Oracle® Grid Infrastructure
Upgrading Oracle Restart

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Oracle Grid Infrastructure Upgrading Oracle Restart, 21c for Linux and Unix-Based Operating Systems

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Preface

This scenario document explains how to upgrade Oracle Grid Infrastructure for a standalone server (Oracle Restart) to a later release.

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  Install Java Access Bridge so that assistive technologies on Microsoft Windows systems can use the Java Accessibility API.

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Use Case Scenario for this Document

Oracle Grid Infrastructure for a standalone server upgrade consists of upgrading Oracle Restart and Oracle Automatic Storage Management (Oracle ASM). Oracle Restart supports only out-of-place upgrades.

Prerequisites for this Scenario

- Before you start the Oracle Restart upgrade, ensure that you have administrative privileges.

- Download the Oracle Grid Infrastructure image file for the release to which you want to upgrade.

Outline for this Scenario

1. **Preparing Oracle Restart for Upgrade**. Identify the upgrade path for your installation and complete the required preupgrade checks.

2. **Upgrading and Patching Oracle Restart**. Use the Oracle Grid Infrastructure installer to upgrade and OPatchAuto to patch Oracle Restart.

3. **Downgrade Oracle Restart**. Downgrade Oracle Restart to an earlier release after a successful or a failed upgrade.

These steps correspond to the chapters in this scenario document.

Audience

This guide provides configuration information for network and system administrators, and database installation information for database administrators (DBAs) who upgrade or downgrade Oracle Restart.

This guide assumes that you are familiar with Oracle Database concepts.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Set Up Java Access Bridge to Implement Java Accessibility

Install Java Access Bridge so that assistive technologies on Microsoft Windows systems can use the Java Accessibility API.

Java Access Bridge is a technology that enables Java applications and applets that implement the Java Accessibility API to be visible to assistive technologies on Microsoft Windows systems.

Refer to *Java Platform, Standard Edition Accessibility Guide* for information about the minimum supported versions of assistive technologies required to use Java Access Bridge. Also refer to this guide to obtain installation and testing instructions, and instructions for how to use Java Access Bridge.

Related Topics

• *Java Platform, Standard Edition Java Accessibility Guide*

Command Syntax

Refer to these command syntax conventions to understand command examples in this guide.

Convention	Description
$	Bourne or BASH shell prompt in a command example. Do not enter the prompt as part of the command.
%	C Shell prompt in a command example. Do not enter the prompt as part of the command.
#	Superuser (root) prompt in a command example. Do not enter the prompt as part of the command.
monospace	UNIX command syntax

Convention	Description
backslash \	A backslash is the UNIX and Linux command continuation character. It is used in command examples that are too long to fit on a single line. Enter the command as displayed (with a backslash) or enter it on a single line without a backslash: `dd if=/dev/rdsk/c0t1d0s6 of=/dev/rst0 bs=10b \  count=10000`
braces { }	Braces indicate required items: `.DEFINE {macro1}`
brackets [ ]	Brackets indicate optional items: `cvtcrt termname [outfile]`
ellipses ...	Ellipses indicate an arbitrary number of similar items: `CHKVAL fieldname value1 value2 ... valueN`
italic	Italic type indicates a variable. Substitute a value for the variable: *library_name*
vertical line |	A vertical line indicates a choice within braces or brackets: `FILE filesize [K|M]`

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.
italic	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.

1
Preparing to Upgrade Oracle Restart

Before you upgrade Oracle Restart, determine the best upgrade path, and run the procedures that are described here to prepare for the upgrade.

Oracle recommends that you test the upgrade process and prepare a backup strategy.

- Options and Restrictions for Oracle Restart Upgrades
  Review these upgrade options and restrictions when you upgrade to Oracle Grid Infrastructure for a standalone server (Oracle Restart) 21c.

- Checks to Complete Before Upgrading Oracle Restart
  Complete these preupgrade checks to avoid issues during the Oracle Restart upgrade process.

- Installing the Oracle Database Preinstallation RPM Using ULN
  Use this procedure to subscribe to Unbreakable Linux Network (ULN) Oracle Linux channels for your Oracle software.

- Creating a Copy of the Preinstallation Configuration File for the grid User
  Create a copy of the preinstallation configuration file for the `grid` user to set hard and soft limits for the operating system parameters.

- Shutting Down the Database
  If your Oracle Database uses Oracle Automatic Storage Management (Oracle ASM) for storage, then shut down the database before upgrading Oracle Restart.

Options and Restrictions for Oracle Restart Upgrades

Review these upgrade options and restrictions when you upgrade to Oracle Grid Infrastructure for a standalone server (Oracle Restart) 21c.

Supported upgrade paths for Oracle Restart for this release are:

- Oracle Restart upgrade from 12c Release 2 (12.2) to Oracle Restart 21c.

- Oracle Restart upgrade from 18c to Oracle Restart 21c.

- Oracle Restart upgrade from 19c to Oracle Restart 21c.

Restrictions for Oracle Restart Upgrades

- Oracle Restart upgrades are always out-of-place upgrades. You cannot perform an in-place upgrade of Oracle Restart to an existing Grid home.

- The same user that owned the earlier release of the Oracle Restart software must perform the Oracle Restart 21c upgrade.

- Do not delete directories in the Grid home. For example, do not delete the directory `Grid_home/OPatch`. If you delete the directory, then the Oracle Restart installation owner cannot use the OPatch utility to patch the Grid home, and OPatch displays the error message `"'checkdir' error: cannot create Grid_home/OPatch"`.

- The software in the 21c Oracle Restart home is not fully functional until the upgrade is complete. Running `srvctl`, `crsctl`, and other commands from the new Grid home are not supported until the `rootupgrade.sh` script is run and the upgrade is complete.

- To manage databases in an existing earlier release database home during the Oracle Restart upgrade, use the `srvctl` utility from the existing database home.

Checks to Complete Before Upgrading Oracle Restart

Complete these preupgrade checks to avoid issues during the Oracle Restart upgrade process.

1. Review the new features for the Oracle Restart release to which you want to upgrade.

2. Ensure that you have all of the information you need for the upgrade. For example:
   - An Oracle base location for Oracle Restart.
   - An Oracle Restart home location that is different from your existing Oracle Restart home.
   - Privileged user operating system groups.
   - `root` user access, to run scripts as the `root` user during the upgrade.

3. Unset the `$ORACLE_HOME`, `$ORACLE_BASE`, and `$ORACLE_SID` environment variables because these environment variables are used during the upgrade. For example, as the `grid` user, run the following commands:

   For bash shell:

   ```
   $ unset ORACLE_HOME
   $ unset ORACLE_BASE
   $ unset ORACLE_SID
   ```

   For C shell:

   ```
   $ unsetenv ORACLE_HOME
   $ unsetenv ORACLE_BASE
   $ unsetenv ORACLE_SID
   ```

4. Ensure that the installation owner user profile, such as `.profile` or `.cshrc`, does not set any of these environment variables.

5. Unset any environment variables, such as `ORA_NLS10` and `TNS_ADMIN`, set for the installation owner user that is connected with the Oracle software homes.

6. Ensure that the `$ORACLE_HOME/bin` path is removed from your PATH environment variable.

Related Topics

- *Oracle Database New Features Guide*

Installing the Oracle Database Preinstallation RPM Using ULN

Use this procedure to subscribe to Unbreakable Linux Network (ULN) Oracle Linux channels for your Oracle software.

To obtain Unbreakable Linux Network (ULN) support, subscribe to Oracle Linux channels, and to add the Oracle Linux channel that distributes the Oracle Database Preinstallation RPM:

1. Download the Oracle Linux ISO from one of the following websites:

   • Oracle yum

     https://yum.oracle.com/oracle-linux-isos.html

   • Oracle Software Delivery Cloud website:

     https://edelivery.oracle.com/linux

   > **Note:**
   >
   > Ensure that you use the latest available update release for Oracle Linux.

2. Register your server with Unbreakable Linux Network (ULN). By default, you are registered for the Oracle Linux Latest channel for your operating system and hardware.

   • Oracle Linux 7
     https://docs.oracle.com/en/operating-systems/oracle-linux/uln-user/

   • Oracle Linux 8
     https://docs.oracle.com/en/operating-systems/oracle-linux/8/software-management/

3. Log in to Unbreakable Linux Network:

   https://linux.oracle.com

4. Start a terminal session and enter the following command as `root`, depending on your platform. For example:

   • Oracle Linux 7

     ```
     # yum install oracle-database-preinstall-21c
     ```

   • Oracle Linux 8

     ```
     # dnf install oracle-database-preinstall-21c
     ```

   > **Note:**
   >
   > Use the `-y` option if you want `yum` to skip the package confirmation prompt.

You should see output indicating that you have subscribed to the Oracle Linux channel, and that packages are being installed.

The Oracle Database Preinstallation RPM automatically creates a standard (not role-allocated) Oracle installation owner and groups, and sets up other kernel configuration settings as required for Oracle installations.

5. Check the RPM log file to review the system configuration changes. For example:

```
/var/log/oracle-database-preinstall-21c/backup/timestamp/
orakernel.log
```

6. Repeat steps 1 through 4 on all other servers in your cluster.

If you have a premier support subscription, you can enable Ksplice to provide zero downtime patching. Refer to the Ksplice User's Guide for installation instructions:

https://docs.oracle.com/en/operating-systems/oracle-linux/ksplice-user/

Creating a Copy of the Preinstallation Configuration File for the grid User

Create a copy of the preinstallation configuration file for the `grid` user to set hard and soft limits for the operating system parameters.

1. As the `root` user, go to the `/etc/security/limits.d` directory.

```
# cd /etc/security/limits.d
```

2. Create a copy of the preinstallation configuration file for the `grid` user by replacing the `oracle` user with the `grid` user.

```
# cat oracle-database-preinstall-21c.conf | sed 's/oracle /grid /g'
> oracle-grid-user-preinstall-21c.conf
```

3. Delete the preinstallation configuration files for the earlier release.

```
# rm -r -f oracle-database-preinstall-19c.conf oracle-grid-user-
preinstall-19c.conf
```

Shutting Down the Database

If your Oracle Database uses Oracle Automatic Storage Management (Oracle ASM) for storage, then shut down the database before upgrading Oracle Restart.

1. Log in as the `oracle` user.

2. Shut down the Oracle Database instance.

```
$ Grid_home/bin/srvctl stop database -d database_unique_name
```

3. Ensure that your Oracle Database instance is shut down.

```
$ Grid_home/bin/srvctl status database –d database_unique_name
Database is not running.
```

2

Upgrading and Patching Oracle Restart

Learn how to upgrade Oracle Restart to a later release using the out-of-place upgrade mode and install the patches.

- **Steps to Upgrade Oracle Restart**
  Complete this procedure to upgrade Oracle Grid Infrastructure for a standalone server (Oracle Restart) from an earlier release.

- **Verifying the Oracle Restart Software Version After Upgrade**
  Check the software release version of Oracle Restart after the upgrade.

- **Patching Oracle Restart**
  After you have upgraded to Oracle Grid Infrastructure for a standalone server (Oracle Restart) 21c, you can install individual software patches by downloading them from My Oracle Support.

- **Unlocking and Deinstalling the Previous Release Grid Home**
  After upgrading from previous releases, if you want to deinstall the previous release Grid home, then you must first change the permission and ownership of the previous release Grid home.

Steps to Upgrade Oracle Restart

Complete this procedure to upgrade Oracle Grid Infrastructure for a standalone server (Oracle Restart) from an earlier release.

Be prepared to run root scripts before you start the upgrade.

1. As the `grid` user, download the Oracle Grid Infrastructure image files and extract the files to the Grid home.

   For example:

   ```
   mkdir -p /u01/app/grid/product/21.0.0/grid
   chown grid:oinstall /u01/app/grid/product/21.0.0/grid
   cd /u01/app/grid/product/21.0.0/grid
   unzip -q download_location/grid_home.zip
   ```

   `download_location/grid_home.zip` is the path of the downloaded Oracle Grid Infrastructure image file.

   > **✎ Note:**
   >
   > - You must extract the image software into the directory where you want your new Grid home to be located.

2. Start the Oracle Grid Infrastructure wizard:

```
$ /u01/app/grid/product/21.0.0/grid/gridSetup.sh
```

3. Select the **Upgrade Oracle Grid Infrastructure** option to upgrade Oracle Grid Infrastructure for a standalone server.

4. Select the installation options as prompted.

5. You can run `root` scripts, either automatically or manually. Oracle recommends that you configure `root` script automation, so that the `rootupgrade.sh` script can run automatically during the upgrade.

   At any time during the upgrade, if you have a question about what you are being asked to do, or what input you are required to provide during the upgrade, then click the **Help** button on the installer window.

Verifying the Oracle Restart Software Version After Upgrade

Check the software release version of Oracle Restart after the upgrade.

1. Log in as the `grid` user.

2. Verify that Oracle Restart 21c is in use after the upgrade.

```
$ Grid_home/bin/crsctl query has softwareversion
Oracle High Availability Services version on the local node is
[21.0.0.0.0]
```

Patching Oracle Restart

After you have upgraded to Oracle Grid Infrastructure for a standalone server (Oracle Restart) 21c, you can install individual software patches by downloading them from My Oracle Support.

1. Download the patches that you want to apply from My Oracle Support:

   https://support.oracle.com

   Select the **Patches and Updates** tab to locate the patch.

   Oracle recommends that you select **Recommended Patch Advisor**, and enter the product group, release, and platform for your software.

   Place the patches in a shared directory that is accessible to all users.

2. Review the README file for the patch that you want to apply, and complete all of the required steps before installing the patch.

3. As the `root` user, go to the `/OPatch` directory in the Grid home.

```
# cd /u01/app/grid/product/21.0.0/grid/OPatch
```

4. Install the version of the OPatch utility that is recommended in the README file for the patch.

5. Follow the instructions in the README file for the patch to apply the patch.

```
# opatchauto apply patch_directory_location/patch_ID
```

6. As the grid user, verify the release patch number for your Oracle Restart.

```
$ Grid_home/bin/crsctl query has softwareversion
```

The release patch number changes only for Release Update (RU) and Release Update Revision (RUR) patches.

Unlocking and Deinstalling the Previous Release Grid Home

After upgrading from previous releases, if you want to deinstall the previous release Grid home, then you must first change the permission and ownership of the previous release Grid home.

1. As the root user, unlock the previous release Grid home.

```
# /u01/app/oracle/product/18.0.0/grid/crs/install/roothas.sh -unlock -
dstcrshome previous_release_Grid_home
```

2. After you change the permissions and ownership of the previous release Grid home, log in as the Oracle Grid Infrastructure installation owner (grid, in the preceding example), and use the deinstall command from the previous release Grid home $ORACLE_HOME/deinstall directory.

> ⚠ **Caution:**
>
> You must use the deinstall command from the same release to remove Oracle software. Do not run the deinstall command from a later release to remove Oracle software from an earlier release. For example, do not run the deinstall command from the 19.0.0.0.0 Grid home to remove Oracle software from an existing 18.0.0.0.0 Grid home.

3

Downgrading Oracle Restart

You can restore Oracle Grid Infrastructure for a standalone server (Oracle Restart) to the previous release after a successful or a failed upgrade.

- Options and Restrictions for Oracle Restart Downgrades
  Review these downgrade options and restrictions when you downgrade Oracle Restart to an earlier release after a successful or a failed upgrade.

- Downgrading Oracle Restart
  Use this procedure to deconfigure and downgrade Oracle Restart, or to troubleshoot Oracle Restart installation errors.

Options and Restrictions for Oracle Restart Downgrades

Review these downgrade options and restrictions when you downgrade Oracle Restart to an earlier release after a successful or a failed upgrade.

Downgrade options include the following earlier releases:

- Oracle Restart downgrade to Oracle Restart 19c.
- Oracle Restart downgrade to Oracle Restart 18c.
- Oracle Restart downgrade to Oracle Restart 12c Release 2 (12.2).

Restrictions for Oracle Restart Downgrades

- You can downgrade Oracle Restart to an earlier release only if you did not make any configuration changes after the upgrade.
- You can only downgrade to the Oracle Restart release you upgraded from. For example, if you upgraded from Oracle Restart 19c to Oracle Restart 21c, then you can only downgrade to Oracle Restart 19c.

Downgrading Oracle Restart

Use this procedure to deconfigure and downgrade Oracle Restart, or to troubleshoot Oracle Restart installation errors.

1. As the `oracle` user, create a backup of the SPFILE to a PFILE from 21c Oracle home to 19c Oracle home.

```
$ CREATE PFILE='/u01/app/oracle/product/19.0.0/dbhome_1/dbs/SIDinit.ora'
FROM SPFILE
```

You can use this PFILE during the database downgrade process.

2. List all Oracle Databases on the server with their version, unique name of the database, and Oracle home information.

```
$ srvctl config database -home
```

3. Downgrade Oracle Database. Refer to *Oracle Database Upgrade Guide* for more information about required pre-downgrade tasks, downgrade tasks, post-downgrade tasks, and compatibility information.

> **Note:**
>
> Downgrade Oracle Database only if the Oracle Database version is higher than the Oracle Restart version to which you are downgrading Oracle Restart.

4. As the `oracle` user, downgrade the Oracle Restart resources corresponding to the Oracle Database, only if you have downgraded your Oracle Database.

```
$ srvctl downgrade database -d db_unique_name -
oraclehome $ORACLE_HOME -t to_version
```

5. Inspect the Oracle Restart configuration of each database, service, and listener.

```
$ srvctl config database -db db_unique_name
$ srvctl config service -db db_unique_name
$ srvctl config listener -listener listener_name
```

Make a note of the configuration information and use this information when adding the components back to Oracle Restart.

6. Stop all databases and listeners that are running before you downgrade Oracle Restart.

```
$ srvctl stop database -db db_unique_name
$ srvctl stop listener [-listener listener_name]
```

7. Deinstall Oracle Restart while retaining the existing Oracle Automatic Storage Management (Oracle ASM) disk group.

```
$ cd /u01/app/oracle/product/21.0.0/dbhome_1/deinstall
$ ./deinstall
If you want to retain the existing diskgroups and associated ASM
filter driver labels
or if any of the information detected is incorrect, you can modify
by entering 'y'.
Do you want to modify above information  (y|n) [n]: y
Specify the ASM Diagnostic Destination
[ASM_diagnostic_destination]:
Specify the diskstring [AFD_diskstring]:
Specify the diskgroups that are managed by this ASM instance
[+DATA]:
De-configuring ASM will drop the diskgroups and clear the AFD
labels at cleanup time.
```

```
Do you want deconfig tool to drop the diskgroups and  all AFD labels (y|
n) [y]: n
```

8. As the `grid` user, download the Oracle Grid Infrastructure 19c image files and extract the files to the Grid home.

```
$ mkdir -p /u01/app/grid/product/19.0.0/grid
$ chown grid:oinstall /u01/app/grid/product/19.0.0/grid
$ cd /u01/app/grid/product/19.0.0/grid
$ unzip -q download_location/grid_home.zip
```

download_location/grid_home.zip is the path of the downloaded Oracle Grid Infrastructure image file.

> **Note:**
>
> You must extract the image software into the directory where you want your new Grid home to be located.

9. Start the Oracle Grid Infrastructure installation wizard.

```
$ /u01/app/grid/product/19.0.0/grid/gridSetup.sh
```

10. Select the Configuration Option as **Set Up Software Only** and select the installation options as prompted.

11. As the `grid` user, update the Oracle central inventory (`oraInventory`).

```
$ /u01/app/oracle/product/19.0.0/grid/oui/bin/runInstaller -
updateNodeList ORACLE_HOME=downgraded_Grid_home -defaultHomeName CRS=TRUE
```

12. As the `root` user, run `roothas.sh` to configure Oracle Restart without Oracle ASM.

```
# /u01/app/oracle/product/19.0.0/grid/crs/install/roothas.sh
```

13. As the `grid` user, start Oracle ASM Configuration Assistant (Oracle ASMCA).

```
$ /u01/app/oracle/product/19.0.0/bin/asmca
```

14. Create a new temporary Oracle ASM disk group.

> **Note:**
>
> Configure Oracle ASM to use the new disk group and provide `/.../.` * as the disk string so that Oracle ASM can discover the new disk.

15. Mount the existing Oracle ASM disk group and click **Exit** to close Oracle ASMCA.

16. Move the password file from the temporary disk group to the existing disk group.

```
$ /u01/app/oracle/product/19.0.0/bin/asmcmd
ASMCMD> pwmove --asm new_diskgroup/orapwasm existing_diskgroup/
orapwasm -f
```

17. Remove the SPFILE from the existing Oracle ASM disk group.

```
ASMCMD> rm existing_diskgroup/ASM/ASMPARAMETERFILE/
REGISTRY.253.1075263285
```

18. Copy the SPFILE from the new Oracle ASM disk group to the existing disk group.

```
ASMCMD> spcopy -u +new_diskgroup/asm/ASMPARAMETERFILE/
registry.253.722601213 +existing_diskgroup/spfile
ASMCMD> exit
```

19. Restart the high availability stack to verify that Oracle ASM starts with SPFILE from the existing disk group.

20. Start Oracle ASMCA and delete the new temporary disk group.

21. As the `oracle` user, add the components back to Oracle Restart with the same attributes that you noted in earlier steps.

    a. Add Oracle Database to the Oracle Restart configuration.

```
$ srvctl add database -db db_unique_name -oraclehome Oracle_home
-spfile spfile_name
```

    For the `-spfile` parameter, provide the SPFILE that you noted in Step 5.

    b. Add the listener to the Oracle Restart configuration.

```
$ srvctl add listener -listener listener_name -oraclehome
Oracle_home
```

    For the `-oraclehome` parameter, provide the Oracle home from where the listener was running before the downgrade.

    c. Add each service to the database using the `srvctl add service` command.

```
$ srvctl add service -db db_unique_name -service
service_name_list
```

22. Start the components that you have added back to Oracle Restart.

    a. Start the Oracle database.

```
$ srvctl start database -db db_unique_name
```

    b. Start the listener.

```
$ srvctl start listener -listener listener_name
```

    c. Start each service using the `srvctl start service` command.

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23. Connect to Oracle Database and start the pluggable database (PDB).

```
$ sqlplus / as sysdba
SQL> ALTER PLUGGABLE DATABASE pdb_name OPEN;
SQL> exit
```

24. Verify that the Oracle Restart resources are running after the downgrade.

```
$ /u01/app/oracle/product/19.0.0/bin/crsctl stat res -t
```

Related Topics

• *Oracle Database Upgrade Guide*