

# Configuring virtual machines with Virtual Machine Manager

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Draft

# 1 Environment

This document applies to the following products and product versions:

- SUSE Linux Enterprise Server 15 SP5, 15 SP4, 15 SP3, 15 SP2, 12 SP5

## 2 Introduction

Virtual Machine Manager is a GUI (graphical user interface) application for configuring virtual machines managed by `libvirt`. This article will help you configure your virtual machine using Virtual Machine Manager.

## 3 Requirements

- Any SUSE Linux Enterprise-based desktop environment with the Virtual Machine Manager application installed.
- At least one connection to a valid VM Host Server configured by Virtual Machine Manager or `libvirt`.
- An existing `libvirt`-based virtual machine on the VM Host Server.

## 4 Viewing detailed information

Virtual Machine Manager's *Details* view offers in-depth information about the VM Guest's complete configuration and hardware equipment. Using this view, you can also change the guest configuration or add and modify virtual hardware to an existing virtual machine. To access *Details*, do the following:

1. Start Virtual Machine Manager by running the `virt-manager` command from the command line.
2. Left-click the virtual machine that you need to view or modify from the list of virtual machines and select *Open*.
3. In the virtual machine's console window, select *View > Details* from the menu, or click *Show virtual hardware details* in the toolbar.

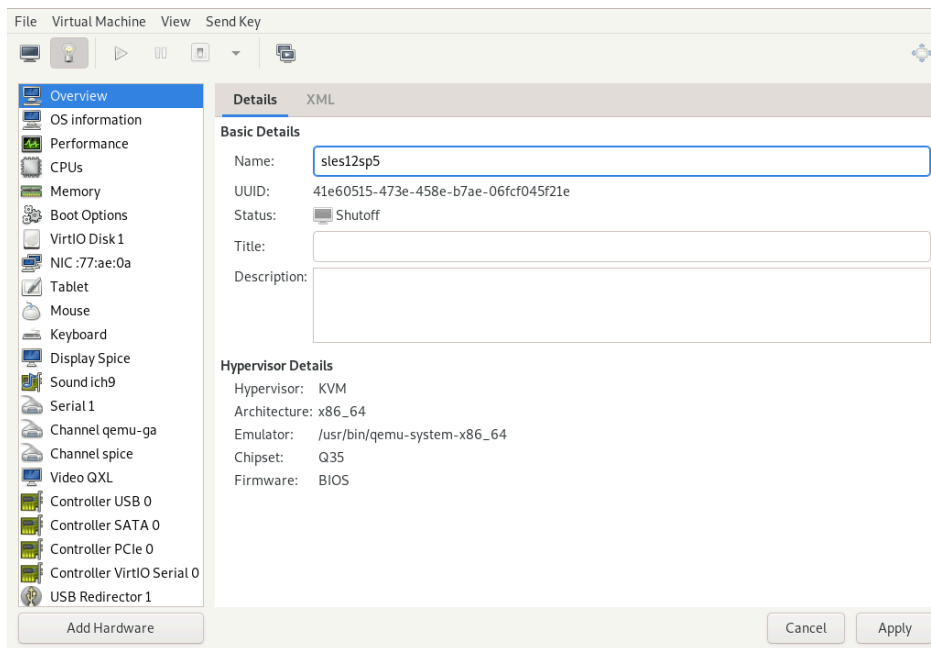


FIGURE 1: VM GUEST'S DETAILS

The left panel of the window lists VM Guest overview information and already installed hardware. After clicking an item in the list, you can access its detailed settings in the right view. You can change the hardware parameters to match your needs, then click *Apply* to confirm them.



## Tip

Some changes take effect immediately, while others need a reboot of the machine—and Virtual Machine Manager warns you about that fact.

To remove installed hardware from a VM Guest, select it from the left panel and then click *Remove* in the bottom right of the window.

To add new hardware, click *Add Hardware* below the left panel, then select the type of the hardware you want to add in the *Add New Virtual Hardware* window. Modify its parameters and confirm with *Finish*.

## 5 Overview

The *Overview* shows basic details about the VM Guest and the hypervisor.

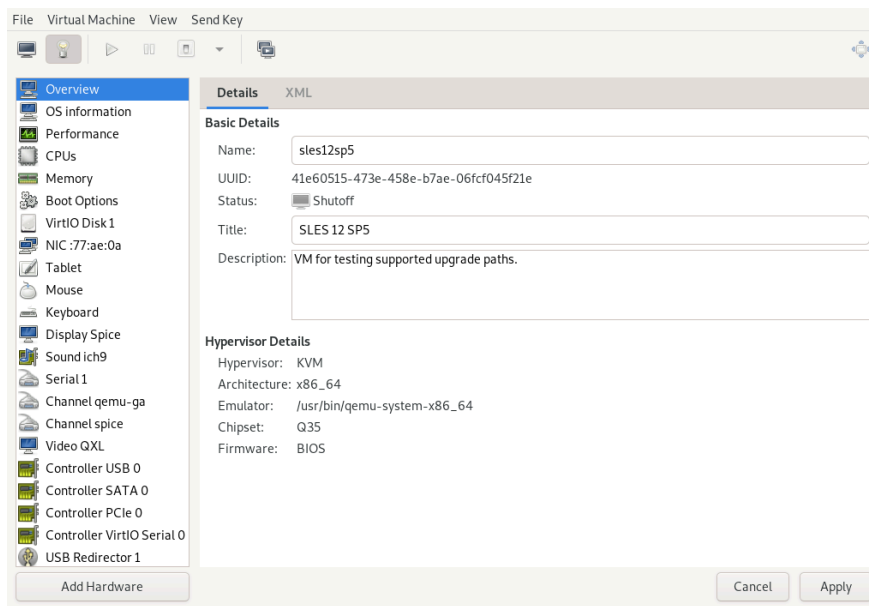


FIGURE 2: OVERVIEW DETAILS

The *Name*, *Title*, and *Description* fields are editable, and will help you to identify the VM Guest in the *Virtual Machine Manager* list of machines.

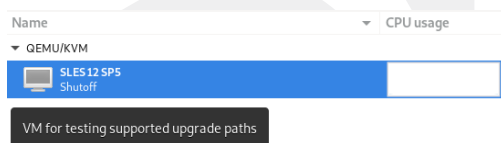


FIGURE 3: VM GUEST TITLE AND DESCRIPTION

*UUID* shows the Universally Unique IDentifier of the virtual machine, while *Status* shows its current status: *Running*, *Paused*, or *Shutoff*.

The *Hypervisor Details* section shows the hypervisor type, CPU architecture, the emulator in use (if any), and the chipset type. None of the hypervisor parameters can be changed.

## 6 Performance statistics

*Performance* shows regularly updated charts of CPU and memory usage, and disk and network I/O.

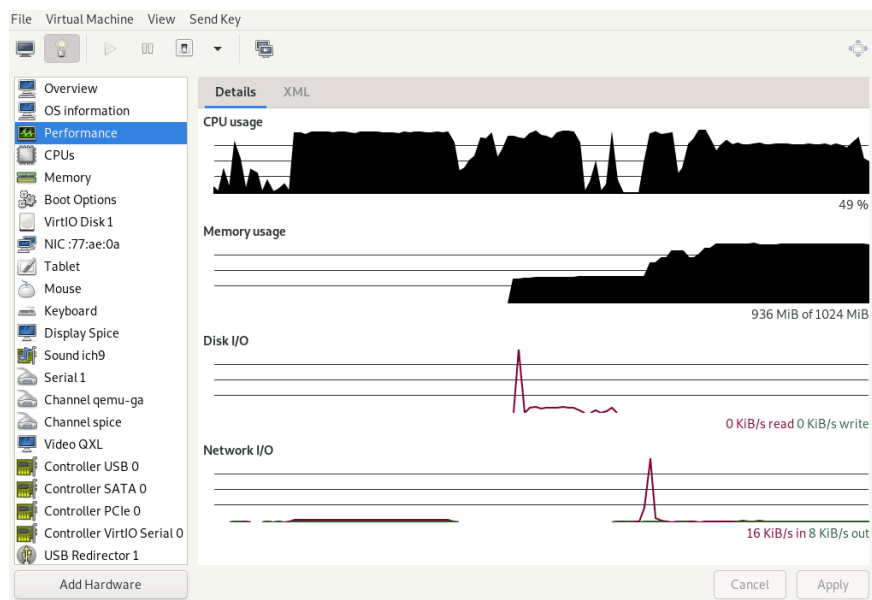


FIGURE 4: PERFORMANCE



### Tip: Enabling disabled charts

Not all the charts in the *Graph* view are enabled by default. To enable these charts, go to *File > View Manager*, then select *Edit > Preferences > Polling*, and check the charts that you want to see.

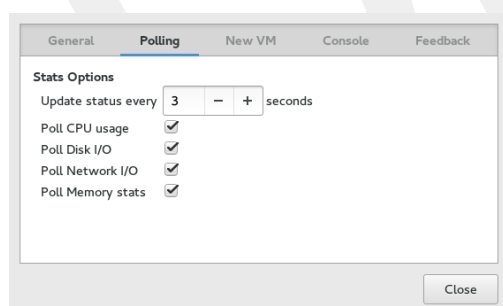


FIGURE 5: STATISTICS CHARTS

## 7 Basic hardware

This section describes the setup of the virtualized processor and memory. These components are vital to a VM Guest, so you cannot remove them.

## 7.1 Processor

*CPU* includes detailed information about the processor configuration of the VM Guest .

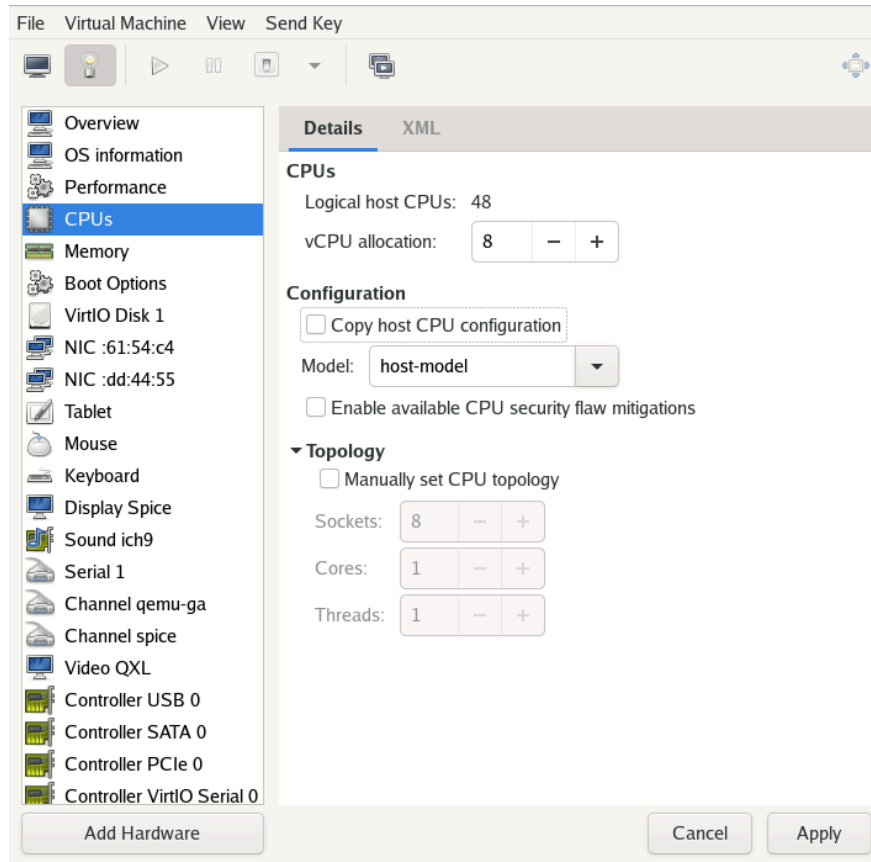


FIGURE 6: PROCESSOR VIEW

In the *CPUs* section, you can configure the number of virtual CPUs allocated to the VM Guest. *Logical host CPUs* shows the number of online and usable CPUs on the VM Host Server.

The *Configuration* section lets you configure the CPU model and topology.

When activated, the *Copy host CPU configuration* option uses the host CPU model for VM Guest. You can see the details of the host CPU model in the output of the `virsh capabilities` command. When deactivated, the CPU model needs to be specified from the models available in the drop-down box.

The host CPU model generally provides a good trade-off between CPU features and ability to migrate the VM Guest. `libvirt` does not model every aspect of each CPU, so the VM Guest CPU will not match the VM Host Server CPU exactly. However, the ABI provided to the VM

Guest is reproducible, and during migration, the complete CPU model definition is transferred to the destination VM Host Server, ensuring that the migrated VM Guest will see the exact same CPU model on the destination.

The `host-passthrough` model provides the VM Guest with a CPU that is exactly the same as the VM Host Server CPU. This can be useful when the VM Guest workload requires CPU features not available in `libvirt`'s simplified `host-model` CPU. The `host-passthrough` model is also required in some cases, for example, when running VM Guests with more than 4 TB of memory. The `host-passthrough` model comes with the disadvantage of reduced migration capability. A VM Guest with `host-passthrough` model CPU can only be migrated to a VM Host Server with identical hardware.

For more information on `libvirt`'s CPU model and topology options, see the *CPU model and topology* documentation at <https://libvirt.org/formatdomain.html#cpu-model-and-topology>.

After you activate *Manually set CPU topology*, you can specify a custom number of sockets, cores and threads for the CPU.

## 7.2 Memory

*Memory* contains information about the memory that is available to the VM Guest.



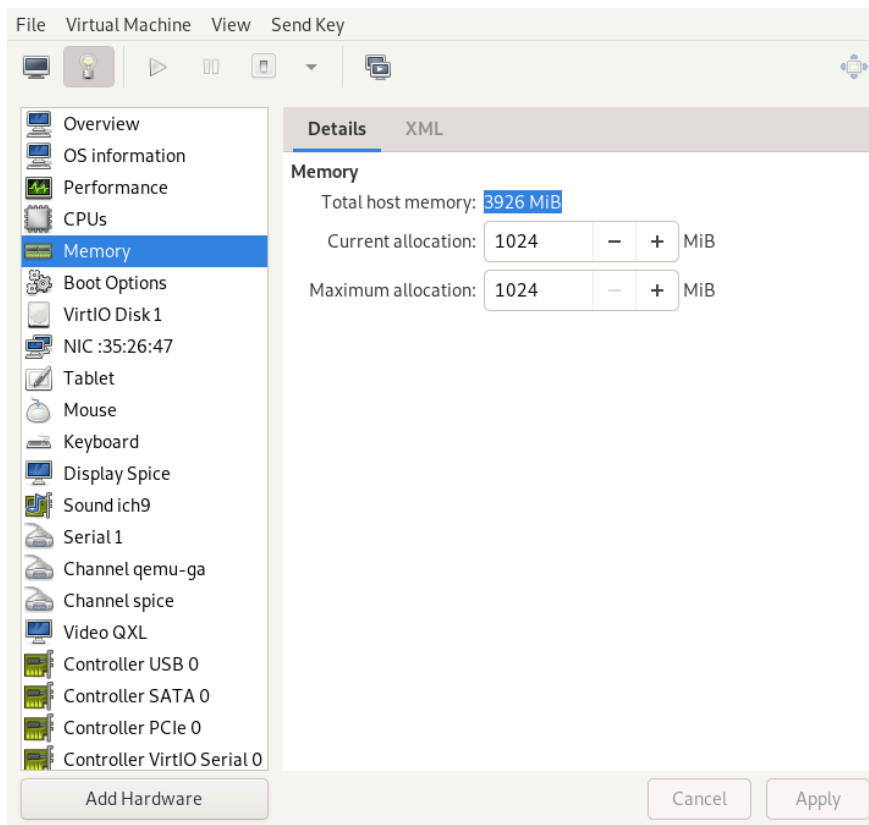


FIGURE 7: MEMORY VIEW

### ***Total host memory***

Total amount of memory installed on the VM Host Server.

### ***Current allocation***

The amount of memory currently available to VM Guest. You can hotplug more memory by increasing this value up to the value of *Maximum allocation*.

### ***Maximum allocation***

The maximum value to which you can hotplug the currently available memory. Any change to this value will take effect after the next VM Guest reboot.



## **Important: Large memory VM Guests**

VM Guests with memory requirements of 4 TB or more currently need to use the host-passthrough CPU model.

## 8 Boot options

*Boot Options* introduces options affecting the VM Guest boot process.

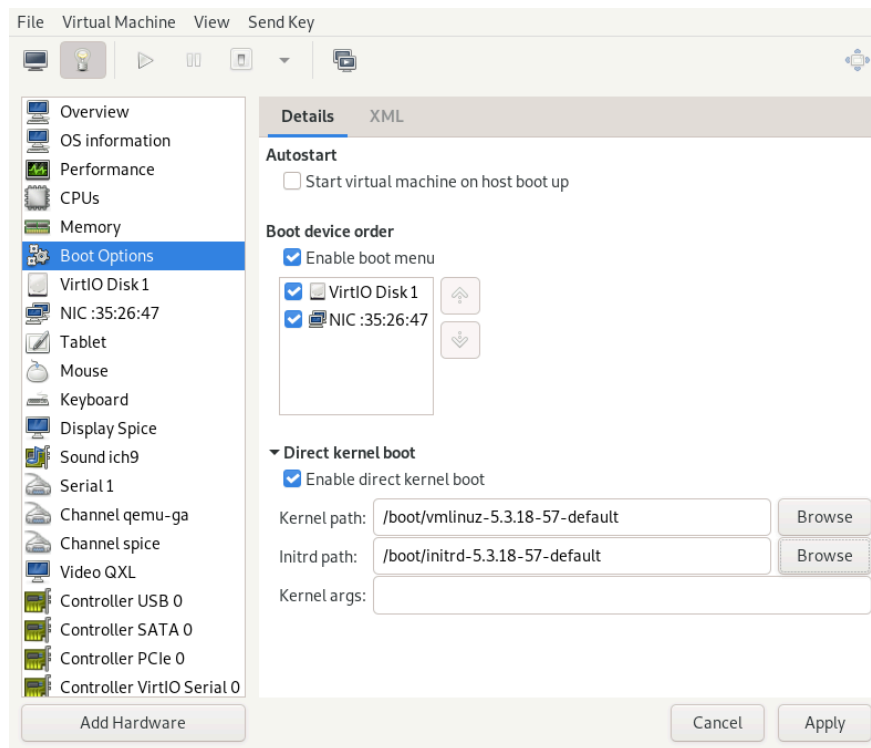


FIGURE 8: BOOT OPTIONS

In the *Autostart* section, you can specify whether the virtual machine should automatically start during the VM Host Server boot phase.

In the *Boot device order*, activate the devices that will be used for booting the VM Guest. You can change their order with the up and down arrow buttons on the right side of the list. To choose from a list of bootable devices on VM Guest start, activate *Enable boot menu*.

To boot a different kernel than the one on the boot device, activate *Enable direct kernel boot* and specify the paths to the alternative kernel and initrd placed on the VM Host Server file system. You can also specify kernel arguments that will be passed to the loaded kernel.

## 9 Storage

This section gives you a detailed description of configuration options for storage devices. It includes both hard disks and removable media, such as USB or CD-ROM drives.

1. Below the left panel, click *Add Hardware* to open the *Add New Virtual Hardware* window. There, select *Storage*.

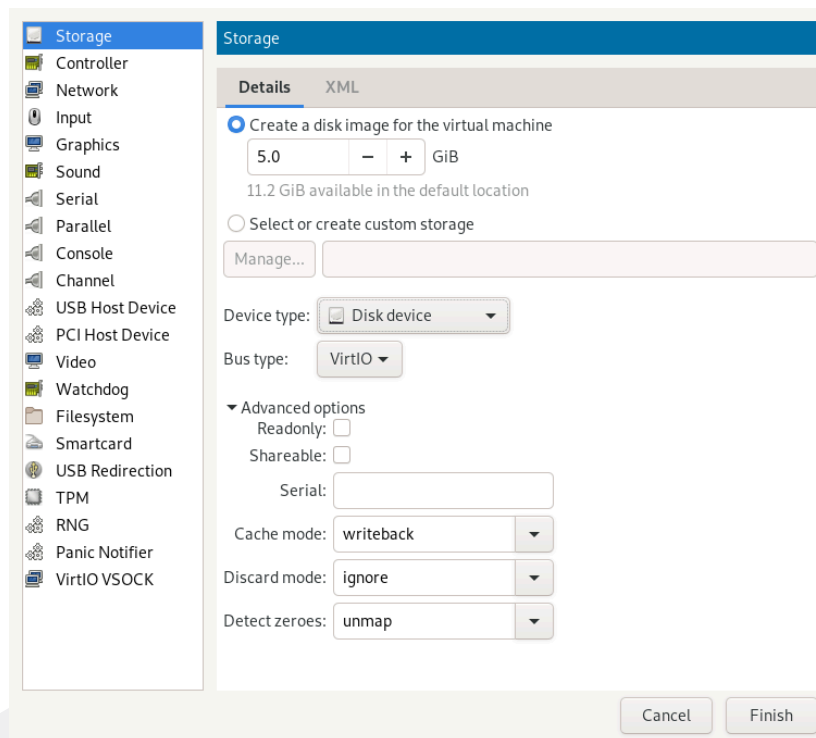


FIGURE 9: **ADD A NEW STORAGE**

2. To create a `qcow2` disk image in the default location, activate *Create a disk image for the virtual machine* and specify its size in gigabytes.  
To gain more control over the disk image creation, activate *Select or create custom storage* and click *Manage* to manage storage pools and images.



### Tip: Supported storage formats

SUSE only supports the following storage formats: `raw` and `qcow2`.

3. After you manage to create and specify the disk image file, specify the *Device type*. It can be one of the following options:
  - *Disk device*
  - *CDROM device*: Does not allow using *Create a disk image for the virtual machine*.

- *Floppy device*: Does not allow using *Create a disk image for the virtual machine*.
  - *LUN Passthrough*: Required to use an existing SCSI storage directly without adding it into a storage pool.
4. Select the *Bus type* for your device. The list of available options depends on the device type you selected in the previous step. The types based on *VirtIO* use paravirtualized drivers.
  5. In the *Advanced options* section, select the preferred *Cache mode*.
  6. Confirm your settings with *Finish*. A new storage device appears in the left panel.

## 10 Controllers

This section focuses on adding and configuring new controllers.

### PROCEDURE 2: ADDING A NEW CONTROLLER

1. Below the left panel, click *Add Hardware* to open the *Add New Virtual Hardware* window. There, select *Controller*.

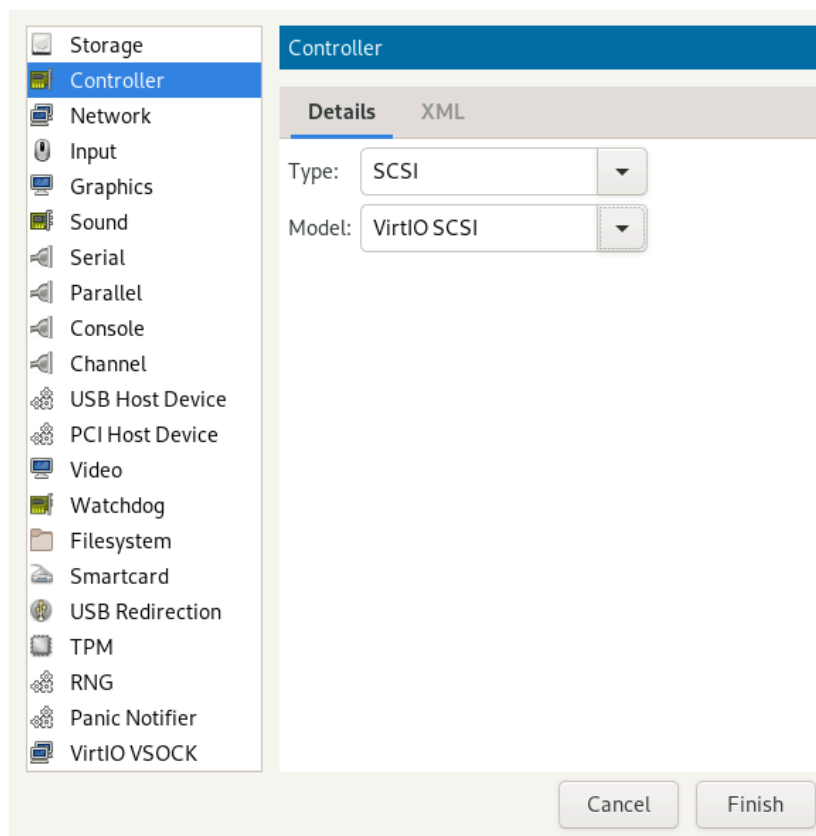


FIGURE 10: ADD A NEW CONTROLLER

2. Select the type of the controller. You can choose from *IDE*, *Floppy*, *SCSI*, *SATA*, *VirtIO Serial* (paravirtualized), *USB*, or *CCID* (smart card devices).
3. Optionally, in the case of a USB or SCSI controller, select a controller model.
4. Confirm your settings with *Finish*. A new controller appears in the left panel.

## 11 Networking

This section describes how to add and configure new network devices.

### PROCEDURE 3: ADDING A NEW NETWORK DEVICE

1. Below the left panel, click *Add Hardware* to open the *Add New Virtual Hardware* window. There, select *Network*.

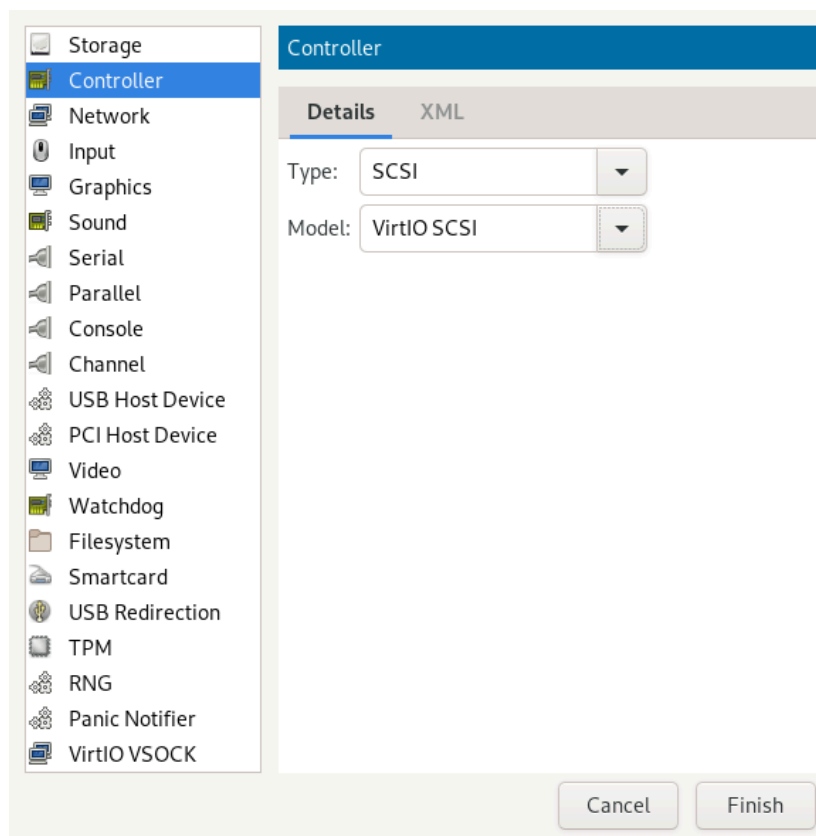


FIGURE 11: ADD A NEW NETWORK INTERFACE

2. From the *Network source* list, select the source for the network connection. The list includes the VM Host Server's available physical network interfaces, network bridges, or network bonds. You can also assign the VM Guest to a virtual network that was already defined.
3. Specify a *MAC address* for the network device. While Virtual Machine Manager pre-fills a random value for your convenience, it is recommended to supply a MAC address appropriate for your network environment to avoid network conflicts.
4. Select a device model from the list. You can either leave the *Hypervisor default*, or specify one of *e1000*, *rtl8139*, or *virtio* models. Note that *virtio* uses paravirtualized drivers.
5. Confirm your settings with *Finish*. A new network device appears in the left panel.

## 12 Input devices

This section focuses on adding and configuring new input devices such as mouse, keyboard, or tablet.

#### PROCEDURE 4: ADDING A NEW INPUT DEVICE

1. Below the left panel, click *Add Hardware* to open the *Add New Virtual Hardware* window. There, select *Input*.

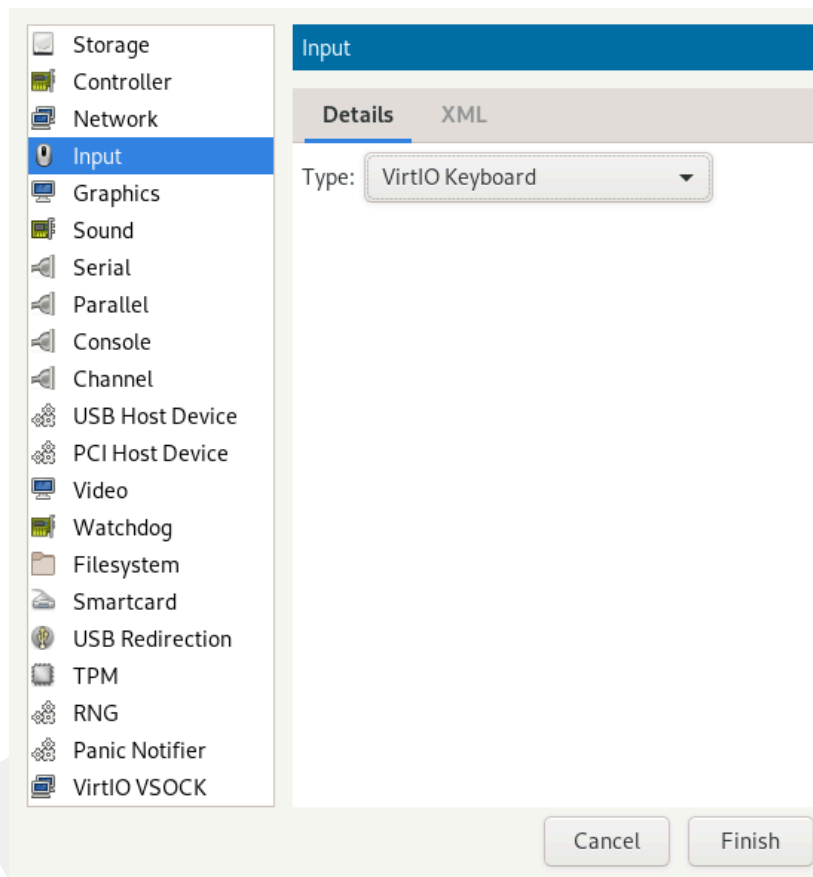


FIGURE 12: ADD A NEW INPUT DEVICE

2. Select a device type from the list.
3. Confirm your settings with *Finish*. A new input device appears in the left panel.



#### Tip: Enabling seamless and synchronized mouse pointer movement

When you click within a VM Guest's console with the mouse, the pointer is captured by the console window and cannot be used outside the console unless it is explicitly released (by pressing **Alt + Ctrl**). To prevent the console from grabbing the key and to enable seamless pointer movement between host and guest instead, follow the instructions in *Procedure 4, "Adding a new input device"* to add an *EvTouch USB Graphics Tablet* to the VM Guest.

Adding a tablet has the additional advantage of synchronizing the mouse pointer movement between the VM Host Server and the VM Guest when using a graphical environment on the guest. With no tablet configured on the guest, you will often see two pointers with one dragging behind the other.

## 13 Video

This section describes how to add and configure new video devices.

### PROCEDURE 5: ADDING A VIDEO DEVICE

1. Below the left panel, click *Add Hardware* to open the *Add New Virtual Hardware* window. There, select *Video*.

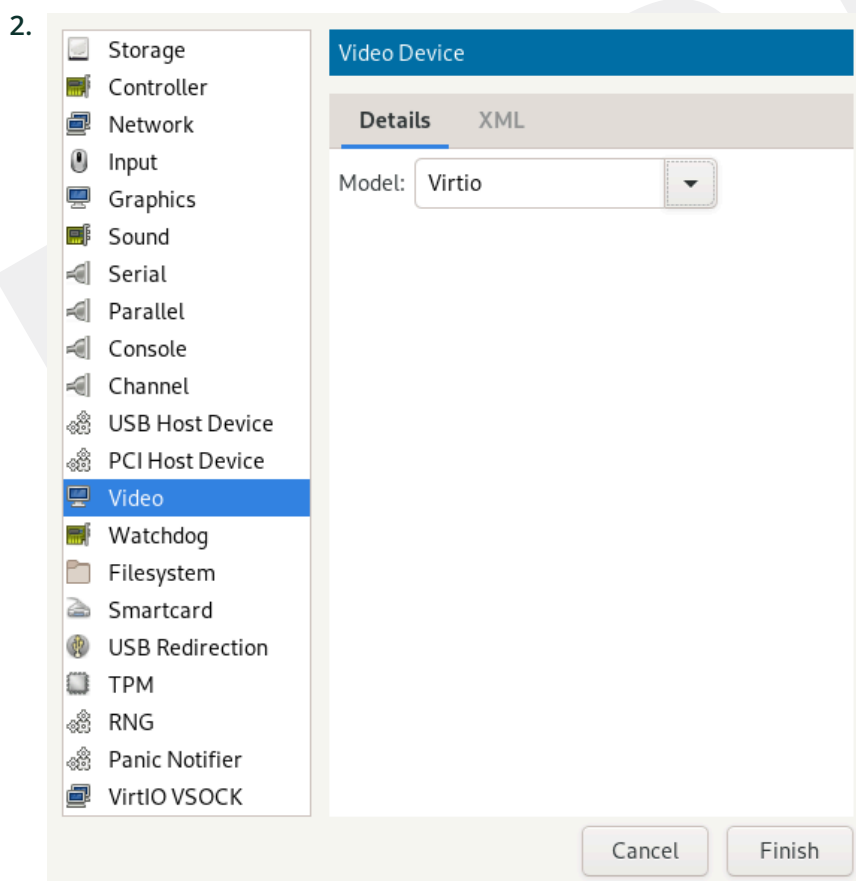


FIGURE 13: ADD A NEW VIDEO DEVICE



3. Select a model from the list. You can choose from:

- Cirrus
- QXL
- VGA
- Virtio
- VMVGA
- Xen



#### Note: Secondary video devices

Only *QXL* and *Virtio* can be added as secondary video devices.

4. Confirm your settings with *Finish*. A new video device appears in the left panel.

## 14 USB redirectors

USB devices that are connected to the client machine can be redirected to the VM Guest by using *USB Redirectors*.

### PROCEDURE 6: ADDING A USB REDIRECTOR

1. Below the left panel, click *Add Hardware* to open the *Add New Virtual Hardware* window. There, select *USB Redirection*.

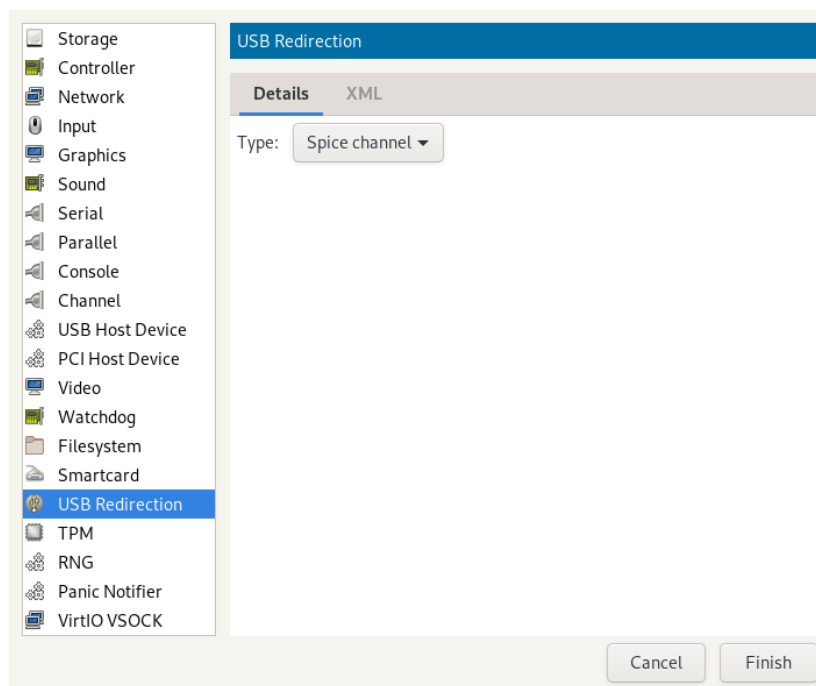


FIGURE 14: ADD A NEW USB REDIRECTOR

2. Select a device type from the list. Depending on your configuration, you can either select a *Spice channel* or a *TCP* redirector.
3. Confirm your settings with *Finish*. A new USB redirector appears in the left panel.

## 15 Miscellaneous

### Smartcard

Smartcard functionality can be added via the *Smartcard* element. A physical USB smartcard reader can then be passed through to the VM Guest.

### Watchdog

Virtual watchdog devices are also supported. They can be created via the *Watchdog* element. The model as well as the action of the device can be specified.



### Tip: Requirements for virtual watchdog devices

QA virtual watchdog devices require a specific driver and daemon to be installed in the VM Guest. Otherwise the virtual watchdog device does not work.

## TPM

You can use the Host TPM device in the VM Guest by adding TPM functionality via the *TPM* element.



### Tip: Virtual TPMs

The Host TPM can only be used in one VM Guest at a time.

## 16 Adding a CD/DVD-ROM device with Virtual Machine Manager

KVM supports CD or DVD-ROMs in VM Guest either by directly accessing a physical drive on the VM Host Server or by accessing ISO images. To create an ISO image from an existing CD or DVD, use **dd**:

```
> sudo dd if=/dev/CD_DVD_DEVICE of=my_distro.iso bs=2048
```

To add a CD/DVD-ROM device to your VM Guest, proceed as follows:

1. Double-click a VM Guest entry in the Virtual Machine Manager to open its console and switch to the *Details* view with *View > Details*.
2. Click *Add Hardware* and choose *Storage* in the pop-up window.
3. Change the *Device Type* to *IDE CDROM*.
4. Select *Select or create custom storage*.
  - a. To assign the device to a physical medium, enter the path to the VM Host Server's CD/DVD-ROM device (for example, `/dev/cdrom`) next to *Manage*. Alternatively, use *Manage* to open a file browser and then click *Browse Local* to select the device. Assigning the device to a physical medium is only possible when the Virtual Machine Manager was started on the VM Host Server.
  - b. To assign the device to an existing image, click *Manage* to choose an image from a storage pool. If the Virtual Machine Manager was started on the VM Host Server, alternatively choose an image from another location on the file system by clicking *Browse Local*. Select an image and close the file browser with *Choose Volume*.

5. Save the new virtualized device with *Finish*.
6. Reboot the VM Guest to make the new device available. For more information, see [Section 18, “Ejecting and changing floppy or CD/DVD-ROM media with Virtual Machine Manager”](#).

## 17 Adding a floppy device with Virtual Machine Manager

Currently KVM only supports the use of floppy disk images—using a physical floppy drive is not supported. Create a floppy disk image from an existing floppy using **dd**:

```
> sudo dd if=/dev/fd0 of=/var/lib/libvirt/images/floppy.img
```

To create an empty floppy disk image use one of the following commands:

### Raw image

```
> sudo dd if=/dev/zero of=/var/lib/libvirt/images/floppy.img bs=512 count=2880
```

### FAT formatted image

```
> sudo mkfs.msdos -C /var/lib/libvirt/images/floppy.img 1440
```

To add a floppy device to your VM Guest, proceed as follows:

1. Double-click a VM Guest entry in the Virtual Machine Manager to open its console and switch to the *Details* view with *View > Details*.
2. Click *Add Hardware* and choose *Storage* in the pop-up window.
3. Change the *Device Type* to *Floppy Disk*.
4. Choose *Select or create custom storage* and click *Manage* to choose an existing image from a storage pool. If Virtual Machine Manager was started on the VM Host Server, alternatively choose an image from another location on the file system by clicking *Browse Local*. Select an image and close the file browser with *Choose Volume*.
5. Save the new virtualized device with *Finish*.
6. Reboot the VM Guest to make the new device available. For more information, see [Section 18, “Ejecting and changing floppy or CD/DVD-ROM media with Virtual Machine Manager”](#).

## 18 Ejecting and changing floppy or CD/DVD-ROM media with Virtual Machine Manager

Whether you are using the VM Host Server's physical CD/DVD-ROM device or an ISO/floppy image: Before you can change the media or image of an existing device in the VM Guest, you first need to disconnect the media from the guest.

1. Double-click a VM Guest entry in the Virtual Machine Manager to open its console and switch to the *Details* view with *View > Details*.
2. Choose the Floppy or CD/DVD-ROM device and “eject” the medium by clicking *Disconnect*.
3. To “insert” a new medium, click *Connect*.
  - a. If using the VM Host Server's physical CD/DVD-ROM device, first change the media in the device (this may require unmounting it on the VM Host Server before it can be ejected). Then choose *CD-ROM or DVD* and select the device from the drop-down box.
  - b. If you are using an ISO image, choose *ISO image Location* and select an image by clicking *Manage*. When connecting from a remote host, you may only choose images from existing storage pools.
4. Click *OK* to finish. The new media can now be accessed in the VM Guest.

## 19 Assigning a host PCI device to a VM Guest

You can directly assign PCI devices on the VM Host Server to guests (PCI pass-through). When the PCI device is assigned to one VM Guest, it cannot be used on the host or by another VM Guest unless it is re-assigned. A prerequisite for this feature is a VM Host Server configuration as described in *FIXME* .

### 19.1 Adding a PCI device with Virtual Machine Manager

The following procedure describes how to assign a PCI device from a VM Host Server to a VM Guest using Virtual Machine Manager:

1. Double-click a VM Guest entry in the Virtual Machine Manager to open its console and switch to the *Details* view with *View > Details*.

2. Click *Add Hardware* and choose the *PCI Host Device* category in the left panel. A list of available PCI devices appears in the right part of the window.

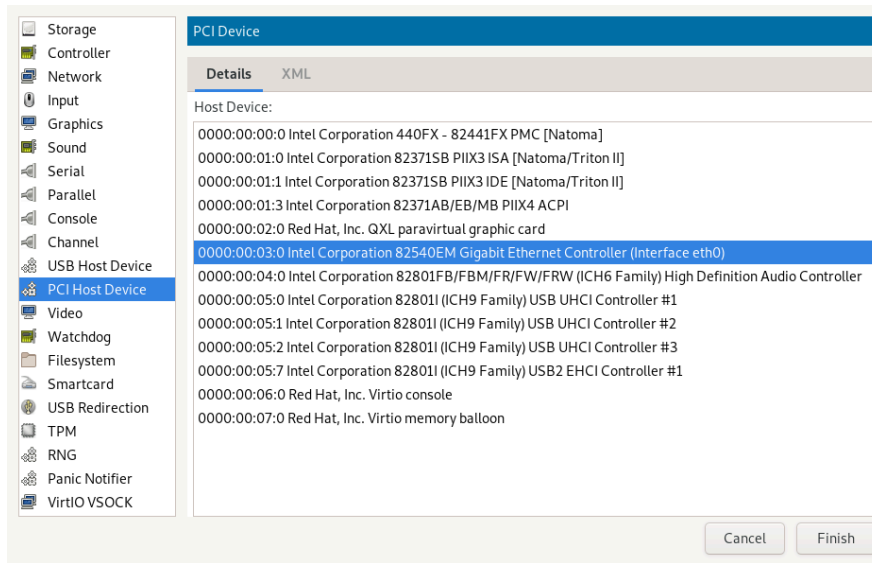


FIGURE 15: ADDING A PCI DEVICE

3. From the list of available PCI devices, choose the one you want to pass to the guest. Confirm with *Finish*.

### ! Important: SLES 11 SP4 KVM guests

On a newer QEMU machine type (`pc-i440fx-2.0` or higher) with SLES 11 SP4 KVM guests, the `acpiphp` module is not loaded by default in the guest. This module must be loaded to enable hotplugging of disk and network devices. To load the module manually, use the command `modprobe acpiphp`. It is also possible to autoload the module by adding `install acpiphp /bin/true` to the `/etc/modprobe.conf.local` file.

### ! Important: KVM guests using QEMU Q35 machine type

KVM guests using the QEMU Q35 machine type have a PCI topology that includes a `pcie-root` controller and seven `pcie-root-port` controllers. The `pcie-root` controller does not support hotplugging. Each `pcie-root-port` controller supports hotplugging a single PCIe device. PCI controllers cannot be hotplugged, so plan accordingly and add more `pcie-root-port`s if more than seven PCIe devices will be hotplugged. A `pcie-to-pci-`

`bridge` controller can be added to support hotplugging legacy PCI devices. See <https://libvirt.org/pci-hotplug.html> for more information about PCI topology between QEMU machine types.

## 20 Assigning a host USB device to a VM Guest

Analogous to assigning host PCI devices (see [Section 19, “Assigning a host PCI device to a VM Guest”](#)), you can directly assign host USB devices to guests. When the USB device is assigned to one VM Guest, it cannot be used on the host or by another VM Guest unless it is re-assigned.

### 20.1 Adding a USB device with Virtual Machine Manager

To assign a host USB device to VM Guest using Virtual Machine Manager, follow these steps:

1. Double-click a VM Guest entry in the Virtual Machine Manager to open its console and switch to the *Details* view with *View > Details*.
2. Click *Add Hardware* and choose the *USB Host Device* category in the left panel. A list of available USB devices appears in the right part of the window.

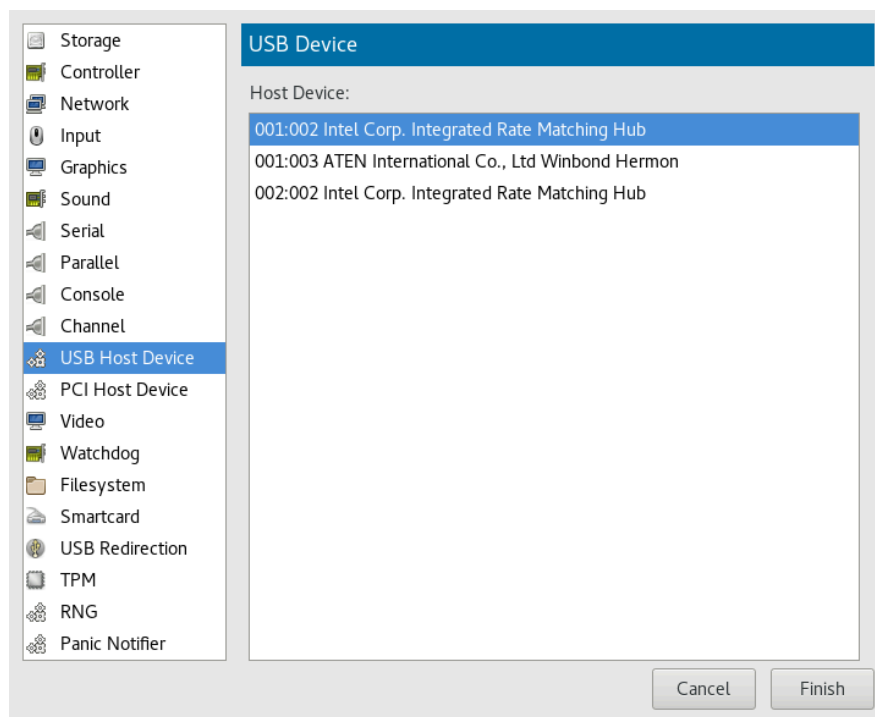


FIGURE 16: ADDING A USB DEVICE

3. From the list of available USB devices, choose the one you want to pass to the guest. Confirm with *Finish*. The new USB device appears in the left pane of the *Details* view.



#### Tip: USB device removal

To remove the host USB device assignment, click it in the left pane of the *Details* view and confirm with *Remove*.

## 21 Summary

Your virtual machine is properly configured to suit your needs and you can monitor its performance statistics.



## 22 Troubleshooting

### Virtual Machine Manager cannot establish connection to VM Host Server

Verify that the `libvirtd` service is running on VM Host Server:

```
> sudo systemctl status libvirtd.service
● libvirtd.service - Virtualization daemon
  Loaded: loaded (/usr/lib/systemd/system/libvirtd.service; enabled; vendor preset:
         enabled)
  Active: active (running) since Thu 2021-08-19 07:46:07 UTC; 2 weeks 0 days ago
  [...]
```

### Virtual Machine Manager cannot execute a guest VM with more than 255 vCPU's assigned.

See <https://www.suse.com/support/kb/doc/?id=000019723>  for a workaround.

## 23 Related topics

- See [FIXME](#) for more information on setting up virtual networks with Virtual Machine Manager.
- See [FIXME](#) for more details on managing storage with Virtual Machine Manager.
- For more information on disk cache modes, see [FIXME](#) .