



Red Hat Enterprise Linux 8

Upgrading to RHEL 8

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

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Abstract

This document provides instructions on how to perform an in-place upgrade from Red Hat Enterprise Linux 7 to Red Hat Enterprise Linux 8 using the Leapp utility. During the in-place upgrade, the existing RHEL 7 operating system is replaced by a RHEL 8 version.

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- For simple comments on specific passages, make sure you are viewing the documentation in the Multi-page HTML format. Highlight the part of text that you want to comment on. Then, click the **Add Feedback** pop-up that appears below the highlighted text, and follow the displayed instructions.
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 1. Go to the [Bugzilla](#) website.
 2. As the Component, use **Documentation**.
 3. Fill in the **Description** field with your suggestion for improvement. Include a link to the relevant part(s) of documentation.
 4. Click **Submit Bug**.

CHAPTER 1. REQUIREMENTS AND KNOWN LIMITATIONS

1.1. REQUIREMENTS

An in-place upgrade to RHEL 8 is currently supported only on systems meeting the following requirements:

- RHEL 7.6 installed
- The Server variant
- The Intel 64 architecture
- At least 100MB of free space available on the boot partition (mounted at **/boot**)
- FIPS mode disabled; see the solution [How to disable FIPS mode in RHEL 6 or RHEL 7](#)
- Minimum hardware requirements for RHEL 8; see [Red Hat Enterprise Linux technology capabilities and limits](#).

1.2. KNOWN LIMITATIONS

Notable known limitations currently include:

- Roll back to the last known good state has not been implemented in the **Leapp** utility. However, it is possible to use the **BOOM** boot manager to allow booting into LVM snapshots of the system partitions. For instructions, see [What is BOOM and how to install it?](#) and [How to create a BOOM boot entry](#).
- Packages that are not part of the Minimal (@**minimal**) or Base (@**base**) package groups might cause the upgrade to fail. It is advisable to use **BOOM** in such cases.
- No disk, LVM, or file system encryption can currently be used on a system targeted for an in-place upgrade.
- No Multipath or any kind of network storage mount can be used as a system partition (for example, iSCSI, FCoE, or NFS).
- During the upgrade process, the **Leapp** utility sets SELinux mode to permissive and disables firewall.
- No support for other Red Hat products running on top of the OS, Red Hat Software Collections, Red Hat Developer Tools, or add-ons, such as High Availability or Network Function Virtualization, is currently provided.
- On systems where the root file system is formatted as XFS with **ftype=0** (default in RHEL 7.2 and earlier versions), the RPM upgrade transaction calculation might fail if numerous packages are installed on the system. If the cause of such a failure is insufficient space, increase the available space by using the **LEAPP_OVL_SIZE=<SIZE_IN_MB>** environment variable with the **leapp upgrade** command, and set the size to more than 2048 MB (see a related [solution](#) for more information). To determine the **ftype** value, use the **xfs_info** command.
- The whole system needs to be mounted under the root file system, with the exception of **/home** and **/boot**. For example, the **/var** or **/usr** directories cannot be mounted on a separate partition.

- In-place upgrade is currently unsupported for on-demand instances on Public Clouds (Amazon EC2, Azure, Huawei Cloud, Alibaba Cloud, Google Cloud) that use Red Hat Update Infrastructure but not Red Hat Subscription Manager for a RHEL subscription.

See also [Section 5.3, “Known issues”](#).

CHAPTER 2. PREPARING A RHEL 7 SYSTEM FOR THE UPGRADE

This procedure describes the steps that are necessary before performing an in-place upgrade to RHEL 8 using the **Leapp** utility.

Prerequisites

- The system meets conditions listed in [Chapter 1, Requirements and known limitations](#).

Procedure

1. Make sure your system has been successfully subscribed using the Red Hat Subscription Manager.
2. Make sure you have the Red Hat Enterprise Linux Server subscription attached.
 - a. Automatically assign the Red Hat Enterprise Linux Server subscription to the system:

```
# subscription-manager attach --auto
```

- b. Verify that RHEL Server is subscribed:

```
# subscription-manager list --installed
+-----+
   Installed Product Status
+-----+
Product Name: Red Hat Enterprise Linux Server
Product ID: 69
Version: 7.6
Arch: x86_64
Status: Subscribed
```

3. Set the RHEL 7.6 version as a starting point for the upgrade:

```
# subscription-manager release --set 7.6
```

4. If you use the **yum-plugin-versionlock** plug-in to lock packages to a specific version, clear the lock by running:

```
# yum versionlock clear
```

See [How to restrict yum to install or upgrade a package to a fixed specific package version?](#) for more information.

5. Update all packages to the latest version:

```
# yum update
```

6. Reboot the system:

```
# reboot
```

7. Enable the Extras repository where some of the dependencies are available:

```
# subscription-manager repos --enable rhel-7-server-extras-rpms
```

8. Install the Leapp utility:

```
# yum install leapp
```

9. Download additional required data files (RPM package changes and RPM repository mapping) attached to the Knowledgebase article [Data required by the Leapp utility for an in-place upgrade from RHEL 7 to RHEL 8](#) and place them in the `/etc/leapp/files` directory.
10. Make sure you have any configuration management (such as **Salt**, **Chef**, **Puppet**, **Ansible**) disabled or adequately reconfigured to not attempt to restore the original RHEL 7 system.
11. Make sure your system does not use more than one Network Interface Card (NIC) with a name based on the prefix used by the kernel (**eth**). For instructions on how to migrate to another naming scheme before an in-place upgrade to RHEL 8, see [How to perform an in-place upgrade to RHEL 8 when using kernel NIC names on RHEL 7](#).
12. Make sure you have a full system backup or a virtual machine snapshot. You should be able to get your system to the pre-upgrade state if you follow standard disaster recovery procedures within your environment.

CHAPTER 3. PERFORMING THE UPGRADE FROM RHEL 7 TO RHEL 8

This procedure describes how to upgrade to RHEL 8 using the **Leapp** utility.

Prerequisites

- The steps listed in [Chapter 2, Preparing a RHEL 7 system for the upgrade](#) have been completed, including a full system backup.

Procedure

1. On your RHEL 7 system, start the upgrade process:

```
# leapp upgrade
```

In this phase, the **Leapp** utility collects data about your system, checks the upgradability, and produces a pre-upgrade report in the **/var/log/leapp/leapp-report.txt** file.

If the system is upgradable, **Leapp** downloads necessary data and prepares an RPM transaction for the upgrade.

If your system does not meet the parameters for a reliable upgrade, **Leapp** terminates the upgrade process and provides a record describing the issue and a recommended solution in the **/var/log/leapp/leapp-report.txt** file. For more information, see [Chapter 5, Troubleshooting](#).

2. Manually reboot the system:

```
# reboot
```

In this phase, the system boots into an RHEL 8-based initial RAM disk image, initramfs. **Leapp** upgrades all packages and automatically reboots to the RHEL 8 system.

If a failure occurs, investigate logs as described in [Chapter 5, Troubleshooting](#).

3. Perform the following post-upgrade tasks:

- a. Log in to the RHEL 8 system.

- b. Change SELinux mode to enforcing:

- Ensure that there are no SELinux denials before you switch from permissive mode, for example, by using the **ausearch** utility. See [Chapter 5, Troubleshooting](#) for more details.

- Enable SELinux in enforcing mode:

```
# setenforce 1
```

- c. Enable firewall:

```
# systemctl start firewalld  
# systemctl enable firewalld
```

See [Using and configuring firewalls](#) for more information.

- d. Unset the RHEL 7.6 version to be able to consume **yum** updates from RHEL 8 correctly:

```
# subscription-manager release --unset
```

- e. Verify the state of the system as described in [Chapter 4, Verifying the post-upgrade state of the RHEL 8 system](#).

CHAPTER 4. VERIFYING THE POST-UPGRADE STATE OF THE RHEL 8 SYSTEM

This procedure lists steps recommended to perform after an in-place upgrade to RHEL 8.

Prerequisites

- The system has been upgraded following the steps described in [Chapter 3, Performing the upgrade from RHEL 7 to RHEL 8](#) and you were able to log in to RHEL 8.

Procedure

After the upgrade completes, determine whether the system is in a desired state, at least:

- Verify that the current OS version is Red Hat Enterprise Linux 8:

```
# cat /etc/redhat-release  
Red Hat Enterprise Linux release 8.0 (Ootpa)
```

- Check the OS kernel version:

```
# uname -r  
4.18.0-80.el8.x86_64
```

Note that **.el8** is important.

- Verify that the correct product is installed:

```
# subscription-manager list --installed  
+-----+  
 Installed Product Status  
+-----+  
Product Name: Red Hat Enterprise Linux for x86_64  
Product ID: 479  
Version: 8.0  
Arch: x86_64  
Status: Subscribed
```

- Verify that network services are operational, for example, try to connect to a server using SSH.

CHAPTER 5. TROUBLESHOOTING

This chapter lists troubleshooting resources and tips.

5.1. TROUBLESHOOTING RESOURCES

Console output

By default, only error and critical log level messages are printed to the console output by the **Leapp** utility. To change the log level, use the **--verbose** or **--debug** options with the **leapp upgrade** command.

- In *verbose* mode, **Leapp** prints info, warning, error, and critical messages.
- In *debug* mode, **Leapp** prints debug, info, warning, error, and critical messages.

Logs

- The **/var/log/leapp/dnf-debugdata** directory contains transaction debug data. This directory is present only if **Leapp** is executed with the **--debug** option.
- The **/var/log/leapp/leapp-upgrade.log** file lists issues found during the initramfs phase.
- The **journalctl** utility provides complete logs.

Reports

- The **/var/log/leapp/leapp-report.txt** file lists issues found during the pre-upgrade phase.

5.2. TROUBLESHOOTING TIPS

Pre-upgrade phase

- Verify that your system meets all conditions listed in [Chapter 1, Requirements and known limitations](#). For example, use the **df -h** command to see whether the system has sufficient available space in the **/boot** partition.
- Make sure you followed all steps described in [Chapter 2, Preparing a RHEL 7 system for the upgrade](#), for example, your system does not use more than one Network Interface Card (NIC) with a name based on the prefix used by the kernel (**eth**).
- Investigate the pre-upgrade report in the **/var/log/leapp/leapp-report.txt** file to determine the problem and a recommended solution.
- If a problem occurs during downloading RPM packages, examine transaction debug data located in the **/var/log/leapp/dnf-debugdata** directory.

initramfs phase

- During this phase, potential failures will redirect you into the dracut shell. Check the journal:

```
# journalctl
```

Alternatively, reboot the system from the dracut shell issuing the **reboot** command and check the **/var/log/leapp/leapp-upgrade.log** file.

Post-upgrade phase

- If your system appeared to be successfully upgraded but booted into the old RHEL 7 kernel, reboot and check the kernel version of the default entry in GRUB.
- Make sure you followed the recommended steps in [Chapter 4, Verifying the post-upgrade state of the RHEL 8 system](#).
- If your application or a service stops working or behaves incorrectly after you have switched SELinux to enforcing mode, search for denials using the **ausearch**, **journalctl**, or **dmesg** utilities:

```
# ausearch -m AVC,USER_AVC -ts recent
# journalctl -t setroubleshoot
# dmesg | grep -i -e selinux -e type=1400
```

The most common problems are caused by incorrect labeling. See [Troubleshooting problems related to SELinux](#) for more details.

5.3. KNOWN ISSUES

- Under certain circumstances, traceback messages similar to the following example might occur:

```
2019-02-11T08:00:38Z CRITICAL Traceback (most recent call last):
  File "/usr/lib/python2.7/site-packages/dnf/yum/rpmtrans.py", line 272, in callback
    File "/usr/lib/python2.7/site-packages/dnf/yum/rpmtrans.py", line 356, in _uninst_progress
    File "/usr/lib/python2.7/site-packages/dnf/yum/rpmtrans.py", line 244, in _extract_cbkey
      RuntimeError: TransactionItem not found for key: lz4
```

It is safe to ignore such messages, which neither interrupt nor affect the result of the upgrade process.

- Network teaming currently does not work when the in-place upgrade is performed with a disabled Network Manager.
- The **Leapp** utility currently fails to upgrade packages from the Supplementary channel, such as the **virtio-win** package, due to a missing mapping support for this channel. (BZ#1621775)
- RHEL 8 packages that use RPM rich dependencies cause failure during the upgrade transaction check. So far, **redhat-rpm-config** with its dependencies and **tpm2-abrmd** have been identified to cause such a problem. These packages are removed during the upgrade process by **Leapp**.
- Customers often use an HTTP proxy for their environments. In such cases, Red Hat Subscription Manager needs to be configured to use such a proxy, or the **subscription-manager** command needs to be executed with the **--proxy <hostname>** option, otherwise execution of the **subscription-manager** command fails. If customers use the **--proxy** option instead of the configuration change, the upgrade process fails because **Leapp** is unable to detect the proxy. To prevent the problem from occurring, manually edit the **rhsm.conf** file as described in [How to configure HTTP Proxy for Red Hat Subscription Management](#). (BZ#1689294).

5.4. OBTAINING SUPPORT

To open a support case, select RHEL 8 as the product, and provide a sosreport from your system. To generate a sosreport on your system, run:

```
# sosreport
```

—

Note that you can leave the case ID empty.

For details on generating a sosreport, see the solution [What is a sosreport and how to create one in Red Hat Enterprise Linux 4.6 and later?](#).

For more information on opening and managing a support case on the Customer Portal, see the article [How do I open and manage a support case on the Customer Portal? .](#)

CHAPTER 6. RELATED INFORMATION

- Red Hat Enterprise Linux technology capabilities and limits
- Considerations in adopting RHEL 8