HI5 MULTIPLAYER DEMO OPERATION MANUAL

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KEY COMMANDS

ESCAPE	Return to Lobby Scene or close game (when playing as Server)
SPACE	Reset all the objects in the scene and delete all lines drawn.
T	Show/Hide the Vive Trackers.
BACKSPACE	Show/Hide the Vive Trackers.
G	Turn gravity On/Off.
C	Show/Hide all body colliders.

PREREQUISITES

The following things are essential for the demo to work with two players and one third-party viewer:

- 1 x Pair of HTC Vive Lighthouse base stations ☐
- 1 x Sync cable for Lighthouse base stations ☐
- 2 x Vive HMD ☐
- 4 x Vive Tracker ☐
- 2 x pairs of Hi5 glove ☐
- 1 x Router with at least 3 ethernet port ☐
- 3 x Ethernet cable ☐
- 2 x VR capable computer ☐
- 1 x Regular gaming computer ☐

STEP BY STEP INSTRUCTIONS

This section is split into three parts. First part are the steps needed for a successful operation. Once the operational part has been established the reader may continue with the second part which is starting the demo for daily use. Last but not least is a looped part which can be followed for every new guest trying the experience.

During operation please pay attention to things mentioned the chapter “Things to observe during operation”.

SETUP

1. Setup the Vive lighthouse base stations, opposite from each other. Make sure they are place with sufficient height and distance to each other. Maximum diagonal distance should not exceed 5 meters. Make sure the base stations are stable and don't vibrate when operating. Placing them higher helps with occlusion from the player. See chapter “Example room layout” for an example.

2. Use the sync cable and connect it to the base stations. Make sure they are set to the right mode. One should be in mode “A” and the other one in mode “B”. It doesn’t matter which base station is set to which mode. (Complete Vive setup guide can be found here: https://support.steampowered.com/steamvr/HTC_Vive/)

3. Setup all three computers in a location that keeps the play area free. One computer is used as third-party viewer. The other two are used to with the Vive HMD.

4. Connect the Vive HMD to both the VR enabled computers.

5. Connect the ethernet cables to all computers and link them with the router.

6. Run SteamVR on both VR computers. For each computer do the following:
    a. Define a global forward direction and remember it. The direction should be diagonal to the angles of the base stations.
    b. Remember the direction and/or mark it.
    c. Place the HMD on the floor, in the middle of the room, with its forward side facing the global direction you decided in step 6.a.
    d. In SteamVR click on the drop down menu thing on the top of the window where it says SteamVR.
    e. Choose Settings.
    f. On the left tab selection choose Developer.
    g. Scroll down to where it says “Room and Tracking”.
    h. According to the size of your play area choose Medium or Large space and click on “Quick Calibrate”. (In CES we always used Medium Space). *(It's important to*

do this on each computer at least once so SteamVR sees and establishes both Lighthouse base stations at least once.)

7. Decide which computers room space setup you want to use as a dominate one.

8. Go to the Steam folder on that computer. Usually: C:\Program Files (x86)\Steam

9. Locate and copy the following two files to an external harddrive or USB drive:
    a. Steam\config**chaperone_info.vrchap**
    b. Steam\config\lighthouse**lighthousedb.json**

10. On the second computer that is using VR, copy and replace those files that you just copied from the external harddrive in the exact same folders inside the Steam folder.

11. **NOTICE:** If for any reason the Lighthouse base stations get moved or touched, this process needs to be repeated. Steps 6. - 10.

12. Copy the Hi5 Demo executable on all three computers.

13. Plugin the Hi5 receiver dongles on the Vive HMD by using the HTC USB extension cable. Make sure the Hi5 receiver is fixed by looping it between the cables and the head strap. Make sure it moves as little as possible when the user is moving his head.

14. For each of the VR computers do the following:
    a. Follow the setup instructions for Hi5 Gloves and ensure they are operational.
    b. Start the demo while holding down CTRL on the keyboard. A configuration window will open. *(If it doesn't, close the demo and repeat this step).*
    c. Choose "Fantastic" in the Graphics quality settings drop down menu. Then click on "Play!".
    d. Open the calibration scene and do a complete calibration. Make sure the calibration is successful and everything is operational (enough battery power in each glove, no magnetized glove). See Hi5 Manual for troubleshooting.
    e. In the demo click on Start Server.
    f. Close the demo.
    g. Take off the gloves. Power off both the gloves and the Vive trackers. You can do this by pressing and holding the power button of each for more than 5 seconds. You can automatically turn off the Vive trackers by closing SteamVR.

15. After repeating step 14. For the other computer the demo is ready for operation.

OPERATION

Once the steps listed in the Setup guide are complete, the user may go through the following step by step guide to ensure a proper operation of the demo.

INITIAL STEPS (Daily fresh start)

1. Decide which computer the client or guest will use. Remember it and remember which HMD belongs to that computer.

2. On this computer, start the demo and start it in server mode by clicking on “Start Server”. Make sure you select HMD in the camera settings on the same screen. *(Because we want to hide the networking latency issues, the guest/client should always use the computer running as Server.)*

3. Power on both the Hi5 gloves and the Vive trackers belonging to this computer.

4. Put on the Hi5 gloves and do a complete calibration.

5. Make sure everything is working properly (battery level, magnetization, calibration result). Then start a new game as server.

6. Start the demo on the second VR computer and type in the IP of the server computer. Then click on Connect. Again make sure the camera settings are set to HMD mode.

7. Power on both the Hi5 gloves and the Vive trackers belonging to the second computer.

8. Put on the Hi5 gloves and do a complete calibration.

9. Make sure everything is working properly (battery level, magnetization, calibration result). Then start a new game as server.

10. Check if the tracking mismatch between the two lighthouse universes (computer) is within acceptable parameters. If it's not, then re-do the lighthouse calibration on the server computer and copy it to the second computer.

11. Start the third computer and type in the IP of the server computer. Make sure the camera configuration is set to “Observer Cam” mode (Third-Party viewer). Then click on Connect.

12. The user using the first computer (Server) can take off the HMD and the glove. Then prepare it for the first client.

13. The system is now operational.

LOOPED STEPS (For every new client/customer)

1. Welcome the user, ask him to put on the plastic gloves.

2. Help him with putting on the Hi5 glove.

3. Give the user the HMD and help him to put it on.

4. Once the user is inside VR, confirm the tracking and finger tracking is still operational parameters. If not, do a complete calibration of Hi5 on the computer that has these issues.

5. Put on your own HMD from the second computer.

6. The operator or you should then reset the scene before letting the user explore the world. Press SPACE on the server computer or pressing the reset button in VR on the side of the table should do the trick. *(This should minimize and potential error state or bugs).*

7. Operation has been established. Let the guest explore the virtual world or show him the tricks and functionality yourself.

THINGS TO OBSERVE DURING OPERATION

Do note that lighthouse tracking is not real-world absolute. Thus each computer or HMD will calculate its real-world location individually. We can force to align these by copying over the calibrated files. However, if the HMD loses tracking from the base stations then that computer will re-calculate its universe and it will no longer match. Usually these results are within acceptable parameters. In environments with bad tracking or a lot of interferences this issue can get exaggerated.

In version 2.1 the trackers or controllers are no longer synced between clients. Instead the hands global position and rotation is synced. Locally you can always see the trackers/controllers by pressing T on the keyboard but you can not see the remote trackers.

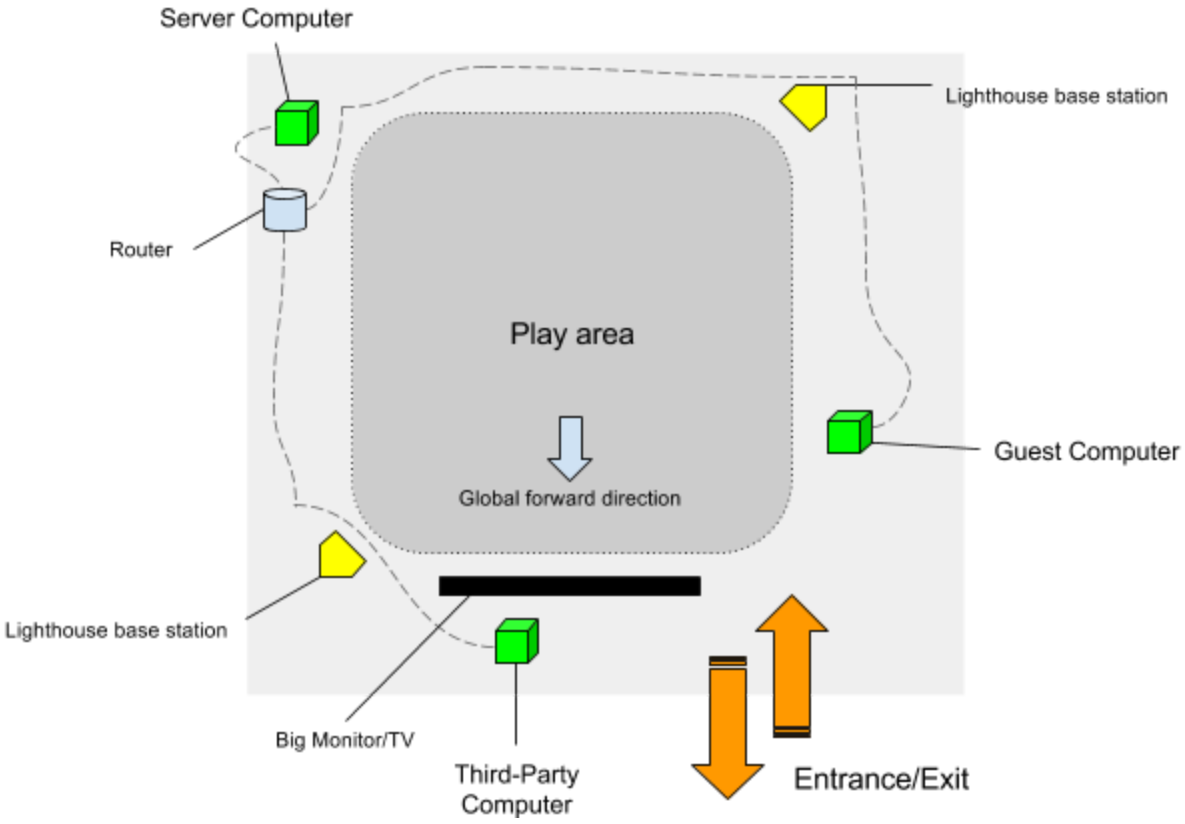
The demo has gone through a lot of iterations in order to solve bugs and make it error proof. If for any reason things stop behaving like they should it's best to restart the demo on all the machines. In extreme cases a re-boot might be required.

The starting order of the demos should not be broken. Always start the server first. Then the second client with HMD followed by third party viewer. DO NOT start clients and click on connect or have them in auto connect mode and then start the server. Doing this will generate the issue mentioned above.

If the gloves become magnetized severely, a full calibration may be need by someone familiar with the correct postures as well as a full demagnetization procedure. In this case the demos need to be restarted completely on every computer.

If a user has trouble to start a drawing then ask him to do the pinching motion faster. The detection of the pinching is not based on finger angels, instead it measure how fast the angle of the finger decreased over a given time window.

EXAMPLE ROOM LAYOUT



KNOWN ISSUES

- If the client clicks on the “Connect as Client” button before the server is created, this will cause a bug and the game will be broken. To fix this, have the client restart the app after the server is created. Always have the server started first before clicking “Connect as Client”.

- Jagged fingers or broken rig on the hand/fingers when using low quality setting, make sure to run in Fantastic. Double-click executable while holding Ctrl to bring up the settings dialog.

- Spamming reset and gravity keyboard buttons or buttons in VR can break the objects.