



# Windows Server® 2008

## **Linux Integration Services Version 3.2 for Hyper-V (Windows Server 2008, Windows Server 2008 R2, Microsoft Hyper-V Server 2008, and Microsoft Hyper-V Server 2008 R2) Readme**

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### **Abstract**

This guide discusses the installation and functionality of Linux Integration Services for Hyper-V™ technology when the components are installed on a virtual machine.

***Microsoft***

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# Linux Integration Services Version 3.2 for Microsoft Hyper-V Readme

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## Linux Integration Services Version 3.2 for Microsoft Hyper-V Features

When installed on a virtual machine that is running a supported Linux operating system, Linux Integration Services for Hyper-V provides the following functionality:

- **Driver support:** Linux Integration Services supports the network controller and the IDE and SCSI storage controllers that were developed specifically for Hyper-V.
- **Fastpath Boot Support for Hyper-V:** Boot devices now take advantage of the block Virtualization Service Client (VSC) to provide enhanced performance.
- **Timesync:** The clock inside the virtual machine will remain synchronized with the clock on the virtualization server with the help of the pluggable time source device.
- **Integrated Shutdown:** Virtual machines running Linux can be shut down from either Hyper-V Manager or System Center Virtual Machine Manager by using the “Shut Down” command.
- **Symmetric Multi-Processing (SMP) Support:** Supported Linux distributions can use up to 4 virtual processors (VP) per virtual machine.



### Note

SMP support is not available for 32-bit Linux guest operating systems running on Windows Server 2008 Hyper-V or Microsoft Hyper-V Server 2008.

- **Heartbeat:** Allows the virtualization server to detect whether the virtual machine is running and responsive.
- **KVP (Key Value Pair) Exchange:** Information about the running Linux virtual machine can be obtained by using the Key Value Pair exchange functionality on the Windows Server 2008 virtualization server.
- **Integrated Mouse Support:** The cursor is no longer bound to the VMConnect window when used with the Linux Graphical User Interface.

## Supported Virtualization Server Operating Systems

This version of Linux Integration Services supports the following versions of Hyper-V:

- Windows Server® 2008 Standard, Windows Server 2008 Enterprise, and Windows Server 2008 Datacenter (64-bit versions only)
- Microsoft® Hyper-V Server 2008

- Windows Server® 2008 R2 Standard, Windows Server 2008 R2 Enterprise, and Windows Server 2008 R2 Datacenter
- Microsoft® Hyper-V Server 2008 R2

**Note**

Supported versions include those updated with Service Pack 1 or Service Pack 2, where available.

## Supported Guest Operating Systems

This version of Linux Integration Services supports the following guest operating systems and virtual CPU (vCPU) configurations:

- Red Hat Enterprise Linux 6.0 and 6.1 x86 and x64 (Up to 4 vCPU)
- CentOS 6.0 x86 and x64 (Up to 4 vCPU)

Other supported operating systems (including SUSE Linux Enterprise Server 10 and Red Hat Enterprise Linux 5) should use the version of Linux Integration Services available at <http://www.microsoft.com/downloads/en/details.aspx?FamilyID=eee39325-898b-4522-9b4c-f4b5b9b64551>.

# Installing Linux Integration Services Version 3.2 on Red Hat Enterprise Linux 6

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### ▶ To install Linux Integration Services Version 3.2:

1. Open Hyper-V Manager: Click **Start**, point to **Administrative Tools**, and then click **Hyper-V Manager**.
2. Create a new virtual machine where you will install Linux: In the **Actions** menu, click **New**, and then click **Virtual Machine**.
3. Specify the Linux installation media: Right-click the virtual machine that you created, and then click **Settings**. In **IDE Controller**, specify one of the following:
  - An image file in ISO format that contains the files required for installation
  - A physical CD/DVD drive that contains the installation media
4. Turn on the virtual machine: Right-click the virtual machine that you created, and then

click **Connect**.

5. Begin installing Linux.
6. When prompted, restart the virtual machine and complete any first-boot configuration tasks.



**Note**

Unless a legacy network adapter was added during the virtual machine's initial configuration, the virtual machine will not have any network support.

7. Log on to the virtual machine.
8. In Hyper-V Manager, configure **LinuxIC v32.ISO** (located in the directory where you extracted the downloaded files) as a physical CD/DVD drive on the virtual machine.
9. As the root user, mount the CD in the virtual machine by issuing the following command at a shell prompt:

```
# mount /dev/cdrom /media
```

10. As the root user, run the following command to install the synthetic drivers. A reboot is required after installation.

```
# /media/install.sh
```

```
# reboot
```

## Verifying Linux Integration Services Version 3.2 Functionality

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Linux Integration Services provides support for the **modinfo** command. To get module information for each installed kernel module, run the following command:

```
# /sbin/modinfo hv_vmbus
filename:      /lib/modules/2.6.32-71.el6.i686/extra/hv_vmbus.ko
version:      3.2
license:      GPL
srcversion:   56F00728DAE99444BE1FD9B
alias:        acpi*:VMBus:*
```

```
alias:          acpi*:VMBUS:*
depends:
vermagic:       2.6.32-71.el6.i686 SMP mod_unload modversions 686
parm:          vmbus_loglevel:int
```

This command can be repeated for all kernel modules (hv\_vmbus, hv\_netvsc, hv\_storvsc, hv\_blkvsc, and hv\_utils).

To verify that all subcomponents are running,, as the root user, issue the following command at a shell prompt:

```
# /sbin/lsmmod | grep hv
```

The output should include lines similar to the following example:

```
hv_utils      4747  0
hv_netvsc     57832 0
hv_timesource 0      [permanent]
hv_storvsc    50288 0
hv_mouse      3373  0
hv_vmbus      70120 3 hv_netvsc,hv_storvsc, hv_mouse,hv_utils,hv_timesource,[permanent]
```



#### Note

Your file system type or other local factors might result in different file sizes in your deployment.

- “hv\_netvsc” provides support for the synthetic network card.
- “hv\_storvsc” provides support for all storage devices.
- “hv\_timesource” is the pluggable time source module to assist in accurate timekeeping in the virtual machine.
- “hv\_vmbus” is the fast communication channel between the server running Hyper-V and the virtual machine.
- “hv\_mouse” is the virtual mouse driver.
- “hv\_utils” provides integrated shutdown, key value pair data exchange, and heartbeat.

# Using Key Value Pair (KVP) Exchange with a Linux virtual machine

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After Linux Integration Services are installed on the virtual machine, Key Value Pair exchange functionality is activated. This allows the virtual machine to provide the following information to the virtualization server:

- Fully Qualified Domain Name of the virtual machine
- Version of the Linux Integration Services that are installed
- IP Addresses (both IPv4 and IPv6) for all Ethernet adapters in the virtual machine
- OS Build information, including the distribution and kernel version
- Processor architecture (x86 or x86-64)

The data can be viewed using the Hyper-V WMI provider, and accessed via Windows PowerShell. Instructions for viewing Key Value Pair exchange data are available at these websites:

- <http://social.technet.microsoft.com/wiki/contents/articles/hyper-v-script-to-check-ic-version.aspx>
- [http://blogs.msdn.com/b/virtual\\_pc\\_guy/archive/2008/11/18/hyper-v-script-looking-at-kvp-guestintrinsicexchangeitems.aspx](http://blogs.msdn.com/b/virtual_pc_guy/archive/2008/11/18/hyper-v-script-looking-at-kvp-guestintrinsicexchangeitems.aspx)

# Configuring the Synthetic Network Card in Red Hat Enterprise Linux

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Use the Network configuration tool (in System/Administration/Network) to configure the newly installed synthetic network adapter. Configure the Virtual Ethernet Card, which is a synthetic network card with enhanced performance. After successful configuration, **eth0** should appear in the output of the ifconfig command, similar to the following example:

```
$/sbin/ifconfig
```

```
eth0          Link encap:Ethernet HWaddr 00:15:5D:01:08:77
```

# Configuring the Synthetic Storage Controller in Red Hat Enterprise Linux

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## ▶ To configure the Synthetic Storage Controller:

1. If you have a SCSI disk attached, as the root user, execute the following command at a shell prompt:

```
# cat /proc/scsi/scsi
```

This displays the information for the synthetic SCSI controller.

```
Attached devices:
```

```
Host: scsi0 Channel: 00 Id: 00 Lun: 00 Vendor: Msft Model: Virtual Disk Rev:
1.0 Type: Direct-Access ANSI SCSI Revision: 04
```

This indicates that the synthetic SCSI controller has been enumerated correctly.

2. Next, as the root user, execute the following command at a shell prompt to verify that there are disk(s) attached to the SCSI controller:

```
# ls /dev/sd*
```

```
brw-r----- 1 root disk 8,0 Nov 27 17:25 /dev/sda
```

3. After you confirm the presence of the disk(s), use the **fdisk** tool (as the root user) to create a partition on the disk.

## Uninstalling Linux Integration Services

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To uninstall Linux Integration Services, follow these steps.

1. Execute the following command as the root user:

32-bit versions:

```
# rpm -e microsoft-hyper-v-rhel6-41.1 kmod-microsoft-hyper-v-rhel6-41.1
```

64-bit versions:

```
# rpm -e microsoft-hyper-v-rhel6-41.1 kmod-microsoft-hyper-v-rhel6-41.1
```

# Additional Information about Linux Integration Services Version 3.2

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## Release Notes

- To mount an ISO file in the virtual machine, the following command must be run before executing the mount command:  

```
# insmod /lib/modules/$(uname -r)/kernel/drivers/ata/ata_piix.ko
```

Alternatively, copy the ISO file into the virtual machine and mount it using the -o loop option.
- The ISO file also contains a .src.rpm (Source RPM) and debugging RPM. The debugging info should not be used unless instructed by Microsoft Support.
- This version of Linux Integration Services no longer includes the Hypercall adapter that was present in earlier versions.
- Verifying the digital signature of the RPM packages under Red Hat Enterprise Linux (by executing the rpm -K command) will return a “KEYS ARE NOT OK” message.
- Support for this version of Linux Integration Services is provided via the [Microsoft TechNet forums](http://go.microsoft.com/fwlink/?LinkID=193443&clid=0x409) at <http://go.microsoft.com/fwlink/?LinkID=193443&clid=0x409> or by contacting the appropriate support channels for Microsoft or Red Hat.
- Event log entries: You might see event log entries similar to the following. These messages can be safely ignored.
  - Networking driver on 'Virtual Machine' loaded but has a different version from the server. Server version 3.2 Client version 0.2 (Virtual machine ID DC1CCF5C-0C1A-4825-B32C-9A4F8F85AA9D). The device will work, but this is an unsupported configuration. This means that technical support will not be provided until this problem is resolved. To fix this problem, upgrade the integration services. To upgrade, connect to the virtual machine and select Insert Integration Services Setup Disk from the Action menu.
  - A storage device in 'Virtual Machine' loaded but has a different version from the server. Server version 4.2 Client version 2.0 (Virtual machine ID DC1CCF5C-0C1A-4825-B32C-9A4F8F85AA9D). The device will work, but this is an unsupported configuration. This means that technical support will not be provided until this problem is resolved. To fix this problem, upgrade the integration services. To upgrade, connect to the virtual machine and select Insert Integration Services Setup Disk from the Action menu.

## Features Not Available

The following features are not available in this version of Linux Integration Services:

- Integration Services: Volume Snapshot Backup

- Networking: Jumbo Frames and TCP Offload
- Storage: Hot Add/Remove (VHD's and Passthrough Disks)

## **Important Considerations for Making Linux Virtual Machines Highly Available in Failover Clustering and Hyper-V**

Linux virtual machines that will be deployed in a highly-available scenario (using failover clustering) should be configured with static MAC addresses for each virtual network adapter. Because of the way Linux configures the network adapter, in some versions of Linux it is possible that the networking configuration will be lost after failover because a new MAC address might be assigned to the virtual network adapter. To work around this issue, ensure that each virtual network adapter has a static MAC address by editing the settings of the virtual machine in Hyper-V Manager.