Spear Phishing Campaign Delivers Buer & Bazar

Be attentive while opening any email. The Zscaler research team became aware of a prevalent phishing campaign targeting employees of various organizations.

Zscaler ThreatLabZ became aware of a prevalent phishing campaign targeting employees of various organizations. During the past couple of weeks, many enterprise users have been getting spear phishing emails indicating that their employment with the company has been terminated.

These emails contain a Google document link that leads to the Bazar backdoor (from the TrickBot gang). What's interesting is that this campaign also used the Buer loader, which is the first time we have seen these two malware strains used together.

Use of the Buer loader by the TrickBot gang comes as no surprise as this group is known to work with different malware groups. In the past, the TrickBot gang has also worked with other botnets, such as Emotet.

Campaign

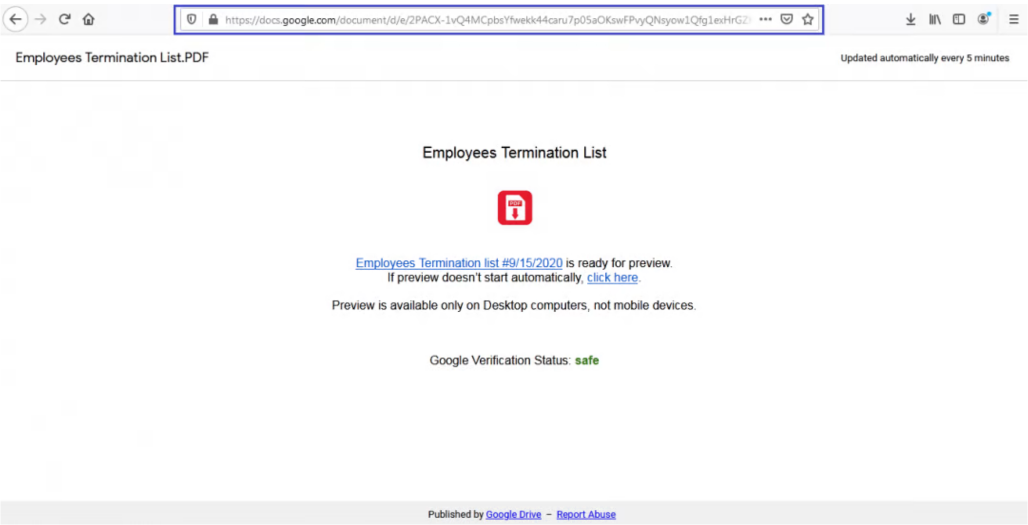
In this email campaign, instead of relying on attachments, the attackers included links to what appeared to be a legitimate Google Docs document, which itself contained links to malicious files hosted on Google Drive or, in some cases, hosted elsewhere. In some previous phishing email campaigns, attackers leveraged SendGrid to distribute the initial emails to hide the Google Drive links in the documents behind a SendGrid URL as a way to bypass traditional defences.

Samples of emails that we have seen are shown in Figure 1 and Figure 2.

Figure 1: One of the spear phishing email templates targeting an employee.

Figure 2: Another spear phishing email template

The link in both emails is a Google Docs link claiming to host a PDF file with a list of employees that have been terminated, as shown in Figure 3.



https://docs.google.com/document/d/e/2PACX-1vQ4MCpbsYfwekk44caru7p05aOKswFPvyQNsyow1Qfg1exHrGZ

Employees Termination List.PDF

Updated automatically every 5 minutes

Employees Termination List

Employees Termination list #9/15/2020 is ready for preview.
If preview doesn't start automatically, click here.

Preview is available only on Desktop computers, not mobile devices.

Google Verification Status: safe

Published by Google Drive – Report Abuse

Figure 3: The link to the fake Google Doc containing the download link.

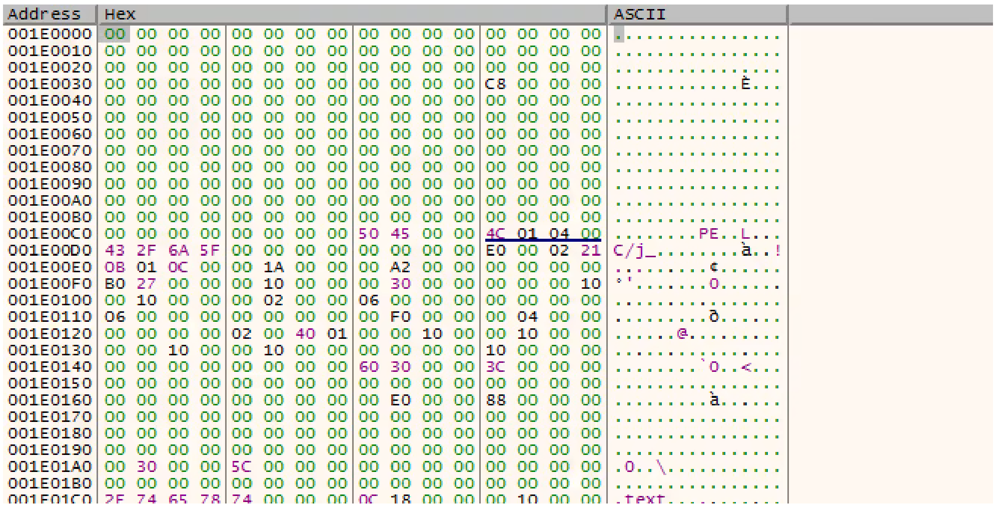
The link in the Google Doc redirects to the URL unitedyfl[.]com/print_preview.exe to download the malware payload.

Although, the use of target names with actuating themes is not new to this group, there has been a significant uptick in the number of emails received and this campaign has been persistently active for the past few weeks.

Packer

In most cases, the payload that is downloaded is the Bazar malware but, in some cases, it is the Buer loader. The packer used in both malware payloads is identical. Most notably, the packed binaries are exe files with a randomly named export function. The export function is responsible for payload decryption and injection.

First, a shellcode is decrypted, which further decrypts a headerless PE loader that has the final payload in its overlay. The headersless loader allocates memory, maps the payload into memory with proper permissions, and finally transfers control to it. In this campaign, no process self-injection is used to load the payload.



```
Address  Hex                                              ASCII
001E0000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0010 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0020 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0030 00 00 00 00 00 00 00 00 00 00 00 00 C8 00 00 00 ............È...
001E0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E00A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E00B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E00C0 00 00 00 00 00 00 00 00 50 45 00 00 4C 01 04 00 ........PE..L...
001E00D0 43 2F 6A 5F 00 00 00 00 00 00 00 00 E0 00 02 21 C/j_........à..!
001E00E0 0B 01 0C 00 00 1A 00 00 00 A2 00 00 00 00 00 00 .........¢......
001E00F0 B0 27 00 00 00 10 00 00 00 30 00 00 00 00 00 10 °'.......0......
001E0100 00 10 00 00 00 02 00 00 06 00 00 00 00 00 00 00 ................
001E0110 06 00 00 00 00 00 00 00 00 F0 00 00 00 04 00 00 .........ð......
001E0120 00 00 00 00 02 00 40 01 00 00 10 00 00 10 00 00 ......@.........
001E0130 00 00 10 00 00 10 00 00 00 00 00 00 10 00 00 00 ................
001E0140 00 00 00 00 00 00 00 00 60 30 00 00 3C 00 00 00 ........`0..<...
001E0150 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0160 00 00 00 00 00 00 00 00 00 E0 00 00 88 00 00 00 .........à......
001E0170 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0180 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E0190 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E01A0 00 30 00 00 5C 00 00 00 00 00 00 00 00 00 00 00 .0..\...........
001E01B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
001E01C0 2E 74 65 78 74 00 00 00 0C 18 00 00 00 10 00 00 .text...........
```

Figure 4: The decrypted header less PE loader.

Figure 5: The payload embedded at the end of the loader.

Bazar loader and Bazar backdoor

The Bazar backdoor is a new stealthy malware, part of the TrickBot group's toolkit arsenal and leveraged for high-value targets. The Bazar loader is used to download and execute the Bazar backdoor on the target system. The goal of this backdoor is to execute binaries, scripts, modules, kill processes, and then remove itself from the compromised machine. The samples used in this campaign heavily rely on control flow obfuscation. The detailed analysis report about this backdoor can be found here.

The Bazar loader downloads the Bazar backdoor from the C&C using the following URI format:
{C&C}/api/v\d{3}

The downloaded payload is XOR-encrypted and can be decrypted using the script provided in the appendix.

The downloaded malware was successfully captured by the Zscaler Cloud Sandbox:*Figure 6: The Zscaler Cloud Sandbox report*.

The C&C TLS communications of the Bazar backdoor have been using certificates created in the same manner that TrickBot certificates have been created. The C&C server TLS certificate is shown in Figure 7.

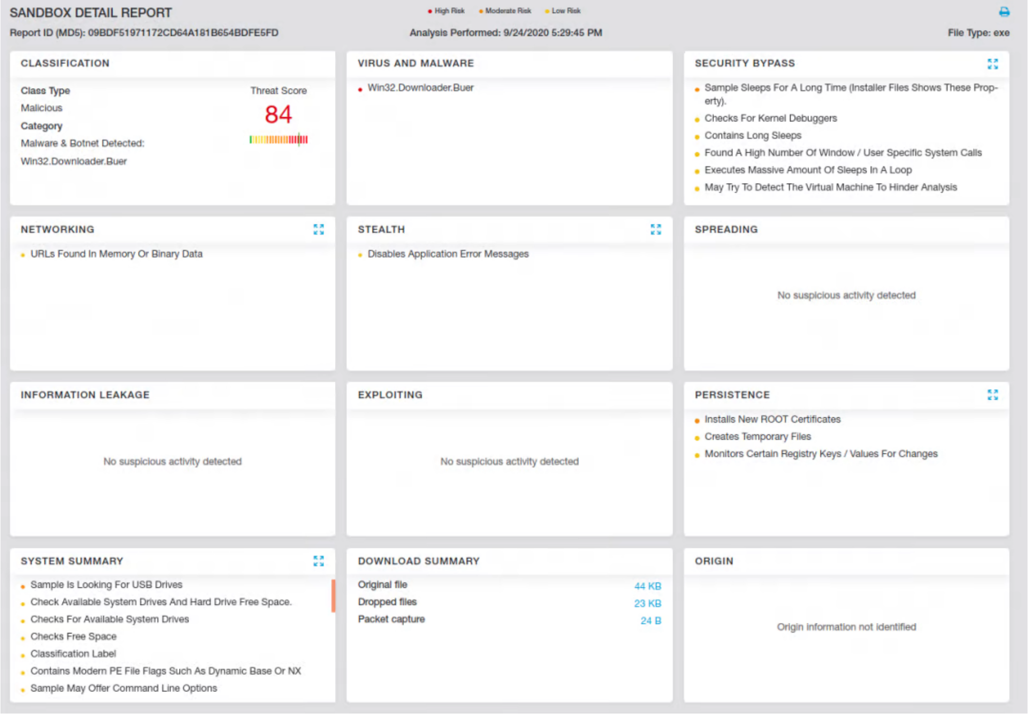
Figure 7: The Bazar/TrickBot TLS certificate.

Researchers also observed that the backdoor downloads and executes the Cobalt Strike pentesting and post-exploitation toolkit on the victim's machine within some period of time after the infection. By deploying Cobalt Strike, it is clear that this stealthy backdoor is being used to gain a foothold in corporate networks so that ransomware can be deployed, data can be stolen, or network access could be sold to other threat actors.

Buer loader

The Buer loader was first discovered around the end of 2019. It is a very capable malware written in C and primarily sold on Russian underground forums for around US$400. Notably, this malware does not function in the CIS. It has most of the important strings encrypted and APIs are loaded by hash, just like most of the sophisticated malware these days. We are not going to go into technical details because detailed analysis of this has already published.

The Buer loader was captured by the Zscaler Cloud Sandbox.



SANDBOX DETAIL REPORT

● High Risk ● Moderate Risk ● Low Risk

Report ID (MD5): 09BDF51971172CD64A181B654BDFE5FD

Analysis Performed: 9/24/2020 5:29:45 PM

File Type: exe

CLASSIFICATION

Class Type
Malicious
Category
Malware & Botnet Detected:
Win32.Downloader.Buer

Threat Score
84

VIRUS AND MALWARE

- Win32.Downloader.Buer

SECURITY BYPASS

- Sample Sleeps For A Long Time (Installer Files Shows These Property).
- Checks For Kernel Debuggers
- Contains Long Sleeps
- Found A High Number Of Window / User Specific System Calls
- Executes Massive Amount Of Sleeps In A Loop
- May Try To Detect The Virtual Machine To Hinder Analysis

NETWORKING

- URLs Found In Memory Or Binary Data

STEALTH

- Disables Application Error Messages

SPREADING

No suspicious activity detected

INFORMATION LEAKAGE

No suspicious activity detected

EXPLOITING

No suspicious activity detected

PERSISTENCE

- Installs New ROOT Certificates
- Creates Temporary Files
- Monitors Certain Registry Keys / Values For Changes

SYSTEM SUMMARY

- Sample Is Looking For USB Drives
- Check Available System Drives And Hard Drive Free Space.
- Checks For Available System Drives
- Checks Free Space
- Classification Label
- Contains Modern PE File Flags Such As Dynamic Base Or NX
- Sample May Offer Command Line Options

DOWNLOAD SUMMARY

Original file	44 KB
Dropped files	23 KB
Packet capture	24 B

ORIGIN

Origin information not identified

Figure 8: The Zscaler Cloud Sandbox report for the Buer loader.

In addition to sandbox detections, Zscaler's multilayered cloud security platform detects indicators at various levels:

Win32.Trojan.Buerloader
Win32.Backdoor.Bazar

Conclusion

The TrickBot group has been running similarly themed campaigns for some time. The targeted nature of the campaign with subject lines having the organization’s name makes these campaign’s highly effective compared to generic spray-and-pray attacks. But even these specially crafted attacks are not immune from a pair of vigilant eyes and the right set of tools. We at Zscaler ThreatLabZ are always on the lookout for bad stuff—be it for our company or for our customers—to provide protection against it.

Last but not the least, always be attentive while opening any email links or attachments. Even if there is a tiny bit of suspicion, verify the email or get it reviewed thoroughly by your security team before proceeding further.

IOCs

MD5

Fa0322fb70610d6e675855588184eda39 (Buer loader)

06f42898d5b2303c0b455d3152ced044 (Bazar loader)

04a20c9f33023439b612935b6901917f (Bazar loader)

951acc18e4f14471f49235327e0c1ccc (Bazar loader)

4bb9a709958a1790a6bc257a9b5cb48e (Bazar loader)

03e699324d06bd3d597994f5df893048 (Bazar backdoor group: t1)

Distribution and document URLs

http://unitedyfl[.]com/print_preview.exe

https://docs.google[.]com/document/u/1/d/e/2PACX-1vTwnIt9tXcgRxaOME9G3yErRp50dGxW1EK0TeIAYZwkMEg4j8fOpU9kP7xMJ6pufKfzs0ETJwX5ZMM5/pub

https://docs.google[.]com/document/u/1/d/e/2PACX-1vSE2BfEV4tOmHOpMzeBhWbyajWwjxajBvm1YpJSRWyDL-qXbnSsu-OHhyuT2Y4mbZ72uPT9uToZWvo2/pub

https://docs.google[.]com/document/u/1/d/e/2PACX-1vTCf1OgjnHoaohnZ0BMwCFRU62HyC85BfeiX7NGPiwvrqr8P-_-Y_5Mab9wAJjCIcldWv8wvKVXFuiK/pub

https://docs.google[.]com/document/d/e/2PACX-1vQ4MCpbsYfwekk44caru7p05aOKswFPvyQNsyow1Qfg1exHrGZHaqOmWcnSeAxmDK2V1i3ml9DP8kYT/pub

https://docs.google[.]com/document/d/e/2PACX-1vRl0GvrO4JO8Rs4v1BTtXmsMThv1M413Z14onQl-TkrsXZEOOr1zF8gKu3GDOwFBN0kaw5g70C7lbIE/pub

https://docs.google[.]com/document/d/e/2PACX-1vR0NwqguWEFX4ZilvsxKSaJQbUfXpfK5fvWxbxUBJfPzbmvGuxHS7bltp9cjpJ0RvrvdlAxeKpSjDKQ/pub

C&C

Buer loader

104.248.83[.]13

Bazar loader

164.68.107[.]165
91.235.129[.]64
37.220.6[.]126
195.123.241[.]194
82.146.37[.]128
85.143.221[.]85
164.132.76[.]76
54.37.237[.]253

Some of the URIs seen in this campaign include

- /api/v190 - Download Updated Bazar loader(64 - bit)
- /api/v192 - Download Bazar backdoor(64 - bit)
- /api/v202 - (Server did not respond with payload at the time of analysis)
- /api/v207 - (Server did not respond with payload at the time of analysis)

PDB string

c:\Users\Mr.Anderson\Documents\Visual Studio 2008\Projects\Anderson\x64\Release\Anderson.pdb

Some of the subject lines observed

Re: {Target Company Name} termination list

Re: {Target Company Name} avoiding

FW: Urgent: {Target Company Name}: A Customer Complaint Request – Prompt Action Required

RE: FYI: {Target Company Name} Employees Termination List – Confirmation Required

Re: complaint request

Re: my call, {Target Company Name}.

Re: {Target Company Name} - my visit

Re: can't call you

MITRE ATT&CK

ID	Technique
T1566.002	Phishing: Spearphishing Link
T1566.003	Phishing: Spearphishing via Service
T1204.001	User Execution: Malicious Link
T1204.002	User Execution: Malicious File
T1547.001	Boot or Logon Autostart Execution: Registry Run Keys / Startup Folder
T1055.013	Process Injection: Process Doppelgänging
T1055.012	Process Injection: Process Hollowing
T1027.002	Obfuscated Files or Information: Software Packing
T1140	Deobfuscate/Decode Files or Information
T1036.005	Masquerading: Match Legitimate Name or Location
T1087	Account Discovery
T1010	Application Window Discovery
T1083	File and Directory Discovery
T1057	Process Discovery

T1012	Query Registry
T1018	Remote System Discovery
T1082	System Information Discovery
T1033	System Owner/User Discovery
T1124	System Time Discovery
T1119	Automated Collection
T1005	Data from Local System
T1053.002	Scheduled Task/Job: At (Windows)
T1547.004	Boot or Logon Autostart Execution: Winlogon Helper DLL
T1071.001	Application Layer Protocol: Web Protocols
T1568.002	Dynamic Resolution: Domain Generation Algorithms
T1020	Automated Exfiltration
T1041	Exfiltration Over C2 Channel
T1568.002	Dynamic Resolution: Domain Generation Algorithms

Appendix

Script to decrypt downloaded Bazar backdoor

```
key = "20200915"
data = open("v190", 'rb').read()
out = ""
for i in range(len(data)):
    out += chr(ord(data[i]) ^ ord(key[i%len(key)]))
of = open('dec1', 'wb')
of.write(out)
of.close()
#Note: Key can vary between downloader samples
```

Buer strings

```
Uc3nakqfdpmcFjc
powershell.exe -Command "& {Add-MpPreference -ExclusionPath
update
Kdc23icmQoc21f
open
.dll
rundll32
regsvr32
powershell.exe "-Command" "if((Get-ExecutionPolicy ) -ne  'AllSigned')  { Set-
ExecutionPolicy -Scope Process Bypass }; & '
%02x
POST
Content-Type: application/x-www-form-urlencoded
runas
%s, "%s"
Software\Microsoft\Windows\CurrentVersion\RunOnce
{%s-%d-%d}
ntdll.dll
myyux?44659379=3=83684
myyux?44659379=3=83684
myyux?44659379=3=83684
myyux?44659379=3=83684
myyux?44659379=3=83684
UndefinedTypeError>>1I5480%C9#5=O=B8
hd0OkaN3/Iqc7_Kdh
secinit.exe
false
true
null
https://104.248.83.13/
api/update/
https://104.248.83.13/
api/update/
X4OIvcO7uWS
update
statusCode
AccessToken
method
x64
exelocal
memload
memloadex
api/download/
api/downloadmodule/
download_and_exec
download_and_exec
regsrv32
rundll
rundllex
parameters
autorun
explorer.exe
api/module/
modules
loaddllmem
Admin
User
Windows 10
Windows Server 2019/Server 2016
Windows 8.1
Windows Server 2012 R2
Windows 8
Windows Server 2012
Windows 7
Windows Server 2008 R2
Windows XP
SQCP]ICW
X4OIvcO7uWS
Unknown
x32
x64
LdrLoadDll
RtlCreateUserThread
LdrGetProcedureAddress
RtlFreeUnicodeString
RtlAnsiStringToUnicodeString
RtlInitAnsiString
Mozilla/5.0 (Apple-iPhone7C2/1202.466; U; CPU like Mac OS X; en) AppleWebKit/420+
(KHTML, like Gecko) Version/3.0 Mobile/1A543 Safari/419.3
X4OIvcO7uWS
dllhost.exe
dllhost.exe
Software\Microsoft\Windows NT\CurrentVersion\Winlogon
Shell
open
akb,cvc
%ALLUSERSPROFILE%
Ostersin
\AutoReg.exe
" ensgJJ
ensgJJ
explorer.exe
secinit.exe
shell32.dll
Winhttp.dll
advapi32.dll
user32.dll
netapi32.dll
```

```
NtWriteVirtualMemory
Lr?jjma_rcTgprs_jKckmpw
JbpEcrNpmacbspc?bbpcqq
LrOscpwTgprs_jKckmpw
LrDpccTgprs_jKckmpw
LrNpmrcarTgprs_jKckmpw
LrPc_bTgprs_jKckmpw
LrEcrAmlrcvrRfpc_b
LrQcrAmlrcvrRfpc_b
```

Buer loader API hashes and corresponding API names

```
0x69f7df2a -> advapi32_GetTokenInformation
0xe79d18d6 -> kernel32_OpenProcessToken
0x47979a8f -> advapi32_GetCurrentHwProfileW
0x19e1e0c2 -> kernel32_RegCreateKeyExW
0xd45f73b5 -> kernel32_RegCloseKey
0xcb5998e2 -> kernel32_RegSetValueExW
0xce636ff5 -> advapi32_GetSidSubAuthority
0xaf7f658e -> winhttp_WinHttpOpen
0x20b4c051 -> winhttp_WinHttpSetTimeouts
0x8ef04f02 -> winhttp_WinHttpCrackUrl
0x9f47a05e -> winhttp_WinHttpConnect
0x1dd1d38d -> winhttp_WinHttpOpenRequest
0x26d17a4e -> winhttp_WinHttpSendRequest
0xb20e6a35 -> winhttp_WinHttpGetIEProxyConfigForCurrentUser
0x1ef97964 -> winhttp_WinHttpGetProxyForUrl
0x8678c3f6 -> winhttp_WinHttpSetOption
0xea74138b -> winhttp_WinHttpWriteData
0x80cc5bd7 -> winhttp_WinHttpReadData
0x6c3f3920 -> winhttp_WinHttpReceiveResponse
0xde67ac3c -> winhttp_WinHttpQueryHeaders
0x710832cd -> winhttp_WinHttpQueryDataAvailable
0x9964b3dc -> winhttp_WinHttpCloseHandle
0x302ebe1c -> kernel32_VirtualAlloc
0x4247bc72 -> kernel32_VirtualQuery
0x1803b7e3 -> kernel32_VirtualProtect
0x1a4b89aa -> kernel32_GetCurrentProcess
0x8a8b4676 -> kernel32_LoadLibraryA
0x1acaee7a -> kernel32_GetProcAddress
0x61eebd02 -> kernel32_GetModuleHandleW
0x8a8b468c -> kernel32_LoadLibraryW
0xab489125 -> kernel32_GetNativeSystemInfo
0x34590d2e -> kernel32_GetLastError
0x5b3716c6 -> kernel32_GlobalFree
0xe183277b -> kernel32_VirtualFree
0x62f1df50 -> kernel32_VirtualFreeEx
0xdd78764 -> kernel32_VirtualAllocEx
0xf3cf5f6f -> kernel32_GetModuleFileNameW
0xae7a8bda -> kernel32_CloseHandle
0x29e91ba6 -> kernel32_HeapSize
0xe3802c0b -> kernel32_HeapAlloc
0x864bde7e -> kernel32_GetProcessHeap
0x12dfcc4e -> kernel32_ExitProcess
0x7722b4b -> kernel32_TerminateProcess
0xb4f0f46f -> kernel32_CreateProcessW
0xff5ec2ce -> kernel32_ExitThread
0x4b3e6161 -> kernel32_TerminateThread
0xed619452 -> kernel32_CreateMutexW
0x7bffe25e -> kernel32_OpenMutexW
0xf785ce6 -> kernel32_ReadFile
0xe6886cef -> kernel32_WriteFile
0x1a7f0bab -> kernel32_CreateFileW
0xbdfa937d -> kernel32_GetFileSize
0x617ea42b -> kernel32_DeleteFileW
0x6659de75 -> kernel32_WriteProcessMemory
0xc56e656d -> kernel32_GetCommandLineW
```

```
0x78c1ba50 -> kernel32_ExpandEnvironmentStringsW
0x2e0ccb63 -> kernel32_CreateDirectoryW
0x5c62ca81 -> kernel32_WaitForSingleObject
0x8edf8b90 -> kernel32_OpenProcess
0x8a62152f -> kernel32_CreateToolhelp32Snapshot
0xc9112e01 -> kernel32_Process32NextW
0x63f6889c -> kernel32_Process32FirstW
0x4b9358fc -> kernel32_DuplicateHandle
0x24e2968d -> kernel32_GetComputerNameW
0x110e739a -> kernel32_GetVolumeInformationW
0xf7643b99 -> kernel32_GetThreadContext
0x3cc73360 -> kernel32_ResumeThread
0x77643b9b -> kernel32_SetThreadContext
0x1c2c653b -> ntdll_memset
0x1c846140 -> ntdll_memcpy
0x932d8a1a -> ntdll_NtDelayExecution
0x9716d04e -> ntdll_NtReleaseMutant
0x6f7f7a64 -> ntdll_RtlGetVersion
0x996cc394 -> ntdll_ZwUnmapViewOfSection
0xabf93436 -> ntdll_strtoul
0x2bd04fd1 -> ntdll_iswctype
0x26a5553c -> ntdll_strstr
0x4117fd0e -> ntdll_NtQueryDefaultLocale
0xd24c9118 -> ntdll_RtlCreateUserThread
0xd52ff865 -> ntdll_NtQueryVirtualMemory
0x339c09fb -> ntdll_NtQueryInformationProcess
0x6a13016e -> ntdll_NtSetInformationThread
0x6debaaa9 -> ntdll_NtFilterToken
0xd584ba6c -> shell32_SHGetFolderPathW
0x375eadf4 -> shell32_CommandLineToArgvW
0xba1eb35b -> shell32_ShellExecuteW
0xf674afe0 -> user32_wsprintfW
```

References

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