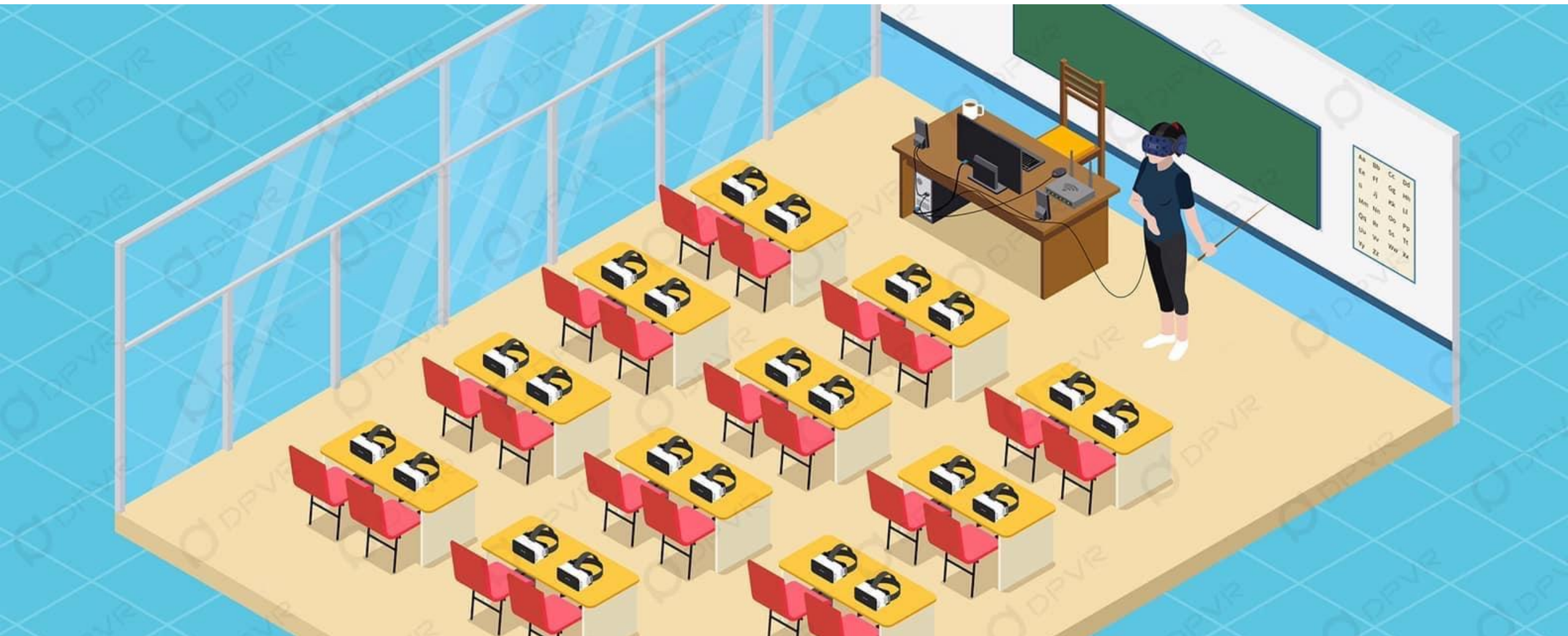




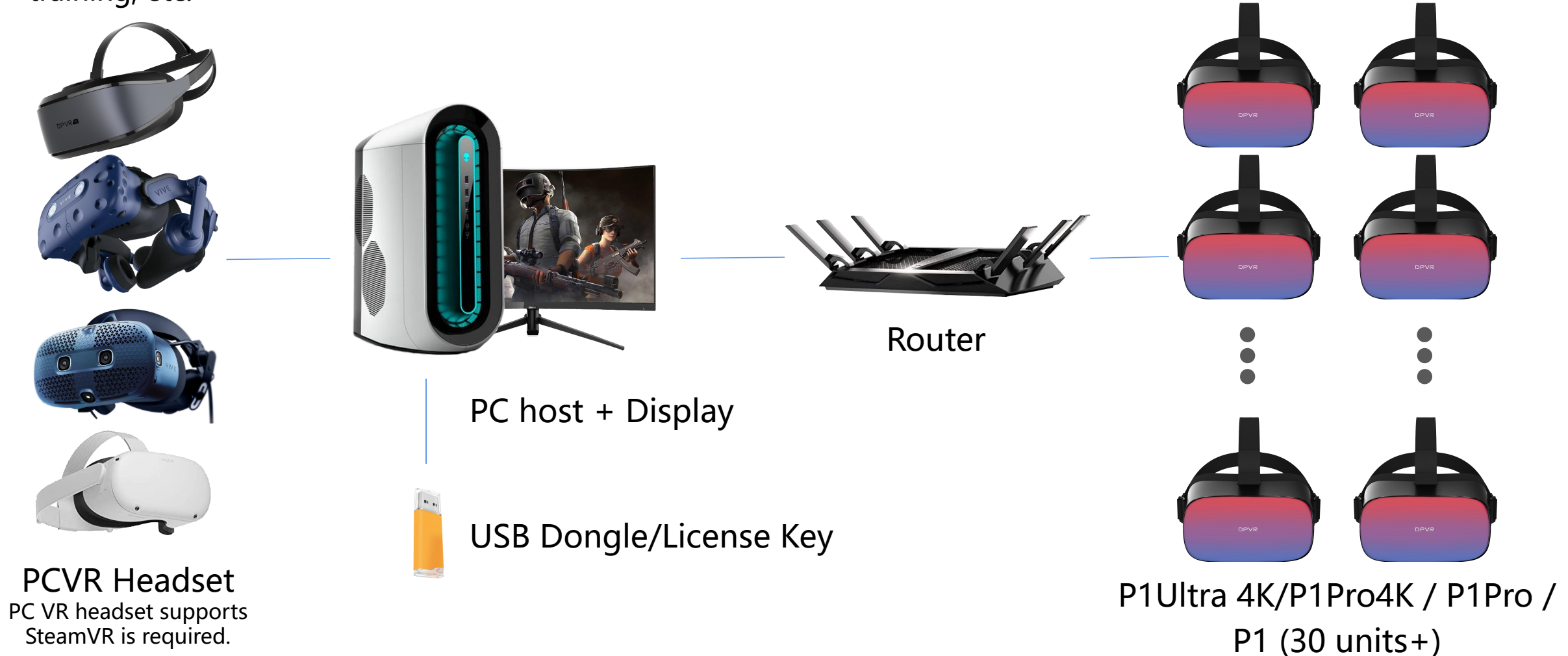
StarLink User Guide v1.0.7



Introduction



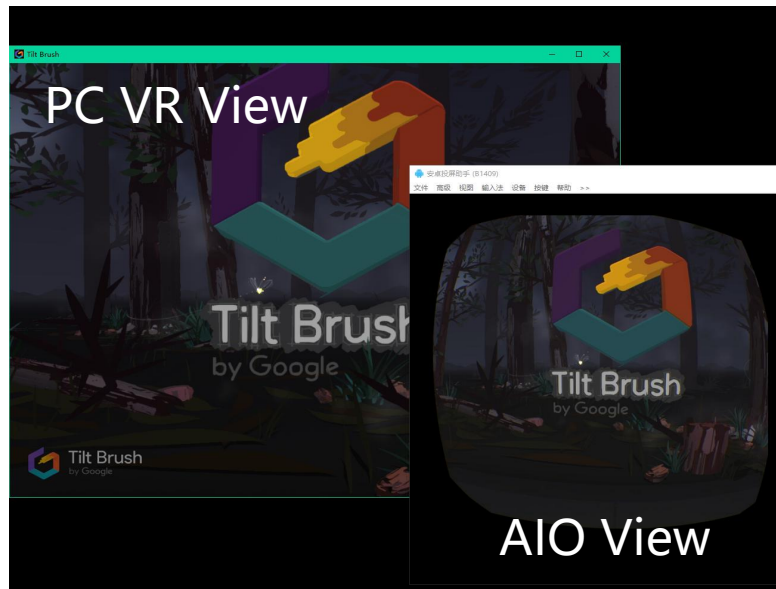
- Through the WLAN, the PC VR content can be mirrored into multiple AIOs, so that the users of AIOs can have a first-person immersive perspective real-time. This solution can be widely used in multi-person VR learning and training, etc.



Advantages: Ultra High Definition / Motion Sickness Free / Multi-Device



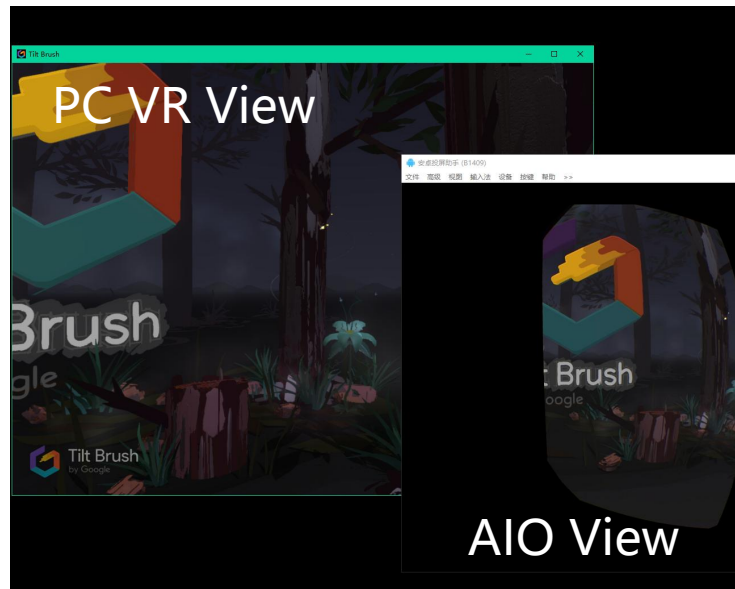
- **UHD:** The high resolution of the **ROI** content transmitted to the AIOs is approximately equal to a **16K panoramic video**.
- **Motion Sickness Free:** The real-time streaming with pose data ensures that the viewer's viewport is consistent with the presenter's, and **solve the motion sickness problem caused by inconsistency poses between PC VR Presenter and AIO HMD Viewers**
- **Multi-device:** Real-time support **30 AIO devices** at 10 Mbps, and **50 AIO devices** at 5 Mbps.



PC VR Presenter



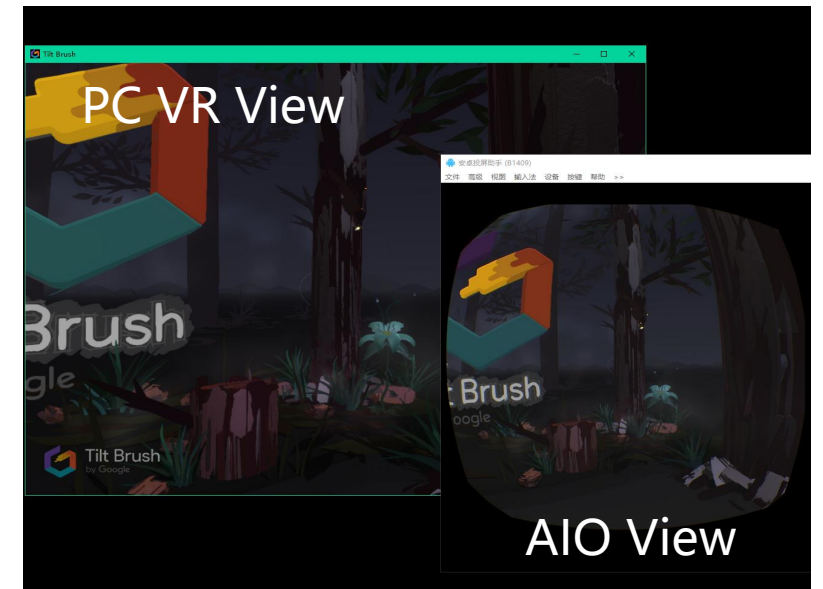
AIO Viewer



PC VR Presenter



AIO Viewer



PC VR Presenter



AIO Viewer

Hardware List and Configuration



VR Devices	Model Options	QTY
PC VR	HTC VIVE PRO	1
	HTC COSMOS	
	OC Quest 2	
	DPVR E3 Series	
AIO	DPVR P1Ultra 4K	Less than 50 units
	DPVR P1Pro 4K	
	DPVR P1 Pro	
	DPVR P1	

PS: PC VR headset supports SteamVR is required.

PC Suit	Recommended Configuration	QTY
Display	-	1
Host	CPU: Intel i5-9600K equal or above.	1
	GPU: NVIDIA, GeForce RTX 2060 equal or above.	
	RAM: 8GB equal or above	
	OS: Windows 10 64 bits	
	USB / DP / HDMI: Depends on the type of PC VR headset.	

PS1: For the PC configuration, on the one hand, the configuration depends on the complexity of the VR content, on the other hand, the "Starlink" SERVER will bring about an additional 10-20% of the system load, it is recommended to consider both aspects.

PS2: "StarLink" only supports NVIDIA series graphics cards for now.

Other Devices	Recommended Configuration	QTY
5G Enterprise Router	NETGEAR R8000P equal or above	1
USB Dongle or activation code	Consult the solution provider	1
Ethernet Cable	CAT6 Ethernet Cable	1

Software List and Introduction

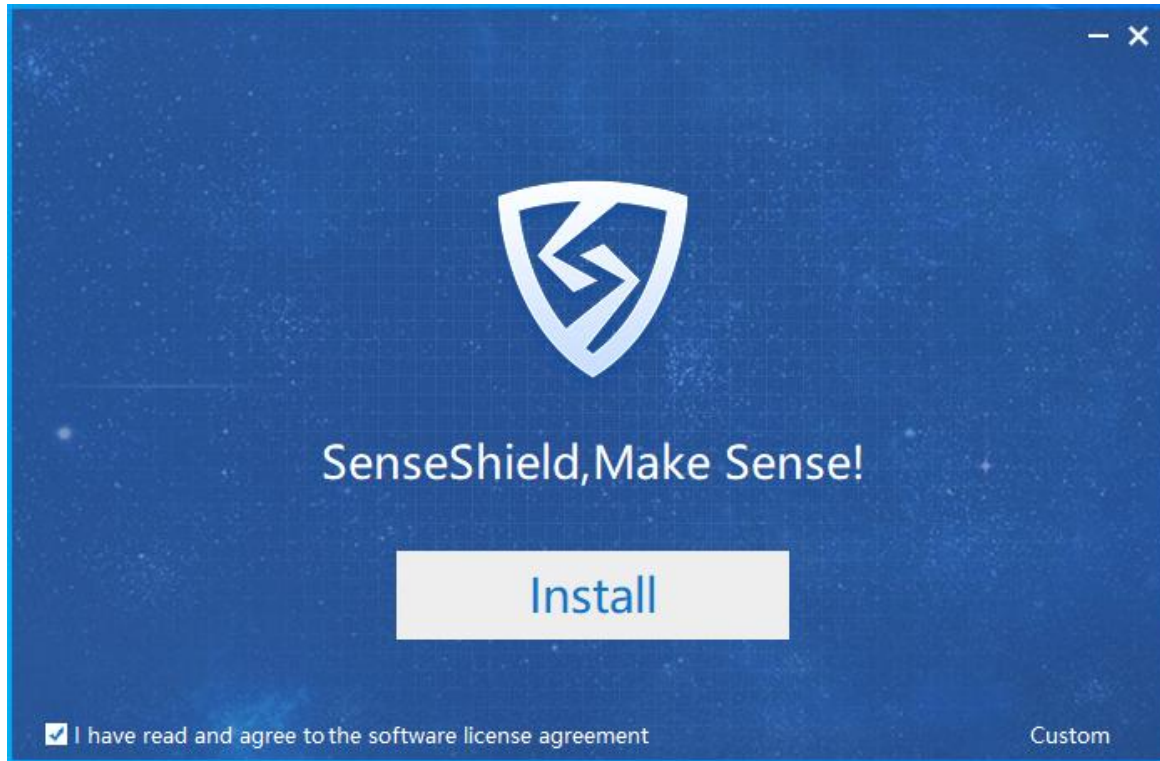


Software	Introduction
DPVR_StarLinkServer_v1.0.7 Server (end)	Running on the PC with SteamVR and the VR app. "StarLink" server will automatically discover and connect to the AIOs that have started the PLAYER end under the same WIFI, and transmit the content of the PC VR headset to the PLAYER end in real-time.
DPVR_StarLinkPlayer_v1.0.7 (Player end)	Installed on the AIO HMD. Receive commands from the SERVER end under the same WIFI, and real-time render the PC VR content with pose data.
DPVR_AppPatch_v1.9.1	DPVR_AppPatch is a patch tool. A SteamVR app must be patched before running the "StarLink". The tool also supports modifications of FPS and resolution of the VR app to optimize the performance.
Virbox User Tool (Must have) and Elite4S SDK (Optional)	The software and driver for USB Dongle and license key activation.

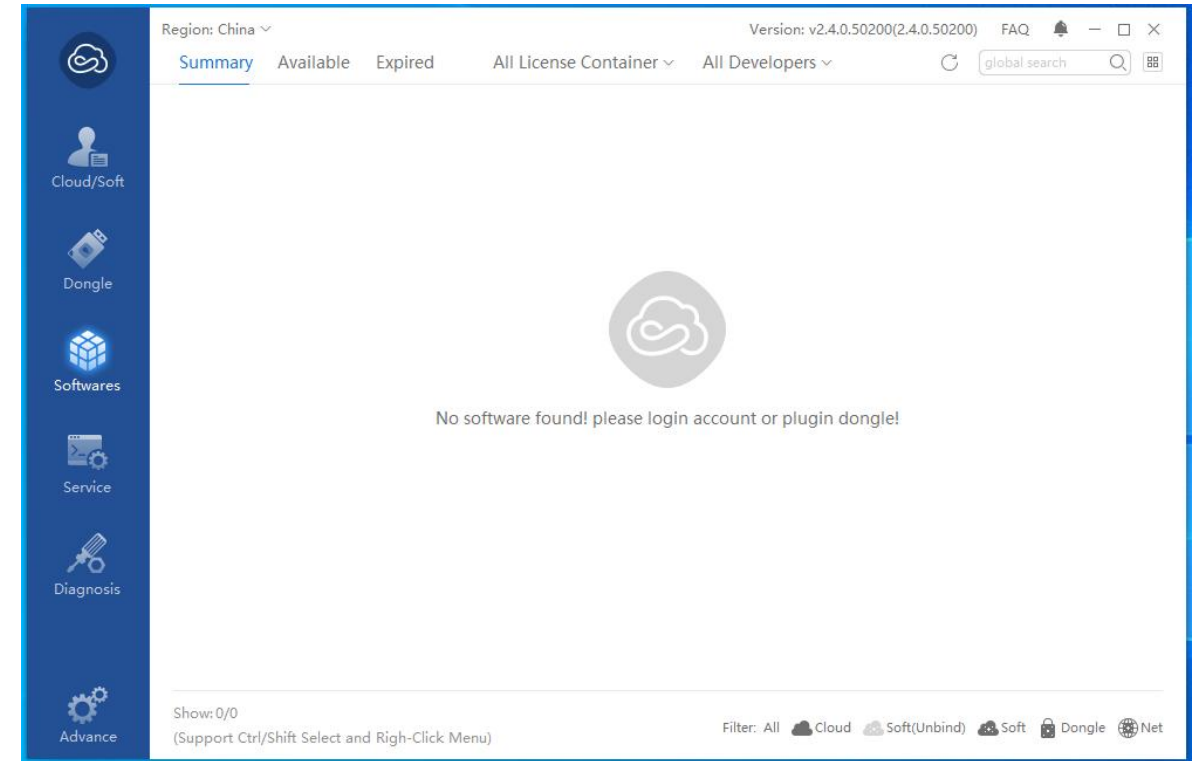
Deployment and Use

1. Turn off/uninstall the firewall software on the PC, install the Virbox User Tool.

Special note: If the Virbox User Tool is not installed, the "StarLink" Server cannot start correctly.



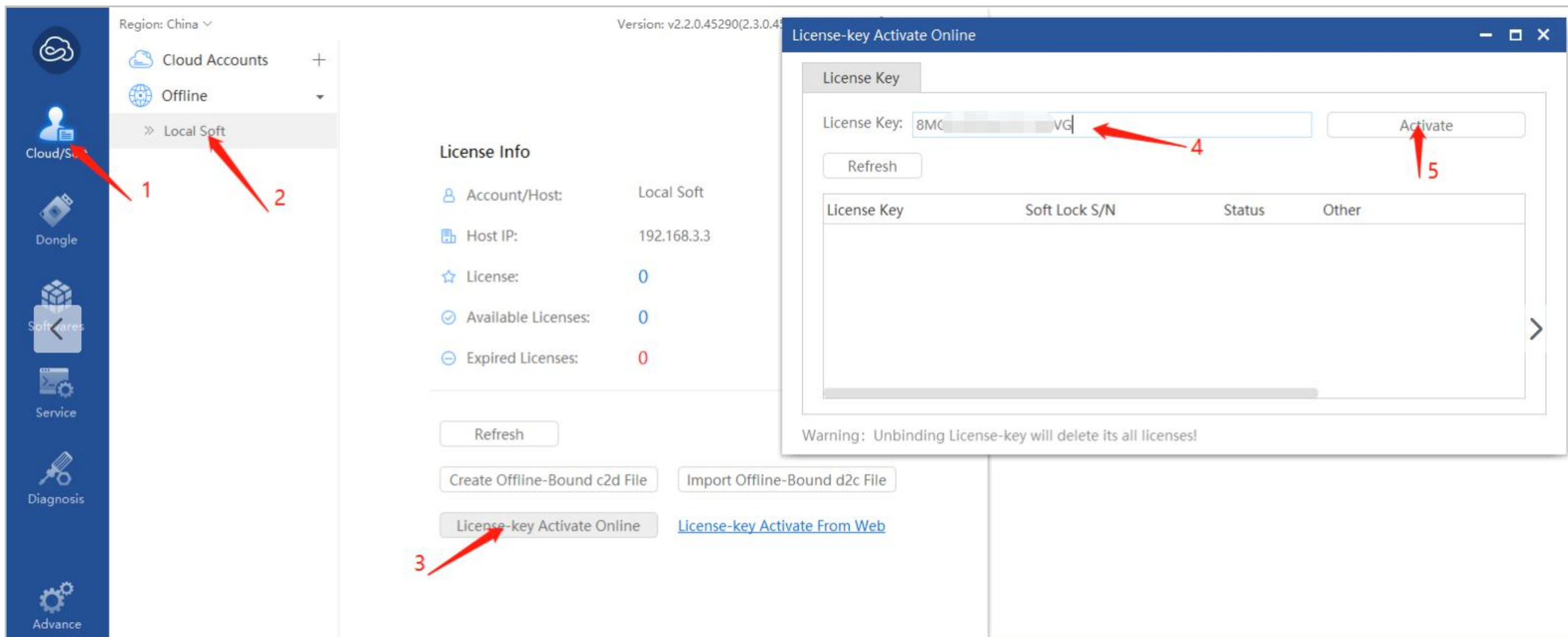
Virbox User Tool installation interface



Virbox User Tool operation interface

2. Before starting the "StarLink" Server end, plug the USB Dongle into the PC, or follow the instructions below to active the license key for trial use.

Please check with your solution provider for details.



Region: China ▾

Cloud Accounts +
Offline ▾
» Local Soft

Cloud/Soft 1
Dongle
Softwares
Service
Diagnosis
Advance

Version: v2.2.0.45290(2.3.0.4)

License Info

- Account/Host: Local Soft
- Host IP: 192.168.3.3
- License: 0
- Available Licenses: 0
- Expired Licenses: 0

Refresh

Create Offline-Bound c2d File Import Offline-Bound d2c File

License-key Activate Online [License-key Activate From Web](#) 3

License-key Activate Online

License Key

License Key: 8MC [redacted] VG 4

Refresh

Activate 5

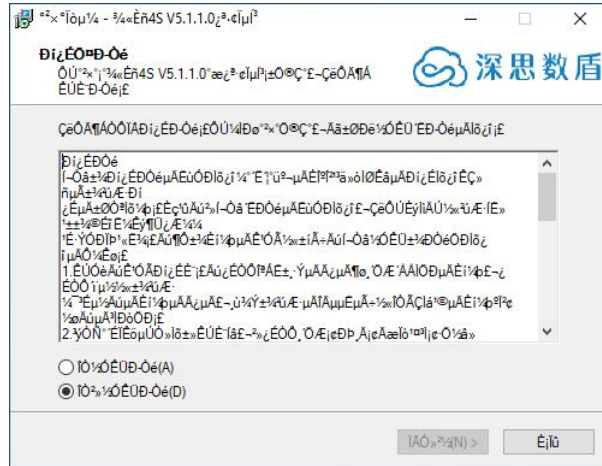
License Key	Soft Lock S/N	Status	Other
-------------	---------------	--------	-------

Warning: Unbinding License-key will delete its all licenses!

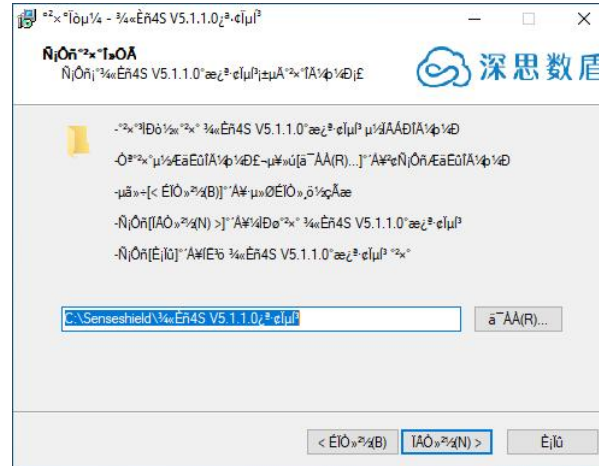
3. If the "StarLink" server still cannot find the Dongle, please install the Elite4S SDK.



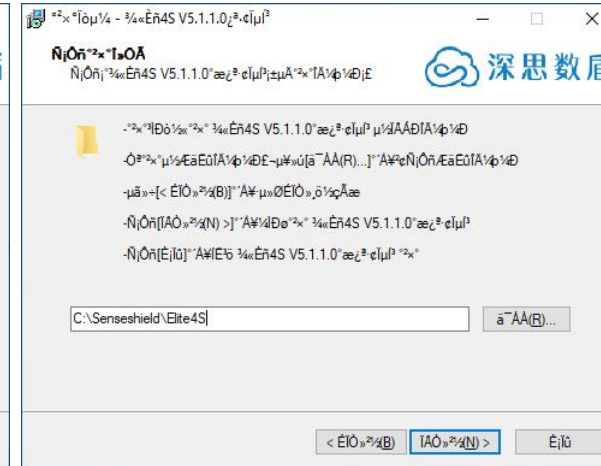
Special Note: The UI might be unreadable if the OS does not support Chinese characters. Please follow the steps below.



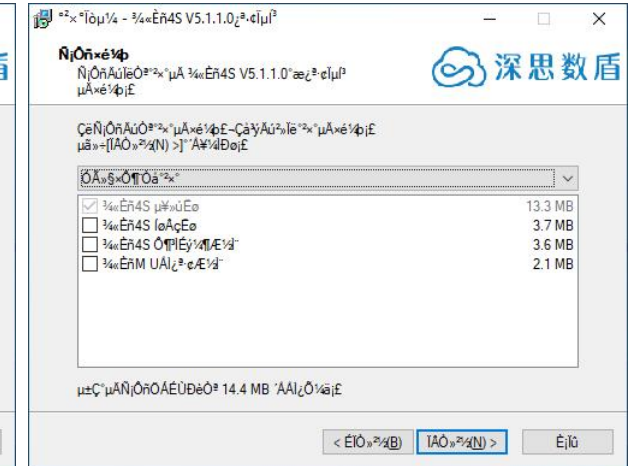
STEP 1



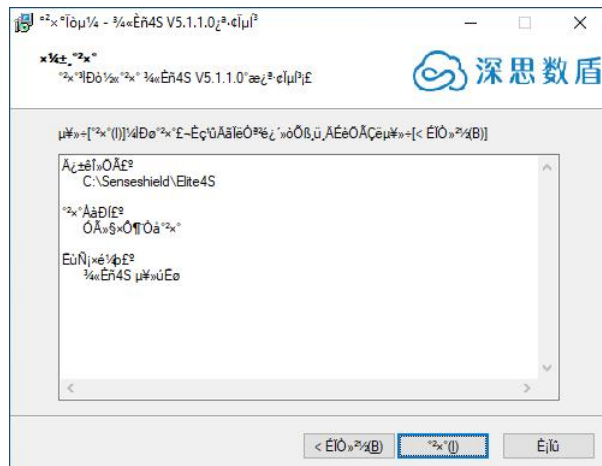
STEP 2



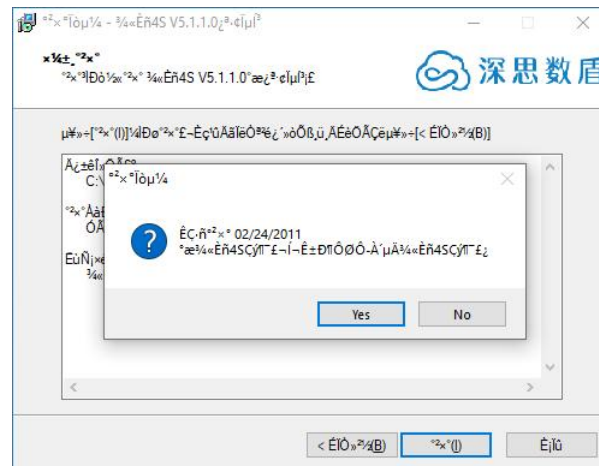
STEP 3



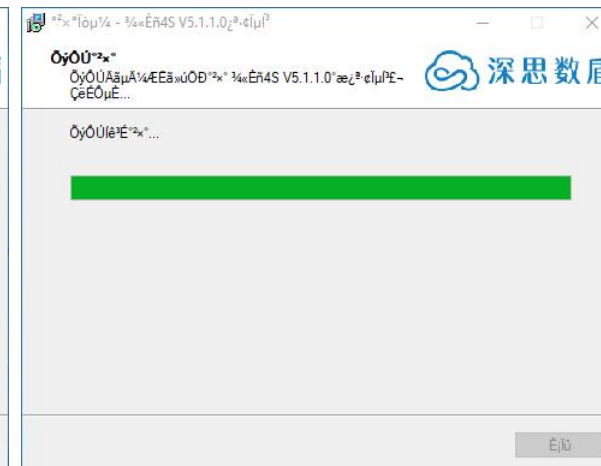
STEP 4



STEP 5



STEP 6



STEP 7



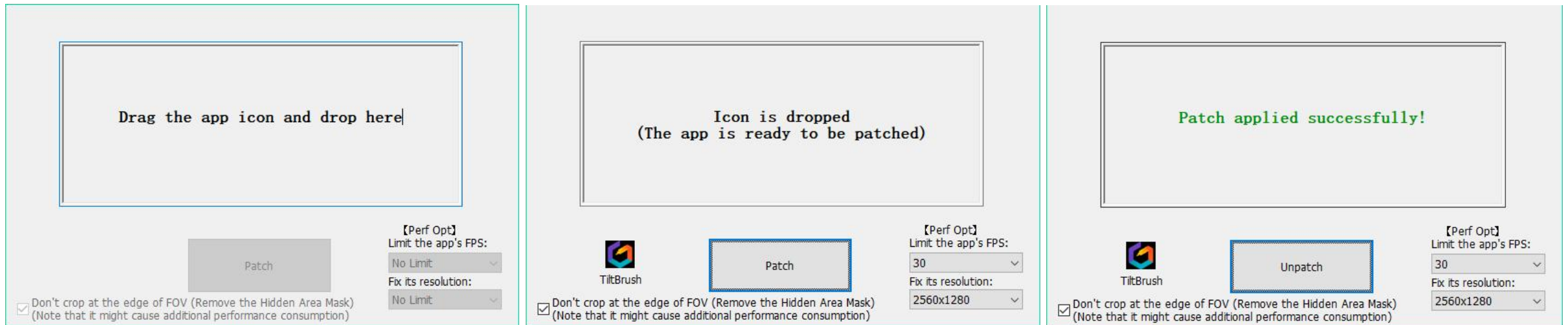
STEP 8

4. Run the DPVR_AppPatch_v1.9.1.exe, drag the app icon to the window and patch the app.



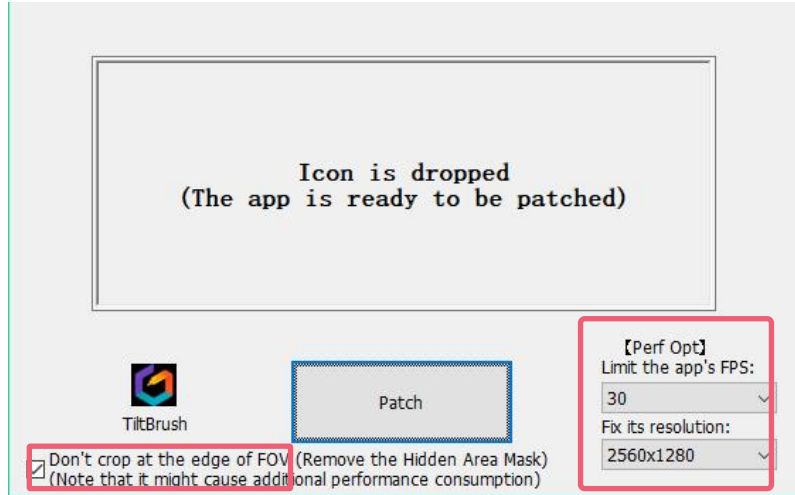
Special Note:

- A SteamVR app must be patched before running the "StarLink".
- To unpatch the app, drag its icon to the DPVR_AppPatch and click "Unpatch" button.
- If you are experiencing any lag, patching the app and choosing lower FPS and resolution can help.
- For each VR app, you can choose different FPS and resolution for different levels of performance optimization.
- Each VR app only need to be patched once. You can copy the patched application directly to other PC without patching again.



Note: If the VR application has been patched by the DPVR_AppPatch tool with its version lower than v1.9.1, you must drag the application into the DPVR_AppPatch_v1.9.1 window to Unpatch, and then patch again.

Recommendations: If the steaming performance for the current VR content is poor on the AIO viewer end, e.g. the playback is stuttered, flickering or not smooth, very frequently, you can use the DPVR_AppPatch_v1.9.1 tool to optimize the VR app to get a better performance.

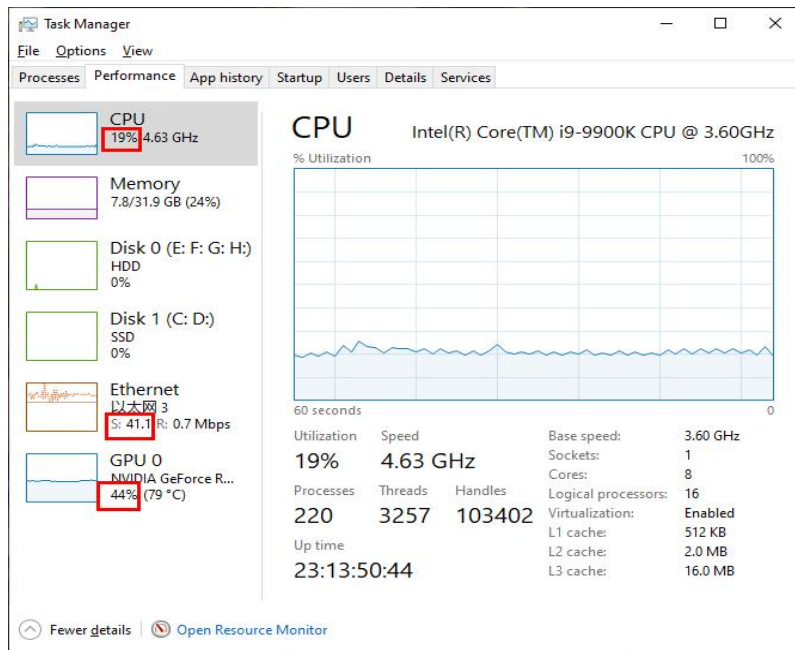


Limit FPS: The default value is "No Limit". It is recommended to limit it to 30 or lower at the beginning, or if the streaming performance of the current VR content is poor.

Limit resolution: The default value is "No Limit". It is recommended to limit it to 2560x1280 or lower at the beginning, or if the streaming performance of the current VR content is poor.

Don't crop at the edge of FOV: This option is checked by default. This option MUST be checked for the Afterimage mode and Follow mode (the default mode). Please just change the FPS or resolution if the steaming performance is poor and leave this option checked.

Please unpatch and re-patch the current application to make the settings take effect.



How to decide the FPS and resolution limitation:

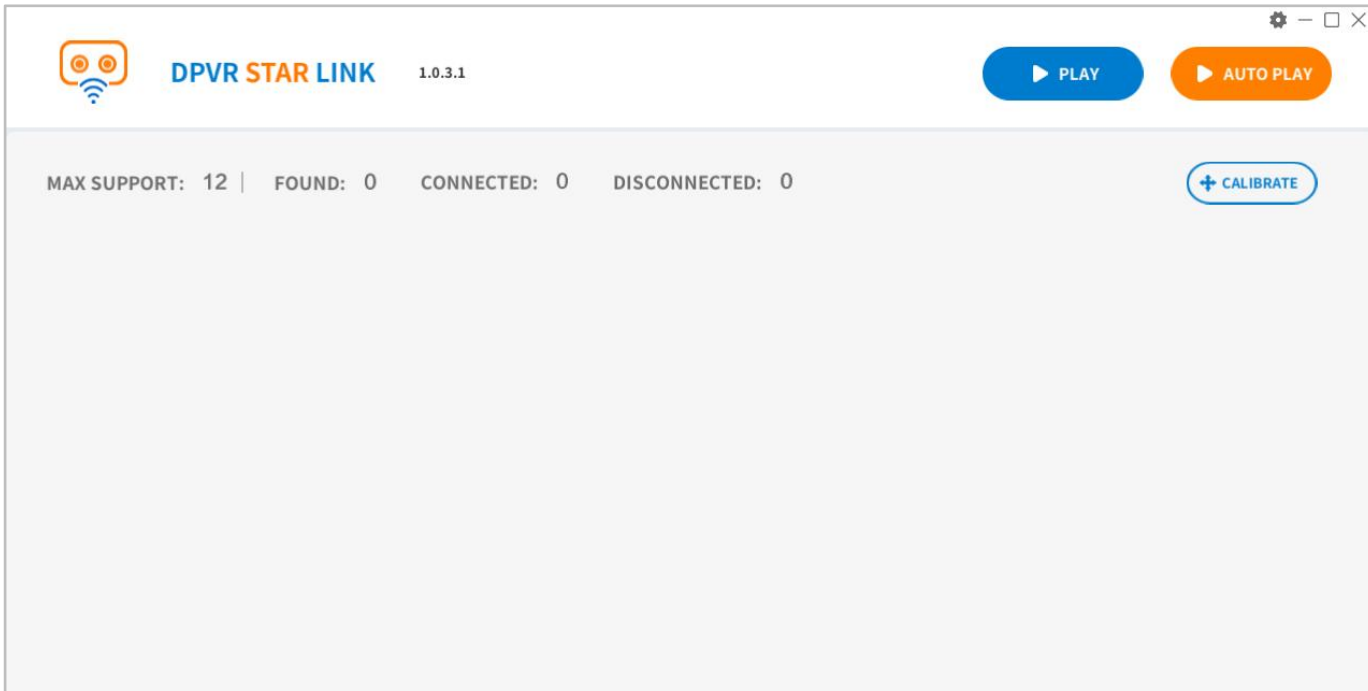
1. After applying the DPVR_AppPatch on the VR app, run the VR app and play Starlink Server.
2. Press Ctrl+Shift+Esc to launch the Task Manager, click the "Performance" tab and check on the CPU, GPU and Ethernet usage. If the CPU and GPU usage exceeds 90% or even reaches 100%, it means that CPU and GPU is overloaded and the performance might be unstable. You should re-patch the VR app to limit the its FPS/resolution to a lower profile with DPVR_AppPatch tool, or change to a higher spec PC.
3. It is recommended that the CPU and GPU usage be kept below 80% most of the time to ensure the smooth and stable running of current VR applications and Starlink Server.

5. Run SteamVR, and run the DPVR_StarLinkServer.exe.

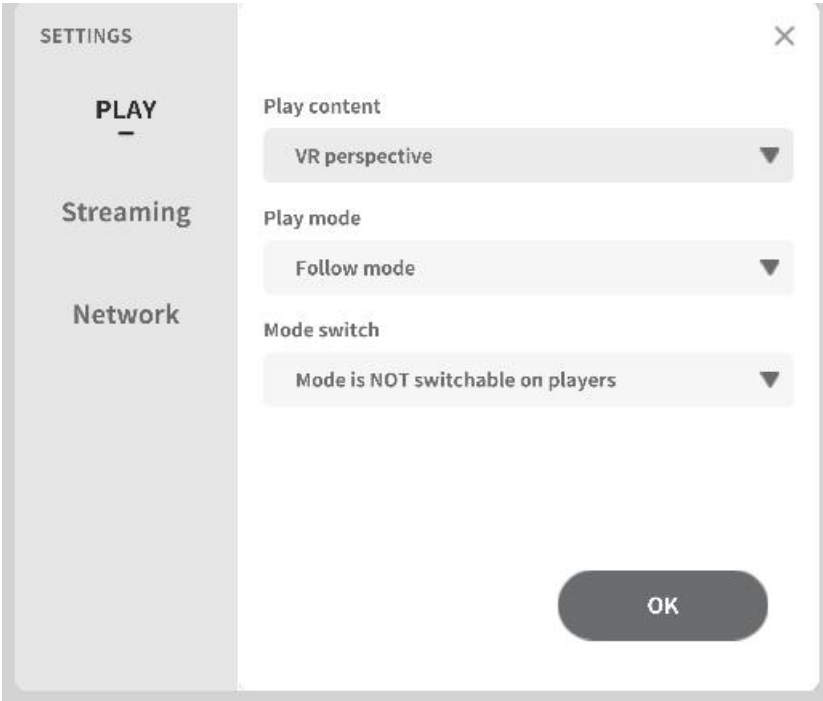
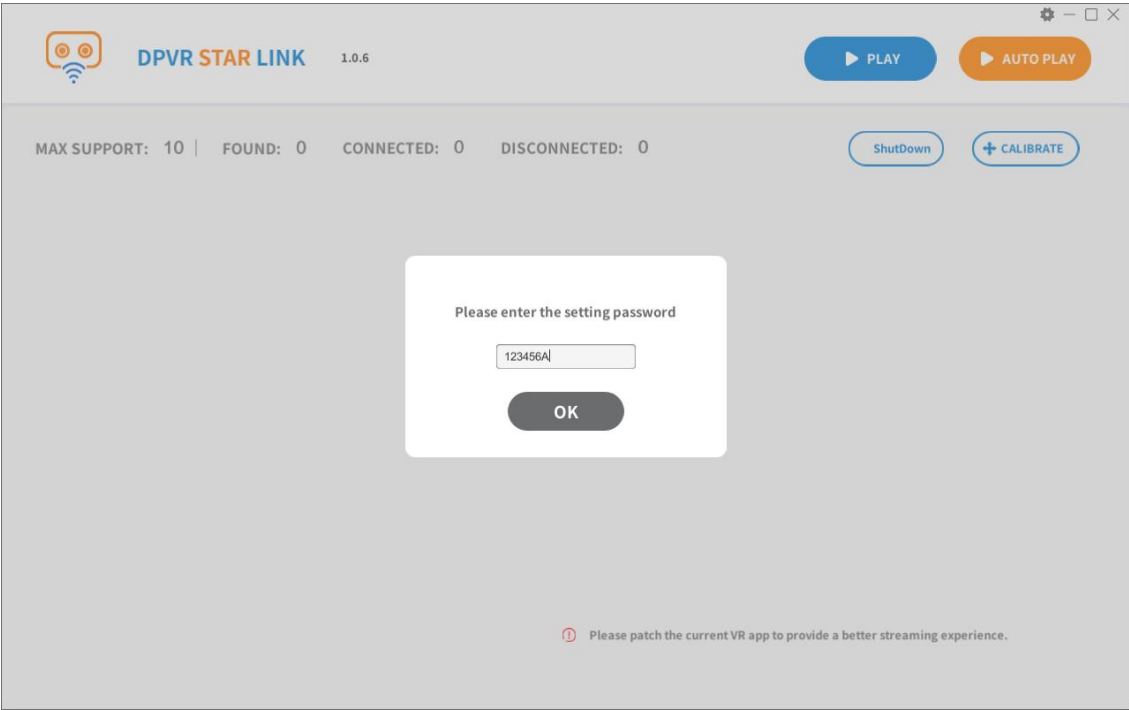


Special note:

- SteamVR must run before the DPVR_StarLinkServer.exe runs.
- Please ensure that the full path of the "StarLink" SERVER only contains ASCII characters e.g. alphanumeric characters, underscores and spaces.
- Allow internet access to the StarLink SERVER and Nginx SERVER and make sure the firewalls or AntiVirus programs are turned off.
- Please click the Settings to choose the Ethernet when there are multiple network cards available.

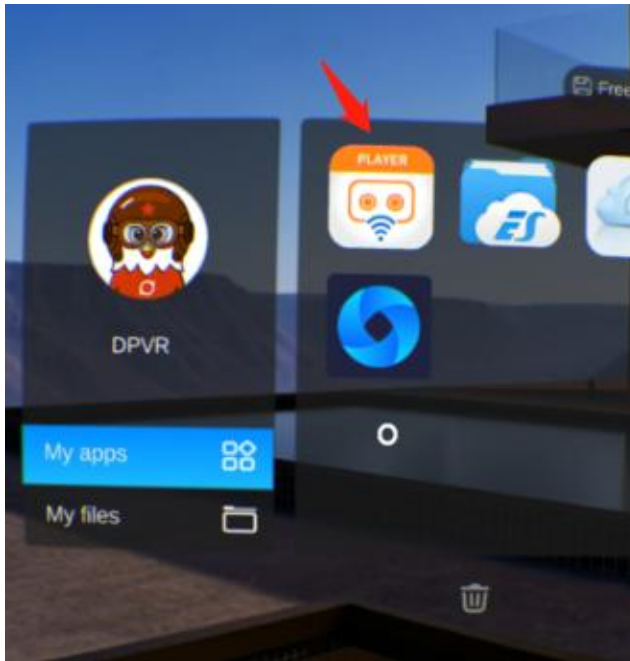


- Entering the setting requires entering the setting password, the password is: 123456.



6. Connect the AIO and PC to the same WLAN.

- Use CAT6 cable to connect the PC with the router.
- Find and run the DPVR_StarLinkPlayer at the My apps tab, then enter the WIFI settings by clicking the icon on the upper right corner.



If Starlink Player is not started,
find it in the My apps tab



Starlink Player UI



Settings UI

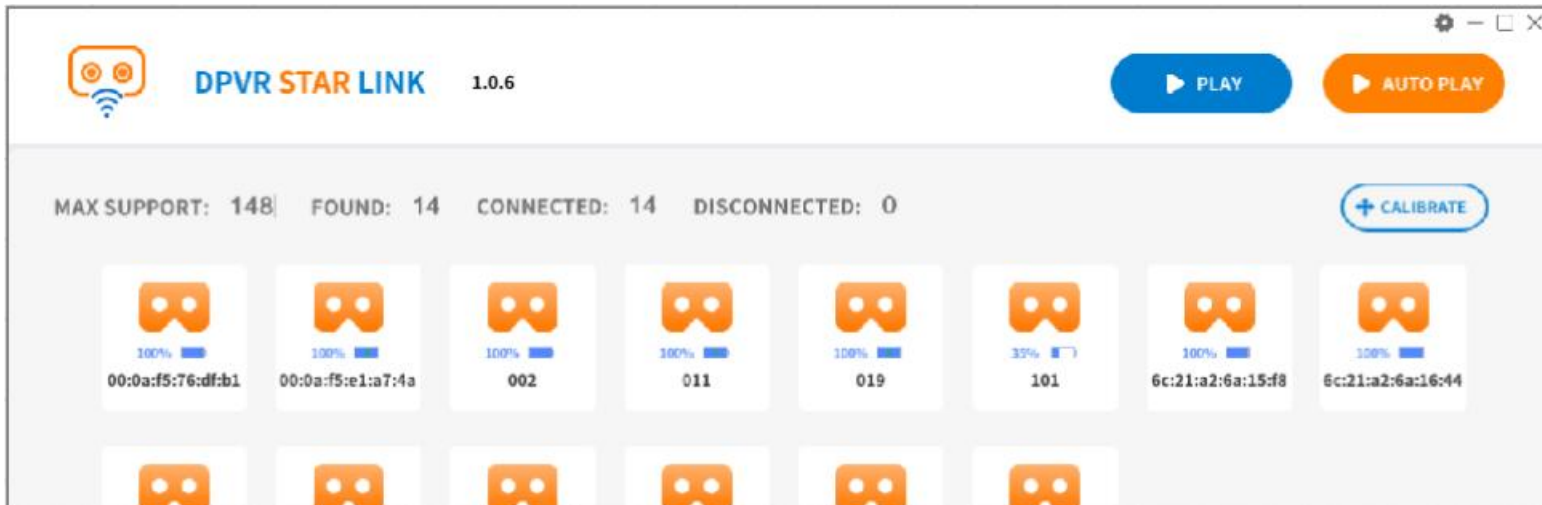
7. After the WIFI setting, wait for the connection between SERVER end and PLAYER end.



Special Note:

- After the first start of the Player end, the DPVR_StarLinkPlayer will be started automatically after booting. You can disable the auto start in the "settings".
- The "settings" is only available when the PLAYER end is not connected with the SERVER end.

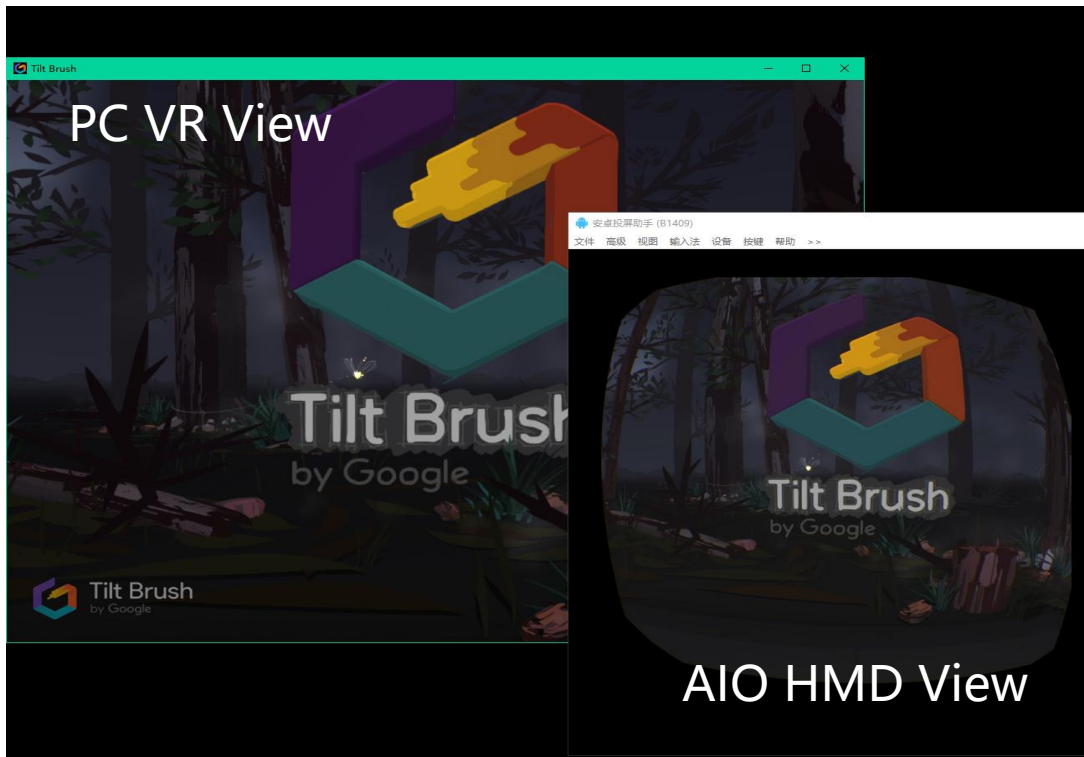
- After the connection is successful, the SERVER end will display the device info as shown below.

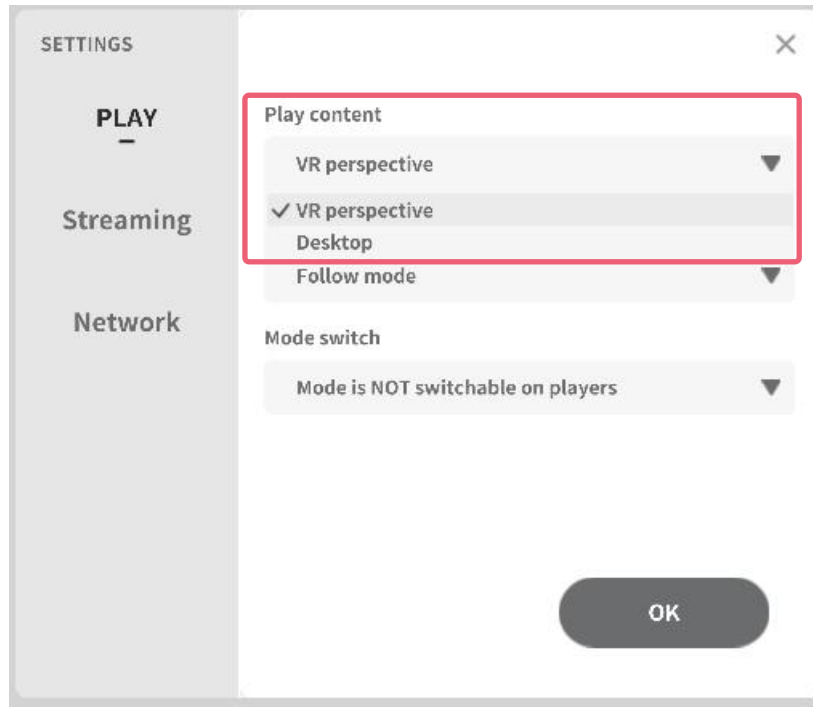


8. Click the "Play" button to start the streaming between the PC VR and the AIO once the connection is successful.

Special Note:

- When playing, you can click the "calibrate" button to make the content of the PC VR displayed in front of all AIOs connected.
- Please do not unplug the USB Dongle during playing.
- Modification of streaming settings, including resolution, FPS, and bitrate is supported by the settings of the SERVER end for a best playing performance.



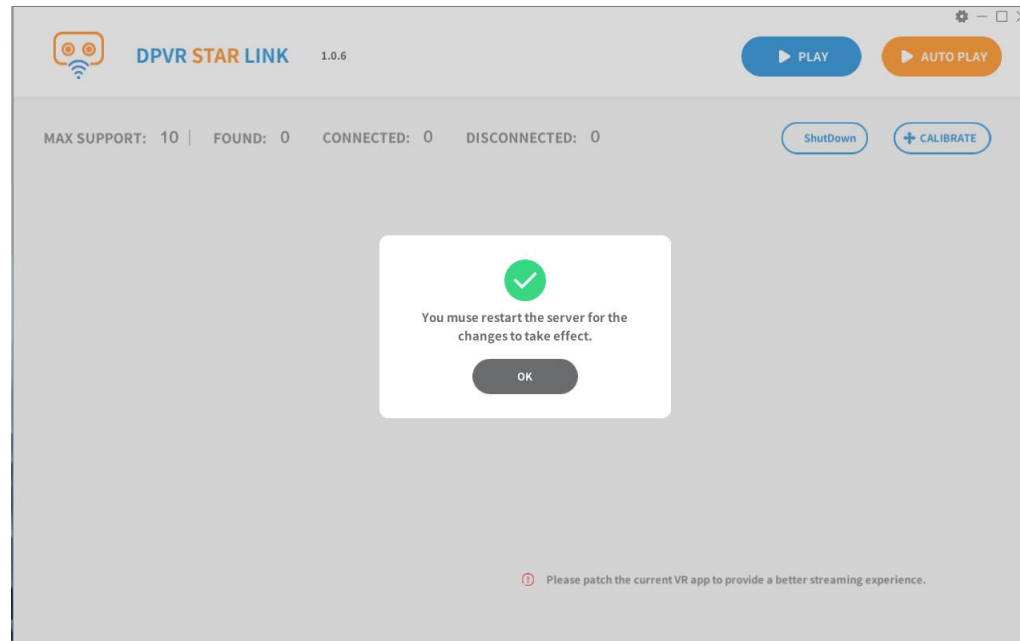


Play content: Support 2 modes switching

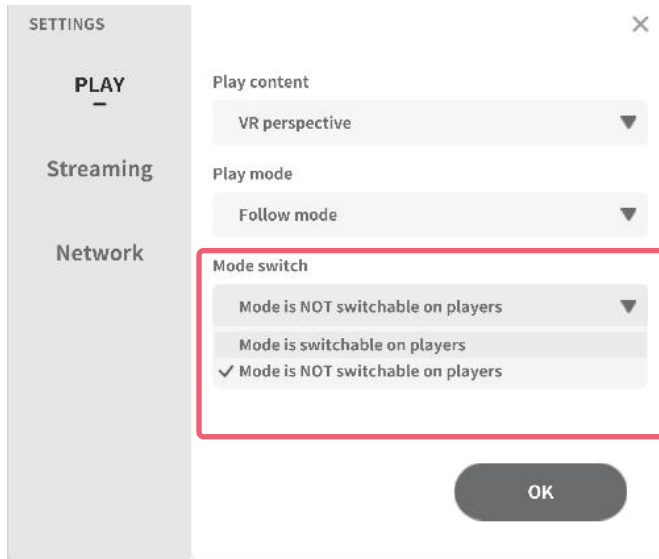
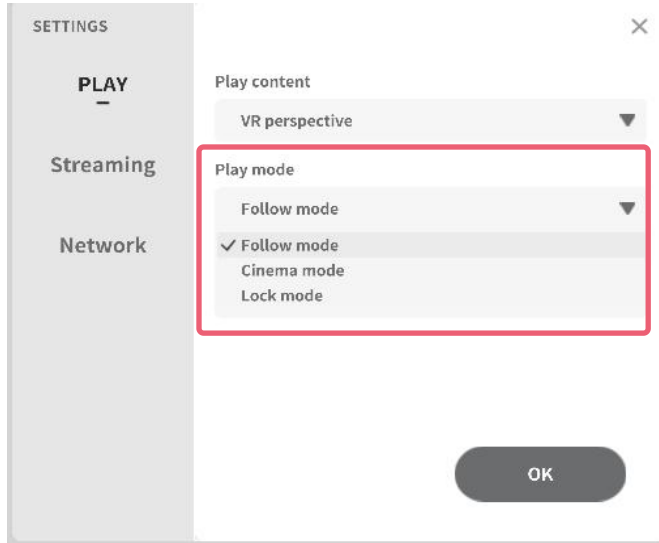
- VR Perspective: The presenter synchronizes the VR screen to the viewer, allowing the viewer to watch from the presenter's first-person perspective. This setting is the default.
- Desktop: The presenter synchronizes the content of the PC desktop to the viewer, allowing the viewer to watch the screen content on the PC desktop.

Special Note::

- After switching the playback content settings, the setting needs to be restarted on the server side to take effect.



Recommendations: You can set play mode in server end, and configure if the mode is switchable on viewer end.



Play Mode:

- Follow mode (Default): Viewers' VR content follows the presenter's pose. (Viewers can move their heads to follow the presenter's viewport)
- Cinema mode: Viewers sit in a cinema and watch the big screen in the front displaying the presenter's VR content.
- Lock mode: Viewers don't need to move their heads. The content from the presenter's view is fixed in front of the viewers' eyes. This mode could cause motion sickness.
- Afterimage mode: hidden by default, similar to Follow mode, except for the fading after-image retention and an indicator box showing the current viewport.

Note: The afterimage mode is hidden by default. If you need to experience or use this mode, you can find the CastConfig.json file in the following path

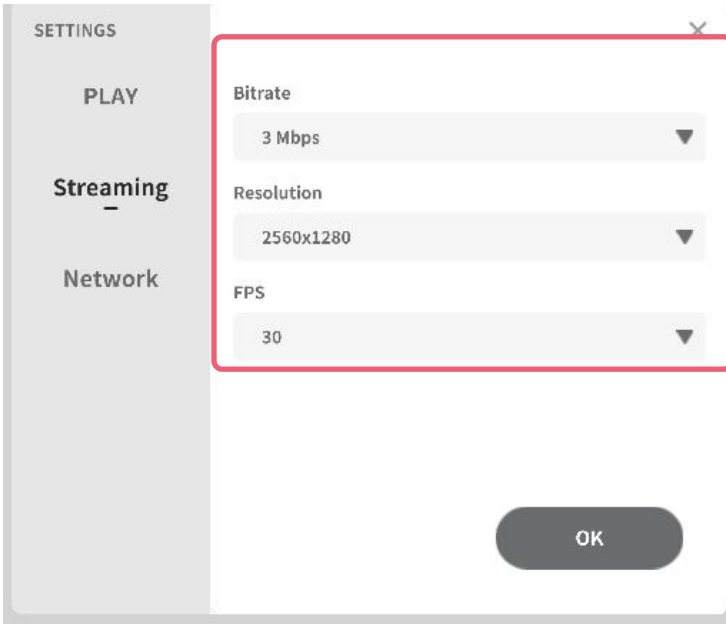
DPVR_StarLinkServer_Data\StreamingAssets, modify the "afterimageMode" key value to 1, save the json file and restart the server.

```
{ "afterimageMode": 1, "indicatorBox": 1 }
```

Mode switchable:

- OFF (Default): Viewers can't switch play mode on their own when watching videos.
- ON: Viewers can double click the touchpad to switch among play modes when watching the VR content.

Recommendations: You can adjust streaming settings in server end.



Bitrate: The default value is 3 Mbps. If the viewer feels unclear, you can increase it appropriately. The increase will cause higher network bandwidth and GPU burden; when the load is too high, the playback might be stuttered or flickering. Follow below instructions to fine-tune.

How to check the router performance:

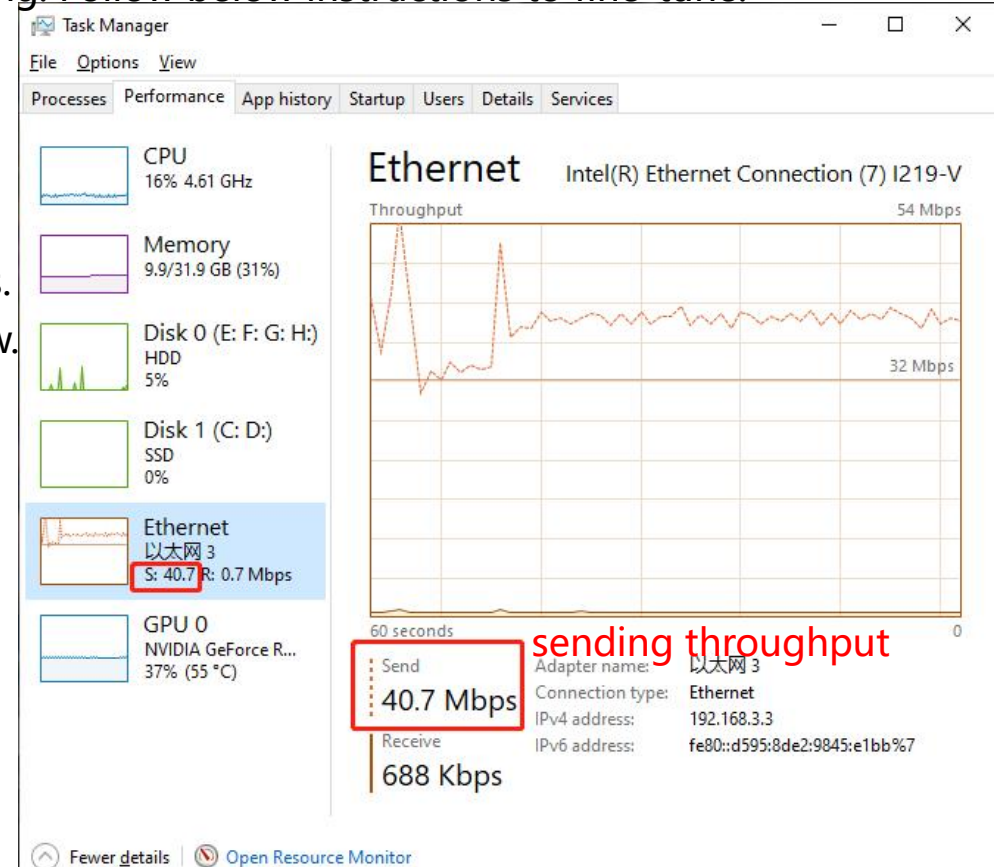
1. Start the Task Manager and check the sending and receiving speed data.
2. Theoretical sending throughput value = **Bitrate** * number of connected devices. While receiving speed should be very low.
3. If the sending throughput value is much lower than the theoretical value, it indicates that the router performance is insufficient. Please set a lower bitrate or switch to use a better router/cable.

Hardware requirement for network:

1. Make sure to use a 5G WiFi router.
2. Use CAT6 ethernet cable.

Resolution: The default value is 2560x1280. If the viewer feels unclear, you can increase it appropriately.

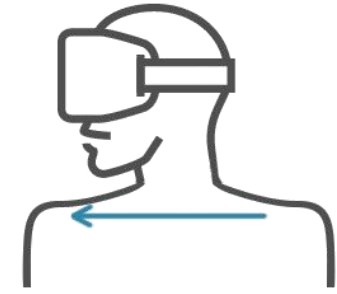
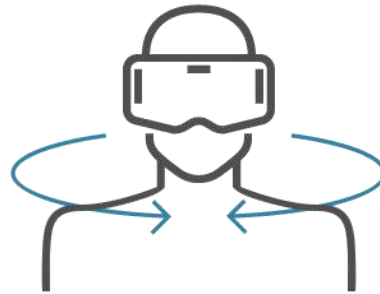
FPS: The default FPS is 30. If the viewer feels not smooth, you can increase it appropriately. The increase will cause higher network bandwidth and GPU burden



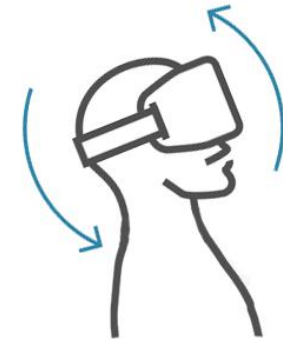
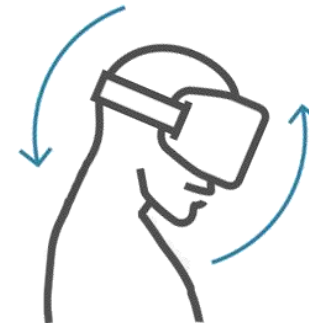
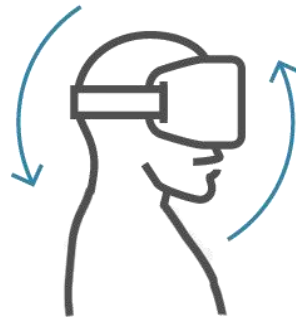
Special Note: The presenter can turn his head left and right/up and down at will when using it, but it is not recommended to tilt the head drastically, which might cause dizziness to the viewers.



Turning left and right
(360° supported)



Turning upside down
(180° supported)



Tilting left and right
(Less than 30° is supported)
(Above 30° is not recommended)

