# Red Hat Enterprise Linux 8

# Upgrading from RHEL 6 to RHEL 8

Instructions for an in-place upgrade from Red Hat Enterprise Linux 6 to Red Hat
Enterprise Linux 8

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## Legal Notice

## Abstract

This document provides instructions on how to perform an in-place upgrade from Red Hat Enterprise Linux (RHEL) 6 to RHEL 8. Upgrading to RHEL 8 is a two-stage process. First you have to upgrade your system from RHEL 6 to RHEL 7 followed by an upgrade to RHEL 8.

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# PREFACE

The guidelines in this document frequently refer to the following existing documentation:

- How do I upgrade from Red Hat Enterprise Linux (RHEL) 6 to RHEL 7
  If you are using SAP HANA, follow How do I upgrade from RHEL 6 to RHEL 7 with SAP HANA instead.

- Upgrading from RHEL 7 to RHEL 8

This document also includes additional instructions specific to upgrading from RHEL 6 to RHEL 8.

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# CHAPTER 1. PLANNING AN UPGRADE

An in-place upgrade is the recommended way to migrate your system to a later major version of RHEL.
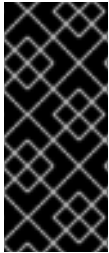
> **IMPORTANT**
>
> Before you start, Red Hat recommends that you read this reference, including the linked documents, to prevent a situation when certain changes to your system have been done but you are unable to proceed with the upgrading process. Especially, ensure that your system meets the requirements described in this document and that you are aware of the known limitations.

## 1.1. REQUIREMENTS

The following are the general criteria a system must meet to upgrade from RHEL 6 to RHEL 8:

- The architecture is Intel 64 or IBM Z.

- The RHEL Server variant is installed.

- The FIPS mode is disabled.

- The system contains no LUKS-encrypted partitions or volumes.

- Minimum hardware requirements for RHEL 8 are met.

- Access to repositories with RHEL 6, RHEL 7 and RHEL 8 content is provided.

Note that there can be further requirements and limitations. For details, see:

- The Overview section in the **How do I upgrade from Red Hat Enterprise Linux 6 to Red Hat Enterprise Linux 7** document

- The Planning an upgrade section in the Upgrading from RHEL 7 to RHEL 8 documentation

## 1.2. CONSIDERATIONS

You should consider the following before upgrading:

- Significant changes between the RHEL major releases
  For details, see:

  - The Major changes and migration considerations chapter in the **RHEL 7 Migration Planning Guide**

  - The Considerations in adopting RHEL 8 document

- Applications not distributed by Red Hat
  If you run applications on a system you want to upgrade that are not provided by Red Hat, consider the following:

  - For RPM-based applications:

    - You require packages that are compatible with the particular target version.

- The packages, including all dependencies, are available in a repository to which you have access.

  - For non-RPM-based applications:

    - Dependencies and libraries might have changed during these two major version upgrades. Make sure that the dependencies and libraries are available on the particular target version.

    - If the applications are written in an interpreted language, such as Python or Ruby, review whether all libraries are available on the target version.

## 1.3. OVERVIEW OF THE UPGRADING PROCESS

An in-place upgrade from RHEL 6 to RHEL 8 requires the following major steps:

1. Prepare the RHEL 6 system for the upgrade and update the RHEL 6 system to the latest version of RHEL 6.10.

2. Perform a pre-upgrade assessment of the RHEL 6 system and resolve reported problems.

3. Perform an in-place upgrade to RHEL 7.6.

4. Prepare the RHEL 7 system for the upgrade to RHEL 8 and update the RHEL 7 system to RHEL 7.8.

5. Perform a pre-upgrade assessment of the RHEL 7 system and resolve problems identified in this phase.

6. Perform an in-place upgrade to RHEL 8.2.

7. Verify the state of the upgraded system.

For detailed instructions, see the following chapters.

# CHAPTER 2. PREPARING A RHEL 6 SYSTEM FOR AN UPGRADE TO RHEL 7

This section provides an overview of steps necessary to prepare a RHEL 6 system for an upgrade to RHEL 7.

To prepare your RHEL 6 system for an in-place upgrade to RHEL 7, perform the following steps:

1. Back up the RHEL 6 system, and ensure that the backup is recoverable.
   For details about creating backups in your environment, see the documentation of your backup software. The following list provides additional resources about backup and recovery:

   - What is Relax and Recover(ReaR) and how can I use it for disaster recovery?

   - If the system to upgrade runs in a VM, consider VM snapshots. For details about VM snapshots, see the documentation of your virtualizor.

   - For details about LVM snapshots, see Snapshot logical volumes

   - Relax-and-Recover (ReaR)

2. Update the RHEL 6 system to RHEL 6.10, and reboot the host:

   ```
   # yum update
   # reboot
   ```

3. Enable the RHEL 6 **Extras** repository, and install the utilities required for the in-place upgrade to RHEL 7. For details, see the Step 1: Prepare the system section in the **How do I upgrade from Red Hat Enterprise Linux 6 to Red Hat Enterprise Linux 7** document.

# CHAPTER 3. UPGRADING FROM RHEL 6.10 TO RHEL 7.6

This section describes the key steps for an in-place upgrade from RHEL 6 to RHEL 7.

The in-place upgrade consists of two major stages, a pre-upgrade assessment of the system, and the actual in-place upgrade:

- In the pre-upgrade phase, the Preupgrade Assistant collects information from the system, analyzes it, and suggests possible corrective actions. The Preupgrade Assistant does not make any changes to your system.

- In the in-place upgrade phase, the Red Hat Upgrade Tool installs RHEL 7 packages and adjusts basic configuration where possible.

To perform an in-place upgrade from RHEL 6 to RHEL 7:

1. Assess the upgradability of your system using the Preupgrade Assistant, and fix problems identified in the report before you proceed with the upgrade. For detailed instructions, see Step 2: Perform the system assessment in the **How do I upgrade from Red Hat Enterprise Linux 6 to Red Hat Enterprise Linux 7** document.

2. Use the Red Hat Upgrade Tool to upgrade to RHEL 7.6. For a detailed procedure, see the Step 3: Perform the upgrade section in **How do I upgrade from Red Hat Enterprise Linux 6 to Red Hat Enterprise Linux 7**.

# CHAPTER 4. PREPARING THE RHEL 7 SYSTEM FOR AN UPGRADE TO RHEL 8

This section describes actions you need to perform on your RHEL 7 system before you can proceed with the upgrade to RHEL 8.

To prepare your RHEL 7 system for the upgrade to RHEL8, follow these steps:

1. Migrate the GRUB Legacy boot loader to GRUB2
   After the upgrade, RHEL 7 still uses the GRUB Legacy boot loader. However, GRUB Legacy is not supported on RHEL 7 and later versions. Therefore, you must manually migrate the boot loader to GRUB2. For details, see the Upgrading from GRUB Legacy to GRUB 2 section in the **RHEL 7 System Administrator's Guide**.

2. Resolve potential problems with installed packages. For details, see Section 7.1, "Ensuring that installed packages match the current major RHEL version".

3. Adjust custom **System V** and **Upstart** scripts to **systemd** services.
   On a RHEL 7 system, **systemd** replaces **Upstart** as the init system. To use the features **systemd** provides, such as parallel startup of system services at boot time, manually convert legacy **System V** and **Upstart** scripts to **systemd** services. For details, see Converting traditional sysV init scripts to Red Hat Enterprise Linux 7 systemd unit files.

4. Update paths to system directories in your scripts.
   On a RHEL 7 system, the **/bin**, **/sbin**, **/lib**, and **/lib64** directories have been replaced by symbolic links to their corresponding directory in **/usr**. For example, on RHEL 8, **/bin** is a symbolic link to the **/usr/bin/** directory.

   If you use scripts or applications that expect **/bin**, **/sbin**, **/lib**, and **/lib64** to be real directories, adjust them accordingly. For example, you can update the scripts and applications to:

   - Use the paths in **/usr**, such as **/usr/bin/**

   - Accept that **/bin**, **/sbin**, **/lib**, and **/lib64** are symbolic links instead of directories

5. Update your YUM scripts and plug-ins to use the YUM 4 API.
   RHEL 8 no longer supports the Python API of YUM 3. If you use any scripts or YUM plug-ins that use the legacy API, migrate them to the YUM 4 API. For more information, see Notable changes to the YUM stack.

6. If you miss certain packages after the upgrade, see the Section 7.3, "Installing missing packages after upgrading to RHEL 7" section in the **Troubleshooting** chapter.

7. Review the Considerations in adopting RHEL 8 document and make additional changes to your system if needed.

8. Update your system to RHEL 7.8 and reboot the host:

   ```
   # yum update
   # reboot
   ```

9. Ensure that all your applications and services are configured and work as expected. For example, if you run a DNS server on the host, verify that the configuration is still valid after the upgrade and that the service works in the same way as it did before the upgrade.

10. Follow the preparation steps described in the Preparing a RHEL 7 system for the upgrade chapter in the **Upgrading from RHEL 7 to RHEL 8** document.

# CHAPTER 5. UPGRADING FROM RHEL 7.8 TO RHEL 8.2

This section describes how to update a RHEL 7 host to RHEL 8. Note that RHEL version 7.8 is a prerequisite for upgrading to RHEL 8.2.

Similarly to the in-place upgrade from RHEL 6 to RHEL 7, the in-place upgrade consists of two major stages, a pre-upgrade assessment of the system in which the system remains unchanged, and the actual in-place upgrade. In case of a RHEL 7 to RHEL 8 upgrade, both phases are handled by the Leapp utility.

To perform an in-place upgrade from RHEL 7.8 to RHEL 8.2:

1. Assess the upgradability of your system and fix reported problems as described in Reviewing the pre-upgrade report of the **Upgrading from RHEL 7 to RHEL 8** document.

2. Upgrade your RHEL 7 system to RHEL 8 per instructions in Performing the upgrade from RHEL 7 to RHEL 8 of the **Upgrading from RHEL 7 to RHEL 8** document.

## Additional resources

- Troubleshooting in the **Upgrading from RHEL 7 to RHEL 8** document

# CHAPTER 6. PERFORMING POST-UPGRADE TASKS

This section suggests major actions you should take after upgrading the system to RHEL 8.

After you have upgraded your system to RHEL 8, complete especially the following tasks:

1. Verify the state of the upgraded system. For a list of recommended steps, see the Verifying the post-upgrade state of the RHEL 8 system chapter in the **Upgrading from RHEL 7 to RHEL 8** document.

2. Re-evaluate and re-apply your security policies. For detailed instructions, see the Applying security policies section in the **Upgrading from RHEL 7 to RHEL 8** document.

3. Restore the default SELinux security contexts on the file system:

   ```
   # restorecon -Rv /
   ```

   Note that restoring the SELinux security contexts can be time-consuming on large file systems. Optionally, you can exclude large or remote file systems, by using the **-e** *directory* parameter. For further details, see the **restorecon(8)** man page.

4. Manually migrate applications that were not handled during the upgrade. This can apply both to applications available in the base RHEL and applications provided by Red Hat Software Collections, Red Hat Developer Toolset, or Red Hat Developer Tools.
   On a RHEL 8 host, a number of user space components are distributed as Application Streams. For information about using Application Streams, see the Installing, managing, and removing user-space components documentation.

   For migration instructions, see the RHEL 8 documentation on the Red Hat Customer Portal for the respective component, for example for databases, the Database servers chapter in the **Deploying different types of servers** documentation.

5. Resolve potential problems with installed packages. For details, see Section 7.1, "Ensuring that installed packages match the current major RHEL version".

# CHAPTER 7. TROUBLESHOOTING

This section describes how to troubleshoot and solve package-related issues after the in-place upgrade from both RHEL 6 to RHEL 7 and RHEL 7 to RHEL 8.

## 7.1. ENSURING THAT INSTALLED PACKAGES MATCH THE CURRENT MAJOR RHEL VERSION

Ensure that only packages are installed that have been built for the currently installed major RHEL version:

1. To display installed packages for a different major RHEL version:

   - On RHEL 7, enter:

     ```
     # rpm -aq | grep -v -e '[.]el7' -e '^gpg-pubkey-'
     ```

   - On RHEL 8, enter:

     ```
     # rpm -aq | grep -v -e '[.+]el8' -e '^gpg-pubkey-' -e '^libmodulemd1-'
     ```

2. Remove or replace the packages reported in the previous step, because they are not supported. For details see the Can I install packages from different versions of RHEL? document.
   If the command in the previous step did not display any output, all installed packages were built for the installed major RHEL version and no further actions are required.

## 7.2. FIXING DEPENDENCY ERRORS

After an in-place upgrade, it is possible that packages are installed while some of their dependencies have been removed by the upgrade tool. To solve this problem:

1. Identify dependencies errors:

   ```
   # yum check dependencies
   ```

   If the command displays no output, no further actions are required.

2. To fix dependency errors, reinstall the affected packages. During this operation, the **yum** utility automatically installs missing dependencies. If the required dependencies are not available in the repositories, install these packages manually.

## 7.3. INSTALLING MISSING PACKAGES AFTER UPGRADING TO RHEL 7

If you miss certain packages after the upgrade from RHEL 6 to RHEL 7, you probably did not provide a repository to the Red Hat Upgrade Tool that contained these packages. To install these packages after the upgrade, you can use, for example, the following commands:

```
# cd /root/preupgrade
# bash noauto_postupgrade.d/install_rpmlist.sh kickstart/RHRHEL7rpmlist_kept
```

Note that different issues can prevent installing the RPMs. In this case, resolve the problems. For further details about other files with lists of packages you should install on the upgraded system, see the **/root/preupgrade/kickstart/README** file and the pre-upgrade report.

## 7.4. KNOWN ISSUES

For known issues when upgrading:

- From RHEL 6 to RHEL 7, see the known issues section in the **How do I upgrade from Red Hat Enterprise Linux 6 to Red Hat Enterprise Linux 7** documentation

- From RHEL 7 to RHEL 8, see the known issues section in the **Upgrading from RHEL 7 to RHEL 8** documentation

# CHAPTER 8. ADDITIONAL RESOURCES

- Supported in-place upgrade paths for Red Hat Enterprise Linux

- Red Hat Enterprise Linux Life Cycle

- Using and configuring Red Hat Subscription Manager