Evoting – Basic installation and hardening

Version 1.6 Date

Windows image documentation

2024-09-17

Ontrex

Prerequisites

To create the image, the technician PC needs the following applications

AnyBurn	https://www.anyburn.com/download.php
Rufus	https://rufus.ie/de/
Windows ADK	https://learn.microsoft.com/en-us/windows-hardware/get-started/adk-install
HP Image	https://ftp.ext.hp.com/pub/caps-softpaq/cmit/HPIA.html
Assistant	
Lenovo Update	https://support.lenovo.com/ch/en/solutions/ht037099-download-
Retriever	thinkvantage-technologies-administrator-tools

Create packages

Software

7zip

64-Bit MSI from https://www.7-zip.org/download.html

GMP

This installer is provided by the customer

KeePass

Version 2.xx Setup from https://keepass.info/download.html

KeyStore Explorer

On https://keystore-explorer.org/downloads.html download the newest Windows setup (including JRE)

Edge



Notepad++

Newest 64-Bit installer from https://notepad-plus-plus.org/downloads/



Notepad++ P	lugins							
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Available U	odates In	stalled	Incomp	atible				«XML Tools» and «JSTool»
Available of	Junes		meomp	utione				
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JSTool				1.2312				
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Notepad++ Plugins

PowerShell 7

On <u>https://learn.microsoft.com/en-us/powershell/scripting/install/installing-powershell-on-windows?view=powershell-7.4</u> download the current x64 PowerShell 7.x MSI

OpenSSL

On

http://wiki.overbyte.eu/wiki/index.php/ICS_Download#Download_OpenSSL_Binaries_.28required_f or_SSL-enabled_components.29 download the latest Win-64 3.x version

SDelete

Download from <u>https://learn.microsoft.com/en-us/sysinternals/downloads/sdelete</u> and extract the 32-Bit and 64-Bit executable

TotalCommander

Download 64-Bit Installer from https://www.ghisler.com/download.htm

Drivers

Supported models

The following laptop models have to be supported, and their drivers integrated into the image: EliteBook 850 G5, ThinkPad P52s (20LC), ZBook Fury 16 G9, ZBook Fury 16 G10

HP	
A HP Image Assistant 5.1.11	Start HP Image Assistant, click on
File Tools Languages Help	the download icon on the left,
😑 🕒 Download SoftPaqs	then choose "Edit Product List",
	and add the computer model(s)
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Unattended Installation Supported	
A. Critical INF Installation Supported ▼	Then click "Download"
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AMD Video Driver and Control Panel Driver - Graphics Routine 22.20	
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sp141851.exe		29.03.2023 09:39	Application	36'821 KB	
sp142504.exe		29.03.2023 09:39	Application	58'157 KB	
sp142679.exe		29.03.2023 09:39	Application	421 KB	
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C > Windows (C:) > temp > retriever	2 > n1fupa0w > Comp >	5 V	This extracts the archive to usable	
lame ^	Date modified	Туре	Size	file collections
LEPLang	3/29/2023 10:13 AM	File folder		
Resource	3/29/2023 10:13 AM	File folder		
dock_port	12/4/2022 9:57 PM	PNG File	9 KB	
EasyResume	12/4/2022 10:04 PM	Application	2,298 KB	
EventLogger.dll	12/4/2022 10:04 PM	Application exten	103 KB	
InstHelper.dll	12/4/2022 10:04 PM	Application exten	169 KB	
iTin.Core.dll	12/4/2022 10:05 PM	Application exten	45 KB	
Lenovo.Vantage.RpcClient.dll	12/4/2022 10:05 PM	Application exten	31 KB	

Driver package adjustments

For some of the laptop models, not all drivers are needed, and some must be deleted before creating the packages.

HP 850 G5:

- Delete the driver for "Conexant HD Audio Driver" (currently SP140283)
- Delete the driver for "AMD Video Driver" (currently SP142415)

HP ZBook Fury 16 G9:

- Delete the driver for "AMD Video Driver" (currently SP152918)
- Delete the driver for "Realtek HD Audio" (currently SP153035)
- Delete the driver for "Intel XMM LTE" (currently SP145803)

HP ZBook Fury 16 G10:

- Delete duplicate Intel Video drivers
- Delete the driver for "Realtek HD Audio" (currently SP154241)
- Delete the driver for "Intel XMM" (currently SP151698)

Create the package

	^			G			Add the extracted folders to a
me	^	Date modified	Туре	Size			7zip archive
sp74518		29.03.2023 09:45	File folder				
sp75708		29.03.2023 09:45	File folder				
sp82020		29.03.2023 09:43	File folder				
sp91562			File folder				
sp94816	Pin to Quick acce	ss	File folder				
sp96234	7-Zip	>	Add to archive	6			
sp96501	Signieren und vers	schlüsseln	Compress and email	45			
sp98820	Mehr GpgEX Optio	onen >	Add to "HPIADownloa	ds.7z"			
sp101370			Compress to "HPIADo	wnloads.	7z" and	email	
sp104124	Send to	/	Add to "HPIADownloa	ds.zip"			
sp111438	Cut		Compress to "HPIADo	wnloads.	zip" and	email	
sp112848	Сору		CRC SHA			>	
sp115295	Create shortcut	ï	File folder				
sp135655	Delete		File folder				
sp138373	Rename		File folder				
sp140913			File folder				
sp141045	Properties		File folder				
sp141851		29.03.2023 09:39	File folder				
sp142504		29.03.2023 09:39	File folder				
sp142679		29.03.2023 09:39	File folder				
sp143121		29.03.2023 09:39	File folder				
Readme (202	30329 094525).html	29.03.2023 09:45	Firefox HTML Doc.		133 KB		

Add to Archive Archive: ChHPIADownloads Archive: hp_eltebook_850_g3 Archive format: 7z Update mode: Add and replace files Compression level: 5-Normal Path mode: Relative pathnames Compression method: LZMA2 Dictionary size: 16 MB Dictionary size: 16 MB	
Compression level: 5 - Normal Path mode: Relative pathnames Compression method: • LZMA2 Options	
Compression method: LZMA2 Options Compression method: Create SFX archive	
Compression method.	
Dictionary size: Ib MB Compress shared files	
Word size: * 32 Delete files after compression	
Solid Block size: * 4 GB	
Number of CPU threads: * 8 V / 8 Enter password:	
Memory usage for Compressing: 1248 MB / 12953 MB / 16191 MB *80% Reenter password:	
Memory usage for Decompressing: 18 MB	
Split to volumes, bytes:	
Parameters: Encryption method: AES-256 V	
Options	
OK Cancel Help	
■ hp_elitebook_850_g5.exe Properties × Sign the finished archive (with	
timestamp)	
Security Details Previous Versions	
General Compatibility Digital Signatures	
Signature list	
Name of sign Digest algorit Timestamp	
Ontrex AG sha256 07 October 2022	

Updates

To identify which updates are needed, set up a computer with the last image version, enable networking on it, and let it automatically run Windows Update using Microsoft Update. Write down the KB numbers of any update it's installing, then download those updates separately and integrate them into the new image version.

Then, apply the image again, and repeat the above step until Windows Update reports that no updates need to be installed on a freshly applied image.

Windows

Microsoft'Update Catalog	k85017308		Search	Go to
40.1 Max				https://catalog.update.microsoft.
				<u>com/Home.aspx</u> and search for
Contraction of the later	Welcome			the KB article numbers in the top
	Welcome to the Micr feedback Visit our n us with your thoughts the site, enter in your visit our FAQ for sear	ewsgroup or send us and suggestions. To search terms in the	an email to provide get started using	right
2022-09 Dynamic Cumulative Update for Windows 10 Version 20H2 for ARM64-based Systems (KB5017308)	Windows 10 and later GDR-DU	Security Updates	9/13/2022	For the monthly updates,
2022-09 Cumulative Update for Windows 10 Version 21H2 for x64- based Systems (KB5017308)	Windows 10 LTSB, Windows 10, version 1903 and later	Security Updates	9/13/2022	download the regular cumulative
2022-09 Dynamic Cumulative Update for Windows 10 Version 21H2 for x64-based Systems (KB5017308)	Windows 10 and later GDR-DU	Security Updates	9/13/2022	update, not the dynamic one
2022-09 Vorschau zum kumulativen Update für .N Version 21H2 für x64 (KB5017858)	IET Framework 3.5, 4.8 un	d 4.8.1 für	Windows 10	For .NET only download the 4.8.1 package, not the 4.8
windows10.0-kb5017266-x64-ndp481_14c793f0ce6cf windows10.0-kb5017262-x64-ndp48_e542f896b1eeb				

<u>Windows Mali</u> <u>Removal Tool -</u> (<u>KB890830)</u>	icious Software - v5.106	Windows 7, Windows Server 2008	Update Rollups	10/11/2022	For the malicious software removal tool, sort by date, then
Windows Malie Removal Tool x (KB890830)	icious Software x64 - v5.106	Windows Server 2012, Windows 8.1, Windows Server 2012 R2, Windows 10, Undete		pick the newest package for	
<u>Windows Malie</u> <u>Removal Tool -</u> (<u>KB890830)</u>	icious Software - v5.106	Windows 8.1, Windows 10, Windows 10 LTSB, Windows 10, version 1903 and later, Windows 11	Update Rollups	10/11/2022	Windows 10 64 bit
.NET Des	sktop	Runtime 6.0.15			For .NET 6, go to
		ime enables you to run existing Windows desktop NET Runtime; you don't need to install it separa	tions. This	https://dotnet.microsoft.com/en- us/download/dotnet/6.0 and	
os	OS Installers Binaries				download the newest "Desktop
Windows	Arm64	<u>x64</u> <u>x86</u> <u>winget instructions</u>		Runtime" for x64	

Microsoft Defender

Antimalware solution	Definition version	On
Microsoft Defender Antivirus for Windows 11, Windows 10, Windows 8.1, and Windows Server	<u>32-bit 64-bit ARM</u>	https://www.microsoft.com/en- us/wdsi/defenderupdates Download the 64-bit Version for
		the antivirus definitions
Update for Microsoft Defender Antivirus antimalware platform Microsoft Defender Definition <u>- KB4052623 (Version 4.18.2211.5)</u> Antivirus Updates	12/8/2022	For the antimalware update,
		download the newest "Definition
		Updates" package
updateplatform.x86fre_85dfdcc7cc8df1062fc64ae81dbe0fc3b4		Pick the one for "amd64fre"
updateplatform.amd64fre_7f1e1eb218c67263a51f402fb080f1bb updateplatform.arm64fre_9383ac7ca8917dc66023c6ff68d3679c		

BIOS

BIOS			
2 Select from My Products List 3 Get SoftPags	 My Products List HP ZBook Fury 16 G10 M Microsoft Windows 11 HP ZBook Fury 16 G9 Mc Microsoft Windows 11 HP EliteBook 850 G5 Not Microsoft Windows 10 	D version 21H2 (64-bit) obile Workstation PC D version 21H2 (64-bit) tebook PC	For HP, select all models, then press Analyze
bios	× 🕅 🖉		Filter for the word "bios"
Critical Select Components to	Download/Apply 🔹 过	Download (3)	Then check all the BIOS updates and click "Download"
Name	\downarrow	Category	
HP BIOS and System Firmware (U96)	~	BIOS - System Firm	
HP BIOS and System Firmware (V96)		BIOS - System Firm	
HP BIOS Config Utility (BCU)		Software - System	
HP Firmware Pack (Q78)	~	BIOS	



Q Download SoftPaqs	Q Download SoftPaqs				
Operation	Operation				
Download SoftPag(s	s) only				
 Download and extra 	act SoftPaqs				
Folder preview					
Download					
C:\HPIADownloads\s	pXXXXX.exe				
Unpack					
C:\HPIADownloads\s	pXXXXX				
		Start			
Select all				For Lenovo, select the model in	
 System 	Update Retriever, then search for				
	updates				
20JH [ThinkPad Yoga 3 20LC [ThinkPad P52s]					
				Filter for "Bios"	
Туре:	Systems:			Filter for Blos	
Bios ~	Select.	. Se	earch		
Title	Update ID	Severity	Туре	Then download the BIOS update	
BIOS Update Utility - 10/11	n27uj32w Recommended Bios				
PC > DVD Drive (E:) CES_X64FREV_DE-DE_DV9	PC > DVD Drive (E:) CES_X64FREV_DE-DE_DV9 > configuration > biosupdates V				
Name	Date modified	Туре	Size	respective models, and copy	
🕼 hp_elitebook_850_g5_sp152771.exe	sp152771.exe 25.06.2024 19:04 Application 16'795 KB		16'795 KB	them to the "biosupdates"	
<pre> // hp_zbook_fury_16_g9_sp153119.exe // hp_zbook_fury_16_g9_s</pre>					
hp_zbook_fury_16_g10_sp151263.exe i i i lenovo_thinkpad_p52s_n27uj32w.exe i i i i i i i i i i i i i i i i i i i i i i i i	Image: Weight of the system 25.03.2024 09:33 Application 23'935 KB Image: Weight of the system 25.06.2024 16:43 Application 12'910 KB				

Hardening

To harden the OS installation, we are using settings sets from both Microsoft, the Swiss Post, and the CIS benchmark, as well as some settings from ourselves.

Microsoft security baselines

Choose the download you want		On https://www.microsoft.com/en-
File Name	Size	us/download/details.aspx?id=553
Windows 11 version 22H2 Security Baseline.zip	1.4 MB	<u>19</u> download LGPO.exe
LGPO.zip	520 KB	
Windows 10 version 21H1 Security Baseline.zip	1.2 MB	And the baselines for 21H2
Windows 10 version 21H2 Security Baseline.zip	1.2 MB	
Windows 11 Security Baseline.zip	1.2 MB	

r PC → Windows (C:) → temp2 → GPOs			Extract the baseline zip file
Name	Änderungsdatum	Тур	
486589C2-0290-4764-8058-9825B56B4169}	04.10.2022 09:04	Dateiordner	
{7AD4F62E-9296-4FEA-9765-C4E3EEAAE	04.10.2022 09:04	Dateiordner	
{23DEF82E-039F-40D5-BBCC-35444958D0	04.10.2022 09:04	Dateiordner	
B669E0C6-C1E3-4582-B797-FE384B21CD	04.10.2022 09:04	Dateiordner	
B697C660-A87B-4AF1-B37D-9440912605	04.10.2022 09:04	Dateiordner	
{C94113F4-C027-4F5F-8210-85F4AC2C60	04.10.2022 09:04	Dateiordner	
{DD304A7D-15A7-42B7-AB52-2338F4ECE	04.10.2022 09:04	Dateiordner	
{E675A3BA-6C5C-4E57-A3D3-96C19CEC7	04.10.2022 09:04	Dateiordner	
computer.txt	5444958D065}\DomainSysvol\GPO\		Export the GPOs as text file usin
d diala di			the script.
dentialguard.txt			the <u>seript</u> .
ender.txt			
C:\temp2\GPOs> lgpo /parse /m ".\{B697C660-A87B-4AF1-B37D-9 locker.txt			
C:\temp2\GPOs> lgpo /parse /m ".\{C94113F4-C027-4F5F-8210-8 r.txt		User\registry.pol" /q > ie_u	
C:\temp2\GPOs> lgpo /parse /m ".\{DD304A7D-15A7-4287-AB52-2 puter.txt		Machine\registry.pol" /q > c	

Swiss Post recommendations

_		
52 53 54 55 56 57 58 59 60 62 63 64	log " Set hardening rules from Sets Post" log " Registry Regs" Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT Wicrosoft) window barrentwireion/boliciesLagiower", "ModdPrinter", 1) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT Wicrosoft) window barrentwireion/boliciesLagiower", "ModdPrinter", 1) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT Wicrosoft) window barrentwireion/boliciesLagiower", "ModdPrinter", 0) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT Wicrosoft) window barrentwireion/boliciesLagiower", "ModPrinter", 0) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT Wicrosoft) window barrentwireion/bethereit", 0) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft) window barrentwireion/bethereit", 0) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft) window barrentwirein/bethereit", "Detaillamacherin", 1) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft) window barrentwirein/bethereit", "Detaillamacherin", 1) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft Windows barrentwirein/bethereit", "Detaillamacherin", 1) Microsoft Win32 Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft Windows barrentwirein] Wirristerferif", "Detaillamacherin", 1) Microsoft Win32, Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft Windows barrentwirein] Wirristerferif", "Detaillamacherin", 1) Microsoft Win32, Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft Windows barrentwirein] Wirristerferif", "Detaillamacherin", 1) Microsoft Win32, Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft Windows barrentwirein] Wirristerferif", "Detaillamacherin", 1) Microsoft Win32, Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft Windows barrentwirein] Wirristerferif", "Detaillamacherin", 1) Microsoft Win32, Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft Windows barrentwirein] Wirristerferif", "Detaillamacherin", 1) Microsoft Win32, Registry): Settle("NET_LOG_MACHENGOTEMENT WICrosoft Windo	The security settings from the Swiss Post have been implemented as PowerShell
65 66 67 68 69 70 71 72	<pre>Wicrosoft.win2.Registry: isstvlae("wKLCLAL_AUGUINLSOFTMAKIPOLicEWKICrosoft WindowsFreemailDomsimPorting". "DomsimPorting". "DomsimPorting</pre>	commands inside the customization.ps1
73 74 75 76	log "Disable Teredo" netsh interface teredo set state disabled log "Result SLATESTITCOGE"	
77 78 79 80	log " Disable Guest User" net User Gast / Active:no Tog " Result SASTEXTICTORE"	
81 82 83 84 85 86	log " Changing Audit Policy" andStpol /set /subactagory: "Autorisierungsrichtlinienanderung" /success:enable /failure:disable andStpol /set /subactagory: "Autorisierungsrichtlinienanderung" /success:enable / failure:enable auditpol /set /subactagory: "Autorisierungsrichtlinienanderung "success:enable / failure:enable	
80 87 88 89	Jog " Block ICOP" [httrosoft.wis.Regitry]:SetValue("NEY_LOCAL_MACHINE\SETMARE/Policies/Wicrosoft/WindowsFiremall⩽", "Custom-Block-LORPv4", "v2.30/Acti [Wicrosoft.Win32.Registry]:SetValue("NEY_LOCAL_MACHINE\SETMARE/Policies/Wicrosoft/WindowsFiremall⩽", "Custom-Block-LORPv6", "v2.30/Acti	

CIS Benchmark

📙 cis.	txt 🗵	The settings from the CIS
1 2 3	;; CIS Benchmark Policies	benchmark have been implemented as LGPO exports in
4	Computer	the file cis.txt
5	SYSTEM\CurrentControlSet\Control\Lsa	
6	RunAsPPL	
7	DWORD:1	
8		
9	Computer	
10	SOFTWARE\Policies\Microsoft\Windows\System	
11	AllowCustomSSPsAPs	
12	DWORD:0	
13		
14	Computer	
15	Software\Policies\Microsoft\Windows\CloudContent	
16	DisableConsumerAccountStateContent	
17	DWORD:1	

Custom settings

In addition to the predefined hardening rules taken from other sources, we have implemented a few security settings of our own. These mostly deal with cloud integration, privacy, and data leakage prevention.

Setting	Set to
Turn off the advertising ID	Enabled
Allow telemetry	Disabled
Do not show feedback notifications	Enabled
Do not allow web search	Enabled
Turn off Windows error reporting	Enabled
Disable changing Automatic Configuration settings	Enabled

There are also almost 100 privacy enhancing settings for the Edge browser that would be out of scope to document here in detail, but are listed in the text file "edge.txt" in the image.



Non-implemented security settings

The following security baseline settings recommended by either Microsoft or the Swiss Post haven't been implemented in the image. They are present in the configuration files but commented out and documented here with the respective reason why they weren't enabled.

Setting	Reason
Disable Windows + R	It's a usability decrease without a clear security benefit
Static DNS server	We didn't want to set a public DNS server like 8.8.8.8 due to
	privacy issues, and the security risk from a DNS based MitM
	attack seemed low considering we're using transport
	encryption
Configure Windows Defender	Because the offline laptops don't have network connectivity,
SmartScreen: Block	this would cause queries to SmartScreen to not work, and
	authorized E-Voting applications to be blocked
Deny write access to removable	We need to save data to unencrypted USB drives during the e-
drives not protected by	voting process
BitLocker	
Block untrusted and unsigned	We need to be able to run executables from USB drives during
processes that run from USB	the e-voting process
Script execution policy: All	We need to be able to run unsigned scripts during the e-voting
Signed	process



Autounattend-File

To allow the setup to proceed without user choices, we use an unattend file to automatically configure various settings and actions during Windows Setup. The unattend file is copied to the root file of the boot media under the name autounattend.xml.

Following are the settings that are implemented in the file, separated by the steps they are happening in.

WindowsPE

- OS Language is set to German
- User locale and system locale are set to Swiss German
- Keyboard layout is set to Swiss German
- Windows EULA is automatically accepted
- Registration organization of Windows is set to "Evoting"
- Disk is partitioned into 3 partitions:
 - 500 MB EFI partition for BitLocker
 - o 16 MB MSR partition for disk metadata
 - Rest of the disk as a primary partition for the OS
- Partitions are formatted:
 - EFI partition as FAT32 and labelled "System"
 - OS partition as NTFS and labelled "Windows"
- The Windows installation is applied from the "Windows 10 Enterprise N LTSC" image

OOBESystem

- WLAN setup is skipped
- EULA is skipped
- Privacy settings are skipped
- Time zone is set to Western Europe Standard Time
- An administrator account is configured with a default password
- OS Language is set to German
- User locale and system locale are set to Swiss German
- Keyboard layout is set to Swiss German

Specialize

- Auto logon is configured for the administrator account
 - Six PowerShell commands are started in sequence
 - PowerShell script execution policy is set to "RemoteSigned"
 - The drive letter of the boot media is retrieved from WMI
 - Drivers are installed
 - o Applications are installed
 - o Policies and other settings are applied
 - The updates are staged to the computer hard disk to later be installed

Checklist for image update

When a new version of the image has to be created, the following steps need to be executed:

- Check for <u>every application</u> whether a new version is available and replace those. For some of them, the customer might have to be contacted since the downloads aren't public. For some applications, an update might not be allowed due to compatibility issues.
- Create a new driver package for each <u>supported model</u>. Make sure to <u>exclude the drivers</u> that have caused issues in the past.
- Download current BIOS update packages for every model, and update the script "checkbiosupdatestatus.ps1" to the current versions
- Check with the customer if any security settings need to be adjusted.



- Set up a VM with the last image, then update it from the Microsoft servers, note the KB numbers of the updates that are being installed, and integrate them into the image.
- Check if any Notepad++ plugins have been updated by launching the application and looking at the update tab in Plugins Admin
- Create a Release Candidate ISO file, then modify the image verification script until it returns the correct results.
- Image a computer using the ISO file and doublecheck whether all Windows Updates are counted as installed.
- Create a zip file with the <u>documentation</u>.
- Upload the iso file, the documentation, and the image verification script to the sharing platform
- Archive the image components onto the project network server

Create documentation to publish

We need to make available a collection of files to the public to document what we've done and allow some transparency to the voters. We create an archive of script and documentation files and provide that to the customer who takes care of the publishing itself.

Windows PowerShell Scivy 1s E: <pre>kcivitypeInformation</pre> -Recurse sell <pre>sell</pre> <	ect FullName, Length, LastWrite	sTime Export-Csv	_ C:\temp\thurgau	□ ×	<pre>Export a list of all the customized files to a CSV file using the command: ls E:\configuration\ -Recurse select FullName, Length, LastWriteTime Export-Csv C:\data\thurgau\documentation\ filelist.csv -</pre>
	07/04/2022 44/22			24.1/0	NoTypeInformation -Encoding UTF8
customization.ps1	07/11/2022 11:33 04/11/2022 09:08	Windows		21 KB 18 KB	Archive the four PowerShell files
a updates.ps1	19/10/2022 11:47	Windows		16 KB	and the entire "customization"
drivers.ps1	19/10/2022 11:47	Windows		17 KB	directory into a zip file
software	04/11/2022 09:07	File folder			, .
customization	26/10/2022 11:37	File folder			
drivers	13/10/2022 13:26	File folder			
updates	13/10/2022 09:53	File folder			
C:\temp\thurgau\doc	cumentation\image-v1	.0-documenta	tion.7z\		and add:
Name	Size	Packed Size	Modified		 autounattend.xml
customization	588 014	208 804	2023-01-10	0 10:29	 filelist.csv
autounattend.xml	9 659	1 831	2022-10-24	17:21	• the image verification
a customization.ps1	21 280		2023-01-10	0 11:01	_
a drivers.ps1	17 158		2023-01-11	14:19	script
a filelist.csv	3 732	1 154	2023-01-13	3 09:55	 image documentation
software.ps1	18 115		2023-01-10) 11:56	Word file as a PDF
w updates.ps1	15 614		2022-10-19	9 10:47	
werify-image_v1.0.ps1	24 799	12 971	2023-01-13	3 10:11	
windows Image.pdf	1 388 348	1 242 976	2023-01-13	3 11:26	
image-v0	.5-documentati	on.7z			Upload the resulting file

Archival

While we don't archive the full ISO files due to space issues, we want to archive the most important files for future reference.

enprojekte (P:) > Kanton Thurgau Staatsk	Create a subdirectory for the			
Name	Date modified	Туре	Size	current image version, and copy
biosupdates	28.03.2024 15:12	File folder		the documentation 7z, as well as
customization	28.03.2024 15:13	File folder		the directories: customization,
software	28.03.2024 15:15	File folder		-
🕝 image-v1.4-documentation.7z	28.03.2024 15:07	7z Archive	1'412 KB	software and biosupdates

Create the bootable ISO

urn Help			- 0	Start Anyburn, then choose "Edi
e select a task:				Image"
Burn image file to	to disc			
Burn Audio CD from mp3/m4	n4a/flac/ape/wav	Erase rewritable disc		
Copy disc to imag	age file	Copy disc to another dis	iC	
Rip Audio CD to mp3/fla	lac/ape/wav	Convert image file forma	at	
Browse / Extract im	mage file	Edit image file		
© Edit image file Options Help Select an image file:				Open a bootable ISO file
	le_windows_10_ent	erprise_ltsc_2021_x64_dvd_71	796d33.iso	
nage file Help		Remove 🗡 Properties 🔬	− □ More ▼	Add the "autounattend.xml" and the "configuration" directory
ES_X64REV_DE-DE_DV9 boot configuration efi sources support	Name / boot configuration efi support autorun.inf bootmgr bootmgr.efi Fetup.exe	Size Type 17921 KB File folder 2539337 KB File folder 21736 KB File folder 4785741 KB File folder 313 KB File folder 11 KB Setup Information ml 10 KB XML Document 405 KB File File 1506 KB EFI File 73 KB	Modified 2021-10-06 2022-10-05 2021-10-06 2021-10-06 2021-10-06 2022-10-05 2022-10-05 2021-10-06 2021-10-06	
nage file Help			- 🗆 X	Save under a different name
nation image file:				
	\temp\thurgau\de-de_window			
ct image file type: Star	andard ISO Images (.ISO)		~	
nage file Help			- C	Wait until it's finished
nation:				
):57:49 Scanning a	on image file: C:\temp\thurg and optimizing files layout ting image file	au\de-de_windows_10_enterprise_ltsc_20;	21_x64_dvd_71	
Message D:57:49 Destination D:57:49 Scanning a D:57:49 Start writin	and optimizing files layout		21_x64_dvd_71	

Upload the image

	Rename the resulting image to evotinglaptop_vx.y.iso
evotinglaptop_v0 .5.iso	

All Files > Kiteworks > Kanton Thurgau	And upload it to the Kiteworks share
Name ~	https://kiteworks.ontrex.ch/#/fol
🗌 💶 Upload	der/8666a49b-a3d7-4831-9d02- 45666f755d19
evotinglaptop_v0.5.iso	



User Guide

Extract the ISO to a USB Stick

	Start Rufus and select the ISO file
Laufwerkseigenschaften	
V	
Startart	
Medium oder Abbilddatei (Bitte wählen Sie ein Abbild) 🗸 🔗 AUSWAHL	
✓ Rufus 3.20.1929 (Portable) - □ ×	Use GPT, UEFI (without CSM) and
	Large FAT32 as options
Laufwerkseigenschaften	
Laufwerk	Do not modify the drive name, it
Mehrere Partitionen (E:) (G:) [64 GB]	has to stay on the default value
Startart	
evotinglaptop_v0.3.iso V AUSWAHL	
Abbildeigenschaft	
Standard-Windows-Installation v	
Partitionsschema Zielsystem	
GPT V UEFI (ohne CSM) V	
 Erweiterte Laufwerkseigenschaften einblenden 	
Formatierungseinstellungen —	
Laufwerksbezeichnung	
CES_X64FREV_DE-DE_DV9	
Dateisystem Größe der Zuordnungseinheit	
Large FAT32 (Standard) V 32 Kilobyte (Standard) V	
Erweiterte Formatierungsoptionen ausblenden	
Erweiterte Bezeichnung und Symbole erstellen	
Auf defekte Blöcke prüfen 1 Durchgang ~	
Status ———	
FERTIG	
Start Schliessen	
Verwende Abbild: evotinglaptop_v0.3.iso	
Windows User Experience	Do not let Rufus do any
Customize Windows installation?	adjustments to the Windows
Disable data collection (Skip privacy questions)	installation
Set a local account using the same name as this user's	
Set regional options using the same values as this user's	
OK Abbrechen	

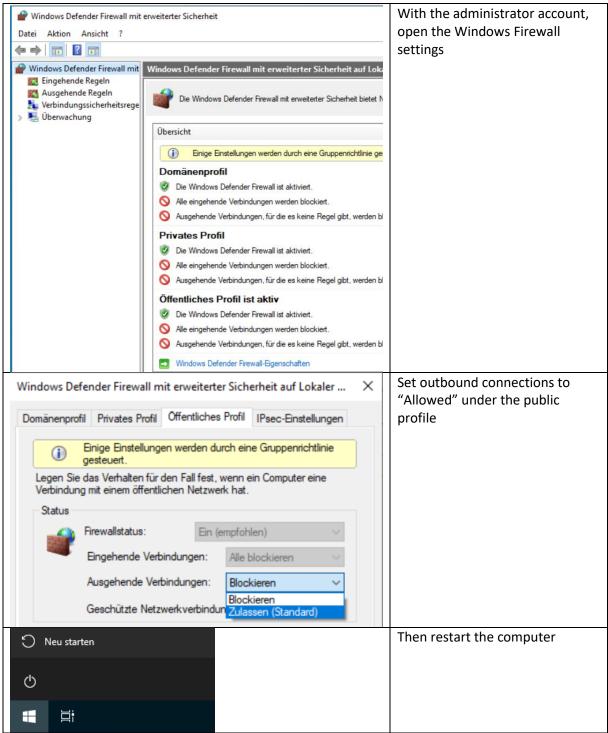
Apply the image to a computer

Apply the image to a compute	er					
💰 Windows Setup	Boot the laptop from the USB stick by pressing either F9 for HP,					
Windows wird installiert	F12 for Lenovo, or Esc for Panasonic early in the boot					
Status		process.				
	The Windows Setup will then					
Windows-Dateien werden kopiert (automatically start					
Dateien werden für die Installation vo						
Features werden installiert						
Updates werden installiert						
Aktion wird abgeschlossen						
💰 Windows Setup		After a while it'll reboot				
Windows muss neu gestartet werden, um	fortzufahren.					
Neustart in 7 Sekunden						
Z Administrator: C:\Windows\System32\Wir	dowePowerShell\v10\powershell.ovo	and continue by installing				
13.10.2022 - 15:50:26.42 - Instal		drivers, applications etc				
13.10.2022 - 15:50:26.49 - Keef		unvers, applications etc				
	esult 0					
13.10.2022 - 15:50:45.97 - Edge						
Administrator: Windows PowerShell		When the computer is installing				
13.10.2022 - 13:00:23.67 -	Installing updates	updates, the USB stick can be				
13.10.2022 - 13:00:23.80 -	NET 4.8	removed				
13.10.2022 - 13:00:54.16 - 13:00:54.17	Result 3010					
13.10.2022 - 13:00:54.17 -	• Windows Cumulative					
≥r PC → Windows (C:) → ProgramData →	~ دً	Log files about the setup are				
^		created in the directory				
Name	Änderungsdatum	c:\programdata				
A.E.T. Europe B.V	13.10.2022 15:51					
Microsoft	13.10.2022 15:54					
Packages	13.10.2022 16:11					
regid.1991-06.com.microsoft	13.10.2022 16:15					
SoftwareDistribution	07.12.2019 10:14					
ssh	06.10.2021 15:28					
USOPrivate	07.12.2019 10:14					
USOShared	07.12.2019 10:14					
drivers	13.10.2022 16:16					
installs	13.10.2022 16:16					
V Corëto und Lauf-verles (2)		The hard drive will not be				
✓ Geräte und Laufwerke (2) –	immediately encrypted					
Windows (C:)						
37.0 GB frei von 59.0 GB						
✓ Geräte und Laufwerke (2)	✓ Geräte und Laufwerke (2)					
Windows (C)	be encrypted (if the laptop is					
Windows (C:)		connected to a power supply)				
37.0 GB frei von 59.0 GB						
37.0 GB Hel VON 39.0 GB						



Enable network connectivity

By default, both incoming and outgoing network connections are blocked. If the specific laptop that is being set up needs to have Internet connectivity, outgoing connections have to be manually enabled.



Change language

	By default, the UI language is in
Datei Start Freigeben Ansicht	German.
An Schnellzugriff Kopieren Einfügen in Amerikania Kopieren nach *	If the PC is required to be in French
Zwischenablage Organisieren	
← Einstellungen ☆ Startseite	then open Settings and go to "Time and Language", then "Language"
Einstellung suchen $ ho$	
Zeit und Sprache	
🗟 Datum und Zeit	
🚳 Region	
⊿ ^字 Sprache	
Windows-Anzeigesprache	Change the display language to French
Deutsch (Schweiz)	
Français (Suisse)	
uleser oprache angezeigt.	
Windows-Anzeigesprache wird festgelegt Windows muss Sie abmelden, um die neue Sprache vollständig anzuwenden. Fortsetzen?	Do <i>not</i> log off when prompted
Ja, jetzt abmelden Nein, später abmelden	
Verwandte Einstellungen	Scroll down and click "Administrative language
Administrative Sprachoptionen	options"
Willkommensseite und neue Benutzerkonten	Click "Copy Settings"
Zeigen Sie Ihre internationalen Einstellungen an, und kopieren Sie sie auf die Willkommensseite, in Systemkonten und neue Benutzerkonten.	
Einstellungen <u>k</u> opieren	

Aktuelle Einstellungen für folgende Konto Willkommensseite und Systemkon Neue Benutzerkonten	Set the checkboxes on the login page and the new user accounts, then press OK		
	ОК	Abbrechen	
🔗 Anzeigesprache ändern		×	Confirm the restart
Die Systemanzeigesprach müssen Windows neu sta Änderungen wirksam wer Speichern Sie Ihre Arbeit und schl Programme vor dem Neustart.			
Jetzt neu			
🐂 🖸 📗 🗢 Explorateur de	After that, Windows is in French		
Fichier Accueil Partage			
Épingler à Accès rapide	déplacer vers ▼	■ Re	
Presse-papiers	Orga	niser	

Verify image authenticity

To verify that a USB stick hasn't been tampered with and contains only either official Microsoft files or files that have been put there as part of the image customization, the script "verify-image.ps1" can be used.

C > Downloads > ISO	< 5 v	Search ISO		Download the German Windows
Name	Date modified	Туре	Size	LTSC 2021 ISO from an official
de-de_windows_10_enterprise_ltsc_2021_x64_dvd_71796d33.iso	16.11.2021 20:25	Disc Image File	4'832'998 KB	Microsoft source, like the VLSC,
SW_DVD9_WIN_ENT_LTSC_2021_64BIT_German_MLF_X22-84426.ISO	16.11.2021 20:25	Disc Image File	4'832'998 KB	the partner download portal or
				Visual Studio Downloads.
PS C:\users\athman.boukhaoua\Documents\Kanton-Thurgau> .\verify-ima @_enterprise_ltsc_2021_x64_dvd_71796d33.iso" -ImageUSB d:_	age.ps1 -ReferenceI		\de-de_windows_1	Run the script with the parameter
Verifying integrity of the reference ISO file Mounting reference ISO file Mounted to drive F				-ReferenceISO pointing to the
D:\System Volume Information\WPSettings.dat not ok Results of the scan have been written to:				above ISO file, and -ImageUSB set
C:\Users\athman.boukhaoua\Documents\evoting_imagecheck.csv				to the USB drive that should be
				checked
PS C:\users\athman.boukhaoua\Documents\Kanton-Thurgau> .\verify-ima @_enterprise_ltsc_2021_x64_dvd_71796d33.iso" -ImageUSB d: -DisplayF		ISO "C:\temp\thurgau	\de-de_windows_1	Optionally, the parameter "-
Verifying integrity of the reference ISO file Mounting reference ISO file Mounted to drive G				DisplayPositiveResults" can be
D:\autorun.inf ok because original D:\autorun.tend.xml ok by hash				used to show correctly checked
D:\bootmgr ok because original D:\bootmgr.efi ok because original D:\setup.exe ok because original				files in green



	Α	В	С	D	E	F	G	Н	The script will output a detailed
1	Info	Reason	Result	FileName					
2	3378723CI	original	ok	D:\autorur	inf				report in the "Documents"
3	E803F131/	hash	ok	D:\autouna	attend.xml				directory that shows check
4	4EEAC11B	original	ok	D:\bootmg	r				results for all files
5	96B7EE39/	original	ok	D:\bootmg	r.efi				
6	300433680	original	ok	D:\setup.e	xe				
7	A6FB0A49	hash	failed	D:\System	D:\System Volume Information\WPSettings.dat				
8	163271449	original	ok	D:\boot\bo	:d				
9	CD2C00CE	original	ok	D:\boot\bo	oot.sdi				
10	2F9C24282	original	ok	D:\boot\bo	ootfix.bin				
11	55A47316	original	ok	D:\boot\bo	ootsect.exe	e			
12	F425E135/	original	ok	D:\boot\et	fsboot.cor	n			
13	BF8A9CC6	original	ok	D:\boot\m	emtest.exe	e			
14	C89CDA7E	original	ok	D:\boot\de	e-de\boots	ect.exe.m	ui		

Version History

v0.1

- Initial Version
- Includes 8 applications, drivers for 4 models and initial hardening rules from both Swiss Post and Microsoft
- Includes updates for October 2022

v0.2

- Add 7-Zip application
- Add Total Commander configuration, license, and shortcut in Start Menu
- Enable display of hidden files and file extensions in Explorer
- Remove camera driver from 850 G3 driver package
- Fix driver install logic for both 850 G3 and 850 G5
- Downgrade Smart Screen policy in Explorer from Block to Warn

v0.3

- UAC is now set to highest level
- PowerShell execution policy set to allow unsigned scripts
- Changed username for admin login to "EvotingAdmin"

v0.4

- Blocking all outgoing ICMP packets
- Blocking all outgoing network connections by default
- Blocking cameras and audio devices in with device installation restrictions
- Update Total Commander to version 10.52
- Installing Total Commander to c:\totalcmd
- Installing OpenSSL to c:\openssl

v0.5

- Updated OpenSSL to 1.1.1s
- Enabled the hardening rule "Disable new DMA devices when the PC is locked"

v1.0

- Disabled all Bluetooth devices
- Disabled automatic Windows Updates
- Disabled 31 Windows services for additional hardening
- Added support for laptop model HP ZBook Fury 16 G9
- Added almost 100 privacy hardening rules for Edge Browser
- Updates to Windows for December 2022
- Updates to applications: Notepad++ 8.4.8, STunnel 5.67

v1.1

- Added .NET 6 Runtime
- Disabled Sleep Mode
- Added a barcode and OCR font
- Increased local account password expiration to 120 days
- Split setup logs into two files to make them more readable
- Updates to Windows for March 2023
- Updates to applications: KeePass 2.53.1, Notepad++ 8.5.1, OpenSSL 1.1.1t, STunnel 5.69

v1.1.1

- Removed SafeSign
- Installed GMP to c:\vmgj
- Updates to applications: KeePass 2.54, Notepad++ 8.5.3, OpenSSL 3.1.1

v1.2

- Added 63 new hardening rules from CIS benchmarks
- Disabled Hibernate Mode
- Assigned text files to open with Notepad++
- Customized task bar
- Removed support for HP EliteBook 850 G3
- Updates to Windows and drivers for July 2023
- Updates to applications: 7-Zip 23.01, Notepad++ 8.5.4, STunnel 5.70

v1.3

- Uninstalled Windows Experience Pack
- Allowed standard users to change the system time
- Added the font "Roboto Mono"
- Added the Notepad++ Plugin "JSTool"
- Updates to Windows and drivers for November 2023
- Updates to applications: KeePass 2.55, Notepad++ 8.6, OpenSSL 3.2.0, SDelete 2.05, STunnel 5.71, TotalCommander 11.02

v1.3.1

• Added support for laptop model HP ZBook Fury 16 G10

v1.4

- Disabled Windows Recovery Partition
- Added two applications: PowerShell 7 and KeyStore Explorer 5.5.3
- Added BIOS updates to the image for every supported model
- Added a script that notifies if the installed BIOS version is too old
- Updates to Windows and drivers for March 2024
- Updates to applications: KeePass 2.56, Notepad++ 8.6.4, OpenSSL 3.2.1, STunnel 5.72, TotalCommander 11.03

v1.5

- Removed an application: STunnel
- Updates to BIOS, Windows and drivers for June 2024
- Updates to applications: KeePass 2.57, Notepad++ 8.6.8, OpenSSL 3.3.1, 7-Zip 24.07, PowerShell 7.4.3

v1.6

- Added French language pack
- Updates to BIOS, Windows and drivers for September 2024
- Updates to applications: Notepad++ 8.6.9, OpenSSL 3.3.2, 7-Zip 24.08, PowerShell 7.4.5

Image Authenticity

The authenticity of files in the image is guaranteed through a few different ways:

- Microsoft files are either signed by Microsoft or contained in an ISO file that has a wellknown hash published on the official Microsoft website as well as third party websites.
- Driver files from hardware manufacturers are signed by the manufacturers. Windows would display a warning popup when a driver installation with an invalid signature is attempted, so any unsigned driver would be visible during imaging.
- Application executables are signed by their respective developers.
- Application add-ins that we deploy for Notepad++ or Total Commander are not signed. However, they are downloaded from inside their signed parent executable over an HTTPS connection.
- Ontrex custom developed files are either signed by Ontrex, or a hash of the file is stored in a signed script.



This reduces the risk that any malicious files are present in the image, at least to a degree that we can trust the respective developers.

Lessons learned

- 1. Windows updates cannot be installed during the "specialize" step. Probably due to provisioning mode. They instead need to be installed in a RunOnce key.
- 2. Scheduled tasks also cannot be added during Windows Setup because the task service isn't running yet.
- 3. BitLocker encryption cannot start if there is a DVD inserted in the optical drive, or the laptop is not connected to a power supply.
- 4. There is no way to block USB network adapters only. If using the DenyDeviceClasses GPO, it blocks every network adapter including internal ones.
- 5. You cannot define power settings by registry keys. You need to use the powercfg.exe commands.

Scripts

export-gpos.cmd

```
lgpo /parse /m ".\{23DEF82E-039F-40D5-BBCC-
35444958D065}\DomainSysvol\GPO\Machine\registry.pol" /q > ie_computer.txt
lgpo /parse /m ".\{4B6589C2-0290-4764-8058-
9825B56B4169}\DomainSysvol\GPO\User\registry.pol" /q > user.txt
lgpo /parse /m ".\{7AD4F62E-9296-4FEA-9765-
C4E3EEAAECC1}\DomainSysvol\GPO\Machine\registry.pol" /q > credentialguard.txt
lgpo /parse /m ".\{B669E0C6-C1E3-4582-B797-
FE384B21CDD1}\DomainSysvol\GPO\Machine\registry.pol" /q > defender.txt
lgpo /parse /m ".\{B697C660-A87B-4AF1-B37D-
9440912605E7}\DomainSysvol\GPO\Machine\registry.pol" /q > bitlocker.txt
lgpo /parse /m ".\{C94113F4-C027-4F5F-8210-
85F4AC2C6082}\DomainSysvol\GPO\User\registry.pol" /q > ie_user.txt
lgpo /parse /m ".\{DD304A7D-15A7-42B7-AB52-
2338F4ECE2C7}\DomainSysvol\GPO\Machine\registry.pol" /q > computer.txt
```

Sources

<u>https://winaero.com/create-bootable-usb-for-windows-10-install-wim-larger-than-4gb/</u> <u>https://learn.microsoft.com/en-us/windows/client-management/manage-device-installation-with-group-policy</u>

https://learn.microsoft.com/en-us/windows-hardware/drivers/install/system-defined-device-setupclasses-available-to-vendors

https://github.com/wormeyman/FindFonts/blob/master/Add-Font.ps1

https://www.alkanesolutions.co.uk/2021/12/06/installing-fonts-with-powershell/