02-06-2021
https://youtu.be/-HK1KLbisNY
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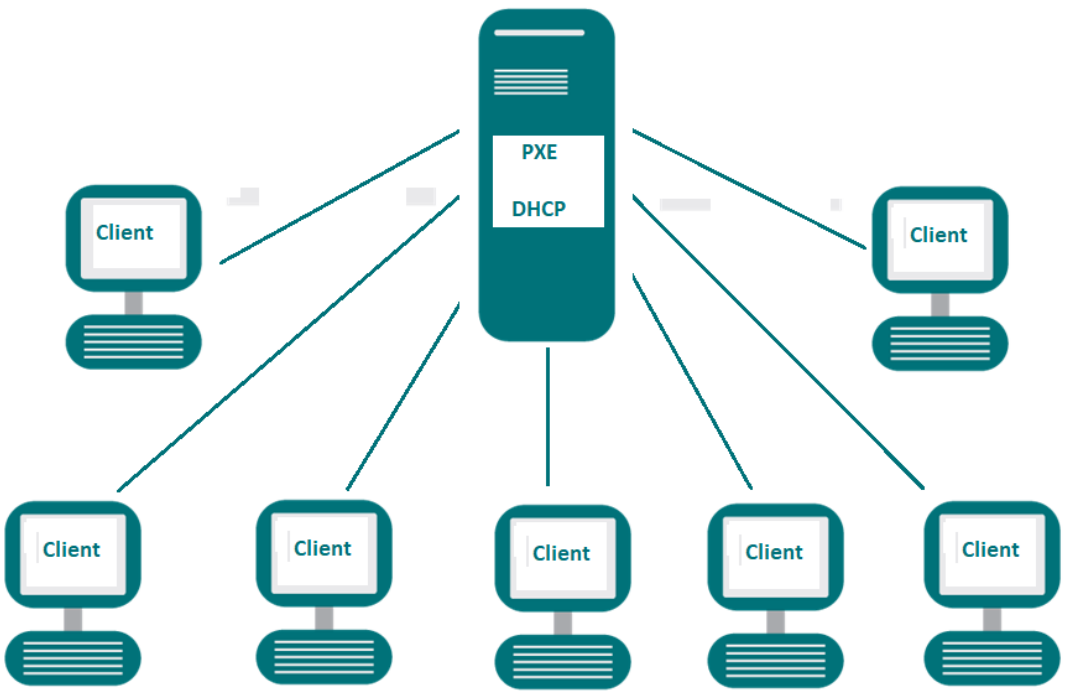
PXE-Server

What is a PXE server? A Preboot eXecution Environment, pronounce pixie. PXE is one of the components of the server installation, which allows a server to boot from a PXE server on a network prior to booting from OS on the local hard drive. This is used for mass installation of the servers without the need for DVD or USB.

Directory: /etc/sysconfig/network-scripts, / etc/xinetd.d/tftp, /usr/share/syslinux/pxelinux.0, /var/lib/tftpboot, /var/lib/tftpboot/pxelinux.cfg, networkboot, /mnt/images/pxeboot/

Config file: /etc/sysconfig/network-scripts/ifcfg-enp0s3, /etc/hostname, /etc/dhcp/dhcpd.conf, etc/xinetd.d/tftp, CentOS-7-x86_64-DVD-1908.iso, andaconda.cfg, centos7.cfg, /var/lib/tftpboot/pxelinux.cfg

Port #: 69, 4011
Package: dhcp tftp tftp-server syslinux vsftpd xinetd
Services: xinetd, dhcpd, vsftpd, tftp, firewalld
Protocol: tcp, udp
Command:
URL:



Configure PXE [network boot] installation server

Server ip = 192.168.56.133
Hostname = pxe01.zmpt.com

Set static ip and hostname

[root@pxe01 ~]# vi /etc/sysconfig/network-scripts/ifcfg-enp0s3

TYPE=Ethernet
DEVICE=enp0s3
NAME=enp0s3
ONBOOT=yes
BOOTPROTO=static
IPADDR=192.168.56.133
NETMASK=255.255.255.0
HWADDR=08:00:27:27:7f:f7

[root@zmpt01 ~]# vi /etc/hostname
pxe01.zmpt.com

Install the required packages

[root@pxe01 ~]# yum install -y dhcp tftp tftp-server syslinux vsftpd xinetd

Configure DHCP server – Dynamic host control Protocol

The Dynamic Host Configuration Protocol (DHCP) is a network management protocol used on Internet Protocol (IP) networks, whereby a DHCP server dynamically assigns an IP address

Configure the DHCP configuration file – copy and paste – edit as needed

[root@pxe01 ~]# vi /etc/dhcp/dhcpd.conf #< ---delete content and start from scratch

```
ddns-update-style interim;
ignore client-updates;
authoritative;
allow booting;
allow bootp;
allow unknown-clients;

subnet 192.168.56.0 netmask 255.255.255.0 {
range 192.168.56.171 192.168.56.200;
option domain-name-servers 192.168.56.133;
option domain-name "pxeboot.zmpt.com";
option routers 192.168.56.133;
option broadcast-address 192.168.56.255;
default-lease-time 600;
max-lease-time 7200;

# IP of PXE Server
next-server 192.168.56.133;
filename "pxelinux.0";
}
```

Config TFTP server file – Trivial File Transfer Protocol

No edit required

[root@pxe01 ~]# vi /etc/xinetd.d/tftp

```
{
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
```

```
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /var/lib/tftpboot                  #< --- Network boot related file goes
here
        disable                 = yes
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
}
```

Copy network boot related files to /var/lib/tftpboot – 5 files

```
[root@pxe01 tftpboot]# cp -v /usr/share/syslinux/pxelinux.0 /var/lib/tftpboot/

[root@pxe01 tftpboot]# cp -v /usr/share/syslinux/menu.c32 /var/lib/tftpboot/

[root@pxe01 tftpboot]# cp -v /usr/share/syslinux/memdisk /var/lib/tftpboot/

[root@pxe01 tftpboot]# cp -v /usr/share/syslinux/mboot.c32 /var/lib/tftpboot/

[root@pxe01 tftpboot]# cp -v /usr/share/syslinux/chain.c32 /var/lib/tftpboot/
```

```
[root@pxe01 tftpboot]# pwd
/var/lib/tftpboot
[root@pxe01 tftpboot]# ls
chain.c32  mboot.c32  memdisk  menu.c32  pxelinux.0
```

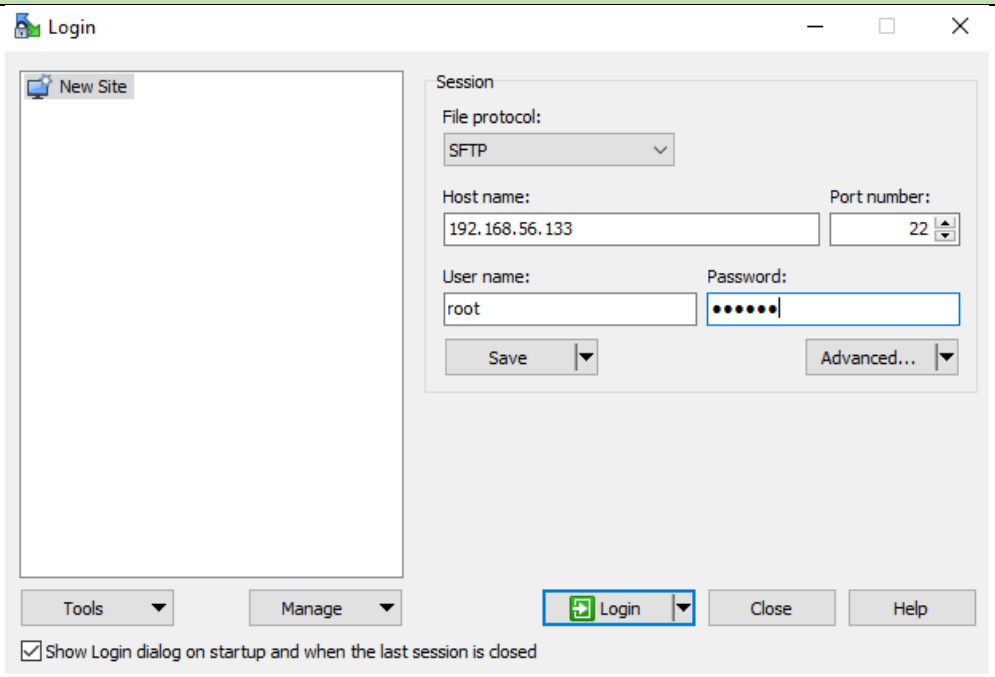
Make a directory in tftpboot folder

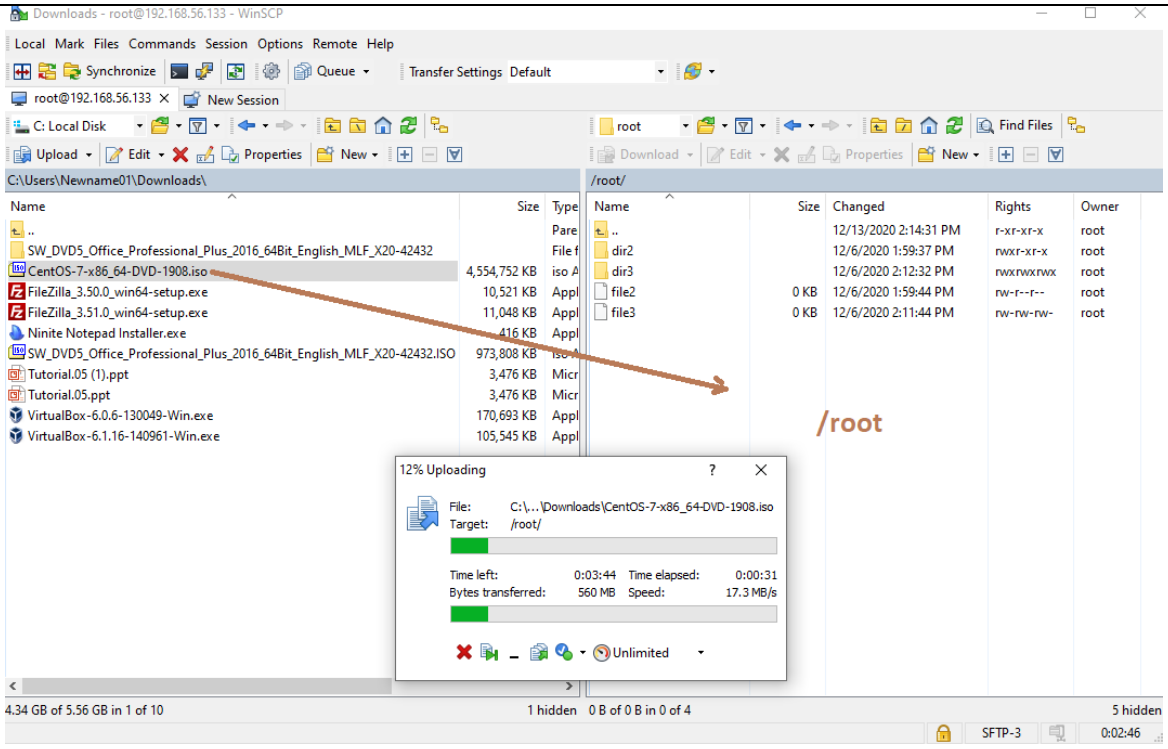
```
[root@pxe01 tftpboot]# pwd
/var/lib/tftpboot
[root@pxe01 tftpboot]# mkdir pxelinux.cfg
[root@pxe01 tftpboot]# mkdir networkboot
```

```
[root@pxe01 tftpboot]# ls -l
total 172
-rw-r--r--. 1 root root 20832 Feb  6 16:20 chain.c32
-rw-r--r--. 1 root root 33628 Feb  6 16:20 mboot.c32
-rw-r--r--. 1 root root 26140 Feb  6 16:19 memdisk
-rw-r--r--. 1 root root 55140 Feb  6 16:19 menu.c32
drwxr-xr-x. 2 root root     6 Feb  6 16:23 networkboot
```

-rw-r--r--. 1 root root 26759 Feb 6 16:19 pxelinux.0
drwxr-xr-x. 2 root root   6 Feb 6 16:23 pxelinux.cfg

Copy the iso file to the server





[root@pxe01 ~]# ls -ltrh
total 4.4G

```
-rw-r--r--. 1 root root 4.4G Dec 27  2019 CentOS-7-x86_64-DVD-1908.iso
drwxr-xr-x. 2 root root    6 Dec  6 14:59 dir2
-rw-r--r--. 1 root root    0 Dec  6 14:59 file2
-rw-rw-rw-. 1 root root    0 Dec  6 15:11 file3
drwxrwxrwx. 2 root root    6 Dec  6 15:12 dir3
```

```
[root@pxe01 ~]# mount -o loop CentOS-7-x86_64-DVD-1908.iso /mnt
mount: /dev/loop0 is write-protected, mounting read-only
```

```
[root@pxe01 ~]# df -h
Filesystem              Size  Used Avail Use% Mounted on
devtmpfs                484M     0  484M   0% /dev
tmpfs                   496M     0  496M   0% /dev/shm
tmpfs                   496M  6.9M  489M   2% /run
tmpfs                   496M     0  496M   0% /sys/fs/cgroup
/dev/mapper/centos-root   14G  6.1G  7.4G  46% /
/dev/loop0               4.4G  4.4G     0 100% /mnt
/dev/sda1               1014M  136M  879M  14% /boot
tmpfs                   100M     0  100M   0% /run/user/0
```

Now copy to /var/ftp/pub – directory

```
[root@pxe01 mnt]# pwd
/mnt

[root@pxe01 mnt]# cp -av * /var/ftp/pub
```

Copy Kernel Files

```
[root@pxe01 mnt]# cd /mnt/images/pxeboot/
[root@pxe01 pxeboot]# ls -l
total 60360
-rw-r--r--. 2 root root 55073584 Sep  6  2019 initrd.img
-r--r--r--. 1 root root      441 Sep 11  2019 TRANS.TBL
-rwxr-xr-x. 2 root root  6734016 Aug  7  2019 vmlinuz
```

```
[root@pxe01 pxeboot]# cp initrd.img /var/lib/tftpboot/networkboot/
[root@pxe01 pxeboot]# cp vmlinuz /var/lib/tftpboot/networkboot/
```

Unmount the cd

[root@pxe01 ~]# umount /mnt

Set the encription - SSL (Secure Sockets Layer) – save the generated encryption key

[root@pxe01 ~]# openssl passwd -1 redhat
1qvYA3uE2$jFmQN3bDPC13U41b8OegF/

Copy anaconda-ks.cfg from the /root folder, if not available , copy from another computer or online

[root@pxe01 ~]# cp anaconda-ks.cfg /var/ftp/pub/

Rename anacomda-ks.cfg to centos7.cfg

[root@pxe01 pub]# mv anaconda-ks.cfg centos7.cfg

Modify the fields as shown

[root@pxe01 pub]# vi centos7.cfg

```
#platform=x86, AMD64, or Intel EM64T
#version=DEVEL

#Firewall configuration
firewall --disabled
#Install OS
install
#Use FTP Installation Media
url --url="ftp://192.168.56.133/pub"
#Root password
rootpw --iscrypted $1$qvYA3uE2$jFmQN3bDPC13U41b8OegF/


# System authorization information
auth --enableshadow --passalgo=sha512


# Use graphical install
graphical
# Run the Setup Agent on first boot
firstboot disable

# Keyboard layouts
```

```
keyboard us

# System language
lang en_US

#SELinux configuration
selinux disabled

#Installation logging level
logging level=info

# System timezone
timezone America/New_York --isUtc

# System bootloader configuration
bootloader --location=mbr

# Partition clearing information
clearpart --all --initlabel

part swap --asprimary --fstype="swap" ---size-1024
part /boot --fstype xfs --size=1024
part pv.01 --size=1 --grow

volgroup zmpt01 pv.01
logvol / --fstype xfs --name=lv_01 --vgname=zmpt01 --size=1 --grow

%packages
@^minimal
@core

%end

%addon com_redhat_kdump --enable --reserve-mb='auto'

%end
```

Change the centos7.cfg to allow file execution

```
[root@pxe01 pub]# ls -l centos7.cfg
-rw-------. 1 root root 1006 Feb  7 14:31 centos7.cfg
[root@pxe01 pub]# chmod 755 centos7.cfg
```

Config file explaination – centos7.cfg

```
#platform=x86, AMD64, or Intel EM64T                    #< ---Architecture of processor
#version=DEVEL

#Firewall configuration                                 #< ---Disable the firewall
firewall --disabled

#Install OS                                             #< --- OS Install
Install

#Use FTP Installation Media                             #< ----FTP server folder location
url --url="ftp://192.168.56.133/pub"

# System authorization information                     #< ---Authorication of password
file
auth --enableshadow --passalgo=sha512

#Root password                                          #< --- root password generated
rootpw --iscrypted $1$qvYA3uE2$jFmQN3bDPC13U41b8OegF/


# Use graphical install                                 #< ---Graphical Mode Installation
graphical
# Run the Setup Agent on first boot
firstboot disable

# Keyboard layouts                                      # < --- Default setting
keyboard us

# System language
lang en_US

#SELinux configuration
selinux disabled

#Installation logging level
logging level=info

# System timezone
timezone America/New_York --isUtc

# System bootloader configuration
bootloader --location=mbr

# Partition clearing information
```

```
clearpart --all --initlabel

part swap --asprimary --fstype="swap" ---size-1024
part /boot --fstype xfs --size=1024
part pv.01 --size=1 --grow

volgroup zmpt01 pv.01
logvol / --fstype xfs --name=lv_01 --vgname=zmpt01 --size=1 --grow

%packages
@^minimal
@core

%end

%addon com_redhat_kdump --enable --reserve-mb='auto'

%end
```

PXE boot Menu – Create ‘default’ file

```
[root@pxe01 pxelinux.cfg]# pwd
/var/lib/tftpboot/pxelinux.cfg
```

```
[root@pxe01 pxelinux.cfg]# vi default

default menu.c32
prompt 0
timeout 30
MENU Title zmprotech PXE installation
LABEL centos7_x64 bits
MENU LABEL Centos7_64
KERNEL /networkboot/vmlinuz
APPEND initrd=/networkboot/initrd.img inst.repo=ftp://192.168.56.133/pub
ks=ftp://192.168.56.133/pub/cento7.cfg
```

Start all the required services

```
[root@pxe01 pxelinux.cfg]# systemctl start xinetd
[root@pxe01 pxelinux.cfg]# systemctl enable xinetd

[root@pxe01 pxelinux.cfg]# systemctl start dhcpd
```

```
Job for dhcpd.service failed because the control process exited with error code. See "systemctl status
dhcpd.service" and "journalctl -xe" for details.
[root@pxe01 pxelinux.cfg]# systemctl enable dhcpd
Created symlink from /etc/systemd/system/multi-user.target.wants/dhcpd.service to
/usr/lib/systemd/system/dhcpd.service.

[root@pxe01 pxelinux.cfg]# systemctl start vsftpd
[root@pxe01 pxelinux.cfg]# systemctl enable vsftpd
Created symlink from /etc/systemd/system/multi-user.target.wants/vsftpd.service to
/usr/lib/systemd/system/vsftpd.service.

[root@pxe01 pxelinux.cfg]# systemctl start tftp
[root@pxe01 pxelinux.cfg]# systemctl enable tftp
Created symlink from /etc/systemd/system/sockets.target.wants/tftp.socket to
/usr/lib/systemd/system/tftp.socket.
[root@pxe01 pxelinux.cfg]#
```

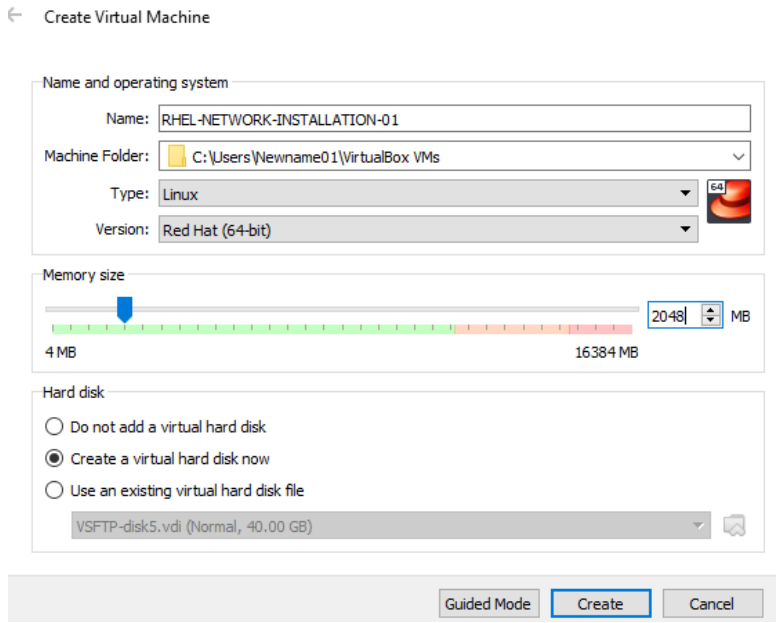
SELinux exception – allow through SELinux

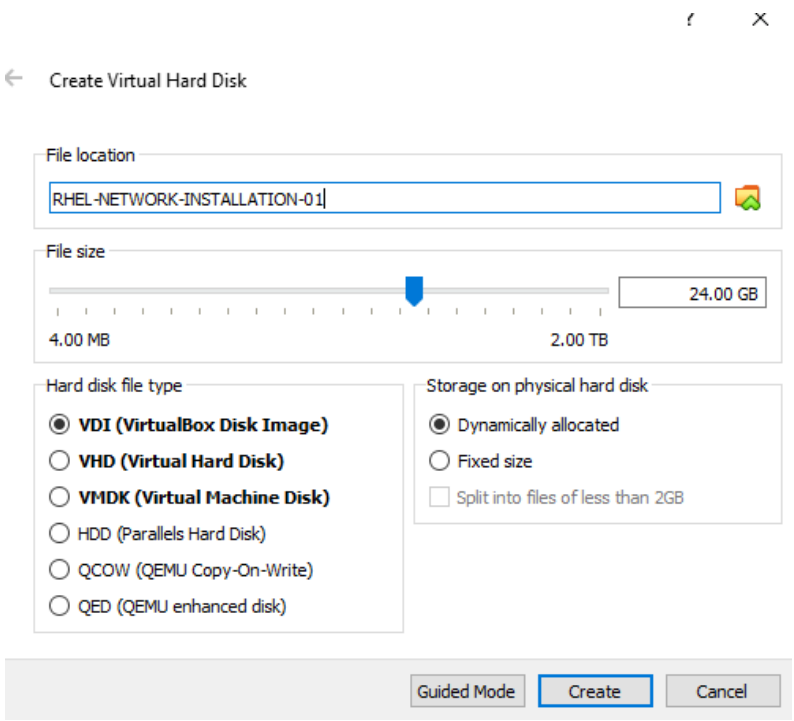
```
[root@pxe01 ~]# setsebool -P allow_ftpd_full_access 1
```

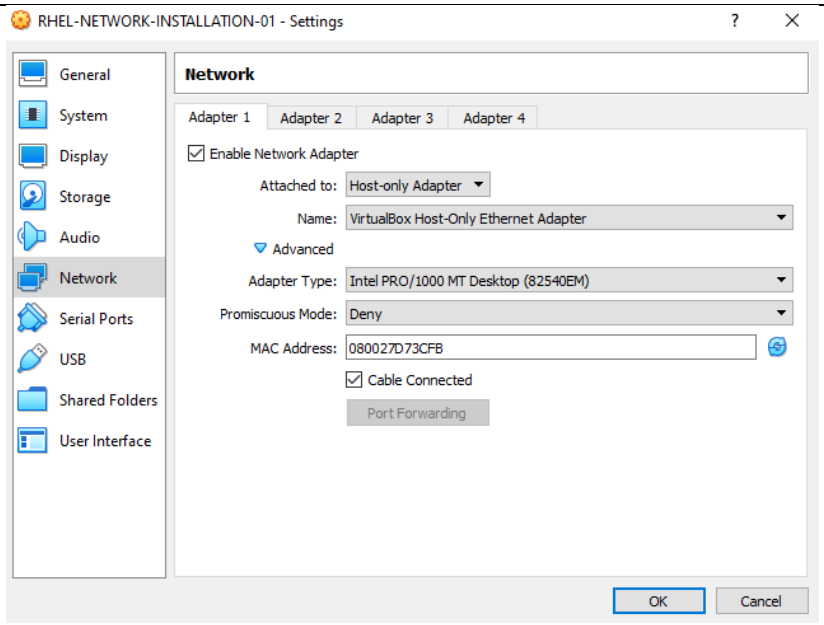
Open ports in firewall

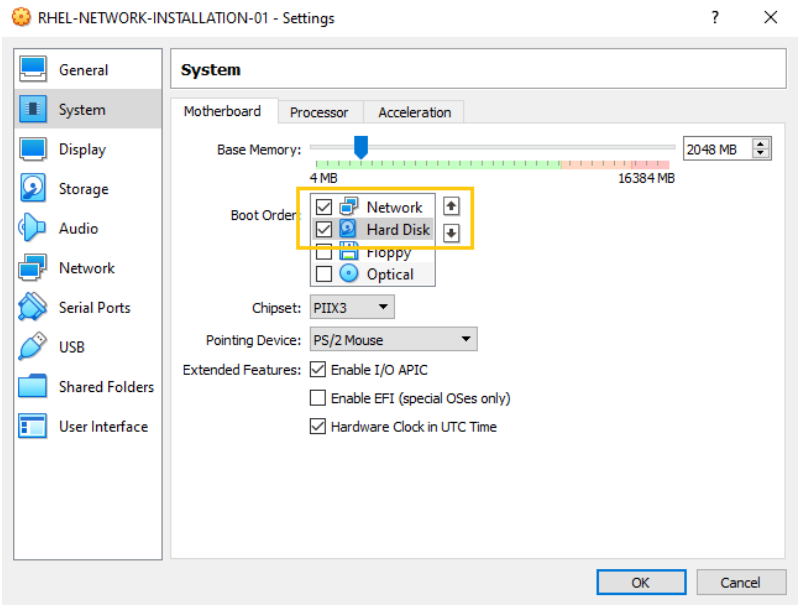
```
[root@pxe01 ~]# firewall-cmd --add-service=ftp --permanent
success
[root@pxe01 ~]# firewall-cmd --add-service=dhcp --permanent
success
[root@pxe01 ~]# firewall-cmd --add-port=69/tcp --permanent
success
[root@pxe01 ~]# firewall-cmd --add-port=69/udp --permanent
success
[root@pxe01 ~]# firewall-cmd --add-port=4011/udp --permanent
success
[root@pxe01 ~]# firewall-cmd --reload
Success
```

Now configure new VM and set to boot from network









Clone the VM