AgentTesla Malware

By Malwares

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The following table contains list of artifacts that had been analyzed within this document.

Agent Tesla is spyware that collects information about the actions of its victims by recording keystrokes and user interactions. It is falsely marketed as legitimate software on the dedicated website where this malware is sold.

Code of malware is packed, so after unpacking it you should see only these sections as shown in figure below.

But that’s not actual code, actual code resolved during runtime of malware as shown in figure below.

It resolves QWzgdyIDcJlMs during runtime and code will be around 25k lines of code as shown in figure below.

It checks for the operating system as shown and gets a hash of the current domain in figure below.

It gets the hostname, processor type, name of current user as shown on figures below.

It enumerates network adapter configuration as shown in figure below.

It gets the mac address of the machine as shown in figure below.

Enumeration functions in folder path "C:\\Users\\Mahmoud_El_Menshawy\\AppData\\Local”, used for stealing browsers caches, passwords, profiles etc... As shown in figure below.

stealing browsers caches, passwords, profiles etc... As shown in figure below.

[DebuggerHidden] #

It hides debugging for editing browser state.

```
{
    // Token: 0x06000002 RID: 2 RVA: 0x00002058 File Offset: 0x00000258
    [DebuggerHidden]
    [EditorBrowsable(EditorBrowsableState.Never)]
    public a()
    {
    }
}
```

Embedded http request

https://api.telegram.org/bot%telegramapi%/.

https://www.theonionrouter.com/dist.torproject.org/torbrowser/9.5.3/tor-win32-0.4.3.6.zip". # Tor browser.

```
        // Token: 0x04000040 RID: 64
        private const string A = "https://api.telegram.org/bot%telegramapi%/";

        // Token: 0x04000041 RID: 65
        private const string a = "%chatid%";
    }
```

```
    // Token: 0x04000120 RID: 288
    private const string A = "https://www.theonionrouter.com/dist.torproject.org/
      torbrowser/9.5.3/tor-win32-0.4.3.6.zip";

    // Token: 0x04000121 RID: 289
    public string a;

    // Token: 0x04000122 RID: 290
    public Socket A;
}
```

Enumeration and other important Functions

EnumProcessModules.

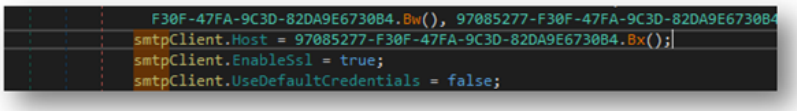
GetWindowThreadProcessId.

GetModuleFileNameEx.

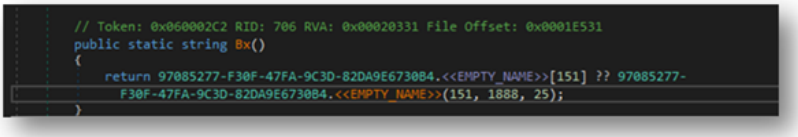
Decryption of all Configurations

All configurations depends on big array called <<EMPTY_NAME>>

Let's go in depth of code.



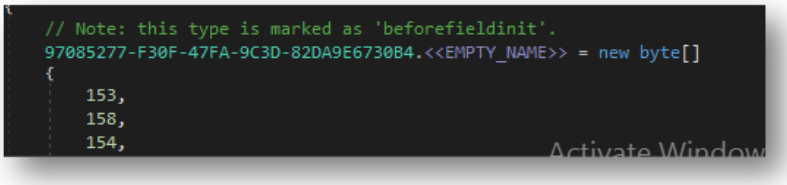
Let's go to the function Bx().



Then. <<EMPTY_NAME>>.

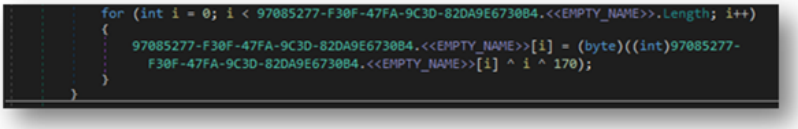
<<EMPTY_NAME>> is an array of bytes.

When I did more research I found reference to this array as shown in figure below.



So <<EMPTY_NAME>> is really big array around more than 11k line

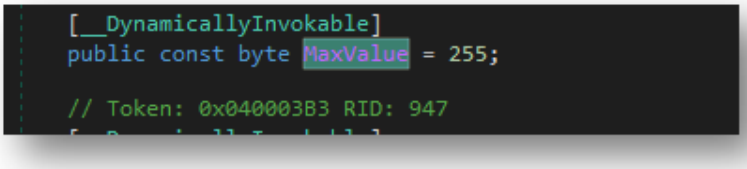
So it gets each element of the big array then XOR with itself then XOR with value 170 and save it to array. <<EMPTY_NAME>> (overwrite array with new value) as shown in figure below.



So let's see big array

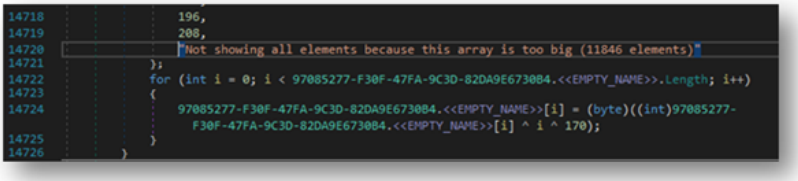
{153,158,154,153,215,214,213,212,143,238,237,140,194,195,132,237,242,129,213,212,132,204,207,196,203,202,201,238,251,250,235,209,238,212,192,

So the value of (byte.MaxValue) will be 255 as shown in figure below.



So at this point everything is okay but only problem is string called

,"Notshowingallelementsbecausethisarrayistoobig(11846elements)" At the end of array.



So that means we don't have all values of bytes of array which means we can't reverse the array to get string <<EMPTY_NAME>> which will be resolved after finishing the loop.

I tried to create array of bytes but it display error called "cannot implicitly convert type string to byte"

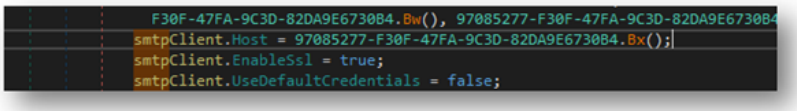
That's mean we don't have complete elements of array

So I removed string,"Notshowingallelementsbecausethisarrayistoobig(11846elements)".

Let's see decryption function of malware and how to get host

That's the beginning of the SMTP function.

So class call function Bx() as shown in figure below.



If we go through Bx() we see this code.

So it pushes an array called <<EMPTY_NAME>> with parameters (151, 1888, 25) and the return value will save at an array called <<EMPTY_NAME>> [151].

<<EMPTY_NAME>> with parameters (151, 1888, 25)

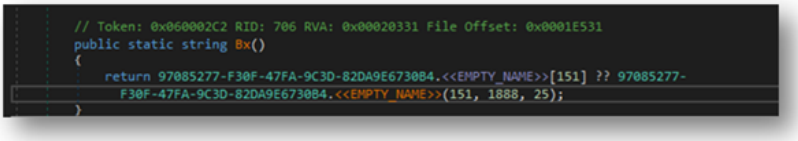
151 => refers to the save position of the first array.

1888 => starting counting position of big array which was already mentioned at the beginning of report.

25 => counting.

So that means it starts from the position of array 1888 until 1913.

So length of host name will be 25



So let's go inside <<EMPTY_NAME>>

EMPTY_NAME>> with parameters (151, 1888, 25)

Num => 151, index => 1888, count => 25.

So num2 =0.

So we hit if condition if (num2 ==0){num2 =1}

So value of num2 will be 1

If value of num2 = 4 exit while loop otherwise continue looping

Value of num2 = 1.

So we hit condition

If (num2 == 1) {num2 =2}

So value of num2 will be 2

Then continue looping because num2! = 4.

So we hit condition

If (num2 == 2)

{

@string = Encoding.UTF8.GetString(97085277-F30F-47FA-9C3D-82DA9E6730B4.<<EMPTY_NAME>>, index, count);

num2 = 3;

}

So it pushes big array and gets string (host) based on specific parameters.

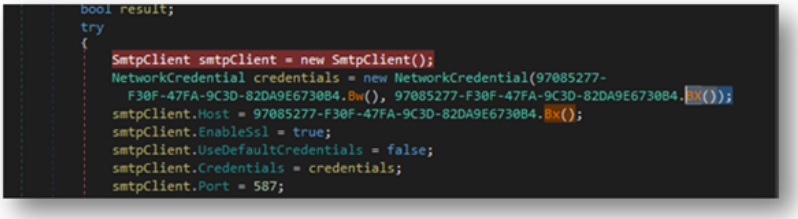
<<EMPTY_NAME>>, index, count)

Index => 1888, count => 25.

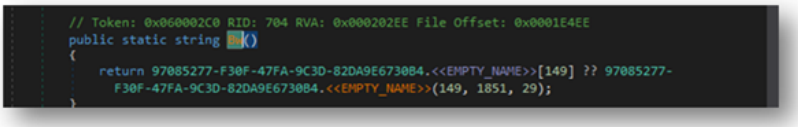
And save value in @string.

So value will be => mail.totallyanonymous.com.

Same thing for credentials username will be at function Bw(), and password will be at function BX());



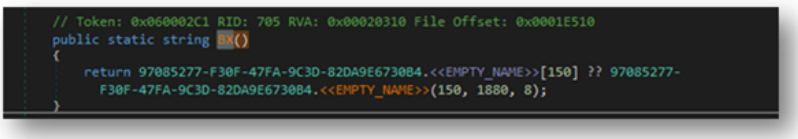
Bw()=> Username



If we apply the same technique we get the result honebots@totallyanonymous.com.

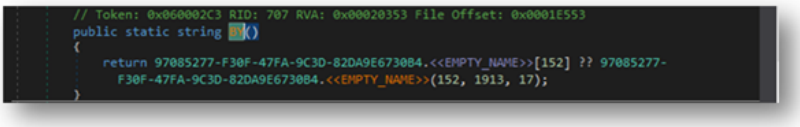
Same technique for password.

BX() => Password



Result => 572h094S.

Same technique for Mail address to.



Results => marhmelo@rape.lol.

So at this point I noticed that the class called 97085277-F30F-47FA-9C3D-82DA9E6730B4 includes all configurations so I decided to decrypt all big arrays.

So I write .net code as shown in figure to decrypt all content of the array.

I just got the length of the array which will be 9998.

My code

```
//Decryption AgentTesla configurations

// Author : Mahmoud ElMenshawy

using System;

using System.Text;

public class Program

{

	public static void Main()

	{

		string @host;

		string @to;

		string @from;

		string @password;

		string @content;

		byte[] array =
{153,158,154,153,215,214,213,212,143,238,237,140,194,195,132,237,242,129,213,212,132,204,207,196,203,202,201,238,251,250,235,209,238,212,192,

for(int i = 0; i < array.Length; i++)

			array[i] = (byte)((int)array[i] ^ i ^ 170);

		@host = Encoding.UTF8.GetString(array,1888,25);

		@to = Encoding.UTF8.GetString(array,1913,17);

		@from = Encoding.UTF8.GetString(array,1851,29);

		@password = Encoding.UTF8.GetString(array,1880,8);

		@content = Encoding.UTF8.GetString(array,1,9998);

		Console.Write("Host name: ");

		Console.WriteLine(@host);

		Console.Write("To: ");

		Console.WriteLine(@to);

		Console.Write("From: ");

		Console.WriteLine(@from);

		Console.Write("Password: ");

		Console.WriteLine(@password);
```

```
                Console.WriteLine("");

                Console.WriteLine("Content of array: ");

                Console.WriteLine(@content);

        }

}
```

Result of code

Host name: mail.totallyanonymous.com

To: marhmelo@rape.lol

From: honebots@totallyanonymous.com

Password: 572h094S

Content of array:

520yyyy-MM-dd HH:mm:ssyyyy_MM_dd_HH_mm_ss
<hr>ObjectLengthChainingModeGCMAuthTagLengthChainingModeKeyDataBlobAESMicrosoft Primitive
ProviderCONNECTIONKEEP-ALIVEPROXY-AUTHENTICATEPROXY-AUTHORIZATIONTETRAILERTRANSFER-
ENCODINGUPGRADE%startupfolder%\%insfolder%\%insname%/\%insfolder%\Software\Microsoft\Windows\CurrentVersion\Run%insregname%SOI
(Windows NT 10.0; Win64; x64; rv:80.0) Gecko/20100101 Firefox/80.0OKhttp://XZYpUW.com\MamSELECT * FROM
Win32_ProcessorName MBUnknownCOCO_-_.zip yyyy-MM-dd hh-mm-
ssCookieapplication/zipSCSC_.jpegScreenshotimage/jpeg/log.tmpKLKL_.html<html></html>Logtext/html[]Time:
MM/dd/yyyy HH:mm:ssUser Name: Computer Name: OSFullName: CPU: RAM: IP Address: New Recovered!User Name:
OSFullNameuninstallSoftware\Microsoft\Windows
NT\CurrentVersion\WindowsLoad%ftphost%/%ftpuser%%ftppassword%STORLengthWriteCloseGetBytesOpera
BrowserOpera Software\Opera StableYandex BrowserYandex\YandexBrowser\User DataIridium BrowserIridium\User
DataChromiumChromium\User Data7Star7Star\7Star\User DataTorch BrowserTorch\User DataCool
NovoMapleStudio\ChromePlus\User DataKometaKometa\User DataAmigoAmigo\User DataBraveBraveSoftware\Brave-
Browser\User DataCentBrowserCentBrowser\User DataChedotChedot\User DataOrbitumOrbitum\User
DataSputnikSputnik\Sputnik\User DataComodo DragonComodo\Dragon\User DataVivaldiVivaldi\User
DataCitrioCatalinaGroup\Citrio\User Data360 Browser360Chrome\Chrome\User DataUranuCozMedia\Uran\User
DataLiebao Browserliebao\User DataElements BrowserElements Browser\User DataEpic PrivacyEpic Privacy
Browser\User DataCoccocCocCoc\Browser\User DataSleipnir 6Fenrir Inc\Sleipnir5\setting\modules\ChromiumViewerQIP
SurfQIP Surf\User DataCoowonCoowon\Coowon\User
Data,"URL:Username:Password:Application:PWPW_honebots@totallyanonymous.com572h094Smail.totallyanonymous.commarhmelo@rape.lolimage/j
f \Data\Tor\torrcp=%PostURL%127.0.0.1POST+%2Bapplication/x-www-form-urlencoded&&
<<>>"Copied Text: [ ] ()
False{BACK}{ALT+TAB}{ALT+F4}{TAB}{ESC}{Win}{CAPSLOCK}↑↓←→{DEL}{END}{HOME}{Insert}{NumLock}{PageDown}
{PageUp}{ENTER}{F1}
{F2}{F3}{F4}{F5}{F6}{F7}{F8}{F9}{F10}{F11}{F12}control{CTRL}
Windows
RDPcredentialpolicyblobrdgchrome{{{0}}}CopyToComputeHashsha512CopySystemDrive\WScript.ShellRegReadg401

502

500 Addchat_id%chatid%captionhttps://api.telegram.org/bot%telegramapi%/sendDocumentdocument----------
x

--

multipart/form-data; boundary=Content-Disposition: form-data; name="{0}"

{1}Content-Disposition: form-data; name="{0}"; filename="{1}"

Content-Type: {2}

--

CookiesOperaChrome\Google\Chrome\User Data\360Chrome\Chrome\User DataYandexSRWare IronBrave Browser\Iridium\User DataCoolNovoEpic Privacy BrowserCocCocQQ BrowserTencent\QQBrowser\User DataUC BrowserUCBrowser\uCozMediacookies.sqliteFirefoxAPPDATA\Mozilla\Firefox\IceCat\Mozilla\icecat\PaleMoon\Moonchild Productions\Pale Moon\SeaMonkey\Mozilla\SeaMonkey\Flock\Flock\Browser\K-Meleon\K-Meleon\Postbox\Postbox\Thunderbird\Thunderbird\IceDragon\Comodo\IceDragon\WaterFox\Waterfox\BlackHawk\NETGATE Technologies\BlackHawk\CyberFox\8pecxstudios\Cyberfox\Path=([A-z0-9\/\.\-]+)profiles.ini\Default\Profileorigin_urlusername_valuepassword_valuev10v11\Local State"encrypted_key":"(.*?)"\Default\Login Data\Login Data\Google\Chrome\User Data\loginsMajorMinor2F1A6504-0641-44CF-8BB5-3612D865F2E5Windows Secure Note3CCD5499-87A8-4B10-A215-608888DD3B55Windows Web Password Credential154E23D0-C644-4E6F-8CE6-5069272F999FWindows Credential Picker Protector4BF4C442-9B8A-41A0-B380-DD4A704DDB28Web Credentials77BC582B-F0A6-4E15-4E80-61736B6F3B29Windows CredentialsE69D7838-91B5-4FC9-89D5-230D4D4CC2BCWindows Domain Certificate Credential3E0E35BE-1B77-43E7-B873-AED901B6275BWindows Domain Password Credential3C886FF3-2669-4AA2-A8FB-3F6759A77548Windows Extended Credential00000000-0000-0000-0000-000000000000SchemaIdpResourceElementpIdentityElementpPackageSidpAuthenticatorElementIE/EdgeTypeValue\Common Files\Apple\Apple Application Support\plutil.exe\Apple Computer\Preferences\keychain.plist*Login Datajournalwow_logins\Microsoft\Edge\User DataEdge Chromium\Microsoft\Credentials\\Microsoft\Protect\GuidMasterKey\Default\EncryptedStorage\EncryptedStorageentriescategoryPasswordstr3str2blob0P([A-z0-9\/\.]+)"\browsedata.dbautofillFalkon BrowserstartProfile=([A-z0-9\/\.]+)Backend=([A-z0-9\/\.-]+)\settings.ini\Claws-mail\clawsrcpasskey0master_passphrase_salt=(.+)master_passphrase_pbkdf2_rounds=(.+)use_master_passphrase=(.+)\accountrcsmtp_serveraddressaccount\passwordstorerc{(.*),(.*)}(.*)ClawsMailTransformFinalBlockSubstringIterationCountsignons3.txt---

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objectsDataDecryptTripleDesFlock BrowserALLUSERSPROFILE\\DynDNS\Updater\config.dyndnsusername==password=&Ht6KzXhChhttp://DynDns.comDynDNS\Psi\profiles\Psi+\profGUI\configsSoftware\OpenVPN-GUI\configs\usernameauth-dataentropyOpen VPNUSERPROFILE\OpenVPN\config\remote \FileZilla\recentservers.xml<Server><Host></Host>:<Port></Port><User></User><Pass encoding="base64"></Pass><Pass>FileZillaSOFTWARE\\Martin Prikryl\\WinSCP 2\\SessionsHostNameUserNamePublicKeyFilePortNumber22[PRIVATE KEY LOCATION: "{0}"]WinSCPUsernameAll Users\FlashFXP\3quick.datIP=port=user=pass=created=FlashFXP\FTP Navigator\Ftplist.txtServerNo PasswordUserFTP NavigatorProgramfiles(x86)programfiles\jDownloader\config\database.scriptprogramfiles(x86)INSERT INTO CONFIG VALUES('AccountController','sq.txtJDownloaderSoftware\PaltalkHKEY_CURRENT_USER\Software\Paltalk\pwdPaltalk\.purple\accounts.xml<account<protocol></protocol><name></name><password></password>Pidgin\SmartFTP\Client 2.0\Favorites\Quick Connect\\SmartFTP\Client 2.0\Favorites\Quick Connect*.xml<Password></Password><Name></Name>SmartFTPappdata\Ipswitch\WS_FTP\Sites\ws_ftp.iniHOSTUIDPWDWS_FTPPWD=KeyModeIVPaddingCreateDecryptor\cftp\Ftplist.txt;Serve<server_ip></server_ip><server_port></server_port><server_user_name></server_user_name><server_user_password></server_user_password>FTPGetterHKEY_LOCAL_MACHINE\SOFTWARE\Vitalwerks\DUCHKEY_CURRENT_USER\SOFTWARE\Vitalwerks\DUIP+-0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz\The Bat!\Account.CFNzzzTheBatHKEY_CURRENT_USER\Software\RimArts\B2\SettingsDataDirFolder.lst\Mailbox.iniAccountSMTPServerMailAddressPNT\CurrentVersion\Windows Messaging Subsystem\Profiles\Outlook\9375CFF0413111d3B88A00104B2A6676Software\Microsoft\Windows Messaging Subsystem\Profiles\9375CFF0413111d3B88A00104B2A6676Software\Microsoft\Office\16.0\Outlook\Profiles\Outlook\9375CFF0413111d3B88A00104PasswordPOP3 PasswordHTTP PasswordSMTP PasswordSMTP ServerOutlookHKEY_CURRENT_USER\Software\Aerofox\FoxmailPreviewExecutableHKEY_CURRENT_USER\Software\Aerofox\Foxmail\V3.1FoxFiles\Foxmail\mail\\VirtualStore\Program Files (x86)\Foxmail\mail\\Accounts\Account.rec0\Account.stgReadDisposePOP3HostSMTPHostIncomingServerPOP3PasswordFoxmail5A71\Opera Mail\Opera Mail\wand.datopera:Opera Mailabcçdefgğhıijklmnoöpqrsştuüvwxyz1234567890_-.~!@#$%^&*()[{]}\|';:,<>/?+=

\Pocomail\accounts.iniPOPPassSMTPPassSMTPPocoMailRealVNC 4.xSOFTWARE\Wow6432Node\RealVNC\WinVNC4RealVNC 3.xSOFTWARE\RealVNC\vncserverSOFTWARE\RealVNC\WinVNC4Software\ORL\WinVNC3TightVNCSoftware\TightVNC\ServerPasswordViewOrControlPasswordControlPasswordTigerVNCSoftware\TigerVNC\ServerTrimUltraVNCProgramFiles(x86)\uvnc bvba\UltraVNC\ultravnc.inipasswdpasswd2ProgramFiles\UltraVNC\ultravnc.ini

\eM Client.dlleM Client\accounts.dateM ClientAccountConfiguration72905C47-F4FD-4CF7-A489-4E8121A155BDhosto6806642kbM7c5\Mailbird\Store\Store.dbServer_HostEncryptedPasswordMailbirdSenderIdentitiesNordVPNNordVPN directory not found!NordVpn.exe*user.configSelectSingleNode//setting[@name='Username']/valueInnerText//setting[@name='Password']/value\MySQL\Workbench\v

MySQL Workbench%ProgramW6432%Private Internet Access\data\Private Internet Access\data\account.json.*"username":"(.*?)".*"password":"(.*?)"Private Internet Access<array><dict><string></string>

<data></data>Safari Browser -convert xml1 -s -o "\fixed_keychain.xml" A10B11C12D13E14F15ABCDEF(EndsWith)IndexOfUNIQUEtableSoftware\DownloadManager\Passwords\EncPasswordInternet Download Manager{0}http://127.0.0.1:HTTP/1.1 HostnamePort200 Connection established

Proxy-Agent: HToS5x

Connect

You can try code at link below

Link: https://dotnetfiddle.net/.

> If you wanna learn malware analysis you can check my YouTube channel I'm trying publish analysis of malware and some methods to analysis malwares.
> Please don't forgot subscribe my channel Than you ♥

> YouTube channel
> https://www.youtube.com/channel/UCParXHaBXBmqRdHuVUg21pA

References

1- https://www.fortinet.com/blog/threat-research/analysis-of-new-agent-tesla-spyware-variant.

2- https://blog.malwarebytes.com/threat-analysis/2020/04/new-agenttesla-variant-steals-wifi-credentials/.

3- https://www.deepinstinct.com/2020/07/02/agent-tesla-a-lesson-in-how-complexity-gets-you-under-the-radar/.
