



# Inovação com dados em nuvem

**TRILHA**

**#TheDevConf**  
Oracle

## Upgrade do Oracle Database Cloud Service de 11g para 19c

Thamires Samira Ferreira

23.03.21 11h00



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# Inovação com dados em nuvem

**UPGRADE DO ORACLE  
DATABASE CLOUD SERVICE  
DE 11g PARA 19c**



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## 1. Considerações iniciais e pré requisitos

Recursos usados:

### OCI

- Banco de dados 11gR2
- Db-System VM 2.1 Shape

### Local

- Gerador de chaves SSH – usado: PuttyGen
- SSH Terminal Client – usado: Putty / MobaXterm

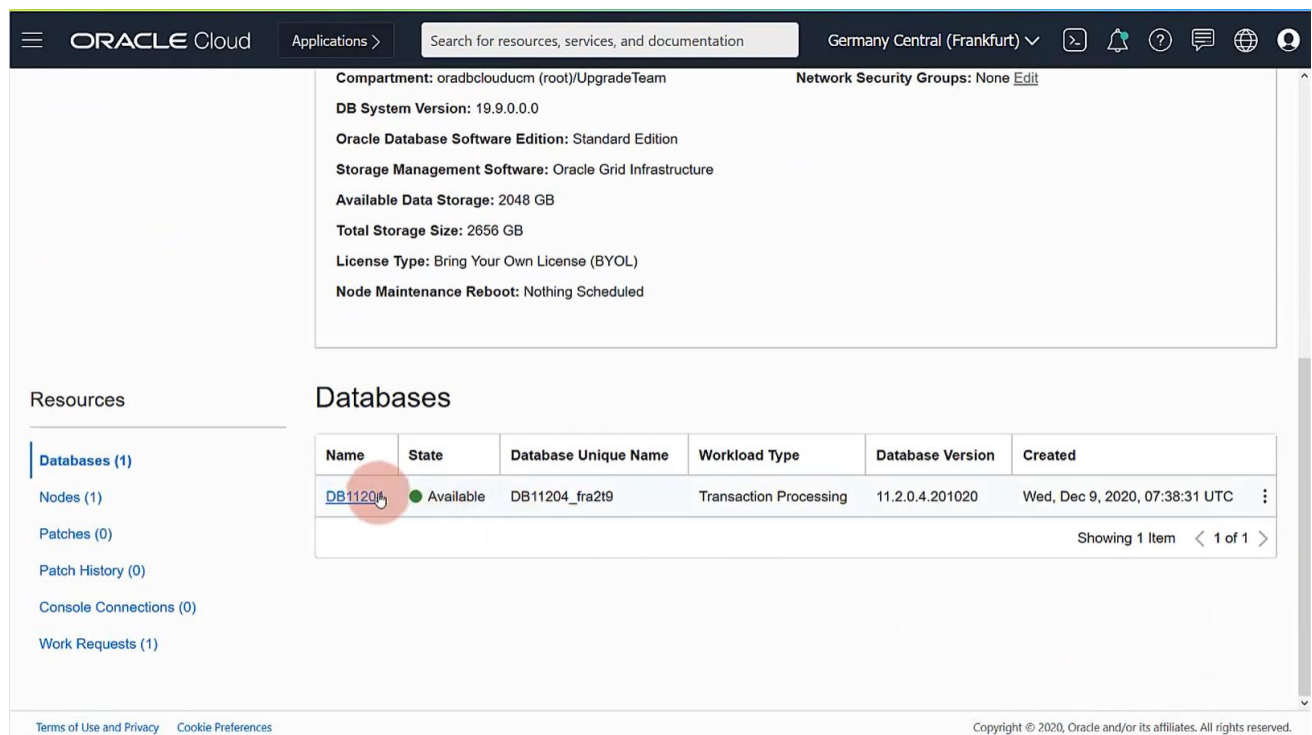
## 2. Upgrade para DBSystems e Bare Metal na OCI

Navegue pelo menu inicial até o seu DB System

The screenshot displays the Oracle Cloud console interface. At the top, the navigation bar includes the Oracle Cloud logo, a search bar, and the region 'Germany Central (Frankfurt)'. The breadcrumb trail indicates the path: Overview » Bare Metal, VM and Exadata » DB Systems » DB System Details. The main content area features a large green hexagonal icon with 'DBS' and the status 'AVAILABLE'. To the right of the icon, the system name 'DB11204' is displayed, along with action buttons: 'Scale Storage Up', 'Change Shape', 'Clone', 'Add SSH Keys', and 'More Actions'. Below these, there are two tabs: 'DB System Information' (selected) and 'Tags'. The 'DB System Information' tab is divided into two columns: 'General Information' and 'Network'. The 'General Information' column lists details such as Lifecycle State (Available), Availability Domain (OUGC:EU-FRANKFURT-1-AD-2), OCID, Shape (VM.Standard2.4), Creation time, Time zone, Compartment, DB System Version (19.9.0.0.0), Oracle Database Software Edition (Standard Edition), Storage Management Software (Oracle Grid Infrastructure), and Available Data Storage (2048 GB). The 'Network' column lists VCN (DANIEL), Client subnet (Public Subnet-DANIEL), Port (1521), Hostname Prefix (db11204), Host Domain Name (sub02121342350.daniel.oraclevcn.com), Scan DNS Name (db11204-scan...), and Network Security Groups (None). At the bottom of the console, there are links for 'Terms of Use and Privacy' and 'Cookie Preferences', and a copyright notice for 2020.



Clique no seu **banco de dados**



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Compartment: oradbccloudum (root)/UpgradeTeam Network Security Groups: None [Edit](#)

DB System Version: 19.9.0.0.0

Oracle Database Software Edition: Standard Edition

Storage Management Software: Oracle Grid Infrastructure

Available Data Storage: 2048 GB

Total Storage Size: 2656 GB

License Type: Bring Your Own License (BYOL)

Node Maintenance Reboot: Nothing Scheduled

**Resources**

- Databases (1)**
- Nodes (1)
- Patches (0)
- Patch History (0)
- Console Connections (0)
- Work Requests (1)

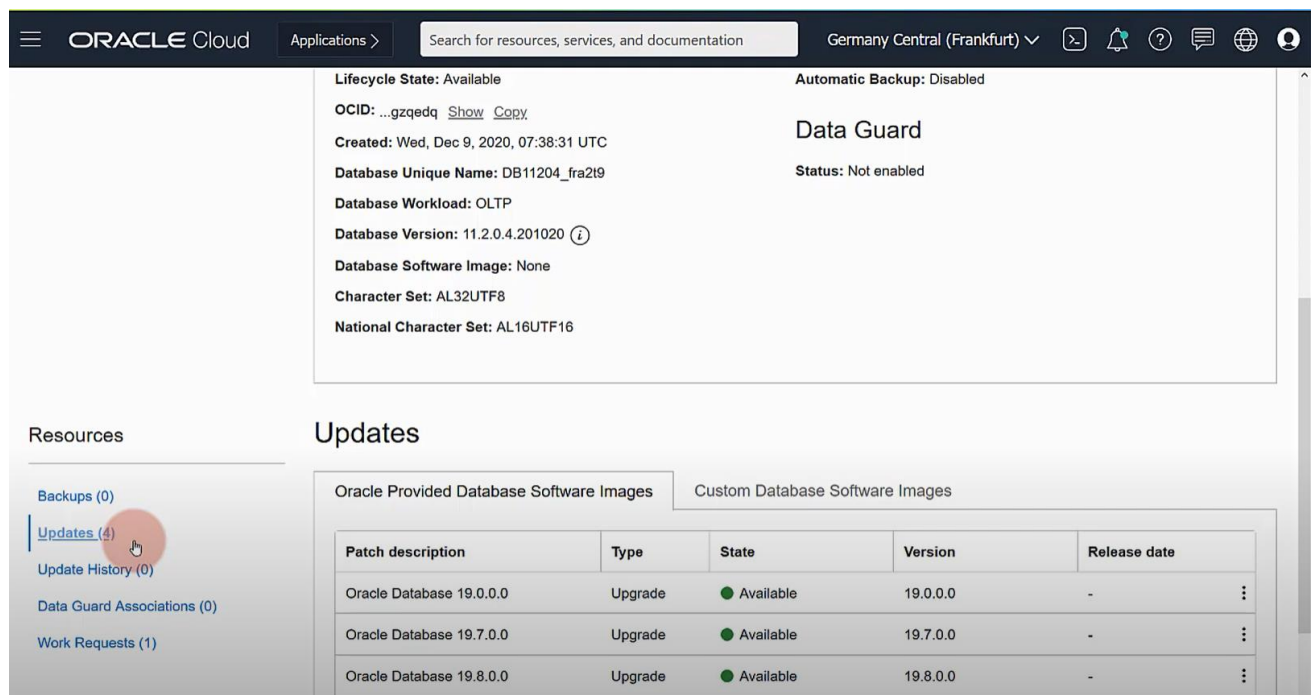
**Databases**

Name	State	Database Unique Name	Workload Type	Database Version	Created
<a href="#">DB11204</a>	Available	DB11204_fra2t9	Transaction Processing	11.2.0.4.201020	Wed, Dec 9, 2020, 07:38:31 UTC

Showing 1 Item < 1 of 1 >

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Em seguida navegue até a aba **updates**



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Lifecycle State: Available Automatic Backup: Disabled

OCID: ...gzqeqd [Show](#) [Copy](#)

Created: Wed, Dec 9, 2020, 07:38:31 UTC

Database Unique Name: DB11204\_fra2t9

Database Workload: OLTP

Database Version: 11.2.0.4.201020 ⓘ

Database Software Image: None

Character Set: AL32UTF8

National Character Set: AL16UTF16

**Data Guard**

Status: Not enabled

**Resources**

- Backups (0)
- Updates (4)**
- Update History (0)
- Data Guard Associations (0)
- Work Requests (1)

**Updates**

Oracle Provided Database Software Images Custom Database Software Images

Patch description	Type	State	Version	Release date
Oracle Database 19.0.0.0	Upgrade	Available	19.0.0.0	-
Oracle Database 19.7.0.0	Upgrade	Available	19.7.0.0	-
Oracle Database 19.8.0.0	Upgrade	Available	19.8.0.0	-

6

Escolha a versão desejada da lista e inicie o pre-check

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👤

Lifecycle State: Available

Automatic Backup: Disabled

OCID: ...gzqedq Show Copy

Data Guard

Created: Wed, Dec 9, 2020, 07:38:31 UTC

Status: Not enabled

Database Unique Name: DB11204\_fra2t9

Database Workload: OLTP

Database Version: 11.2.0.4.201020 ⓘ

Database Software Image: None

Character Set: AL32UTF8

National Character Set: AL16UTF16

Resources

Updates

Backups (0)

Updates (4)

Update History (1)

Data Guard Associations (0)

Work Requests (2)

Oracle Provided Database Software Images

Custom Database Software Images

Patch description	Type	State	Version	Release date	
Oracle Database 19.0.0.0	Upgrade	● Available	19.0.0.0	-	Precheck ⚙️
Oracle Database 19.7.0.0	Upgrade	● Available	19.7.0.0	-	Upgrade ⋮
Oracle Database 19.8.0.0	Upgrade	● Available	19.8.0.0	-	⋮

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Lifecycle State: AvailableAutomatic Backup: Disabled

OCID: o-zqzqdq Show Copy

Confirm

Cancel

Click Run Precheck to initiate the database upgrade precheck.

Run Precheck

Cancel

Database Software Image Name: Oracle Database 19c Express Edition  
Character Set: AL32UTF8  
National Character Set: AL16UTF16

Resources

Backups (0)  
Updates (4)  
Update History (0)  
Data Guard Associations (0)  
Work Requests (1)

Updates

Oracle Provided Database Software ImagesCustom Database Software Images

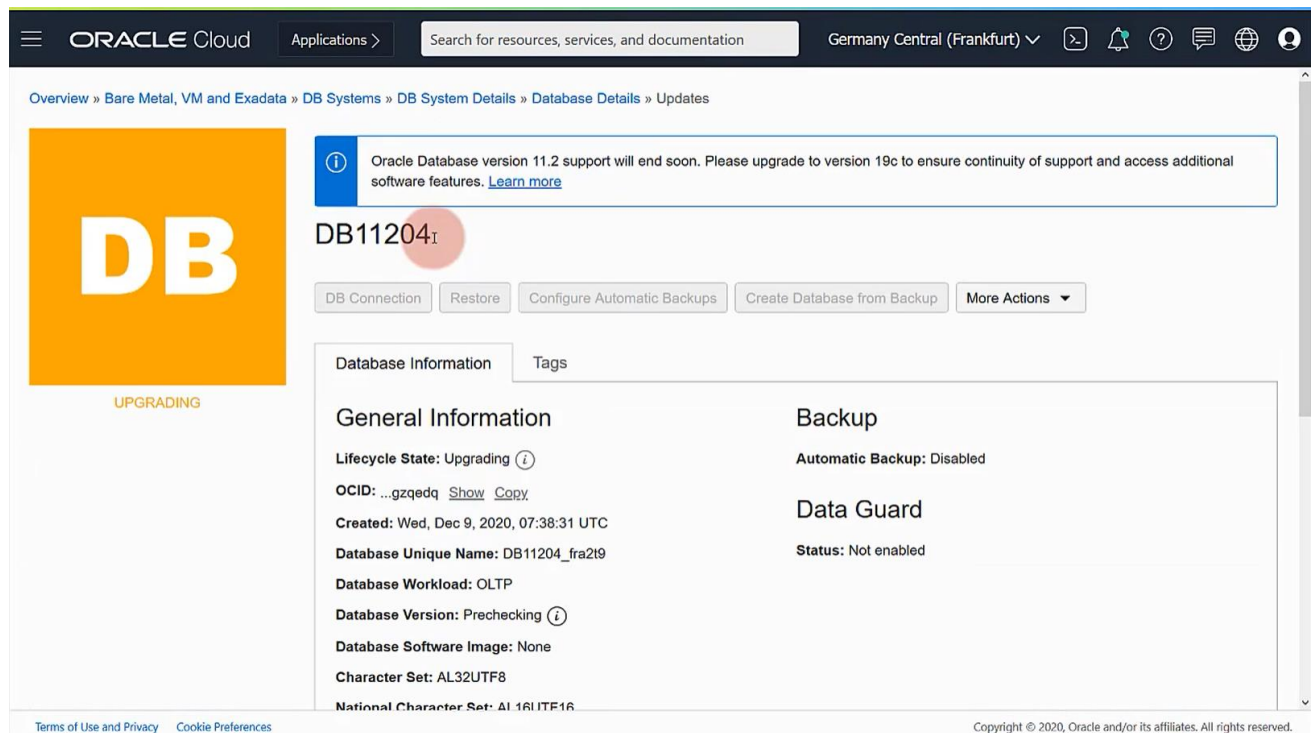
Patch description	Type	State	Version	Release date
Oracle Database 19.0.0.0	Upgrade	● Available	19.0.0.0	-
Oracle Database 19.7.0.0	Upgrade	● Available	19.7.0.0	-
Oracle Database 19.8.0.0	Upgrade	● Available	19.8.0.0	-

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O DB-System entrará em status de “**upgrade**” por alguns minutos



Oracle Database version 11.2 support will end soon. Please upgrade to version 19c to ensure continuity of support and access additional software features. [Learn more](#)

**DB11204**

DB Connection Restore Configure Automatic Backups Create Database from Backup More Actions

Database Information Tags

**General Information**

Lifecycle State: Upgrading ⓘ

OCID: ...gzqeqq [Show](#) [Copy](#)

Created: Wed, Dec 9, 2020, 07:38:31 UTC

Database Unique Name: DB11204\_fra2t9

Database Workload: OLTP

Database Version: Prechecking ⓘ

Database Software Image: None

Character Set: AL32UTF8

National Character Set: AL16UTF16

**Backup**

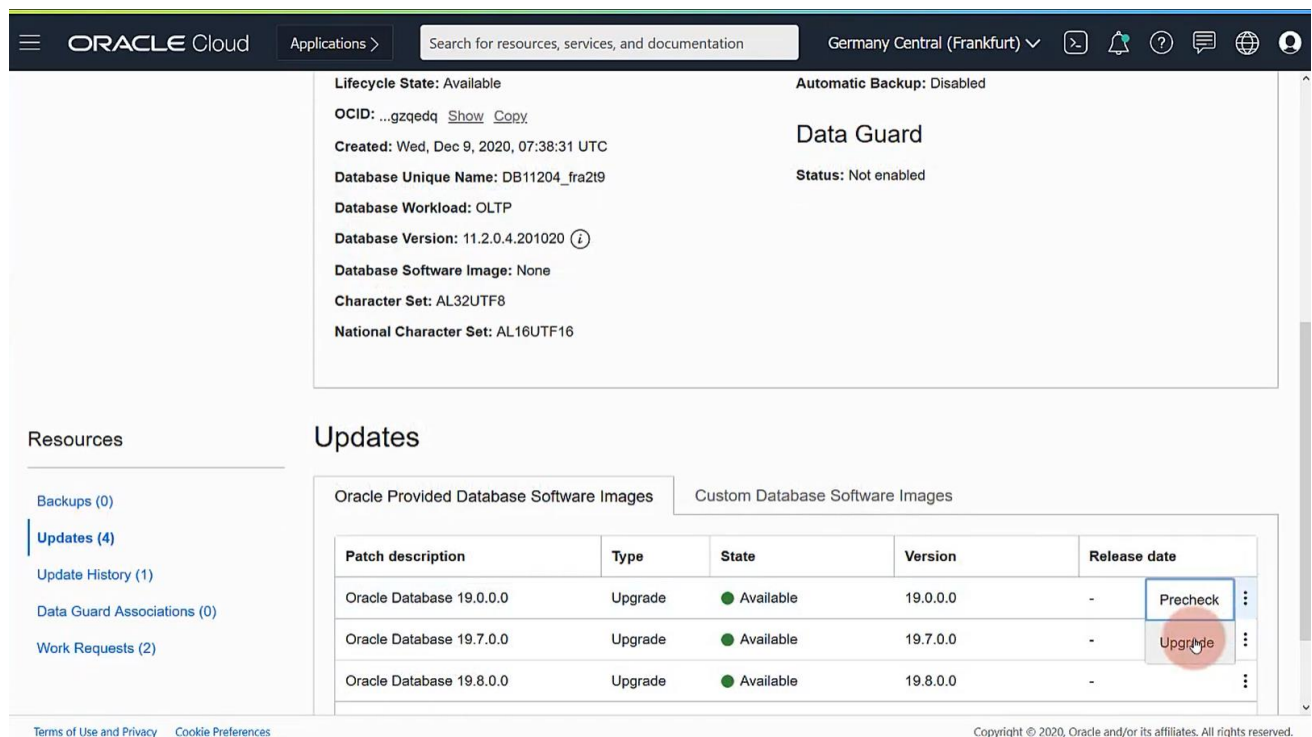
Automatic Backup: Disabled

**Data Guard**

Status: Not enabled

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Quando o processo finalizar podemos ir até o menu **upgrade** e iniciar o upgrade do banco de dados



Lifecycle State: Available Automatic Backup: Disabled

OCID: ...gzqeqq [Show](#) [Copy](#)

Created: Wed, Dec 9, 2020, 07:38:31 UTC

Database Unique Name: DB11204\_fra2t9

Database Workload: OLTP

Database Version: 11.2.0.4.201020 ⓘ

Database Software Image: None

Character Set: AL32UTF8

National Character Set: AL16UTF16

**Data Guard**

Status: Not enabled

**Resources**

Backups (0)

**Updates (4)**

Update History (1)

Data Guard Associations (0)

Work Requests (2)

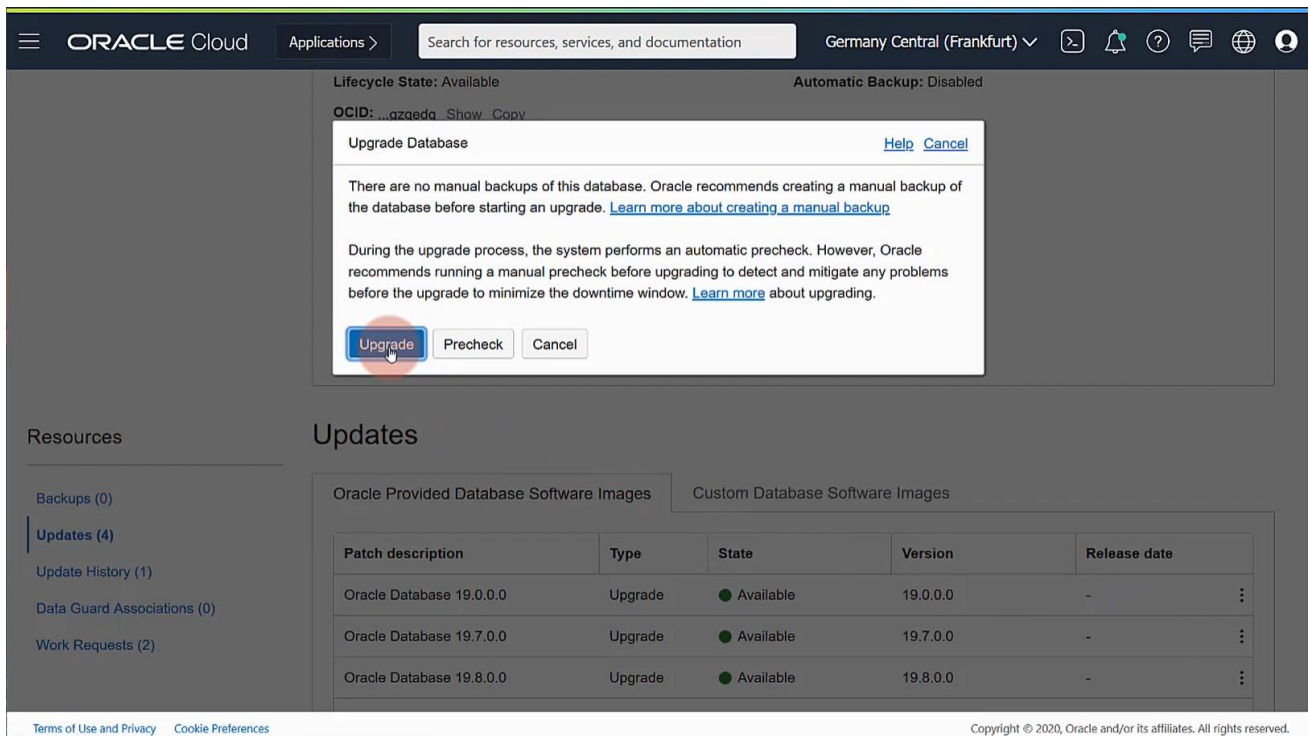
**Updates**

Oracle Provided Database Software Images Custom Database Software Images

Patch description	Type	State	Version	Release date	
Oracle Database 19.0.0.0	Upgrade	Available	19.0.0.0	-	Precheck
Oracle Database 19.7.0.0	Upgrade	Available	19.7.0.0	-	Upgrade
Oracle Database 19.8.0.0	Upgrade	Available	19.8.0.0	-	

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Lifecycle State: Available Automatic Backup: Disabled

OCID: ...gzqeda Show Copy

**Upgrade Database** [Help](#) [Cancel](#)

There are no manual backups of this database. Oracle recommends creating a manual backup of the database before starting an upgrade. [Learn more about creating a manual backup](#)

During the upgrade process, the system performs an automatic precheck. However, Oracle recommends running a manual precheck before upgrading to detect and mitigate any problems before the upgrade to minimize the downtime window. [Learn more](#) about upgrading.

**Upgrade** Precheck Cancel

**Resources**

- Backups (0)
- Updates (4)**
- Update History (1)
- Data Guard Associations (0)
- Work Requests (2)

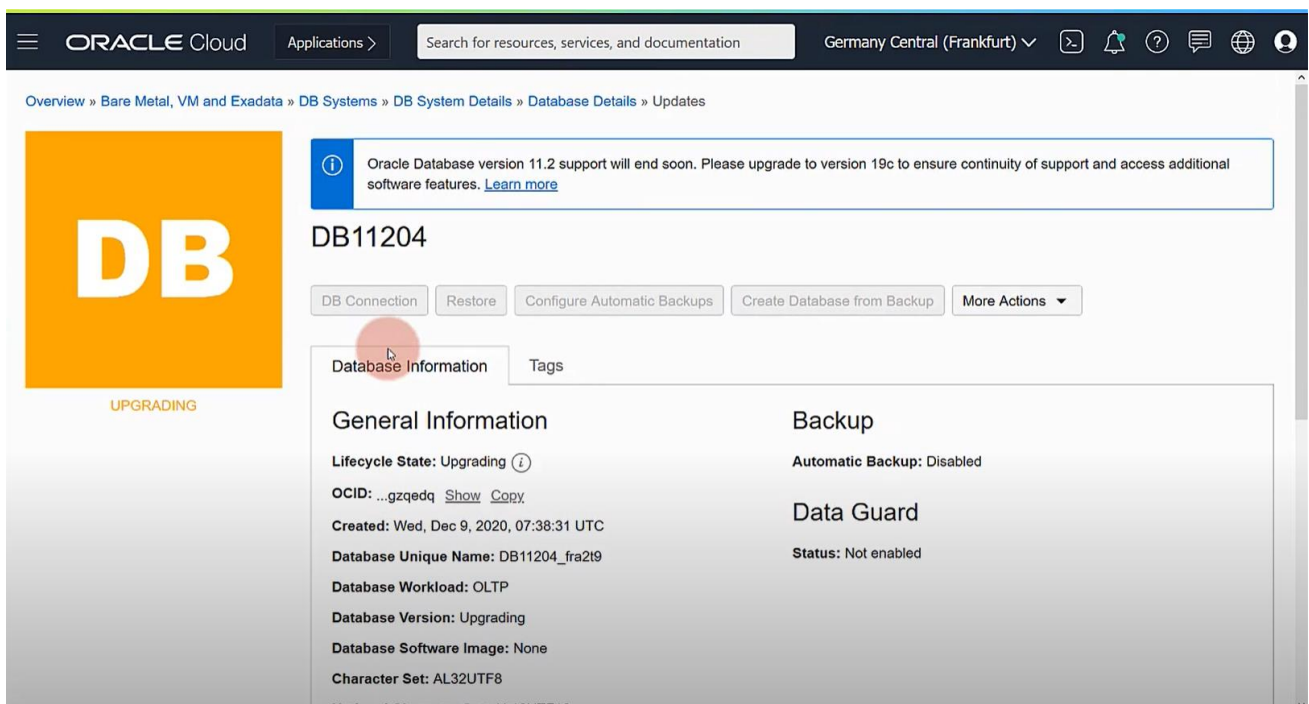
**Updates**

Oracle Provided Database Software Images Custom Database Software Images

Patch description	Type	State	Version	Release date
Oracle Database 19.0.0.0	Upgrade	Available	19.0.0.0	-
Oracle Database 19.7.0.0	Upgrade	Available	19.7.0.0	-
Oracle Database 19.8.0.0	Upgrade	Available	19.8.0.0	-

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Aguarde até que o processo termine



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Overview » Bare Metal, VM and Exadata » DB Systems » DB System Details » Database Details » Updates

**DB**

**UPGRADING**

Oracle Database version 11.2 support will end soon. Please upgrade to version 19c to ensure continuity of support and access additional software features. [Learn more](#)

**DB11204**

DB Connection Restore Configure Automatic Backups Create Database from Backup More Actions

**Database Information** Tags

**General Information**

Lifecycle State: Upgrading ⓘ

OCID: ...gzqeda Show Copy

Created: Wed, Dec 9, 2020, 07:38:31 UTC

Database Unique Name: DB11204\_fra2t9

Database Workload: OLTP

Database Version: Upgrading

Database Software Image: None

Character Set: AL32UTF8

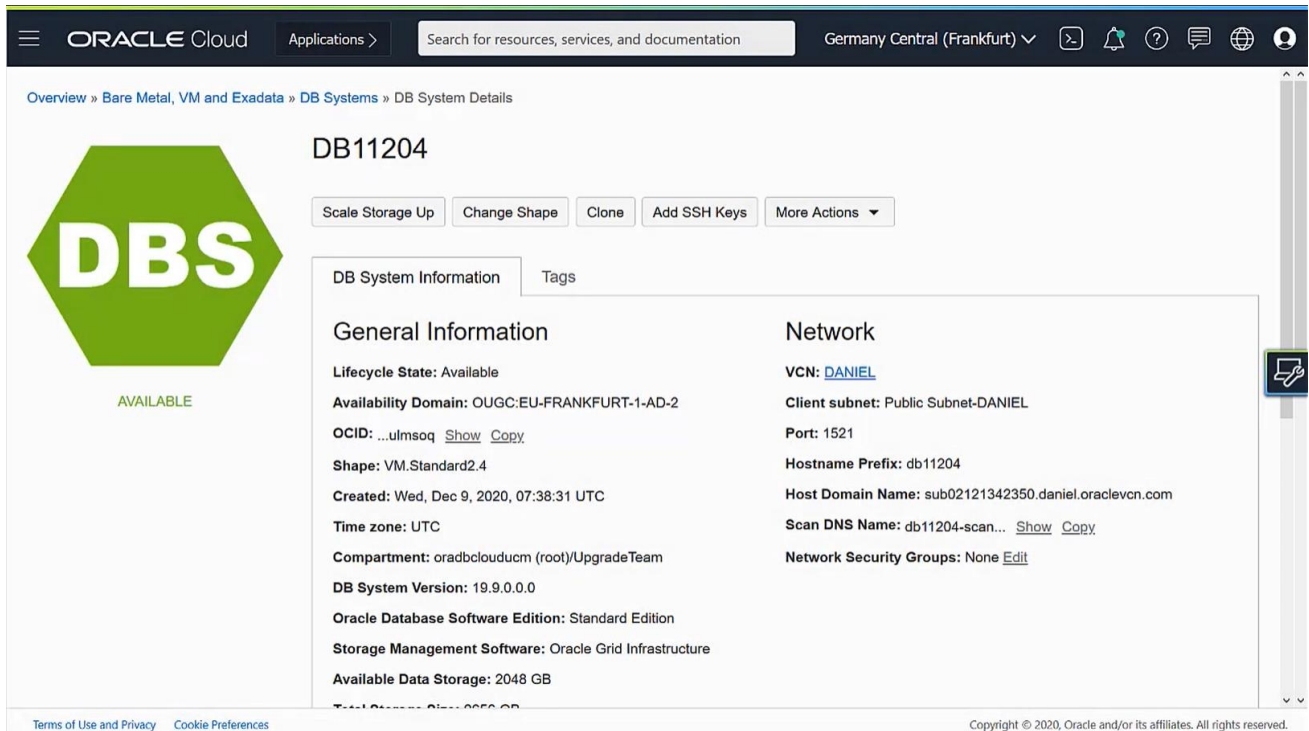
National Character Set: AL16UTF16

**Backup**

Automatic Backup: Disabled

**Data Guard**

Status: Not enabled



**DB11204**

Scale Storage Up Change Shape Clone Add SSH Keys More Actions

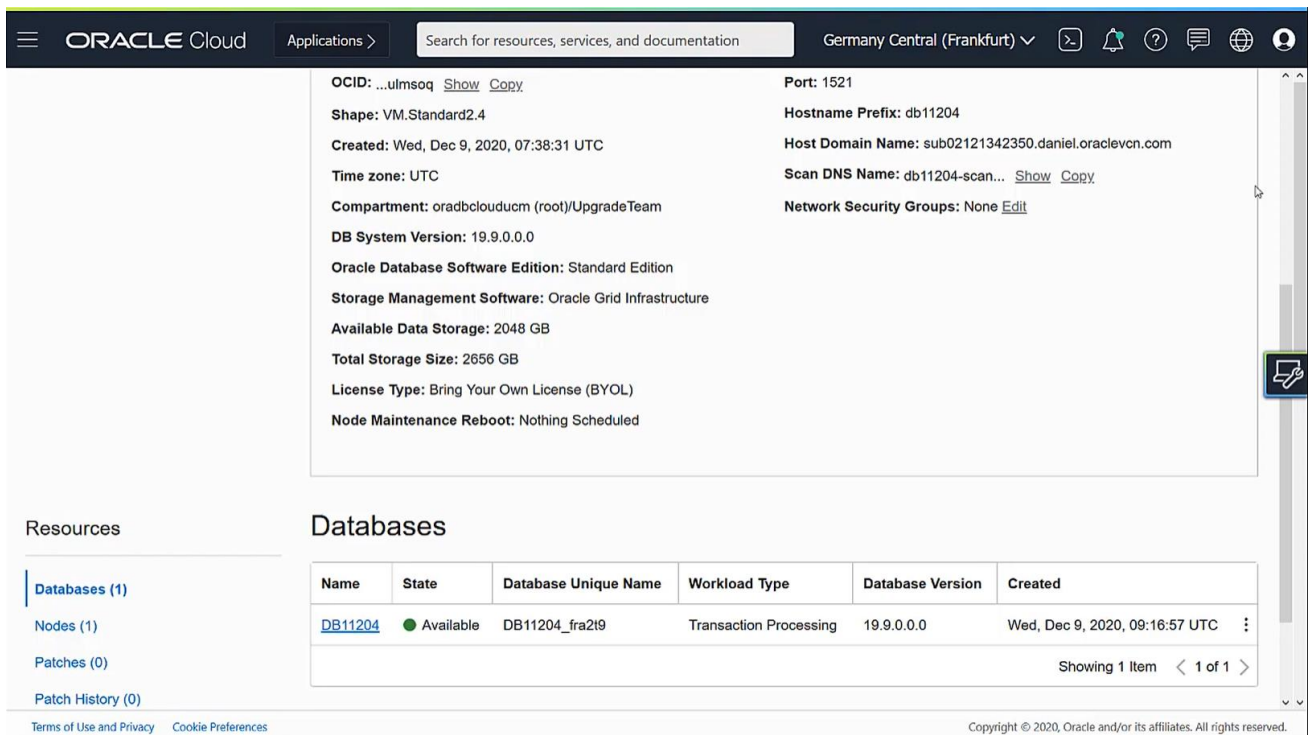
**DB System Information** Tags

**General Information**

Lifecycle State: Available  
Availability Domain: OUGC:EU-FRANKFURT-1-AD-2  
OCID: ...ulmsq [Show](#) [Copy](#)  
Shape: VM.Standard2.4  
Created: Wed, Dec 9, 2020, 07:38:31 UTC  
Time zone: UTC  
Compartment: oradbcloudum (root)/UpgradeTeam  
DB System Version: 19.9.0.0.0  
Oracle Database Software Edition: Standard Edition  
Storage Management Software: Oracle Grid Infrastructure  
Available Data Storage: 2048 GB

**Network**

VCN: [DANIEL](#)  
Client subnet: Public Subnet-DANIEL  
Port: 1521  
Hostname Prefix: db11204  
Host Domain Name: sub02121342350.daniel.oraclevcn.com  
Scan DNS Name: db11204-scan... [Show](#) [Copy](#)  
Network Security Groups: None [Edit](#)



**Resources**

- [Databases \(1\)](#)
- [Nodes \(1\)](#)
- [Patches \(0\)](#)
- [Patch History \(0\)](#)

**Databases**

Name	State	Database Unique Name	Workload Type	Database Version	Created
<a href="#">DB11204</a>	Available	DB11204_fra2t9	Transaction Processing	19.9.0.0.0	Wed, Dec 9, 2020, 09:16:57 UTC

Showing 1 item < 1 of 1 >

Está pronto o upgrade!

Quando voltar ao status disponível verifique a versão do banco via console e ssh.

## 2.1 Atividades pós upgrade

Após uma atualização bem-sucedida, observe o seguinte:

- A Oracle recomenda remover a antiga DBHOME

```
[root@host]$ dbcli list-dbhomes
[root@host]$ dbcli delete-dbhome -i <id>
[root@host]$ dbcli describe-job -i <id>
```

- Verifique se os backups automáticos estão habilitados para o banco de dados, se você os desabilitou antes da atualização.
- Edite o parâmetro COMPATIBLE do banco de dados Oracle para refletir a nova versão do software do banco de dados Oracle.

```
SQL> alter system set compatible='19.0.0' scope=spfile;
SQL> shutdown immediate
SQL> startup
```

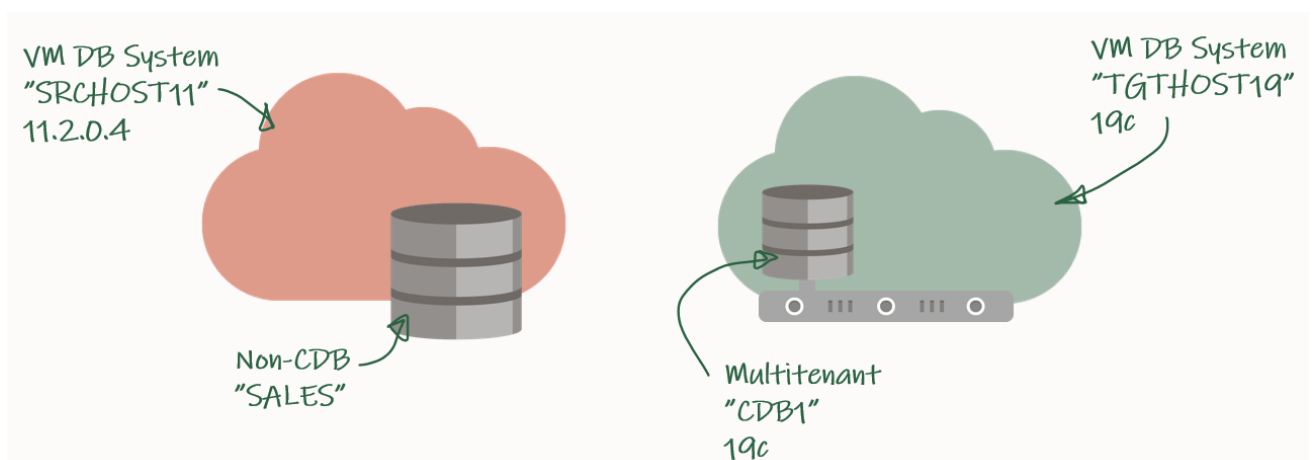
Sempre defina COMPATIBLE para o valor padrão da versão.

- Em sistemas de banco de dados de máquina virtual, certifique-se de que o arquivo .bashrc no diretório inicial do usuário Oracle foi atualizado para apontar para o início do banco de dados 19c.

```
export OLD_HOME=/u01/app/oracle/product/11.2.0.4/dbhome_1
export NEW_HOME=/u01/app/oracle/product/19.0.0.0/dbhome_2
cp ~/.bashrc ~/.bashrc_backup_`(date -u +%Y%m%d-%H%M%S)`
sed -i "s,$OLD_HOME,$NEW_HOME,g" ~/.bashrc
source ~/.bashrc
```

## 3. Upgrade para 19c multitenant de on-prem e Exadata Cloud Service – downtime mínimo.

Para fazer o upgrade e passar de non-cdb para container database um passo a mais precisa ser realizado no upgrade. A arquitetura que vemos abaixo pode ser contruída manualmente para diminuir downtime. Podemos criar um novo ambiente com os binários instalados e pronto para receber o plug do banco de origem em um pdb.



Passo a passo para executar uma técnica com mínimo downtime:

- Provisione um servidor temporário com binários do 11g e 19c
- Faça um backup de nível 0 enquanto o banco de dados de origem (Doc ID 790559.1)
- Restaure o banco de dados no servidor de destino
- Faça backup incremental no banco de dados de origem
- Recupere o banco temporário destino usando backup incremental
- Início do downtime, restinja o acesso ao banco de origem.
- Transfira os últimos archives da origem para o destino.
- Recupere e abra o banco de destino
- Inicie o upgrade do banco de destino
- Describa, check de compatibilidade e Plug-in ( Doc ID 2392653.1 -> TDE)
- Validações de integridade, conectividade etc.

### 3.1 Backup origem e restore no destino

```
[opc@srchost11]$ sudo mkdir -p /mnt/upgsales

[opc@srchost11]$ sudo mount x.x.x.x:/upgsales /mnt/upgsales

[oracle@srchost11]$ mkdir -p /mnt/upgsales/backup
[oracle@srchost11]$ cp
/opt/oracle/dcs/commonstore/wallets/tde/$ORACLE_UNQNAME/ewallet.p12
/mnt/upgsales/
[oracle@srchost11]$ cp $ORACLE_HOME/dbs/orapw$ORACLE_SID
/mnt/upgsales/orapw$ORACLE_SID
```

**SQL> CREATE PFILE='/mnt/upgsales/init.ora' FROM SPFILE;**

```
RMAN>
run {
allocate channel CH01 device type disk;
allocate channel ch02 device type disk;
allocate channel CH03 device type disk;
allocate channel CH04 device type disk;
allocate channel CH05 device type disk;
BACKUP INCREMENTAL LEVEL 0 DATABASE FORMAT '/mnt/upgsales/backup/lvl0%U' PLUS
ARCHIVELOG FORMAT '/mnt/upgsales/backup/arch%U' ;
BACKUP CURRENT CONTROLFILE FORMAT '/mnt/upgsales/backup/controlfile';}
```

#### Destino

```
[opc@tgthost19]$ sudo mkdir -p /mnt/upgsales
[opc@tgthost19]$ sudo mount x.x.x.x:/upgsales /mnt/upgsales
[oracle@tgthost19]$ cp /mnt/upgsales/init.ora
$ORACLE_HOME/dbs/initSALES.ora
[oracle@tgthost19]$ cp /mnt/upgsales/orapwSALES
$ORACLE_HOME/dbs/orapwSALES
[oracle@tgthost19]$ mkdir -p
/opt/oracle/dcs/commonstore/wallets/tde/SALES
[oracle@tgthost19]$ cp /mnt/upgsales/ewallet.p12
/opt/oracle/dcs/commonstore/wallets/tde/SALES/
```

```
[oracle@tgthost19]$ mkdir -p /u01/app/oracle/admin/SALES/adump
[oracle@tgthost19]$ vi $ORACLE_HOME/dbs/initSALES.ora

--remover parametros com duplo underscore
Set audit_file_dest='/u01/app/oracle/admin/SALES/adump'
Set control_files='+RECO/sales/controlfile/current.256.1048859635'
Set SALES.sga_target=6G
Set SALES.pga_aggregate_target=2G
Set db_unique_name='SALES'
--fim vi

[oracle@tgthost19]$ $ORACLE_HOME/bin/srvctl stop database -db
$ORACLE_UNQNAME

[oracle@tgthost19]$ export ORACLE_UNQNAME=SALES
[oracle@tgthost19]$ export ORACLE_SID=SALES
[oracle@tgthost19]$ sql / as sysdba

SQL> STARTUP NOMOUNT
[oracle@tgthost19]$ rman target /

RMAN> RESTORE CONTROLFILE FROM '/mnt/upgsales/backup/controlfile';
RMAN> ALTER DATABASE MOUNT;
RMAN> sql 'ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN FORCE KEYSTORE
IDENTIFIED BY <SALES-keystore-password>';
RMAN> sql "ADMINISTER KEY MANAGEMENT CREATE LOCAL AUTO_LOGIN KEYSTORE
FROM KEYSTORE
''/opt/oracle/dcs/commonstore/wallets/tde/$ORACLE_UNQNAME/' ' IDENTIFIED
BY <SALES-keystore-password>";
RMAN> CATALOG START WITH '/mnt/upgsales/backup' NOPROMPT;
RMAN> RESTORE DATABASE;

-- Para os incrementais:

[oracle@srchost11]$ rman target /

SALES RMAN> BACKUP INCREMENTAL LEVEL 1 DATABASE FORMAT
'/mnt/upgsales/backup/lvl1%U' PLUS ARCHIVELOG FORMAT
'/mnt/upgsales/backup/arch%U';

[oracle@tgthost19]$ rman target /

RMAN SALES> CATALOG START WITH '/mnt/upgsales/backup'
NOPROMPT;
RMAN SALES> RECOVER DATABASE;
```

### 3.2 Preupgrade



```
[oracle@srchost11]$ cp preupgrade_19_cbuild_7_1f.zip
$ORACLE_HOME/rdbms/admin
[oracle@srchost11]$ cd $ORACLE_HOME/rdbms/admin
[oracle@srchost11]$ unzip preupgrade_19_cbuild_7_1f.zip

[oracle@srchost11]$ mkdir -p /mnt/upgsales/preupg_logs_SALES
[oracle@srchost11]$ cd /mnt/upgsales/preupg_logs_SALES
[oracle@srchost11]$ $ORACLE_HOME/jdk/bin/java -jar
$ORACLE_HOME/rdbms/admin/preupgrade.jar FILE TEXT DIR .

SALES SQL> SET SERVEROUT ON
SALES SQL>
@/mnt/upgsales/preupg_logs_SALES/preupgrade_fixups.sql
```

### 3.3 Início do downtime, restinja o acesso ao banco de origem.

```
[oracle@srchost11]$ sqlplus / as sysdba

SALES SQL> SHUTDOWN IMMEDIATE
SALES SQL> STARTUP RESTRICT

[oracle@srchost11]$ rman target /

SALES RMAN> sql 'ALTER SYSTEM ARCHIVE LOG CURRENT';
SALES RMAN> BACKUP INCREMENTAL LEVEL 1 DATABASE FORMAT
'/mnt/upgsales/backup/lvl1%U' PLUS ARCHIVELOG FORMAT
'/mnt/upgsales/backup/arch%U';
```

#### Target

```
[oracle@tgthost19]$ rman target /

RMAN SALES> CATALOG START WITH '/mnt/upgsales/backup' NOPROMPT;

RMAN> RECOVER DATABASE;

[oracle@tgthost19]$ sqlplus / as sysdba

SALES SQL> ALTER DATABASE OPEN RESETLOGS UPGRADE;
```

## Upgrade

```
[oracle@tgthost19]$ mkdir -p /mnt/upgsales/upg_logs_SALES
[oracle@tgthost19]$ dbupgrade -l /mnt/upgsales/upg_logs_SALES
SQL> STARTUP

SQL> --Recompile
SQL> @$ORACLE_HOME/rdbms/admin/utlrlp
SQL> --Check outcome of upgrade
SQL> @$ORACLE_HOME/rdbms/admin/utlusts.sql
SQL> --Post-upgrade fixups
SQL> @/mnt/upgsales/preupg_logs_${SOURCE_SID}/postupgrade_fixups.sql
SQL> --Timezone file upgrade
SQL> SET SERVEROUTPUT ON
SQL> @$ORACLE_HOME/rdbms/admin/utltz_upg_check.sql
SQL> @$ORACLE_HOME/rdbms/admin/utltz_upg_apply.sql

[oracle@tgthost19]$ more /mnt/upgsales/preupg_logs_SALES/preupgrade.log
```

## 3.4 Describe, check de compatibilidade e Plug-in

```
SQL> ADMINISTER KEY MANAGEMENT EXPORT ENCRYPTION KEYS WITH SECRET "<a-
secret-password>" TO '/mnt/upgsales/key_export_SALES' FORCE KEYSTORE
IDENTIFIED BY <SALES-keystore-password>;
SALES SQL> SHUTDOWN IMMEDIATE
SALES SQL> STARTUP MOUNT
SALES SQL> ALTER DATABASE OPEN READ ONLY;
SALES SQL> EXEC DBMS_PDB.DESCRIBE('/mnt/upgsales/manifest_sales.xml');
SALES SQL> SHUTDOWN IMMEDIATE
[oracle@tgthost19]$ source ~/.bashrc
[oracle@tgthost19]$ env | grep ORA
[oracle@tgthost19]$ $ORACLE_HOME/bin/srvctl start database -db
$ORACLE_UNQNAME

CDB1 SQL> SET SERVEROUT ON
CDB1 SQL> BEGIN
    IF
DBMS_PDB.CHECK_PLUG_COMPATIBILITY('/mnt/upgsales/manifest_sales.xml',
'SALES') THEN
        DBMS_OUTPUT.PUT_LINE('SUCCESS');
    ELSE
        DBMS_OUTPUT.PUT_LINE('ERROR');
    END IF;
END;
/

CDB1 SQL> SELECT type, message, action FROM pdb_plug_in_violations WHERE
name='SALES' and status='PENDING';
```

```
CDB1 SQL> CREATE PLUGGABLE DATABASE SALES USING
'/mnt/upgsales/manifest_sales.xml' MOVE;
CDB1 SQL> ALTER PLUGGABLE DATABASE SALES OPEN;

--TDE

CDB1 SQL> ALTER SESSION SET CONTAINER=SALES;
CDB1 SQL> ADMINISTER KEY MANAGEMENT IMPORT ENCRYPTION KEYS WITH SECRET
"a-secret-password" FROM '/mnt/upgsales/key_export_SALES' FORCE KEYSTORE
IDENTIFIED BY <CDB1-keystore-password> WITH BACKUP;

--Complete the conversion
CDB1 SQL> ALTER SESSION SET CONTAINER=SALES;
CDB1 SQL> @$ORACLE_HOME/rdbms/admin/noncdb_to_pdb.sql
CDB1 SQL> SHUTDOWN IMMEDIATE
CDB1 SQL> STARTUP
CDB1 SQL> ALTER SESSION SET CONTAINER=CDB$ROOT;
CDB1 SQL> SELECT type, message, action FROM pdb_plug_in_violations WHERE
name='SALES' and status='PENDING';
CDB1 SQL> ALTER SESSION SET CONTAINER=CDB$ROOT;
CDB1 SQL> SELECT OPEN_MODE, RESTRICTED FROM V$PDBS WHERE NAME='SALES';
CDB1 SQL> ALTER PLUGGABLE DATABASE SALES SAVE STATE;

CDB1 SQL> ALTER SESSION SET CONTAINER=SALES;

--Conversão completa! Valide o banco de dados.
```

## Referencias e links úteis

**Upgrading a Database** - [https://docs.oracle.com/en-us/iaas/Content/Database/Tasks/dbsystem\\_upgrading\\_database.htm](https://docs.oracle.com/en-us/iaas/Content/Database/Tasks/dbsystem_upgrading_database.htm)

**RMAN Restore of Backups as Part of a Database Upgrade** (Doc ID 790559.1)

**How to UnPlug/Plug-in PDB (TDE Enabled) in DBaaS Environment** (Doc ID 2392653.1)

**How to Download and Run Oracle's Database Pre-Upgrade Utility** (Doc ID 884522.1)

**Performing Preupgrade Checks Using AutoUpgrade** -

<https://docs.oracle.com/en/database/oracle/oracle-database/19/upgrd/using-autoupgrade-utility-perform-checks.html#GUID-A177DDAB-C617-476B-8718-041333DAA67B>