

Oracle Database 18c

O que há de novo?

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NOSSOS PATROCINADORES



NOSSOS APOIADORES





- Desde Nov/2016
- Oracle Security / Cloud / Performance / HA / etc Solution Architect

Rodrigo Jorge

ORACLE
Certified Master



- OCMs 11g / 12c / MAA / Cloud
- OCEs 11g / 12c
- (...)



www.dbarj.com.br



- Global systems integrator focused on the Oracle platform
- Consultants average 15+ years of Oracle experience
- Worldwide specialist in Engineered Systems implementations
- 16 Oracle ACE members, specialist recognized by Oracle for their technical expertise

Oracle Specializations*

- Oracle Exadata
- Oracle Exalogic
- Oracle Database
- Oracle GoldenGate
- Oracle Data Integrator
- Oracle Database
- Oracle Data Warehouse
- Oracle Real Application Cluster
- Oracle Performance Tuning
- Oracle Database Security



Oracle Engineered Systems Numbers

- 700+ Oracle Engineered Systems which AEG have configured, patched or supported.
- 190 AEG resources which have an average 15+ years of Oracle experience
- AEG Support across 27 countries
- 150 Oracle Engineered Systems (Exadata/Exalogic etc) currently under management directly by AEG
- 205 customers in either the AEG Managed Services program or remoteDBA program
- 50,000 Accenture Oracle IDC resources that can be leveraged for Level 1 & Level 2 support



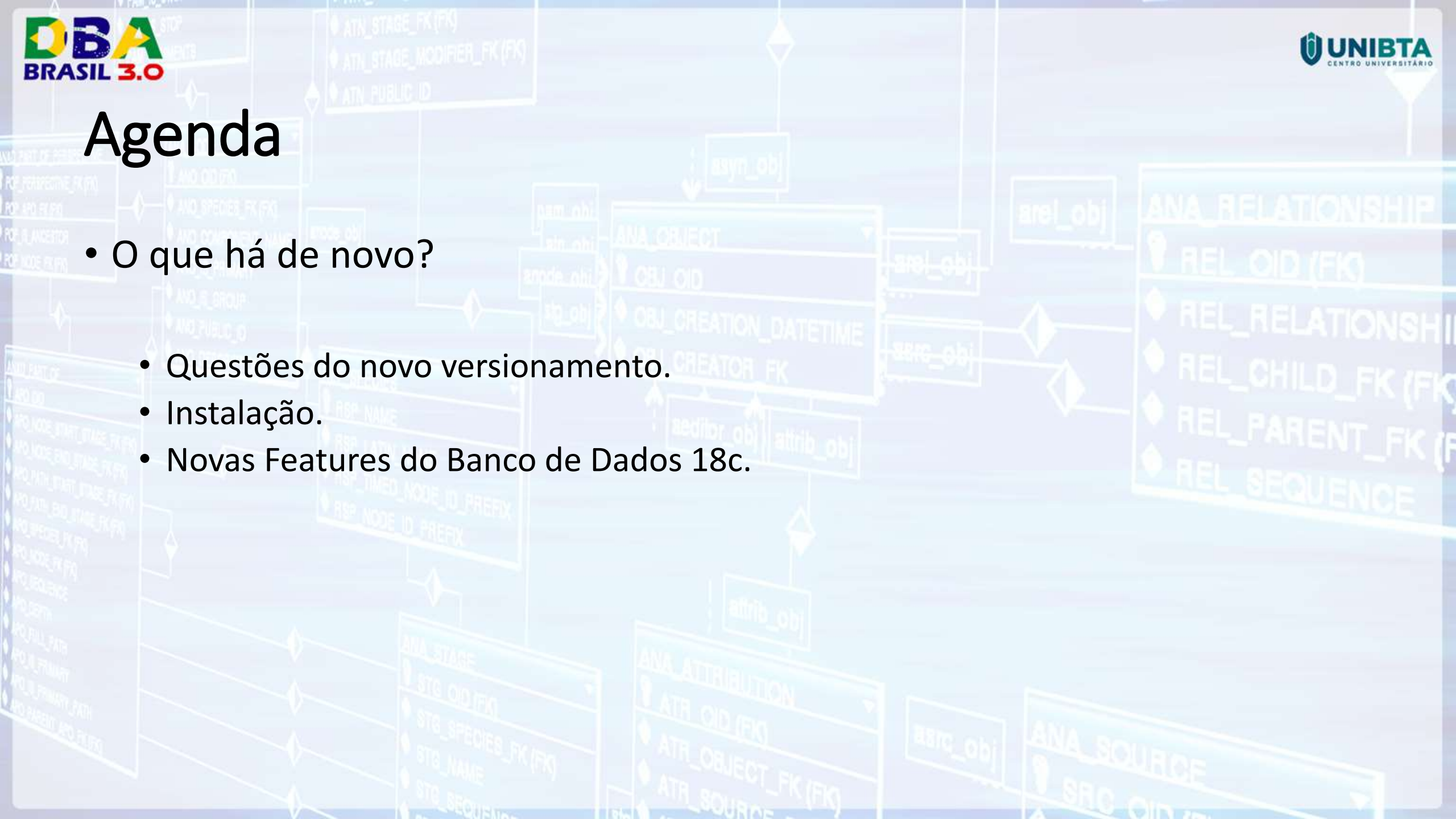
Our consultants have been published in multiple subject areas and additional online resources that demonstrate Accenture's experience and expertise with the OES platform



*<https://www.accenture.com/us-en/service-oracle-diamond-partner>

Agenda

- O que há de novo?
 - Questões do novo versionamento.
 - Instalação.
 - Novas Features do Banco de Dados 18c.



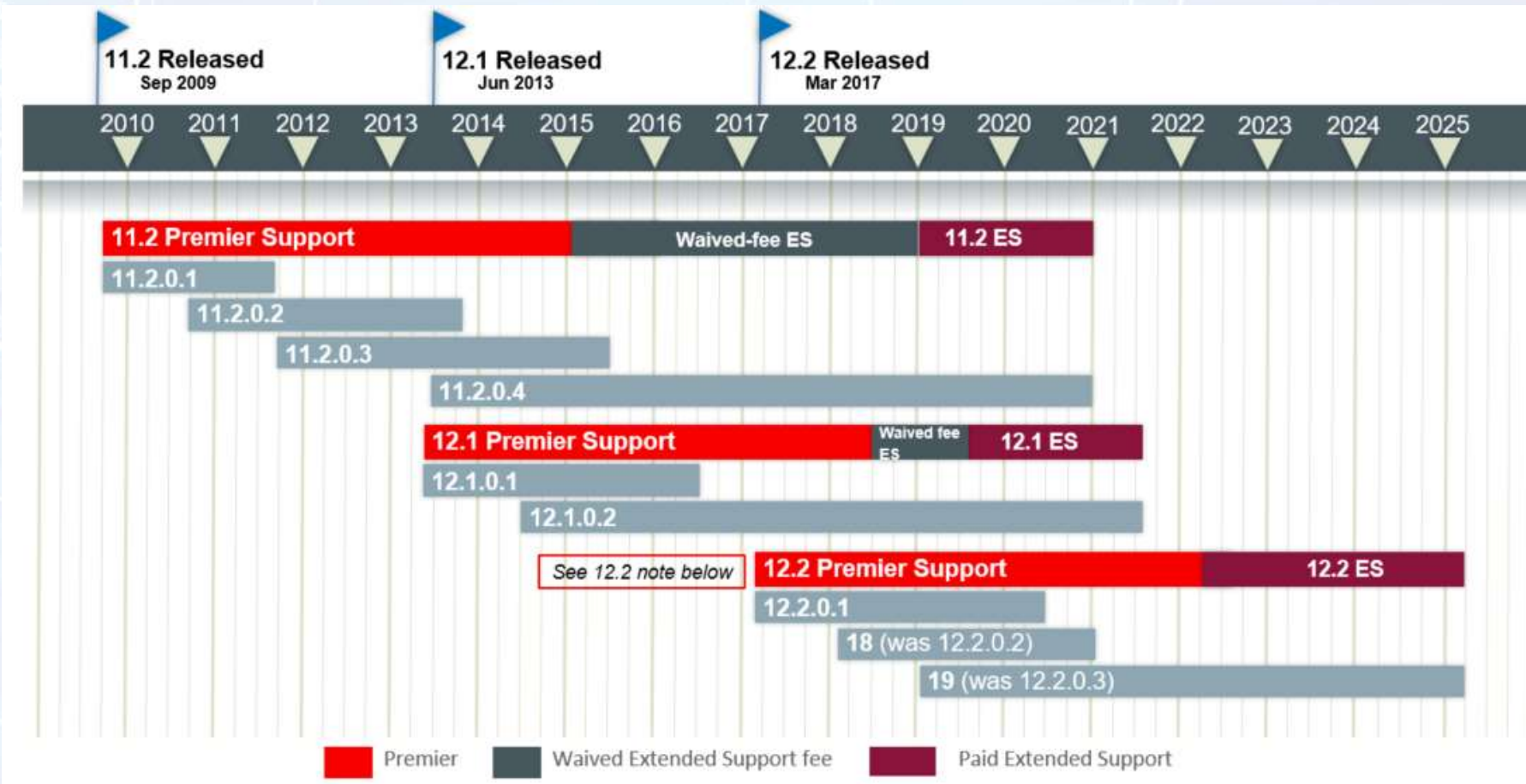
Oracle Database 18c NÃO É Autonomous Database!

Oracle Database 18c:

- Instalar um DB 18c on-prem.
- Fazer o deploy automático de um 18c DBaaS na Oracle Public Cloud ou Cloud@Customer.
- Instalar por conta própria um DB 18c na Cloud.

Autonomous Database:

- Comprar um Autonomous Database Cloud Service na Oracle Public Cloud ou Cloud@Customer.
- Tem que incluir as palavras “Autonomous Database”.
- Ex: “Oracle Autonomous Data Warehouse Cloud Service”, “Oracle Autonomous Database OLTP”, “Oracle Autonomous NoSQL Database”



Release Family

Modelo Antigo:

- 11.2.0.1
 - 11.2.0.2
 - 11.2.0.3
 - 11.2.0.4
- 12.1.0.1
 - 12.1.0.2

Modelo Novo:

- 12.2.0.1
 - 18 (was 12.2.0.2)
 - 19 (was 12.2.0.3)
- 20
 - 21
 - 22
- ...

2017	2018	2019	2020	2021	2022	2023	2024
12.2 Premier Support					12.2 ES		
12.2.0.1			18c (was 12.2.0.2)		19c (was 12.2.0.3)		
				20c "Family"			
				20c		21c	
						22c	

Version	Release Date
Oracle 7	06-1992
Oracle 8	06-1997
Oracle 9i	01-2001
Oracle 10g	01-2003
Oracle 11g	09-2007
Oracle 12c	06-2013
Oracle 18c	02-2018
Oracle 19c	02-2019
Oracle 20c	02-2020
Oracle 21c	02-2021
Oracle 22c	02-2022

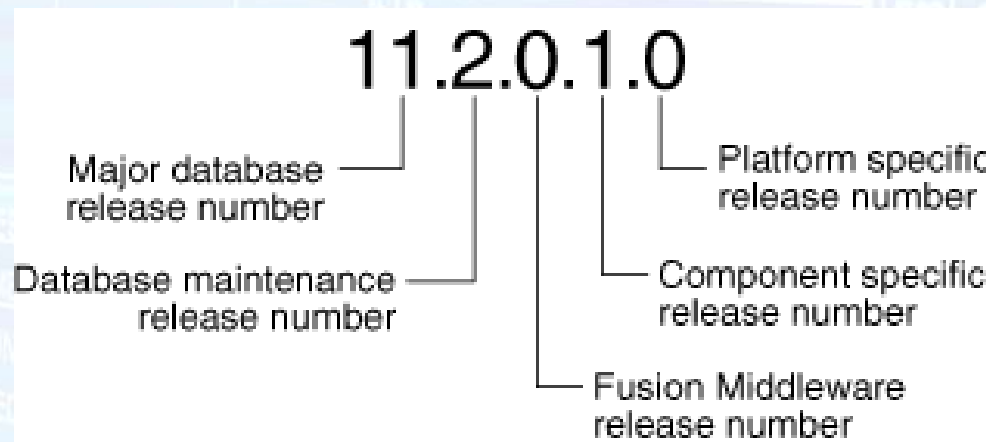
“There will be fewer new features in each version that comes out but more functionalities will come out on a regular basis.” - Joel Goodman

**http://education.oracle.com/pls/web_prod-plq-dad/db_pages.getpage?page_id=2029*

Existirão features incompletas no BD

- Apenas use se estiver na documentação oficial.
 - Parâmetro PDB_LOCKDOWN na 12.1.0.2 mas só funciona na 12.2.0.1.
 - Read Only Oracle Home (ROOH) na 12.2.0.1 mas só documentado na 18c.
 - `_allow_cross_endian_dictionary` na 18c mas sem documentação.

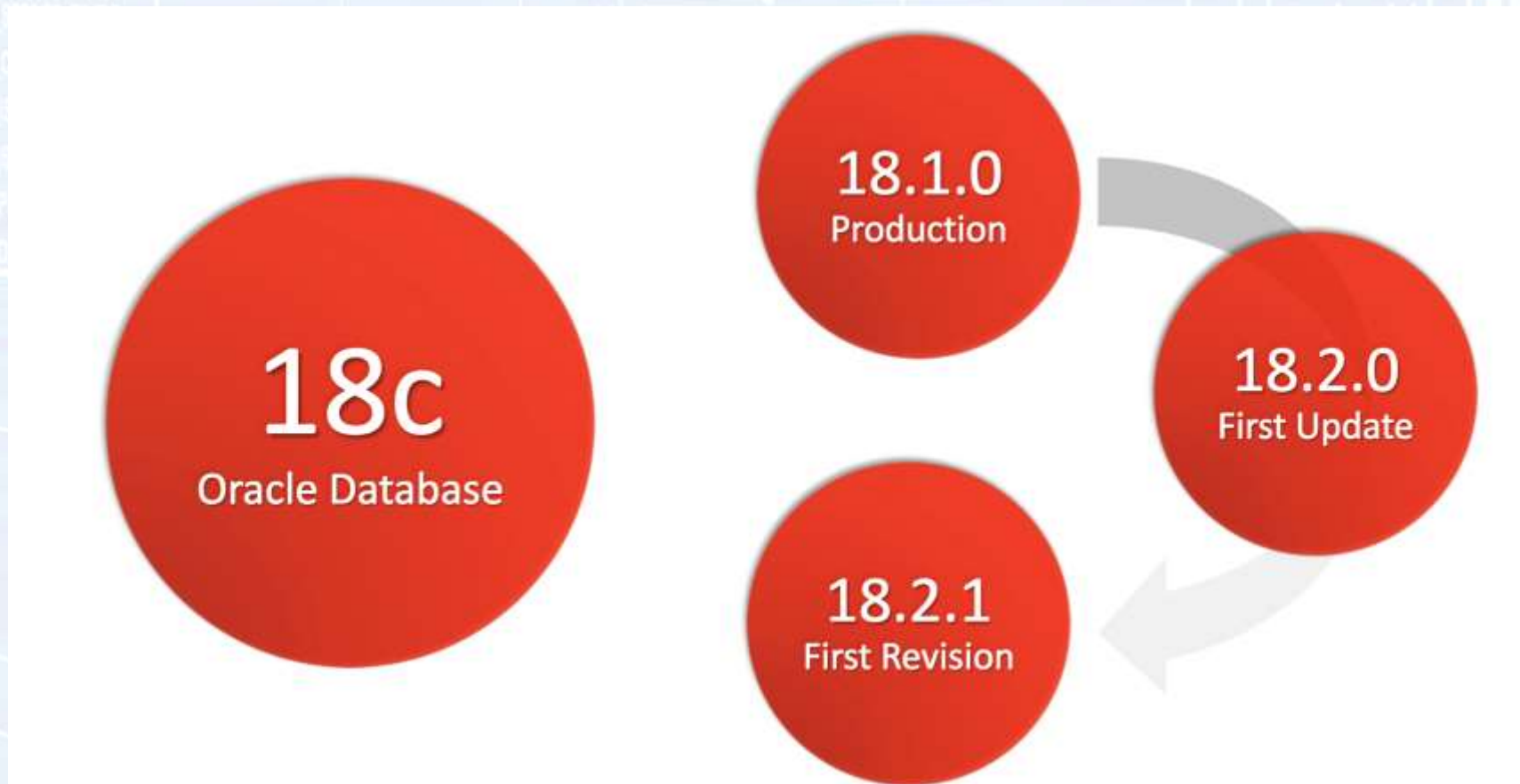
Modelo de Versão - Antigo

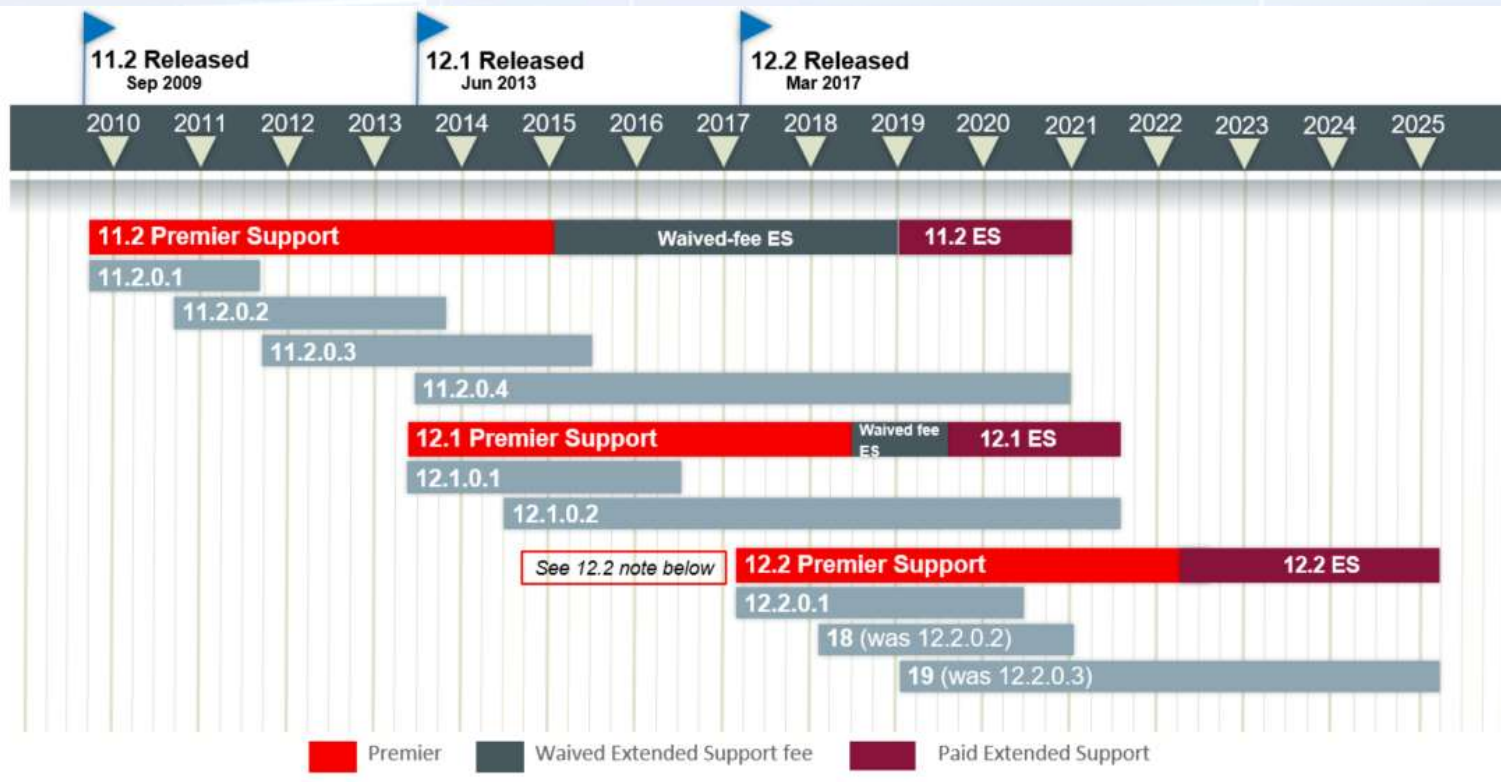


- 11gR2 com PSU 180417 : 11.2.0.4.180417
- 12cR2 com RU 180417 : 12.2.0.1.180417

* https://docs.oracle.com/cd/E18283_01/server.112/e17120/dba004.htm

Modelo de Versão - Novo





2018				2019				2020			
18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	18.10	18.11	18.12
				19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8

2021				2022				2023				2024			
19.9	19.10	19.11	19.12	19.13	19.14	19.15	19.16	19.17	19.18	19.19	19.20	19.21	19.22	19.23	19.24

Como instalar?

- Oficialmente disponível apenas para Exadata / Oracle Public Cloud.
- Como instalar em em uma lab / virtualbox ?
 1. Use o instalador para Exadata.
 2. “Faça algumas mudanças”.
 3. Cria seu Banco de Dados
 4. Voilà.
- <http://www.dbarj.com.br/en/2018/02/installing-oracle-database-18-on-ol-7/>
- <http://www.dbarj.com.br/en/2018/02/creating-and-running-an-oracle-18-db-instance-on-oracle-linux/>

O instalador é o próprio ORACLE_HOME!

```
[root@ora18cserver ~]# mkdir -p /u01/app/oraInventory
[root@ora18cserver ~]# mkdir -p /u01/app/oracle/product/18.0.0/dbhome_1
[root@ora18cserver ~]# chown -R oracle: /u01/app/oraInventory
[root@ora18cserver ~]# chown -R oracle: /u01/app/oracle
[root@ora18cserver ~]# su - oracle

[oracle@ora18cserver ~]$ unzip -q V974953-01.zip -d /u01/app/oracle/product/18.0.0/dbhome_1/
Archive:  V974953-01.zip
  creating: /u01/app/oracle/product/18.0.0/dbhome_1/bin/
  inflating: /u01/app/oracle/product/18.0.0/dbhome_1/bin/lxegen
  inflating: /u01/app/oracle/product/18.0.0/dbhome_1/bin/sqlldr
  extracting: /u01/app/oracle/product/18.0.0/dbhome_1/bin/lsnrctl
  inflating: /u01/app/oracle/product/18.0.0/dbhome_1/bin/ore_srcexport.pl
  inflating: /u01/app/oracle/product/18.0.0/dbhome_1/bin/oklist
  extracting: /u01/app/oracle/product/18.0.0/dbhome_1/bin/extproc
...
```



Novas Features

Novas Features

The screenshot shows the Oracle Help Center interface. At the top, it says 'ORACLE Help Center' and 'Welcome Rodrigo Sign Out'. The breadcrumb trail is 'Home / Database / Oracle / Oracle Database / Release 18'. The main heading is 'Database New Features Guide'. On the left is a 'Table of Contents' sidebar with a search icon and navigation arrows. The selected item is '1 Oracle Database Release 18c New Features'. The main content area shows the title '1 Oracle Database Release 18c New Features' and a sub-heading 'Application Development'. Below this, there is a list of categories: Application Development, Availability, Big Data and Data Warehousing, Database Overall, Diagnosability, Performance, RAC and Grid, and Security. The 'Application Development' category is expanded to show sub-items: APEX, General, Graph, JSON, and PL/SQL.

ORACLE Help Center Welcome Rodrigo Sign Out

Home / Database / Oracle / Oracle Database / Release 18

Database New Features Guide

Table of Contents

- Title and Copyright Information
- Preface
- 1 Oracle Database Release 18c New Features**
 - Application Development
 - APEX
 - Application Express 5.1: New and Updated Packaged Applications
 - Application Express 5.1: Interactive Grid
 - Application Express 5.1: Font APEX Icon Library
 - Application Express 5.1: Page Designer Enhancements
 - Application Express 5.1: Calendar Enhancements
 - Application Express 5.1: Oracle JET Charts
 - General

1 Oracle Database Release 18c New Features

This chapter contains descriptions of all of the features that are new to Oracle Database Release 18c.

- Application Development
- Availability
- Big Data and Data Warehousing
- Database Overall
- Diagnosability
- Performance
- RAC and Grid
- Security

Application Development

- APEX
- General
- Graph
- JSON
- PL/SQL

Disponibilidade de Features ainda mais dividida

Exadata / ODA

Feature/Option/Pack	SE2	EE	EE-ES	DBCS SE	DBCS EE	DBCS EE-HP	DBCS EE-EP	ExaCS
Oracle Multitenant - # of PDBs		1	252	4096	1	1	4096	4096
CDB Fleet Management	N	N	Y	N	Y	Y	Y	Y
PDB Snapshot Carousel	N	N	Y	N	Y	Y	Y	Y
Refreshable PDB switchover	N	N	Y	Y	Y	Y	Y	Y

Readonly ORACLE_HOME

Objetivos:

- Remover do ORACLE_HOME arquivos mutáveis.
- Consolidar estes arquivos em uma pasta separada.
- Facilitar a migração / clonagem de ambientes.
- Facilita a utilização de Docker / compartilhamento de ORACLE_HOMEs / etc.

Readonly ORACLE_HOME

Verificando os parâmetros:

```
[oracle@ora18cserver dbhome_1]$ roohctl -help
```

```
Usage: roohctl [<flag>] [<command> <option>]
```

Following are the possible flags:

```
-help
```

Following are the possible commands:

```
-enable Enable Read-only Oracle Home
```

```
[-nodeList List of nodes in a cluster environment]
```

OBS: Não mostra a opção -disable mesmo sendo suportado

Readonly ORACLE_HOME

orabasetab antes:

```
[oracle@ora18cserver ~]$ cat $ORACLE_HOME/install/orabasetab
#orabasetab file is used to track Oracle Home associated with Oracle Base
/u01/app/oracle/product/18.0.0/dbhome_1:/u01/app/oracle-base:OraDB18Home1:N:
```

Readonly ORACLE_HOME

orabasetab depois:

```
[oracle@ora18cserver ~]$ cat $ORACLE_HOME/install/orabasetab
#orabasetab file is used to track Oracle Home associated with Oracle Base
/u01/app/oracle/product/18.0.0/dbhome_1:/u01/app/oracle-base:OraDB18Home1:Y:
```

Readonly ORACLE_HOME

Ativando:

```
[oracle@ora18cserver dbhome_1]$ roohctl -enable
```

Enabling Read-Only Oracle home.

Cannot enable Read-Only Oracle home in a configured Oracle home.

The Oracle Home is configured with databases '**orcl**'.

Readonly ORACLE_HOME

Ativando:

```
[oracle@ora18cserver dbhome_1]$ roohctl -enable
```

Enabling Read-Only Oracle home.

Update orabasetab file to enable Read-Only Oracle home.

Orabasetab file has been updated successfully.

Create bootstrap directories for Read-Only Oracle home.

Bootstrap directories have been created successfully.

Bootstrap files have been processed successfully.

Read-Only Oracle home has been enabled successfully.

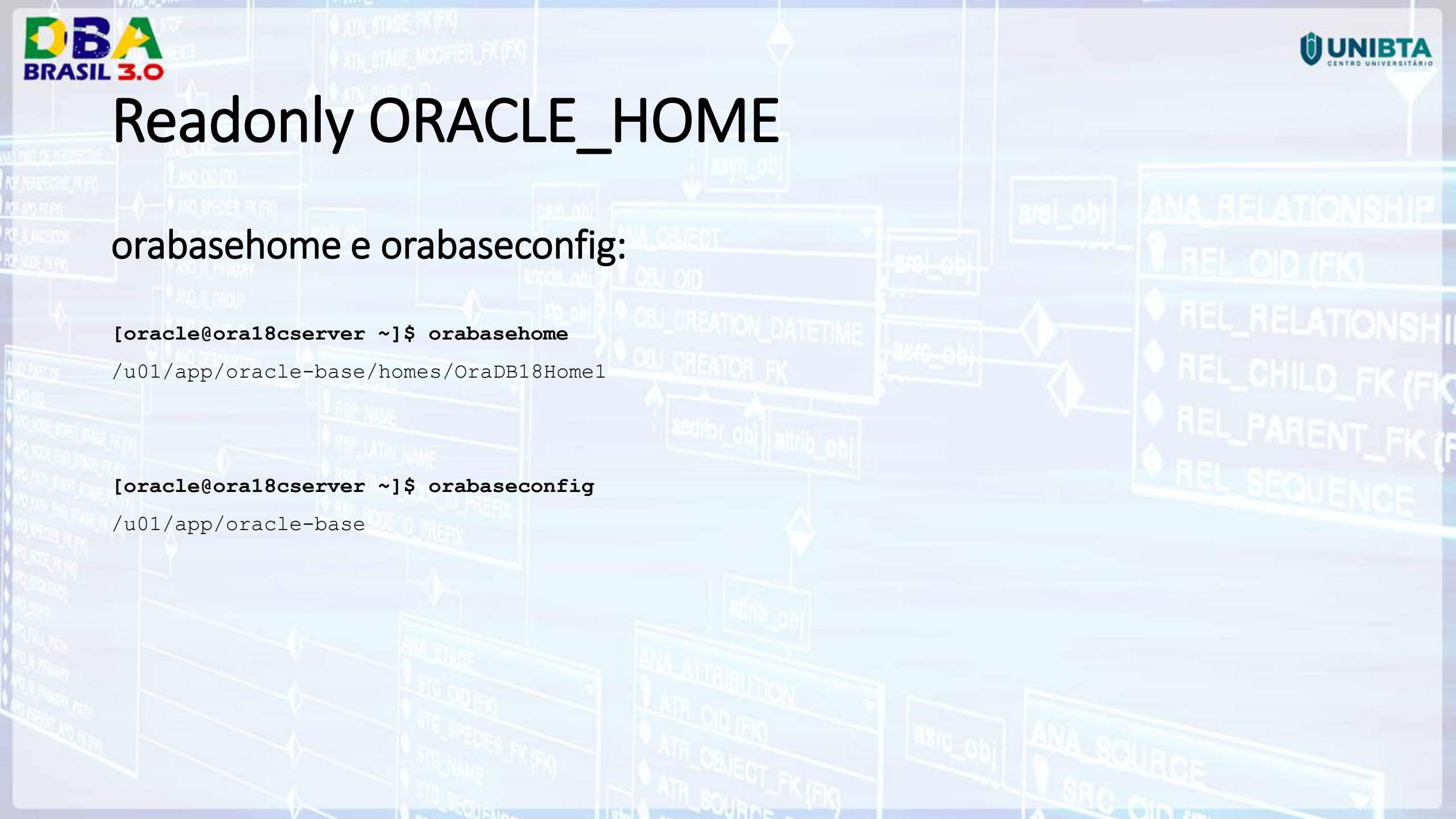
Check the log file /u01/app/oracle-base/cfgtoollogs/roohctl/roohctl-180429AM100542.log.

Readonly ORACLE_HOME

orabasehome e orabaseconfig:

```
[oracle@ora18cserver ~]$ orabasehome
/u01/app/oracle-base/homes/OraDB18Home1
```

```
[oracle@ora18cserver ~]$ orabaseconfig
/u01/app/oracle-base
```



Readonly ORACLE_HOME

Salvando permissões e proprietários atuais:

```
# find -depth -printf '%m:%u:%g:%p\n' |
awk -v RS='\n' -F: '
BEGIN {
    print "#!/bin/sh";
    print "set -e";
    q = "\047";

    gsub(q, q q "\\\" q);
    f = $0;
    sub(/^[^:]*:[^:]*:[^:]*:/, "", f);
    print "chown --", q $2 ":" $3 q, q f q;
    print "chmod", $1, q f q;
}' > original-permissions.sh
```

Readonly ORACLE_HOME

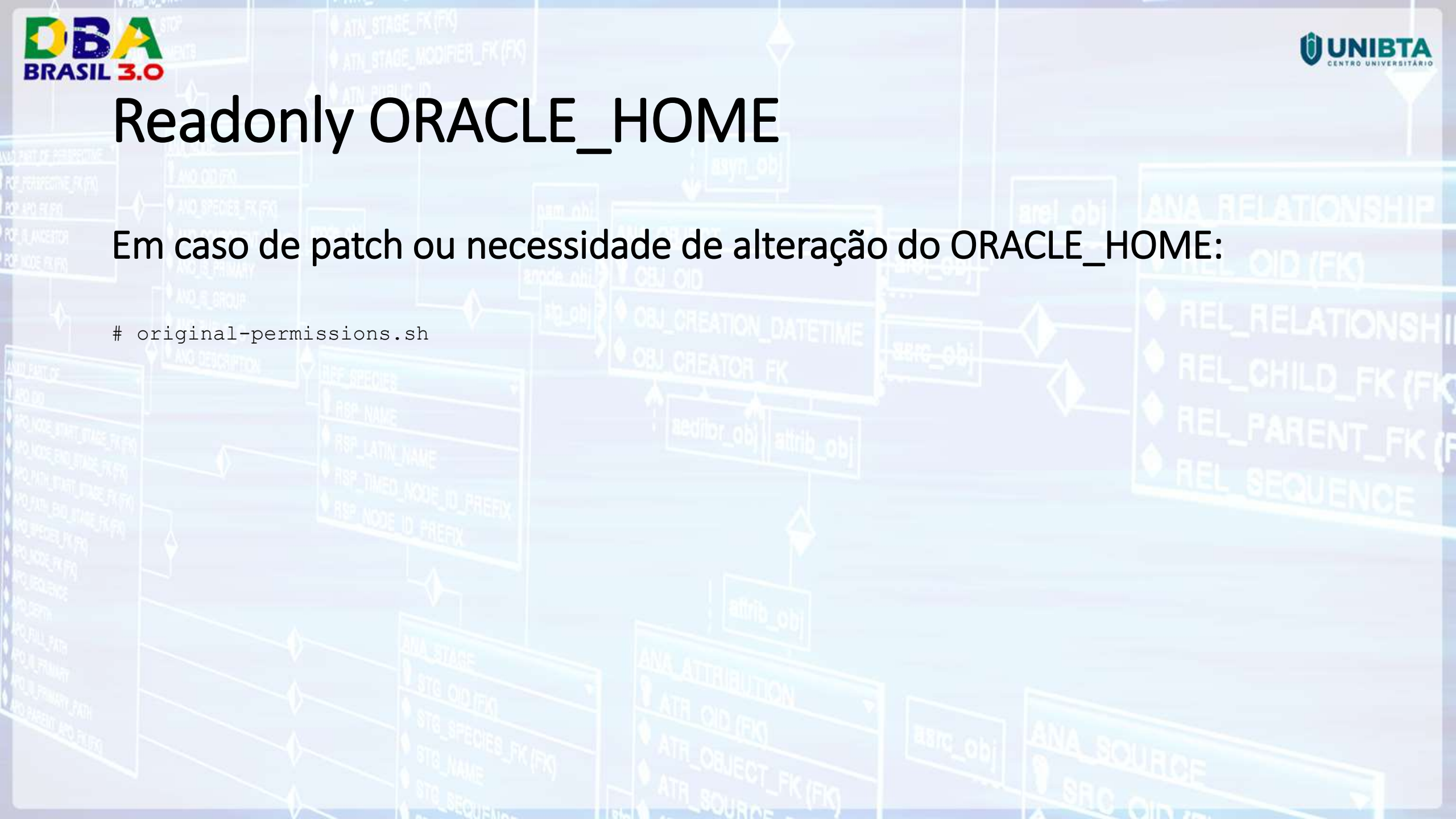
Alterando permissões para root:

```
# ORACLE_HOME=/u01/app/oracle/product/18.0.0/dbhome_1
# cd $ORACLE_HOME
# find ./ -perm -u+x ! -perm -g+x -exec chmod g=u-w {} +
# find ./ -perm -u+r ! -perm -g+r -exec chmod g=u-w {} +
# find ./ -perm -g+w ! -type l -exec chmod g-w {} +
# find ./ -perm -o+w ! -type l -exec chmod o-w {} +
# chown -R root ./*
```

Readonly ORACLE_HOME

Em caso de patch ou necessidade de alteração do ORACLE_HOME:

```
# original-permissions.sh
```



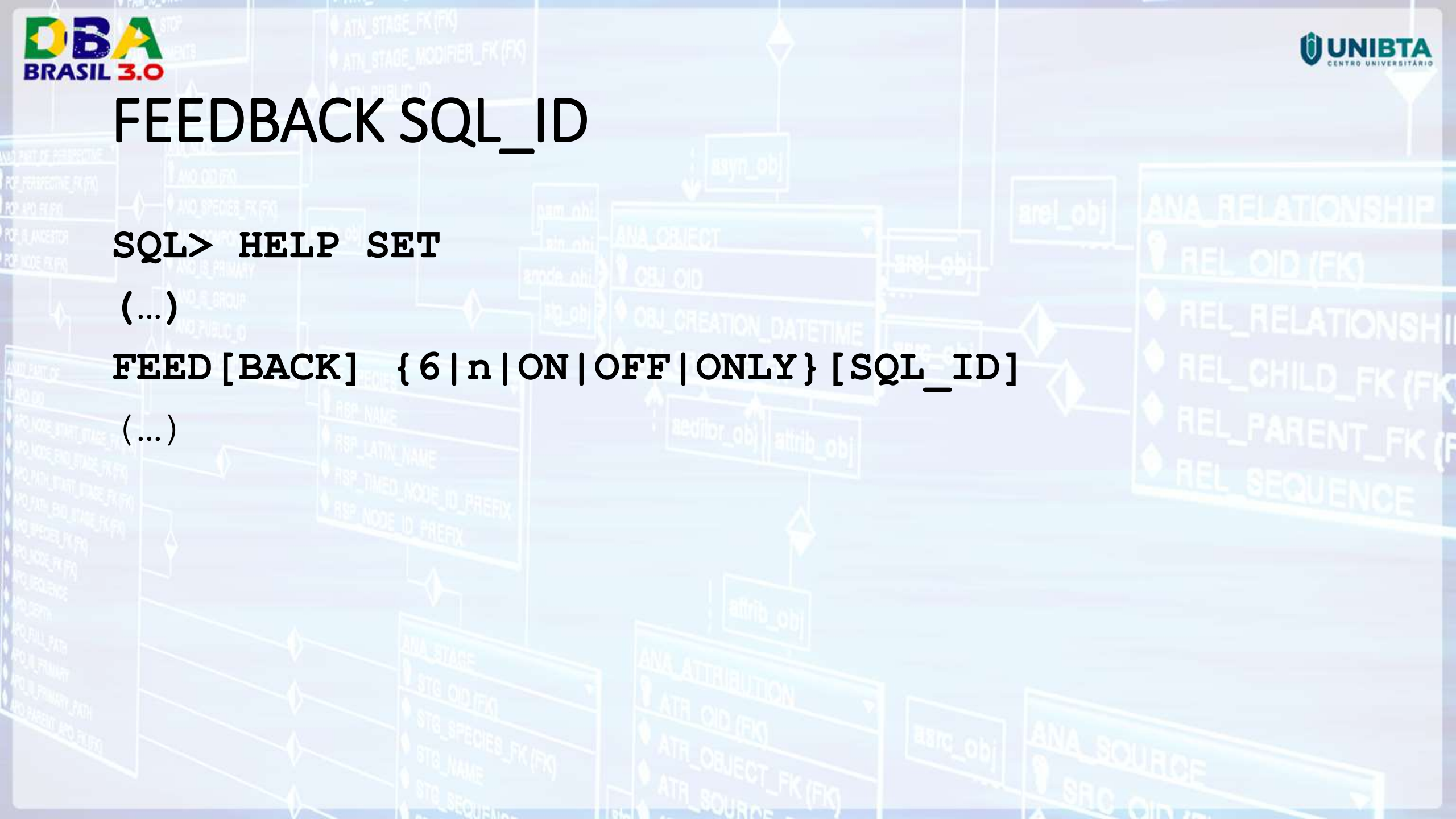
FEEDBACK SQL_ID

SQL> HELP SET

(...)

FEED [BACK] { 6 | n | ON | OFF | ONLY } [SQL_ID]

(...)



FEEDBACK SQL_ID – 18c

```
SQL> set feed on sql_id
```

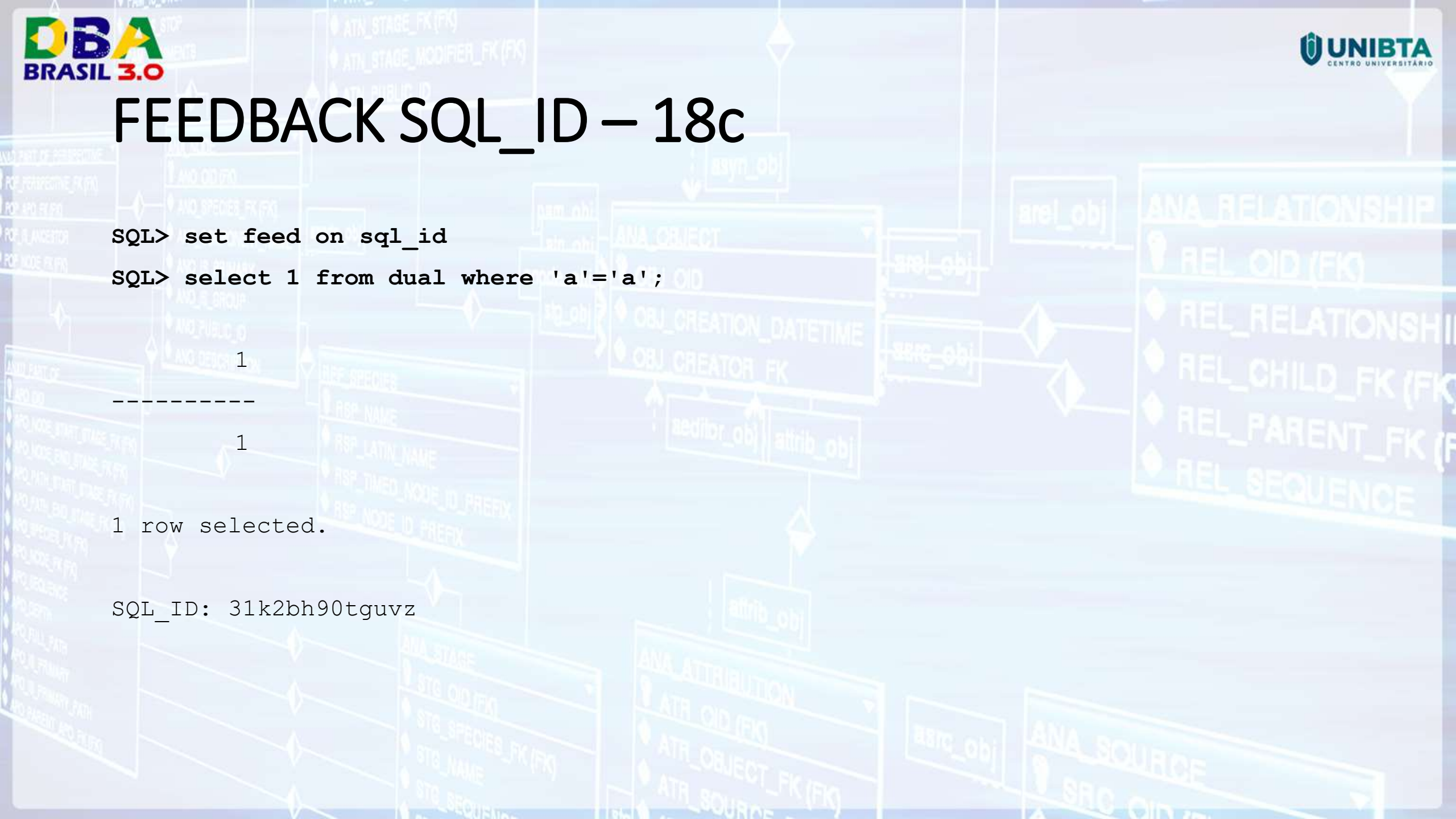
```
SQL> select 1 from dual where 'a'='a';
```

```
1
```

```
1
```

```
1 row selected.
```

```
SQL_ID: 31k2bh90tguvz
```



FEEDBACK SQL_ID – Pré 18c

```
SQL> set feed off
```

```
SQL> select 1 from dual where 'a'='a';
```

```
1
```

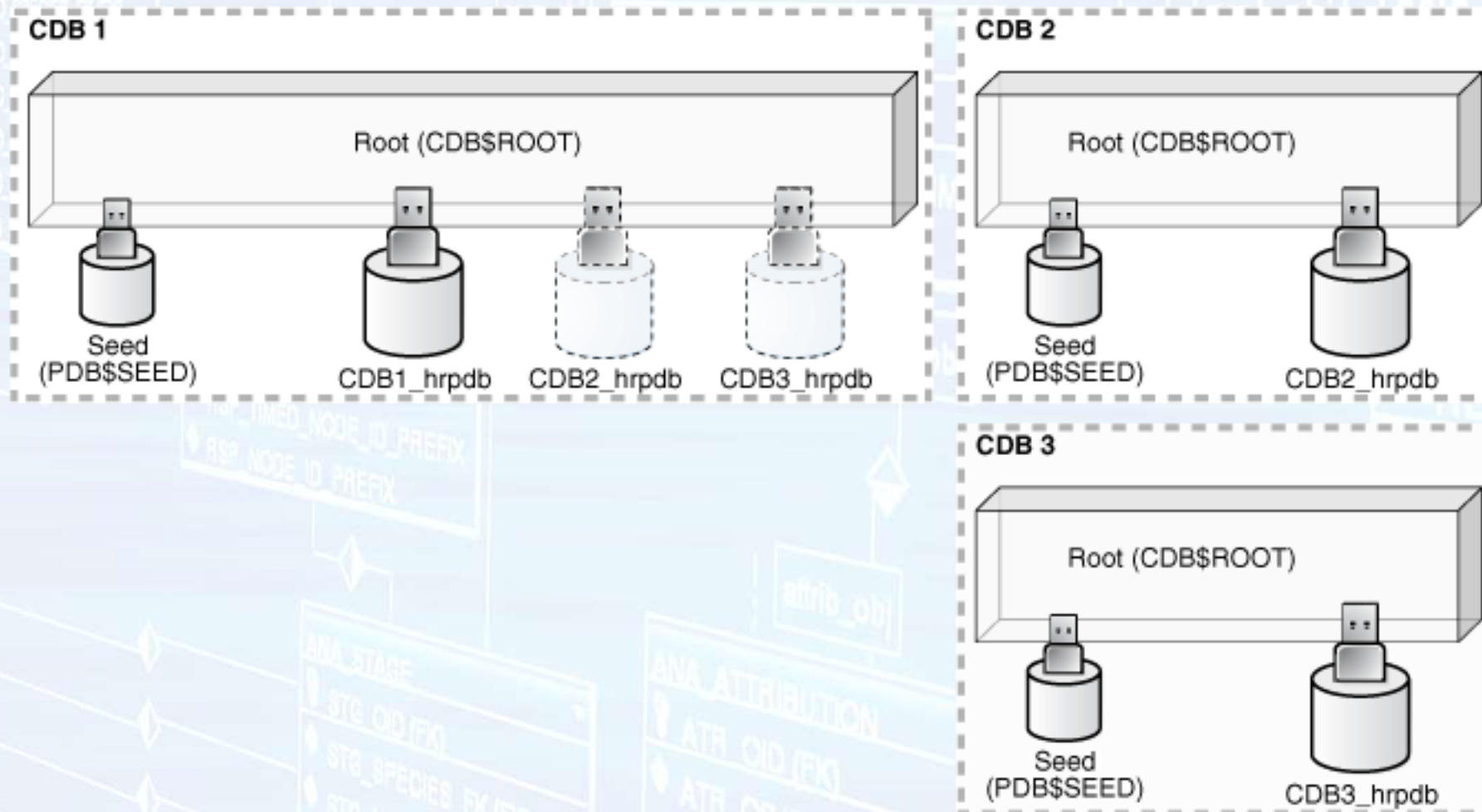
```
1
```

```
SQL> select PREV_SQL_ID from v$session where sid=sys_context('USERENV','SID');
```

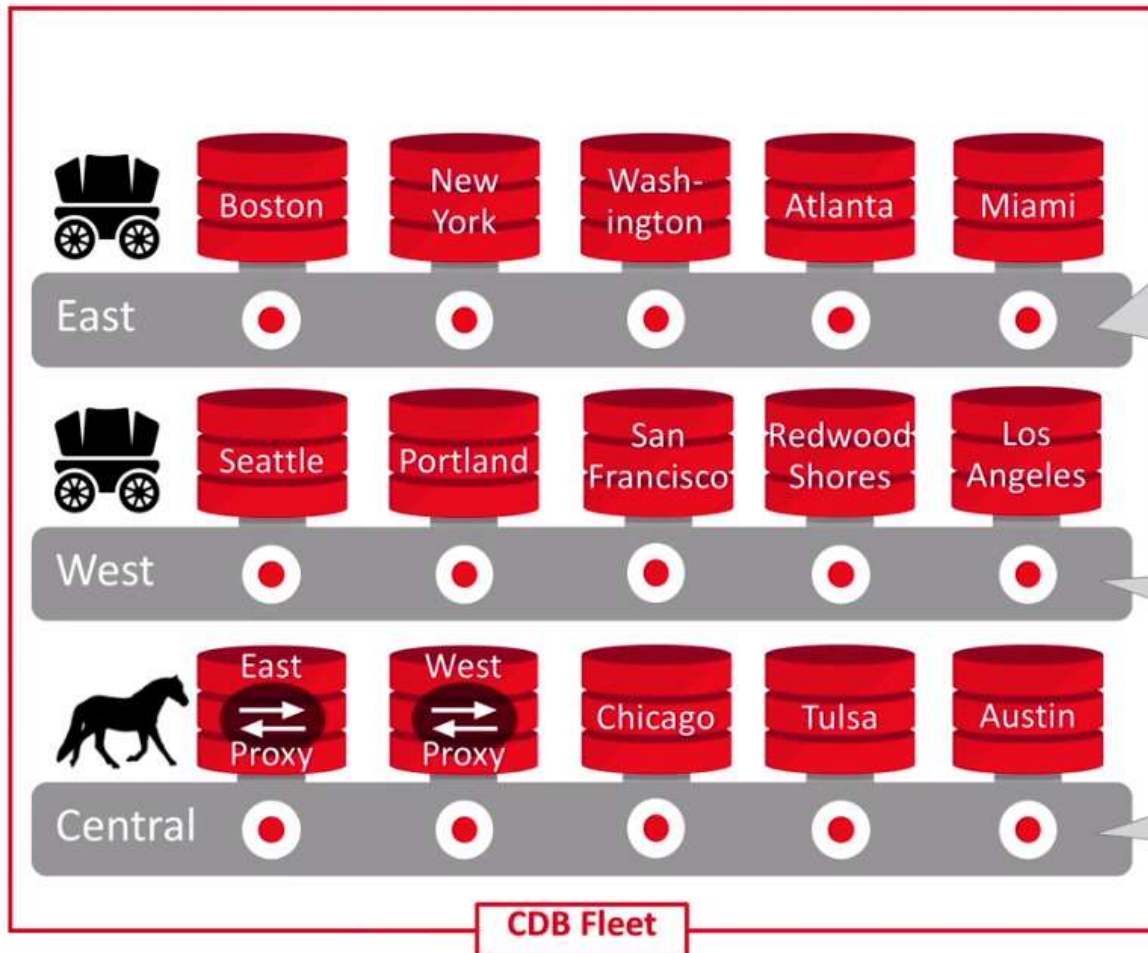
```
PREV_SQL_ID
```

```
-----  
31k2bh90tguvz
```


CDB Fleets in Oracle 18c - Structure



CDB Fleets in Oracle 18c - Steps



2. create database link `Central_Link` connect to `c##system` identified by secret using 'Central';

3. alter database set `Lead_CDB_URI = 'Central_Link'`;

4. *{Repeat steps performed in East}*

1. alter database set `Lead_CDB = 'TRUE'`;

CDB Fleets in Oracle 18c

- Vantages?

Não muitas **ainda...**

- Basicamente queries em: CDB_Views / GV\$ Views / Container clause
- Será provavelmente mais desenvolvido nas próximas versões.
- 100% funcional apenas em Exadata.

ALTER SYSTEM CANCEL SQL

- Antes:

```
SQL> ALTER SYSTEM KILL SESSION 'sid,serial#,@inst_id';
```

```
SQL> ALTER SYSTEM DISCONNECT SESSION 'sid,serial#' IMMEDIATE;
```

- Agora:

- ALTER SYSTEM CANCEL SQL 'SID, SERIAL[, @INST_ID][, SQL_ID]';

ALTER SYSTEM CANCEL SQL

Exemplos:

```
SQL> ALTER SYSTEM CANCEL SQL '20, 51142';
```

```
SQL> ALTER SYSTEM CANCEL SQL '20, 51142, @2';
```

```
SQL> ALTER SYSTEM CANCEL SQL '20, 51142, 84djy3dbarjvq';
```

```
SQL> ALTER SYSTEM CANCEL SQL '20, 51142, @1, 84djy3dbarjvq';
```

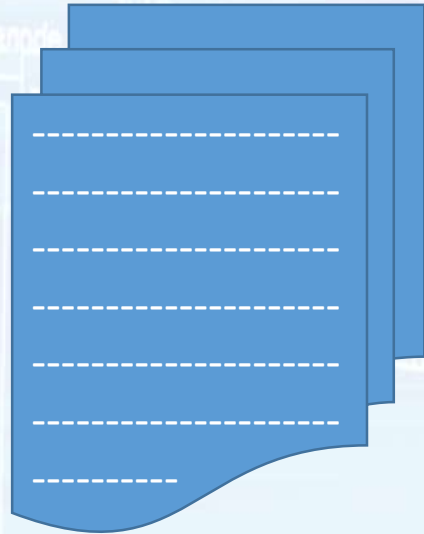
DBMS_SESSION.SLEEP

- Antes:
 - DBMS_LOCK.SLEEP();
 - Requer privilégios de EXECUTE na DBMS_LOCK.
 - Concedia indiretamente acesso em outras subrotinas da DBMS_LOCK.
- Agora:
 - DBMS_SESSION.SLEEP();
 - DBMS_LOCK.SLEEP is deprecated.

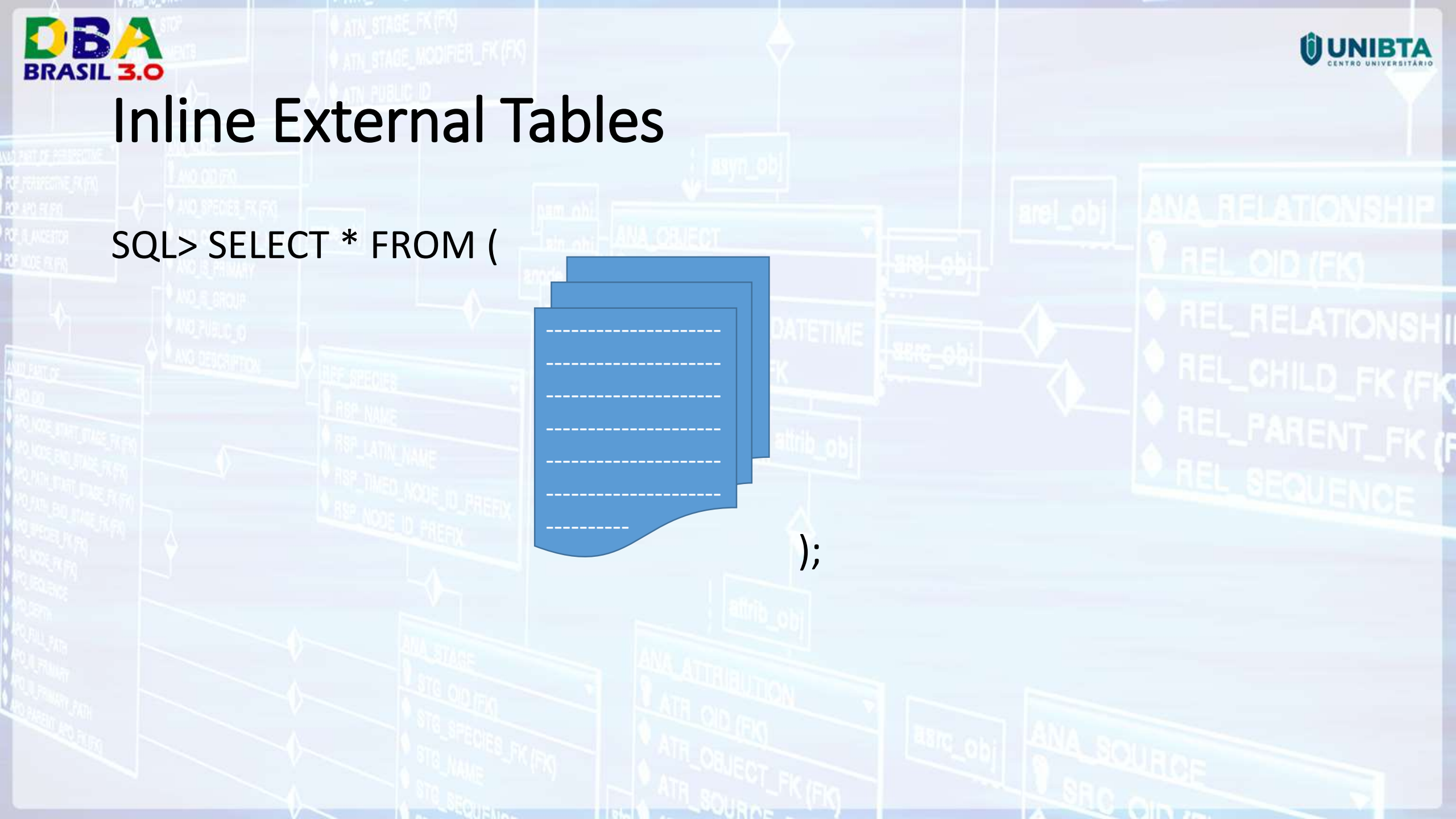
```
SQL> EXEC DBMS_SESSION.sleep(10);
```


Inline External Tables

```
SQL> SELECT * FROM (
```



```
);
```



Inline External Tables – 12cR2

```
SELECT country_code, COUNT(*) AS amount
FROM test.tab_ext EXTERNAL MODIFY (
    ACCESS PARAMETERS (
        BADFILE tmp_dir1:'part_tab_ext_%a_%p.bad'
        LOGFILE tmp_dir1
        NODISCARDFILE
    )
    LOCATION ('gbr1.txt', 'ire1.txt', 'ire2.txt')
    REJECT LIMIT 5
)
GROUP BY country_code
ORDER BY 1;
```

Inline External Tables – 18c

```

SELECT country_code, COUNT(*) AS amount
FROM EXTERNAL (
  (
    country_code  VARCHAR2(3),
    object_id     NUMBER,
    owner         VARCHAR2(128),
    object_name   VARCHAR2(128)
  )
  TYPE oracle loader
  DEFAULT DIRECTORY tmp_dir1
  ACCESS PARAMETERS (
    RECORDS DELIMITED BY NEWLINE
    BADFILE tmp_dir1
    LOGFILE tmp_dir1:'inline_ext_tab_%a_%p.log'
    DISCARDFILE tmp_dir1
    FIELDS CSV WITH EMBEDDED TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"'
    MISSING FIELD VALUES ARE NULL (
      country_code,
      object_id,
      owner,
      object_name
    )
  )
  LOCATION ('gbr1.txt', 'gbr2.txt', 'ire1.txt', 'ire2.txt')
  REJECT LIMIT UNLIMITED
) inline_ext_tab
GROUP BY country_code
ORDER BY 1;

```


Private Temporary Tables

- Memory-based.
- Apagada ao:
 - Fim da sessão - ON COMMIT PRESERVE DEFINITION;
 - Fim da transação - ON COMMIT DROP DEFINITION;
- Idéia herdada do SQL Server.
- Antes era necessário pré-criar os objetos como GTT.

```
SQL> show parameter private_temp_table_prefix
```

NAME	TYPE	VALUE
private_temp_table_prefix	string	ORA\$PTT_

Private Temporary Tables

No SQL Server:

```
Create Procedure spInsertStudent
    (@Name Varchar(50), @Age int, @Gender Varchar(50))
As
Begin
    Insert Into #Students
    Values (@Name, @Age, @Gender)

    Select * From #Students
    Order By name
End
```

Private Temporary Tables

```
SQL> CREATE PRIVATE TEMPORARY TABLE ora$ptt_my_temp_table (  
2     id                NUMBER,  
3     description       VARCHAR2(20)  
4 )  
5 ON COMMIT DROP DEFINITION;
```

Table created.

```
SQL> INSERT INTO ora$ptt_my_temp_table VALUES (1, 'ONE');
```

1 row created.

Private Temporary Tables

```
SQL> SELECT COUNT(*) FROM ora$ptt_my_temp_table;
```

```

COUNT (*)
-----
1

```

```
SQL> COMMIT;
```

Commit complete.

```
SQL> SELECT COUNT(*) FROM ora$ptt_my_temp_table;
```

```
SELECT COUNT(*) FROM ora$ptt_my_temp_table
*
```

ERROR at line 1:

ORA-00942: table or view does not exist

Private Temporary Tables

```
SET SERVEROUTPUT ON
DECLARE
  v_sql PRIMARY CLOB;
  v_return VARCHAR2(30);
BEGIN
  v_sql := 'CREATE PRIVATE TEMPORARY TABLE ora$ptt_test (
            id NUMBER,
            description VARCHAR2(20)
          )
          ON COMMIT DROP DEFINITION';

  EXECUTE IMMEDIATE v_sql;
  EXECUTE IMMEDIATE q'[INSERT INTO ora$ptt_test VALUES (1, 'ONE')]';

  v_sql := 'SELECT description INTO :v_return FROM ora$ptt_test WHERE id = 1';
  EXECUTE IMMEDIATE v_sql INTO v_return;
  COMMIT;
  DBMS_OUTPUT.put_line(v_return);
END;
/
```

Schema Only Accounts

Pré-18c:

- Usuários criados com senhas impossíveis ou locked.

18c:

- “no authentication” clause.
- Alterando:
 - ALTER USER ... IDENTIFIED BY ...;
 - ALTER USER ... NO AUTHENTICATION;

Schema Only Accounts

```
SQL> CREATE USER C##DBARJ no authentication;
```

```
USER created.
```

```
SQL> SELECT username, authentication_type, password_versions FROM dba_users WHERE username = 'C##DBARJ';
```

USERNAME	AUTHENTICATION_TYPE	PASSWORD_VERSIONS
C##DBARJ	NONE	

```
SQL> SELECT con_id, username, authentication_type, password_versions FROM cdb_users WHERE username = 'C##DBARJ';
```

CON_ID	USERNAME	AUTHENTICATION_TYPE	PASSWORD_VERSIONS
1	C##DBARJ	NONE	
3	C##DBARJ	NONE	

Schema Only x Locked Accounts

```
SQL> create user dba_schema no authentication;
```

User created.

```
SQL> grant dba to dba_schema;
```

Grant succeeded.

```
SQL> create user rjorge identified by oracle;
```

User created.

```
SQL> alter user dba_schema GRANT CONNECT through rjorge;
```

User altered.

```
SQL> conn rjorge[dba_schema]/oracle@localhost:1521/pdb
Connected.
```

```
SQL> create user dba_schema account lock;
```

User created.

```
SQL> grant dba to dba_schema;
```

Grant succeeded.

```
SQL> create user rjorge identified by oracle;
```

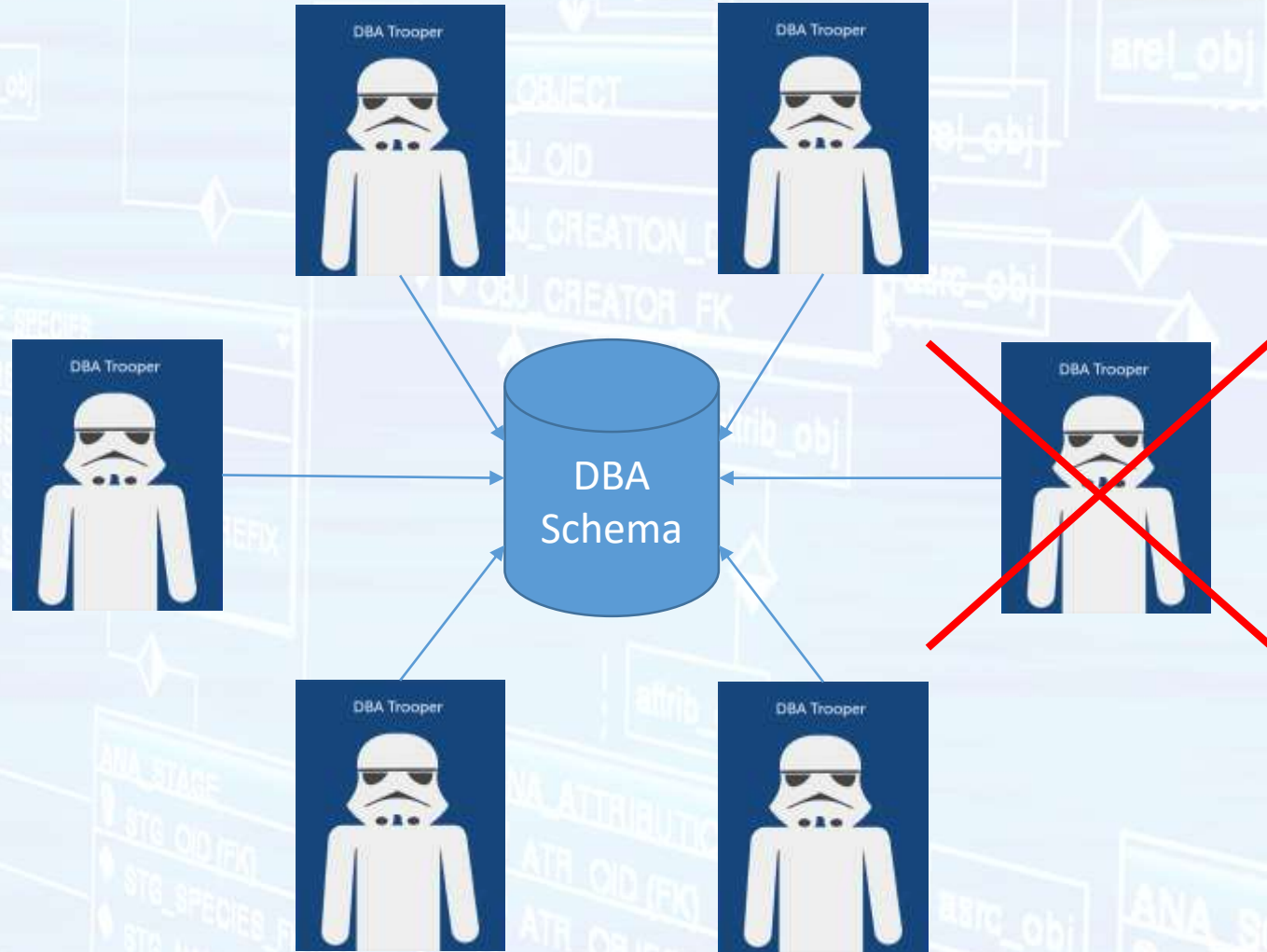
User created.

```
SQL> alter user dba_schema GRANT CONNECT through rjorge;
```

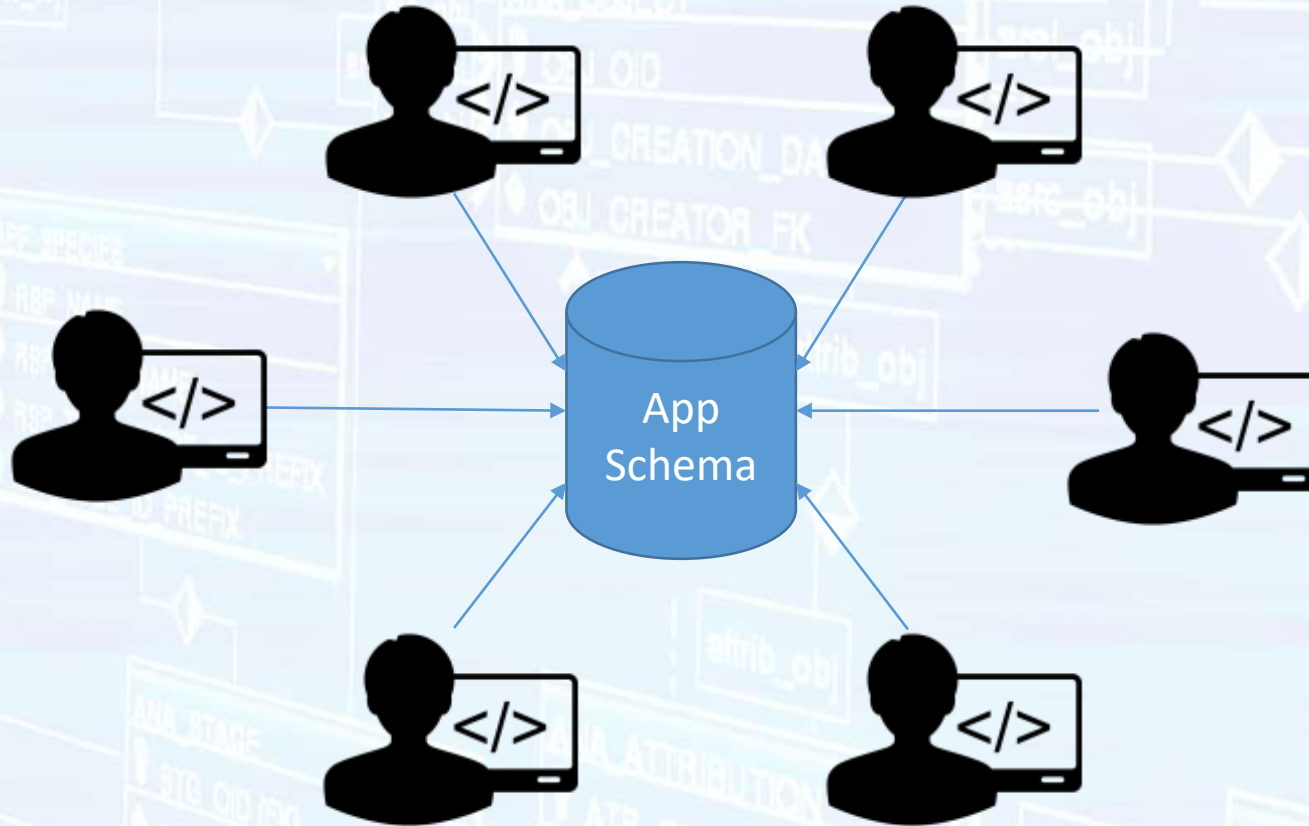
User altered.

```
SQL> conn rjorge[dba_schema]/oracle@localhost:1521/pdb
ERROR:
ORA-28000: The account is locked.
```

Schema Only Accounts

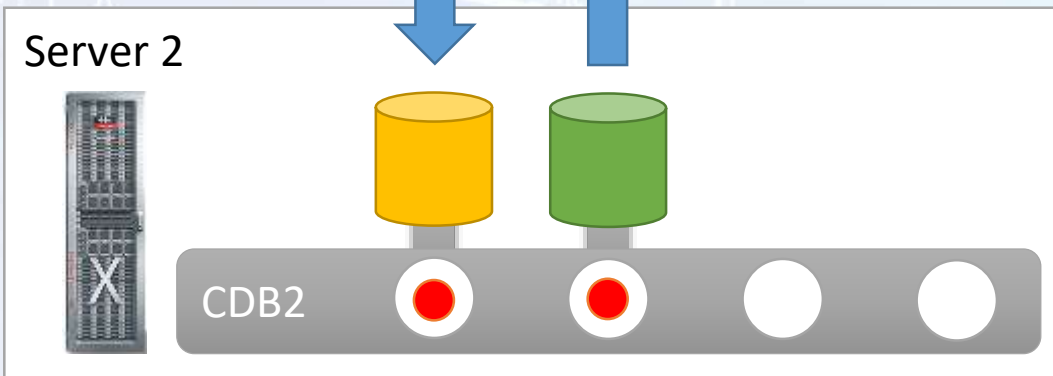
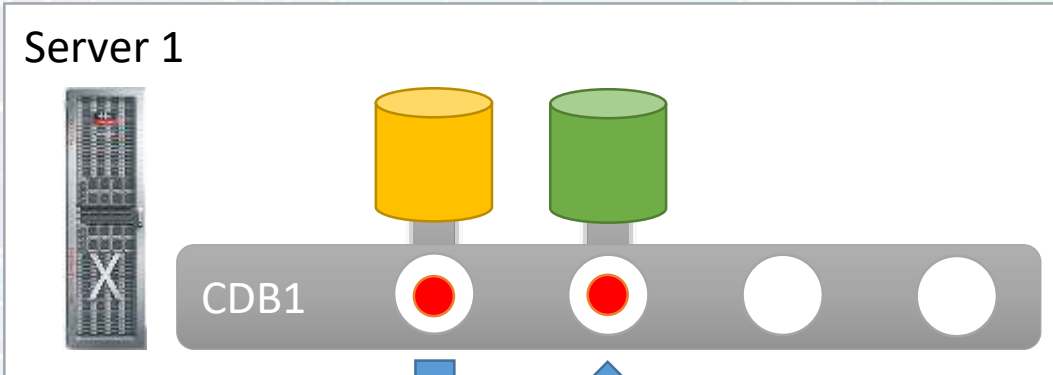


Schema Only Accounts



Refreshable PDB

12cR2 Feature !!!

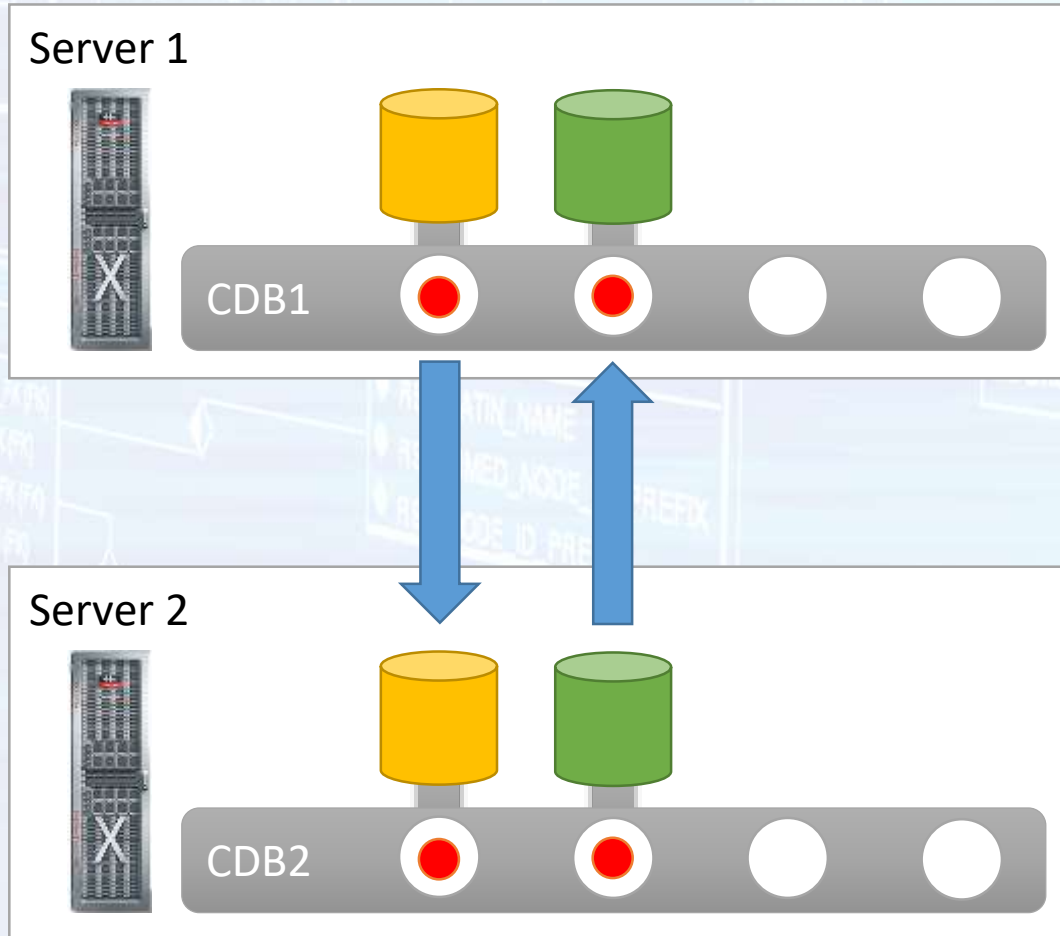


1. create pluggable database Yellow;
4. create pluggable database Green from Green@CDB2_Link
refresh mode every 2 minutes;

2. create pluggable database Yellow from Yellow@CDB1_Link
refresh mode every 2 minutes;
3. create pluggable database Green;

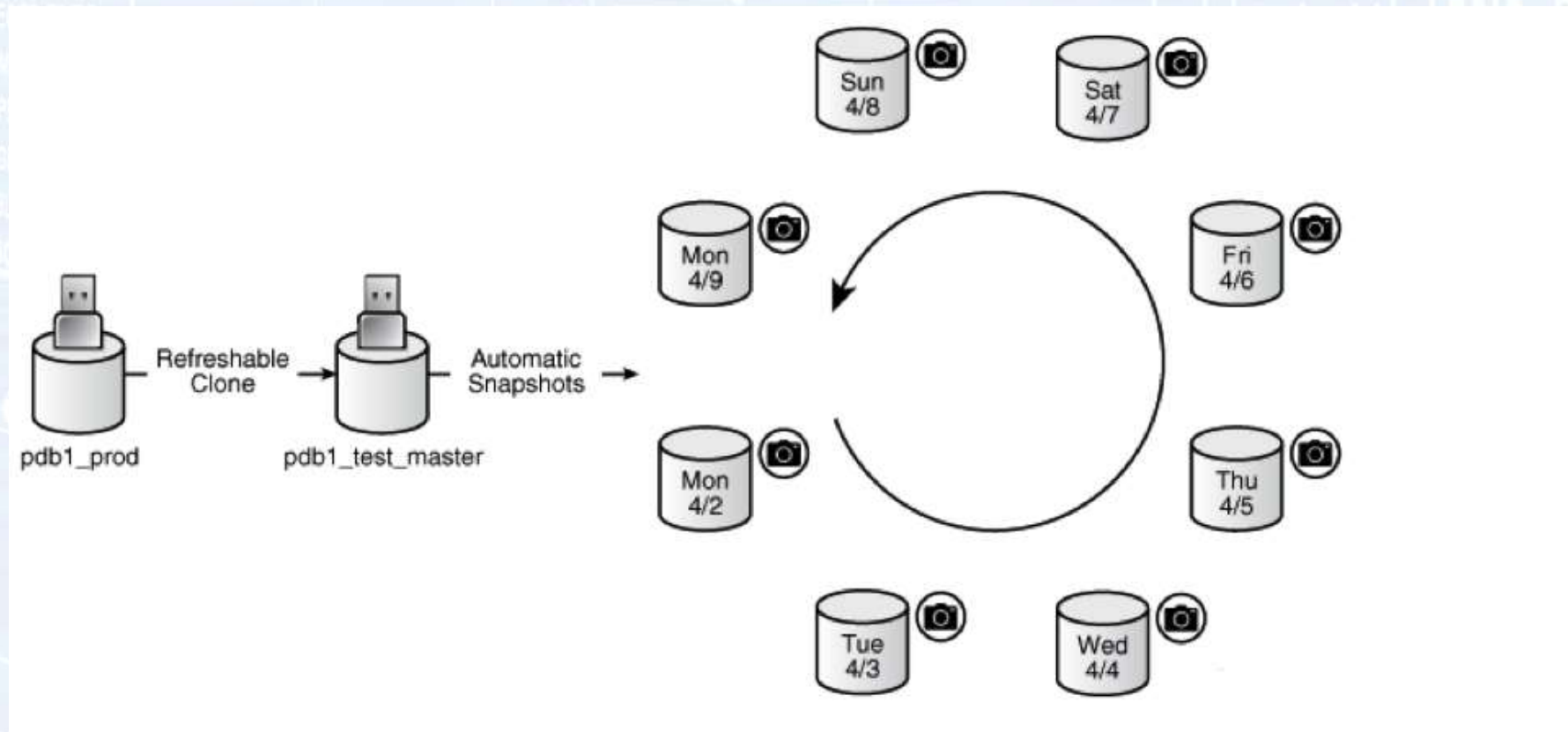
Refreshable PDB Switchover

18c Feature !!!

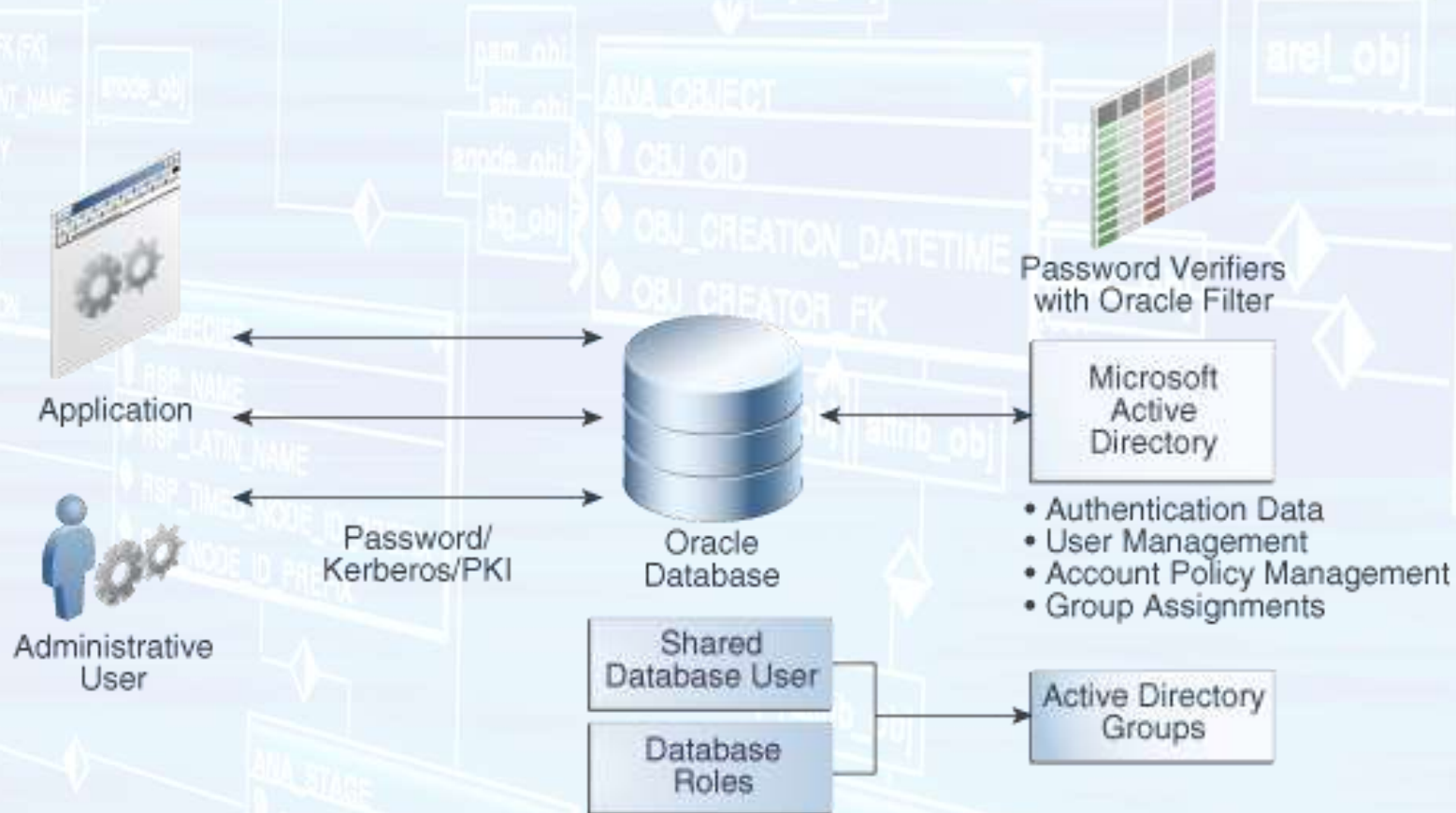


`alter pluggable database Green
refresh mode every 2 minutes
from Green@CDB1_Link switchover;`

PDB Snapshot Carousel



Integration of Active Directory Services



What else?

- Many, many, many JSON new features.
- APROX_COUNT and APPROX_SUM.
- Lost Write Protection.
- Oracle Data Guard – automatic correction of non-logged blocks
 - SQL> ALTER DATABASE FORCE LOGGING;
 - SQL> ALTER DATABASE SET STANDBY NOLOGGING FOR DATA AVAILABILITY;
 - SQL> ALTER DATABASE SET STANDBY NOLOGGING FOR LOAD PERFORMANCE;
- PDB backups usable after plugging in to a new CDB
- Backups from non-CDBs are usable after migration to CDB

What else?

- Database In-Memory Support for External Tables
- Concurrent SQL Execution with SQL Performance Analyzer
- Memoptimized Rowstore
- Ability to Encrypt Sensitive Credential Data in the Data Dictionary:
 - SYS.LINK\$
 - SYS.SCHEDULER\$_CREDENTIAL

- ...
- ...
- ...



<https://docs.oracle.com/en/database/oracle/oracle-database/18/newft/new-features.html>

Referências

- Oracle Official Doc
 - <https://docs.oracle.com/en/database/oracle/oracle-database/index.html>
- Tim Hall
 - <https://oracle-base.com/articles/18c/articles-18c>
- DBI Services (Special thanks to Franck Pachot)
 - <https://blog.dbi-services.com/>



NOSSOS PATROCINADORES



NOSSOS APOIADORES





Obrigado