How to tamper the EDR?

Master of Puppets

Whoami

Daniel Feichter

- Founder of **Infosec Tirol**
- Originally industrial engineer, since about 4 years passioned, wannabe red teamer
  - Endpoint security on Windows
  - Advanced Persistent Threat emulation
  - Endpoint security research, mostly antivirus & EDR
  - Favourite ATT&CK tactic, Defense Evasion TA0005
- Martial arts fan and fully convinced EDR user
- Twitter @VirtualAllocEx

Disclaimer

- It’s only about my personal experience / journey
- I make no claims to completeness
- No Zero days, just learning about EPP/EDR mechanisms and functionality on Windows
- Shown strategy / concept applies to multiple products on Windows
- Speaking about EDRs, I always refer to EPP/EDR combinations
- Feel free to ask, excluded, which product was used in the demos (vendor neutrality) 😉

We take a look at

- ATT&CK T1562.001: Impair Defenses: Disable or Modify Tools

- Disable main functionalities from EDR, without relying on:
  - EDR uninstall password / token
  - Using any uninstall software
  - Uninstalling EDR in general
  - Using Windows Security Center

- Similar seen in the wild, by AvosLocker Ransomware

We want to achieve

- Deep dive AV/EPP/EDR products on Windows
  - EDR components user space and kernel space
  - Functionality and relationship between user- and kernel space

- Tamper EDR key component, disable EDR and get permanently rid of:

Antivirus capabilities

Based on user space DLL injection -> user space API hooking

EDR capabilities

Active response (detections); Telemetry footprint

EDR capabilities

Host isolation; Real time response; sensor recovery

Give me a scenario

- Red team engagement
  - Initial access: phishing or similar
  - Achieved privileged user rights: exploit or misconfiguration
  - Explore process structure -> additional useful user session open

T1003.001

OS credential dumping: LSASS memory

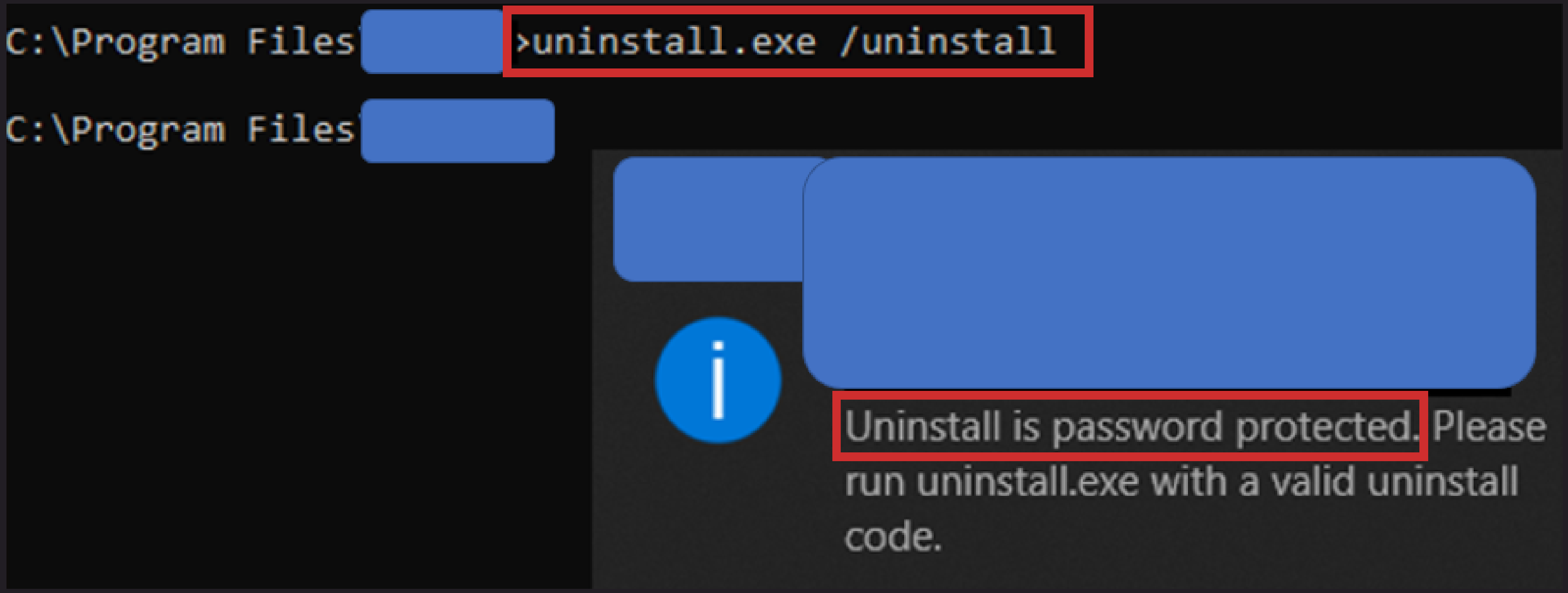
T1134.001

Access token manipulation: token impersonation/theft

- But installed EDR is tough! -> Beginning of my private EDR tampering journey

Come on, I am already admin

- Despite privileged user rights, most EDRs still annoying
- Why not simply uninstall the EDR?



```
C:\Program Files[redacted]>uninstall.exe /uninstall

C:\Program Files[redacted]
```

[redacted]

[redacted]

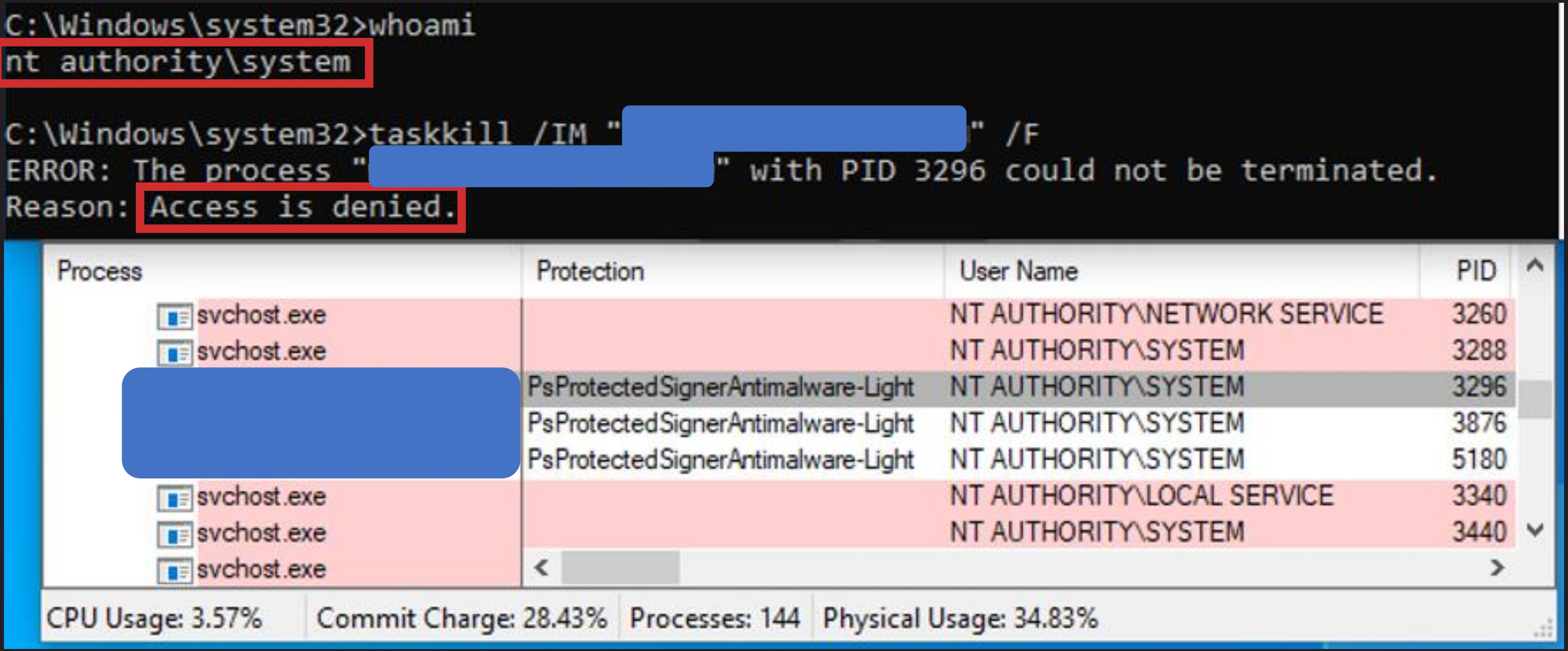
Uninstall is password protected. Please run uninstall.exe with a valid uninstall code.

User space

First step: EDR processes

User-space component: EDR processes

- Normally, initialized as Protected Process Light (PPL)
- Despite system integrity, process termination not allowed



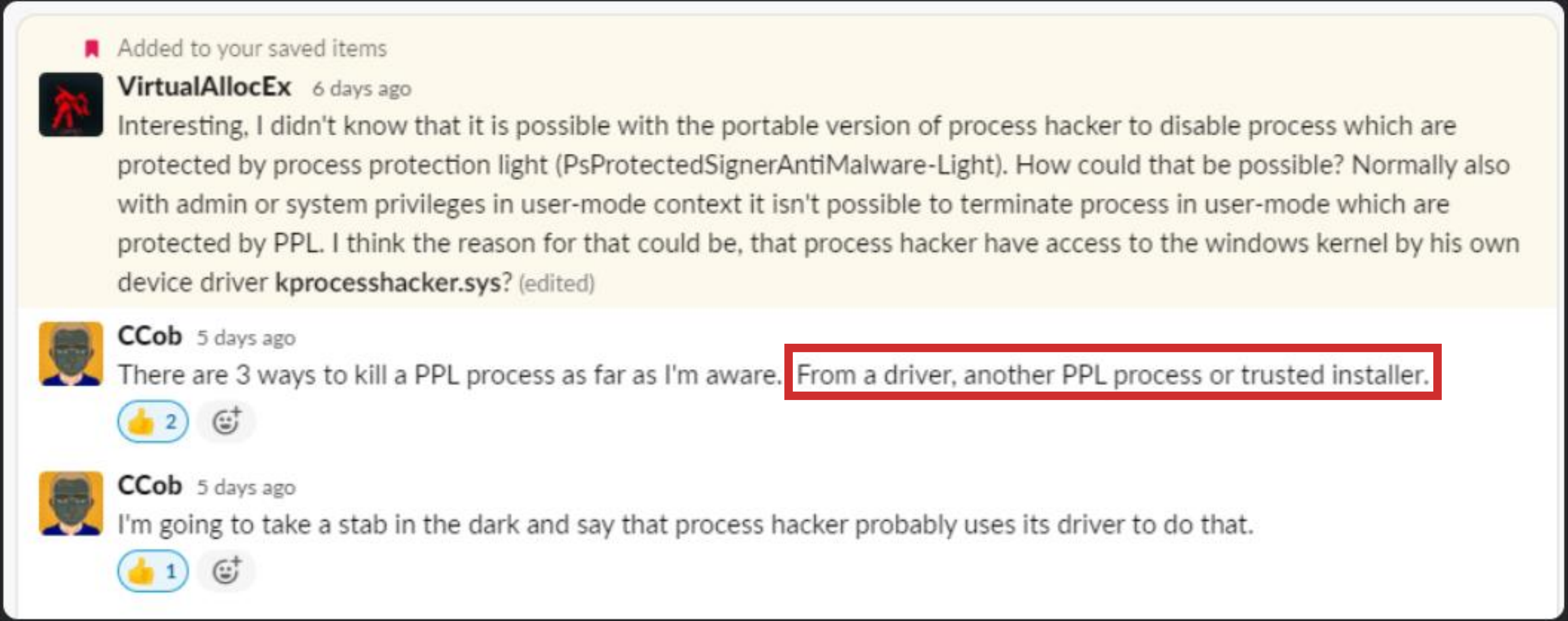
```
C:\Windows\system32>whoami
nt authority\system

C:\Windows\system32>taskkill /IM "[redacted]" /F
ERROR: The process "[redacted]" with PID 3296 could not be terminated.
Reason: Access is denied.
```

Process	Protection	User Name	PID
svchost.exe		NT AUTHORITY\NETWORK SERVICE	3260
svchost.exe		NT AUTHORITY\SYSTEM	3288
[redacted]	PsProtectedSignerAntimalware-Light	NT AUTHORITY\SYSTEM	3296
[redacted]	PsProtectedSignerAntimalware-Light	NT AUTHORITY\SYSTEM	3876
[redacted]	PsProtectedSignerAntimalware-Light	NT AUTHORITY\SYSTEM	5180
svchost.exe		NT AUTHORITY\LOCAL SERVICE	3340
svchost.exe		NT AUTHORITY\SYSTEM	3440
svchost.exe			

CPU Usage: 3.57% Commit Charge: 28.43% Processes: 144 Physical Usage: 34.83%

EDR processes: disable PPL

- Signed vulnerable (device) driver -> RTCore64 CVE 2019-16098
- Creds to @EthicalChaos



Added to your saved items

VirtualAllocEx 6 days ago

Interesting, I didn't know that it is possible with the portable version of process hacker to disable process which are protected by process protection light (PsProtectedSignerAntiMalware-Light). How could that be possible? Normally also with admin or system privileges in user-mode context it isn't possible to terminate process in user-mode which are protected by PPL. I think the reason for that could be, that process hacker have access to the windows kernel by his own device driver **kprocesshacker.sys**? (edited)

CCob 5 days ago

There are 3 ways to kill a PPL process as far as I'm aware. From a driver, another PPL process or trusted installer.

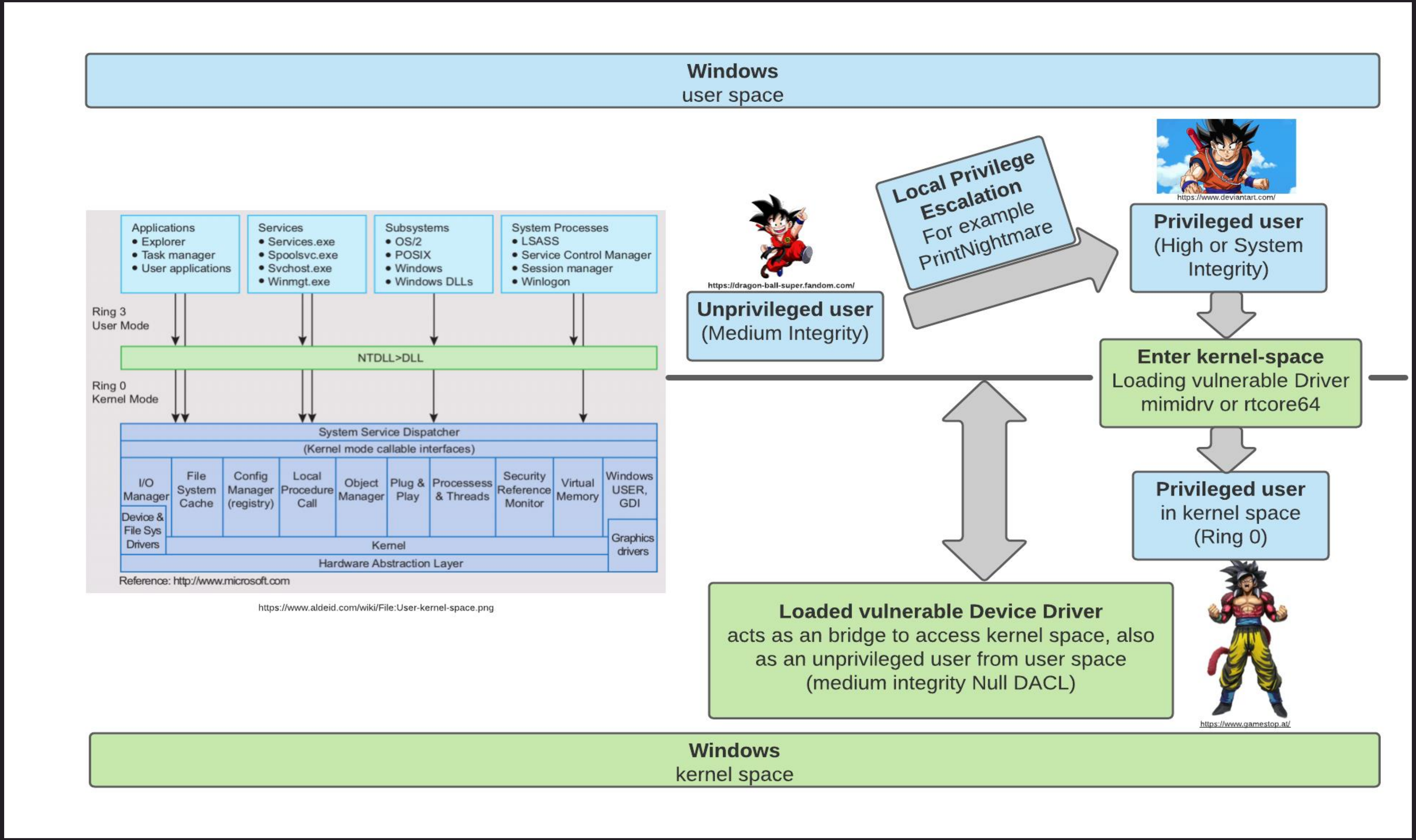
👍 2

CCob 5 days ago

I'm going to take a stab in the dark and say that process hacker probably uses its driver to do that.

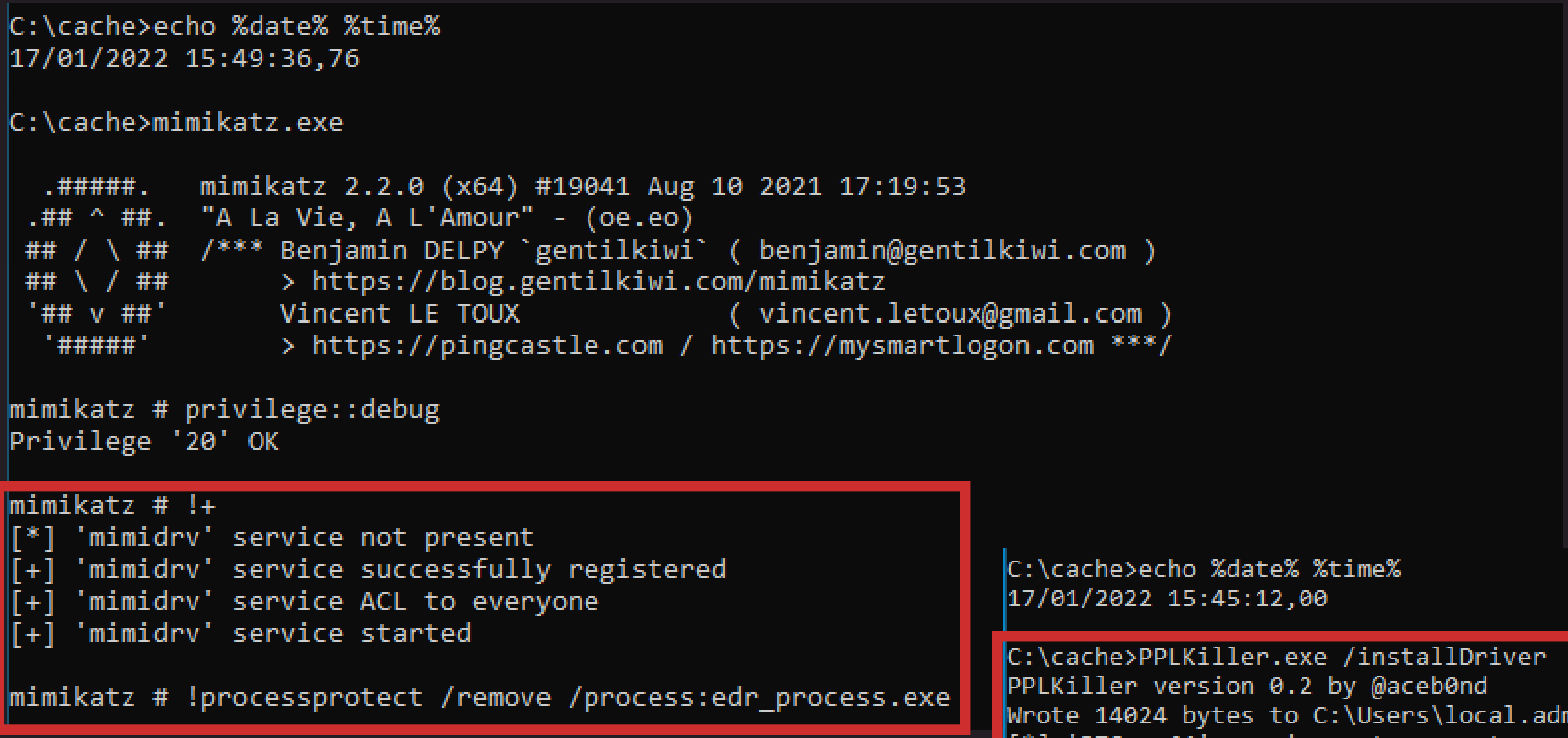
👍 1

EDR processes: disable PPL

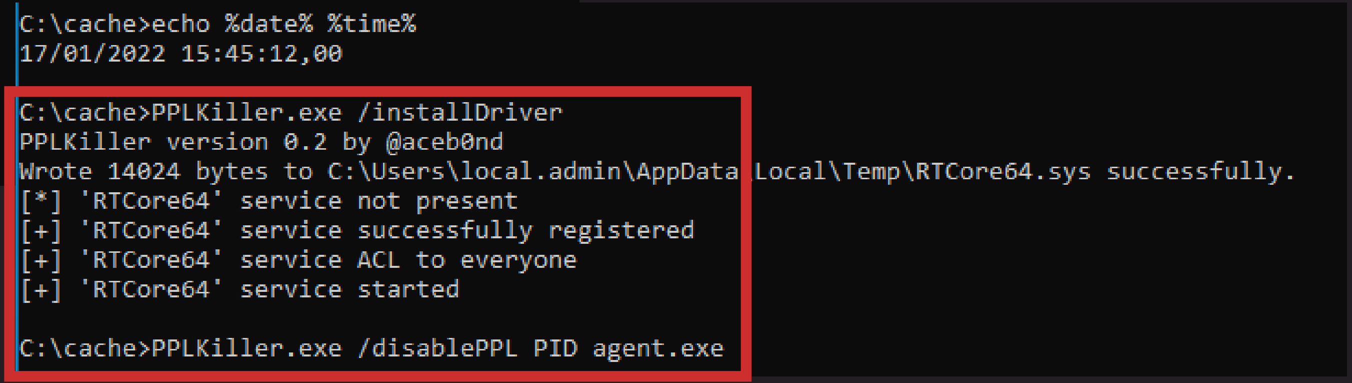

Windows
user space
Applications
• Explorer
• Task manager
• User applications
Services
• Services.exe
• Spoolsvc.exe
• Svchost.exe
• Winmgt.exe
Subsystems
• OS/2
• POSIX
• Windows
• Windows DLLs
System Processes
• LSASS
• Service Control Manager
• Session manager
• Winlogon
Ring 3
User Mode
NTDLL>DLL
Ring 0
Kernel Mode
System Service Dispatcher
(Kernel mode callable interfaces)
I/O Manager
File System Cache
Config Manager (registry)
Local Procedure Call
Object Manager
Plug & Play
Processess & Threads
Security Reference Monitor
Virtual Memory
Windows USER, GDI
Device & File Sys Drivers
Kernel
Graphics drivers
Hardware Abstraction Layer
Reference: http://www.microsoft.com
https://www.aldeid.com/wiki/File:User-kernel-space.png
https://dragon-ball-super.fandom.com/
Unprivileged user
(Medium Integrity)
Local Privilege Escalation
For example PrintNightmare
https://www.deviantart.com/
Privileged user
(High or System Integrity)
Enter kernel-space
Loading vulnerable Driver
mimidrv or rtcore64
Privileged user
in kernel space
(Ring 0)
Loaded vulnerable Device Driver
acts as an bridge to access kernel space, also as an unprivileged user from user space
(medium integrity Null DACL)
https://www.gamestop.at/
Windows
kernel space

User-space component: EDR process tampering

- Tool Time -> PPL Killer -> driver rtcore64.sys or Mimikatz -> mimidrv.sys



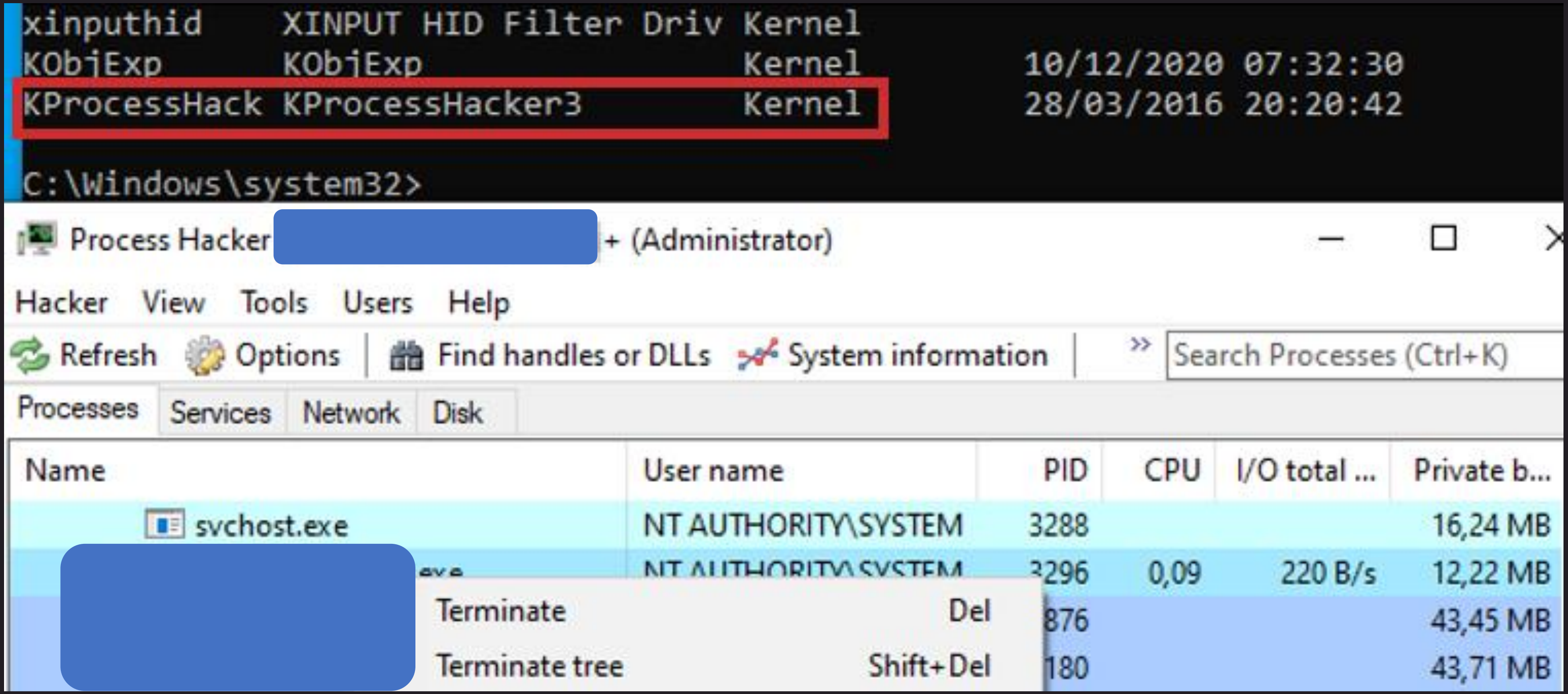
```
C:\cache>echo %date% %time%
17/01/2022 15:49:36,76

C:\cache>mimikatz.exe

  .#####.   mimikatz 2.2.0 (x64) #19041 Aug 10 2021 17:19:53
 .## ^ ##.  "A La Vie, A L'Amour" - (oe.eo)
 ## / \ ##  /*** Benjamin DELPY `gentilkiwi` ( benjamin@gentilkiwi.com )
 ## \ / ##       > https://blog.gentilkiwi.com/mimikatz
 '## v ##'       Vincent LE TOUX             ( vincent.letoux@gmail.com )
  '#####'        > https://pingcastle.com / https://mysmartlogon.com ***/

mimikatz # privilege::debug
Privilege '20' OK

mimikatz # !+
[*] 'mimidrv' service not present
[+] 'mimidrv' service successfully registered
[+] 'mimidrv' service ACL to everyone
[+] 'mimidrv' service started

mimikatz # !processprotect /remove /process:edr_process.exe
```



```
C:\cache>echo %date% %time%
17/01/2022 15:45:12,00

C:\cache>PPLKiller.exe /installDriver
PPLKiller version 0.2 by @aceb0nd
Wrote 14024 bytes to C:\Users\local.admin\AppData\Local\Temp\RTCore64.sys successfully.
[*] 'RTCore64' service not present
[+] 'RTCore64' service successfully registered
[+] 'RTCore64' service ACL to everyone
[+] 'RTCore64' service started

C:\cache>PPLKiller.exe /disablePPL PID agent.exe
```

User-space component: EDR process tampering

- Tool Time -> execute Process Hacker as privileged user



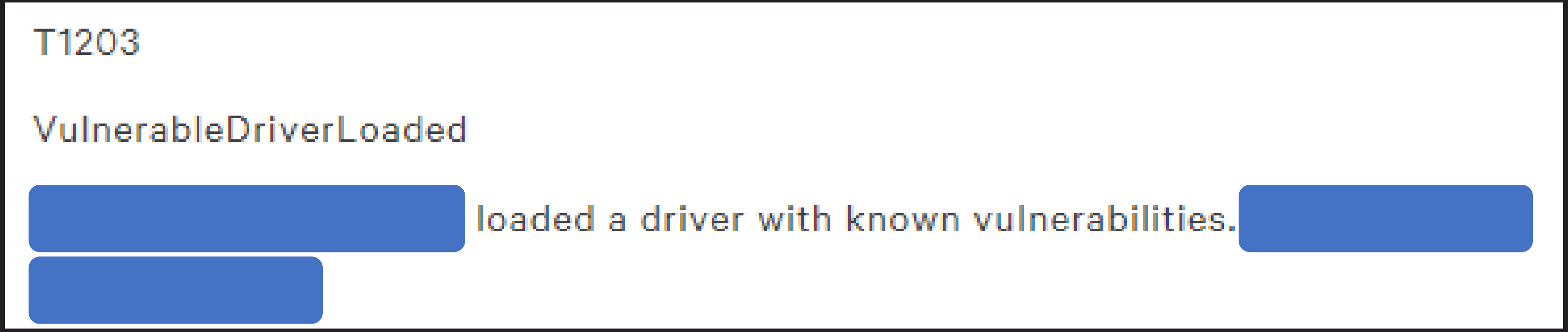
```
xinputhid    XINPUT HID Filter Driv Kernel
KObjExp      KObjExp                Kernel          10/12/2020 07:32:30
KProcessHack KProcessHacker3        Kernel          28/03/2016 20:20:42

C:\Windows\system32>
```

Process Hacker [redacted] + (Administrator)

Name	User name	PID	CPU	I/O total ...	Private b...
svchost.exe	NT AUTHORITY\SYSTEM	3288			16,24 MB
[redacted] .exe	NT AUTHORITY\SYSTEM	3296	0,09	220 B/s	12,22 MB
		876			43,45 MB
		180			43,71 MB

User-space component: EDR process tampering

- EDR vendors start to blacklist / block signed vulnerable drivers
- Depending on product, bypassing is necessary

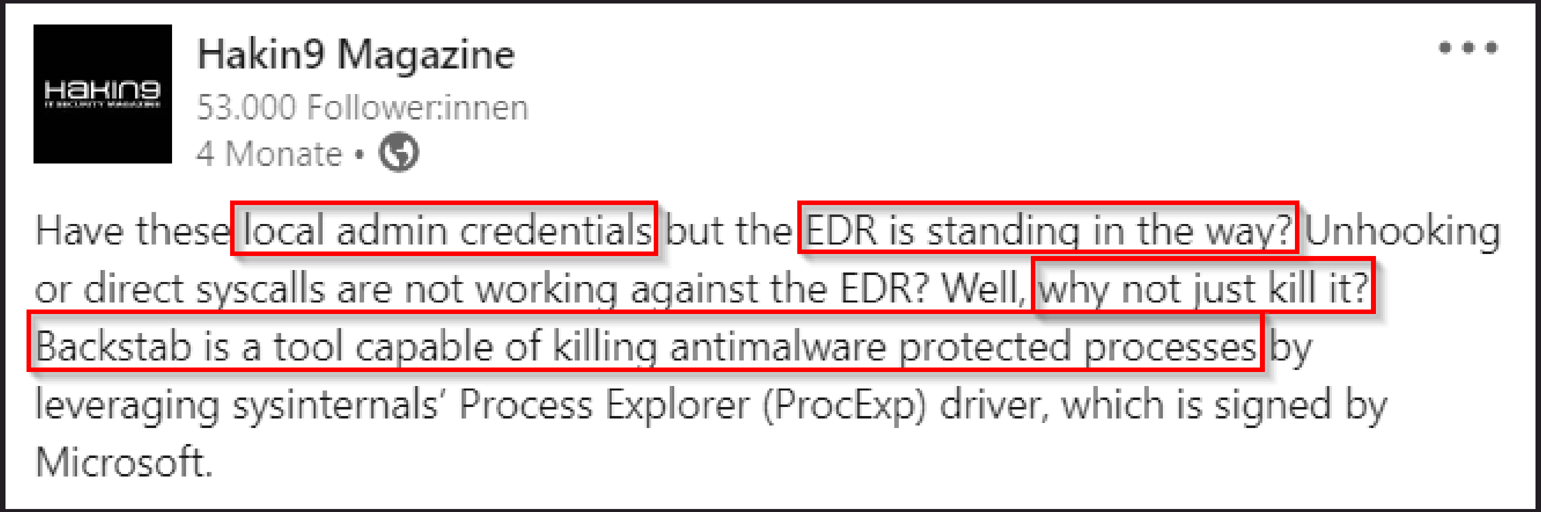


T1203

VulnerableDriverLoaded

[redacted] loaded a driver with known vulnerabilities. [redacted]
[redacted]

User-space component: EDR process tampering



Hakin9 Magazine

53.000 Follower:innen

4 Monate •

Have these local admin credentials but the EDR is standing in the way? Unhooking or direct syscalls are not working against the EDR? Well, why not just kill it? Backstab is a tool capable of killing antimalware protected processes by leveraging sysinternals' Process Explorer (ProcExp) driver, which is signed by Microsoft.

Reference: https://www.linkedin.com/feed/update/urn:li:activity:6902622063433986048/

Process termination

Only temporary, gets restarted again and again

Process termination

Even between gap, process terminated and gets restarted EDR works fine

EDR Killed?

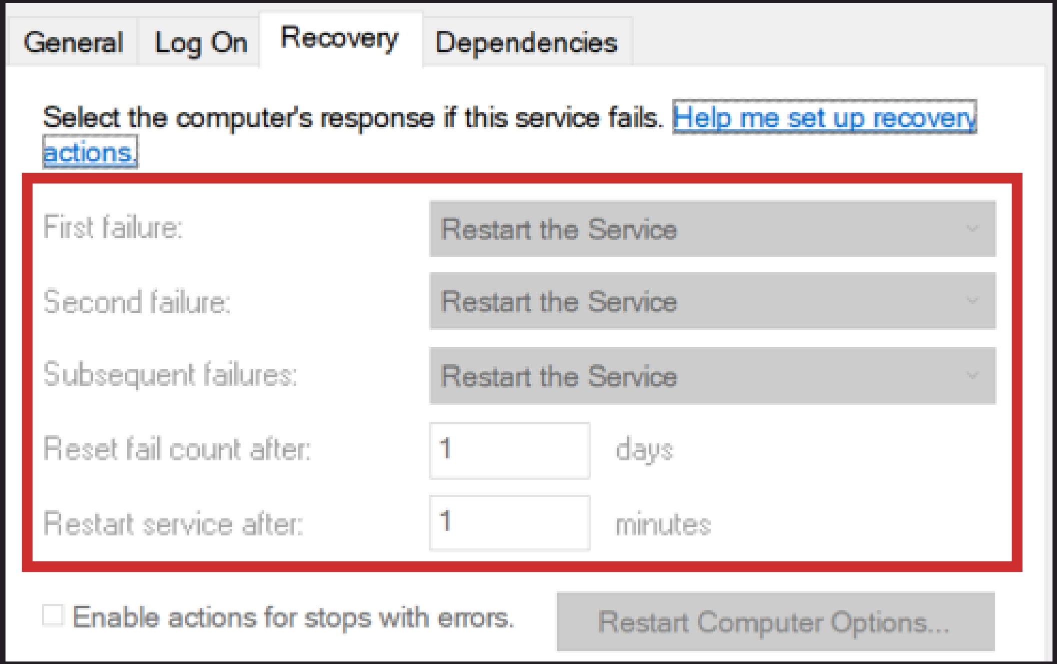
Much to less to get temporary or permanently rid of an EDR!

User space

Second step: EDR services

User-space component: EDR service

- Identify EDR service, connected to EDR PPL process
- EDR user space service + EDR user space process = EDR user space component
- Responsible to restart terminated PPL EDR process(es)



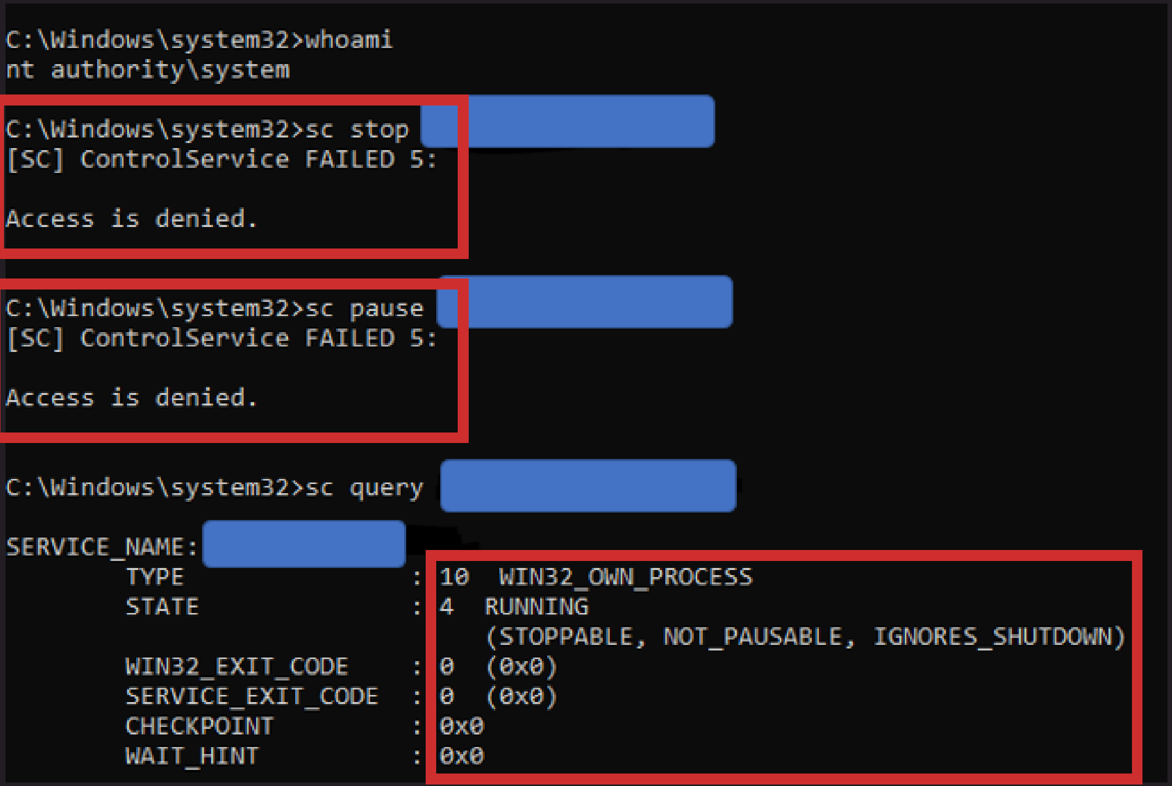
Select the computer's response if this service fails. Help me set up recovery actions.

First failure:	Restart the Service	
Second failure:	Restart the Service	
Subsequent failures:	Restart the Service	
Reset fail count after:	1	days
Restart service after:	1	minutes

☐ Enable actions for stops with errors.

User-space component: EDR service tampering

- Initialization as protected service by ELAM driver
- Despite system integrity, not possible (also not temporary) to pause, stop, disable etc.



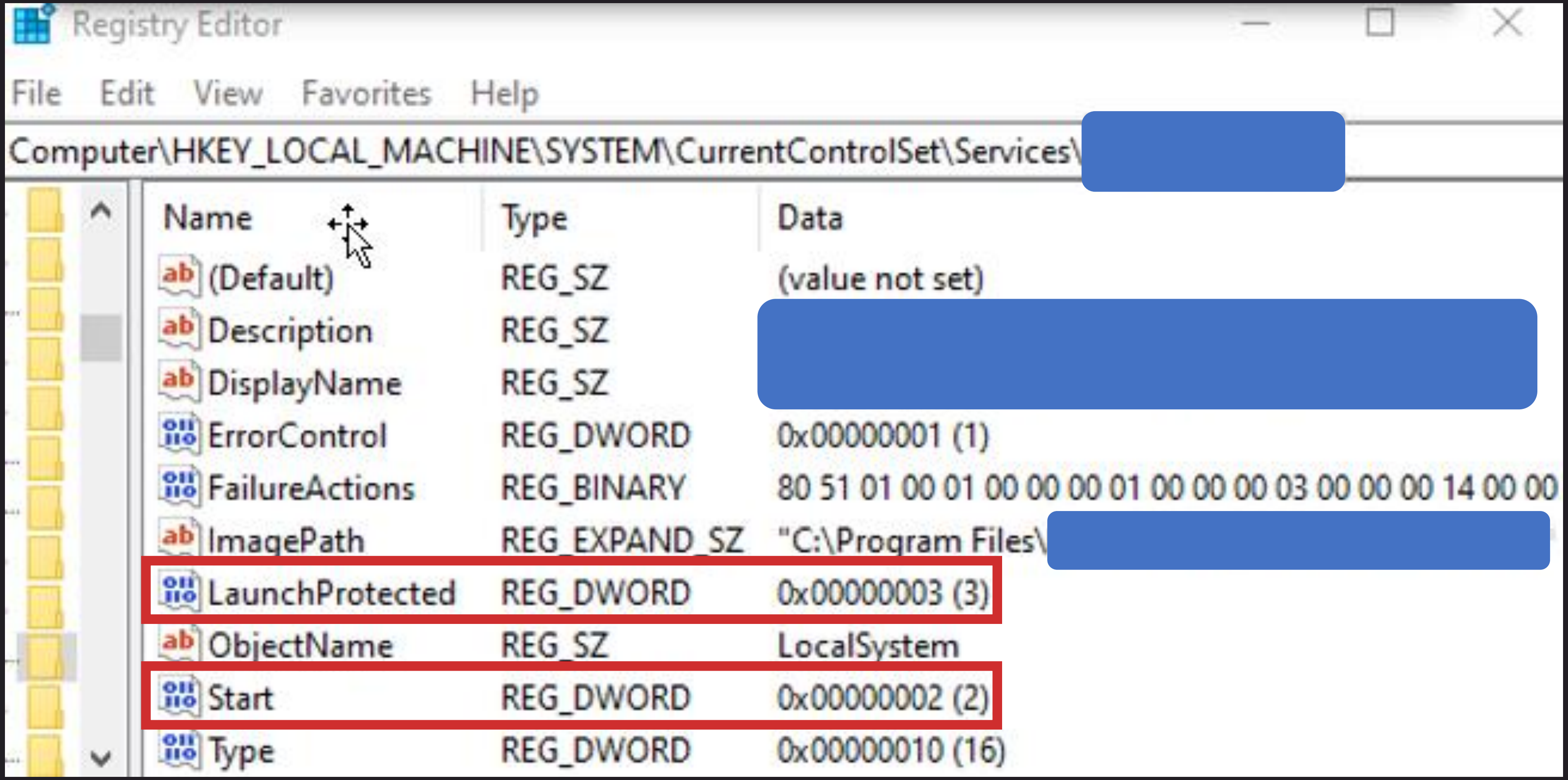
```
C:\Windows\system32>whoami
nt authority\system

C:\Windows\system32>sc stop [redacted]
[SC] ControlService FAILED 5:

Access is denied.

C:\Windows\system32>sc pause [redacted]
[SC] ControlService FAILED 5:

Access is denied.

C:\Windows\system32>sc query [redacted]

SERVICE_NAME: [redacted]
        TYPE               : 10  WIN32_OWN_PROCESS
        STATE              : 4  RUNNING
                                (STOPPABLE, NOT_PAUSABLE, IGNORES_SHUTDOWN)
        WIN32_EXIT_CODE    : 0  (0x0)
        SERVICE_EXIT_CODE  : 0  (0x0)
        CHECKPOINT         : 0x0
        WAIT_HINT          : 0x0
```

User space

Third step: EDR registry keys

User-space component: EDR registry keys

- Identify reg keys / sub keys / entries from EDR user space component (service)

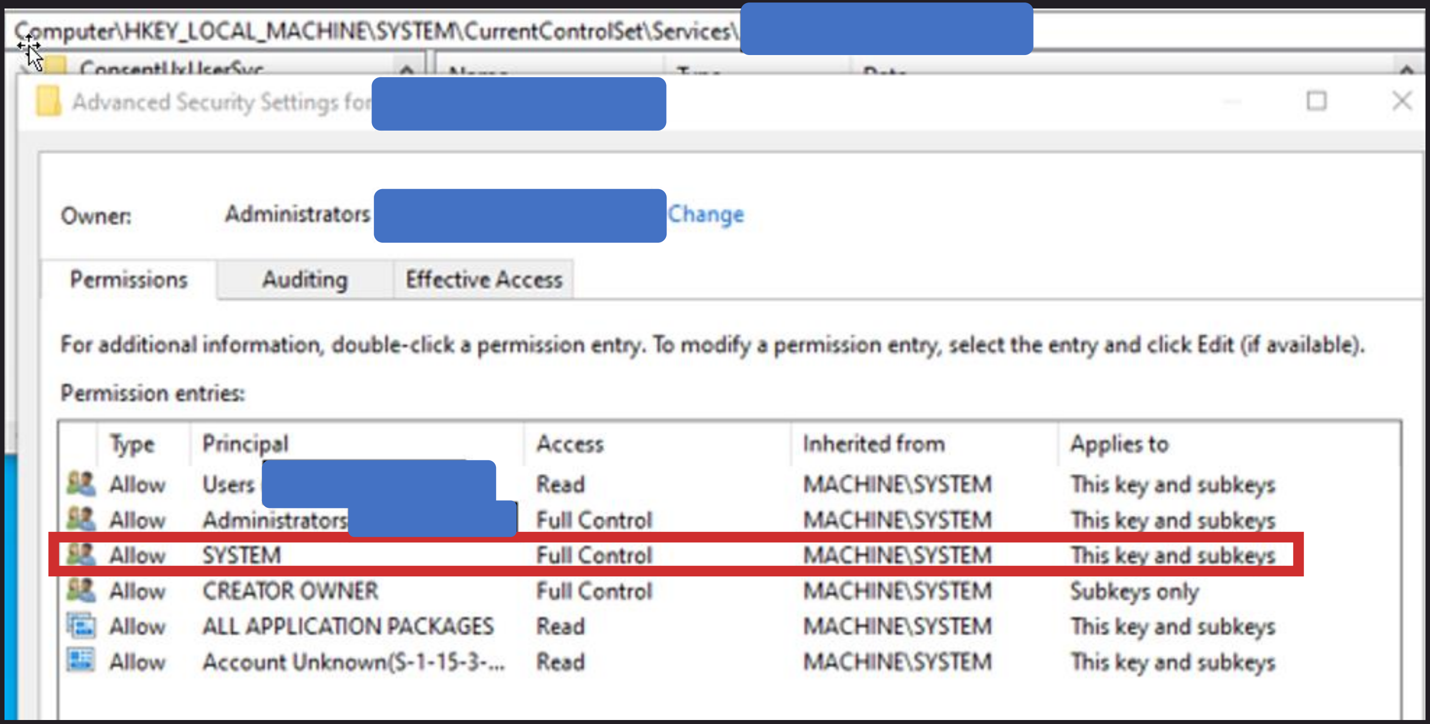


Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\[redacted]

Name	Type	Data
(Default)	REG_SZ	(value not set)
Description	REG_SZ	[redacted]
DisplayName	REG_SZ	[redacted]
ErrorControl	REG_DWORD	0x00000001 (1)
FailureActions	REG_BINARY	80 51 01 00 01 00 00 00 01 00 00 00 03 00 00 00 14 00 00
ImagePath	REG_EXPAND_SZ	"C:\Program Files\[redacted]
LaunchProtected	REG_DWORD	0x00000003 (3)
ObjectName	REG_SZ	LocalSystem
Start	REG_DWORD	0x00000002 (2)
Type	REG_DWORD	0x00000010 (16)

User-space component: EDR registry tampering

- Start entry: value 2 = autoload and value 4 = disabled
- Tamper reg key -> disable EDR user space component
- Like EDR services and processes, despite system integrity…



Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\[redacted]

Advanced Security Settings for [redacted]

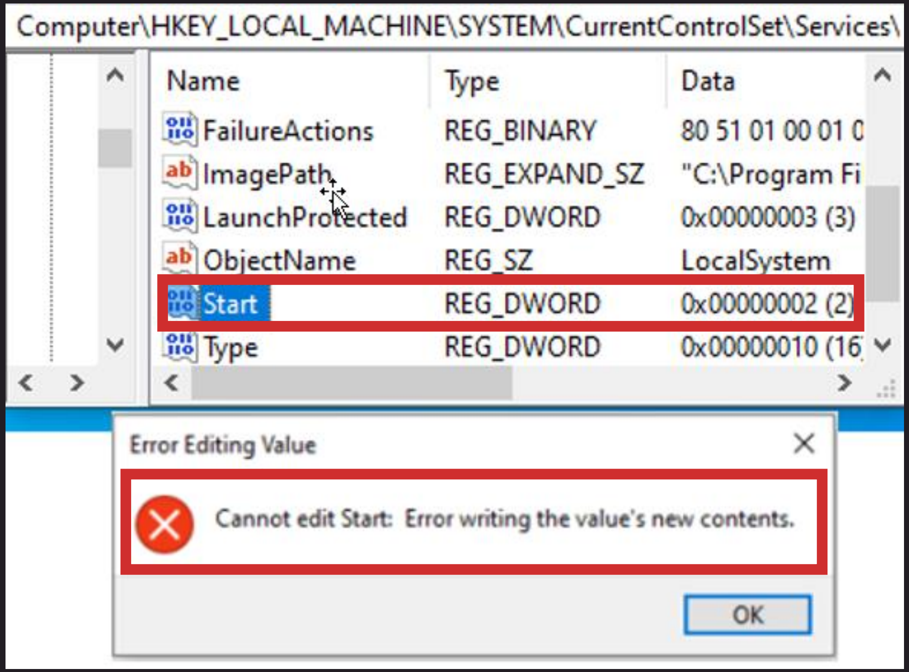
Owner: Administrators [redacted] Change

Permissions | Auditing | Effective Access

For additional information, double-click a permission entry. To modify a permission entry, select the entry and click Edit (if available).

Permission entries:

Type	Principal	Access	Inherited from	Applies to
Allow	Users [redacted]	Read	MACHINE\SYSTEM	This key and subkeys
Allow	Administrators [redacted]	Full Control	MACHINE\SYSTEM	This key and subkeys
Allow	SYSTEM	Full Control	MACHINE\SYSTEM	This key and subkeys
Allow	CREATOR OWNER	Full Control	MACHINE\SYSTEM	Subkeys only
Allow	ALL APPLICATION PACKAGES	Read	MACHINE\SYSTEM	This key and subkeys
Allow	Account Unknown(S-1-15-3-...	Read	MACHINE\SYSTEM	This key and subkeys



Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\

Name	Type	Data
FailureActions	REG_BINARY	80 51 01 00 01 0
ImagePath	REG_EXPAND_SZ	"C:\Program Fi
LaunchProtected	REG_DWORD	0x00000003 (3)
ObjectName	REG_SZ	LocalSystem
Start	REG_DWORD	0x00000002 (2)
Type	REG_DWORD	0x00000010 (16

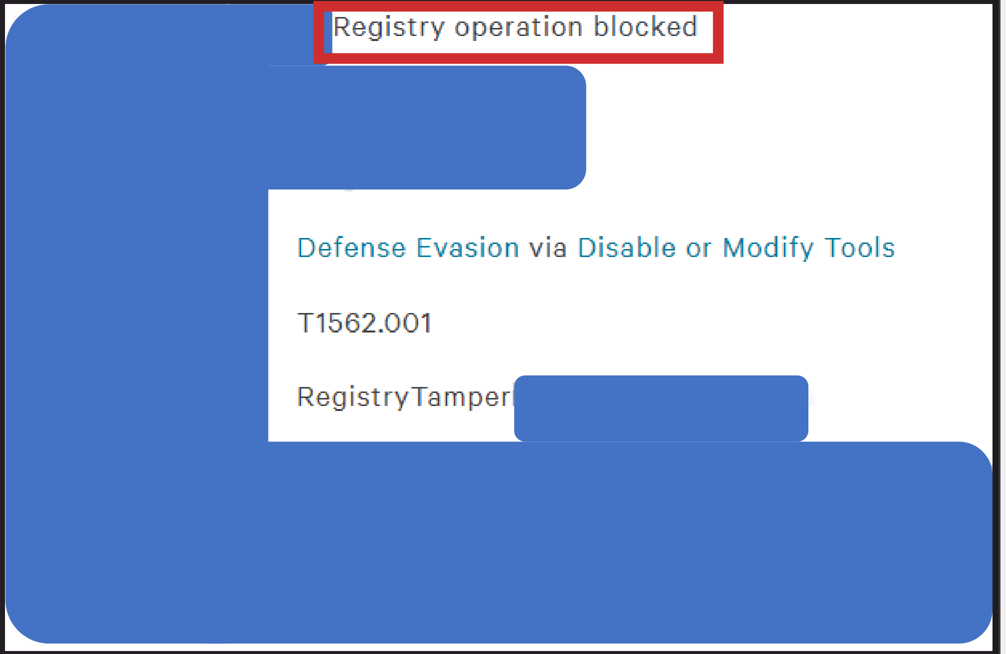
Error Editing Value

Cannot edit Start: Error writing the value's new contents.

OK

User-space component: EDR registry tampering

- Depending on product -> we (possibly) create tamper protection alerts



Registry operation blocked

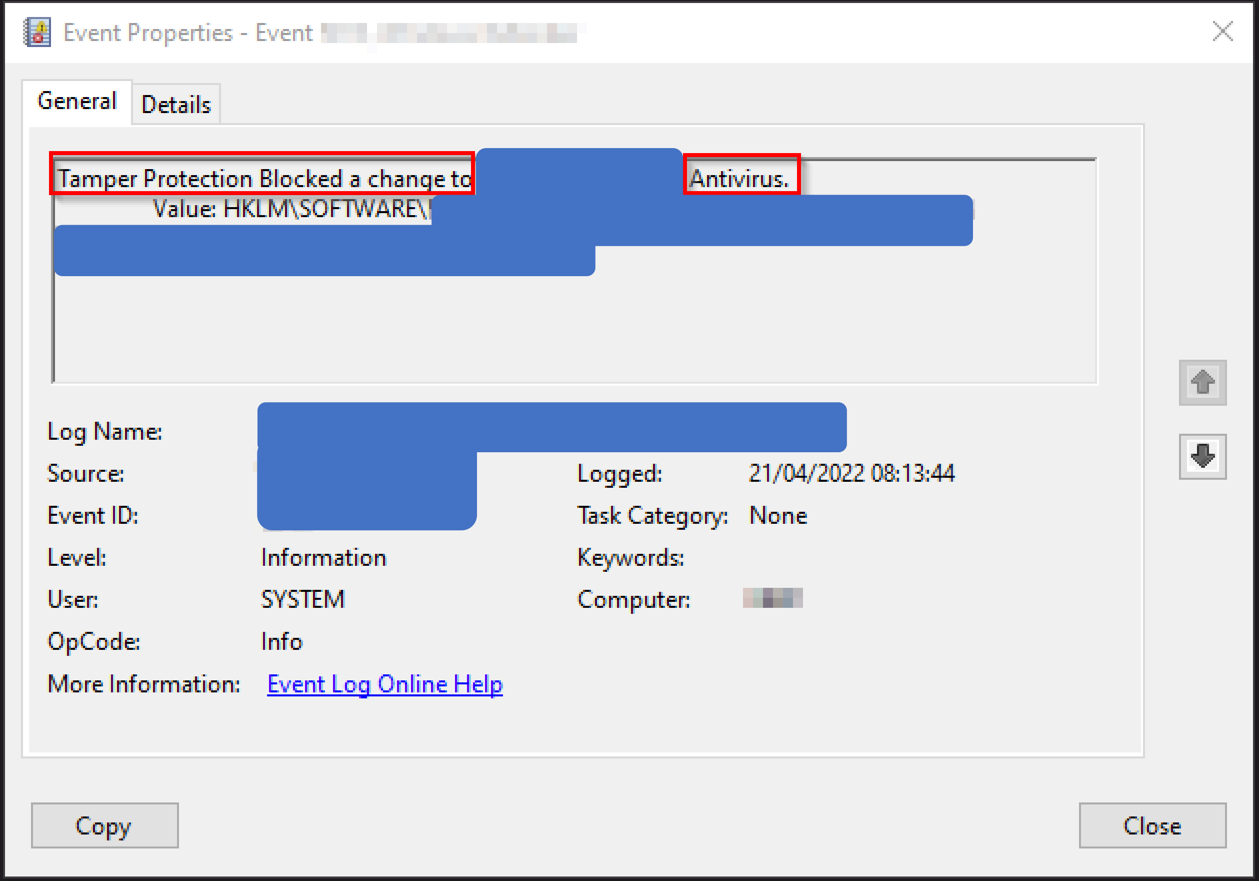
[redacted]

Defense Evasion via Disable or Modify Tools

T1562.001

RegistryTamper[redacted]

[redacted]



Event Properties - Event [redacted]

Tamper Protection Blocked a change to [redacted] Antivirus.
Value: HKLM\SOFTWARE\[redacted]

[redacted]

Log Name:	[redacted]		
Source:	[redacted]	Logged:	21/04/2022 08:13:44
Event ID:		Task Category:	None
Level:	Information	Keywords:	
User:	SYSTEM	Computer:	[redacted]
OpCode:	Info		
More Information:	Event Log Online Help		

Interim status: EDR user space component tampering

EDR processes

Protected by PPL and gets restarted by protected EDR user space service

Current tamper status

- Patch PPL from EDR user space process
- Temporary termination possible

EDR service

Protected by initialization as protected service by EDR ELAM driver

Current tamper status

Compared to EDR processes, also not temporary stoppable or pausable

EDR registry keys

Could be a first key element, but tamper protection until now unknown

Current tamper status

Like EDR services, despite system integrity until now, no tampering possible

D3F C0N

HOM3C0MING

Kernel space

Fourth step: EDR kernel callback routines

Kernel-space: EDR callback routines

- Kernel Patch Protection aka PatchGuard
  - (Officially) hooks in kernel space no longer allowed
  - Forced to user space -> user space API hooking
  - Despite Patchguard, different kernel callbacks can be registered:

PsProcessNotifyRoutine

User space DLL injection -> user space API-hooking;
Telemetry processes

PsThreadNotfifyRoutine

Process Injections

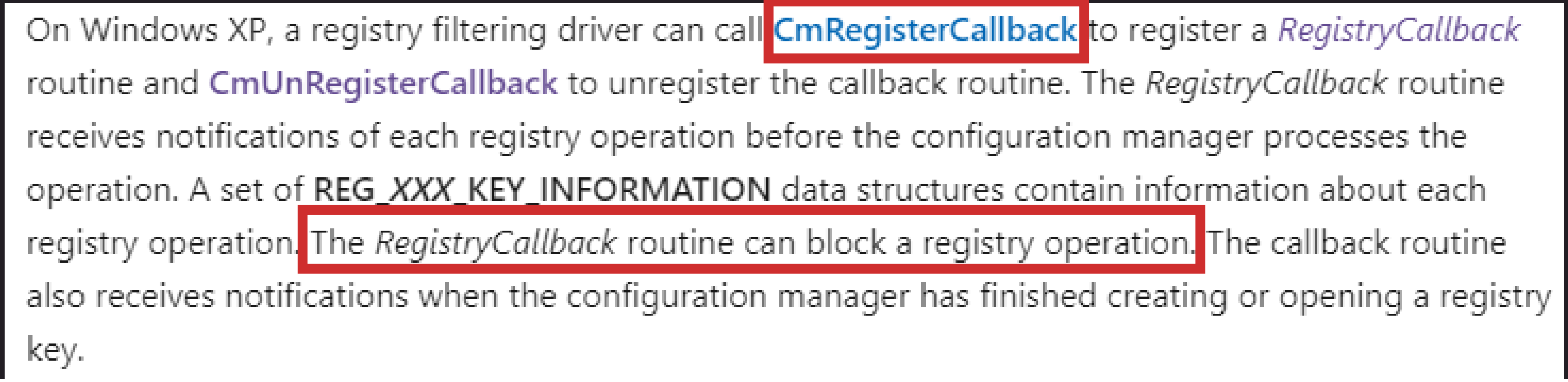
PsLoadImageNotify Routine

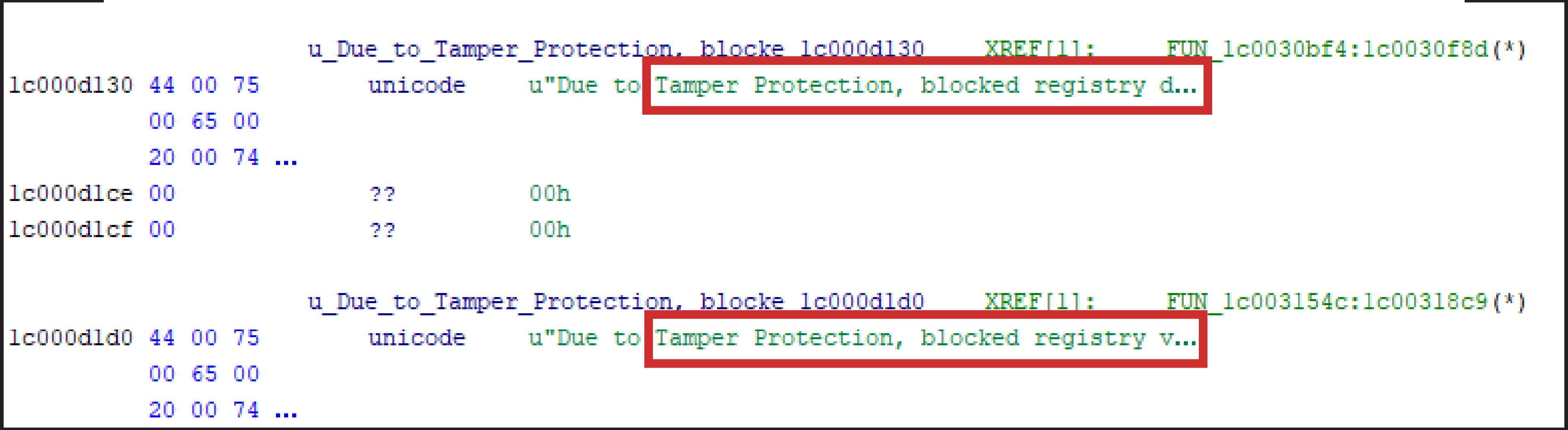
DLL mapping, suspicious image loading

Telemetry collection in general -> attackers footprint based on EDR sensor telemetry

Kernel-space: EDR callback routines

- Besides, used by EDRs to protect their own registry keys against tampering!


On Windows XP, a registry filtering driver can call CmRegisterCallback to register a *RegistryCallback* routine and CmUnRegisterCallback to unregister the callback routine. The *RegistryCallback* routine receives notifications of each registry operation before the configuration manager processes the operation. A set of **REG_*XXX*_KEY_INFORMATION** data structures contain information about each registry operation. The *RegistryCallback* routine can block a registry operation. The callback routine also receives notifications when the configuration manager has finished creating or opening a registry key.


```
                      u_Due_to_Tamper_Protection, blocke 1c000d130    XREF[1]:     FUN_1c0030bf4:1c0030f8d(*)
1c000d130 44 00 75         unicode     u"Due to Tamper Protection, blocked registry d…
          00 65 00
          20 00 74 …
1c000d1ce 00               ??          00h
1c000d1cf 00               ??          00h

                      u_Due_to_Tamper_Protection, blocke 1c000d1d0    XREF[1]:     FUN_1c003154c:1c00318c9(*)
1c000d1d0 44 00 75         unicode     u"Due to Tamper Protection, blocked registry v…
          00 65 00
          20 00 74 …
```

First demo: disable EDR user space component

- Using gained knowledge to:
  - Only disable permanently the EDR user space component and what's the impact on:

Antivirus capabilities

Based on user space DLL injection -> user space API hooking

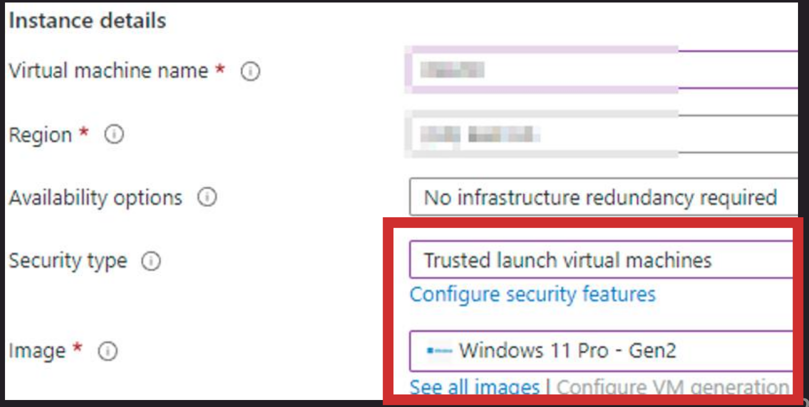
EDR capabilities

Active response (detections); Telemetry footprint

EDR capabilities

Host isolation; Real time response; sensor recovery

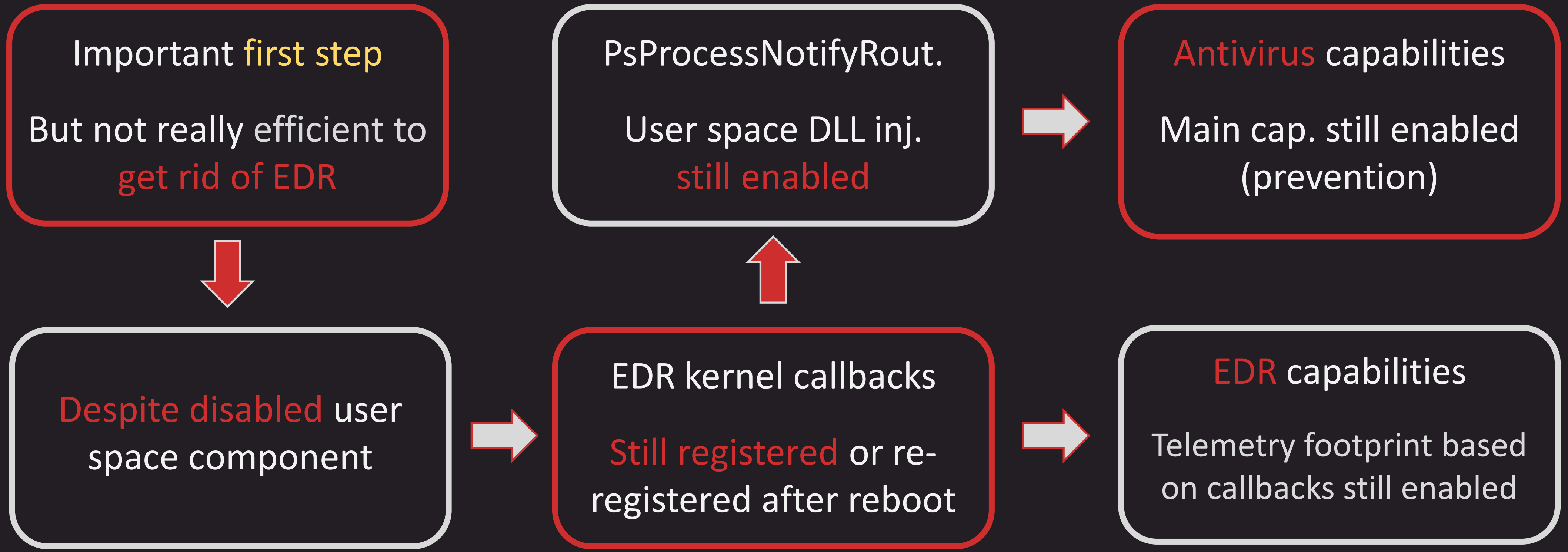
- **All creds** for the POC CheekyBlinder to @brsn76945860
- Have a look at his amazing blog https://br-sn.github.io/


Instance details

Virtual machine name *	[redacted]
Region *	[redacted]
Availability options	No infrastructure redundancy required
Security type	Trusted launch virtual machines Configure security features
Image *	Windows 11 Pro - Gen2 See all images | Configure VM generation

Conclusion: first demo

- If read/write access kernel space:
  - EDR callbacks can be patched -> registry key tamper protection disabled -> Start entry value 4
  - Disable permanently EDR user space component:



Important first step

But not really efficient to get rid of EDR

Despite disabled user space component

EDR kernel callbacks

Still registered or re-registered after reboot

PsProcessNotifyRout.

User space DLL inj. still enabled

Antivirus capabilities

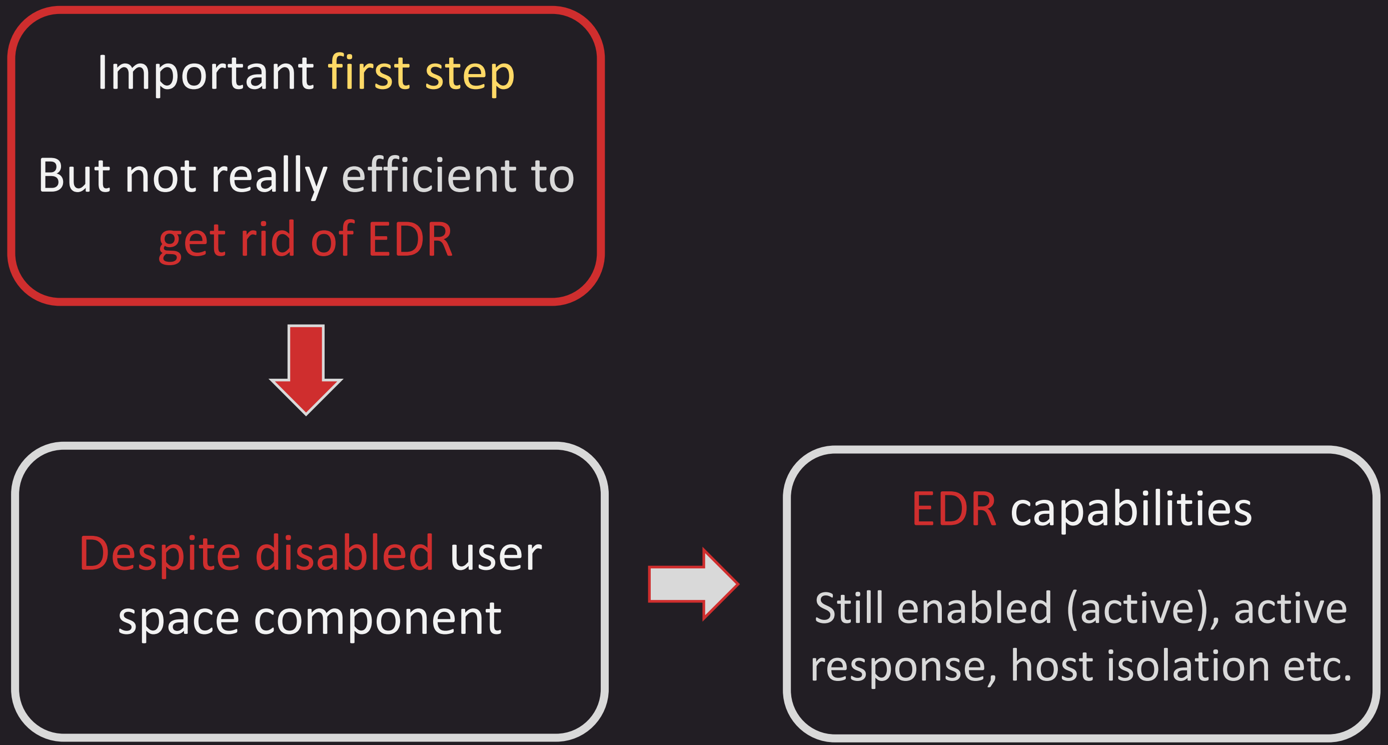
Main cap. still enabled (prevention)

EDR capabilities

Telemetry footprint based on callbacks still enabled

Conclusion: first demo

- If read/write access kernel space:
  - EDR callbacks can be patched -> registry key tamper protection disabled -> Start entry value 4
  - Disable permanently EDR user space component:



Important first step

But not really efficient to get rid of EDR

Despite disabled user space component

EDR capabilities

Still enabled (active), active response, host isolation etc.

Kernel space

Final step: minifilter driver, knockout the EDR!

Kernel-space: EDR minifilter driver

- Independent from EDR user space component
  - Still active, even if EDR user space component is disabled
  - Depending on product, could be responsible for:

Based on the respective callback -> prevention (hooking), detection capabilities (active response and telemetry)

Kernel callback registration in general

EDR web console capabilities

Host isolation, real time response, sensor recovery

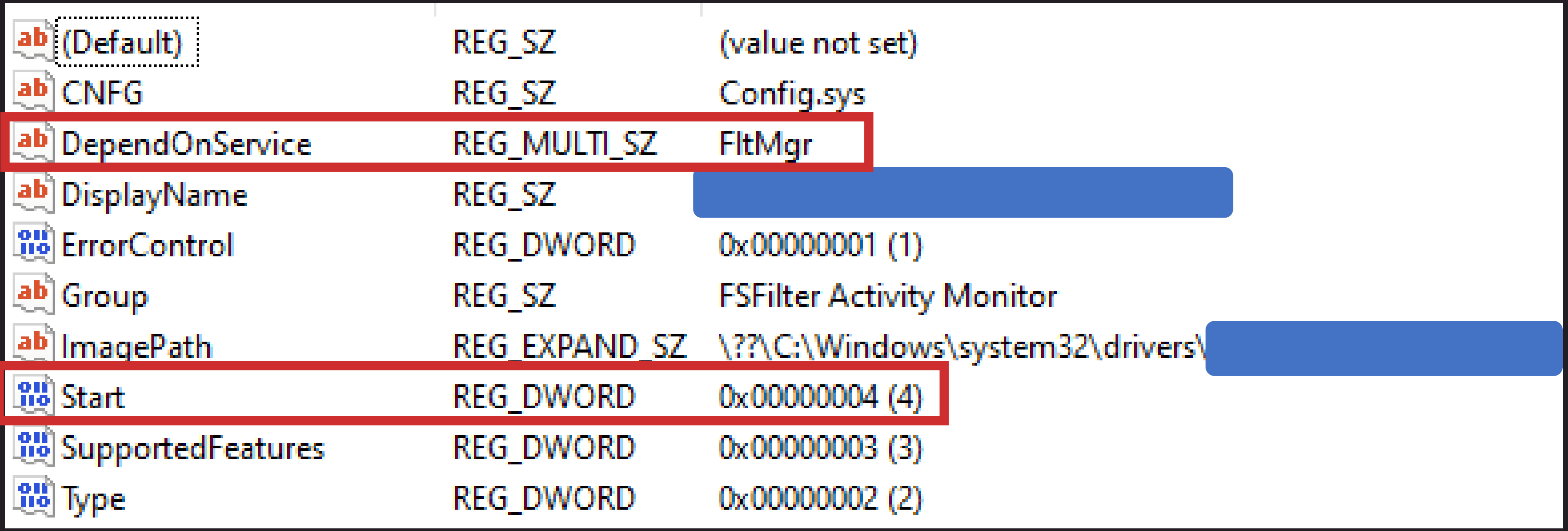
Tampering key element

Permanently get rid of antivirus and EDR capabilities

EDR-minifilter driver (Windows kernel space)

Kernel-space: EDR minifilter driver

- How to disable the EDR minifilter driver?
  - EDR minifilter -> independent registry key
  - Similar structure to EDR user space component reg key -> remember, Start entry value 4



(Default)	REG_SZ	(value not set)
CNFG	REG_SZ	Config.sys
DependOnService	REG_MULTI_SZ	FltMgr
DisplayName	REG_SZ	[redacted]
ErrorControl	REG_DWORD	0x00000001 (1)
Group	REG_SZ	FSFilter Activity Monitor
ImagePath	REG_EXPAND_SZ	\??\C:\Windows\system32\drivers\[redacted]
Start	REG_DWORD	0x00000004 (4)
SupportedFeatures	REG_DWORD	0x00000003 (3)
Type	REG_DWORD	0x00000002 (2)

Second demo: disable EDR minifilter driver

- Using gained knowledge to:
  - Only permanently disable initialization of EDR minifilter driver (kernel component)
  - EDR User space component stays enabled
  - What's the impact on:

Antivirus capabilities

Based on user space DLL injection -> user space API hooking

EDR capabilities

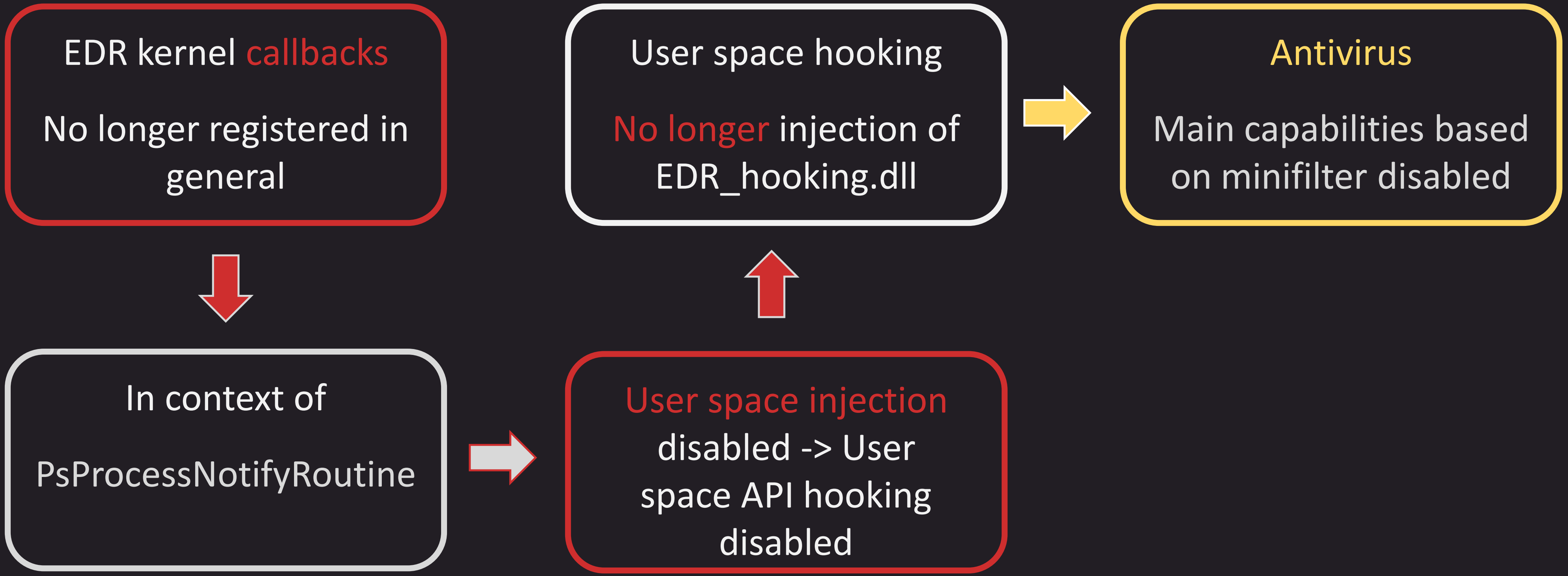
Active response (detections); Telemetry footprint

EDR capabilities

Host isolation; Real time response; sensor recovery

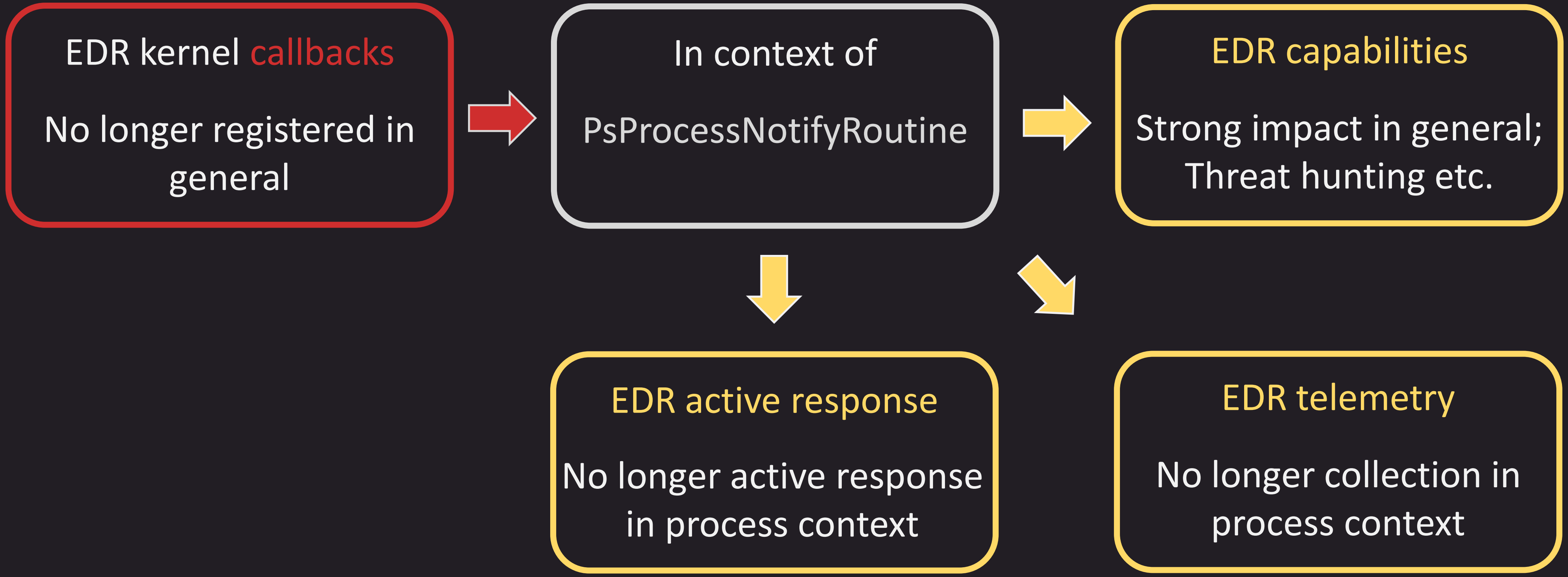
Conclusion: second demo

- Permanently disabling EDR minifilter, much stronger impact:
- Permanently impact on:


EDR kernel callbacks
No longer registered in general
In context of
PsProcessNotifyRoutine
User space injection disabled -> User space API hooking disabled
User space hooking
No longer injection of EDR_hooking.dll
Antivirus
Main capabilities based on minifilter disabled

Conclusion: second demo

- Permanently disabling EDR minifilter, much stronger impact:
- Permanently impact on:


EDR kernel callbacks
No longer registered in general
In context of
PsProcessNotifyRoutine
EDR capabilities
Strong impact in general; Threat hunting etc.
EDR active response
No longer active response in process context
EDR telemetry
No longer collection in process context

Conclusion: second demo

- Permanently disabling EDR minifilter driver, much stronger impact!
  - Disabling the EDR minifilter driver itself:
    - Permanently impact (depending on product) on Blue team EDR web console features

Host isolation

Based on EDR sensor, host isolation no longer possible

Real time response

Based on EDR sensor, EDR (reverse) shell no longer possible

EDR sensor recovery

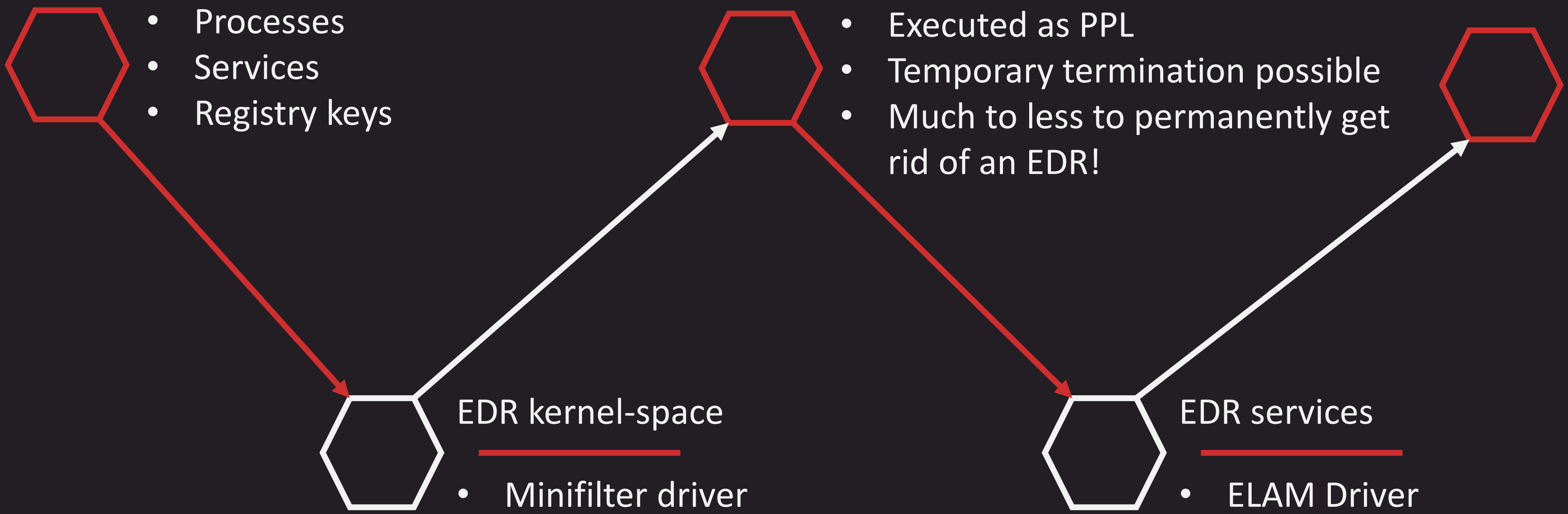
Based on EDR sensor, recovery of an EDR sensor no longer possible

D3F
C0N
HOM3C0MING

Summary

End: summary of the talk

Summary



EDR user-space

- Processes
- Services
- Registry keys

EDR kernel-space

- Minifilter driver
- ELAM driver
- Firmware driver etc.

EDR processes

- Executed as PPL
- Temporary termination possible
- Much to less to permanently get rid of an EDR!

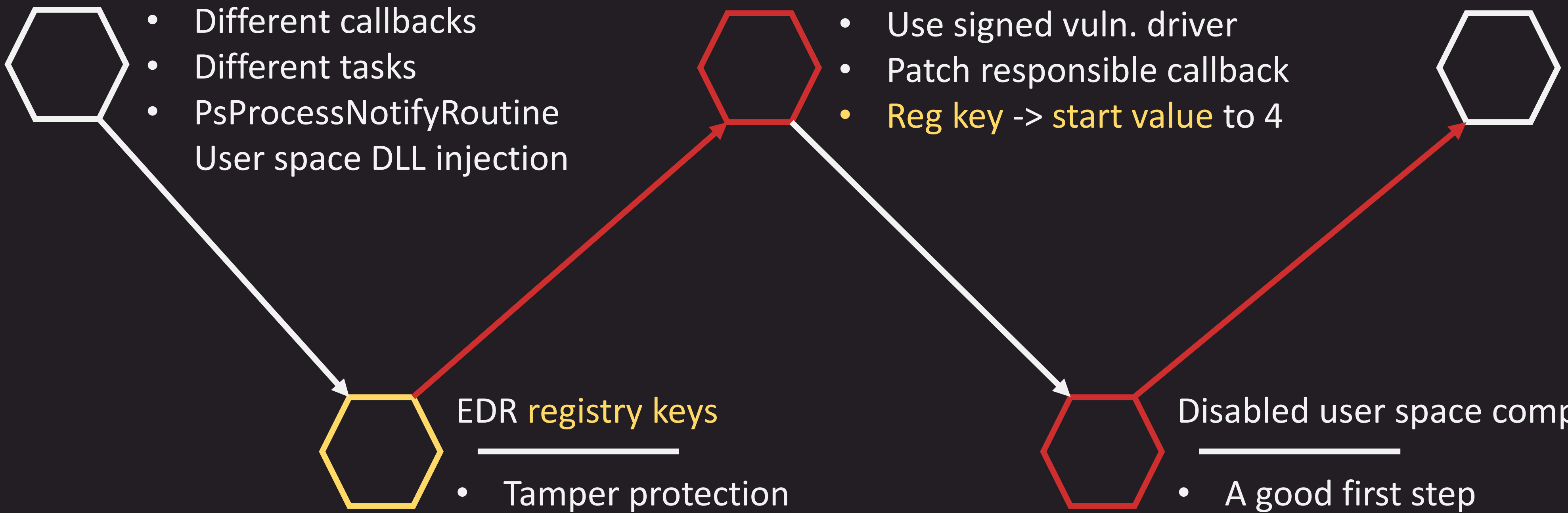
EDR services

- ELAM Driver
- Executed as protected service
- Also, not temporary pauseable stoppable etc.

User-space comp.

- PPL process
- +
- Protected service

Summary



EDR callbacks

- Different callbacks
- Different tasks
- PsProcessNotifyRoutine
  User space DLL injection

EDR registry keys

- Tamper protection
- Kernel callbacks
- CmRegisterCallback or
  PsProcessNotifyRoutine

Disable user-space comp.

- Use signed vuln. driver
- Patch responsible callback
- Reg key -> start value to 4

Disabled user space comp.

- A good first step
- But no strong impact on
  antivirus and EDR capabilities
- Too less to get rid of the EDR

EDR minifilter driver

- Independent comp.
- Kernel space
- Responsible for
  callback registration

Summary

EDR minifilter

- Product dependent, possible key element to get rid of antivirus and EDR capabilities

EDR minifilter

- Independent protected reg key
- Similar reg key structure compared to user space comp.

Minifilter tampering

- Use signed vuln. driver
- Patch respective callback
- Disable EDR minifilter reg key -> start value to 4

Disabled minifilter

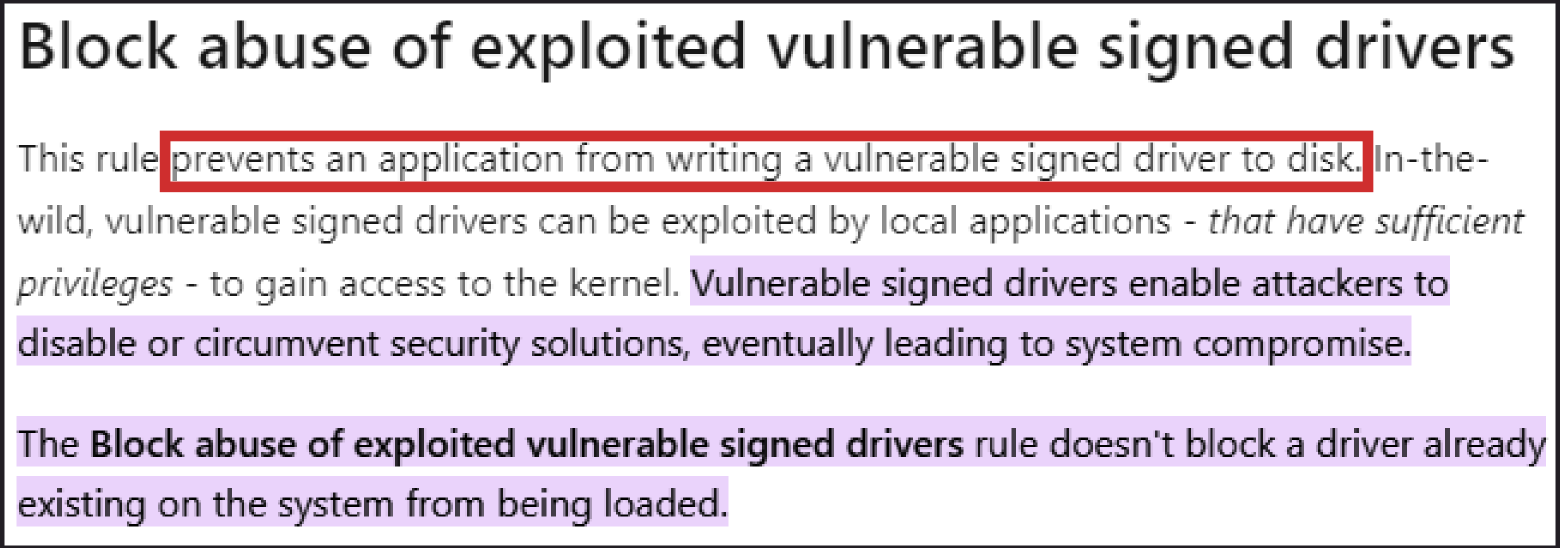
- Much stronger impact compared to disabled user space component
- Permanently get rid of antivirus and EDR capabilities, based on EDR minifilter driver

Conclusion

- Not an EDR vulnerability!
- More a Windows OS Architecture decision
- Same rules for all 3rd party vendors

Blue Team: Mitigation

- Key element is that the attacker get access to kernel space, in case of vulnerable drivers we should try to mitigate this:
- In case of Windows Defender:
  - ASR Rule: Block abuse of exploited vulnerable signed drivers



Block abuse of exploited vulnerable signed drivers

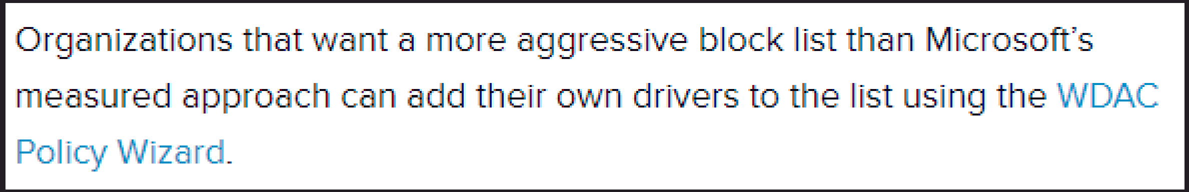
This rule prevents an application from writing a vulnerable signed driver to disk. In-the-wild, vulnerable signed drivers can be exploited by local applications - *that have sufficient privileges* - to gain access to the kernel. Vulnerable signed drivers enable attackers to disable or circumvent security solutions, eventually leading to system compromise.

The **Block abuse of exploited vulnerable signed drivers** rule doesn't block a driver already existing on the system from being loaded.

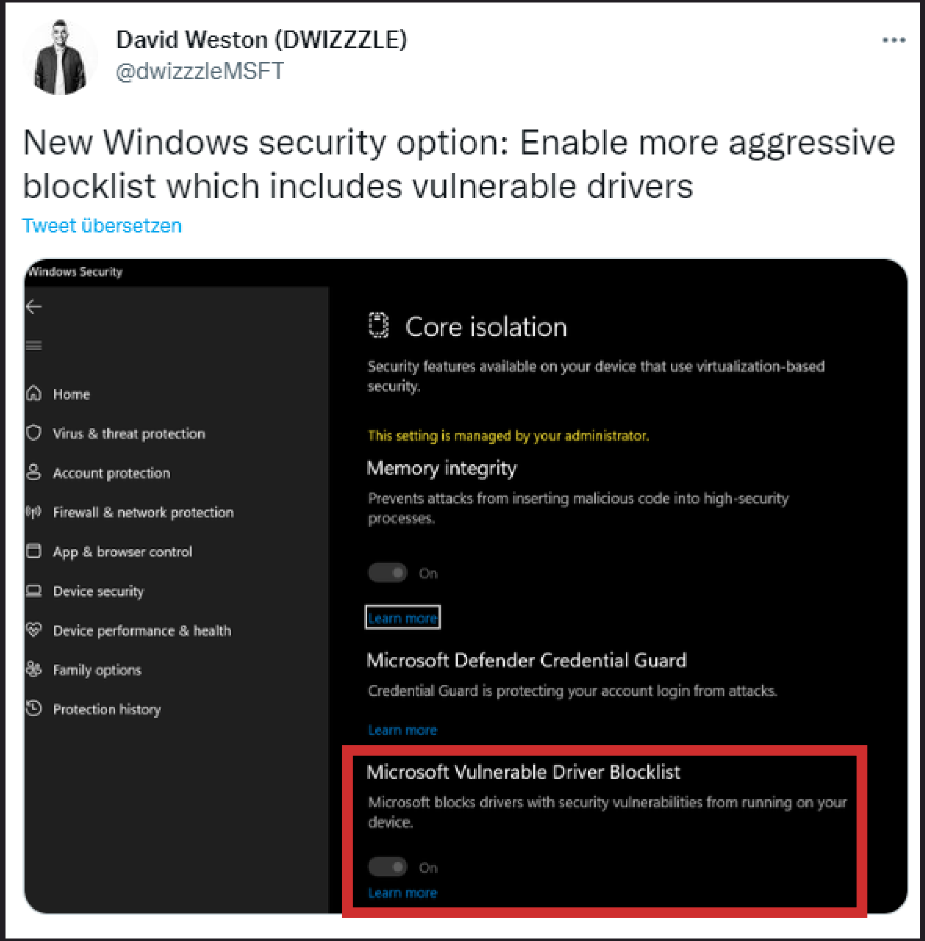
Quelle: **https://docs.microsoft.com/en-us/microsoft-365/security/defender-endpoint/attack-surface-reduction-rules-reference?view=o365-worldwide**

Blue Team: Mitigation

- Windows Device Guard VBS/HVCI:
  - Microsoft Vulnerable Driver Blocklist
  - More aggressive additional hardening with WDAC


Organizations that want a more aggressive block list than Microsoft's measured approach can add their own drivers to the list using the WDAC Policy Wizard.

Resource: https://www.techrepublic.com/article/how-microsoft-blocks-vulnerable-malicious-drivers-defender-third-party-security-tools-windows-11/


David Weston (DWIZZZLE)
@dwizzzleMSFT

New Windows security option: Enable more aggressive blocklist which includes vulnerable drivers

Tweet übersetzen

Windows Security

Core isolation

Security features available on your device that use virtualization-based security.

This setting is managed by your administrator.

Memory integrity

Prevents attacks from inserting malicious code into high-security processes.

On

Learn more

Microsoft Defender Credential Guard

Credential Guard is protecting your account login from attacks.

Learn more

Microsoft Vulnerable Driver Blocklist

Microsoft blocks drivers with security vulnerabilities from running on your device.

On

Learn more

Resource: https://twitter.com/dwizzzleMSFT/status/1508217367259611142

Thank you Las Vegas!

- **Thanks** for the amazing opportunity to be a part of **Defcon 30 / Adversary Village** and thanks to the **greatest community!**
- Thanks to my girlfriend **Brigitte** and my sister **Stefanie** for the **unique support!**
- Check out the blog post https://www.infosec.tirol/how-to-tamper-the-edr/

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