This post was updated Feb 28th 2022 to include new IOCs and the PartyTicket ‘decoy ransomware’.

wiper malware sample circulating in Ukrainian organizations.

- Our analysis shows a signed driver is being used to deploy a wiper that targets Windows devices, manipulating the MBR resulting in subsequent boot failure.
- This blog includes the technical details of the wiper, dubbed HermeticWiper, and includes IOCs to allow organizations to stay protected from this attack.
- This sample is actively being used against Ukrainian organizations, and this blog will be updated as more information becomes available.
- We also analyze a ‘ransomware’, called PartyTicket, reportedly used as a decoy during wiping operations.
- SentinelOne customers are protected from this threat, no action is needed.

Background

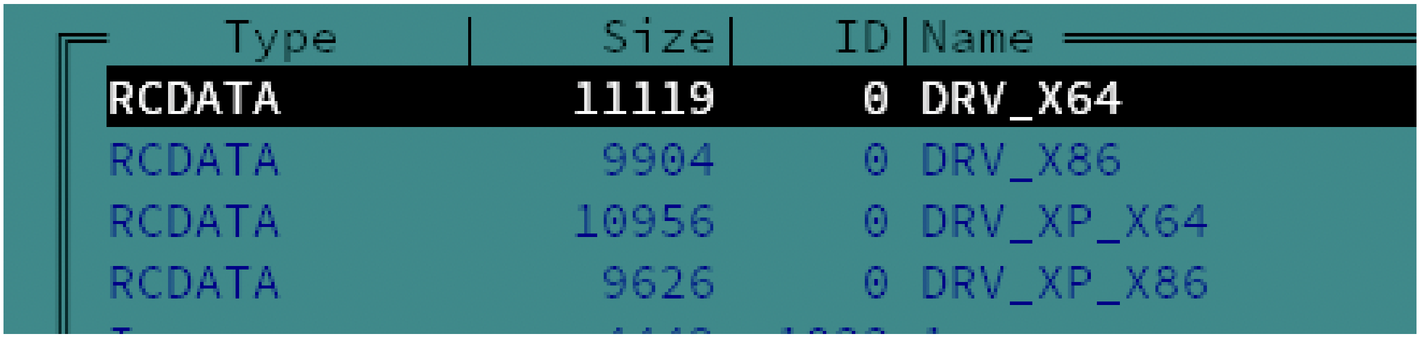
On February 23rd, our friends at Symantec and ESET research tweeted hashes associated with a wiper attack in Ukraine, including one which is not publicly available as of this writing.

We started analyzing this new wiper malware, calling it ‘HermeticWiper’ in reference to the digital certificate used to sign the sample. The digital certificate is issued under the company name ‘Hermetica Digital Ltd’ and valid as of April 2021. At this time, we haven’t seen any legitimate files signed with this certificate. It’s possible that the attackers used a shell company or appropriated a defunct company to issue this digital certificate.

This is an early effort to analyze the first available sample of HermeticWiper. We recognize that the situation on the ground in Ukraine is evolving rapidly and hope that we can contribute our small part to the collective analysis effort.

Technical Analysis

At first glance, HermeticWiper appears to be a custom-written application with very few standard functions. The malware sample is 114KBs in size and roughly 70% of that is composed of resources. The developers are using a tried and tested technique of wiper malware, abusing a benign partition management driver, in order to carry out the more damaging components of their attacks. Both the Lazarus Group (Destover) and APT33 (Shamoon) took advantage of Eldos Rawdisk in order to get direct userland access to the filesystem without calling Windows APIs. HermeticWiper uses a similar technique by abusing a different driver, `empntdrv.sys`.



```
      Type              Size|     ID|Name
RCDATA                 11119       0 DRV_X64
RCDATA                  9904       0 DRV_X86
RCDATA                 10956       0 DRV_XP_X64
RCDATA                  9626       0 DRV_XP_X86
```

HermeticWiper resources containing EaseUS Partition Manager drivers

The copies of the driver are ms-compressed resources. The malware deploys one of these depending on the OS version, bitness, and SysWow64 redirection.

comes to accessing Physical Drives directly as well as getting partition information. This adds to the difficulty of analyzing HermeticWiper, as a lot of functionality is deferred to `DeviceIoControl` calls with specific IOCTLs.

MBR and Partition Corruption

HermeticWiper enumerates a range of Physical Drives multiple times, from 0-100. For each Physical Drive, the `\\.\EPMNTDRV\` device is called for a device number.

The malware then focuses on corrupting the first 512 bytes, the Master Boot Record (MBR) for every Physical Drive. While that should be enough for the device not to boot again, HermeticWiper proceeds to enumerate the partitions for all possible drives.

They then differentiate between FAT and NTFS partitions. In the case of a FAT partition, the malware calls the same 'bit fiddler' to corrupt the partition. For NTFS, the HermeticWiper parses the Master File Table before calling this same bit fiddling function again.

MFT parsing and bit fiddling calls

We euphemistically refer to the bit fiddling function in the interest of brevity. Looking through it, we see calls to Windows APIs to acquire a cryptographic context provider and generate random bytes. It's likely this is being used for an inlined crypto

Further functionality refers to interesting MFT fields (`$bitmap`, `$logfile`) and NTFS streams (`$DATA`, `$I30`, `$INDEX_ALLOCATION`). The malware also enumerates common folders ('My Documents', 'Desktop', 'AppData'), makes references to the registry ('ntuser'), and Windows Event Logs (`"\\\\?\\C:\\Windows\\System32\\winevt\\Logs"`). Our analysis is ongoing to determine how this functionality is being used, but it is clear that having already corrupted the MBR and partitions for all drives, the victim system should be inoperable by this point of the execution.

Along the way, HermeticWiper's more mundane operations provide us with further IOCs to monitor for. These include the momentary creation of the abused driver as well as a system service. It also modifies several registry keys, including setting the `SYSTEM\CurrentControlSet\Control\CrashControl CrashDumpEnabled` key to **0**, effectively disabling crash dumps before the abused driver's execution starts.

Disabling CrashDumps via the registry

Finally, the malware waits on sleeping threads before initiating a system shutdown, finalizing the malware's devastating effect.

A Decoy Ransomware – PartyTicket

On February 24th, 2022, Symantec researchers pointed to a new Go ransomware being used as a decoy alongside the deployment of HermeticWiper. During our

The idea of using a ransomware as a decoy for a wiper is counterintuitive. In particular, a ransomware as poorly coded as PartyTicket is more likely to tie up resources during the execution of an otherwise efficient wiper.

As often happens to amateur Go developers, the malware has poor control over its concurrent threads and the commands it attempts to run. This leads to hundreds of threads and events spawned in our consoles. That is to say, it’s a very loud and ineffective ransomware that should fire alerts left and right.

The folder organization and function naming conventions within the binary show the developer’s intent for taunting the U.S. Government and the Biden administration.

Project folders and function names referring to the Biden Administration

Similar taunting can be found in the ransom note after execution:

In trying to understand the execution flow of PartyTicket, we see the `403forBiden.wHiteHousE.primaryElectionProcess()` function recursively enumerating folders:

PartyTicket looping over non-system folders resources. While the files found are all queued into a channel for the threads to reference.

PartyTicket generating concurrent threads

The function indirectly called for each thread is `main.subscribeNewPartyMember()`. It in turn takes a filename, makes a copy with a `<UUID>.exe` name and deletes the original file. Then we expect a second loop to relieve that queue of files and run each through a standard Go AES crypto implementation. However, execution is unlikely to get this far with the current design of PartyTicket.

(Thanks to Joakim Kennedy (Intezer) for pointing out this indirect call)

Crypto routine for files queued in the 'salary' channel

Overall our analysis of PartyTicket indicates it to be a rather simple, poorly coded, and loud malware. Its possible role as a decoy ransomware deployed alongside HermeticWiper is more likely to be effective for its accidental hogging of the victim organization's system resources rather than the encryption of files itself. IOCs and Yara rules have been added below.

Conclusion

After a week of defacements and increasing DDoS attacks, the proliferation of sabotage operations through wiper malware is an expected and regrettable escalation. At this time, we have a very small sliver of aperture into the attacks in threat intel research teams, independent researchers, and journalists looking to get the story straight. Our thanks to the researchers at Symantec, ESET, Stairwell, and RedCanary among others who've contributed samples, time, and expertise.

SentinelOne Customers Protected

Indicators of Compromise

(Updated February 28th, 2022)

ms-compressed resources	SHA1

RCDATA_DRV_X86	0231721ef4e4519ec776ff7d1f25c937545ce9f4
RCDATA_DRV_XP_X64	9c2e465e8dfdfc1c0c472e0a34a7614d796294af
RCDATA_DRV_XP_X86	ee764632adedf6bb4cf4075a20b4f6a79b8f94c0

HermeticWiper	SHA1
Win32 EXE	0d8cc992f279ec45e8b8dfd05a700ff1f0437f29
Win32 EXE	61b25d11392172e587d8da3045812a66c3385451
Win32 EXE	912342f1c840a42f6b74132f8a7c4ffe7d40fb77
Win32 EXE	9518e4ae0862ae871cf9fb634b50b07c66a2c379
Win32 EXE	d9a3596af0463797df4ff25b7999184946e3bfa2

1626df

YARA Rules

(https://github.com/SentineLabs/Yara/blob/main/APT_RU_SunFlowerSeed.yar)

```
import "pe"

rule MAL_HERMETIC_WIPER {
    meta:
      desc = "Hermetic Wiper - broad hunting rule"
      author = "Hegel @ SentinelLabs"
      version = "1.0"
      last_modified = "02.23.2022"
      hash = "1bc44eef75779e3ca1eefb8ff5a64807dbc942b1e4a2672d77b9f69
      reference = "https://www.sentinelone.com/labs/hermetic-wiper-uk
    strings:
        $string1 = "DRV_XP_X64" wide ascii nocase
        $string2 = "EPMNTDRV\\%u" wide ascii nocase
        $string3 = "PhysicalDrive%u" wide ascii nocase
        $cert1 = "Hermetica Digital Ltd" wide ascii nocase
    condition:
      uint16(0) == 0x5A4D and
      all of them
}

rule MAL_PARTY_TICKET {
    meta:
      desc = "PartyTicket / HermeticRansom Golang Ransomware - associ
      hash = "4dc13bb83a16d4ff9865a51b3e4d24112327c526c1392e14d56f20d
      reference = "https://twitter.com/juanandres_gs/status/149693073
    strings:
        $string1 = "/403forBiden/" wide ascii nocase
        $string2 = "/wHiteHousE/" wide ascii
        $string3 = "vote_result." wide ascii
        $string4 = "partyTicket." wide ascii
        $buildid1 = "Go build ID: \"qb0H7AdWAYDzfMA1J80B/nJ9FF8fupJl4
        $project1 = "C:/projects/403forBiden/wHiteHousE/" wide ascii
    condition:
      uint16(0) == 0x5A4D and
      (2 of ($string*) or
        any of ($buildid*) or
        any of ($project*))
}

rule MAL_COMPROMISED_HERMETICA_CERT  {
    meta:
      desc = "Hermetica Cert - broad hunting rule based on the certif
      author = "Hegel @ SentinelLabs"
      version = "1.0"
      last_modified = "03.01.2022"
      hash = "1bc44eef75779e3ca1eefb8ff5a64807dbc942b1e4a2672d77b9f69
      reference = "https://www.sentinelone.com/labs/hermetic-wiper-uk
    condition:
      uint16(0) == 0x5a4d and
      for any i in (0 .. pe.number_of_signatures) : (
         pe.signatures[i].issuer contains "DigiCert EV Code Signing C
         pe.signatures[i].serial == "0c:48:73:28:73:ac:8c:ce:ba:f8:f0
      )
}
```

```
      author = "Hegel @ SentinelLabs"
      version = "1.0"
      last_modified = "03.01.2022"
      hash = "13037b749aa4b1eda538fda26d6ac41c8f7b1d02d83f47b0d187dd6
      reference = "https://www.welivesecurity.com/2022/03/01/isaacwip
    strings:
        $name1 = "Cleaner.dll" wide ascii
        $name2 = "cl.exe" wide ascii nocase
        $name3 = "cl64.dll" wide ascii nocase
        $name4 = "cld.dll" wide ascii nocase
        $name5 = "cll.dll" wide ascii nocase
        $name6 = "Cleaner.exe" wide ascii
        $export = "_Start@4" wide ascii
    condition:
      uint16(0) == 0x5A4D and
      (any of ($name*) and $export)
}

rule MAL_HERMETIC_WIZARD {
    meta:
      desc = "HermeticWizard hunting rule"
      author = "Hegel @ SentinelLabs"
      version = "1.0"
      last_modified = "03.01.2022"
      reference = "https://www.welivesecurity.com/2022/03/01/isaacwip
    strings:
        $name1 = "Wizard.dll" wide ascii
        $name2 = "romance.dll" wide ascii
        $name3 = "exec_32.dll" wide ascii
        $function1 = "DNSGetCacheDataTable" wide ascii
        $function2 = "GetIpNetTable" wide ascii
        $function3 = "WNetOpenEnumW" wide ascii
        $function7 = "GetEnvironmentStrings" wide ascii
        $ip_anchor1 = "192.168.255.255" wide ascii
    condition:
      uint16(0) == 0x5A4D and
      (any of ($function*) and any of ($name*) and $ip_anchor1)
}
```

SentinelOne STAR Rules

```
EventType = "Process Creation" AND TgtProcPublisher = "HERMETICA DIGI
( SrcProcSignedStatus = "signed" AND IndicatorPersistenceCount = "2"
```

UKRAINE WIPER

SHARE

PDF

JUAN ANDRÉS GUERRERO-SAADE

Juan Andrés is AVP of Research for SentinelLabs and Distinguished Resident Fellow for Threat Intelligence at the Johns Hopkins SAIS Alperovitch Institute. Before joining SentinelOne, JAGS led multiple threat intelligence teams at Google, Chronicle, was a Principal Security Researcher at GReAT focusing on

His research work is the subject of two permanent exhibits at the International Spy Museum in Washington, DC.

PREV

Sanctions Be Damned | From Dridex to Macaw, The Evolution of Evil Corp

NEXT

Zen and the Art of SMM Bug Hunting | Finding, Mitigating and Detecting UEFI Vulnerabilities

RELATED POSTS

ChamelGang & Friends | Cyberespionage Groups Attacking Critical Infrastructure with Ransomware

JUNE 26 2024

ScarCruft | Attackers Gather Strategic Intelligence and Target Cybersecurity Professionals

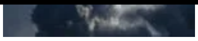
JANUARY 22 2024

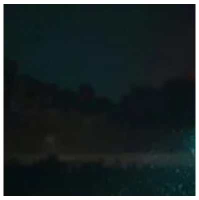
Search ...

SIGN UP

Get notified when we post new content.

RECENT POSTS





China’s Influence Ops | Twisting Tales of Volt Typhoon at Home and Abroad

OCTOBER 16, 2024

Kryptina RaaS | From Unsellable Cast-Off to Enterprise Ransomware

SEPTEMBER 23, 2024

LABS CATEGORIES

- Crimeware
- Security Research
- Advanced Persistent Threat
- Adversary
- LABScon
- Security & Intelligence

SENTINELLABS

In the era of interconnectivity, when markets, geographies, and jurisdictions merge in the melting pot of the digital domain, the perils of the threat ecosystem become unparalleled. Crimeware families achieve an unparalleled level of technical sophistication, APT groups are competing in fully-fledged cyber warfare, while once decentralized and scattered threat actors are forming adamant alliances of operating as elite corporate espionage teams.

RECENT POSTS

Cloud Malware | A Threat Hunter’s Guide to Analysis, Techniques and Delivery

OCTOBER 24, 2024

China’s Influence Ops | Twisting Tales of Volt Typhoon at Home and Abroad

OCTOBER 16, 2024

Kryptina RaaS | From Unsellable Cast-Off to Enterprise Ransomware

SEPTEMBER 23, 2024

Get notified when we post new content.

Twitter LinkedIn