Novell SUSE® Linux Enterprise Virtual Machine Driver Pack

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SUSE DRIVERS FOR SLES ON XEN*

September 10, 2007

Novell®

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Contents

About This Guide

This documentation describes how to install the SUSE® Linux Enterprise Virtual machine Driver Pack for SUSE Linux Enterprise Server (SLES) 9 and 10 on existing systems running Novell® SUSE Linux virtualization technology. It contains the following section:

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 SUSE Linux Enterprise Server

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This section contains the following topics:

1.1 Introduction

SUSE® Linux Enterprise Virtual Machine Driver Pack contains disk and network device drivers for SUSE Linux Enterprise Server (SLES) 9 SP3 and 10 SP1 systems in order to enable the high-performance hosting of these unmodified guest operating systems on top of SLES 10 SP1.

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.

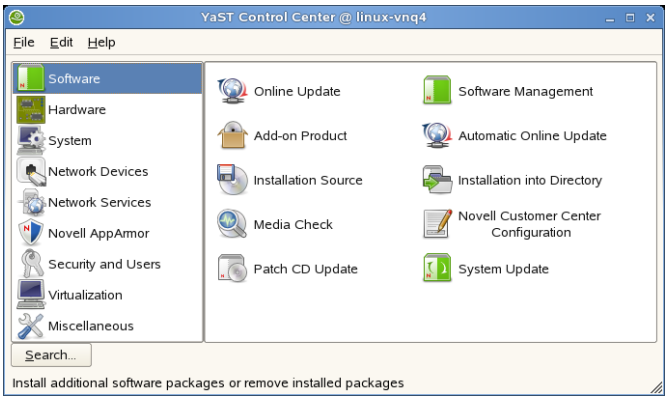
2. Get the latest updates for SLES 10 SP1. Use *YaST* > *Software* > *Online Update* or click the *Software Updater* on the taskbar.

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

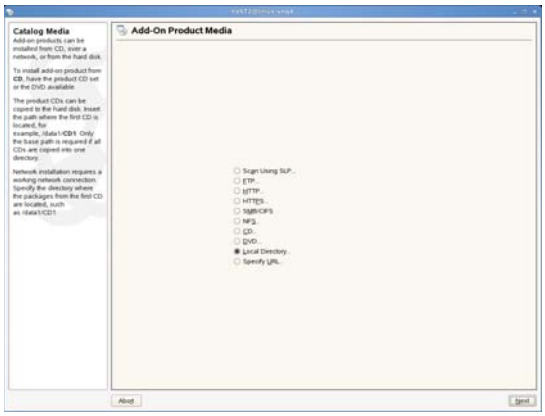
1.5 Loading the Driver Pack

1. Download the SLES-Virtual-Machine-Driver-Pack-10.CD1.iso file to your SLES 10 SP1 virtual machine host server.
2. Open YaST.

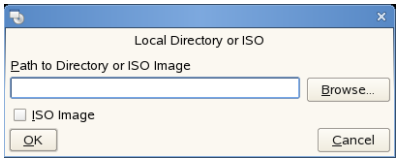
If YaST doesn't appear in your list of applications, you can run it by logging in as `root` and entering `YaST2` at a terminal.



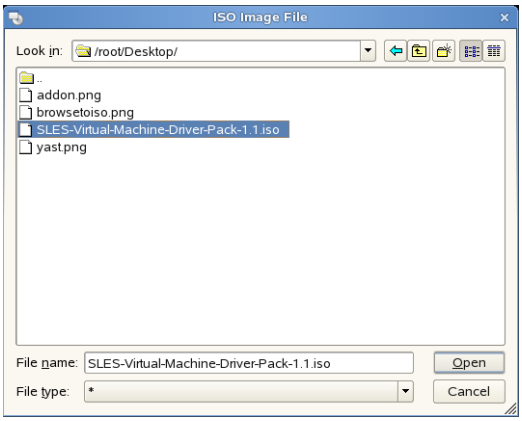
3 Select *Software*, then click *Add-on Product*.



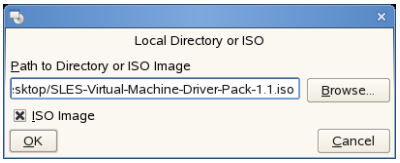
4 Click *Local Directory*, then click *Next*.



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

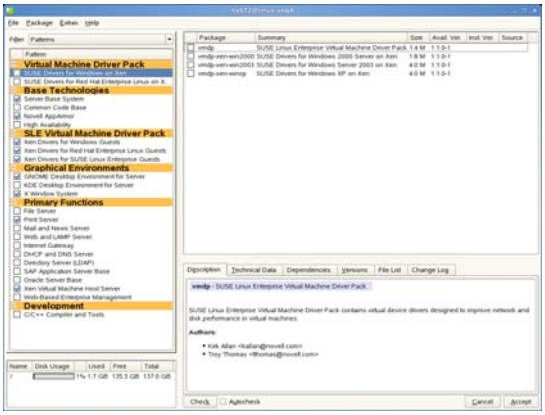


6 Select the driver pack ISO, then click *Open*.



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 Linux Enterprise Server 9 SP3

NOTE: The drivers for SLES 9 are not included in the driver pack. They are available through the standard update channels.

This section provides isntructions for running SLES 9 SP3 as a fully virtual guest with Xen drivers and contains the following topics:

1.6.1 Meeting System and Software Requirements

You must have SUSE Linux Enterprise Server 9 SP3 or later.

1.6.2 Setting Up the Virtual Machine

1. Create a new fully virtual machine or start an existing fully virtual machine. (Use *YaST* > *Virtualization* > *Virtual Machine Manager*).
2. Get the latest updates for the operating system from your update channel. For information on updating SLES 9, see the SUSE LINUX Enterprise Server 9 Documentation (http://www.novell.com/documentation/sles9/index.html).

   IMPORTANT: Make sure you perform this step.
3. If you want to back up the driver files, open a terminal and enter `mv initrd-xxx.img to initrd-xxx.img.bak`, where *xxx* is the kernel version.
4. Verify that the Xen drivers are installed.
   - **4a** Launch YaST by entering `yast2` at a terminal.
   - **4b** Select *Software* > *Software Management*.
   - **4c** Search for `xen-kmp` and make sure that the appropriate drivers are installed for your system.

     If they are not selected, select them and click *Accept* to complete the installation.

1.6.3 Editing the Configuration File to Recognize the Virtual Network Card

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

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

2 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).

3 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', ]
```

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

5 Restart the virtual machine by using *YaST* > *Virtualization* > *Virtual Machine Manager*.

You can also restart the virtual machine by using xm start vm_cfgfile, but make sure to connect to it with a viewer.

The first time the virtual machine boots, you might see a message indicating that new hardware was found. This message is to be expected and can be safely cancelled.

1.6.4 Setting Up the Virtual Machine's Block Device

1 Edit the virtual machine's `/boot/grub/menu.lst` file. At the kernel line, append an `hdx=noprobe` parameter where `hdx` is the drive designation specified in the virtual machine configuration file.

For example, if the virtual machine configuration file specifies a virtual disk as hda, such as: `disk=['file:/var/lib/xen/images/vm1/hda,ioemu:hda,w']`, you should see something like `kernel vmlinuz-kernel_ver hda=noprobe` appended to the kernel line.

2 Reboot the virtual machine.

1.6.5 Configuring the Virtual Network Card

1 Identify the number of each virtual network card.

Virtual network cards are identified by `vif-x` files located in the `/sys/class/net/ethx/driver` directories. For example, network card 0 is designated as `/sys/class/net/eth0/driver/vif-0`. Look in each `ethx/driver` directory for a `vif-x` file, such as `vif-0`, `vif-1`, and so on.

2 Run YaST.

2a Make sure you are logged in as root.

2b Open a terminal.

2c Enter `YaST2`.

3 In YaST, click *Network Devices* > *Network Card*.

4 Click *Change*, then select and delete each network card that is already configured.

5 Click *Add*, then change the ethx parameter to a network card number identified in Step 1. Repeat the process to add all virtual network cards.

1.7 SUSE Linux Enterprise Server 10 SP1

NOTE: The drivers for SLES 10 are not included in the driver pack. They are available through the standard update channels.

This section provides isntructions for running SLES 10 SP1 as a fully virtual guest with Xen drivers and contains the following topics:

1.7.1 Meeting System and Software Requirements

You must have SUSE Linux Enterprise Server 10 SP1 or later.

1.7.2 Setting Up the Virtual Machine

1. Create a new fully virtual machine or start an existing fully virtual machine. (Use *YaST* > *Virtualization* > *Virtual Machine Manager*).
2. Get the latest updates for the operating system from your update channel. For information on updating SLES 10, see the SUSE Linux Enterprise Server 10 SP1 documentation (http://www.novell.com/documentation/sles10/index.html).

   IMPORTANT: Make sure you perform this step.
3. If you want to back up the driver files, enter `mv initrd-xxx.img to initrd-xxx.img.bak` (where *xxx* is the kernel version) at a terminal.
4. Verify that the Xen drivers are installed.
   - **4a** Launch YaST by entering `yast2` at a terminal.
   - **4b** Select *Software* > *Software Management*.
   - **4c** Search for `xen-kmp` and make sure that the appropriate drivers are installed for your system.

     If they are not selected, select them and click *Accept* to complete the installation.

1.7.3 Setting Up the Virtual Machine's Block Device

1. Edit the virtual machine's `/boot/grub/menu.lst` file. At the kernel line, append an `hdx=noprobe` parameter where *hdx* is the drive designation specified in the virtual machine configuration file.

   For example, if the virtual machine configuration file specifies a virtual disk as hda, such as:

   ```
   disk=['file:/var/lib/xen/images/vm1/hda,ioemu:hda,w']
   ```

   the following kernel line should be appended:

```
kernel vmlinuz-kernel_ver hda=noprobe
```

Also at the kernel line, change `root=/dev/disk/by-id/xxx` to `root=/dev/hdxx`, where *hdxx* is the disk and partition of your root partition. For example, `root=/dev/hda2`.

2 Shut down the virtual machine.

1.7.4 Editing the Configuration File to Recognize the Virtual Network Card

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

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

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2 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).

3 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', ]
```

4 At the terminal, enter `xm new` *vm_cfgfile* to reference the virtual machine in the Xen store so it is managed again.

5 Restart the virtual machine by using *YaST* > *Virtualization* > *Virtual Machine Manager*.

You can also restart the virtual machine by using `xm start vm_cfgfile`, but make sure to connect to it with a viewer.

The first time the virtual machine boots, you might see a message indicating that new hardware was found. This message is to be expected and can be safely cancelled.

1.7.5 Configuring the Virtual Network Card

1 Identify the number of each virtual network card.

Virtual network cards are identified by `vif-x` files located in the `/sys/class/net/ethx/device/driver` directories. For example, network card 0 is designated as `/sys/class/net/eth0/driver/vif-0`. Look in each `ethx/driver` directory for a `vif-x` file, such as `vif-0`, `vif-1`, and so on.

2 In YaST, click *Network Devices* > *Network Card*. Select and delete each network card that is already configured.

3 Click *Add*, then change the ethx parameter to a network card number identified in Step 1 and enter `xen-vnif` as the module name. Repeat the process to add all virtual network cards.

1.8 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.