

Oracle Linux 8

Release Notes for Oracle Linux 8.6



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Preface

[Oracle Linux 8: Release Notes for Oracle Linux 8.6](#) provides information about the new features and known issues in the Oracle Linux 8.6 release. The information applies to both x86_64 and 64-bit Arm (aarch64) architectures. This document might be updated after it is released.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	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.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <https://www.oracle.com/corporate/accessibility/>.

For information about the accessibility of the Oracle Help Center, see the Oracle Accessibility Conformance Report at <https://www.oracle.com/corporate/accessibility/templates/t2-11535.html>.

Access to Oracle Support for Accessibility

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <https://www.oracle.com/corporate/accessibility/learning-support.html#support-tab>.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees,

customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

1

About Oracle Linux 8

The current Oracle Linux 8 release contains new features and enhancements that improve performance in different areas including automation and management, security and compliance, container management, and developer tools. These enhancements are especially designed to make the operating system adaptable to different types of deployment from strictly on-premises installations, hybrid deployments that combine on-premises and cloud installations, and full cloud deployment.

System Requirements and Limitations

To determine whether your hardware is supported on the current Oracle Linux 8 release, check the Hardware Certification List at <https://linux.oracle.com/hardware-certifications>. Note that hardware is listed as it becomes available and is validated.

Note that Oracle Linux 8 for the aarch64 platform is primarily engineered for use with Ampere™ eMAG™-based EVK platform and the Marvell ThunderX2® processor. Other hardware may be supported and added to the Hardware Certification List in future.

CPU, memory, disk and file system limits for all Oracle Linux releases are described in [Oracle Linux: Limits](#).

Available Architectures

The release is available on the following platforms:

- Intel 64-bit (x86_64)
- AMD 64-bit (x86_64)
- 64-bit Arm (aarch64)

The Arm platform is only supported with Unbreakable Enterprise Kernel Release (UEK).

Shipped Kernels

For the x86_64 platform, Oracle Linux 8.6 ships with the following default kernel packages:

- `kernel-4.18.0-372.9.1.el8` (Red Hat Compatible Kernel (RHCK))
- `kernel-uek-5.4.17-2136.307.3` (Unbreakable Enterprise Kernel Release 6 (UEK R6))

For new installations, the UEK kernel is automatically enabled and installed. It also becomes the default kernel on first boot.

Starting with the Oracle Linux 8.5 release, Unbreakable Enterprise Kernel Release 7 (UEK R7) is also available as an additional installation option.



Note:

For the 64-bit Arm (aarch64) platform, Oracle Linux ships only with the UEK kernel.

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

About the Unbreakable Enterprise Kernel

The Unbreakable Enterprise Kernel (UEK) is a Linux kernel built by Oracle and supported through Oracle Linux support. UEK is tested on Arm (aarch64), Intel x86, and AMD x86 (x86_64) platforms. Each release contains additional features, bug fixes, and updated drivers to provide support for key functional requirements, improve performance, and optimize the kernel for use on Oracle products such as Oracle's Engineered Systems, Oracle Cloud Infrastructure, and large enterprise deployments for Oracle customers.

Typically, a UEK release contains changes to the kernel ABI relative to a previous UEK release. These changes require recompilation of third-party kernel modules on the system. To minimize impact on interoperability during releases, the Oracle Linux team works closely with third-party vendors regarding hardware and software that have dependencies on kernel modules. Thus, before installing the latest UEK release, verify its support status with your application vendor.

The kernel ABI for a UEK release remains unchanged in all subsequent updates to the initial release.

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

For more information about UEK such as tutorials, notices, and release notes of different UEK versions, go to [Unbreakable Enterprise Kernel documentation](#).

User Space Compatibility

Oracle Linux maintains user space compatibility with Red Hat Enterprise Linux (RHEL) that is independent of the kernel version that underlies the operating system. Existing applications in user space continue to run unmodified on UEK R6 and UEK R7, with no required recertifications for RHEL certified applications.

Obtaining Installation Images

The following installation images for the current Oracle Linux 8 release are available:

- Full ISO of Oracle Linux for typical on-premise installations
- Boot ISO of Oracle Linux for network installations
- Boot ISO of the supported UEK release for installing on hardware that is supported only on UEK

- Source DVDs

You can download these images from the following locations. Note that the images in these locations are for both the x86_64 and aarch64 platforms, unless indicated otherwise:

- Oracle Software Delivery Cloud at <https://edelivery.oracle.com>
- Oracle Linux yum server at <https://yum.oracle.com/oracle-linux-downloads.html>

To prepare a downloaded image for installing Oracle Linux, see [Oracle Linux 8: Installing Oracle Linux](#).

For information about the available ISOs for the three most recent updates to the Oracle Linux releases, refer to <https://yum.oracle.com/oracle-linux-isos.html>.

For developers who are making use of the Raspberry Pi hardware platform, Oracle provides an unsupported developer release image, which includes the firmware that is required to boot this platform. For more information about making use of the Raspberry Pi hardware platform, see [Install Oracle Linux on a Raspberry Pi](#).

 **Note:**

Aside from installation ISOs, you can also use Oracle Linux images to create compute instances on Oracle Cloud Infrastructure. For information about these images, see the release notes for the specific image that you are using on the [Oracle Cloud Infrastructure Documentation](#) page.

To use Oracle Linux on Oracle Cloud Infrastructure, see <https://docs.oracle.com/iaas/oracle-linux/home.htm>.

Upgrading From Oracle Linux 7 to Oracle Linux 8

You can upgrade an Oracle Linux 7 system to the latest Oracle Linux 8 release by using the `leapp` utility. For step-by-step instructions, as well as information about any known issues that you might encounter when upgrading your system, see [Oracle Linux 8: Performing System Upgrades With Leapp](#).

Installing Oracle-Supported RDMA Packages

Oracle Linux 8 releases earlier than Oracle Linux 8.7 ship with UEK R6 as the default kernel.

Starting with Oracle Linux 8.5, you also have the option of installing UEK R7. From Oracle Linux 8.7 onward, UEK R7 is the default kernel.

Oracle provides Remote Direct Memory Access (RDMA) packages for use with UEK R6 and UEK R7. The RDMA feature enables direct memory access between two systems that are connected by a network. RDMA facilitates high-throughput and low-latency networking in clusters.

To use RDMA features, you must first install the Oracle-supported RDMA packages. To do so, ensure that your system is subscribed to the appropriate channels on ULN or that you have enabled the appropriate repositories on the Oracle Linux yum server.

RDMA With UEK R6

If you are subscribed to ULN, enable the following channels:

- `ol8_x86_64_UEKR6`
- `ol8_x86_64_baseos_latest`
- `ol8_x86_64_appstream`
- `ol8_x86_64_UEKR6_RDMA`

Note that if your system is newly registered on ULN, it is already subscribed to the `ol8_x86_64_UEKR6`, `ol8_x86_64_baseos_latest`, and `ol8_x86_64_appstream` channels by default. However, you must explicitly subscribe to the `ol8_x86_64_UEKR6_RDMA` channel prior to installing RDMA packages.

If you are using the Oracle Linux yum server, enable the following repositories:

- `ol8_UEKR6`
- `ol8_baseos_latest`
- `ol8_appstream`
- `ol8_UEKR6_RDMA`

Note that if your system already uses the Oracle Linux yum server, the `ol8_UEKR6`, `ol8_baseos_latest`, and `ol8_appstream` repositories are enabled by default. However, you must explicitly enable the `ol8_UEKR6_RDMA` repository prior to installing RDMA packages.

For additional information about RDMA, including any known issues, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 6 Update 3](#).

RDMA With UEK R7

If you are subscribed to ULN, enable the following channels:

- `ol8_x86_64_UEKR7`
- `ol8_x86_64_baseos_latest`
- `ol8_x86_64_appstream`
- `ol8_x86_64_UEKR7_RDMA`

Note that if your system is newly registered on ULN, it is already subscribed to the `ol8_x86_64_UEKR6`, `ol8_x86_64_baseos_latest`, and `ol8_x86_64_appstream` channels by default. You should disable `ol8_x86_64_UEKR6` and then explicitly subscribe to the `ol8_x86_64_UEKR7_RDMA` and `ol8_x86_64_UEKR7_RDMA` channels prior to installing RDMA packages.

If you are using the Oracle Linux yum server, enable the following repositories:

- `ol8_UEKR7`
- `ol8_baseos_latest`
- `ol8_appstream`
- `ol8_UEKR7_RDMA`

Note that if your system already uses the Oracle Linux yum server, the `ol8_UEKR6`, `ol8_baseos_latest`, and `ol8_appstream` repositories are enabled by default. You should disable `ol8_UEKR6` and then explicitly subscribe to the `ol8_UEKR7_RDMA` and `ol8_UEKR7_RDMA` repositories prior to installing RDMA packages.

For additional information about RDMA, including any known issues, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 7](#).

2

New Features and Changes

This chapter describes the new features, major enhancements, bug fixes, and other changes that are included in this release of Oracle Linux 8.

Installation

The following installation changes are introduced in Oracle Linux 8.6:

- **Image Builder includes capability to customize file system partition on LVM.** If you have more than one partition, this feature enhancement enables you to create images with a customized file system partition on LVM and then resize those partitions at runtime. To do so, you would specify a customized file system configuration in your blueprint and then create images with the desired disk layout. The default file system layout remains unchanged; also, if you use plain images without file system customization, the `root` partition is resized by `cloud-init`.

--secontext Option of strace Enhanced to Include Mismatch Parameter

For the Red Hat Compatible Kernel (`rhck`), the `--secontext` option of the `strace` utility has been enhanced to include a mismatch parameter. This parameter enables you to print the expected context, along with the actual context upon mismatch only. The output is separated by double exclamation marks (`!!`), with the actual context appearing first, followed by the expected context.

Software Management

The following software management features and enhancements are introduced in Oracle Linux 8.6:

- **New `modulesync` command for replacing certain workflows.** You cannot install modular packages in Oracle Linux 8.6 without modular metadata. In previous releases, you could use the `dnf` command to download packages, and then use the `createrepo_c` command to redistribute those packages. With this enhancement, the `modulesync` command is introduced. This command is used to ensure the presence of modular metadata, which ensures package installability. The command downloads `rpm` packages from modules and then creates a repository with modular metadata inside a working directory.
- **New `--path` option added to RPM.** In Oracle Linux 8.6, you can use the new `--path` option to query packages by specifying a file that is currently not installed. This option is similar to the existing `--file` option; however, the new option matches packages solely based on the provided path. Note that the file specified by that path does not need to exist on disk.

The `--path` option can be useful when you exclude all of the documentation files at installation time by specifying the `--nodocs` option with the `dnf` command. In this case, you can opt to use the `--path` option to display the owning package of such an excluded file. The `--file` option does not display the package because the requested file does not exist.

Shells and Command-Line Tools

The following shells and command-line interface (CLI) tools features and improvements are introduced in Oracle Linux 8.6:

- **lsupd package updated to version 1.7.13.** The `lsupd` package has been updated to version 1.7.13. This update provides some bug fixes and enhancements over the previous version.
- **net-snmp-cert gencert tool uses the SHA512 encryption algorithm instead of SHA1.** The `net-snmp-cert gencert` tool has been updated to generate certificates by using SHA512 encryption algorithm. This change provides for increased security.
- **dnn and text modules now available in the opencv package.** The `dnn` module that contains the Deep Neural Networks for image classification inference, as well as the `text` module that is used for scene text detection and recognition are now available in the `opencv` package.
- **opencryptoki package updated to version 3.17.0.** The `opencryptoki` package has been updated to version 3.17.0. This update provides some bug fixes and enhancements over the previous version.
- **Capability for excluding certain network interfaces and IP addresses when creating a rescue image.** The `EXCLUDE_IP_ADDRESSES` variable enables you to ignore certain IP addresses, and the `EXCLUDE_NETWORK_INTERFACES` variable enables you to ignore certain network interfaces when creating a rescue image.

Compilers and Development Toolsets

Oracle Linux 8.6 introduces the following features, enhancements, and changes to compilers and development toolsets.

- **Rust Toolset updated to version 1.58.1.** This version of the Rust Toolset includes the following changes:
 - Rust compiler support has been added for the 2021 edition of the language, featuring disjoint capture in closure, `IntoIterator` for arrays, a new Cargo feature resolver, as well as other changes.
 - Cargo support for new custom profiles has been added.
 - Cargo now deduplicates compiler errors.
 - New open range patterns have been added.
 - Captured identifiers in format strings have been added.
- **LLVM Toolset updated to version 13.0.1.** The LLVM Toolset has been updated to version 13.0.1. The following notable changes were made in this version of the tool:

- Clang support added for guaranteed tail calls with statement attributes in C++ and `attributemusttail` in C.
- Clang support added for the `-Wreserved-identifier` warning, which warns developers when using reserved identifiers in their code.
- The Clang `-Wshadow` flag now checks for shadowed structured bindings.
- The Clang `-Wextra` now implies `Wnull-pointer-subtraction`.
- **Location change for libffi's self-modifying code.** In this release, libffi's self-modifying code takes advantage of a feature in the Linux kernel for creating a suitable file that is independent of any other file system. As a result of this change, libffi's self-modifying code no longer depends on making part of the file system insecure.
- **Command for capturing glibc optimization data added.** You can use the new `ld.so --list-diagnostics` command to capture data that influences glibc optimization decisions, such as IFUNC selection and `glibc-hwcaps` configuration, in a single machine-readable file.
- **GCC Toolset updated to version 11.2.** The GCC Toolset has been updated to version 11.2. See [GCC Toolset 11.2](#) for more information about these changes.
- **UTF-8 `en_US@ampm` locale with 12-hour clock added.** In this release, you can use the new UTF-8 `en_US@ampm` locale with a 12-hour clock. You can also combine this new locale with other locales by specifying the `LC_TIME` environment variable.
- **GDB disassembler includes support for new arch14 instructions.** In this release, GDB is able to disassemble the new arch14 instructions.
- **PCP updated to version 5.3.5.** The Performance Co-Pilot (PCP) package (`pcp`) has been updated to version 5.3.5. Several notable improvements are included in this version of PCP, including the following:
 - New `pmieconf(1)` rules for CPU and disk saturation.
 - Improved stability and scalability for the `pmproxy(1)` service.
 - Improved service latency and robustness for the `pmlogger(1)` service.
 - Performance metrics related to electrical power added.
 - New features added to the `pcp-htop(1)` utility.
 - Nvidia GPU metrics updated.
 - Linux kernel KVM and networking metrics added.
 - New MongoDB metrics agent added.
 - New sockets metrics agent and `pcp-ss(1)` utility added.
 - The `pmcd(1)` and `pmproxy(1)` Avahi service advertising is disabled by default.
- **pcp-container package updated to version 5.3.5** The `pcp-container` package has been updated to version 5.3.5.
- **grafana package updated to version 7.5.11.** The `grafana` package has been updated to version 7.5.11. Notable changes include the additional of a new `prepare time series` transformation for backward compatibility of panels that do not support the new data frame format. Also, CVE-2021-43813 is resolved in this version of Grafana.
- **grafana-pcp package updated to version 3.2.0.** The `grafana-pcp` package has been updated to version 3.2.0. Notable improvements include the following:

- New MS SQL server dashboard for PCP Redis added.
- Visibility of empty histogram buckets in the PCP Vector eBPF/BCC Overview dashboard added.
- A bug fix for the `metric()` function of PCP Redis, where the function did not return all metric names.
- **js-d3-flame-graph updated to version 4.0.7.** The `js-d3-flame-graph` package has been updated to version 4.0.7. Notable changes include the addition of a new blue and green color scheme and added functionality for displaying flame graph context.

GCC Toolset 11.2

Oracle Linux 8.6 provides the GCC Toolset 11.2, which is an Application Stream that is distributed in the form of a Software Collection in the `AppStream` repository. The GCC Toolset is similar to the Oracle Linux Developer Toolset. See [Compilers and Development Toolsets](#) for additional information about changes to compilers and developer toolsets in this release.

GCC Toolset 11.2 is available as an Application Stream within the `AppStream` repository, in the form of a Software Collection.

To install this toolset, use the following command:

```
sudo dnf install gcc-toolset-11
```

If you previously installed this toolset, use the following command to upgrade to the latest version:

```
sudo dnf upgrade gcc-toolset-11
```

To run a tool from GCC Toolset 11, use the following command:

```
scl enable gcc-toolset-11 tool
```

The following command initiates a shell session, where tool versions from the GCC Toolset 11 take precedence over system versions of the same tools:

```
scl enable gcc-toolset-11 bash
```

Availability of the container-tools:4.0 stable stream in Oracle Linux 8.6

Oracle Linux 8.6 includes the `container-tools:4.0` stable stream.

Database

This release of Oracle Linux 8 ships with version 8.0 of the MySQL database software.

Dynamic Programming Languages, Web, and Database Servers

Oracle Linux 8.6 includes several feature changes and improvements for dynamic programming languages and web and database servers. Note that that this release also introduces several new and improved module streams:

- **php:8.0 module stream added.** The `php:8.0` module stream has been added in Oracle Linux 8.6. `php:8.0` provides several bug fixes and enhancements over the 7.4 version, including the following notable features:
 - New named arguments are order-independent and self-documented, and enable you to specify only required parameters.
 - New attributes enable you to use structured metadata with PHP's native syntax.
 - New union types enable you to use native union type declarations that are validated at runtime instead of PHPDoc annotations for a combination of types.
 - Internal functions now more consistently raise an Error exception instead of warnings if parameter validation fails.
 - The Just-In-Time compilation has improved the performance.
 - The `Xdebug` debugging and productivity extension for PHP have been updated to version 3. This version introduces major functionality and configuration changes over `Xdebug` version 2.

To install the `php:8.0` module stream:

```
sudo dnf module install php:8.0
```

If you previously installed `php:7.4`, you can switch to the latest version by running the following commands:

```
sudo dnf module reset php
sudo dnf module enable php:8.0
sudo dnf distro-sync
```

- **Perl updated to version 5.32.** Oracle Linux 8.6 provides Perl version 5.32. This version of Perl includes a number of bug fixes and enhancements over Perl version 5.30, which was distributed in Oracle Linux 8.3. Notable changes include the following:
 - Added support for unicode version 13.0 in Perl.
 - Enhancement to the `qr` quote-like operator.
 - `POSIX::mblen()`, `mbtowc`, and `wctomb` functions work on shift state locales and are thread-safe on C99 and higher compilers when executed on a platform that includes locale thread-safety. Also, the `length` parameters are now optional.
 - New experimental `isa` infix operator for testing whether a given object is an instance of a given class or a class that is derived from it.
 - Alpha assertions and scripts are no longer experimental.
 - Feature checks are faster.Perl capability for dumping compiled patterns before optimization.

If you previously installed `perl` version 5.30, you can switch to the latest version by running the following commands:

```
sudo dnf module reset perl
sudo dnf module enable perl:5.32
sudo dnf distro-sync
```

File Systems and Storage

Oracle Linux 8.6 provides the following file systems and storage features, enhancements, and changes:

- **Btrfs removed from RHCK.** The Btrfs file system is removed from RHCK in Oracle Linux 8. As such, you cannot create or mount Btrfs file systems when using this kernel. Also, note that any Btrfs user space packages that are provided are not supported with RHCK.

Note:

Support for the Btrfs file system is enabled in UEK R7 and UEK R6. Starting with Oracle Linux 8.3, you have the option to create a Btrfs root file system during an installation, as well as select Btrfs as the file system type when formatting devices. See [Oracle Linux 8: Installing Oracle Linux](#) for more information about this feature.

For more information about managing a Btrfs root file system, see [Oracle Linux 8: Managing Local File Systems](#).

For changes that have been made to Btrfs in UEK R6, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 6 Update 3 \(5.4.17-2136\)](#).

For changes to Btrfs in UEK R7, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 7 \(5.15.0-0.30\)](#).

- **OCFS2 removed from RHCK.** The Oracle Cluster File System version 2 (OCFS2) file system is removed from RHCK in Oracle Linux 8. As such, you cannot create or mount OCFS2 file systems when using this kernel. Also, any OCFS2 user space packages that are provided are not supported with RHCK.

Note:

OCFS2 is fully supported with UEK R6 and UEK R7 in Oracle Linux 8.6.

- **Samba utilities options renamed or removed in version 4.15.** In version 4.15 of Samba, some utilities have been improved to ensure a consistent command-line interface. These changes include several renamed and removed options. To avoid any issues after an update to version 4.15 of Samba, you should review any scripts that use Samba utilities, and update them accordingly.

The following is a summary of the Samba changes that are introduced in this release:

- Samba command-line utilities previously silently ignored unknown options, whereas now, these utilities consistently reject unknown options.

- Many command-line options have a corresponding `smb.conf` variable for controlling the default value. To identify whether a command-line option has an `smb.conf` variable name, see the associated manual pages for the specified utility.
- Samba utilities now log to standard error (`stderr`) by default. Use the `--debug-stdout` option to change this behavior.
- The `--client-protection=off|sign|encrypt` option has been added to the common parser.
- The following options have been renamed in all utilities:
 - * `--kerberos` renamed `--use-kerberos=required|desired|off`
 - * `--krb5-ccache` renamed `--use-krb5-ccache= CCACHE`
 - * `--scope` renamed `--netbios-scope= SCOPE`
 - * `--use-ccache` renamed `--use-winbind-ccache`
- The following options have been removed:
 - * `-e` and `--encrypt`
 - * `-C` removed from `-use-winbind-ccache`
 - * `-i` removed from `-netbios-scope`
 - * `-S` and `--signing`
- The following options have been removed (or renamed) from the utilities that are listed:
 - * `ndrdump: -l` no longer available for `--load-dso`
 - * `net: -l` no longer available for `--long`
 - * `sharesec: -V` no longer available for `--viewsddl`
 - * `smbcquotas: --user` renamed `--quota-user`
 - * `nmbd: --log-stdout` renamed `--debug-stdout`
 - * `smbd: --log-stdout` renamed `--debug-stdout`
 - * `winbindd: --log-stdout` renamed `--debug-stdout`

High Availability and Clusters

The following high availability and clustering features are included in Oracle Linux 8.6:

- **pcmk_delay_base parameter accepts different values for different modes.** You can now specify different values for different nodes when configuring a fence device by using the `pcmk_delay_base` parameter. This improvement enables a single fence device to be used in a two-node cluster, with a different delay for each node, which can prevent a situation where each node attempts to fence the other node at the same time.
- **Capability added for specifying automatic removal of location constraint following resource move.** A new `--autodelete` option has been added to the `pcs resource move` command. This option was previously only available as a Technology Preview, but it is now fully supported. When you specify this option, the location constraint that the command creates is automatically removed after the resource has been moved. When you use the `pcs resource move` command, it adds a constraint to the resource to prevent it from running on the node on which it is currently running.

- **Detailed Pacemaker status display for internal errors available.** If Pacemaker can not execute a resource or fence agent for some reason, such as when the agent is not installed or if there has been an internal timeout, the Pacemaker status displays now display a detailed exit reason for the internal error.
- **Support for special characters inside `pcmk_host_map` values added.** Support has been added to the `pcmk_host_map` property for special characters inside `pcmk_host_map` values by specifying a backslash (`\`) in front of the value. For example, to include a space in the host alias, you would specify `pcmk_host_map="node3:plug\ 1"`.
- **pcs support for OCF Resource Agent API 1.1 standard.** The `pcs` command now includes support for OCF 1.1 resource and STONITH agents. Note that an OCF 1.1 agent's metadata must comply with the OCF 1.1 schema. If an OCF 1.1 agent's metadata does not comply with the OCF 1.1 schema, the `pcs` considers the agent invalid and does not create or update a resource of the agent unless you also specify the `--force` option. The `pcsd` web interface and `pcs` commands for listing agents omit OCF 1.1 agents with invalid metadata from the listing.

An OCF agent that declares that it implements any OCF version other than 1.1, or does not declare a version at all, is validated against the OCF 1.0 schema. Validation issues are reported as warnings, but is not necessary to specify the `--force` option for those agents when creating or updating a resource of the agent.

Infrastructure Services

Oracle Linux 8.6 introduces several version updates to infrastructure and command-line tools, including the following features:

- **New `bind9.16` package version 9.16.23 introduced.** The `bind` component version 9.16.23 is introduced as alternative to version 9.11.36. This version includes several new features, as well as some removed features, including the following:
 - New Key and Signing Policy feature in DNSSEC.
 - New QNAME minimisation to improve privacy.
 - New `validate-except` feature added to Permanent.
 - Negative Trust Anchors to temporarily disable DNSSEC validation.
 - Response policy zones (RPZ) have been re-factored.
 - New naming conventions for zone types. The *primary* and *secondary* zone types are now used as synonyms for *master* and *slave*
 - New supplementary YAML output mode for the `dig`, `mdig`, and `delv` commands.
 - Functionality for `filter-aaaa` has been moved into separate `filter-a` and `filter-aaaa` plugins.
 - New zone type mirror support, per [RFC 8806](#).

The following features have been removed:

- The `dnssec-enabled` option is removed; DNSSEC is now enabled by default; the `dnssec-enabled` keywords are no longer accepted.

- The `lwresd` lightweight resolver daemon and the `liblwres` light resolver library have both been removed.
- **Bind component updated to version 9.11.36.** The `bind` component has been updated to version 9.11.36. This version provides some bug fixes and several enhancements, including the following:
 - The `lame-ttl` option has been improved for better security.
 - A multiple threads bug affecting RBTDB instances has been fixed and no longer results in assertion failure in `free_rbtodb()`.
 - ZONEMD RR type implementation updated to match RFC 8976.
 - Maximum supported number of NSEC3 iterations is reduced to 150; records with additional iterations are treated as insecure.
 - An invalid direction field in an LOC record has been fixed so that it no longer results in a failure.
- **nginx-mod-devel package added to nginx:1.20 module stream.** The `nginx-mod-devel` package has been added to the `nginx:1.20` module stream in this release. This package includes all of the necessary files for building external dynamic modules for `nginx`, which includes RPM macros and the `nginx` source code.

Networking

Oracle Linux 8.6 introduces the following networking features, enhancements, and changes:

- **CleanUpModulesOnExit firewalld global configuration option available.** This enhancement enables you to set the `CleanUpModulesOnExit` option to `no` to stop `firewalld` from unloading these kernel modules. Whereas, previously, when restarting or shutting down `firewalld`, it recursively unloaded kernel modules. As a result, other packages that were attempting to use these modules or dependent modules failed.
- **hostapd package added.** The `hostapd` package is available for installation in Oracle Linux 8.6. However note that support for `hostapd` is limited to setting up an Oracle Linux 8 host as an 802.1X authenticator on an Ethernet network *only*. Other scenarios, such as wireless access points or authenticators in wireless networks, are currently not supported.
- **NetworkManager updated to version 1.36.0.** `NetworkManager` has been upgraded to version 1.36.0. This version of `NetworkManager` includes several enhancements and bug fixes over the previous version, most notably the following:
 - Reworking of how layer 3 configurations are handled. This enhancement improves the stability, performance, and memory usage of `NetworkManager`.
 - The additional of the `blackhole`, `unreachable`, `prohibit` route types.
 - `NetworkManager` ignores routes managed by routing services.
 - Improvements to the Wi-Fi Protected Access version 3 (WPA3) network security by enabling the hash-to-element (H2E) method when generating simultaneous authentication of equals (SAE) password elements.
 - The service now correctly handles replies from DHCP servers that send duplicate address or mask options.
 - The ability to turn off MAC aging on bridges has been added.

- `NetworkManager` no longer listens for `netlink` events for the `qdiscs` and `filters` traffic control objects.
- Network bonds support for setting a queue ID for bond ports.
- **NetworkManager includes support for setting the number of receiving queueus (`rx_queue`) on OVS-DPDK interfaces.** You can use `NetworkManager` to configure the `n_rxq` setting of Open vSwitch (OVS) Data Plane Development Kit (DPDK) interfaces. Use the `ovs-dpdk.n-rxq` attribute in `NetworkManager` to set the number of receiving queues on OVS-DPDK interfaces.
- **nftables framework includes support for nft set elements with attached counters.** You can now configure the `nftables` framework by using the `nft` tool. The kernel enables this tool to count the network packets from a given source address with the statement `add @myset {ip saddr counter}`. In this release, you can count packets that match a specific criteria with a dynamic set and elements with attached counters.
- **Restoring large nftables sets requires less memory.** The `nftables` framework has been enhanced to require significantly less memory when restoring large sets. The algorithm that prepares the `netlink` message is also improved.

Security

Oracle Linux 8.6 introduces the following security features, enhancements, and changes:

- **Audit updated to version 3.0.7.** The `audit` packages have been updated in this release. The updated version of Audit includes several changes and improvements, including the following:
 - Added `sudoers` to Audit base rules. The `/etc/sudoers` and `etc/sudoers.d/` directories have been added to Audit base rules, for example, the Payment Card Industry Data Security Standard (PCI DSS) and the Operating Systems Protection Profile (OSPP). This improvement increases security by monitoring configuration changes in privileged areas such as `sudoers`.
 - Added the `--eoe-timeout` option to the `ausearch` command and its analogous `eoe_timeout` option to `auditd.conf` file, which impacts how `ausearch` parses co-located events. You can use these options to specify the end of the event timeout to avoid problems with parsing co-located events. The default value for the end of the event timeout is set to two seconds.
- **clevis-systemd no longer depends on nc.** In this release, the `clevis-systemd` package no longer depends on the `nc` package. This dependency did not work correctly when used with Extra Packages for Enterprise Linux (EPEL).
- **fapolicyd framework packages updated to version 1.1.** Several improvements have been made in this update release, including the ability to use the new `rules.d/` and `trust.d/` directories, the `fagenrules` script. In addition, some new options have been added to the `fapolicyd-cli` command.
- **libcap packages updated to version 2.48.** The `libcap` packages have been updated to version 2.48. This update provides some bug fixes and enhancements over the previous version.
- **Libreswan updated to version 4.5.** Libreswan has been updated to version 4.5. This update provides some bug fixes and enhancements over the previous

version, including added support for Internet Key Exchange version 2 (IKEv2) for Labeled IPsec and childless initiation of IKE Security Association (SA).

- **libseccomp packages updated to version 2.5.2.** The `libseccomp` packages have updated to version 2.5.2. This version provides several bug fixes and enhancements over the previous version.
- **Libssh updated to version 0.9.6.** The `libssh` package has been updated to version 0.9.6. In this version of Libssh, there are some bug fixes, and other enhancements, including the following:

Support added for multiple identity files, which are now processed from the bottom to the top, as listed in the `~/.ssh/config` file.

Parsing of sub-second times in SFTP is fixed.

A regression for the `ssh_channel_poll_timeout()` function, where it returned `SSH_AGAIN` unexpectedly, is fixed.

A possible heap-buffer overflow after a key re-exchange is fixed

- **Support for diffie-hellman-group14-sha256 provided in crypto policies.** In Oracle Linux 8.6, you can use the `diffie-hellman-group14-sha256` key exchange (KEX) algorithm for the `libssh` library in the Oracle Linux system-wide cryptographic policies. This release additionally provides parity with OpenSSH, which also supports the KEX algorithm; `libssh` has `diffie-hellman-group14-sha256` enabled by default, but you can disable it by using a custom crypto policy.
- **OpenSSH servers include support for drop-in configuration files.** Support for the `include` directive has been added to the `sshd_config` file, which means you can now include configuration files in another directory. This change makes it easier to apply system-specific configurations on OpenSSH servers by using automation tools, including the Ansible Engine. The new behavior is also more consistent with the capabilities of the `ssh_config` file. Also, drop-in configuration files provide for easier organization of different configuration files for different uses, for example, for filter incoming connections.
- **pcsc-lite packages have been updated to version 1.9.5.** The `pcsc-lite` packages have been updated to version 1.9.5. This version includes many enhancements and bug fixes over the previous version. Notable changes include fixes for memory leaks and concurrency problems, as well as the following:
 - The `pcscd` daemon no longer automatically exits after inactivity when started manually.
 - The `pcsc-spy` utility provides support for Python 3 and a new `--thread` option.
 - The `SCardEndTransaction()` function has been improved for better performance.
 - The `poll()` function replaces the `select()` function. This function allows for file descriptor numbers that are higher than `FD_SETSIZE`.
- **New `--checksum` option for verifying installed versions of SELinux policy modules.** You can use the new `--checksum` option of the `semodule` command to verify the versions of installed SELinux policy modules. Previously, there was no simple way to verify that the installed module is the same version as the module which was supposed to be installed.

You can use the new `semodule -l --checksum` command to receive a SHA256 hash for the specified module, enabling you to compare it with the checksum of the original file, which is faster than reinstalling modules.

- **SCAP rules include warning message to configure Audit log buffer for large systems.** SCAP rules now include a warning message to configure Audit log buffer for large systems. The `xccdf_org.ssgproject.content_rule_audit_basic_configuration` SCAP rule displays a performance warning that suggests that users of large systems (where the Audit log buffer that is configured by this rule) might be too small and can override the custom value. The new warning also describes the process for configuring a larger Audit log buffer. This improvement enables users of large systems to remain compliant and have their Audit log buffer set correctly.
- **SCAP Security Guide updated to version 0.1.60.** The SCAP Security Guide (SSG) packages have updated to version 0.1.60. Notable changes include the following:
 - The `xccdf_org.ssgproject.content_enable_fips_mode` rule checks only whether FIPS mode has been enabled properly. It does not guarantee, however, that system components have undergone FIPS certification.
- **SSG capability for scans and remediations that detect home directories and interactive users.** This enhancement adds OVAL checks and remediations that detect local interactive users in a system and their respective home directories. The SCAP Security Guide (SSG) suite can now safely check and remediate all related benchmark requirements, where previously, there was no robust solution for covering this gap by using the OVAL language.
- **OpenSCAP packages updated to version 1.3.6.** The OpenSCAP packages have been updated to version 1.3.6. This version of OpenSCAP provides numerous enhancements and bug fixes, most notably the following:
 - Capability for providing local copies of remote SCAP source data stream components by using the `--local-files` option has been added.
 - OpenSCAP accepts multiple `--rule` arguments on the command line for selecting multiple rules.
 - OpenSCAP allows the skipping of evaluation for some rules by using the `--skip-rule` option.
 - Restricting memory that is consumed by OpenSCAP probes can be accomplished by using the `OSCAP_PROBE_MEMORY_USAGE_RATIO` environment variable.
 - OpenSCAP adds support for the OSBuild Blueprint as a remediation type.
 - OpenSCAP includes the ability to consume local files instead of remote SCAP source data stream components in this release. You can now download and copy the remote SCAP source data stream components to the target system before performing the OpenSCAP scan and then provide them to OpenSCAP by specifying the `--local-files` option with the `oscap` command. In previous releases, you could not perform a complete evaluation of SCAP source data streams that contained remote components on systems without Internet access, which meant that OpenSCAP could not evaluate some of the rules in the data streams because the remote components had to be downloaded from the Internet.
- **SSG support for `/etc/security/faillock.conf` file added.** Support for the `/etc/security/faillock.conf` file has been added to SSG. This enhancement enables SSG to assess and remediate the `/etc/security/faillock.conf` file for the definition of `pam_faillock` settings. In addition, the `authselect` tool can be used to enable the `pam_faillock` module to ensure the integrity of `pam` files. This

change causes the assessment remediation of the `pam_faillock` module to be more aligned with the latest versions and best practices.

New `--estimate-only` Option for `sosreport update` Command

This `sos report update` command includes a new `--estimate-only` option that you can use to approximate the disk space required for collecting an `sos report` from an Oracle Linux 8 server. Running the `sos report --estimate-only` command executes a dry run of `sos report` and mimics all plugins consecutively, as well as estimates disk size. Note that because the final disk space estimation is approximate, it is recommended that you double the estimated value.

Windows Server 2022 Guest Support

This release includes support for using Windows Server 2022 as a guest operating system on KVM virtual machines (VMs).

Technology Preview

For the Red Hat Compatible Kernel in the current Oracle Linux 8 release, the following features are under technology preview:

kexec Fast Reboot

The `kexec fast reboot` feature is available as a technology preview feature in Oracle Linux 8. This feature significantly speeds up the boot process by enabling the kernel to boot directly into the second kernel without having to first pass through the Basic Input/Output System (BIOS). To use this feature, load the `kexec` module first, then reboot the system.

SGX Available

Software Guard Extensions (SGX) is an Intel technology for protecting software code and data from disclosure and modification. The Linux kernel partially supports SGX v1 and v1.5; version 1 enables platforms by using the Flexible Launch Control mechanism to use the SGX technology.

DAX File System Available

In this release, the DAX file system is available as a Technology Preview for the ext4 and XFS file systems. DAX enables an application to directly map persistent memory into its address space. The system must have some form of persistent memory available to use DAX. Persistent memory can be in the form of one or more Non-Volatile Dual In-line Memory Modules (NVDIMMs). In addition, a file system that supports DAX must be created on the NVDIMMs; the file system must be mounted with the `dax` mount option. Then, an `mmap` of a file on the `dax`-mounted file system results in a direct mapping of storage into the application's address space.

NVMe/TCP available

NVMe over Fabrics TCP host and the target drivers are included in RHCK as a technology preview in this release.

 **Note:**

Support for NVMe/TCP is already available in Unbreakable Enterprise Kernel Release 6.

3

Known Issues

This chapter lists known issues in the current Oracle Linux 8 release. The list covers issues that might affect both x86 and aarch64 platforms. In the list, additional issues that are specific only to aarch64 platforms are labeled `aarch64 only`.

The following guides provide additional information about known issues that related to specific Oracle Linux components:

- Podman container management tool: [Oracle Linux: Podman User's Guide](#)
- System and Oracle Cloud Infrastructure instance upgrade using Leapp: [Oracle Linux 8: Performing System Upgrades With Leapp](#)

Installation and Upgrade Issues

The following are known installation and upgrade issues for Oracle Linux 8.6.

Oracle Linux 8.5 systems with `libguestfs-benchmarking` and `lld-test` packages installed cannot be upgraded to Oracle Linux 8.6

The `libguestfs-benchmarking` and `lld-test` packages are not included in Oracle Linux 8.6. Consequently, if your Oracle Linux 8.5 system includes these packages, upgrading the system to Oracle Linux 8.6 fails.

To work around this issue, remove these packages from the system prior to upgrading to Oracle Linux 8.6. For example:

```
sudo dnf remove libguestfs-benchmarking lld-test
```

(Bug ID 34122488)

Messages referring to `tmpfiles.d/` files appear during upgrade

During an upgrade from Oracle Linux 8.5 to Oracle Linux 8.6, and with the appropriate Oracle Linux 8 repositories enabled, the `dnf upgrade` command displays messages similar to the following:

```
Running scriptlet: systemd-239-44.0.1.el8.x86_64
4550/4550
[/usr/lib/tmpfiles.d/dnssec-trigger.conf:1] Line references path below legacy
directory /var/run/, updating /var/run/dnssec-trigger → /run/dnssec-trigger;
please update the tmpfiles.d/ drop-in file accordingly.
[/usr/lib/tmpfiles.d/krb5-krb5kdc.conf:1] Line references path below legacy
directory /var/run/, updating /var/run/krb5kdc → /run/krb5kdc; please update
the tmpfiles.d/ drop-in file accordingly.
[/usr/lib/tmpfiles.d/nss-pam-ldapd.conf:2] Line references path below legacy
directory /var/run/, updating /var/run/nslcd → /run/nslcd; please update the
tmpfiles.d/ drop-in file accordingly.
[/usr/lib/tmpfiles.d/pesign.conf:1] Line references path below legacy
```

```
directory /var/run/, updating /var/run/pesign → /run/pesign; please update
the tmpfiles.d/ drop-in file accordingly.
[/usr/lib/tmpfiles.d/portreserve.conf:1] Line references path below legacy
directory /var/run/, updating /var/run/portreserve → /run/portreserve; please
update the tmpfiles.d/ drop-in file accordingly.
.
.
.
```

These messages can be safely ignored, as the upgrade or package installation completes successfully.

As an alternative workaround, update the configuration by following the instructions in the message. Change the legacy `var/run/<...>` directory path to `/run/<...>`.

(Bug ID 32852433)

Installer automatically enables Ethernet over USB network interface during a PXE installation

During a Preboot Execution Environment (PXE) installation of Oracle Linux 8, the installer automatically enables the Ethernet over USB network interface with the `bootproto=dhcp` and `ONBOOT=yes` parameters. These default settings causes the `NetworkManager` service to fail to start.

To prevent this issue from occurring, or to resolve the issue if you have already encountered it, use one of the following workarounds:

- Prior to installation, disable the `ONBOOT` parameter for the Ethernet over USB network interface in the kickstart file, as follows:

```
network --bootproto=dhcp --device=enp0s20f0u8u3c2 --onboot=off --ipv6=auto
```
- During installation, on the Network & Host Name screen, do not select the **Connect automatically with priority** check box to connect automatically on every reboot for the Ethernet over USB network interface.
- If you have already encountered this issue, then after the installation, change the network configuration setting for the Ethernet over USB network interface to `ONBOOT=no`. Then reboot the system.

(Bug ID 31888490)

Interactive text-based installation wizard unable to complete when an alternate language is selected

If you selected an alternate language while using the text-based installer to install the OS, you cannot proceed with the installation. The installation is blocked with [!] flags for **Software Selection** and **Installation Destination** regardless of what you have set for these two options.

However, this issue does not occur if you are performing an installation by using the default English language selection or by using the graphical installation program.

(Bug IDs 30535416, 29648703)

Graphical installation program fails to produce error when an unacceptable Kdump value is entered

A minor upstream usability error affects the graphical installation program during the configuration of Kdump.

If you specify an unacceptable value when manually configuring the Kdump memory reservation, you can click *Done* to return to the Installation Summary screen. The installer does not generate a warning or error message. Instead, the installer automatically resets the value either to the last known acceptable value or the default value of 512 MB, which enables the installation to succeed. However, because this corrected setting is not displayed on the screen, you might not become aware that your specified value was ignored.

This issue does not occur with the text-based installer, which correctly returns an error if you enter an unacceptable value and prevents you from continuing.

(Bug IDs 31133351, 31182708)

Graphical installation program does not display the reserved memory that is manually set for Kdump

A minor usability error affects the graphical installation program during the configuration of Kdump. If you manually change the default memory size that is reserved for Kdump, the new setting is not displayed when the screen is refreshed. Instead, only the values for the total system memory and usable system memory are displayed. Consequently, the limits for the parameter "Memory to be reserved (Mb)" become unknown for future Kdump configuration.



Note:

The default setting `auto` for Kdump memory reservation is adequate as the kernel determines what size to use when it boots

(Bug IDs 31133287 and 31182699)

Scriptlet-related error for `microcode_ctl` might be displayed during upgrade

A scriptlet-related error message might be displayed during an upgrade of an Oracle Linux 8 release to its next version. When you run the `dnf update` command, an output similar to the following might appear:

```
Running scriptlet: tuned-2.13.0-6.0.2.el8.noarch
1089/1089
Running scriptlet: microcode_ctl-4:20191115-4.el8.x86_64
1089/1089
realpath: weak-updates/kmod-kvdo/vdo/kvdo.ko: No such file or directory
realpath: weak-updates/kmod-kvdo/uds/uds.ko: No such file or directory
dracut: installkernel failed in module kernel-modules-extra
warning: %posttrans(microcode_ctl-4:20191115-4.el8.x86_64) scriptlet failed,
exit status 1

Error in POSTTRANS scriptlet in rpm package microcode_ctl
```

```
Running scriptlet: libgcc-8.3.1-4.5.0.7.el8.x86_64
1089/1089
Running scriptlet: glibc-common-2.28-101.0.1.el8.x86_64
1089/1089
Running scriptlet: info-6.5-6.el8.x86_64
1089/1089
```

This error message is displayed if you use the Server with GUI environment to install Oracle Linux 8 and then you reboot the server by using RHCK. This installation method installs the kernel dependent, `kmod-kvdo` package or module, which is a different version in the previous Oracle Linux 8 release.

However, you can safely ignore the message because the `kmod-kvdo` package is successfully installed during the upgrade process.

**Note:**

This error does not occur if you install the Minimal Install base environment or if you boot the server with UEK R6 or UEK R7.

(Bug ID 31292199)

`rhncfgd` register command might fail if `python3-rhn-virtualization-hosts` package is installed

Beginning with Oracle Linux 8.1, using the `rhncfgd` command to register a system with the Unbreakable Linux Network (ULN) might fail if the `python3-rhn-virtualization-hosts` package is installed on the system. This issue has been observed when the `libvirtd` service is not running.

To work around this issue, ensure that the `libvirtd` packages are installed on your system and that the service is enabled and running prior to issuing the `rhncfgd` command.

(Bug ID 30366521)

Package conflict between `usbguard-1.0.0-2.el8.i686` and `usbguard-1.0.0-8.el8.x86_64` on Oracle Linux 8 upgrades

Beginning with Oracle Linux 8.5, when you upgrade Oracle Linux 8 with both the `ol8_baseos_latest` and `ol8_appstream` yum repositories enabled, a conflict between the `usbguard-1.0.0-2.el8.i686` and `usbguard-1.0.0-8.el8.x86_64` packages occurs.

The following error is produced:

```
Problem: package usbguard-1.0.0-8.el8.x86_64 conflicts with usbguard
provided by usbguard-1.0.0-2.el8.i686
- cannot install the best candidate for the job
- problem with installed package usbguard-1.0.0-2.el8.i686
(try to add '--allowerase' to command line to replace conflicting packages
```

or `'--skip-broken'` to skip uninstalleable packages or `'--nobest'` to use not only best candidate packages)

This conflict occurs because in Oracle Linux 8.6 and later releases, the `usbguard-1.0.0-2.el8.i686` and the `usbguard-1.0.0-8.el8.x86_64` packages conflict with each other and could no longer be installed together, unlike in previous Oracle Linux 8 releases.

To work around this issue, remove the `usbguard-1.0.0-2.el8.i686` package from your Oracle Linux 8 system prior to upgrading to the current release.

(Bug ID 34097708)

Presence of beignet package could result in dependency issue during an upgrade

While upgrading a system to the current Oracle Linux 8 release, you might encounter a dependency issue if the `beignet` package exists on the system to be upgraded.

This issue exists specifically in cases where you upgrade systems running Oracle Linux 8.2 or earlier releases to the current Oracle Linux version. In these earlier releases, the `beignet` package requires earlier versions of the `clang-libs` package.

However, the `beignet` package is currently not available for Oracle Linux 8.4 and later Oracle Linux 8 releases. Therefore, the issue does not exist for these cases.

To work around this issue, remove the `beignet` package from the system prior to upgrading to the current Oracle Linux 8 release.

(Bug ID 31213935)

ULN registration wizard not displayed on first boot after an installation

On new installations of Oracle Linux 8, the ULN registration wizard that presents the options to register with ULN and to use Oracle Ksplice is not displayed on first boot.

As an alternative, you can register with ULN after the installation completes. For instructions, see <https://linux.oracle.com/>.

(Bug ID 29933974)

Graphics controller requirements for an installation on an Oracle VM VirtualBox guest

To successfully install Oracle Linux 8 on an Oracle VM VirtualBox guest, where the graphical installation program is used and the default `Server with GUI` environment is selected, you must set the guest to use the `VMSVGA` graphics controller and configure the guest with at least 64MB of memory. Otherwise, the graphical display is unable to start correctly.

Beginning with Oracle VM VirtualBox 6.0, the `VMSVGA` graphics controller is the default controller for guests running Linux operating systems. This issue is more likely to appear if install Oracle Linux 8 on an existing guest that was created on an earlier Oracle VM VirtualBox release. To configure Oracle Linux 8 guests, Oracle recommends that you use Oracle VM VirtualBox 6.0 or later.

(Bug ID 30004543)

aarch64 only: Installer displays error: 'Failed to set new efi boot target' on systems with a multipath-enabled NVMe controller"

The Oracle Linux 8.6 installer displays the following error on aarch64 systems that have a multipath-enabled NVMe controller:

```
Failed to set new efi boot target . This is most likely a kernel or firmware bug.
```

To work around this issue, disable native multipath support for the installation at boot time by adding the `nvme_core.multipath=N` command-line argument on the target system.

(Bug IDs 34215333, 31758304)

Removing container-selinux package might also remove the selinux-policy-targeted package

If you remove the `container-selinux` package from the system after installing the current Oracle Linux 8 release, the `selinux-policy-targeted` package might also be removed.

When this problem occurs, you might also see an error message about being unable to load SELinux policy.

To avoid this issue, use the following syntax with the `dnf remove` command:

```
sudo dnf remove container-selinux --setopt=exclude=selinux-policy-targeted
```

(Bug ID 32860334)

Running `dnf update glusterfs-*` command fails to upgrade previously installed packages

If `glusterfs-*.i686` packages exist on an Oracle Linux 8 system which you then upgrade to the next update version, running the `dnf update glusterfs*` command later fails to upgrade GlusterFS packages.

As a workaround, first remove the `glusterfs-*.i686` packages from the system, and then run the `dnf update glusterfs*` command.

(Bug ID 30279840)

Updating `libss` package might fail if `libss-devel` package is installed

The `libss` package might fail to update if the `libss-devel` package is installed on the system.

This issue persists if UEK R6 is enabled. However, after updating the kernel and enabling UEK R7, the issue is no longer encountered.

To work around this issue, first remove the `libss-devel` package from the system. Then, install the corresponding version of this package from the Oracle Linux 8 Distro Builder developer repository (`ol8_distro_builder`). For example, you can run the following command:

```
sudo dnf --enablerepo=ol8_distro_builder install libss-devel
```

Note:

The `ol8_distro_builder` repository is an unsupported developer repository. You should only enable it for this particular installation action, rather than enabling it globally.

(Bug ID 32005190)

Options for configuring disk cache characteristics during VM creation unavailable in web console

Some options for configuring disk cache characteristics in the web console are currently not available when you are creating a new VM or before the installation starts. For disks that are already added to a VM or when adding a new disk to an already running system, these configuration options are available in the web console.

As an alternative solution, and before the installation begins, use the `virt-manager` CLI or a similar CLI to configure disk cache characteristics for a newly added disk as well for disks that already exist in the VM.

Oracle recommends that you should use Oracle Linux Virtualization Manager for more complex virtualization requirements. For more information, see <https://docs.oracle.com/en/virtualization/oracle-linux-virtualization-manager/>.

(Bug ID 30301271)

ACPI error messages displayed on Dell EMC PowerEdge Server during boot

During a system boot of an Intel-based Dell EMC PowerEdge Server, error messages similar to the following might be displayed if the Dell Active Power Controller (DAPC) setting is enabled in the BIOS:

```
kernel: ACPI Error: No handler for Region [SYSI] (0000000061df8ef3) [IPMI] (20190816/evregion-132)
kernel: ACPI Error: Region IPMI (ID=7) has no handler (20190816/exfldio-265)
kernel: ACPI Error: Aborting method \_SB.PMI0._GHL due to previous error (AE_NOT_EXIST) (20190816/psparse-531)
kernel: ACPI Error: Aborting method \_SB.PMI0._PMC due to previous error (AE_NOT_EXIST) (20190816/psparse-531)
kernel: ACPI Error: AE_NOT_EXIST, Evaluating _PMC (20190816/power_meter-743)
```

To work around this issue, disable the `acpi_power_meter` kernel module as follows:

```
echo "blacklist acpi_power_meter" >> /etc/modprobe.d/hwmon.conf
```

After disabling the `acpi_power_meter` kernel module, reboot the system for the change to take effect.

For environments that do not require the DAPC feature, as an alternative workaround, you can disable the DAPC BIOS setting.

(Bug ID 32105233)

Oracle Linux 8 does not recognize SAS controllers on older Oracle Sun hardware

The Oracle Linux 8 installer does not recognize some Serial Attached SCSI (SAS) controllers that are found in older Oracle Sun server models. If you attempt to install Oracle Linux 8 on these server models, the installer does not recognize the local disk and the installation fails. Examples of these server models include, but are not limited to, the following: Oracle Sun Fire X4170 M2 Server, Oracle Sun Fire X4170 M3 Server, Oracle Sun OVCA X3-2 Server, and the Oracle Sun X4-2 Server.

The following SAS controllers are removed from the `mpt2sas` driver in RHCK:

- SAS2004, PCI ID 0x1000:0x0070
- SAS2008, PCI ID 0x1000:0x0072
- SAS2108_1, PCI ID 0x1000:0x0074
- SAS2108_2, PCI ID 0x1000:0x0076
- SAS2108_3, PCI ID 0x1000:0x0077
- SAS2116_1, PCI ID 0x1000:0x0064
- SAS2116_2, PCI ID 0x1000:0x0065
- SSS6200, PCI ID 0x1000:0x007E

The following SAS controllers are removed from the `megaraid_sas` driver in RHCK:

- Dell PERC5, PCI ID 0x1028:0x15
- SAS1078R, PCI ID 0x1000:0x60
- SAS1078DE, PCI ID 0x1000:0x7C
- SAS1064R, PCI ID 0x1000:0x411
- VERDE_ZCR, PCI ID 0x1000:0x413
- SAS1078GEN2, PCI ID 0x1000:0x78
- SAS0079GEN2, PCI ID 0x1000:0x79
- SAS0073SKINNY, PCI ID 0x1000:0x73
- SAS0071SKINNY, PCI ID 0x1000:0x71

The workaround for this issue is to use the Unbreakable Enterprise Kernel Release 6 (UEK R6) boot ISO, and then run UEK R6 with Oracle Linux 8, as these controllers are supported in the Unbreakable Enterprise Kernel release.

(Bug ID 29120478)

File System Issues

The following are known file systems issues that have been encountered in this release of Oracle Linux 8.

Btrfs file system not supported on RHCK

The Btrfs file system is removed from RHCK in Oracle Linux 8, which means you cannot create or mount this file system when using this kernel. Also, any Btrfs user space packages that are provided are not supported with RHCK.

Support for the Btrfs file system is enabled in UEK R7 and UEK R6. Starting with Oracle Linux 8.3, during an installation, you have the option to create a Btrfs root file system, as well as select Btrfs as the file system type when formatting devices.

For further details about these changes, see the following documentation:

- For information about creating a Btrfs root file system during an installation, see [Oracle Linux 8: Installing Oracle Linux](#).
- For information about managing the Btrfs file system, see [Oracle Linux 8: Managing Local File Systems](#).
- For the latest information about other enhancements that have been made to Btrfs in UEK R6, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 6 Update 3 \(5.4.17-2136\)](#).

For information about UEK R7, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 7 \(5.15.0-0.30\)](#).

OCFS2 file system not supported on RHCK

The OCFS2 file system is removed from RHCK in Oracle Linux 8, which means you cannot create or mount this file system when using this kernel. Also, OCFS2 user space packages that are provided are not supported with RHCK.

Note that support for OCFS2 file systems is enabled in UEK R7 and UEK R6. For the latest information and other enhancements that have been made to OCFS2 in UEK R6, see [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 6 Update 3 \(5.4.17-2136\)](#). See also [Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 7 \(5.15.0-0.30\)](#).

ext4: Frequent or repeated system shutdowns can cause file system corruption

If a system that is using the `ext4` file system is repeatedly or frequently shut down, the file system might become corrupted. This issue is difficult to replicate and is therefore considered to be a corner-case issue. The issue exists in the upstream code and proposed patches are currently under review.

(Bug ID 27547113)

Kernel Issues

The following are known kernel issues that have been encountered in this release of Oracle Linux 8.

KVM guests boot with "amd64_edac_mod: Unknown symbol" errors on AMD 64-bit platforms

The following errors might be displayed repeatedly when KVM guests are booting on 64-bit AMD hosts:

```
[ 12.474069] amd64_edac_mod: Unknown symbol amd_register_ecc_decoder (err
[ 120)
[ 12.474083] amd64_edac_mod: Unknown symbol amd_report_gart_errors (err 0)
[ 12.852250] amd64_edac_mod: Unknown symbol amd_unregister_ecc_decoder (err 0)
[ 12.852297] amd64_edac_mod: Unknown symbol amd_register_ecc_decoder (err 0)
.
.
.
```

These errors occur because the module code for the kernel erroneously returns `-EEXIST` for modules that failed to load and are in the process of being removed from the module list. The `amd64_edac_mod` module will not be loaded in a VM. These errors can be ignored, as they do not impact functionality in any way.

This issue occurs on Oracle Linux 8 hosts that are running RHCK *only* and is not encountered on UEK R6 hosts.

(Bug ID 29853602)

Output of modinfo command does not show Retpoline support

A bug in the Oracle Linux 8 code causes Retpoline support to not be displayed in the output of the `modinfo -F retpoline` command, even though the `CONFIG_RETPOLINE` flag is set to `Y`, for example:

```
sudo modinfo -F retpoline
/usr/lib/modules/4.18.0-80.el8.x86_64/kernel/sound/usb/usx2y/snd-usb-us1221.ko
.xz
```

The `CONFIG_RETPOLINE=Y` flag is still required to add and display Retpoline support. If the parameter is enabled, the kernel builds with a retpoline capable compiler.

To confirm that the `CONFIG_RETPOLINE` flag is enabled, search for the parameter in the kernel's `config-kernel` configuration file, for example:

```
cat /boot/config-5.4.17-2011.7.4.el8uek.x86_64 | grep RETPOLINE.

CONFIG_RETPOLINE=y
```

(Bug ID 29894295)

Kdump might fail on some AMD hardware

Kdump might fail on some AMD hardware that is running the current Oracle Linux release. Impacted hardware includes the AMD EPYC CPU servers.

To work around this issue, modify the `/etc/sysconfig/kdump` configuration file and remove the `iommu=off` command-line option from the `KDUMP_COMMANDLINE_APPEND` variable. Restart the `kdump` service for the changes to take effect.

(Bug ID 31274238, 34034614, 34211826)

Limitations of the LVM dm-writecache caching method

The new LVM `dm-writecache` caching method has certain limitations that do not exist with the `dm-cache` method, including the following:

- Cannot attach or detach `dm-writecache` when a logical volume is active.
- Cannot take a snapshot of a logical volume when the logical volume is using `dm-writecache`.
- Must use a `dm-writecache` block size that matches the existing file system block size when attaching `dm-writecache` to an inactive logical volume.
- Cannot resize a logical volume when `dm-writecache` is attached to the volume.
- Cannot use `pvmove` commands on devices that are used with `dm-writecache`.
- Cannot use logical volumes with `dm-writecache` when using thin pools or the virtual data optimizer (VDO).

For more information about the `dm-writecache` caching method, see the File Systems and Storage features section of [Oracle Linux 8: Release Notes for Oracle Linux 8.2](#). See also the `lvmcache(7)` manual page.

Error: "mcelog service does not support this processor"

An error indicating that the `mcelog` service does not support the processor can appear in the system log on systems with AMD processors, such as some Oracle Server hardware. The message might be displayed as follows:

```
mcelog: ERROR: AMD Processor family
23: mcelog does not support this processor. Please use the edac_mce_amd
module instead.
```

The `mcelog` daemon is a service that is used on `x86_64` platforms to log and handle hardware error messaging. On AMD systems, the `edac_mce_amd` kernel module handles machine exception logging. Therefore, AMD systems do not require the `mcelog` daemon. This error should be downgraded to a warning.

(Bug ID 29501190)

Power button defaults to ACPI Suspend mode

By default, the Oracle Linux 8 graphical user interface (GUI) console mode treats the hardware power button as the equivalent of the ACPI "Sleep" button, which puts the system into low-power sleep mode. This behavior is specific to the GNOME desktop environment.

In previous Oracle Linux releases, the hardware power button initiated a system shutdown. To ensure that Oracle Linux 8 behaves the same way, do the following:

1. Create a file named `/etc/dconf/db/local.d/01-shutdown-button-action` with following content:

```
[org/gnome/settings-daemon/plugins/power]
power-button-action='interactive'
```

2. Create a file named `/etc/dconf/db/local.d/locks/01-power` with the following content:

```
/org/gnome/settings-daemon/plugins/power/power-button-action
```

3. Run the following command:

```
sudo dconf update
```

4. Log out of the desktop environment and then log back in for the new settings to take effect.

(Bug ID 25597898)

Podman Issues

For information about known issues with the Podman container management tool in Oracle Linux 8, refer to Known Issues chapter of the [Oracle Linux: Podman User's Guide](#).

4

Package Changes from the Upstream Release

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

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 [Changes to Source Packages](#).

Added Binary Packages for BaseOS by Oracle

The following binary packages have been added to BaseOS by Oracle:

- bcache-tools
- btrfs-progs
- dtrace
- iwlax2xx-firmware
- kernel-uek
- kernel-uek-debug
- kernel-uek-debug-devel
- kernel-uek-devel
- kernel-uek-doc
- linux-firmware-core
- NetworkManager-config-connectivity-oracle
- ocfs2-tools
- oracle-backgrounds
- oraclelinux-release
- oraclelinux-release-el8
- oracle-logos
- oracle-logos-httpd
- oracle-logos-ipa

Added Binary Packages for AppStream by Oracle

The following binary packages have been added to AppStream by Oracle:

- `dtrace-devel`
- `dtrace-testsuite`
- `libblockdev-btrfs`
- `oracle-database-preinstall-21c`
- `python3-dnf-plugin-ulninfo`

Added Binary Packages for CodeReady Linux Builder by Oracle

The following binary packages have been added to CodeReady Linux Builder by Oracle:

- `dotnet5.0-build-reference-packages`
- `dotnet-sdk-3.1-source-built-artifacts`
- `dotnet-sdk-5.0-source-built-artifacts`
- `ibus-typing-booster-tests`
- `java-11-openjdk-demo-fastdebug`
- `java-11-openjdk-demo-slowdebug`
- `java-11-openjdk-devel-fastdebug`
- `java-11-openjdk-devel-slowdebug`
- `java-11-openjdk-fastdebug`
- `java-11-openjdk-headless-fastdebug`
- `java-11-openjdk-headless-slowdebug`
- `java-11-openjdk-jmods-fastdebug`
- `java-11-openjdk-jmods-slowdebug`
- `java-11-openjdk-slowdebug`
- `java-11-openjdk-src-fastdebug`
- `java-11-openjdk-src-slowdebug`
- `java-11-openjdk-static-libs-fastdebug`
- `java-11-openjdk-static-libs-slowdebug`
- `java-17-openjdk-demo-fastdebug`
- `java-17-openjdk-devel-fastdebug`
- `java-17-openjdk-fastdebug`
- `java-17-openjdk-headless-fastdebug`
- `java-17-openjdk-jmods-fastdebug`

- java-17-openjdk-src-fastdebug
- java-17-openjdk-static-libs-fastdebug
- java-1.8.0-openjdk-accessibility-fastdebug
- java-1.8.0-openjdk-accessibility-slowdebug
- java-1.8.0-openjdk-demo-fastdebug
- java-1.8.0-openjdk-demo-slowdebug
- java-1.8.0-openjdk-devel-fastdebug
- java-1.8.0-openjdk-devel-slowdebug
- java-1.8.0-openjdk-fastdebug
- java-1.8.0-openjdk-headless-fastdebug
- java-1.8.0-openjdk-headless-slowdebug
- java-1.8.0-openjdk-slowdebug
- java-1.8.0-openjdk-src-fastdebug
- java-1.8.0-openjdk-src-slowdebug
- leptonica
- libcomps-devel
- libdnf-devel
- libfdt
- libmpc-devel
- libpciaccess-devel
- librepo-devel
- librhsm-devel
- libsolv-devel
- libsolv-tools
- qemu-kvm-tests
- shim-unsigned-ia32

Modified BaseOS Binary Packages

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

- autofs
- binutils
- boom-boot
- boom-boot-conf
- boom-boot-grub2
- chkconfig

- chrony
- cockpit
- cockpit-bridge
- cockpit-doc
- cockpit-system
- cockpit-ws
- coreutils
- coreutils-common
- coreutils-single
- dbus
- dbus-common
- dbus-daemon
- dbus-libs
- dbus-tools
- dbxtool
- dnf
- dnf-automatic
- dnf-data
- dnf-plugins-core
- dracut
- dracut-caps
- dracut-config-generic
- dracut-config-rescue
- dracut-live
- dracut-network
- dracut-squash
- dracut-tools
- efibootmgr
- efi-filesystem
- expat
- expat-devel
- firewalld
- firewalld-filesystem
- fuse
- fuse3

- fuse3-devel
- fuse3-libs
- fuse-common
- fuse-devel
- fuse-libs
- fwupd
- fwupdate
- fwupdate-efi
- fwupdate-libs
- glibc
- glibc-all-langpacks
- glibc-common
- glibc-devel
- glibc-headers
- glibc-langpack-aa
- glibc-langpack-af
- glibc-langpack-agr
- glibc-langpack-ak
- glibc-langpack-am
- glibc-langpack-an
- glibc-langpack-anp
- glibc-langpack-ar
- glibc-langpack-as
- glibc-langpack-ast
- glibc-langpack-ayc
- glibc-langpack-az
- glibc-langpack-be
- glibc-langpack-bem
- glibc-langpack-ber
- glibc-langpack-bg
- glibc-langpack-bhb
- glibc-langpack-bho
- glibc-langpack-bi
- glibc-langpack-bn
- glibc-langpack-bo

- glibc-langpack-br
- glibc-langpack-brx
- glibc-langpack-bs
- glibc-langpack-byn
- glibc-langpack-ca
- glibc-langpack-ce
- glibc-langpack-chr
- glibc-langpack-cmn
- glibc-langpack-crh
- glibc-langpack-cs
- glibc-langpack-csb
- glibc-langpack-cv
- glibc-langpack-cy
- glibc-langpack-da
- glibc-langpack-de
- glibc-langpack-doi
- glibc-langpack-dsb
- glibc-langpack-dv
- glibc-langpack-dz
- glibc-langpack-el
- glibc-langpack-en
- glibc-langpack-eo
- glibc-langpack-es
- glibc-langpack-et
- glibc-langpack-eu
- glibc-langpack-fa
- glibc-langpack-ff
- glibc-langpack-fi
- glibc-langpack-fil
- glibc-langpack-fo
- glibc-langpack-fr
- glibc-langpack-fur
- glibc-langpack-fy
- glibc-langpack-ga
- glibc-langpack-gd

- glibc-langpack-gez
- glibc-langpack-gl
- glibc-langpack-gu
- glibc-langpack-gv
- glibc-langpack-ha
- glibc-langpack-hak
- glibc-langpack-he
- glibc-langpack-hi
- glibc-langpack-hif
- glibc-langpack-hne
- glibc-langpack-hr
- glibc-langpack-hsb
- glibc-langpack-ht
- glibc-langpack-hu
- glibc-langpack-hy
- glibc-langpack-ia
- glibc-langpack-id
- glibc-langpack-ig
- glibc-langpack-ik
- glibc-langpack-is
- glibc-langpack-it
- glibc-langpack-iu
- glibc-langpack-ja
- glibc-langpack-ka
- glibc-langpack-kab
- glibc-langpack-kk
- glibc-langpack-kl
- glibc-langpack-km
- glibc-langpack-kn
- glibc-langpack-ko
- glibc-langpack-kok
- glibc-langpack-ks
- glibc-langpack-ku
- glibc-langpack-kw
- glibc-langpack-ky

- glibc-langpack-lb
- glibc-langpack-lg
- glibc-langpack-li
- glibc-langpack-lij
- glibc-langpack-ln
- glibc-langpack-lo
- glibc-langpack-lt
- glibc-langpack-lv
- glibc-langpack-lzh
- glibc-langpack-mag
- glibc-langpack-mai
- glibc-langpack-mfe
- glibc-langpack-mg
- glibc-langpack-mhr
- glibc-langpack-mi
- glibc-langpack-miq
- glibc-langpack-mjw
- glibc-langpack-mk
- glibc-langpack-ml
- glibc-langpack-mn
- glibc-langpack-mni
- glibc-langpack-mr
- glibc-langpack-ms
- glibc-langpack-mt
- glibc-langpack-my
- glibc-langpack-nan
- glibc-langpack-nb
- glibc-langpack-nds
- glibc-langpack-ne
- glibc-langpack-nhn
- glibc-langpack-niu
- glibc-langpack-nl
- glibc-langpack-nn
- glibc-langpack-nr
- glibc-langpack-nso

- glibc-langpack-oc
- glibc-langpack-om
- glibc-langpack-or
- glibc-langpack-os
- glibc-langpack-pa
- glibc-langpack-pap
- glibc-langpack-pl
- glibc-langpack-ps
- glibc-langpack-pt
- glibc-langpack-quz
- glibc-langpack-raj
- glibc-langpack-ro
- glibc-langpack-ru
- glibc-langpack-rw
- glibc-langpack-sa
- glibc-langpack-sah
- glibc-langpack-sat
- glibc-langpack-sc
- glibc-langpack-sd
- glibc-langpack-se
- glibc-langpack-sgs
- glibc-langpack-shn
- glibc-langpack-shs
- glibc-langpack-si
- glibc-langpack-sid
- glibc-langpack-sk
- glibc-langpack-sl
- glibc-langpack-sm
- glibc-langpack-so
- glibc-langpack-sq
- glibc-langpack-sr
- glibc-langpack-ss
- glibc-langpack-st
- glibc-langpack-sv
- glibc-langpack-sw

- glibc-langpack-szl
- glibc-langpack-ta
- glibc-langpack-tcy
- glibc-langpack-te
- glibc-langpack-tg
- glibc-langpack-th
- glibc-langpack-the
- glibc-langpack-ti
- glibc-langpack-tig
- glibc-langpack-tk
- glibc-langpack-tl
- glibc-langpack-tn
- glibc-langpack-to
- glibc-langpack-tpi
- glibc-langpack-tr
- glibc-langpack-ts
- glibc-langpack-tt
- glibc-langpack-ug
- glibc-langpack-uk
- glibc-langpack-unm
- glibc-langpack-ur
- glibc-langpack-uz
- glibc-langpack-ve
- glibc-langpack-vi
- glibc-langpack-wa
- glibc-langpack-wae
- glibc-langpack-wal
- glibc-langpack-wo
- glibc-langpack-xh
- glibc-langpack-yi
- glibc-langpack-yo
- glibc-langpack-yue
- glibc-langpack-yuw
- glibc-langpack-zh
- glibc-langpack-zu

- glibc-locale-source
- glibc-minimal-langpack
- grub2-common
- grub2-efi-aa64-modules
- grub2-efi-ia32
- grub2-efi-ia32-cdboot
- grub2-efi-ia32-modules
- grub2-efi-x64
- grub2-efi-x64-cdboot
- grub2-efi-x64-modules
- grub2-pc
- grub2-pc-modules
- grub2-tools
- grub2-tools-efi
- grub2-tools-extra
- grub2-tools-minimal
- grubby
- iptables
- iptables-arptables
- iptables-devel
- iptables-ebtables
- iptables-libs
- iptables-services
- iptables-utils
- 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
- iwlax2xx-firmware
- kexec-tools
- kmod
- kmod-kvdo
- kmod-libs
- kmod-redhat-oracleasm
- ksc
- libasan
- libatomic
- libatomic-static
- libdnf
- libertas-sd8686-firmware
- libertas-sd8787-firmware
- libertas-usb8388-firmware
- libertas-usb8388-olpc-firmware
- libgcc
- libgfortran
- libgomp
- libgomp-offload-nvptx
- libipa_hbac
- libitm
- libkcapi
- libkcapi-hmaccalc
- liblsan
- libnsl
- libquadmath
- libreport-filessystem
- libsss_autofs

- libsss_certmap
- libsss_idmap
- libsss_nss_idmap
- libsss_simpleifp
- libsss_sudo
- libstdc++
- libtsan
- libubsan
- libxslt
- libzstd
- libzstd-devel
- linux-firmware
- linux-firmware-core
- mcelog
- microcode_ctl
- mokutil
- mozjs52
- mozjs60
- NetworkManager
- NetworkManager-adsl
- NetworkManager-bluetooth
- NetworkManager-config-connectivity-oracle
- NetworkManager-config-server
- NetworkManager-dispatcher-routing-rules
- NetworkManager-initscripts-updown
- NetworkManager-libnm
- NetworkManager-ovs
- NetworkManager-ppp
- NetworkManager-team
- NetworkManager-tui
- NetworkManager-wifi
- NetworkManager-wwan
- nscd
- nss_db
- ntsysv

- `nvmetcli`
- `opa-address-resolution`
- `opa-basic-tools`
- `opa-fastfabric`
- `opa-fm`
- `opa-libopamgt`
- `OpenIPMI`
- `OpenIPMI-lanserv`
- `OpenIPMI-libs`
- `OpenIPMI-perl`
- `os-prober`
- `parted`
- `platform-python`
- `policycoreutils`
- `policycoreutils-dbus`
- `policycoreutils-devel`
- `policycoreutils-newrole`
- `policycoreutils-python-utils`
- `policycoreutils-restorecond`
- `polkit`
- `polkit-devel`
- `polkit-docs`
- `polkit-libs`
- `procps-ng`
- `procps-ng-i18n`
- `python3-boom`
- `python3-configshell`
- `python3-dnf`
- `python3-dnf-plugin-post-transaction-actions`
- `python3-dnf-plugins-core`
- `python3-dnf-plugin-versionlock`
- `python3-firewall`
- `python3-hawkey`
- `python3-iscsi-initiator-utils`
- `python3-libdnf`

- python3-libipa_hbac
- python3-libs
- python3-libsss_nss_idmap
- python3-openipmi
- python3-policycoreutils
- python3-rtslib
- python3-sss
- python3-sssdconfig
- python3-sss-murmur
- python3-test
- redhat-indexhtml
- redhat-release
- sanlock-lib
- sos
- sos-audit
- sssd
- sssd-ad
- sssd-client
- sssd-common
- sssd-common-pac
- sssd-dbus
- sssd-ipa
- sssd-kcm
- sssd-krb5
- sssd-krb5-common
- sssd-ldap
- sssd-nfs-idmap
- sssd-polkit-rules
- sssd-proxy
- sssd-tools
- sssd-winbind-idmap
- systemd
- systemd-container
- systemd-devel
- systemd-journal-remote

- systemd-libs
- systemd-pam
- systemd-tests
- systemd-udev
- target-restore
- trace-cmd
- tuned
- tuned-profiles-atomic
- tuned-profiles-compat
- tuned-profiles-cpu-partitioning
- tuned-profiles-mssql
- tuned-profiles-oracle
- vim-minimal
- yum
- yum-utils

Modified Binary Packages for CodeReady Linux Builder by Oracle

The following binary packages to CodeReady Linux Builder by Oracle have been modified:

- crash-devel
- cups-filters-devel
- dotnet-sdk-3.1-source-built-artifacts
- dotnet-sdk-5.0-source-built-artifacts
- fwupd-devel
- gcc-plugin-devel
- gcc-toolset-10-gcc-plugin-devel
- glibc-benchtests
- glibc-nss-devel
- glibc-static
- guile-devel
- iscsi-initiator-utils-devel
- Judy-devel
- kmod-devel
- libblockdev-crypto-devel
- libblockdev-devel
- libblockdev-fs-devel

- libblockdev-loop-devel
- libblockdev-lvm-devel
- libblockdev-mdraid-devel
- libblockdev-part-devel
- libblockdev-swap-devel
- libblockdev-utils-devel
- libblockdev-vdo-devel
- libcephfs2
- libcephfs-devel
- libdnf-devel
- librados-devel
- libradosstriper1
- libradosstriper-devel
- librbd-devel
- libreoffice-sdk
- libreoffice-sdk-doc
- libsss_nss_idmap-devel
- libstdc++-static
- mozjs52-devel
- mozjs60-devel
- NetworkManager-libnm-devel
- nss_hesiod
- ocaml-libguestfs
- ocaml-libguestfs-devel
- OpenIPMI-devel
- openscap-engine-sce-devel
- PackageKit-glib-devel
- parted-devel
- python3-mpich
- sanlock-devel
- sblim-cmpi-devel
- tog-pegasus-devel

Modified AppStream Binary Packages

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

- abrt
- abrt-addon-ccpp
- abrt-addon-coredump-helper
- abrt-addon-kerneloops
- abrt-addon-pstoreoops
- abrt-addon-vmcore
- abrt-addon-xorg
- abrt-cli
- abrt-cli-ng
- abrt-console-notification
- abrt-dbus
- abrt-desktop
- abrt-gui
- abrt-gui-libs
- abrt-java-connector
- abrt-libs
- abrt-plugin-machine-id
- abrt-plugin-sosreport
- abrt-tui
- adwaita-gtk2-theme
- anaconda
- anaconda-core
- anaconda-dracut
- anaconda-gui
- anaconda-install-env-deps
- anaconda-tui
- anaconda-user-help
- anaconda-widgets
- ansible-pcp
- aspNetcore-runtime-3.0
- aspNetcore-runtime-3.1
- aspNetcore-runtime-5.0
- aspNetcore-runtime-6.0
- aspNetcore-targeting-pack-3.0
- aspNetcore-targeting-pack-3.1

- aspnetcore-targeting-pack-5.0
- aspnetcore-targeting-pack-6.0
- authd
- autocorr-af
- autocorr-bg
- autocorr-ca
- autocorr-cs
- autocorr-da
- autocorr-de
- autocorr-en
- autocorr-es
- autocorr-fa
- autocorr-fi
- autocorr-fr
- autocorr-ga
- autocorr-hr
- autocorr-hu
- autocorr-is
- autocorr-it
- autocorr-ja
- autocorr-ko
- autocorr-lb
- autocorr-lt
- autocorr-mn
- autocorr-nl
- autocorr-pl
- autocorr-pt
- autocorr-ro
- autocorr-ru
- autocorr-sk
- autocorr-sl
- autocorr-sr
- autocorr-sv
- autocorr-tr
- autocorr-vi

- autocorr-zh
- binutils-devel
- blivet-data
- buildah
- buildah-tests
- clang
- clang-analyzer
- clang-devel
- clang-libs
- clang-resource-filesystem
- clang-tools-extra
- cloud-init
- cockpit-composer
- cockpit-machines
- cockpit-packagekit
- cockpit-pcp
- cockpit-session-recording
- cockpit-storaged
- compat-libgfortran-48
- compat-libpthread-nonshared
- composer-cli
- containernetworking-plugins
- containers-common
- cpp
- crash
- cups-filters
- cups-filters-libs
- dbus-devel
- dbus-x11
- delve
- dnf-plugin-spacewalk
- dotnet
- dotnet-apphost-pack-3.0
- dotnet-apphost-pack-3.1
- dotnet-apphost-pack-5.0

- dotnet-apphost-pack-6.0
- dotnet-host
- dotnet-hostfxr-3.0
- dotnet-hostfxr-3.1
- dotnet-hostfxr-5.0
- dotnet-hostfxr-6.0
- dotnet-runtime-3.0
- dotnet-runtime-3.1
- dotnet-runtime-5.0
- dotnet-runtime-6.0
- dotnet-sdk-3.0
- dotnet-sdk-3.1
- dotnet-sdk-5.0
- dotnet-sdk-6.0
- dotnet-targeting-pack-3.0
- dotnet-targeting-pack-3.1
- dotnet-targeting-pack-5.0
- dotnet-targeting-pack-6.0
- dotnet-templates-3.0
- dotnet-templates-3.1
- dotnet-templates-5.0
- dotnet-templates-6.0
- eclipse-ecf-core
- eclipse-ecf-runtime
- eclipse-emf-core
- eclipse-emf-runtime
- eclipse-emf-xsd
- eclipse-equinox-osgi
- eclipse-jdt
- eclipse-p2-discovery
- eclipse-pde
- eclipse-platform
- eclipse-swt
- efi-srpm-macros
- eth-tools-basic

- eth-tools-fastfabric
- fapolicyd
- fapolicyd-selinux
- firefox
- firewall-applet
- firewall-config
- gcc
- gcc-c++
- gcc-gdb-plugin
- gcc-gfortran
- gcc-offload-nvptx
- gcc-toolset-10-gcc
- gcc-toolset-10-gcc-c++
- gcc-toolset-10-gcc-gdb-plugin
- gcc-toolset-10-gcc-gfortran
- gcc-toolset-10-libasan-devel
- gcc-toolset-10-libatomic-devel
- gcc-toolset-10-libitm-devel
- gcc-toolset-10-liblsan-devel
- gcc-toolset-10-libquadmath-devel
- gcc-toolset-10-libstdc++-devel
- gcc-toolset-10-libstdc++-docs
- gcc-toolset-10-libtsan-devel
- gcc-toolset-10-libubsan-devel
- gcc-toolset-11-binutils
- gcc-toolset-11-binutils-devel
- gcc-toolset-11-gcc
- gcc-toolset-11-gcc-c++
- gcc-toolset-11-gcc-gdb-plugin
- gcc-toolset-11-gcc-gfortran
- gcc-toolset-11-gcc-plugin-devel
- gcc-toolset-11-gdb
- gcc-toolset-11-gdb-doc
- gcc-toolset-11-gdb-gdbserver
- gcc-toolset-11-libasan-devel

- gcc-toolset-11-libatomic-devel
- gcc-toolset-11-libgccjit
- gcc-toolset-11-libgccjit-devel
- gcc-toolset-11-libgccjit-docs
- gcc-toolset-11-libitm-devel
- gcc-toolset-11-liblsan-devel
- gcc-toolset-11-libquadmath-devel
- gcc-toolset-11-libstdc++-devel
- gcc-toolset-11-libstdc++-docs
- gcc-toolset-11-libtsan-devel
- gcc-toolset-11-libubsan-devel
- gdb
- gdb-doc
- gdb-gdbserver
- gdb-headless
- git-clang-format
- glibc-gconv-extra
- glibc-utils
- gnome-boxes
- gnome-session
- gnome-session-kiosk-session
- gnome-session-wayland-session
- gnome-session-xsession
- gnome-themes-standard
- guile
- httpd
- httpd-devel
- httpd-filesystem
- httpd-manual
- httpd-tools
- icedtea-web
- icedtea-web-javadoc
- initial-setup
- initial-setup-gui
- ipa-client

- ipa-client-common
- ipa-client-epn
- ipa-client-samba
- ipa-common
- ipa-python-compat
- ipa-selinux
- ipa-server
- ipa-server-common
- ipa-server-dns
- ipa-server-trust-ad
- Judy
- kernel-rpm-macros
- kernelshark
- ksh
- libasan6
- libblockdev
- libblockdev-btrfs
- libblockdev-crypto
- libblockdev-dm
- libblockdev-fs
- libblockdev-kbd
- libblockdev-loop
- libblockdev-lvm
- libblockdev-lvm-dbus
- libblockdev-mdraid
- libblockdev-mpath
- libblockdev-nvdim
- libblockdev-part
- libblockdev-plugins-all
- libblockdev-swap
- libblockdev-utils
- libblockdev-vdo
- libcmptiCppl0
- libguestfs
- libguestfs-appliance

- libguestfs-bash-completion
- libguestfs-devel
- libguestfs-gfs2
- libguestfs-gobject
- libguestfs-gobject-devel
- libguestfs-inspect-icons
- libguestfs-java
- libguestfs-java-devel
- libguestfs-javadoc
- libguestfs-man-pages-ja
- libguestfs-man-pages-uk
- libguestfs-rescue
- libguestfs-rsync
- libguestfs-tools
- libguestfs-tools-c
- libguestfs-xfstools
- libitm-devel
- libquadmath-devel
- librados2
- librbd1
- libreoffice-base
- libreoffice-calc
- libreoffice-core
- libreoffice-data
- libreoffice-draw
- libreoffice-emailmerge
- libreoffice-filters
- libreoffice-gdb-debug-support
- libreoffice-graphicsfilter
- libreoffice-gtk3
- libreoffice-help-ar
- libreoffice-help-bg
- libreoffice-help-bn
- libreoffice-help-ca
- libreoffice-help-cs

- libreoffice-help-da
- libreoffice-help-de
- libreoffice-help-dz
- libreoffice-help-el
- libreoffice-help-en
- libreoffice-help-es
- libreoffice-help-et
- libreoffice-help-eu
- libreoffice-help-fi
- libreoffice-help-fr
- libreoffice-help-gl
- libreoffice-help-gu
- libreoffice-help-he
- libreoffice-help-hi
- libreoffice-help-hr
- libreoffice-help-hu
- libreoffice-help-id
- libreoffice-help-it
- libreoffice-help-ja
- libreoffice-help-ko
- libreoffice-help-lt
- libreoffice-help-lv
- libreoffice-help-nb
- libreoffice-help-nl
- libreoffice-help-nn
- libreoffice-help-pl
- libreoffice-help-pt-BR
- libreoffice-help-pt-PT
- libreoffice-help-ro
- libreoffice-help-ru
- libreoffice-help-si
- libreoffice-help-sk
- libreoffice-help-sl
- libreoffice-help-sv
- libreoffice-help-ta

- libreoffice-help-tr
- libreoffice-help-uk
- libreoffice-help-zh-Hans
- libreoffice-help-zh-Hant
- libreoffice-impress
- libreofficekit
- libreoffice-langpack-af
- libreoffice-langpack-ar
- libreoffice-langpack-as
- libreoffice-langpack-bg
- libreoffice-langpack-bn
- libreoffice-langpack-br
- libreoffice-langpack-ca
- libreoffice-langpack-cs
- libreoffice-langpack-cy
- libreoffice-langpack-da
- libreoffice-langpack-de
- libreoffice-langpack-dz
- libreoffice-langpack-el
- libreoffice-langpack-en
- libreoffice-langpack-es
- libreoffice-langpack-et
- libreoffice-langpack-eu
- libreoffice-langpack-fa
- libreoffice-langpack-fi
- libreoffice-langpack-fr
- libreoffice-langpack-ga
- libreoffice-langpack-gl
- libreoffice-langpack-gu
- libreoffice-langpack-he
- libreoffice-langpack-hi
- libreoffice-langpack-hr
- libreoffice-langpack-hu
- libreoffice-langpack-id
- libreoffice-langpack-it

- libreoffice-langpack-ja
- libreoffice-langpack-kk
- libreoffice-langpack-kn
- libreoffice-langpack-ko
- libreoffice-langpack-lt
- libreoffice-langpack-lv
- libreoffice-langpack-mai
- libreoffice-langpack-ml
- libreoffice-langpack-mr
- libreoffice-langpack-nb
- libreoffice-langpack-nl
- libreoffice-langpack-nn
- libreoffice-langpack-nr
- libreoffice-langpack-nso
- libreoffice-langpack-or
- libreoffice-langpack-pa
- libreoffice-langpack-pl
- libreoffice-langpack-pt-BR
- libreoffice-langpack-pt-PT
- libreoffice-langpack-ro
- libreoffice-langpack-ru
- libreoffice-langpack-si
- libreoffice-langpack-sk
- libreoffice-langpack-sl
- libreoffice-langpack-sr
- libreoffice-langpack-ss
- libreoffice-langpack-st
- libreoffice-langpack-sv
- libreoffice-langpack-ta
- libreoffice-langpack-te
- libreoffice-langpack-th
- libreoffice-langpack-tn
- libreoffice-langpack-tr
- libreoffice-langpack-ts
- libreoffice-langpack-uk

- libreoffice-langpack-ve
- libreoffice-langpack-xh
- libreoffice-langpack-zh-Hans
- libreoffice-langpack-zh-Hant
- libreoffice-langpack-zu
- libreoffice-math
- libreoffice-ogltrans
- libreoffice-opensymbol-fonts
- libreoffice-pdfimport
- libreoffice-pyuno
- libreoffice-ure
- libreoffice-ure-common
- libreoffice-wiki-publisher
- libreoffice-writer
- libreoffice-x11
- libreoffice-xsltfilter
- libreport
- libreport-anaconda
- libreport-cli
- libreport-gtk
- libreport-newt
- libreport-plugin-bugzilla
- libreport-plugin-kerneloops
- libreport-plugin-logger
- libreport-plugin-mailx
- libreport-plugin-reportuploader
- libreport-plugin-ureport
- libreport-web
- libreswan
- libstdc++-devel
- libstdc++-docs
- libvirt
- libvirt-client
- libvirt-daemon
- libvirt-daemon-config-network

- libvirt-daemon-config-nwfilter
- libvirt-daemon-driver-interface
- 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-iscsi-direct
- libvirt-daemon-driver-storage-logical
- libvirt-daemon-driver-storage-mpath
- libvirt-daemon-driver-storage-rbd
- libvirt-daemon-driver-storage-scsi
- libvirt-daemon-kvm
- libvirt-devel
- libvirt-docs
- libvirt-libs
- libvirt-lock-sanlock
- libvirt-nss
- libvirt-wireshark
- libxslt-devel
- llvm
- llvm-devel
- llvm-doc
- llvm-googletest
- llvm-libs
- llvm-static
- llvm-test
- lorax
- lorax-composer
- lorax-lmc-novirt

- `lorax-lmc-virt`
- `lorax-templates-generic`
- `lorax-templates-rhel`
- `lua-guestfs`
- `mariadb`
- `mariadb-backup`
- `mariadb-common`
- `mariadb-devel`
- `mariadb-embedded`
- `mariadb-embedded-devel`
- `mariadb-errmsg`
- `mariadb-gssapi-server`
- `mariadb-oggraph-engine`
- `mariadb-server`
- `mariadb-server-galera`
- `mariadb-server-utils`
- `mariadb-test`
- `mecab-ipadic`
- `mecab-ipadic-EUCJP`
- `mod_ldap`
- `mod_proxy_html`
- `mod_session`
- `mod_ssl`
- `mpich`
- `mpich-devel`
- `mpich-doc`
- `netstandard-targeting-pack-2.1`
- `NetworkManager-cloud-setup`
- `nginx`
- `nginx-all-modules`
- `nginx-filesystem`
- `nginx-mod-devel`
- `nginx-mod-http-image-filter`
- `nginx-mod-http-perl`
- `nginx-mod-http-xslt-filter`

- `nginx-mod-mail`
- `nginx-mod-stream`
- `nodejs`
- `nodejs-devel`
- `nodejs-docs`
- `nodejs-full-i18n`
- `npm`
- `openchange`
- `openscap`
- `openscap-devel`
- `openscap-engine-sce`
- `openscap-python3`
- `openscap-scanner`
- `openscap-utils`
- `open-vm-tools`
- `open-vm-tools-desktop`
- `open-vm-tools-sdmp`
- `osbuild-composer`
- `osbuild-composer-core`
- `osbuild-composer-dnf-json`
- `osbuild-composer-worker`
- `osinfo-db`
- `pacemaker-cluster-libs`
- `pacemaker-libs`
- `pacemaker-schemas`
- `PackageKit`
- `PackageKit-command-not-found`
- `PackageKit-cron`
- `PackageKit-glib`
- `PackageKit-gstreamer-plugin`
- `PackageKit-gtk3-module`
- `pcp`
- `pcp-conf`
- `pcp-devel`
- `pcp-doc`

- pcp-export-pcp2elasticsearch
- pcp-export-pcp2graphite
- pcp-export-pcp2influxdb
- pcp-export-pcp2json
- pcp-export-pcp2spark
- pcp-export-pcp2xml
- pcp-export-pcp2zabbix
- pcp-export-zabbix-agent
- pcp-gui
- pcp-import-collectl2pcp
- pcp-import-ganglia2pcp
- pcp-import-iostat2pcp
- pcp-import-mrtg2pcp
- pcp-import-sar2pcp
- pcp-libs
- pcp-libs-devel
- pcp-pmda-activemq
- pcp-pmda-apache
- pcp-pmda-bash
- pcp-pmda-bcc
- pcp-pmda-bind2
- pcp-pmda-bonding
- pcp-pmda-bpftrace
- pcp-pmda-cifs
- pcp-pmda-cisco
- pcp-pmda-dbping
- pcp-pmda-denki
- pcp-pmda-dm
- pcp-pmda-docker
- pcp-pmda-ds389
- pcp-pmda-ds389log
- pcp-pmda-elasticsearch
- pcp-pmda-gfs2
- pcp-pmda-gluster
- pcp-pmda-gpfs

- pcp-pmda-gpsd
- pcp-pmda-hacluster
- pcp-pmda-haproxy
- pcp-pmda-infiniband
- pcp-pmda-json
- pcp-pmda-libvirt
- pcp-pmda-lio
- pcp-pmda-lmsensors
- pcp-pmda-logger
- pcp-pmda-lustre
- pcp-pmda-lustrecomm
- pcp-pmda-mailq
- pcp-pmda-memcache
- pcp-pmda-mic
- pcp-pmda-mongodb
- pcp-pmda-mounts
- pcp-pmda-mssql
- pcp-pmda-mysql
- pcp-pmda-named
- pcp-pmda-netcheck
- pcp-pmda-netfilter
- pcp-pmda-news
- pcp-pmda-nfsclient
- pcp-pmda-nginx
- pcp-pmda-nvidia-gpu
- pcp-pmda-openmetrics
- pcp-pmda-openvswitch
- pcp-pmda-oracle
- pcp-pmda-pdns
- pcp-pmda-perfevent
- pcp-pmda-podman
- pcp-pmda-postfix
- pcp-pmda-postgresql
- pcp-pmda-rabbitmq
- pcp-pmda-redis

- pcp-pmda-roomtemp
- pcp-pmda-rsyslog
- pcp-pmda-samba
- pcp-pmda-sendmail
- pcp-pmda-shping
- pcp-pmda-slurm
- pcp-pmda-smart
- pcp-pmda-snmp
- pcp-pmda-sockets
- pcp-pmda-statsd
- pcp-pmda-summary
- pcp-pmda-systemd
- pcp-pmda-trace
- pcp-pmda-unbound
- pcp-pmda-weblog
- pcp-pmda-zimbra
- pcp-pmda-zswap
- pcp-selinux
- pcp-system-tools
- pcp-testsuite
- pcp-zeroconf
- perl-PCP-LogImport
- perl-PCP-LogSummary
- perl-PCP-MMV
- perl-PCP-PMDA
- perl-Sys-Guestfs
- perl-XML-Parser
- pesign
- pki-acme
- pki-base
- pki-base-java
- pki-ca
- pki-kra
- pki-server
- pki-symkey

- pki-tools
- platform-python-debug
- platform-python-devel
- plymouth
- plymouth-core-libs
- plymouth-graphics-libs
- plymouth-plugin-fade-throbber
- plymouth-plugin-label
- plymouth-plugin-script
- plymouth-plugin-space-flares
- plymouth-plugin-throbgress
- plymouth-plugin-two-step
- plymouth-scripts
- plymouth-system-theme
- plymouth-theme-charge
- plymouth-theme-fade-in
- plymouth-theme-script
- plymouth-theme-solar
- plymouth-theme-spinfinity
- plymouth-theme-spinner
- podman
- podman-docker
- podman-remote
- podman-tests
- policycoreutils-gui
- policycoreutils-sandbox
- pykickstart
- python2
- python2-debug
- python2-devel
- python2-libs
- python2-test
- python2-tkinter
- python2-tools
- python3-abrt

- python3-abrt-addon
- python3-abrt-container-addon
- python3-abrt-doc
- python3-blivet
- python3-blockdev
- python3-clang
- python3-dnf-plugin-modulesync
- python3-dnf-plugin-spacewalk
- python3-idle
- python3-ipaclient
- python3-ipalib
- python3-ipaserver
- python3-ipatests
- python3-kickstart
- python3-libguestfs
- python3-libreport
- python3-pcp
- python3-pki
- python3-rhncfg
- python3-rhncfg-actions
- python3-rhncfg-client
- python3-rhncfg-management
- python3-rhn-check
- python3-rhn-client-tools
- python3-rhnlib
- python3-rhnpush
- python3-rhn-setup
- python3-rhn-setup-gnome
- python3-sanlock
- python3-spacewalk-backend-libs
- python3-spacewalk-oscapp
- python3-spacewalk-usix
- python3-tkinter
- rear
- redfish-finder

- 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-rpm-config
- rhel-system-roles
- rhncfg
- rhncfg-actions
- rhncfg-client
- rhncfg-management
- rhn-check
- rhn-client-tools
- rhn-custom-info
- rhnlib
- rhnpush
- rhnsd
- rhn-setup
- rhn-setup-gnome
- rpmdevtools
- ruby
- ruby-devel
- ruby-doc
- rubygem-bigdecimal
- rubygem-did_you_mean
- rubygem-io-console
- rubygem-json
- rubygem-minitest
- rubygem-net-telnet
- rubygem-openssl
- rubygem-power_assert
- rubygem-psych

- rubygem-rake
- rubygem-rdoc
- rubygems
- rubygems-devel
- rubygem-test-unit
- rubygem-xmlrpc
- ruby-irb
- ruby-libguestfs
- ruby-libs
- sanlk-reset
- sanlock
- scap-security-guide
- scap-security-guide-doc
- scap-workbench
- setroubleshoot
- setroubleshoot-plugins
- setroubleshoot-server
- skopeo
- skopeo-tests
- sos-collector
- spacewalk-oscaps
- spacewalk-remote-utils
- spacewalk-usix
- spice-streaming-agent
- systemtap
- systemtap-client
- systemtap-devel
- systemtap-exporter
- systemtap-initscript
- systemtap-runtime
- systemtap-runtime-java
- systemtap-runtime-python3
- systemtap-runtime-virtguest
- systemtap-runtime-virthost
- systemtap-sdt-devel

- systemtap-server
- thunderbird
- tog-pegasus
- tog-pegasus-libs
- tuned-gtk
- tuned-utils
- tuned-utils-systemtap
- vim-common
- vim-enhanced
- vim-filesystem
- vim-X11
- virt-dib
- virt-install
- virt-manager
- virt-manager-common
- virt-p2v-maker
- WALinuxAgent
- WALinuxAgent-udev
- wget
- xsane
- xsane-common
- xsane-gimp
- zstd

Removed BaseOS Binary Packages

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

- dnf-plugin-subscription-manager
- grub2-ppc64le-modules
- kpatch
- kpatch-dnf
- NetworkManager-config-connectivity-redhat
- python3-cloud-what
- python3-subscription-manager-rhsm
- python3-syspurpose
- redhat-logos

- `redhat-logos-httpd`
- `redhat-release-eula`
- `rhsm-icons`
- `subscription-manager`
- `subscription-manager-cockpit`
- `subscription-manager-plugin-ostree`
- `subscription-manager-rhsm-certificates`

Removed AppStream Binary Packages

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

- `ansible-collection-microsoft-sql`
- `ansible-collection-redhat-rhel_mgmt`
- `coreos-installer`
- `coreos-installer-bootinfra`
- `coreos-installer-dracut`
- `insights-client`
- `libreport-plugin-rhtsupport`
- `libreport-rhel`
- `libreport-rhel-anaconda-bugzilla`
- `libreport-rhel-bugzilla`
- `redhat-backgrounds`
- `redhat-logos-ipa`
- `redhat-support-lib-python`
- `redhat-support-tool`
- `rhc`
- `rhc-worker-playbook`
- `rhsm-gtk`
- `rt-tests`
- `spice-client-win-x64`
- `spice-client-win-x86`
- `spice-qxl-wddm-dod`
- `spice-vdagent-win-x64`
- `spice-vdagent-win-x86`
- `subscription-manager-initial-setup-addon`
- `subscription-manager-migration`

- `subscription-manager-migration-data`
- `toolbox`
- `toolbox-tests`
- `virtio-win`
- `virt-who`

Removed CodeReady Linux Builder Binary Packages

No binary packages were removed from CodeReady Linux Builder by Oracle.

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 [Changes to Binary Packages](#).

Added Source Packages for BaseOS by Oracle

The following source packages have been added to the BaseOS by Oracle:

- `bcache-tools`
- `btrfs-progs`
- `dtrace`
- `kernel-uek`
- `ocfs2-tools`
- `oraclelinux-release`
- `oraclelinux-release-el8`
- `oracle-logos`

Added Source Packages for AppStream by Oracle

The following source packages have been added to AppStream by Oracle:

- `dtrace`
- `oracle-database-preinstall-21c`
- `python3-dnf-plugin-ulninfo`

Modified BaseOS Source Packages

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

- `autofs`
- `binutils`
- `boom-boot`

- chkconfig
- chrony
- cockpit
- coreutils
- dbus
- dbxtool
- dnf
- dnf-plugins-core
- dracut
- efibootmgr
- efi-rpm-macros
- expat
- firewalld
- fuse
- fwupd
- fwupdate
- gcc
- glibc
- grub2
- grubby
- iptables
- iscsi-initiator-utils
- kexec-tools
- kmod
- kmod-kvdo
- kmod-redhat-oracleasm
- ksc
- libdnf
- libkcapi
- libreport
- libxslt
- linux-firmware
- mcelog
- microcode_ctl
- mokutil

- mozjs52
- mozjs60
- NetworkManager
- nvmetcli
- opa-ff
- opa-fm
- OpenIPMI
- os-prober
- parted
- policycoreutils
- polkit
- procps-ng
- python3
- python-configshell
- python-rtslib
- redhat-indexhtml
- redhat-release
- sanlock
- sos
- sssd
- systemd
- trace-cmd
- tuned
- vim
- zstd

Modified AppStream Source Packages

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

- abrt
- abrt-java-connector
- anaconda
- anaconda-user-help
- ansible-pcp
- authd
- binutils

- buildah
- ceph
- clang
- cloud-init
- cockpit-appstream
- cockpit-composer
- cockpit-session-recording
- compat-libgfortran-48
- containernetworking-plugins
- containers-common
- crash
- cups-filters
- dbus
- delve
- dnf-plugins-core
- dnf-plugin-spacewalk
- dotnet3.0
- dotnet3.1
- dotnet5.0
- dotnet6.0
- eclipse
- eclipse-ecf
- eclipse-emf
- efi-rpm-macros
- eth-tools
- fapolicyd
- firefox
- firewalld
- gcc
- gcc-toolset-10-gcc
- gcc-toolset-11-binutils
- gcc-toolset-11-gcc
- gcc-toolset-11-gdb
- gdb
- glibc

- `gnome-boxes`
- `gnome-session`
- `gnome-themes-standard`
- `guile`
- `httpd`
- `icedtea-web`
- `initial-setup`
- `ipa`
- `Judy`
- `ksh`
- `libblockdev`
- `libguestfs`
- `libreoffice`
- `libreport`
- `libreswan`
- `libvirt`
- `libxslt`
- `llvm`
- `lorax`
- `lorax-templates-rhel`
- `mariadb`
- `mecab-ipadic`
- `mpich`
- `NetworkManager`
- `nginx`
- `nodejs`
- `openchange`
- `openscap`
- `open-vm-tools`
- `osbuild-composer`
- `osinfo-db`
- `pacemaker`
- `PackageKit`
- `pcp`
- `perl-XML-Parser`

- `pesign`
- `pki-core`
- `plymouth`
- `podman`
- `policycoreutils`
- `pykickstart`
- `python2`
- `python3`
- `python-blivet`
- `rear`
- `redfish-finder`
- `redhat-lsb`
- `redhat-rpm-config`
- `rhel-system-roles`
- `rhncfg`
- `rhn-client-tools`
- `rhn-custom-info`
- `rhnlib`
- `rhnpush`
- `rhnsd`
- `rpmdevtools`
- `ruby`
- `sanlock`
- `sblim-cmpi-devel`
- `scap-security-guide`
- `scap-workbench`
- `setroubleshoot`
- `setroubleshoot-plugins`
- `skopeco`
- `sos-collector`
- `spacewalk-backend`
- `spacewalk-oscapp`
- `spacewalk-remote-utils`
- `spacewalk-usix`
- `spice-streaming-agent`

- systemtap
- thunderbird
- tog-pegasus
- trace-cmd
- tuned
- vim
- virt-manager
- virt-p2v
- WALinuxAgent
- wget
- xsane
- zstd

Modified Source Packages for CodeReady Linux Builder by Oracle

The following binary packages to CodeReady Linux Builder by Oracle have been modified:

- ceph
- crash
- cups-filters
- dotnet3.1
- dotnet5.0
- fwupd
- gcc
- gcc-toolset-10-gcc
- glibc
- guile
- iscsi-initiator-utils
- Judy
- kmod
- libblockdev
- libdnf
- libguestfs
- libreoffice
- libvirt
- mozjs52
- mozjs60

- mpich
- NetworkManager
- OpenIPMI
- openscap
- PackageKit
- parted
- sanlock
- sblim-cmpi-devel
- sssd
- tog-pegasus

Removed BaseOS Source Packages

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

- kpatch
- libica
- redhat-logos
- subscription-manager

Removed AppStream Source Packages

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

- ansible-collection-microsoft-sql
- ansible-collection-redhat-rhel_mgmt
- coreos-installer
- insights-client
- libica
- redhat-logos
- redhat-support-lib-python
- redhat-support-tool
- rhc
- rhc-worker-playbook
- rt-tests
- spice-client-win
- spice-qxl-wddm-dod
- spice-vdagent-win
- subscription-manager

- subscription-manager-migration-data
- toolbox
- virtio-win
- virt-who