

# Ryuk in 5 Hours - The DFIR Report

By editor

Published: 2020-10-18 · Archived: 2026-04-05 18:51:56 UTC

## Intro

The Ryuk threat actors went from a phishing email to domain wide ransomware in 5 hours. They escalated privileges using Zerologon (CVE-2020-1472), less than 2 hours after the initial phish. They used tools such as Cobalt Strike, AdFind, WMI, and PowerShell to accomplish their objective.

Ryuk has been one of the most proficient ransomware gangs in the past few years, with the FBI claiming [\\$61 million USD](#) having been paid to the group as of February 2020. Earlier in the year, the group grew a little quiet, but that seems to have changed in the past few weeks, with incidents like what occurred at [UHS hospitals](#).

## Case Summary

In our previous [Ryuk case](#), we saw the threat actors leverage access to an environment via the Bazar Loader malware. This time around, we saw them accomplish their objective faster, but the general tactics and techniques stayed similar between incidents.

Bazar was introduced to the environment again with the delivery via phishing emails. For an in depth breakdown on this loader, see [this analysis](#) by Roman Marshanski & [Vitali Kremez](#). Bazar, once running, was seen again injecting into explorer.exe, svchost.exe, and spawning command shell processes.

From this loader we saw initial mapping of the domain, using built-in windows utilities such as Nltest. However, unlike the last case, the threat actors started at a lower privileged user and rather than proceed slowly or cautiously, they exploited the recently disclosed Zerologon vulnerability (CVE-2020-1472) to reset the machine password of the primary domain controller.

Lateral movement was initiated via SMB file transfers and WMI executions of Cobalt Strike Beacons. The network indicators align similarly to the prior campaign and were noted by [Kyle Ehmke](#) in response to our last post pivoting off the prior report's intel. From memory analysis, we were also able to conclude the actors were using a trial version of Cobalt Strike with the EICAR string present in the network configuration for the beacon. Both portable executable and DLL beacons were used.

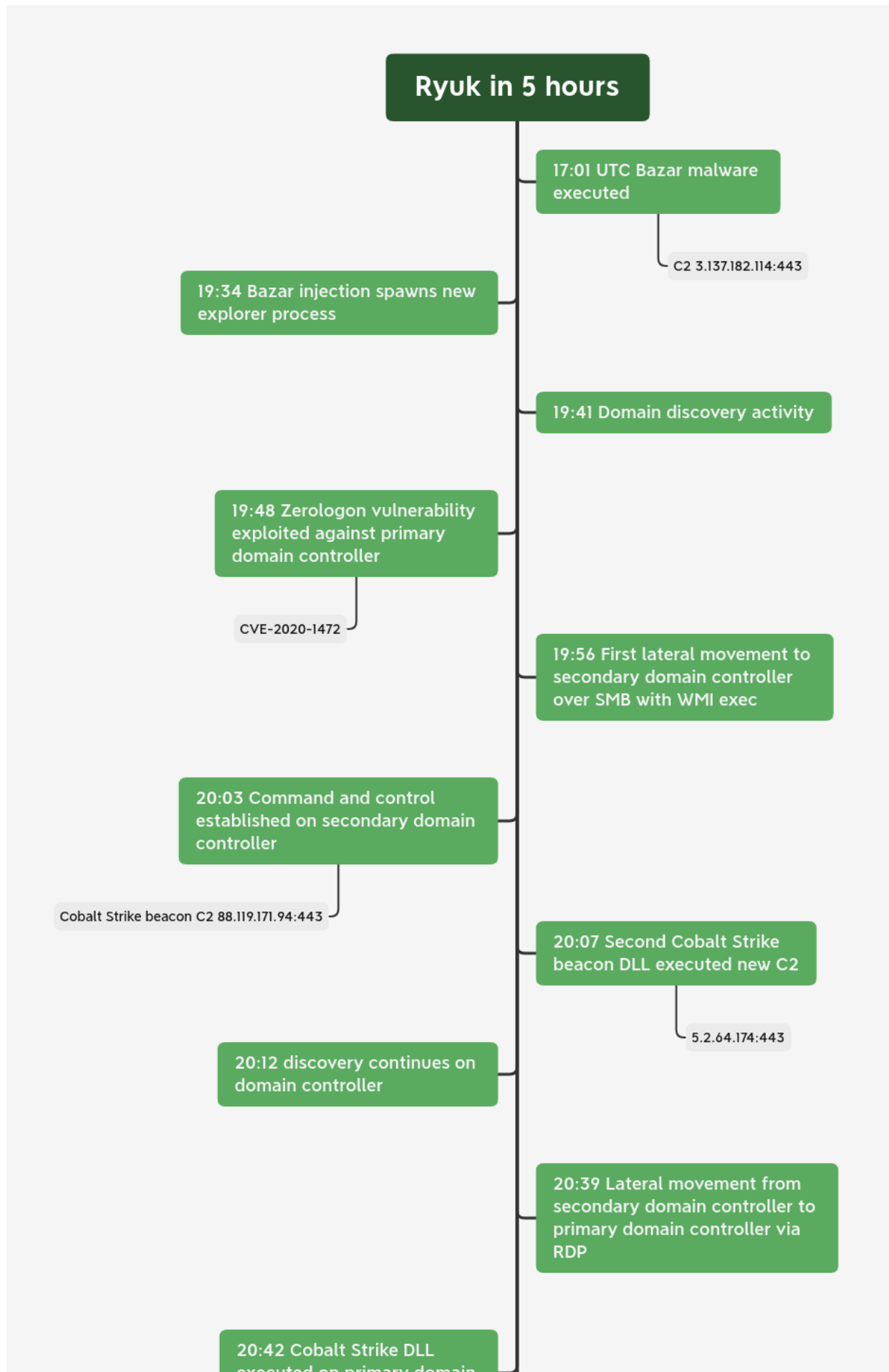
After moving laterally to the secondary domain controller, the threat actor started on more domain discovery via Net and the PowerShell Active Directory module. From there, the threat actors appeared to use the default named pipe privilege escalation module on the server. At this point, the threat actors used RDP to connect from the secondary domain controller, to the first domain controller, using the built in Administrator account.

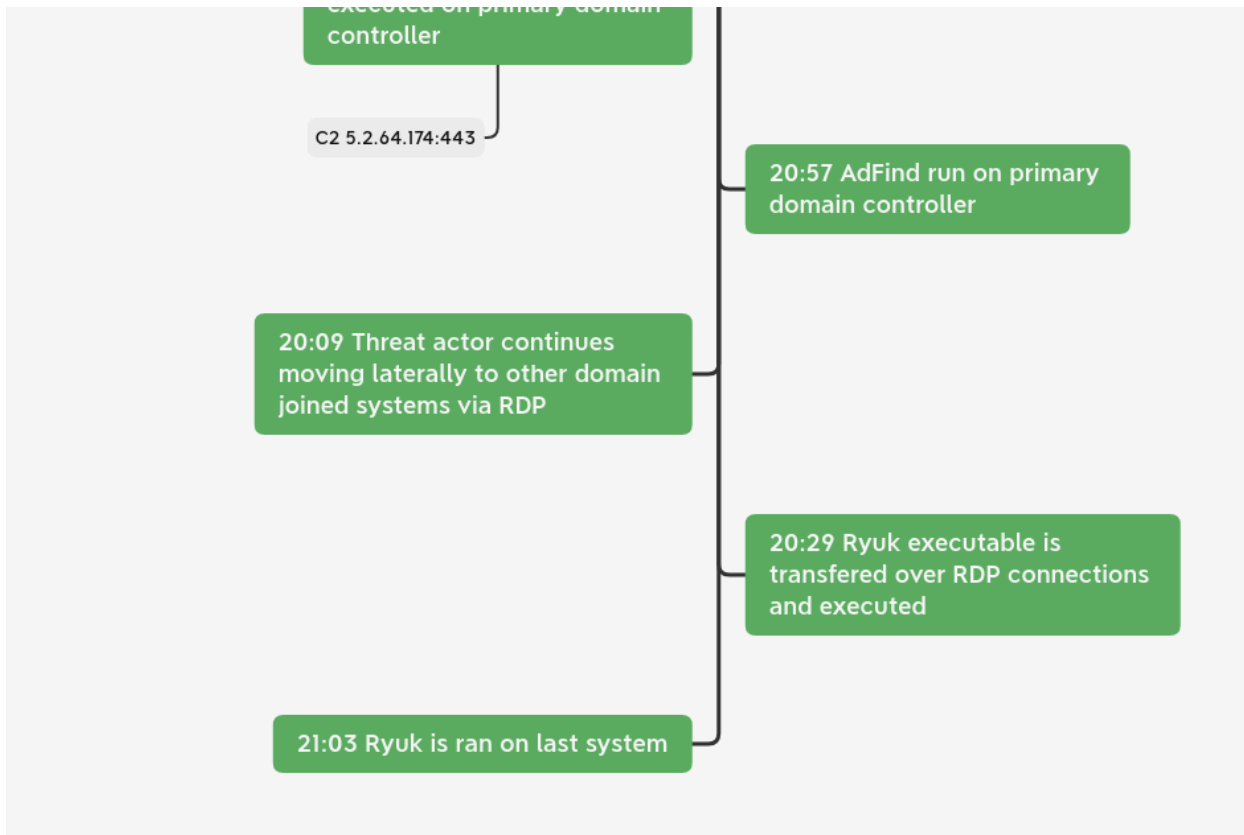
Once on the main domain controller, another Cobalt Strike beacon was dropped and executed. Then more domain reconnaissance was performed using [AdFind](#). Once this completed, at the four hour mark, the threat actors were ready for their final objective.

Four hours and 10 minutes in, the threat actors used the pivot from the primary domain controller to RDP into the Backup server. Backup servers were again targeted first for deployment of the ransomware executable, followed by servers and then workstations. The threat actors finished their objective by executing the ransomware on the primary domain controller, and at the 5 hour mark, the attack completed.

While last time we commented on the lead time between the first and second day to aid detection and response activity, this case goes to show that you can't count on that kind of timescale. You need to be ready to act in less than an hour, to make sure you can effectively disrupt the threat actor.

## **Timeline**





## MITRE ATT&CK

### Initial Access

Access was initiated by a phishing email leading to the Bazar Loader malware executable.

### Execution

Bazar relies on user execution of an executable to run. This user was a Domain User and did not have any other permissions.

### Privilege Escalation

CVE-2020-1472 was used to reset the credentials on one of the domain controllers in the environment. After resetting the password, the threat actors then targeted a different domain controller, potentially due to breaking services by use of their exploit.

No.	Time	Source	Destination	Protocol	Length	Info
13610	185.683265	10.	10.	DCERPC	330	Bind: call_id: 2, Fragment: Single, 3 context items: RPC_NETLOGON V1.0 (32bit NDR), RPC_NETLOGON V1.0 (64bit NDR), RPC_NETLOGON V1.0 (6c71c2c-9812-4540-0300-00000000...
13611	185.683268	10.	10.	DCERPC	254	Bind.ack: call_id: 2, Fragment: Single, max_xmit: 4280 max_recv: 4280, 3 results: Provider rejection, Acceptance, Negotiate ACK
13614	185.683269	10.	10.	RPC_NETLOGON	322	NetServerReqChallenge request,
13615	185.683271	10.	10.	RPC_NETLOGON	206	NetServerReqChallenge response
13622	185.683316	10.	10.	DCERPC	330	Bind: call_id: 2, Fragment: Single, 3 context items: RPC_NETLOGON V1.0 (32bit NDR), RPC_NETLOGON V1.0 (64bit NDR), RPC_NETLOGON V1.0 (6c71c2c-9812-4540-0300-00000000...
13625	185.683319	10.	10.	DCERPC	254	Bind.ack: call_id: 2, Fragment: Single, max_xmit: 4280 max_recv: 4280, 3 results: Provider rejection, Acceptance, Negotiate ACK
13626	185.683326	10.	10.	RPC_NETLOGON	366	NetServerAuthenticate2 request
13627	185.683321	10.	10.	RPC_NETLOGON	210	NetServerAuthenticate2 response, STATUS_ACCESS_DENIED
13634	185.683346	10.	10.	DCERPC	330	Bind: call_id: 2, Fragment: Single, 3 context items: RPC_NETLOGON V1.0 (32bit NDR), RPC_NETLOGON V1.0 (64bit NDR), RPC_NETLOGON V1.0 (6c71c2c-9812-4540-0300-00000000...
13637	185.683364	10.	10.	DCERPC	254	Bind.ack: call_id: 2, Fragment: Single, max_xmit: 4280 max_recv: 4280, 3 results: Provider rejection, Acceptance, Negotiate ACK
13638	185.683365	10.	10.	RPC_NETLOGON	322	NetServerReqChallenge request,
13639	185.683366	10.	10.	RPC_NETLOGON	206	NetServerReqChallenge response
13644	185.683386	10.	10.	DCERPC	330	Bind: call_id: 2, Fragment: Single, 3 context items: RPC_NETLOGON V1.0 (32bit NDR), RPC_NETLOGON V1.0 (64bit NDR), RPC_NETLOGON V1.0 (6c71c2c-9812-4540-0300-00000000...
13649	185.683406	10.	10.	DCERPC	254	Bind.ack: call_id: 2, Fragment: Single, max_xmit: 4280 max_recv: 4280, 3 results: Provider rejection, Acceptance, Negotiate ACK
13650	185.683407	10.	10.	RPC_NETLOGON	366	NetServerAuthenticate2 request
13652	185.683425	10.	10.	RPC_NETLOGON	210	NetServerAuthenticate2 response, STATUS_ACCESS_DENIED
13669	185.683451	10.	10.	DCERPC	330	Bind: call_id: 2, Fragment: Single, 3 context items: RPC_NETLOGON V1.0 (32bit NDR), RPC_NETLOGON V1.0 (64bit NDR), RPC_NETLOGON V1.0 (6c71c2c-9812-4540-0300-00000000...
13663	185.683470	10.	10.	DCERPC	254	Bind.ack: call_id: 2, Fragment: Single, max_xmit: 4280 max_recv: 4280, 3 results: Provider rejection, Acceptance, Negotiate ACK
13664	185.683471	10.	10.	RPC_NETLOGON	322	NetServerReqChallenge request,
13665	185.683472	10.	10.	RPC_NETLOGON	206	NetServerReqChallenge response
13672	185.683497	10.	10.	DCERPC	330	Bind: call_id: 2, Fragment: Single, 3 context items: RPC_NETLOGON V1.0 (32bit NDR), RPC_NETLOGON V1.0 (64bit NDR), RPC_NETLOGON V1.0 (6c71c2c-9812-4540-0300-00000000...
13675	185.683497	10.	10.	DCERPC	254	Bind.ack: call_id: 2, Fragment: Single, max_xmit: 4280 max_recv: 4280, 3 results: Provider rejection, Acceptance, Negotiate ACK
13676	185.683498	10.	10.	RPC_NETLOGON	366	NetServerAuthenticate2 request
13677	185.683505	10.	10.	RPC_NETLOGON	210	NetServerAuthenticate2 response
13684	185.683541	10.	10.	DCERPC	330	Bind: call_id: 2, Fragment: Single, 3 context items: RPC_NETLOGON V1.0 (32bit NDR), RPC_NETLOGON V1.0 (64bit NDR), RPC_NETLOGON V1.0 (6c71c2c-9812-4540-0300-00000000...
13687	185.683544	10.	10.	DCERPC	254	Bind.ack: call_id: 2, Fragment: Single, max_xmit: 4280 max_recv: 4280, 3 results: Provider rejection, Acceptance, Negotiate ACK
13688	185.683545	10.	10.	RPC_NETLOGON	366	NetServerAuthenticate2 request [Malformed Packet]
13689	185.683592	10.	10.	RPC_NETLOGON	210	NetServerPasswordSet response [Malformed Packet]

```

+ Frame 13688: 882 bytes on wire (7056 Bits), 882 bytes captured (7056 bits)
+ Ethernet II, Src: [redacted]
+ Internet Protocol
+ Transmission Control Protocol, Src Port: 53037, Dst Port: 445, Seq: 563280, Ack: 451532, Len: 828
+ NetBIOS Session Service
+ SMB2 (Server Message Block Protocol version 2)
+ Distributed Computing Environment / Remote Procedure Call (DCE/RPC) Request, Fragment: Single, FragLen: 704, Call: 2, Ctx: 1, [Resp: #13690]
- Microsoft Network Logon, NetServerPasswordSet
  Operation: NetServerPasswordSet (30)
  [Response in Frame: 13690]
  + Server Handle
  - unknown string
  Referent ID: 0x0000000000000000
  Max Count: 0
  Offset: 5
  Actual Count: 4399980
- [Malformed Packet: RPC_NETLOGON]
- [Expert Info (Error/Malformed): Malformed Packet (Exception occurred)]
  [Malformed Packet (Exception occurred)]
  [Severity level: Error]
  [Group: Malformed]
    
```

Packet showing the zeroed out password.

```
Microsoft Network Logon, NetrServerPasswordSet2
Operation: NetrServerPasswordSet2 (30)
[Request in frame: 13688]
  AUTHENTICATOR: return_authenticator
  Referent ID: 0x727a324725c96601
  Credential: 0000000000000000
  [Malformed Packet: RPC_NETLOGON]
  [Expert Info (Error/Malformed): Malformed Packet (Exception occurred)]
  [Malformed Packet (Exception occurred)]
  [Severity level: Error]
  [Group: Malformed]
```

On one of the domain controllers we saw use of the Cobalt Strike named pipe escalation.

```
C:\Windows\system32\cmd.exe /c echo 92d8cc45954 >; \\.\pipe\446b3c
```

### Defense Evasion

On the first domain controller that the treat actors connected to after their initial connection, they dropped a DLL and executed it via rundll32.

```
C:\Windows\system32\cmd.exe /C rundll32 C:\Windows\system32\SQL.dll, StartW
```

Dropped via RDP and executed via rundll32 on the second domain controller.

```
rundll32 C:\PerfLogs\arti64.dll, rundll
```

Shortly after, the DLL was called again via regsvr32.

```
regsvr32 C:\PerfLogs\arti64.dll
```

Then a 2nd DLL was dropped and executed in a similar manner on the 2nd DC.

```
rundll32 C:\\PerfLogs\\socks64.dll, rundll
```

### Discovery

Ran on the beachhead.

```
nltest /domain_trusts /all_trusts
nltest /dclist:DOMAIN
net group "Domain admins" /DOMAIN
```

Ran on a domain controller.

```
net group "enterprise admins" /domain
nltest /domain_trusts /all_trusts
nltest /dclist:"DOMAIN"
ping DOMAINCONTROLLER
```

```
cmd.exe /C time
net user administrator /domain
```

Then they imported the PowerShell Active Directory module.

```
C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe -nop -exec bypass -EncodedCommand SQBtAHAAbwByAHQALQBNAG8AZAB1AGwAZQAgAEEAYwB0AGkAdgBIAEQAAQByAGUAYwB0AG8AcgB5AA==
```

They then ran the following looking for host names, operating systems and last logon dates of all AD systems.

```
C:\Windows\system32\cmd.exe /C Get-ADComputer -Filter {enabled -eq $true} -properties *|select Name, DNSHostName
```

After already completing the above discovery work and having already pivoted to their 2nd domain controller, the threat actors moved on to AdFind for further domain reconnaissance.

```
C:\Windows\Temp\adf\AdFind.exe
C:\Windows\Temp\adf\adf.bat
```

Contents of the script ran the following with AdFind.

```
adfind.exe -f "(objectcategory=person)"
adfind.exe -f "(objectcategory=computer)"
adfind.exe -f "(objectcategory=organizationalUnit)"
adfind.exe -sc trustdmp
adfind.exe -subnets -f (objectCategory=subnet)
adfind.exe -f "(objectcategory=group)"
adfind.exe -gcb -sc trustdmp
```

The threat actor then ran this command a few times.

```
nltest /domain_trusts /all_trusts
```

### Lateral Movement

The first lateral movement occurred to the domain controller not affected by the use of CVE-2020-1472. An executable was transferred to it via SMB using a domain administrator account.

```
2020/10/18 [redacted] ack psh 352 bytes
\*\SMB@8000\*.k9*x\PerfLogs\servisess.exe8 DH2Q06R>1MxAcQFid4RqLsM
00000000/
```

```
"File created:
RuleName: -
UtcTime: [redacted]
ProcessGuid: {f3f0e111-bfcf-5f74-0100-00000000b00}
ProcessId: 4
Image: System
TargetFilename: C:\PerfLogs\servisess.exe
```

After transferring the exe, the threat actors utilized WMI from the beachhead host to execute the file.

```
C:\Windows\system32\cmd.exe /C WMIC/node:"DC.DOMAIN.local" process call create "cmd /c C:\PerfLogs\servisses. .
```

The presence of the EICAR strings point to the Cobalt Strike software being used as a [trial version](#).

```
AQAPRQVH1
JJM1
RAQH
AXAX^YZAXAYAZH
XAYZH
wininet
APAPA
AQAJ
/wp-includes/modcp.png
50!P%QAP[4\PZX54(P^)7CC)7}$EICAR-STANDARD-ANTIVIRUS-TEST
Connection: close
Accept-Language: en-US
User-Agent: Mozilla/5.0 (Linux; Android 6.0; HTC One X10 Build/MRA58K; wv) AppleWebKit/537.36 (KHTML, like Gecko) Version/4.0
50!P%QAP[4\PZX54(P^)7CC)7}$EICAR-STANDARD-ANTIVIRUS-TEST-FILE!$H+H*
50!P%QAP[4\PZX54(P^)7CC)7}$EICAR-STANDARD-ANTIVIRUS-TEST-FILE!$H
XXXH
havemosts.com
```

They accessed the GPO's for the domain but none were modified or added.

```
mmc.exe "C:\Windows\System32\gpedit.msc"
```

Shortly there after we saw a Cobalt Strike DLL transferred via the RDP connection.

```
"File created:
RuleName: technique_id=T1047,technique_name=File System Permissions Weaknes
s
UtcTime:
ProcessGuid: {1372730A-D516-5F74-6700-00000000F00}
ProcessId: 2656
Image: C:\Windows\Explorer.EXE
TargetFilename: C:\PerfLogs\arti64.dll
CreationUtcTime:
```

RDP was used to pivot from the main domain controller and distribute the final ransomware payload enterprise wide.

### Command and Control

After our previous report, [@kyleehmke](#) pivoted off of our prior Ryuk report and used the network data to link several of these [domains](#) which we saw in this case.

#### Bazar:

Report\_Print.exe

3.137.182.114:443

cstr3.com

#### Cobalt Strike:

servisses.exe

88.119.171.94:443

Issuer Org lol

Subject Org lol

JA3: 57f3642b4e37e28f5cbe3020c9331b4c

JA3s: e35df3e00ca4ef31d42b34bebaa2f86e

SQL.dll

5.2.64.174:443

Issuer Org lol

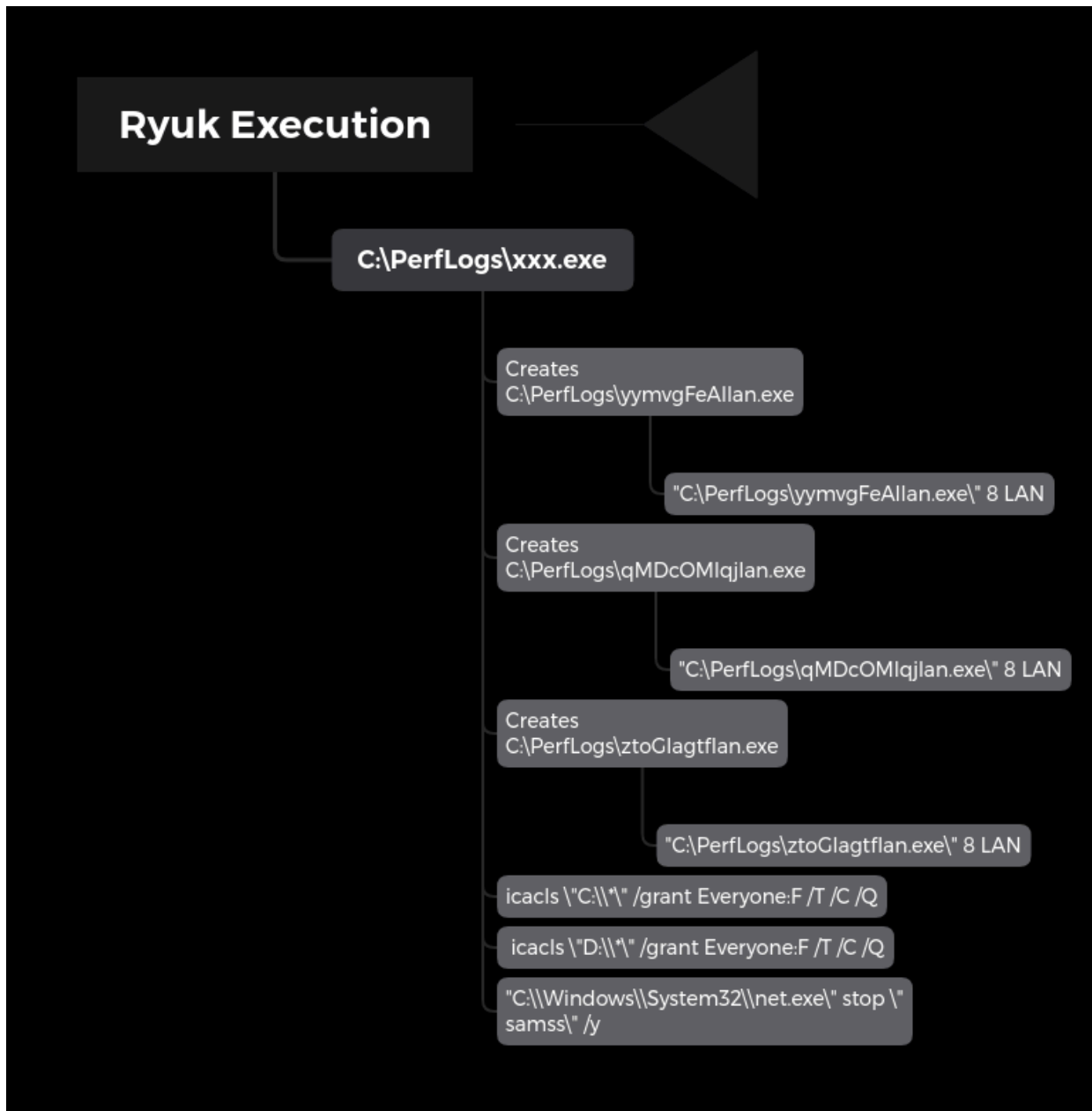
Subject Org lol

JA3: a0e9f5d64349fb13191bc781f81f42e1

JA3s: ae4edc6faf64d08308082ad26be60767

### **Impact**

Starting around 4.5 hours after the initial Bazar malware was executed, the Ryuk threat actors acted on their final objectives and initiated RDP connections from the domain controller previously exploited, to the rest of the environment. This time they initiated the ransomware first on the secondary domain controller (their 1st pivot) and transferred the Ryuk executable over the RDP connection.



Enjoy our report? Please consider donating \$1 or more to the project using [Patreon](#). Thank you for your support!

We also have pcaps, files, memory images, Kape and Redline packages available [here](#).

## IOCs

<https://misppriv.circl.lu/events/view/80223> & <https://otx.alienvault.com/pulse/5f8cce76f5614d9b220181b6>

## Network

3.137.182.114:443  
cstr3.com  
88.119.171.94:443  
havemosts.com  
5.2.64.174:443  
quwasd.com

## File

```
servisses.exe
d971827d974effedaeaf7d62b619b1dd
c3a846eb04e2fe765e56fa15a0d5c1eb650ccba3
1d8b7faf5f290465cc742e07abca78fac419135b191071cc77912263cd1dde1d
socks64.dll
890206f0c506366d480e02fc9fed988a
ba1542d9b55fff21bda9495ed884404b0436cff2
feb8c2bcb71da02dbbeecb999869e053cf96af8cce6f9705cadca4338133d3b5
SQL.dll
3785d87f6995b4b95d9b55f8d2556237
9b44a8f0bb2d65fb19e7ca7bbd85b36c176f3d60
d67461ba45a4edf3b2a69b3e64303fda8130bd1fc7a1173f35c1fe67b40c9639
arti64.dll
3785d87f6995b4b95d9b55f8d2556237
9b44a8f0bb2d65fb19e7ca7bbd85b36c176f3d60
d67461ba45a4edf3b2a69b3e64303fda8130bd1fc7a1173f35c1fe67b40c9639
xxx.exe
5b8b66ddb1fd67211e9a4bf78c1700
cdb042dd8e9dc17f677c991b386f4cd242f2628d
ccde47a0d315dcd4740fccfe8e8110fbb1fd85bb305734fec409f52051790c98
```

## Detections

### Network

```
GPL NETBIOS SMB-DS IPC$ share access
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
```

## Sigma

[https://github.com/Neo23x0/sigma/blob/master/rules/windows/malware/win\\_mal\\_ryuk.yml](https://github.com/Neo23x0/sigma/blob/master/rules/windows/malware/win_mal_ryuk.yml)

[https://github.com/Neo23x0/sigma/blob/master/rules/windows/process\\_creation/win\\_powershell\\_suspicious\\_parameter\\_variation.y](https://github.com/Neo23x0/sigma/blob/master/rules/windows/process_creation/win_powershell_suspicious_parameter_variation.y)

[https://github.com/Neo23x0/sigma/blob/master/rules/windows/process\\_creation/win\\_susp\\_wmi\\_execution.yml](https://github.com/Neo23x0/sigma/blob/master/rules/windows/process_creation/win_susp_wmi_execution.yml)

[https://github.com/Neo23x0/sigma/blob/master/rules/windows/process\\_creation/win\\_trust\\_discovery.yml](https://github.com/Neo23x0/sigma/blob/master/rules/windows/process_creation/win_trust_discovery.yml)

[https://github.com/Neo23x0/sigma/blob/master/rules/windows/process\\_creation/win\\_susp\\_net\\_execution.yml](https://github.com/Neo23x0/sigma/blob/master/rules/windows/process_creation/win_susp_net_execution.yml)

Detects AdFind usage from a past case:

```
title: AdFind Recon
description: Threat Actor using AdFind for reconnaissance.
author: The DFIR Report
date: 2019/8/2
references:
  - https://thedfirreport.com/2020/08/03/dridex-from-word-to-domain-dominance/
tags:
```

```
- attack.remote_system_discovery
- attack.T1018
logsource:
  category: process_creation
  product: windows
detection:
  selection_1:
    CommandLine|contains:
      - adfind -f objectcategory=computer
  selection_2:
    CommandLine|contains:
      - adfind -gcb -sc trustdmp
  condition: selection_1 or selection_2
falsepositives:
  - Legitimate Administrator using tool for Active Directory querying
level: medium
status: experimental
```

## Yara

```
/*
YARA Rule Set
Author: The DFIR Report
Date: 2020-10-13
Identifier: Case 1006 Ryuk
Reference: https://thedfirreport.com/
*/

/* Rule Set ----- */

import "pe"

rule ryuk_1006_servisses_procdump {
meta:
description = "files - file servisses-procdump.exe"
author = "The DFIR Report"
reference = "https://thedfirreport.com/"
date = "2020-10-13"
hash1 = "387894a0b404c67e722799308b12ff2be31d2e8ce798aa53d971f0c13805d54d"
strings:
$s1 = "c:/crossdev/src/winthreads-svn6233/src/mutex.c" fullword ascii
$s2 = "mutex_global_shmem" fullword ascii
$s3 = "mutex_global_static_shmem" fullword ascii
$s4 = "_pthread_key_dest_shmem" fullword ascii
$s5 = "_pthread_key_sch_shmem" fullword ascii
$s6 = "_pthread_key_max_shmem" fullword ascii
$s7 = "_pthread_key_lock_shmem" fullword ascii
$s8 = "cannot find name of executable" fullword ascii
$s9 = "tiles32.png" fullword ascii
$s10 = "GetModuleFileName: %s" fullword ascii
$s11 = "IP_DEST_HOST_UNREACHABLE (11003)" fullword ascii
$s12 = "This program requires Windows NT!" fullword ascii
```

```
$s13 = "SNMP_INVALID_SESSION" fullword ascii
$s14 = "SNMP_TRAP_ERRORS" fullword ascii
$s15 = "SNMP_SELECT_FDERRORS" fullword ascii
$s16 = "Some different radices: %d %x %o %#x %#o " fullword ascii
$s17 = "c:/crossdev/src/winpthreads-svn6233/src/rwlock.c" fullword ascii
$s18 = "_pthread_tls_shmem" fullword ascii
$s19 = "IP_DEST_PORT_UNREACHABLE (11005)" fullword ascii
$s20 = "pthr_root_shmem" fullword ascii
condition:
uint16(0) == 0x5a4d and filesize < 2000KB and
( pe.imphash() == "a90d500745a1ce2417c01fecefb2851" or 8 of them )
}

rule ryuk_1006_files_socks64 {
meta:
description = "files - file socks64.dll"
author = "The DFIR Report"
reference = "https://thedfirreport.com/"
date = "2020-10-13"
hash1 = "feb8c2bcb71da02dbbeeb999869e053cf96af8c6e6f9705cadca4338133d3b5"
strings:
$x1 = "C:\\Users\\Izidu\\Desktop\\2019\\WindowsSDK7-Samples-master\\WindowsSDK7-Samples-master\\winui\\picture
$s2 = "C:\\Users\\Izidu\\Desktop\\2019\\WindowsSDK7-Samples-master\\WindowsSDK7-Samples-master\\winui\\picture
$s3 = "PluginSample.dll" fullword ascii
$s4 = "AppPolicyGetProcessTerminationMethod" fullword ascii
$s5 = "luginSample.pdb" fullword ascii
$s6 = "rundll" fullword ascii
$s7 = "AcquireSamplePlugin::DisplayConfigureDialog" fullword wide
$s8 = "AppPolicyGetThreadInitializationType" fullword ascii
$s9 = "`template-parameter-" fullword ascii
$s10 = "operator<=>" fullword ascii
$s11 = "operator co_await" fullword ascii
$s12 = "AppPolicyGetWindowingModel" fullword ascii
$s13 = "Transfer Completed Successfully!" fullword wide
$s14 = "AppPolicyGetShowDeveloperDiagnostic" fullword ascii
$s15 = "noexcept" fullword ascii
$s16 = "Read-Only Photo Acquire Plugin" fullword wide
$s17 = "api-ms-win-appmodel-runtime-l1-1-2" fullword wide
$s18 = "Software\\Microsoft\\Windows\\CurrentVersion\\Photo Acquisition\\Plugins\\%ws" fullword wide
$s19 = ".?AUIUserInputString@" fullword ascii
$s20 = "g0DVNrB\\"Rtf#" fullword ascii
condition:
uint16(0) == 0x5a4d and filesize < 2000KB and
( pe.imphash() == "0fd22f187f22ab4ec2eb55f91ccea7a" and ( pe.exports("SGeruIUrgVdfMaxMccIKRh") and pe.export:
}

rule ryuk_1006_Report_Print {
meta:
description = "files - file Report_Print.exe"
author = "The DFIR Report"
reference = "https://thedfirreport.com/"
date = "2020-10-13"
hash1 = "23ac461f9b5128841cafabb4282432252ea7b57874595cf6fe8457fc1ac65007"
```

```
strings:
$s1 = "kErNe132.Dll" fullword wide
$s2 = "D00K0L.exe" fullword ascii
$s3 = "c:/crossdev/src/winpthreads-svn6233/src/mutex.c" fullword ascii
$s4 = "hmutex" fullword ascii
$s5 = "._FindPESectionExec" fullword ascii
$s6 = "mutex_global_shmem" fullword ascii
$s7 = "processthreadsapi.h" fullword ascii
$s8 = "mutex_global_static_shmem" fullword ascii
$s9 = "TargetIp" fullword ascii
$s10 = "c:\\crossdev\\gccmaster\\build-tdm64\\gcc\\x86_64-w64-mingw32\\libgcc" fullword ascii
$s11 = "h:\\crossdev\\gccmaster\\build-tdm64\\runtime\\mingw-w64-crt" fullword ascii
$s12 = "J_mingw_winmain_lpCmdLine" fullword ascii
$s13 = "GNU C 4.8.1 -mtune=generic -march=x86-64 -g -O2 -O2 -O2 -fbuilding-libgcc -fno-stack-protector" fullw
$s14 = "GNU C 4.8.1 -mtune=generic -march=x86-64 -g -O2 -O2 -O2 -fbuilding-libgcc -fno-stack-protector -fno-e:
$s15 = "GNU C 4.8.1 -m64 -mtune=generic -march=x86-64 -g -O2 -std=gnu99" fullword ascii
$s16 = "GNU C 4.8.1 -mtune=generic -march=x86-64 -g -O2 -O2 -O2 -fbuilding-libgcc -fno-stack-protector -fexcej
$s17 = "9lpszCommandLine" fullword ascii
$s18 = "=_mingw_GetSectionForAddress" fullword ascii
$s19 = "=_mingw_winmain_lpCmdLine" fullword ascii
$s20 = "%Target" fullword ascii
condition:
uint16(0) == 0x5a4d and filesize < 3000KB and
( pe.imphash() == "8f0088451a1156246379abc67514cacf" and pe.exports("CSBhvSWCvFRvfCfAoJdoFuAUmK") or 8 of the
}

rule ryuk_1006_files_xxx {
meta:
description = "files - file xxx.exe"
author = "The DFIR Report"
reference = "https://thedfirreport.com/"
date = "2020-10-13"
hash1 = "ccde47a0d315dcd4740fccfe8e8110fbb1fd85bb305734fec409f52051790c98"
strings:
$s1 = "D00K0L.exe" fullword ascii
$s2 = "c:/crossdev/src/winpthreads-svn6233/src/mutex.c" fullword ascii
$s3 = "hmutex" fullword ascii
$s4 = "mutex_global_shmem" fullword ascii
$s5 = "processthreadsapi.h" fullword ascii
$s6 = "mutex_global_static_shmem" fullword ascii
$s7 = "fake_get_output_format" fullword ascii
$s8 = "&rvaTarget" fullword ascii
$s9 = "h:\\crossdev\\gccmaster\\build-tdm64\\runtime\\mingw-w64-crt" fullword ascii
$s10 = "c:\\crossdev\\gccmaster\\build-tdm64\\gcc\\x86_64-w64-mingw32\\32\\libgcc" fullword ascii
$s11 = "E_mingw_winmain_lpCmdLine" fullword ascii
$s12 = "GNU C 4.8.1 -m32 -mtune=generic -march=x86-64 -g -O2 -O2 -O2 -fbuilding-libgcc -fno-stack-protector"
$s13 = "GNU C 4.8.1 -m32 -mtune=generic -march=x86-64 -g -O2 -O2 -O2 -fbuilding-libgcc -fno-stack-protector -
$s14 = "GNU C 4.8.1 -m32 -mtune=generic -march=x86-64 -g -O2 -O2 -O2 -fbuilding-libgcc -fno-stack-protector -
$s15 = "GNU C 4.8.1 -m32 -mtune=generic -march=x86-64 -g -O2 -std=gnu99" fullword ascii
$s16 = "=_mingw_winmain_lpCmdLine" fullword ascii
$s17 = "Npthead_getspecific" fullword ascii
$s18 = "=_gthread_getspecific" fullword ascii
$s19 = "=_mingw_GetSectionForAddress" fullword ascii
```

```
$s20 = "4lpszCommandLine" fullword ascii
condition:
uint16(0) == 0x5a4d and filesize < 2000KB and
( pe.imphash() == "00f3261b5b33a9b1e8b6003f4056a885" and pe.exports("CSBhvSWCvFRvfCfAoJdoFuAUmK") or 8 of them
}

rule ryuk_1006_servisses {
meta:
description = "files - file servisses.exe"
author = "The DFIR Report"
reference = "https://thedfirreport.com/"
date = "2020-10-13"
hash1 = "1d8b7faf5f290465cc742e07abca78fac419135b191071cc77912263cd1dde1d"
strings:
$s1 = "DOOKOL.exe" fullword ascii
$s2 = "c:/crossdev/src/winpthreads-svn6233/src/mutex.c" fullword ascii
$s3 = "mutex_global_shmem" fullword ascii
$s4 = "mutex_global_static_shmem" fullword ascii
$s5 = "_pthread_key_dest_shmem" fullword ascii
$s6 = "_pthread_key_max_shmem" fullword ascii
$s7 = "_pthread_key_sch_shmem" fullword ascii
$s8 = "_pthread_key_lock_shmem" fullword ascii
$s9 = "cannot find name of executable" fullword ascii
$s10 = "tiles32.png" fullword ascii
$s11 = "GetModuleFileName: %s" fullword ascii
$s12 = "IP_DEST_HOST_UNREACHABLE (11003)" fullword ascii
$s13 = "This program requires Windows NT!" fullword ascii
$s14 = "SNMP INVALID_SESSION" fullword ascii
$s15 = "SNMP TRAP_ERRORS" fullword ascii
$s16 = "SNMP SELECT_FDERRORS" fullword ascii
$s17 = "Some different radices: %d %x %o %#x %#o " fullword ascii
$s18 = "c:/crossdev/src/winpthreads-svn6233/src/rwlock.c" fullword ascii
$s19 = "_pthread_tls_shmem" fullword ascii
$s20 = "IP_DEST_PORT_UNREACHABLE (11005)" fullword ascii
condition:
uint16(0) == 0x5a4d and filesize < 2000KB and
( pe.imphash() == "a90d500745a1ce2417c01fecefb2851" and pe.exports("KADWEGAFSTWUATQFFFFkxCEEf") or 8 of them
}

rule ryuk_1006_files_SQL {
meta:
description = "files - file SQL.dll"
author = "The DFIR Report"
reference = "https://thedfirreport.com/"
date = "2020-10-13"
hash1 = "d67461ba45a4edf3b2a69b3e64303fda8130bd1fc7a1173f35c1fe67b40c9639"
strings:
$s1 = ".data$_ZN12_GLOBAL__N_110fake_mutexE" fullword ascii
$s2 = ".data$_ZZN12_GLOBAL__N_116get_static_mutexEvE4once" fullword ascii
$s3 = "DOOKOL.dll" fullword ascii
$s4 = "_ZN12_GLOBAL__N_110fake_mutexE" fullword ascii
$s5 = "_ZZN12_GLOBAL__N_116get_static_mutexEvE4once" fullword ascii
$s6 = ".data$_ZN12_GLOBAL__N_115emergency_mutexE" fullword ascii
```

```
$s7 = ".data$_ZN12_GLOBAL__N_1L12static_mutexE" fullword ascii
$s8 = "__shmem_winpthreadgrabber_mutex_global_shmem" fullword ascii
$s9 = "__shmem_winpthreadinit_mutex_global_shmem" fullword ascii
$s10 = "__shmem_winpthreadptr_mutex_global_shmem" fullword ascii
$s11 = "c:/crossdev/src/winpthread-svn6233/src/mutex.c" fullword ascii
$s12 = "pthread_mutex_lock_intern" fullword ascii
$s13 = "__shmem_winpthreadinit_mutex_global_static_shmem" fullword ascii
$s14 = "__shmem_winpthreadgrabber_mutex_global_static_shmem" fullword ascii
$s15 = "__shmem_winpthreadptr_mutex_global_static_shmem" fullword ascii
$s16 = "_Z7ExecutePv" fullword ascii
$s17 = "hmutex" fullword ascii
$s18 = "._FindPESectionExec" fullword ascii
$s19 = "_ZN9__gnu_cxx17__recursive_mutex6unlockEv" fullword ascii
$s20 = ".text$_ZN9__gnu_cxx17__recursive_mutex6unlockEv" fullword ascii
condition:
uint16(0) == 0x5a4d and filesize < 2000KB and
( pe.imphash() == "d16819dafefb97404d0d0e42adb82e5c" and ( pe.exports("CSBhvSWCvFRvfcAoJdoFuAUmk") and pe.exp
}
```

If you have detections you would like to add to this section, please contact us and we will credit you.

## MITRE

Spearphishing Link – T1192

Remote Desktop Protocol – T1076

Remote File Copy – T1105

Windows Management Instrumentation – T1047

Command-Line Interface – T1059

Domain Trust Discovery – T1482

Remote System Discovery – T1018

System Time Discovery – T1124

Data Encrypted for Impact – T1486

Commonly Used Port – T1043

Standard Application Layer Protocol – T1071

Standard Cryptographic Protocol – T1032

User Execution – T1204

Valid Accounts – T1078

Exploitation for Privilege Escalation – T1068

Signed Binary Proxy Execution – T1218

Rundll32 – T1085

Regsvr32 – T1117

(internal case 1006)

---

Source: <https://thefirreport.com/2020/10/18/ryuk-in-5-hours/>