All That for a Coinminer? - The DFIR Report

By editor

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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

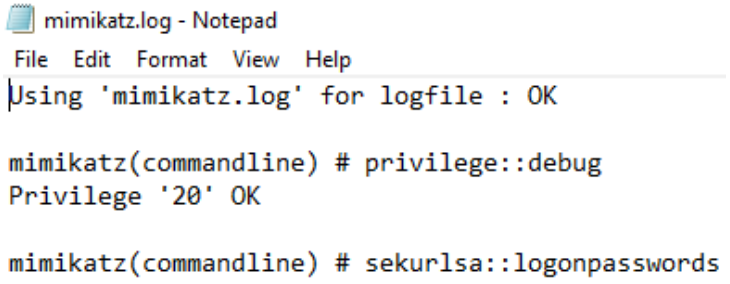
Mimikatz was used to dump credentials from memory, as well as, export Kerberos tickets using the following command:

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

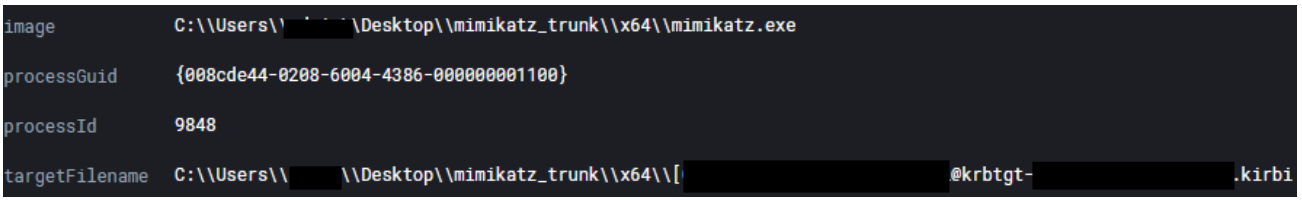
The threat actors used a vbs script named launch to execute mimikatz. This is the content of launch.vbs

```
set shell=CreateObject("Shell.Application")
shell.ShellExecute "mimikatz.exe", """log"" ""privilege::debug"" ""sekurlsa::logonpasswords"" ""sekurlsa::tic
set shell=nothing
```

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

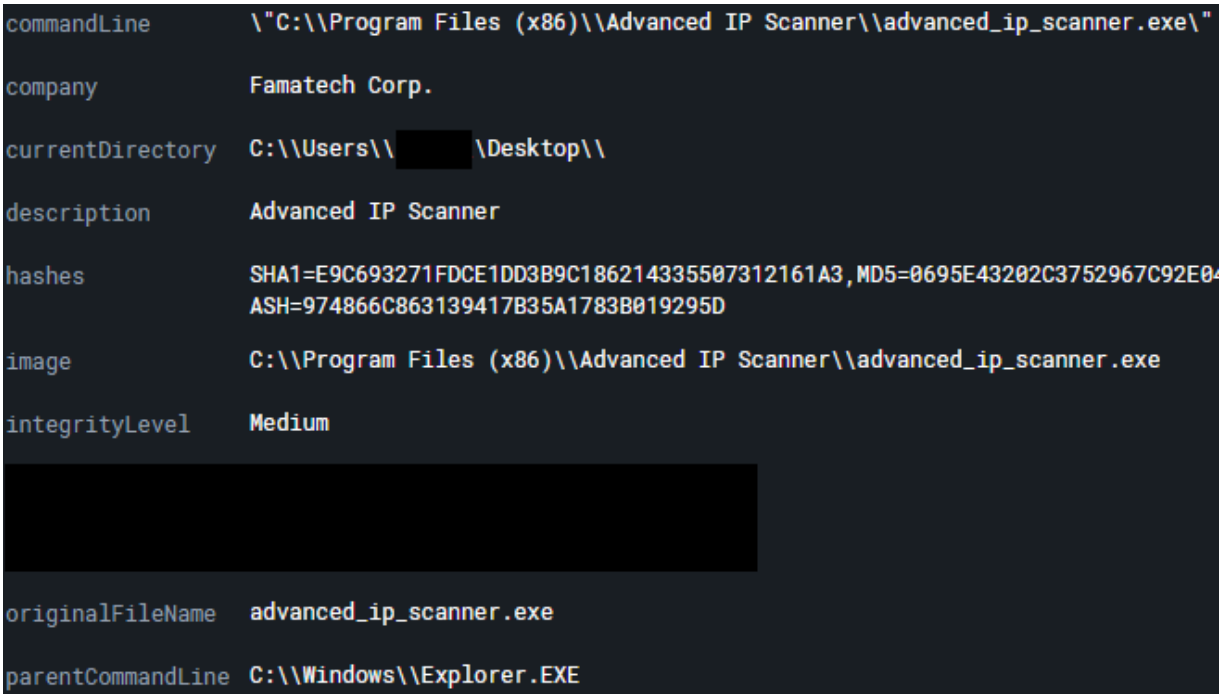


The Kerberos tickets were saved to disk, due to the threat actor using sekurlsa::tickets /export.



Discovery

Advanced IP Scanner was used to scan the environment.



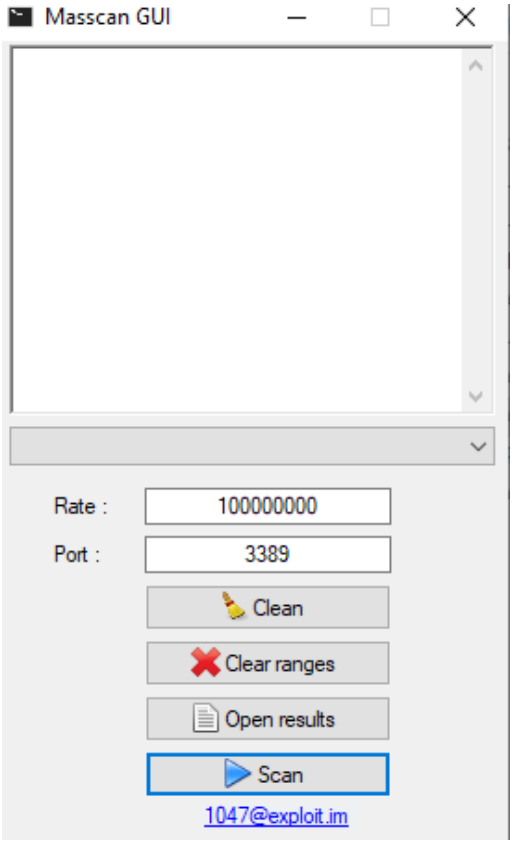
Task manager was opened multiple times. Possibly looking at logged in users and/or processes.

```
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.



Lateral Movement

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

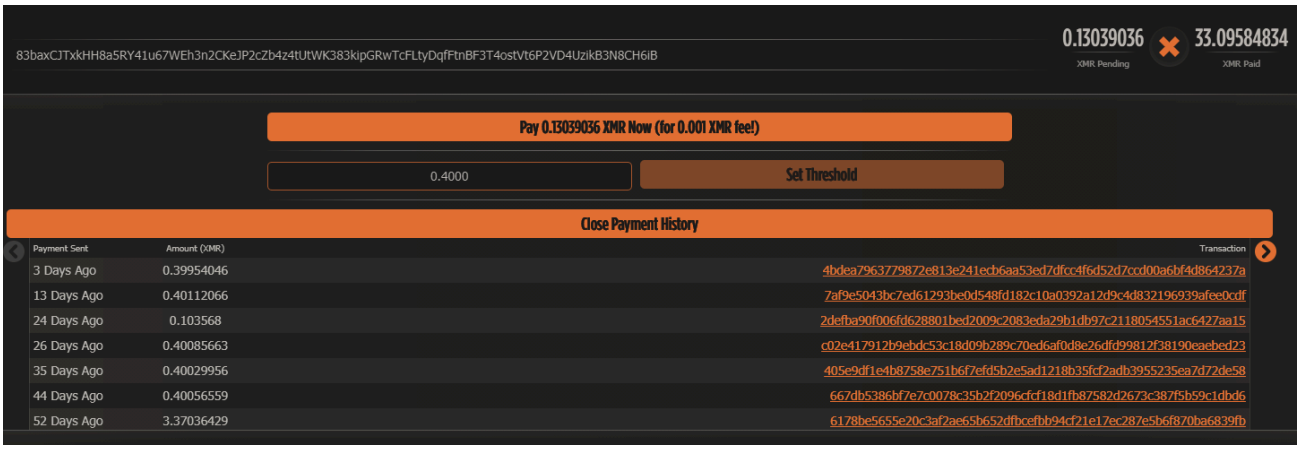
Command and Control

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.



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

```
https://github.com/Neo23x0/sigma/blob/master/rules/windows/process_creation/win_mimikatz_command_line.yml
https://github.com/Neo23x0/sigma/blob/master/rules/windows/builtin/win_alert_mimikatz_keywords.yml
https://github.com/Neo23x0/sigma/blob/master/rules/windows/process_creation/win_attrib_hiding_files.yml
```

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,__globa
$s3 = "lSystem.Resources.ResourceReader, mscorlib, Version=2.0.0.0, Culture=neutral, PublicKeyToken=b77a5c561
$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)" fullw
$s14 = "__kernel void blake2b_initial_hash(__global void *out,__global const void* blockTemplate,uint blockTe
$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_PROGR
$s17 = "__kernel void execute_vm(__global void* vm_states,__global void* rounding,__global void* scratchpads,
$s18 = "__kernel void execute_vm(__global void* vm_states,__global void* rounding,__global void* scratchpads,
$s19 = "__local exec_t* execution_plan=(__local exec_t*)(execution_plan_buf+(get_local_id(0)/8)*RANDOMX_PROGR
$s20 = "__kernel void blake2b_initial_hash(__global void *out,__global const void* blockTemplate,uint blockTe
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
$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 wid
$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 w
$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\\U
$x11 = "ERROR kuhl_m_kernel_processProtect ; Argument /process:program.exe or /pid:processid needed" fullword
$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)"
$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,__globa
$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)" fullwo
$s10 = "__kernel void blake2b_initial_hash(__global void *out,__global const void* blockTemplate,uint blockTe
$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_PROGR
$s13 = "__kernel void execute_vm(__global void* vm_states,__global void* rounding,__global void* scratchpads,
$s14 = "__kernel void execute_vm(__global void* vm_states,__global void* rounding,__global void* scratchpads,
$s15 = "__local exec_t* execution_plan=(__local exec_t*)(execution_plan_buf+(get_local_id(0)/8)*RANDOMX_PROGR
$s16 = "__kernel void blake2b_initial_hash(__global void *out,__global const void* blockTemplate,uint blockTe
$s17 = "nvml.dll" fullword ascii
$s18 = "__kernel void Groestl(__global ulong *states,__global uint *BranchBuf,__global uint *output,ulong Tar
$s19 = "__kernel void Blake(__global ulong *states,__global uint *BranchBuf,__global uint *output,ulong Targe
$s20 = "__kernel void JH(__global ulong *states,__global uint *BranchBuf,__global uint *output,ulong Target,u
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

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