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# Shortcut-Based (LNK) Attacks Delivering Malicious Code On The Rise

**CYBERCRIME INTELLIGENCE**

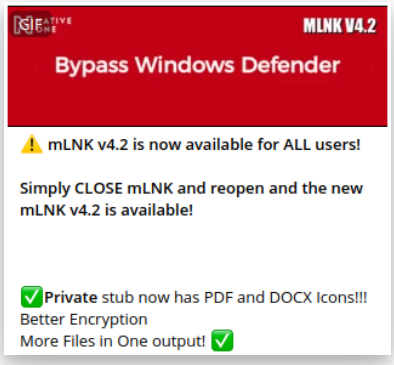
17 JUL 2022
MALWARE, CYBERCRIME, POWERSHELL

Cybercriminals are always looking for innovative techniques to evade security solutions. Based on the Resecurity® HUNTER assessment, attackers are actively leveraging tools allowing them to generate malicious shortcut files (.LNK files) for payload delivery.

Resecurity, Inc. (USA), a Los Angeles-based cybersecurity company protecting Fortune 500's

worldwide, has detected an update to one of them most popular tools used by cybercriminals. The tool in question generates malicious LNK files, and is so frequently used for malicious payload deliveries these days.

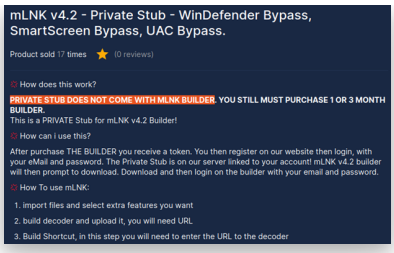
MLNK Builder has emerged in Dark Web with their new version (4.2), and the updated feature-set focuses on AV evasion and masquerading with icons from legitimately popular applications and file formats.




The noteable spike of campaigns involving malicious shortcuts (LNK files) conducted by both APT groups and advanced cybercriminals was detected in April-May this year – Bumblebee Loader and UAC-0010 (Armageddon) targeting EU Countries described by CERT UA.

Malicious shortcuts continue to give hard times to network defenders, especially when combating global botnet and ransomware activity, using them as a channel for multi-staged payload deliveries.

According to experts from Resecurity, the existing MLNK Builder customers will receive an update for free, but the authors have also released a “Private Edition” which is only available to a tight circle of vetted customers, it requires an additional license costing $125 per build.




The updated tool provides a rich arsenal of options and settings to generate malicious files to appear as legitimate Microsoft Word, Adobe PDF, ZIP Archives, images .JPG/.PNG, audio MP3 and even video .AVI files. as well as more advanced features to obfuscate malicious payload.


Bad actors continue to develop creative ways to trick detection mechanisms enabeling them the successful delivery of their malicious payloads – by leveraging combinations of extensions and different file formats, as well as Living Off the Land Binaries (LOLbins).

The most actively used malware families leveraging LNK-based distribution are TA570 Oakboat (aka Qbot), IcedID, AsyncRAT and the new strain of Emotet. The most recent Qakbot distribution campaign also included malicious Word

documents using the CVE-2022-30190 (Follina) zero-day vulnerability in the Microsoft Support Diagnostic Tool (MSDT).

Some notable campaigns have been detected in April-May 2022. The cybercriminal activity utilized related APT attacks targeting private and public sectors:

- UAC-0010 (Armageddon) Activity targeting EU Countries
https://cert.gov.ua/article/39086

The bad actors are using malicious LNK files in a combination with ISO (via extension spoofing) to confuse the antivirus logic and endpoint protection solutions. It's interesting to note how well-known products in the industry are not able to properly detect and analyze them.

## What Is The LNK File?

Shell Link Binary File Format, which contains information that can be used to access another data object. The Shell Link Binary File Format is the format of Windows files with the extension ".LNK".

LNK is a filename extension for shortcuts to local files in Windows. LNK file shortcuts provide quick access to executable files (.exe) without the users navigating the program's full path.

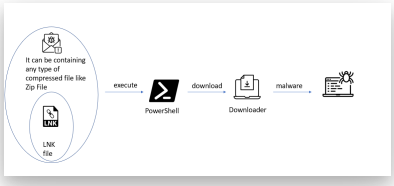
Files with the Shell Link Binary File Format (.LNK) contain metadata about the executable file, including the original path to the target application.

Windows uses this data to support the launching of applications, linking of scenarios, and storing application references to a target file.

We all use .LNK files as shortcuts in our Desktop, Control Panel, Task Menu, and Windows Explorer

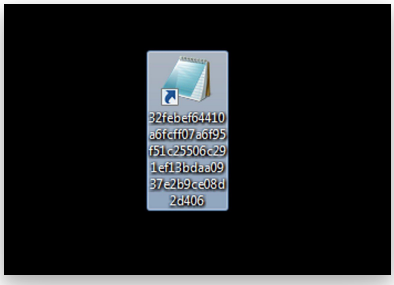
# Why Attackers Use LNK File

Such files typically look legitimate, and may have an icon the same as an existing application or document. The bad actors incorporate malicious code into LNK files (e.g. Powershell scenario) allowing the execution of the payload on the target machine.



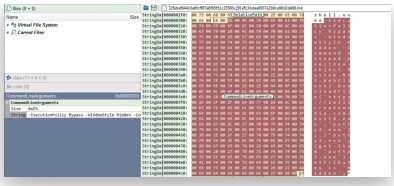

The process of a malicious .LNK

Let’s review a sample of a malicious LNK file in more detail:



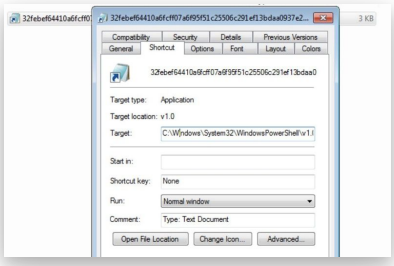

The malicious .LNK file

In this example, PowerShell code was embedded inside the file which will be executed after the victim clicks on the LNK file. We have examined the structure of the file using Malcat:



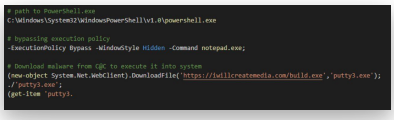
PowerShell code embedded inside the file

You can see the PowerShell scenario embedded in the file:




PowerShell scenario embedded

The logic of the scenario allows to bypass the execution policy and download the file from external resource and execute it:



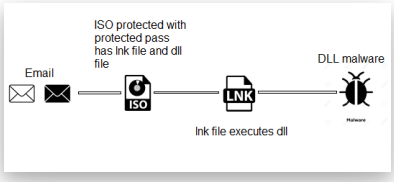

Bypassing the execution policy

We observed a campaign that delivered Bumblebee through contact forms on a target's website. The messages claimed that the website used stolen images and included a link that ultimately delivered an ISO file containing the malware.

Resecurity attributed this campaign to another threat actor the company tracks as TA578 and has

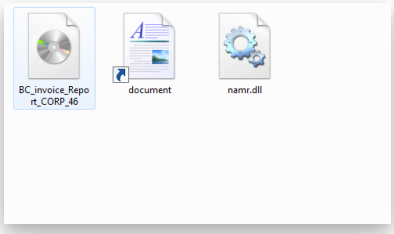
done since May 2020. TA578 uses email campaigns to deliver malware like Ursnif, IcedID, KPOT Stealer, Buer Loader, and BazaLoader, as well as Cobalt Strike.

Our researchers detected another campaign in April that hijacked email threads to deliver the Bumblebee malware loader in replies to the target with an archived ISO attachment.



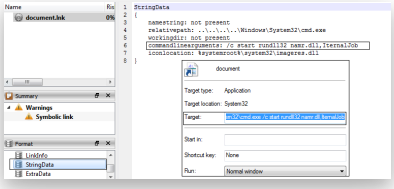

LNK file executes DLL malware file

So, we can extract the hidden file with pass, we can see that in the next figure.




Extracting the hidden file with pass

After that we can examine the .ISO contents which includes a document file (.LNK file) and namr.dll file, we can then further analyze the .LNK file, shown in the next figure.

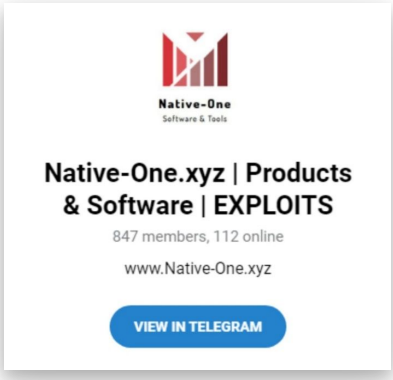


Analyzing the malicious .LNK file

From the previous figure, we identify how the .LNK file contains a command to execute the .DLL file.

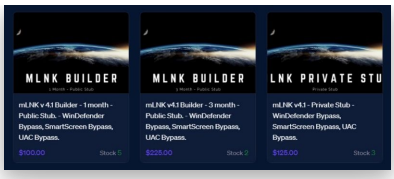
## How Attackers Generate Malicious LNK Files?

Attackers can generate malicious shortcuts via tools available for sale in the Dark Web. One such tool is advertised in a Telegram channel “Native-One.xyz | Products & Software | Exploit " called mLNK builder – it grants the ability to convert any payload into a .LNK file format.



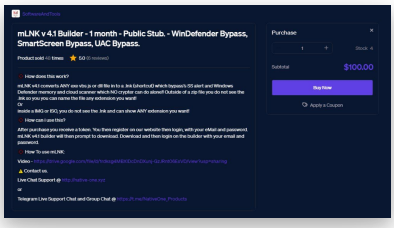

Generation of malicious shortcut files

Cybercriminals can purchase mLNK builder by using one of the three available plans, starting from a one month to 3 month plan and then a private option (providing unique stub).




Purchasing the mLNK builder

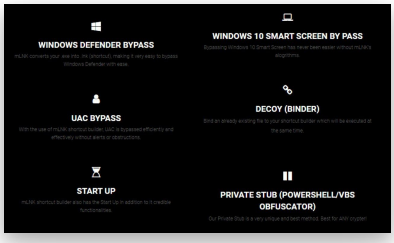
The price of the tool starts from $100 (per month) with the option to evade Windows Defender, Smart Screen and UAC:




mLNK tool evades Windows Defender, Smart Screen & UAC

The features of the mLNK builder include bypassing the following solutions:

1. Windows Defender
2. Windows Defender Memory
3. Windows Defender Cloud Scanner
4. Smart Screen Alert
5. AMSI and MUCH MORE!

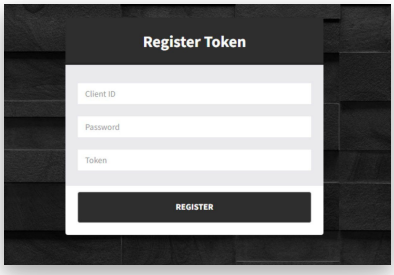



The features of mLNK

After buying the tool, the author of the tool will send you text file containing the credential to login.


The text file containing credentials to login

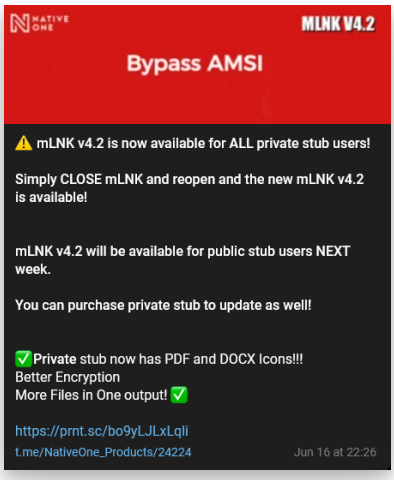
After we opened the link we found this page, we must enter the credentials which were sent by the author, after registering the tool will downloaded.

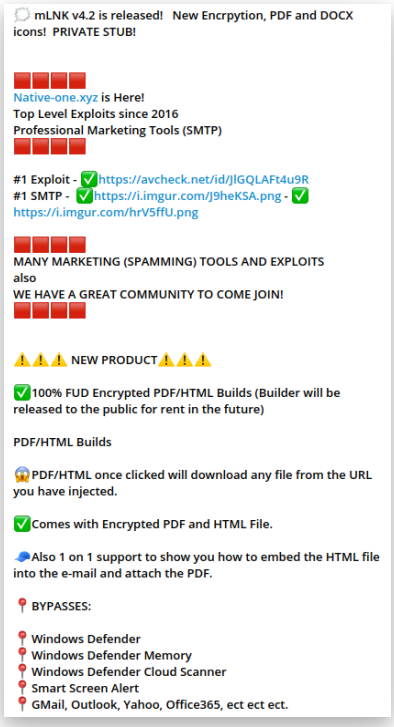



Token registration

Recently they published a new version of the tool, it will be free to all the old users, it now also contains new ICONs like Documents and PDF as we will see in this report.

- https://t.me/NativeOne_Products/24224



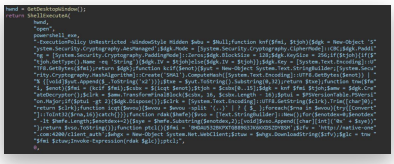




# The Analysis Of The Tool

Here we can see the analysis of the tool, we can see there are two functions.


Analyzing the malicious tool

When examining the sub_401350, we can see how the tool use ShellExcuteA to execute the PowerShell code. This PowerShell communicates with C&C, we can see that in the next figure.

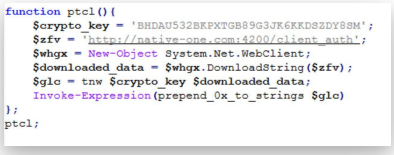


PowerShell communicates with C&C

After downloading the binary from C&C, we can decode the payload by using the base64 decoder, then use ASE decryption to decrypt the payload, we can then see the process the tool follows to decrypt the payload,

1. Downloading the payload from "*https://native-one[.]com:4200/client_auth*"
2. Gets '*BHDAU532BKPXTGB89G3JK6KKDSZDY8SM*' converts to bytes and computes sha1 and convert to hex string returns first 32chars of hexstring(aeskey) == *fc002b88fa5ccd51bfabd8c753e8aa3d*
3. coverts downloaded payload each hex XX to an array of decimal values and get the first 16 and uses it as IV for AES
4. Decryption AES CBC 256 key == *fc002b88fa5ccd51bfabd8c753e8aa3d* (32bytes

each char 1 byte) IV == *9042766da089753480c479e2b342862f* - fromhex(16bytes).

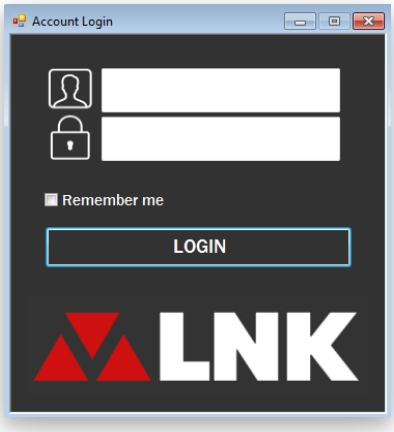



Using ASE decryption on the payload

After decrypting the payload, we got a second PowerShell code that's used to validate the credentials, we can see that in the next figure.

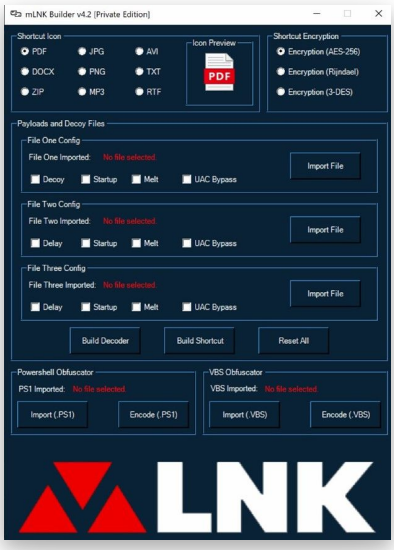

Decrypting the payload reveals second PowerShell code

After executing the tool, the email and password used to register is required once again, we can see this in the next figure.



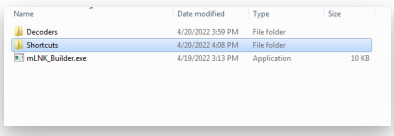
After executing the tool

We register with the email and password, then we get the GUI for the tool enabling us to start converting payloads into .LNK files, we can see that in the next figure.




GUI after logging in

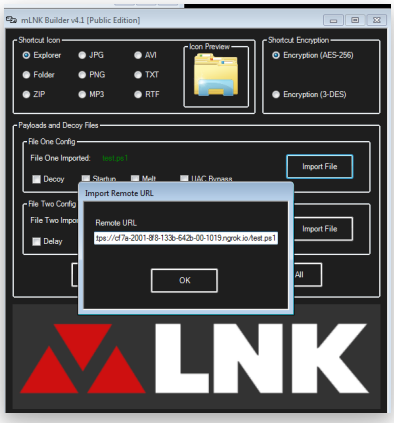
We can see the folder setup the tool uses which has a Decoders payloads, also we can see the shortcuts for the converted payloads, we can see that in the next figure.




We can now see the folder tree

We create four payloads to test detection, after creating the payloads, we start importing them one by one to create shortcuts for them. We test

detection by using windows defender and others, we can see importing file into the next figure.

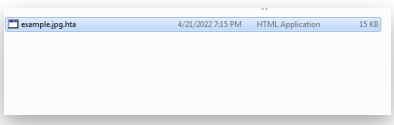



Creating four payloads to test detection

After that we can build the decoder and we can see that in the next figure.

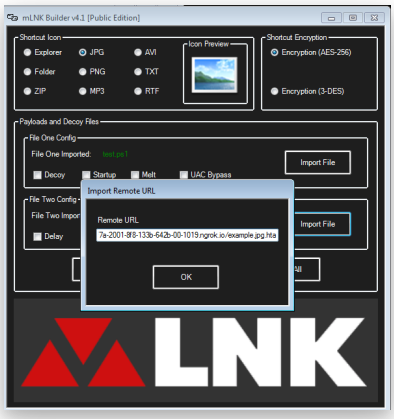

Building the decoder

After decoding the payload, it will save in the Decoders folders, we can see that in the next figure.



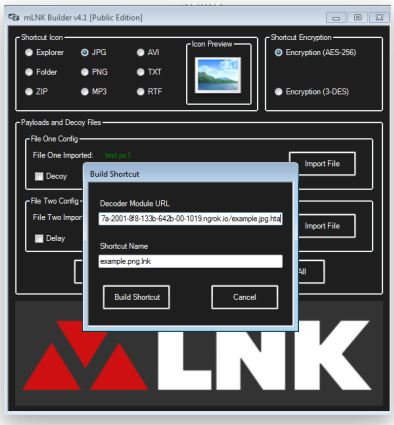

Saved in decoders folder

And after that we can import the URL of decoded payload and create the .LNK, we can see that in the next figure.



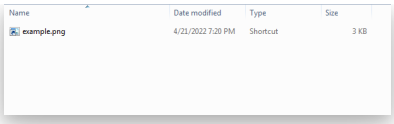

Creating four payloads to test detection

Now, we can build the .LNK file, we can see that in the next figure



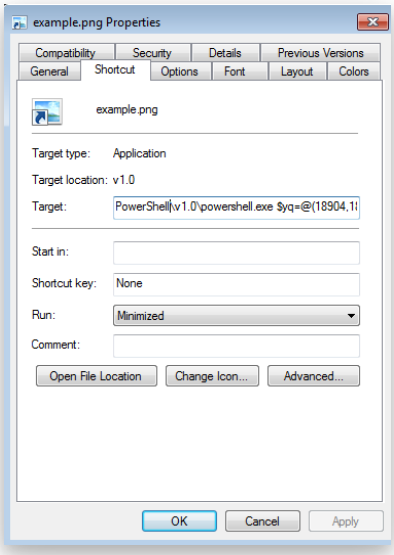

Building the malicious .LNK (shortcut) file

Finally, we can see the .LNK file in the shortcut folder, we can see that in the next figure.




After the creation of the file, we can see the location

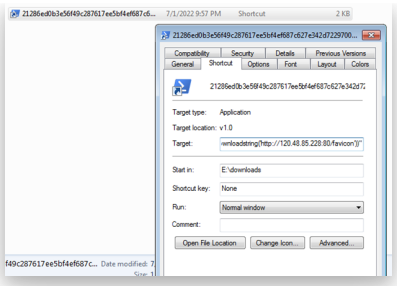
So, now we can examine the target file and see how the .LNK file was created, we can see that in the next figure.

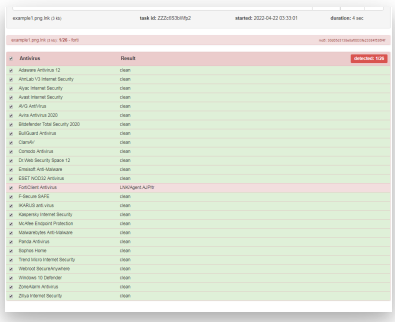


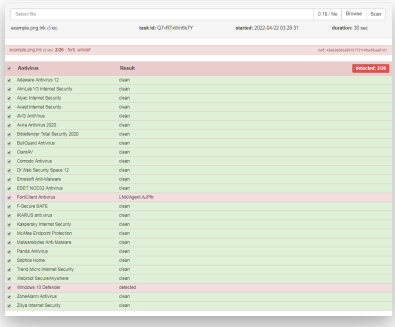

Examining the target file to see how it was created

From the previous figure, we can see how the target contains PowerShell code. Now, we want to test the detection of the payload.

The attackers recently generated a new .LNK file with the PowerShell ICON, this is not common, the .LNK technique nowadays is widely used as we can see in the below screenshot, this is a PowerShell .LNK containing a new stage of the malware.


Compatibility
Security
Details
Previous Versions
General
Shortcut
Options
Font
Layout
Colors
Target type: Application
Target location: v1.0
Target:
Start in: E:\downloads
Shortcut key: None
Run: Normal window
Comment:
Open File Location
Change Icon...
Advanced...



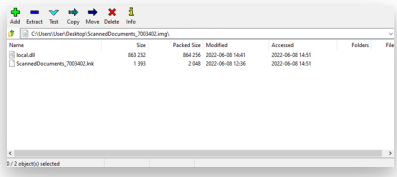


As observed, the newest version of mLNK Builder demonstrated very low detection rates by popular antivirus products which increases the effectiveness of the malicious .LNK files in cyber-attacks.

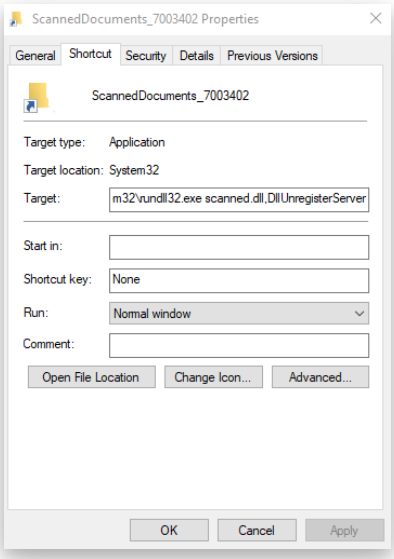
Recently we found qabot was using the LNK technique.

obama187 - .html > .zip > .img > .lnk > .dll

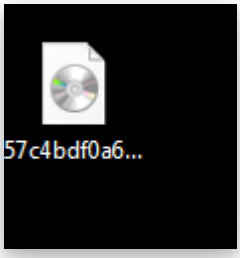
as we can see there are two files the LNK file will run the dll file



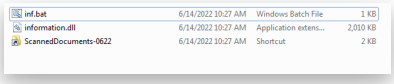
Here we can see the LNK command “rundll32.exe scanned.dll,DllUnregisterServer”



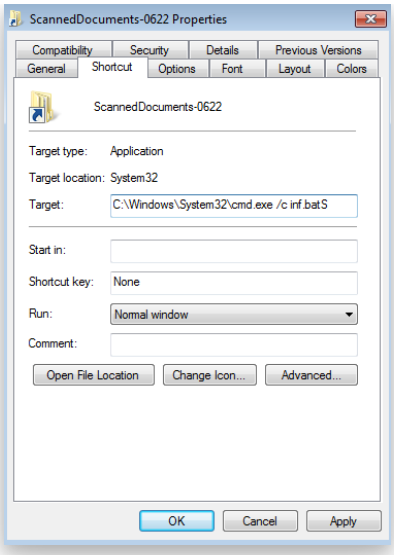
Also, we observed how Bumblebee used the LNK technique
via OneDrive URLs -> IMG -> LNK -> BAT -> DLL recently



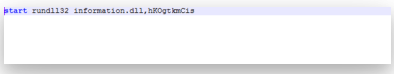

After we extracted the ISO we found these files, the shortcut was conations, code to run the batch file.




As we can see the shortcut contains the code to run the batch file in the screenshot below.

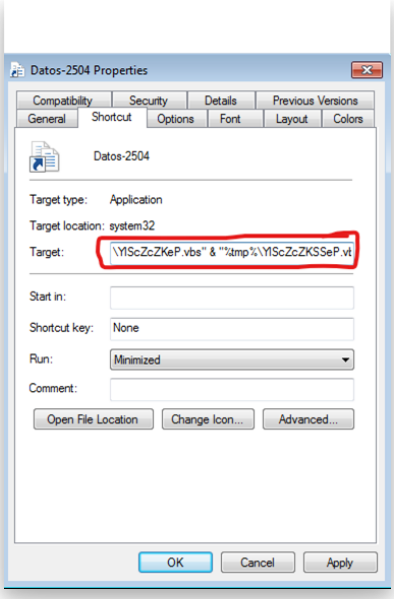



The batch conations this code to run the DLL library.

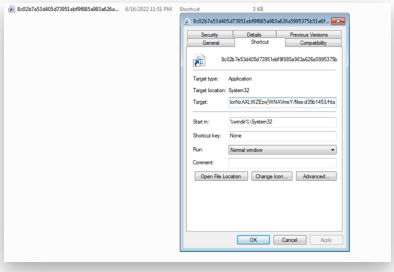



Also, recently we caught emotet using the technique to run VBS code via the LNK file, as we can see in the below screenshot the LNK file contains the malicious code:

“C:\Windows\system32\cmd.exe /v:on /c findstr "glKmfOKnQLYKnNs.*" "Datos-2504.lnk" > "%tmp%\YlScZcZKeP.vbs" & "%tmp%\YlScZcZKSSeP.vbs"”

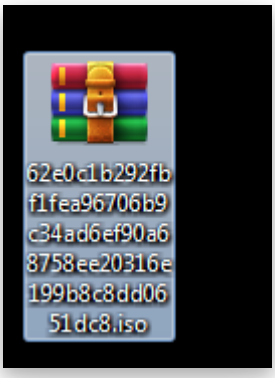



Another SideWinder malware was using LNK

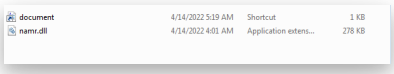


It will download a new stage by using this command.

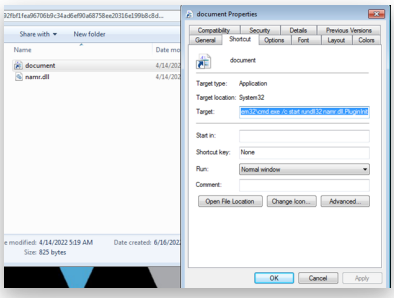
Another sample was related to ICDL malware, it was also using LNK
ISO -> LNK -> DLL

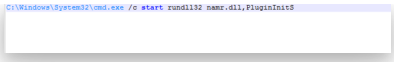



It contained these files, the document file contains the command to run the DLL library.



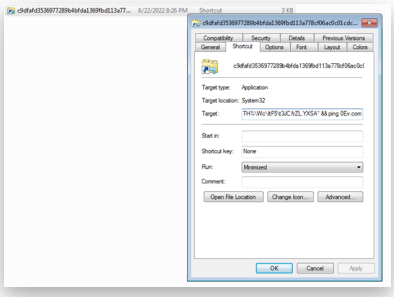

As we can see here, the command.



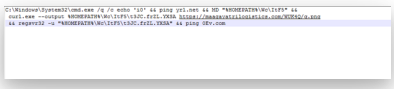



Also, we have found a new one related to Matanbuchus. Matanbuchus Loader is a new malware-as-a-service created by a threat actor who references demonic themes in software and usernames.

It appears as a normal file but contains malicious code within it, as we can see in the below screenshot




The malicious code will ping a malicious domain to create a new directory “ItF5”, and it will download new file as an image then change it to a new file, and run it.



# IOCs:

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567dde18d84ceb426dfd181492cee959
ff942b936242769123c61b5b76a4c7ad
bfc3995ae78a66b857863ad032a311ae
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27c86be535bedfb6891068f9381660ac
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115D7891A2ABBE038C12CCC9ED3CFEEDFDD1242E51BCC67BFA22C7CC25

# References:

- UAC-0010 (Armageddon) Activity targeting EU Countries
https://cert.gov.ua/article/39086