

**Oracle® Linux 7**

**Release Notes for Oracle Linux 7 Update 7 (aarch64)**

**ORACLE®**

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## Preface

[Oracle® Linux 7: Release Notes for Oracle Linux 7 Update 7 \(aarch64\)](#) provides a summary of the new features and known issues in Oracle Linux 7 Update 7 (aarch64). This document may be updated after it is released.

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## Audience

This document is intended for users and administrators of Oracle Linux 7 Update 7 (aarch64). It describes potential issues and the corresponding workarounds you may encounter while using this release. Oracle recommends that you read this document before installing Oracle Linux 7 Update 7 (aarch64). It is assumed that readers have a general understanding of the Linux operating system.

## Related Documents

The latest version of this document and other documentation for this product are available at:

[Oracle® Linux 7 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.
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# Chapter 1 System Requirements and Limitations

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1.1 File System, Storage, and Address Space Limitations ..... 1

System requirements and limitations for 64-bit Arm architecture are under review. You can check whether your hardware is supported on Oracle Linux 7 by checking the Hardware Certification List at <https://linux.oracle.com/hardware-certifications>. Hardware is listed as it becomes available and is validated.

## 1.1 File System, Storage, and Address Space Limitations

The following table describes the maximum file size and maximum file system size for the BTRFS, ext4, and XFS file systems. File system limitations are affected by kernel versions and features, and by the architecture of the system on which Oracle Linux is installed. The values depicted here are estimates based on the known variables that might affect the maximum theoretical value that can be achieved. The theoretical values might be higher than those depicted here, and the actual achievable values might be lower than the values shown, depending on the hardware and the kernel version that is used.

File System Type	Maximum File Size	Maximum File System Size
<code>btrfs</code>	8 EiB	8 EiB
<code>ext4</code>	16 TiB	1 EiB
<code>xfs</code>	8 EiB	8 EiB

The limits for the `ext4` file system that are described here are higher than those recommended and might prove unstable. If you plan to work with systems where you are intend to work towards using higher file system sizes or file sizes, it is recommended that you use either the BTRFS or XFS file system.

The maximum supported size for a bootable logical unit number (LUN) is 50 TB. GPT and UEFI support are required for LUNs that are larger than 2 TB.

The maximum size of the address space that is available to each process is 128 TB.

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## Chapter 2 Shipped Kernel

Oracle Linux 7 Update 7 (aarch64) ships with the following kernel package:

`kernel-  
uek-4.14.35-1902.3.2.el7` Unbreakable Enterprise Kernel Release 5 (UEK R5), which is the default kernel.

The Unbreakable Enterprise Kernel Release 5 is the only kernel that is supported at this time for the 64-bit Arm platform.

The Oracle Linux release is tested as a bundle, as shipped on the installation media image. When installed from the installation media image, the minimum kernel version that is supported is the kernel that is included in the image. Downgrading kernel packages is not supported, unless recommended by Oracle Support.

The kernel source code for the shipped kernel is available after the initial release through a public git source code repository at <https://github.com/oracle/linux-uek>.

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# Chapter 3 New Features and Changes

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The following new features and changes are included in Oracle Linux 7 Update 7 (aarch64).

For details about the new features and changes in the initial release of Oracle Linux 7, see [Oracle® Linux 7: Release Notes for Oracle Linux 7](#). Note that support for the 64-bit Arm platform started with the [Oracle Linux 7 Update 6 \(aarch64\)](#) release. Changes that are described in this document are subsequent to the changes that are described in the release notes for that initial release.

### 3.1 Graphical Installation Program Enhancement

In Oracle Linux 7 Update 7 (aarch64), the graphical installation program has been enhanced to detect whether Simultaneous Multithreading (SMT) is enabled on the system. If the feature is enabled, a message is displayed at the bottom of the Installation Summary screen. SMT enables the execution of multiple threads on a single physical CPU core, which can improve performance. Note that the use of SMT is only possible where the CPU is SMT-capable.

### 3.2 DTrace

DTrace is enabled for 64-bit Arm platforms and ports of the DTrace code are available in UEK R5. Refer to [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 5 Update 2](#) for more information.

The DTrace user-space code in the `dtrace-utils` package has also all been ported to run on 64-bit Arm platforms to fully enable DTrace for Oracle Linux 7 Update 7 (aarch64)

### 3.3 Developer and Compiler Tools

The following developer tools, features, and enhancements are included in this update:

- **`gcc-libraries` packages updated to version 8.3.1.** This version of the GNU Compiler Collection (GCC) introduces several bug fixes and enhancements over the previous GCC version.
- **`linuxptp` packages updated to version 2.0.** This version of the `linuxptp` compiler tool introduces several bug fixes and improvements over the previous version.
- **Python version 3.6 available.** This update includes `python3` packages, which provide the Python 3.6 interpreter and the `pip` and `setuptools` tools. Previously, these packages were only available as a part of software collections.

## 3.4 Developer Toolchain

The Oracle Linux 7 Update 7 (aarch64) release includes a toolchain that provides a solid developer toolset to build code for 64-bit Arm platforms and compile modules against the provided kernel. The toolchain includes version 7.3 of the `gcc` compiler, which is used to build the aarch64 version of UEK R5.

Developer tools are released as a software collection that can be found in the `/addons/Oscl` directory repository on the provided ISO. You can install the `oracle-armtoolset-1` software collection by using the `yum` command:

```
# yum install scl-utils oracle-armtoolset-1
```

After the `oracle-armtoolset-1` software collection is installed, enable it by running the following command:

```
# scl enable oracle-armtoolset-1 bash
```

The `oracle-armtoolset-1` software collection is released as an addition to the Software Collection Library for Oracle Linux and is only available on aarch64 platforms.



### Note

The `oracle-armtoolset-1` software collection is required if you need to build kernel modules from source.

## 3.5 Networking

The following networking features, bug fixes, and enhancements are included in this update:

- **NetworkManager includes capability for VLAN filtering on bridge interfaces.** This enhancement enables you to configure virtual LAN (VLAN) filtering on bridge interfaces in the corresponding `NetworkManager` connection profiles, as well as define VLANs directly on bridge ports.
- **NetworkManager includes capability for configuring policy routing rules.** This enhancement enables you to configure rules as part of a connection profile, which means that `NetworkManager` now adds the rules when the profile is activated and removes the rules when the profile is deactivated. Previously, you would have had to set up policy routing rules outside of `NetworkManager` by using the dispatcher script provided in the `NetworkManager-dispatcher-routing-rules` package.

## 3.6 Security

The following security features, bug fixes, and enhancements are included in this update:

- **Network Security Services (NSS) package updates.** This update introduces several NSS changes, including several bug fixes, security enhancements, and improvements over the previous NSS version.

Notably, the NSS code and Certificate Authority (CA) list now meets the recommendations that are published with the latest Mozilla Firefox Extended Support Release (ESR). The updated CA list improves compatibility with the certificates that are used in the Internet Public Key Infrastructure (PKI).

- **SCAP Security Guide enhancement to include Universal Base Image containers and images.** The security policies in the SCAP Security Guide been enhanced to include Universal Base Image (UBI) containers and UBI images, which also includes `ubi-minimal` images. This enhancement enables the configuration compliance scanning of UBI containers and images by using the `atomic scan` command. UBI containers and images can now be scanned against any profile that is shipped in the SCAP Security

Guide, with only those rules that are relevant to the secure configuration of UBI being evaluated. Any rules that are inapplicable to UBI images and containers are automatically skipped.

- **scap-security-guide packages updated to version 0.1.43.** As of this update, the `scap-security-guide` packages are updated to version 0.1.43 in this update. This version of the `scap-security-guide` packages provides several bug fixes and enhancements over the previous version.
- **shadow-utils packages updated to version 4.6.** The `shadow-utils` packages have been updated to version 4.6 in this update. This version of the `shadow-utils` packages provides several bug fixes and enhancements over the previous version, including the new `newuidmap` and `newgidmap` commands for manipulating name space mapping for UID and GID.
- **tangd\_port\_t SELinux type added.** Oracle Linux 7 Update 7 (aarch64) includes the `tangd_port_t` SELinux type. This SELinux type enables the `tangd` service to run as confined while in SELinux enforcing mode, which simplifies the configuration of a Tang server to enable listening on a user-defined port, while preserving the security level that SELinux provides when in enforcing mode.

## 3.7 Infrastructure Services

The following server and services features, bug fixes, and enhancements are included in this update:

### 3.7.1 Tuned Updates

As of this update, the `tuned` packages are updated to version 2.11. This version of Tuned provides several bug fixes and enhancements over the previous version, including the following: added support for the boot loader specification, an updated `virtual-host` profile, the addition of a range feature for CPU exclusion, and other important improvements.

### 3.7.2 Chrony Updates

As of this update, the `chrony` packages are updated to version 3.4. This version of Chrony provides several bug fixes and enhancements over the previous version, including the following: hardware time-standing improvements, extended polling interval ranges, the addition of the burst and filter options to NTP sources, and other important improvements.

## 3.8 Technology Preview

The following information is specific to features in Oracle Linux 7 Update 7 (aarch64) that are not supported, but may be made available under technology preview.



#### Note

Features that are currently under technology preview when using UEK R5 are described in [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 5 Update 2](#).

Oracle makes available an Oracle Linux 7 Update 7 (aarch64) disk image for use on Raspberry Pi™ 3 Model B+ hardware as a technology preview for developer use *only*. Oracle does not provide support for the disk image or the hardware. Developers are encouraged to visit the Oracle Linux for Arm community forum at [https://community.oracle.com/community/technology\\_network\\_community/server\\_%26\\_storage\\_systems/linux/oracle-linux-for-arm](https://community.oracle.com/community/technology_network_community/server_%26_storage_systems/linux/oracle-linux-for-arm) for further assistance.



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# Chapter 4 Known Issues

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This chapter describes known issues for Oracle Linux 7 Update 7 (aarch64).

Note that additional issues that are specific to the kernel that you are using might also be present. If you are using the default UEK R5 kernel, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 5 Update 2](#). If you are using an alternate UEK release or update, refer to the release notes for the appropriate kernel version in [Unbreakable Enterprise Kernel Documentation](#).

## 4.1 Support Limited to Text-Mode Environments and Server Software

Oracle Linux 7 Update 7 (aarch64) is engineered and tested for server-related usage *only*. Although packages for desktop and productivity features are built and provided, testing of these packages is limited and support for graphical mode packages is not provided in this update. You can install any of these packages on your platform, but some of these applications might not work or could have issues that are not documented here.

Oracle does not provide support for these packages and any assistance is community-based. If you choose to run a desktop environment or any desktop applications, direct your questions to the Oracle Linux for Arm community forum at [https://community.oracle.com/community/technology\\_network\\_community/server\\_%26\\_storage\\_systems/linux/oracle-linux-for-arm](https://community.oracle.com/community/technology_network_community/server_%26_storage_systems/linux/oracle-linux-for-arm).

## 4.2 Installation and Upgrade Issues

The following issues might be encountered during an Oracle Linux 7 Update 7 (aarch64) installation.

## 4.2.1 Alternate installation options

When performing a text-based installation, the installer detects the video controller and offers a graphical installation on the system video console by default. The boot menu may not offer options to perform text-based or VNC-based installation.

To perform a text-based installation, you must specify the `inst.text` option on the boot command line. If you intend to perform a remote graphical installation over VNC, you must use the `inst.vnc` option, as well as specify boot options to configure the network. Typically `ip=dhcp` is used for this purpose.

For more information about boot options, see [Oracle® Linux 7: Installation Guide](#).

(Bug ID 27581120)

## 4.2.2 Graphical installer allows users to edit kickstart settings

When performing a graphical installation, where some installation options are already set by using a kickstart configuration file, it is still possible to modify these settings by clicking the various fields during the installation and editing the predefined content. These types of edits during the installation process requires that you intentionally attempt to modify the setting, effectively enabling an interactive installation, where options that are set in the kickstart configuration are not secured by any policy.

Note that this type of change is not possible when performing a text-based installation. During a text-based installation, you can only modify fields that have not already been predefined in the kickstart configuration file.

(Bug ID 28642357)

## 4.2.3 Installing the oracle-armtoolset-8 package sometimes fails

Running the `yum install oracle-armtoolset-8` command sometimes fails to install the package. This failure occurs at the following stage of the installation:

```
Installing : oracle-armtoolset-8-runtime-8.0-1.el7_6.aarch64 16/69
Error unpacking rpm package oracle-armtoolset-8-runtime-8.0-1.el7_6.aarch64
error: unpacking of archive failed on file
/opt/oracle/oracle-armtoolset-8/root/lib64: cpio: rename
Installing : oracle-armtoolset-8-libgo-8.2.0-6.el7_6.aarch64 17/69
error: oracle-armtoolset-8-runtime-8.0-1.el7_6.aarch64: install failed
Installing : oracle-armtoolset-8-libasan-8.2.0-6.el7_6.aarch64 18/69
```

Subsequent attempts to install the individual package also fail:

```
Failed:
oracle-armtoolset-8-runtime.aarch64 0:8.0-1.el7_6
```

If you encounter this issue, run the following commands to remove and then reinstall the `oracle-armtoolset-8` package:

```
# yum remove 'oracle-armtoolset-8*'
# yum remove policycoreutils-python
# rm -Rf /opt/oracle/oracle-armtoolset-8/
# yum install policycoreutils-python
# yum install 'oracle-armtoolset-8*'
```

(Bug ID 29672241)

## 4.2.4 Kernel panic for QLogic cnic module on ThunderX2 during installation

The QLogic `cnic` driver module is unsupported on 64-bit Arm platforms. The Cavium ThunderX2 servers include hardware that can cause the `cnic` driver module to load, thus triggering a kernel panic.

To work around this issue, black list the `cnic` module at boot by using the `module_blacklist=cnic` boot option in the kernel command line for the installer. To prevent the module from installing or loading in the future, create the file `/etc/modprobe.d/cnic.conf` file and add the following lines:

```
blacklist cnic
install cnic /bin/true
```

(Bug IDs 27011806, 28109733)

## 4.2.5 Error with PXE-based installation on UEFI virtual machine

An error appears when performing an installation on a UEFI-based virtual machine by using a PXE boot, where there is no `ramfb` device present. Typically, the error appears as follows:

```
Error: Image at 0023F1EB000 start failed: Not Found
```

This error message can be safely ignored, as it does not prevent the installation and is reported as debugging output. Note also that the error does not appear in earlier versions of the package, where support for the `QemuRamfbDxe` driver was not present.

(Bug ID 28868674)

## 4.2.6 Upgrade fails if open files limit is too low and rpm-plugin-systemd-inhibit is installed

Upgrades from Oracle Linux 7 Update 6 (aarch64) to Oracle Linux 7 Update 7 (aarch64) can fail if the log-in session open files limit is set too low and the system that is being upgraded includes multiple packages from many channels or repositories. This issue can be triggered if the `rpm-plugin-systemd-inhibit` package is installed and the session is configured for a maximum open file limit that is lower than 4096. The issue typically results in `yum` failing to update and produces error messages similar to the following:

```
Verifying : glib2-static-2.56.1-1.el7.i686
glib2-static-2.56.1-1.el7.i686 was supposed to be installed but is not!
```

To resolve this issue, set the open file limit to 4096 before running the `yum update` command:

```
# ulimit -n 4096
# yum update -y
```

(Bug ID 28720235)

## 4.3 Automatic Bug Reporting Tool

The daemons and features that are provided by the Red Hat Automatic Bug Reporting Tool (ABRT) are not supported in Oracle Linux. ABRT packages and associated files, such as `libreport`, are included in the distribution to satisfy package dependencies, but the features within these packages are not supported. For technical assistance, contact Oracle Support by accessing the My Oracle Support portal or by telephone.

## 4.4 btrfs-convert operation results in a file system that cannot be mounted

The `btrfs-convert` tool can be used to convert an `ext4` file system to `btrfs`. However, if the tool attempts to convert a file system that has not been created with a sector block size that matches the system default page size (which is set to 64 KB for the aarch64 platform) the resulting file system cannot

be mounted. This issue can occur if the original `ext4` file system is not created by using the `-b 65536` option to specify a 64 KB block size.

(Bug ID 28200561)

## 4.5 Manual execution of shim first-stage boot loader may fail in the UEFI shell

Manually loading of shim binaries from the UEFI shell may fail in some scenarios. The following cases are known to fail:

- `FS0:\EFI\redhat\shimaa64.efi`
- `FS0:\EFI\redhat\> shimaa64.efi`

`FS0:\> \EFI\redhat\shimaa64.efi` is known to work correctly.

A standard installation is unaffected by this bug. The problem is limited to the manual execution of `shim` in the UEFI shell.

(Bug ID 27962691)

## 4.6 Kdump tools fail to create a vmcore-dmesg.txt on systems with many CPUs

On systems with multiple CPUs, the crash dump tools that are included with Kdump, fail to create a `vmcore-dmesg.txt` file, which is created with the `vmcore` file. This issue may result in the following segmentation fault:

```
...
kdump: saving to /sysroot//var/crash/127.0.0.1-2018-05-22-12:34:45/
kdump: saving vmcore-dmesg.txt
/lib/kdump-lib-initramfs.sh: line 118: 459 Segmentation fault
$_dmesg_collector /proc/vmcore > ${_path}/vmcore-dmesg-incomplete.txt
kdump: saving vmcore-dmesg.txt failed
kdump: saving vmcore
Copying data : [100.0 %] \
eta: 0s
kdump: saving vmcore complete
```

This issue is the result of a log buffer that is dynamically allocated by the kernel. `vmcore-dmesg` does not know how to access memory that allocated in this way. The issue is typically triggered on systems with 64 or more CPUs, but has also been observed on a 32-core Ampere X-Gene 3 system.

The `dmesg` output can be retrieved manually by the running `crash` command against `vmcore` and then using the `dmesg` command when in the crash shell.

(Bug ID 28064675, 28670960)

## 4.7 Snapshots of KVM guests using UEFI fail and are unsupported

In this release, you cannot create snapshots of KVM guests if they use UEFI. In older versions of QEMU and `libvirt`, the tools might allow you to create the snapshot without an error or warning, but the snapshot could be corrupted. More recent versions of these tools prevent snapshot creation by producing an error similar to the following:

```
# snapshot-create-as OL7-seboot
```

```
error: Operation not supported: internal snapshots of a VM with pflash based
firmware are not supported
```

(Bug ID 26826800)

## 4.8 Uninstalling libpcap package can result in removal of a large number of libvirt packages

The `libpcap` package is updated to enable functionality for upcoming technologies. If you install this package and then attempt to uninstall it, a large number of `libvirt` packages might also be uninstalled due to dependency relationships. The `libvirt` package has a dependency on the `libvirt-daemon-driver-nwfilter` package, and this package has a dependency on `libpcap`. Removing `libpcap` removes the entire `libvirt` family of packages.

(Bug ID 28582266)

## 4.9 Virtual machine with copied disk fails to boot

Attempting to start a virtual machine that has been created to use a copied virtual machine hard disk can fail with messages similar to the following:

```
Section 0 has negative size
Failed to load image: Unsupported
start_image() returned Unsupported
Error: Image at 002384AD000 start failed: Unsupported
Unloading driver at 0x002384AD000
```

After failing, the boot loader drops back into the UEFI interactive shell.

This issue is caused by a problem with the default EFI boot option that is used by the aarch64 virtual machine firmware when it attempts to boot the disk.

To work around the issue, when the virtual machine drops to the UEFI shell after it fails to boot, you can type the following information to manually load the appropriate shim binary:

```
Shell> FS0:\EFI\BOOT\fbaa64.efi
```

Note that typing this information is a one-time requirement and future reboots of the same virtual machine do not require manual intervention.

(Bug ID 27972230)

## 4.10 grubby fatal error during kernel upgrade when /boot is on a btrfs subvolume

If `/boot` is hosted on a `btrfs` subvolume, GRUB 2 is unable to correctly process the `initramfs` and `vmlinuz` pathnames. This problem occurs when you update or install a new kernel and `grubby` attempts to update the GRUB 2 configuration. In the case where you are running a fresh installation of Oracle Linux 7 Update 7 (aarch64), and you upgrade the UEK kernel, the following error is displayed:

```
grubby fatal error: unable to find a suitable template
```

When the system is rebooted after the kernel update, the system boots to the old kernel.

The workaround for this problem is to use `grub2-mkconfig` to regenerate the `/etc/grub2/grub.cfg` file immediately after the kernel has been installed or upgraded, for example:

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

Obtain a listing of the kernel menu entries in the generated configuration as follows:

```
# grep -P "submenu|^menuentry" /boot/grub2/grub.cfg | cut -d '"' -f2
```

From the listing, select the kernel entry that you want to run as the default kernel and set this entry as the default using the following command, substituting *menu entry title* with the title of the kernel entry that you identified in the listing:

```
# grub2-set-default "menu entry title"
```

You can use the `grub2-editenv list` command to check that the `saved_entry` has been updated with the selected kernel menu title.

Reboot and use `uname -a` to check that the correct kernel is now running.

(Bug ID 22750169)

## 4.11 Hebrew LaTeX fonts

Installing the `tex-fonts-hebrew` package fails unless you first install all of the `texlive*` packages.

## 4.12 Unable to create Oracle Linux 7 LXC containers on NFS

The creation of Oracle Linux 7 containers fails when the `root` file system (`/container`) is hosted on an NFS share. This problem occurs because the `iputils` package in Oracle Linux 7 releases, (Updates 4 and 5) is built to use the Linux file extended attributes `[xattr(7)] security capabilities(7)`. Because the NFS protocol does not support these file capabilities, the `iputils` package might not be installed into an NFS files system. For example, when attempting to create an Oracle Linux 7 Update 4 container, the installation fails while installing the `iputils` package, producing the following error:

```
Error unpacking rpm package iputils-20121221-7.el7.x86_64
error: unpacking of archive failed on file /usr/bin/ping: cpio: cap_set_file
error: iputils-20121221-7.el7.x86_64: install failed
```

Similar issues are seen when attempting to install the `initscripts` and `systemd` packages while creating an Oracle Linux 7 Update 3 container.

This issue occurs on both NFSv3 and NFSv4.

Oracle Linux 6 containers are not affected. LXC is available as a technology preview in this update. Note that some functionality may not work correctly.

(Bug ID 25024258)

## 4.13 Segmentation fault when running `bluedevil-wizard`

The `bluedevil-wizard`, which is available in the `bluedevil` package, is unable to connect or locate Bluetooth devices and fails with a segmentation fault when it is run.

(Bug ID 27101618)

## 4.14 `dsktune` command fails with an unsupported error message

The `dsktune` command, which is included with the 389 Directory Server base package (`389-ds-base`) fails with the following error message notifying you that the system does not have support for `cx16`, which is a feature commonly available on `x86-64` platforms:

```
ERROR: This system does not support CMPXCHG16B instruction (cpuflag cx16).
nsslapd-enable-nunc-stans must be set to "off" on this system.
In a future release of Directory Server this platform will NOT be
supported.
```

```
ERROR : The above errors MUST be corrected before proceeding.
```

The `dsktune` command checks that a system meets requirements and can provide helpful information pertaining to onfiguration, but it is not required to run the 389 Directory Server.

(Bug ID 26861135)

## 4.15 Unable to customize guest name during installation with Virtual Machine Manager

During an installation with `virt-manager`, if you select a customized configuration and then edit the Name field to customize the virtual machine (VM) name, an error similar to the following occurs when you attempt to apply the changes:

```
Error apply changes: 'NoneType' object has no attribute 'rfind'

Traceback (most recent call last):
  File "/usr/share/virt-manager/virtManager/details.py", line 1887, in
config_apply
    ret = self.config_overview_apply()
  File "/usr/share/virt-manager/virtManager/details.py", line 1979, in
config_overview_apply
    self.vm.rename_domain(self.widget("overview-name").get_text())
  File "/usr/share/virt-manager/virtManager/domain.py", line 596, in
rename_domain
    new_nvram, old_nvram = self._copy_nvram_file(new_name)
  File "/usr/share/virt-manager/virtManager/domain.py", line 571, in
_copy_nvram_file
    nvram_dir = os.path.dirname(old_nvram.path)
  File "/usr/lib64/python2.7/posixpath.py", line 129, in dirname
    i = p.rfind('/') + 1
AttributeError: 'NoneType' object has no attribute 'rfind'
```

This issue is only encountered when attempting to customize the Name field. If you apply any other customizations prior to the installation, such as changes to Title or Description, the installation proceeds as expected. Note that you can edit the Name field after the installation completes, if desired.

(Bug ID 29954660)



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# Chapter 5 Installation and Availability

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You can download a full Oracle Linux 7 Update 7 (aarch64) installation media image from the Oracle Software Delivery Cloud at <https://edelivery.oracle.com/>. You can also obtain the latest Oracle Linux 7 packages from the Unbreakable Linux Network (ULN) and the Oracle Linux yum server.

Oracle Linux 7 Update 7 (aarch64) is made available in two forms:

- A disk image that uses the file name format, `rpi3-ol7.7-image-timestamp.img.xz`, which can be installed onto an SD Card and used on a Raspberry Pi 3 Model B or Raspberry Pi 3 Model B+ single-board computer. This image includes the necessary firmware to boot the Raspberry Pi 3 directly into Oracle Linux 7. This image is made available for developers who may not have access to alternate Arm hardware.



### Note

The disk image for the Raspberry Pi is available as a technology preview for developer use only. Oracle does not provide support for Oracle Linux on Raspberry Pi systems. Developers are encouraged to visit the Oracle Linux for Arm community forum at [https://community.oracle.com/community/technology\\_network\\_community/server\\_%26\\_storage\\_systems/linux/oracle-linux-for-arm](https://community.oracle.com/community/technology_network_community/server_%26_storage_systems/linux/oracle-linux-for-arm) for further assistance.

- `OracleLinux-R7-U7-Server-aarch64-dvd.iso`: An ISO image that can be used for a standard installation on generic 64-bit Armv8 hardware. This ISO has been tested on Arm hardware and is engineered for use with Ampere™ eMAG™-based EVK platform and the Cavium ThunderX2® processor. For the latest hardware validated for Oracle Linux 7 Update 7 (aarch64), refer to the Hardware Certification List at <https://linux.oracle.com/hardware-certifications>. Note that hardware is listed as it becomes available.

You can install additional software for Oracle Linux 7 by subscribing to the different channels on ULN or by enabling the required repositories within your yum configuration. To explore the channels that are available to you on ULN, log in to <https://uln.oracle.com/> and view the Channels option. To view the Oracle Linux yum repositories that are available for Oracle Linux 7, visit <https://yum.oracle.com/oracle-linux-7.html>.



### Note

The Oracle Linux yum server does not provide equivalent repositories for some channels that are available on ULN. These channels provide non-open source packages.

UEK R5 is the default boot kernel for fresh installations of Oracle Linux 7 Update 7 (aarch64). Note that this is the only kernel that is available for the aarch64 platform in this update. For more information, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 5 Update 2](#).

## 5.1 Installing the ISO

The process to install Oracle Linux 7 Update 7 (aarch64) does not differ substantially from the installation process on the `x86_64` platform. The same instructions and information that are provided in [Oracle® Linux 7: Installation Guide](#) also apply to the aarch64 platform.

The recommended installation process is as follows:

1. Obtain the ISO image from the Oracle Technology Network (<https://www.oracle.com/linux/products.html>)
2. Configure a network installation server to perform the installation. See *Oracle® Linux 7: Installation Guide* for more information.
3. Create a kickstart file to automate your installation. See *Oracle® Linux 7: Installation Guide* for more information on the contents of this file and how to use it when booting the installer.
4. Connect your target Arm hardware to the network and configure the firmware to boot from the network or by performing a PXE boot. Refer to your hardware documentation for instructions.
5. Boot the target hardware and wait for the installation to complete.

The following exceptions and additional information might be required to complete the installation:

## Graphical network-based installation

If you are performing a manual installation over the network and intend to use the remote graphical installer over VNC by setting the `inst.vnc` boot option, you must also set boot options to configure the network. Otherwise, the graphical installer fails to load and the installation reverts to text mode.

To ensure that the VNC server starts at boot, append the appropriate `ip` option to your kernel boot command. Typically, for a DHCP configuration, this may look similar to the following: `ip=eth0:dhcp`.

## Software Selection Groups

Note that the available Software Selection Groups in the installer may differ slightly from the groups that are available in the `x86_64` installer.

## Software Sources

Note that unlike the `x86_64` installer, there are no alternate Software Source repositories provided on this ISO.

## 5.2 Installation of Raspberry Pi™ 3 Image

Oracle provides an installation image of Oracle Linux 7 Update 7 (aarch64) that is specifically designed to run on Raspberry Pi 3 Model B or Raspberry Pi 3 Model B+ hardware. The provided installation image is a default installation of Oracle Linux 7 Update 7 (aarch64) into a raw disk image that can be cloned block-by-block to an SD Card for immediate boot. The default file system used in the image is `btrfs`. Raspberry Pi is a trademark of the Raspberry Pi Foundation.

For more information about installing a Linux image onto the Raspberry Pi, visit <https://www.raspberrypi.org/documentation/installation/installing-images/linux.md>.

The following is a summary of the recommended installation process:

1. Obtain the Raspberry Pi 3 disk image from the Oracle Technology Network at <https://www.oracle.com/linux/products.html>. Unzip the disk image when you have downloaded it.
2. On an existing Oracle Linux 7 system, insert the SD Card into an SD Card reader that is connected to the system. The image is 5 GB in size. At minimum, your SD Card must have the capacity to store this image. An 8 GB SD Card is the recommended minimum.

3. Identify the device name for the SD Card. You can obtain this information from the output of `dmesg`, when you connect the device by using the `lsblk` or `fdisk -l` commands to list device names and device information.
4. Use the `dd` command to perform a block copy of the image file to the SD Card device, for example:

```
# dd if=/path/to/img of=/dev/mmcblk0 bs=4M
```

where `/path/to/img` is the relative path to the image file and `/dev/mmcblk0` is the device name for the SD Card.



### Important

This operation is destructive and will overwrite any data on the device that you have specified. Ensure that you have specified the correct device name. The operation may take some time to complete.

5. When the operation has completed, eject the SD Card from the reader, insert it into the SD Card reader on the Raspberry Pi and boot into Oracle Linux 7.
6. Log into the image as the `root` user using the password **oracle**. Change the password immediately after logging into to image.

If your SD Card is larger than the image (5 GB), you can grow the partition size to maximize disk usage. To grow the partition size, run the following commands after the installation has completed and after logging into the system on the Raspberry Pi:

```
# growpart /dev/mmcblk0 4  
# btrfs filesystem resize max /
```



### Tip

If you require a graphical user interface (GUI), the XFCE desktop environment, which is available in the `ol7_developer_EPEL` yum repository, is usable and may be more suitable for devices with limited resources, such as the Raspberry Pi.



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# Appendix A Package Changes from the Upstream Release

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The following sections list the changes to binary and source packages from the upstream release.

## A.1 Changes to Binary Packages

This section contains information about the removed, modified, and new **binary** packages in this release. For information about the **source** package changes, see [Section A.2, “Changes to Source Packages”](#).

### A.1.1 Added Binary Packages by Oracle

The following binary packages have been added by Oracle:

- [AAVMF](#)
- [dtrace-utils](#)
- [dtrace-utils-devel](#)
- [dtrace-utils-testsuite](#)
- [inotify-tools](#)
- [isl](#)
- [isl-devel](#)
- [ivshmem-tools](#)
- [kernel-uek](#)
- [kernel-uek-debug](#)
- [kernel-uek-debug-devel](#)
- [kernel-uek-devel](#)
- [kernel-uek-headers](#)

- `kernel-uek-tools`
- `kernel-uek-tools-libs`
- `kernel-uek-tools-libs-devel`
- `libdtrace-ctf`
- `libdtrace-ctf-devel`
- `libzstd`
- `libzstd-devel`
- `lxc`
- `lxc-devel`
- `lxc-libs`
- `ocfs2-tools`
- `ocfs2-tools-devel`
- `oracle-armtoolset-1`
- `oracle-armtoolset-1-binutils`
- `oracle-armtoolset-1-binutils-devel`
- `oracle-armtoolset-1-build`
- `oracle-armtoolset-1-cpp`
- `oracle-armtoolset-1-gcc`
- `oracle-armtoolset-1-gcc-c++`
- `oracle-armtoolset-1-gcc-gdb-plugin`
- `oracle-armtoolset-1-gcc-gfortran`
- `oracle-armtoolset-1-gcc-gnat`
- `oracle-armtoolset-1-gcc-go`
- `oracle-armtoolset-1-gcc-objc`
- `oracle-armtoolset-1-gcc-objc++`
- `oracle-armtoolset-1-gcc-plugin-devel`
- `oracle-armtoolset-1-gdb`
- `oracle-armtoolset-1-gdb-doc`
- `oracle-armtoolset-1-gdb-gdbserver`
- `oracle-armtoolset-1-golang`

- `oracle-armtoolset-1-golang-bin`
- `oracle-armtoolset-1-golang-docs`
- `oracle-armtoolset-1-golang-misc`
- `oracle-armtoolset-1-golang-src`
- `oracle-armtoolset-1-golang-tests`
- `oracle-armtoolset-1-libasan`
- `oracle-armtoolset-1-libasan-static`
- `oracle-armtoolset-1-libatomic`
- `oracle-armtoolset-1-libatomic-static`
- `oracle-armtoolset-1-libgcc`
- `oracle-armtoolset-1-libgccjit`
- `oracle-armtoolset-1-libgccjit-devel`
- `oracle-armtoolset-1-libgfortran`
- `oracle-armtoolset-1-libgfortran-static`
- `oracle-armtoolset-1-libgnat`
- `oracle-armtoolset-1-libgnat-devel`
- `oracle-armtoolset-1-libgnat-static`
- `oracle-armtoolset-1-libgo`
- `oracle-armtoolset-1-libgo-devel`
- `oracle-armtoolset-1-libgomp`
- `oracle-armtoolset-1-libgo-static`
- `oracle-armtoolset-1-libitm`
- `oracle-armtoolset-1-libitm-devel`
- `oracle-armtoolset-1-libitm-static`
- `oracle-armtoolset-1-liblsan`
- `oracle-armtoolset-1-liblsan-static`
- `oracle-armtoolset-1-libobjc`
- `oracle-armtoolset-1-libstdc++`
- `oracle-armtoolset-1-libstdc++-devel`
- `oracle-armtoolset-1-libstdc++-static`

- `oracle-armtoolset-1-libtsan`
- `oracle-armtoolset-1-libtsan-static`
- `oracle-armtoolset-1-libubsan`
- `oracle-armtoolset-1-libubsan-static`
- `oracle-armtoolset-1-runtime`
- `oracle-armtoolset-1-toolchain`
- `oracle-logos`
- `perf`
- `python-perf`
- `qemu`
- `qemu-block-gluster`
- `qemu-block-iscsi`
- `qemu-block-rbd`
- `qemu-common`
- `qemu-img`
- `qemu-kvm`
- `qemu-kvm-core`
- `qemu-system-aarch64`
- `qemu-system-aarch64-core`
- `reflink`
- `uname26`
- `yum-plugin-ulninfo`
- `zstd`

### A.1.2 Modified Binary Packages

The following binary packages from the upstream release have been modified:

- `abrt`
- `abrt-addon-ccpp`
- `abrt-addon-kerneleoops`
- `abrt-addon-pstoreoops`
- `abrt-addon-python`

- `abrt-addon-vmcore`
- `abrt-addon-xorg`
- `abrt-cli`
- `abrt-console-notification`
- `abrt-dbus`
- `abrt-desktop`
- `abrt-gui`
- `abrt-gui-libs`
- `abrt-java-connector`
- `abrt-libs`
- `abrt-python`
- `abrt-tui`
- `akonadi`
- `akonadi-mysql`
- `anaconda`
- `anaconda-core`
- `anaconda-gui`
- `anaconda-tui`
- `anaconda-widgets`
- `apr-util`
- `apr-util-devel`
- `autofs`
- `basesystem`
- `binutils`
- `binutils-devel`
- `bpftool`
- `btrfs-progs`
- `chrony`
- `cloud-init`
- `clutter-bin`

- `clufteer-cli`
- `clufteer-common`
- `clufteer-lib-ccs`
- `clufteer-lib-general`
- `clufteer-lib-pcs`
- `cmirror`
- `cockpit`
- `cockpit-bridge`
- `cockpit-system`
- `cockpit-ws`
- `coreutils`
- `cpp`
- `cups-filters`
- `cups-filters-libs`
- `curl`
- `dbus`
- `dbus-devel`
- `dbus-libs`
- `dbus-x11`
- `device-mapper`
- `device-mapper-event`
- `device-mapper-event-libs`
- `device-mapper-libs`
- `device-mapper-multipath`
- `device-mapper-multipath-libs`
- `dhclient`
- `dhcp`
- `dhcp-common`
- `dhcp-libs`
- `dracut`

- dracut-config-generic
- dracut-config-rescue
- dracut-fips
- dracut-fips-aesni
- dracut-network
- dtc
- efibootmgr
- firefox
- fuse
- fuse-devel
- fuse-libs
- fwupdate
- fwupdate-efi
- fwupdate-libs
- gcc
- gcc-c++
- gcc-gfortran
- gcc-gnat
- gcc-objc
- gcc-objc++
- gdb
- gdb-gdbserver
- glibc
- glibc-common
- glibc-devel
- glibc-headers
- glibc-utils
- gnome-system-log
- gperftools-libs
- grub2

- `grub2-common`
- `grub2-efi-aa64`
- `grub2-efi-aa64-cdboot`
- `grub2-efi-aa64-modules`
- `grub2-tools`
- `grub2-tools-extra`
- `grub2-tools-minimal`
- `grubby`
- `gststreamer`
- `gststreamer-tools`
- `httpd`
- `httpd-devel`
- `httpd-manual`
- `httpd-tools`
- `initial-setup`
- `initial-setup-gui`
- `initscripts`
- `ipa-client`
- `ipa-client-common`
- `ipa-common`
- `ipa-python-compat`
- `ipa-server`
- `ipa-server-common`
- `ipa-server-dns`
- `ipa-server-trust-ad`
- `iscsi-initiator-utils`
- `iscsi-initiator-utils-iscsiuio`
- `iwl1000-firmware`
- `iwl100-firmware`
- `iwl105-firmware`

- `iwl135-firmware`
- `iwl2000-firmware`
- `iwl2030-firmware`
- `iwl3160-firmware`
- `iwl3945-firmware`
- `iwl4965-firmware`
- `iwl5000-firmware`
- `iwl5150-firmware`
- `iwl6000-firmware`
- `iwl6000g2a-firmware`
- `iwl6000g2b-firmware`
- `iwl6050-firmware`
- `iwl7260-firmware`
- `iwl7265-firmware`
- `java-11-openjdk`
- `java-11-openjdk-devel`
- `java-11-openjdk-headless`
- `java-1.7.0-openjdk`
- `java-1.7.0-openjdk-devel`
- `java-1.7.0-openjdk-headless`
- `kdepimlibs`
- `kdepimlibs-akonadi`
- `kdepimlibs-devel`
- `kdepimlibs-kxmlrpcclient`
- `kde-settings`
- `kde-settings-ksplash`
- `kde-settings-plasma`
- `kde-settings-pulseaudio`
- `kernel`
- `kernel-abi-whitelists`

- `kernel-debug`
- `kernel-debug-devel`
- `kernel-devel`
- `kernel-doc`
- `kernel-headers`
- `kernel-tools`
- `kernel-tools-libs`
- `kexec-tools`
- `kmod`
- `kmod-kvdo`
- `kmod-libs`
- `kpartx`
- `ksc`
- `ksh`
- `libcurl`
- `libcurl-devel`
- `libdbi-dbd-mysql`
- `libdbi-dbd-pgsql`
- `libdbi-drivers`
- `libfdt`
- `libfdt-devel`
- `libgcc`
- `libgfortran`
- `libgnat`
- `libgnat-devel`
- `libgomp`
- `libgudev1`
- `libgudev1-devel`
- `libguestfs`
- `libguestfs-inspect-icons`

- libguestfs-java
- libguestfs-tools
- libguestfs-tools-c
- libguestfs-xfstools
- libitm
- libitm-devel
- libobjc
- libreport
- libreport-anaconda
- libreport-cli
- libreport-filesystem
- libreport-gtk
- libreport-plugin-bugzilla
- libreport-plugin-mailx
- libreport-plugin-reportuploader
- libreport-plugin-ureport
- libreport-python
- libreport-rhel-anaconda-bugzilla
- libreport-web
- libreswan
- libssh2
- libstdc++
- libstdc++-devel
- libstdc++-docs
- libstoragemgmt
- libstoragemgmt-arcconf-plugin
- libstoragemgmt-hpsa-plugin
- libstoragemgmt-local-plugin
- libstoragemgmt-megaraid-plugin
- libstoragemgmt-netapp-plugin

- `libstoragemgmt-nfs-plugin`
- `libstoragemgmt-nfs-plugin-clibs`
- `libstoragemgmt-nstor-plugin`
- `libstoragemgmt-python`
- `libstoragemgmt-python-clibs`
- `libstoragemgmt-smis-plugin`
- `libstoragemgmt-targetd-plugin`
- `libstoragemgmt-udev`
- `libvirt`
- `libvirt-bash-completion`
- `libvirt-client`
- `libvirt-daemon`
- `libvirt-daemon-config-network`
- `libvirt-daemon-config-nwfilter`
- `libvirt-daemon-driver-interface`
- `libvirt-daemon-driver-lxc`
- `libvirt-daemon-driver-network`
- `libvirt-daemon-driver-nodedev`
- `libvirt-daemon-driver-nwfilter`
- `libvirt-daemon-driver-qemu`
- `libvirt-daemon-driver-secret`
- `libvirt-daemon-driver-storage`
- `libvirt-daemon-driver-storage-core`
- `libvirt-daemon-driver-storage-disk`
- `libvirt-daemon-driver-storage-gluster`
- `libvirt-daemon-driver-storage-iscsi`
- `libvirt-daemon-driver-storage-logical`
- `libvirt-daemon-driver-storage-mpath`
- `libvirt-daemon-driver-storage-rbd`
- `libvirt-daemon-driver-storage-scsi`

- `libvirt-daemon-kvm`
- `libvirt-daemon-qemu`
- `libvirt-devel`
- `libvirt-docs`
- `libvirt-libs`
- `libxml2`
- `libxml2-devel`
- `libxml2-python`
- `libxslt`
- `libxslt-devel`
- `linux-firmware`
- `lorax`
- `lvm2`
- `lvm2-cluster`
- `lvm2-libs`
- `lvm2-python-boom`
- `lvm2-python-libs`
- `lz4`
- `mdadm`
- `mod_session`
- `mod_ssl`
- `mokutil`
- `mozjs52`
- `nfs-utils`
- `nscd`
- `nss-softokn`
- `nss-softokn-devel`
- `nss-softokn-freebl`
- `nss-softokn-freebl-devel`
- `ntp`

- ntpdate
- OpenIPMI
- OpenIPMI-libs
- OpenIPMI-modalias
- OpenIPMI-perl
- openscap
- openscap-containers
- openscap-python
- openscap-scanner
- openscap-utils
- openssl
- openssl-devel
- openssl-libs
- oscap-anaconda-addon
- osinfo-db
- os-prober
- PackageKit
- PackageKit-command-not-found
- PackageKit-glib
- PackageKit-gstreamer-plugin
- PackageKit-gtk3-module
- PackageKit-yum
- parted
- pcs
- pcs-snmp
- perf
- perl-DBD-MySQL
- perl-Sys-Guestfs
- perl-XML-Parser
- plymouth

- `plymouth-core-libs`
- `plymouth-graphics-libs`
- `plymouth-plugin-label`
- `plymouth-plugin-two-step`
- `plymouth-scripts`
- `plymouth-system-theme`
- `plymouth-theme-charge`
- `policycoreutils`
- `policycoreutils-devel`
- `policycoreutils-gui`
- `policycoreutils-newrole`
- `policycoreutils-python`
- `policycoreutils-sandbox`
- `polkit`
- `polkit-devel`
- `polkit-docs`
- `ppp`
- `pykickstart`
- `python`
- `python2-ipaclient`
- `python2-ipalib`
- `python2-ipaserver`
- `python3`
- `python3-libs`
- `python-blivet`
- `python-clufter`
- `python-configshell`
- `python-devel`
- `python-jwt`
- `python-libguestfs`

- `python-libs`
- `python-msrestazure`
- `python-perf`
- `python-rtslib`
- `python-s3transfer`
- `qt3`
- `qt3-devel`
- `qt3-MySQL`
- `qt3-ODBC`
- `qt3-PostgreSQL`
- `qt-settings`
- `rear`
- `redhat-bookmarks`
- `redhat-indexhtml`
- `redhat-lsb`
- `redhat-lsb-core`
- `redhat-lsb-cxx`
- `redhat-lsb-desktop`
- `redhat-lsb-languages`
- `redhat-lsb-printing`
- `redhat-lsb-submod-multimedia`
- `redhat-lsb-submod-security`
- `redhat-release-server`
- `redhat-rpm-config`
- `redhat-upgrade-dracut`
- `redhat-upgrade-dracut-plymouth`
- `redhat-upgrade-tool`
- `redland`
- `redland-virtuoso`
- `rhn-check`

- `rhn-client-tools`
- `rhnlb`
- `rhnsd`
- `rhn-setup`
- `rhn-setup-gnome`
- `rpmdevtools`
- `scap-security-guide`
- `scap-security-guide-doc`
- `scap-workbench`
- `selinux-policy`
- `selinux-policy-devel`
- `selinux-policy-minimum`
- `selinux-policy-mls`
- `selinux-policy-targeted`
- `setroubleshoot`
- `setroubleshoot-plugins`
- `setroubleshoot-server`
- `shim-aa64`
- `shim-unsigned-aa64`
- `sos`
- `sos-collector`
- `spice-streaming-agent`
- `system-config-date`
- `system-config-kickstart`
- `systemd`
- `systemd-devel`
- `systemd-libs`
- `systemd-python`
- `systemd-sysv`
- `tog-pegasus`

- `tog-pegasus-libs`
- `unixODBC`
- `unixODBC-devel`
- `uom-lib`
- `virt-install`
- `virt-manager`
- `virt-manager-common`
- `virt-p2v-maker`
- `virt-v2v`
- `wireshark`
- `wireshark-gnome`
- `xfsprogs`
- `xsane-common`
- `xsane-gimp`
- `xulrunner`
- `yum`
- `yum-plugin-aliases`
- `yum-plugin-changelog`
- `yum-plugin-ovl`
- `yum-plugin-tmprepo`
- `yum-plugin-verify`
- `yum-plugin-versionlock`
- `yum-rhn-plugin`
- `yum-utils`

### A.1.3 Modified Optional Binary Packages

The following optional binary packages have been modified:

- `thunderbird`

### A.1.4 New Binary Packages

The following binary packages are new for Update 7, relative to Update 6 of Oracle Linux 7:

- `adobe-mappings-cmap`

- `adobe-mappings-pdf`
- `biosdevname`
- `chrome-gnome-shell`
- `geoipupdate`
- `geolite2`
- `kernel`
- `kmod-kvdo`
- `ksc`
- `libmaxminddb`
- `libpaper`
- `nbdkit`
- `openjpeg2`
- `pmdk-convert`
- `po4a`
- `python3`
- `python3-setuptools`
- `python-blivet3`
- `python-pip`
- `python-rpm-generators`
- `python-rpm-macros`
- `python-wheel`
- `redfish-finder`
- `sassist`
- `ucx`
- `urw-base35-fonts`
- `xorriso`

### A.1.5 Removed Binary Packages

The following binary packages from the upstream release have been removed:

- `anaconda-user-help`
- `compat-dapl`

- `compat-exiv2-023`
- `compat-exiv2-026`
- `compat-gcc-34`
- `compat-gcc-44`
- `compat-glibc`
- `compat-libgfortran-41`
- `cpuid`
- `crash-ptdump-command`
- `hyperv-daemons`
- `infinipath-psm`
- `insights-client`
- `intel-cmt-cat`
- `ixpdimm_sw`
- `java-1.6.0-openjdk`
- `kabi-yum-plugins`
- `kpatch`
- `libinvm-cim`
- `libinvm-cli`
- `libinvm-il8n`
- `libpsm2`
- `libsmbios`
- `mcelog`
- `memkind`
- `memtest86+`
- `microcode_ctl`
- `mkbootdisk`
- `nvml`
- `opa-ff`
- `opa-fm`
- `openssl098e`

- `open-vm-tools`
- `oracleasm`
- `ovmf`
- `prelink`
- `python-rhsm`
- `qemu-kvm`
- `redhat-access-gui`
- `redhat-access-plugin-ipa`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-as-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-bn-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-de-DE`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-en-US`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-es-ES`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-fr-FR`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-gu-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-hi-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-it-IT`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-ja-JP`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-kn-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-ko-KR`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-ml-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-mr-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-or-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-pa-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-pt-BR`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-ru-RU`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-ta-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-te-IN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-zh-CN`
- `Red_Hat_Enterprise_Linux-Release_Notes-7-zh-TW`

- `redhat-logos`
- `redhat-release-eula`
- `redhat-support-lib-python`
- `redhat-support-tool`
- `seabios`
- `sgabios`
- `subscription-manager`
- `subscription-manager-migration-data`
- `syslinux`
- `tboot`
- `vdo`
- `virt-who`
- `x86info`
- `xorg-x11-drv-intel`
- `xorg-x11-drv-openchrome`
- `xorg-x11-drv-vesa`
- `xorg-x11-drv-vmmouse`
- `xorg-x11-drv-vmware`

## A.2 Changes to Source Packages

This section contains information about the removed, modified, and new **source** packages in this release. For information about the **binary** package changes, see [Section A.1, “Changes to Binary Packages”](#).

### A.2.1 Added Source Packages by Oracle

The following source packages have been added by Oracle:

- `dtrace-utils`
- `edk2`
- `inotify-tools`
- `isl`
- `kernel-uek`
- `libdtrace-ctf`
- `lxc`

- `ocfs2-tools`
- `oracle-armtoolset-1`
- `oracle-armtoolset-1-binutils`
- `oracle-armtoolset-1-gcc`
- `oracle-armtoolset-1-gdb`
- `oracle-armtoolset-1-golang`
- `oraclelinux-release`
- `oracle-logos`
- `qemu`
- `reflink`
- `uname26`
- `yum-plugin-ulninfo`
- `zstd`

### A.2.2 Modified Source Packages

The following source packages from the upstream release have been modified:

- `abrt`
- `abrt-java-connector`
- `akonadi`
- `anaconda`
- `apr-util`
- `autofs`
- `babel`
- `basesystem`
- `bcc`
- `binutils`
- `brlty`
- `btrfs-progs`
- `caribou`
- `ceph-common`
- `chrony`

- `cloud-init`
- `clufter`
- `cockpit`
- `coreutils`
- `cups-filters`
- `curl`
- `custodia`
- `dbus`
- `dbus-glib`
- `dbusmenu-qt`
- `dbus-python`
- `deltarpm`
- `device-mapper-multipath`
- `device-mapper-persistent-data`
- `dhcp`
- `dracut`
- `dtc`
- `efibootmgr`
- `file`
- `firefox`
- `firewalld`
- `fuse`
- `fuseiso`
- `fwupdate`
- `gcc`
- `gcc-libraries`
- `gdb`
- `gdbm`
- `glibc`
- `gnome-system-log`

- `gperftools`
- `grub2`
- `grubby`
- `gststreamer`
- `gststreamer1`
- `gststreamer1-plugins-bad-free`
- `gststreamer1-plugins-base`
- `gststreamer1-plugins-good`
- `gststreamer1-plugins-ugly-free`
- `gststreamer-plugins-bad-free`
- `gststreamer-plugins-base`
- `gststreamer-plugins-good`
- `hawkey`
- `httpd`
- `initial-setup`
- `initscripts`
- `ipa`
- `iscsi-initiator-utils`
- `java-11-openjdk`
- `java-1.7.0-openjdk`
- `javapackages-tools`
- `kdepimlibs`
- `kde-settings`
- `kernel`
- `kernel-uek`
- `kexec-tools`
- `keycloak-httpd-client-install`
- `kmod`
- `kmod-kvdo`
- `ksc`

- kscreen
- ksh
- libblockdev
- libbytesize
- libdbi-drivers
- libguestfs
- libguestfs-winsupport
- libpwquality
- libreport
- libreswan
- libssh2
- libstoragemgmt
- libtdb
- libtevent
- libvirt
- libvirt-cim
- libvirt-glib
- libvirt-java
- libvirt-python
- libvirt-snmp
- libxml2
- libxslt
- linux-firmware
- lorax
- lvm2
- lz4
- mdadm
- mozjs52
- nfs-utils
- nss-softokn

- ntp
- OpenIPMI
- openscap
- openssl
- oscap-anaconda-addon
- osinfo-db
- osinfo-db-tools
- os-prober
- PackageKit
- parted
- pcp
- pcs
- pcsc-lite
- pcsc-lite-ccid
- perftest
- perl-DBD-MySQL
- perl-XML-Parser
- plymouth
- policycoreutils
- polkit
- polkit-kde
- polkit-pkla-compat
- polkit-qt
- ppp
- pyatspi
- pygobject3
- pykickstart
- python
- python3
- python3-setuptools

- `python-adal`
- `python-augeas`
- `python-azure-sdk`
- `python-backports`
- `python-backports-ssl_match_hostname`
- `python-beaker`
- `python-blivet`
- `python-blivet3`
- `python-boto3`
- `python-cffi`
- `python-chardet`
- `python-cherrypy`
- `python-configobj`
- `python-configshell`
- `python-coverage`
- `python-cpio`
- `python-cryptography`
- `python-cups`
- `python-dateutil`
- `python-decorator`
- `python-di`
- `python-dmidecode`
- `python-dns`
- `python-docs`
- `python-docutils`
- `python-enum34`
- `python-ethtool`
- `python-futures`
- `python-gssapi`
- `python-gudev`

- `python-hwdata`
- `python-idna`
- `python-iniparse`
- `python-inotify`
- `python-ipaddr`
- `python-ipaddress`
- `python-IPy`
- `python-isodate`
- `python-jinja2`
- `python-jsonpatch`
- `python-jsonpointer`
- `python-jwcrypto`
- `python-jwt`
- `python-kdcproxy`
- `python-kerberos`
- `python-kitchen`
- `python-kmod`
- `python-krbV`
- `python-ldap`
- `python-linux-procfs`
- `python-lxml`
- `python-mako`
- `python-markupsafe`
- `python-matplotlib`
- `python-meh`
- `python-memcached`
- `python-msrest`
- `python-msrestazure`
- `python-netaddr`
- `python-netifaces`

- `python-nose`
- `python-nss`
- `python-ntplib`
- `python-oauthlib`
- `python-paramiko`
- `python-paste`
- `python-pillow`
- `python-pip`
- `python-ply`
- `python-prettytable`
- `python-psycopg2`
- `python-pyasnl`
- `python-pyblock`
- `python-pycparser`
- `python-pycurl`
- `python-pyudev`
- `python-qrcode`
- `python-reportlab`
- `python-requests`
- `python-requests-oauthlib`
- `python-rpm-generators`
- `python-rpm-macros`
- `python-rtslib`
- `python-s3transfer`
- `python-schedutils`
- `python-setproctitle`
- `python-setuptools`
- `python-six`
- `python-slip`
- `python-smbc`

- `python-sqlalchemy`
- `python-subprocess32`
- `python-suds`
- `python-tempita`
- `python-urlgrabber`
- `python-urllib3`
- `python-urwid`
- `python-virtualenv`
- `python-wheel`
- `python-yubico`
- `qt3`
- `rear`
- `redhat-bookmarks`
- `redhat-indexhtml`
- `redhat-lsb`
- `redhat-release-server`
- `redhat-rpm-config`
- `redhat-upgrade-dracut`
- `redhat-upgrade-tool`
- `redland`
- `rhn-client-tools`
- `rhnlib`
- `rhnsd`
- `rpmdevtools`
- `scap-security-guide`
- `scap-workbench`
- `selinux-policy`
- `setroubleshoot`
- `setroubleshoot-plugins`
- `shim`

- `shim-signed`
- `sos`
- `sos-collector`
- `spice-streaming-agent`
- `sssd`
- `system-config-date`
- `system-config-date-docs`
- `system-config-kickstart`
- `systemd`
- `tog-pegasus`
- `unixODBC`
- `uom-lib`
- `virt-manager`
- `volume_key`
- `wireshark`
- `xfspgrog`
- `xsane`
- `xulrunner`
- `yum`
- `yum-langpacks`
- `yum-metadata-parser`
- `yum-plugin-ulninfo`
- `yum-rhn-plugin`
- `yum-utils`

### A.2.3 Modified Optional Source Packages

The following optional source packages have been modified:

- `gnu-efi`
- `jetty-artifact-remote-resources`
- `jetty-parent`
- `jetty-toolchain`

- `kmod-redhat-ixgbe`
- `libreoffice`
- `pesign`
- `publican`
- `sanlock`
- `thunderbird`

## A.2.4 New Source Packages

The following source packages are new for Update 7, relative to Update 6 of Oracle Linux 7:

- `adobe-mappings-cmap`
- `adobe-mappings-pdf`
- `chrome-gnome-shell`
- `compat-exiv2-026`
- `geoipupdate`
- `geolite2`
- `libmaxminddb`
- `libpaper`
- `openjpeg2`
- `pmdk-convert`
- `python3`
- `python3-setuptools`
- `python-blivet3`
- `python-pip`
- `python-rpm-generators`
- `python-rpm-macros`
- `python-wheel`
- `redfish-finder`
- `sassist`
- `ucx`
- `urw-base35-fonts`
- `xorriso`

## A.2.5 Removed Source Packages

The following source packages from the upstream release have been removed:

- `anaconda-user-help`
- `biosdevname`
- `compat-dapl`
- `compat-exiv2-023`
- `compat-exiv2-026`
- `compat-gcc-34`
- `compat-gcc-44`
- `compat-glibc`
- `compat-libgfortran-41`
- `cpuid`
- `crash-ptdump-command`
- `genwqe-tools`
- `hyperv-daemons`
- `infinipath-psm`
- `insights-client`
- `intel-cmt-cat`
- `ixpdimm_sw`
- `java-1.6.0-openjdk`
- `kabi-yum-plugins`
- `kernel`
- `kmod-kvdo`
- `kpatch`
- `ksc`
- `libcxl`
- `libehca`
- `libica`
- `libinvm-cim`
- `libinvm-cli`

- libinvm-il8n
- libocxl
- libpsm2
- librtas
- libservicelog
- libsmbios
- libvtpd
- libzfcphbaapi
- lsvpd
- mcelog
- memkind
- memtest86+
- microcode\_ctl
- mkbootdisk
- nbdkit
- nvml
- opa-ff
- opa-fm
- opal-prd
- openssl098e
- openssl-ibmca
- open-vm-tools
- oracleasm
- ovmf
- paflib
- pmdk-convert
- powerpc-utils
- powerpc-utils-python
- ppc64-diag
- ppc64-utils

- prelink
- python-rhsm
- qclib
- qemu-kvm
- qemu-kvm-ma
- redhat-access-gui
- redhat-access-plugin-ipa
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-as-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-bn-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-de-DE
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-en-US
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-es-ES
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-fr-FR
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-gu-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-hi-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-it-IT
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-ja-JP
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-kn-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-ko-KR
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-ml-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-mr-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-or-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-pa-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-pt-BR
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-ru-RU
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-ta-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-te-IN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-zh-CN
- Red\_Hat\_Enterprise\_Linux-Release\_Notes-7-zh-TW
- redhat-logos

- `redhat-release-eula`
- `redhat-support-lib-python`
- `redhat-support-tool`
- `s390utils`
- `seabios`
- `servicelog`
- `sgabios`
- `SLOF`
- `subscription-manager`
- `subscription-manager-migration-data`
- `syslinux`
- `tboot`
- `tss2`
- `vdo`
- `virt-who`
- `x86info`
- `xorg-x11-drv-intel`
- `xorg-x11-drv-openchrome`
- `xorg-x11-drv-vesa`
- `xorg-x11-drv-vmmouse`
- `xorg-x11-drv-vmware`
- `yaboot`

