Hong Kong
Security Watch Report

Q3 2014

Foreword

Better Security Decision with Situational Awareness

Nowadays, a lot of “invisible” compromised computers are controlled by attackers with the owner being unaware. The data on these computers may be mined and exposed every day, and the computers may be utilized in different kinds of abuse and criminal activities.

The Hong Kong Security Watch Report aims to provide the public a better “visibility” of the situation of the compromised computers in Hong Kong so that they can make better decision in protecting their information security.

The data in this report is about the activities of compromised computers in Hong Kong which suffer from, or participate in various forms of cyber attacks, including web defacement, phishing, malware hosting, botnet command and control centres (C&C) or bots. Computers in Hong Kong are defined as those whose network geolocation is Hong Kong, or the top level domain of their host name is “.hk” or “.香港”.

Capitalizing on the Power of Global Intelligence

This report is the fruit of the collaboration of HKCERT and global security researchers. Many security researchers have the capability to detect attacks targeting their own or their customers’ networks. Some of them provide the information of IP addresses of attack source or web links of malicious activities to other information security organizations with an aim to collaboratively improve the overall security of the cyberspace. They have good practice in sanitizing personal identifiable data before sharing information.

HKCERT collects and aggregates such valuable data about Hong Kong from multiple information sources for analysis with Information Feed Analysis System (IFAS), a system developed by HKCERT. The information sources (Appendix 1) are very distributed and reliable, providing a balanced reflection of the security status of Hong Kong.

We remove duplicated events reported by multiple sources and use the following metrics for measurement to assure the quality of statistics.

Type of Attack	**Metric used**
Defacement, Phishing, Malware Hosting	Number of security events on unique URLs within the reporting period
Botnet command and control centres (C&C)	Number of security events on unique IP addresses within the reporting period

Bots	Sum of the number of individual bots as recorded with the reporting period. The number of individual bots is the maximum of the daily number of security events on unique IP addresses.

Better information better service

We will continue to enhancing this report with more valuable information sources and more in-depth analysis. We will also explore how to use the data to enhance our services. *Please send us your feedback via email (**hkcert@hkcert.org**).*

Limitations

The data collected in this report is from multiple different sources with different collection method, collection period, presentation format and their own limitations. The numbers from the report should be used as a reference, and should neither be compared directly nor be regarded as a full picture of the reality.

Disclaimer

Data may be subject to update and correction without notice. We shall not have any liability, duty or obligation for or relating to the content and data contained herein, any errors, inaccuracies, omissions or delays in the content and data, or for any actions taken in reliance thereon. In no event shall we be liable for any special, incidental or consequential damages, arising out of the use of the content and data.

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Highlight of Report

This report is for Quarter 3 of 2014.

In 2014 Q3, there were 18,087 unique security events related to Hong Kong used for analysis in this report. The information is collected with IFAS[1] from 19 sources of information.[2] They are not from the incident reports received by HKCERT.

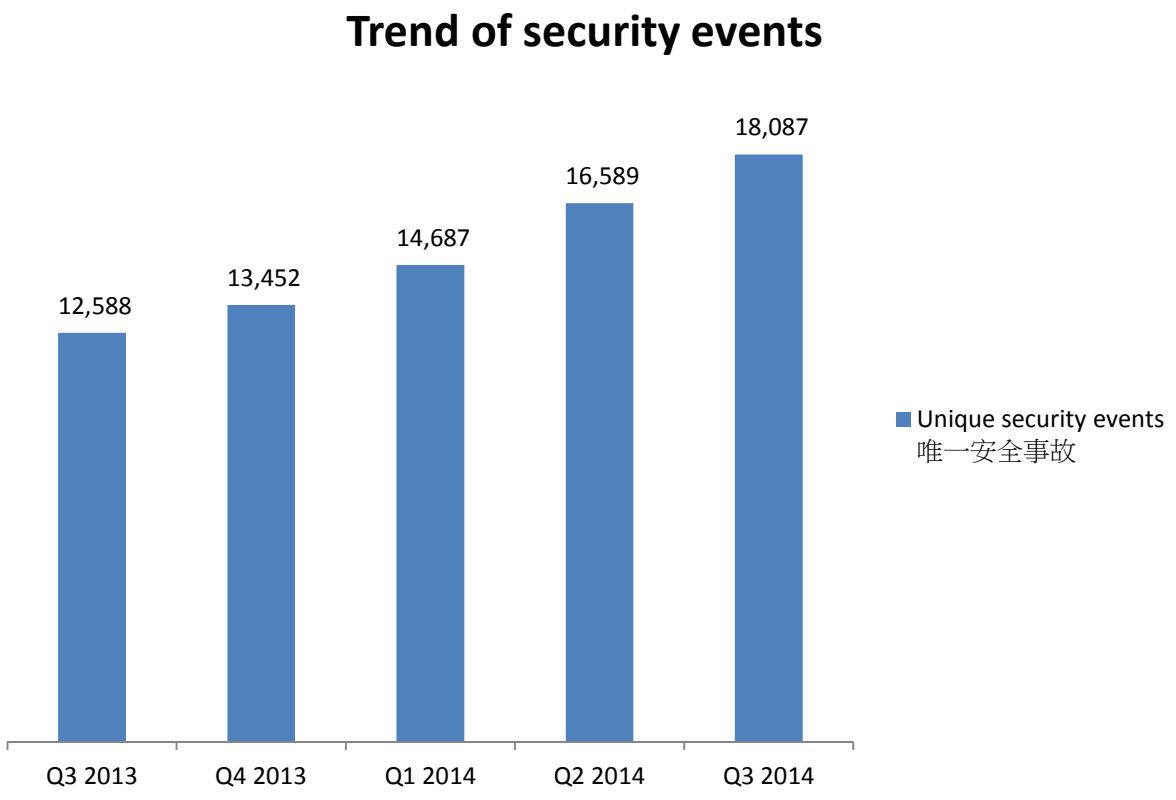


Figure 1-Trend of security events[3]

The total number of security events has increased in Q3 2014 and the increases have been carrying on since Q3 2013. The increase was mainly contributed by the server related events, which have been increasing since Q4 2013.

[1] IFAS Information Feed Analysis System is a HKCERT developed system that collects global security intelligence relating to Hong Kong for analysis.

[2] Refer to Appendix 1 for the Sources of Information

[3] The numbers were adjusted to exclude the unconfirmed defacement events

Server related security events

Server related security events include malware hosting, phishing and defacement. Their trend and distribution are summarized below:

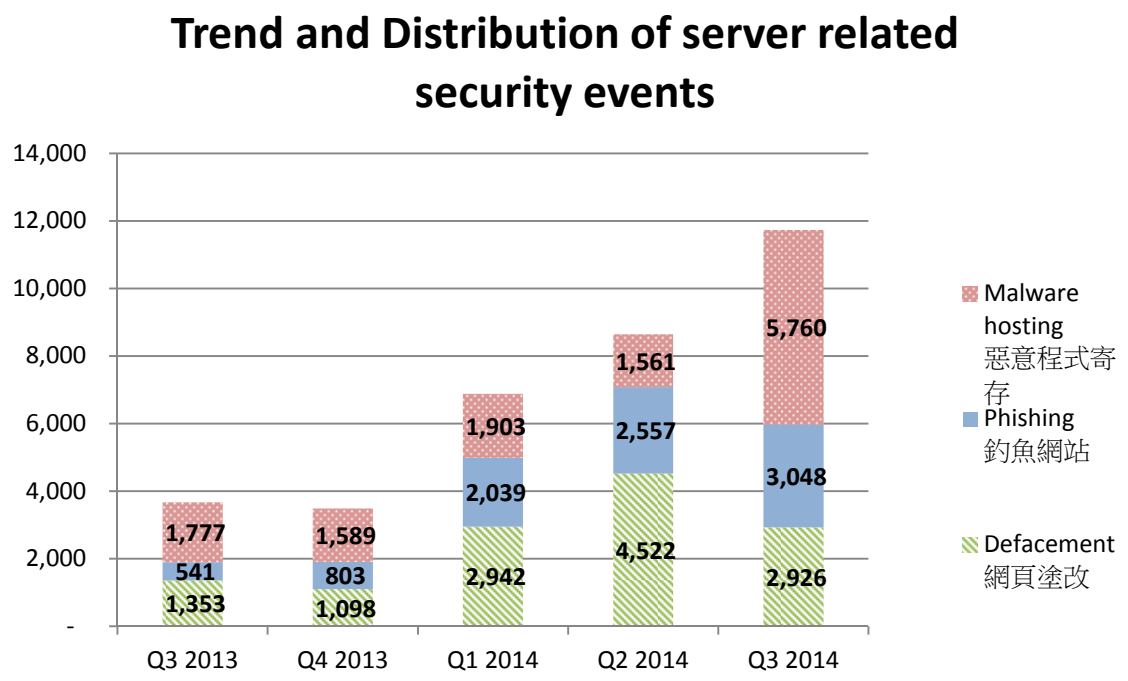


Figure 2 –Trend and distribution of server related security events[4]

The number of server related security events significantly increased by 36% in Q3 2014.

In this quarter, the numbers of defacement events decreased by 35% while the number of phishing events and malware hosting events increased by 19% and 269% respectively.

The sharp increase of malware hosting events was due to a few mass compromise cases. It can be revealed from the IP/URL ratio, which increased from 4.45 to 14.12 (See Figure 10). The most serious case contributed 2110 malware hosting URLs. After investigations, a large number of the URLs were hosted in servers that used out-of-dated software, which may be the causes of the compromises. HKCERT cannot emphasize more on the importance of applying security patches. Websites and server administrators should pay attention to the vulnerabilities of the software and patch them in time.

This quarter, we discovered a phishing campaign targeting Alipay, which is a popular online payment system. Among the 3048 phishing URLs, around half of them got a similar pattern of [a/b][1-4].asp, e.g. “a1.asp” or “b3.asp”. An optional parameter, “?bank=[bankname]”, which specifies the bank logo to be used in the phishing page, can also be added, such as “a1.asp?bank=ccb”. All those URLs were linking to fake Alipay login pages. Careless users

[4] The numbers were adjusted to exclude the unconfirmed defacement events

who enter their Alipay login credentials will give out that sensitive information to the cyber criminals and may incur financial loss. According to our data, this pattern was first discovered in March, and then the number started to increase in the following months. We have passed this case to the related parties to follow up and will keep monitoring such phishing URL patterns.

HKCERT urges system and application administrators to protect the servers.

- patch server up-to-date to avoid the known vulnerabilities being exploited.
- update web application and plugins to the latest version
- follow best practice on user account and password management
- implement validation check for user input and system output
- provide strong authentication, e.g. two factor authentication, at administrative control interface
- acquire information security knowledge to prevent social engineering

Botnet related security events

Botnet related security events can be classified into two categories:

- Botnet Command and Control Centres (C&C) security events – involving small number of powerful computers, mostly servers, which give commands to bots
- Bots security events – involving large number of computers, mostly home computers, which receive commands from C&C.

Botnet Command and Control Servers

The trend of botnet C&C security events is summarized below:

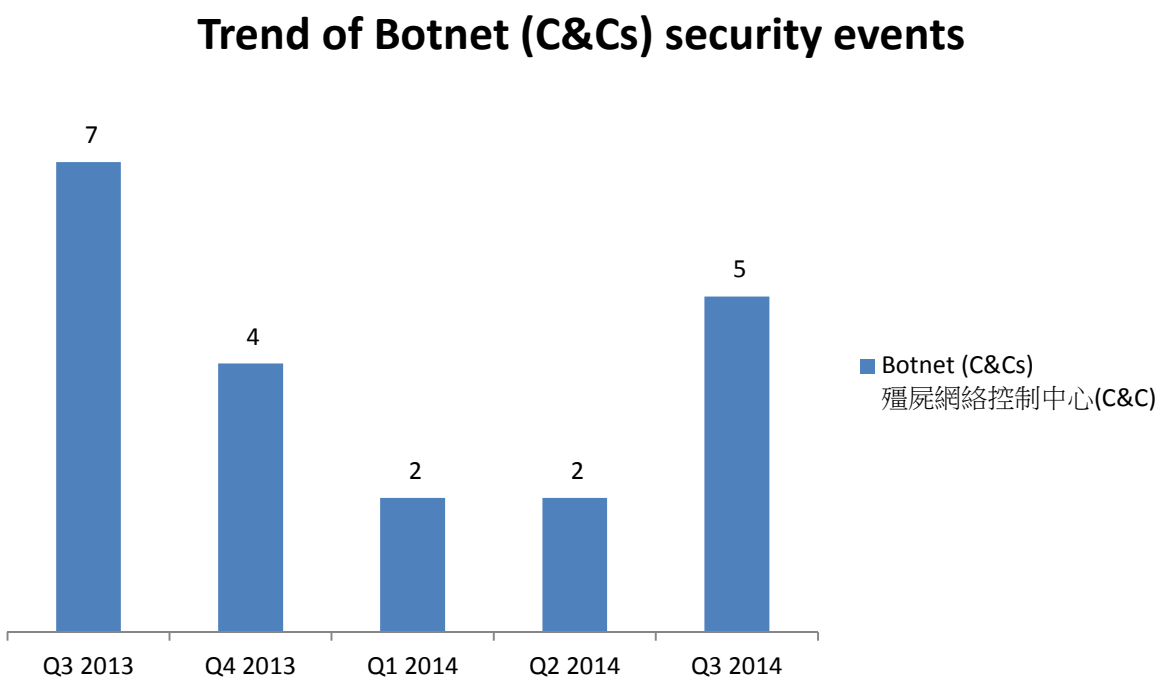


Figure 3 –Trend of Botnet (C&Cs) related security events

The number of botnet Command and Control Servers increased this quarter.

There were 5 C&C servers reported in this quarter. Three of the reported servers were identified as Zeus C&C servers, while the other two were IRC bot C&C servers.

Botnet Bots

The trend of botnet (bots) security events is summarized below:

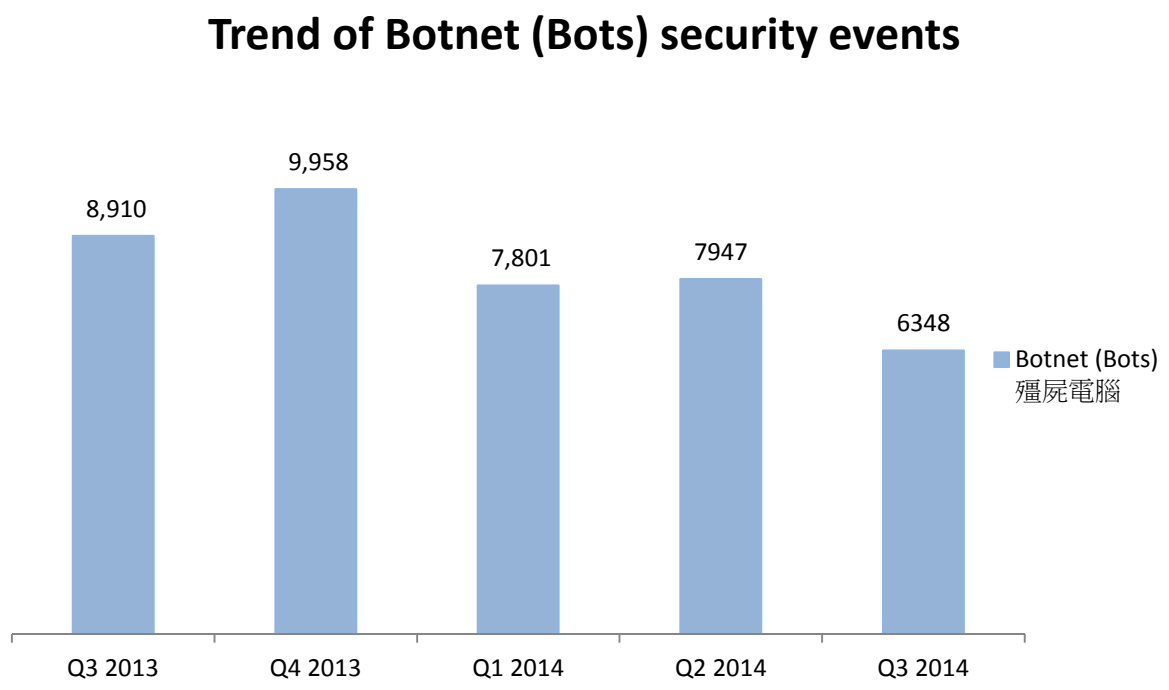


Figure 4 - Trend of Botnet (Bots) security events[5]

Number of Botnet (bots) on Hong Kong network decreased in this quarter.

In Q3 2014, the number of botnet infections in Hong Kong decreased by 20%, 9 of the top 10 botnets have their numbers decreased or roughly unchanged.

Conficker, Zeus and ZeroAccess have constantly been the top three botnets since we started collecting data in Q2 2013. Among them, the number of ZeroAccess events recorded the largest drop last year. Its number dropped from 2802 as of Q3 2013 to 1062 as of Q3 2014. It's a drop of 37.9% or 1740 events. Its number was dropping steadily at a rate of 300-500 events every quarter. If the rate persists, the number of ZeroAccess events will drop below 1000 at the end of this year.

HKCERT has been following up the security events received and proactively engaged local ISPs for the botnet clean up since June 2013. Currently, botnet cleanup operations against major botnet family - Pushdo, Citadel, ZeroAccess and GameOver Zeus are still in action.

[5] The number botnet(bots) security events in Q4 2013 was adjusted due to the update of numbers of the Zeus botnet

HKCERT urges users to protect computers so as not to become part of the botnets.

- patch their computers
- install a working copy of security software and scan for malware on their machines
- set strong passwords to avoid credential based attack
- do not use Windows, media files and software that have no proper licenses
- do not use Windows and software that have no security updates

HKCERT urges general users to join the cleanup acts. Ensure your computers are not being infected and controlled by malicious software.

Protect yourself and keep the cyberspace clean.

Users can use the HKCERT guideline to detect and clean up botnets

- Botnet Detection and Cleanup Guideline
  https://www.hkcert.org/botnet

Report Details

1. Defacement

1.1 Summary

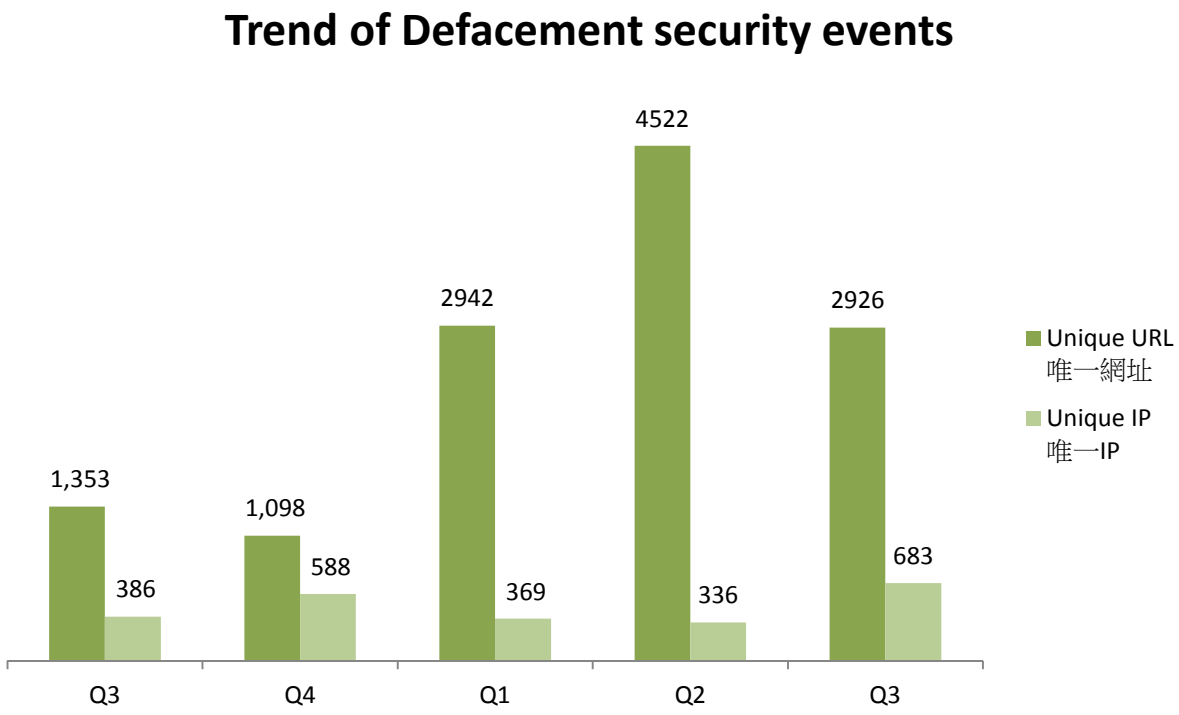


Figure **5** –Trend of Defacement security events[6]

What is defacement?

- Defacement is the unauthorized alteration of the content of a legitimate website using hacking method.

What are the potential impacts?

- The integrity of the website content is damaged.
- Original content might be inaccessible
- Reputation of the website owner might be damaged
- Other information stored / processed on the server might be further compromised by the hacker to perform other attacks.

[6] The numbers were adjusted to exclude the unconfirmed defacement events

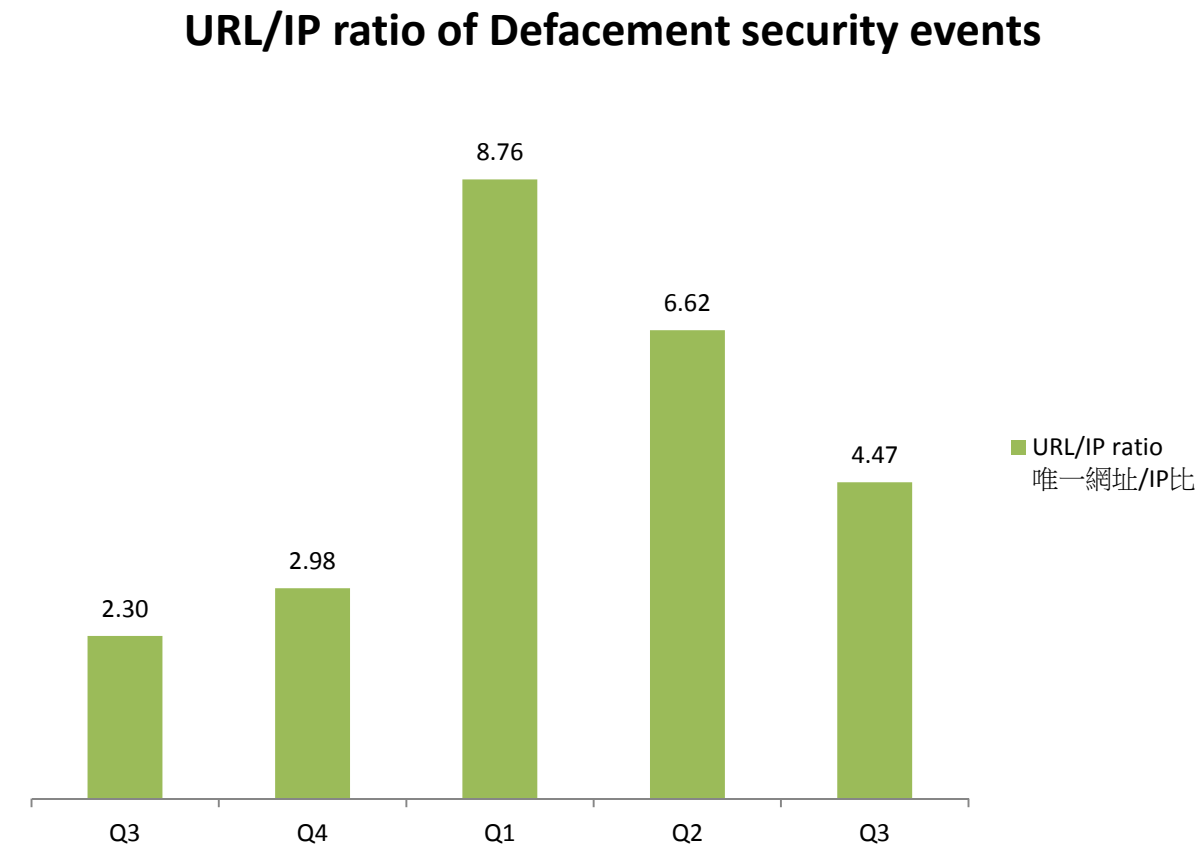


Figure 6 - URL/IP ratio of defacement security events

What is URL/IP ratio?

- It is the number of security events count in unique URL divided by the number of security events count in unique IP addresses

What can this ratio indicate?

- Number of events counted in unique URL cannot reflect the number of compromised servers, since one server may contain many URL
- Number of events counted in unique IP address can better related to the number of compromised servers
- The higher the ratio is, the more mass compromise happened

Sources of Information:

- Zone - H

2. Phishing

2.1 Summary

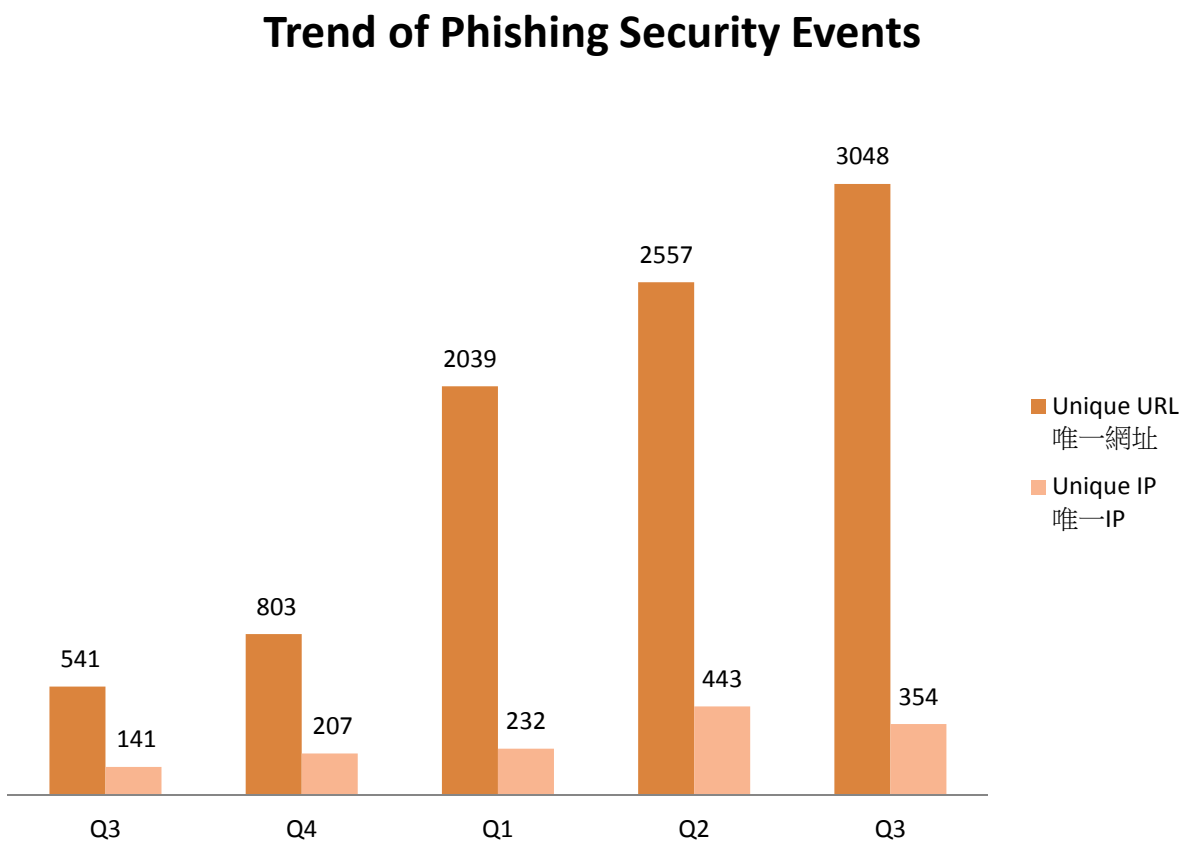


Figure 7 –Trend of Phishing Security Events

What is Phishing?

- Phishing is the spoofing of a legitimate website for fraudulent purpose

What is the potential impact?

- Personal information or account credentials of visitors might be stolen, leading to financial loss.
- Original content might be inaccessible
- Reputation of the website owner might be damaged
- Server might be further compromised to perform other attacks.

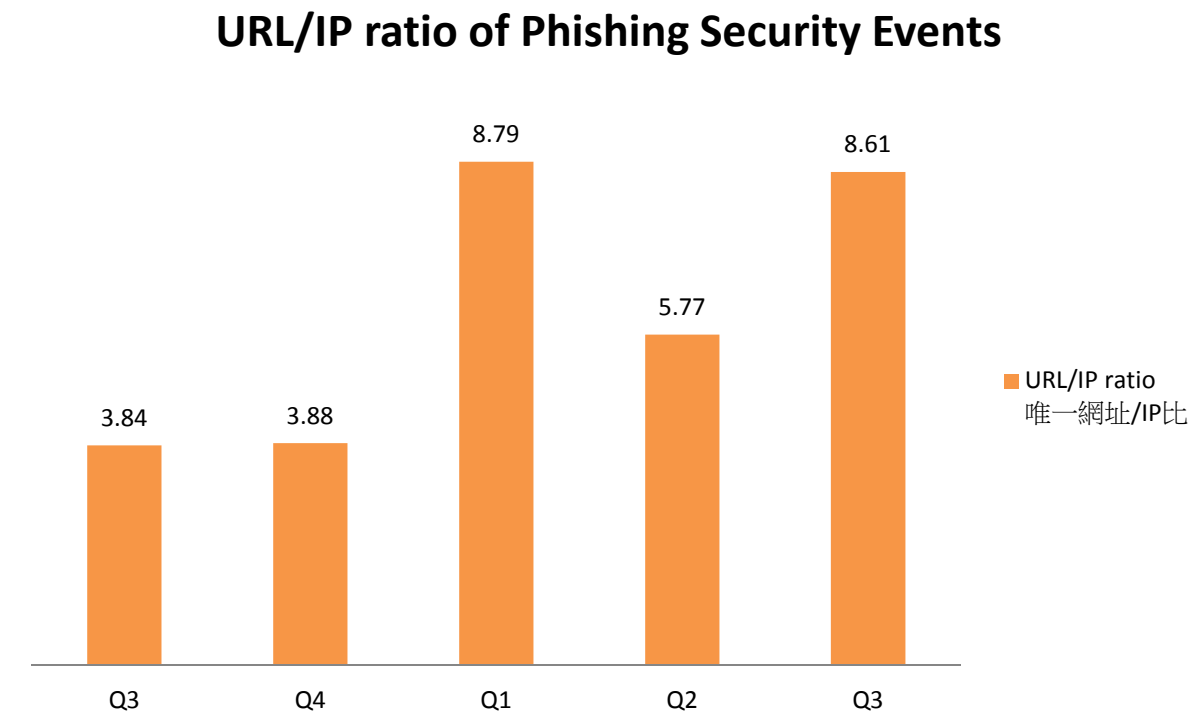


Figure 8 - URL/IP ratio of phishing security events

What is URL/IP ratio?

- It is the number of security events count in unique URL divided by the number of security events count in unique IP addresses

What can this ratio indicate?

- Number of events counted in unique URL cannot reflect the number of compromised servers, since one server may contain many URL
- Number of events counted in unique IP address can better related to the number of compromised servers
- The higher the ratio is, the more mass compromise happened

Sources of Information:

- ArborNetwork – Atlas SRF
- CleanMX – phishing
- Millersmiles
- Phishtank

3. Malware Hosting

3.1 Summary

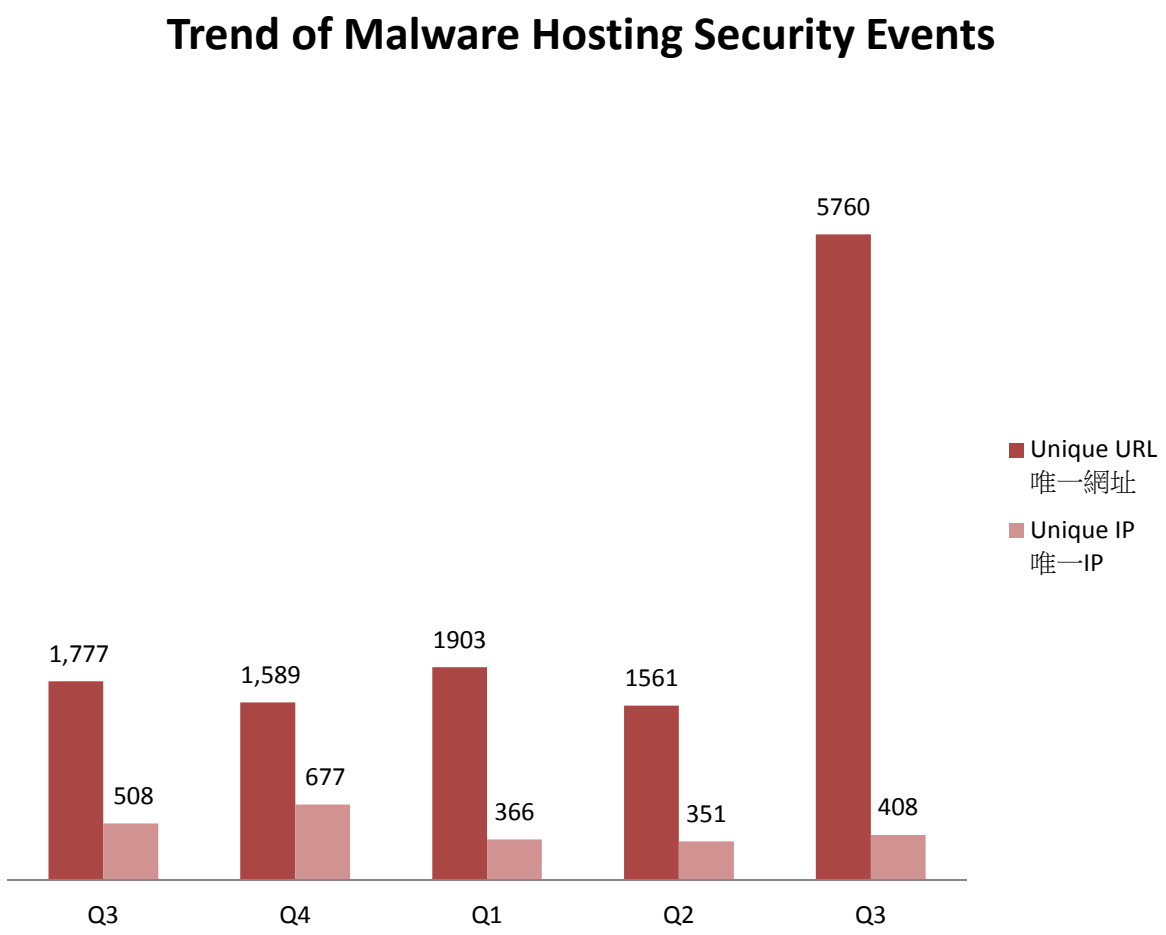


Figure 9 –Trend of Malware Hosting Security Events

What is Malware Hosting?

- Malware Hosting is the dispatching of malware on a website

What is the potential impact?

- Visitors might download and install the malware, or execute the malicious script to get compromised.
- Original content might be inaccessible
- Reputation of the website owner might be damaged
- Server might be further compromised to perform other criminal activities.

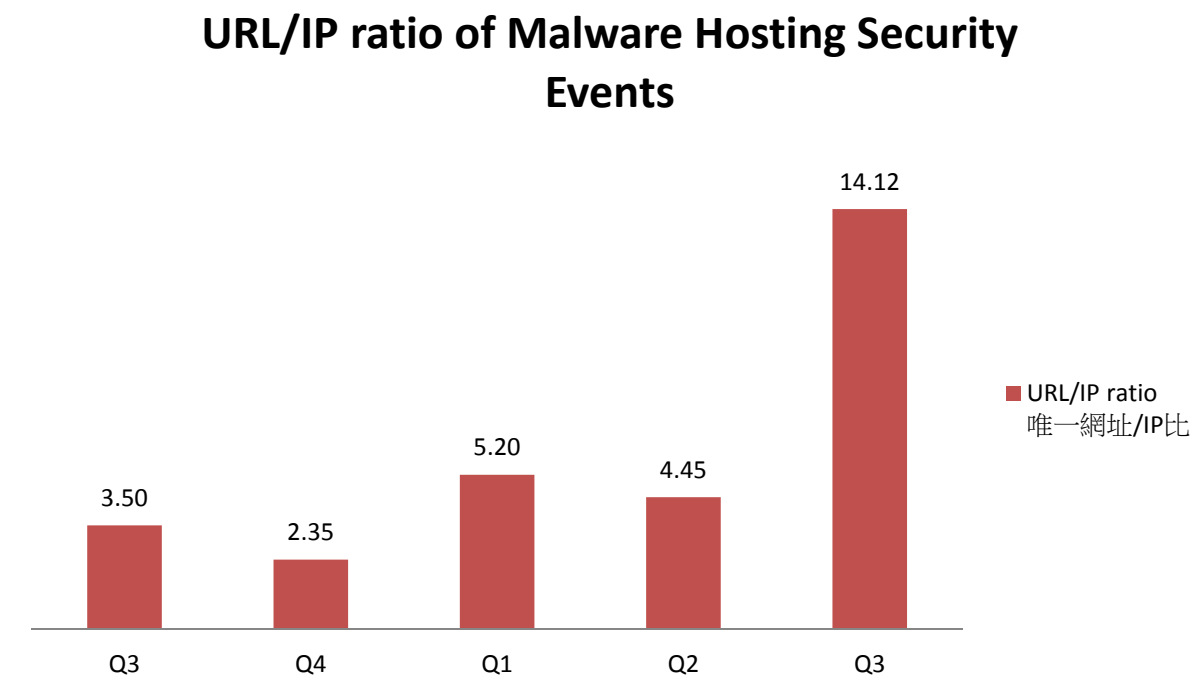


Figure 10 - URL/IP ratio of malware hosting security events

What is URL/IP ratio?

- It is the number of security events count in unique URL divided by the number of security events count in unique IP addresses

What can this ratio indicate?

- Number of events counted in unique URL cannot reflect the number of compromised servers, since one server may contain many URL
- Number of events counted in unique IP address can better related to the number of compromised servers
- The higher the ratio is, the more mass compromise happened

Sources of Information:

- Abuse.ch: Zeus Tracker – Binary URL
- Abuse.ch: SpyEye Tracker – Binary URL
- CleanMX – Malware
- Malc0de
- MalwareDomainList
- Sacour.cn

4. Botnet

4.1 Botnets – Command & Control Servers

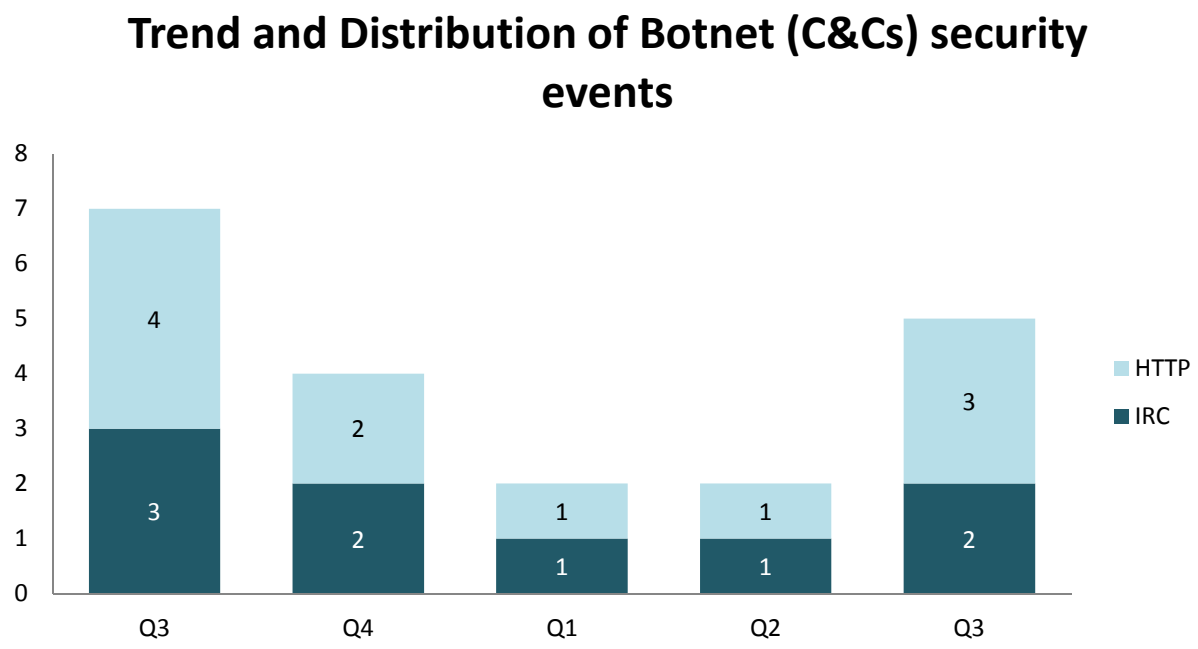


Figure 11 –Trend and Distribution of Botnet (C&Cs) security events

What is a Botnet Command & Control Centre?

- A Botnet Command & Control Centre is a server used by cybercriminals to control the bots, which are compromised computers, by sending them commands to perform malicious activities, e.g. stealing personal and financial information or launching DDoS attacks.

What is the potential impact?

- Server might be heavily loaded when many bots connecting to it.
- Server might contain large amount of personal and financial data stolen by other bots.

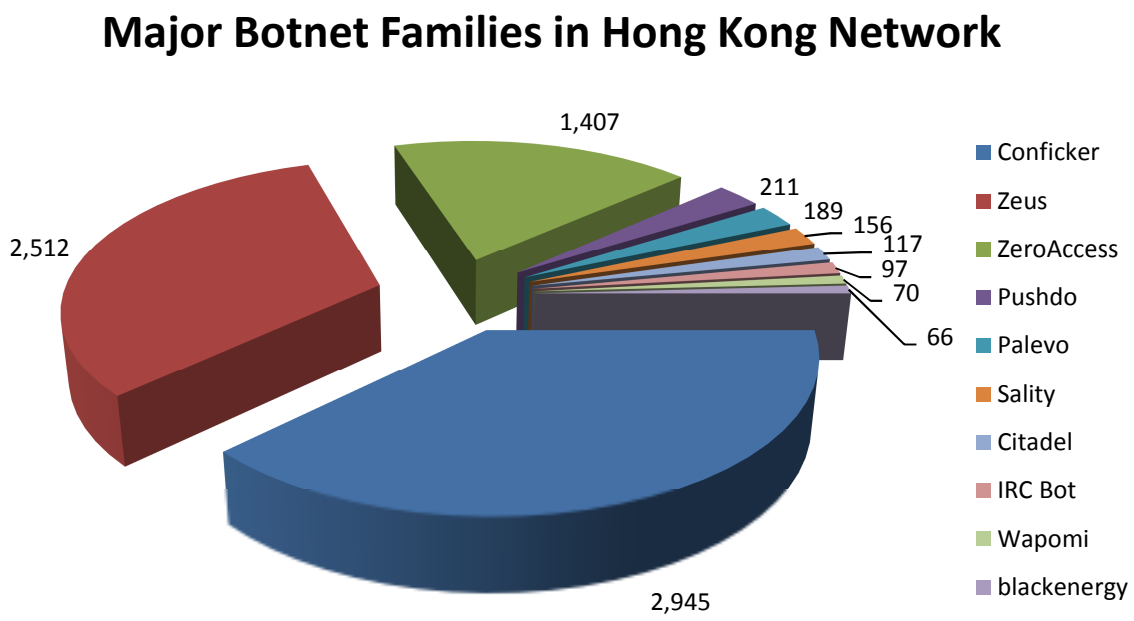
Sources of Information:

- Zeus Tracker
- SpyEye Tracker
- Palevo Tracker
- Shadowserver – C&Cs

4.2 Botnets – Bots

4.2.1 Major Botnet Families[7] found on Hong Kong Networks

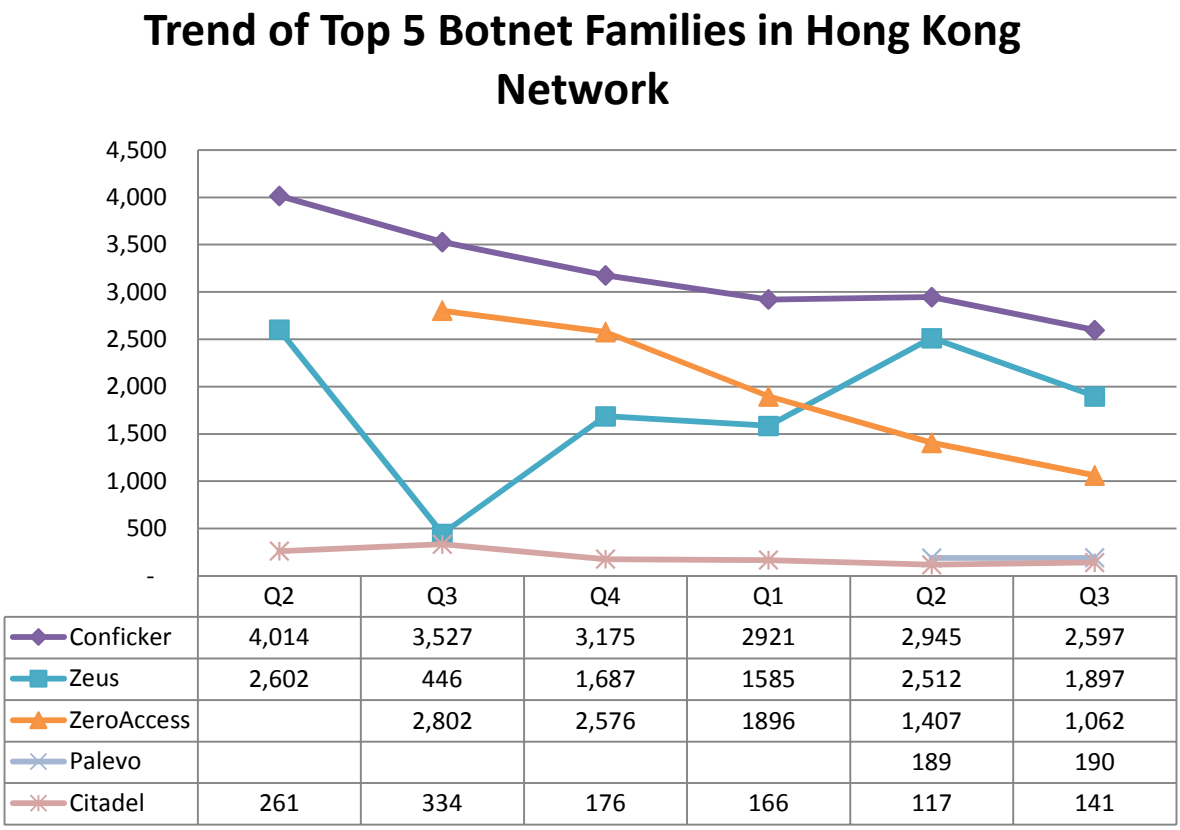
Individual botnet's size is calculated from the maximum of the daily counts of unique IP addresses attempting to connect to the botnet in the report period. In other words, the real botnet size should be larger because not all bots are powered on within the same day.



Rank	↑↓	Concerned Bots	Number of Unique IP addresses (Max count in a Quarter)	Changes with previous period
1	-	Conficker	2,597	-12%
2	-	Zeus	1,897	-24%
3	-	ZeroAccess	1,062	-25%
4	↑	Palevo	190	1%
5	↑	Citadel	141	21%
6	-	Sality	111	-29%
7	↑	IRC Bot	74	-24%
8	↓	Pushdo	63	-70%
9	-	Wapomi	55	-21%
10	-	blackenergy	37	-44%

Figure 12 –Major Botnet Families in Hong Kong Networks

[7] Major Botnet Families are selected botnet families with considerable amount of security events reported from the information sources constantly across the reporting period.



	Q2	Q3	Q4	Q1	Q2	Q3
Conficker	4,014	3,527	3,175	2921	2,945	2,597
Zeus	2,602	446	1,687	1585	2,512	1,897
ZeroAccess		2,802	2,576	1896	1,407	1,062
Palevo					189	190
Citadel	261	334	176	166	117	141

Figure 13 – Trend of Top 3 Botnet Families in Hong Kong Network

Note:

Information provided from sources for ZeroAccess became stable since Q3 2013; hence, it cannot be compared with that of Q2 2013.

What is a Botnet - Bot?

- A bot is usually a personal computer that is infected by malicious software to become part of a botnet. Once infected, the malicious software usually hide itself, and stealthy connect to the Command & Control Server, to get the instruction from hackers.

What is the potential impact?

- Computer owner's personal and financial data might be stolen which may lead to financial loss.
- Computer might be commanded by attacker to perform other criminal activities.

Sources of Information:

- ArborNetwork – Atlas SRF – conficker
- ShadowServer – botnet_drone
- ShadowServer – sinkhole_http_drone
- ShadowServer – Microsoft_sinkhole

Appendices

Appendix 1 – Sources of information

The following information feeds sources

Event Type	Source	First introduced
Defacement	Zone - H	2013-04
Phishing	ArborNetwork: Atlas SRFPhishing	2013-04
Phishing	CleanMX – Phishing	2013-04
Phishing	Millersmiles	2013-04
Phishing	Phishtank	2013-04
Malware Hosting	Abuse.ch: Zeus Tracker – Binary URL	2013-04
Malware Hosting	Abuse.ch: SpyEye Tracker – Binary URL	2013-04
Malware Hosting	CleanMX – Malware	2013-04
Malware Hosting	Malc0de	2013-04
Malware Hosting	MalwareDomainList	2013-04
Malware Hosting	Sacour.cn	2013-04
Botnet (C&Cs)	Abuse.ch: Zeus Tracker – C&Cs	2013-04
Botnet (C&Cs)	Abuse.ch: SpyEye Tracker – C&Cs	2013-04
Botnet (C&Cs)	Abuse.ch: Palevo Tracker – C&Cs	2013-04
Botnet (C&Cs)	Shadowserver C&Cs	2013-09
Botnet(Bots)	Arbor Network: Atlas SRF–Conficker	2013-08
Botnet(Bots)	Shadowserver botnet_drone	2013-08
Botnet(Bots)	Shadowserver sinkhole_http_drone	2013-08
Botnet(Bots)	Shadowserver microsoft_sinkhole	2013-08

Appendix 2 – Geolocation identification methods

We use the following methods to identify if a network's geolocation is in Hong Kong.

Method	Last update
Maxmind	2013-10-29

Appendix 3 – Major Botnet Families

Major Botnets	Alias	Nature	Infection Method	Attacks / Impacts
BankPatch	● MultiBanker ● Patcher ● BankPatcher	Banking Trojan	● via adult web sites ● corrupt multimedia codecs ● SPAM e-mail ● chat and messaging systems	● monitor specific banking websites and harvest user's passwords, credit card information and other sensitive financial data
BlackEnergy	Nil	DDoS Trojan	● rootkit techniques to maintain persistence ● uses process injection technique ● strong encryption and modular architecture	● launch DDoS attacks
Citadel	Nil	Banking Trojan	● avoid and disable security tool detection	● steal banking credentials and sensitive information ● keystroke logging ● screenshot capture ● video capture ● man-in-the-browser attack ● ransomware
Conficker	● Downadup ● Kido	Worm	● domain generation algorithm (DGA) capability ● communicate via P2P network ● disable security software	● exploit the Windows Server Service vulnerability (MS08-067) ● brute force attacks for admin credential to spread across network ● spread via removable drives using "autorun" feature
Glupteba	Nil	Trojan	● drive-by download via Blackhole Exploit Kit	● push contextual advertising and clickjacking to victims

IRC Botnet	Nil	Trojan	• communicate via IRC network	• backdoor capabilities that allow unauthorized access • launch DDoS attack • send spams
Palevo	• Rimecud • Butterfly bot • Pilleuz • Mariposa Vaklik	Worm	• Spread via instant messaging, P2P network and removable drives	• backdoor capabilities that allow unauthorized access • steal login credentials and sensitive information • steal money directly from banks using money mules
Pushdo	• Cutwail • Pandex	Downloader	• hiding its malicious network traffic • domain generation algorithm (DGA) capability • distribute via drive by download • exploit browser and plugins' vulnerabilities	• download other banking malware (e.g. Zeus and Spyeye) • launch DDoS attacks • send spams
Sality	Nil	Trojan	• rootkit techniques to maintain persistence • communicate via P2P network • spread via removable drives and shares • disable security software • use polymorphic and entry point obscuring (EPO) techniques to infect files	• send spams • proxying of communications • steal sensitive information • compromise web servers and/or coordinating distributed computing tasks for the purpose of processing intensive tasks (e.g. password cracking) • install other malware

Slenfbot	Nil	Worm	• spread via removable drives and shares	• backdoor capabilities that allow unauthorized access • download financial malware • sending spam • launch DDoS attacks
Torpig	• Sinowal • Anserin	Trojan	• rootkit techniques to maintain persistence (Mebroot rootkit) • domain generation algorithm (DGA) capability • distribute via drive by download	• steal sensitive information • man in the browser attack
Wapomi	Nil	Worm	• spread via removable drives and shares • infects executable files	• backdoor capabilities • download and drop additional destructive payloads • alter important files causing unreliable system performance • gather computer activity, transmit private data and cause sluggish computer
ZeroAccess	• max++ • Sirefef	Trojan	• rootkit techniques to maintain persistence • communicate via P2P network • distribute via drive by download • distribute via disguise as legitimate file (eg. media files, keygen)	• download other malware • Bitcoin mining and click fraud

Zeus	● Gameover	Banking Trojan	● stealthy techniques to maintain persistence ● distribute via drive by download ● communicate via P2P network	● steal banking credential and sensitive information ● man in the browser attack ● keystroke logging ● download other malware (eg. Cryptolocker) ● launch DDoS attacks