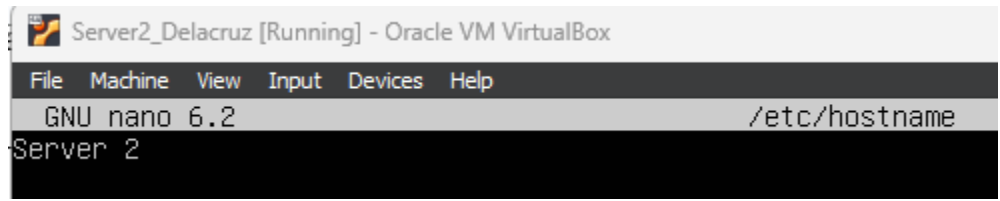




## 1.2 Use server2 for Server 2



```
Server2_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
GNU nano 6.2 /etc/hostname
Server 2
nan
```

## 1.3 Use workstation for the Local Machine



```
ivan@Workstation: ~
GNU nano 6.2 /etc/hostname
Workstation
```


2. Edit the hosts using the command *sudo nano /etc/hosts*. Edit the second line.

### 2.1 Type 127.0.0.1 server 1 for Server 1



```
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
127.0.0.1 server 1
```

### 2.2 Type 127.0.0.1 server 2 for Server 2



```
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
127.0.0.1 Server 2
```

### 2.3 Type 127.0.0.1 workstation for the Local Machine



```
GNU nano 6.2 /etc/hosts *
127.0.0.1 localhost
127.0.0.1 workstation
```

**Task 2:** Configure SSH on Server 1, Server 2, and Local Machine. Do the following:

1. Upgrade the packages by issuing the command *sudo apt update* and *sudo apt upgrade* respectively.

SERVER 1

```
Server1_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
libk5crypto3 libkeyutils1 libklibc libkmod2 libkrb5-26-heimdal libkrb5-3 libkrb5support0
libksba8 libldap-2.4-2 libldap-common liblvm2app2.2 liblvm2cmd2.02 liblwres160 liblxc-common
liblxc1 liblz4-1 liblzma5 libmagic-mgc libmagic1 libmount1 libmspack0 libncurses5 libncursesw5
libnettle6 libnss-systemd libntfs-3g88 libnuma1 libp11-kit0 libpam-modules libpam-modules-bin
libpam-runtime libpam-systemd libpam0g libparted2 libpcap0.8 libpci3 libpcre3 libperl5.26
libplymouth4 libpng16-16 libpolkit-agent-1-0 libpolkit-backend-1-0 libpolkit-gobject-1-0
libprocps6 libpython3-stdlib libpython3.6 libpython3.6-minimal libpython3.6-stdlib
libroken18-heimdal libsas12-2 libsas12-modules libsas12-modules-db libseccomp2 libsepol1
libsmartcols1 libsqlite3-0 libss2 libssl1.0.0 libssl1.1 libstdc++6 libsystemd0 libtinfo5
libudev1 libunistring2 libunwind8 libuuid1 libwind0-heimdal libx11-6 libx11-data libxau6 libxcb1
libxml2 libxslt1.1 libxtables12 libzstd1 linux-base linux-firmware linux-signed-generic locales
login lshw lvm2 lxcfs lxd lxd-client man-db mdadm mount multiarch-support ncurses-base
ncurses-bin ncurses-term netcat-openbsd netplan.io networkd-dispatcher nplan ntfs-3g open-iscsi
open-vm-tools openssh-client openssh-server openssh-sftp-server openssl overlayroot parted
passwd patch pciutils perl perl-base perl-modules-5.26 plymouth plymouth-theme-ubuntu-text
policykit-1 pollinate procps psmisc python-apt-common python3 python3-apport python3-apt
python3-commandnotfound python3-cryptography python3-debconf python3-distro-info
python3-distupgrade python3-gdbm python3-gi python3-httpplib2 python3-jinja2 python3-jwt
python3-minimal python3-pkg-resources python3-problem-report python3-requests
python3-software-properties python3-twisted python3-twisted-bin python3-update-manager
python3-urllib3 python3.6 python3.6-minimal rsync rsyslog screen snapd
software-properties-common sosreport squashfs-tools ssh-import-id sudo systemd systemd-sysv tar
tcpdump thermald tmux tzdata ubuntu-advantage-tools ubuntu-keyring ubuntu-minimal
ubuntu-release-upgrader-core ubuntu-server ubuntu-standard udev ufw uidmap unattended-upgrades
update-manager-core update-notifier-common ureadahead util-linux uuid-runtime vim vim-common
vim-runtime vim-tiny wget wireless-regdb xkb-data xxd xz-utils zlib1g
317 upgraded, 11 newly installed, 0 to remove and 0 not upgraded.
Need to get 223 MB of archives.
After this operation, 193 MB of additional disk space will be used.
Do you want to continue? [Y/n] Abort.
```

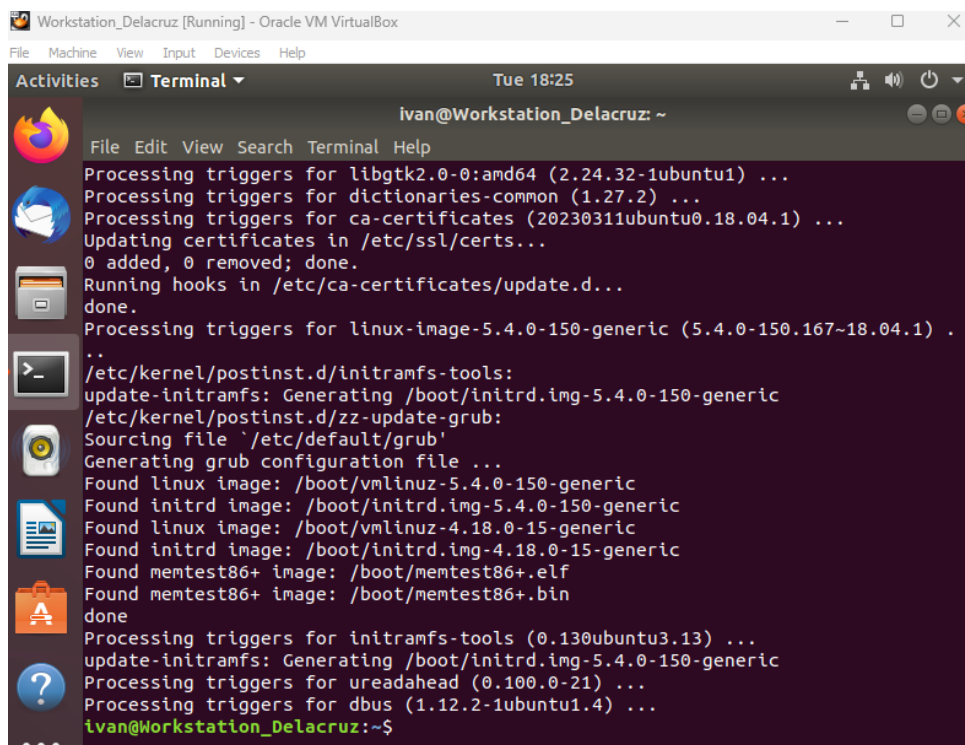
```
Server1_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Setting up dnsutils (1:9.11.3+dfsg-1ubuntu1.18) ...
Setting up ubuntu-standard (1.417.5) ...
Setting up pollinate (4.33-0ubuntu1~18.04.2) ...
Setting up python3-update-manager (1:18.04.11.13) ...
Setting up liblvm2cmd2.02:amd64 (2.02.176-4.1ubuntu3.18.04.3) ...
Setting up python3-distupgrade (1:18.04.45) ...
Setting up dmideventd (2:1.02.145-4.1ubuntu3.18.04.3) ...
dm-event.service is a disabled or a static unit not running, not starting it.
Setting up liblxc1 (3.0.3-0ubuntu1~18.04.3) ...
Setting up liblxc-common (3.0.3-0ubuntu1~18.04.3) ...
Installing new version of config file /etc/apparmor.d/abstractions/lxc/start-container ...
Installing new version of config file /etc/apparmor.d/lxc/lxc-default-cgns ...
Installing new version of config file /etc/apparmor.d/lxc/lxc-default-with-nesting ...
Setting up lxd (3.0.3-0ubuntu1~18.04.2) ...
Setting up lvm2 (2.02.176-4.1ubuntu3.18.04.3) ...
update-initramfs: deferring update (trigger activated)
Setting up ubuntu-release-upgrader-core (1:18.04.45) ...
Installing new version of config file /etc/update-manager/release-upgrades ...
Setting up update-manager-core (1:18.04.11.13) ...
Setting up update-notifier-common (3.192.1.19) ...
Installing new version of config file /etc/cron.weekly/update-notifier-common ...
Processing triggers for install-info (6.5.0.dfsg.1-2) ...
Processing triggers for libc-bin (2.27-3ubuntu1.6) ...
Processing triggers for systemd (237-3ubuntu10.57) ...
Processing triggers for mime-support (3.60ubuntu1) ...
Processing triggers for initramfs-tools (0.130ubuntu3.13) ...
update-initramfs: Generating /boot/initrd.img-4.15.0-213-generic
Setting up ubuntu-server (1.417.5) ...
Processing triggers for ureadahead (0.100.0-21) ...
Processing triggers for ca-certificates (20230311ubuntu0.18.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
ivan@Server1_Delacruz:~$ _
```

## SERVER 2

```
Server2_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
libgssapi-krb5-2 libgssapi3-heimdal libhcrypto4-heimdal libheimbase1-heimdal
libheimmtl0-heimdal libhogweed4 libhx509-5-heimdal libicu60 libidn11 libidn2-0 libip4tc0
libip6tc0 libiptc0 libirs160 libisc-export169 libisc169 libisccc160 libisccfg160 libjson-c3
libk5crypto3 libkeyutils1 libklibc libkmod2 libkrb5-26-heimdal libkrb5-3 libkrb5support0
libksba8 libldap-2.4-2 libldap-common liblvm2app2.2 liblvm2cmd2.02 liblwres160 liblxc-common
liblxc1 liblz4-1 liblzma5 libmagic-mgc libmagic1 libmount1 libmspack0 libncurses5 libncursesw5
libnettle6 libnss-systemd libntfs-3g88 libnuma1 libp11-kit0 libpam-modules libpam-modules-bin
libpam-runtime libpam-systemd libpam0g libparted2 libpcap0.8 libpci3 libpcre3 libperl5.26
libplymouth4 libpng16-16 libpolkit-agent-1-0 libpolkit-backend-1-0 libpolkit-gobject-1-0
libprocps6 libpython3-stdlib libpython3.6 libpython3.6-minimal libpython3.6-stdlib
libroken18-heimdal libsasl2-2 libsasl2-modules libsasl2-modules-db libseccomp2 libsepol1
libsmartcols1 libsqlite3-0 libss2 libssl1.0.0 libssl1.1 libstdc++6 libsystemd0 libtinfo5
libudev1 libunistring2 libunwind8 libuuid1 libwind0-heimdal libx11-6 libx11-data libxau6 libxcb1
libxml2 libxslt1.1 libxtables12 libzstd1 linux-base linux-firmware linux-signed-generic locales
login lshw lvm2 lxcfs lxd lxd-client man-db mdadm mount multiarch-support ncurses-base
ncurses libncurses-term netcat-openbsd netplan.io networkd-dispatcher nplan ntfs-3g open-iscsi
open-vm-tools openssl-client openssl-server openssl-sftp-server openssl overlayroot parted
passwd patch pciutils perl perl-base perl-modules-5.26 plymouth plymouth-theme-ubuntu-text
policykit-1 pollinate procps psmisc python-apt-common python3 python3-apt python3-apt
python3-commandnotfound python3-cryptography python3-debconf python3-distro-info
python3-distupgrade python3-gdm python3-gi python3-httplib2 python3-jinja2 python3-jwt
python3-minimal python3-pkg-resources python3-problem-report python3-requests
python3-software-properties python3-twisted python3-twisted-bin python3-update-manager
python3-urllib3 python3.6 python3.6-minimal rsync rsyslog screen snapd
software-properties-common sosreport squashfs-tools ssh-import-id sudo systemd systemd-sysv tar
tcpdump thermald tmux tzdata ubuntu-advantage-tools ubuntu-keyring ubuntu-minimal
ubuntu-release-upgrader-core ubuntu-server ubuntu-standard udev ufw uidmap unattended-upgrades
update-manager-core update-notifier-common ureadahead util-linux uuid-runtime vim vim-common
vim-runtime vim-tiny wget wireless-regdb xkb-data xxd xz-utils zlib1g
317 upgraded, 11 newly installed, 0 to remove and 0 not upgraded.
Need to get 223 MB of archives.
After this operation, 193 MB of additional disk space will be used.
Do you want to continue? [Y/n] Abort.
```

```
Server2_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Setting up dnsutils (1:9.11.3+dfsg-1ubuntu1.18) ...
Setting up ubuntu-standard (1.417.5) ...
Setting up pollinate (4.33-0ubuntu1~18.04.2) ...
Setting up python3-update-manager (1:18.04.11.13) ...
Setting up liblvm2cmd2.02:amd64 (2.02.176-4.1ubuntu3.18.04.3) ...
Setting up python3-distupgrade (1:18.04.45) ...
Setting up dmideventd (2:1.02.145-4.1ubuntu3.18.04.3) ...
dm-event.service is a disabled or a static unit not running, not starting it.
Setting up liblxc1 (3.0.3-0ubuntu1~18.04.3) ...
Setting up liblxc-common (3.0.3-0ubuntu1~18.04.3) ...
Installing new version of config file /etc/apparmor.d/abstractions/lxc/start-container ...
Installing new version of config file /etc/apparmor.d/lxc/lxc-default-cgns ...
Installing new version of config file /etc/apparmor.d/lxc/lxc-default-with-nesting ...
Setting up lxd (3.0.3-0ubuntu1~18.04.2) ...
Setting up lvm2 (2.02.176-4.1ubuntu3.18.04.3) ...
update-initramfs: deferring update (trigger activated)
Setting up ubuntu-release-upgrader-core (1:18.04.45) ...
Installing new version of config file /etc/update-manager/release-upgrades ...
Setting up update-manager-core (1:18.04.11.13) ...
Setting up update-notifier-common (3.192.1.19) ...
Installing new version of config file /etc/cron.weekly/update-notifier-common ...
Processing triggers for install-info (6.5.0.dfsg.1-2) ...
Processing triggers for libc-bin (2.27-3ubuntu1.6) ...
Processing triggers for systemd (237-3ubuntu10.57) ...
Processing triggers for mime-support (3.60ubuntu1) ...
Processing triggers for initramfs-tools (0.130ubuntu3.13) ...
update-initramfs: Generating /boot/initrd.img-4.15.0-213-generic
Setting up ubuntu-server (1.417.5) ...
Processing triggers for ureadahead (0.100.0-21) ...
Processing triggers for ca-certificates (20230311ubuntu0.18.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
ivan@Server2_Delacruz:~$ _
```

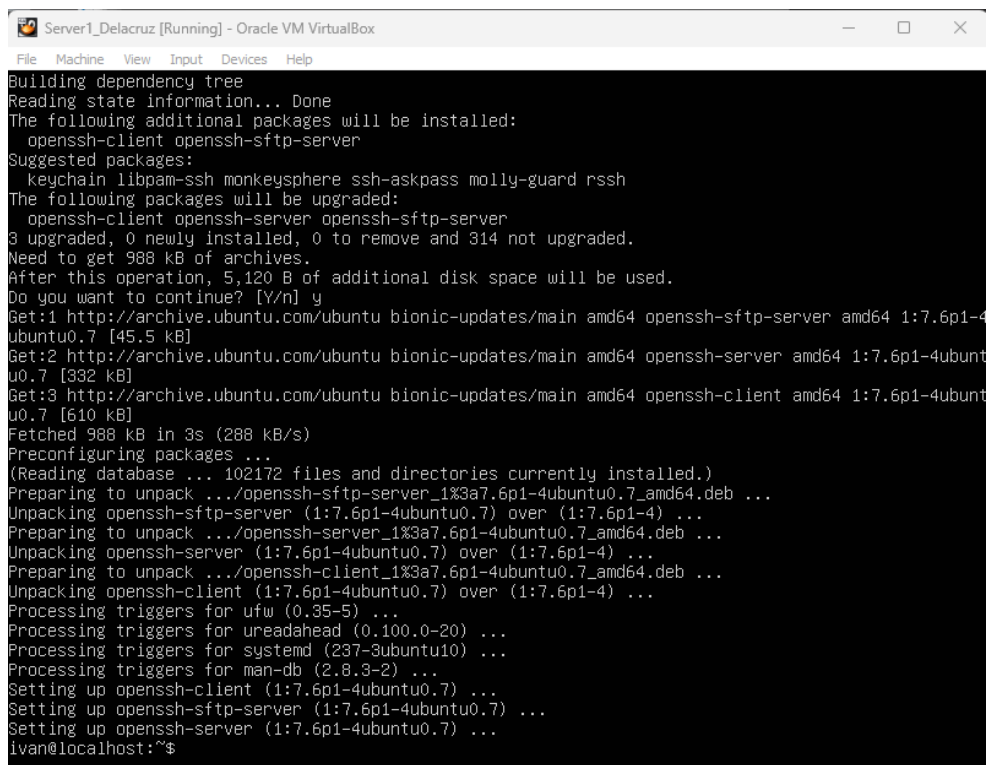
LOCAL MACHINE



```
Workstation_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Tue 18:25
ivan@Workstation_Delacruz: ~
File Edit View Search Terminal Help
Processing triggers for libgtk2.0-0:amd64 (2.24.32-1ubuntu1) ...
Processing triggers for dictionaries-common (1.27.2) ...
Processing triggers for ca-certificates (20230311ubuntu0.18.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
Processing triggers for linux-image-5.4.0-150-generic (5.4.0-150.167~18.04.1) .
..
/etc/kernel/postinst.d/initramfs-tools:
update-initramfs: Generating /boot/initrd.img-5.4.0-150-generic
/etc/kernel/postinst.d/zz-update-grub:
Sourcing file `/etc/default/grub'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.4.0-150-generic
Found initrd image: /boot/initrd.img-5.4.0-150-generic
Found linux image: /boot/vmlinuz-4.18.0-15-generic
Found initrd image: /boot/initrd.img-4.18.0-15-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
Processing triggers for initramfs-tools (0.130ubuntu3.13) ...
update-initramfs: Generating /boot/initrd.img-5.4.0-150-generic
Processing triggers for ureadahead (0.100.0-21) ...
Processing triggers for dbus (1.12.2-1ubuntu1.4) ...
ivan@Workstation_Delacruz:~$
```

2. Install the SSH server using the command *sudo apt install openssh-server*.

## SERVER 1



```
Server1_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  openssh-client openssh-sftp-server
Suggested packages:
  keychain libpam-ssh monkeysphere ssh-askpass molly-guard rssh
The following packages will be upgraded:
  openssh-client openssh-server openssh-sftp-server
3 upgraded, 0 newly installed, 0 to remove and 314 not upgraded.
Need to get 988 kB of archives.
After this operation, 5,120 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-sftp-server amd64 1:7.6p1-4ubuntu0.7 [45.5 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-server amd64 1:7.6p1-4ubuntu0.7 [332 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-client amd64 1:7.6p1-4ubuntu0.7 [610 kB]
Fetched 988 kB in 3s (288 kB/s)
Preconfiguring packages ...
(Reading database ... 102172 files and directories currently installed.)
Preparing to unpack .../openssh-sftp-server_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-sftp-server (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Preparing to unpack .../openssh-server_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-server (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Preparing to unpack .../openssh-client_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-client (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Processing triggers for ufw (0.35-5) ...
Processing triggers for ureadahead (0.100.0-20) ...
Processing triggers for systemd (237-3ubuntu10) ...
Processing triggers for man-db (2.8.3-2) ...
Setting up openssh-client (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-sftp-server (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-server (1:7.6p1-4ubuntu0.7) ...
ivan@localhost:~$
```

## SERVER 2

```
Server2_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  openssh-client openssh-sftp-server
Suggested packages:
  keychain libpam-ssh monkeysphere ssh-askpass molly-guard rssh
The following packages will be upgraded:
  openssh-client openssh-server openssh-sftp-server
3 upgraded, 0 newly installed, 0 to remove and 314 not upgraded.
Need to get 988 kB of archives.
After this operation, 5,120 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-sftp-server amd64 1:7.6p1-4ubuntu0.7 [45.5 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-server amd64 1:7.6p1-4ubuntu0.7 [332 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-client amd64 1:7.6p1-4ubuntu0.7 [610 kB]
Fetched 988 kB in 2s (473 kB/s)
Preconfiguring packages ...
(Reading database ... 102172 files and directories currently installed.)
Preparing to unpack .../openssh-sftp-server_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-sftp-server (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Preparing to unpack .../openssh-server_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-server (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Preparing to unpack .../openssh-client_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-client (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Processing triggers for ufw (0.35-5) ...
Processing triggers for ureadahead (0.100.0-20) ...
Processing triggers for systemd (237-3ubuntu10) ...
Processing triggers for man-db (2.8.3-2) ...
Setting up openssh-client (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-sftp-server (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-server (1:7.6p1-4ubuntu0.7) ...
ivan@localhost:~$
```

## LOCAL MACHINE

```
File Edit View Search Terminal Help
Processing triggers for ureadahead (0.100.0-20) ...
Processing triggers for systemd (237-3ubuntu10.12) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Setting up openssh-client (1:7.6p1-4ubuntu0.7) ...
Setting up ssh-import-id (5.7-0ubuntu1.1) ...
Setting up openssh-sftp-server (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-server (1:7.6p1-4ubuntu0.7) ...

Creating config file /etc/ssh/sshd_config with new version
Creating SSH2 RSA key; this may take some time ...
2048 SHA256:LPQYmLrahw6kwfUNF1Rn/xu25T+QuMj0dYgMp0n055s root@ivan-VirtualBox (RSA)
Creating SSH2 ECDSA key; this may take some time ...
256 SHA256:MLaIk+NjPCIIL1ID6oAlFL0FxJZ1LAVYcoPTHmCKkcNc root@ivan-VirtualBox (ECDSA)
Creating SSH2 ED25519 key; this may take some time ...
256 SHA256:rFj39JewK2FY/AgBkhzelQHz4qCj60s+pmboSg5jWfw root@ivan-VirtualBox (ED25519)
Created symlink /etc/systemd/system/sshd.service → /lib/systemd/system/ssh.service.
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /lib/systemd/system/ssh.service.
Processing triggers for ureadahead (0.100.0-20) ...
Processing triggers for systemd (237-3ubuntu10.12) ...
Processing triggers for ufw (0.35-5) ...
ivan@ivan-VirtualBox:~$
```

### 3. Verify if the SSH service has started by issuing the following commands:

3.1 *sudo service ssh start*

3.2 *sudo systemctl status ssh*

#### SERVER 1

```
Server1_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
ubuntu0.7 [45.5 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-server amd64 1:7.6p1-4ubuntu0.7 [332 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-client amd64 1:7.6p1-4ubuntu0.7 [610 kB]
Fetched 988 kB in 3s (288 kB/s)
Preconfiguring packages ...
(Reading database ... 102172 files and directories currently installed.)
Preparing to unpack .../openssh-sftp-server_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-sftp-server (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Preparing to unpack .../openssh-server_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-server (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Preparing to unpack .../openssh-client_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-client (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Processing triggers for ufw (0.35-5) ...
Processing triggers for ureadahead (0.100.0-20) ...
Processing triggers for systemd (237-3ubuntu10) ...
Processing triggers for man-db (2.8.3-2) ...
Setting up openssh-client (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-sftp-server (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-server (1:7.6p1-4ubuntu0.7) ...
ivan@localhost:~$ sudo service ssh start
ivan@localhost:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-08-22 09:40:35 UTC; 6min ago
     Process: 2748 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
    Main PID: 2749 (sshd)
       Tasks: 1 (limit: 2322)
      CGroup: /system.slice/ssh.service
              └─2749 /usr/sbin/sshd -D

Aug 22 09:40:35 localhost.localdomain systemd[1]: Starting OpenBSD Secure Shell server...
Aug 22 09:40:35 localhost.localdomain sshd[2749]: Server listening on 0.0.0.0 port 22.
Aug 22 09:40:35 localhost.localdomain sshd[2749]: Server listening on :: port 22.
Aug 22 09:40:35 localhost.localdomain systemd[1]: Started OpenBSD Secure Shell server.
ivan@localhost:~$
```

#### SERVER 2

```
Server2_Delacruz [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
ubuntu0.7 [45.5 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-server amd64 1:7.6p1-4ubuntu0.7 [332 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-client amd64 1:7.6p1-4ubuntu0.7 [610 kB]
Fetched 988 kB in 2s (473 kB/s)
Preconfiguring packages ...
(Reading database ... 102172 files and directories currently installed.)
Preparing to unpack .../openssh-sftp-server_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-sftp-server (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Preparing to unpack .../openssh-server_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-server (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Preparing to unpack .../openssh-client_1%3a7.6p1-4ubuntu0.7_amd64.deb ...
Unpacking openssh-client (1:7.6p1-4ubuntu0.7) over (1:7.6p1-4) ...
Processing triggers for ufw (0.35-5) ...
Processing triggers for ureadahead (0.100.0-20) ...
Processing triggers for systemd (237-3ubuntu10) ...
Processing triggers for man-db (2.8.3-2) ...
Setting up openssh-client (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-sftp-server (1:7.6p1-4ubuntu0.7) ...
Setting up openssh-server (1:7.6p1-4ubuntu0.7) ...
ivan@localhost:~$ sudo service ssh start
ivan@localhost:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-08-22 09:40:47 UTC; 9min ago
     Process: 2557 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
    Main PID: 2558 (sshd)
       Tasks: 1 (limit: 4653)
      CGroup: /system.slice/ssh.service
              └─2558 /usr/sbin/sshd -D

Aug 22 09:40:47 localhost.localdomain systemd[1]: Starting OpenBSD Secure Shell server...
Aug 22 09:40:47 localhost.localdomain sshd[2558]: Server listening on 0.0.0.0 port 22.
Aug 22 09:40:47 localhost.localdomain sshd[2558]: Server listening on :: port 22.
Aug 22 09:40:47 localhost.localdomain systemd[1]: Started OpenBSD Secure Shell server.
ivan@localhost:~$ _
```

## LOCAL MACHINE

```
ivan@ivan-VirtualBox:~$ sudo service ssh start
ivan@ivan-VirtualBox:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: ena
   Active: active (running) since Tue 2023-08-22 17:40:02 PST; 3min 12s ago
     Main PID: 6032 (sshd)
        Tasks: 1 (limit: 4659)
       CGroup: /system.slice/ssh.service
               └─6032 /usr/sbin/sshd -D

Aug 22 17:40:02 ivan-VirtualBox systemd[1]: Starting OpenBSD Secure Shell serve
Aug 22 17:40:02 ivan-VirtualBox sshd[6032]: Server listening on 0.0.0.0 port 22
Aug 22 17:40:02 ivan-VirtualBox sshd[6032]: Server listening on :: port 22.
Aug 22 17:40:02 ivan-VirtualBox systemd[1]: Started OpenBSD Secure Shell server
lines 1-12/12 (END)
```

4. Configure the firewall to all port 22 by issuing the following commands:

4.1 *sudo ufw allow ssh*

4.2 *sudo ufw enable*

4.3 *sudo ufw status*

## SERVER 1

```
ivan@localhost:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
ivan@localhost:~$ sudo ufw enable
Firewall is active and enabled on system startup
ivan@localhost:~$ sudo ufw status
Status: active

To Action From
--
22/tcp ALLOW Anywhere
22/tcp (v6) ALLOW Anywhere (v6)
ivan@localhost:~$
```

## SERVER 2



```

ivan@localhost:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
ivan@localhost:~$ sudo ufw enable

Command 'udo' not found, but can be installed with:

sudo apt install udo

ivan@localhost:~$ sudo ufw status
Status: inactive
ivan@localhost:~$ sudo ufw allow ssh
Skipping adding existing rule
Skipping adding existing rule (v6)
ivan@localhost:~$ sudo ufw enable
Firewall is active and enabled on system startup
ivan@localhost:~$ sudo ufw status
Status: active

To Action From
--
22/tcp ALLOW Anywhere
22/tcp (v6) ALLOW Anywhere (v6)

```

#### LOCAL MACHINE

```

ivan@Workstation_Delacruz:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
ivan@Workstation_Delacruz:~$ sudo ufw enable
Firewall is active and enabled on system startup
ivan@Workstation_Delacruz:~$ sudo ufw status
Status: active

To Action From
--
22/tcp ALLOW Anywhere
22/tcp (v6) ALLOW Anywhere (v6)

ivan@Workstation_Delacruz:~$

```

**Task 3:** Verify network settings on Server 1, Server 2, and Local Machine. On each device, do the following:

1. Record the ip address of Server 1, Server 2, and Local Machine. Issue the command *ifconfig* and check network settings. Note that the ip addresses of all the machines are in this network 192.168.56.XX.
  - 1.1 Local Machine 1 IP address: 192.168.56.104
  - 1.2 Server 1 IP address: 192.168.56.106
  - 1.3 Server 2 IP address: 192.168.56.105
2. Make sure that they can ping each other.

2.1 Connectivity test for Local Machine 1 to Server 1: ☐ Successful ☐ Not Successful

```
ivan@Workstation:~$ ping 192.168.56.106
PING 192.168.56.106 (192.168.56.106) 56(84) bytes of data.
64 bytes from 192.168.56.106: icmp_seq=1 ttl=64 time=1.43 ms
64 bytes from 192.168.56.106: icmp_seq=2 ttl=64 time=1.73 ms
64 bytes from 192.168.56.106: icmp_seq=3 ttl=64 time=2.70 ms
64 bytes from 192.168.56.106: icmp_seq=4 ttl=64 time=5.25 ms
64 bytes from 192.168.56.106: icmp_seq=5 ttl=64 time=0.931 ms
^C
--- 192.168.56.106 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4496ms
rtt min/avg/max/mdev = 0.931/2.408/5.250/1.533 ms
```

2.2 Connectivity test for Local Machine 1 to Server 2: ☐ Successful ☐ Not Successful

```
ivan@Workstation:~$ ping 192.168.56.105
PING 192.168.56.105 (192.168.56.105) 56(84) bytes of data.
64 bytes from 192.168.56.105: icmp_seq=1 ttl=64 time=1.30 ms
64 bytes from 192.168.56.105: icmp_seq=2 ttl=64 time=0.785 ms
64 bytes from 192.168.56.105: icmp_seq=3 ttl=64 time=2.76 ms
64 bytes from 192.168.56.105: icmp_seq=4 ttl=64 time=1.09 ms
^C
--- 192.168.56.105 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3131ms
rtt min/avg/max/mdev = 0.785/1.482/2.759/0.759 ms
```

2.3 Connectivity test for Server 1 to Server 2: ☐ Successful ☐ Not Successful

```
ivan@server1:~$ ping 192.168.56.105
PING 192.168.56.105 (192.168.56.105) 56(84) bytes of data.
64 bytes from 192.168.56.105: icmp_seq=1 ttl=64 time=4.63 ms
64 bytes from 192.168.56.105: icmp_seq=2 ttl=64 time=1.25 ms
64 bytes from 192.168.56.105: icmp_seq=3 ttl=64 time=1.42 ms
64 bytes from 192.168.56.105: icmp_seq=4 ttl=64 time=2.59 ms
64 bytes from 192.168.56.105: icmp_seq=5 ttl=64 time=3.16 ms
^C
--- 192.168.56.105 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4008ms
rtt min/avg/max/mdev = 1.252/2.609/4.629/1.236 ms
ivan@server1:~$ _
```

**Task 4:** Verify SSH connectivity on Server 1, Server 2, and Local Machine.

1. On the Local Machine, issue the following commands:

1.1 `ssh username@ip_address_server1` for example, `ssh jvtaylor@192.168.56.120`

1.2 Enter the password for server 1 when prompted

1.3 Verify that you are in server 1. The user should be in this format `user@server1`.

For example, `jvtaylor@server1`

2. Logout of Server 1 by issuing the command `control + D`.

```

ivan@Workstation:~$ ssh ivan@192.168.56.106
The authenticity of host '192.168.56.106 (192.168.56.106)' can't be established.
ED25519 key fingerprint is SHA256:+Yevbk2zaFIqw6oJTamjvCGa0WfcLhjupXK+U0Uea58.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Terminal Permanently added '192.168.56.106' (ED25519) to the list of known hosts.
ivan@192.168.56.106's password:
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-79-generic x86_64)

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

System information as of Tue Aug 22 11:29:51 PM UTC 2023

System load:  0.0615234375   Processes:            115
Usage of /:   29.3% of 9.75GB Users logged in:      1
Memory usage: 6%           IPv4 address for enp0s3: 192.168.56.106
Swap usage:   0%           IPv4 address for enp0s8: 10.0.3.15

Expanded Security Maintenance for Applications is not enabled.

12 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Tue Aug 22 23:21:45 2023
ivan@server1:~$
logout
Connection to 192.168.56.106 closed.

```

### 3. Do the same for Server 2.

```

ivan@Workstation:~$ ssh ivan@192.168.56.105
The authenticity of host '192.168.56.105 (192.168.56.105)' can't be established.
ED25519 key fingerprint is SHA256:+VJRDS26kiXKctnX4CR52/E5TVEuBuA8AipMXps1ttQ.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.56.105' (ED25519) to the list of known hosts.
ivan@192.168.56.105's password:
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-79-generic x86_64)

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

System information as of Tue Aug 22 11:31:51 PM UTC 2023

System load:  0.060546875   Processes:            115
Usage of /:   29.5% of 9.75GB Users logged in:      1
Memory usage: 6%           IPv4 address for enp0s3: 192.168.56.105
Swap usage:   0%           IPv4 address for enp0s8: 10.0.3.15

Expanded Security Maintenance for Applications is not enabled.

12 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Tue Aug 22 23:22:25 2023
ivan@server2:~$
logout
Connection to 192.168.56.105 closed.

```

### 4. Edit the hosts of the Local Machine by issuing the command `sudo nano /etc/hosts`. Below all texts type the following:

4.1 **IP\_address server 1** (provide the ip address of server 1 followed by the hostname)

4.2 **IP\_address server 2** (provide the ip address of server 2 followed by the hostname)

```
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
127.0.0.1 workstation
192.168.56.106 server1
192.168.56.105 server2
```

4.3 Save the file and exit.

5. On the local machine, verify that you can do the SSH command but this time, use the hostname instead of typing the IP address of the servers. For example, try to do **ssh jvtaylor@server1**. Enter the password when prompted. Verify that you have entered Server 1. Do the same for Server 2.

SERVER 1

```
ivan@Workstation:~$ ssh ivan@server1
The authenticity of host 'server1 (192.168.56.106)' can't be established.
ED25519 key fingerprint is SHA256:+Yevbk2zaFIqw6oJTamjvCGa0WfcLhjupXK+U0Uea58.
This host key is known by the following other names/addresses:
  ~/.ssh/known_hosts:1: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'server1' (ED25519) to the list of known hosts.
ivan@server1's password:
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-79-generic x86_64)

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

System information as of Tue Aug 22 11:39:12 PM UTC 2023

System load:  0.0               Processes:            115
Usage of /:   29.3% of 9.75GB   Users logged in:     1
Memory usage: 6%               IPv4 address for enp0s3: 192.168.56.106
Swap usage:   0%               IPv4 address for enp0s8: 10.0.3.15

Expanded Security Maintenance for Applications is not enabled.

12 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Tue Aug 22 23:29:51 2023 from 192.168.56.104
ivan@server1:~$
logout
Connection to server1 closed.
```

SERVER 2

```

ivan@Workstation:~$ ssh ivan@server2
The authenticity of host 'server2 (192.168.56.105)' can't be established.
ED25519 key fingerprint is SHA256:+VJRDS26kiXKctnx4CR52/E5TVEuBuA8AipMXpsittQ.
This host key is known by the following other names/addresses:
  ~/.ssh/known_hosts:4: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'server2' (ED25519) to the list of known hosts.
ivan@server2's password:
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-79-generic x86_64)

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

System information as of Tue Aug 22 11:39:22 PM UTC 2023

System load:  0.0               Processes:           117
Usage of /:   29.5% of 9.75GB   Users logged in:    1
Memory usage: 6%               IPv4 address for enp0s3: 192.168.56.105
Swap usage:   0%               IPv4 address for enp0s8: 10.0.3.15

Expanded Security Maintenance for Applications is not enabled.

12 updates can be applied immediately.
Settings     these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Tue Aug 22 23:31:51 2023 from 192.168.56.104
ivan@server2:~$
logout
Connection to server2 closed.

```

## Reflections:

Answer the following:

1. How are we able to use the hostname instead of IP address in SSH commands?  
To be able to use the hostname in the ssh command we must configure the host and put the ip address and the name of the hostname itself to be able to use it without typing the ip address.
2. How secured is SSH?

the ssh protocol that provides a strong authentication password as well as encrypted data exchanges between the two computers.