HOT CLONING

In Oracle 19c, "hot cloning" refers to the process of creating a copy of a database while it is still running and operational, meaning users can continue to access the original database with minimal disruption during the cloning process; essentially, it's a method to create a live replica of a database without taking it offline.

Highlevel steps:

1. Check the Db in archivelog mode .Db mustbe in archive and enable it
2. Check the all physical file locations datafiles,controlfiles,logfiles and parameter file
3. Now create pfile from spfile and backup controlfile
4. Now the database put hot backup mode.
5. copy the files from source to target
6. End the hot backup mode after copy all files from source to target
7. come to target db and check all files get it or not
8. open and edit pfile .create audit file location manually
9. rename the pfile from initorcl.ora to initclone.ora
10. start the db in nomount mode
11. modify the controlfile and recreate
12. Peform recovery
13. Now open database reset logs

STEP 1: Check db must be in archive log mode and upon running if not enable archive ,enable it

```
SQL> startup mount
ORACLE instance started.

Total System Global Area  423622096 bytes
Fixed Size                  9135568 bytes
Variable Size             171966464 bytes
Database Buffers          239075328 bytes
Redo Buffers                3444736 bytes
Database mounted.
SQL> archive log list
Database log mode              No Archive Mode
Automatic archival             Disabled
Archive destination            /u01/app/oracle/product/19c/dbhome/dbs/arch
Oldest online log sequence     25
Current log sequence           27
```

Enable archive log

```
SQL> alter database archivelog;

Database altered.

SQL> archive log list;
Database log mode              Archive Mode
Automatic archival             Enabled
Archive destination            /u01/app/oracle/product/19c/dbhome/dbs/arch
Oldest online log sequence     25
Next log sequence to archive   27
Current log sequence           27
SQL>
```

Open database

```
SQL> alter database open;

Database altered.

SQL> select name,open_mode,log_mode from v$database;

NAME      OPEN_MODE            LOG_MODE
--------- -------------------- ------------
ORCL      READ WRITE           ARCHIVELOG
```

STEP 2: check the locations of physical files datafiles,control files ,redologfiles and pparameter files

```
SQL> select name from v$controlfile;

NAME
--------------------------------------------------------------------------------
/u01/app/oracle/oradata/ORCL/control01.ctl
/u01/app/oracle/oradata/ORCL/control02.ctl

SQL> select FILE_NAME from dba_data_files;

FILE_NAME
--------------------------------------------------------------------------------
/u01/app/oracle/oradata/ORCL/system01.dbf
/u01/app/oracle/oradata/ORCL/sysaux01.dbf
/u01/app/oracle/oradata/ORCL/undotbs01.dbf
/u01/app/oracle/oradata/ORCL/users01.dbf

SQL> select MEMBER from v$logfile;

MEMBER
--------------------------------------------------------------------------------
/u01/app/oracle/oradata/ORCL/redo03.log
/u01/app/oracle/oradata/ORCL/redo02.log
/u01/app/oracle/oradata/ORCL/redo01.log

SQL> show parameter spfile;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      /u01/app/oracle/product/19c/db
                                                 home/dbs/spfileorcl.ora
SQL>
```

Connect pdb and notedown pdb datfiles also

```
                                                 home/dbs/spfileorcl.ora
SQL> show pdbs;

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 EXPDB                          MOUNTED
SQL> alter pluggable database expdb open;

Pluggable database altered.
```

```
SQL> alter session set container=expdb;

Session altered.

SQL> select FILE_NAME from dba_data_files;

FILE_NAME
--------------------------------------------------------------------------------
/u01/app/oracle/oradata/ORCL/expdb/system01.dbf
/u01/app/oracle/oradata/ORCL/expdb/sysaux01.dbf
/u01/app/oracle/oradata/ORCL/expdb/undotbs01.dbf
/u01/app/oracle/oradata/ORCL/expdb/users01.dbf
```

STEP 3: Create pfile and backup control file

```
SQL> create pfile from spfile;

File created.
```

```
SQL> alter database backup controlfile to trace as '/u01/app/oracle/oradata/ORCL/control.sql';

Database altered.

SQL>
```

STEP 4: Now the database put hot backup mode .

```
SQL> select distinct STATUS from v$backup;

STATUS
------------------
NOT ACTIVE
```

```
SQL> alter database begin backup;

Database altered.

SQL> select distinct STATUS from v$backup;

STATUS
------------------
ACTIVE
NOT ACTIVE

SQL> select distinct STATUS from v$backup where STATUS='ACTIVE';

STATUS
------------------
ACTIVE
```

STEP 5: Now copy the files from source to target

Datafiles copieng using scp command from sorce to target.

```
[oracle@oracle ORCL]$ scp *.dbf root@192.168.227.13:/u01/app/oracle/oradata/CLONE/
The authenticity of host '192.168.227.13 (192.168.227.13)' can't be established.
ECDSA key fingerprint is SHA256:+1xk7luuUWvwS8lKDOkMKfsn/CYJQ4GoNXpm7677uz4.
ECDSA key fingerprint is MD5:9f:ef:b9:13:00:3d:63:63:6a:e6:a0:ad:c4:0e:76:33.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.227.13' (ECDSA) to the list of known hosts.
root@192.168.227.13's password:
sysaux01.dbf                                                                                  100%  530MB  35.3MB/s   00:15
system01.dbf                                                                                  100%  900MB  36.4MB/s   00:24
temp01.dbf                                                                                    100%   32MB  34.5MB/s   00:00
undotbs01.dbf                                                                                 100%  280MB  40.0MB/s   00:07
users01.dbf                                                                                   100% 5128KB  35.9MB/s   00:00
[oracle@oracle ORCL]$ scp *.log root@192.168.227.13:/u01/app/oracle/oradata/CLONE/
root@192.168.227.13's password:
redo01.log                                                                                    100%   50MB  40.0MB/s   00:01
redo02.log                                                                                    100%   50MB  40.6MB/s   00:01
redo03.log                                                                                    100%   50MB  40.1MB/s   00:01
```

logfiles and controlfile copy

```
[oracle@oracle ORCL]$ scp *.log root@192.168.227.13:/u01/app/oracle/oradata/CLONE/
root@192.168.227.13's password:
redo01.log                                                                                    100%   50MB  40.0MB/s   00:01
redo02.log                                                                                    100%   50MB  40.6MB/s   00:01
redo03.log                                                                                    100%   50MB  40.1MB/s   00:01
[oracle@oracle ORCL]$ scp control.sql root@192.168.227.13:/u01/app/oracle/oradata/CLONE/
root@192.168.227.13's password:
control.sql                                                                                   100% 7583     3.2MB/s   00:00
```

Copy pluggable database files

```
[oracle@oracle expdb]$ scp *.dbf root@192.168.227.13:/u01/app/oracle/oradata/CLONE/expdb/
root@192.168.227.13's password:
sysaux01.dbf                                                                                  100%  330MB  37.9MB/s   00:08
system01.dbf                                                                                  100%  270MB 655.6KB/s   07:01
temp01.dbf                                                                                    100%   36MB  36.2MB/s   00:00
undotbs01.dbf                                                                                 100%  100MB  33.3MB/s   00:03
users01.dbf                                                                                   100% 5128KB  34.6MB/s   00:00
[oracle@oracle expdb]$ ll
```

```
[oracle@oracle pdbseed]$ scp *.dbf root@192.168.227.13:/u01/app/oracle/oradata/CLONE/pdbseed/
root@192.168.227.13's password:
sysaux01.dbf                                                                                  100%  330MB  36.6MB/s   00:09
system01.dbf                                                                                  100%  270MB  38.5MB/s   00:07
temp012025-02-15_00-34-20-451-AM.dbf                                                          100%   36MB  39.5MB/s   00:00
undotbs01.dbf                                                                                 100%  100MB  33.9MB/s   00:02
[oracle@oracle pdbseed]$ cd ..
[oracle@oracle ORCL]$ ll
```

Copy pfile and archives

```
[oracle@oracle dbs]$ scp initorcl.ora root@192.168.227.13:/u01/app/oracle/product/19c/dbhome/dbs/
root@192.168.227.13's password:
initorcl.ora                                                                                  100% 1000   412.2KB/s   00:00
[oracle@oracle dbs]$ scp .dbf root@192.168.227.13:/u01/app/oracle/product/19c/dbhome/dbs/
root@192.168.227.13's password:
.dbf: No such file or directory
[oracle@oracle dbs]$ scp *.dbf root@192.168.227.13:/u01/app/oracle/product/19c/dbhome/dbs/
root@192.168.227.13's password:
arch1_27_1193098917.dbf                                                                       100%   13MB  31.8MB/s   00:00
arch1_28_1193098917.dbf                                                                       100% 1024   482.6KB/s   00:00
arch1_29_1193098917.dbf                                                                       100% 3072     1.6MB/s   00:00
[oracle@oracle dbs]$ ls -lh
total 14M
```

STEP 6: **Now end the hot backup mode after copy all files from source to target**

```
SQL> select distinct STATUS from v$backup where STATUS='ACTIVE';

STATUS
------------------
ACTIVE

SQL> alter database end backup;

Database altered.
```

```
SQL> select distinct STATUS from v$backup where STATUS='ACTIVE';

no rows selected
```

STEP 7: **Now come to target db and check all files get it or not**

```
drwxrwxr-x. 4 oracle oinstall 4096 Feb 17 06:42 CLONE
[root@oracle oradata]# cd CLONE/
[root@oracle CLONE]# ll
total 1942596
-rw-r--r--. 1 root   root          7583 Feb 17 06:42 control.sql
drwxrwxr-x. 2 oracle oinstall      4096 Feb 17 06:46 expdb
drwxrwxr-x. 2 oracle oinstall      4096 Feb 17 06:50 pdbseed
-rw-r-----. 1 root   root      52429312 Feb 17 06:41 redo01.log
-rw-r-----. 1 root   root      52429312 Feb 17 06:41 redo02.log
-rw-r-----. 1 root   root      52429312 Feb 17 06:41 redo03.log
-rw-r-----. 1 root   root     555753472 Feb 17 06:40 sysaux01.dbf
-rw-r-----. 1 root   root     943726592 Feb 17 06:40 system01.dbf
-rw-r-----. 1 root   root      33562624 Feb 17 06:40 temp01.dbf
-rw-r-----. 1 root   root     293609472 Feb 17 06:40 undotbs01.dbf
-rw-r-----. 1 root   root       5251072 Feb 17 06:40 users01.dbf
[root@oracle CLONE]# cd
[root@oracle ~]# cd /u01/app/oracle/product/19c/dbhome
[root@oracle dbhome]# cd dbs
[root@oracle dbs]# ll
total 13776
-rw-r-----. 1 root   root     14090240 Feb 17 06:55 arch1_27_1193098917.dbf
-rw-r-----. 1 root   root         1024 Feb 17 06:55 arch1_28_1193098917.dbf
-rw-r-----. 1 root   root         3072 Feb 17 06:55 arch1_29_1193098917.dbf
-rwxrwxr-x. 1 oracle oinstall     3079 May 14  2015 init.ora
-rw-r--r--. 1 root   root         1000 Feb 17 06:54 initorcl.ora
[root@oracle dbs]#
```

STEP 8: **open and edit pfile .create audit file location manually**

You can get this location in pfile $ORACLE_HOME/dbs/initorcl.ora

Mkdir -p /u01/app/oracle/admin/clone/adump

```
[root@oracle CLONE]# mkdir -p /u01/app/oracle/admin/orcl/adump
[root@oracle CLONE]# chown -R oracle:oinstall /u01/app/oracle/admin/orcl/adump
[root@oracle CLONE]# chmod -R 775 /u01/app/oracle/admin/orcl/adump
[root@oracle CLONE]#
```

clone.__data_transfer_cache_size=0

clone.__db_cache_size=176160768

clone.__inmemory_ext_roarea=0

clone.__inmemory_ext_rwarea=0

clone.__java_pool_size=0

clone.__large_pool_size=4194304

clone.__oracle_base='/u01/app/oracle'#ORACLE_BASE set from environment

clone.__pga_aggregate_target=142606336

clone.__sga_target=423624704

clone.__shared_io_pool_size=16777216

clone.__shared_pool_size=213909504

clone.__streams_pool_size=0

clone.__unified_pga_pool_size=0

*.audit_file_dest='/u01/app/oracle/admin/clone/adump'

*.audit_trail='db'

*.compatible='19.0.0'

*.control_files='/u01/app/oracle/oradata/CLONE/control01.ctl','/u01/app/oracle/oradata/CLONE/control02.ctl'

*.db_block_size=8192

*.db_name='clone'

*.diagnostic_dest='/u01/app/oracle'

*.dispatchers='(PROTOCOL=TCP) (SERVICE=cloneXDB)'

*.enable_pluggable_database=true

*.nls_language='AMERICAN'

*.nls_territory='AMERICA'

*.open_cursors=300

*.pga_aggregate_target=134m

*.processes=300

*.remote_login_passwordfile='EXCLUSIVE'

*.sga_target=401m

*.undo_tablespace='UNDOTBS1'

STEP 9: **rename the pfile from initorcl.ora to initclone.ora**

```
[oracle@oracle dbs]$ mv initorcl.ora initclone.ora
[oracle@oracle dbs]$ ll
total 13780
-rwxrwxr-x. 1 oracle oinstall 14090240 Feb 17 06:55 arch1_27_1193098917.dbf
-rwxrwxr-x. 1 oracle oinstall     1024 Feb 17 06:55 arch1_28_1193098917.dbf
-rwxrwxr-x. 1 oracle oinstall     3072 Feb 17 06:55 arch1_29_1193098917.dbf
-rwxrwxr-x. 1 oracle oinstall     1019 Feb 17 07:37 initclone.ora
-rwxrwxr-x. 1 oracle oinstall     3079 May 14  2015 init.ora
-rwxr-xr-x. 1 oracle oinstall     1000 Feb 17 07:30 initorcl.ora.bkp
```

STEP 10: **start the db in nomount mode**

```
[oracle@oracle dbs]$ export ORACLE_SID=clone
[oracle@oracle dbs]$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Mon Feb 17 07:41:09 2025
Version 19.3.0.0.0

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Connected to an idle instance.

SQL> startup nomount
ORACLE instance started.

Total System Global Area  423622096 bytes
Fixed Size                  9135568 bytes
Variable Size             171966464 bytes
Database Buffers          239075328 bytes
Redo Buffers                3444736 bytes
SQL>
```

STEP 11: **modify the controlfile and recreate**

```
CREATE CONTROLFILE SET DATABASE "CLONE" RESETLOGS  ARCHIVELOG
   MAXLOGFILES 16
   MAXLOGMEMBERS 3
   MAXDATAFILES 1024
   MAXINSTANCES 8
   MAXLOGHISTORY 292
LOGFILE
  GROUP 1 '/u01/app/oracle/oradata/CLONE/redo01.log'  SIZE 50M BLOCKSIZE 512,
  GROUP 2 '/u01/app/oracle/oradata/CLONE/redo02.log'  SIZE 50M BLOCKSIZE 512,
  GROUP 3 '/u01/app/oracle/oradata/CLONE/redo03.log'  SIZE 50M BLOCKSIZE 512
-- STANDBY LOGFILE
DATAFILE
  '/u01/app/oracle/oradata/CLONE/system01.dbf',
  '/u01/app/oracle/oradata/CLONE/sysaux01.dbf',
```

'/u01/app/oracle/oradata/CLONE/undotbs01.dbf',

'/u01/app/oracle/oradata/CLONE/pdbseed/system01.dbf',

'/u01/app/oracle/oradata/CLONE/pdbseed/sysaux01.dbf',

'/u01/app/oracle/oradata/CLONE/users01.dbf',

'/u01/app/oracle/oradata/CLONE/pdbseed/undotbs01.dbf',

'/u01/app/oracle/oradata/CLONE/expdb/system01.dbf',

'/u01/app/oracle/oradata/CLONE/expdb/sysaux01.dbf',

'/u01/app/oracle/oradata/CLONE/expdb/undotbs01.dbf',

'/u01/app/oracle/oradata/CLONE/expdb/users01.dbf'

CHARACTER SET AL32UTF8

;

Now start the db in mount state and recreate file

```
SQL> startup nomount
ORACLE instance started.

Total System Global Area  423622096 bytes
Fixed Size                  9135568 bytes
Variable Size             171966464 bytes
Database Buffers          239075328 bytes
Redo Buffers                3444736 bytes
SQL> @/u01/app/oracle/oradata/CLONE/control.sql

Control file created.
```

STEP 12: Peform recovery

SQL> RECOVER DATABASE USING BACKUP CONTROLFILE UNTIL CANCEL;

ORA-00279: change 2284883 generated at 02/17/2025 06:35:32 needed for thread 1 ORA-00289: suggestion : /u01/app/oracle/product/19c/dbhome/dbs/arch1_30_1193098917.dbf ORA-00280: change 2284883 for thread 1 is in sequence #30 Specify log: {<RET>=suggested | filename | AUTO | CANCEL} AUTO

ORA-00308: cannot open archived log '/u01/app/oracle/product/19c/dbhome/dbs/arch1_30_1193098917.dbf'

ORA-27037: unable to obtain file status Linux-x86_64 Error: 2: No such file or directory Additional information: 7 ORA-00308: cannot open archived log '/u01/app/oracle/product/19c/dbhome/dbs/arch1_30_1193098917.dbf'

ORA-27037: unable to obtain file status Linux-x86_64 Error: 2: No such file or directory Additional information: 7

ORA-01547: warning: RECOVER succeeded but OPEN RESETLOGS would get error below ORA-01195: online backup of file 1 needs more recovery to be consistent ORA-01110: data file 1: '/u01/app/oracle/oradata/CLONE/system01.dbf'

When ever got this error we can recover by redolog files by using rman

STEP 13: Connect to RMAN and recover database

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

Recovery Manager: Release 19.0.0.0.0 - Production on Mon Feb 17 08:49:16 2025
Version 19.3.0.0.0

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connected to target database: CLONE (DBID=1720879650, not open)

RMAN> recover database;

Starting recover at 17-FEB-25
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=436 device type=DISK

starting media recovery

archived log for thread 1 with sequence 30 is already on disk as file /u01/app/oracle/oradata/CLONE/redo03.log
archived log file name=/u01/app/oracle/oradata/CLONE/redo03.log thread=1 sequence=30
media recovery complete, elapsed time: 00:00:01
Finished recover at 17-FEB-25

RMAN>
```

STEP 14: Now open database reset logs

Open database using resetlogs option :

SQL> alter database open resetlogs;

Database altered.

STEP 15: Check the database name and status :

```
SQL> select name,open_mode from v$database;

NAME      OPEN_MODE
--------- --------------------
CLONE     READ WRITE
```

STEP 16: **Now check the pdb**

```
SQL> show pdbs;

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 EXPDB                          READ WRITE NO
SQL> alter pluggable database all close;

Pluggable database altered.

SQL> show pdbs;

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 EXPDB                          MOUNTED
```

Open pluggable db .

```
SQL> alter pluggable database expdb open;

Pluggable database altered.

SQL> alter session set container=expdb;

Session altered.

SQL> show con_name;

CON_NAME
------------------------------
EXPDB
SQL> select FILE_NAME from dba_data_files;

FILE_NAME
--------------------------------------------------------------------------------
/u01/app/oracle/oradata/CLONE/expdb/system01.dbf
/u01/app/oracle/oradata/CLONE/expdb/sysaux01.dbf
/u01/app/oracle/oradata/CLONE/expdb/undotbs01.dbf
/u01/app/oracle/oradata/CLONE/expdb/users01.dbf
```

HOT cloning completed.