Fedora 12

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Christoph Curran

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- □□□□
- Installation
- Configuration
- Administration
- □□
- Tips and Tricks
- Troubleshooting

2. □□□□

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2.1. □□□□□□

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□□□□□□□□□□□ shell □□□□□□□□□□□□□□□□□□□□□ key caps □□□□□□□□□

> To see the contents of the file **my_next_bestselling_novel** in your current working directory, enter the **cat my_next_bestselling_novel** command at the shell prompt and press **Enter** to execute the command.

The above includes a file name, a shell command and a key cap, all presented in Mono-spaced Bold and all distinguishable thanks to context.

Key-combinations can be distinguished from key caps by the hyphen connecting each part of a key-combination. For example:

> Press **Enter** to execute the command.
>
> Press **Ctrl**+**Alt**+**F1** to switch to the first virtual terminal. Press **Ctrl**+**Alt**+**F7** to return to your X-Windows session.

The first sentence highlights the particular key cap to press. The second highlights two sets of three key caps, each set pressed simultaneously.

[1] https://fedorahosted.org/liberation-fonts/

If source code is discussed, class names, methods, functions, variable names and returned values mentioned within a paragraph will be presented as above, in **Mono-spaced Bold**. For example:

> File-related classes include **filesystem** for file systems, **file** for files, and **dir** for directories. Each class has its own associated set of permissions.

Proportional Bold

This denotes words or phrases encountered on a system, including application names; dialogue box text; labelled buttons; check-box and radio button labels; menu titles and sub-menu titles. For example:

> Choose **System > Preferences > Mouse** from the main menu bar to launch **Mouse Preferences**. In the **Buttons** tab, click the **Left-handed mouse** check box and click **Close** to switch the primary mouse button from the left to the right (making the mouse suitable for use in the left hand).
>
> To insert a special character into a **gedit** file, choose **Applications > Accessories > Character Map** from the main menu bar. Next, choose **Search > Find…** from the **Character Map** menu bar, type the name of the character in the **Search** field and click **Next**. The character you sought will be highlighted in the **Character Table**. Double-click this highlighted character to place it in the **Text to copy** field and then click the **Copy** button. Now switch back to your document and choose **Edit > Paste** from the **gedit** menu bar.

The above text includes application names; system-wide menu names and items; application-specific menu names; and buttons and text found within a GUI interface, all presented in Proportional Bold and all distinguishable by context.

Note the **>** shorthand used to indicate traversal through a menu and its sub-menus. This is to avoid the difficult-to-follow 'Select **Mouse** from the **Preferences** sub-menu in the **System** menu of the main menu bar' approach.

Mono-spaced Bold Italic or ***Proportional Bold Italic***

Whether Mono-spaced Bold or Proportional Bold, the addition of Italics indicates replaceable or variable text. Italics denotes text you do not input literally or displayed text that changes depending on circumstance. For example:

> To connect to a remote machine using ssh, type **ssh *username@domain.name*** at a shell prompt. If the remote machine is **example.com** and your username on that machine is john, type **ssh john@example.com**.
>
> The **mount -o remount *file-system*** command remounts the named file system. For example, to remount the **/home** file system, the command is **mount -o remount /home**.
>
> To see the version of a currently installed package, use the **rpm -q *package*** command. It will return a result as follows: ***package-version-release***.

Note the words in bold italics above — username, domain.name, file-system, package, version and release. Each word is a placeholder, either for text you enter when issuing a command or for text displayed by the system.

Aside from standard usage for presenting the title of a work, italics denotes the first use of a new and important term. For example:

When the Apache HTTP Server accepts requests, it dispatches child processes or threads to handle them. This group of child processes or threads is known as a *server-pool*. Under Apache HTTP Server 2.0, the responsibility for creating and maintaining these server-pools has been abstracted to a group of modules called *Multi-Processing Modules* (*MPMs*). Unlike other modules, only one module from the MPM group can be loaded by the Apache HTTP Server.

2.2. □□□□

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```
books        Desktop   documentation  drafts  mss    photos   stuff  svn
books_tests  Desktop1  downloads      images  notes  scripts  svgs
```

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```
package org.jboss.book.jca.ex1;

import javax.naming.InitialContext;

public class ExClient
{
   public static void main(String args[])
       throws Exception
   {
      InitialContext iniCtx = new InitialContext();
      Object         ref    = iniCtx.lookup("EchoBean");
      EchoHome       home   = (EchoHome) ref;
      Echo           echo   = home.create();

      System.out.println("Created Echo");

      System.out.println("Echo.echo('Hello') = " + echo.echo("Hello"));
   }

}
```

2.3. □□□□□

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Note□□□□

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Important[illegible]

[illegible] session [illegible]

Warning[illegible]

[illegible]

3. [illegible]

[illegible] Bugzilla [illegible] **Fedora Documentation.** [illegible]*http://bugzilla.redhat.com/bugzilla/*[illegible]

[illegible]*Virtualization_Guide*

[illegible]

[illegible] I. Installation

[illegible]

[illegible] Fedora [illegible]

[illegible]

1.1. [illegible] Fedora [illegible] KVM

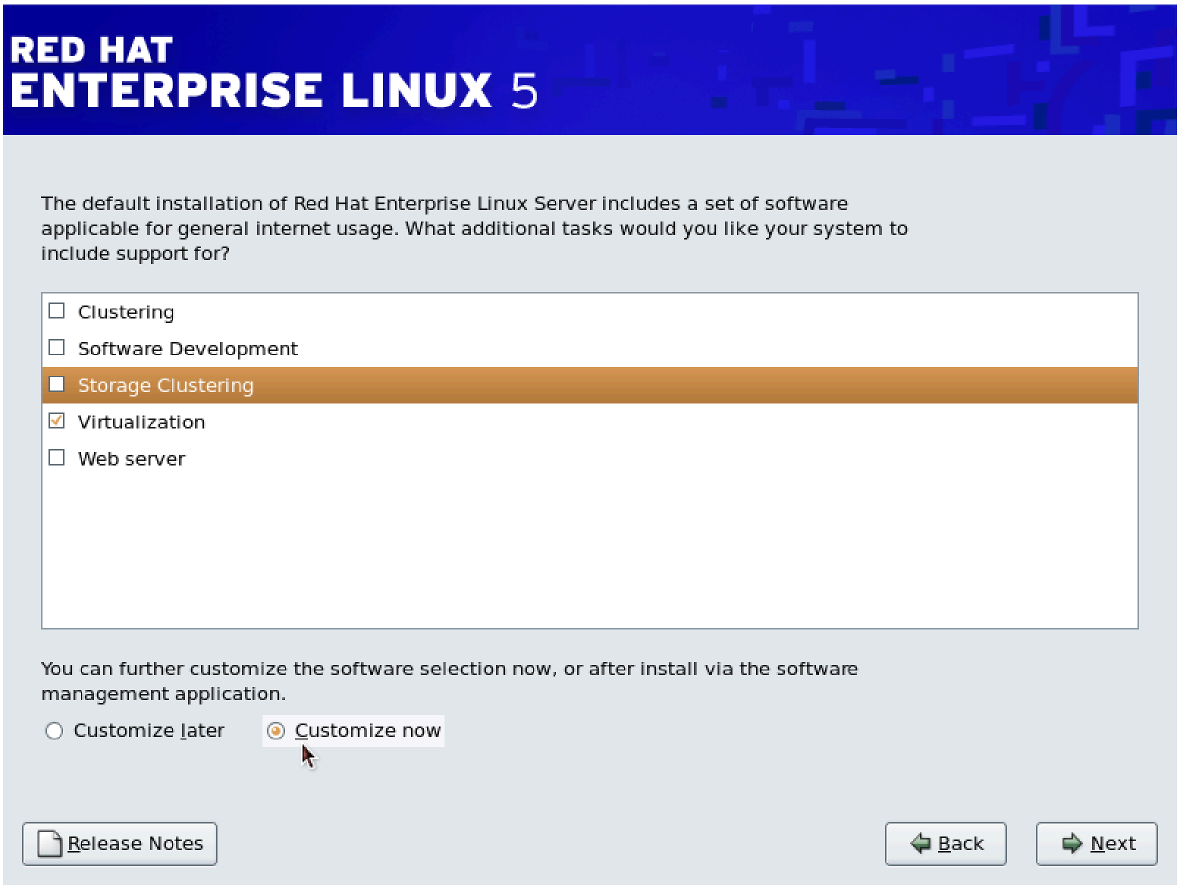
[illegible] Fedora 12 [illegible] KVM [illegible]

[illegible]

[illegible]*Fedora 12* [illegible] *http://docs.fedoraproject.org* [illegible] Fedora 12 [illegible]

1. [illegible] Fedora 12 [illegible]DVD [illegible] PXE [illegible] Fedora [illegible]

2. [illegible]

   RED HAT
   ENTERPRISE LINUX 5

   The default installation of Red Hat Enterprise Linux Server includes a set of software applicable for general internet usage. What additional tasks would you like your system to include support for?

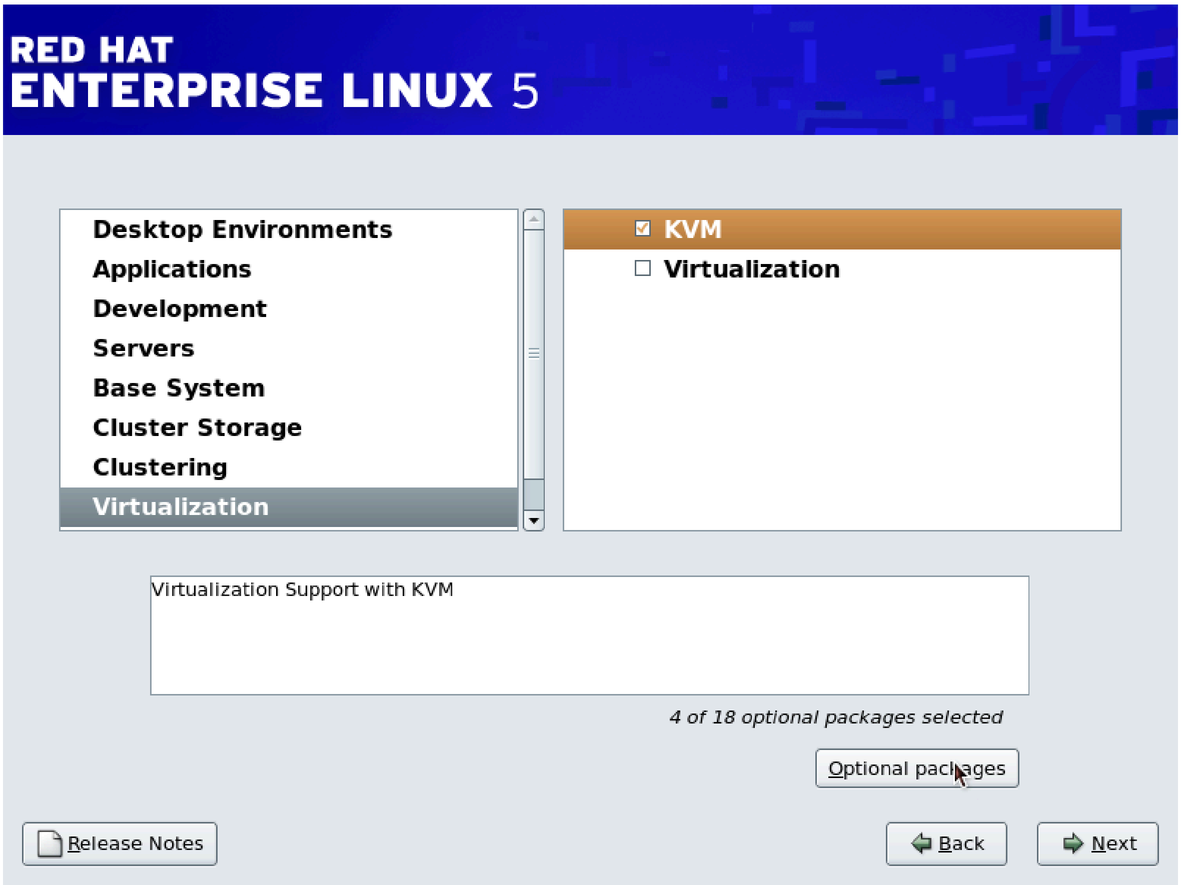
   □ Clustering
   □ Software Development
   □ Storage Clustering
   ☑ Virtualization
   □ Web server

   You can further customize the software selection now, or after install via the software management application.

   ○ Customize later ● Customize now

   [illegible]

3. [illegible]**KVM**[illegible] KVM hypervisor[illegible]**`virt-manager`**[illegible]**`libvirt`** [illegible] **`virt-viewer`**[illegible]



Virtualization Support with KVM

4 of 18 optional packages selected

4. □□□□□□□□□□□

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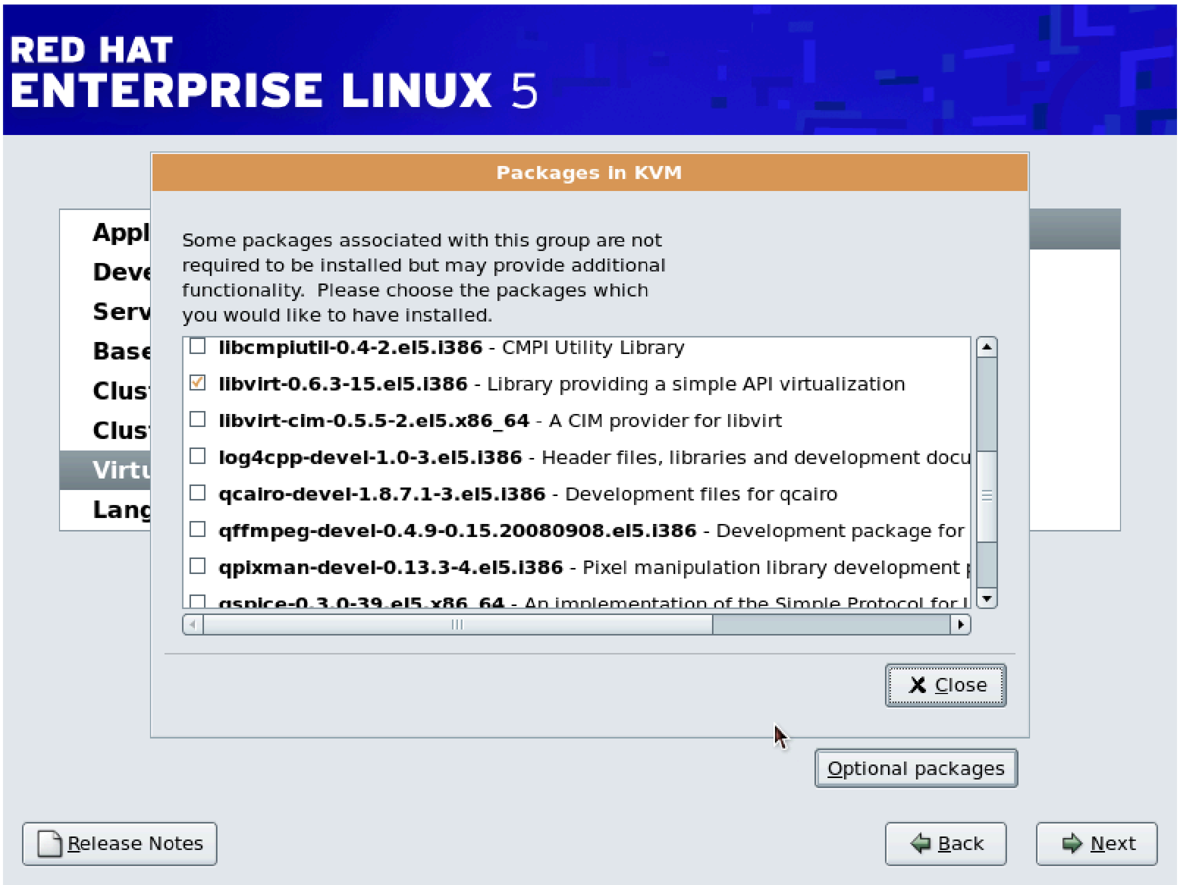

RED HAT ENTERPRISE LINUX 5

Packages in KVM

Some packages associated with this group are not required to be installed but may provide additional functionality. Please choose the packages which you would like to have installed.

- ☐ **libcmpiutil-0.4-2.el5.i386** - CMPI Utility Library
- ☑ **libvirt-0.6.3-15.el5.i386** - Library providing a simple API virtualization
- ☐ **libvirt-cim-0.5.5-2.el5.x86_64** - A CIM provider for libvirt
- ☐ **log4cpp-devel-1.0-3.el5.i386** - Header files, libraries and development docu
- ☐ **qcairo-devel-1.8.7.1-3.el5.i386** - Development files for qcairo
- ☐ **qffmpeg-devel-0.4.9-0.15.20080908.el5.i386** - Development package for
- ☐ **qpixman-devel-0.13.3-4.el5.i386** - Pixel manipulation library development
- ☐ **qspice-0.3.0-39.el5.x86_64** - An implementation of the Simple Protocol for I

[illegible]

[illegible] kickstart [illegible] KVM [illegible]

[illegible] Kickstart [illegible] Fedora [illegible] KVM hypervisor [illegible]Kickstart [illegible] Kickstart [illegible] Fedora [illegible]

[illegible] Kickstart [illegible] `%packages` [illegible]

```
%packages
@kvm
```

[illegible] Fedora Project [illegible]*http://docs.fedoraproject.org*[illegible] *Fedora 12* [illegible] Kickstart [illegible]

1.2. [illegible] Fedora [illegible] KVM [illegible]

[illegible] Fedora 12[illegible] KVM hypervisor [illegible]

[illegible] yum [illegible] KVM hypervisor

[illegible] Fedora [illegible] **kvm** [illegible]**kvm** [illegible] KVM kernel [illegible] Linux kernel [illegible] KVM hypervisor[illegible]

[illegible] **kvm** [illegible]

```
# yum install kvm
```

[illegible]

[illegible]

python-virtinst

[illegible] **virt-install** [illegible]

libvirt

libvirt [illegible] hypervisor [illegible] API [illegible]**libvert** [illegible] **xm** [illegible] **virsh** [illegible]

libvirt-python

libvirt-python [illegible] Python [illegible] **libvirt** API [illegible]

virt-manager

virt-manager[illegible] **libvirt** [illegible] API[illegible]

[illegible]

```
# yum install virt-manager libvirt libvirt-python python-virtinst
```

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□□ **virt-manager** □□□□□□□□□□□□□□□□□ **`virt-install`** □□□□□□□□□□□□□□□□□□□□□

□□□□ Fedora □□□□□ Linux □□□□□Solaris □ Windows □□□□□□□□□□□□□□ □ *3,* □□□□□□□□□□□□□□ □□□□□□□□□□□□□□

2.1. □□ virt-install □□□□□□□

□□□□□□□□□□□□□ **`virt-install`** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **`virt-install`**□□□□□□□ script □□□□□□□□□□□□□□□□□□□ **`virt-install`** □ kickstart □□□□□□□□□□□□□□□□□□□□□□□□□□

`virt-install` □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
$ virt-install --help
```

`virt-install` □ man page □□□□□□□□□□□□□□□□□□□□□□□□□□

`qemu-img` □□□□□□□□□□□□□ **`virt-install`** □□□□□□□□□□□□

□□□□□□□□□□ `--`*`vnc`*□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□ Red Hat Enterprise Linux 3 □□□□□□□□□ *`rhel3support`*□□□□□□□□□□□□□□□□□□□□□□□ 5GB □□□□□□□□□□□□□□□□□□ KVM hypervisor□

```
# virt-install --accelerate --hvm --connect qemu:///system \
        --network network:default \
        --name rhel3support --ram=756\
        --file=/var/lib/libvirt/images/rhel3support.img \
        --file-size=6 --vnc --cdrom=/dev/sr0
```

□□ 2.1. □□ virt-install □ KVM □□□ Red Hat Enterprise Linux 3 □□□

```
# virt-install --name Fedora11 --ram 512 --file=/var/lib/libvirt/images/
Fedora11.img \
        --file-size=3 --vnc --cdrom=/var/lib/libvirt/images/Fedora11.iso
```

□□ 2.2. □□ virt-install □□□ Fedora 11 □□□

2.2. □□ virt-manager □□□□□□□

`virt-manager` □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

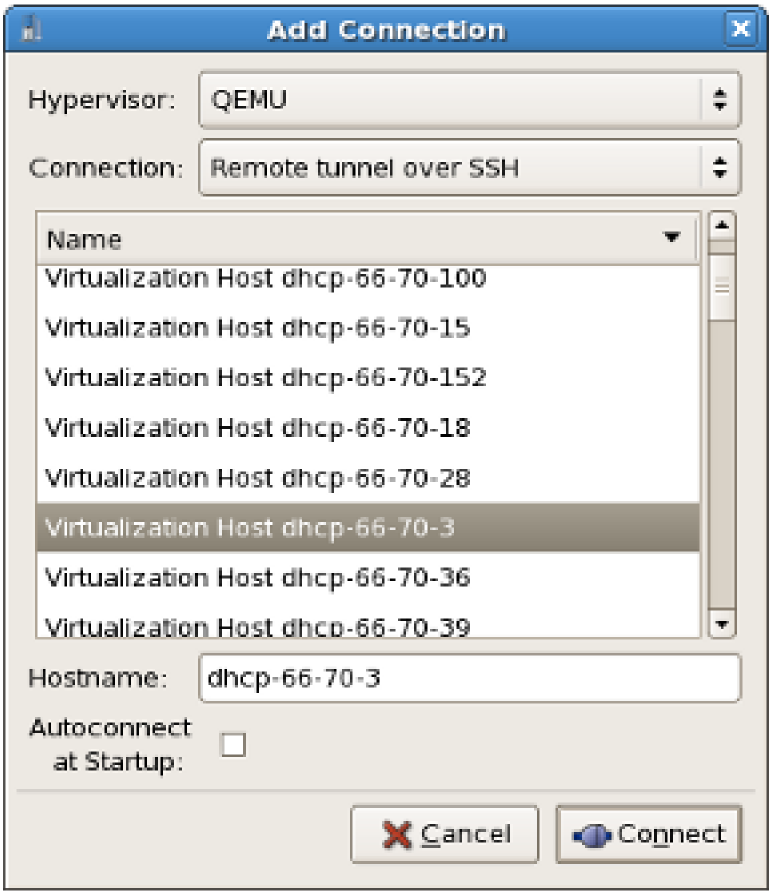
□□ 2.1. □□ virt-manager □□□□□□□□□□

1. □□□□ **virt-manager**□□□ root □□□□□□□□□□□

   ```
   # virt-manager &
   ```

   `virt-manager` □□□□□□□□□□□□□□□□□□□□□□□□□□ root □□□□□□□□ **sudo** □□□

2. □□□□ **->** □□□□□□□□□□□□□□□□□□□□□□□ hypervisor□□□□□ □□□□□



Add Connection

Hypervisor: QEMU

Connection: Remote tunnel over SSH

Name

Virtualization Host dhcp-66-70-100

Virtualization Host dhcp-66-70-15

Virtualization Host dhcp-66-70-152

Virtualization Host dhcp-66-70-18

Virtualization Host dhcp-66-70-28

Virtualization Host dhcp-66-70-3

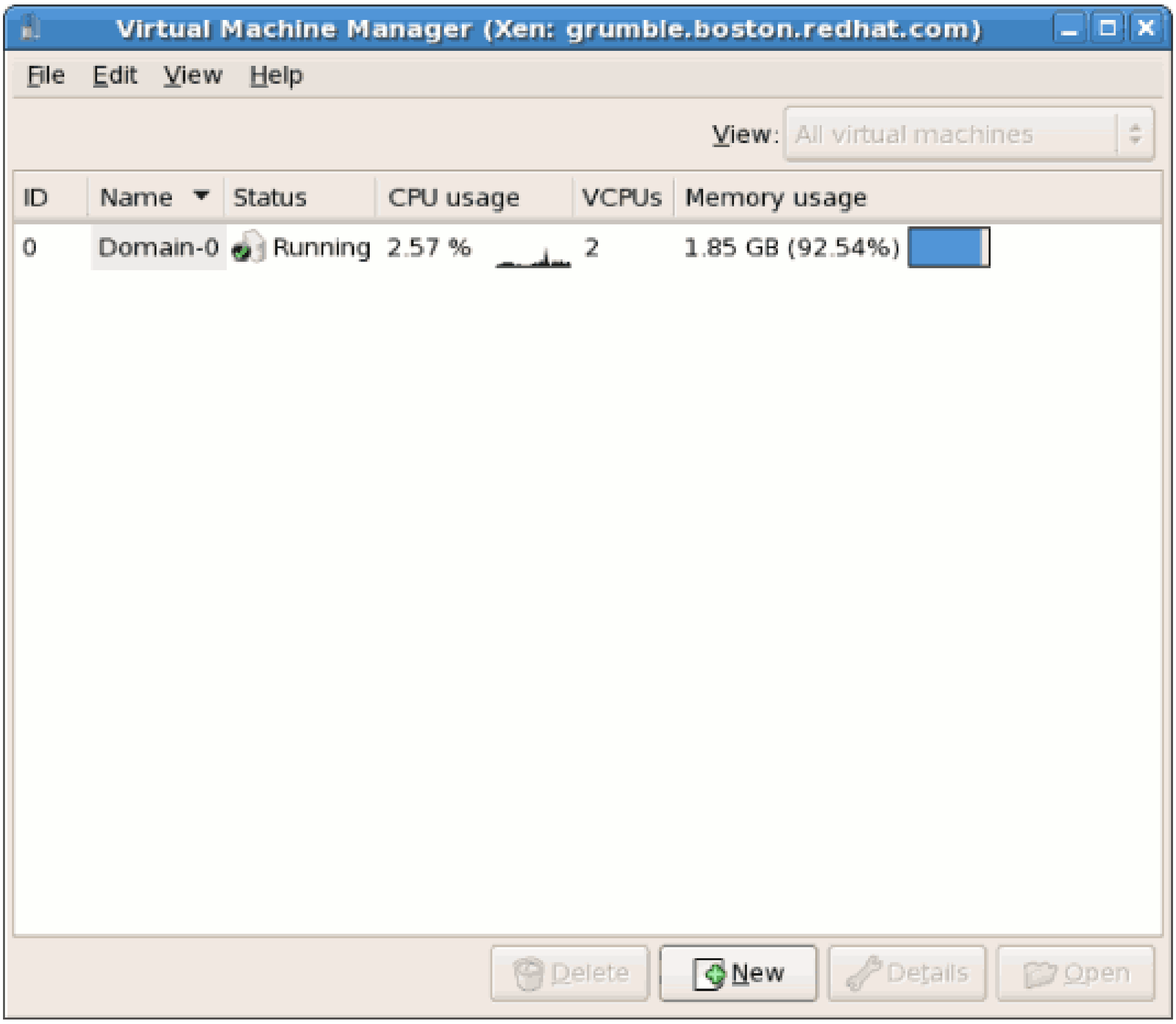
Virtualization Host dhcp-66-70-36

Virtualization Host dhcp-66-70-39

Hostname: dhcp-66-70-3

Autoconnect at Startup: □

3. **virt-manager** □□□



ID	Name	Status	CPU usage	VCPUs	Memory usage
0	Domain-0	Running	2.57 %	2	1.85 GB (92.54%)

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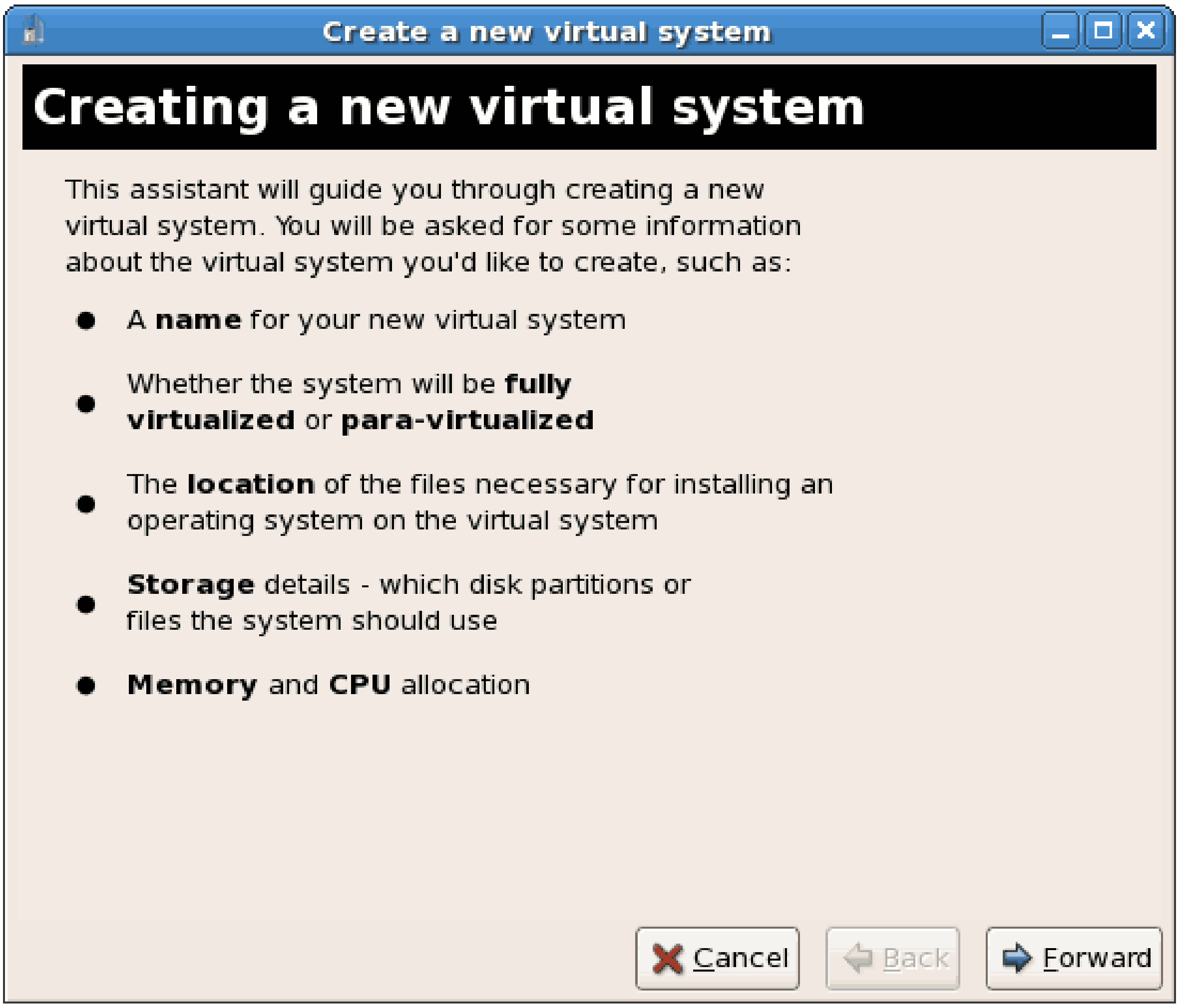

Creating a new virtual system

This assistant will guide you through creating a new virtual system. You will be asked for some information about the virtual system you'd like to create, such as:

- A **name** for your new virtual system
- Whether the system will be **fully virtualized** or **para-virtualized**
- The **location** of the files necessary for installing an operating system on the virtual system
- **Storage** details - which disk partitions or files the system should use
- **Memory** and **CPU** allocation

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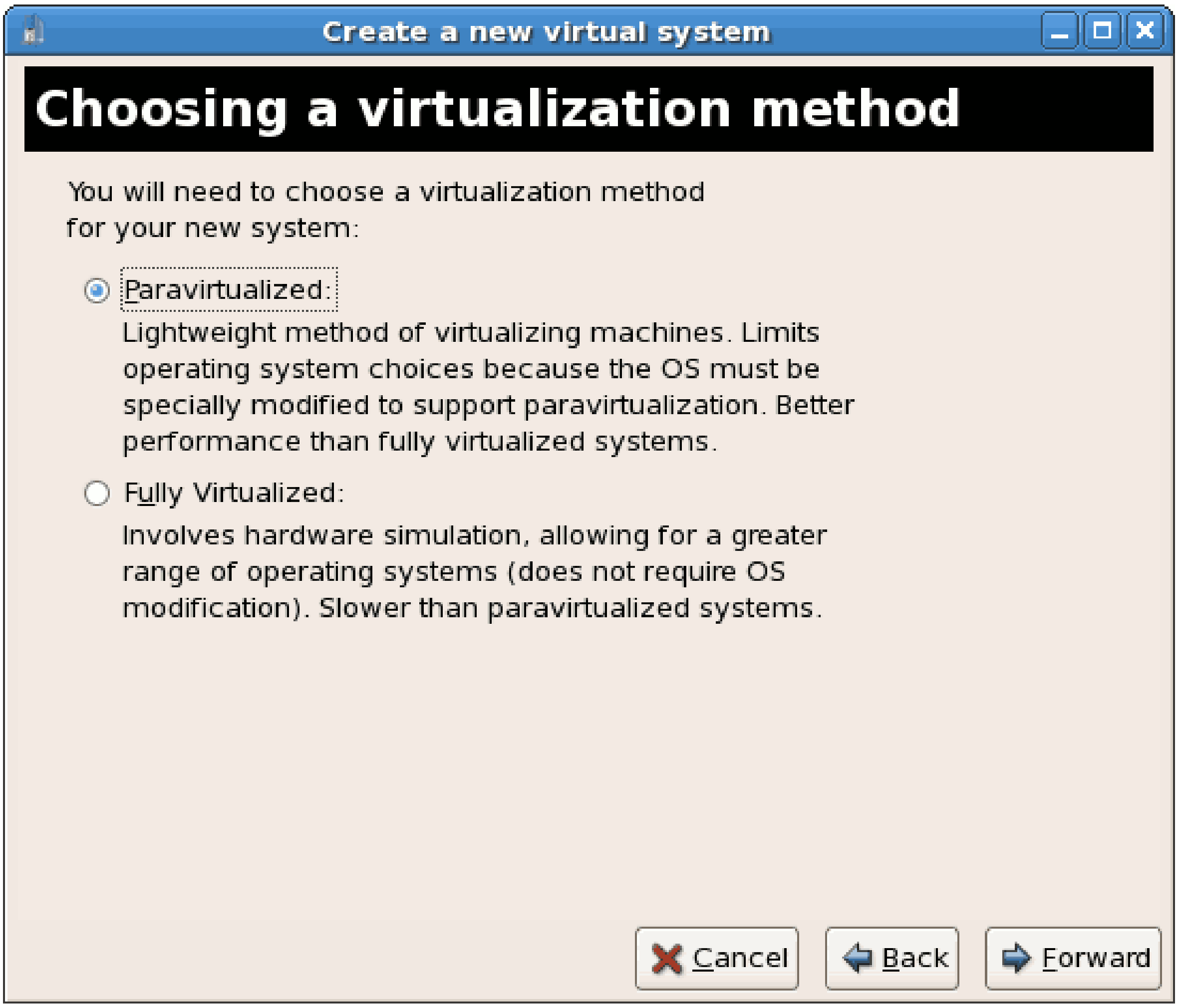
5. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

   □□□□□□□□ Intel® VT □ AMD-V □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **/** □□□□□□□□□□□□ **`kernel-xen`** □□□□□□□□□□□□□□□□□□□□□□□

   □□□□□□□ KVM hypervisor□□□□□□□□□□□□□□□□□□



Create a new virtual system

Choosing a virtualization method

You will need to choose a virtualization method for your new system:

● Paravirtualized:
Lightweight method of virtualizing machines. Limits operating system choices because the OS must be specially modified to support paravirtualization. Better performance than fully virtualized systems.

○ Fully Virtualized:
Involves hardware simulation, allowing for a greater range of operating systems (does not require OS modification). Slower than paravirtualized systems.

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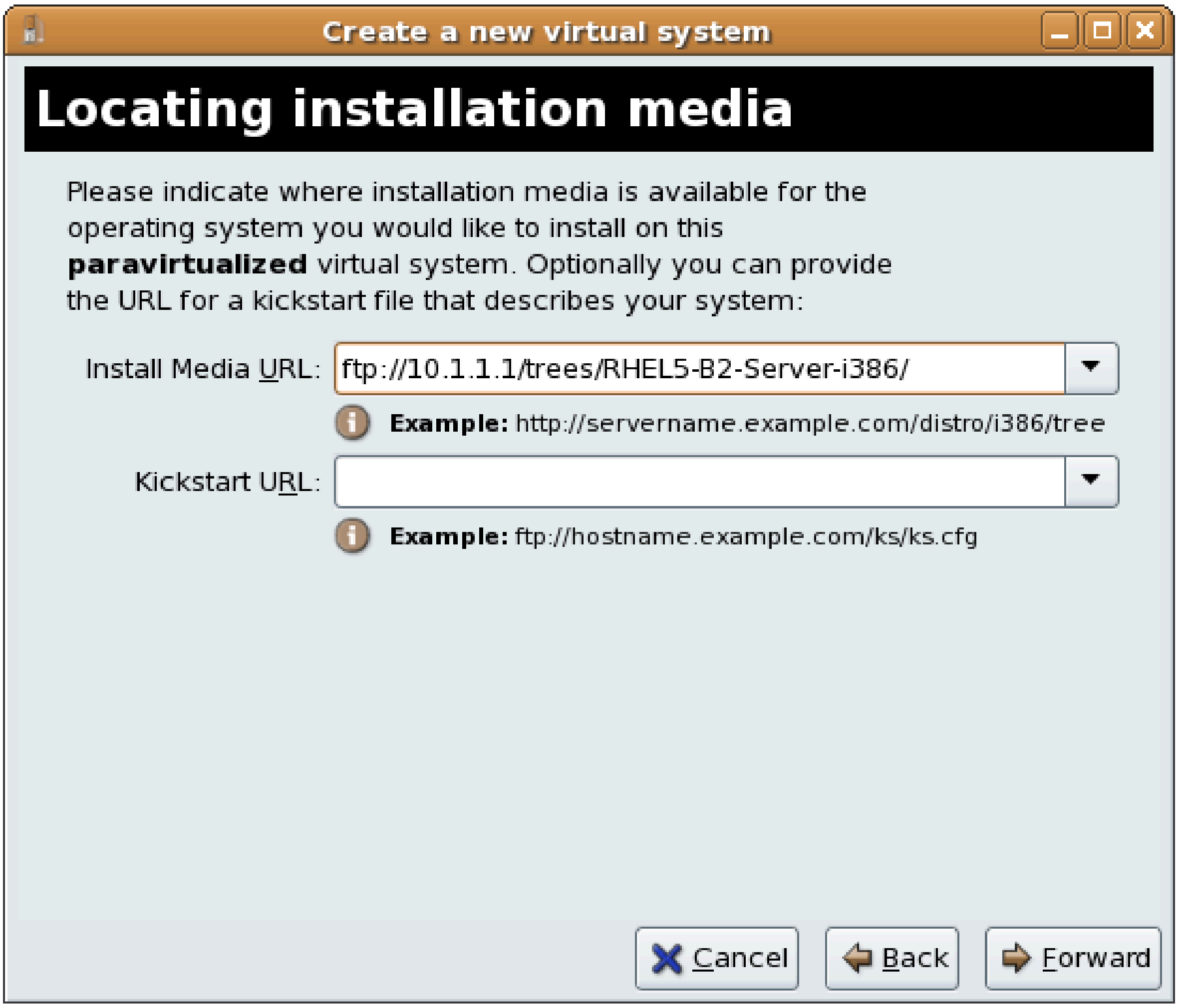
6. □□

   a. □□□`HTTP`□`FTP` □ `NFS`□□□□□□□□□□□□ Fedora □□□□□□□□□□□□□□□□ `NFS`□`FTP` □ `HTTP` □ host □□□□□□□□□□□□□□□□□□□□□□□□□□□□□

      □□□□□□□□□□□□□ **`.iso`**□□□□□□□□□□□□□□□□□□□□□□□□□□□□

      □□□□□□□□ Fedora □□□□□□□□□□□



Locating installation media

Please indicate where installation media is available for the operating system you would like to install on this **paravirtualized** virtual system. Optionally you can provide the URL for a kickstart file that describes your system:

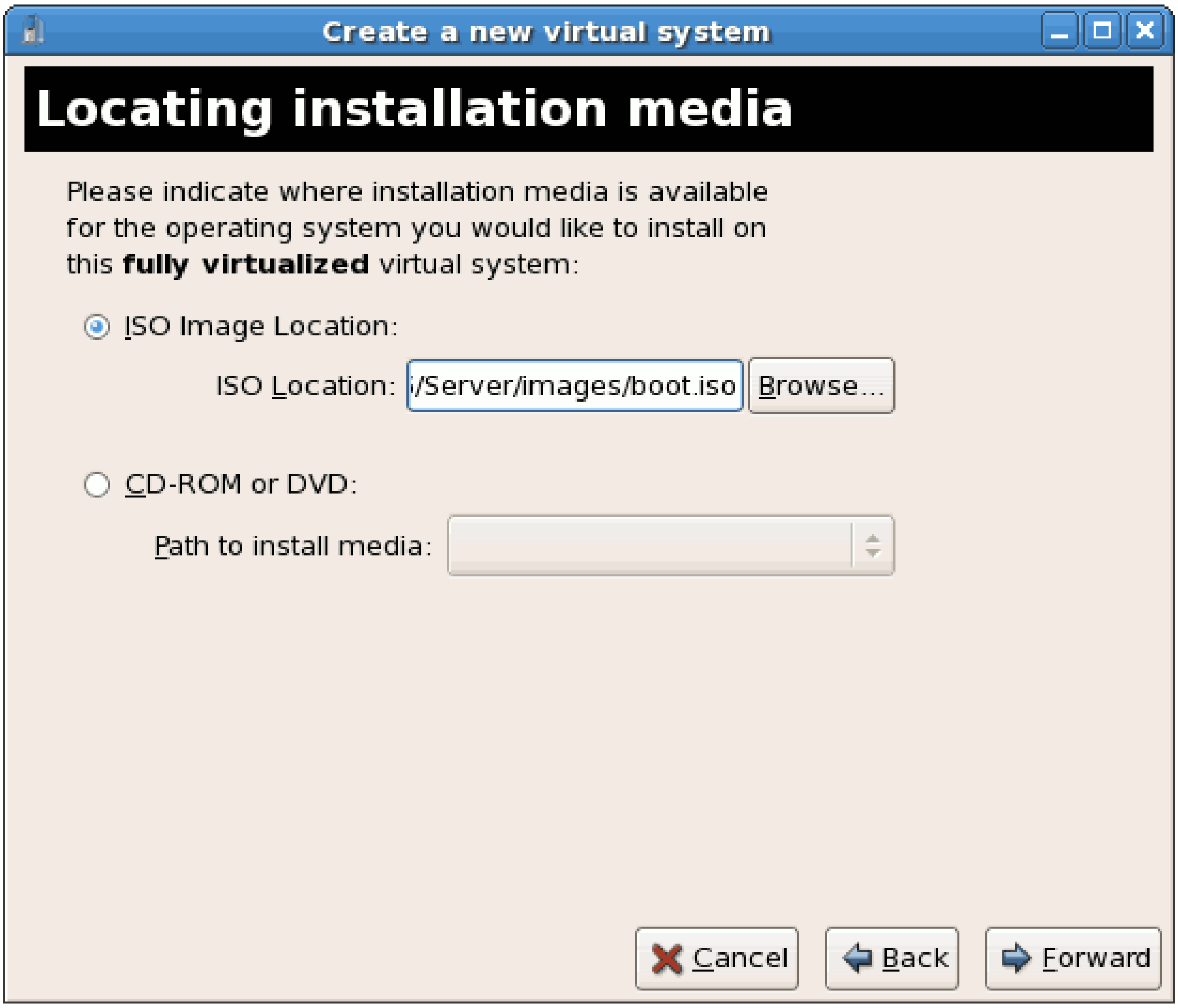
Install Media URL: ftp://10.1.1.1/trees/RHEL5-B2-Server-i386/

Example: http://servername.example.com/distro/i386/tree

Kickstart URL:

Example: ftp://hostname.example.com/ks/ks.cfg

b. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **`.iso`** □ **`.img`**□□□□□□Windows □□□□□□□□ **`.iso`** □□□Linux □□□ UNIX □□□ □□□□□□□□□□□□□□□ **`.iso`** □□□□□□□□□



Locating installation media

Please indicate where installation media is available for the operating system you would like to install on this **fully virtualized** virtual system:

● ISO Image Location:

ISO Location: i/Server/images/boot.iso

○ CD-ROM or DVD:

Path to install media:

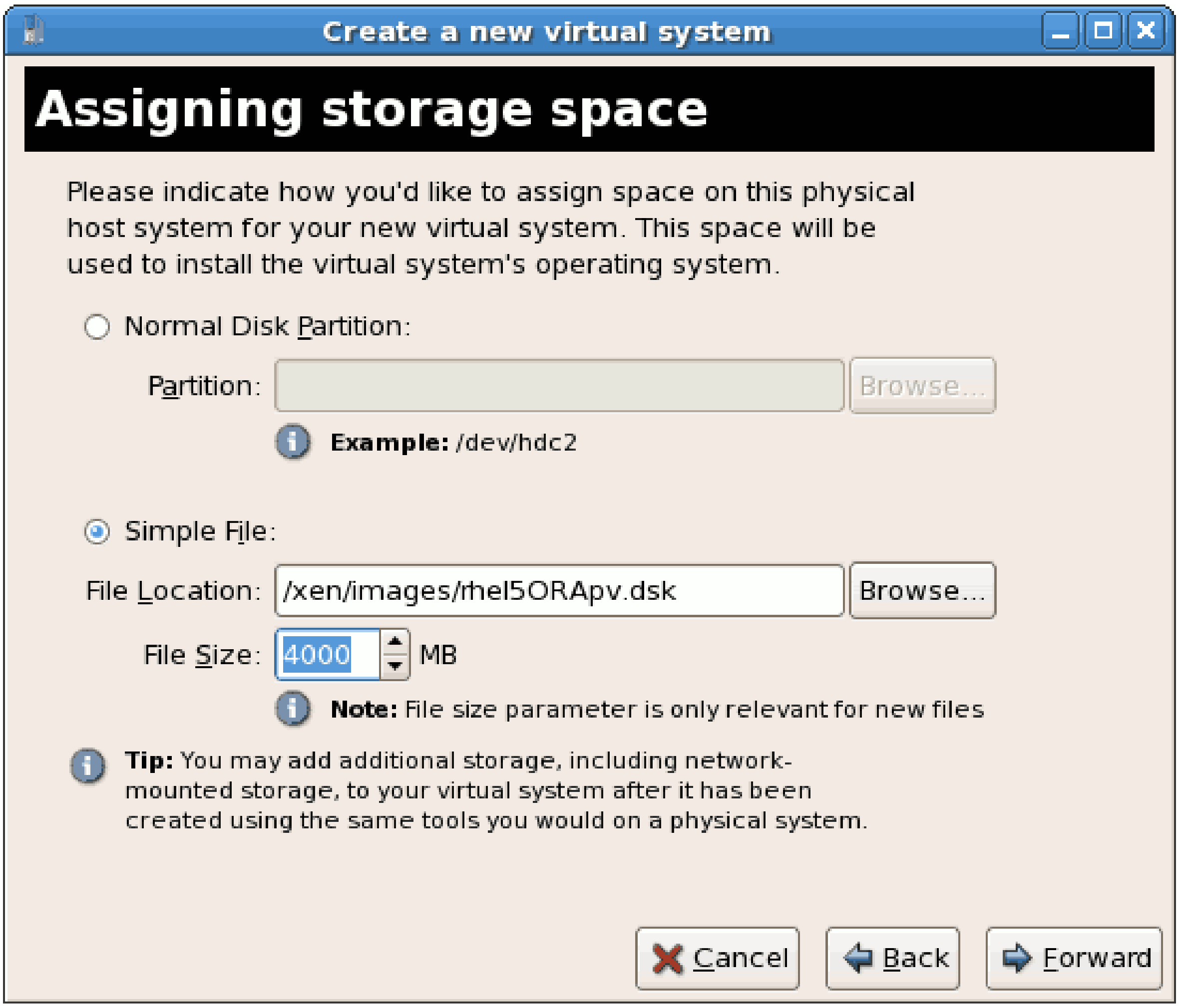
□□□□□□□□□□□□□□□□□□□□□

7. The **Assigning storage space** window displays. Choose a disk partition, LUN or create a file based image for the guest storage.

   □□□□□□□□□□□□□□□□□□ **`/var/lib/xen/images/`** □□□□□□□ Fedora □□□□□□□□□□□□□□□□□□□□□□□ SELinux □□□□□□□ SELinux □□□□□□enforcing□□□□□□□□ *□ 7.1, “SELinux □□□□”* □□□□□□□□□□□□□□□□□□□□

   Your guest storage image should be larger than the size of the installation, any additional packages and applications, and the size of the guests swap file. The installation process will choose the size of the guest's swap file based on size of the RAM allocated to the guest.

   Allocate extra space if the guest needs additional space for applications or other data. For example, web servers require additional space for log files.



Assigning storage space

Please indicate how you'd like to assign space on this physical host system for your new virtual system. This space will be used to install the virtual system's operating system.

○ Normal Disk Partition:

Partition: Browse...

Example: /dev/hdc2

● Simple File:

File Location: /xen/images/rhel5ORApv.dsk Browse...

File Size: 4000 MB

Note: File size parameter is only relevant for new files

Tip: You may add additional storage, including network-mounted storage, to your virtual system after it has been created using the same tools you would on a physical system.

Choose the appropriate size for the guest on your selected storage type and click the **Forward** button.

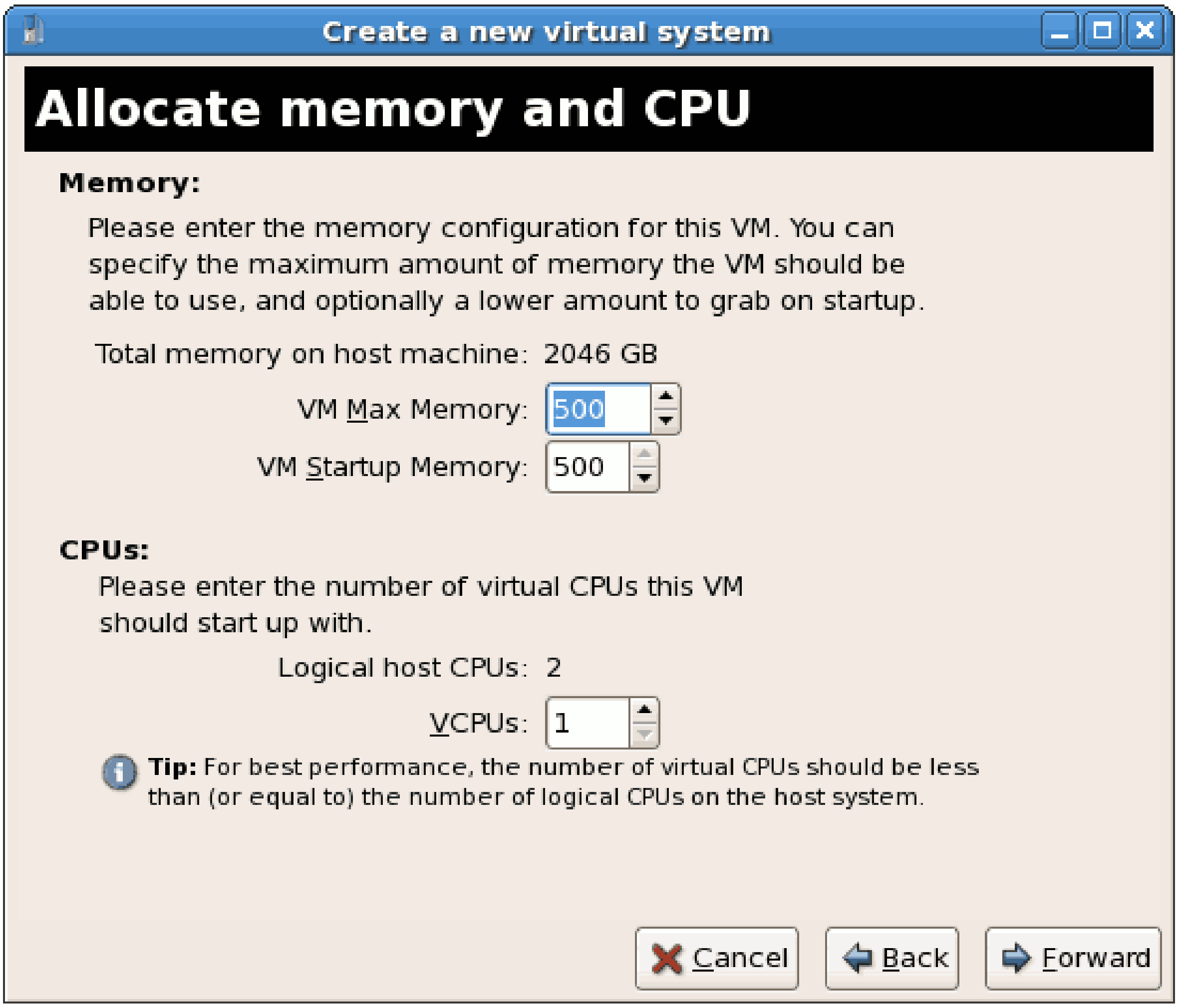
□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□ `/var/lib/xen/images/`□□□□□□□□□□□□□□□□□□□□□□□□ `/xen/images/` □□□□□□□□□□□□□□□□ SELinux □□□ SELinux □□□□□□□□□□

8. The Allocate memory and CPU window displays. Choose appropriate values for the virtualized CPUs and RAM allocation. These values affect the host's and guest's performance.

   □□ 512MB □□□

   Assign sufficient virtual CPUs for the virtualized guest. If the guest runs a multithreaded application assign the number of virtualized CPUs it requires to run most efficiently. Do not assign more virtual CPUs than there are physical processors (or hyper-threads) available on the host system. It is possible to over allocate virtual processors, however, over allocating has a significant, negative affect on guest and host performance due to processor context switching overheads.



Allocate memory and CPU

Memory:

Please enter the memory configuration for this VM. You can specify the maximum amount of memory the VM should be able to use, and optionally a lower amount to grab on startup.

Total memory on host machine: 2046 GB

VM Max Memory: 500

VM Startup Memory: 500

CPUs:

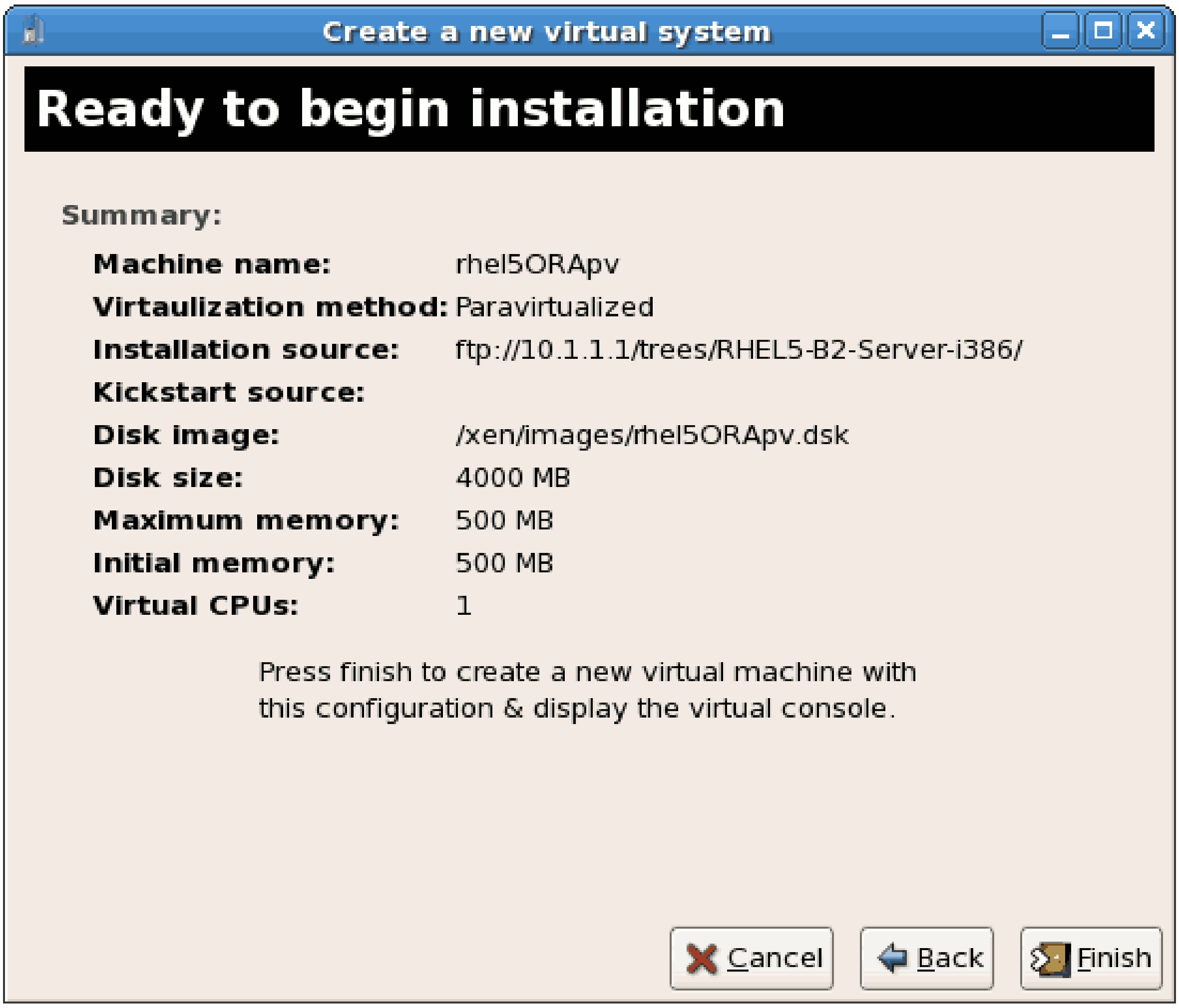
Please enter the number of virtual CPUs this VM should start up with.

Logical host CPUs: 2

VCPUs: 1

Tip: For best performance, the number of virtual CPUs should be less than (or equal to) the number of logical CPUs on the host system.

9. □□



Ready to begin installation

Summary:

Machine name:	rhel5ORApv
Virtaulization method:	Paravirtualized
Installation source:	ftp://10.1.1.1/trees/RHEL5-B2-Server-i386/
Kickstart source:	
Disk image:	/xen/images/rhel5ORApv.dsk
Disk size:	4000 MB
Maximum memory:	500 MB
Initial memory:	500 MB
Virtual CPUs:	1

Press finish to create a new virtual machine with this configuration & display the virtual console.

VNC □□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□ **virt-manager** □□□□□□□□□□□□□□□□*□ 3, □□□□□□□□□□□□* □□□□□□□□□□□□□□□□□□□□□□□□□□□□□

2.3. □□ PXE □□□□□□

□□□□□□□□ PXE □□□□□□□□□□□□□□ PXE □□□□□□□□□□□□□□□□□□□□□□□network bridge□□□□□□□□□□□ PXE □□□□□□□□□□□□□□□□□□

1. □□□□□□□□
   a. □□ **/etc/sysconfig/network-scripts/** □□□□□□□□□ script □□□□□□□□□□ **ifcfg-installation** □ □□□□□□□□□□□□□ *installation* □□□□□□

      ```
      # cd /etc/sysconfig/network-scripts/
      # vim ifcfg-installation
      DEVICE=installation
      TYPE=Bridge
      BOOTPROTO=dhcp
      ONBOOT=yes
      ```

Warning

The line, *`TYPE=Bridge`*, is case-sensitive. It must have uppercase 'B' and lower case 'ridge'.

b. □□□□□□□□□□□

```
# ifup installation
```

c. □□□□□□□□□□□□□□□□□□□□□□□□□□□□ **`brctl show`** □□□□□□□□□□□□□□□□□□□□□□□□□□

```
# brctl show
bridge name     bridge id               STP enabled     interfaces
installation    8000.000000000000       no
virbr0          8000.000000000000       yes
```

`virbr0` □□□□□□ **`libvirt`** □□□□□□□□□□□□□□□□□□□□□ NAT□□□□□□□□□□□□□□□

2. □□□□□□□□□□□□□□□

□□ **`BRIDGE`** □□□

```
# Intel Corporation Gigabit Network Connection
DEVICE=eth1
BRIDGE=installation
BOOTPROTO=dhcp
HWADDR=00:13:20:F7:6E:8E
ONBOOT=yes
```

□□□□□□□□□□□□□□□□□□□□□□□

```
# service network restart
```

□□ **`brctl show`** □□□□□□□□□□□□□□□□

```
# brctl show
bridge name     bridge id               STP enabled     interfaces
installation    8000.001320f76e8e       no              eth1
virbr0          8000.000000000000       yes
```

3. □□□□□

Configure **`iptables`** to allow all traffic to be forwarded across the bridge.

```
# iptables -I FORWARD -m physdev --physdev-is-bridged -j ACCEPT
# service iptables save
# service iptables restart
```

Disable iptables on bridges

Alternatively, prevent bridged traffic from being processed by **`iptables`** rules. In **`/etc/sysctl.conf`** append the following lines:

```
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0
```

Reload the kernel parameters configured with **`sysctl`**

```
# sysctl -p /etc/sysctl.conf
```

4. **□□□□□□□□□□ libvirt**

   Restart the **`libvirt`** daemon.

   ```
   # service libvirtd reload
   ```

□□□□□□□□□□□□□□□□□□□□□

□□ virt-install □□□ PXE □□

□ **`virt-install`** □□□□ **`--network=bridge:BRIDGENAME`** □□□□□□□□ PXE □□□□□□□ `--`*`pxe`* □□□

```

# virt-install --accelerate --hvm --connect qemu:///system \
    --network=bridge:installation --pxe\
    --name EL10 --ram=756 \
    --vcpus=4
    --os-type=linux --os-variant=rhel5
    --file=/var/lib/libvirt/images/EL10.img \

```

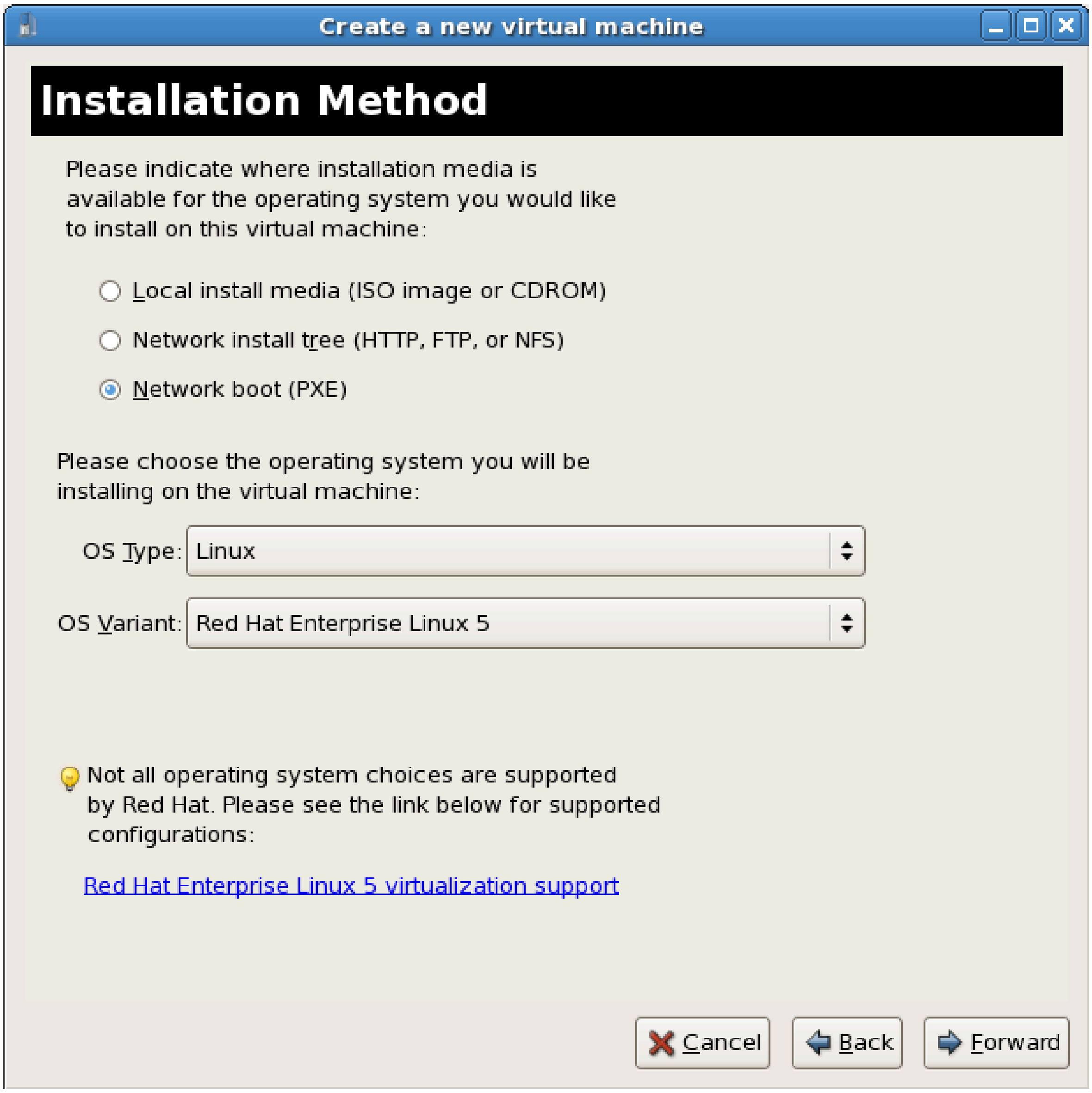
□□ 2.3. □□ virt-install □□□ PXE □□

□□ virt-manager □□□ PXE □□

□□□□□□□□ virt-manager □□□□□□□□□□□□□□□□□□□□□□ □ *3,* □□□□□□□□□□□□□

1. **□□ PXE**

   □□□PXE□□□□□□□□



Create a new virtual machine

Installation Method

Please indicate where installation media is available for the operating system you would like to install on this virtual machine:

○ Local install media (ISO image or CDROM)

○ Network install tree (HTTP, FTP, or NFS)

● Network boot (PXE)

Please choose the operating system you will be installing on the virtual machine:

OS Type: Linux

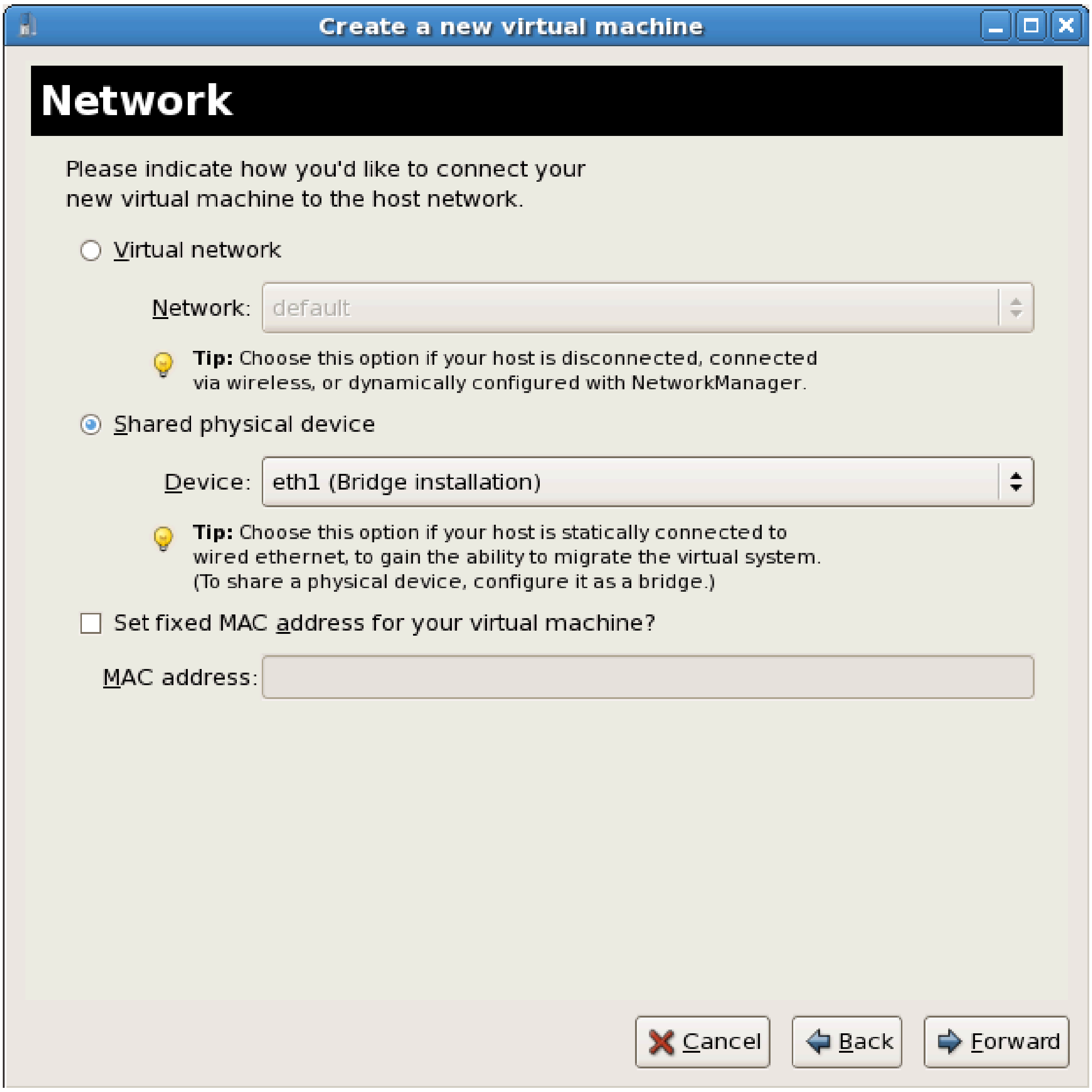
OS Variant: Red Hat Enterprise Linux 5

Not all operating system choices are supported by Red Hat. Please see the link below for supported configurations:

Red Hat Enterprise Linux 5 virtualization support

2. □□□□□□

   □□□□□□□□□□□□□□□□□□□□□□□□□□□□



Create a new virtual machine

Network

Please indicate how you'd like to connect your new virtual machine to the host network.

○ Virtual network

Network: default

Tip: Choose this option if your host is disconnected, connected via wireless, or dynamically configured with NetworkManager.

● Shared physical device

Device: eth1 (Bridge installation)

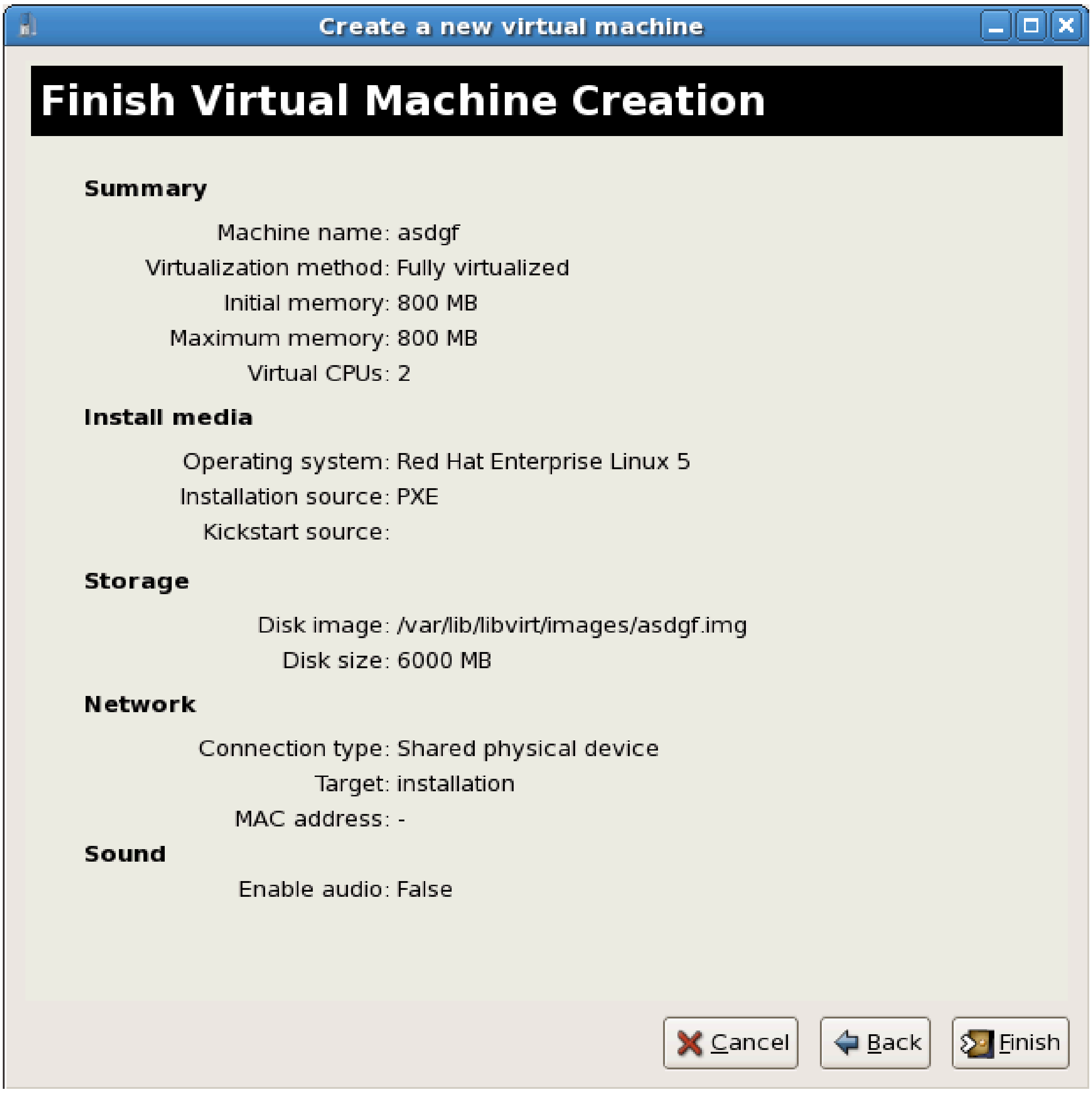
Tip: Choose this option if your host is statically connected to wired ethernet, to gain the ability to migrate the virtual system. (To share a physical device, configure it as a bridge.)

□ Set fixed MAC address for your virtual machine?

MAC address:

3. □□□□

   □□□□□□□□□□□□□□□



Finish Virtual Machine Creation

Summary

Machine name: asdgf
Virtualization method: Fully virtualized
Initial memory: 800 MB
Maximum memory: 800 MB
Virtual CPUs: 2

Install media

Operating system: Red Hat Enterprise Linux 5
Installation source: PXE
Kickstart source:

Storage

Disk image: /var/lib/libvirt/images/asdgf.img
Disk size: 6000 MB

Network

Connection type: Shared physical device
Target: installation
MAC address: -

Sound

Enable audio: False

DHCP □□□□□□□□□□□ PXE □□□□□□□□□□□□□□□□□

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□□□□□□□□ Fedora □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ □ *2, □□□□□□□□□□□*□

3.1. □ Red Hat Enterprise Linux 5 □□□□□□□□□□□□□

□□□□□□□□□ Red Hat Enterprise Linux 5 □□□ Linux □□□□□□ **kernel-xen** □□□

□□□□□□□□□□□

□□□□□□□ Xen hypervisor □□□□□□□□□□□□□ KVM hypervisor □□□□□

□□□□□□□□□□□□□□ root □□□

□□□□□□□□□□□□□□□ Red Hat Enterprise Linux□□□□□□□□□□□□□□□□□□ Live CD □□□□□□□□

□□□ virt-manager □□ virt-install □□□□□□□□ Red Hat Enterprise Linux 5 □□□□□□□ **virt-manager** □□□□□□□□□□ □ *2.2, “□□ virt-manager □□□□□□□”* □□□□□

□□□□□□□□□ **virt-install** □□□□□□□□□□□□□**--vnc** □□□□□□□□□□□□□□□□□□□□□□□□ *rhel5PV*□□□□□□□□ *rhel5PV.dsk*□□ Red Hat Enterprise Linux 5 □□□□□□□□□ *ftp://10.1.1.1/trees/CentOS5-B2-Server-i386/*□□□□□□□□□□□□□□□□□□□□□

```
# virt-install -n rhel5PV -r 500 \
-f /var/lib/libvirt/images/rhel5PV.dsk -s 3 --vnc -p \
-l ftp://10.1.1.1/trees/CentOS5-B2-Server-i386/
```

□□□□□□□□

Red Hat Enterprise Linux □□□□□□□□□□□□□□□□□□□□□□□□□□□ Kickstart □□□□□□□□□□□□□

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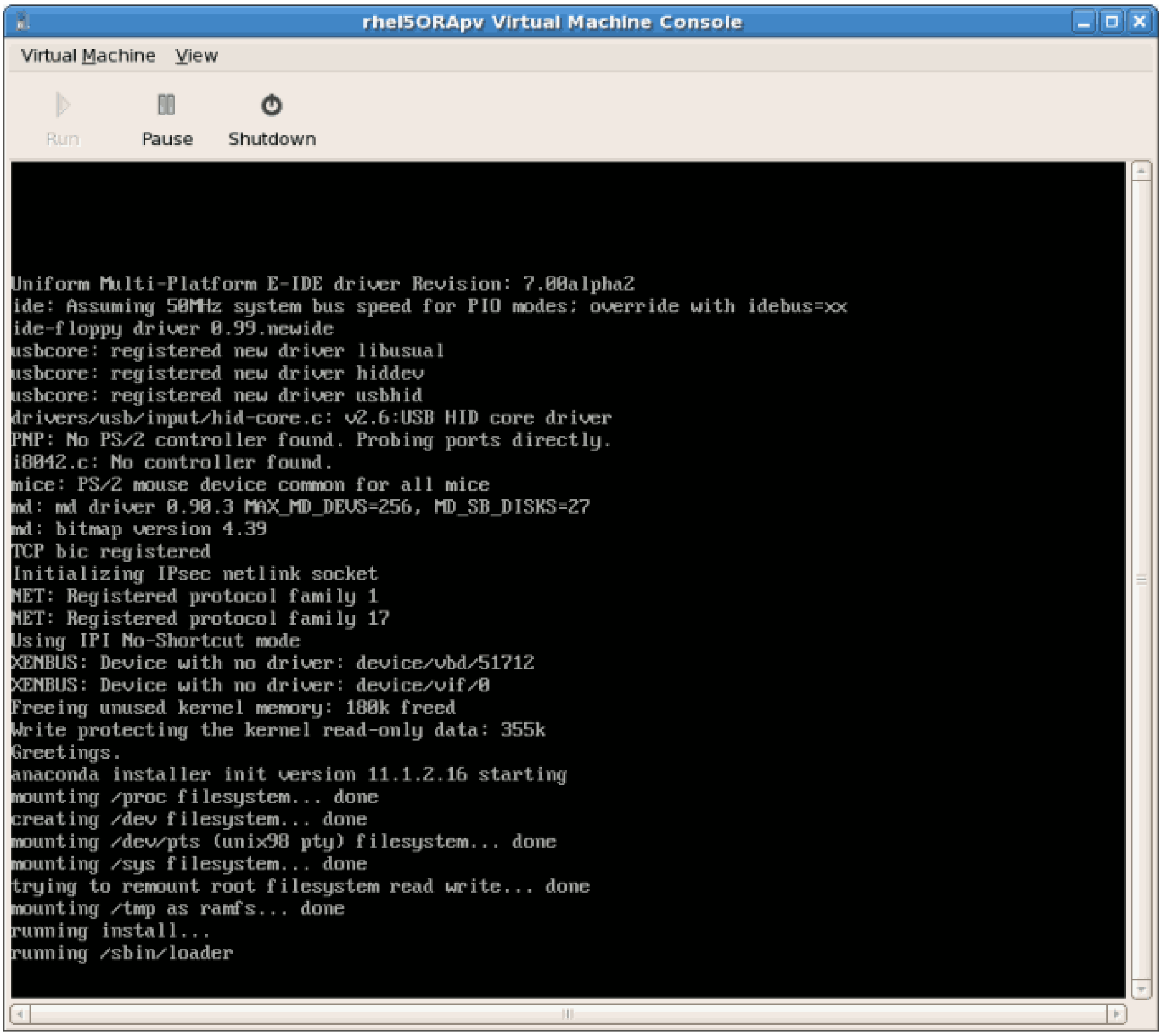
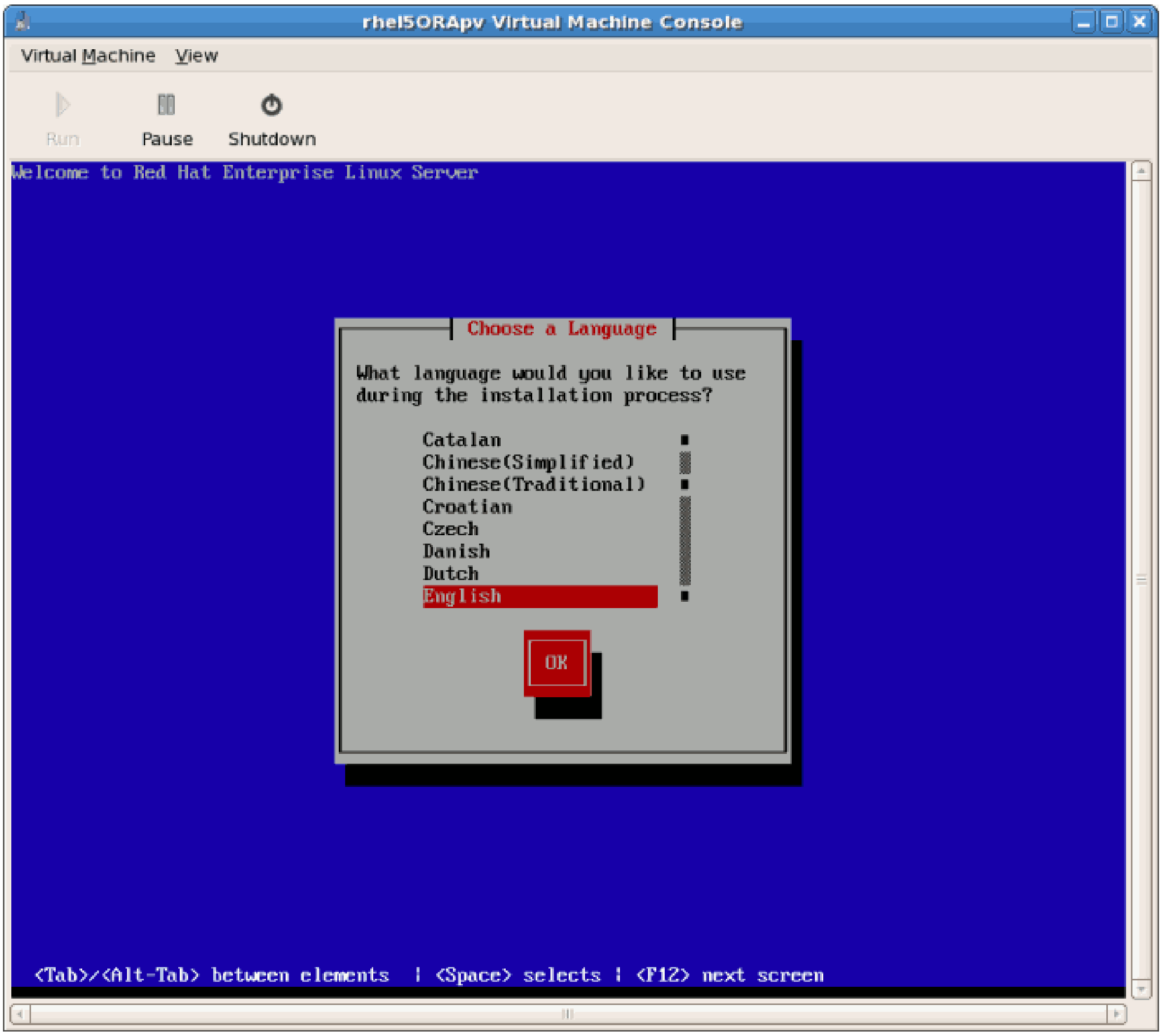


```
Uniform Multi-Platform E-IDE driver Revision: 7.00alpha2
ide: Assuming 50MHz system bus speed for PIO modes; override with idebus=xx
ide-floppy driver 0.99.newide
usbcore: registered new driver libusual
usbcore: registered new driver hiddev
usbcore: registered new driver usbhid
drivers/usb/input/hid-core.c: v2.6:USB HID core driver
PNP: No PS/2 controller found. Probing ports directly.
i8042.c: No controller found.
mice: PS/2 mouse device common for all mice
md: md driver 0.90.3 MAX_MD_DEVS=256, MD_SB_DISKS=27
md: bitmap version 4.39
TCP bic registered
Initializing IPsec netlink socket
NET: Registered protocol family 1
NET: Registered protocol family 17
Using IPI No-Shortcut mode
XENBUS: Device with no driver: device/vbd/51712
XENBUS: Device with no driver: device/vif/0
Freeing unused kernel memory: 180k freed
Write protecting the kernel read-only data: 355k
Greetings.
anaconda installer init version 11.1.2.16 starting
mounting /proc filesystem... done
creating /dev filesystem... done
mounting /dev/pts (unix98 pty) filesystem... done
mounting /sys filesystem... done
trying to remount root filesystem read write... done
mounting /tmp as ramfs... done
running install...
running /sbin/loader
```

□□□□□□□□□□□□□□□□□□□□□Red Hat Enterprise Linux □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

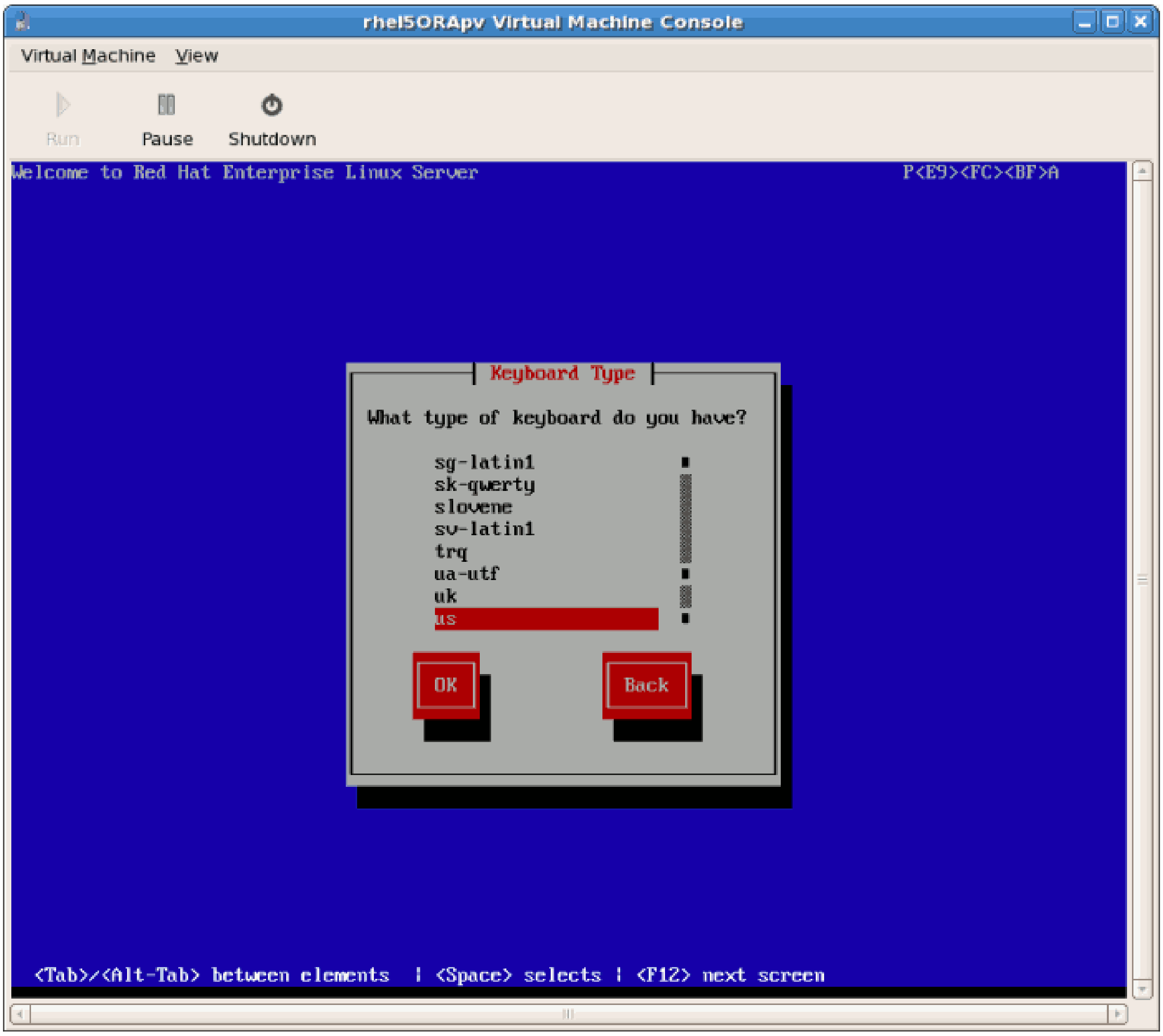
□□ 3.1. □□□□□□ Red Hat Enterprise Linux □□□□□□□□

1. □□□□□□□□□□□□



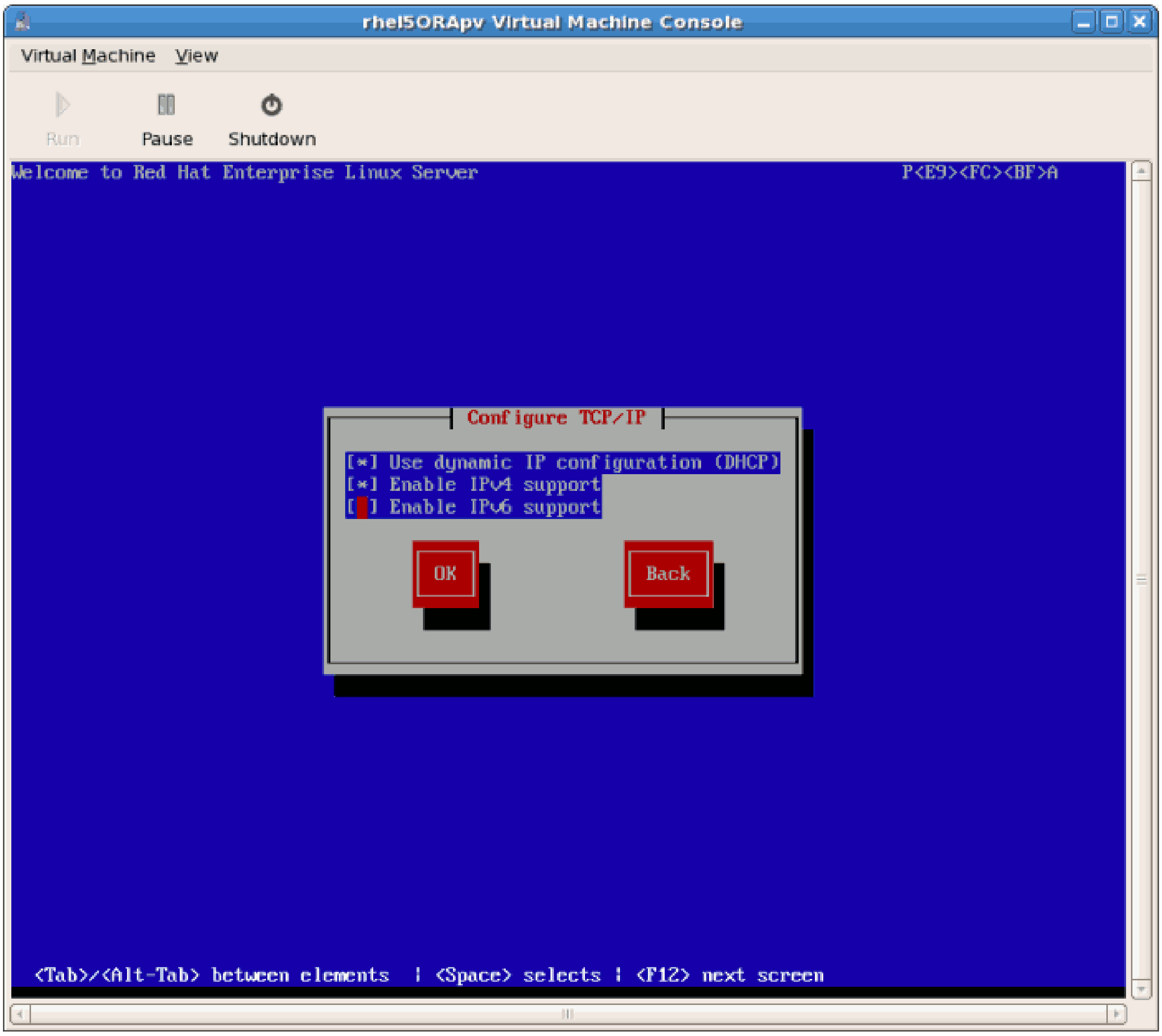
```
Welcome to Red Hat Enterprise Linux Server

                    Choose a Language

  What language would you like to use
  during the installation process?

        Catalan
        Chinese(Simplified)
        Chinese(Traditional)
        Croatian
        Czech
        Danish
        Dutch
        English

 <Tab>/<Alt-Tab> between elements  | <Space> selects | <F12> next screen
```

2. ▯▯▯▯▯▯▯▯▯▯▯▯▯



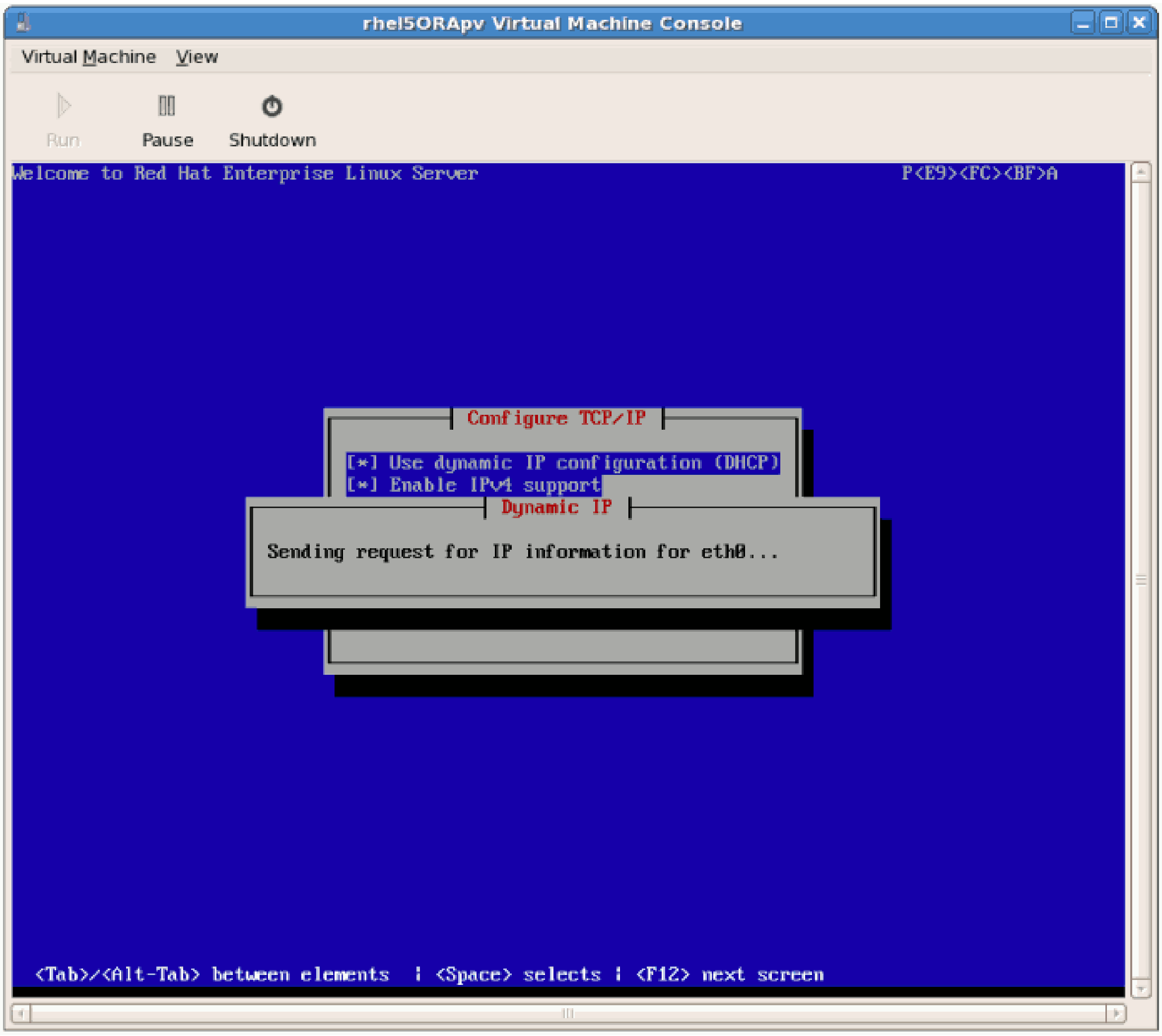
```
Welcome to Red Hat Enterprise Linux Server                                    P<E9><FC><BF>A

                         Keyboard Type

               What type of keyboard do you have?

                    sg-latin1
                    sk-qwerty
                    slovene
                    sv-latin1
                    trq
                    ua-utf
                    uk
                    us

                    OK              Back

  <Tab>/<Alt-Tab> between elements   | <Space> selects | <F12> next screen
```

3. □□□□□□□□□□□□□□□□□ DHCP□□□□□□□□□□ IP □□□



```
Welcome to Red Hat Enterprise Linux Server                    P<E9><FC><BF>A

                    ┤ Configure TCP/IP ├

                [*] Use dynamic IP configuration (DHCP)
                [*] Enable IPv4 support
                [ ] Enable IPv6 support

                      OK               Back

  <Tab>/<Alt-Tab> between elements  | <Space> selects | <F12> next screen
```

4. □□□□□ DHCP□□□□□□□□□□□□□□□ IP □□□



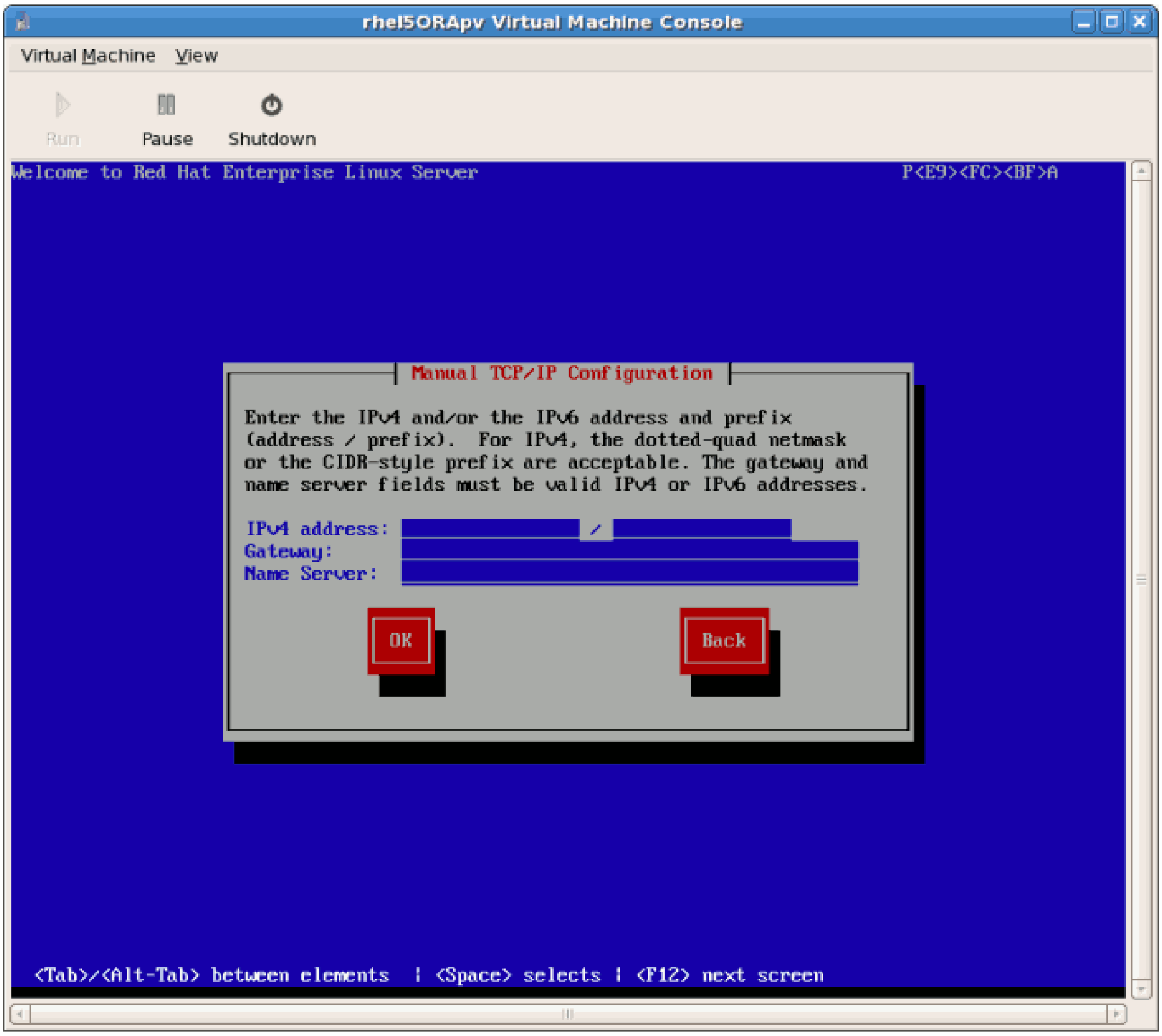
```
Welcome to Red Hat Enterprise Linux Server                                P<E9><FC><BF>A

                         ┤ Configure TCP/IP ├
                        [*] Use dynamic IP configuration (DHCP)
                        [*] Enable IPv4 support
                                ┤ Dynamic IP ├

                  Sending request for IP information for eth0...

  <Tab>/<Alt-Tab> between elements   |  <Space> selects  |  <F12> next screen
```

5. □□□□□□□□□□□□□□ IP □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

   a. □□□□□□□□ IP □□□□□□□□□□□ IP □□□□□□□□□□□□□□□

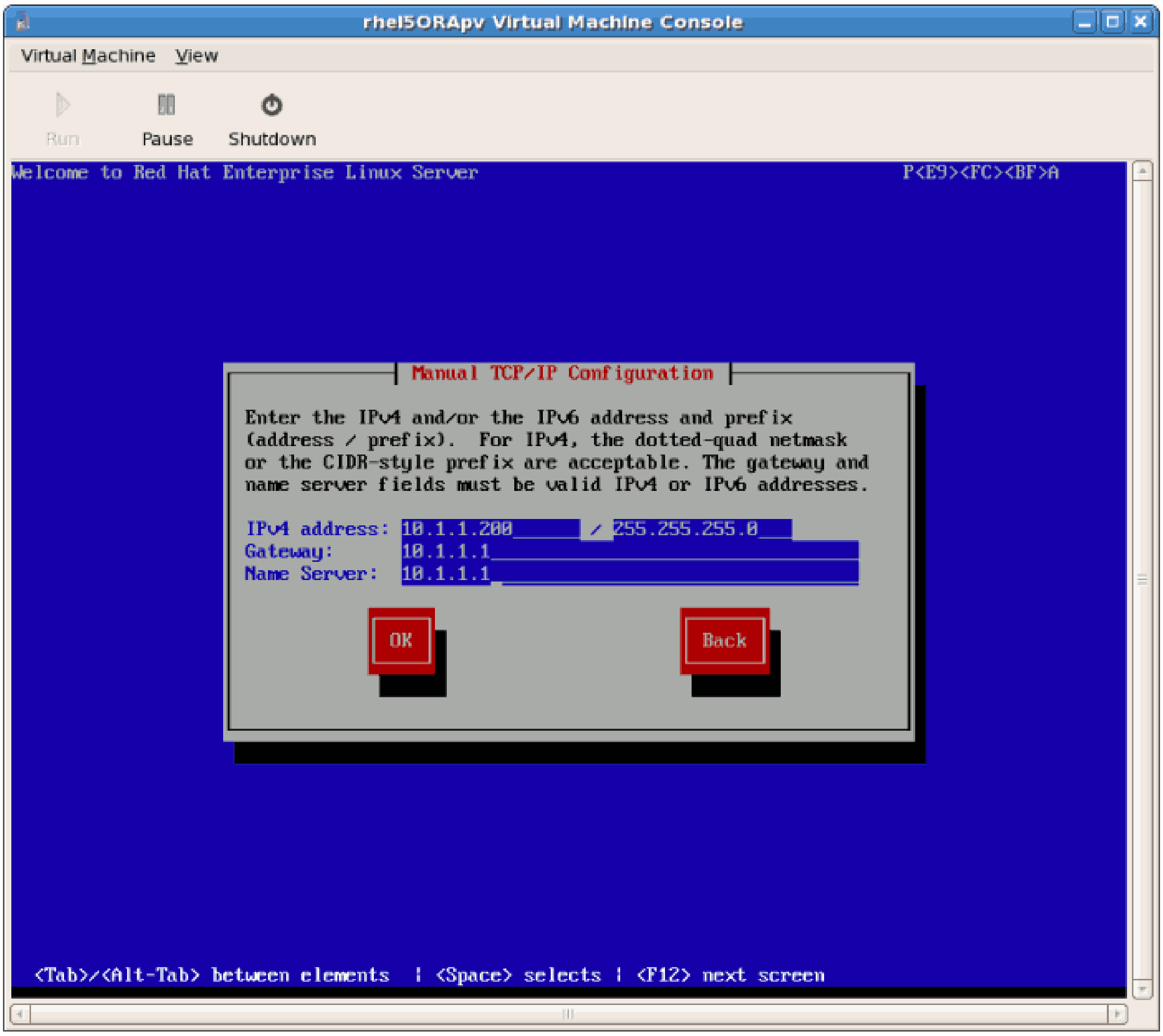
   b. □□□□□□□□□□□□□□□□□□□□□□□□□□□□

   □□□□□□□□□□□



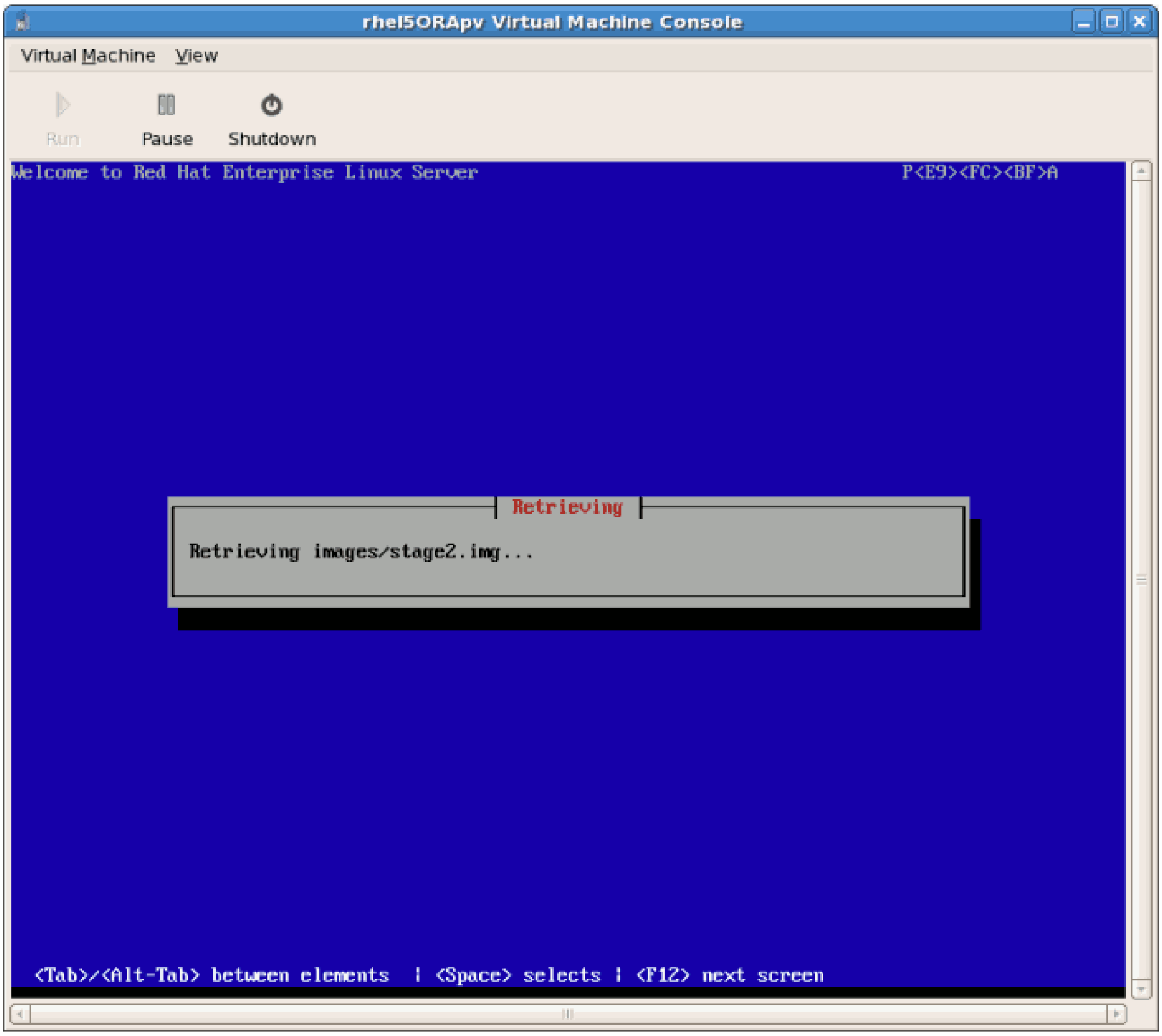
```
Welcome to Red Hat Enterprise Linux Server                         P<E9><FC><BF>A

                 Manual TCP/IP Configuration

     Enter the IPv4 and/or the IPv6 address and prefix
     (address / prefix).  For IPv4, the dotted-quad netmask
     or the CIDR-style prefix are acceptable. The gateway and
     name server fields must be valid IPv4 or IPv6 addresses.

     IPv4 address:                /
     Gateway:
     Name Server:

                 OK                           Back

  <Tab>/<Alt-Tab> between elements  | <Space> selects | <F12> next screen
```

6. □□□□□□□ IP □□□□□□□□



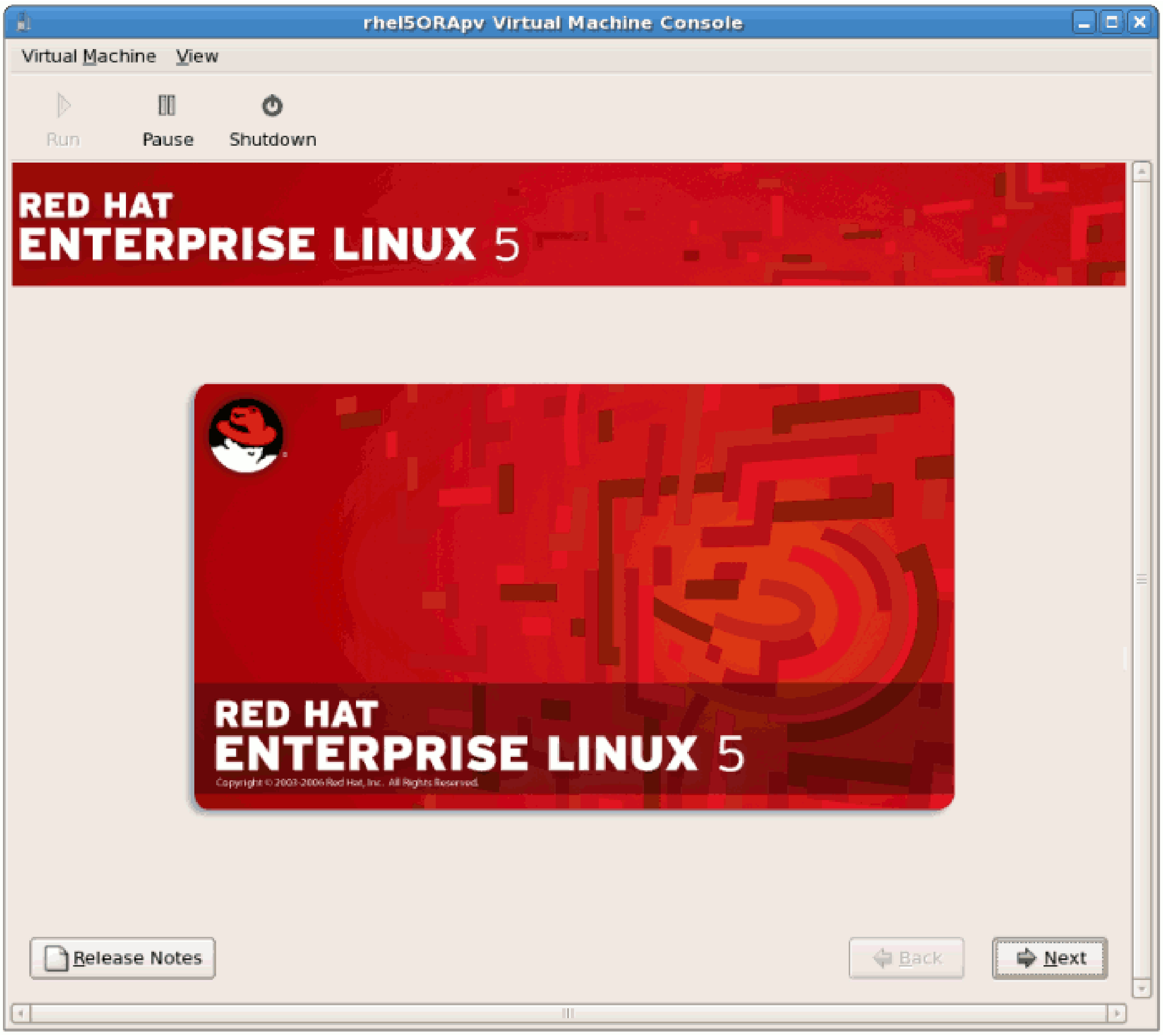
```
Welcome to Red Hat Enterprise Linux Server                    P<E9><FC><BF>A

                    Manual TCP/IP Configuration

 Enter the IPv4 and/or the IPv6 address and prefix
 (address / prefix).  For IPv4, the dotted-quad netmask
 or the CIDR-style prefix are acceptable. The gateway and
 name server fields must be valid IPv4 or IPv6 addresses.

 IPv4 address: 10.1.1.200______ / 255.255.255.0___
 Gateway:      10.1.1.1_________________________________
 Name Server:  10.1.1.1_________________________________

          OK                          Back

 <Tab>/<Alt-Tab> between elements  | <Space> selects | <F12> next screen
```

7. □□□□□□□□□□□□□□□□□□□□□□



```
Welcome to Red Hat Enterprise Linux Server                    P<E9><FC><BF>A

                         ┤ Retrieving ├
          Retrieving images/stage2.img...

  <Tab>/<Alt-Tab> between elements  | <Space> selects | <F12> next screen
```

□□□□□□□□□□□□□□□□□□□□□□


rhel5ORApv Virtual Machine Console
Virtual Machine
View
Run
Pause
Shutdown
RED HAT
ENTERPRISE LINUX 5
RED HAT
ENTERPRISE LINUX 5
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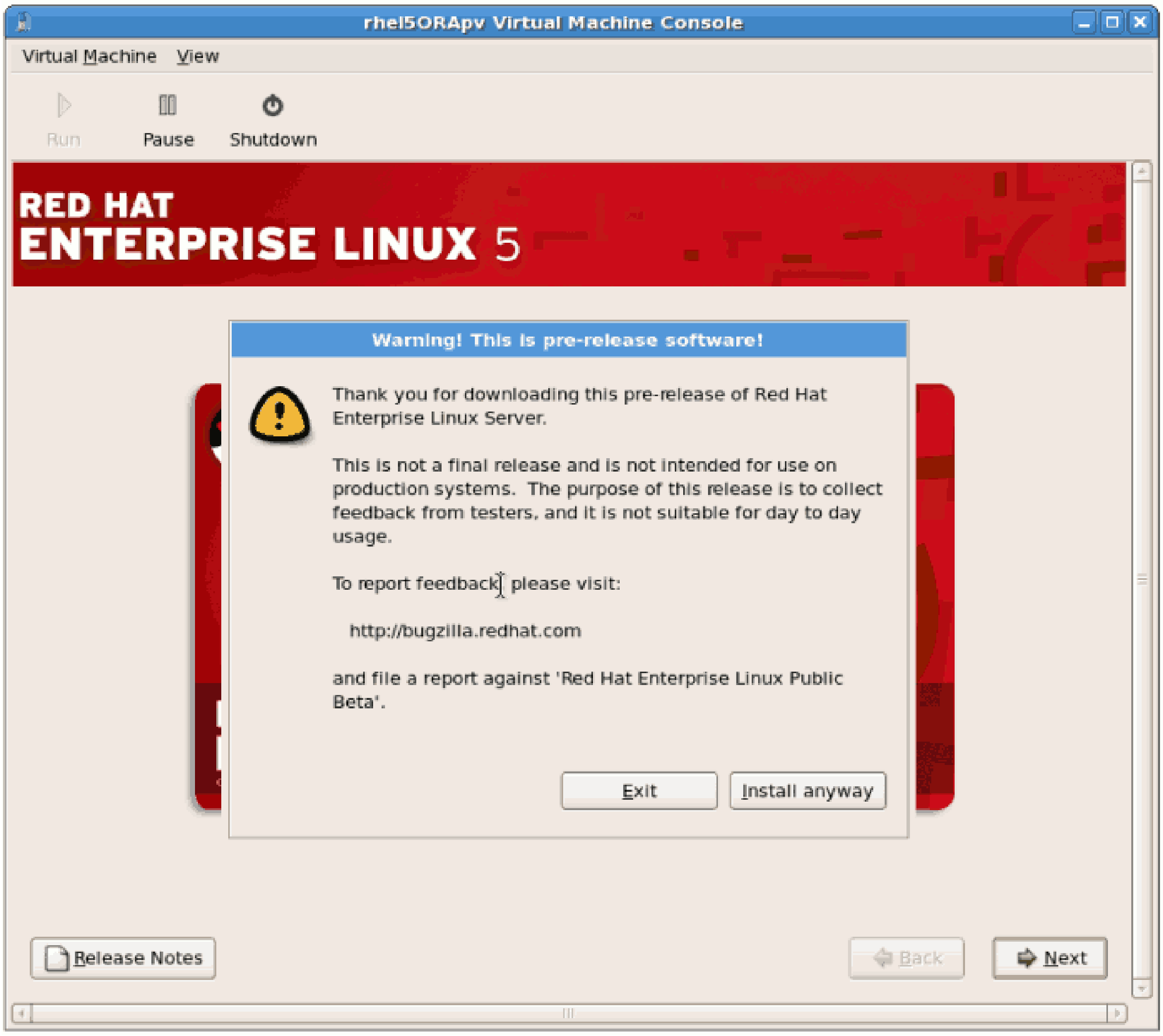
Release Notes
Back
Next

□□□□□□□□□ Beta □□□



Warning! This is pre-release software!

Thank you for downloading this pre-release of Red Hat Enterprise Linux Server.

This is not a final release and is not intended for use on production systems. The purpose of this release is to collect feedback from testers, and it is not suitable for day to day usage.

To report feedback, please visit:

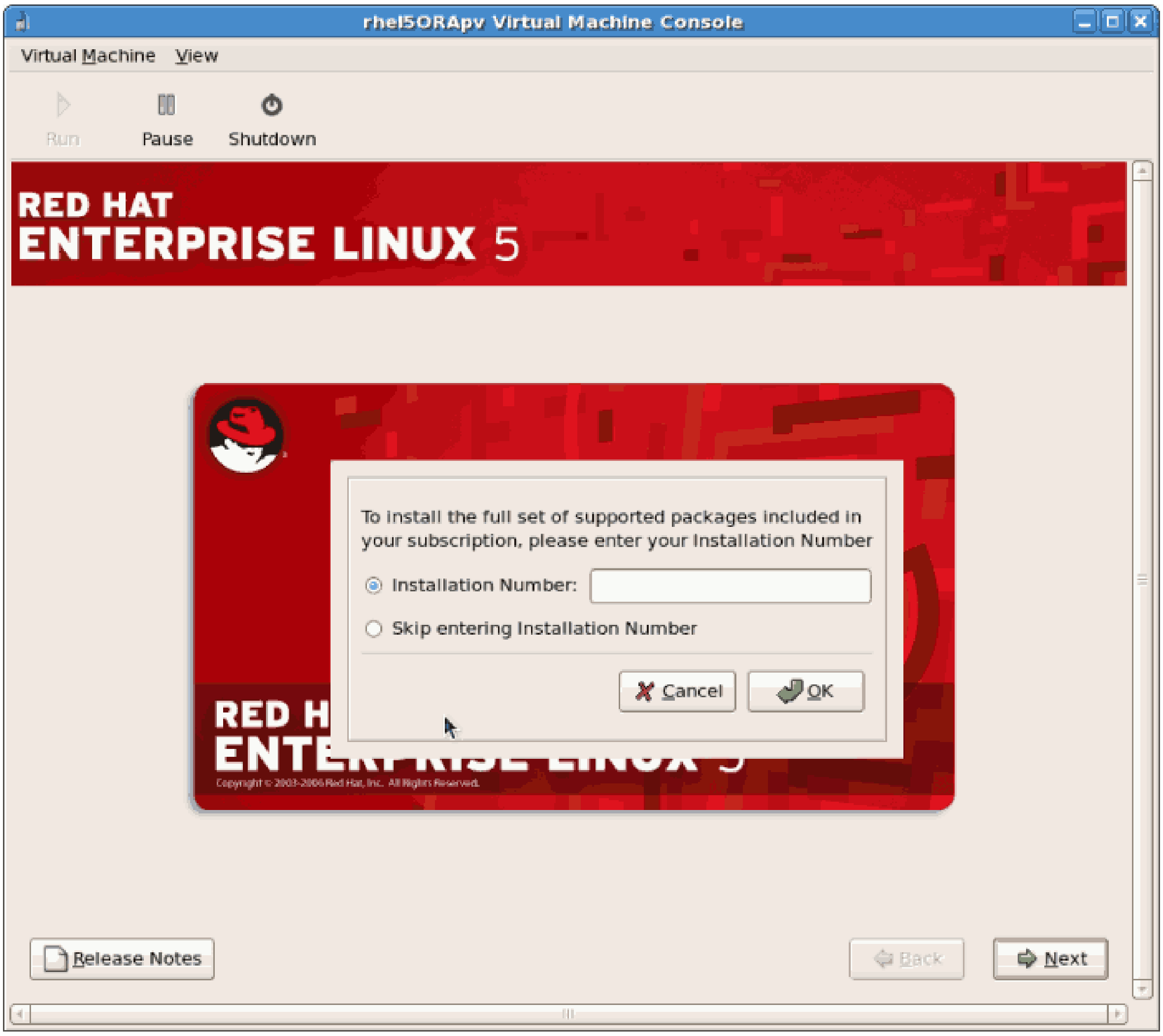
http://bugzilla.redhat.com

and file a report against 'Red Hat Enterprise Linux Public Beta'.

Exit Install anyway

□□ 3.2. □□□□□□□

1. □□□□□□□□□□□□□□□□□□□□□□ RHN □□□□□□□□□□□□□□□□□□□□□□



To install the full set of supported packages included in your subscription, please enter your Installation Number

● Installation Number:

○ Skip entering Installation Number

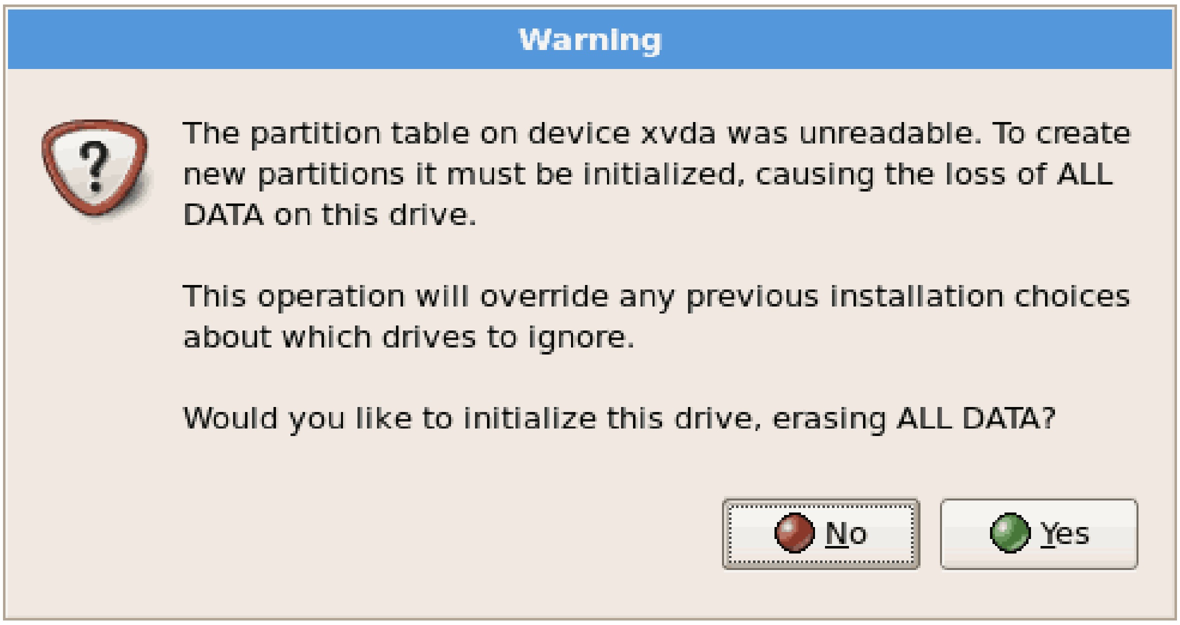
Cancel OK

Note

□□□□□□□□□□□□□□□□□□ **rhn_register** □□□□□□□□□□□□□□□□ Red Hat Network □□□□□□□□ **rhn_register** □□□□□ root □□□□□

```
# rhn_register
```

2. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□



Warning

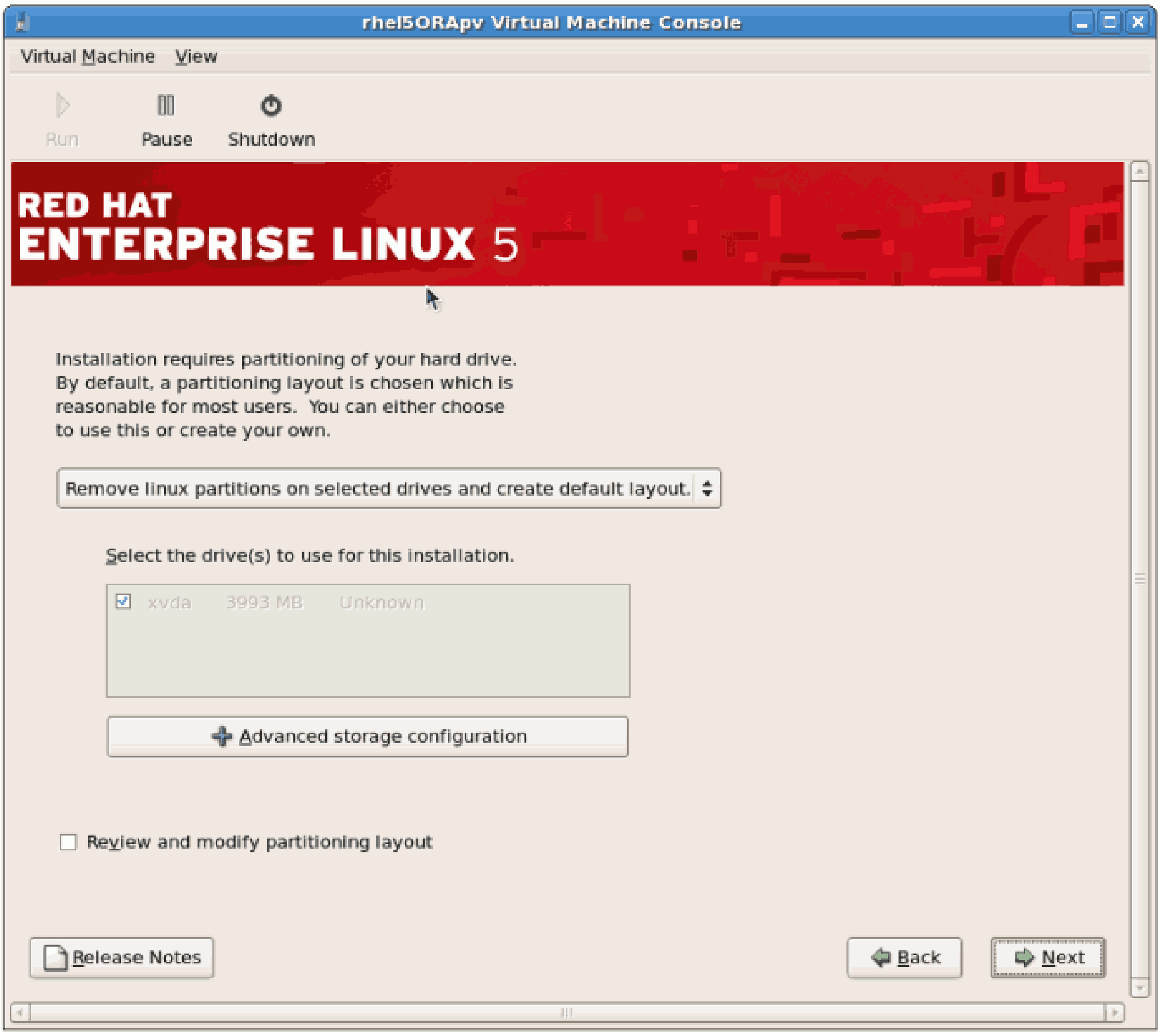
The partition table on device xvda was unreadable. To create new partitions it must be initialized, causing the loss of ALL DATA on this drive.

This operation will override any previous installation choices about which drives to ignore.

Would you like to initialize this drive, erasing ALL DATA?

□□□□□□□□□□□□□□

3. □□□□□□□□□□□□□□□□□□□□□□ iSCSI □□□□□□□□□□□□□□□□□□□□□□□□□□□



Installation requires partitioning of your hard drive.
By default, a partitioning layout is chosen which is
reasonable for most users. You can either choose
to use this or create your own.

Remove linux partitions on selected drives and create default layout.

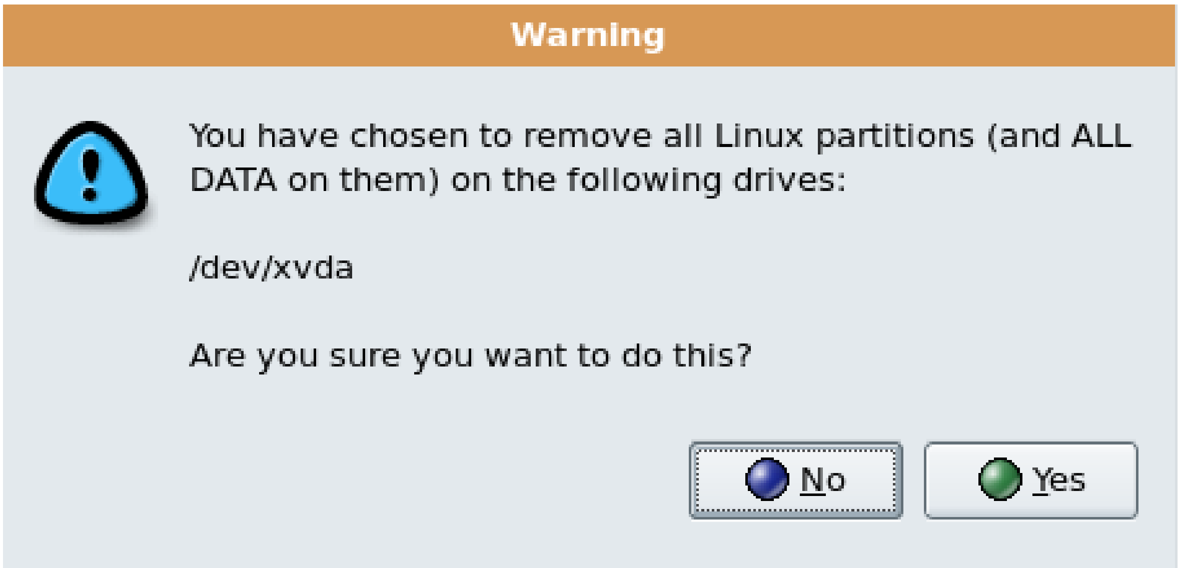
Select the drive(s) to use for this installation.

☑ xvda 3993 MB Unknown

□ Review and modify partitioning layout

□□□□□□□□□□□□□□□□□

4. □□□□□□□□□□□□□□□□□



Warning

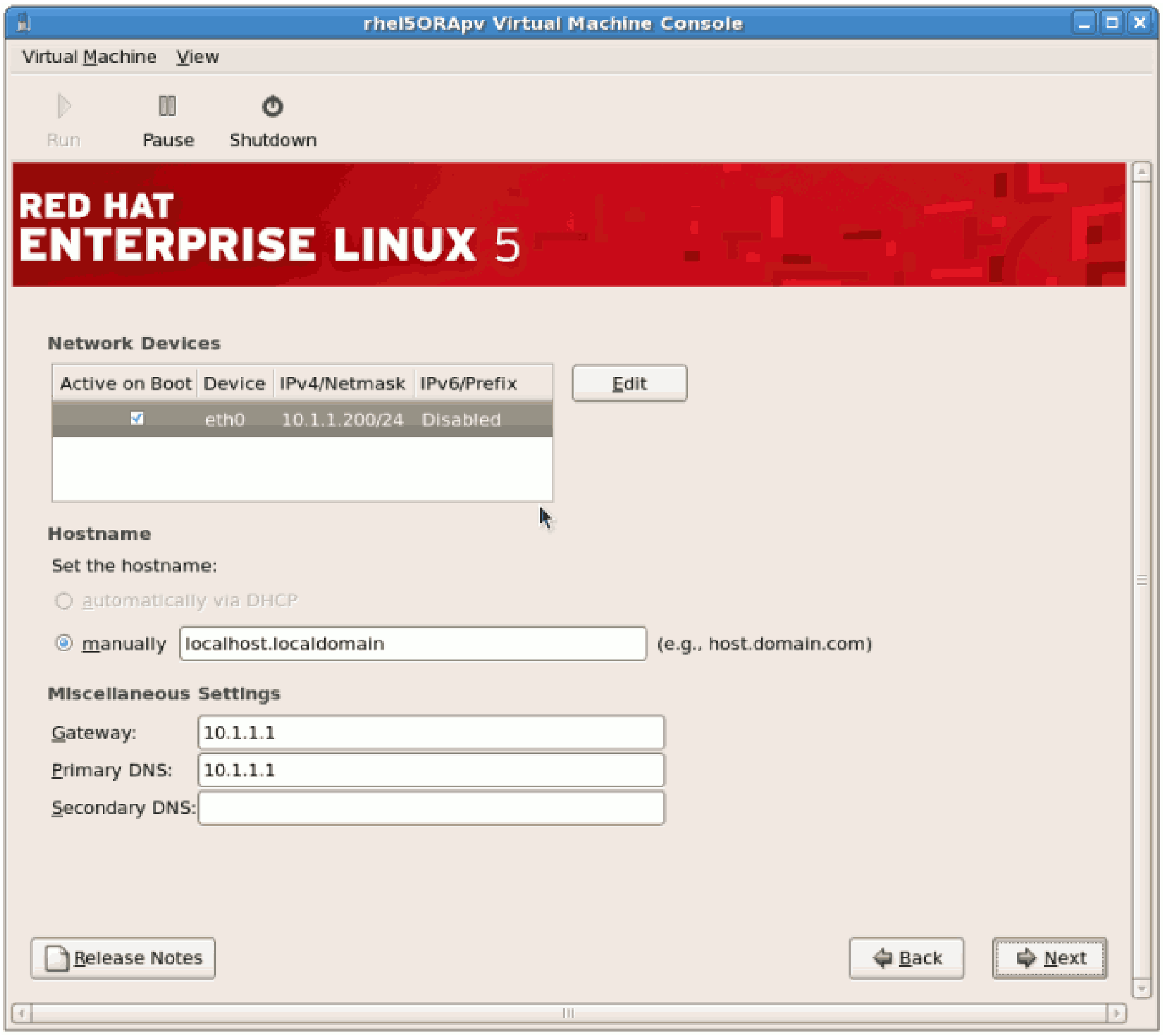
You have chosen to remove all Linux partitions (and ALL DATA on them) on the following drives:

/dev/xvda

Are you sure you want to do this?

[illegible]

5. [illegible]



rhel5ORApv Virtual Machine Console

Network Devices

Active on Boot	Device	IPv4/Netmask	IPv6/Prefix
☑	eth0	10.1.1.200/24	Disabled

Hostname

Set the hostname:

○ automatically via DHCP

● manually localhost.localdomain (e.g., host.domain.com)

Miscellaneous Settings

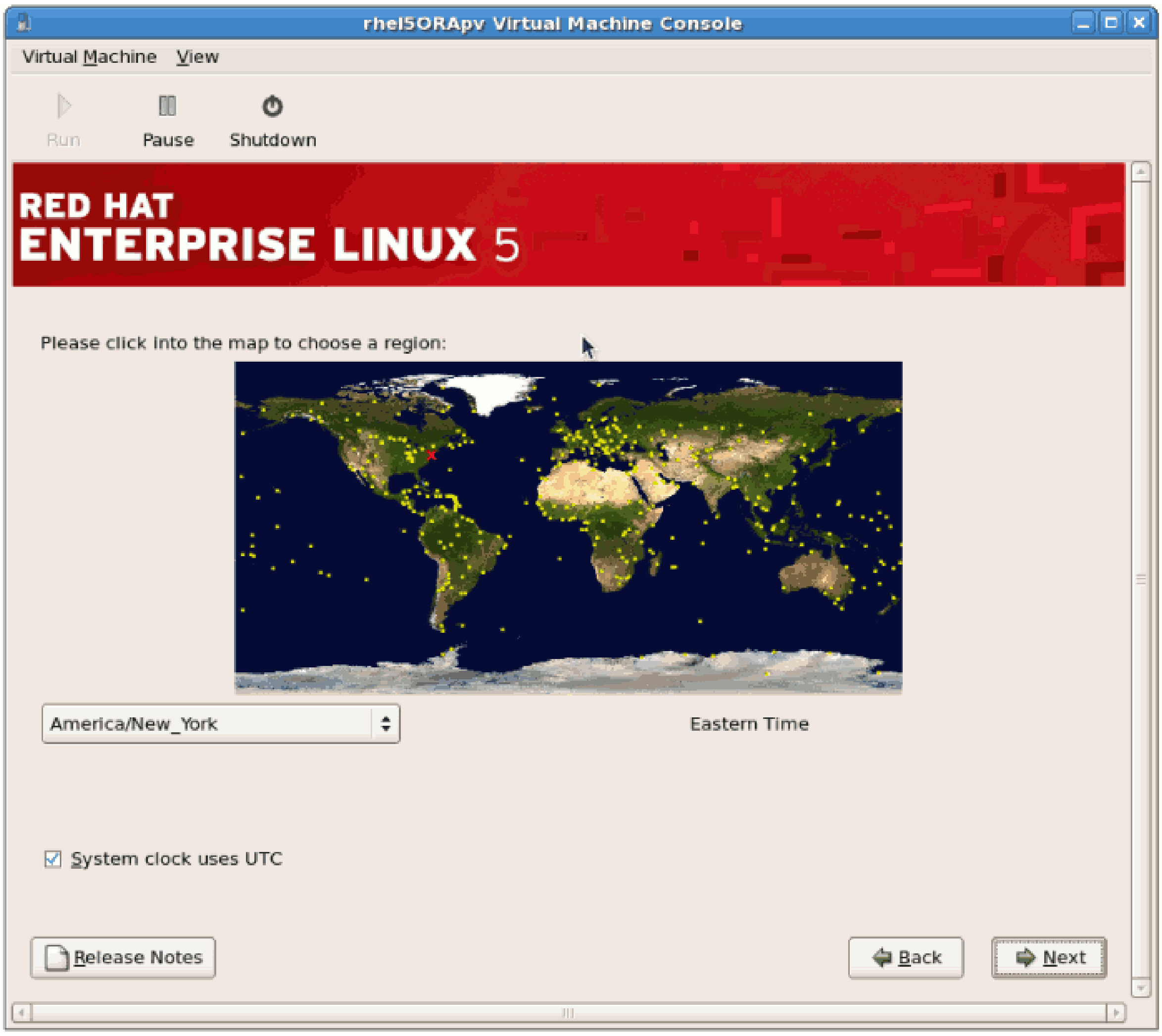
Gateway: 10.1.1.1

Primary DNS: 10.1.1.1

Secondary DNS:

□□□□□□□□□□□□□□□□

6. □□□□□□□□□□□□□□□□



rhel5ORApv Virtual Machine Console

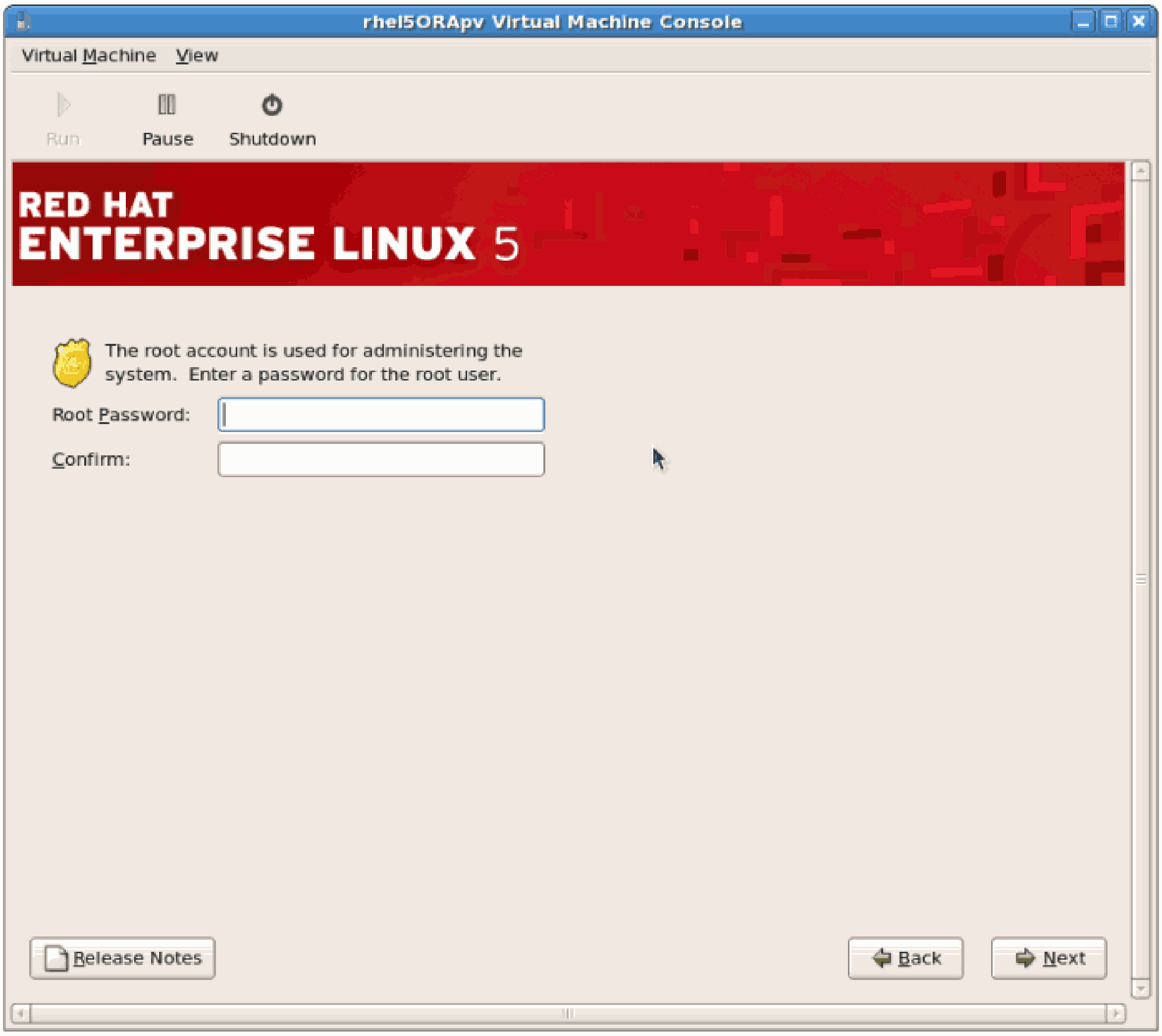
Please click into the map to choose a region:

America/New_York

Eastern Time

☑ System clock uses UTC

7. □□□□□□□□ root □□□



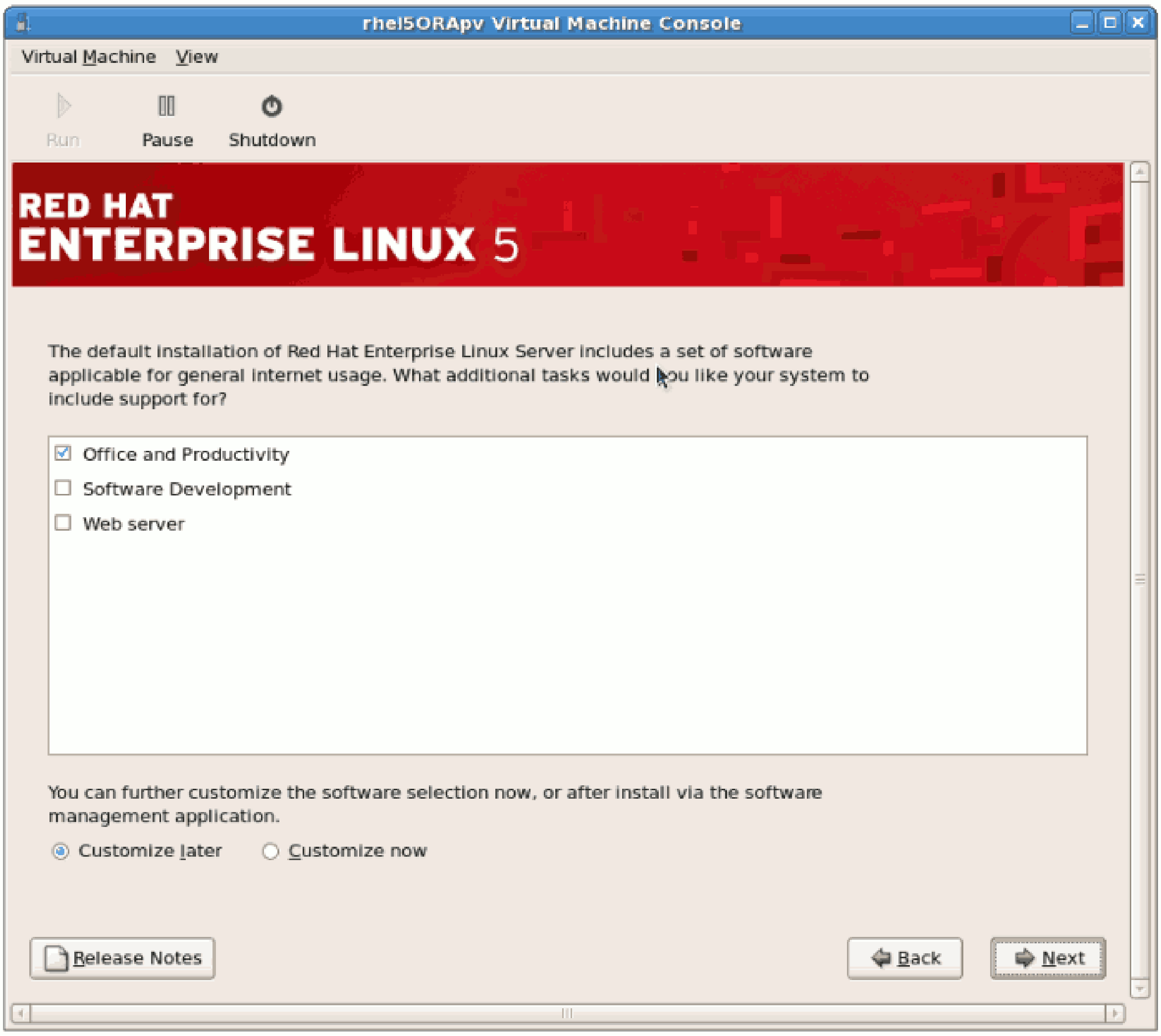
The root account is used for administering the system. Enter a password for the root user.

Root Password:

Confirm:

▯▯▯▯▯▯▯▯▯▯▯▯▯▯

8. ▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯ **kernel-xen** ▯▯▯▯▯▯▯▯ **kernel-xen** ▯▯▯▯▯▯▯▯▯▯▯



The default installation of Red Hat Enterprise Linux Server includes a set of software applicable for general internet usage. What additional tasks would you like your system to include support for?

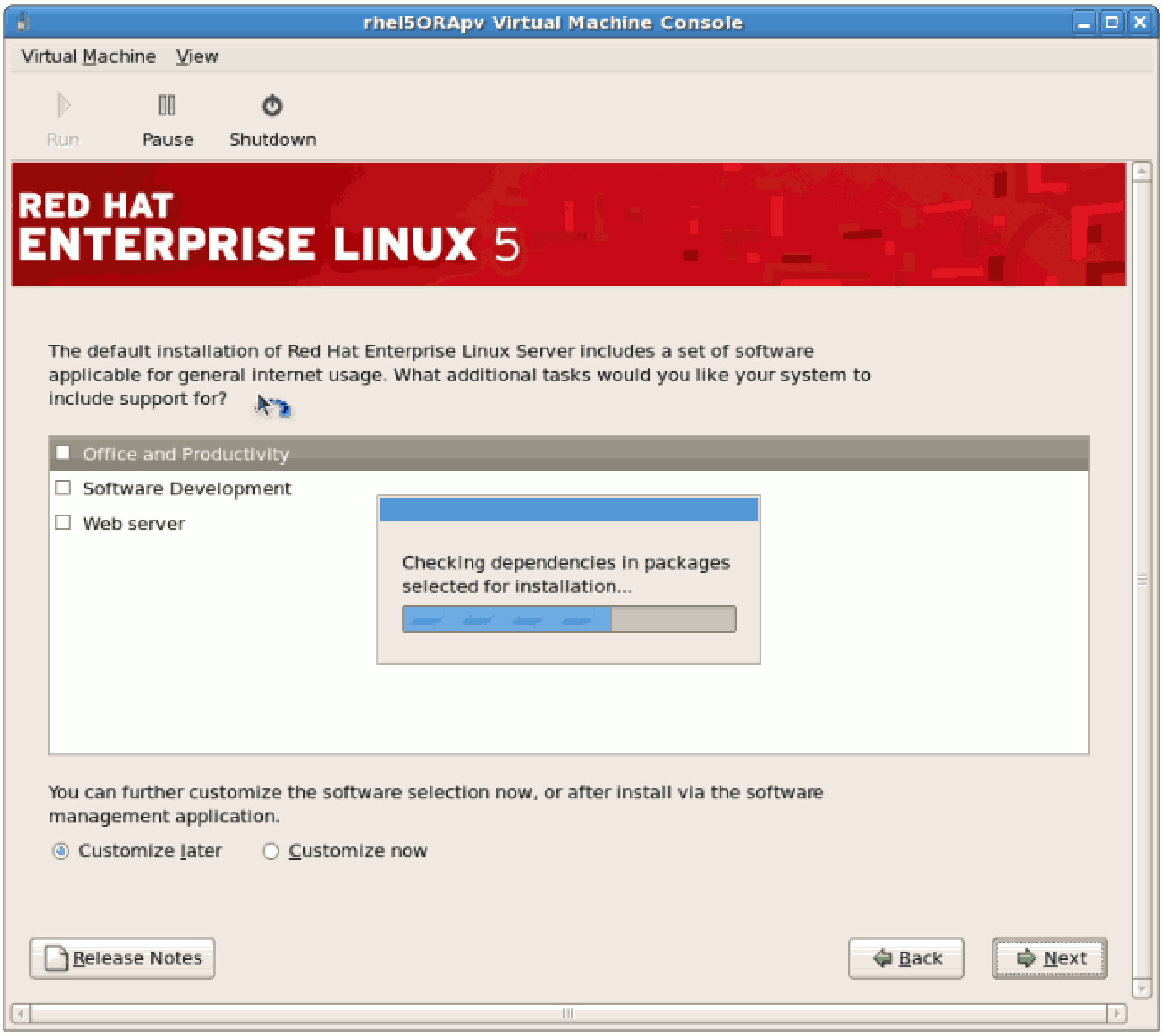
☑ Office and Productivity
□ Software Development
□ Web server

You can further customize the software selection now, or after install via the software management application.

● Customize later ○ Customize now

□□□□□□□□□

9. □□□□□□□□□□□



The default installation of Red Hat Enterprise Linux Server includes a set of software applicable for general internet usage. What additional tasks would you like your system to include support for?

□ Office and Productivity

□ Software Development

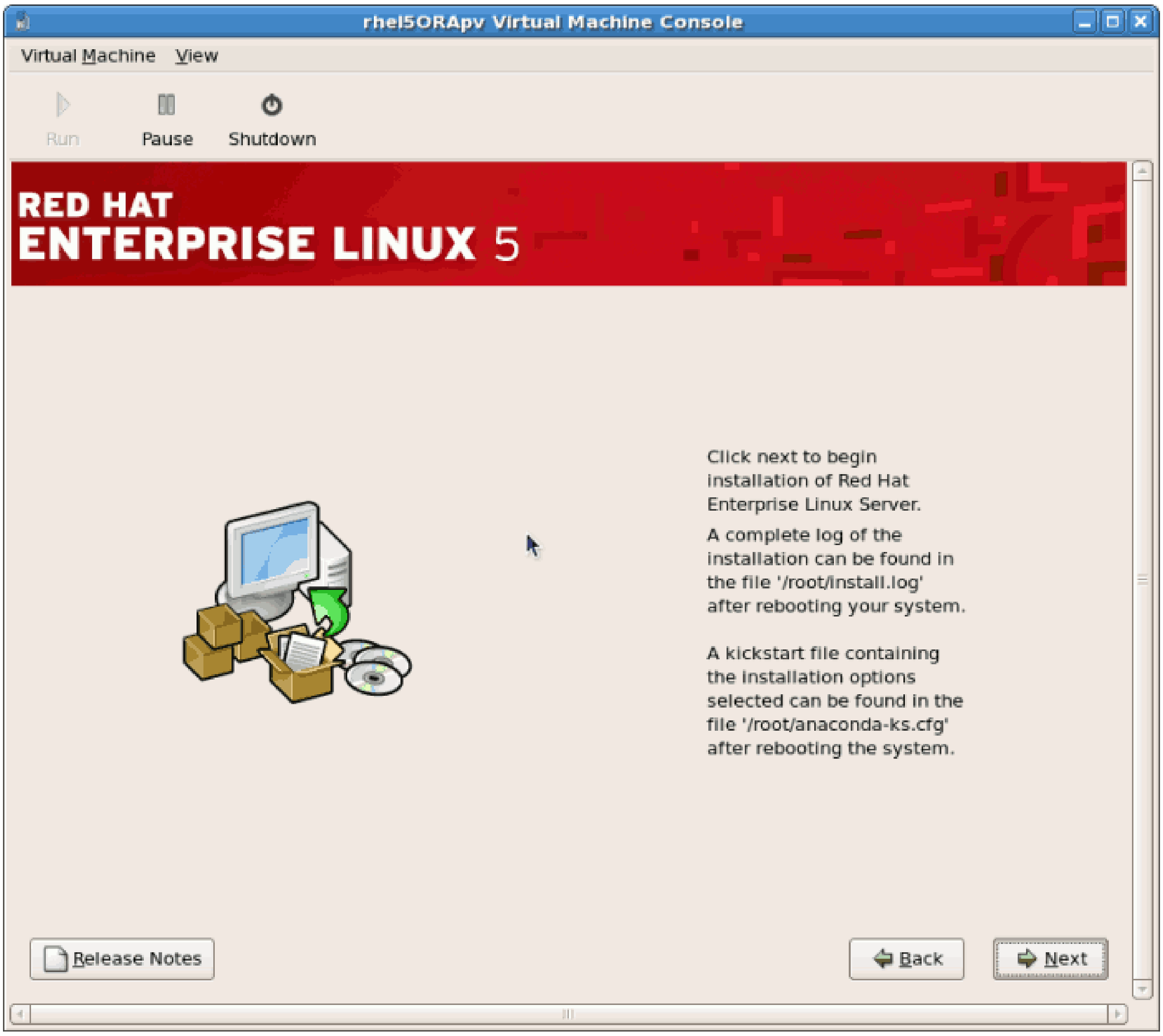
□ Web server

Checking dependencies in packages selected for installation...

You can further customize the software selection now, or after install via the software management application.

● Customize later ○ Customize now

10. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

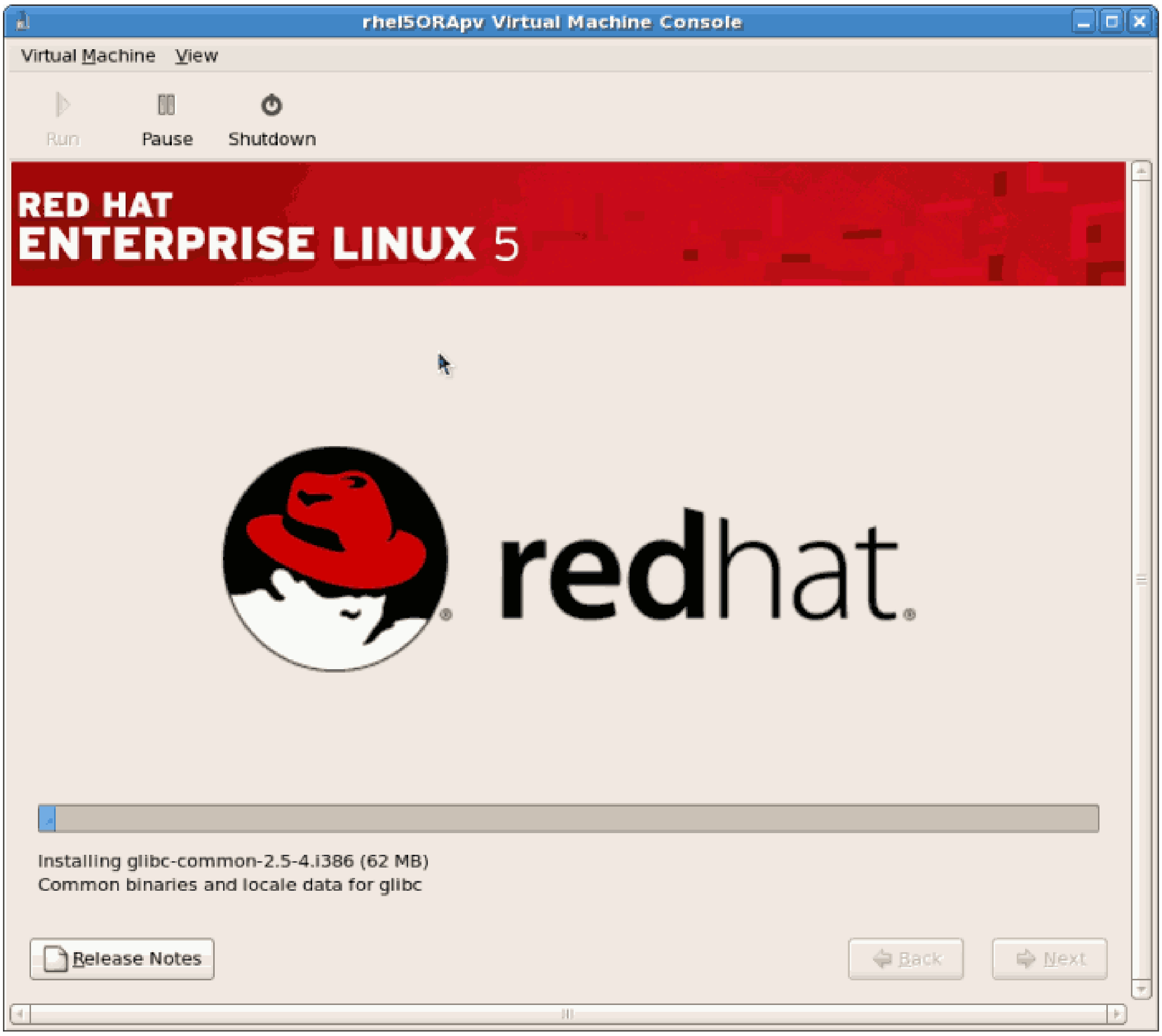


Click next to begin installation of Red Hat Enterprise Linux Server.

A complete log of the installation can be found in the file '/root/install.log' after rebooting your system.

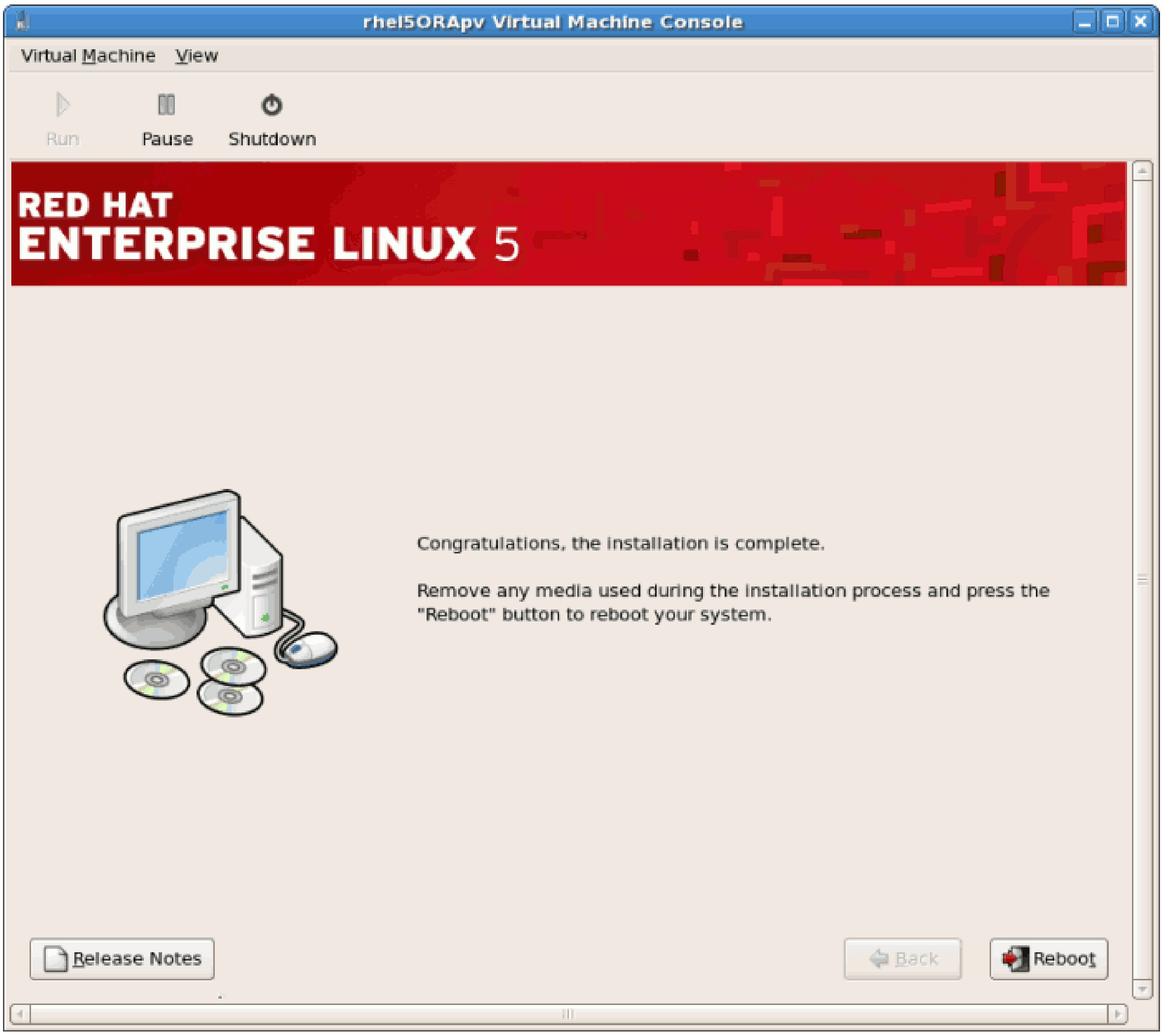
A kickstart file containing the installation options selected can be found in the file '/root/anaconda-ks.cfg' after rebooting the system.

11. □□□□□□□□□□□□□□□□□



Installing glibc-common-2.5-4.i386 (62 MB)
Common binaries and locale data for glibc

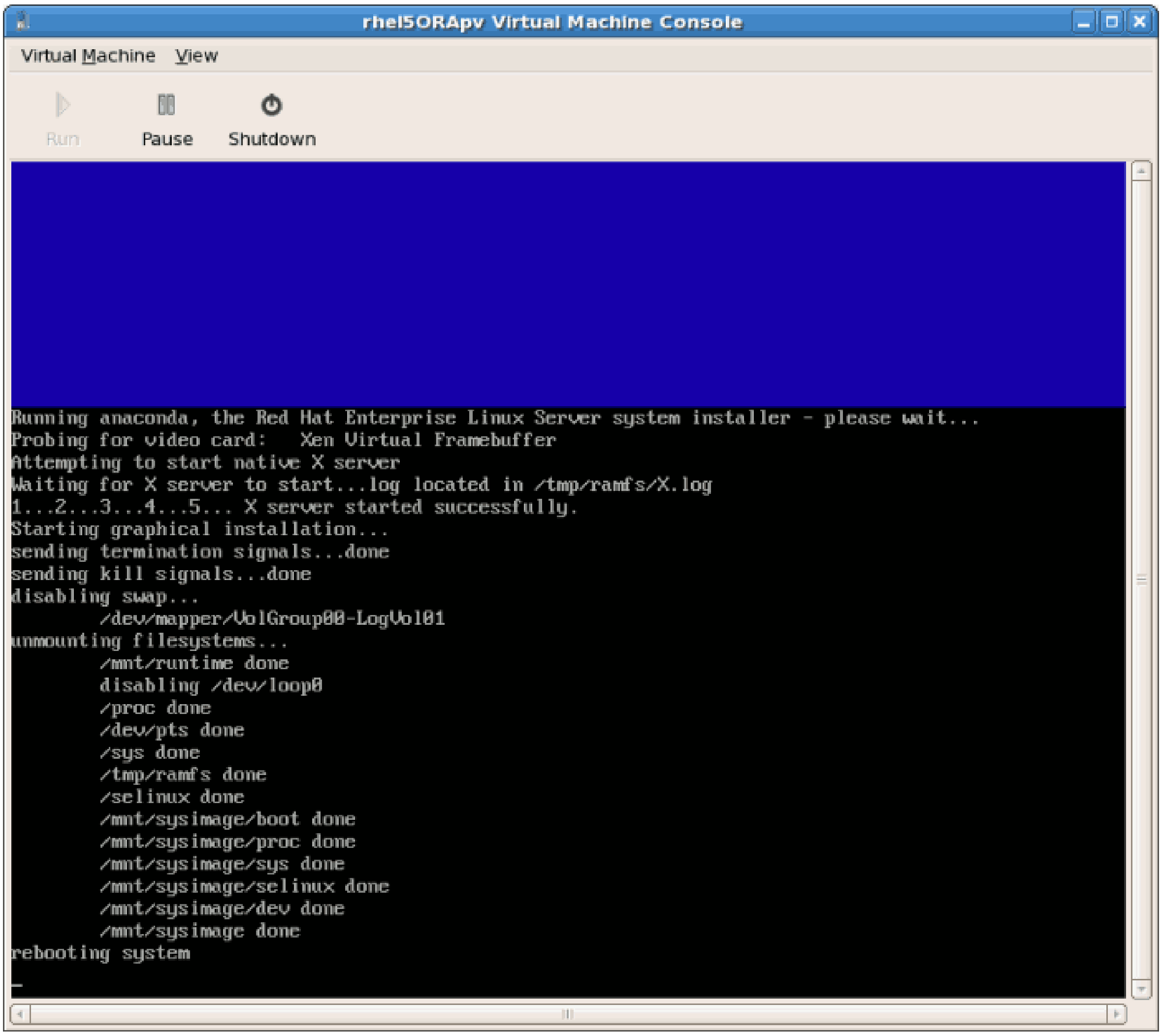
12. □□□□□□□□□□□□□□□□□



Congratulations, the installation is complete.

Remove any media used during the installation process and press the "Reboot" button to reboot your system.

13. □□□□□□□□□□□□□□□□□□□□...



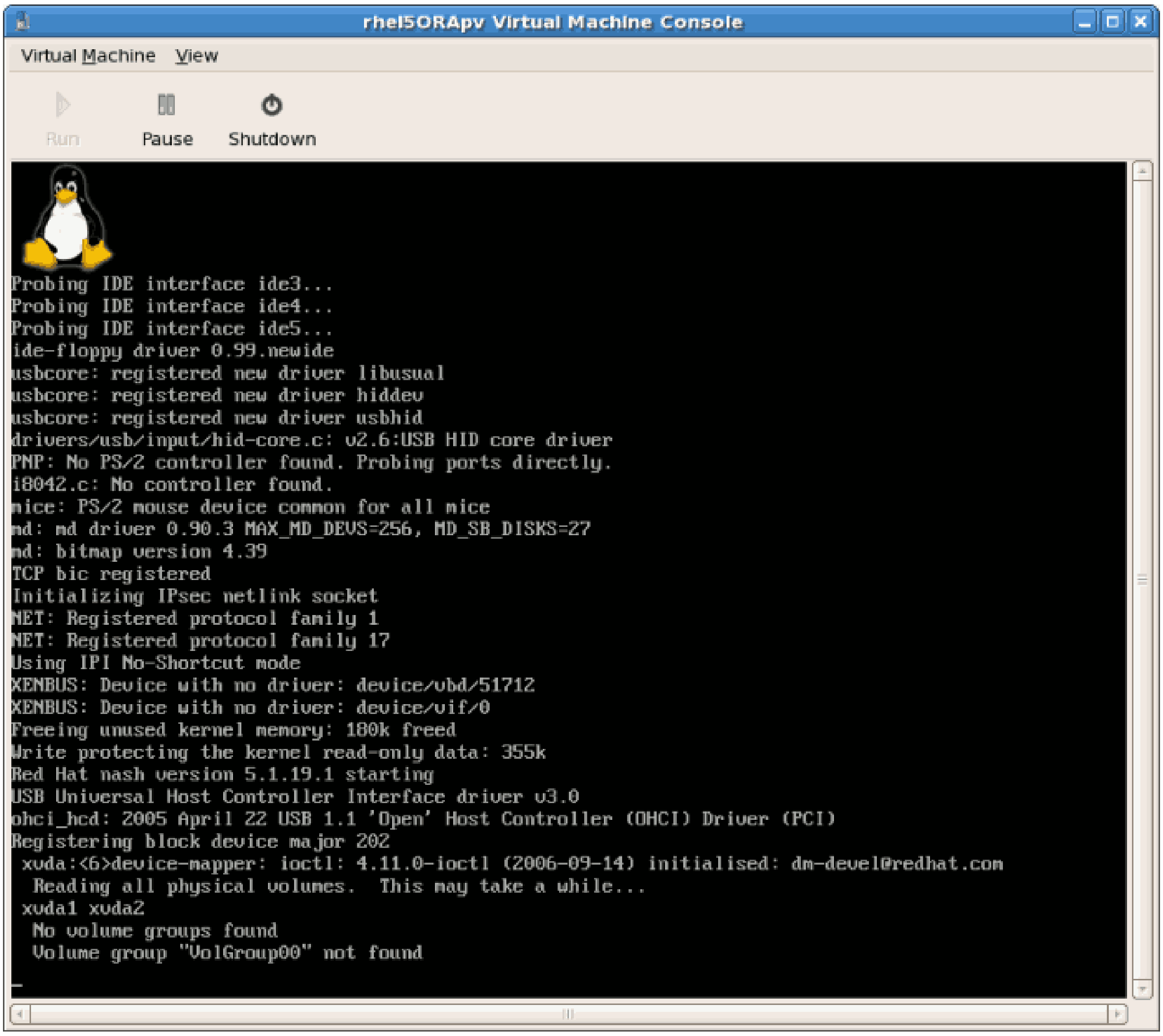
```
Running anaconda, the Red Hat Enterprise Linux Server system installer - please wait...
Probing for video card:   Xen Virtual Framebuffer
Attempting to start native X server
Waiting for X server to start...log located in /tmp/ramfs/X.log
1...2...3...4...5... X server started successfully.
Starting graphical installation...
sending termination signals...done
sending kill signals...done
disabling swap...
        /dev/mapper/VolGroup00-LogVol01
unmounting filesystems...
        /mnt/runtime done
        disabling /dev/loop0
        /proc done
        /dev/pts done
        /sys done
        /tmp/ramfs done
        /selinux done
        /mnt/sysimage/boot done
        /mnt/sysimage/proc done
        /mnt/sysimage/sys done
        /mnt/sysimage/selinux done
        /mnt/sysimage/dev done
        /mnt/sysimage done
rebooting system
_
```

14. * 3.1, “ Red Hat Enterprise Linux 5 ”* **`virt-install`** *`rhel5PV`*

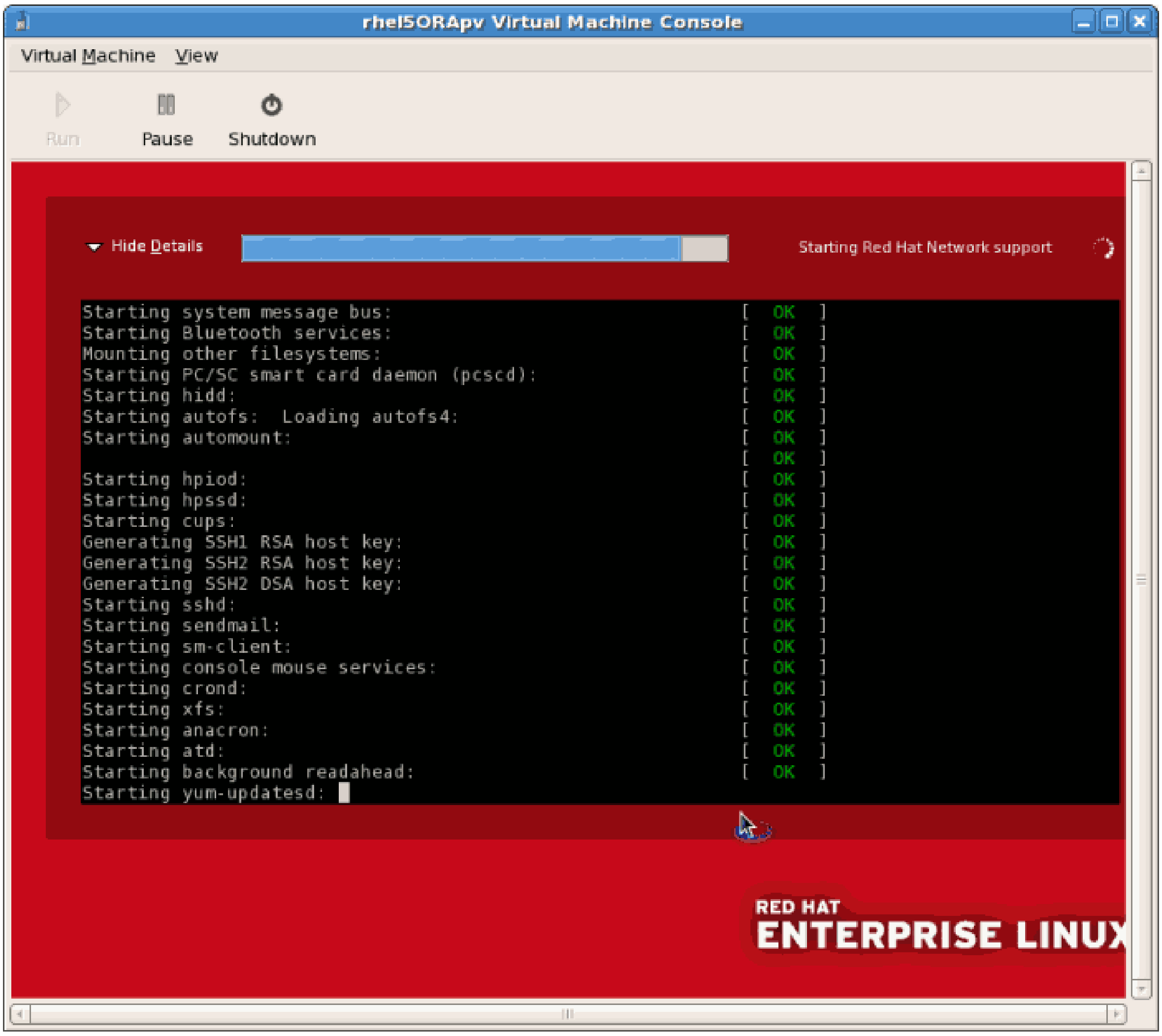
   ```
   virsh reboot rhel5PV
   ```

    `virt-manager`

    VNC

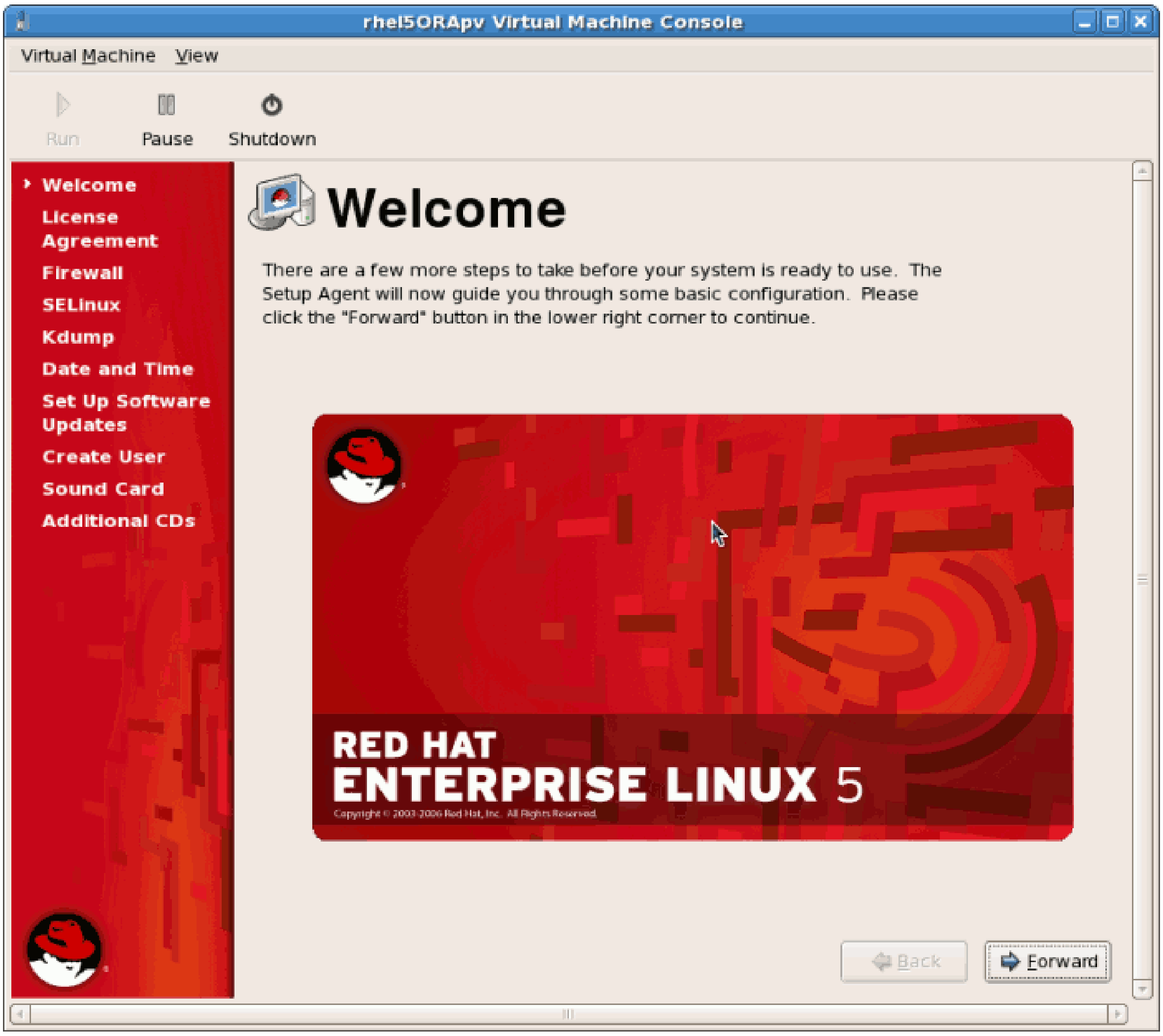


```
Probing IDE interface ide3...
Probing IDE interface ide4...
Probing IDE interface ide5...
ide-floppy driver 0.99.newide
usbcore: registered new driver libusual
usbcore: registered new driver hiddev
usbcore: registered new driver usbhid
drivers/usb/input/hid-core.c: v2.6:USB HID core driver
PNP: No PS/2 controller found. Probing ports directly.
i8042.c: No controller found.
mice: PS/2 mouse device common for all mice
md: md driver 0.90.3 MAX_MD_DEVS=256, MD_SB_DISKS=27
md: bitmap version 4.39
TCP bic registered
Initializing IPsec netlink socket
NET: Registered protocol family 1
NET: Registered protocol family 17
Using IPI No-Shortcut mode
XENBUS: Device with no driver: device/vbd/51712
XENBUS: Device with no driver: device/vif/0
Freeing unused kernel memory: 180k freed
Write protecting the kernel read-only data: 355k
Red Hat nash version 5.1.19.1 starting
USB Universal Host Controller Interface driver v3.0
ohci_hcd: 2005 April 22 USB 1.1 'Open' Host Controller (OHCI) Driver (PCI)
Registering block device major 202
 xvda:<6>device-mapper: ioctl: 4.11.0-ioctl (2006-09-14) initialised: dm-devel@redhat.com
  Reading all physical volumes.  This may take a while...
 xvda1 xvda2
  No volume groups found
  Volume group "VolGroup00" not found
_
```



```
Starting system message bus:                                  [  OK  ]
Starting Bluetooth services:                                  [  OK  ]
Mounting other filesystems:                                   [  OK  ]
Starting PC/SC smart card daemon (pcscd):                     [  OK  ]
Starting hidd:                                                [  OK  ]
Starting autofs:  Loading autofs4:                            [  OK  ]
Starting automount:                                           [  OK  ]
                                                              [  OK  ]
Starting hpiod:                                               [  OK  ]
Starting hpssd:                                               [  OK  ]
Starting cups:                                                [  OK  ]
Generating SSH1 RSA host key:                                 [  OK  ]
Generating SSH2 RSA host key:                                 [  OK  ]
Generating SSH2 DSA host key:                                 [  OK  ]
Starting sshd:                                                [  OK  ]
Starting sendmail:                                            [  OK  ]
Starting sm-client:                                           [  OK  ]
Starting console mouse services:                              [  OK  ]
Starting crond:                                               [  OK  ]
Starting xfs:                                                 [  OK  ]
Starting anacron:                                             [  OK  ]
Starting atd:                                                 [  OK  ]
Starting background readahead:                                [  OK  ]
Starting yum-updatesd: █
```

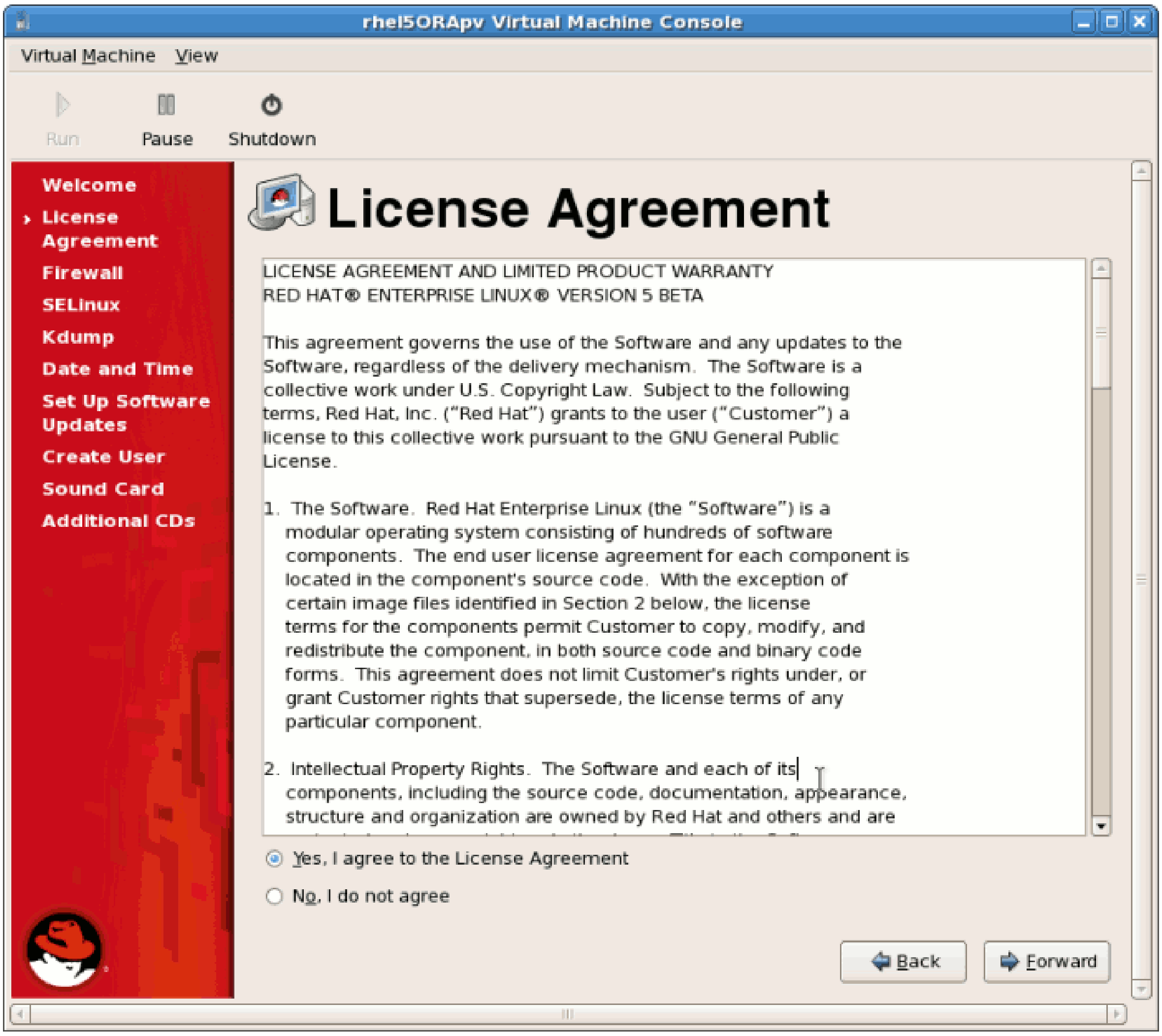
15. □□□□□□□□□□*First Boot*□□□



Welcome

There are a few more steps to take before your system is ready to use. The Setup Agent will now guide you through some basic configuration. Please click the "Forward" button in the lower right corner to continue.

16. □□□□□□□□□□□□□



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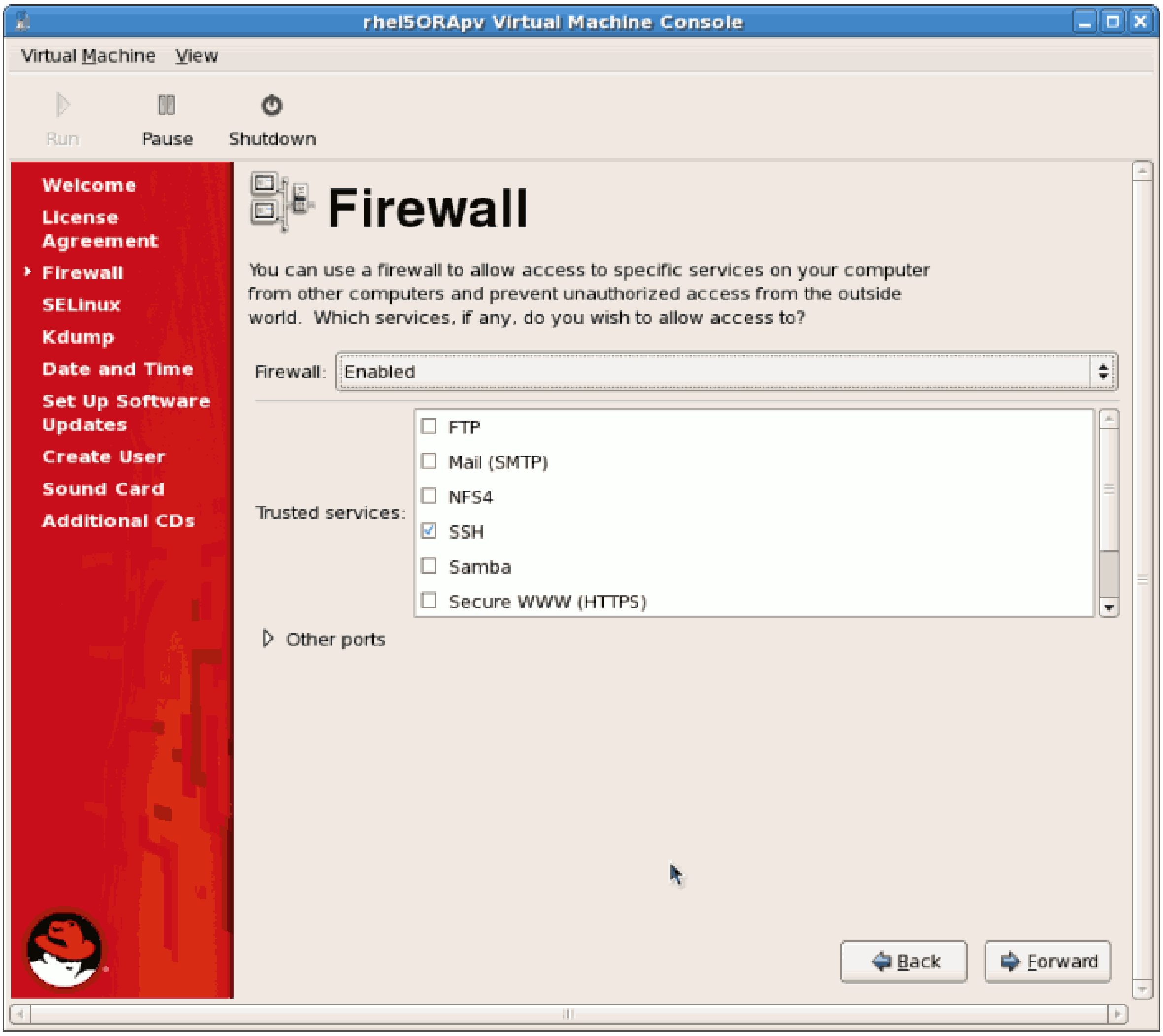
● Yes, I agree to the License Agreement

○ No, I do not agree

□□□□□□□□□□□□□□□□□□□□

17. □□□□□□



Firewall

You can use a firewall to allow access to specific services on your computer from other computers and prevent unauthorized access from the outside world. Which services, if any, do you wish to allow access to?

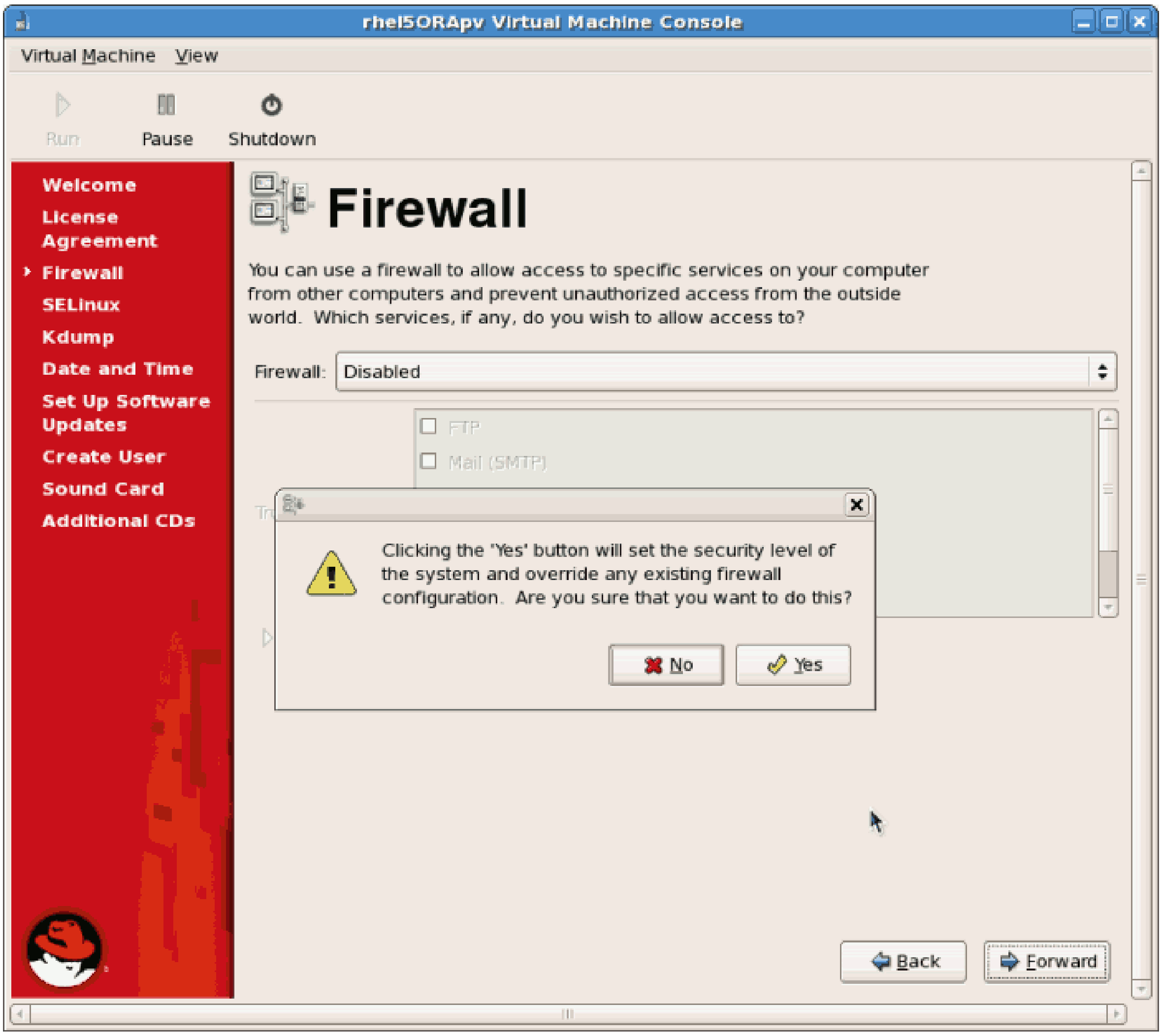
Firewall: Enabled

Trusted services:
□ FTP
□ Mail (SMTP)
□ NFS4
☑ SSH
□ Samba
□ Secure WWW (HTTPS)

▷ Other ports

Click **Forward** to continue.

- ▯▯

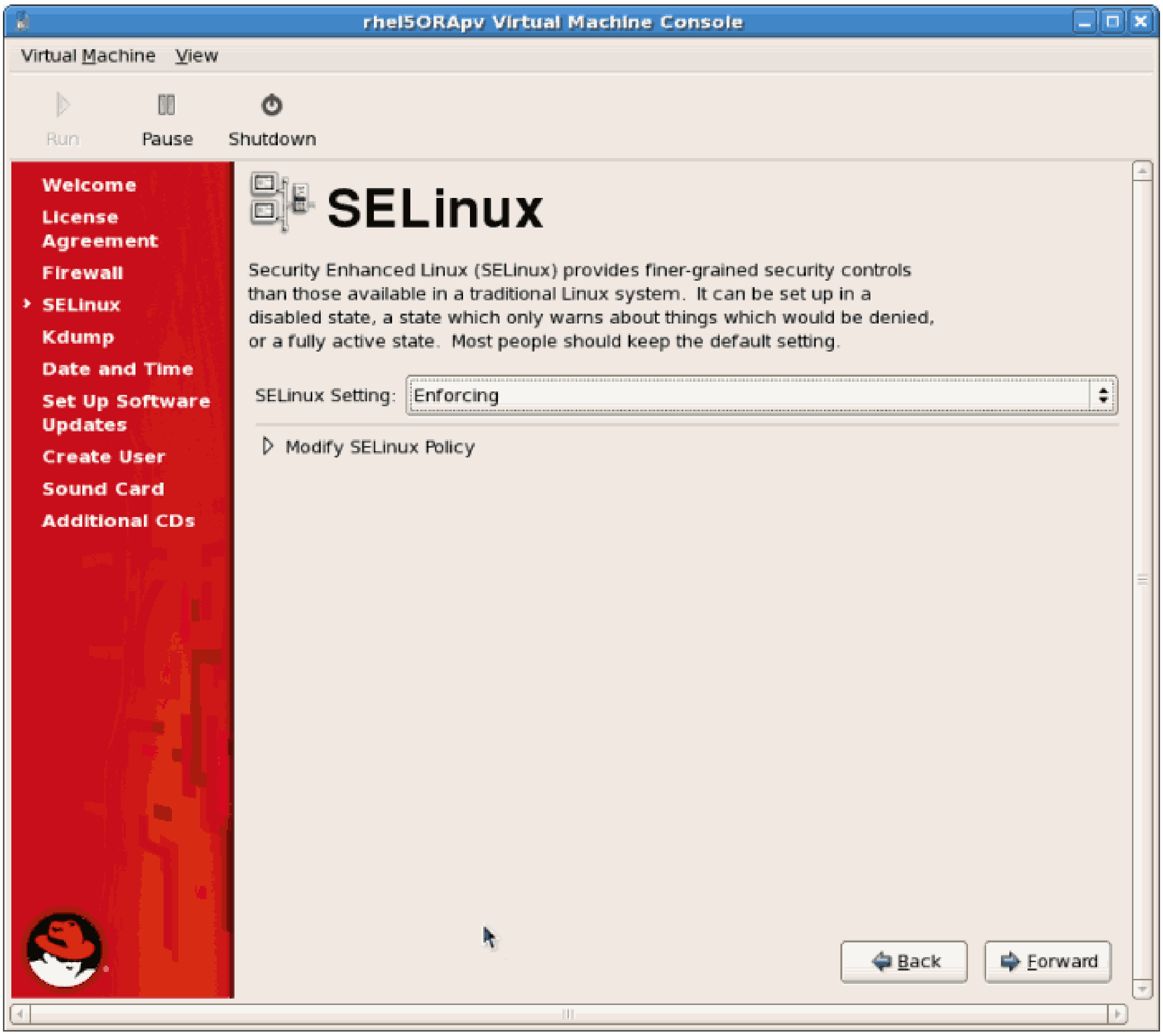


You can use a firewall to allow access to specific services on your computer from other computers and prevent unauthorized access from the outside world. Which services, if any, do you wish to allow access to?

Firewall: Disabled

Clicking the 'Yes' button will set the security level of the system and override any existing firewall configuration. Are you sure that you want to do this?

18. □□ SELinux□□□□□□□□□□ SELinux □□□□□□□□□□□□□□□ SELinux □□□□□□□□□□□□□□□□□□□□



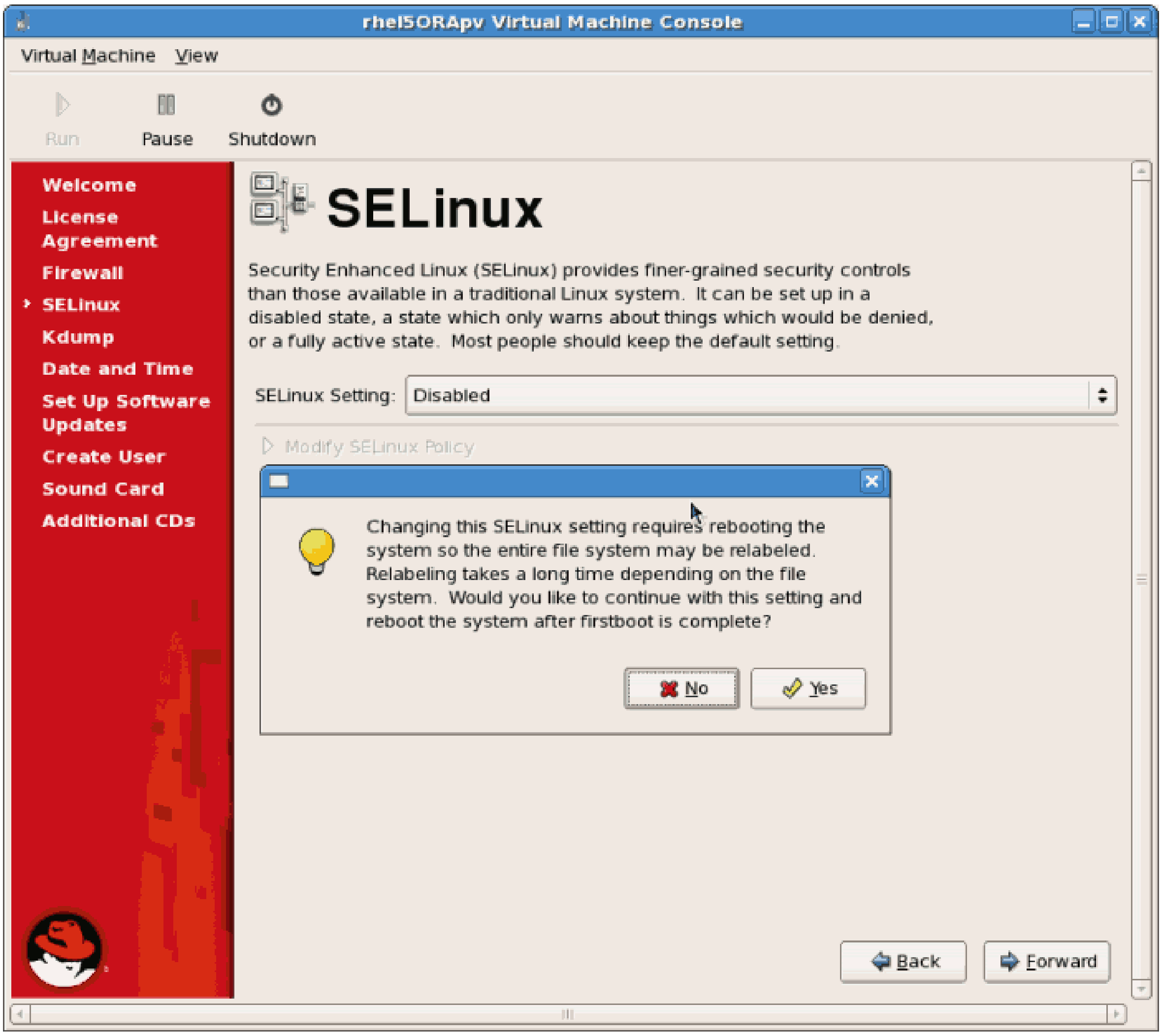
SELinux

Security Enhanced Linux (SELinux) provides finer-grained security controls than those available in a traditional Linux system. It can be set up in a disabled state, a state which only warns about things which would be denied, or a fully active state. Most people should keep the default setting.

SELinux Setting: Enforcing

Click **Forward** to continue.

- SELinux SELinux



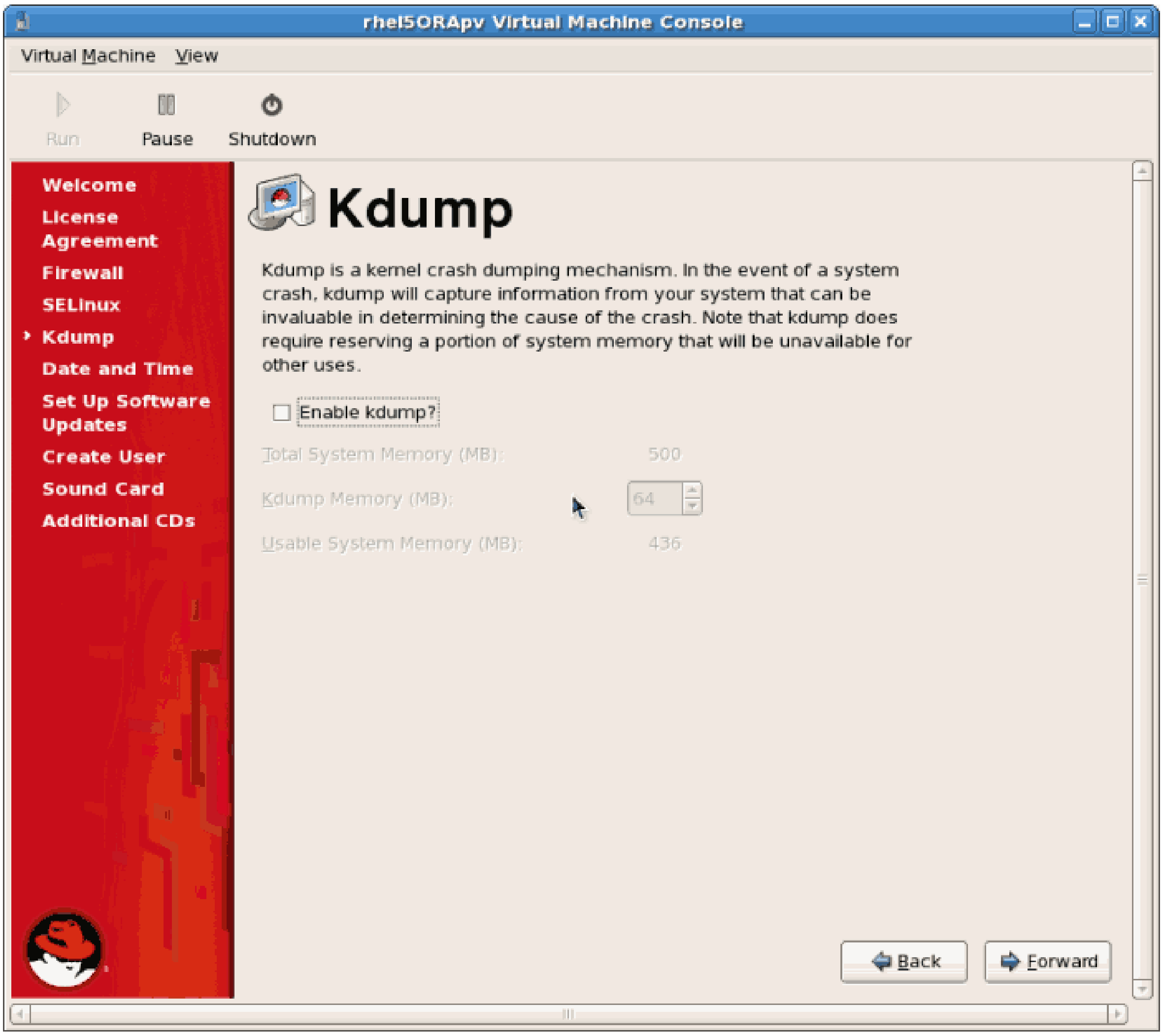
SELinux

Security Enhanced Linux (SELinux) provides finer-grained security controls than those available in a traditional Linux system. It can be set up in a disabled state, a state which only warns about things which would be denied, or a fully active state. Most people should keep the default setting.

SELinux Setting: Disabled

Changing this SELinux setting requires rebooting the system so the entire file system may be relabeled. Relabeling takes a long time depending on the file system. Would you like to continue with this setting and reboot the system after firstboot is complete?

19. ▯▯▯▯▯ **kdump**▯



Kdump

Kdump is a kernel crash dumping mechanism. In the event of a system crash, kdump will capture information from your system that can be invaluable in determining the cause of the crash. Note that kdump does require reserving a portion of system memory that will be unavailable for other uses.

□ Enable kdump?

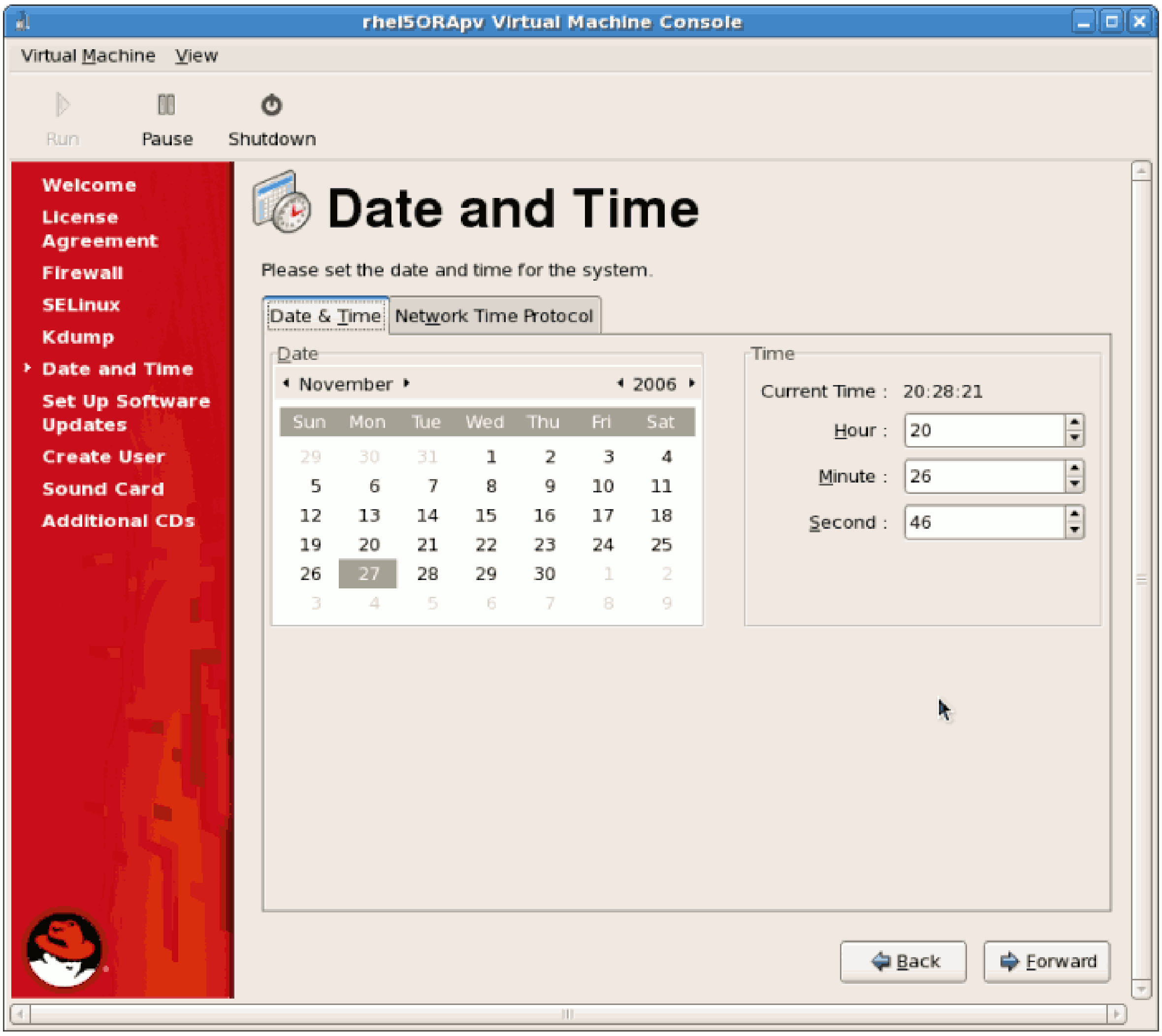
Total System Memory (MB): 500

Kdump Memory (MB): 64

Usable System Memory (MB): 436

Click **Forward** to continue.

20. □□□ hypervisor □□□□□



Date and Time

Please set the date and time for the system.

Date & Time | Network Time Protocol

Date

November 2006

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Time

Current Time : 20:28:21

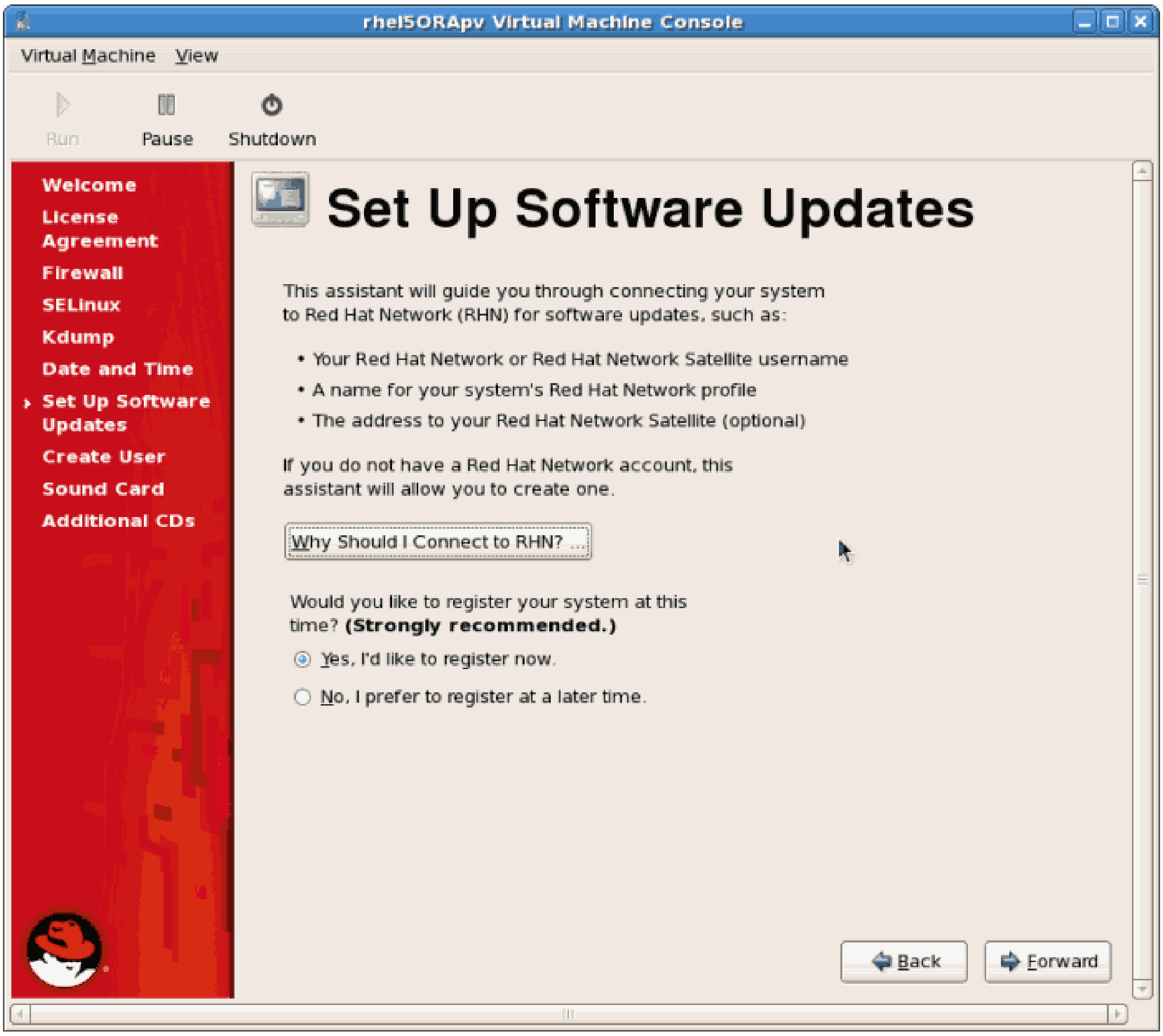
Hour : 20

Minute : 26

Second : 46

Click **Forward** to continue.

21. □□□□□□□□□□□□□ Fedora Network □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ RHN □□



Set Up Software Updates

This assistant will guide you through connecting your system to Red Hat Network (RHN) for software updates, such as:

- Your Red Hat Network or Red Hat Network Satellite username
- A name for your system's Red Hat Network profile
- The address to your Red Hat Network Satellite (optional)

If you do not have a Red Hat Network account, this assistant will allow you to create one.

Why Should I Connect to RHN? ...

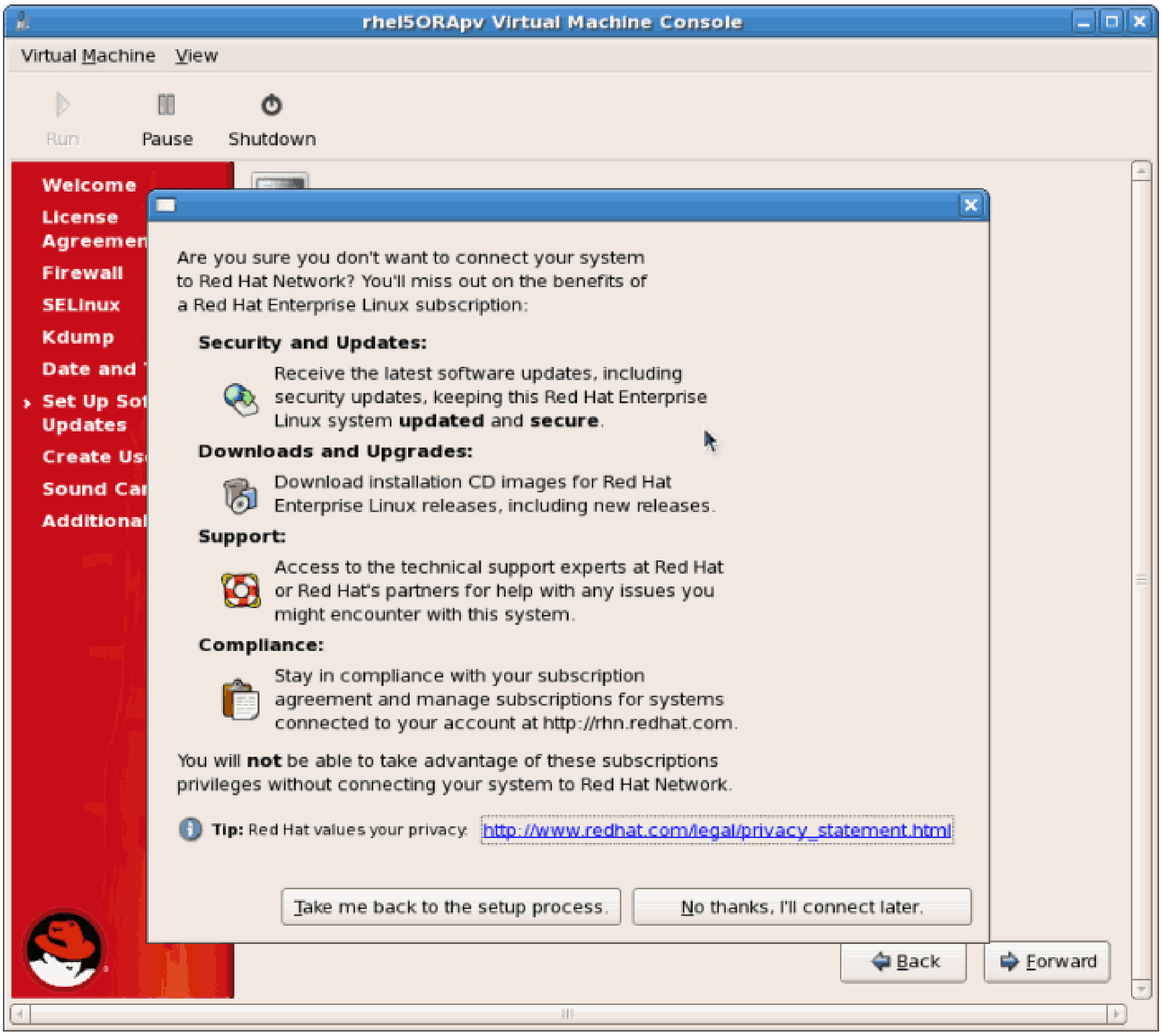
Would you like to register your system at this time? **(Strongly recommended.)**

● Yes, I'd like to register now.

○ No, I prefer to register at a later time.

Click **Forward** to continue.

a. □□□□ RHN □□□□



Are you sure you don't want to connect your system to Red Hat Network? You'll miss out on the benefits of a Red Hat Enterprise Linux subscription:

Security and Updates:

Receive the latest software updates, including security updates, keeping this Red Hat Enterprise Linux system **updated** and **secure**.

Downloads and Upgrades:

Download installation CD images for Red Hat Enterprise Linux releases, including new releases.

Support:

Access to the technical support experts at Red Hat or Red Hat's partners for help with any issues you might encounter with this system.

Compliance:

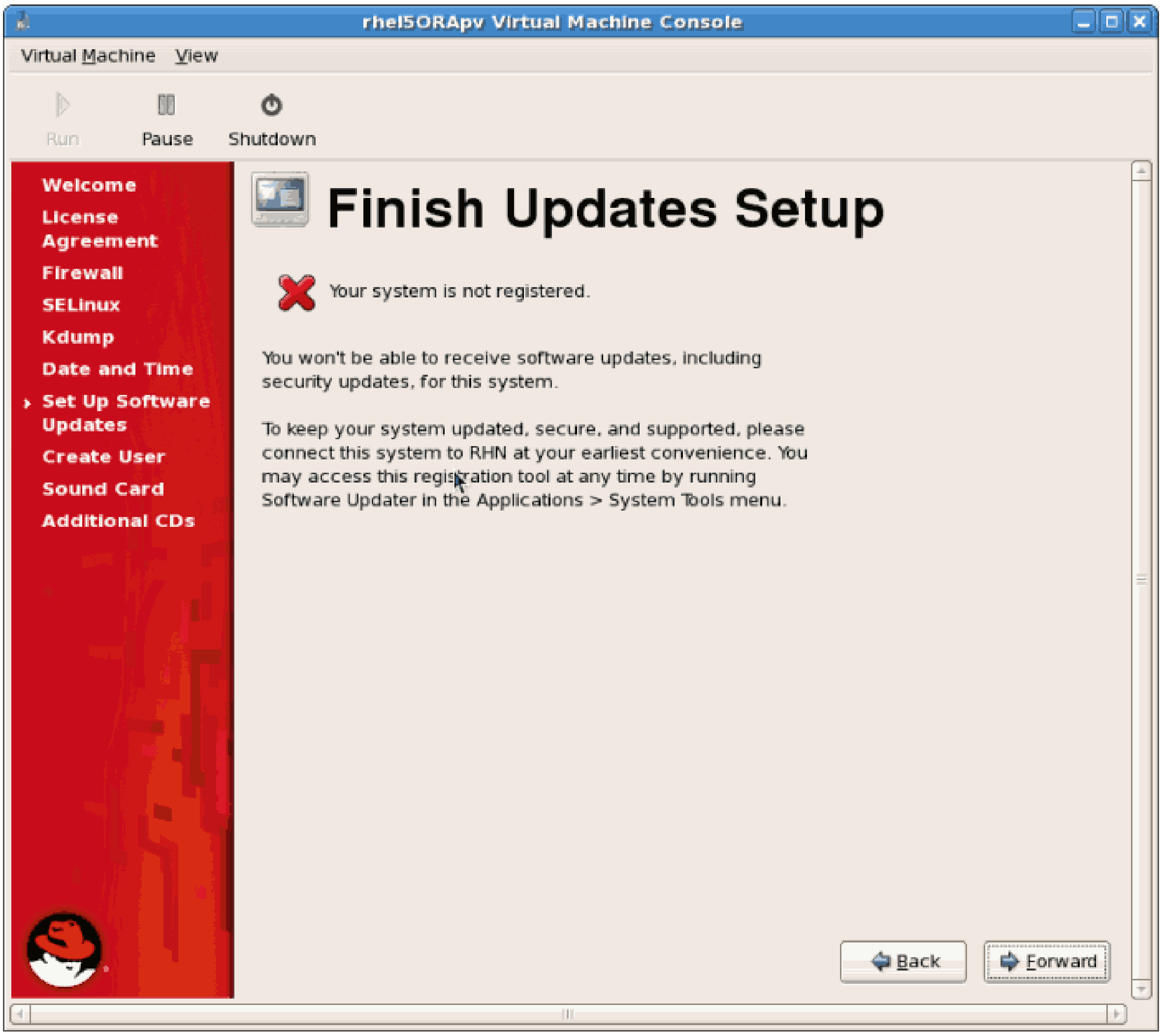
Stay in compliance with your subscription agreement and manage subscriptions for systems connected to your account at http://rhn.redhat.com.

You will **not** be able to take advantage of these subscriptions privileges without connecting your system to Red Hat Network.

Tip: Red Hat values your privacy: http://www.redhat.com/legal/privacy_statement.html

Take me back to the setup process.
No thanks, I'll connect later.

b. □□□□□□□□□□□□□□ RHN □□□□□□□□□□□□□□□□□□□□□□□□□□□□□



Finish Updates Setup

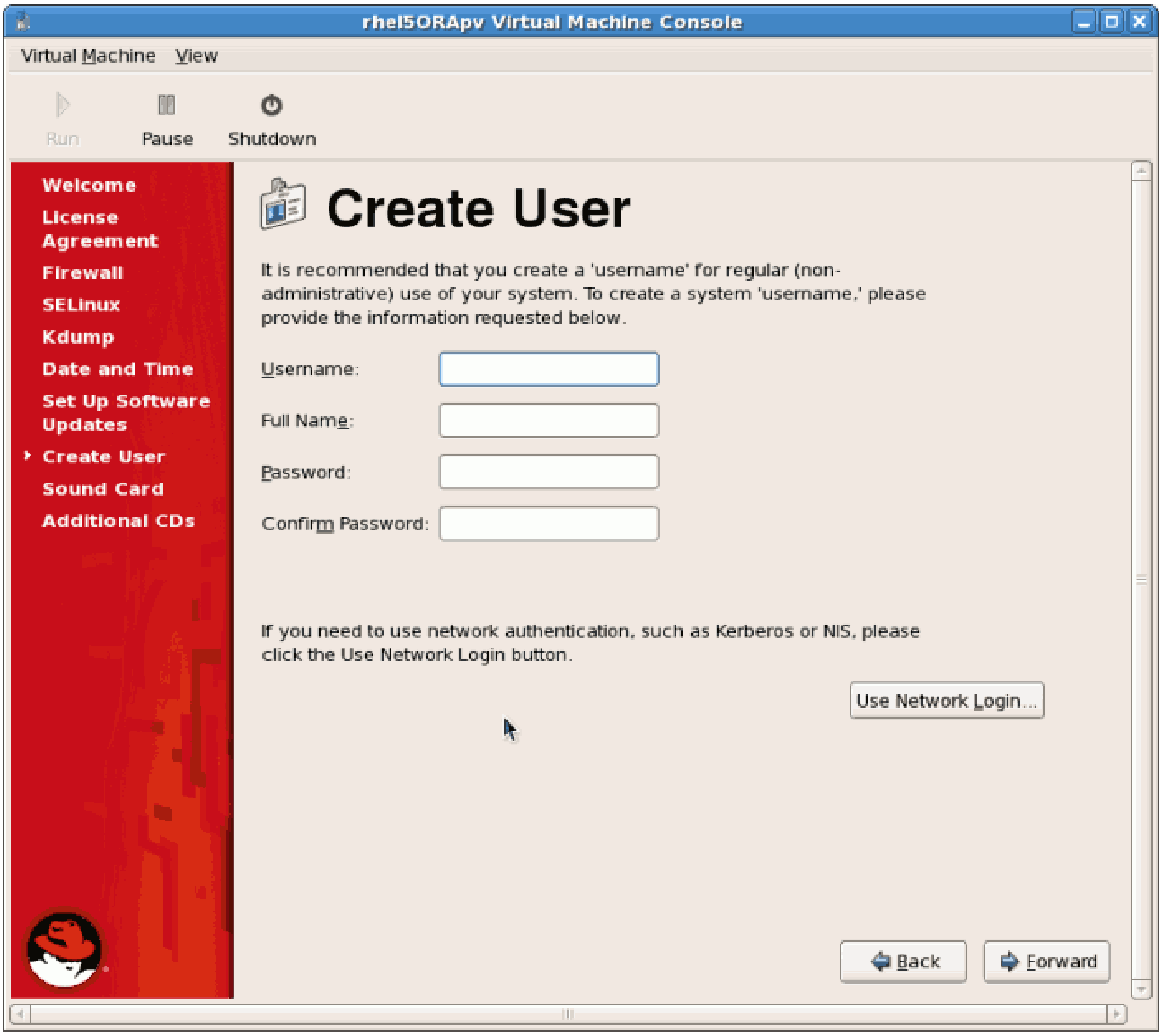
Your system is not registered.

You won't be able to receive software updates, including security updates, for this system.

To keep your system updated, secure, and supported, please connect this system to RHN at your earliest convenience. You may access this registration tool at any time by running Software Updater in the Applications > System Tools menu.

□□□□□□□□□□□□

22. □□□□□ root □□□□□□□□□□□□□□□□□□ root □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□



Create User

It is recommended that you create a 'username' for regular (non-administrative) use of your system. To create a system 'username,' please provide the information requested below.

Username:

Full Name:

Password:

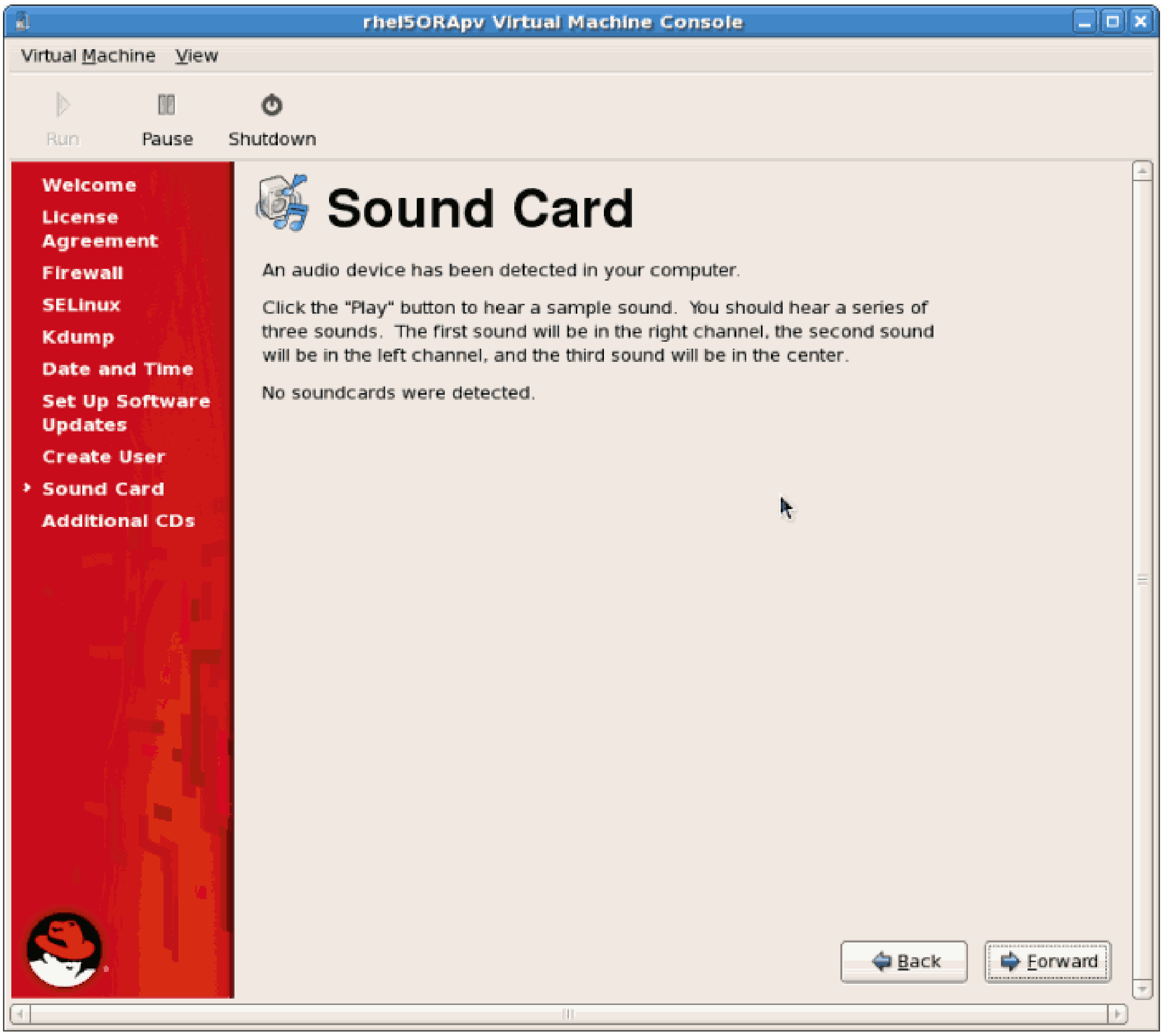
Confirm Password:

If you need to use network authentication, such as Kerberos or NIS, please click the Use Network Login button.

[illegible]

23. [illegible]

]



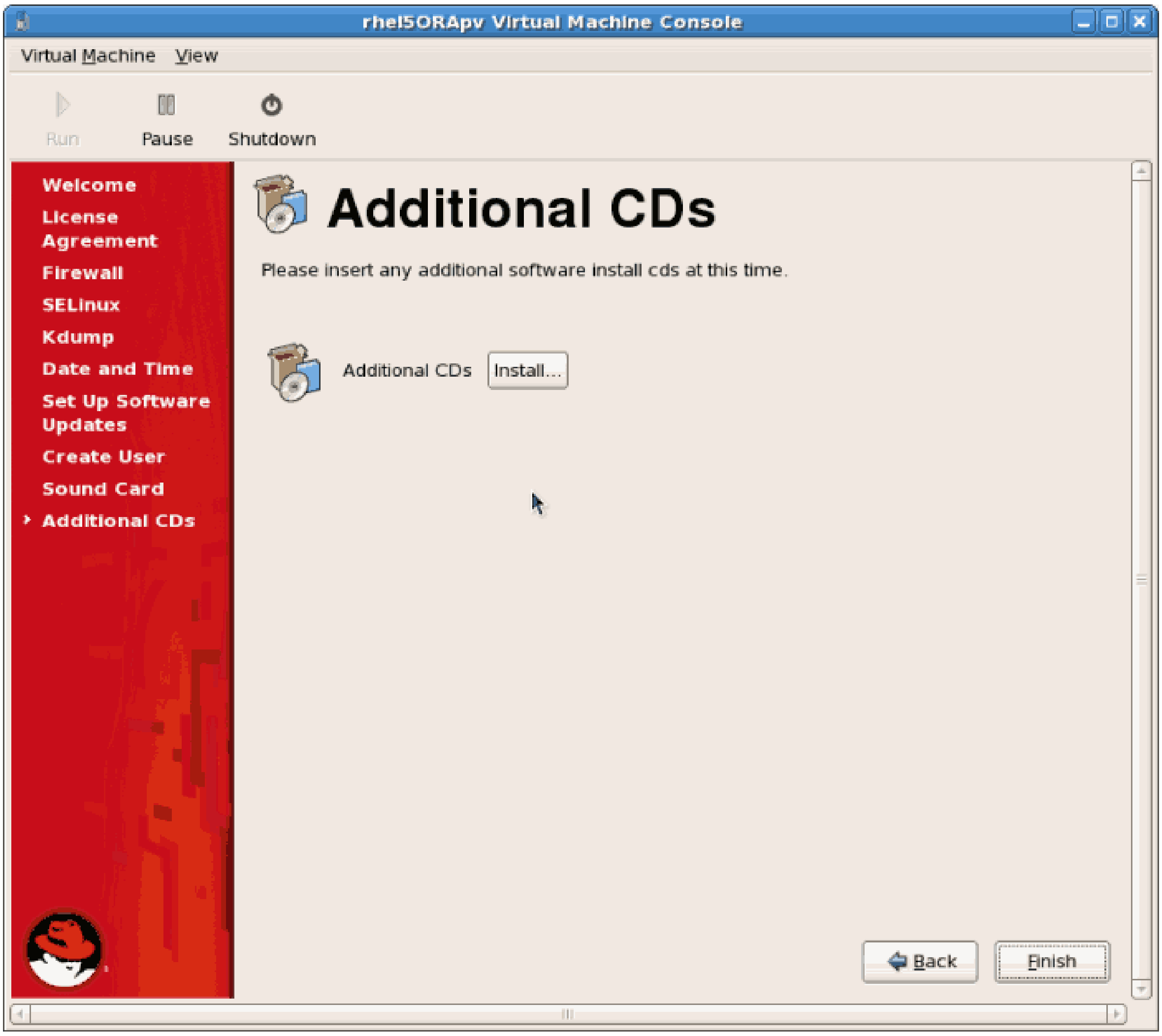
Sound Card

An audio device has been detected in your computer.

Click the "Play" button to hear a sample sound. You should hear a series of three sounds. The first sound will be in the right channel, the second sound will be in the left channel, and the third sound will be in the center.

No soundcards were detected.

24. □□ **yum** □□□□□□□□□□□□□□□□□□

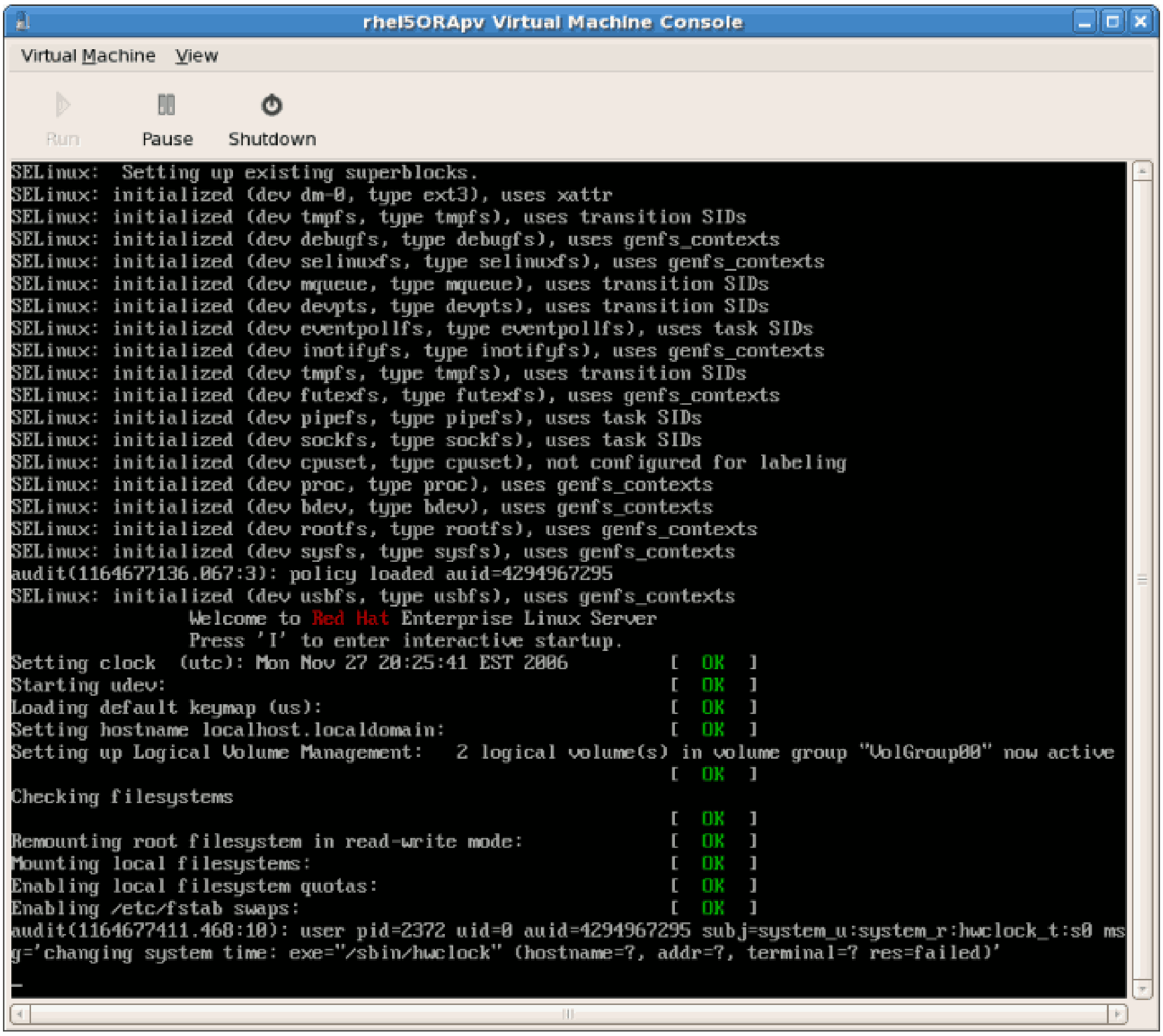


Additional CDs

Please insert any additional software install cds at this time.

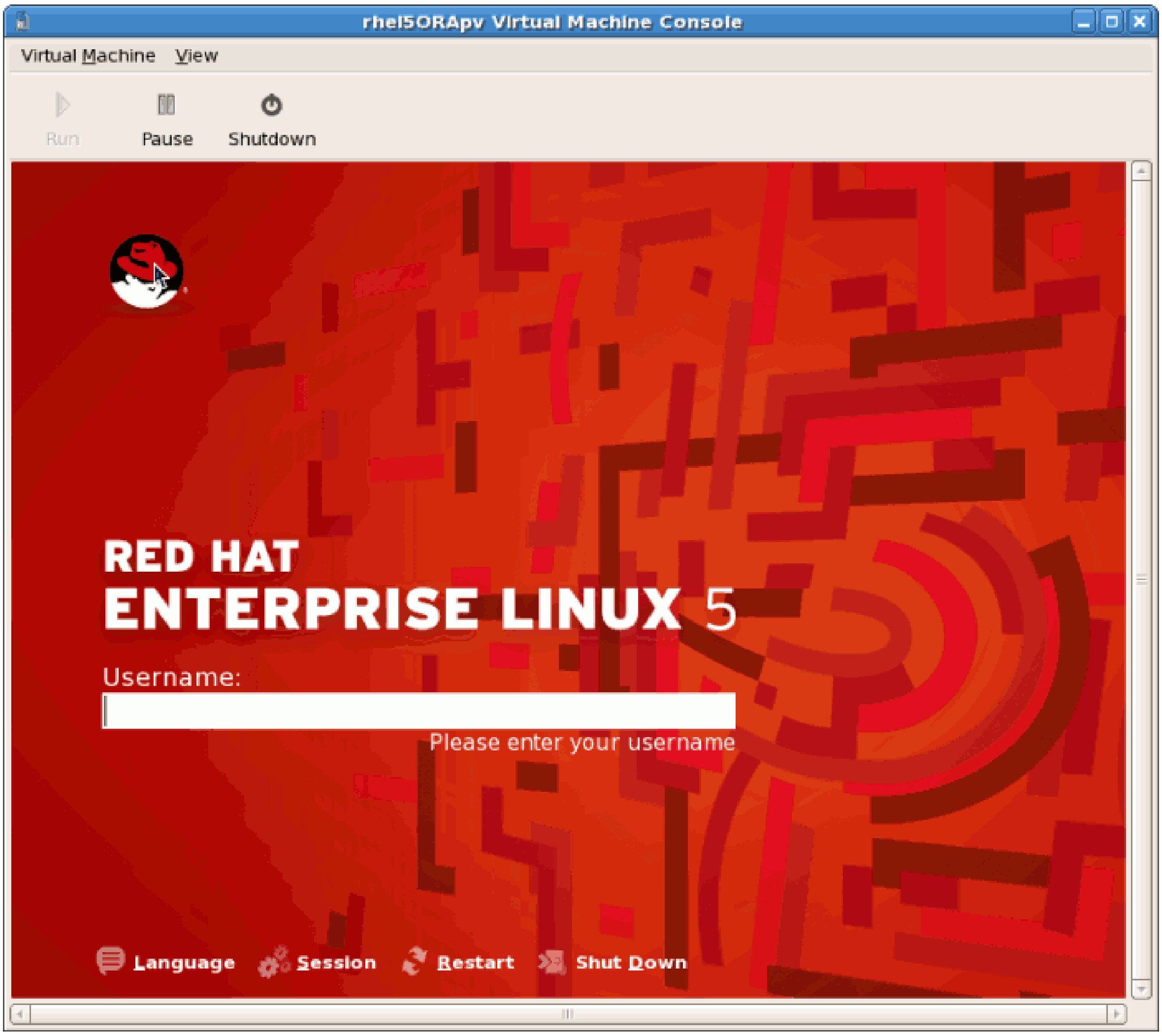
Additional CDs Install...

25. □□□□□□□□□□□□□□□□□□□□□□□□□□□□



```
SELinux:  Setting up existing superblocks.
SELinux: initialized (dev dm-0, type ext3), uses xattr
SELinux: initialized (dev tmpfs, type tmpfs), uses transition SIDs
SELinux: initialized (dev debugfs, type debugfs), uses genfs_contexts
SELinux: initialized (dev selinuxfs, type selinuxfs), uses genfs_contexts
SELinux: initialized (dev mqueue, type mqueue), uses transition SIDs
SELinux: initialized (dev devpts, type devpts), uses transition SIDs
SELinux: initialized (dev eventpollfs, type eventpollfs), uses task SIDs
SELinux: initialized (dev inotifyfs, type inotifyfs), uses genfs_contexts
SELinux: initialized (dev tmpfs, type tmpfs), uses transition SIDs
SELinux: initialized (dev futexfs, type futexfs), uses genfs_contexts
SELinux: initialized (dev pipefs, type pipefs), uses task SIDs
SELinux: initialized (dev sockfs, type sockfs), uses task SIDs
SELinux: initialized (dev cpuset, type cpuset), not configured for labeling
SELinux: initialized (dev proc, type proc), uses genfs_contexts
SELinux: initialized (dev bdev, type bdev), uses genfs_contexts
SELinux: initialized (dev rootfs, type rootfs), uses genfs_contexts
SELinux: initialized (dev sysfs, type sysfs), uses genfs_contexts
audit(1164677136.067:3): policy loaded auid=4294967295
SELinux: initialized (dev usbfs, type usbfs), uses genfs_contexts
                Welcome to Red Hat Enterprise Linux Server
                Press 'I' to enter interactive startup.
Setting clock  (utc): Mon Nov 27 20:25:41 EST 2006         [  OK  ]
Starting udev:                                             [  OK  ]
Loading default keymap (us):                               [  OK  ]
Setting hostname localhost.localdomain:                    [  OK  ]
Setting up Logical Volume Management:   2 logical volume(s) in volume group "VolGroup00" now active
                                                           [  OK  ]
Checking filesystems
                                                           [  OK  ]
Remounting root filesystem in read-write mode:             [  OK  ]
Mounting local filesystems:                                [  OK  ]
Enabling local filesystem quotas:                          [  OK  ]
Enabling /etc/fstab swaps:                                 [  OK  ]
audit(1164677411.468:10): user pid=2372 uid=0 auid=4294967295 subj=system_u:system_r:hwclock_t:s0 ms
g='changing system time: exe="/sbin/hwclock" (hostname=?, addr=?, terminal=? res=failed)'
_
```

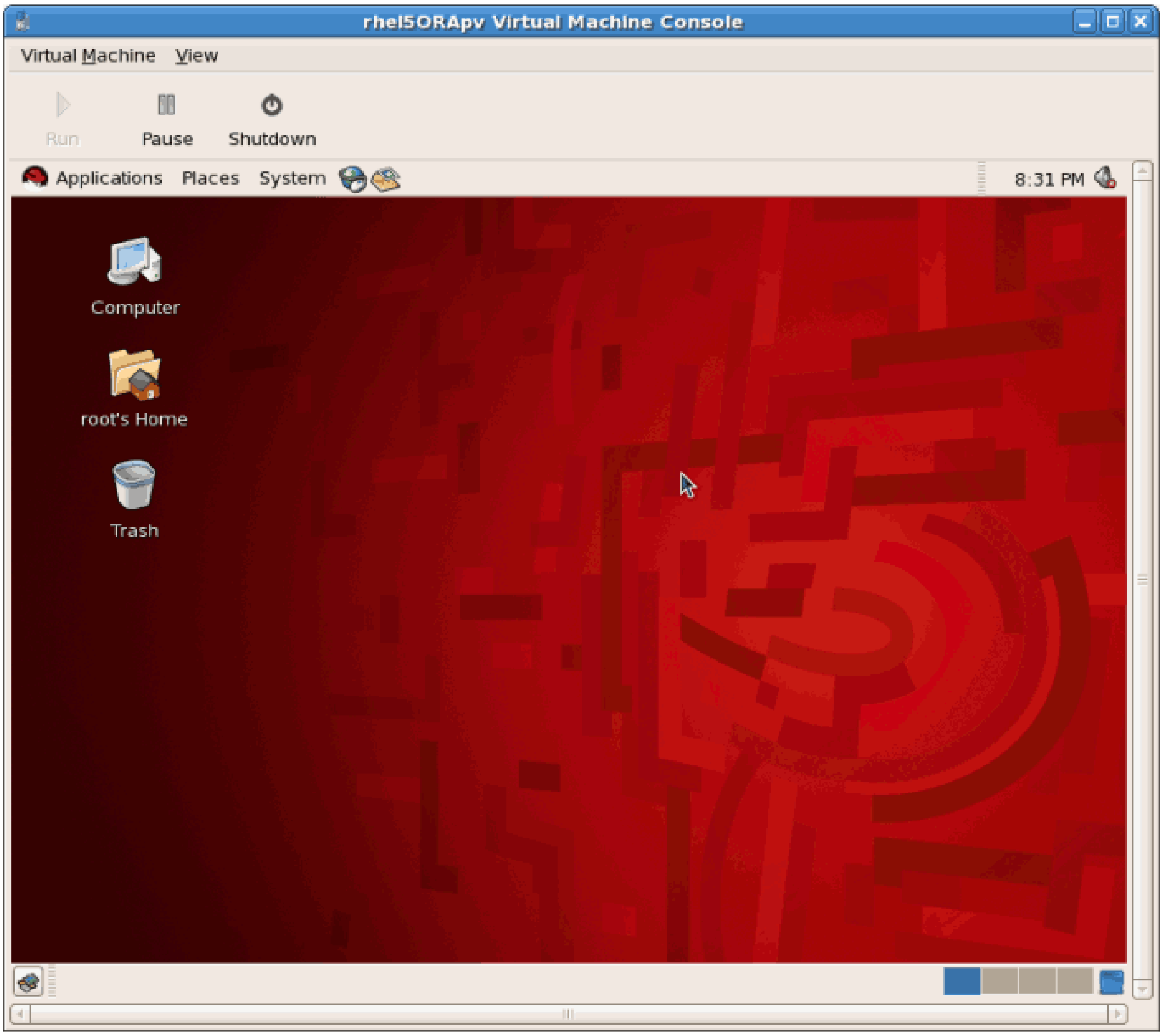
26. Red Hat Enterprise Linux 5 [illegible]



Username:

Please enter your username

27. □□□□□□□□□□□□□□□□□□ Red Hat Enterprise Linux 5 □□□□□



3.2. □ Red Hat Enterprise Linux 5 □□□□□□□□□□□□

□□□□□□□□□□□□□□□□ Red Hat Enterprise Linux 5 □□□□

□□ 3.3. □□□ virt-manager □□□□□□□□□□□ Red Hat Enterprise Linux 5 □□□

1. **Open virt-manager**

   Start **`virt-manager`**. Launch the **Virtual Machine Manager** application from the **Applications** menu and **System Tools** submenu. Alternatively, run the **`virt-manager`** command as root.

2. **Select the hypervisor**

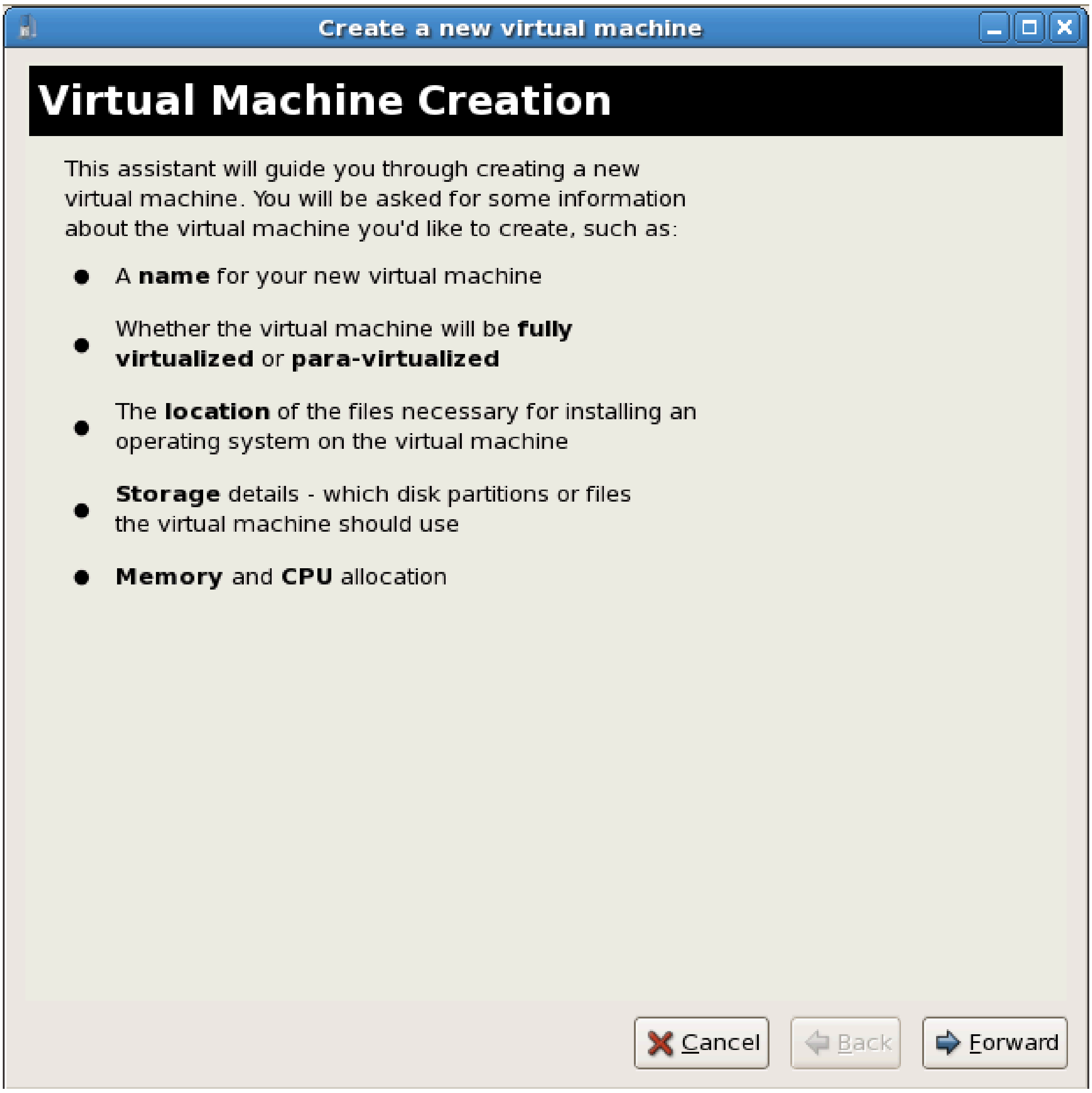
   Select the hypervisor. If installed, select Xen or KVM. For this example, select KVM. Note that presently KVM is named `qemu`.

   □□□□□□ hypervisor □□□□□□□□□□□□□□□□□□□□□□□□□□**...**□□□□□□□□□ *□ 16.1, “□□□□□□”*□

   □□□□□ hypervisor □□□□□□□□□□□□□□□□□□□□□□□□□□□□□

3. **Start the new virtual machine wizard**

   Pressing the **New** button starts the virtual machine creation wizard.



Create a new virtual machine

Virtual Machine Creation

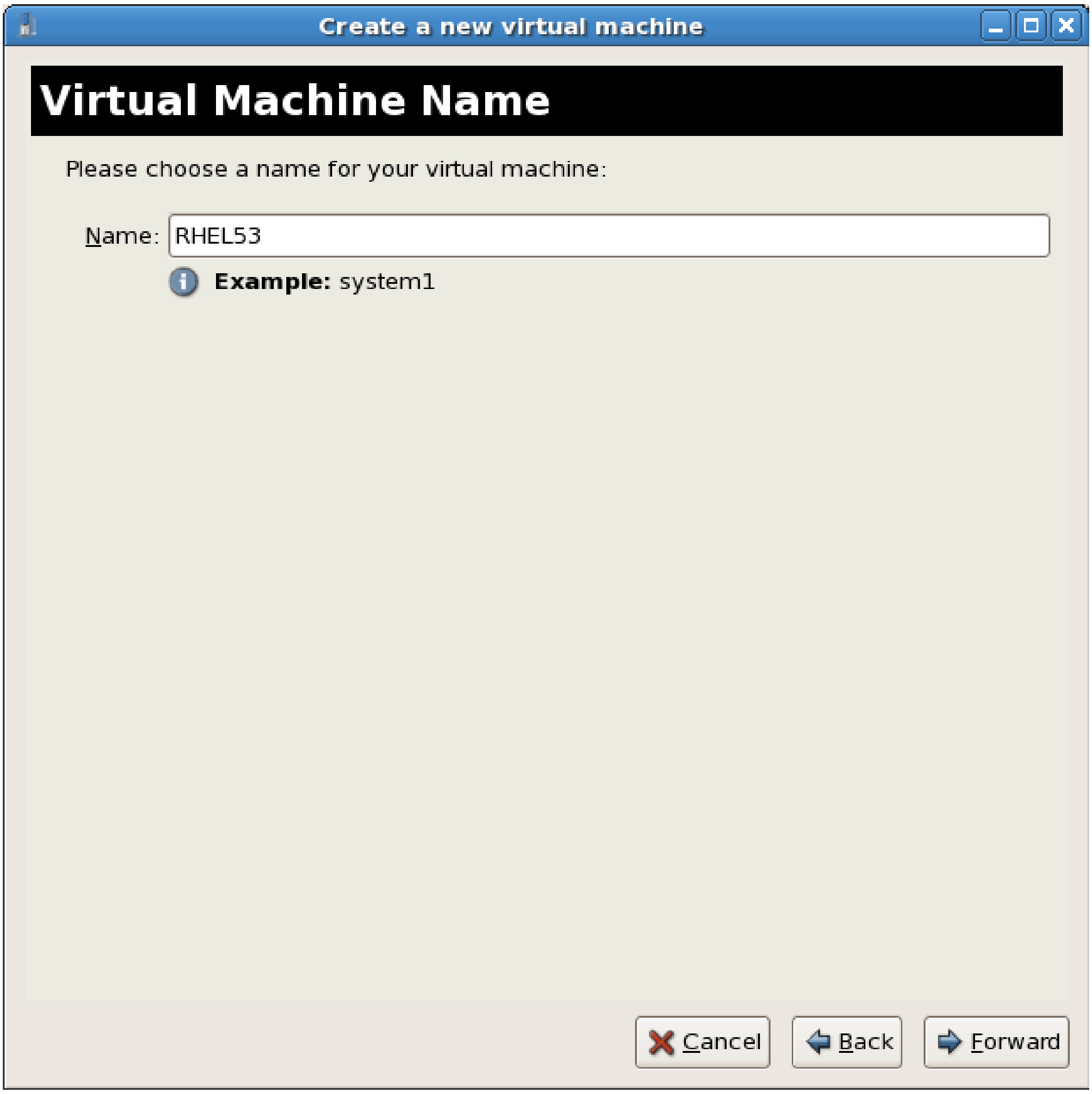
This assistant will guide you through creating a new virtual machine. You will be asked for some information about the virtual machine you'd like to create, such as:

- A **name** for your new virtual machine
- Whether the virtual machine will be **fully virtualized** or **para-virtualized**
- The **location** of the files necessary for installing an operating system on the virtual machine
- **Storage** details - which disk partitions or files the virtual machine should use
- **Memory** and **CPU** allocation

Press **Forward** to continue.

4. **Name the virtual machine**

   □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□



Virtual Machine Name

Please choose a name for your virtual machine:

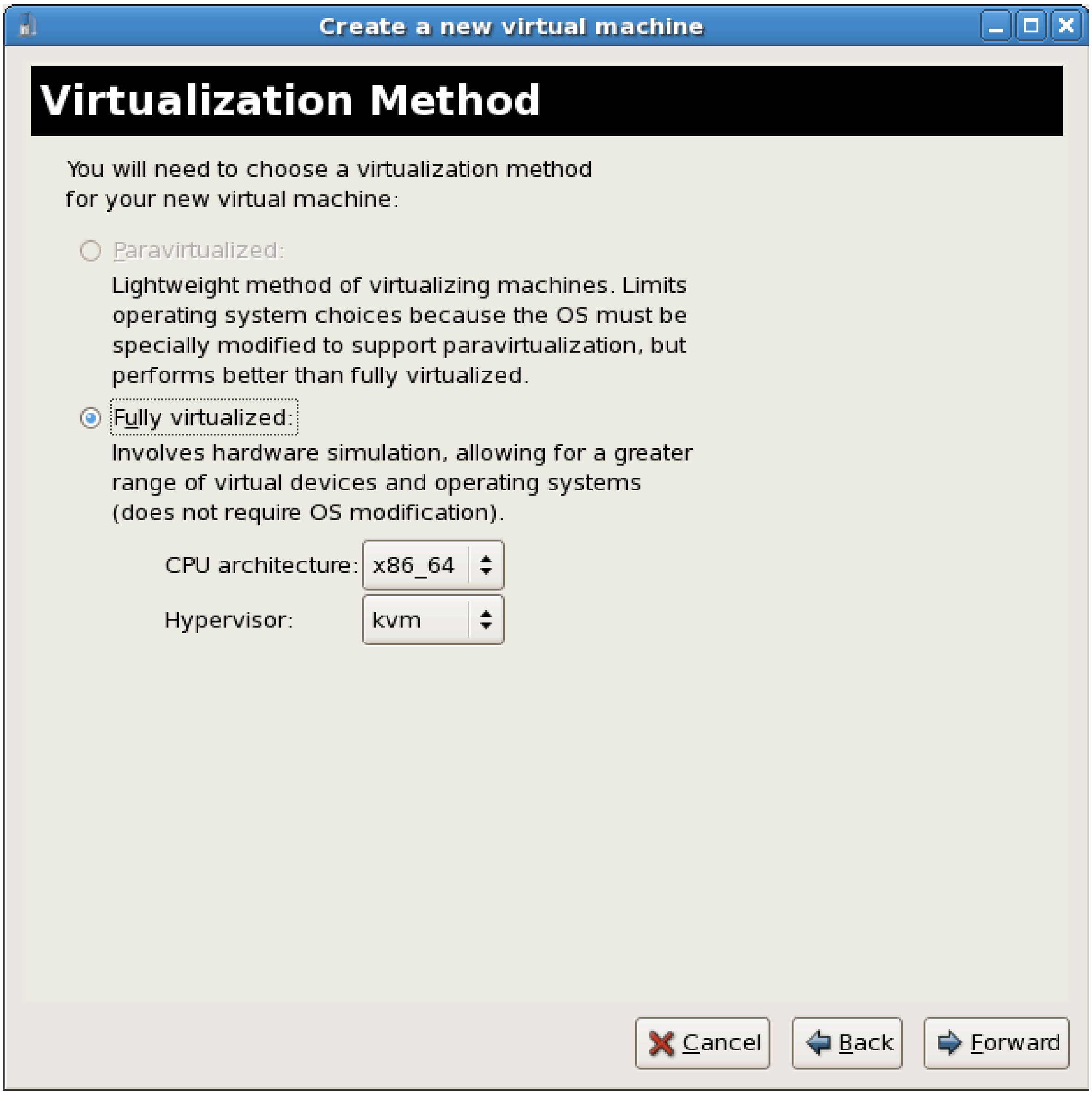
Name: RHEL53

Example: system1

□□□□□□□□□□□□□□

5. **Choose a virtualization method**

   □□ KVM □ Xen □□□*□□ 4*□□□□□□□□□□□□□ hypervisor□□□□□□□ KVM hypervisor□



Virtualization Method

You will need to choose a virtualization method for your new virtual machine:

○ Paravirtualized:
Lightweight method of virtualizing machines. Limits operating system choices because the OS must be specially modified to support paravirtualization, but performs better than fully virtualized.

● Fully virtualized:
Involves hardware simulation, allowing for a greater range of virtual devices and operating systems (does not require OS modification).

CPU architecture: x86_64

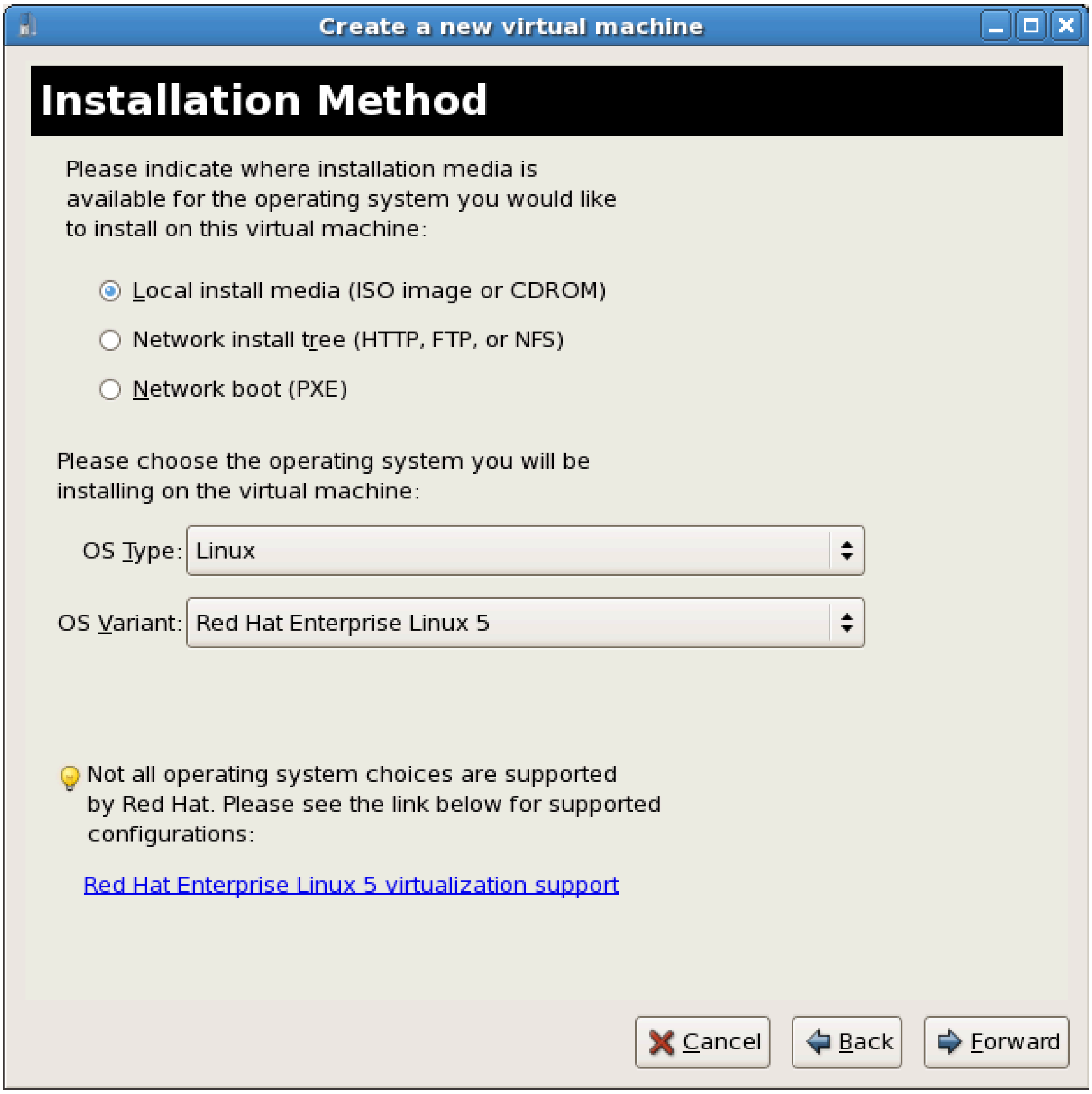
Hypervisor: kvm

[illegible]

6. **Select the installation method**

   [illegible]**Local install media**[illegible] ISO [illegible]**Network install tree**[illegible] HTTP[illegible]FTP [illegible] NFS [illegible]**Network boot**[illegible] PXE [illegible]

   [illegible]**Linux**[illegible]**Red Hat Enterprise Linux 5**[illegible]



Create a new virtual machine

Installation Method

Please indicate where installation media is available for the operating system you would like to install on this virtual machine:

● Local install media (ISO image or CDROM)

○ Network install tree (HTTP, FTP, or NFS)

○ Network boot (PXE)

Please choose the operating system you will be installing on the virtual machine:

OS Type: Linux

OS Variant: Red Hat Enterprise Linux 5

Not all operating system choices are supported by Red Hat. Please see the link below for supported configurations:

Red Hat Enterprise Linux 5 virtualization support

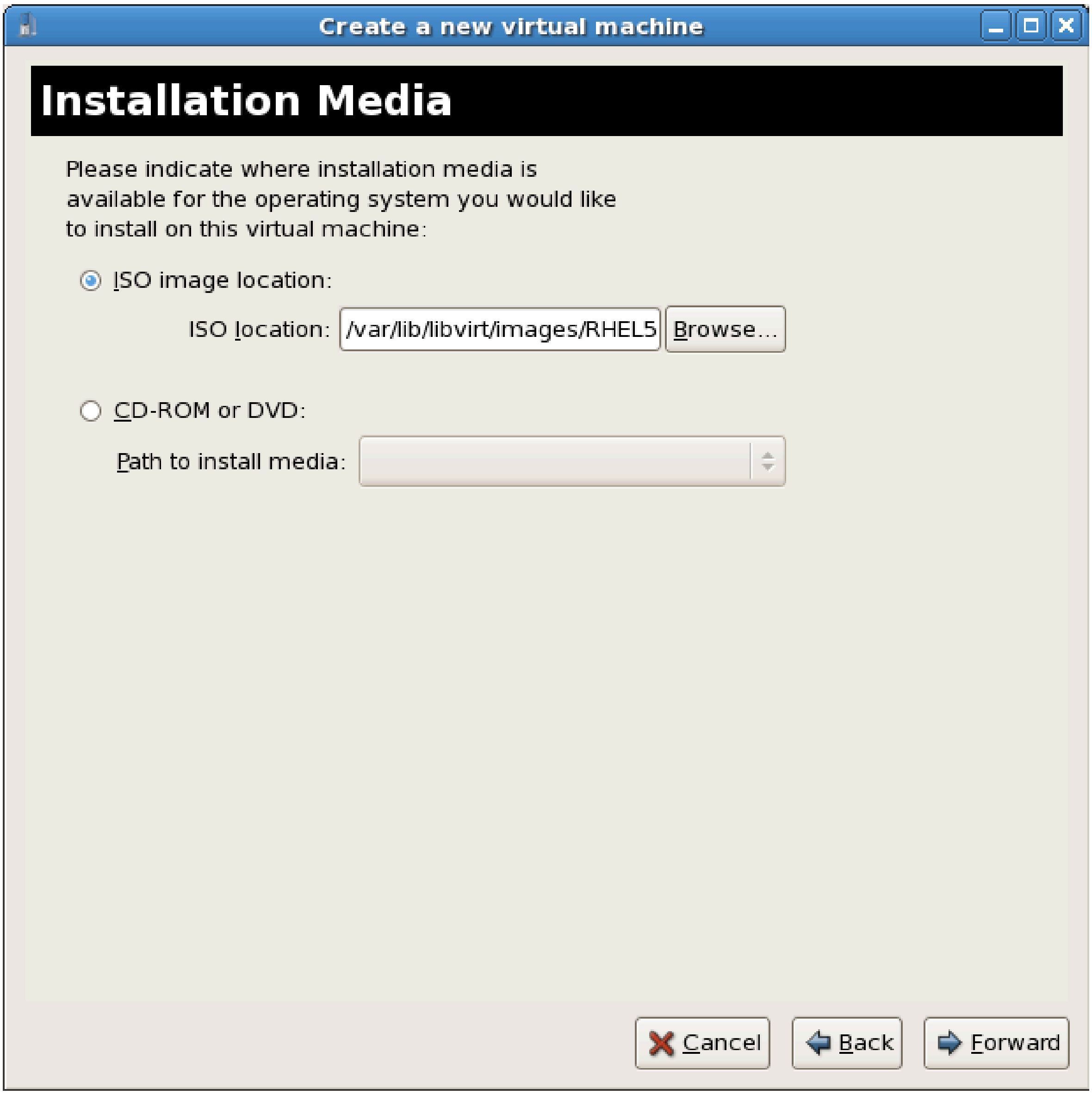
□□□□□□□□□□□□□□□□

7. **Locate installation media**
   □□ ISO □□□□□□□ CD/DVD □□□□□□□□□□□□□□□ Red Hat Enterprise Linux 5 □□ DVD □ ISO □□□□

   a. Press the **Browse** button.

   b. □□□ ISO □□□□□□□□□ ISO □□□□□□□□□□□□□□□□□□□□

   c. □□□□□□□□□□□□□□□□□□□



Create a new virtual machine

Installation Media

Please indicate where installation media is available for the operating system you would like to install on this virtual machine:

● ISO image location:

ISO location: /var/lib/libvirt/images/RHEL5 Browse...

○ CD-ROM or DVD:

Path to install media:

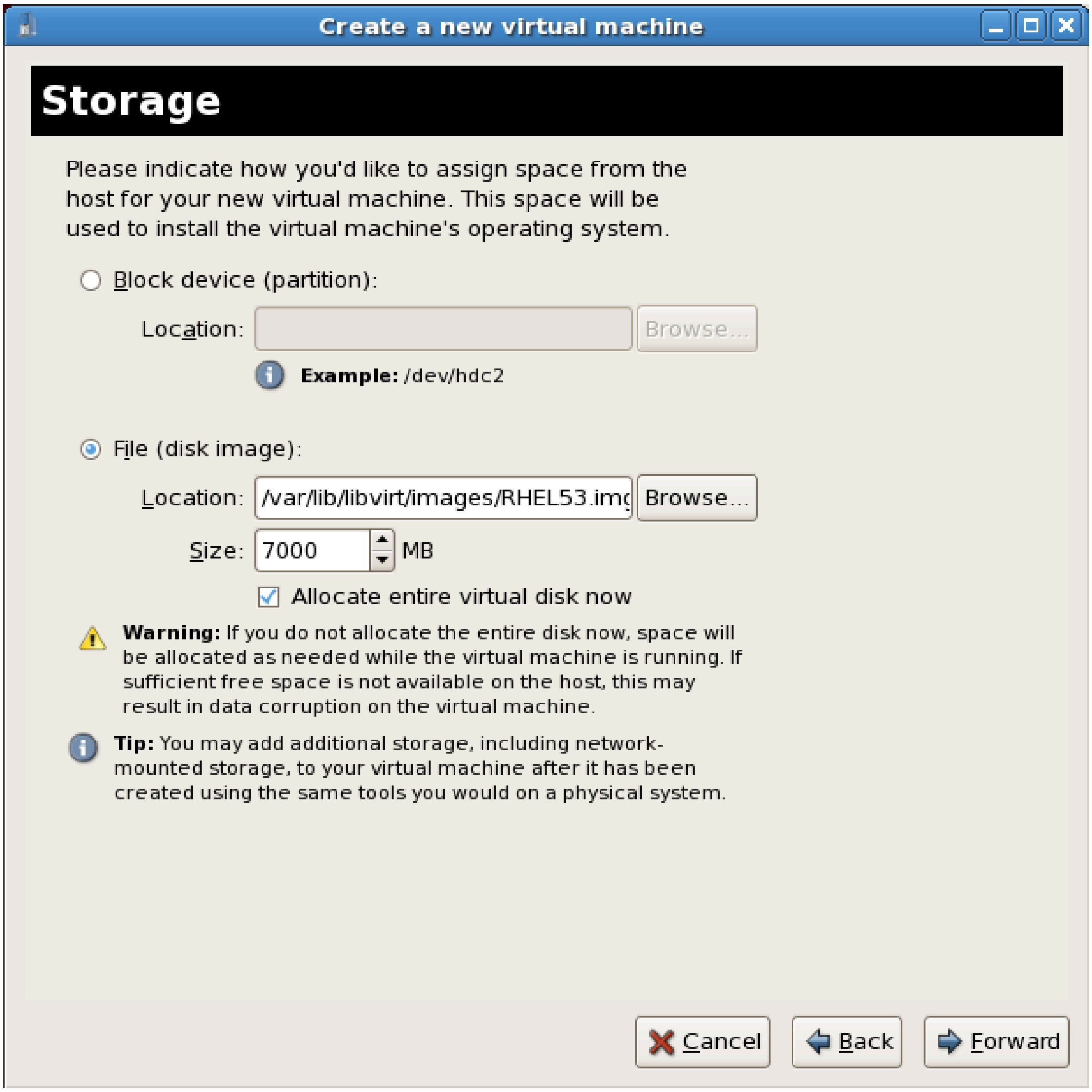
□□□□□□□□□□□□□□

Image files and SELinux

□□□ ISO □□□□□□□□□□□□□□□□□□□□ `/var/lib/libvirt/images/` □□□□□□□□□□□□□□□□□□□ SELinux □□□□□ □□□□□ □ *7.1, “SELinux □□□□”*□

8. **Storage setup**

   □□ `/var/lib/libvirt/images/` □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□□□□□□□□□□



Create a new virtual machine

Storage

Please indicate how you'd like to assign space from the host for your new virtual machine. This space will be used to install the virtual machine's operating system.

○ Block device (partition):

Location: Browse...

Example: /dev/hdc2

● File (disk image):

Location: /var/lib/libvirt/images/RHEL53.im(Browse...

Size: 7000 MB

☑ Allocate entire virtual disk now

Warning: If you do not allocate the entire disk now, space will be allocated as needed while the virtual machine is running. If sufficient free space is not available on the host, this may result in data corruption on the virtual machine.

Tip: You may add additional storage, including network-mounted storage, to your virtual machine after it has been created using the same tools you would on a physical system.

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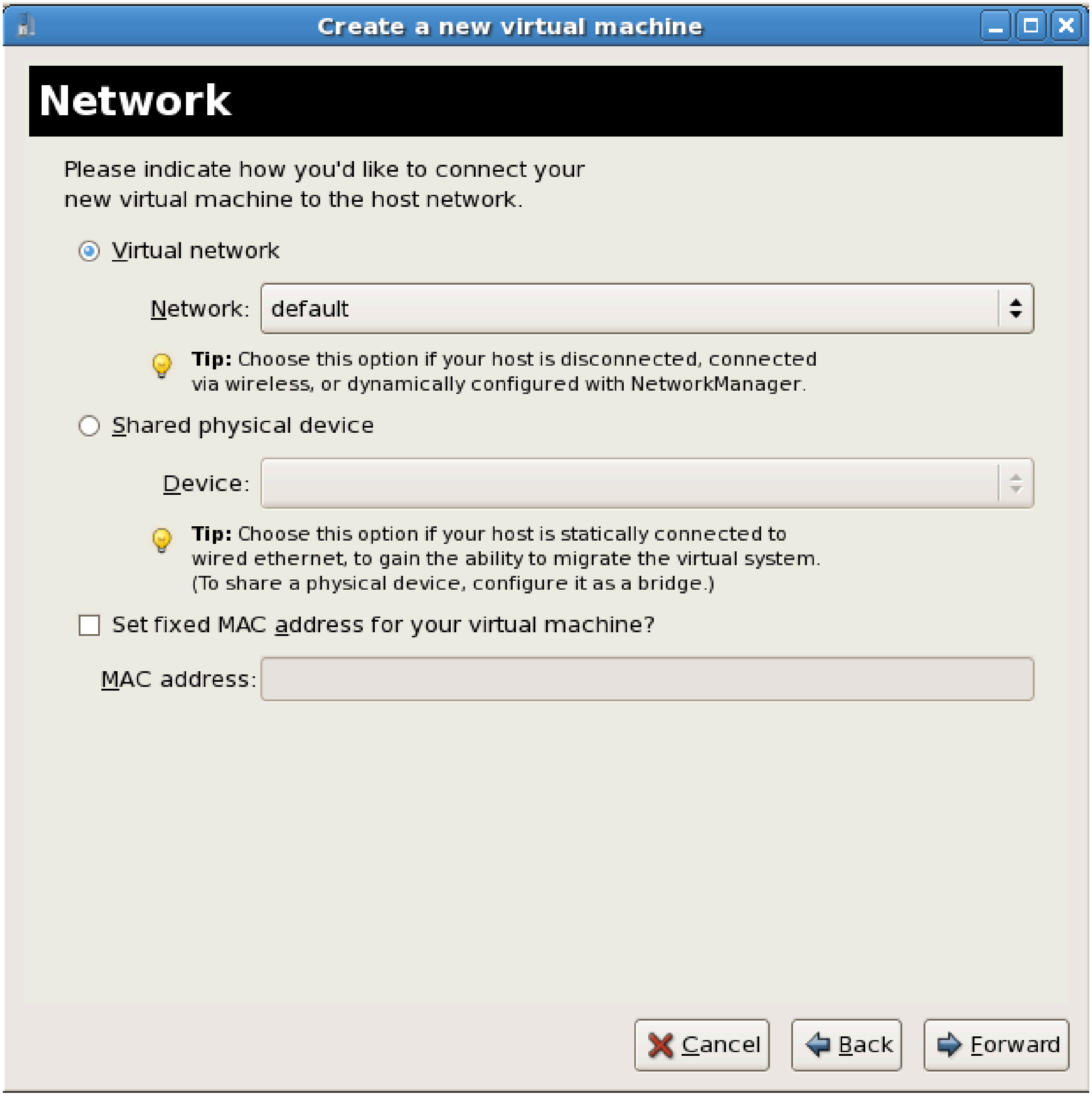
□□□ □ *5,* □□□□□□□□□

9. **Network setup**

   Select either **Virtual network** or **Shared physical device**.

   The virtual network option uses Network Address Translation (NAT) to share the default network device with the virtualized guest. Use the virtual network option for wireless networks.

   The shared physical device option uses a network bond to give the virtualized guest full access to a network device.



Network

Please indicate how you'd like to connect your new virtual machine to the host network.

● Virtual network

Network: default

Tip: Choose this option if your host is disconnected, connected via wireless, or dynamically configured with NetworkManager.

○ Shared physical device

Device:

Tip: Choose this option if your host is statically connected to wired ethernet, to gain the ability to migrate the virtual system. (To share a physical device, configure it as a bridge.)

□ Set fixed MAC address for your virtual machine?

MAC address:

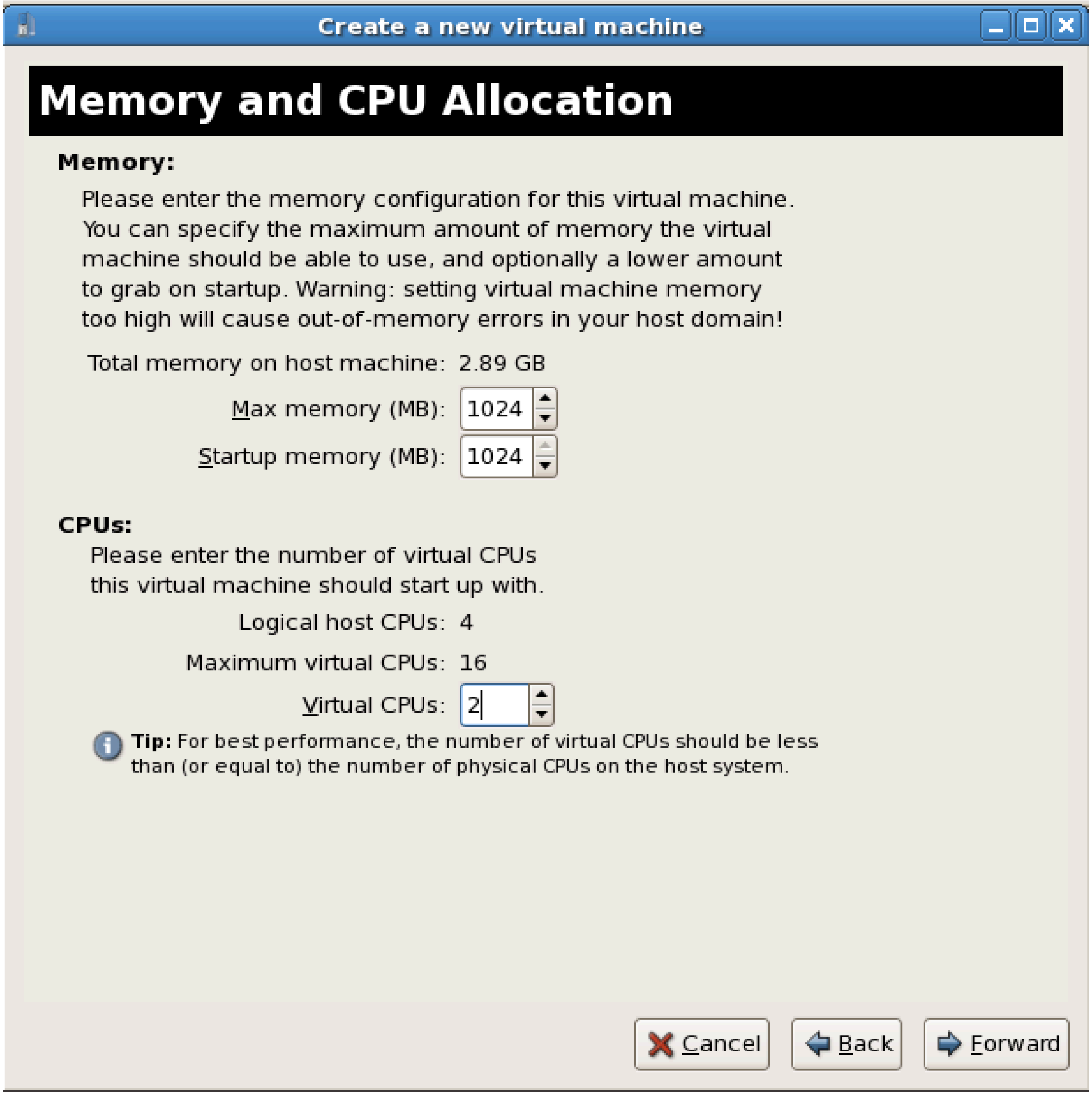
Press **Forward** to continue.

10. **Memory and CPU allocation**

    The Allocate memory and CPU window displays. Choose appropriate values for the virtualized CPUs and RAM allocation. These values affect the host's and guest's performance.

    Virtualized guests require sufficient physical memory (RAM) to run efficiently and effectively. Choose a memory value which suits your guest operating system and application requirements. Windows Server 2008. Remember, guests use physical RAM. Running too many guests or leaving insufficient memory for the host system results in significant usage of virtual memory and swapping. Virtual memory is significantly slower causing degraded system performance and responsiveness. Ensure to allocate sufficient memory for all guests and the host to operate effectively.

    Assign sufficient virtual CPUs for the virtualized guest. If the guest runs a multithreaded application assign the number of virtualized CPUs it requires to run most efficiently. Do not assign more virtual CPUs than there are physical processors (or hyper-threads) available on the host system. It is possible to over allocate virtual processors, however, over allocating has a significant, negative affect on guest and host performance due to processor context switching overheads.



Memory and CPU Allocation

Memory:

Please enter the memory configuration for this virtual machine. You can specify the maximum amount of memory the virtual machine should be able to use, and optionally a lower amount to grab on startup. Warning: setting virtual machine memory too high will cause out-of-memory errors in your host domain!

Total memory on host machine: 2.89 GB

Max memory (MB): 1024

Startup memory (MB): 1024

CPUs:

Please enter the number of virtual CPUs this virtual machine should start up with.

Logical host CPUs: 4

Maximum virtual CPUs: 16

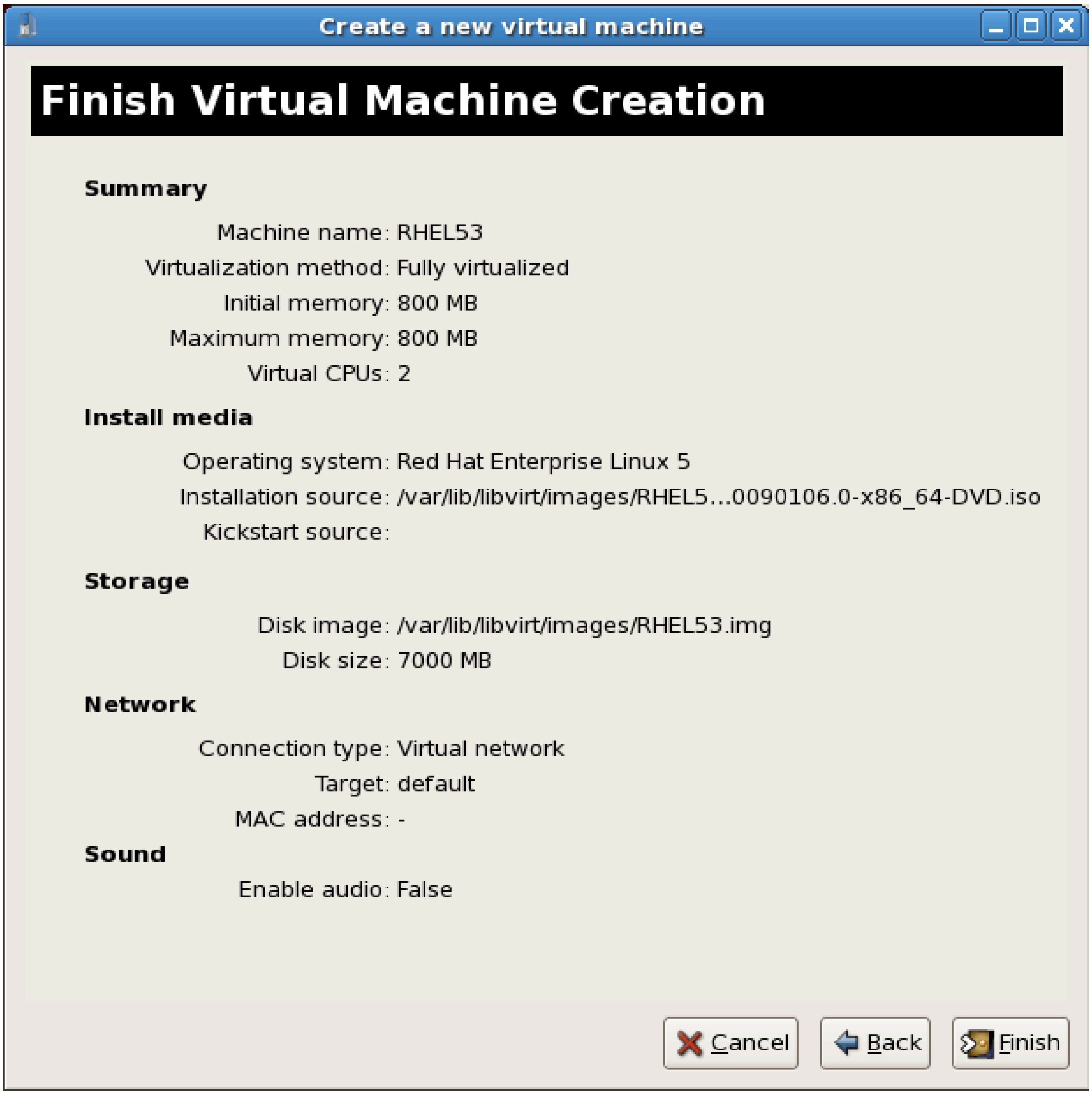
Virtual CPUs: 2

Tip: For best performance, the number of virtual CPUs should be less than (or equal to) the number of physical CPUs on the host system.

Press **Forward** to continue.

11. **Verify and start guest installation**

    □□□□□□□□



Create a new virtual machine

Finish Virtual Machine Creation

Summary

Machine name: RHEL53
Virtualization method: Fully virtualized
Initial memory: 800 MB
Maximum memory: 800 MB
Virtual CPUs: 2

Install media

Operating system: Red Hat Enterprise Linux 5
Installation source: /var/lib/libvirt/images/RHEL5...0090106.0-x86_64-DVD.iso
Kickstart source:

Storage

Disk image: /var/lib/libvirt/images/RHEL53.img
Disk size: 7000 MB

Network

Connection type: Virtual network
Target: default
MAC address: -

Sound

Enable audio: False

□□□□□□□□□□□□□□□□□□□

12. **□□ Linux**
    □□□ Red Hat Enterprise Linux 5 □□□□□□□□□□□□□□□□ http://redhat.com/docs □□*Red Hat Enterprise Linux* □□□□□□□

□□□□□□□□□□□ Red Hat Enterprise Linux 5 □□□□

3.3. □□ Windows XP □□□□□□□□□□□□□□

□□□□□ Windows XP□□□□□□□□□□□□□□□□□□□□□□□□□ Linux □□□ Windows XP □□□□

□□□□□□□□□□□□□□□□ root □□□

1. **Starting virt-manager**
   □□□□□□ > □□□□ > □□□□□□□□□□□□□□□□□□ > □□□□□□□□□□□□□□□□□□□□□□□□□

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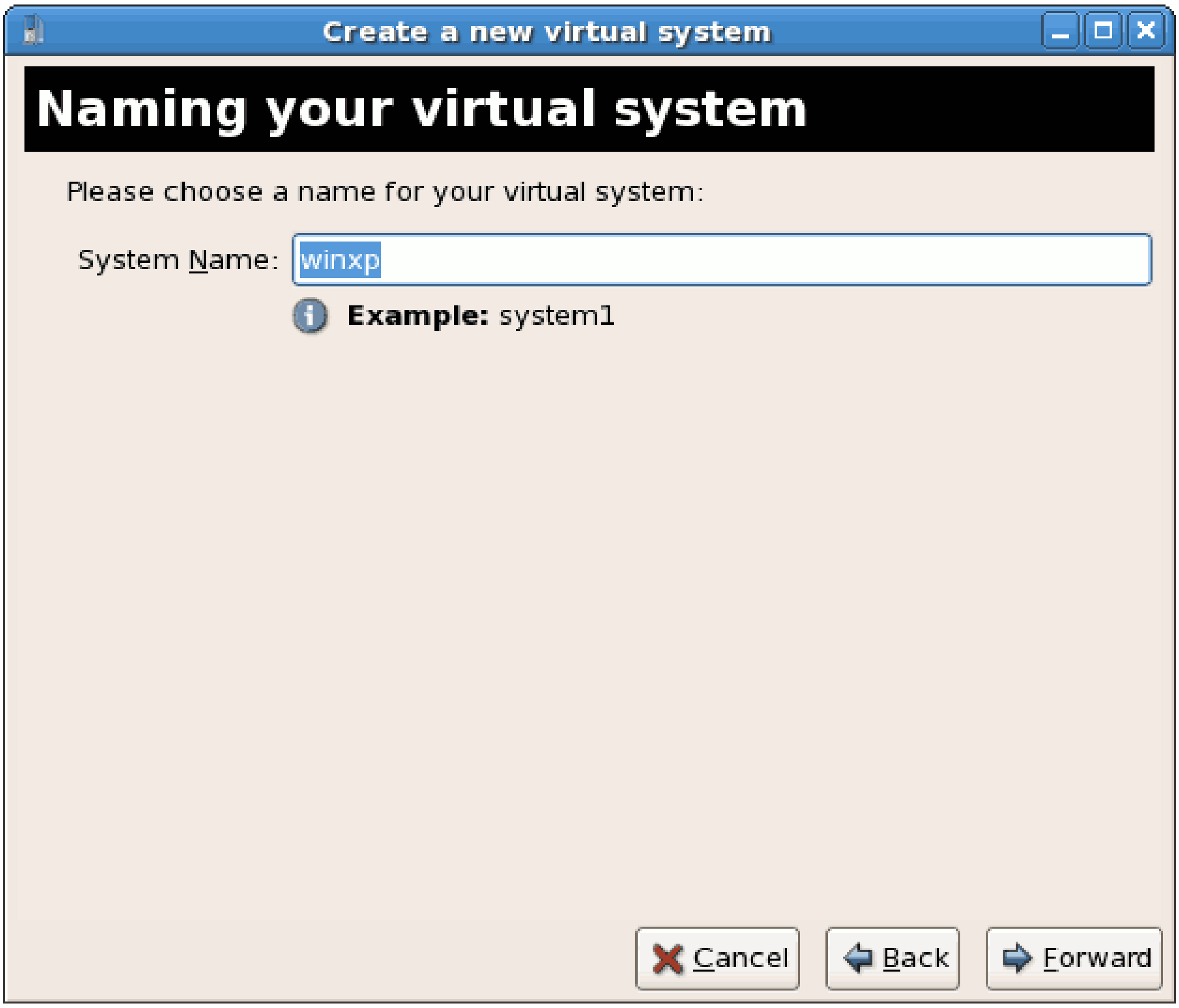


Create a new virtual system

Naming your virtual system

Please choose a name for your virtual system:

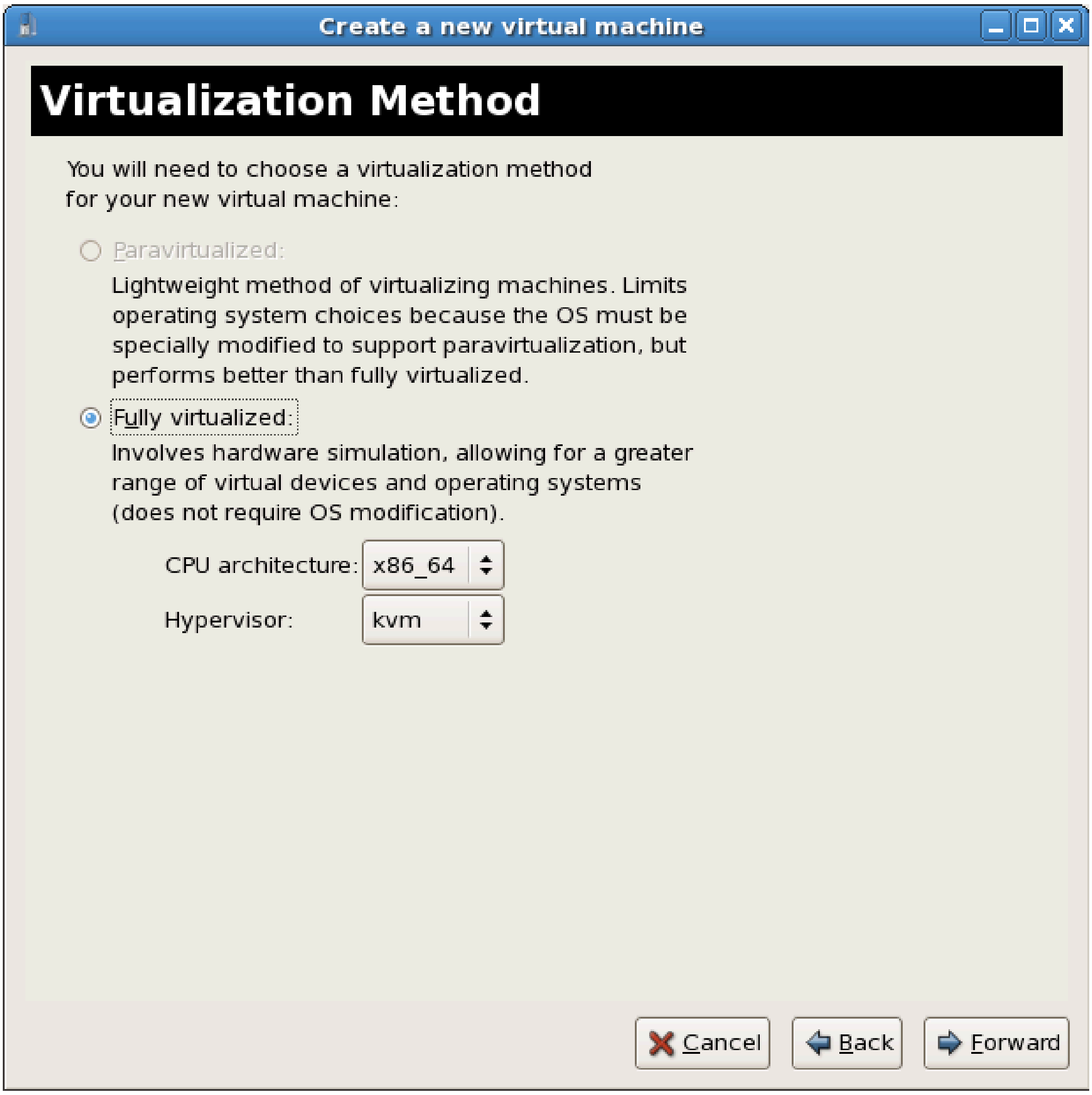
System Name: winxp

Example: system1

3. □□□□□□□□□

□□□□□□□ KVM □ Xen□□□ □□ *1*□□□□□□□□□□□□□□ hypervisor□□□□□□□ KVM hypervisor□

□□□□□□□□□□□□□□ Windows□


Create a new virtual machine

Virtualization Method

You will need to choose a virtualization method for your new virtual machine:

○ Paravirtualized:
Lightweight method of virtualizing machines. Limits operating system choices because the OS must be specially modified to support paravirtualization, but performs better than fully virtualized.

● Fully virtualized:
Involves hardware simulation, allowing for a greater range of virtual devices and operating systems (does not require OS modification).

CPU architecture: x86_64

Hypervisor: kvm

4. □□□□□□

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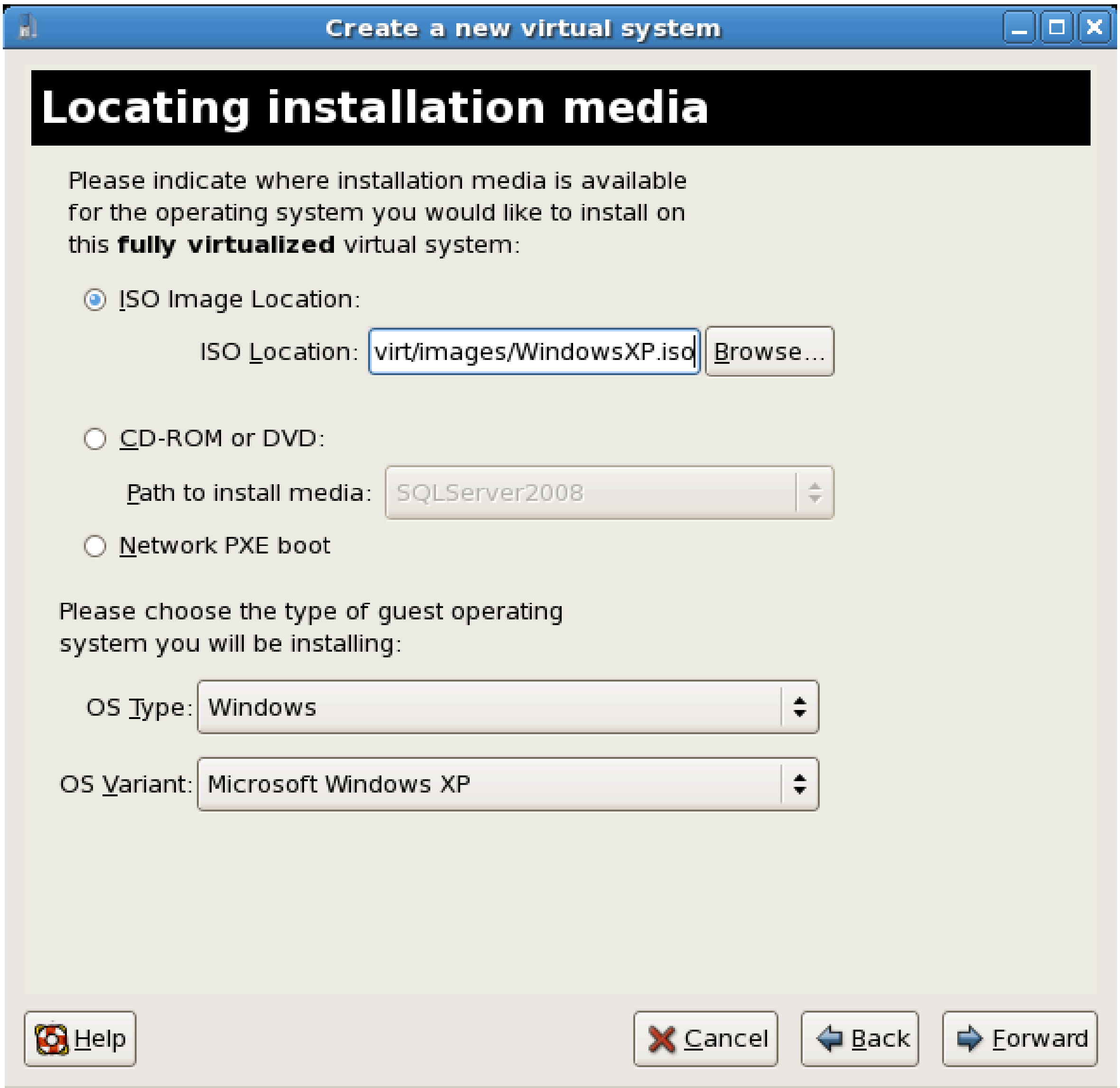
   □□□□□□□□□□□ Windows □□□□□□□□□□□□□□□ □**ISO** □□□□□□□□□□ Windows □□□□□□.iso□□□□□

   □□□□□□□□□□□□□□□**Windows**□□□□□□□□□□□□□□□□□□**Microsoft Windows XP**□□

   □□□□□□□ PXE □□□□□□



Create a new virtual system

Locating installation media

Please indicate where installation media is available for the operating system you would like to install on this **fully virtualized** virtual system:

● ISO Image Location:

ISO Location: virt/images/WindowsXP.iso

○ CD-ROM or DVD:

Path to install media: SQLServer2008

○ Network PXE boot

Please choose the type of guest operating system you will be installing:

OS Type: Windows

OS Variant: Microsoft Windows XP

Press **Forward** to continue.

Image files and SELinux

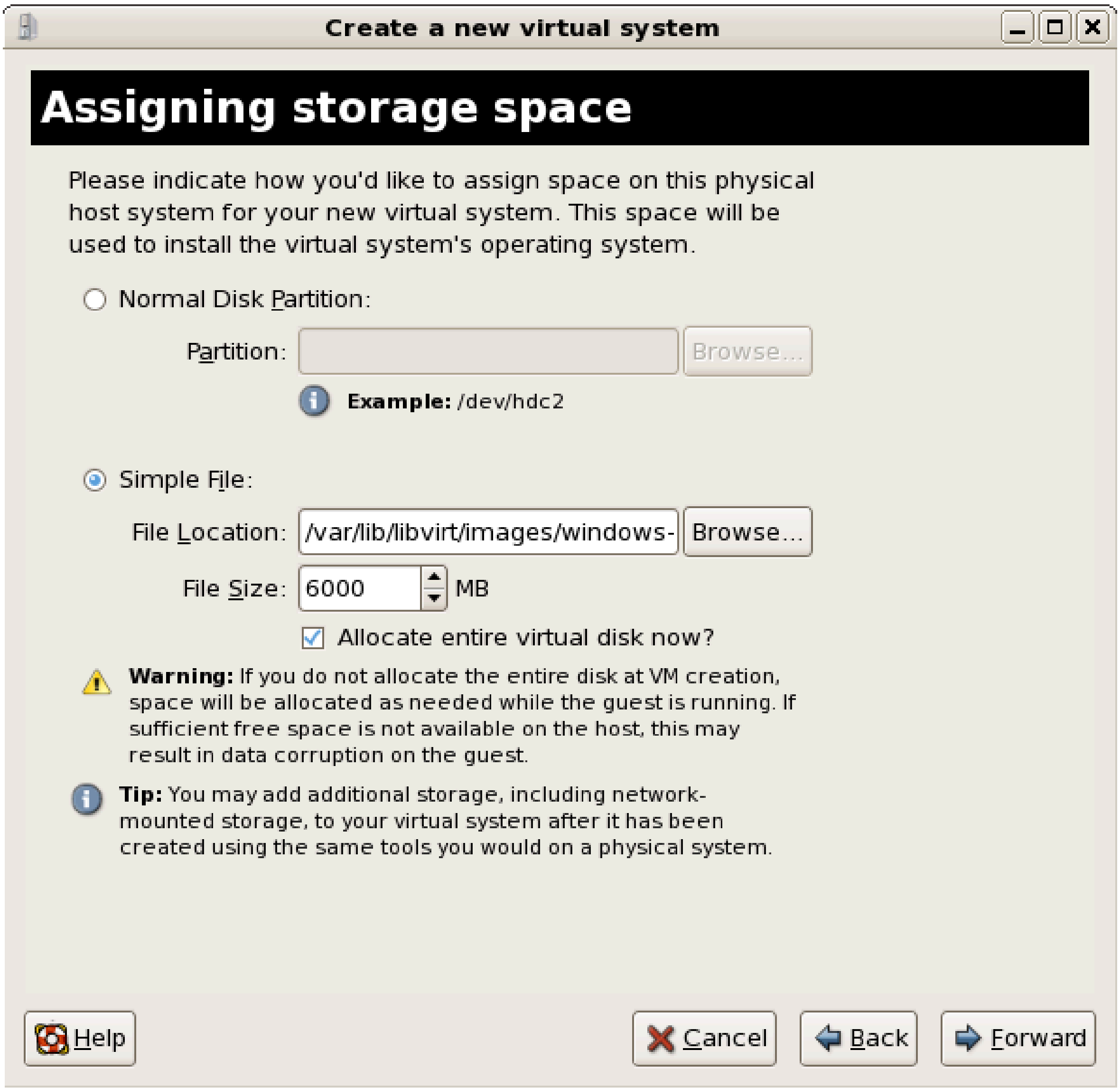
 ISO **`/var/lib/libvirt/images/`** SELinux
  7.1, “SELinux ”

5. The **Assigning storage space** window displays. Choose a disk partition, LUN or create a file based image for the guest storage.

    `/var/lib/libvirt/images/` Fedora SELinux SELinux enforcing *7.1, “SELinux ”*

    Your guest storage image should be larger than the size of the installation, any additional packages and applications, and the size of the guests swap file. The installation process will choose the size of the guest's swap file based on size of the RAM allocated to the guest.

Allocate extra space if the guest needs additional space for applications or other data. For example, web servers require additional space for log files.



Create a new virtual system

Assigning storage space

Please indicate how you'd like to assign space on this physical host system for your new virtual system. This space will be used to install the virtual system's operating system.

○ Normal Disk Partition:

Partition: [ ] Browse...

Example: /dev/hdc2

● Simple File:

File Location: /var/lib/libvirt/images/windows- Browse...

File Size: 6000 MB

☑ Allocate entire virtual disk now?

Warning: If you do not allocate the entire disk at VM creation, space will be allocated as needed while the guest is running. If sufficient free space is not available on the host, this may result in data corruption on the guest.

Tip: You may add additional storage, including network-mounted storage, to your virtual system after it has been created using the same tools you would on a physical system.

Choose the appropriate size for the guest on your selected storage type and click the **Forward** button.

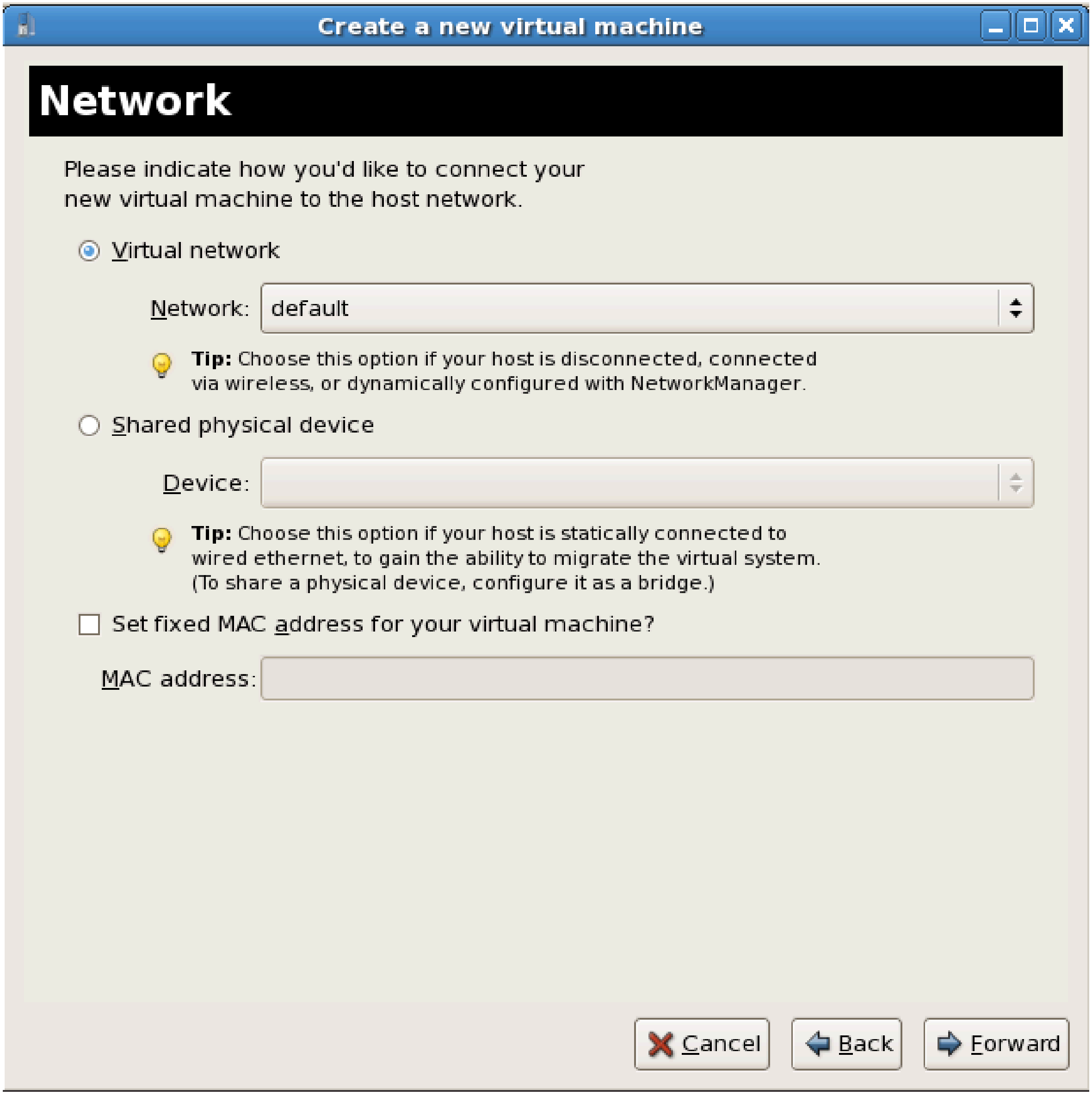
□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **`/var/lib/libvirt/images/`**□□□□□□□□□□□□□□□□□□□□□□□□ **`/images/`** □□□□□□□□□□□□□□□□ SELinux □□ SELinux □□□□□□□□□

6. **Network setup**
   Select either **Virtual network** or **Shared physical device**.

   The virtual network option uses Network Address Translation (NAT) to share the default network device with the virtualized guest. Use the virtual network option for wireless networks.

The shared physical device option uses a network bond to give the virtualized guest full access to a network device.



Network

Please indicate how you'd like to connect your new virtual machine to the host network.

● Virtual network

Network: default

Tip: Choose this option if your host is disconnected, connected via wireless, or dynamically configured with NetworkManager.

○ Shared physical device

Device:

Tip: Choose this option if your host is statically connected to wired ethernet, to gain the ability to migrate the virtual system. (To share a physical device, configure it as a bridge.)

□ Set fixed MAC address for your virtual machine?

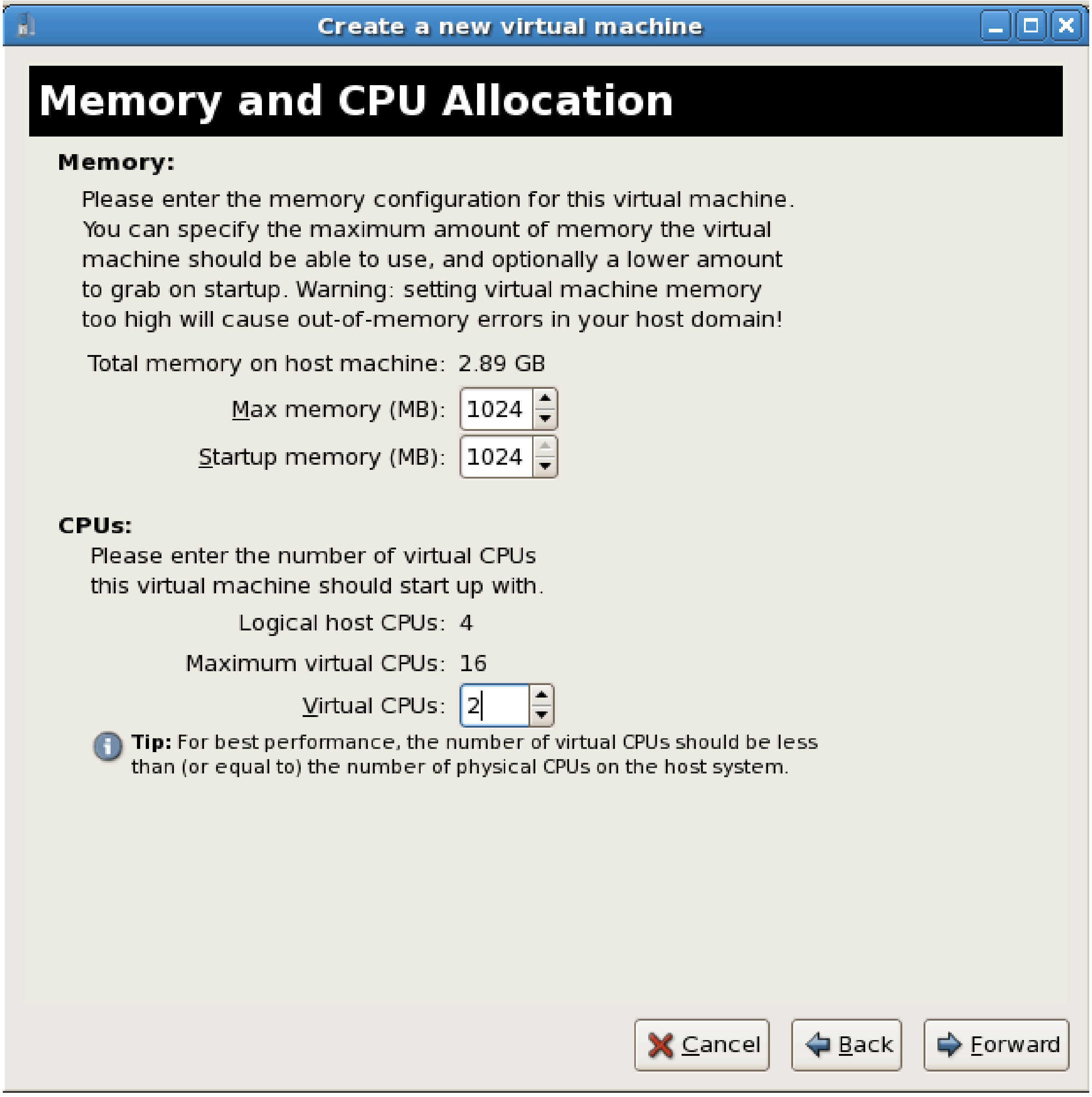
MAC address:

Press **Forward** to continue.

7. The Allocate memory and CPU window displays. Choose appropriate values for the virtualized CPUs and RAM allocation. These values affect the host's and guest's performance.

   □□

   Assign sufficient virtual CPUs for the virtualized guest. If the guest runs a multithreaded application assign the number of virtualized CPUs it requires to run most efficiently. Do not assign more virtual CPUs than there are physical processors (or hyper-threads) available on the host system. It is possible to over allocate virtual processors, however, over allocating has a significant, negative affect on guest and host performance due to processor context switching overheads.



Create a new virtual machine

Memory and CPU Allocation

Memory:

Please enter the memory configuration for this virtual machine. You can specify the maximum amount of memory the virtual machine should be able to use, and optionally a lower amount to grab on startup. Warning: setting virtual machine memory too high will cause out-of-memory errors in your host domain!

Total memory on host machine: 2.89 GB

Max memory (MB): 1024

Startup memory (MB): 1024

CPUs:

Please enter the number of virtual CPUs this virtual machine should start up with.

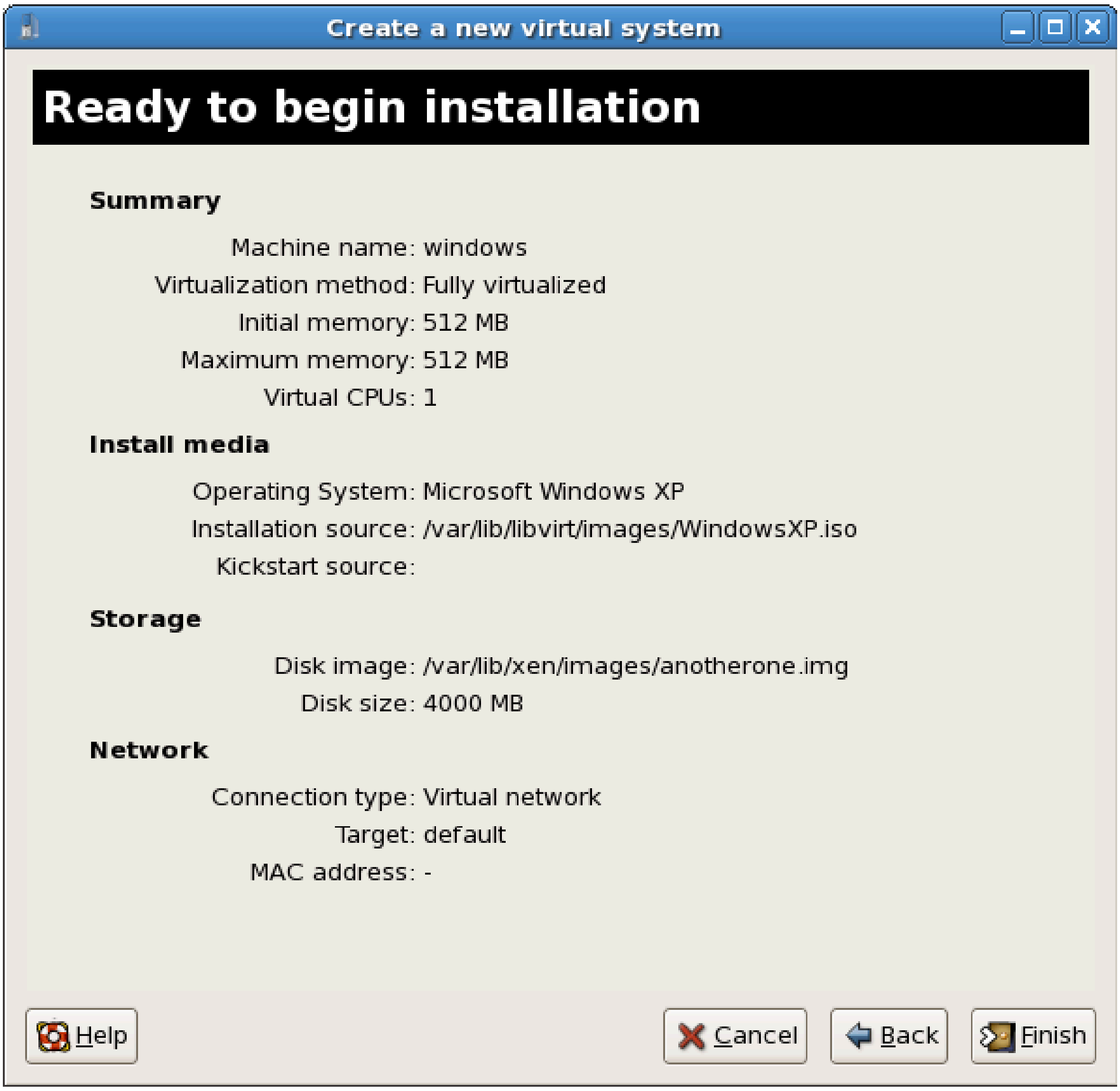
Logical host CPUs: 4

Maximum virtual CPUs: 16

Virtual CPUs: 2

Tip: For best performance, the number of virtual CPUs should be less than (or equal to) the number of physical CPUs on the host system.

8. □□□



Create a new virtual system

Ready to begin installation

Summary

Machine name: windows
Virtualization method: Fully virtualized
Initial memory: 512 MB
Maximum memory: 512 MB
Virtual CPUs: 1

Install media

Operating System: Microsoft Windows XP
Installation source: /var/lib/libvirt/images/WindowsXP.iso
Kickstart source:

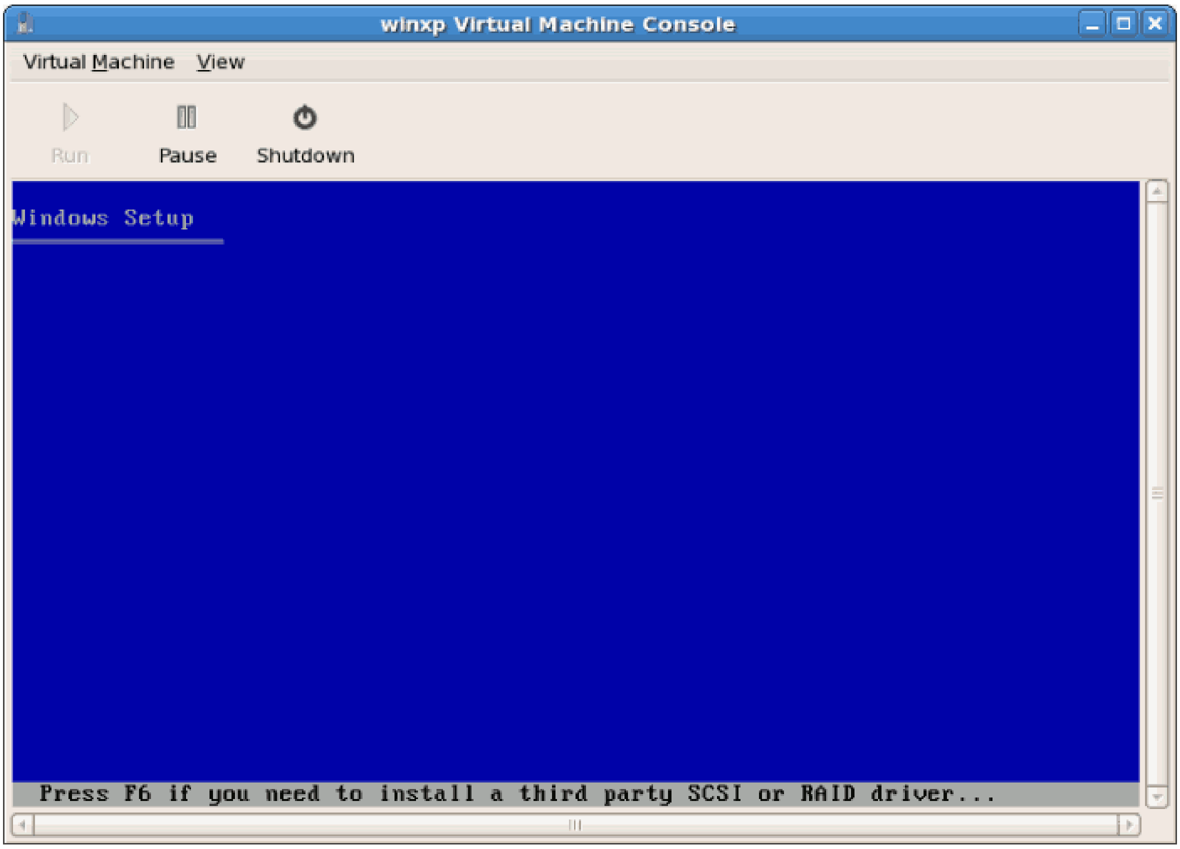
Storage

Disk image: /var/lib/xen/images/anotherone.img
Disk size: 4000 MB

Network

Connection type: Virtual network
Target: default
MAC address: -

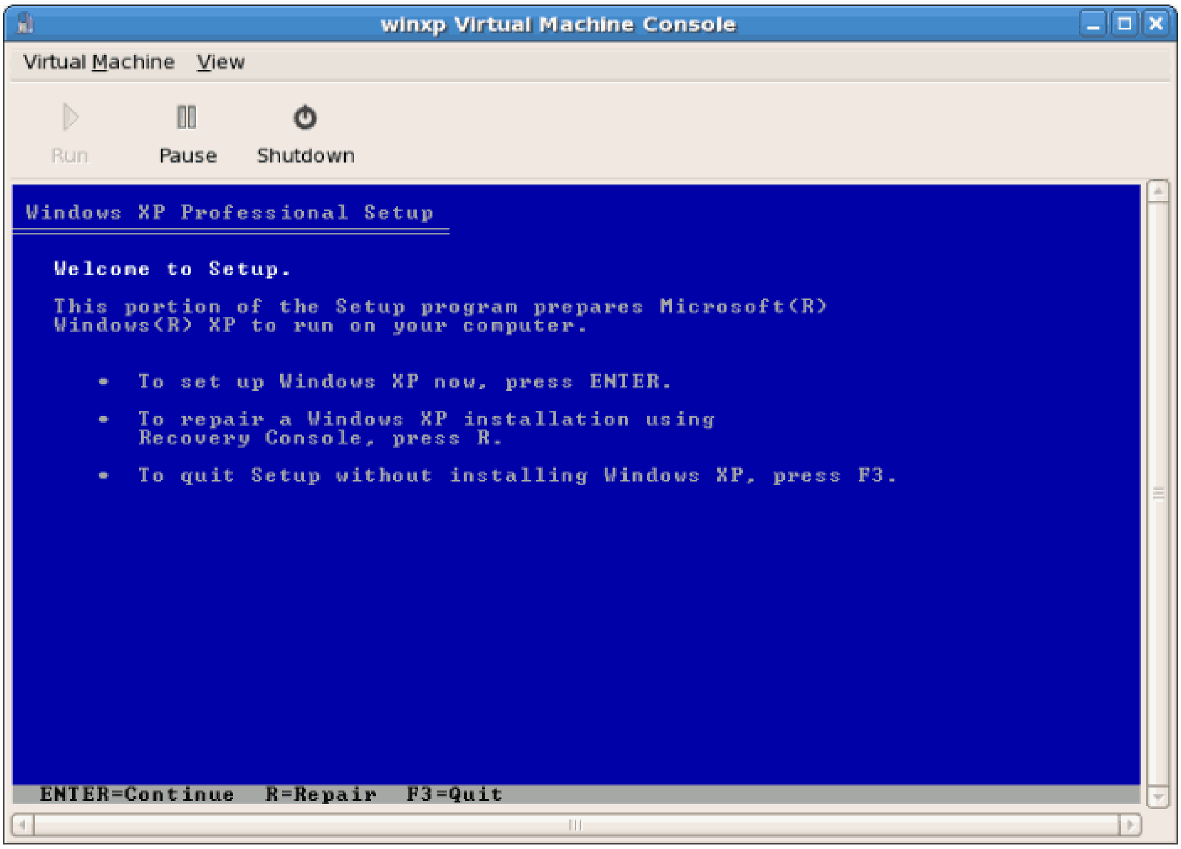
9. □□ **virt-manager** □□□□□□□□□□□□ Windows □□□□□□□□□□□□□□□□□□□□□ □□□□□□□□ **F5** □□□□□□ HAL□□□□□ Windows □□□□□□□□□□□□ `Generic i486 Platform`□□□□□□□□□□□□□□□□



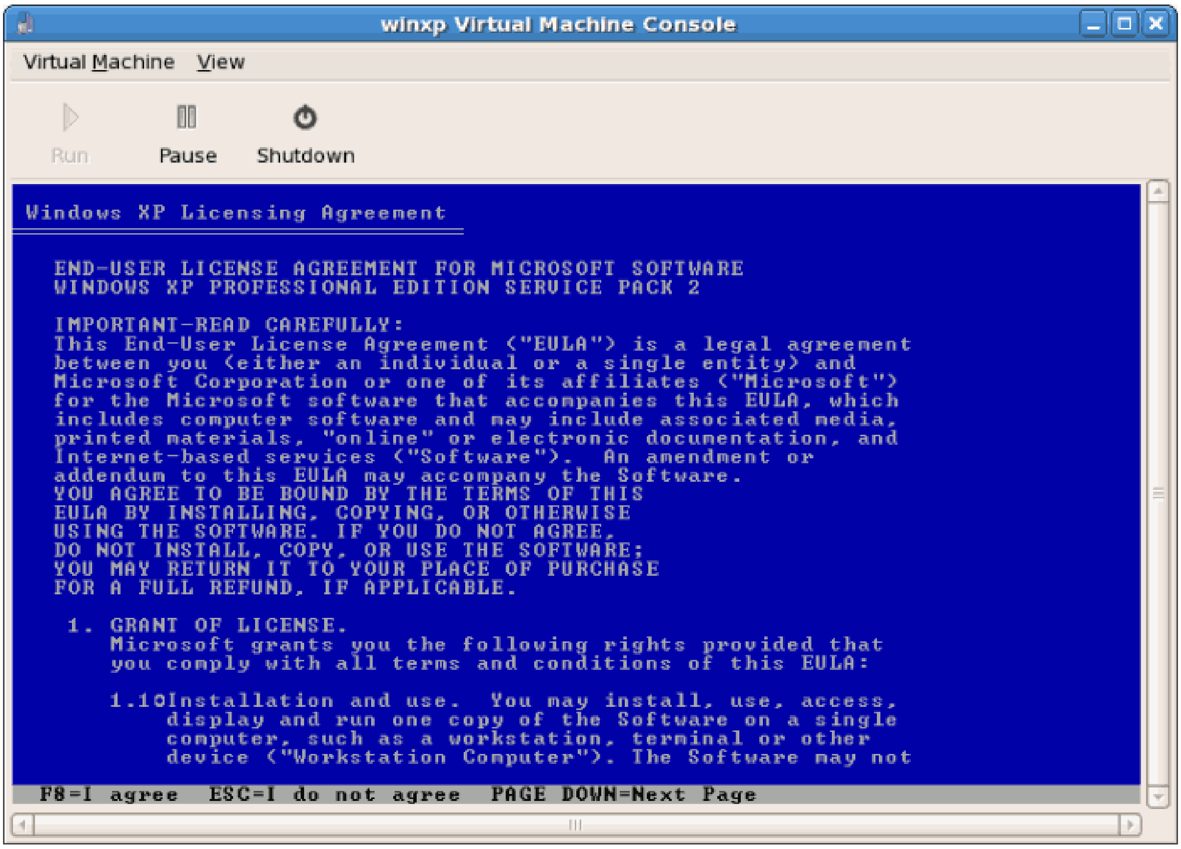
Windows Setup

Press F6 if you need to install a third party SCSI or RAID driver...

10. □□□□□□□□□□□ Windows □□□□□□□□□

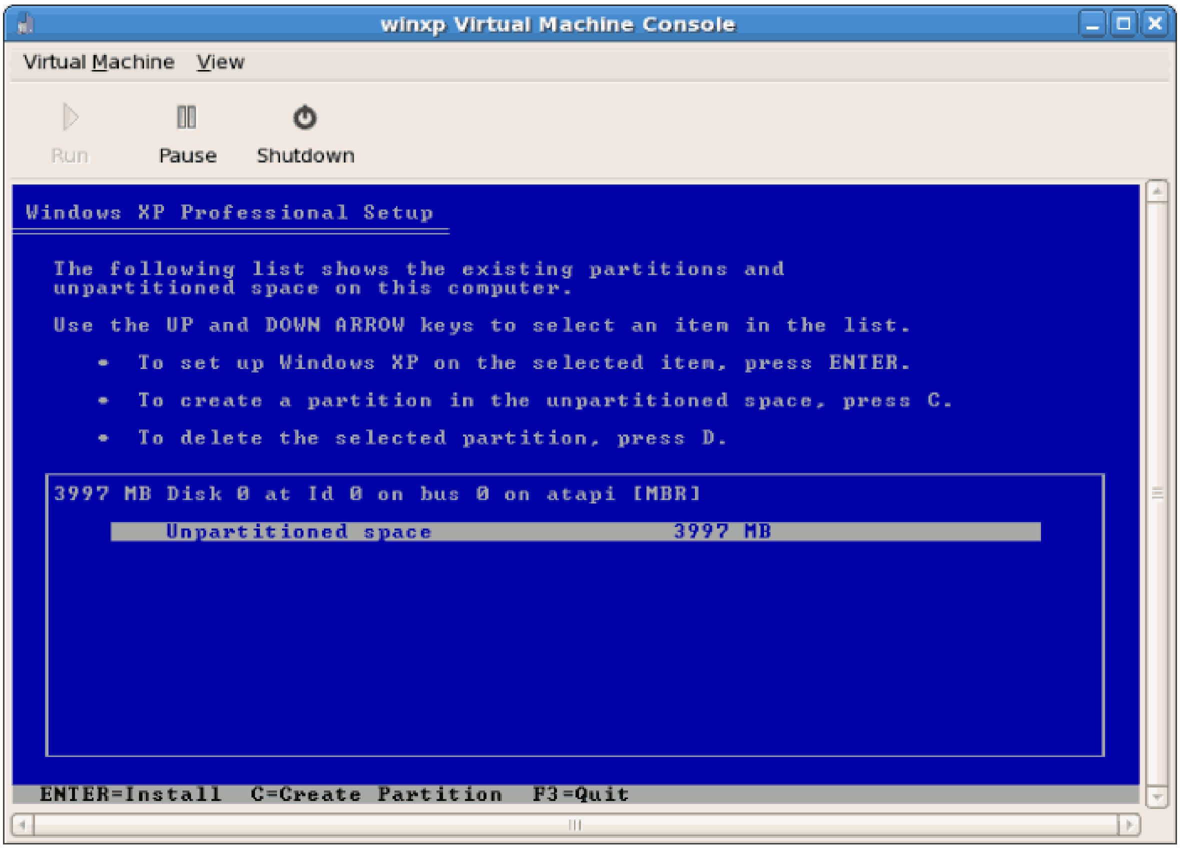


```
Windows XP Professional Setup

  Welcome to Setup.

  This portion of the Setup program prepares Microsoft(R)
  Windows(R) XP to run on your computer.

      •  To set up Windows XP now, press ENTER.

      •  To repair a Windows XP installation using
         Recovery Console, press R.

      •  To quit Setup without installing Windows XP, press F3.

 ENTER=Continue   R=Repair   F3=Quit
```

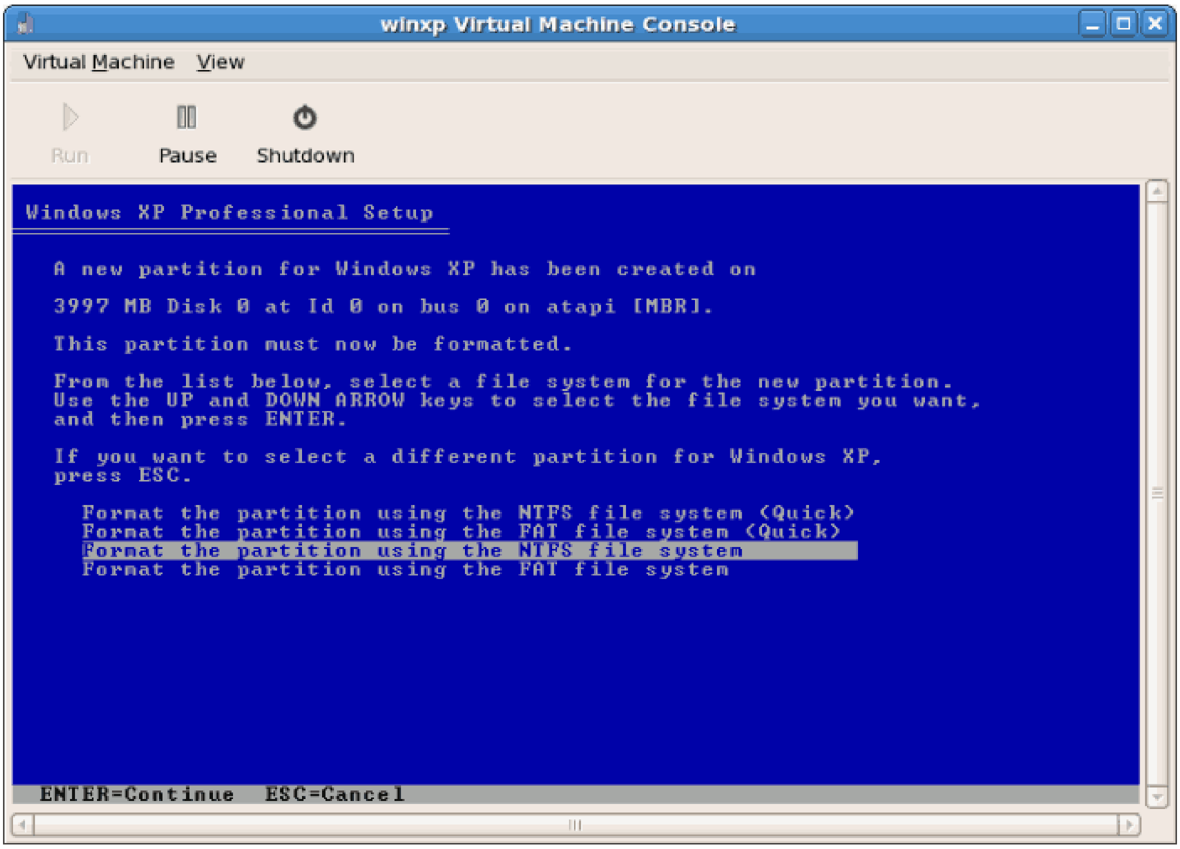


```
Windows XP Licensing Agreement

  END-USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE
  WINDOWS XP PROFESSIONAL EDITION SERVICE PACK 2

  IMPORTANT-READ CAREFULLY:
  This End-User License Agreement ("EULA") is a legal agreement
  between you (either an individual or a single entity) and
  Microsoft Corporation or one of its affiliates ("Microsoft")
  for the Microsoft software that accompanies this EULA, which
  includes computer software and may include associated media,
  printed materials, "online" or electronic documentation, and
  Internet-based services ("Software").  An amendment or
  addendum to this EULA may accompany the Software.
  YOU AGREE TO BE BOUND BY THE TERMS OF THIS
  EULA BY INSTALLING, COPYING, OR OTHERWISE
  USING THE SOFTWARE. IF YOU DO NOT AGREE,
  DO NOT INSTALL, COPY, OR USE THE SOFTWARE;
  YOU MAY RETURN IT TO YOUR PLACE OF PURCHASE
  FOR A FULL REFUND, IF APPLICABLE.

   1. GRANT OF LICENSE.
      Microsoft grants you the following rights provided that
      you comply with all terms and conditions of this EULA:

      1.1OInstallation and use.  You may install, use, access,
          display and run one copy of the Software on a single
          computer, such as a workstation, terminal or other
          device ("Workstation Computer"). The Software may not

 F8=I agree   ESC=I do not agree   PAGE DOWN=Next Page
```

11. □□□□□□□□□□□□□□□□

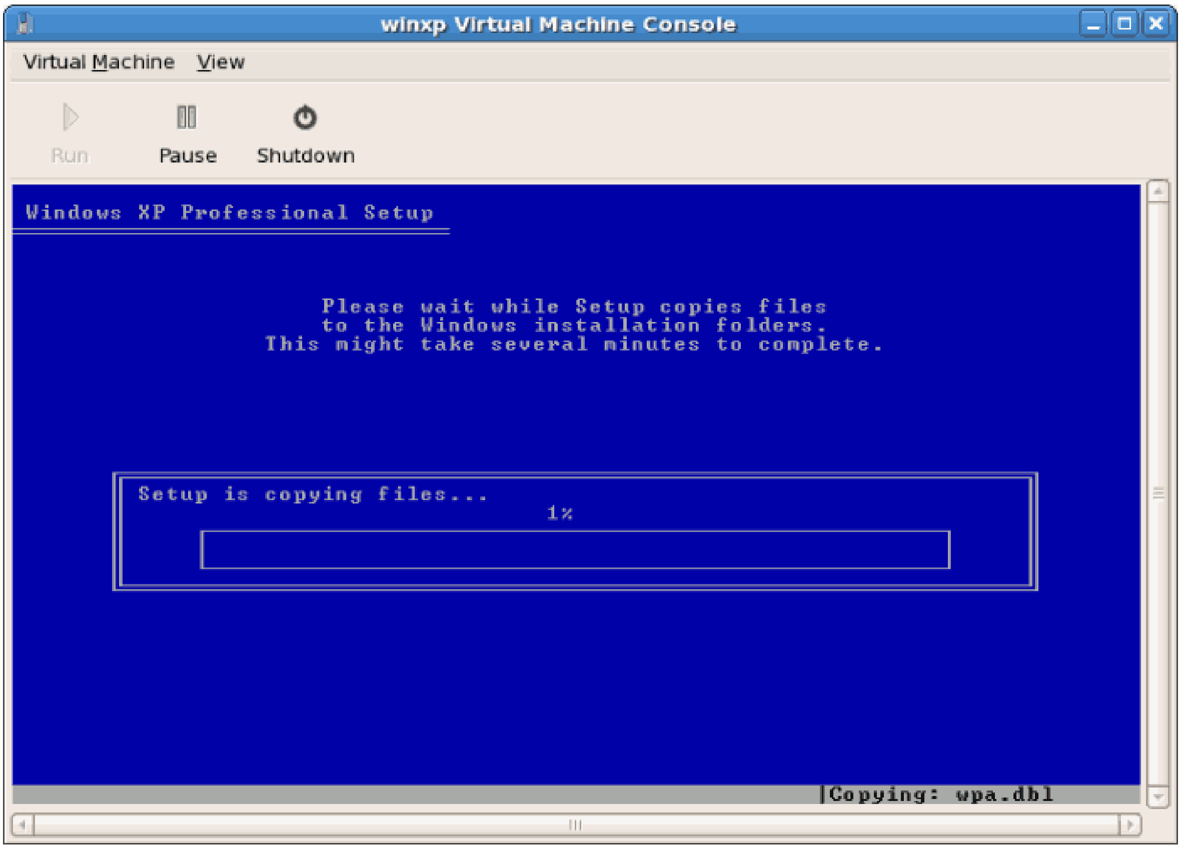


```
Windows XP Professional Setup

  The following list shows the existing partitions and
  unpartitioned space on this computer.

  Use the UP and DOWN ARROW keys to select an item in the list.

     •  To set up Windows XP on the selected item, press ENTER.

     •  To create a partition in the unpartitioned space, press C.

     •  To delete the selected partition, press D.

  3997 MB Disk 0 at Id 0 on bus 0 on atapi [MBR]

        Unpartitioned space                      3997 MB

  ENTER=Install  C=Create Partition  F3=Quit
```

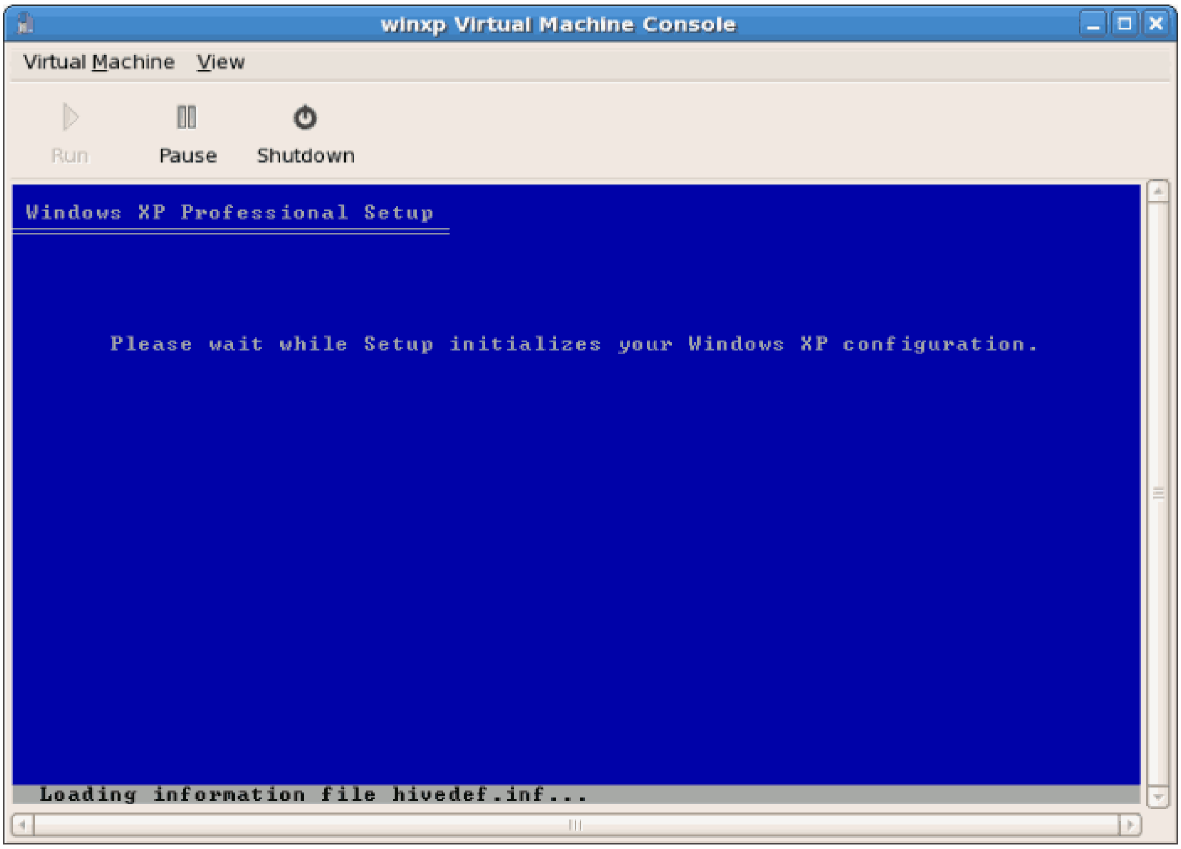


```
Windows XP Professional Setup

  A new partition for Windows XP has been created on

  3997 MB Disk 0 at Id 0 on bus 0 on atapi [MBR].

  This partition must now be formatted.

  From the list below, select a file system for the new partition.
  Use the UP and DOWN ARROW keys to select the file system you want,
  and then press ENTER.

  If you want to select a different partition for Windows XP,
  press ESC.

    Format the partition using the NTFS file system (Quick)
    Format the partition using the FAT file system (Quick)
    Format the partition using the NTFS file system
    Format the partition using the FAT file system

  ENTER=Continue  ESC=Cancel
```

12. □□□□□□□□□Windows □□□□□□□□□□□□□□□□

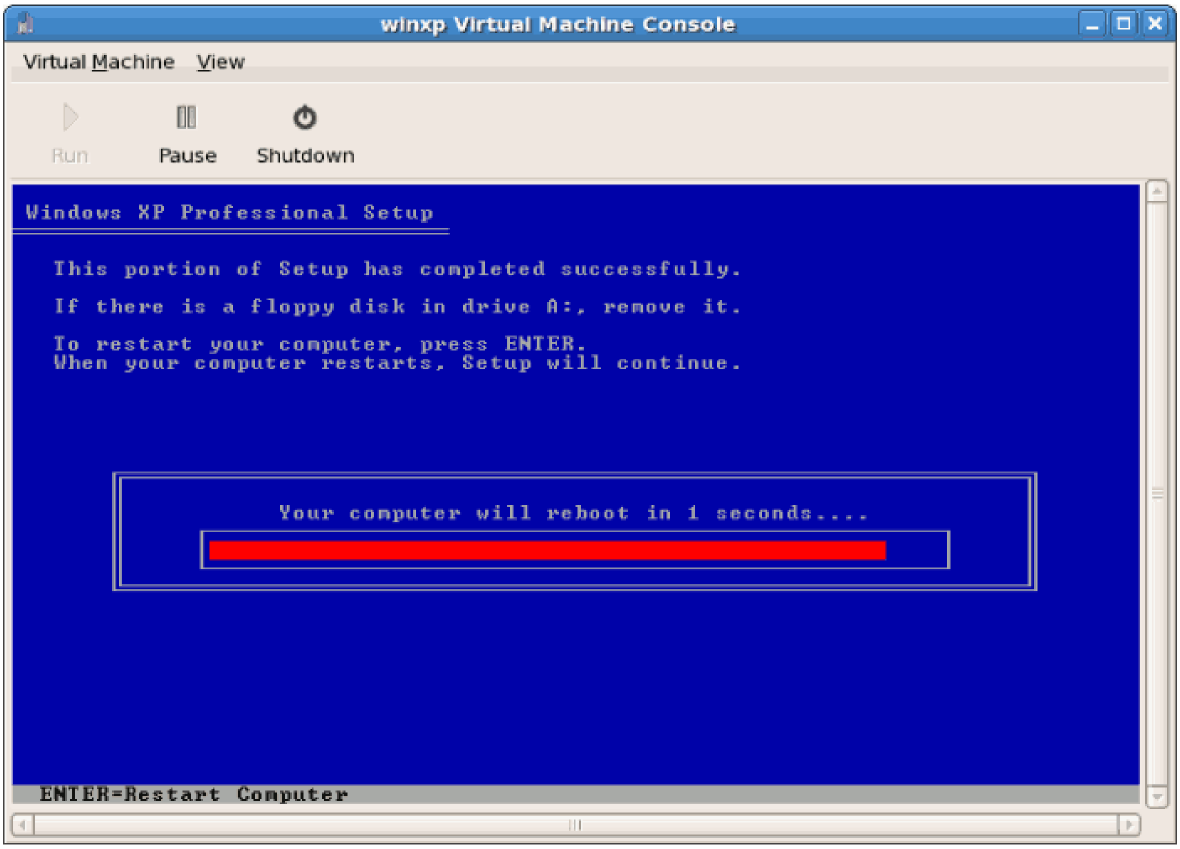


```
Windows XP Professional Setup

                 Please wait while Setup copies files
                 to the Windows installation folders.
              This might take several minutes to complete.

      Setup is copying files...
                                    1%

                                                        |Copying: wpa.dbl
```



```
Windows XP Professional Setup

      Please wait while Setup initializes your Windows XP configuration.

  Loading information file hivedef.inf...
```

13. □□□□□□□□□□□□□Windows □□□□□□



Windows XP Professional Setup

This portion of Setup has completed successfully.

If there is a floppy disk in drive A:, remove it.

To restart your computer, press ENTER.
When your computer restarts, Setup will continue.

Your computer will reboot in 1 seconds....

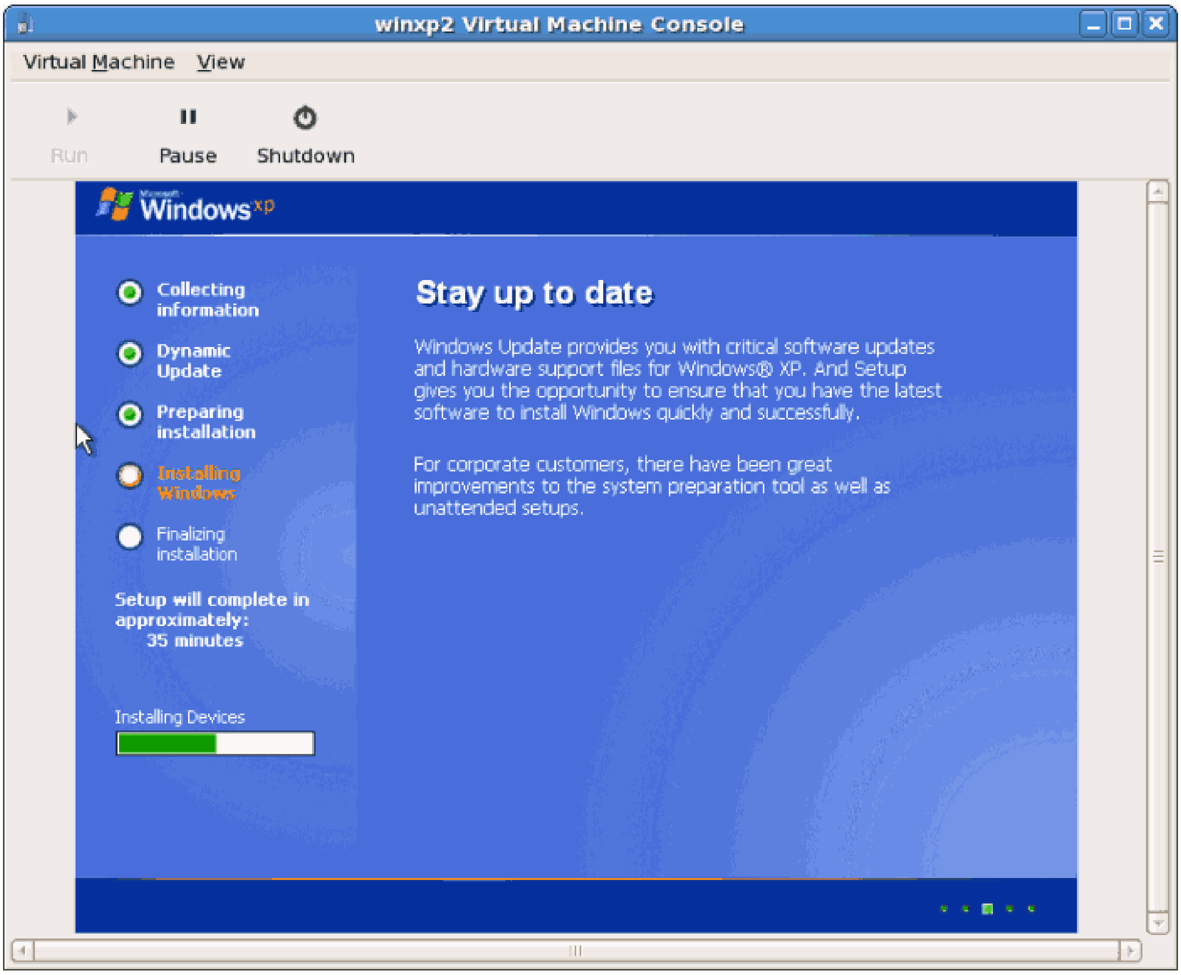
ENTER=Restart Computer

14. □□□□ Windows □□□□

```
# virsh start WindowsGuest
```

□□ *WindowsGuest* □□□□□□□□□

15. □□□□□□□□□□□□□□□ Windows □□□□□□



Collecting information

Dynamic Update

Preparing installation

Installing Windows

Finalizing installation

Setup will complete in approximately:
35 minutes

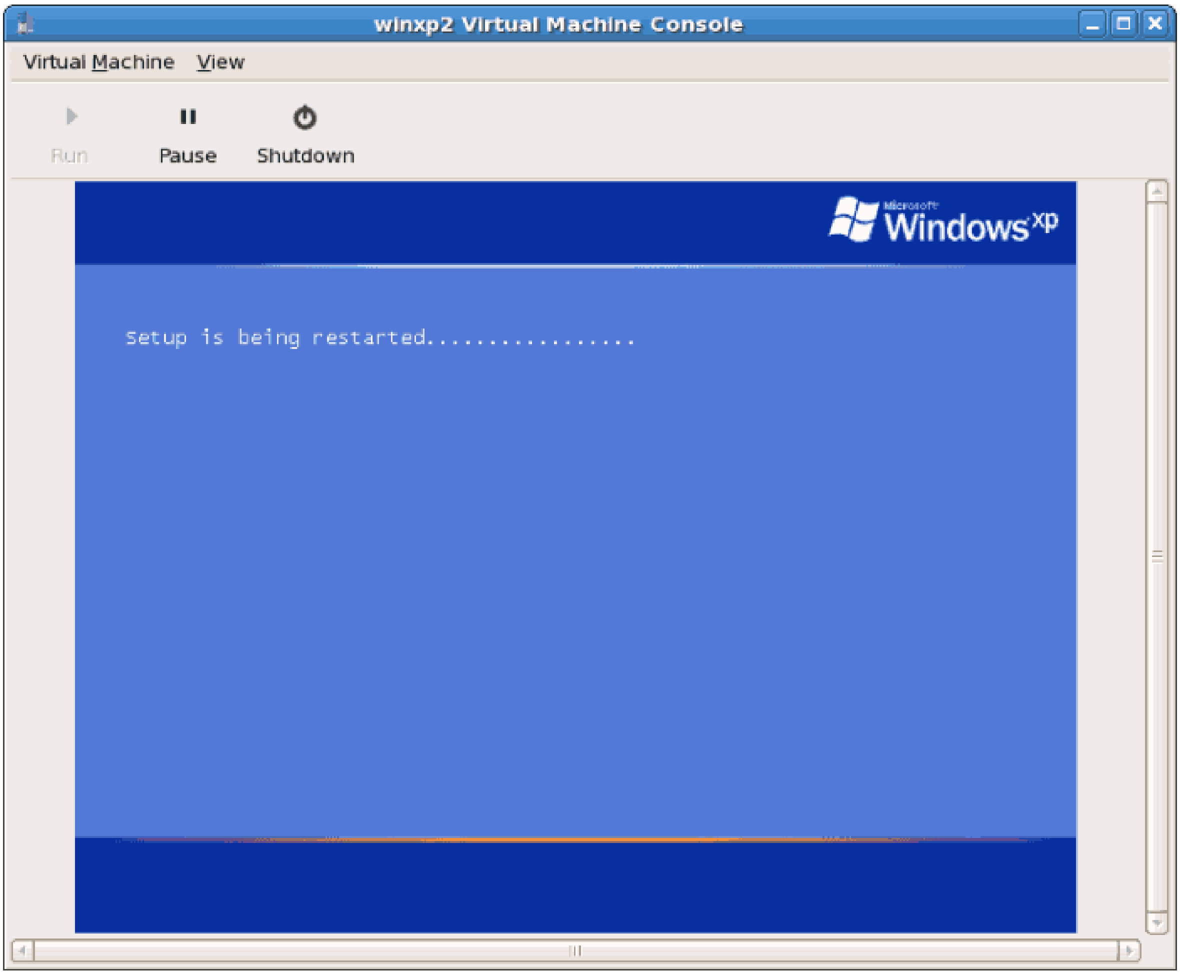
Installing Devices

Stay up to date

Windows Update provides you with critical software updates and hardware support files for Windows® XP. And Setup gives you the opportunity to ensure that you have the latest software to install Windows quickly and successfully.

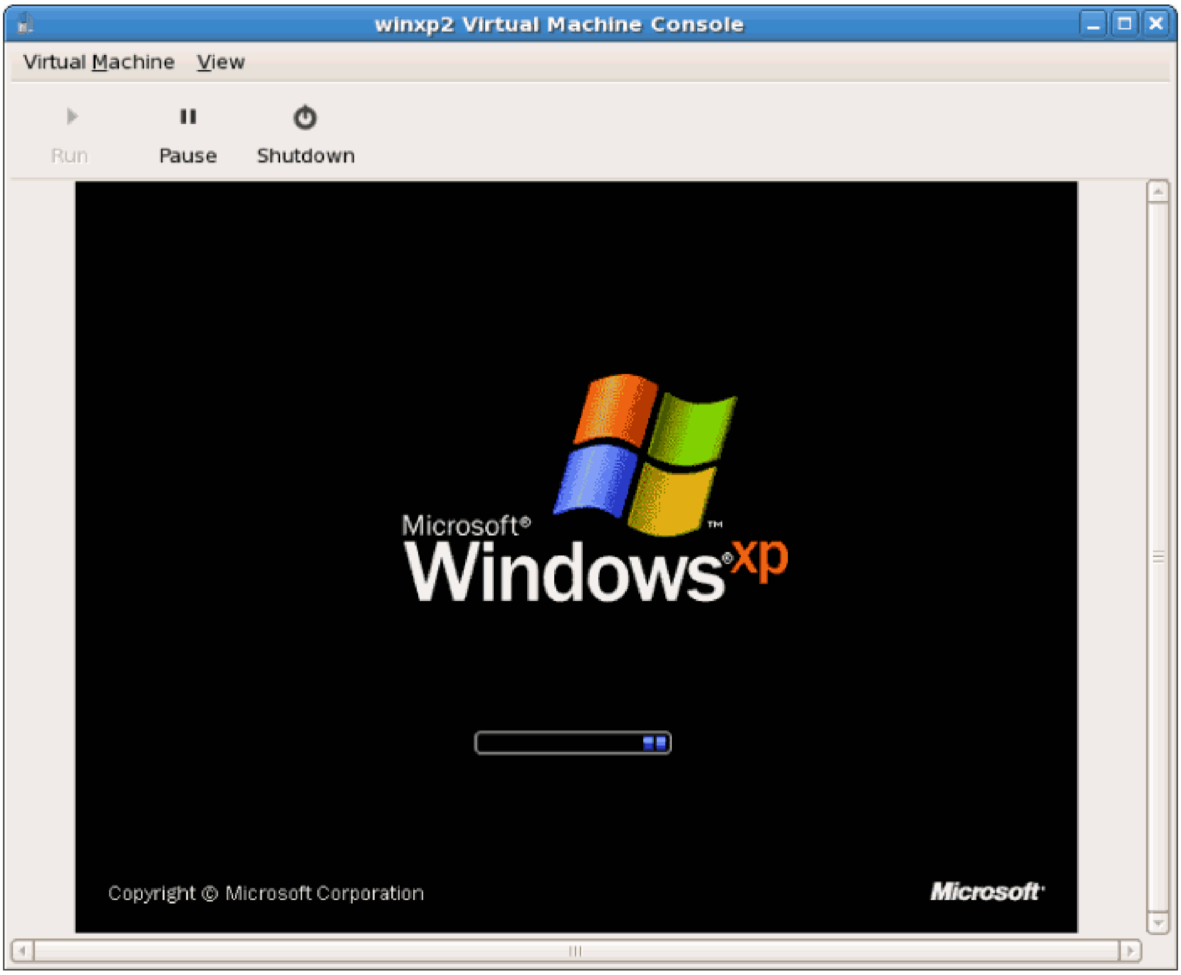
For corporate customers, there have been great improvements to the system preparation tool as well as unattended setups.

16. □□□□□□□□□□□□□□□□□□□□□□□□ **virsh reboot *WindowsGuestName*** □□□ `Setup is being restarted` □□□□

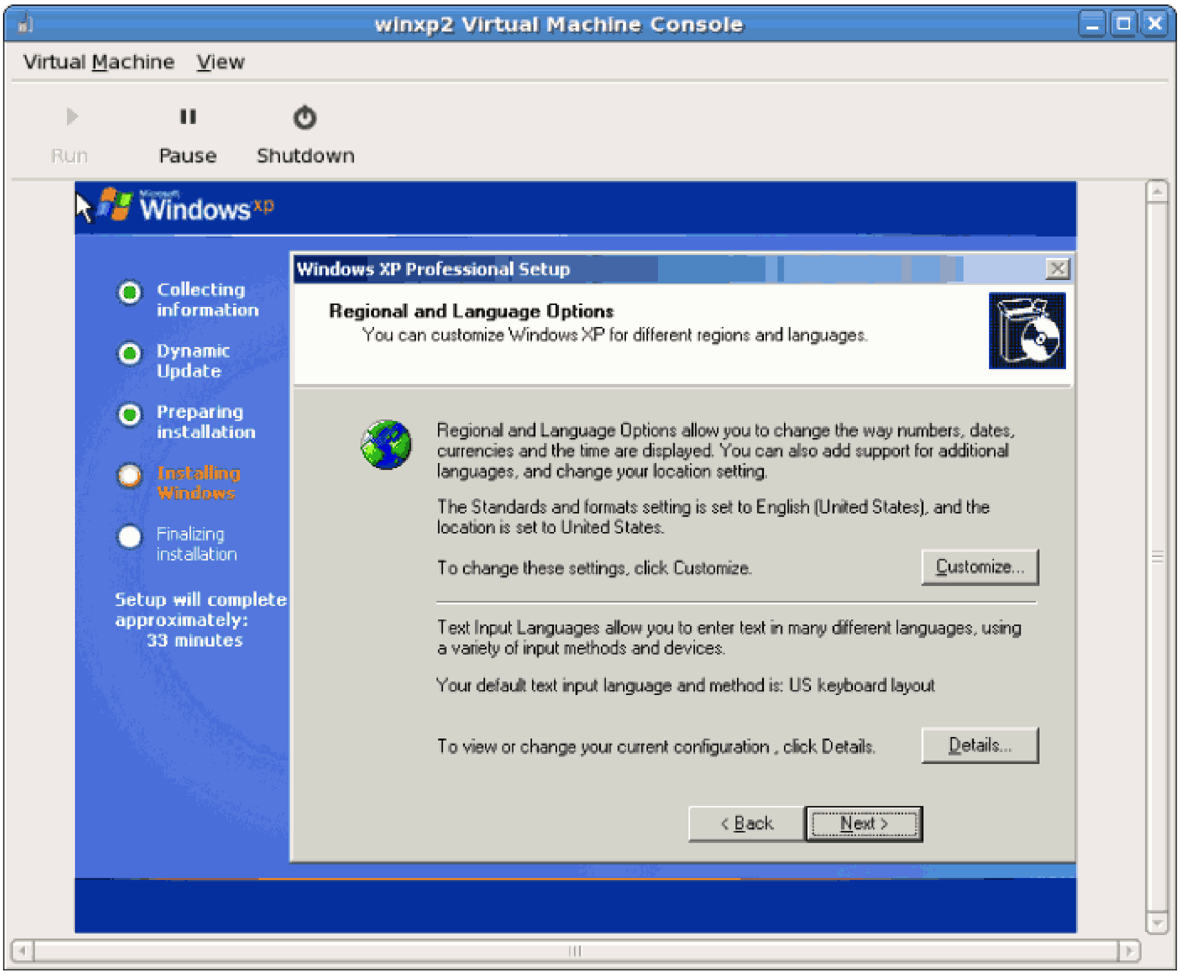


Setup is being restarted................

17. □□□□□□□□□□□ Windows □□□□□□


winxp2 Virtual Machine Console
Virtual Machine
View
Run
Pause
Shutdown
Microsoft®
Windows® xp
™
Copyright © Microsoft Corporation
Microsoft

18. □□□□□□□□□□ Windows □□□□□□□□□□



Regional and Language Options

You can customize Windows XP for different regions and languages.

Regional and Language Options allow you to change the way numbers, dates, currencies and the time are displayed. You can also add support for additional languages, and change your location setting.

The Standards and formats setting is set to English (United States), and the location is set to United States.

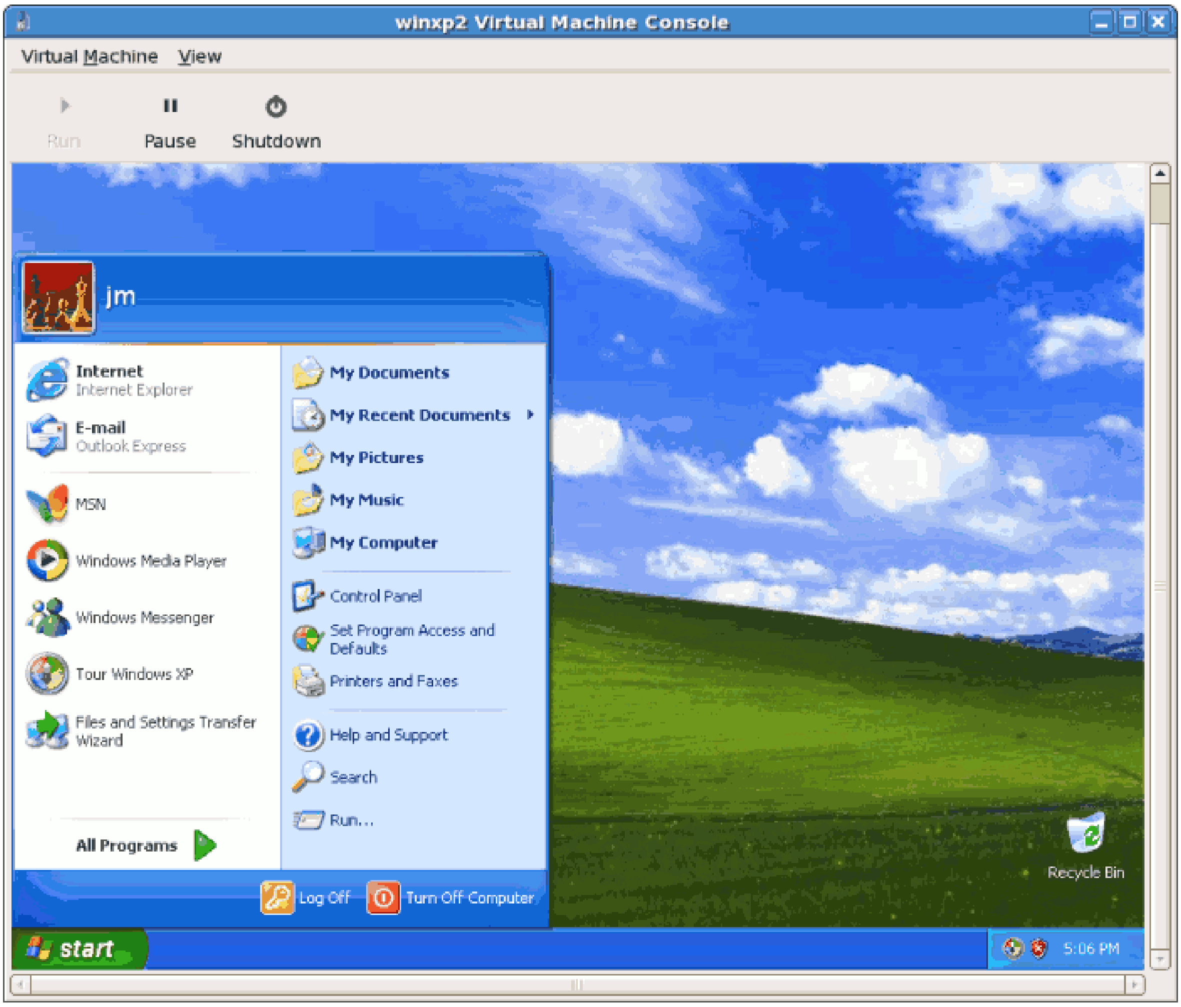
To change these settings, click Customize.

Text Input Languages allow you to enter text in many different languages, using a variety of input methods and devices.

Your default text input language and method is: US keyboard layout

To view or change your current configuration , click Details.

19. □□□□□□□□□□□□□□ Windows □□□



3.4. □□ Windows Server 2003 □□□□□□□□□□□

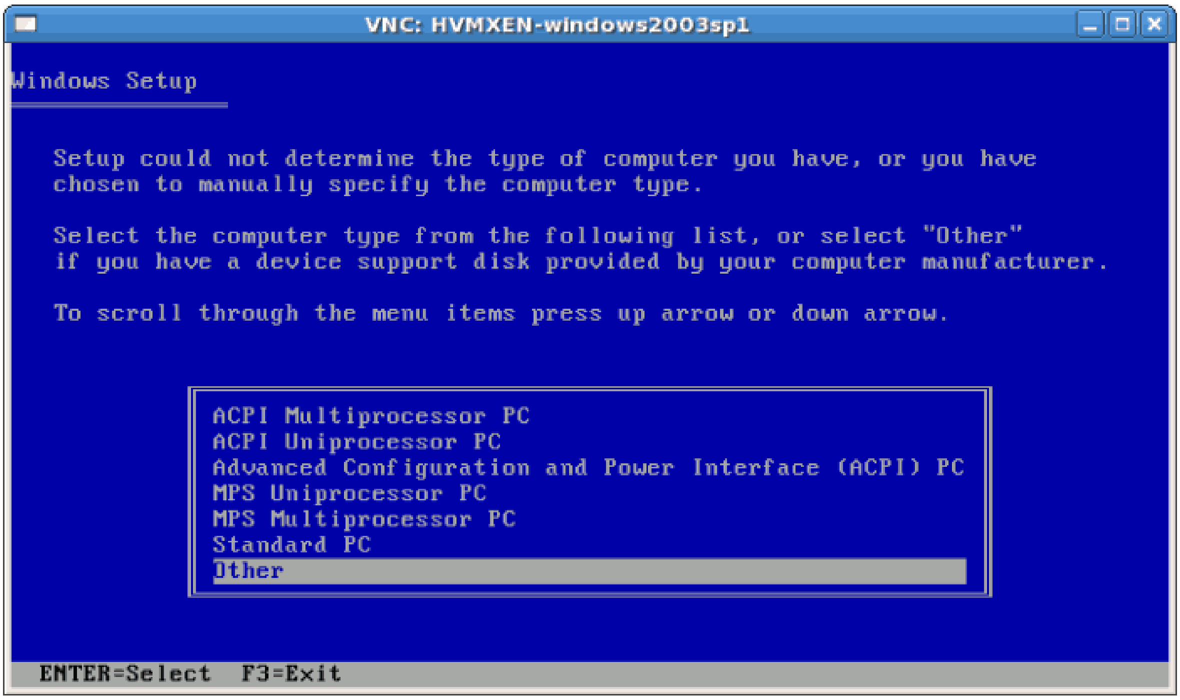
□□□□□□□□□ **virt-install** □□□□□□ Windows Server 2003 □□□□□□□□□□**virt-install** □□□□□□ virt-manager□□□□□□ *□ 3.3, “□□ Windows XP □□□□□□□□□□□□□□”* □□□□□ Windows XP □□□□□□□

1. □□□ **virt-install** □□□ Windows Server 2003□Windows □□□□□□□□□□ virt-viewer □□□□□ **virt-install** □□□ Windows Server 2003 □□□□□□□□□

   □□ **virt-install** □□□□□□

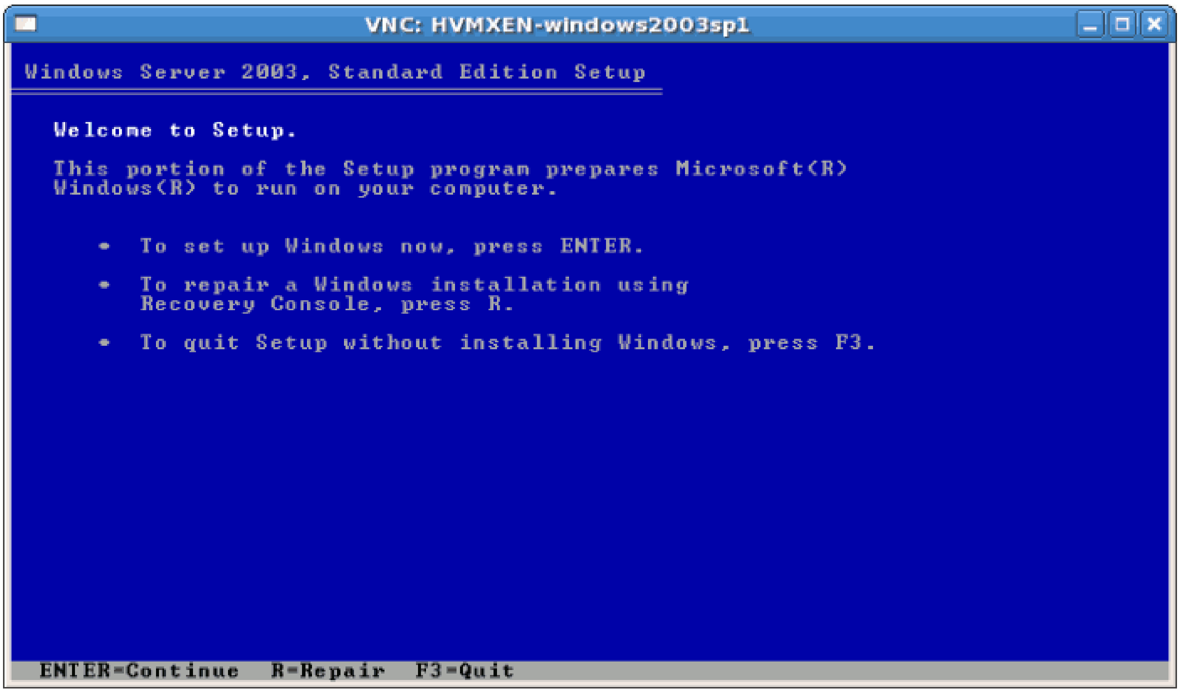
   ```
   # virt-install -hvm -s 5 -f /var/lib/libvirt/images/windows2003spi1.dsk
    \
   -n windows2003sp1 -cdrom=/ISOs/WIN/en_windows_server_2003_sp1.iso  \
   -vnc -r 1024
   ```

2. □□□□□□□□□□□□□□□□□□□□□ **F5**□□□□□□□□□□□□□□□□ **F5**□□□□□□□□□□□□□□□□□ **F5** □□□□□□□□□□□**HAL**□□□□□□□□□□□□□□□□□ PC□□□□□□□□□□□□□□□□□□□□□□□□□□

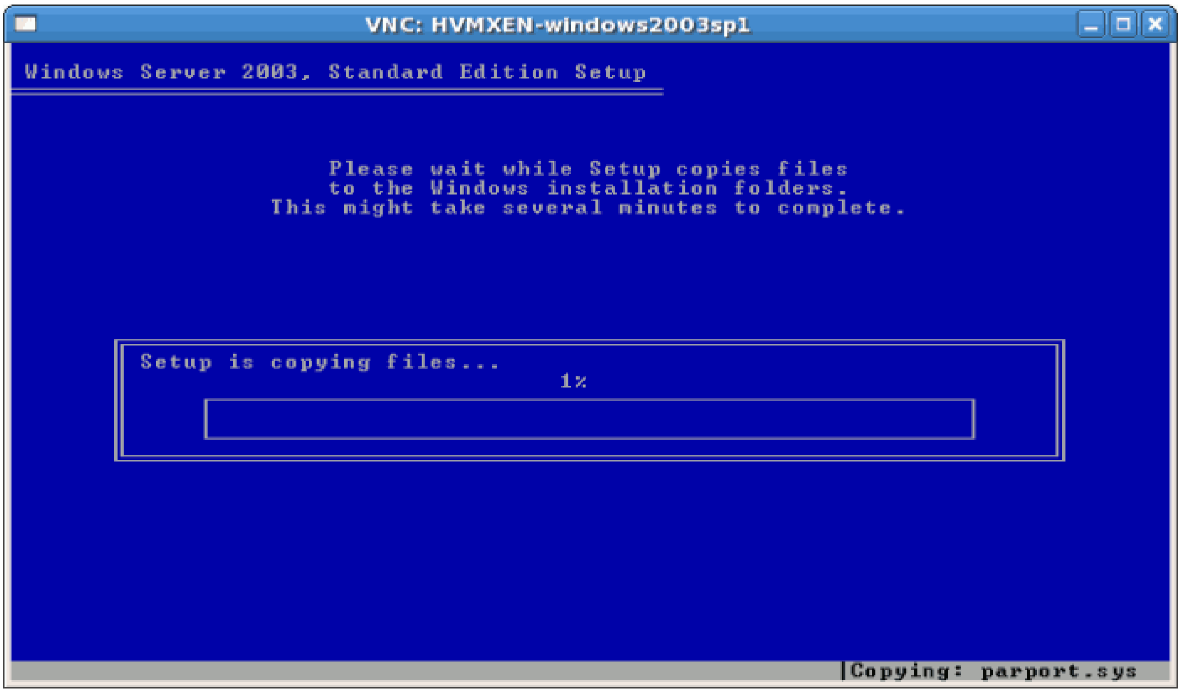


```
Windows Setup

  Setup could not determine the type of computer you have, or you have
  chosen to manually specify the computer type.

  Select the computer type from the following list, or select "Other"
  if you have a device support disk provided by your computer manufacturer.

  To scroll through the menu items press up arrow or down arrow.

             ACPI Multiprocessor PC
             ACPI Uniprocessor PC
             Advanced Configuration and Power Interface (ACPI) PC
             MPS Uniprocessor PC
             MPS Multiprocessor PC
             Standard PC
             Other

  ENTER=Select  F3=Exit
```

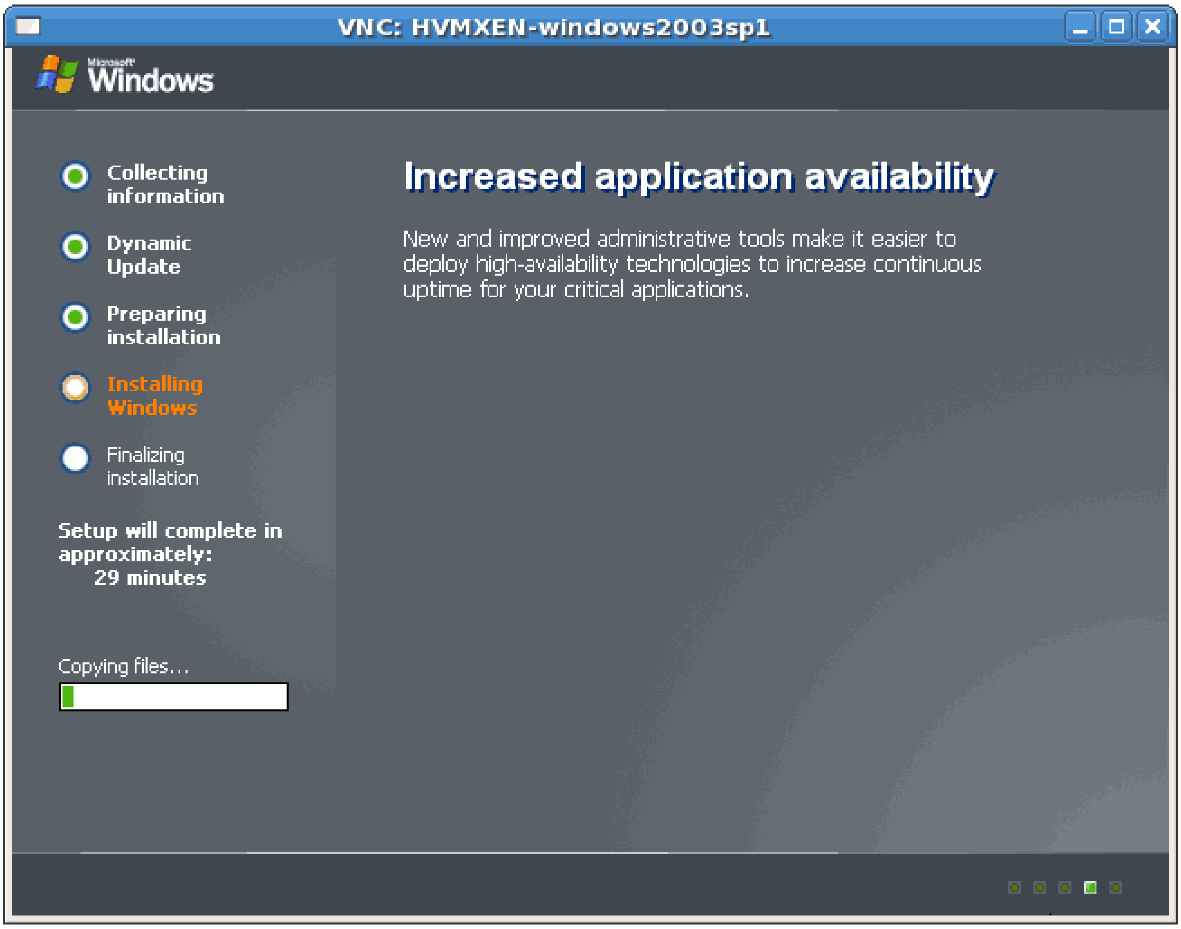
3. □□□□□□□□□□



```
 Windows Server 2003, Standard Edition Setup

  Welcome to Setup.

  This portion of the Setup program prepares Microsoft(R)
  Windows(R) to run on your computer.

     •  To set up Windows now, press ENTER.

     •  To repair a Windows installation using
        Recovery Console, press R.

     •  To quit Setup without installing Windows, press F3.

  ENTER=Continue  R=Repair  F3=Quit
```



```
Windows Server 2003, Standard Edition Setup

          Please wait while Setup copies files
          to the Windows installation folders.
        This might take several minutes to complete.

  Setup is copying files...
                                 1%

                                        |Copying: parport.sys
```



Increased application availability

New and improved administrative tools make it easier to deploy high-availability technologies to increase continuous uptime for your critical applications.

Setup will complete in approximately:
29 minutes

Copying files...

4. Windows 2003 □□□□□□□□□□□□□□□□□□□

3.5. □□ Windows Server 2008 □□□□□□□□□□□

□□□□□□□ Windows Server 2008 □□□□□□□□□□□□

□□ 3.4. □□ virt-manager □□□ Windows Server 2008

1. **Open virt-manager**

   Start **`virt-manager`**. Launch the **Virtual Machine Manager** application from the **Applications** menu and **System Tools** submenu. Alternatively, run the **`virt-manager`** command as root.

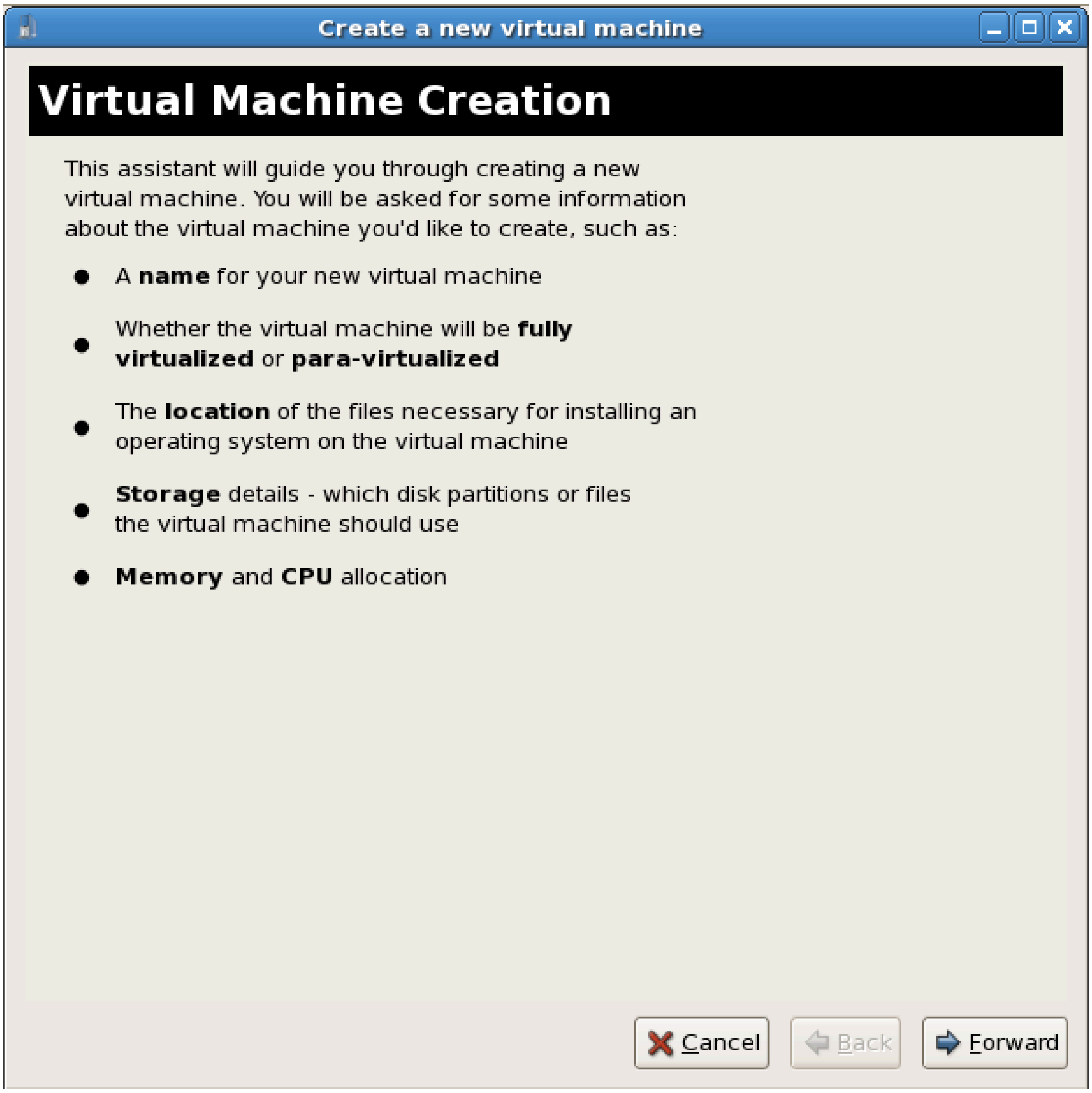
2. **Select the hypervisor**

   Select the hypervisor. If installed, select Xen or KVM. For this example, select KVM. Note that presently KVM is named `qemu`.

   □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

3. **Start the new virtual machine wizard**

   Pressing the **New** button starts the virtual machine creation wizard.



Create a new virtual machine

Virtual Machine Creation

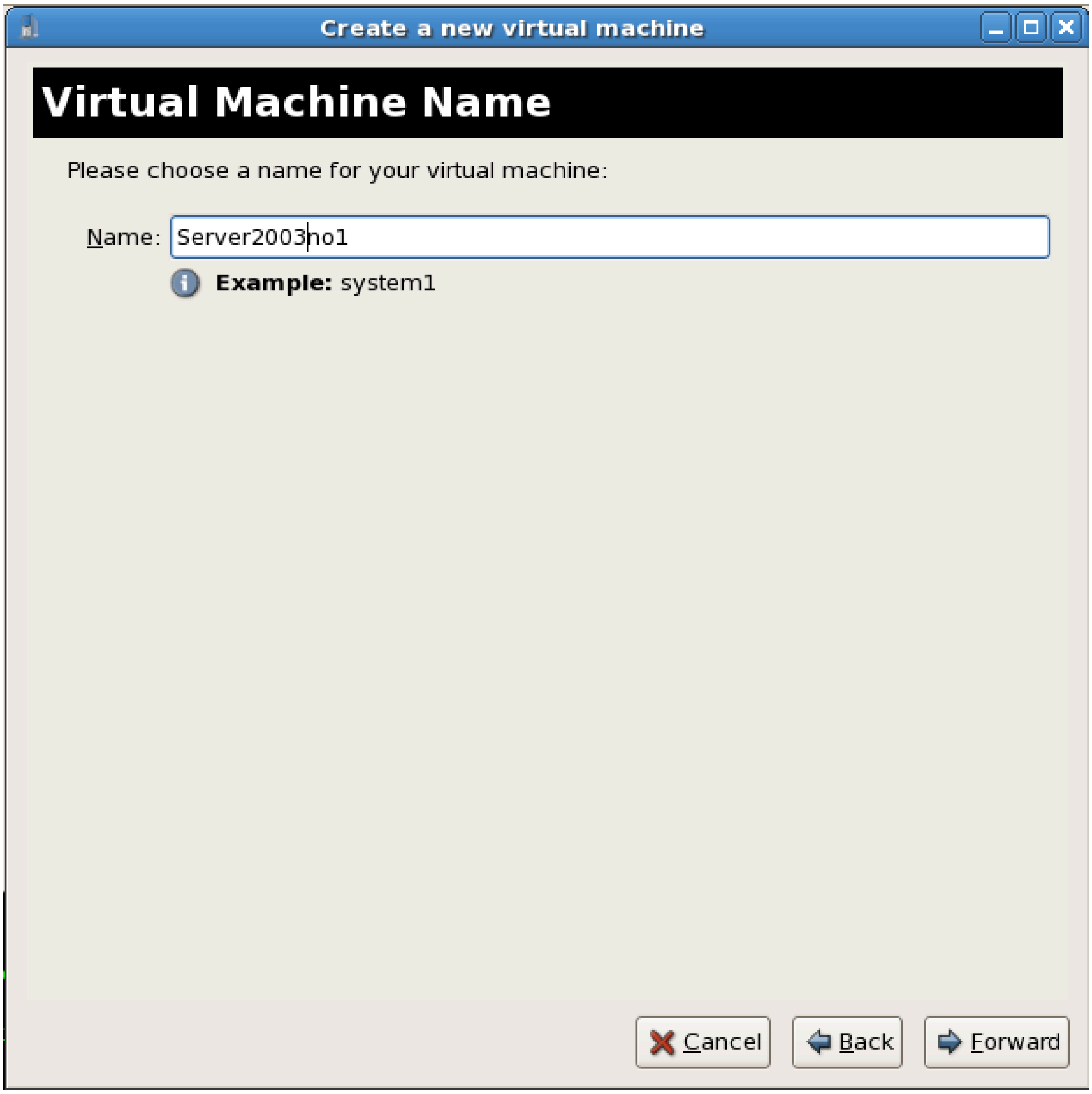
This assistant will guide you through creating a new virtual machine. You will be asked for some information about the virtual machine you'd like to create, such as:

- A **name** for your new virtual machine
- Whether the virtual machine will be **fully virtualized** or **para-virtualized**
- The **location** of the files necessary for installing an operating system on the virtual machine
- **Storage** details - which disk partitions or files the virtual machine should use
- **Memory** and **CPU** allocation

Press **Forward** to continue.

4. **Name the virtual machine**

   □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

   Virtual Machine Name

   Please choose a name for your virtual machine:

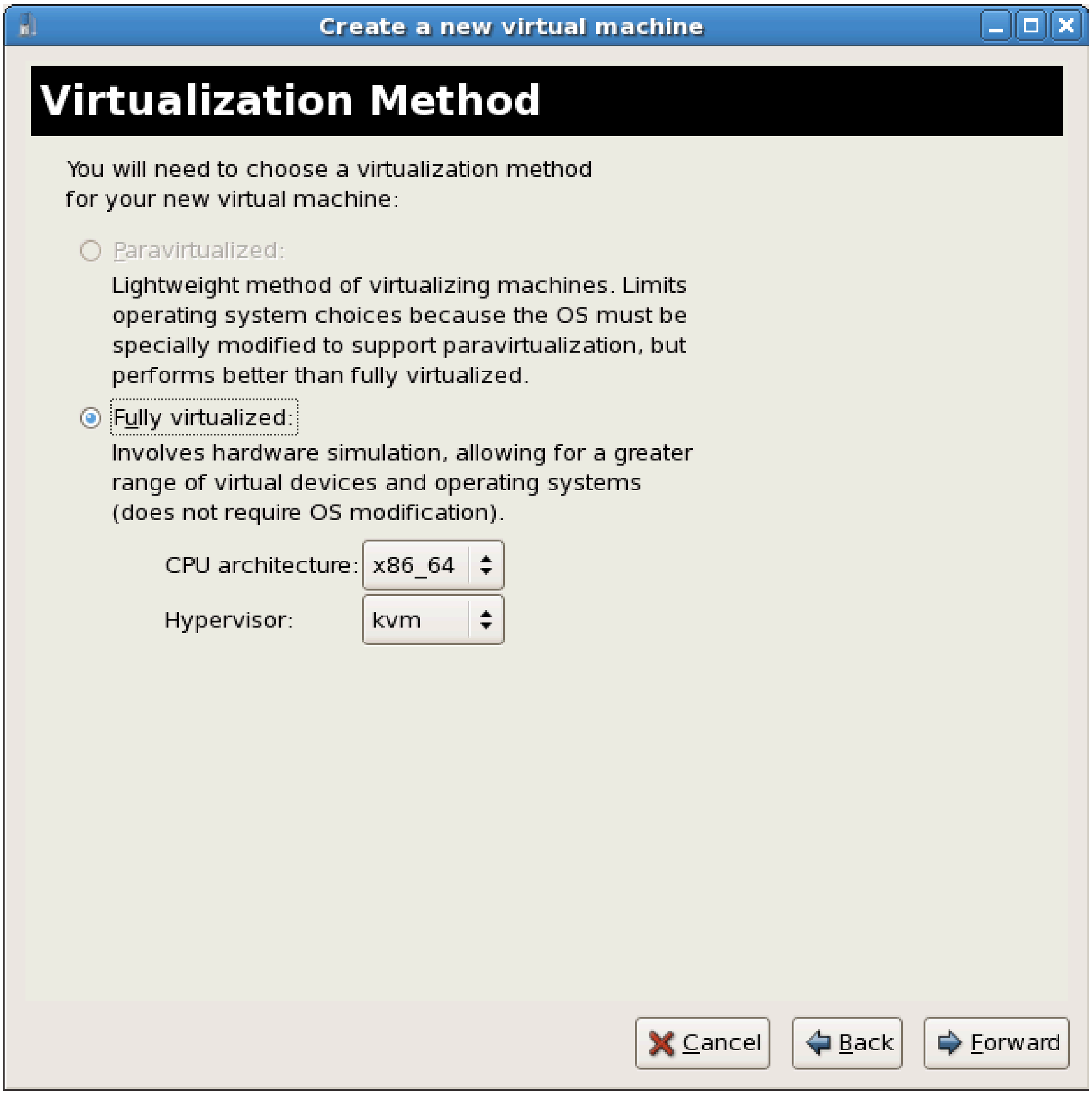
   Name: Server2003no1

   Example: system1

   □□□□□□□□□□□□□□

5. **Choose a virtualization method**

   □□ KVM □ Xen□□□□□□□□□□ hypervisor□□□□□□□ KVM hypervisor□



Create a new virtual machine

Virtualization Method

You will need to choose a virtualization method for your new virtual machine:

○ Paravirtualized:
Lightweight method of virtualizing machines. Limits operating system choices because the OS must be specially modified to support paravirtualization, but performs better than fully virtualized.

● Fully virtualized:
Involves hardware simulation, allowing for a greater range of virtual devices and operating systems (does not require OS modification).

CPU architecture: x86_64

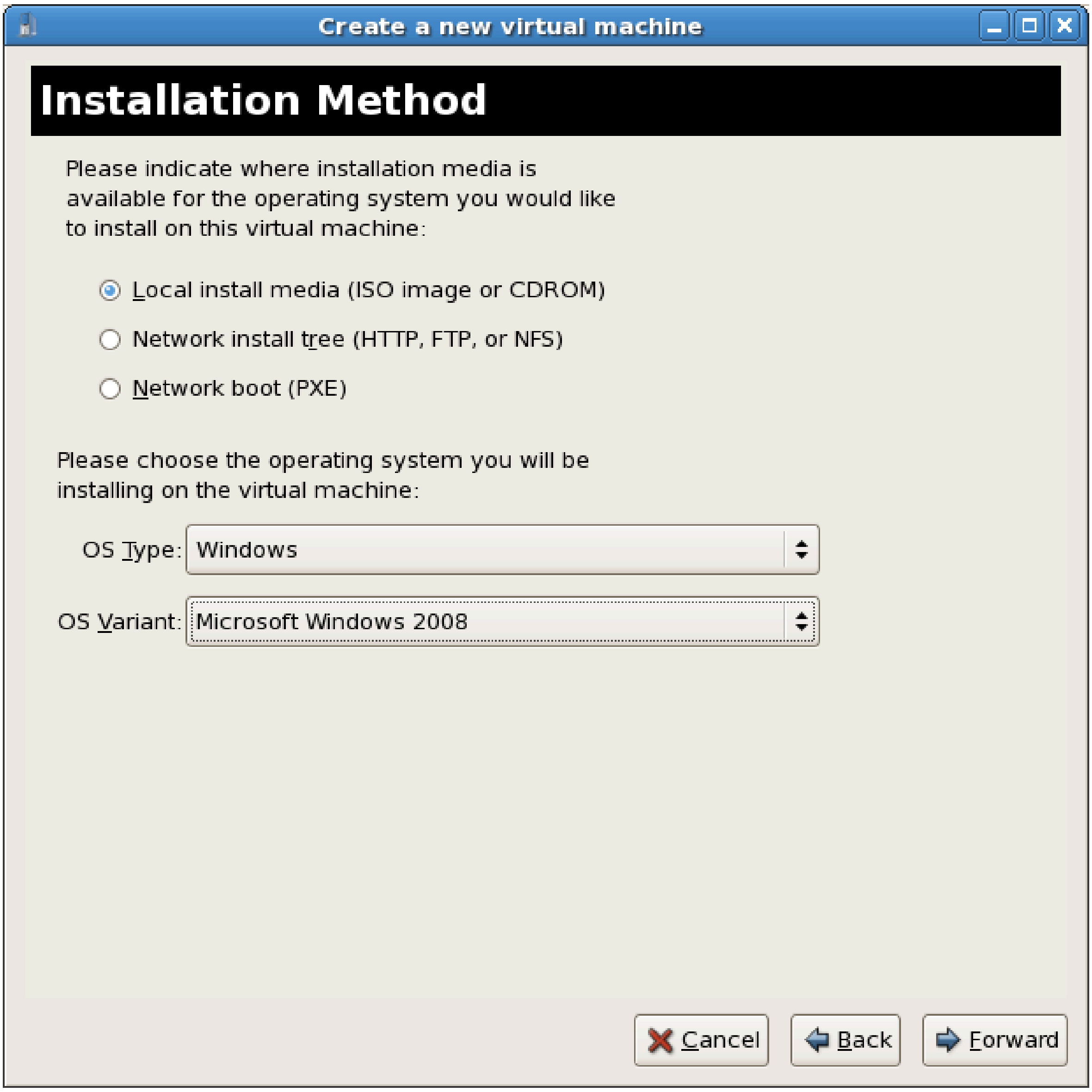
Hypervisor: kvm

□□□□□□□□□□□□□□□

6. **Select the installation method**
   □□□□□ Windows □□□□□□□□□□□□□□□□□□□□□□ ISO □□□□□□□□□□□□

   □□□□ PXE □□□□□□□□ Windows □□□□□□□□PXE □□□□□□□□ PXE □□□ Windows □□□□□□□□□□

   □□□□□□□□□□□□**Windows**□□□□□□□□□□□□□□**Microsoft Windows 2008**□□□□□□□


Create a new virtual machine

Installation Method

Please indicate where installation media is available for the operating system you would like to install on this virtual machine:

● Local install media (ISO image or CDROM)

○ Network install tree (HTTP, FTP, or NFS)

○ Network boot (PXE)

Please choose the operating system you will be installing on the virtual machine:

OS Type: Windows

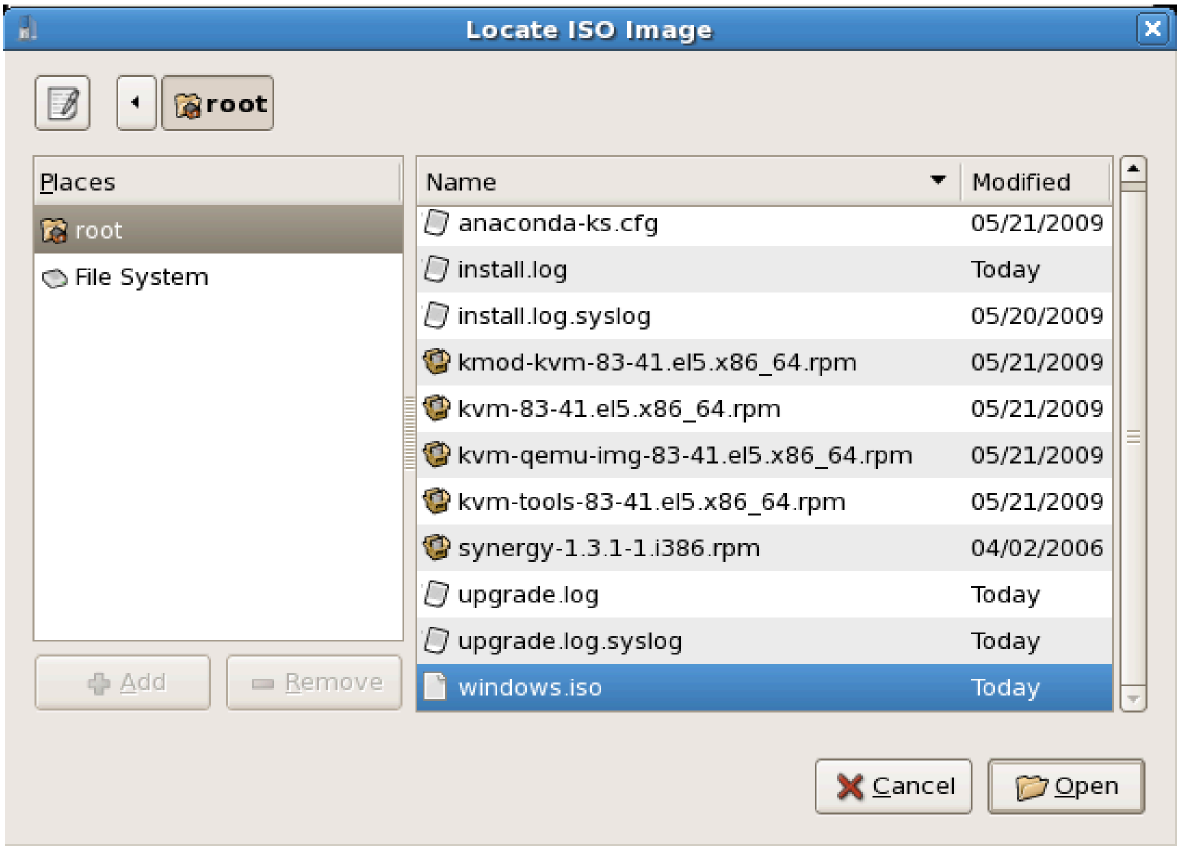
OS Variant: Microsoft Windows 2008

□□□□□□□□□□□□□□□

7. **Locate installation media**
   □□ ISO □□□□□□□□□□□□□□□□□□□□ Windows Server 2008 □□□□□ ISO □□□□

   a. Press the **Browse** button.

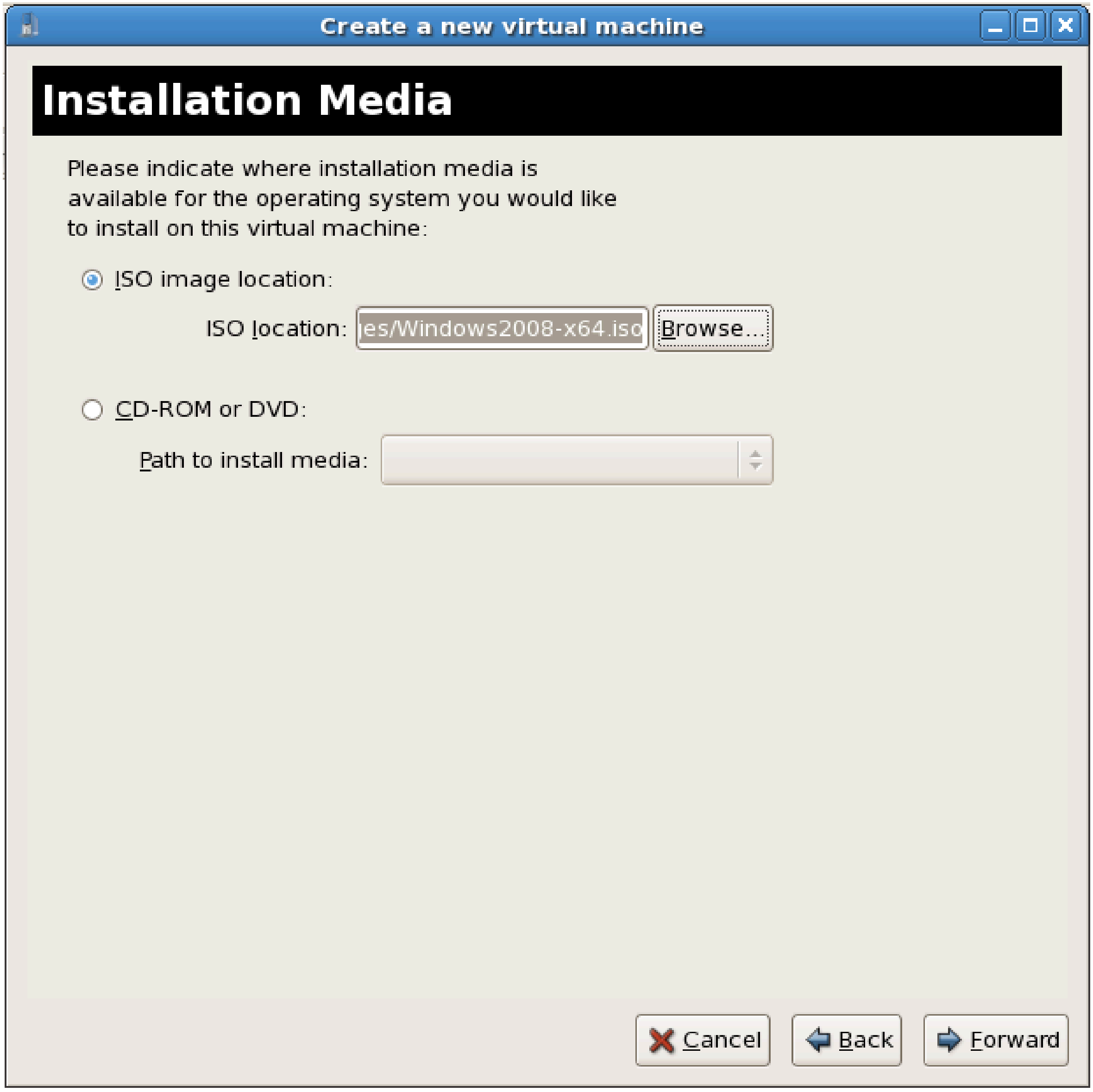
   b. □□ ISO □□□□□□□□□□□□□□□



Name	Modified
anaconda-ks.cfg	05/21/2009
install.log	Today
install.log.syslog	05/20/2009
kmod-kvm-83-41.el5.x86_64.rpm	05/21/2009
kvm-83-41.el5.x86_64.rpm	05/21/2009
kvm-qemu-img-83-41.el5.x86_64.rpm	05/21/2009
kvm-tools-83-41.el5.x86_64.rpm	05/21/2009
synergy-1.3.1-1.i386.rpm	04/02/2006
upgrade.log	Today
upgrade.log.syslog	Today
windows.iso	Today

□□□□□□□□□□□□□□

c. □□□□□□□□□□□□□□□□


Create a new virtual machine

Installation Media

Please indicate where installation media is available for the operating system you would like to install on this virtual machine:

● ISO image location:

ISO location: es/Windows2008-x64.iso [Browse...]

○ CD-ROM or DVD:

Path to install media:

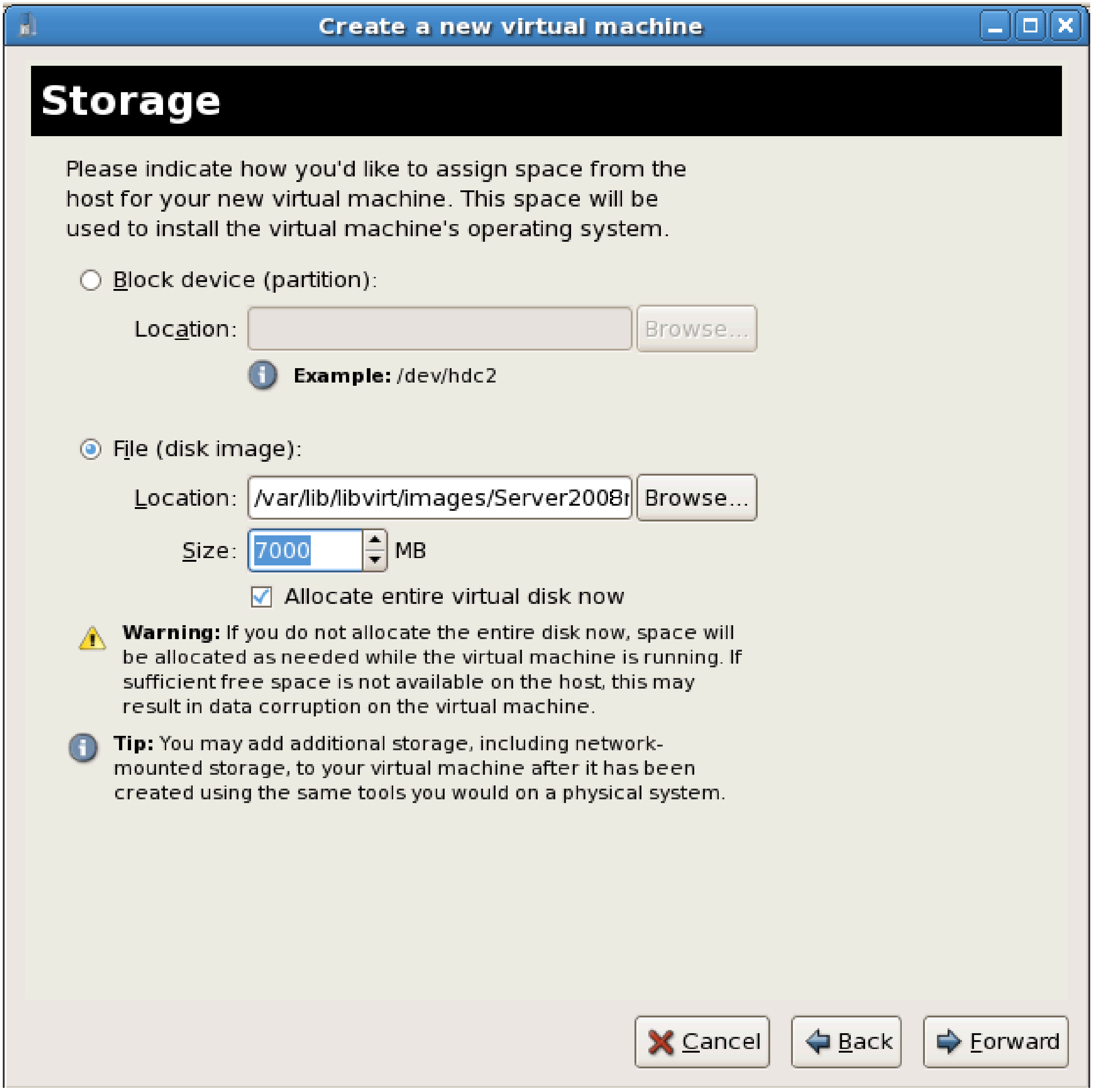
□□□□□□□□□□□□□□□□

Image files and SELinux

□□ ISO □□□□□□□□□□□□□□□□□□□□ /var/lib/libvirt/images/ □□□□□□□□□□□□□□□□□□□□ SELinux□□□□□ □ □ *7.1, "SELinux □□□□"*□

8. **Storage setup**

   □□□ /var/lib/libvirt/images/ □□□



Storage

Please indicate how you'd like to assign space from the host for your new virtual machine. This space will be used to install the virtual machine's operating system.

○ Block device (partition):

Location: Browse...

Example: /dev/hdc2

● File (disk image):

Location: /var/lib/libvirt/images/Server2008r Browse...

Size: 7000 MB

☑ Allocate entire virtual disk now

Warning: If you do not allocate the entire disk now, space will be allocated as needed while the virtual machine is running. If sufficient free space is not available on the host, this may result in data corruption on the virtual machine.

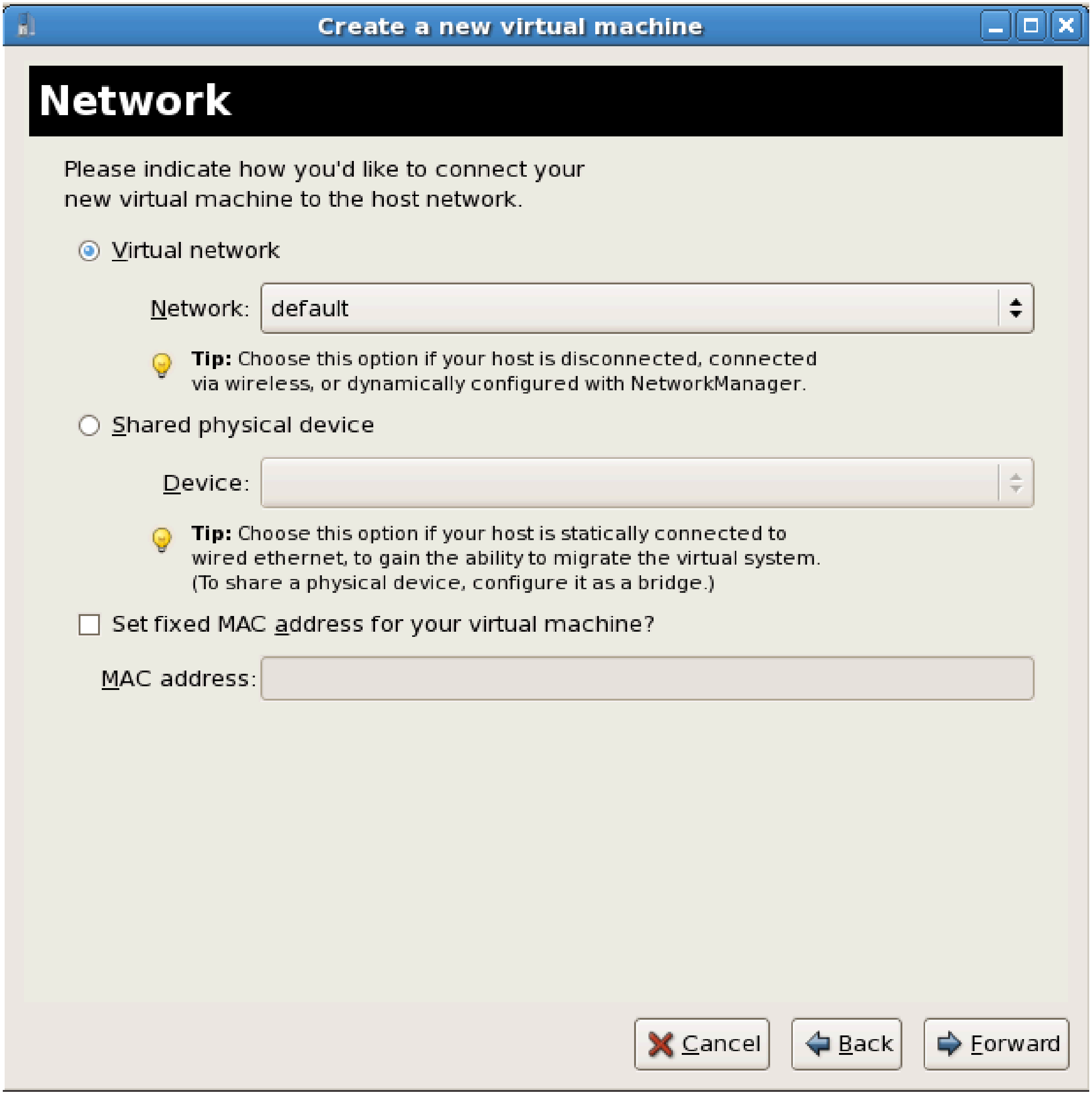
Tip: You may add additional storage, including network-mounted storage, to your virtual machine after it has been created using the same tools you would on a physical system.

□□□□□□□□□□□□□□

9. **Network setup**
   Select either **Virtual network** or **Shared physical device**.

   The virtual network option uses Network Address Translation (NAT) to share the default network device with the virtualized guest. Use the virtual network option for wireless networks.

   The shared physical device option uses a network bond to give the virtualized guest full access to a network device.



Create a new virtual machine

Network

Please indicate how you'd like to connect your new virtual machine to the host network.

● Virtual network

Network: default

Tip: Choose this option if your host is disconnected, connected via wireless, or dynamically configured with NetworkManager.

○ Shared physical device

Device:

Tip: Choose this option if your host is statically connected to wired ethernet, to gain the ability to migrate the virtual system. (To share a physical device, configure it as a bridge.)

□ Set fixed MAC address for your virtual machine?

MAC address:

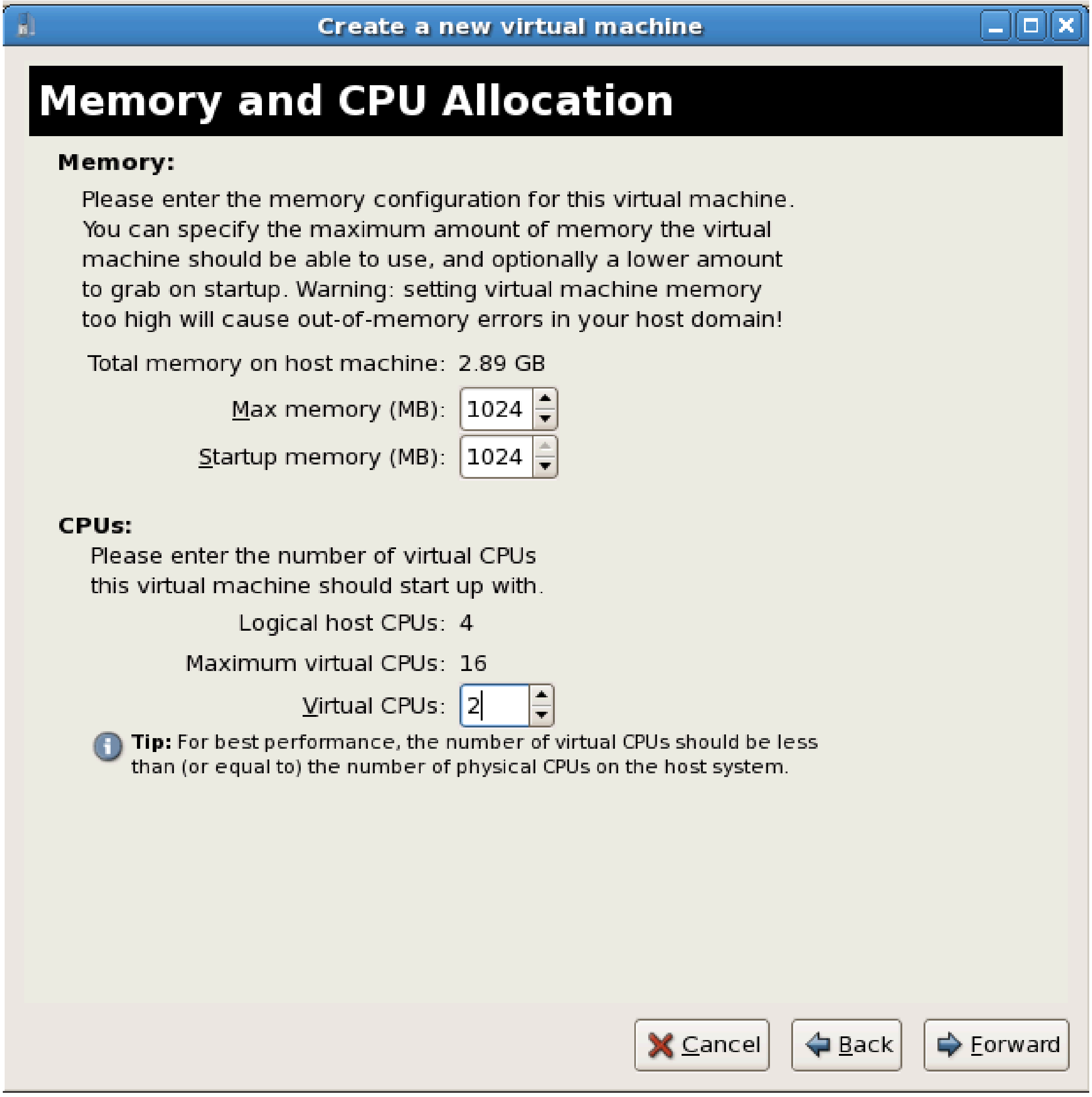
Press **Forward** to continue.

10. **Memory and CPU allocation**

    The Allocate memory and CPU window displays. Choose appropriate values for the virtualized CPUs and RAM allocation. These values affect the host's and guest's performance.

    Virtualized guests require sufficient physical memory (RAM) to run efficiently and effectively. Choose a memory value which suits your guest operating system and application requirements. Windows Server 2008. Remember, guests use physical RAM. Running too many guests or leaving insufficient memory for the host system results in significant usage of virtual memory and swapping. Virtual memory is significantly slower causing degraded system performance and responsiveness. Ensure to allocate sufficient memory for all guests and the host to operate effectively.

    Assign sufficient virtual CPUs for the virtualized guest. If the guest runs a multithreaded application assign the number of virtualized CPUs it requires to run most efficiently. Do not assign more virtual CPUs than there are physical processors (or hyper-threads) available on the host system. It is possible to over allocate virtual processors, however, over allocating has a significant, negative affect on guest and host performance due to processor context switching overheads.



Create a new virtual machine

Memory and CPU Allocation

Memory:

Please enter the memory configuration for this virtual machine. You can specify the maximum amount of memory the virtual machine should be able to use, and optionally a lower amount to grab on startup. Warning: setting virtual machine memory too high will cause out-of-memory errors in your host domain!

Total memory on host machine: 2.89 GB

Max memory (MB): 1024

Startup memory (MB): 1024

CPUs:

Please enter the number of virtual CPUs this virtual machine should start up with.

Logical host CPUs: 4

Maximum virtual CPUs: 16

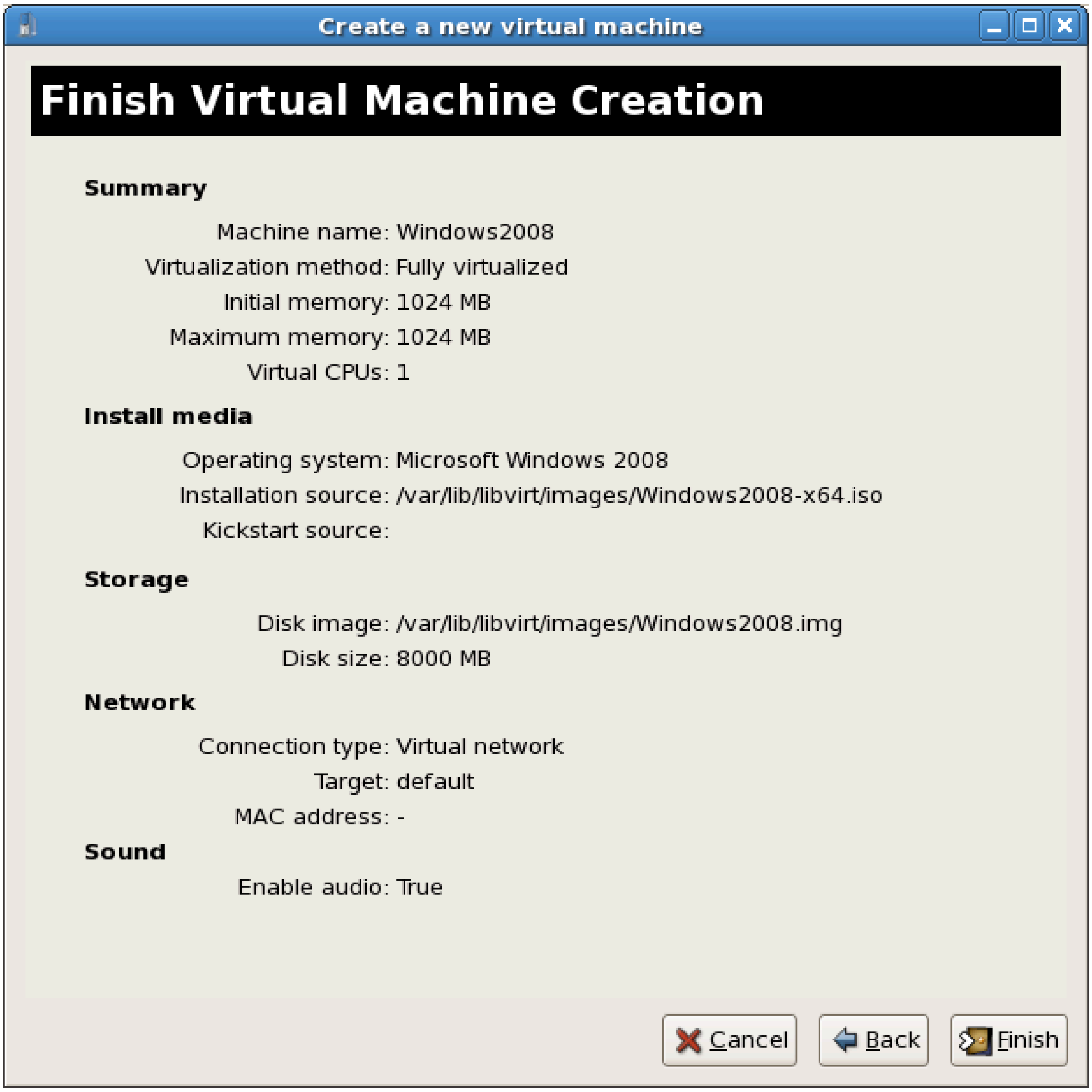
Virtual CPUs: 2

Tip: For best performance, the number of virtual CPUs should be less than (or equal to) the number of physical CPUs on the host system.

Press **Forward** to continue.

11. **Verify and start guest installation**

□□□□□



Create a new virtual machine

Finish Virtual Machine Creation

Summary

Machine name: Windows2008
Virtualization method: Fully virtualized
Initial memory: 1024 MB
Maximum memory: 1024 MB
Virtual CPUs: 1

Install media

Operating system: Microsoft Windows 2008
Installation source: /var/lib/libvirt/images/Windows2008-x64.iso
Kickstart source:

Storage

Disk image: /var/lib/libvirt/images/Windows2008.img
Disk size: 8000 MB

Network

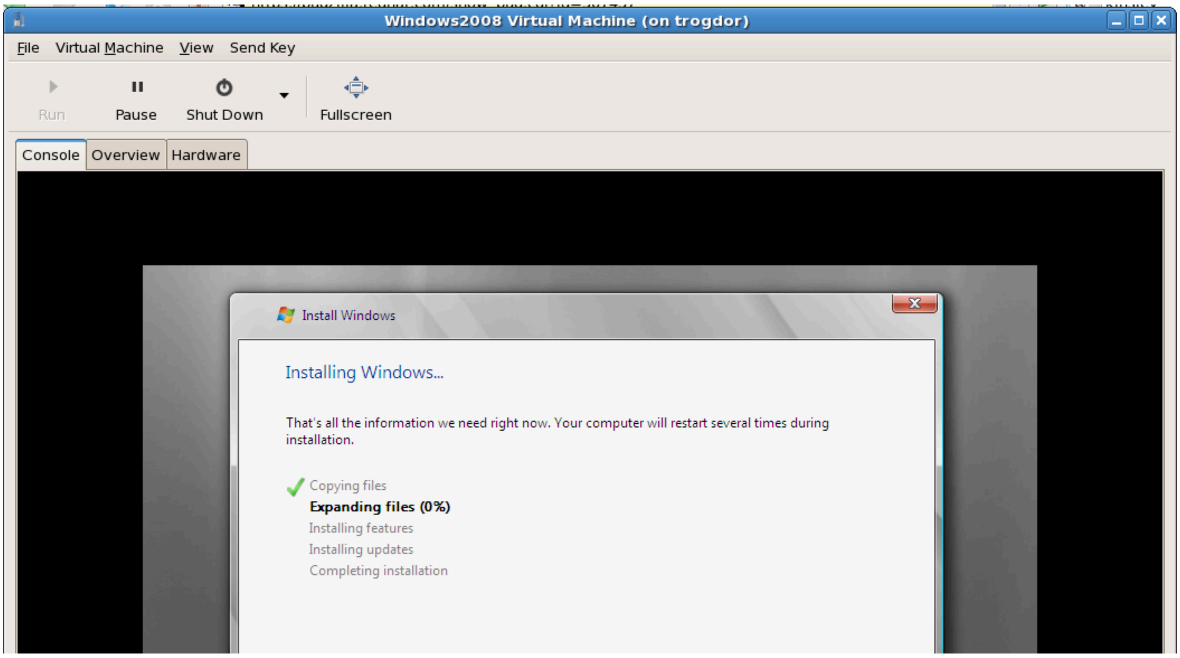
Connection type: Virtual network
Target: default
MAC address: -

Sound

Enable audio: True

□□□□□□□□□□□□□□□□□□□□□□

12. □□ **Windows**



Installing Windows...

That's all the information we need right now. Your computer will restart several times during installation.

✓ Copying files
Expanding files (0%)
Installing features
Installing updates
Completing installation

□□ Windows Server 2008 □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□[1]□□□□□□ Windows □□□□□□

□ II. Configuration

□ Fedora □□□□□□□□□

□□

[illegible]

[illegible]

4.1. [illegible]

[illegible]

[illegible] **dd** [illegible] **/dev/fd0** [illegible]

```
# dd if=/dev/fd0 of=~/legacydrivers.img
```

> **[illegible]**
>
> [illegible]

[illegible] Linux [illegible] **virt-manager** [illegible] **/var/lib/libvirt/images/rhel5FV.img** [illegible] Xen hypervisor[illegible]

1. [illegible] **virsh** [illegible] XML [illegible]

   ```
   # virsh dumpxml rhel5FV > rhel5FV.xml
   ```

   [illegible] XML [illegible] virsh XML [illegible] [illegible] *18, [illegible] libvirt script*[illegible]

2. [illegible]

   ```
   # dd if=/dev/zero of=/var/lib/libvirt/images/rhel5FV-floppy.img bs=512
    count=2880
   ```

3. [illegible] XML [illegible]

   ```
   <disk type='file' device='floppy'>
           <source file='/var/lib/libvirt/images/rhel5FV-floppy.img'/>
           <target dev='fda'/>
   </disk>
   ```

4. [illegible]

   ```
   # virsh stop rhel5FV
   ```

5. [illegible] XML [illegible]

   ```
   # virsh create rhel5FV.xml
   ```

[illegible]

4.2. □□□□□□□□□□□

□□

- □□□□□□□
- □□□□
- □□□□□□□□□□□□ iSCSI□
- □□□□□□□□□□□□□□□file container□□
- **NFS** □□□□□□□□□□□□□□
- iSCSI □□□□□□□□□□□□□□□
- □□□□□□□**GFS**□□

□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□container□□

1. □□□□□□□□□□□□□□□□□□□□□□□ ISO □□□□

   a. □□□ **dd** □□□□□□□ sparse □□□□□□□□□□□□□□□□□□□□□□□□□□□ sparse □□□Sparse □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

   ```
   # dd if=/dev/zero of=/var/lib/libvirt/images/FileName.img bs=1M
    seek=4096 count=0
   ```

   b. □□□□□ sparse□□□□□□□□□□□□□□□□□□□□□□□□□□□ sparse □□□□□□□□

   ```
   # dd if=/dev/zero of=/var/lib/libvirt/images/FileName.img bs=1M
    count=4096
   ```

   □□□□□□□□□□□ 400MB □□□□□□□□□□□□□□□□□□□□□□□□

2. □□□□□□□□□□□□□□□□□□□□ *Guest1* □□□□□□□□□□□□□□□□

   ```
   # virsh dumpxml Guest1 > ~/Guest1.xml
   ```

3. □□□□□□□□□□□□□□□□□□□□ *Guest1.xml*□□□□□□□disk=□□□□□□□□□□□□□□□□

   ```
   >disk type='file' device='disk'<
           >driver name='tap' type='aio'/<
           >source file='/var/lib/libvirt/images/Guest1.img'/<
           >target dev='xvda'/<
   >/disk<
   ```

4. □□□□□□ disk= □□□ **FileName.img**□□□□□□□□□□□□□□□□□
□□

   ```
   >disk type='file' device='disk'<
   ```

```
        >driver name='tap' type='aio'/<
        >source file='/var/lib/libvirt/images/Guest1.img'/<
        >target dev='xvda'/<
>/disk<
>disk type='file' device='disk'<
        >driver name='tap' type='aio'/<
        >source file='/var/lib/libvirt/images/FileName.img'/<
        >target dev='hda'/<
>/disk<
```

5. □□□□□□□□□□□□□□□□□□□□

   ```
   # virsh create Guest1.xml
   ```

6. □□□ Linux □□ Linux □□□□□□□□□□□□□□□□□□□□□

   □□□□□□□□□ **FileName.img** □□□□□□□□□□ **/dev/hdb** □□□

   a. □□□ *n* □□□□□□□□□

      ```
      # fdisk /dev/hdb
      Command (m for help):
      ```

   b. □□□ *p* □□□□□□□□□□

      ```
      Command action
         e   extended
         p   primary partition (1-4)
      ```

   c. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ *1* □□□□

      ```
      □□□□□□1-4□□1
      ```

   d. □□□□□□ *Enter* □□□□□□□□□□□□□

      ```
      □□□□□□1-400□□□ 1□□
      ```

   e. □□□□□□□□□□□□□□□□□□□□□□□□ *Enter* □□□□□□□□□

      ```
      □□□□□□□ +size □ +sizeM □ +sizeK□2-400□□□ 400□□
      ```

   f. □□□□□□ *t* □□□□□□□□□□

      ```
      Command (m for help): t
      ```

   g. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ *1*□

```
□□□□□□1-4□□1
```

h. Linux □□□□□□ *83*□

```
Hex code□□□ L □□□□□□□83
```

i. □□□□□□□□□□□

```
Command (m for help): w
Command (m for help): q
```

j. □□ `ext3` □□□□□□□□□□□□□□

```
# mke2fs -j /dev/hdb
```

7. □□□□□□□□□□□

```
# mount /dev/hdb1 /myfiles
```

□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□

□□ *4.1*, “□□□□□□□□□□□□□□□□” □□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□ CD-ROM□DVD □□□□□□□□

□□ 4.1. □□□□□□□□□□□□□□□□

1. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

2. □□□□□□ **`multipath`** □□□□□□□□□□□□□□□

3. □□□ **`virsh attach`** □□□□□ *`myguest`* □□□□□□□□□□□□ *`/dev/hdb1`* □□□□□□□□□□□□ *`hdc`* □□□□□□□□□□□□□□*`hdc`* □□□□□□□□□ □□□□□□□□ Windows □□□□□□□□ *`hd*`* □□□□□□□□□□□□□□□□

   □□ CD-ROM □ DVD □□□□□□□□ `--`*`type hdd`* □□□□□□

   □□□□□□□□□□□□□ `--`*`type floppy`* □□□□□□

   ```
   # virsh attach-disk myguest /dev/hdb1 hdc --driver tap --mode readonly
   ```

4. □□□□□□ Linux □ **`D:`** □□□ Windows □□□□□□□□□ **`/dev/hdb`** □□□□□□□□□□□□□□□□□□□

4.3. □□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□ iSCSI□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□live migration□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□UUID□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ UUID □□□□ iSCSI □□□□□□ LUN□UUID □□□□□□□□□□□□□□□□□ swap □□□□□□□□□□□ UUID □□□□□□□□□□

□□□□ **multipath** □□□□□□□ □□□□□□□□□ **multipath** □□□□□□ □□□□□□□

□□□□□

□□□□□□□ **udev** □□□□ *LUN* □□□□□□□□□□□□□□ **multipath** □□□□□□□□□□

1. □□ **/etc/scsi_id.config** □□□

   a. □□□ **options=-b** □□□□□□□□□□

   ```
   # options=-b
   ```

   b. □□□□□□□

   ```
   options=-g
   ```

   □□□□□□ **udev** □□□□□□□□□□□ SCSI □□□□□□□□□□ UUID□

2. □□□□□□□□□□ UUID□□□□□□ **scsi_id -g -s /block/sd*** □□□□□□□□□

   ```
   # scsi_id -g -s /block/sd*
   3600a0b800013275100000015427b625e
   ```

   □□□□□□□□□□□□□□□□□□□□□ /dev/sdc □□□ UUID□

3. □□□□□ **scsi_id -g -s /block/sd*** □□□□□□□ UUID □□□□□□□□□□□□□ UUID □□□□□

4. □□□□□□□□□□□□□□□□ **/etc/udev/rules.d** □□□□□□□□□□ **20-names.rules** □□□ □□□□□□□□□

   ```
   KERNEL="sd*", BUS="scsi", PROGRAM="/sbin/scsi_id -g -s", RESULT=UUID,
    NAME=devicename
   ```

   □□ *UUID* □ *devicename* □□□□□□□□□□ UUID□□□□□□□□□□□□□□□□□□□□□

   ```
   KERNEL="sd*", BUS="scsi", PROGRAM="/sbin/scsi_id -g -s",
    RESULT="3600a0b800013275100000015427b625e", NAME="rack4row16"
   ```

   udev daemon □□□□□□□□ UUID □□□□□□ **/dev/sd*** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□UUID □ 3600a0b800013275100000015427b625e □□□□□□□□□ **/dev/rack4row16**□

5. □□□□□□ **/etc/rc.local**□

   ```
   /sbin/start_udev
   ```

6. □□ **/etc/scsi_id.config**□**/etc/udev/rules.d/20-names.rules** □ **/etc/rc.local** □□□□□□ □□□□□□□□□□□□□

   ```
   /sbin/start_udev
   ```

□□□

□□□□□

multipath □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□**multipath** □□□□ Linux □□□□□□□□□□□□□□□□fault tolerance□□□□□□□□fail-over□□□□□□□□

□□□ **multipath** □□□□□□□ LUN □□□ UUID□□□□□□□ **scsi_id** □□□□□□□□□ UUIS□

```
# scsi_id -g -s /block/sdc
```

Multipath □□□□□□□□□ **/dev/mpath** □□□□□□□□□□□□□□□ 4 □□□□□□□ **/etc/multipath.conf** □□

```
multipaths {
        multipath {
        wwid                3600805f30015987000000000768a0019
        alias                oramp1
        }
        multipath {
        wwid                3600805f30015987000000000d643001a
        alias                oramp2
        }
        mulitpath {
        wwid                3600805f3001598700000000086fc001b
        alias                oramp3
        }
        mulitpath {
        wwid                3600805f300159870000000000984001c
        alias                oramp4
        }
}
```

□□□□□□□□□□ LUN□□□□□□□□ **/dev/mpath/oramp1**□**/dev/mpath/oramp2**□**/dev/mpath/oramp3** □ **/dev/mpath/oramp4**□□□□□□□□□□□□□ WWID □□□□□□□□□□□□□□□□□□□□□

4.4. □□□□□□□ CD-ROM □ DVD □□□□□□□□

□□□□□ ISO □□□□□□□□□□□□□□□□□□□□□□ **virsh** □□□□ *attach-disk* □□□

```
# virsh attach-disk [domain-id] [source] [target] --driver file --type
 cdrom --mode readonly
```

source □ *target* □□□□□□□□□□□□□□□□□□□□□□□□□□□*source* □□□□□ ISO □□□□□□□□□□□□□ **/dev** □□□□□□□□□□

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□□□□□□□□ Fedora □□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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- Fibre Channel
- iSCSI
- NFS
- GFS2

□□□

5.1. □□ iSCSI □□□□□□

□□□□□□□□□□□□□□ iSCSI □□□□□□□□□□□□□□□□□□□□□□

5.2. □□ NFS □□□□□□

□□□□□□□□□□□□ NFS□□□□□□□□□□□□□□□□□□□

5.3. □□ GFS2 □□□□□□

□□□□□□□□□□□□ Fedora □ Global File System 2□GFS2□□□□□□□□□□□□□□□□□□□□

[illegible]

[illegible] Fedora [illegible]dom0[illegible]

- [illegible] SELinux [illegible]enforcing[illegible]

```
# setenforce 1
```

- [illegible] **AutoFS**[illegible]**NFS**[illegible]**FTP**[illegible]**HTTP**[illegible]**NIS**[illegible]**telnetd**[illegible]**sendmail** [illegible]

- [illegible]

- [illegible]

- [illegible] **/var/lib/libvirt/images/** [illegible] SELinux [illegible]

- [illegible] `vsftpd` [illegible]

[illegible]

[illegible]Xen hypervisor [illegible]

- [illegible]
- [illegible] hypervisor [illegible] *SELinux*[illegible] SELinux [illegible] *[illegible] 7.1, “SELinux [illegible]”*[illegible]
- [illegible] dom0 [illegible] dom0 [illegible]
- [illegible] dom0[illegible] dom0 [illegible] dom0 [illegible]dom0 [illegible]

7.1. SELinux [illegible]

SELinux[illegible] Linux[illegible] NSA [illegible] Linux [illegible] Linux [illegible]SELinux [illegible]Fedora [illegible] Linux [illegible] SELinux[illegible]

[illegible] SELinux[illegible]SELinux [illegible] **/var/lib/libvirt/images** [illegible]

[illegible] LVM [illegible] SELinux [illegible]

[illegible] SELinux [illegible]

[illegible] 7.1. [illegible] SELinux [illegible]

1. [illegible] *volumegroup* [illegible] 5GB [illegible] *NewVolumeName*[illegible]

   ```
   # lvcreate -n NewVolumeName -L 5G volumegroup
   ```

2. [illegible] ext3[illegible] *NewVolumeName* [illegible]

   ```
   # mke2fs -j /dev/volumegroup/NewVolumeName
   ```

3. [illegible]**/etc**[illegible]**/var**[illegible]**/sys**[illegible]**/home** [illegible] **/root**[illegible] **/virtstorage** [illegible]

   ```
   # mkdir /virtstorage
   ```

4. [illegible]

   ```
   # mount /dev/volumegroup/NewVolumeName /virtstorage
   ```

5. [illegible] Xen [illegible] SELinux [illegible]

   ```
   semanage fcontext -a -t xen_image_t "/virtualization(/.*)?"
   ```

   [illegible] KVM [illegible] SELinux [illegible]

   ```
   semanage fcontext -a -t virt_image_t "/virtualization(/.*)?"
   ```

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **/etc/selinux/targeted/contexts/files/file_contexts.local** □□□□□□□□□□□□□□□□□□□□□□□□□

```
/virtstorage(/.*)?    system_u:object_r:xen_image_t:s0
```

6. □□□□□□□□□□□□□□**/virtstorage**□□□□□□□□□□□□□□□□□□□ **xen_image_t**□**restorecon** □ **setfiles** □□□ **/etc/selinux/targeted/contexts/files/** □□□□□□

```
# restorecon -R -v /virtualization
```

7.2. SELinux □□□□

□□□□□□□□□□ SELinux □□□ SElinux □□□□□□□□□□□ LVM □□□□□□□□□□□□□□□□□□□□□□□□□ SELinux □□□□

```
# semanage fcontext -a -t xen_image _t -f -b /dev/sda2
# restorecon /dev/sda2
```

xend_disable_t □□ boolean □□□□□□□□□□□□ daemon □□ **xend** □□□□□□□□unconfined mode□□□□□□□□□□□□□□□□□□□□□□□□□□ □ **xen_image_t**□

[illegible]

[illegible] libvirt [illegible] hypervisor[illegible] Xen[illegible]KVM [illegible] hypervisor[illegible] libvirt [illegible]

[illegible]

8.1. [illegible] libvirt [illegible]

[illegible]NAT[illegible]Network address translation[illegible]

[illegible]

[illegible] `libvirt` [illegible] NAT [illegible] **`virsh net-list --all`** [illegible]

```
# virsh net-list --all
Name                 State      Autostart
-----------------------------------------
default              active     yes
```

[illegible] XML [illegible]

```
# virsh net-define /usr/share/libvirt/networks/default.xml
```

[illegible] **`/usr/share/libvirt/networks/default.xml`** [illegible]

[illegible]

```
# virsh net-autostart default
Network default marked as autostarted
```

[illegible]

```
# virsh net-start default
Network default started
```

[illegible] `libvirt` [illegible] NAT [illegible] IP [illegible]

```
# brctl show
bridge name     bridge id               STP enabled     interfaces
virbr0          8000.000000000000       yes
```

`libvirt` [illegible] **`iptables`** [illegible] **`INPUT`**[illegible]**`FORWARD`**[illegible]**`OUTPUT`** [illegible] **`POSTROUTING`** chain [illegible] `virbr0` [illegible]**`libvirt`** [illegible] **`ip_forward`** [illegible] **`ip_forward`** [illegible] **`/etc/sysctl.conf`**[illegible]

```
net.ipv4.ip_forward = 1
```

[illegible]

[illegible] XML[illegible]

```
<interface type='network'>
  <source network='default'/>
</interface>
```

Note

□□□□□□□ MAC □□□□□□□□□□MAC □□□□□□□□□□□□□□□□□□□□ MAC □□□□□□□□□□

```
<interface type='network'>
  <source network='default'/>
  <mac address='00:16:3e:1a:b3:4a'/>
  </interface>
```

8.2. □□ libvirt □□□□□□□□□□

□□□

□□ Xen □□ script

□□□□□□□□□ Xen □□□□□□□□□□□□□□□□ **/etc/xen/xend-config.sxp** □□□□□□□□□□□□□□□□ Xen □□□□□□

```
(network-script network-bridge)
```

□□□□

```
(network-script /bin/true)
```

□□ NetworkManager□□□□□□□□

NetworkManager □□□□□□□□□□□NetworkManager □□□□□□□□□□□□□□□□□□□ script □□□□□□

```
# chkconfig NetworkManager off
# chkconfig network on
# service NetworkManager stop
# service network start
```

Note

□□□ NetworkManager □□□□□□□□□*NM_CONTROLLED=no*□□□□□□□□□□□□□□ **ifcfg-*** script□

□□□□ initscript

□□□

□□□ **/etc/sysconfig/network-scripts** □□□

```
# cd /etc/sysconfig/network-scripts
```

□□□□□□□□□□□□□□□□□□ script□□□□□□□□**ifcfg-eth0** □□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
DEVICE=eth0
# change the hardware address to match the hardware address your NIC uses
HWADDR=00:16:76:D6:C9:45
ONBOOT=yes
BRIDGE=br0
```

□□

□□□□□□ *MTU* □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Maximum Transfer Unit□MTU□□

```
MTU=9000
```

□□ **/etc/sysconfig/network-scripts** □□□□□□□□□□□□□ script□□□□□□ **ifcfg-br0** □□□□□□*br0* □□□□□□□□□□□□□□□□ DEVICE □□□□□□□□□□□□□□□□□□□□□□

```
DEVICE=br0
TYPE=Bridge
BOOTPROTO=dhcp
ONBOOT=yes
DELAY=0
```

Warning

The line, *TYPE=Bridge*, is case-sensitive. It must have uppercase 'B' and lower case 'ridge'.

□□□□□□□□□□□□□□□□□□□□

```
# service network restart
```

Configure **iptables** to allow all traffic to be forwarded across the bridge.

```
# iptables -I FORWARD -m physdev --physdev-is-bridged -j ACCEPT
# service iptables save
# service iptables restart
```

Disable iptables on bridges

Alternatively, prevent bridged traffic from being processed by **iptables** rules. In **/etc/sysctl.conf** append the following lines:

```
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0
```

Reload the kernel parameters configured with **`sysctl`**

```
# sysctl -p /etc/sysctl.conf
```

Restart the **`libvirt`** daemon.

```
# service libvirtd reload
```

□□

```
# brctl show
bridge name     bridge id               STP enabled     interfaces
virbr0          8000.000000000000       yes
br0             8000.000e0cb30550       no              eth0
```

□□□□□□□ **`virbr0`** □□□□□□□□□□□□□□□□□□□□□ **`virbr0`**□**`virbr0`** □□□□□□□□□□□□NAT□□□□□

KVM □□□□□□□□

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KVM □□□□□□□□□□□□□□□□□□□□□□□□□□ Fedora □□□□ Fedora □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□ KVM □□□□□virtio □□□□□□□□□□□□□□ Fedora □□□□□□□

Note

□□□□□□□□ 28 □□□□□□□□□ PCI □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ 28 □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ VTd □ PCI □□□□□□□□

□□ Microsoft Windows □□□□□ KVM □□□□□□□□□

- Windows XP□
- Windows Server 2003□
- Windows Vista □□
- Windows Server 2008□

9.1. □□ KVM Windows □□□□□□□□□

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- □□□□□□□□□□□□□□ host □□□□□□
- □□□□□□□□□□□□□□ CD-ROM □□ .iso □□□□□□
- □□□□□□□□□□□□□□□□□□□□□□□□ Windows □□□□□□

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1. □□□□□□
   □□□□□□□□□□□ Microsoft□*windowsservercatalog.com*[1]□□□□

   virtio-win □□□□ **/usr/share/virtio-win/** □□□□□□□□□□□□□ **virtio-win.iso**□

2. □□□□□□□□□□□
   □□□

   □□□□□□□□□□ root □□ virtio □□□□□□□□□□□□□□□□□

□ virt-manager □□□□□□□

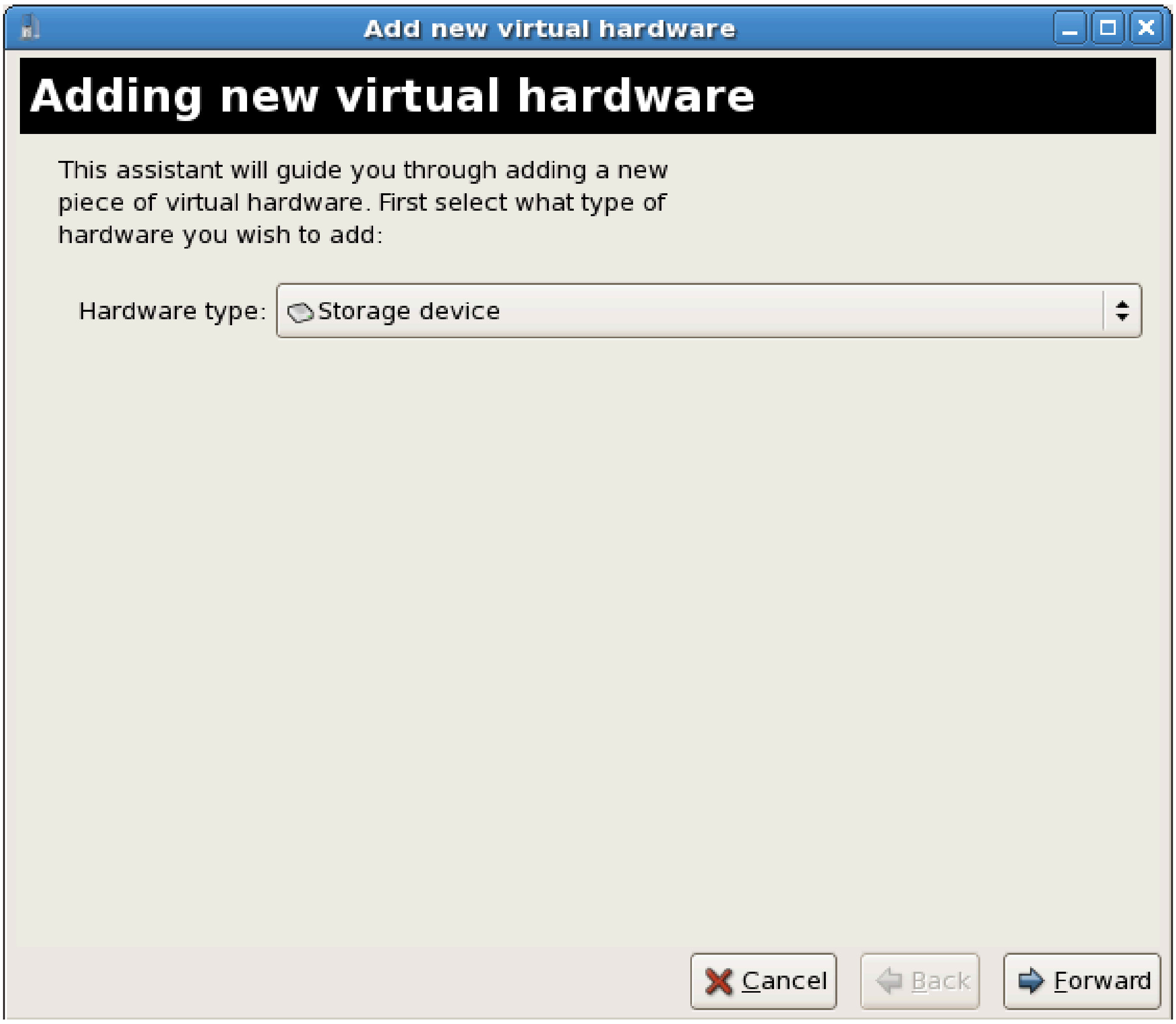
□□□ □□ *9.1, "□□ Windows □□□□□□□□□ **virt-manager** □□□□□□□□□□"* □□ **virt-manager** □□□□□□□□□□□

□□ 9.1. □□ Windows □□□□□□□□□ **virt-manager** □□□□□□□□□□

1. □□ **virt-manager**□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

2. [illegible]

3. [illegible]



Add new virtual hardware

Adding new virtual hardware

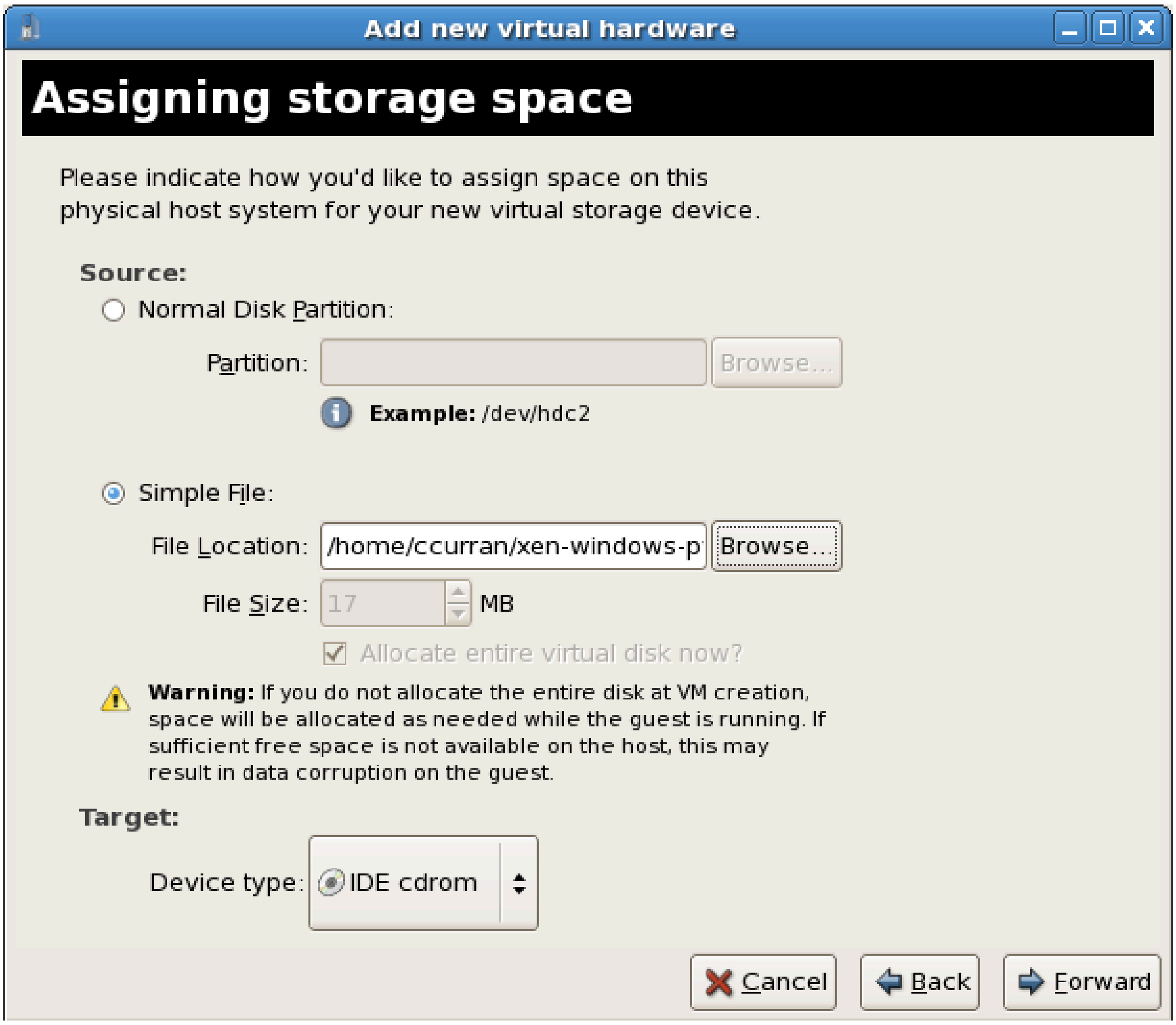
This assistant will guide you through adding a new piece of virtual hardware. First select what type of hardware you wish to add:

Hardware type: Storage device

4. [illegible] .iso [illegible] **yum** [illegible].iso [illegible] **`/usr/share/xenpv-win`**[illegible]

   [illegible]

   [illegible]**IDE** [illegible]



Add new virtual hardware

Assigning storage space

Please indicate how you'd like to assign space on this physical host system for your new virtual storage device.

Source:

○ Normal Disk Partition:

Partition:

Example: /dev/hdc2

● Simple File:

File Location: /home/ccurran/xen-windows-p

File Size: 17 MB

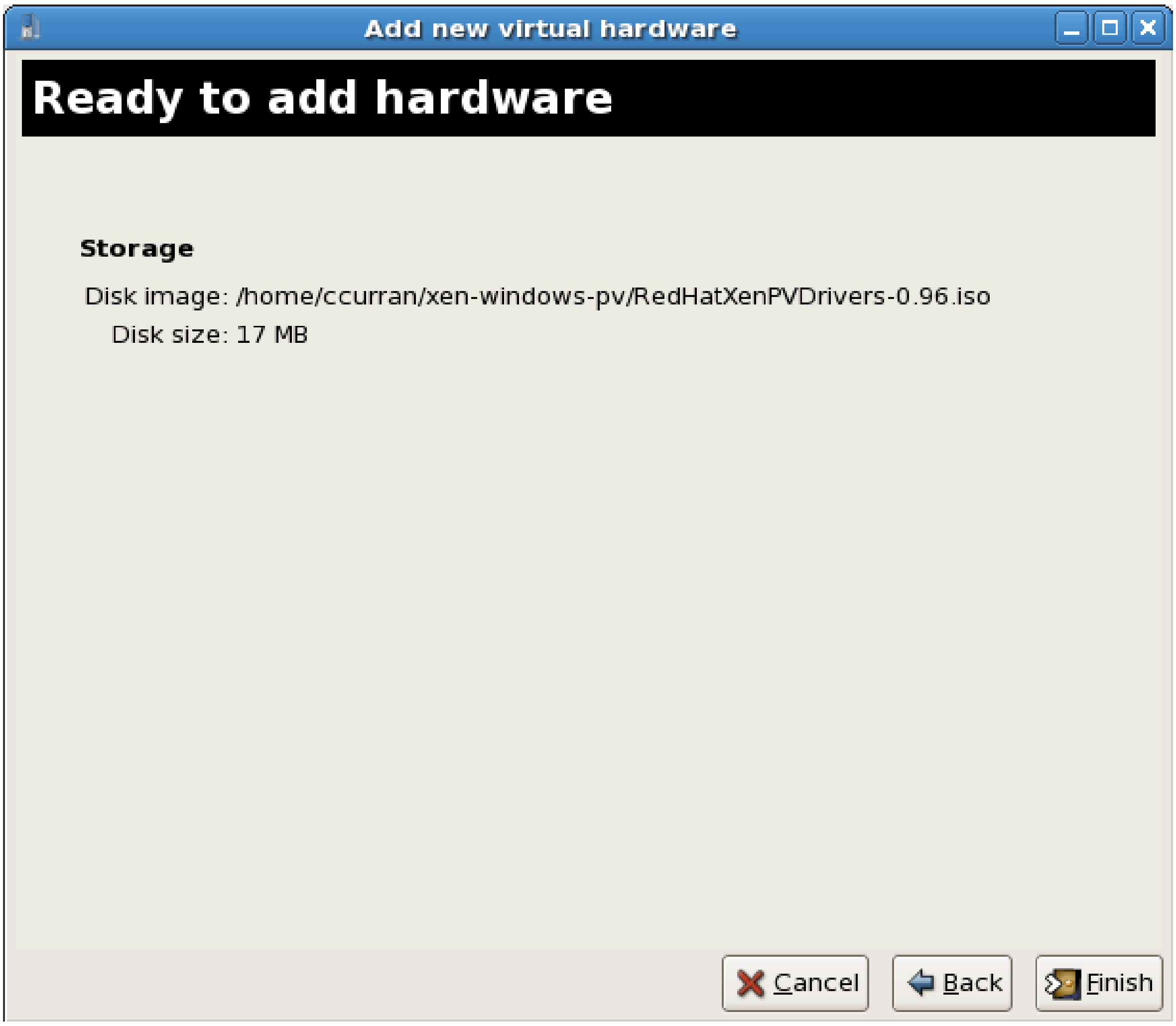
☑ Allocate entire virtual disk now?

Warning: If you do not allocate the entire disk at VM creation, space will be allocated as needed while the guest is running. If sufficient free space is not available on the host, this may result in data corruption on the guest.

Target:

Device type: IDE cdrom

5. □□□



Add new virtual hardware

Ready to add hardware

Storage

Disk image: /home/ccurran/xen-windows-pv/RedHatXenPVDrivers-0.96.iso

Disk size: 17 MB

□□□□□□□□□□

□□□□□□□□□□□□ Windows □□□□□□□□□□□□□□□□□

- □□□□□□ Windows VM □□□□□ run-once□□□□□□□□□□ **viostor.vfd** □□□□□□□□□

  a. **Windows Server 2003**

     □ windows □□□□□ F6 □□□□□□□□□□□□□□□ F6□□□□□□□□□□□□□□□

  b. **Windows Server 2008**

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□ KVM □□□□□□□□□□□□□□□□

□□ **virtio** □□□□□□□□□□ IDE □□□□□□□□□□□□□□□□□□□□□□□□□□□ libvirt □□□□□□□**virt-manager**□**virsh attach-disk** □ **virsh attach-interface** □□□□□□□□□□□□□□ *□□ KVM □□□□□□□□□□□□□* □□□□□□

1. □□□□□□□□□□□ IDE □□

   ```
   <disk type='file' device='disk'>
      <source file='/var/lib/libvirt/images/disk1.img'/>
   ```

```
   <target dev='hda' bus='ide'/>
</disk>
```

2. □□□ **bus=** □□□□□ **`virtio`** □□□□□□□□□□

   ```
   <disk type='file' device='disk'>
      <source file='/var/lib/libvirt/images/disk1.img'/>
      <target dev='hda' bus='virtio'/>
   </disk>
   ```

□□ KVM □□□□□□□□□□□□□□

□□□□□□□□□□□□□ KVM □□□□□□□□□□ **`virt-manager`** □□□□□□

□□□**`virsh attach-disk`** □ **`virsh attach-interface`** □□□□□□□□□□□□□□□□□□□□□□□□□□□

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1. □□□□□ **`virt-manager`** □□□□□□□□□□□□□□□□

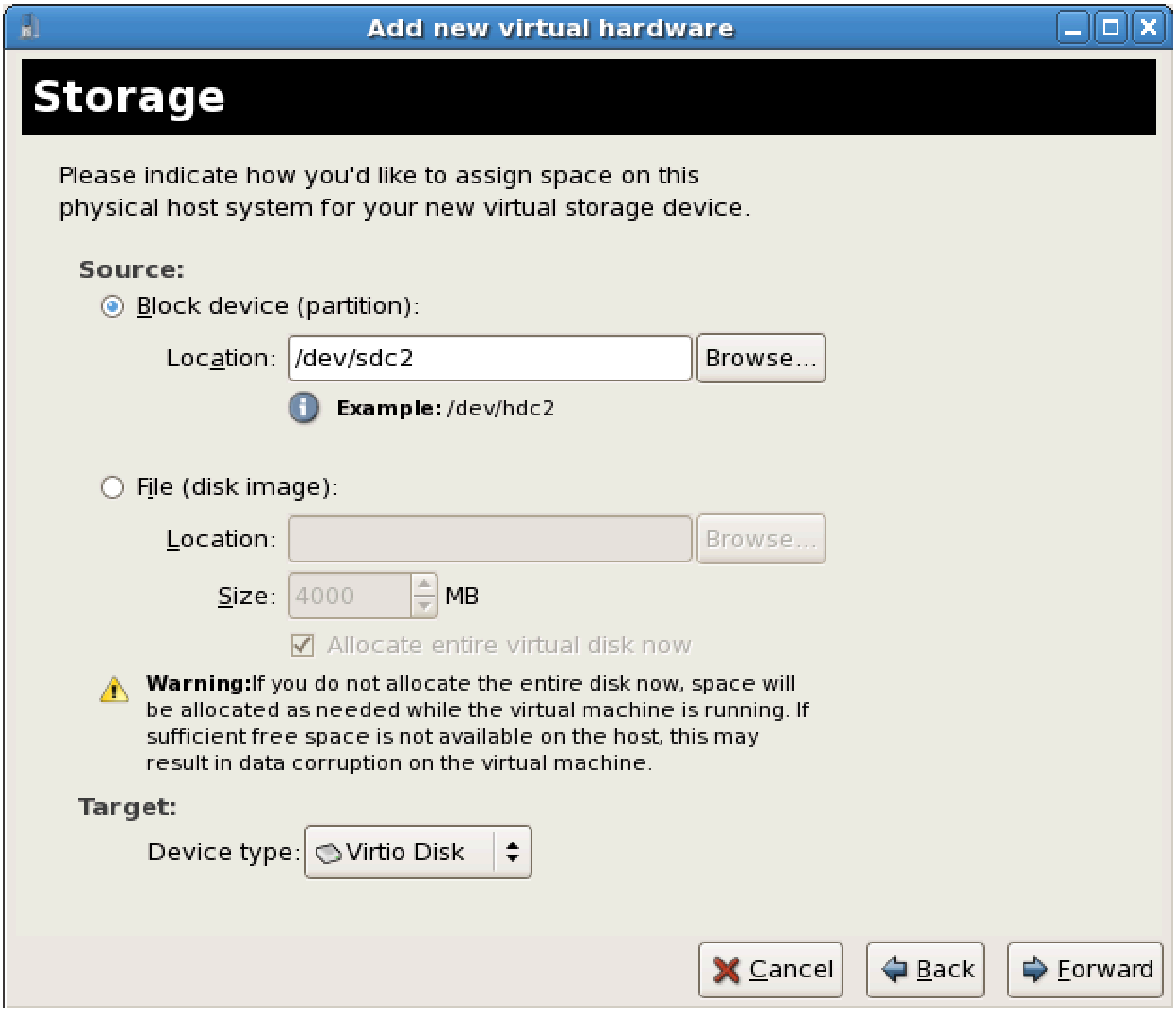
2. □□□□□□□□□

3. □□□□□□□□□□

4. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

   1. □□□□□

      □□□□□□□□□□□□□□□□□□□□**Virtio** □□□□□□□□□□□□□□□□□□□□



Add new virtual hardware

Storage

Please indicate how you'd like to assign space on this physical host system for your new virtual storage device.

Source:

● Block device (partition):

Location: /dev/sdc2

Example: /dev/hdc2

○ File (disk image):

Location:

Size: 4000 MB

☑ Allocate entire virtual disk now

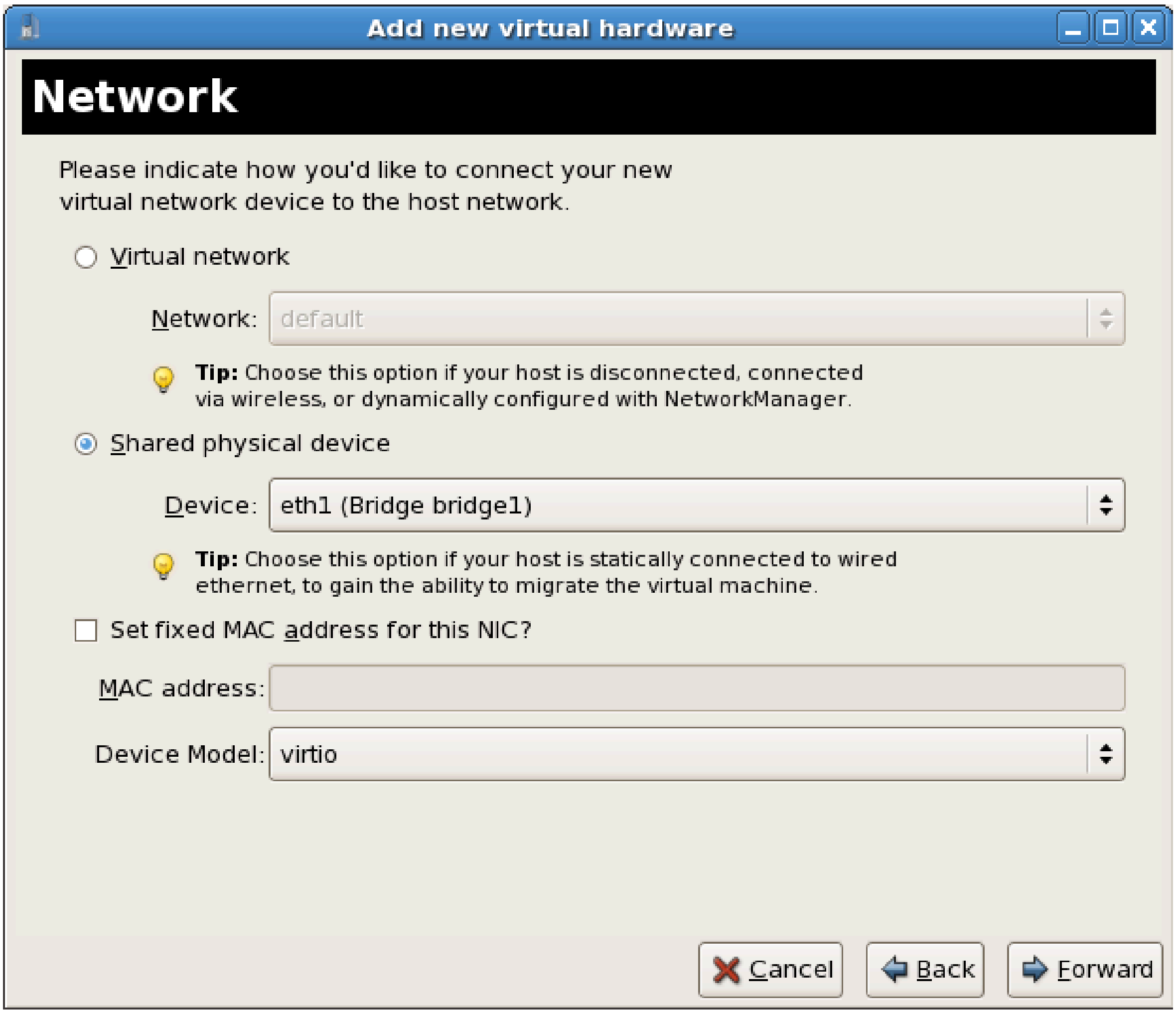
Warning: If you do not allocate the entire disk now, space will be allocated as needed while the virtual machine is running. If sufficient free space is not available on the host, this may result in data corruption on the virtual machine.

Target:

Device type: Virtio Disk

2. □□□□□

□□□□□□□□□□□□□□□□□□□□□□□□**virtio**□□□□□□□□□□□□□□□□□□□□



Network

Please indicate how you'd like to connect your new virtual network device to the host network.

○ Virtual network

Network: default

Tip: Choose this option if your host is disconnected, connected via wireless, or dynamically configured with NetworkManager.

● Shared physical device

Device: eth1 (Bridge bridge1)

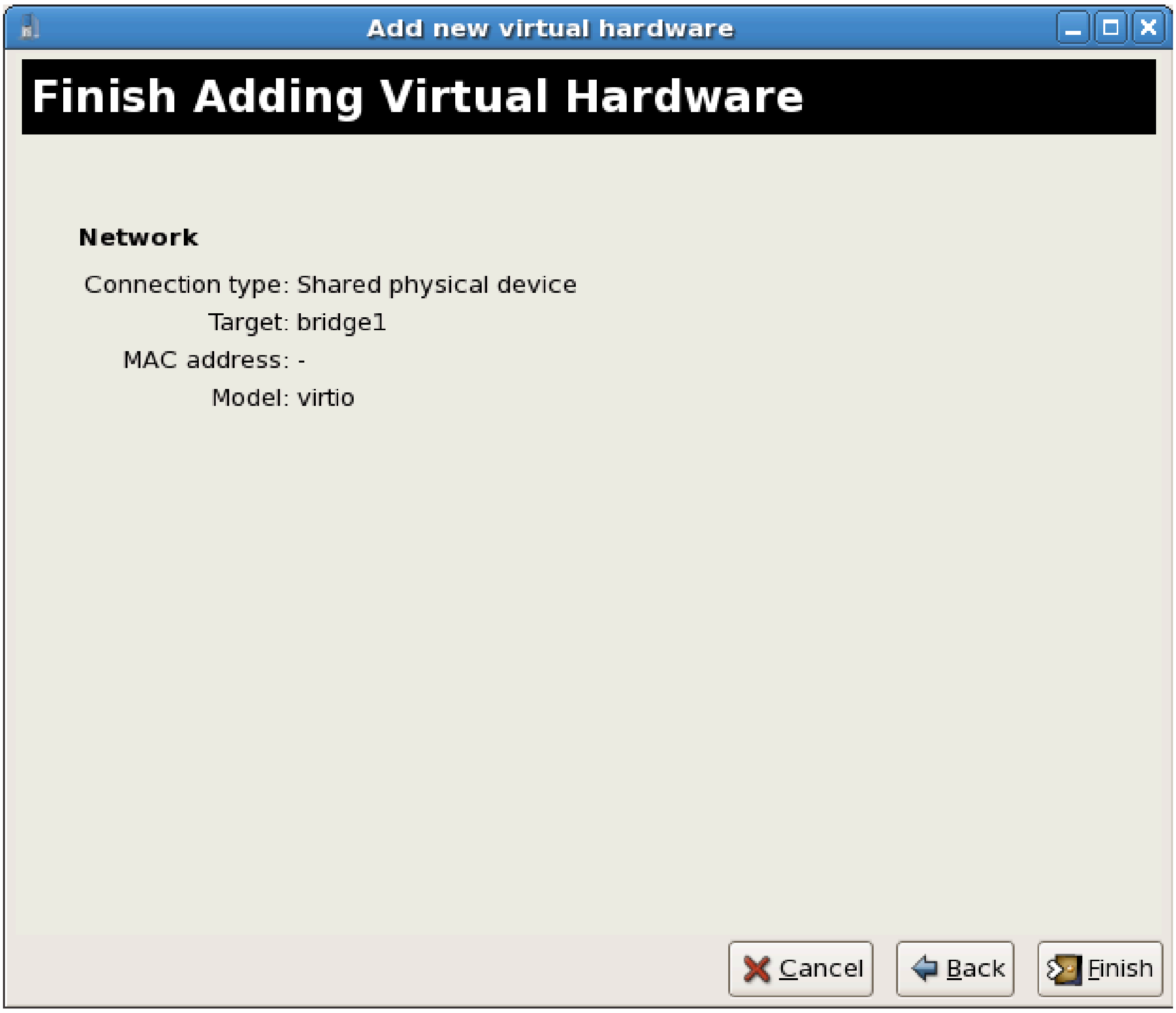
Tip: Choose this option if your host is statically connected to wired ethernet, to gain the ability to migrate the virtual machine.

☐ Set fixed MAC address for this NIC?

MAC address:

Device Model: virtio

5. □□□□□□□□□□□□□



Finish Adding Virtual Hardware

Network

Connection type: Shared physical device
Target: bridge1
MAC address: -
Model: virtio

6. □□□□□□□□□□□□□□□□□□□□□Windows □□□□□□□□

□ III. Administration

□□□□□□□

□□□□□□□□□□□□□ Fedora □□□□□□□□□□□□□□□□□□□□□□□□□□

□□ xend □□□□□□

xend □□□□ daemon □□□□□□□□□□□□□□□□□□□□□ daemon □□□□□□□□□□□ **xend** □□□□□□□□□□□□□□□□□□□□□□ **xend** □□□□□□□□□□ **xend** □□□□□ **/etc/xen/xend-config.sxp** □□□□□□□□□□□□□ **xend-config.sxp** □□□□□□□□□□□□□□

□□	Description
(console-limit)	□□□□□□□□□□□□□□□□ xend_unix_server □□□□□□□□□□□□□□□
(min-mem)	□□□□□ domain0□□□□□□ 0□□□□□□□□□□□□□□□□ megabyte □□□□□
(dom0-cpus)	□□ domain0 □□□□ CPU □□□□□□□□□□□□□□□□ CPU □□□□□
(enable-dump)	□□□□□□□□□□□□□□ 0□□
(external-migration-tool)	□□□□□□□□□□□□□ script □□□□□□Script □□□□ **/etc/xen/scripts/external-device-migrate** □□
(logfile)	□□□□□□□□□□□□□**/var/log/xend.log**□□
(loglevel)	□□□□□□□□□□DEBUG□INFO□WARNING□ERROR □ CRITICAL□□□□□ DEBUG□□
(network-script)	□□□□□□□□□□□ script□□ script □□□□ **/etc/xen/scripts** □□□□□
(xend-http-server)	□□ http □□□□□□□□□□□□□□□□□□
(xend-unix-server)	□□ unix domain socket □□□
(xend-relocation-server)	□□□□□□□□□□□□□□□□□□□□□□
(xend-unix-path)	□□ **xend-unix-server** □□□□□□□□□□□□□ **/var/lib/xend/xend-socket**□
(xend-port)	□□ http □□□□□□□□□□□□□□□□ 8000□□
(xend-relocation-port)	□□□□□□□□□□□□□□□□□□ 8002□□
(xend-relocation-address)	□□□□□□□□□□□□□□□□□□□□ `xend-address` □□□
(xend-address)	□□ domain socket □□□□□□□□□□□□□□□□□□□□□□□

□□ 10.1. **xend** □□□□

□□□□□□□□□□□□□□□□ xend □□□□□□□□□□□□□□□ daemon □□□□□□□□□□□□□□□□□□□□□□□ **xend** daemon□

```
service xend start
```

□□□□□ **xend** □□□ daemon□

```
service xend stop
```

□□□□□□ daemon □□□

□□□□□ **xend** □□□□□ daemon□

```
service xend restart
```

daemon □□□□□

□□□□□ **xend** daemon □□□□

```
service xend status
```

□□□□ daemon □□□□

□□□□□□ xend

□□ **`chkconfig`** □□□□ xend □□□ **`initscript`**□

```
chkconfig --level 345 xend
```

xend □□□□ runlevel 3□4 □ 5 □□□□□□

KVM □□□□□□□

KVM □□□□□□□ CPU □□□□□□□□□□□□□Time Stamp Counter□TSC□□□□□□□ CPU □□□□□□□□□□□□□□□□□□□□□□□□ KVM □□□□□□□□□□□□□□□□□□ □□□

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NTP

□□□□□□□Network Time Protocol□NTP□daemon □□□□□□□□□□□□□□□□□ `ntpd` □□□

```
# service ntpd start
```

□ ntpd □□□□□□□□□□□□□□□

```
# chkconfig ntpd on
```

□□ `ntpd` □□□□□□□□□□□□□□□□clock skew□□□□□□□□□□□

□□□□ CPU □□□□□□□□□□□□□□

□ `constant_tsc` □□□□□□□□□ CPU □□□□□□□□□□□□□□□□□□□□□ CPU □□□□ `constant_tsc` □□□□□□□□□□□

```
$ cat /proc/cpuinfo | grep constant_tsc
```

□□□□□□□□□□□□□□□□ CPU □□□ `constant_tsc`□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□

□□□ KVM □□□□□□□□□

Note

□□□□□□□□ AMD □□□ F cpu□

□ CPU □□ `constant_tsc` □□□□□□□□□□□□□□□*BZ#513138*[1]□□□□□□□□□□□□□□□□□□□□□□TSC □□□□□□□□□□□□□□ **`cpufreq`** □□□□ deep C □□□□□□□□□□□□□□□□□□□□□□□□ TSC □□□□□□□□□□□□ deep C □□□□□□□□□ TSC □□□□□□□**`processor.max_cstate=1`**□□ □□□□□□ grub □□ kernel □□□□□

[1] https://bugzilla.redhat.com/show_bug.cgi?id=513138

```
term Fedora (vmlinuz-2.6.29.6-217.2.3.fc11)
        root (hd0,0)
        kernel /vmlinuz-vmlinuz-2.6.29.6-217.2.3.fc11 ro root=/dev/
VolGroup00/LogVol00 rhgb quiet processor.max_cstate=1
```

□□□□□ **/etc/sysconfig/cpuspeed** □□□□□□□ **cpufreq**□□□□□□ **constant_tsc** □□□□□□□□□□□□ **MIN_SPEED** □ **MAX_SPEED** □□□□□□□□□□□□□□□ **/sys/devices/system/cpu/cpu*/cpufreq/scaling_available_frequencies** □□□□□□

□ Red Hat Enterprise Linux □□□□□□□□□□□□□□

□□□□ Red Hat Enterprise Linux □□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **/boot/grub/grub.conf** □□□□ **/kernel** □□□□□□□

□□□□□□□ Red Hat Enterprise Linux □□□□□□□□□□□□□□□□□□□□□□□□□□

Red Hat Enterprise Linux	□□□□□□ kernel □□
□□□□□□□□□ 5.4 AMD64/Intel 64	□□□□□□□
□□□□□□□□ 5.4 AMD64/Intel 64	divider=10 notsc lpj=n
□□□□□□□□□ 5.4 x86	□□□□□□□
□□□□□□□□□ 5.4 x86	divider=10 clocksource=acpi_pm lpj=n
5.3 AMD64/Intel 64	divider=10 notsc
5.3 x86	divider=10 clocksource=acpi_pm
4.8 AMD64/Intel 64	notsc divider=10
4.8 x86	clock=pmtmr divider=10
3.9 AMD64/Intel 64	□□□□□□□
3.9 x86	□□□□□□□

□□□□□□□□□□□□ Windows □□□

□□□□□□□□□□□□ Windows □□□□□□□□□□□□□□Windows □□□□□□□□ **boot.ini** □□□□□□□□□□□□□□□□□□□□□□□□□

```
/use pmtimer
```

□□□□□□□□ Windows □□□□□□ pmtimer □□□□□□□□□□□□□ *Windows XP □ Windows Server 2003 Boot.ini □□□□□□□□*[2]□

[2] http://support.microsoft.com/kb/833721

KVM [illegible]

[illegible] KVM hypervisor [illegible] KVM [illegible]

[illegible]

- Load balancing - guests can be moved to hosts with lower usage when a host becomes overloaded.
- Hardware failover - when hardware devices on the host start to fail, guests can be safely relocated so the host can be powered down and repaired.
- Energy saving - guests can be redistributed to other hosts and host systems powered off to save energy and cut costs in low usage periods.
- Geographic migration - guests can be moved to another location for lower latency or in serious circumstances.

[illegible]

An offline migration suspends the guest then moves an image of the guests memory to the destination host. The guest is resumed on the destination host and the memory the guest used on the source host is freed.

[illegible] 1 Gbit [illegible] 2GB [illegible]

[illegible]memory page[illegible]KVM [illegible] KVM [illegible]

[illegible]

12.1. [illegible]

[illegible]

[illegible]

- [illegible]
  - Fibre Channel
  - iSCSI
  - NFS
  - GFS2
- [illegible] Fedora [illegible]
- [illegible]
- [illegible]
- [illegible]

□□□□□□□□□

□□□ □ *5,* □□□□□□□□□□□□。

□□□□□□□□□ □ *12.2, “□□□□□□□□□□□□□□□□□□□□□ NFS”* □□ NFS □□□

12.2. □□□□□□□□□□□□□□□□□□□□□□□□□□ NFS

□□□□□□ NFS □□□□ KVM □□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□ □ *5,* □□□□□□□□□□□□

1. **□□□□ libvirt □□□□□**

   □□□□□□□□□□□□□□ **/etc/exports** □□□□

   ```
   /var/lib/libvirt/images *.bne.redhat.com(rw,no_root_squash,async)
   ```

   □□□□□□□□□□□□□□□□□□

2. **□□ NFS**

   a. □ NFS □□□□□□□□□□□□□□□□□

   ```
   # yum install nfs
   ```

   b. □ **iptables** □□□ NFS □□□□□□□ NFS □□□ **/etc/hosts.allow** □□□□

   c. □□ NFS □□□

   ```
   # service nfs start
   ```

3. □□□□□□□□□□□□□□□□□□

   □□□□□□□□□ **/var/lib/libvirt/images** □□□

   ```
   # mount sourceURL:/var/lib/libvirt/images /var/lib/libvirt/images
   ```

   □□□□□□□□□□□□□□□□□□□

   □□

12.3. □ virsh □□□□□□ KVM □□

□□□□□ **virsh** □□□□□□□□□□□□□□□□□□□□**migrate** □□□□□□□□□□□□□

```
# virsh migrate --live GuestName DestinationURL
```

The *GuestName* parameter represents the name of the guest which you want to migrate.

The *DestinationURL* parameter is the URL or hostname of the destination system. The destination system must run the same version of Fedora, be using the same hypervisor and have **libvirt** running.

Once the command is entered you will be prompted for the root password of the destination system.

□□□□ virsh □□□□□□□□

□□□□□□□ `test1.bne.redhat.com` □□□ `test2.bne.redhat.com` □□□□□□□□□□□□□□□□□□□□□□□□□□□ **`CentOS4test`** □□□□□□

□□

1. □□□□□□□□□□□

   □□□□□□ `test1.bne.redhat.com` □□□ `CentOS4test` □□□□□□□

   ```
   [root@test1 ~]# virsh list
   Id Name                 State
   ----------------------------------
    10 CentOS4                running
   ```

2. □□□□□

   □□□□□□□□□□□□□□□□□□□□□ `test2.bne.redhat.com`□□□ **`/system`** □□□□□ URL □□□□□ libvirt □□□□□□□□□□□□□□

   ```
   # virsh migrate --live CentOS4test qemu+ssh://test2.bne.redhat.com/
   system
   ```

   Once the command is entered you will be prompted for the root password of the destination system.

3. □□

   □□□□□□□□□□□□□□□□□□□□□□□□□□□□**`virsh`** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

4. □□□□□□□□□□□□□

   □□□□□□ `test2.bne.redhat.com` □□□ `CentOS4test` □□□□□□□

   ```
   [root@test2 ~]# virsh list
   Id Name                 State
   ----------------------------------
    10 CentOS4                running
   ```

□□□□□□□□□

□□□□□□□□

libvirt □□□□□□□□□□□□□ TLS/SSL□unix sockets□SSH □□□□□ TCP□□□□□□□□□□□□□□□□□□□ □ *13,* □□□□□□□□□□

12.4. □ virt-manager □□□□□□

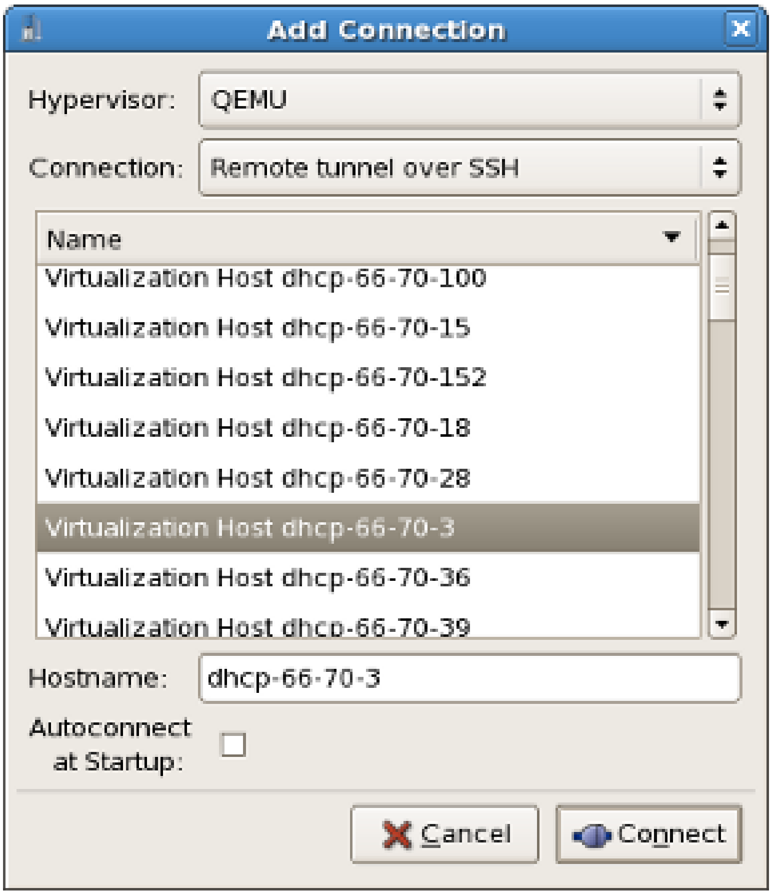
□□□□□□□□□□□ **`virt-manager`** □□□□□□□□ KVM □□□□□

1. □□

   □□□□□□□□

- **Hypervisor□□□ □QEMU□□**
- □□□□□□□□□□
- □□□□□□□□□□□□

□□□□□□□



Add Connection

Hypervisor: QEMU

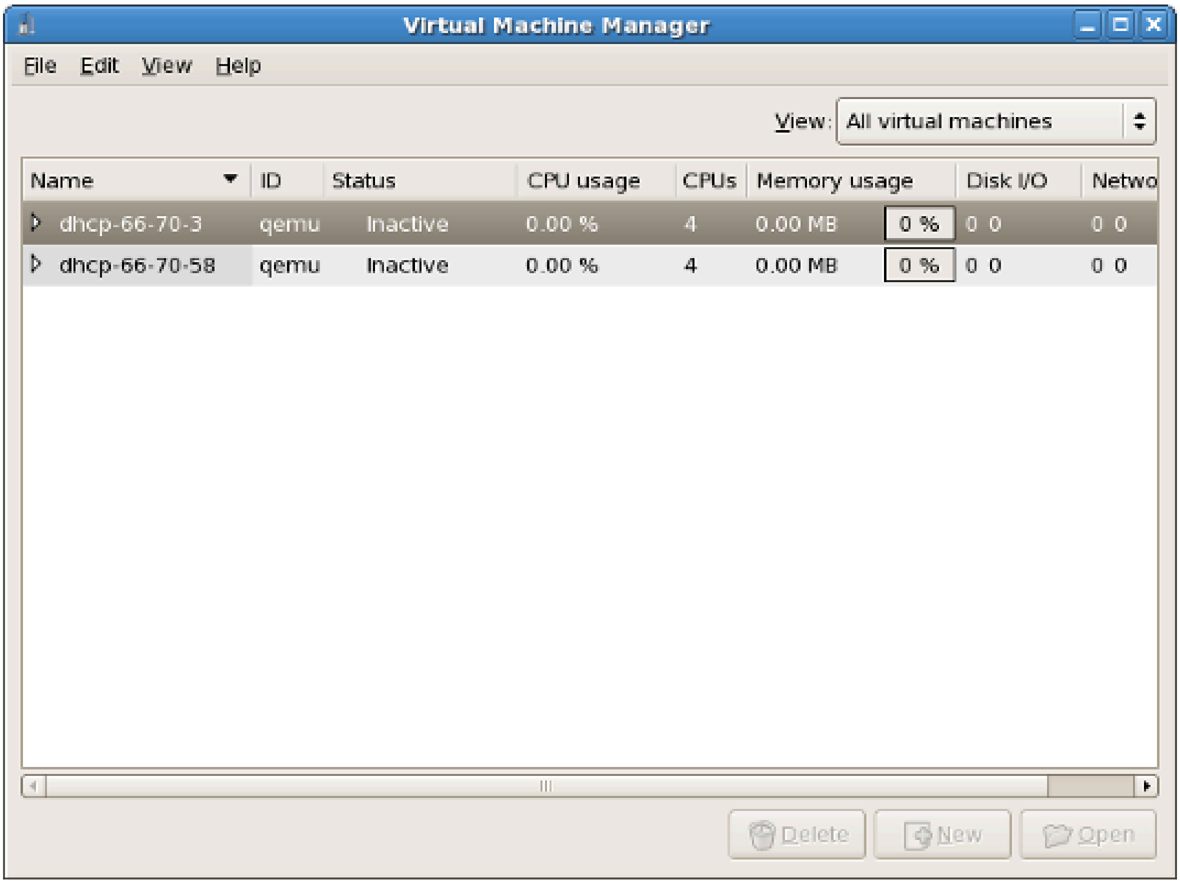
Connection: Remote tunnel over SSH

Name
Virtualization Host dhcp-66-70-100
Virtualization Host dhcp-66-70-15
Virtualization Host dhcp-66-70-152
Virtualization Host dhcp-66-70-18
Virtualization Host dhcp-66-70-28
Virtualization Host dhcp-66-70-3
Virtualization Host dhcp-66-70-36
Virtualization Host dhcp-66-70-39

Hostname: dhcp-66-70-3

Autoconnect at Startup: □

□□□□□□□□□□□□□□□□□□□□□


Virtual Machine Manager

File Edit View Help

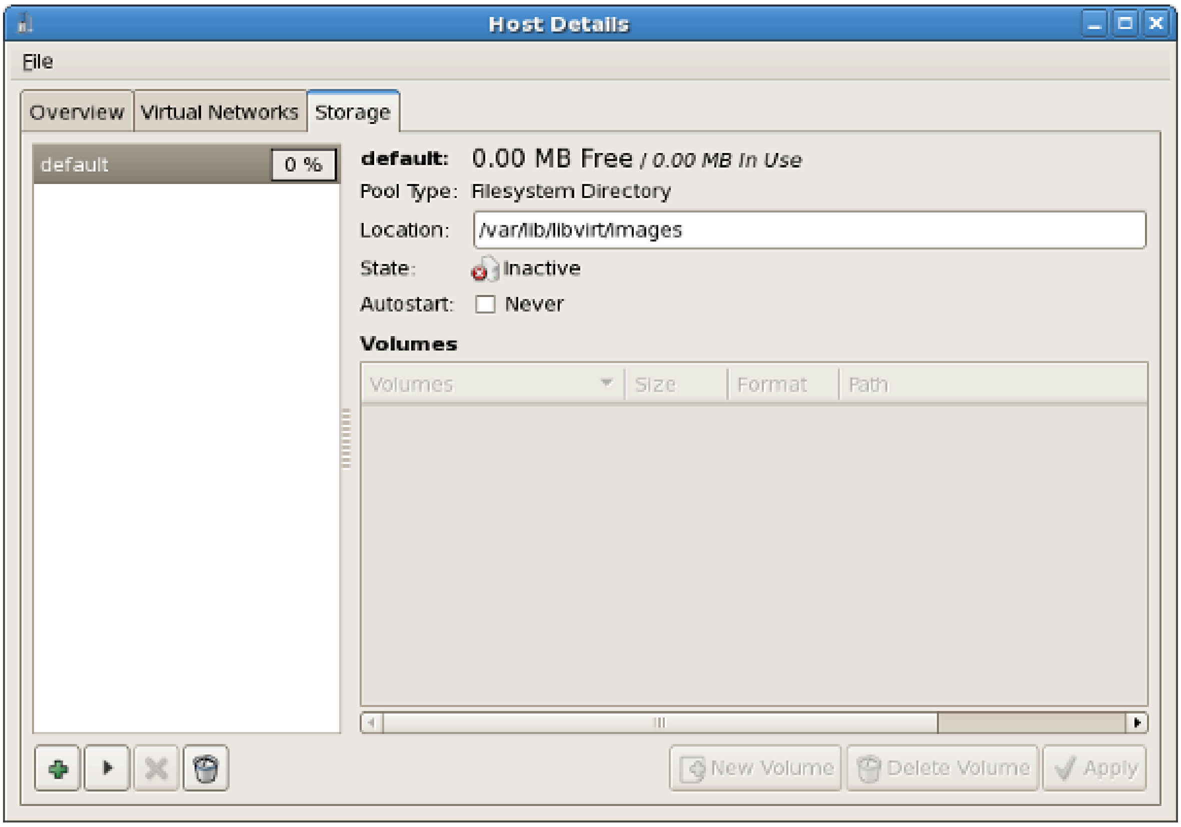
View: All virtual machines

Name	ID	Status	CPU usage	CPUs	Memory usage		Disk I/O	Netwo
dhcp-66-70-3	qemu	Inactive	0.00 %	4	0.00 MB	0 %	0 0	0 0
dhcp-66-70-58	qemu	Inactive	0.00 %	4	0.00 MB	0 %	0 0	0 0

2. □□□□□□□□□□□□□□□□□□ NFS □□□□□ pool□

   □□

   □□□□□□□□□□□□□



default: 0.00 MB Free / *0.00 MB In Use*

Pool Type: Filesystem Directory

Location: /var/lib/libvirt/images

State: Inactive

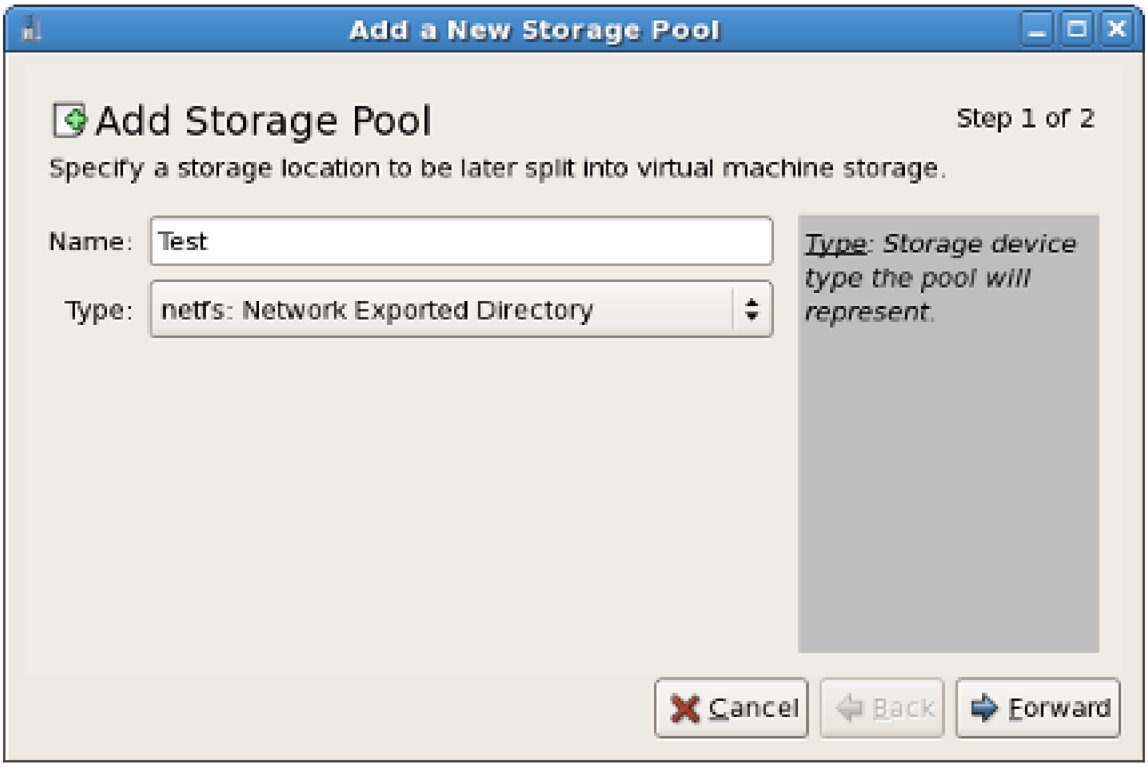
Autostart: □ Never

Volumes

3. □□□□□□□ pool□□□□□□□□□□□□□□□□□**+**□□□□□□□□□□□□□□□ Pool□□□□□□□□□□□

   □□□□□□□□□

   - □□□□□□□□□□□ pool □□□□
   - □□□□□□□**netfs**□□□□□□□□□□□



Add a New Storage Pool

Add Storage Pool

Step 1 of 2

Specify a storage location to be later split into virtual machine storage.

Name: Test

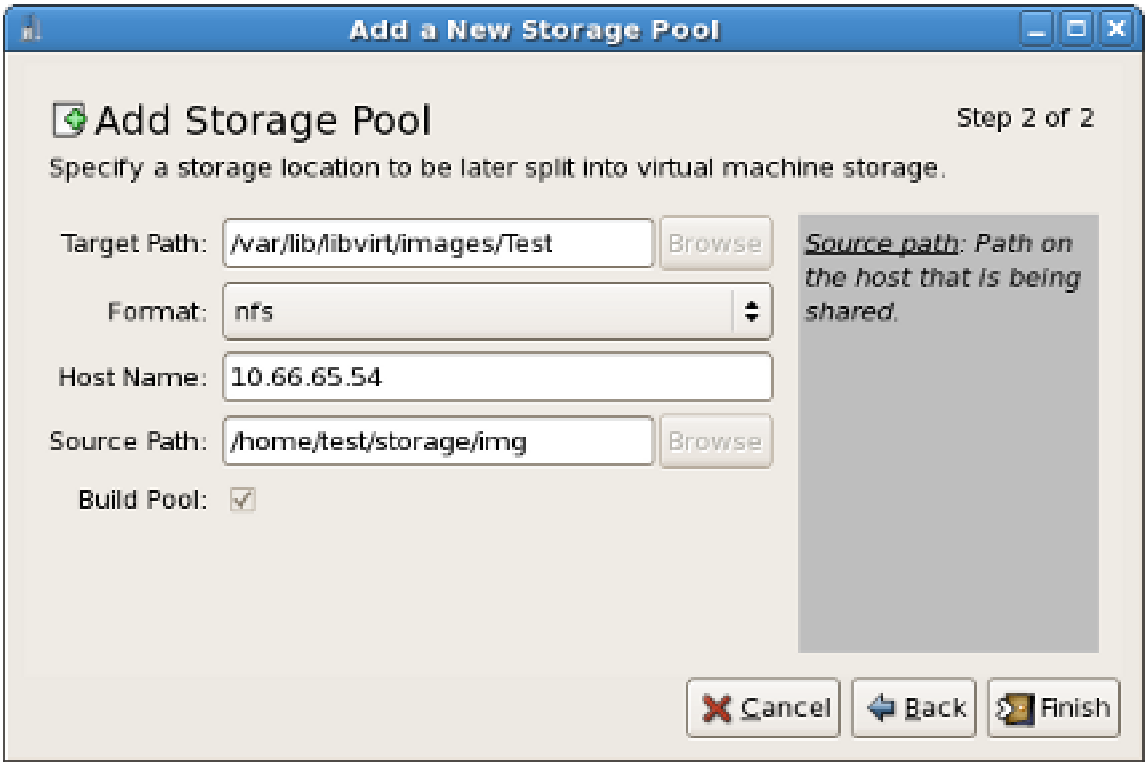
Type: netfs: Network Exported Directory

Type: Storage device type the pool will represent.

[illegible]

4. [illegible]

   - [illegible] NFS [illegible] iSCSI[illegible]
   - [illegible] IP [illegible]



Add Storage Pool

Step 2 of 2

Specify a storage location to be later split into virtual machine storage.

Target Path: /var/lib/libvirt/images/Test

Format: nfs

Host Name: 10.66.65.54

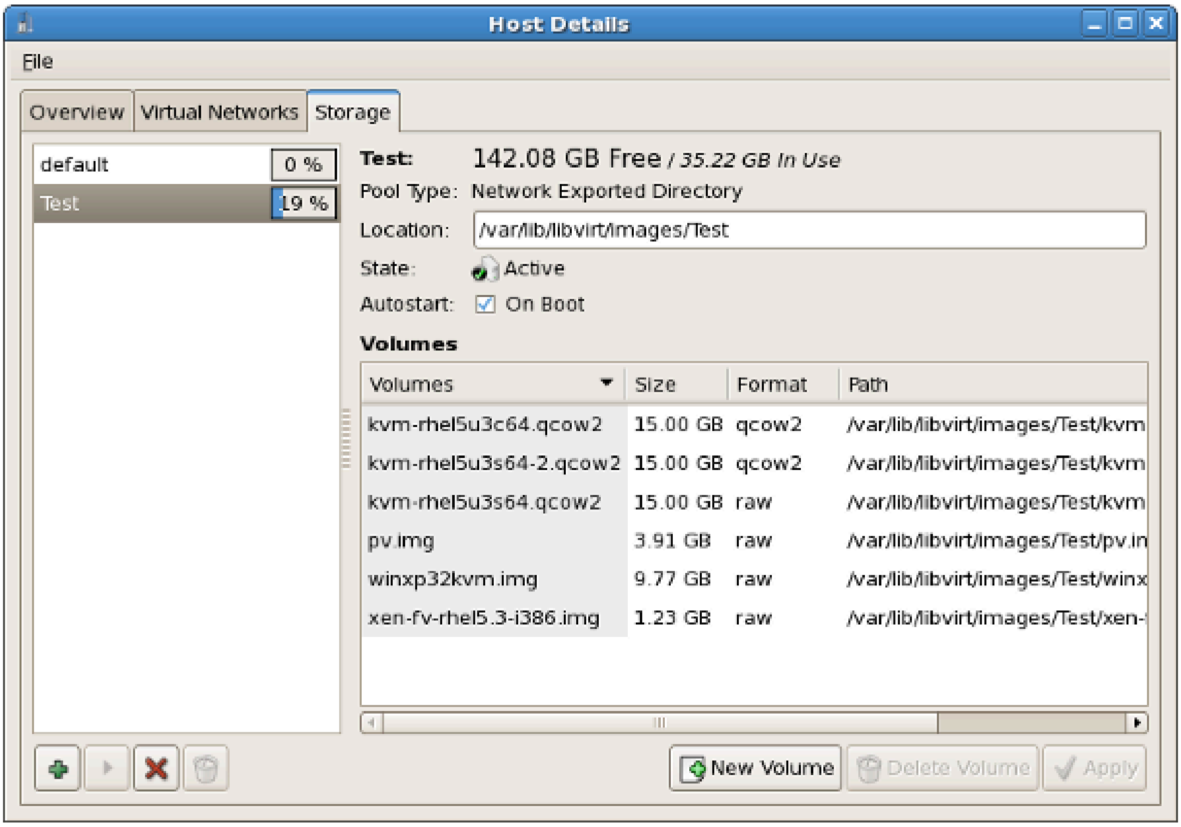
Source Path: /home/test/storage/img

Build Pool: ☑

Source path: Path on the host that is being shared.

□□□□□□□

5. □□□□□□□ pool □□□□□□□□□□□□□□□□□



default	0 %
Test	19 %

Test: 142.08 GB Free / *35.22 GB In Use*

Pool Type: Network Exported Directory

Location: /var/lib/libvirt/images/Test

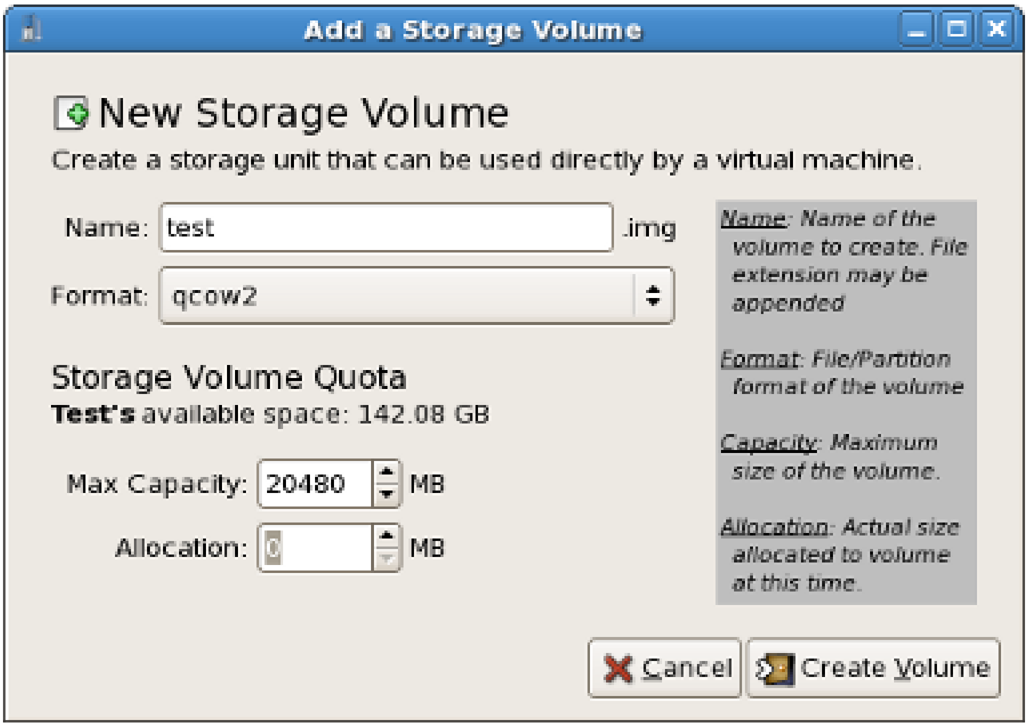
State: Active

Autostart: ☑ On Boot

Volumes

Volumes	Size	Format	Path
kvm-rhel5u3c64.qcow2	15.00 GB	qcow2	/var/lib/libvirt/images/Test/kvm
kvm-rhel5u3s64-2.qcow2	15.00 GB	qcow2	/var/lib/libvirt/images/Test/kvm
kvm-rhel5u3s64.qcow2	15.00 GB	raw	/var/lib/libvirt/images/Test/kvm
pv.img	3.91 GB	raw	/var/lib/libvirt/images/Test/pv.in
winxp32kvm.img	9.77 GB	raw	/var/lib/libvirt/images/Test/winx
xen-fv-rhel5.3-i386.img	1.23 GB	raw	/var/lib/libvirt/images/Test/xen-

6. □□□□□□□□□□□□□□□□□□



New Storage Volume

Create a storage unit that can be used directly by a virtual machine.

Name: test .img

Format: qcow2

Storage Volume Quota

Test's available space: 142.08 GB

Max Capacity: 20480 MB

Allocation: 0 MB

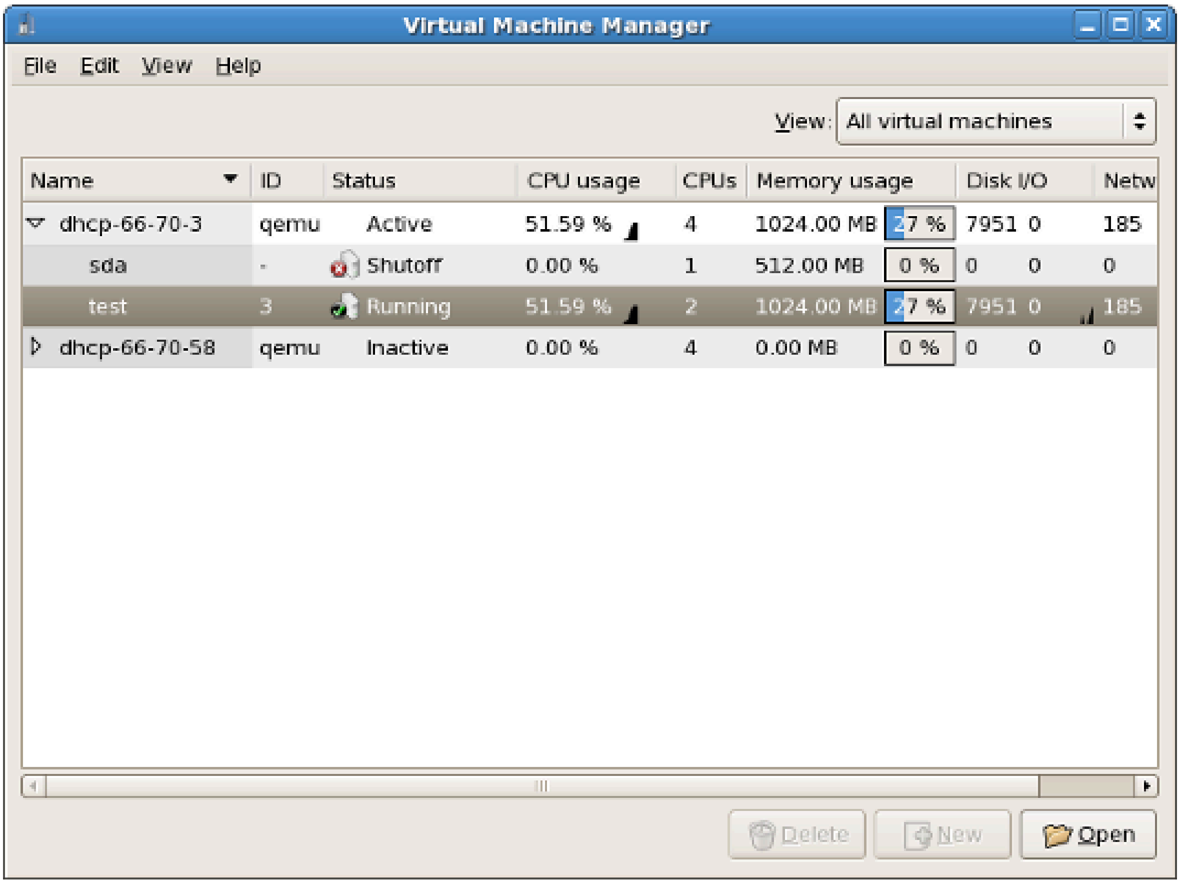
Name: Name of the volume to create. File extension may be appended

Format: File/Partition format of the volume

Capacity: Maximum size of the volume.

Allocation: Actual size allocated to volume at this time.

7. □□□□□□□□□□□□□□□□□□□□□□□□



View: All virtual machines

Name	ID	Status	CPU usage	CPUs	Memory usage		Disk I/O		Netw
dhcp-66-70-3	qemu	Active	51.59 %	4	1024.00 MB	27 %	7951	0	185
sda	-	Shutoff	0.00 %	1	512.00 MB	0 %	0	0	0
test	3	Running	51.59 %	2	1024.00 MB	27 %	7951	0	185
dhcp-66-70-58	qemu	Inactive	0.00 %	4	0.00 MB	0 %	0	0	0

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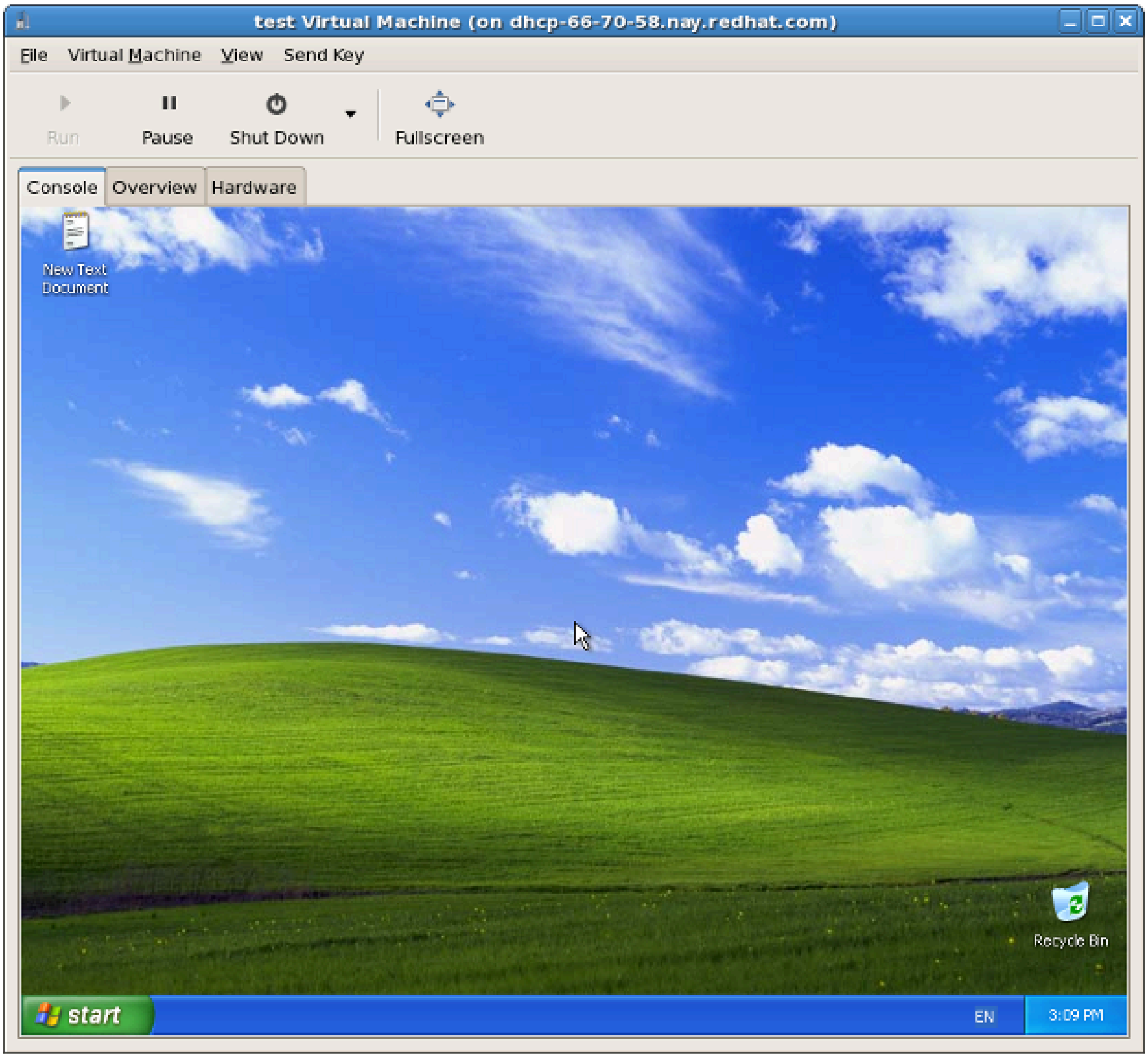
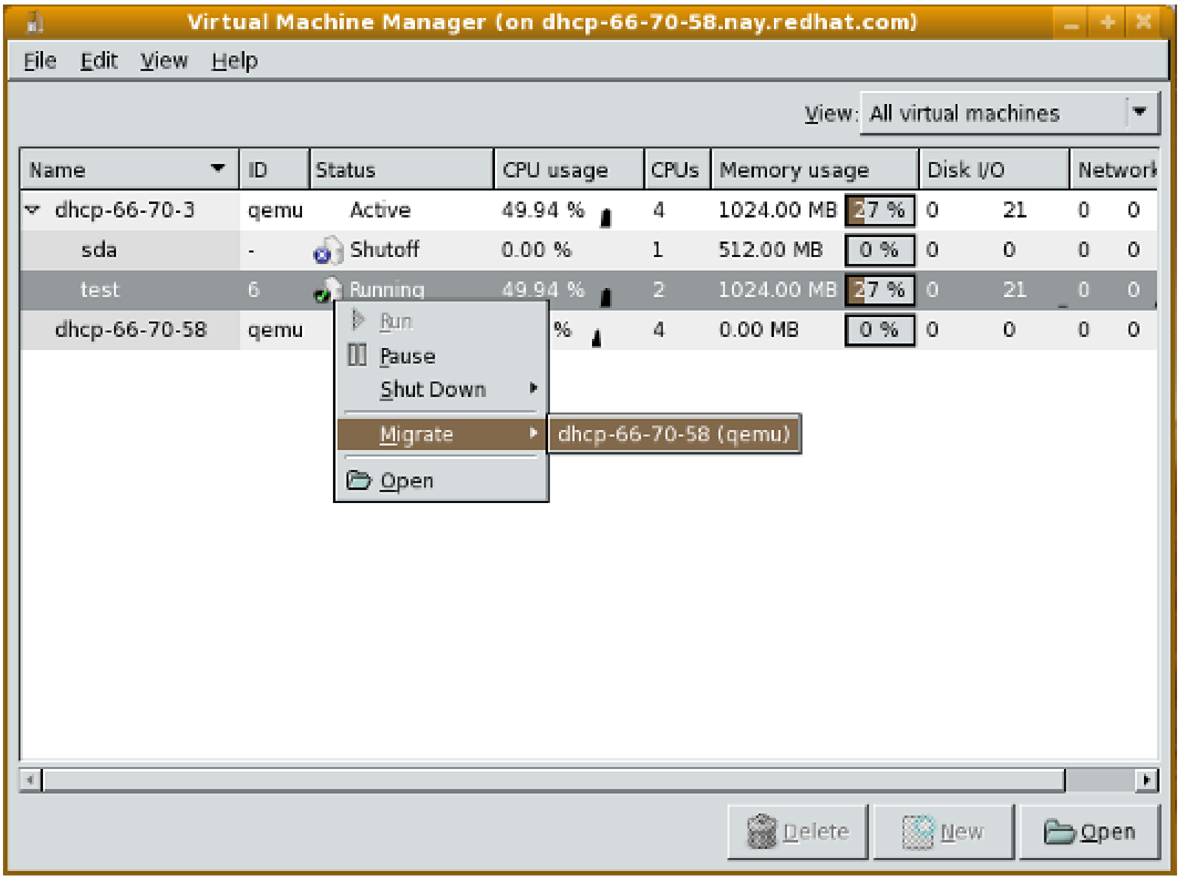

test Virtual Machine (on dhcp-66-70-58.nay.redhat.com)
File
Virtual Machine
View
Send Key
Run
Pause
Shut Down
Fullscreen
Console
Overview
Hardware
New Text Document
Recycle Bin
start
EN
3:09 PM

8. □□

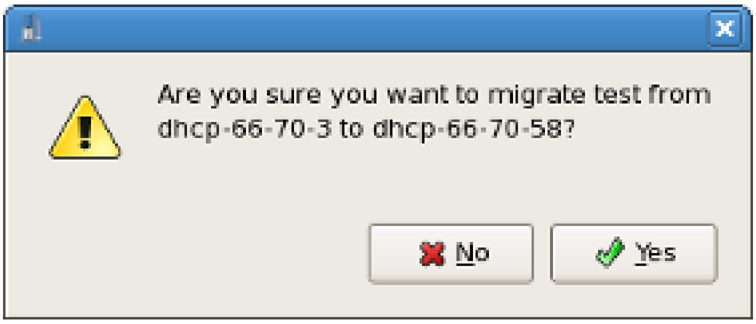


Virtual Machine Manager (on dhcp-66-70-58.nay.redhat.com)

View: All virtual machines

Name	ID	Status	CPU usage	CPUs	Memory usage		Disk I/O		Network	
dhcp-66-70-3	qemu	Active	49.94 %	4	1024.00 MB	27 %	0	21	0	0
sda	-	Shutoff	0.00 %	1	512.00 MB	0 %	0	0	0	0
test	6	Running	49.94 %	2	1024.00 MB	27 %	0	21	0	0
dhcp-66-70-58	qemu		%	4	0.00 MB	0 %	0	0	0	0

9. □□□□□□□□□□□□



Are you sure you want to migrate test from dhcp-66-70-3 to dhcp-66-70-58?

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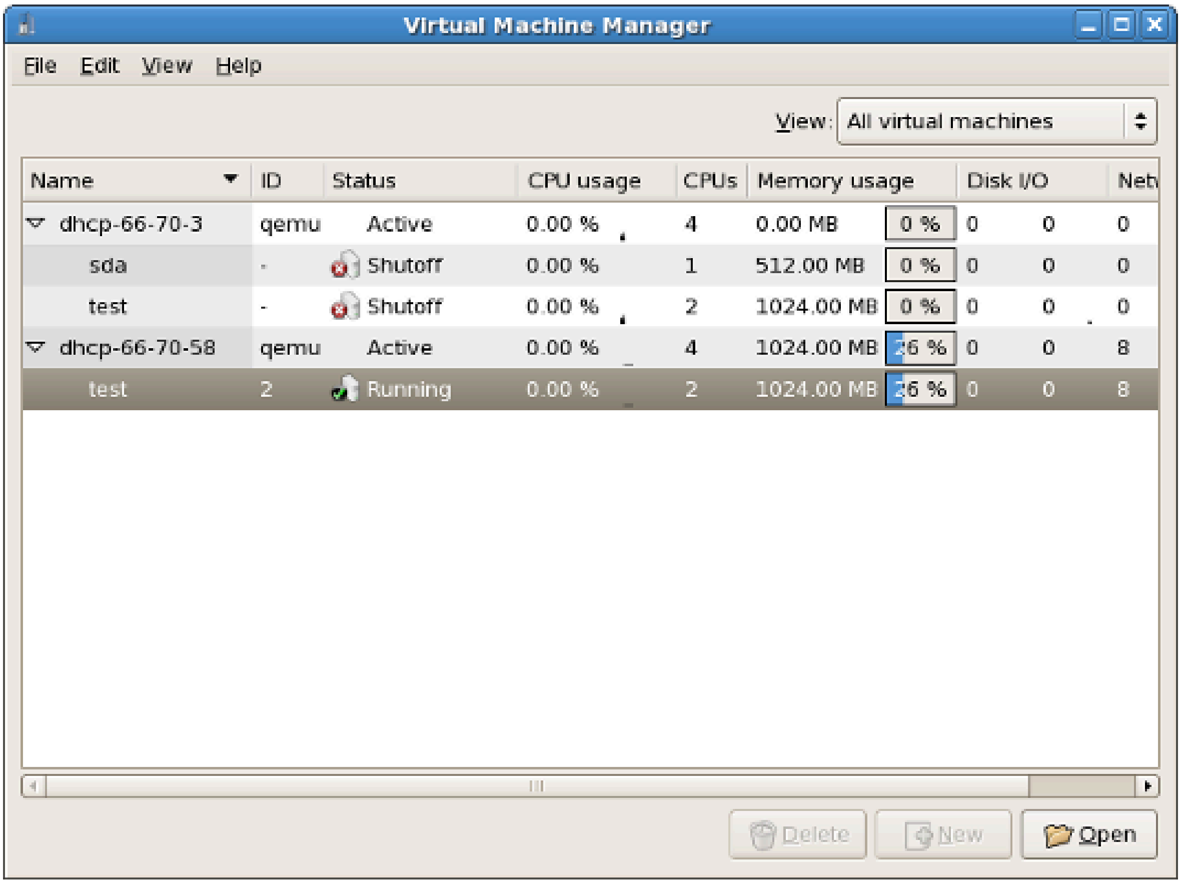
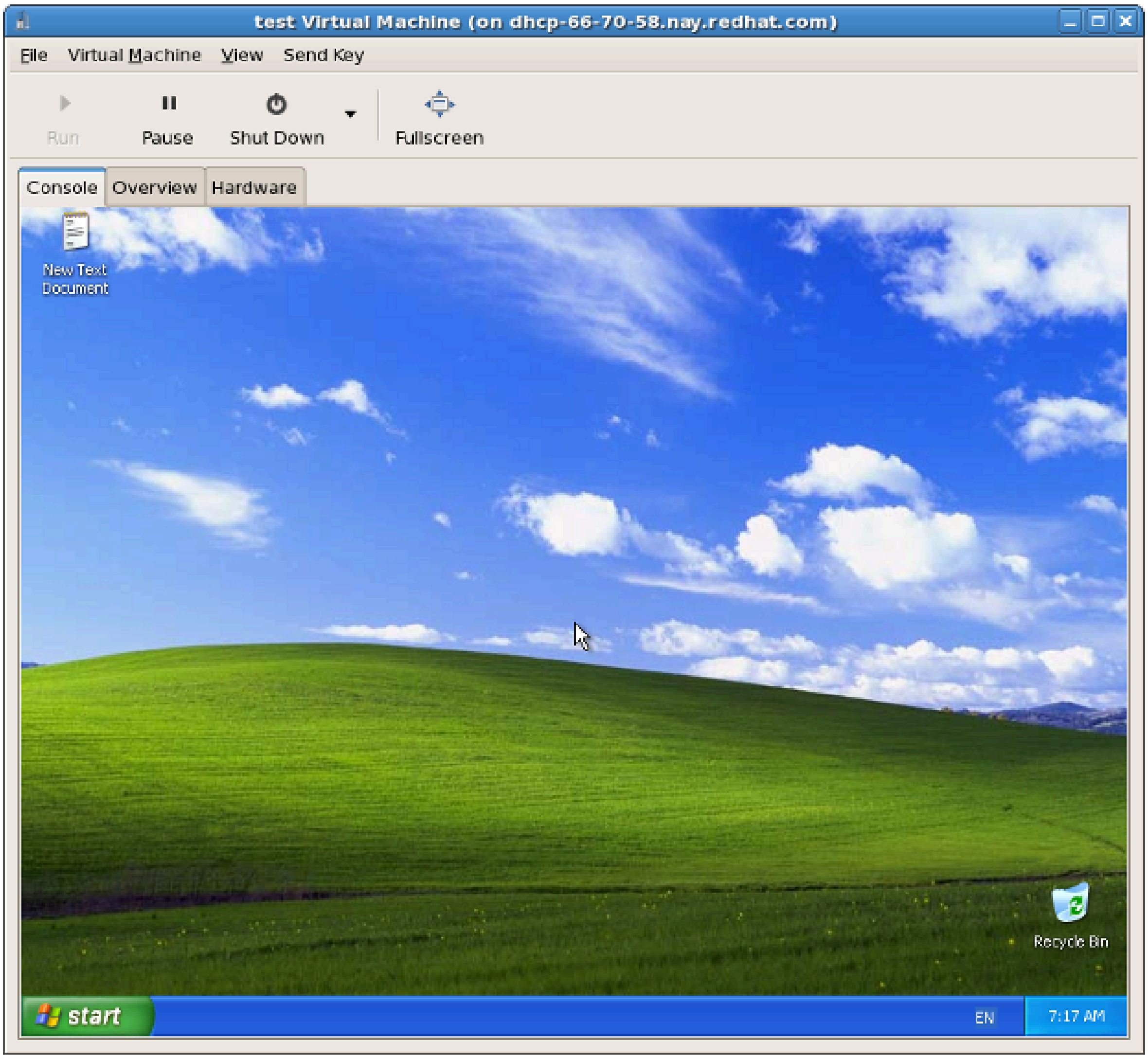


Name	ID	Status	CPU usage	CPUs	Memory usage		Disk I/O		Net
▽ dhcp-66-70-3	qemu	Active	0.00 %	4	0.00 MB	0 %	0	0	0
sda	-	Shutoff	0.00 %	1	512.00 MB	0 %	0	0	0
test	-	Shutoff	0.00 %	2	1024.00 MB	0 %	0	0	0
▽ dhcp-66-70-58	qemu	Active	0.00 %	4	1024.00 MB	26 %	0	0	8
test	2	Running	0.00 %	2	1024.00 MB	26 %	0	0	8

□□□□□□□□□□□□□□□□□□□


test Virtual Machine (on dhcp-66-70-58.nay.redhat.com)
File
Virtual Machine
View
Send Key
Run
Pause
Shut Down
Fullscreen
Console
Overview
Hardware
New Text Document
Recycle Bin
start
EN
7:17 AM

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13.1. □□□□ SSH □□□□□□□

ssh □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **`libvirt`** □□□□□□□□□□ **SSH** □□□□□□□□□□□□□□□□ **SSH** □□□□□□□□□ □□□ **SSH** □□□□□□□□□□□□□□□□□□□□□□□□□ **VNC** □□□□□□ **SSH**□

SSH □□□□□□□□□□□□ SSH □□□□□□□□□□□□□□□□□□□□□□□□□□□□ **VNC** □□□□

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- □□□ root □□□□□□□□□□□□□□□□□
- □□□□□□□□□□□□
- □□□□□□□□□□□□□□□□□□□□□□□□□
- ssh □□□□□□□□□□

□ **`virt-manager`** □□ **SSH** □□

□□□□□□□□□□□□□□□□□□□□□ **SSH** □□

1. □□□□□□ **`virt-manager`** □□□□□□□□□□□□□□□□□ **`ssh`** □□□□□□□□□□

   ```
   $ ssh-keygen -t rsa
   ```

2. □□□□□□□**`virt-manager`** □□□□ **`libvirt`** □□□□□□□□□□□□□□□□□ **`scp`** □□□□□□□□□□□□□□□ **`$HOME/.ssh/id_rsa.pub`** □□□□

   ```
   $ scp $HOME/.ssh/id_rsa.pub root@somehost:/root/key-dan.pub
   ```

3. □□□□□□□□□ **`ssh`** □ root □□□□□□□□□□□□□□□□□□□□□□□□□□□□ root □□□□□□□□□□□□□□□□□□□□□□□□

   ```
   $ ssh root@somehost
   # mkdir /root/.ssh
   # chmod go-rwx /root/.ssh
   # cat /root/key-dan.pub >> /root/.ssh/authorized_keys
   # chmod go-rw /root/.ssh/authorized_keys
   ```

`libvirt` daemon□`libvirtd`□

`libvirt` daemon □□□□□□□□□□□□□□□□□ `libvirtd` daemon □□□□□□□□□□□□□□□□□ Fedora **`kernel-xen`** □□□ □□□□□□□□□□

```
$ ssh root@somehost
# chkconfig libvirtd on
# service libvirtd start
```

□ `libvirtd` □ **SSH** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **VNC** □□□□□□□

13.2. □□□□ TLS □ SSL □□□□□□□□

□□□□□□ TLS □ SSL □□□□□□□□TLS □ SSL □□□□□□□□□□□□□□□□ ssh □□□□□□□□ □ *13.1, “□□□□ SSH □□□□□□□□”*□□TLS □ SSL □□□□□□□□□□□ □□□□□□□□□□□**libvirt** □□□□□□□□□□□□□□□□ TCP □□□□□□□□□□□□□□□□□□□□□□ x509 □□□□□□□□□□□□□□□□□□□□□□□□□□□□ VNC □□□□□□□□□□□ TLS □□ x509 □□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□ shell □□□□□□□□□□□□□□□□□□□□□□□□□□□□□ VNC □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□ virt-manager □□ TLS/SSL □□□□□

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`libvirt` □□□□□

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Xen VNC □□□

Xen VNC □□□□□□□□ **`/etc/xen/xend-config.sxp`** □□□□□□□□ TLS□□□□□□□□□□ **`(vnc-tls 1)`** □□□□□□□□□□□□□□□

`/etc/xen/vnc` □□□□□□ 3 □□□□

- **`ca-cert.pem`** - CA □□
- **`server-cert.pem`** - CA □□□□□□□□□
- **`server-key.pem`** - □□□□□□□

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`virt-manager` □ **`virsh`** □□□□□

□□□□□□□□□□□□□□□□□□□□ **`libvirt`** □□ API□CA □□□□□□□□□□□□□□□ **`/etc/pki`** □□□□□□□□□□□□□□□□□□ *http://libvirt.org/remote.html*□

□□□□□□□□□ **`virt-manager`** □□□□□□□□ □**SSL/TLS**□ □□□□□□□□□

□□ **`virsh`** □□ URI □□□□□□□□

- □□ KVM □□□**`qemu://hostname.guestname/system`**□
- □□ Xen □□□**`xen://hostname.guestname/`**□

□□□□ VNC □ SSL □ TLS□□□□□□□□□□□□□□□□□□□ **`$HOME/.pki`** □□□□□□□□□□□□□□□□

- CA □□ **`ca-cert.pem`** - CA □□□
- **`libvirt-vnc`** □ **`clientcert.pem`** - CA □□□□□□□□□□□
- **`libvirt-vnc`** □ **`clientkey.pem`** - □□□□□□□□□

13.3. □□□□□

□□□□□□□□□□**`libvirt`** □□□□□□□□□□

□□□□□□□□Transport Layer Security□TLS□

□□□□□□ TLS 1.0□SSL 3.1□□□□□□□□ TCP/IP socket□□ 16514□

UNIX socket

Unix [illegible] socket [illegible]Socket [illegible] UNIX [illegible] SELinux [illegible] socket [illegible] **/var/run/libvirt/libvirt-sock** [illegible] **/var/run/libvirt/libvirt-sock-ro**[illegible]

SSH

[illegible] Shell [illegible]SSH[illegible] Netcat[illegible]*nc* [illegible]libvirt daemon[illegible]**libvirtd**[illegible] 22 [illegible] SSH [illegible] ssh [illegible] **ssh-agent** [illegible]

ext

ext [illegible]libvirt [illegible]

tcp

[illegible] TCP/IP socket[illegible] 16509[illegible]

[illegible] tls[illegible]

[illegible] URI

[illegible]**Uniform Resource Identifier**[illegible]**URI**[illegible] **virsh** [illegible] **libvirt** [illegible]**URI** [illegible] **--connect** [illegible] **virsh** [illegible]

libvirt URI [illegible] [] [illegible]

```
driver[+transport]://[username@][hostname][:port]/[path][?extraparameters]
```

[illegible] URI [illegible]

[illegible]

- [illegible] SSH [illegible] `ccurran`[illegible] Xen hypervisor [illegible] `towada` [illegible]

  ```
  xen+ssh://ccurran@towada/
  ```

- [illegible] TLS [illegible] `towada` [illegible] Xen hypervisor[illegible]

  ```
  xen://towada/
  ```

- [illegible] TLS [illegible] `towada` [illegible] Xen hypervisor[illegible]*`no_verify=1`* [illegible] libvirt [illegible]

  ```
  xen://towada/?no_verify=1
  ```

- [illegible] SSH [illegible] `towada` [illegible] KVM hypervisor[illegible]

  ```
  qemu+ssh://towada/system
  ```

[illegible]

- [illegible] UNIX socket [illegible] KVM hypervisor[illegible]Unix socket [illegible]

```
qemu+unix:///system?socket=/opt/libvirt/run/libvirt/libvirt-sock
```

- □□□□□□□□□□□ TCP/IP □□□□□□ 5000□IP □□□ 10.0.0.10 □ libvirt daemon□□□□□□□□□□□□□□□□□

```
test+tcp://10.1.1.10:5000/default
```

□□□ URI □□

□□□□□□□□□□□□ URI □□□□□□ *□□ 13.1, “□□□ URI □□”* □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ URI □□□URL-escaped□□□□□□□□□□□□□□□□□ □□□□□□□□?□□□□□□ URI □□□□

□□	□□□□	Description	□□□□
name	□□□□	□□□□□ virConnectOpen □□□ □□□□□□□□□□□□□□□□□□□ URI □□□□ □□□□□□□□□□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□□□□□□	name=qemu:///system
command	ssh □ ext	□□□□□□□□ ext □□□□□□□□□□ssh □□ □□□□ ssh□□□□□□□PATH□□□□□□	command=/opt/openssh/bin/ssh
socket	unix □ ssh	UNIX □□ socket □□□□□□□ □□□□□□□□ ssh □□□□□□□□□□□□□ netcat □□□□□□ netcat□□	socket=/opt/libvirt/run/libvirt/libvirt-sock
netcat	ssh	netcat □□□□□□□□□□□□□□□□□□□ nc□ □□□ ssh □□□□libvirt □□□□ □ ssh □□□□□command -p port [-l username] hostname netcat -U socket□□□□□□□□□□□□□□□□□□□□□ □□□□□□ URI □□□□□□netcat □ socket □□□□□□□□□□□□□□□□□□□□□□□□	netcat=/opt/netcat/bin/nc
no_verify	tls	□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□ IP □□□□□□□□□□□□□□ □□□□ libvirt □□□□□□□	no_verify=1
no_tty	ssh	□□□□□□□□□□□□□□□□□□ ssh □□□□□□□□□ □□□ ssh-agent □□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ - □ □□□□□□ libvirt □□□□□□□□□	no_tty=1

□□ 13.1. □□□ URI □□

□ IV. □□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□ Fedora □□

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□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ Xen □□□□

□□□□□□□

- **vmstat**
- **iostat**
- **lsof**

  ```
  # lsof -i :5900
  xen-vncfb 10635  root  5u  IPv4 218738  TCP
   grumble.boston.redhat.com:5900 (LISTEN)
  ```

- **qemu-img**

□□□□□□□

- **systemTap**
- **crash**
- **xen-gdbserver**
- **sysrq**
- **sysrq t**
- **sysrq w**
- **sysrq c**

□□□□

brtcl

-
  ```
  # brctl show
  bridge name   bridge id            STP enabled    interfaces
  xenbr0        8000.feffffffffff    no             vif13.0
                                                    pdummy0
                                                    vif0.0
  ```

-
  ```
  # brctl showmacs xenbr0
  port no  mac addr                is local?       aging timer
    1      fe:ff:ff:ff:ff:ff       yes             0.00
  ```

-
  ```
  # brctl showstp xenbr0
  xenbr0
  bridge id              8000.feffffffffff
  designated root        8000.feffffffffff
  root port              0                    path cost
   0
  ```

```
max age                20.00                bridge max age
 20.00
hello time             2.00                 bridge hello time
 2.00
forward delay          0.00                 bridge forward delay
 0.00
aging time            300.01
hello timer            1.43                 tcn timer
 0.00
topology change timer  0.00                 gc timer
 0.02
flags

vif13.0 (3)
port id                8003                 state
 forwarding
designated root        8000.fefffffffffff   path cost
 100
designated bridge      8000.fefffffffffff   message age timer
 0.00
designated port        8003                 forward delay timer
 0.00
designated cost        0                    hold timer
 0.43
flags

pdummy0 (2)
port id                8002                 state
 forwarding
designated root        8000.fefffffffffff   path cost
 100
designated bridge      8000.fefffffffffff   message age timer
 0.00
designated port        8002                 forward delay timer
 0.00
designated cost        0                    hold timer
 0.43
flags

vif0.0 (1)
port id                8001                 state
 forwarding
designated root        8000.fefffffffffff   path cost
 100
designated bridge      8000.fefffffffffff   message age timer
 0.00
designated port        8001                 forward delay timer
 0.00
designated cost        0                    hold timer
 0.43
flags
```

- **ifconfig**
- **tcpdump**

KVM □□

- **ps**
- **pstree**
- **top**
- **kvmtrace**
- **kvm_stat**

Xen □□

- **xentop**
- **xm dmesg**
- **xm log**

□□ virsh □□□□□□

virsh □□□□□□□□□□□□ hypervisor□□□□□□□□□□□□□□□□□□

virsh □□□□□□□□ **libvirt** □□ API □□□□□□□□□□□ **xm** □□□□□□□□□□□□□□□□□**virt-manager**□□□□□□□□□□□□□□□□□□□□□□□□□□□ **virsh** □□□□□□□ □□□□□ **virsh** □□□□□□□□□□□ script□

virsh □□□□□□□□

□□□□□□□□□□□ virsh □□□□□□□□□□□□□□□

□□	Description
help	□□□□□□□□□
list	□□□□□□□□
dumpxml	□□□□□□ XML □□□□□
create	□□□ XML □□□□□□□□□□□□□□□□□□□
start	□□□□□□□□□□□□□
destroy	□□□□□□□□
define	□□□□□□ XML □□□□□
domid	□□□□□□ ID□
domuuid	□□□□□□ UUID□
dominfo	□□□□□□□□□□□
domname	□□□□□□□□□
domstate	□□□□□□□□□
quit	□□□□□□□□□
reboot	□□□□□□□□
restore	□□□□□□□□□□□□□□□□□□
resume	□□□□□□□□□□□□
save	□□□□□□□□□□□□□□□□□□
shutdown	□□□□□□□□□
suspend	□□□□□□□
undefine	□□□□□□□□□□□□□□□□□
migrate	□□□□□□□□□□□□□□

□□ 15.1. □□□□□□□

□□□□□□ **virsh** □□□□□□□□□□□□□ hypervisor □□□

□□	Description
setmem	□□□□□□□□□□□□
setmaxmem	□□ hypervisor □□□□□□□□□□□□□
setvcpus	□□□□□□□□□□□ CPU □□□
vcpuinfo	□□□□□□□□□□□ CPU □□□
vcpupin	□□□□□□□□ CPU □□□□

□□	Description
domblkstat	□□□□□□□□□□□□□□□□□□□□
domifstat	□□□□□□□□□□□□□□□□□□□
attach-device	□□□□□□ XML □□□□□□□□□□□□□□□□□□□□□
attach-disk	□□□□□□□□□□□□□
attach-interface	□□□□□□□□□□□□□□
detach-device	□□□□□□□□□□□□□□□ **attach-device** □□□□□□□ XML □□□
detach-disk	□□□□□□□□□□□□□□
detach-interface	□□□□□□□□□□□□□□□

□□ 15.2. □□□□□□

□□□□□□ **virsh** □□□

□□	Description
version	□□ **virsh** □□□
nodeinfo	□□□□□ hypervisor □□□□□□

□□ 15.3. □□□□

□□ hypervisor

□□ **virsh** □□□□□ hypervisor session□

```
# virsh connect {hostname OR URL}
```

<name> □ hypervisor □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **-readonly**□

□□□□□□□□□□ XML □□□□□□□□□

□□ **virsh** □□□□□□□ XML □□□□□

```
# virsh dumpxml {domain-id, domain-name or domain-uuid}
```

□□□□□□□□□□ XML □□□□□□□□□□□□**stdout**□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ *guest.xml* □□□□□□□

```
# virsh dumpxml GuestID > guest.xml
```

guest.xml □□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□ XML □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **virsh dumpxml** □□□□□□ □□□□□□□□□ *□ 18.1, “□□□□ virsh □ XML □□□□”*□

virsh dumpxml □□□□□□

```
# virsh dumpxml r5b2-mySQL01
<domain type='xen' id='13'>
    <name>r5b2-mySQL01</name>
    <uuid>4a4c59a7ee3fc78196e4288f2862f011</uuid>
    <bootloader>/usr/bin/pygrub</bootloader>
    <os>
```

```
        <type>linux</type>
        <kernel>/var/lib/libvirt/vmlinuz.2dgnU_</kernel>
        <initrd>/var/lib/libvirt/initrd.UQafMw</initrd>
        <cmdline>ro root=/dev/VolGroup00/LogVol00 rhgb quiet</cmdline>
    </os>
    <memory>512000</memory>
    <vcpu>1</vcpu>
    <on_poweroff>destroy</on_poweroff>
    <on_reboot>restart</on_reboot>
    <on_crash>restart</on_crash>
    <devices>
        <interface type='bridge'>
            <source bridge='xenbr0'/>
            <mac address='00:16:3e:49:1d:11'/>
            <script path='vif-bridge'/>
        </interface>
        <graphics type='vnc' port='5900'/>
        <console tty='/dev/pts/4'/>
    </devices>
</domain>
```

□□□□□□□□□□

□□□□□□□ XML □□□□□□□□□□□□□□□□□□□□□□□□□□□□ XML □□□□□□ **dumpxml** □□□□□□ □□□□□□□□□□ *XML* □□□□□□□□□□□□□□□□ **virsh** □□□□ XML □□□□□□□□□□□□□

```
# virsh create configuration_file.xml
```

□□□□□□□□□□

□□□□ **dumpxml** □□□□□□ □□□□□□□□□□ *XML* □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□**virsh edit** □□□□□□□□□□□□□□□□□□□□□□□□ *softwaretesting* □□□□□

```
# virsh edit softwaretesting
```

□□□□□□□□□□□□□□□□□□□□□□□□ **$EDITOR** shell □□□□□□□□ **vi**□□

□□□□□□

□□ **virsh** □□□□□□□□

```
# virsh suspend {domain-id, domain-name or domain-uuid}
```

□□□ I/O □□□□□□□□□□□□□□□□□□□□□□□□□□□ **resume**□□□□□□□□□□□□□□□□

□□□□□□

□□ **virsh** □□□ **resume** □□□□□□□□□□□□□□□□□□

```
# virsh resume {domain-id, domain-name or domain-uuid}
```

□□□□□□□□□□□□□□□□□□□□□ **suspend** □ **resume** □□□

□□□□□

□□□□ **virsh** □□□□□□□□□□□□□□□□□□□□

```
# virsh save {domain-name, domain-id or domain-uuid} filename
```

□□ **restore**□□□

□□□□□

□□ **virsh** □□□□□□□□□ **virsh save** □□□□□□□□□□□□□□□□□

```
# virsh restore filename
```

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ UIDD □□□□□□□□□□□□□□ id□

□□□□□

□□□□ **virsh** □□□□□□□□

```
# virsh shutdown {domain-id, domain-name or domain-uuid}
```

□□□□□□□□□□□□□□ **on_shutdown** □□□□□□□□□□□□□□□□

□□□□□□□

□□ **virsh** □□□□□□□□□□

```
#virsh reboot {domain-id, domain-name or domain-uuid}
```

□□□□□□□□□□□□□□ **on_reboot** □□□□□□□□□□□□□□□□

□□□□□□□

□□□□ **virsh** □□□□□□□□

```
# virsh destroy {domain-id, domain-name or domain-uuid}
```

□□□□□□□□□□□□□□□□□□□□□□□□ **virsh destroy** □□□□□□□□□□□□□□□□□□□□□□□□□□□ **destroy** □□□□□□□□□□□□□□□□□□ **shutdown** □□□**shutdown** option(□□□□□□□□□

□□□□□□□□ ID

□□□□□□□□□□ ID□

```
# virsh domid {domain-name or domain-uuid}
```

□□□□□□□□□□

□□□□□□□□□□□□□

```
# virsh domname {domain-id or domain-uuid}
```

□□□□□□ UUID

□□□□□□□□ UUID□

```
# virsh domuuid {domain-id or domain-name}
```

virsh domuuid □□□□□□□□

```
# virsh domuuid r5b2-mySQL01
4a4c59a7-ee3f-c781-96e4-288f2862f011
```

□□□□□□□

□□□□□□ **virsh** □□□□□□□□ ID□□□□□□ UUID □□□□□□□□□□□□□

```
# virsh dominfo {domain-id, domain-name or domain-uuid}
```

□□□□□ **virsh dominfo** □□□□□□□□

```
# virsh dominfo r5b2-mySQL01
id:             13
name:           r5b2-mysql01
uuid:           4a4c59a7-ee3f-c781-96e4-288f2862f011
os type:              linux
state:          blocked
cpu(s):         1
cpu time:             11.0s
max memory:     512000 kb
used memory:    512000 kb
```

□□□□□□

□□□□□□□□□□□□

```
# virsh nodeinfo
```

virsh nodeinfo □□□□□□□□

```
# virsh nodeinfo
CPU model                    x86_64
CPU (s)                      8
CPU frequency                2895 Mhz
CPU socket(s)                2
```

```
Core(s) per socket           2
Threads per core:            2
Numa cell(s)                 1
Memory size:                 1046528 kb
```

□□□□□□□□□□□□□□□□□□□□□□□

□□□□□

□□□□ **virsh** □□□□□□□□□□□□□□□□□□

```
# virsh list
```

□□□□□□□□□

--inactive □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

--all □□□□□□□□□□□□□□□

```
# virsh list --all
 Id Name                 State
----------------------------------
  0 Domain-0             running
  1 Domain202            paused
  2 Domain010            inactive
  3 Domain9600           crashed
```

□□□ **virsh list** □□□□□□□□□□□□□□□□□□

- running □□□□ CPU □□□□□□□□□□
- □□□ blocked □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ I/O□□□□□□□□□□□□□□□□□□□□□□□□□
- paused □□□□□□□□□□□□□□□□□□□□□□□□ **virt-manager** □□ **pause** □□□**xm pause** □ **virsh suspend** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ hypervisor □□□□□□□ CPU □□□□□□
- shutdown □□
- □□□ dying □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
- □□□ crashed □□□

□□□□ CPU □□

□□ **virsh** □□□□□□□□□ CPU □□□

```
# virsh vcpuinfo {domain-id, domain-name or domain-uuid}
```

virsh vcpuinfo □□□□□□□□

```
# virsh vcpuinfo r5b2-mySQL01
VCPU:           0
```

```
CPU:            0
State:          blocked
CPU time:       0.0s
CPU Affinity:   yy
```

□□□□ CPU □□□□

□□□□ CPU □□□ CPU □□□□□

```
# virsh vcpupin {domain-id, domain-name or domain-uuid} vcpu, cpulist
```

vcpu □□□ VCPU □□□□□ **cpulist** □□□□ CPU □□□□□□

□□□□ CPU □□

□□ **virsh** □□□□□□□□□□ CPU □□□

```
# virsh setvcpus {domain-name, domain-id or domain-uuid} count
```

□□ *count* □□□□□□□□□□□□□□□□□□□□□□

□□□□□□□

□□ **virsh** □□□□□□□□□□□□□

```
# virsh setmem {domain-id or domain-name} count
```

□□□□ kb □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ 64 MB □□□

□□□□□□□□□□□□

□□□ **virsh domblkstat** □□□□□□□□□□□□□□□□□□□□□

```
# virsh domblkstat GuestName block-device
```

□□□□□□□□□□□

□□ **virsh domifstat** □□□□□□□□□□□□□□□□□□□□□

```
# virsh domifstat GuestName interface-device
```

□□ virsh □□□□□□

□□□□□□□□ **virsh** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ --live □□□□□□□□□**migrate** □□□□□□□□□□□□□

```
# virsh migrate --live GuestName DestinationURL
```

--live □□□□□□□□□□□□□□□ *--live* □□□□□□□□□□□

The *GuestName* parameter represents the name of the guest which you want to migrate.

The *DestinationURL* parameter is the URL or hostname of the destination system. The destination system must run the same version of Fedora, be using the same hypervisor and have **libvirt** running.

Once the command is entered you will be prompted for the root password of the destination system.

□□□□□□

□□□□□□□□□□ **virsh** □□□□□□□□□□□□□□□□□□□□□□□

```
# virsh net-list
```

□□□□□□□□□□□□□□□□□□□□

```
# virsh net-list
Name                 State      Autostart
-----------------------------------------
default              active     yes
vnet1                     active     yes
vnet2                     active     yes
```

□□□□□□□□□□□□□□□□

```
# virsh net-dumpxml NetworkName
```

□□□ XML □□□□□□□□□□□□□□□□□□□□

```
# virsh net-dumpxml vnet1
<network>
  <name>vnet1</name>
  <uuid>98361b46-1581-acb7-1643-85a412626e70</uuid>
  <forward dev='eth0'/>
  <bridge name='vnet0' stp='on' forwardDelay='0' />
  <ip address='192.168.100.1' netmask='255.255.255.0'>
    <dhcp>
      <range start='192.168.100.128' end='192.168.100.254' />
    </dhcp>
  </ip>
</network>
```

□□□□□□□□□□□□ **virsh** □□□□□□

- **virsh net-autostart** □□□□ — □□□□□□□□□□□□□□□□□□□
- **virsh net-create *XMLfile*** — □□□□□□□ XML □□□□□□□□□□□□□□□□
- **virsh net-define *XMLfile*** — □□□□□ XML □□□□□□□□□□□□□□□□□□□□
- **virsh net-destroy** □□□□ — □□□□□□□□□□□□□□□□□
- **virsh net-name *networkUUID*** — □□□□□□ *networkUUID* □□□□□□□□

- **virsh net-uuid** □□□□ — □□□□□□□□□□□□□□□ UUID□

- **virsh net-start** □□□□□□□□□ — □□□□□□□□□□□

- **virsh net-undefine** □□□□□□□□□ — □□□□□□□□□□□□□

□□□□□□□□□□□Virtual Machine Manager□virt-manager□□□□□□□

□□□□□□□□□□□□□□□□**`virt-manager`**□□□□□□□□□□□□□□□ GUI □□□

`virt-manager` □□□□□□□□□□□□□□□□ hypervisor □□□□□□□□□□□□□□□□ **`virt-manager`** □□□□□□□□□□□□□□□□□□□**`virt-manager`** □□□□□□□□□□□□□□□□□

- □□□□□□
- □□□□ CPU□
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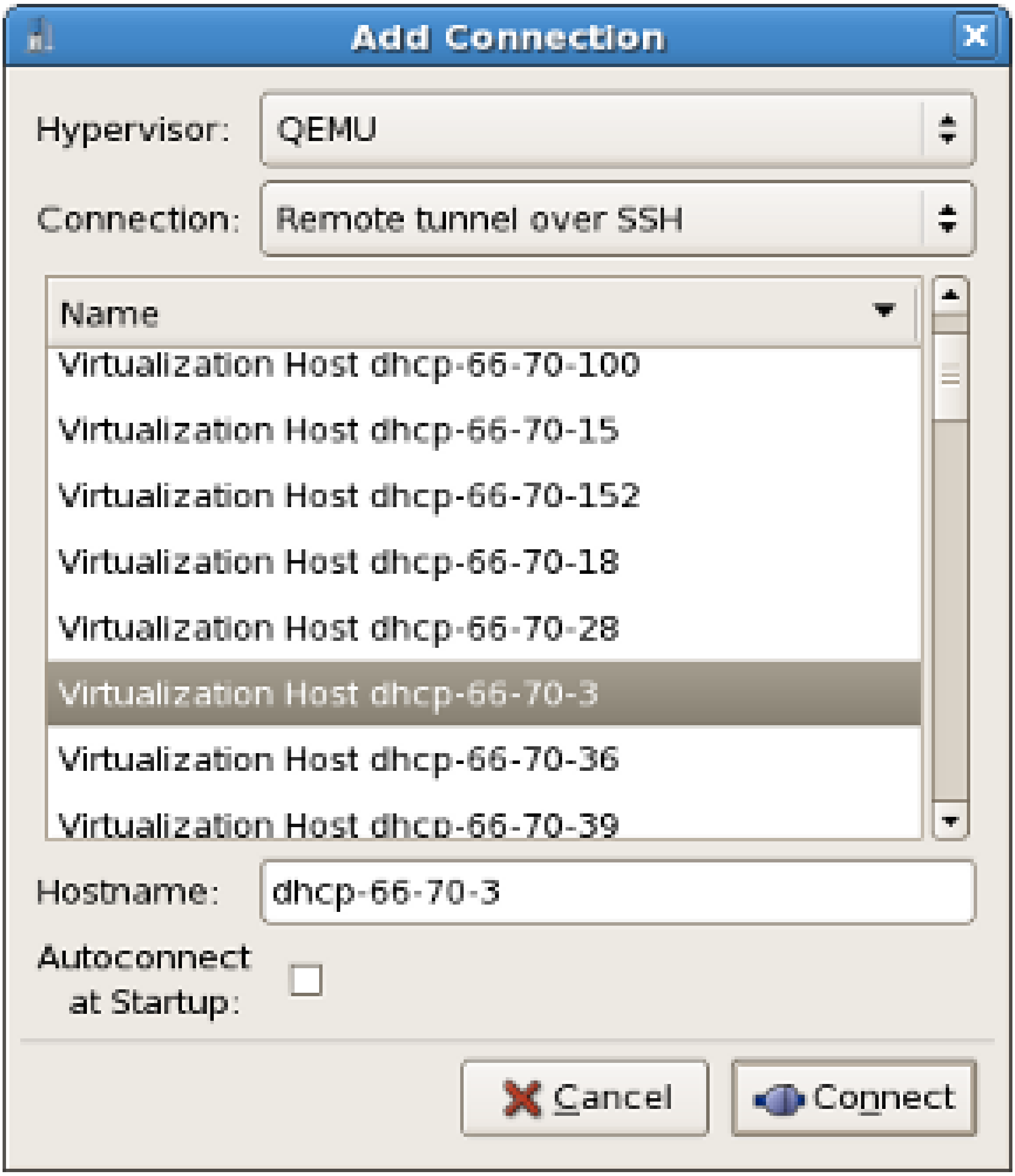
16.1. □□□□□□

□□□□□□□□□□□□□□□□□ hypervisor session□□□□□□□□□□□□□□□□ session□Root □□□□□□□□□□□□□□□□□□ session□□□□□□□□□□□□ **Xen** □□□□□□ QEMU□KVM□□



Add Connection

Hypervisor: QEMU

Connection: Remote tunnel over SSH

Name
Virtualization Host dhcp-66-70-100
Virtualization Host dhcp-66-70-15
Virtualization Host dhcp-66-70-152
Virtualization Host dhcp-66-70-18
Virtualization Host dhcp-66-70-28
Virtualization Host dhcp-66-70-3
Virtualization Host dhcp-66-70-36
Virtualization Host dhcp-66-70-39

Hostname: dhcp-66-70-3

Autoconnect at Startup: □

□□ 16.1. □□□□□□□□□□□□

16.2. □□□□□□□□□□□□

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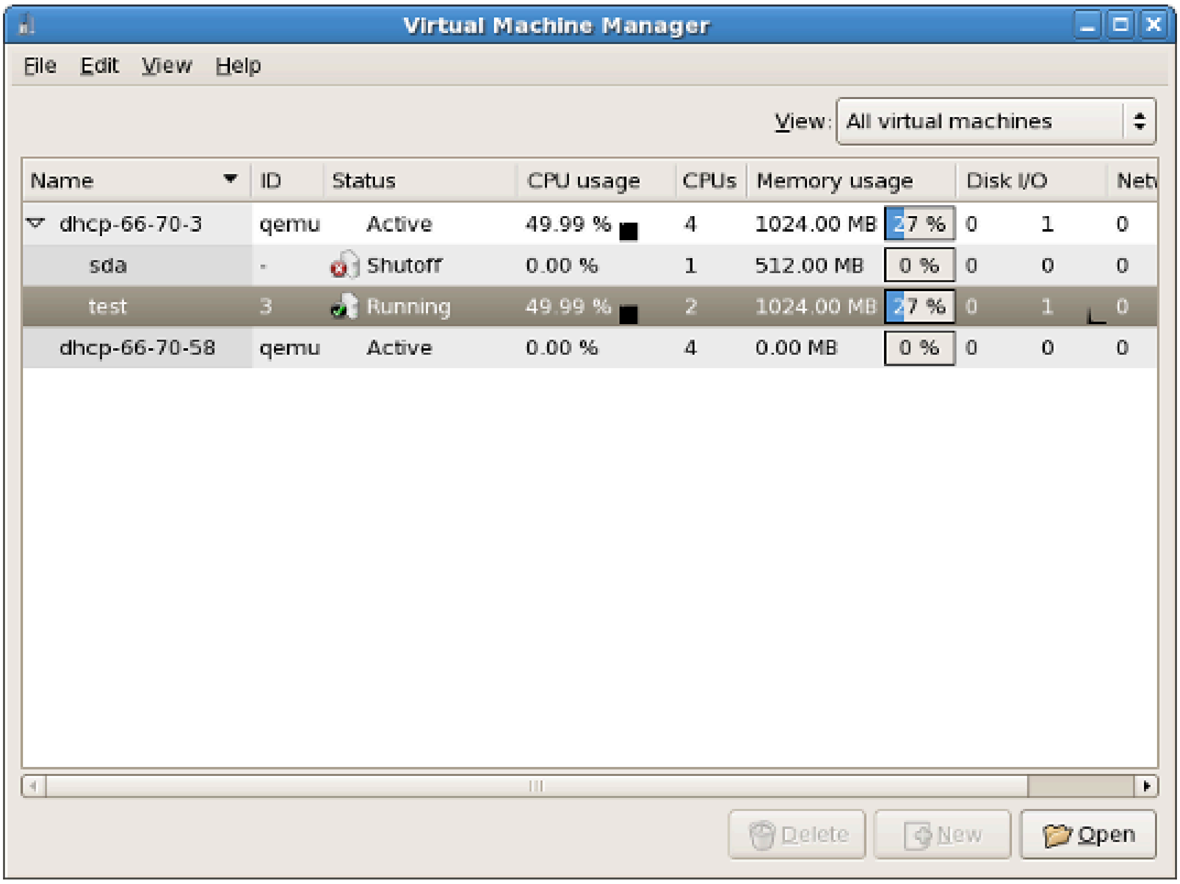


Virtual Machine Manager

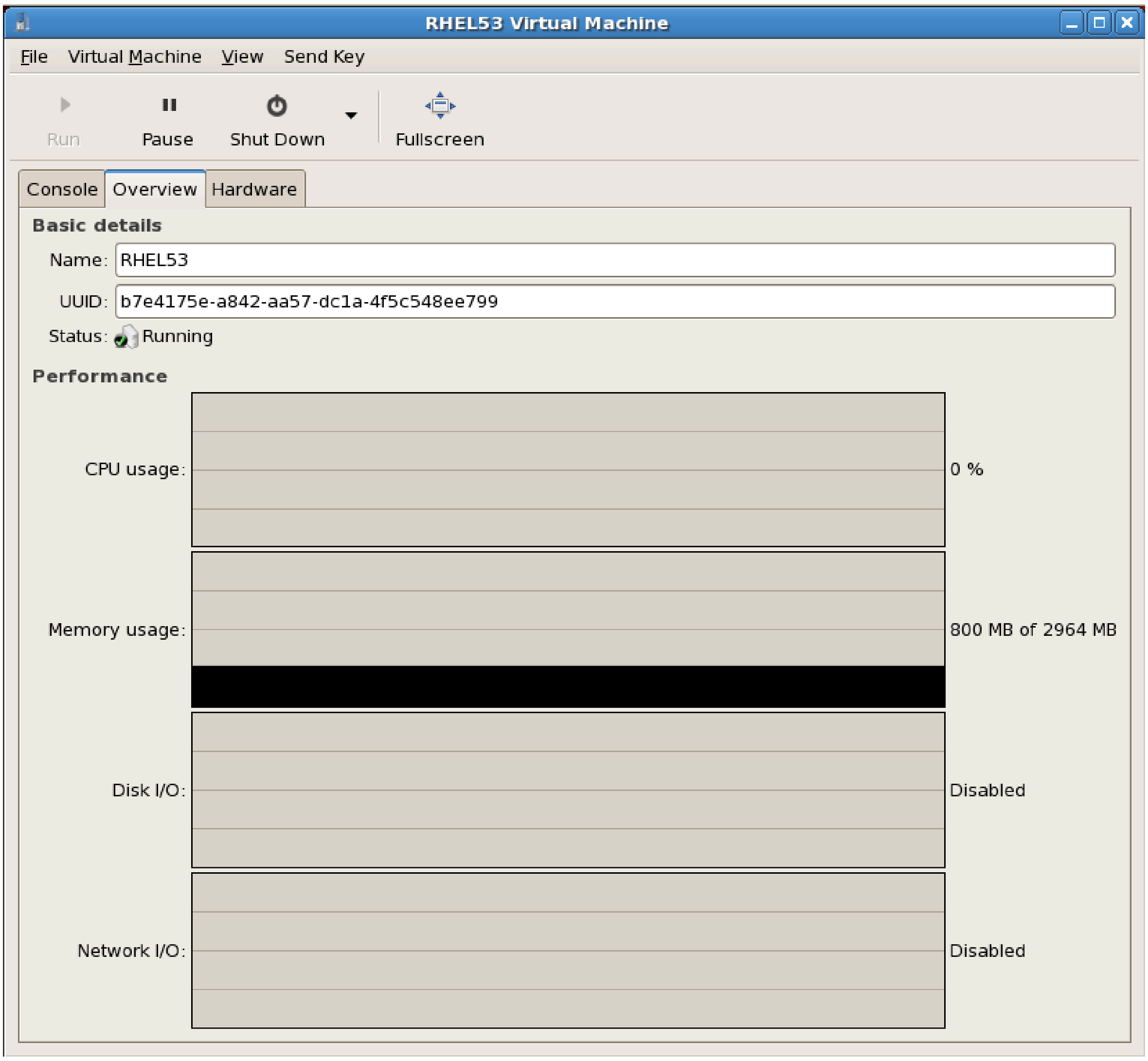
View: All virtual machines

Name	ID	Status	CPU usage	CPUs	Memory usage		Disk I/O		Netw
dhcp-66-70-3	qemu	Active	49.99 %	4	1024.00 MB	27 %	0	1	0
sda	-	Shutoff	0.00 %	1	512.00 MB	0 %	0	0	0
test	3	Running	49.99 %	2	1024.00 MB	27 %	0	1	0
dhcp-66-70-58	qemu	Active	0.00 %	4	0.00 MB	0 %	0	0	0

□□ 16.2. □□□□□□□□□□□□□□

16.3. □□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **`virt-manager`** □□□□□□□□□□□□□□UUID □□□□□□□□□□□□□□□□□globally unique identifier□□



Basic details

Name: RHEL53

UUID: b7e4175e-a842-aa57-dc1a-4f5c548ee799

Status: Running

Performance

CPU usage: 0 %

Memory usage: 800 MB of 2964 MB

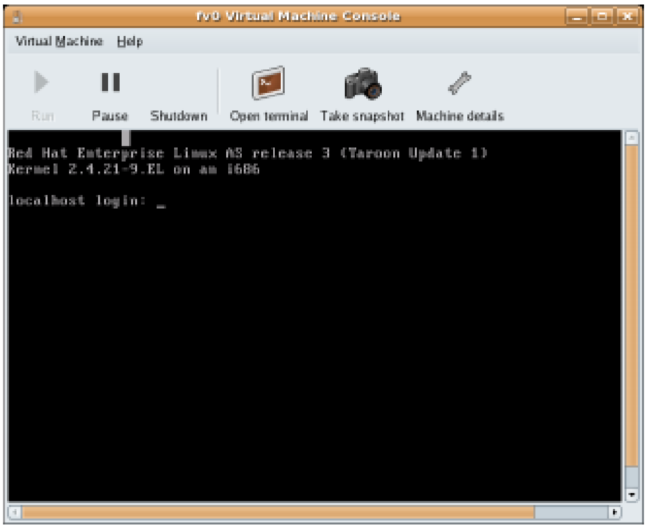
Disk I/O: Disabled

Network I/O: Disabled

□□ 16.3. `virt-manager` □□□□□□

16.4. □□□□□□□□□

□□local virtual framebuffers□□□□□□□□□□□□□□□□□□□□□□□ **VNC** □□□



```
Red Hat Enterprise Linux AS release 3 (Taroon Update 1)
Kernel 2.4.21-9.EL on an i686

localhost login: _
```

□□ 16.4. □□□□□□□□

□□□□ VNC □□□□

□□□□□□□□□□□□ VNC □□□□□□□□□□VNC □□□□□□□□□□□□□□□□□□□□□□ Fedora □□□□□□□□□□□□□□□□□□□□□□dom0□□ loopback □□□127.0.0.1□□□□□□□□□□□□□□□□□□ shell □□□□□□□□□□□ VNC □□□ virt-manager □□□□□□□

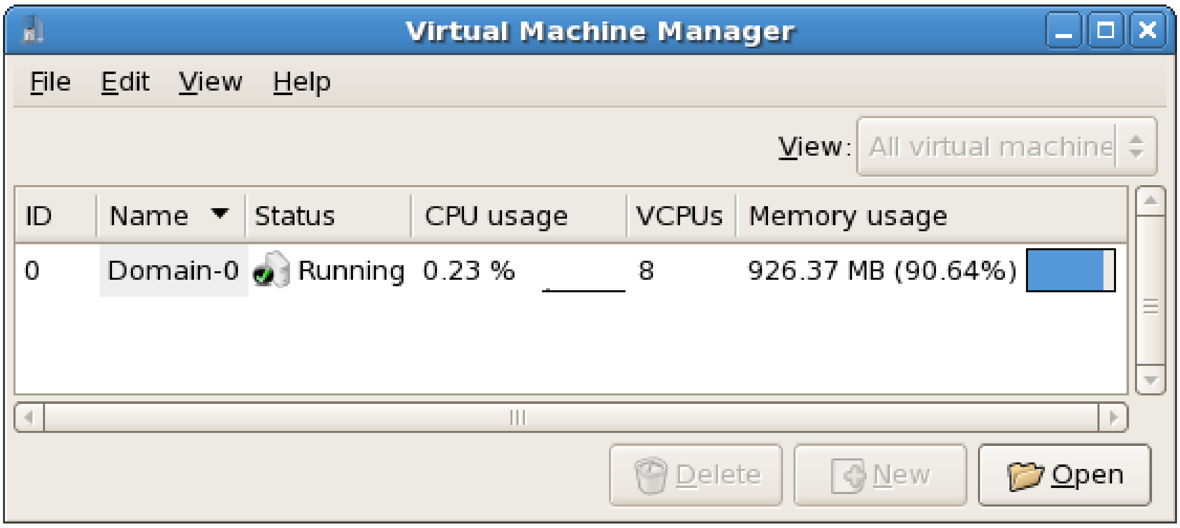
□□□□□□□□□□ □ *13, □□□□□□□□□□□□* □□□□□□□□□TLS □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□ Ctrl+Alt+F11□□□□□□□□□□□□□□□□□□□□□□□ **virt-manager** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□ Ctrl □ Alt□□Ctrl Ctrl Ctrl Alt+F1□□□ Ctrl-Alt-F11 □□□□□□□□

16.5. Starting virt-manager

□□□□ **virt-manager** session□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□**virt-manager**□

virt-manager □□□□□□□□□□



ID	Name	Status	CPU usage	VCPUs	Memory usage
0	Domain-0	Running	0.23 %	8	926.37 MB (90.64%)

□□ 16.5. □□ **virt-manager**

□□□**virt-manager** □□□□□□□□□□□□□□□□□□□□□□□ ssh □□□□□□□□

```
ssh -X □□□□[remotehost]# virt-manager
```

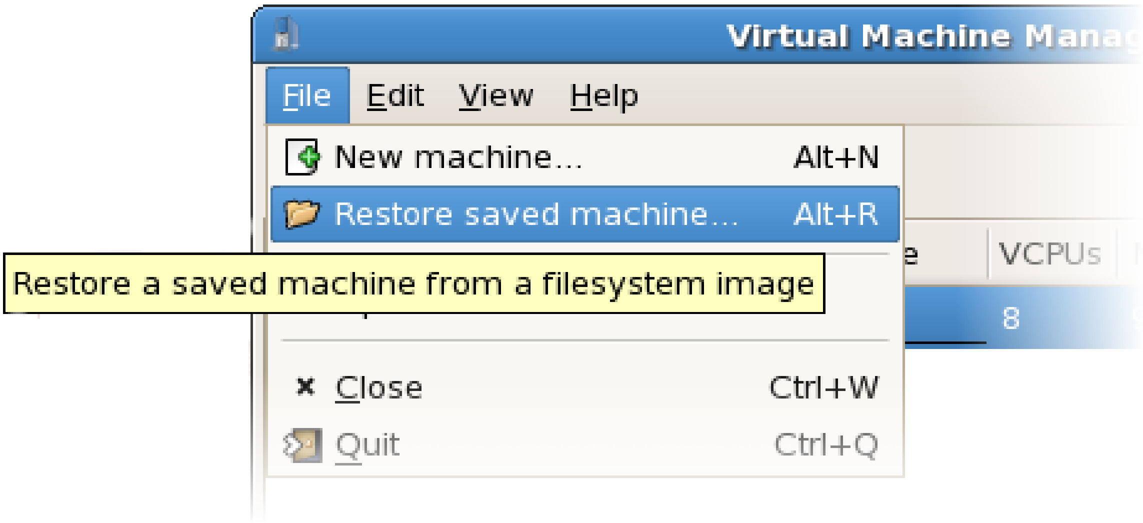
□□□□□□ *□ 13.1, “□□□□ SSH □□□□□□□□”* □□□□□□□□□□ **ssh** □□□□□□□□□□□□□

16.6. □□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Domain0 □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□ session□

1. □□□□□□□□□□□□□□□□□□□□



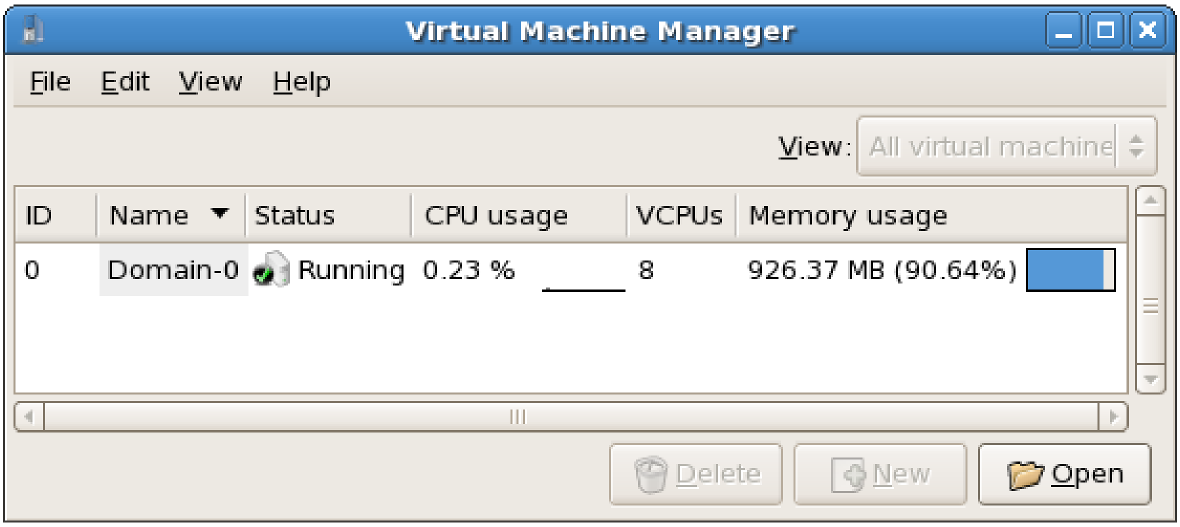
□□ 16.6. □□□□□□□□

2. □□□□□□□□□□□□□□

3. □□□□□□□□□□□□□□□□ session □□□

4. □□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□



ID	Name	Status	CPU usage	VCPUs	Memory usage
0	Domain-0	Running	0.23 %	8	926.37 MB (90.64%)

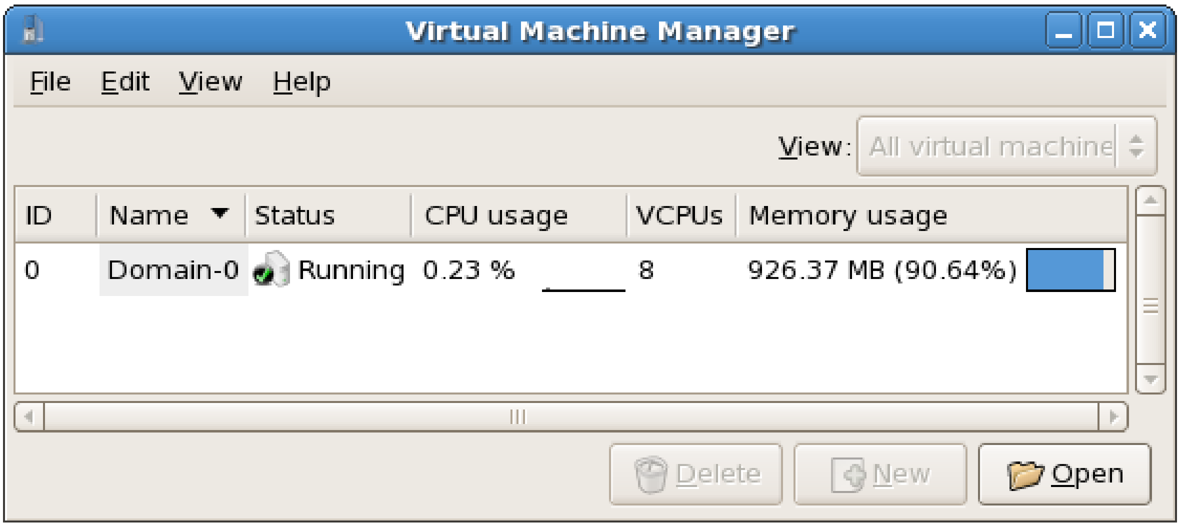
□□ 16.7. □□□□□□□□□□□□ session

16.7. □□□□□□□□□□

□□□□□□□□□□□□□□Virtual Machine Monitor□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□

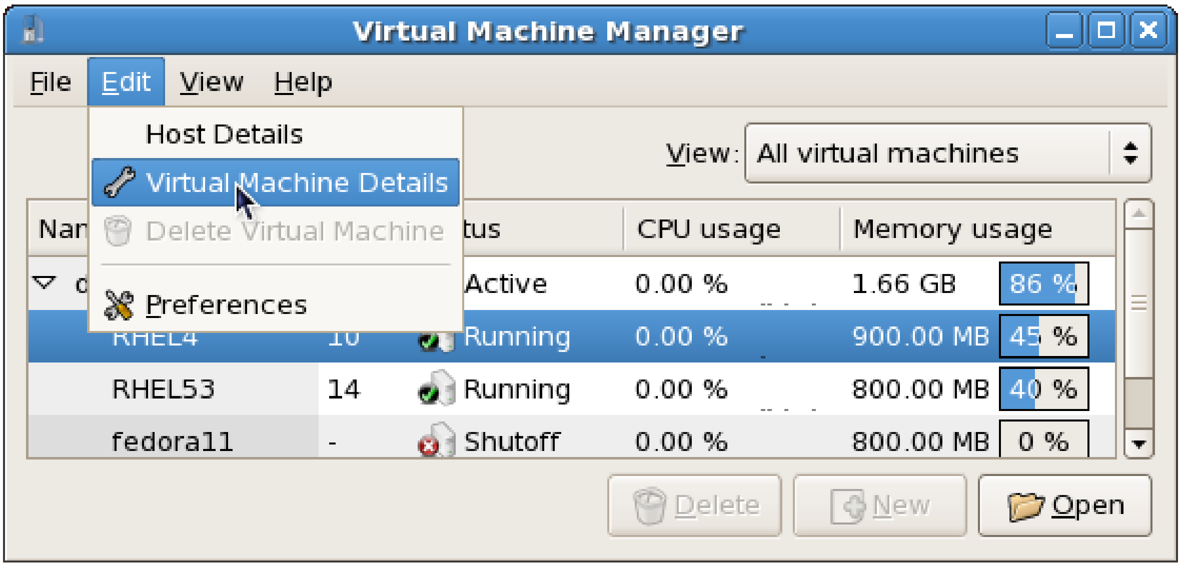
1. □□□□□□□□□□□□□□□□□□□□□□□□□



ID	Name	Status	CPU usage	VCPUs	Memory usage
0	Domain-0	Running	0.23 %	8	926.37 MB (90.64%)

□□ 16.8. □□□□□□□□□□□□

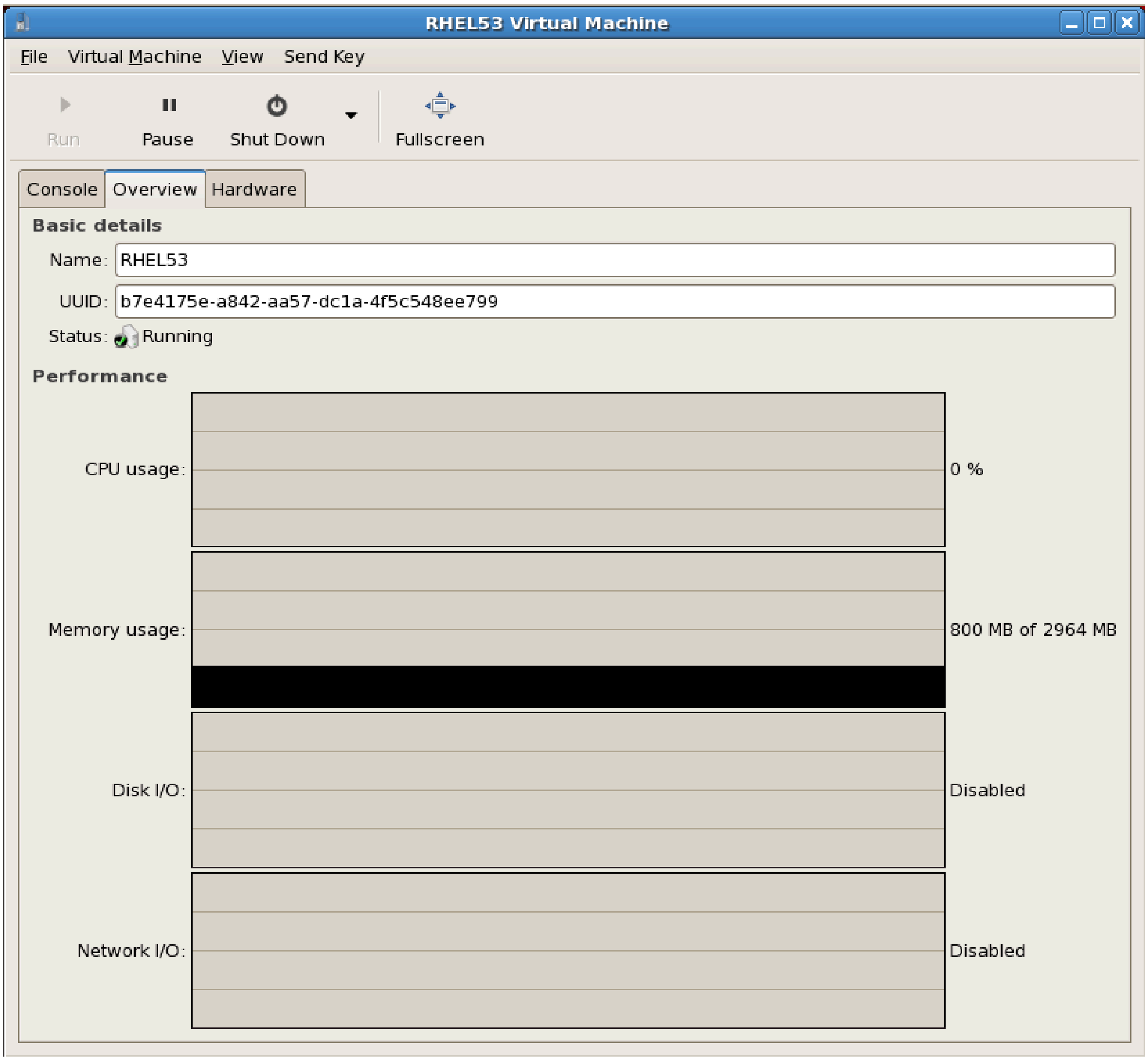
2. □□



Nar		tus	CPU usage	Memory usage	
c		Active	0.00 %	1.66 GB	86 %
RHEL4	10	Running	0.00 %	900.00 MB	45 %
RHEL53	14	Running	0.00 %	800.00 MB	40 %
fedora11	-	Shutoff	0.00 %	800.00 MB	0 %

□□ 16.9. □□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ CPU □□□□□□□□



Basic details

Name: RHEL53

UUID: b7e4175e-a842-aa57-dc1a-4f5c548ee799

Status: Running

Performance

CPU usage: 0 %

Memory usage: 800 MB of 2964 MB

Disk I/O: Disabled

Network I/O: Disabled

□□ 16.10. □□□□□□□□□□□□□□

3. □□□□□□□□□□□□□□□□□□□□□□

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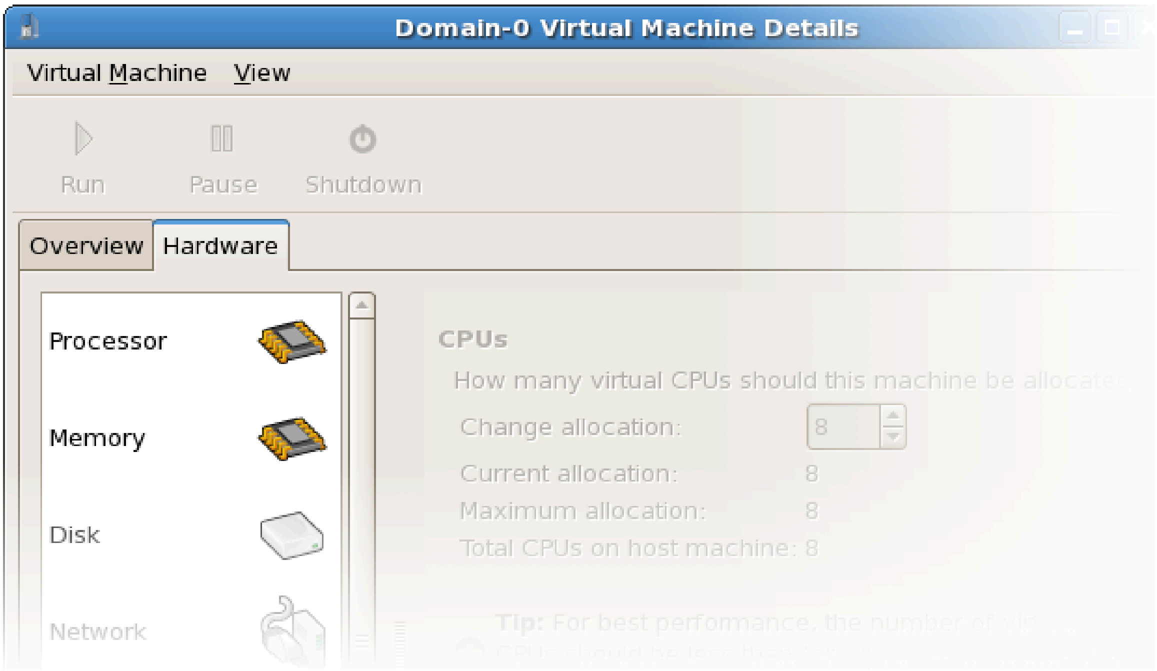


CPUs

How many virtual CPUs should this machine be allocate

Change allocation: 8

Current allocation: 8

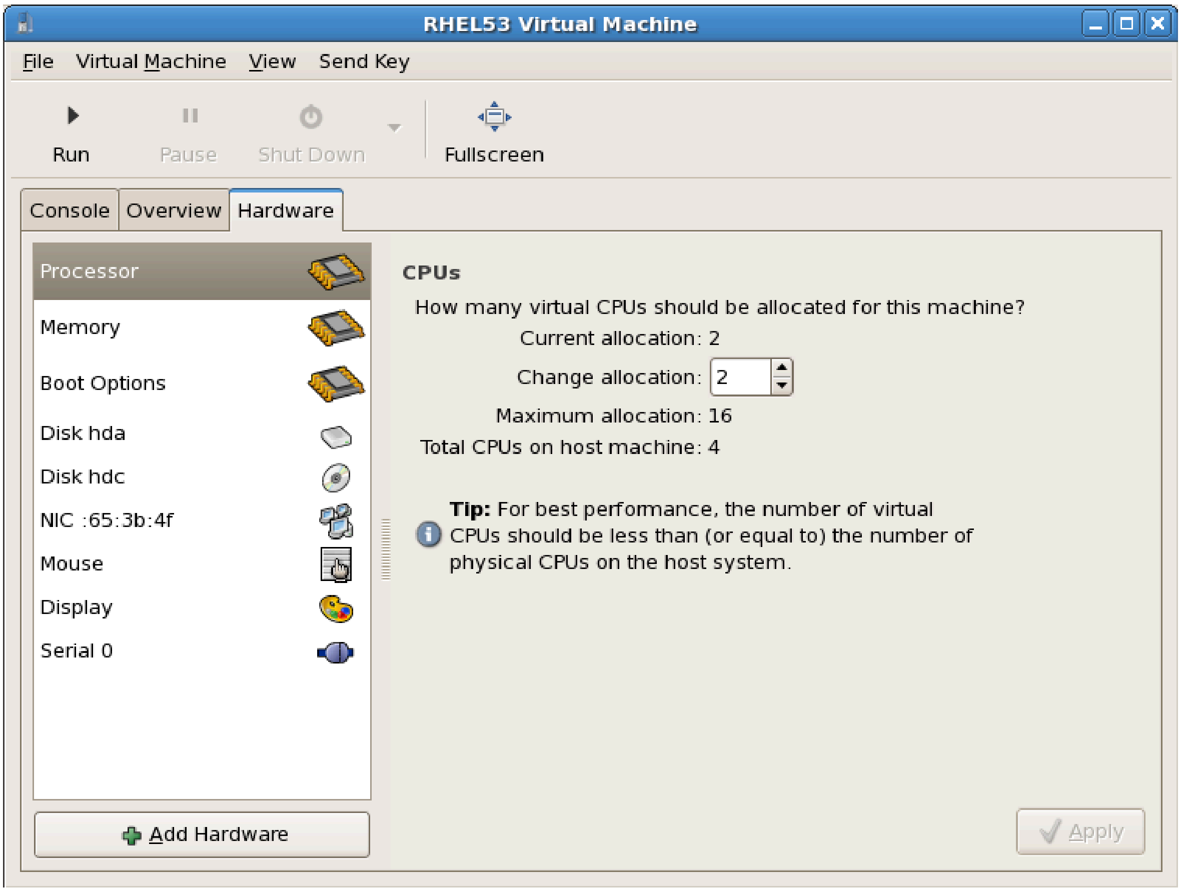
Maximum allocation: 8

Total CPUs on host machine: 8

Tip: For best performance, the number of vir
CPUs should be less than (or e

□□ 16.11. □□□□□□□□□□□□

4. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□



CPUs

How many virtual CPUs should be allocated for this machine?

Current allocation: 2

Change allocation: 2

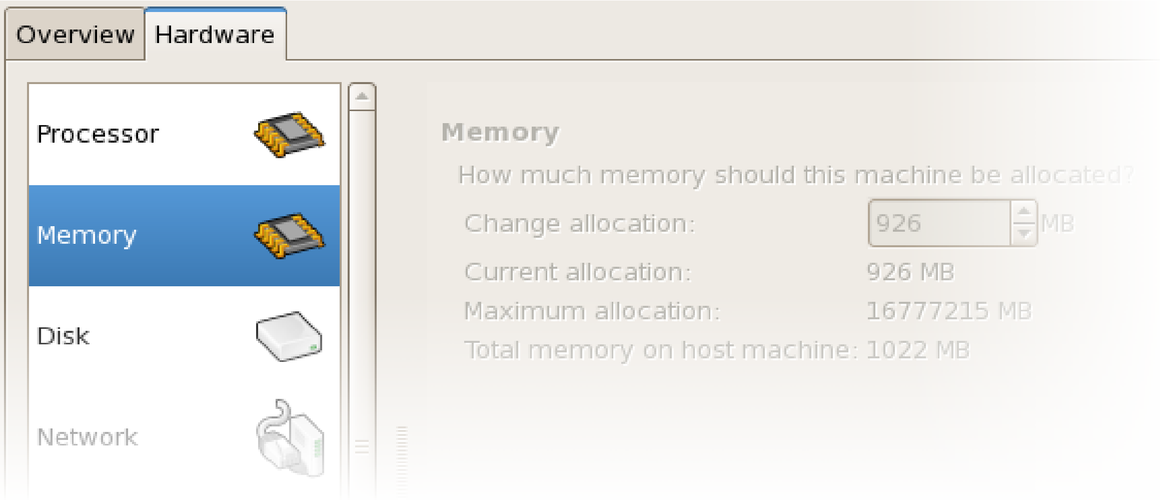
Maximum allocation: 16

Total CPUs on host machine: 4

Tip: For best performance, the number of virtual CPUs should be less than (or equal to) the number of physical CPUs on the host system.

□□ 16.12. □□□□□□□

5. □□□□□□□□□ □□□□□□□□□□□□ RAM □□□□□□



Memory

How much memory should this machine be allocated?

Change allocation: 926 MB

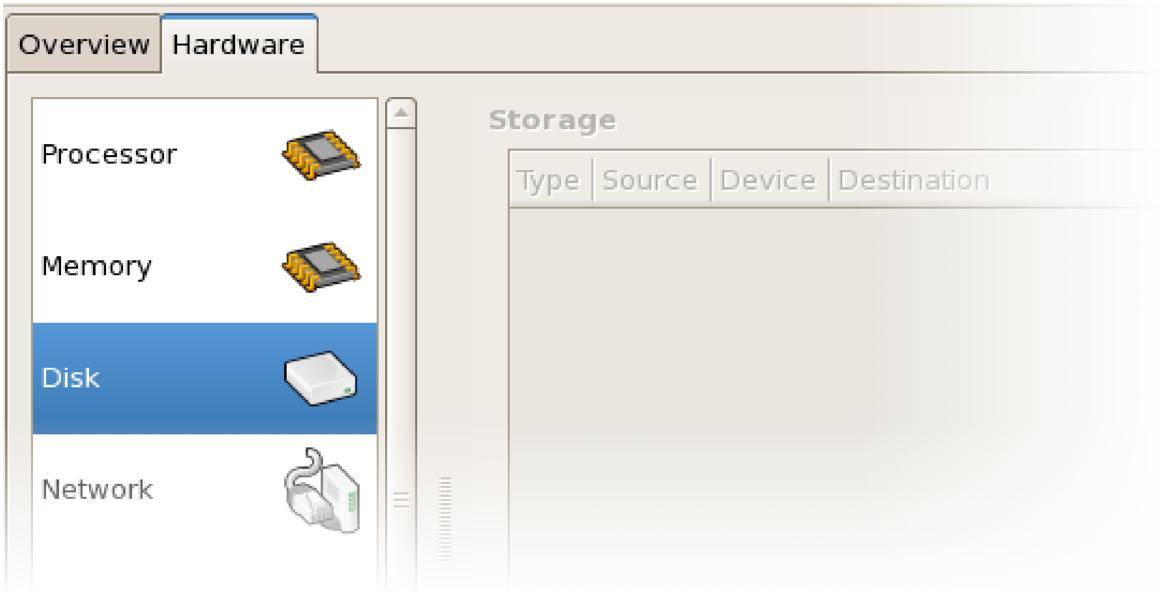
Current allocation: 926 MB

Maximum allocation: 16777215 MB

Total memory on host machine: 1022 MB

□□ 16.13. □□□□□□□

6. □□□□□□□□□□□□□□□□□□□□□□□□□□□

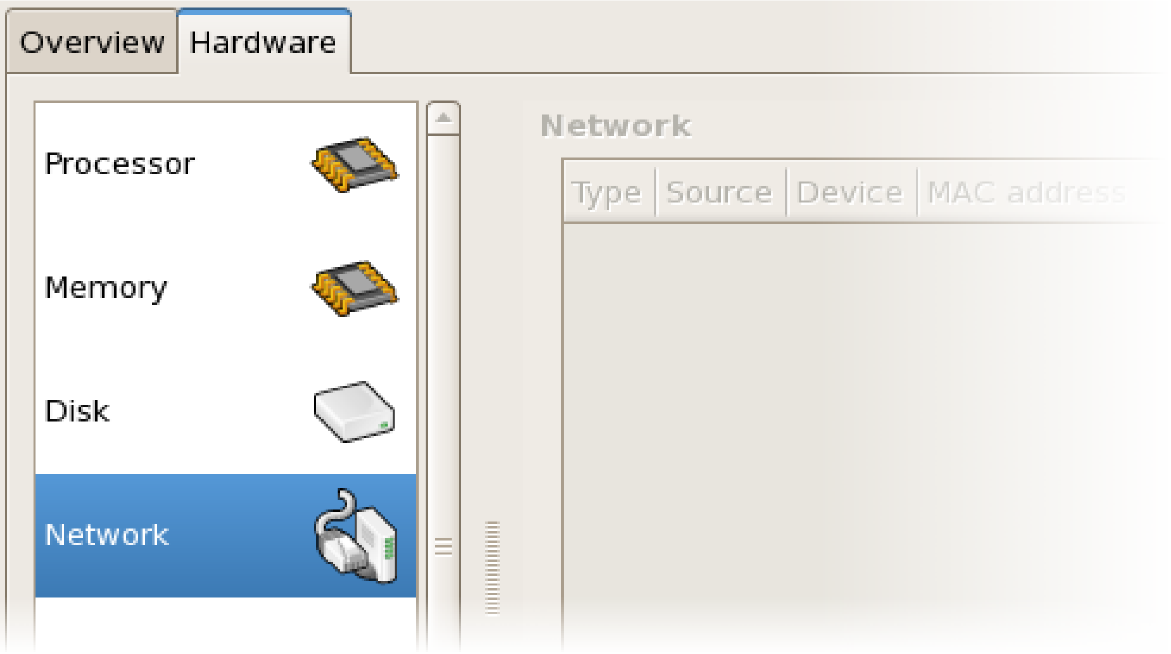


Storage

Type	Source	Device	Destination

□□ 16.14. □□□□□□□□□

7. □□□□□□□□□□□□□□□□□□□□□□□□□□□



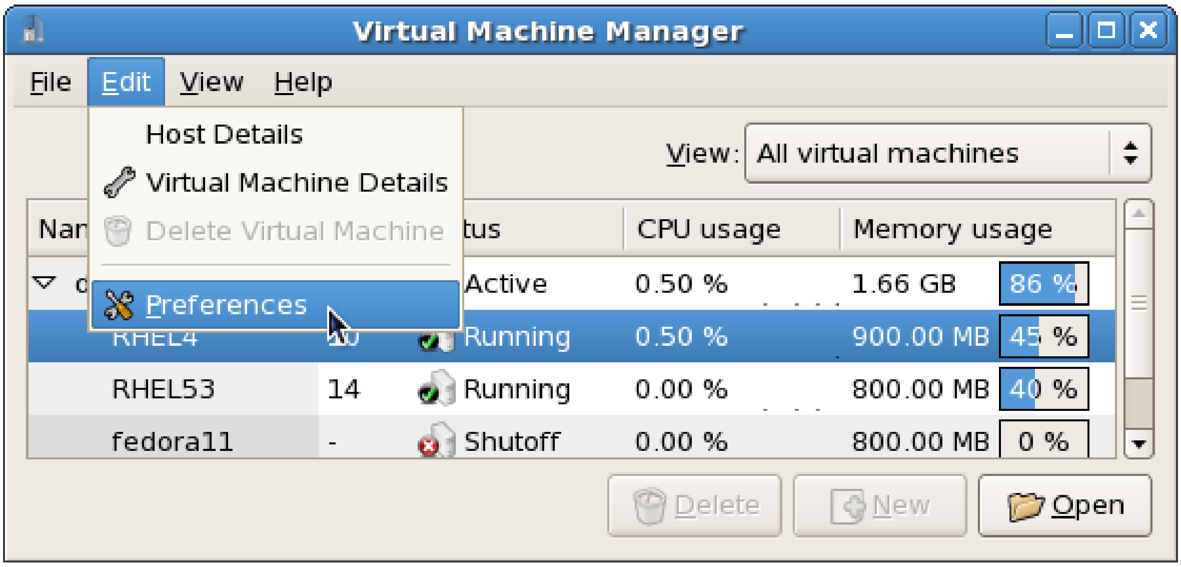
□□ 16.15. □□□□□□□□□

16.8. □□□□

□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□

1. □□□□□□□□□□□□□□

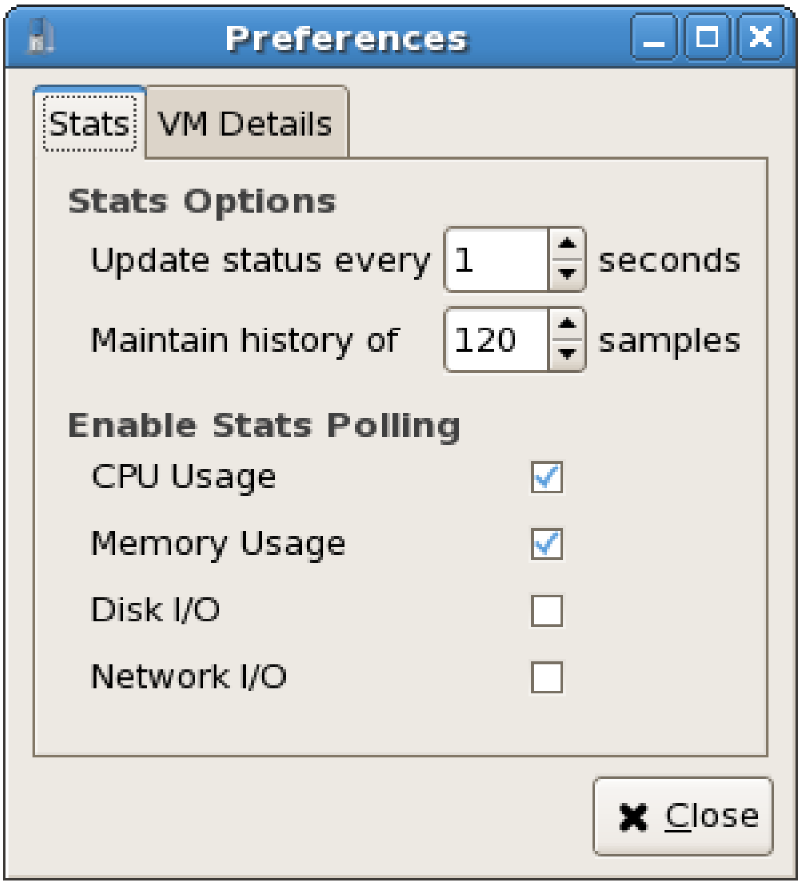


Nan		tus	CPU usage	Memory usage	
▽ d		Active	0.50 %	1.66 GB	86 %
RHEL4	10	Running	0.50 %	900.00 MB	45 %
RHEL53	14	Running	0.00 %	800.00 MB	40 %
fedora11	-	Shutoff	0.00 %	800.00 MB	0 %

□□ 16.16. □□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□

2. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□



Preferences

Stats | VM Details

Stats Options

Update status every 1 seconds

Maintain history of 120 samples

Enable Stats Polling

CPU Usage ☑

Memory Usage ☑

Disk I/O □

Network I/O □

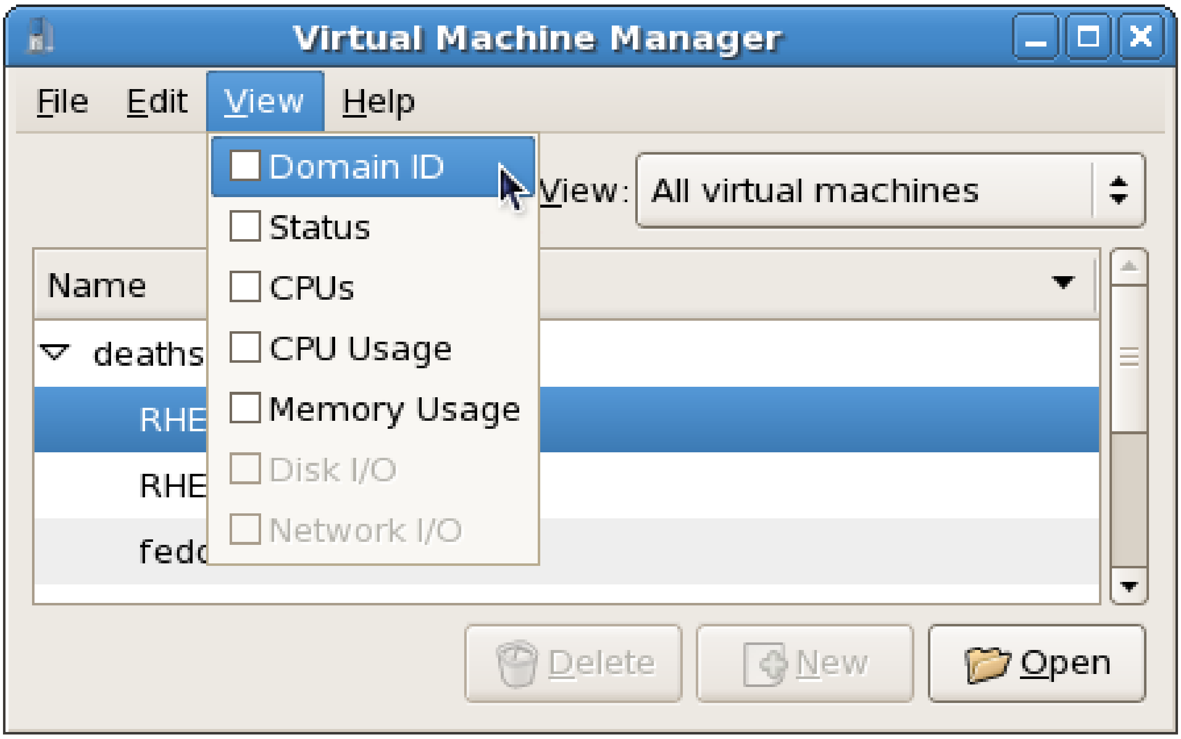
□□ 16.17. □□□□□□

3. □□□□□□□□□□□□□□□□□□□□□□□

16.9. □□□□□□□□□□

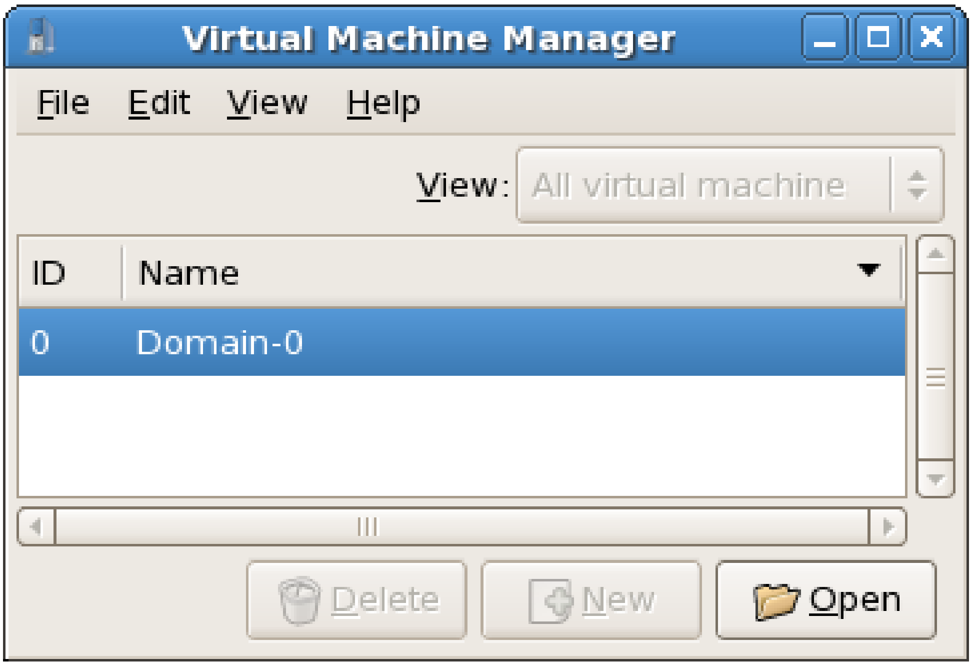
□□□□□□□□□□□□□□□□□□ ID□

1. □□□□□□□□□□□ **ID** □□□□□



 16.18. ID

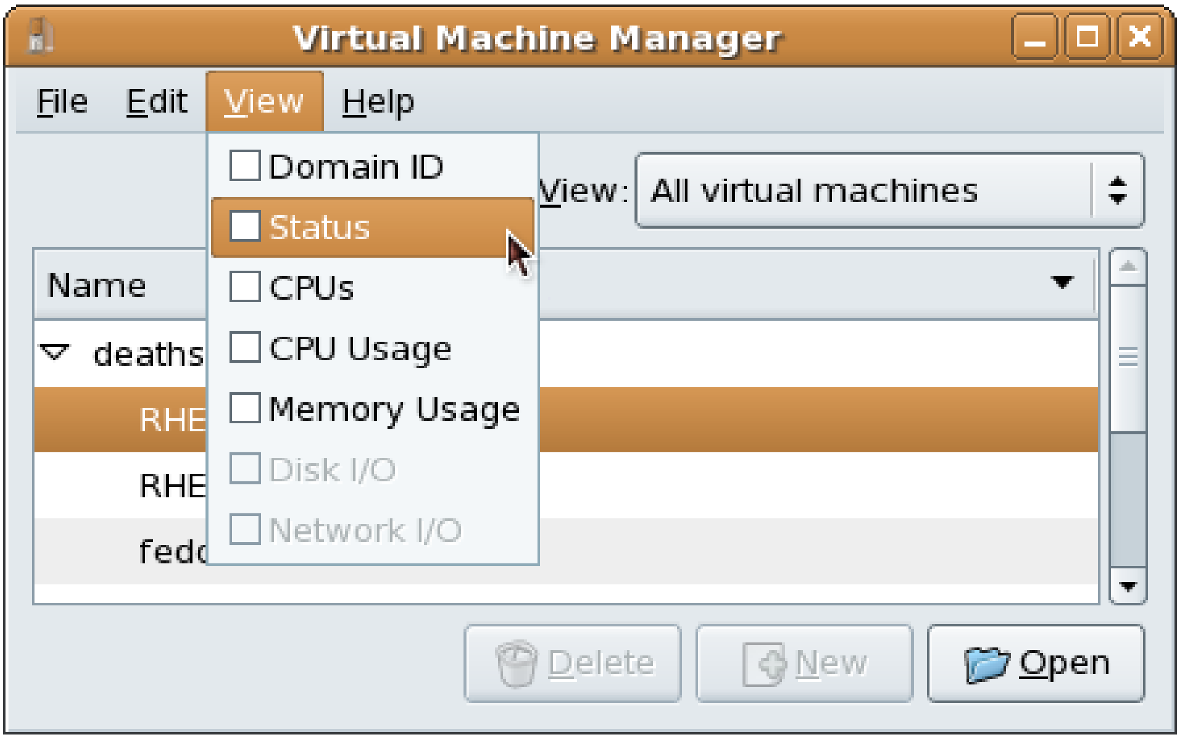
2. ID



 16.19. ID

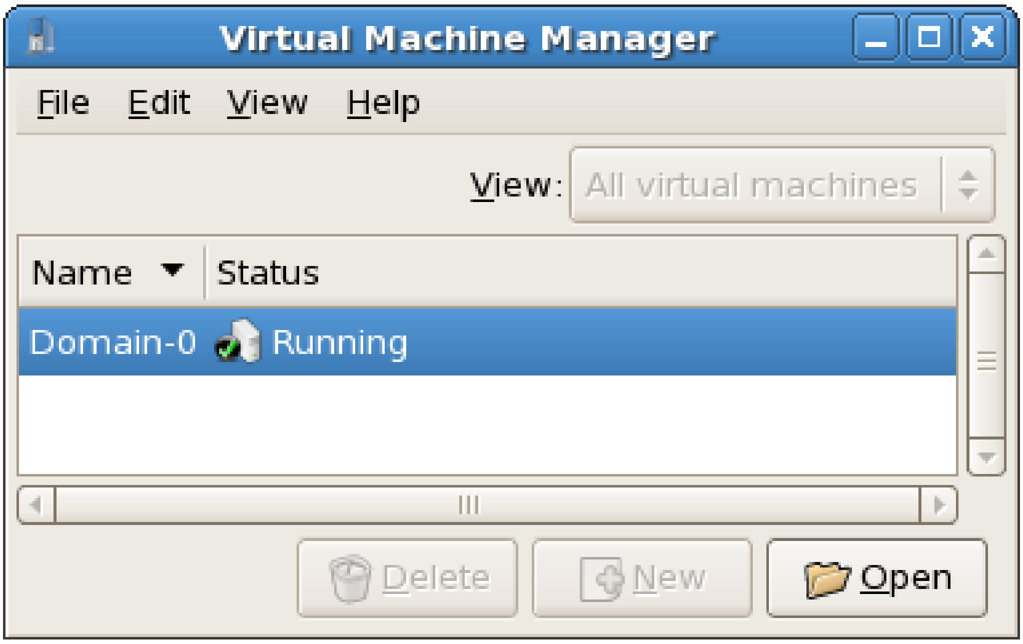
16.10.

1. □□□□□□□□□□□□□□□□



□□ 16.20. □□□□□□□□□

2. □□□□□□□□□□□□□□□□□□□□□□□□□□

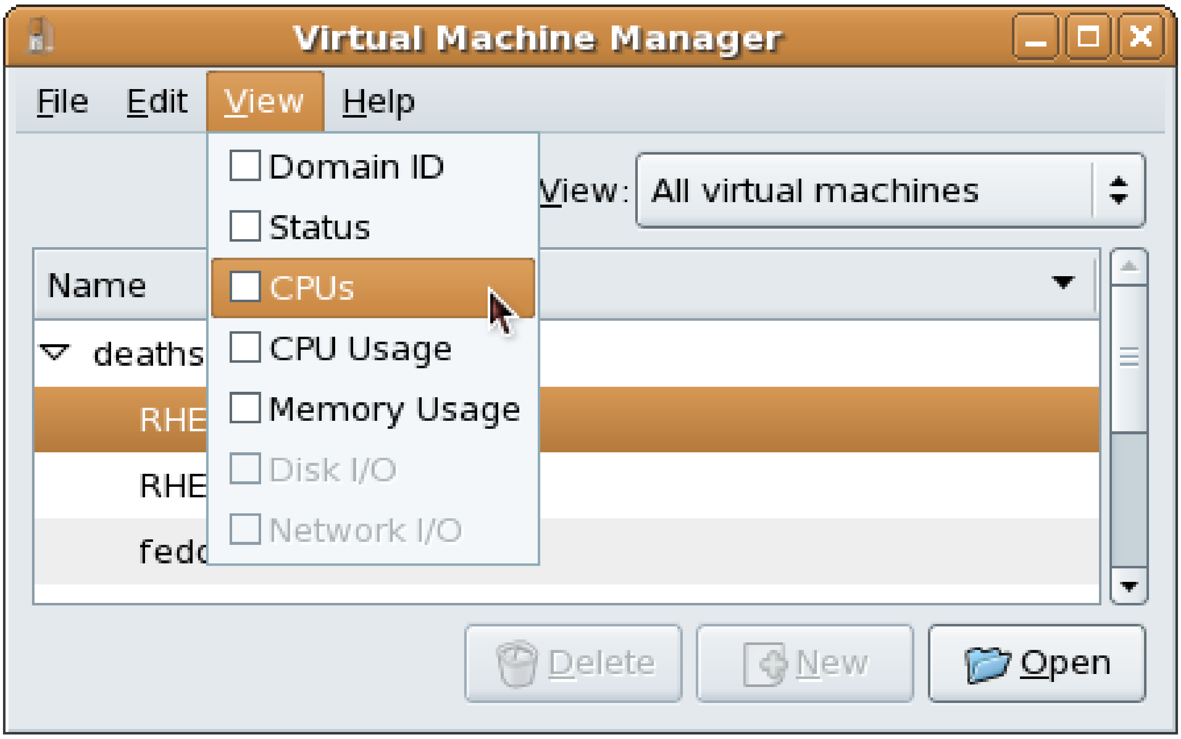


□□ 16.21. □□□□□□□□□

16.11. □□□□ CPU

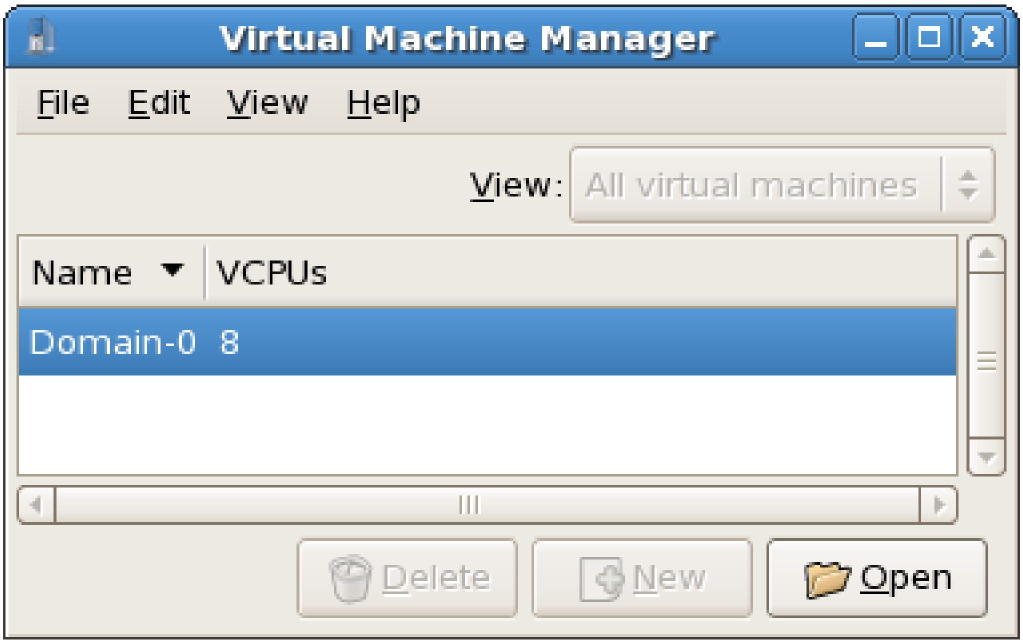
□□□□□□□□□□□□□□□□ CPU □□□

1. □□□□□□□□□□□ **CPU** □□□□□□



□□ 16.22. □□□□ CPU □□□

2. □□□□□□□□□□□□□□□□□□□□□□□□ CPU □□□



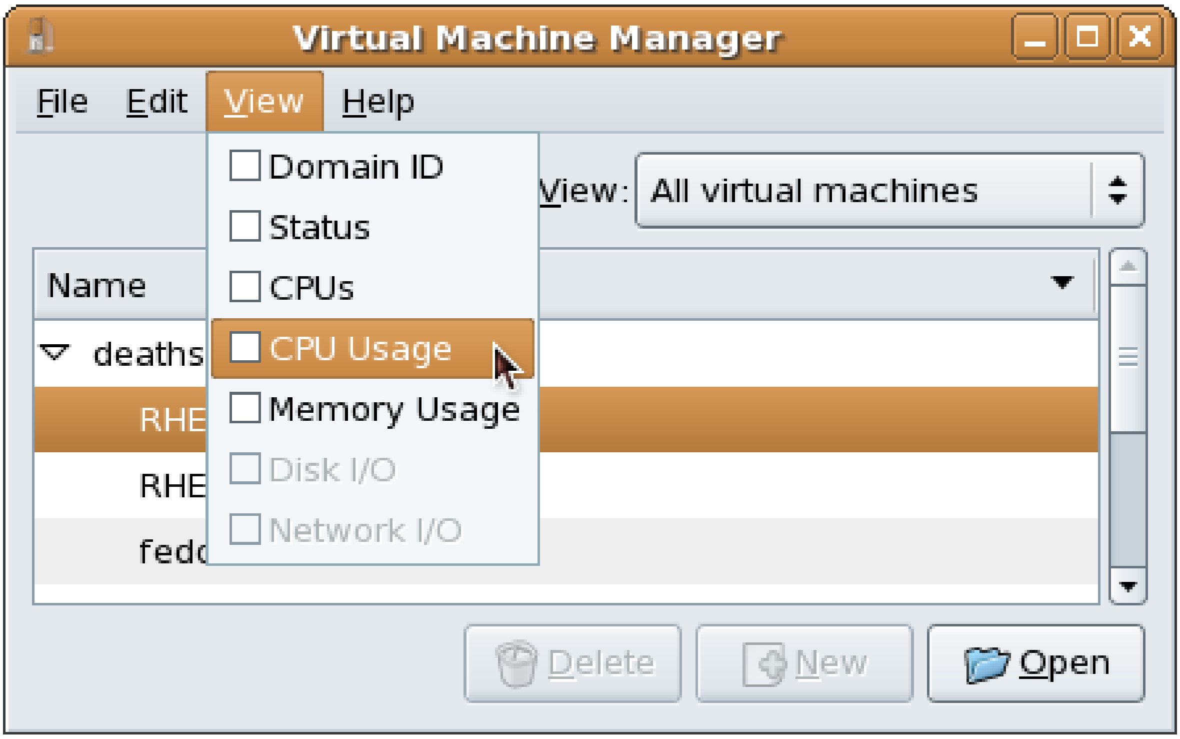
Name	VCPUs
Domain-0	8

□□ 16.23. □□□□ CPU

16.12. □□ CPU □□□

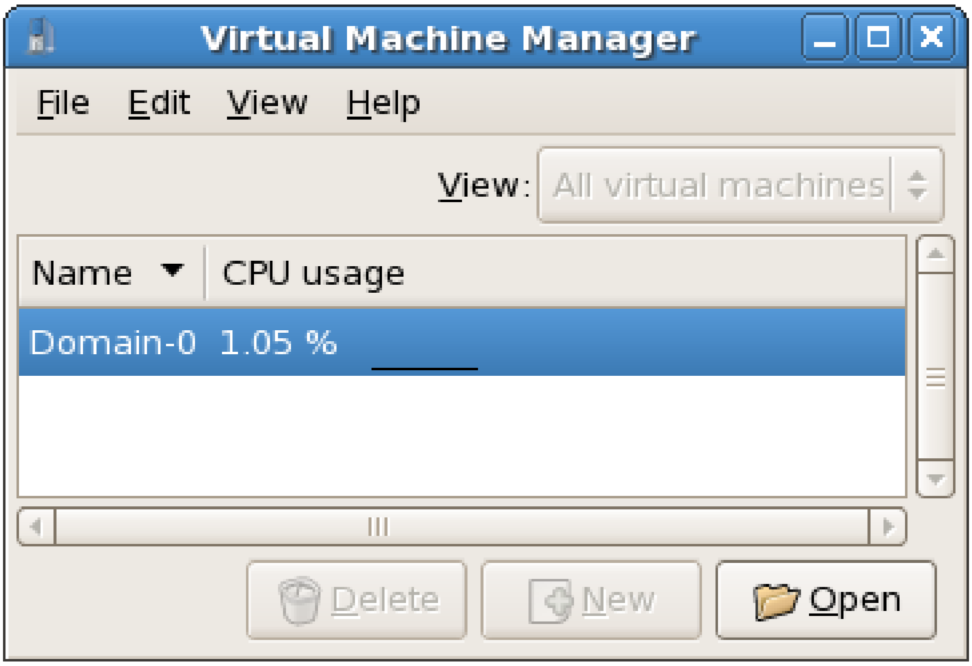
□□□□□□□□□□□□□□□□ CPU □□□□

1. □□□□□□□□□ **CPU** □□□□□□□□



□□ 16.24. □□ CPU □□□

2. □□□□□□□□□□□□□□□□□□□□ CPU □□□□□□□

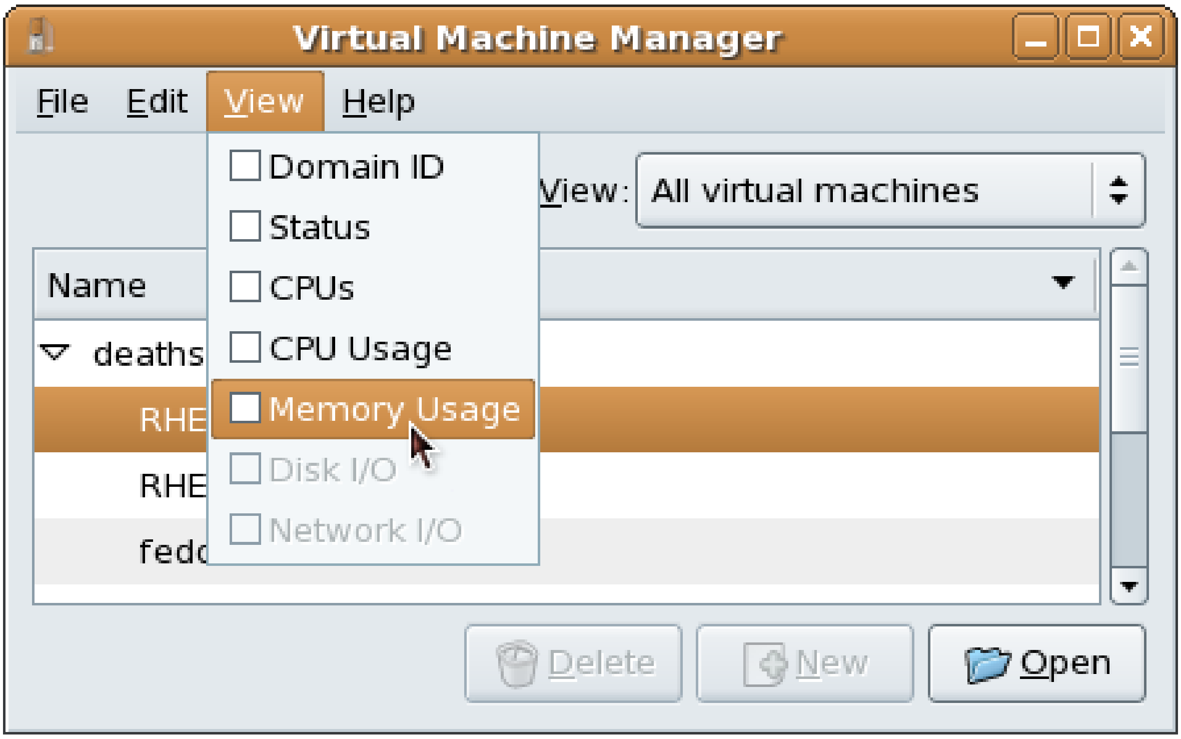


□□ 16.25. □□ CPU □□□

16.13. □□□□□□□□

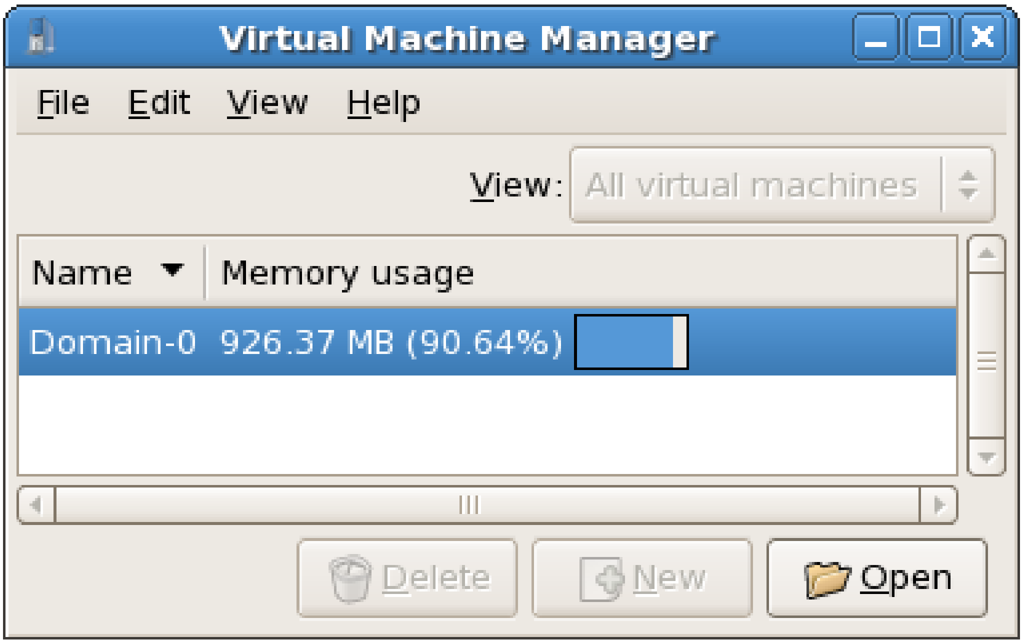
□□□□□□□□□□□□□□□□□□□□

1. □□□□□□□□□□□□□□□□□□□□□□



□□ 16.26. □□□□□□□□

2. □□□□□□□□□□□□□□□□□□□□□□□□ MB □□□□□□□□□□□



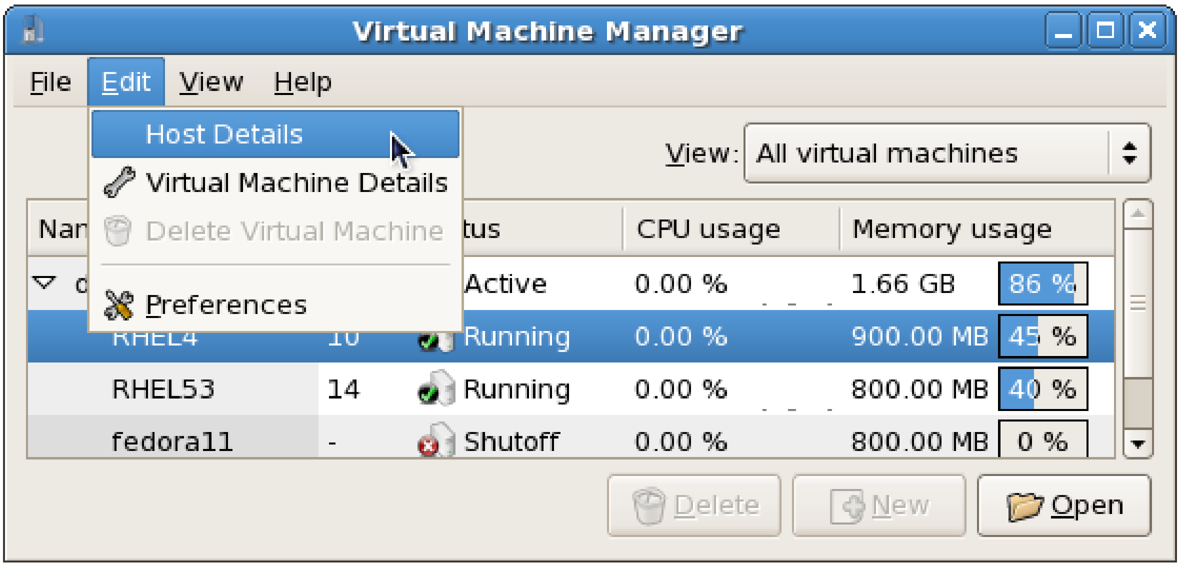
Name	Memory usage
Domain-0	926.37 MB (90.64%)

□□ 16.27. □□□□□□□□

16.14. □□□□□□

□□□□□□□□□□□□□□□

1. □□□□□□□□□□□□□□□□

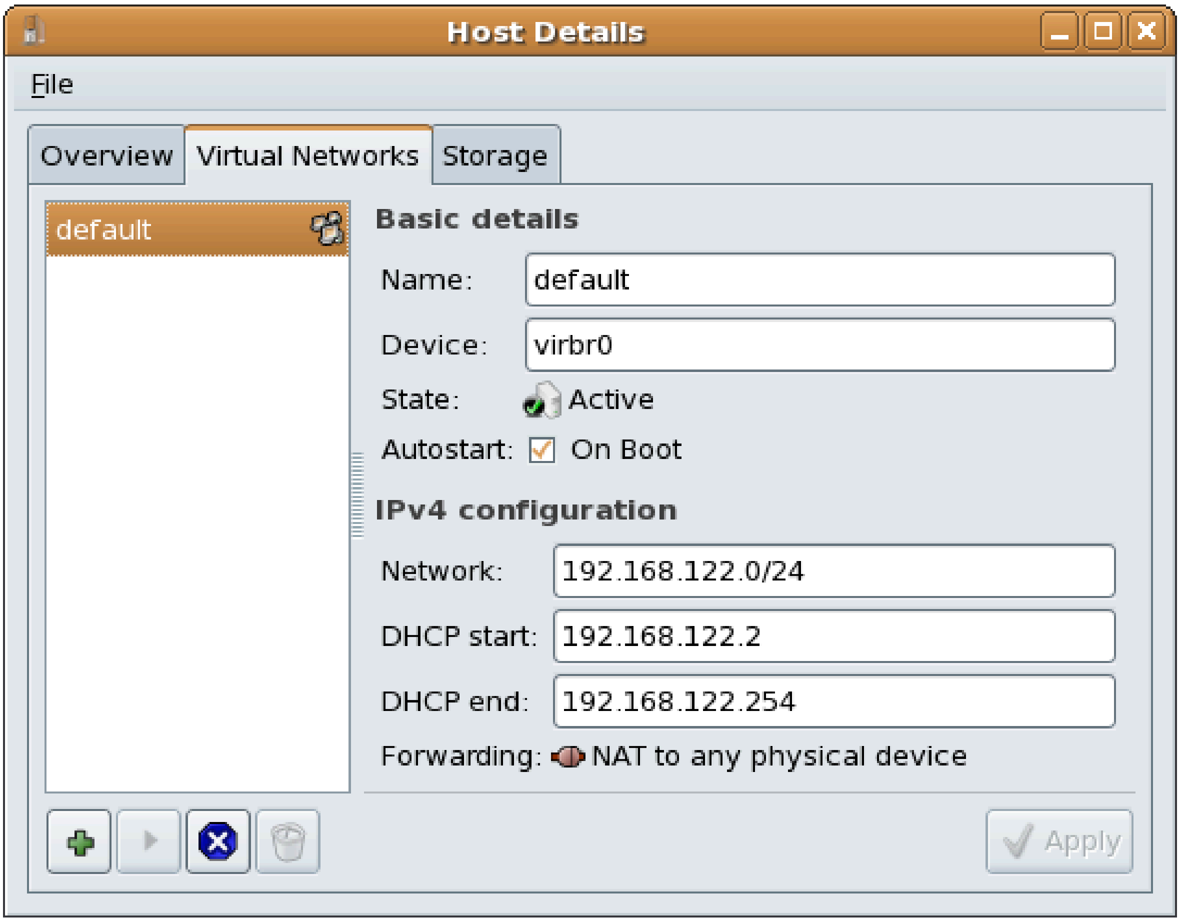


View: All virtual machines

Name	ID	Status	CPU usage	Memory usage	
▽ d		Active	0.00 %	1.66 GB	86 %
RHEL4	10	Running	0.00 %	900.00 MB	45 %
RHEL53	14	Running	0.00 %	800.00 MB	40 %
fedora11	-	Shutoff	0.00 %	800.00 MB	0 %

□□ 16.28. □□□□□□□□□□□□□

2. □□□□□□□□□□□□□□□□□□□□□□



Basic details

Name: default

Device: virbr0

State: Active

Autostart: ☑ On Boot

IPv4 configuration

Network: 192.168.122.0/24

DHCP start: 192.168.122.2

DHCP end: 192.168.122.254

Forwarding: NAT to any physical device

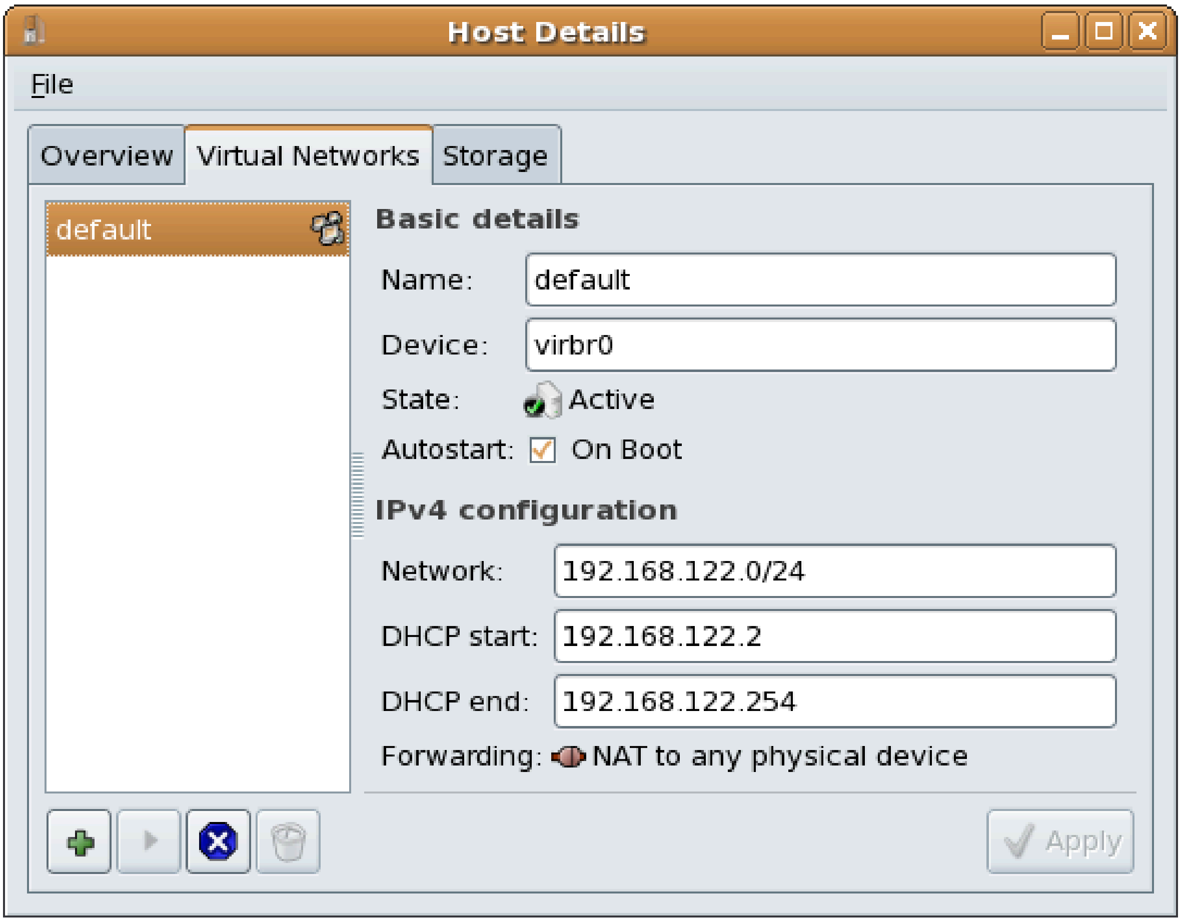
□□ 16.29. □□□□□□□□□

3. □□

16.15. □□□□□□□□

□□□□□□□□□□□□□□□

1. □□□□□□□□□□□□□□□ □ *16.14, “□□□□□□”*□□□□□□□□□



Host Details

File

Overview | Virtual Networks | Storage

default

Basic details

Name: default

Device: virbr0

State: Active

Autostart: ☑ On Boot

IPv4 configuration

Network: 192.168.122.0/24

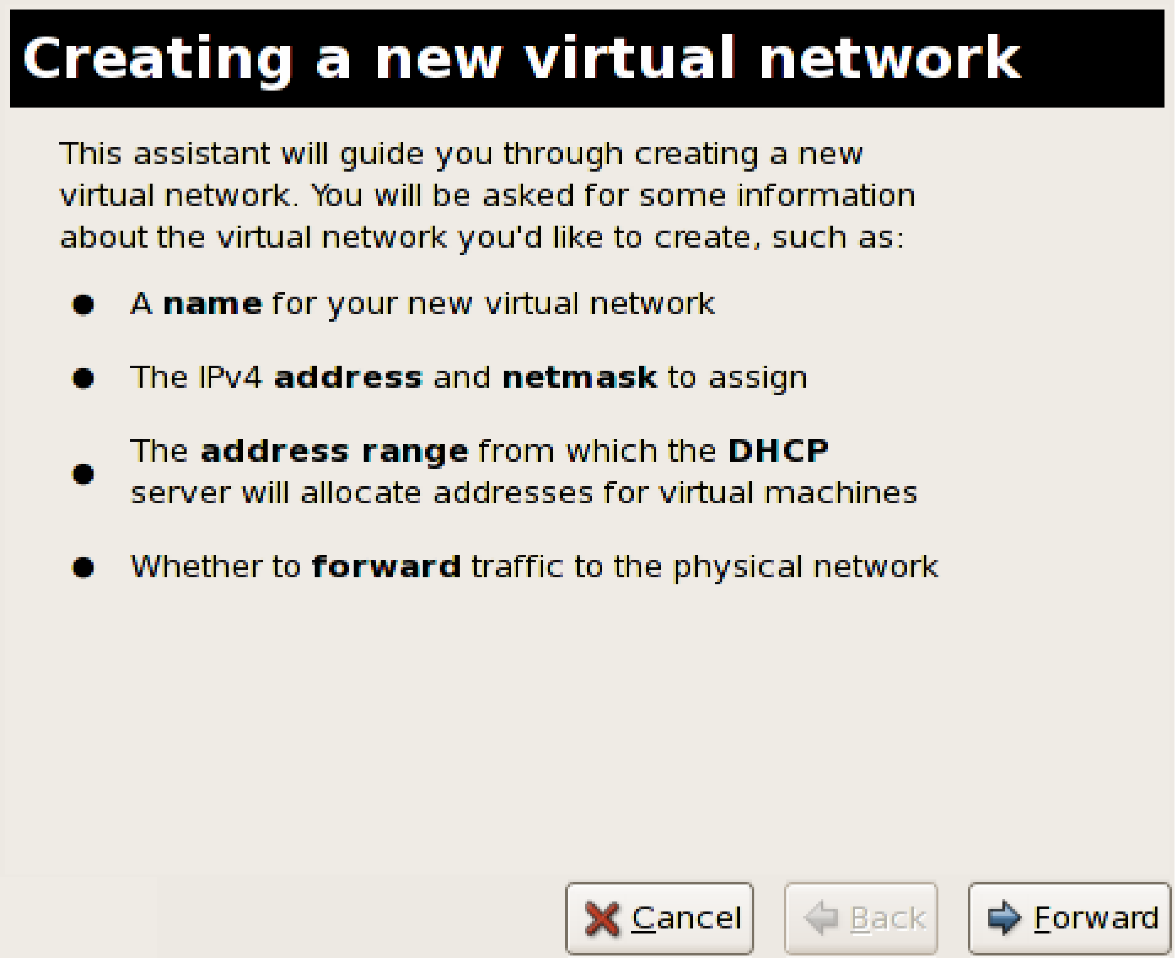
DHCP start: 192.168.122.2

DHCP end: 192.168.122.254

Forwarding: NAT to any physical device

□□ 16.30. □□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□



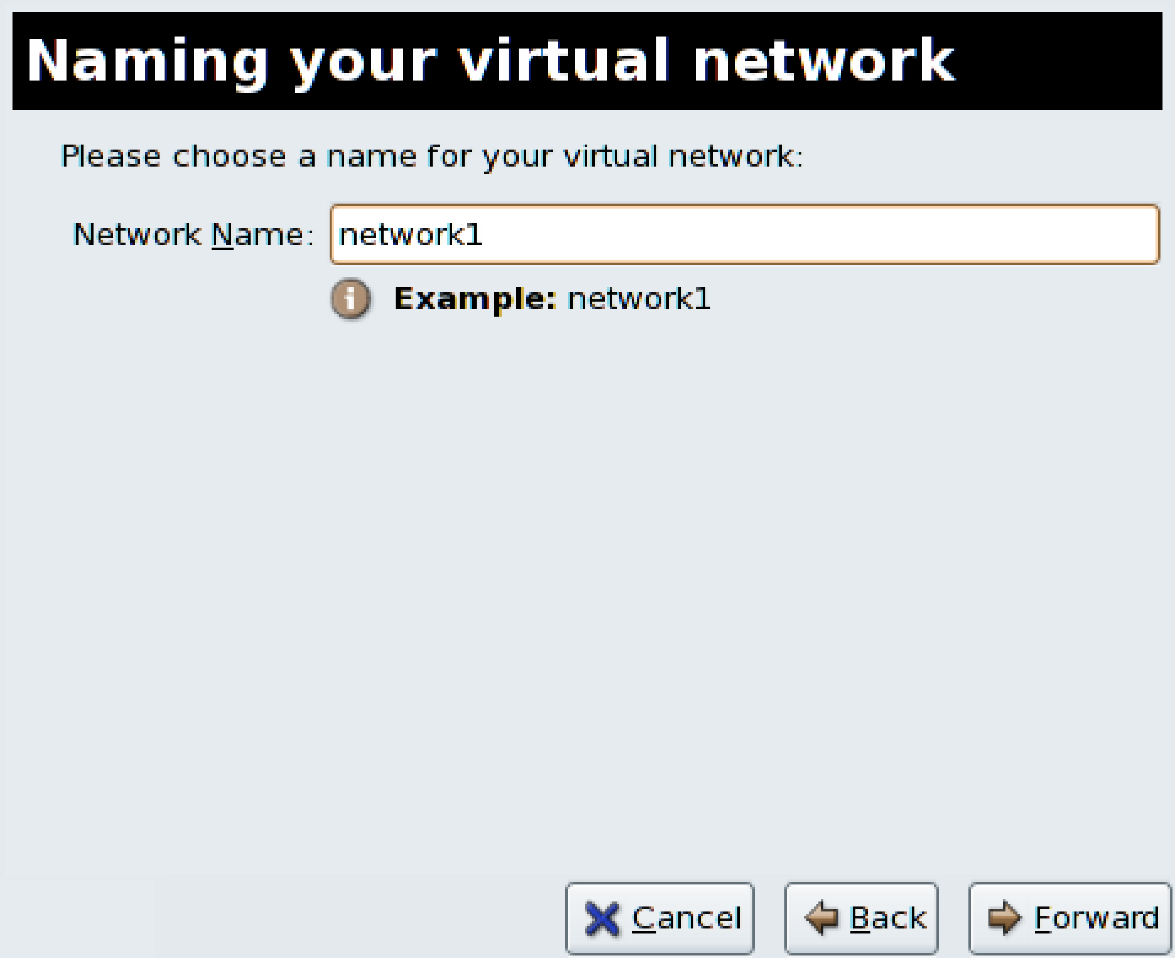
Creating a new virtual network

This assistant will guide you through creating a new virtual network. You will be asked for some information about the virtual network you'd like to create, such as:

- A **name** for your new virtual network
- The IPv4 **address** and **netmask** to assign
- The **address range** from which the **DHCP** server will allocate addresses for virtual machines
- Whether to **forward** traffic to the physical network

□□ 16.31. □□□□□□□□

2. □□□□□□□□□□□□□□□□□□□□□□



Naming your virtual network

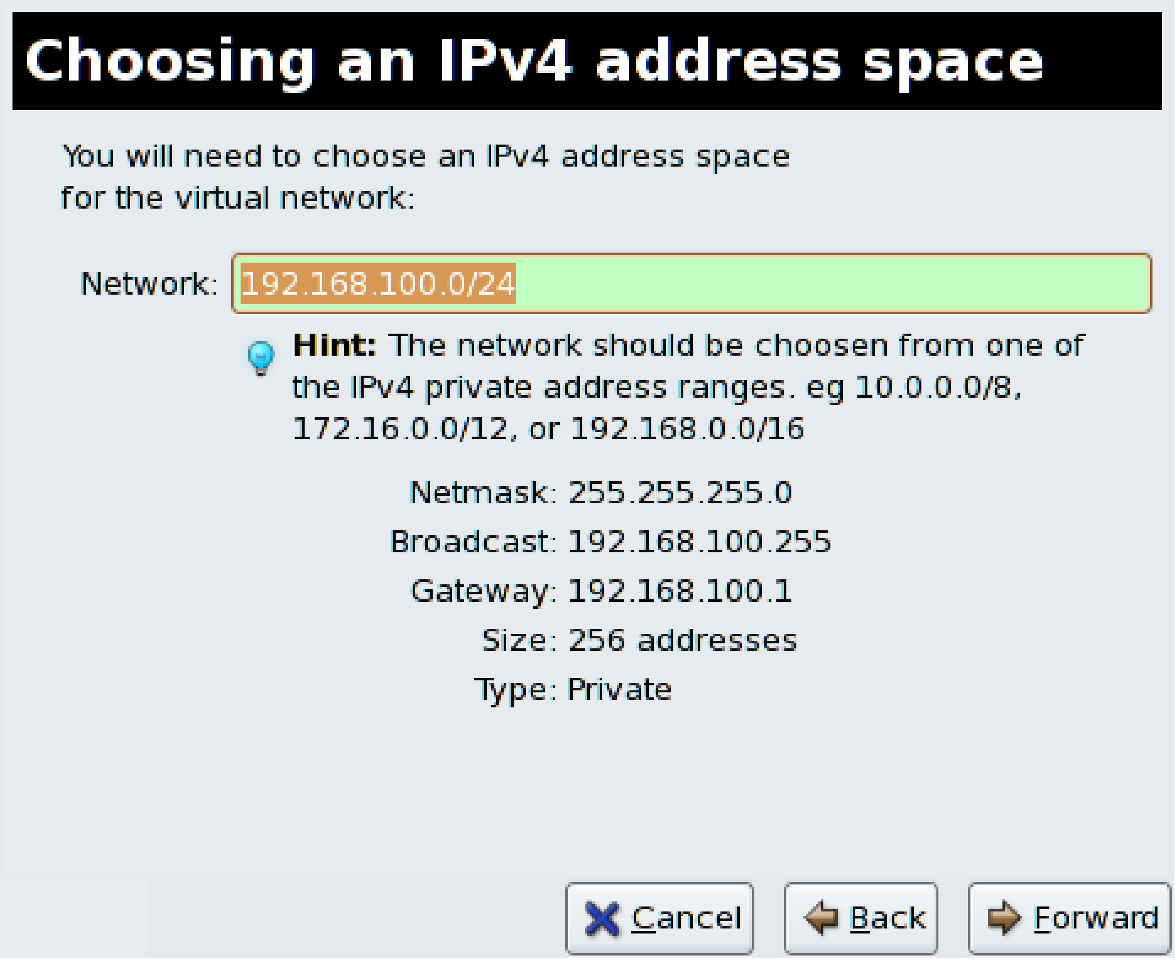
Please choose a name for your virtual network:

Network Name: network1

Example: network1

□□ 16.32. □□□□□□□

3. □□□□□□□□□□□□ IPv4 □□□□□□□□□□□□□□



Choosing an IPv4 address space

You will need to choose an IPv4 address space for the virtual network:

Network: 192.168.100.0/24

Hint: The network should be choosen from one of the IPv4 private address ranges. eg 10.0.0.0/8, 172.16.0.0/12, or 192.168.0.0/16

Netmask: 255.255.255.0

Broadcast: 192.168.100.255

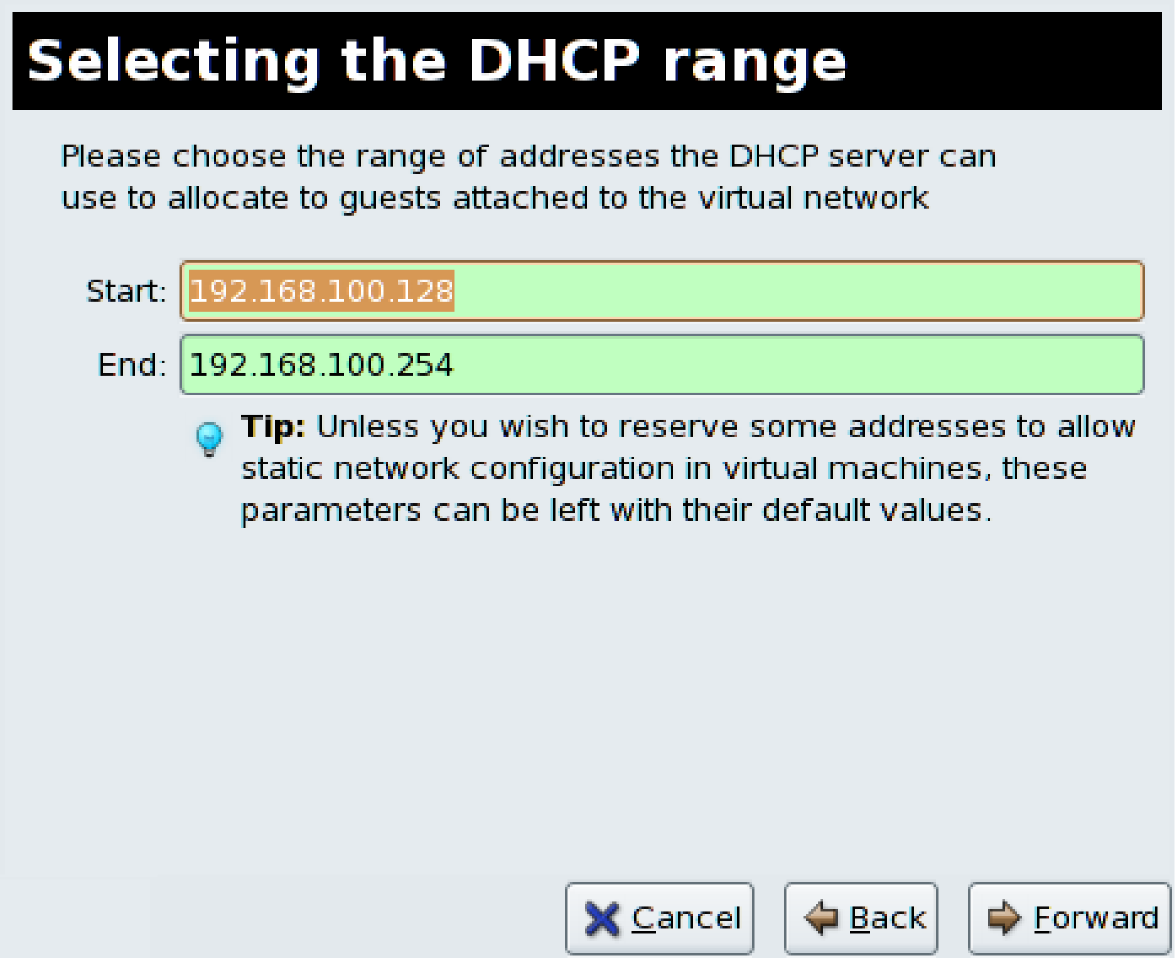
Gateway: 192.168.100.1

Size: 256 addresses

Type: Private

□□ 16.33. □□□□ IPv4 □□□□

4. □□□□□ IP □□□□□□□□□□□□□□□□□□□□ DHCP □□□□□□□□□□□□□□□□□



Selecting the DHCP range

Please choose the range of addresses the DHCP server can use to allocate to guests attached to the virtual network

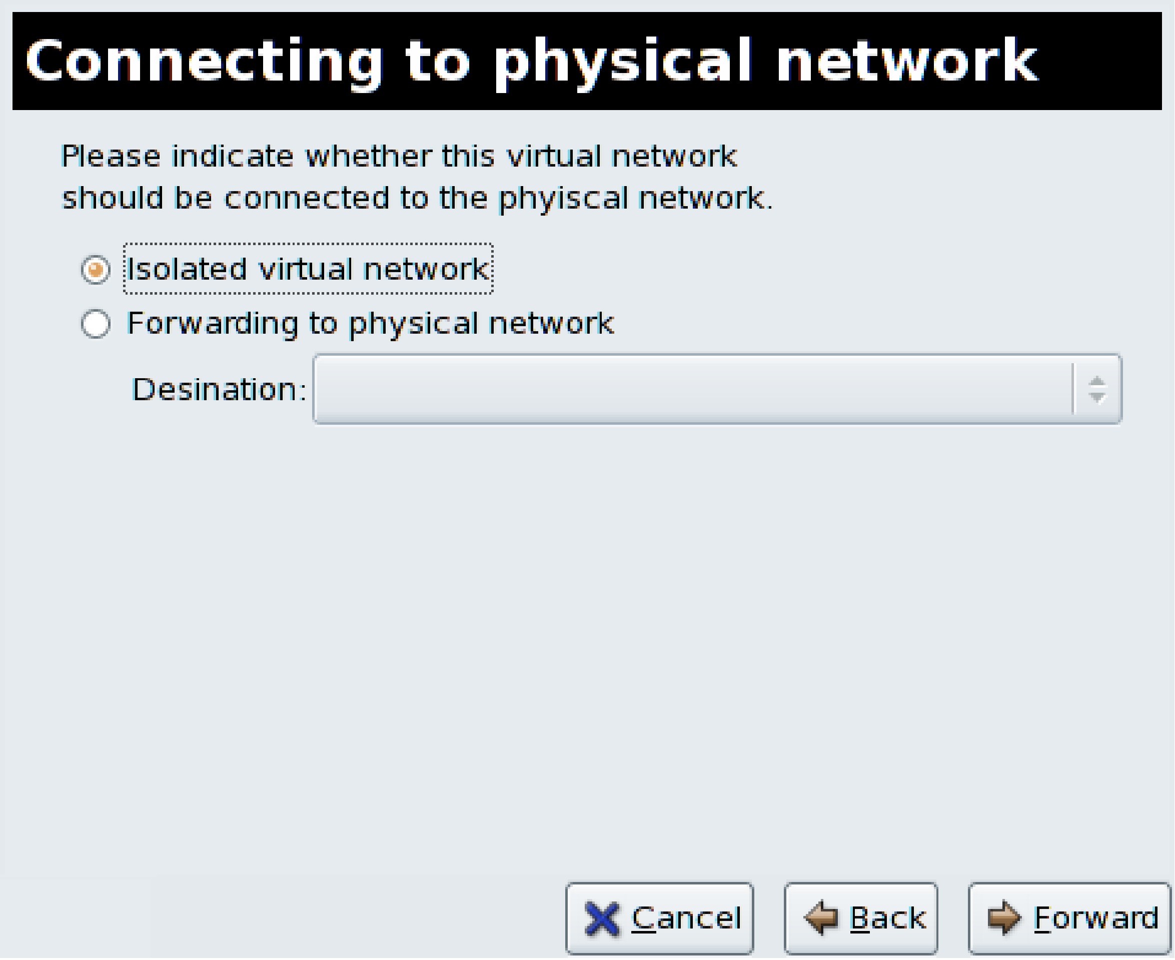
Start: 192.168.100.128

End: 192.168.100.254

Tip: Unless you wish to reserve some addresses to allow static network configuration in virtual machines, these parameters can be left with their default values.

□□ 16.34. □□ DHCP □□

5. □□□□□□□□□□□□□□□□□



Connecting to physical network

Please indicate whether this virtual network should be connected to the phyiscal network.

● Isolated virtual network

○ Forwarding to physical network

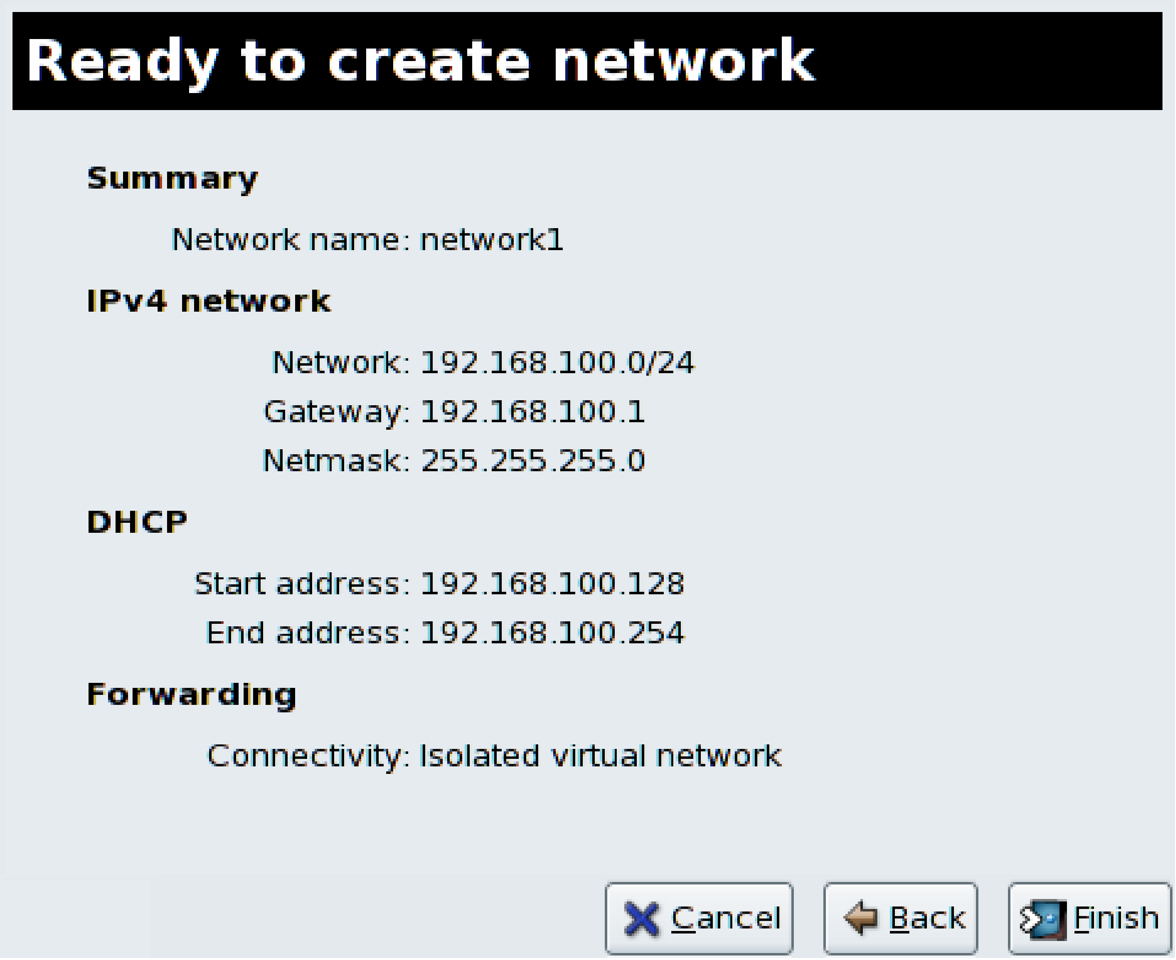
Desination:

□□ 16.35. □□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□ NAT □□□□□□□□□□□□ NAT □□□□□□ eth0□

Click **Forward** to continue.

6. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□



Ready to create network

Summary

Network name: network1

IPv4 network

Network: 192.168.100.0/24

Gateway: 192.168.100.1

Netmask: 255.255.255.0

DHCP

Start address: 192.168.100.128

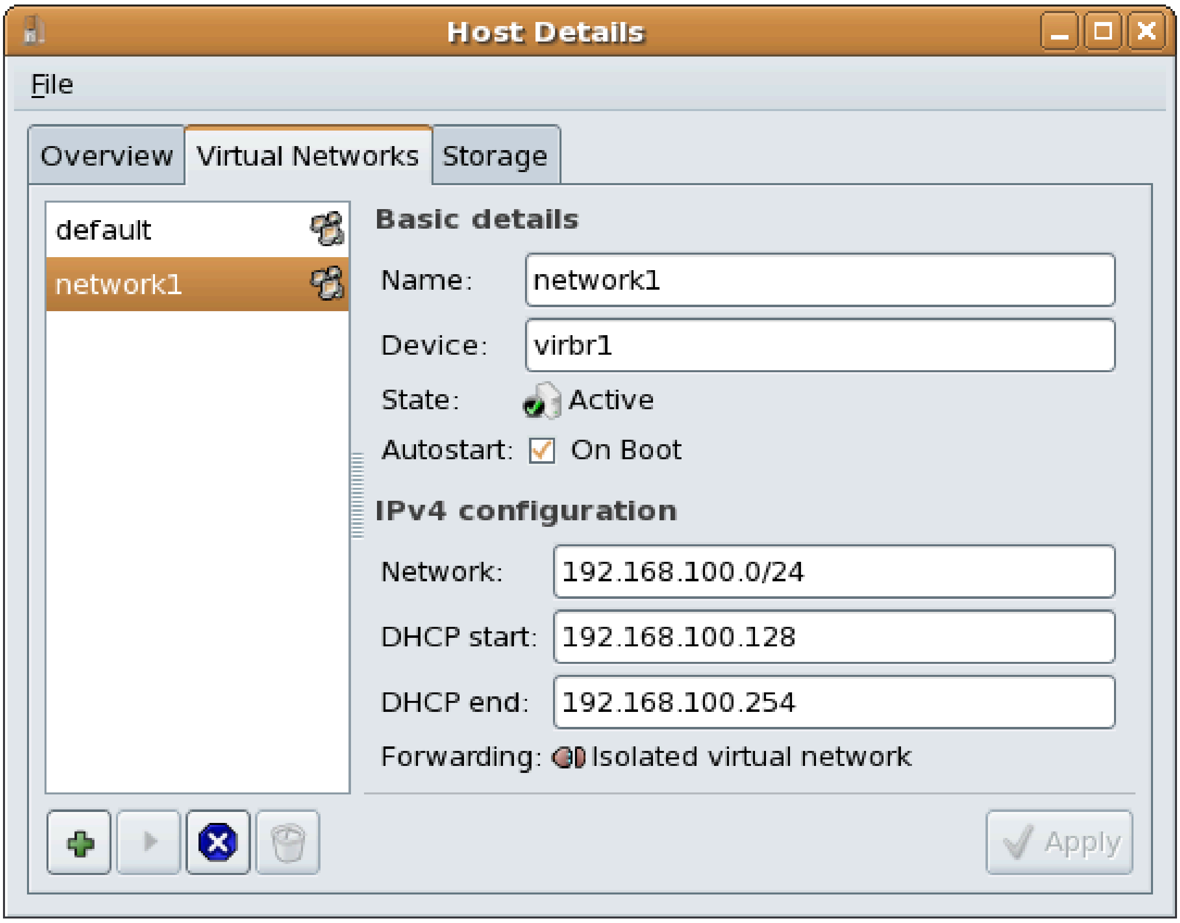
End address: 192.168.100.254

Forwarding

Connectivity: Isolated virtual network

□□ 16.36. □□□□□□□□

7. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□



default
network1

Basic details

Name: network1

Device: virbr1

State: Active

Autostart: ☑ On Boot

IPv4 configuration

Network: 192.168.100.0/24

DHCP start: 192.168.100.128

DHCP end: 192.168.100.254

Forwarding: Isolated virtual network

□□ 16.37. □□□□□□□□□□□

V. Tips and Tricks

[illegible]

[illegible]

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□□□□□□□□□□□□□□□□□□□□□□□□□□□□

17.1. □□□□□□□

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□□□□□□ **virsh** □□□□□□□ *TestServer*□□□□□□□□□□□□□□□□□□

```
# virsh autostart TestServer
Domain TestServer marked as autostarted
```

□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□ *--disable* □□

```
# virsh autostart --disable TestServer
Domain TestServer unmarked as autostarted
```

□□□□□□□□□□□□□□□□□□□□□□□

17.2. □ KVM □ Xen hypervisor □□□□

□□□□□□□ KVM □ Xen hypervisor □□□□□□□□□

Fedora □□□□□□□□□ hypervisor □□□

□ hypervisor □□□□□□□□□□

□□□□□□□□□□□□□ Xen □ KVM □□□□□□□□□□□□□□□□□□□□□□□□ hypervisor □□□

17.2.1. □ Xen □ KVM

□□□□□□□□□ Xen □□□ KVM hypervisor □□□□□□□□□□ *kernel-xen* □□□□□□□□□□□

1. **□□ KVM □□**

   □□□□□□□□ *kvm* □□□□□□□□□

   ```
   # yum install kvm
   ```

2. □□□□□□□□□□□

   kernel-xen □□□□□□□□□□□□□ **uname** □□□□□□□□□□□□□□□□□□

   ```
   $ uname -r
   2.6.23.14-107.fc8xen
   ```

   □□□□□□□□□□□□ kernel □□**2.6.23.14-107.fc8xen**□□□□□□□□□□□□□□ kernel□□**2.6.23.14-107.fc8**□□□□□□□□□□□□□□□□□□

- **□ Xen □□□□□□□□**

  `grub.conf` □□□□□□□□□□□□□□□□□□□□□□□□□□ **`/boot/grub/grub.conf`** □□□□□□□□

  ```
  default=1
  timeout=5
  splashimage=(hd0,0)/grub/splash.xpm.gz
  hiddenmenu
  title Fedora (2.6.23.14-107.fc8)
          root (hd0,0)
          kernel /vmlinuz-2.6.23.14-107.fc8 ro root=/dev/VolGroup00/
  LogVol00 rhgb quiet
          initrd /initrd-2.6.23.14-107.fc8.img
  title Fedora (2.6.23.14-107.fc8xen)
          root (hd0,0)
          kernel /xen.gz-2.6.23.14-107.fc8
          module /vmlinuz-2.6.23.14-107.fc8xen ro root=/dev/
  VolGroup00/LogVol00 rhgb quiet
          module /initrd-2.6.23.14-107.fc8xen.img
  ```

  □□□ **default=1** □□□□□□ GRUB □□□□□□□□□□□□□□□□□ Xen □□□□□□□□□□□□□ *0*□□□□□□□□□□□□□□□

  ```
  default=0
  timeout=5
  splashimage=(hd0,0)/grub/splash.xpm.gz
  hiddenmenu
  title Fedora (2.6.23.14-107.fc8)
          root (hd0,0)
          kernel /vmlinuz-2.6.23.14-107.fc8 ro root=/dev/VolGroup00/
  LogVol00 rhgb quiet
          initrd /initrd-2.6.23.14-107.fc8.img
  title Fedora (2.6.23.14-107.fc8xen)
          root (hd0,0)
          kernel /xen.gz-2.6.23.14-107.fc8
          module /vmlinuz-2.6.23.14-107.fc8xen ro root=/dev/
  VolGroup00/LogVol00 rhgb quiet
          module /initrd-2.6.23.14-107.fc8xen.img
  ```

3. □□□□□□□□□□□

   □□□□□□□□□□□□□□□□KVM □□□□□□□□□□□□□□□□□□ KVM □□□□□□□

   ```
   $ lsmod | grep kvm
   kvm_intel              85992  1
   kvm                   222368  2 ksm,kvm_intel
   ```

   □□□□□□□□□□□ **kvm** □□□ **`kvm_intel`** □ **`kvm_amd`** □□□□□

17.2.2. □ KVM □ Xen

□□□□□□□□ KVM □□ Xen hypervisor □□□□□□□□□ *kvm* □□□□□□□□□□

1. □□ **Xen** □□

   □□□□□□□ *kernel-xen* □ *xen* □□□□□□□□

   ```
   # yum install kernel-xen xen
   ```

   kernel-xen □□□□□□□□□□□□□□□

2. □□□□□□□□□□

   □□□ **uname** □□□□□□□□□□□□□□

   ```
   $ uname -r
   2.6.23.14-107.fc8
   ```

   □□□□□□□□□□**2.6.23.14-107.fc8**□□□□□□□□□□□□□□□□□□□□ **xen**□□□ **2.6.23.14-107.fc8xen**□□□□ Xen kernel □□□□□□□□□□□□□□□□□□□□□

   - □□□□□□□ **Xen** □□

     grub.conf □□□□□□□□□□□□□□□□□□□□□□□□□ **/boot/grub/grub.conf** □□□□□□□

     ```
     default=0
     timeout=5
     splashimage=(hd0,0)/grub/splash.xpm.gz
     hiddenmenu
     title Fedora (2.6.23.14-107.fc8)
             root (hd0,0)
             kernel /vmlinuz-2.6.23.14-107.fc8 ro root=/dev/VolGroup00/
     LogVol00 rhgb quiet
             initrd /initrd-2.6.23.14-107.fc8.img
     title Fedora (2.6.23.14-107.fc8xen)
             root (hd0,0)
             kernel /xen.gz-2.6.23.14-107.fc8
             module /vmlinuz-2.6.23.14-107.fc8xen ro root=/dev/
     VolGroup00/LogVol00 rhgb quiet
             module /initrd-2.6.23.14-107.fc8xen.img
     ```

     □□□ **default=0** □□□□□□ GRUB □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ *1*□□□□□□□□□□□□□□□

     ```
     default=1
     timeout=5
     splashimage=(hd0,0)/grub/splash.xpm.gz
     hiddenmenu
     title Fedora (2.6.23.14-107.fc8)
             root (hd0,0)
             kernel /vmlinuz-2.6.23.14-107.fc8 ro root=/dev/VolGroup00/
     LogVol00 rhgb quiet
             initrd /initrd-2.6.23.14-107.fc82.6.23.14-107.fc8.img
     title Fedora (2.6.23.14-107.fc8xen)
             root (hd0,0)
             kernel /xen.gz-2.6.23.14-107.fc8
     ```

```
        module /vmlinuz-2.6.23.14-107.fc8xen ro root=/dev/
VolGroup00/LogVol00 rhgb quiet
        module /initrd-2.6.23.14-107.fc8xen.img
```

3. □□□□□□□□□

   □□□□□□□ Xen □□□□□□□ **uname** □□□□

   ```
   $ uname -r
   2.6.23.14-107.fc8xen
   ```

   □□□□□ xen □□□□□□□□□□ Xen □□□

17.3. □□ qemu-img

qemu-img □□□□□□□□□ Xen □ KVM □□□□□□□□□□□□**qemu-img** □□□□□□□□□□□□□□□□□□□□□□□□□□□□**qemu-img** □□□□□□□□□□

□□□□□□□□□□□□□□

□□□□□□□□ **filename**□□□□ **size** □□□ **format**□

```
# qemu-img create [-6] [-e] [-b base_image] [-f format] filename [size]
```

□□□□□□ base_image□□□□□□□□□ base_image □□□□□□□□□□□□□□□□□□□base_image □□□□□□□□□□□□□commit□□□□□

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□□□□

```
# qemu-img convert [-c] [-e] [-f format] filename [-O output_format]
 output_filename
```

□□□□□□filename□□□□□ output_format □□□□□□output_filename□□□□□□□□□□□□-e□□□□□□-c□□□

□□□qcow□□□

□□□□□□□□□□□ 128 □□□□□□□ AES □□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□ **qcow** □ **cow**□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□

info □□□□□□□□□□□□**info** □□□□□□□

```
# qemu-img info [-f format] filename
```

□□□□□□□□□□ **filename** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **vm** □□□□□□□□□□□□□□□□□□□□□□

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raw

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qcow2

QEMU □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ holes□□□ Windows□□□□□ AES □□□□□zlib □□□□□□□□ VM □□□

qcow

□□ QEMU □□□□□□□□□□□□□□□□□□□

cow

□□□□□□Copy On Write□□□□□□□**cow** □□□□□□□□□□□□□□□□□□□□□□□ Windows□

vmdk

VMware 3 □ 4 □□□□□

cloop

Linux □□□ Loop □□□□□□□□□□□□□□□□□□□□ Knoppix □□□□

17.4. □ KVM □□□□□

KVM hypervisor □□□□□□□overcommitting□□□

□□ Xen

Xen hypervisor □□□□□□□□□□□□ Xen hypervisor □□□□□□□□□□□□□□□□□□□□□□□□□□□

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□ KVM □□□□□□□□□ Linux □□□KVM hypervisor □□KVM □□□

□□□□□□□□□□□□□□□□□□□□□□□Linux □□□□□□□□□□□□swap□□□□□□□□□□□□□□□□□□□□□□□□Linux □□□□□□□□□□□□□□□□□□□□□□□

□□□ KVM □□□□□ Linux □□ **pdflush** □□□□□□□□□**pdflush** □□□□kill□□□□□□□□□□□□□□□□**pdflush** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

Warning

□□□

□□□ KVM □□□□□□□□□□□□□□□□□□□□□□□□□ 50%□0.5□□□□□□

```
(0.5 * □□□) + (□□□□□□□ * RAM) = □□□□□□□□□
```

Red Hat □□□□□□□□□□□□□□□□□□□□□□□□□ swap □□□□□□ — □□□ *Knowledgebase*[1]□

□□ 100% □□

□□□□□□□□□□

KVM hypervisor □□□□□□□□□□□VCPU□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ VCPU □□□□□□□□□□□□□□ 100% □□□□□□□□□□□□□□□□□□□□□□

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17.5. □□ `/etc/grub.conf`

□□□□□□□□□□□□□□□□□□□□ **`/etc/grub.conf`** □□□□□□□□□□□□□□□□□□□ `xen` □□□□□□□□□□□ Xen hypervisor□□□□□□□□□ `xen` □□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□□□□□□□**`initrd`** □□□□□□□**`0`**□□□□□□□□□ `xen` hypervisor □□□□□□□□□□□□□□□□□□□ grub □□□ `xen` □□□□□□

□□□□□□□□□ *kernel-xen* □□□□□□ **`grub.conf`**□□□□□□□ **`grub.conf`** □□□□□□□□□□□□□□□□□□□□□□□ **`title`** □□□□

```
#boot=/dev/sda
default=0
timeout=15
#splashimage=(hd0,0)/grub/splash.xpm.gz hiddenmenu
serial --unit=0 --speed=115200 --word=8 --parity=no --stop=1
terminal --timeout=10 serial console

title Fedora (2.6.23.14-107.fc8xen)
        root (hd0,0)
        kernel /xen.gz-2.6.23.14-107.fc8 com1=115200,8n1
        module /vmlinuz-2.6.23.14-107.fc8xen ro root=/dev/VolGroup00/
LogVol00
        module /initrd-2.6.23.14-107.fc8xen.img
```

□□□□□□ `grub.conf` □□□□...

□□ **`grub.conf`** □□□

□□□□ boot time □□□□□□□□□□ 256MB □□□□□□□□□□□□□□ `dom0_mem=256M` □□□ **`grub.conf`** □□ `xen` □□□□□□□□□□□□□□□□□□□□ grub □ □□□□□□□

```
#boot=/dev/sda
```

[1] http://kbase.redhat.com/faq/docs/DOC-15252

```
default=0
timeout=15
#splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
serial --unit=0 --speed=115200 --word=8 --parity=no --stop=1
terminal --timeout=10 serial console

title Fedora (2.6.23.14-107.fc8xen)
        root (hd0,0)
        kernel /xen.gz-2.6.23.14-107.fc8 com1=115200,8n1 dom0_mem=256MB
        module /vmlinuz-2.6.23.14-107.fc8xen ro
        root=/dev/VolGroup00/LogVol00
        module /initrd-2.6.23.14-107.fc8xen.img
```

17.6. [illegible]

[illegible]Intel VT [illegible] AMD-V[illegible]

[illegible]

[illegible] fedora *kernel-xen* [illegible] Xen [illegible]

[illegible]

```
$ grep -E 'svm|vmx' /proc/cpuinfo
```

[illegible] `vmx` [illegible] Intel VT [illegible]

```
flags   : fpu tsc msr pae mce cx8 apic mtrr mca cmov pat pse36 clflush
        dts acpi mmx fxsr sse sse2 ss ht  tm syscall lm constant_tsc pni
 monitor ds_cpl
        vmx est tm2 cx16 xtpr lahf_lm
```

[illegible] `svm` [illegible] AMD-V [illegible] AMD [illegible]

```
flags   :  fpu tsc msr pae mce cx8 apic mtrr mca cmov pat pse36 clflush
        mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt lm 3dnowext 3dnow
 pni cx16
        lahf_lm cmp_legacy svm cr8legacy ts fid vid ttp tm stc
```

[illegible]`flags:`[illegible]

[illegible] BIOS [illegible] *[illegible] 19.1, “[illegible] BIOS [illegible]”*[illegible]

17.7. [illegible]

[illegible] script [illegible] script [illegible] hypervisor [illegible]

```
#!/bin/bash
```

```
declare -i IS_HVM=0
declare -i IS_PARA=0
check_hvm()
{
        IS_X86HVM="$(strings /proc/acpi/dsdt | grep int-xen)"
          if [ x"${IS_X86HVM}" != x ]; then
           echo "Guest type is full-virt x86hvm"
           IS_HVM=1
        fi
}
check_para()
{
        if $(grep -q control_d /proc/xen/capabilities); then
          echo "Host is dom0"
          IS_PARA=1
        else
          echo "Guest is para-virt domU"
          IS_PARA=1
        fi
}
if [ -f /proc/acpi/dsdt ]; then
        check_hvm
fi

if [ ${IS_HVM} -eq 0 ]; then
        if [ -f /proc/xen/capabilities ] ; then
                check_para
        fi
     fi
if [ ${IS_HVM} -eq 0 -a ${IS_PARA} -eq 0 ]; then
        echo "Baremetal platform"
fi
```

□□□□

□□□□□□□□□□ **`virsh capabilities`** □□□

17.8. □□□□□□□□□ MAC □□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□ *MAC* □□□□□□□□□□□□□□□□□□ MAC □□□□□□□□□□□□□□□□ script □□□□□□□□□□□□ MAC □□□□□□□ script □□□□□□□□□□ **`macgen.py`**□□□□□□□□□□□□□□□□□□ **`./macgen.py`** □□□ script□□□□□□□□□□□□ MAC □□□□□□□□□□□□□□□

```
$ ./macgen.py
00:16:3e:20:b0:11

#!/usr/bin/python
# macgen.py script to generate a MAC address for virtualized guests on Xen
#
import random
```

```
#
def randomMAC():
        mac = [ 0x00, 0x16, 0x3e,
                random.randint(0x00, 0x7f),
                random.randint(0x00, 0xff),
                random.randint(0x00, 0xff) ]
        return ':'.join(map(lambda x: "%02x" % x, mac))
#
print randomMAC()
```

□□□□□□□□□□□□□□ MAC □□□□□□

□□□□□□□□□ **python-virtinst** □□□□□□□□ MAC □□□□□□□□□□□□□□□□□□□ **UUID**□

```
# echo  'import virtinst.util ; print\
 virtinst.util.uuidToString(virtinst.util.randomUUID())' | python
# echo  'import virtinst.util ; print virtinst.util.randomMAC()' | python
```

□□ script □□□□□□□□□□□□ script □□□□□□□

```
#!/usr/bin/env python
#  -*- mode: python; -*-
print ""
print "New UUID:"
import virtinst.util ; print
 virtinst.util.uuidToString(virtinst.util.randomUUID())
print "New MAC:"
import virtinst.util ; print virtinst.util.randomMAC()
print ""
```

17.9. □□□□□ ftpd

vsftpd □□ vsftpd □□□□□□□□□□□□□□□□□□□ **Server** □□□□□□□ RPM □□□□□□□□□ **rpm -ivh vsftpd*.rpm** □□□□□□□□□□□□□ RPM □□□□□□□□□□□□□□□□□□□□

1. □□□□ vsftpd □□□□□□□□□□□ **vipw** □□□ **/etc/passwd** □□ ftp □□□FTP □□□□□□□□□□□□□□□□□□□

   ```
   ftp:x:14:50:FTP User:/xen/pub:/sbin/nologin
   ```

2. □□ vsftpd □□□□□□□□□□□□□□□□□□□□□□□□ chkconfig □□□□□□ vsftpd □□□□□□□

3. □□□ vsftpd □□□□□□□□□□ **chkconfig --list vsftpd** □□□□□

   ```
   $ chkconfig --list vsftpd
   vsftpd          0:off   1:off   2:off   3:off   4:off   5:off   6:off
   ```

4. □□□ **chkconfig --levels 345 vsftpd on** □□ run level 3□4 □ 5 □□□□□□□ vsftpd□

5. □□□ **chkconfig --list vsftpd** □□□□□□ vsftdp □□□□□□□□□□□□□□□□□□□□□□□□

```
$ chkconfig --list vsftpd
vsftpd          0:off   1:off   2:off   3:on    4:on    5:on    6:off
```

6. □□□ **service vsftpd start vsftpd** □□□ vsftpd □□□

   ```
   $service vsftpd start vsftpd
   Starting vsftpd for vsftpd:                          [  OK  ]
   ```

17.10. □□ LUN □□□□□

□□□□□□□□□□□□□□□□□□□□□□□□ multipath □□□□□□□□ *LUN* □□□□□

□□□□□□□□□□□□□□ LUN □□□□

□□□□□□□□□□□□□□□□□□□□□ **udev** □□□ LUN □□□□□□□□□□□□□□ LUN □□□□□□□□□□□□□□□□□ UUID□□□□□□□□□ UUID □□□□□□□□□□□□ **/etc** □□□□ **scsi_id** □□□□□ LUN □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
# options=-b
```

□□□□□□□□□□□□

```
# options=-g
```

□□□ udev □□□□□□ SCSI □□□□□□□□□□ UUID□□□□□□□□□ UUID□□□□ **scsi_id** □□□

```
# scsi_id -g -s /block/sdc
*3600a0b80001327510000015427b625e*
```

□□□□□□ UUID□□□□□□□□□□□□□□□UUID □□□□□□□□□□□□□□ UUID □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **/etc/udev/rules.d** □□□□ **20-names.rules** □□□□□□□□□□□□□□□□□□□□

```
# KERNEL="sd*",  BUS="scsi",  PROGRAM="sbin/scsi_id", RESULT="UUID",
 NAME="devicename"
```

□□□□□□ *UUID* □ *devicename* □□□□□□□□□ UUID □□□□□□□□□□□□□□□

```
KERNEL="sd*",  BUS="scsi",  PROGRAM="sbin/scsi_id",
 RESULT="3600a0b80001327510000015427b625e", NAME="mydevicename"
```

□□□□□□□□□□□ **/dev/sd*** □□□□□□□□□□□□□ UUID□□□□□□□□□□□□□□□□□□□□□□□□ */dev/devicename* □□□□□□□□□□□□□□□□□□ */dev/mydevice* □□□□□□□□□ **/etc/rc.local** □□□□□□□□□□

```
/sbin/start_udev
```

□□□□□□□□□□□□□ LUN □□□

□□□□□□□□□□□□□□ LUN □□□ **/etc/** □□□□ **multipath.conf** □□□□□□□□□□□□□

```
multipath  {
             wwid       3600a0b80001327510000015427b625e
             alias      oramp1
}
multipath  {
             wwid       3600a0b80001327510000015427b6
             alias      oramp2
}
multipath  {
             wwid       3600a0b80001327510000015427b625e
             alias      oramp3
}
multipath  {
             wwid       3600a0b80001327510000015427b625e
             alias      oramp4
}
```

□□□□□□ LUN□ **/dev/mpath/oramp1**□**/dev/mpath/oramp2**□**/dev/mpath/oramp3**□□□ **dev/mpath/oramp4**□□□□□□ **/dev/mpath** □□□□□□ LUN □□□□□□□□□□□□□□□□□□□□ LUN □ wwid □□

17.11. □□□□□□□ SMART □□□□

SMART □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
/sbin/service smartd stop
/sbin/chkconfig --del smartd
```

17.12. □□□□□□□□□□□

□□ hypervisor □□□□□□□□□□□□□□□□□□□□ **uuidgen** □□□□□□□□□ UUID□□ □□□□□□ **vif** □□□□□□□□□□□□□□□ MAC □□□□□□□□□□□□□□□□□□□□□□□□□□□ script □□□□□□□ xen □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ □□□□ **xenbr** □□□□□□□□□□□□□□□□□□□□□□□□□□ **'disk='** □□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□ **/etc/sysconfig/network** □□□ HOSTNAME □□□□□□□□□□□□

□□□□□ **/etc/sysconfig/network-scripts/ifcfg-eth0** □□□ **HWADDR** □□□□□□□□ **ifconfig eth0** □ □□□□□□□□□□□□□□ IP □□□□□□□□□□ **IPADDR** □□□

17.13. □□□□□□□□□□□□□□□□□□□□□□

□□

`name`

hypervisor □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

`uuid`

□□□□□□□□□□□□ UUID □□□□□ **uuidgen** □□□□□□□□ UUID □□□□□

```
$ uuidgen
a984a14f-4191-4d14-868e-329906b211e5
```

`vif`

- *MAC □□*□□□□□□□□□□□□ MAC □□ *□ 17.8, “□□□□□□□ MAC □□”* □□ script□

- □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ `xenbr` □□□□□□□□□□□□□□□□□□ **`brctl show`** □□□□□□□□□□

- □□□□□□□□□□□ **`disk=`** □□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□

`/etc/sysconfig/network`

□□ `HOSTNAME` □□□□□□□□□ **`hostname`**□

`/etc/sysconfig/network-scripts/ifcfg-eth0`

- □□ `HWADDR` □□□□□ **`ifconfig eth0`** □□□

- □□□□□□□ IP □□□□□ `IPADDR` □□□

□□□□□□ libvirt script

□□□□□□□□□□□□□□□ **`libvirt`** □□□□□□ script□□□□□□□□□□□□□□□□□□□□□□□

□ *17*, □□□□□ □□□□□□ **`libvirt`** □□□□□□□□□□□□□□□□

18.1. □□□□ virsh □ XML □□□□

`virsh` □□□ XML □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ script□□□□□□□□□ XML □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ ISO □□□□□ **hdc** □ □□□□□□□□□□□□□□□□ XML □□□

```
# cat satelliteiso.xml
<disk type="file" device="disk">
        <driver name="file"/>
        <source file="/var/lib/libvirt/images/rhn-satellite-5.0.1-11-
redhat-linux-as-i386-4-embedded-oracle.iso"/>
        <target dev="hdc"/>
        <readonly/>
</disk>
```

□□□ **`virsh attach-device`** □□□ ISO □□ **hdc** □□□□□□□satellite□□□□□□

```
# virsh attach-device satellite satelliteiso.xml
```

□ VI. Troubleshooting

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□□ bug □□ bug□□□□□□□□□□□□□□□□□□□□□□□□□□ Fedora □□□□□□□□□□□ Fedora □□□□□□□□*http://docs.fedoraproject.org*□□□□□

Troubleshooting

□□□□□□□ Fedora □□□□□□□□□□□□□□□□□

19.1. Loop □□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ loop □□□□□□□□□□□□□□□□□□ 8 □□□□ loop □□□□□□□□□ 8 □□□□□□□□□□□ loop □□□□□□□ **`/etc/modprobe.conf`** □□□□□□□□ loop □□□□□□□□□ **`/etc/modprobe.conf`** □□□□□□□□□□□□□□□□

```
options loop max_loop=64
```

□□□□□□□ 64□□□□□□□□□□□□□□□□□ loop □□□□□□□□□□□□□□□□□□□□□□□□ loop □□□□□□□□□□□□□□□ loop □□□□□□□□□□□□□□□□□□□□□□□□□□□ **`phy: block device`** □ **`tap:aio`** □□□□□□□□ loop □□□□□□□□□□□□□□□□□□□□□□□□□□□□ **`phy: device`** □ **`file: file`** □□□

19.2. □ BIOS □□□ Intel VT □ AMD-V □□□□□□□

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Intel VT □□□□□□ BIOS □□□□□□□□□□□□□□□□□□□VT □□□□□□□□□□□□□□

□□ Rev 2 □□□ AMD-V □□□□□□□□□□□□□□□□□□ BIOS □□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□ BIOS □□□□□□□□ *□ 19.2, “□ BIOS □□□ Intel VT □ AMD-V □□□□□□□”* □□□□□□□□□□□□□□□□□□□□□□

□□ BIOS □□□□□□□□□□□□□□□□□Intel® VT □ AMD-V □ BIOS □□

□□ 19.1. □ BIOS □□□□□□□□□□□□

1. □□□□□□□□□□□□□□□ BIOS □□□□□□□□□□□□□ **delete** □□ **`Alt`** + **F4** □□□□□□

2. □□□ **Restore Defaults**□□□□□□□□□□□□□□ **Save & Exit**□□□□□□□□□

3. □□□□□□□□□□□□□

4. □□□□□□□□□□ **BIOS Setup Utility**□BIOS □□□□□□□□□□□□□□□□□□□□ **Intel®Virtualization Technology** □ **AMD-V**□□□□□□□□□□□□□□□□□□□□**Virtualization Extensions**□□□□□□□□□□□□□ **Save & Exit**□

5. □□□□□□□□□□□□□

6. □□ **`cat /proc/cpuinfo | grep vmx svm`**□□ BIOS □□□□□□□□□

□□ A. □□□□

□□□□□□□□□□□□□ Linux□□□□□□□□□□

A.1. □□□□

- *http://www.cl.cam.ac.uk/research/srg/netos/xen/* Xen™ □□□□□□□□□□□□□□□□Fedora *kernel-xen* □□□□□□□□□□□□□□□□□□ □□□□□□□ xen □□ binary □□□□□□□□□□□□□□□□□□ xen □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

- Xen □□□□

  http://www.xen.org/

- *http://www.libvirt.org/* **`libvirt`** □□□ API □□□□□□

- *http://virt-manager.et.redhat.com/* **Virtual Machine Manager**□virt-manager□□□□□□□□□□□□□□□□□□□□□□□□□□□□

- □□□□□□□□□

  http://www.openvirtualization.com[1]

- Fedora □□

  http://docs.fedoraproject.org

- □□□□□□□□

  http://virt.kernelnewbies.org[2]

- Red Hat □□□□□□□□□

  http://et.redhat.com[3]

A.2. □□□□□□□

- **`/usr/share/doc/xen-<version-number>/`** □□□□□□□□□□□□ Xen □□□□ hypervisor □□□□□□□□□□□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□ Xen □□□□□□□□□

- **`man virsh`** and **`/usr/share/doc/libvirt-<version-number>`** — □□□□□□□ **`virsh`** □□□□□□□□□□□□□□□□□□ □□□□□□□ **`libvirt`** □□□□□□□ API □□□□□□

- **`/usr/share/doc/gnome-applet-vm-<version-number>`** — □□□□□□□□□□□□□□□□□□□□□□□□□ GNOME □□□□□□ □□□□□□□□□□□□

- **`/usr/share/doc/libvirt-python-<version-number>`** — □□□□□□□□ **`libvirt`** □□□□□□ Python □□□□□□ **`libvirt-python`** □□□□□ python □□□□□□□□ **`libvirt`** □□□□□□□□□□□□□□□

- **`/usr/share/doc/python-virtinst-<version-number>`** — □□□□**`virt-install`** □□□□□□□□□□□□□□□□ □□□□□□□□□□ Fedora □ Linux □□□□□□□□□□□□

- **`/usr/share/doc/virt-manager-<version-number>`** — □□

□□ B. □□□□

□□ 12.1.3 Mon Oct 12 2009 Christopher Curran *ccurran@redhat.com*

□ Red Hat Enterprise Linux 5.4 □□□□□□□ 5.4-61 □□□□

□□ C. □□□□

□□□□□□□ DocBook XML v4.3□

□□□□□□ Jan Mark Holzer □ Chris Curran □□□□

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- Don Dutile - □□□□□□□□□□□□□□□□
- Barry Donahue - □□□□□□□□□□□□□□□□
- Rick Ring - □□□□□□□□□□□□□□□
- Michael Kearey - □□ XML □□□□□ virsh □□□□□□□□□□□□□□□□□□
- Marco Grigull - □□□□□□□□□□□□□□□□
- Eugene Teo - □□ virsh □□□□□□□□□□□□□□□□

Publican□□□□□□□□□□□□□□□ - Jeffrey Fearn□

Red Hat □□□□□□□□□□□□

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  - Sam Friedmann
- □□
  - Hedda Peters
- □□□□
  - Francesco Valente

- [illegible]
  - Glaucia de Freitas
  - Leticia de Lima
- [illegible]
  - Angela Garcia
  - Gladys Guerrero
- [illegible]
  - Yuliya Poyarkova

[illegible]

[illegible]

[illegible]Bare-metal[illegible]

[illegible]bare-metal[illegible] *dom0* [illegible]

dom0

[illegible] [illegible]*Host*[illegible] [illegible]

dom0 [illegible] *Hypervisor* [illegible] Linux [illegible]host instance[illegible]Dom0 [illegible]

Domains

domU [illegible] *Domains* [illegible] *Hypervisor* [illegible] [illegible] [illegible]

domU

domU [illegible]*Domains*[illegible]

[illegible]

Xen [illegible] KVM [illegible]*Bare-metal*[illegible] Linux [illegible]

[illegible]

[illegible] [illegible]

[illegible]

[illegible] *domU*[illegible]

Hardware Virtual Machine

[illegible] [illegible]

Hypervisor

Hypervisor [illegible]Hypervisor [illegible]

[illegible]Host[illegible]

[illegible] *dom0*[illegible]

[illegible] [illegible] [illegible] [illegible] [illegible]

I/O

[illegible]/[illegible]I/O[illegible]

Kernel-based Virtual Machine

KVM[illegible] Kernel [illegible] AMD64 [illegible] Intel 64 [illegible] Linux [illegible] [illegible]VM [illegible] Linux kernel [illegible] Linux kernel [illegible]KVM [illegible] Windows [illegible] Linux [illegible]KVM [illegible] libvirt [illegible]virt-manager [illegible] virsh[illegible] hypervisor[illegible]

KVM [illegible] Hypervisor [illegible] API [illegible] Linux kernel [illegible] Linux [illegible]guest density

LUN

[illegible]Logical Unit Number[illegible]LUN[illegible] SCSI [illegible]

[illegible]Migration[illegible]

[illegible] Xen [illegible]Xen [illegible] KVM [illegible]

[illegible]

- Load balancing - guests can be moved to hosts with lower usage when a host becomes overloaded.
- Hardware failover - when hardware devices on the host start to fail, guests can be safely relocated so the host can be powered down and repaired.

- Energy saving - guests can be redistributed to other hosts and host systems powered off to save energy and cut costs in low usage periods.
- Geographic migration - guests can be moved to another location for lower latency or in serious circumstances.

[illegible]

An offline migration suspends the guest then moves an image of the guests memory to the destination host. The guest is resumed on the destination host and the memory the guest used on the source host is freed.

[illegible] 2GB [illegible] 1 Gbit [illegible]

[illegible]memory page[illegible]

[illegible] I/O [illegible] CPU [illegible]

MAC [illegible]

[illegible]Media Access Control Address[illegible] MAC [illegible] MAC [illegible]

[illegible]

[illegible] kernel[illegible] Xen kernel [illegible] *kernel-xen* [illegible] kernel [illegible]SELinux [illegible]load balancing[illegible]provisioning[illegible]

[illegible] Fedora 9 [illegible] kernel [illegible] Linux tree [illegible] Linux kernel [illegible]

[illegible]

[illegible]

[illegible]

[illegible] Linux [illegible] I/O [illegible]

Security Enhanced Linux

[illegible] Linux [illegible]SELinux [illegible] Linux kernel [illegible] Linux [illegible]Linux Security Modules[illegible]LSM[illegible]

Universally Unique Identifier

[illegible]Universally Unique Identifier[illegible]UUID[illegible]distributed computing environments[illegible] UUID [illegible]`ext2` [illegible] `ext3` [illegible]RAID [illegible]iSCSI [illegible] LUN [illegible]MAC [illegible]

Virtualization

[illegible] hypervisor[illegible]Hypervisor [illegible]

- Xen [illegible] KVM [illegible]
- Xen [illegible] Linux [illegible]
- [illegible]binary translation[illegible]

Virtualized CPU

[illegible]VCPUs[illegible] CPU [illegible] CPU [illegible]

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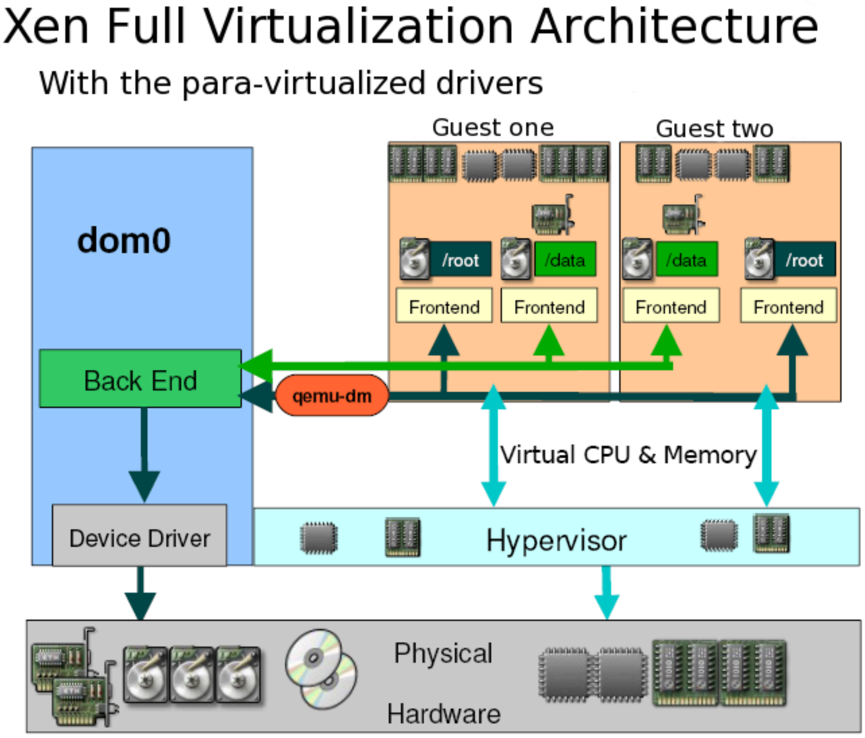
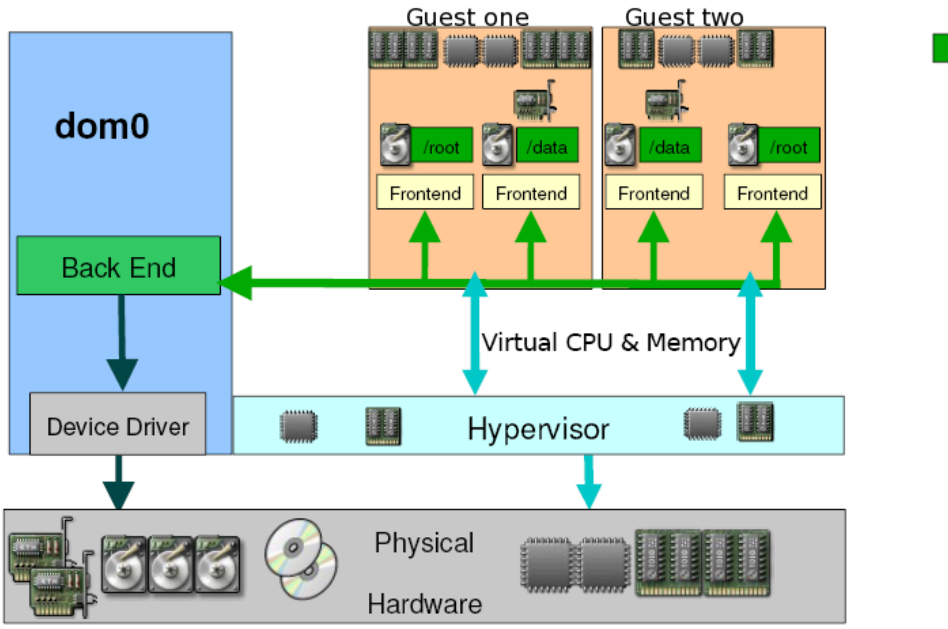
□□□□□□□□□□□□□□□□□□□□ Java Runtime Environment □□ LISP□□

Xen

Fedora □□□ Xen hypervisor □ KVM hypervisor□□□□ *Kernel-based Virtual Machine*□□□□□ hypervisor □□□□□□□□□□□□□□□Xen hypervisor □□ Linux □□□□□□□□□□□□□□□□□□□□□□□□□ API□□□□□□□□□ *dom0* □ Domain0□



Xen Para-virtualization Architecture



Guest one
Guest two
dom0
/root
/data
/data
/root
Frontend
Frontend
Frontend
Frontend
Back End
Virtual CPU & Memory
Device Driver
Hypervisor
Physical
Hardware