Hong Kong
Security Watch Report

Q2 2015

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

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Table of Content

Highlight of Report

This report is for Quarter 2 of 2015.

In 2015 Q2, there were 21,787 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.

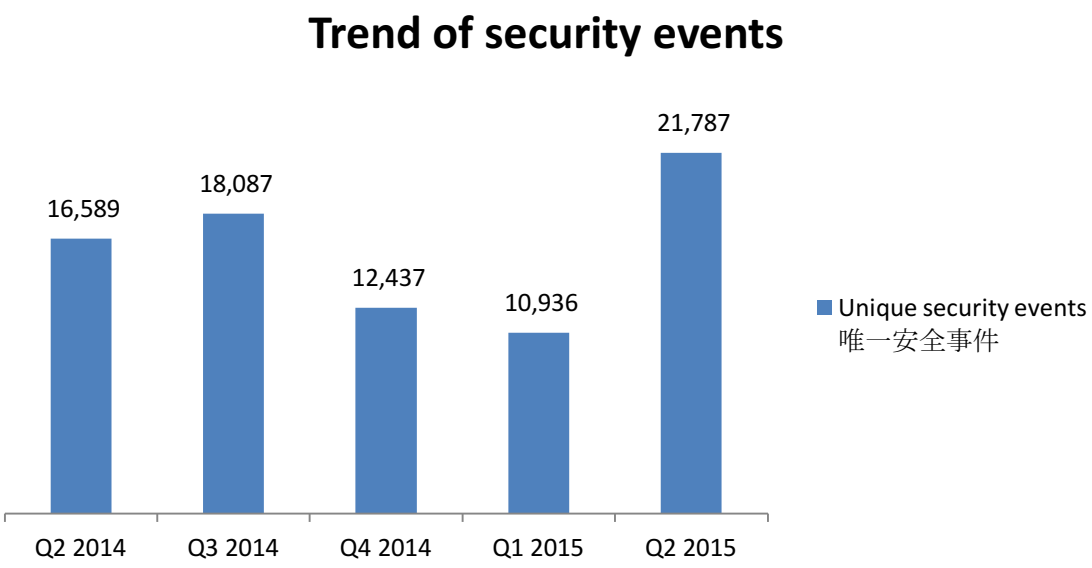


Figure 1-Trend of security events[3]

The total number of security events in Q2 2015 increased dramatically by 99% or 10,851 events, reached a record high since Q2 2013. The increase was due to server events.

Server related security events

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

[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

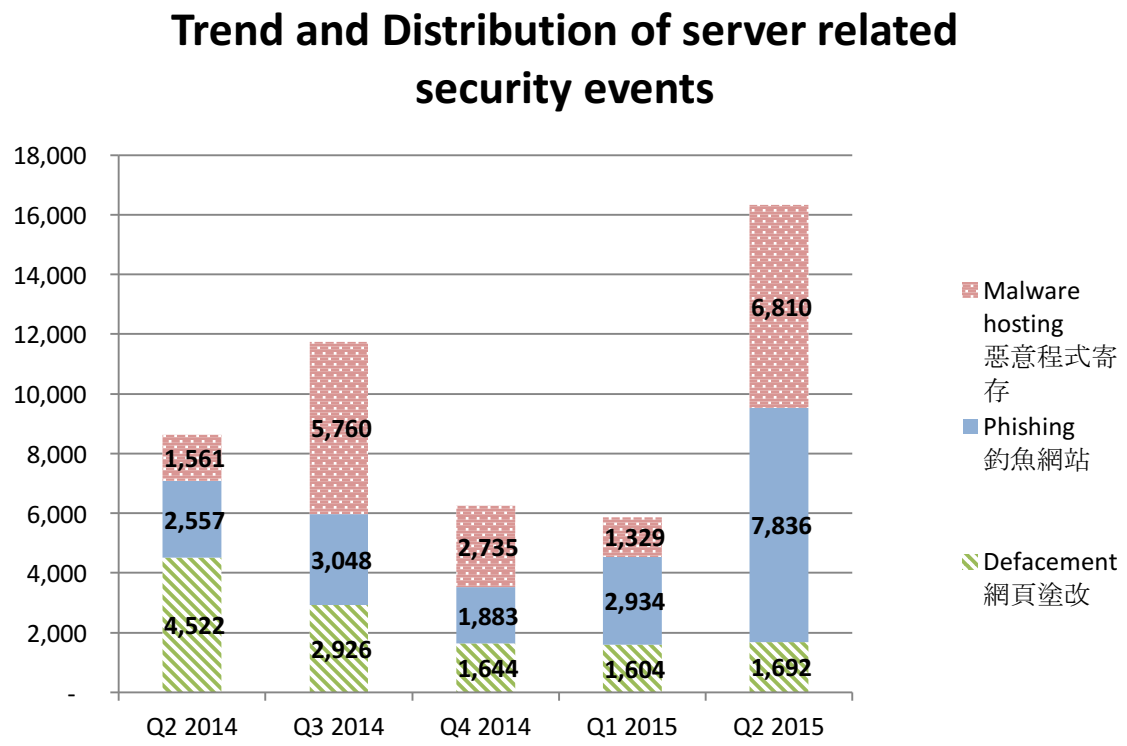


Figure 2 –Trend and distribution of server related security events[4]

The number of server related security events increased dramatically from 5,867 to 16,338 (increased by 178%) in Q2 2015. The number of server related security events, phishing events and malware hosting events all reached a record high.

In this quarter, the number of defacement events increased slightly by 5% but the number of phishing events and malware hosting events increased dramatically by 168% and 412% respectively.

The increase of phishing events was contributed by a few phishing campaigns. In this quarter, the top phishing target was a Japanese gaming site hiroba.dqx.jp. This campaign utilized more than 10 IP addresses and 3200 URLs, which equals more than 40% of all phishing events. The second and third phishing targets were both Chinese online merchants, namely taobao.com and xzhjia.com, more than 1600 and 1200 URLs were targeting them respectively. As of the time of writing, most of these phishing URLs were no longer accessible.

Among the malware hosting events, about 41% or 2828 events were hosting HTML/Drop.Agent.AB malware. It was found that this malware was related to the Ramnit botnet.

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

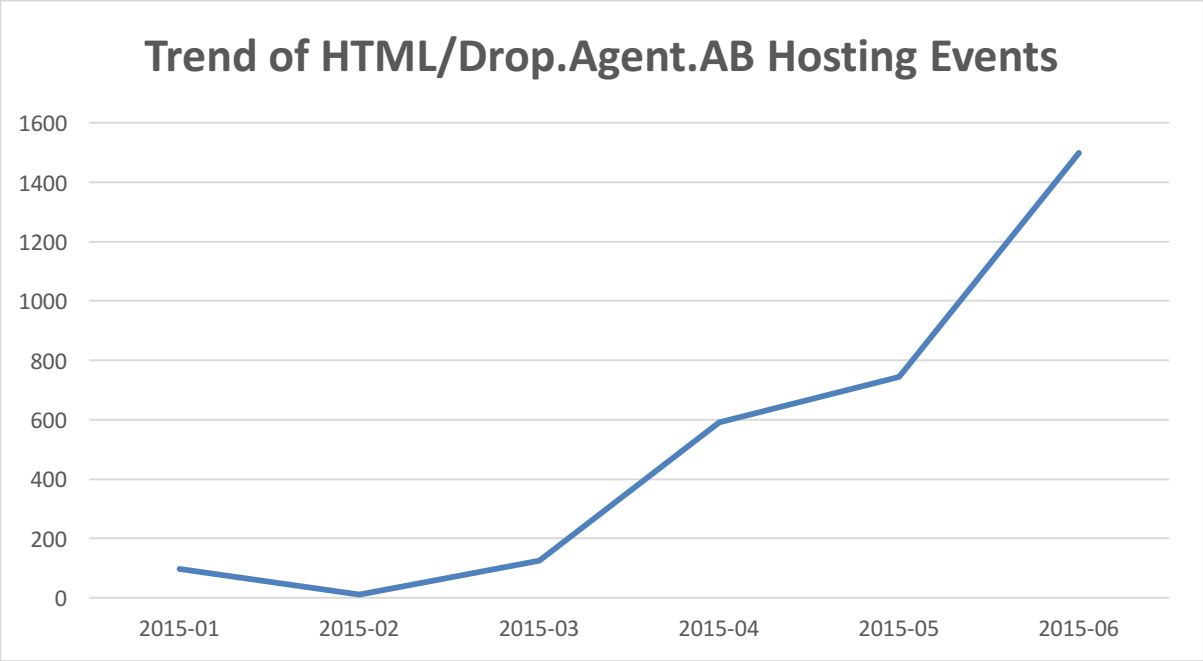


Figure 3 - Trend of HTML/Drop.Agent.AB Hosting Events

As shown in Figure 3, the HTML/Drop.Agent.AB events started rising in March. In February, a takedown operation was carried out against the Ramnit botnet, a lot of bots were identified and cleared. The sudden increase of Ramnit related malware hosting events may reflect that the cybercriminals behind were working hard to recover the botnet. More about the Ramnit botnet will be described in the botnet section.

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:

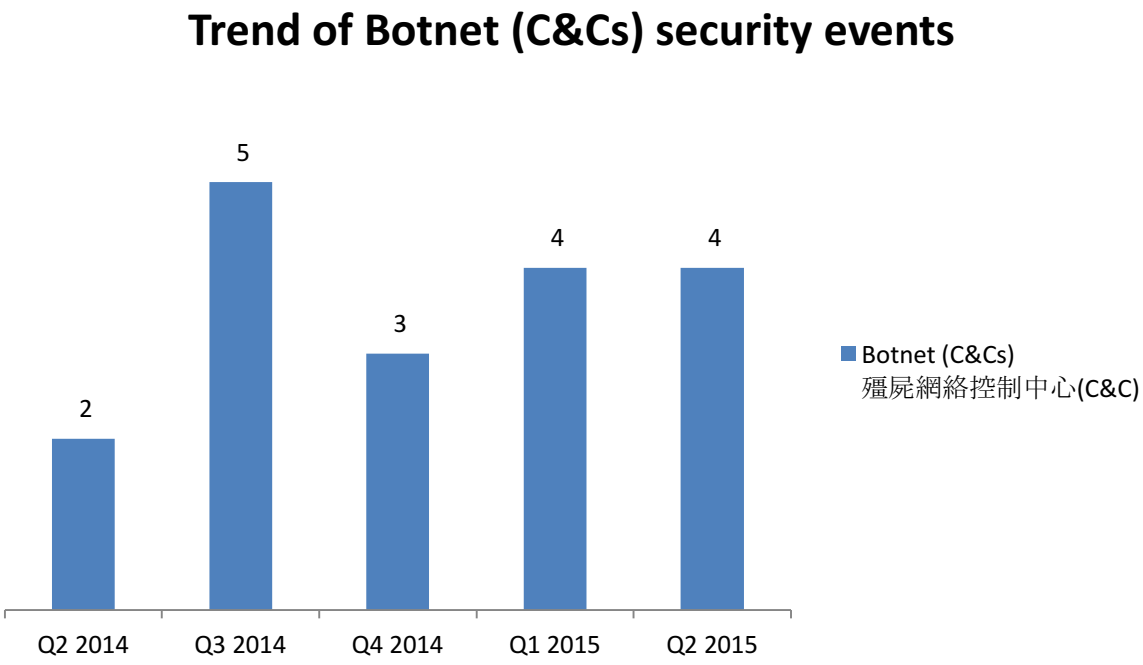


Figure 4 –Trend of Botnet (C&Cs) related security events

The number of botnet Command and Control Servers remains unchanged this quarter.

There were 4 C&C servers reported in this quarter. One of the reported servers was identified as Zeus C&C server, while the other three were identified as IRC bot C&C servers.

Botnet Bots

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

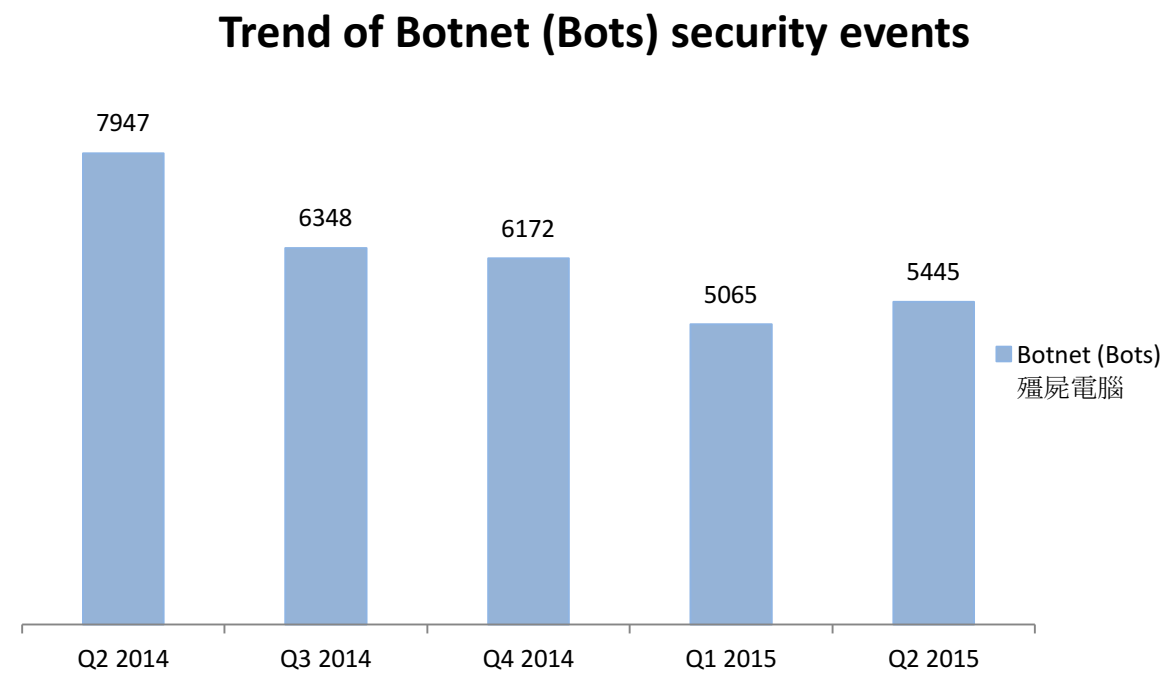


Figure 5 - Trend of Botnet (Bots) security events

Number of Botnet (bots) on Hong Kong network slightly increased in this quarter, stopping the dropping trend since Q3 2014.

In Q2 2015, the number of botnet infections in Hong Kong increased by 8%. The Virut botnet increased significantly by 87%. It took over Zeus to become the second largest botnet in Hong Kong. (Figure 14)

Other than Virut, three botnets, namely Ramnit, Tinba and Dyre, entered the top 10 the first time. (Figure 13)

Ramnit

Ramnit is a fully-featured worm. It can steal various types of sensitive information including web credentials, FTP credentials, browser cookies and files, etc. It can allow the attackers to access the victim's file system and take control of the computer. It can also download additional malwares.

Ramnit first appeared in 2010 and spreaded quickly. Now it has infected more than 3.2 million computers worldwide. On 25 Feb, an operation driven by law enforcement[5], led by the Europol and assisted by industry partners Symantec, Microsoft, and others, seized the servers and other infrastructure owned by the cybercrime group behind the Ramnit botnet. A large amount of victims were identified that it became the 6th botnet this quarter.

[5] http://www.symantec.com/connect/blogs/ramnit-cybercrime-group-hit-major-law-enforcement-operation

Ramnit spreads through file infection, exploit kits hosted on websites and social media, public FTP servers and bundle with other software.

Tinba

Tinba is a banking Trojan that can perform Man in the Browser (MiTB) attack to steal banking credentials. Tinba was first identified in 2012. It first targeted the users in Turkey and then users in Czech. But now it targets a large scope of banks worldwide[6].

Tinba employed some interesting anti-sandboxing tricks to evade analysis[7]. First it detects user interactions by checking the mouse movement and the active window. If Tinba is running inside a sandbox, the mouse location and the active window will always be the same, it will not execute the main routine until some user interaction is detected. Moreover, it will detect the disk capacity. If the disk is too small, it is likely to be a sandbox environment. Tinba will just quit in this case.

Tinba spreads through exploit kits and spam emails.

Dyre

Dyre is a banking Trojan that successfully stole millions in 2015[8]. It monitors the website visited by the victims. Once a victim logins to one of the targeted banks websites, Dyre will display a fake screen claiming the site is experiencing issues and asks the victim to call a number. In the phone call, the criminals would try to social engineer critical information from the victim. With this information, the criminal will transfer money from the victim's account to offshore accounts. To make things worse, the criminals will immediately launch a DDoS against the victim for distraction.

Like Tinba, Dyre also employed anti-sandboxing trick[9]. But instead of using a few tricks, Dyre use only one – by checking how many processor cores the system has. If the machine has only one core, it will terminate. As most sandboxes were configured with only one core and most modern computers have multicores, this simple trick was proven to be highly effective. Researchers tested a Dyre sample with eight sandboxes, all of them failed to analyze the malware.

Dyre spreads through spam emails.

[6] https://blog.avast.com/2014/09/15/tiny-banker-trojan-targets-customers-of-major-banks-worldwide/
[7] https://www.f-secure.com/weblog/archives/00002810.html
[8] http://securityintelligence.com/dyre-wolf/
[9] http://www.seculert.com/blog/2015/04/new-dyre-version-evades-sandboxes.html

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
- do not open files from unreliable sources

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.

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

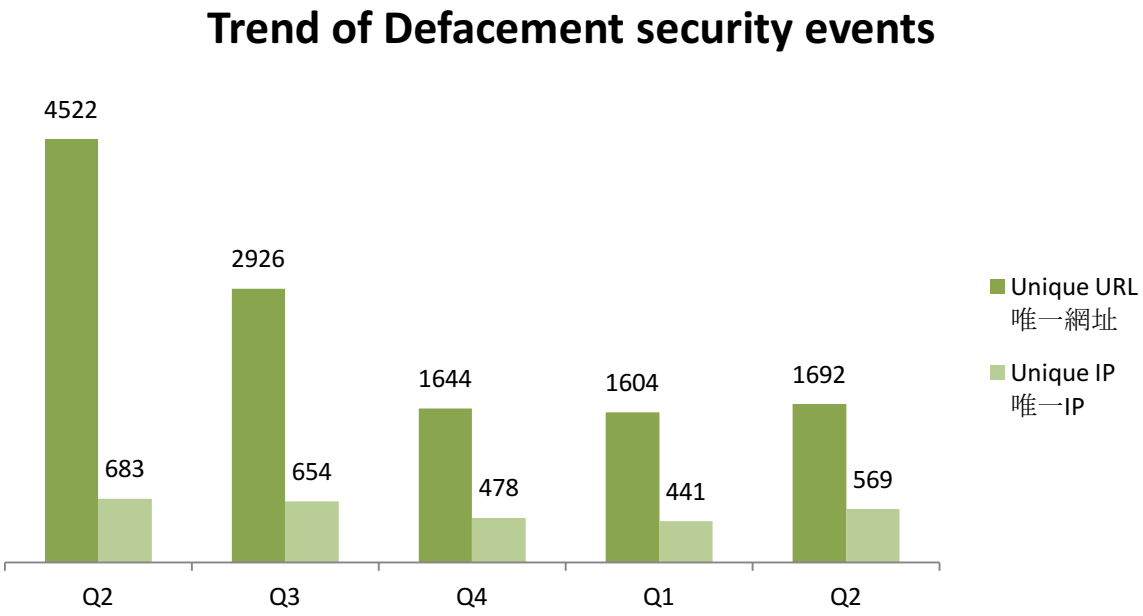


Figure **6** –Trend of Defacement security events[10]

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.

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

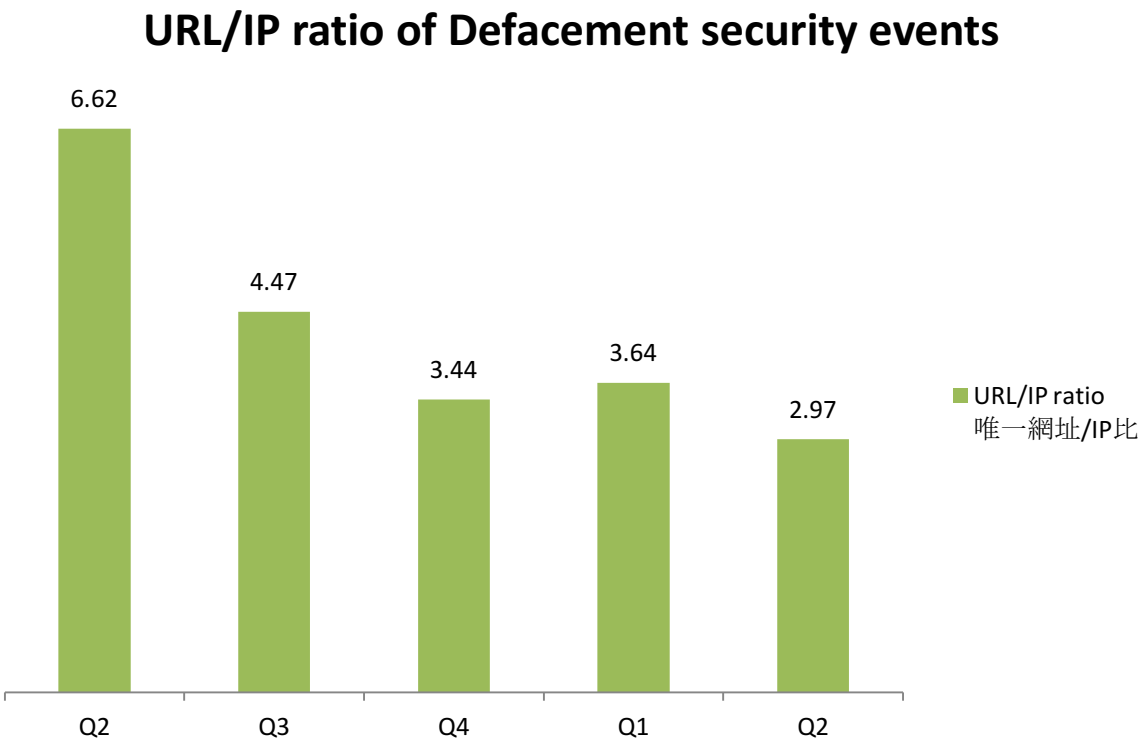


Figure 7 - URL/IP ratio of defacement security events

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

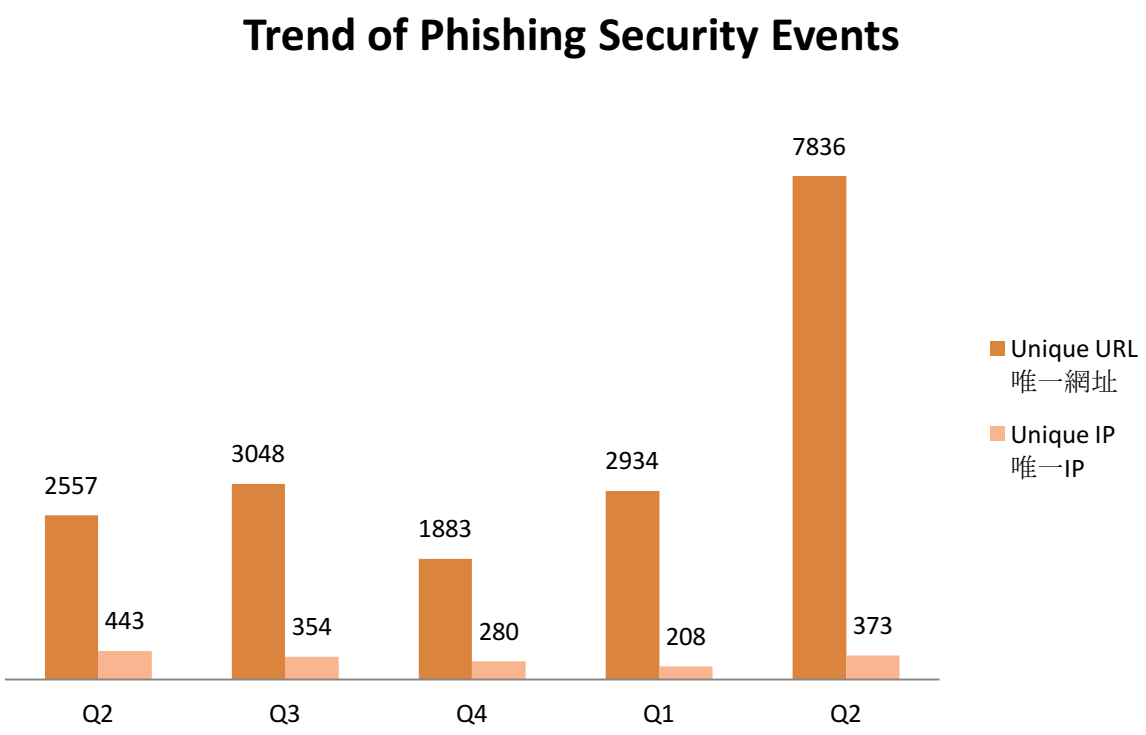


Figure 8 –Trend of Phishing Security Events

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.

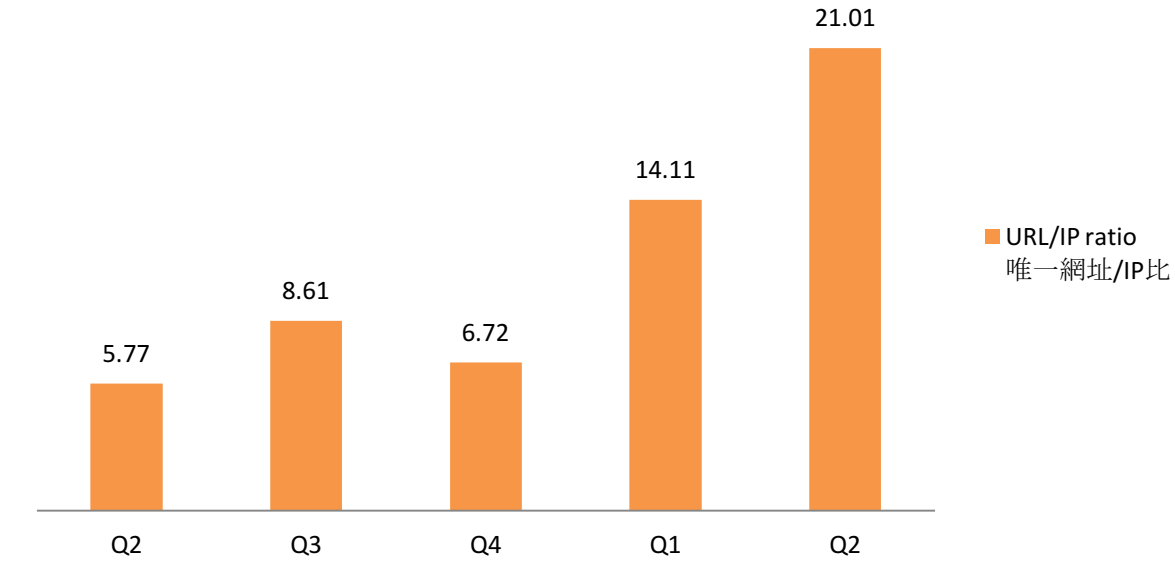


Figure 9 - URL/IP ratio of phishing security events

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

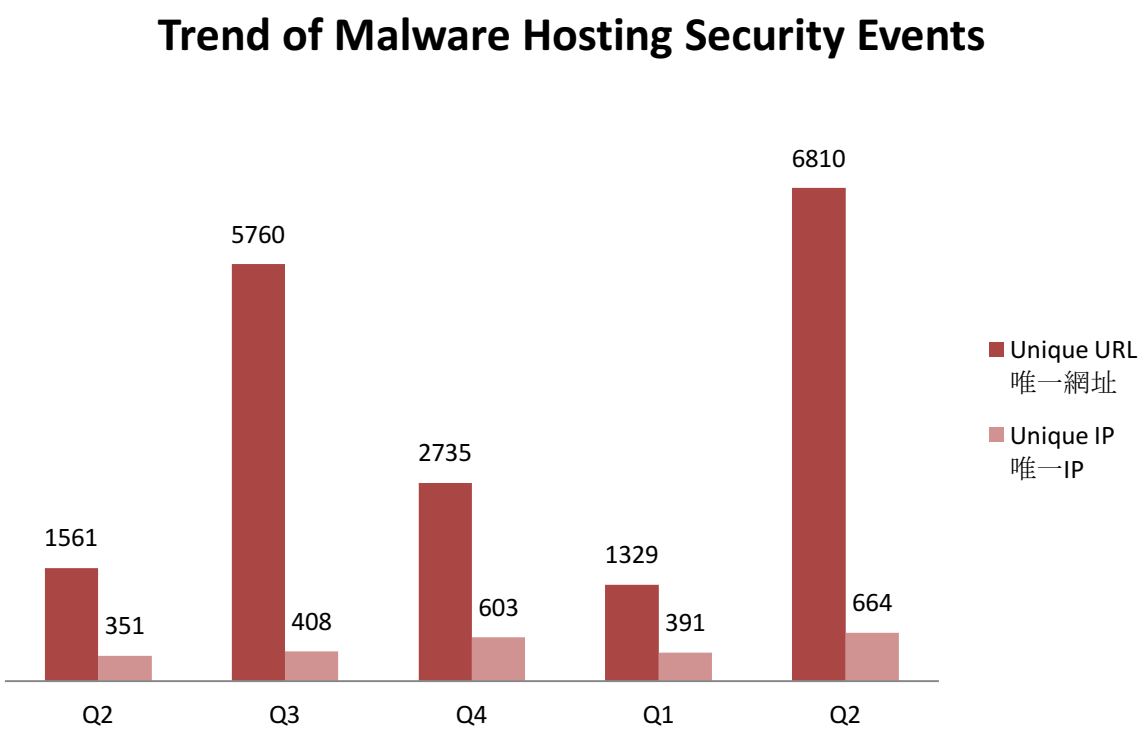


Figure 10 –Trend of Malware Hosting Security Events

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.

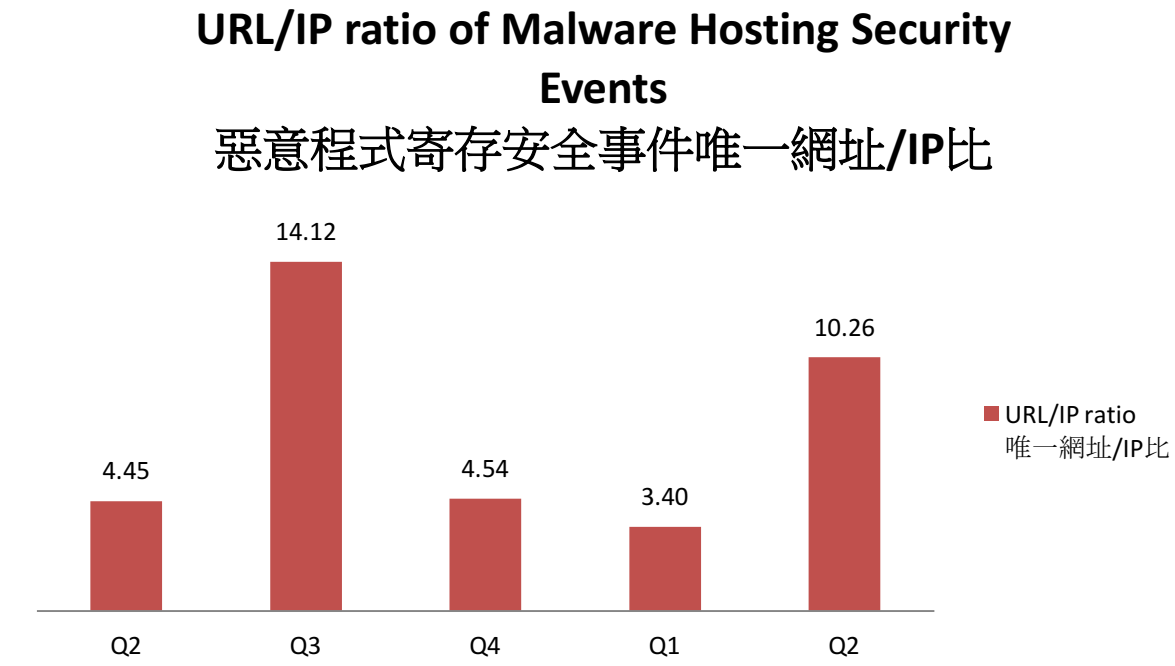


Figure 11 - URL/IP ratio of malware hosting security events

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

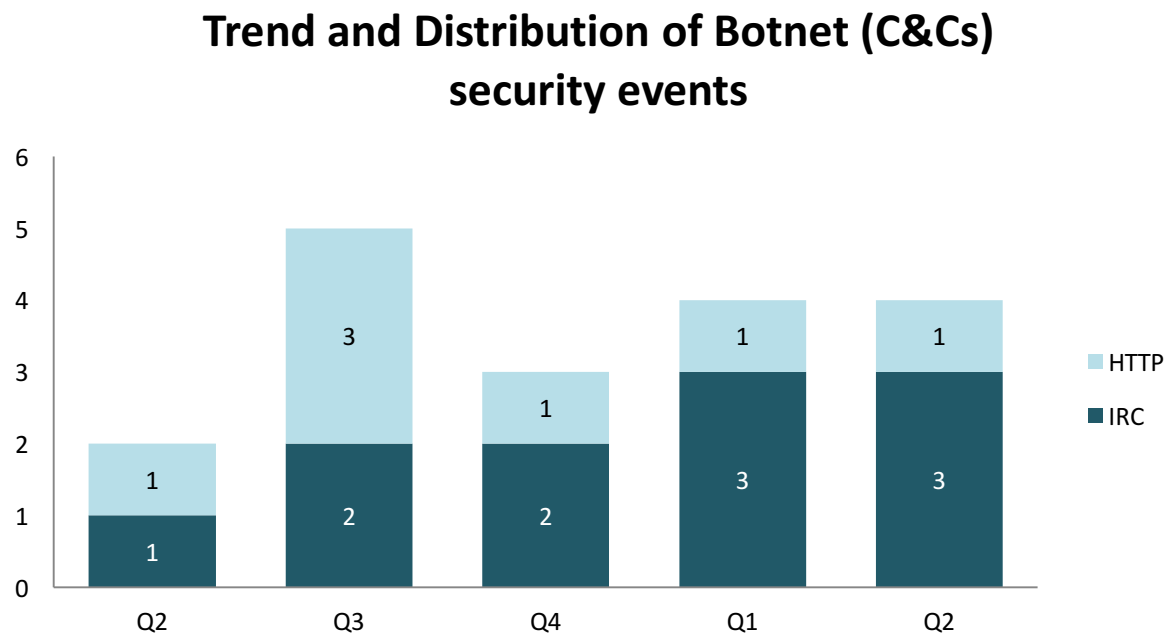


Figure 12 –Trend and Distribution of Botnet (C&Cs) security events

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 connect to it.
- Server might contain large amount of personal and financial data stolen by other bots.

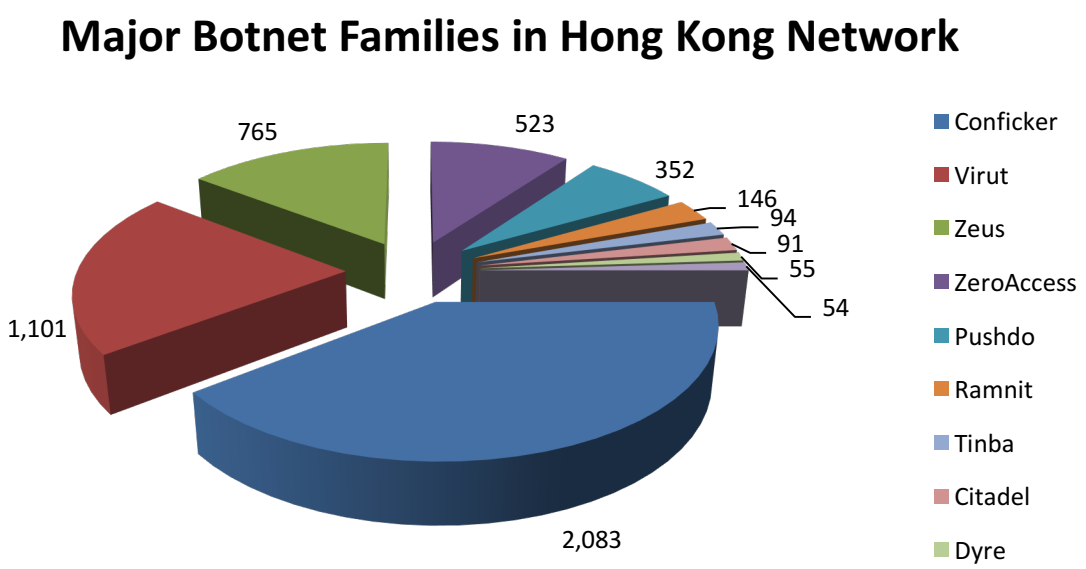
Sources of Information:

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

4.2 Botnets – Bots

4.2.1 Major Botnet Families[11] found on Hong Kong Networks

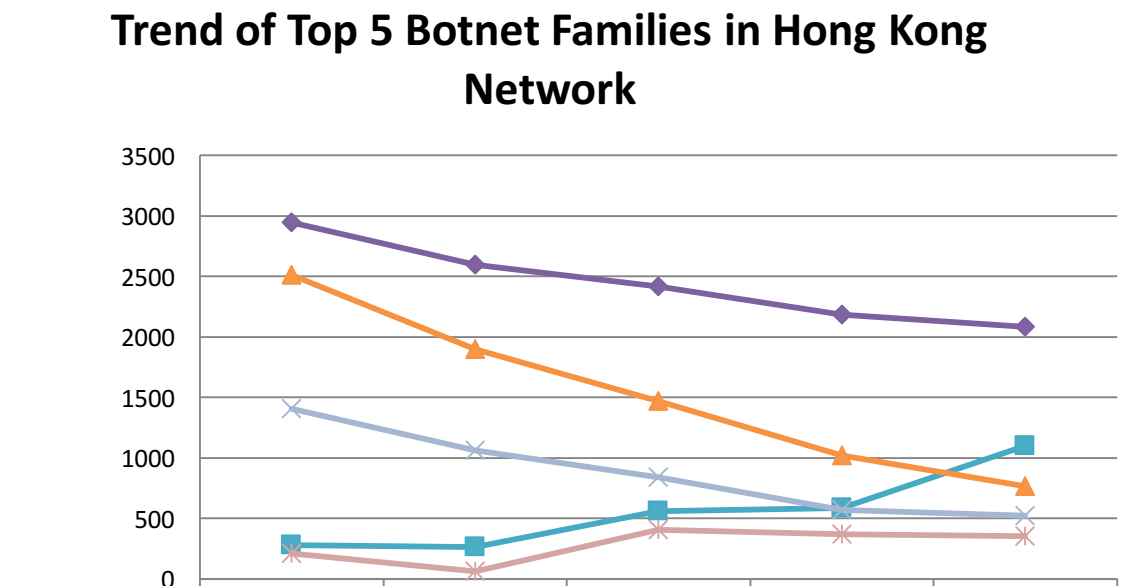
Individual botnet's size is calculated from the maximum of the daily counts of unique IP addresses attempting to connect to the botnet in the report period. In other words, the real botnet size should be larger because not all bots are powered on within the same day.



Rank	↑↓	Concerned Bots	Number of Unique IP addresses (Max count in a Quarter)	Changes with previous period
1	-	Conficker	2,083	-5%
2	↑	Virut	1,101	87%
3	↓	Zeus	765	-25%
4	-	ZeroAccess	523	-8%
5	-	Pushdo	352	-4%
6	NEW	Ramnit	146	NA
7	NEW	Tinba	94	NA
8	↓	Citadel	91	-13%
9	NEW	Dyre	55	NA
10	↓	Bankpatch	54	15%

Figure 13 –Major Botnet Families in Hong Kong Networks

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



	Q2 2014	Q3 2014	Q4 2014	Q1 2015	Q2 2015
Conficker	2945	2597	2419	2185	2083
Virut	277	263	559	588	1101
Zeus	2512	1897	1472	1020	765
ZeroAccess	1407	1062	838	569	523
Pushdo	211	63	406	367	352

Figure 14 – Trend of Top 5 Botnet Families in Hong Kong Network[12]

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

[12] The numbers of Virut events in Q2 and Q3 were adjusted.

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	2015-6-15

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

Dyre	Nil	Banking Trojan	• spam e-mail	• steal banking credential by tricking the victim to call an illegitimate number • send spams
Gamarue	• Andromeda	Downloader/ Worm	• via exploit kit • spam e-mail • MS Word macro • removable-drives	• steal sensitive information • allow unauthorized access • install other malware
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

Ramnit	Nil	Worm	• file infection • via exploit kits • public FTP servers	• backdoor capabilities that allow unauthorized access • steal login credentials and sensitive information
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
Tinba	• TinyBanker • Zusy	Banking Trojan	• via exploit kit • Spam e-mail	• steal banking credential and sensitive information

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
Virut	Nil	Trojan	• spread via removable drives and shares	• send spams • launch DDoS attacks • fraud • data theft
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