

ORACLE

AutoUpgrade to Oracle 19c

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Database Upgrade and Migrations

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15-Nov-2019



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Database Upgrade

What you shouldn't do



Photo by Kai Pilger on Unsplash

Don't do this | Outdated Versions

From: [redacted]
Sent: Monday, January 14, 2019 2:08 AM
To: A [redacted]@oracle.com>
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 | What's wrong here?

Subject: Fed: Is it possible to configure 9i RAC database on11gR2 clusterware

----- Forwarded Message -----

Subject: Is it possible to configure 9i RAC database on11gR2 clusterware

Date: Wed, 23 Oct 2019 01:29:41 -0700 (PDT)

From: <aaaa.bbbbbb@oracle.com>

To: <xxxxx@oracle.com>

Hi Experts,

Please confirm, Is it possible to configure 9i RAC database on11gR2 clusterware.

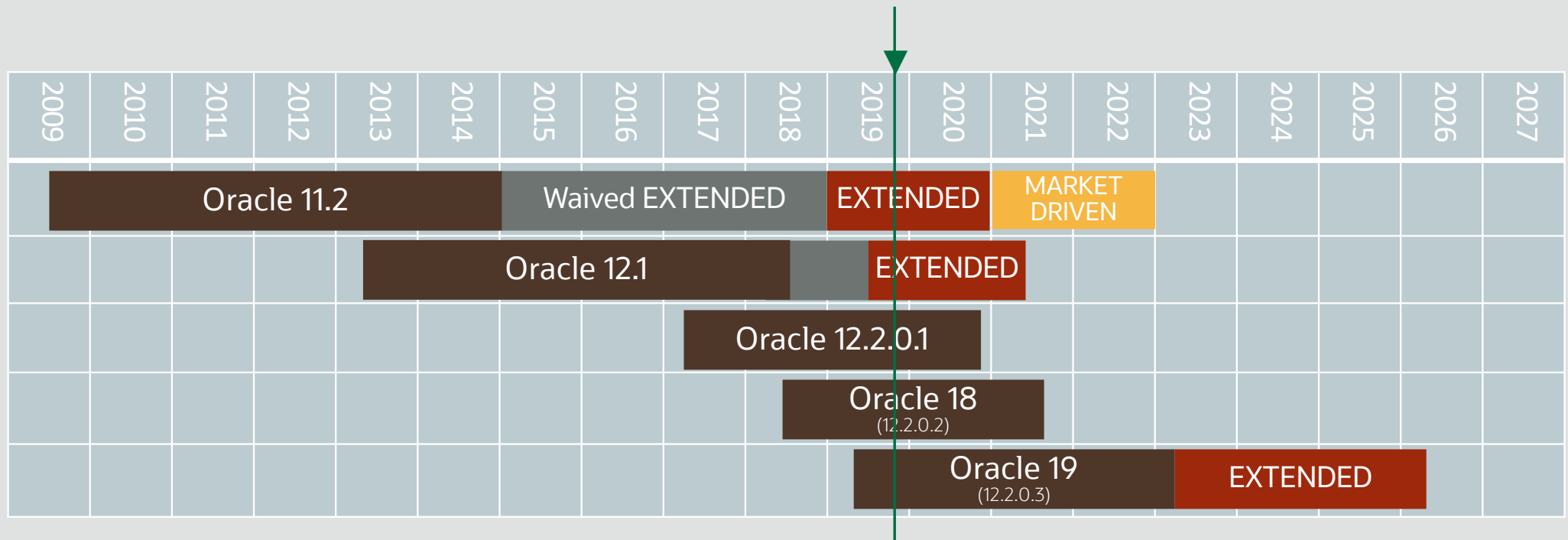
Regards

Database Upgrade

Why you "want" to upgrade



Lifetime Support Policy



Premier Support
 Waived Extended Support
 Paid Extended Support
 Market Driven Support

Oracle 12.2 Release Family?

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

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
		12.2.0.1									
			Oracle 18 (12.2.0.2)								
			Oracle 19 (12.2.0.3)				EXTENDED				

- MOS Note:742060.1 - The Single Source of Truth

Check

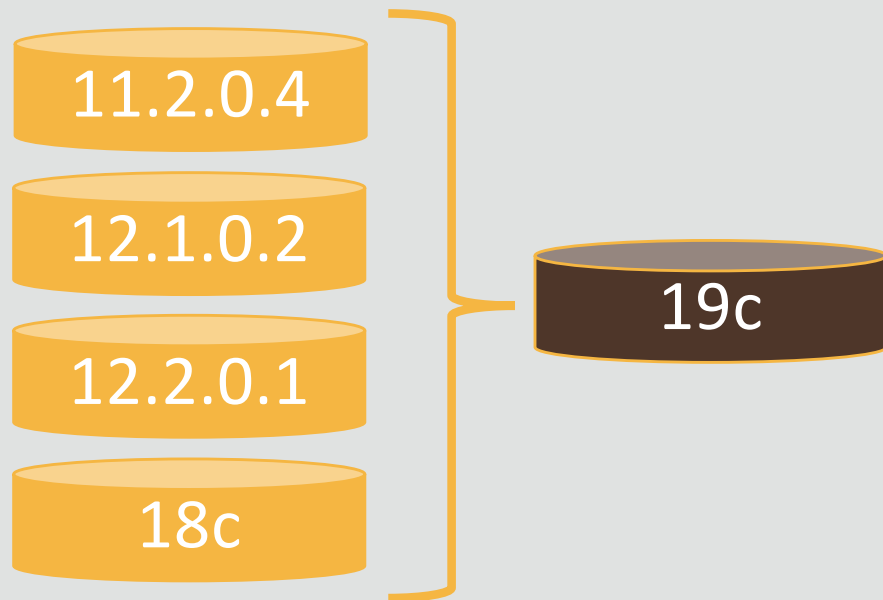
Before Upgrade

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Photo by [Pablo Heimplatz](#) on [Unsplash](#)

Database Upgrade | Supported Releases



Oracle Database 19c requires OL7, RHEL7 or SLES12 or newer

Posted on February 14, 2019 by Mike Dietrich Oracle Database 19c

Oracle Database 19.2 for Oracle Exadata systems is available for download since yesterday night. One important thing you need to take into account once Oracle 19c will be generally available: On **Linux**, Oracle Database 19c requires OL7, RHEL7 or SLES12 or newer.

Database Installation Guide for Linux

Home / Database / Oracle / Oracle Database / Release 19

Database Installation Guide for Linux

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Title and Copyright Information	
Preface	
Changes in this Release for Oracle Database	
1 Oracle Database Installation Checklist	

Oracle® Database

Database Installation Guide

19c for Linux

E96432-01

January 2019

You will find the exact minimum OS and kernel version requirements in the Database Installation Guide for Linux for Oracle 19c. Please see here the [Operating System Checklist for Oracle Database Installation on Linux](#).

<https://mikedietrichde.com/2019/02/14/oracle-database-19c-requires-ol7-rhel7-or-sles12-or-newer/>

Supportability | OS Certification



The screenshot displays the Oracle Supportability page. At the top, the Oracle logo and navigation links are visible. The main section is titled "Search Results: Oracle Database 11.2.0.3.0 on Linux x86-64 Red Hat Enterprise Linux 7". Below this, there is a "Certification Search" section with a search bar and filters. The search results show a table with columns for Product, Release, and Platform. The product is Oracle Database, the release is 11.2.0.3.0, and the platform is Linux x86-64 Red Hat Enterprise Linux 7. Below the table, there is a "Certification Results" section. A red arrow points to this section, which contains a yellow warning icon and the text: "Oracle Database 11.2.0.3.0 is not certified on Linux x86-64 Red Hat Enterprise Linux 7".

Product	Release	Platform
Oracle Database	11.2.0.3.0	Linux x86-64 Red Hat Enterprise Linux 7

Certification Results

Operating System Certification

 **Oracle Database 11.2.0.3.0 is not certified on Linux x86-64 Red Hat Enterprise Linux 7**

Displaying Oracle Database 11.2.0.3.0 Certifications (Filtered by Linux x86-64 Red Hat Enterprise Linux 7) | [View Certification Notes](#) | Group by: [Product Category](#) | Show: [All Certifications](#)

Supportability | OS Certification

Search Results: Oracle Database 11.2.0.4.0 on Linux x86-64 Oracle Linux 7

[Certification Search](#)

Certification Results

Operating System Certification

 **Oracle Database 11.2.0.4.0 is certified on Linux x86-64 Oracle Linux 7**

[See Certification Details for Notes and Support information.](#)

Displaying Oracle Database 11.2.0.4.0 Certifications (Filtered by Linux x86-64 Oracle Linux 7) [View Certification Notes](#)

View  [Share Link](#)

Certified With	Number of Releases / Versions
Operating Systems (1 Item)	
Linux x86-64	1 Version (Oracle Linux 7)

AutoUpgrade

The recommended way to upgrade databases



Photo by [Joshua Sortino](#) on [Unsplash](#)

Download | Get the latest autoupgrade.jar

- [MOS Note: 2485457.1](#)



Description

Oracle Database Autoupgrade allows DBAs to upgrade one or many databases without human intervention, all with one command and a single configuration file.

Autoupgrade version

The last update of the tool corresponds to version **20190815**.

Benefits

Autoupgrade enables customers to upgrade one or many Oracle databases at the command-line with a single command and a single configuration file. Autoupgrade will run the preupgrade tasks, perform automated backups where needed, execute the database upgrade, and finish by taking care of post-upgrade tasks. It includes automatic retry and fallback, the possibility to schedule upgrades for future points in time, and the ability to set, change or remove initialization parameters as desired. It saves time and money by upgrading hundreds of databases with one command and replacing complex high-maintenance upgrade solutions.

As of the January 2019 Release Updates (DBRU201901) and beyond, Autoupgrade Support is available for Oracle Database 12c Release 2 (12.2) and Oracle Database 18c (18.5) target homes. For both Oracle Database 12c Release 2 (12.2) and Oracle Database 18c (18.5) target homes, you should download the [Autoupgrade Tool](#) and place it under \$ORACLE_HOME/rdms/admin.

In Oracle Database 18c (18.5) and later target Oracle homes, the autoupgrade.jar file exists by default. However, before you use Autoupgrade, Oracle recommends that you download the [latest version](#) and replace the one already existing under \$ORACLE_HOME/rdms/admin.

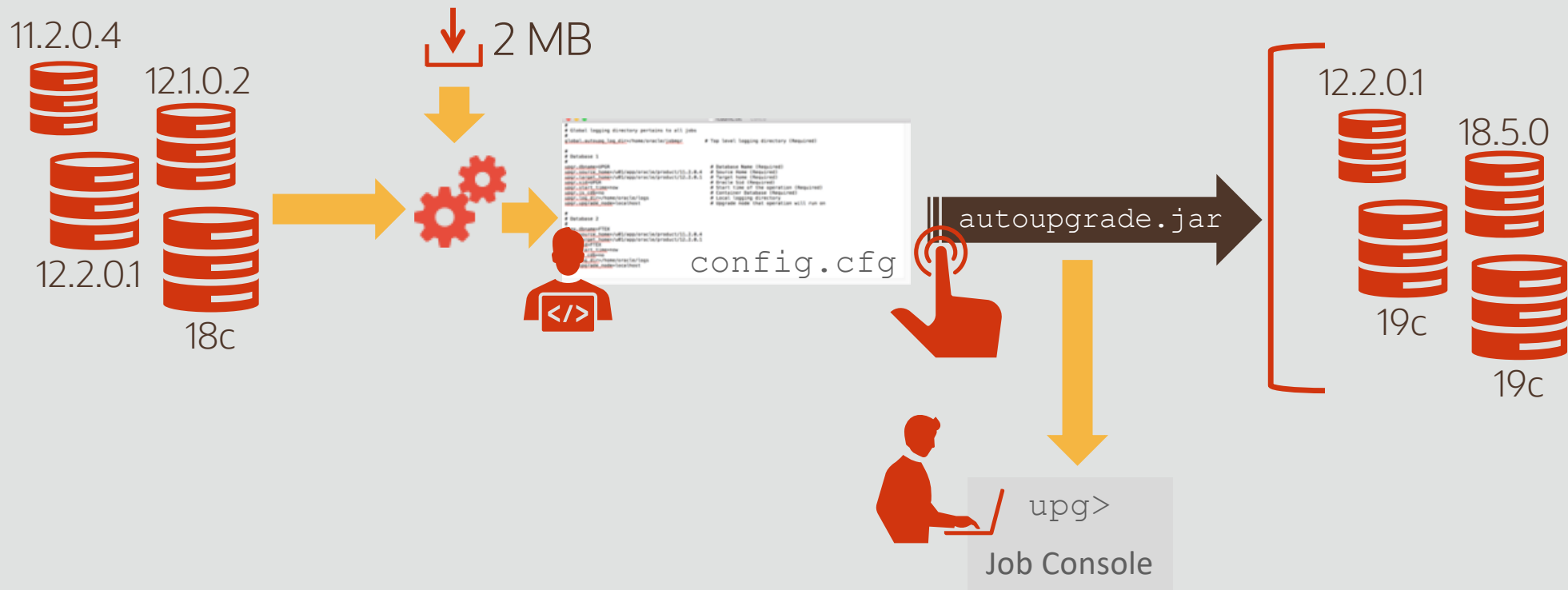
Target versions supported

Autoupgrade Tool can be used on upgrading to below Oracle Database releases:

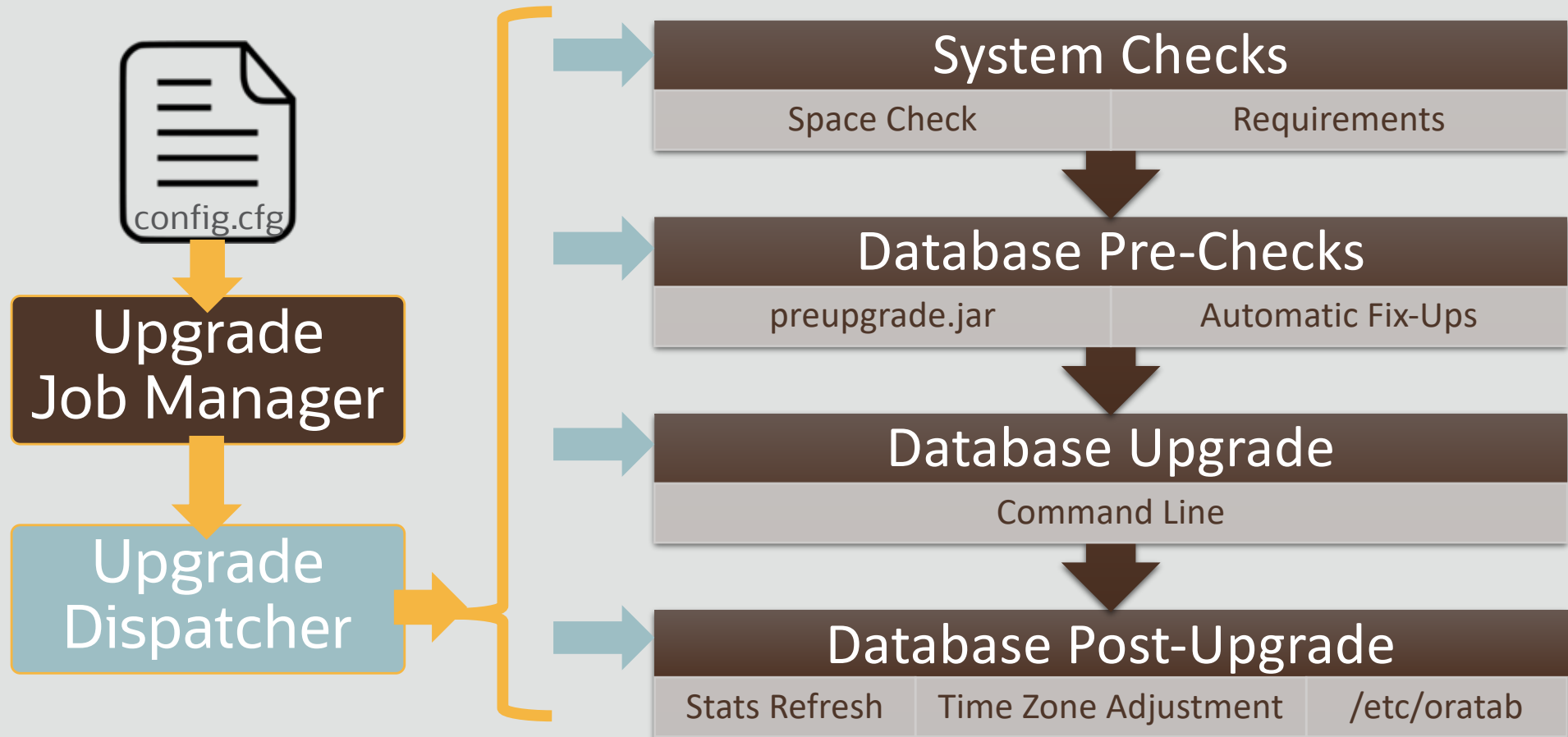
- Oracle Database 18c (18.5 and newer)
- Oracle Database 18c (18.5 and newer)
- Oracle Database 12c Release 2 (12.2 + DBRU201901) and newer

Upgrade | AutoUpgrade

autoupgrade.jar
MOS Note: 2485457.1



AutoUpgrade | Architecture



AutoUpgrade | Requirements

- Java 8 or newer
 - Default in your \$ORACLE_HOME since 12.1.0.2
 - Check: `$ORACLE_HOME/jdk/bin/java -version`
- The AutoUpgrade package
 - A jar file of 2 MB in size

AutoUpgrade | Availability and Support

- Non-CDB and CDB upgrades
- All operating systems running Oracle Database servers
- Standard Edition 2 and Enterprise Edition
- Upgrades **from version**:
 - 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

AutoUpgrade | What we are working on

- RAC
- Data Guard
 - Disable DG Broker and defer log transport
- Migration from non-CDB to PDB
 - Well ... we can ... but it is not flexible enough yet ☺
- Unplug/plugin/upgrade

AutoUpgrade | Blog Post Series

- <https://mikedietrichde.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

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



AutoUpgrade | Use the newest version

- `$ java -jar autoupgrade_new.jar -version`

```
build.hash 9c85160
```

```
build.version 20191024
```

```
build.date 2019/10/24 12:47:31
```

```
build.max_target_version 19
```

```
build.type production
```

AutoUpgrade | Create sample config file

```
$ java -jar autoupgrade.jar -create_sample_file config
```

```
Created sample configuration file /home/oracle/sample_config.cfg
```

AutoUpgrade | Example config file

```
global.autoupg_log_dir=/home/oracle/logs

upg1.dbname=DB12
upg1.start_time=NOW
upg1.source_home=/u01/app/oracle/product/12.2.0.1
upg1.target_home=/u01/app/oracle/product/19
upg1.sid=DB12
upg1.log_dir=/home/oracle/aux/DB12
upg1.upgrade_node=localhost
upg1.target_version=19

upg2.dbname=UPGR
upg2.start_time=NOW
upg2.source_home=/u01/app/oracle/product/11.2.0.4
...
```

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
```

- 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, utlrlp.sql won't be run - Default: YES
#
upgr2.run_utlrlp=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

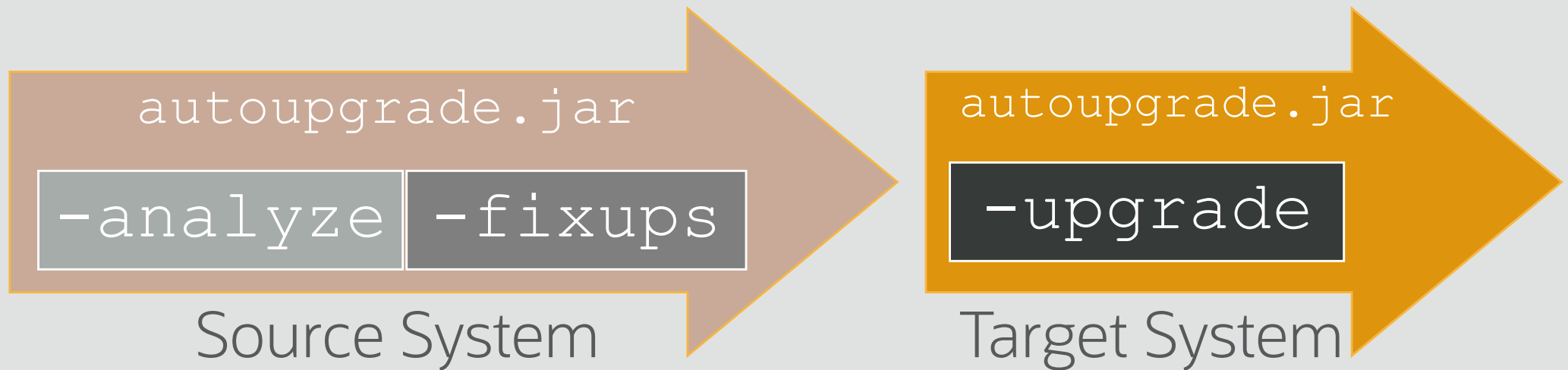
-analyze

-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 fixups
$ 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 ← Status Logs
 - /database_1
 - ./job_number
 - ./prechecks
 - ./preupgrade ← HTML Report
 - ./prefixups
 - ./drain
 - ./dbupgrade ← Upgrade Logs
 - ./postupgrade
 - ./temp
 - /database_2
 - ...



AutoUpgrade

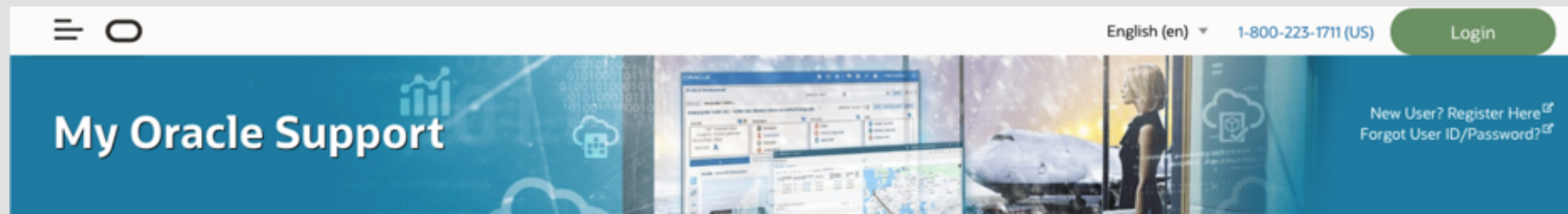
Oracle 11.2.0.4 => 19.5.0

Oracle 12.2.0.1 => 19.5.0

https://youtu.be/d0_y8s0asjs

AutoUpgrade | What if ...

1. ZIP the entire global log directory:
`global.autoupg_log_dir`
2. Add the `alert.log`
3. Upload it to MOS



Next version will have:

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

AutoUpgrade | What if ... a fixup fails?

- If a fixup fails, the upgrade fails
- In case you need to overwrite this particular fixup
 - `prefix_logdir/sid/jobno/prechecks/sid_checklist.cfg`

[checkname]	DICTIONARY_STATS
[stage]	PRECHECKS
[fixup_available]	YES
[runfix]	YES >>>> NO
[severity]	RECOMMEND

AutoUpgrade | What if ... you need to restart?

- By default, AutoUpgrade will resume
- If you'd like to restart, remove the recovery checkpoint
 - `java -jar autoupgrade.jar -config DB.cfg -clear_recovery_data`
- Then start AutoUpgrade again

AutoUpgrade | What if ... you have RAC? 1/2

- Run **analyze** and **fixups** mode
 - `java -jar autoupgrade.jar -config config.cfg -mode analyze`
 - `java -jar autoupgrade.jar -config config.cfg -mode fixups`
- Stop the instances and disable the database
 - `srvctl stop database -d orcl`
 - `srvctl disable database -d orcl`
- Startup the database on current node
 - `sqlplus / as sysdba`
 - `SQL> startup`
- Run the **deploy** mode
 - `java -jar autoupgrade.jar -config config.cfg -mode deploy`

AutoUpgrade | What if ... you have RAC? 2/2

- Create the spfile

- `sqlplus / as sysdba`
 - `SQL> startup nomount`
 - `SQL> create spfile='+DATA' from
pfile='/home/oracle/autoup2/orcl1/orcl1/temp/after_upgrade_pfile_orcl1.ora';`
 - `SQL> shutdown immediate`
 - `SQL> exit`

- Update Clusterware

- `srvctl upgrade database -d orcl -oraclehome $ORACLE_HOME`
- `srvctl enable database -d orcl`
- `srvctl status database -d orcl`
- `srvctl config database -d orcl`
- `srvctl start database -d orcl`
- `srvctl status database -d orcl`

"After qualifying the new AutoUpgrade tool on a representative portion of our database landscape we found that tool was doing a great job and is production-ready. In our automation tool we have removed a lot of "home-grown" code, and replaced it with AutoUpgrade functionality.

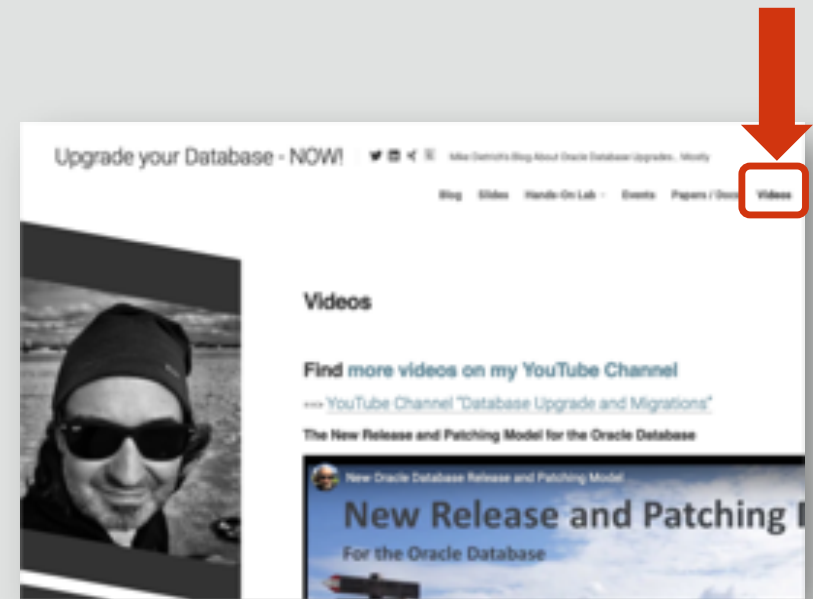
Since August 2019 all upgrades at SimCorp have been executed using the AutoUpgrade tool."

Daniel Overby Hansen
Lead Developer
SimCorp A/S - Denmark



Videos | Upgrade Channel on Youtube

- <https://www.youtube.com/channel/UCTKvCZwAbOeTSRFQDAh7yXw>
- **AutoUpgrade**
 - <https://youtu.be/kr3aZrqA9Go> [11:57 min]
 - https://youtu.be/dO_y8sOasjs [DOAG 2019]
- Preupgrade Steps
 - <https://youtu.be/2R0Plcn7Udk> [6:27 min]
- Database Upgrade
 - <https://youtu.be/ZqW3hS64hng> [4:17 min]
- Postupgrade and Time Zone change
 - <https://youtu.be/kEBLqYDmspw> [7:58 min]



Migration Strategies

Migration to Oracle Multitenant



Photo by [Mathias Jensen](#) on [Unsplash](#)

Oracle Multitenant | Oracle 19c

8.1.1 Deprecation of Non-CDB Architecture

The non-CDB architecture is deprecated in Oracle Database 12c, and may be desupported and unavailable in a release after Oracle Database 12c Release 2. Oracle recommends use of the CDB architecture.

- Oracle 18c and Oracle 19c belong to the Oracle Database 12.2 release family
- For further details see [MOS Note: 742060.1](#)

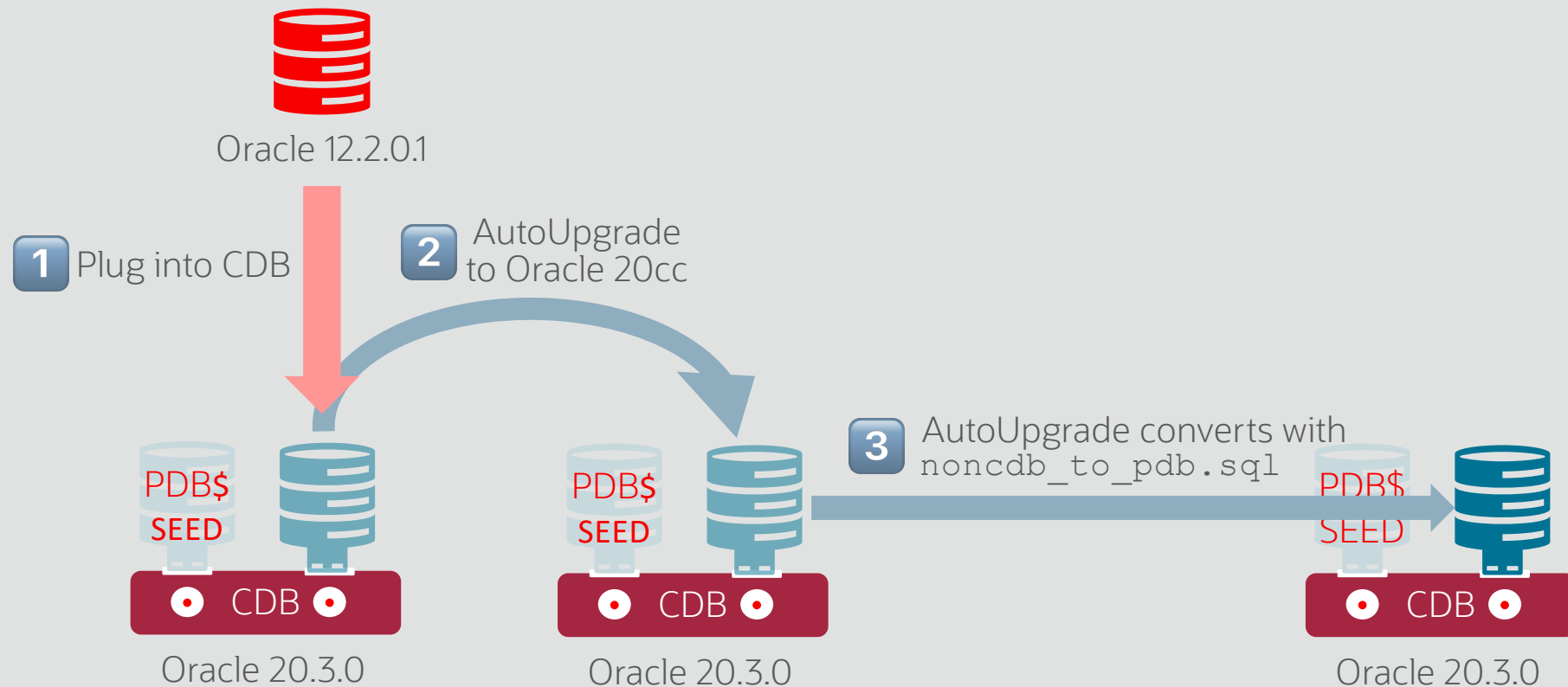
And by the way ...

- Since **Oracle 19c** you can have 3 user-created PDBs without need for a Multitenant license!!!
 - <https://mikedietrichde.com/2019/09/17/3-pdbs-included-with-oracle-19c-and-desupport-of-non-cdbs-with-20c/>

Table 3-2 Consolidation

Feature / Option / Pack	SE 2	EE	EE-ES	DBCS SE	DBCS EE	DBCS EE-HP	DBCS EE-EP	ExaCS	Notes
Oracle Multitenant - # of PDBs	3	252	4096	3	3	4096	4096	4096	<p>The number value in each column indicates the maximum number of pluggable databases (PDBs) that can be created for each offering.</p> <ul style="list-style-type: none">• For all offerings, if you are not licensed for Oracle Multitenant, then you may have up to 3 PDBs in a given container database at any time.• EE: Extra cost option; if you are licensed for Oracle Multitenant, then you can create up to 252 PDBs.• EE-ES: Extra cost option; if you are licensed for Oracle Multitenant, then you can create up to 4096 PDBs.

Upgrade to 20c | Migration to Multitenant



AutoUpgrade | Migration to Multitenant

- Future functionality

```
#  
# Specify the SID of the target CDB to plug into after upgrade  
#  
upg2.target_cdb=CDB2
```

Move to Multitenant | Automation?

- AutoUpgrade automates non-CDB-to-PDB migration
 - Requires customer creating the destination CDB
 - Can't lift the migration constraints (downtime, fallback)
- No automation for Endianness migrations

<https://mikedietrichde.com/2019/07/22/database-migration-from-non-cdb-to-pdb-overview/>



Database Migration from non-CDB to PDB – Overview

Posted on July 22, 2019 by Mike Dietrich | [Oracle Database 19c](#)

Today I'll start writing a series of several "How-to" articles about database migration from non-CDB to PDB – Overview. You'll find a quick introduction below. And of course, the links to all the other related blog posts.

Database Migration from non-CDB to PDB – Overview

When you plan to move from non-CDB, the Oracle term for regular database deployments, to a Pluggable Database (PDB), you will migrate your database. It will become a PDB and run as part of a Container Database (CDB). This is a well known concept for several years now called Oracle Multitenant. If you have only one PDB, we call it Single Tenant.



<https://mikedietrichde.com/2019/07/22/database-migration-from-non-cdb-to-pdb-overview/>

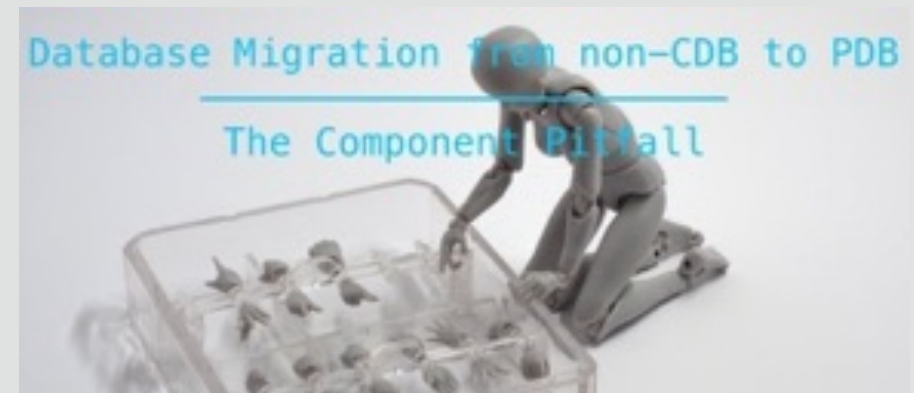
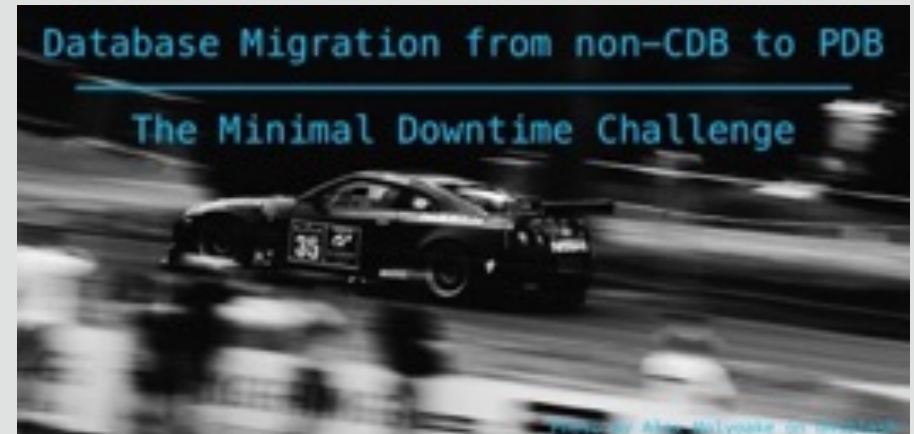
Related Posts

- [Upgrade, plug in, convert \(noncdb_to_pdb.sql\) – 11.2.0.4 and higher](#)
- [Plugin, upgrade, convert \(noncdb_to_pdb.sql\) – 12.2.0.1 and higher](#)
- [Clone via NON\\$CDB, upgrade, convert – 12.1.0.2 and higher](#)

Things to know

In addition to these scenarios, I'd like to highlight also the special cases such as:

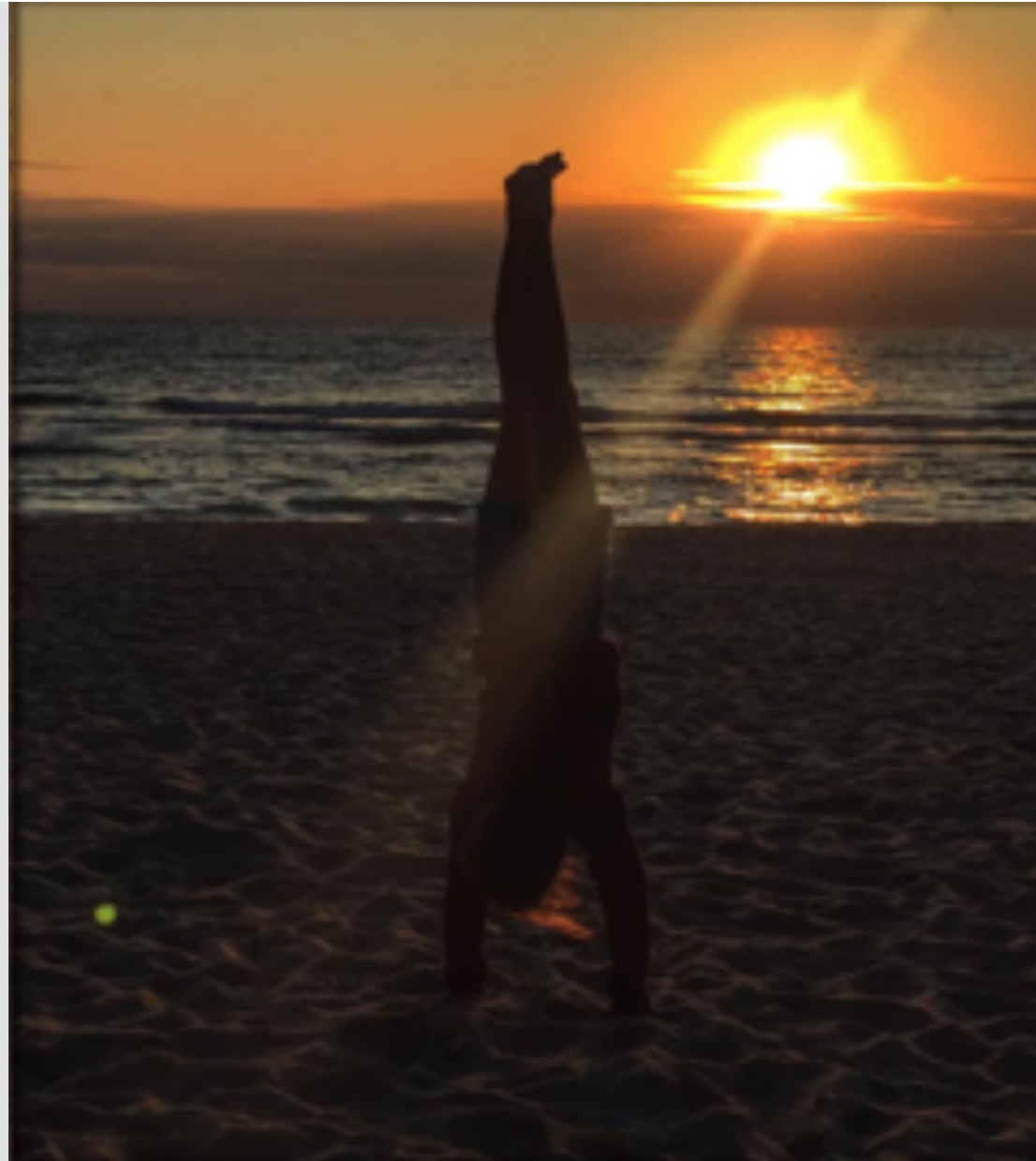
- [Typical Plugin Issues and Workarounds](#)
- [The Compatible Pitfall](#)
- [The Time Zone Pitfall](#)
- [The Component Pitfall](#)
- [The Patch Level Pitfall](#)
- [Various Pitfalls](#)
- [The Fallback Challenge](#)
- [The Minimal Downtime Challenge](#)



Further Information

Finally ...

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Slides | <https://MikeDietrichDE.com>

Upgrade your Database - NOW!

Blog | Slides | For Oracle | For PostgreSQL | For Microsoft SQL Server | For IBM DB2 | For SAP HANA | For SAP S/4HANA | For SAP BW | For SAP ECC | For SAP CRM | For SAP SRM | For SAP SCM | For SAP PS | For SAP FI | For SAP CO | For SAP SD | For SAP MM | For SAP PM | For SAP QA | For SAP TR | For SAP PLM | For SAP ERM | For SAP GRC | For SAP AEC | For SAP ERM | For SAP GRC | For SAP AEC

Posted on August 5, 2019 by Mike Dietrich | [Twitter](#) | [LinkedIn](#) | [Facebook](#)

There are several pitfalls when you plug a non-CDB into a CDB environment. I'd like to highlight a few potential roadblocks as well. This is part of a series of blog posts to make your migration from a non-CDB to a CDB easier.

Database Migration from non-CDB to CDB - Various Pitfalls

Photo by Michael Schmitt

Database Migration from non-CDB to CDB - Various Pitfalls



Upgrade your Database - NOW!

Upgrade talks you may want to attend, too

- Wednesday, Nov 20 – 13:00h - Tokio
 - How to Diagnose Oracle Database Upgrade Issues
 - Roy Swonger, VP Database Upgrade, Utilities and Datapatch, Oracle
- Thursday, Nov 21 – 9:00h - Tokio
 - Supercharging Oracle Upgrades
 - Daniel Overby Hansen, Lead Developer, SimCorp A/S
 - Mike Dietrich, Master Product Manager, Database Upgrade and Migrations, Oracle

Questions?



Thank you for your attention!

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