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Oracle Database 23ai 体验

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一、Oracle Database 23ai 发布

2024年5月2日，Oracle Database 23ai正式发布！

新闻链接：https://www.oracle.com/cn/news/announcement/oracle-announces-availability-database-23ai-with-ai-vector-search-2024-05-02/

新闻稿

Oracle Database 23ai Brings the Power of AI to Enterprise Data and Applications

Oracle AI Vector Search allows documents, images, and relational data that are stored in mission-critical databases to be easily searched based on their conceptual content

Generative AI can now be used to ask natural language questions about private data stored in Oracle databases

2024年5月2日，Oracle Database 23ai正式发布！在过去四年中，Oracle数据库开发部门一直在努力研发Oracle 数据库的下一个长期支持版本，重点是AI和开发人员的工作效率。**鉴于此版本数据库中对AI的关注，Oracle Database 23c更名为Oracle Database 23ai。**
Oracle Database 23ai 专注于三个关键领域：

1. AI for Data
2. 数据开发
3. 数据关键任务

Oracle Database 23ai现已在Oracle Exadata Cloud@Customer、OCI Exadata数据库服务和OCI基础数据库服务上推出。Azure Oracle数据库服务中也有提供。对于开发人员，Oracle Database 23ai现在可在Always Free自治数据库中使用，也可以在 Autonomous Database 23ai Container Image和Oracle Database 23ai Free中下载。Oracle GoldenGate 23ai和GoldenGate 23ai 免费版也可供下载。Oracle Database 23ai for Linux （OL & RHEL 8/9）和Windows 的本地部署版本将很快推出，其他平台将在未来几个月内推出。有关详细信息，请查看Oracle Support说明文档 ID 742060.1。

Oracle Database 23ai有超过300+新功能，详细介绍请关注Oracle官方博客：https://blogs.oracle.com/database/post/oracle-23ai-now-generally-available

二、下载 Oracle Database 23ai Free

下载Oracle Database 23ai

https://www.oracle.com/database/free/get-started
本次主要下载下面两个安装包：
oracle-database-preinstall-23ai-1.0-2.el8.x86_64.rpm
oracle-database-free-23ai-1.0-1.el8.x86_64.rpm

下载Autonomous Database 23ai 容器镜像

https://www.oracle.com/autonomous-database/free-trial/#free-container-image

三、安装过程

1、环境准备

主机名	ip地址	操作系统	内存	cpu
oracle23c	192.168.100.136	CentOS Stream 8	4G	1个双核，x86-64

2、安装Oracle Database 23ai软件

官方安装文档：https://docs.oracle.com/en/database/oracle/oracle-database/23/install.html

2.1 安装oracle-database-preinstall-23ai-1.0-2.el8.x86_64.rpm包

Oracle数据库Preinstallation RPM包自动创建了oracle安装用户和组。它也设置了数据库安装需要的内核参数。

```
--root用户安装
[root@oracle23c ~]# cd /opt
[root@oracle23c opt]# yum install -y oracle-database-pre*.rpm
CentOS Stream 8 - AppStream
CentOS Stream 8 - BaseOS
CentOS Stream 8 - Extras
CentOS Stream 8 - Extras common packages
Dependencies resolved.
================================================================================
 Package                         Architecture        Version
================================================================================
Installing:
 oracle-database-preinstall-23ai        x86_64              1.0-2.el8
Installing dependencies:
 compat-openssl10                x86_64              1:1.0.2o-4.
 ksh                             x86_64              20120801-26
 
Transaction Summary
================================================================================
Install  3 Packages

Total size: 2.1 M
Total download size: 2.0 M
Installed size: 6.2 M
Downloading Packages:
(1/2): compat-openssl10-1.0.2o-4.el8.x86_64.rpm
(2/2): ksh-20120801-267.el8.x86_64.rpm
--------------------------------------------------------------------------------
Total
```

```
CentOS Stream 8 - AppStream
Importing GPG key 0x8483C65D:
 Userid     : "CentOS (CentOS Official Signing Key) <security@centos.org>"
 Fingerprint: 99DB 70FA E1D7 CE22 7FB6 4882 05B5 55B3 8483 C65D
 From       : /etc/pki/rpm-gpg/RPM-GPG-KEY-centosofficial
Key imported successfully
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :
  Installing       : ksh-20120801-267.el8.x86_64
  Running scriptlet: ksh-20120801-267.el8.x86_64
  Installing       : compat-openssl10-1:1.0.2o-4.el8.x86_64
  Running scriptlet: compat-openssl10-1:1.0.2o-4.el8.x86_64
  Installing       : oracle-database-preinstall-23ai-1.0-2.el8.x86_64
  Running scriptlet: oracle-database-preinstall-23ai-1.0-2.el8.x86_64
  Verifying        : compat-openssl10-1:1.0.2o-4.el8.x86_64
  Verifying        : ksh-20120801-267.el8.x86_64
  Verifying        : oracle-database-preinstall-23ai-1.0-2.el8.x86_64

Installed:
  compat-openssl10-1:1.0.2o-4.el8.x86_64          ksh-20120801-267.el8.x86_64

Complete!
```

2.2 安装oracle-database-free-23ai-1.0-1.el8.x86_64.rpm包

```
[root@oracle23c opt]# yum install -y oracle-database-free-23ai-1.0-1.el8.x86_64.rpm
Last metadata expiration check: 0:01:48 ago on Sun 05 May 2024 02:15:40 PM CST.
Dependencies resolved.
================================================================================
 Package                      Architecture          Version
================================================================================
Installing:
 oracle-database-free-23ai                  x86_64                1.0-1

Transaction Summary
================================================================================
Install  1 Package

Total size: 1.3 G
Installed size: 3.6 G
Downloading Packages:
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :
  Running scriptlet: oracle-database-free-23ai-1.0-1.x86_64
  Installing       : oracle-database-free-23ai-1.0-1.x86_64
  Running scriptlet: oracle-database-free-23ai-1.0-1.x86_64
[INFO] Executing post installation scripts...
[INFO] Oracle home installed successfully and ready to be configured.
To configure Oracle Database Free, optionally modify the parameters in '/etc/sysconfig/orac

  Verifying        : oracle-database-free-23ai-1.0-1.x86_64

Installed:
  oracle-database-free-23ai-1.0-1.x86_64

Complete!
```

3、创建和配置Oracle Database

3.1 查看/编辑配置文件

配置文件/etc/sysconfig/oracle-free-23ai.conf缺省会创建1个cdb(FREE)、一个pdb(FREEPDB1)，并且配置监听端口(1521)。我们可以编辑它来修改配置参数。

```
[oracle@oracle23c oracle]$ cat /etc/sysconfig/oracle-free-23ai.conf
#This is a configuration file to setup the Oracle Database.
#It is used when running '/etc/init.d/oracle-free-23ai configure'.

# LISTENER PORT used Database listener, Leave empty for automatic port assignment
LISTENER_PORT=

# Character set of the database
CHARSET=AL32UTF8

# Database file directory
# If not specified, database files are stored under Oracle base/oradata
DBFILE_DEST=

# DB Domain name
DB_DOMAIN=

# Configure TDE
CONFIGURE_TDE=false

# Encrypt Tablespaces list, Leave empty for user tablespace alone or provide ALL for encryp
# For specific tablespaces use SYSTEM:true,SYSAUX:false
ENCRYPT_TABLESPACES=

# SKIP Validations, memory, space
SKIP_VALIDATIONS=false
```

3.2 静默创建数据库和监听

```
[root@oracle23c ~]# /etc/init.d/oracle-free-23ai configure
Specify a password to be used for database accounts. Oracle recommends that the password er
Confirm the password:
Configuring Oracle Listener.
Listener configuration succeeded.
Configuring Oracle Database FREE.
Enter SYS user password:
**********
Enter SYSTEM user password:
*******
Enter PDBADMIN User Password:
**********
Prepare for db operation
7% complete
Copying database files
29% complete
Creating and starting Oracle instance
30% complete
33% complete
36% complete
39% complete
43% complete
Completing Database Creation
47% complete
49% complete
50% complete
Creating Pluggable Databases
54% complete
71% complete
```

```
Executing Post Configuration Actions
93% complete
Running Custom Scripts
100% complete
Database creation complete. For details check the logfiles at:
 /opt/oracle/cfgtoollogs/dbca/FREE.
Database Information:
Global Database Name:FREE
System Identifier(SID):FREE
Look at the log file "/opt/oracle/cfgtoollogs/dbca/FREE/FREE.log" for further details.

Connect to Oracle Database using one of the connect strings:
    Pluggable database: oracle23c/FREEPDB1
    Multitenant container database: oracle23c
```

文件目录结构及用途：

File Name and Location	Purpose
/opt/oracle	Oracle base. This is the root of the Oracle Database Free directory tree.
/opt/oracle/product/23ai/dbhomeFree	Oracle home. This home is where the Oracle Database Free is installed. It contains the directories of the Oracle Database Free executables and network files.
/opt/oracle/oradata/FREE	Database files.
/opt/oracle/diag subdirectories	Diagnostic logs. The database alert log is /opt/oracle/diag/rdbms/free/FREE/trace/alert_FREE.log
/opt/oracle/cfgtoollogs/dbca/FREE	Database creation logs. The FREE.log file contains the results of the database creation script execution.
/etc/sysconfig/oracle-free-23ai.conf	Configuration default parameters.
/etc/init.d/oracle-free-23ai	Configuration and services script.

The parameters set in this file are explained in detail in the silent mode installation procedure: Performing a Silent Installation.
To create the database with the default settings:

4 设置oracle用户环境变量

```
[oracle@oracle23c ~]$ vi .bash_profile

export ORACLE_SID=FREE
export ORAENV_ASK=NO
. /opt/oracle/product/23ai/dbhomeFree/bin/oraenv
export ORACLE_BASE=/opt/oracle/
export ORACLE_HOME=/opt/oracle/product/23ai/dbhomeFree
export PATH=$ORACLE_HOME/bin:$PATH
```

四、数据库使用

1、连接数据库

```
--连接cdb
[oracle@oracle23c admin]$ sqlplus sys@oracle23c:1521 as sysdba

SQL*Plus: Release 23.0.0.0.0 - Production on Sun May 5 18:00:35 2024
Version 23.4.0.24.05

Copyright (c) 1982, 2024, Oracle.  All rights reserved.

Enter password:

Connected to:
Oracle Database 23ai Free Release 23.0.0.0.0 - Develop, Learn, and Run for Free
Version 23.4.0.24.05

SQL> show pdbs;

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 FREEPDB1                       READ WRITE NO

[oracle@oracle23c ~]$ sqlplus system@oracle23c:1521

SQL*Plus: Release 23.0.0.0.0 - Production on Sun May 5 17:56:37 2024
Version 23.4.0.24.05

Copyright (c) 1982, 2024, Oracle.  All rights reserved.

Enter password:
Last Successful login time: Sun May 05 2024 17:54:19 +08:00

Connected to:
Oracle Database 23ai Free Release 23.0.0.0.0 - Develop, Learn, and Run for Free
Version 23.4.0.24.05

SQL>
--连接pdb
[oracle@oracle23c ~]$ sqlplus system@oracle23c:1521/FREEPDB1

SQL*Plus: Release 23.0.0.0.0 - Production on Sun May 5 17:53:33 2024
Version 23.4.0.24.05

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Enter password:
Last Successful login time: Sun May 05 2024 16:32:51 +08:00

Connected to:
Oracle Database 23ai Free Release 23.0.0.0.0 - Develop, Learn, and Run for Free
Version 23.4.0.24.05

SQL>
```

2、启停数据库

2.1使用sqlplus启停数据库

```
--停止数据库
$ sqlplus / as sysdba
SQL> SHUTDOWN IMMEDIATE
--启动数据库
SQL> STARTUP
SQL> ALTER PLUGGABLE DATABASE ALL OPEN;
```

2.2使用服务启停数据库和监听

```
--root用户执行
# systemctl daemon-reload
# systemctl enable oracle-free-23ai
--启停数据库和监听
# systemctl start oracle-free-23ai
# systemctl stop oracle-free-23ai
--重启数据库和监听
# systemctl restart oracle-free-23ai
--查看数据库和监听状态
# /etc/init.d/oracle-free-23ai status
[root@oracle23c ~]# /etc/init.d/oracle-free-23ai status
Status of the Oracle FREE 23ai service:

LISTENER status: RUNNING
FREE Database status:   RUNNING
```

3、查看监听状态

```
[oracle@oracle23c ~]$ lsnrctl status

LSNRCTL for Linux: Version 23.0.0.0.0 - Production on 05-MAY-2024 17:47:48

Copyright (c) 1991, 2024, Oracle.  All rights reserved.

Connecting to (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=oracle23c)(PORT=1521)))
STATUS of the LISTENER
------------------------
Alias                     LISTENER
Version                   TNSLSNR for Linux: Version 23.0.0.0.0 - Production
Start Date                05-MAY-2024 16:08:37
Uptime                    0 days 1 hr. 40 min. 6 sec
Trace Level               off
Security                  ON: Local OS Authentication
SNMP                      OFF
Default Service           FREE
Listener Parameter File   /opt/oracle/product/23ai/dbhomeFree/network/admin/listener.ora
Listener Log File         /opt/oracle/diag/tnslsnr/oracle23c/listener/alert/log.xml
Listening Endpoints Summary...
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=oracle23c)(PORT=1521)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))
Services Summary...
Service "17b22ca69c5317efe065020c294702bf" has 1 instance(s).
  Instance "FREE", status READY, has 1 handler(s) for this service...
Service "FREE" has 1 instance(s).
  Instance "FREE", status READY, has 1 handler(s) for this service...
Service "FREEXDB" has 1 instance(s).
  Instance "FREE", status READY, has 1 handler(s) for this service...
Service "freepdb1" has 1 instance(s).
  Instance "FREE", status READY, has 1 handler(s) for this service...
The command completed successfully
```

4、查看后台进程

```
[oracle@oracle23c ~]$ ps -ef|grep db_
oracle     71278       1  0 16:59 ?        00:00:01 db_pmon_FREE
oracle     71282       1  0 16:59 ?        00:00:00 db_clmn_FREE
oracle     71286       1  0 16:59 ?        00:00:01 db_psp0_FREE
oracle     71290       1  0 16:59 ?        00:00:58 db_vktm_FREE
oracle     71296       1  0 16:59 ?        00:00:00 db_gen0_FREE
oracle     71300       1  0 16:59 ?        00:00:00 db_mman_FREE
oracle     71306       1  0 16:59 ?        00:00:00 db_gen2_FREE
oracle     71308       1  0 16:59 ?        00:00:00 db_diag_FREE
oracle     71311       1  0 16:59 ?        00:00:00 db_ofsd_FREE
oracle     71314       1  0 16:59 ?        00:00:00 db_gwpd_FREE
oracle     71316       1  0 16:59 ?        00:00:03 db_dbrm_FREE
oracle     71318       1  0 16:59 ?        00:00:15 db_vkrm_FREE
oracle     71324       1  0 16:59 ?        00:00:01 db_pman_FREE
oracle     71327       1  0 16:59 ?        00:00:02 db_dia0_FREE
oracle     71329       1  0 16:59 ?        00:00:00 db_dbw0_FREE
oracle     71333       1  0 16:59 ?        00:00:01 db_lgwr_FREE
oracle     71336       1  0 16:59 ?        00:00:01 db_ckpt_FREE
oracle     71339       1  0 16:59 ?        00:00:00 db_smon_FREE
oracle     71346       1  0 16:59 ?        00:00:00 db_smco_FREE
oracle     71350       1  0 16:59 ?        00:00:00 db_reco_FREE
oracle     71352       1  0 16:59 ?        00:00:00 db_lreg_FREE
oracle     71354       1  0 16:59 ?        00:00:00 db_pxmn_FREE
oracle     71362       1  0 16:59 ?        00:00:04 db_mmon_FREE
oracle     71364       1  0 16:59 ?        00:00:01 db_mmnl_FREE
oracle     71366       1  0 16:59 ?        00:00:03 db_bg00_FREE
oracle     71368       1  0 16:59 ?        00:00:00 db_w000_FREE
oracle     71376       1  0 16:59 ?        00:00:01 db_bg01_FREE
oracle     71379       1  0 16:59 ?        00:00:00 db_w001_FREE
oracle     71386       1  0 16:59 ?        00:00:01 db_bg02_FREE
oracle     71395       1  0 16:59 ?        00:00:00 db_d000_FREE
oracle     71397       1  0 16:59 ?        00:00:00 db_s000_FREE
oracle     71399       1  0 16:59 ?        00:00:00 db_tmon_FREE
oracle     71401       1  0 16:59 ?        00:00:00 db_rcbg_FREE
oracle     71404       1  0 16:59 ?        00:00:00 db_tt00_FREE
oracle     71406       1  0 16:59 ?        00:00:00 db_tt01_FREE
oracle     71410       1  0 16:59 ?        00:00:00 db_p000_FREE
oracle     71412       1  0 16:59 ?        00:00:00 db_aqpc_FREE
oracle     71418       1  0 16:59 ?        00:00:46 db_cjq0_FREE
oracle     71430       1  0 16:59 ?        00:00:00 db_qm02_FREE
oracle     71437       1  0 16:59 ?        00:00:00 db_q002_FREE
oracle     71633       1  0 16:59 ?        00:00:02 db_q003_FREE
oracle     71648       1  0 16:59 ?        00:00:08 db_m001_FREE
oracle     71650       1  0 16:59 ?        00:00:15 db_m002_FREE
oracle     71654       1  0 16:59 ?        00:00:12 db_m003_FREE
oracle     74169       1  0 17:58 ?        00:00:03 db_m004_FREE
oracle     74756       1  0 18:18 ?        00:00:01 db_m006_FREE
```

附录、参考文档：

https://mp.weixin.qq.com/s/uiY7bImIB-w8KcQHH957WA

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