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# **Oracle® Linux 6**

## **Release Notes for Oracle Linux 6.4**



E39522-11  
March 2021

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## Abstract

This document contains information on Oracle Linux 6.4. This document may be updated after it is released. To check for updates to this document, see [Oracle® Linux Documentation](#).

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The software described in this documentation is either in Extended Support or Sustaining Support. See <https://www.oracle.com/us/support/library/enterprise-linux-support-policies-069172.pdf> for more information. Oracle recommends that you upgrade the software described by this documentation as soon as possible.

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This document is intended for users and administrators of Oracle Linux. It describes potential issues and the corresponding workarounds you may encounter while using Oracle Linux. Oracle recommends that you read this document before installing or upgrading Oracle Linux.

Document generated on: 2021-03-31 (revision: 11688)

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## Preface

*Oracle® Linux 6: Release Notes for Oracle Linux 6.4* provides a summary of the new features, changes, and fixed and known issues in Oracle Linux 6.4.

## Audience

This document is written for system administrators who want to install or update Oracle Linux. It is assumed that readers have a general understanding of the Linux operating system.

## Document Organization

The document is organized as follows:

- [Chapter 1, \*New Features and Changes\*](#) contains a summary of the new features and changes in this release.
- [Chapter 2, \*Fixed and Known Issues\*](#) contains details of the fixed and known issues with the software.
- [Chapter 3, \*Upgrading to Oracle Linux 6 Update 4\*](#) contains information about how to install updates on your system.

## Related Documents

The documentation for this product is available at:

[Oracle® Linux Documentation](#)

## Conventions

The following text conventions are used in this document:

Convention	Meaning
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
<code>monospace</code>	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 New Features and Changes

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This chapter describes the new features that are introduced by Oracle Linux 6 Update 4.

## 1.1 Supported Kernels

Oracle Linux 6 Update 4 ships with two sets of kernel packages:

- Unbreakable Enterprise Kernel Release 2 ([kernel-uek-2.6.39-400.17.1.el6uek](#))
- Red Hat Compatible Kernel ([kernel-2.6.32-358.el6](#))

By default, both the Unbreakable Enterprise Kernel and the Red Hat Compatible Kernel for the specific architecture (i386 or x86\_64) are installed and the system boots the Unbreakable Enterprise Kernel.

To make your system use the Red Hat Compatible Kernel by default:

1. Edit `/etc/grub.conf` and change the value of the `default` parameter to indicate the Red Hat Compatible Kernel. (Each entry for a bootable kernel in the file starts with a `title` definition. The entries are effectively numbered from 0 upwards, where 0 corresponds to the first entry in the file, 1 to the second entry, and so on. To view the GRUB manual, use the `info grub` command.)
2. Edit `/etc/sysconfig/kernel` and change the setting for the default kernel package type from `DEFAULTKERNEL=kernel-uek` to `DEFAULTKERNEL=kernel`.

### 1.1.1 Unbreakable Enterprise Kernel Release 2

The Unbreakable Enterprise Kernel Release 2 (UEK R2) is based on the upstream kernel 3.0.36 stable source tree.

The Unbreakable Enterprise Kernel supports a wide range of hardware and devices. In close cooperation with hardware and storage vendors, the following device drivers have been updated by Oracle in the 2.6.39-400 kernel.

## Storage Adapter Drivers

### Broadcom

- NetXtreme II iSCSI driver ([bnx2i](#)) updated to 2.7.4.1f.

- NetXtreme II Fibre Channel over Ethernet driver ([bnx2fc](#)) updated to 2.2.17.

#### **Emulex**

- Blade Engine 2 Open-iSCSI driver ([be2iscsi](#)) updated to 10.0.272.0o.
- Fibre Channel HBA driver ([lpfc](#)) updated to 8.3.5.86.2p.

#### **Mellanox**

- ConnectX core driver ([mlx4\\_core](#)) released at 1.0-0fed1.5.5 (x86\_64 only). Handles low-level functions such as device initialization and firmware commands processing, and controls resource allocation so that the InfiniBand and Ethernet functions can share a device without interfering with each other.
- ConnectX Ethernet driver ([mlx4\\_en](#)) released at 1.5.4.24 (x86\_64 only). Handles Ethernet-specific functions and plugs into the netdev mid-layer.
- ConnectX InfiniBand driver ([mlx4\\_ib](#)) released at 1.0-0fed1.5.5 (x86\_64 only). Handles InfiniBand-specific functions.

#### **QLogic**

- Fibre Channel HBA driver ([qla2xxx](#)) updated to 8.04.00.11.39.0-k.
- iSCSI driver ([qla4xxx](#)) updated to 5.03.00.01.06.02-uek2. Now supports Open-iSCSI.

## **Network Adapter Drivers**

#### **Broadcom**

- NetXtreme II network adapter driver ([bnx2](#)) updated to 2.2.3e.
- NetXtreme II 10Gbps network adapter driver ([bnx2x](#)) updated to 1.74.17.
- Converged Network Interface Card core driver ([cnic](#)) updated to 2.5.12e.
- Tigon3 Ethernet adapter driver ([tg3](#)) updated to 3.125g.

#### **Emulex**

- Blade Engine 2 10Gbps adapter driver ([be2net](#)) updated to 4.4.161.0o.

#### **Intel**

- PRO/1000 PCI-Express Gigabit network adapter driver ([e1000e](#)) updated to 2.1.4-NAPI.
- Gigabit Ethernet network adapter driver ([igb](#)) updated to 4.0.17.
- 10 Gigabit PCI-Express network adapter driver ([ixgbe](#)) updated to 3.11.33.
- 10 Gigabit Server Adapter virtual function driver ([ixgbevf](#)) updated to 2.6.2-NAPI. The kernel must support Single Root I/O Virtualization (SR-IOV).

#### **QLogic**

- NetXen Multiport 1/10 Gigabit Network adapter driver ([netxen\\_nic](#)) updated to 4.0.80.

- 1/10 GbE Converged/Intelligent Ethernet Adapter driver ([qlcnic](#)) updated to 5.1.27.35.
- QLE81xx network adapter driver ([qlge](#)) updated to v1.00.00.31.

## Miscellaneous Drivers

### Oracle

- Reliable Datagram Sockets driver ([rds](#)) updated to 4.1. RDS provides in-order, non-duplicated, highly-available, low-overhead, reliable delivery of datagrams between hundreds of thousands of non-connected endpoints.

## 1.2 Notable New Features

This release of the Unbreakable Enterprise Kernel includes the following new functionality:

- The following InfiniBand hardware is supported with the Unbreakable Enterprise Kernel:
  - Mellanox ConnectX-2 InfiniBand Host Channel Adapters
  - Sun InfiniBand QDR Host Channel Adapter PCIe #375-3696
- InfiniBand support via the [rdma](#) package. To start the [rdma](#) service, and enable it to load all the required modules automatically when you reboot the system, run the following commands as [root](#):

```
# service rdma start
# chkconfig --level 2345 rdma on
```

To stop or restart the [rdma](#) service, use the following commands:

```
# service rdma stop
# service rdma restart
```

To configure which upper-layer modules the [rdma](#) service should load, edit [/etc/rdma/rdma.conf](#).

- The Linux Containers template script for Oracle Linux ([lxc-oracle](#)) supports the creation of containers for Oracle Enterprise Linux 4, Oracle Linux 5, and Oracle Linux 6, downloading and installing the release RPMs from the Oracle Yum Server repository.

### 1.2.1 Xen Improvements

Several improvements have been incorporated to support Xen usage with the Unbreakable Enterprise Kernel:

- Numerous bug fixes and performance improvements.
- Added support for more than 128 GB in a PV guest.
- Xen Machine Check Exception (MCE) driver added (allows you to view MCE events that the Xen hypervisor receives).
- Xen Physical CPU (PCPU) driver added (allows management tools to online or offline physical CPUs in dom0).
- Xen Processor Aggregator Device (PAD) added (enables configuration and control of all processors on a platform).

## 1.2.2 Notable New Features Available with the Red Hat Compatible Kernel

The following sections detail notable new features in this update for the Red Hat Compatible Kernel.

### 1.2.2.1 LVM RAID10 Support

You can create, resize, and remove RAID10 volumes in LVM, where striping is laid out across an array of mirrors.

To create a RAID 10 logical volume, use the following form of the `lvcreate` command:

```
# lvcreate --type raid10 -m mirrors -i stripes -L lv_size -n lv_name vol_grp
```

For example, the following command would create a 200 GB RAID10 volume named `myr10vol` with four stripes and two mirrors in the `myvg` volume group:

```
# lvcreate --type raid10 -m 1 -i 4 -L 200G -n myr10vol myvg
```

The `-m` option specifies the number of additional copies of the data, not the total number of copies.

### 1.2.2.2 New Boot and Kickstart Options

The following new boot options are available:

```
bond=bondname:bondslave1[,bondslave2]\...:[opt1[,opt2]\...]
```

Specifies the bonded network interface, the network connections to be bonded to the interface, and any additional options.

```
vlanid=tag
```

Specifies a network device's numeric 802.1q tag to allow installation over a VLAN.

The following new Kickstart options are available with the `network` keyword:

```
--bondslaves=bondslave1[,bondslave2]\... --bondopts=opt1[,opt2]\...
```

Specifies the network connections to be bonded to the network interface, and any additional options.

```
--vlanid=tag
```

Specifies a network device's numeric 802.1q tag to allow installation over a VLAN.

The new Kickstart `fcoe` keyword allows you to enable Fibre Channel over Ethernet (FCoE) devices in addition to Enhanced Disk Drive Services (EDD) discovered devices. The following options are available with the `fcoe` keyword:

```
--autovlan
```

Specifies that VLANs should be discovered automatically.

```
--dcb=setting1[,setting2]\...
```

Specifies settings for Data Center Bridging (DCB).

```
--nic=device
```

Specifies the name of the FCoE device to activate.

### 1.2.2.3 Persistent Device Naming

`udev` maintains persistent device names for devices such as `/dev/sdb` by creating symbolic links such as `/dev/disk/by-path/pci-0000:00:0d.0-scsi-1:0:0:0` and `/dev/disk/by-uuid/e8d40553-43f2-4ae6-8e4b-38e04e7ee41c`. The kernel message log now records each `udev` persistent device name mapping in the following format:

```
udev_alias: device_name (udev_persistent_name1 udev_persistent_name2 ... )
```

You can use a log analyzer to examine these messages, which are also saved in `/var/log/messages`.

### 1.2.2.4 PMU Support for Uncore and Load Latency

The uncore feature of the `perf` event subsystem implements Performance Monitoring Unit (PMU) support for the Intel Xeon Processor X55xx and X56xx processor families. Multiple processor cores can share physical uncore subsystems, including the L3 cache. Uncore PMU support allows packages to collect performance data, including load latency at various levels in the cache and memory hierarchy, which ranges from micro-operation dispatch up to globally observable data. Debugging in `perf` is made possible by the implementation of PMU event parsing.

## 1.3 Technology Preview Features

The following features included in the Unbreakable Enterprise Kernel Release 2 are still under development, but are made available for testing and evaluation purposes.

- Kernel module signing facility

Applies cryptographic signature checking to modules on module load, checking the signature against a ring of public keys compiled into the kernel. GPG is used to do the cryptographic work and determines the format of the signature and key data.

- Linux Containers (lxc)

Based on the Linux Cgroups and name spaces functionality, containers allow you to safely and securely run multiple applications or instances of an operating system on a single host without risking them interfering with each other. Containers are lightweight and resource-friendly, which saves both rack space and power. In order to get started with containers, you need to install the `lxc` package, which is included in the package repository of the Unbreakable Enterprise Kernel.

- Transcendent memory (tmem)

Transcendent Memory provides a new approach for improving the utilization of physical memory in a virtualized environment by claiming underutilized memory in a system and making it available where it is most needed. From the perspective of an operating system, tmem is fast pseudo-RAM of indeterminate and varying size that is useful primarily when real RAM is in short supply. To learn more about this technology and its use cases, see the Transcendent Memory project page on [oss.oracle.com](https://oss.oracle.com/projects/tmem/): <https://oss.oracle.com/projects/tmem/>

- Distributed Replicated Block Device (DRBD)

A shared-nothing, synchronously replicated block device (*RAID1 over network*), designed to serve as a building block for high availability (HA) clusters. It requires a cluster manager (for example, pacemaker) to implement automatic failover.

The following Technology Preview features are currently not supported under Oracle Linux 6 and may not be functionally complete:

- DIF/DIX support for SCSI
- FS-Cache
- `fsfreeze`
- IPv6 support in IPVS
- LVM API
- LVM RAID support
- Matahari
- Open multicast ping (`omping`)
- System Information Gatherer and Reporter (SIGAR)
- Trusted Platform Module (TPM)
- Trusted Boot
- `vios-proxy`

The following Technology Preview features are only available when running the Red Hat Compatible Kernel (RHCK):

- Brocade BFA driver
- Diagnostic pulse for the `fence_ipmilan` agent
- Error Detection And Correction (EDAC) driver interface
- Fibre Channel over Ethernet (FCoE) target mode
- Kernel Media support
- KVM Live Snapshots
- KVM network drivers wire-speed requirement
- Parallel NFS
- Remote audit logging
- Single Root I/O Virtualization (SR-IOV) on the `be2net` driver
- System monitoring via SNMP

These features are not suitable for production use, but are included to give them wider exposure.

## 1.4 Packages Added to the Upstream Release

The following packages have been added to the upstream release:

- `cgdcboxd`
- `cpupowerutils`
- `haproxy`
- `hypervkvpd`
- `keepalived`
- `libitm`
- `libjpeg-turbo`
- `libltdb`
- `linuxptp`
- `mesa-dril-drivers`
- `mtdev`
- `pcs`
- `python-linux-procfs`
- `python-schedutils`
- `scipy`
- `suitesparse`
- `tbb`
- `tuna`
- `xorg-x11-drv-modesetting`

## 1.5 Packages Modified from the Upstream Release

The following packages have been modified from the upstream release:

- `abrt`
- `anaconda`
- `autofs`
- `basesystem`
- `bind`
- `brlty`
- `btrfs-progs`
- `boost`

- `compat-glibc`
- `coreutils`
- `crash`
- `cpuspeed`
- `dbus`
- `device-mapper-multipath`
- `dhcp`
- `dracut`
- `efax`
- `firefox`
- `firstaidkit`
- `firstboot`
- `gdm`
- `git`
- `gnome-desktop`
- `grub`
- `grubby`
- `gststreamer`
- `httpd`
- `hypervkvpd`
- `initscripts`
- `irqbalance`
- `iscsi-initiator-utils`
- `java-1.7.0-openjdk`
- `kabi-whitelists`
- `kabi-yum-plugins`
- `kdeadmin`
- `kdebase`
- `kdelibs`
- `kde-settings`



- `kdebase-workspace`
- `kexec-tools`
- `libxml2`
- `libxslt`
- `libitm`
- `libreoffice`
- `libreport`
- `libvirt`
- `luci`
- `mkbootdisk`
- `module-init-tools`
- `net-snmp`
- `netxen-firmware`
- `nmap`
- `nss`
- `ocaml-libvirt`
- `openmpi`
- `openoffice.org`
- `openssl1098e`
- `PackageKit`
- `pcs`
- `pilot-link`
- `piranha`
- `plymouth`
- `policycoreutils`
- `publican`
- `python-virtinst`
- `qpid-cpp`
- `qpid-qmf`
- `rdma`

- `redhat-bookmarks`
- `redhat-indexhtml`
- `redhat-lsb`
- `redhat-release-server`
- `redhat-rpm-config`
- `rhn-client-tools`
- `rhnlib`
- `rhnsd`
- `rpmdevtools`
- `sanlock`
- `selinux-policy`
- `setroubleshoot`
- `setroubleshoot-plugins`
- `sos`
- `system-config-date`
- `system-config-date-docs`
- `system-config-kickstart`
- `system-config-network`
- `system-config-services`
- `system-config-services-docs`
- `system-config-users-docs`
- `system-icon-theme`
- `systemtap`
- `thunderbird`
- `tog-pegasus`
- `udev`
- `wireshark`
- `xsane`
- `xulrunner`
- `yum`

- `yum-rhn-plugin`
- `yum-utils`

Unless otherwise noted, changes relate to distro renaming, trademark usage, or user-interface modifications.

## 1.6 Packages Removed from the Upstream Release

The following packages from the upstream release are not included:

- `iprutils`
- `libehca`
- `libica`
- `libreport-plugin-rhtsupport`
- `librtas`
- `libservicelog`
- `libvpd`
- `lsvpd`
- `openssl-ibmca`
- `powerpc-utils`
- `ppc64-utils`
- `publican-redhat`
- `python-rhsm`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-as-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-bn-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-de-DE`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-en-US`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-es-ES`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-fr-FR`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-gu-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-hi-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-it-IT`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-ja-JP`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-kn-IN`

#### Packages Added by Oracle

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- `Red_Hat_Enterprise_Linux-Release_Notes-6-ko-KR`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-ml-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-mr-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-or-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-pa-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-pt-BR`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-ru-RU`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-si-LK`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-ta-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-te-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-zh-CN`
- `Red_Hat_Enterprise_Linux-Release_Notes-6-zh-TW`
- `redhat-logos`
- `s390utils`
- `servicelog`
- `subscription-manager`
- `subscription-manager-migration-data`
- `virt-who`
- `yaboot`

## 1.7 Packages Added by Oracle

The following packages have been added to the base release by Oracle:

- `kernel-uek`
- `lxc` (x86\_64 only)
- `ocfs2-tools`
- `oracleasm-support`
- `oracle-logos`
- `oraclelinux-release`
- `oraclelinux-release-notes`
- `oracle-rdbms-server-11gR2-preinstall`

#### Packages Added by Oracle

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- `reflink`



## Chapter 2 Fixed and Known Issues

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This chapter describes the fixed and known issues for Oracle Linux 6 Update 4.



#### Important

Run the `yum update` command regularly to ensure that the latest bug fixes and security errata are installed on your system.

### 2.1 Fixed Issues

The following issues have been fixed in this update:

- The updated automounter package (`autofs`) allows NetApp filer paths to be automounted. (Bug ID 12658280)
- The legacy DNS resolver in the UEK R2 kernel now supports the sending of NFSv4 referrals (lists of NFS servers and exported NFS file systems) to Oracle Linux 6 clients. The user-space component is included with the `nfs-utils` package. (Bug ID 14769650)

### 2.2 Known Issues

This section describes known issues in this update.

#### Kernel Panic with Emulex LPe16XXX and Sun Storage FCoE Adapters

A kernel panic can occur at boot time if the UEK kernel is older than UEK R2 QU5 (2.6.39-400.209.1) and one of the following FCoE adapters is installed on the system:

- Emulex LPe16002-M6-O 2-Port 10Gb FCoE Adapter
- Emulex LPem16002-M6-O 2-Port 10Gb FCoE Adapter
- Emulex LPe16202-X 2-Port 10Gb FCoE Adapter
- Sun Storage 16Gb FC ExpressModule Universal HBA-Emulex (#7101689 and #7101690)
- Sun Storage 16Gb FC PCIe Universal HBA-Emulex (#7101683 and #7101684)

The panic occurs because these adapters require version 0:8.3.7.10.4p or later of the `lpfc` driver.

To resolve this issue, update the kernel to UEK R2 QU5 (2.6.39-400.209.1), UEK R3 (3.8.13-16), or later release, which include an updated version of the `lpfc` driver.

#### Oracle Clusterware Fails to Start on ASM Storage with SELinux Enabled

If the SELinux policy packages have not been updated recently, Cluster Ready Services (CRS) might fail to start with messages such as the following in `/var/log/messages`:

## Known Issues

---

```
SELinux is preventing /usr/lib/oracleasm/oracleasm-instantiate-disk from
associate access on the filesystem DATA1.
```

The solution is to upgrade the `selinux-policy` and `selinux-policy-targeted` packages to ensure that you are running a version no earlier than 3.7.195.0.1.el6\_4.5:

```
# yum update 'selinux-policy*'
```

After upgrading the packages, reboot the system. (Bug ID 13925445)

## Support for Large Memory 32-bit Systems

Releases of Oracle Linux prior to Oracle Linux 5 supplied a *hugemem* kernel to allow a system to address up to 64 GB of memory in 32-bit mode. The *hugemem* kernel is no longer available in Oracle Linux 5 and later releases.

The Unbreakable Enterprise Kernel (UEK) supports a maximum of 16 GB of memory for 32-bit kernels on bare metal and hardware virtualized machine (HVM) systems, and 8 GB for fully paravirtualized machine (PVM) systems. 32-bit PVM guest operating systems must be located in the first 128 GB of physical memory on the host.

The Red Hat Compatible Kernel (RHCK) has the same limitations, except that PVM systems can have up to 16 GB of memory. The limitation of 8 GB for PVM on UEK was chosen for reasons of reliability.

A 32-bit system uses the PAE (physical address extension) memory feature to map physical memory beyond 4 GB into the 32-bit address space that is available to each process. A 64-bit system can address memory beyond 4 GB without requiring an extra layer of memory abstraction.

Oracle Linux on x86\_64 includes 32-bit libraries, which allow applications built for both 64-bit and 32-bit Linux to run on the same system. This capability provides scalability to virtually unlimited memory sizes, while retaining the ability to run 32-bit applications. Oracle recommends this configuration for any system with more than 4 GB of memory. (Bug ID 16974301)

## Linux Containers 32-bit Support

The Linux Containers package (`lxc`) is not available for the i386 architecture.

## Linux Containers Interoperability with SELinux

Running with SELinux enabled on the host can cause issues with Linux Containers. The workaround is to disable SELinux altogether by setting `SELINUX=disabled` in `/etc/selinux/config` and rebooting the system. Using the `setenforce Permissive` command is not sufficient as the `selinuxfs` pseudo file system remains mounted. (Bug ID 15967411)

## Linux Containers Default Configuration Location

The default location for a container's configuration has changed from `/etc/lxc/name` to `/container/name` in `lxc 0.8.0`.

To start a container that you created with a previous update of Oracle Linux, specify the `-f` option to `lxc-start`, for example:

```
# lxc-start -n ol6u3 -f /etc/lxc/ol6u3/config
```

To convert an existing container to use the new location:

1. Move the container's configuration directory to `/container/name`:



## Known Issues

---

```
# mv /etc/lxc/name /container
```

2. Edit the `/container/name/config` file and change the values of any `lxc.rootfs` and `lxc.mount` parameters to refer to `/container` instead of `/etc/lxc`.

For example, if the `config` file contained the following entries:

```
lxc.rootfs = /etc/lxc/example/rootfs
lxc.mount.entry=/lib /etc/lxc/example/rootfs/lib none ro,bind 0 0
lxc.mount.entry=/usr/lib /etc/lxc/example/rootfs/usr/lib none ro,bind 0 0
lxc.mount.entry=/lib64 /etc/lxc/example/rootfs/lib64 none ro,bind 0 0
lxc.mount.entry=/usr/lib64 /etc/lxc/example/rootfs/usr/lib64 none ro,bind 0 0
```

you would change these entries to read:

```
lxc.rootfs = /container/example/rootfs
lxc.mount.entry=/lib /container/example/rootfs/lib none ro,bind 0 0
lxc.mount.entry=/usr/lib /container/example/rootfs/usr/lib none ro,bind 0 0
lxc.mount.entry=/lib64 /container/example/rootfs/lib64 none ro,bind 0 0
lxc.mount.entry=/usr/lib64 /container/example/rootfs/usr/lib64 none ro,bind 0 0
```

After converting the container, you do not need to specify the `-f` option to `lxc-start`. (Bug ID 15967411)

## Broadcom NetXtreme II 10Gbps Network Adapter Driver

When using the `bnx2x` driver in a bridge, disable Transparent Packet Aggregation (TPA) by including `options bnx2x disable_tpa=1` in `/etc/modprobe.conf`. (Bug ID 14626070)

## Btrfs File System Balancing

Running `btrfs filesystem balance` converts a non-RAID or concatenated file system setup to RAID-0 after adding a new device. Do not run this command if you do not intend to convert the profile of the file system after adding the new device. (Bug ID 13715389)

## Btrfs Conversion Does Not Preserve SELinux Security Contexts

Converting an existing `ext2`, `ext3`, or `ext4` root file system to `btrfs` does not carry over the associated security contexts that are stored as part of a file's extended attributes. With SELinux enabled and set to enforcing mode, you might experience many `permission denied` errors after reboot, and the system might be unbootable. To avoid this problem, enforce automatic file system relabeling run at bootup time. To trigger automatic relabeling, create an empty file named `autorelabel` (for example, by using `touch`) in the file system's root directory before rebooting the system after the initial conversion. The presence of this file instructs SELinux to recreate the security attributes for all files on the file system. If you forget to do this and rebooting fails, either temporarily disable SELinux completely by adding `selinux=0` to the kernel boot parameters, or disable enforcing of the SELinux policy by adding `enforcing=0`. (Bug ID 13806043)

## Btrfs RAID1 Failure Results in a Kernel Panic

A failing RAID1 disk might result in a kernel panic with the error `kernel: BTRFS error (device (null)) in btree_writpage_io_failed_hook:3662: IO failure (Error occurred while writing out btree at offset)`. (Bug ID 16262571)

## btrfs subvolume get-default Command

The `btrfs subvolume get-default` command lists all existing subvolumes instead of only the default subvolume. (Bug ID 13815433)

## btrfs filesystem defragment Command

The `btrfs filesystem defragment` command exits with an exit code of 20 even if it succeeds. (Bug ID 13714531)

## Btrfs File Size

Commands such as `du` might show inconsistent results for file sizes in a btrfs file system when the number of bytes that is under delayed allocation is changing. (Bug ID 13096268)

## Btrfs Hard Link Limit

Btrfs has a limit of 237 hard links to a file. Attempting to create more than this number of links results in the error `Too many links`. (Bug ID 16278563)

## Error Message Following First Reboot on an HP ProLiant Server

You might see a message similar to the following during the first reboot of an HP ProLiant server:

```
[Firmware Bug]: the BIOS has corrupted hw-PMU resources (MSR 186 is 43003c)
```

You can safely ignore this message. The functionality and performance of the operating system and the server are not affected.

## Mellanox ConnectX Drivers

The Mellanox ConnectX core, Ethernet, and InfiniBand drivers are supported only for the x86\_64 architecture.

(Bug ID 16228063)

## udev Message

A message similar to the following might be recorded in `dmesg` or `/var/log/messages` at boot time:

```
udev (pid): /proc/pid/oom_adj is deprecated, please use /proc/pid/oom_score_adj instead.
```

The `udev` process uses the deprecated `oom_adj` kernel interface to prevent it from being killed if the system runs short of memory. You can safely ignore the message as the action still succeeds. To prevent the message from occurring, install the package `udev-147-2.42.el6.arch.rpm` or higher. (Bug ID 13655071, 13712009)

## Unable to Register Oracle Linux Guest with ULN

Registering an Oracle Linux guest running under Virtual Box with the Unbreakable Linux Network (ULN) might fail with a server communication error. The workaround is to run the following command as `root` on the guest:

```
# echo "uuid=`uuidgen -t`" >> /etc/sysconfig/rhn/up2date
```

and then run `uln_register` again. (Bug ID 14696776)

## xguest Package Not Installable with SELinux Disabled

If the `xguest` package fails to install with a `PREIN` script error, enable SELinux by setting `SELINUX=enabled` in `/etc/selinux/config`, reboot the system, and reinstall the `xguest` package. (Bug ID 13495388)

## X Window System Does Not Run in a PVHVM guest

If you install an Oracle Linux 6 Update 4 (x86\_64) PVHVM guest with either the Desktop or the Software Development Workstation installation options, the X Window System is not accessible after installation when you boot the guest into run level 5. This problem is seen in OVM 3.0 and later.

Use the following workaround:

1. Boot the guest into run level 3 by appending 3 to the `kernel` command line in GRUB, for example:

```
kernel /vmlinuz-2.6.39-400.15.0.el6uek.x86_64 ... rd_NO_DM 3
```

2. After the guest boots, log in as `root`, and uninstall the `xorg-x11-drv-cirrus` package, for example:

```
# rpm -ev --nodeps xorg-x11-drv-cirrus
```

You can then either reboot the system into run level 5 or use the `init 5` command to switch to run level 5. The X Window System will be accessible on subsequent boots to run level 5. (Bug ID 16280196)

## Oracle VM 3.0 Guests Crash During Oracle Database Installation

PVHVM guests on Oracle VM 3.0 crash during Oracle Database installation if the value of the maximum memory (`maxmem`) parameter set for the guest is greater than the amount specified at boot time (`memory`). To avoid this issue, ensure that the values of the `maxmem` and `memory` parameters are the same. This issue has been resolved in Oracle VM 3.1.1. (Bug ID 13396734)

## Bootting UEK R2 as a 32-bit PVHVM guest

When booting UEK R2 as a 32-bit PVHVM guest, you can safely ignore the kernel message `register_vcpu_info failed: err=-38`, which might be displayed. (Bug ID 13713774)

## Post-installation Anaconda Errors

In certain cases, after successfully completing installation and rebooting the system, it is possible for errors such as the following to occur:

```
Error in sys.excepthook:
Traceback (most recent call last):
  File "/usr/lib/python2.6/site-packages/meh/handler.py", line 161, in
(lambda)
    File "/usr/lib/anaconda/exception.py", line 44, in handleException
    File "/usr/lib/python2.6/site-packages/meh/handler.py", line 106, in
handleException
    File "/usr/lib/anaconda/gui.py", line 1169, in mainExceptionWindow
ImportError: No module named ui.gui
```

```
14:05:55 CRITICAL: anaconda 11.5.0.47 exception report
Traceback (most recent call first):
  File "/usr/lib64/python2.6/site-packages/gtk-2.0/gtk/_lazyutils.py", line 32,
in __
getattr__
    File "/usr/lib/anaconda/gui.py", line 1453, in keyRelease
    if ((event.keyval == gtk.keysyms.KP_Delete
ImportError: No module named keysyms
```

These errors can safely be ignored.

## FCoE Target Service

The upstream release has added support for FCoE target service. This service is not supported with the previous release of the Unbreakable Enterprise Kernel (2.6.32). To use this service, boot your system into the Unbreakable Enterprise Kernel Release 2 (2.6.39) or the Red Hat Compatible Kernel.

## mlx4\_core Conflicts Between the `mlx_en` and `ofa` Packages

Both the `mlx_en` and `ofa` packages contain `mlx4_core`. Only one of these packages should be installed. Attempting to install both packages on a single server results in a package conflict error. If you have a Mellanox Ethernet Controller, install `mlx_en`. If you have a Mellanox InfiniBand Controller, install `ofa`. If your system has both controllers, use `ofa` as it supports both the Ethernet and InfiniBand controllers.

## Kdump Service Fails to Start for UEK

When configuring the crash kernel for the UEK, only standard crash kernel settings (for example, `crashkernel=128M@32M`) are supported. The new settings used by the Red Hat Compatible Kernel (for example, `crashkernel=auto`) are not supported and cause the `kdump` service to fail to start. (Bug ID 13495212)

## iTCO\_wdt Errors

If you see the boot-time `dmesg` error `iTCO_wdt: failed to reset NO_REBOOT flag, device disabled by hardware/BIOS with UEK R2` or `iTCO_wdt: failed to reset NO_REBOOT flag, reboot disabled by hardware with UEK`, add the line `blacklist iTCO_wdt` to `/etc/modprobe.d/blacklist-watchdog`.

## Paravirtualized Drivers in a Hardware Virtualized Guest

The Unbreakable Enterprise Kernel adds support for PV drivers in a HVM guest (PVHVM) on Oracle VM. The default is to present only PV drivers when running in an HVM guest. To run `kernel-uek` fully hardware virtualized, including the drivers, add the parameter `xen_emul_unplug=never` to the boot parameters in `/etc/grub.conf`, for example:

```
kernel /vmlinuz-2.6.32-300.2.1.el6uek ro root=/dev/VolGroup00/LogVol100 xen_emul_unplug=never
```

Adding this parameter makes the kernel also present the emulated drivers as previously (for example, the `8139cp` network driver).

## Incorrect Package Count

Selecting all packages in certain groups during installation might not show the correct package count. (Bug ID 11684244)

## Default Reverse Path Filtering Mode Affects Certain Oracle Products

Oracle Linux 6 defaults to reverse path filtering in strict mode. Some Oracle products and network storage devices work more reliably with reverse path filtering in loose mode. To enable loose mode, issue the following command (where `iface` is the network interface, for example, `eth1`).

```
# sysctl net.ipv4.conf.iface.rp_filter=2
```

The default setting is 1 for strict mode. (Bug ID 10649976)

## Receive Packet Steering errors

Certain network operations that utilize receive packet steering could cause errors on the system. (Bug ID 11071685)

## Spurious udev Messages During Failed Path Restoration

If failed paths are restored in a multipath configuration, you might see `udev-work` error messages in `/var/log/messages`. The failed paths are restored despite these messages, which you can ignore. (Bug ID 11682171)

## Default NFS Mount Options

The default NFS mount option has changed to NFS v4. To mount an NFS v3 volume (the default in Oracle Linux 5), use the following mount options:

```
-o vers=3,mountproto=tcp
```

## Setting the Serial Console in a Hardware Virtualized Guest

To set the serial console a hardware virtualized guest, use following settings in the guest:

- Add the following parameters to the kernel boot line in `/etc/grub.conf`:

```
console=tty0 console=ttyS0,57600n8
```

- Add the following line to `/etc/securetty`:

```
ttyS0
```

## Oracle RDBMS Server 11gR2 Preinstall Settings Not Visible After Installation

On an x86\_64 system, if you install the `pam.i386` package either manually or via a package dependency, and the `oracle-rdbms-server-11gR2-preinstall` package is also selected, this overwrites the settings for Oracle Database in `/etc/security/limits.conf`. This is most likely to occur during a Kickstart-automated installation that includes non-standard packages. To restore the settings, run the `oracle-rdbms-server-11gR2-preinstall-verify` script. (Bug ID 14212822)

## Unbreakable Linux Network

Following the first reboot after installing Oracle Linux 6, you are prompted to register your system with the Unbreakable Linux Network (ULN). If you did not configure your network during the installation, the registration process to ULN cannot succeed. To register your system, log in as `root`, configure the system's network manually, and run `uln_register`.

## Console Appears to Hang When Booting

On some hardware, the console may appear to hang during the boot process after starting `udev`. However, the system does boot properly and is accessible. A workaround to this problem is to add `nomodeset` as a kernel boot parameter in `/etc/grub.conf`. (Bug ID 10094052, 13485328)

## Default I/O Scheduler

For the Unbreakable Enterprise Kernel, `deadline` is the default I/O scheduler.

For the Red Hat Compatible Kernel, `cfq` is the default I/O scheduler.

### **`sched_yield()` Settings for Completely Fair Scheduler**

For the Unbreakable Enterprise Kernel, the default setting is `kernel.sched_compat_yield=1`.

For the Red Hat Compatible Kernel, the default setting is `kernel.sched_compat_yield=0`.

## Chapter 3 Upgrading to Oracle Linux 6 Update 4

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This chapter describes how to upgrade your system to Oracle Linux 6 Update 4.

### 3.1 Supported Upgrade Paths

Upgrading from Oracle Linux 6 GA, Update 1, Update 2, or Update 3 is supported. Upgrading from a beta release is not supported.

In-place upgrading from a major version of Oracle Linux 5 or earlier is not supported. Although Anaconda provides an option to perform an upgrade, fresh installation is strongly recommended.

If you have an Oracle Linux 5.8 system, you can use new features in Unbreakable Enterprise Kernel without upgrading to Oracle Linux 6 as Oracle Linux 5.8 includes the Unbreakable Enterprise Kernel.

### 3.2 Obtaining Oracle Linux 6 Update 4 Packages



#### Note

You use `yum` rather than `up2date` to manage packages with Oracle Linux 6. Using `up2date` is not supported.

You can download a full Oracle Linux installation media image from the Oracle Software Delivery Cloud at <https://edelivery.oracle.com/linux>. You can also obtain Oracle Linux packages from the Unbreakable Linux Network (ULN) and the Oracle Yum Server server.

#### 3.2.1 About the Unbreakable Linux Network

You have the option of registering a system with ULN when you install Oracle Linux 6 on a system. To register with ULN after installation, use the `uln_register` command.

To obtain Oracle Linux updates from ULN, you must have an Oracle Linux support subscription. For more information about ULN, see <https://linux.oracle.com>.

During ULN registration, your server is automatically registered with the latest channels for the base repository and the Unbreakable Enterprise Kernel Release 2. If you have upgraded your system from a previous release and do not want to install UEK Release 2, you must manually unsubscribe the server from this channel.

ULN also provides channels for Oracle-specific software packages such as Oracle's `ASMLib` userspace package and the Oracle Instant Client. To enable access to these packages, log in to ULN and subscribe your system to the Oracle Software channel.

## 3.2.2 About Oracle Yum Server

Oracle also provides all errata and updates for Oracle Linux via the Oracle Yum Server service, which includes updates to the base distribution, but does not include Oracle-specific software. You do not require an Oracle Linux support subscription to use this service. For more information on how to obtain updates from Oracle Yum Server, see <https://yum.oracle.com>.

By default, all new installations of Oracle Linux 6 Update 4 are automatically configured to use the Oracle Yum Server update service. If you subsequently register the system with ULN, the Oracle Yum Server service is automatically disabled.

The following entries in the `/etc/yum.repos.d/public-yum-ol6.repo` file enable you to download the latest available packages for Oracle Linux 6 and the Unbreakable Enterprise Kernel Release 2:

```
[ol6_latest]
name=Oracle Linux $releasever Latest ($basearch)
baseurl=https://yum.oracle.com/repo/OracleLinux/OL6/latest/$basearch/
gpgkey=https://yum.oracle.com/RPM-GPG-KEY-oracle-ol6
gpgcheck=1
enabled=1

[ol6_UEK_latest]
name=Latest Unbreakable Enterprise Kernel for Oracle Linux $releasever ($basearch)
baseurl=https://yum.oracle.com/repo/OracleLinux/OL6/UEK/latest/$basearch/
gpgkey=https://yum.oracle.com/RPM-GPG-KEY-oracle-ol6
gpgcheck=1
enabled=1
```

## 3.2.3 About Oracle Linux Installation Media

Oracle Linux 6 Update 4 contains two distinct repository sources on the installation media for the Red Hat Compatible Kernel and the Unbreakable Enterprise Kernel. To configure `yum` to use both repositories from an ISO image of the installation media, create the file `/etc/yum.repos.d/Media.repo` containing entries similar to the following:

```
[ol6_base_media]
name=Oracle Linux 6 Update 4 Base Media
baseurl=file:///media/ISOimage/Server
gpgkey=file:///media/ISOimage/RPM-GPG-KEY
gpgcheck=1
enabled=1

[ol6_uek_media]
name=Oracle Linux 6 Update 4 UEK Media
baseurl=file:///media/ISOimage/UEK2
gpgkey=file:///media/ISOimage/RPM-GPG-KEY
gpgcheck=1
enabled=1
```

Adjust the value of the `baseurl` and `gpgkey` parameters to match the mount point of the ISO image on your system. If you do not require one of the repositories, set the value of the corresponding `enabled` parameter to 0.

## 3.3 Applying Updates

Once you have set up the ULN channels, Oracle Yum Server repositories, or installation media repositories that `yum` should use, you can update all installed packages by running the following command:

```
# yum update
```



If your system is currently installed with Oracle Linux 6 GA, Update 1, Update 2, or Update 3, this command upgrades it to Update 4.

You can use the following command to update a specific package:

```
# yum update package
```

For example, to update the Z-shell package (`zsh`), you would enter:

```
# yum update zsh
```

For more information, see the `yum(8)` manual page.

## 3.4 Upgrading Unbreakable Enterprise Kernel Release 2

Oracle Linux 6 Update 4 ships with the latest Unbreakable Enterprise Kernel Release 2. If you upgrade your system from the installation media, there are two upgrade scenarios:

- If UEK R2 is not currently installed on the system, only the latest Red Hat Compatible Kernel is installed. The UEK R2 kernel is not installed.
- If UEK R2 is currently installed on the system, the latest version of that kernel is installed.

`yum` uses whatever repositories you have configured on your system to upgrade it. You can find the latest UEK2 packages in the `ol6_i386_UEK_latest` and `ol6_x86_64_UEK_latest` repositories. If you want to install the latest UEK R2 kernel, subscribe your system to the correct channel on ULN, or configure the repository in the `/etc/yum.repos.d/public-yum-ol6.repo` file as shown here:

```
[ol6_UEK_latest]
name=Latest Unbreakable Enterprise Kernel for Oracle Linux $releasever ($basearch)
baseurl=https://yum.oracle.com/repo/OracleLinux/OL6/UEK/latest/$basearch/
gpgkey=https://yum.oracle.com/RPM-GPG-KEY-oracle-ol6
gpgcheck=1
enabled=1
```

