Photo by Turcanu Răzvan on Unsplash

Upgrade to Oracle AI Database 26ai Best Practices and Customer Experience

ConTech by RoOUG 2025, November 2025

Oracle

DBAs

run the world

Daniel Overby Hansen

Distinguished Product Manager

dohdatabase

@dohdatabase.com

https://dohdatabase.com

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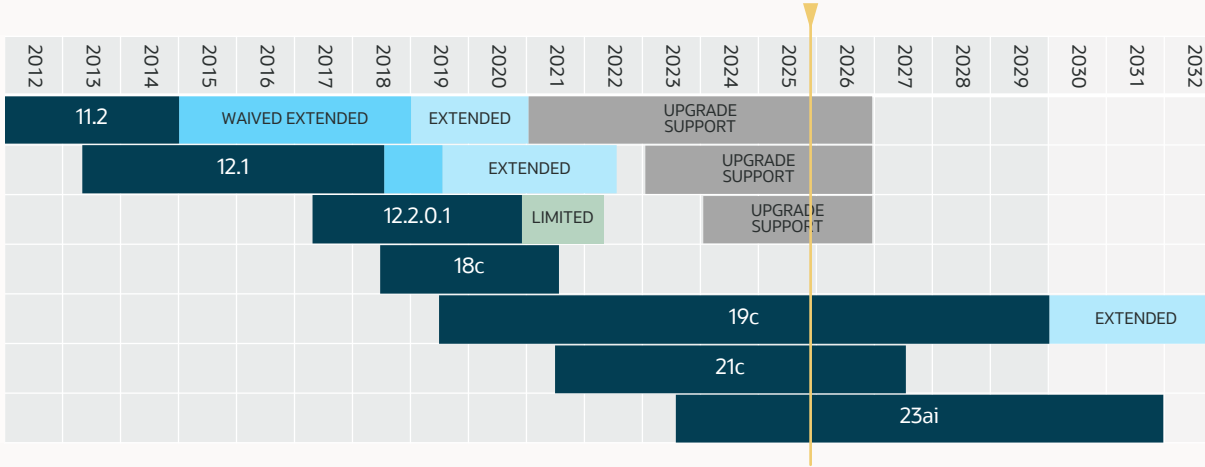
Lifetime Support Policy



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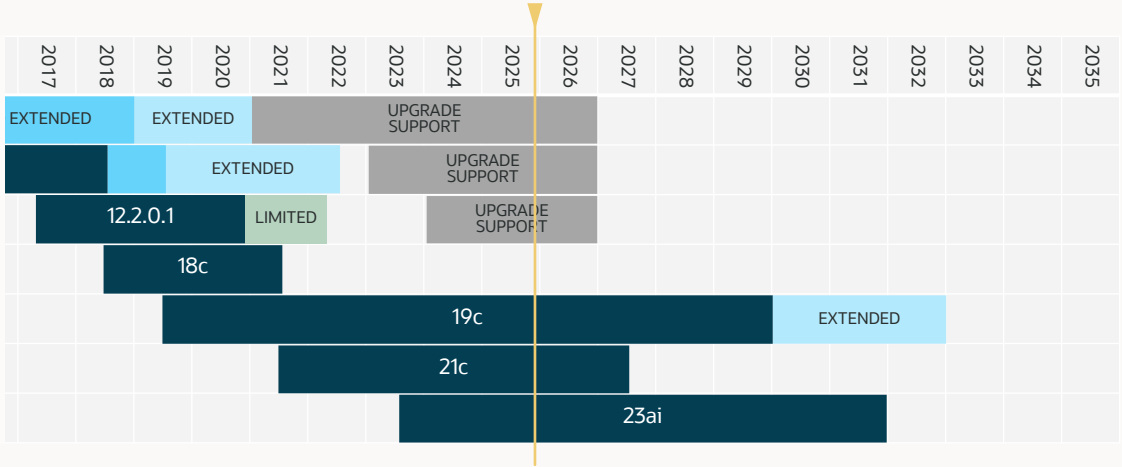
Lifetime Support Policy



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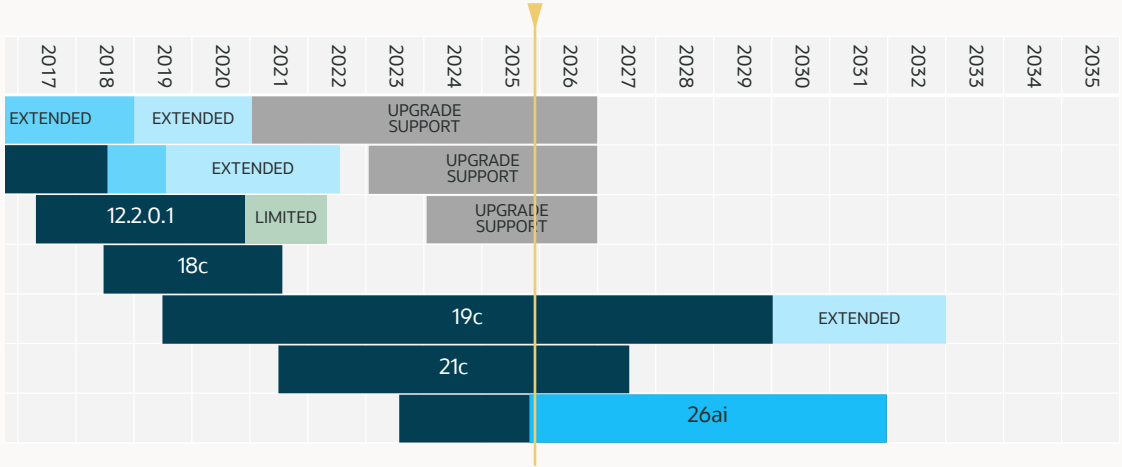
Lifetime Support Policy



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Do you want to upgrade?

Oracle Database 11.2.0.4
Oracle Database 12.1.0.2
Oracle Database 12.2.0.1
Oracle Database 18c

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Oracle Database 11.2.0.4
Oracle Database 12.1.0.2
Oracle Database 12.2.0.1
Oracle Database 18c

Oracle Database 19c

Oracle Database 23ai

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Oracle Database 11.2.0.4
Oracle Database 12.1.0.2
Oracle Database 12.2.0.1
Oracle Database 18c

Oracle Database 19c

Oracle Database 23ai

Oracle AI Database 26ai

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26ai

When is a database upgrade required?

Copyright © 2025, Oracle and/or its affiliates

Oracle Database 19c ⇒ Oracle Database 23ai ⇒ Oracle AI Database 26ai

UPGRADE

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Oracle Database 19c ⇒ Oracle AI Database 26ai

UPGRADE

Copyright © 2025, Oracle and/or its affiliates

Oracle Database 19c ⇒ Oracle Database 23ai ⇒ Oracle AI Database 26ai

UPDATE

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July 2025	Oracle Database 23ai	23.9.0.25.07
October 2025	Oracle AI Database 26ai	23.26.0.0.0
January 2026	Oracle AI Database 26ai	23.26.1.0.0
April 2026	Oracle AI Database 26ai	23.26.2.0.0

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July 2025	Oracle Database 23ai	23.9.0.25.07
October 2025	Oracle AI Database 26ai	23.26.0.0.0
January 2026	Oracle AI Database 26ai	23.26.1.0.0
April 2026	Oracle AI Database 26ai	23.26.2.0.0

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April 2026	Oracle AI Database 26ai	23.26.2.0.0

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July 2025	Oracle Database 23ai	23.9.0.25.07
October 2025	Oracle AI Database 26ai	23.26.0.0.0
January 2026	Oracle AI Database 26ai	23.26.1.0.0
April 2026	Oracle AI Database 26ai	23.26.2.0.0

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```
SQL> select version, version_full from v$instance

VERSION              VERSION_FULL
-------------------- --------------------
23.0.0.0.0           23.26.0.0.0
```

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```
SQL> select version, version_full from v$instance

VERSION           VERSION_FULL
----------------- -----------------
23.0.0.0.0        23.26.0.0.0
```

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Your Road to Oracle AI Database 26ai

ANALYZE ⇛ UPGRADE ⇛ GO-LIVE

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Oracle AI Database 26ai supports the multitenant architecture only

- You must convert your database to a PDB

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```
--Use up to 3 user-created PDBs
--without a license for Multitenant option.
--Applies to Oracle Database 19c and newer, including SE2

alter system set max_pdbs=3;
```


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Update Exadata System Software to the latest version

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Further Information

Exadata System Software

- Recommended to use latest version. However, minimum version is 25.1

- MOS Note: 888828.1

  Exadata Database Machine and Exadata Storage Server Supported Versions

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Upgrade to Oracle Grid Infrastructure 26ai

- Manages Oracle Database 19c and newer
- Upgrade older databases in advance

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```
--Grid Infrastructure 26ai requires a minimum compatible setting
--Databases older than 19c may not use this disk group anymore

alter diskgroup DATA set attribute 'compatible.rdbms' = '19.0.0.0.0';
```


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Confirm your clients can connect to Oracle AI Database 26ai

- Upgrade your clients well in advance of the upgrade

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Client / Server Interoperability

Client Version	Server Version						
	26ai	21c	19c	18c	12.2.0	12.1.0	11.2.0
26ai[#11]	Yes	Yes	Yes	No	No	No	No
21c	Yes	Yes	Yes	Was	Was	Yes[#12]	No
19c	Yes	Yes	Yes	Was	Was	Yes[#12]	Yes[#9]
18c	No	Was	Was	Was	Was	Was	Was[#9]
12.2.0	No	Was	Was	Was	Was	Was	Was
12.1.0	No	Yes[#12]	Yes[#12]	Was	Was	Yes[#12]	Yes[#12]
11.2.0	No	No	Yes[#9]	Was[#9]	Was	Yes[#12]	Yes[#9]

MOS Note: 2073031 - Client / Server Interoperability Support Matrix

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Client / Server Interoperability

Client Version	Server Version						
	26ai	21c	19c	18c	12.2.0	12.1.0	11.2.0
26ai[#11]	Yes	Yes	Yes	No	No	No	No
21c	Yes	Yes	Yes	Was	Was	Yes[#12]	No
19c	Yes	Yes	Yes	Was	Was	Yes[#12]	Yes[#9]
18c	No	Was	Was	Was	Was	Was	Was[#9]
12.2.0	No	Was	Was	Was	Was	Was	Was
12.1.0	No	Yes[#12]	Yes[#12]	Was	Was	Yes[#12]	Yes[#12]
11.2.0	No	No	Yes[#9]	Was[#9]	Was	Yes[#12]	Yes[#9]

MOS Note: 2073031 - Client / Server Interoperability Support Matrix

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```
--List current connections and their driver details
--Join to gv$session for more details.

select * from gv$session_connect_info;
```


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The same certification matrix applies to database links as well

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Further Information

Client / Server Interoperability

- Client / Server Interoperability Support Matrix (Doc ID 207303.1)
- Blog post: Are Your Oracle Database Clients Ready for the next Database Upgrade?

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On important databases, execute a dictionary check before upgrade

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```
upg1.sid=SALESDB
upg1.source_home=/u01/app/oracle/product/19c
upg1.target_home=/u01/app/oracle/product/26ai
upg1.target_cdb=CDB1
upg1.run_dictionary_health=full

#To run only the critical checks
#upg1.run_dictionary_health=critical
```


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Familiarize yourself with the changes in Oracle AI Database

- Check the Upgrade Guide

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Home
Parameters
Users, Roles, etc
Privileges
Included Fixes
Oracle Database Home
Objects
Fixed Objects
Audit
System
Scheduler
Report

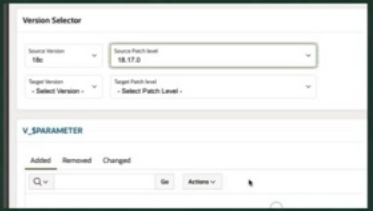
ORAdiff

ORAdiff - Find the differences between two Oracle Database releases

ORAdiff allows you to compare two database releases to each other - with or without patch bundles on top.

Get Started

1. Click the menu icon on the upper left corner of the page
2. Select an object type from the left-hand navigation menu
3. Choose the Source and Target versions and patch levels
4. View the report. You may optionally choose a filter



ORAdiff will display the differences such as "new tables", "added parameters", "changed columns", "removed privileges" and much more. ORAdiff search can tell you when a parameter was added and which files changed in your Oracle Home.

ORAdiff data is refreshed when new patch bundles are released to the public.

Questions? Ideas? Enhancement requests? Contact us on: #oradiff-int

Further Information

ORAdiff / Oracle Release Analyzer Diff Utility

- Demo
- http://oradiff.oracle.com

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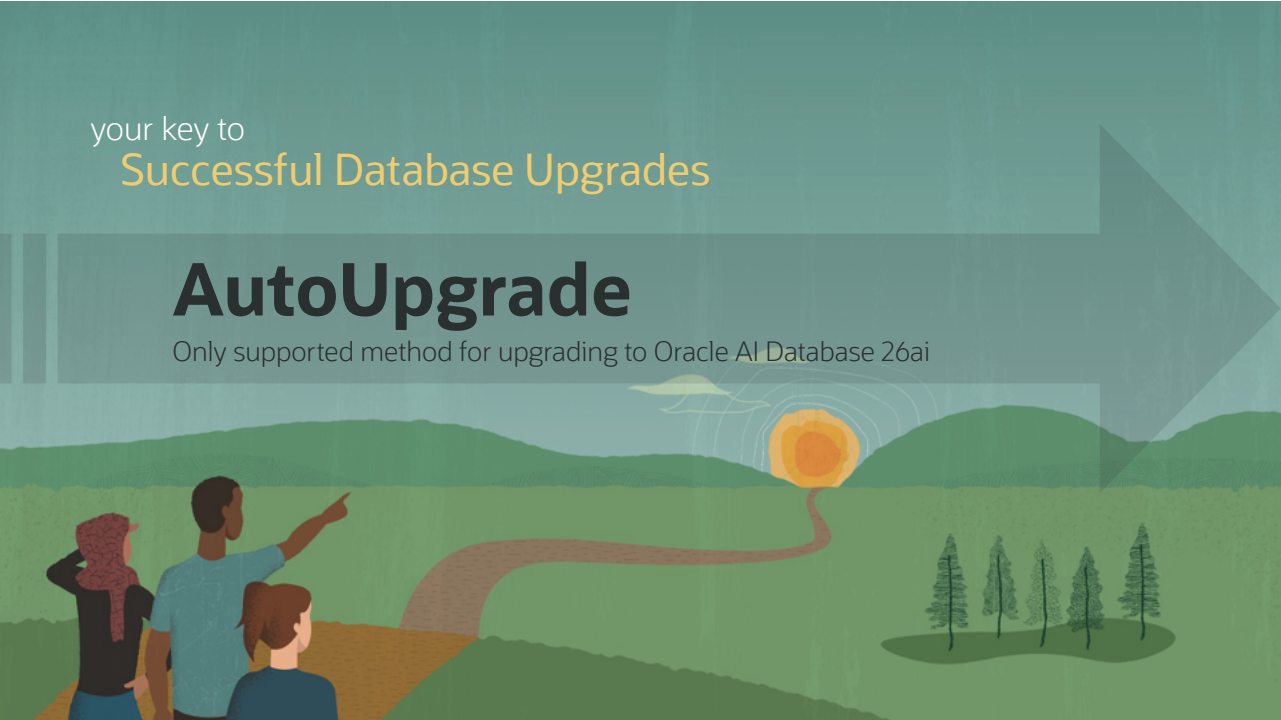
Upgrade

your key to

Successful Database Upgrades

AutoUpgrade

Only supported method for upgrading to Oracle AI Database 26ai



AutoUpgrade

1 Upgrading

2 Non-CDB to PDB

3 Patching

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AutoUpgrade

Upgrading

Non-CDB to PDB

Patching

Oracle Database 19c

Oracle AI Database 26ai

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AutoUpgrade

Upgrading

Non-CDB to PDB

Patching

Non-CDB

Multitenant

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AutoUpgrade

Upgrading

Non-CDB to PDB

Patching

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One single tool for everything
- on all platforms

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```
-- Always use the latest version of AutoUpgrade
-- Available as a direct download from oracle.com or MOS (Doc ID 2485457.1)

wget https://download.oracle.com/otn-pub/otn_software/autoupgrade.jar
```


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Simplify downloading and installing Oracle software and patches

- Oracle AI Database 26ai comes as fully updated gold images

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DEMO

Download patches
Install Oracle home

Watch on YouTube

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```
$ cat get-software.cfg

global.global_log_dir=/home/oracle/autoupgrade/logs
global.keystore=/home/oracle/autoupgrade/keystore
install1.target_version=23
install1.patch=RECOMMENDED,37393792
install1.folder=/u01/app/oracle/software
```


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```
$ cat get-software.cfg

global.global_log_dir=/home/oracle/autoupgrade/logs
global.keystore=/home/oracle/autoupgrade/keystore
install1.target_version=23
install1.patch=RECOMMENDED,37393792,JDK
install1.folder=/u01/app/oracle/software
```


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OJVM is embedded in Release Updates

- No separate download
- Complete RAC Rolling patching support

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```
$ cat get-software.cfg

global.global_log_dir=/home/oracle/autoupgrade/logs
global.keystore=/home/oracle/autoupgrade/keystore
install1.target_version=23
install1.patch=RECOMMENDED,37393792,JDK
install1.folder=/u01/app/oracle/software
```

```
java -jar autoupgrade.jar -config get-software.cfg -mode download
```


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```
$ cat install-OH.cfg

global.global_log_dir=/home/oracle/autoupgrade/logs
install1.target_version=23
install1.patch=RECOMMENDED,37393792,JDK
install1.folder=/u01/app/oracle/software
install1.download=no
install1.target_home=/u01/app/oracle/product/dbhome_26
install1.home_settings.edition=EE
install1.home_settings.oracle_base=/u01/app/oracle
```


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```
$ cat install-OH.cfg

global.global_log_dir=/home/oracle/autoupgrade/logs
install1.target_version=23
install1.patch=RECOMMENDED,37393792,JDK
install1.folder=/u01/app/oracle/software
install1.download=no
install1.target_home=/u01/app/oracle/product/dbhome_26
install1.home_settings.edition=EE
install1.home_settings.oracle_base=/u01/app/oracle
```

```
java -jar autoupgrade.jar -config install-OH.cfg -mode create_home
```


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Create Container Database in advance

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Create Container Database

1. Character set
2. Components
3. `COMPATIBLE`

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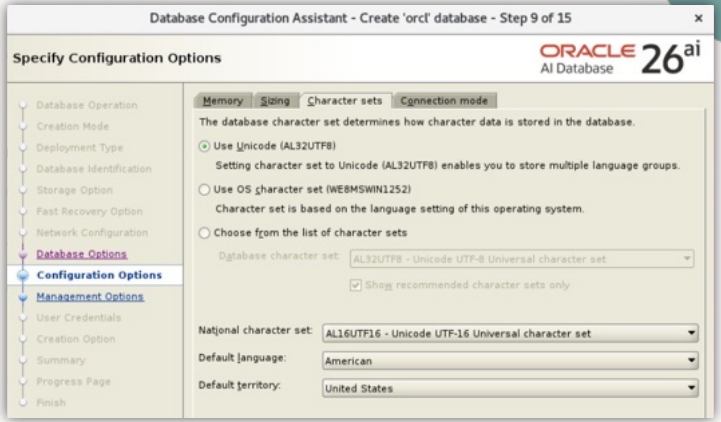
Create Container Database

1 Character set

- Always choose AL32UTF8
- Allows PDBs with any character set

2 Components

3 COMPATIBLE



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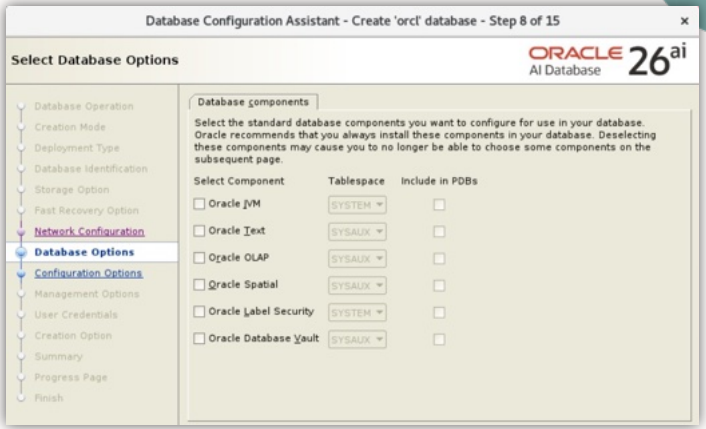
Create Container Database

1 Character set

2 Components

- Install as many as you need
- No more than that

3 COMPATIBLE



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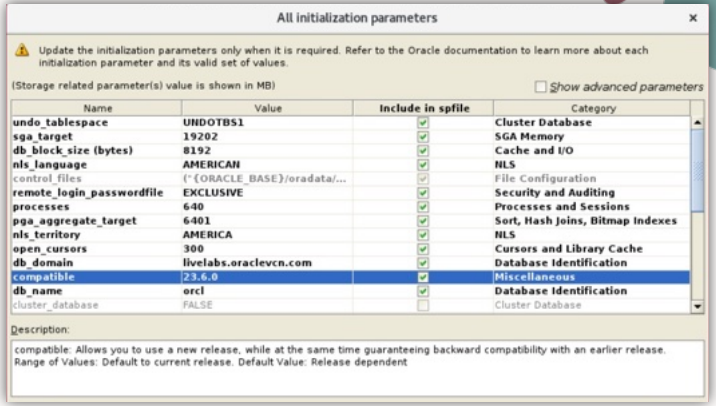
Create Container Database

1 Character set

2 Components



3 COMPATIBLE

- Keep at `23.6.0` to benefit from AI Vector Search features
- Unless you want the option of downgrade

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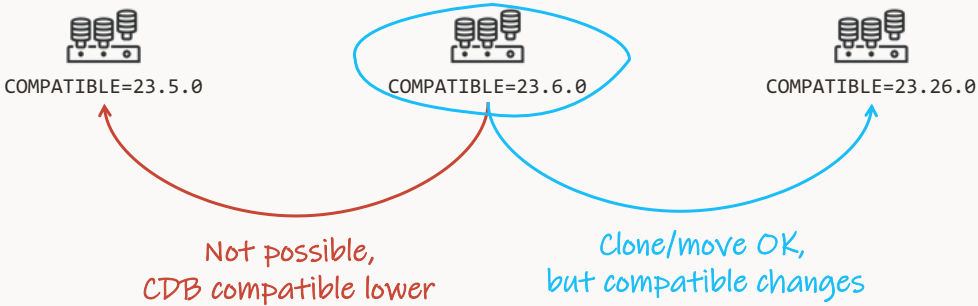
Compatible



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New In 26ai

```
-- You can now update the COMPATIBLE parameter without a restart
-- Works within a release, e.g., from 23.6.0 to 23.26.0
-- Cross-release changes, e.g., 19.0.0 to 23.6.0, still requires a restart

alter database set downgrade compatibility to '23.6.0';
```


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Further Information

Container Database

- YouTube: Create CDB in Oracle AI Database
- Blog post: How I Think You Should Create Your Container Databases
- Compatible Documentation
- Blog post: Online COMPATIBLE raise starting with 23.9

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```
SQL> select con$name, comp_id, status from cdb_registry;

CON$NAME COMP_ID   STATUS
-------- --------- -----------
CDB$ROOT CATALOG   VALID
CDB$ROOT CATPROC   VALID
CDB$ROOT XDB       VALID
RED      CATALOG   VALID
RED      CATPROC   VALID
RED      XDB       VALID
```

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```
alter system set "_exclude_seed_cdb_view"=false;
```


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```
alter system set "_exclude_seed_cdb_view"=false;

SQL> select con$name, comp_id, status from cdb_registry;

CON$NAME COMP_ID   STATUS
-------- --------- -----------
CDB$ROOT CATALOG   VALID
CDB$ROOT CATPROC   VALID
CDB$ROOT XDB       VALID
PDB$SEED CATALOG   VALID
PDB$SEED CATPROC   VALID
PDB$SEED XDB       VALID
RED      CATALOG   VALID
RED      CATPROC   VALID
RED      XDB       VALID
```


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1 Plug in

2 Upgrade

3 Convert

Irreversible!
Flashback no good

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ROLLBACK

Backup / restore

Ensure you have a recent backup and requires time to restore and recover

Copy data files

Requires time and disk space to hold a copy of the data files

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ROLLBACK

Backup / restore

Ensure you have a recent backup and requires time to restore and recover

Copy data files

Requires time and disk space to hold a copy of the data files

Refreshable clone PDB

Requires ~~time and~~ disk space to hold a copy of the data files

Requires Oracle Database 12.2 or newer

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Upgrade via Refreshable Clone PDB

CREATE

In CDB on Oracle AI Database 26ai, create a copy of PDB over a database link

REFRESH

Apply redo from source to keep PDB up-to-date

OUTAGE

Disconnect users and refresh PDB for the last time

UPGRADE

Upgrade PDB to Oracle AI Database 26ai

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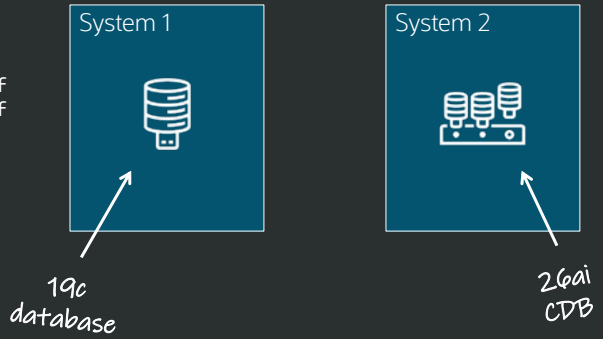
Upgrade via Refreshable Clone PDB

```
system01.dbf
sysaux01.dbf
users01.dbf
undo01.dbf
...
```



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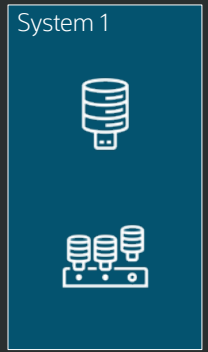
Upgrade via Refreshable Clone PDB

```
system01.dbf
sysaux01.dbf
users01.dbf
undo01.dbf
...
```



Could be same system as well

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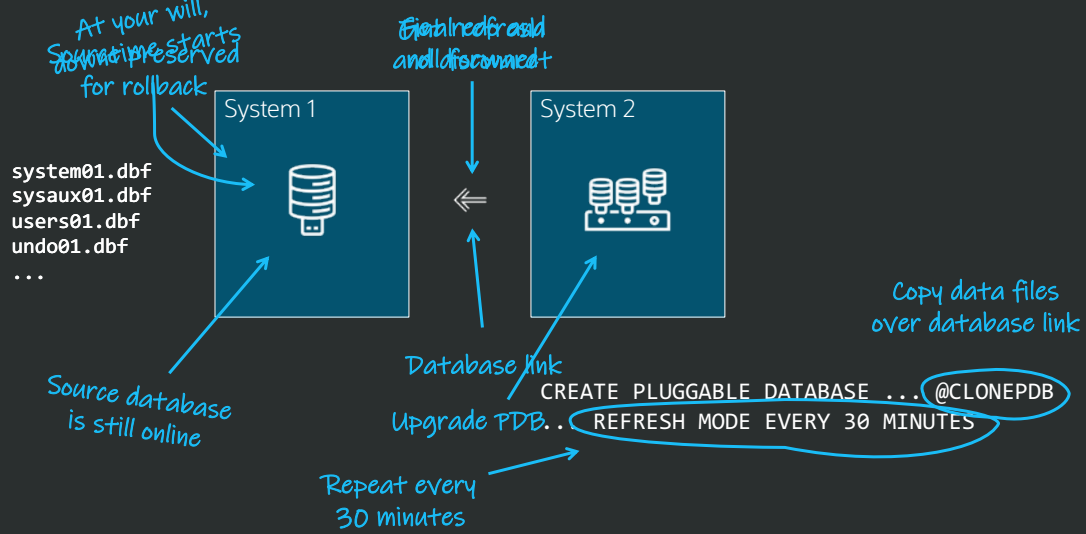
Upgrade via Refreshable Clone PDB



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DEMO

Upgrade to Oracle AI Database 26ai

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You must restore the PDB on standby database after disconnect from non-CDB

- Refreshable clone works only with deferred recovery on standby database

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Key Benefits of Upgrade via Refreshable Clone PDB

1. Less downtime
2. Excellent rollback option
3. For PDBs and non-CDBs

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We used AutoUpgrade and refreshable clone to move a mission-critical 76 TB database to Oracle Database 23ai in less than 45 minutes - while preserving the source as rollback option

Portuguese Government Agency

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Works everywhere

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Works everywhere

- Base Database Service
- Exadata Database Service
- Exadata Cloud@Customer
- On-prem and other clouds
- Exascale migration
- Non-CDB to PDB migration
- PDB upgrade
- On-prem to cloud migration

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In the cloud, upgrading Oracle databases is as easy as pressing a button

The easy approach ⇒ Upgrade entire CDB, including all PDBs

The fast approach ⇒ Upgrade single PDB

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You can also migrate with Data Pump or Transportable Tablespaces

- Suitable when direct upgrade is not possible
- Smaller databases
- Reorganizing data

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Upgrading in the cloud

- Blog post: Upgrade Pluggable Database to Oracle Database 23ai
- Blog post: Upgrade Oracle Base Database Service to Oracle Database 23ai
- Blog post: Upgrade from 19c to 23ai using AutoUpgrade –ExaDB-D or ExaC@C – Part 1
- Blog post: When A Refreshable Clone Takes Over The Service
- Blog post: Upgrade to Oracle Database 23ai
- Documentation: Proceed command

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Go Live

Check your standby databases

- Check our webinar for details

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```
--Default value is for CDBs with many PDBs
--Other places, it leads to concurrency issues
--Reset back to 12.1 default as described in MOS 2431353.1

alter system set "_cursor_obsolete_threshold"=1024;
```


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```
--Default value is for CDBs with many PDBs
--Other places, it leads to concurrency issues
--Reset back to 12.1 default as described in MOS 2431353.1

alter system set "_cursor_obsolete_threshold"=1024
comment="Added 2025-11-03 - Advice from MOS Note: 2431353.1";
```


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```
--Database collects SQL Plan Directives even when adaptive
--statistics are off.
--If you do not use Adaptive Statistics (optimizer_adaptive_statistics)
--then turn it completely off as described in MOS 2209560.1

alter system set "_sql_plan_directive_mgmt_control"=0;
```


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```
--Database collects expression statistics for
--SQL Plan Directives and Auto-Indexing.
--If you don't use any of these, then turn it to the 11.2 value of "1".
--Tables being used in dictionary: EXP_HEAD$, EXP_OBJ$, EXP_STAT$
--Doc ID 2674400.1, Value of "0" fully disables tracking.

alter system set "_column_tracking_level"=1;
```


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Real World Customer Case

Techniker Krankenkasse

Move hundreds of Oracle Database19c PDBs to Oracle Database 23ai with ExaScale-only

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Customer Case | Techniker Krankenkasse

Customer

Project

Constraints

Preparation

Upgrade

Success?

Remarks

Large German Public Health Insurance

- **Founded**: 1884
- **Legal Form**: Public Corporation
- **Headquarters**: Hamburg, Germany
- **Members**: 11.9 million
- **Employees**: approx. 19,000
- **Customer Service**: 174 service centers
- **Budget 2024**: €62.5 billion

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Customer Case | Techniker Krankenkasse

Customer

Project

Constraints

Preparation

Upgrade

Success?

Remarks

Move to Oracle Database 23ai with ExaScale

- No ASM, no Oracle Database 19c anymore

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Customer Case | Techniker Krankenkasse

Customer
Project
Constraints
Preparation
Upgrade
Success?
Remarks

`COMPATIBLE=23.0.0`

No ASM, no Oracle Database 19c anymore

Data Pump as rollback

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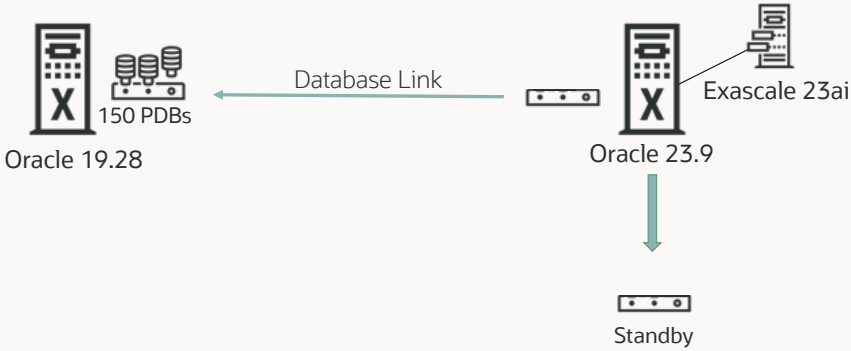
Customer Case | Techniker Krankenkasse

- Customer
- Project
- Constraints
- **Preparation**
- Upgrade
- Success?
- Remarks



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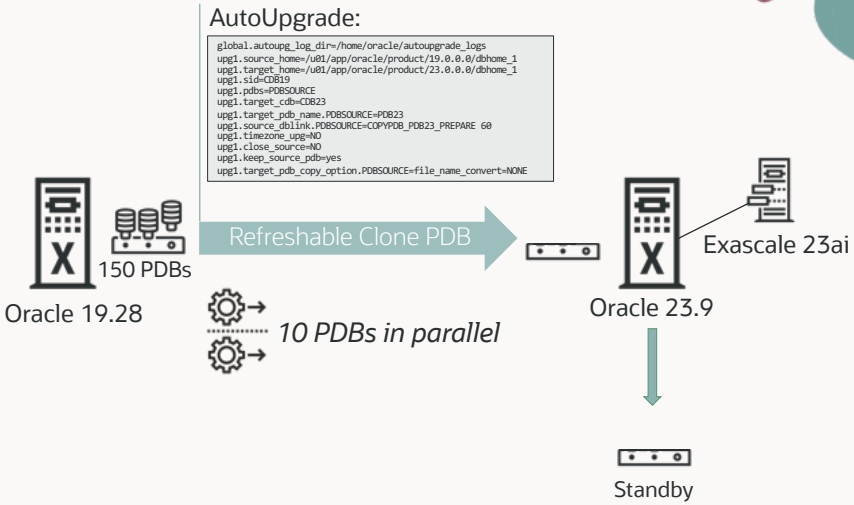
Customer Case | Techniker Krankenkasse

- Customer
- Project
- Constraints
- Preparation
- **Upgrade**
- Success?
- Remarks



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Customer Case | Techniker Krankenkasse

- Customer
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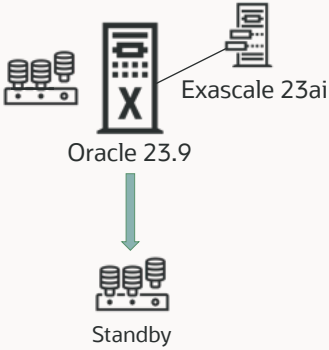
Oracle 19.28



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Customer Case | Techniker Krankenkasse

Customer

Project

Constraints

Preparation

Upgrade

Success?

Remarks

Yes!!

- Migrated 150 PDBs from TEST & DEV within less than 4 weeks
- Migrated larger environments already
- ExaScale snapshots are super-fast

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Customer Case | Techniker Krankenkasse

Customer

Project

Constraints

Preparation

Upgrade

Success?

Remarks

Standby building

- There were some issues
- Refreshable Clones don't propagate
- PDB recovery isolation doesn't work as expected

A number of SRs had to be opened for various areas

Optimizer works very well

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It's better to fail in our lab, than in production

Oracle LiveLabs:
Hitchhiker's Guide for Upgrading to Oracle AI Database

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Key Learnings

1. Start preparing today
2. Use AutoUpgrade
3. Caution with Data Guard and Multitenant conversion

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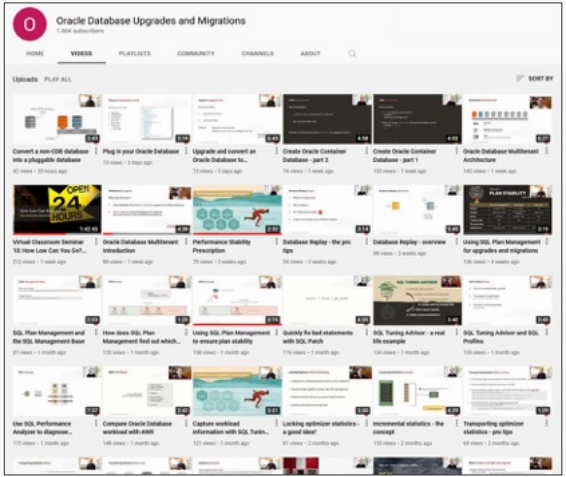
YouTube | Oracle Database Upgrades and Migrations



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Episode 17 From SR to Patch – Insights into the Oracle Database Development process *55 minutes – June 22, 2023*	
Episode 18 Cross Platform Migration – Transportable Tablespaces to the Extreme *145 min – February 22, 2024*	
Episode 19 Move to Oracle Database 23ai – Everything you need to know about Multitenant PART 1 *145 min – May 16, 2024*	
Episode 20 Move to Oracle Database 23ai – Everything you need to know about Multitenant PART 2 *100 min – June 28, 2024*	

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