TA505 is Expanding its Operations

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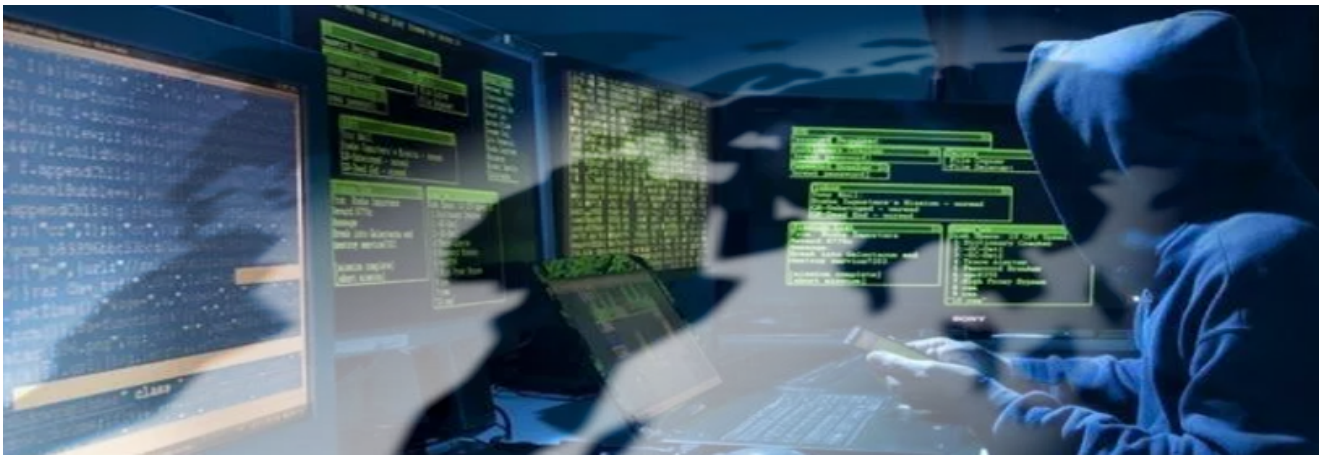

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Introduction

In the last few days, during monitoring activities, Yoroi CERT noticed a suspicious attack against an Italian organization. The malicious email contains a highly suspicious sample which triggered the ZLAB team to investigate its capabilities and its possible attribution, discovering a potential expansion of the TA505 operation. The threat group is also known for its recent attack campaign against Bank and Retail business sectors, but the latest evidence indicates a potential expansion of its criminal operation to other industries too.

Technical Analysis

Hash	0c88e285b6fc183c96b6f03ca5700cc9ca7c83dfccc6ad14a946d1868d1cc273
Threat	Dropper
Brief Description	Excel file with malicious macro
Ssdeep	3072:Mc38TehYTdeHVhjqabWHLtyeGxml8/dgzxXYhh3vVYwrq 8/P5HKuPF1+bkm13Kkf:B38TehYTdeHVhjqabWHLty/xml8/dgNr

Table 1. Information about initial dropper

The intercepted attack starts with a spear phishing email embedding a spreadsheet. The document is weaponized with malicious macro code triggered when the user opens the document to see the content under the obfuscated view.

Figure 1. XLS document
To understand its capabilities, the macro code has been isolated and analyzed in detail. Part of the macro's content is shown in the following figure.

Figure 2. Part of extracted macro
Surprisingly, the source code is composed by more than 1600 lines of code and it is highly obfuscated. Paying more attention during the code analysis, we discovered that it is full of junk instructions used to declare and initialize variables never used, as shown in Figure 2. Only a small portion of this code is actually used to start the infection, the rest is just junk code.

Figure 3. Example of junk instructions used in macro
Once the macro is executed, the malware downloads two files from *"kentona[.su",* using an SSL encrypted communication, and stores them in "C:\Users\Public" path: "*rtegre.exe*" and "*wprgxyeqd79.exe*".

Hash	aafa83d5e0619e69e64fcac4626cfb298baac54c7251f479721df1c2eb16bee7
Threat	Generic
Brief Description	Trojan/Downloader (Executable file)
Ssdeep	12288:3gL3qJxG5hfNV6oYYbDRcY4KhbmwPMCchbjBxwhrVm HAyzNkyRJK7hRMCQ:3mqkhfzYZY4kmgsbdm2HAENk0K7Dm

Table 2. Information about "rtegre.exe" downloaded from "kentona[.su"

Hash	6f1a8ee627ec2ed7e1d818d32a34a163416938eb13a97783a71f9b79843a80a2
Threat	Trojan
Brief Description	SFX (self-extracting archive) (Executable file)
Ssdeep	49152:sIWB74MncmEWy4i1LkjoAwG2PI/mfqtftvMKcr+7Ao95 xQW1vB38PELaacVzWTV3:sICtHsJoMAwG

Table 3. Information about "wprgxyeqd79.exe" (SFX) downloaded from "kentona[.su"

Figure 4. Files contained in "wprgxyeqd79.exe" (SFX)
The "wprgxyeqd79.exe" sample actually is a Self Extracting Archive (SFX/SFA) containing four files designed to be extracted in the %TEMP% folder. After that, it executes "exit.exe" which launches the "i.cmd" batch script.

Figure 5. "i.cmd" script contained in "pasmmm.exe"

This new script performs a ping to “www[.cloudflare[.com” for three times with a delay of 3000ms, testing the connectivity of the victim machine. If the host is successfully reached, the script renames a file named “kernel.dll”, obviously not the real one, in “uninstall.exe”, another misleading name. Then it invokes the renamed executable and runs it passing a series of parameter: *“uninstall.exe x -pQELRatcwbU2EJ5 -y”*

These parameters are needed to self-decrypt the “uninstall.exe” file which is again another SFX archive. The “-p” parameter, indeed, specify the password of the archive to be extracted. The crucial file, at this point of the infection, is the SFX executable named “uninstall.exe”. It has a structure similar to previous *“wprgxyeqd79.exe”* file: two of their files have the same name, but the content of this new SFX is extracted in the *“%ALLUSERSPROFILE%\Windows Anytime Upgrade”* directory.

Figure 6. Files contained in “uninstall.exe” (SFX)
Another time, the execution flow moves from “exit.exe to “i.cmd”. The script is quite different from the previous one: it guarantees its persistence on the victim machine through the setting of *“HKCU\Software\Microsoft\Windows\CurrentVersion\Run”* registry key, creating a new entry named *“Windows Anytime Upgrade”* which points to *“winserv.exe”*, just stored into the same folder. Thus, the script provides to run *“winserv.exe”*.

Figure 7. “i.cmd” script contained in “uninstall.exe”
An interesting part of the script is the continuous killing of every “rundll32.exe” process running into the victim machine, generates a huge amount of noise, as visible in the following process explorer view.

```
:Repeat
taskkill /f /im “rundll32.exe” || goto :Repeat
```

Figure 8. List of malware’s processes
Anyway, just before the kill loop, the real malicious payload is executed: the “*winserv.exe*” file. Analyzing it in depth, we discover it actually is the RMS (Remote Manipulator System) client by TektonIT, encrypted using the MPress PE compressor utility, a legitimate tool, to avoid antivirus detection.

Figure 9. Information about MPress packer used in “winserv.exe” payload
TektonIT RMS acts as a remote administration tool, allowing the attacker to gain complete access to the victim machine. Together with the RMS executable, there is another file named *“settings.dat”* containing the custom configuration prepared by the attacker. It contains information like:

- Server address and port the client will connect to
- The password chosen by the attacker for the remote access
- The ID associated to the victim client

All these information are automatically loaded by the RMS executable and firstly stored in the registry key *"HKCU\Software\tektonik\Remote MANIPULATOR System\Host\parameters"*. At the next startup, the software will directly load the configuration from the just created key.

Figure 10. Registry key set by "winserv.exe" (on the left); "settings.dat" file (on the right)
The client establishes a new connection with the remote command and control server hosted on a Bulgarian remote host 217.12.201.159, part of a Virtual Dedicated Server subnet of the AS-21100, operated by ITL LLC.

Figure 11. C2's parameters
The attack is composed by a complex flow we synthesize in the following scheme:

Figure 12. Complete infection chain

The TA505 Connection

After the reconstruction of the full infection chain, we noticed strong similarities with a recent spear-phishing attack campaign against an unspecified US retail company. The attack, as stated by CyberInt, leveraged a command and control server located in Germany related to the TA505 actor: a very active group involved in cyber-criminal operation all around the world, threatening a wide range of high profile companies, active since 2014.

Figure 13. Comparison between infection chains
The comparison of the infection chains reveals in both cases the attacker used a couple of SFX stages to deploy the "RMS" software: a legitimate remote administration tool produced by the Russian company "TektonIT". The tool is able to grant remote access and full, direct control of the infected machine to the group. Also, some code pieces are directly re-used in the analyzed campaigns, such as the *"i.cmd"* and *"exit.exe"* files, and, at the same time, some new components have been introduced, for instance the *"rtegre.exe"* and the *"veter1605_MAPS_10cr0.exe"* file.

During the analysis, we also noticed the *"veter**1605**_MAPS_10**cr0**.exe"* file slightly changed run after run, a few hours after the initial discovery the infection chain dropped it with different icons, different suffix, from "cr0" to "cr24", and appendix from "veter1605_" to "veter2005_". This may indicate the campaign is still ongoing.

Conclusion

The TA505 group is one of the most active threat groups operating since 2014, it has traditionally targeted Banking and Retail industries, as we recently documented during the analysis of the "*Stealthy Email Stealer*" part of their arsenal. The peculiarity of this recent attack wave is it actually hit a company not strictly in the Banking or Retail sector, as they recently did, suggesting the threat group could be potentially widening their current operations.

Indicators of Compromise

- Dropurl:
  - kentona[.su - 47.245.58.124
  - hxxps://kentona[.su/xpepriubgpokejifuv7efrhguskdgfjn/ananas.exe
  - hxxps://kentona[.su/xpepriubgpokejifuv7efrhguskdgfjn/pasmmm.exe
- C2:

  217[.12.201.159
- Persistence:

  HKCU\Software\Microsoft\Windows\CurrentVersion\Run
- Hash:
  - 0c88e285b6fc183c96b6f03ca5700cc9ca7c83dfccc6ad14a946d1868d1cc273
  - 1ee1ba514212f11a69d002005dfc623b1871cc808f18ddfa2191102bbb9f623b
  - fd701894e7ec8d8319bc9b32bba5892b11bdf608c3d04c2f18eff83419eb6df0
  - c69ce39ac3e178a89076136af7418c6cb664844b0ce5cb643912ed56c373a08a
  - 5310c2397ba4c783f7ee9724711a6da9b5c603b5c9781fff3407b46725e338b3
  - aafa83d5e0619e69e64fcac4626cfb298baac54c7251f479721df1c2eb16bee7
  - 210bb55664d291d82b94b9cea6fcf41029eded9eca6e7fe7b7d58715407a0703
  - 2b5eefc4bc2d34cbe5093332c47b5405cf5c32e8156767fc8bc9ddd9cdcf3018
  - 609b0a416f9b16a6df9b967dc32cd739402af31566e019a8fb8abdf3cb573e30
  - 6f1a8ee627ec2ed7e1d818d32a34a163416938eb13a97783a71f9b79843a80a2

Yara Rules

```
rule excel_dropper {
meta:
    description = "Yara rule for excel dropper"
    author = "Cybaze - Yoroi ZLab"
    last_updated = "2019-05-22"
    tlp = "white"
    category = "informational"
strings:
    $a1 = { 98 C3 AB F0 E7 F3 BD F4 }
    $a2 = { 41 6E D5 7E F0 10 AB A7 }
    $a3 = "gxbgarjktzyu"
    $a4 = "Bob Brown"

condition:
    all of them
}

import "pe"
rule pasmmm_exe {
meta:
    description = "Yara rule for pasmmm SFX archive"
    author = "Cybaze - Yoroi ZLab"
    last_updated = "2019-05-22"
    tlp = "white"
    category = "informational"
strings:
    $a1 = { 1C Cf 43 39 C8 32 B4 B0 }
    $a2 = { 60 6C B8 7C 5F FA }
    $a3 = "LookupPrivilege"
    $a4 = "LoadBitmap"

condition:
    pe.number_of_sections == 6 and all of them
}

import "pe"
rule uninstall_exe {
meta:
    description = "Yara rule for uninstall SFX archive"
    author = "Cybaze - Yoroi ZLab"
    last_updated = "2019-05-22"
    tlp = "white"
    category = "informational"
strings:
    $a1 = { E8 68 BA 01 00 51 }
    $a2 = { 58 E9 8B C6 4F 6F 7A }
    $a3 = { D9 4E D5 FA D4 34 }

condition:
    pe.number_of_resources == 24 and all of them
}

import "pe"
rule winserv_exe {
meta:
```

```
    description = "Yara rule for winserv backdoor"
    author = "Cybaze - Yoroi ZLab"
    last_updated = "2019-05-22"
    tlp = "white"
    category = "informational"
strings:
    $a1 = "MPRESS1"
    $a2 = { 90 C4 73 05 E6 92 }
    $a3 = { E9 64 4B 56 3F EC }
    $a4 = { 10 EF D0 E1 36 E1 14 3C }

condition:
    all of them and pe.version_info["CompanyName"] contains "tox"
}

import "pe"
rule veter_random {
meta:
    description = "Yara rule for veter_trojan"
    author = "Cybaze - Yoroi ZLab"
    last_updated = "2019-05-22"
    tlp = "white"
    category = "informational"
strings:
    $a = { 5E C2 04 00 F6 44 24 04 01 56 }

    $b1 = { 01 8B 02 8B 48 04 03}
    $b2 = { 4A 3B C2 7E 08 8B C2 }

    $c1 = { E8 83 CA 04 89 55 E8 }
    $c2 = { 1F DF 70 07 22 84 82 }

condition:
    $a and (($b1 and $b2 and pe.version_info["CompanyName"] contains "Miranda") or
($c1 and $c2 and pe.version_info["InternalName"] contains "DrldwgRom"))
}
```

This blog post was authored by Davide Testa, Antonio Farina and Luca Mella of Cybaze-Yoroi Z-LAB