

Upgrade to Oracle AI Database 26ai

Best Practices and Customer Experience

Oracle

DBAs

run the world





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Virtual Classroom Seminars

Slides

Episode 16

(replaces Episode 1 from Feb 2021)

[Oracle Database Release and Patching Strategy for 19c and 23c](#)

115 minutes – May 10, 2023



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

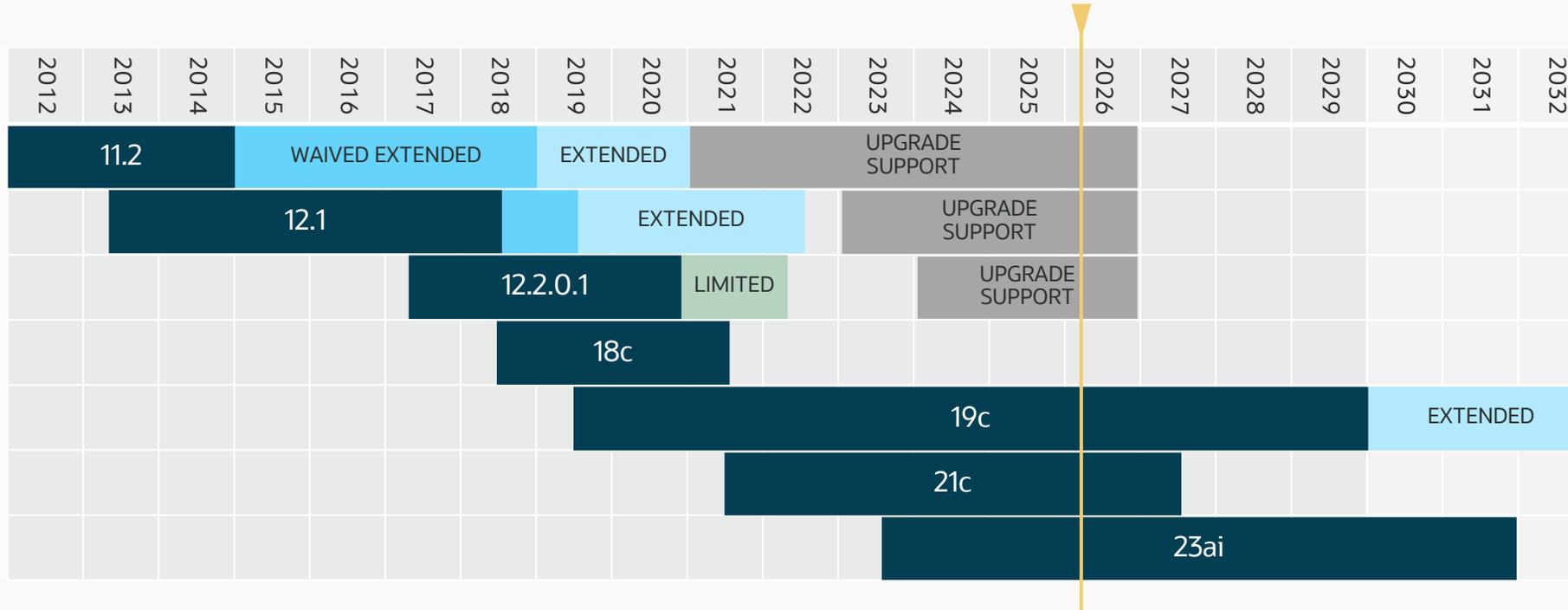


Recorded Web Seminars

<https://MikeDietrichDE.com/videos>

More than 40 hours of technical content,
on-demand, anytime, anywhere

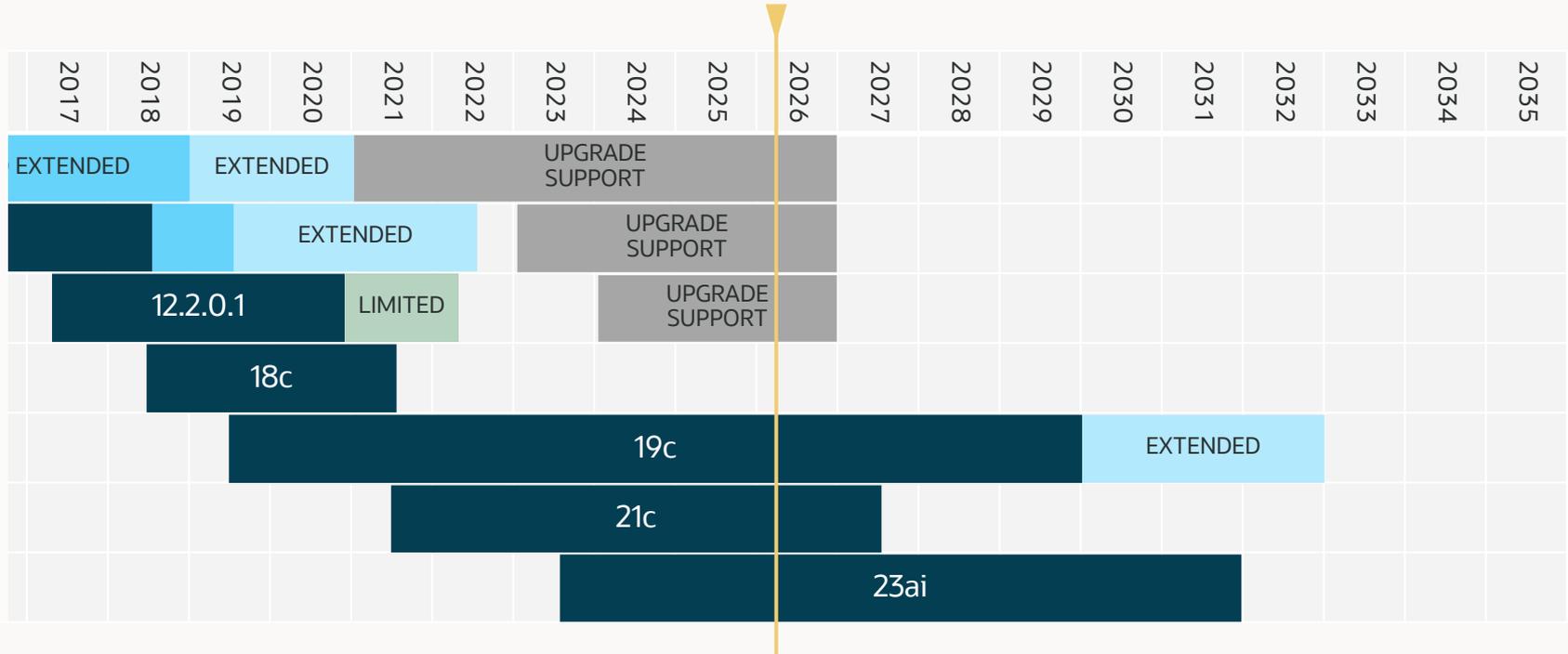
Lifetime Support Policy



Premier Support
 Waived Extended Support
 Paid Extended Support
 Restricted Upgrade Support
 Limited Error Correction



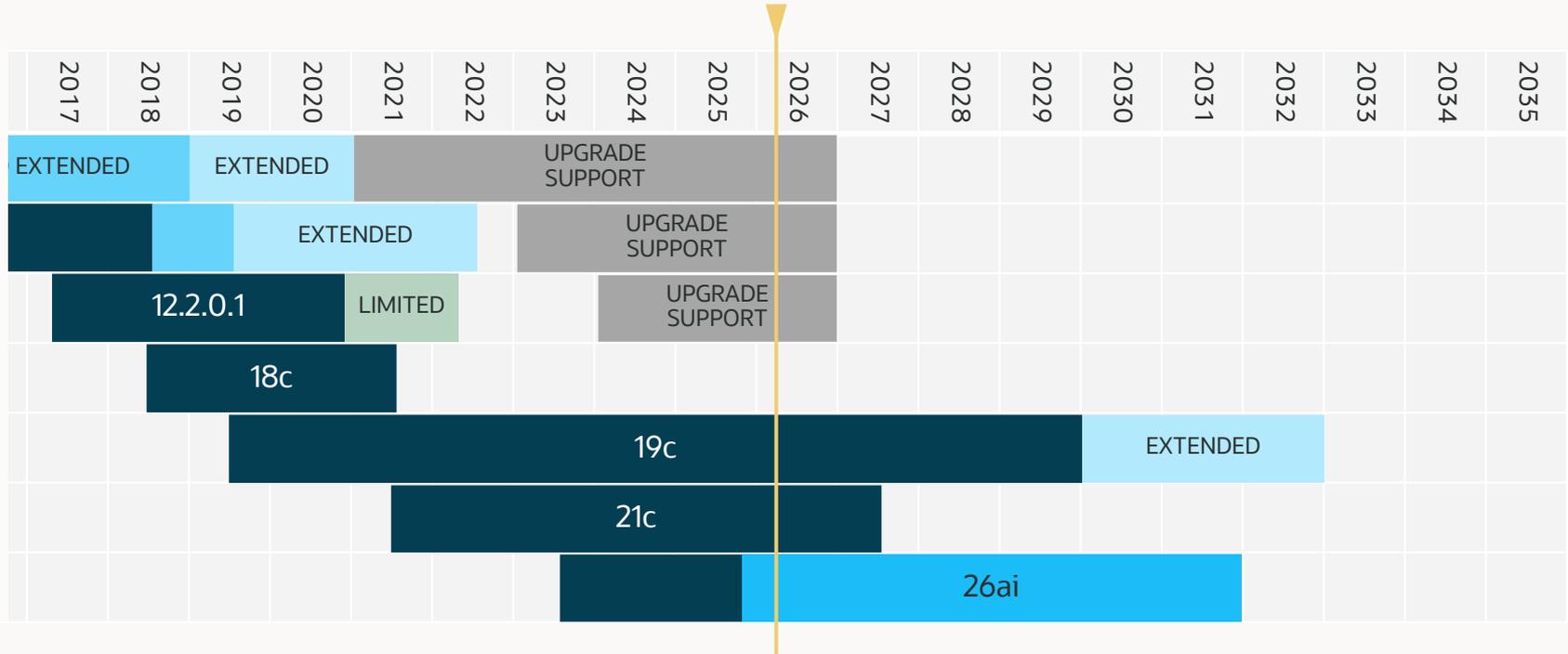
Lifetime Support Policy



Premier Support
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 Limited Error Correction



Lifetime Support Policy



■ Premier Support
 ■ Waived Extended Support
 ■ Paid Extended Support
 ■ Restricted Upgrade Support
 ■ Limited Error Correction



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

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 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

26^{ai}

When is a database upgrade
required?

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

UPGRADE

Oracle Database 19c



Oracle AI Database 26ai

UPGRADE

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

UPDATE

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

July 2025

Oracle Database 23ai

23.9.0.25.07

October 2025

Oracle AI Database 26ai

23.26.0.0.0

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Oracle AI Database 26ai

23.26.2.0.0

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

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

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

VERSION

VERSION_FULL

23.0.0.0.0

23.26.0.0.0

No changes



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

VERSION	VERSION_FULL
23.0.0.0.0	23.26.0.0.0

This changes

26^{ai}

There is no need to re-certify your app

- Certification for Oracle Database 23ai applies to Oracle AI Database 26ai

Before Upgrade

—
Considerations and tasks





Oracle AI Database 26ai supports the multitenant architecture only

- You must convert your database to a PDB

--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_pdb=3;
```





Update Exadata System Software to the latest version

Further Information

Exadata System Software



- Recommended to use latest version. However, minimum version is 25.1
- [Exadata Database Machine and Exadata Storage Server Supported Versions](#)





Upgrade to Oracle Grid Infrastructure 26ai

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

--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';
```





Confirm your clients can connect to Oracle AI Database 26ai

- Upgrade your clients well in advance of the upgrade

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: KB141043 - Client / Server Interoperability Support Matrix



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: KB141043 - Client / Server Interoperability Support Matrix



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

```
select * from gv$session_connect_info;
```





The same certification matrix applies to **database links** as well

Further Information

Client / Server Interoperability



- Client / Server Interoperability Support Matrix ([KB141043](#))
- Blog post: [Are Your Oracle Database Clients Ready for the next Database Upgrade?](#)



On important databases, execute
a dictionary check before upgrade

```
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
```





Familiarize yourself with the changes in Oracle AI Database

- Check the [Upgrade Guide](#)

- Home
- Parameters
- Users, Roles, etc
- Privileges
- Included Fixes
- Oracle Database Home
- Objects
- Fixed Objects
- Audit
- System
- Scheduler
- Release & Updates Timeline
- Report
- Custom Patch Sets



Oracle Release Analyzer Diff Utility

Find the differences between two Oracle Database releases

Oracle Release Analyzer Diff Utility (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



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

Further Information

ORAdiff / Oracle Release Analyzer Diff Utility



[Watch the demo](#)

<http://oradiff.oracle.com>

your key to

Successful Database Upgrades

AutoUpgrade

Only supported method for upgrading to Oracle AI Database 26ai





One single tool for everything
- on all platforms

-- Always use the latest version of AutoUpgrade
-- Available as a direct download from oracle.com or MOS (KB123450)

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





Simplify downloading and installing Oracle software and patches

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

DEMO

Download patches
Install Oracle home

 [Watch on YouTube](#)

```
$ cat get-software.cfg
```

```
global.global_log_dir=/home/oracle/autoupgrade/logs
```

```
global.keystore=/home/oracle/autoupgrade/keystore
```

```
install1.target_version=26
```

```
install1.patch=RECOMMENDED, 37393792
```

```
install1.folder=/u01/app/oracle/software
```



```
$ cat get-software.cfg
```

```
global.global_log_dir=/home/oracle/autoupgrade/logs
```

```
global.keystore=/home/oracle/autoupgrade/keystore
```

```
install1.target_version=26
```

```
install1.patch=RECOMMENDED,37393792,JDK
```

```
install1.folder=/u01/app/oracle/software
```





OJVM is embedded in Release Updates

- No separate download
- Complete RAC Rolling patching support



```
$ cat get-software.cfg
```

```
global.global_log_dir=/home/oracle/autoupgrade/logs
```

```
global.keystore=/home/oracle/autoupgrade/keystore
```

```
install1.target_version=26
```

```
install1.patch=RECOMMENDED,37393792,JDK
```

```
install1.folder=/u01/app/oracle/software
```

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



```
$ cat install-OH.cfg
```

```
global.global_log_dir=/home/oracle/autoupgrade/logs  
install1.target_version=26  
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
```



```
$ cat install-OH.cfg
```

```
global.global_log_dir=/home/oracle/autoupgrade/logs  
install1.target_version=26  
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
```





Create Container Database in advance

Create Container Database



1 Character set

2 Components

3 COMPATIBLE



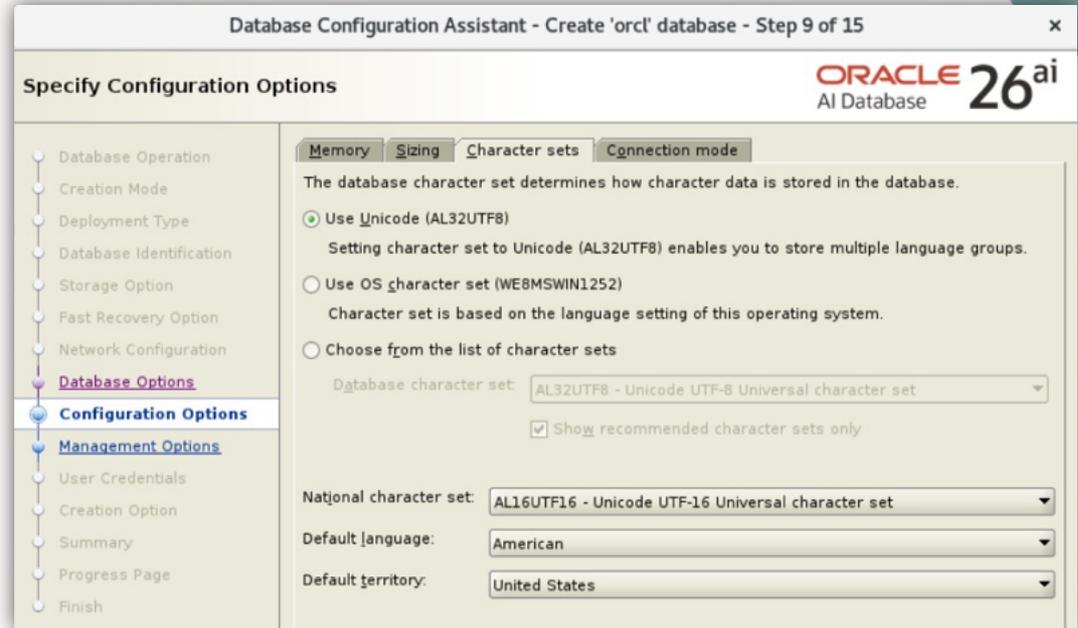
Create Container Database

1 Character set

- Always choose AL32UTF8
- Allows PDBs with any character set

2 Components

3 COMPATIBLE



Database Configuration Assistant - Create 'orcl' database - Step 9 of 15

Specify Configuration Options

ORACLE 26^{ai}
AI Database

Memory Sizing **Character sets** Connection mode

The database character set determines how character data is stored in the database.

- Use Unicode (AL32UTF8)
Setting character set to Unicode (AL32UTF8) enables you to store multiple language groups.
- Use OS character set (WE8MSWIN1252)
Character set is based on the language setting of this operating system.
- Choose from the list of character sets

Database character set: AL32UTF8 - Unicode UTF-8 Universal character set

Show recommended character sets only

National character set: AL16UTF16 - Unicode UTF-16 Universal character set

Default language: American

Default territory: United States



Create Container Database

1 Character set

2 Components

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

3 COMPATIBLE

Database Configuration Assistant - Create 'orcl' database - Step 8 of 15

ORACLE 26^{ai}
AI Database

Select Database Options

Database components

Select the standard database components you want to configure for use in your database. Oracle recommends that you always install these components in your database. Deselecting these components may cause you to no longer be able to choose some components on the subsequent page.

Select Component	Tablespace	Include in PDBs
<input type="checkbox"/> Oracle JVM	SYSTEM	<input type="checkbox"/>
<input type="checkbox"/> Oracle Text	SYSAUX	<input type="checkbox"/>
<input type="checkbox"/> Oracle OLAP	SYSAUX	<input type="checkbox"/>
<input type="checkbox"/> Oracle Spatial	SYSAUX	<input type="checkbox"/>
<input type="checkbox"/> Oracle Label Security	SYSTEM	<input type="checkbox"/>
<input type="checkbox"/> Oracle Database Vault	SYSAUX	<input type="checkbox"/>



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

All initialization parameters

⚠ Update the initialization parameters only when it is required. Refer to the Oracle documentation to learn more about each initialization parameter and its valid set of values.

(Storage related parameter(s) value is shown in MB) Show advanced parameters

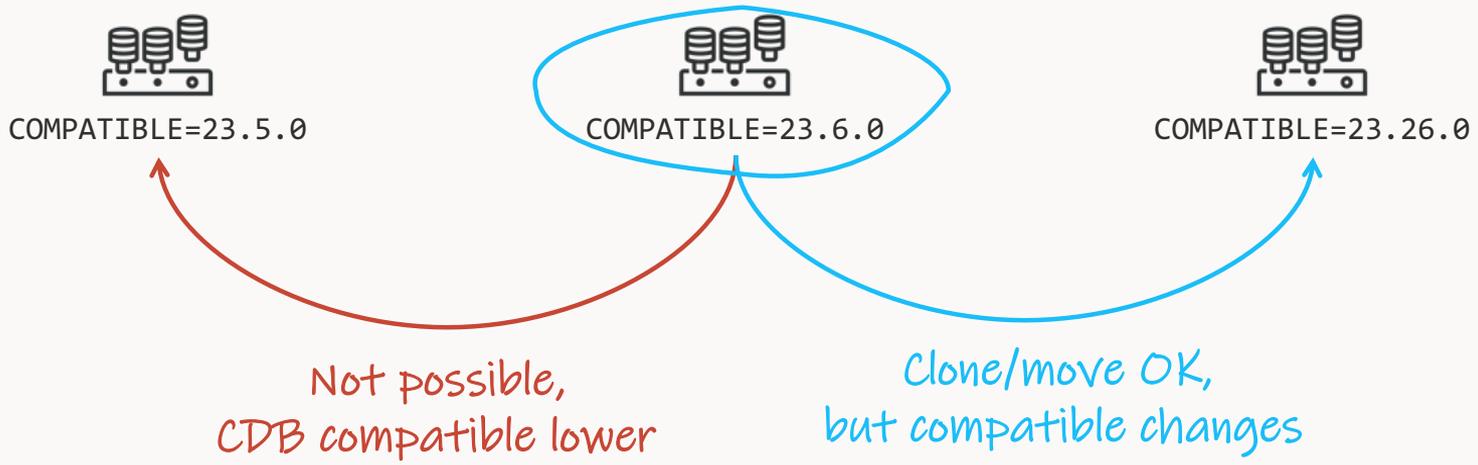
Name	Value	Include in spfile	Category
undo_tablespace	UNDOTBS1	<input checked="" type="checkbox"/>	Cluster Database
sga_target	19202	<input checked="" type="checkbox"/>	SGA Memory
db_block_size (bytes)	8192	<input checked="" type="checkbox"/>	Cache and I/O
nls_language	AMERICAN	<input checked="" type="checkbox"/>	NLS
control_files	{* {ORACLE_BASE}/oradata/...	<input checked="" type="checkbox"/>	File Configuration
remote_login_passwordfile	EXCLUSIVE	<input checked="" type="checkbox"/>	Security and Auditing
processes	640	<input checked="" type="checkbox"/>	Processes and Sessions
pga_aggregate_target	6401	<input checked="" type="checkbox"/>	Sort, Hash Joins, Bitmap Indexes
nls_territory	AMERICA	<input checked="" type="checkbox"/>	NLS
open_cursors	300	<input checked="" type="checkbox"/>	Cursors and Library Cache
db_domain	livelabs.oraclevcn.com	<input checked="" type="checkbox"/>	Database Identification
compatible	23.6.0	<input checked="" type="checkbox"/>	Miscellaneous
db_name	orcl	<input checked="" type="checkbox"/>	Database Identification
cluster_database	FALSE	<input type="checkbox"/>	Cluster Database

Description:

compatible: Allows you to use a new release, while at the same time guaranteeing backward compatibility with an earlier release.
Range of Values: Default to current release. Default Value: Release dependent



Compatible



- 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';
```



Further Information

Container Database



YouTube:

[Create CDB in Oracle AI Database](#)

Blog post:

[How I Think You Should Create Your Container Databases](#)

[COMPATIBLE Parameter - Documentation](#)

Blog post:

[Online COMPATIBLE raise starting with 23.9](#)



```
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

No information on
PDB\$SEED



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

```
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

Refreshable Clone PDBs



From non-CDB or PDB directly into Oracle AI Database 26ai



1

Plug in

2

Upgrade

3

Convert



*Irreversible!
Flashback no good*



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

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



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

Upgrade via Refreshable Clone PDB

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



*19c
database*



*26ai
CDB*

Upgrade via Refreshable Clone PDB

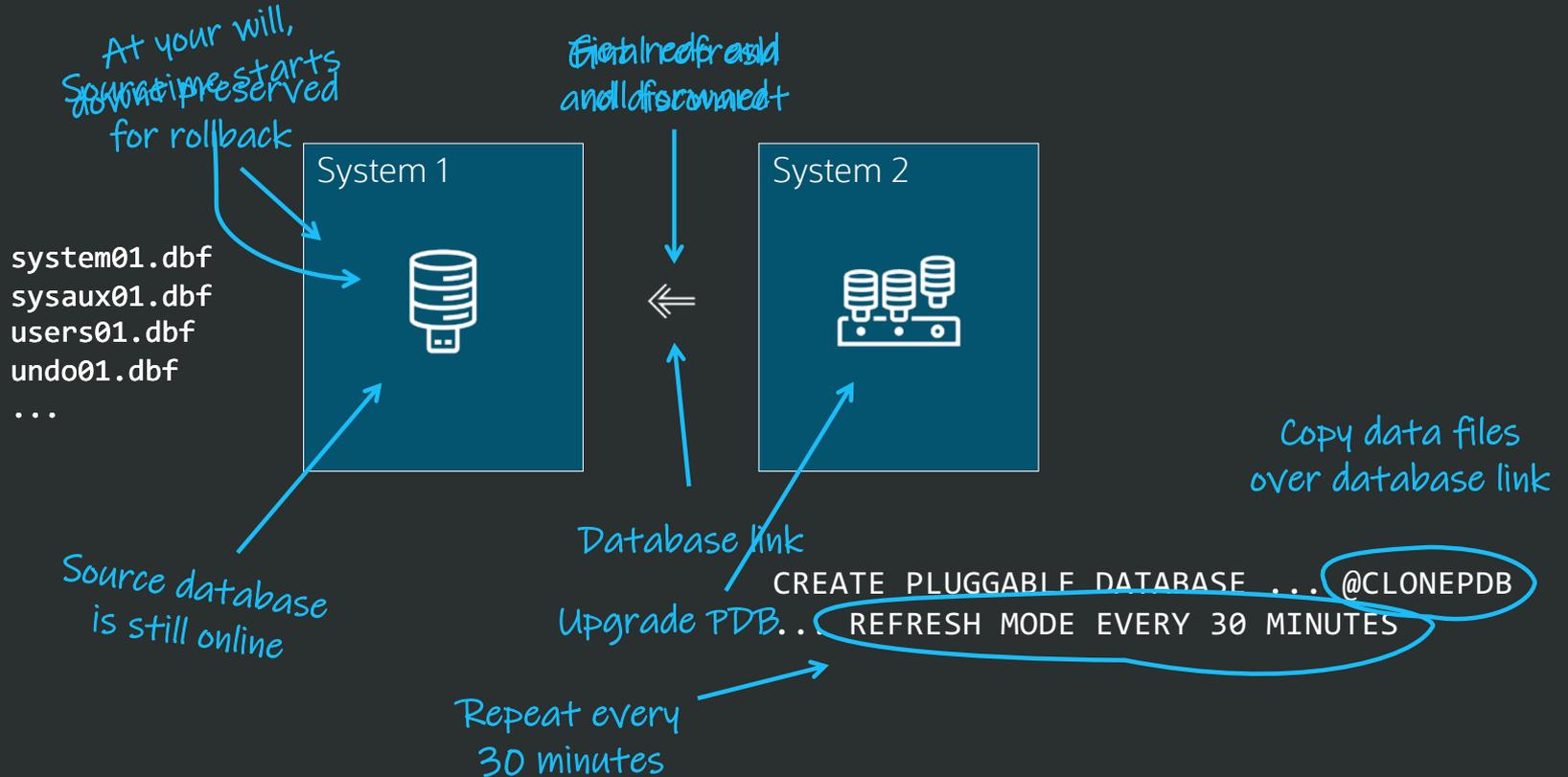
system01.dbf
sysaux01.dbf
users01.dbf
undo01.dbf
...



*Could be same
system as well*



Upgrade via Refreshable Clone PDB



DEMO

Upgrade to Oracle AI Database 26ai





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

- Refreshable clone works only with deferred recovery on standby database

Key Benefits of Upgrade via Refreshable Clone PDB



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



*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

Works everywhere

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

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



You can also migrate with Data Pump or Transportable Tablespaces

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

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](#)



Go-Live



Considerations and parameter recommendations





Check your standby databases

- Check our [webinar](#) for details

--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 KB147694

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



```
--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 KB147694
```

```
alter system set "_cursor_obsolete_threshold"=1024  
comment="Added 2026-03-11 - Advice from MOS Note: KB147694";
```



Real World Customer Cases





**Techniker
Krankenkasse**

Move hundreds of Oracle Database 19c PDBs to
Oracle Database 23ai with ExaScale-only



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

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



Customer Case | Techniker Krankenkasse

Customer

COMPATIBLE=23.0.0

Project

Constraints

No ASM, no Oracle Database 19c anymore

Preparation

Upgrade

Data Pump as rollback

Success?

Remarks

Customer Case | Techniker Krankenkasse

Customer

Project

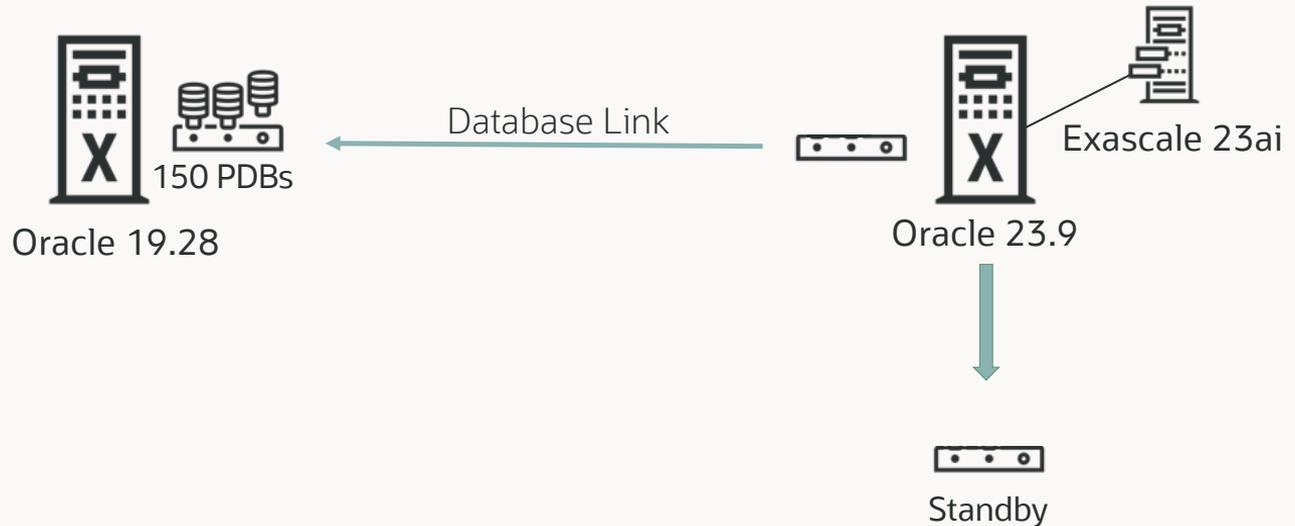
Constraints

Preparation

Upgrade

Success?

Remarks



Customer Case | Techniker Krankenkasse

Customer

Project

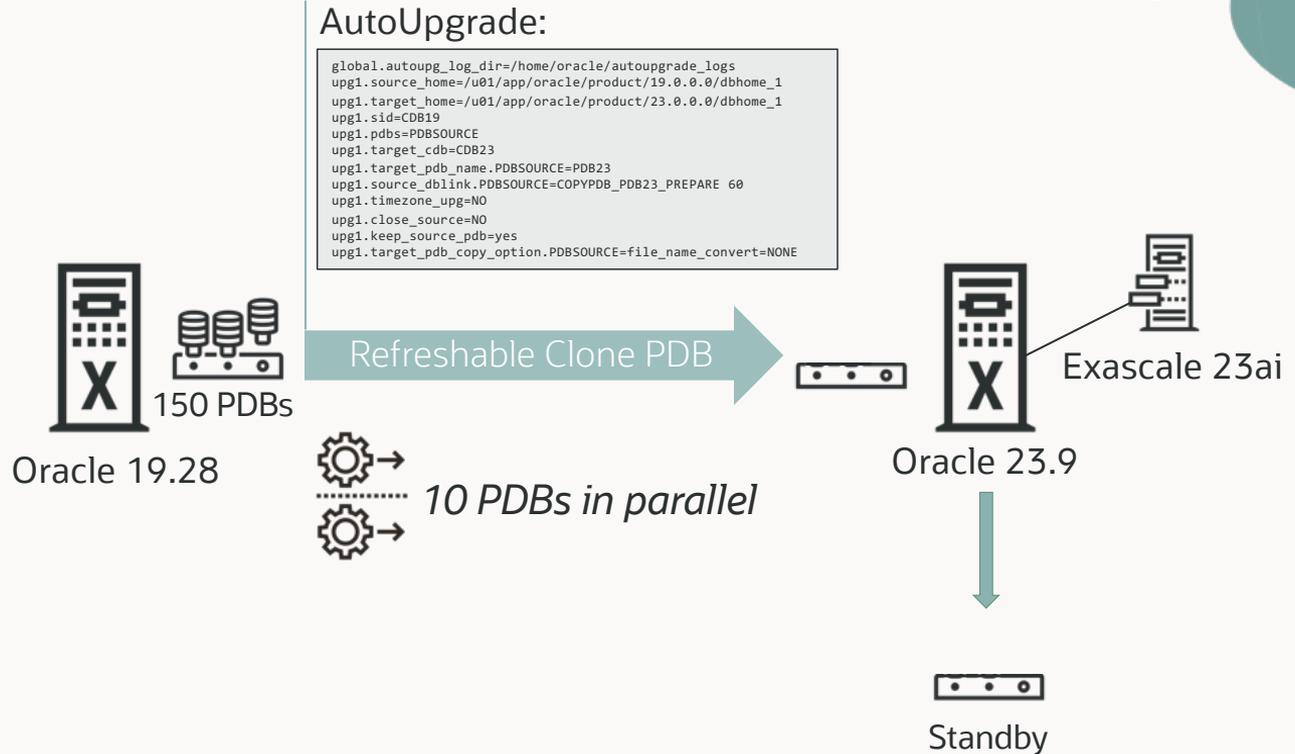
Constraints

Preparation

Upgrade

Success?

Remarks



Customer Case | Techniker Krankenkasse

Customer

Project

Constraints

Preparation

Upgrade

Success?

Remarks



Oracle 19.28



Oracle 23.9



Standby



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

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

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

Oracle LiveLabs:
[Hitchhiker's Guide for Upgrading to Oracle AI Database](#)

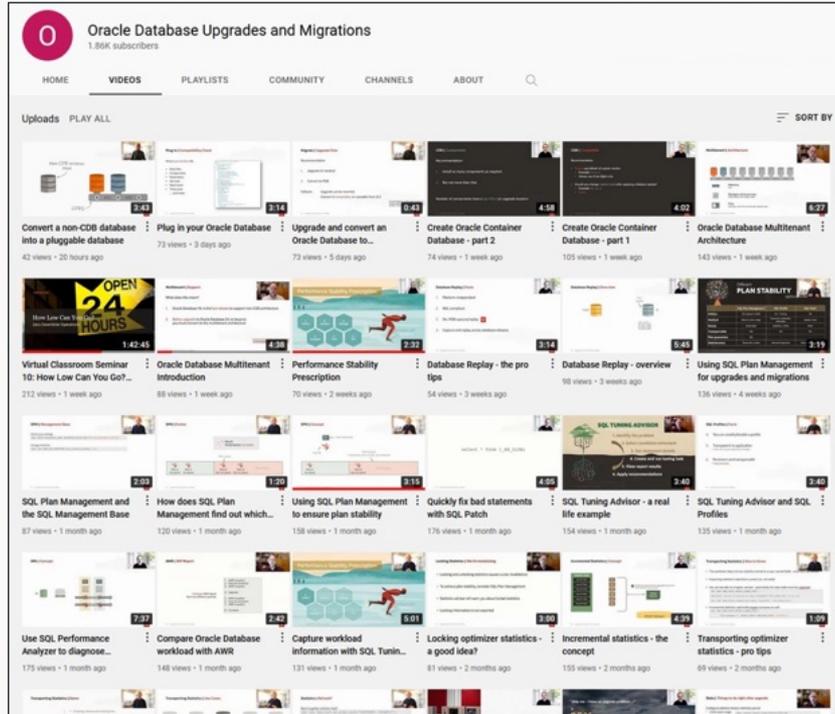
Key Learnings



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



YouTube | Oracle Database Upgrades and Migrations



<https://www.youtube.com/@upgradenow>

- 600+ videos
- New videos every week
- No marketing
- No buzzword
- All tech



ORACLE