



LAB 5
DOCKER, SAMBA, DNS và Firewall

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Nhóm học phần: CT179-04

- *Các sinh viên bị phát hiện sao chép bài của nhau sẽ nhận 0đ cho tất cả bài thực hành của môn này.*
- *Bài nộp phải ở dạng PDF, hình minh họa phải rõ ràng chi tiết. Hình minh họa chỉ cần chụp ở nội dung thực hiện, không chụp toàn màn hình.*
- *Video hướng dẫn ở cuối bài.*

1. Triển khai dịch vụ WEB sử dụng Docker

1.1. Thực hiện cài đặt CentOS 9 vào máy tính cá nhân (hoặc máy ảo).

1.2. Cấu hình mạng cho máy ảo giao tiếp được với máy vật lý và kết nối được vào Internet. (Câu 2 - Lab04)

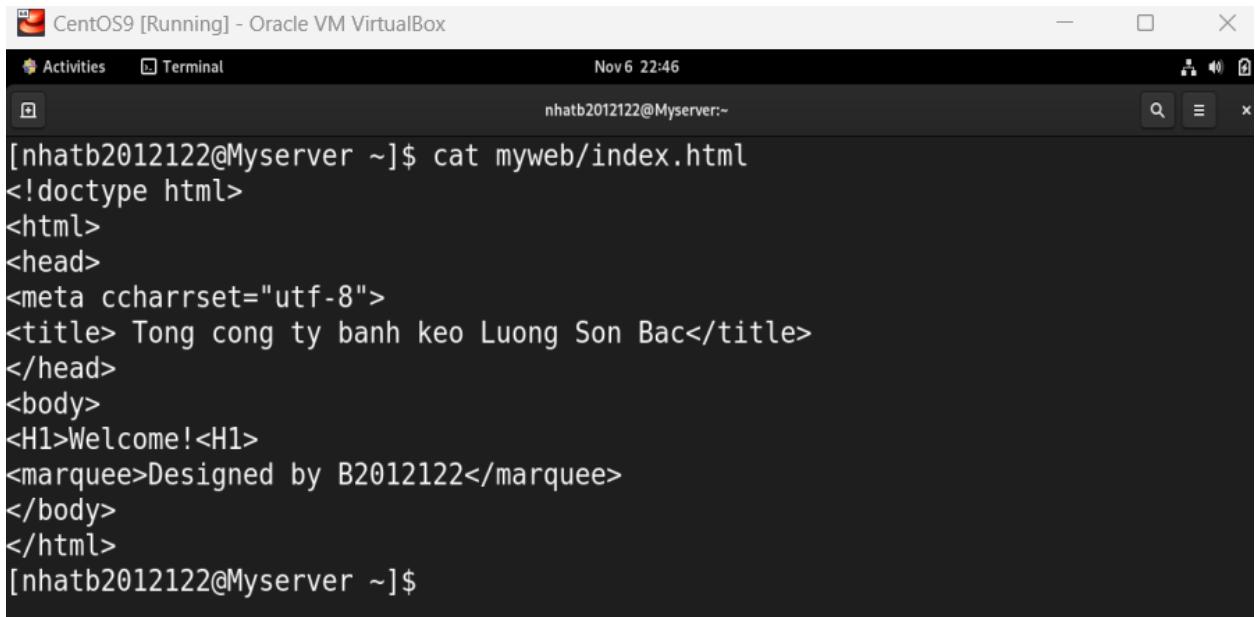
```
[nhatb2012122@Myserver ~]$ ifconfig -a
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
          inet 192.168.155.98  netmask 255.255.255.0  broadcast 192.168.155.255
            inet6 fe80::224b:9576:7be1:28f7  prefixlen 64  scopeid 0x20<link>
            inet6 2401:d800:7273:893c:19bb:44d3:3ee8:f6fe  prefixlen 64  scopeid 0x
0<global>
          ether 08:00:27:91:a8:fa  txqueuelen 1000  (Ethernet)
          RX packets 53749  bytes 67964197 (64.8 MiB)
          RX errors 0  dropped 0  overruns 0  frame 0
          TX packets 26638  bytes 2758459 (2.6 MiB)
          TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

```
C:\Users\vannh>ping 192.168.155.98
```

```
Pinging 192.168.155.98 with 32 bytes of data:
Reply from 192.168.155.98: bytes=32 time=2ms TTL=64
Reply from 192.168.155.98: bytes=32 time<1ms TTL=64
Reply from 192.168.155.98: bytes=32 time<1ms TTL=64
```

```
Ping statistics for 192.168.155.98:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms
Control-C
^C
C:\Users\vannh>
```

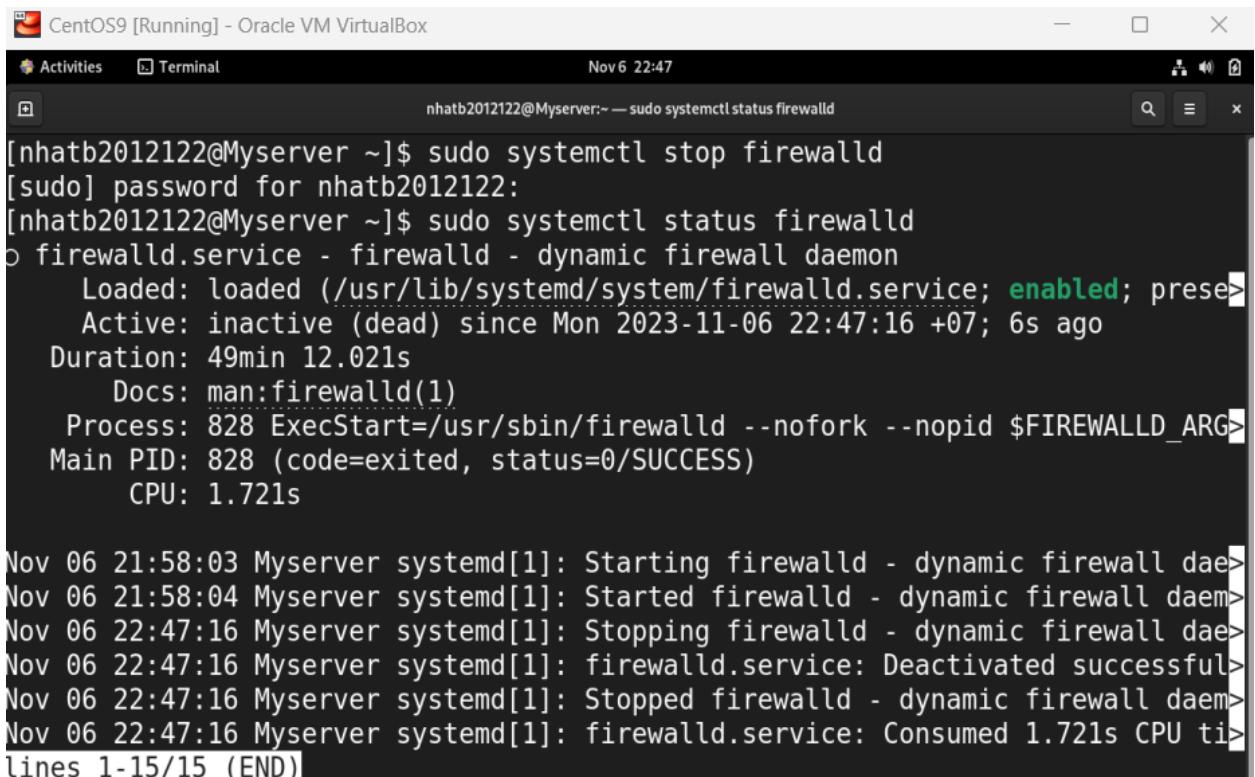
- 1.3. Tạo thư mục ~/myweb, sau đó tạo một trang web đơn giản index.html lưu vào thư mục ~/myweb.(Câu 6 - Lab04)



```
[nhatb2012122@Myserver ~]$ cat myweb/index.html
<!doctype html>
<html>
<head>
<meta charset="utf-8">
<title> Tong cong ty banh keo Luong Son Bac</title>
</head>
<body>
<H1>Welcome!<H1>
<marquee>Designed by B2012122</marquee>
</body>
</html>
[nhatb2012122@Myserver ~]$
```

Tắt tường lửa:

```
$sudo systemctl stop firewalld
```



```
[nhatb2012122@Myserver ~]$ sudo systemctl stop firewalld
[sudo] password for nhatb2012122:
[nhatb2012122@Myserver ~]$ sudo systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; presen>
   Active: inactive (dead) since Mon 2023-11-06 22:47:16 +07; 6s ago
     Duration: 49min 12.021s
       Docs: man:firewalld(1)
      Process: 828 ExecStart=/usr/sbin/firewalld --nofork --nopid $FIREWALLD_ARG>
     Main PID: 828 (code=exited, status=0/SUCCESS)
        CPU: 1.721s

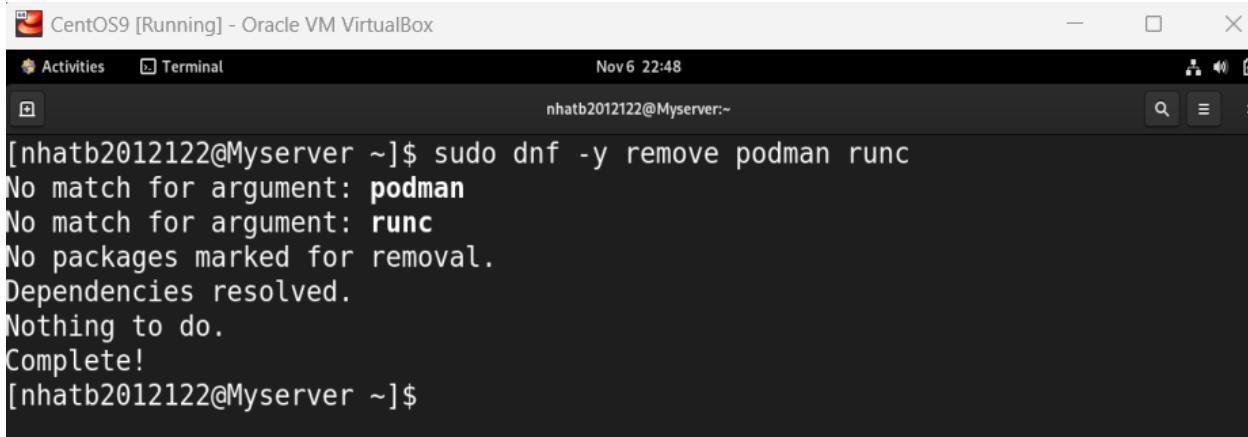
Nov 06 21:58:03 Myserver systemd[1]: Starting firewalld - dynamic firewall dae>
Nov 06 21:58:04 Myserver systemd[1]: Started firewalld - dynamic firewall daem>
Nov 06 22:47:16 Myserver systemd[1]: Stopping firewalld - dynamic firewall dae>
Nov 06 22:47:16 Myserver systemd[1]: firewalld.service: Deactivated successful>
Nov 06 22:47:16 Myserver systemd[1]: Stopped firewalld - dynamic firewall daem>
Nov 06 22:47:16 Myserver systemd[1]: firewalld.service: Consumed 1.721s CPU ti>
lines 1-15/15 (END)
```

Tìm hiểu và thực hiện các yêu cầu sau (kèm hình minh họa cho từng bước):

- 1.4. Cài đặt Docker lên máy ảo CentOS 9

- Gỡ bỏ PodMan (do sẽ đụng độ với Docker)

```
$sudo dnf -y remove podman runc
```



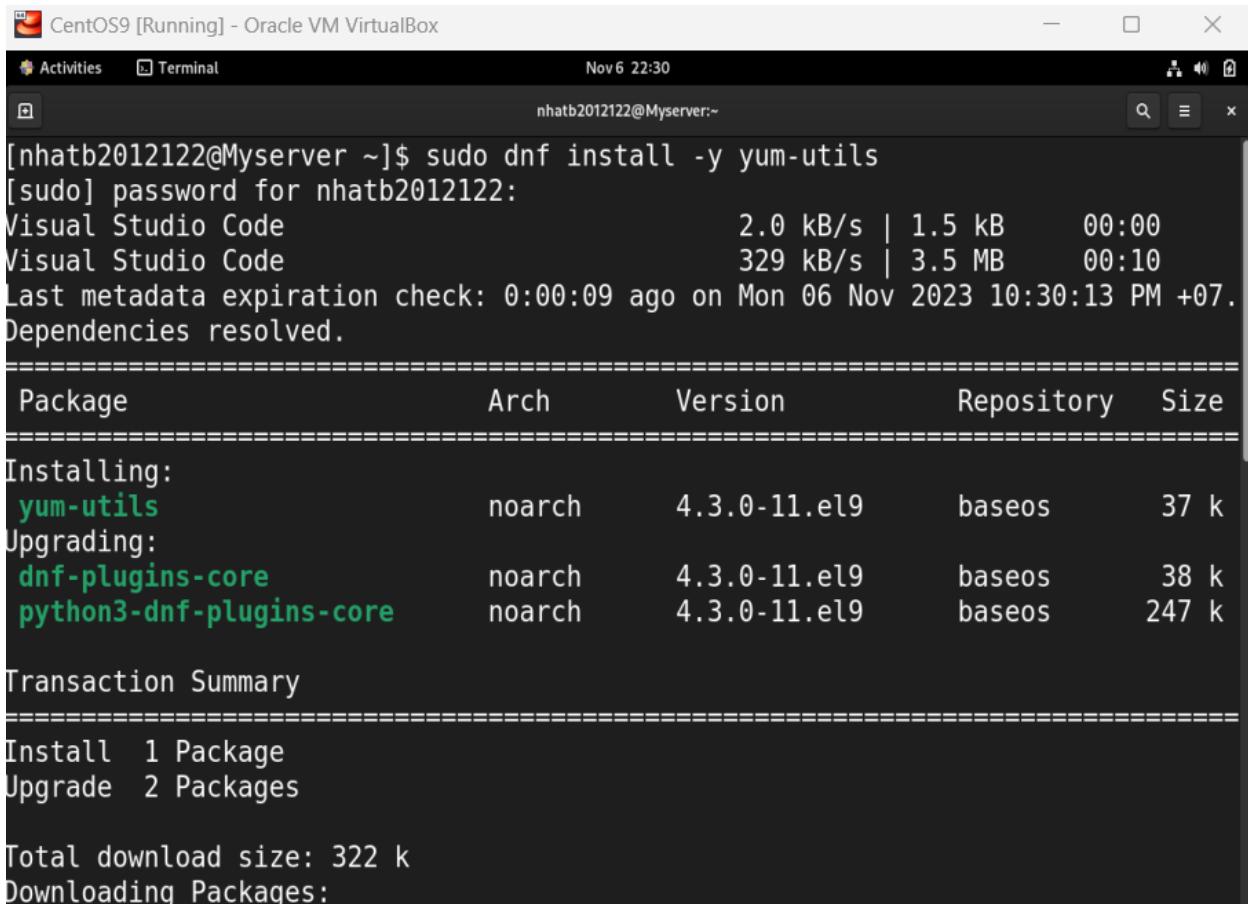
CentOS9 [Running] - Oracle VM VirtualBox

Activities Terminal Nov 6 22:48 nhatb2012122@Myserver:~

```
[nhatb2012122@Myserver ~]$ sudo dnf -y remove podman runc
No match for argument: podman
No match for argument: runc
No packages marked for removal.
Dependencies resolved.
Nothing to do.
Complete!
[nhatb2012122@Myserver ~]$
```

- Cài đặt công cụ yum-utils

```
$sudo dnf install -y yum-utils
```

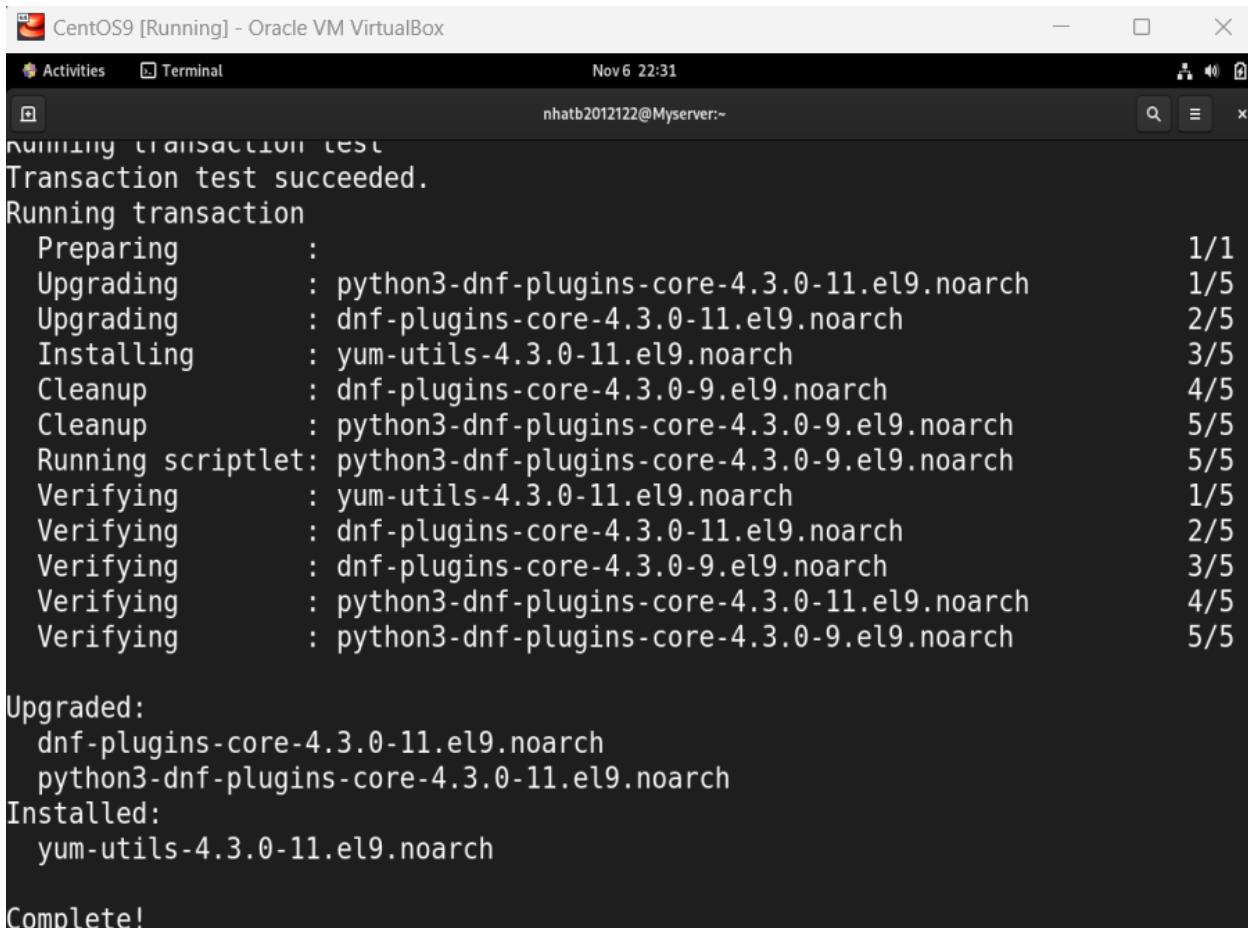


CentOS9 [Running] - Oracle VM VirtualBox

Activities Terminal Nov 6 22:30 nhatb2012122@Myserver:~

```
[nhatb2012122@Myserver ~]$ sudo dnf install -y yum-utils
[sudo] password for nhatb2012122:
Visual Studio Code 2.0 kB/s | 1.5 kB 00:00
Visual Studio Code 329 kB/s | 3.5 MB 00:10
Last metadata expiration check: 0:00:09 ago on Mon 06 Nov 2023 10:30:13 PM +07.
Dependencies resolved.
=====
Package Arch Version Repository Size
=====
Installing:
 yum-utils noarch 4.3.0-11.el9 baseos 37 k
Upgrading:
 dnf-plugins-core noarch 4.3.0-11.el9 baseos 38 k
 python3-dnf-plugins-core noarch 4.3.0-11.el9 baseos 247 k
Transaction Summary
=====
Install 1 Package
Upgrade 2 Packages

Total download size: 322 k
Downloading Packages:
```



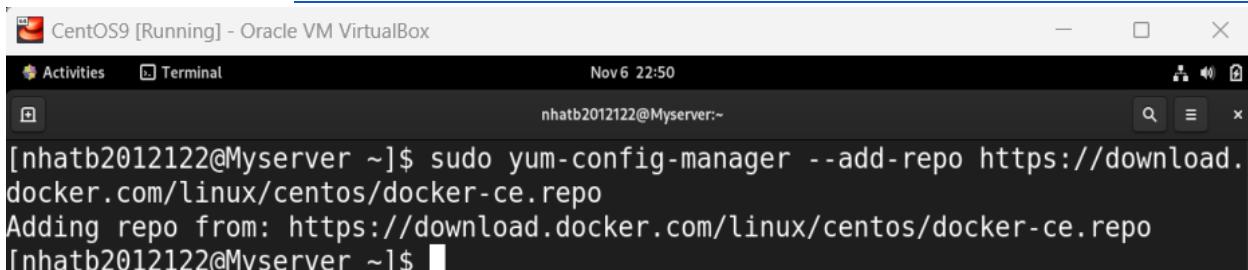
```
CentOS9 [Running] - Oracle VM VirtualBox
Activities Terminal Nov 6 22:31
nhatb2012122@Myserver:~ / 
Running transaction test
Transaction test succeeded.
Running transaction
Preparing : 1/1
Upgrading : python3-dnf-plugins-core-4.3.0-11.el9.noarch 1/5
Upgrading : dnf-plugins-core-4.3.0-11.el9.noarch 2/5
Installing : yum-utils-4.3.0-11.el9.noarch 3/5
Cleanup : dnf-plugins-core-4.3.0-9.el9.noarch 4/5
Cleanup : python3-dnf-plugins-core-4.3.0-9.el9.noarch 5/5
Running scriptlet: python3-dnf-plugins-core-4.3.0-9.el9.noarch 5/5
Verifying : yum-utils-4.3.0-11.el9.noarch 1/5
Verifying : dnf-plugins-core-4.3.0-11.el9.noarch 2/5
Verifying : dnf-plugins-core-4.3.0-9.el9.noarch 3/5
Verifying : python3-dnf-plugins-core-4.3.0-11.el9.noarch 4/5
Verifying : python3-dnf-plugins-core-4.3.0-9.el9.noarch 5/5

Upgraded:
dnf-plugins-core-4.3.0-11.el9.noarch
python3-dnf-plugins-core-4.3.0-11.el9.noarch
Installed:
yum-utils-4.3.0-11.el9.noarch

Complete!
```

- Thêm địa repo của Docker vào công cụ yum

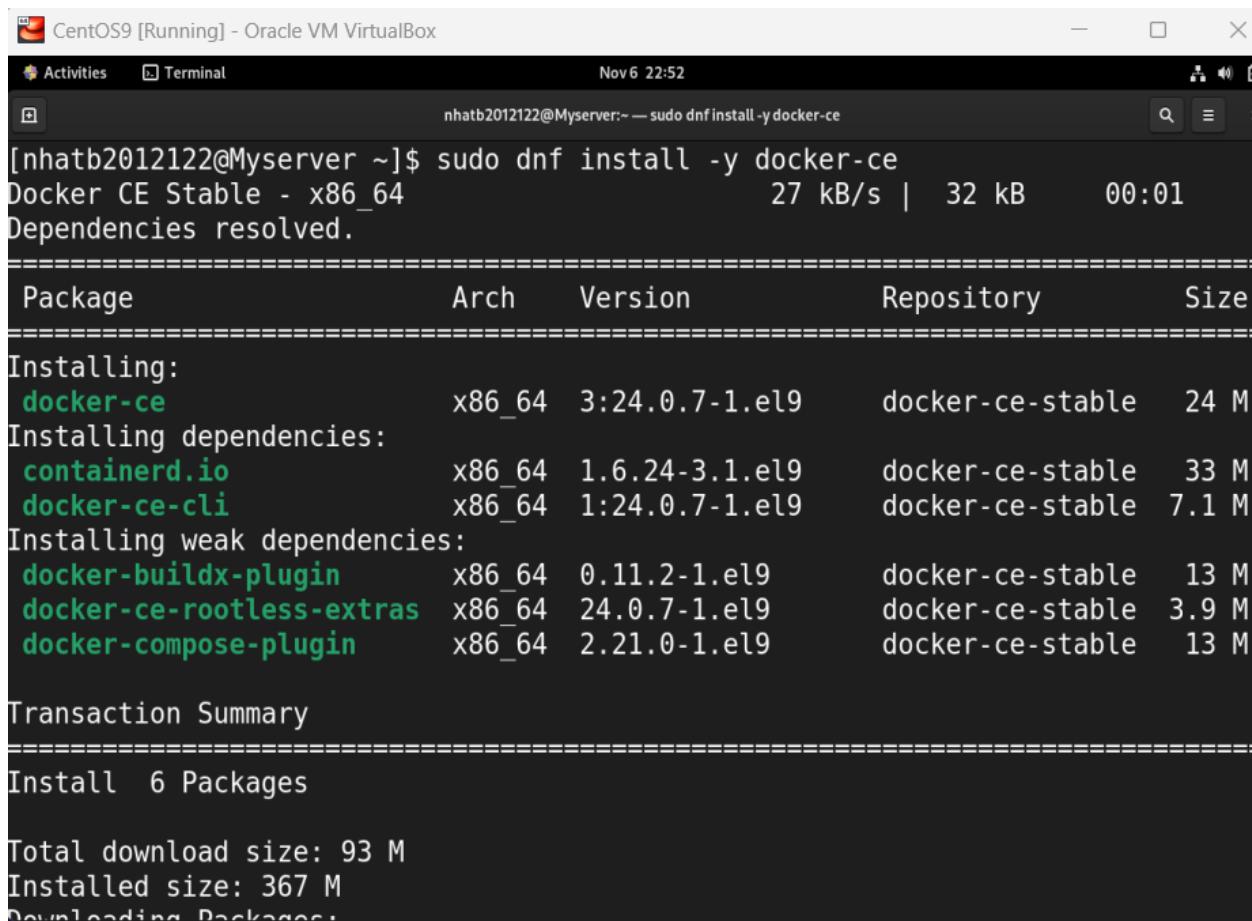
```
$sudo yum-config-manager \
--add-repo \
https://download.docker.com/linux/centos/docker-ce.repo
```



```
CentOS9 [Running] - Oracle VM VirtualBox
Activities Terminal Nov 6 22:50
nhatb2012122@Myserver:~ / 
[nhatb2012122@Myserver ~]$ sudo yum-config-manager --add-repo https://download.docker.com/linux/centos/docker-ce.repo
Adding repo from: https://download.docker.com/linux/centos/docker-ce.repo
[nhatb2012122@Myserver ~]$ 
```

- Cài đặt Docker

```
$sudo dnf install docker-ce -y
```

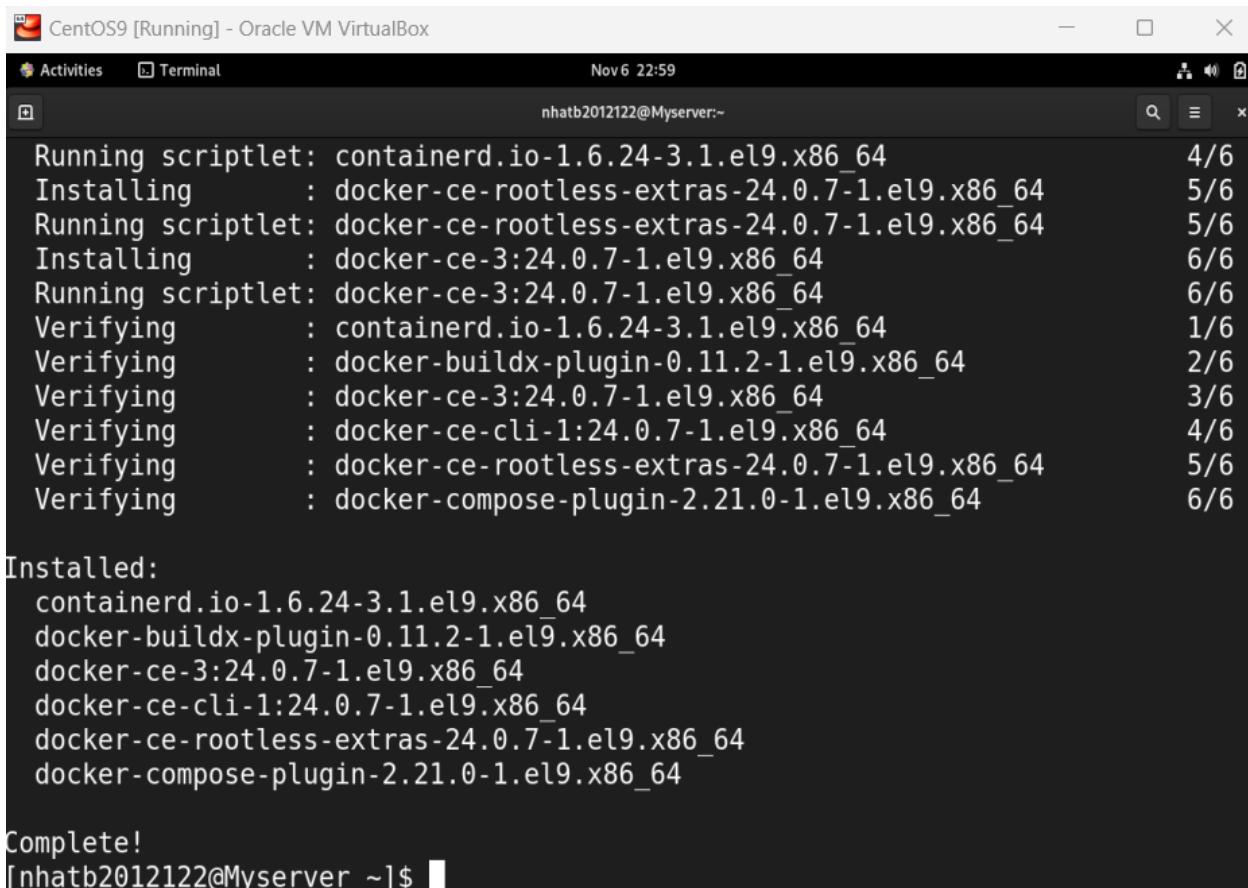


CentOS9 [Running] - Oracle VM VirtualBox

Activities Terminal Nov 6 22:52

```
nhatb2012122@Myserver:~ — sudo dnf install -y docker-ce
[nhatb2012122@Myserver ~]$ sudo dnf install -y docker-ce
Docker CE Stable - x86_64                               27 kB/s | 32 kB     00:01
Dependencies resolved.
=====
Package           Arch   Version      Repository      Size
=====
Installing:
  docker-ce       x86_64  3:24.0.7-1.el9    docker-ce-stable  24 M
Installing dependencies:
  containerd.io   x86_64  1.6.24-3.1.el9    docker-ce-stable  33 M
  docker-ce-cli   x86_64  1:24.0.7-1.el9    docker-ce-stable  7.1 M
Installing weak dependencies:
  docker-buildx-plugin x86_64  0.11.2-1.el9    docker-ce-stable  13 M
  docker-ce-rootless-extras x86_64  24.0.7-1.el9    docker-ce-stable  3.9 M
  docker-compose-plugin x86_64  2.21.0-1.el9    docker-ce-stable  13 M
Transaction Summary
=====
Install 6 Packages

Total download size: 93 M
Installed size: 367 M
Downloading Packages:
```



```
[nhatb2012122@Myserver:~]$ sudo dnf install docker-ce docker-ce-rootless-extras docker-ce-cli docker-compose-plugin
Last metadata expiration check: 0:00:00 ago
Resolving Dependencies
--> Running scriptlet: containerd.io-1.6.24-3.1.el9.x86_64                                4/6
Installing : docker-ce-rootless-extras-24.0.7-1.el9.x86_64                               5/6
Running scriptlet: docker-ce-rootless-extras-24.0.7-1.el9.x86_64                                5/6
Installing : docker-ce-3:24.0.7-1.el9.x86_64                                         6/6
Running scriptlet: docker-ce-3:24.0.7-1.el9.x86_64                                6/6
Verifying   : containerd.io-1.6.24-3.1.el9.x86_64                                1/6
Verifying   : docker-buildx-plugin-0.11.2-1.el9.x86_64                            2/6
Verifying   : docker-ce-3:24.0.7-1.el9.x86_64                                3/6
Verifying   : docker-ce-cli-1:24.0.7-1.el9.x86_64                                4/6
Verifying   : docker-ce-rootless-extras-24.0.7-1.el9.x86_64                            5/6
Verifying   : docker-compose-plugin-2.21.0-1.el9.x86_64                            6/6

Installed:
  containerd.io-1.6.24-3.1.el9.x86_64
  docker-buildx-plugin-0.11.2-1.el9.x86_64
  docker-ce-3:24.0.7-1.el9.x86_64
  docker-ce-cli-1:24.0.7-1.el9.x86_64
  docker-ce-rootless-extras-24.0.7-1.el9.x86_64
  docker-compose-plugin-2.21.0-1.el9.x86_64

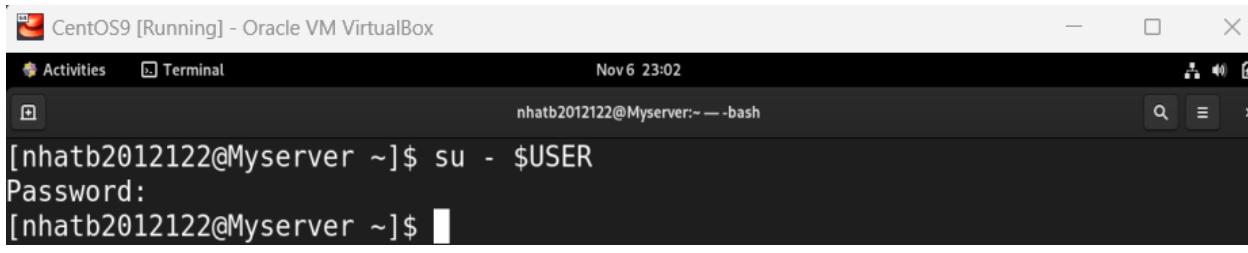
Complete!
```

- Thêm người dùng hiện tại vào nhóm docker để sử dụng các lệnh của Docker mà không cần quyền sudo
\$ sudo usermod -aG docker \$USER



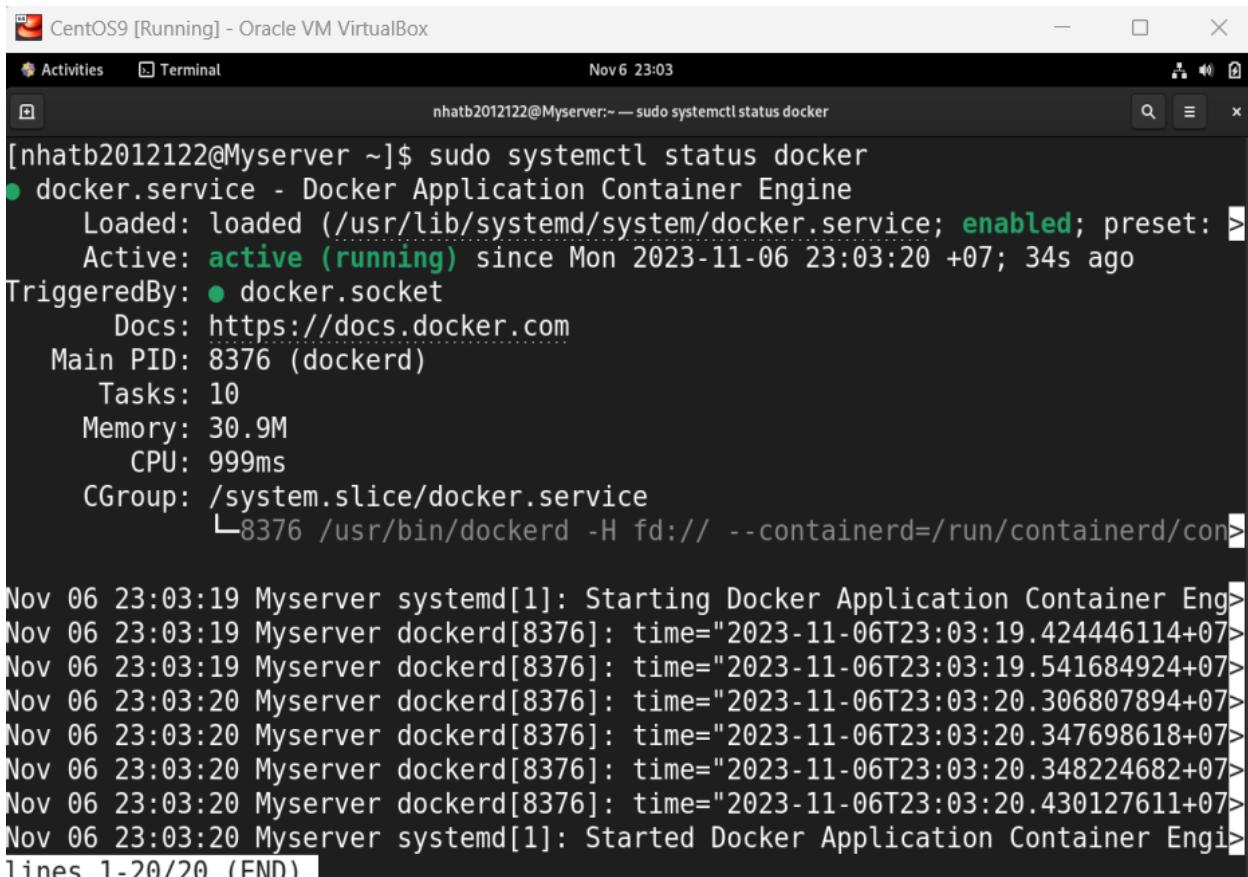
```
[nhatb2012122@Myserver ~]$ sudo usermod -aG docker $USER
[sudo] password for nhatb2012122:
[nhatb2012122@Myserver ~]$
```

- Login lại vào shell để việc thêm người dùng vào nhóm có tác dụng
\$ su - \$USER



```
[nhatb2012122@Myserver ~]$ su - $USER
Password:
[nhatb2012122@Myserver ~]$
```

- Chạy dịch vụ Docker
\$ sudo systemctl start docker
\$ sudo systemctl enable docker

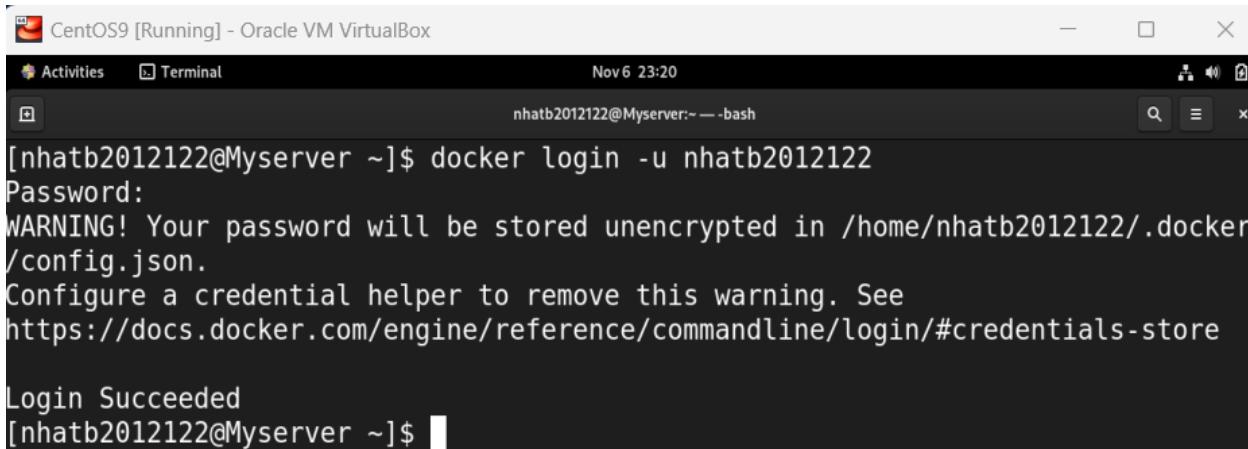


```
[nhatb2012122@Myserver ~]$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
  Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; preset: >
  Active: active (running) since Mon 2023-11-06 23:03:20 +07; 34s ago
    TriggeredBy: ● docker.socket
      Docs: https://docs.docker.com
   Main PID: 8376 (dockerd)
     Tasks: 10
    Memory: 30.9M
      CPU: 999ms
     CGroup: /system.slice/docker.service
             └─8376 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/con>

Nov 06 23:03:19 Myserver systemd[1]: Starting Docker Application Engine>
Nov 06 23:03:19 Myserver dockerd[8376]: time="2023-11-06T23:03:19.424446114+07">
Nov 06 23:03:19 Myserver dockerd[8376]: time="2023-11-06T23:03:19.541684924+07">
Nov 06 23:03:20 Myserver dockerd[8376]: time="2023-11-06T23:03:20.306807894+07">
Nov 06 23:03:20 Myserver dockerd[8376]: time="2023-11-06T23:03:20.347698618+07">
Nov 06 23:03:20 Myserver dockerd[8376]: time="2023-11-06T23:03:20.348224682+07">
Nov 06 23:03:20 Myserver dockerd[8376]: time="2023-11-06T23:03:20.430127611+07">
Nov 06 23:03:20 Myserver systemd[1]: Started Docker Application Engine>
lines 1-20/20 (END)
```

- Tạo 1 tài khoản trên DockerHub (<https://hub.docker.com/>), sau đó đăng nhập sử dụng lệnh sau:

```
$ docker login -u <docker-username>
```

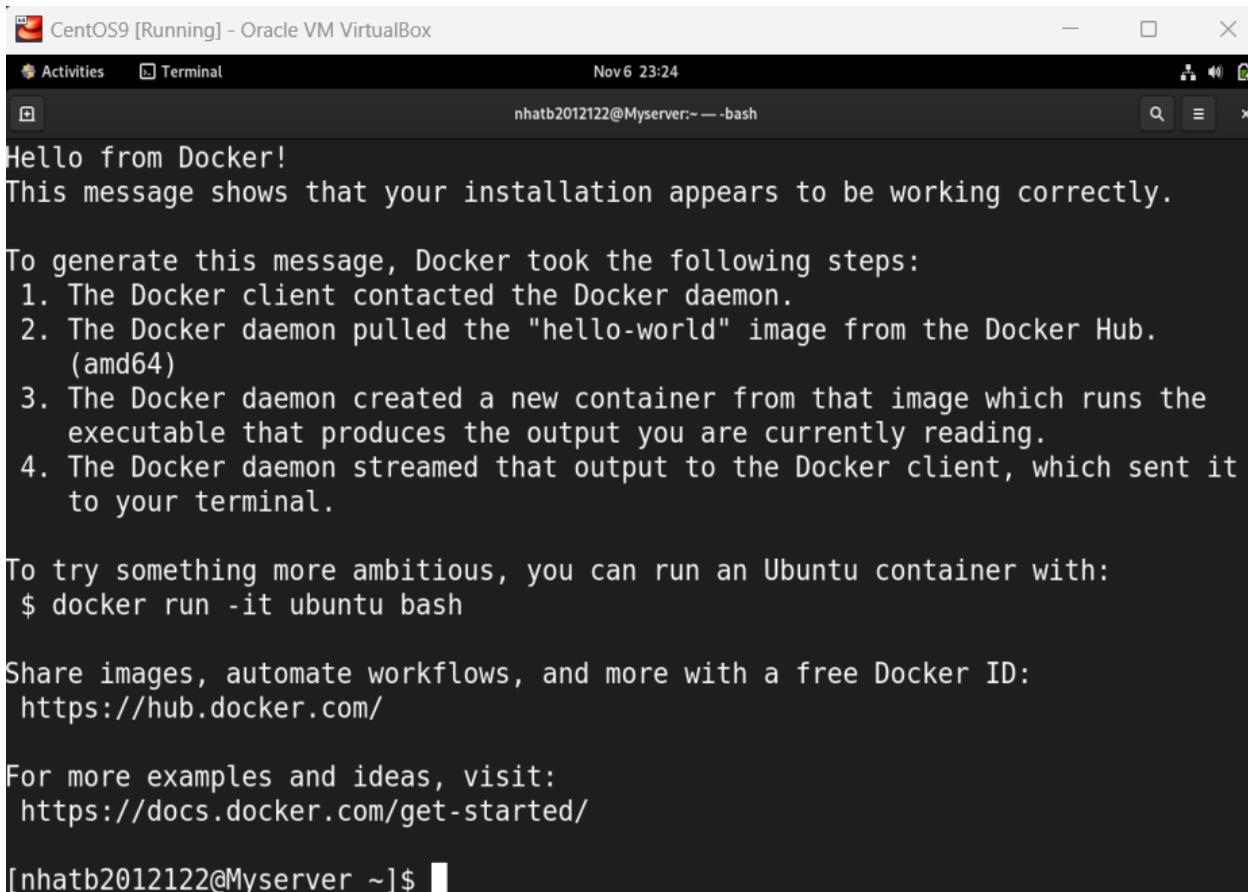


```
[nhatb2012122@Myserver ~]$ docker login -u nhatb2012122
Password:
WARNING! Your password will be stored unencrypted in /home/nhatb2012122/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[nhatb2012122@Myserver ~]$
```

- Kiểm tra docker bằng cách tải image hello-world và tạo container tương ứng. Nếu xuất hiện thông điệp chào mừng từ Docker là cài đặt thành công.

```
$ docker run hello-world
```



CentOS9 [Running] - Oracle VM VirtualBox

Activities Terminal Nov 6 23:24 nhatb2012122@Myserver:~ — bash

```
Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

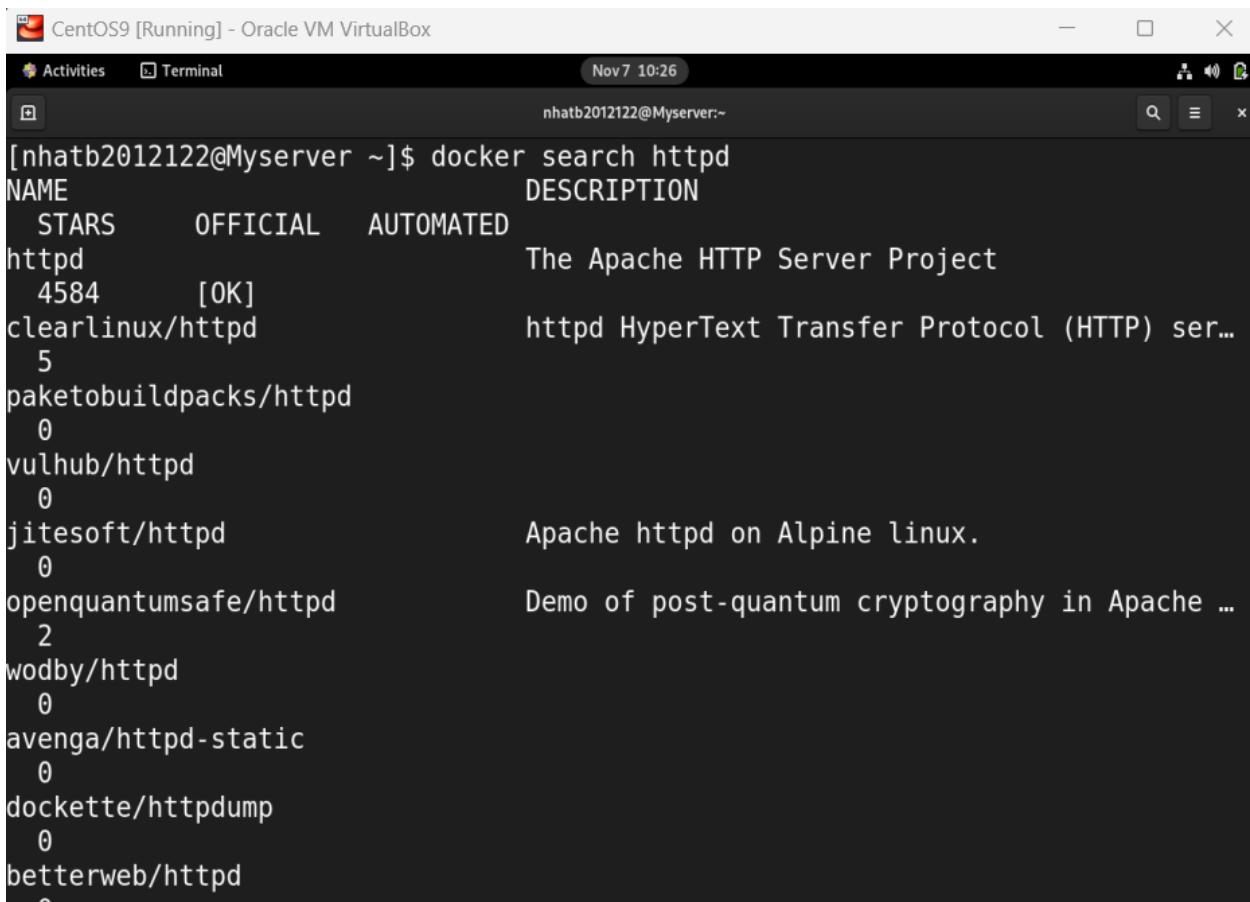
Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
```

[nhatb2012122@Myserver ~]\$ █

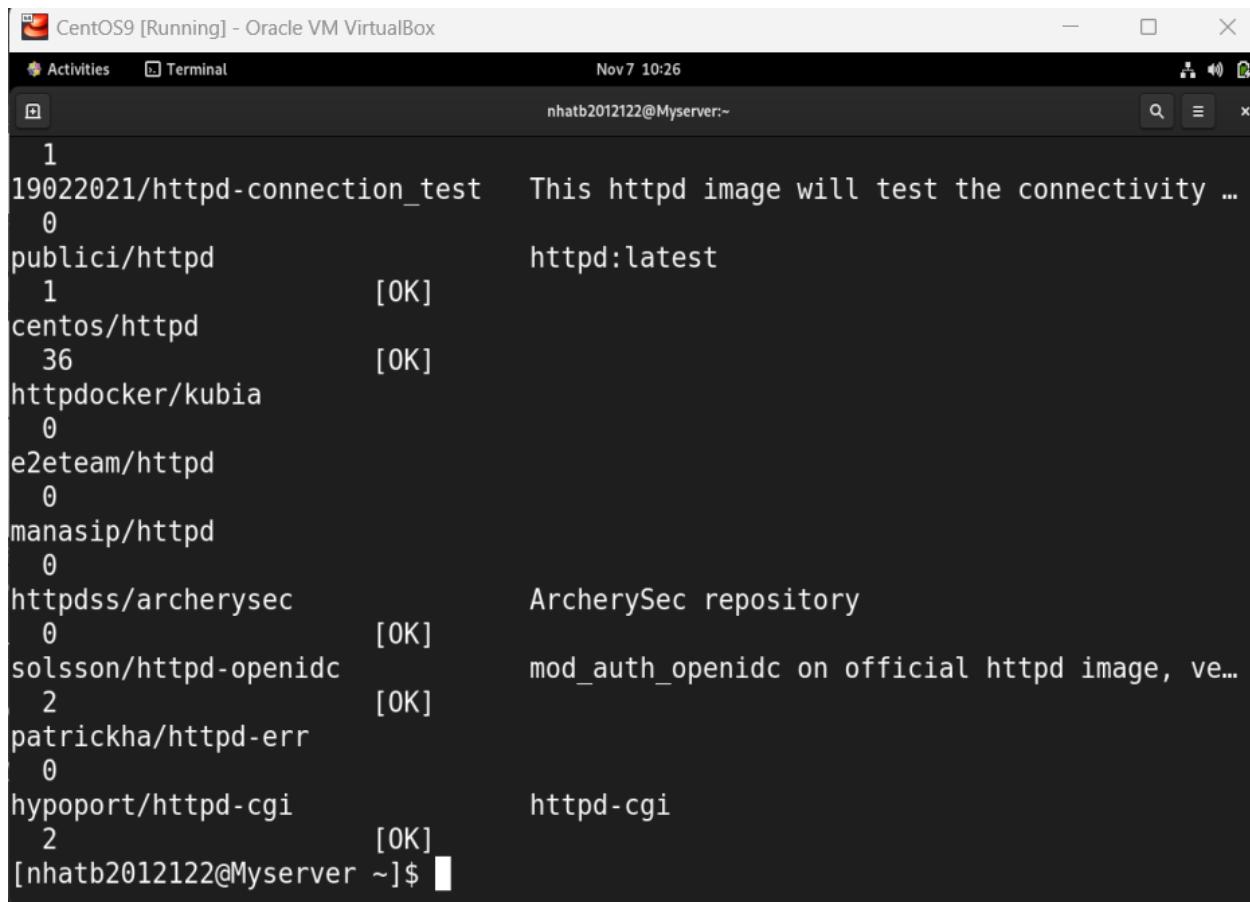
- 1.5. Triển khai dịch vụ web server lên máy ảo CentOS 9 sử dụng một Docker container
- Tìm kiếm image với từ khóa httpd, kết quả sẽ thấy 1 image tên httpd ở dòng đầu tiên.

```
$ docker search httpd
```



The screenshot shows a terminal window titled "CentOS9 [Running] - Oracle VM VirtualBox". The window title bar includes icons for minimize, maximize, and close, along with the name of the VM and the host application. The terminal interface has a dark background with light-colored text. At the top, there are tabs for "Activities" and "Terminal", and a status bar showing the date and time ("Nov 7 10:26") and the user's session ("nhatb2012122@Myserver:~"). Below the status bar is a search bar with a magnifying glass icon. The main area of the terminal displays the output of the command "docker search httpd". The output is a table with three columns: NAME, STARS, OFFICIAL, AUTOMATED, and DESCRIPTION. The table lists several Docker images related to the Apache HTTP Server Project, including "httpd" (4584 stars, official, automated), "clearlinux/httpd" (5 stars), "paketobuildpacks/httpd" (0 stars), "vulnhub/httpd" (0 stars), "jitesoft/httpd" (0 stars), "openquantumsafe/httpd" (2 stars), "wodby/httpd" (0 stars), "avenga/httpd-static" (0 stars), "dockette/httpdump" (0 stars), and "betterweb/httpd" (0 stars). The DESCRIPTION column provides brief descriptions for some of these images.

NAME	STARS	OFFICIAL	AUTOMATED	DESCRIPTION
httpd	4584	[OK]		The Apache HTTP Server Project
clearlinux/httpd	5			httpd HyperText Transfer Protocol (HTTP) ser...
paketobuildpacks/httpd	0			
vulnhub/httpd	0			
jitesoft/httpd	0			Apache httpd on Alpine linux.
openquantumsafe/httpd	2			Demo of post-quantum cryptography in Apache ...
wodby/httpd	0			
avenga/httpd-static	0			
dockette/httpdump	0			
betterweb/httpd	0			



A screenshot of a CentOS 9 VM running in Oracle VM VirtualBox. The terminal window shows the output of a Docker search command for 'httpd'. The results include various Docker images for httpd, such as 'httpd:latest' from 'publici/httpd' and 'httpd-cgi' from 'hypoport/httpd-cgi'. The terminal window has a dark theme with white text and a black background. The title bar says 'CentOS9 [Running] - Oracle VM VirtualBox'. The status bar at the bottom right shows the date and time as 'Nov 7 10:26'.

```
1
19022021/httpd-connection_test This httpd image will test the connectivity ...
  0
publici/httpd                  httpd:latest
  1                               [OK]
centos/httpd                   [OK]
  36
httpdocker/kubia
  0
e2eteam/httpd
  0
manasip/httpd
  0
httpdss/archerysec             ArcherySec repository
  0                               [OK]
solsson/httpd-openidc          mod_auth_openidc on official httpd image, ve...
  2                               [OK]
patrickha/httpd-err
  0
hypoport/httpd-cgi             httpd-cgi
  2                               [OK]
[nhatb2012122@Myserver ~]$
```

- Tạo container từ image httpd

```
$ docker run -d -it -p 8080:80 --name webserver httpd
      -d: chạy container ở chế độ background
      -it: tạo shell để tương tác với container
      --name webserver: đặt tên container là webserver
      -p 8080:80 gắn cổng 8080 của máy CentOS vào cổng 80 của
      container.
```

The terminal window shows the command `docker run -d -it -p 8080:80 --name webserver httpd` being executed. The output indicates that Docker is pulling the `httpd:latest` image from the library. Once pulled, it starts the container and displays its status. The browser window below shows the URL `192.168.155.98:8080`, which returns the message "It works!".

```
[nhatb2012122@Myserver ~]$ docker run -d -it -p 8080:80 --name webserver httpd
Unable to find image 'httpd:latest' locally
latest: Pulling from library/httpd
578acb154839: Pull complete
cla8c8567b78: Pull complete
10b9ab03bf45: Pull complete
74dbedf7ddc0: Pull complete
6a3b76b70f73: Pull complete
Digest: sha256:4e24356b4b0aa7a961e7dfb9e1e5025ca3874c532fa5d999f13f8fc33c09d1b7
Status: Downloaded newer image for httpd:latest
cd1a1db4811f7fd8cde72c71da9f7bf2729f8bc9e86492114c62b2ef44de5616
[nhatb2012122@Myserver ~]$ 
```

It works!

- Sao chép thư mục `~/myweb` vào thư mục gốc của dịch vụ của web trên Docker container.

```
$ docker cp myweb/ webserver:/usr/local/apache2/htdocs/
```

```
[nhatb2012122@Myserver ~]$ docker cp myweb/ webserver:/usr/local/apache2/htdocs/
/
Successfully copied 2.56kB to webserver:/usr/local/apache2/htdocs/
[nhatb2012122@Myserver ~]$ 
```

- Trên máy vật lý, mở trình duyệt web và truy cập vào địa chỉ `http://<Địa chỉ IP máy ảo CentOS>:8080/myweb` để kiểm chứng trang web vừa tạo.



Welcome!

Designed by B2012122

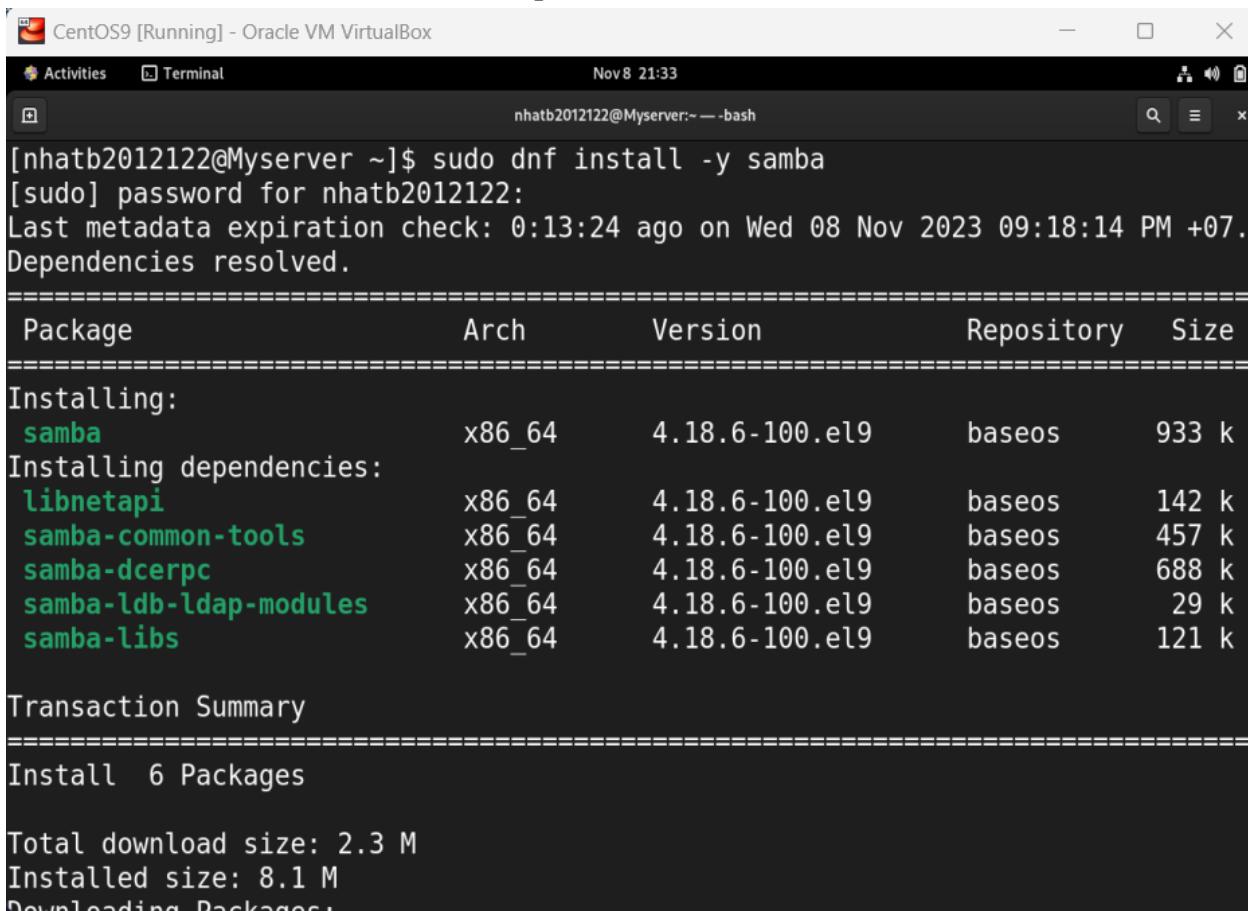
2. Cài đặt và cấu hình dịch vụ SAMBA

Samba là dịch vụ chia sẻ file giữa các hệ điều hành khác nhau như Windows và Linux bằng cách sử dụng giao thức SMB/CIFS. Trong bài thực hành sinh viên sẽ cài đặt và cấu hình dịch vụ Samba trên máy chủ CentOS và sử dụng máy Windows để truy cập tới dịch vụ.

Tìm hiểu và thực hiện các yêu cầu sau (kèm hình minh họa cho từng bước):

- Cài đặt dịch vụ Samba:

```
$sudo dnf install -y samba
```



The screenshot shows a terminal window titled "CentOS9 [Running] - Oracle VM VirtualBox". The window has a dark theme with white text. The title bar includes the window name, the host name "Nov 8 21:33", and the user "nhatb2012122@Myserver:~ -- bash". The terminal content shows the command \$sudo dnf install -y samba being run, followed by a password prompt, and the output of the package installation process. The output includes sections for "Installing:", "Installing dependencies:", and "Transaction Summary", listing packages like samba, libnetapi, samba-common-tools, samba-dcerpc, samba-ldb-ldap-modules, and samba-libs with their respective versions, architectures (x86_64), repositories (baseos), and sizes.

```
[nhatb2012122@Myserver ~]$ sudo dnf install -y samba
[sudo] password for nhatb2012122:
Last metadata expiration check: 0:13:24 ago on Wed 08 Nov 2023 09:18:14 PM +07.
Dependencies resolved.
=====
 Package           Arch      Version       Repository  Size
 =====
 Installing:
  samba            x86_64    4.18.6-100.el9   baseos     933 k
Installing dependencies:
  libnetapi         x86_64    4.18.6-100.el9   baseos     142 k
  samba-common-tools x86_64    4.18.6-100.el9   baseos     457 k
  samba-dcerpc      x86_64    4.18.6-100.el9   baseos     688 k
  samba-ldb-ldap-modules x86_64    4.18.6-100.el9   baseos     29 k
  samba-libs        x86_64    4.18.6-100.el9   baseos     121 k

Transaction Summary
=====
Install 6 Packages

Total download size: 2.3 M
Installed size: 8.1 M
Downloading Packages:
```

```
CentOS9 [Running] - Oracle VM VirtualBox
Activities Terminal Nov 8 21:33
nhatb2012122@Myserver:~ -- bash

Installing : samba-common-tools-4.18.6-100.el9.x86_64 2/6
Installing : libnetapi-4.18.6-100.el9.x86_64 3/6
Installing : samba-dcerpc-4.18.6-100.el9.x86_64 4/6
Installing : samba-ldb-ldap-modules-4.18.6-100.el9.x86_64 5/6
Installing : samba-common-tools-4.18.6-100.el9.x86_64 6/6
Installing : samba-4.18.6-100.el9.x86_64 6/6
Running scriptlet: samba-4.18.6-100.el9.x86_64 6/6
Verifying : libnetapi-4.18.6-100.el9.x86_64 1/6
Verifying : samba-4.18.6-100.el9.x86_64 2/6
Verifying : samba-common-tools-4.18.6-100.el9.x86_64 3/6
Verifying : samba-dcerpc-4.18.6-100.el9.x86_64 4/6
Verifying : samba-ldb-ldap-modules-4.18.6-100.el9.x86_64 5/6
Verifying : samba-libs-4.18.6-100.el9.x86_64 6/6

Installed:
libnetapi-4.18.6-100.el9.x86_64
samba-4.18.6-100.el9.x86_64
samba-common-tools-4.18.6-100.el9.x86_64
samba-dcerpc-4.18.6-100.el9.x86_64
samba-ldb-ldap-modules-4.18.6-100.el9.x86_64
samba-libs-4.18.6-100.el9.x86_64

Complete!
```

- Tạo người dùng và nhóm người dùng chia sẻ dữ liệu:

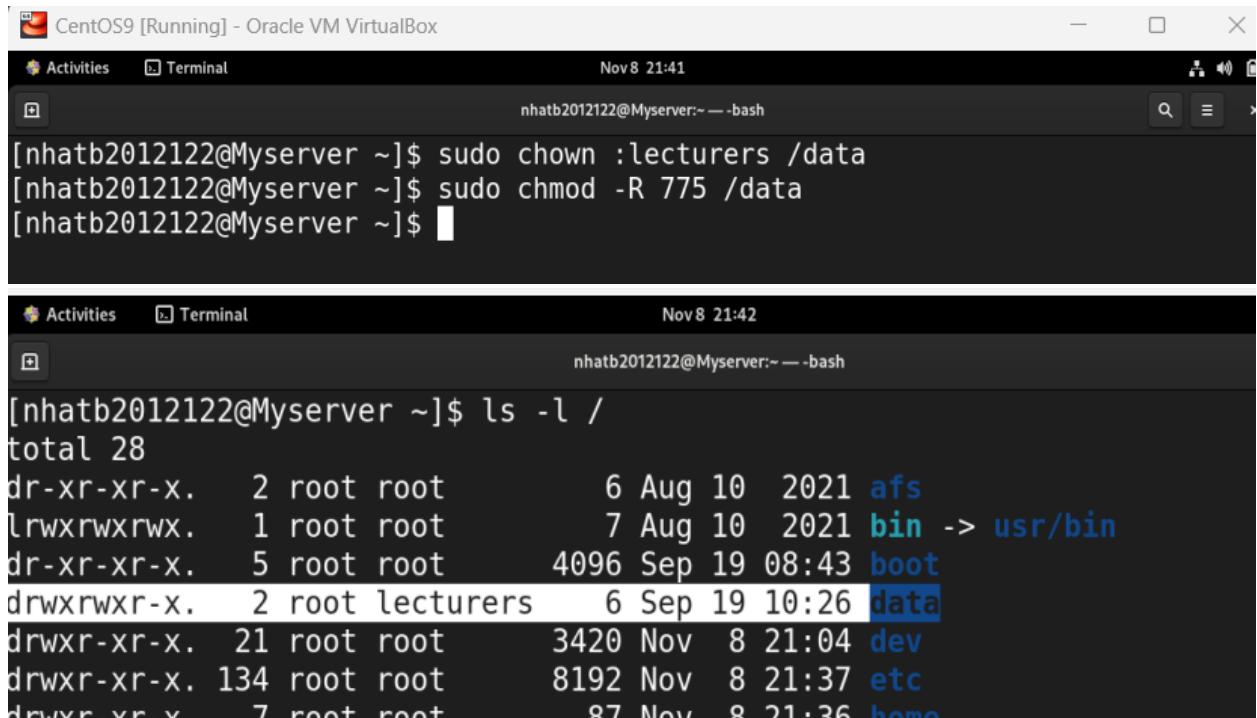
```
$sudo adduser tuanhai
$sudo passwd tuanhai
$sudo groupadd lecturers
$ sudo usermod -a -G lecturers tuanhai
```

```
CentOS9 [Running] - Oracle VM VirtualBox
Activities Terminal Nov 8 21:37
nhatb2012122@Myserver:~ -- bash

[nhatb2012122@Myserver ~]$ sudo adduser vannhat
[nhatb2012122@Myserver ~]$ sudo passwd vannhat
Changing password for user vannhat.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[nhatb2012122@Myserver ~]$ sudo groupadd lecturers
[nhatb2012122@Myserver ~]$ sudo usermod -a -G lecturers vannhat
[nhatb2012122@Myserver ~]$ █
```

- Tạo thư mục cần chia sẻ và phân quyền:

```
$sudo mkdir /data  
$sudo chown :lecturers /data  
$sudo chmod -R 775 /data
```



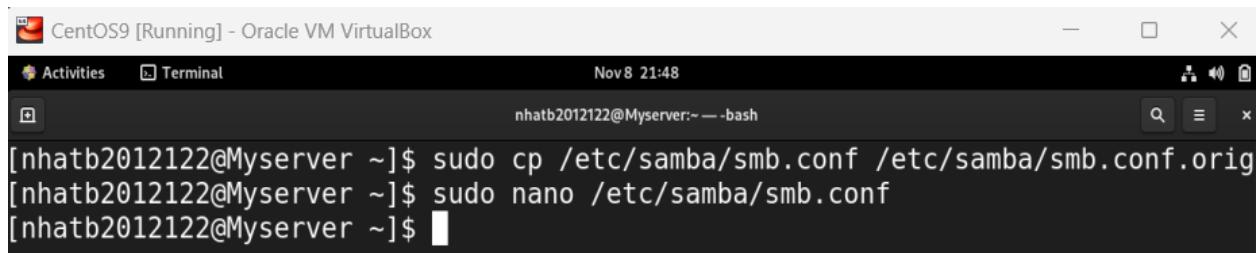
```
CentOS9 [Running] - Oracle VM VirtualBox  
Activities Terminal Nov 8 21:41  
nhatb2012122@Myserver:~ -- bash  
[nhatb2012122@Myserver ~]$ sudo chown :lecturers /data  
[nhatb2012122@Myserver ~]$ sudo chmod -R 775 /data  
[nhatb2012122@Myserver ~]$
```



```
Activities Terminal Nov 8 21:42  
nhatb2012122@Myserver:~ -- bash  
[nhatb2012122@Myserver ~]$ ls -l /  
total 28  
dr-xr-xr-x. 2 root root 6 Aug 10 2021 afs  
lrwxrwxrwx. 1 root root 7 Aug 10 2021 bin -> usr/bin  
dr-xr-xr-x. 5 root root 4096 Sep 19 08:43 boot  
drwxrwxr-x. 2 root lecturers 6 Sep 19 10:26 data  
drwxr-xr-x. 21 root root 3420 Nov 8 21:04 dev  
drwxr-xr-x. 134 root root 8192 Nov 8 21:37 etc  
drwxr-xr-x. 7 root root 87 Nov 8 21:36 home
```

- Cấu hình dịch vụ Samba:

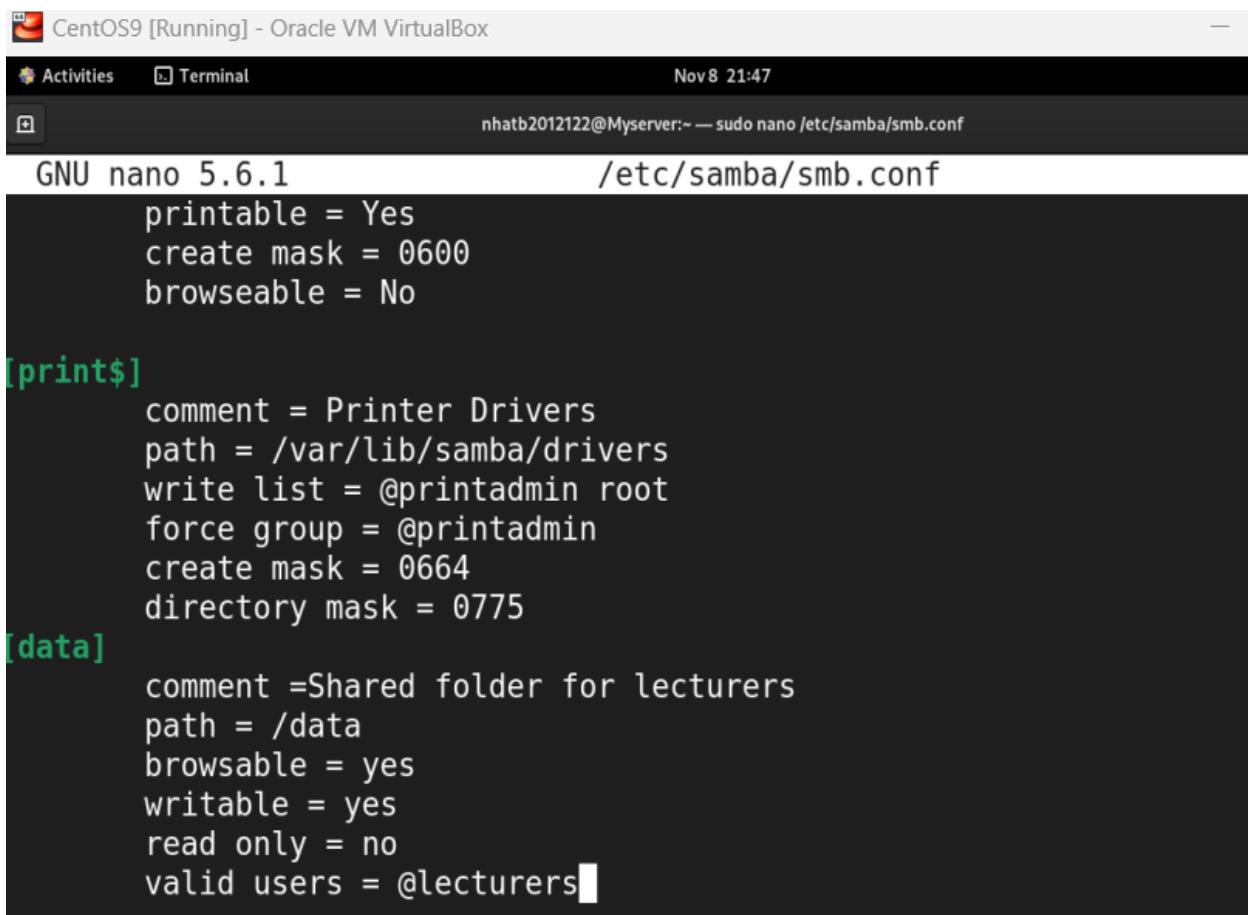
```
$sudo cp /etc/samba/smb.conf /etc/samba/smb.conf.orig  
$sudo nano /etc/samba/smb.conf
```



```
CentOS9 [Running] - Oracle VM VirtualBox  
Activities Terminal Nov 8 21:48  
nhatb2012122@Myserver:~ -- bash  
[nhatb2012122@Myserver ~]$ sudo cp /etc/samba/smb.conf /etc/samba/smb.conf.orig  
[nhatb2012122@Myserver ~]$ sudo nano /etc/samba/smb.conf  
[nhatb2012122@Myserver ~]$
```

#Thêm đoạn cấu hình bên dưới vào cuối tập tin

```
[data]  
comment = Shared folder for lecturers  
path = /data  
browsable = yes  
writable = yes  
read only = no  
valid users = @lecturers
```



```
CentOS9 [Running] - Oracle VM VirtualBox
Activities Terminal Nov 8 21:47
nhatb2012122@Myserver:~ — sudo nano /etc/samba/smb.conf

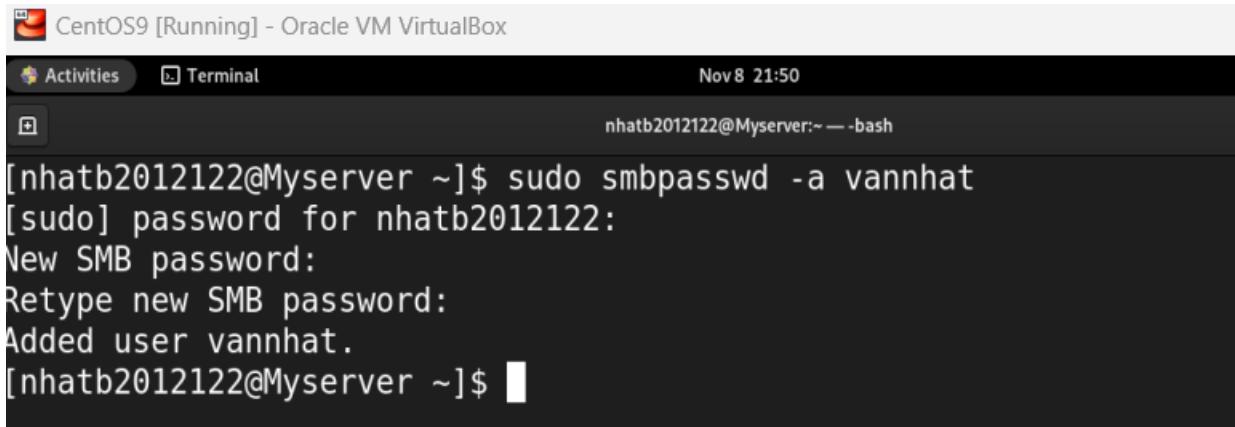
GNU nano 5.6.1 /etc/samba/smb.conf

printable = Yes
create mask = 0600
browseable = No

[print$]
comment = Printer Drivers
path = /var/lib/samba/drivers
write list = @printadmin root
force group = @printadmin
create mask = 0664
directory mask = 0775

[data]
comment = Shared folder for lecturers
path = /data
browsable = yes
writable = yes
read only = no
valid users = @lecturers
```

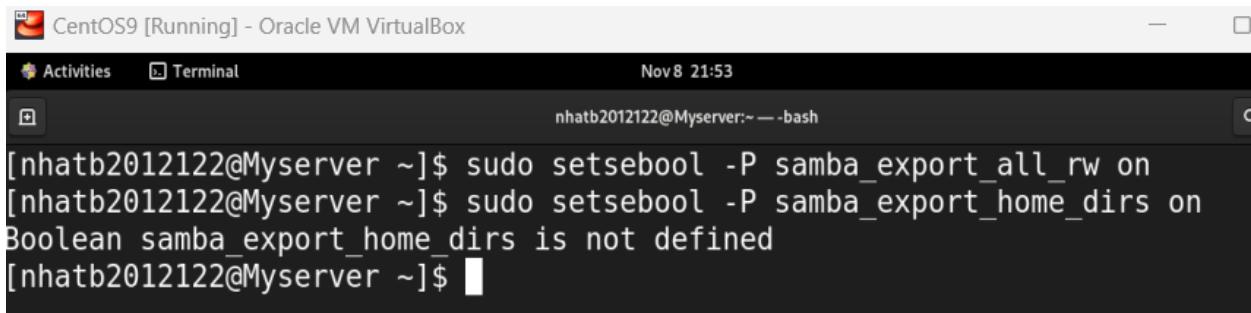
- Thêm người dùng cho dịch vụ Samba:
\$sudo smbpasswd -a tuanhai
#Đặt mật khẩu Samba cho người dùng



```
CentOS9 [Running] - Oracle VM VirtualBox
Activities Terminal Nov 8 21:50
nhatb2012122@Myserver:~ — bash

[nhatb2012122@Myserver ~]$ sudo smbpasswd -a vannhat
[sudo] password for nhatb2012122:
New SMB password:
Retype new SMB password:
Added user vannhat.
[nhatb2012122@Myserver ~]$
```

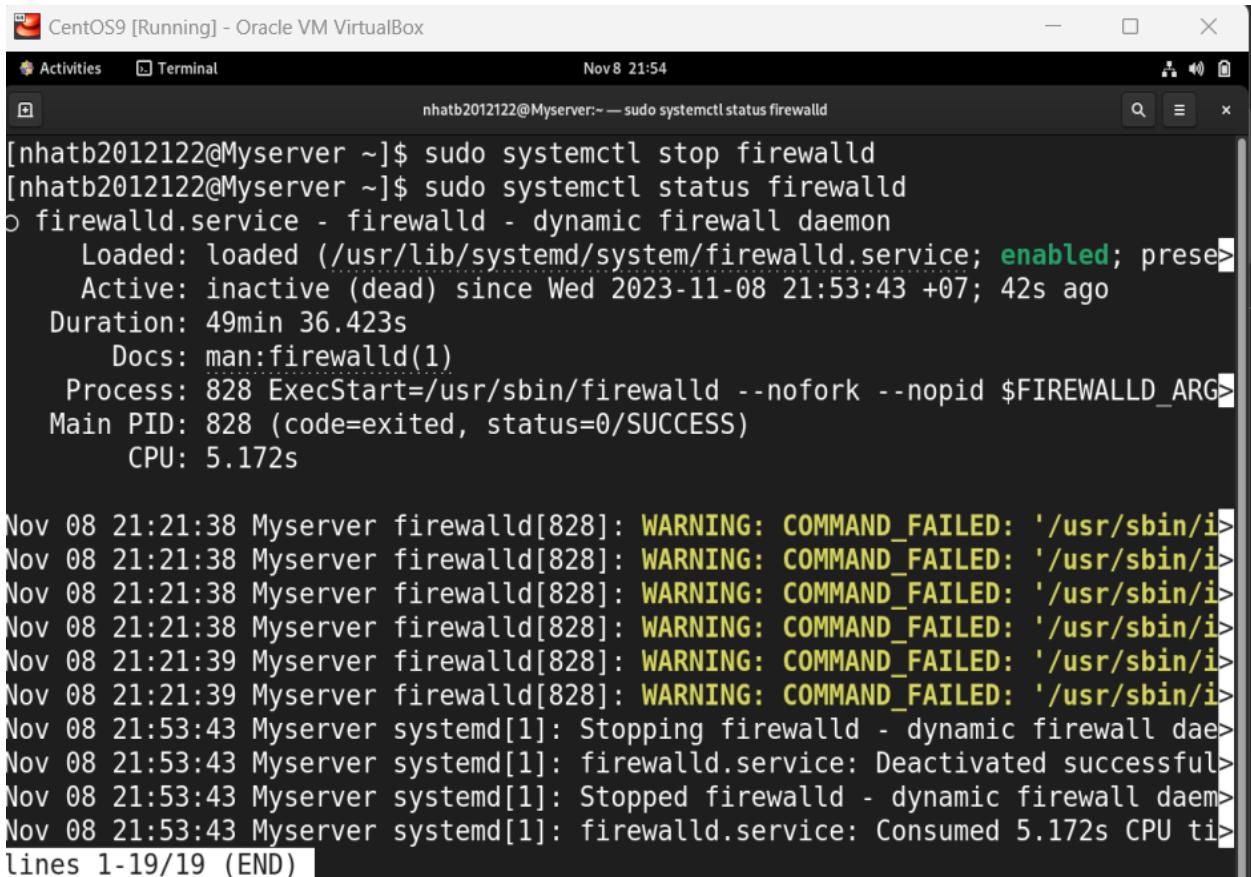
- Cấu hình SELINUX cho phép Samba
\$sudo setsebool -P samba_export_all_rw on
\$sudo setsebool -P samba_enable_home_dirs on



```
[nhatb2012122@Myserver ~]$ sudo setsebool -P samba_export_all_rw on
[nhatb2012122@Myserver ~]$ sudo setsebool -P samba_export_home_dirs on
Boolean samba_export_home_dirs is not defined
[nhatb2012122@Myserver ~]$
```

- Tắt tường lửa:

```
$sudo systemctl stop firewalld
```

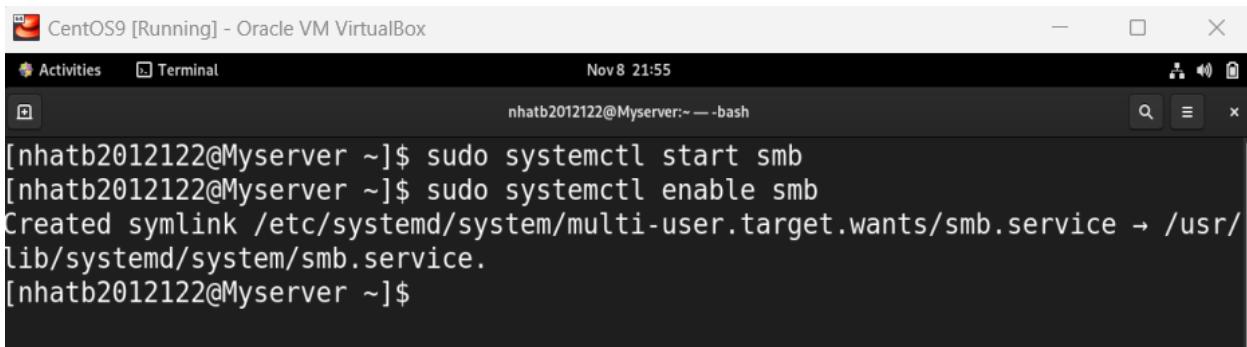


```
[nhatb2012122@Myserver ~]$ sudo systemctl stop firewalld
[nhatb2012122@Myserver ~]$ sudo systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; presen>
   Active: inactive (dead) since Wed 2023-11-08 21:53:43 +07; 42s ago
     Duration: 49min 36.423s
       Docs: man:firewalld(1)
      Process: 828 ExecStart=/usr/sbin/firewalld --nofork --nopid $FIREWALLD_ARG>
     Main PID: 828 (code=exited, status=0/SUCCESS)
        CPU: 5.172s

Nov 08 21:21:38 Myserver firewalld[828]: WARNING: COMMAND_FAILED: '/usr/sbin/i>
Nov 08 21:21:39 Myserver firewalld[828]: WARNING: COMMAND_FAILED: '/usr/sbin/i>
Nov 08 21:21:39 Myserver firewalld[828]: WARNING: COMMAND_FAILED: '/usr/sbin/i>
Nov 08 21:53:43 Myserver systemd[1]: Stopping firewalld - dynamic firewall dae>
Nov 08 21:53:43 Myserver systemd[1]: firewalld.service: Deactivated successful>
Nov 08 21:53:43 Myserver systemd[1]: Stopped firewalld - dynamic firewall daem>
Nov 08 21:53:43 Myserver systemd[1]: firewalld.service: Consumed 5.172s CPU ti>
lines 1-19/19 (END)
```

- Khởi động cho phép Samba tự động thực thi khi khởi động hệ điều hành:

```
$sudo systemctl start smb
$sudo systemctl enable smb
```



```
[nhatb2012122@Myserver ~]$ sudo systemctl start smb
[nhatb2012122@Myserver ~]$ sudo systemctl enable smb
Created symlink /etc/systemd/system/multi-user.target.wants/smb.service → /usr/lib/systemd/system/smb.service.
[nhatb2012122@Myserver ~]$
```

- Trên File Explorer của máy Windows, chọn tính năng “Add a network location” để nối kết tới Samba server sử dụng địa chỉ \\<IP máy CentOS>\data



Specify the location of your website

Type the address of the website, FTP site, or network location that this shortcut will open.

Internet or network address:

← Add Network Location

What do you want to name this location?

Create a name for this shortcut that will help you easily identify this network location:

\\192.168.155.98\data.

Type a name for this network location:

3. Cài đặt và cấu hình dịch vụ DNS

DNS (Domain Name System) là giải pháp dùng tên miền thay cho địa chỉ IP khó nhớ khi sử dụng các dịch vụ trên mạng. Truy cập đến website của Trường CNTT-TT- Trường ĐH Cần Thơ bằng địa chỉ nào dễ nhớ hơn ?

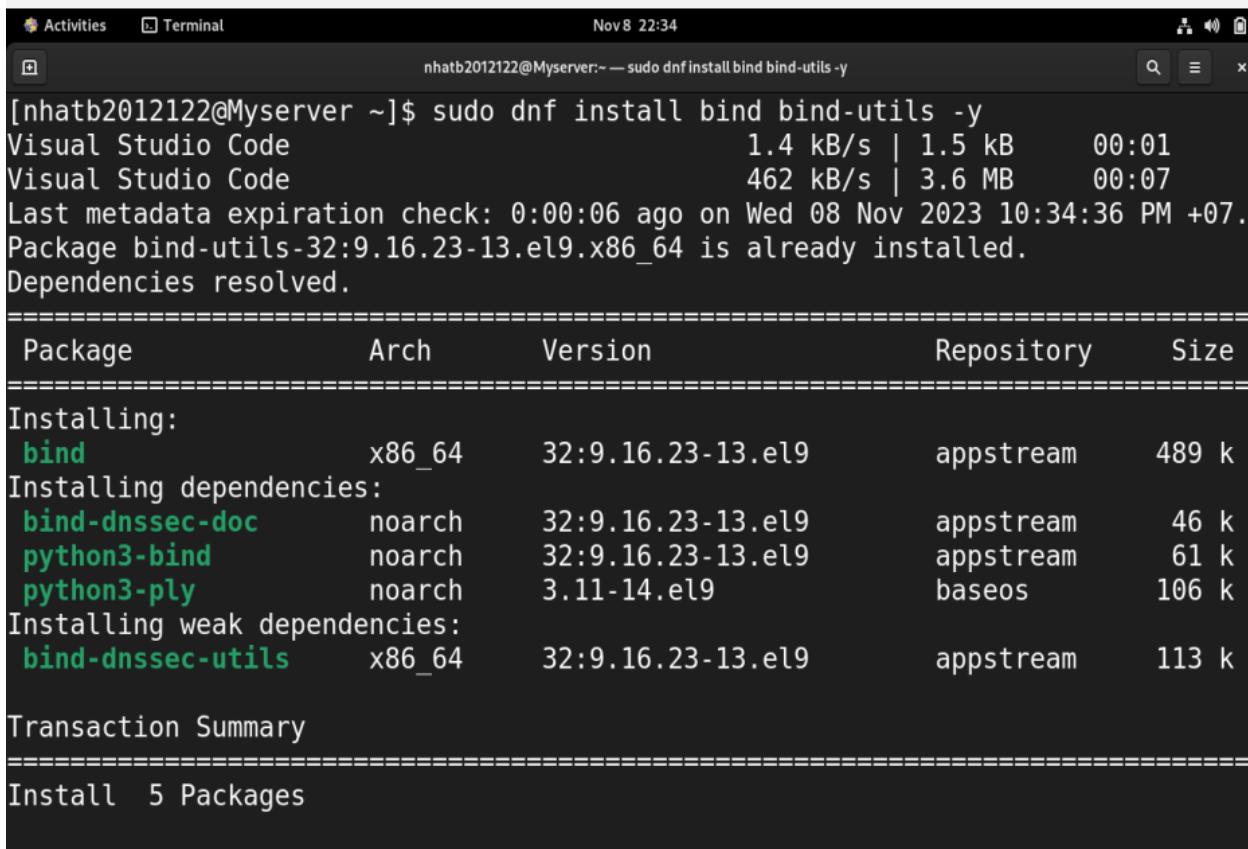
<http://123.30.143.202> hay <http://www.cit.ctu.edu.vn>

Trong bài thực hành này sinh viên cần cài đặt phần mềm BIND trên CentOS để phân giải tên miền “qtht.com.vn”

Tìm hiểu và thực hiện các yêu cầu sau (kèm hình minh họa cho từng bước):

3.1. Cài đặt BIND và các công cụ cần thiết:

\$ sudo dnf install bind bind-utils -y

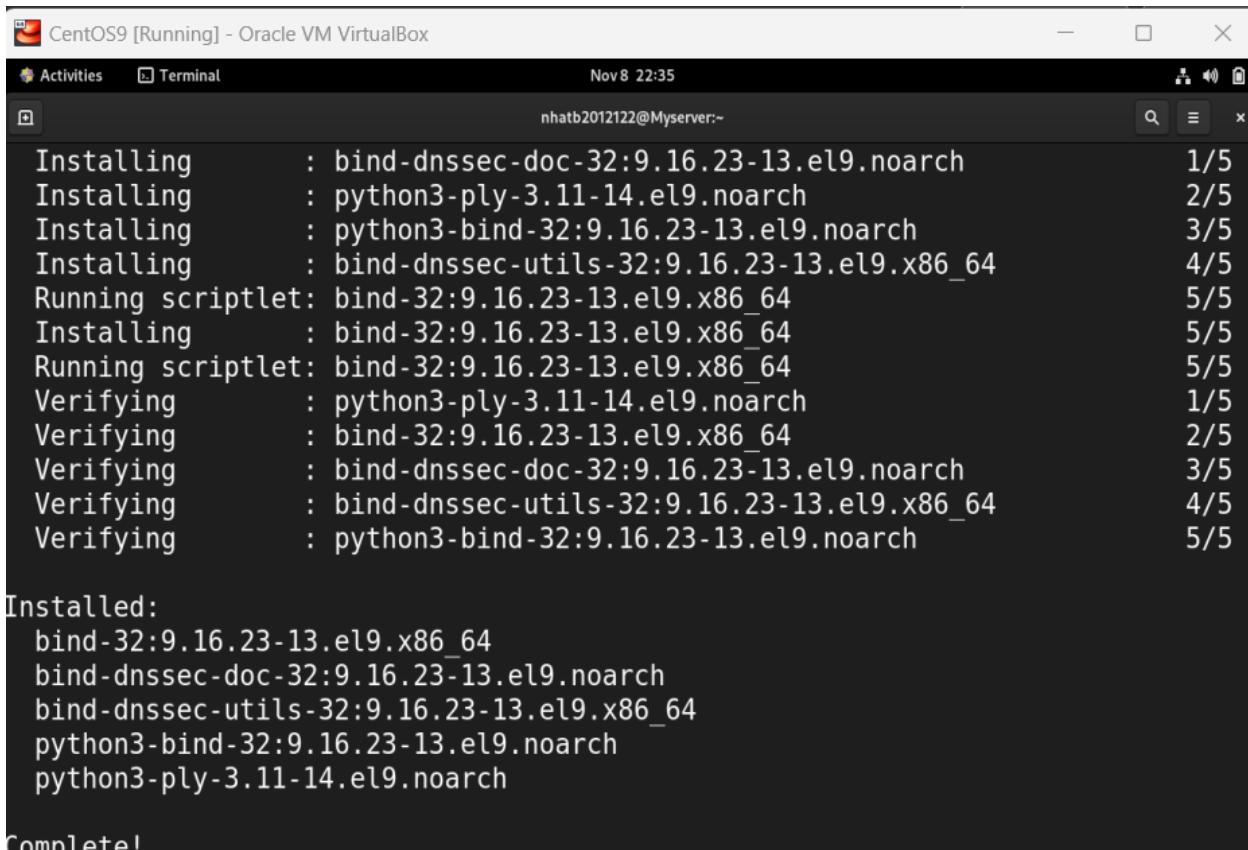


The screenshot shows a terminal window titled "Terminal" with the command "sudo dnf install bind bind-utils -y" entered. The output shows the installation of the "bind" package and its dependencies. The transaction summary indicates 5 packages were installed.

```
[nhatb2012122@Myserver ~]$ sudo dnf install bind bind-utils -y
Visual Studio Code           1.4 kB/s | 1.5 kB   00:01
Visual Studio Code           462 kB/s | 3.6 MB  00:07
Last metadata expiration check: 0:00:06 ago on Wed 08 Nov 2023 10:34:36 PM +07.
Package bind-utils-32:9.16.23-13.el9.x86_64 is already installed.
Dependencies resolved.

=====
 Package          Arch      Version       Repository    Size
=====
Installing:
 bind             x86_64    32:9.16.23-13.el9    appstream   489 k
Installing dependencies:
 bind-dnssec-doc  noarch    32:9.16.23-13.el9    appstream   46 k
 python3-bind     noarch    32:9.16.23-13.el9    appstream   61 k
 python3-ply      noarch    3.11-14.el9        baseos      106 k
Installing weak dependencies:
 bind-dnssec-utils x86_64   32:9.16.23-13.el9    appstream   113 k

Transaction Summary
=====
Install 5 Packages
```



CentOS9 [Running] - Oracle VM VirtualBox

Activities Terminal Nov 8 22:35 nhatb2012122@Myserver:~

```
Installing      : bind-dnssec-doc-32:9.16.23-13.el9.noarch          1/5
Installing      : python3-ply-3.11-14.el9.noarch                  2/5
Installing      : python3-bind-32:9.16.23-13.el9.noarch          3/5
Installing      : bind-dnssec-utils-32:9.16.23-13.el9.x86_64       4/5
Running scriptlet: bind-32:9.16.23-13.el9.x86_64                5/5
Installing      : bind-32:9.16.23-13.el9.x86_64                5/5
Running scriptlet: bind-32:9.16.23-13.el9.x86_64                5/5
Verifying       : python3-ply-3.11-14.el9.noarch          1/5
Verifying       : bind-32:9.16.23-13.el9.x86_64                2/5
Verifying       : bind-dnssec-doc-32:9.16.23-13.el9.noarch          3/5
Verifying       : bind-dnssec-utils-32:9.16.23-13.el9.x86_64       4/5
Verifying       : python3-bind-32:9.16.23-13.el9.noarch          5/5

Installed:
bind-32:9.16.23-13.el9.x86_64
bind-dnssec-doc-32:9.16.23-13.el9.noarch
bind-dnssec-utils-32:9.16.23-13.el9.x86_64
python3-bind-32:9.16.23-13.el9.noarch
python3-ply-3.11-14.el9.noarch

Complete!
```

3.2. Cấu hình DNS server:

```
$sudo nano /etc/named.conf
#(tham khảo file mẫu)

...
options {
    listen-on port 53 { 127.0.0.1; any; };
    ...
    allow-query      { localhost; any; };
    recursion yes;
    forwarders {192.168.55.1; };

    ..
};

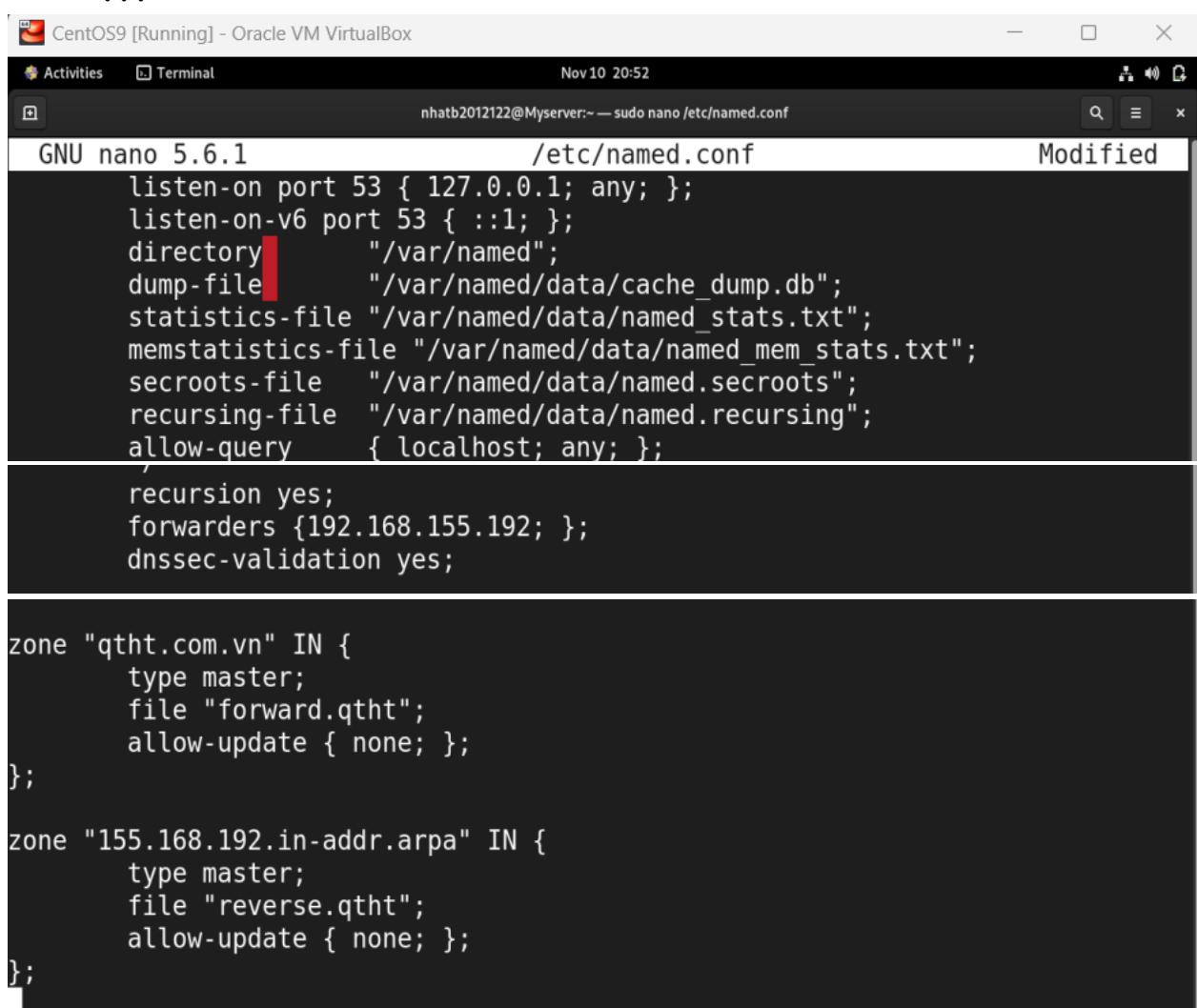
logging {
    ..
};

zone "." IN {
    ...
};
```

```
zone "qtht.com.vn" IN {
    type master;
    file "forward.qtht";
    allow-update { none; };
};

zone "55.168.192.in-addr.arpa" IN {
    type master;
    file "reverse.qtht";
    allow-update { none; };
};

...
```



```
GNU nano 5.6.1          /etc/named.conf      Modified
listen-on port 53 { 127.0.0.1; any; };
listen-on-v6 port 53 { ::1; };
directory "/var/named";
dump-file "/var/named/data/cache_dump.db";
statistics-file "/var/named/data/named_stats.txt";
memstatistics-file "/var/named/data/named_mem_stats.txt";
secroots-file "/var/named/data/named.secroots";
recursing-file "/var/named/data/named.recurse";
allow-query { localhost; any; };

recursion yes;
forwarders {192.168.155.192; };
dnssec-validation yes;

zone "qtht.com.vn" IN {
    type master;
    file "forward.qtht";
    allow-update { none; };
};

zone "55.168.192.in-addr.arpa" IN {
    type master;
    file "reverse.qtht";
    allow-update { none; };
};
```

3.3. Tạo tập tin cấu hình phân giải xuôi:

```
$sudo cp /var/named/named.localhost /var/named/forward.qtht
```

```
[nhatb2012122@Myserver ~]$ sudo cp /var/named/named.localhost /var/named/forward.qtht
[nhatb2012122@Myserver ~]$ sudo ls -l /var/named
total 20
drwxrwx--- 2 named named    6 Jul 20 01:18 data
drwxrwx--- 2 named named    6 Jul 20 01:18 dynamic
-rw-r----- 1 root  root   152 Nov 10 21:00 forward.qtht
-rw-r----- 1 root  named  2253 Jul 20 01:18 named.ca
-rw-r----- 1 root  named   152 Jul 20 01:18 named.empty
-rw-r----- 1 root  named   152 Jul 20 01:18 named.localhost
-rw-r----- 1 root  named   168 Jul 20 01:18 named.loopback
drwxrwx--- 2 named named    6 Jul 20 01:18 slaves
[nhatb2012122@Myserver ~]$
```

```
$sudo chgrp named /var/named/forward.qtht
```

```
[nhatb2012122@Myserver ~]$ sudo chgrp named /var/named/forward.qtht
```

```
[nhatb2012122@Myserver ~]$ sudo ls -l /var/named
```

```
total 20
```

```
drwxrwx--- 2 named named    6 Jul 20 01:18 data
drwxrwx--- 2 named named    6 Jul 20 01:18 dynamic
-rw-r----- 1 root  named   152 Nov 10 21:00 forward.qtht
-rw-r----- 1 root  named  2253 Jul 20 01:18 named.ca
-rw-r----- 1 root  named   152 Jul 20 01:18 named.empty
-rw-r----- 1 root  named   152 Jul 20 01:18 named.localhost
-rw-r----- 1 root  named   168 Jul 20 01:18 named.loopback
drwxrwx--- 2 named named    6 Jul 20 01:18 slaves
```

```
[nhatb2012122@Myserver ~]$ █
```

```
$sudo nano /var/named/forward.qtht
```

```
#(tham khảo file mẫu)
```

```
$TTL 1D
```

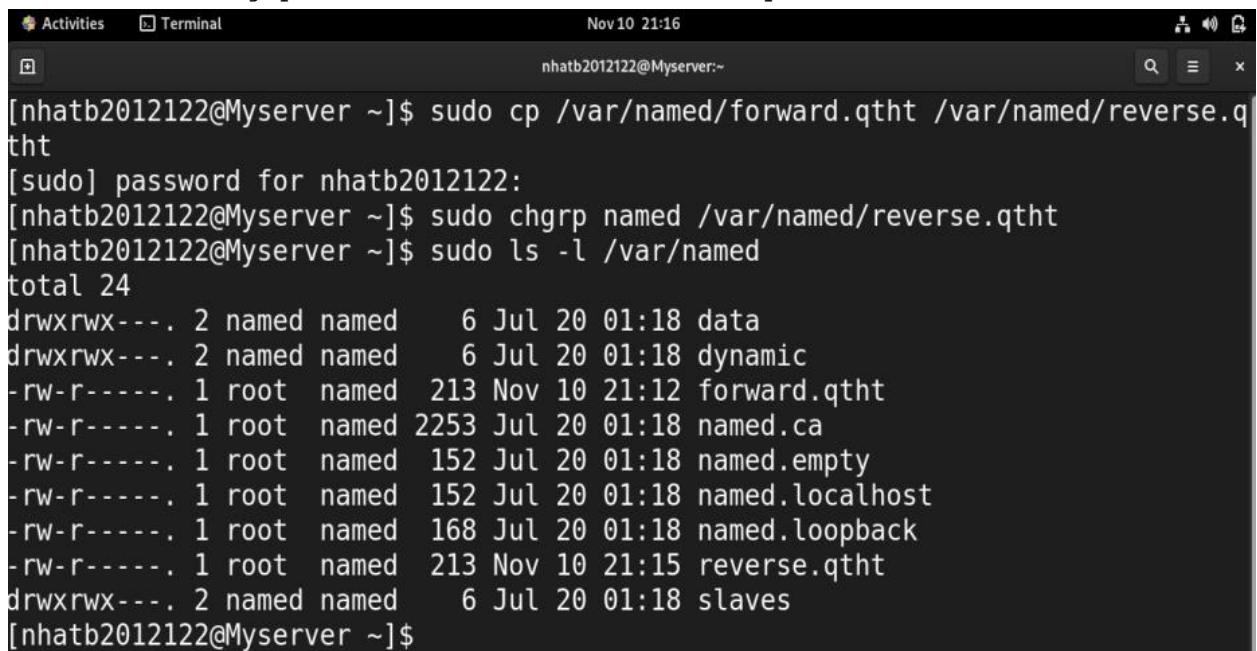
```
@ IN SOA @ qtht.com.vn. (
        0      ;Serial
        1D     ;Refresh
        1H     ;Retry
        1W     ;Expire
        3H     ;Minimum TTL
)
@ IN NS dns.qtht.com.vn.
dns IN A 192.168.55.250
www IN A 192.168.55.250
htql IN A 8.8.8.8
```

```
GNU nano 5.6.1          /var/named/forward.qtht          Modified
$TTL 1D
@      IN SOA @ qtht.com.vn. (
                                0      ; serial
                                1D     ; refresh
                                1H     ; retry
                                1W     ; expire
                                3H )   ; minimum

@      IN      NS      dns.qtht.com.vn.
dns    IN      A       192.168.155.98
www    IN      A       192.168.155.98
htql   IN      A       8.8.8.8
```

3.4. Tạo tập tin cấu hình phân giải ngược:

```
$sudo cp /var/named/forward.qtht /var/named/reverse.qtht
$sudo chgrp named /var/named/reverse.qtht
```



```
Activities Terminal Nov 10 21:16
[nhatb2012122@Myserver ~]$ sudo cp /var/named/forward.qtht /var/named/reverse.qtht
[nhatb2012122@Myserver ~]$ sudo chgrp named /var/named/reverse.qtht
[nhatb2012122@Myserver ~]$ sudo ls -l /var/named
total 24
drwxrwx---. 2 named named 6 Jul 20 01:18 data
drwxrwx---. 2 named named 6 Jul 20 01:18 dynamic
-rw-r-----. 1 root  named 213 Nov 10 21:12 forward.qtht
-rw-r-----. 1 root  named 2253 Jul 20 01:18 named.ca
-rw-r-----. 1 root  named 152 Jul 20 01:18 named.empty
-rw-r-----. 1 root  named 152 Jul 20 01:18 named.localhost
-rw-r-----. 1 root  named 168 Jul 20 01:18 named.loopback
-rw-r-----. 1 root  named 213 Nov 10 21:15 reverse.qtht
drwxrwx---. 2 named named 6 Jul 20 01:18 slaves
[nhatb2012122@Myserver ~]$
```

```
$sudo nano /var/named/reverse.qtht
```

```
$TTL 1D
@      IN SOA @ qtht.com.vn. (
                                0      ; Serial
                                1D     ; Refresh
                                1H     ; Retry
                                1W     ; Expire
                                3H )   ; Minimum TTL

)
@      IN      NS      dns.qtht.com.vn.
```

```

dns      IN      A      192.168.55.250
250      IN      PTR     www.qtht.com.vn.

GNU nano 5.6.1          /var/named/reverse.qtht
$TTL 1D
@      IN SOA  @ qtht.com.vn. (
                                0      ; serial
                                1D     ; refresh
                                1H     ; retry
                                1W     ; expire
                                3H )   ; minimum

@      IN      NS      dns.qtht.com.vn.
dns    IN      A       192.168.155.98
98    IN      PTR     www.qtht.com.vn.

```

3.5. Kiểm tra và sử dụng dịch vụ DNS

- Tắt tường lửa:

```
$sudo systemctl stop firewalld
```

```

[nhatb2012122@Myserver ~]$ sudo systemctl stop firewalld
[nhatb2012122@Myserver ~]$ sudo systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
  Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; presen
  Active: inactive (dead) since Fri 2023-11-10 21:21:39 +07; 6s ago
    Duration: 41min 42.192s
      Docs: man:firewalld(1)
    Process: 830 ExecStart=/usr/sbin/firewalld --nofork --nopid $FIREWALLD_ARD
   Main PID: 830 (code=exited, status=0/SUCCESS)
        CPU: 7.946s

Nov 10 20:40:13 Myserver firewalld[830]: WARNING: COMMAND_FAILED: '/usr/sbin/i
Nov 10 20:40:14 Myserver firewalld[830]: WARNING: COMMAND_FAILED: '/usr/sbin/i
Nov 10 20:40:14 Myserver firewalld[830]: WARNING: COMMAND_FAILED: '/usr/sbin/i
Nov 10 20:40:14 Myserver firewalld[830]: WARNING: COMMAND_FAILED: '/usr/sbin/i
Nov 10 20:40:15 Myserver firewalld[830]: WARNING: COMMAND_FAILED: '/usr/sbin/i
Nov 10 20:40:17 Myserver firewalld[830]: WARNING: COMMAND_FAILED: '/usr/sbin/i
Nov 10 21:21:39 Myserver systemd[1]: Stopping firewalld - dynamic firewall dae
Nov 10 21:21:39 Myserver systemd[1]: firewalld.service: Deactivated successful
Nov 10 21:21:39 Myserver systemd[1]: Stopped firewalld - dynamic firewall daem
Nov 10 21:21:39 Myserver systemd[1]: firewalld.service: Consumed 7.946s CPU ti

```

- Khởi động dịch vụ DNS:

```
$sudo systemctl start named
```

- #### - Kiểm tra kết quả:

```
nslookup www.qtht.com.vn <địa chỉ IP máy ảo>
nslookup htql.qtht.com.vn <địa chỉ IP máy ảo>
nslookup www.ctu.edu.vn <địa chỉ IP máy ảo>
```

```
[nhatb2012122@Myserver ~]$ nslookup www.qtht.com.vn 192.168.155.98
Server:      192.168.155.98
Address:     192.168.155.98#53
```

Name: www.qtht.com.vn
Address: 192.168.155.98

```
[nhatb2012122@Myserver ~]$ nslookup htql.qtht.com.vn 192.168.155.98
Server:      192.168.155.98
Address:     192.168.155.98#53
```

Name: htql.qtht.com.vn
Address: 8.8.8.8

```
[nhatb2012122@Myserver ~]$ nslookup www.ctu.edu.vn 192.168.155.98
Server:      192.168.155.98
Address:     192.168.155.98#53
```

Non-authoritative answer:
Name: www.ctu.edu.vn
Address: 123.30.143.225

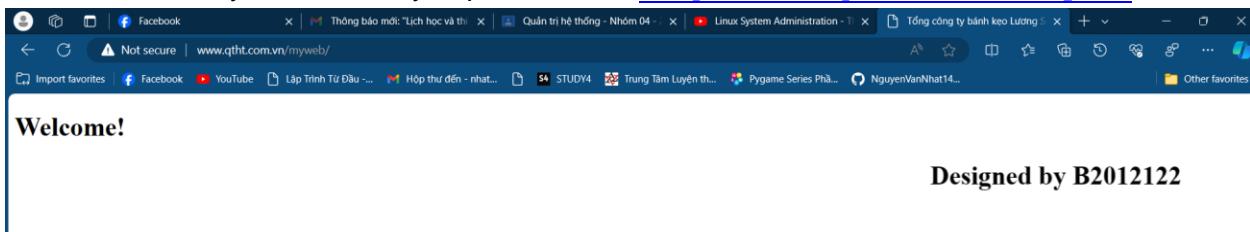
```
C:\Users\vannh>nslookup htql.qtht.com.vn 192.168.155.98
Server: www.qtht.com.vn
Address: 192.168.155.98

Name: htql.qtht.com.vn
Address: 8.8.8.8

C:\Users\vannh>nslookup www.ctu.edu.vn 192.168.155.98
Server: www.qtht.com.vn
Address: 192.168.155.98

Non-authoritative answer:
Name: www.ctu.edu.vn
Address: 123.30.143.225
```

- Trên máy vật lý, cấu hình DNS server là IP của máy ảo CentOS. Sau đó, mở trình duyệt web và truy cập vào địa chỉ <http://www.qtht.com.vn/myweb>



4. Cấu hình tường lửa Firewalld

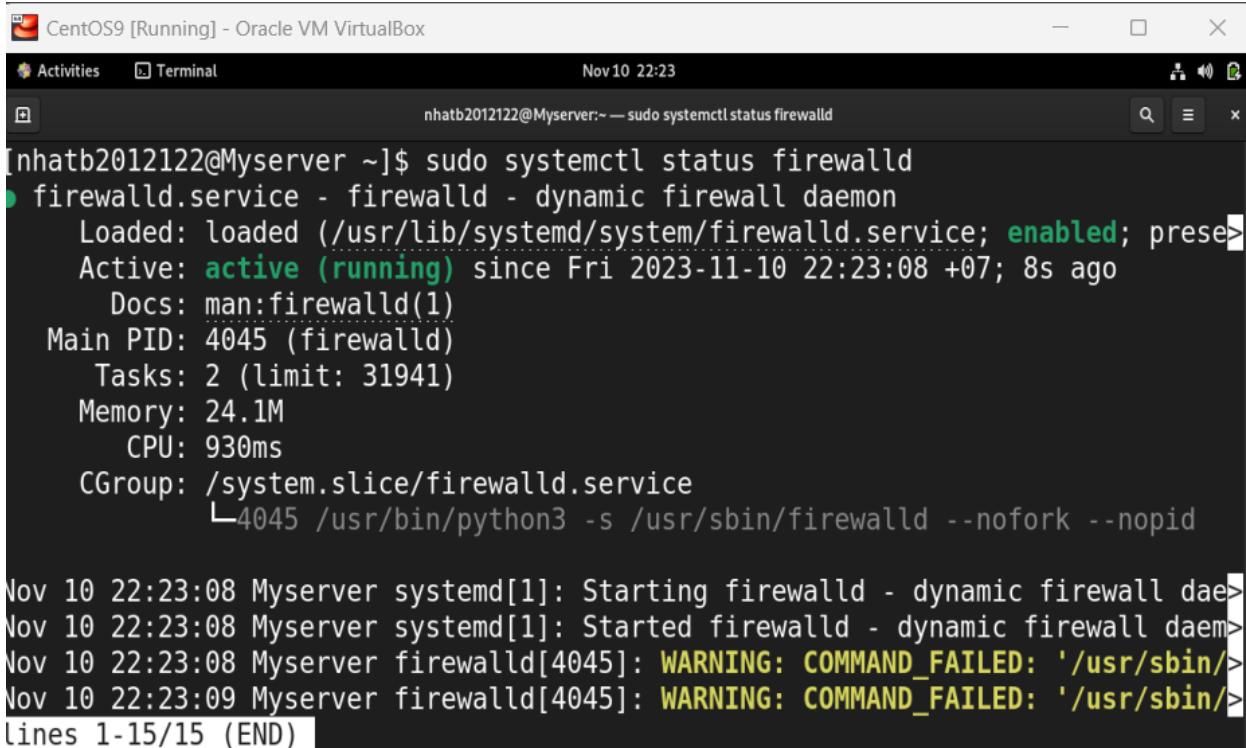
Công cụ Firewalld (dynamic firewall daemon) cung cấp dịch vụ tường lửa mạnh mẽ, toàn diện; được cài đặt mặc định cho nhiều bản phân phối Linux. Từ CentOS 7 trở về sau, tường lửa Firewalld được thay thế cho tường lửa iptables với những khác biệt cơ bản:

- Firewalld sử dụng “zone” như là một nhóm các quy tắc (rule) áp đặt lên những luồng dữ liệu. Một số zone có sẵn thường dùng:
 - *drop*: ít tin cậy nhất – toàn bộ các kết nối đến sẽ bị từ chối.
 - *public*: đại diện cho mạng công cộng, không đáng tin cậy. Các máy tính/services khác không được tin tưởng trong hệ thống nhưng vẫn cho phép các kết nối đến tùy từng trường hợp cụ thể.
 - *trusted*: đáng tin cậy nhất – tin tưởng toàn bộ thiết bị trong hệ thống.
- Firewalld quản lý các quy tắc được thiết lập tự động, có tác dụng ngay lập tức mà không làm mất đi các kết nối và session hiện có.
 - *Runtime* (mặc định): có tác dụng ngay lập tức nhưng mất hiệu lực khi reboot hệ thống.
 - *Permanent*: không áp dụng cho hệ thống đang chạy, cần reload mới có hiệu lực, tác dụng vĩnh viễn cả khi reboot hệ thống.

Tìm hiểu và thực hiện các yêu cầu sau (kèm hình minh họa cho từng bước):

- Khởi động tường lửa firewalld

```
$sudo systemctl start firewalld
```

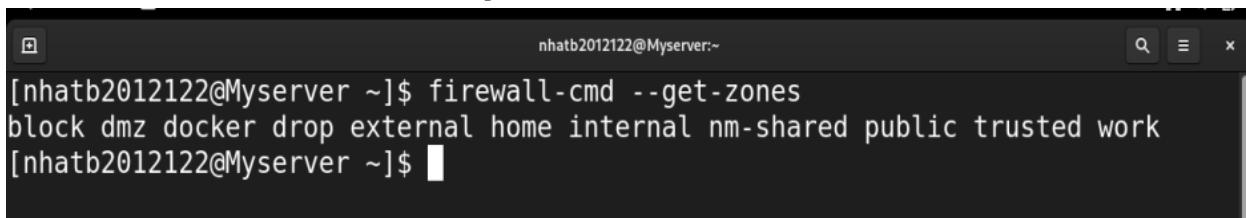


```
[nhatb2012122@Myserver ~]$ sudo systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; pres>
   Active: active (running) since Fri 2023-11-10 22:23:08 +07; 8s ago
     Docs: man:firewalld(1)
 Main PID: 4045 (firewalld)
    Tasks: 2 (limit: 31941)
   Memory: 24.1M
      CPU: 930ms
     CGroup: /system.slice/firewalld.service
             └─4045 /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nopid

Nov 10 22:23:08 Myserver systemd[1]: Starting firewalld - dynamic firewall dae>
Nov 10 22:23:08 Myserver systemd[1]: Started firewalld - dynamic firewall daem>
Nov 10 22:23:08 Myserver firewalld[4045]: WARNING: COMMAND_FAILED: '/usr/sbin/>
Nov 10 22:23:09 Myserver firewalld[4045]: WARNING: COMMAND_FAILED: '/usr/sbin/>
Lines 1-15/15 (END)
```

- Liệt kê tất cả các zone đang có trong hệ thống

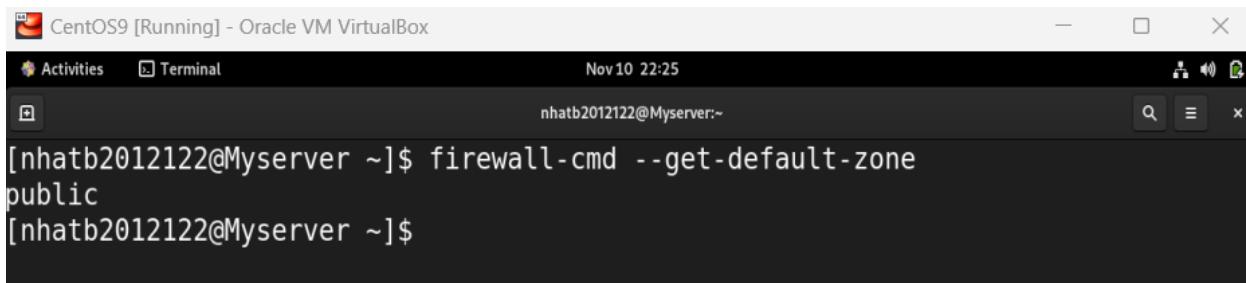
```
$firewall-cmd --get-zones
```



```
[nhatb2012122@Myserver ~]$ firewall-cmd --get-zones
block dmz docker drop external home internal nm-shared public trusted work
[nhatb2012122@Myserver ~]$
```

- Kiểm tra zone mặc định

```
$firewall-cmd --get-default-zone
```



```
[nhatb2012122@Myserver ~]$ firewall-cmd --get-default-zone
public
[nhatb2012122@Myserver ~]$
```

- Kiểm tra zone đang được sử dụng bởi giao diện mạng (thường là *public*); và xem các rules của zone

```
$firewall-cmd --get-active-zones
```

```
nhatb2012122@Myserver:~$ firewall-cmd --get-active-zones
docker
  interfaces: docker0
public
  interfaces: enp0s3
[nhatb2012122@Myserver ~]$ █

$ sudo firewall-cmd --list-all --zone=public
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --list-all --zone=public
public (active)
  target: default
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpcv6-client ssh
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
[nhatb2012122@Myserver ~]$
```

- Từ máy vật lý, ping, truy cập dịch vụ web và kết nối SSH tới máy CentOS. Cho biết kết quả.

```
C:\Users\vannh>ping 192.168.155.98

Pinging 192.168.155.98 with 32 bytes of data:
Reply from 192.168.155.98: bytes=32 time<1ms TTL=64
Reply from 192.168.155.98: bytes=32 time<1ms TTL=64
Reply from 192.168.155.98: bytes=32 time<1ms TTL=64
Reply from 192.168.155.98: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.155.98:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\vannh>
```

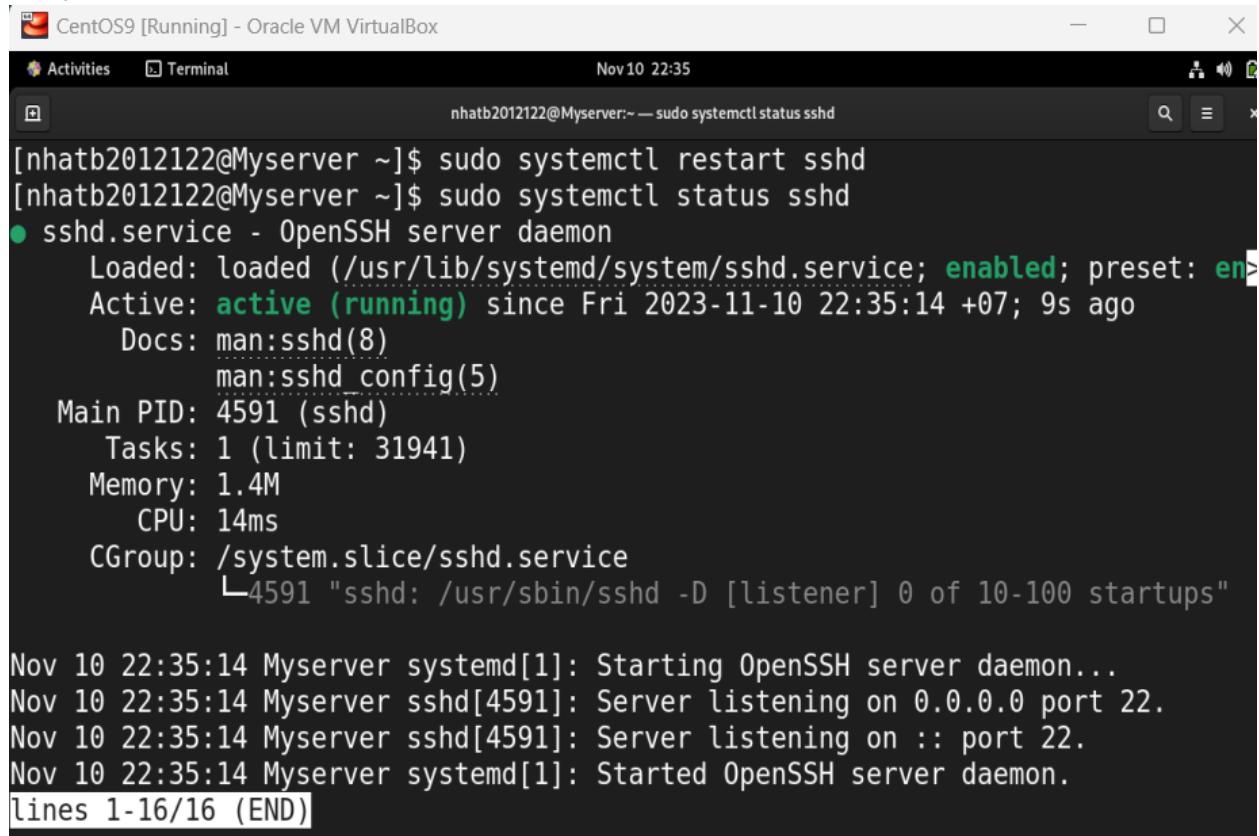
Bật chế độ chứng thực bằng mật khẩu

```
# Thus, host-specific definitions should be at the beginning of the
# configuration file, and defaults at the end.

# Site-wide defaults for some commonly used options. For a comprehensive
# list of available options, their meanings and defaults, please see the
# ssh_config(5) man page.

# Host *
#   ForwardAgent no
#   ForwardX11 no
PasswordAuthentication yes
#   HostbasedAuthentication no
#   GSSAPIAuthentication no
#   GSSAPIDelegateCredentials no
#   GSSAPIKeyExchange no
#   GSSAPITrustDNS no
#   BatchMode no
#   CheckHostIP yes
```

Chạy lại sshd



CentOS9 [Running] - Oracle VM VirtualBox

Activities Terminal Nov 10 22:35

nhatb2012122@Myserver:~ — sudo systemctl status sshd

```
[nhatb2012122@Myserver ~]$ sudo systemctl restart sshd
[nhatb2012122@Myserver ~]$ sudo systemctl status sshd
● sshd.service - OpenSSH server daemon
    Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: enabled)
    Active: active (running) since Fri 2023-11-10 22:35:14 +07; 9s ago
      Docs: man:sshd(8)
            man:sshd_config(5)
   Main PID: 4591 (sshd)
     Tasks: 1 (limit: 31941)
    Memory: 1.4M
       CPU: 14ms
      CGroup: /system.slice/sshd.service
              └─4591 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

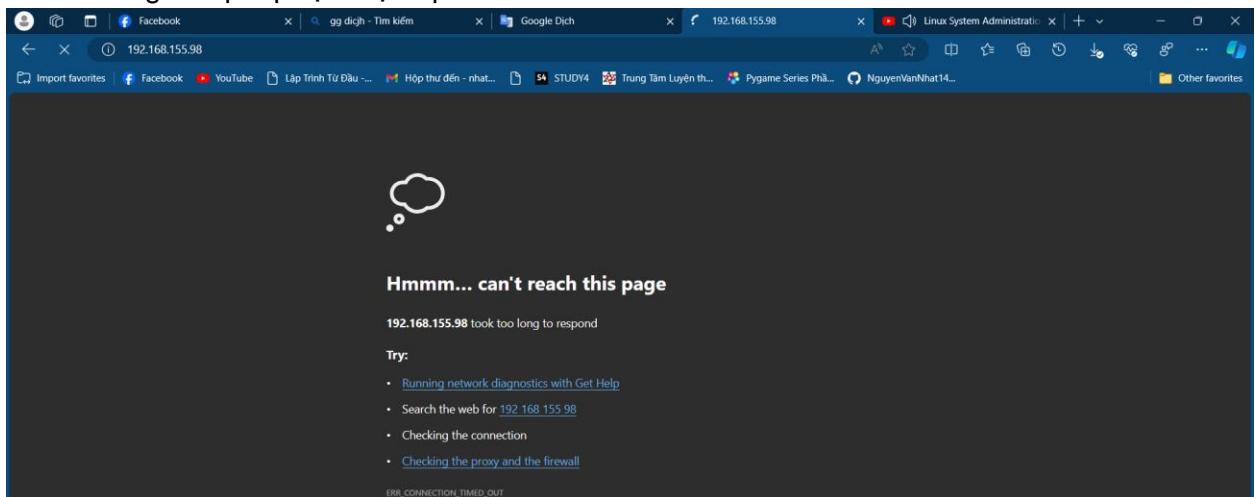
Nov 10 22:35:14 Myserver systemd[1]: Starting OpenSSH server daemon...
Nov 10 22:35:14 Myserver sshd[4591]: Server listening on 0.0.0.0 port 22.
Nov 10 22:35:14 Myserver sshd[4591]: Server listening on :: port 22.
Nov 10 22:35:14 Myserver systemd[1]: Started OpenSSH server daemon.
```

lines 1-16/16 (END)

Chạy httpd

```
nhatb2012122@Myserver:~ — sudo systemctl status httpd
[nhatb2012122@Myserver ~]$ sudo systemctl start httpd
[nhatb2012122@Myserver ~]$ sudo systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
   Active: active (running) since Fri 2023-11-10 22:02:14 +07; 1h 8min ago
     Docs: man:httpd.service(8)
 Main PID: 1180 (httpd)
    Status: "Total requests: 5; Idle/Busy workers 100/0;Requests/sec: 0.00122"
      Tasks: 213 (limit: 31941)
     Memory: 41.0M
        CPU: 15.594s
       CGroup: /system.slice/httpd.service
               └─1180 /usr/sbin/httpd -DFOREGROUND
                  ├─1268 /usr/sbin/httpd -DFOREGROUND
                  ├─1269 /usr/sbin/httpd -DFOREGROUND
                  ├─1271 /usr/sbin/httpd -DFOREGROUND
                  └─1272 /usr/sbin/httpd -DFOREGROUND
```

Zone không cho phép dịch vụ httpd



- Chuyển giao diện mạng sang zone `drop`; và xem các rules của zone
\$sudo firewall-cmd --zone=drop --change-interface=enp0s3

```
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --zone=drop --change-interface=enp0s3
success
[nhatb2012122@Myserver ~]$ █
```

```
$sudo firewall-cmd --list-all --zone=drop
```

```
nhatb2012122@Myserver ~]$ sudo firewall-cmd --list-all --zone=drop
rop (active)
target: DROP
icmp-block-inversion: no
interfaces: enp0s3
sources:
services:
ports:
protocols:
forward: yes
masquerade: no
forward-ports:
source-ports:
icmp-blocks:
rich rules:
nhatb2012122@Myserver ~]$
```

- Từ máy vật lý, ping, truy cập dịch vụ web và kết nối SSH tới máy CentOS. Cho biết kết quả.

Không ping được vì tất cả dịch vụ bị chặn

```
C:\Users\vannh>ping 192.168.155.98

Pinging 192.168.155.98 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.155.98:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Users\vannh>
```

Dịch vụ web không nối kết tới được

- Chuyển giao diện mạng sang zone *trusted*; và xem các rules của zone
\$sudo firewall-cmd --zone=trusted --change-interface=enp0s3

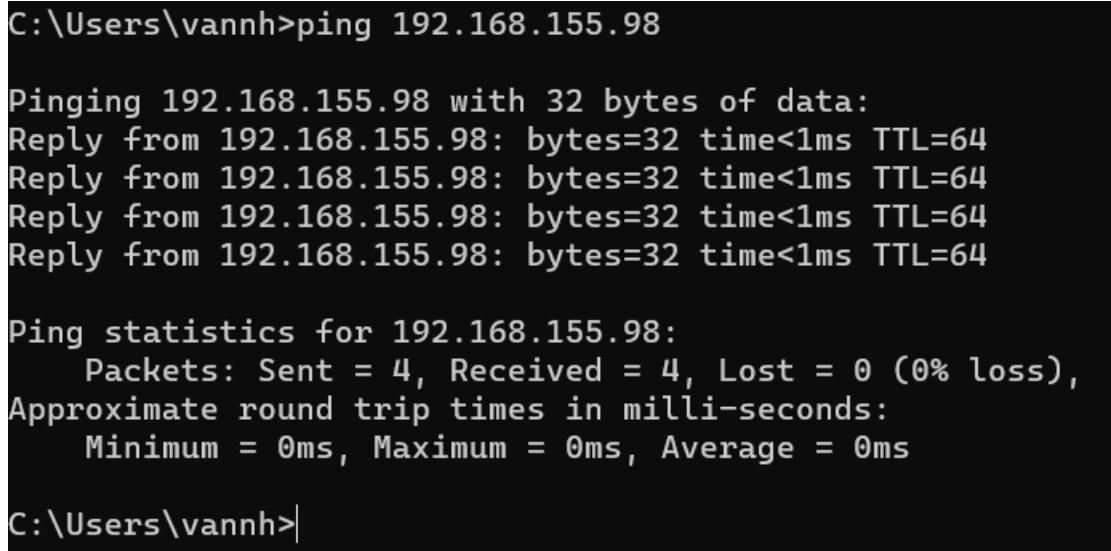
```
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --zone=trusted --change-interface=
enp0s3
success
[nhatb2012122@Myserver ~]$
```

```
$sudo firewall-cmd --list-all --zone=trusted
```



```
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --list-all --zone=trusted
trusted (active)
  target: ACCEPT
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services:
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
[nhatb2012122@Myserver ~]$
```

- Từ máy vật lý, ping, truy cập dịch vụ web và kết nối SSH tới máy CentOS. Cho biết kết quả.
ping thành công



```
C:\Users\vannh>ping 192.168.155.98

Pinging 192.168.155.98 with 32 bytes of data:
Reply from 192.168.155.98: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.155.98:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\vannh>
```

Dịch vụ web truy cập được

This page is used to test the proper operation of the HTTP server after it has been installed. If you can read this page it means that this site is working properly. This server is powered by [CentOS](#).

If you are a member of the general public:

The website you just visited is either experiencing problems or is undergoing routine maintenance.

If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".

If you are the website administrator:

You may now add content to the webroot directory. Note that until you do so, people visiting your website will see this page, and not your content.

For systems using the Apache HTTP Server: You may now add content to the directory `/var/www/html/`. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file `/etc/httpd/conf.d/welcome.conf`.

For systems using NGINX: You should now put your content in a location of your choice and edit the `root` configuration directive in the `nginx` configuration file `/etc/nginx/nginx.conf`.

- Tạo zone mới có tên là `qthtserver`
\$ sudo firewall-cmd --permanent --new-zone=qthtserver
\$ sudo systemctl restart firewalld
\$ sudo firewall-cmd --list-all --zone=qthtserver

```
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --permanent --new-zone=qthtserver
success
[nhatb2012122@Myserver ~]$ sudo systemctl restart firewalld
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --list-all --zone=qthtserver
qthtserver
  target: default
  icmp-block-inversion: no
  interfaces:
  sources:
  services:
  ports:
  protocols:
  forward: no
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
[nhatb2012122@Myserver ~]$
```

- Cho phép các dịch vụ HTTP, DNS, SAMBA, FTP và cổng 9999/tcp hoạt động trên zone `qthtserver`

```
$sudo firewall-cmd --permanent --zone=qthtserver --add-service=http  
$sudo firewall-cmd --permanent --zone=qthtserver --add-service=dns  
$sudo firewall-cmd --permanent --zone=qthtserver --add-service=samba  
$sudo firewall-cmd --permanent --zone=qthtserver --add-service=ftp  
$sudo firewall-cmd --permanent --zone=qthtserver --add-port=9999/tcp
```

```
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --permanent --zone=qthtserver --ad-  
d-service=http  
success  
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --permanent --zone=qthtserver --ad-  
d-service=dns  
success  
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --permanent --zone=qthtserver --ad-  
d-service=samba  
success  
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --permanent --zone=qthtserver --ad-  
d-service=ftp  
success  
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --permanent --zone=qthtserver --ad-  
d-port=9999/tcp  
success  
[nhatb2012122@Myserver ~]$ █
```

- Thêm rule để chỉ cho phép máy vật lý có thẻ SSH tới máy CentOS

```
$sudo firewall-cmd --permanent --zone=qthtserver --add-rich-rule='rule family=ipv4 source  
address=<IP máy vật lý>/32 port port=22 protocol=tcp accept'
```

```
nhatb2012122@Myserver:~  
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --permanent --zone=qthtserver --ad-  
d-rich-rule='rule family=ipv4 source address=192.168.155.98/32 port port=22 pro-  
tocol=tcp accept'  
success  
[nhatb2012122@Myserver ~]$
```

- Khởi động lại tường lửa firewalld

```
$sudo systemctl restart firewalld
```

```
nhatb2012122@Myserver:~ — sudo systemctl status firewalld
[nhatb2012122@Myserver ~]$ sudo systemctl restart firewalld
[nhatb2012122@Myserver ~]$ sudo systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
  Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; presen>
  Active: active (running) since Fri 2023-11-10 23:29:50 +07; 12s ago
    Docs: man:firewalld(1)
   Main PID: 6998 (firewalld)
      Tasks: 2 (limit: 31941)
     Memory: 24.1M
        CPU: 1.116s
      CGroup: /system.slice/firewalld.service
              └─ 6998 /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nopid

Nov 10 23:29:50 Nhat systemd[1]: Starting firewalld - dynamic firewall daemon.>
Nov 10 23:29:50 Nhat systemd[1]: Started firewalld - dynamic firewall daemon.
Nov 10 23:29:51 Nhat firewalld[6998]: WARNING: COMMAND_FAILED: '/usr/sbin/ipta>
Nov 10 23:29:51 Nhat firewalld[6998]: WARNING: COMMAND_FAILED: '/usr/sbin/ipta>
lines 1-15/15 (END)
```

- Chuyển giao diện mạng sang zone qthtserver; và xem các rules của zone


```
$sudo firewall-cmd --permanent --zone=qthtserver --change-interface=enp0s3
$sudo firewall-cmd --list-all --zone=qthtserver
```

```
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --permanent --zone=qthtserver --change-interface=enp0s3
The interface is under control of NetworkManager, setting zone to 'qthtserver'.
success
[nhatb2012122@Myserver ~]$ sudo firewall-cmd --list-all --zone=qthtserver
qthtserver (active)
  target: default
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: dns ftp http samba
  ports: 9999/tcp
  protocols:
  forward: no
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
    rule family="ipv4" source address="192.168.155.98/32" port port="22" protocol="tcp" accept
[nhatb2012122@Myserver ~]$
```

- Kiểm tra máy vật lý có thể truy cập được tới các dịch vụ trên máy CentOS hay không.

The screenshot shows a Microsoft Edge browser window. The address bar indicates the site is not secure and shows the IP address 192.168.155.98. The title bar says "HTTP Server Test Page powered by Linux System Administration - Ti...". The page content is a test page for an HTTP server, featuring a dark blue and purple nebula-style background with the text "HTTP SERVER TEST PAGE" in white. Below this, a message states: "This page is used to test the proper operation of the HTTP server after it has been installed. If you can read this page it means that this site is working properly. This server is powered by [CentOS](#)". There are two sections: "If you are a member of the general public:" and "If you are the website administrator:". The public section says: "The website you just visited is either experiencing problems or is undergoing routine maintenance." The administrator section says: "You may now add content to the webroot directory. Note that until you do so, people visiting your website will see this page, and not your content." It also provides instructions for Apache and NGINX users. At the bottom right is a "CentOS Stream 9" logo with the text "POWERED BY" and a rainbow icon. Below the logo is the text "--- Hết ---".

If you are a member of the general public:

The website you just visited is either experiencing problems or is undergoing routine maintenance.

If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".

If you are the website administrator:

You may now add content to the webroot directory. Note that until you do so, people visiting your website will see this page, and not your content.

For systems using the Apache HTTP Server: You may now add content to the directory `/var/www/html/`. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file `/etc/httpd/conf.d/welcome.conf`.

For systems using NGINX: You should now put your content in a location of your choice and edit the `root` configuration directive in the `nginx` configuration file `/etc/nginx/nginx.conf`.

CentOS Stream 9
POWERED BY

--- Hết ---