65 (0.24%)
geob04	56 (0.21%)
12345	42 (0.16%)
hnpublica	39 (0.15%)
canchis	37 (0.14%)
acuario	33 (0.12%)

TOP 10 BASE WORDS

BASE WORD	INSTANCES
ronald	78 (0.29%)
geob	59 (0.22%)
caleta	49 (0.18%)
hnpublica	40 (0.15%)
nuco	39 (0.15%)
canchis	39 (0.15%)
davki	36 (0.14%)
y1e2s3u	33 (0.12%)
acuario	33 (0.12%)
jorge	32 (0.12%)

ATM MALWARE IN LAC

Attacks against cash machines included the use of explosives, fake facades, skimming devices and covert micro-cameras to capture victims' PINs. But thieves also turned to ATM malware to steal cash. Specifically, we discovered Ploutus malware during a number of investigations of compromised ATMs within the LAC region. This malicious software was installed both by USB or CD/DVD and by taking advantage of non-hardened OS configuration. This enabled attackers to access a covert control interface on the screen by entering a specific key sequence in the display, which allowed adversaries to withdraw money.

DISPATCH FROM THE FIELD: UNAM CERT

PROVIDED BY THE UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO CERT (UNAM-CERT)

UNAM-CERT is responsible for providing incident detection and response services for the last 21 years within the Universidad Nacional Autónoma de México (National Autonomous University of Mexico, UNAM). Established in 2001, this agency has been internationally recognized as a member of FIRST (Forum of Incident Response and Security Teams).

For the last four years, UNAM-CERT has maintained its incident response process certification under the ISO/IEC 27001:2005 – Information Security Management System (ISMS) standard. UNAM-CERT also provides other information security services, such as penetration tests, vulnerabilities assessments, forensic analysis, security audits, implementation of best practices, specialized training and awareness promotion for "online safety" in general.

Incident Detection and Response

At the beginning of 2013, UNAM-CERT's framework for threat, pattern and trend detection was improved with deployment of one server (Darknet) with 8,970 public IP addresses, capturing malware and running tools that simulate vulnerable services in order to detect attacks. This server simulates 26,910 running honeypots, and all the collected data is shared globally with members of the Honeynet Project. UNAM-CERT also implemented new infrastructure, based on 15 Raspberry Pi microcomputers, to detect attacks on malicious websites and industrial control systems (ICS/SCADA).

During last year, UNAM-CERT worked with other CSIRTs in Latin America to take down a C&C botnet server on a Mexican website and to report several phishing incidents related to Mexican financial institutions.

Malware Analysis and Collaboration

UNAM-CERT collaborates with two anti-virus research laboratories, exchanging the malware samples collected by the Darknet server on a daily basis. Dynamic and static analyses of malware are performed to determine the potential impact and risk, and test results are published on www.malware.unam.mx.

ASIA PACIFIC (APAC)

The majority of the data collected from compromises in the APAC region came from our investigations in Australia. Throughout last year, as with the 2013 Trustwave Global Security Report, compromise trends within the APAC region closely mirrored those observed in EMEA.

ISOLATED STATISTICS

A review of the previous year's APAC caseload determined that compromises of smaller merchants increasingly were related to the exploitation of well-known security bugs in off-the-shelf (whether open-source or commercial) software packages. These packages included common e-commerce shopping carts, forum software (e.g., for customer support), blogging platforms, content management systems and rich-text editor software (often utilized by the above).

PAYMENT SERVICE PROVIDERS UNDER ATTACK

Another trend of note in the region was compromises relating to PSPs. A PSP in the payment card context is any entity that interacts with payment card data on behalf of multiple merchants. Breaches of these types of organizations are significant, since a single event can affect the payments associated with many merchants.

Compromises of PSPs are also more difficult to detect because the PSP is not normally named in the card brands' or acquirers' transaction records. This means that when fraud occurs, the affected merchants are easy to identify—but not the PSP involved in the processing of those past transactions.

NOTABLE EVENTS & COMPROMISES IN APAC

During 2013 in APAC, more acquiring banks moved their merchant portfolio to hosted and redirect-style payment products, with the goal of simplifying PCI DSS compliance by reducing the size and complexity of the merchants' compliance scope. As we observed in Europe, we learned of an increase in compromises of these hosted and redirect-style environments in APAC. However, compromises of this type are not yet frequent enough to discourage acquirers' efforts to move merchants to these types of environments. However, attacks are on the rise, and it is clear that these solutions are not the cure merchants and acquirers originally thought.

We will continue to monitor how the card brands and acquiring banks will choose to implement version 3.0 of the PCI DSS in region, given it reduces the extent to which these solutions can be used to minimize merchants' compliance efforts.

OTHER COMPROMISES

Outside of the payment card space, Trustwave also investigated a number of compromises of corporate networks in 2013. These compromises often took a similar form—malware was uncovered on the internal network when it attempted to 'phone home' to some type of botnet command-and-control infrastructure.

Trustwave was then engaged to investigate, and in each case found that systems had been compromised in drive-by download attacks, usually via a vulnerability in Adobe Acrobat, Adobe Reader, Adobe Flash or Java.

BREAKDOWN OF APAC INCIDENTS

During the previous year, the number of deliberate and targeted attacks grew. Compared to 2012, during which we saw fewer attacks, in 2013 criminals used multiple techniques to gain entry, propagate through the environment, identify sensitive data and subsequently exfiltrate data from the environment.

Although most of the incident response and forensic engagements relate to opportunistic, financially motivated cybercriminals, we observed a steady stream of compromises unrelated to payment card data theft in the region. These incidents primarily relate to drive-by-downloads, phishing and employee misuse. It seems businesses in certain countries (and sectors) are becoming more willing to have third-party experts involved.

Almost all of the events covered in the APAC data set, as compared to the global data set, relate to compromises that occurred in Australia and New Zealand. There are two potential reasons for this phenomenon:

1

The number of e-commerce compromises in Australia and New Zealand grew four percent from 2012 to 2013.

This may be due to the growth of the e-commerce sector in Australia in general, or to the attractiveness of Australian payment cards (which, according to the payment brands, tend to have comparatively high limits, relative to other markets in the region) to black market peddlers.

2

The Australian and New Zealand payment card industries are more effective at detecting compromises than their international colleagues within the region, according to acquiring banks.

There are a relatively small number of issuing and acquiring banks in Australia and New Zealand, and these organizations tend to share fraud management information. This makes detection of merchant compromises via common point-of-purchase analysis more straightforward.

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