Setting up a Python and scratch enabled, Java+Bedrock server that allows remote connections

Compatibility

This was working as of 2023-01-25 with the latest versions of all plugins on a Rasbperry Pi 4 Model B with 4 GB with a Raspbian Lite 32 bit OS

Minecraft Java 1.19.3
Minecraft Bedrock 1.19.51
Paper 1.19.3-384
Geyser-Spigot #1286
Floodgate-Spigot #74
raspberryjuice-1.12.1

Intro

The four main sections describe steps to set up the server, normal multi-player, python, and scratch. These could be done on 4 different computers across the world or all on the same computer. Setting up the server is by far the most complex, and need only be done by one administrator. All others can connect with minimal technical expertise (e.g., students).

Setting up the server

1. Make sure java is up to date

   java –version

   If this is not 17 or higher, you need to update java. On the raspberry pi, the default repo isn't good enough, you need to explicitly specify version 17:

   sudo apt install openjdk-17-jdk -y
2. Download a copy of Minecraft server:
   https://www.minecraft.net/en-us/download/server
3. Download the paper server:
   https://papermc.io/downloads
4. Download the geyser-spigot.jar plugin:
   https://ci.opencollab.dev/job/GeyserMC/job/Geyser/job/master/
5. Download the floodgate-spigot.jar plugin:
   https://ci.opencollab.dev/job/GeyserMC/job/Floodgate/job/master/
6. Download RaspberryJuice plugin:
   https://www.spigotmc.org/resources/raspberryjuice.22724/
7. Make a new folder ("minecraft-server") and move the .jar files downloaded in steps 2-6 into that folder
8. Inside a terminal within your minecraft-server directory, run the paper server:

   java -Xmx2048M -Xms2048M -jar paper-1.19.3-384.jar

   You may need to adjust the name of the jar file.
9. Edit eula.txt so that you agree to the end user license agreement
   eula=true
10. Restart the paper server
    java -Xmx2048M -Xms2048M -jar paper-1.19.3-384.jar
11. Let it load so it generates a bunch of files then kill it.
12. Move the jar files you downloaded from steps 4-6 into the plugins directory
13. Edit the server.properties and other files to your liking
14. Restart the paper server
    java -Xmx2048M -Xms2048M -jar paper-1.19.3-384.jar
15. On your router, forward ports 19132 (bedrock), 25565 (java), 14711 (scratch), and 4711 (python) to the same ports on your server (or different port numbers if you've changed the defaults)

Enabling Scratch on the server

Scratch uses websockets on port 14711, Raspberry juice uses TCP sockets on port 4711. So we need a proxy to relay websocket traffic to TCP traffic. On your server:

1. sudo apt-get install websockify
2. websockify 14711 localhost:4711

Communication in person

1. Install minecraft
   https://www.minecraft.net/en-us/download
2. Begin minecraft
   a. Java:
      i. select multiplayer
      ii. Click “add server”
      iii. Enter whatever you like for “Server name”
      iv. Enter the server’s IP for “Server address”
         1. For WAN connections, this should be the external IP of the router
         2. For LAN connections, this should be the internal IP
      v. Click “Join server”
   b. Bedrock
      i. Select “servers” tab
      ii. Click “add server”
      iii. Enter whatever you like for “Server name”
      iv. Enter the server’s IP for “Server address”
         1. For WAN connections, this should be the external IP
         2. For LAN connections, this should be the internal IP
      v. Enter 19132 for the port
      vi. Click “Join server”

Communicating with Python

1. Install Python 3
   https://www.python.org/downloads/
   Be sure you update your path to include python and pip, or you’ll get “command not found” errors in the next steps
2. Install mcpi
   From a terminal, type
   pip install mcpi

3. Run your python code (this particular code relies on the position of a player, so someone must be logged in):
   python example.py

Contents of example.py

```
from mcpi.minecraft import Minecraft
from time import sleep

##### FOR REMOTE (WAN) ACCESS ####
# replace xxx.xxx.xxx.xxx with the external server IP
#address = "xxx.xxx.xxx.xxx"

##### FOR LOCAL (LAN) ACCESS ####
# replace 192.168.1.2 with the internal server IP
# address = "192.168.1.2"

##### FOR ACCESS FROM THE SERVER ####
address = "localhost"

port = 4711
mc = Minecraft.create(address=address, port=port)

# Constantly grab the player's position and create
# a new stone block underneath him/her
while True:
    x,y,z = mc.player.getPos()

    # Debug
    print("x: {}, y: {}, z: {}".format(x,y,z))

    mc.setBlock(x,y-1,z,1)
    sleep
```

Communicating with Scratch

This website describes connecting to a server running RaspberryJamMod instead of raspberry juice.

https://www.instructables.com/Coding-in-Minecraft-With-Scratch/

You can skip the installation (steps 1 & 2) and we'll use a modified version of their Javascript plugin to communicate with the RaspberryJuice plugin on our server, located here instead of their link:

Its use is basically identical, so you can follow along with the directions starting at step 3.

1. For more details, start with step 3 here: https://www.instructables.com/Coding-in-Minecraft-With-Scratch/
2.

Credits

A huge thank you to developers of all the plugins (paper, raspberry juice, geyser, floodgate) used!

These directions were a combination of the directions here (java+bedrock) https://jamesachambers.com/minecraft-java-bedrock-server-together-geyser-floodgate/

And here: (python) https://jeremypedersen.com/posts/2022-03-28-mcpi-macos/

along with extremely useful discussions with James A. Chambers (https://jamesachambers.com/) and