AWS EC2 Jenkins Server and Agent Registration

The purpose of this walkthrough is to demonstrate how a person can install a Jenkins server and register agents on different nodes to be used by Jenkins. There is not a hard requirement of using AWS as the steps for installing the server and agent registration are the same, but there will be some security group firewall issues that will arise with AWS that I will show how to solve.

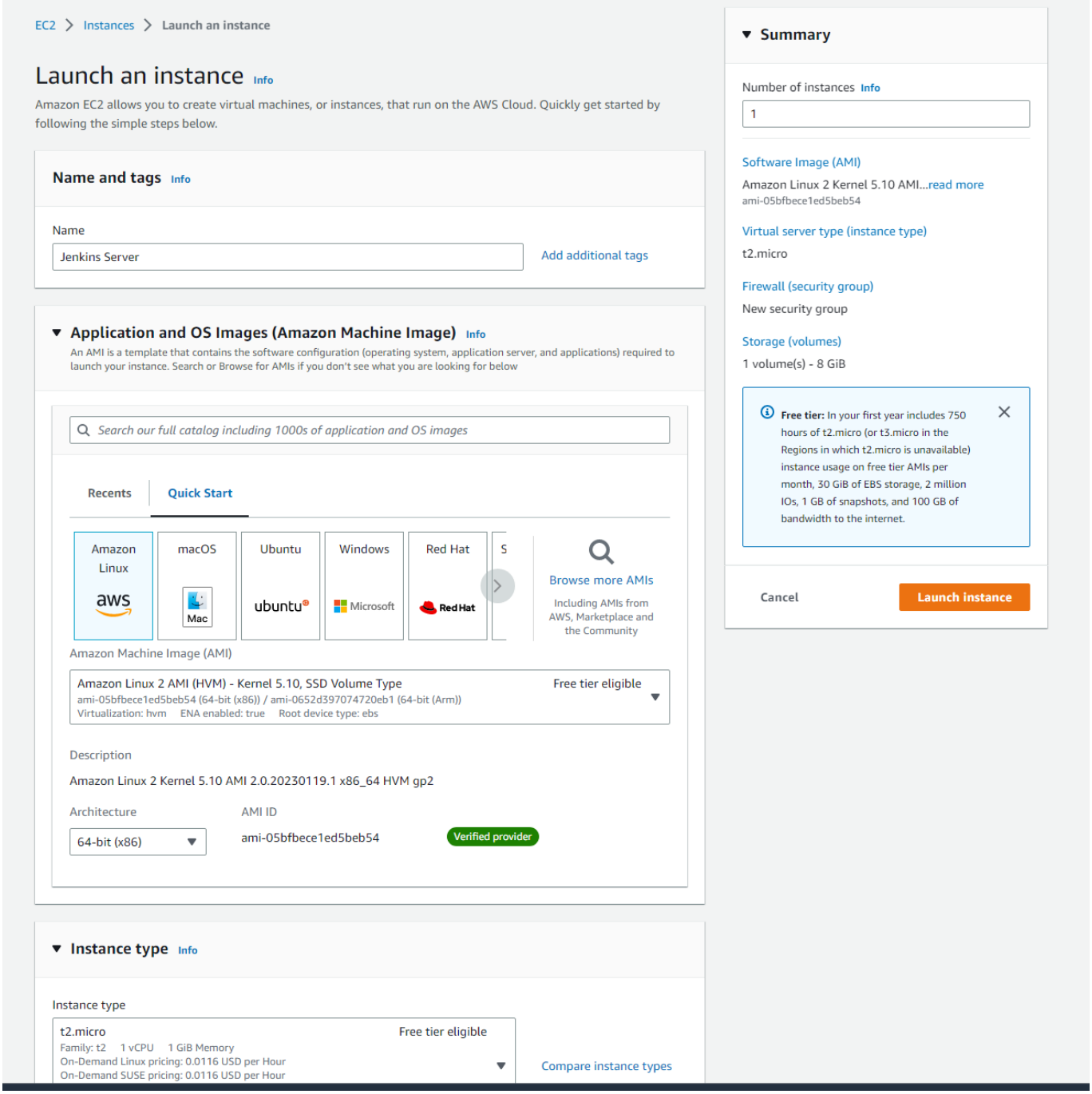
This isn't a clean cut walkthrough because I wanted to inform you of *why* certain don't work in this area. This is very helpful because these concepts will apply in many different areas.

Create an EC2 instance

This tutorial assumes that you already have an AWS account that can use the EC2 service provided by AWS.

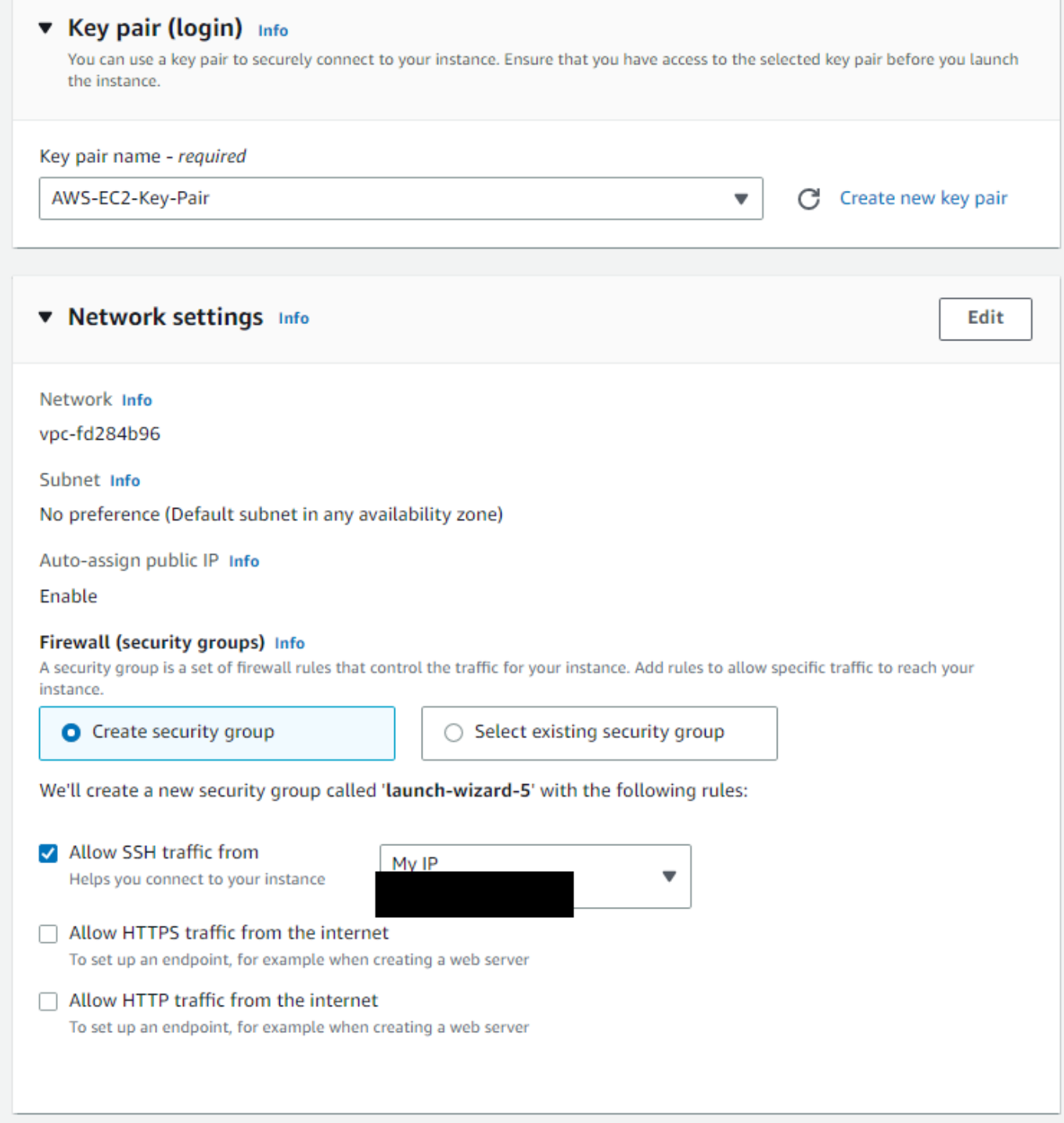
Create an Amazon-Linux EC2 instance.

Ensure that the Amazon Linux OS is installed.

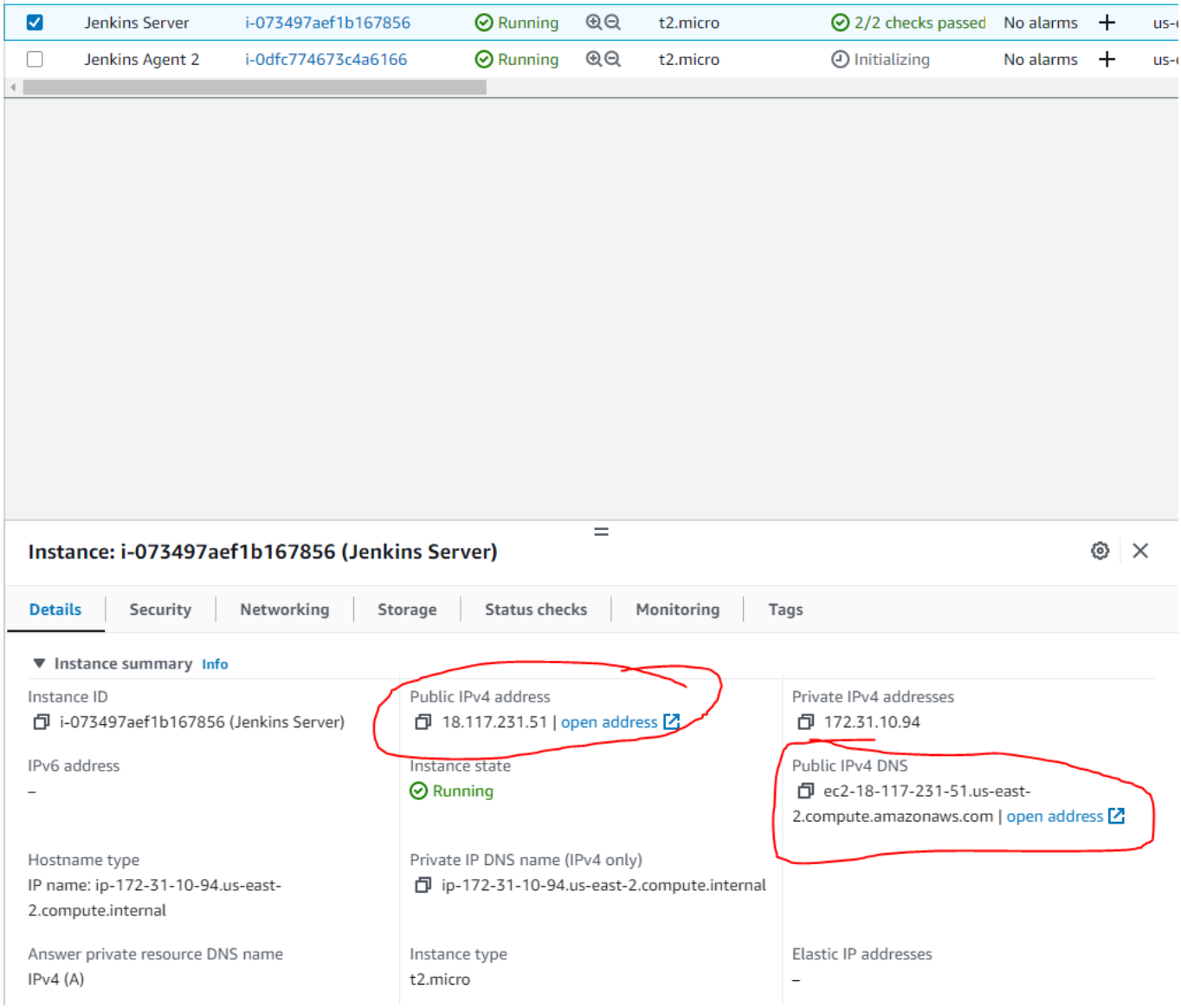


You can keep a majority of the defaults for the machine.

*Note: You'll need to have a public private key pair for use with SSH. You can also set a rule for SSH traffic to allow **only** from your IP.*



Now that your instance is set up, you can navigate back to the instances page and gather basic information about the machine.



Connect to your EC2 jenkins server.

You can see these commands when you first spin up the instance.

In this screenshot, I had made a SSH alias for the machine.

```
C:\Users\Chris Morales>ssh aws-j-server
The authenticity of host 'ec2-18-117-231-51.us-east-2.compute.amazonaws.com (18.117.231.51)' can't be established.
ECDSA key fingerprint is SHA256:+NdyaXgNW6Yh3WInko0rZrUHmIEVm+RvzMQTAdiFVIU.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-18-117-231-51.us-east-2.compute.amazonaws.com,18.117.231.51' (ECDSA) to the list of known hosts.

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-10-94 ~]$
```

Installing the Jenkins Server

Now that you have a shell, we can now begin installing the jenkins server.

The Jenkins documentation that is provided by Jenkins is what I followed for this guide. The link is here.

Installing the Jenkins Generic Java Package

You can find it here. Just make sure to choose the right distribution; in this case "CentOS/Fedora/Red Hat" will be the correct choice.

You will have to run the following commands

```
    sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-
stable/jenkins.repo
    sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io.key
```

As noted in the link from above, the command might fail if you have an existing machine with these installed at one point. With this new EC2 instance, you won't have this problem.

```
    sudo yum install fontconfig java-11-openjdk
```

You will run into an issue here with the java-11-openjdk file that you wanted to install. You'll have an output that should be the same as the one in the next screenshot. The output will tell you the right command. But I've put it here for your convenience.

```
Installed:
  fontconfig.x86_64 0:2.13.0-4.3.amzn2

Dependency Installed:
  dejavu-fonts-common.noarch 0:2.33-6.amzn2                    dejavu-sans-fonts.noarch 0:2.33-6.amzn2
  fontpackages-filesystem.noarch 0:1.44-8.amzn2

Complete!


java-11-openjdk is available in Amazon Linux Extra topic "java-openjdk11"

To use, run
# sudo amazon-linux-extras install java-openjdk11

Learn more at
https://aws.amazon.com/amazon-linux-2/faqs/#Amazon_Linux_Extras
```

```
    sudo amazon-linux-extras install java-openjdk11
```

Now that you have this, you can install the jenkins server onto the machine.

```
    sudo yum install jenkins
```

Running the Jenkins Server

Now that you have the Jenkins server package installed, you now need to run the server. To find the package, you can use this find command with grep.

```
sudo find / | grep jenkins.war
```

```
[ec2-user@ip-172-31-10-94 ~]$ sudo find / | grep jenkins.war
/usr/share/java/jenkins.war
[ec2-user@ip-172-31-10-94 ~]$
```

Now, you just need to run the the following command to start the server in the background. Replace the path of the .war file with wherever the file is.

```
[ec2-user@ip-172-31-10-94 ~]$ java -jar /usr/share/java/jenkins.war --httpPort=8080&
[1] 4989
```

```
java -jar /usr/share/java/jenkins.war --httpPort=8080&
```

Access the Jenkins Server

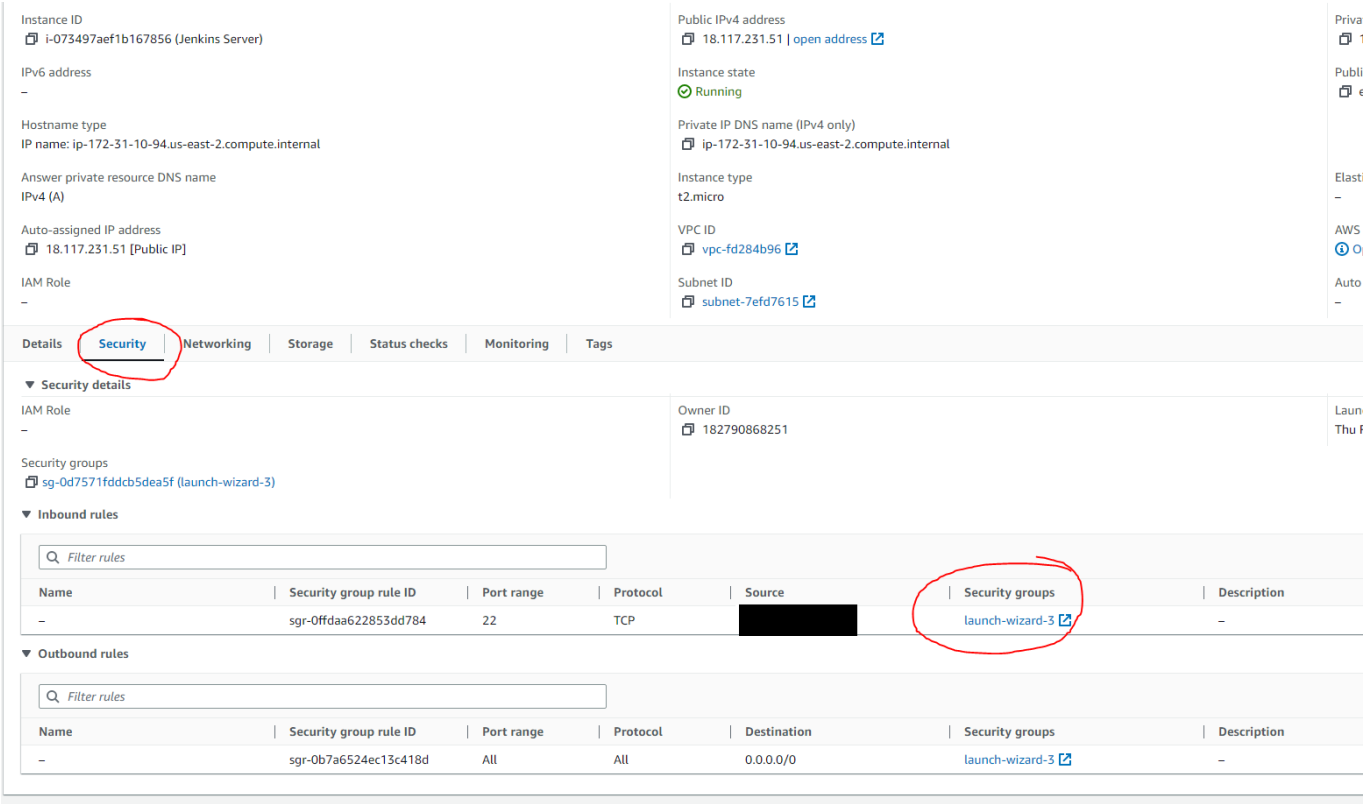
All you need to access this is either the public IP or the public DNS of the instance and input this into a web browser using the corresponding port.

Question: Will this work?

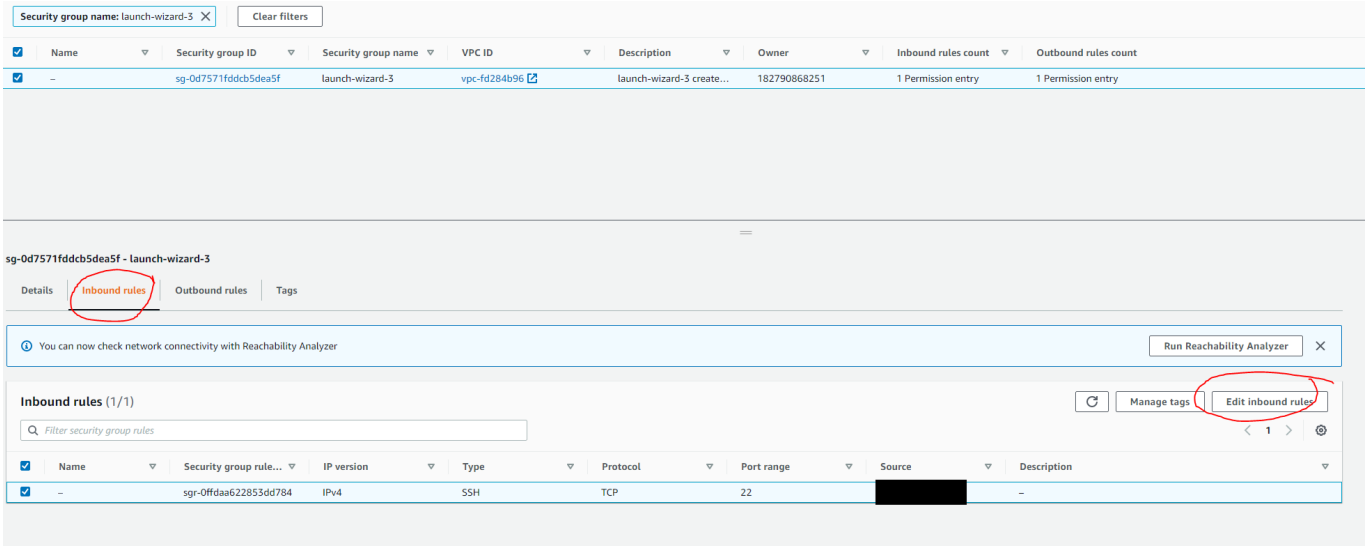
Answer: No. Why? Because the security group (essentially firewall) prevents all traffic other than SSH connections from our own IP. So, we need to add a specific rule to allow this HTTP traffic through the port specified.

Creating a HTTP rule in security groups

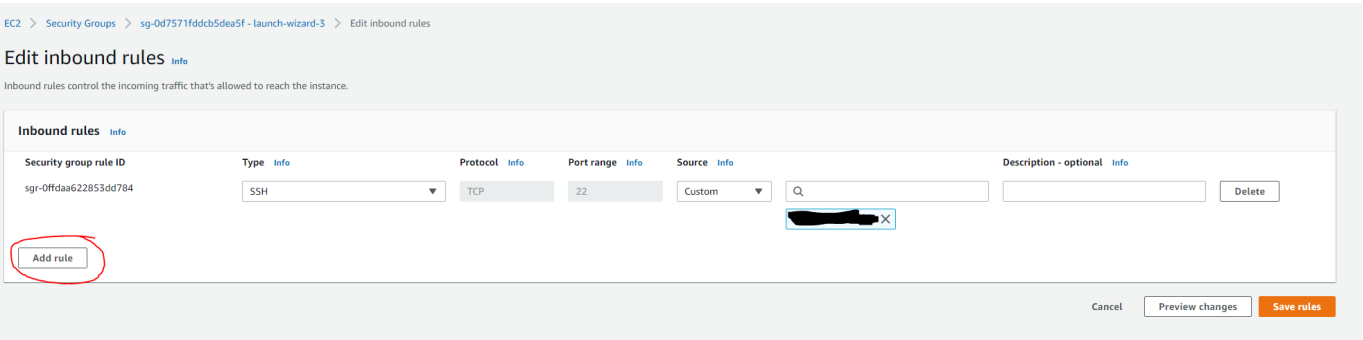
There are multiple ways that you can find the seceurity group, but the easiest way to find which group is applied to a machine is by selecting the machines from the instances page and then clicking the "Security" tab.



Here, you'll be getting a summary overview of the security rule. Now you can go further in and look at a summarized table of the group.



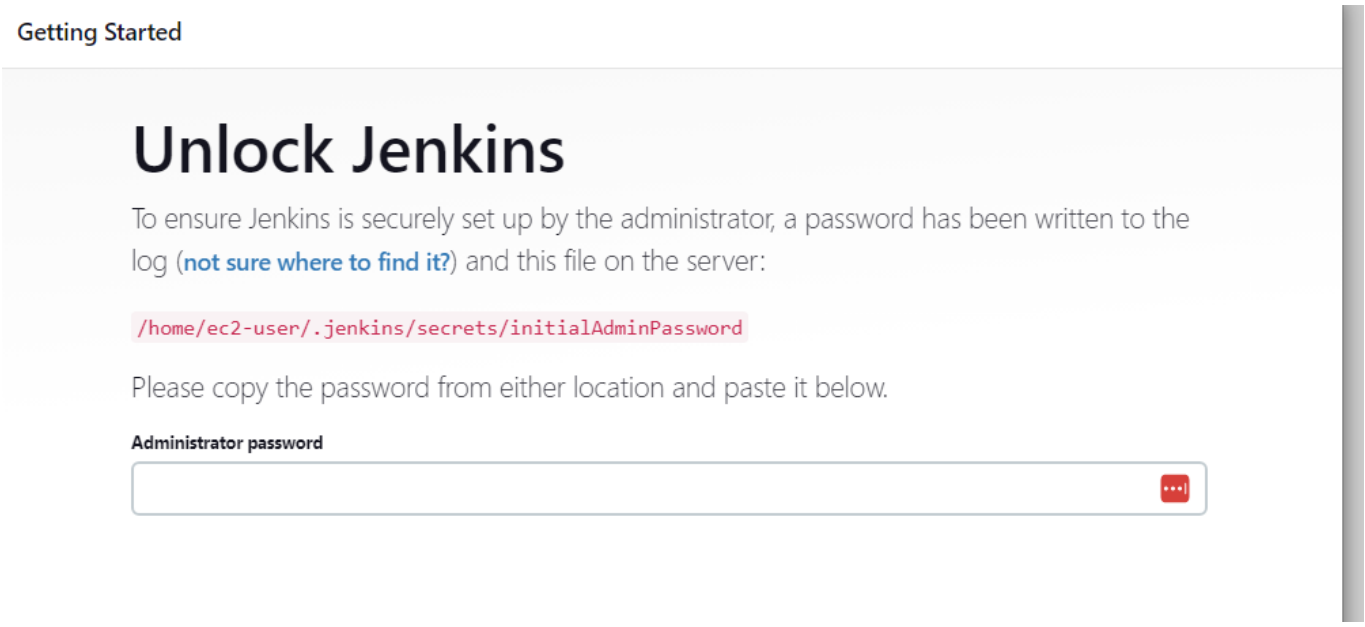
Now, you can add a rule.



You need to add the rule to allow HTTP connections

Press save and then you now have a new rule.

Now, refresh the webpage and you'll be brought to the initial "Unlock Jenkins" page. You can find the password based on what the page tells you.



Set up Jenkins Server Post-Fix

Having gotten the initial configuration page, you can set up your Jenkins server with basic stuff to get started.

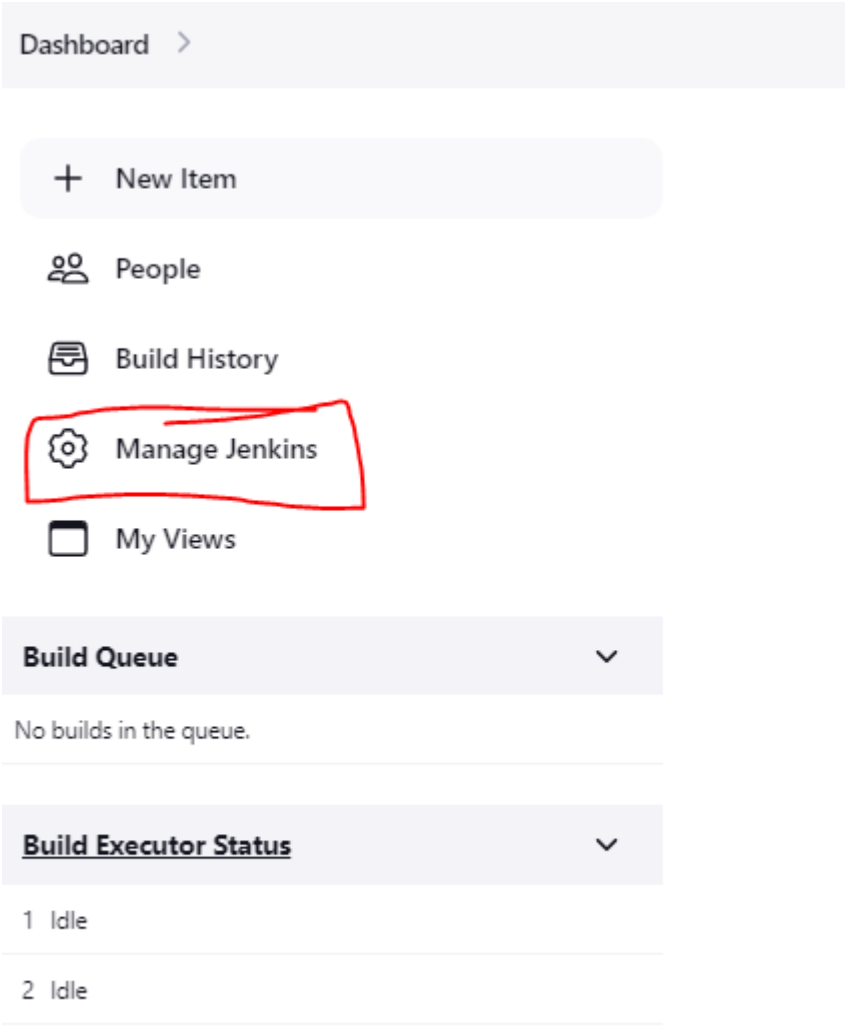
1. You can install the recommmended default plugins.
2. Set up a super user of choice.
3. Finally, you can update the link, but for now, it's fine to keep it normal.

Now, you have a working Jenkins instance.

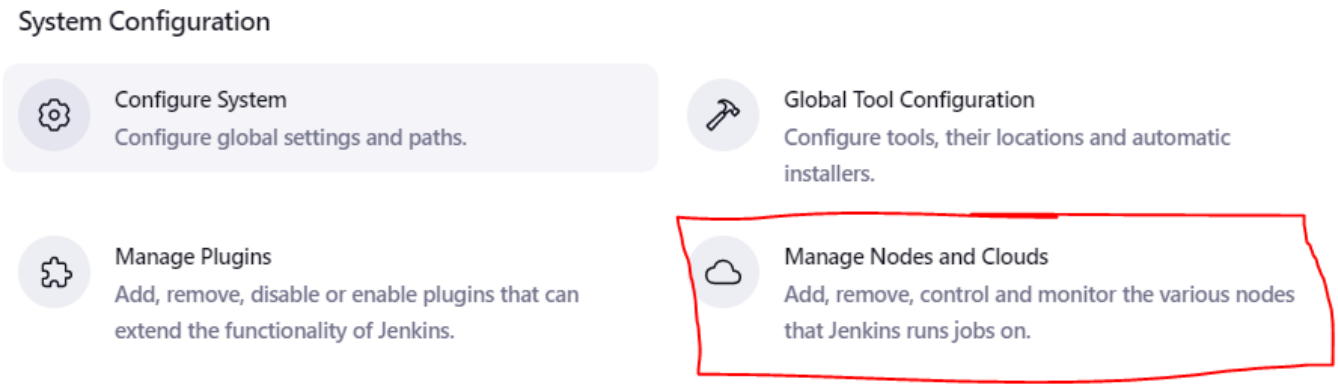
Registering Agents

Now you need to to register an agent to do the work. You'll be shown the general menu on the left hand side of the screen.

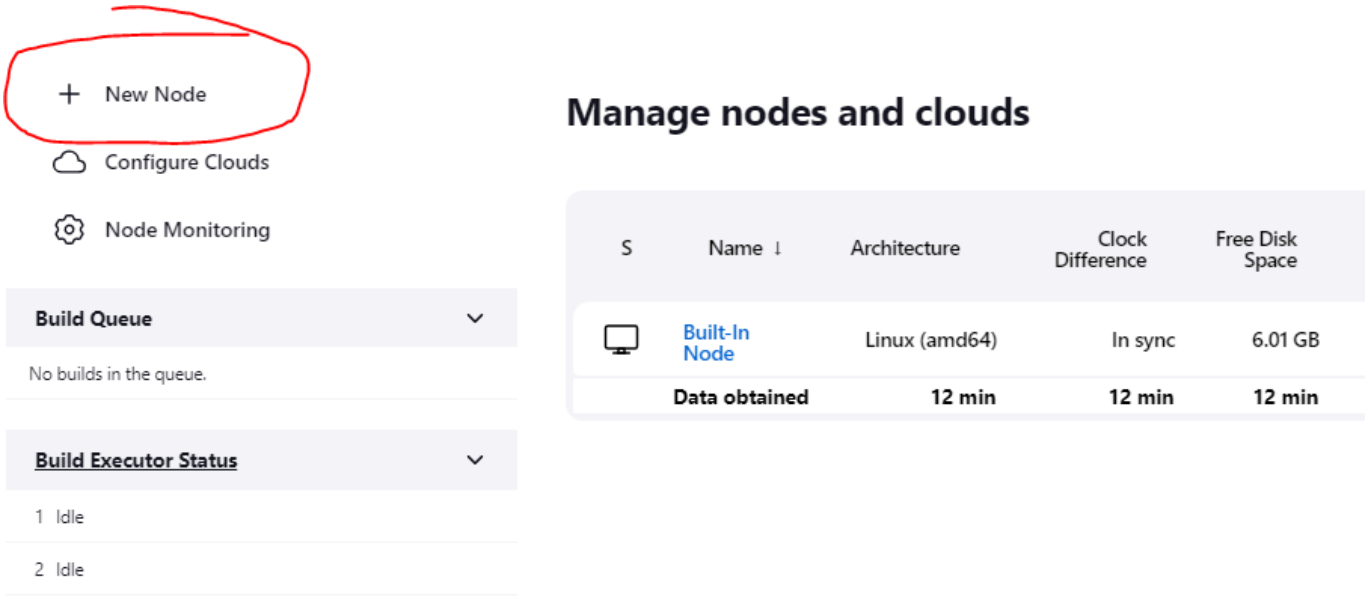
1. Press the "Manage Jenkins" button.



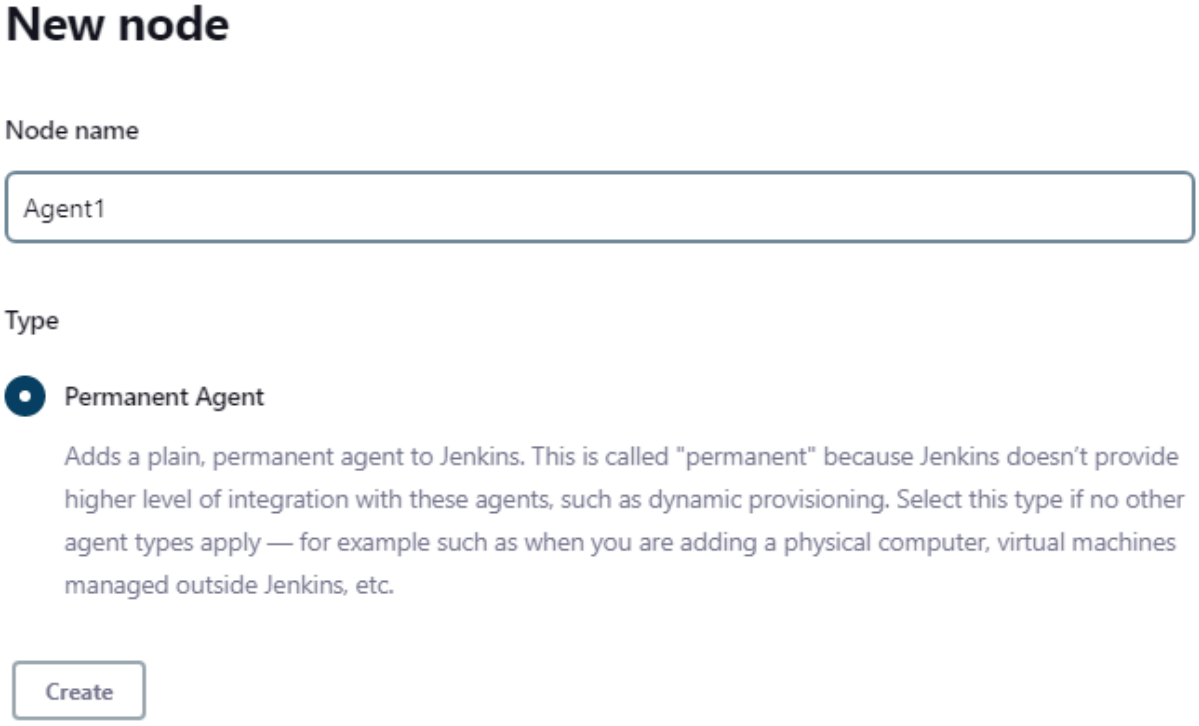
2. Choose "Manage Nodes and Clouds"



3. Choose "New Node"

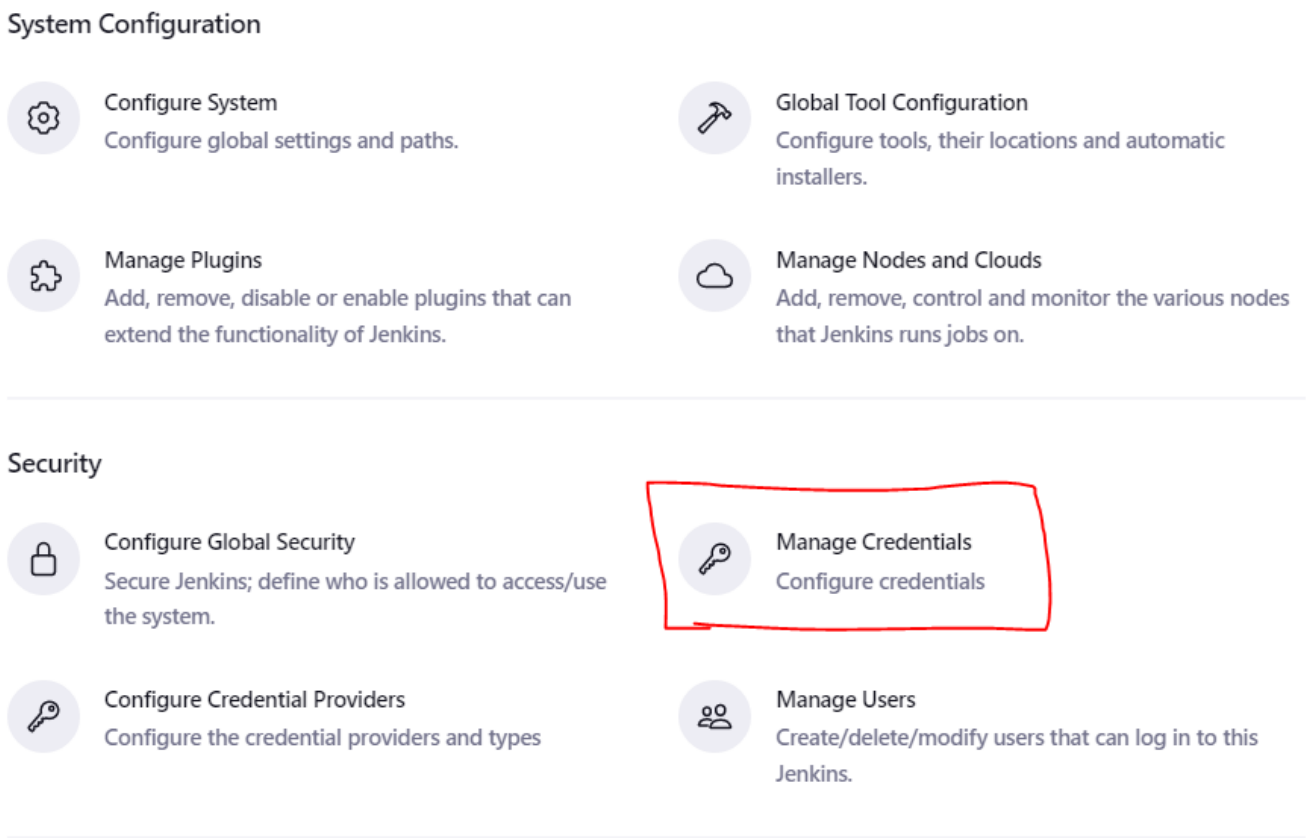


4. Give it a name and choose "permanent agent for our use case".

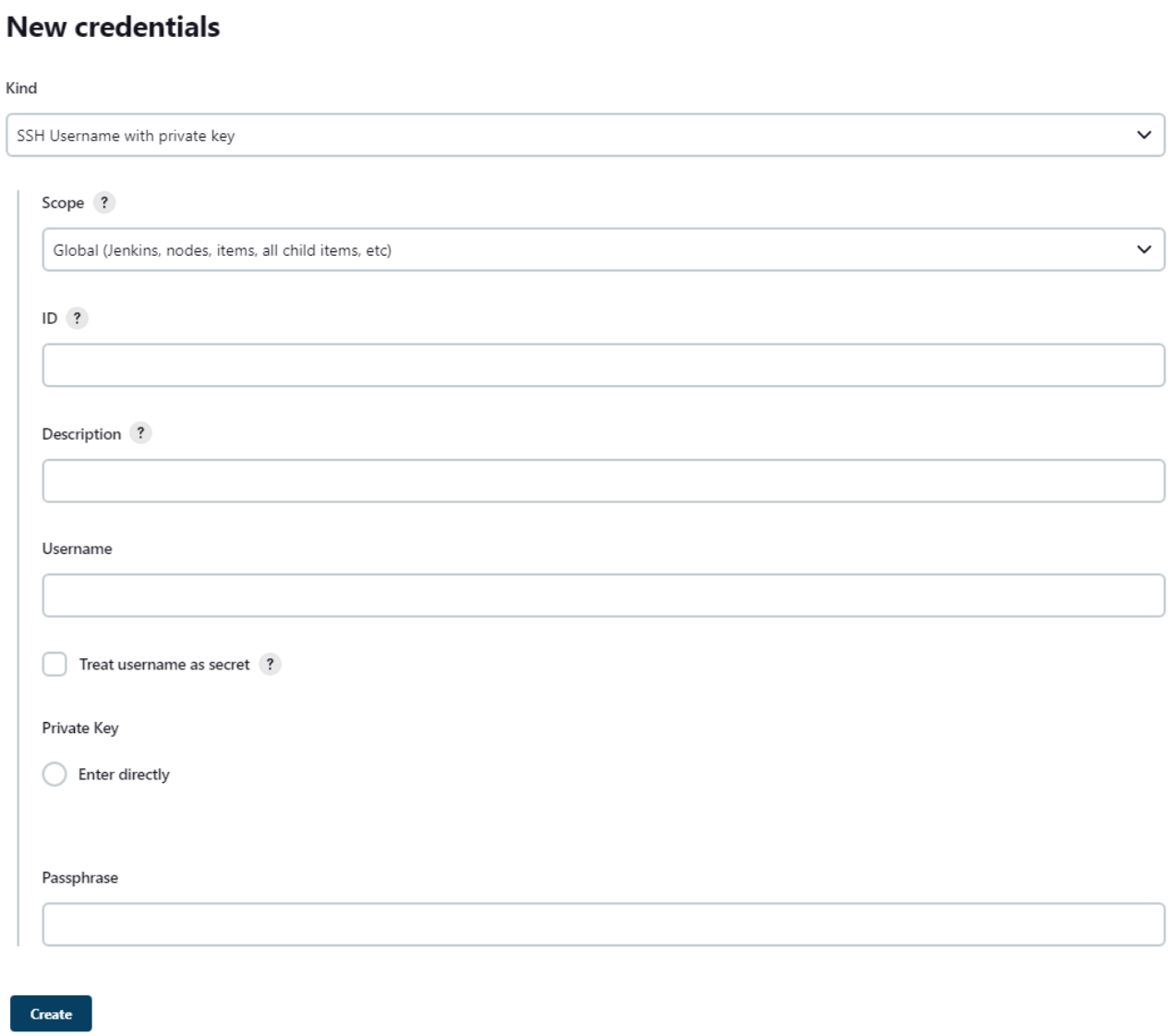


5. Create a new public-private key pair on a machine. Have the private key ready.

6. Back on Jenkins, go back into "Manage Jenkins" and then choose the "Manage Credentials" option.



7. You'll be able to create some new credentials under the dropdow under the "global" option. Choose "add credential" and then you will be brought to another screen. Manually change the type of credential to "SSH Username with Private Key"



8. Fill out the fields with the correct information. Give it any ID. And then make sure that the username is an **actual** user on the target machine. Copy and paste the private key inside of the private key field.

This picture showcases a complete form after the credential was made.

Scope ?

System (Jenkins and nodes only)

ID ?

ssh-agent-key

Description ?

Key used to use nodes as workers.

Username

ec2-user

Treat username as secret ?

Private Key

Enter directly

Key

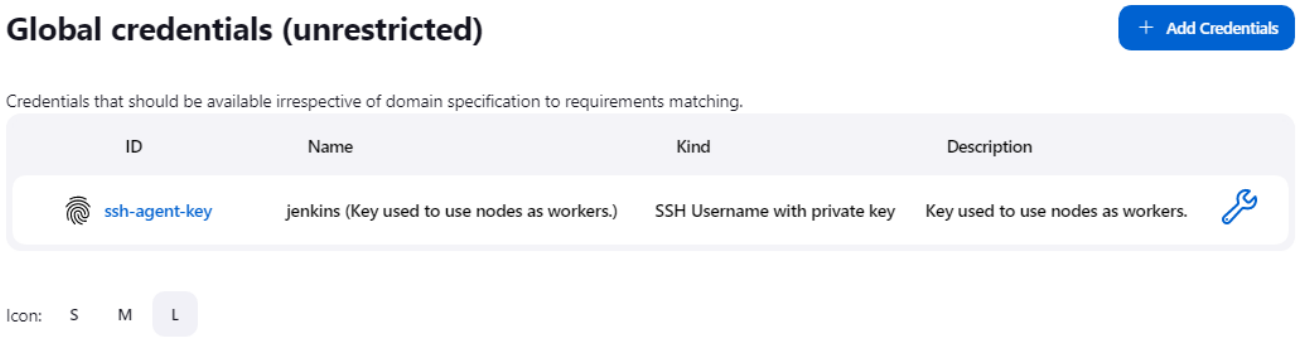
Concealed for Confidentiality

Replace

Passphrase

Save

9. You can go back to the credetials tab to find your new entry.



10. Go back to the agent creation, now we can fill in the later information.
    1. Fill in the information according to how you want to organize and use the agent. Use the hostname or the IP address. In this case, it's another EC2 instance.

Name ?

Agent1

Description ?

Number of executors ?

1

Remote root directory ?

/home/ec2-user

Labels ?

agent1

Usage ?

Only build jobs with label expressions matching this node

Launch method ?

Launch agents via SSH

Host ?

ec2-18-219-99-104.us-east-2.compute.amazonaws.com

Credentials ?

ec2-user (Key used to use nodes as workers.)

+ Add

Host Key Verification Strategy ?

Manually trusted key Verification Strategy ?

Require manual verification of initial connection ?

Advanced...

Save

You'll have to place the appropriate hostname in the "Host" field.

You'll also have to specify the credential key that you want to use.

11. Once you save the agent, the agent launching process will begin. However, the manual verification option in the figure above will require your input. Once you go back, you can press "Status" and a new option that will allow you trust the host key will be there.

Question: Does this work?

Answer: No. You haven't copied the public key to the target machine. And so, you need to update the authorized_keys file for the user that you're targeting. Then, you need to make sure that the SSH rule allows your jenkins server to SSH to your agents.

12. Once you solve the SSH problem, you will run into another problem where the agent doesn't have java installed. You will have to simply run the same command from before on the agent to get java installed.

13. Now you can relaunch the agent and you should be see a connected message.

```
bash: /home/ec2-user/jdk/bin/java: No such file or directory

[02/03/23 05:02:59] [SSH] Checking java version of java
[02/03/23 05:02:59] [SSH] java -version returned 11.0.16.
[02/03/23 05:02:59] [SSH] Starting sftp client.
[02/03/23 05:02:59] [SSH] Copying latest remoting.jar...
[02/03/23 05:02:59] [SSH] Copied 1,368,830 bytes.
Expanded the channel window size to 4MB
[02/03/23 05:02:59] [SSH] Starting agent process: cd "/home/ec2-user" && java  -jar remoting.jar -workDir /home/ec2-
user -jar-cache /home/ec2-user/remoting/jarCache
Feb 03, 2023 5:03:00 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using /home/ec2-user/remoting as a remoting work directory
Feb 03, 2023 5:03:00 AM org.jenkinsci.remoting.engine.WorkDirManager setupLogging
INFO: Both error and output logs will be printed to /home/ec2-user/remoting
<===[JENKINS REMOTING CAPACITY]===>channel started
Remoting version: 3077.vd69cf116da_6f
Launcher: SSHLauncher
Communication Protocol: Standard in/out
This is a Unix agent
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by jenkins.slaves.StandardOutputSwapper$ChannelSwapper to constructor
java.io.FileDescriptor(int)
WARNING: Please consider reporting this to the maintainers of jenkins.slaves.StandardOutputSwapper$ChannelSwapper
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
Evacuated stdout
Agent successfully connected and online
```