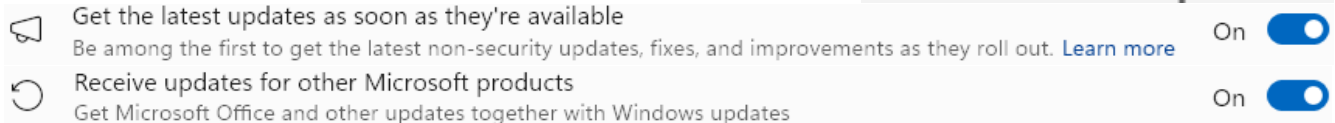Congrats on installing extendedInterface !

Performance

Disable efficiency cores. The effect has been as much as a ~3x difference in the latency from beginning a large bash script to completion.

Disabling HyperThreading can result in a significant performance improvement as well, especially for such very heavy single-threading tasks as flight sim.

request: Configuration

Windows Update

Get the latest updates as soon as they're available
Be among the first to get the latest non-security updates, fixes, and improvements as they roll out. Learn more   On

Receive updates for other Microsoft products
Get Microsoft Office and other updates together with Windows updates   On

As a particular example, 'other' updates may include the MSW component WSL.

If you are a developer of hardware/software design scripts…

Pin this to Start . You mostly just want: **C:_bash.bat.lnk**

Includes sshf/vncf/_vnchost , git , sane defaults , and the extra powerful scripting capabilities of ubiquitous_bash . YubiKey/SSH , symlinks , end-of-line , are properly supported.

Dependencies…

Install all of these dependencies if possible – the 'ubcp' prompt will start faster and the functionality is useful. Use the default install locations for these dependencies, or they may not be found.

In particular, *some dependencies may not be bundled* with the extendedInterface installer due to practical issues with their copyright licenses, due to other issues, or due to lack of usual utility.

'gh' 'Program Files/GitHub CLI'
'ykman' 'Yubico/YubiKey Manager'
'yubico-piv-tool' 'Yubico/Yubico PIV Tool/bin'
'nmap' 'Nmap'
'qalc' 'Qalculate'
'vncviewer' 'TigerVNC'
'kate' 'Kate/bin'
'VBoxManage' 'Oracle/VirtualBox'
'OpenSSH/'
'VeraCrypt' 'VeraCrypt'

'sdelete'

'ykman' 'Yubico/YubiKey Manager'
'yubico-piv-tool' 'Yubico/Yubico PIV Tool/bin'
'nmap' 'Nmap'
'VBoxManage' 'Oracle/VirtualBox'
'VeraCrypt' 'VeraCrypt'

Some dependencies may not be bundled.

Windows11 on ARM64 Compatibility

Normal performance and functionality is has been tested for extendedInterface under Windows11 on ARM64 systems. Computers comparable to these tested systems are specifically recommended:

*) Microsoft Surface Pro 2-in-1 Laptop/Tablet (2024), Windows 11 Copilot+ PC, 13" Touchscreen OLED Display, Snapdragon X Elite (12 Core), 16GB RAM, 256GB Storage

Through the x86/x64 translation layer, performance is actually better than high-end 13th generation Intel x64 CPU under the best possible configuration. Two reasons are believed to account for this high performance under ARM64.

1. Fork related calls are usually the most performance intensive Cygwin tasks – these should mostly run in the MSW OS kernel as native ARM64 code.

2. Single threading performance of ARM64 is known to have surpassed Intel x64 a few years before 2024.

Performance

Change "Power mode" to "Best Performance". The "Recommend" setting is usable, however, the difference will be at least ~2x faster startup for _bash/Cygwin terminal and instant start for some programs (ie. qalc based 'c' calculator). Moreover, the improved performance consistency is also highly preferable for occasional (ie. note taking) use of at least some ARM64 tablets (ie. Microsoft Surface tablets are remarkably instantaneous to Suspend/Resume).

Keyboard

Configuring Keyboard layout to 'traditional' to allow   Win + `   keyboard shortcut and other benefits is very strongly recommended.

Screensaver

For OLED screens, if screen burn-in will significantly affect expected use cases, and if the display will be kept on as an indicator of ongoing computing, then it is recommended to enable the screensaver.

Exceptions

*) vJoy

*) JoystickGremlin

When bundled installers for these programs prompt to install under a Windows11 on ARM64 system (or comparable), simply click through cancelling their installers. Continue the extendedInterface installation.

Further

*) Development of more native applications, hardware implementations of abstraction layers, etc, is a substantial goal of the extendedInterface project, and developers usually benefit already from access to x64 VR capable PC workstations.

 *) Microsoft or community support for vJoy/JoystickGremlin under a Windows11 on ARM64 (or comparable) system is possible. Mostly not a priority for the extendedInterface project or associated developers. Rather, programming libraries and HID translation hardware will be more capable and more robust.

 *) Cygwin and the installer already do not have any known or expected substantial, much less prohibitive, limitations under ARM64 through modern x64 translation. Cygwin in particular can apparently already call ARM64 binaries as appropriate. Compiling Cygwin itself for ARM64 may not be practical. Alternate code paths to use ARM64 specific 'ubcp' Cygwin dependencies when available would be expected to introduce more flaws, maintainability, reliability, and user data synchronization (eg. installed SSH keys in home directory) issues. Not a priority for extendedInterface project or associated developers.

Enable AI, Confidentially and Securely

AI can now automate workflows, especially the data mangling needed for basic illustration, photo manipulation, and concise writing, as well as drastically improve use of CI APIs for complete coverage of programming defects, catch programming mistakes in real time, and provide programming code solutions at a much lower rate of mistakes due to vastly greater diligence.

AI confidentiality issues can be fully mitigated if necessary by legitimate SecureKVMs, stateless firewalls, and properly cautious sanitation. Improved programming and IT configuration defect rates outright mitigates overall risks, not to mention that legitimate security always manages overall risk which is negatively affected by performance below the point of causing more human error.

Absolute harmlessness has never been relevant given the urgent needs of society, along with simplicity of 'attention is all you need' tokenizing AI, widely available rich training data, and inevitably increasingly available computing power.

Embedding AI within applications and developing applications using AI graphics and coding also has the potential to obviate existing software and software services, so the cost of not implementing AI quickly is absolutely becoming noncompetitive.

MSW Copilot

If MSW Copilot is not enabled, then the command line tool ViVeTool and also possibly installing a relevant MSW update, has been known to correct this issue.

https://github.com/thebookisclosed/ViVe/releases/tag/v0.3.3

C:\ViVeTool.exe /enable /id:44776738 /priority:test /store:both

https://www.catalog.update.microsoft.com/Search.aspx?q=%20%28KB5031455%29

Usually this will be sufficient for x64 .

If MSW Copilot is still not enabled (ie. Windows on ARM), then there may be a few more workarounds to try.

C:\ViVeTool.exe /enable /id:49445394 /priority:test /store:both

https://winaero.com/windows-11-settings-app-copilot/#:~:text=Enter%20the%20command%20below%20and%20hit%20Enter%20%3A,reveal%20the%20Copilot%20AI%20assistant.%20You%20are%20done.

C:\ViVeTool.exe /enable /id:44774629 /priority:test /store:both

C:\ViVeTool.exe /enable /id:44850061 /priority:test /store:both

C:\ViVeTool.exe /enable /id:44776738 /priority:test /store:both

C:\ViVeTool.exe /enable /id:42105254 /priority:test /store:both

C:\ViVeTool.exe /enable /id:41655236 /priority:test /store:both

https://mspoweruser.com/how-to-enable-windows-copilot-via-vivetool/

microsoft-edge://?ux=copilot&tcp=1&source=taskbar

https://www.reddit.com/r/Windows11/comments/16tdsfx/only_a_few_users_will_get_windows_copilot_after/?rdt=49489

Unfortunately, usually all of these additional workarounds will not be sufficient to enable a Copilot sidebar for Windows on ARM .

VoiceAttack

Hierarchy of commands is provided, from most general purpose (eg. copy/paste, align VR headset, respond/ignore) to most specific (eg. SIM-DCS-FA18C for the simulated FA18C aircraft). General purpose commands also include such internal global commands as 'ack' (to emit audible beeps).
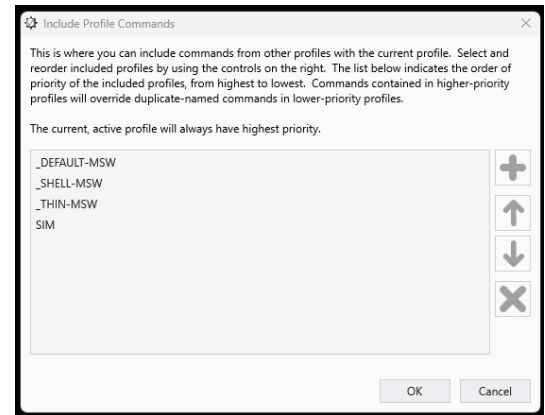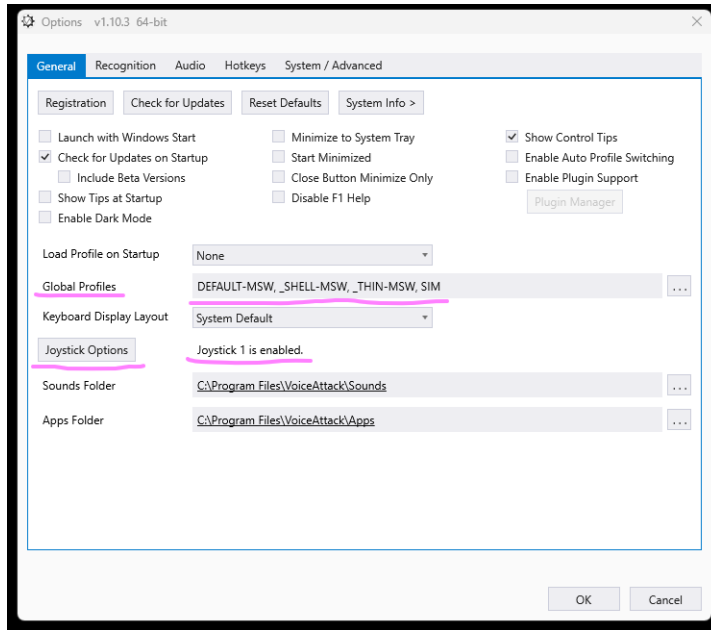

WARNING: NOTICE: Do NOT set 'SIM' as a Global Profile <u>unless</u> you will mainly use VoiceAttack macros ONLY for flight sim and similar (ie. ONLY if you will NOT be using 'DEV', etc).

A few other VoiceAttack configuration settings are recommended as well.
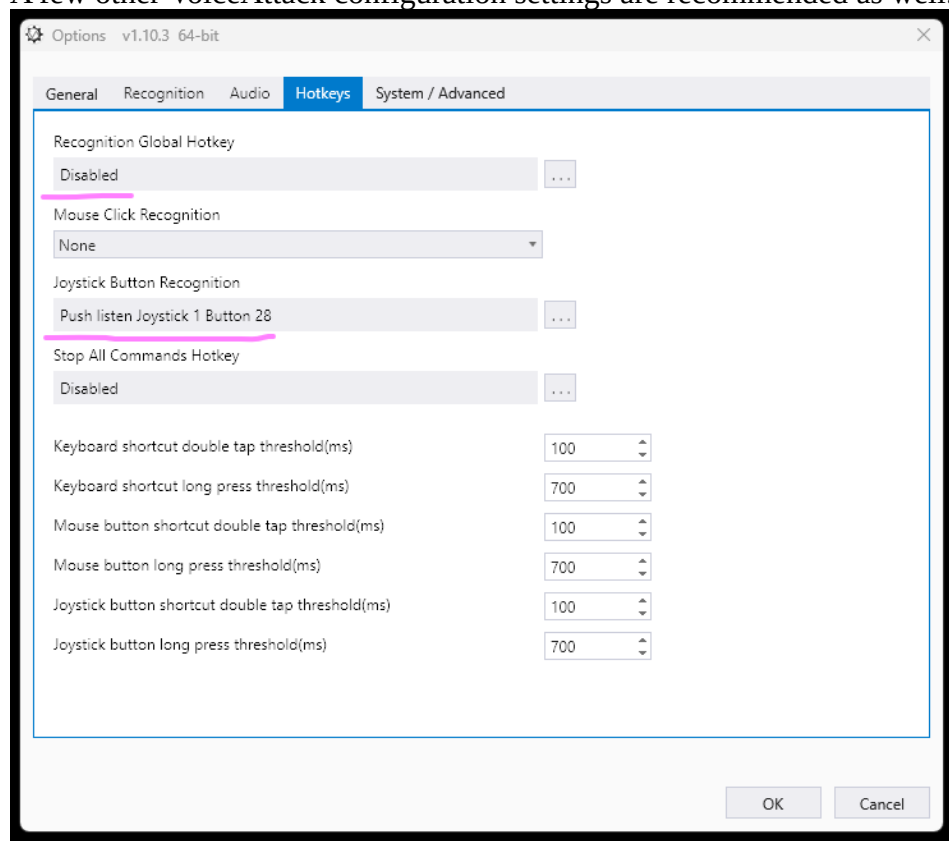
Specialization profiles with the name of another profile in their own name (eg. SIM-DCS-FA18C and SIM-DCS) must always include the commands from the common ancestor (ie. include SIM-DCS).
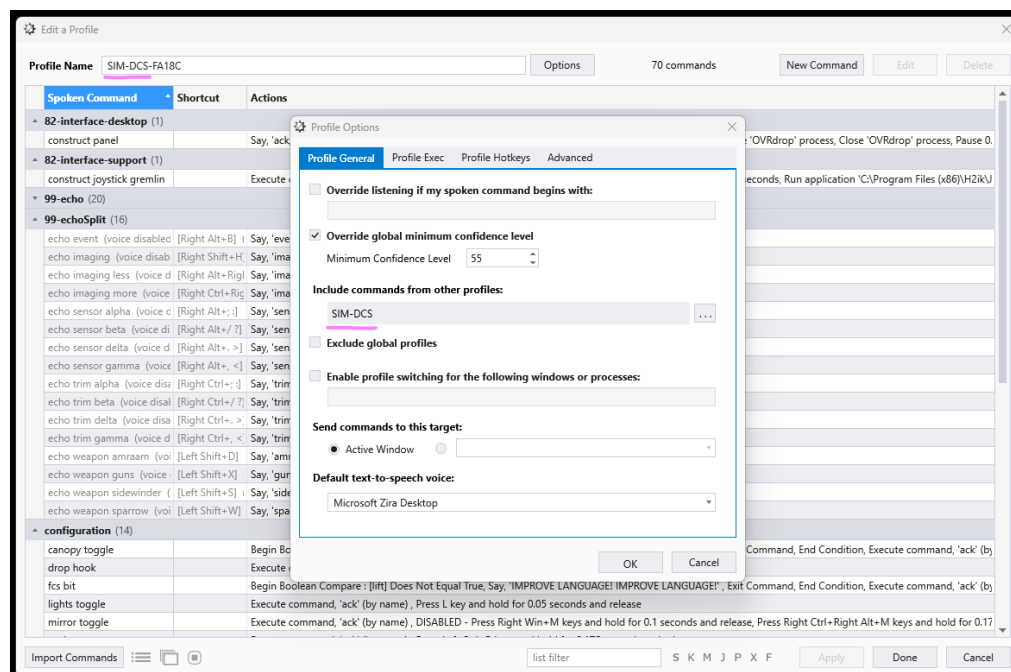
Categories are kept consistent for commands in provided VoiceAttack profiles. Consider roughly adhering to this standard with your own VoiceAttack macros for more convenient editing.

[No Category]
ie. dummy commands to absorb irrelevant voice commands given to other apps
eg. 'reset orientation' used by the VR app 'Virtual Desktop'

00-global

80-interface-shell

80-interface-desktop

80-interface-desktop-alternate

82-interface-desktop-grab

82-interface-support

82-interface-tile

83-interface-tile-panelboard

83-interface-tile-panelboard-recorder

84-interface-volume-comm

84-interface-volume-sim

85-interface-media

89-interface-clipboard

89-interface-common

89-interface-hands

89-interface-VoiceAttack

99-infrastructure

aaExperiment

zzzLOCKOUT

83-interface-thin

99-extension
eg. F 1 key

99-scratchKeys

yELABORATE

Microphone, VoiceAttack, Keyboard, Mouse, Workarounds

Copilot Keyboard Button

Wireless and laptop keyboards now include a 'Copilot+' keyboard button. Unfortunately, this does not play nice with KVMs, especially not with SecureKVMs, for which any wireless functionality is absolutely unacceptable and crowded conditions may necessitate compact layout, TrackPoint, etc.

Fortunately, legacy keyboards can summon Copilot by remapping the ' Win + LeftShift + F23 ' buttons. An AutoHotKey script to remap this to the more accessible 'Win + c' is installed to StartUp by 'extendedInterface' by default.

https://www.tomshardware.com/software/windows/windows-copilot-key-is-secretly-from-the-ibm-era-but-you-can-remap-it-with-the-right-tools

Spurious Echo Cancellation

Realtek TRRS microphone input, at least with some driver versions, albeit this seems an analog electronics or embedded effect, can apparently incorrectly autoconfigure, filtering out voice input as an echo, while passing other noise.

Plugging in a TRRS headset having a microphone with drastically different microphone DC resistance, may reset this malfunctioning circuitry. However, this has not been adequately tested, and obviously does not guarantee the next autoconfiguration will be correct.

VoiceAttack Changing Microphone Volume at Loading and also Unlocking PC

Not due to VoiceAttack specifically, but due to Microsoft Speech Recognition changing the volume. Nevertheless, VoiceAttack has an option itself to prevent this. VoiceAttack Settings, System / Advanced tab, "Prevent Speech Engine From Changing Microphone Volume". At least if VoiceAttack is 'Run as Administrator' (which is always strongly recommended), this is effective.

https://forum.voiceattack.com/smf/index.php?topic=3798.0

Applications Changing Microphone Volume

Video conferencing applications in particular may change microphone volume. Disabling 'Allow applications to take exclusive control of this device' under 'Microphone Properties' in the MS Windows Sound settings, may prevent some of these applications from changing microphone volume. Unfortunately, this may not be sufficient.

MSW UI Latency, Workarounds - Desktop Background, Mouse Cursor, Icon Text

Default 'Visual Effects' 'Performance Options' under 'Adjust the appearance and performance of Windows', may cause some unnecessary UI latency (ie. responsiveness issues), and may also break some things such as causing a *very* distracting placeholder image in 'Task View', garbled or invisible mouse cursor in some situations, and garbled or invisible icon text. Other issues are additionally possible, so these settings merit some configuration for compatibility.

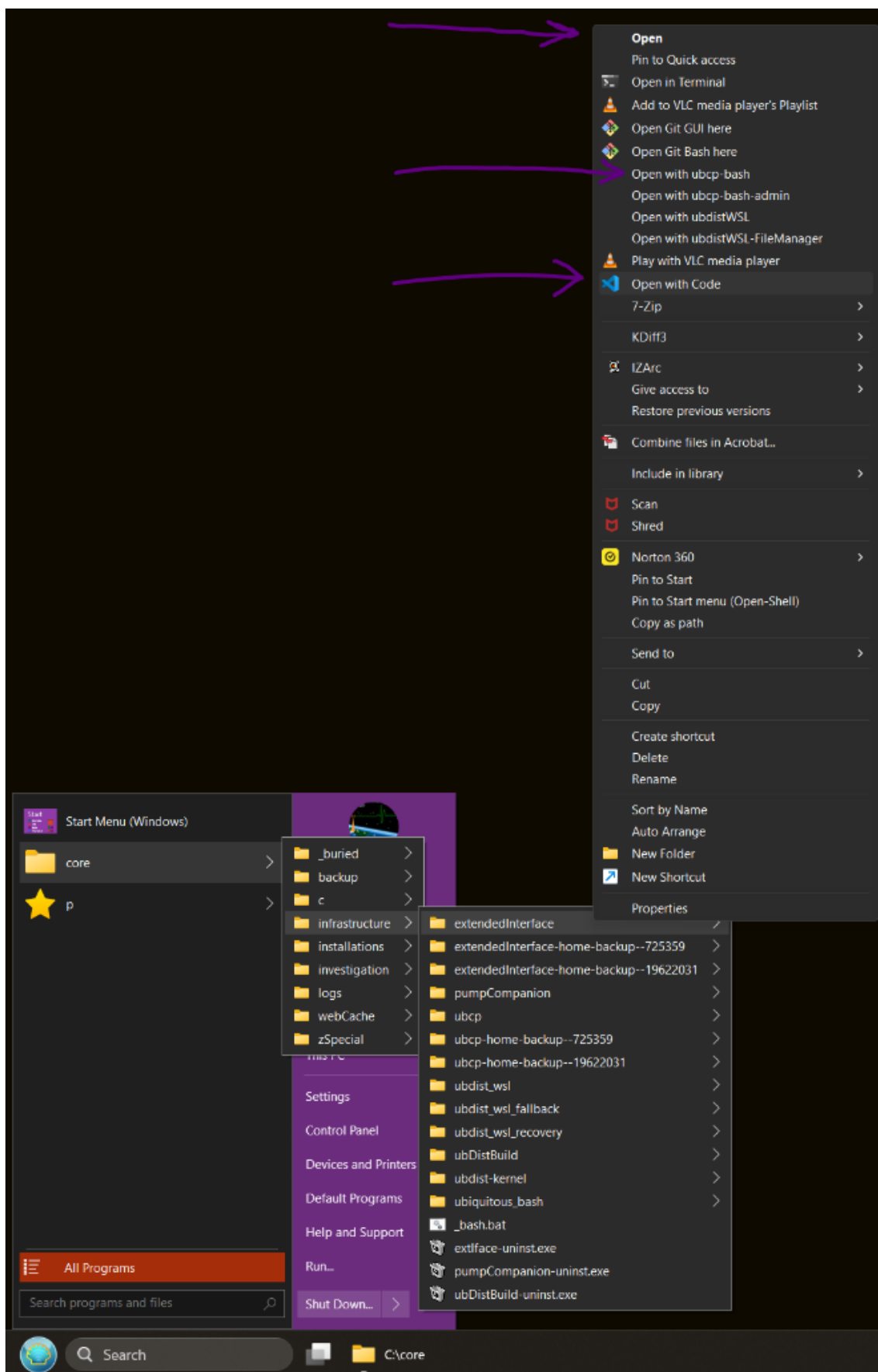Consider changing these settings as necessary and/or as desired.
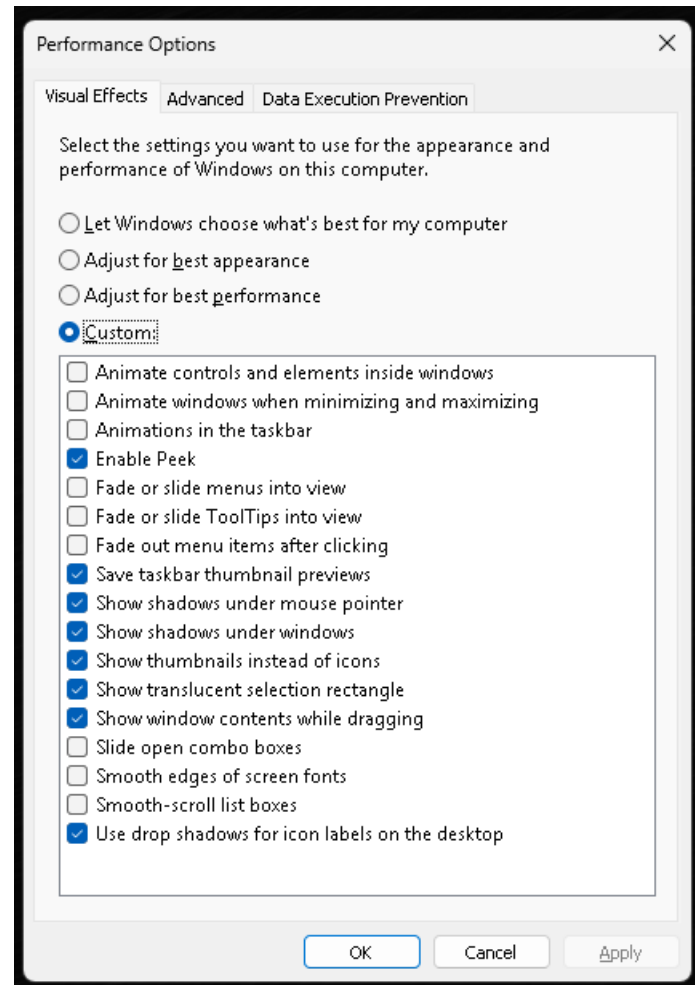
Open-Shell

Supplements (without disabling) the newer MSW10/MSW11 start menu with directory/tree launcher. Strongly recommended to directly open project and core/infrastructure,installations directories from a tree with reasonable efficiency.
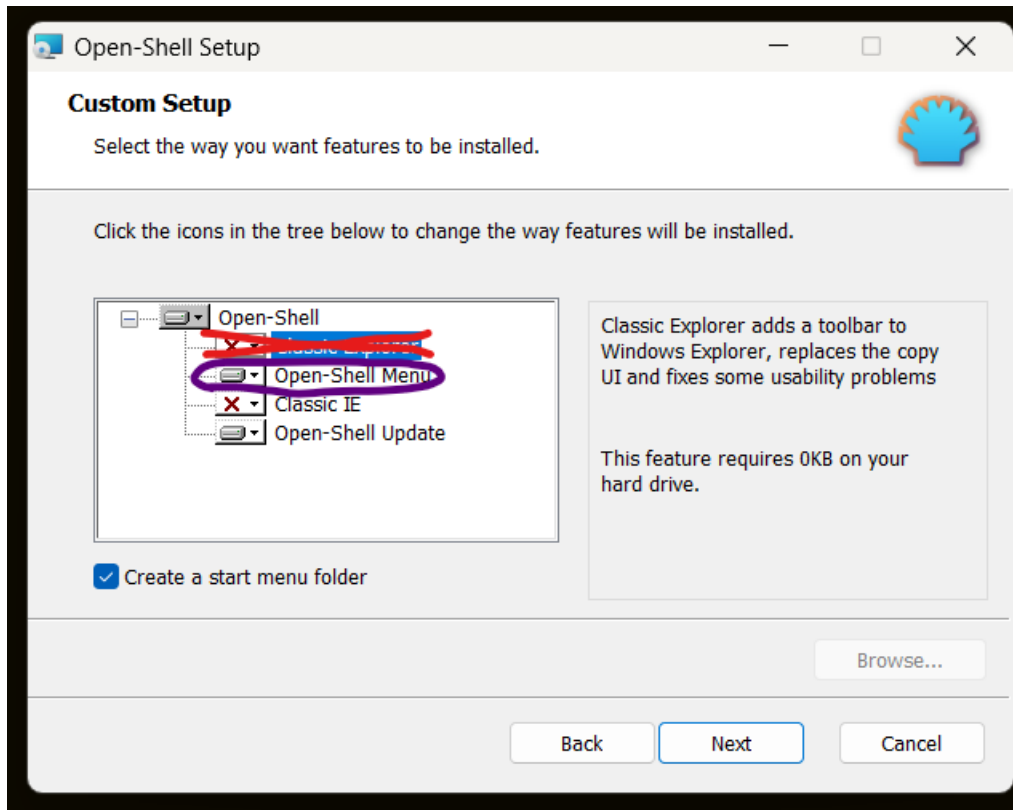
Installer for Open-Shell may not be bundled to prevent installation of possibly undesired features.

Shift+Click, Shift+Win, or the provided 'Start Menu (Windows)' shortcut will access the original menu.

Open
Pin to Quick access
Open in Terminal
Add to VLC media player's Playlist
Open Git GUI here
Open Git Bash here
Open with ubcp-bash
Open with ubcp-bash-admin
Open with ubdistWSL
Open with ubdistWSL-FileManager
Play with VLC media player
Open with Code
7-Zip
KDiff3
IZArc
Give access to
Restore previous versions
Combine files in Acrobat...
Include in library
Scan
Shred
Norton 360
Pin to Start
Pin to Start menu (Open-Shell)
Copy as path
Send to
Cut
Copy
Create shortcut
Delete
Rename
Sort by Name
Auto Arrange
New Folder
New Shortcut
Properties

Start Menu (Windows)
core
p

_buried
backup
c
infrastructure
installations
investigation
logs
webCache
zSpecial

extendedInterface
extendedInterface-home-backup--725359
extendedInterface-home-backup--19622031
pumpCompanion
ubcp
ubcp-home-backup--725359
ubcp-home-backup--19622031
ubdist_wsl
ubdist_wsl_fallback
ubdist_wsl_recovery
ubDistBuild
ubdist-kernel
ubiquitous_bash
_bash.bat
extIface-uninst.exe
pumpCompanion-uninst.exe
ubDistBuild-uninst.exe

Settings
Control Panel
Devices and Printers
Default Programs
Help and Support
Run...
All Programs
Search programs and files
Shut Down...

Q Search
C:\core

If security (specifically integrity) is at all important...

LSA Protection through Group Policy

Run -> gpedit.msc ->

Computer Configuration / Administrative Templates / System / Local Security Authority ->

Configure LSASS to run as a protected process -> Enabled

Options DropDown -> Enabled with UEFI Lock

After reboot, you want to see this:

Instead of this:

Beware the warning badged icon may appear for a while before the green check mark badged icon appears.

Exploit Protection

Enable as many mitigations as possible, disabling only temporarily and only as necessary. In particular, usually only 'Force randomization for images (Mandatory ASLR)', and 'Randomize memory allocations (Bottom-up ASLR)' , must be default for some older programs.

Disable Invasive Web Content (Presumably running JavaScript within Sessions)

cmd /c winget uninstall –accept-package-agreements --accept-source-agreements "Windows web experience pack"
winget uninstall –accept-package-agreements --accept-source-agreements "Windows web experience pack"
powershell -Command "Get-AppxPackage WebExperience | Remove-AppxPackage"

This may not be done successfully by the installer due to possibility of 'winget' halting on interactive prompt. Similar Web Browser security measures are strongly recommended.

Security Technical Implementation Guides

Especially High and Medium STIG results must be considered against relevant CVE history, tested with essential software, and added with any workarounds for essential software, to a scripted installer with manual steps as necessary, which is then used organization wide. Long proven mitigations may eventually be released as an open-source MSW installer, similar to extendedInterface .

https://en.wikipedia.org/wiki/Security_Technical_Implementation_Guide

Download the SCAP Tool for MSW . Later, maybe download any needed non-included SCAP content.

https://public.cyber.mil/stigs/scap/

SCC 5.8 Windows		153.92 MB	18 Sep 2023

Run a scan and view results.

Read the relevant reports. Especially High and Medium STIG results.

Reports	XML	Checklist	Logs		
Report Type		Format	Filename		Size (MB)
All Settings		HTML	Results/SCAP/SCC-5.8_2023-12-01_...-Settings_Microsoft_Windows_11_STIG-1.2.4.html		████
Non-Compliance		HTML	Results/SCAP/SCC-5.8_2023-12-01_...ompliance_Microsoft_Windows_11_STIG-1.2.4.html		████

If you are a legacy gamer...

You now have:

C:\core\infrastructure\extendedInterface\README-installer.pdf

C:\core\infrastructure\extendedInterface\support\joystickgremlin
C:\core\infrastructure\extendedInterface\support\voiceattack

C:\core\infrastructure\extendedInterface\app

Dependencies

C:\core\infrastructure\extendedInterface_local\ops.sh

Add your own Bash scripting here, or overload functions provided to change functionality .

One common use case will be to configure shell variables corresponding to your own joystick/throttle USB UIDs .

JoystickGremlin

The USB UIDs are configured for a particular MS SWFFB2 joystick and a Thrustmaster TWCS throttle. You will need to change these. Scripts have done this automatically before, and a general purpose converter will be added.

HidGuardian can be configured through JoystickGremlin -> Tools -> Options -> HidGuardian .

vJoy

Configuring vJoy is particularly difficult. Please attempt to match the following screenshots – four devices, 32buttons for first device, 31buttons for second device, 30buttons for third device, 29buttons for fourth device, POV Hat Switch continuous, POVs 1, Force Feedback – All .

vJoyConf - Configure vJoy Devices

vJoy Device: 1   (v2.1.9)

Axes
- ☑ X
- ☑ Y
- ☑ Z
- ☑ Rx
- ☑ Ry
- ☑ Rz
- ☑ Slider
- ☑ Dial/Slider2

Number of Buttons
32

POV Hat Switch
- ○ 4 Directions
- ◉ Continuous

POVs:
```
0
1
2
3
4
```

Force Feedback
- ☑ Enable Effects
- ☑ Constant
- ☑ Ramp
- ☑ Square
- ☑ Sine
- ☑ Triangle
- ☑ Sawtooth Up
- ☑ Sawtooth Down
- ☑ Spring
- ☑ Damper
- ☑ Inertia
- ☑ Friction

Apply   Undo

Delete Device

☑ Enable vJoy   Reset All

---

vJoyConf - Configure vJoy Devices

vJoy Device: 2   (v2.1.9)

Axes
- ☑ X
- ☑ Y
- ☑ Z
- ☑ Rx
- ☑ Ry
- ☑ Rz
- ☑ Slider
- ☑ Dial/Slider2

Number of Buttons
31

POV Hat Switch
- ○ 4 Directions
- ◉ Continuous

POVs:
```
0
1
2
3
4
```

Force Feedback
- ☑ Enable Effects
- ☑ Constant
- ☑ Ramp
- ☑ Square
- ☑ Sine
- ☑ Triangle
- ☑ Sawtooth Up
- ☑ Sawtooth Down
- ☑ Spring
- ☑ Damper
- ☑ Inertia
- ☑ Friction

Apply   Undo

Delete Device

☑ Enable vJoy   Reset All

---

vJoyConf - Configure vJoy Devices

vJoy Device: 3   (v2.1.9)

Axes
- ☑ X
- ☑ Y
- ☑ Z
- ☑ Rx
- ☑ Ry
- ☑ Rz
- ☑ Slider
- ☑ Dial/Slider2

Number of Buttons
30

POV Hat Switch
- ○ 4 Directions
- ◉ Continuous

POVs:
```
0
1
2
3
4
```

Force Feedback
- ☑ Enable Effects
- ☑ Constant
- ☑ Ramp
- ☑ Square
- ☑ Sine
- ☑ Triangle
- ☑ Sawtooth Up
- ☑ Sawtooth Down
- ☑ Spring
- ☑ Damper
- ☑ Inertia
- ☑ Friction

Apply   Undo

Delete Device

☑ Enable vJoy   Reset All

---

vJoyConf - Configure vJoy Devices

vJoy Device: 4   (v2.1.9)

Axes
- ☑ X
- ☑ Y
- ☑ Z
- ☑ Rx
- ☑ Ry
- ☑ Rz
- ☑ Slider
- ☑ Dial/Slider2

Number of Buttons
29

POV Hat Switch
- ○ 4 Directions
- ◉ Continuous

POVs:
```
0
1
2
3
4
```

Force Feedback
- ☑ Enable Effects
- ☑ Constant
- ☑ Ramp
- ☑ Square
- ☑ Sine
- ☑ Triangle
- ☑ Sawtooth Up
- ☑ Sawtooth Down
- ☑ Spring
- ☑ Damper
- ☑ Inertia
- ☑ Friction

Apply   Undo

Delete Device

☑ Enable vJoy   Reset All

If you are a legacy VR gamer…

You now have:

C:\core\infrastructure\extendedInterface\param.ods

Use this spreadsheet as a calculator and a checklist to ensure an optimum resolution at the best clarity available with your VR heatset at a minimal number of pixels for your high-end PC to render.

Configure your In-App/In-Game, SteamVR, and NVIDIA Control Panel settings to match.

If you are a legacy VR flight sim enthusiast...

Then you have a lot of learning to do.

All of 'C:\core\infrastructure\extendedInfrastructure' is a template of:
* Documentation. Begin with 'README.md' and 'commonControlScheme.pdf' .
* Startup sequences to run supporting applications (eg. SIMFFB, DCS SRS) .
* Configuration files (eg. for JoystickGremlin, VoiceAttack) .
* Batch scripts .
* Bash scripts integrated with MSW through 'ubcp' .
* Python scripts (at least eventually, maybe) integrated with MSW through 'ubcp' .

ResizeBar has a large performance benefit (which can be directly put into higher resolutions for better VR visual clarity). Enable this for your application (eg. DCS World) if possible.

Consider whether Hardware GPU Scheduler may be helpful or harmful to performance.

https://www.majorgeeks.com/content/page/hardware_accelerated_gpu_scheduling.html

PanelBoard is a part of any 'ubdist' dist/OS, and uses scripting to cause a Virtual Machine Linux Desktop (at least KDE Plasma), to arrange and switch to windows as an IDE-like interface to rapidly interact with a standardized set of files/folders (eg. approach plates, checklists, waypoints lists, notes, etc). Specifically intended for use with OVRDrop .
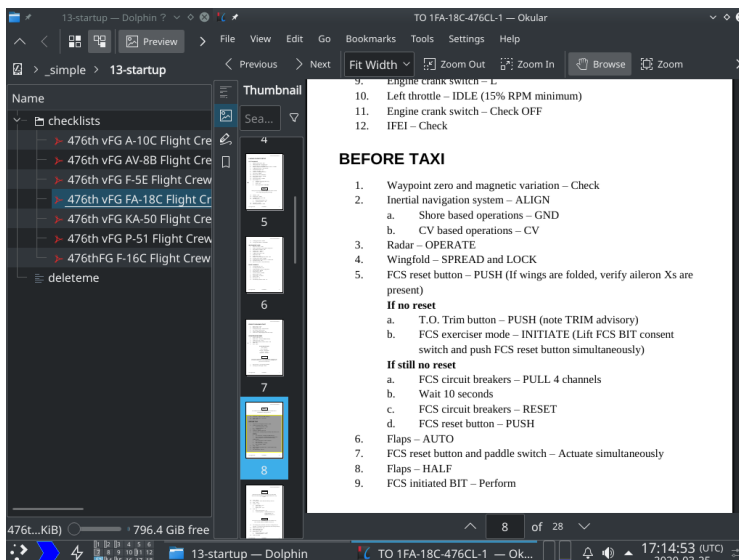
NVIDIA ResizeBar config for legacy flight sim…

NVIDIA Profile Inspector 2.3.0.13

DCS World

MSFS2020

'Microsoft Flight Simulator'

'0x00F00BA' '0x00000001'
'0x000F00BB' '0x00000001'
'0x000F00FF' '0x0000000040000000'

If you are a CARDinal user or gamer… or a native 'ubdist' dist/OS user… or an MSW user of 'ubiquitous_bash' compatible software (eg. 'BOM_designer')...

Then welcome to the future, you will not have needed to install 'extendedInterface' .

If you are using CARDinal, 'ubcp' would already be included, and user interface hardware would be used more directly without vJoy, etc. Voice commands would be directly sent to VirtualMachines through the CARDinal 'queue' (ie. ad-hoc shared wires) IPC bus, rather than translated to obscure reserved key combinations through VoiceAttack.

If you are using 'ubdist' natively, the legacy keyboard/mouse emulation provided by such hacks as vJoy, VoiceAttack, etc, would be better managed by relevant less constrained open-source software (eg. 'wmctrl'), or by CARDinal (eg. for Virtual Machine use in VR, for joystick inputs, etc).

If 'ubcp' was needed for MSW compatibility, it would have been included with the installer for that software (eg. 'BOM_designer').

Limitations

Installation directory is hardcoded to C:\core\infrastructure . Installation is for all users (other users of 'ubcp' will be 'root' within the 'Cygwin' shell).

Eventually, it should be possible to edit configuration files used by software created for the MSW platform (eg. JoystickGremlin, VoiceAttack), and call these programs, thus enabling relative paths through Bash scripting through 'ubcp' .

For now however, changing these locations is officially unsupported (though some provisions may already be in place for some dynamic path finding).

If you can't use hardcoded C:\ paths…

Back up your data redundantly, reinstall MSW. It's worth it.

If you can't afford an 8TB SSD for C:\ …

You probably will be able to afford an 8TB SSD (because the hardware gets cheaper) before us developers can afford to support your nonstandard installation to D:\ anyway.

Adding complexity is not doing you any favors, moreover. Many MSW apps these days, especially VR apps, ship with a huge set of dependencies, tens to hundreds of GB. There is a reason shared dependencies under the MSW OS is quickly going out of style: getting these apps to work with the unstable OS that is MSW is already asking for trouble. The common phrase for broken dependencies, refers to 'DLL', not '.so', for a very real reason spanning many decades and persisting to the present day. By installing your programs under such a nonstandard path as D:\ , you are very much undoing the difficult efforts of developers to make your software supportable, so you shouldn't expect support for doing so.

If you have multiple user accounts on the same MSW OS…

Unless you're running a kiosk, with a very limited set of software, stop doing that. UNIX like distributions/OperatingSystems (eg. GNU/Linux) have the filesystem hierarchy, with all multi-user programs in PATH, and separate HOME directories for everyone. Shared 'Program Files' and such as MSW does, with start menu entries 'Only For Me', among other issues, does not work well.

At least give every user a separate Virtual Machine, a separate PC, a separate VPS, etc. And don't rely on the OS permissions to keep things sane: keep your data on a protected server and keep the OS nonpersistent.

Special Situations

Force Larger Screen Space without Headless Ghost

https://www.monitortests.com/forum/Thread-Custom-Resolution-Utility-CRU

https://github.com/mirage335-colossus/extendedInterface_bundle/tree/main/cru

ReInstall/UnInstall

Reboot before ReInstall/UnInstall is recommended. File locking may persist, although detection and/or termination of relevant processes is attempted.