

# REvil Ransomware Threat Research Update and Detections | Splunk

By Splunk Threat Research Team

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On July 2, 2021, rumors of a "supply-chain ransomware" attack began circulating on Reddit and was later confirmed by Kaseya VSA, a remote monitoring management software. Kaseya shared in an [open statement](#) that this cyber attack was carried out by a ransomware criminal group called REvil, where they used [Kaseya](#) to distribute ransomware to its on-premises customers. On July 5, 2021, our team at Splunk pushed out a rapid response blog to help organizations [detect REvil Ransomware Kaseya in Splunk](#). **While Splunk was not impacted by the ransomware attack**, as a security leader we want to help the industry by providing tools, guidance and support.

Today, we're here to provide more insights and research around this ransomware organization, in hopes to help businesses around the world understand the group and their tactics.

## Introduction to REvil

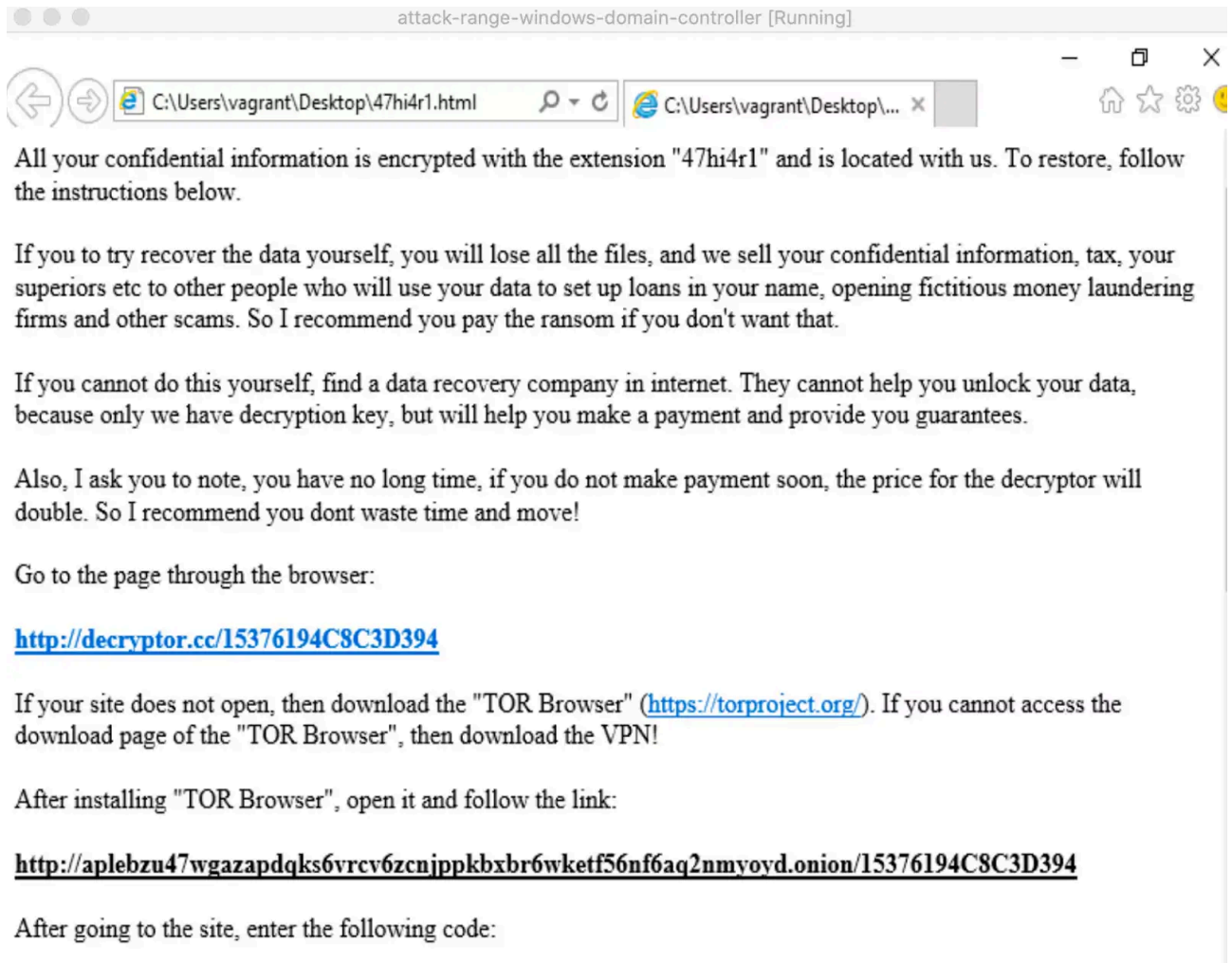
The REvil payload (Ransomware Evil or also known as Sodinokibi) is ransomware as a service criminal enterprise. REvil is said to be related to the criminal group known as [GandCrab](#). In a Ransomware as a service scheme, malicious actors partner with affiliates to extend their botnets and reap profits from new additions and attacks brought to them by affiliates. The profit is shared with affiliates which encourages them to infect more victims.

The REvil payload is associated with some of the following attack vectors:

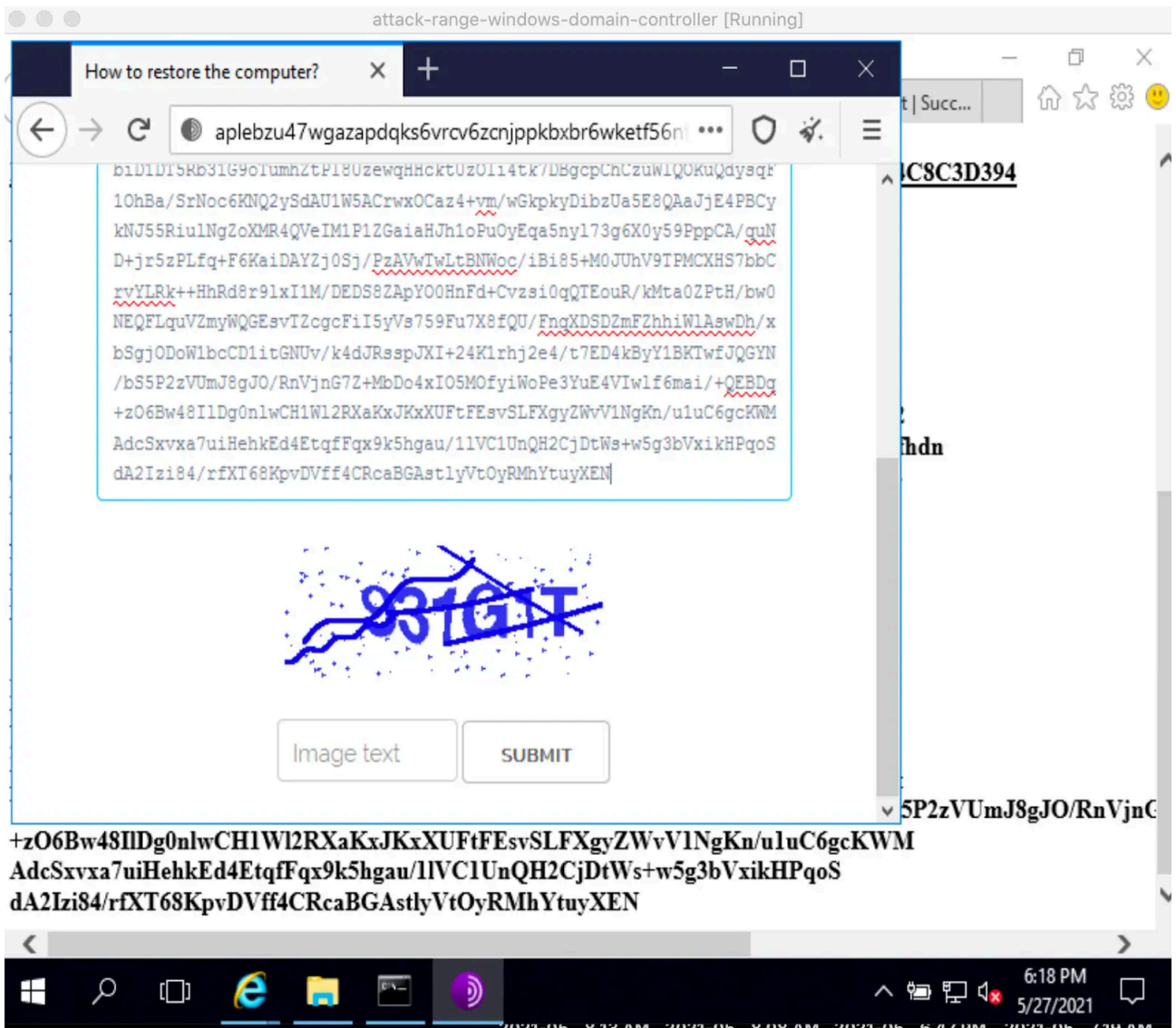
- [Elliptic curve cryptography \(ECC\)](#) for file encryption (files, shares)
- Windows Remote Desktop (RDP) [brute force entry](#).
- Double extortion threat
- Target VPN devices
- Phishing emails
- Affiliates may choose different attack vectors including specific software exploitation

## Understanding How REvil Ransomware is Executed in a Simulation

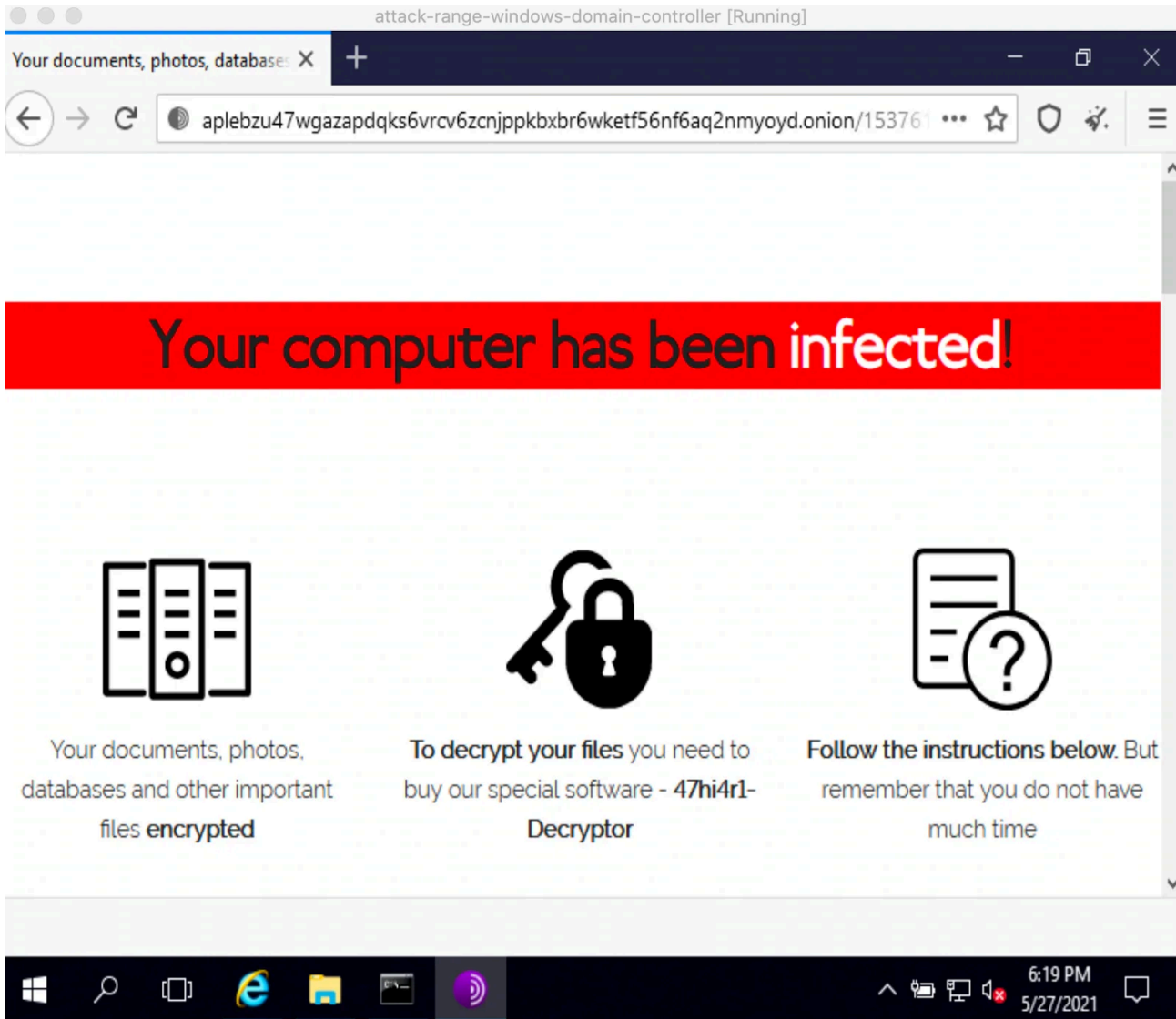
The following images show REvil ransomware execution replicated via [Splunk Attack Range](#). First, we can see the ransom note indicating the site located on the dark web where the victim needs to go for further information.



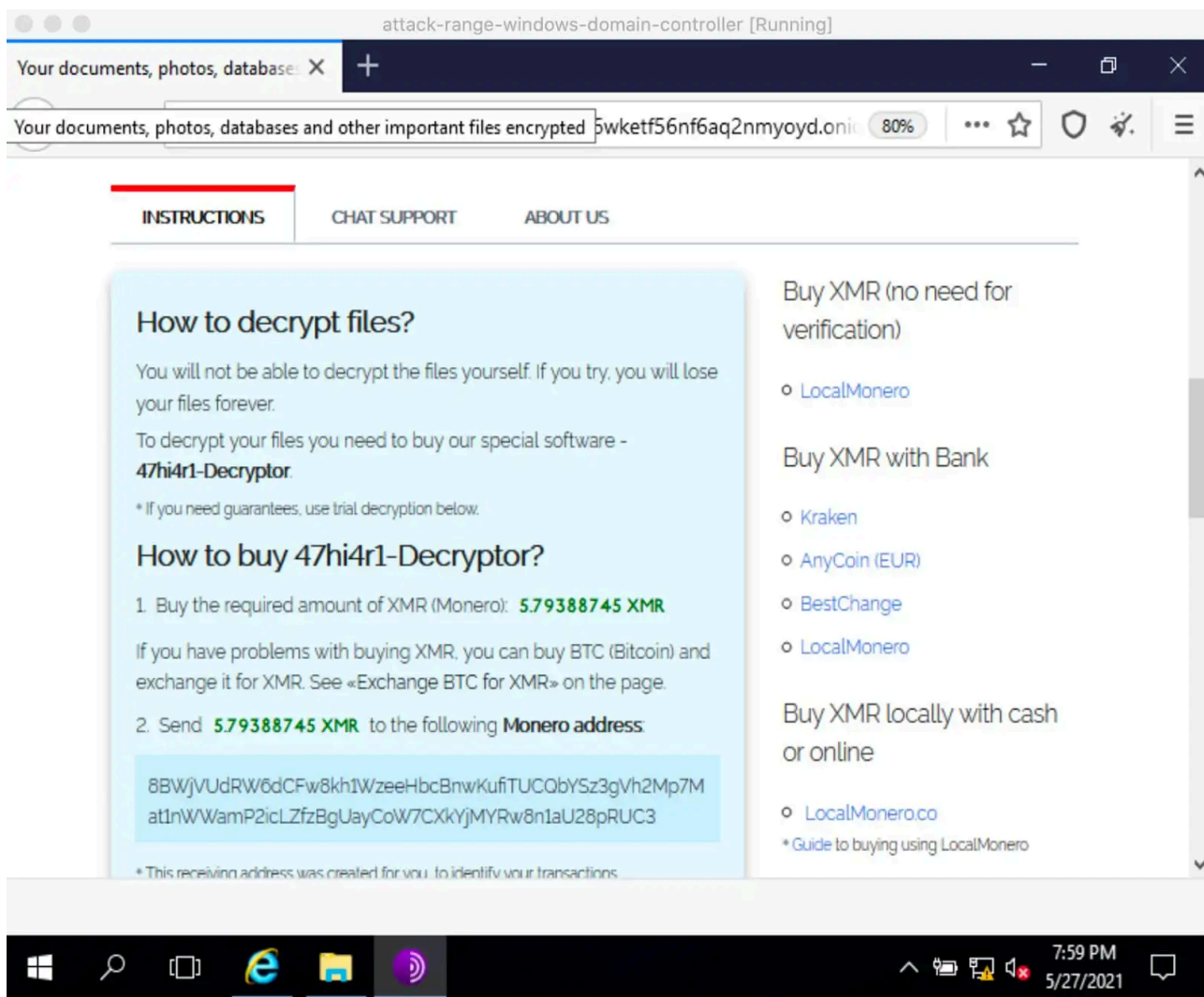
The ransomware payload does not disable the systems completely, even though the documents are indeed encrypted, the system is left with enough capacity to download the TOR browser program and install it. Once a victim browses to the named site via TOR browser, they find a form where the key found in the ransom note is meant to be entered. Notice there is a captcha in this form.



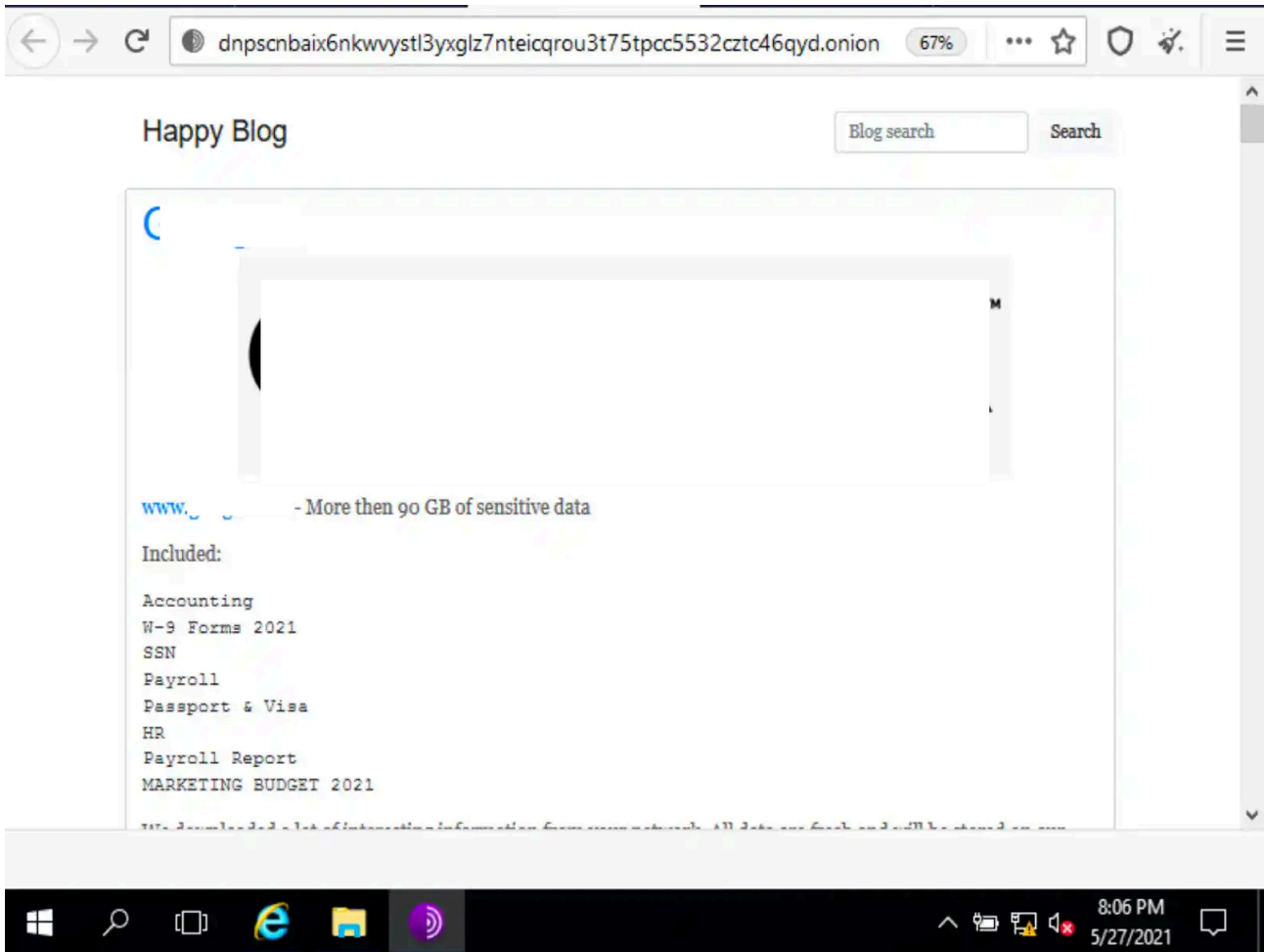
After entering the key the victim is presented with a page with instructions on the steps to follow to be able to decrypt the files.



In the following capture, the Monero (XMR) address where victims are supposed to send payment can be seen.



The next capture shows the Dark Web page where the REvil ransomware gang advertises the information they claim they obtained from victims that did not pay the ransom.



## REvil Command-line Arguments

REvil Ransomware also has several command line parameters to dictate its behavior or features it wants to execute.

```
func_callRc4Algorithm((int)&unk_97F270, 0x65, 15, 12, (int)v12); // -nolan
v13 = 0;
func_callRc4Algorithm((int)&unk_97F270, 0x662, 5, 16, (int)v8); // -nolocal
v9 = 0;
func_callRc4Algorithm((int)&unk_97F270, 0x310, 16, 10, (int)v19); // -path
v20 = 0;
func_callRc4Algorithm((int)&unk_97F270, 0x1EC, 7, 14, (int)v10); // -silent
v11 = 0;
dword_981000 = func_CheckArgv(v12) == 0;
dword_981004 = func_CheckArgv(v8) == 0;
dword_981008 = (int)func_CheckArgv(v19);
dword_98100C = func_CheckArgv(v10) == 0;
func_callRc4Algorithm((int)&unk_97F270, 2973, 9, 10, (int)v17); // -fast
v18 = 0;
dword_980FF8 = (int)func_CheckArgv(v17);
func_callRc4Algorithm((int)&unk_97F270, 68, 5, 10, (int)v15); // -full
v16 = 0;
dword_980FFC = (int)func_CheckArgv(v15);
```

## REvil Configuration JSON File

REvil uses RC4 encryption/decryption algorithm to decrypt its notable strings and its configuration file. REvil does this by parsing the 0x20 bytes RC4 key placed in one of its sections and verifying the checksum hash of the encrypted config file in its code body. This configuration file (JSON format) contains information and conditions on how it will encrypt the files in the compromised machine.

Below is the screenshot and description of the notable field in that configuration file.

```
{ "pk": "5eMVS5ZuLrnmMs3uBCBR/umVEDmri4MYuD8HHuTJDko=",  
  "pid": "$2a$10$G5Qx5Qc78Jw0jiGX6BWkxeg.Jvosjw7/MxURO3/EBbs2LXb/c0KIG",  
  "sub": "4861",  
  "dbg": false,  
  "et": 1,  
  "wipe": true,  
  "wht":  
  { "fld": ["application data", "mozilla", "program files (x86)", "windows.old", "google", "system volume information",  
    "program files", "appdata", "intel", "$windows.~ws", "perflogs", "$windows.~bt", "programdata", "msocache",  
    "$recycle.bin", "boot", "tor browser"],  
    "fls": ["ntuser.ini", "autorun.inf", "ntuser.dat.log", "iconcache.db", "boot.ini", "ntldr", "bootsect.bak", "thumbs.db",  
    "bootfont.bin", "desktop.ini", "ntuser.dat"],  
    "ext": ["sys", "ps1", "msc", "ocx", "diagpkg", "ics", "icns", "mod", "msstyles", "icl", "key", "theme", "cur", "msi", "cab",  
    "lock", "bat", "hta", "adv", "com", "ani", "spl", "rom", "lnk", "diagcab", "idx", "deskthemepack", "exe", "dll", "cmd", "386",  
    "drv", "diagcfg", "themepack", "hlp", "nomedia", "bin", "rtp", "ico", "cpl", "msu", "wpx", "scr", "nls", "prf", "mpa", "msp",  
    "shs"]},  
    "wfld": ["backup"],  
    "prc": ["xfssvccon", "ocautoupds", "mydesktopservice", "tbirdconfig", "oracle", "thebat", "visio", "onenote", "excel",  
    "thunderbird", "winword", "wordpad", "powerpnt", "dbeng50", "encsvc", "firefox", "mshelp", "isqlplussvc", "infopath",  
    "sqbcoreservice", "steam", "outlook", "ocomm", "synctime", "sql", "ocssd", "agntsvc", "dbsnmp", "mydesktopqos", "msaccess"],  
    "dmn":  
    "schlafsack-test.net;cimanchesterescorts.co.uk;dareckleyministries.com;punchbaby.com;chefdays.de;maasreusel.nl;desc  
hl.net;bargningavesta.se;samnewbyjax.com;nakupunafoundation.org;assurancesalextraspaille.fr;walter-lemm.de;vihannes  
porssi.fi;merzi.info;precisionbevel.com;artotelamsterdam.com;elpa.se;travelffeine.com;shsthepapercut.com;modelmakir  
g.nl;stoeferlehalle.de;sotsioloogia.ee;kingfamily.construction;slimidealherbal.com;12starhd.online;craigvalentinead  
ademy.com;apprendrelaudit.com;havecamerawilltravel2017.wordpress.com;ohidesign.com;body-armour.online;stupbratt.no;
```

```
"dmn": "schlafsack-test.net;cimanchesterescorts.co.uk;dareckleyministries.com;punch  
"net": false,  
"svc": ["vss", "backup", "memtas", "sophos", "mepocs", "sql", "veeam", "svc$"],  
"nbody": "QQBsAGwAIAB5AG8AdQBByACAAYwBvAG4AZgBpAGQAZQBwAHQAaQBhAGwAIABpAG4AZgBvAHIAk  
"nname": "{EXT}.html",  
"exp": false,  
"img": "QQBMAEwAIABZAE8AVQBSACAAQwBPAE4ARgBJAEQARQBOAFQASQBBAEwAIABJAE4ARgBPAFIATQB  
"arn": false}
```

### Kill Switch for REvil Ransomware

This ransomware also has a kill switch. It tries to avoid compromising a machine with a specific keyboard layout and languages like (Russian, Ukrainian, Belarusian, and many more) as shown in the screenshot below.

```
int func_CheckKeyboardLayout()
{
    int UserDefaultUILanguage; // esi
    int SystemDefaultUILanguage; // ecx
    int v2; // eax
    int KeyboardLocale[18]; // [esp+4h] [ebp-48h]

    KeyboardLocale[0] = 0x419; // Russian
    KeyboardLocale[1] = 0x422; // Ukrainian
    KeyboardLocale[2] = 0x423; // Belarusian
    KeyboardLocale[3] = 0x428; // Tajik
    KeyboardLocale[4] = 0x42B; // Armenian
    KeyboardLocale[5] = 0x42C; // Azerbaijani
    KeyboardLocale[6] = 0x437; // Georgian
    KeyboardLocale[7] = 0x43F; // Kazakh
    KeyboardLocale[8] = 0x440; // Kyrgyz Cyrillic
    KeyboardLocale[9] = 0x442; // Turkmen
    KeyboardLocale[10] = 0x443;
    KeyboardLocale[11] = 0x444; // Tatar
    KeyboardLocale[12] = 0x818;
    KeyboardLocale[13] = 0x819;
    KeyboardLocale[14] = 0x82C; // Azerbaijani Cyrillic
    KeyboardLocale[15] = 0x843; // Uzbek Cyrillic
    KeyboardLocale[16] = 0x45A; // Syriac
    KeyboardLocale[17] = 0x2801;
    UserDefaultUILanguage = GetUserDefaultUILanguage();
    SystemDefaultUILanguage = GetSystemDefaultUILanguage();
    v2 = 0;
    while ( KeyboardLocale[v2] != UserDefaultUILanguage && KeyboardLocale[v2] != SystemDefaultUILanguage )
    {
        if ( (unsigned int)v2 >= 0x12 )
            return 0;
    }
    return 1;
}
```

## Privilege Escalation

REvil Ransomware will try to run itself using “runas” command to have a privilege escalation of execution.

```
v3 = (WCHAR *)func_ParseCmdLineArgv();
func_callRc4Algorithm((int)&unk_9801B0, 2056, 12, 10, (int)v6); // runas
pExecInfo.cbSize = 60;
pExecInfo.fMask = 0;
v7 = 0;
pExecInfo.hwnd = GetForegroundWindow();
pExecInfo.lpVerb = (LPCWSTR)v6;
pExecInfo.lpFile = v2;
pExecInfo.lpParameters = v3;
pExecInfo.lpDirectory = 0;
pExecInfo.nShow = 1;
pExecInfo.hInstApp = 0;
pExecInfo.lpIDList = 0;
pExecInfo.lpClass = 0;
pExecInfo.hkeyClass = 0;
pExecInfo.dwHotKey = 0;
pExecInfo.hIcon = 0;
pExecInfo.hProcess = 0;
while ( !ShellExecuteExW(&pExecInfo) )
```

## Persistence

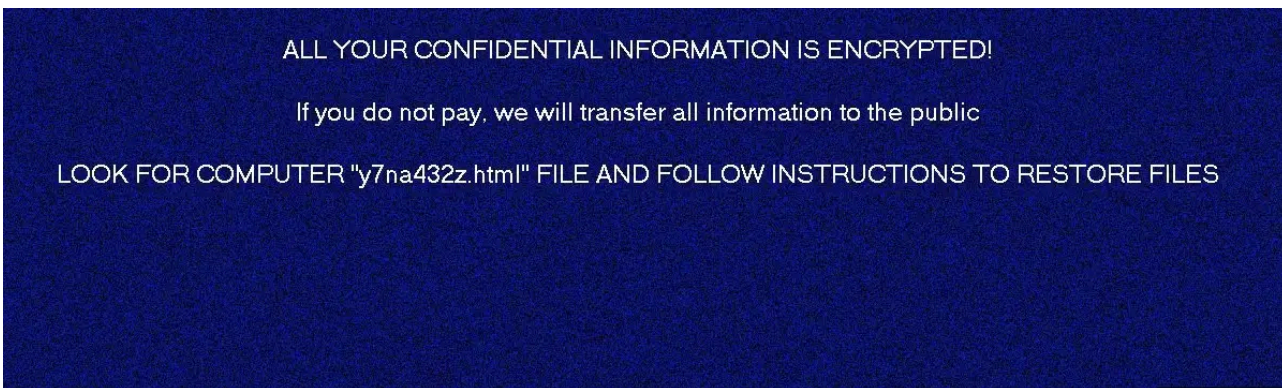
If the “arn” field in its configuration file is enabled, it will create an autorun registry on the compromised machine as a persistence mechanism.

```
void func_CreateRegRun()
{
    WCHAR *v0; // esi
    WCHAR SubKey[46]; // [esp+0h] [ebp-78h] BYREF
    WCHAR ValueName[12]; // [esp+5Ch] [ebp-1Ch] BYREF
    int v3; // [esp+74h] [ebp-4h] BYREF

    if ( dword_981010 )
    {
        v0 = func_GetModuleFilename(0, (int)&v3);
        if ( v0 )
        {
            func_callRc4Algorithm((int)&unk_97F270, 972, 7, 90, (int)SubKey); // SOFTWARE\Microsoft\Windows\CurrentVersion\Run
            SubKey[45] = 0;
            func_callRc4Algorithm((int)&unk_97F270, 1171, 14, 20, (int)ValueName); // tQZ5HNPI
            ValueName[10] = 0;
            if ( !func_RegSetValue(HKEY_LOCAL_MACHINE, SubKey, ValueName, 1u, (BYTE *)v0, 2 * v3 + 2) )
                func_RegSetValue(HKEY_CURRENT_USER, SubKey, ValueName, 1u, (BYTE *)v0, 2 * v3 + 2);
            func_Releaseheap(v0);
        }
    }
}
```

## Defacement

Aside from the ransomware notes, it will generate in several folders in the compromised machine, it will also create a bitmap containing a note that the machine is also infected.



## COM Object

The Splunk Threat Research team also found some function in REvil ransomware where it uses com object IWbemClassObject “4590f811-1d3a-11d0-891f-00aa004b2e24” and “49BD2028-1523-11D1-AD79-00C04FD8FDFF” to execute root/cimv2 namespace or privilege escalation.

```

if ( CoInitialize(0) < 0 )
    return 1;
if ( ConInitializeSecurity(0, -1, 0, 0, 0, 3, 0, 0, 0) < 0 )
{
    byte_97FFE0(0);
    return 1;
}
ppv = 0;
if ( CoCreateInstance(&rclsid, 0, 1u, &riid, &ppv) >= 0 )// 4590f811-1d3a-11d0-891f-00aa004b2e24
    // IwbemClassObject
{
    v21 = 0;
    func_callRc4Algorithm((int)&unk_97F270, 1089, 14, 20, (int)psz);// ROOT/CIMV2
    psz[10] = 0;
    v4 = SysAllocString(psz);
    v5 = (*(int (__stdcall **))(LPVOID, OLECHAR *, _DWORD, _DWORD, _DWORD, _DWORD, _DWORD, _DWORD, int *, int))(*(_DWORD *
        ppv,
        v4,
        0,
        0,
        0,
        0,
        0,
        0,
        &v21,
        a1);
    SysFreeString(v4);
    if ( v5 >= 0 )
    {
        v18 = 0;
        // asynchronous call with IUnsecuredApartment
        CoCreateInstance(&stru_97C118, 0, CLSCTX_LOCAL_SERVER, &stru_97C0E8, &v18);// 498D2028-1523-11D1-AD79-00C04FD8FDFD-
        off_97F054[1]((int)&off_97F054, a2, 0);
    }
}

```

### Other Registry Entry

REvil is known to have a randomly generated file extension (5-10 characters) that will be used for its ransomware notes filename and for the files it encrypts. This randomly generated string will also save in a unique registry key. In this case, the randomly generated file extension is “.teu459110”

|  |          |  |
|--|----------|--|
| HKEY_LOCAL_MACHINE\SOFTWARE\Facebook_Assistant |          |  |
| HKEY_LOCAL_MACHINE\SOFTWARE\Facebook_Assistant | z4x      | hexce5,e3,15,4b,96,6e,2e,b9,e6,32,cd,ee,04,20,51,fe,e9,95,10,39,ab,8b,83,18,b8,3f,07,1e,e4,c9,0e,4a,                         |
| HKEY_LOCAL_MACHINE\SOFTWARE\Facebook_Assistant | Lywu     | hexc86,d5,68,e0,3a,d7,e2,66,21,d0,c7,06,58,59,ce,e7,12,60,13,79,82,e9,31,a4,a7,7e,21,59,6e,49,d0,42,                         |
| HKEY_LOCAL_MACHINE\SOFTWARE\Facebook_Assistant | xNyfl    | hexcb5,6b,f1,89,ed,3f,7b,5d,45,e7,e8,ef,cd,b5,c1,a5,b6,41,d9,83,ae,60,29,5b,5b,0c,66,04,f4,ba,bd,a0,d6,a1,8e,77,6b,c9,06,3,  |
| HKEY_LOCAL_MACHINE\SOFTWARE\Facebook_Assistant | WqDdDd   | hexcd8,e0,a1,18,01,2a,6b,0e,b5,9b,65,a4,ef,dc,d1,82,14,85,1f,7c,5b,0f,54,a4,47,bf,19,64,82,e4,24,83,b2,cf,45,58,9c,b2,7c,70, |
| HKEY_LOCAL_MACHINE\SOFTWARE\Facebook_Assistant | ghyYa4L  | ".teu459110"   |
| HKEY_LOCAL_MACHINE\SOFTWARE\Facebook_Assistant | AVPVIDwq | hexc68,a3,09,b8,68,7c,15,09,e1,fc,1e,76,91,e4,78,7f,88,46,d4,1b,84,0b,b8,e7,d4,19,11,a1,af,0f,f7,c7,50,aa,fa,28,33,0b,b1,7d, |

### Machine Info

REvil ransomware will also gather some information about the compromised machine like the computer name, user name, language used by the machine, product name, operating system, network group, OS version, and file extension it generates for the encrypted files. Below is the example of the information in json format.

```

{"ver":514,
"pid":"$2a$10$G5Qx50c78Jw0jiGX6Bwkxeg.Jvosjw7/MxUR03/EBbs2LXb/c0KIG",
"sub":"4861","pk":"5eMVS5ZuLrnmMs3uBCBR/umVEDmri4MYuD8HHuTJDKo=",
"uid":"71E611A26639E375",
"sk":"Ao6rw2tEY+7FQdCTzok0s6HU9KUDtWL3yozxyh0cxMMJjCk7KxH5a1/IeLIIIMtS2bJAuRJS57PMLfILX/SoMjSThRfSc0T9M1PKpPnCepHMHG19RrC",
"unm":"administrator",
"net":"WIN-DC-410",
"grp":"attackrange.local",
"lng":"en-US",
"bro":false,
"os":"Windows Server 2016 Datacenter",
"bit":64,
"dsk":"QwADAAAAAPDffwcAAAAAgMR0AQAAAA==",
"ext":"52e8n"}

```

### Defense Evasion

It will also execute a base 64 encoded PowerShell script command that will delete the shadow copy of the compromised machine.

Base 64 encoded:

```
powershell -e Rwb1AHQALQBxAG0AaQBPAgIAagBLAGMAAdAAgAFcAaQBuADMAMgBfAFMAaABhAGQAbwB3AGMABwBwAHkAIAB8ACAARgBvAHIAI
```

Base 64 decoded:

```
Get-WmiObject Win32_Shadowcopy | ForEach-Object {$_.Delete();}
```

## Detect REvil Ransomware with Splunk

### REvil Registry Entry (New)

```
| tstats `security_content_summariesonly` count values(Registry.registry_key_name)
```

```
as registry_key_name values(Registry.registry_path) as registry_path min(_time)
```

```
as firstTime max(_time) as lastTime FROM datamodel=Endpoint.Registry where  
(Registry.registry_path="*\\SOFTWARE\\WOW6432Node\\Facebook_Assistant\\*" OR Registry.registry_path="*\\SOFTWARE
```

```
AND (Registry.registry_value_name = "\\.*" OR Registry.registry_value_name = "Binary
```

```
Data") by Registry.registry_value_name Registry.dest Registry.user
```

```
| `security_content_ctime(lastTime)`
```

```
| `security_content_ctime(firstTime)`
```

```
| `drop_dm_object_name(Registry)`
```

```

| tstats `security_content_summariesonly` count values(Registry.registry_key_name)
as registry_key_name values(Registry.registry_path) as registry_path min(_time)
as firstTime max(_time) as lastTime FROM datamodel=Endpoint.Registry where Registry.registry_path="*\SOFTWARE\WOW6432Node\Facebook_Assistant\*"
AND (Registry.registry_value_name = "\.*" OR Registry.registry_value_name = "Binary Data")
by Registry.dest Registry.user Registry.registry_value_name
| `security_content_ctime(lastTime)`
| `security_content_ctime(firstTime)`
| `drop_dm_object_name(Registry)`
    
```

✓ 6 events (01/06/2021 12:00:00.000 to 02/06/2021 12:40:10.000) No Event Sampling

Events Patterns **Statistics (2)** Visualization

20 Per Page Format Preview

| dest                         | user    | registry_value_name | count | registry_key_name                          | registry_path   |
|------------------------------|---------|---------------------|-------|--|---|
| win-dc-410.attackrange.local | unknown | .589b1k31d          | 1     | ghyYa4L                                    | HKLM\SOFTWARE\WOW6432Node\Facebook_Assistant\ghyYa4L  |
| win-dc-410.attackrange.local | unknown | Binary Data         | 5     | AVPvtDwg<br>Lywu<br>WqDdDd<br>xNyfI<br>z4x | HKLM\SOFTWARE\WOW6432Node\Facebook_Assistant\AVPvtDwg<br>HKLM\SOFTWARE\WOW6432Node\Facebook_Assistant\Lywu<br>HKLM\SOFTWARE\WOW6432Node\Facebook_Assistant\WqDdDd<br>HKLM\SOFTWARE\WOW6432Node\Facebook_Assistant\xNyfI<br>HKLM\SOFTWARE\WOW6432Node\Facebook_Assistant\z4x |

### REvil Common Exec Parameter (New)

| tstats count min(\_time) as firstTime max(\_time) as lastTime from datamodel=Endpoint.Processes

where Processes.process = "\*-nolan\*" OR Processes.process = "\*-nolocal\*" OR Processes.process = "\*-fast\*" OR Processes.process = "\*-full\*"

by Processes.process\_name Processes.process Processes.parent\_process\_name Processes.parent\_process Processes.dest Processes.user Processes.process\_id Processes.process\_guid

```

| tstats `security_content_summariesonly` count min(_time) as firstTime max(_time) as lastTime from datamodel=Endpoint.Processes
where Processes.process = "*-nolan*" OR Processes.process = "*-nolocal*" OR Processes.process = "*-fast*" OR Processes.process = "*-full*"
by Processes.process_name Processes.process Processes.parent_process_name Processes.parent_process Processes.dest Processes.user Processes.process_id Processes.process_guid
| `drop_dm_object_name(Processes)`
| `security_content_ctime(firstTime)`
| `security_content_ctime(lastTime)`
    
```

✓ 4 events (01/06/2021 13:00:00.000 to 02/06/2021 13:15:34.000) No Event Sampling

Events Patterns **Statistics (2)** Visualization

20 Per Page Format Preview

| process_name | process                                      | parent_process_name | parent_process                       | dest                         | user          | process_id   |
|--------------|--|---------------------|--------------------------------------|------------------------------|---------------|--------------|
| revil.exe    | revil.exe -nolocal -nolan -path C:\Temp\test | cmd.exe             | "cmd.exe" /s /k pushd "C:\Temp\test" | win-dc-410.attackrange.local | Administrator | 3928 {5F000} |
| revil.exe    | revil.exe -nolocal -nolan -path C:\Temp\test | cmd.exe             | "cmd.exe" /s /k pushd "C:\Temp\test" | win-dc-410.attackrange.local | Administrator | 4084 {5F000} |

### Modification Of Wallpaper (New)

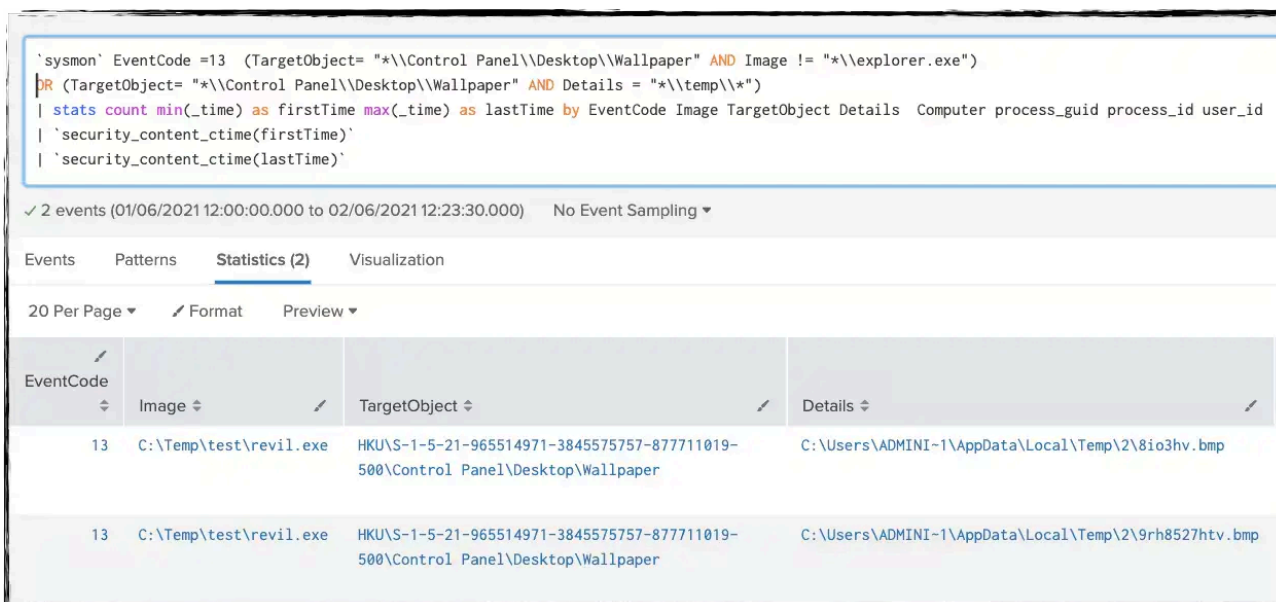
sourcetype=XmlWinEventLog:Microsoft-Windows-Sysmon/Operational OR

source=XmlWinEventLog:Microsoft-Windows-Sysmon/Operational

```
EventCode =13 (TargetObject= "*\\Control Panel\\Desktop\\Wallpaper" AND Image != "*\\explorer.exe")
```

```
OR (TargetObject= "*\\Control Panel\\Desktop\\Wallpaper" AND Details = "*\\temp\\*")
```

```
| stats count min(_time) as firstTime max(_time) as lastTime by EventCode Image TargetObject Details Computer
```



### Wbemprox COM Object Execution (New)

```
sourcetype=XmlWinEventLog:Microsoft-Windows-Sysmon/Operational OR
```

```
source=XmlWinEventLog:Microsoft-Windows-Sysmon/Operational
```

```
EventCode=7 ImageLoaded IN ("*\\fastprox.dll", "*\\wbemprox.dll", "*\\wbemcomn.dll")
```

```
NOT (process_name IN ("wmiprvse.exe", "WmiApSrv.exe", "unsecapp.exe")) NOT(Image IN("*\\windows\\*", "*\\prog
```

```
| stats count min(_time) as firstTime max(_time) as lastTime by Image ImageLoaded process_name Computer Event
```

```
'sysmon' EventCode=7 ImageLoaded IN ("*\fastprox.dll", " *\wbemprox.dll", " *\wbemcomn.dll")
NOT (process_name IN ("wmiprvse.exe", "WmiApSrv.exe", "unsecapp.exe")) NOT(Image IN("*\windows\*", " *\program files*", " *\wbem\*))
| stats count min(_time) as firstTime max(_time) as lastTime by Image ImageLoaded process_name Computer EventCode Signed ProcessId Hashes IMPHASH
| `security_content_ctime(firstTime)`
| `security_content_ctime(lastTime)`
```

✓ 3 events (03/06/2021 08:00:00.000 to 04/06/2021 08:18:36.000) No Event Sampling

Events Patterns **Statistics (3)** Visualization

20 Per Page Format Preview

| Image             | ImageLoaded                           | process_name | Computer                     | EventCode | Signed | ProcessId | Hashes       |
|-------------------|---------------------------------------|--------------|------------------------------|-----------|--------|-----------|--------------|
| C:\Temp\revil.exe | C:\Windows\SysWOW64\wbem\fastprox.dll | revil.exe    | win-dc-819.attackrange.local | 7         | true   | 5996      | MD5=FBA861EF |
| C:\Temp\revil.exe | C:\Windows\SysWOW64\wbem\wbemprox.dll | revil.exe    | win-dc-819.attackrange.local | 7         | true   | 5996      | MD5=F14B95C2 |
| C:\Temp\revil.exe | C:\Windows\SysWOW64\wbemcomn.dll      | revil.exe    | win-dc-819.attackrange.local | 7         | true   | 5996      | MD5=9B037683 |

### Known Services Killed by Ransomware (New)

```
Sourcetype=WinEventLog:System EventCode=7036 Message IN
(" *VSS*", " *backup*", " *sophos*", " *sql*", " *mentas*", " *mepocs*", " *veeam*", " *svc$*")
```

```
Message=" *service entered the stopped state"
```

```
| stats count min(_time) as firstTime max(_time) as lastTime by EventCode Message dest Type
```

```
'wineventlog_system' EventCode=7036 Message IN (" *VSS*", " *backup*", " *sophos*", " *sql*", " *mentas*", " *mepocs*", " *veeam*", " *svc$*") Message=" *service entered the stopped state"
| stats count min(_time) as firstTime max(_time) as lastTime by EventCode Message dest Type
| `security_content_ctime(lastTime)`
| `security_content_ctime(firstTime)`
```

✓ 1 event (03/06/2021 11:00:00.000 to 04/06/2021 11:53:18.000) No Event Sampling

Events Patterns **Statistics (1)** Visualization

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| EventCode | Message                                    | dest                         |
|-----------|--|------------------------------|
| 7036      | The VSS service entered the stopped state. | win-dc-392.attackrange.local |

### Allow network Discovery In [Firewall](#) (New)

```
| tstats `security_content_summariesonly` count min(_time) as firstTime max(_time)
```

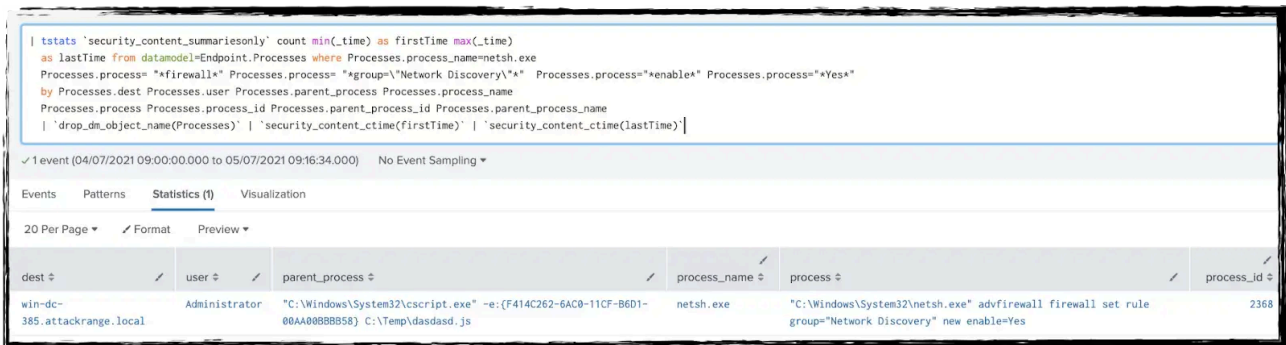
```
as lastTime from datamodel=Endpoint.Processes where Processes.process_name=netsh.exe
```

```
Processes.process= " *firewall*" Processes.process= " *group=\"Network Discovery\"*" Processes.process=" *enab
```

by Processes.dest Processes.user Processes.parent\_process Processes.process\_name

Processes.process Processes.process\_id Processes.parent\_process\_id Processes.parent\_process\_name

| `drop\_dm\_object\_name(Processes)` | `security\_content\_ctime(firstTime)` | `security\_content\_ctime(lastTime)`



## Disable Windows Behavior Monitoring (Updated)

| tstats `security\_content\_summariesonly` count min(\_time) as firstTime max(\_time)

as lastTime from datamodel=Endpoint.Registry where

Registry.registry\_path= "\*\\SOFTWARE\\Policies\\Microsoft\\Windows Defender\\Real-Time Protection\\DisableBeh

Registry.registry\_path= "\*\\SOFTWARE\\Policies\\Microsoft\\Windows Defender\\Real-Time Protection\\DisableOnl

Registry.registry\_path= "\*\\SOFTWARE\\Policies\\Microsoft\\Windows Defender\\Real-Time Protection\\DisableSc

Registry.registry\_path= "\*\\SOFTWARE\\Microsoft\\Windows Defender\\Real-Time Protection\\DisableRealtimeMonit

Registry.registry\_path= "\*\\Real-Time Protection\\DisableIntrusionPreventionSystem" OR

Registry.registry\_path= "\*\\Real-Time Protection\\DisableIOAVProtection" OR

Registry.registry\_path= "\*\\Real-Time Protection\\DisableScriptScanning"

Registry.registry\_value\_name = "DWORD (0x00000001)"

by Registry.registry\_path Registry.registry\_key\_name Registry.registry\_value\_name

Registry.dest

| `drop\_dm\_object\_name(Registry)`

| `security\_content\_ctime(firstTime)`

| `security\_content\_ctime(lastTime)`

```

| tstats `security_content_summariesonly` count min(_time) as firstTime max(_time)
as lastTime from datamodel=Endpoint.Registry where
Registry.registry_path= "*\\SOFTWARE\\Policies\\Microsoft\\Windows Defender\\Real-Time Protection\\DisableBehaviorMonitoring" OR
Registry.registry_path= "*\\SOFTWARE\\Policies\\Microsoft\\Windows Defender\\Real-Time Protection\\DisableOnAccessProtection" OR
Registry.registry_path= "*\\SOFTWARE\\Policies\\Microsoft\\Windows Defender\\Real-Time Protection\\DisableScanOnRealtimeEnable" OR
Registry.registry_path= "*\\SOFTWARE\\Microsoft\\Windows Defender\\Real-Time Protection\\DisableRealtimeMonitoring" OR
Registry.registry_path= "*\\Real-Time Protection\\DisableIntrusionPreventionSystem" OR
Registry.registry_path= "*\\Real-Time Protection\\DisableIOAVProtection" OR
Registry.registry_path= "*\\Real-Time Protection\\DisableScriptScanning"
Registry.registry_value_name = "DWORD (0x00000001)"
by Registry.registry_path Registry.registry_key_name Registry.registry_value_name
Registry.dest | `drop_dm_object_name(Registry)`

```

16 of 54,367 events matched No Event Sampling ▾

Events Patterns **Statistics (5)** Visualization

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| registry_path   | registry_key_name                | registry_value_name |
|---|----------------------------------|---------------------|
| HKLM\SOFTWARE\Policies\Microsoft\Windows Defender\Real-Time Protection\DisableBehaviorMonitoring        | DisableBehaviorMonitoring        | DWORD (0x00000001)  |
| HKLM\SOFTWARE\Policies\Microsoft\Windows Defender\Real-Time Protection\DisableIOAVProtection            | DisableIOAVProtection            | DWORD (0x00000001)  |
| HKLM\SOFTWARE\Policies\Microsoft\Windows Defender\Real-Time Protection\DisableIntrusionPreventionSystem | DisableIntrusionPreventionSystem | DWORD (0x00000001)  |
| HKLM\SOFTWARE\Policies\Microsoft\Windows Defender\Real-Time Protection\DisableOnAccessProtection        | DisableOnAccessProtection        | DWORD (0x00000001)  |
| HKLM\SOFTWARE\Policies\Microsoft\Windows Defender\Real-Time Protection\DisableScanOnRealtimeEnable      | DisableScanOnRealtimeEnable      | DWORD (0x00000001)  |

| tstats `security\_content\_summariesonly` count min(\_time) as firstTime max(\_time)

as lastTime from datamodel=Endpoint.Processes where Processes.process\_name IN ("powershell.exe", "pwsh.exe",

Processes.process="\*set-mpreference\*" AND

Processes.process IN ("\*disablerealtimemonitoring\*", "\*disableioavprotection\*", "\*disableintrusionpreventionsys

by Processes.dest Processes.user Processes.parent\_process Processes.process\_name Processes.process Processes

| `drop\_dm\_object\_name(Processes)`

```
| `security_content_ctime(firstTime)`
```

```
| `security_content_ctime(lastTime)`
```

```

| tstats `security_content_summariesonly` count min(_time) as firstTime max(_time)
as lastTime from datamodel=Endpoint.Processes where Processes.process_name IN ("powershell.exe", "pwsh.exe", "sqlps.exe", "sqltoolsps.exe")
Processes.process="set-mppreferences" AND
Processes.process IN ("*disablerealtime monitoring*", "*disableioavprotection*", "*disableintrusionpreventionsystem*", "*disablescriptscanning*", "*disablelockatfirstseen*")
by Processes.dest Processes.user Processes.parent_process Processes.process_name Processes.process Processes.process_id Processes.parent_process_id
| `drop_dm_object_name(Processes)`
| `security_content_ctime(firstTime)`
| `security_content_ctime(lastTime)`
    
```

| dest                         | user          | parent_process  | process_name   | process   |
|------------------------------|---------------|---|----------------|---|
| win-dc-201.attackrange.local | Administrator | powershell  | powershell.exe | "C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe" Set-MpPreference -DisableRealtimeMonitoring True -DisableIntrusionPreventionSystem True -DisableIOAVProtection True -DisableScriptScanning True |
| win-dc-201.attackrange.local | administrator | C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe | powershell.exe | "C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe" Set-MpPreference -DisableRealtimeMonitoring True -DisableIntrusionPreventionSystem True -DisableIOAVProtection True -DisableScriptScanning True |

### Msmpeng Application DLL Side (New)

```
| tstats `security_content_summariesonly` values(Filesystem.file_path) as
```

```
file_path count min(_time) as firstTime max(_time) as lastTime from datamodel=Endpoint.Filesystem
```

```
where (Filesystem.file_name = "msmpeng.exe" OR Filesystem.file_name = "mpsvc.dll") AND Filesystem.file_path
```

```
by Filesystem.file_create_time Filesystem.process_id Filesystem.file_name Filesystem.user
```

```
| `drop_dm_object_name(Processes)`
```

```
| `security_content_ctime(firstTime)`
```

```
| `security_content_ctime(lastTime)`
```

```
|tstats `security_content_summariesonly` values(Filesystem.file_path) as  
file_path count min(_time) as firstTime max(_time) as lastTime from datamodel=Endpoint.Filesystem  
where (Filesystem.file_name = "msmpeng.exe" OR Filesystem.file_name = "mpsvc.dll") AND Filesystem.file_path != "*\\Program Files\\windows defender\\*"  
by Filesystem.file_create_time Filesystem.process_id Filesystem.file_name Filesystem.user  
| `drop_dm_object_name(Proceses)`  
| `security_content_ctime(firstTime)`  
| `security_content_ctime(lastTime)`
```

✓ 6 events (04/07/2021 14:00:00.000 to 05/07/2021 14:12:01.000) No Event Sampling ▼

Events Patterns **Statistics (4)** Visualization

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| Filesystem.file_create_time ↕ | Filesystem.process_id ↕ | Filesystem.file_name ↕ | Filesystem.user ↕ | file_path ↕            |
|-------------------------------|-------------------------|------------------------|-------------------|------------------------|
| 2021-07-05 14:02:06.004       | 5136                    | msmpeng.exe            | unknown           | C:\Windows\msmpeng.exe |
| 2021-07-05 14:02:06.004       | 7156                    | msmpeng.exe            | unknown           | C:\Windows\msmpeng.exe |
| 2021-07-05 14:02:06.020       | 5136                    | mpsvc.dll              | unknown           | C:\Windows\mpsvc.dll   |
| 2021-07-05 14:02:06.020       | 7156                    | mpsvc.dll              | unknown           | C:\Windows\mpsvc.dll   |

## Hashes

REvil Ransomware:

SHA256: [33026ba868a6159223b486b57caebe40926208bb80b89749318e51dcd5b8b883](#)

## Mitigation

For mitigation of this and similar ransomware threats please use CISA guidance for reference:

<https://www.cisa.gov/ransomware>

**We hope that this information is helpful. Our team is standing by to help if you need it.**

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Source: [https://www.splunk.com/en\\_us/blog/security/revil-ransomware-threat-research-update-and-detections.html](https://www.splunk.com/en_us/blog/security/revil-ransomware-threat-research-update-and-detections.html)