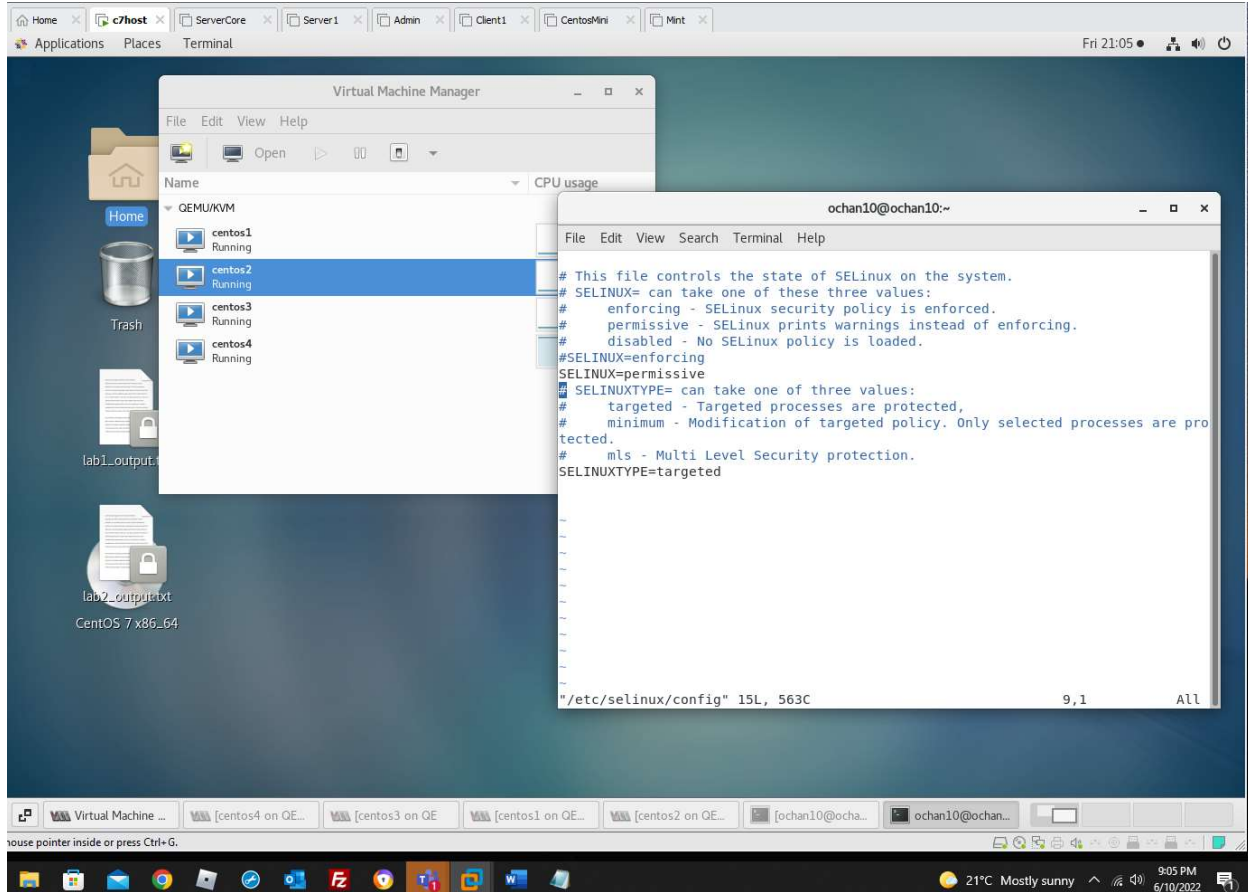


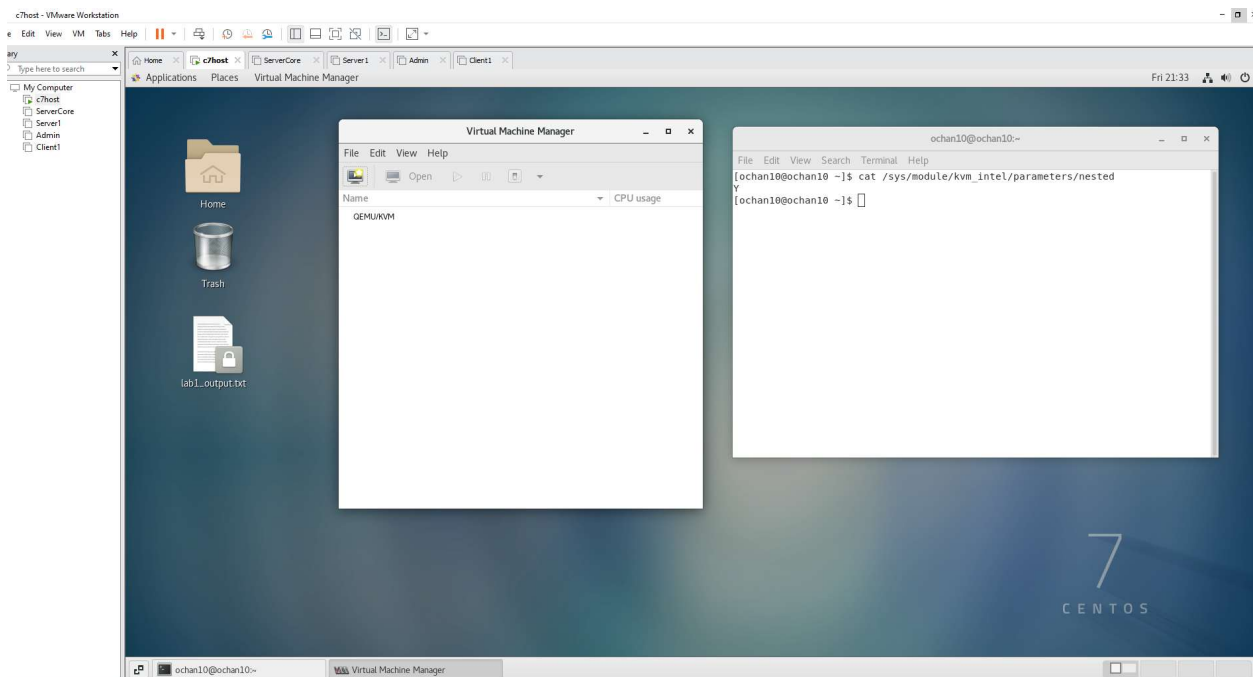
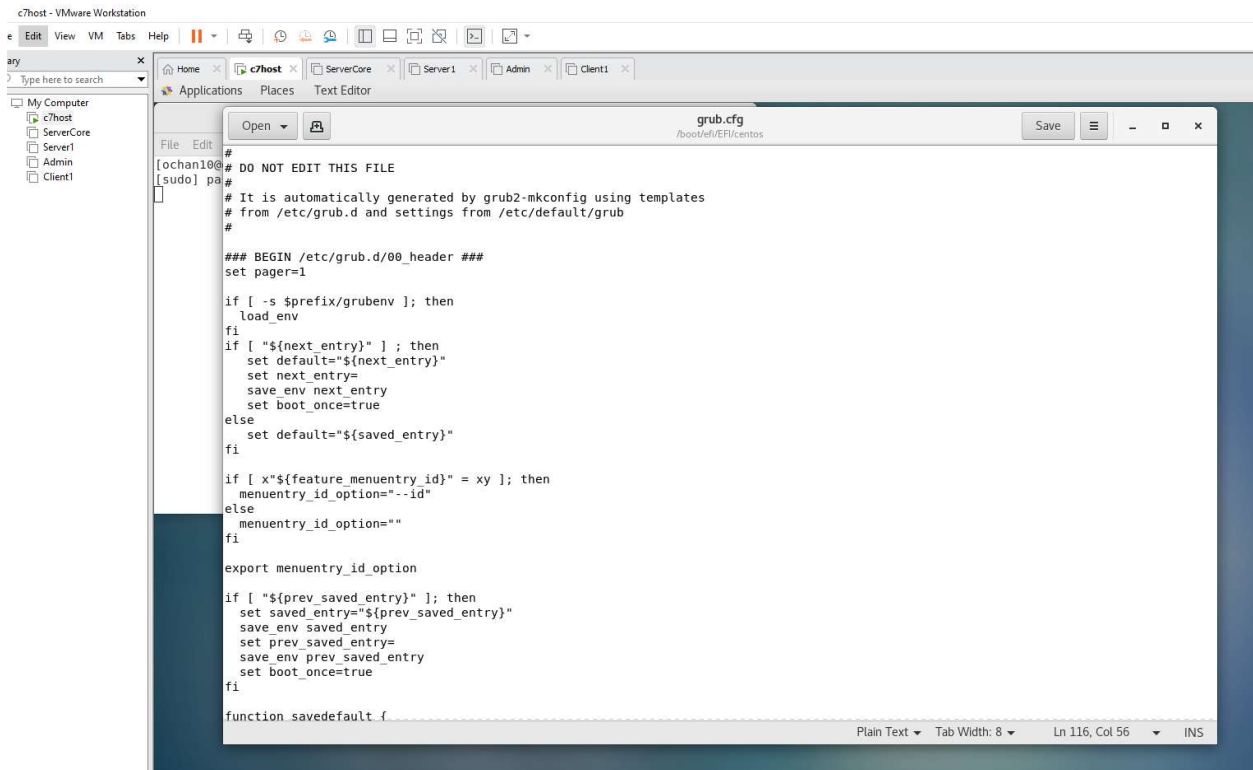
Centos1 installation time: 2 hours

Centos2 installation time: 1 hour

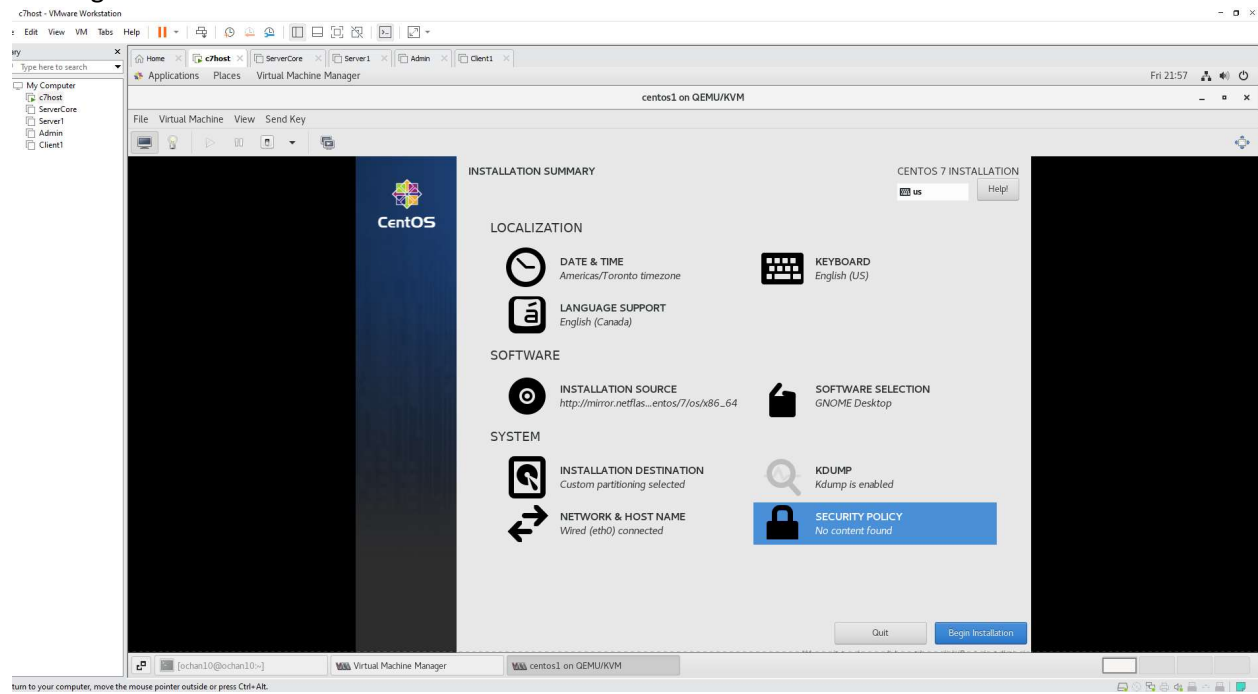
Centos3 installation time: 20 minutes

SELINUX update:





Investigation 2:



Ks link:

```
# Kickstart file for C7.0 "centos3" vm in OPS245
# Winter 2021 version by P.C.
# Fall 2018 version by C.J - External 2018-09-16
# Based on Summer 2015 version A.S.
# Based on Winter 2014 version A.S.
# Based on Beta version - kp Jan 17 2013 Revision 1.32 2012-01-19
#
# For documentation on kickstart options see
# http://www.centos.org/docs/5/html/5.2/Installation\_Guide/s1-kickstart2-
options.html
#
# First version author: Andrew Smith <andrew.smith@senecacollege.ca>
# Previous version author: Chris Johnson <chris.johnson@senecacollege.ca>
# Current version author: Peter Callaghan <peter.callaghan@senecacollege.ca>

# Installation or upgrade
install

# Installation source
url --url=http://mirror.netflash.net/centos/7/os/x86_64/

# Language and keyboard type
lang en_US.UTF-8
keyboard us

# Network connection information
network --onboot yes --device eth0 --bootproto dhcp --hostname=centos3

# Root account information
rootpw ops245

# Firewall and permitted services
firewall --service=ssh

# Authentication (password) configuration
authconfig --enablesshadow --passalgo=sha512 --enablefingerprint

# SELinux settings
selinux --permissive

# Timezone
timezone America/Toronto

# GRUB bootloader configuration
bootloader --location=mbr --driveorder=vda --append="crashkernel=auto rhgb
quiet"

# Disk partitions
# Clear all partitions and set up initial disk label
# Create a boot partition that is 500M in size
# Create a PV that is at least 1M in size and fills whole disk
zerombr
clearpart --all --initlabel --drives=vda
part biosboot --fstype=biosboot --size=1
part /boot --fstype=ext4 --size=500
```

```

part --grow --size=1 pv.1

# LVM configuration
# One volume group named "vg_centos3"
# 8GB logical volume named "lv_root" for /
# 1GB logical volume named "lv_home" for /home
# 496 to 992MB logical volume named "lv_swap" for swap space
volgroup vg_centos3 --pesize=4096 pv.1
logvol / --fstype=ext4 --name=lv_root --vgname=vg_centos3 --size=8192
logvol /home --fstype=ext4 --name=lv_home --vgname=vg_centos3 --size=1024
logvol swap --name=lv_swap --vgname=vg_centos3 --grow --size=496 --
maxsize=992

# Software repositories to use in addition to installation source
repo --name="CentOS" --
baseurl=http://mirror.netflash.net/centos/7/os/x86_64/ --cost=100

# User account
user --name=ops245 --password=ops245 --groups=wheel

# Disable firstboot configuration screens
firstboot --disable

# Shut down the system when installation is done
poweroff

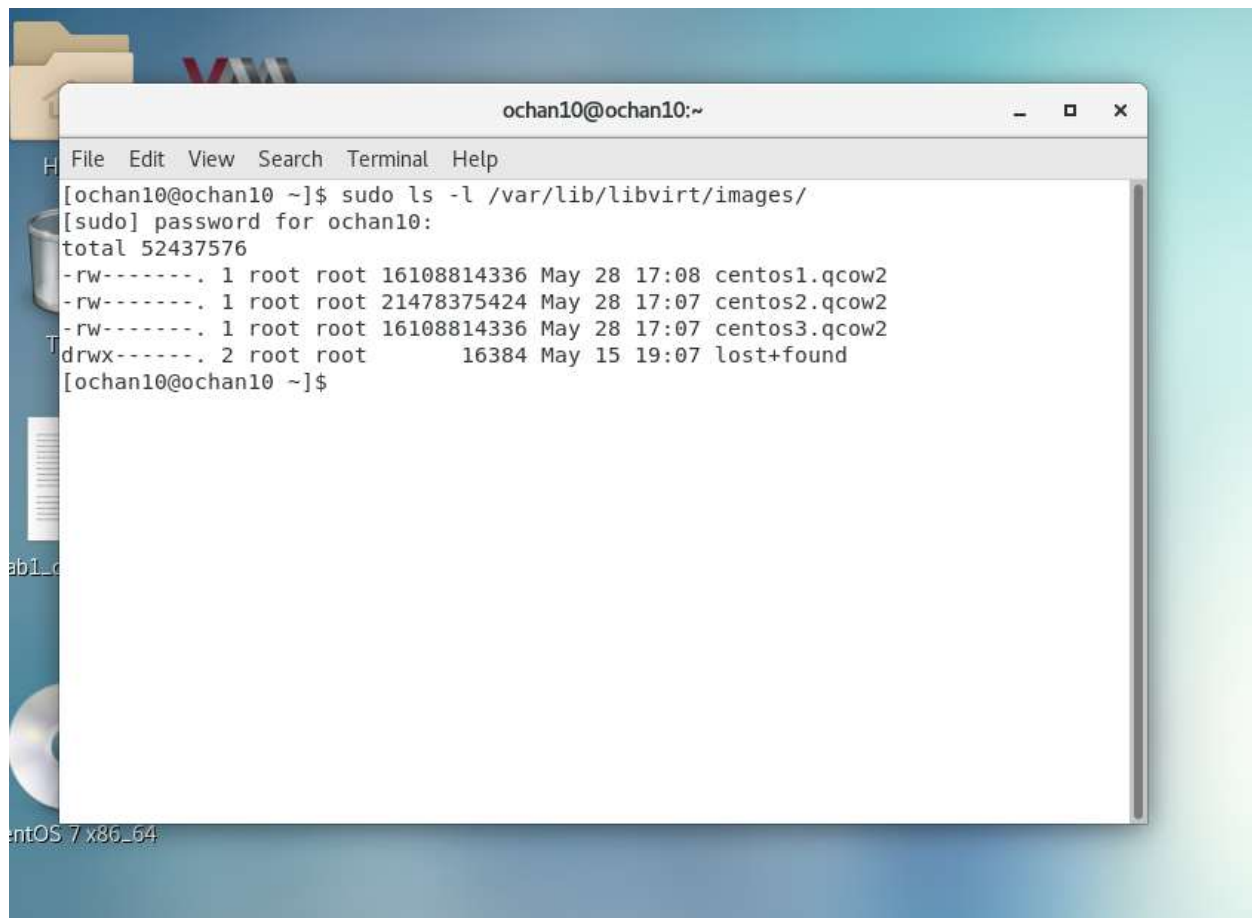
# Packages to be installed
%packages
@base
@core
gpgme
gnupg2
hdparm
glibc-common
-initscripts
ncurses-base
elinks
%end

```

What happens when the installation is finished?

- After the installation was completed, it shutdown and reboots by itself and went to the login page.

- **Regular-user account name: ops245**
- **Regular-user account password: ops245**
- **Root Password: ops245**



ochan10@ochan10:~

File Edit View Search Terminal Help

[ochan10@ochan10 ~]\$ sudo ls -l /var/lib/libvirt/images/

[sudo] password for ochan10:

total 52437576

-rw-----. 1 root root 16108814336 May 28 17:08 centos1.qcow2

-rw-----. 1 root root 21478375424 May 28 17:07 centos2.qcow2

-rw-----. 1 root root 16108814336 May 28 17:07 centos3.qcow2

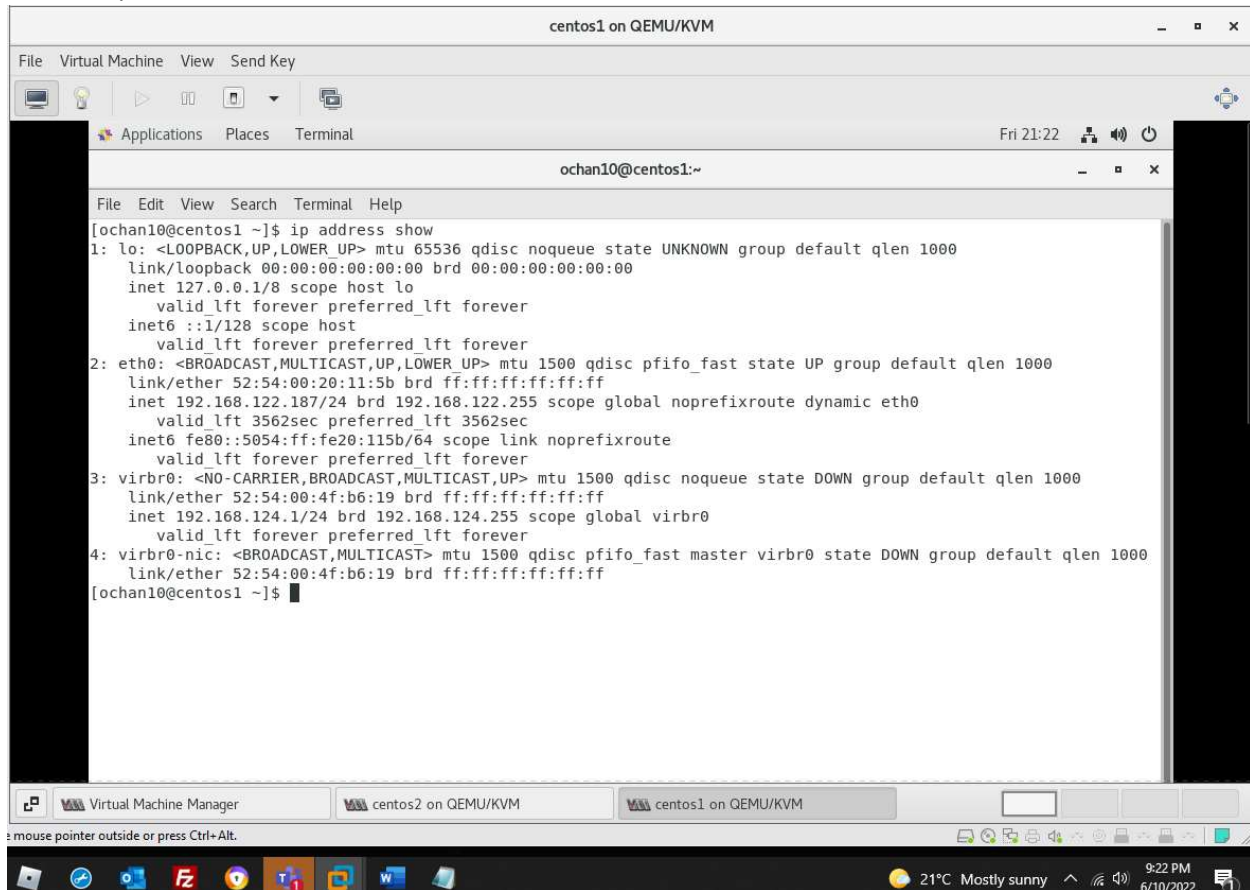
drwx-----. 2 root root 16384 May 15 19:07 lost+found

[ochan10@ochan10 ~]\$

ab1_c

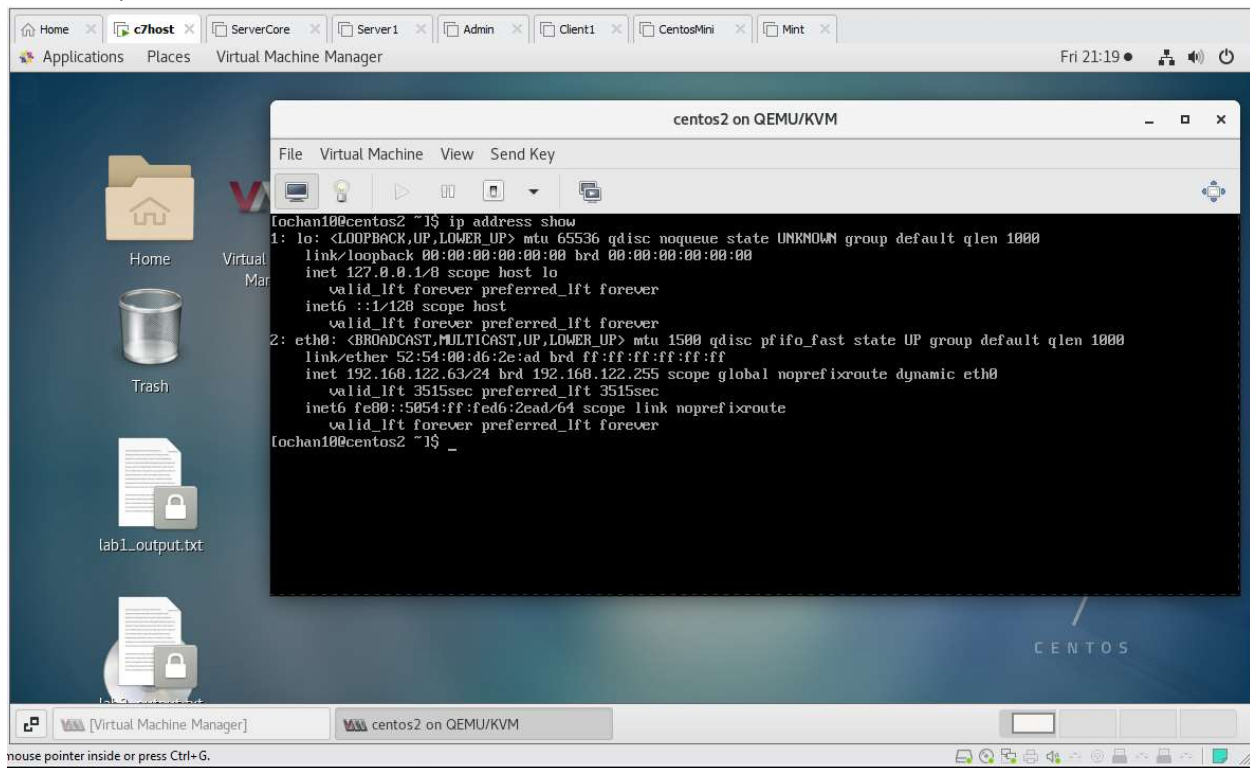
entOS 7 x86_64

Centos1 ip address:

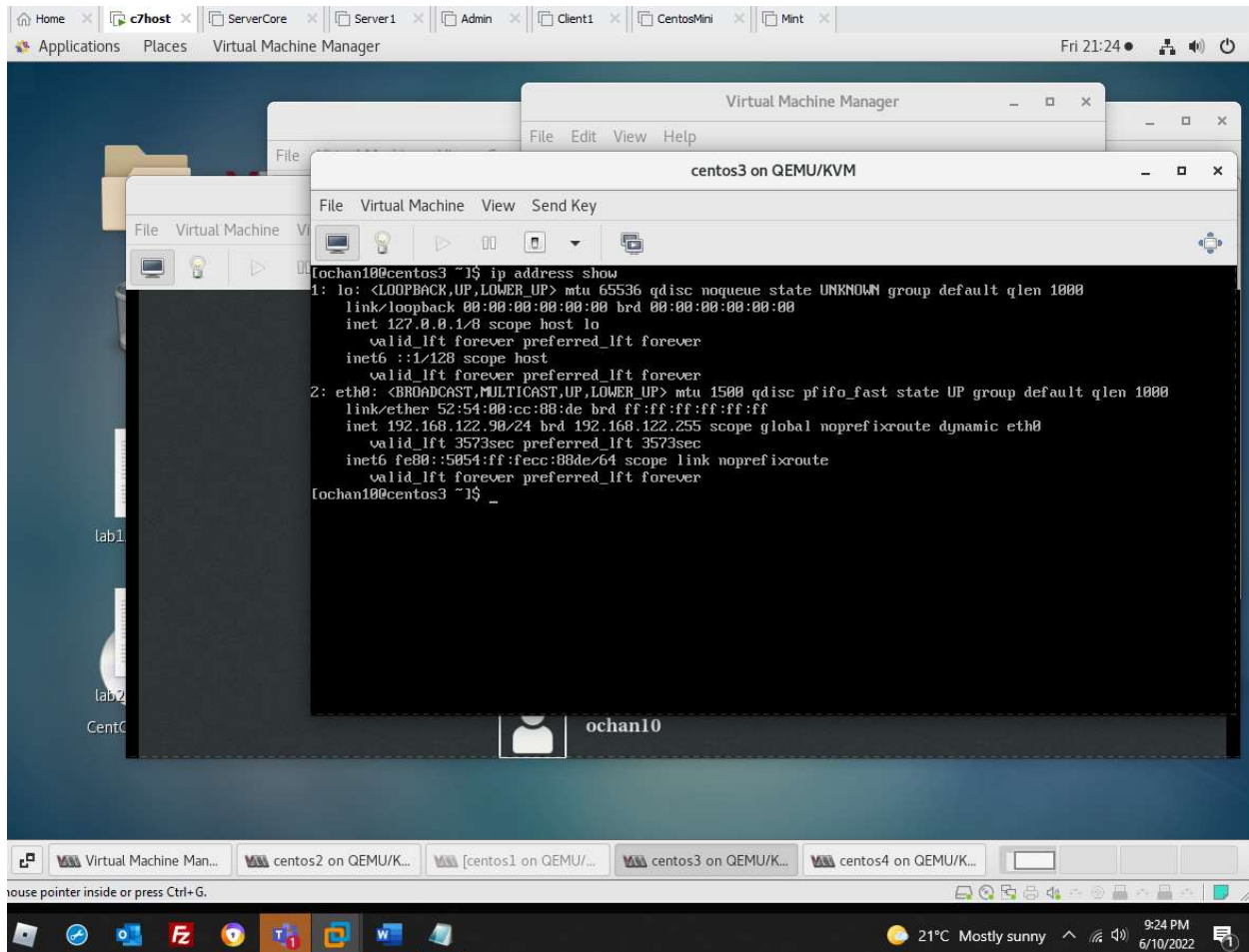


```
centos1 on QEMU/KVM
File Virtual Machine View Send Key
Applications Places Terminal
Fri 21:22
ochan10@centos1:~
File Edit View Search Terminal Help
[ochan10@centos1 ~]$ ip address show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 52:54:00:20:11:5b brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.187/24 brd 192.168.122.255 scope global noprefixroute dynamic eth0
        valid_lft 3562sec preferred_lft 3562sec
    inet6 fe80::5054:ff:fe20:115b/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:4f:b6:19 brd ff:ff:ff:ff:ff:ff
    inet 192.168.124.1/24 brd 192.168.124.255 scope global virbr0
        valid_lft forever preferred_lft forever
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
    link/ether 52:54:00:4f:b6:19 brd ff:ff:ff:ff:ff:ff
[ochan10@centos1 ~]$
```

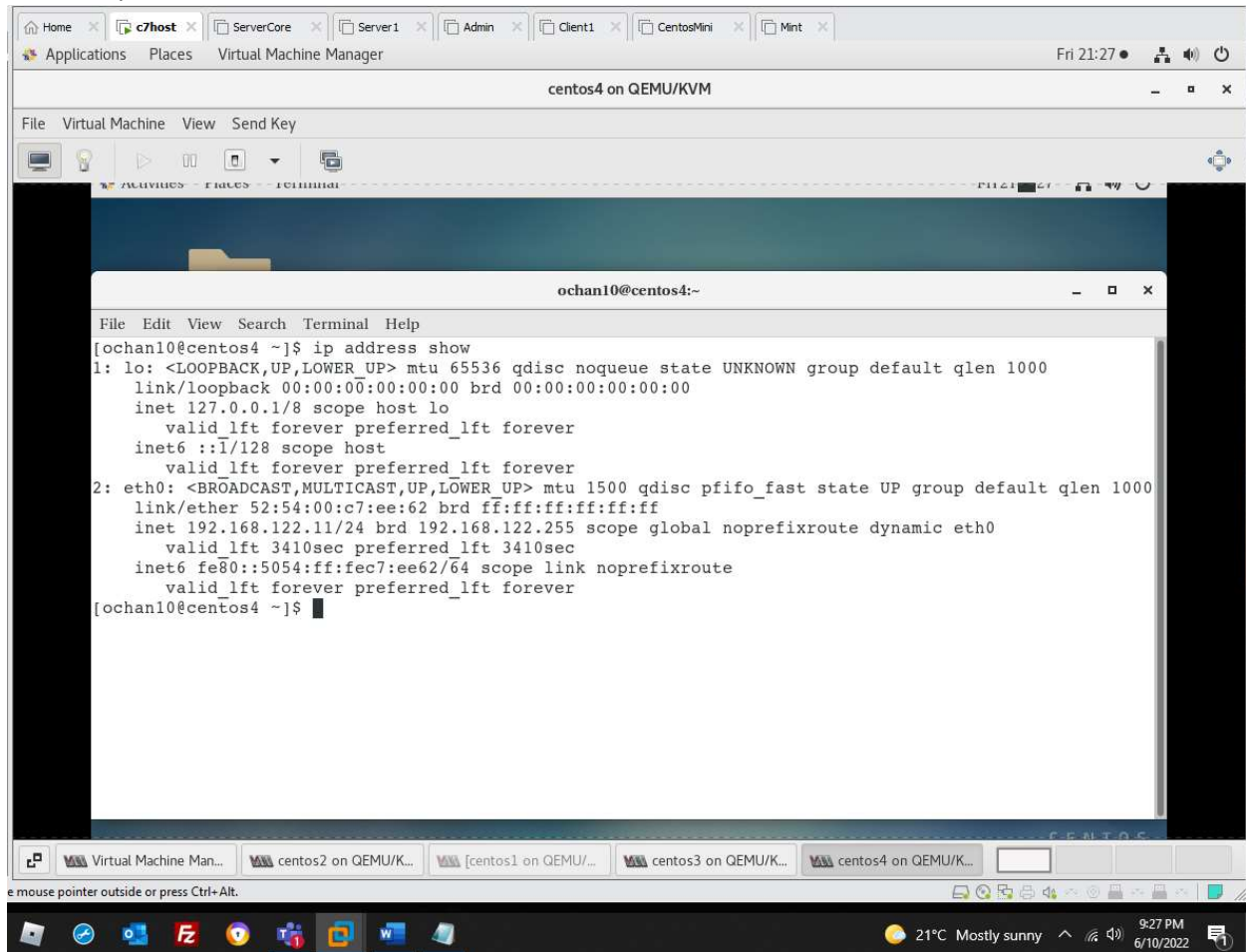
Centos2 ip address:



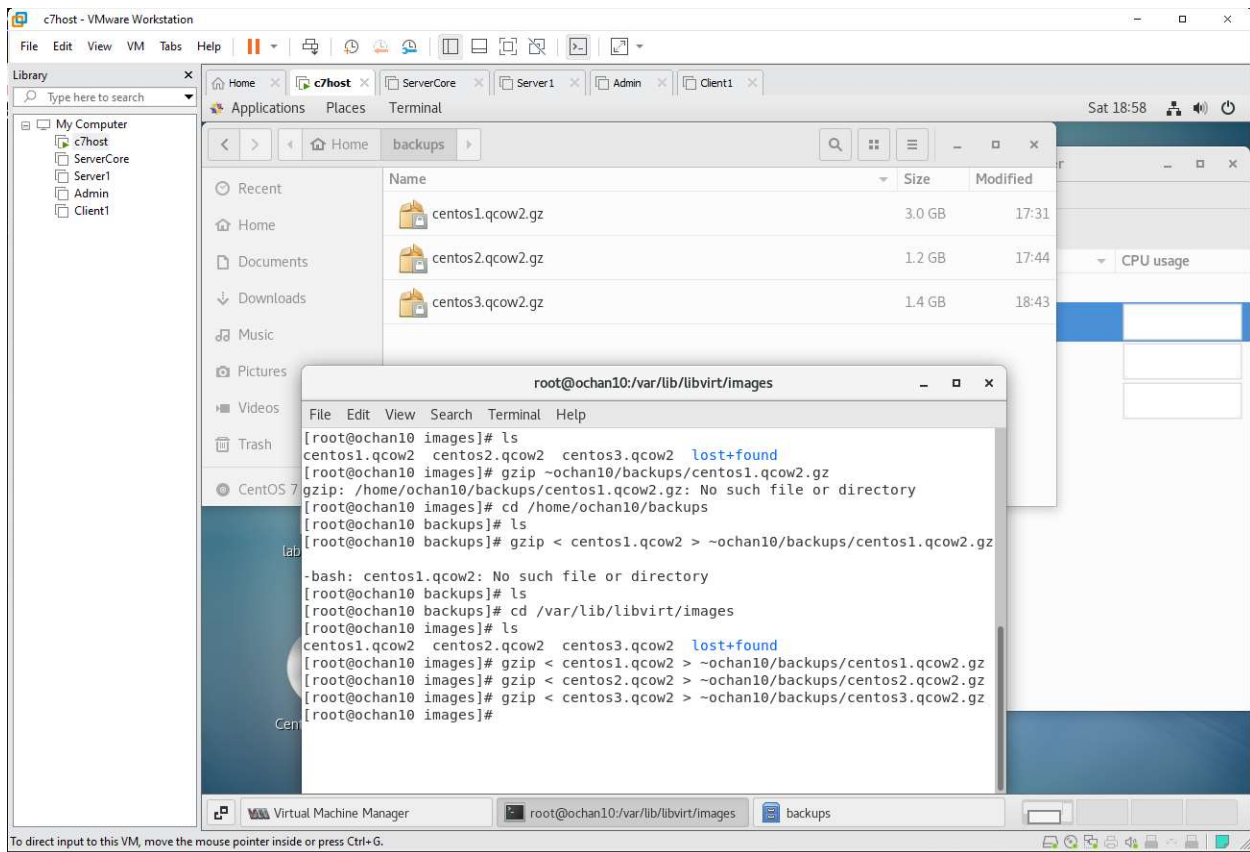
Centos3 ip address:

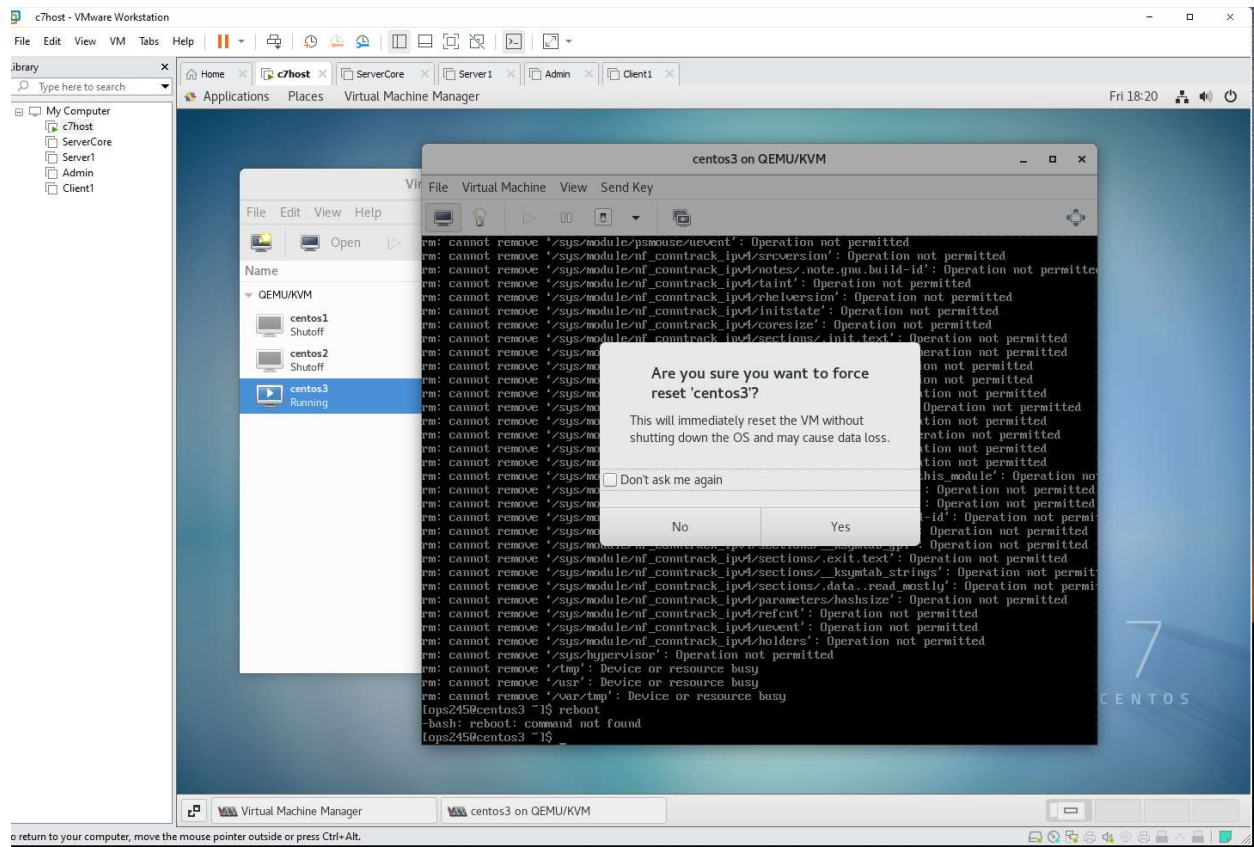


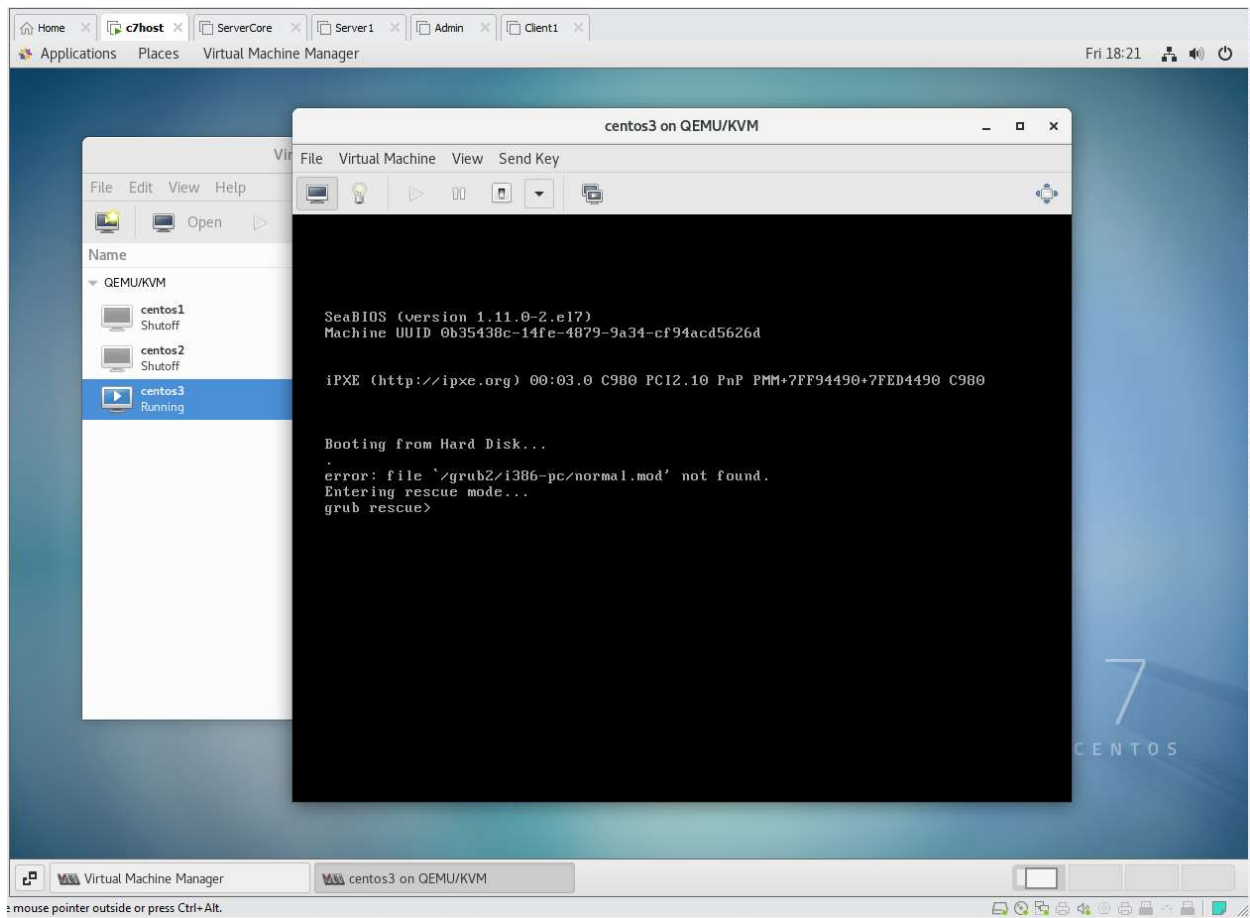
Centos4 ip address:

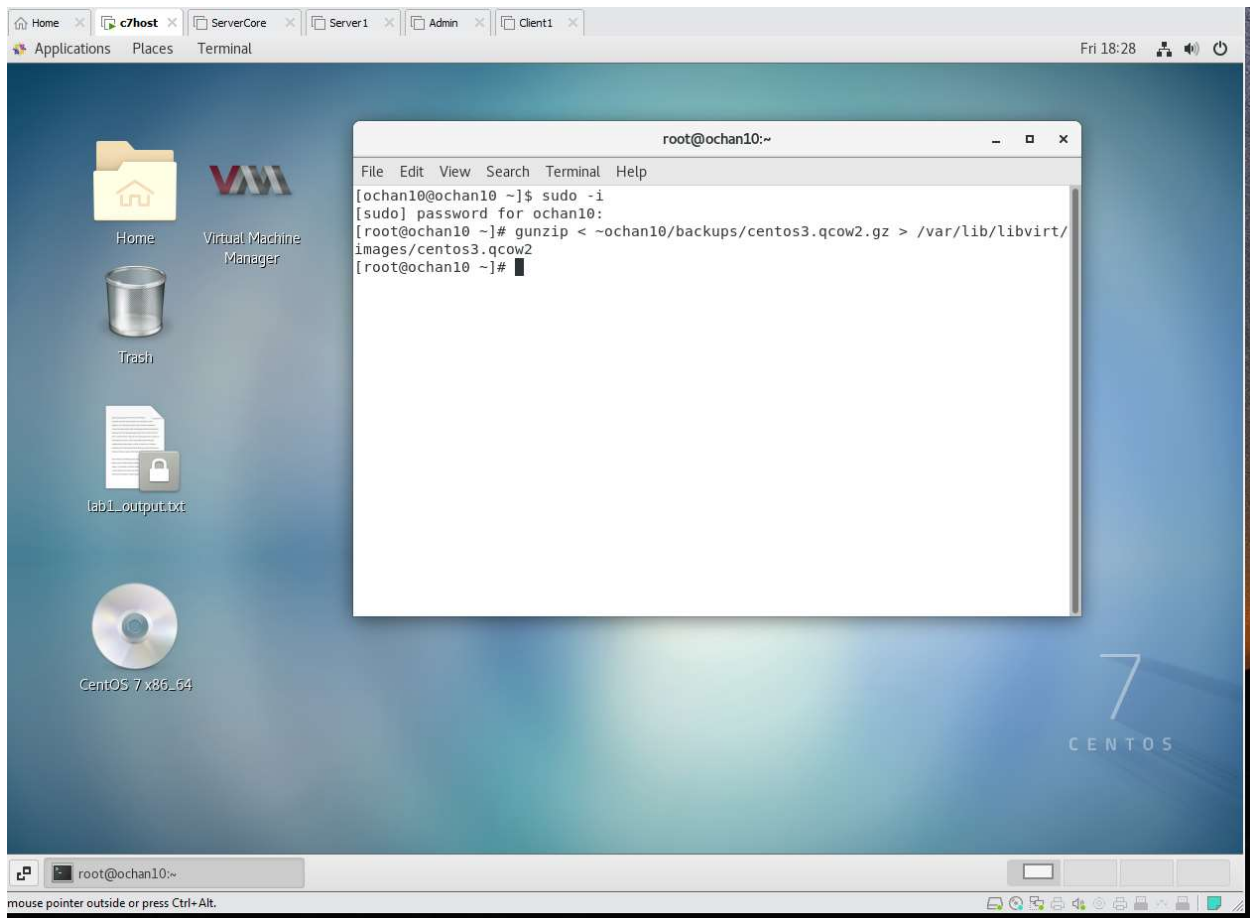


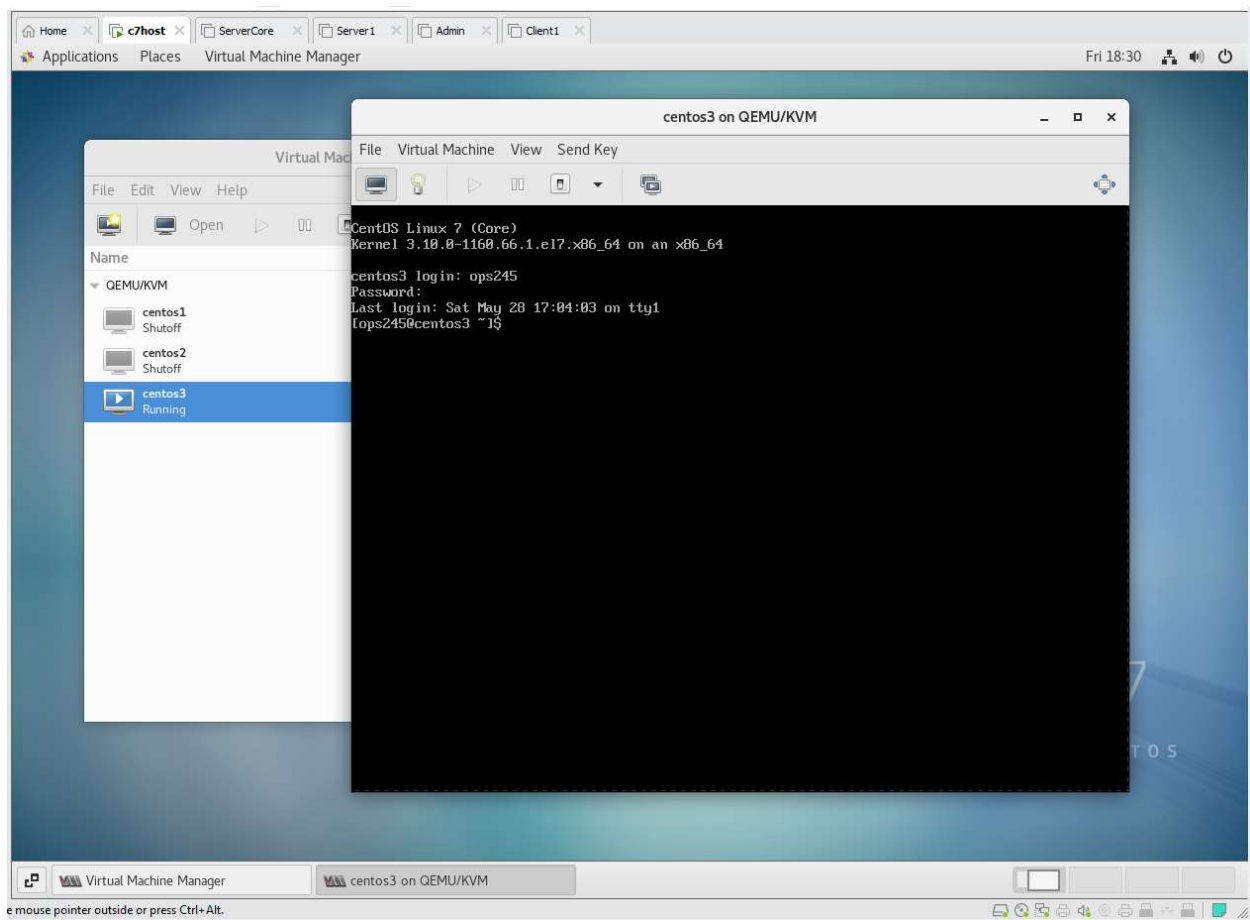
```
File Edit View Search Terminal Help
[ochan10@centos4 ~]$ ip address show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 52:54:00:c7:ee:62 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.11/24 brd 192.168.122.255 scope global noprefixroute dynamic eth0
        valid_lft 3410sec preferred_lft 3410sec
    inet6 fe80::5054:ff:fec7:ee62/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[ochan10@centos4 ~]$
```

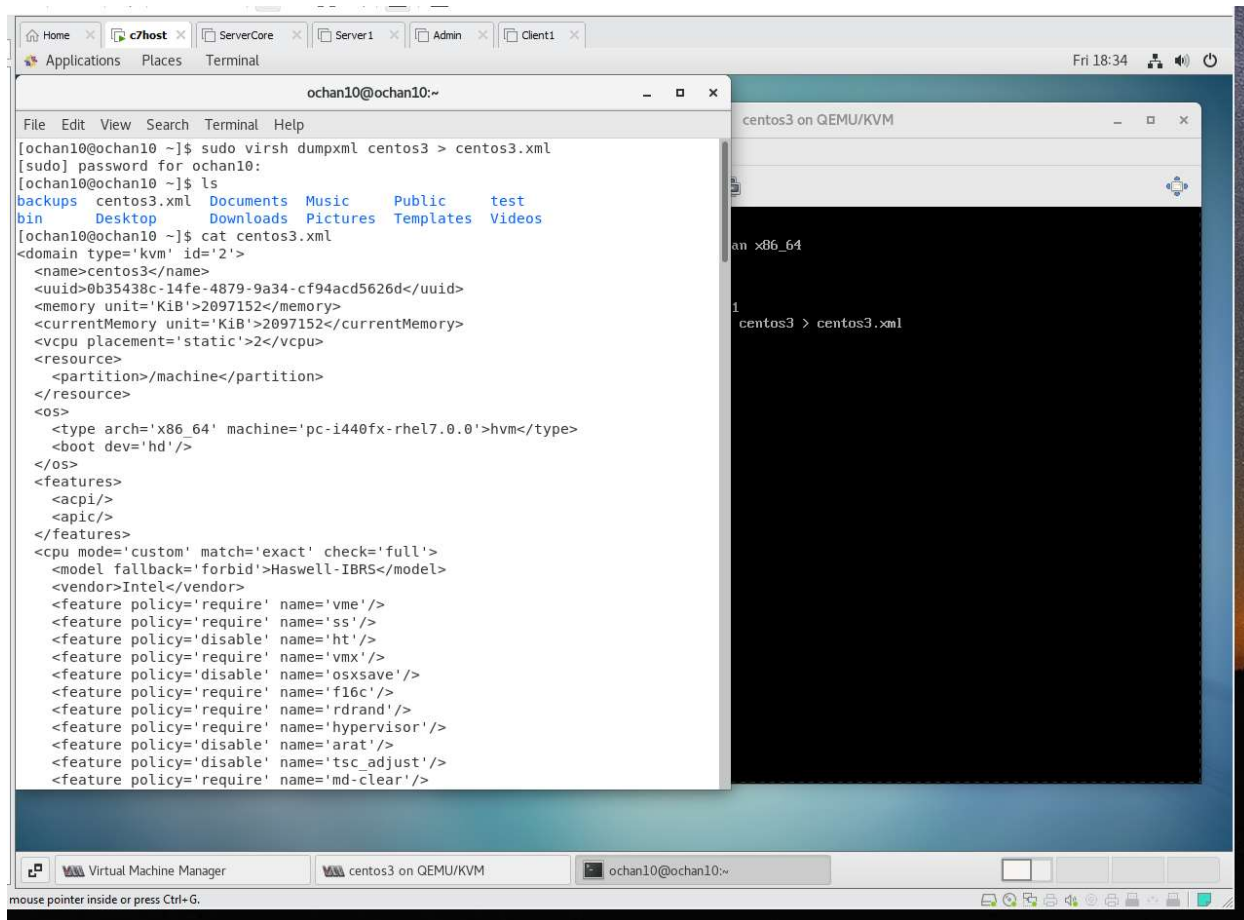


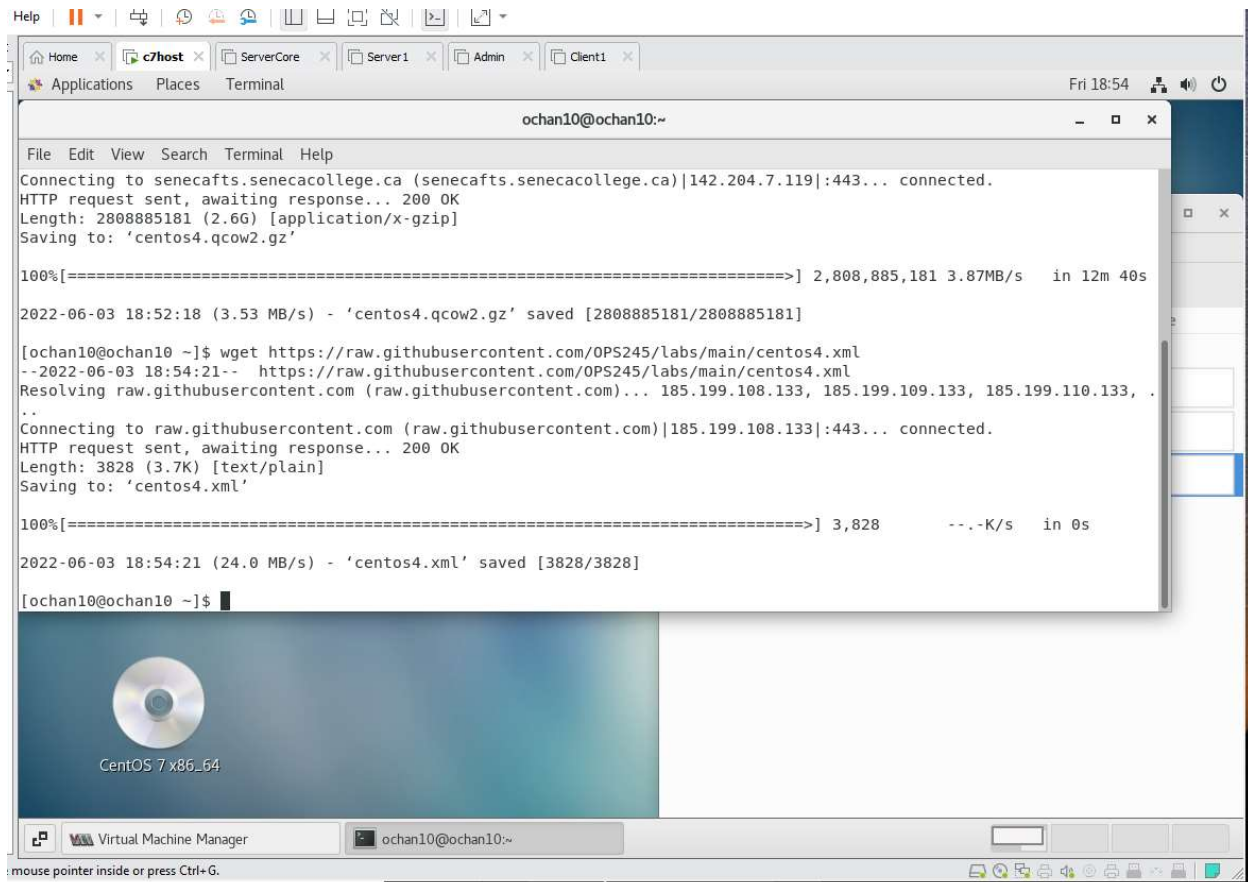


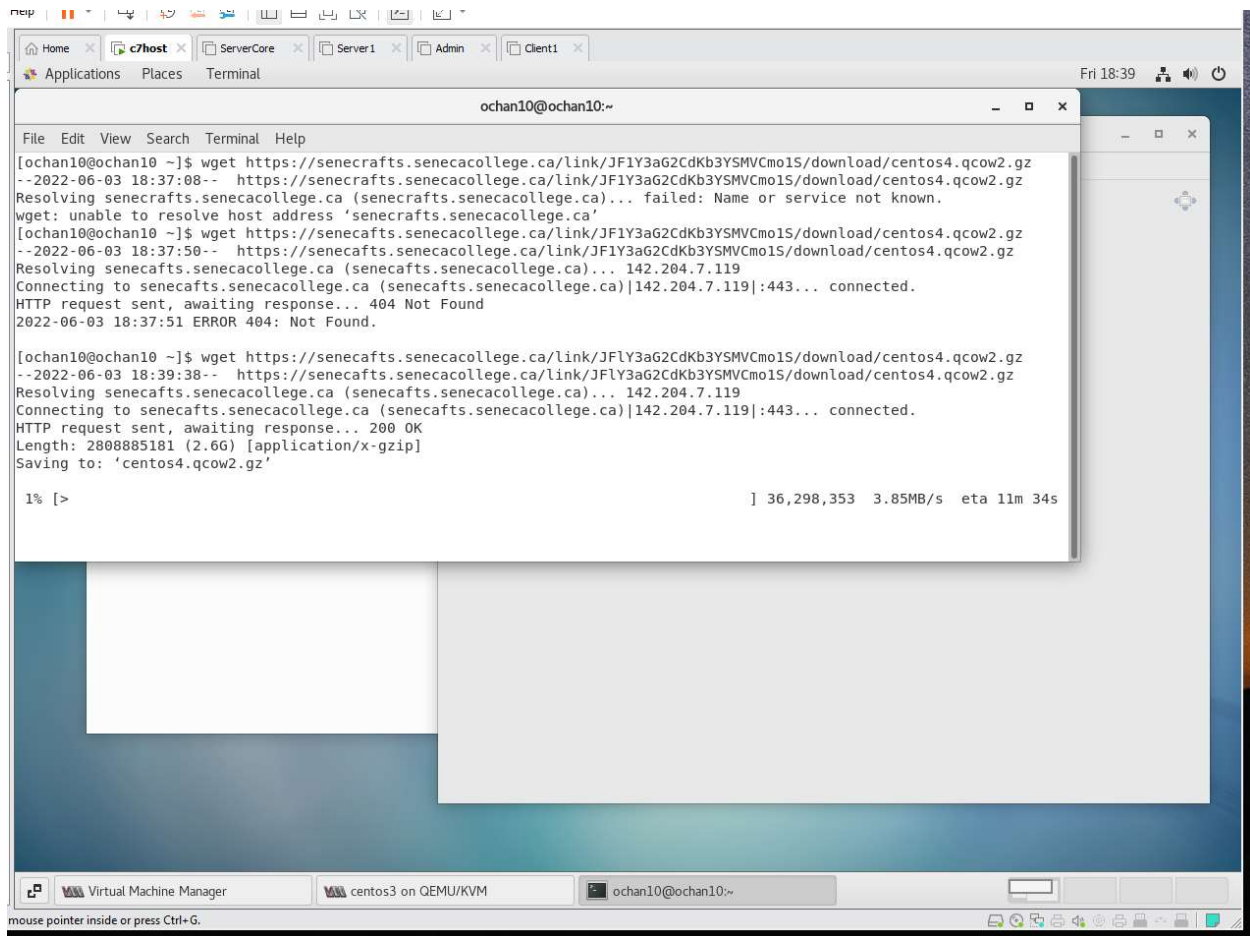


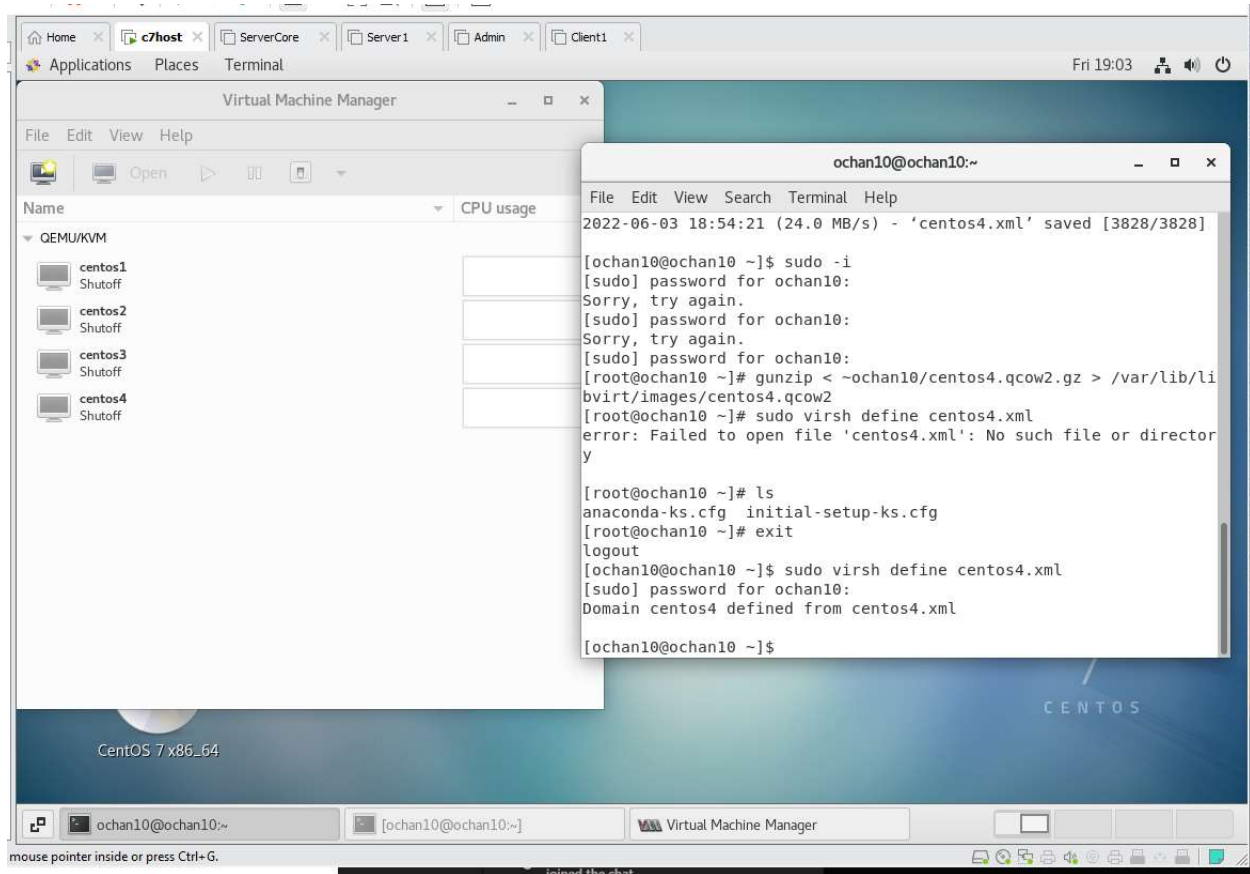


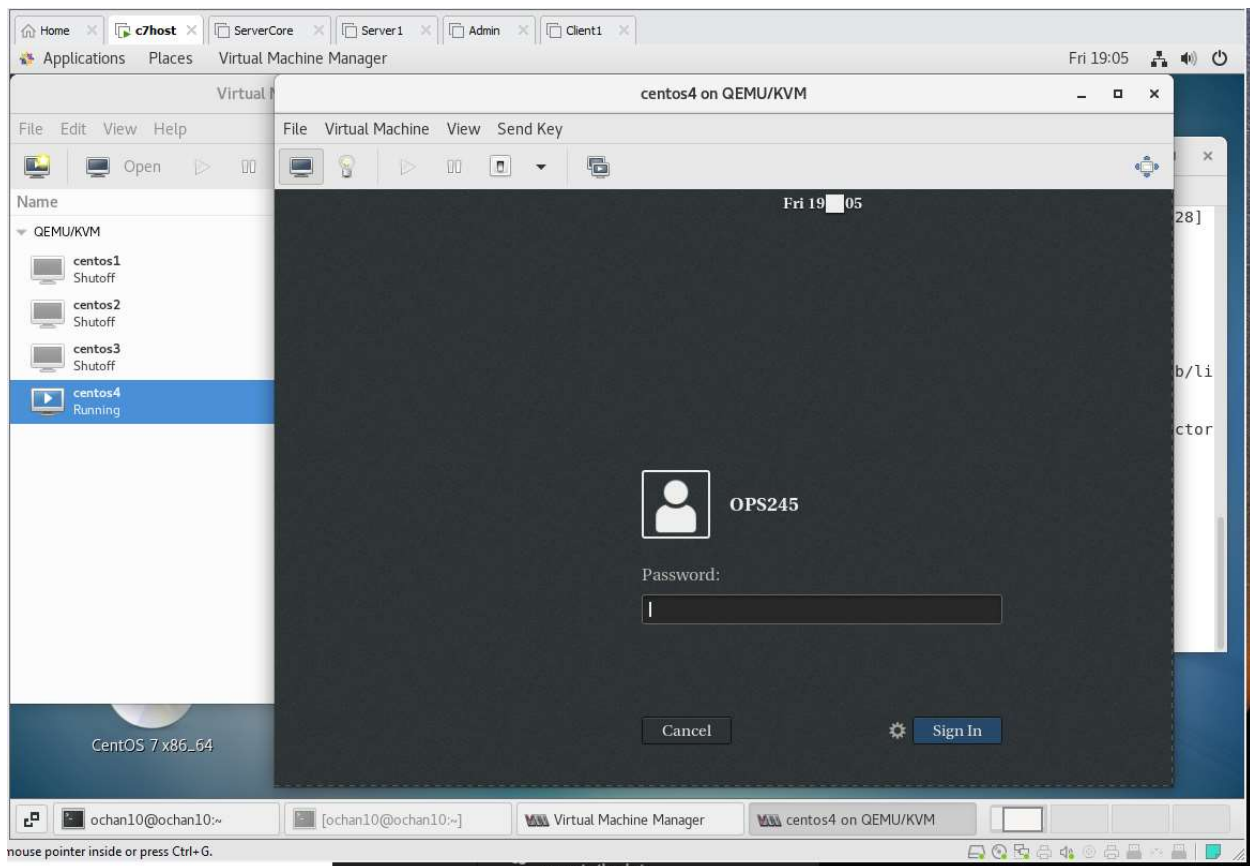


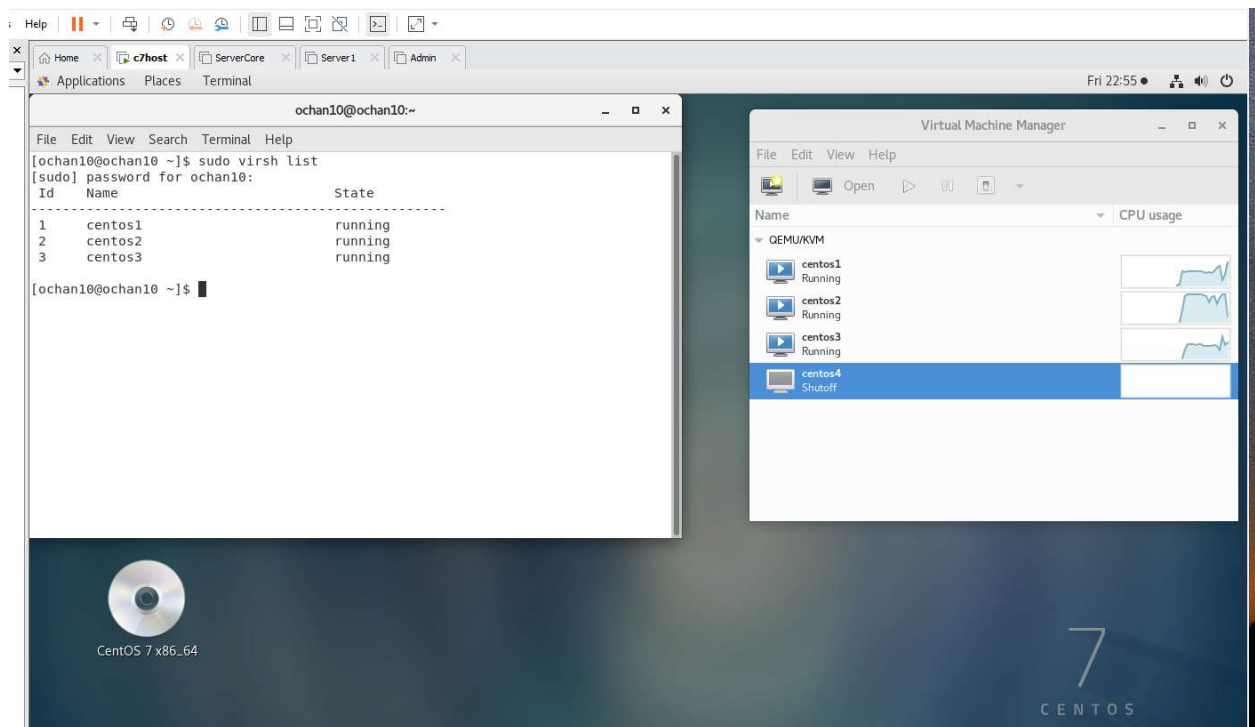
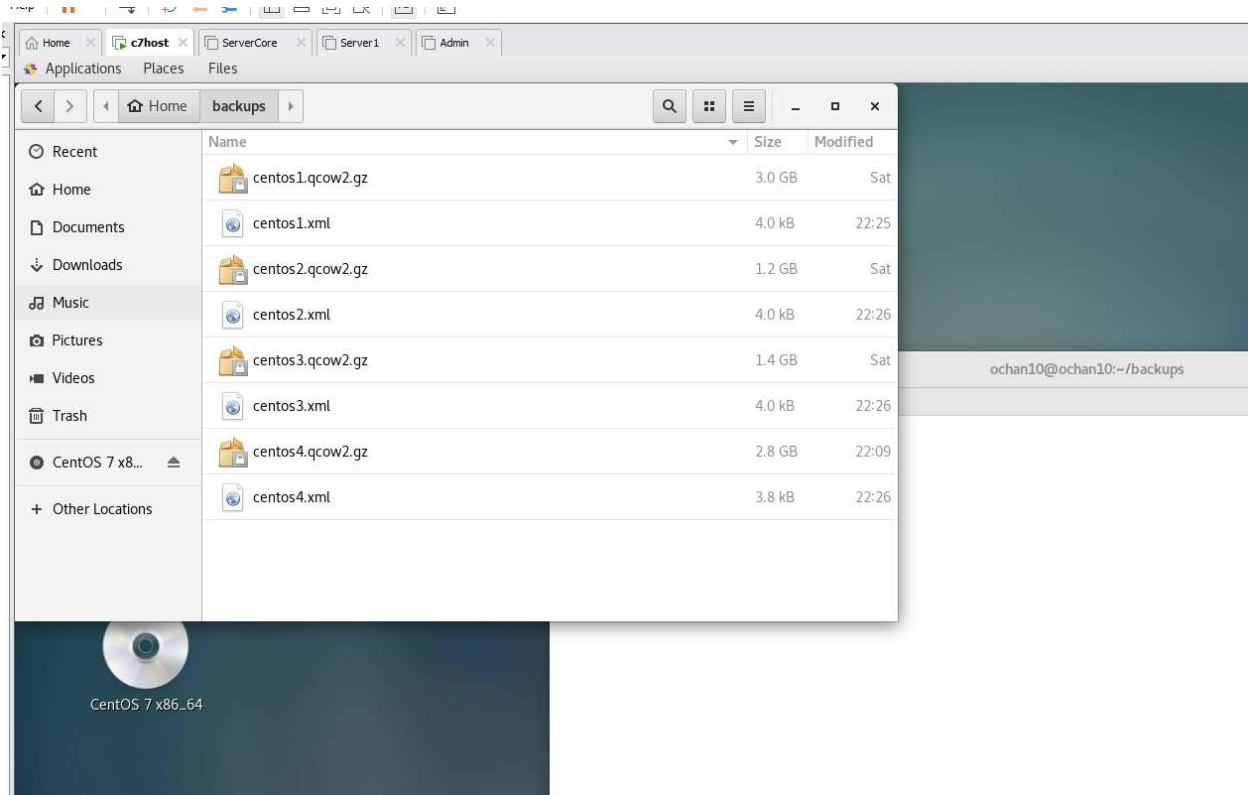












oChan10@oChan10:~

```
File Edit View Search Terminal Help
[ochan10@oChan10 ~]$ sudo virsh list
[sudo] password for ochan10:
Id      Name        State
-----
1       centos1     running
2       centos2     running
3       centos3     running

[ochan10@oChan10 ~]$ sudo virsh list --all
Id      Name        State
-----
1       centos1     running
2       centos2     running
3       centos3     running
-       centos4     shut off

[ochan10@oChan10 ~]$
```

Virtual Machine Manager

Name CPU usage

QEMU/KVM

- centos1 Running
- centos2 Running
- centos3 Running
- centos4 Shutoff

CentOS 7 x86_64

Help | [Icons] | Fri 22:!

Home | c7host | ServerCore | Server1 | Admin

Applications | Places

ochan10@ochan10:~

File Edit View Search Terminal Help

```
[ochan10@ochan10 ~]$ sudo virsh list
[sudo] password for ochan10:
Id      Name        State
-----
1       centos1     running
2       centos2     running
3       centos3     running

[ochan10@ochan10 ~]$ sudo virsh list --all
Id      Name        State
-----
1       centos1     running
2       centos2     running
3       centos3     running
-       centos4     shut off

[ochan10@ochan10 ~]$ sudo virsh list --inactive
Id      Name        State
-----
-       centos4     shut off

[ochan10@ochan10 ~]$
```

Virtual Machine Manager

File Edit View Help

Open [Icons]

Name CPU usage

QEMU/KVM

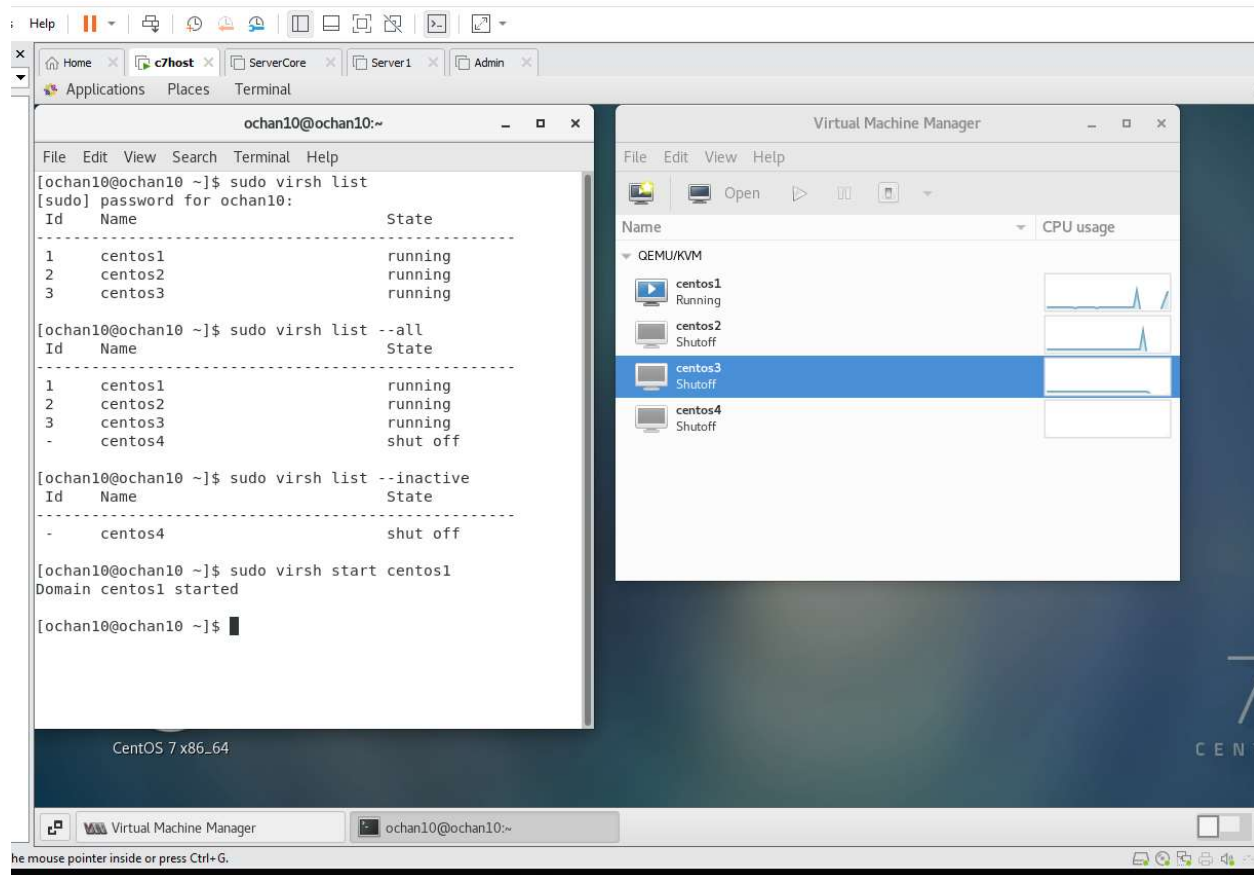
- centos1 Running
- centos2 Running
- centos3 Running
- centos4 Shutoff

CentOS 7 x86_64

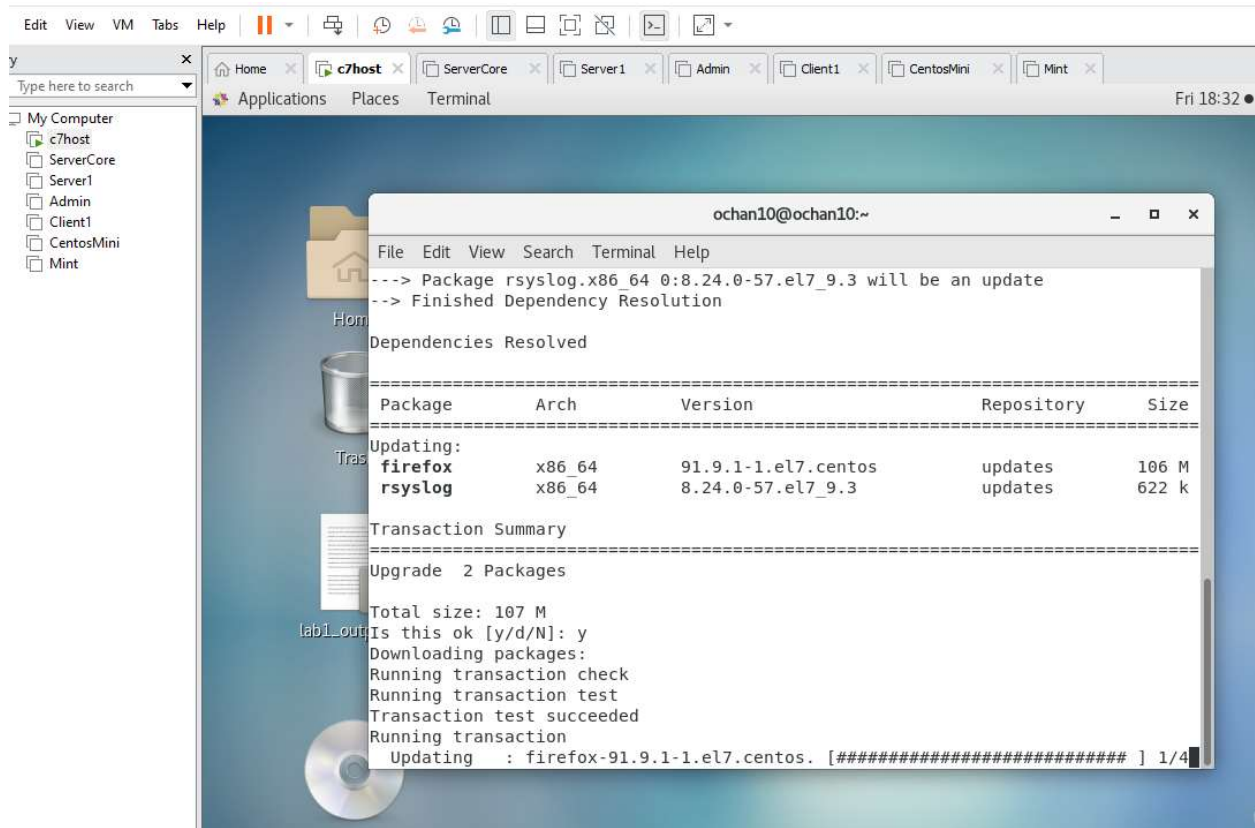
7
CENTO

Virtual Machine Manager | ochan10@ochan10:~

ie mouse pointer inside or press Ctrl+G.



Yum update:

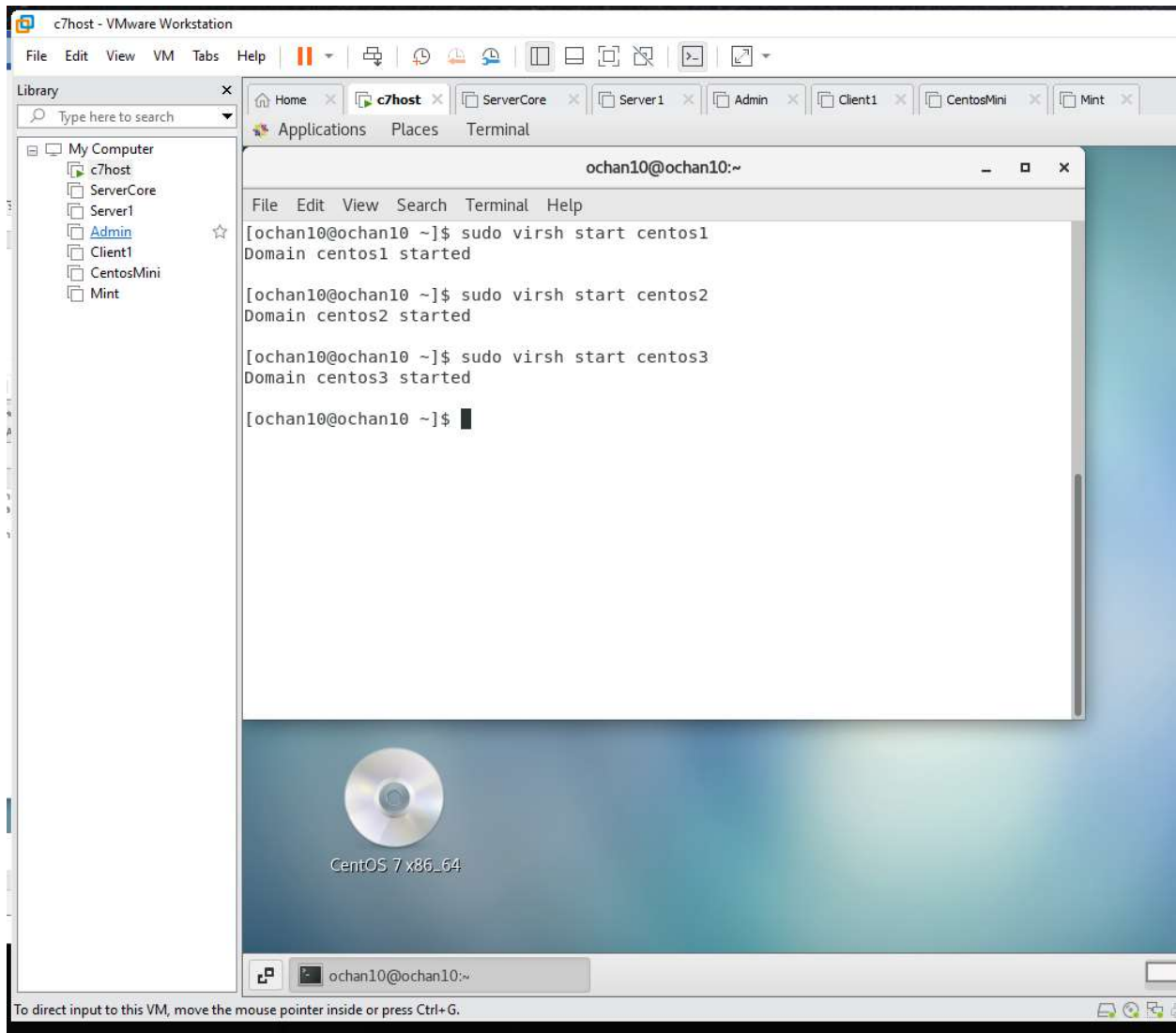


```
ochan10@ochan10:~  
File Edit View Search Terminal Help  
--> Package rsyslog.x86_64 0:8.24.0-57.el7_9.3 will be an update  
--> Finished Dependency Resolution  
Dependencies Resolved  

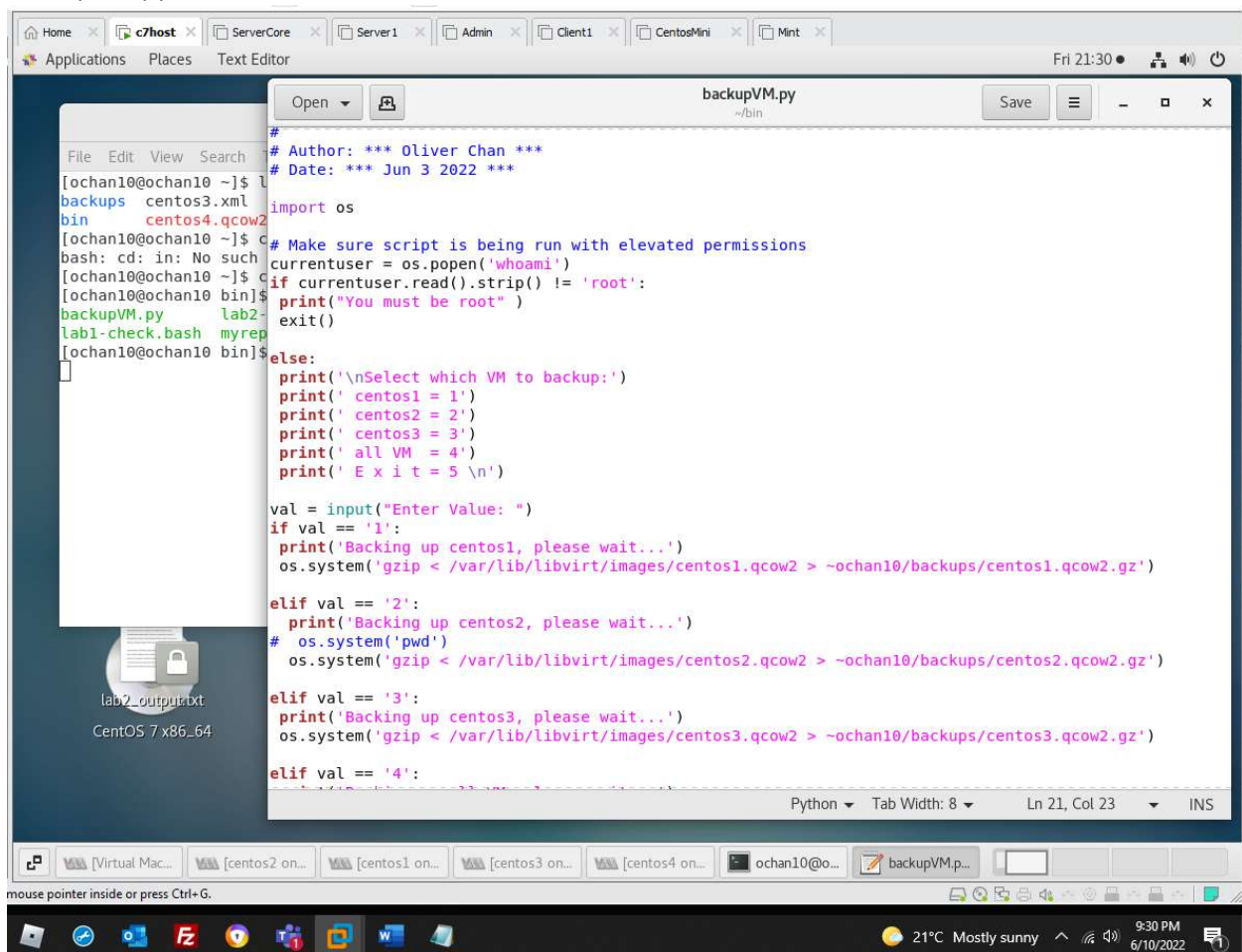

| Package   | Arch   | Version             | Repository | Size  |
|-----------|--------|---------------------|------------|-------|
| Updating: |        |                     |            |       |
| firefox   | x86_64 | 91.9.1-1.el7.centos | updates    | 106 M |
| rsyslog   | x86_64 | 8.24.0-57.el7_9.3   | updates    | 622 k |

  
Transaction Summary  
-----  
Upgrade 2 Packages  
  
Total size: 107 M  
Is this ok [y/d/N]: y  
Downloading packages:  
Running transaction check  
Running transaction test  
Transaction test succeeded  
Running transaction  
Updating : firefox-91.9.1-1.el7.centos. [##### ] 1/4
```

Centos1:



backupVM.py



The screenshot shows a virtual machine interface with a terminal window and a file explorer. The terminal window displays the execution of a Python script named `backupVM.py`. The script prompts the user to select a VM to backup (1 for centos1, 2 for centos2, 3 for centos3, 4 for all VM, 5 for exit). The user has selected '1', and the script is running the command `os.system('gzip < /var/lib/libvirt/images/centos1.qcow2 > ~ochan10/backups/centos1.qcow2.gz')`. The file explorer shows a folder named `lab2_output.txt` and a file named `CentOS 7 x86_64`.

```
# Author: *** Oliver Chan ***
# Date: *** Jun 3 2022 ***

import os

# Make sure script is being run with elevated permissions
currentuser = os.popen('whoami')
if currentuser.read().strip() != 'root':
    print("You must be root")
    exit()
else:
    print('\nSelect which VM to backup:')
    print(' centos1 = 1')
    print(' centos2 = 2')
    print(' centos3 = 3')
    print(' all VM = 4')
    print(' E x i t = 5 \n')

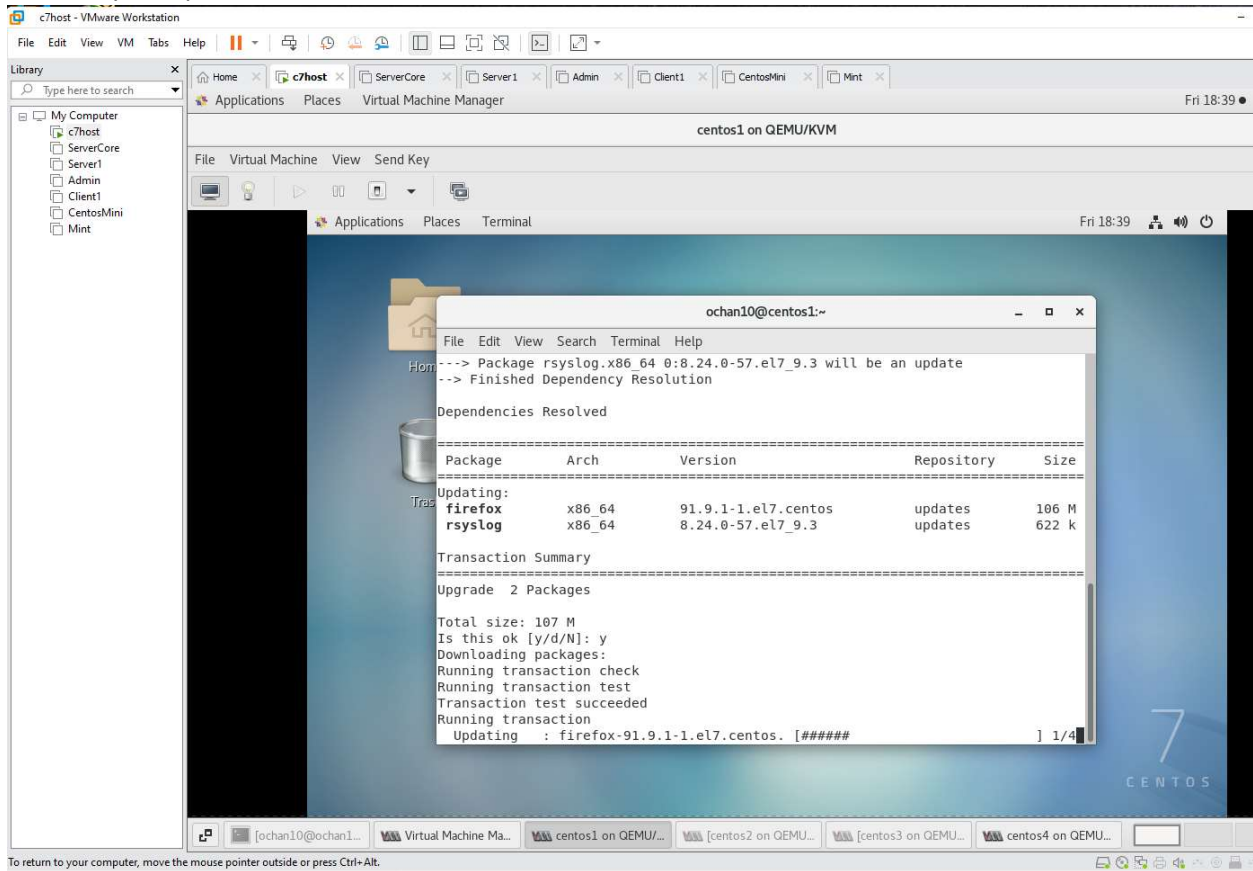
    val = input("Enter Value: ")
    if val == '1':
        print('Backing up centos1, please wait...')
        os.system('gzip < /var/lib/libvirt/images/centos1.qcow2 > ~ochan10/backups/centos1.qcow2.gz')

    elif val == '2':
        print('Backing up centos2, please wait...')
        # os.system('pwd')
        os.system('gzip < /var/lib/libvirt/images/centos2.qcow2 > ~ochan10/backups/centos2.qcow2.gz')

    elif val == '3':
        print('Backing up centos3, please wait...')
        os.system('gzip < /var/lib/libvirt/images/centos3.qcow2 > ~ochan10/backups/centos3.qcow2.gz')

    elif val == '4':
        print('Backing up all VMs, please wait...')
        os.system('gzip < /var/lib/libvirt/images/*.qcow2 > ~ochan10/backups/all.qcow2.gz')
```

Centos1 yum update



The image shows a screenshot of a Virtual Machine Manager (VMM) interface. At the top, there's a menu bar with options like 'File', 'Virtual Machine', 'View', and 'Send Key'. Below the menu bar, there's a sidebar on the left with a file explorer showing the contents of the VM's file system. The main window displays the terminal output of a 'yum update' command. The output lists various packages to be updated, including glibc, gcc, and kernel. The interface also shows a top status bar with the VM name 'centos4 on QEMU/KVM' and a bottom status bar with the current user 'ops245@centos4:-'.

rect input to this VM, move the mouse pointer inside or press Ctrl+G.

Lab2-check.bash script report:

```
c7host - VMware Workstation
Edit View VM Tabs Help
y
Type here to search
My Computer
  c7host
  ServerCore
  Server1
  Admin
  Client1
  CentosMini
  Mint
Applications Places Terminal
ochan10@ochan10:~/bin

File Edit View Search Terminal Help

CHECKING YOUR LAB 2 WORK:

Enter the username that you created for your c7host and ALL VMs: ochan10
Checking for existence of "/home/ochan10/bin" directory in c7host: OK
Checking for pathname "/home/ochan10/bin/lab2-check.bash":OK
Checking that "centos1", "centos2", and "centos3" VMs have been created:OK
Checking that "centos1", "centos2", and "centos3" VMs are ALL running:OK
Checking that "centos1" has correct ext4 file-system type:
Enter IP Address for your centos1 VMs eth0 device: 192.168.122.187
ochan10@192.168.122.187's password:
OK
Checking that "centos2" has correct ext4 file-system types:
Enter IP Address for your centos2 VMs eth0 device: 192.168.122.63
The authenticity of host '192.168.122.63 (192.168.122.63)' can't be established.
ECDSA key fingerprint is SHA256:njTNUi16UK0H7Ngglju+rWZv06Iqmb0ZF0BMY8PG2aM.
ECDSA key fingerprint is MD5:92:90:a6:3d:be:e6:39:46:a8:be:11:00:44:c5:2e:74.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.122.63' (ECDSA) to the list of known hosts.
ochan10@192.168.122.63's password:
OK
Checking that "centos2" has correct partition sizes:
ochan10@192.168.122.63's password:
OK
Checking that "/var/lib/libvirt/images/centos1.qcow2" file exists:
OK
Checking that "/var/lib/libvirt/images/centos2.qcow2" file exists:OK
Checking that "/var/lib/libvirt/images/centos3.qcow2" file exists:OK
Checking that file pathname "/home/ochan10/bin/backupVM.py" exists:OK
Checking that centos1 backed up in user's home directory:OK
Checking that centos2 backed up in user's home directory:OK
Checking that centos3 backed up in user's home directory:
OK

Congratulations!

You have successfully completed Lab 2.
1. Submit a screenshot of your entire desktop (including this window) to your course professor.
2. A copy of this script output has been created at /home/ochan10/Desktop/lab2_output.txt. Submit this file along with your screenshot.
3. Also submit a copy of your backupVM.py script.

[ochan10@ochan10 bin]$
```

Virtual Machine Manager [centos4 on GEMU/KVM] [centos3 on GEMU/KVM] centos1 on GEMU/KVM centos2 on GEMU/KVM ochan10@ochan10:~/bin ochan10@ochan10:~/bin

Running backupVM.py screenshot:

