

ORACLE

Upgrade Your Databases to 19c

Daniel Overby Hansen
Senior Principal Product Manager





Daniel Overby Hansen

Senior Principal Product Manager
Cloud Migration

 <https://dohdatabase.com>

 @dohdatabase

 dohdatabase



Photo by Kai Pilger on Unsplash

Database Upgrade

What you shouldn't do

Don't do this | Outdated Versions

From: [redacted]
Sent: Monday, January 14, 2019 7:08 AM
To: [redacted]
Subject: Migration Oracle DB Version 7 to Oracle DB 12C

Hello

I'm working into a deal in LAD Customer, migrating about aprox 70 db oracle database version 7 (supporting OLD application developed on Oracle Forms) distributed around all country, my customer is want to modernized their application to 3 layer architecture (using an J2EE app) and move all data to an oracle DB central repository.

We are intend to recommend best architecture and sizing but we do not know Oracle 7 database.

- Can you recommend us any tool to extract performance information like AWR on Oracle DB version 7?
- Can you recommend us methods and tools to migrate database from oracle database version 7 to oracle database version 12?

Don't do this | Outdated Versions

Subject:Oracle Upgrade from 10.2.0.3 to 18c
Date:Tue, 26 Feb 2019 15:17:43 -0800 (PST)
From: @oracle.com>
To:mike.dietrich@oracle.com

Hi Mike,

One of my customer is running their SaaS application on a 10.2.0.3 DBEE.
They have internally decided to upgrade their db's to 18.3 and one of their business requirement is to have near zero down time migration.

Source
Production and Physical Standby (Data Guard) is on version 10.2.0.3 on RHEL 5

Desired Target
Production and Physical Standby (Data Guard) to be on 18.3 on RHEL 6

GA: 29-NOV-2006

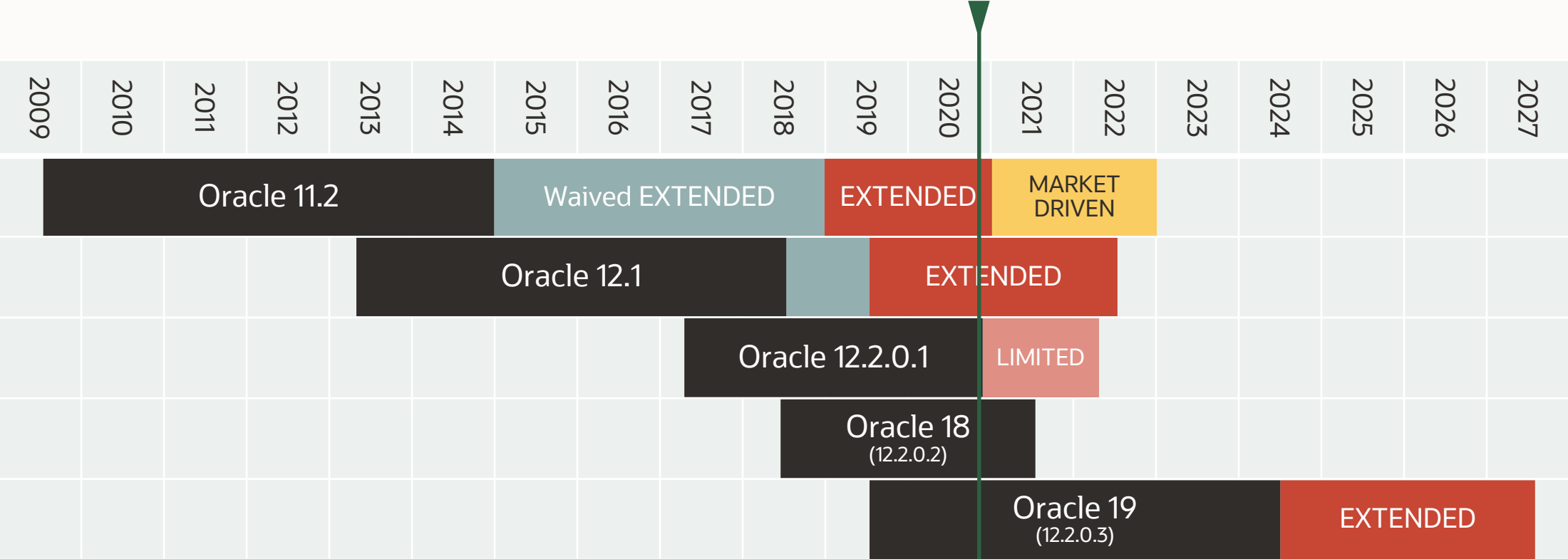


Photo by SpaceX on Unsplash

Database Upgrade

Why you "want" to upgrade

Lifetime Support Policy



- Premier Support
- Waived Extended Support
- Paid Extended Support
- Market Driven Support
- Limited Error Correction

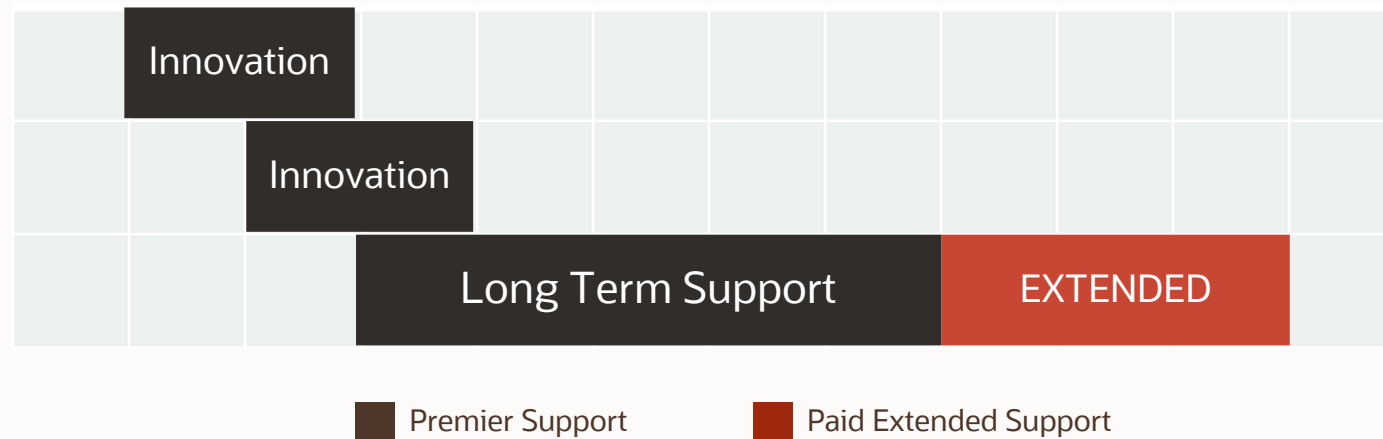
Release Types | Long Term Support vs Innovation Releases

Long Term Support Release

- 5 years of Premier Support followed by 3 years of Extended Support

Innovation Release

- 2 years of Premier Support, but there is no Extended Support

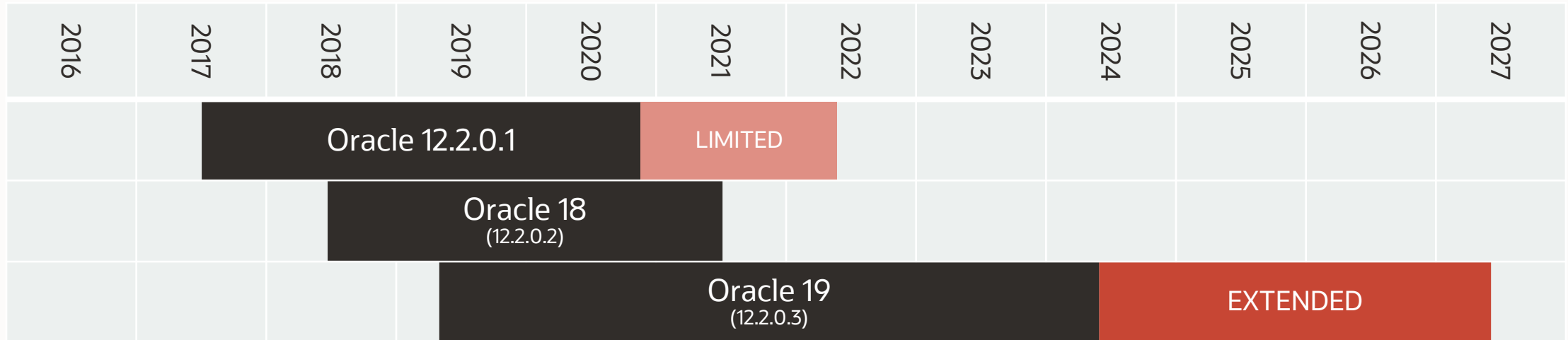


- [MOS Note: 742060.1 - Release Schedule of Current Database Releases](#)

Oracle 12.2 Release Family

Includes:

- Oracle 12.2.0.1, Oracle 18c (12.2.0.2), Oracle 19c (12.2.0.3)



- [MOS Note:742060.1](#) - The Single Source of Truth
- [MOS Note:161818.1](#) - Releases Support Status Summary



Check

Before Upgrade

Your Key to Successful Database Upgrades



1

Name	Download
Microsoft Windows x64 (64-bit)	ZIP (2.9 GB)
Linux x86-64	ZIP (2.8 GB) RPM (2.5 GB)
Oracle Solaris (SPARC systems, 64-bit)	ZIP (2.8 GB)
IBM AIX	ZIP (4.1 GB)
HP-UX ia64	ZIP (4.7 GB)
Linux on System z (64-bit)	ZIP (2.6 GB)

Download and install Oracle 19c

eDelivery

2

Oracle Database 19c Proactive Patch Information (Doc ID 2521164.1)

Modified: Oct 15, 2019 Type: ANNOUNCEMENT Language: En

In this Document

[Details](#)
[Oracle Database 19c Proactive Patch Info \(Doc ID 2521164.1\)](#)
[Introduction](#)
[Oracle Database 19c Release Update](#)
[R19 Grid Infrastructure Release Update \(Update\)](#)
[R19 Database Release Update Revision \(Revision\)](#)
[R19 Grid Infrastructure Release Update Revision \(Revision\)](#)
[R19 OJVM Release Update \(Update\)](#)

Download and install newest RU

MOS: 2521164.1

3

AutoUpgrade Tool (Doc ID 2485457.1)

In this Document

[Main Content](#)
[Benefits](#)
[Target versions supported](#)
[AutoUpgrade documentation](#)
[Known limitations](#)
[References](#)

APPLIES TO:

Oracle Database - Enterprise Edition - Version 12.2.0.1 and later
Oracle Database - Standard Edition - Version 12.2.0.1 and later
Information in this document applies to any platform.

MAIN CONTENT

Description

Oracle Database AutoUpgrade allows DBAs to upgrade one or many databases without human intervention, all with one click.

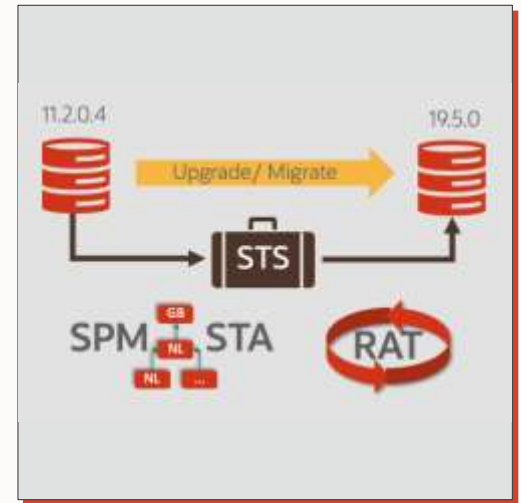
AutoUpgrade version

The last update of the tool corresponds to version 20191024.

Download and use newest AutoUpgrade

MOS: 2485457.1

4

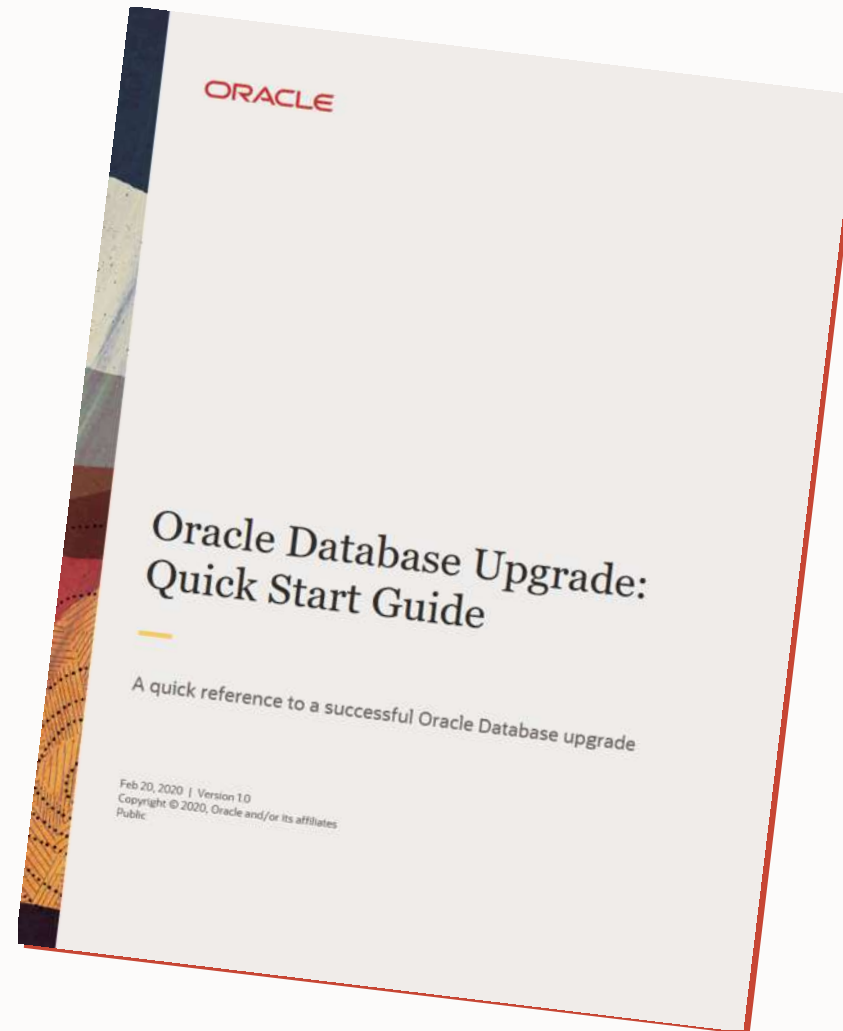


Get started | Quick Start Guide

Simple overview

Read it, try it

Download from [oracle.com](https://www.oracle.com)



Database Upgrade | Supported Releases

Database / Oracle / Oracle Database / Release 19

Database Upgrade Guide



Oracle Database Releases That Support Direct Upgrade

Review the supported options for direct upgrades to the latest Oracle Database release.

You can perform a direct upgrade to the new release from the following releases:

- 11.2.0.4
- 12.1.0.2
- 12.2.0.1
- 18

Platform Certification | Linux x86-64



	Database 11.2.0.4	Database 12.1.0.2	Database 19c
Oracle Linux 4	Certified		
Oracle Linux 5	Certified	Certified	
Oracle Linux 6	Certified	Certified	
Oracle Linux 7	Certified	Certified	Certified
Oracle Linux 8		Certified	Certified
Red Hat 4	Certified		
Red Hat 5	Certified	Certified	
Red Hat 6	Certified	Certified	
Red Hat 7	Certified	Certified	Certified
Red Hat 8		Certified	Certified



Platform Certification | **Windows Server**



	Database 11.2.0.4	Database 12.1.0.2	Database 19c
Microsoft Windows x64 2003	Certified		
Microsoft Windows x64 2003 R2	Certified		
Microsoft Windows x64 2008	Certified	Certified	
Microsoft Windows x64 2008 R2	Certified	Certified	
Microsoft Windows x64 2012	Certified	Certified	
Microsoft Windows x64 2012 R2	Certified	Certified	Certified
Microsoft Windows x64 2016			Certified
Microsoft Windows x64 2019			Certified



More Links on the Upgrade Blog

Oracle Clusterware Certification on OL8/RHEL8

<https://mikedietchde.com/2020/05/14/of-course-oracle-clusterware-is-certified-on-ol8-rhel8-as-well/>

Oracle Database 19c Certification on OL8/RHEL8

<https://mikedietchde.com/2020/05/11/oracle-database-19c-is-certified-on-ol8-and-rhel8/>

Of course, Oracle Clusterware is certified on OL8/RHEL8 as well

Posted on May 14, 2020 by Mike Dietrich Operating System

To be very honest, when I posted a few days ago, Oracle Database 19c is certified on OL8/RHEL8 I didn't check for the Oracle **Clusterware (OCW) certification**. I blindly assumed that this is the case. But from comments and discussions on twitter, I realized it may be necessary to point this out explicitly to avoid confusion. Even though my fellow mate, RAC Product Manager Anil Nair has pointed it out already many times: **Of course, Oracle Clusterware is certified on OL8/RHEL8 as well.**



Photo by Angela Helke on Unsplash

Oracle Database 19c is certified on OL8 and RHEL8

26

Posted on May 11, 2020 by Mike Dietrich Operating System


Oh ... I'd say this was the question I've got asked the second most often in the past months (after a potential extension for Oracle 12.2.0.1 support): **When will Oracle certify OL8 and RHEL8?** And I read this question internally even more often. Now thanks to my team mate Daniel Overby Hansen who spotted it on Twitter on the weekend, we can tell you that ... finally ... drum roll ... **Oracle Database 19c is certified on OL8 and RHEL8.**










Photo by Derek Oyen on Unsplash

Oracle 19c | Installation

Gold Image

1. Create ORACLE_HOME directory
2. Download image 
3. Unpack into ORACLE_HOME
4. ./runInstaller
5. root.sh

Oracle Database 19c	
19.3	
Name	Download
Microsoft Windows x64 (64-bit)	 ZIP (2.9 GB)
Linux x86-64	 ZIP (2.8 GB)  RPM (2.5 GB)
Oracle Solaris (SPARC systems, 64-bit)	 ZIP (2.8 GB)
IBM AIX	 ZIP (4.1 GB)
HP-UX ia64	 ZIP (4.7 GB)
Linux on System z (64-bit)	 ZIP (2.6 GB)

Root script execution configuration

Configuration option

Database Installation options

Database Edition

Installation Location

Operating System Groups

Root script execution

Prerequisite Checks

During the software configuration, the "root" user is used. You can choose to use the "root" user automatically by specifying the "root" user. The user specified will also be used for the prerequisite checks.

Automatically run configuration

Use "root" user credential

Password:

APEX | Upgrade In Advance

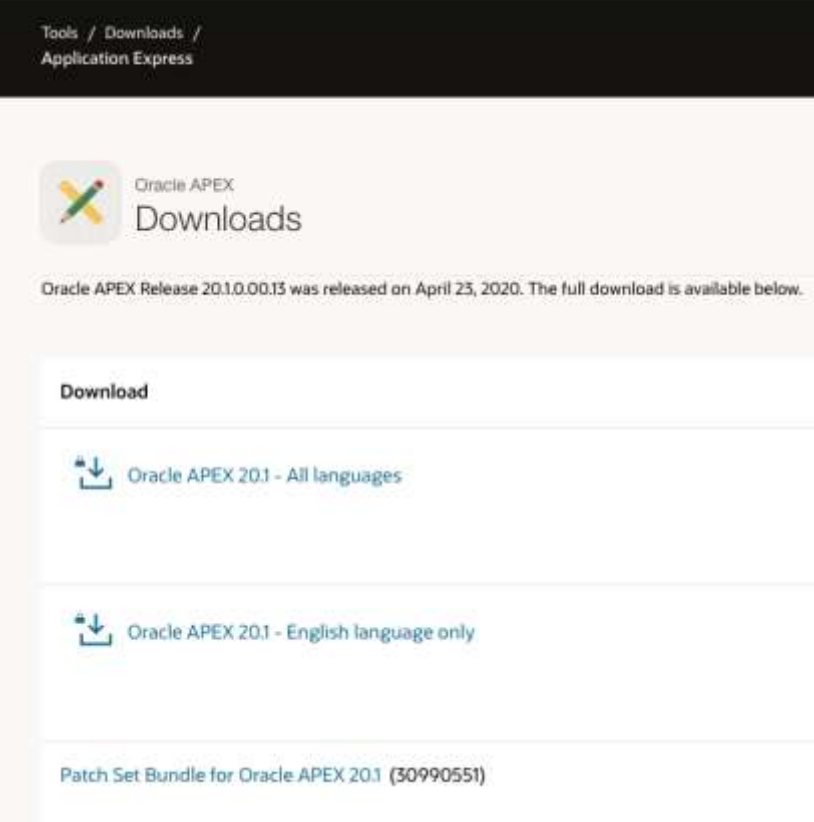
APEX upgrade

- Not part of the database upgrade
- [MOS Note: 1088970.1](#) - Master Note APEX Upgrades

APEX certification

- Minimum APEX Version for Oracle 19c: [APEX 18.2](#)
- [MOS Note: 1344948.1](#) - APEX Database and Web Server Certification

Download the [newest APEX](#)

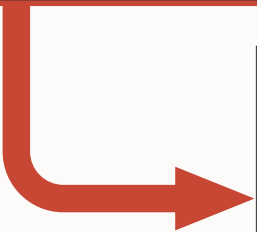


The screenshot shows the Oracle APEX Downloads page. At the top, there is a breadcrumb trail: "Tools / Downloads / Application Express". Below this, the Oracle APEX logo is displayed next to the word "Downloads". A message states: "Oracle APEX Release 20.10.00.13 was released on April 23, 2020. The full download is available below." Underneath, there is a "Download" section with two options: "Oracle APEX 20.1 - All languages" and "Oracle APEX 20.1 - English language only". At the bottom of the page, there is a link for "Patch Set Bundle for Oracle APEX 20.1 (30990551)".

Upgrade 19c | Speed it up

Check when dictionary stats have been gathered the last time

```
SELEECT
  to_char(max(end_time), 'dd-mon-yy hh24:mi') latest, operation
FROM
  dba_optstat_operations
WHERE
  operation in ('gather_dictionary_stats', 'gather_fixed_objects_stats')
GROUP BY
  operation;
```



LATEST	OPERATION
13-SEP-19 11:52	gather_fixed_objects_stats
18-APR-19 23:59	gather_dictionary_stats

Refresh stats a day **before the upgrade**

Upgrade 19c | Make it run faster ...

Stats not gathered on several clustered indexes (bug 25286819)

```
exec dbms_stats.gather_schema_stats('SYS');  
exec dbms_stats.gather_index_stats('SYS','I_OBJ#');  
exec dbms_stats.gather_index_stats('SYS','I_FILE#_BLOCK#');  
exec dbms_stats.gather_index_stats('SYS','I_TS#');  
exec dbms_stats.gather_index_stats('SYS','I_USER#');  
exec dbms_stats.gather_index_stats('SYS','I_TOID_VERSION#');  
exec dbms_stats.gather_index_stats('SYS','I_MLOG#');  
exec dbms_stats.gather_index_stats('SYS','I_RG#');
```

... [autoupgrade.jar](#) does this for you automatically!

Upgrade 19c | **Effect of having good stats**

The larger the dictionary, the bigger the effect

	Duration	Reduction
No dictionary and fixed objects stats	15 min 55 sec	
Gathered dictionary and fixed objects stats	14 min 10 sec	11 %
Gathered schema and cluster index stats	13 min 41 sec	3.4 % to previous
Total downtime saved	2 min 14 sec	14 % overall

- This example has been done with one of the tiny Hands-On Lab databases

Operating System | Recommendations

- [MOS Note: 1587357.1](#)
Oracle Database on Unix AIX, HP-UX, Linux, Solaris and MS Windows – Installation and Configuration Requirements Quick Reference

19c
Common Requirements
Oracle Linux 7
RHEL 7
SLES 12
SLES 15
AIX 7.1
AIX 7.2

Oracle Linux 7		
Oracle Linux 7		
OS Version	Patches/Packages	Kernel settings
Oracle Linux 7.4 with the Unbreakable Enterprise Kernel 4: 4.1.12-124.19.2.el7uek.x86_64 or later Oracle Linux 7.4 with the Unbreakable Enterprise Kernel 5: 4.14.35-1818.1.6.el7uek.x86_64 or later Oracle Linux 7.5 with the Red Hat Compatible kernel: 3.10.0-862.11.6.el7.x86_64 or later Reference: 2551169.1	bc binutils compat-libcap1 compat-libstdc++ elfutils-libelf elfutils-libelf-devel fontconfig-devel glibc glibc-devel ksh libaio libaio-devel libXrender libXrender-devel libX11 libXau libXi libXtst	semmsl 250 semmsns 32000 semopm 100 semmni 128 shmall Greater than or equal to the value of shmmax, in pages. shmmax Half the size of physical memory in bytes shmmni 4096 panic_on_oops 1 file-max 6815744 aio-max-nr 1048576 ip_local_port_range Minimum: 9000 Maximum: 65500 rmem_default 262144 rmem_max 4194304 wmem_default 262144 wmem_max 1048576





AutoUpgrade

The **ONLY** recommended way to upgrade databases

AutoUpgrade | Requirements

1. Java 8 or newer

- Default in your `$ORACLE_HOME` since 12.1.0.2
- Check: `$ORACLE_HOME/jdk/bin/java -version`

2. The AutoUpgrade package

- A jar file of 2 MB in size

AutoUpgrade | Availability and Support

All architectures (CDB and non-CDB)

All supported operating systems

All editions (SE2, EE)

All types (single instance and RAC)

Upgrades **from all** supported versions:

- 11.2.0.4 and newer

Upgrades **to** version:

- 12.2.0.1 with Jan 2019 Update or newer
- 18.5.0 (includes Jan 2019 Update) or newer
- 19.3.0 or newer

AutoUpgrade | **What you don't need ...**

Agents

EM Cloud Control

DBUA

Extra license

Getting Started

AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Always download latest version from MOS

★ AutoUpgrade Tool (Doc ID 2485457.1)

In this Document

[Main Content](#)

[Benefits](#)

[Target Versions Supported](#)

[AutoUpgrade documentation](#)

[References](#)

APPLIES TO:

Oracle Database - Enterprise Edition - Version 12.2.0.1 and later

Oracle Database - Standard Edition - Version 12.2.0.1 and later

Information in this document applies to any platform.

MAIN CONTENT

Description

Oracle Database AutoUpgrade allows DBAs to upgrade one or many databases without human intervention, all with one

AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Check your version

```
$ java -jar autoupgrade.jar -version  
  
build.hash 04dd9f2  
build.version 19.7.5  
build.date 2020/02/11 15:28:49  
build.max_target_version 19  
build.type production
```

Compare to latest version on MOS

Download

The most recent version of AutoUpgrade can be downloaded via this link: version [20201023.](#)

AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Simplest version

```
upg1.source_home=/u01/app/oracle/product/12.2.0.1  
upg1.target_home=/u01/app/oracle/product/19  
upg1.sid=CDB1
```

Or, generate a sample config file

```
$ java -jar autoupgrade.jar -create_sample_file config  
  
Created sample configuration file /home/oracle/sample_config.cfg
```

Pro tip: *upg1* is a prefix that you decide.
Use it to define multiple databases



AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Check your database

```
$ java -jar autoupgrade.jar -config CDB1.cfg -mode analyze

...

----- Final Summary -----
Number of databases          [ 1 ]

Jobs finished successfully    [1]
Jobs failed                   [0]
Jobs pending                   [0]
----- JOBS FINISHED SUCCESSFULLY -----
Job 101 for CDB1
```

Pro tip: Analyze is similar to running `preupgrade.jar`



AutoUpgrade | **Get Started**

Download

Configure

Analyze

Check

Upgrade

Preupgrade report is saved here:

/home/oracle/autoupg_default/CDB1/CDB1/100/prechecks



AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Preupgrade report is saved here:

`/home/oracle/autoupg_default/CDB1/CDB1/100/prechecks`

- This is your logging base directory.
- Can be changed in the config file

AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Preupgrade report is saved here:

/home/oracle/autoupg_default/CDB1/CDB1/100/prechecks

- Database SID

AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Preupgrade report is saved here:

/home/oracle/autoupg_default/CDB1/CDB1/100/prechecks

- Job number
- Most likely 100
- Increments everytime you start AutoUpgrade

AutoUpgrade | Get Started

- Download
- Configure
- Analyze
- Check**
- Upgrade

Evaluate the preupgrade report

The screenshot shows the Oracle AutoUpgrade preupgrade report interface. At the top, the Oracle logo is displayed, followed by the date and time: "Date: Tue Nov 24 13:16:45 CET 2020 | DB Compatible: 12.2.0 | DB Version: 12.2.0.1.0 | Operating System: Linux". Below this, the container name "CDB1" is shown in a red header. The interface is divided into two main sections: "Containers" on the left and "CDB\$ROOT" on the right. The "Containers" section lists various containers and their associated checks, including CDB\$ROOT, PDB\$SEED, and PDB1. The "CDB\$ROOT" section displays three specific checks with their details:

- CheckName: ARCHIVE_MODE_ON** | FixUp Available: NO | Severity: ERROR | Stage: PRECHECKS
Turn on the archive mode of the database prior the AutoUpgrade execution.
The database to be upgraded must have the archive mode on before execute the AutoUpgrade for a fast restoration in case of error.
The database does not have the archive mode enabled.
- CheckName: UNIFIED_RECORDS_IN_FILE** | FixUp Available: YES | Severity: WARNING | Stage: PRECHECKS
Load the Unified Audit records from OS spillover audit files to database audit table using DBMS_AUDIT_MGMT.LOAD_UNIFIED_AUDIT_FILES api before upgrade.
Oracle Unified Audit records present in the OS spillover audit files must be loaded to the database audit table before database upgrade to ensure they can be read after upgrade. For more information, refer to "LOAD_UNIFIED_AUDIT_FILES Procedure" in Database PLUSQL Packages and Types Reference.
There are Unified Audit records present in the OS spillover audit files.
- CheckName: DICTIONARY_STATS** | FixUp Available: YES | Severity: RECOMMEND | Stage: PRECHECKS
Gather stale data dictionary statistics prior to database upgrade in off-peak time using:

EXECUTE DBMS_STATS.GATHER_DICTIONARY_STATS;

Dictionary statistics help the Oracle optimizer find efficient SQL execution plans and are essential for proper upgrade timing. Oracle recommends gathering dictionary statistics in the last 24 hours before database upgrade.

For information on managing optimizer statistics, refer to the 12.2.0.1 Oracle Database SQL Tuning Guide.



AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Preupgrade report comes in:

- HTML
- Text
- JSON
- XML



AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Upgrade

```
$ java -jar autoupgrade.jar -config CDB1.cfg -mode deploy
```

Have a cup of coffee and wait, or ...



AutoUpgrade | Get Started

- Download
- Configure
- Analyze
- Check

Upgrade

Monitor

```
upg> lsj
```

Job#	DB_NAME	STAGE	OPERATION	STATUS	START_TIME	UPDATED	MESSAGE
101	CDB1	PREFIXUPS	EXECUTING	RUNNING	20/11/24 13:38	13:39:26	Remaining 12/13



AutoUpgrade | Get Started

Download
Configure
Analyze
Check

Upgrade

All the details

```
upg> status -job 101

Progress
-----
Start time:      20/11/24 13:38
Elapsed (min):   13
Last update:    2020-11-24T13:48:52.139
Stage:          DBUPGRADE
Operation:      EXECUTING
Status:         RUNNING
Stage summary:
  SETUP          <1 min
  GRP            <1 min
  PREUPGRADE     <1 min
  PRECHECKS     <1 min
  PREFIXUPS     8 min
  DRAIN         <1 min
  DBUPGRADE     3 min (IN PROGRESS)

Job Logs Locations
-----
Logs Base:      /home/oracle/autoupg_default/CDB1/CDB1
Job logs:       /home/oracle/autoupg_default/CDB1/CDB1/101
Stage logs:     /home/oracle/autoupg_default/CDB1/CDB1/101/dbupgrade
TimeZone:      /home/oracle/autoupg_default/CDB1/CDB1/temp
```



AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

All the details - continued

```
...
Additional information
-----
Details:
[Upgrading] is [0%] completed for [cdb1-cdb$root]
      +-----+-----+
      |CONTAINER|   PERCENTAGE|
      +-----+-----+
      | CDB$ROOT|  UPGRADE [12%]|
      | PDB$SEED|UPGRADE PENDING|
      |      PDB3|UPGRADE PENDING|
      +-----+-----+

Error Details:
None
```



AutoUpgrade | Get Started

Download

Configure

Analyze

Check

Upgrade

Success

```
upg> Job 101 completed
----- Final Summary -----
Number of databases          [ 1 ]

Jobs finished successfully   [1]
Jobs failed                  [0]
Jobs pending                 [0]
----- JOBS FINISHED SUCCESSFULLY -----
Job 101 for CDB1

---- Drop GRP at your convenience once you consider it is no longer needed ----
Drop GRP from CDB1: drop restore point AUTOUPGRADE_9212_CDB1122010
```

And it includes:

- Recompilation (utlsp)
- Timezone file upgrade
- Postupgrade fixups
- ... and so much more

Advanced Options

AutoUpgrade | Upgrade One or Many Databases

```
upg1.source_home=/u01/app/oracle/product/12.2.0.1  
upg1.target_home=/u01/app/oracle/product/19  
upg1.sid=CDB1
```

```
upg1.source_home=/u01/app/oracle/product/12.2.0.1  
upg1.target_home=/u01/app/oracle/product/19  
upg1.sid=CDB1
```

```
upg2.source_home=/u01/app/oracle/product/12.2.0.1  
upg2.target_home=/u01/app/oracle/product/19  
upg2.sid=CDB2
```

```
upg3.source_home=/u01/app/oracle/product/11.2.0.4  
upg3.target_home=/u01/app/oracle/product/19  
upg3.sid=DB11204
```

```
upg4.source_home=/u01/app/oracle/product/11.2.0.4  
upg4.target_home=/u01/app/oracle/product/19  
upg4.sid=SALES
```

```
upg5.source_home=/u01/app/oracle/product/11.2.0.4  
upg5.target_home=/u01/app/oracle/product/19  
upg5.sid=DEMO
```

```
upgn.source_home=/u01/app/oracle/product/12.1.0.2  
upgn.target_home=/u01/app/oracle/product/19  
upgn.sid=HR
```

AutoUpgrade | Adjust init parameters

```
#  
#   Example global pfile configuration entries  
#  
global.del_during_upgrade_pfile=/database/pfiles/global_during_delinit.ora  
global.add_during_upgrade_pfile=/database/pfiles/global_during_addinit.ora  
global.del_after_upgrade_pfile=/database/pfiles/global_after_delinit.ora  
global.add_after_upgrade_pfile=/database/pfiles/global_after_addinit.ora  
#  
#   Example local pfile configuration entries  
#  
upg2.del_during_upgrade_pfile=/database/pfiles/hr_during_delinit.ora  
upg2.add_during_upgrade_pfile=/database/pfiles/hr_during_addinit.ora  
upg2.del_after_upgrade_pfile=/database/pfiles/hr_after_delinit.ora  
upg2.add_after_upgrade_pfile=/database/pfiles/hr_after_addinit.ora
```

AutoUpgrade | Execute external scripts

```
#  
# Example global script execution  
#  
global.before_action=/database/scripts/run_this_before.sh  
global.after_action=/database/scripts/run_this_after.sh  
#  
# Example local script execution  
#  
upg2.before_action=/database/scripts/run_this_on_UPG2_before.sh  
upg2.after_action=/database/scripts/run_this_on_UPG2_after.sh
```

Pass return code
back to AutoUpgrade

Y

- Permitted extension options:
 - Unix shell (.sh)
 - Microsoft Windows batch (.bat, .cmd)
 - Microsoft Windows PowerShell (.ps1)

AutoUpgrade | Protection - GRP options

```
#  
#   By default a GRP will be created. Default for EE: Yes  
#  
upg2 .restoration=no  
#  
#   By default a GRP will be kept. This option overwrites the default.  
#  
upg2 .drop_grp_after_upgrade=yes
```

AutoUpgrade | Other options

```
#  
# Example global directive - Default: Underscores stay as before  
#  
global .remove_underscore_parameters=yes  
#  
# If unset, utlrp.sql won't be run - Default: YES  
#  
upgr2 .run_utlrp=no  
#  
# If unset, time zone upgrade won't be performed - Default: YES  
# As Timezone can't be downgraded, it may be useful to postpone and skip it  
#  
upgr2 .timezone_upg=no
```


AutoUpgrade | **Start time**

- **VALID** values
 - **Format:** DD/MM/YYYY HH24:MI:SS
 - NOW [this is the default]
 - 30/12/2018 15:30:00
 - 01/11/2019 01:30:15
 - 2/5/2019 3:30:50

AutoUpgrade | 4 Operation Modes

autoupgrade.jar

-analyze

-fixups

-upgrade

-deploy

AutoUpgrade | Best Practice

autoupgrade.jar

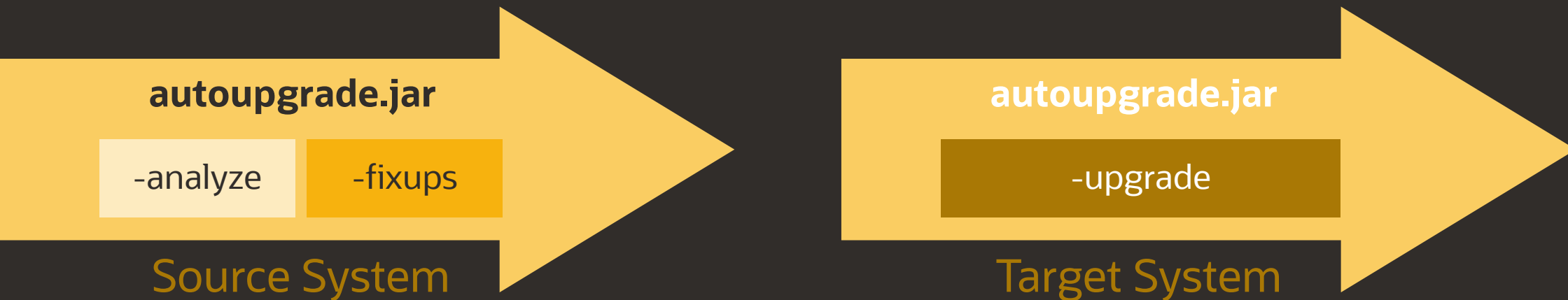
-analyze

-deploy

```
$ java -jar autoupgrade.jar -config config.cfg -mode analyze
```

```
$ java -jar autoupgrade.jar -config config.cfg -mode deploy
```

AutoUpgrade | Move to new hardware



```
$ java -jar autoupgrade.jar -config config.cfg -mode analyze
```

```
$ java -jar autoupgrade.jar -config config.cfg -mode deploy
```

```
$ java -jar autoupgrade.jar -config config.cfg -mode upgrade
```

AutoUpgrade | Job Console

- Most important commands

upg>

```
lsj                // List jobs
resume -job <number> // Restarts a job
status -job <number> // Show job status
restore -job <number> // Restores database from GRP
abort -job <number> // Aborts the specified job
```

AutoUpgrade | Log File Structure

- Logs written in TEXT and JSON format
 - /cfgtoollogs
 - ./upgrade/auto ◀ Status Log
 - /database_1
 - ./job_number
 - ./prechecks ◀ HTML Report
 - ./preupgrade
 - ./prefixups
 - ./drain
 - ./dbupgrade ◀ Upgrade Logs
 - ./postupgrade
 - ./temp
 - /database_2
 - ...

AutoUpgrade | What if ...

1. ZIP the entire global log directory:

```
java -jar autoupgrade.jar -config config.cfg -zip
```

2. Add the `alert.log`

3. Upload it to MOS



AutoUpgrade | What if ... you have RAC?

Since AutoUpgrade 19.8 (2020/03/27)

- RAC database upgrades are supported
- Works best with SPFILE in ASM
 - Oracle Grid Infrastructure upgrade must be done separately upfront



File System



Home



Trash



HammerDB



sqldev



Terminal



Firefox

oracle@hol:~/scripts

File Edit View Search Terminal Tabs Help

oracle@hol:~/scripts x oracle@hol:~ x

```
[DB12] oracle@hol:~/scripts
$ █
```

I



AutoUpgrade | **Coming soon!**

Data Guard

- Disable Data Guard Broker and defer log transport

Unplug/plug upgrade

AutoUpgrade | Blog Post Series

<https://mikedietchde.com/2019/04/29/the-new-autoupgrade-utility-in-oracle-19c/>

AutoUpgrade – Step-by-step

1. [The new AutoUpgrade Utility – Download, documentation and supported versions](#)
2. [Create and adjust the config file for AutoUpgrade](#)
3. [Config file for AutoUpgrade – Advanced options](#)
4. [Config file for AutoUpgrade – Tweaking init parameters](#)
5. [AutoUpgrade: ANALYZE, FIXUPS, UPGRADE and DEPLOY modes](#)
6. [AutoUpgrade: Where do you find all the logfiles?](#)
7. [UPG: The AutoUpgrade Command Line Interface](#)
8. [Upgrading Multitenant databases with AutoUpgrade](#)
9. [Moving to a new server with AutoUpgrade](#)
10. [How to tweak the hidden settings in AutoUpgrade](#)
11. [AutoUpgrade and Data Guard, RAC, Restart and non-CDB to PDB](#)
12. [AutoUpgrade and Wallets](#)

The new AutoUpgrade utility in Oracle 19c

51

Posted on April 29, 2019 by Mike.Dietrich [AutoUpgrade](#)





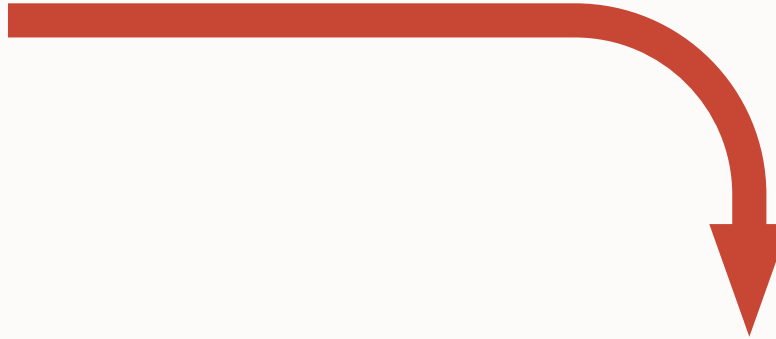
Photo by [Ales Krivec](#) on [Unsplash](#)

After Upgrade

Best Practices and things to take care on

Best Practice | COMPATIBLE Parameter

- When should you change COMPATIBLE?
 - 7-10 days after the upgrade
- Which value?
 - 11.2.0
 - 12.1.0
 - 12.2.0
 - 18.0.0
 - **19.0.0**
- Change COMPATIBLE for RUs?
 - **NEVER!**



- *Flashback to GRP*
- *Downgrade*

Things to do right after upgrade

Configure statistics history retention period

- Check space usage:

```
SQL> select space_usage_kbytes/1024 mb  
from v$sysaux_occupants where  
occupant_name='SM/OPTSTAT';
```

- Check retention

- Default: 31 days

```
SQL> select dbms_stats.get_stats_history_retention from dual;
```

- Adjust setting

- Example: 10 days

```
SQL> exec dbms_stats.alter_stats_history_retention(10);
```

Post Upgrade | Unified Audit Trail

- Internal structure changed to improve query performance of `UNIFIED_AUDIT_TRAIL` view
 - Old records must be converted to new format
 - To convert:

```
SQL> EXEC DBMS_AUDIT_MGMT.TRANSFER_UNIFIED_AUDIT_RECORDS;
```
 - Only applicable if upgrading from Oracle Database 12.1

More Information | Client Connectivity

[MOS Note: 207303.1](#)

[Client / Server Interoperability Support Matrix for Different Oracle Versions](#)

Client Version	Server Version								
	19c	18c	12.2.0 ^{#10}	12.1.0	11.2.0	11.1.0	10.2.0	10.1.0	9.2.0
19c	Yes	Yes	Yes	Yes	Yes ^{#9}	No	No	No ^{#3}	No ^{#3}
18c	Yes	Yes	Yes	Yes	Yes ^{#9}	No	No	No ^{#3}	No ^{#3}
12.2.0	Yes	Yes	Yes	Yes	Yes ^{#9}	No	No	No ^{#3}	No ^{#3}
12.1.0	Yes	Yes	Yes	Yes	Yes	Was	MDS ^{#7}	No ^{#3}	No ^{#3}
11.2.0	Yes ^{#9}	Yes ^{#9}	Yes ^{#9}	Yes	Yes	Was	MDS ^{#7}	No	Was ^{#5}
11.1.0	No	No	No	Was	Was	Was	Was ^{#7}	Was ^{#6}	Was ^{#5}
10.2.0	No ^{#11}	No ^{#11}	No ^{#11}	MDS ^{#7#11}	MDS ^{#7#11}	Was ^{#7#11}	MDS ^{#11}	Was	Was ^{#5}
10.1.0 ^{#4}	No	No	No	No	Was ^{#6}	Was ^{#6}	Was	Was	Was
9.2.0	No	No	No	No ^{#8}	Was ^{#5}	Was ^{#5}	Was ^{#5}	Was	Was



Oracle 19c | Multimedia Removal

- The Oracle Multimedia API gets removed during upgrade
 - The Locator still exists and works
 - ORDIM component remains VALID in DBA_REGISTRY
- Recommendation
 - Check, if you use Oracle Multimedia
 - If not, you can remove it before upgrade
- More information
 - <https://mikedietrichde.com/2019/02/18/oracle-multimedia-will-be-removed-in-oracle-database-19c/>
 - [MOS Note: 2347372.1 – Oracle Multimedia Statement of Direction](#)
 - [MOS Note: 2375644.1 – How To Migrate Data From Oracle Multimedia Data Types to BLOB columns](#)

Oracle 19c | Streams Removal

- The Oracle Streams API gets removed during upgrade
- See:
 - <https://docs.oracle.com/en/database/oracle/oracle-database/19/upgrd/behavior-changes-deprecated-desupport-oracle-database.html#GUID-7E90C2D3-853A-45B2-AC6D-C9326798E82B>

Desupport of Oracle Streams

Starting in Oracle Database 19c (19.1), Oracle Streams is desupported. Oracle GoldenGate is the replication solution for Oracle Database.

Note that Oracle Database Advanced Queuing is not deprecated, and is fully supported in Oracle Database 19c. Oracle Streams did not support features added in Oracle Database 12c (12.1) and later releases, including the multitenant architecture, `LONG VARCHAR`, and other new features. Oracle Streams replication functionality is superseded by GoldenGate.

Oracle 19c | DBMS_JOB

DBMS_JOB package is still supported

- Grant the CREATE JOB privilege
- During and after upgrade, for each job in DBMS_JOB a corresponding entry will be created with DBMS_SCHEDULER
- The check in preupgrade.jar is only checking for inconsistencies or any issues





JOB_TABLE_INTEGRITY	Starting with Oracle Database 19c, jobs created and managed through DBMS_JOB package in previous database versions will be re-created using Oracle Scheduler architecture. Jobs not successfully re-created may not function properly after upgrade.	Fix the metadata for the DBMS_JOB jobs listed below before upgrading the database to ensure these jobs can be properly re-created, or drop them if no longer needed. For reference, check the section "Summary of DBMS_JOB Subprograms" in the Oracle Database PL/SQL Packages and Types Reference documentation.	WARNING	PRE	NONE	19.1
		{1}				

[MOS Note: 2380601.1 - Database Preupgrade tool check list](#)



Oracle 19c | **DBMS_JOB**




Upgrade your Database - NOW!     Mike Dietrich's Blog About Oracle Database Upgrades... Mostly

[Blog](#) [Slides](#) [Hands-On Lab](#) [Events](#) [Papers / Docs](#) [Videos](#) [Scripts](#) [Links](#) [Oracle Documentation](#)

DBMS_JOB – Behavior Change in Oracle 19c during upgrade

Posted on May 24, 2019 by Mike.Dietrich [Behavior Change](#)



https://mikedietchde.com/2019/05/24/dbms_job-behavior-change-in-oracle-19c-during-upgrade/

Health Check | **hcheck.sql**

If your database is highly important, do a health check

- `hcheck.sql` - Script to Check for Known Problems ([MOS Note: 136697.1](#))

```
SQL> @/tmp/hcheck
H.Check Version 4.4 on 01-MAR-2018 23:46:27
-----
Catalog Version 11.2.0.4.0 (1102000400)
db_name: UPGR

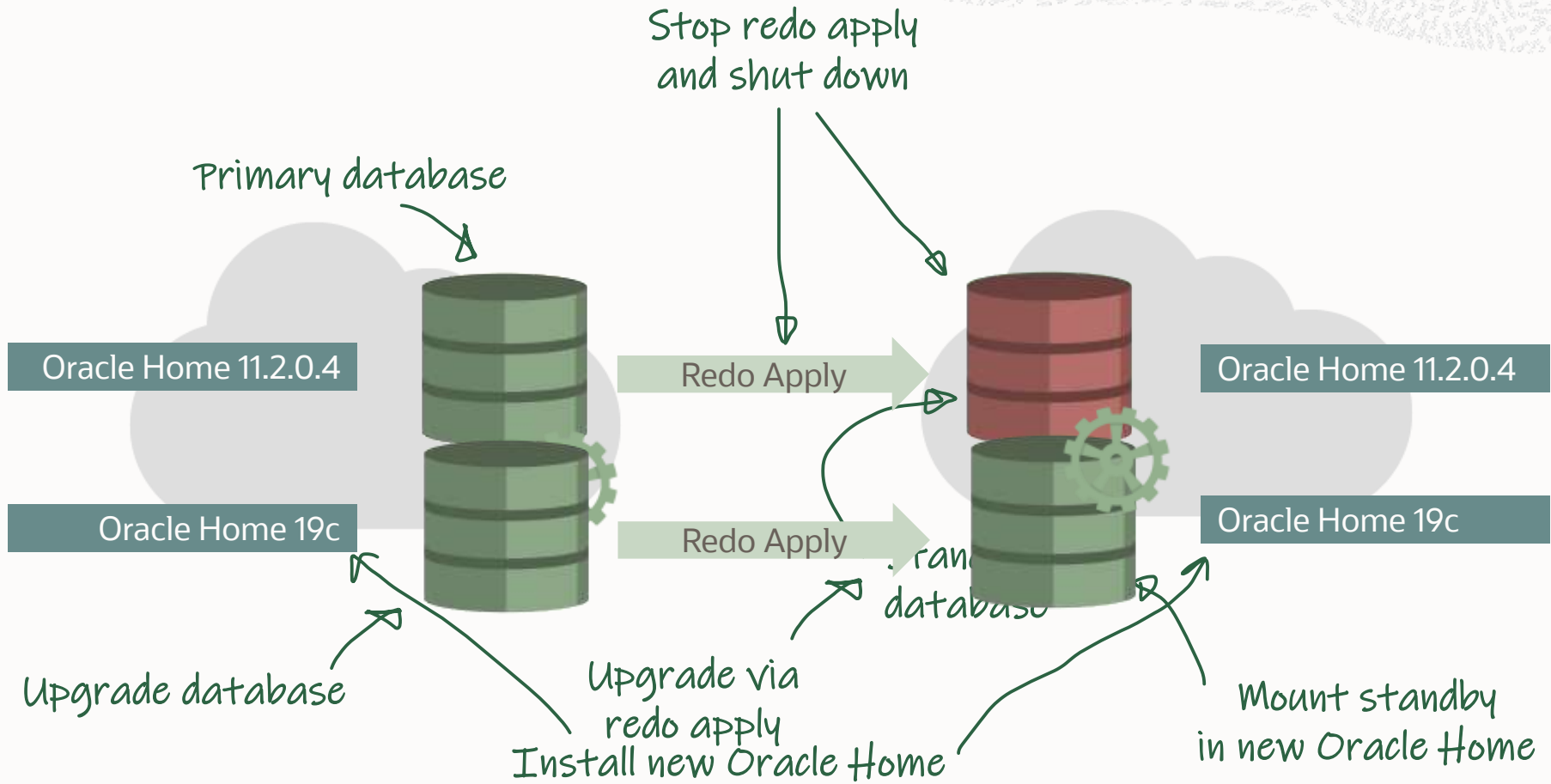
Procedure Name          Catalog   Fixed
Result                 Version  Vs Release  Timestamp
-----
.- LobNotInObj          ... 1102000400 <= *All Rel* 03/01 23:46:27 PASS
.- MissingOIDOnObjCol  ... 1102000400 <= *All Rel* 03/01 23:46:27 PASS
.- SourceNotInObj      ... 1102000400 <= *All Rel* 03/01 23:46:27 FAIL
HCKE-0003: SOURCE$ for OBJ# not in OBJ$ (Doc ID 1360233.1)
SOURCE$ has 4 rows for 1 OBJ# values not in OBJ$
.- OversizedFiles      ... 1102000400 <= *All Rel* 03/01 23:46:27 PASS
```





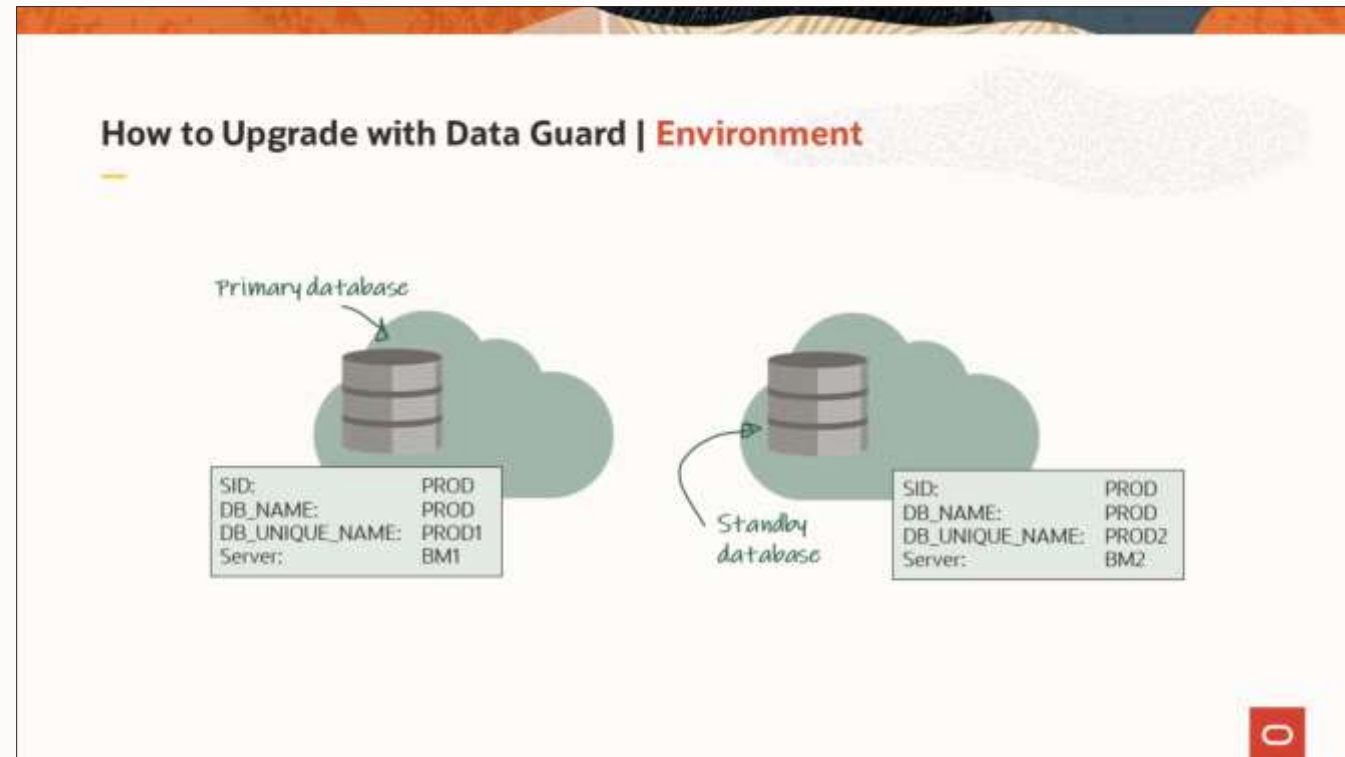
Upgrade with Data Guard

Upgrade with Data Guard | Concept



Remember use latest
Release Update

Upgrade with Data Guard | Demo



Upgrade with Data Guard | Blog Post



<https://dohdatabase.com/2020/11/26/how-to-upgrade-with-data-guard/>



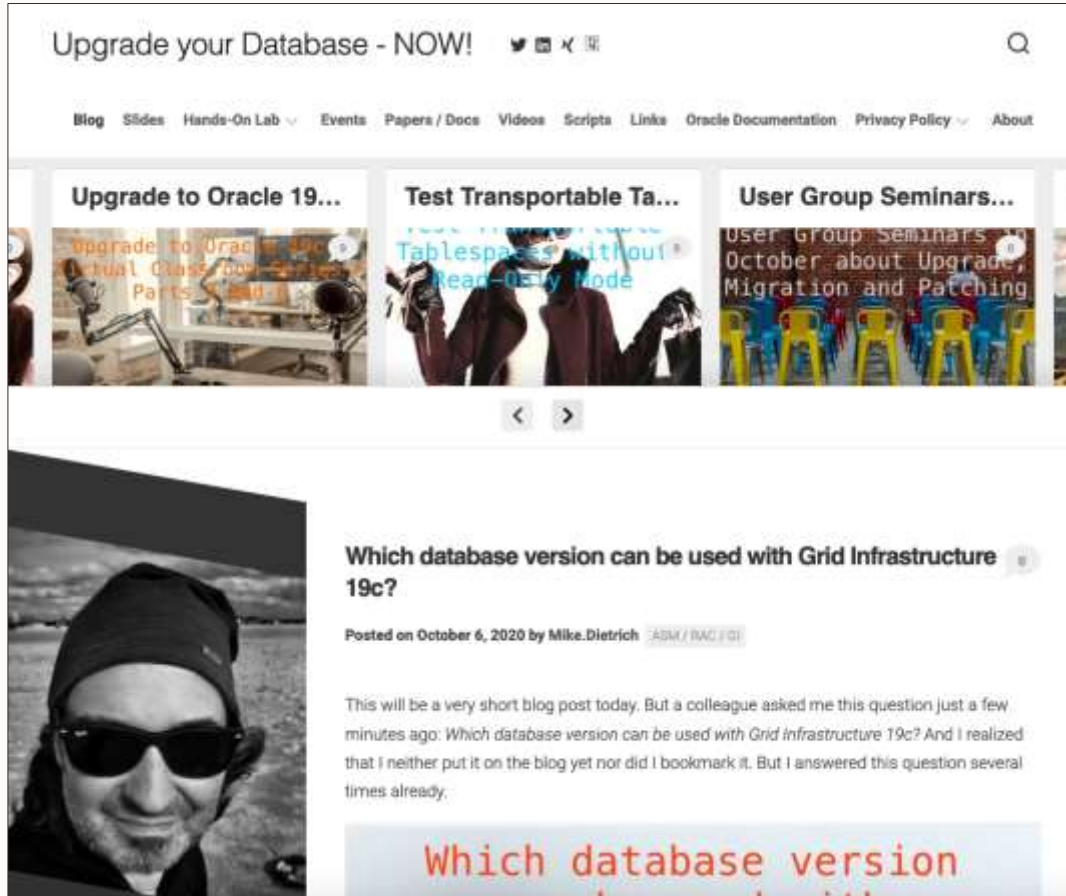


Summary

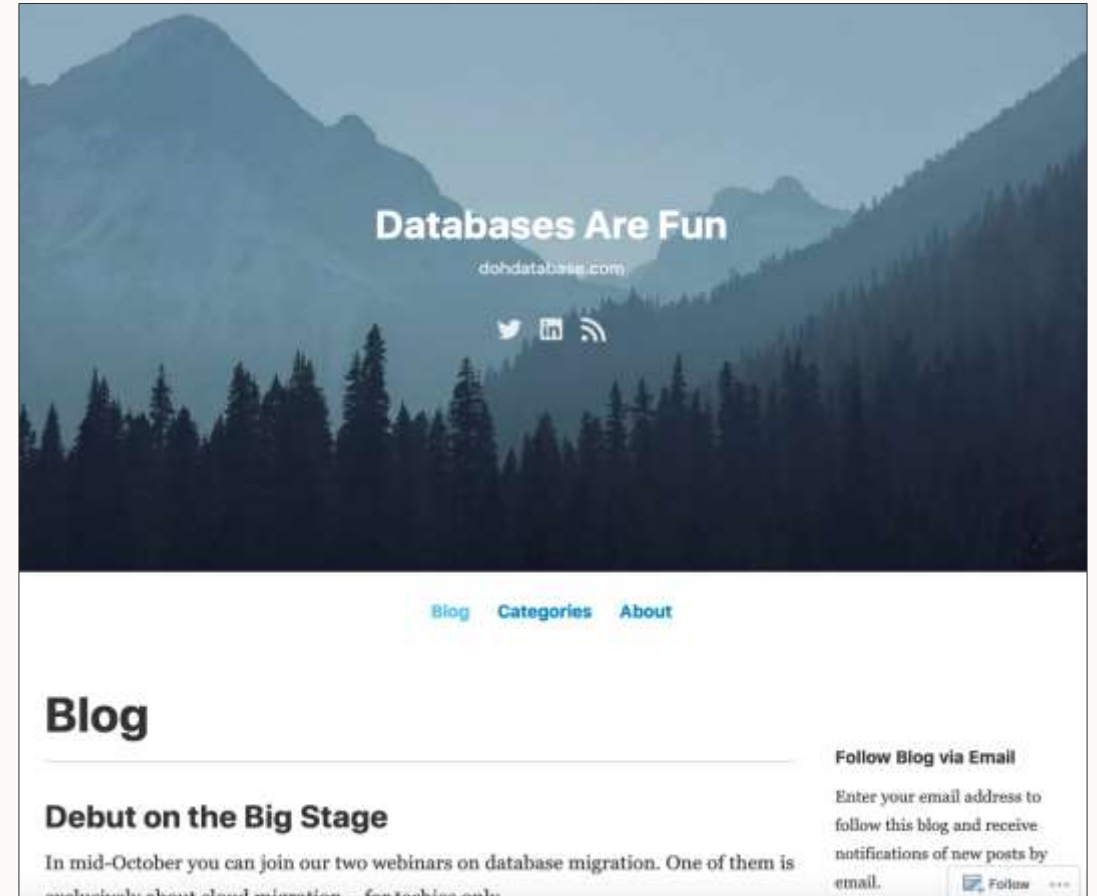
Further Information

https://MikeDietrichDE.com

https://DOHdatabase.com



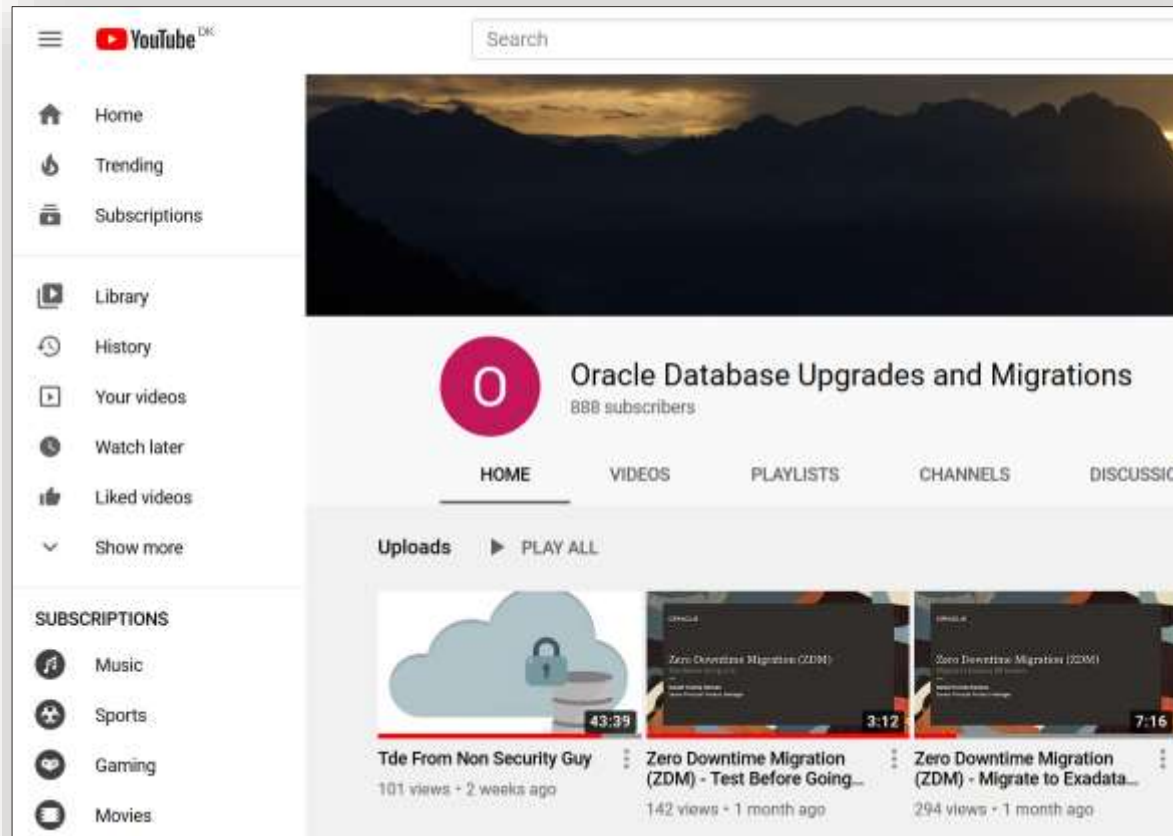
The screenshot shows the homepage of MikeDietrichDE.com. At the top, there is a navigation bar with the title "Upgrade your Database - NOW!" and social media icons for Twitter, Facebook, and LinkedIn. Below the navigation bar, there are three featured articles with images and titles: "Upgrade to Oracle 19...", "Test Transportable Ta...", and "User Group Seminars...". The main content area features a large article titled "Which database version can be used with Grid Infrastructure 19c?" with a sub-header "ASM / RAC / GI". The article text begins with "This will be a very short blog post today. But a colleague asked me this question just a few minutes ago: Which database version can be used with Grid Infrastructure 19c? And I realized that I neither put it on the blog yet nor did I bookmark it. But I answered this question several times already." A small profile picture of Mike Dietrich is visible on the left side of the article.



The screenshot shows the homepage of DOHdatabase.com. The background features a scenic view of mountains and a forest. The main heading is "Databases Are Fun" with the website URL "dohdatabase.com" below it. There are social media icons for Twitter, LinkedIn, and RSS. Below the main heading, there is a navigation bar with links for "Blog", "Categories", and "About". The main content area is titled "Blog" and features a featured article titled "Debut on the Big Stage". The article text begins with "In mid-October you can join our two webinars on database migration. One of them is exclusively about cloud migration — for techies only." On the right side, there is a "Follow Blog via Email" section with a text input field and a "Follow" button.




YouTube | Oracle Database Upgrades and Migrations



[YouTube Channel](#)



Upgrade your Database - NOW!  Mike Dietrich's Blog About Oracle Database Upgrades... Mostly

Blog Slides **Hands-On Lab** Events Papers / Docs Videos Scripts Links Oracle Documente

HOL 19c – Main Index Page

« PREVIOUS » MAIN INDEX HOL 19c » NEXT »

[Download the Oracle 19c Hands-On Lab](#)

You can use this page as an index page for the 19c lab!

- Setup
- Load
- Capture and Preserve SQL
- AutoUpgrade

- 1. Setup
- 2. Load
- 3. Capture and Preserve
- 4. AutoUpgrade
- 5. AWR Diff
- 6. SQL Perf Analyzer
- 7. SQL Plan Mgmt
- 8. SQL Tuning Advisor
- 10. Plugin UPGR => CDB2
- 11. Migrate FTEX
- 12. Un-/ Plug / Upgrade
- 13. Fallback Strategies
- 15. AutoUpgrade – Special



Thank you!

