Oracle® Virtual Networking Host Drivers for Oracle Linux 5, Oracle Linux 6, and Oracle VM

Installation Guide for Enabling Embedded Host Drivers

Installing and Enabling Host Drivers 1

This document contains the following topics:

Kernel Compatibility

The Oracle Virtual Networking host drivers have been integrated into various Oracle host operating systems and hypervisors that are built from the following kernels:

- UEK2 which applies to kernel versions `2.6.39-400.204.0.el5uek` to `2.6.39-400.212.1.el5uek`.

  The UEK2 kernel is currently used in operating systems based on Oracle Linux 5 update 9. This kernel is used in Oracle's Unbreakable Enterprise Kernel for Oracle Linux 5.

  UEK2 kernel version 2.6.39-400.211.1 is also used in Oracle Linux 6.5 x86-GA (32-bit only).

- UEK3 which applies to kernel versions `2.6.39-400.204.0.el6uek` to `2.6.39-400.212.1.el6uek`.

  The UEK3 kernel is currently used in operating systems based on Oracle Linux 6 update 4. This kernel is used in Oracle's Unbreakable Enterprise Kernel for Oracle Linux 6.

Kernel File Names

The procedures and syntax for activating the host drivers in each kernel type are the same except for the kernel filenames. So, for example, when you are required to enter a value for the `<kernel-filename>` option, you will enter either `kernel-uek-2.6.39-400.204.0.el5uek.x86_64.rpm` or `kernel-uek-2.6.39-400.204.0.el6uek.x86_64.rpm` depending on the host server type.

Performing Local Install

When you install the Oracle Linux OS or Oracle VM hypervisor on the server, the Oracle Virtual Networking host drivers are also installed. However, by default, the Oracle Virtual Networking host drivers are not loaded into memory, so they are not automatically active after a server boot up. To support vNICs and vHBAs on the Oracle Linux server, you will need to explicitly enable the locally installed Oracle Virtual Networking host drivers.

> **Note** PXE install to Local disk/SAN disk for OVM is not supported at this point. OVM can be installed through CD image to Local disk then install Oracle Virtual Networking user space application from the Yum repository or the rpm.

Enabling the host drivers has the following main parts:

- Installing the host drivers, which can be done through an automated updater or manually
- Enabling the networking service
- Verifying the host is operating

Install the Host Drivers

Installing the host drivers can occur through either an automated installer, such as Yum, or by manually installing the RPM.

Installing Using Yum

Before installing the host drivers, make sure the following prerequisites have been completed;

- the Yum repository is reachable through the network by the Oracle Linux 6 Update 4 server
- the Yum service is running correctly
- you have root access to the Yum repository

Using Yum, you will install the kernel and Oracle Virtual Networking user space application from the Yum repository by using the **yum install** command. Using Yum, you do not install the software from Oracle server or the Fabric Interconnect. Follow this procedure:

Step 1   Install the kernel. For example:

yum install <kernel-filename>

> The contents for kernel-filename string will vary, as documented in Kernel Compatibility.
>
> Note

Step 2   Install the Oracle Virtual Networking user space application. For example:

yum install orclovn-user.x86_64

Manually Installing

If you are not using an automated update manager, you can install the kernel like any other software. Before installing the host drivers, make sure the following prerequisites are met:

- The Oracle Linux OS or Oracle VM hypervisor is installed on the server including all require patches and updates
- All RPMs for Oracle Virtual networking are downloaded to the Oracle 6 Update 4 servers' hard drive
- You have root access on the server.

When manually installing, the RPMs, you will load the UEK2 firmware, kernel, and Oracle Virtual Networking user space application by using the **rpm -ivh** command. Using the manual installation procedure, you install the software directly from the server, not the Fabric Interconnect. Follow this procedure:

Step 1   Install the firmware. For example:

rpm -ivh <kernel-filename>**.noarch.rpm**

Step 2   Install the kernel. For example:

rpm -ivh <kernel-filename>

Step 3   Install the Oracle Virtual Networking user space application. For example:

rpm -ivh oclovn-user.x86_64.rpm

Activate the Oracle Virtual Networking Service

When the kernel is installed on the host, and the correct kernel and OFED version are set as the first item in the kernel load list, enable the Oracle Virtual Networking service, which is named `xsigo`:

Step 1 Turn on the Oracle Virtual Networking service:

```
chkconfig xsigo on
```

Step 2 Verify that the Oracle Virtual Networking service is on:

```
chkconfig -list xsigo
xsigo            0:off    1:off    2:on     3:on     4:on     5:on     6:off
```

Step 3 Reboot the host.

By default, the `orclovn-user` package chooses the first UEK kernel from your current grub.conf file. Wait until the host reboots, then proceed to the next section.

Verify That the Server is Detected by the Oracle Fabric Interconnect

After the server has completed its reboot, verify that the server is seen from the Fabric Interconnect.

Step 1 Issue the **show physical-server** command and locate the server:

```
show physical-server
name     guid              descr port         os    version           server-profile
----------------------------------------------------------------------------
dalek 21280001fc8f22 davros:ServerPort20 Linux/2.6.39-400.209.1.el6uek/x86_64
2.11.2010/3.0.0 elbert
```

PXE Installing to Local Disk

The following steps document how to PXE install the Oracle Virtual Networking host drivers onto the server's local hard disk for Oracle Linux 6 Update 4, Oracle Linux 5 Update 9, or Oracle VM servers. Creating the PXE install image for local disk has the following main parts:

- Downloading and extracting the Oracle Virtual Networking driver package
- Depending on the host server, either
  — Appending Oracle Virtual Networking host drivers to the standard driver disk image (Oracle Linux 6 only)
  — Creating the Driver Disk (Oracle Linux 5 or Oracle VM)
- Installing the host drivers, which can be done through an automated updater or manually
- Enabling the host drivers
- Verifying the host is operating

Download and Extract the Image

Download `xsigo-boot-5.0.7-LX.tar` for XGboot and get the standard Red Hat image (rhdd.img) by extracting the tar file.

Step 1 Access the tar file from:

http://www.oracle.com/technetwork/server-storage/xsigo-1870185.html?ssSourceSiteId=ocomen and

Step 2 On that page, download *Oracle Virtual Networking Drivers for RedHat Enterprise Linux.*

Step 3 Extract the xsigo-boot.tar file to folder and make a PXE label by appending with xsigo-rhdd.img.

Step 4 Create the Driver disk based on your host server type. See the next sections.

Append the Host Drivers to the Driver Disk (Oracle Linux 6)

For Oracle Linux 6 Update 4 OS, you can append the PXE label directly to the driver disk.

Step 1 Run the **`rpm ivh -append`** command and enter the following text:

```
Label  OEL6u4-LX507
Kernel OEL6u4-vmlinuz
append initrd=OEL6u4-initrd.img,OEL6u4-xsigo-rhdd-2.6.32-358.el6.x86_64-
                        5.0.7.LX-x86_64.img network
```

Step 2 Proceed to Install the Host Drivers.

Make a Custom Driver Disk (Oracle Linux 5 and Oracle VM)

Making the driver disk for Oracle Linux 5 Update 9 or Oracle VM requires you to use the stock initrd that Red Hat provides (included in the .tar file) and running a proprietary Oracle Virtual Networking tool to inject specific information into the stock initrd. The proprietary tool is named "xsigo-insert-dd," and when it runs, it opens the default initrd for editing, places the Xsigo host drivers inside, then repacks the initrd as a "custom" initrd with the prefix `xsigo-`.

When the custom initrd is created and used as the server's boot image, Oracle Linux 5 Update 9 servers boot up with the Oracle Virtual Networking vNIC nd vHBA drivers included, and vNICs and vHBAs are loaded into the OS like any physical device.

To make the custom driver disk, follow this procedure:

Step 1 Download `xsigo-boot-5.0.7-LX.tar` for XGboot from http://www.oracle.com/technetwork/server-storage/xsigo-1870185.html?ssSourceSiteId=ocomen

Step 2 Extract the downloaded tar file to a separate folder. The "rhdd.img" will be part of the extracted files.

Step 3 Copy stock "initrd.img" which comes with Redhat distribution-CD image to extracted folder.

Step 4 Run the following command to insert xsigo drivers into stock initrd.img.

```
./xg-insert-dd xsigo-rhdd-2.6.18-348.el5-5.0.7.LX-x86_64.img initrd.img
```

When `xg-insert-dd` is run, it opens the default initrd for editing, places the Xsigo host drivers inside, then repacks the initrd as a custom initrd with the xsigo- prefix.

Step 5   Make a PXE label on PXE server by appending the following stanza to the xsigo-initrd.img.

```
Label  OEL5U9-LX507
kernel OEL5U9-vmlinuz-507LX
append initrd=xsigo-initrd-OEL5U9-5.0.7-LX.img network
```

Step 6   Boot server with "HCA", XGBoot finds vNIC/vHBA by establishing XSMP session with chassis.

Step 7   Give the PXE label upon the PXE prompt and start the installation on Local disk and reboot the server.

Step 8   Proceed to Install the Host Drivers.

Install the Host Drivers

Installing the host drivers can occur through either an automated installer, such as Yum, or by manually installing the RPM.

Installing Through Yum

Before installing the host drivers, make sure the following prerequisites have been completed;

- the Yum repository is reachable through the network by the Oracle Linux server
- the Yum service is running correctly
- you have root access to the Yum repository

Using Yum, you will install the kernel and Oracle Virtual Networking user space application from the Yum repository by using the **yum install** command. Using Yum, you do not install the software from Oracle server or the Fabric Interconnect. Follow this procedure:

Step 1   Install the appropriate kernel from the Yum repository or the rpm.

```
yum install <kernel-filename>
```

Step 2   Install the Oracle Virtual Networking user space application from the Yum repository of the rpm. For example:

```
yum install orclovn-user.x86_64
```

Installing Manually

If you are not using an automated update manager, you can install the host drivers manually. Follow this procedure:

Step 1   Use the **rpm -ivh** command to install the host software. For example:

```
rpm -ivh <kernel-filename>.noarch.rpm
```

Step 2   Install the user space application. For example:

```
rpm -ivh orclovn-user-6.0.0-1.x86_64.rpm
```

> **Note**
>
> If you are installing or configuring host drivers for any other kernel, you have to override the kernel version by using the following command:
>
> ```
> /opt/xsigo/bin/orclovn-setup --kversion <Kernel-version>
> --ofed-version <ofed Version>   --install
> ```
>
> By default the first UEK kernel in you current grub.conf file is chosen.
>
> Some examples for Oracle Linux 6
>
> * For kernel "2.6.39-400.209.1.el6uek" and OFED version 1.5.5.151 you would use:
>
> ```
> opt/xsigo/bin/orclovn-setup --kversion 2.6.39-400.209.1.el6uek
> --ofed-version 1.5.5.151 --install
> ```
>
> * For kernel "2.6.39-400.209.1.el5uek" and native OFED drivers, you would use:
>
> ```
> opt/xsigo/bin/orclovn-setup --kversion 2.6.39-400.209.1.el6uek
> --ofed-version native --install
> ```
>
> For Oracle Linux 5 or Oracle VM, the examples and syntax are the same except for the kernel version string.

Enable the Oracle Virtual Networking Service

You will need to activate the Oracle Virtual Networking service, which is called xsigo.

Step 1   Turn on the Oracle Virtual Networking Service by issuing the **chkconfig** command:

```
chkconfig xsigo on
```

Step 2   Verify that the Oracle Virtual Networking service is on.

```
chkconfig -list xsigo
xsigo           0:off   1:off   2:on    3:on    4:on    5:on    6:off
```

Step 3   Reboot the host server. By default, the orclovn-user package chooses the first UEK kernel from your current grub.conf file.

Verify That the Server is Detected by the Oracle Fabric Interconnect

After the server has completed its reboot, verify that the server is seen from the Fabric Interconnect.

Step 1   Log into the Fabric Interconnect and check the physical server list.

```
show physical-server
name      guid            descr port       os     version        server-profile
------------------------------------------------------------------------------
elbert 21280001fc8f22  jammu:ServerPort20 Linux/2.6.39-400.209.1.el6uek/x86_64
2.11.2010/3.0.0 elbert
```

PXE Installing to SAN Disk

PXE installing involves creating a server boot image that resides on another device, typically a LUN in the SAN. PXE booting is useful for blades and other diskless servers that lack an internal hard drive where the kernel, OS/hypervisor, and host drivers can be loaded. When PXE installing a server's boot information, you will create a driver disk, inject the Oracle Virtual Networking host drivers into the boot image, then reboot the server.

Enabling the host drivers has the following main parts:

- Downloading and extracting the Oracle Virtual Networking driver package
- Depending on your host server type, either:
  - Append the host drivers into the standard driver disk image (Oracle Linux 6)
  - Make the driver disk (Oracle Linux 5 and Oracle VM)
- Installing the host drivers, which can be done through an automated updater or manually.
- Enabling the host drivers.
- Verifying the host is operating.

Download and Extract the Image

Download `xsigo-boot-5.0.7-LX.tar` for XGboot and get the standard Red Hat image (rhdd.img) by extracting the tar file.

Step 1 Access the tar file from:

http://www.oracle.com/technetwork/server-storage/xsigo-1870185.html?ssSourceSiteId=ocomen and

Step 2 On that page, download *Oracle Virtual Networking Drivers for RedHat Enterprise Linux*.

Step 3 Extract the xsigo-boot.tar file to folder and make a PXE label by appending with xsigo-rhdd.img.

Append the Host Drivers to the Driver Disk (Oracle Linux 6)

For Oracle Linux 6 Update 4 OS, you can append the PXE label directly to the driver disk.

Step 1 Run the **`rpm ivh -append`** command and enter the following text:

```
Label  OEL6u4-LX507
Kernel OEL6u4-vmlinuz
append initrd=OEL6u4-initrd.img,OEL6u4-xsigo-rhdd-2.6.32-358.el6.x86_64-
                        5.0.7.LX-x86_64.img network
```

Make the Driver Disk (Oracle Linux 5 and Oracle VM)

To inject the drivers into the stock Red Hat initrd, you will need to run a proprietary tool called `xg-insert-dd`. This tool is included in the xgboot.tar file. When `xg-insert-dd` is run, it opens the default initrd for editing, places the Xsigo host drivers inside, then repacks the initrd as a custom initrd with the xsigo- prefix. When the server uses this custom initrd, the Xsigo drivers will be loaded at boot time.

To make driver-disk manually for Oracle Linux 5 Update 9:

Step 1 Extract above download tar file to a separate folder.

Step 2   Copy stock "initrd.img" which comes with Redhat distribution-CD image to extracted folder.

Step 3   Run the following command to insert xsigo drivers into stock initrd.img.

`./xg-insert-dd xsigo-rhdd-2.6.18-348.el5-5.0.7.LX-x86_64.img initrd.img`

Step 4   Make a PXE label on PXE server by appending xsigo-initrd.img.

```
label OEL5U9-LX507
kernel OEL5U9-vmlinuz-507LX
append initrd=xsigo-initrd-OEL5U9-5.0.7-LX.img network
```

Install the Kernel Software and Host Drivers

The following procedure must be done from the host console command-line, which is typically accessible through the Ctrl+Alt+F2 key sequence.

Step 1   Mount the new system disk and enable SSH service for SCP.

```
chroot /mnt/sysimage
/etc/init.d/sshd start
```

Step 2   Copy kernel and userspace RPMs through SCP from a TFTP server (or wherever the RPMs reside)

Step 3   Install the firmware RPM. For example:

`rpm -ivh` <kernel-filename>**`.noarch.rpm`**

Step 4   Install the kernel RPM. For example:

`rpm -ivh` <kernel-filename>**`.rpm`**

Step 5   Install the userspace RPM. For example:

`rpm -ivh orclovn-user-6.0.0-1.x86_64.rpm`

Step 6   Run the setup script to load the Oracle Virtual Networking software modules into the initrd (initramfs) files.

```
/opt/xsigo/bin/orclovn-setup --install
title Oracle Linux Server (2.6.39-400.209.1.el6uek)

Oracle Linux Server release 6.4

Creating new initrd using /sbin/xgmkinitrd /boot/initrd-2.6.39-
400.209.1.el6uek.img 2.6.39-400.209.1.el6uek

Running /sbin/mkinitrd -f --preload mlx4_ib --preload mlx4_core --preload xscore
--preload xsvhba --preload xsvnic --with dm-multipath  /boot/initrd-2.6.39-
400.209.1.el6uek.img 2.6.39-400.209.1.el6uek

WARNING: using /tmp for temporary files

Please use /sbin/xgmkinitrd /boot/initrd-2.6.39-400.209.1.el6uek.img 2.6.39-
400.209.1.el6uek to create any new initrd files.

This is a wrapper script around mkinitrd which includes the Xsigo drivers

Done
```

> **Note** The setup script runs for Oracle Linux 6, Oracle Linux 5, and Oracle VM. The script's syntax is the same regardless of server OS or hypervisor, but the output of the script differs based on the OS or hypervisor.

Enable the Oracle Virtual Networking Service

On the host, you will need to activate the Oracle Virtual Networking service which is called xsigo.

Step 1   Turn the Oracle Virtual Networking service on:

```
chkconfig xsigo on
```

Step 2   Verify that the service is running.

```
chkconfig –list xsigo
xsigo            0:off   1:off   2:on   3:on   4:on   5:on   6:off
```

Step 3   Boot server with "HCA", XGBoot finds vNIC/vHBA by establishing XSMP session with chassis.

Verify That the Server is Detected by the Oracle Fabric Interconnect

After the server has completed its reboot, verify that the server is seen from the Fabric Interconnect.

Step 1   Log into the Fabric Interconnect and verify that the host server is present in the physical server list:

```
show physical-server
name     guid           descr port       os    version            server-profile
---------------------------------------------------------------------------
elbert 21280001fc8f22 jammu:ServerPort20 Linux/2.6.39-400.209.1.el5uek/x86_64
2.11.2010/3.0.0 elbert
```

Downgrading to an Older Version of Kernel or Host Driver

If you need to install an earlier version of host driver, you cannot just re-install the older version while the newer version is still in memory. If you do so, the older version of host driver does not overwrite the newer version, and mismatches can occur among the various software modules installed. See Mismatched Driver Error Messages.

If you will be installing an older version of host driver, you must completely uninstall all components of the newer version, and perform a fresh install of the older host driver software.

To downgrade to an earlier version of host driver, follow this procedure:

Step 1   Uninstall the kernel RPM and user space RPM from the system.

Step 2   Install the host-driver and reboot the host.

Step 3   The host should be seen on the Fabric interconnect in the physical server list:

```
show physical-server
name     guid           descr port        os   version        server-profile
----------------------------------------------------------------------------
elbert 21280001fc8f22 jammu:ServerPort20 Linux/2.6.39-400.17.1.el6uek/x86_64
2.11.2010/3.0.0 elbert
```

Mismatched Driver Error Messages

If you install user space application and old host drivers simultaneously on the same server, the following error messages will be displayed when you install the mismatched drivers:

```
rpm -ivh xsigo-hostdrivers-kmod-2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64.rpm
Preparing...              ######################################### [100%]
        file /etc/init.d/xsigo from install of xsigo-hostdrivers-kmod-
2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64 conflicts with file from package
orclovn-user-6.0.r7493-1.x86_64
        file /opt/xsigo/.config/xen/__init__.pyc from install of xsigo-
hostdrivers-kmod-2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64 conflicts with file
from package orclovn-user-6.0.r7493-1.x86_64
        file /opt/xsigo/.config/xen/__init__.pyo from install of xsigo-
hostdrivers-kmod-2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64 conflicts with file
from package orclovn-user-6.0.r7493-1.x86_64
        file /opt/xsigo/.config/xen/xg.pyc from install of xsigo-hostdrivers-
kmod-2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64 conflicts with file from package
orclovn-user-6.0.r7493-1.x86_64
        file /opt/xsigo/.config/xen/xg.pyo from install of xsigo-hostdrivers-
kmod-2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64 conflicts with file from package
orclovn-user-6.0.r7493-1.x86_64
        file /opt/xsigo/.config/xen/xsigoutils.pyc from install of xsigo-
hostdrivers-kmod-2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64 conflicts with file
from package orclovn-user-6.0.r7493-1.x86_64
        file /opt/xsigo/.config/xen/xsigoutils.pyo from install of xsigo-
hostdrivers-kmod-2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64 conflicts with file
from package orclovn-user-6.0.r7493-1.x86_64
        file /opt/xsigo/bin/xsigo-support from install of xsigo-hostdrivers-
kmod-2.6.39_400.17.1.el6uek.5.0.7.LX-1.x86_64 conflicts with file from package
orclovn-user-6.0.r7493-1.x86_64.
```

If these messages occur, use the procedure documented in Downgrading to an Older Version of Kernel or Host Driver.

Accessing Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit either of the following URLS:

http://www.oracle.com/us/corporate/acquisitions/xsigo/support-1849142.html

http://www.oracle.com/us/corporate/accessibility/support/index.html if you are hearing impaired.