

# Oracle® VM

Server Release Notes

Release 2.2.2

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This document contains information on Oracle VM Server Release 2.2.2 and supersedes the product documentation. This document contains last-minute information that could not be included in the Oracle VM Server documentation. Read this document before installing Oracle VM Server. This document may be updated after it is released. To check for updates to this document, and to view other Oracle documentation, refer to the Documentation section on the Oracle Technology Network (OTN) Web site:

<http://www.oracle.com/technology/documentation/>

The following topics are contained in this document:

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## 1 Introduction

Oracle VM is a platform that provides a fully equipped environment for better leveraging the benefits of virtualization technology. Oracle VM enables you to deploy operating systems and application software within a supported virtualization environment. The components of Oracle VM are:

- Oracle VM Manager
- Oracle VM Server

This document contains last-minute release information on Oracle VM Server. See the *Oracle VM Manager Release Notes* for last-minute release information on Oracle VM Manager.

## 2 Hardware Requirements

This release of Oracle VM Server supports i686 and x86\_64 host hardware only. Oracle VM Server requires a 32- or 64-bit processor with at least an i686-class processor on the host computer. This includes all Intel Pentium Pro or newer, and all AMD Athlon/Duron processors and newer. At least a Pentium 4 or Athlon CPU is recommended.

For hardware virtualized (unmodified) guest operating systems (for example, Microsoft Windows), a CPU with hardware virtualization support is required. This includes some Intel Pentium D, Core, Core2 and Xeon models, and some AMD Athlon and Opteron models. This feature may also need to be enabled in the BIOS. Please refer to your processor documentation for information on whether your processor supports hardware virtualization and how to enable it in the BIOS.

A dual core CPU or multiple CPUs are recommended to run multiple guests.

The minimum memory requirement is 1GB RAM, although it is recommended you have a computer with at least 2GB RAM. Guest memory requirements vary for each guest operating system. You should perform your own memory sizing for guest operating systems.

### 3 Dom0 Memory Settings

Oracle recommends you to leave the dom0 memory to the value by default. It is set by default as  $502 + 0.0205 * \text{physical-memory}$  (in MB) during the installation.

### 4 Supported Guest Operating Systems

The guest you create must be one of the following supported configurations.

**Table 1 64-bit CPU Hardware Virtualized Supported Guest Operating Systems (Linux and Solaris)**

Guest Operating System	Hardware Virtualized 32-bit	Hardware Virtualized 32-bit with PV Drivers	Hardware Virtualized 64-bit	Hardware Virtualized 64-bit with PV Drivers
Oracle Linux Release 6.x	Yes	Yes	Yes	Yes
Oracle Linux Release 5.x	Yes	Yes	Yes	Yes
Oracle Linux Release 4.x	Yes	Yes	Yes	Yes
Oracle Solaris 11 Express <sup>1</sup>	N/A	Yes	N/A	No
Oracle Solaris 10 <sup>1</sup>	N/A	Yes	N/A	Yes
RedHat Enterprise Linux 6.x	Yes	Yes	Yes	Yes
RedHat Enterprise Linux 5.x	Yes	Yes	Yes	Yes
RedHat Enterprise Linux 4.x	Yes	Yes	Yes	Yes
RedHat Enterprise Linux 3.x	Yes	Yes	Yes	No

<sup>1</sup> Oracle Solaris support begins with Solaris 10 10/09. The Solaris 10 or Solaris 11 Express OS runs as a hardware virtual machine (HVM), which requires HVM support (Intel VT or AMD-V) on the underlying hardware platform. By default, Solaris 10 or Solaris 11 Express OS already has the required paravirtualized (PV) drivers installed as part of the OS. Oracle Solaris10 or Solaris 11 Express supports x86 32-bit and 64-bit architecture. 32-bit or 64-bit mode is selected at OS boot time by examining the hypervisor and the underlying hardware.

**Table 2 64-bit CPU Hardware Virtualized Supported Guest Operating Systems (Microsoft Windows)**

Guest Operating System	Hardware Virtualized 32-bit	Hardware Virtualized 32-bit with PV Drivers 1.x	Hardware Virtualized 32-bit with PV Drivers 2.x	Hardware Virtualized 64-bit	Hardware Virtualized 64-bit with PV Drivers 1.x	Hardware Virtualized 64-bit with PV Drivers 2.x
Microsoft Windows™ 2000 SP4	Yes	No	No	Yes	No	No
Microsoft Windows™ Server 2003 SP2	Yes <sup>1</sup>	Yes	Yes	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ Server 2003 R2 SP2	Yes <sup>1</sup>	Yes	Yes	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ XP SP2	Yes <sup>1</sup>	Yes	Yes	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ Vista SP2	Yes <sup>1</sup>	Yes	Yes	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ Server 2008 SP 1	Yes <sup>1</sup>	Yes	Yes	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ Server 2008 R2	N/A	N/A	N/A	Yes <sup>1</sup>	No	Yes
Microsoft Windows™ 7	Yes <sup>1</sup>	No	Yes	Yes <sup>1</sup>	No	Yes

<sup>1</sup> HVM-only mode is used to facilitate the Windows PV Drivers installation. Windows PV Drivers are required on the Windows OS if available in order to be supported as a guest OS.

**Table 3 64-bit CPU Paravirtualized Supported Guest Operating Systems**

Guest Operating System	Paravirtualized 32-bit	Paravirtualized 64-bit
Oracle Linux Release 6.x	Yes	Yes
Oracle Linux Release 5.x	Yes	Yes
Oracle Linux Release 4.x	Yes	Yes
RedHat Enterprise Linux 6.x	Yes	Yes
RedHat Enterprise Linux 5.x	Yes	Yes
RedHat Enterprise Linux 4.x	Yes	Yes

**Table 4 32-bit CPU Hardware Virtualized Supported Guest Operating Systems (Linux and Solaris)**

Guest Operating System	Hardware Virtualized 32-bit	Hardware Virtualized 32-bit with PV Drivers
Oracle Linux Release 6.x	Yes	Yes
Oracle Linux Release 5.x	Yes	Yes
Oracle Linux Release 4.x	Yes	Yes
Oracle Solaris 11 Express <sup>1</sup>	N/A	Yes
Oracle Solaris 10 <sup>1</sup>	N/A	Yes
RedHat Enterprise Linux 6.x	Yes	Yes
RedHat Enterprise Linux 5.x	Yes	Yes

**Table 4 (Cont.) 32-bit CPU Hardware Virtualized Supported Guest Operating Systems (Linux and Solaris)**

Guest Operating System	Hardware Virtualized 32-bit	Hardware Virtualized 32-bit with PV Drivers
RedHat Enterprise Linux 4.x	Yes	Yes
RedHat Enterprise Linux 3.x	Yes	Yes

<sup>1</sup> Oracle Solaris support begins with Solaris 10 10/09. The Solaris 10 or Solaris 11 Express OS runs as a hardware virtual machine (HVM), which requires HVM support (Intel VT or AMD-V) on the underlying hardware platform. By default, Solaris 10 or Solaris 11 Express OS already has the required paravirtualized (PV) drivers installed as part of the OS. Oracle Solaris10 or Solaris 11 Express supports x86 32-bit and 64-bit architecture. 32-bit or 64-bit mode is selected at OS boot time by examining the hypervisor and the underlying hardware.

**Table 5 32-bit CPU Hardware Virtualized Supported Guest Operating Systems (Microsoft Windows)**

Guest Operating System	Hardware Virtualized 32-bit	Hardware Virtualized 32-bit with PV Drivers 1.x	Hardware Virtualized 32-bit with PV Drivers 2.x
Microsoft Windows™ 2000 SP4	Yes	No	No
Microsoft Windows™ Server 2003 SP2	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ Server 2003 R2 SP2	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ XP Pro	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ Vista	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ Server 2008 SP 1	Yes <sup>1</sup>	Yes	Yes
Microsoft Windows™ Server 2008 R2	N/A	N/A	N/A
Microsoft Windows™ 7	Yes <sup>1</sup>	No	Yes

<sup>1</sup> HVM-only mode is used to facilitate the Windows PV Drivers installation. Windows PV Drivers are required on the Windows OS if available in order to be supported as a guest OS.

**Table 6 32-bit CPU Paravirtualized Supported Guest Operating Systems**

Guest Operating System	Paravirtualized 32-bit
Oracle Enterprise Linux Release 5.x	Yes
Oracle Enterprise Linux Release 4.x	Yes
RedHat Enterprise Linux 5.x	Yes
RedHat Enterprise Linux 4.x	Yes

**Table 7 Support Matrix of Windows PV Drivers on Oracle VM Releases**

Oracle VM Release	Windows PV 1.0.8	Windows PV 1.0.11	Windows PV 2.0.7
Oracle VM Server 2.1.5	Yes	Yes	No

**Table 7 (Cont.) Support Matrix of Windows PV Drivers on Oracle VM Releases**

Oracle VM Release	Windows PV 1.0.8	Windows PV 1.0.11	Windows PV 2.0.7
Oracle VM Server 2.2.0	Yes	Yes	No
Oracle VM Server 2.2.1	No	Yes	Yes

## 5 Oracle VM Server and Manager Support Matrix

The following table shows the compatibility for a specific version of the Oracle VM Manager to manage server pools running specific versions of Oracle VM Server.

Oracle VM Manager can manage many server pools of different versions of Oracle VM Servers. For example, Oracle VM Manager 2.2.0 can manage a server pool of Oracle VM 2.1.5 servers, the server pool of Oracle VM 2.2.0 servers, the server pool of Oracle VM 2.2.1 servers, as well as the server pool of Oracle VM 2.2.2 servers.

**Oracle VM Manager 2.2.0** can manage Oracle VM Server for x86 version 2.1.0, 2.1.1, 2.1.2, 2.1.5, 2.2.0, 2.2.1, 2.2.2.

**Oracle VM Manager 2.1.5** can manage Oracle VM Server for x86 version 2.1.0, 2.1.1, 2.1.2, 2.1.5.

**Oracle VM Manager 2.1.2** can manage Oracle VM Server for x86 version 2.1.0, 2.1.1, 2.1.2.

**Oracle VM Manager 2.1.1** can manage Oracle VM Server for x86 version 2.1.0, 2.1.1.

**Oracle VM Manager 2.1.0** can manage Oracle VM Server for x86 version 2.1.0.

Each Oracle VM server pool must consist of the same version of the Oracle VM servers. You can not mix Oracle VM 2.1.x and 2.2.x servers in the same server pool.

## 6 Known Limitations and Workarounds

This section contains information on known limitations and workarounds for Oracle VM Server for the following issues:

- [Migration of a Large Virtual Machine Fails and Reboots dom0](#)
- [Reducing a Guest's Memory Does Not Include Hugepages\\_Free Memory](#)
- [Increasing ip\\_conntrack Table Size Causes Dom0 Out of Memory Error](#)
- [xen\\_top\\_info Always Shows Free Disk Space as 0](#)
- [Migration of Hugepages-Enabled Guest Fails](#)
- [Sparse File Option Not Used When a Template is Copied](#)
- [Cannot Start Solaris 10 Guest with More Than 2 vCPUs](#)
- [Limit of 32 Virtual CPUs](#)
- [Solaris 10 Guest Network not Working](#)
- [Error: Acquire Running Lock Failed: 256](#)
- [Dell PowerEdge R710 fails to start](#)
- [Problem Installing Oracle VM Server 2.x on a System With More Than 24 CPUs](#)
- [Memory Ballooning is Off by Default in Oracle VM Server 2.2.1](#)

- Error on Oracle VM Server 2.1.x and 2.2.x Server Install on 64GB Memory Using Kickstart Method
- Hang with OCFS2 Cluster Size of 4K
- Upgrade Oracle VM Manager to Enable New Features
- Unstable Network With e1000 Controller on Windows 2008 Guests
- Cannot Use P2V Utility on Computer With Less Than 512MB RAM
- Disk Entries Out of Order in Guest Configuration File After Conversion With P2V Utility
- Guests With Local SCSI Disks Created With P2V Utility Fail File System Check
- Guest Clock Drift
- SELinux Support
- Duplicate IP Addresses in Guests
- Duplicate IP Addresses in Dom0
- CDROM in Paravirtualized Guest Configuration File Causes Guest Panic
- Empty Virtual Network Interface Entry in Guest Configuration File Creates Two Interfaces With Identical MAC Addresses
- Memory Size Limit For Paravirtualized Guests
- Network Latency With Hardware Virtualized Guests
- Network Latency Negative Number With Windows Guests With More Than One VCPU
- Cannot Start Up a Guest if MAXMEM is Not Equal to MEMORY
- Cannot Unload qla2xxx Driver on an HP ProLiant G6 Server with QLogic 8Gb HBA
- Mid-layer Underflow Detected with qlaxxx Driver
- ISCSI Connection Errors
- Cannot Boot PV or PVHVM Guest With Second SCSI Disk
- Paravirtualized Guest for Oracle Enterprise Linux Release 4 Update 4
- Live Migration Fails Over SSL After Upgrade from 2.1.1
- Live Migration of a Hardware Virtualized Guest with Unmatched NX Bit Settings Fails
- OCFS2 Cluster Cannot be Mounted
- A Virtual Machine Server Started Before The Server Pool Master Does Not Join The Domain in an OCFS2 Cluster
- SAN-based Multipath Shared Disks
- Multiple Swap Partitions
- Swap Partition(s) Mounted Multiple Times
- Installing kdump
- Cannot Install kdump on Oracle Linux or Red Hat Enterprise Linux 5.x Guests
- Cannot Create Red Hat Enterprise Linux 3.x 64-bit Guests

- [Cannot Create Red Hat Enterprise Linux 4.1 Guests](#)
- [Warning Displayed in dmesg on Dom0 When Using dm-nfs Block Devices](#)
- [Oracle ASM Errors](#)
- [Logical Volume Manager Setup During Installation](#)
- [xm dump-core Fails](#)
- [Guest Restore Errors](#)
- [Creating Hardware Virtualized Guests](#)

## 6.1 Migration of a Large Virtual Machine Fails and Reboots dom0

Live migration of a large virtual machine, for example a virtual machine with over 64GB RAM, may fail and reboot the Oracle VM Server (dom0). This is caused by limited shadow memory on the Oracle VM Server.

**Workaround:** Increase the shadow memory limit for the virtual machine. Set the shadow memory limit using the `shadow_memory` parameter in the `vm.cfg` file.

`shadow_memory=value`.

The *value* is expressed in MB. The default value is 128. A suggested value for a guest with 64GB RAM is at least 256, and for a guest with over 128GB of RAM is at least 512.

## 6.2 Reducing a Guest's Memory Does Not Include Hugepages\_Free Memory

The number of allocated and free hugepages can be displayed using the `/proc/meminfo` utility:

```
# cat /proc/meminfo | grep HugePages
```

The count of free hugepages is shown after "HugePages\_Free: ". They are available for use as a hugepage but not for other uses. All hugepages, both allocated and free, are removed from the normal page allocation pool. This is true for both Oracle VM guests and bare metal systems. Reducing an Oracle VM guest's memory reservation with the dom0 using the `xm mem-set` command does not reduce the number of free hugepages.

## 6.3 Increasing ip\_contrack Table Size Causes Dom0 Out of Memory Error

The netfilter (iptables) `ip_contrack` table is used for network connection tracking. If you increase the size of the `ip_contrack` table without increasing the dom0 memory allocation, dom0 may run out of memory if the `ip_contrack` table becomes full.

**Workaround:** If you set `net.ipv4.netfilter.ip_contrack_max` to any number higher than 1048576 ( $2^{20}$ ), you must also increase the dom0 memory. The default dom0 memory is 543MB. For example, if `net.ipv4.netfilter.ip_contrack_max` is set to 2097152 ( $2^{21}$ ), `dom0_mem` should be set to at least 768MB.

## 6.4 xen\_top\_info Always Shows Free Disk Space as 0

The free disk always results in 0 when using the `XEN_TOP_INFO()` function, for example:

```
# /opt/ovs-agent-2.3/Utils/do_rpc.py xen_top_info
xen_top_info [] =>
success:218_EL5_U3_iscsi=0.0:512:0
```

Free disk space information is not available when using the XEN\_TOP\_INFO() function. This feature has not been implemented and is not available.

## 6.5 Migration of Hugepages-Enabled Guest Fails

Live migration from an Oracle Enterprise Linux PV guest that has the hugepages feature enabled, is currently not supported.

## 6.6 Sparse File Option Not Used When a Template is Copied

**Solution:** There's a configurable option to use sparse file option when a template is copied. You can set the parameter in the configuration file (/etc/ovs-agent/agent.ini). If the sparse ratio of the template is lower than the predefined ratio, it is copied as a non-sparse file. If you want the server to always use sparse copy, change this value to 0 and restart the Oracle VM agent.

```
[vm]
disk.sparse.ratio=0
```

## 6.7 Cannot Start Solaris 10 Guest with More Than 2 vCPUs

If Solaris 10 guest fails to start when more than 2 vCPUs are configured, apply the Solaris 10 patch 144452-01, which you can get from Oracle Support.

## 6.8 Solaris 10 Guest Network not Working

If the Solaris 10 guest OS comes up without a working network, use Oracle VM Manager to set the network type of Solaris 10 virtual machine to "Paravirtualized", or modify the vm.cfg and change the vif type from ioemu to netfront. Then, log into the Solaris guest OS and configure the xnf network interface.

```
vif = ['bridge=xenbr0,mac=xx:xx:xx:xx:xx:xx,type=netfront']
```

## 6.9 Error: Acquire Running Lock Failed: 256

When there are inconsistent DLM locks in the HA-enabled server pool, a guest VM can fail to start due to an inability to acquire a lock.

**Solution:** Update the Oracle VM Agent to ovs-agent-2.3-27 or later. To reset the inconsistent DLM lock issue, you can disable HA for the pool from the Oracle VM Manager or Enterprise Manager; then re-enable it. From the server pool master (dom0), run the command:

```
# /opt/ovs-agent-2.3/Utils/do_rpc.py cluster_setup False
# /opt/ovs-agent-2.3/Utils/do_rpc.py cluster_setup
```

## 6.10 Dell PowerEdge R710 fails to start

If a Dell PowerEdge R710 fails to start after installing the Oracle VM Server 2.2.1 and rebooting, upgrade the BIOS of the server to 2.0.11 or later.

## 6.11 Problem Installing Oracle VM Server 2.x on a System With More Than 24 CPUs

When installing Oracle VM Server 2.1.x or 2.2.x on a system with more than 24 CPUs, the installer does not get loaded. The console messages stop after the CPU initialization messages.

**Solution:** When booting the VM Server ISO Media on a processor complex that has more than 24 CPUs, add the "max\_cpus" parameter to the install command line, for example:

```
linux mpath max_cpus=1
```

The installed VM Server does not require the max\_cpus parameter when a 64-bit xen hypervisor is selected (either by default or from the grub menu). More details can be found at the Oracle support note 1082097.1 at the My Oracle Support site.

## 6.12 Memory Ballooning is Off by Default in Oracle VM Server 2.2.1

In a new install of Oracle VM Server 2.2.1, memory ballooning is disabled by default. When upgrading from an early Oracle VM Server to Oracle VM Server 2.2.1 release, manually modify the `/etc/xen/xend-config.sxp` to change the default dom0 memory ballooning behavior. Setting `dom0-min-mem=0` alone in `xend-config.sxp` won't disable dom0 memory ballooning. You can set `enable-dom0-ballooning=no` in `xend-config.sxp` to disable dom0 memory ballooning.

## 6.13 Error on Oracle VM Server 2.1.x and 2.2.x Server Install on 64GB Memory Using Kickstart Method

Installation might fail on a server with 64GB memory using a kickstart file, showing the error message:

```
Unknown interrupt or fault at EIP 00000060 c0400291 00000290
```

**Workaround:** On systems with greater than 32GB memory, set `mem=4G` or some other value less than 32 GB on the kickstart install kernel command line entry, then retry the installation process.

## 6.14 Hang with OCFS2 Cluster Size of 4K

If the cluster size of an existing OCFS2 partition is 4K, you might find that dom0 hangs while running a stress test with 4 domains. The 4K cluster size can only happen if someone creates an OCFS2 partition in Oracle VM Server 2.1.x using the `mkfs.ocfs2` command manually without the option `-C 1M` to set the cluster size. Use the default installation process of Oracle VM Server 2.1.5, 2.2.0 and 2.2.1 to set up a cluster size of 1M on the OCFS2 partition.

## 6.15 Upgrade Oracle VM Manager to Enable New Features

To use the new features in Oracle VM Server Release 2.2.2 in Oracle VM Manager, you must upgrade Oracle VM Manager to Release 2.2.0.

## 6.16 Limit of 32 Virtual CPUs

Oracle VM Server Release 2.2.2 is supported on a machine with 64 physical CPUs. With the updated package `xen-3.4.0-0.1.21` or later, available from Oracle's Unbreakable Linux Network (<http://linux.oracle.com>), Oracle VM Server 2.2.1 can support up to 128 physical CPUs. But neither hardware virtualized nor paravirtualized guests are supported with more than 32 virtual CPUs per guest.

## 6.17 Unstable Network With e1000 Controller on Windows 2008 Guests

Unstable network connections may occur on Microsoft Windows 2008 guest virtual machines using the e1000 network device emulator (controller). The following network issues may occur:

- The `net use` command may fail or disconnect.
- The network may become unreachable.
- Network packets may become lost.

**Workaround:** Change the `FlowControl` and `LargeSendOffload(IPv4)` parameters for the e1000 driver to the following settings:

- `FlowControl` from `Disabled` to `Tx & Rx Enabled`.
- `LargeSendOffload(IPv4)` from `Enabled` to `Disabled`.

To change the driver parameters:

1. Open **Device Manager**.
2. Double-click on **Network adapters**.
3. Double-click on **Intel(R) PRO/1000 Network Connection**.
4. Select the **Advanced** tab.
5. Change the settings as described above and click **OK**.

## 6.18 Cannot Use P2V Utility on Computer With Less Than 512MB RAM

The P2V utility fails to start on a computer with less than 512MB of RAM. The kernel panics with an error similar to:

```
VFS: Cannot open root device "<NULL>" or unknown block(0,21)
Please append a correct "root=" boot option
Kernel panic - not syncing: VFS: Unable to mount root fs on unknown-block(0,21)
```

## 6.19 Disk Entries Out of Order in Guest Configuration File After Conversion With P2V Utility

After converting a computer with `sda` as the boot device to a hardware virtualized guest, the guest does not start (Power On). The computer may have a configuration similar to:

- The boot device is `sda`
- The secondary disk is `hda`

The P2V utility creates a guest configuration file entry similar to:

```
disk =
['file:/OVS/running_pool/myGuest/System-hda.img,hda,w',
```

```
'file:/OVS/running_pool/myGuest/System-sda.img,hdb,w',  
]
```

The disk entries in the guest configuration file are not in the correct order.

**Workaround:** Correct the disk order in the guest configuration file (vm.cfg), for example:

```
disk =  
[ 'file:/OVS/running_pool/myGuest/System-hda.img,hdb,w',  
  'file:/OVS/running_pool/myGuest/System-sda.img,hda,w',
```

## 6.20 Guests With Local SCSI Disks Created With P2V Utility Fail File System Check

An Oracle Linux Release 4 guest with a local SCSI disk created with the P2V utility may fail the file system check when the guest is started. This occurs if a non-boot disk is configured as a SCSI disk in the guest configuration file. The error displayed is similar to the following:

```
Checking filesystems  
/boot: clean, 35/130560 files, 31002/522080 blocks  
fsck.ext3: Unable to resolve 'LABEL=/export0'  
*** An error occurred during the file system check.  
*** Dropping you to a shell; the system will reboot  
*** when you leave the shell.  
*** Warning -- SELinux is active  
*** Disabling security enforcement for system recovery.  
*** Run 'setenforce 1' to reenforce.  
Give root password for maintenance
```

**Workaround:** Comment out the SCSI disk entry in the /etc/fstab file.

Alternatively, create a new initrd image with the /sbin/mkinitrd script using the sym53c8xx module. The sym53c8xx module is for the LSI Logic/Symbios Logic 53c895a SCSI controller, which is the SCSI controller used for guests. To create a new initrd image on Oracle Linux Release 4, Update 7:

```
# grep ' /boot ' /proc/mounts > /dev/null 2>&1 || mount /boot  
# mv /boot/initrd-`uname -r`.img /boot/initrd-`uname -r`.img.orig  
# mkinitrd --with sd_mod --with=sym53c8xx /boot/initrd-`uname -r`.img `uname -r`
```

## 6.21 Guest Clock Drift

The system time of guest operating systems may drift at rate faster than the Network Time Protocol daemon (ntpd) can correct.

**Workaround:** For paravirtualized guests, set the value of /proc/sys/xen/independent\_wallclock to 1. The default value is 0. For hardware virtualized guests, periodically run ntpdate to reset the system clock.

## 6.22 SELinux Support

SELinux is not included with this release and is not supported.

## 6.23 Duplicate IP Addresses in Guests

Creating guests using a virtual machine template which contains a MAC address may cause guests to have the same IP address, and therefore create a network conflict.

**Workaround:** Use unique MAC addresses for each guest. Alternatively create guests in Oracle VM Manager.

## 6.24 Duplicate IP Addresses in Dom0

Restarting the network service in dom0 incorrectly sets the same IP address for both the xend bridge (xenbr0), and for the ethernet port (eth0). To reproduce this issue:

1. Display the IP addresses for dom0:

```
# ifconfig
```

The output displays something similar to the following, which shows the IP address is assigned to xenbr0 and not eth0:

```
eth0      Link encap:Ethernet  HWaddr XX:XX:XX:XX:XX:XX
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          ...

xenbr0    Link encap:Ethernet  HWaddr XX:XX:XX:XX:XX:XX
          inet addr:192.168.2.20  Bcast:0.0.0.0  Mask:255.255.255.0
          ...
```

2. Restart the network services:

```
# service network restart
```

3. Display the network configuration:

```
# ifconfig
```

The output displays something similar to the following, which shows the IP address is assigned both to xenbr0 **and** to eth0:

```
eth0      Link encap:Ethernet  HWaddr XX:XX:XX:XX:XX:XX
          inet addr:192.168.2.20  Bcast:192.168.2.255  Mask:255.255.255.0
          ...

xenbr0    Link encap:Ethernet  HWaddr XX:XX:XX:XX:XX:XX
          inet addr:192.168.2.20  Bcast:0.0.0.0  Mask:255.255.255.0
          ...
```

**Workaround:** Do not use the `service network restart` command (or the equivalent `/etc/init.d/network restart`) to apply changes to the IP address stored in the `/etc/sysconfig/network-scripts/ifcfg-eth0` file. Instead, use the `ifconfig` command to manually change the IP configuration of the bridge. On the next system restart the new setting are automatically applied.

## 6.25 CDROM in Paravirtualized Guest Configuration File Causes Guest Panic

A paravirtualized guest which includes a CDROM drive in the configuration file causes guest panic.

**Workaround:** Remove the CDROM definition from the guest configuration file.

## 6.26 Empty Virtual Network Interface Entry in Guest Configuration File Creates Two Interfaces With Identical MAC Addresses

An empty or missing Virtual Network Interface (*vif*) `type` parameter in a guest configuration file causes two interfaces to be created, both with identical MAC addresses. For example, the following entry causes this issue:

```
vif = [ 'mac=mac_address, bridge=bridge' ]
```

The *vif* entries that are created are similar to:

```
vif = [ 'type=ioemu, mac=mac_address, bridge=bridge' ]  
vif = [ 'type=netfront, mac=mac_address, bridge=bridge' ]
```

This creates two *vif* interfaces with the same MAC address, but using different drivers (netfront and ioemu).

This occurs in hardware virtualized guests on the following operating systems:

- Oracle Linux/Red Hat Enterprise Linux Release 5 Updates 2 to 4
- Oracle Linux/Red Hat Enterprise Linux Release 4 Updates 7 to 8

This also occurs on guests with the paravirtualized drivers installed on Oracle Linux/Red Hat Enterprise Linux Release 4 Update 6 and below guest operating systems.

**Workaround:** Use only one (and not none) *vif* type entries in the guest configuration file, by specifying either:

```
vif = [ 'type=ioemu, mac=mac_address, bridge=bridge' ]
```

or

```
vif = [ 'type=netfront, mac=mac_address, bridge=bridge' ]
```

## 6.27 Memory Size Limit For Paravirtualized Guests

The memory size for a 32-bit PAE paravirtualized guest is limited to 63GB, even if the computer has more physical memory. It is the maximum that the Xen hypervisor can present to the guest, but the guest must also support that figure. For 64-bit paravirtualized guests, the limit for memory size is 500GB

## 6.28 Network Latency With Hardware Virtualized Guests

Network latency with hardware virtualized guests with the database on an iSCSI storage volume may cause the guest to become unresponsive under heavy I/O loads.

**Workaround:** If `ip6tables` have been enabled, disable them. `ip6tables` are disabled by default during installation. For example

1. Edit the `/etc/modprobe.conf` file to include the following lines:

```
alias net-pf-10 off  
alias ip6tables off
```

2. Edit the `/etc/sysconfig/network` file to set:

```
NETWORKING_IPV6=no
```

3. Stop the `ip6tables` firewall:

```
# /sbin/service ip6tables stop
```

4. Run the following command:

```
# /sbin/chkconfig ip6tables off
```

5. Restart the network:

```
# /sbin/service network restart
```

6. Reboot the computer.

## 6.29 Network Latency Negative Number With Windows Guests With More Than One VCPU

Network latency may result in a negative number with Windows guests when `vcpu` is set to a number larger than 1. For example, a ping to a remote IP address from a Windows guest may result in:

```
Reply from 192.168.2.1: bytes=32 time=-7639ms TTL=64
```

**Workaround:** Add the `/usepmtimer` parameter to the `C:\boot.ini` file of the Windows guest operating system, and reboot the guest.

See also Microsoft's Support article number 895980 at <http://support.microsoft.com/kb/895980>.

## 6.30 Cannot Start Up a Guest if MAXMEM is Not Equal to MEMORY

Hardware virtualized guests and hardware virtualized guests with paravirtualized drivers installed (HVM/PVHVM) do not start up on some Intel-based computers. The guest almost immediately *locks up*, or crashes, during loading of the kernel. This occurs on Intel-based computers which support Extended Page Tables (EPT), unless the Hardware Assisted Paging (HAP) is disabled (`hap=0`) in the guest configuration file (`vm.cfg`).

This issue occurs when the `maxmem` setting does not equal the `memory` setting in the guest configuration file.

For HVM/PVHVM guests, HAP is enabled (`hap=1`) by default in the guest configuration file, so setting `maxmem` for an HVM/PVHVM guest causes a crash early in the boot process.

**Workaround:** Set the `maxmem` setting to equal the `memory` setting in the guest configuration file (`vm.cfg`). Alternatively, remove the `maxmem` setting.

## 6.31 Cannot Unload qla2xxx Driver on an HP ProLiant G6 Server with QLogic 8Gb HBA

Cannot unload a `qla2xxx` driver on an HP ProLiant G6 Server with a QLogic 8Gb Host Bus Adapter (HBA). Both the `modprobe -r qla2xxx` and `rmmmod` commands hang. Warning messages can be displayed using the `dmesg` command. The `qla2xxx` driver is not removed and all disks become inaccessible.

If the driver is later loaded using the `modprobe` command, an error similar to the following is displayed:

```
PCI: Enabling device 0000:0a:00.0 (0140 -> 0143)
ACPI: PCI Interrupt 0000:0a:00.0[A] -> GSI 31 (level, low) -> IRQ 23
```

```

qla2xxx 0000:0a:00.0: Found an ISP2532, irq 23, iobase 0xe503e000
qla2xxx 0000:0a:00.0: Configuring PCI space...
PCI: Setting latency timer of device 0000:0a:00.0 to 64
qla2xxx 0000:0a:00.0: Configure NVRAM parameters...
qla2xxx 0000:0a:00.0: Verifying loaded RISC code...
qla2xxx 0000:0a:00.0: Allocated (64 KB) for EFT...
qla2xxx 0000:0a:00.0: Allocated (1414 KB) for firmware dump...
qla2xxx 0000:0a:00.0: Failed to reserve interrupt 23 already in use.
ACPI: PCI interrupt for device 0000:0a:00.0 disabled
qla2xxx: probe of 0000:0a:00.0 failed with error -38

```

### Workaround:

1. Determine which initrd image is used to boot the computer from the default= parameter in the /etc/grub.conf file. The value begins with 0 (zero). For example, default=3 refers to the fourth entry, denoted with title .... The module /initrd-2.6.18... or initrd /initrd-2.6.18... listed in this entry is the correct file name.

2. Rename the file, which is located in the /boot directory, with the command:

```
# mv /boot/initrd-version.el5xen.img /boot/initrd-version.el5xen.orig.img
```

3. Add the following to the /etc/modprobe.conf file:

```
options qla2xxx ql2xenablesix=1
```

4. Rebuild the initrd with the command:

```
# mkinitrd -v /boot/initrd-version.el5xen.img version.el5xen
```

For example:

```
# mkinitrd -v /boot/initrd-2.6.18-128.2.1.4.3.el5xen.img
2.6.18-128.2.1.4.3.el5xen
```

## 6.32 Mid-layer Underflow Detected with qlaxxx Driver

A mid-layer underflow detected error may be encountered with the qlaxxx driver. The dmesg command displays messages similar to:

```
qla2xxx 0000:0c:00.0: scsi(0:0:0:1): Mid-layer underflow detected (4000 of 4000
bytes)...returning error status.
```

## 6.33 ISCSI Connection Errors

ISCSI connection errors may be encountered when starting up an Oracle VM Server. The dmesg command displays messages similar to:

```
# dmesg |grep connection
connection8:0: ping timeout of 5 secs expired, last rx 4294914790, last ping
4294916040, now 4294917290
connection8:0: detected conn error (1011)
```

These errors can be ignored.

## 6.34 Cannot Boot PV or PVHVM Guest With Second SCSI Disk

Cannot boot a paravirtualized (PV) guest, or a hardware virtualized guest with paravirtual drivers installed (PVHVM) after adding a second SCSI disk. This occurs whether you add a secondary SCSI disk using Oracle VM Manager, or manually in the guest configuration file. The guest crashes when it is started up.

The guest operating systems affected are Oracle Linux and Red Hat Releases 4.x and 5.x on both 32- and 64-bit.

**Workaround:** There are a number of workarounds to this issue.

- For Oracle Enterprise Linux Release 4 (PVHVM) guests, disable the auto-loading of the ISCSI device driver in the guest. To disable auto-loading of the ISCSI device driver, add the following line to the `/etc/modprobe.conf` file:

```
alias drivervname off
```

For example

```
alias sym53c8xx off
```

- For Oracle Enterprise Linux Release 5 (PVHVM) guests, remove the driver module from the guest. To remove the driver module in the guest, move it to another location with a command similar to:

```
# mv /lib/modules/`uname -r`/kernel/drivers/scsi/sym53c8xx_2/sym53c8xx.ko  
/root/sym53c8xx.ko
```

- For PVM guests, remove the driver module from the `initrd` file. To remove the SCSI driver module from the `initrd` file:

```
# zcat /boot/initrd-version.ELxenU.img | cpio -it | grep ko|grep -i scsi  
4509 blocks  
lib/scsi_mod.ko
```

Remake the `initrd` image without the SCSI module (`scsi_mod.ko`) for the `version.ELxenU` kernel:

```
# mkinitrd --omit-scsi-modules --with=xenblk --with=xennet  
/boot/initrd-version.ELxenU.img.scsifix version.ELxenU  
# zcat /boot/initrd-version.ELxenU.img.scsifix | cpio -it | grep ko|grep -i  
scsi
```

Use the new `initrd` image for the guest. When you restart the guest, the second SCSI disk is loaded.

## 6.35 Paravirtualized Guest for Oracle Enterprise Linux Release 4 Update 4

Oracle Linux 4 Update 4 does not support a direct installation as a paravirtualized guest.

**Workaround:** Install as a hardware virtualized guest and convert it to a paravirtualized guest. See the *Oracle VM Server User's Guide*.

## 6.36 Live Migration Fails Over SSL After Upgrade from 2.1.1

Live Migration fails over SSL after upgrading from Oracle VM Server Release 2.1.1. The following error is displayed during live migration:

```
Error: can't connect: (113, 'No route to host')
```

Oracle VM Server Release 2.1.2 adds support for live migration over SSL. Live migration over SSL requires port 8003 to be open in the Oracle VM Server firewall. If you have upgraded from a previous Oracle VM Server release, the firewall settings are not changed and port 8003 may not be open to enable live migration over SSL.

**Workaround:** Open port 8003 in the Oracle VM Server firewall with the system-config-securitylevel utility. To start the system-config-securitylevel utility, enter

```
# system-config-securitylevel
```

If you have manually configured the Oracle VM Server firewall, the system-config-securitylevel utility may override those settings.

### 6.37 Live Migration of a Hardware Virtualized Guest with Unmatched NX Bit Settings Fails

Live migration of a hardware virtualized guest from a computer that has NX bit (No eXecute) enabled to one that does not, fails. *NX bit* may also be known as *XD bit* (eXecute Disable) in Intel CPUs.

To perform live migration of a hardware virtualized guest that has NX bit enabled requires both computers to support NX bit and have the feature enabled in the BIOS.

**Workaround:** If the CPU on both computers supports NX bit, make sure the feature is enabled in the BIOS of both computers. If the CPU on the target computer does not support NX bit, disable the feature in the BIOS of both computers.

### 6.38 OCFS2 Cluster Cannot be Mounted

An OCFS2 cluster cannot be mounted and displays the error:

```
Mounting repository @location from location...
mount.ocfs2: Transport endpoint is not connected while mounting location on
/OVS. Check 'dmesg' for more information on this error.
Failed to mount location at /OVS
```

Oracle VM Server Release 2.1.2 adds support for high availability using OCFS2 clusters. An OCFS2 cluster requires port 7777 to be open in the Oracle VM Server firewall. If port 7777 is not open in the firewall, mounting the cluster fails.

**Workaround:** Open port 7777 in the Oracle VM Server firewall with the system-config-securitylevel utility. To start the system-config-securitylevel utility, enter

```
# system-config-securitylevel
```

If you have manually configured the Oracle VM Server firewall, the system-config-securitylevel utility may override those settings.

### 6.39 A Virtual Machine Server Started Before The Server Pool Master Does Not Join The Domain in an OCFS2 Cluster

In an HA-enabled server pool, if a Virtual Machine Server in an OCFS2 cluster is started *before* the Server Pool Master, the Virtual Machine Server does not automatically join the domain.

**Workaround:** There are a number of ways to resolve this issue. When both the Server Pool Master and Virtual Machine Server are started perform one of the following:

- Log in to Oracle VM Manager and select the **Server Pools** tab. Select the server pool and click **Edit**. Click the **Check** button in the **High Availability Infrastructure** field. Check the **Enable High Availability** check box. Click **Apply** or **OK**.
- On the Server Pool Master run the script:
 

```
# /opt/ovs-agent-2.2/utils/do_rpc.py ha_setup_cluster_infrastructure
```
- On the Virtual Machine Server restart the Oracle VM Agent:
 

```
# service ovs-agent restart
```

## 6.40 SAN-based Multipath Shared Disks

For a SAN-based multipathed install, the Oracle VM Server installer may choose a multipath device path for the kernel root partition. For example:

```
title Oracle VM Server-ovs (xen-version.el5ovs)
  root (hd0,0)
  kernel /xen-32bit.gz dom0_mem=574M
  module /vmlinuz-version.el5xen ro root=/dev/mapper/mpath0p3
  module /initrd-version.el5xen.img
```

This is a valid configuration. Note however that if multipath shared disks are assigned to guest virtual machines in Oracle VM Manager Release 2.2, it is highly recommended that each boot entry in the `/etc/grub.conf` file be altered to specify the exact disk UUID instead of the partition. In the event that disk partitions are reordered, there is a potential security impact if a guest virtual machine's multipath disk inadvertently assumes the device path of the system disk. To obtain the UUID for the example above, enter:

```
# blkid -s UUID /dev/mapper/mpath0p3
```

## 6.41 Multiple Swap Partitions

When installing Oracle VM Server on a computer that was previously installed with an earlier version of Oracle VM Server or Oracle Linux, it is possible for previous entries for the swap partitions to be inserted into the `/etc/fstab` file, even if the partitions were not configured during the installation. This results in the swap partitions from the previous installation being mounted when Oracle VM Server reboots. For example, if a system has an installation of Oracle Linux, and Oracle VM Server is installed on the same system in a dual boot configuration with the Oracle Linux installation, the Oracle VM Server installation detects and mounts the swap partition from the Oracle Linux installation.

**Workaround:** Remove the entry for the extra swap partition(s) from the Oracle VM Server `/etc/fstab` file.

## 6.42 Swap Partition(s) Mounted Multiple Times

If Oracle VM Server is installed on a computer with multiple paths to the disk(s) on which a swap partition is created, and the `mpath` command line option is not used, the `/etc/fstab` file contains multiple entries for the same swap partition. There is one entry for each path to the actual disk. This results in the same swap partition being mounted multiple times.

**Workaround:** Delete the duplicate entries from the `/etc/fstab` file.

Alternatively, use the `linux mpath` option at the boot command line when installing Oracle VM Server:

1. Insert the Oracle VM Server CDROM into your CDROM drive.
2. Boot the computer with the Oracle VM Server CDROM.
3. The **Oracle VM Server** installation welcome screen is displayed. At the command prompt, enter `linux mpath` and press **Enter** to begin the installation. This parameter performs an installation using multipath disks.
4. Follow the prompts to install Oracle VM Server. See the *Oracle VM Server Installation Guide*.

## 6.43 Installing kdump

If you need to install kdump (the Linux crash dumping utility) it is available on the Oracle VM Server CD. To install kdump, insert the Oracle VM Server CD in the CD drive, and enter the following commands:

```
# mkdir /mnt/cd
# mount /dev/cdrom/ /mnt/cd
# cd /mnt/cd/Server
# rpm -i busybox-1.2.0-3.i386.rpm
# rpm -i kernel-kdump-2.6.18-8.1.15.0.16.el5.i686.rpm
# rpm -i kexec-tools-1.101-194.4.el5.0.3.i386.rpm
```

To enable kdump on each reboot, add the parameter `crashkernel=128M@16M` to the `kernel` line in the `/boot/grub/grub.conf` file, for example:

```
kernel /xen.gz dom0_mem=512M ro crashkernel=128M@16M
```

## 6.44 Cannot Install kdump on Oracle Linux or Red Hat Enterprise Linux 5.x Guests

You cannot install the kdump crash dumping utility on Oracle Linux and Red Hat Enterprise Linux 5.x guests.

## 6.45 Cannot Create Red Hat Enterprise Linux 3.x 64-bit Guests

Cannot create a Red Hat Enterprise Linux 3.x 64-bit hardware virtualized guest.

Cannot boot a Red Hat Enterprise Linux 3.x 64-bit hardware virtualized guests created in Oracle VM Server Release 2.1 in Oracle VM Server Releases 2.1.1, 2.1.2, 2.1.5 or 2.2.0.

This issue occurs in Oracle VM Server Releases 2.1.1, 2.1.2, 2.1.5 and 2.2.0. It does not occur in Oracle VM Server Release 2.1.

**Workaround:** Include the `acpi=0` parameter in the guest's configuration file, or the `acpi=off` parameter at the command-line if using the `virt-install` command.

With this workaround implemented, the guest operating system shuts down normally when initiated from Oracle VM Manager, but there may be a longer than normal delay before the virtual machine status changes from *Running* to *Powered Off*.

## 6.46 Cannot Create Red Hat Enterprise Linux 4.1 Guests

On some Intel machines, cannot create a Red Hat Enterprise Linux 4.1 hardware virtualized guest. The systems affected are:

- Intel® Xeon® Processor 7000 series
- Intel® Xeon® Processor 5100 series

Intel® Xeon® Processor 5300 series computers are not affected.

**Workaround:** On Intel® Xeon® Processor 7000 series computers, include the `acpi=1` and `apic=1` parameters in the configuration file, or at the command-line if using `virt-install`.

Alternatively:

- Make sure `timer_mode=` is not set in the guest configuration file.
- Make sure `hpet=` is not set in the guest configuration file.
- Add the `nohpet` parameter to the guest `grub.conf` file.

## 6.47 Warning Displayed in `dmesg` on Dom0 When Using `dm-nfs` Block Devices

When using `dm-nfs` block devices for a guest, a warning may be displayed in `dmesg` on dom0:

```
device-mapper: nfs: not using n bytes in incomplete block at EOF
```

This error may occur after upgrading Oracle VM Server from Release 2.1.1 to 2.1.2 or to 2.1.5 and starting a guest that is on NFS storage. This error may also occur if the size of a guest template is not a multiple of 512 bytes.

Starting with Oracle VM Server Release 2.1.2, NFS storage can be used to emulate a guest's block devices. The block device emulator expects the size of the backing file on NFS storage to be a multiple of 512 bytes. This warning indicates that the backing file size is not an exact multiple of 512 bytes. The block device emulator rounds the file size down to the nearest multiple of 512 bytes, and ignores the remaining few bytes in the backing file. The emulated block device appears one sector smaller than expected.

If the size of the backing file has not changed since the guest was created, there should be no effect on the guest and the message can be ignored. If the backing file was inadvertently scribbled on, or truncated, there may be missing or corrupted data.

## 6.48 Oracle ASM Errors

The `oracleasm createdisk` command fails for Oracle Linux Release 4 and Red Hat Enterprise Linux Release 4 paravirtual guests, for example, if a partition exists for `/dev/xvdb1`, the following command should succeed, but does not

```
# /etc/init.d/oracleasm createdisk VOL1 /dev/xvdb1
Marking disk "/dev/xvdb1" as an ASM disk: asmtool: Device "/dev/xvdb1" is not
a partition
[FAILED]
```

**Workaround:** Run the `asmtool` command with the `-a force=yes` parameter to ignore the partition check, for example

```
# asmtool -C -l /dev/oracleasm -n VOL1 -s /dev/xvdb1 -a force=yes
/etc/init.d/oracleasm scandisks
```

The `oracleasm scandisks` command fixes permissions once the disk is created.

## 6.49 Logical Volume Manager Setup During Installation

You cannot set up Logical Volume Manager (LVM) during the Oracle VM Server installation.

**Workaround:** Use pre-configured LVM volumes. Alternatively, you can temporarily exit the Oracle VM Server installer and create an LVM configuration from scratch. During the Oracle VM Server installation, press **Alt+F2** to use the terminal, and run the `lvm` command. When you have finished creating the LVM configuration, press **Alt+F1** to return to the Oracle VM Server installation.

## 6.50 `xm dump-core` Fails

The `xm dump-core` command fails on 64-bit guests.

The `xm dump-core` command does generate a full core dump in this release of Oracle VM Server.

## 6.51 Guest Restore Errors

While restoring a guest, the following errors (in the `dmesg`) may be displayed. These errors are harmless and can be ignored.

Call Trace:

```
<IRQ> [] softlockup_tick+0xdb/0xed
[
```

## 6.52 Creating Hardware Virtualized Guests

If a virtualized guest works as a paravirtualized guest, it does not automatically mean that it works with, or as, a hardware virtualized guest. This section lists some important considerations when creating hardware virtualized guests.

### 6.52.1 Using DHCP

If you set up `dom0` to use DHCP to obtain its IP address, you may have unexpected results as the network setup may become undefined for each `domU` if the DHCP lease expires.

### 6.52.2 Disk Partition Emulation

Do not use disk partition emulation in the configuration file when creating a hardware virtualized guest.

A paravirtualized guest can be configured to emulate a disk partition with the `disk` parameter in the configuration file, for example

```
disk=[ 'phy: /dev/hdb1, hdb, w' ]
```

Can be configured to emulate `hdb` to be `hdb1` by changing the configuration parameter to

```
disk=[ 'phy: /dev/hdb1, hdb1, w' ]
```

The hypervisor emulates a partition table to create a *fake* `/dev/hdb` and the disk appears as `/dev/hdb1`.

In a hardware virtualized guest, this is not possible. You must specify whole disks in the configuration file, not partitions. Oracle recommends always using whole disks for the second parameter.

This does not effect the first parameter, which can be any whole disk, partition or file visible to dom0.

### 6.52.3 Copying File Systems

Do not use the `rsync` command to copy a file system from one computer to another.

**Workaround:** Use the `dd` utility to copy the entire operating system locally, or over the network, for example

```
# dd if=/dev/vgxen/lvol0 | ssh <target host for copied domU> dd
of=/dev/vgxen/lvol0
```

### 6.52.4 Sharing the CDROM

Do not share or use the *real* dom0 CDROM device.

### 6.52.5 Fedora 7 GA Kernel

Do not use the Fedora 7 GA (Release 2.6.21-1.3194.fc7) kernel when using the `virt-install` command-line tool. The Fedora 7 GA kernel is not supported in this release.

## 7 Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at

<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

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Oracle VM Server Release Notes, Release 2.2.2  
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