# Q4
## 2012

**AVG Community**
**Powered**
Threat Report

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# Introduction

## Welcome to the AVG Q4 Community Powered Threat Report

**During the final quarter of 2012, we saw the continued rise of off-the-shelf malware 'toolkits' and ongoing growth in the mobile malware market. However, while these are the work of professional cyber-criminals, we also discovered several attacks involving basic Trojans developed by very young amateur coders – in one case, the author was just 11 years old.**

In this Q4 Community Powered Threat Report, we investigate these subjects and more, round up the latest web, mobile and email threats, and set out our predictions for the key threats that will shape 2013's security landscape. It is, of course, an ever-shifting landscape, though, so to keep up to date with the latest security developments, remember to look out for AVG Threat Labs' regular threat bulletins on the AVG News & Threats blog.

I hope that you enjoy reading this quarter's Threat Report.

*Yuval Ben-Itzhak, CTO, AVG Technologies*

# Executive summary:
# Q4 2012 Highlights

*"60% of attacks detected by during 2012 were performed by exploit toolkits"*

## Key points for Q4 2012

**The quarterly AVG Community Powered Threat Report for Q4 2012 was released on 6 February 2013.**

**Blackhole: King of the Malware Universe**
The Blackhole toolkit was by far the most dominant malware in the market, accounting for 49% of attacks detected by AVG Threat Labs during 2012. In this report, we analyze the top Blackhole incidents we saw this year.

**Mobile Targeted Malware**
During 2012, mobile device penetration rates dramatically increased. Android is the most popular operating system with 72.4% of market share, which has resulted in a big increase in attacks that target it. In this report, we look at the main threats to smartphones and tablets.

**The Rise of Exploit Toolkits**
AVG Threat Labs found that 60% of the attacks during 2012 were performed by exploit toolkits. A new trend has developed as established cyber-criminals realize they can create commercial toolkits that they can sell at a premium to less technically savvy peers, who in turn see such kits as an easy way to get into the market.

**Blackhole and Cool Exploit Kits**
A new exploit toolkit emerged during the last quarter of 2012 called Cool Toolkit. We believe that this kit is produced by the creators of the Blackhole Exploit Kit as it has many similarities. In this report we analyze Cool Toolkit and compare it with Blackhole.

**Is Your Child a Malware Writer?**
Could your pre-teen be writing malicious code? We analyze a Trojan developed by an 11-year-old child to steal account login information of online gamers, and discuss the risks involved.

# Top Trends

*"During 2012, AVG detected almost 4,000,000 threats to mobile devices"*

**The AVG Q4 2012 Community Powered Threat Report Top Trends**

### Web Threats

| | |
|---|---|
| **Blackhole Exploit Kit** | The most active threat on the web, accounting for 39.9% of all detected malware and 84.1% of all toolkits |
| **59%** | Exploit toolkits account for well over half of all threat activity on malicious websites |
| **12.74%** | Of malware relies on Autorun and external hardware devices (such as flash drives) as a distribution method |

### Mobile Threats

| | |
|---|---|
| **com.utooo. android.compass** | The most detected malicious Android application, which pretends to be a compass tool |
| **~3,930,500** | The total number of mobile threats detected by AVG Threat Labs during Q4 2012 |

### Messaging Threats (Spam)

| | |
|---|---|
| **United States** | Is the top **s**pam source country |
| **45.7%** | Of spam messages originated from the USA, followed by the UK with 9.3% |
| **Facebook.com** | The top domain in spam messages |
| **English** | Is by far the most popular language used in spam messages at 70.3% |

# About This Report

*"The AVG Community Protection Network is an online neighborhood watch, where community members work to protect each other"*

## Working Together

The AVG Community Protection Network is an online neighborhood watch where community members work to protect each other. Information about the latest threats is collected from customers who participate in the product improvement program and shared with the community to make sure everyone receives the best possible protection.

The AVG Community Powered Threat Report is based on the Community Protection Network traffic and data collected from participating AVG users over a three-month period, followed by analysis by AVG. It provides an overview of web, mobile devices, spam risks and threats. All statistics referenced are obtained from the AVG Community Protection Network.

AVG has focused on building communities that help millions of online participants support each other on computer security issues and actively contribute to AVG's research efforts.

# Quarterly Key Metrics:
# September-December 2012

Top 10 Web Threats Q4 2012
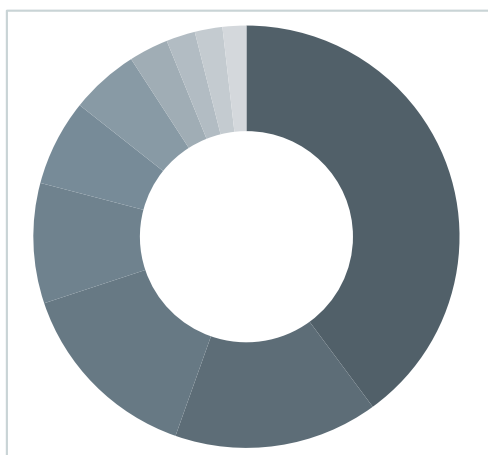


| Blackhole | 39.9 |
|---|---|
| Cool Exploit | 15.5 |
| Redirect to Rogue | 14.5 |
| Rogue Scanner | 9.2 |
| Facebook | 6.6 |
| Parallels Plesk | 5.2 |
| Redkit Exploit | 3 |
| Nuclear Exploit | 2.2 |
| Pharmacy | 2.1 |
| Script Injection | 1.8 |

## Web Threats: Top 10 Threats Q4 2012

This prevalence table shows the top web threats as reported by the AVG community.

| | |
|---|---|
| **Blackhole Exploit Kit** | Pages containing fake virus scanners, or appear to be pages pushing fake antivirus products. Such pages intend either (or both) to lure end user to buy worthless software, or to install malware under the cover of seemingly useful software |
| **Cool Exploit Kit** | Exploit toolkit used to install malware |
| **Redirect to Rogue Scanner** | Injected code which redirect the visitor to a malicious site that tries to install Rogueware |
| **Rogue Scanner** | Pages containing fake virus scanners, or appear to be pages pushing fake antivirus products. Such pages intend either (or both) to lure end user to buy worthless software, or to install malware under the cover of seemingly useful software |
| **Facebook Scam** | Utilizing Facebook to scam people into revealing personal or financial data |
| **Parallels Plesk Panel compromise** | Parallels Plesk Panel is website control panel software widely used by web hosting companies. The vulnerability was discovered in older versions (using plain text to store password data), this vulnerability allows cyber criminals to extract all website account |
| **Redkit Exploit Kit** | Exploit toolkit used to install malware |
| **Nuclear Exploit Kit** | Exploit toolkit used to install malware |
| **Pharmacy Spam Site** | Pharmacy Spam Sites look like legitimate online pharmacies, but are usually copies of real sites. These fake pharmacies often supply generic, or even fake, drugs rather than the brands advertised, and reportedly often deliver no drugs at all |
| **Script Injection Redirect** | Injection of code by an attacker, into a computer program to change the course of execution |

# Quarterly Key Metrics:
# September-December 2012

Top 10 Behavior
Categories Q4 2012
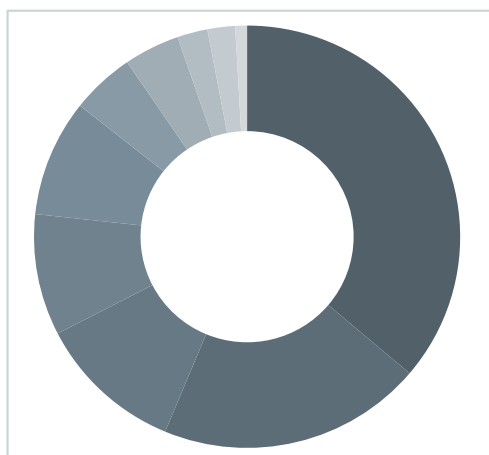


| Trojan | 34.49% |
|---|---|
| Adware | 19.14% |
| Adware/Spyware | 10.62% |
| Downloader | 8.85% |
| Malware | 8.52% |
| Virus | 4.60% |
| Potentially Unwanted Application | 4.03% |
| Backdoor | 2.19% |
| Network Worm | 2.00% |
| Rootkit | 0.85% |

## Web Threats: Top 10 Malware Q4 2012

This prevalence table shows the top malware threats
as reported by the AVG community.

| Worm/AutoRun | 12.74% |
|---|---|
| Win32/Heur | 12.49% |
| Worm/Downadup | 8.14% |
| Win32/Sality | 5.07% |
| Win32/Cryptor | 4.4% |
| Crack.CO | 3.83% |
| HTML/Framer | 2.98% |
| Win32/Virut | 2.93% |
| Generic20.GJD | 2.93% |
| Luhe.Exploit.LNK.CVE-2010-2568.A | 2.78% |

## Web Threats: Top 5 Exploit Toolkits Q4 2012

These metrics represent the top five exploit toolkits in terms
of malicious web activities. Criminals are increasingly using
toolkits to carry out cyber-attacks. In many cases, using
these attack toolkits does not require technical expertise.

| Blackhole | 84.1% |
|---|---|
| Fragus | 8.4% |
| Phoenix | 4.15% |
| Seosploit | 2.09% |
| Bleeding Life | 0.55% |

# Quarterly Key Metrics: September-December 2012

Top 10 Mobile Malware
Detections by Country
Q4 2012
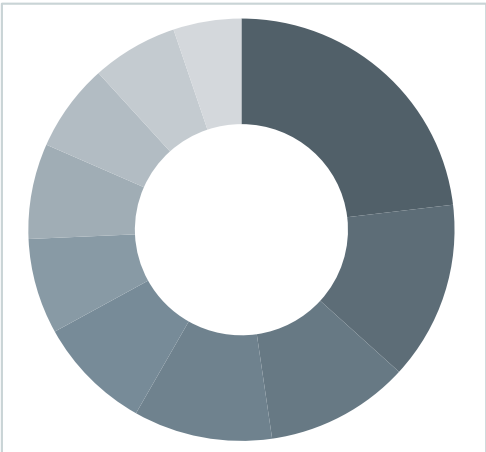


| Russian Federation | 14.10% |
| Thailand | 8.32% |
| United kingdom | 6.68% |
| USA | 6.43% |
| Spain | 5.34% |
| Malaysia | 4.46% |
| Germany | 4.45% |
| Italy | 4.09% |
| Netherlands | 3.99% |
| Indonesia | 3.15% |

## Mobile Threats: Malware Detections by Country Q4 2012

| Russian Federation | 14.1% |
|---|---|
| Thailand | 8.32% |
| United kingdom | 6.68% |
| USA | 6.43% |
| Spain | 5.34% |
| Malaysia | 4.46% |
| Germany | 4.45% |
| Italy | 4.09% |
| Netherlands | 3.99% |
| Indonesia | 3.15% |

# Quarterly Key Metrics: September-December 2012

## Email Threats: Top Domains Q4 2012

| | |
|---|---|
| **no domain in message** | 16.4% |
| **facebook.com** | 8.2% |
| **twitter.com** | 5.4% |
| **bit.ly** | 3.7% |
| **gmail.com** | 3.1% |
| **youtube.com** | 2.7% |
| **amazonaws.com** | 2.1% |
| **hotmail.com** | 2.1% |
| **Linkedin.com** | 1.8% |
| **yahoo.com** | 1.75% |
| **google.com** | 1.7% |

## Email Threats: Top 5 Languages in Spam Messages Q4 2012

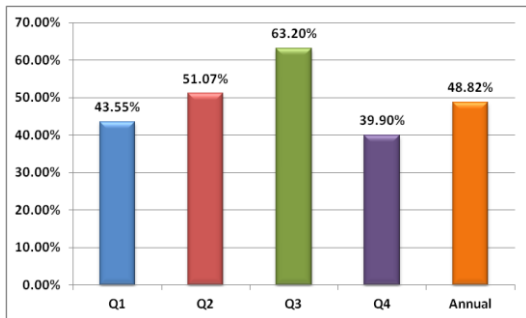| | |
|---|---|
| **English** | 70.3% |
| **Spanish** | 6.7% |
| **Portuguese** | 5.5% |
| **Dutch** | 3.1% |
| **Chinese** | 3% |

# Part 1: 2012 Summary



Figure 1: 2012 Blackhole Market Share

## The King of the Malware Universe:
## The Blackhole Phenomenon

The Blackhole Exploit toolkit is without doubt the King of 2012 malware universe with almost 50% of the market share (fig 1). This means that a staggering 49% of attacks during 2012 were performed using the Blackhole Exploit Toolkit.

The Blackhole toolkit dominated malware in 2012. It is a sophisticated and powerful exploit kit and mainly due to its polymorphic nature it is heavily obfuscated to evade detection by anti-malware solutions.

The success of the kit lies in its straightforward user interface, sophisticated design, encryption and successful marketing model. Blackhole creators 'commercialized' their product by providing a subscription-based service meaning it's available to purchase online and effectively gives anyone the tools to become a cybercriminal.

AVG Threat Labs detected some major Blackhole exploits in 2012:

- Spoof FBI legal action ransomware demands fine for alleged PC misdemeanours: In June 2012, AVG found a new ransomware page delivered by the Blackhole exploit kit which claims to be a legal action by the US Federal Bureau of Investigation. The malware locks up the machine's Windows operating system and demands payment of a 'fine' to unlock it.

- 'Commercialized' Malware, the Blackhole Toolkit, continues its upward trajectory: For those who are interested in becoming a sophisticated cybercriminal, the notorious Blackhole Toolkit has been the kit of choice for the last few years.

# Part 1: 2012 Summary

## Mobile Targeted Malware

During 2012 smartphone device penetration dramatically increased. According to ComScore, 55% of European mobile users have a smartphone[1], 81% of Americans[2] and 81.7% of Japanese. Android is the most popular operating system with 72.4% of market share[3]. Consumers are going mobile and following closely behind are cyber criminals, who have focused on the Android operating system as a lucrative hunting ground.

AVG Threat Labs found during 2012 that:

- Social media and Smartphone: Nearly half of the world's social network users visit social media sites via their phones[4]. Cyber criminals realize that through social networks, they have access to a large number of potential victims that can be converted into a considerable amount of income.
- Malicious Apps: the Google Play Store has had more than 25 billion app downloads[5]; the number of apps on the Android market is more than 600,000[6]. During 2012 we have covered several stories relating to malicious apps on Google Play and other third party apps markets, such as:
- The First Android Rootkit
- Mobile banking targeted for attack: By installing malware on the phones of people who internet bank, cybercriminals can steal large sums in a single transaction
- Malicious apps which send text messages from a device to premium rate services
- Trojan-infected version, uploaded to the unofficial Android app stores, of the hugely popular Android application 'Angry Birds Space'

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[1] http://techcrunch.com/2012/12/17/smartphone-penetration-in-europes-big-5-markets-now-at-55-apple-continues-to-feel-the-heat-from-fast-rising-samsung/
[2] http://mobithinking.com/mobile-marketing-tools/latest-mobile-stats/a#topmobilemarkets
[3] http://mashable.com/2012/11/14/android-72-percent/
[4] http://thenextweb.com/asia/2012/11/16/report-half-of-worlds-social-media-users-go-mobile-as-us-and-europe-lag-asia/
[5] http://techcrunch.com/2012/09/26/google-play-store-25-billion-app-downloads/
[6] http://www.appbrain.com/stats/number-of-android-apps
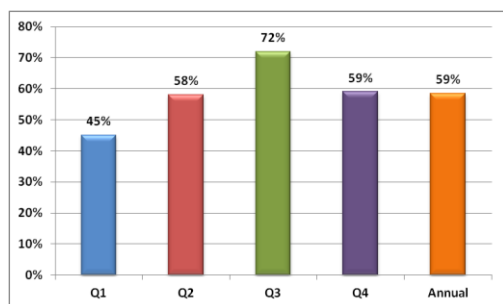
# Part 2: Web Risks and Threats



Fig 2: 2012 Exploit Toolkit Market Share

## The Rise of Exploit Toolkits

A crimeware toolkit is a 'commercial' software program that can be used by novices and experts alike to facilitate the launch of widespread attacks on networked computers. With the attack toolkit, cyber criminals can launch an attack using pre-written malicious code that exploits a number of vulnerabilities in popular applications. These attacks often target un-patched security bugs in widely used products such as Adobe® Flash® Player, Adobe® Reader, Internet Explorer® and the Java Runtime Environment.

The ease of use and accessibility of these toolkits has seen them gain popularity in recent years and allowed a new group of cyber criminals to enter the market, who would normally lack the required technical expertise to succeed.

Tech-savvy criminals realized they could 'monetize' their malicious code writing exploits by selling toolkits to less savvy individuals who would pay good money for them.

**As seen in fig 2, almost 60% of attacks in 2012 were performed by toolkits.**

# Part 2: Web Risks and Threats

## Blackhole and Cool Exploit Kits: More of the Same?

AVG Web Threats Research Group has analyzed a new exploit kit called 'Cool'. At first it looked like a new variant of Blackhole Exploit kit. We have investigated the differences and similarities of the two exploit kits and it seems, Cool is either a copycat or it was created by the same author.

### Code Similarities

- Both exploit Java, Flash, PDF vulnerabilities in the same way.
- The shell code used in both is very similar.
- Both the Cool and Blackhole Exploit kits try to install a specific vulnerable JVM version from the now disabled page http://java.sun.com/update/1.6.0/jinstall-6u60-windows-i586.cab#Version=6,0,0,0.

### Obfuscated code examples

- The Blackhole sample snippet below (fig 3) is shown after the outer layer of obfuscation is removed. The Cool sample snippet below it is verbatim (fig 4).



Fig 3 - Blackhole Code Obfuscation



Fig 4 - Cool Code Obfuscation

# Part 2: Web Risks and Threats

**Code Differences**

At this point we see two main differences:

- Blackhole obfuscates the code (fig 5), changing it every few days to evade detection, unlike Cool (fig 6).
- Blackhole, since version 2.0, has become much more consistent in its blocking of visitors IPs across their vast networks with the aim to make a 'second look' at the code difficult. This is done to discourage (or fool) investigators such as webmasters, automated web spiders and anti-virus researchers.



Fig 5 – Obfuscated Blackhole Cool Toolkit Code



Fig 6 - Cool Toolkit Code
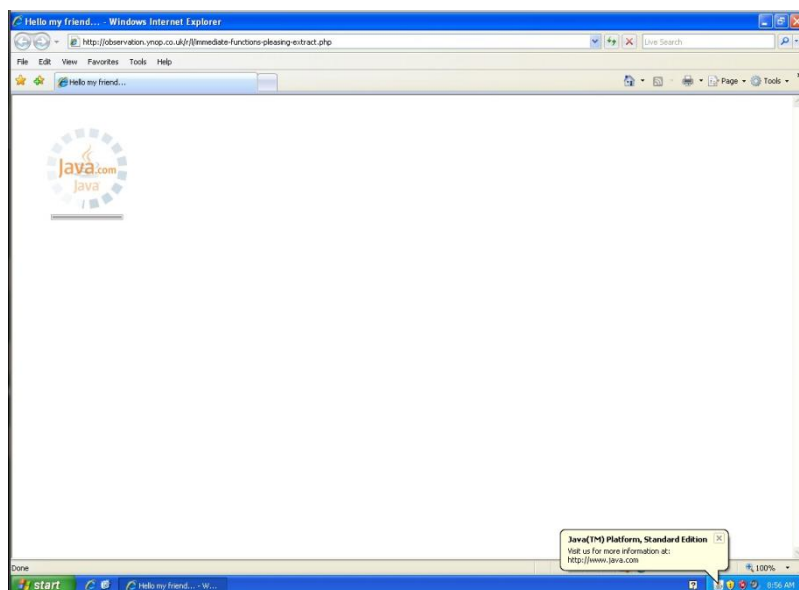
# Part 2: Web Risks and Threats

### About the Cool Exploit Kit

Cool Exploit Kit appears to use the same business model as Blackhole. The customer licenses the exploit kit from the authors and specifies various options to customize it[7]. They place the code on hacked servers or other web servers and then attract victims using spam email or links on other webpages such as social media sites.

So far, Cool has largely been used to install ransomware on victims' machines. The ransomware locks up a victim's PC and presents a phony web page that purports to be a notice of an enforcement action by a major law enforcement agency, such as the FBI in the US or the Metropolitan Police in the UK.

Typically, the pages state that the victim's machine has been used to view child pornography or for downloading copyrighted material. It demands payment of a 'fine' (generally $200) via the untraceable MoneyPak payment system. Victims who pay the fine find out that it does not unlock their machine.
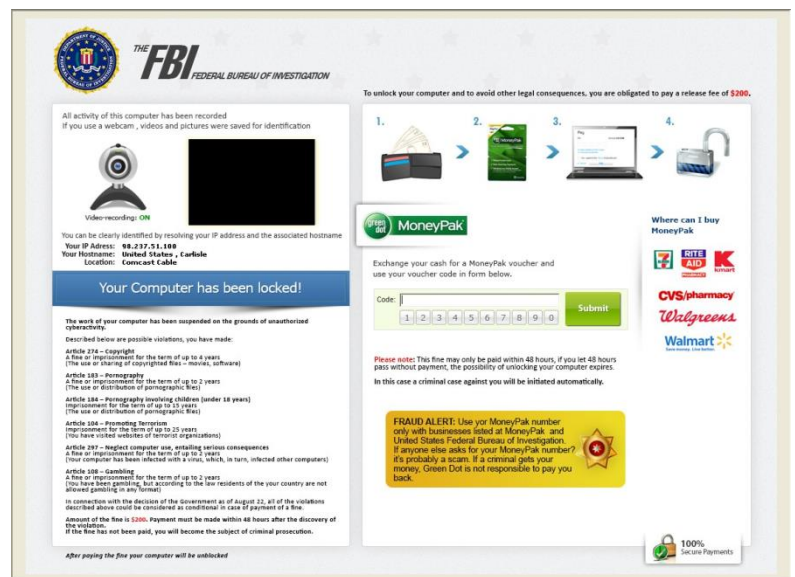
The first indication of the installation of the ransomware is shown in fig 7:



[7] http://en.wikipedia.org/wiki/Blackhole_exploit_kit
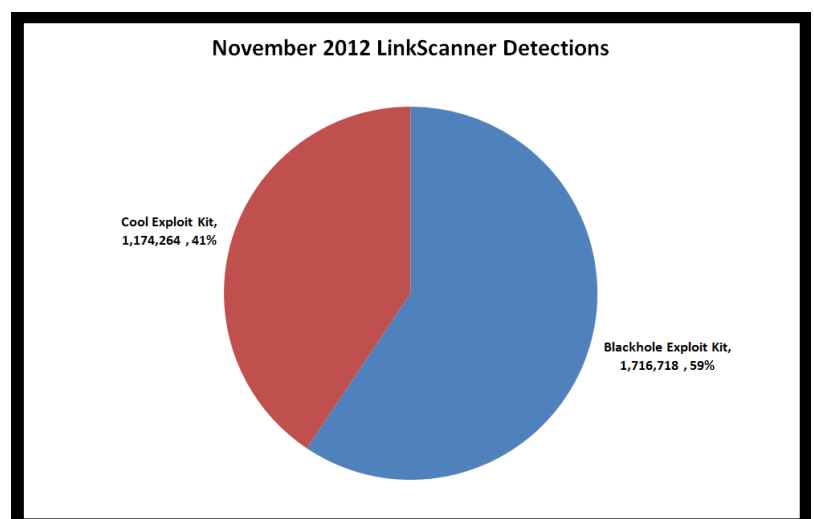
A ransomware page quickly follows. This is one of the most recent examples (fig 8):



Ransomware is still a profitable business that extorts over **five million dollars a year** from victims.

It is also worth noting that Cool Exploit Kit detections statistics are closing the gap on the Blackhole statistics, as seen in fig 9.

# Part 2: Web Risks and Threats



Fig 10 – One of the fake game hacks. Game login data will be sent to the author and no reward is forthcoming.

## Is Your Child a Malware Writer?

Today's children use computers as second nature, but would you suspect your youngster to be able to create malware? I doubt it, but we have found evidence that children as young as 11 are writing malicious code.

Of course, today's kids have ready access to the Internet and most homes now have a personal computer, so their technology skills are way beyond the computer skills of previous generations, but as their skills have evolved, so has the propensity to create mischief.

You may not believe that an 11-year-old schoolboy or schoolgirl could design a Trojan horse that is able to steal the account login information of your favorite online game, but we see these cases on a daily basis.

These childish Trojans have several common characteristics. First of all, most of them are written using .NET framework (Visual Basic, C#) which is easy to learn for beginners and is easy to deploy – you can download Microsoft Visual Studio Express edition for free and use it to start coding malware, or you can download pirated full versions of Borland Delphi for rapid (malware) application development.

Second, these malicious applications are often targeting online games, social networks or email, by either pretending to give away more virtual currency (as shown in fig 10) to an online game or hack somebody's Facebook profile to attract other peers. The main purpose is to get your sensitive data.

# Part 2: Web Risks and Threats



Fig 11 – Email sending routine with gathered stolen login details.

These young code authors unintentionally leave traces in the malware's binary files, which is quite surprising as they are technically savvy. Their creations may not be state-of-the-art programming, but they still they require a degree of technical knowledge.

For example, many of these password stealers send gathered data to the author's personal email address, which they may use to login to other online services, such as YouTube or blogs. This makes it easy to locate their personal data such as their real name, photos, their school, Facebook profile, using any web search engine.

One demonstration of this type of attack is where we detected malware written by an 11-year-old boy from Canada, who played Team Fortress with his friends and got his new iPhone a few days before.

Although AV researchers would never misuse this kind of information, there are plenty of other people peeking into binary files and some will likely have malicious intentions.

One of the 'better' scenarios could be a victim's revenge, whereby they change the password and blocked the malware author's email/Facebook profile. A much more serious scenario would be complete identity theft and misuse.

What is the motivation for this behavior? Most probably these child script writers are not doing it for financial gain, but more likely for a thrill. Essentially, young geeks seek to outsmart their friends and win the games or show off their computer skills.

However, this game can quickly get out of hand. After all, stealing somebody's account details, such as a Steam account with software attached to it worth $500, or a game account with hundred of dollars of virtual currency attached to it, is no laughing matter. Furthermore, if the account details are shared with other accounts such as email or social media, there is a very real risk of cyber-bullying and identity theft.

# Part 2: Web Risks and Threats

## 2013 Threat Predictions

- **Mobile:** We expect to see more high-profile attacks on mobile users, especially ones that target Android devices.
- As China overtook US as the world's top smartphone market with over 1 billion mobile subscribers, we expect a major increase in mobile attacks originating from China.
- **Cool and Blackhole Exploit toolkits** will continue to dominate the malware market.
- **Cyber-warfare** between nations will continue to increase.
- **Privacy:** Online advertising on PCs, tablets and smartphones will become even more aggressively personalized as businesses seek to increase monetization by compromising users' privacy. Advertisers will use browser tracking, social media trawling and location data to identify individual users, and then serve them a bespoke program of adverts, without the users' consent.
- **Cloud security:** Attacks against virtualized cloud infrastructure will expose the risk in public cloud services and the large additional investments needed to better secure them. Well-known cloud systems such as Dropbox, SkyDrive, Cloud Drive (Amazon) and Google Drive have reportedly been attacked by malware, and we will see an increase in attacks against such systems from DoS/DDoS attacks.
- **PC threats:** The steady increase in popularity of Windows 8 will inspire hackers to reveal new vulnerabilities, develop new-style malware and fraudware, and present new proof-of-concept exploits. The number of infected websites targeting PCs will also increase with the growing popularity of 'commercial' exploit kits such as Blackhole, while users' problems will be compounded by an increased reliance on built-in security systems.
- **Mobile-to-PC threats:** Increased connectivity between mobile devices and PCs, combined with the growing BYOD (Bring Your Own Device) trend will make it much easier for malware and viruses to spread across business and home networks. We also expect to register more MITMO (Man-In-The-Mobile) attacks that target PC and mobile internet banking apps. These multi-factor authentication attacks will be stealthier, more polished and more location-oriented.

# Part 3: Appendix

**Other reports from AVG Technologies**

AVG Community Powered Threat Report Q3 2012 (October)

AVG Community Powered Threat Report Q2 2012 (July)

AVG Community Powered Threat Report Q1 2012 (April)

AVG Community Powered Threat Report Q4 2011 (January)

AVG Community Powered Threat Report Q3 2011 (October)

AVG and GfK: AVG SMB Market Landscape Report 2011 (September)

AVG and Future Laboratories: Cybercrime Futures (September)

AVG Community Powered Threat Report Q2 2011 (June)

AVG Community Powered Threat Report Q1 2011 (April)

AVG and Ponemon Institute: 'martphone Security - Survey of U.S. Consumers (March)

# Part 3: Appendix

## About AVG Technologies (NYSE: AVG)

AVG's mission is to simplify, optimize and secure the Internet experience, providing peace of mind to a connected world. AVG's powerful yet easy-to-use software and online services put users in control of their Internet experience. By choosing AVG's software and services, users become part of a trusted global community that benefits from inherent network effects, mutual protection and support. AVG has grown its user base to 143 million active users as of September 30, 2012 and offers a product portfolio that targets the consumer and small business markets and includes Internet security, PC performance optimization, online backup, mobile security, identity protection and family safety software.

www.avg.com

## About the AVG Community

The AVG Community Protection Network is an online neighborhood watch where community members work to protect each other. Information about the latest threats is collected from customers who participate in the product improvement program and shared with the community to make sure everyone receives the best possible protection.

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AVG has focused on building communities that help millions of online participants support each other on computer security issues and actively contribute to AVG's research efforts.

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- Join our Facebook community at www.facebook.com/AVGfree

- Join our LinkedIn community www.linkedin.com/groups?gid=2719797