

"Sin"-ful SPIDERS: WIZARD SPIDER and LUNAR SPIDER

Sharing the Same Web

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CrowdStrike® Intelligence observed a new campaign from a LUNAR SPIDER affiliate to distribute WIZARD SPIDER's TrickBot malware on Feb. 7, 2019. However, this latest campaign is somewhat unique due to a custom variant of a TrickBot module that (to date) is only associated with this campaign. The WIZARD SPIDER threat group is the Russia-based operator of the TrickBot banking malware. This group represents a growing criminal enterprise of which [GRIM SPIDER appears to be a subset](#). The LUNAR SPIDER threat group is the Eastern European-based operator and developer of the [commodity banking malware called BokBot](#) (aka IcedID), which was first observed in April 2017. The BokBot malware provides LUNAR SPIDER affiliates with a variety of capabilities to enable credential theft and wire fraud, through the use of webinjects and a malware distribution function. Campaigns involving both BokBot and TrickBot were first identified by CrowdStrike Intelligence in July 2017. In these campaigns, victim machines infected with BokBot issued a command to download and execute a TrickBot payload. A somewhat sporadic relationship between the two adversaries has continued since then, although this most recent campaign likely signals a more intimate phase of that relationship.

TrickBot Distribution

On Feb. 7, 2019, LUNAR SPIDER's BokBot project ID `C610DF9A` was seen downloading and executing a loader from `http://tfulf<.>host/Sw9HJmXzq.exe`. The custom loader subsequently downloaded a TrickBot loader from `http://185.68.93<.>30/sin.png`. The configuration file of this sample indicates it is TrickBot version 1000351 and belongs to the group tag (gtag) `sin2`. The gtags with a prefix of `sin` have been related to LUNAR SPIDER activity as the successor to the previously associated `mom` gtag prefix. The full TrickBot configuration file, including command-and-control (C2) servers, can be seen below.

```
<mcconf> <ver>1000351</ver> <gtag>sin2</gtag> <srvs> <srv>185.246.64<.>237:443</srv>
<srv>68.119.85<.>138:449</srv> <srv>65.184.200<.>184:449</srv> <srv>185.62.188<.>30:443</srv>
<srv>96.36.253<.>146:449</srv> <srv>92.38.135<.>33:443</srv> <srv>24.247.181<.>155:449</srv>
<srv>31.131.22<.>212:443</srv> <srv>208.79.106<.>155:449</srv> <srv>192.227.204<.>224:443</srv>
<srv>124.29.213<.>74:449</srv> <srv>46.100.14<.>215:449</srv> <srv>190.109.178<.>222:449</srv>
<srv>103.47.168<.>172:449</srv> <srv>208.79.110<.>201:449</srv> <srv>204.14.154<.>126:449</srv>
<srv>103.47.168<.>72:449</srv> <srv>103.47.168<.>91:449</srv> <srv>46.21.249<.>220:443</srv>
<srv>107.146.147<.>235:449</srv> <srv>185.62.188<.>30:443</srv> <srv>68.111.123<.>100:449</srv>
<srv>103.47.169<.>27:449</srv> <srv>24.247.182<.>240:449</srv> <srv>36.91.74<.>138:449</srv>
<srv>125.209.82<.>158:449</srv> <srv>76.107.90<.>235:449</srv> <srv>47.224.98<.>123:449</srv>
<srv>185.222.202<.>79:443</srv> <srv>24.247.182<.>253:449</srv> <srv>216.17.92<.>138:449</srv>
<srv>199.21.106<.>189:449</srv> <srv>208.79.106<.>213:449</srv> <srv>24.247.182<.>253:449</srv>
```

```
<srv>136.25.2.>43:449</srv> <srv>181.129.93.>226:449</srv> <srv>170.79.176.>242:449</srv>
</servs> <autorun> <module name="systeminfo" ctl="GetSystemInfo"/> <module name="injectDll"/>
<module name="pwgrab"/> </autorun> </mcconf>
```

Modified TrickBot Module

This activity follows the previous pattern of BokBot assisting in the delivery of TrickBot. However, the most interesting thing about the custom loader is the embedded, Base64-encoded Portable Executable (PE) file shown in Figure 1.

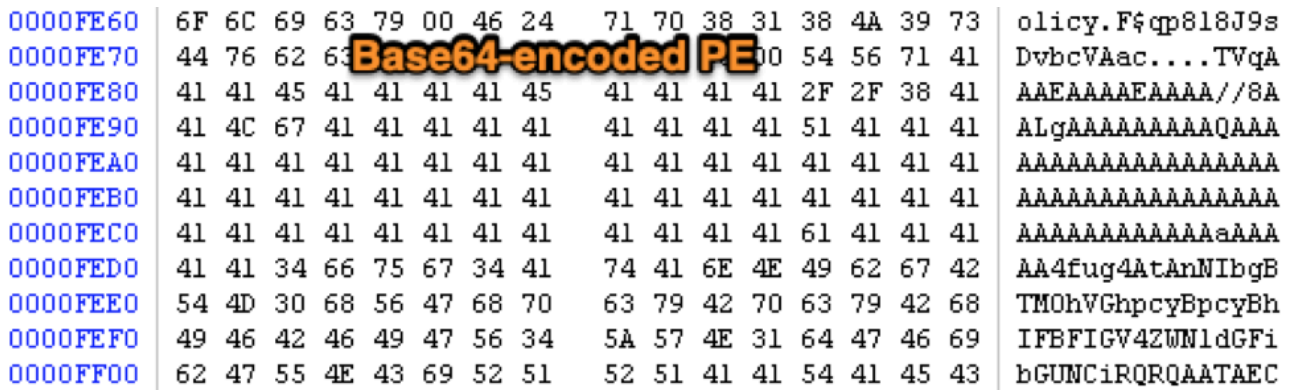


Figure 1. Base64-Encoded PE File

The embedded PE file is extracted by the custom loader, then decoded and executed. Analysis revealed that this decoded PE file is, in fact, a modified version of the TrickBot [lateral movement](#) module `shareDll`. Typically, TrickBot modules are downloaded as a dynamic link library (DLL) with a standard set of exports, named `Start`, `Control` and `Release`. This DLL would then be injected into a child `svchost.exe` process within the TrickBot modular framework. However, in the absence of this framework, the `shareDll` module distributed by BokBot is a PE file. In addition, the strings within a standard TrickBot module are not obfuscated or protected in any way. However, the module distributed by BokBot contains strings that are both encrypted with 256-bit AES, with a derived key and initialization vector (IV), and Base64-encoded with the custom alphabet of `terKSDozBw1l24IyCL6AHh/+5WRiGnj3xJQ8YkEbcg0ZVNPamSsuUTpd0q9vFfX7`. The strings are stored in an encrypted string table (shown in Figure 2) in the exact same way as the main TrickBot loader, and decrypted when they are needed.

4E70h:	00 00 00 00	00 00 00 00	00 00 00 00	00 74 65 72ter
4E80h:	4B 53 44 6F	7A 42 77 31	6C 32 34 49	79 43 4C 36	KSDozBw1l24IyCL6
4E90h:	41 48 68 2F	2B 35 57 52	69 47 6E 6A	33 78 4A 51	AHh/+5WRiGnj3xJQ
4EA0h:	38 59 6B 45	62 63 67 4F	5A 56 4E 50	61 6D 4D 73	8YkEbcgOZVNPamMs
4EB0h:	75 55 54 70	64 30 71 39	76 46 66 58	37 00 00 00	uUTpd0q9vFfX7...
4EC0h:	00 00 00 00	00 00 77 2B	34 47 6E 6F	54 6D 77 68w+4GnoTmwh
4ED0h:	78 50 57 2B	4A 6B 00 6C	55 32 78 48	6F 66 64 57	xPW+Jk.1U2xHofdW
4EE0h:	2B 77 41 52	6F 68 56 69	72 74 51 48	64 4C 4A 47	+wARohVirtQHdLJG
4EF0h:	62 43 4E 48	70 4D 6B 57	2B 74 78 32	41 74 76 42	bCNHpmkW+tx2AtvB
4F00h:	44 77 6B 69	2F 66 70 57	36 54 77 6E	6F 68 4E 42	Dwki/fpW6TwnohNB
4F10h:	74 00 35 70	54 59 6C 45	68 30 57 43	00 77 2B 34	t.5pTYlEh0WC.w+4
4F20h:	47 43 73 4C	47 35 64 57	75 6E 45 32	50 57 2B 4A	GCsLG5dWunE2PW+J
4F30h:	6B 00 77 2B	34 47 43 48	4C 34 36 48	30 59 2B 6F	k.w+4GCHL46H0Y+o
4F40h:	34 70 47 64	57 38 6C 45	68 30 57 43	00 48 64 6B	4pGdW81Eh0WC.Hdk
4F50h:	75 6E 6F 68	4E 68 7A 6B	6D 57 48 34	41 6E 45 32	unohNhzkMWH4AnE2
4F60h:	00 68 6F 68	38 52 6F 71	67 35 70 44	56 43 54 34	.hoh8Roqg5pDVCT4
4F70h:	70 35 6D 00	77 68 34 71	47 64 4C 6B	69 48 4C 73	p5m.wh4qGdLkiHLs
4F80h:	52 2B 57 6B	77 68 4D 38	6E 62 34 70	35 73 71 6B	R+WkwhM8nb4p5sqk
4F90h:	6A 6F 48 00	77 68 34 71	47 64 4C 6B	69 68 77 61	joH.wh4qGdLkihwa
4FA0h:	69 64 43 6B	2B 7A 34 71	47 64 4C 6B	69 41 32 73	idCk+z4qGdLkiA2s

Figure 2. Custom Base64 Alphabet and Encrypted Strings

Table 1 below outlines the key identified differences between the two variants of the shareDll module.

BokBot Distributed shareDll	TrickBot Distributed shareDll
PE file	DLL file
Obfuscated	Little or no obfuscation
No exports	Start, Control, and Release exports

Table 1. Compares Key Differences Between Two Variants of ShareDLL The primary function of the `shareDll` module in both cases is to attempt lateral movement within the victim’s network, to reach machines accessible by the currently logged-on user. In the BokBot distributed instance, once an accessible machine has been located, the modified spreader module will attempt to download the TrickBot loader located at `http://185.68.93<.>30/sin.png` or `http://185.68.93<.>30/win.png` and install TrickBot on the accessible network machine. The whole process of BokBot installing TrickBot on the local machine and moving laterally around the network is illustrated in Figure 3.

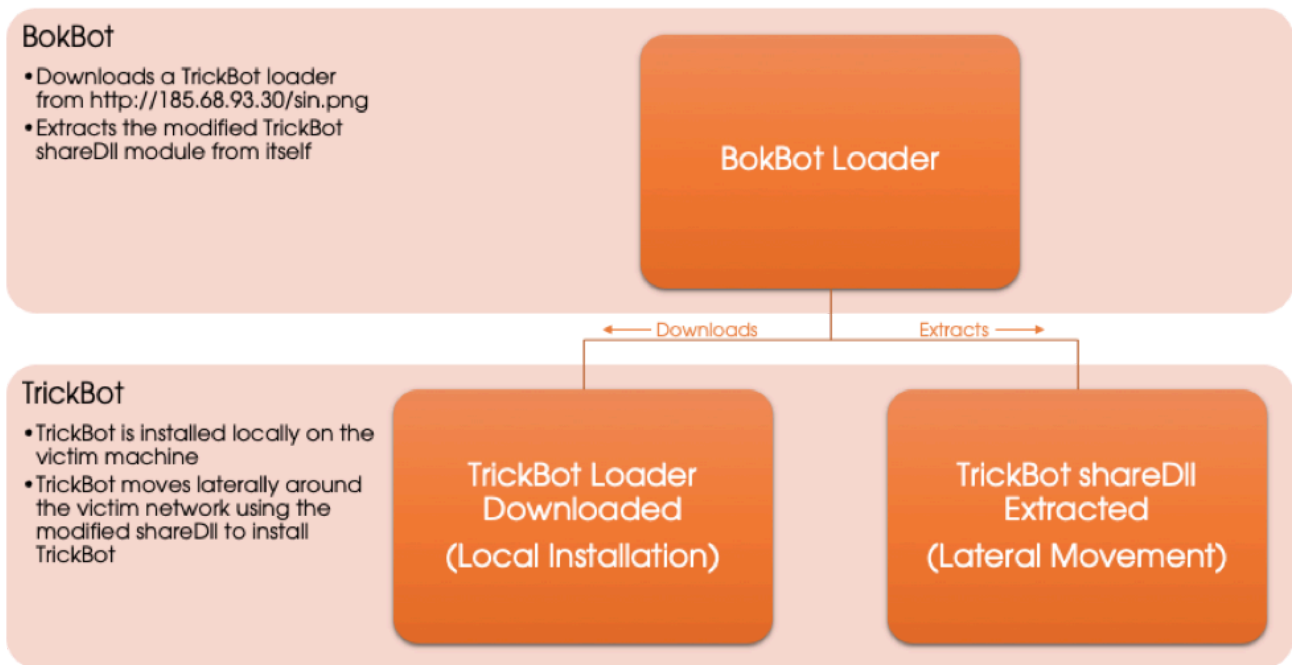


Figure 3. BokBot Installation of TrickBot and Lateral Movement Using ShareDll

Renamed Modules

Beginning on Feb. 8, 2019, CrowdStrike Intelligence observed further development in this intriguing relationship when renamed TrickBot modules were delivered to victims of the gtags `sin2` and `sin4`. These gtags have been closely associated with LUNAR SPIDER activity. The renamed modules and their respective SHA256 hashes are shown in Table 2 and contain the strings `sin`, `tin`, and `win`.

Module Name	Module SHA256 Hash
sharesinDll32	eeefd209ba6afff5830d5510e68b2af90df200550d8ca4c40029baa93a0f01999
sharesinDll32	1b84f604847be0dbdf19ca169deb22b0245ca6f4bc2877b7a0ceeffa0436d7b3
sharesinDll32	ea3c70d82f3b4fe8d0914cc58669da0f3f116aa20f0661d68f826fd55763ef50
sharesinDll64	93da209d2fdb49df19b53089bb1820aa0183e9f207ea87b51b49faa74f8e76ba
sharesinDll64	915e416576be4b459c19941cc86a84fb0d66f54964552be0f69045b89323d2f7
sharesinDll64	6d8551194b12655b4605f046a754257f69b1ee250f21e32466db54797a45c7c0
tabtinDll32	aa074b7a1ce29abd9141dc18ca603f2ed2764ae1afabb92eb2f9e4dc008d99d6
tabtinDll32	ba5bd732466a41636217b639a7a2aff1038a80bc29bd80c0532609d53297051f
tabtinDll64	7023bbd875635b35fdc0eba303143be76afb50c0f34e8d79e8d0daba1d984b60
tabtinDll64	13b8ab8ce0aa9db161c065c6bf2fdbb50c6fd82fe48e4576abc4b8c3136f925e
wormwinDll32	cac2f117d8b4f1fc40dd0921ea91312ad8129df3556444e41fda8d27c81e02cd

wormwinDll32	d51644cefd34dd7e1ec32a3e0336f9c479c196527e8baea6e85937254cecfe99
wormwinDll64	8c20b33374c280e9fd98113304843a339f738647cc13daf8f60312b9fef6b702
wormwinDll64	e8ecceb0cbc0e6aefab5ac47a9e69f7926317d9e4f9a782b8df418c67a8d0661

Table 2. Renamed Modules and Associated SHA256 Hashes Unlike the changes identified in the TrickBot module `shareDll` being distributed by BokBot, the modules `sharesinDll`, `tabtinDll`, and `wormwinDll` remain functionally equivalent to the TrickBot deployed modules `shareDll`, `tabDll`, and `wormDll`, respectively, and retain the typical characteristics of a TrickBot module. More explicitly, the modules are DLLs, contain no encrypted strings, and have the standard TrickBot exports of `Start`, `Control`, and `Release`. CrowdStrike Falcon® endpoint provides protection coverage against these threats through behavioral IOA and machine learning.

Conclusion

It is unclear at this stage what purpose the module renaming serves, but it may be a method of tracking activity from those modules specifically associated with the aforementioned gtags. Additionally, CrowdStrike Intelligence is exploring a possible connection between the TrickBot affiliate operating `sin`-prefixed TrickBot gtags and the BokBot affiliate operating the project ID `C610DF9A`, due to the recent introduction of the previously mentioned custom TrickBot module. Of note, BokBot has aided the distribution of TrickBot, with the standard module set, through other BokBot project IDs for some time. Another key point to note about this recent development is the historical relationship that previously existed between the developers and operators of the banking malware families Dyre (aka Dyreza) and Neverquest (aka Vawtrak). This relationship is key because:

- WIZARD SPIDER includes members that were a part of the same group that had developed and operated Dyre.
- LUNAR SPIDER includes members that were a part of the same group that had developed and operated Neverquest.

Despite being successful malware operations, both Dyre and Neverquest suddenly ceased operating in November 2015 and May 2017, respectively (Figure 4). LUNAR SPIDER had already introduced BokBot to the criminal market at the time Neverquest operations ceased, suggesting that the malware change may have been planned. Conversely, the Dyre operation ceased following Russian law enforcement action in which the offices of a Moscow-based film and production company, named 25th Floor, were raided in November 2015. Although no details were released by Russian law enforcement, it was speculated that the office played a part in the operation of Dyre. There was a one-year delay before the release of the TrickBot malware, which contains key similarities to the Dyre malware, but the operation was immediately successful and grew swiftly.

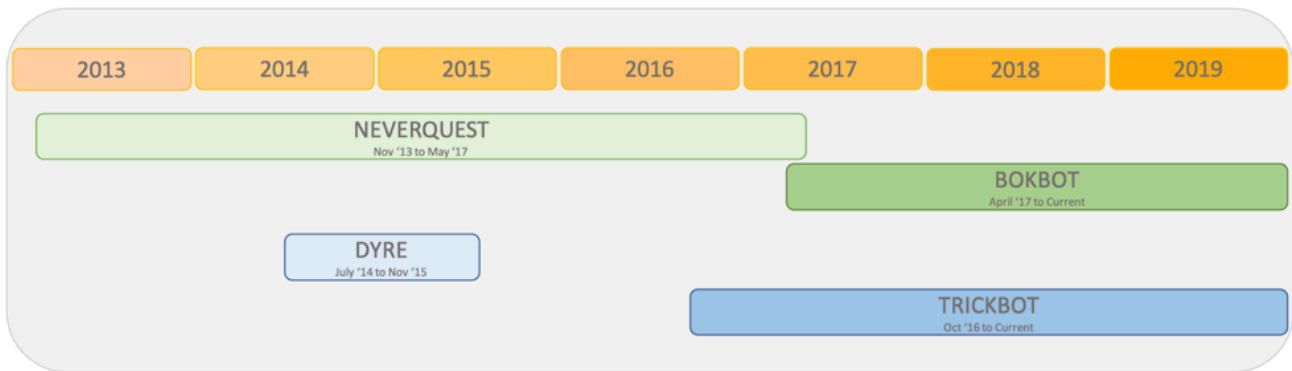


Figure 4. Timeline of Malware Operating Dates

Although BokBot has aided the distribution of TrickBot since 2017, the development of custom TrickBot modules for the specific campaign has not been observed before. This significant development demonstrates a close relationship between the members of LUNAR SPIDER and WIZARD SPIDER. CrowdStrike Intelligence assesses that the historical relationship established during the operations of Dyre and Neverquest has been reinvigorated and solidified now that both WIZARD SPIDER and LUNAR SPIDER have established successful malware operations.

Appendix/Indicators

Indicator	Description
<code>http://tfulf<.>host/Sw9HJmXzq.exe</code>	Custom loader URL
<code>4ba234160cfbd1ef8ca2a259e51abdd4f6109ce74954fb7541d6226ec510b755</code>	Custom loader SHA256
<code>http://185.68.93<.>30/sin.png</code>	TrickBot loader URL
<code>http://185.68.93<.>30/win.png</code>	TrickBot loader URL
<code>d06432486e7e9c2b8aaef4f42c11cf8efe19689638a3512ce931a23bdb5f2b4c</code>	TrickBot loader SHA256
<code>185.246.64<.>237:443</code> <code>68.119.85<.>138:449</code> <code>65.184.200<.>184:449</code> <code>185.62.188<.>30:443</code> <code>96.36.253<.>146:449</code> <code>92.38.135<.>33:443</code> <code>24.247.181<.>155:449</code> <code>31.131.22<.>212:443</code> <code>208.79.106<.>155:449</code> <code>192.227.204<.>224:443</code> <code>124.29.213<.>74:449</code> <code>46.100.14<.>215:449</code> <code>190.109.178<.>222:449</code> <code>103.47.168<.>172:449</code> <code>208.79.110<.>201:449</code> <code>204.14.154<.>126:449</code> <code>103.47.168<.>72:449</code> <code>103.47.168<.>91:449</code> <code>46.21.249<.>220:443</code> <code>107.146.147<.>235:449</code> <code>185.62.188<.>30:443</code> <code>68.111.123<.>100:449</code> <code>103.47.169<.>27:449</code> <code>24.247.182<.>240:449</code> <code>36.91.74<.>138:449</code> <code>125.209.82<.>158:449</code> <code>76.107.90<.>235:449</code>	TrickBot C2 Servers

47.224.98<.>123:449	185.222.202<.>79:443	24.247.182<.>253:449	
216.17.92<.>138:449	199.21.106<.>189:449	208.79.106<.>213:449	
24.247.182<.>253:449	136.25.2<.>43:449	181.129.93<.>226:449	
170.79.176<.>242:449			
f8967874aeedd6a5f492489dfb91de138e34313bf804d3200423c790eb19dce			Customized shareDll module
eefd209ba6afff5830d5510e68b2af90df200550d8ca4c40029baa93a0f01999			s haresinDll32
1b84f604847be0dbdf19ca169deb22b0245ca6f4bc2877b7a0ceeffa0436d7b3			sharesinDll32
ea3c70d82f3b4fe8d0914cc58669da0f3f116aa20f0661d68f826fd55763ef50			sharesinDll32
93da209d2fdb49df19b53089bb1820aa0183e9f207ea87b51b49faa74f8e76ba			sharesinDll64
915e416576be4b459c19941cc86a84fb0d66f54964552be0f69045b89323d2f7			sharesinDll64
6d8551194b12655b4605f046a754257f69b1ee250f21e32466db54797a45c7c0			sharesinDll64
aa074b7a1ce29abd9141dc18ca603f2ed2764ae1afabb92eb2f9e4dc008d99d6			tabtinDll32
ba5bd732466a41636217b639a7a2aff1038a80bc29bd80c0532609d53297051f			tabtinDll32
7023bbd875635b35fdc0eba303143be76afb50c0f34e8d79e8d0daba1d984b60			tabtinDll64
13b8ab8ce0aa9db161c065c6bf2fdbb50c6fd82fe48e4576abc4b8c3136f925e			tabtinDll64
cac2f117d8b4f1fc40dd0921ea91312ad8129df3556444e41fda8d27c81e02cd			wormwinDll32
d51644cefd34dd7e1ec32a3e0336f9c479c196527e8baea6e85937254cecfe99			wormwinDll32
8c20b33374c280e9fd98113304843a339f738647cc13daf8f60312b9fef6b702			wormwinDll64
e8ecceb0cbc0e6aefab5ac47a9e69f7926317d9e4f9a782b8df418c67a8d0661			wormwinDll64

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- *Learn more about comprehensive endpoint protection with the CrowdStrike Falcon® platform by [visiting the product page](#).*
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