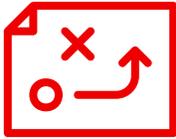


Converting CentOS Linux to Red Hat Enterprise Linux

Maximize your migration transition



“Paid solutions, while incurring licensing or subscription fees, can bring efficiencies that achieve higher value and minimize overall costs when compared with unpaid alternatives.”

SOURCE: IDC¹

With the announcement that the CentOS Project will discontinue updates and releases of CentOS Linux® version 8 on Dec. 31, 2021 and of version 7 on June 30, 2024, many organizations began the process of reevaluating their IT environments and started to plan for a migration.

If your organization needs a production-grade operating system to run critical business systems, migrating to a fully supported Red Hat® Enterprise Linux subscription with a predictable life cycle and extensive partner ecosystem is a straight-forward process that results in a deployment with a similar user experience to that of CentOS Linux.

Why change operating systems

While CentOS Linux is derived from Red Hat Enterprise Linux sources, there are notable differences that make Red Hat Enterprise Linux considerably more reliable and secure, allowing you to manage applications and services using the same tools consistently across multiple infrastructure footprints.

Support

Free open source software undeniably reduces the expense of licensing and subscription costs. Nevertheless, it puts the burden of maintenance and support on your IT organization where time can be money in terms of OpEx and opportunity cost. Even if your IT staff has open source operating system (OS) skills, keeping an unsupported version of Linux running and regularly maintaining it requires valuable time and budget.

Red Hat provides full life cycle support that includes specialty-based routing, collaborative multi-vendor support, global support locations, and personalized guidance. Red Hat also provides 10 years of updates and support for major releases, two years for minor releases, and binary compatibility between releases.

Functionality and stability

Red Hat Enterprise Linux is a fully featured OS with predictable costs that is tested and certified to run on a wide range of commercial off-the-shelf (COTS) hardware with a wide range of COTS software, and all the major cloud platforms. Unlike CentOS Linux, Red Hat Enterprise Linux subscriptions include Red Hat Insights, which uses predictive analytics and deep domain expertise for automating complex operational tasks, as well as detecting security and performance risks.

A recent study by IDC documented 81% less downtime with Red Hat Enterprise Linux compared with unpaid operating systems.¹ In addition, Red Hat Enterprise Linux comes with a wide range of security and interoperability certifications. Since CentOS Linux is built and tested in a completely different environment, it does not inherit Red Hat Enterprise Linux security and interoperability certifications.

Security and compliance

Maintaining security is an ongoing challenge. As infrastructure changes, your security design must be re-evaluated to keep up with the change. Challenges include keeping your systems aligned with the latest security standards, adopting new technologies without compromising security, and ensuring compatibility between an ongoing stream of updates and your existing infrastructure.

Red Hat Enterprise Linux includes a robust set of security and compliance features, as well as automated security management at scale, government and industry standard certifications, and security fixes and patches that are issued quickly when vulnerabilities are discovered. Red Hat Enterprise Linux simplifies compliance management with an ongoing stream of information about common vulnerabilities and exposures (CVE) patches, changes, etc., that is not available with CentOS Linux.

Red Hat Enterprise Linux is the foundation across the Red Hat portfolio for security certifications, including Federal Information Processing Standards (FIPS) 140-2, Common Criteria (CC), and Secure Technical Implementation Guidelines (STIG). Historically, CentOS Linux security patches have been delayed as they collect six weeks or more of Red Hat Enterprise Linux hotfixes before releasing a patch.

Partner ecosystem

CentOS Linux has a limited ecosystem of third-party applications and hardware vendors compared to Red Hat, which has more than 5,000 certified hardware vendors, more than 4,500 certified software vendors, and more than 140 certified cloud providers. CentOS Linux is not certified or supported as a host or guest operating system for use with any Red Hat portfolio product (e.g., Red Hat OpenStack® Platform or Red Hat OpenShift®). In addition, many of the major hardware and software vendors do not certify CentOS Linux for use with their products.

Benefits of migrating from CentOS Linux to Red Hat Enterprise Linux

Why move to Red Hat Enterprise Linux

In a recent [IDC study](#) of organizations that have invested in Red Hat Enterprise Linux (which includes Red Hat Insights and Red Hat Satellite), “Participants reported that they gain staff, cost, and business efficiencies that collectively far outweigh the additional cost of Red Hat subscriptions.” As a result, “despite taking on the cost of Red Hat subscriptions, the organizations end up realizing cost savings and other value that IDC quantifies as being worth nearly seven times the investment costs.”²

Tools like Red Hat Insights—included in a Red Hat Enterprise Linux subscription—provide analytics and control over systems with patching, performance tuning, and configuration management. These advanced support tools help reduce administrator time and minimize support calls.

Value of Red Hat Enterprise Linux management tools

- ▶ **Red Hat Insights** is a cloud-based configuration assessment and proactive remediation tool. It uses predictive analytics to assess and help remediate risks across areas of performance, stability, security, and availability. It identifies issues in these areas and provides best practice guidance, based on more than 20 years of Red Hat knowledge and experience working closely with ecosystem partners.

² IDC White Paper, sponsored by Red Hat. “[The Business Value of Red Hat Solutions Compared to Unpaid Alternatives.](#)” April 2021.

- ▶ **Red Hat Satellite (add-on)** is an infrastructure management solution available with a Red Hat Smart Management subscription. Satellite is designed to provision and maintain Red Hat Enterprise Linux infrastructure anywhere—physical, virtual or cloud. Red Hat Smart Management automates repetitive life cycle management tasks for Red Hat Enterprise Linux, keeping systems secure, available, and compliant while increasing efficiency and reducing total cost of ownership (TCO).

Value of Red Hat subscriptions

Red Hat subscriptions deliver value through service bundles, production-ready code, life cycle management, software interoperability, and access to experts and tools to help you run your business. Red Hat Enterprise Linux subscriptions have a guaranteed service-level agreement (SLA), with premium subscriptions providing 24x7 support coverage for severity 1 issues. In addition, Red Hat product engineers work closely with support teams, as well as hardware and software vendors, so issues are addressed promptly.

Options for migrating from CentOS Linux to Red Hat Enterprise Linux

Once you have decided which systems to migrate, the next decision is whether to build a new Red Hat Enterprise Linux instance(s) and redeploy (lift and shift) your apps and data or to convert your existing CentOS Linux instance(s) to Red Hat Enterprise Linux using the fully supported **Convert2RHEL** tool.

Why lift and shift

There are various circumstances when lifting and shifting applications to a new instance of Red Hat Enterprise Linux makes the most sense.

- ▶ Lift and shift is a clean-slate deployment that eliminates administrative baggage, allowing you to update and improve the configuration and optimize for better performance.
- ▶ You can redeploy a fresh instance with the most recent version of Red Hat Enterprise Linux and all the newest capabilities.

Lift and shift can be done on your own or with the assistance of [Red Hat Consulting](#).

Why convert

There are a number of circumstances when converting makes the most sense.

- ▶ Time constraints: Converting is faster than building a new system.
- ▶ Limited hardware resources: The Convert2RHEL tool converts in place and does not require additional hardware resources.
- ▶ Knowledge: Depending on how old the system is, there may be limited knowledge or documentation on the system configuration. The Convert2RHEL tool preserves system and app configurations.
- ▶ Expertise: There may not be enough in-house Linux expertise for a lift and shift.
- ▶ Downtime: System configurations and workloads remain in place requiring no additional configuration, making the process similar to a minor release update.

There are four main conversion pathways to choose from:

- ▶ **Self-service Convert2RHEL:** If you have internal staff with the necessary skills and time, use the Convert2RHEL tool—a self-service, fully supported tool from Red Hat.
- ▶ **Convert2RHEL + dedicated support:** If you have internal staff and time, but think you may need some help:
 - ▶ Start with the Convert2RHEL tool.
 - ▶ If you get to a point where you need support, a Red Hat Technical Account Manager (TAM) can help you navigate any conversion issues.
- ▶ **Convert2RHEL with Satellite:** If you have a Red Hat Smart Management subscription to manage a fleet of servers, you can use Red Hat Satellite with Convert2RHEL to automate conversions in bulk.
- ▶ **Accelerated conversion with services:** If you do not have the internal staff, skills, and time, or you want to migrate a large number of systems, Red Hat Consulting can help.

Using the Convert2RHEL tool

Convert2RHEL is a supported tool that converts CentOS Linux 7 and CentOS Linux 8 into supportable Red Hat Enterprise Linux systems—retaining existing applications and configurations. It is the result of a collaborative effort between Red Hat Engineering and Consulting services, where it has been used successfully for many CentOS Linux conversions in large and complex enterprise environments.

Support for Convert2RHEL includes:

- ▶ **Conversion guidance:** For users who are converting from an RPM-based Linux distribution to Red Hat Enterprise Linux, check out the [documentation](#). In addition, the [Red Hat Enterprise Linux migration process](#) webpage can help guide your conversion. Existing Red Hat Enterprise Linux subscription holders can use the [Migration Center](#) in the Red Hat Customer Portal for additional resources and a new [Convert2RHEL FAQ](#). If you have complex migration projects or want to accelerate your migration, consider engaging [Red Hat Consulting services](#) to help convert key applications and workloads.
- ▶ **Accessibility:** Access Convert2RHEL from a yum-compatible repository on the [Red Hat FTP server](#). Access to the Convert2RHEL utility and its updates is at no cost and there is no subscription required. However, a subscription is required to access Red Hat Enterprise Linux content to complete the conversion process.
- ▶ **Flexibility:** Convert2RHEL can now access Red Hat Enterprise Linux content through several methods, depending on your use case. Multiple network access methods using Red Hat Subscription Manager, Red Hat Satellite, or other mirrored repositories are available.
- ▶ **Stability:** Many fixes and minor enhancements are included in the most recent release of Convert2RHEL. For example, a built-in inspection check was added to check for untested third-party drivers to avoid compatibility issues. Plans for later releases include an override option to allow the utility to proceed after independent testing.
- ▶ **On-going enhancements:** Red Hat is exploring other capabilities and enhancements to include in future releases.

Convert2RHEL does not convert other Linux distributions like SUSE, Debian, or Ubuntu to Red Hat Enterprise Linux at this time owing to technical concepts such as filesystem metadata and technologies, configuration, and application user space compatibility. The Convert2RHEL tool does work for converting Oracle Linux to Red Hat Enterprise Linux.

Quick start for simple use cases

1. Be sure to read the [documentation](#) for important guidance, additional features, and information on known limitations. It is important to assess the critical nature of the applications and data on a system before making significant changes. For example, a simple test or development environment may require less assessment than a critical database server.
2. Third-party kernel modules like graphics or storage drivers may require more testing and planning. The documentation provides additional guidance on precautions to take before proceeding. There are numerous features like support for rollbacks up to a certain point in the process, use of activation keys instead of credentials, and pulling Red Hat Enterprise Linux content from Red Hat Satellite or other repository management solutions.
3. For a simple CentOS Linux system that is only using the CentOS Linux or Extra Packages for Enterprise Linux (EPEL - Fedora) repositories, the following quick-start instructions show how quickly the utility can convert a system to Red Hat Enterprise Linux. This example demonstrates installing and using Convert2RHEL in a simple CentOS Linux environment over the network to pull the latest Red Hat Enterprise Linux packages using Subscription Manager.
4. Start by doing a full system, application, and data backup so you can restore the system in case the conversion fails.
5. Perform any necessary preconversion remediations, which can include:
 - a. Turning off any configuration management automation (ex: Red Hat Ansible® Automation Platform, Puppet).
 - b. Stopping or preparing application(s).
6. Download the Red Hat GPG key.

```
# curl -o /etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release  
https://www.redhat.com/security/data/fd431d51.txt
```

7. Install the Convert2RHEL repository, replacing VERSION_NUMBER with the appropriate major version of the OS, for example 7 or 8.

```
# curl -o /etc/yum.repos.d/convert2rhel.repo  
https://ftp.redhat.com/redhat/convert2rhel/VERSION\_NUMBER/convert2rhel.repo
```

8. Install the Convert2RHEL utility. Then run it with -h to see all options.

```
# yum -y install convert2rhel  
# convert2rhel -h
```

9. Run `Convert2RHEL` to begin the conversion process and automatically register to Subscription Manager. The `-y` option can be used after testing to auto-answer yes for known, tested scenarios. Additional capabilities, like using activation keys instead of sensitive credentials, are explained in the documentation.

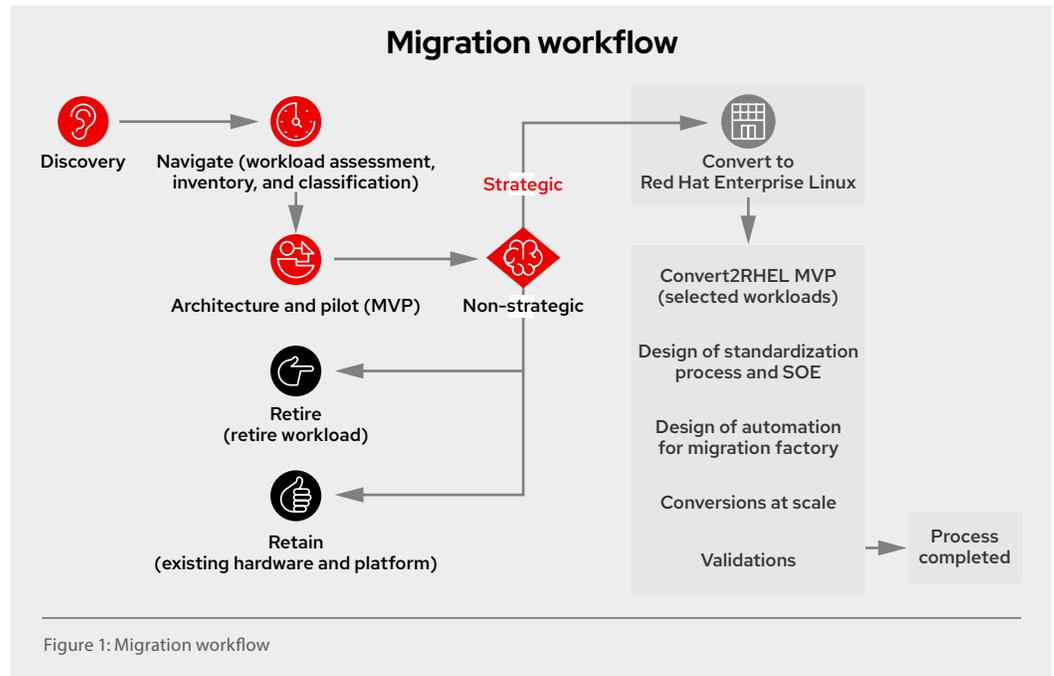
```
# convert2rhel --auto-attach --username=USERNAME --password=PASSWORD
```

- a. Note 1: Regarding how to automate these steps at scale, read this [unsupported, proof-of-concept Ansible Playbook](#)
<https://github.com/oamg/convert2rhel/blob/main/ansible/ansible-convert2rhel.yml>
 - b. Note 2: While not supported by Red Hat because version 6 is outside of the maintenance phase of the life cycle, guidance for conversions from CentOS Linux 6 is provided in [How to convert from CentOS Linux 6 or Oracle Linux 6 to RHEL](#).
10. Conversion success:
 - a. Once the conversion succeeds, a reboot is required to start the system as a Red Hat Enterprise Linux system.
 - b. It may be necessary to reinstall third-party RPMs or otherwise reconfigure some system services after conversion.
 - c. Remove any unwanted artifacts from Convert2RHEL.
 - d. Turn the configuration management automation back on (ex: Red Hat Ansible Automation Platform, Puppet).
 - e. Start post-conversion configuration of application(s)
 11. Another benefit to converting systems to Red Hat Enterprise Linux is to take advantage of the [in-place upgrades from Red Hat Enterprise Linux 7 to Red Hat Enterprise Linux 8](#). If you encounter any bugs with the Convert2RHEL utility itself, or would like to request additional feature enhancements, open a ticket using the respective links for [Red Hat Enterprise Linux 7](#) or [Red Hat Enterprise Linux 8](#).

Consulting services for complex migrations

When you work with Red Hat Consulting, you benefit from decades of open source and Red Hat Enterprise Linux expertise. Red Hat Consulting can help your organization accelerate the migration to Red Hat Enterprise Linux with an incremental approach that produces predictable results. Red Hat Consulting does more than provide you with the tools—they also teach you how to use them. They work with your team, using an integrated process to define and execute a successful migration following established Red Hat best practices with built-in fallbacks.

Red Hat Consulting migration engagement model



The Red Hat Consulting engagement model starts with a discovery process where Red Hat experts work with you to define an overarching strategy that identifies the objectives, skills gaps, and measurable outcomes for the migration to Red Hat Enterprise Linux. This is followed by a highly collaborative set of exercises where Red Hat experts work with your team to create a roadmap for the migration and a minimum viable product (MVP) that includes:

- ▶ Inventorying and determining which systems you want to convert and which systems you want to retire.
- ▶ Assessing and categorizing workloads.
- ▶ Creating a migration path.
- ▶ Implementing architecture and design.
- ▶ Implementing an MVP definition for selected workloads.

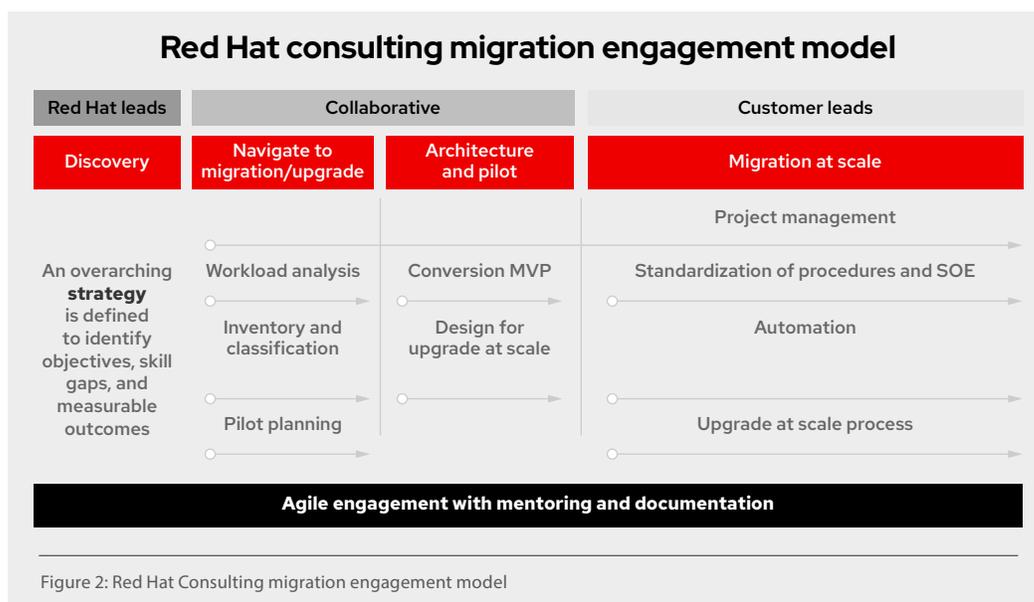
The next step is to define the standard operating environment (SOE) for the migrated systems. This process includes:

- ▶ Redefining the systems in functional layers and reusable elements for a component-based SOE approach.
- ▶ Specifying provisioning and configuration for the systems with self-documenting tooling and validating delivery using life cycle environments.
- ▶ Codifying content delivery, configuration, and life cycle management with tools and monitoring.

The third step is to automate the migration process by:

- ▶ Determining the automation tools for the platform architecture and application type.
- ▶ Creating code to execute the automated approach for conversion of CentOS Linux systems to Red Hat Enterprise Linux at scale.

The final step is pushing the migration into production and then validating the migrated systems with automated testing.



Once you’ve completed the architecture and MVP pilot, the Red Hat Consulting migration engagement model allows you to proceed with Red Hat consulting performing the bulk of the migration, working with a Red Hat solution provider, or doing it yourself with Convert2RHEL.

Getting back to work

With the conversion and upgrade to Red Hat Enterprise Linux complete, you will have access to all the latest Red Hat Enterprise Linux updates—as well as all the performance, support, management, and security capabilities included with Red Hat Enterprise Linux.

Learn more

Learn more about the [Convert2RHEL tool](#), [consulting services](#), and [new programs](#) that help ease your transition to a Red Hat Enterprise Linux subscription.



About Red Hat

Red Hat helps customers standardize across environments, develop cloud-native applications, and integrate, automate, secure, and manage complex environments with [award-winning](#) support, training, and consulting services.

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North America
 1 888 REDHAT1
www.redhat.com

Europe, Middle East, and Africa
 00800 7334 2835
europa@redhat.com

Asia Pacific
 +65 6490 4200
apac@redhat.com

Latin America
 +54 11 4329 7300
info-latam@redhat.com

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