

Link to git hub repository

<https://github.com/eoumenwa/firstprojectongit.git>

Link to Demo 1

<https://drive.google.com/file/d/14YSPcJLnhz0zPmjKqCrRFhxkjR7uerAG/view?usp=sharing>

Link to Demo 2

<https://drive.google.com/file/d/1uK-7CA3vb-VXGC-RrqDfvB0GTImJBmb-/view?usp=sharing>

Shell Scripting

In this project, we need to onboard 20 new Linux users onto a server by creating a shell script that reads a **csv** file that contains the first name of the users to be onboarded.

1. Create the project folder called Shell

```
mkdir Shell
```

Move into the Shell folder

```
cd Shell
```

1. Create a **csv** file name **names.csv**

```
touch names.csv
```

Open the names.csv file

```
vim names.csv
```

Insert some random names into it. (*One name per line*)

Create a group for the users to be onboarded using groupadd command as shown below

```
ubuntu@ip-172-31-45-235:~$ sudo su -
root@ip-172-31-45-235:~# ls -ls
total 4
4 drwxr-xr-x 4 root root 4096 Feb  3 00:27 snap
root@ip-172-31-45-235:~# mkdir Shell
root@ip-172-31-45-235:~# ls -la
total 28
drwx----- 5 root root 4096 Feb  3 00:30 .
drwxr-xr-x 19 root root 4096 Feb  3 00:27 ..
-rw-r--r--  1 root root 3106 Dec  5 2019 .bashrc
-rw-r--r--  1 root root 161 Dec  5 2019 .profile
drwx----- 2 root root 4096 Feb  3 00:27 .ssh
drwxr-xr-x  2 root root 4096 Feb  3 00:30 Shell
drwxr-xr-x  4 root root 4096 Feb  3 00:27 snap
root@ip-172-31-45-235:~# cd Shell
root@ip-172-31-45-235:~/Shell# vim names.csv
root@ip-172-31-45-235:~/Shell# cat names.csv
Christy
Anthony
Charles
Stephanie
Gale
Marcus
Keylan
Marty
Gregory
Erica
Afoma
Ayanna
Nishonda
Amy
Melanie
Darian
Fenton
Morgan
Chinenye
Nathan
root@ip-172-31-45-235:~/Shell# groupadd developers
root@ip-172-31-45-235:~/Shell# touch onboarding-users
root@ip-172-31-45-235:~/Shell# chmod a+x onboarding-users
root@ip-172-31-45-235:~/Shell#
```

Script content

The script will read the CSV file, create each user on the server, and add to an existing group called **developers**. It will also first check for the existence of the user on the system, before it will attempt to create it. Each user will have a default home folder with a **.ssh** folder within its **HOME** folder. For each user's **SSH** configuration, the script will create an **authorized_keys** file and add a given public key to it.

```
#!/bin/bash
# Purpose: This script will read a CSV file, create each user on the server, and
# add the users to an existing group called developers.
# Updated by Emmanuel Umenwa
# Date: January 2021
# Setting variables
userfile=$(cat names.csv)
if [ $(id -u) -eq 0 ]; then
# Reading the CSV file
```

```

for user in $userfile;
do
    echo $user
    if id "$user" &>/dev/null
    then
        echo "User Exists"
    else
# This will create a new user
        useradd -m -d /home/$user -s /bin/bash -g developers $user
        echo "New User Created"
        echo
# This will create a ssh folder in the user home folder
        su - -c "mkdir ~/.ssh" $user
        echo ".ssh directory created for new user"
        echo
# We need to set the user permission for the ssh dir
        su - -c "chmod 700 ~/.ssh" $user
        echo "user permission for .ssh directory set"
        echo
# This will create an authorized-key file
        su - -c "touch ~/.ssh/authorized_keys" $user
        echo "Authorized Key File Created"
        echo
# We need to set permission for the key file
        su - -c "chmod 400 ~/.ssh/authorized_keys" $user
# Copying the public key to each user's authorized _key file
        cp -R "/home/ubuntu/.ssh/id_rsa.pub" "/home/$user/.ssh/authorized_keys"
        echo
        echo "Copied the Public Key to New User Account on the server"
        echo
        echo
        echo "USER PROFILE SUCCESSFULLY SET UP"
        echo
    fi
done
else
echo "Only Admin Can Onboard A User"
fi
echo
echo

```

Confirming each user, their default home directory and user group

```

ubuntu@ip-172-31-45-235:~$ ls -la /home
total 92
drwxr-xr-x 23 root      root      4096 Feb  3 02:19 .
drwxr-xr-x 19 root      root      4096 Feb  7 22:29 ..
drwxr-xr-x  4 Afoma     developers 4096 Feb  8 17:13 Afoma
drwxr-xr-x  3 Amy       developers 4096 Feb  3 02:19 Amy
drwxr-xr-x  4 Anthony   developers 4096 Feb  8 16:36 Anthony
drwxr-xr-x  3 Ayanna    developers 4096 Feb  3 02:19 Ayanna
drwxr-xr-x  3 Charles   developers 4096 Feb  3 02:19 Charles
drwxr-xr-x  3 Chinenye  developers 4096 Feb  3 02:19 Chinenye
drwxr-xr-x  4 Christy   developers 4096 Feb  8 16:30 Christy
drwxr-xr-x  3 Darian    developers 4096 Feb  3 02:19 Darian
drwxr-xr-x  3 Erica     developers 4096 Feb  3 02:19 Erica
drwxr-xr-x  3 Fenton    developers 4096 Feb  3 02:19 Fenton
drwxr-xr-x  4 Gale      developers 4096 Feb  8 16:57 Gale
drwxr-xr-x  3 Gregory   developers 4096 Feb  3 02:19 Gregory
drwxr-xr-x  3 Keylan    developers 4096 Feb  3 02:19 Keylan
drwxr-xr-x  3 Marcus    developers 4096 Feb  3 02:19 Marcus
drwxr-xr-x  3 Marty     developers 4096 Feb  3 02:19 Marty
drwxr-xr-x  3 Melanie   developers 4096 Feb  3 02:19 Melanie
drwxr-xr-x  3 Morgan    developers 4096 Feb  3 02:19 Morgan
drwxr-xr-x  3 Nathan    developers 4096 Feb  3 04:13 Nathan
drwxr-xr-x  3 Nishonda  developers 4096 Feb  3 02:19 Nishonda
drwxr-xr-x  3 Stephanie  developers 4096 Feb  3 02:19 Stephanie
drwxr-xr-x  4 ubuntu     ubuntu     4096 Feb  8 17:04 ubuntu
ubuntu@ip-172-31-45-235:~$ █

```

Changing file permissions and executing the script

```

root@ip-172-31-46-50:~/Shell# ./onboarding-users
-bash: ./onboarding-users: Permission denied
root@ip-172-31-46-50:~/Shell# chmod a+x onboarding-users
root@ip-172-31-46-50:~/Shell# ./onboarding-users

```

```

Christy
New User Created

.ssh directory created for new user

user permission for .ssh directory set

Authorized Key File Created

user permission for the Authorized Key File set

ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQGCzKZyicHxIkk1SrNlxsJyyTrcIdBIT84Z0cQb3R4k0jH53kxkaT5hP8tfwTe62LXi7vV86fY
+SX7TBNM76XGCBw/6vrmGegm6J1x2i1AiLNwg5nqTj0Gn0AIwku4ILCCLAB7tdfRyVuCarmBlwny3lzRyybIUAWXR/D6vpN09MsDILbKdhay+Q
/p90UBMSLPqXdY/QIh/0e3rVv1lwY3Aohnfq7V3t088zKswfA5iexNiSYX1myT00rX8cBE771j9quoNZhQgaLI1mIMtAvnHQChrn9k2nUa0/B
MBCQGo15XzGv1ado7hgoVPoluIUD+FGNo/pH4zcmDLICH6drXY/C9MESnkMUPLFxBXK0/0itApY71vRao9nAhAwpVMsy6Fqi0b5uawhvhoHYIH
TV/f4EtagVagRMP2PxYMYR6jykIV4MPJTkCm+lGhTyMLRu+qRQjdLn8AAtHf4aEV8dIkoGh088DI7eA/4o0wz40V4upH5ewSFS+5IHmRECEW5N
c= > /home/Christy/.ssh/authorized_keys
Copied the Public Key to New User Account on the server

USER PROFILE SUCCESSFULLY SET UP

Nathan
New User Created

.ssh directory created for new user

user permission for .ssh directory set

Authorized Key File Created

user permission for the Authorized Key File set

ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQGCzKZyicHxIkk1SrNlxsJyyTrcIdBIT84Z0cQb3R4k0jH53kxkaT5hP8tfwTe62LXi7vV86fY
+SX7TBNM76XGCBw/6vrmGegm6J1x2i1AiLNwg5nqTj0Gn0AIwku4ILCCLAB7tdfRyVuCarmBlwny3lzRyybIUAWXR/D6vpN09MsDILbKdhay+Q
/p90UBMSLPqXdY/QIh/0e3rVv1lwY3Aohnfq7V3t088zKswfA5iexNiSYX1myT00rX8cBE771j9quoNZhQgaLI1mIMtAvnHQChrn9k2nUa0/B
MBCQGo15XzGv1ado7hgoVPoluIUD+FGNo/pH4zcmDLICH6drXY/C9MESnkMUPLFxBXK0/0itApY71vRao9nAhAwpVMsy6Fqi0b5uawhvhoHYIH
TV/f4EtagVagRMP2PxYMYR6jykIV4MPJTkCm+lGhTyMLRu+qRQjdLn8AAtHf4aEV8dIkoGh088DI7eA/4o0wz40V4upH5ewSFS+5IHmRECEW5N
c= > /home/Nathan/.ssh/authorized_keys
Copied the Public Key to New User Account on the server

USER PROFILE SUCCESSFULLY SET UP

```

Connecting to a user

```

root@ip-172-31-46-50:~/Shell# ssh Christy@ip-172-31-46-50
The authenticity of host 'ip-172-31-46-50 (172.31.46.50)' can't be established.
ECDSA key fingerprint is SHA256:NS0EigN5DjGhfqS6vIbe0b3RKgWR0vpsPgTZXnGZF6w.
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added 'ip-172-31-46-50,172.31.46.50' (ECDSA) to the list of known hosts.
Christy@ip-172-31-46-50: Permission denied (publickey).
root@ip-172-31-46-50:~/Shell# █

```

```

root@ip-172-31-46-50:~# ssh Nathan@3.16.112.33
The authenticity of host '3.16.112.33 (3.16.112.33)' can't be established.
ECDSA key fingerprint is SHA256:NSOEign5DjGhfqS6vIbe0b3RKgWR0vpsPqTZXnGZF6w.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '3.16.112.33' (ECDSA) to the list of known hosts.
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@                WARNING: UNPROTECTED PRIVATE KEY FILE!                @
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
Permissions 0644 for '/root/.ssh/id_rsa' are too open.
It is required that your private key files are NOT accessible by others.
This private key will be ignored.
Load key "/root/.ssh/id_rsa": bad permissions
Nathan@3.16.112.33: Permission denied (publickey).
root@ip-172-31-46-50:~# ssh Nathan@172.31.46.50
The authenticity of host '172.31.46.50 (172.31.46.50)' can't be established.
ECDSA key fingerprint is SHA256:NSOEign5DjGhfqS6vIbe0b3RKgWR0vpsPqTZXnGZF6w.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.31.46.50' (ECDSA) to the list of known hosts.
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@                WARNING: UNPROTECTED PRIVATE KEY FILE!                @
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
Permissions 0644 for '/root/.ssh/id_rsa' are too open.
It is required that your private key files are NOT accessible by others.
This private key will be ignored.
Load key "/root/.ssh/id_rsa": bad permissions
Nathan@172.31.46.50: Permission denied (publickey).
root@ip-172-31-46-50:~# █

```

```

Christy@ip-172-31-45-235:~/.ssh$ ssh-copy-id Anthony@172.31.45.235
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/Christy/.ssh/id_rsa.pub"
The authenticity of host '172.31.45.235 (172.31.45.235)' can't be established.
ECDSA key fingerprint is SHA256:aKgGn5509VarR3Jv/PGMA9nGMS08oujeV1LrmvqVd6w.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
Load key "/home/Christy/.ssh/id_rsa": invalid format
Anthony@172.31.45.235: Permission denied (publickey).
Christy@ip-172-31-45-235:~/.ssh$ ssh Anthony@172.31.45.235
Load key "/home/Christy/.ssh/id_rsa": invalid format
Anthony@172.31.45.235: Permission denied (publickey).
Christy@ip-172-31-45-235:~/.ssh$ █

```

As shown above, I attempted to connect to users but was unable to do so for unknown reasons. I started to troubleshoot and research the SSH process.

Summary of challenges and errors

1. I did not run ssh-keygen to generate the public and private keys. Instead I copied the public and private key from the documentation directly into the authorized key files using the script
2. I went ahead to manually copy both public and private keys into each user's .ssh directory after creating the files id_rsa.pub and id_rsa.pub on some of the users

3. I was trying to connect to users from the root directory

Corrections

1. I started by running ssh-keygen as shown below

```
ubuntu@ip-172-31-45-235:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ubuntu/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/ubuntu/.ssh/id_rsa
Your public key has been saved in /home/ubuntu/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:zLMwn802p+h9uWtyCoLjgey+B4Qwkqedm38CQ06qXh0 ubuntu@ip-172-31-45-235
The key's randomart image is:
+---[RSA 3072]-----+
|
|..
|=* . o
|+.+ = .
|.o o E S B
|o=...o o o
|.o=+.. = . ..
|...+o.. =o=
|+o+o.o .o +*oo
+----[SHA256]-----+
ubuntu@ip-172-31-45-235:~$ ls -la
total 40
drwxr-xr-x  4 ubuntu ubuntu 4096 Feb  8 15:52 .
drwxr-xr-x 23 root root 4096 Feb  3 02:19 ..
-rw-----  1 ubuntu ubuntu 124 Feb  8 15:52 .Xauthority
-rw-----  1 ubuntu ubuntu 588 Feb  8 01:44 .bash_history
-rw-r--r--  1 ubuntu ubuntu 220 Feb 25 2020 .bash_logout
-rw-r--r--  1 ubuntu ubuntu 3771 Feb 25 2020 .bashrc
drwx-----  2 ubuntu ubuntu 4096 Feb  3 00:28 .cache
-rw-r--r--  1 ubuntu ubuntu 807 Feb 25 2020 .profile
drwx-----  2 ubuntu ubuntu 4096 Feb  8 15:58 .ssh
-rw-r--r--  1 ubuntu ubuntu  0 Feb  3 00:30 .sudo_as_admin_successful
-rw-----  1 ubuntu ubuntu 1194 Feb  4 20:27 .viminfo
ubuntu@ip-172-31-45-235:~$ pwd
/home/ubuntu
```

2. listed the directory contents to confirm existence of public and private key files

```
ubuntu@ip-172-31-45-235:~$ cd .ssh
ubuntu@ip-172-31-45-235:~/.ssh$ ls -la
total 24
drwx-----  2 ubuntu ubuntu 4096 Feb  8 15:58 .
drwxr-xr-x  4 ubuntu ubuntu 4096 Feb  8 15:52 ..
-r-----  1 ubuntu ubuntu 395 Feb  3 00:27 authorized_keys
-rw-----  1 ubuntu ubuntu 2610 Feb  8 15:58 id_rsa
-rw-r--r--  1 ubuntu ubuntu 577 Feb  8 15:58 id_rsa.pub
-rw-r--r--  1 ubuntu ubuntu 222 Feb  3 03:33 known_hosts
```

3. Changed permissions on the public key to 'read only'

```

ubuntu@ip-172-31-45-235:~/.ssh$ ls -la
total 24
drwx----- 2 ubuntu ubuntu 4096 Feb  8 16:14 .
drwxr-xr-x 4 ubuntu ubuntu 4096 Feb  8 16:14 ..
-r----- 1 ubuntu ubuntu  395 Feb  3 00:27 authorized_keys
-r----- 1 ubuntu ubuntu 2590 Feb  8 16:14 id_rsa
-rw-r--r-- 1 ubuntu ubuntu  554 Feb  8 16:14 id_rsa.pub
-rw-r--r-- 1 ubuntu ubuntu  444 Feb  8 16:30 known_hosts
ubuntu@ip-172-31-45-235:~/.ssh$ chmod 400 id_rsa.pub
ubuntu@ip-172-31-45-235:~/.ssh$ ls -la
total 24
drwx----- 2 ubuntu ubuntu 4096 Feb  8 16:14 .
drwxr-xr-x 4 ubuntu ubuntu 4096 Feb  8 16:14 ..
-r----- 1 ubuntu ubuntu  395 Feb  3 00:27 authorized_keys
-r----- 1 ubuntu ubuntu 2590 Feb  8 16:14 id_rsa
-r----- 1 ubuntu ubuntu  554 Feb  8 16:14 id_rsa.pub
-rw-r--r-- 1 ubuntu ubuntu  444 Feb  8 16:30 known_hosts

```

4. Modifying the script to change permissions on the authorized key files created using `chmod 400` and running the script to effect the change

```

# We need to set permission for the key file
su - -c "chmod 400 ~/.ssh/authorized_keys" $user
echo "user permission for the Authorized Key File set"
echo

```

```

root@ip-172-31-45-235:~/Shell# vim onboarding-users
root@ip-172-31-45-235:~/Shell# ./onboarding-users

user permission for the Authorized Key File set
Copied the Public Key to New User Account on the server

USER PROFILE SUCCESSFULLY SET UP

user permission for the Authorized Key File set
Copied the Public Key to New User Account on the server

USER PROFILE SUCCESSFULLY SET UP

```

5. Modify content of both the public and private keys using the keys provided in the documentation

6. Copying the public content (id_rsa.pub) to each user's authorized_keys file already created using the following command

```
cp -R "/home/ubuntu/.ssh/id_rsa.pub" "/home/$user/.ssh/authorized_keys"
```

Connecting to users using ssh@ipaddress command

```
ubuntu@ip-172-31-45-235:~$ ssh Afoma@172.31.45.235
Welcome to Ubuntu 20.04.1 LTS (GNU/Linux 5.4.0-1029-aws x86_64)

* Documentation:  https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:       https://ubuntu.com/advantage

System information as of Mon Feb  8 17:13:06 UTC 2021

System load:  0.0               Processes:           118
Usage of /:   23.7% of 7.69GB   Users logged in:    1
Memory usage: 24%              IPv4 address for eth0: 172.31.45.235
Swap usage:   0%

* Introducing self-healing high availability clusters in MicroK8s.
  Simple, hardened, Kubernetes for production, from RaspberryPi to DC.

  https://microk8s.io/high-availability

95 updates can be installed immediately.
40 of these updates are security updates.
To see these additional updates run: apt list --upgradable

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

Afoma@ip-172-31-45-235:~$ Afoma@172.31.45.235
```