Decrypting AzoRult traffic for fun and profit

mariohenkel.medium.com/decrypting-azorult-traffic-for-fun-and-profit-9f28d8638b05

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5 min read



There will be times in your career when you will be presented with a traffic capture and get the task to determine what happened and if any data was stolen.

In this post, I will show you how you can squeeze all those juicy information from a PCAP traffic capture from an Azorult infection.

At the end, you will be able to answer which data has been stolen so you can act accordingly. Let's start!

Getting sample data

Head over to <u>https://any.run</u> and search for "Azorult" in public submissions or use the PCAP you already got

	Public submi	ssi	on	s	
	azorult X				Significant tasks 🔍 azorult 🛛 🗙 🚺
8	Windows 7 Professional 32bit 04 February 2021, 13:30	~		Malicious activity	987372b993e6456068e8381328e823e0.exe PE32 executable (GUI) Intel 80386 Monor Net assembly, for MS Windows Trojan rat azonut
Ð	Windows 7 Professional 32bit 03 February 2021, 19:51	~	Ľ	Malicious activity	f46d5fdc3f35712d869cf163a/79245a6.exe PE32 executable (828) Intel 80386 Mono/ Net asserbly, for MS Windows trojan rat azoutt
2	Windows 7 Professional 32bit 03 February 2021, 12:36	~		Malicious activity 수 총 팩 등	QUOTATION_PROJECT_FEJ-1601.exe PE32 executable (00) Initel 80386 Mono/ Not assembly, for MS Windows trojan ost azswit
**	Windows 7 Professional 32bit 03 February 2021, 07:41	~		Malicious activity 옷 수 똜 팩 톱	swift-copy_invoice11088-remittance-copy_xtisx COPV2 Encrypted encrypted trojan exploit CVE-2017-11882 loader rat azonut
75 25	Windows 7 Professional 32bit 02 February 2021, 13:21	~		Malicious activity 홋 수 타 팩 톱	8 xdfsx Microsoft Excel 2007+ exploit CVE 2017-11882 loader trojan rat azonut
R #	Windows 7 Professional 32bit 02 February 2021, 12:51	~		Malicious activity	RFQ# 02012021 xlisx Microsoft Excel 2007+ exploit CVE-2017-11882 trajan ret azorutt
4	Windows 7 Professional 32bit 02 February 2021, 12:48	~		Malicious activity 오 ㅎ 수 55 딕 15	RFQ#02012021.xlsx Microsoft Excel 2007+ exploit CVE 2017-11882 loader trojan rat atonuit stealer
2	Windows 7 Professional 32bit 02 February 2021, 09:58	~		Malicious activity	57169ad1d814ca03de19053597368a8d.exe P322 executable (QUI) brits 80386 Monol. Not assembly, for MS Windows

Most likely you will find a lot of samples

You will find a lot of samples without actual network traffic since the command and control server was already offline when any.run analyzed the sample. Have a look at samples which show POST requests



A good candidate for further investigation since you can see multiple POST requests Once you found an appropriate sample, download the PCAP to your machine and open it in Wireshark.

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196 73,708200	Realteku_36:3e:ff	Broadcast	ARP	42 Who ha	192.168.100.103? Tell 192.168.100.2		_
197 74.220136	Realteku_35:3e:ff	Broadcast	APP	42 Nho ha	192.168.100.195? Tell 192.168.100.2		-
198 74.284156	ResitekU_36:3e:ff	Broadcast	ARP	42 Nho ha	192.168.100.168? Tell 192.168.100.2		
199 74,813952	fe:54:00:aa:9d:cf	Spanning-tree-(for-			C + Root = 32768/0/52:54:00:27:07:43		
200 75.244188	Realteky_3615e1ff	Broadcast	ARP	42 Web ha	192.168.189.1957 Teil 192.168.109.2		
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288 75.396295	192, 168, 189, 289	184.255.227.212	TEP	54 58813	28 (arx) sand acket win-some ter-s		
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Using Wireshark to follow HTTP streams

You then have to be on the lookout for HTTP POST requests. If you want to see the content of the request, you can right click the appropriate row and click on "Follow" and "HTTP stream"

The "Check-in" which does not contain any interesting info You will notice multiple POST requests while the first is pretty small and functions as a check-in to the Command and Control server. Skip this one since this does not contain any valuable data for us.

<pre>POST /Panel/index.php HTTP/1.1 Jser-Agent: Mozilla/4.0 (compatible; MSIE 6.0b; Windows NT 5.1) dost: 134.255.227.212 Ontent-Length: 15358 Jache-Control: no-cache Lic.ke.[2.Kj.<'.89. >.42.42.L'.LH.:j.L:.5].[L.12.:K. :.L:.92.4'.9X. N.=:.: 9.I[.14.>;.>8.><.(9.(9.(9.(9.(9.(9.(9.(9.(9.(9.(9.(9.(1L.K/.I/.?L.>=.(9.(9.(9.(9.(9.(9.(9.(9.(9.(9.(9.(9.(9.</pre>	【 Wireshark · Folge H	TTP Stream (tcp.stream eq 2) · 6da	0fb39-f223-4a37-b	e5b-05aa638c271d	- 🗆	×
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Size matters! The biggest POST request in the PCAP is our target

One man's trash is another man's treasure! Looks like trash but is actually the stolen data getting exfiltrated! That's the request we are interested in! Notice, that this request contains much more data!

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1 <i>Client Paket, 1 Server Pa</i> Gesamte Verbindu	aket, I Runde.	Da	aten anzeigen un	d speichern als	Roh ~
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	Diesen Stream filtern Drucken	Save as	Zurück	Close	Help

Change view and save

Change the view to "Raw" and save the output to disk so we can further process it.



You might need some patience

Now comes the fun part! As you might have noticed, the POST request data is encrypted in some way. Turns out, it is just XORed with a 3 byte key which unfortunately is not the same for all variants. What now? Make "some" educated guesses?

Fear not, I created a tool which first tries to decrypt it with keys I found in the wild and if this is not successful, it will start to brute force the key. This is possible with the help of a known plaintext attack since I learned through manually reversing AzoRult that the plaintext stolen data contains strings like "<info" which we can look for after every decryption try.

You can get it here: https://GitHub.com/hariomenkel/AzoBrute

Once downloaded, let it run against the extracted POST request and hopefully, you'll receive the key.

Please consider creating an issue at the AzoBrute GitHub repository with your key so I can add it to the list of keys which are tried before trying brute force. Sharing is caring!

Once you have the key, copy it—you will need it for another tool



Change the value of "xor_key"

Now when you have the key, you might want to extract the stolen data don't you? To do so, get https://GitHub.com/hariomenkel/AzoDecrypt and open it in an editor to change the value of "xor_key" to the value you found earlier. Don't forget to add \x before every byte so the format is the same as before. When you are finished, save it and run that bad boy!



Decrypt that bad boy

As you can see, the tool was able to use your key to find the payload, extract it and also squeeze out a ZIP archive containing all stolen credentials, cookies, system infos etc.!

1 Z^^"Zco"cio	#z}*Y^";<闘Xy貯 'joy0@edfl%#:%i`zycao-GD0;\$o1Zcie~*Y*#; <mark>\00\00</mark> by7*>>??-
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2 <pwdsdv8cf1 MozillaFire qldyz%35%31</pwdsdv8cf1 	01-053A-4498-98VA-EAB3719A088W-VF9A8B7AD-0FA0-4899-B4RD-D8006738DQCD>%31 - Fox https%3A%2F%2Fm%2Efacebook%2Ecom honey%40pot%2Ecom honeypass%33%35%36 - w%2Edefault
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5 %33 Outlook	SMTP%3A%2F%2F%31%39%32%2E%31%36%38%2E%31%2E%31%3A%32%30%32%35%32%35%36 - %2Ecom honeypass%33%35%36
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D8006738DQC	D>PK[8][8][1]\00\00\00\00\00\00\00\00\00\00\00~81]\00\00[8]\00\00[8]\00\00[8]
MozillaFire	Fox
9 HOST:	https://m.facebook.com
10 USER:	honey@pot.com
11 PASS:	honeypass356
12 UNKN:	qldyz51w.default
13	
14 SOFT:	GoogleChrome
15 HOST:	https://m.tacebook.com/

Beauty lies in the eye of the beholder

This is the POST request which has been XORed which already shows some information

Passwords	Suctom tyt
List tyt	System.txt
List.txt	

Content of ZIP file

The really interesting data is in the ZIP file. You might want to have a look at it!

Öffnen	-	.F1	 ~/s	PasswordsList.tx chreibtisch/1405_1	ct 5423	Speichern	Ξ		•	8
1 SOFT:			MozillaFireFox							
2 HOST:			https://m.facebook.com							
3 USER:			honey@pot.com							
4 PASS:			honeypass356							
5 UNKN:			qldyz51w.default							
6										
7 SOFT:			GoogleChrome							
8 HOST:			https://m.facebook.com/							
9 USER:			honey@pot.com							
10 PASS:			honeypass356							
11 UNKN:			Default							
13 SOFT .			Outlook							
14 HOST			POP3 · //192 168 1 1 · 2025250	6						
15 USER:			honey@pot.com							
16 PASS:			honeypass356							
17 UNKN:			honey@pot.com							
18			none) epotteon							
19 SOFT:			Outlook							
20 HOST:			SMTP://192.168.1.1:202525	6						
21 USER:			honey@pot.com							
22 PASS:			honeypass356							
23 UNKN:										
24										
				Reiner Text 🔻	Tabulatorbreite: 8	3 ▼ Z.	1, Sp. 1	•	E	INF

PasswordsList.txt

Here you can see the Fake credentials any.run was hosting while running the sample

```
1 E
  2 MachineID :
                 126D802-1343A2EC-616D0FCF-2F7A5199-294826D5F
  3 EXE PATH :
                 C:\Users\admin\Desktop\QUOTATION_PROJECT_FEJ-1601.exe
  5 Windows
             : 6.1 x32 Windows 7 Professional
  6 Computer(Username) : USER-PC(admin)
  7 Screen: 1280x720
  8 Layouts: EN/
 9 LocalTime: 3/2/2021 11:37:40
 10 Zone: UTC+0:0
 11
 12 CPU Model: Intel(R) Core(TM) 15-6400 CPU @ 2.70GHz
 13 CPU Count: 4
 14 GetRAM: 3583
 15 Video Info
 16 Standard VGA Graphics Adapter
 17 RDPDD Chained DD
 18 RDP Encoder Mirror Driver
 19 RDP Reflector Display Driver
 20
 21
 22
 23 [System Process]
 24
           System
 25
                   smss.exe
 26 csrss.exe
 27 wininit.exe
 28
           services.exe
 29
                   svchost.exe
 30
                   svchost.exe
 31
                   svchost.exe
 32
                   svchost.exe
 33
                           dwm.exe
 34
                   svchost.exe
 35
                   svchost.exe
 36
                           taskeng.exe
 37
                                  ctfmon.exe
20
                   cuchact ava
```

Systems.txt

The attacker is also able to gain a lot of information from your system through system.txt

Deless Test

Tabulahashasibar 0 -

What next?

Now that you have the correct XOR key and GUID you can use another tool I created to annoy the attacker through flooding his/her AzoRult panel with real looking fake data which makes it hard to distinguish between real and fake victims and ultimately may stop the attacker from selling the data due to its bad quality.

You can get it here: https://GitHub.com/hariomenkel/AzoSpam

111 1 14 495 45 499 15