312 Midterm Minecraft Server Setup Guide

Table of Contents (Might be broken on PDF)

- Video Demo
- References
- EC2 Setup
- SSH into EC2 Server
- Installing Software Dependencies
  - Install Java 17
  - Install Minecraft Server Jar
- User Permissions
- Running the Minecraft Server
- Automating Server Start
- Minecraft Client

Video Demo

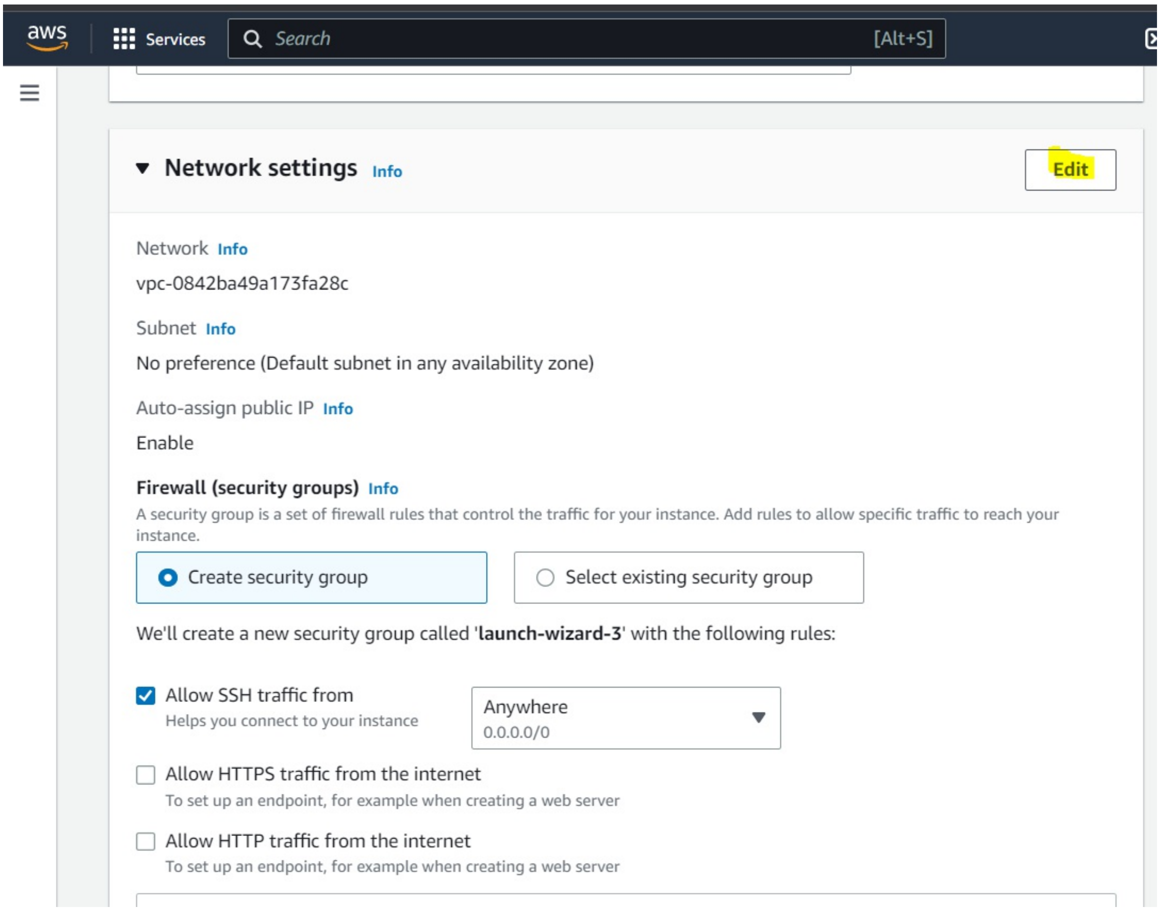
- https://youtu.be/MezlKRTq1zM
  - Read Youtube Video Description for Timestamps

References

- https://www.linkedin.com/pulse/setup-minecraft-server-java-edition-aws-ec2-keran-mckenzie/
  - Heavily inspired by this article although I did have to change the Java install steps due to some dependency errors, and this article also did not cover how to automatically start the server with systemctl
- https://techviewleo.com/install-java-openjdk-on-amazon-linux-system/
  - Helped me a lot on installing Java 17 for the server dependencies
- ChatGPT
  - Helped a lot on the systemctl part for automatically restarting server
- Markdown Table of Contents Generator: https://jsfiddle.net/remarkablemark/o0mja3hf/

EC2 Setup

- From the AWS homepage / dashboard, type in `EC2` into the upper left search bar, and click on it to go to the EC2 menu
- From the EC2 menu, click on the `Launch Instance` button
- In the Launch Instance menu, name your EC2 instance something like "Minecraft" so you can remember it
- For the `Application and OS Images (Amazon Machine Image)` menu, select an Amazon Linux, 64bit (x86) OS image
  - This should be the **default** option
- For the `Instance type` menu, select `t2.small` (should pick a t2 small or bigger for this)
- For `Key pair (login)` menu, I recommend just creating a new SSH key (click the `Create new key pair` button). I used the default options (`RSA`, `.pem`)
  - Name the keypair something memorable, like `MinecraftKey`. In my case though I'm reusing an old key called `lab7`
- In the `Network Settings` menu, click the `Edit` button to the right to edit the Network Settings

- 

Network settings Info

Edit

Network Info

vpc-0842ba49a173fa28c

Subnet Info

No preference (Default subnet in any availability zone)

Auto-assign public IP Info

Enable

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

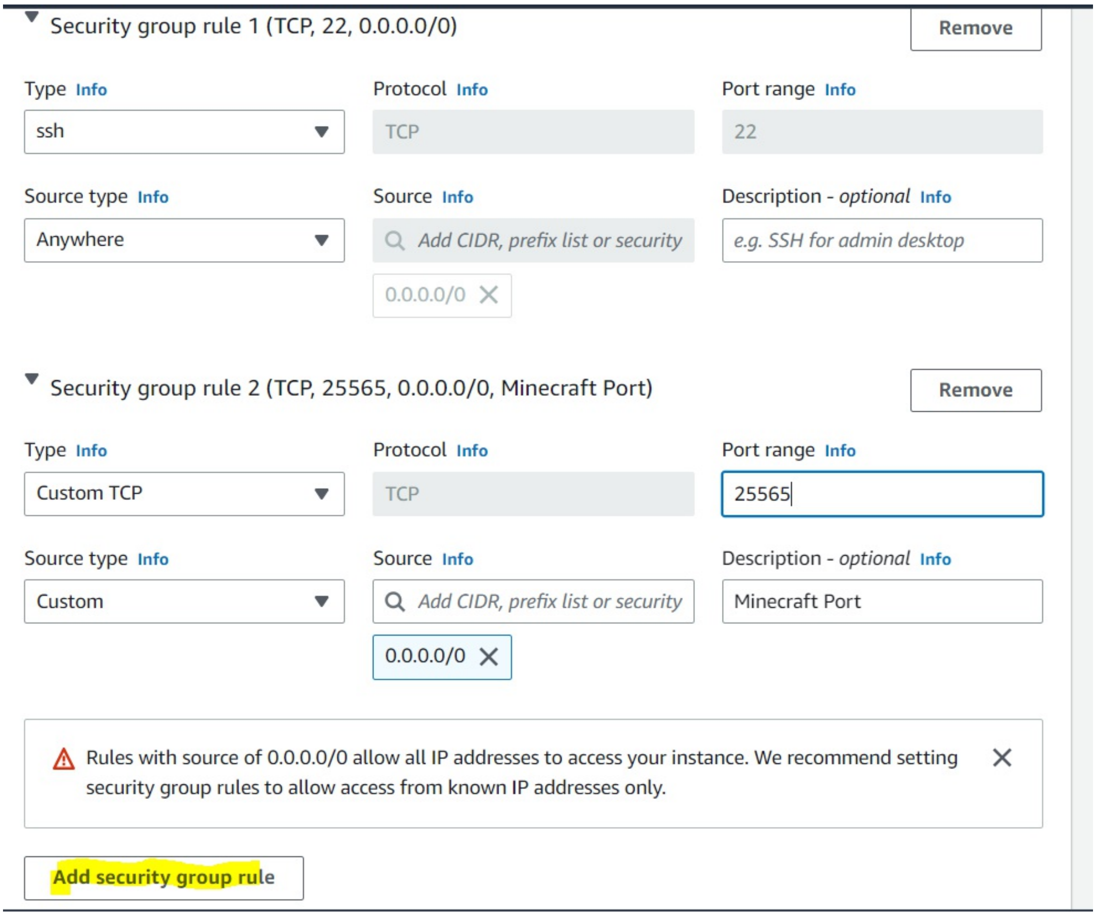
● Create security group ○ Select existing security group

We'll create a new security group called '**launch-wizard-3**' with the following rules:

☑ Allow SSH traffic from
Helps you connect to your instance
Anywhere
0.0.0.0/0

□ Allow HTTPS traffic from the internet
To set up an endpoint, for example when creating a web server

□ Allow HTTP traffic from the internet
To set up an endpoint, for example when creating a web server

- Set `Auto-assign public IP` to `Enable`, if not already the case
- Click on "Create Security Group"
- Keep the existing default SSH option unchanged in the Security Group
- Click `Add security group rule`. Set Type as `Custom TCP`, Protocol as `TCP`, Port Range as `25565`, Source Type as `Custom`, Source as `0.0.0.0/0`, Description as something memorable like `Minecraft Port`
  - 

Security group rule 1 (TCP, 22, 0.0.0.0/0)

Remove

Type Info	Protocol Info	Port range Info
ssh	TCP	22
Source type Info	Source Info	Description - *optional* Info
Anywhere	Add CIDR, prefix list or security 0.0.0.0/0	e.g. SSH for admin desktop

Security group rule 2 (TCP, 25565, 0.0.0.0/0, Minecraft Port)

Remove

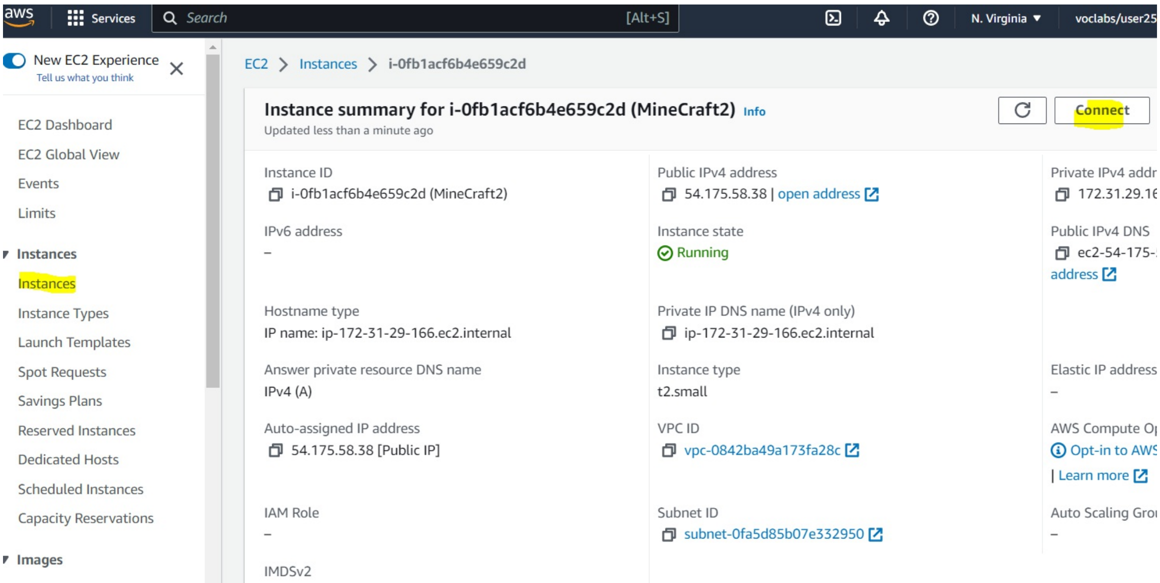
Type Info	Protocol Info	Port range Info
Custom TCP	TCP	25565
Source type Info	Source Info	Description - *optional* Info
Custom	Add CIDR, prefix list or security 0.0.0.0/0	Minecraft Port

Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Add security group rule

- Click `Launch Instance` button in bottom right to finish EC2 instance setup

SSH into EC2 Server

- Wait a few minutes for the EC2 instance to start up, then return to the EC2 main menu (search `EC2` in the upper left search bar)
- Click on `Instances` link in left navbar
- Click on `Instance ID` on your Minecraft Server
- Once you are sure it's running (check `Instance State` status and refresh the page frequently if it hasn't started yet), click the `Connect` button, then `SSH Client`
  - 

    Instance summary for i-0fb1acf6b4e659c2d (MineCraft2)

    Updated less than a minute ago

    Instance ID: i-0fb1acf6b4e659c2d (MineCraft2)

    Public IPv4 address: 54.175.58.38 | open address

    Private IPv4 addr: 172.31.29.16

    IPv6 address: –

    Instance state: Running

    Public IPv4 DNS: ec2-54-175-… address

    Hostname type: IP name: ip-172-31-29-166.ec2.internal

    Private IP DNS name (IPv4 only): ip-172-31-29-166.ec2.internal

    Answer private resource DNS name: IPv4 (A)

    Instance type: t2.small

    Elastic IP address: –

    Auto-assigned IP address: 54.175.58.38 [Public IP]

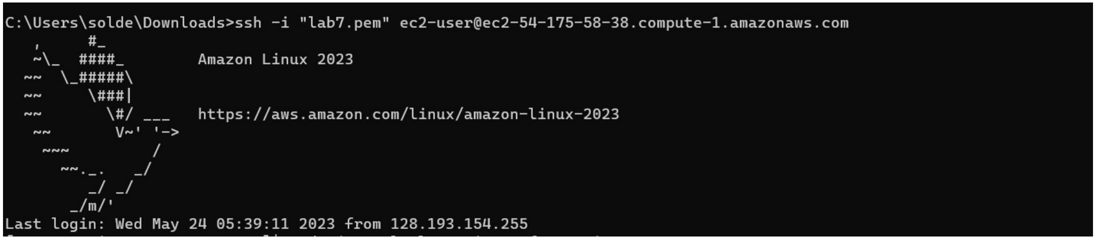
    VPC ID: vpc-0842ba49a173fa28c

    AWS Compute O: Opt-in to AWS | Learn more

    IAM Role: –

    Subnet ID: subnet-0fa5d85b07e332950

    Auto Scaling Grou: –

    IMDSv2
  - Read instructions on the Connect Menu page
  - Double check with instructions, but run `chmod 400 <private SSH key>` if on Unix on your PC (If your local PC is Windows, it should work out of the box). Make sure you are in a directory where you can access the SSH private key. Maybe put that private SSH key in your PATH
  - Connect to your instance with the public DNS, e.g. `ssh -i "<private key filename>" <public DNS>`, where the values in brackets are stand-in values. Go back to the `Instances` menu for your EC2 instance if you want to double check the public DNS value
    - Example: `ssh -i "lab7.pem" ec2-user@ec2-54-175-58-38.compute-1.amazonaws.com`
    - 

```
C:\Users\solde\Downloads>ssh -i "lab7.pem" ec2-user@ec2-54-175-58-38.compute-1.amazonaws.com
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
Last login: Wed May 24 05:39:11 2023 from 128.193.154.255
```

- Make sure you can SSH into your EC2 instance before proceeding further

Installing Software Dependencies

Install Java 17

Run the following commands after SSH'ing into your EC2 instance:

- `wget https://download.java.net/java/GA/jdk17/0d483333a00540d886896bac774ff48b/35/GPL/openjdk-17_linux-x64_bin.tar.gz`
  - Install the tar archive for Java 17 (OpenJDK 17)
- `tar xvf openjdk-17_linux-x64_bin.tar.gz`
  - Extract the archive with `tar` command
- `sudo mv jdk-17 /opt/`
  - Move the extracted folder into `/opt/`
-
```
sudo tee /etc/profile.d/jdk.sh <<EOF
export JAVA_HOME=/opt/jdk-17
export PATH=\$PATH:\$JAVA_HOME/bin
EOF
```
  - Run these commands one line at a time! Sets the PATH for Java
- `source /etc/profile.d/jdk.sh`
  - Source your profile file
- `echo $JAVA_HOME`
  - Check where your Java executable is located (should get an output of `/opt/jdk-17`)

- `java -version`
  - Double check Java version. Should show an output of something like:

    -
      ```
      openjdk version "17" 2021-09-14
      OpenJDK Runtime Environment (build 17+35-2724)
      OpenJDK 64-Bit Server VM (build 17+35-2724, mixed mode, sharing)
      ```

Install Minecraft Server Jar

- `sudo su`
  - Probably a better way of doing this but for now being a sudo user ensures the next parts work as intended
- `mkdir /opt/minecraft/`
  - Add directories for where the `server.jar` will go
- `mkdir /opt/minecraft/server/`
  - Add directories for where the `server.jar` will go
- `cd - Add directories for where the`server.jar`will go`
  - Navigate to the directory where the `server.jar` will go
- `wget https://launcher.mojang.com/v1/objects/c8f83c5655308435b3dcf03c06d9fe8740a77469/server.jar`
  - Install the `server.jar` in the `/opt/minecraft/server/` directory

User Permissions

- At this point you should still be signed in as root (due to `sudo su`)
- `cd`
  - To return to root directory
- `exit`
  - To sign out of root user
- `whoami`
  - To check default (non root) username. It should say `ec2-user` for the default user. If not, write down what the username for the next steps and substitute accordingly
- `sudo chown -R ec2-user:ec2-user /opt/minecraft`
  - Give the `ec2-user` elevated permissions in the `opt/minecraft` directory
- `sudo chmod -R 750 /opt/minecraft`
  - chmods this `opt/minecraft` directory the right Linux file permissions. In this case, 750 gives the user read/write/execute and read/execute to people in your organization.
    - Further reference on 750 permissions: https://chmodcommand.com/chmod-750/
- `sudo visudo`
  - Edit file - Add this to the bottom of visudo file:
    - `ec2-user ALL=(ALL) NOPASSWD: /usr/bin/java -Xmx1024M -Xms1024M -jar /opt/minecraft/server.jar nogui`
  - This adds the ec2-user as a sudo user, which might be a security issue, but it was a way to let this user run the Minecraft server
    - More Information on editing visudo / sudoers file: https://www.digitalocean.com/community/tutorials/how-to-edit-the-sudoers-file

Running the Minecraft Server

- Return to the server directory with `cd /opt/minecraft/server`
- Make sure you are still signed in as `ec2-user` via `whoami`
- Run `java -Xmx1024M -Xms1024M -jar /opt/minecraft/server.jar nogui` to see if the server at least runs
- If it's your first time running the server, after running the server you will get an error relating to EULA.
  - Fix with `vi eula.txt`, set `eula=true`

Automating Server Start

- Check if this command works as a standalone before adding to systmctl
  - `sudo -u <username> <java executable path> -Xmx1024M -Xms1024M -jar <path to server.jar>/server.jar nogui`
  - Example: `sudo -u ec2-user /opt/jdk-17/bin/java -Xmx1024M -Xms1024M -jar /opt/minecraft/server/server.jar nogui`
  - If in doubt, check `whereis java` to find Java executable path
- Once you're sure that the command above works, then let's add a sytemd file:
  - `sudo nano /etc/systemd/system/minecraft.service`
  - Add the following:

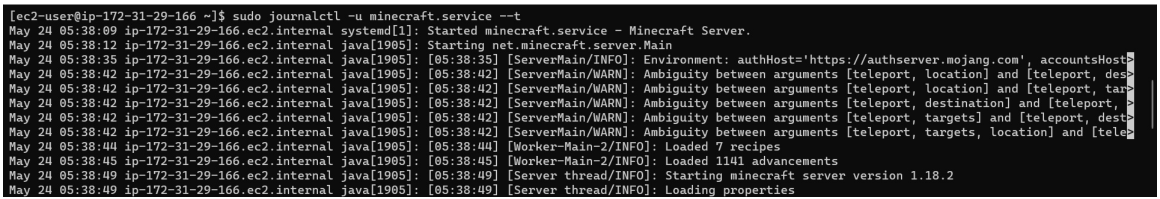
        -
          ```
          Description=Minecraft Server
          After=network.target

          [Service]
          User=ec2-user
          WorkingDirectory=/opt/minecraft/server
          ExecStart=/opt/jdk-17/bin/java -Xmx1024M -Xms1024M -jar /opt/minecraft/server/server.jar nogui
          Restart=on-failure

          [Install]
          WantedBy=multi-user.target
          ```

- Run the following in root directory as `ec2-user`:
    - `sudo systemctl daemon-reload`
    - `sudo systemctl start minecraft`
    - `sudo systemctl enable minecraft`

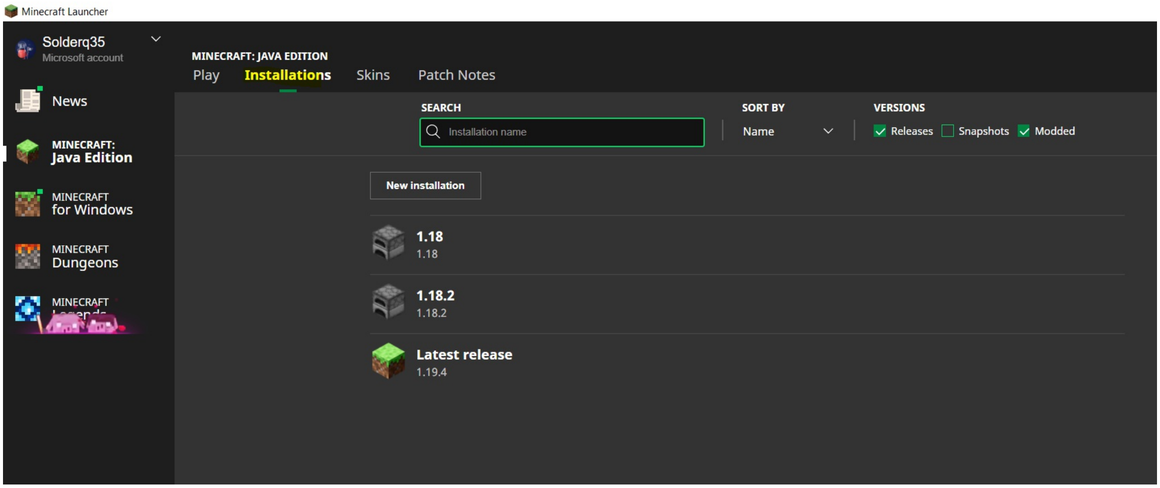
- Reboot the EC2 instance now, ssh back in

- Use `sudo journalctl -u minecraft.service --t` to check if the server is running, press down arrow keys to scroll all the way down
    - 

      ```
      [ec2-user@ip-172-31-29-166 ~]$ sudo journalctl -u minecraft.service --t
      May 24 05:38:09 ip-172-31-29-166.ec2.internal systemd[1]: Started minecraft.service - Minecraft Server.
      May 24 05:38:12 ip-172-31-29-166.ec2.internal java[1905]: Starting net.minecraft.server.Main
      May 24 05:38:35 ip-172-31-29-166.ec2.internal java[1905]: [05:38:35] [ServerMain/INFO]: Environment: authHost='https://authserver.mojang.com', accountsHost>
      May 24 05:38:42 ip-172-31-29-166.ec2.internal java[1905]: [05:38:42] [ServerMain/WARN]: Ambiguity between arguments [teleport, location] and [teleport, des>
      May 24 05:38:42 ip-172-31-29-166.ec2.internal java[1905]: [05:38:42] [ServerMain/WARN]: Ambiguity between arguments [teleport, location] and [teleport, tar>
      May 24 05:38:42 ip-172-31-29-166.ec2.internal java[1905]: [05:38:42] [ServerMain/WARN]: Ambiguity between arguments [teleport, destination] and [teleport, >
      May 24 05:38:42 ip-172-31-29-166.ec2.internal java[1905]: [05:38:42] [ServerMain/WARN]: Ambiguity between arguments [teleport, targets] and [teleport, dest>
      May 24 05:38:42 ip-172-31-29-166.ec2.internal java[1905]: [05:38:42] [ServerMain/WARN]: Ambiguity between arguments [teleport, targets, location] and [tele>
      May 24 05:38:44 ip-172-31-29-166.ec2.internal java[1905]: [05:38:44] [Worker-Main-2/INFO]: Loaded 7 recipes
      May 24 05:38:45 ip-172-31-29-166.ec2.internal java[1905]: [05:38:45] [Worker-Main-2/INFO]: Loaded 1141 advancements
      May 24 05:38:49 ip-172-31-29-166.ec2.internal java[1905]: [05:38:49] [Server thread/INFO]: Starting minecraft server version 1.18.2
      May 24 05:38:49 ip-172-31-29-166.ec2.internal java[1905]: [05:38:49] [Server thread/INFO]: Loading properties
      ```
    - Check back periodically if you just restarted the EC2 instance
        - `Ctrl C` to leave the logs, then check `sudo journalctl -u minecraft.service --t` again
    - Not sure on the details on how it works but `--t` helps you skip to near the bottom of the output logs

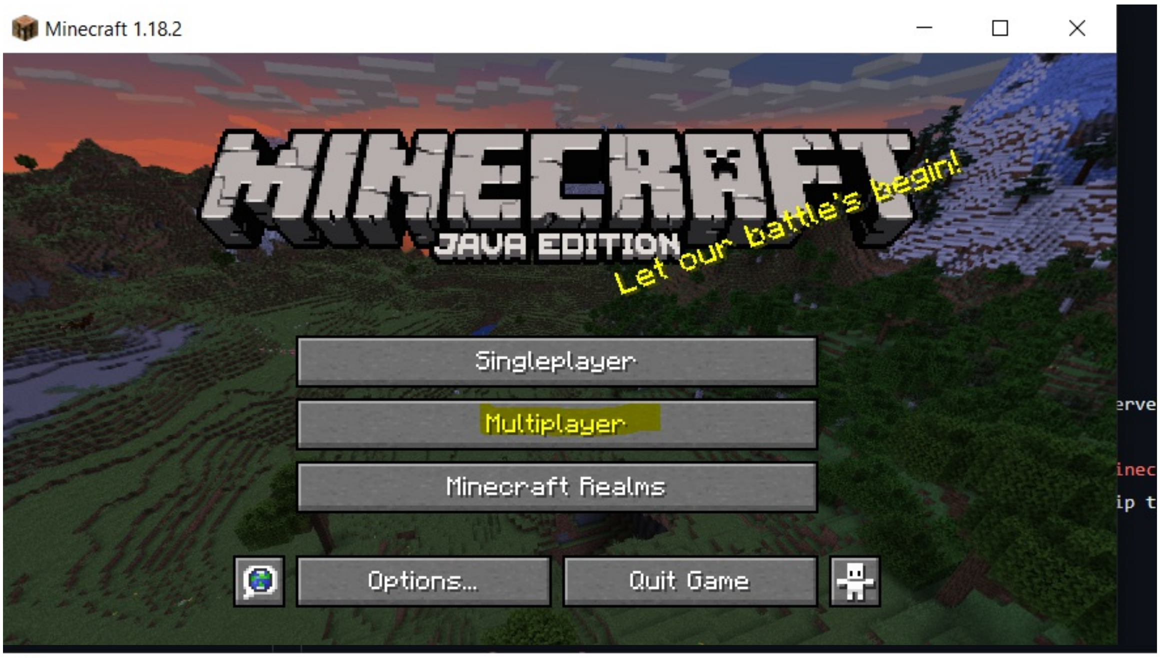
Minecraft Client

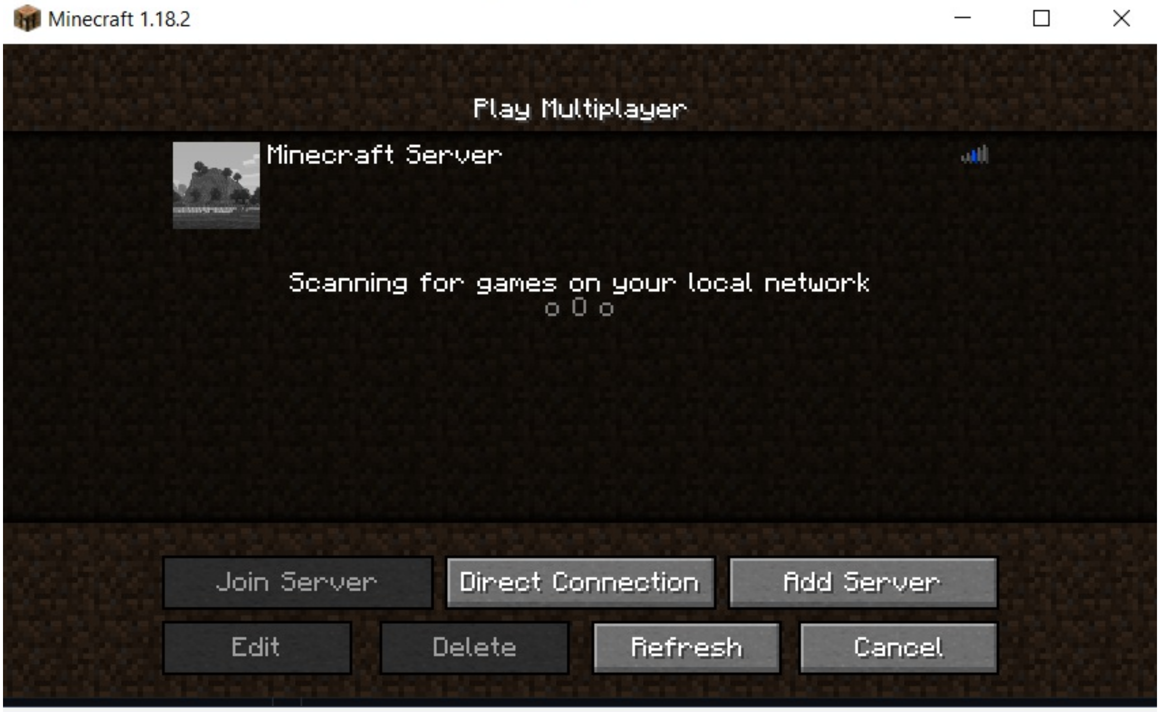
- Get Minecraft from https://www.minecraft.net/en-us
    - No need for too much detail here right? I did get the paid version of Minecraft for PC (Java edition) if it matters

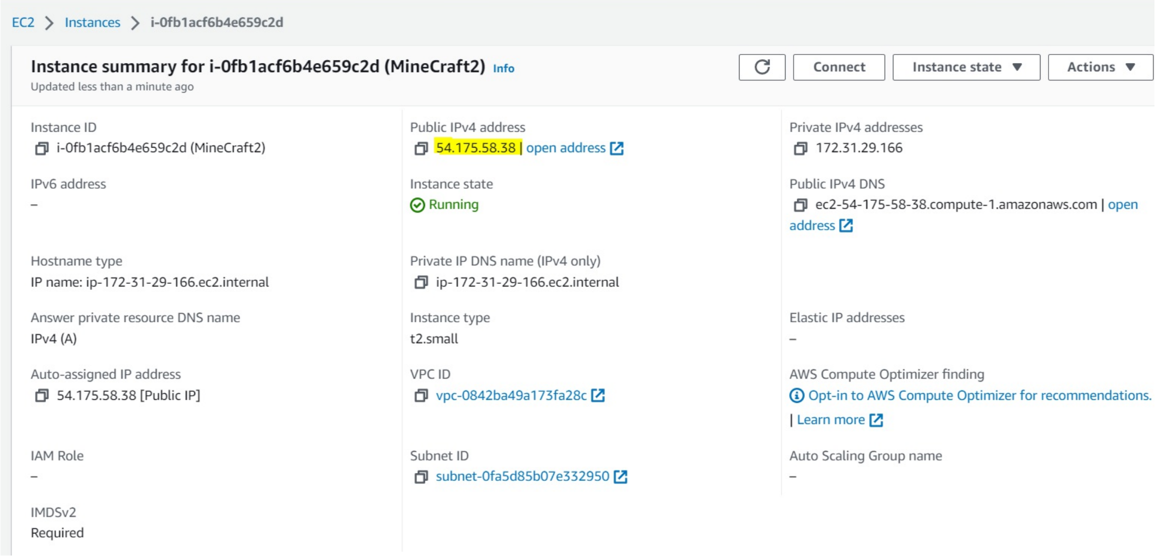
- After installing and booting up the Minecraft Launcher, go to Installations menu, then New Installation, then `release 1.18.2`
    - 

    - This is important because 1.18.2 client is needed based on the server installed (e.g. Java 17) in previous steps. Other versions of Minecraft Client may not be compatible!
    - Create the 1.18.2 installation and launch it

- After launching 1.18.2 Minecraft client, select `Multiplayer`, then `Proceed`, then `Direct Connection`. Enter in the Public IPV4 address as stated on your EC2 instance

- 

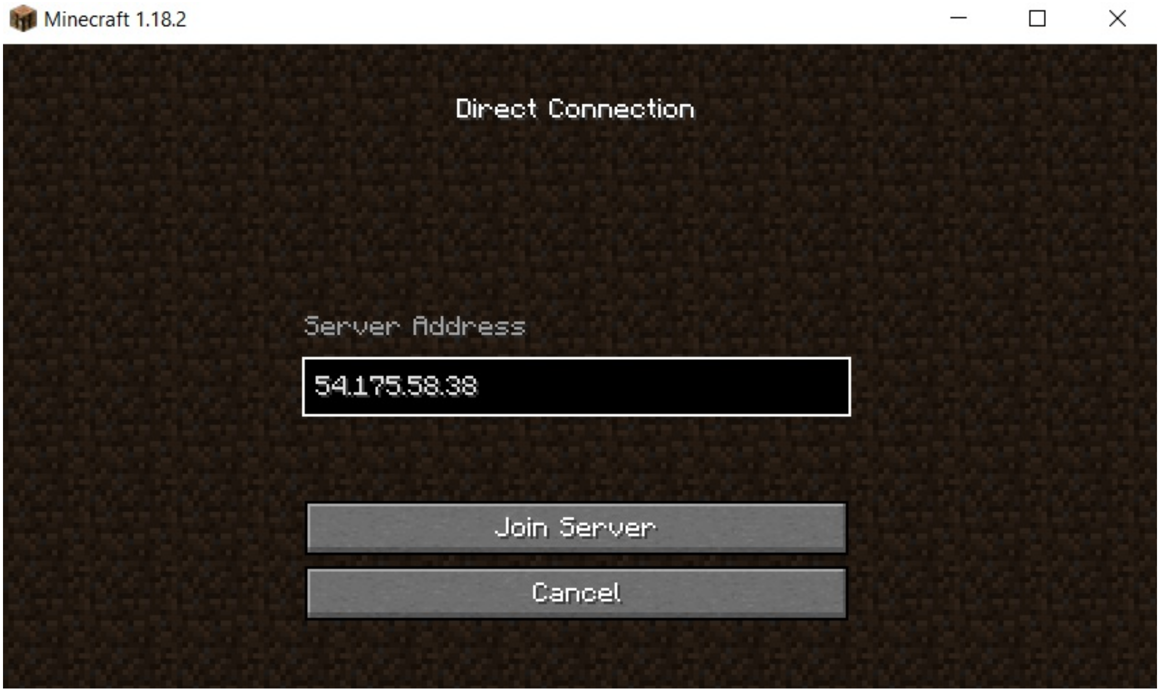
- 

- 

Instance summary for i-0fb1acf6b4e659c2d (MineCraft2) Info

Updated less than a minute ago

Instance ID i-0fb1acf6b4e659c2d (MineCraft2)	Public IPv4 address 54.175.58.38 | open address	Private IPv4 addresses 172.31.29.166
IPv6 address –	Instance state Running	Public IPv4 DNS ec2-54-175-58-38.compute-1.amazonaws.com | open address
Hostname type IP name: ip-172-31-29-166.ec2.internal	Private IP DNS name (IPv4 only) ip-172-31-29-166.ec2.internal	
Answer private resource DNS name IPv4 (A)	Instance type t2.small	Elastic IP addresses –
Auto-assigned IP address 54.175.58.38 [Public IP]	VPC ID vpc-0842ba49a173fa28c	AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations. | Learn more
IAM Role –	Subnet ID subnet-0fa5d85b07e332950	Auto Scaling Group name –
IMDSv2 Required		

  - 

    Direct Connection
    Server Address
    54.175.58.38

- Have fun on your server. Dig a hole in the ground