Oracle® VM

Administrator's Guide for Release 3.3

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Oracle Legal Notices

Abstract

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Preface

The Oracle VM Administrator's Guide explains how to manage Oracle VM and perform administrative tasks, such as configuring the system configuration, using Oracle VM Guest Additions, backing up and restoring components, troubleshooting common issues.

Audience

This document is intended for Oracle VM administrators with privileged access to the physical and virtual resources of the Oracle VM environment. This guide assumes that you have an in depth knowledge of Oracle VM (see the *Oracle VM Manager User's Guide*), and that you are familiar with Oracle Linux system administration and Linux command line operation.

This Guide contains information previously contained in other parts of the Oracle VM documentation set, especially the now deprecated *Oracle VM Utilities Guide*.

Related Documents

For more information, see the following documents in the Oracle VM documentation set:

- *Oracle VM Release Notes*
- *Oracle VM Installation and Upgrade Guide*
- *Oracle VM Concepts Guide*
- *Oracle VM Manager Getting Started Guide*
- *Oracle VM Manager User's Guide*
- *Oracle VM Manager Command Line Interface User's Guide*
- *Oracle VM Administrator's Guide*
- *Oracle VM Paravirtual Drivers for Microsoft Windows Guide*
- *Oracle VM Web Services API Developer's Guide*
- *Oracle VM Security Guide*
- *Oracle VM Licensing Information User Manual*

You can also get the latest information on Oracle VM by going to the Oracle VM Web site:

http://www.oracle.com/us/technologies/virtualization/oraclevm

Command Syntax

Oracle Linux command syntax appears in `monospace` font. The dollar character ($), number sign (#), or percent character (%) are Oracle Linux command prompts. Do not enter them as part of the command. The following command syntax conventions are used in this guide:

Convention	Description
backslash \	A backslash is the Oracle Linux command continuation character. It is used in command examples that are too long to fit on a single line. Enter the command as displayed (with a backslash) or enter it on a single line without a backslash:

Convention	Description
	`dd if=/dev/rdsk/c0t1d0s6 of=/dev/rst0 bs=10b \` `count=10000`
braces { }	Braces indicate required items: `.DEFINE {macro1}`
brackets [ ]	Brackets indicate optional items: `cvtcrt termname [outfile]`
ellipses ...	Ellipses indicate an arbitrary number of similar items: `CHKVAL fieldname value1 value2 ... valueN`
italics	Italic type indicates a variable. Substitute a value for the variable: `library_name`
vertical line |	A vertical line indicates a choice within braces or brackets: `FILE filesize [K|M]`
forward slash /	A forward slash is used to escape special characters within single or double quotes in the Oracle VM Manager Command Line Interface, for example: `create Tag name=MyTag description="HR/'s VMs"`

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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Chapter 1 Oracle VM Configuration

This chapter gives you information on the configuration options outside the standard Oracle VM product installation. These configuration options are performed using tools other than the *Oracle VM Server* or *Oracle VM Manager* installers, or the Oracle VM Manager UI.

1.1 Oracle VM Server Configuration

This section gives you detail on the configuration options for *Oracle VM Server*.

1.1.1 Installing Oracle VM Storage Connect plug-ins

Vendor-specific (non-generic) Oracle VM Storage Connect plug-ins are available directly from your storage vendor. Generic Oracle VM Storage Connect plug-ins are already installed by default during the installation of Oracle VM Server and no further action is required if you select to only use the generic plug-ins. Vendor-specific Oracle VM Storage Connect plug-ins usually facilitate additional management functionality that you can take advantage of from within Oracle VM Manager.

A complete list of vendor-specific Oracle VM Storage Connect plug-ins is available at:

https://www.oracle.com/virtualization/storage-connect-partner-program.html

Oracle VM Storage Connect plug-ins are delivered as an RPM, usually a single RPM, but your storage vendor may provide multiple RPMs. When you have the Oracle VM Storage Connect plug-in RPM from your storage vendor, install the RPM on your Oracle VM Servers. You must install the RPM on all the Oracle VM Servers that will use the particular storage.

To install the Oracle VM Storage Connect plug-in RPM, on the command line of the Oracle VM Server, enter

```
# rpm -ivh filename.rpm
```

If you are upgrading an existing Oracle VM Storage Connect plug-in, use the RPM upgrade parameter:

```
# rpm -Uvh filename.rpm
```

If you are installing or upgrading an Oracle VM Storage Connect plug-in on an Oracle VM Server already managed by Oracle VM Manager, rediscover the Oracle VM Server to update the database repository with the latest configuration information about the Oracle VM Server.

Read the install and configuration documentation for the Oracle VM Storage Connect plug-in from your storage vendor before you install and use it. There may be extra configuration required that is not documented here.

1.1.2 Creating ZFS Volumes on SPARC

Local ZFS volumes are supported as local physical disks on Oracle VM Server for SPARC. While Oracle VM Manager does not provide tools to create or manage ZFS volumes, it does detect ZFS volumes as local physical disks that can either be used for virtual disks by the virtual machines hosted on the Oracle VM Server where the volume resides, or for use as a local repository to store virtual machine resources. In this section, we describe the steps required to manually create ZFS volumes on a SPARC-based Oracle VM Server and how to detect these within Oracle VM Manager.

In the control domain for the Oracle VM Server where you wish to create the ZFS volumes that you intend to use, use the `zfs create` command to create a new ZFS volume:

```
# zfs create -p -V XG pool/OVS/volume
```

The size of the volume, represented by *X*G can be any size that you require as long as your hardware supports it. The *pool*, that the volume belongs to can be any ZFS pool. Equally, the *volume* name can be of your choosing. The only requirement is that the volume resides under *OVS* within the pool, so that Oracle VM Manager is capable of detecting it. The following example shows the creation of two ZFS volumes of 20 GB in size:

```
# zfs create -V 20G rpool/OVS/DATASET0
# zfs create -V 20G rpool/OVS/DATASET1
```

Once you have created the ZFS volumes that you wish to use, you must rediscover your server within Oracle VM Manager. See Discover Servers in the *Oracle VM Manager User's Guide* for more information on how to do this. Once the server has been rediscovered, the ZFS volumes appear as physical disks attached to the server in the Physical Disks perspective within the Oracle VM Manager Web Interface. See Physical Disks Perspective in the *Oracle VM Manager User's Guide* for more information on this perspective.

As long as a ZFS volume is unused and Oracle VM Manager is able to detect it as a local physical disk attached to the server, you are able to create a repository on the ZFS volume by selecting to use this disk when you create the repository. See Create New Repository in the *Oracle VM Manager User's Guide* for more information on creating repositories.

Using this feature, you can use a single SPARC server to create virtual machines without any requirement to use an NFS repository or any additional physical disks.

1.1.3 Configuring a Secondary Service Domain on SPARC

The default configuration of the Oracle VM Agent uses a single service domain, the primary domain, which provides virtual disk and virtual network services to guest virtual machines. To increase the availability of guest virtual machines, you can configure a secondary service domain to provide virtual disk and virtual network services through both the primary and the secondary service domains. With such a configuration, guest virtual machines can use virtual disk and virtual network multipathing and continue to be fully functional even if one of the service domains is unavailable.

The primary domain is always the first service domain and this is the domain that is discovered by Oracle VM Manager. The second service domain, the secondary domain, is a root domain, that is a domain configured with a PCIe root complex, and it should be configured similarly to the primary domain. The secondary domain must use the same operating system version, same number of CPUs and same memory allocation. Unlike the primary domain, the secondary service domain is not visible to Oracle VM Manager. The secondary domain mimics the configuration of the primary service domain and is transparently managed by the Oracle VM Agent. In the case where the primary service domain becomes unavailable, the secondary service domain ensures that guest virtual machines continue to have access to virtualized resources such as disks and networks. When the primary service domain becomes available again, it resumes the role of managing these resources.

The following tasks should be performed in order to configure the Oracle VM Agent to use a secondary service domain:

- Install the Oracle VM Agent as described in Installing Oracle VM Server on SPARC Hardware in the *Oracle VM Installation and Upgrade Guide*.
- Create the secondary service domain.
- Install the secondary service domain.
- Configure the Oracle VM Agent to use the secondary service domain.

1.1.3.1 Requirements

To configure the Oracle VM Agent with a secondary service domain, your SPARC server must meet the minimum requirements listed in this section, in addition to the standard installation requirements described in Preinstallation Tasks and Requirements in the *Oracle VM Installation and Upgrade Guide*.

Hardware

You need a SPARC Server that has at least two PCIe buses, so that it can be configured with two LDoms root domains. One root domain is configured as the primary domain, and the second root domain is configured as the secondary domain. For more information about LDoms root domains, refer to I/O Domain Overview in the *Oracle VM Server for SPARC Administration Guide* available at:

http://docs.oracle.com/cd/E38405_01/html/E38406/index.html

Both domains must be configured with at least one PCIe bus. The PCIe buses that you assign to each domain must be unique. You cannot assign the same PCIe bus to two different domains.

By default, after a fresh installation, all PCIe buses are assigned to the primary domain. When adding a new service domain, some of these PCIe buses must be released from the primary domain and then assigned to the secondary domain.

For example, a SPARC T5-2 server with two SPARC T5 processors has 4 PCIe buses. This server can be configured with a primary domain and a secondary domain. You can assign two PCIe buses to the primary domain, and two PCIe buses to the secondary domain.

Network

The network ports used by the primary domain must all be connected to the PCIe buses that are assigned to the primary domain.

Similarly the network ports used by the secondary domain must all be connected to the PCIe buses that are assigned to the secondary domain.

In addition, the primary and secondary domains must have the same number of network ports. Each network port in the primary domain must have a corresponding network port in the secondary domain, and they must be connected to the same physical network.

For example, a SPARC T5-2 server with two SPARC T5 processors has 4 PCIe buses (pci_0, pci_1, pci_2, and pci_3). The server also has 4 onboard network ports. Two network ports are connected to pci_0, and the other two are connected to pci_3. You can assign 2 PCIe buses (pci_0 and pci_1) to the primary domain, and 2 PCIe buses (pci_2 and pci_3) to the secondary domain. That way, both domains have two ports configured. You must ensure that each port is connected to the same physical network as one of the ports in the corresponding domain.

Storage

Physical disks or LUNs used by the primary domain must all be accessible through one or several host bus adapters (HBAs) connected to the PCIe buses that are assigned to the primary domain. The primary domain needs at least one disk for booting and hosting the operating system. The primary domain usually has access to all, or a subset of, local SAS disks present on the server through an onboard SAS HBA connected to one of the PCIe buses of the server.

Similarly, physical disks or LUNs used by the secondary domain must all be accessible through one or several HBAs connected to the PCIe buses assigned to the secondary domain. The secondary domain

needs at least one disk for booting and hosting the operating system. Depending on the server used, the secondary domain might not have access to any local SAS disks present on the server, or it might have access to a subset of the local SAS disks. If the secondary domain does not have access to any of the local SAS disks then it must have an HBA card on one of its PCIe buses and access a LUN from an external storage array that it can use for booting.

Warning

If the boot disk of the secondary domain is on a storage array shared between multiple servers or multiple domains, make sure that this disk is only accessible by the secondary domain. Otherwise the disk might be used by mistake by another server or domain, and you can corrupt the boot disk of the secondary domain. Depending on the storage array and the storage area network, this can usually be achieved using zoning or LUN masking.

In addition, if a Fibre Channel (FC) storage area network (SAN) is used, then the primary and the secondary domains must have access to the same FC disks. So one or more FC HBAs must be connected to the FC SAN and to the PCIe buses that are assigned to the primary domain. And, one or more FC HBAs must be connected to the FC SAN and to the PCIe buses that are assigned to the secondary domain.

Note

The primary and the secondary domain do not need to have access to same SAS or iSCSI disks. Only the SAS or iSCSI disks accessible from the primary domain are visible to Oracle VM Manager. Oracle VM Manager does not have visibility of any SAS or iSCSI disks accessible only from the secondary domain. If a virtual machine is configured with SAS or iSCSI disks, then the corresponding virtual disks in the virtual machine have a single access path, through the primary domain. If a virtual machine is configured with FC disks, then the corresponding virtual disks in the virtual machine have two access paths: one through the primary domain; and one through the secondary domain.

For example, a SPARC T5-2 server with two SPARC T5 processors has 4 PCIe buses (pci_0, pci_1, pci_2, pci_3). The server also has 2 onboard SAS HBAs to access the 6 internal SAS disks. One SAS HBA is connected to PCIe bus pci_0 and accesses 4 internal disks. The other SAS HBA is connected to PCIe bus pci_4 and accesses the 2 other internal SAS disks. You can assign 2 PCIe buses (pci_0 and pci_1) to the primary domain, and 2 PCIe buses (pci_2 and pci_3) to the secondary domain. That way, both domains have access to internal SAS disks that can be used for booting. The primary domain has access to four SAS disks, and the secondary domain has access to two SAS disks.

If you want to connect the server to an FC SAN, then you can add an FC HBA to the primary domain (for example on PCIe bus pci_1) and an FC HBA to the secondary domain (for example, on PCIe bus pci_2). Then you should connect both FC HBAs to the same SAN.

1.1.3.2 Limitations

While using secondary service domains help to ensure better availability of guest virtual machines, there are some limitations to using them within an Oracle VM context. The following list outlines each of these limitations that you should be aware of if you decide to configure a secondary service domain:

- **Clustering:** Clustering cannot be used with a secondary service domain. If a server is configured with a secondary service domain then that server cannot be part of a clustered server pool.
- **Network Configuration:** Network bonds/aggregation and VLANs are not automatically configured on the secondary domain. If you configure bonds/aggregation or VLANs on the primary domain using Oracle VM Manager, then corresponding bonds/aggregation or VLANs won't be automatically configured

on the secondary domain. If you want to use any such bond/aggregation or VLANs with virtual machines then the corresponding bonds/aggregation or VLANs must be manually configured on the secondary domain.

- **Storage:** NFS, SAS, iSCSI and ZFS volumes accessible only from the secondary domain cannot be used or managed using Oracle VM Manager.

Important

Secondary service domains cannot access NFS repositories. For this reason, virtual machine I/O to virtual disks is served by the control domain only. If the control domain stops or reboots, virtual machine I/O to virtual disks is suspended until the control domain resumes operation. Use physical disks (LUNs) for virtual machines that require continuous availability during a control domain reboot.

- **Virtual Machine Disk Multipathing:** When assigning a disk to a virtual machine, only fibre channel (FC) disks are configured with disk multipathing through the primary and the secondary domains. NFS, SAS, iSCSI or ZFS disks assigned to a virtual machine are configured with a single path through the primary domain.

- **Virtual Machine Network Port:** When assigning a network port to a virtual machine, two network ports are effectively configured on the virtual machine: one connected to the primary domain, and one connected to the secondary domain. The network port connected to the primary domain is configured with a MAC address that can be defined from within Oracle VM Manager. The MAC address must be selected in the range [00:21:f6:00:00:00, 00:21:f6:0f:ff:ff]. The network port connected to the secondary domain is configured with a MAC address derived from the MAC address of the network port connected to the primary domain. This MAC address starts with 00:21:f6:8.

  For example, if the MAC address defined in Oracle VM Manager is 00:21:f6:00:12:34 then this MAC address is used on the network port connected to the primary domain. The derived MAC address is then 00:21:f6:80:12:34 and should be used on the network port connected to the secondary domain. Oracle VM Manager uses a default dynamic MAC address range of [00:21:f6:00:00:00, 00:21:f6:ff:ff:ff]. When using a secondary service domain, this range must be reduced to [00:21:f6:00:00:00, 00:21:f6:0f:ff:ff]. See Virtual NICs in the *Oracle VM Manager User's Guide* for more information on changing the default range of MAC addresses within the Oracle VM Manager Web Interface.

- **Live Migration:** A virtual machine cannot be live migrated to a server configured with a different number of service domains. That is you cannot migrate a virtual machine running on a server with a secondary service domain to a server without a secondary service domain; and you cannot migrate a virtual machine running on a server without a secondary service domain to a server with a secondary service domain.

1.1.3.3 Creating a Secondary Service Domain

There are particular requirements that must be met for the secondary service domain to be usable within an Oracle VM context. These requirements are set out below:

- No domain (other than the primary domain) must exist before you start to set up a secondary domain. You can see all existing domains in the output of the `ldm ls` command.

- No virtual switch must exist before you start to set up a secondary domain. You can see all virtual switches in the VSW section in the output of the `ldm ls-services` command.

- The name of the secondary service domain must be "*secondary*."

- The secondary service domain should be a root domain.

- The secondary service domain should be configured with 1 cpu core.
- The secondary service domain should be configured with 8 GB of memory.
- The secondary service domain should have virtual disk service (vds) with the name "*secondary-vds0*" .
- The secondary service domain should be totally independent of any other domain (in particular of the primary domain), so it should have no virtual disk and no virtual network interface, and only use physical disk and physical network interface.

For more information about creating a root domain, refer to Creating a Root Domain by Assigning PCIe Buses in the *Oracle VM Server for SPARC Administration Guide* available at:

http://docs.oracle.com/cd/E38405_01/html/E38406/configurepciexpressbusesacrossmultipleldoms.html

To make sure that these requirements are met and to simplify the process of setting up and configuring the secondary service domain, you can use the `ovs-agent-secondary` command to assist you, see Section 1.1.3.6, “Using the `ovs-agent-secondary` Command To Setup A Secondary Domain”.

The following instructions describe how to create a secondary service domain manually.

Manually Creating a Secondary Service Domain

1. Create the service domain and set the core CPU and memory requirements using the following commands:

```
# ldm create secondary
# ldm set-core 1 secondary
# ldm set-memory 8g secondary
```

2. Assign the PCI buses that you wish the secondary service domain to use. For each bus, issue the following command, substituting *`pci_2`* with the correct bus identifier:

```
ldm add-io pci_2 secondary
```

3. Add the secondary virtual disk service to the secondary domain, using the following command:

```
ldm add-vds secondary-vds0 secondary
```

4. Remove any PCI buses that you added to the secondary service domain from the primary domain. To begin reconfiguring the primary domain, you must enter the following command:

```
# ldm start-reconf primary
```

   Now, for each bus that you added to the secondary domain, enter the following command to remove it from the primary domain, substituting *`pci_2`* with the correct bus identifier:

```
# ldm rm-io pci_2 primary
```

5. When you have finished reconfiguring the primary domain, you must reboot it:

```
# reboot
```

1.1.3.4 Installing the Secondary Service Domain

After the secondary service domain has been created and the primary domain has finished rebooting, start the secondary service domain using the following commands in the control domain:

```
# ldm bind secondary
# ldm start secondary
```

Once the secondary service domain has been started, you can access its console by obtaining the console port using the following command:

```
# ldm ls secondary
NAME             STATE      FLAGS   CONS    VCPU  MEMORY   UTIL  NORM  UPTIME
secondary        active     -t--v-  5000    8     8G       0.0%  0.0%  0s
```

Note that the console port is listed in the CONS column. You can open a telnet connection to this port as follows:

```
# telnet 0 5000
Trying 0.0.0.0...
Connected to 0.
Escape character is '^]'.

Connecting to console "secondary" in group "secondary" ....
Press ~? for control options ..

{0} ok
```

Now you must install the Oracle Solaris 11 operating system into the secondary domain. This can be achieved by following the instructions provided in Installing Oracle Solaris 11.1 Systems in the *Oracle Solaris 11.1* documentation available at:

http://docs.oracle.com/cd/E26502_01/html/E28980/index.html

Do ***not*** attempt to install either the Oracle VM Agent or the LDoms Manager into the secondary service domain. Only the Oracle Solaris 11 operating system is required.

Make sure that the secondary service domain is properly configured so that it can boot automatically. In particular, the OpenBoot PROM (OBP) variables of the domain must be correctly set. For instance, the `auto-boot?` parameter should be set to **true**, and `boot-device` parameter should contain the device path of the boot disk that is configured for the secondary domain.

1.1.3.5 Manually Configuring the Oracle VM Agent to Support the Secondary Domain

You can use the `ovs-agent-secondary` command to assist you with the process of setting the Oracle VM Agent to support the secondary domain, see Section 1.1.3.6, “Using the `ovs-agent-secondary` Command To Setup A Secondary Domain”. The instructions that follow describe how to configure the Oracle VM Agent manually.

1. Create a configuration file in `/etc/ovs-agent/shadow.conf` on the primary domain. This configuration file is in JSON format and at absolute minimum should contain the following content to enable support for the secondary domain:

   ```
   {
       "enabled": true
   }
   ```

   a. Each network link in the primary domain should have a corresponding network link in the secondary domain connected to the same physical network. By default, a network link in the primary domain is associated with the network link with the same name in the secondary domain. If a network link in the primary domain should be associated with a network link in the secondary domain with a different name, then you need to define a network link mapping. To define a network mapping, you need to add a '*nic-mapping*' entry in `/etc/ovs-agent/shadow.conf`. Typically, entries of this sort look similar to the following:

      ```
      {
          enabled": true,
      ```

```
    nic-mapping": [
      ["^net4$", "net2" ],
      ["^net5$", "net3" ]
    ]
}
```

In the above example, *net4* is a network interface in the primary domain and is connected to the same physical network as the network interface named *net2* in the secondary domain. Equally, *net5* is a network interface in the primary domain and is connected to the same physical network as the network interface named *net3* in the secondary domain. Note that network interface names in the primary domain are encapsulated with the regular expression characters caret (^) and dollar ($) to ensure an exact match for the network interface name in the primary domain. Ensure that the JSON file is properly formatted as defined at http://json.org/.

b. Each Fibre Channel (FC) disk accessible from the primary domain domain should also be accessible from the secondary domain. By default, a FC disk is accessed using the same device path in the primary domain and in the secondary domain. In particular, each disk is accessed using the same disk controller name. If a disk controller in the primary domain should be associated with a disk controller in the secondary domain with a different name, then you need to define a disk controller mapping.

   It is recommended that Solaris I/O multipathing is enabled in the primary and in the secondary domain on all multipath-capable controller ports, in particular on all FC ports. In that case, all FC disks appear under a single disk controller (usually c0), and disk controller mapping is usually not needed in that case.

   To define a disk controller mapping, add a '*disk-mapping*' entry in the `/etc/ovs-agent/shadow.conf` file. For example:

```
{
    "enabled": true,
    "disk-mapping": [
        [ "c0t", "c1t" ]
    ]
}
```

   In the above example, *c0t* is a disk controller in the primary domain that is connected to the same FC disk as the disk controller named *c1t* in the secondary domain. Ensure that the JSON file is properly formatted as defined at http://json.org/.

c. An example of an `/etc/ovs-agent/shadow.conf` file that requires both network interface and disk controller mapping follows:

```
{
    "enabled": true,
    "nic-mapping": [
        [ "^net4$", "net2" ],
        [ "^net5$", "net3" ]
    ],
    "disk-mapping": [
        [ "c0t", "c1t" ]
    ]
}
```

2. Save the LDoms configuration with the secondary service domain to the service processor.

Warning

Before saving the configuration, ensure that the secondary service domain is active. If the configuration is saved while the secondary service domain is

not active, then the secondary service domain won't start automatically after a power-cycle of the server

```
# ldm add-spconfig ovm-shadow
```

3. To complete the configuration, reconfigure the Oracle VM Agent by running the following command:

```
# ovs-agent-setup configure
```

The configuration values that are used for this process map onto the values that you entered for the configuration steps when you first configured Oracle VM Agent for your primary control domain, as described in Configuring Oracle VM Agent for SPARC in the *Oracle VM Installation and Upgrade Guide*.

When the Oracle VM Agent configuration has completed, the secondary domain is running and Oracle VM Agent is able to use it in the case that the primary domain becomes unavailable.

1.1.3.6 Using the `ovs-agent-secondary` Command To Setup A Secondary Domain

The `ovs-agent-secondary` command can be used to automatically create and setup a secondary domain. In particular, the command indicates whether the server is suitable for creating a secondary service domain, and which PCIe buses are available for the secondary service domain.

To create a secondary service domain, run the following command on the control domain:

```
# ovs-agent-secondary create secondary
```

Important

The `ovs-agent-secondary` command is a helper script that is provided *as is*. This command might not work with some servers or configurations. If the command does not work, create the secondary service domain manually, as described in Section 1.1.3.3, “Creating a Secondary Service Domain”.

Disabling the Oracle VM Agent

If the Oracle VM Agent is enabled then a menu is displayed for disabling the Oracle VM Agent. The Oracle VM Agent must be disabled when creating a secondary service domain. Example output from the `ovs-agent-secondary` command, for this scenario, is displayed below:

```
This command can not be run while the ovs-agent is online.
Do you want to disable the ovs-agent service?

   1) Yes, disable the ovs-agent service
   2) No, exit the ovs-agent-secondary tool

Choice (1-2): 1
```

Listing PCIe Buses Present on the Server

The list of all PCIe buses present on the server is displayed, with information indicating whether or not they are available for creating a secondary service domain. Example output from the `ovs-agent-secondary` command, for this step, is displayed below:

```
Gathering information about the server...

The server has 4 PCIe buses.

------------------------------------------------------------------------
```

```
This is the list of PCIe buses present on the server, and whether
or not they are available for creating a secondary service domain

  Bus         Available   Reason
  ---         ---------   ------
  pci_0              no   Bus is assigned and used by the primary domain
  pci_1             yes   Bus is assigned to the primary domain but it is not used
  pci_2             yes   Bus is assigned to the primary domain but it is not used
  pci_3             yes   Bus is assigned to the primary domain but it is not used


Enter + or - to show or hide details about PCIe buses.

  +) Show devices in use

Or select one of the following options.

  0) Exit and do not create a secondary service domain
  1) Continue and select PCIe buses to create a secondary service domain

Choice (0-1): 1
```

Use this information to figure out which PCIe buses are available, and which buses you want to use for the secondary service domain. You can display more or less information about the PCIe buses by entering "+" or "-".

A PCIe bus is not available for creating a secondary service in the following cases:

- **The PCIe bus is assigned to a domain other than the primary domain.**

  If you want to use such a PCIe bus for the secondary service domain then you must first remove it from the domain it is currently assigned to.

- **The PCIe bus is assigned to the primary domain and devices on that bus are used by the primary domain.**

  If you want to use such a PCIe bus for the secondary service domain then you must reconfigure the primary domain so that it stops using devices from that bus.

Warning

When a PCIe bus is assigned to the primary domain, the tool may not always be able to figure out if devices from the bus are used by the primary domain. Furthermore, the tool only identifies common devices (such as network interfaces and disks) and the common usage of these devices (including link aggregation, IP configuration or ZFS pool). If you want to create a secondary domain with a PCIe bus that is currently assigned to the primary domain, make sure that this bus is effectively not used by the primary domain at all.

Selecting PCIe Buses for the Secondary Service Domain

The next step provided by the `ovs-agent-secondary` command allows you to actually select the PCIe buses that are to be used for the secondary service domain. Typically, this step may appear as follows:

```
The following PCIe buses can be selected for creating a secondary
service domain.

  Bus        Selected   Devices Count
  ---        --------   -------------
  pci_1            no   ETH(2) FC(2) IB(2)
  pci_2            no   ETH(2) FC(2) IB(2)
  pci_3            no   DSK(2) ETH(2)
```

```
Enter + or - to show or hide details about PCIe buses.

  +) Show PCIe slots

Or enter the name of one or more buses that you want to add to the
selection of PCIe buses to create a secondary service domain.

Or select one of the following options.

  0) Exit and do not create a secondary service domain
  1) Add all PCIe buses to the selection
  2) Remove all PCIe buses from the selection

Choice (0-2): pci_2 pci_3
```

Note that in addition to the menu options, which allow you to add all available PCIe buses to the secondary service domain, you can also manually specify a space separated list of PCIe buses by bus name to individually add particular buses to the secondary service domain.

As soon as at least one PCIe bus is marked as selected, the menu options change to allow you to create the secondary service domain with the selected PCIe buses:

```
The following PCIe buses can be selected for creating a secondary
service domain.

  Bus        Selected   Devices Count
  ---        --------   -------------
  pci_1            no   ETH(2) FC(2) IB(2)
  pci_2           yes   ETH(2) FC(2) IB(2)
  pci_3           yes   DSK(2) ETH(2)


Enter + or - to show or hide details about PCIe buses.

  +) Show PCIe slots

Or enter the name of one or more buses that you want to add to the
selection of PCIe buses to create a secondary service domain.

Or select one of the following options.

  0) Exit and do not create a secondary service domain
  1) Add all PCIe buses to the selection
  2) Remove all PCIe buses from the selection
  3) Create a secondary services domain with the selected buses

Choice (0-3): 3
```

Confirming the Selection of PCIe Buses for the Secondary Service Domain

A final confirmation screen displays the buses selected for the secondary service domain, before you can proceed to create the secondary service domain. This confirmation screen looks as follows:

```
You have selected the following buses and devices for the secondary
domain.

  Bus        Current Domain       Slot                Devices Count
  ---        --------------       ----                -------------
  pci_2      primary
                                  /SYS/MB/PCIE2       IB(2)
                                  /SYS/MB/PCIE3       FC(2)
                                  /SYS/MB/PCIE4       ETH(2)
  pci_3      primary
```

```
                                /SYS/MB/PCIE8
                                /SYS/MB/SASHBA1      DSK(2)
                                /SYS/MB/NET2         ETH(2)

Verify that the selection is correct.

  0) Exit and do not create a secondary service domain
  1) The selection is correct, create a secondary domain with pci_2 pci_3
  2) Go back to selection menu and change the selection

Choice (0-2): 1
```

Creating the Secondary Service Domain

After the selection of PCIe buses for the secondary service domain has been confirmed, the secondary domain is created and instructions for configuring the secondary service domain are displayed. The output from the tool looks similar to the following:

```
ldm create secondary
ldm set-core 1 secondary
ldm set-memory 8G secondary
ldm add-io pci_2 secondary
ldm add-io pci_3 secondary
ldm start-reconf primary
ldm rm-io pci_2 primary
ldm rm-io pci_3 primary

------------------------------------------------------------------------

The secondary service domain has been created. Next, you need to
install Solaris on that domain. Then you can configure the Oracle
VM Agent to run with the secondary domain.

Once the secondary service domain is up and running with Solaris,
run the following command to configure the Oracle VM Agent to run
with the secondary domain:

  # ovs-agent-secondary configure
```

If a reboot is required to complete the creation of the secondary service domain then a corresponding menu is displayed, otherwise the tool terminates and the creation of secondary service domain is already finished. The following menu is displayed if a reboot is required:

```
You need to reboot the system in order to complete the
creation of the secondary domain.

Do you want to reboot the system now?

  1) Yes, reboot the system now
  2) No, I will reboot the system later

Choice (1-2): 1
```

Install the Service Domain

When you have finished creating the new service domain, you need to install it. Simply follow the instructions already provided in Section 1.1.3.4, “Installing the Secondary Service Domain”.

Configure the Oracle VM Agent for the Secondary Domain

Once the secondary service domain is correctly installed, you must configure the Oracle VM Agent to use it by running the `ovs-agent-secondary` command on the control domain, as follows:

```
# ovs-agent-secondary configure
```

The `ovs-agent-secondary` command guides you through a number of configuration steps before the configuration changes are made to the Oracle VM Agent.

Checking the Installation of the Secondary Service Domain

The first step in the configuration process requires you to confirm that the secondary domain is installed and running. This step is displayed as follows:

```
The secondary service domain exists and is active. It should be up
and running Solaris 11.1.

Confirm that the secondary service domain is up and running Solaris 11.1

  1) Yes, the secondary service domain is up and running Solaris 11.1.
  2) No, the secondary service domain is not running Solaris 11.1

Choice (1-2): 1
```

Mapping Network Interfaces Between the Primary and the Secondary Domain

Each network link in the primary domain should have a corresponding network link in the secondary domain connected to the same physical network. By default, a network link in the primary domain is associated with the network link with the same name in the secondary domain. If a network link in the primary domain should be associated with a network link in the secondary domain with a different name, then you need to define a network link mapping. This is achieved in the next step of the configuration process, which is displayed as follows:

```
Each network link in the primary domain should have a corresponding
network link in the secondary domain connected to the same physical
network. By default, a network link in the primary domain will be
associated with the network link with the same name in the secondary
domain.

Network links in the primary domain and corresponding link in the
secondary domain:

    Primary    Secondary
    -------    ---------
    net0       net0
    net1       net1
    net4       net4
    net5       net5
    net6       net6
    net7       net7

If a network link in the primary domain should be associated with
a network link in the secondary domain with a different name, then
you need to define a network link mapping.

Do you need to define a network link mapping?

  1) Yes, I need to map a network link in the primary domain to
     a network link in the secondary domain with a different name.
  2) No, each network link in the primary domain has a corresponding
     network link in the secondary domain with the same name.

Choice (1-2): 1
```

Ideally, you should be able to select option 2 here to continue. However, it is possible that network link names may not correspond correctly. In this case, you should select option 1 and redefine the mapping as follows:

```
Enter the mapping for net0 [net0]:
```

```
Enter the mapping for net1 [net1]:
Enter the mapping for net4 [net4]: net2
Enter the mapping for net5 [net5]: net3
Enter the mapping for net6 [net6]:
Enter the mapping for net7 [net7]:

Network links in the primary domain and corresponding link in the
secondary domain:

    Primary    Secondary
    -------    ---------
    net0       net0
    net1       net1
    net4       net2
    net5       net3
    net6       net6
    net7       net7

Is the mapping correct?

  1) Yes, the mapping is correct.
  2) No, the mapping is not correct, redo the mapping.

Choice (1-2): 1
```

Note that you are prompted for the mapping for each network link in the primary domain. If you enter a blank line, the existing default mapping is used. If you need to change a mapping, you must specify the network link name in the secondary domain that is connected to the same physical network as the network link listed in the primary domain.

When you have finished redefining the mappings, you should select option 1 to continue to the next step in the configuration process.

Mapping Fibre Channel Disk Controllers Between the Primary and the Secondary Domain

Each Fibre Channel (FC) disk accessible from the primary domain domain should also be accessible from the secondary domain. By default, a FC disk is accessed using the same device path in the primary domain and in the secondary domain. In particular, each disk is accessed using the same disk controller name. If a disk controller in the primary domain should be associated with a disk controller in the secondary domain with a different name, then you must define a disk controller mapping.

It is recommended that Solaris I/O multipathing is enabled in the primary and in the secondary domain on all multipath-capable controller ports, in particular on all FC ports. In this case, all FC disks appear under a single disk controller (usually c0), and disk controller mapping is usually not needed.

The following screen is displayed for this step in the configuration process:

```
Each Fibre Channel (FC) disk accessible from the primary domain
domain should also be accessible from the secondary domain. By
default, a FC disk will be access using the same device path in
the primary domain and in the secondary domain. In particular,
each disk will be accessed using the same disk controller name.

FC disk controllers in the primary domain and corresponding
controller in the secondary domain:

    Primary    Secondary
    -------    ---------
    c0         c0

If a disk controller in the primary domain should be associated with
a disk controller in the secondary domain with a different name, then
you need to define a disk controller mapping.
```

```
Do you need to define a disk controller mapping?

  1) Yes, I need to map a disk controller in the primary domain to
     a disk controller in the secondary domain with a different name.
  2) No, each disk controller in the primary domain has a corresponding
     disk controller in the secondary domain with the same name.

Choice (1-2): 1
```

Ideally, you should be able to select option 2 here to continue. However, it is possible that disk controller names may not correspond correctly. In this case, you should select option 1 and redefine the mapping as follows:

```
Enter the mapping for c0 [c0]: c1

FC disk controllers in the primary domain and corresponding
controller in the secondary domain:

    Primary    Secondary
    -------    ---------
    c0         c1

Is the mapping correct?

  1) Yes, the mapping is correct.
  2) No, the mapping is not correct, redo the mapping.

Choice (1-2): 1
```

Note that you are prompted for the mapping for each FC disk controller in the primary domain. If you enter a blank line, the existing default mapping is used. If you need to change a mapping, you must specify the FC disk controller name in the secondary domain that is connected to the same FC disk listed in the primary domain.

When you have finished redefining the mappings, you should select option 1 to continue to the next step in the configuration process.

Saving the Oracle VM Agent Configuration for the Secondary Service Domain

The Oracle VM Agent uses a configuration file to be able to access and configure itself for resources in the secondary service domain. In this step of the configuration process, the configuration file is created and saved to disk within the primary control domain:

```
Creating configuration file
Saving configuration ovm-shadow on the service processor

The secondary service domain is configured. Continuing with
the configuration of the Oracle VM Agent.
```

Reconfiguring the Oracle VM Agent

Finally, the Oracle VM Agent is automatically reconfigured to use the secondary service domain and the Oracle VM Agent is enabled:

```
Network Configuration
Network Configuration OK
Storage Configuration
Storage Configuration OK
OVS Agent Configuration
OVS Agent Configuration OK
Cluster Configuration
Cluster Configuration OK
```

```
LDoms Manager Configuration
LDoms Manager Configuration OK
Virtual I/O Services Configuration
Virtual I/O Services Configuration OK
LDoms Configuration
*** ERROR: The vds service is not configured on the secondary domain.
Configuring the vds service
Saving configuration ovm-shadow on the service processor
LDoms Configuration OK

The LDoms configuration has been dynamically updated and stored on
the service processor.

Enabling Oracle VM Agent Services
```

The configuration values that are used for this process map onto the values that you entered for the configuration steps when you first configured Oracle VM Agent for your primary control domain, as described in Configuring Oracle VM Agent for SPARC in the *Oracle VM Installation and Upgrade Guide*.

When the process is complete, the Oracle VM Agent is enabled and your environment is configured to use both a primary and a secondary service domain.

1.1.4 Enabling Multipath I/O Support

In case user action is required to enable *multipathing*, this sections explains how to do so. The required steps depend on the storage hardware implemented. Consequently, the steps below are intended as a guideline and priority should be given to the SAN hardware documentation. Please note that some guidelines have already been provided for the configuration of multipathing on SPARC hardware in Storage Requirements in the *Oracle VM Installation and Upgrade Guide*. Not all steps apply to your environment. Consult the SAN hardware vendor's documentation for a complete list of steps, the order in which to execute them, and their relevance to your specific environment.

General steps to configure multipathing:

1. Design and document the multipathing configuration you intend to apply to the SAN hardware used in your Oracle VM environment.
2. Ensure that the drivers for your Host Bus Adapters (HBAs) are present. If not, install the drivers.
3. Configure the appropriate zoning on the fibre channel switches.
4. Configure LUN masking on the storage arrays.
5. Configure path optimization features (ALUA or similar) on your disk subsystem, if so instructed by your vendor's documentation.
6. Check the fabric information on each Oracle VM Server that has access to the SAN hardware. Use `multipath -ll` and related commands.
7. Make the necessary changes to the file `/etc/multipath.conf` on the Oracle VM Servers.

Note

You must make the exact same changes to the multipath configuration file on all Oracle VM Servers in your environment.

Important

It is critical that the configuration parameter `user_friendly_names` remain set to **no** within the `/etc/multipath.conf` configuration file.

8. Restart the multipath daemon (multipathd).
9. Check the fabric information again to verify the configuration.
10. If so instructed by the vendor's documentation, rebuild initrd.
11. Reboot the Oracle VM Servers to verify that the SAN and multipathing configuration come up properly after a restart.

For detailed information and instructions, consult the SAN hardware vendor's documentation.

Note

Booting from a multipath SAN is supported.

1.1.5 Installing Oracle VM Server Diagnostic Tools

As an optional post-installation step, Oracle recommends that you also install and configure diagnostics tools on all Oracle VM Servers. These tools can be used to help debug and diagnose issues such as system crashes, hanging, unscheduled reboots, and *OCFS2* cluster errors. The output from these tools can be used by Oracle Support and can significantly improve resolution and response times.

Obtaining a system memory dump (vmcore) can be very useful when attempting to diagnose and resolve the root cause of an issue. To be able to get a useful vmcore dump, a proper kdump service configuration is required. See the Oracle Support Document 1520837.1, *How to Configure 'kdump' for Oracle VM 3.2.1*, for information on how to install kdump.

https://support.oracle.com/epmos/faces/DocumentDisplay?id=1520837.1

At the time of writing, the kdump article mentioned is the latest version of this document. There may be a more recent version published after the release of this Guide, so check the My Oracle Support web site for a more recent version that is specifically related to this release.

In addition, you can install netconsole, a utility allowing system console messages to be redirected across the network to another server. See the Oracle Support Document 1351524.1, *How to Configure "netconsole" for Oracle VM Server 3.0*, for information on how to install netconsole.

https://support.oracle.com/epmos/faces/DocumentDisplay?id=1351524.1

The OSWatcher Black Box (OSWbb) utility may also be useful as it collects and archives operating system and network metrics that you can use to diagnose performance issues. OSWbb operates as a set of background processes on the server and gathers data on a regular basis, invoking utilities like vmstat, netstat, iostat, and top. See the Oracle Support Document 580513.1, *How To Start OSWatcher Black Box Every System Boot*, for information on how to install OSWbb.

https://support.oracle.com/epmos/faces/DocumentDisplay?id=580513.1

Additional information on using diagnostic tools is provided in the Oracle Linux documentation. See the chapter titled *Support Diagnostic Tools* in the *Oracle Linux Administrator's Solutions Guide*.

http://docs.oracle.com/cd/E37670_01/E37355/html/ol_diag.html

1.1.6 Changing the Oracle VM Server (Dom0) Memory Size

When you install Oracle VM Server, the installer sets a default memory size for *dom0*. The algorithm used is:

dom0_mem = 502 + int(physical_mem * 0.0205)

Example sizes are set out in table Table 1.1.

Table 1.1 Default Dom0 Memory Size

Physical Memory	Dom0 Memory
2 GB	560 MB
4 GB	600 MB
8 GB	680 MB
16 GB	848 MB
32 GB	1184 MB
64 GB	1856 MB
128 GB	4000 MB
256 GB	5888 MB
512 GB	11264 MB
1024 GB	22008 MB
2048 GB	43504 MB

You may encounter performance issues if the dom0 memory size is not set appropriately for your needs on the Oracle VM Server.

To change the dom0 memory allocation, edit the `/boot/grub/grub.conf` file on the Oracle VM Server and change the *`dom0_mem`* parameter, for example, to change the memory allocation to 1024 MB, edit the file to be:

```
kernel /xen.gz console=com1,vga com1=38400,8n1 dom0_mem=1024M
```

1.1.7 Oracle VM Server SNMP Monitoring Tools

Oracle VM Server includes support for SNMP (Simple Network Management Protocol) monitoring, allowing you to take advantage of SNMP monitoring tools like Nagios. By default, the appropriate SNMP packages are installed on Oracle VM Server. Availability of these packages can be checked in the following way:

```
# rpm -qa | grep snmp
net-snmp-utils-5.3.2.2-17.0.1.el5_8.1
net-snmp-libs-5.3.2.2-17.0.1.el5_8.1
net-snmp-5.3.2.2-17.0.1.el5_8.1
```

The SNMP daemons are disabled by default, and should be enabled if you intend to use SNMP to monitor an Oracle VM Server. You can check your configuration to determine whether the service has been enabled in the following way:

```
# chkconfig --list |grep snmp
snmpd           0:off   1:off   2:off   3:off   4:off   5:off   6:off
snmptrapd       0:off   1:off   2:off   3:off   4:off   5:off   6:off
```

To enable the SNMP service, you can start it manually by issuing the following command:

```
# service snmpd start
```

To enable the SNMP service permanently, you can issue the following command:

```
# chkconfig --level 2345 snmpd on
```

When the service is running, you can use the `snmpwalk` command line utility to view the available MIBs. The following output shows usage of the `snmpwalk` command to view the MIBs that are enabled by default:

Tip

If the last line of the output contains `No more variables left in this MIB View (It is past the end of the MIB tree)`, then you might not have read access rights in `snmpd.conf`. To resolve this issue, you can temporarily add `rocommunity public` to `/etc/snmp/snmpd.conf` and allow read access from all computers on the network.

```
# snmpwalk -v2c -c public localhost
SNMPv2-MIB::sysDescr.0 = STRING: Linux test.us.oracle.com 2.6.39-300.12.0.el5uek #1 SMP
  Thu Oct 4 14:13:28 PDT 2012 x86_64
SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmpAgentOIDs.10
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (64612) 0:10:46.12
SNMPv2-MIB::sysContact.0 = STRING: Root >root@localhost> (configure /etc/snmp/snmp.local.conf)
SNMPv2-MIB::sysName.0 = STRING: test.us.oracle.com
SNMPv2-MIB::sysLocation.0 = STRING: Unknown (edit /etc/snmp/snmpd.conf)
SNMPv2-MIB::sysORLastChange.0 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORID.1 = OID: SNMPv2-MIB::snmpMIB
SNMPv2-MIB::sysORID.2 = OID: TCP-MIB::tcpMIB
SNMPv2-MIB::sysORID.3 = OID: IP-MIB::ip
SNMPv2-MIB::sysORID.4 = OID: UDP-MIB::udpMIB
SNMPv2-MIB::sysORID.5 = OID: SNMP-VIEW-BASED-ACM-MIB::vacmBasicGroup
SNMPv2-MIB::sysORID.6 = OID: SNMP-FRAMEWORK-MIB::snmpFrameworkMIBCompliance
SNMPv2-MIB::sysORID.7 = OID: SNMP-MPD-MIB::snmpMPDCompliance
SNMPv2-MIB::sysORID.8 = OID: SNMP-USER-BASED-SM-MIB::usmMIBCompliance
SNMPv2-MIB::sysORDescr.1 = STRING: The MIB module for SNMPv2 entities
SNMPv2-MIB::sysORDescr.2 = STRING: The MIB module for managing TCP implementations
SNMPv2-MIB::sysORDescr.3 = STRING: The MIB module for managing IP and ICMP implementations
SNMPv2-MIB::sysORDescr.4 = STRING: The MIB module for managing UDP implementations
SNMPv2-MIB::sysORDescr.5 = STRING: View-based Access Control Model for SNMP.
SNMPv2-MIB::sysORDescr.6 = STRING: The SNMP Management Architecture MIB.
SNMPv2-MIB::sysORDescr.7 = STRING: The MIB for Message Processing and Dispatching.
SNMPv2-MIB::sysORDescr.8 = STRING: The management information definitions for the SNMP
  User-based Security Model.
SNMPv2-MIB::sysORUpTime.1 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.2 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.3 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.4 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.5 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.6 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.7 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.8 = Timeticks: (1) 0:00:00.01
....
```

To edit the configuration of the SNMP daemon on your Oracle VM Server you can either edit the configuration file at `/etc/snmp/snmpd.conf` directly, or you can use the `snmpconf` command line utility to assist you with any further configuration that you may require.

1.2 Oracle VM Manager Configuration

This section gives you details on the configuration and management options for *Oracle VM Manager*.

1.2.1 Oracle VM Manager Utilities

This section discusses command line tools that are available with Oracle VM Manager. These tools are installed with Oracle VM Manager and provide facilities to quickly perform certain configuration and diagnostic tasks directly from the command line.

1.2.1.1 Oracle VM Manager Administrator Tool (ovm_admin)

The Oracle VM Manager Administrator Tool, which can be invoked on the command line using the `ovm_admin` command, is used to perform typical administrative actions specific to Oracle VM Manager. These actions allow you to manage users that have access to Oracle VM Manager's data store, and control log rotation for the `AdminServer.log` file. To perform any action using the Oracle VM Manager Administrator Tool, you must use the password that is configured for the *weblogic* user.

The Oracle VM Manager Administrator Tool is installed as part of the default Oracle VM Manager installation process. The full path to the Oracle VM Manager Administrator Tool is:

```
/u01/app/oracle/ovm-manager-3/bin/ovm_admin
```

Syntax

```
ovm_admin [--help ] [--createuser ] [--deleteuser ] [--listusers ] [--modifyuser
] [--modifyds ] [--lockusers tries] [--unlockuser admin] [--listconfig ] [--
rotatelogsdaily HH:MM] [--rotatelogsbysize KB]
```

Options

The following table shows the available options for this command.

Option	Description
`--help`	Display the `ovm_admin` command parameters and options.
`--createuser`	Create new Oracle VM Manager admin user.
`--deleteuser`	Delete an Oracle VM Manager admin user.
`--listusers`	List the Oracle VM Manager users.
`--modifyuser`	Modify an Oracle VM Manager user password.
`--modifyds`	Modify an Oracle VM Manager database schema. Typically used if the password for the MySQL database has been changed directly within MySQL.
`--lockusers` *tries*	Set the maximum login tries before locking accounts. This setting is global.
`--unlockuser` *admin*	Unlock a user account.
`--listconfig`	List configuration information about Oracle VM Manager.
`--rotatelogsdaily` *HH:MM*	Rotate the Oracle VM Manager application logs daily (HH:MM).
`--rotatelogsbysize` *KB*	Rotate the Oracle VM Manager application logs by size (KB).

Examples

Example 1.1 Managing users with the Oracle VM Manager Administrator Tool

The Oracle VM Manager Administrator Tool provides you with the ability to perform various user management functions directly from the command line. By default, the Oracle VM Manager installation process only creates and configures a single Oracle VM Manager administrative user. While this is often sufficient for many customers, creating separate administrative user accounts may be useful for security and auditing purposes.

Example 1.2 Creating a new Oracle VM Manager user

A new user can be created for the Oracle VM Manager application using the Oracle VM Manager Administrator Tool by running the following command:

```
# ./ovm_admin --createuser
```

The tool returns the following output:

```
Oracle VM Manager Release version Admin tool

Please enter the username : [ovmuser]

Please enter the password for [ovmuser] (minimum 8 chars. with one numeric/special char.) :
Please re-enter the password :
```

Note

Your password must conform to the password requirements suggested by the Oracle VM Manager Administrator Tool, or the creation of your user fails in the final step.

```
Please enter the password for weblogic :
```

At this point you must enter the password for the Oracle WebLogic Server. If you have not changed the Oracle VM Manager admin user's password, this password is usually the same as your default Oracle VM Manager admin user's password.

```
Initializing WebLogic Scripting Tool (WLST) ...

Welcome to Oracle WebLogic Server Administration Scripting Shell

Type help() for help on available commands

Connecting to Oracle WebLogic Server ...

Connected ...
Creating user '[ovmuser]' ...
Created user '[ovmuser]' successfully ...
Exiting...
```

Example 1.3 Deleting an Oracle VM Manager user

Removing an Oracle VM Manager administrative user can be achieved using the Oracle VM Manager Administrator Tool by running the following command:

```
# ./ovm_admin --deleteuser ovmuser
```

You are prompted for the Oracle WebLogic Server password. This is the password for the Oracle WebLogic Server as it was set up during installation. If you have not changed the Oracle VM Manager admin user's password, this password is usually the same as your default Oracle VM Manager admin user's password. Typical output is presented below:

```
Oracle VM Manager Release version Admin tool

Please enter the password for weblogic :

Initializing WebLogic Scripting Tool (WLST) ...

Welcome to Oracle WebLogic Server Administration Scripting Shell
```

```
Type help() for help on available commands

Connecting to Oracle WebLogic Server ...

Connected ...
Deleting user 'ovmuser' ...
Deleted user 'ovmuser' successfully ...
Exiting...
```

Important

There are some users stored within Oracle WebLogic Server that are critical to the healthy functioning of your Oracle VM Manager environment. Do not attempt to delete either of these accounts:

- *OracleSystemUser*
- *weblogic*

It is also generally advisable to keep the default *admin* user account, so that there is always at least one administrative account that is able to access the Oracle VM Manager application. Attempting to delete the *Oracle WebLogic Server* user account using the Oracle VM Manager Administrator Tool fails with the message:

```
Cannot delete the admin user account 'weblogic' ...
```

Example 1.4 Changing an Oracle VM Manager user's password

It is possible to change any Oracle VM Manager administrative user's password using the Oracle VM Manager Administrator Tool by running the following command:

```
# ./ovm_admin --modifyuser
```

The tool returns the following output:

```
Oracle VM Manager Release version Admin tool

Please enter the username : [ovmuser]

Please enter the current password :
```

Note

You must be able to provide the user's current password in order to modify the user account.

If you need to reset an account due to a lost password, you should delete the user account and create a new account.

```
Please enter a new password for [ovmuser] (minimum 8 chars. with one numeric/special char.) :
Please re-enter the password :
```

Note

Your password must conform to the password requirements suggested by the Oracle VM Manager Administrator Tool, or the creation of your user fails in the final step.

```
Please enter the password for weblogic :
```

At this point you must enter the password for the Oracle WebLogic Server. If you have not changed the Oracle VM Manager admin user's password, this password is usually the same as your default Oracle VM Manager admin user's password.

```
Initializing WebLogic Scripting Tool (WLST) ...

Welcome to Oracle WebLogic Server Administration Scripting Shell

Type help() for help on available commands

Connecting to Oracle WebLogic Server ...

Connected ...
Modifying user '[ovmuser]' ...
Modified user '[ovmuser]' successfully ...
Exiting...
```

Example 1.5 Modifying the Oracle VM Manager database schema

You can use the Oracle VM Manager Administrator Tool to handle database schema changes within MySQL. The most typical use case for this is where the password for the Oracle VM Manager database has been changed directly within MySQL, without using any of the tools provided with Oracle VM. An alternative use case would be where the Oracle VM Manager database has been renamed within MySQL. The `--modifyds` option is used to update Oracle VM Manager for changes made directly to the MySQL database:

```
# ./ovm_admin --modifyds
```

The tool prompts you for the Oracle VM Manager database schema, password and the Oracle WebLogic Server password, and returns output similar to the following:

```
Oracle VM Manager Release version Admin tool

Please enter the Oracle VM Manager database schema (ovs or appfw): ovs

Please enter the schema password for ovs (minimum 8 chars. with one numeric/special char.) :
Please re-enter the password :

Please enter the password for weblogic :

Initializing WebLogic Scripting Tool (WLST) ...
......
Modified Data Source successfully ...
Disconnected from Oracle WebLogic Server: AdminServer
Exiting...
```

Note that there is a second database schema, usually named *appfw*, that is also used by Oracle VM Manager. If the password for this database has also been changed, then the same command must be run again, as follows:

```
Oracle VM Manager Release version Admin tool

Please enter the Oracle VM Manager database schema (ovs or appfw): appfw

Please enter the schema password for appfw (minimum 8 chars. with one numeric/special char.) :
Please re-enter the password :

Please enter the password for weblogic :

Initializing WebLogic Scripting Tool (WLST) ...
......
Modified Data Source successfully ...
Disconnected from Oracle WebLogic Server: AdminServer
```

```
Exiting...
```

When you have finished running this command, you must restart Oracle VM Manager:

```
# service ovmm restart
# service ovmcli restart
```

Example 1.6 Listing Oracle VM Manager users

You can use the Oracle VM Manager Administrator Tool to obtain a list of users that have access to the Oracle VM Manager application by running the following command:

```
# ./ovm_admin --listusers
```

The tool prompts you for the Oracle WebLogic Server password and returns output similar to the following:

```
Oracle VM Manager Release version Admin tool

Please enter the password for weblogic :

Initializing WebLogic Scripting Tool (WLST) ...

Welcome to Oracle WebLogic Server Administration Scripting Shell

Type help() for help on available commands

Connecting to Oracle WebLogic Server ...

Connected ...
Listing Oracle VM users ...
User : OracleSystemUser
User : weblogic
User : admin
User : [ovmuser]
Listed users successfully ...
Exiting...
```

Some of the users stored within Oracle WebLogic Server and listed are critical to the healthy functioning of your Oracle VM Manager environment. These include:

- *OracleSystemUser:* Used by Oracle Web Services Manager (OWSM). OWSM is part of the standard Oracle Fusion Middleware (FMW) Infrastructure, that includes ADF.
- *weblogic:* The default Oracle WebLogic Server administrative user.

The default *admin* user account is also typically listed. Any other user accounts listed, such as the [ovmuser] account, have been added to the system after installation.

Example 1.7 Locking Oracle VM Manager user accounts

In order to protect unauthorized access to Oracle VM Manager it is possible to configure an account locking facility that is triggered after a number of failed attempts to log in. This is achieved using the Oracle VM Manager Administrator Tool in the following way:

```
# ./ovm_admin --lockusers [3]
```

Note

Account locking is enabled by default according to the base Oracle WebLogic Server configuration. The default settings allow for 5 invalid login attempts before

the account is locked. The lock period is set to 30 minutes. The only way to change the lock period is to edit the underlying Oracle WebLogic Server configuration directly. For more information on configuring the Oracle WebLogic Server lockout parameters, please refer to the Oracle WebLogic Server documentation on this at:

http://docs.oracle.com/cd/E13222_01/wls/docs81/ConsoleHelp/security_realm_userlockout.html

Important

This is a global parameter that applies to all users. Setting this parameter on an instance of Oracle VM Manager that makes use of a single administrator account can result in this account being locked for 30 minutes before anybody is able to use it again. To recover from this is it is possible to unlock the account. See Example 1.8, “Unlocking Oracle VM Manager user accounts”.

You are prompted to enter the Oracle WebLogic Server password in order to apply this setting. Typical output from the command follows:

```
Oracle VM Manager Release version Admin tool

Please enter the password for weblogic :

Initializing WebLogic Scripting Tool (WLST) ...

Welcome to Oracle WebLogic Server Administration Scripting Shell

Type help() for help on available commands

Connecting to Oracle WebLogic Server ...

Connected ...
Setting Invalid Login attempts to '[3]' ...
Exiting...
Restart of Oracle VM Manager is required for Data Store change to take effect ...
```

Restart Oracle VM Manager in order for the setting to take effect.

An account is locked for 30 minutes before it is automatically unlocked again.

Example 1.8 Unlocking Oracle VM Manager user accounts

When account locking is enabled (see Example 1.7, “Locking Oracle VM Manager user accounts”), it is possible for Oracle VM Manager user accounts to become locked for up to 30 minutes if a user fails to authenticate after the number of attempts that has been configured for this facility. When a user's account has become locked and the user enters the correct username and password combination, an error appears when the user attempts to authenticate:

```
Unexpected error during login (javax.security.auth.login.LoginException),
please consult logs for details.
```

An investigation of the `AdminServer.log` reveals:

```
000000000183> >1358953290200< >BEA-090078< >User ovmuser in security realm myrealm
has had 3 invalid login attempts, locking account for 30 minutes.<
```

It is possible to override the 30 minute lock on an account by using the Oracle VM Manager Administrator Tool in the following way:

```
# ./ovm_admin --unlockuser [ovmuser]
```

You are prompted for the Oracle WebLogic Server account password in order to complete the operation.

Example 1.9 Rotating Oracle VM Manager logs

The Oracle VM Manager Administrator Tool allows you to control how and when log files are rotated. There are two options available:

- `--rotatelogsdaily:` Set the logs to be rotated on a daily basis at an allocated time.
- `--rotatelogsbysize:` Set the logs to be rotated when they reach a specified size.

In both cases, you are prompted for the Oracle WebLogic Server password in order to update the configuration.

Example 1.10 Rotating Oracle VM Manager logs daily

To set the logs to rotate daily at an allocated time, run the Oracle VM Manager Administrator Tool in the following way:

```
# ./ovm_admin --rotatelogsdaily [00:30]
```

The time provided is specified in the format `HH:MM`.

Typical output from the command follows:

```
Oracle VM Manager Release version Admin tool

Please enter the password for weblogic :

Initializing WebLogic Scripting Tool (WLST) ...

Welcome to Oracle WebLogic Server Administration Scripting Shell

Type help() for help on available commands

Connecting to Oracle WebLogic Server ...

Connected ...
Configure log rotation setting to rotate daily at [00:30] ...
Modified log rotation setting successfully ...
Exiting...
```

Example 1.11 Rotating Oracle VM Manager logs by size

To set the logs to rotate when they reach a specified size, run the Oracle VM Manager Administrator Tool in the following way:

```
# ./ovm_admin --rotatelogsbysize [1024]
```

The size provided is specified according to the number of kilobytes before rotation.

Typical output from the command follows:

```
Oracle VM Manager Release version Admin tool

Please enter the password for weblogic :

Initializing WebLogic Scripting Tool (WLST) ...
```

```
Welcome to Oracle WebLogic Server Administration Scripting Shell

Type help() for help on available commands

Connecting to Oracle WebLogic Server ...

Connected ...
Configure log rotation setting to rotate the logs based on size ([1024] KB) ...
Modified log rotation setting successfully ...
Exiting...
```

1.2.1.2 Oracle VM Diagnostic Capture (VMPInfo3)

For diagnostic purposes, Oracle Support Services use a script called `VMPInfo3` that automatically collects vital troubleshooting information from your Oracle VM environment. This script is installed when you install Oracle VM Manager and is located at:

`/u01/app/oracle/ovm-manager-3/ovm_tools/support/vmpinfo3.sh`

The script is usually run with a minimum of two parameters, as follows:

```
./vmpinfo3.sh --username=admin
```

The script creates a tarball in the `/tmp` directory. When the script has finished running, it notifies you of the filename for the tarball that it has created and instructs you to send the file to Oracle Support. An example of the output follows:

```
================================================================================
 Please send /tmp/vmpinfo3-3.x.y.z-20130123-163252.tar.gz to Oracle OVM support
================================================================================
```

The script can be run to list all servers that it is able to report on with the `listservers` argument:

```
./vmpinfo3.sh --username=admin listservers
```

It is also possible to limit the amount of data that the script collects to a specified set of servers. This can be done using the `servers` argument and providing a comma-separated list of the servers that you would like to collect data for:

```
./vmpinfo3.sh --username=admin servers=myserver1.example.com,myserver2.example.com
```

For detailed information about the script, its purpose and usage, please consult the support note with Doc ID 1521931.1. You can also find this document by logging on to My Oracle Support and searching the knowledge base for *"vmpinfo3"*.

1.2.2 Changing the Oracle VM Manager admin User Password

The Oracle VM Manager *admin* user is used to log in to the Oracle VM Manager user interface. To change the password for the Oracle VM Manager *admin* user account, log in to the Oracle VM Manager *host computer* as the *root* user and perform the following:

```
# cd /u01/app/oracle/ovm-manager-3/bin
#./ovm_admin --modifyuser
```

Follow the prompts to change the *admin* user password. A full example of using this command to change a user password is shown in Example 1.4, “Changing an Oracle VM Manager user's password”.

1.2.3 Setting up SSL on Oracle VM Manager

By default, Oracle VM Manager provides its own SSL certificates stored within a custom keystore. The certificates that are provided are signed using an internal Certificate Authority (CA). As of version 3.3.1 of Oracle VM, SSL certificates are used extensively throughout the product:

- For the authentication of Oracle VM Manager to each Oracle VM Server that it has discovered and for the encryption of communications between Oracle VM Manager and the Oracle VM Agent running on each Oracle VM Server.
- For the authentication and encryption of some tools that make use of the Oracle VM Manager web-services API.
- For the encryption of communications between a web-browser and the Oracle VM Manager web-based user interface .

Certificates are generated automatically during the installation of Oracle VM Manager. To avoid SSL validation issues in client web-browsers, you can obtain the internal CA certificate used by Oracle VM Manager and install it into each web-browser that is used to access the Oracle VM Manager web user interface. This is discussed in Exporting the CA certificate. Alternatively, if you have obtained an SSL certificate signed by an external CA that is already trusted by your users' web-browsers, you can change the SSL certificate that is used for the encryption of communications between the web-browser and the Oracle VM Manager web-based user interface. This is discussed in more detail in Changing the SSL Key. Finally, if you need to generate a new SSL key that is signed by the internal CA, you can follow the instructions provided in Generating a New SSL Key.

Warning

Once you have started configuring your environment using Oracle VM Manager you must avoid changing the CA certificate under any circumstances. This certificate is used for a variety of purposes, such as the authentication of Oracle VM Manager to each Oracle VM Server instance. Changing the CA certificate breaks all previously configured certificate-based authentication and can result in an unusable environment.

Oracle VM Manager does not use the default keystore and certification provided by Oracle WebLogic Server. Instead, it makes use of its own 2048-bit keystores. These are located at:

- `/u01/app/oracle/ovm-manager-3/domains/ovm_domain/security/ovmssl.jks`
- `/u01/app/oracle/ovm-manager-3/domains/ovm_domain/security/ovmca.jks`

The passwords for these keystores are randomized at installation. If you need to update a keystore, such as the CA keystore, to add mutually trusted CAs to the keystore, you may need to change the keystore password using the Oracle VM Key Tool. Changing the keystore password is described in Changing the Keystore Password.

1.2.3.1 The Oracle VM Key Tool

Oracle VM Manager also includes its own key management tool to help manage SSL certificates in conjunction with the keytool provided in the Java Development Kit (JDK) that is installed on the Oracle VM Manager host. This tool is located on the Oracle VM Manager host at:

`/u01/app/oracle/ovm-manager-3/ovm_upgrade/bin/ovmkeytool.sh`

Before using this tool, you must set the MW_HOME environment variable to point to the location of the Oracle WebLogic Server Middleware directory for your current installation of Oracle VM Manager:

```
# export MW_HOME=/u01/app/oracle/Middleware
```

Important

The Oracle VM Key Tool is intended for use by advanced administrators. Incorrect usage can cause authentication issues that have wide-reaching repercussions. Ensure that you understand what you are doing before you use this tool.

Syntax

```
ovmkeytool.sh [ --help ] [ --overwrite ] [ --quiet ] [ --verbose ] [ --propertyFile
filename ] [ -D property=value ] [ --noWebLogic ] { [{ show } | { check } | { setup } | {
setupWebLogic } | { gencakey } | { setcakey } | { gensslkey } | { setsslkey } | { changepass } | {
exportca } ] }
```

Options

The following table shows the available options for this tool.

Option	Description
`--help`	Display the `ovmkeytool.sh` command parameters and options.
`--overwrite`	Allow existing keystores to be overwritten if user interaction is disabled.
`--quiet`	Run with no user interaction using property values exclusively.
`--verbose`	Output extra information while running.
`--propertyFile` *filename*	The specified file can be used to provide properties to the tool.
`-D` *property=value*	Sets a property to a given value.
`--noWebLogic`	Do not attempt to configure Oracle WebLogic Server or verify Oracle WebLogic Server settings.

Commands

The following table shows the available commands for this tool. Only one command can be run at once.

Option	Description
`show`	Show the current values being used, including details about the current contents of the keystores.
`check`	Checks the current set-up and outputs details about any errors that are found.
`setup`	Sets up all of the keystore files and configures Oracle WebLogic Server.
`setupWebLogic`	Configures existing keystore settings in Oracle WebLogic Server.
`gencakey`	Generates a new certificate authority (CA) key. Also puts this key into the trust-store. Avoid running this command on an instance of Oracle VM Manager that has already been configured.
`setcakey`	Sets the certificate authority (CA) key to use an existing key from an existing keystore file. Avoid running this command on an instance of Oracle VM Manager that has already been configured.

Option	Description
`gensslkey`	Generates a new SSL key.
`setsslkey`	Sets the SSL key to use an existing key from an existing keystore file.
`changepass`	Allows the passwords for existing keystore files and keys to be configured or changed.
`exportca`	Exports the CA certificate (in PEM format).

Note

Many of the commands provided with this tool prompt for the Oracle WebLogic Server username and password. The default *weblogic* user should be used, and the password must match the one-time password that is set during Oracle VM Manager installation.

Checking Certificate Validity

At any time the `show` and `check` commands can be used to output details about the Oracle VM Manager and Oracle WebLogic Server SSL configuration and to verify the configuration appears valid. The check is by no means exhaustive, but it does verify that the keystore files exist, contain the expected keys, and are configured the same way in Oracle WebLogic Server as in the Oracle VM Manager. An example of the `check` command is presented below:

```
# ./ovmkeytool.sh check
 Oracle MiddleWare Home (MW_HOME): [/u01/app/oracle/Middleware]
 WebLogic domain directory: [/u01/app/oracle/ovm-manager-3/domains/ovm_domain]
 Oracle WebLogic Server name: [AdminServer]
 WebLogic username: [weblogic]
 WebLogic password: [********]
 WLST session logged at: /tmp/wlst-session2891919577425803475.log

 The Oracle VM Manager CA and SSL configuration appears to be valid.
```

Exporting the CA certificate

Oracle VM Manager contains it's own internal Certificate Authority (CA) which it uses for performing certificate-based authentication and to sign the SSL certificate that is used for the web-based user interface. To avoid certificate errors in web browsers connecting to the Oracle VM Manager web user interface, this CA certificate may be added as a trusted CA into the user's browser. The internal CA certificate can be retrieved, in PEM format, using the `exportca` command:

```
# ./ovmkeytool.sh exportca
----BEGIN CERTIFICATE-----
MIID+zCCAuOgAwIBAgIUamdPKrCAl4O1yD8QlywkYhmh0l8wDQYJKoZIhvcNAQEL
BQAwgaQxCzAJBgNVBAYTAlVTMRMwEQYDVQQIEwpDYWxpZm9ybmlhMRUwEwYDVQQH
EwxSZWR3b29kIENpdHkxGzAZBgNVBAoTEk9yYWNsZSBDb3Jwb3JhdGlvbjEaMBgG
A1UECxMRT3JhY2xlIFZNIE1hbmFnZXIxMDAuBgNVBAMTJ09WTSBDQSAwMDA0ZmIw
MDAwMDEwMDAwN2RiZmM3M2UyYTFkNjY3ZTAeFw0xMzExMDYxNDU5MjBaFw0yMzEx
MDcxNDU5MjBaMIGkMQswCQYDVQQGEwJVUzETMBEGA1UECBMKQ2FsaWZvcm5pYTEV
MBMGA1UEBxMMUmVkd29vZCBDaXR5MRswGQYDVQQKExJPcmFjbGUgQ29ycG9yYXRp
b24xGjAYBgNVBAsTEU9yYWNsZSBWTSBNYW5hZ2VyMTAwLgYDVQQDEydPVk0gQ0Eg
MDAwNGZiMDAwMDAxMDAwMDdkYmZjNzNlMmExZDY2N2UwggEiMA0GCSqGSIb3DQEB
AQUAA4IBDwAwggEKAoIBAQCKEekWsegMBt6aAPLAq+riDX8TS6ssr6NNjdDNy0mQ
32NZRyoR8K85T0O0KoFJ9lkgJOH8Ll4Q4219S2xey0obnqMqt5byW/XhXjiDLgpF
ESg/p2IGic8MubElhOQI3V71SeIcMHGk2b6sdS12T583uZD+FxvzCZoSTod4l4Pw
KvmAWV0FJQHaeOlGxj2tUaAWyVGbw66IzXZM4WlmNFH/2SNdx7XK4lXtPD/QiMVB
7bXaP/wCTc1vQlXgP550idwRQi5ol2ly7IO2fbflfX5wdnkuJWFOKzJfnkclsMHo
DW1FX5FEj34dEd/97wXvfAfYXRtC1DIq91mrF4vxD3lzAgMBAAGjIzAhMA8GA1Ud
```

```
EwEB/wQFMAMBAf8wDgYDVR0PAQH/BAQDAgAFMA0GCSqGSIb3DQEBCwUAA4IBAQAe
JK82gdNA/7tftEAgON7GlzJ0BSgu/3e1Luali+xOt2FFGAvrDtTdLxJjEEWM0OU4
Bhoc/6kjQ71nFs9Q/xxP9qC3YQPXa447Q1i9RZql5g2S5aQBr18ZHqeXp6HannLo
iwLBfSpbACgAhZwpzo7ZS38yENir6u1LKAnFAP/6D55Jgx7/UnbHNcFTSXc2u4cI
N3MHJ+0p8umz4+HrqqhFChNYZF2XhmuPawgL8TmRB2FNlQUcbmH19Nwb4UeOxEuD
isAf90p/GlTdtwzbNbm6Mv3rPEK2GtIL5YcIwLyKYKZ07P5VW6tGuzJTMipN0cLo
ij8FtceX5tmLGxlGQoKN
-----END CERTIFICATE-----
```

Refer to your web-browser documentation to determine how to add CA certificates to your list of trusted CAs within your browser.

Generating a New SSL Key

The default SSL certificates generated during the installation of Oracle VM Manager are valid for ten years from the date of installation. Nonetheless, there may be a requirement to update the SSL certificate served by Oracle VM Manager at any point. This can be achieved using the `genssl` command, which generates a new SSL certificate signed by the Oracle VM Manager internal CA. This is essentially the same configuration as is achieved after a fresh installation, but the certificate is generated afresh. The example below shows the typical output of this command:

```
# ./ovmkeytool.sh gensslkey
Path for SSL keystore: [/u01/app/oracle/ovm-manager-3/domains/ovm_domain/security/ovmssl.jks]
The hostname should be the fully qualified hostname of the system
(this is the hostname you'd use to access this system from outside the
local domain).  Depending on your machine setup the value below may not be
correct.
Fully qualified hostname: [myserver.example.com]
Key distinguished name is "CN=myserver.example.com, OU=Oracle VM Manager, O=Oracle Corporation,
  L=Redwood City, ST=California, C=US".  Use these values? [yes]
Alternate hostnames (separated by commas): [myserver.example.com,myserver]
You may either specify passwords or use random passwords.
If you choose to use a random password, only WebLogic, the Oracle VM Manager,
and this application will have access to the information stored in this
keystore.
Use random passwords? [yes]
Generating SSL key and certificate and persisting them to the keystore...
Updating keystore information in WebLogic
Oracle MiddleWare Home (MW_HOME): [/u01/app/oracle/Middleware]
WebLogic domain directory: [/u01/app/oracle/ovm-manager-3/domains/ovm_domain]
Oracle WebLogic Server name: [AdminServer]
WebLogic username: [weblogic]
WebLogic password: [********]
WLST session logged at: /tmp/wlst-session1784610151469840 67.log
```

Note that the command prompts you to provide the values for various steps through the procedure as the new SSL certificate is generated. Notably, you must enter a valid fully qualified domain name for the server. This value is used for the hostname in the SSL certificate and must match the hostname that is used to access the Oracle VM Manager web-based user interface.

Changing the SSL Key

If you have already obtained an SSL certificate that has been signed by a third-party CA, you may wish to use this instead of the default SSL certificate used for Oracle VM Manager. To do this, you must first create your own Java keystore and import your certificate into this. This is achieved using the `keytool` command provided with the JDK. To create a new keystore:

```
# keytool -genkey -alias mydomain -keyalg RSA -keystore /home/oracle/keystore.jks -keysize 2048
```

To import a PEM format certificate file into the new keystore:

```
# keytool -import -trustcacerts -alias mydomain -file mydomain.crt -keystore \
```

```
  /home/oracle/keystore.jks
```

Once you have an existing keystore containing your SSL certificate, use the `setsslkey` command in the `ovmkeytool.sh` command to use this instead of the default keystore:

```
# ./ovmkeytool.sh setsslkey
Path for SSL keystore: [/u01/app/oracle/ovm-manager-3/domains/ovm_domain/security/ovmssl.jks]
  /home/oracle/keystore.jks
Keystore password:
Alias of key to use as SSL key: mydomain
Key password:
Updating keystore information in WebLogic
Oracle MiddleWare Home (MW_HOME): [/u01/app/oracle/Middleware]
WebLogic domain directory: [/u01/app/oracle/ovm-manager-3/domains/ovm_domain]
Oracle WebLogic Server name: [AdminServer]
WebLogic username: [weblogic]
WebLogic password: [********]
WLST session logged at: /tmp/wlst-session5820685079094897641.log
```

Changing the Keystore Password

In some scenarios, you may also want to configure Oracle WebLogic Server's SSL truststore to provide additional trusted CAs. To do this you may use the `changepass` command to change the truststore password, since the default password for the keystore is randomized and it would not be possible to modify the keystore without the correct password. Once you have reset the password, you can modify the keystore using the Java `keytool`, as required. It is imperative that the existing internal Oracle VM Manager CA certificate is not removed from the keystore.

An example of setting the keystore password and then accessing trust information using the Java keytool command is shown below:

```
# ./ovmkeytool.sh changepass
You may either specify passwords or use random passwords.
If you choose to use a random password, only WebLogic, the Oracle VM Manager,
and this application will have access to the information stored in this
keystore.
Use random passwords? [yes] no
Change CA Keystore and Key passwords? [yes] no

Change SSL Keystore and Key passwords? [yes] no

Change SSL Trustore password? [yes]
SSL Trust Keystore password:
Verify SSL Trust Keystore password:
Updating trust-store information in WebLogic
Oracle MiddleWare Home (MW_HOME): [/u01/app/oracle/Middleware]
WebLogic domain directory: [/u01/app/oracle/ovm-manager-3/domains/ovm_domain]
Oracle WebLogic Server name: [WLS1] AdminServer
WebLogic username: [weblogic]
WebLogic password: [********]
WLST session logged at: /tmp/wlst-session6297528751781822860.log
```

```
# keytool -list -keystore /u01/app/oracle/ovm-manager-3/domains/ovm_domain/security/ovmtrust.jks
Enter keystore password:

Keystore type: JKS
Keystore provider: SUN

Your keystore contains 1 entry

ovmmgr_ca_key_entry, Nov 7, 2013, trustedCertEntry,
Certificate fingerprint (MD5): 65:31:9C:17:35:59:6C:A7:A3:93:C8:93:F0:A7:81:6A
```

1.2.4 Configuring Oracle VM Manager UI Session Timeout

You can change the amount of time that an Oracle VM Manager session can remain inactive before it is invalidated. Oracle VM Manager runs on *Oracle WebLogic Server* , and to configure Oracle VM Manager timeout settings you need to access the Oracle WebLogic Server console.

To configure Oracle VM Manager session timeout:

1. Access the Oracle WebLogic Server console by entering:

   `https://hostname:7002/console`

   Log in with the user *weblogic* and the password you set during the Oracle VM Manager installation.

2. Click **Deployments** in the left pane of the Administration Console.

3. Click **Next** to change the page until **ovm_console** is listed in the Deployments table.

4. Click the "**+**" next to ovm_console to expand the view for the ovm_console deployment.

5. Click **ovm/console** in the Modules list. The settings for ovm_console is displayed.

6. Click on the **Configuration** tab.

7. Click **Lock and Edit** in the **Change Center** pane to modify the settings.

8. Click the **Configuration** tab and then click the **General** subtab. Edit the **Session Timeout** (in seconds) field in the table. The default setting is half an hour (1800 seconds). Click **Save**.

   If you receive a permissions related error, you may need to change the permissions or ownership on the file located at `/u01/app/oracle/ovm-manager-3/weblogic/deploy/ovm_console/plan/plan.xml`. You can do this by running the following command:

   ```
   chown oracle:dba /u01/app/oracle/ovm-manager-3/weblogic/deploy/ovm_console/plan/plan.xml
   ```

   You will need to resave your changes in order for them to take effect.

9. Go back to the Deployments page by clicking **Deployments** in the left pane. In the Deployments table, select the **ovm_console** check box. Click **Update** to redeploy the application.

10. Change the source and deployment plan paths as desired. Click **Finish**.

11. To activate the changes, click **Activate Changes** in the Change Center of the Administration Console.

Important

Due to the nature of some pages served within Oracle VM Manager, the client browser auto-refreshes regularly to poll for changes. This is particularly apparent on the Health page. Since the client is constantly refreshing, UI timeout may not behave as expected. Therefore, a configuration parameter for ADF has been set to timeout automatic polling after a default period of 20 minutes where there has been no mouse or keyboard interaction within Oracle VM Manager. This means that for these pages, the UI timeout value only becomes effective after the polling timeout has been effected.

Changes to the polling timeout are not directly configurable. If you require this facility to be modified contact Oracle Support.

For more information on updating a Web application, see the Oracle WebLogic Server documentation:

http://docs.oracle.com/cd/E23549_01/apirefs.1111/e13952/taskhelp/web_applications/UpdateWebApplication.html

1.3 MySQL Configuration

The *Oracle VM Manager* installer performs an installation of the MySQL database. Database files are located at `/u01/app/oracle/mysql/data`. A standard init script is created at: `/etc/init.d/ovmm_mysql`. This script can be used to start, stop, restart and obtain the status of the MySQL server, for example:

```
# /etc/init.d/ovmm_mysql restart
```

Configuration for the Oracle VM Manager MySQL instance is contained in `/u01/app/oracle/mysql/data/my.cnf`.

Warning

Editing this configuration file may break your Oracle VM Manager installation. Do not edit it without instruction from an Oracle Support representative.

MySQL events are logged in a log file located at `/u01/app/oracle/mysql/data/mysqld.err`.

1.4 ISO Provisioning for PVM Guest Installations

When you create a PVM guest from an ISO file, you cannot use an ISO file from a repository to install the operating system. Oracle VM requires that the ISO file is mounted so that its internal file system contents are available during the installation of the operating system for a PVM guest. The mounted ISO file can be made available via an NFS, HTTP or FTP server. The following examples show how to create and use mounted ISO files on an NFS share, and on an HTTP server.

Example 1.12 Creating an installation tree on an NFS share

This example creates an installation tree for *paravirtualized guest* by mounting an ISO file. The installation tree is made available via an NFS share. On the NFS server, enter

```
# mkdir -p /isos/EL5u6-x86_64
# mount -o ro,loop /path/Enterprise-R5-U6-Server-x86_64-dvd.iso /isos/EL5u6-x86_64
# exportfs *:/isos/EL5u6-x86_64/
```

When you create the *virtual machine* using the Oracle VM Manager Web Interface, enter the installation location in the **Network Boot Path** field in the **Create Virtual Machine** wizard as:

```
nfs:example.com:/isos/EL5u6-x86_64
```

Example 1.13 Creating an installation tree on an HTTP server

This example creates an installation tree from an ISO file that can be accessed via HTTP. On the HTTP server, enter

```
# cd /var/www/html
# mkdir EL5u6-x86_64
# mount -o ro,loop /path/Enterprise-R5-U6-Server-x86_64-dvd.iso EL5u6-x86_64
```

When you create the virtual machine using the Oracle VM Manager Web Interface, enter the installation location in the **Network Boot Path** field in the **Create Virtual Machine** wizard as:

```
http://example.com/EL5u6-x86_64
```

Tip

If you have multiple ISO files, you can mount each ISO file and copy the contents into a single directory. All the ISO files are then available from the same location.

Chapter 2 Oracle VM Utilities

The Oracle VM Utilities are a collection of command line scripts that allow you to perform a set of basic management tasks on *Oracle VM Servers*, *storage repositories* and *virtual machines* in an Oracle VM environment.

While many of the command line tools provided by Oracle VM Utilities are useful, as of Oracle VM Release 3.2 many of the actions they allow you to perform can be achieved using the Oracle VM Manager Command Line Interface, which provides a wider range of control over objects within *Oracle VM Manager*. The Oracle VM Manager Command Line Interface provides better information about objects and affords more flexibility when dealing with particular object types. See the *Oracle VM Manager Command Line Interface User's Guide* for more information.

The Oracle VM Utilities described in this chapter are at release 2.0. The Oracle VM Utilities Release 2.0 are only able to be used with Oracle VM Release 3.3 or higher. If you attempt to execute any of the scripts on an earlier version, a warning message is displayed to inform you that the script is not supported. If you attempt to use an earlier version of the Oracle VM Utilities on Oracle VM Release 3.3 or higher, they will not work due to the changes in the Oracle VM API.

Only the `ovm_vmhostd` and `vm_dump_metrics` scripts are supported by Oracle Support. All other command line scripts in the Oracle VM Utilities are provided as-is, for your convenience. They are not officially or formally supported by Oracle. However, the use of these scripts *is* officially supported when performing the steps to set up *hard partitioning* as described in Setting Hard Partitioning for Virtual Machine CPUs in the *Oracle VM Concepts Guide*, and in the white paper *Hard Partitioning With Oracle VM Server for x86* located at:

http://www.oracle.com/technetwork/server-storage/vm/ovm-hardpart-168217.pdf

2.1 Introduction to the Oracle VM Utilities

The Oracle VM Utilities are command line scripts used to execute certain basic operations on your Oracle VM environment. These utilities make a connection to the Oracle VM Manager host, using the server host name and an Oracle VM Manager administrative user name and password. After authentication, commands can be submitted to Oracle VM Manager from the command line.

The Oracle VM Utilities are:

- `ovm_vmcontrol:` Command line script to perform administrative operations on a virtual machine.
- `ovm_vmdisks:` Command line script to list virtual and raw physical disks attached to a virtual machine in order to facilitate a back up.
- `ovm_vmmessage:` Command line script to send and retrieve messages in the form of key/value pairs to and from a running virtual machine that has Oracle VM Guest Additions installed.
- `ovm_vmhostd:` Command line script to facilitate the communication of host-based statistics about the Oracle VM Server hosting a virtual machine. Enables SAP applications to be fully supported and certified to run on an Oracle Linux *guest*.
- `vm_dump_metrics:` Command line script that can output the Oracle VM Server host information in XML format. This XML can be consumed by a SAP application running within the virtual machine.

See Section 2.4, “Using the Oracle VM Utilities” for information on the command line parameters and options, and examples for these scripts.

2.2 Oracle VM Utilities Prerequisites

Before you install and use the Oracle VM Utilities, you must first enable secure TCP (TCPS) on the Oracle VM Manager host. To do this, you must first create an SSL certificate keystore, then enable TCPS using the keystore.

To create a certificate keystore:

1. Enter the following commands on the Oracle VM Manager host to create the keystore:

```
# cd /u01/app/oracle/ovm-manager-3/bin
# ./secureOvmmTcpGenKeyStore.sh
```

   You are prompted to enter the following information:

```
Generate OVMM TCP over SSL key store by following steps:
Enter keystore password: password
Re-enter new password: password
What is your first and last name?
  [Unknown]:  name
What is the name of your organizational unit?
  [Unknown]:  unit
What is the name of your organization?
  [Unknown]:  organization
What is the name of your City or Locality?
  [Unknown]:  City
What is the name of your State or Province?
  [Unknown]:  State
What is the two-letter country code for this unit?
  [Unknown]:  country_code
Is CN=name, OU=unit, O=organization, L=City, ST=State, C=country_code correct?
  [no]:  yes

Enter key password for <ovmm>
        (RETURN if same as keystore password): password
Re-enter new password: password
```

2. Use the keystore to enable the TCPS service using the `secureOvmmTcp.sh` script, which is in the same directory as the keystore script above. On the Oracle VM Manager host, enter:

```
# ./secureOvmmTcp.sh
```

   You are prompted to enter the following information:

```
Enabling OVMM TCP over SSL service

Please enter the OVM manager user name: username
Please enter the OVM manager user password: password
Please enter the password for TCPS key store : password
           The keystore password created in the previous script
The job of enabling OVMM TCPS service is committed, please restart OVMM to take effect.
```

3. Restart the local Oracle VM Manager instance:

```
# /sbin/service ovmm restart
```

2.3 Installing the Oracle VM Utilities

The Oracle VM Utilities are available for download as a `.zip` file from the Oracle VM downloads page:

```
http://www.oracle.com/technetwork/server-storage/vm/downloads/index.html
```

The Oracle VM Utilities can be installed on directly on the system running Oracle VM Manager or, alternately, on any server or desktop system running Oracle Linux. The sections below describe how and where to install these utilities. An overview of the installation directory structure and files is also provided.

2.3.1 Installing the Oracle VM Utilities on Oracle VM Manager

When installing Oracle VM Utilities on the same server as Oracle VM Manager, it is recommended that you put them in the software directory of the Oracle VM Manager application. The Oracle VM Utilities are bundled in a `.zip` archive. To install, simply download the archive and extract in the appropriate directory.

In the example below, we have already downloaded the `.zip` file and show how to copy the `.zip` file into the installation directory, where it is unzipped.

```
# cp ovm_utils_archive.zip /u01/app/oracle/ovm-manager-3/
# cd /u01/app/oracle/ovm-manager-3
# unzip ovm_utils_archive.zip
```

At this point, the command line scripts are ready to use. Note that these scripts execute a Java program and use the default Java VM on the *host computer*. On the Oracle VM Manager host, the appropriate Java VM is installed as part of the Oracle VM Manager application in `/u01/app/oracle/java`. No further configuration is required.

2.3.2 Installing the Oracle VM Utilities on Oracle Linux

When installing Oracle VM Utilities on an Oracle Linux server or desktop computer, you may put them in the installation directory of your choice, for example: `/usr/local/bin`. The Oracle VM Utilities are bundled in a `.zip` archive. To install, simply download the archive, copy and extract in the appropriate directory.

```
# cp ovm_utils_archive.zip /usr/local/bin/oracle/
# cd /usr/local/bin/oracle
# unzip ovm_utils_archive.zip
```

Caution

Oracle VM Utilities **do not** work with the Open JDK or GNU Compiler for Java (GCJ). You must install a standard Java VM, version 1.6 or above, and make sure it is defined as the default Java VM by the `JAVA_HOME` environment variable or included in the `PATH` variable on your system.

The command line scripts in Oracle VM Utilities execute a Java program and use the default Java VM on the host computer. To verify the exact path to the Java executable and the active Java version, use the following commands:

```
# which java
/usr/java
# java -version
java version "1.6.0_26"
Java(TM) SE Runtime Environment (build 1.6.0_26-b03)
Java(TM) Server VM (build 20.1-b02, mixed mode)
```

If a standard Java VM version 1.6 or above is not available on your system, download and install the version suited for your platform from:

http://java.com/en/download/

To make sure the correct Java VM version is used, set the `JAVA_HOME` and `PATH` variables as follows:

1. Edit the Oracle Linux shell profile.

```
# vi /etc/profile
```

or

```
# vi /etc/bashrc
```

2. Add the lines below to the profile. If your Java path does not match `/usr/java`, replace with the actual path on your system.

```
JAVA_HOME=/usr/java
export JAVA_HOME
PATH=$PATH:$JAVA_HOME/bin
export PATH
```

3. Save the file. Log out and log back in to activate your changes.

4. Verify the Java path and version again, to make sure that the correct Java VM is used.

```
# which java
/usr/java
# java -version
java version "1.6.0_26"
Java(TM) SE Runtime Environment (build 1.6.0_26-b03)
Java(TM) Server VM (build 20.1-b02, mixed mode)
```

The command line scripts are now ready to use.

2.3.3 Oracle VM Utilities Scripts

When you unzip the Oracle VM Utilities archive, a subdirectory named `ovm_utils` is created, containing these utility scripts:

- `ovm_vmcontrol`
- `ovm_vmdisks`
- `ovm_vmhostd`
- `ovm_vmmessage`
- `ovm_reporestore`
- `vm-dump-metrics`

To get help on each command, execute the command without any options, for example:

```
# /u01/app/oracle/ovm-manager-3/ovm_utils/ovm_vmcontrol
```

For each of these utility scripts, a *man* page is also included. These help files can be found in `/u01/app/oracle/ovm-manager-3/ovm_utils/man/man8/`.

```
# ls -1 /u01/app/oracle/ovm-manager-3/ovm_utils/man/man8/
ovm_reporestore.8
ovm_vmcontrol.8
ovm_vmdisks.8
ovm_vmhostd.8
ovm_vmmessage.8
```

Use the `man` command to display the help, for example:

```
 # man man/man8/ovm_vmcontrol.8
```

2.4 Using the Oracle VM Utilities

This section gives you more detail on using the Oracle VM Utilities, including command line examples.

The Oracle VM Utilities make a connection to the Oracle VM Manager host server, using the server host name and an Oracle VM Manager administrative user name and password. Oracle VM Manager listens on port 54322 (secure TCP).

2.4.1 Oracle VM Virtual Machine Control (ovm_vmcontrol)

The `ovm_vmcontrol` utility operates on a *virtual machine*. It passes basic virtual machine control commands from the command line to Oracle VM Manager. This utility allows you to lock a virtual machine, send and receive messages from a virtual machine, or set CPU pinning (hard partitioning).

Syntax

`ovm_vmcontrol { -u` *`username`* `} { -p` *`password`* `| -E } { -h` *`hostname`* `} { -c` *`command`* `} [ -v` *`vm_name`* `] [ -s` *`cpu_thread`* `... ] [ -T` *`tag`* `... ] { -C { preserve | restart | coredump-restart | coredump-destroy | none } }`

Where *`command`* is:

{ `lock` | `vcpuset` | `vcpuget` | `settags` | `gettags` | `setoncrash` | `getoncrash` | `setsuperpage` | `unsetsuperpage` }

Options

The following table shows the available options for this command.

Option	Description
`-u` *`username`*	The username of an Oracle VM Manager admin user. This option is required.
{ `-p` *`password`* | `-E` }	The `-p` option is the password corresponding with the admin username. Alternatively, you can use the `-E` option to set the password in an environment variable named `OVMUTIL_PASS`, and securely submit the password. To set this variable for a single session on Oracle Linux, use: `# export OVMUTIL_PASS=`*`password`* This option is required.
`-h` *`hostname`*	The hostname of the server running Oracle VM Manager. This option is required.
`-c { lock | vcpuset | vcpuget | settags | gettags | setoncrash | getoncrash | setsuperpage | unsetsuperpage }`	The command to execute. This option is required. The `lock` command allows you to lock a virtual machine for a certain period of time. When a virtual machine is locked by the utility, it is not possible for other tools or users to perform operations on that specific virtual machine. This is particularly useful if you are an administrator and need to make a virtual machine back up while the virtual machine is stopped: you want to prevent anyone starting the virtual machine before the back up finishes.

Option	Description
	The `lock` command sleeps until you press `Ctrl+C` to release the lock. If the `ovm_control` utility is killed, the virtual machine is unlocked as well. The `vcpuset` command hard-binds or *pins* virtual CPUs to threads. For example, `-c vcpuset -s 0,1,2` physically binds vcpu0 to thread0, vcpu1 to thread1, vcpu2 to thread2. Use the `vcpuget` command to retrieve information about pinned virtual CPUs for the selected virtual machine. CPU binding immediately takes effect, and will continue on subsequent start ups of the virtual machine. The `settags` and `gettags` commands are used to manage tag metadata for a given virtual machine.
`-v` *`vm_name`*	The virtual machine name.
`-s` *`cpu_thread`* ...	A comma separated list of physical thread numbers with which to bind virtual CPUs. The list of thread numbers can be a range, or a specific list of physical CPU threads. For example, `-s 0-3` means any virtual CPU can be running anywhere on the physical CPU (threads) 0,1,2, or 3; and `-s 0,3` means the specific physical CPU (threads) 0 and 3. This command must be used in combination with: `-c vcpuset`
`-T` *`tag`* ...	A comma separated list of strings to be associated with a virtual machine as metadata This command must be used in combination with: `-c settags`
`-C` { `preserve` | `restart` | `coredump-restart` | `coredump-destroy` | `none` }	Change a virtual machine's *on_crash* setting. This command must be used in combination with: `-c setoncrash`

Examples

Example 2.1 Locking a virtual machine

```
# ./ovm_vmcontrol -u admin -E -h localhost -v MyVM01 -c lock
Oracle VM VM Control utility version.
Connected.
Command : lock
Locking VM 'MyVM01'
Press Ctrl-C to unlock.
```

Example 2.2 Checking CPU pinning for a virtual machine

This example shows the virtual CPUs of the virtual machine are bound to threads 0 and 1.

```
# ./ovm_vmcontrol -u admin -E -h localhost -v MyVM01 -c vcpuget

Oracle VM VM Control utility version.
Connecting with a secure connection.
Connected.
Command : vcpuget
Current pinning of virtual CPUs to physical threads : 0-1
```

Example 2.3 Setting CPU pinning for a virtual machine

This example binds the virtual CPUs of the virtual machine to thread 0.

```
# ./ovm_vmcontrol -u admin -E -h localhost -v MyVM01 -c vcpuset -s 0

Oracle VM VM Control utility version.
Connecting with a secure connection.
Connected.
Command : vcpuset
Pinning virtual CPUs
Pinning of virtual CPUs to physical threads  '0' 'vm1' completed.
```

2.4.2 Oracle VM Retrieve Disk (ovm_vmdisks)

The `ovm_vmdisks` utility is designed to help the administrator make back ups of virtual machines, particularly when the virtual machine's *virtual disks* are files in a storage repository on a remote NFS storage server. The `ovm_vmdisks` utility takes a virtual machine name and lists out every virtual disk file for that virtual machine, as well as the virtual machine configuration (`vm.cfg`) file. This allows you to take the file listings from the output of the utility and back them up to a server or tape. If the virtual disks are actual physical devices directly attached to the virtual machine, the utility lists the device mapper entry on the Oracle VM Server to which the virtual machine is assigned. In case the virtual disks are files on an NFS server, the utility lists the NFS server name, mount point, and file name/location.

Syntax

`ovm_vmdisks { -u username } { -p password | -E } { -h hostname } [ -v vm_name ]`

Options

The following table shows the available options for this command.

Option	Description
`-u username`	The username of an Oracle VM Manager admin user. This option is required.
`{ -p password | -E }`	The `-p` option is the password corresponding with the admin username. Alternatively, you can use the `-E` option to set the password in an environment variable named `OVMUTIL_PASS`, and securely submit the password. To set this variable for a single session on Oracle Linux, use: `# export OVMUTIL_PASS=password` This option is required.
`-h hostname`	The hostname of the server running Oracle VM Manager. This option is required.
`-v vm_name`	The virtual machine name.

Examples

Example 2.4 Listing virtual disks for a virtual machine

This example shows a virtual machine with three disks, each attached in a different way.

```
# ./ovm_vmdisks -u admin -E -h localhost -v MyVM01
Oracle VM Retrieve Disk Control utility version.
Connected.
Virtual Machine : 'MyVM01' status : 'Running'.
Assigned Server : OVS_01
Virtual Disk : 'MyVM01_bootdisk' size : 20GB
   file=/OVS/Repositories/0004fb0000030000b0272c74e714ab12/VirtualDisks/ \
   0004fb00001200006e548a28cb886f42.img
   mountpoint=/dev/mapper/3300000006160a212/VirtualDisks/ \
   0004fb00001200006e548a28cb886f42.img
Virtual Disk : 'MyVM01_datadisk' size : 250GB
   file=/OVS/Repositories/0004fb00000300005b06362f2d866a98/VirtualDisks/ \
   0004fb0000120000f217eb8c0fa70eef.img
   mountpoint=nfs01:/mnt/vol2/repo03/VirtualDisks/ \
   0004fb0000120000f217eb8c0fa70eef.img
Physical Disk : 'pd003'
   device=/dev/mapper/3300000009b7b2cc4
Config File :
   file=/OVS/Repositories/0004fb00000300005b06362f2d866a98/ \
   VirtualMachines/0004fb00000600008757e38248a544e6/vm.cfg
   mountpoint=nfs01:/mnt/vol2/repo03/VirtualMachines/ \
   0004fb00000600008757e38248a544e6/vm.cfg
```

As you can see in the console output, the virtual machine *MyVM01* is currently running. Backing up a running virtual machine would be inconsistent, therefore it is highly recommended that you shut down the virtual machine prior to making any back ups. The console output shows that the virtual machine contains three disks, two virtual and one physical, and also provides the location of the virtual machine configuration file:

- **MyVM01_bootdisk:** A virtual disk on an OCFS2 storage repository. The OCFS2 repository is on the device `/dev/mapper/3300000006160a212`.
- **MyVM01_datadisk:** A virtual disk on an NFS storage server named `nfs01`. The full path to the virtual disk file on the NFS server is `/mnt/vol2/repo03/VirtualDisks/0004fb0000120000f217eb8c0fa70eef.img`.
- **pd003:** A raw disk device at `/dev/mapper/3300000009b7b2cc4`.
- `vm.cfg:` The virtual machine configuration file on NFS server `nfs01`. The full path to the configuration file is `nfs01:/mnt/vol2/repo03/VirtualMachines/0004fb00000600008757e38248a544e6/vm.cfg`.

2.4.3 Oracle VM Virtual Machine Messaging (ovm_vmmessage)

The `ovm_vmmessage` utility lets you send a *message* to a running virtual machine, or to query the value of a message sent from within a virtual machine to Oracle VM Manager using the Oracle VM API messaging interface. These values are basic key/value pairs such as `foo=bar`.

New Oracle VM templates released by Oracle contain a configuration utility called `ovmd`. This utility is used to perform first-boot installation configuration either locally from the virtual machine console or remotely through the messaging interface provided by this utility. The `ovmd` utility also allows the owner of the virtual machine to send messages back to Oracle VM Manager. For more information about `ovmd`, and the Oracle VM Guest Additions in general, see Chapter 3, *Oracle VM Guest Additions*.

To send messages you combine `-k key` and `-V value`. To retrieve messages, use `-q key`.

Syntax

```
ovm_vmmessage { -u username }{ -p password | -E }{ -h hostname }[ -v vm_name ][ -k key ]
[ -V value ][ -q key ]
```

Options

The following table shows the available options for this command.

Option	Description
`-u username`	The username of an Oracle VM Manager admin user. This option is required.
{ `-p password` | `-E` }	The `-p` option is the password corresponding with the admin username. Alternatively, you can use the `-E` option to set the password in an environment variable named `OVMUTIL_PASS`, and securely submit the password. To set this variable for a single session on Oracle Linux, use: `# export OVMUTIL_PASS=password` This option is required.
`-h hostname`	The hostname of the server running Oracle VM Manager. This option is required.
`-v vm_name`	The virtual machine name. The virtual machine name is the name you assign during the creation of the virtual machine.
`-k key`	The key to send.
`-V value`	The value to send with the key. This command must be used in combination with: `-k key`
`-q key`	The key to query.

Examples

Example 2.5 Sending a message to a virtual machine

```
# ./ovm_vmmessage -u admin -p password -h localhost -v MyVM02 -k foo -V bar
Oracle VM VM Message utility version.
Connected.
VM : 'MyVM02' has status :  Running.
Sending message.
Message sent successfully.
```

Example 2.6 Retrieving a message from a virtual machine

```
# ./ovm_vmmessage -u admin -p password -h localhost -v MyVM02 -q foo
Oracle VM VM Message utility version.
Connected.
VM : 'MyVM02' has status :  Running.
Querying for key 'foo'.
Query successful.
Query for Key : 'foo' returned value 'bar'.
Key set 27 minutes ago.
```

2.4.4 Oracle VM Repository Restore (ovm_reporestore)

The `ovm_reporestore` utility allows the administrator to easily back up metadata about assemblies, ISO files and virtual disks that are stored in a given storage repository. The resulting XML file can then be used to restore this data to an Oracle VM Manager instance in the case that the repository imported into the Oracle VM Manager afresh. Typical use cases would be for back up and restore or disaster recovery, or alternately where the storage for the repository is moved to an alternate location or to a clone of the environment. The utility works in two modes:

- A back up mode, where the metadata is dumped to an XML file. Ideally, this should be run as a regular cronjob, so that the data is consistently backed up.
- A restore mode, where the metadata stored in the XML file is imported into an Oracle VM Manager instance to update the information stored for assemblies, ISO files and virtual disks with matching UUIDs.

Syntax

```
ovm_reporestore { -u username } { -p password | -E } { -h hostname } { -r repository | -a }
[ -f filename.xml ] [ -F OVMModelDump.xml ] [ -y ] [ -D ] [ -R ] [ -N ]
```

Options

The following table shows the available options for this command.

Option	Description
`-u username`	The username of an Oracle VM Manager admin user. This option is required.
{ `-p password` | `-E` }	The `-p` option is the password corresponding with the admin username. Alternatively, you can use the `-E` option to set the password in an environment variable named `OVMUTIL_PASS`, and securely submit the password. To set this variable for a single session on Oracle Linux, use: `# export OVMUTIL_PASS=password` This option is required.
`-h hostname`	The hostname of the server running Oracle VM Manager. This option is required.
{ `-r repository` | `-a` }	The `-r` option is the name of the storage repository. Alternatively, you can run the command against all repositories using the `-a` option. This option is required.
`-f filename.xml`	The XML file to read or write to.
`-F OVMModelDump.xml`	Use an Oracle VM Manager model dump XML file as input
`-y`	Assume yes on restoring a filename and description without prompting.
`-D`	Dump metadata to a file. This command is intended to be used in combination with: `-f -r -a`
`-R`	Restore metadata from file.

Option	Description
	This command is intended to be used in combination with: `-f -r -a -y`
`-N`	Fix metadata after a refresh without an XML file. This command is intended to be used in combination with: `-R -r -a`

Examples

Example 2.7 Backing up metadata for all repositories to an XML file

This example shows how to dump all of the metadata stored across all repositories to an XML file.

```
# ./ovm_reporestore -u admin -E -h localhost -D -f /tmp/dump2.xml -a
Oracle VM Repository Repair utility version.
Connected.
Export mode.
Processing repository 'iscsirepo'
->Processing assemblies.
->Processing Virtual ISOs.
->Processing Virtual Disks.
Processing repository 'MyRepository'
->Processing assemblies.
->Processing Virtual ISOs.
->Processing Virtual Disks.
Processing repository 'nfs1'
->Processing assemblies.
->Processing Virtual ISOs.
->Processing Virtual Disks.
Wrote to '/tmp/dump2.xml'
Finished...
```

Example 2.8 Restoring metadata from data in an XML file

This example shows how to restore the names and descriptions for assemblies, ISOs and virtual disks that have the same UUIDs as those stored in the provided XML file across all repositories. As it is used without the `-y` option, the user is prompted with the option to update the name and description of each matching item in a repository.

```
# ./ovm_reporestore -u admin -E -h localhost -R -f /tmp/dump2.xml -a
Oracle VM Repository Repair utility version.
Connected.
Repair mode.
Reading from '/tmp/dump2.xml'
Processing repository 'iscsirepo'
->Processing assemblies.
->Processing Virtual ISOs.
->Processing Virtual Disks.
Processing repository 'MyRepository'
->Processing assemblies.
->Processing Virtual ISOs.
->Processing Virtual Disks.
Processing repository 'nfs1'
->Processing assemblies.
->Processing Virtual ISOs.
->Processing Virtual Disks.
The following element has no name: '0004fb0000120000ea4a4a161bdf8de7.img'
Element found. Name : '0004fb0000120000ea4a4a161bdf8de7.img' Description :  ''
Are you sure you want to modify this entry? [y/N] n
```

```
Skipping element.
Finished...
```

2.4.5 Oracle VM Hostd For Metrics Messaging (ovm_vmhostd and vm-dump-metrics)

The Oracle VM Utilities include tools that ensure that SAP applications are fully supported and certified to run on Oracle Linux guests running within a Oracle VM environment. These tools facilitate the communication of host-based statistics about the Oracle VM Server hosting a particular virtual machine, using the virtual machine messaging facility provided by Oracle VM Manager, to the virtual machine itself.

For this functionality to succeed, the guest virtual machine should be running Oracle Linux with the Oracle VM Guest Additions installed. See Chapter 3, *Oracle VM Guest Additions* for more information.

These are the only tools within the Oracle VM Utilities that are officially supported by Oracle.

The `ovm_vmhostd` utility runs with daemon-like behavior. It initially checks that the virtual machine is running, and then sends the Oracle VM Server metrics as a message. It sleeps for 60 seconds and then sends a message updating the values for the original message. This behavior continues until the process is killed.

Syntax

`ovm_vmhostd { -u` *`username`* `}{ -p` *`password`* `| -E }{ -h` *`hostname`* `}[ -v` *`vm_name`* `]`

Options

The following table shows the available options for this command.

Option	Description
`-u` *`username`*	The username of an Oracle VM Manager admin user. This option is required.
`{ -p` *`password`* `| -E }`	The `-p` option is the password corresponding with the admin username. Alternatively, you can use the `-E` option to set the password in an environment variable named `OVMUTIL_PASS`, and securely submit the password. To set this variable for a single session on Oracle Linux, use: `# export OVMUTIL_PASS=`*`password`* This option is required.
`-h` *`hostname`*	The hostname of the server running Oracle VM Manager. This option is required.
`-v` *`vm_name`*	The virtual machine name. The virtual machine name is the name you assign during the creation of the virtual machine.

Examples

Example 2.9 Sending Oracle VM Server details to a virtual machine

```
# ./ovm_vmhostd -u admin -E -h localhost -v myvm
Oracle VM Hostd version.
Connected.
VM : 'pvm1' has status :  Running.
VM: 'pvm1' is online, sending metrics.
```

```
.Sleeping 60 seconds.
.Sleeping 60 seconds.
.Sleeping 60 seconds.
```

2.4.5.1 Retrieve Host Statistics Within a Virtual Machine (vm-dump-metrics)

The `vm-dump-metrics` script can be copied to the guest virtual machine where the message from the `ovm_vmhostd` script is received. This script is a simple shell script that can output the Oracle VM Server host information in XML format. This XML can be consumed by a SAP application running within the virtual machine.

By default, the `vm-dump-metrics` script outputs data to STDOUT, but can be changed to output data to file by editing the `OUTFILE` variable at the beginning of the script.

The `vm-dump-metrics` script queries `ovmd` to obtain the message with the key `vmhost`. If no message is obtained, it exits with status `1`. If a message is found, the script parses this message to populate the resulting XML. Typical XML output generated by the `vm-dump-metrics` script follows:

```
<metrics>
  <metric type='real64' context='host'>
    <name>TotalCPUTime</name>
    <value>2694.3596</value>
  </metric>
  <metric type='uint64' context='host'>
    <name>PagedOutMemory</name>
    <value>0</value>
  </metric>
  <metric type='uint64' context='host'>
    <name>PagedInMemory</name>
    <value>0</value>
  </metric>
  <metric type='uint64' context='host'>
    <name>UsedVirtualMemory</name>
    <value>6747</value>
  </metric>
  <metric type='uint64' context='host'>
    <name>FreeVirtualMemory</name>
    <value>9817</value>
  </metric>
  <metric type='uint64' context='host'>
    <name>FreePhysicalMemory</name>
    <value>9817</value>
  </metric>
  <metric type='uint64' context='host'>
    <name>MemoryAllocatedToVirtualServers</name>
    <value>6747</value>
  </metric>
  <metric type='uint32' context='host'>
    <name>NumberOfPhysicalCPUs</name>
    <value>4</value>
  </metric>
  <metric type='string' context='host'>
    <name>HostSystemInfo</name>
    <value>ovm3</value>
  </metric>
  <metric type='string' context='host'>
    <name>VirtProductInfo</name>
    <value>Oracle VM 3</value>
  </metric>
  <metric type='string' context='host'>
    <name>VirtualizationVendor</name>
    <value>Oracle Corporation</value>
  </metric>
  <metric type='uint64' context='host'>
    <name>Time</name>
```

```
    <value>1360606566774</value>
  </metric>
  <metric type='string' context='host'>
    <name>HostName</name>
    <value>ovm3</value>
  </metric>
  <metric type='uint64' context='vm' id='0' uuid='0004fb00-0006-0000-d72b-647e20a85939'>
    <name>PhysicalMemoryAllocatedToVirtualSystem</name>
    <value>1024</value>
  </metric>
  <metric type='uint64' context='vm' id='0' uuid='0004fb00-0006-0000-d72b-647e20a85939'>
    <name>ResourceMemoryLimit</name>
    <value>1024</value>
  </metric>
  <metric type='uint32' context='vm' id='0' uuid='0004fb00-0006-0000-d72b-647e20a85939'>
    <name>ResourceProcessorLimit</name>
    <value>1</value>
  </metric>
  <metric type='real64' context='vm' id='0' uuid='0004fb00-0006-0000-d72b-647e20a85939'>
    <name>TotalCPUTime</name>
    <value>2694.3596</value>
  </metric>
</metrics>
```

If you do not want to use the `vm-dump-metrics` script on your virtual machine, you can query `ovmd` directly and parse the output yourself:

```
# ovmd -g vmhost
com.sap.host.VirtualizationVendor=Oracle Corporation;com.sap.host.VirtProductInfo=Oracle VM 3;
com.sap.host.PagedInMemory=0;com.sap.host.PagedOutMemory=0;com.sap.host.PageRates=0;
com.sap.vm.uuid=0004fb0000060000d72b647e20a85939;com.sap.host.HostName=ovm3;
com.sap.host.HostSystemInfo=ovm3;com.sap.host.NumberOfPhysicalCPUs=4;com.sap.host.NumCPUs=4;
com.sap.host.TotalPhyMem=16383;com.sap.host.UsedVirtualMemory=6747;
com.sap.host.MemoryAllocatedToVirtualServers=6747;com.sap.host.FreeVirtualMemory=9817;
com.sap.host.FreePhysicalMemory=9817;com.sap.host.TotalCPUTime=381175.97;
com.sap.host.Time=1360606887997;com.sap.vm.PhysicalMemoryAllocatedToVirtualSystem=1024;
com.sap.vm.ResourceMemoryLimit=1024;com.sap.vm.TotalCPUTime=2696.2214;
com.sap.vm.ResourceProcessorLimit=1;
```

Chapter 3 Oracle VM Guest Additions

The Oracle VM Guest Additions are a set of packages that can be installed on the *guest* operating system of a *virtual machine* running in the Oracle VM environment. These packages provide the tools to allow bi-directional communication directly between the *Oracle VM Manager* and the operating system running within the virtual machine. This is a powerful tool that provides administrators fine-grained control over the configuration and behavior of components running within the virtual machine directly from Oracle VM Manager.

This chapter gives you detail on the installation, configuration and use of the Oracle VM Guest Additions.

3.1 Introduction to the Oracle VM Guest Additions

The Oracle VM Utilities include a *messaging* tool, which allows sending of key-value pairs to a *virtual machine*, or *guest*, and to retrieve messages from the guest. The `ovm_vmmessage` utility requires the Oracle VM Guest Additions to be installed on the guest virtual machine. The current edition of Oracle VM Guest Additions includes message channel and guest IP information.

The Oracle VM Guest Additions allows direct integration between guest software and the virtualization layer, to assist in orchestration and automation of complex, multi-virtual machine deployments. Features of the Oracle VM Guest Additions include:

- Improved information about virtual machines within Oracle VM Manager, such as reporting on IP addressing.
- Ability to use the template configuration facility to automatically configure virtual machines as they are first started.
- Ability to send messages directly to a virtual machine from Oracle VM Manager to trigger programmed events.
- Ability to query a virtual machine to obtain information pertaining to previous messages.
- Ability to interact with the Oracle VM Utilities `ovm_vmmessage` command.

3.2 Installing the Oracle VM Guest Additions

If the *virtual machine* is derived from an Oracle VM template that does not have the Oracle VM Guest Additions installed, you can install the Oracle VM Guest Additions by downloading them from the Oracle Unbreakable Linux Network (ULN).

http://linux.oracle.com

Log into ULN, and select the appropriate *Add ons* channel for the *guest* operating system, for example:

- Enterprise Linux 5 Add ons (i386)
- Enterprise Linux 5 Add ons (x86_64)
- Oracle Linux 6 Add ons (i386)
- Oracle Linux 6 Add ons (x86_64)

In addition to the ULN downloads, the required packages are available from Oracle's public YUM repository:

- http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/

- http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/

Download and install the Oracle Unbreakable Enterprise Kernel (UEK) and other guest addition utilities to the guest virtual machine. The packages you need are:

- kmod-ovmapi-uek
- libovmapi
- libovmapi-devel
- ovmd
- python-simplejson
- xenstoreprovider
- ovm-template-config
- ovm-template-config-authentication
- ovm-template-config-datetime
- ovm-template-config-firewall
- ovm-template-config-network
- ovm-template-config-selinux
- ovm-template-config-ssh
- ovm-template-config-system
- ovm-template-config-user

To install these packages, make sure that your virtual machine has public Internet access and is connected to the appropriate ULN channel or YUM repository. Then use the following command syntax in your Oracle Linux guest, separating the package names by spaces:

```
# yum install libovmapi xenstoreprovider ovmd python-simplejson xenstoreprovider
```

Caution

When manually installing the downloaded packages, make sure that the `kmod-ovmapi-uek` version matches the UEK version of the virtual machine:

- UEK *2.36.32-100* requires `kmod-ovmapi-uek-1.0.0-27.100`
- UEK *2.36.32-200* requires `kmod-ovmapi-uek-1.0.0-27.200`
- UEK *2.36.32-300* requires `kmod-ovmapi-uek-1.0.0-27.300`

3.3 Upgrading the Oracle VM Guest Additions

If the *virtual machine* is derived from an Oracle VM template that does have the Oracle VM Guest Additions installed, you may need to update the packages in order for the Oracle VM Guest Additions to function correctly. Using the Oracle Unbreakable Linux Network (ULN) (http://linux.oracle.com) YUM repository you can run the following command to update the packages:

```
# yum update ovmd libovmapi xenstoreprovider \
  ovm-template-config \
  ovm-template-config-authentication \
  ovm-template-config-datetime \
  ovm-template-config-firewall \
  ovm-template-config-network \
  ovm-template-config-selinux \
  ovm-template-config-ssh \
  ovm-template-config-system \
  ovm-template-config-user
```

If you are using a kernel version lower than UEK *2.6.39-300*, and you want to continue to use the current kernel, you must also run the following command to update the `ovmapi.ko` module:

```
# yum update kmod-ovmapi-uek
```

Alternatively, you can update your kernel to the latest UEK version by running the following command:

```
# yum update kernel-uek
```

If you are using Oracle Linux 5, you need to enable `ol5_UEK_latest` within `/etc/yum.repos.d/ULN-Base.repo`, before you attempt to update your kernel version. For example, the file should contain the following lines:

```
[ol5_UEK_latest]
name=Latest Unbreakable Enterprise Kernel for Oracle Linux $releasever ($basearch)
baseurl=http://public-yum.oracle.com/repo/OracleLinux/OL5/UEK/latest/$basearch/
gpgkey=http://public-yum.oracle.com/RPM-GPG-KEY-oracle-el5
gpgcheck=1
enabled=1
```

3.4 Using the Oracle VM Guest Additions (ovmd)

The Oracle VM Guest Additions daemon, `ovmd`, facilitates a bi-directional *messaging* channel between *Oracle VM Manager* and the *guest*. It allows first-boot installation configuration, and is capable of sending and receiving messages consisting of key-value pairs.

It is possible to send messages via Oracle VM Manager to the Oracle VM Guest Additions daemon running on any guest, using the `ovm_vmmessage` utility that can be installed on any Linux system with access to Oracle VM Manager or on the Oracle VM Manager host itself. See Section 2.4.3, “Oracle VM Virtual Machine Messaging (ovm_vmmessage)” for more information on using this tool.

In previous releases you could use the `ovmd` utility to send key/value messages to a virtual machine. This feature is now included directly in Oracle VM Manager. Although this section mentions the options available to send messages to a virtual machine using `ovmd`, you should instead use the Oracle VM Manager Web Interface or Oracle VM Manager Command Line Interface to send key/value messages. The virtual machine must have the Oracle VM Guest Additions daemon installed and running. See Send VM Messages in the *Oracle VM Manager User's Guide*, or the *Oracle VM Manager Command Line Interface User's Guide* for more information.

Used in conjunction with the `ovm-template-config` script, the `ovmd` utility can be used to remotely configure system and application configuration parameters within a *virtual machine* as it boots. See Section 3.6, “The Oracle VM Template Configuration Script and Modules” for more information on this facility.

Oracle VM Manager makes use of `ovmd` in order to obtain IP addressing information from the guest to include in the Oracle VM Manager Web Interface when displaying detailed virtual machine information. See Section 3.5, “Displaying the Virtual Machine's IP Address”.

You can run `ovmd` directly from the command line to perform actions outside of `ovmd`'s function as a daemon or system service. Running `ovmd` using the `--help` parameter provides you with a breakdown of the options supported when run directly from the command line.

Syntax

```
ovmd [{ -p | --set-param= } param ][{ -g | --get-param= } key ][{ -r | --delete-param= } key ]
[{ -x | --delete-params }][{ -l | --list-params }][{ -e | --event= } event ][{ -s | --script=
} script ][{ -d | --debug= }{ 0 | 1 | 2 }][{ -f | --pid-file= } filename ][{ -t | --time-period=
} seconds ][{ -v | --version }][{ -h | --help }]
```

Options

The following table shows the available options for this command.

Option	Description
{ -p | --set-param= } *param*	Set a parameter in the format of *key*=*value*.
{ -g | --get-param= } *key*	Get the value of the parameter by key name.
{ -r | --delete-param= } *key*	Delete the parameter by key name.
{ -x | --delete-params }	Delete all parameters.
{ -l | --list-params }	List all parameters.
{ -e | --event= } *event*	Inject an event.
{ -s | --script= } *script*	Run a script on the virtual machine.
{ -d | --debug= }{ 0 | 1 | 2 }	Set the debug level. `0` is `DEBUG_OFF`, `1` is `DEBUG_STDERR`, and `2` is `DEBUG_SYSLOG`. The default is `2`.
{ -f | --pid-file= } *filename*	Set the path name of the process ID (PID) file.
{ -t | --time-period= } *seconds*	Set the period for daemon mode. The default is `10` seconds.
{ -v | --version }	Show the `ovmd` script version number and exit.
{ -h | --help }	Show help on the `ovmd` command options.

Examples

Example 3.1 Showing the ovmd script version

```
# ovmd -v
```

Example 3.2 Running a script on a virtual machine

```
# ovmd --script=/scripts/cleanup
```

Example 3.3 Sending a message from a virtual machine to Oracle VM Manager

```
# ovmd -p key1=value1
```

See Section 3.4.2, “Using the Messaging Channel” for more information on sending and receiving messages using the `ovmd` script.

Example 3.4 Listing messages sent from Oracle VM Manager on a virtual machine

```
# ovmd -\-list
```

```
{"key1":"value1"}
{"key2":"value2"}
```

Example 3.5 Deleting a message on a virtual machine

```
# ovmd -r key1
```

3.4.1 Using the Oracle VM Guest Additions Daemon to Enable First-Boot Configuration

If you are configuring a virtual machine to act as a template or if you intend to *clone* it, you may want to set it up so that at next boot it behaves as if it is booting for the first time, thereby prompting for configuration input either by the VM API or on the virtual machine console. This can be achieved by running the following commands as *root* within the virtual machine:

```
# ovmd -s cleanup
# service ovmd enable-initial-config
# shutdown -h now
```

On next boot, the virtual machine acts as if it is performing a first-time boot.

If you have configured `ovmd` to run as a service, you are able to configure it remotely using the *messaging* facility and the `ovm-template-config` script.

See the example Section 3.4.2, “Using the Messaging Channel” for more information on using the messaging channel. Also see Section 3.6, “The Oracle VM Template Configuration Script and Modules” for information about the `ovm-template-config` script.

3.4.2 Using the Messaging Channel

This section gives an example of a message exchange between Oracle VM Manager and a running Oracle Linux virtual machine with Oracle VM Guest Additions installed. The `ovm_vmmessage` tool that is included with Oracle VM Utilities is used to communicate with the Oracle Linux guest. More information about the messaging utility can be found in Section 2.4.3, “Oracle VM Virtual Machine Messaging (ovm_vmmessage)”.

Example 3.6 Sending a message from the guest to Oracle VM Manager

Using `ovmd`, you send information from within the virtual machine to your Oracle VM Manager using the following syntax:

```
# ovmd -p key1=value1
```

The message appears in the Oracle VM Manager user interface, as a *Virtual Machine API Incoming Message* event for the virtual machine in question. When you expand the event, the description shows the key-value pair and the date and time when the information exchange took place.

The message from the guest can also be retrieved via the `ovm_vmmessage` utility. To do so, you query the key and the value is returned in the response:

```
# ./ovm_vmmessage -u admin -p password -h localhost -v MyVM02 -q key1
Oracle VM VM Message utility version.
Connected.
VM : 'MyVM02' has status :  Running.
Querying for key 'key1.
Query successful.
Query for Key : 'key1' returned value 'value1'.
Key set 7 minutes ago.
```

Example 3.7 Sending a message from Oracle VM Manager to a virtual machine

Using `ovm_vmmessage`, you send information to a virtual machine using the following syntax:

```
# ./ovm_vmmessage -u admin -p password -h localhost -v MyVM02 -k key2 -V value2
Oracle VM VM Message utility version.
Connected.
VM : 'MyVM02' has status :  Running.
Sending message.
Message sent successfully.
```

Using `ovmd` from within the guest, you can retrieve the message sent from Oracle VM Manager using the following syntax:

```
# ovmd -\-list
{"key1":"value1"}
{"key2":"value2"}
```

The `ovmd -\-list` command retrieves all messages, both sent and received. You can identify the specific message you are looking for by its key. To remove obsolete messages, use the following syntax:

```
# ovmd -r key1
# ovmd -\-list
{"key2":"value2"}
```

3.4.3 Configuring the Oracle VM Guest Additions Daemon to Run as a Service

To enable `ovmd` to run as a service on Oracle Linux, run the `chkconfig` command as *root*:

```
# chkconfig ovmd on
```

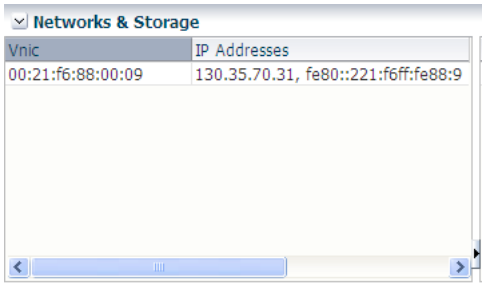
To start the `ovmd` service, run the following as *root*:

```
# /etc/init.d/ovmd start
```

When configured as a service, `ovmd` listens for message requests sent from Oracle VM Manager.

3.5 Displaying the Virtual Machine's IP Address

When the Oracle VM Guest Additions are installed, the *virtual machine* IP address becomes visible in the *Oracle VM Manager* user interface, as part of the detailed virtual machine information.



3.6 The Oracle VM Template Configuration Script and Modules

The Oracle VM Guest Additions include a set of packages that can help with the automatic configuration of *virtual machine* as they are created from a template and booted for the first time. The master package for this facility is known as `ovm-template-config`. The Oracle VM template configuration script can be used to configure a virtual machine remotely using the Oracle VM *messaging* facility via `ovmd`.

3.6.1 Overview of the Template Configuration Script (ovm-template-config)

The Oracle VM Template Configuration Script, ovm-template-config works in conjunction with a set of modular configuration scripts that function in a manner very similar to the standard Linux System V, init.d and chkconfig, script model. Control over how configuration modules are run is handled within the /etc/template.d directory on the *guest* virtual machine. The configuration module scripts are stored in /etc/template.d/scripts.

The ovm-template-config script is the master script that is used to control all enabled modules. Running ovm-template-config with the --help parameter provides a usage breakdown.

For remote configuration, ovm-template-config is used in conjunction with ovmd to capture configuration parameters that have been sent to the guest using the Oracle VM messaging facility. When this is the case, ovm-template-config targets are presented to ovmd as --script parameters:

```
# ovmd -s cleanup
# ovmd -s configure
```

Important

When performing remote configuration, using ovmd to process messages containing configuration keys, the *authentication* module must be enabled. Processing of messages can only be completed if the final message contains the root user password. See Section 3.6.2, "Enabling and Disabling Configuration Modules (ovm-chkconfig)" for more information on this module.

See Section 3.6.4, "Triggering Configuration Changes" for more information on calling this script directly.

Syntax

ovm-template-config [-e | --enumerate] [--human-readable] [{ -i | --input= } *input*] [{ -o | --output= } *output*] [--stdin] [--console-input] [--ovf-transport-iso] [{ -s | --script= } *script*] [--logfile= *logfile*] [--loglevel= *loglevel*] [--version] [{ -h | --help }] *target*

Where *target* is:

{ configure | unconfigure | reconfigure | cleanup | suspend | resume | migrate | shutdown }

Options

The following table shows the available options for this command.

Option	Description
[-e | --enumerate]	Enumerate the parameters for *target*.
--human-readable	Print in human readable format when enumerate parameters.
{ -i | --input= } *input*	Input parameters from this file descriptor.
{ -o | --output= } *output*	Output parameters to this file descriptor.
--stdin	Build parameters from stdin.
--console-input	Build parameters from the console input.
--ovf-transport-iso	Build parameters from the OVF transport ISO.
{ -s | --script= } *script*	Specify a script.

Option	Description
`--logfile=` *`logfile`*	Set the name of the log file.
`--loglevel=` *`loglevel`*	Set the logging level.
`--version`	Show the `ovm-template-config` script version number and exit.
{ `-h` | `--help` }	Show help on the `ovm-template-config` command options.

Examples

Example 3.8 Listing the key pairs in configuration modules

```
# ovm-template-config --enumerate configure
```

Example 3.9 Listing the key pairs specific to the network configuration module

```
# ovm-template-config --enumerate --script network configure
```

Example 3.10 Passing configuration information to the script from STDIN

```
# ovm-template-config --stdin configure
```

Example 3.11 Passing configuration information from the command line prompt (prompting for values)

```
# ovm-template-config --console-input configure
```

Example 3.12 Passing configuration information from an OVF transport mounted on a CDROM device

```
# ovm-template-config --ovf-transport-iso configure
```

3.6.2 Enabling and Disabling Configuration Modules (ovm-chkconfig)

When a module is enabled, symlinks to the module script are made to other subdirectories within `/etc/template.d` based on the type of target the module provides, in much the same way that the System V `init` process works. When a module gets added, the header of the module script is read to verify the name, priority and targets and then a symlink is made to the corresponding subdirectories under `/etc/template.d`.

Enabling and disabling targets for any module is handled using the `ovm-chkconfig` script. Usage of this command is outlined using the `--help` parameter.

Syntax

`ovm-chkconfig` [`--list` [*`name`*]] [`--add` *`name`*] [`--del` *`name`*] [`--target=` *`target`* ... *`name`* { `on` | `off` }] [`--version`] [{ `-h` | `--help` }]

Where *`target`* is:

{ `configure` | `unconfigure` | `reconfigure` | `cleanup` | `suspend` | `resume` | `migrate` | `shutdown` }

Options

The following table shows the available options for this command.

Option	Description
[`--list` [*`name`*]]	Lists the status of the script *`name`*.
[`--add` *`name`*]	Add a new script *`name`*.
[`--del` *`name`*]	Delete a script *`name`*.
[`--target=` *`target`* ... *`name`* { `on` | `off` }]	Specify the *`target`*s in a comma separated list, for example: `--target="configure,unconfigure"`
`--version`	Show the `ovm-chkconfig` script version number and exit.
{ `-h` | `--help` }	Show help on the `ovm-chkconfig` command options.

Examples

Example 3.13 Listing available modules and their target runtime status

```
# ovm-chkconfig --list
name            configure  unconfigure reconfigure cleanup  suspend  resume  migrate  shutdown
authentication  on:90      off         off         off      off      off     off      off
datetime        on:50      off         off         off      off      off     off      off
firewall        on:41      off         off         off      off      off     off      off
network         off        off         off         off      off      off     off      off
selinux         off        off         off         off      off      off     off      off
ssh             off        off         off         off      off      off     off      off
system          off        off         off         off      off      off     off      off
user            off        off         off         off      off      off     off      off
```

Example 3.14 Enabling all targets supported by a module

```
# ovm-chkconfig --add authentication
```

Example 3.15 Disabling all targets supported by a module

```
# ovm-chkconfig --del datetime
```

Example 3.16 Disabling particular targets for a module

```
# ovm-chkconfig --target=cleanup user off
```

3.6.3 Key-Value Pairs Used By Available Configuration Modules

To obtain a full listing of all of the key pairs that are used to trigger configuration changes through the `ovm-template-config` configuration modules, run the following command on the guest system where `ovm-template-config` is installed:

```
# ovm-template-config --human-readable --enumerate configure
```

The output from this command is printed as a Python data structure, that is easy to parse and understand. Content can be limited to the information specific to a configuration module by using the `--script` parameter as presented below:

```
# ovm-template-config --human-readable --enumerate configure --script datetime
       [('50',
  'datetime',
  [{u'description': u'System date and time in format year-month-day-hour-minute-second, e.g.,
                    "2011-4-7-9-2-42".',
    u'hidden': True,
```

```
    u'key': u'com.oracle.linux.datetime.datetime'},
   {u'description': u'System time zone, e.g., "America/New_York".',
    u'hidden': True,
    u'key': u'com.oracle.linux.datetime.timezone'},
   {u'description': u'Whether to keep hardware clock in UTC: True or False.',
    u'hidden': True,
    u'key': u'com.oracle.linux.datetime.utc'},
   {u'description': u'Whether to enable NTP service: True or False.',
    u'hidden': True,
    u'key': u'com.oracle.linux.datetime.ntp'},
   {u'description': u'NTP servers separated by comma, e.g.,
                     "time.example.com,0.example.pool.ntp.org".',
    u'hidden': True,
    u'key': u'com.oracle.linux.datetime.ntp-servers'},
   {u'description': u'Whether to enable NTP local time source: True or False.',
    u'hidden': True,
    u'key': u'com.oracle.linux.datetime.ntp-local-time-source'}])]
```

From the output, it becomes clear as to which configuration modules are triggered at which runlevel and what keys and values they accept. Note that all key names are structured so that they are prefixed with *com.oracle*, to avoid conflicts with any custom modules that you may intend to develop for your own purposes.

Key value pairs are actually passed to `ovm-template-config` in JSON format:

```
{"com.oracle.linux.datetime.ntp":"True"}
{"com.oracle.linux.datetime.ntp-servers":"0.pool.ntp.org,1.pool.ntp.org,2.pool.ntp.org"}
{"com.oracle.linux.root-password":"mysecret"}
```

3.6.4 Triggering Configuration Changes

There are a variety of approaches that can be used to trigger a configuration change using `ovm-template-config`. Most commonly, this is done by setting the `ovmd` service to run using in *enable-initial-config* mode. This causes the virtual machine to wait to be provided with configuration parameters either on via the console, or via the `ovmd` messaging facility, after the next boot. This is the usual approach when configuring a virtual machine to act as a template.

To manually force `ovmd` to pass messages to the `ovm-template-config` script, simply run `ovmd` with the `--script` parameter set to point to one of the `ovm-template-config` targets:

```
# ovmd --list
{"com.oracle.linux.datetime.ntp":"True"}
{"com.oracle.linux.datetime.ntp-servers":"0.pool.ntp.org,1.pool.ntp.org,2.pool.ntp.org"}
{"com.oracle.linux.root-password":"password"}
# ovmd -s configure
```

Note

To perform an action using messaging parameters and `ovm-template-config`, the *authentication* module must be enabled and your final message should include an authentication request in the form of a key-value message:

```
{"com.oracle.linux.root-password":"password"}
```

When running `ovmd` like this, `ovmd` prepares two pipes (*infd* and *outfd*) and calls the `ovm-template-config` script transparently in the background in the following way:

```
# ovm-template-config --input <infd> --output <outfd> configure
```

During testing, it may be useful to simply pass configuration information directly to the script from STDIN on the command line. This can be achieved by calling the script directly with the `--stdin` parameter:

```
# ovm-template-config --stdin configure <<EOF
> {"com.oracle.linux.selinux.mode": "disabled"}
> {"com.oracle.linux.root-password": "ovsroot"}
> EOF
```

Configuration can also be achieved directly from the console by running the script using the `--console-input` option. Doing this will prompt you for values for each of the keys that need to be defined for any enabled modules:

```
# ovm-template-config --console-input configure
```

3.6.5 Developing Oracle VM Template Configuration Modules

The provided module scripts are developed in Python. Theoretically, it is possible to develop module scripts in a different language, as long as the input, output and argument handling remains the same. The example provided in this section makes use of the Python programming language.

Each module script consists of 2 main parts:

1. The script header, which contains information like script name, targets, priorities and description.
2. The actual script, which handles a small set of parameters.

For examples of functional module scripts, refer to the existing modules in the `/etc/template.d/scripts` directory.

Module Script Header

Module script headers require a very specific comment block in order for `ovm-chkconfig` to handle enabling and disabling your script functionality. The format for the script header is as follows:

```
### BEGIN PLUGIN INFO
# name: [script name]
# [target]: [priority]
# [target]: [priority]
# description: a description that can
#   cross multiple lines.
### END PLUGIN INFO
```

When developing your own module script, you must include a header following the exact same format. Provide your own script name, which will be used when calling `ovm-chkconfig`, the targets that your script will support, and the priority for your script. The priority will specify in what order the script gets executed. You do not have to implement all targets. If you have a configure target but no cleanup target, this is still acceptable. The configure target gets called when a first boot/initial start of the virtual machine happens. The cleanup target happens when you manually initiate a cleanup in your virtual machine or when you want to restore the virtual machine to its original state. An example of the network module script header is provided below:

```
### BEGIN PLUGIN INFO
# name: network
# configure: 50
# cleanup: 50
# description: Script to configure template network.
### END PLUGIN INFO
```

Module Script Body

The main requirement for the module script body is that it accepts at least one target parameter. Target parameters that might get presented by the `ovm-template-configure` script include:

- `configure`
- `unconfigure`
- `reconfigure`
- `cleanup`
- `suspend`
- `resume`
- `migrate`
- `shutdown`

Your script can handle any other arguments that you require. There is one optional parameter which is useful to implement and this is `-e` or `--enumerate`. `ovm-template-config` uses this to be able to enumerate or list the parameters for a target supported by your script.

A very basic template to use for your script body follows:

```
try:
    import json
except ImportError:
    import simplejson as json
from templateconfig.cli import main


def do_enumerate(target):
    param = []
    if target == 'configure':
        param += []
    elif target == 'cleanup':
        param += []
    return json.dumps(param)


def do_configure(param):
    param = json.loads(param)
    return json.dumps(param)


def do_cleanup(param):
    param = json.loads(param)
    return json.dumps(param)


if __name__ == '__main__':
    main(do_enumerate, {'configure': do_configure, 'cleanup': do_cleanup})
```

This script supports the configure and cleanup targets.

You can fill out the script with your own code. For instance, for the `do_enumerate` function, you would populate the parameters that are supported for each target in the script. An example from the firewall module is presented below:

```
def do_enumerate(target):
    param = []
    if target == 'configure':
        param += [{'key': 'com.oracle.linux.network.firewall',
                   'description': 'Whether to enable network firewall: True or False.',
                   'hidden': True}]
```

```
    return json.dumps(param)
```

Each target function begins by reading the JSON parameters passed to the script, using the `param = json.loads(param)` statement. From this point, code can be written to perform actions based on the values of the keys that the script expects to receive. Once again, the example provided below is from the firewall module:

```
def do_configure(param):
    param = json.loads(param)
    firewall = param.get('com.oracle.linux.network.firewall')
    if firewall == 'True':
        shell_cmd('service iptables start')
        shell_cmd('service ip6tables start')
        shell_cmd('chkconfig --level 2345 iptables on')
        shell_cmd('chkconfig --level 2345 ip6tables on')
    elif firewall == 'False':
        shell_cmd('service iptables stop')
        shell_cmd('service ip6tables stop')
        shell_cmd('chkconfig --level 2345 iptables off')
        shell_cmd('chkconfig --level 2345 ip6tables off')
    return json.dumps(param)
```

Module Script Packaging

Once you have written one or more configuration module scripts, you may want to package them as RPMs that can be deployed on other systems. In order to install and configure template configure scripts, they have to be packaged in an RPM, with a specific naming convention. Package the script as `ovm-template-config-[scriptname]`. Ideally in the post install of the RPM you should add the script automatically by executing `# /usr/sbin/ovm-chkconfig --add scriptname`. When de-installing a script/RPM, remove it at uninstall time using `# /usr/sbin/ovm-chkconfig --del scriptname`. This is illustrated in the following example of an RPM spec file that can be used:

```
Name: ovm-template-config-example
Version: 3.0
Release: 1%{?dist}
Summary: Oracle VM template example configuration script.
Group: Applications/System
License: GPL
URL: http://www.oracle.com/virtualization
Source0: %{name}-%{version}.tar.gz
BuildRoot: %(mktemp -ud %{_tmppath}/%{name}-%{version}-%{release}-XXXXXX)
BuildArch: noarch
Requires: ovm-template-config

%description
Oracle VM template example configuration script.

%prep
%setup -q

%install
rm -rf $RPM_BUILD_ROOT
make install DESTDIR=$RPM_BUILD_ROOT

%clean
rm -rf $RPM_BUILD_ROOT

%post
if [ $1 = 1 ]; then
    /usr/sbin/ovm-chkconfig --add example
fi

%preun
if [ $1 = 0 ]; then
```

```
    /usr/sbin/ovm-chkconfig --del example
fi

%files
%defattr(-,root,root,-)
%{_sysconfdir}/template.d/scripts/example

%changelog
* Tue Mar 22 2011 John Smith  - 3.0-1
- Initial build.
```

Edit the example spec file to reference your own script name.

In order to create RPMs, you must install `rpmbuild`:

```
# yum install rpm-build
```

The following example Makefile may help to automate the build process:

```
DESTDIR=
PACKAGE=ovm-template-config-example
VERSION=3.0

help:
@echo 'Commonly used make targets:'
@echo '  install    - install program'
@echo '  dist       - create a source tarball'
@echo '  rpm        - build RPM packages'
@echo '  clean      - remove files created by other targets'

dist: clean
mkdir $(PACKAGE)-$(VERSION)
tar -cSp --to-stdout --exclude .svn --exclude .hg --exclude .hgignore \
--exclude $(PACKAGE)-$(VERSION) * | tar -x -C $(PACKAGE)-$(VERSION)
tar -czSpf $(PACKAGE)-$(VERSION).tar.gz $(PACKAGE)-$(VERSION)
rm -rf $(PACKAGE)-$(VERSION)

install:
install -D example $(DESTDIR)/etc/template.d/scripts/example

rpm: dist
rpmbuild -ta $(PACKAGE)-$(VERSION).tar.gz

clean:
rm -fr $(PACKAGE)-$(VERSION)
find . -name '*.py[cdo]' -exec rm -f '{}' ';'
rm -f *.tar.gz

.PHONY: dist install rpm clean
```

Edit this Makefile to reference your own script.

Create a working directory, copy over your script, the spec file and the Makefile. Run:

```
# make dist
```

to create a src tarball of your code and then run:

```
# make rpm
```

This will generate an RPM in the `RPMS/noarch` directory within your working directory. For example: `RPMS/noarch/ovm-template-config-test-3.0-1.el6.noarch.rpm`.

Chapter 4 Converting Hosts

This chapter discusses creating *hardware virtualized guest* images from existing physical computers running any of the operating systems supported by Oracle VM.

4.1 Converting a Host

You can convert the operating system and application software on a computer to an Oracle VM *hardware virtualized guest* image using the Physical to Virtual (P2V) conversion utility. The P2V utility is included on *Oracle VM Server* CDs prior to the 3.3 release. The operating system must be one of the Oracle VM supported guest operating systems. See the *Oracle VM Release Notes* for a list of the supported guest operating systems. To perform a P2V conversion, the *host computer* must have a CPU that supports PAE (Physical Address Extension).

The P2V conversion process creates a *virtual machine* configuration file (`vm.cfg`), allows you to make some modifications in terms of sizing of the virtual machine hardware, and then replicates the physical image and transfers it over the network to a storage repository using *Oracle VM Manager*. The image on your physical computer is not changed in any way.

The P2V utility converts disks on the computer to *virtual disk* images. The first four virtual disk images are created as IDE disks (hda, hdb, hdc, and hdd) on the guest, using the original disk names. Up to seven additional disks are created as SCSI devices (sda, sdb, sdc, and so on). The disk entries in the `vm.cfg` file look similar to:

```
disk = ['file:System-sda.img,hda,w',
'file:System-sdb.img,hdb,w',
'file:System-sdc.img,hdc,w',
'file:System-sdd.img,hdd,w',
'file:System-sde.img,sda,w',
'file:System-sdf.img,sdb,w',
'file:System-sdg.img,sdc,w',
'file:System-sdh.img,sdd,w',
'file:System-sdi.img,sde,w',
'file:System-sdj.img,sdf,w',
'file:System-sdk.img,sdg,w',
]
```

The hardware virtualized guest created by the P2V utility must have its own network configuration. If you use the same network configuration as the original computer, a network clash may occur as two computers on the network may have the same IP and MAC address. When the guest is started, make sure the network device is detected and a new network device is configured.

You can run the P2V utility interactively, or as an automated process using a kickstart configuration file. When you use the P2V utility with a kickstart file, no user intervention is required.

4.2 Using the P2V Utility

Note

The P2V utility is not available on the Oracle VM Server 3.3 Installation ISO or CDROM. If you intend to use it, you must download the Oracle VM Server Installation ISO for the 3.2 release. You can download this ISO from:

https://edelivery.oracle.com/oraclevm

When you use the P2V utility, you are prompted for all required information.

To create a virtual machine image of a computer:

1. Insert the Oracle VM Server 3.2 CDROM into the CDROM drive of the computer you want to image.

   Note

   This procedure is for 64-bit computers. If you want to convert a 32-bit host computer to a *virtual machine template*, you must use the Oracle VM 2.*x* CD.

2. Start the computer with the Oracle VM Server CDROM.

3. The **Oracle VM Server** screen is displayed.

   At the `boot:` prompt, enter:

```
p2v
```

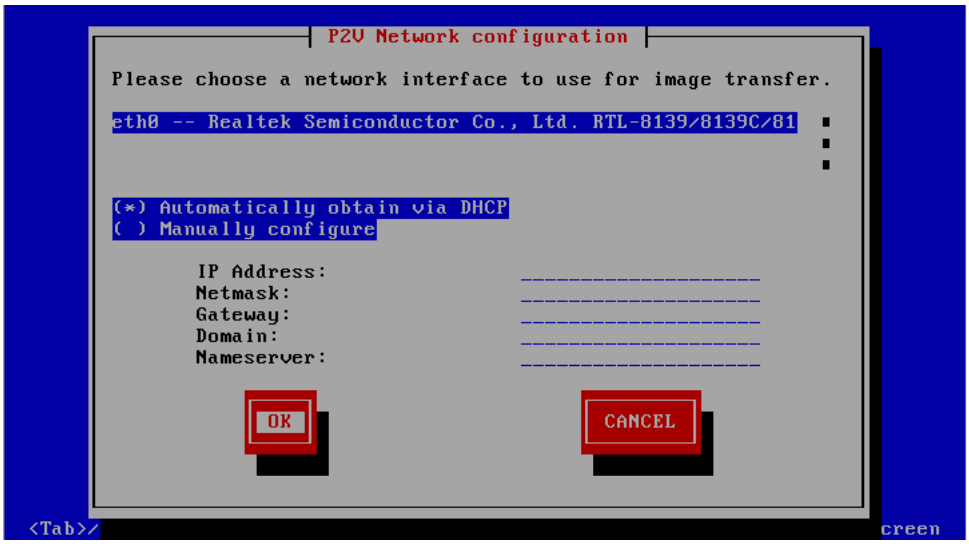
   Press **Enter**.

4. The **CD Found** screen is displayed.

If you want to make sure the CDROM is error free, you can have the installer test it for errors. To test the CDROM, select **OK** and press **Enter**. The CDROM is tested and any errors are reported.

To skip media testing and continue with the installation, select **Skip** and press **Enter**.

5. The **P2V Network Configuration** screen is displayed.



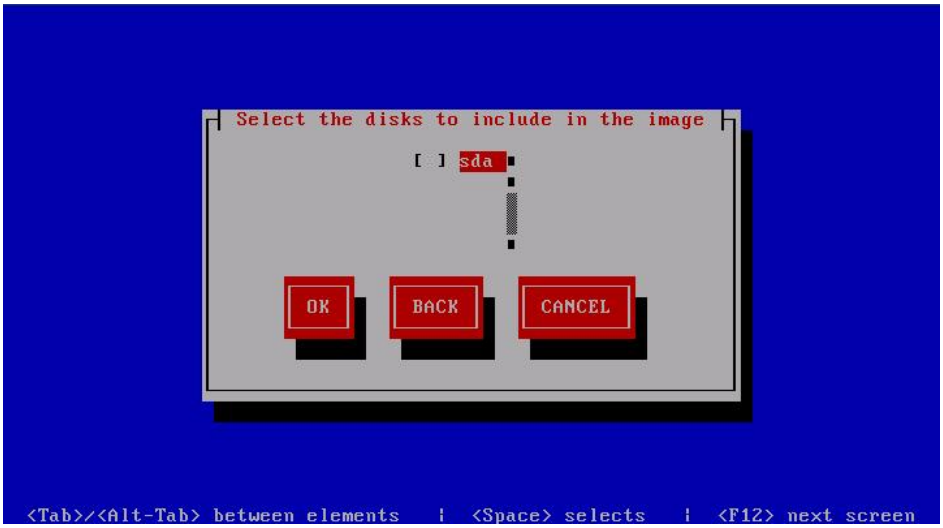
Select your Ethernet driver from the list displayed.

If your computer uses DHCP to assign its IP address, select **Automatically obtain via DHCP**.

If your computer uses a static IP address, select **Manually configure**, and enter the IP address and netmask, gateway, *domain* and name server for your computer.

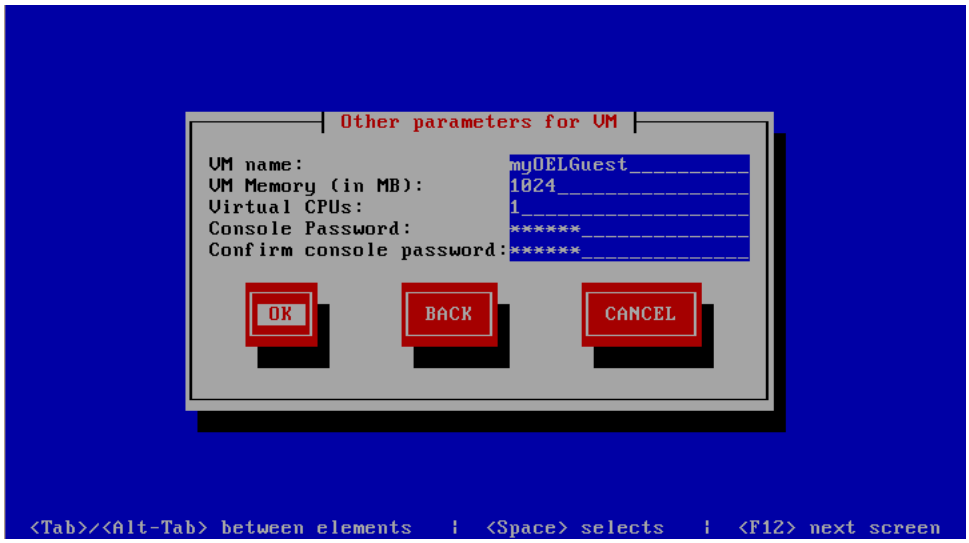
Select **OK** and press **Enter**.

6. The disk selection screen is displayed.



Select the disk partition(s) on the computer to include in the guest image. Select **OK** and press **Enter**.

7. The **Other parameters for VM** screen is displayed.

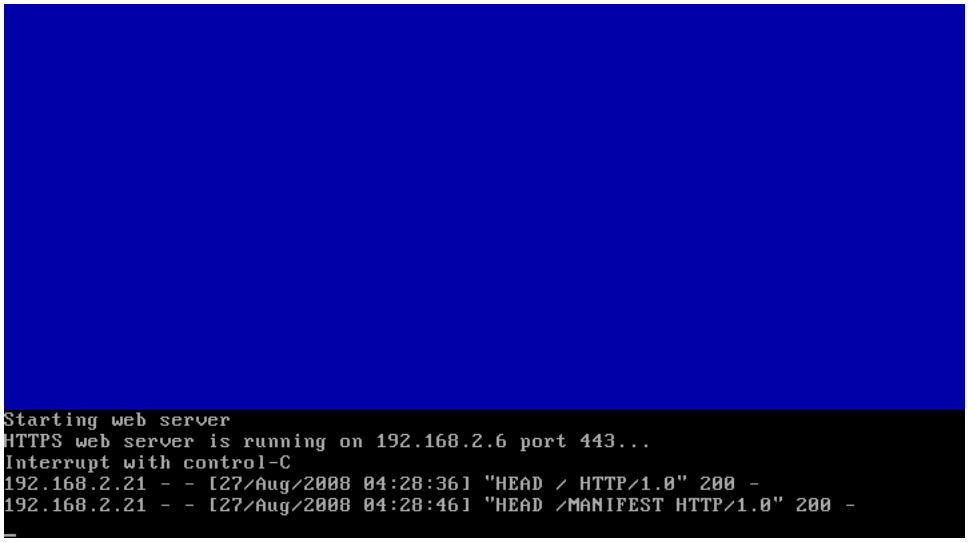


Enter information about the guest image for:

- VM (guest) name.
- VM (guest) memory.
- Number of virtual CPUs.
- Console password. This is no longer required, but you must enter a value.

Select **OK** and press **Enter**.

8. A secure web server (HTTPS) is started. The IP address of the computer, and port number the web server is available on is displayed.



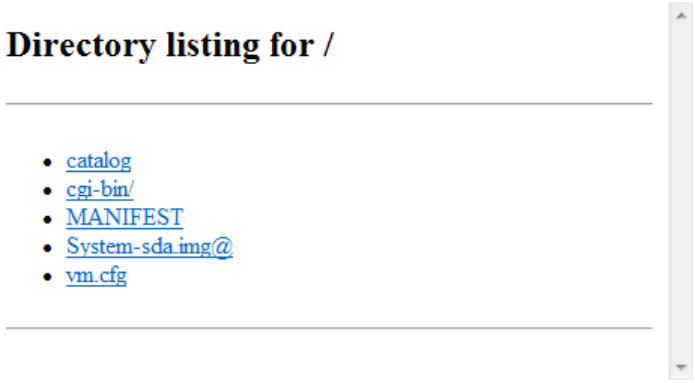
Open a web browser on another computer and enter the URL created using the information displayed on the computer running the P2V utility, for example

https://192.168.2.6/

Important

The Web server uses port 443. You must ensure that this port is open between the Web server and the Oracle VM Server into which you plan to import the template.

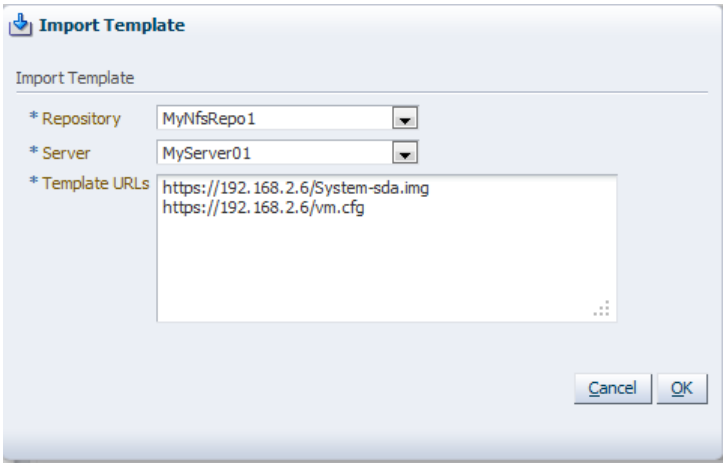
A directory listing is displayed which contains the files created by the P2V utility. Take a note of the URLs for the `vm.cfg` and *.img files as you use them in the next step when importing the virtual machine into Oracle VM Manager.



Log in to Oracle VM Manager and import the guest using the import template feature. When you import the guest, you should add the URLs for each virtual disk image and the virtual machine configuration file on a new line in the **Template URLs** field in the **Import Template** dialog, for example:

```
https://192.168.2.6/System-sda.img

https://192.168.2.6/vm.cfg
```



9. When the *virtual machine template* is added to the repository, you should terminate the P2V utility on the host computer. Press **Control**+**C** to terminate the P2V utility on the computer. Remove the *Oracle VM Server* CDROM from your CDROM drive. Restart the computer.

The guest image is created and available in the repository as a hardware virtualized virtual machine template.

4.3 Using the P2V Utility with a Kickstart File

You can use a kickstart file to automate the creation of a *guest* image of a physical computer using the P2V utility. When you use the P2V utility with a kickstart file, no user intervention is required. If there are any missing parameters in the kickstart file, you are prompted to enter them.

To use a P2V kickstart file, you must create a file with the P2V configuration options and parameters and place it on a kickstart server. The kickstart server can be made available using NFS, FTP, or HTTP. The kickstart server is set up in the same way as a standard Oracle Linux or Red Hat kickstart server and is beyond the scope of this book.

The following example P2V kickstart file starts sends the guest image to an instance of *Oracle VM Manager* via network device eth0, which obtained an IP address via DHCP:

```
p2v
cdrom
lang en_US.UTF-8
keyboard us
target --ovmmanager
network --device eth0 --bootproto dhcp
diskimage --device /dev/sda --type IDE
vm_options --name myVM --mem 2048 --vcpus 2 --consolepasswd password
```

See Section 4.4, “P2V Parameters” for detailed information on the P2V kickstart file options and parameters.

To create an Oracle VM virtual machine image of a computer using the P2V utility with a kickstart file:

1. Create a P2V kickstart file and copy it to your kickstart server.
2. Insert the *Oracle VM Server* CDROM into your CDROM drive of the computer you want to image.
3. Restart the computer with the Oracle VM Server CDROM.
4. The **Oracle VM Server** screen is displayed. At the `boot:` prompt, enter `p2v` and the protocol and location for the kickstart file. For example, to use a kickstart file called `ks.cfg` on an HTTP server named *http://example.com*, enter:

   ```
   p2v ks=http://example.com/mypath/ks.cfg
   ```

   Press **Enter**.
5. If there are any missing parameters in the kickstart file, you are prompted to enter them.
6. If the kickstart file includes the directive to import the guest image to Oracle VM Manager, a secure web server (HTTPS) is started. A screen is displayed giving the IP address of the computer, and port number the web server is available on. Log in to Oracle VM Manager and import the guest using the import template feature as described in Section 4.2, “Using the P2V Utility”.
7. When the virtual machine template is added to the repository, you should terminate the P2V utility on the host computer. Press **Control**+**C** to terminate the P2V utility on the computer. Remove the Oracle VM Server CDROM from your CDROM drive. Restart the computer.

The guest image is created and available in the repository as a hardware virtualized virtual machine template.

4.4 P2V Parameters

This section contains information about the Physical to Virtual (P2V) conversion utility and details the usage, syntax and parameters on the command line and in a kickstart file.

The P2V conversion utility enables you to convert a computer's operating system (Linux and Microsoft Windows™) and applications to an Oracle VM *hardware virtualized* *guest* image. The P2V utility is included on the *Oracle VM Server* CD. You can access the P2V utility by restarting a computer with the Oracle VM Server CD. The Oracle VM Server start-up screen is displayed. At the `boot:` prompt, enter `p2v`, for example:

```
boot: p2v
```

You can use a P2V kickstart file to automate creation of hardware virtualized guest images from physical computers. This section discusses the options and parameters of the P2V kickstart file.

The P2V utility converts disks on the computer to *virtual disk* images. The virtual disk images are created as IDE disks (hda, hdb, hdc, hdd, and so on) on the guest, using the original disk names. When you use a P2V kickstart file, up to four disks are automatically deployed in the guest. Any extra disks are converted and added to the guest configuration file (`vm.cfg`), although they are not deployed. To deploy the additional disks in the guest, edit the guest configuration file, remove the comments from the disk entries, and map the additional disks to SCSI device names, for example, sda, sdb, and sdc. The boot disk must always be mapped to device hda. Any files on the guest which contain references to these devices must also be changed, for example, the `/etc/fstab` file may contain references to `/dev/hda1`, `/dev/sda1`, and so on.

When you use a P2V kickstart file, at least one network interface must use DHCP. This is required for the computer running the P2V utility to read the kickstart file over the network. The network configuration for this network interface cannot be modified from the kickstart file.

If you want the P2V utility's web server to listen using a network interface other than the one used to initiate the kickstart session, the network configuration (DHCP or static IP address) for that network interface can be specified in the kickstart file.

A number of screens may be displayed prior to the P2V utility starting with a kickstart file. You can suppress these screens to fully automate the P2V utility. Prior to the P2V utility starting, you may see up to four screens:

- P2V Network Configuration screen.
- Language selection screen.
- Keyboard selection screen.
- Installation source screen.

Syntax

`p2v [ ks=ksfile ] [ ksdevice=device ]`

Options

The following table shows the options for this command. These options can also be used in a kickstart file.

Option	Description
`ks=ksfile`	The name and location of a P2V kickstart file. This should be used on the command line, not in a kickstart file.
`ksdevice=device`	Suppresses the P2V Network Configuration screen. The *`device`* parameter is the name of an Ethernet device, for

Option	Description
	example `eth0`. This should be used on the command line, not in a kickstart file.
`p2v`	Indicates the kickstart file is intended to automate a P2V conversion. This parameter is required in order to perform an automated P2V conversion and should be supplied at the Oracle VM Server `boot:` prompt instead of `install`, `update`, or `rescue`. It accepts no parameters.
`lang` *`language`*	Suppresses the P2V Language selection screen. The *`language`* parameter is the name of the operating system language, for example, `en_US.UTF-8`.
`keyboard` *`keyboard`*	Suppresses the P2V Keyboard selection screen. The keyboard parameter is the name of the keyboard type, for example, `us`.
`cdrom`	Suppress the Installation source screen.
`target --ovmmanager`	Sets the end destination for the guest image. Sets the P2V utility to operate in HTTPS server mode to transfer the guest image to a running instance of *Oracle VM Manager*.

`diskimage` *`option`* ...	Denotes a disk to be included in the guest image. The P2V utility uses device mapper-based snapshotting to copy the disk as a `system-*.img` file on the target computer. There may be multiple `diskimage` directives in a P2V kickstart file, each resulting in a disk image in the guest image. The `--device` parameter must always be used with the `diskimage` directive to indicate which device should be imaged.
	
	The *`option`* parameter is one or more of the following:
	
	`--device` *`path`*
	
	The device to image. *`path`* must be the full path to the device. For example:
	
	`diskimage --device /dev/sda`
	
	`--type` { `IDE` | `SCSI` | `LVM` | `MDRAID` }
	
	Sets the type of disk. Must be one of `IDE`, `SCSI`, `LVM`, or `MDRAID`. Devices /dev/hda, /dev/hdb, /dev/hdc, and /dev/hdd should be `IDE`. Devices /dev/sd[a-zz] should be `SCSI`. A logical volume should be `LVM`. Devices /dev/md[a-zz] should be `MDRAID`. For example:
	
	`diskimage --device /dev/hda --type IDE`

`network` *`option`* ...	Configures network information for the computer. The *`option`* parameter is one or more of the following: `--bootproto` { `dhcp` | `bootp` | `static` } Sets the method by which the network configuration is determined. Must be `dhcp`, `bootp`, or `static`. The default is `dhcp`. `bootp` and `dhcp` are treated as the same.

Option	Description

	`dhcp` uses a DHCP server to obtain the networking configuration, for example:
	`network --bootproto dhcp`
	`static` requires all the necessary networking information. As the name implies, this information is static and is used during and after the installation. The entry for static networking is more complex, as you must include all network configuration information on one line. You must specify the IP address, netmask, gateway, and nameserver, for example:
	`network --bootproto static --ip 10.0.2.15 --netmask 255.255.255.0 --gateway 10.0.2.254 --nameserver 10.0.2.1`
	The `static` method has the following restrictions:
	• All static networking configuration information must be specified on one line; you cannot wrap lines using a backslash.
	• You can only specify one nameserver.
	`--ip` *`ipaddress`*
	The IP address for the computer.
	`--gateway` *`ipaddress`*
	The IP address for the default gateway.
	`--nameserver` *`ipaddress`*
	The IP address for the primary nameserver.
	`--netmask` *`netmask`*
	The netmask for the computer.

`vm_options` *`option`* ...	Sets the configuration options for the guest. The *`option`* parameter is one or more of the following: `--name` *`name`* The name of the guest. `--mem` *`size`* The memory allocation for the guest in Mb. `--vcpus` *`number`* The number of VCPUs for the guest. `--consolepasswd` *`password`*

Option	Description
	The console password for the guest. This option is ignored by Oracle VM Manager when the guest is imported. For example: `vm_options --name MyVM --mem 2048 --vcpus 2 --consolepasswd mypassword`

Examples

Example 4.1 P2V Kickstart File

An example P2V kickstart file follows:

```
p2v
cdrom
lang en_US.UTF-8
keyboard us
target --ovmmanager
network --device eth0 --bootproto dhcp
diskimage --device /dev/sda --type IDE
vm_options --name myVM --mem 2048 --vcpus 2 --consolepasswd password
```

Example 4.2 Suppressing the P2V Network Configuration Screen

To suppress the P2V Network Configuration screen, supply the Ethernet device on the command line, for example:

```
boot: p2v ks=http://example.com/ks.cfg ksdevice=eth0
```

Example 4.3 Suppressing the Language Selection Screen

To suppress the Language selection screen, supply the language parameter in the kickstart file, for example:

```
lang en_US.UTF-8
```

Example 4.4 Suppressing the Keyboard Selection Screen

To suppress the Keyboard selection screen, supply the keyboard parameter in the kickstart file, for example:

```
keyboard us
```

Example 4.5 Suppressing the Installation Source Screen

To suppress the Installation source screen, supply the source parameter in the kickstart file, for example:

```
cdrom
```

Chapter 5 Backing up and Restoring Oracle VM Components

This chapter gives you the basic information required to back up and restore *Oracle VM Manager*, the database repository, and *virtual machines*.

Oracle does not recommend backing up Oracle VM Servers as no critical data is contained on them. Instead of backing up and recovering an Oracle VM Server, in the event of a failure, simply delete it from Oracle VM Manager, reinstall the Oracle VM Server software if required, and rediscover it.

For a more thorough discussion on backing up and restoring the various entities that comprise Oracle VM, see the *Oracle VM 3: Backup and Recovery Best Practices Guide* at:

http://www.oracle.com/technetwork/server-storage/vm/overview/index.html

5.1 Backing up and Restoring Oracle VM Manager

This section contains information about how to back up and restore *Oracle VM Manager*, including the database repository. Note that the MySQL database repository is automatically backed up every day. It is possible to manually backup the database and these steps are discussed in Section 5.1.2, “Backing up the MySQL Database Repository”. The following outline describes the steps required to perform a manual backup of Oracle VM Manager.

To back up Oracle VM Manager:

1. Back up/copy the Oracle VM Manager configuration file located at:

   ```
   /u01/app/oracle/ovm-manager-3/.config
   ```

2. Back up the Oracle VM Manager database. The Oracle VM Manager database is backed up automatically every 24 hours using the MySQL Enterprise Backup utility, but it is also possible to perform a manual backup. See Section 5.1.2, “Backing up the MySQL Database Repository” for more information on Oracle VM Manager MySQL database backup and restore facilities.

5.1.1 Backing Up The Oracle VM Manager Configuration File

To back up Oracle VM Manager, you should back up the Oracle VM Manager configuration file. This file contains info

The Oracle VM Manager configuration file is located at:

```
/u01/app/oracle/ovm-manager-3/.config
```

This configuration file contains database connection information, ports and the UUID used by Oracle VM Manager. The structure of this configuration file follows:

Example 5.1 Oracle VM Manager configuration file

```
DBTYPE=Database type, legacy: always 'MySQL' for Oracle VM Manager 3.3.1 and above
DBHOST=Hostname of database server, legacy: always 'localhost' for Oracle VM Manager 3.3.1 and above
SID=Oracle SID: default value of 'ovs'
LSNR=Database listener port number: default value of '49500'
OVSSCHEMA=Oracle VM Manager database name: default value of 'ovs'
APEX=Legacy option: always None for Oracle VM Manager 3.3.1 and above
WLSADMIN=Oracle WebLogic Server administrator: default value of weblogic
OVSADMIN=Oracle VM Manager administrator: default value of admin
COREPORT=Oracle VM Manager core port: default value of 54321
UUID=Oracle VM Manager UUID
BUILDID=Oracle VM Manager version and build number
```

To backup this configuration file, copy it to a safe alternative location.

5.1.2 Backing up the MySQL Database Repository

This section contains information about the *Oracle VM Manager* MySQL backup facility.

As of Oracle VM Manager Release 3.2.1, backups of the local MySQL database are performed automatically every 24 hours. Backups are stored within `/u01/app/oracle/mysql/dbbackup` by default, and are rotated regularly so that only the 21 most recent backups are stored at any point in time. Backups make use of the MySQL Enterprise Backup utility. See http://www.mysql.com/products/enterprise/backup.html for more information on the MySQL Enterprise Backup utility.

The MySQL Enterprise Backup package is installed as a dependency during the installation of Oracle VM Manager. On Oracle Linux systems this is handled by installing `meb-3.8.0-el6.x86_64.rpm`.

On x86 systems, backup configuration options are defined in `/etc/sysconfig/ovmm` on the Oracle VM Manager host.

To configure the default path used to store MySQL database backup files, locate the following line:

```
DBBACKUP=/u01/app/oracle/mysql/dbbackup
```

Note

This path can be changed to an alternate location if you need to cater to disk space requirements.

The default path for the mysqlbackup binary is specified in the following line:

```
DBBACKUP_CMD=/opt/mysql/meb-3.8/bin/mysqlbackup
```

Warning

This path is made explicit for the purposes of handling future updates to the MySQL Enterprise Backup package. It should not be changed.

5.1.2.1 Backing up Directories and Logs

Each backup is stored in a directory within the path defined by `DBBACKUP`. The backup directory is named `AutoFullBackup-MMDDYYYY_hhmmss`. Within the backup directory is a log file, named `AutoBackup.log`, containing information about the events that took place during the backup process. The backup directory contains a backup of the MySQL configuration file, a `datadir` directory containing the binary log for the database, a `meta` directory containing files specific to the MySQL Enterprise Backup process that was run at the time, and the actual `MBI` image file for the database that is backed up.

Only the 21 most recent backups are maintained within the `DBBACKUP` path. Manual backups, where the backup directory name is not prepended with `AutoFullBackup`, are ignored by the rotation.

Currently, it is not possible to change the frequency of automatic backups, or the number of automatic backups that are retained during a rotation.

5.1.2.2 Performing a Backup Manually

It is possible to initiate a backup manually. This is usually done when performing an upgrade of Oracle VM Manager. While it is possible to invoke the `mysqlbackup` utility directly, it is recommended that you initiate a backup directly from the Oracle VM Manager core. This can be achieved using the provided backup script at `/u01/app/oracle/ovm-manager-3/ovm_tools/bin/BackupDatabase` script:

```
# /u01/app/oracle/ovm-manager-3/ovm_tools/bin/BackupDatabase -w

Enter your OVM Manager username: admin
Enter your OVM Manager password:

INFO:  Backup started to:
         /u01/app/oracle/mysql/dbbackup/ManualBackup-20140324_102412

       Job: 'Start Backup to: ManualBackup'
```

By default, the backup script stores the backup as a manual backup, to avoid the rotation that takes place for other automatic backups. The backup script prompts you for your Oracle VM Manager username and password.

In the example above, we used the `-w` command-line switch to force the backup script to wait until the backup job is complete. This option is useful if you need to capture potential error messages, but you should be aware that using it also causes the script to wait indefinitely, until the job either completes or exits due to an error. If you choose not to use the `-w` command-line switch, you should check the status of the backup job within the Oracle VM Manager Web Interface or Oracle VM Manager Command Line Interface to determine whether or not the job completed successfully. A full list of supported options for this command can be obtained using the `-h` command-line switch. These are not fully documented here as most of the options provided are not supported for customer use.

Note

The backup script assumes that you are using a properly signed SSL certificate within a production environment. Using a self-signed certificate is not recommended and may result in an error when you run the script. It is possible to override SSL verification by using the `--insecure` command-line parameter, however this may compromise the security of the operation and is not recommended. A better approach to resolving any SSL verification error, is to install an SSL certificate signed by a recognized CA, as described in Changing the SSL Key.

For more information on using MySQL Enterprise Backup, see http://dev.mysql.com/doc/mysql-enterprise-backup/en.

5.1.3 Restoring Oracle VM Manager

To restore Oracle VM Manager, and the Oracle VM Manager database schema from a backup, you must have performed the steps to back up Oracle VM Manager in Section 5.1.1, “Backing Up The Oracle VM Manager Configuration File”.

To restore Oracle VM Manager from a backup:

1. First, if you need to reinstall or upgrade Oracle VM Manager, use the Oracle VM Manager installation media to perform an install or upgrade of the software on your server. See Installing Oracle VM Manager for information on how to perform the installation. See Upgrading Oracle VM Manager for information on how to perform the upgrade.

   You should perform the install using the `runInstaller.sh --uuid` *`uuid`* command and provide the UUID from the previous manager installation you created a backup from. The UUID can be found in the Oracle VM Manager configuration file.

   Note

   The Oracle VM Manager UUID is also persisted in the `/etc/sysconfig/ovmm` file on Linux, and in the `/etc/opt/ovmm` file on Solaris. If the system disk of

the server on which you are installing or restoring Oracle VM Manager was not wiped entirely, the existing UUID is still present and will be detected when running the installer.

- The `--uuid` option on Linux overrides this existing UUID. Solaris users must use the shortened form of this option: `-u`.
- If no UUID is present in `/etc/sysconfig/ovmm`, the `--uuid` option adds the UUID to the file on Linux. On Solaris, the `-u` option adds the UUID to `/etc/opt/ovmm` if the UUID is not present in this file.

An example install command syntax for Linux is as shown in this example:

```
# ./runInstaller.sh --uuid 0004FB000000100002CB7F2DFFA8D8
```

When the Oracle VM Manager installer prompts for installation information other than passwords, reuse the same usernames for the database schema, Oracle WebLogic Server and Oracle VM Manager administration user, as set out in the backup of the Oracle VM Manager configuration file. You must set the passwords again as the passwords are not backed up and cannot be restored.

2. After installation, reinstallation or upgrade, stop the Oracle VM Manager Command Line Interface, Oracle VM Manager, and the database before you restore the backup. On Linux:

```
# /sbin/service ovmcli stop
# /sbin/service ovmm stop
# /sbin/service ovmm_mysql stop
```

3. Before you restore the database, ensure that no database files already exist on the Oracle VM Manager host:

```
# cd /u01/app/oracle/mysql/data/
# rm -rf appfw ibdata1 ib_logfile0 ib_logfile1 mysql ovs performance_schema
```

Important

Do not remove any of the following files from `/u01/app/oracle/mysql/data/`:

- `auto.cnf`
- `my.cnf`
- `.mysqlconfig`
- `mysql_upgrade_info`

  This file may only exist if there was an upgrade to the current version. It does not exist on systems where a fresh installation was performed.

4. To initiate the database restore, as the **oracle** user, use the `RestoreDatabase` command located in `/u01/app/oracle/ovm-manager-3/ovm_tools/bin`, for example:

```
# su - oracle
$ bash /u01/app/oracle/ovm-manager-3/ovm_tools/bin/RestoreDatabase.sh \
     ManualBackup-20140324_102412
INFO: Expanding the backup image...
INFO: Applying logs to the backup snapshot...
INFO: Restoring the backup...
INFO: Restoring OVM keystores and certificates
INFO: Success - Done!
```

```
INFO: Log of operations performed is available at:
/u01/app/oracle/mysql/dbbackup/ManualBackup-20140324_102412/Restore.log


IMPORTANT:

      As 'root', please start the OVM Manager database and application using:
               service ovmm_mysql start; service ovmm start
```

The `RestoreDatabase` script expects the name of the directory for a particular backup directory as described in Section 5.1.2.1, “Backing up Directories and Logs”. You do not need to specify the full path to the backup directory as this is already specified in the **DBBACKUP** variable.

5. Restart the database and Oracle VM Manager, and the Oracle VM Manager Command Line Interface. On Linux:

```
# /sbin/service ovmm_mysql start
# /sbin/service ovmm start
# /sbin/service ovmcli start
```

6. Since the certificates required to authenticate various components, such as the Oracle VM Manager Web Interface and Oracle VM Manager Command Line Interface, are regenerated during the new installation and the mappings for these are overwritten by the database restore, it is necessary to reconfigure the certificates used to authenticate these components. This is achieved by running the following script to reconfigure the Oracle WebLogic Server:

```
# export MW_HOME=/u01/app/oracle/Middleware
# /u01/app/oracle/ovm-manager-3/ovm_upgrade/bin/ovmkeytool.sh setupWebLogic
```

For more information on the `ovmkeytool.sh` script, please see Section 1.2.3, “Setting up SSL on Oracle VM Manager”.

Once you have run this command, you must restart Oracle VM Manager and then run the client certificate configuration script. On Linux:

```
# /sbin/service ovmm restart
# /u01/app/oracle/ovm-manager-3/bin/configure_client_cert_login.sh
```

The script requires that Oracle VM Manager is running, and prompts you for the administrator username and password that should be used to access Oracle VM Manager. The script makes changes that may require Oracle VM Manager to be restarted:

```
# /sbin/service ovmm restart
```

7. Within Oracle VM Manager go to the **Servers and VMs** tab and perform a **Refresh All** on your existing *server pools*. See Refresh All in the *Oracle VM Manager User's Guide* for more information on these options.

5.1.4 How to Restore Oracle VM Manager If You Have No Database Backup

Important

The instructions provided here should be used as a last resort. You really must ensure that your backup strategy is adequate and that the database backups are available on storage that is suitable for this purpose. Typically, these backups should be stored on some form of network attached storage, preferably with a RAID that provides some form of mirroring. To change the backup path to a suitable location, see Section 5.1.2, “Backing up the MySQL Database Repository”.

If you have reinstalled Oracle VM Manager from scratch, using the `runInstaller.sh --uuid uuid` command and have provided the UUID from the previous manager installation, but you do not have a database backup, a certain level of recovery is possible based on the information stored on the Oracle VM Servers and in your attached storage. It is important that you follow a set order of actions to ensure that the server pools that your Oracle VM Servers are members of are able to be properly recovered. These steps are outlined as follows:

1. Discover one Oracle VM Server from each server pool.
2. Discover the storage that contains the server pool file system. Present it to the newly discovered Oracle VM Server. Refresh the storage.
3. Refresh the file system or physical disks that contain the server pool file system.
4. Refresh the file systems or physical disks that contain the repositories used by server pool. If you get an error, when refreshing a physical disk, similar to the following:

   ```
   OVMAPI_7281E Cannot perform operation on file system...
   ```

   then take ownership of the repositories and try to perform the physical disk refresh again.
5. Present the repositories to the Oracle VM Server.
6. Refresh the repositories.
7. Discover the remaining Oracle VM Servers in the server pool.
8. Refresh all Oracle VM Servers in the server pool to discover the virtual machines.

Note

When you perform a restore in this manner, the names and descriptions of all objects in Oracle VM Manager are lost. You need to manually rename each object in your environment.

5.2 Oracle WebLogic Server Backup and Restore

In general, it is not necessary to perform a separate backup of the Oracle WebLogic Server component used by Oracle VM Manager, however in the instance that you have created separate Oracle WebLogic Server users to facilitate a number of different login credentials that can be used to access Oracle VM Manager you may need to perform your own backup of the Oracle WebLogic Server LDAP directory used for authentication. This is particularly important if you intend to upgrade Oracle VM Manager, as there is a possibility that any user credentials that have been manually configured within Oracle WebLogic Server may be lost during an update process.

Full documentation describing the Oracle WebLogic Server LDAP backup process and how to configure Oracle WebLogic Server LDAP backups can be found at:

http://docs.oracle.com/cd/E24329_01/web.1211/e21048/failures.htm

In the Oracle VM context, LDAP data for Oracle WebLogic Server is stored in:

`/u01/app/oracle/ovm-manager-3/domains/ovm_domain/servers/AdminServer/data/ldap`

Based on the information provided in the Oracle WebLogic Server documentation, you can perform a full backup of this directory on your own schedule, or you can rely on Oracle WebLogic Server's automated backups located in:

```
/u01/app/oracle/ovm-manager-3/domains/ovm_domain/servers/AdminServer/data/ldap/backup
```

If you opt to use the Oracle WebLogic Server backup service, you may wish to change some of the default backup parameters as described in:

http://docs.oracle.com/cd/E24329_01/apirefs.1211/e24401/taskhelp/security/ConfigureBackupsForEmbeddedLDAPServers.html

Note that in the instructions presented in the link provided, the domain for the Oracle VM Manager application is **ovm_domain**.

5.3 Backing up Virtual Machines

There are a number of options you can use to take a back up of a *virtual machine*. This section discusses some of them and the pros and cons for each.

One of the main points that should be considered when backing up a virtual machine, is whether you can shut down the virtual machine during the back up. Backing up a running virtual machine allows the machine to be available for use, but does not allow for a back up that is consistent or easy to restore. Creating a back up of a running virtual machine is similar to taking a back up of a running database without putting the tablespaces in back up or read-only mode. The first couple of blocks you back up from a the virtual machine are likely to be out of sync with the last blocks of your back up. If and when you try to restore a back up taken from a running virtual machine, you may not be able to rebuild the machine due to disk errors.

You can install back up software in the virtual machine, for example Oracle Secure Backup. This allows you to safely back up a running virtual machine. The ease by which you can restore the virtual machine from the back up depends on the software used.

The following table discusses some virtual machine back up options, with some high level benefits and disadvantages of each method. This is not an exhaustive list of all the options that may be available.

Table 5.1 Virtual Machine Backup Options

Backup Option	Benefits	Disadvantages
Install back up software in the virtual machine and back up to an external source.	Virtual machine can be running. Fine grained control of files backed up.	
Create a back up of the virtual machine from the storage repository (see Repository Exports Perspective).	Consistent virtual disk status.	Virtual machine must be stopped.
Create a cold *clone* of the (stopped) virtual machine (see Clone a Virtual Machine or Template, then back up the clone from the storage repository (see Repository Exports Perspective).	Consistent virtual disk status.	Virtual machine must be stopped.
Create a hot clone of the (running) virtual machine (see Clone a Virtual Machine or Template, then back up the clone from the storage repository (see Repository Exports Perspective).	Virtual machine can be running.	Inconsistent virtual disk status. Virtual disks may need to be recovered using a disk repair utility. May cause data loss or corruption.

Backup Option	Benefits	Disadvantages
		Only available on *OCFS2-based* file systems (iSCSI or fibre channel-based storage). Should not be used for virtual machines running an Oracle Database (instead use the rman utility or similar).
Create a back up of the entire storage repository (see Repository Exports Perspective).	Back up all virtual machines at once. Consistent virtual disk status.	Virtual machines must be stopped.

The two recommended strategies for backing up a virtual machine are to:

- Shut down the virtual machine and create a cold clone, then back up the clone files from the storage repository.
- Shut down the virtual machine and back up the virtual machine files from the storage repository.

These two options create a safe back up, with the *virtual disks* in a stable and consistent state. To restore the virtual machine, import the virtual machine into the storage repository (see Import Virtual Machine).

Chapter 6 Troubleshooting Oracle VM

This chapter gives you details on troubleshooting problems with installing and using all components of Oracle VM.

For additional information, see the Oracle support-oriented Web sites:

- My Oracle Support, http://support.oracle.com
- Oracle Virtualization Community, https://community.oracle.com/community/server_%26_storage_systems/virtualization

6.1 Troubleshooting Oracle VM Installation

The section contains information on known issues you may encounter when installing Oracle VM, and explains how to resolve them. If you contact Oracle Support for assistance with an *Oracle VM Manager* installation, please include the installation logs. See Installation Logs in the *Oracle VM Installation and Upgrade Guide* for information on log file names and locations.

6.1.1 libaio Not Installed

The following error is displayed during installation of Oracle VM Manager if the prerequisite libaio package is not installed:

```
libaio is not installed...
```

To fix this error, install the libaio package. For information on how to install libaio, see Prerequisite Packages in the *Oracle VM Installation and Upgrade Guide*.

6.1.2 Cannot Install MySQL

The Oracle VM Manager installer may fail to install MySQL and displays the message:

```
Failed: The database instance is not available.
```

You can check the log file at `/tmp/ovmm-installer.selfextract_id/ovm-manager-3-install-date.log` for more detailed information.

There are two workarounds to this issue.

1. Make sure that MySQL is not installed, or has installed correctly. Use the following command to check the status:

   ```
   $ /etc/init.d/ovmm_mysql status
   ```

   If MySQL is running, run the Oracle VM Manager installation script to uninstall it, and reinstall Oracle VM Manager.

2. Make sure the computer's host name matches the host name in the `/etc/hosts` file. See Network in the *Oracle VM Installation and Upgrade Guide* to configure the host name.

6.1.3 Cannot Create OVS Database Schema

The Oracle VM Manager install may fail and display the following message:

```
Creating the Oracle VM Manager database schema ... Failed.
```

You can check the log file at `/tmp/ovmm-installer.selfextract_id/ovm-manager-3-install-date.log` for more detailed information.

Possible workarounds for this issue are:

1. Make sure that MySQL has installed correctly. Use the following command to check the status:

   ```
   $ /etc/init.d/ovmm_mysql status
   ```

   If MySQL is running, run the Oracle VM Manager installation script to uninstall it, and reinstall Oracle VM Manager.

2. Reinstall Oracle VM Manager.

6.1.4 Installation Fails on Non-English Character Set

If the operating system is a non-English character set or language, the Oracle VM Manager installer may display the following error:

```
Update default password failed.
```

Oracle VM Manager only supports the English language and character set.

You can check the log file at `/tmp/ovmm-installer.selfextract_id/ovm-manager-3-install-date.log` for more detailed information.

To workaround this issue, set the character set to en_US.UTF-8:

1. Run the following command to check if the value of LANG is `en_US.UTF-8`:

   ```
   # env|grep LANG
   ```

2. If the character set is not `en_US.UTF-8`, change it to `en_US.UTF-8`:

   ```
   # export LC_CTYPE="en_US.UTF-8"
   ```

3. Reinstall Oracle VM Manager.

6.1.5 Installation Fails When Using an NIS-based Oracle User Account

If the *oracle* user account is created using NIS-based authentication (Network Information Services), the Oracle VM Manager installation fails during the prerequisite check, and the following error is displayed:

```
Verifying installation prerequisites ...
hardnofiles should be set to 8192 but was 0
Configuration verification failed ...
```

Or the installation may pass prerequisite check, but may fail later during the installation of the Application Development Framework:

```
Retrieving Oracle Application Development Framework (ADF) ...
Unzipping Oracle ADF ...
Installing Oracle ADF ...
Installing Oracle ADF Patch...
```

To workaround this issue, disable ypbind service and create a non-NIS-based *oracle* user account using `createOracle.sh` on the host computer and rerun the installer:

```
# /sbin/service ypbind stop
# service ypbind status
```

```
ypbind is stopped
# ./createOracle.sh
# ./runInstaller.sh
```

6.2 Troubleshooting Oracle VM Server

This section describes some problems you may encounter when using *Oracle VM Server*, and explains how to resolve them.

If you need to contact Oracle Support Services, you will be asked to supply the log files mentioned in this section. You may also be required to provide the exact version of each Oracle VM component. To find the version of *Oracle VM Manager*, click the **Help** menu, then **About**. To find the version of Oracle VM Server and *Oracle VM Agent*, see Control Domains Perspective in the *Oracle VM Manager User's Guide*.

6.2.1 Oracle VM Server Debugging Tools

If *virtual machine* creation fails, check the Oracle VM Server log files and use the command-line tools to help you find the cause of a problem. There are a number of useful command-line tools, important directories, and log files that you should check when troubleshooting problems with Oracle VM Server. This section discusses these tools and log files.

6.2.1.1 Oracle VM Server Directories

The important Oracle VM Server directories you should check when troubleshooting problems with Oracle VM Server are listed in Table 6.1, “Oracle VM Server directories”.

Table 6.1 Oracle VM Server directories

Directory	Purpose
`/etc/xen`	Contains Oracle VM Server configuration files for the Oracle VM Server daemon and virtualized *guests*.
`/etc/xen/scripts`	Contains networking related scripts.
`/var/log`	Contains the Oracle VM Agent log file, `ovs-agent.log`. Contains the `ovmwatch.log`, which logs virtual machine life cycle *events*. Contains the `ovm-consoled.log`, which logs remote VNC console access, and all communication with Oracle VM Manager.
`/var/log/xen`	Contains Oracle VM Server log files.
`/var/log/messages`	Contains Oracle VM Server messages.

6.2.1.2 Oracle VM Server Log Files

The Oracle VM Serverlog files you should check when troubleshooting problems with Oracle VM Server are listed in Table 6.2, “Oracle VM Server log files”.

Table 6.2 Oracle VM Server log files

Log File	Purpose
`xend.log`	Contains a log of all the actions of the Oracle VM Server daemon. Actions are normal or error conditions. This log contains the same information as output using the `xm log` command. This file is located in the `/var/log/xen` directory.

Log File	Purpose
`xend-debug.log`	Contains more detailed logs of the actions of the Oracle VM Server daemon. This file is located in the `/var/log/xen` directory.
`xen-hotplug.log`	Contains a log of hotplug events. Hotplug events are logged if a device or network script does not start up or become available. This file is located in the `/var/log/xen` directory.
`qemu-dm.pid.log`	Contains a log for each *hardware virtualized* guest. This log is created by the quemu-dm process. Use the `ps` command to find the *pid* (process identifier) and replace this in the file name. This file is located in the `/var/log/xen` directory.
`ovs-agent.log`	Contains a log for Oracle VM Agent. This file is located in the `/var/log/` directory.
`osc.log`	Contains a log for Oracle VM Storage Connect plug-ins. This file is located in the `/var/log/` directory.
`ovm-consoled.log`	Contains a log for the Oracle VM virtual machine console. This file is located in the `/var/log/` directory.
`ovmwatch.log`	Contains a log for the Oracle VM watch daemon. This file is located in the `/var/log/` directory.

6.2.1.3 Oracle VM Server Command Line Tools

The Oracle VM Server command line tools you should use when troubleshooting problems with Oracle VM Server are listed in Table 6.3, “Oracle VM Server command line tools”.

Table 6.3 Oracle VM Server command line tools

Command-Line Tool	Purpose
`xentop`	Displays real-time information about Oracle VM Server and domains.
`xm dmesg`	Displays log information on the *hypervisor*.
`xm log`	Displays log information of the Oracle VM Server daemon.

6.2.2 Using DHCP on Oracle VM Servers

It is recommended that you install Oracle VM Server on a computer with a static IP address. If your computers uses DHCP you should configure your DHCP server to assign static DHCP addresses. This makes sure your host always receives the same IP address. The behavior of the Oracle VM Server host is undefined if used in an environment where your IP address may change due to DHCP lease expiry.

6.2.3 Oracle VM Server Firewall Blocks NFS Access

Oracle VM Server blocks NFS access from any external computer (or guest) by default. This may cause problems when trying to create a guest using an NFS connection. To resolve this, disable the firewall with the following command:

```
# service iptables stop
```

6.2.4 Unable to Use Certain Key Combinations When Connecting to Dom0 Console

Some server models and some client terminals are not ideally compatible with regard to special key combinations. For instance, on some HP servers, such as the HP DL380G4 (BIOS P51) server, the Alt-F2

key combination required to toggle to the login screen does not work for all terminal clients. Some terminal clients provide alternate key mappings, so it is worth checking the documentation of your selected terminal client to determine whether an alternative mapping is available.

If you are using the Windows PuTTY SSH client, then you can press Alt-rightARROW and Alt-leftARROW to toggle the login screen, instead of the printed Alt-F2.

6.2.5 Storage Array LUN Remapping on Oracle VM Servers

Storage array LUN remapping is not supported by Oracle VM Servers. An Oracle VM Server must maintain the connections to a storage array's logical drive using the same LUN IDs. If a LUN is remapped, the following error may be printed in the Oracle VM Server's messages log:

```
Warning! Received an indication that the LUN assignments on this target have changed.
The Linux SCSI layer does not automatically remap LUN assignments.
```

To work around this issue:

- For Fibre Channel storage, reboot the Oracle VM Server. The new storage array LUN IDs are used.
- For iSCSI storage, restart the iscsi daemon on the Oracle VM Server to delete and restore all iSCSI target connections, for example:

  ```
  # service iscsi restart
  ```

  Alternatively, on the Oracle VM Server, log out and log in again to the target for which the LUN IDs have changed, for example:

  ```
  # iscsiadm --mode node --logout 10.196.211.136 iqn.xyz:1535.600a0b800036e48a0000000047b30d8d
  # iscsiadm --mode node --login 10.196.211.136 iqn.xyz:1535.600a0b800036e48a0000000047b30d8d
  ```

6.2.6 Tuning ISCSI Settings on Oracle VM Servers

In some cases, it is possible to run into limitations or bugs within a particular ISCSI implementation that may require you to tune your ISCSI settings for storage initiators on each of your Oracle VM Servers.

Typically this is required when you experience an IO lock on a LUN and an unexpected change in the kernel workload on the Oracle VM Server. You may also notice a dramatic increase in network traffic between the Oracle VM Server and the storage array. This particular case has been noted to occur on some ZFS appliances running Oracle Solaris 11 and is related to the Sun iSCSI COMSTAR port provider. The problem can usually be resolved by updating package versions, however if this is not an option you may tune your ISCSI settings on each Oracle VM Server that communicates with a SUN.COMSTAR target to enable flow control.

To tune ISCSI, on each Oracle VM Server, perform the following steps:

- Open `/etc/iscsi/iscsid.conf` in a text editor.
- Locate the section titled `iSCSI settings`.
- Change the value of the entry `node.session.iscsi.InitialR2T` to `yes`, and the value of the entry `node.session.iscsi.ImmediateData` to `no`.
- Save the file.
- Restart the ISCSI daemon by issuing the following command:

  ```
  # service iscsid restart
  ```

Note

The preferred resolution to this issue is to update your software. Manual configuration of Oracle VM Server settings is not generally advisable, as changes may be lost during future updates.

6.3 Troubleshooting Oracle VM Manager

This section describes some problems you may encounter when using *Oracle VM Manager*, and explains how to resolve them.

6.3.1 Oracle VM Manager Log Files

Oracle VM Manager error messages are displayed in the user interface, in the Jobs tab, in the object's *Events* list and are also available in log files. Log files are stored in the following directory on the Oracle VM Manager host computer:

```
/u01/app/oracle/ovm-manager-3/domains/ovm_domain/servers/AdminServer/logs
```

There a few files of interest here:

- `access.log`: Used to track HTTP access to the Web interface of the Oracle VM Manager and to the underlying *Oracle WebLogic Server* HTTP interface. This log can be used to track access and HTTP operations within Oracle VM Manager to help debug access issues and to audit access to the Oracle VM Manager.
- `AdminServer.log`: Used to track events within the underlying Oracle WebLogic Server framework, including events triggered by Oracle VM Manager. This log can be used to track a variety of issues within Oracle VM Manager including TLS/SSL certificate issues, server availability issues, and any actions performed within Oracle VM Manager which are usually identifiable by searching for items containing the string `com.oracle.ovm.mgr`. Log in failures resulting from locked accounts (as opposed to incorrect credentials) are also in this file.
- `AdminServer-diagnostic.log`: Used to track exceptions within the underlying Oracle WebLogic Server framework, including particular events triggered by Oracle VM Manager such as log in failures due to incorrect credentials. This log can be used to track Oracle VM Manager behavior that results in an exception or for log in failure, which can be tracked by searching for the string `An incorrect username or password was specified`.

Since log file format is determined by Oracle WebLogic Server, many of these files may be difficult to read. A log parsing tool is included with Oracle VM Manager to help extract useful information from the actual log files. The log parsing tool is named `OvmLogTool.py` and is located at:

```
/u01/app/oracle/ovm-manager-3/ovm_tools/bin
```

`OvmLogTool.py` can do three useful things:

- Convert and combine all the AdminServer log files into one easier-to-read file.
- Create a filtered summary log file that only lists errors.
- Tail the AdminServer log, applying the filtering on the fly.

Usually analysis of the logs starts by generating an error summary log. The summary file can act as an index into the filtered file to investigate and analyze errors, providing you with time stamps an a shortened summary of each error that may need further investigation. To generate a summary log file, do the following:

```
# python OvmLogTool.py -s -o summary
processing input file: /u01/app/oracle/ovm-manager-3/domains/ovm_domain/servers/
AdminServer/logs/AdminServer.log00001
processing input file: /u01/app/oracle/ovm-manager-3/domains/ovm_domain/servers/
AdminServer/logs/AdminServer.log
```

This generates a file named `summary` in the local directory. You can use this to look for *errors* that occurred within Oracle VM Manager.

To get a full log of all events and errors within Oracle VM Manager you can do the following:

```
# python OvmLogTool.py -o filteredlog
processing input file: /u01/app/oracle/ovm-manager-3/domains/ovm_domain/servers/
AdminServer/logs/AdminServer.log00001
processing input file: /u01/app/oracle/ovm-manager-3/domains/ovm_domain/servers/
AdminServer/logs/AdminServer.log
```

This generates a file named `filteredlog` in the local directory. You can use this to look for all events that occurred within Oracle VM Manager.

Finally, you can use `OvmLogTool.py` to filter results on the fly while tailing the log:

```
# python OvmLogTool.py -t
tailing log file: /u01/app/oracle/ovm-manager-3/domains/ovm_domain/servers/
AdminServer/logs/AdminServer.log
```

Use **Ctrl**+**C** to exit the program when you have finished tailing the log file.

6.3.2 Oracle VM Manager Web Interface Database Synchronization

The Oracle VM Manager Web Interface and the Oracle VM Manager Command Line Interface make use of a separate database to store a representation of the data model that is used by the Oracle VM Manager core. This is a legacy design artifact that is intended to help with performance and to allow for the potential to decouple the Oracle VM Manager Web Interface from the Oracle VM Manager core. This database makes use of events that are returned by the Oracle VM Manager core to notify the user interface layer of changes to the data model.

In rare instances, where the database used by the Oracle VM Manager Web Interface falls out of sync with the actual data model in the Oracle VM Manager core database, information represented within the Oracle VM Manager Web Interface may not reflect the actual environment. A typical scenario where this may happen is during a virtual machine clone operation that fails. During this process, the virtual machine is actually created within the data model and the database used by the user interface layer. If a part of the whole operation fails, Oracle VM Manager attempts to clean up and roll back, resulting in the virtual machine being removed from the data model. However, in this case, an event is not generated to notify that the clean up has succeeded, and the virtual machine information remains in the user interface database. The result is that the cloned virtual machine is still shown in the Oracle VM Manager Web Interface and the Oracle VM Manager Command Line Interface even though it does not actually exist in the environment.

The user interface database is not resynchronized automatically when the service is restarted, as this can take a long time for large environments. To force database resynchronization, you must create a file on the Oracle VM Manager host before restarting the service. The following instructions explain how to force resynchronization.

Steps to resynchronize the Oracle VM Manager Web Interface database

- You must access the shell of the Oracle VM Manager host, either directly or over SSH.
- Change user to the 'oracle' user, using `su`.

```
# su - oracle
```

- Touch a file called `/tmp/.resyncUI` as the oracle user.

```
$ touch /tmp/.resyncUI
```

If you are unable to do this as the oracle user, then touch the file as any other user but ensure that its permissions are such that any other user can delete the file:

```
# touch /tmp/.resyncUI
# chmod 666 /tmp/.resyncUI
```

- Restart the Oracle VM Manager service as root:

```
# service ovmm restart
```

6.3.3 Oracle VM Manager Command Line Tool

A set of Oracle VM command line utilities are available for download. These Oracle VM Utilities are a collection of command line scripts that allow you to perform a set of basic management tasks on *virtual machines* in an Oracle VM environment. These utilities are particularly useful to administrators who need to execute certain operations quickly and/or repeatedly. Using the command line scripts makes these tasks quicker and easier to perform. See Chapter 2, *Oracle VM Utilities* for more information on these utilities.

A command line interface to Oracle VM Manager is available which mirrors the user interface in functionality to enable ad hoc, scripted, and programmatic access to the Oracle VM environment. See the *Oracle VM Manager Command Line Interface User's Guide* for more information on the command line interface.

6.3.4 No File Systems Found When Searching a Storage Server

On storage servers that have a very large number of file systems available, the UI may time out while refreshing the list of available file systems, resulting in a `No File Systems Available` message. This usually means that the time out value is set too low for the number of file systems that the UI needs to refresh. To resolve this, change the settings for the **Refresh Timeout Value** in the **Preferences Pane** on the **Tools and Resources** tab in the Oracle VM Manager Web Interface to increase the timeout value.

See Preferences in the *Oracle VM Manager User's Guide* for more information on Oracle VM Manager UI preferences.

6.3.5 Unable to Discover Servers to Oracle VM Manager Due To Time Differences

Oracle VM Manager uses certificate-based authentication to maintain secure communication with the Oracle VM Agent that runs on each Oracle VM Server instance. This means that the system time on each Oracle VM Server must be within the bounds of the certificate *valid from* and *valid to* timestamps, or certificate validity is challenged and Oracle VM Manager is unable to authenticate to the Oracle VM Agent.

In most instances, this is not a problem, since servers are automatically configured to use the Oracle VM Manager as an NTP server as soon as ownership is taken. However, during server discovery the Oracle VM Manager uses a password to perform its initial authentication against a server and to provide its certificate for ongoing communication. During this phase of discovery, a check is performed to ensure that the system time on the Oracle VM Server is within the bounds required for certificate authentication to take place. If this is not the case, discovery fails and an error message is returned:

```
OVMAPI_4024E: Cannot take ownership of server myserver5.virtlab.info because the date
```

```
and time on the server are outside the valid range for the manager's SSL certificate.
The certificate is valid from 10/24/13 7:37 PM to 10/25/23 7:37 PM, but server's timestamp
is 9/28/13 8:14 PM.  Please verify the server's NTP and time settings.
```

In this situation, it is necessary that you access the affected Oracle VM Server directly and update its system time manually before attempting to rediscover the server using Oracle VM Manager. Once Oracle VM Manager has completed discovery and is able to take ownership of the server, its NTP configuration is updated automatically and it remains synchronized with the Oracle VM Manager host.

6.3.6 Unable to Create a Clustered Server Pool on a Disk that already has an OCFS2 File System

If you attempt to create a clustered server pool using a disk located on a storage device that already contains an OCFS2 file system, the Oracle VM Agent on the server detects the file system and refuses to overwrite it. This is normal behavior and protects you from accidentally setting up two OCFS2 file systems with matching UUIDs on the same disk, leading to instability and unexpected behavior.

If you are certain that the existing OCFS2 file system that is already present on the disk is no longer in use by any other server pool or repository, you can clean the disk by connecting to the Oracle VM Server and issuing the following command:

```
dd if=/dev/zero of=/dev/mapper/360a98000433468704234786f36394763 bs=1M count=256
```

Replace */dev/mapper/360a98000433468704234786f36394763* with the correct path to the disk device where you are creating the new server pool cluster.

Warning

Using `dd` is data destructive. Make sure you are certain about the disk device name and that the OCFS2 file system that you are deleting is no longer in use. It is advisable to make backups of any data that exists on the disk that you are editing before proceeding. This operation should be performed by a skilled systems administrator.

6.3.7 Unable to Create a Repository on a Device that has Partitions

A repository cannot be hosted on a physical disk that has pre-existing partitions. If you attempt to create a repository on a disk that already has a partition, an error is generated notifying you that the backing device is not allowed to contain partitions. If you are intent on creating a repository on the selected disk, you must delete any pre-existing partitions. This may require you to directly access the Oracle VM Server where the disk is mounted and to manually remove the partition objects on the disk using the `fdisk` command. For example:

```
# fdisk /dev/sdb


WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
         switch off the mode (command 'c') and change display units to
         sectors (command 'u').

Command (m for help): p

Disk /dev/sdb: 500.1 GB, 500107862016 bytes
255 heads, 63 sectors/track, 60801 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0001e791
```

```
   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1               1        6528    52428800   83  Linux

Command (m for help): d
Partition number (1): 1

Command (m for help): w
```

Warning

Using `fdisk` is data destructive. Make sure you are certain about the disk device name and partitions that you are deleting. It is advisable to make backups of any data that exists on the disk that you are editing before proceeding. This operation should be performed by a skilled systems administrator.

Usually, restarting the affected Oracle VM Server after performing these operations is advisable. In the case of an iSCSI disk, connections to targets need to be re-initiated. In all cases, the storage needs to be refreshed. Simply restarting the Oracle VM Server ensures that all necessary actions are performed.

Once the Oracle VM Server has restarted, you may attempt to recreate the repository.

6.4 Troubleshooting Virtual Machines

The section contains information on known issues you may encounter when creating or using *virtual machine*, and explains how to resolve them.

6.4.1 Setting the Guest's Clock

PVM guests may perform their own system clock management, for example, using the NTPD (Network Time Protocol daemon), or the *hypervisor* may perform system clock management for all guests.

You can set *paravirtualized* guests to manage their own system clocks by setting the `xen.independent_wallclock` parameter to `1` in the `/etc/sysctl.conf` file. For example:

```
"xen.independent_wallclock = 1"
```

If you want to set the hypervisor to manage paravirtualized guest system clocks, set `xen.independent_wallclock` to `0`. Any attempts to set or modify the time in a guest will fail.

You can temporarily override the setting in the `/proc` file. For example:

```
"echo 1 > /proc/sys/xen/independent_wallclock"
```

Note

This setting does not apply to *hardware virtualized* guests.

6.4.2 Wallclock Time Skew Problems

Additional parameters may be needed in the boot loader (`grub.conf`) configuration file for certain operating system variants after the guest is installed. Specifically, for optimal clock accuracy, Linux guest boot parameters should be specified to ensure that the *pit* clock source is utilized. Adding `clock=pit nohpet nopmtimer` for most guest will result in the selection of *pit* as the clock source for the guest. Published templates for Oracle VM include these additional parameters.

Proper maintenance of virtual time can be tricky. The various parameters provide tuning for virtual time management and supplement, but do not replace, the need for an *ntp* time service running within guest.

Ensure that the `ntpd` service is running and that the `/etc/ntp.conf` configuration file is pointing to valid time servers.

6.4.3 Mouse Pointer Tracking Problems

If your mouse pointer fails to track your cursor in a VNC Viewer session in a hardware virtualized guest, add the following to the Oracle VM Server configuration file located at `/etc/xen/xend-config.sxp` to force the device model to use absolute (tablet) coordinates:

```
usbdevice='tablet'
```

Restart the Oracle VM Server for the changes to take effect. You may need to do this for each Oracle VM Server in the *server pool*.

6.4.4 Cloning Virtual Machine from Oracle VM 2.*x* Template Stuck in Pending

When creating a virtual machine from an Oracle VM 2.*x* template, the *clone* job fails with the error:

```
OVMAPI_9039E Cannot place clone VM: template_name.tgz, in Server Pool: server-pool-uuid.
That server pool has no servers that can run the VM.
```

This is caused by a network configuration inconsistency with the `vif = ['bridge=xenbr0']` entry in the virtual machine's configuration file.

To resolve this issue, remove any existing networks in the *virtual machine template*, and replace them with valid networks which have the Virtual Machine role. Start the clone job again and the virtual machine clone is created. Alternatively, remove any existing networks in the template, restart the clone job, and add in any networks *after* the clone job is complete.

6.4.5 Hardware Virtualized Guest Stops

When running hardware virtualized guests, the *QEMU* process (qemu-dm) may have its memory usage grow substantially, especially under heavy I/O loads. This may cause the hardware virtualized guest to stop as it runs out of memory. If the guest is stopped, increase the memory allocation for *dom0*, for example from 512 MB to 768 MB. See Section 1.1.6, “Changing the Oracle VM Server (Dom0) Memory Size” for information on changing the dom0 memory allocation.

6.4.6 Migrating Virtual Machines

You cannot *migrate virtual machines* on computers with hardware that is not identical. To migrate virtual machines, you must have hardware that is the same make and model and the CPU must be in the same CPU family. You must also have the same Oracle VM Server release number.

6.4.7 Migrating Large Hardware Virtualized Guest Results in CPU Soft Lock

On some hardware, such as the SUN FIRE X4170 M2 Server, migration of very large virtual machines using hardware virtualization can result in a soft lockup causing the virtual machine to become unresponsive. This lock is caused when the migration causes the virtual machine kernel to lose the clock source. Access to the console for the virtual machine shows a series of error messages similar to the following:

```
BUG: soft lockup - CPU#0 stuck for 315s! [kstop/0:2131]
```

To resolve this, the virtual machine must be restarted and the *`clocksource=jiffies`* option should be added to the HVM guest kernel command line, before rebooting the virtual machine again.

Important

This option should only be used on HVM guest systems that have actually resulted in a CPU soft lock.

6.4.8 Hardware Virtualized Guest Devices Not Working as Expected

Some devices, such as sound cards, may not work as expected in hardware virtualized guests. In a hardware virtualized guest, a device that requires physical memory addresses instead uses virtualized memory addresses, so incorrect memory location values may be set. This is because DMA (Direct Memory Access) is virtualized in hardware virtualized guest.

Hardware virtualized guest operating systems expect to be loaded in memory starting somewhere around address 0 and upwards. This is only possible for the first hardware virtualized guest loaded. Oracle VM Server virtualizes the memory address to be 0 to the size of allocated memory, but the guest operating system is actually loaded at another memory location. The difference is fixed up in the shadow page table, but the operating system is unaware of this.

For example, a sound is loaded into memory in a hardware virtualized guest running Microsoft Windows™ at an address of 100 MB may produce garbage through the sound card, instead of the intended audio. This is because the sound is actually loaded at 100 MB *plus* 256 MB. The sound card receives the address of 100 MB, but it is actually at 256 MB.

An IOMMU (Input/Output Memory Management Unit) in the computer's memory management unit would remove this problem as it would take care of mapping virtual addresses to physical addresses, and enable hardware virtualized guests direct access to the hardware.

6.4.9 Paravirtualized Guest Disk Devices are Not Recognized

If you opt to create a PVHVM or PVM, you must ensure that all disks that the virtual machine is configured to use are configured as paravirtual devices, or they may not be recognized by the virtual machine. If you discover that a disk or virtual cdrom device is not being recognized by your virtual machine, you may need to edit the `vm.cfg` file for the virtual machine directly. To do this, determine the UUID of the virtual machine, and then locate the configuration file in the repository, for example on an Oracle VM Server:

```
# vi /OVS/Repositories/UUID/vm.cfg
```

Locate each `disk` entry that contains a hardware device such as `hda`, `hdb`, or `hdc` and replace with an `xvd` mapping, such as `xvda`, `xvdb`, `xvdc` etc.

Restart the virtual machine with the new configuration, to check that it is able to discover the disk or virtual cdrom device.

6.4.10 Cannot Start Virtual Machine Console

If you launch the virtual machine console in Oracle VM Manager and an error is displayed, you may not have installed the VNC viewer on the Oracle VM Manager host computer. To resolve this problem, install a VNC viewer on the Oracle VM Manager host. You can also install a VNC viewer on the client accessing the Oracle VM Manager Web Interface. Oracle recommends you also install a VNC viewer on the Oracle VM Manager host computer so that if a client does not have a VNC viewer, this problem does not occur. See Installing and Upgrading Packages Required For The VNC and Serial Console in the *Oracle VM Installation and Upgrade Guide* for more information on installing the VNC viewer.

6.4.11 Cannot Create a Virtual Machine from Installation Media

When creating a virtual machine, the following message may be displayed:

```
Error: There is no server supporting hardware virtualization in the selected server pool.
```

To resolve this issue, make sure the Oracle VM Server supports hardware virtualization. Follow these steps to check:

a. Run the following command to check if hardware virtualization is supported by the CPU:

```
# cat /proc/cpuinfo |grep -E 'vmx|smx'
```

If any information that contains `vmx` or `smx` is displayed, it means that the CPU supports hardware virtualization. Here is an example of the returned message:

```
flags : fpu tsc msr pae mce cx8 apic mtrr mca cmov pat pse36 clflush dts acpi mmx fxsr
sse sse2 ss ht tm pbe nx lm constant_tsc pni monitor ds_cpl vmx est tm2 cx16 xtpr lahf_lm
```

Note

The `/proc/cpuinfo` command only shows virtualization capabilities starting with Linux 2.6.15 (Intel®) and Linux 2.6.16 (AMD). Use the `uname -r` command to query your kernel version.

b. Make sure you have enabled hardware virtualization in the BIOS.

c. Run the following command to check if the operating system supports hardware virtualization:

```
# xm info |grep hvm
```

The following is an example of the returned message:

```
xen_caps : xen-3.0-x86_64 xen-3.0-x86_32p hvm-3.0-x86_32 hvm-3.0-x
```

If the CPU does not support hardware virtualization, use the paravirtualized method to create the virtual machine. See Create Virtual Machine in the *Oracle VM Manager User's Guide* for information on creating a *paravirtualized virtual machine*.

6.4.12 Cannot Change CD in the Virtual Machine

To change the CD in a virtual machine:

a. Unmount the first CD:

```
# umount mount-point
```

b. Select the second ISO file, and click **Change CD**.

c. Mount the second CD:

```
# mount /dev/cdrom mount-point
```

Glossary

C

clone
: The action or result of making an exact copy of an object. The object may be a virtual machine, virtual machine template, ISO file, or virtual disk. Cloning is analogous to copying and maintains the integrity of the original object, while creating a new object based on the original. A clone customizer may be used to define cloning options to specify details of where the object components may reside when cloned, such as in a different storage repository.

D

dom0
: An abbreviation for *domain zero*. The management domain with privileged access to the hardware and device drivers. Dom0 is the first domain started at boot time. Dom0 has more privileges than domU. It can access the hardware directly and can manage the device drivers for other domains. It can also start new domains.

domain
: A configurable set of resources, including memory, virtual CPUs, network devices and disk devices, in which virtual machines run. A domain is granted virtual resources and can be started, stopped and rebooted independently.

  See Also: *dom0*

  See Also: *domU*

E

events
: Events are used to register status information of "objects" within Oracle VM Manager for future reference or to make problems easier to trace back. Events are often, though not always, related to *jobs* that are initiated within Oracle VM Manager. For instance, when a job fails, an event is generated. Events can also be triggered through changes in the environment such as server crashes or storage disconnects. Therefore, events are used to alert you to potential problems that may need your attention.

  Events are categorized by severity. Most events will be informational, but they can also be warnings or errors. If an event has an error level severity, you need to acknowledge the error event to clear the error and to perform further operations on the object that generated the error.

  See Also: *jobs*

G

guest
: A guest operating system that runs within a domain in Oracle VM Server. A guest may be paravirtualized or hardware virtualized. Multiple guests can run on the same Oracle VM Server.

H

hard partitioning
: Hard partition, or CPU pinning, is the act of binding a virtual machine to one or more physical CPUs or cores. This prevents software within the virtual machine from running on any cores other than those specified for the

virtual machine. By default, Oracle VM takes advantage of distributed resource scheduling, which allows a virtual machine to use all cores on an Oracle VM Server as required. In some situations, such as the requirement to conform with Oracle licensing policies for partitioned environments, it may be desirable to implement hard partitioning.

Hard partitioning can result in restrictions on live migration, DRS and DPM.

host computer
: The physical computer on which the software is installed. Typically used to refer to either the computer on which Oracle VM Server or Oracle VM Manager is running.

hypervisor
: A hypervisor, also called a monitor or Virtual Machine Manager (VMM), is a layer which abstracts the virtual hardware from the real hardware. As such it is the only privileged entity in the system which has full access to real hardware resources. It controls only the most basic resources of the system, including CPU and memory usage, privilege checks, and hardware interrupts.

Hosted hypervisors are designed to run within a traditional operating system. In other words, a hosted hypervisor adds a distinct software layer to the host operating system, and the guest operating system becomes a third software level above the hardware and the host-based hypervisor. A well-known example of a hosted hypervisor is Oracle VM VirtualBox. Others include VMware Server and Workstation, Microsoft Virtual PC, KVM, QEMU, and Parallels.

Native hypervisors are software systems that run directly on the host's hardware to control the hardware, and to monitor the guest operating systems. The guest operating system runs on a separate level above the hypervisor. Examples of this type of virtualization architecture are Oracle VM, Microsoft Hyper-V, VMware ESX, and Xen.

M

messaging
: Oracle VM supports a messaging system that enables communication between the Oracle VM Manager and a guest running within a virtual machine on any Oracle VM Server, as long as the guest has the Oracle VM Guest Additions installed. This messaging system works by sending key/value pairs between the guest and Oracle VM Manager via a secured connection. Messaging allows greater administrative control over virtual machines and facilitates remote and automated configuration of virtual machines as they are started.

migrate
: The act of moving a virtual machine from one Oracle VM Server to another, or to the Unassigned Virtual Machines folder. Migration can be performed on either a running or a stopped virtual machine.

multipath
: The technique of creating more than one physical path between the server CPU and its storage devices. It results in better fault tolerance and performance enhancement. Oracle VM supports multipath I/O out of the box. Oracle VM Servers are installed with multipathing enabled because it is a requirement for SAN disks to be discovered by Oracle VM Manager

O

OCFS2
: OCFS2 is a general-purpose shared-disk cluster file system for Linux capable of providing both high performance and high availability. OCFS2 is developed by Oracle and is integrated within the mainstream Linux kernel. OCFS2 is used within Oracle VM to facilitate clustered server pools, storage of virtual machine images and for the purpose of allowing guests to share the same file system.

A clustered server pool always uses an OCFS2 file system to store the cluster configuration and to take advantage of OCFS2's heartbeat facility. There are two types of heartbeats used in OCFS2 to ensure high availability:

- The disk heartbeat: all Oracle VM Servers in the cluster write a time stamp to the server pool file system device.
- The network heartbeat: all Oracle VM Servers communicate through the network to signal to each other that every cluster member is alive.

These heartbeat functions exist directly within the kernel and are fundamental to the clustering functionality that Oracle VM offers for server pools. The server pool file system should be stored on a separate NFS server or on a small LUN if possible, as OCFS2's heartbeat facility can be disturbed by intensive I/O operations taking place on the same physical storage.

A storage repository configured on a LUN-based repository must be linked to a clustered server pool due to the nature of the OCFS2 file system. As a result, LUN-based repositories cannot be shared between multiple server pools, although it is possible to move an OCFS2 repository from one server pool to another.

For more information on OCFS2, please refer to https://oss.oracle.com/projects/ocfs2/.

Oracle VM Agent
: An application installed with Oracle VM Server. The Oracle VM Agent receives and processes management requests, and provides event notifications and configuration data to the Oracle VM Manager. Oracle VM Manager manages the virtual machines running on Oracle VM Server by communicating with Oracle VM Agent. It contains three components: master Oracle VM Server, Utility Server, and Virtual Machine Server.

Oracle VM Manager
: The Oracle VM Manager is the management platform, which offers an easy-to-use, web-browser interface as well as a command-line interface (CLI). The Oracle VM Manager tracks and manages the resources available in your virtual environment. The user interface, which is an Application Development Framework (ADF) web application, allow you to easily manage Oracle VM Server pools. Manages virtual machine life cycle, including creating virtual machines from templates or from installation media, deleting, powering off, uploading, deployment and live migration of virtual machines. Manages resources including ISO files, templates and shared virtual disks.

Oracle VM Server
: A self-contained virtualization environment designed to provide a lightweight, secure, server-based platform for running virtual machines. The Oracle VM Server comprises a hypervisor and a privileged domain (called dom0) that allow multiple domains or virtual machines (that is, Linux, Solaris, Windows, and so on) to run on one physical machine. Includes Oracle VM Agent to enable communication with Oracle VM Manager.

  The Oracle VM Server for x86 incorporates an open source Xen hypervisor component, which has been customized and optimized to integrate into the larger, Oracle - developed virtualization server. The Oracle VM Server for x86 is also responsible for access and security management and generally acts as the server administrative entity, because the hypervisor’s role is limited.

  On Oracle VM Server for SPARC systems, the SPARC hypervisor is built into the SPARC firmware and is generally referred to as the Logical Domains Manager (LDOM). As with the Xen hypervisor, each virtual machine is securely executed on a single computer and runs its own guest Oracle Solaris operating system

P

paravirtualized machine (PVM)
: A virtual machine with a kernel that is recompiled to be made aware of the virtual environment. Runs at near native speed, with memory, disk and network access optimized for maximum performance.

Paravirtualized guests use generic, idealized device drivers, which are part of the guest's OS. The I/O operations using these generic device drivers are mapped to the real device drivers in dom0. The generic, abstracted drivers in the guest seldom change and provide excellent guest stability. The dom0 domain, alternatively, can use the native hardware vendor drivers, and the guests can safely migrate to another dom0 with slightly different drivers.

For other resources such as CPU and memory, paravirtualized kernels make special "hypercalls" to the Xen hypervisor. These hypercalls provide better performance by reducing the number of instructions and context switches required to handle an incoming request. By contrast, on an emulated (hardware virtualized) guest, driver requests engage the guest's interrupt handler, increasing the I/O operation overhead.

Q

QEMU
: Also referred to as qemu-dm, which is the process name. The virtualization process which allows full virtualization of a PC system within another PC system.

S

server pool
: Server pools logically organize one or more Oracle VM Servers into groups where virtual machines can run.

  Each server pool can have up to 32 physical servers. Each Oracle VM Server can be a member of only one server pool. The server pool is the operational unit of Oracle VM. Policies are configured and enforced at the server pool level.

  A minimum cluster of three Oracle VM Server nodes in each server pool is strongly recommended for high availability. If one node in the cluster experiences a hardware failure or is shut down for maintenance, failover redundancy is preserved with the other two nodes. Having a third node in the cluster also provides reserve capacity for production load requirements.

V

virtual disk
: A file or set of files, usually on the host file system although it may also be a remote file system, that appears as a physical disk drive to the guest operating system.

virtual machine (VM)
: A guest operating system and the associated application software that runs within Oracle VM Server. May be paravirtualized or hardware virtualized machines. Multiple virtual machines can run on the same Oracle VM Server.

virtual machine template
: A template of a virtual machine. Contains basic configuration information such as the number of CPUs, memory size, hard disk size, and network interface card (NIC). Create virtual machines based on a virtual machine template using Oracle VM Manager.

W

WebLogic
: Oracle WebLogic Server is a platform that includes an application server that can run java applications within a web-based framework. Oracle VM Manager runs as an application within Oracle WebLogic Server, taking advantage of many of Oracle WebLogic Server's many features to deliver a robust web UI through which Oracle VM can be fully managed.

The installation process behind Oracle VM Manager automatically installs and configures Oracle WebLogic Server on the system where Oracle VM Manager is installed. During this process, a *weblogic* user is set up within Oracle WebLogic Server to manage Oracle WebLogic Server configuration and to administer the underlying system. An *admin* user is also set up within Oracle WebLogic Server and is given permission to access the Oracle VM Manager application. A typical setup uses the same password for both of these users, although this is not always the case and it is possible to configure a different password for each user depending on your requirements.

In general, users of the Oracle VM Manager application should avoid attempting to access the underlying Oracle WebLogic Server, or to change any configuration parameters here without guidance from Oracle Support.

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