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Course/Section: CPE232-CPE31S4	**Date Submitted:** 09/04/2023
Instructor: Dr. Jonathan Taylar	**Semester and SY:** 1st/2023-2024

Activity 3: Install SSH server on CentOS or RHEL 8

1. **Objectives:**

1.1 Install Community Enterprise OS or Red Hat Linux OS

1.2 Configure remote SSH connection from remote computer to CentOS/RHEL-8

2. **Discussion:**

CentOS vs. Debian: Overview

CentOS and Debian are Linux distributions that spawn from opposite ends of the candle.

CentOS is a free downstream rebuild of the commercial Red Hat Enterprise Linux distribution where, in contrast, Debian is the free upstream distribution that is the base for other distributions, including the Ubuntu Linux distribution.

As with many Linux distributions, CentOS and Debian are generally more alike than different; it isn't until we dig a little deeper that we find where they branch.

CentOS vs. Debian: Architecture

The available supported architectures can be the determining factor as to whether a distro is a viable option or not. Debian and CentOS are both very popular for x86_64/AMD64, but what other archs are supported by each?

Both Debian and CentOS support AArch64/ARM64, armhf/armhfp , i386 , ppc64el/ppc64le. (Note: armhf/armhfp and i386 are supported in CentOS 7 only.)

CentOS 7 additionally supports POWER9 while Debian and CentOS 8 do not. CentOS 7 focuses on the x86_64/AMD64 architecture with the other archs released through the AltArch SIG (Alternate Architecture Special Interest Group) with CentOS 8 supporting x86_64/AMD64, AArch64 and ppc64le equally.

Debian supports MIPSel, MIPS64el and s390x while CentOS does not. Much like CentOS 8, Debian does not favor one arch over another —all supported architectures are supported equally.

CentOS vs. Debian: Package Management

Most Linux distributions have some form of package manager nowadays, with some more complex and feature-rich than others.

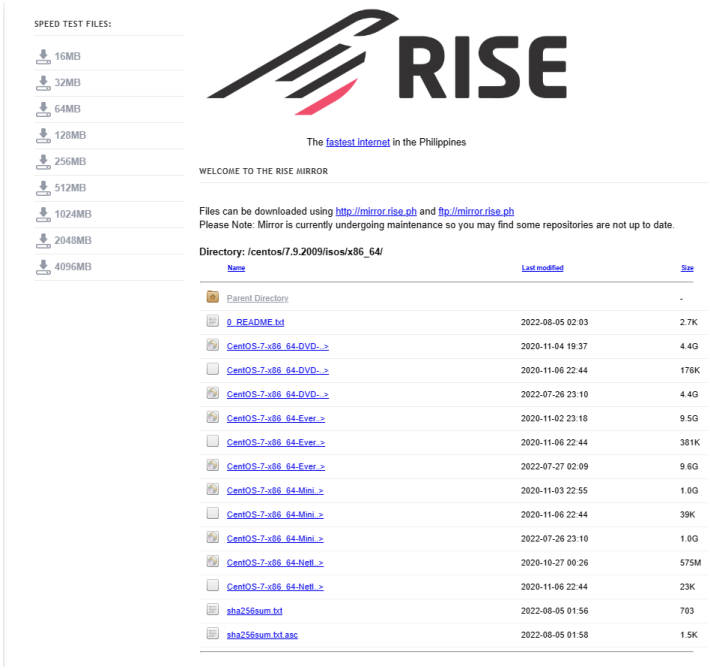
CentOS uses the RPM package format and YUM/DNF as the package manager.

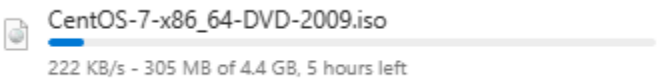
Debian uses the DEB package format and dpkg/APT as the package manager.

Both offer full-feature package management with network-based repository support, dependency checking and resolution, etc.. If you're familiar with one but not the other, you may have a little trouble switching over, but they're not overwhelmingly different. They both have similar features, just available through a different interface.

Task 1: Download the CentOS or RHEL-8 image (Create screenshots of the following)

1. Download the image of the CentOS here: http://mirror.rise.ph/centos/7.9.2009/isos/x86_64/

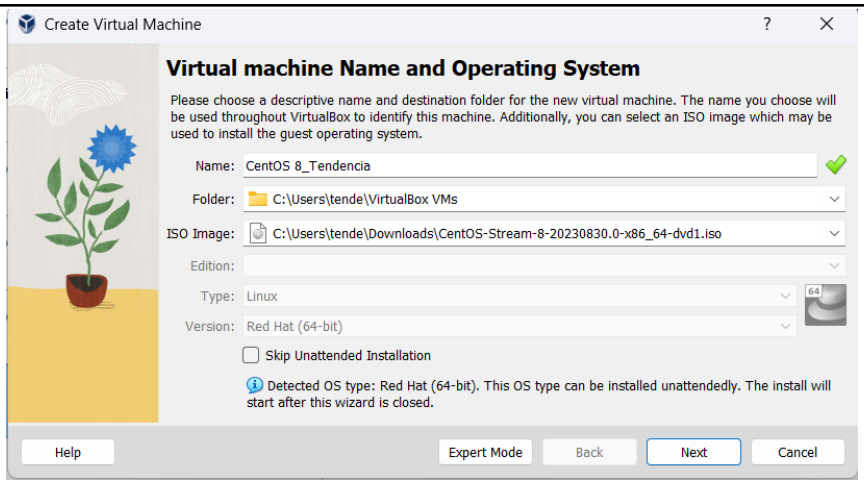


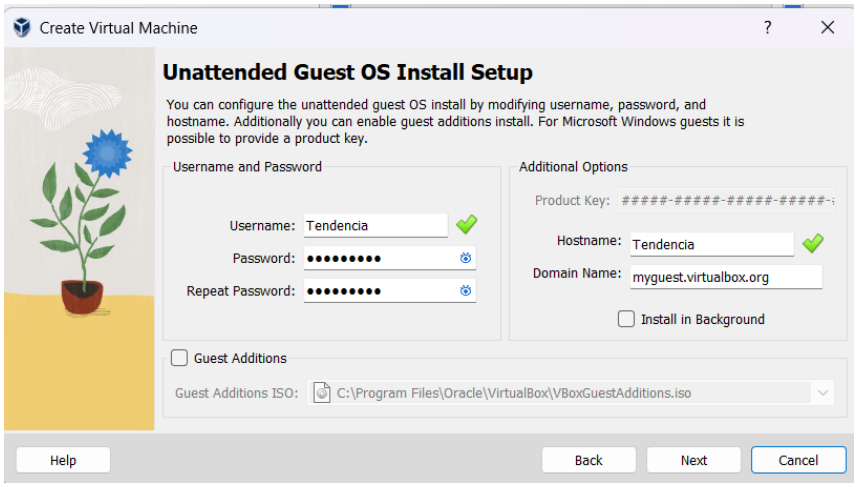


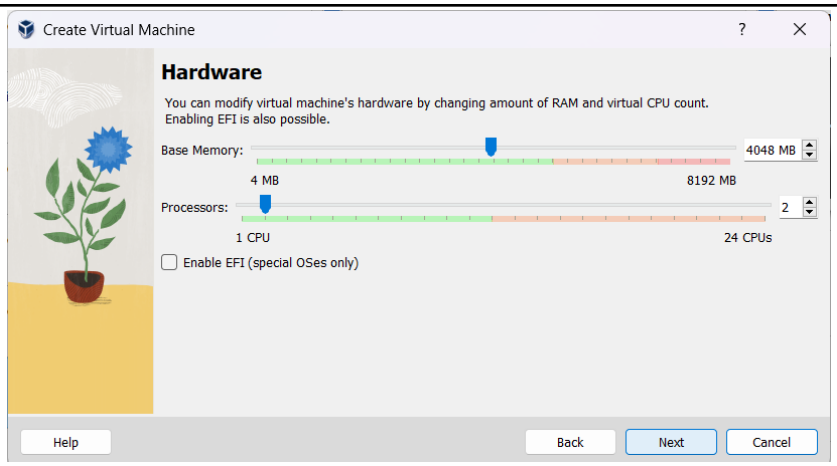
CentOS-Stream-8-20230830.0-x86_64-dvd1.iso

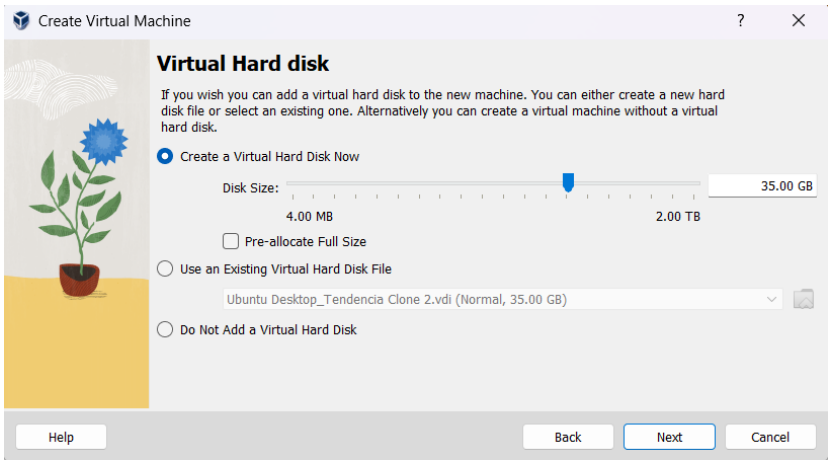
Note: All tasks were accomplished using CentOS 7, but I also attempted them on CentOS 8 (and chose the latter to be shown onto the document).

2. Create a VM machine with 2 Gb RAM and 32 Gb HD.

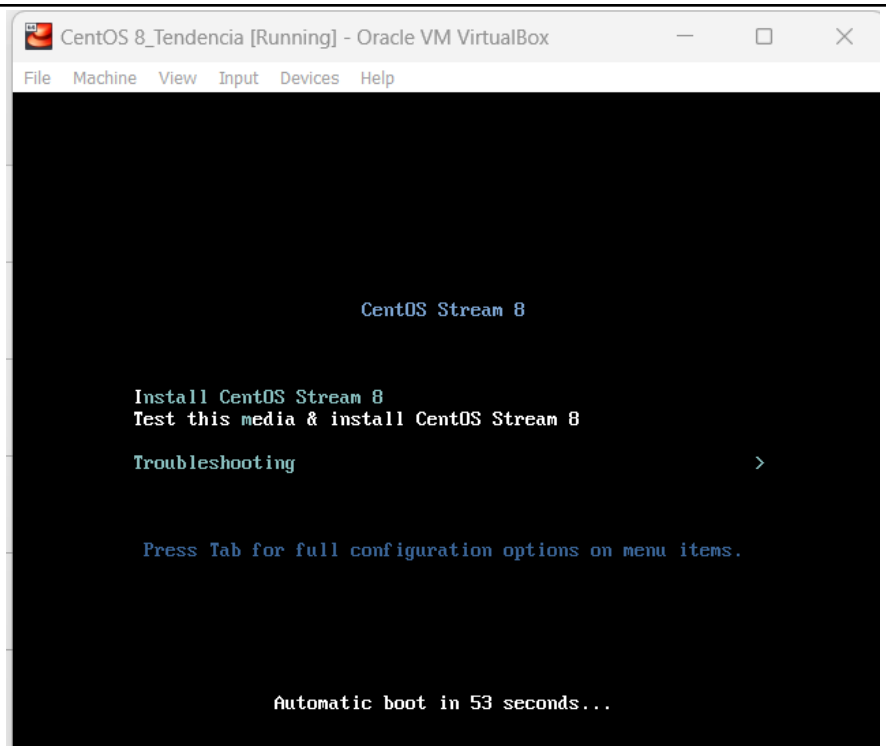

Create Virtual Machine
Virtual machine Name and Operating System
Please choose a descriptive name and destination folder for the new virtual machine. The name you choose will be used throughout VirtualBox to identify this machine. Additionally, you can select an ISO image which may be used to install the guest operating system.
Name: CentOS 8_Tendencia
Folder: C:\Users\tende\VirtualBox VMs
ISO Image: C:\Users\tende\Downloads\CentOS-Stream-8-20230830.0-x86_64-dvd1.iso
Edition:
Type: Linux
Version: Red Hat (64-bit)
Skip Unattended Installation
Detected OS type: Red Hat (64-bit). This OS type can be installed unattendedly. The install will start after this wizard is closed.
Help
Expert Mode
Back
Next
Cancel

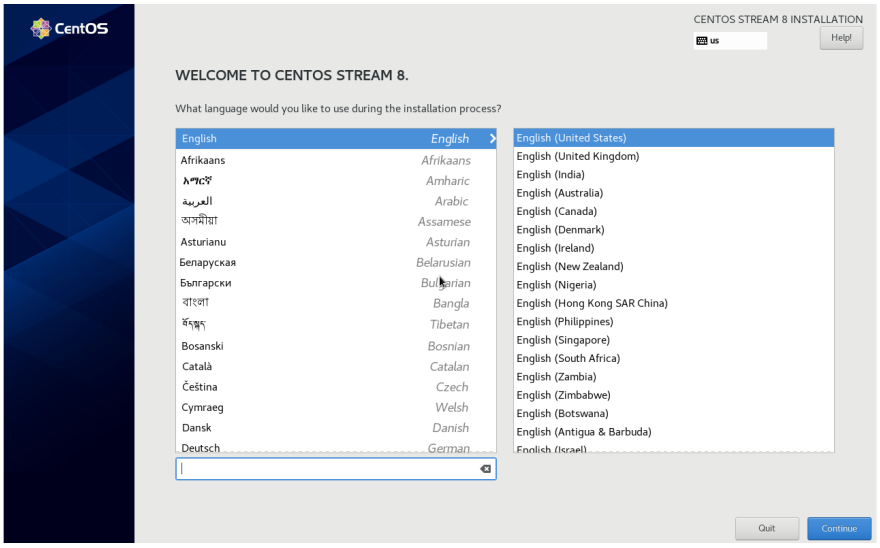

Create Virtual Machine
Unattended Guest OS Install Setup
You can configure the unattended guest OS install by modifying username, password, and hostname. Additionally you can enable guest additions install. For Microsoft Windows guests it is possible to provide a product key.
Username and Password
Username: Tendencia
Password:
Repeat Password:
Additional Options
Product Key:
Hostname: Tendencia
Domain Name: myguest.virtualbox.org
Install in Background
Guest Additions
Guest Additions ISO: C:\Program Files\Oracle\VirtualBox\VBoxGuestAdditions.iso
Help
Back
Next
Cancel

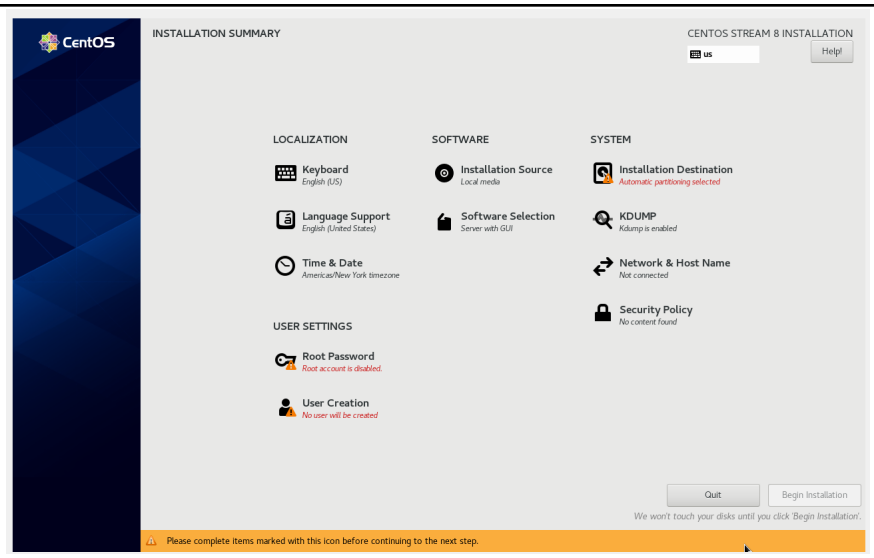


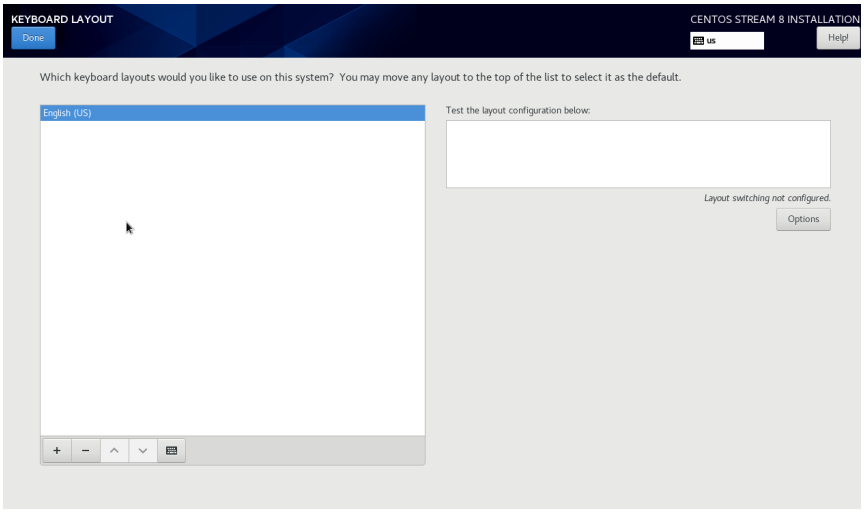


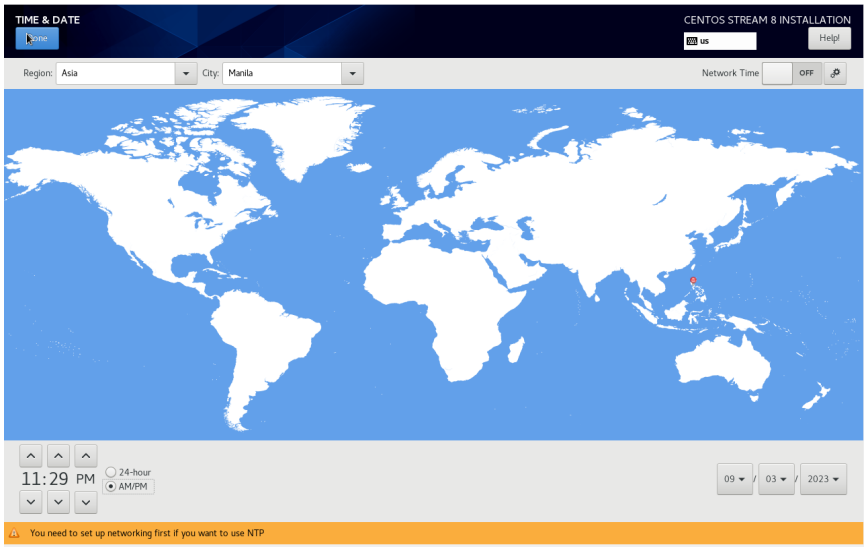
3. Install the downloaded image.

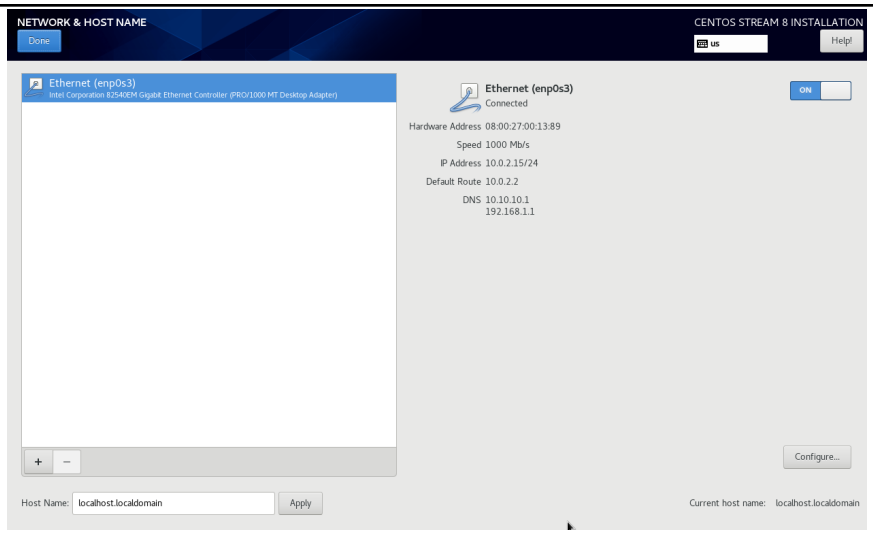

CentOS 8_Tendencia [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
CentOS Stream 8
Install CentOS Stream 8
Test this media & install CentOS Stream 8
Troubleshooting
Press Tab for full configuration options on menu items.
Automatic boot in 53 seconds...

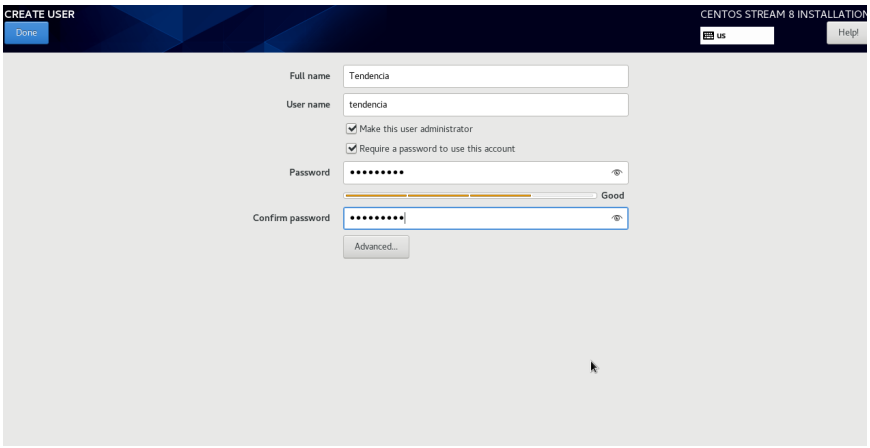

CentOS
CENTOS STREAM 8 INSTALLATION
us
Help!
WELCOME TO CENTOS STREAM 8.
What language would you like to use during the installation process?
English English
Afrikaans Afrikaans
አማርኛ Amharic
العربية Arabic
অসমীয়া Assamese
Asturianu Asturian
Беларуская Belarusian
Български Bulgarian
বাংলা Bangla
བོད་སྐད་ Tibetan
Bosanski Bosnian
Català Catalan
Čeština Czech
Cymraeg Welsh
Dansk Danish
Deutsch German
English (United States)
English (United Kingdom)
English (India)
English (Australia)
English (Canada)
English (Denmark)
English (Ireland)
English (New Zealand)
English (Nigeria)
English (Hong Kong SAR China)
English (Philippines)
English (Singapore)
English (South Africa)
English (Zambia)
English (Zimbabwe)
English (Botswana)
English (Antigua & Barbuda)
Quit
Continue

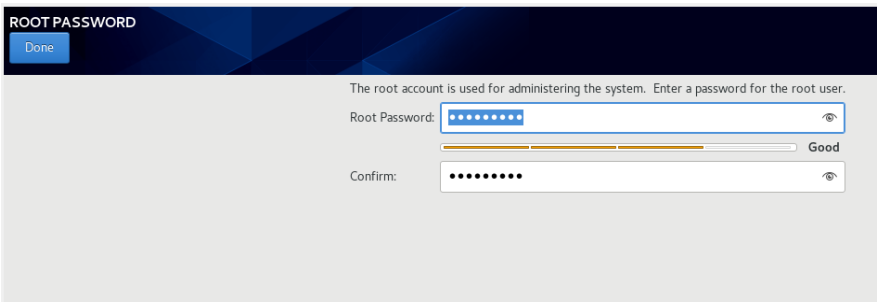

CentOS
INSTALLATION SUMMARY
CENTOS STREAM 8 INSTALLATION
us
Help!
LOCALIZATION
Keyboard
English (US)
Language Support
English (United States)
Time & Date
Americas/New York timezone
SOFTWARE
Installation Source
Local media
Software Selection
Server with GUI
SYSTEM
Installation Destination
Automatic partitioning selected
KDUMP
Kdump is enabled
Network & Host Name
Not connected
Security Policy
No content found
USER SETTINGS
Root Password
Root account is disabled.
User Creation
No user will be created
Quit
Begin Installation
We won't touch your disks until you click 'Begin Installation'.
Please complete items marked with this icon before continuing to the next step.


KEYBOARD LAYOUT
Done
CENTOS STREAM 8 INSTALLATION
us
Help!
Which keyboard layouts would you like to use on this system? You may move any layout to the top of the list to select it as the default.
English (US)
Test the layout configuration below:
Layout switching not configured.
Options

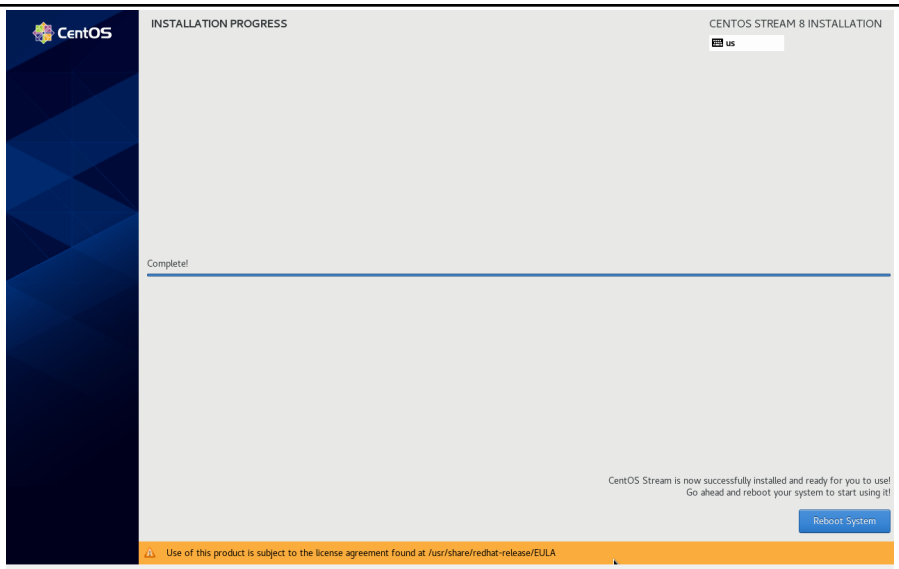

TIME & DATE
Done
CENTOS STREAM 8 INSTALLATION
us
Help!
Region: Asia
City: Manila
Network Time
OFF
11:29 PM
24-hour
AM/PM
09
03
2023
You need to set up networking first if you want to use NTP

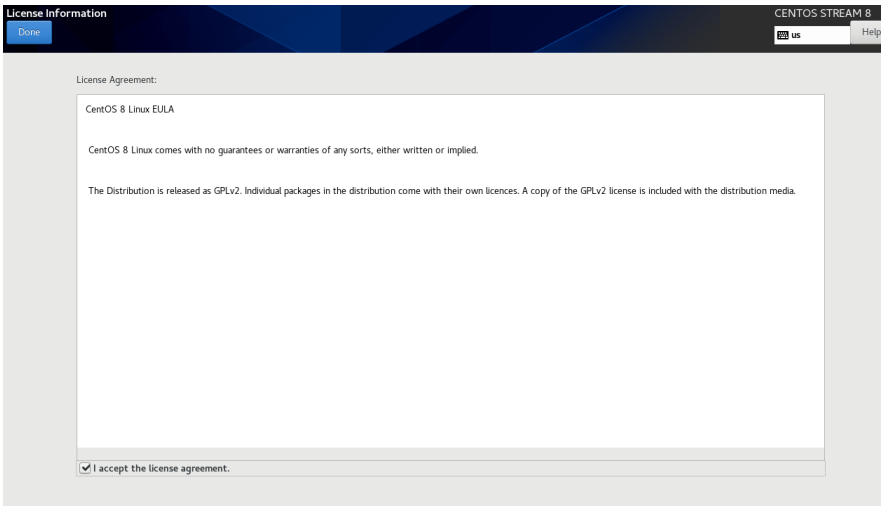

NETWORK & HOST NAME
Done
CENTOS STREAM 8 INSTALLATION
us
Help!
Ethernet (enp0s3)
Intel Corporation 82540EM Gigabit Ethernet Controller (PRO/1000 MT Desktop Adapter)
Ethernet (enp0s3)
Connected
ON
Hardware Address 08:00:27:00:13:89
Speed 1000 Mb/s
IP Address 10.0.2.15/24
Default Route 10.0.2.2
DNS 10.10.10.1
192.168.1.1
Configure...
Host Name: localhost.localdomain
Apply
Current host name: localhost.localdomain

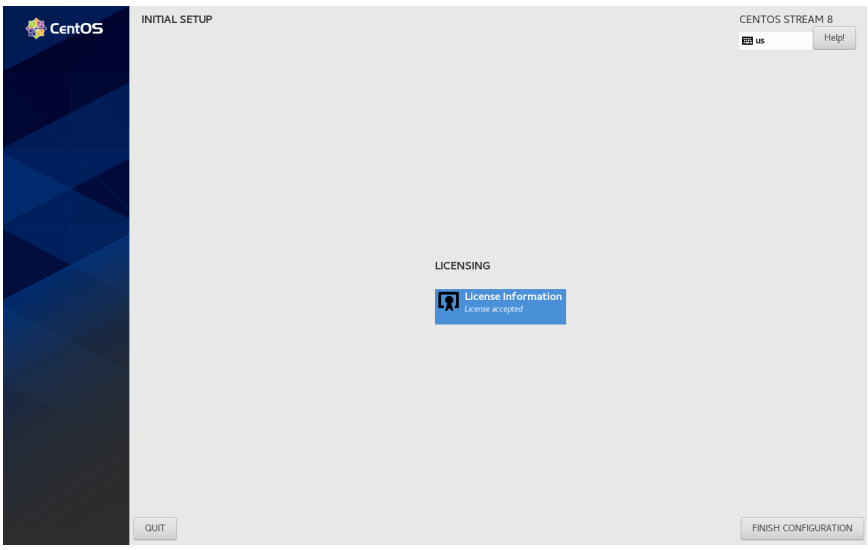

CREATE USER
Done
CENTOS STREAM 8 INSTALLATION
us
Help!
Full name
Tendencia
User name
tendencia
Make this user administrator
Require a password to use this account
Password
Good
Confirm password
Advanced...

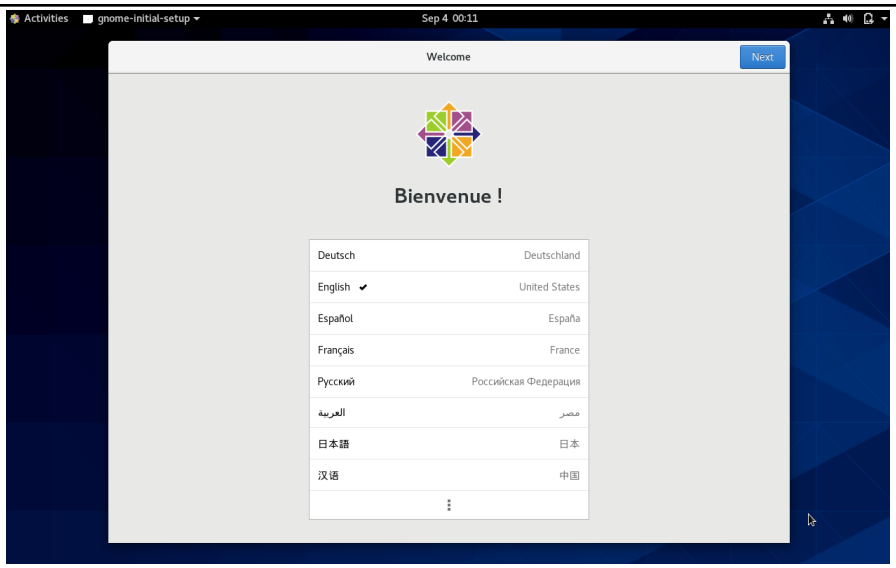

ROOT PASSWORD
Done
The root account is used for administering the system. Enter a password for the root user.
Root Password:
Good
Confirm:

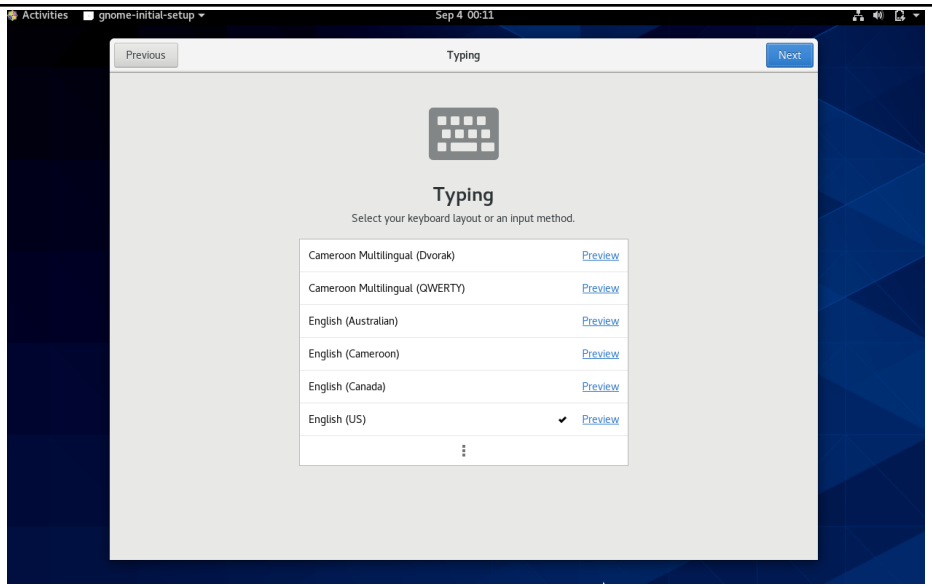

CentOS
INSTALLATION PROGRESS
CENTOS STREAM 8 INSTALLATION
us
Preparing transaction from installation source

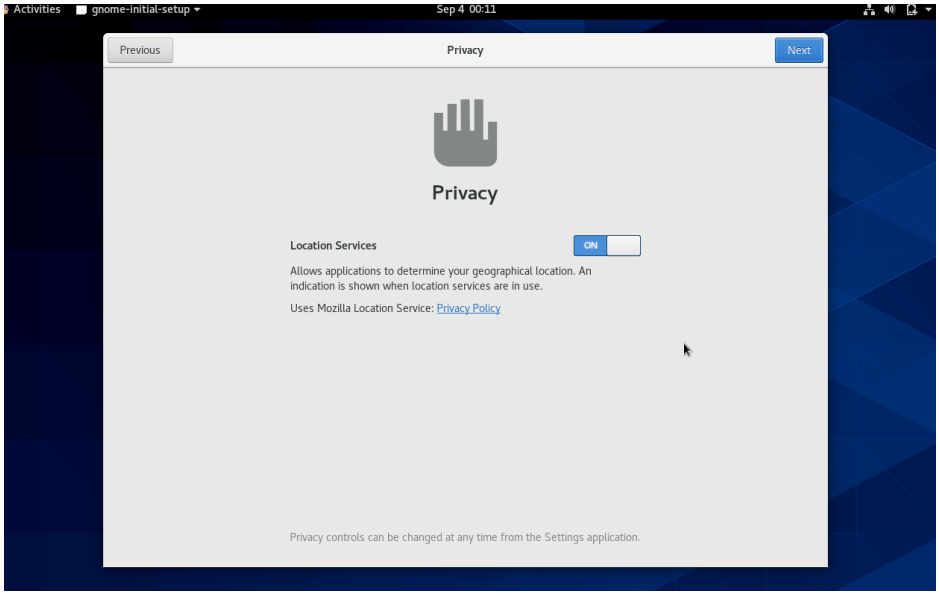

CentOS
INSTALLATION PROGRESS
CENTOS STREAM 8 INSTALLATION
us
Complete!
CentOS Stream is now successfully installed and ready for you to use!
Go ahead and reboot your system to start using it!
Reboot System
Use of this product is subject to the license agreement found at /usr/share/redhat-release/EULA


License Information
Done
CENTOS STREAM 8
us
Help
License Agreement:
CentOS 8 Linux EULA
CentOS 8 Linux comes with no guarantees or warranties of any sorts, either written or implied.
The Distribution is released as GPLv2. Individual packages in the distribution come with their own licences. A copy of the GPLv2 license is included with the distribution media.
I accept the license agreement.

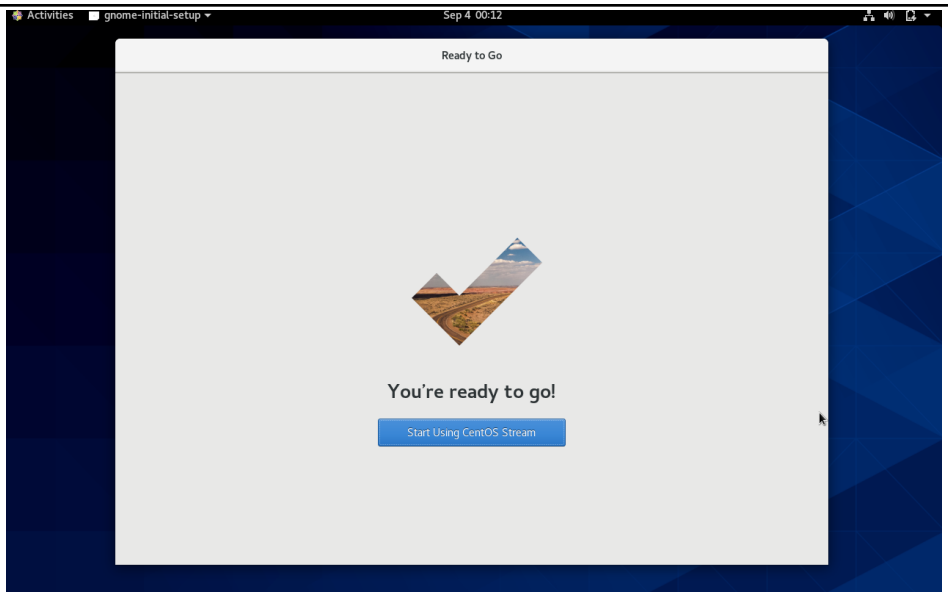

CentOS
INITIAL SETUP
CENTOS STREAM 8
us
Help!
LICENSING
License Information
License accepted
QUIT
FINISH CONFIGURATION

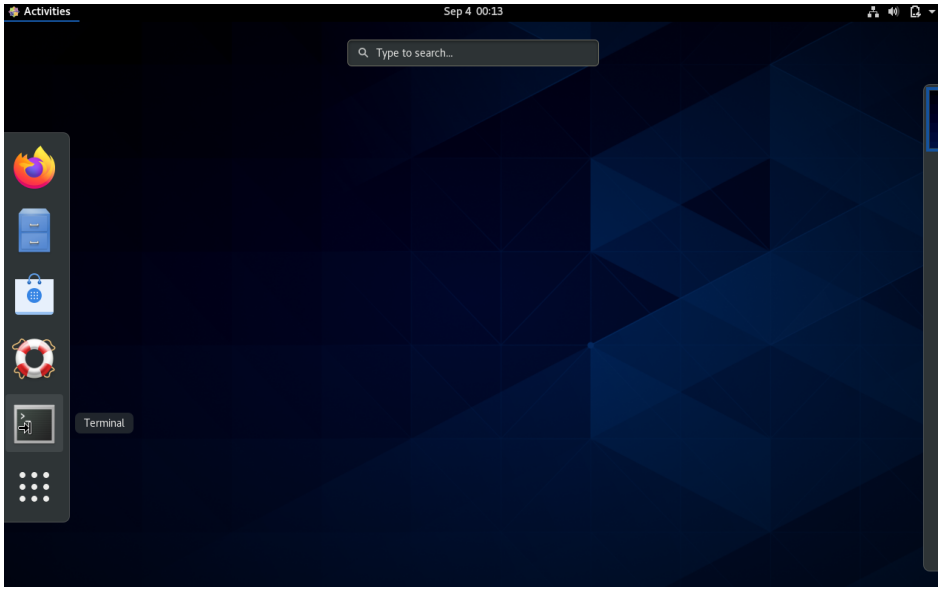

Activities
gnome-initial-setup
Sep 4 00:11
Welcome
Next
Bienvenue !
Deutsch
Deutschland
English
United States
Español
España
Français
France
Русский
Российская Федерация
العربية
مصر
日本語
日本
汉语
中国





4. Show evidence that the OS was installed already.





Task 2: Install the SSH server package *openssh*

1. Install the ssh server package *openssh* by using the *dnf* command:
   $ dnf install openssh-server

```
[tendencia@localhost ~]$ dnf install openssh-server
Error: This command has to be run with superuser privileges (under the root user
 on most systems).
[tendencia@localhost ~]$ su
Password:
[root@localhost tendencia]# dnf install openssh-server
Last metadata expiration check: 0:16:16 ago on Mon 04 Sep 2023 12:33:40 AM PST.
Package openssh-server-8.0p1-19.el8.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@localhost tendencia]#
```

2. Start the *sshd* daemon and set to start after reboot:

$ systemctl start sshd

```
[root@localhost tendencia]# systemctl start sshd
[root@localhost tendencia]#
```

$ systemctl enable sshd

```
[root@localhost tendencia]# systemctl enable sshd
[root@localhost tendencia]#
```

3. Confirm that the sshd daemon is up and running:
   $ systemctl status sshd

```
[root@localhost tendencia]# systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; vendor preset>
   Active: active (running) since Mon 2023-09-04 00:07:55 PST; 45min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 969 (sshd)
    Tasks: 1 (limit: 22695)
   Memory: 2.0M
   CGroup: /system.slice/sshd.service
           └─969 /usr/sbin/sshd -D -oCiphers=aes256-gcm@openssh.com,chacha20-po>

Sep 04 00:07:54 localhost.localdomain systemd[1]: Starting OpenSSH server daemo>
Sep 04 00:07:55 localhost.localdomain sshd[969]: Server listening on 0.0.0.0 po>
Sep 04 00:07:55 localhost.localdomain sshd[969]: Server listening on :: port 22.
Sep 04 00:07:55 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
lines 1-15/15 (END)
```

4. Open the SSH port 22 to allow incoming traffic:
   $ firewall-cmd --zone=public --permanent --add-service=ssh

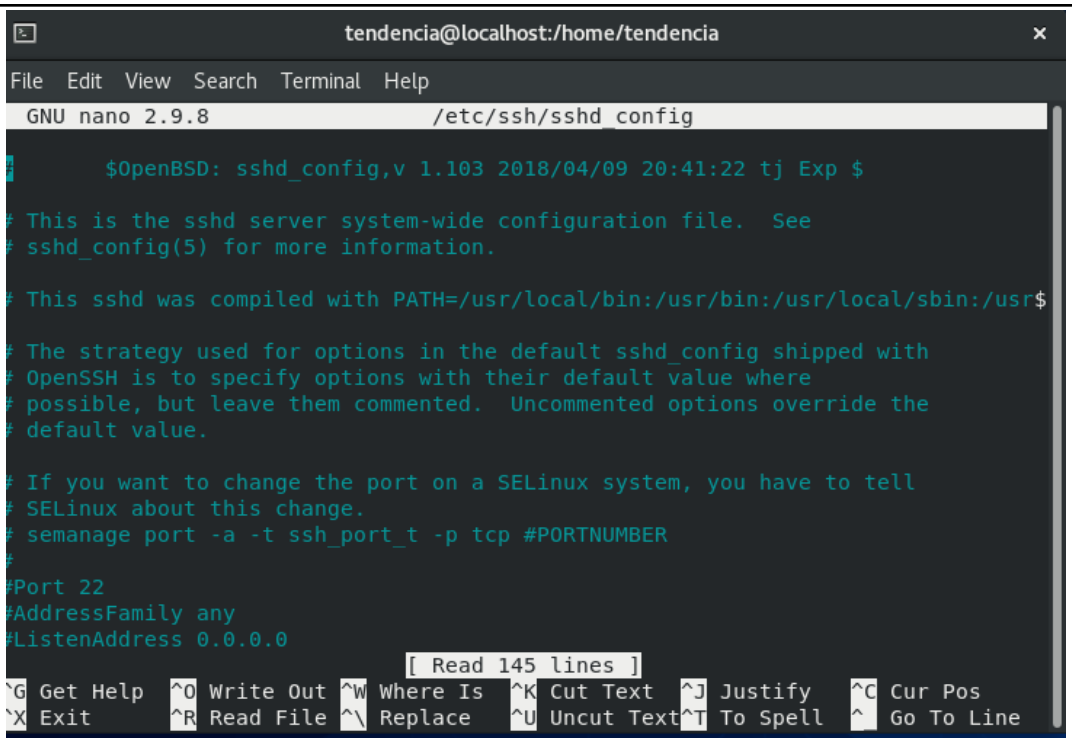
```
[root@localhost tendencia]# firewall-cmd --zone=public --permanent --add-service
=ssh
Warning: ALREADY_ENABLED: ssh
success
```

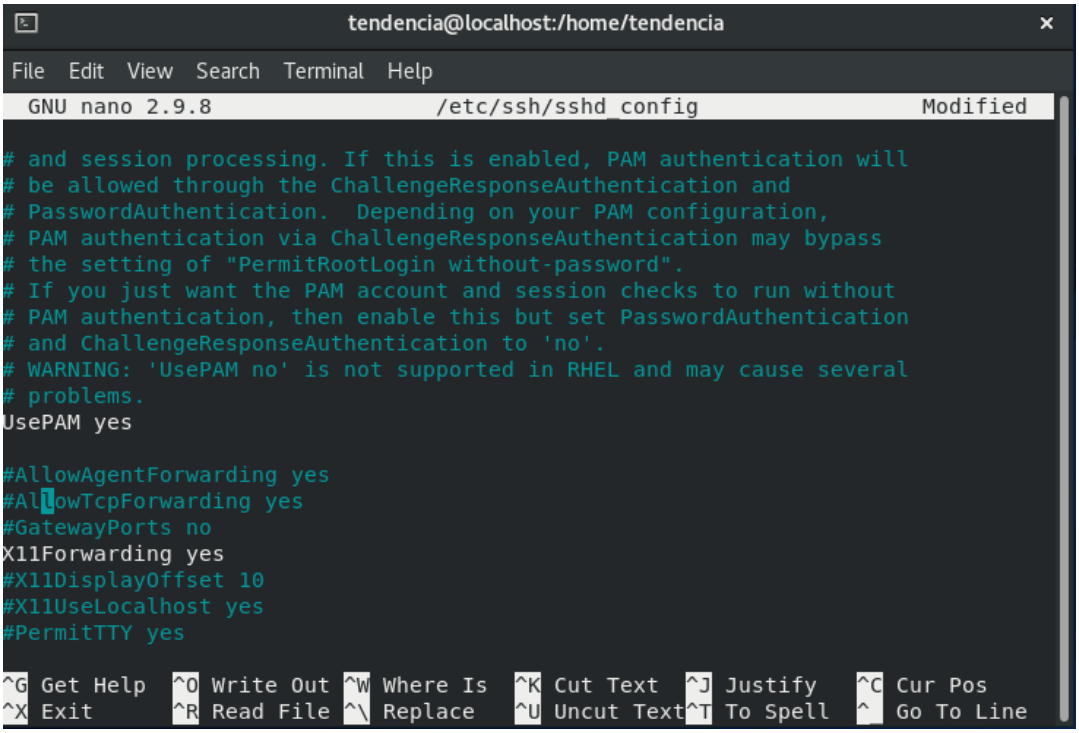
   $ firewall-cmd --reload

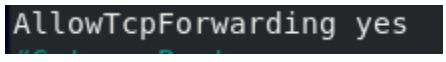
```
[root@localhost tendencia]# firewall-cmd --reload
success
```

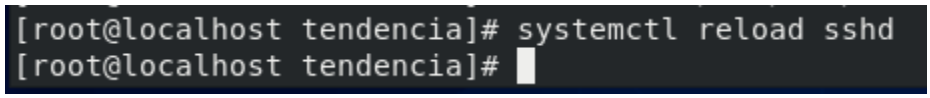
5. Locate the ssh server man config file */etc/ssh/sshd_config* and perform custom configuration. Every time you make any change to the */etc/ssh/sshd-config* configuration file reload the *sshd* service to apply changes:
   $ systemctl reload sshd

```
[root@localhost tendencia]# sudo nano /etc/ssh/sshd_config
```









Task 3: Copy the Public Key to CentOS

1. Make sure that *ssh* is installed on the local machine.
2. Using the command *ssh-copy-id*, connect your local machine to CentOS.
3. On CentOS, verify that you have the *authorized_keys*.

```
tendencia@workstation:~$ ssh-copy-id -i ~/.ssh/id_rsa tendencia@192.168.56.104
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/tendencia/.ssh/id_rsa.pub"



/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already in
stalled

/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
tendencia@192.168.56.104's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'tendencia@192.168.56.104'"
and check to make sure that only the key(s) you wanted were added.

tendencia@workstation:~$ ssh 'tendencia@192.168.56.104'
Last login: Tue Oct  3 07:10:50 2023
[tendencia@centoslocal ~]$ logout
Connection to 192.168.56.104 closed.
```

Task 4: Verify ssh remote connection

1. Using your local machine, connect to CentOS using ssh.
2. Show evidence that you are connected.

```
tendencia@workstation:~$ ssh 'tendencia@centoslocal'
Last login: Tue Oct  3 07:15:24 2023 from 192.168.56.101
[tendencia@centoslocal ~]$
```

Reflections:

Answer the following:

1. What do you think we should look for in choosing the best distribution between Debian and Red Hat Linux distributions?

   When making a choice between Debian and Red Hat Linux distributions, it's crucial to consider several key factors. First and foremost, determine the specific purpose and use case for the distribution. Red Hat-based distributions like CentOS and RHEL are often preferred in enterprise settings, thanks to their reputation for stability and long-term support. Debian, on the other hand, is a popular choice for general-purpose and community-driven projects. Another critical aspect to evaluate is the level of support and maintenance required. Red Hat distributions typically offer long-term support (LTS) options and commercial support, making them well-suited for mission-critical systems. Debian primarily relies on community support, although LTS is available for some releases.

   Package management systems differ between the two. Debian uses Debian packages (.deb) and the APT package manager, while Red Hat employs RPM packages (.rpm) and the YUM or DNF package manager. Your familiarity with the package management system can influence your choice.

Consider the ecosystem and software availability as well. Debian boasts a vast repository of open-source software, while Red Hat offers certified software through its ecosystem, including the Red Hat Software Collections (RHSCL). Lastly, think about licensing requirements, as Debian emphasizes free and open-source software, while Red Hat distributions include some proprietary components and offer subscription-based support.

2. What are the main diffence between Debian and Red Hat Linux distributions?

   Here are some of the main differences between Debian and Red Hat Linux distributions:

   a. Origin and Licensing:

      Debian: Developed by the Debian Project and focuses on free and open-source software.

      Red Hat: Developed by Red Hat, Inc., and includes some proprietary components. Red Hat enforces trademark restrictions.

   b. Package Management:

      Debian: Uses .deb packages and the APT package manager (e.g., apt-get).

      Red Hat: Uses .rpm packages and the YUM (CentOS 7 and earlier) or DNF (CentOS 8, RHEL, Fedora) package manager.

   c. Release Cycle:

      Debian: Has a "Stable" release and a "Testing" release, with long development cycles. Older versions receive security updates.

      Red Hat: Offers multiple products, including RHEL (with long-term support) and CentOS (based on RHEL). RHEL has a predictable release cycle with extended support options.

   d. Support and Maintenance:

      Debian: Community-driven with community support. LTS (Long Term Support) is available for some releases.

      Red Hat: Offers commercial support for RHEL and CentOS (by Red Hat). Provides extended support, including EUS (Extended Update Support).

   e. Software Ecosystem:

      Debian: A vast repository of open-source software. Emphasizes stability.

      Red Hat: Offers certified software through its ecosystem, including the Red Hat Software Collections (RHSCL).

f. Security Updates:

   Debian: Security updates are maintained by the Debian Security Team.

   Red Hat: Security updates are provided through the Red Hat Security Response Team and often include backported fixes.

g. Target Audience:

   Debian: Suited for general-purpose use, community projects, and personal servers.

   Red Hat: Primarily designed for enterprise environments, data centers, and mission-critical systems.