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Oracle Linux 7 to Oracle Linux 8 In Place Upgrade with LEAPP

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Contents

Oracle Linux 7 to Oracle Linux 8 In Place Upgrade with LEAPP

This document intends to explain steps for executing   in place upgrade from OEL7 to OEL8 for **OCI Native VMs** with Leapp utility.

There are many prerequisite tasks to be completed before executing the upgrade process without fail. It is very important to understand that only packages provided by Oracle are installed. Upgrade stability isn't guaranteed if third-party packages are present in the system. Please check Supported OS versions, Shapes and other requirements if planned systems are meeting the criteria below.

This process might be disruptive if not applied correctly or on a non-supported environment. It is highly recommended to test and apply changes on a non-production environment first to get familiar with process and observe any challenges may cause problem in production.

You can get more details from documentation below.

https://docs.oracle.com/en/learn/ol-linux-leapp/index.html
https://docs.oracle.com/en/operating-systems/oracle-linux/8/leapp/leapp-AboutLeapp.html

Leapp operations consist of two phases:

The pre-upgrade phase, where system checks are performed to verify if the software can be upgraded.

The actual upgrade, which process is based on configuration files that map packages between previous and current versions of the software packages.

1.1 Supported Leapp Features

1.1.1 Upgrading Oracle Linux 7 Systems

For Oracle Linux systems, the following table lists supported and unsupported features by the Leapp utility.

Upgradeable With Leapp	Not Upgradeable With Leapp
Platforms (latest shipping updates) • x86_64 • Arm (aarch64) Operating Systems • Current Oracle Linux 7 version only Profiles • Minimal Install • Virtualization Host • Server with GUI • Basic Web Server • Infrastructure Server • File and Print Server	Systems installed with the following: • ISV applications and middleware Note: ISVs must provide and validate Leapp actors to coordinate their application upgrades. • Oracle Linux Manager or Spacewalk for Oracle Linux • Installations that did not use ISO images such as Ceph and GlusterFS • Migration of disks that are encrypted with LUKS • Systems that are registered with ULN • Systems in FIPS mode or running SecureBoot • Systems configured with Docker or Podman containers • Systems configured with high-availability clustering software such as Pacemaker / Corosync or other 3rd party clustering solutions

1.1.2 Upgrading Oracle Linux 7 Oracle Cloud Infrastructure Instances

The Leapp utility can also upgrade both the x86_64 and Arm (aarch64) platforms that are running Oracle Linux 7 instances on Oracle Cloud Infrastructure.

The following table lists available and unavailable features:

Supported with Leapp	Unsupported with Leapp
Images • Oracle Linux 7 Unbreakable Enterprise Kernel Release 6 Platform Image • Oracle Autonomous Linux 7 See https://docs.oracle.com/iaas/Content/Compute/References/images.htm	**Images** • Bring Your Own (BYOI) Images See https://docs.oracle.com/iaas/Content/Compute/References/bringyourownimage.htm. • Oracle Cloud Infrastructure Marketplace images
Shapes • All Flexible Shapes See https://docs.oracle.com/iaas/Content/Compute/References/computeshapes.htm#flexible. • All Virtual Machine Shapes See https://docs.oracle.com/iaas/Content/Compute/References/computeshapes.htm#vmshapes.	**Shapes** • Bare Metal Shapes See, https://docs.oracle.com/iaas/Content/Compute/References/computeshapes.htm#baremetalshapes..
Features • Instances that are being managed with the Oracle OS Management Service See https://docs.oracle.com/iaas/os-management/osms/osms-getstarted.htm. • Instances managed with the Oracle OS Management Hub service See https://docs.oracle.com/en-us/iaas/osmh/doc/overview.htm.	**Features** • Any unupgradeable features listed in the table in Upgrading Oracle Linux 7 Systems. • Oracle Autonomous Linux 7 Instances that are being managed with the Oracle OS Management Service must migrate to Oracle OS Management Hub first. See https://docs.oracle.com/iaas/os-management/osms/osms-migration-osmh.htm.

1.1.3 Upgrading Oracle Linux 7 Systems with Oracle Databases

The Leapp utility can be used to upgrade Oracle Linux 7 systems that host Oracle Database both single host or in a Real Application Clusters (RAC) configuration across multiple hosts. Systems must fulfill the other Leapp criteria listed in the previous sections. The following table lists the scope of Oracle Database support.

Supported with Leapp	Unsupported with Leapp
• Upgrading Oracle Linux 7 running Oracle Database 19c to Oracle Linux 8 on x86_64 • Upgrading Oracle Database 12c to 19c on Oracle Linux 7 before upgrading to Oracle Linux 8 on x86_64 • Upgrading Oracle Database 18c to 19c on Oracle Linux 7 before upgrading to Oracle Linux 8 on x86_64	• Upgrading from Oracle Database 21c on Oracle Linux 7 to Oracle Database 21c Oracle Linux 8 • Upgrading directly from Oracle Database 12c on Oracle Linux 7 to Oracle Database 19c Oracle Linux 8 • Upgrading directly from Oracle Database 19c on Oracle Linux 7 to Oracle Database 21c Oracle Linux 8 • Upgrading Oracle Linux 7 with an Oracle Databases on a Bare Metal Oracle Cloud Infrastructure to Oracle Linux 8 • Upgrading Oracle Linux 7 running any instant client to Oracle Linux 8

1.1.4 Requirements for Upgrading

To upgrade an Oracle Linux 7 system or instance, ensure that either one meets the following requirements:

- The minimum installation requirements as listed in System Requirements in Oracle Linux 8: Installing Oracle Linux are met. In particular, ensure that the system has disk space to complete the Leapp upgrade. Disk space in the /boot partition is especially paramount. The partition must have at least 250 MB of disk space to accommodate the installation of the Red Hat Compatible Kernel (RHCK) and Unbreakable Enterprise Kernel (UEK), initramfs, kdump images, and so on. Examine the preupgrade report which might notify you if insufficient disk space is detected. For more information about the preupgrade phase, see Assessing the Capability of the System for Upgrading.
- Only packages provided by Oracle are installed. Upgrade stability isn't guaranteed if third-party packages are present in the system.
- Oracle Linux yum server at https://yum.oracle.com or a corresponding yum mirror is accessible.If accessing repositories from a mirror or a local repository, ensure that both Oracle Linux7 and Oracle Linux 8 channels are mirrored.
- x86_64 deployments are running Unbreakable Enterprise Kernel Release 5 or later versions or the Red Hat Compatible Kernel (RHCK).
- aarch64 deployments are running the Unbreakable Enterprise Kernel Release 6.

1.2 Preparing for the Upgrade

Complete the steps as applicable to prepare for an upgrade from Oracle Linux 7 to Oracle Linux 8.

- Set up a means to connect remotely through a console.

- Always Keep a Console Connection ready to reach instance through Console. Create a console connection by following the instructions at https://docs.oracle.com/iaas/Content/Compute/References/serialconsole.htm#Instance_Console_Connections.

- Verify that if Instance is managed by OS Management Hub and OS Management Service and disable agents before upgrade. You can enable them after successful execution.

- Perform Backup for Boot Volume and Block Volume before starting the upgrade process. Always back up a system so that the system can be restored to its former state if the upgrade fails. https://docs.oracle.com/iaas/Content/Block/Concepts/bootvolumebackups.htm

- Shut down all production workloads that have been set up to run on the system, as the upgrade is intrusive and requires several reboots.

- Disable Secure Boot if it's running. It is not possible to disable Secure Boot if it is already enabled on an Oracle Cloud Infrastructure instance.

```
#sudo bootctl status
...
Secure Boot: disabled
...
#sudo mokutil --sb-state
SecureBoot disabled
```

- If the system has network mounted file systems, unmount them, and then insert related entries in the /etc/fstab file inside comment marks.

- If the system is registered with ULN or a ULN mirror, unregister the system.

1.3 Upgrading the System Step by Step

1. Establish an SSH connection to your instance.

2. Verify that the system locale is set to **en_US.UTF-8**.

```
#cat /etc/locale.conf
```

3. Obtain the latest Oracle Linux 7 packages.

```
#sudo yum update -y
```

4. Reboot the system.

```
#sudo reboot
```

5. After reboot and Instance is reachable again, take a note of OS and kernel versions.
6. Ensure that the ol7_leapp and ol7_latest repositories are enabled.

```
#uname -r
#cat /etc/oracle-release
```

7. Install the Leapp utility using the following command:

```
#sudo yum install -y leapp-upgrade --enablerepo=ol7_leapp,ol7_latest
```

8. Next phase will be running the preupgrade check command and analyzing the report.

```
#sudo leapp preupgrade --oci
```

9. Report will be displayed as an example below.
   Examine the report files. We have to clear the high risk (Inhibitor) entries marked as Risk Factor: high (inhibitor). Otherwise, these findings will prevent the upgrade from completing the process.

```
============================================================
                     REPORT OVERVIEW
============================================================
Upgrade has been inhibited due to the following problems:
    1. Possible problems with remote login using root account
    2. Missing required answers in the answer file
HIGH and MEDIUM severity reports:
    1. Packages not signed by Oracle found on the system
    2. Difference in Python versions and support in OL 8
    3. Detected customized configuration for dynamic linker.
    4. Default Boot Kernel
Reports summary:
    Errors:                      0
    Inhibitors:                  2
    HIGH severity reports:       3
    MEDIUM severity reports:     1
    LOW severity reports:        5
    INFO severity reports:       2
Before continuing consult the full report:
    A report has been generated at /var/log/leapp/leapp-report.json
    A report has been generated at /var/log/leapp/leapp-report.txt
============================================================
                  END OF REPORT OVERVIEW
============================================================
```

10. Fix the first inhibitor by editing **/etc/ssh/sshd_config.** You can keep PermitRootLogin Yes or No based your hardening rules but you must add an entry to file as "**PermitRootLogin prohibit-password**"

11. In order to fix the 2nd inhibitor, we need to update answerfile and change "confirm" line to confirm = True by editing the answer file. As alternative, we can run this command the update the answer file

```
#sudo leapp answer --section remove_pam_pkcs11_module_check.confirm=True
```

12. After fixing Inhibitors, re-run the pre-upgrade command

```
#sudo leapp preupgrade --oci
```

13. after re-running the pre-upgrade, the report will be looking like below without any blocker.

```
Debug output written to /var/log/leapp/leapp-preupgrade.log
============================================================
                     REPORT OVERVIEW
============================================================
HIGH and MEDIUM severity reports:
    1. Detected customized configuration for dynamic linker.
    2. Difference in Python versions and support in OL 8
    3. Module pam_pkcs11 will be removed from PAM configuration
    4. Default Boot Kernel
Reports summary:
    Errors:                    0
    Inhibitors:                0
    HIGH severity reports:     2
    MEDIUM severity reports:   2
    LOW severity reports:      5
    INFO severity reports:     2
Before continuing consult the full report:
    A report has been generated at /var/log/leapp/leapp-report.json
    A report has been generated at /var/log/leapp/leapp-report.txt
============================================================
                  END OF REPORT OVERVIEW
============================================================
Answerfile has been generated at /var/log/leapp/answerfile
```

14. Run the upgrade process.

```
#sudo leapp upgrade --oci
```

15. The upgrade process will take approximately 15 minutes, and returns to the command prompt when finished.

```
Complete!
====> * add_upgrade_boot_entry
        Add new boot entry for Leapp provided initramfs.
A reboot is required to continue. Please reboot your system.

Debug output written to /var/log/leapp/leapp-upgrade.log
============================================================
                    REPORT OVERVIEW
============================================================
HIGH and MEDIUM severity reports:
    1. Difference in Python versions and support in OL 8
    2. Detected customized configuration for dynamic linker.
    3. Module pam_pkcs11 will be removed from PAM configuration
    4. Default Boot Kernel
Reports summary:
    Errors:                      0
    Inhibitors:                  0
    HIGH severity reports:       2
    MEDIUM severity reports:     2
    LOW severity reports:        5
    INFO severity reports:       2
Before continuing consult the full report:
    A report has been generated at /var/log/leapp/leapp-report.json
    A report has been generated at /var/log/leapp/leapp-report.txt
============================================================
                 END OF REPORT OVERVIEW
============================================================
Answerfile has been generated at /var/log/leapp/answerfile
```

16. The reboot will disconnect the SSH connection. During the boot process, the Leapp process automatically upgrades packages. The upgrade operation also includes multiple automatic reboots. We will not be able to reconnect the SSH session until all the reboots have been completed. We have to be patient and wait approximately 30 minutes and then reconnect the SSH session to the system. We can observe the boot process with Local Console Connection.
17. When all upgrade completes, we can re-establish the SSH connection again.
18. Now we can check the new OS and kernel versions

```
#uname -r
#cat /etc/oracle-release
```

19. We can confirm that OS has been update to Oracle Linux 8.

1.4 Post upgrade Tasks

Depending on the OS profile and application requirements, we might need to perform other procedures to return the newly upgraded system back into operation. We can review the `/var/log/leapp/leapp-report.txt` that's generated after the upgrade. This report might contain more recommendations to ensure that the upgraded system remains in a supported state.

Important Services and Settings to be checked after upgrade

1. Firewalld

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

2. SELINUX

   ```
   #sudo setenforce enforcing
   OR
   #sudo vi /etc/selinux/config
   SELINUX=enforcing
   ```

3. NetworkManager & DNS Management (/etc/resolv.conf)
4. python libraries
5. OS Management Service & OS Management Hub
6. Removing old kernel packages and removing unnecessary packages from OEL7

   ```
   #sudo rpm -qa | grep el7
   #sudo dnf remove -y leapp-upgrade
   #sudo dnf remove -y python2-leapp
   #sudo dnf remove -y *el7*
   #sudo dnf clean all
   ```