

SIU-CAVE Setup Guide

Software

Configuring VRPN:

In the file `vrpn_07_26`, open the `vrpn CFG` file and find the Wiimote section; uncomment out the line `"vrpn_WiiMote"` and save the file. Also remember the address, `"WiiMote0"`, as it will be used later. This is how the peripheral network finds the Wiimote's bluetooth information. Assuming your Wiimote is connected via bluetooth, you can then run the `"vrpn_server"` application; if your Wiimote is properly connected you should see confirmation messages, as well as the lights on the remote functioning. Make sure to leave the server running whilst using any applications involving the Wiimote.

Microsoft Kinect SDK:

In order to use the Kinect motion sensor with MiddleVR, you have to download the Microsoft Kinect SDK. Since we used the Kinect v1, you have to download the SDK for version 1 in order to ensure compatibility with MiddleVR.

Install Link: <https://www.microsoft.com/en-us/download/details.aspx?id=40278>

MiddleVR Installation:

You need to install the pro version of MiddleVR. For our needs, we just used the 30 day free trial, which you could also use, but it has to be the pro version.

Install Link: <http://www.middlevr.com/downloads/download-middlevr-for-unity/>

Unity Installation:

We developed our demo application using the Unity Game Engine because MiddleVR is compatible with Unity 4.2 and above, including Unity 5. You do not need to download Unity in order to run our demo, however if you would like to further edit/examine the project file you need to download Unity.

Install Link: <https://unity3d.com/get-unity/download>

MiddleVR Configuration:

Once MiddleVR Pro is installed, you can open our configuration file, `"kinect_wiimote_test"`. All of our settings should have been applied automatically, but just in case let's cover each section of MiddleVR.

Devices:

- The devices tab holds all of the available input devices and their drivers. For our settings, you should check that the wiimote and kinect have been added properly. If not, click on the plus icon to add a new device. For the wiimote, select the VRPN Axis device and set the address as the previously mentioned `WiiMote0@localhost`. The axis should also be set to 16, and the click add. If the Kinect is missing, simply just add the Kinect v1 device as well. Also make sure

the wand device is assigned to our Wiimote; device for wand navigation should be set to our VRPN axis device with a horizontal index of 2 and vertical index of 3. This allows for us to only track the y and z-axis of the WiiMote's motion.

Adjustment to the scale options increase/decrease the speed of the movement.

3D nodes:

- The nodes tab gives a graphical overview of your project, including screens, cameras, and tracking data. Our project has three screens, each with their own designated camera. The cameras are the children of our "HeadNode" and represent the user in the CAVE. The entire project is the child of the "VRSystemCenterNode", and the CenterNode is assigned the Kinect's input data, "Kinect0.User0.Head". This way the entire project rotates and transforms based on the user's head-tracking data. Also make sure that the advanced settings of VRSystemCenterNode show only the UseTrackerYaw option selected, as further tracking can cause jittery cameras.

Viewports:

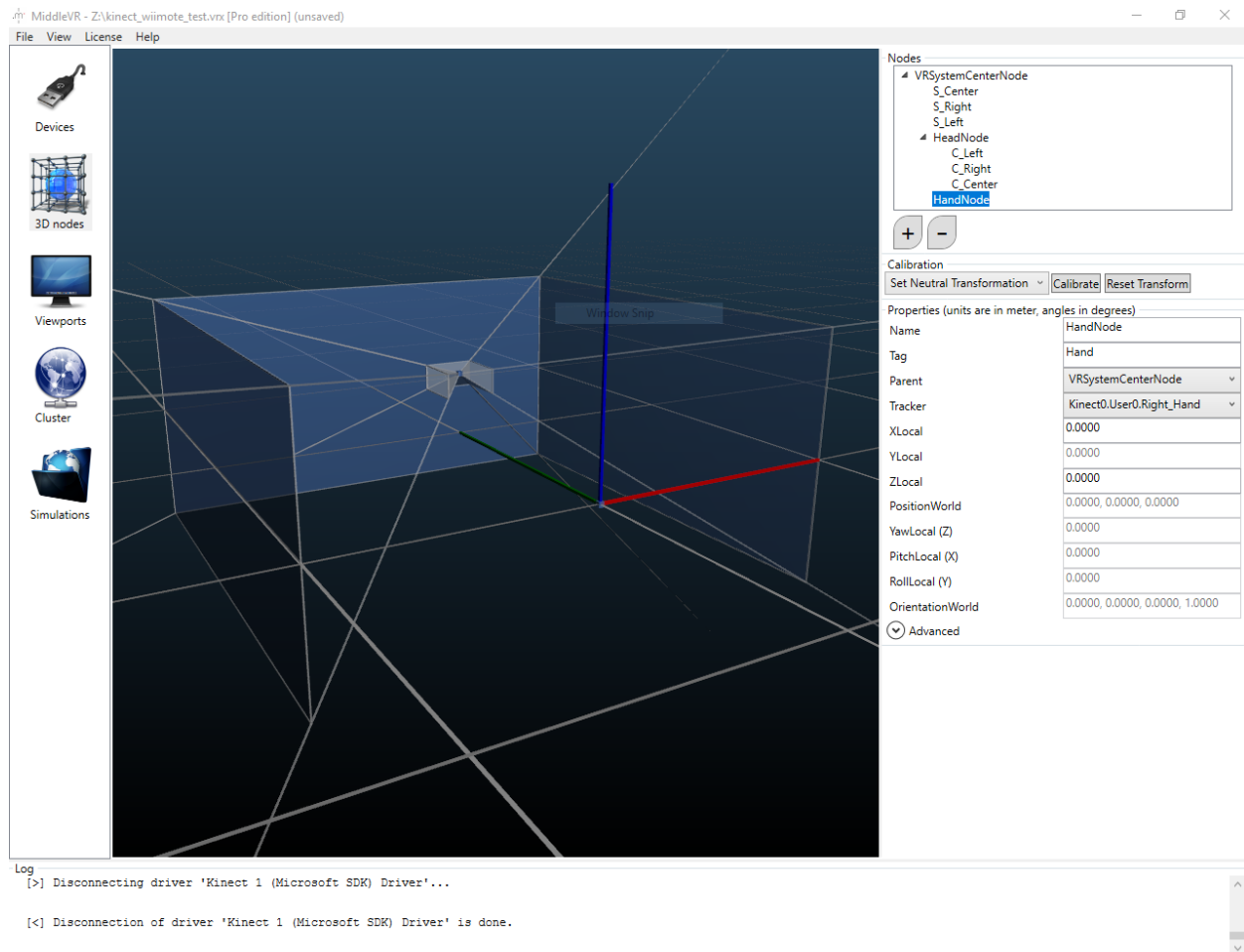
- The viewports tab handles your graphics settings of your project, including the desired resolution, vsync options, as well as any screen offsets you'd like to create. You need one viewport per screen/camera pair you have, so our project will show three viewports, each assigned to their own camera. Make sure the proper camera is assigned the proper viewport, i.e. V_Center to C_Center.

Cluster:

- This is where you manage the configuration of your computer cluster. For our project, we had one server PC, along with two client PCs. You need to assign each PC its corresponding viewport. In our configuration file, we assigned the server node to V_Center and then our two client nodes to V_Left and V_Right. Also, it is important to enter each PC's correct IP address within this Cluster tab. To do this, open up the MiddleVR cluster daemon on each PC. When the daemon loads up, it will display the PC's IP address on the screen. This is the IP address that you will need to enter for the corresponding cluster node in the cluster tab.

Simulation:

- The simulations tab is where you choose the configuration file and the executable that you want to run. For our project, you are going to select the "kinect_wiimote_test" as the configuration file, and the "forest_demo" as the executable. The "forest_demo" is the application that we made in Unity. Also, this is where you can send commands to the other clients. You can either choose to kill all cluster nodes, which simply ends the tasks that each client is running, or you can run the simulation. Running the simulation causes the server machine to send the commands to each client telling it to run the application



Unity Application Configuration:

Step 1:

Open the existing unity project folder (Demo_app) or create a new unity project

Step 2:

Make sure the MiddleVR package is imported into the Unity Application.

Step 3: (Skip this step if the MiddleVR package is already imported in Unity)

-To Import the MiddleVR package file, open Asset menu, then Import package and Custom package.

-MiddleVR Unity package is located in the data folder of your MiddleVR installation.

-Select the MiddleVR.unitypackage file

-Click import

Step 4:

Add the VR manager to your scene

-Open the MiddleVR folder imported in the earlier step in the project tab.

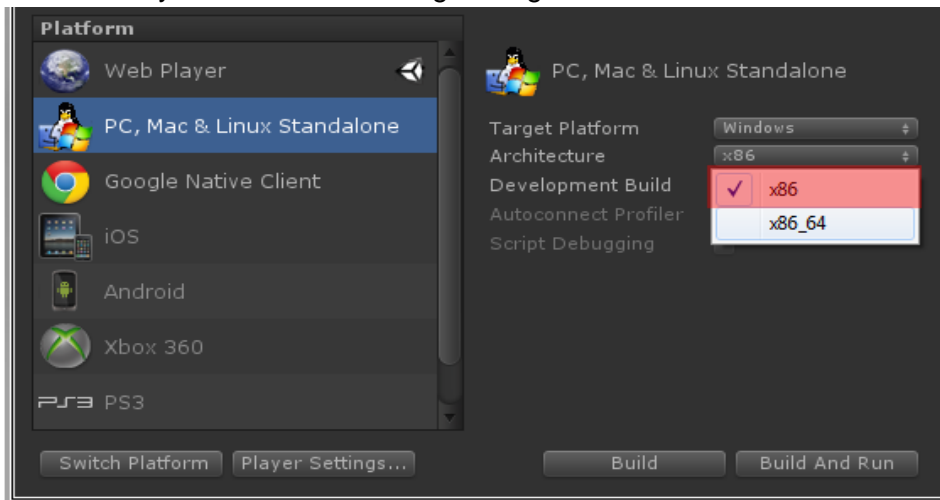
-Drag and drop the VRManager prefab in the project Hierarchy tab.

-In the VRManager Script, specify the path of config file created in MiddleVR.

Step 5:

Export your Unity Application:

- Click Build Setting on File tab in Unity.
- Make sure you have the following settings selected.



-Select Build Button.

Running the Application:

- Step 1: Make sure your VRPN is configured and that the WiiMote is running
- Step 2: Launch MiddleVR and open the kinect_wiimote_test configuration file
- Step 3: Open the MiddleVR Cluster Daemon on each of the three PCs
- Step 4: Select the Forest_Demo as the simulation and the kinect_wiimote_test as the config
- Step 5: Press the run button underneath the command line in the simulations tab

Hardware

Purchased:

- [Projectors](#) (x3)
- [Rear projection screen material](#) (x3)
- [Projector stands](#) (x3)
- [Screen frame](#) (x3)
- [Network switch](#)

Donated:

- Computers (x3)
- Kinect v1
- WiiMote
- Wires and converters