



The modern workplace, after an audit

—— Mirko Colemanberg ——



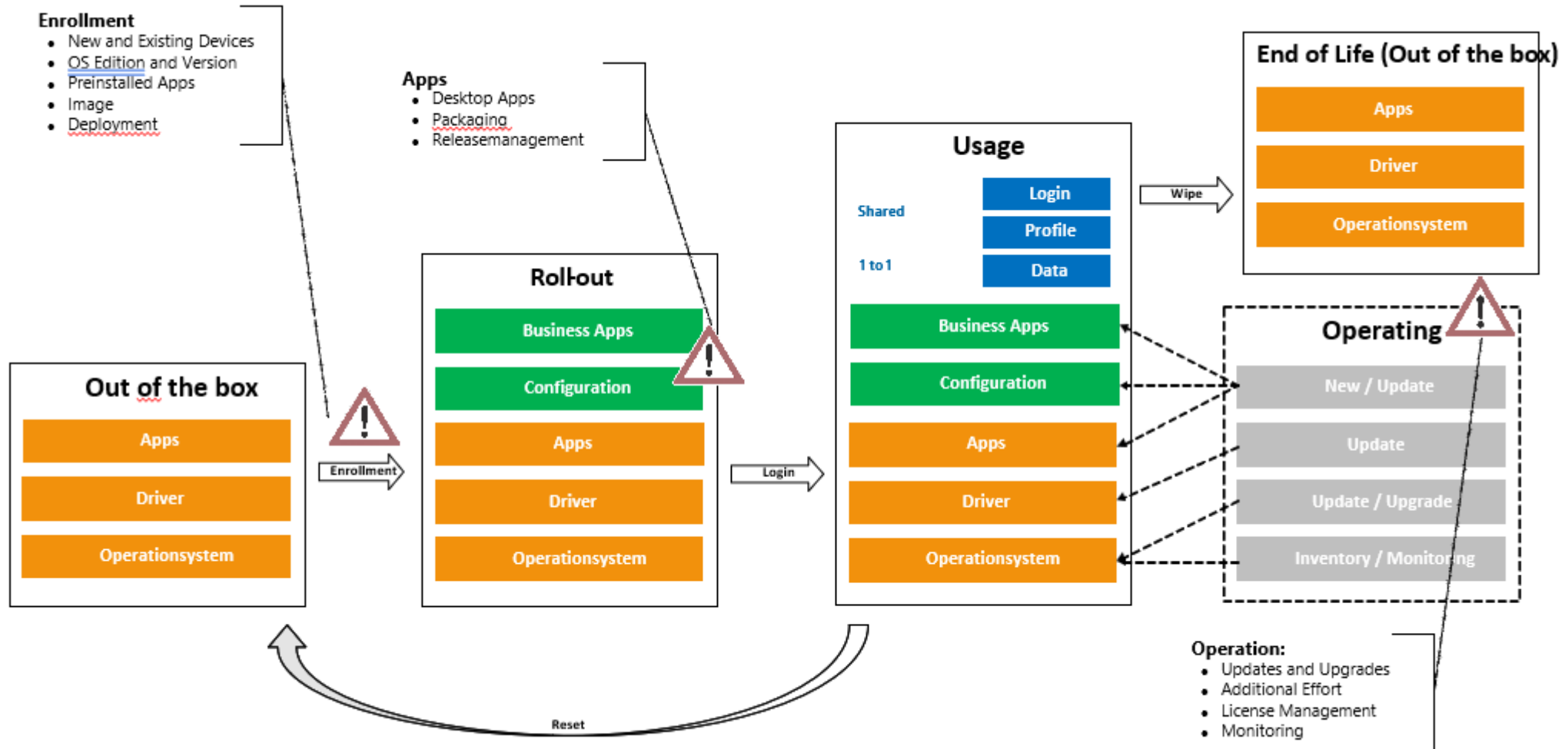
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Based on the Device Lifecycle





Device Hardening Lifecycle



Analyze, Vectors and Vendors.



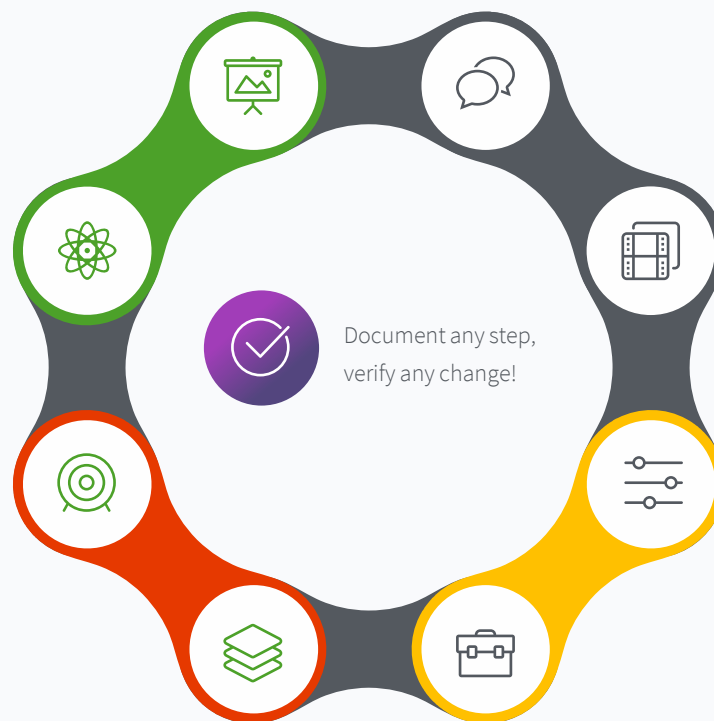
Overview, create a matrix



Decide, what we have, where we have to go.



Test, Line of Business Devices and Applications



Implement, piloting on a broader Device and App selection



Monitor, check the hardening level, excludes needed



No Excludes, only other solutions (EPM)



Report, ready for Audit.



- 3.1 Fileserver - Rights management on File shares
- 3.2 Active Directory - Different Mismatching configuration
- 3.3 Active Directory - Password expires not for all of users User
- 3.4 Active Directory - Accounts with longtime no Logon
- 3.5 Active Directory – Two Domain Admins not Protected



Patch Management - Operating system End-of-Life

Network -

not OWP-Devices in the wrong Network, no NAC

Intune -

two-Factor Authentication for Role based Accounts

3.7 Asset Management - Documentation not complete

With a Zerotrust and AON-VPN is not really a Zerotrust, you get the possibility to access LDAP ;-)

It still needs a good AD-Server (DC) Hardening!!!



- 3.15 Network - not OWP-Devices in the wrong Network, no NAC

With AON-VPN it's still possible to Access network and do Scans;-)





- 3.16 Intune - two-Factor Authentication for Role based Accounts

Some Audits are not really good controlled, we have PIM / PAG in place, there is also implemented that every User have MFA!

FAIL



- 3.17 Asset Management - Documentation not complete

Conclusion / Decision	
Date:	22.02.21
Decided by:	Mirko
Implementation on the test tenant is done, some different roles has to be tested, and made final decisions, details on the rights a RBAC Role get is Documented in the Intune for Modern Workplace - Concept – 005 documetation!	

Conclusion / Decision	
Date:	22.02.21 14.2.23
Decided by:	Mirko
<p>Implementation on the test tenant is done, some different roles has to be tested, and made final decisions, details on the rights a RBAC Role get is Documented in the Intune for Modern Workplace – Concept – 005 documetation!</p> <p>Edit: RBAC is completely integrated, based on the Concept related integration above. In the meantime, we have also changed the EntraID PIM/PAG integration and use now the PAG user that has also more rights in Intune as a Service Administrator Role. No more access with regular Users to Intune and as well EntraID.</p>	



- 3.6 Endpoint Security - Print Nightmare Local Privilege Escalation possible
- 3.7 Endpoint Security - Office Macros
- 3.8 Endpoint Security - PowerShell Constrained Language Mode
- 3.9 Endpoint Security - Security Hardening
- 3.10 Endpoint Security - Installation of Application
- 3.11 Endpoint Security - run PowerShell Scripts without digital Signature
- 3.13 Endpoint Security - PowerShell Hardening
- 3.14 Endpoint Security - Not signed Office Macros via USB
- 3.18 Endpoint Security - Application Guard & SmartScreen for non-Edge not active
- 3.19 Endpoint Security - Non-compliant Devices
- 3.20 Endpoint Security - confusing Alerts
- 3.21 Endpoint Security - Saved WLAN PSK on a Device
- 3.22 Endpoint Security - Cached Login Credentials
- 3.23 Endpoint Security - USB Stick no check on Malware
- 3.24 Endpoint Security - No Adblock in Browser
- 3.25 Endpoint Security - Boot von USB Stick



only specific Servers are allowed

```
Windows NT\Printers\PointAndPrint -Name 'TrustedServers' -Value 1 -e Si
Windows NT\Printers\PointAndPrint -Name 'ServerList' -Value "
Windows NT\Printers\PointAndPrint -Name 'ShowNoElevationOnInstall'
Windows NT\Printers\PointAndPrint -Name 'UpdatePromptSettings' -Value
Windows NT\Printers\PointAndPrint -Name 'RestrictDriverInstallationAdm
```

https://github.com/PrintNightmare/exploitation

<https://itm4n.github.io/printnightmare-exploitation/>

```
PS C:\temp> Invoke-Nightmare -drivername "PrintMe" -NewUser "audt1-admin" -NewPassword "q0002023.1.1.1"
[+] created payload at C:\Users\Audit1\AppData\Local\Temp\nightmare.dll
[+] using pDriverPath = "C:\Windows\System32\DriverStore\FileRepository\ntprint.inf_amd64_da68d8e26d6f4c64\And64\mxdwdrv
.dll"
Invoke-Nightmare : [!] AddPrinterDriverEx failed
In Zeile:1 Zeichen:1
+ Invoke-Nightmare -drivername "PrintMe" -NewUser "audt1-admin" -NewPa ...
+ ~~~~~
+ CategoryInfo          : NotSpecified: (:) [Write-Error], WriteErrorException
+ FullyQualifiedErrorId : Microsoft.PowerShell.Commands.WriteErrorException,Invoke-Nightmare

[+] deleting payload from C:\Users\Audit1\AppData\Local\Temp\nightmare.dll
PS C:\temp>
```



• 3.7 Endpoint Security - Office Macros

ASR related, change Macros and only allow Signed Macros, it's a workaround, because get rid of Macros ;-)

Microsoft Excel 2016

Excel Options > Security > Trust Center

Disable all except digitally signed macros

VBA Macro Notification Settings (User) ☒ Enabled

Excel Options > Security > Trust Center > Protected View

Do not open files from the Internet zone in Protected View (User) ☒ Enabled

Do not open files in unsafe locations in Protected View (User) ☒ Enabled

Turn off Protected View for attachments opened from Outlook (User) ☒ Enabled

Microsoft Office 2016

Security Settings > Trust Center

Only trust VBA macros that use V3 signatures (User) ☒ Enabled





- 3.8 Endpoint Security - PowerShell Constrained Language Mode

Constrained Language mode is designed to allow basic language elements such as loops, conditionals, string expansion, and access to object properties. The restrictions prevent operations that could be abused by a malicious actor.

The Constrained Language mode permits `Invoke-Expression` and a subset of PowerShell language elements, but limits the object types that can be used.

```
"$([Environment]::GetFolderPath('CommonDesktopDirectory'))\*.lnk"
```





• 3.9 Endpoint Security - Security Hardening

In this case;

- Ensure 'Network security: LAN Manager authentication level' is set to 'Send NTLMv2 response only, Refuse LM & NTLM'



Ensure 'Network security: Configure encryption types allowed for Kerberos' is set to 'NTLM, NTLMv2-SSP, AES128_HMAC_SHA1, AES256_HMAC_SHA1, Future encryption types'

Server side?

Server / Local machine, Client / Server, yes set it for Server (if the Device shares, it's like a Server)

Network security: Minimum session security for NTLM SSP based (including secure RPC) servers This security setting allows a server to require the negotiation of 128-bit encryption and/or NTLMv2 session security. These values are dependent on the LAN Manager Authentication Level security setting value. The options are: Require NTLMv2 session security: The connection will fail if message integrity is not negotiated. Require 128-bit encryption. The connection will fail if strong encryption (128-bit) is not negotiated. Default: Windows XP, Windows Vista, Windows 2000 Server, Windows Server 2003, and Windows Server 2008: No requirements. Windows 7 and Windows Server 2008 R2: Require 128-bit encryption

[Learn more](#)

Network Security Minimum Session Security For NTLMSSP Based Servers ⓘ Require NTLM and 128-bit encryption



- 3.10 Endpoint Security - Installation of Application

Microsoft Store apps in this case.
Who needs to close down Store, tell me why!

FAIL

System Services

Microsoft App Store		Configure Xbox Accessory Management Service Startup Mode ⓘ	Disabled
Allow Game DVR ⓘ	Block	Configure Xbox Live Auth Manager Service Startup Mode ⓘ	Disabled
MSI Allow User Control Over Install ⓘ	Disabled	Configure Xbox Live Game Save Service Startup Mode ⓘ	Disabled
MSI Always Install With Elevated Privileges ⓘ	Disabled	Configure Xbox Live Networking Service Startup Mode ⓘ	Disabled

Task Scheduler

Enable Xbox Game Save Task ⓘ	Disabled
------------------------------	----------



- 3.11 Endpoint Security - run PowerShell Scripts without digital Signature

Is signed PowerShell scripts a thing to secure execution of Scripts?

15 Ways to Bypass the PowerShell Execution Policy (netspi.com)

FAIL



• 3.19 Endpoint Security - Non-compliant Devices

Policies

Notifications

Retire noncompliant devices

Compliance settings

Scripts

Monitor

 Save  Discard

These settings configure the way the compliance service treats devices. Each device evaluates these as a "Built-in Device Compliance Policy" which is reflected in device monitor.

Mark devices with no compliance
policy assigned as ⓘ

☒ Compliant





• 3.21 Endpoint Security - Saved WLAN PSK on a Device

```
1 function Get-WifiProfile
2 {
3     [cmdletbinding()]
4     param
5     (
6         [System.Array]$Name=$NULL
7     )
8     Begin
9     {
10         $List=((netsh.exe wlan show profiles) -match ' : ' -replace '.*:\s', '')
11         $ProfileList=$List | Foreach-object {[pscustomobject]{Name=$_}}
12     }
13     Process
14     {
15         Foreach ($Name in $Name)
16         {
17             $ProfileList | Where-Object { $_.Name -match $WLANProfile }
18         }
19     }
20     End
21 }
22
23 $profiles = Get-WifiProfile
24 foreach ($profile in $profiles) {
25     if ($profile.Name -ge 5) {
26         exit 1
27     }
28     else {
29         #Sharepoint folder was found, skyp sync...
30         exit 0
31     }
32 }
```

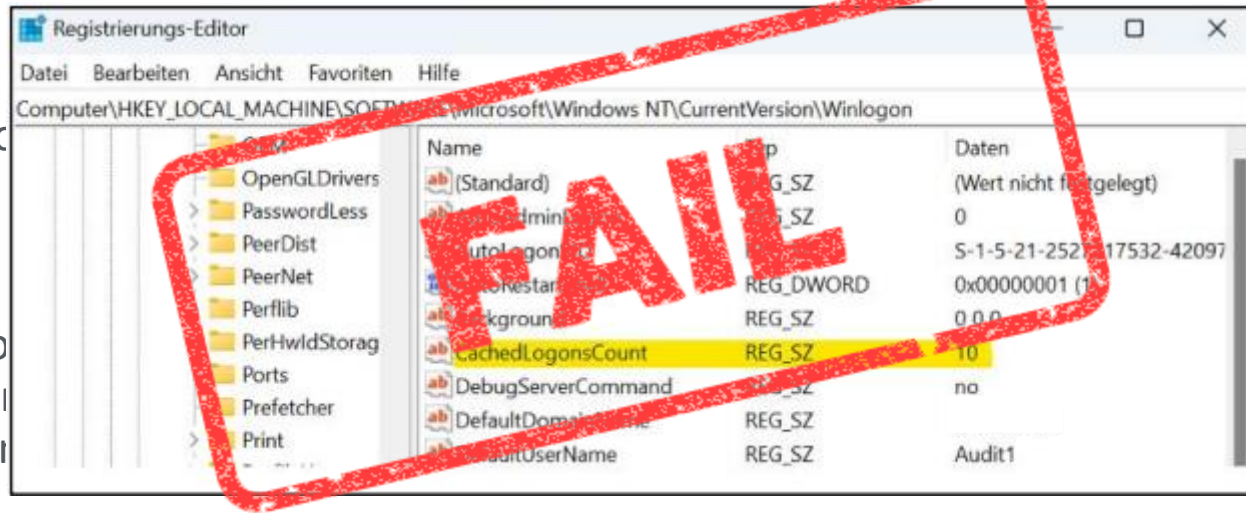
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1 function Get-WifiProfile
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11         $ProfileList=$List | Foreach-object {[pscustomobject]{Name=$_}}
12     }
13     Process
14     {
15         Foreach ($WLANProfile in $Name)
16         {
17             $ProfileList | Where-Object { $_.Name -match $WLANProfile }
18         }
19     }
20     End
21 }
22
23 $profiles = Get-WifiProfile
24 foreach ($profile in $profiles) {
25     if ($profile.Name -ne ' ' -and $profile.Name -ne ' ' -and $profile.Name -ne ' ') {
26         Netsh.exe wlan delete profile $profile.Name
27     }
28 }
```



• 3.22 Endpoint Security - Cached Login Credentials

Caching of login

- Azure AD Joined machines, credentials are not cacheable and not manageable at the endpoint.



only applies to domain-joined machines.

Microsoft Q&A = For AAD joined machines, there is no Credential Manager – a component which is managed by the operating system.

- For AAD joined machines, credential caching is related to the Primary Refresh Token that is issued when a user is authenticated against Azure AD.



3.23 Endpoint Security - USB Stick no check on Malware



Scan Parameter ⓘ

Full scan





• 3.24 Endpoint Security - No AdBlock in Browser

Good Idea, who of you have it?
Nicola have a point, maybe...





- 3.25 Endpoint Security - Boot von USB Stick

What's about your OSD?





A Threat was cleaned successfully by Windows-Defender !

Threat details:

```
"computer": "xxxxxxxxxx",
"deviceid": "xxxxxxxxxxxxxxxxxxxxxxxxxxxx",
"customerid": "xxxxxxxxxxxxxxxxxxxxxxxxxxxx",
"eventid": 1000,
"defendereventid": 1116,
"eventrecordid": 10813,
"description": "EUS:Win32/CustomEnterpriseBlock",
"detectionid": "{7ADAC75F-D838-433C-BDB6-D2EA7AC57F4A}",
"detectiontime": "2023-12-05T13:19:41.19Z",
"threatid": "2147717805",
"threatname": "EUS:Win32/CustomEnterpriseBlock",
"severityid": "5",
"categoryid": "49",
"fwlink": "https://go.microsoft.com/fwlink/?linkid=37020&name=EUS:Win32/C",
"sourceid": "12",
"process": "Unknown",
"user": "",
"resource": "file:_c:\\temp\\azurehound-windows-amd64\\azurehound.exe",
"actionid": "9",
"errordescription": "Auf dem Gerät wurde erfolgreich beendet. ",
"actionstring": "No additional actions required"
```



Microsoft
Defender
For Endpoint

```
"resource": "containerfile:_C:\\Users\\Audit1\\Desktop\\temp.zip; file:_C:\\Users\\Audit1\\Desktop\\temp.zip->temp/Invoke-
Certify.ps1; file:_C:\\Users\\Audit1\\Desktop\\temp.zip->temp/Invoke-Rubeus.ps1; file:_C:\\Users\\Audit1\\Desktop\\temp.zip-
>temp/Seatbelt/Invoke-Seatbelt.ps1",
```

```
"resource": "containerfile:_C:\\Users\\Audit1\\Desktop\\temp.zip; file:_C:\\Users\\Audit1\\Desktop\\temp.zip-
>temp/blod42.zip->BloodHound-win32-x64/resources/app/Collectors/DebugBuilds/SharpHound.exe;
file:_C:\\Users\\Audit1\\Desktop\\temp.zip->temp/blod42/BloodHound-win32-
x64/resources/app/Collectors/DebugBuilds/SharpHound.exe; file:_C:\\Users\\Audit1\\Desktop\\temp.zip-
>temp/SharpHound.exe",
```

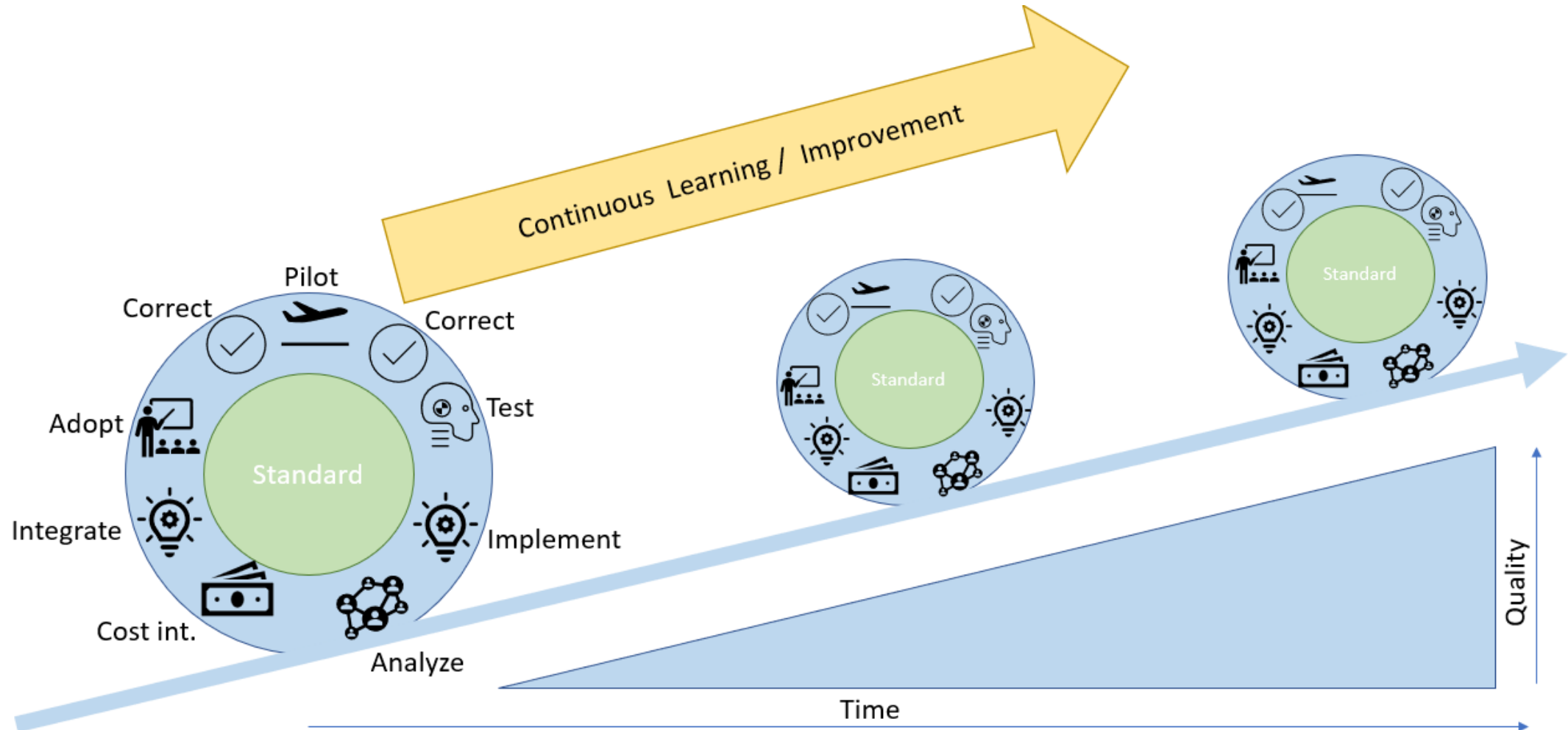
A Threat was cleaned successfully by Windows-Defender !

Threat details:

```
"computer": "xxxxxxxxxx",
"deviceid": "xxxxxxxxxxxxxxxxxxxxxxxxxxxx",
"customerid": "xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
"eventid": 1000,
"defendereventid": 1117,
"eventrecordid": 10814,
"description": "HackTool:Win64/BloodHound!MSR",
"detectionid": "{5E00DA11-D338-484D-A4F9-14D04917A296}",
"detectiontime": "2023-12-05T12:24:08.028Z",
"threatid": "2147744881",
"threatname": "HackTool:Win64/BloodHound!MSR",
"severityid": "4",
"categoryid": "34",
"fwlink": "https://go.microsoft.com/fwlink/?linkid=37020&name=HackTool:Win64/BloodHound!MSR&threatid=2147744881&enterprise=1",
"sourceid": "2",
"process": "Unknown",
"user": "",
"resource": "containerfile:_C:\\Users\\Audit1\\Desktop\\temp.zip; file:_C:\\Users\\Audit1\\Desktop\\temp.zip->temp/blod42.zip->BloodHound-win32-
x64/BloodHound.exe",
"actionid": "2",
"errordescription": "Auf dem Gerät wurde keine Schadsoftware oder andere potenziell unerwünschte Software gefunden. ",
"actionstring": "No additional actions required"
```



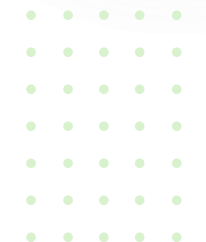
Continuous improvement





Benchmarks today

There are some Benchmark tools, frameworks, compliance examples around, that helps you based on CVE's or Audit relevant settings choosing the right one to get a success and structured environment.



CIS

The CIS Benchmarks are prescriptive configuration recommendations for more than 25+ vendor product families. They represent the consensus-based effort of cybersecurity experts globally to help you protect your systems against threats more confidently.



STIGVIEWER

STIGViewer® is for professionals who need access to the Security Technical Implementation Guides (STIGs) and documentation.
Unified Compliance Framework®



Canonical

Start with Ubuntu and get trusted open source for every part of your stack.



MS Security baselines

Microsoft is dedicated to providing its customers with secure operating systems, such as Windows and Windows Server, and secure apps, such as Microsoft 365 apps for enterprise and Microsoft Edge.



Benchmarks today

There are some Benchmark tools, frameworks, compliance examples around, that helps you based on CVE's or Audit relevant settings choosing the right one to get a success and structured environment.



NCSC Device Security Guidance

While no set of mitigation strategies are guaranteed to protect against all cyber threats, organizations are recommended to implement eight essential mitigation strategies from the Strategies to Mitigate Cyber Security Incidents as a baseline. This baseline, known as the Essential Eight, makes it much harder for adversaries to compromise systems.



ACSC Essential Eight

We support the most critical organizations in the UK, the wider public sector, industry, SMEs as well as the general public. When incidents do occur, we provide effective incident response to minimize harm to the UK, help with recovery, and learn lessons for the future.



Additional Audit benchmarks

Some Devices in Production are regulated by the Industry.

For example, they have to be Certified that's not possible to change anything, because it can be impacted to an Application to change the something that will have an impact to the production, like measurement of a high impacted value.

- Pharma industry
 - Medical industry
 - Oil Industry
 - Etc.
-
- NIST SP 800-53 (Government USA, can be used for Public as well)
 - PCI-DSS (finance / Credit)
 - HIPAA (Healthcare USA)



FREE DOWNLOAD

CIS Benchmark

Safeguard IT systems against cyber threats with these CIS Benchmarks. Click to download a PDF from the list of available versions.

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Recent versions available for CIS Benchmark:

- Microsoft Windows 11 Enterprise (3.0.0)
- Microsoft Windows 11 Stand-alone (2.0.0)
- Microsoft Windows 10 EMS Gateway (2.0.0)
- Microsoft Windows 10 Enterprise (3.0.0)
- Microsoft Windows 10 Enterprise Release 2004 (1.9.1)
- Microsoft Windows 10 Enterprise Release 1909 (1.8.1)
- Microsoft Windows 10 Enterprise Release 1903 (1.7.1)



Microsoft Windows 11 Security Technical Implementation Guide

Overview

Version	Date	Finding Count (256)			Downloads		
1	2023-09-29	CAT I (High): 26	CAT II (Med): 213	CAT III (Low): 17	Excel	JSON	XML

STIG Description

This Security Technical Implementation Guide is published as a tool to improve the security of Department of Defense (DOD) information systems. The requirements are derived from the National Institute of Standards and Technology (NIST) 800-53 and related documents. Comments or proposed revisions to this document should be sent via email to the following address: disa.stig_spt@mail.mil.

Available Profiles

Findings (MAC III - Administrative Sensitive)

Finding ID	Severity	Title	Description
V-253283	High	Data Execution Prevention (DEP) must be configured to at least OptOut.	Attackers are constantly looking for vulnerabilities in systems and applications. Data Execution Prevention (DEP) prevents harmful code from running in protected memory locations reserved for...
V-253284	High	Structured Exception Handling Overwrite Protection (SEHOP) must be enabled.	Attackers are constantly looking for vulnerabilities in systems and applications. Structured Exception Handling Overwrite Protection (SEHOP) blocks exploits that use the Structured Exception...



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Endpoint security | Security baselines ...

 Search



Use security baselines to apply Microsoft-recommended security configuration settings to your enrolled devices. [Learn more.](#)

Overview





-  Overview
-  All devices
-  Security baselines
-  Security tasks

Manage

-  Antivirus

Security Baselines

↑↓ Version

 Security Baseline for Windows 10 and later	Version 23H2
 Microsoft Defender for Endpoint Baseline	Version 6
 Security Baseline for Microsoft Edge	Version 117
 Windows 365 Security Baseline	November 2021
 Microsoft 365 Apps for Enterprise Security Baseline	Version 2306



Australian Government
Australian Signals Directorate

ASD AUSTRALIAN
SIGNALS
DIRECTORATE
ACSC Australian
Cyber Security
Centre



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[Home](#) > [Resources for business...](#) > [System hardening an...](#) > [System hardening](#) > **Hardening Microsoft Windows 10 version 21H1 Workstations**

Hardening Microsoft Windows 10 version 21H1 Workstations

Content complexity

Moderate ● ● ●



First published: 01 May 2017

Last updated: 06 Oct 2021

Content written for

Introduction

Workstations are often targeted by malicious actors using malicious websites, emails or removable media in an attempt



GUIDANCE

Device Security Guidance

Guidance for organisations on how to choose, configure and use devices securely

Pages

PAGE 1 OF 51

**Device Security
Guidance**

[Platform Guides](#) +

[Getting ready](#) +

[Policies and settings](#) +

[Managing deployed
devices](#) +

[Infrastructure](#) +

[Bring your own device
\(BYOD\)](#) +

[Device security
principles for
manufacturers](#) +





Uff, what options we have and have to implement?

- There are a lot of benchmarks around
- Cyber security have to be in our DNA
- Device Security, Hardening of anything
- Patching (not only OS level!)
- Baselines
- Regulations
- Confusing about how to and why
- Order from Company to get Certified (ISO, etc.)

**At the end, every User in our Company
has to be able to work and do the Job!**



How to Start to cover anything

There is no: “Cover anything” because it’s too much

- What are the Business needs
- Create use cases
- Use cases need regulations or certification
- Start reading the Benchmarks, to add it to each use case
- Check the MS-Baselines
 - Not only for Windows



Wait there is more

Try to keep it simple!

Documentation FTW!

- Attack surface reduction
- EDGE
- Other OS, like macOS, Linux, Android, iOS, iPadOS



Feature	Description	Implementation effort	Security improvement
Endpoint Security & baselines	Apply system hardening and configure built-in security features	! Medium-High	! High
Windows LAPS	Local Administrator Password Solution, should be used for all elevated actions	● Low	! High (when also used during operations)
Admin roles	Clean up privileged admin roles	● Low	! High
App Control for Business	Configure & control app execution	? Depends	! High
Defender for Endpoint onboarding	More visibility and XDR	● Medium	! High
Identity - Conditional Access	Protect access to W365 on the identity perimeter	● Low	! Medium-High
Endpoint Privilege Management	Configure & control app elevation for special use cases	● Low	● Medium
Software update policies	Define policies so Windows, drivers and apps stay up to date	● Low	! High
Compliance policies	Verify your deployment and system integrity	● Low	● Medium

Thank you
Niklas Tinner



Are there some Help around

Yes, community tools

Documentation FTW!

- [SkipToTheEndpoint/OpenIntuneBaseline: Community-driven baseline to accelerate Intune adoption and learning. \(github.com\)](#)
- [ThomasKur/M365Documentation: Automatic Microsoft 365 Documentation to simplify the life of admins and consultants. \(github.com\)](#)
- [alexverboon/IntuneCustomCompliance: Microsoft Intune Custom Compliance \(github.com\)](#)
- [Sander Rozemuller | All about Identity, AVD, Automation, DevOps, Monitoring, Intune and Security](#)



**It's easy to be
complicated, but very
complicated to keep it
easy!**

—— Mirko Colemanberg ——



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SECURE & MODERN ENDPOINT MANAGEMENT



Mirko Colemberg

Senior Expert Endpoint Consultant

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Session Feedback

