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Migration nach Oracle 23c

Johannes Ahrends

CarajanDB GmbH

Oracle ACE Pro

… über mich

Oracle-Spezialist seit 1992

7 Jahre: Presales bei Oracle in Düsseldorf
6 Jahre: Projektleiter bei Herrmann & Lenz Services GmbH
6 Jahre: Technischer Direktor ADM Presales bei Quest Software GmbH
seit 12 Jahren: Geschäftsführer CarajanDB GmbH

Oracle ACE Pro

DOAG-Mitglied:

- Ernennung zum Oracle ACE
- DOAG-Themenverantwortlicher Datenbankadministration, Standard Edition
- DOAG-Botschafter

Buchautor:

- Oracle9i für den DBA
- Oracle10g für den DBA
- Oracle 11g Release 2 für den DBA

Hobbies:

- Drachen steigen lassen (Kiting) draußen wie drinnen (Indoorkiting)
- Motorradfahren (nur draußen)
- Singen (überall)

Oracle 23c Enterprise Edition

Disclaimer

- Die Version ist noch nicht verfügbar.
- Alle Folien und Aussagen beziehen sich auf die Version 21c und älter.
- Es werden Features von Oracle 23c vorgestellt, die zum Zeitpunkt des Vortrages offiziell bekannt sind (z.B. Oracle23cFREE).

Stand 16. November 2023

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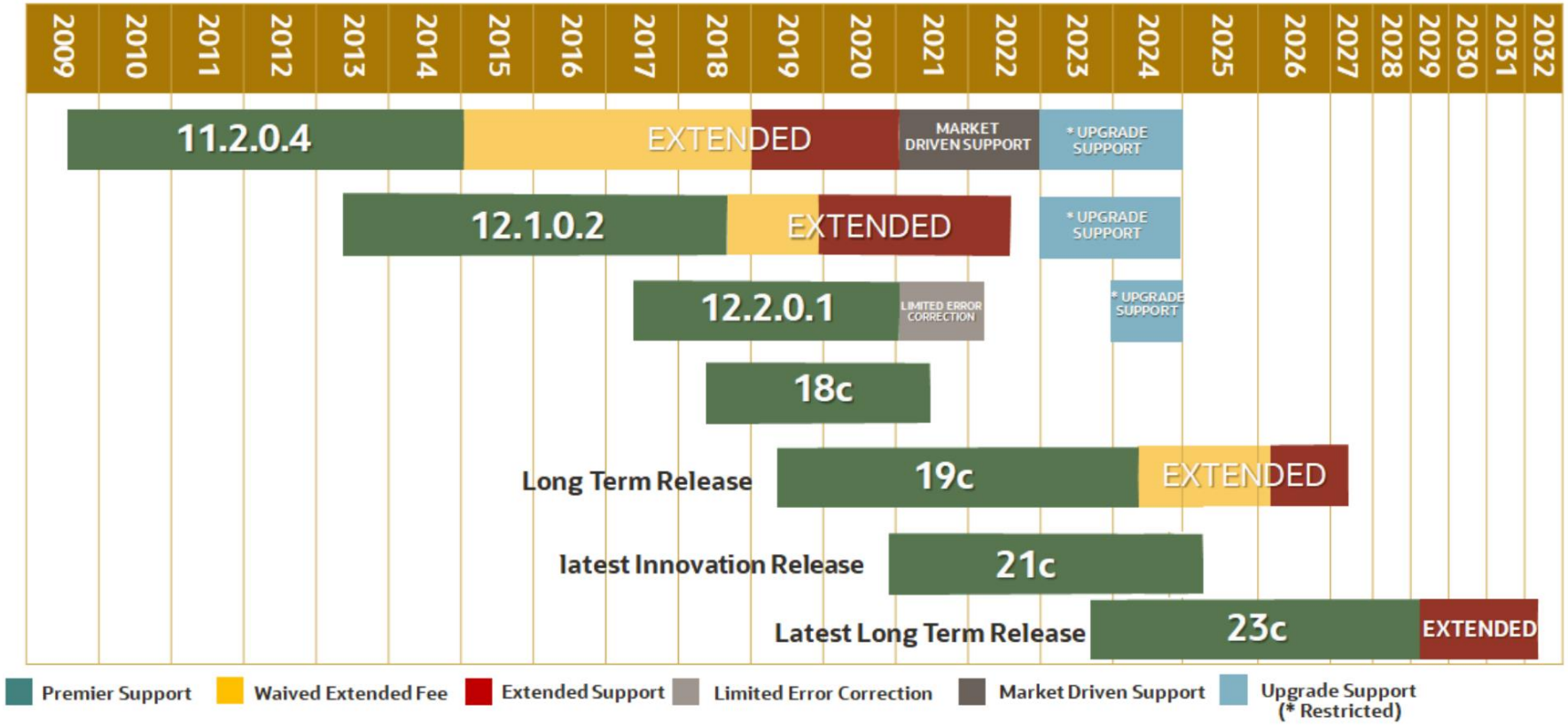
Oracle Support

Oracle Support

Release Schedule of Current Database Releases (Doc ID 742060.1)

Database Releases and Support Timelines



Long Term Support Release

- Premier Support (PS) ends April 30, 2024.
- Two years of waived Extended Support (ES) fees will be in effect from May 1, 2024 until April 30, 2026.
- Extended Support (ES) fees will be required beginning May 01, 2026 through April 30, 2026.
- Error Correction/Patching is available through April 30, 2027 with paid ES. Without paid ES, patching is only available until April 30, 2026.

My Oracle Support Release Schedule of Current Database Releases (Doc ID s)

Release Zyklen

- Innovation Release:
  - neue Features
  - kein Extended Support
  - zuerst benutzt bei 18c
  - 21c und wohl auch 22c
- Terminal Release
  - letztes Release eines Zyklus
  - 11.2.0.4 und 12.1.0.2
- Long Term Support Release
  - neue Namensgebung für Terminal Release
  - 19c und 23c

Long Term oder Innovation Release

- Long Term Release:
  - *Oracle Database Long Term Releases are ideal for use cases that benefit from less frequent upgrades to newer releases.* ***Long Term Releases offer the highest level of stability and the longest length of error correction support****. These releases have 5 years of Premier Support followed by 3 years of Extended Support. When combined with Extended Support, customers typically have almost 4 years to upgrade from one Long Term Release to the next Long Term Release.*
- Innovation Release:
  - *In between Oracle Database Long Term Releases, Oracle delivers Oracle Database Innovation Releases that include many enhancements and new capabilities which will also be included in the next Long Term Release.* ***Innovation Releases are designed to enable customers to continuously use leading-edge technologies to rapidly develop or deploy new applications or augment existing applications****. Support for Innovation Releases includes 2 years of Premier Support, but there is no Extended Support. Production workloads can be deployed on Innovation Releases if upgrading within 2 years to a newer release is factored into the deployment plan.*

My Oracle Support Release Schedule of Current Database Releases (Doc ID 742060.1)

… aber

2 New Features in 19c Release Updates

This chapter describes the features that are new in Oracle Database 19c Release Updates (RUs).

Oracle® Database New Features Guide 19c November 2021

Oracle Blockchain Table

Oracle Blockchain Table

Blockchain tables are append-only tables in which only insert operations are allowed. Deleting rows is either prohibited or restricted based on time. Rows in a blockchain table are made tamper-resistant by special sequencing and chaining algorithms. Users can verify that rows have not been tampered. A hash value that is part of the row metadata is used to chain and validate rows.

Blockchain tables can be used to implement blockchain applications where the participants trust the Oracle Database provider, but want means to verify that their data hasn't been tampered with. The participants are different database users who trust the Oracle Database provider to maintain a verifiable, tamper-resistant blockchain of transactions. All participants must have privileges to insert data into the blockchain table. The contents of the blockchain table are defined and managed by the application, with a few added metadata fields maintained by Oracle Database. By leveraging a trusted provider with verifiable crypto-secure data management practices, such applications can avoid the distributed consensus requirements. This provides most of the protection of the distributed peer-to-peer blockchains, but with much higher throughput and lower transaction latency compared to peer-to-peer blockchains using distributed consensus.

neu in 19.9.0.0.201020

Oracle® Database New Features Guide 19c November 2021

Password Rollover

Gradual Database Password Rollover for Applications

Starting with this release update, an application can change its database passwords without an administrator having to schedule downtime.

To accomplish this, a database administrator can associate a profile having a non-zero limit for the `PASSWORD_ROLLOVER_TIME` password profile parameter, new with this release, with an application schema. This allows the database password of the application user to be altered while allowing the older password to remain valid for the time specified by the `PASSWORD_ROLLOVER_TIME` limit. During the rollover period of time, the application instance can use either the old password or the new password to connect to the database server. When the rollover time expires, only the new password is allowed.

Before this enhancement, an administrator normally took the application down when the application database password was being rotated. This is because the password update requires changes on both the database and the application side. With the gradual database password rollover enhancement, the application can continue to use the older password until the new password is configured in the application.

In addition to the new clause `PASSWORD_ROLLOVER_TIME` in the `CREATE PROFILE` and `ALTER PROFILE` statements, the `ALTER USER` statement has a new clause, `EXPIRE PASSWORD ROLLOVER PERIOD`. The `ACCOUNT_STATUS` column of the `DBA_USERS` and `USER_USERS` data dictionary views have several new statuses indicating values to indicate rollover status.

neu in 19.12.0.0.210719

Oracle® Database New Features Guide 19c November 2021

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23c New Features

SQL*Plus-Verbesserungen

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Oracle Error Tool OERR direkt aus SQL*Plus aufrufbar:

```
SQL> oerr ora 1555
Message: "snapshot too old: rollback segment number %s with name \"%s\" too small"
Cause: rollback records needed by a reader for consistent read are
       overwritten by other writers
Action: If in Automatic Undo Management mode, increase undo_retention
        setting. Otherwise, use larger rollback segments
```

TNSPing ebenfalls direkt aufrufbar:

```
SQL> ping JOHANNES
SQL> Network service name mapping file:
/u01/app/oracle/product/23cse/dbhome_1/network/admin/tnsnames.ora
Attempting to contact: (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = …)(PORT =
1521)) (CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME = …)))
SP2-1683: Ping failed with error TNS-12543.
Help: https://docs.oracle.com/error-help/db/sp2-1683/
```

Priority Transactions (1)

- Erlaubt Transaktionen, eine Priorität zuzuweisen.
- Erlaubt hoch priorisierten Transaktionen, niedrig priorisierte Transaktionen zu beenden.
  - gesteuert durch system Parameter „`txn_auto_rollback_high_priority_wait_target`
    Session Parameter „`txn_priority = (LOW|MEDIUM|HIGH)`”
  - nützlich bei blockierenden Sessions, row locks etc.
  - Die beendete Transaktion wird zurückgerollt.
  - Erzeugt einen Alert Log Eintrag nach dem Muster:

```
PDB(#):Sessioninformationen(…txn_priority:"LOW") terminated by
Sessioninformationen(…txn_priority:"HIGH"…) because of the parameter
"txn_auto_rollback_high_priority_wait_target = 20
```

Priority Transactions (2)

- Anpassen des Parameters
- Timeout 30 Sekunden

```
SQL> ALTER SESSION SET  container=CARLOS;
Session altered.

SQL> ALTER SYSTEM SET txn_auto_rollback_high_priority_wait_target = 30;
System altered.
```

Priority Transactions (3)

Session 1

```
SQL> ALTER SESSION SET
txn_priority=MEDIUM;
Session altered.

SQL> UPDATE personen SET nachname =
'ANTON' WHERE persid=100005;
1 row updated.

Elapsed: 00:00:00.00

SQL> select nachname from personen where
persid=100005;

ERROR at line 1:
ORA-03113: end-of-file on communication
channel
Process ID: 4132Session ID: 299 Serial
number: 29547
```

Select 2

```
SQL> UPDATE personen SET nachname =
'Berta' where persid=100005;
1 row updated.

Elapsed: 00:00:30.02

SQL> select nachname from personen where
persid=100005;
NACHNAME
--------------------
Berta
```

Priority Transactions (4)

Alert File:

```
2023-11-17T15:47:18.956730+01:00

CARLOS(3):Session (sid: 299, serial: 29547, xid: 3.12.580, txn_priority: "MEDIUM")
terminated by transaction (sid: 46, serial: 2931, xid: -1.-1.-1, txn_priority: "HIGH")
because of the parameter "txn_auto_rollback_high_priority_wait_target = 30"
```

Container Native

- durch den Oracle Database Operator for Kubernetes von Haus aus Container Native
- Verknüpfung der Vorteile von Containern mit der Leistung Oracles ohne Bastelarbeit

- Wer sich mit Kubernetes und Konsorten auskennt, findet sich zurecht: https://github.com/oracle/oracle-database-operator
- Wer das nicht tut: https://blogs.oracle.com/coretec/post/oracle-database-jetzt-containernative

Read Only Oracle Home

eingeführt mit 18c

default in 21c

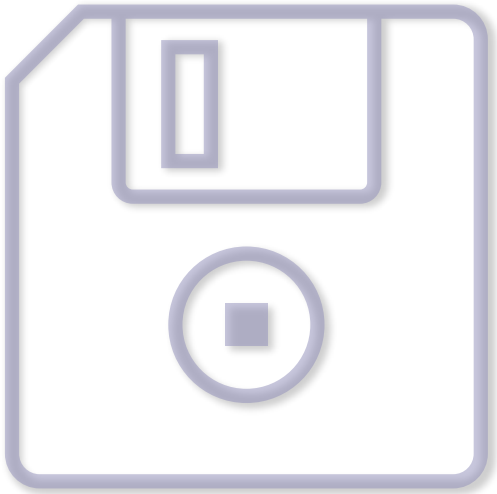
optional in 23c

- Oracle Homes beinhalten ausführbare Konfigurations- und Log-Dateien.
- Read Only Homes trennen diese in eigene Verzeichnisse.
  - → einfacheres Patchen, Konfigurieren etc.
  - → mehr Sicherheit
- Feature funktioniert tadellos, ist aber kein default mehr.

Backup

- Immutable RMAN Backups für OCI
  - Ermöglicht den Schutz von Backups in OCI.
  - Backup-Dateien sind für einen gewählten Zeitraum unveränderbar und nicht löschbar.
    - Auch nicht durch Administratoren!

- bessere Anbindung für hochverfügbare Umgebungen



Security Features (1)

- Schema Privileges
  - Berechtigungen endlich auf Schema Basis möglich
  - Beispiel:

```
GRANT SELECT ANY TABLE ON SCHEMA Fabian TO Johannes;
```

- SQL Firewall
  - Inspiziert alle ankommenden SQL Statements.
  - Lässt nur explizit erlaubtes SQL zu.
  - SE2 wahrscheinlich nicht, da Option

Security Features (2)

- Passwörter dürfen 1024 Bytes groß werden.
  - Vorher nur 30 Byte
  - Das wurde auch Zeit!

- TLS 1.3 endlich von der Datenbank supportet.
  - Das wurde auch Zeit!

SQL Features

- Select ohne from-Klausel
  - kein „DUAL“ mehr erforderlich

```
SQL> SELECT SYSDATE;

SYSDATE
---------
17-NOV-23
```

- IF [NOT] EXISTS
  für DDL-Operationen eingeführt

```
SQL> CREATE TABLE blub1 (ID NUMBER);
Table created.

SQL> CREATE TABLE IF NOT EXISTS blub1
     (ID NUMBER, BERMERKUNG VARCHAR2(20));
Table created.

SQL> desc blub1
 Name                  Null?    Type
 ----------------- -------- ------------
 ID                             NUMBER
```

Spatial und Graph Data

in allen Editionen verfügbar

Table 1-13 Spatial and Graph Data

Feature / Option / Pack	XE	SE2	EE	EE-ES	DBCS SE	DBCS EE	DBCS EE-HP	DBCS EE-EP	ExaCS /CC	Notes
Oracle Spatial and Graph	Y	Y	Y	Y	Y	Y	Y	Y	Y	Oracle Spatial and Graph no longer requires an extra cost license. See Oracle Database Insider blog post for more information.
Property Graph and RDF Graph Technologies (RDF/OWL)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Property Graph and RDF Graph Technologies (RDF/OWL) no longer requires an extra cost license. See Oracle Database Insider blog post for more information.

Licensing Guide 21c

Machine Learning

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in allen Editionen verfügbar

Feature / Option / Pack	XE	SE2	EE	EE-ES	DBCS SE	DBCS EE	DBCS EE-HP	DBCS EE-EP	ExaCS /CC	Notes
Oracle Machine Learning (formerly Advanced Analytics)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Oracle Machine Learning no longer requires an extra cost license. See Oracle Database Insider blog post for more information.

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Verschlüsselung

Native Netzwerkverschlüsselung und Dienste, wie Kerberos, sind jetzt Teil von **allen, lizensierten Oracle Datenbanken** und benötigen **keine Advanced Security** mehr.

Oracle Wallet	An Oracle Wallet is a PKCS#12 container used to store authentication and encryption keys. The Oracle database secure external password store feature stores passwords in an Oracle Wallet for password-based authentication to the Oracle database. The Oracle Wallet may also be used to store credentials for PKI authentication to the Oracle Database, configuration of network encryption (SSL/TLS), and Oracle Advanced Security transparent data encryption (TDE) master encryption keys. Network encryption (native network encryption, network data integrity, and SSL/TLS) and strong authentication services (Kerberos, PKI, and RADIUS) are no longer part of Oracle Advanced Security and are available in all licensed editions of all supported releases of Oracle Database.

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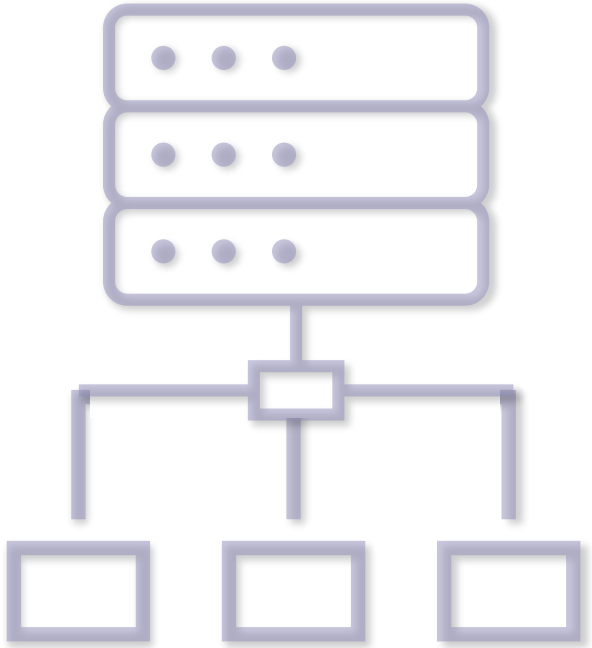
Migration und Upgrade

Multitenant Architecture (1)

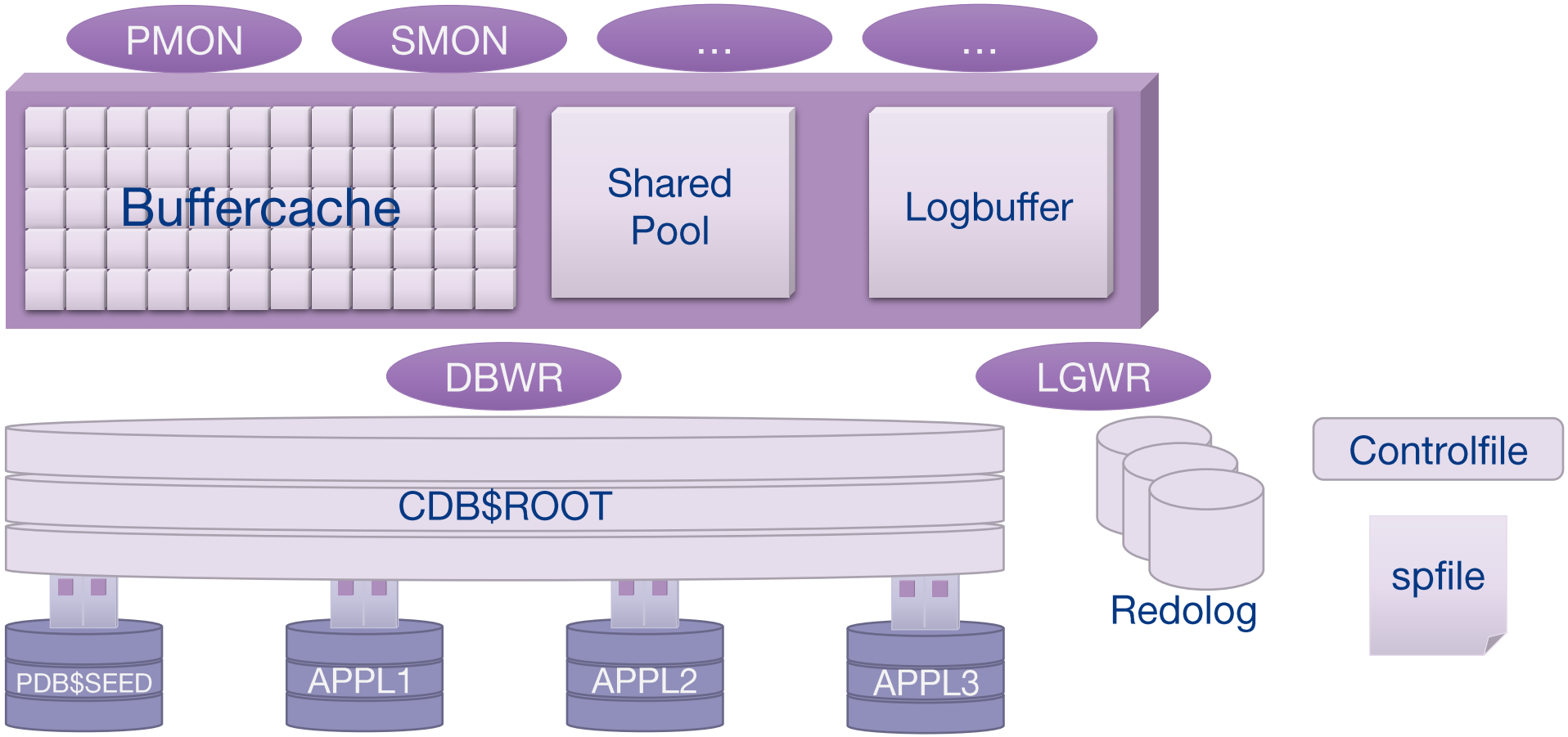
Seit Jahren angekündigt, jetzt ist es so weit:

Multitenant ist Pflicht, NON-CDB ist desupported und ist auch nicht mehr möglich.

- schon seitdem Innovation Release 21c
- weiterhin 3 PDBs ohne zusätzliche Kosten
- Multitenant-Option für max. 254 PDBs pro CDB



Multitenant Architecture (2)



Mythen und Wahrheiten

New Paradigms for Rapid Patching and Upgrades

The investment of time and effort to patch one multitenant container database results in patching all of its many pluggable databases. To patch a single pluggable database, you simply unplug/plug to a multitenant container database at a different Oracle Database software version.

To upgrade all hosted pluggable databases in a container database, simply upgrade the container database and all hosted pluggable databases are upgraded 'in-place'. To upgrade a single PDB, you simply unplug/plug the pluggable database in to a container database at a higher version and upgrade the pluggable database as described in the Database Upgrade Guide.

ALTERNATIVE FAKTEN

Multitenant Migrationsprojekt

- Projektdauer ca. 6 Monate
  - neue Views
    ```
    SQL> SELECT * FROM cdb_pdbs;
    ```
  - neue Namenskonventionen
    ```
    PDBNAME=?
    CDBNAME=?
    ```
  - Anpassung von Skripten
    ```
    SELECT sum(bytes) FROM cdb_data_files
    ```
  - neues Security-Konzept (Common vs. Locale)
    ```
    CREATE USER C##MYDBA …
    ```
  - kein einfaches `sqlplus / as sysdba`
    ```
    ALTER SESSION SET CONTAINER
    ```

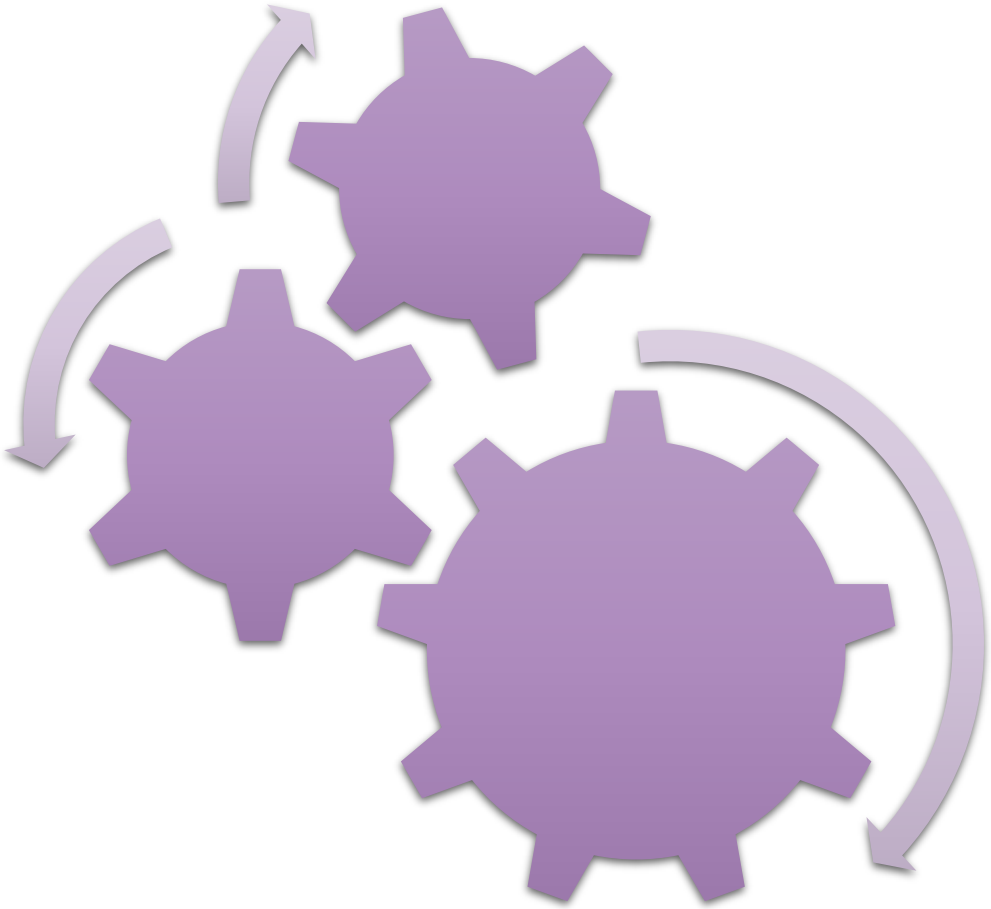
Auto-Upgrade in 23c (1)

- weiterhin das einfachste Tool für ein Upgrade
  - auch nach 23c
- Kann jetzt zudem Release Updates einspielen.
  - Out-of-Place Oracle Home Release Update Patching
- Kann jetzt selbständig den Grad der Parallelisierung festlegen (nur EE).
  - Ermittelt dafür im Vorfeld die Systemressourcen.
- dbua ist seit 23c offiziell deprecated.

Auto-Upgrade in 23c (2)

- Unplug-Plugin von PDBs auf einen anderen Server während des Upgrades
  - vorher nur auf demselben Server nutzbar
  - jetzt sogar für Cloud Migrationen nutzbar

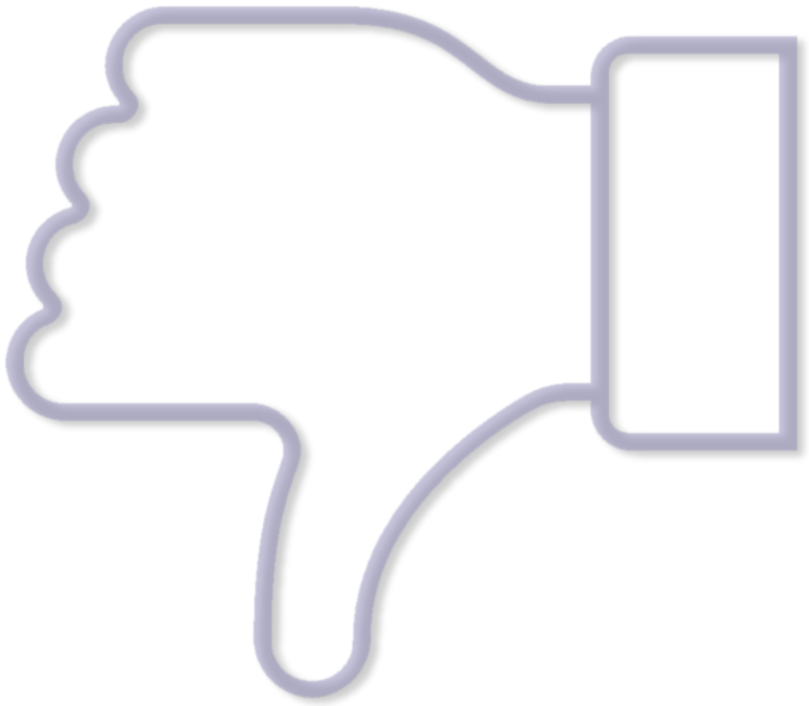
- eingebaute REST APIs
  - Oracle REST Data Services (ORDS)
  - Oracle Cloud Interface (OCI)



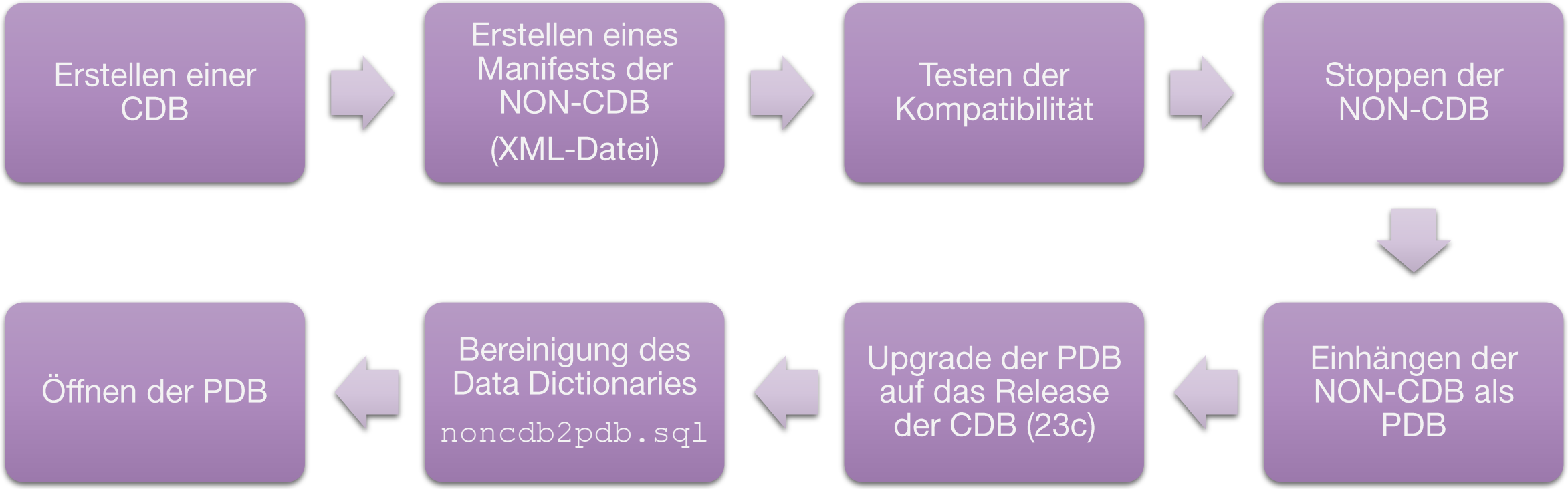
Nachteile

- Die Datenbank/PDB steht während des gesamten Upgrades nicht zur Verfügung.

- Bei Migration auf dem gleichen Server ist ein Rollback sehr aufwändig und zeitintensiv.
  - NON-CDB to PDB



Migrationsphasen



Cloud Migration Advisor | New Project

Oracle Cloud Migration Advisor

mike.dietrich@oracle.com

- Home
- Guided Mode
- Create Project
- My Available Projects
- Download Collectors
- File Exchange with Custom...
- REST Services
- Help

Oracle Cloud Migration Advisor

Welcome to the Cloud Migration Advisor (CMA)

Oracle Cloud Migration Advisor brings you the expert technical knowledge of Oracle Database upgrade and migration development teams, combined with more than a century of combined real-world experience with customer migrations, to give your customer the **best possible migration advice**.

With **Guided Mode**, CMA will quickly tell you

- Which databases can be **most easily migrated** to Oracle Autonomous Database, or
- What is the **best migration method** to move chosen databases to a desired Oracle Cloud platform?

For more options, you can

- Create and configure migration scenarios using **Create Project**, or
- Access your existing migration projects and scenarios with **My Available Projects**.

Now it is time to start - let's move to the Oracle Cloud!

Guided Mode | My Available Projects | Create New Project

Cloud Migration Advisor | Solution - Methods

Migration Methods

Data Pump Conventional Export/Import
Complexity: 36
Downtime: Medium

You can use this method regardless of the endian format and database character set of the source database. You can also use Data Pump to migrate data between different versions of Oracle Database. This method is simple to implement, provides the broadest cross-platform support and enables you to physically re-organize your target database.

Select | Read Instructions

Data Pump Import with DBLink
Complexity: 36
Downtime: Medium

The Oracle Data Pump Import command-line mode NETWORK_LINK parameter enables an import from a source database identified by a valid database link. The data from the source database instance is written directly back to the connected database instance.

Select | Read Instructions

Remote Cloning Non-CDB + Upgrade + Convert
Complexity:
Downtime: Medium

Since Oracle 12.2.0.1 or higher (or with undo restrictions in 12.1.0.2 already), you have the freedom to plugin a non-CDB at first via a database link, and then upgrade and adjust it.

Select | Read Instructions

Unplugging/Plugging Non-CDB + Upgrade + Convert
Complexity:
Downtime: Medium

You can use the unplug/plug method to migrate an Oracle Database non-CDB to a PDB. This method provides a way to consolidate several non-CDB databases into a single Oracle Database multitenant database on the Database service. Finally, you run dbupgrade to bring it to the target version.

Select | Read Instructions

Data Pump Full Transportable
Complexity:
Downtime: Medium

You can use the Data Pump full transportable method to copy an entire database from your on-premises host to the database on a Database service database deployment.

Select | Read Instructions

Database Migration Workbench Physical Online
Complexity:
Downtime: Medium

MWB uses RMAN Transportable Tablespace. TTS provides a Near Zero Downtime (NZDT) way to create a duplicate database from incremental backups of the source database while retaining the original target database.

Select | Read Instructions

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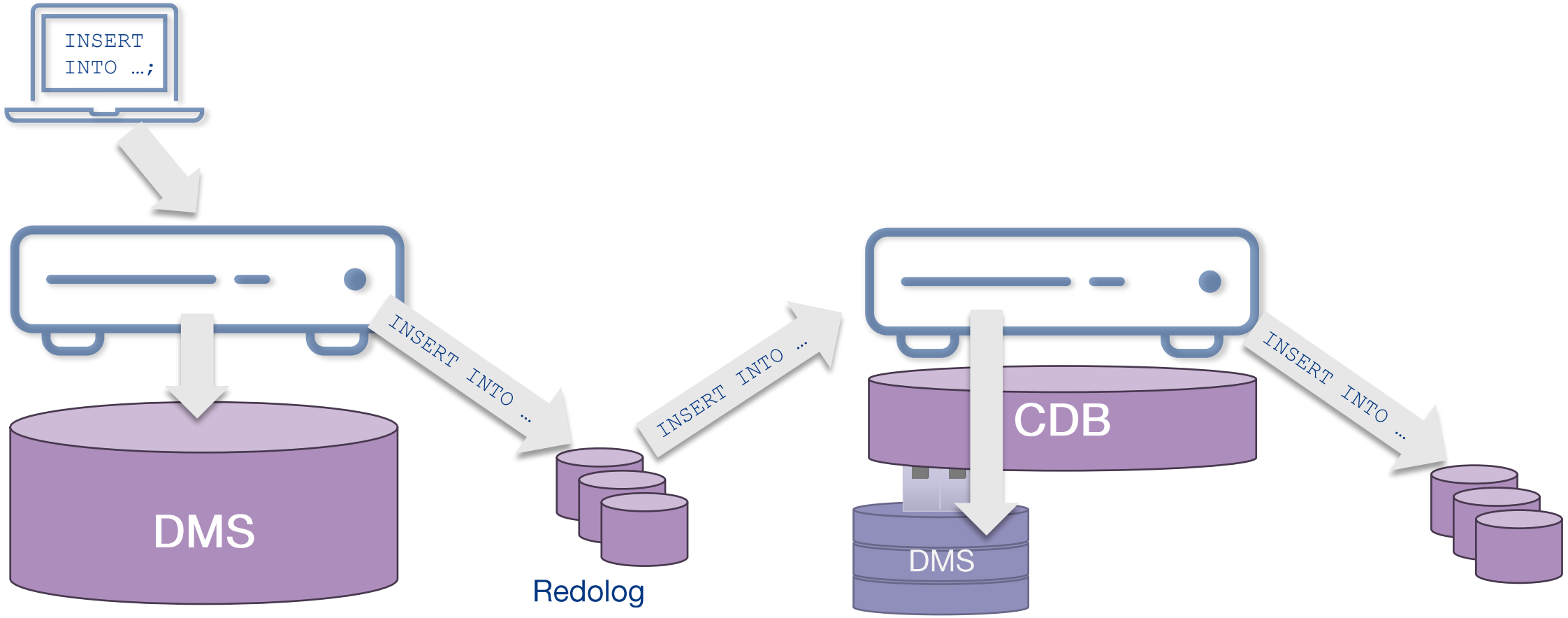
Minimum Downtime

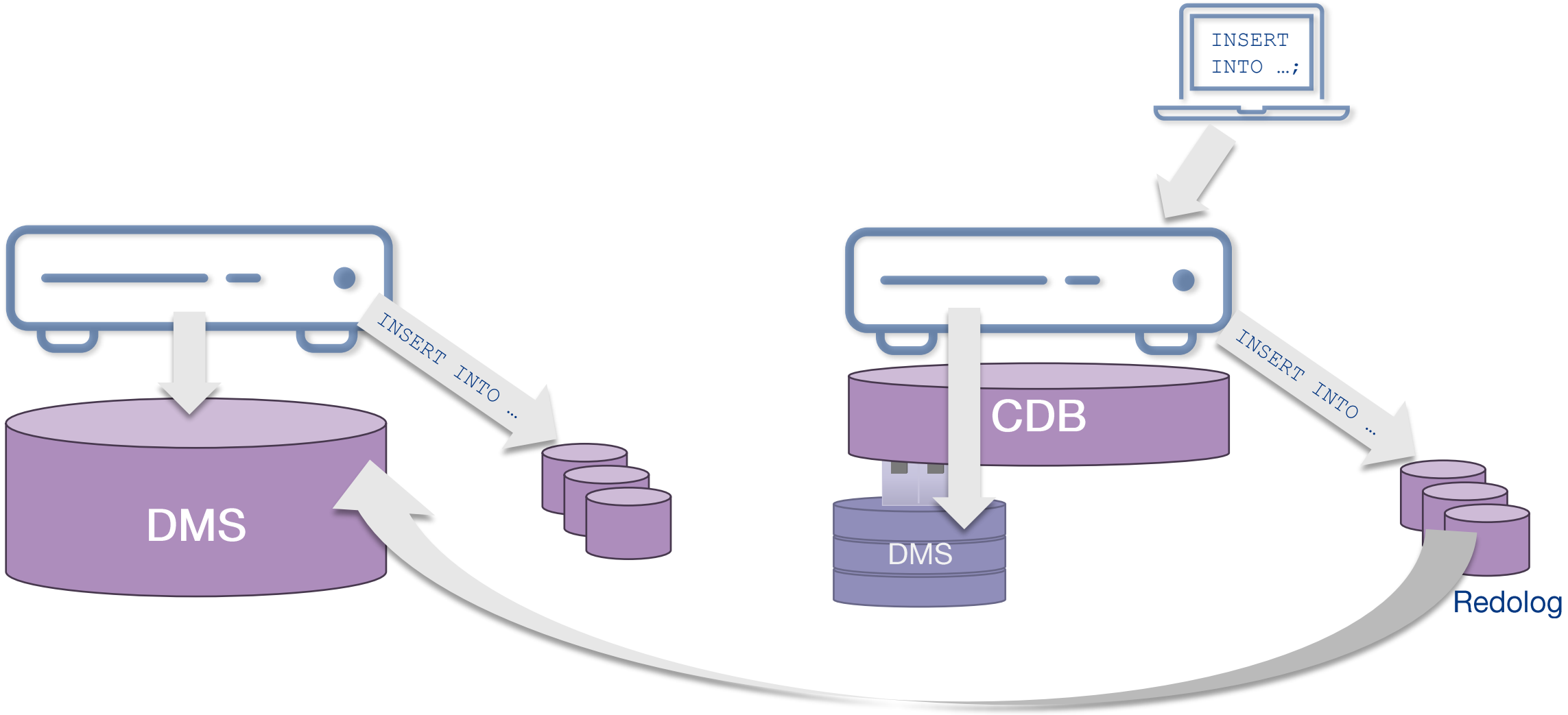
Synchronisierung

Vor der Migration



Synchronisierung

Nach der Migration



SharePlex®

Webinar

Wann: 15.02.2024

Uhrzeit: 11h

Quest

Where Next Meets Now.

Reibungslose Migration zu Oracle 23c

Thema:

Logische Datenreplikation als entscheidender Baustein für eine risikolose Migration zu Oracle 23c

Quest

Herausforderungen

- Themen:
  - Oracle 23c Upgrade
  - Multitenant Database Migration
  - Unicode Migration
  - PostgreSQL Migr
- immer a
- Laufzeit

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Datenbank-Experten mit über 30 Jahren Erfahrung

Was kann CarajanDB für Sie tun?

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