Abusing Vulnerable Drivers to Disable System Defenses: The Case of ThrottleStop

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Agenda

Vulnerable drivers

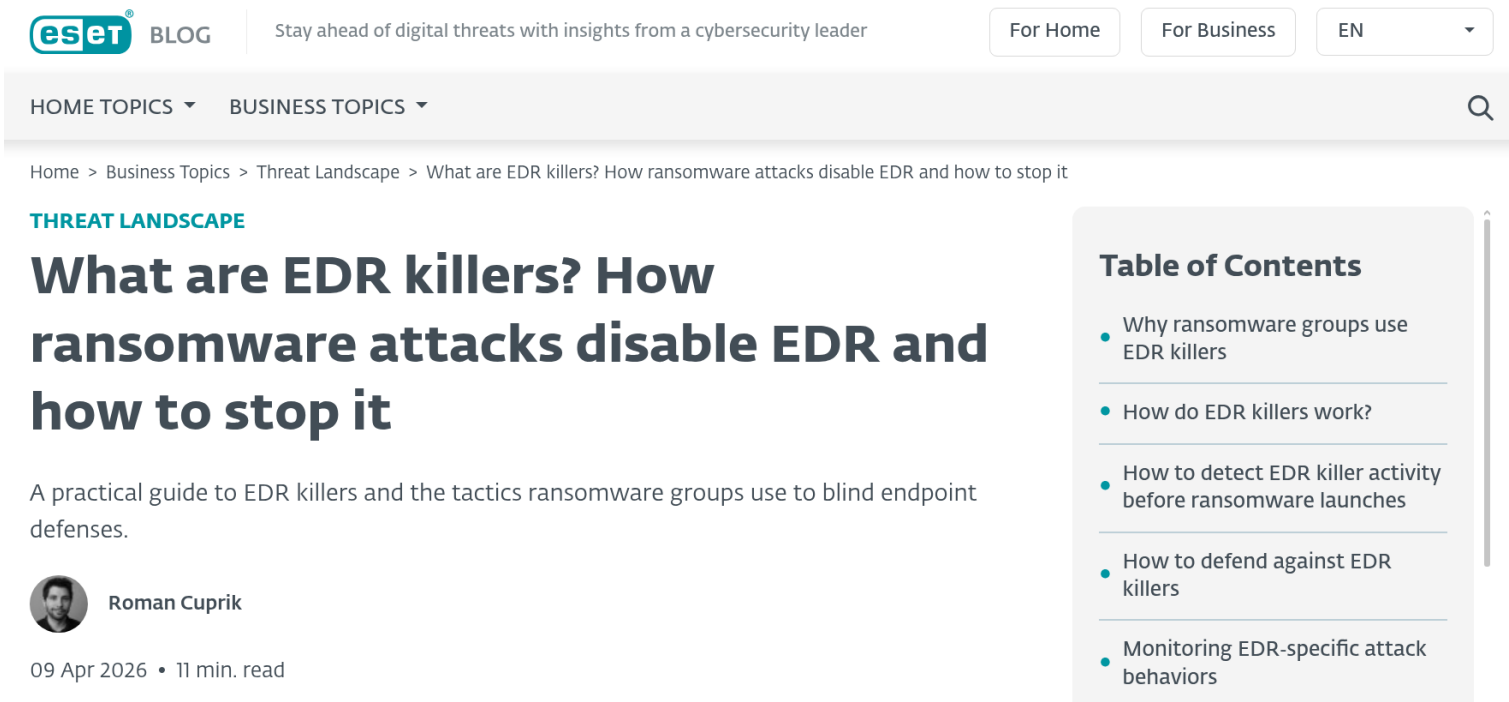
- Vulnerable drivers are a known and dangerous problem in the cybersecurity industry, and are actively abused by malware.
- Since they typically run in protection **ring 0**, or **kernel mode**, they can provide unrestricted access to critical operating system functions and libraries.

Vulnerable drivers

- Hundreds of legitimate, signed, **vulnerable** drivers are available for download.
- They can be shipped alongside specially crafted user-mode code designed to **abuse privileged functions** exposed by the vulnerable driver.

About EDR-killers

According to ESET, there are at least **54 EDR-killer** programs based on the exploitation of vulnerable drivers in use by attackers as of **2026**.

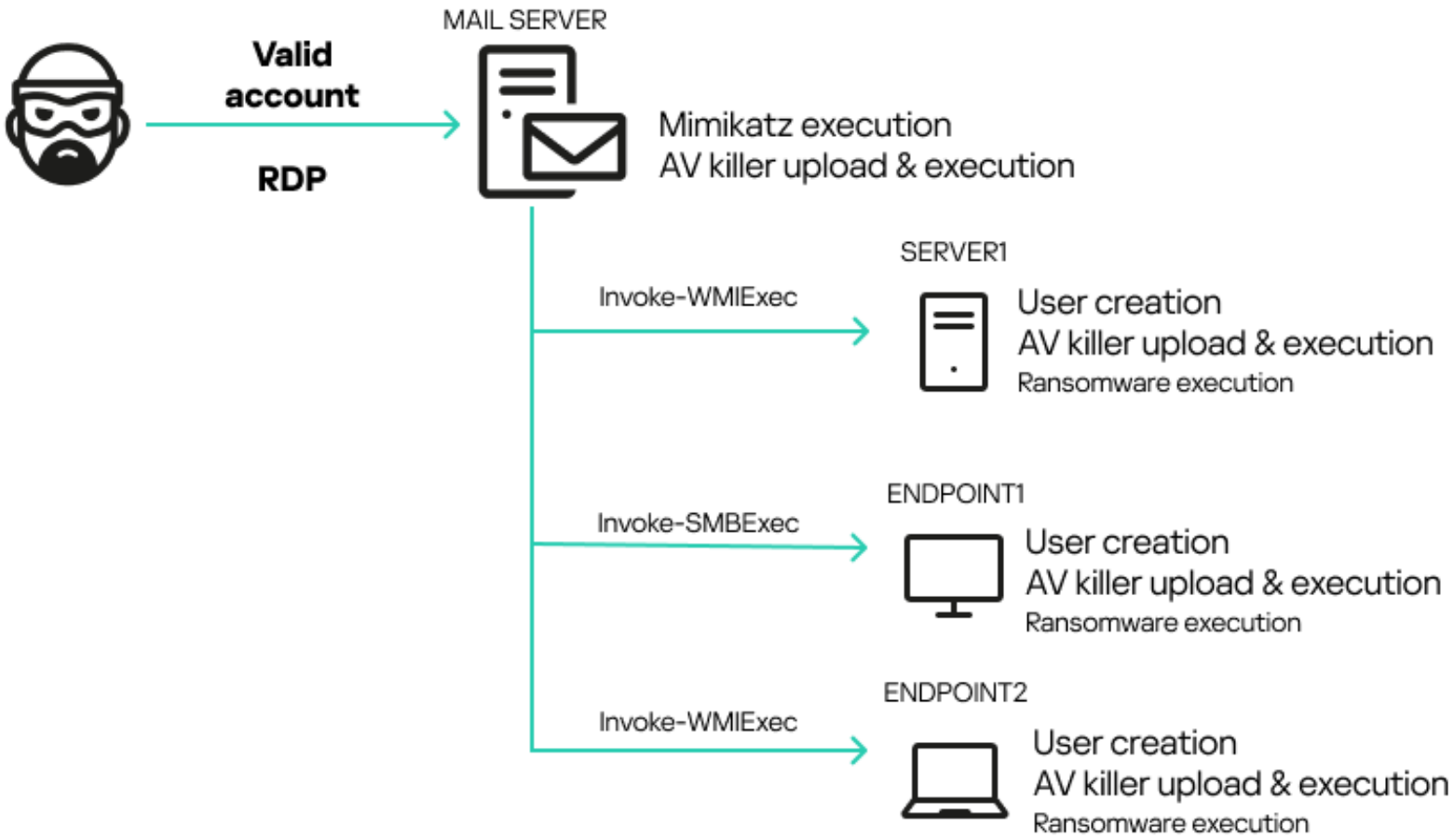


About EDR-killers

In 2025, Kaspersky discovered a vulnerability in ThrottleStop.sys, assigned **CVE-2025-7771**:

- Found in the legitimate `ThrottleStop.sys` driver.
- Used to disable security products before ransomware deployment.
- First seen in a real incident response case in Brazil.

Incident overview



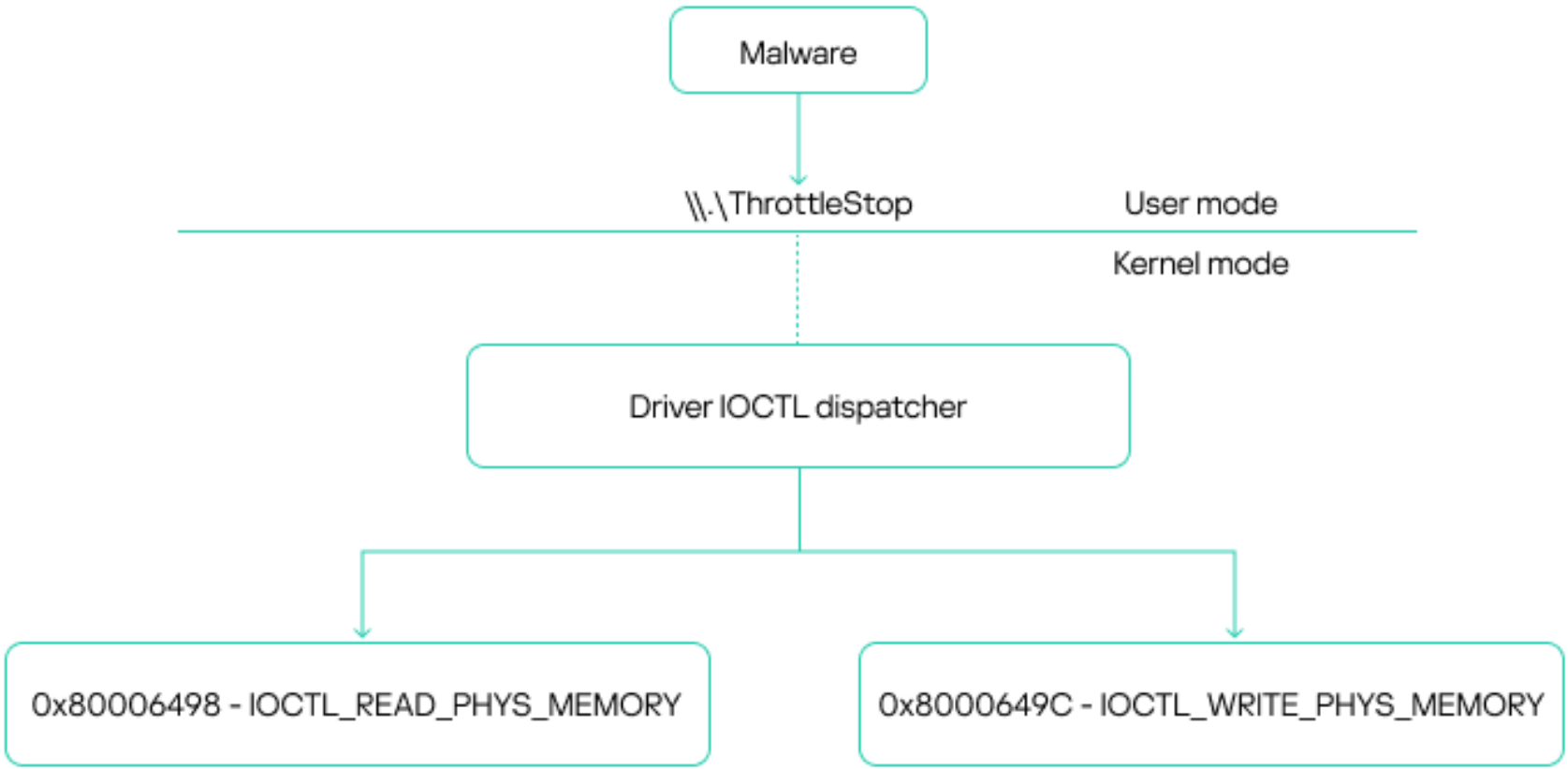
The artifacts

- To **disable the system's defenses**, the attackers relied on two artifacts: `ThrottleBlood.sys` and `All.exe`.
- `ThrottleBlood.sys` is the renamed `ThrottleStop.sys`.
- `All.exe` is the AV-killer itself, designed by the adversaries.

`ThrottleBlood.sys` analysis

- The driver involved in the incident has a **valid certificate** signed on 2020-10-06 20:34:00 UTC.
- When loaded, it creates a device at `\\.\ThrottleStop`.
- This is a communication channel between user mode and kernel mode.
- Communication with the driver is carried out via **IOCTL calls**, specifically using the Win32 `DeviceIoControl` function.

`ThrottleBlood.sys` analysis



EDR-killer analysis

While searching for relevant strings, we noticed a pattern: multiple antivirus process names inside the binary.

```
$ strings -a -el All.exe | grep -Ei 'MsMpEng\.exe|avp\.exe|avgsvc\.exe|avgui\.exe|avastsvc\.exe|avastui\.exe|mcshield\.exe|mcagent\
.exe|savservice\.exe|egui\.exe|ekrn\.exe|ccSvcHst\.exe|pavsrv\.exe|fsav\.exe|fshoster32\.exe|fsdfwd\.exe|wrsa\.exe|mbamservice\.exe
|mbamtray\.exe|bdagent\.exe|vsserv\.exe|cylancesvc\.exe'
MsMpEng.exe
AvastSvc.exe
wsc_proxy.exeekrn.exe
egui.exe
avp.exe
ccSvcHst.exe
AVGSvc.exe
AVGUI.exe
MsMpEng.exe
AvastSvc.exe
wsc_proxy.exeekrn.exe
egui.exe
avp.exe
ccSvcHst.exe
AVGSvc.exe
AVGUI.exe
MsMpEng.exe
AvastSvc.exe
wsc_proxy.exeekrn.exe
egui.exe
avp.exe
ccSvcHst.exe
AVGSvc.exe
AVGUI.exe
```

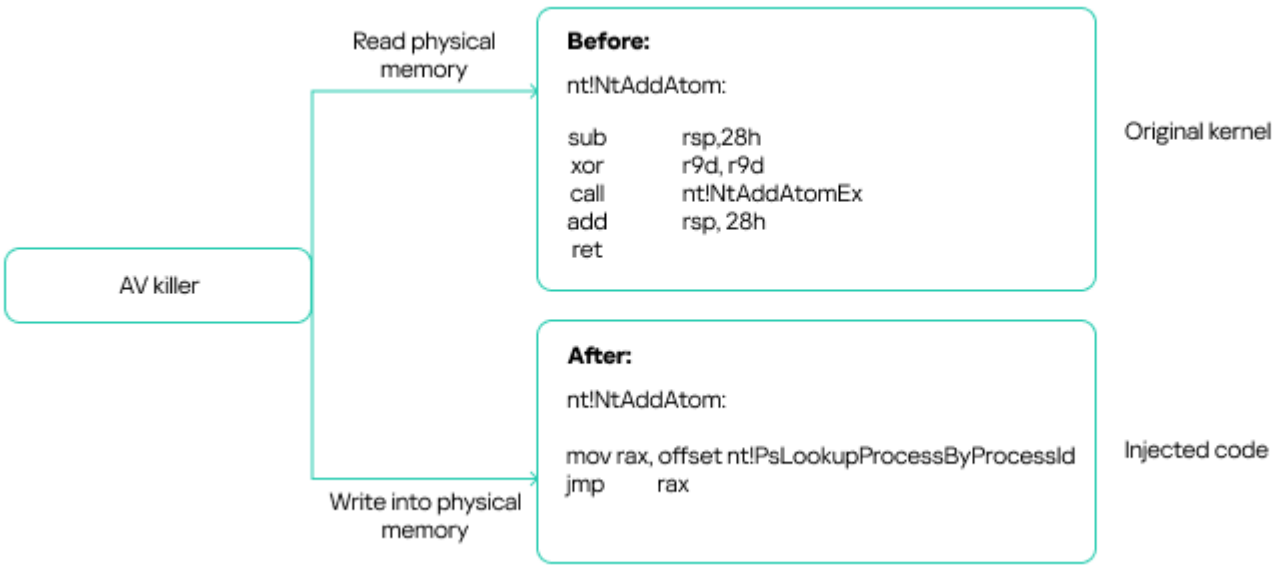
EDR-killer analysis

- When the binary is executed, it first loads the `ThrottleBlood.sys` driver using Service Control Manager (SCM) API methods, such as `OpenSCManagerA()` and `StartServiceW()`.
- To perform read/write operations through `MmMapIoSpace`, the malware must also determine the physical address used by the kernel. This is achieved using the **SuperFetch** technique.

EDR-killer analysis

- By loading `ntoskrnl.exe` with `LoadLibrary`, it identifies the offset of `NtAddAtom`, calculates its kernel address, and uses the vulnerable IOCTL codes to read and write its physical memory.
- Finally, the AV-killer writes a small shellcode that jumps to the desired kernel function and restores the original kernel code after execution to prevent system crashes.

EDR-killer analysis - Exploitation overview



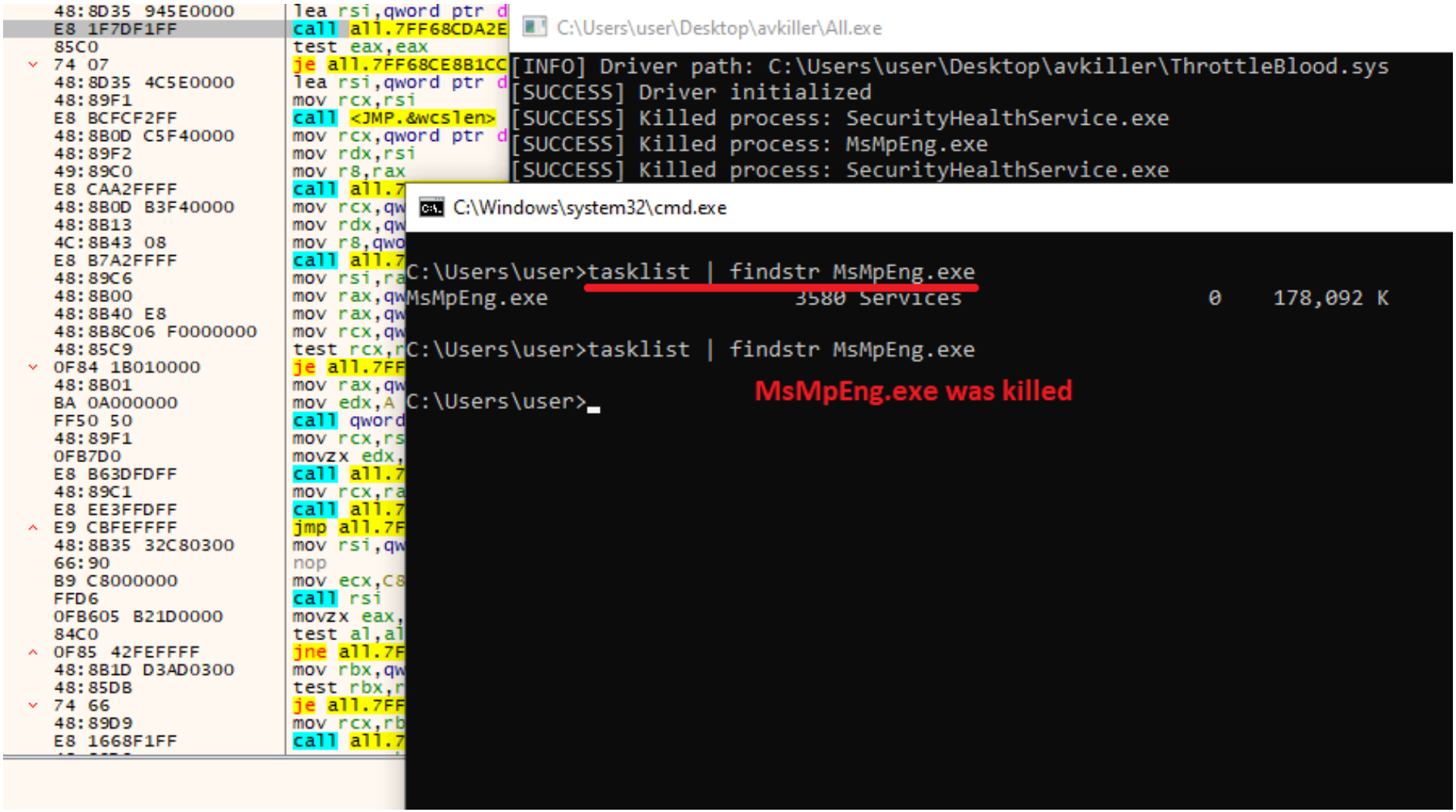
EDR-killer analysis

- Having obtained all the necessary information, the AV-killer starts a loop to find target processes using the `Process32FirstW()` and `Process32NextW()` API calls.
- If any match is found, it uses the vulnerable driver to call the `PsLookupProcessById` and `PsTerminateProcess` kernel functions.

EDR-killer analysis

```
00007FF68CDA1870  4C:8B76 08        mov r14,qword ptr ds:[rsi+8]
00007FF68CDA1874  48:89F9           mov rcx,rdi                  rcx:L"MsMpEng.exe", rdi:L"MsMpEng.exe"
00007FF68CDA1877  E8 14960100       call <JMP.&wcslen>
00007FF68CDA187C  48:8B0E           mov rcx,qword ptr ds:[rsi]   rcx:L"MsMpEng.exe", [qword ptr ds:[rsi]]:L"MsM
00007FF68CDA187F  49:39C6           cmp r14,rax
00007FF68CDA1882  49:89C0           mov r8,rax
00007FF68CDA1885  4D:0F46C6         cmovbe r8,r14
00007FF68CDA1889  48:39F9           cmp rcx,rdi                  rcx:L"MsMpEng.exe", rdi:L"MsMpEng.exe"
00007FF68CDA188C  74 32             je all.7FF68CDA18C0
00007FF68CDA188E  4D:85C0           test r8,r8                       Match found
00007FF68CDA1891  74 2D             je all.7FF68CDA18C0
00007FF68CDA1893  48:85C9           test rcx,rcx                 rcx:L"MsMpEng.exe"
00007FF68CDA1896  74 39             je all.7FF68CDA18D1
00007FF68CDA1898  31D2              xor edx,edx
00007FF68CDA189A  66:0F1F4400 00    nop word ptr ds:[rax+rax],ax
00007FF68CDA18A0  44:0FB74C53 2C    movzx r9d,word ptr ds:[rbx+rdx*2+2C]  word ptr ds:[rbx+rdx*2+2C]:L"sMpEng.exe"
00007FF68CDA18A6  6644:390C51       cmp word ptr ds:[rcx+rdx*2],r9w       word ptr ds:[rcx+rdx*2]:L"sMpEng.exe"
00007FF68CDA18AB  75 24             jne all.7FF68CDA18D1
00007FF68CDA18AD  48:83C2 01        add rdx,1
00007FF68CDA18B1  49:39D0           cmp r8,rdx
00007FF68CDA18B4  75 EA             jne all.7FF68CDA18A0
00007FF68CDA18B6  662E:0F1F8400 0000000  nop word ptr ds:[rax+rax],ax
```

EDR-killer analysis



Tactics, Techniques and Procedures (TTPs)

Table: Identified MITRE ATT&CK Techniques

Technique ID	Description
T1057	Process Discovery
T1562.001	Impair Defenses: Disable or Modify Tools
T1562.006	Impair Defenses: Indicator Blocking
T1543.003	Windows Service
T1489	Service Stop

Mitigations

- The growing use of AV-killer software reinforces the importance of self-defense mechanisms in security products.
- Protect application files, prevent unauthorized process termination, monitor critical memory regions.

Mitigations

- Ensure that detection rules remain updated across customer endpoints.
- Monitor for known vulnerable drivers, suspicious driver loading events, and unusual interactions between user-mode processes and kernel-mode components.

Conclusion

- We analyzed an AV-killer that weaponizes the legitimate, signed `ThrottleStop.sys` driver to terminate security products from kernel space.
- Vulnerable drivers hand attackers a kernel primitive that neutralizes endpoint defenses **before** the main payload ever runs.
- Countering this demands layered controls: driver blocklisting, telemetry on kernel driver loads, network visibility, and IR readiness.

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