Novell SUSE® Linux Enterprise Virtual Machine Driver Pack

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SUSE DRIVERS FOR LINUX* ON XEN*

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Novell®

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About This Guide

This documentation describes how to install the SUSE® Linux Enterprise Virtual machine Driver Pack for Linux on existing systems running Novell® SUSE Linux virtualization technology. It contains the following section:

- Chapter 1, “Virtual Machine Driver Pack for Linux,” on page 9

Audience

This documentation is intended for computer users who need to set up and manage virtual machines hosted on a virtualization host server. It is intended to aid the experienced NetWare® or Linux system administrator who is already somewhat familiar with virtualization technology and data center operations.

Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comments feature at the bottom of each page of the online documentation, or go to www.novell.com/documentation/feedback.html and enter your comments there.

Documentation Updates

For the most recent version of the *SUSE Drivers for Linux On Xen Guide*, visit the Novell Virtualization Technology Web site (http://www.novell.com/documentation/vmserver/).

Additional Documentation

For additional documenation about Novell Virtualization, see the Novell Virtualization Technology Web site (http://www.novell.com/documentation/vmserver/).

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In Novell documentation, a greater-than symbol (>) is used to separate actions within a step and items in a cross-reference path.

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When a single pathname can be written with a backslash for some platforms or a forward slash for other platforms, the pathname is presented with a backslash. Users of platforms that require a forward slash, such as Linux or UNIX*, should use forward slashes as required by your software.

Virtual Machine Driver Pack for Linux

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This section contains the following topics:

- Section 1.1, “Introduction,” on page 9
- Section 1.2, “Best Practices,” on page 10
- Section 1.3, “Buying a Support Subscription,” on page 10
- Section 1.4, “Installing the Virtualization Host Server,” on page 10
- Section 1.5, “Loading the Driver Pack,” on page 10
- Section 1.6, “SUSE Drivers for Red Hat Enterprise Linux 4 on Xen,” on page 13
- Section 1.7, “SUSE Drivers for Red Hat Enterprise Linux 5 on Xen,” on page 15
- Section 1.8, “Drivers for SLES 9 and SLES 10,” on page 17
- Section 1.9, “Security Information,” on page 18

1.1 Introduction

SUSE® Linux Enterprise Virtual Machine Driver Pack contains disk and network device drivers for a number of third-party operating systems in order to enable the high-performance hosting of these unmodified guest operating systems on top of SUSE Linux Enterprise Server 10 (SLES 10) SP1. The guest operating systems supported by this driver pack are:

- Red Hat* Enterprise Linux* 4
- Red Hat Enterprise Linux 5

Virtualization allows the consolidation of Linux workloads on newer, more powerful, energy-efficient hardware. Paravirtualized operating systems such as SUSE Linux Enterprise Server are aware of the underlying virtualization platform, and can therefore interact efficiently with it. Unmodified operating systems are unaware of the virtualization platform and expect to interact directly with the hardware. Because this is not possible when consolidating servers, the hardware must be emulated for the operating system. Emulation can be slow, but it is especially troubling for high-throughput disk and network subsystems. Most performance loss occurs in this area.

The device drivers in SUSE Linux Enterprise Virtual Machine Driver Pack bring many of the performance advantages of paravirtualized operating systems to unmodified operating systems because only the paravirtualized device driver (not the rest of the operating system) is aware of the virtualization platform. For example, a paravirtualized disk device driver appears as a normal, physical disk to the operating system. However, the device driver interacts directly with the virtualization platform (with no emulation) to efficiently deliver disk access, allowing the disk and network subsystems to operate at near native speeds in a virtualized environment, without requiring changes to existing operating systems.

1.2 Best Practices

Before installing SUSE Linux Enterprise Virtual Machine Driver Pack in your production environment, we strongly recommend that you run it in a test environment to ensure that it functions properly with your system.

1.3 Buying a Support Subscription

The customer support you receive for the SUSE Linux Enterprise Virtual Machine Driver Pack is at the same level as your SUSE Linux Enterprise support subscription (http://support.novell.com/linux/sles_support.html). You can choose the following levels of support:

- Basic
- Standard
- Priority

Descriptions of these levels of support and how to buy them are found at SUSE Linux Enterprise Server 10 How to Buy (http://www.novell.com/products/server/howtobuy.html).

1.4 Installing the Virtualization Host Server

1. Install SLES 10 SP1 (see the *SLES 10 Installation and Administration Guide* (http://www.novell.com/documentation/sles10/sles_admin/index.html?page=/documentation/sles10/sles_admin/data/sles_admin.html).

   During the SLES 10 SP1 installation, do the following:

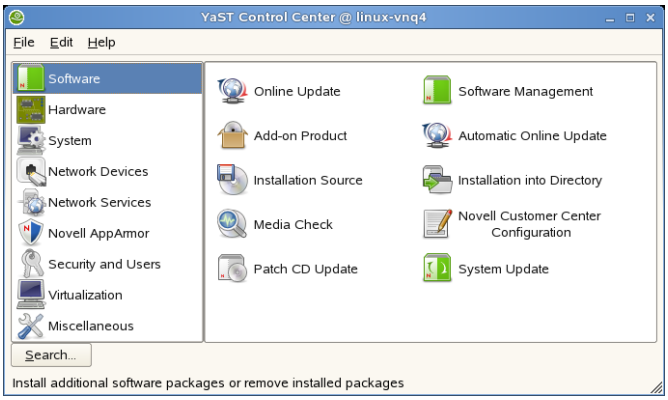
   - Install the minimal packages necessary for SLES, including the Xen Virtual Machine Host Server package. (For best performance, the host server should be running only packages required for virtualization.)
   - Turn off the firewall.
   - Make sure to use ifup, not Network Manager.
2. Get the latest updates for SLES 10 SP1. Use *YaST* > *Software* > *Online Update* or click the *Software Updater* on the taskbar.

   NOTE: To get updates, you must register with Novell Customer Center.

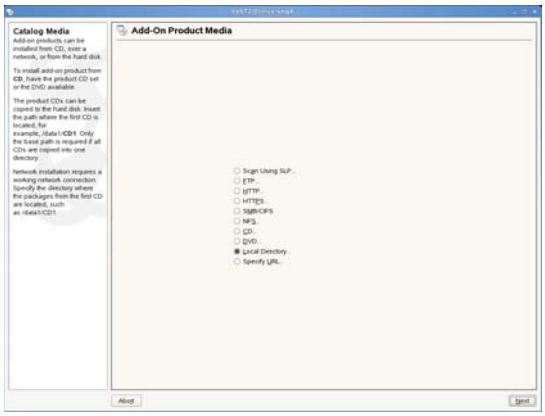
1.5 Loading the Driver Pack

1. Download the SLES-Virtual-Machine-Driver-Pack-10.iso file to your SLES 10 SP1 virtual machine host server.
2. Open YaST.

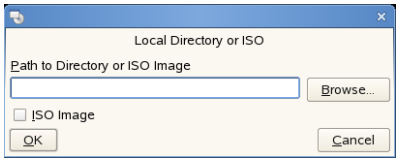
If YaST doesn't appear in your list of applications, you can run it by logging in as `root` and entering `YaST2` at a terminal.



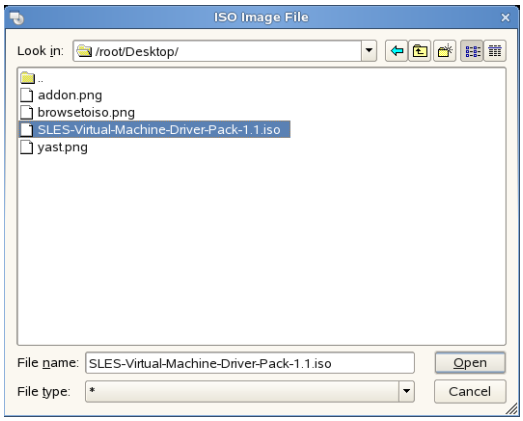
3 Select *Software*, then click *Add-on Product*.



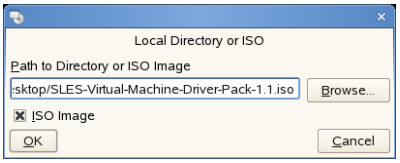
4 Click *Local Directory*, then click *Next*.



5 Select the *ISO Image* box, then browse to the location of the driver pack ISO image you downloaded.

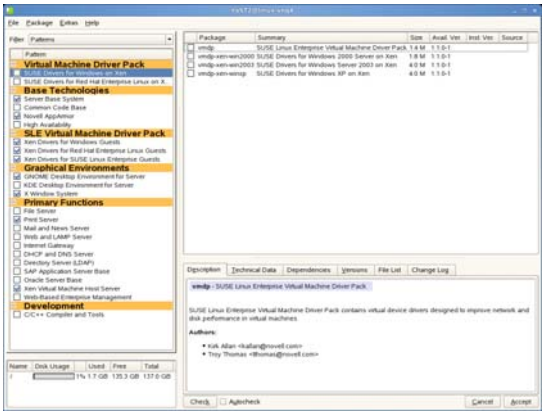


6 Select the driver pack ISO, then click *Open*.



7 Click *OK*.

8 Select *Patterns* from the *Filter* drop-down list.



The drivers are located under Virtual Machine Driver Pack.

9 Select the drivers you want to install, then click *Accept*.

10 When asked if you want to install more packages, click *No*.

The drivers are now on your system in the `opt/novell/vm-driver-pack` directory.

1.6 SUSE Drivers for Red Hat Enterprise Linux 4 on Xen

This section provides instructions for installing, uninstalling, and upgrading the SUSE Drivers for Red Hat Enterprise Linux 4 on Xen.

- Section 1.6.1, “Installing the RHEL 4 Drivers,” on page 13
- Section 1.6.2, “Uninstalling the RHEL 4 Drivers,” on page 14
- Section 1.6.3, “Upgrading the RHEL 4 Drivers,” on page 14
- Section 1.6.4, “Using the Drivers with an Upgraded the Kernel,” on page 14
- Section 1.6.5, “Building Your Own RPMs,” on page 14

1.6.1 Installing the RHEL 4 Drivers

1. Open a terminal.
2. Locate the RPM package you want to install (`opt/novell/vm-driver-pack`).

   If you are installing from the binary RPM included with the driver pack, the RPM is located on the driver pack ISO. .

   (Optional) If you are installing from an RPM that you built, the RPM is located in `/usr/src/redhat/RPMS/`*arch*, where *arch* is the architecture of the virtual machine. See Section 1.6.5, “Building Your Own RPMs,” on page 14 for more information.
3. Set up the ISO image or CD as a virtual CD reader by following the instructions in the *Configuration Options and Settings Guide* in Section 1.5: Virtual CD Drives and ISO Images (http://www.novell.com/documentation/vmserver/config_options/index.html?page=/documentation/vmserver/config_options/data/b9rtimf.html).
4. Enter `rpm -U` *xxx*`.rpm`, where *xxx* is the RPM filename.
5. Edit the `/boot/grub/menu.lst` file and make the following change:

   For each drive specified in the virtual machine configuration file (for example, hda and hdb), append *hdx*`=noprobe` to the kernel line for the updated kernel, where *hdx* is the drive specification found in the virtual machine configuration file.
6. Shut down the virtual machine.
7. On the virtualization host server, open a terminal and enter `xm delete vm_name` to delete the virtual machine’s reference in the xenstore so it is no longer managed.

   TIP: Enter `xm list` to see the name of the virtual machine (*vm_name*).
8. Open the virtual machine configuration file located on the virtualization host server (`/etc/xen/vm/vm_cfgfile` where *vm_cfgfile* is usually the same as the name of the virtual machine).
9. Remove all parameters from the `vif=` line except the `mac=`mac_address parameter. Make sure to leave the single quotes.

   For example, change the line

   ```
   vif=[ 'mac=00:16:3e:55:24:21,model=pcnet,type=ioemu', ]
   ```

   to

   ```
   vif=[ 'mac=00:16:3e:55:24:21', ]
   ```

10 At the terminal, enter `xm new vm_cfgfile` to reference the virtual machine in the xenstore so it is managed again.

11 Restart the virtual machine.

1.6.2 Uninstalling the RHEL 4 Drivers

1 Open a terminal.

2 Enter `rpm -e xxx`, where *xxx* is the name of the driver pack.

TIP: Enter `rpm -qa | grep vmdp` to find out what you have installed.

---

3 Edit the `/boot/grub/menu.lst` file and remove all `hdx=noprobe` entries from the kernel line.

4 Reboot the virtual machine.

1.6.3 Upgrading the RHEL 4 Drivers

1 Open a terminal.

2 Locate the RPM package you want to install (`opt/novell/vm-driver-pack`).

If you are installing from the binary RPM included with the driver pack, the RPM is located on the driver pack ISO. Refer to the *Configuration Options and Settings Guide* in Section 1.5: Virtual CD Drives and ISO Images (http://www.novell.com/documentation/vmserver/config_options/index.html?page=/documentation/vmserver/config_options/data/b9rtimf.html) for instructions on mounting the ISO.

(Optional) If you are installing from an RPM that you built, the RPM is located in `/usr/src/redhat/RPMS/xxx`, where *xxx* is the architecture of the virtual machine. See Section 1.6.5, “Building Your Own RPMs,” on page 14 for more information.

3 Ener `rpm -U --force xxx.rpm`, where *xxx* is the filename of the new RPM.

1.6.4 Using the Drivers with an Upgraded the Kernel

1 Install the new kernel packages.

2 Edit the `/boot/grub/menu.lst` file and remove all `hdx=noprobe` entries from the kernel line.

3 Restart the virtual machine.

4 Upgrade the driver pack (see Section 1.6.3, “Upgrading the RHEL 4 Drivers,” on page 14).

5 Edit the `/boot/grub/menu.lst` file and make the following change:

For each drive specified in the virtual machine configuration file (for example, hda and hdb), append `hdx=noprobe` to the kernel line for the updated kernel, where *hdx* is the drive specification found in the virtual machine configuration file.

1.6.5 Building Your Own RPMs

If you do not have a driver pack that was built for your Linux kernel, you can build your own SUSE Drivers for Red Hat Enterprise Linux 4 on Xen RPM.

1 Open a terminal.

2 Mount the driver pack ISO. Instructions for mounting the ISO are available in the *Configuration Options and Settings Guide* in Section 1.5: Virtual CD Drives and ISO Images (http://www.novell.com/documentation/vmserver/config_options/index.html?page=/documentation/vmserver/config_options/data/b9rtimf.html).

3 Enter `rpmbuild --rebuild xxx.src.rpm`, where *xxx* is the name for the source RPM. This creates a binary RPM in `/usr/src/redhat/RPMS/arch/`, where *arch* is the architecture of the virtual machine.

1.7 SUSE Drivers for Red Hat Enterprise Linux 5 on Xen

This section provides instructions for installing, uninstalling, and updating the SUSE Drivers for Red Hat Enterprise Linux 5 on Xen.

- Section 1.7.1, "Installing the RHEL 5 Drivers," on page 15
- Section 1.7.2, "Uninstalling the RHEL 5 Drivers," on page 16
- Section 1.7.3, "Upgrading the RHEL 5 Drivers," on page 16
- Section 1.7.4, "Using the Drivers with an Upgraded Kernel," on page 17
- Section 1.7.5, "Building Your Own RPMs," on page 17

1.7.1 Installing the RHEL 5 Drivers

1 Open a terminal.

2 Mount the driver pack ISO. Instructions for mounting the ISO are available in the *Configuration Options and Settings Guide* in Section 1.5: Virtual CD Drives and ISO Images (http://www.novell.com/documentation/vmserver/config_options/index.html?page=/documentation/vmserver/config_options/data/b9rtimf.html).

(Optional) If you are installing from an RPM that you built, the RPM is located in `/usr/src/redhat/RPMS/arch`, where *arch* is the architecture of the virtual machine. See Section 1.7.5, "Building Your Own RPMs," on page 17 for more information.

3 Install the RPM.

3a Open a terminal.

3b Enter `rpm -U xxx.rpm`, where *xxx* is the RPM filename.

3c Edit the `/boot/grub/menu.lst` file and make the following changes:

- ❑ Set the default=*xxx* (where *xxx* is the old boot entry) to default=0, which is the boot entry with the latest initrd.
- ❑ For each drive specified in the virtual machine configuration file (for example, hda and hdb), append *hdx*=noprobe to the kernel line for the updated kernel, where *hdx* is the drive specification found in the virtual machine configuration file.

4 Shut down the virtual machine.

5 On the virtualization host server, open a terminal and enter `xm delete vm_name` to delete the virtual machine's reference in xenstore so it is no longer managed.

TIP: Enter `xm list` to see the name of the virtual machine (*vm_name*).

---

6 Open the virtual machine configuration file located on virtualization host server (`/etc/xen/vm/vm_cfgfile` where *vm_cfgfile* is usually the same as the name of the virtual machine).

7 Remove all parameters from the `vif=` line except the `mac=`mac_address parameter. Make sure to leave the single quotes.

For example, change the line

```
vif=[ 'mac=00:16:3e:55:24:21,model=pcnet,type=ioemu', ]
```

to

```
vif=[ 'mac=00:16:3e:55:24:21', ]
```

8 At the terminal, enter `xm new vm_cfgfile` to reference the virtual machine in the xenstore so it is managed again.

9 Restart the virtual machine.

1.7.2 Uninstalling the RHEL 5 Drivers

1 Open a terminal.

2 Enter `rpm -e kmod-vmdp-rhel5-xxx`, where *xxx* is the version of the installed driver pack.

TIP: Enter `rpm -qa | grep vmdp` to find out what you have installed.

---

3 Edit the `/boot/grub/menu.lst` and make the following changes:

- Set the default=*xxx* (where *xxx* is the old boot entry) to default=0, which is the boot entry with the latest initrd.
- Remove all *hdx*=noprobe entries from the kernel line.

4 Restart the virtual machine.

1.7.3 Upgrading the RHEL 5 Drivers

1 Open a terminal.

2 Mount the new driver pack ISO. Instructions for mounting the ISO are available in the *Configuration Options and Settings Guide* in Section 1.5: Virtual CD Drives and ISO Images (http://www.novell.com/documentation/vmserver/config_options/index.html?page=/documentation/vmserver/config_options/data/b9rtimf.html).

(Optional) If you are installing from an RPM that you built, the RPM is located in `/usr/src/redhat/RPMS/`*arch*, where *arch* is the architecture of the virtual machine. See Section 1.7.5, “Building Your Own RPMs,” on page 17 for more information.

3 Enter `rpm -U xxx.rpm`, where *xxx* is the name of the newer driver pack RPM.

4 Verify that the default kernel is the one with the latest initrd in the `/boot/grub/menu.list`.

1.7.4 Using the Drivers with an Upgraded Kernel

1. Install the kernel.

   IMPORTANT: Do not reboot the virtual machine.

2. Before rebooting the virtual machine, make sure all the following directories are present in `/lib/modules/xxx/weak-updates/vmdp` (where *xxx* is the new kernel version):
   - blkfront
   - netfront
   - platform-pci
   - util
   - xenbus

If these files are not present, do the following:

1. Edit the `/boot/grub/menu.lst` file and remove all `hdx=noprobe` entries from the kernel line.
2. Restart the virtual machine.
3. Upgrade the driver pack (see Section 1.7.3, “Upgrading the RHEL 5 Drivers,” on page 16).
4. Edit the `/boot/grub/menu.lst` file and make the following change:

   For each drive specified in the virtual machine configuration file (for example, hda and hdb), append *hdx*`=noprobe` to the kernel line for the updated kernel, where *hdx* is the drive specification found in the virtual machine configuration file.
5. Reboot the virtual machine.

1.7.5 Building Your Own RPMs

If you do not have a driver pack that is compatible with your Linux kernel, you can build your own SUSE Drivers for Red Hat Enterprise Linux 5 on Xen RPM.

1. Open a terminal.
2. Mount the driver pack ISO. Instructions for mounting the ISO are available in the *Configuration Options and Settings Guide* in Section 1.5: Virtual CD Drives and ISO Images (http://www.novell.com/documentation/vmserver/config_options/index.html?page=/documentation/vmserver/config_options/data/b9rtimf.html).
3. Enter `rpmbuild --rebuild xxx.src.rpm`, where *xxx* is the name for the source RPM. This creates a binary RPM in `/usr/src/redhat/RPMS/arch/`, where *arch* is the architecture of the virtual machine.

1.8 Drivers for SLES 9 and SLES 10

Drivers are available for SLES 9 and SLES 10. See the *SUSE Drivers for SLES 9 on Xen* and *SUSE Drivers for SLES 10 on Xen* guides located at the Novell Virtualization Technology Web site (http://www.novell.com/documentation/vmserver/) for more information.

1.9 Security Information

There are no known security issues introduced by the device drivers in this driver pack; however, you should familiarize yourself with potential security issues on XEN (http://www.xensource.com). We recommend that you follow the security recommendations for the operating system you are using.

These drivers do not contain or use cryptography.