Create a KVM from PXE Boot

This document demonstrates how to create a KVM from PXE Boot option.

Assumptions

1. Host machine - Lubuntu 22.0.4
2. Guest VM - Debian 12 Netboot Version
3. QEMU/KVM Virtual Machine Manager 2.2.1

Steps

KVM Setup

Refer to this private document KVM_Install

TFTP Setup

1. Install TFTP

```
sudo apt install tftpd-hpa
```

2. Verify the installation

```
toy@story:/srv/tftp$ sudo service tftpd-hpa status
tftpd-hpa.service - LSB: HPA's tftp server
     Loaded: loaded (/etc/init.d/tftpd-hpa; generated)
     Active: active (running) since Sat 2024-03-09 11:22:35 PST; 34min ago
       Docs: man:systemd-sysv-generator(8)
    Process: 33070 ExecStart=/etc/init.d/tftpd-hpa start (code=exited, status=0/SUCCESS)
      Tasks: 1 (limit: 9150)
     Memory: 268.0K
     CGroup: /system.slice/tftpd-hpa.service
             └─33078 /usr/sbin/in.tftpd --listen --user tftp --address :69 --secure --create
/srv/tftp

Mar 09 11:22:35 story systemd[1]: Starting LSB: HPA's tftp server...
Mar 09 11:22:35 story tftpd-hpa[33070]:  * Starting HPA's tftpd in.tftpd
Mar 09 11:22:35 story tftpd-hpa[33070]:    ...done.
Mar 09 11:22:35 story systemd[1]: Started LSB: HPA's tftp server.
toy@story:/srv/tftp$
```

3. Setup the Boot Directory

```
sudo mkdir /srv/tftp
```

4. Download the Debian Net Boot Image to the Boot Directory (ie. /srv/tftp)
    a. Example: netboot.tar.gz
    b. Unzip the netboot.tar.gz in /srv/tftp

```
total 41M
-rw-r--r-- 1 root root   65 Feb  4 23:43 version.info
lrwxrwxrwx 1 root root   46 Feb  4 23:43 splash.png ->
debian-installer/i386/boot-screens//splash.png
lrwxrwxrwx 1 root root   34 Feb  4 23:43 pxelinux.cfg -> debian-installer/i386/pxelinux.cfg
lrwxrwxrwx 1 root root   32 Feb  4 23:43 pxelinux.0 -> debian-installer/i386/pxelinux.0
lrwxrwxrwx 1 root root   46 Feb  4 23:43 ldlinux.c32 ->
debian-installer/i386/boot-screens/ldlinux.c32
drwxr-xr-x 3 root root 4.0K Feb  4 23:43 debian-installer
-rw-r--r-- 1 root root  41M Mar  9 11:11 netboot.tar
```

    c. Double check the tftpd-hap file content

```
toy@story:/srv$ cat /etc/default/tftpd-hpa
# /etc/default/tftpd-hpa

TFTP_USERNAME="tftp"
```

```
TFTP_DIRECTORY="/srv/tftp"
TFTP_ADDRESS=":69"
TFTP_OPTIONS="--secure --create"
toy@story:/srv$
```

5. Restart the TFTP Daemon

```
sudo systemctl restart tftp-hpa
```

6. Verify the tftpd is listening on the correct gateway IP address for KVM bridge.

```
toy@story:/srv$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen
                                          . . .
                                          . . .
2: enp0s25: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DOWN group
                                          . . .
                                          . . .
4: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group
default qlen 1000
    link/ether 52:54:00:3a:3e:b5 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
       valid_lft forever preferred_lft forever
5: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc fq_codel master virbr0 state DOWN
                                          . . .
                                          . . .

toy@story:/srv$ nc -uvz 192.168.122.1 69
Connection to 192.168.122.1 69 port [udp/tftp] succeeded!
```

Libvirt Setup

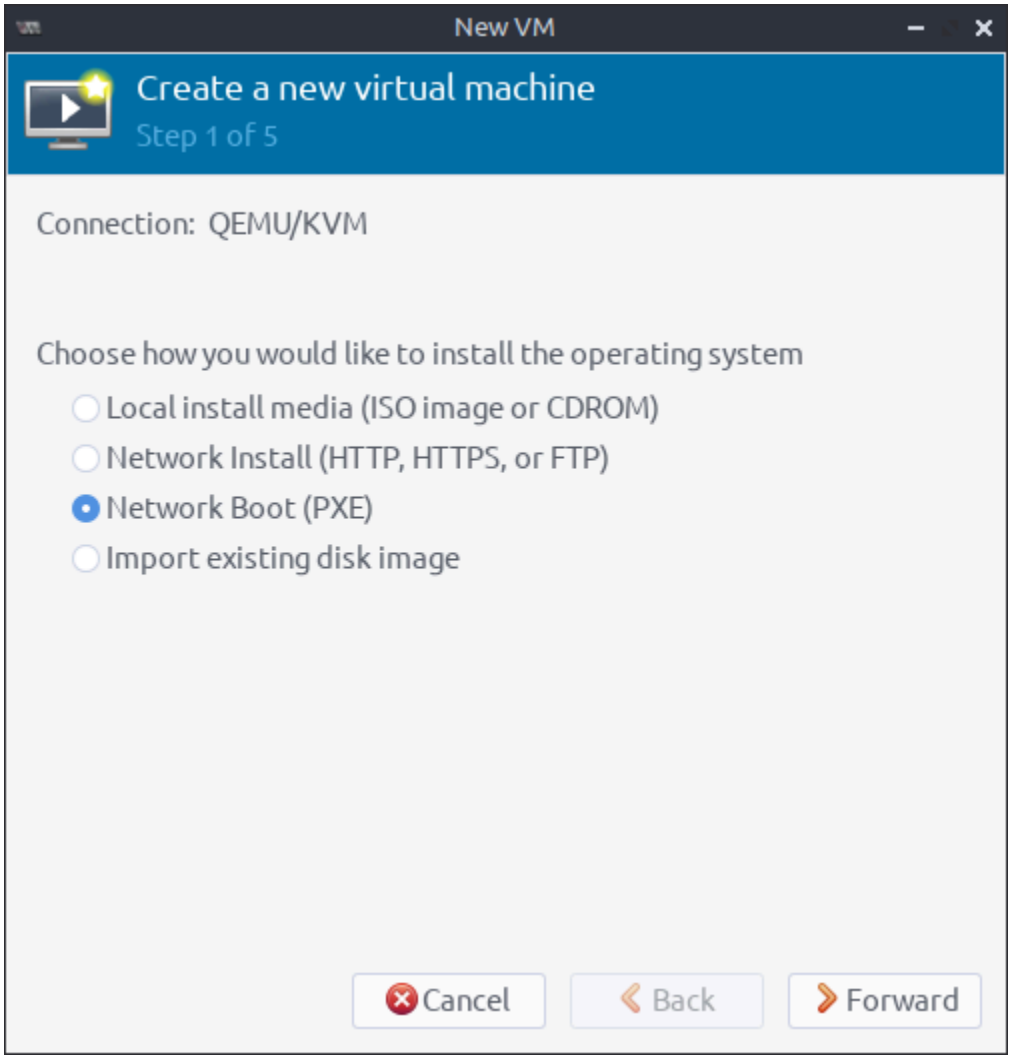
1. Configure the libvirt-daemon to pick up the PXE boot files

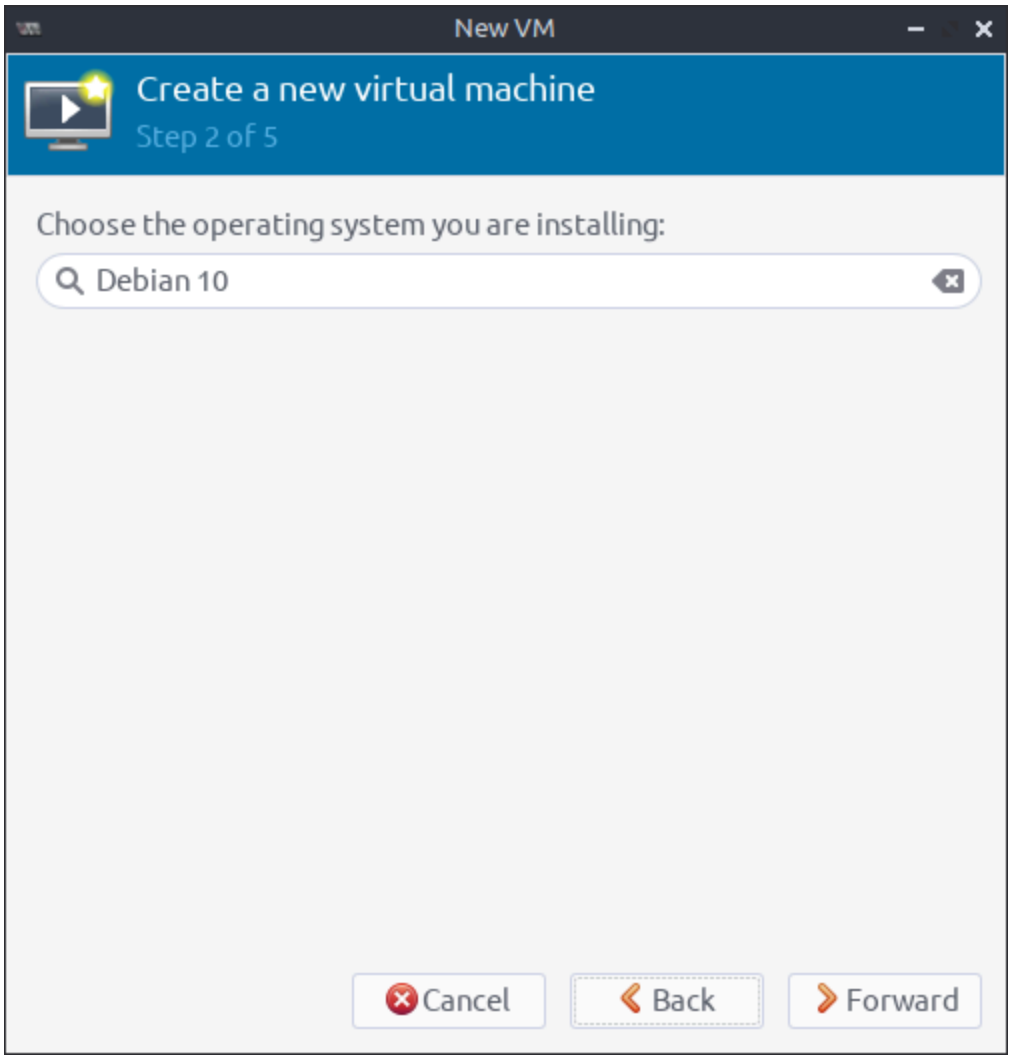
```
toy@story:/srv$ virsh net-edit default

<network>
  <name>default</name>
  <uuid>bb5750e7-7a8b-4742-9678-51dd63c5fa07</uuid>
  <forward mode='nat'/>
  <bridge name='virbr0' stp='on' delay='0'/>
  <mac address='52:54:00:3a:3e:b5'/>
  <ip address='192.168.122.1' netmask='255.255.255.0'>
    <tftp root='/srv/tftp'/>
    <dhcp>
      <range start='192.168.122.2' end='192.168.122.254'/>
      <bootp file='pxelinux.0' server='192.168.122.1'/>
    </dhcp>
  </ip>
</network>
```

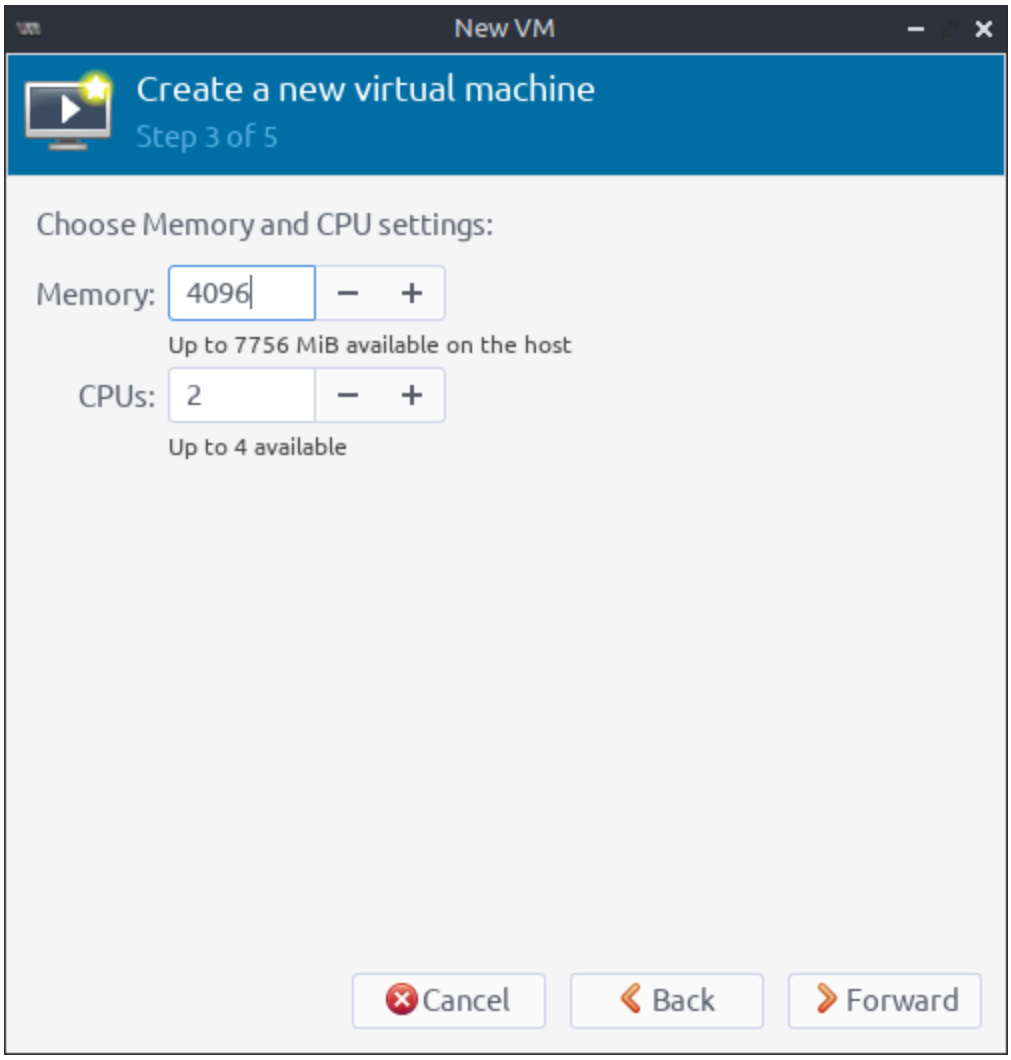
2. Restart the virtual network

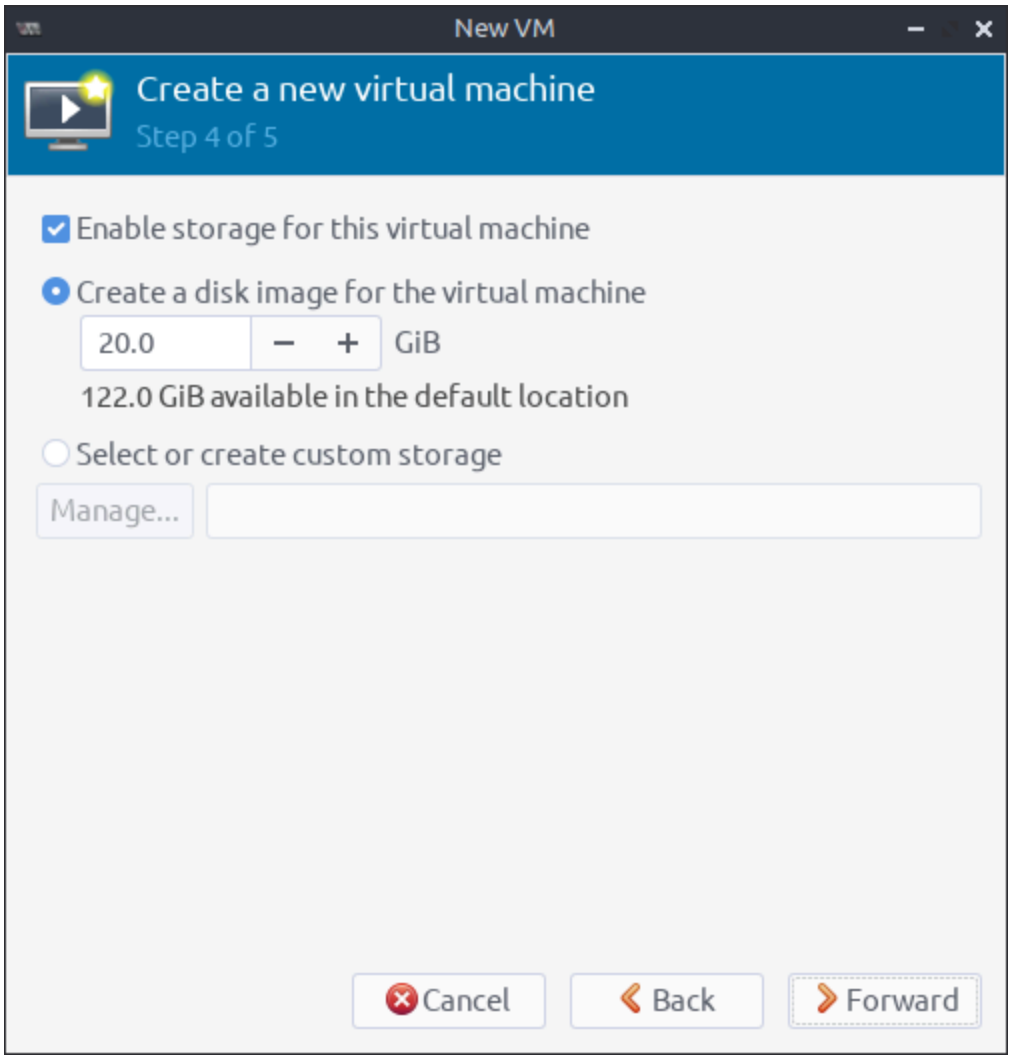
```
$ virsh net-destroy default
Network default destroyed

$ virsh net-start default
Network default started

$ virsh list --all
```

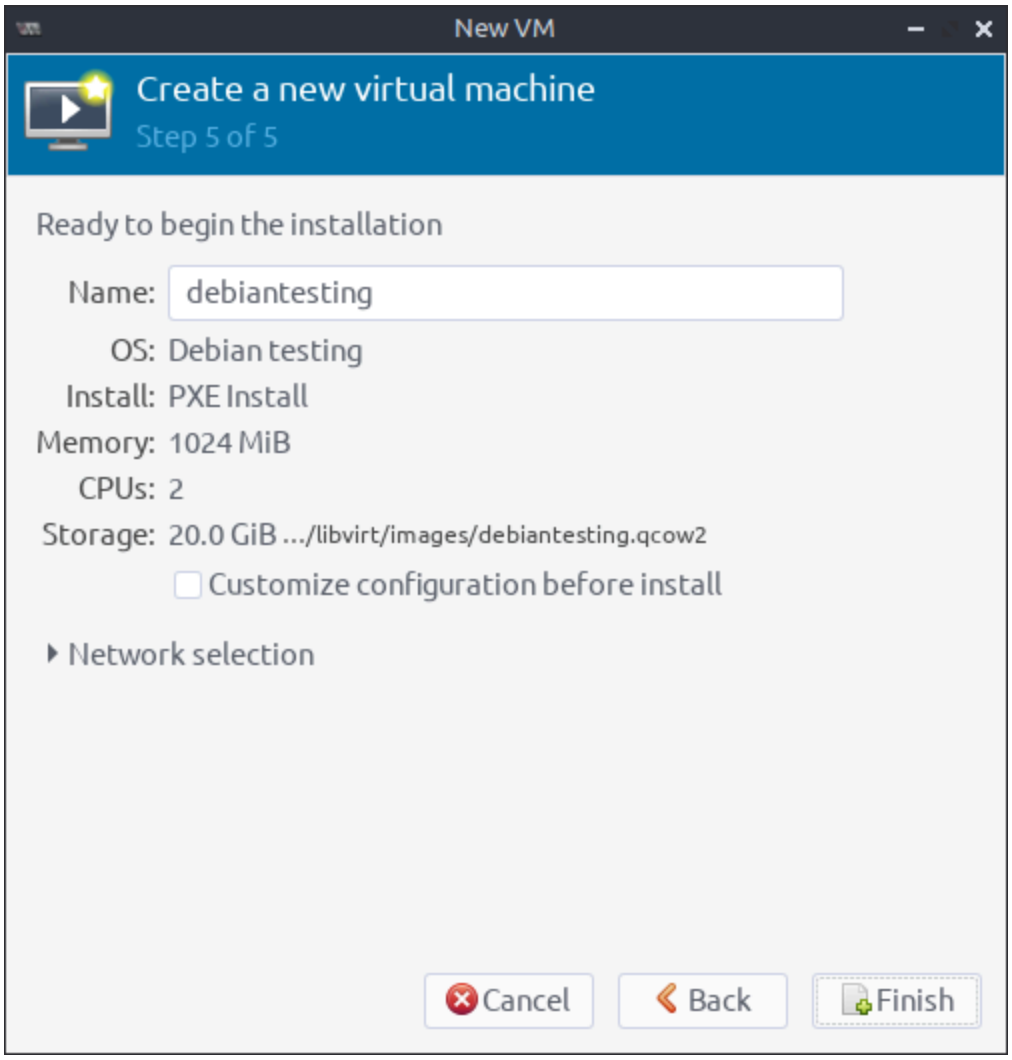
Create VM from PXE Boot (virtual manager 2.2.1)




New VM
Create a new virtual machine
Step 2 of 5
Choose the operating system you are installing:
Debian 10
Cancel
Back
Forward


New VM
Create a new virtual machine
Step 3 of 5
Choose Memory and CPU settings:
Memory:
4096
Up to 7756 MiB available on the host
CPUs:
2
Up to 4 available
Cancel
Back
Forward


New VM
Create a new virtual machine
Step 4 of 5
Enable storage for this virtual machine
Create a disk image for the virtual machine
20.0
GiB
122.0 GiB available in the default location
Select or create custom storage
Manage...
Cancel
Back
Forward


New VM
Create a new virtual machine
Step 5 of 5
Ready to begin the installation
Name: debiantesting
OS: Debian testing
Install: PXE Install
Memory: 1024 MiB
CPUs: 2
Storage: 20.0 GiB .../libvirt/images/debiantesting.qcow2
Customize configuration before install
Network selection
Cancel
Back
Finish