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Guide to Certifying Third-Party Software on Oracle Linux

An Oracle Technical Article

Contents

List of images

List of tables

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Introduction

This guide describes the key points that Independent Software Vendors (ISVs) or third-party vendors should consider when installing, running, and certifying their software on Oracle Linux.

Oracle Linux provides a 100% application binary-compatible alternative to Red Hat Enterprise Linux (RHEL) and CentOS Linux and is supported across both distributed and multicloud environments.

In most cases, ISVs have already certified their applications on RHEL. Because Oracle Linux is 100% application binary compatible with RHEL, third-party applications do not need to be re-certified with Oracle Linux. Third-party vendors simply need to install their application on Oracle Linux and verify the information described in this article.

If a third-party application has not been certified on RHEL, or, if after reading this document any third-party vendor still believes certification testing is needed, they will need to run their own test suite on Oracle Linux.

For hardware certification, please consult the Oracle Linux and Virtualization Hardware Certification List (HCL).

Oracle Linux ships with two sets of kernel packages:

- Unbreakable Enterprise Kernel (UEK), which is installed and booted by default, on x86-64 and Arm (aarch64) platforms
- Red Hat Compatible Kernel (RHCK), which is installed and is an alternative kernel, on x86-64 platforms

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Compatibility

Oracle Linux maintains full user space compatibility with RHEL, which is independent of the kernel version that's running underneath the OS. Note that existing applications in user space continue to run unmodified with UEK; no recertifications are required for RHEL certified applications.

Oracle Linux with the Red Hat Compatible Kernel (RHCK) is 100% Kernel Application Binary Interface (kABI) compatible with RHEL. 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 with RHCK and RHEL shows absolutely no difference in kABI. Kernel modules built for any RHEL kernel will also load on any Red Hat Compatible Kernel release for Oracle Linux.

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Comparing Oracle Linux and Red Hat Enterprise Linux (RHEL)

Applications that run on RHEL also run on Oracle Linux. System libraries in Oracle Linux are compatible 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 in the tables below so ISVs can determine if their application requires any changes in order to complete their certification on Oracle Linux.

Checking the `/etc/redhat-release` File

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

The following tables show examples of how Oracle retains the Red Hat content within the file for the latest two versions of Oracle Linux (at the time of this document's publication).

Also shown is the file `/etc/oracle-release`, which contains Oracle content.

ORACLE LINUX 9	RHEL 9

`$ rpm -qf /etc/redhat-release`
`oraclelinux-release-9.4-1.0.6.el9.x86_64`
 	
`$ cat /etc/redhat-release`
`Red Hat Enterprise Linux release 9.4 (Plow)`
 	
`$ cat /etc/oracle-release`
`Oracle Linux Server release 9.4`
	`$ rpm -qf /etc/redhat-release`
	`redhat-release-9.4-0.4.el9.x86_64`
	
	`$ cat /etc/redhat-release`
	`Red Hat Enterprise Linux release 9.4 (Plow)`

Table 1: Comparison of Oracle Linux 9 and RHEL 9 - Release Information

ORACLE LINUX 8	RHEL 8

`$ rpm -qf /etc/redhat-release`
 	
`oraclelinux-release-8.3-1.0.4.el8.x86_64`
 	
`$ cat /etc/redhat-release`
 	
`Red Hat Enterprise Linux release 8.3 (Ootpa)`
 	
`$ cat /etc/oracle-release`
 	
`Oracle Linux Server release 8.3`
	`$ rpm -qf /etc/redhat-release`
	
	`redhat-release-8.3-1.0.el8.x86_64`
	
	`$ cat /etc/redhat-release`
	
	`Red Hat Enterprise Linux release 8.3 (Ootpa)`

Table 2: Comparison of Oracle Linux 8 and RHEL 8 - Release Information

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Checking the Version of the Release

An application may check for the version (number) of the release via the `redhat-release` package. In the following example, both Oracle Linux 9.4 and RHEL 9.4 return `9.4`

ORACLE LINUX 9	RHEL 9

`# rpm -q --qf "%{version}\n" -f /etc/redhat-release`
 	
`9.4`
	`# rpm -q --qf "%{version}\n" -f /etc/redhat-release`
	
	`9.4`

Table 3: Comparison of Oracle Linux 9 and RHEL 9 - Version Number

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

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The Unbreakable Enterprise Kernel for Oracle Linux

In September of 2010, Oracle introduced the Unbreakable Enterprise Kernel for Oracle Linux. Information about the Unbreakable Enterprise Kernel (UEK) can be found in Oracle Linux documentation and on GitHub. With Oracle Linux, customers have a choice of kernels: UEK, a kernel optimized and recommended by Oracle for stability and performance or RHCK for strict compatibility with RHEL.

Unbreakable Enterprise Kernel, Compatibility, and Third-Party Software

The Unbreakable Enterprise Kernel for Oracle Linux 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 only a stable set of system libraries to ask for kernel services.
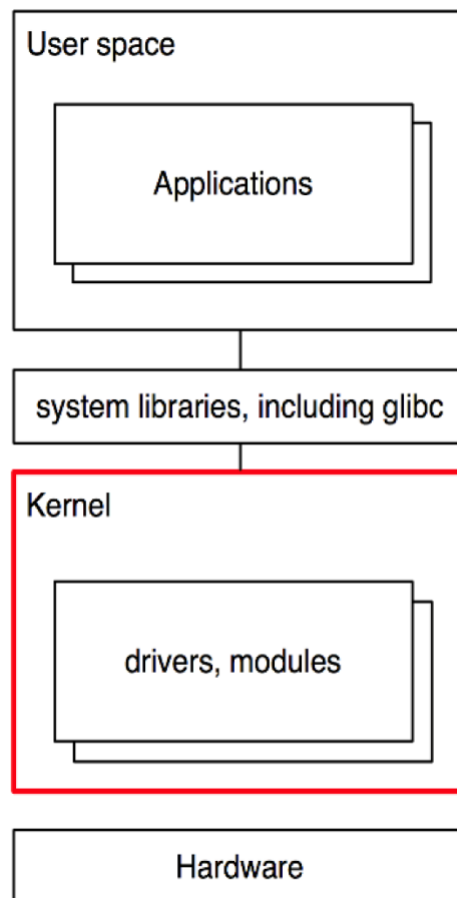

Figure 1. Simplified Diagram of Linux Operating System

Installing the Unbreakable Enterprise Kernel changes the box labeled "Kernel" only. It does not change system libraries such as `glibc` which is the interface that nearly all applications, including Oracle Database, use. The `glibc` version is the same whether you run Oracle Linux with the Unbreakable Enterprise Kernel (UEK) or with the Red Hat Compatible Kernel (RHCK).

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.

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Applications That Read the Kernel Version to Check Compatibility

Some third-party applications will programmatically check to see what version of the Linux kernel is running (using #uname -a or similar command) and will not continue to run if the results show a kernel that is NOT named as a RHEL kernel.

In those cases, running Oracle Linux with the Red Hat Compatible Kernel may be the best option. It is recommended that third-party vendors verify that their application shows a RHEL-named kernel. Once verified, the application will run without change or re-certification on Oracle Linux with RHCK.

If a third-party vendor chooses to run Oracle Linux with the Unbreakable Enterprise Kernel and their application checks for a kernel version, as described above, the vendor will need to modify the application, so it does not fail upon reading the UEK version. Vendors can contact the Oracle Linux Alliance team at ol-ovm-info_ww@oracle.com to cover certification and testing on UEK.

If the third-party application does not check for a kernel version, the application will run on either Oracle Linux kernel, per the guidance provided in this document.

Note that if RHCK is the kernel of choice, the `/etc/grub.conf` will need to be modified to make the system boot with it by default. For more information, see Oracle Linux: Use grubby to Set the Default Kernel

Also note: The Unbreakable Enterprise Kernel is provided by the `kernel-uek` package, whereas the Red Hat Compatible Kernel is provided by the `kernel` package.

Here is an example for Oracle Linux 9:

```
# rpm -qa | grep ^kernel

kernel-modules-core-5.14.0-427.28.1.el9_4.x86_64

kernel-core-5.14.0-427.28.1.el9_4.x86_64

kernel-uek-core-5.15.0-209.161.7.el9uek.x86_64

kernel-uek-modules-5.15.0-209.161.7.el9uek.x86_64

kernel-modules-5.14.0-427.28.1.el9_4.x86_64

kernel-tools-libs-5.14.0-427.28.1.el9_4.x86_64

kernel-tools-5.14.0-427.28.1.el9_4.x86_64

kernel-5.14.0-427.28.1.el9_4.x86_64

kernel-uek-5.15.0-209.161.7.el9uek.x86_64

kernel-headers-5.14.0-427.28.1.el9_4.x86_64

kernel-uek-devel-5.15.0-209.161.7.el9uek.x86_64

kernel-devel-5.14.0-427.28.1.el9_4.x86_64
```

To determine whether the Unbreakable Enterprise Kernel is installed and running, look for the string "uek" embedded into kernel release version or use the `uname -r` command.

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For example:

```
# uname -r
5.15.0-209.161.7.el9uek.x86_64
```

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

For example:

```
# rpm -qa | grep kernel-uek
kernel-uek-core-5.15.0-209.161.7.el9uek.x86_64
kernel-uek-modules-5.15.0-209.161.7.el9uek.x86_64
kernel-uek-5.15.0-209.161.7.el9uek.x86_64
kernel-uek-devel-5.15.0-209.161.7.el9uek.x86_64
```

If your application or 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.

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Summary

The preceding information is a guide for third-party vendors to help them understand the RPMs touched while preparing Oracle Linux and highlights areas of importance to be considered during the testing and possible certification process. The examples provided in this document are intended to provide third-party vendors with the confidence that if their application relies on any of the examples, they should now have all the information needed about the changes or steps required to run their application on Oracle Linux.

If that application does not rely on any of the examples above, it should run without any modifications on Oracle Linux, and Oracle is confident that re-certification is not necessary.

If a third-party vendor runs into an incompatibility issue, they should contact the Oracle Linux Alliance team at ol-ovm-info_ww@oracle.com for assistance in resolving the issue.

Once certification is completed and the third-party vendor would like to promote its solution in the Oracle Linux ISV Catalog, please contact the Oracle Linux Alliance team at ol-ovm-info_ww@oracle.com.

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Downloading Source Code and Binaries

Oracle Linux is:

- Free to download, use, and redistribute (both source and binaries) for an unlimited number of systems. This includes the ISO, updates, and errata – everything – in easy-to-use packaging. We don't require that third-party vendors or end-users give us any information to get Oracle Linux. No email address required, no signing up for a developer subscription, no registering systems, no annual renewals, or anything else.

- The software is the same regardless of whether it is being used for development or for production, with self-support or with an Oracle Linux Support subscription. Mix and match as much as needed, no limitations.

Oracle Linux source code and binary installation media are available from the Oracle Linux Installation Media download page.

Individual binary RPM packages including updates/errata and source packages can be obtained from the Oracle Linux yum server.

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Conclusion

This guide described key points that third-party vendors should consider when installing, running, or certifying their software on Oracle Linux.

Once third-party vendors confirm that they have certified their application on Oracle Linux, the same can be listed in the Oracle Linux ISV Catalog. The ISV Catalog is externally available to customers and prospects interested in running third-party applications on Oracle Linux.

By listing an application in the ISV Catalog, third-party vendors can reach a large audience of users, prospects, and the Oracle Sales team, who are looking for solutions or information about third-party software that runs on Oracle Linux.

Third-party vendors that wish to have their application(s) listed in the ISV Catalog may do so by contacting the Oracle Linux Alliance team at ol-ovm-info_ww@oracle.com.

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Resources

Download Oracle Linux	Source code: https://oss.oracle.com ISOs: Oracle Software Delivery Cloud Installation media: Oracle Linux Installation Media RPM packages: Oracle Linux yum server
Contact an Oracle Linux Alliance Manager	Email: ol-ovm-info_ww@oracle.com
Oracle Linux Support Program	oracle.com/linux/support
Learn about becoming an Oracle Partner	Oracle PartnerNetwork
About Oracle Linux	oracle.com/linux
Oracle Linux Documentation and Training	docs.oracle.com/en/operating-systems/oracle-linux/index.html
Oracle Linux for Developers	developer.oracle.com/linux/

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