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Certification with Oracle Linux 7

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|---|----|
| Introduction | 1 |
| Comparing Oracle Linux 7 and Red Hat Enterprise Linux (RHEL) 7 .. | 2 |
| Checking the /etc/redhat-release File | 2 |
| Checking for the redhat-release Package | 2 |
| Checking the Version of the Distribution | 7 |
| Unbreakable Enterprise Kernel (UEK) | 8 |
| UEK, Compatibility, and Third-Party Software | 8 |
| Information for Third-Party Applications that Check for the Linux Kernel Version | 9 |
| Full, Verified kABI Compliance | 10 |
| Compatibility | 11 |
| Downloading Source Code and Binaries | 11 |
| Conclusion | 11 |
| For More Information | 11 |

Introduction

This article describes the key points that ISVs should consider when installing and certifying their products on Oracle Linux 7.

Oracle Linux is completely open source and fully compatible – both source and binary – with Red Hat Enterprise Linux (RHEL). Partners testing and certifying their applications on Oracle Linux will, at most, simply install their applications on Oracle Linux and verify the information described in this article.

Oracle Linux 7 ships with two sets of kernel packages:

- Unbreakable Enterprise Kernel (UEK), which is installed and booted by default
- Red Hat compatible kernel (RHCK), which is installed by default

When using the Red Hat compatible kernel, Oracle Linux 7 is also fully kABI compatible with RHEL.

Comparing Oracle Linux 7 and Red Hat Enterprise Linux (RHEL) 7

Applications that run on RHEL will run on Oracle Linux. Being both source and binary compatible, all system libraries in Oracle Linux are identical to RHEL's. Since Oracle Linux started shipping in 2006, Oracle has never had a reported instance of application incompatibility.

A small number of RPMS have been changed in Oracle Linux to remove Red Hat trademarks and logos. These are non-functional text or graphics changes that in no way affect binary compatibility. Oracle has added its own text file, `/etc/oracle-release`, so support teams can easily identify that the code is from Oracle.

Modified RPMs are listed below so ISVs can determine if their application requires any changes in order to complete certification on Oracle Linux 7.

Checking the `/etc/redhat-release` File

RHEL provides a text file called `/etc/redhat-release`, which contains a one-line string identifying the specific distribution release. This file is part of the `redhat-release` package. Oracle Linux 7 also contains a text file called `/etc/redhat-release`, which is installed by a package called `oraclelinux-release`.

The following tables show how Oracle Linux releases retain the Red Hat content within the RPM. Also shown is the file `/etc/oracle-release`, which contains Oracle content.

| RHEL 7 | ORACLE LINUX 7 |
|---|--|
| <pre># rpm -qf /etc/redhat-release redhat-release-server-7.0-1.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.0 (Maipo)</pre> | <pre># rpm -qf /etc/redhat-release oraclelinux-release-7.0- 1.0.3.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.0 (Maipo) # cat /etc/oracle-release Oracle Linux Server release 7.0</pre> |

| RHEL 7.1 | ORACLE LINUX 7.1 |
|--|--|
| <pre># rpm -qf /etc/redhat-release</pre> | <pre># rpm -qf /etc/redhat-release</pre> |

| | |
|---|--|
| <pre>redhat-release-server-7.1-1.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.1 (Maipo)</pre> | <pre>oraclelinux-release-7.1- 1.0.5.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.1 (Maipo) # cat /etc/oracle-release Oracle Linux Server release 7.1</pre> |
|---|--|

| RHEL 7.2 | ORACLE LINUX 7.2 |
|---|--|
| <pre># rpm -qf /etc/redhat-release redhat-release-server-7.2-9.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.2 (Maipo)</pre> | <pre># rpm -qf /etc/redhat-release oraclelinux-release-7.2- 1.0.4.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.2 (Maipo) # cat /etc/oracle-release Oracle Linux Server release 7.2</pre> |

| RHEL 7.3 | ORACLE LINUX 7.3 |
|---|--|
| <pre># rpm -qf /etc/redhat-release redhat-release-server-7.3-7.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.3 (Maipo)</pre> | <pre># rpm -qf /etc/redhat-release oraclelinux-release-7.3- 1.0.4.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.3 (Maipo) # cat /etc/oracle-release Oracle Linux Server release 7.3</pre> |

| RHEL 7.4 | ORACLE LINUX 7.4 |
|---|--|
| <pre># rpm -qf /etc/redhat-release redhat-release-server-7.4- 18.el7.x86_64</pre> | <pre># rpm -qf /etc/redhat-release oraclelinux-release-7.4- 1.0.4.el7.x86_64</pre> |

| | |
|--|--|
| <pre># cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.4 (Maipo)</pre> | <pre># cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.4 (Maipo) # cat /etc/oracle-release Oracle Linux Server release 7.4</pre> |
|--|--|

| RHEL 7.5 | ORACLE LINUX 7.5 |
|---|--|
| <pre># rpm -qf /etc/redhat-release redhat-release-server-7.5-8.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.5 (Maipo)</pre> | <pre># rpm -qf /etc/redhat-release oraclelinux-release-7.5- 1.0.3.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.5 (Maipo) # cat /etc/oracle-release Oracle Linux Server release 7.5</pre> |

| RHEL 7.6 | ORACLE LINUX 7.6 |
|---|---|
| <pre># rpm -qf /etc/redhat-release redhat-release-server-7.6-4.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.6 (Maipo)</pre> | <pre># rpm -qf /etc/redhat-release oraclelinux-release-7.6- 1.0.15.el7.x86_64 # cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.6 (Maipo) # cat /etc/oracle-release Oracle Linux Server release 7.6</pre> |

Checking for the redhat-release Package

Oracle Linux 7 includes both the `oraclelinux-release` and the `redhat-release-server` packages.

| RHEL 7 | ORACLE LINUX 7 |
|--------|----------------|
|--------|----------------|

| | |
|--|--|
| <pre># rpm -qa grep redhat-release-server redhat-release-server-7.6-4.el7.x86_64</pre> | <pre># rpm -qa grep redhat-release-server redhat-release-server-7.6-4.0.1.el7.x86_64.rpm # rpm -qa grep oraclelinux-release oraclelinux-release-7.0-1.0.3.el7.x86_64 # rpm -q --provides oraclelinux-release config(oraclelinux-release) = 7:7.0-1.0.3.el7 oraclelinux-release = 7:7.0-1.0.3.el7 oraclelinux-release(x86-64) = 7:7.0-1.0.3.el7</pre> |
|--|--|

| RHEL 7.1 | ORACLE LINUX 7.1 |
|--|--|
| <pre># rpm -qa grep redhat-release-server redhat-release-server-7.1-1.el7.x86_64</pre> | <pre># rpm -qa grep redhat-release-server redhat-release-server-7.1-1.0.2.el7.x86_64 # rpm -qa grep oraclelinux-release oraclelinux-release-7.1-1.0.5.el7.x86_64 # rpm -q --provides oraclelinux-release config(oraclelinux-release) = 7:7.1-1.0.5.el7 oraclelinux-release = 7:7.1-1.0.5.el7 oraclelinux-release(x86-64) = 7:7.1-1.0.5.el7</pre> |

| RHEL 7.2 | ORACLE LINUX 7.2 |
|--|--|
| <pre># rpm -qa grep redhat-release-server redhat-release-server-7.2-9.el7.x86_64</pre> | <pre># rpm -qa grep redhat-release-server redhat-release-server-7.2-1.0.4.el7.x86_64 # rpm -qa grep oraclelinux-release oraclelinux-release-7.2-1.0.4.el7.x86_64 # rpm -q --provides oraclelinux-release</pre> |

| | |
|--|--|
| | <pre>config(oraclelinux-release) = 7:7.2-1.0.4.el7 oraclelinux-release = 7:7.2-1.0.4.el7 oraclelinux-release(x86-64) = 7:7.2-1.0.4.el7</pre> |
|--|--|

| RHEL 7.3 | ORACLE LINUX 7.3 |
|--|--|
| <pre># rpm -qa grep redhat-release-server redhat-release-server-7.3-7.el7.x86_64</pre> | <pre># rpm -qa grep redhat-release-server redhat-release-server-7.3-1.0.4.el7.x86_64 # rpm -qa grep oraclelinux-release oraclelinux-release-7.3-1.0.4.el7.x86_64 # rpm -q --provides oraclelinux-release config(oraclelinux-release) = 7:7.3-1.0.4.el7 oraclelinux-release = 7:7.3-1.0.4.el7 oraclelinux-release(x86-64) = 7:7.3-1.0.4.el7</pre> |

| RHEL 7.4 | ORACLE LINUX 7.4 |
|---|--|
| <pre># rpm -qa grep redhat-release-server redhat-release-server-7.4-18.el7.x86_64</pre> | <pre># rpm -qa grep redhat-release-server redhat-release-server-7.4-1.0.4.el7.x86_64 # rpm -qa grep oraclelinux-release oraclelinux-release-7.4-1.0.4.el7.x86_64 # rpm -q --provides oraclelinux-release config(oraclelinux-release) = 7:7.4-1.0.4.el7 oraclelinux-release = 7:7.4-1.0.4.el7 oraclelinux-release(x86-64) = 7:7.4-1.0.4.el7</pre> |

| RHEL 7.5 | ORACLE LINUX 7.5 |
|---|---|
| <pre># rpm -qa grep redhat-release-server</pre> | <pre># rpm -qa grep redhat-release-server</pre> |

| | |
|---|---|
| <pre>redhat-release-server-7.5-8.el7.x86_64</pre> | <pre>redhat-release-server-7.5-1.0.3.el7.x86_64 # rpm -qa grep oraclelinux-release oraclelinux-release-7.5-1.0.3.el7.x86_64 # rpm -q --provides oraclelinux-release config(oraclelinux-release) = 7:7.5-1.0.3.el7 oraclelinux-release = 7:7.5-1.0.3.el7 oraclelinux-release(x86-64) = 7:7.5-1.0.3.el7</pre> |
|---|---|

| RHEL 7.6 | ORACLE LINUX 7.6 |
|--|--|
| <pre># rpm -qa grep redhat-release-server redhat-release-server-7.6-4.el7.x86_64</pre> | <pre># rpm -qa grep redhat-release-server redhat-release-server-7.6-4.0.1.el7.x86_64 # rpm -qa grep oraclelinux-release oraclelinux-release-7.6-1.0.15.el7.x86_64 # rpm -q --provides oraclelinux-release config(oraclelinux-release) = 7:7.6-1.0.15.el7 oraclelinux-release = 7:7.6-1.0.15.el7 oraclelinux-release(x86-64) = 7:7.6-1.0.15.el7</pre> |

Checking the Version of the Distribution

An application may check for the version of the Linux distribution via the `redhat-release` package. In this case, both Oracle Linux 7 and RHEL 7 return 7.x.

Oracle Linux 7:

```
# rpm -q --qf "%{version}\n" -f /etc/oracle-release
7.x
```

RHEL 7:

```
# rpm -q --qf "%{version}\n" -f /etc/redhat-release
```

If your application installer depends on any of the checks described above, you now have the information needed to make the minimal changes required to run your application on Oracle Linux 7.

Unbreakable Enterprise Kernel

When it comes to the kernel, as noted above, Oracle Linux offers: RHCK, for strict compatibility with the Red Hat kernel, or UEK, a kernel optimized and recommended by Oracle for stability and performance. You can [read more about UEK here](#).

Unbreakable Enterprise Kernel, Compatibility, and Third-Party Software

Oracle's Unbreakable Enterprise Kernel provides many advantages, such as significant performance improvements and new features.

The Linux operating system is a modular system in which the kernel interacts with the hardware and controls and schedules access to resources on behalf of applications. Applications run in what's called *user space* and call a stable set of system libraries to ask for kernel services.

Figure 1 is a simplified diagram of the Linux operating system. Choosing the Unbreakable Enterprise Kernel changes only the box labeled "Kernel."

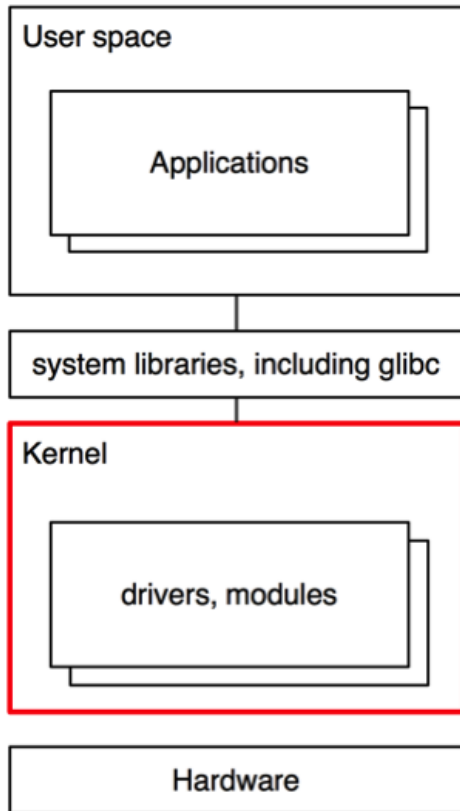


Figure 1. Linux Operating System

As you can see, installing a kernel does not change system libraries such as `glibc`, the interface that nearly all applications, including Oracle Database, use. The `glibc` version is 2.12 whether you run Oracle Linux 7 with the Unbreakable Enterprise Kernel or with the Red Hat compatible kernel.

In contrast, device drivers and other kernel modules are tightly coupled with the kernel and will usually need to be recompiled when a new kernel is introduced.

Information for Third-Party Applications that Check for the Linux Kernel Version

Oracle Linux 7 ships with two sets of kernel packages:

- Unbreakable Enterprise Kernel which is installed and booted by default
- Red Hat compatible kernel, which is installed by default

If needed, `grub2` can be modified to make the system boot with the Red Hat compatible kernel by default. The latest supported releases of the Unbreakable Enterprise Kernel are listed here: linux.oracle.com/supported.html.

The Unbreakable Enterprise Kernel is provided by the `kernel-uek` package, whereas the Red Hat compatible kernel is provided by the `kernel` package. For example:

```
# rpm -qa | grep ^kernel
kernel-3.10.0-123.4.4.el7.x86_64
kernel-headers-3.10.0-123.4.4.el7.x86_64
kernel-uek-3.8.13-35.3.2.el7uek.x86_64
kernel-uek-firmware-3.8.13-35.3.2.el7uek.noarch
kernel-tools-3.10.0-123.4.4.el7.x86_64
kernel-tools-libs-3.10.0-123.4.4.el7.x86_64
```

To determine whether the Unbreakable Enterprise Kernel is installed and running, look for the string “uek” embedded into kernel release version (3.8.13 in the above example), or use the `uname -r` command:

Unbreakable Enterprise Kernel Release 4 (4.1.12):

```
# uname -r
4.1.12-x.y.z.el7uek.x86_64
```

Unbreakable Enterprise Kernel Release 3 (3.8.13):

```
# uname -r
3.8.13-x.y.z.el7uek.x86_64
```

Red Hat Compatible Kernel (3.10):

```
# uname -r
3.10.0-123.4.4.el7.x86_64
```

Also, make sure that the kernel package installed is called `kernel-uek`.

```
# rpm -qa | grep kernel-uek
kernel-uek-3.8.13-35.3.2.el7uek.x86_64
kernel-uek-firmware-3.8.13-35.3.2.el7uek.noarch
```

If your product includes a kernel module, please contact us at ol-ovm-info_ww@oracle.com for more information about supporting your product or application on UEK.

Full, Verified kABI Compliance

Oracle Linux 7 with a Red Hat compatible kernel is fully kABI compatible with RHEL 7. Scripts are run to double-check whether any patches that were to be applied would have a chance of breaking kABI.

Any comparison between Oracle Linux 7 with the Red Hat compatible kernel and RHEL 7 shows absolutely no difference in kABI. Kernel modules built for any RHEL 7 kernel will also load on any Red Hat compatible kernel released for Oracle Linux.

Compatibility

The preceding information compares Oracle Linux 7 and RHEL 7 and highlights areas of importance to ISVs from a testing and certification point of view. If your application relies on any of the examples above, this information should help you to determine if any changes are required to run your application on Oracle Linux.

If your application does not rely on any of the examples above, it should run transparently on Oracle Linux, and Oracle is confident that re-certification is not necessary.

Downloading Source Code and Binaries

Oracle Linux is free to download, use, and distribute (both source and binaries). Oracle Linux source code is available for free download at <http://oss.oracle.com/ol7/>. The binary installation images (ISO) are free to download from [Oracle Software Delivery Cloud](#). Individual binary RPM packages including updates/errata can be obtained from the [Oracle Linux yum server](#).

Conclusion

Oracle Linux is fully compatible—both source and binary—with Red Hat Enterprise Linux. This article described key points that ISVs should consider when installing and certifying their products on Oracle Linux 7.

For More Information

- Visit the Oracle Linux Knowledge Zone on [Oracle PartnerNetwork](#) to learn how to accelerate market opportunities and lower the cost of providing Linux solutions and support to users.
- For more information about becoming an Oracle partner, visit the [Oracle PartnerNetwork](#).
- For information on the Oracle Linux Support program, visit oracle.com/linux.
- To contact an Oracle Linux alliance manager for assistance, email ol-ovm-info_ww@oracle.com.



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