Final project IT8406

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Business analysis and solution

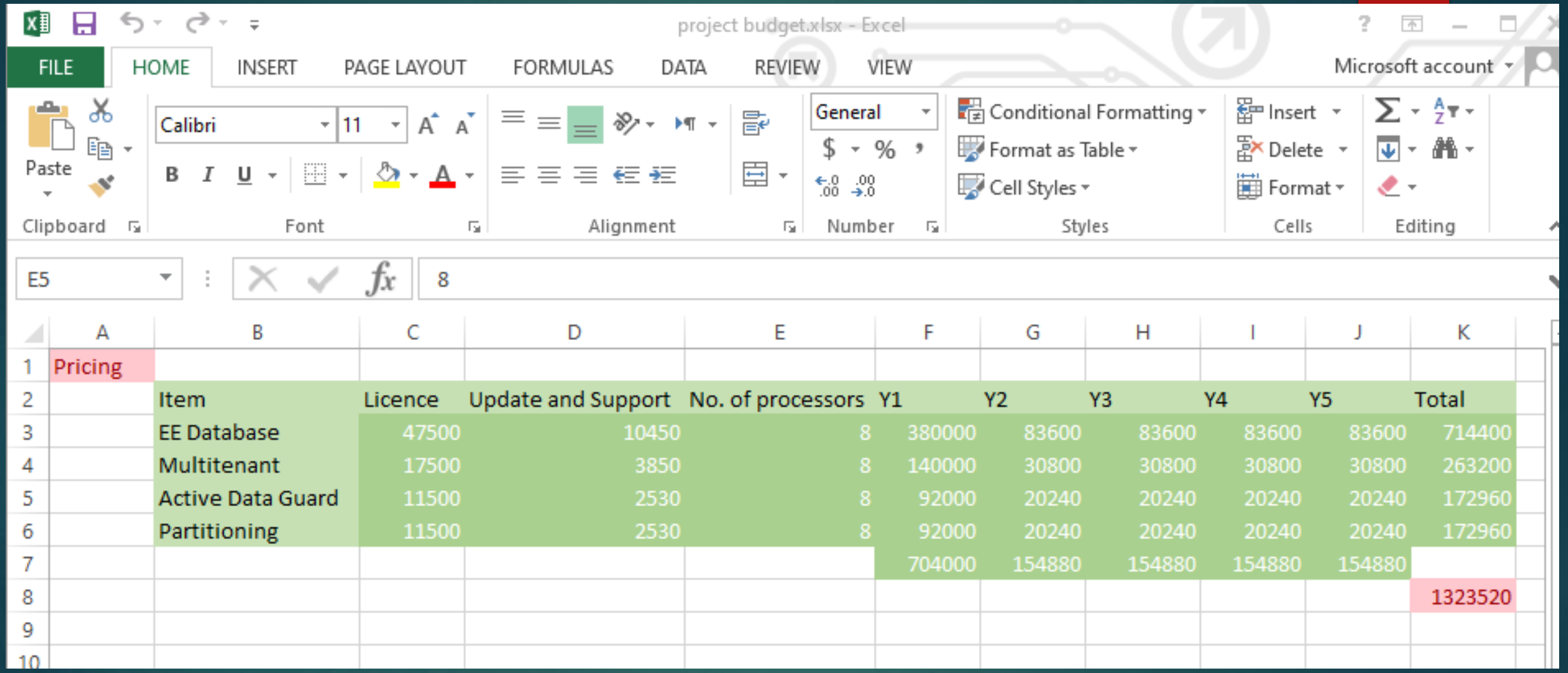
Problems:

- Old system
- The system doesn't run at high level
- The database structure is not organized
- The data increased dramatically and there's no enough resources
- There is no plan B or backup for the data
- The system doesn't run 24/7

Solutions:

1. **Creating three disks each disks have 1 specific container and create a standby database.**
2. Creating one container and adding two pluggable databases and assigning the correct permission
3. Upgrading the system without making any decisive changes

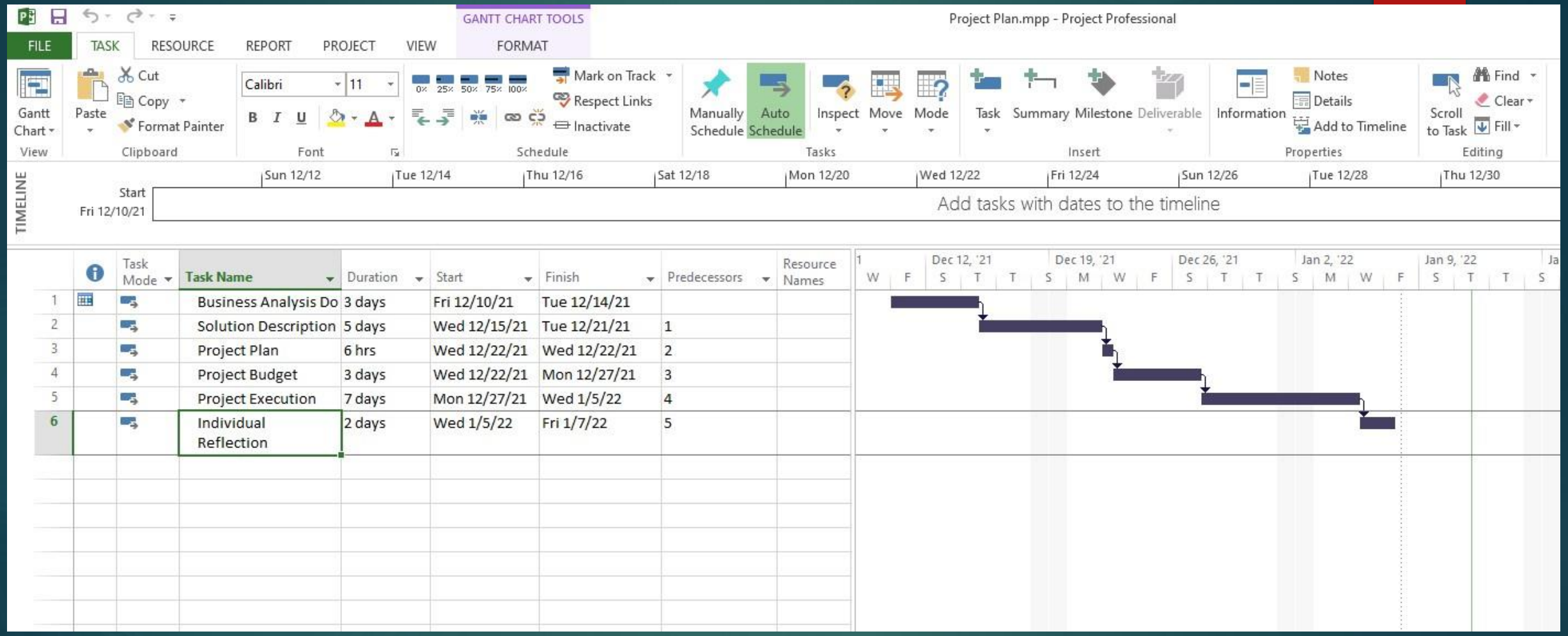
Project Budget



	A	B	C	D	E	F	G	H	I	J	K
1	Pricing										
2		Item	Licence	Update and Support	No. of processors	Y1	Y2	Y3	Y4	Y5	Total
3		EE Database	47500	10450	8	380000	83600	83600	83600	83600	714400
4		Multitenant	17500	3850	8	140000	30800	30800	30800	30800	263200
5		Active Data Guard	11500	2530	8	92000	20240	20240	20240	20240	172960
6		Partitioning	11500	2530	8	92000	20240	20240	20240	20240	172960
7						704000	154880	154880	154880	154880	
8											1323520
9											
10											

*limited budget

Project Plan

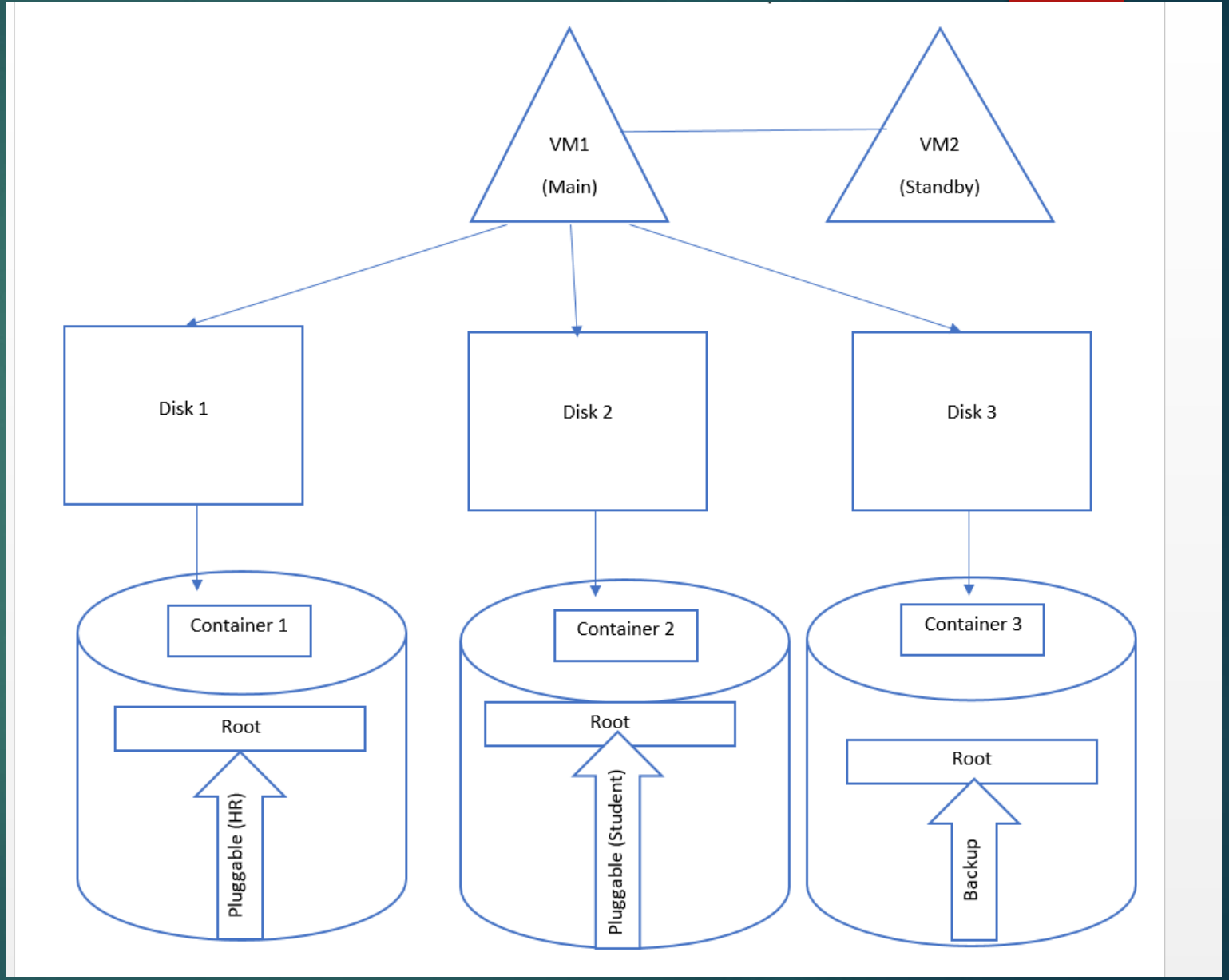

GANTT CHART TOOLS
Project Plan.mpp - Project Professional
FILE
TASK
RESOURCE
REPORT
PROJECT
VIEW
FORMAT
Gantt Chart
Paste
Cut
Copy
Format Painter
Calibri
11
Mark on Track
Respect Links
Inactivate
Manually Schedule
Auto Schedule
Inspect
Move
Mode
Task
Summary
Milestone
Deliverable
Information
Notes
Details
Add to Timeline
Scroll to Task
Find
Clear
Fill
View
Clipboard
Font
Schedule
Tasks
Insert
Properties
Editing
TIMELINE
Start
Fri 12/10/21
Sun 12/12
Tue 12/14
Thu 12/16
Sat 12/18
Mon 12/20
Wed 12/22
Fri 12/24
Sun 12/26
Tue 12/28
Thu 12/30
Add tasks with dates to the timeline
Task Mode
Task Name
Duration
Start
Finish
Predecessors
Resource Names
1 Business Analysis Do 3 days Fri 12/10/21 Tue 12/14/21
2 Solution Description 5 days Wed 12/15/21 Tue 12/21/21 1
3 Project Plan 6 hrs Wed 12/22/21 Wed 12/22/21 2
4 Project Budget 3 days Wed 12/22/21 Mon 12/27/21 3
5 Project Execution 7 days Mon 12/27/21 Wed 1/5/22 4
6 Individual Reflection 2 days Wed 1/5/22 Fri 1/7/22 5
Dec 12, '21
Dec 19, '21
Dec 26, '21
Jan 2, '22
Jan 9, '22

Project Execution

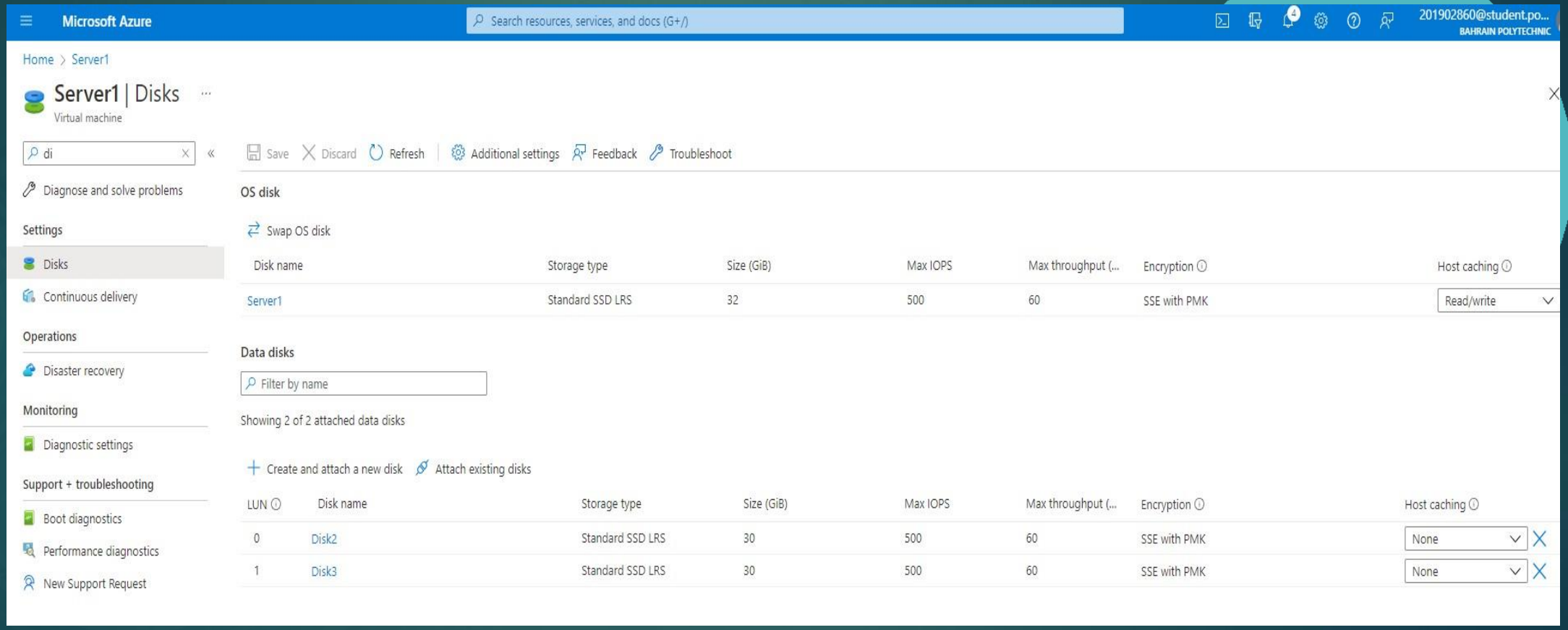
Steps:

1. Create VMs and adding Disks
2. Creating Fast Recovery Area (FRA)
3. Creating tablespaces in different location
4. Opening main and pluggable databases in SQL-developer
5. Creating and Inserting test users and tables
6. Opening sysbackup user and creating manual (cumulative and differential) and auto backup
7. Adding ports and start using EM
8. Start implementing data guard

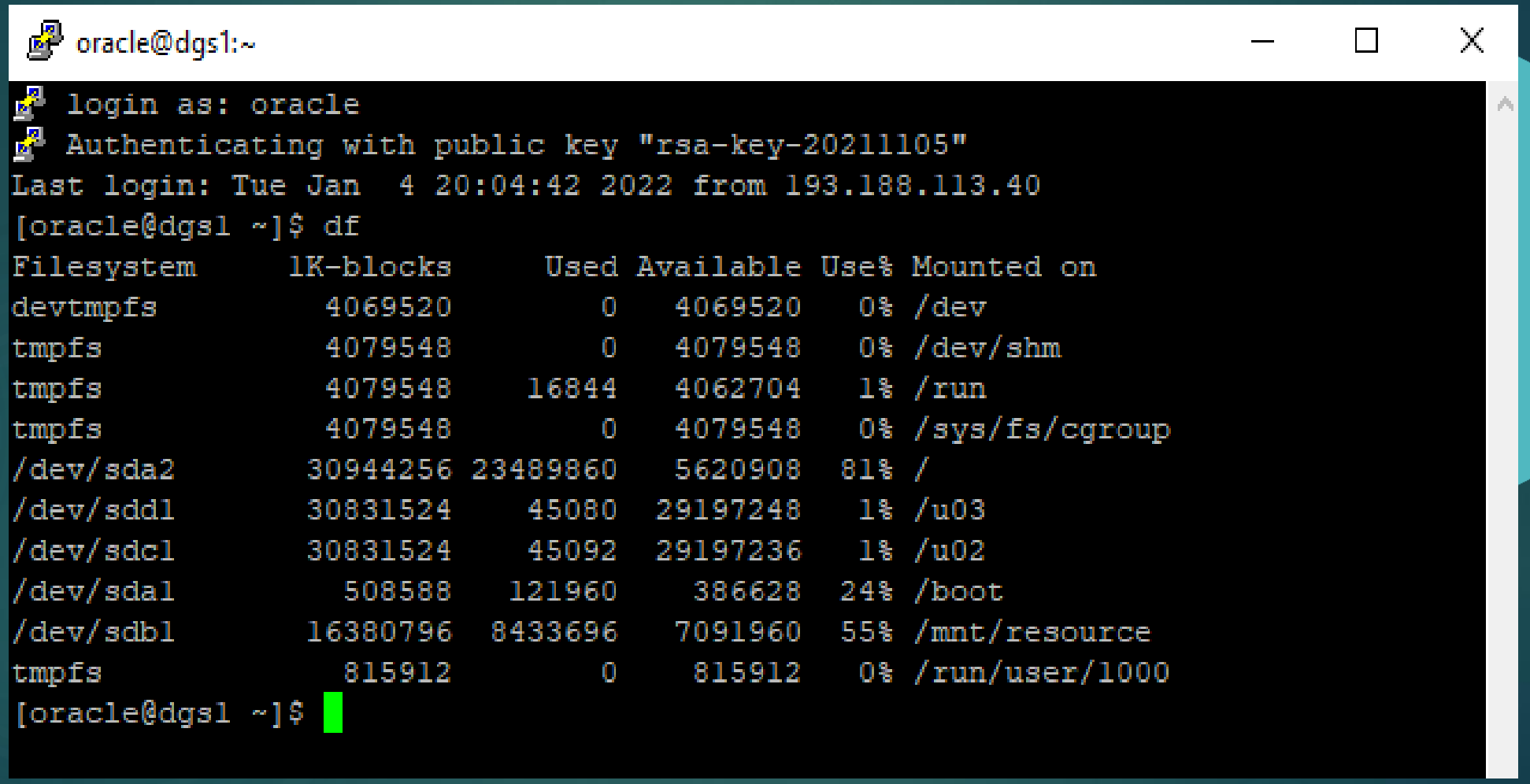
Database structure



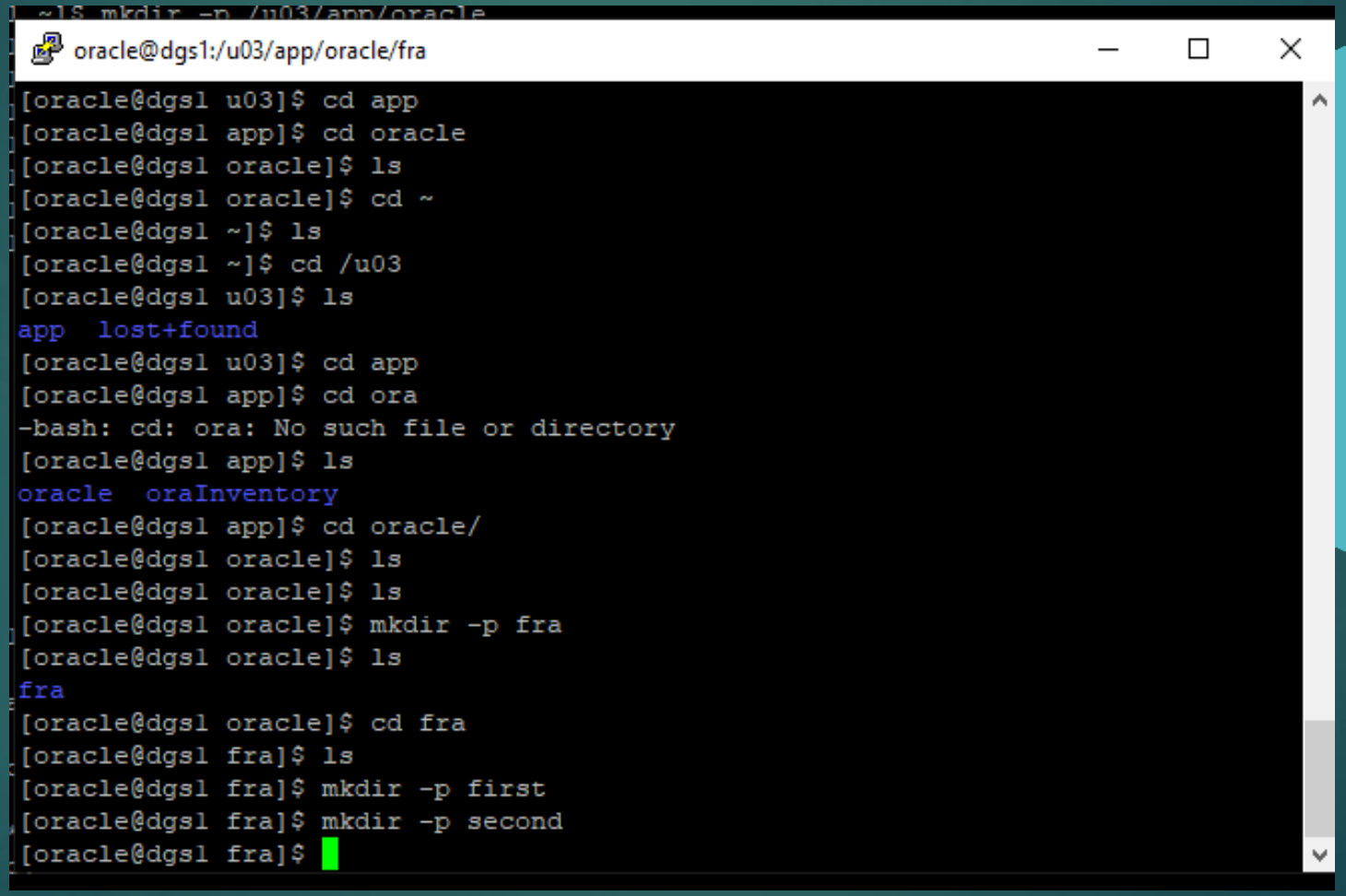
Create VMs and adding Disks



Recognize the disks

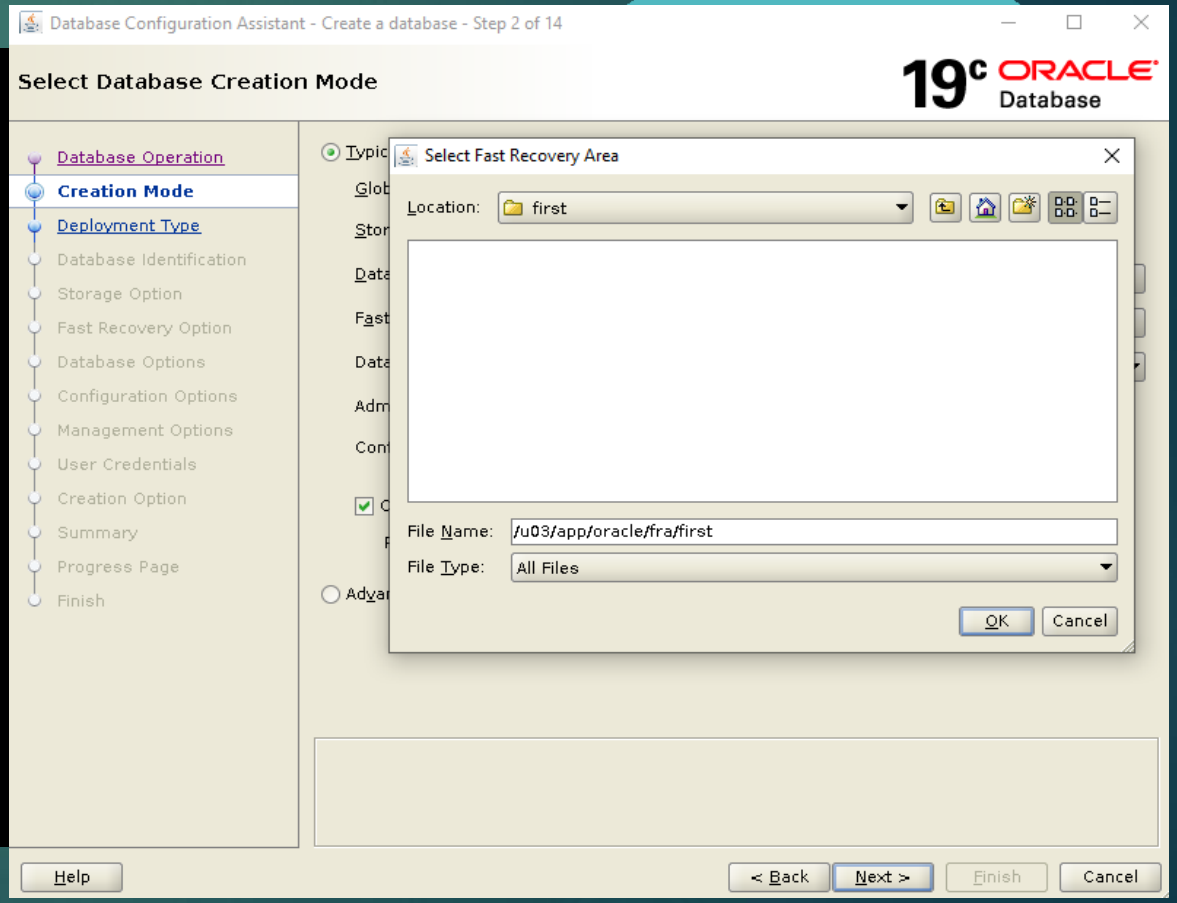


Creating Fast Recovery Area (FRA)



Assigning the FRA

```
[oracle@dgsl ~]$ sql sys as sysdba

SQLcl: Release 19.1 Production on Tue Jan 04 22:42:30 2022

Copyright (c) 1982, 2022, Oracle.  All rights reserved.

Password? (**********?) ***
Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.3.0.0.0


SQL> startup
ORA-01081: cannot start already-running ORACLE - shut it down first
SQL> !lsnrctl start

LSNRCTL for Linux: Version 19.0.0.0.0 - Production on 04-JAN-2022 22:43:09

Copyright (c) 1991, 2019, Oracle.  All rights reserved.

TNS-01106: Listener using listener name LISTENER has already been started

SQL> show parameter db_recovery_file
NAME                         TYPE        VALUE
---------------------------- ----------- --------------------------
db_recovery_file_dest string   /u01/app/oracle/oradata/fra
db_recovery_file_dest_size big integer 10G
SQL> alter system set db_recovery_file_dest='/u03/app/oracle/fra/first' scope=both;

System altered.

SQL>
```

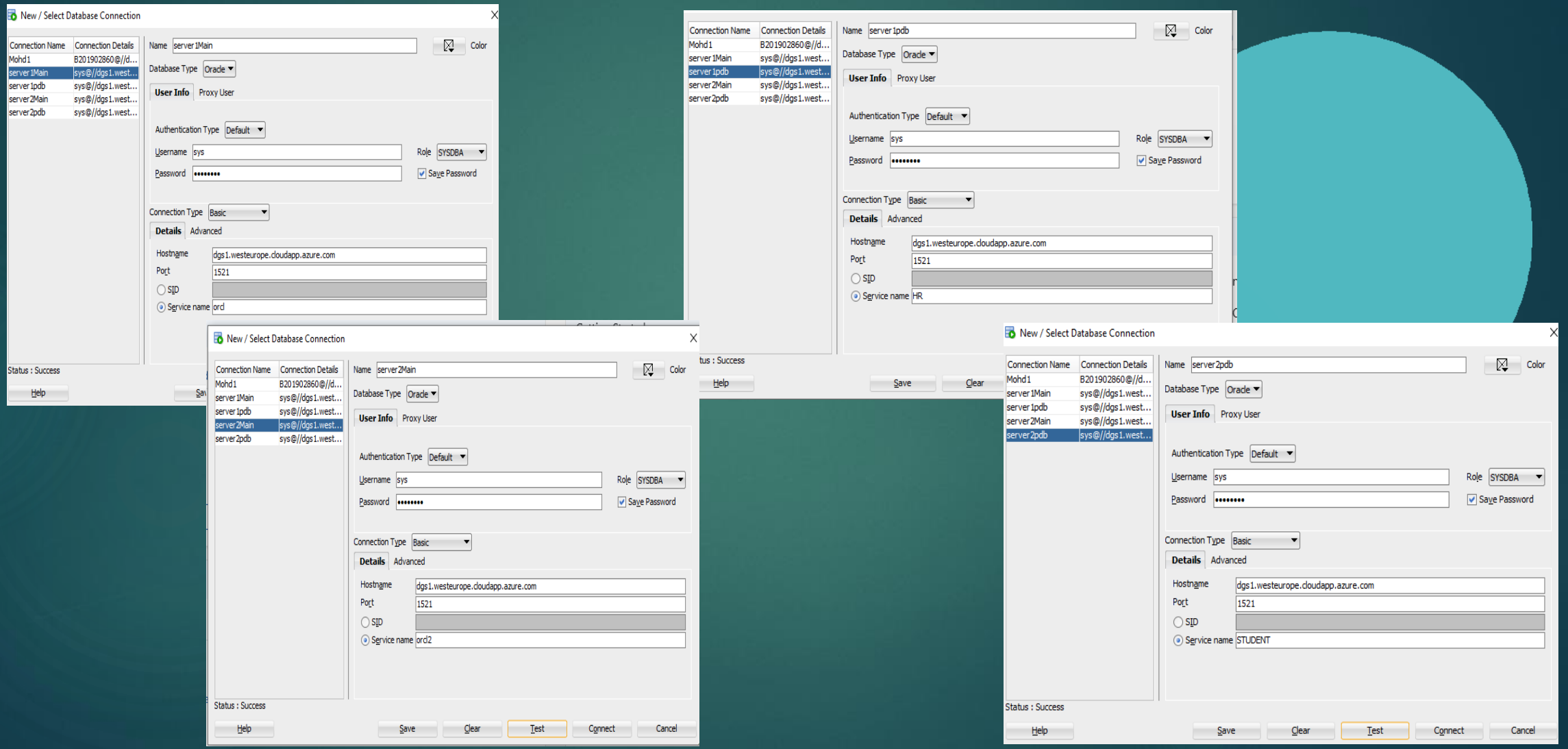


Creating tablespaces in different location

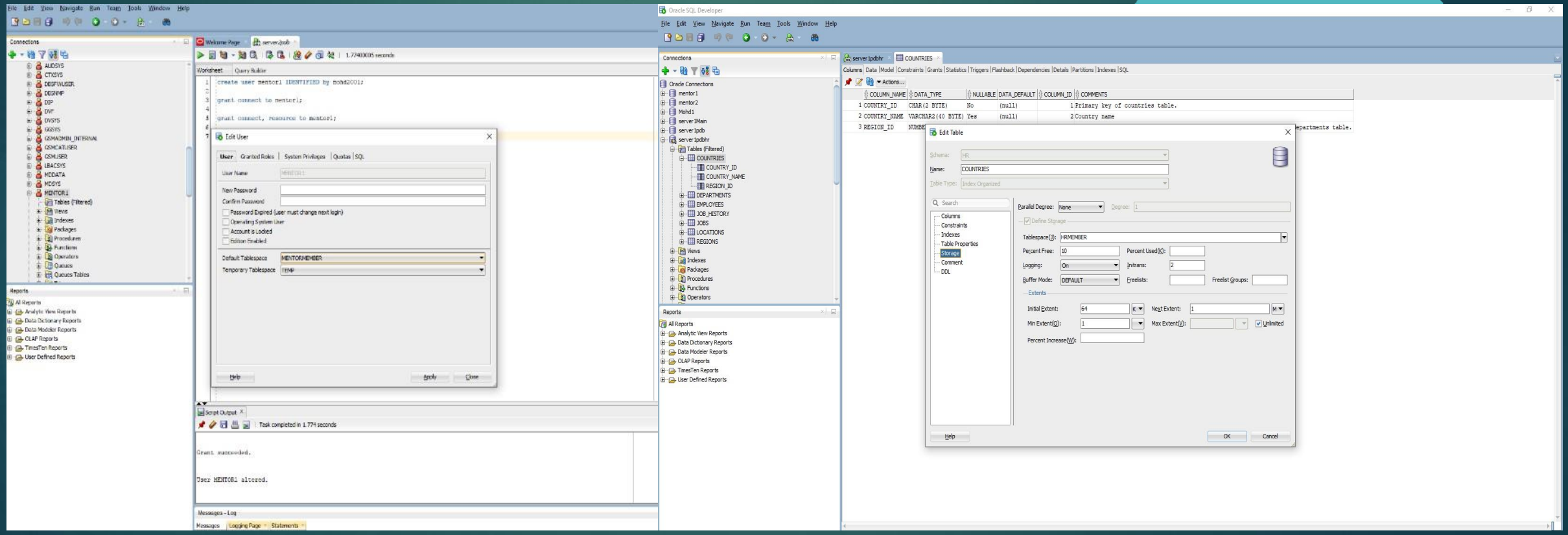
```
oracle@dgs1:~
      TS# NAME                           INC BIG FLA ENC     CON_ID
--------- ------------------------------ --- --- --- --- ----------
        0 SYSTEM                         YES NO YES              3
        1 SYSAUX                         YES NO YES              3
        2 UNDOTBS1                       YES NO YES              3
        3 TEMP                            NO NO YES              3
        5 USERS                          YES NO YES              3
        6 NEWTS                          YES NO YES              3

6 rows selected.

SQL> DROP TABLESPACE NEWTS
  2  ;

Tablespace dropped.

SQL>


SQL> select * from v$tablespace;

      TS# NAME                           INC BIG FLA ENC     CON_ID
--------- ------------------------------ --- --- --- --- ----------
        0 SYSTEM                         YES NO YES              3
        1 SYSAUX                         YES NO YES              3
        2 UNDOTBS1                       YES NO YES              3
        3 TEMP                            NO NO YES              3
        5 USERS                          YES NO YES              3

SQL> CREATE TABLESPACE HRMembers DATAFILE '/u01/app/oracle/oradata/ORCL/HRMembers.dbf' SIZE 50M;

CREATE TABLESPACE HRMembers DATAFILE '/u01/app/oracle/oradata/ORCL/HRMembers.dbf' SIZE 50M
 *
ERROR at line 1:
ORA-01119: error in creating database file
'/u01/app/oracle/oradata/ORCL/HRMembers.dbf'
ORA-27038: created file already exists
Additional information: 1

SQL> CREATE TABLESPACE HRMember DATAFILE '/u01/app/oracle/oradata/ORCL/HRMember.dbf' SIZE 50M;

Tablespace created.

SQL> CREATE TABLESPACE HeadMember DATAFILE '/u01/app/oracle/oradata/ORCL/HeadMember.dbf' SIZE 50M;

Tablespace created.

SQL>  select * from v$tablespace;

      TS# NAME                           INC BIG FLA ENC     CON_ID
--------- ------------------------------ --- --- --- --- ----------
        0 SYSTEM                         YES NO YES              3
        1 SYSAUX                         YES NO YES              3
        2 UNDOTBS1                       YES NO YES              3
        3 TEMP                            NO NO YES              3
        5 USERS                          YES NO YES              3
        8 HRMEMBER                    YES NO YES              3
        9 HEADMEMBER                  YES NO YES              3

7 rows selected.

SQL>
```

```
oracle@dgs1:~
Additional information: 1

SQL> CREATE TABLESPACE StudentMember DATAFILE '/u02/app/oracle/oradata/ORCL2/StudentMember.dbf' SIZE 50M;

CREATE TABLESPACE StudentMember DATAFILE '/u02/app/oracle/oradata/ORCL2/StudentMember.dbf' SIZE 50M
 *
ERROR at line 1:
ORA-01119: error in creating database file
'/u02/app/oracle/oradata/ORCL2/StudentMember.dbf'
ORA-27040: file create error, unable to create file
Linux-x86_64 Error: 2: No such file or directory
Additional information: 1

SQL> SELECT con_id, name, open_mode FROM v$pdbs;

    CON_ID
----------
NAME
--------------------------------------------------------------------------------
OPEN_MODE
----------
         3
STUDENT
READ WRITE


SQL> select * from v$tablespace;

      TS# NAME                           INC BIG FLA ENC     CON_ID
--------- ------------------------------ --- --- --- --- ----------
        0 SYSTEM                         YES NO YES              3
        1 SYSAUX                         YES NO YES              3
        2 UNDOTBS1                       YES NO YES              3
        3 TEMP                            NO NO YES              3
        5 USERS                          YES NO YES              3

SQL> CREATE TABLESPACE StudentMember DATAFILE '/u02/app/oracle/ORCL2/StudentMember.dbf' SIZE 50M;

Tablespace created.

SQL> CREATE TABLESPACE MentorMember DATAFILE '/u02/app/oracle/ORCL2/MentorMember.dbf' SIZE 50M;

Tablespace created.

SQL>


SQL> select * from v$tablespace;

      TS# NAME                           INC BIG FLA ENC     CON_ID
--------- ------------------------------ --- --- --- --- ----------
        0 SYSTEM                         YES NO YES              3
        1 SYSAUX                         YES NO YES              3
        2 UNDOTBS1                       YES NO YES              3
        3 TEMP                            NO NO YES              3
        5 USERS                          YES NO YES              3
        7 STUDENTMEMBER               YES NO YES              3
        8 MENTORMEMBER                YES NO YES              3

7 rows selected.

SQL>
```

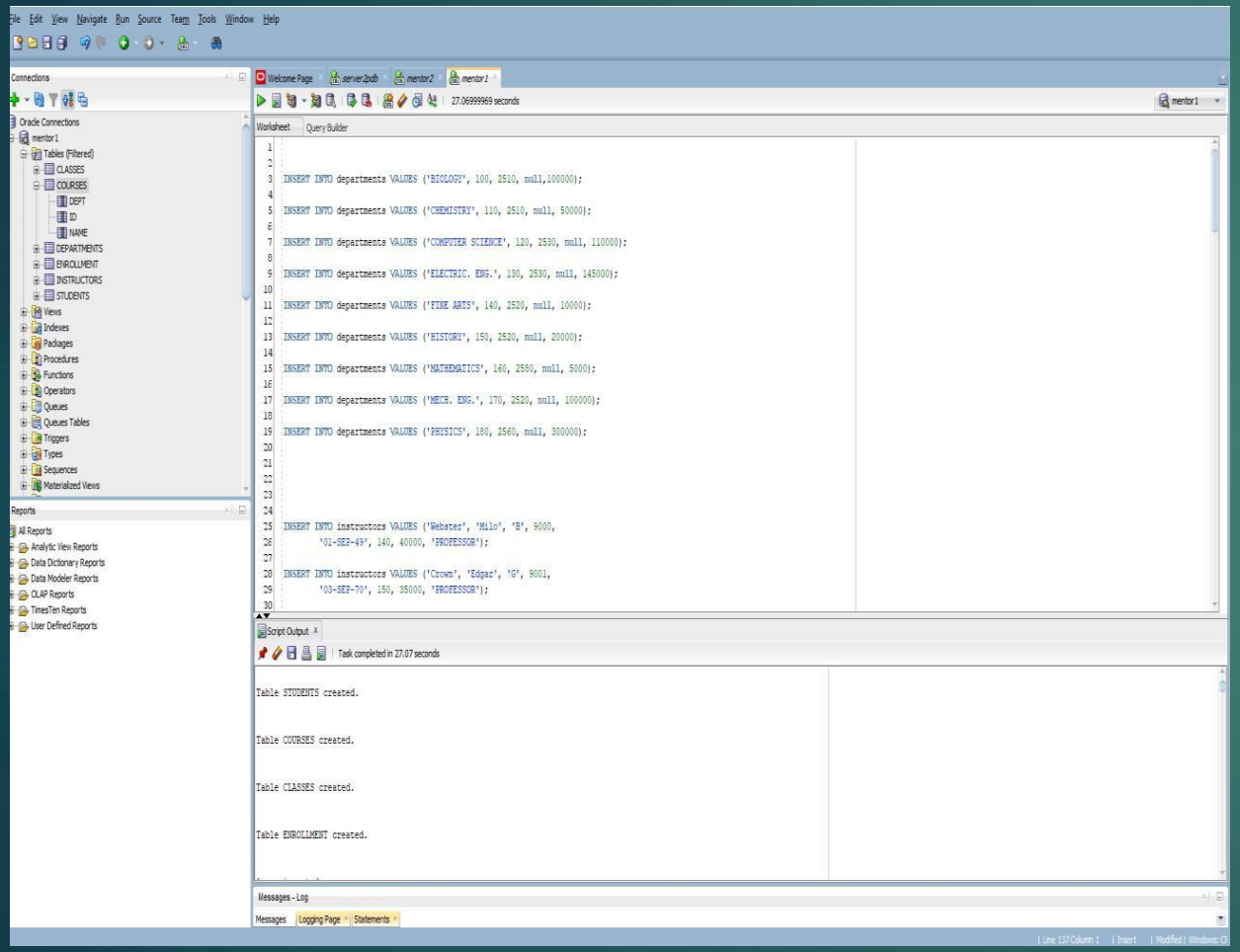
Opening main and pluggable databases in SQL- developer

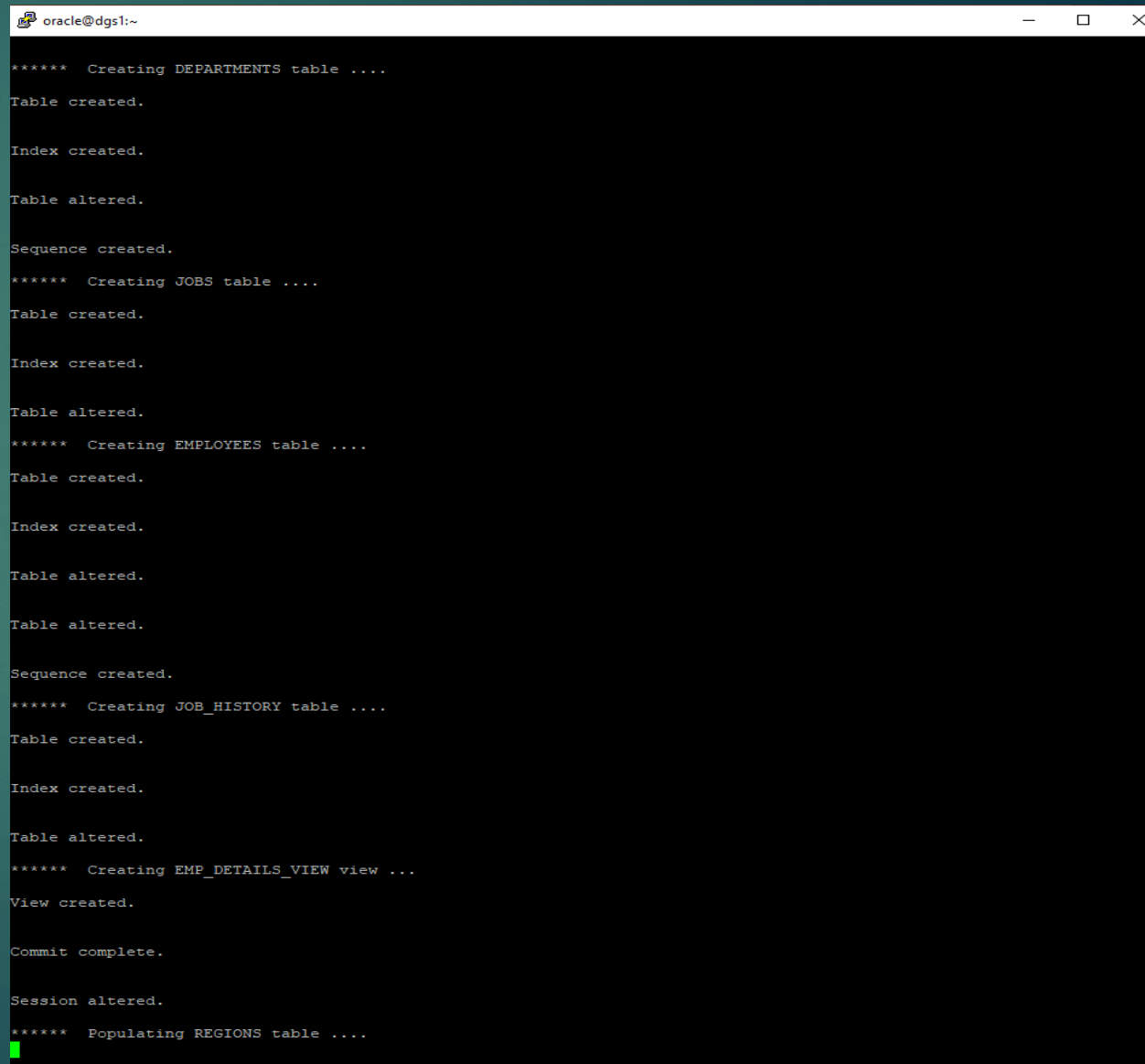


Creation test users , tablespaces and assigning permissions



Inserting test tables





Relocate the FRA in both containers

```
[oracle@dgsl ~]$ dbca
[oracle@dgsl ~]$ df
Filesystem     1K-blocks     Used Available Use% Mounted on
devtmpfs         4069520        0   4069520   0% /dev
tmpfs            4079548        0   4079548   0% /dev/shm
tmpfs            4079548    16876   4062672   1% /run
tmpfs            4079548        0   4079548   0% /sys/fs/cgroup
/dev/sda2       30944256 23735404   5379156  82% /
/dev/sdd1       30831524    45092  29197236   1% /u03
/dev/sdc1       30831524  4537424  24704904  16% /u02
/dev/sda1         508588   121960    386628  24% /boot
/dev/sdb1       16380796  8433696   7091960  55% /mnt/resource
tmpfs             815912        0    815912   0% /run/user/1000
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SQLcl: Release 19.1 Production on Tue Jan 04 22:42:30 2022

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SQL> show parameter db_recovery_file
NAME                         TYPE        VALUE
---------------------------- ----------- --------------------------
db_recovery_file_dest string   /u01/app/oracle/oradata/fra
db_recovery_file_dest_size big integer 10G
SQL> alter system set db_recovery_file_dest='/u03/app/oracle/fra/first' scope=both;

System altered.

SQL>
```
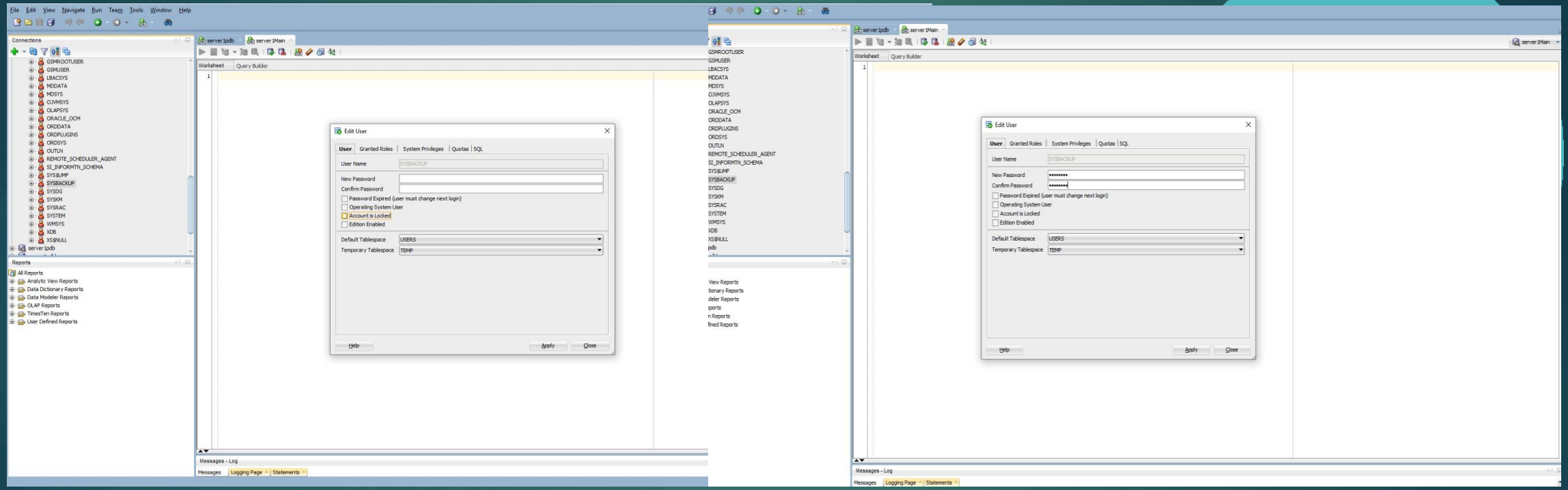
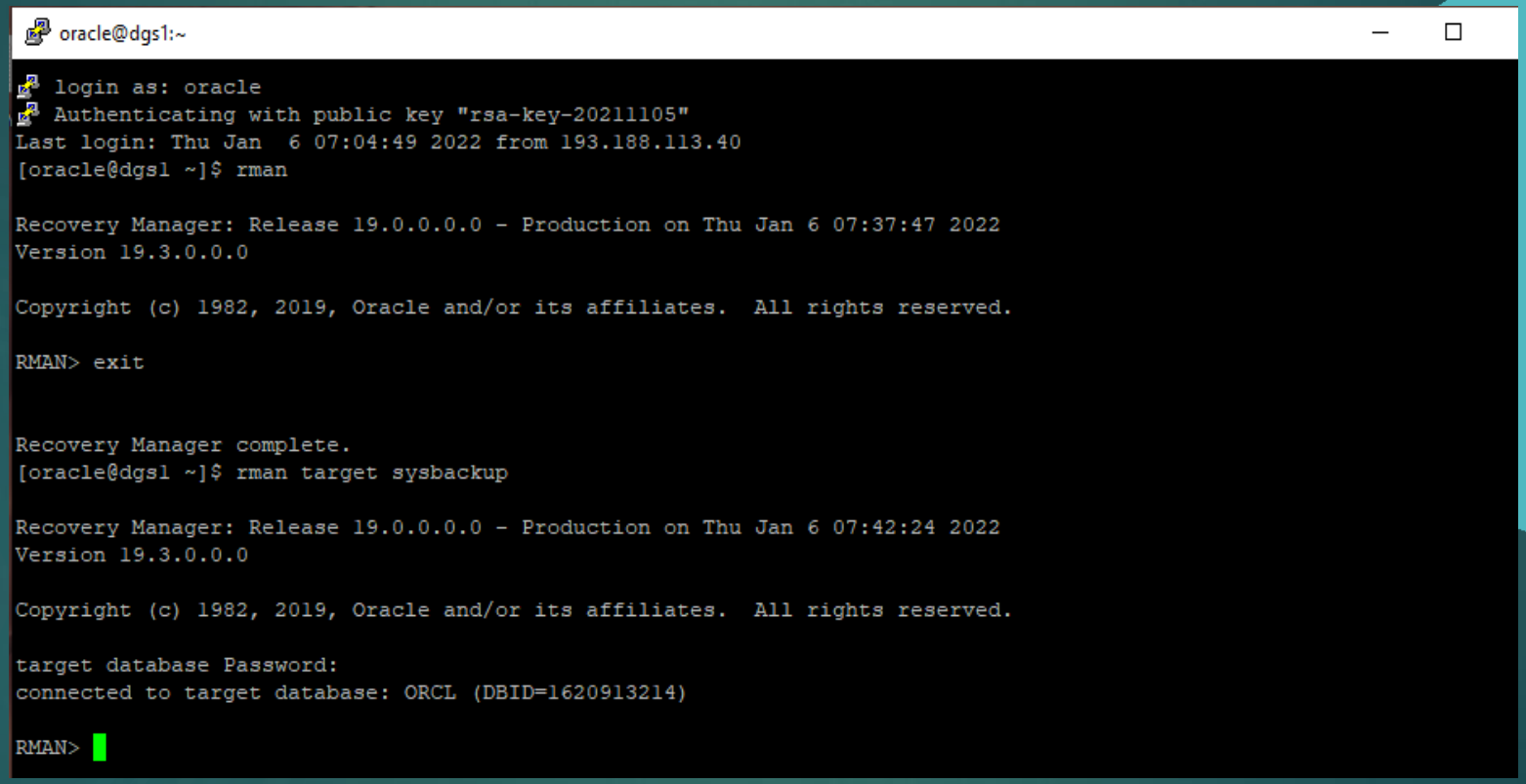

```
SQL> show parameters recovery;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
db_recovery_file_dest                string      /u02/app/oracle/fast_recovery_
                                                 area
db_recovery_file_dest_size           big integer 12732M
recovery_parallelism                 integer     0
remote_recovery_file_dest            string
SQL> alter system set db_recovery_file_dest='/u03/app/oracle/fra/second' scope=both;

System altered.

SQL> show parameters recovery;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
db_recovery_file_dest                string      /u03/app/oracle/fra/second
db_recovery_file_dest_size           big integer 12732M
recovery_parallelism                 integer     0
remote_recovery_file_dest            string
SQL>
```

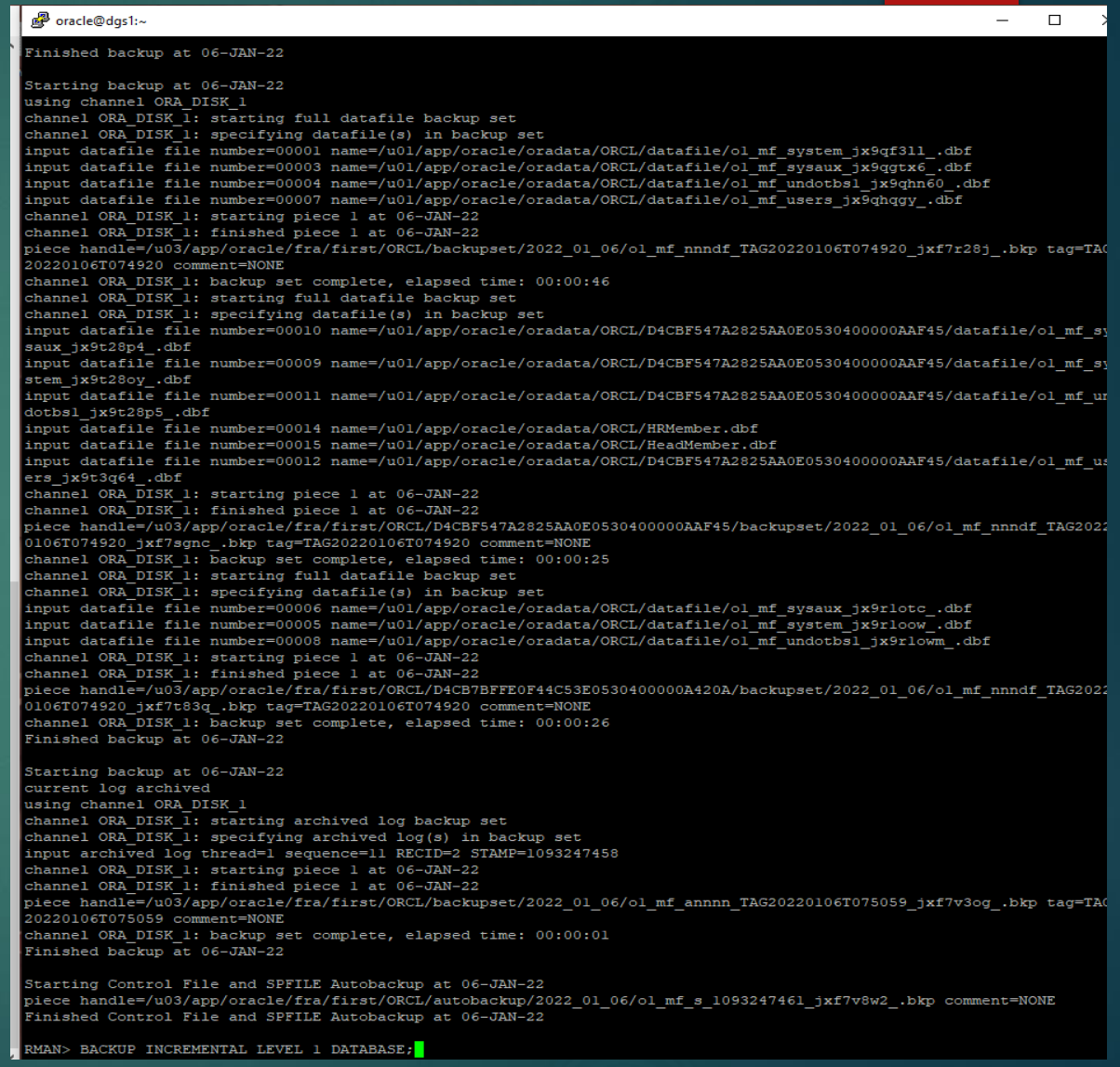
Opening sysbackup user



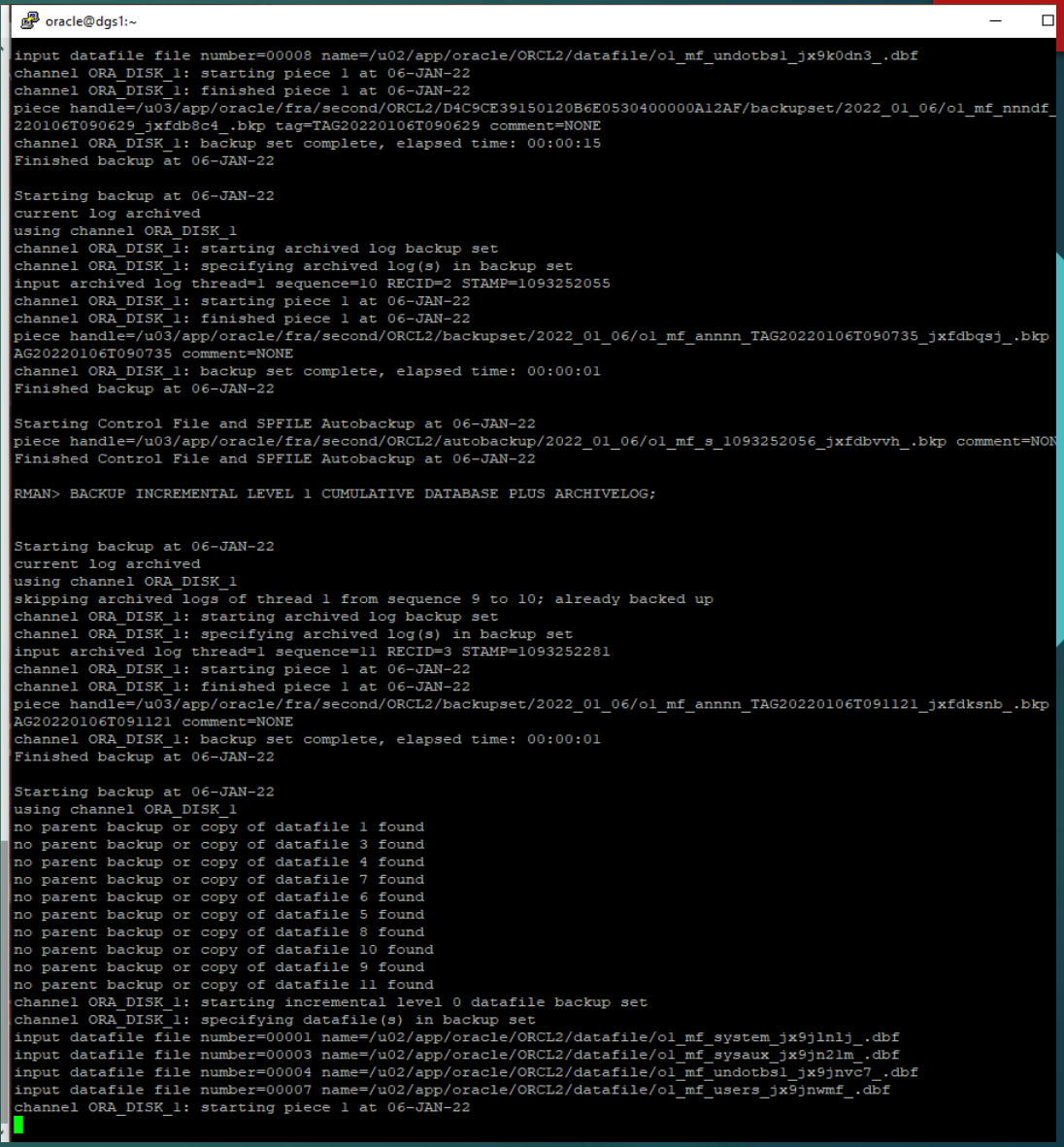
Entering RMAN



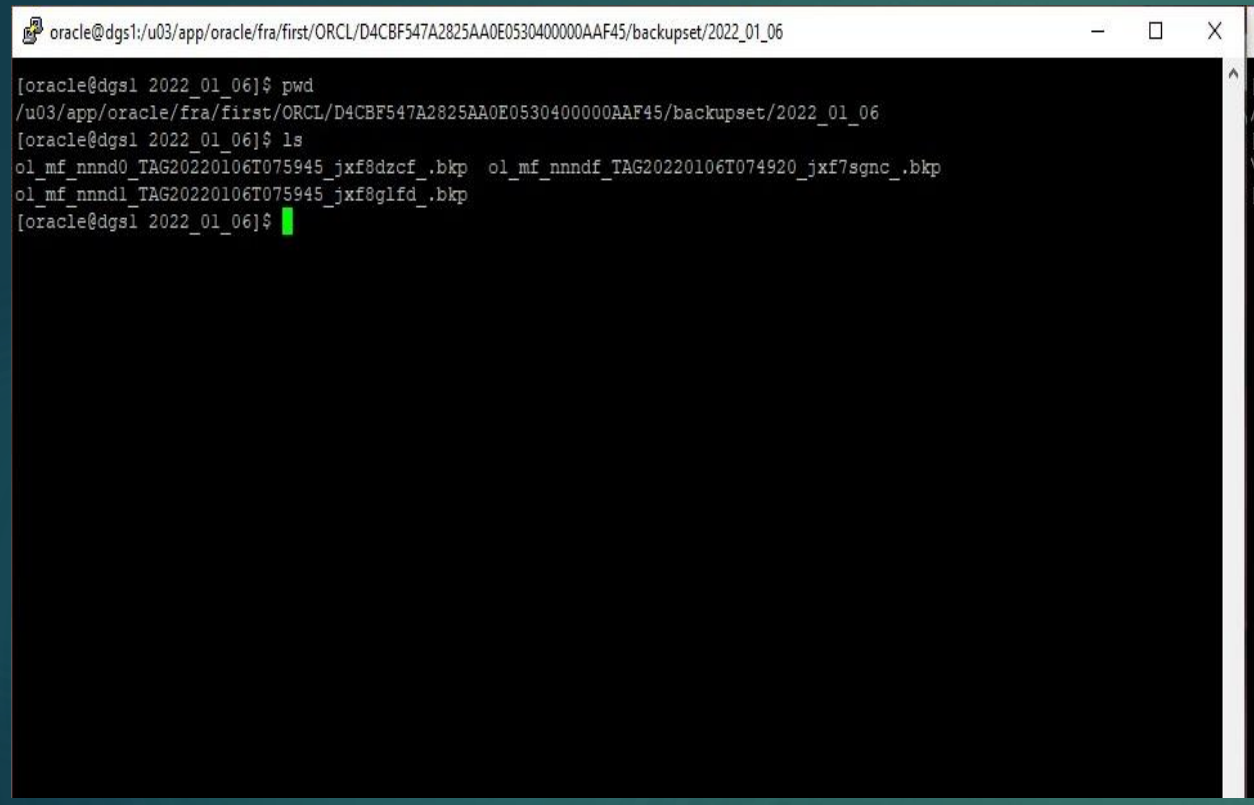
Start incremental level 1 backup (Differential) for HR database

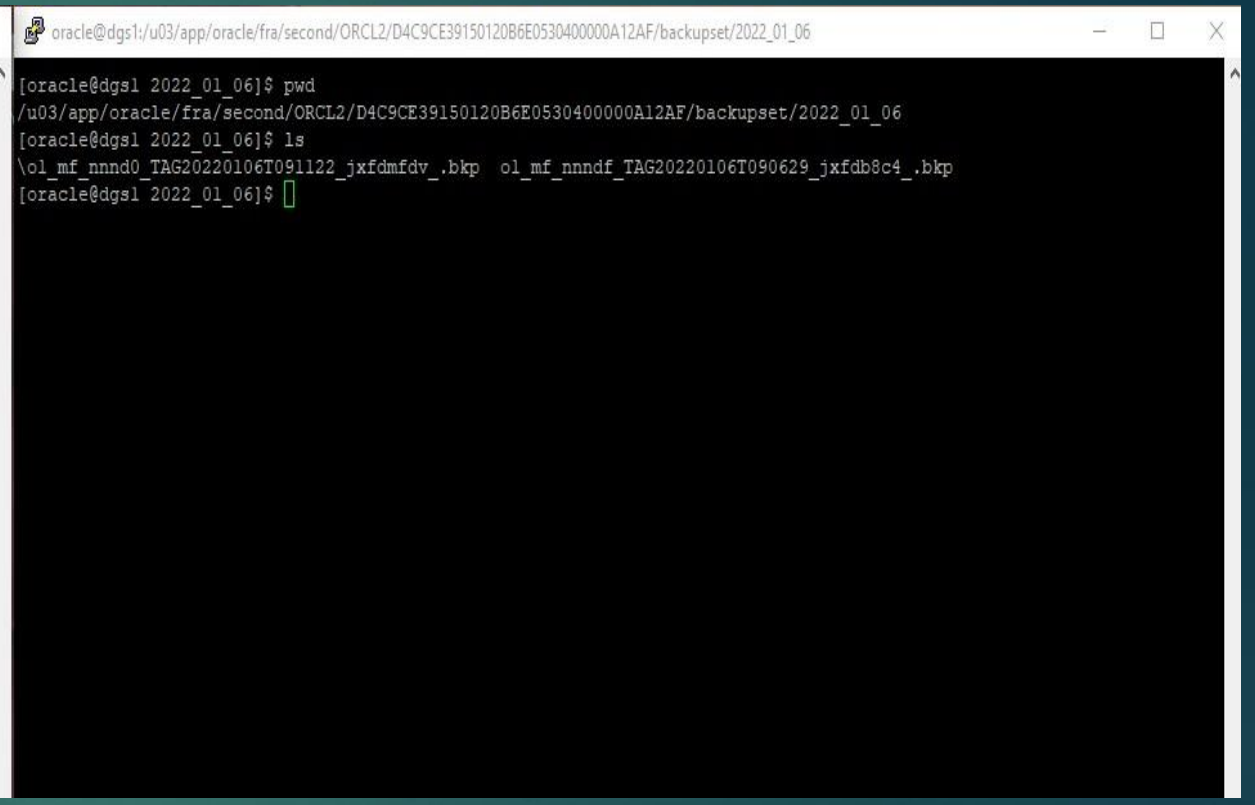


Start incremental level 1 backup (cumulative) for student database



Backup result



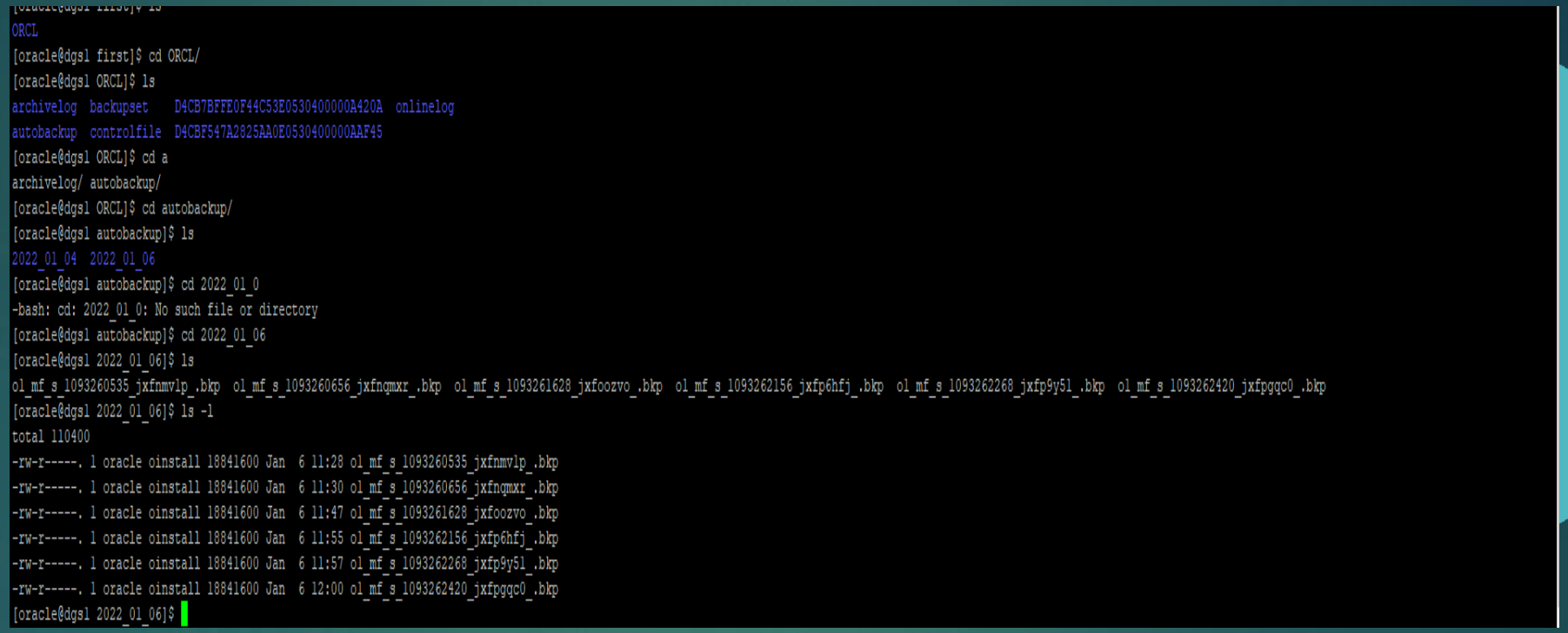


Auto backup

```
oracle@dgs1:/u01/app/oracle/product/19.3.0/dbhome_1/autobackup
[oracle@dgs1 2022_01_06]$ pwd
/u03/app/oracle/fra/first/ORCL/D4CBF547A2825AA0E0530400000AAF45/backupset/2022_01_06
[oracle@dgs1 2022_01_06]$ ls
o1_mf_nnnd0_TAG20220106T075945_jxf8dzcf_.bkp  o1_mf_nnndf_TAG20220106T074920_jxf7sgnc_.bkp
o1_mf_nnnd1_TAG20220106T075945_jxf8glfd_.bkp
[oracle@dgs1 2022_01_06]$ cd $ORACLE_HOME
[oracle@dgs1 dbhome_1]$ mkdir autobackup
mkdir: cannot create directory 'autobackup': File exists
[oracle@dgs1 dbhome_1]$ cd autobackup/
[oracle@dgs1 autobackup]$ ls
daily_backup.sh  hourly_backup.sh
[oracle@dgs1 autobackup]$ nano daily_backup.sh
[oracle@dgs1 autobackup]$ crontab -l
MAILTO=first.last@example.com
# MI HH DD MM DAY CMD
  43  05  *  *  *  /u01/app/oracle/product/19.3.0/dbhome_1/autobackup/daily_backup.sh
  45  05  *  *  *  /u01/app/oracle/product/19.3.0/dbhome_1/autobackup/hourly_backup.sh
[oracle@dgs1 autobackup]$ date
Thu Jan  6 11:20:39 UTC 2022
[oracle@dgs1 autobackup]$ nano .crontab
[oracle@dgs1 autobackup]$ ls
daily_backup.sh  hourly_backup.sh
[oracle@dgs1 autobackup]$ crontab -l
MAILTO=first.last@example.com
# MI HH DD MM DAY CMD
  43  05  *  *  *  /u01/app/oracle/product/19.3.0/dbhome_1/autobackup/daily_backup.sh
  45  05  *  *  *  /u01/app/oracle/product/19.3.0/dbhome_1/autobackup/hourly_backup.sh
[oracle@dgs1 autobackup]$ nano daily_backup.sh
[oracle@dgs1 autobackup]$ nano .crontab
[oracle@dgs1 autobackup]$ crontab -e
crontab: installing new crontab
[oracle@dgs1 autobackup]$ crontab -l
MAILTO=first.last@example.com
# MI HH DD MM DAY CMD
  28  11  *  *  *  /u01/app/oracle/product/19.3.0/dbhome_1/autobackup/daily_backup.sh
  45  05  *  *  *  /u01/app/oracle/product/19.3.0/dbhome_1/autobackup/hourly_backup.sh
[oracle@dgs1 autobackup]$
```

```
oracle@dgs1:/u03/app/oracle/fra/second/ORCL2/D4C9CE39150120B6E0530400000A12AF/backupset/2022_01_06
  List of Datafiles in backup set 9
  Container ID: 3, PDB Name: STUDENT
  File LV Type Ckp SCN    Ckp Time  Abs Fuz SCN Sparse Name
  ---- -- ---- ---------- --------- ----------- ------ ----
  9    0  Incr 2437265    06-JAN-22             NO    /u02/app/oracle/ORCL2/D4CA00BA066B28BCE0530400000A9FAE/datafil
e/o1_mf_system_jx9kvsrr_.dbf
  10   0  Incr 2437265    06-JAN-22             NO    /u02/app/oracle/ORCL2/D4CA00BA066B28BCE0530400000A9FAE/datafil
e/o1_mf_sysaux_jx9kvssd_.dbf
  11   0  Incr 2437265    06-JAN-22             NO    /u02/app/oracle/ORCL2/D4CA00BA066B28BCE0530400000A9FAE/datafil
e/o1_mf_undotbs1_jx9kvssf_.dbf

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ ---------------
10      Incr 0  555.32M     DISK        00:00:13     06-JAN-22
        BP Key: 10   Status: AVAILABLE  Compressed: NO  Tag: TAG20220106T091122
        Piece Name: /u03/app/oracle/fra/second/ORCL2/D4C9CE39150120B6E0530400000A12AF/backupset/2022_01_06/o1_mf_nnnd
0_TAG20220106T091122_jxfdmfdv_.bkp
  List of Datafiles in backup set 10
  Container ID: 2, PDB Name: PDB$SEED
  File LV Type Ckp SCN    Ckp Time  Abs Fuz SCN Sparse Name
  ---- -- ---- ---------- --------- ----------- ------ ----
  5    0  Incr 2135888    04-JAN-22             NO    /u02/app/oracle/ORCL2/datafile/o1_mf_system_jx9k0dlz_.dbf
  6    0  Incr 2135888    04-JAN-22             NO    /u02/app/oracle/ORCL2/datafile/o1_mf_sysaux_jx9k0dmo_.dbf
  8    0  Incr 2135888    04-JAN-22             NO    /u02/app/oracle/ORCL2/datafile/o1_mf_undotbs1_jx9k0dn3_.dbf

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ ---------------
11      Incr 1  3.38M      DISK        00:00:00     06-JAN-22
        BP Key: 11   Status: AVAILABLE  Compressed: NO  Tag: TAG20220106T091122
        Piece Name: /u03/app/oracle/fra/second/ORCL2/D4CA00BA066B28BCE0530400000A9FAE/backupset/2022_01_06/o1_mf_nnnd
1_TAG20220106T091122_jxfdmwkn_.bkp
  List of Datafiles in backup set 11
  Container ID: 3, PDB Name: STUDENT
  File LV Type Ckp SCN    Ckp Time  Abs Fuz SCN Sparse Name
  ---- -- ---- ---------- --------- ----------- ------ ----
  12   1  Incr 2437265    06-JAN-22             NO    /u02/app/oracle/ORCL2/D4CA00BA066B28BCE0530400000A9FAE/datafil
e/o1_mf_users_jx9kwotq_.dbf
  15   1  Incr 2437265    06-JAN-22             NO    /u02/app/oracle/ORCL2/StudentMember.dbf
  16   1  Incr 2437265    06-JAN-22             NO    /u02/app/oracle/ORCL2/MentorMember.dbf

BS Key  Size       Device Type Elapsed Time Completion Time
------- ---------- ----------- ------------ ---------------
12      50.00K     DISK        00:00:01     06-JAN-22
        BP Key: 12   Status: AVAILABLE  Compressed: NO  Tag: TAG20220106T091229
        Piece Name: /u03/app/oracle/fra/second/ORCL2/backupset/2022_01_06/o1_mf_annnn_TAG20220106T091229_jxfdmylr_.bk
p

  List of Archived Logs in backup set 12
  Thrd Seq     Low SCN    Low Time  Next SCN   Next Time
  ---- ------- ---------- --------- ---------- ---------
  1    12      2451218    06-JAN-22 2451332    06-JAN-22

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ ---------------
13      Full    17.95M     DISK        00:00:03     06-JAN-22
        BP Key: 13   Status: AVAILABLE  Compressed: NO  Tag: TAG20220106T091231
        Piece Name: /u03/app/oracle/fra/second/ORCL2/autobackup/2022_01_06/o1_mf_s_1093252351_jxfdn27o_.bkp
  SPFILE Included: Modification time: 06-JAN-22
  SPFILE db_unique_name: ORCL2
  Control File Included: Ckp SCN: 2451363      Ckp time: 06-JAN-22

RMAN>
```

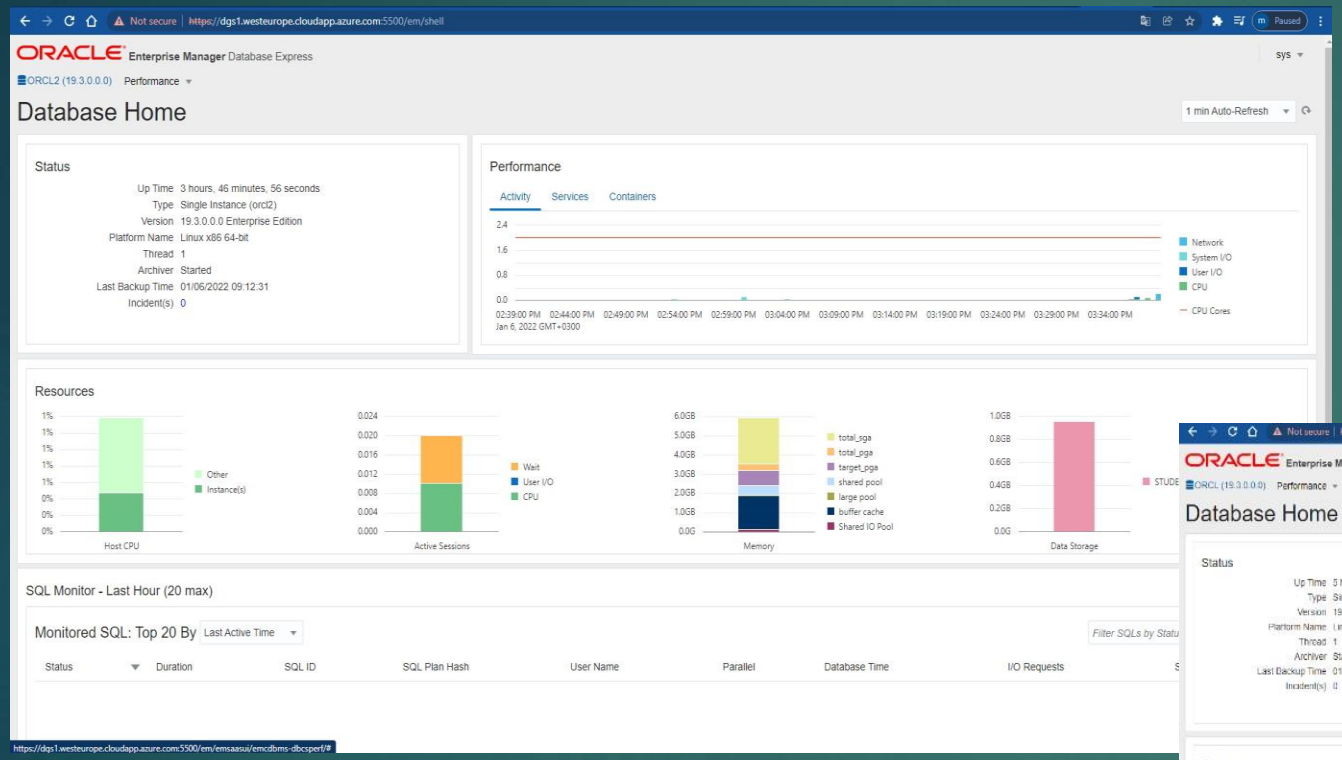
Auto Backup result

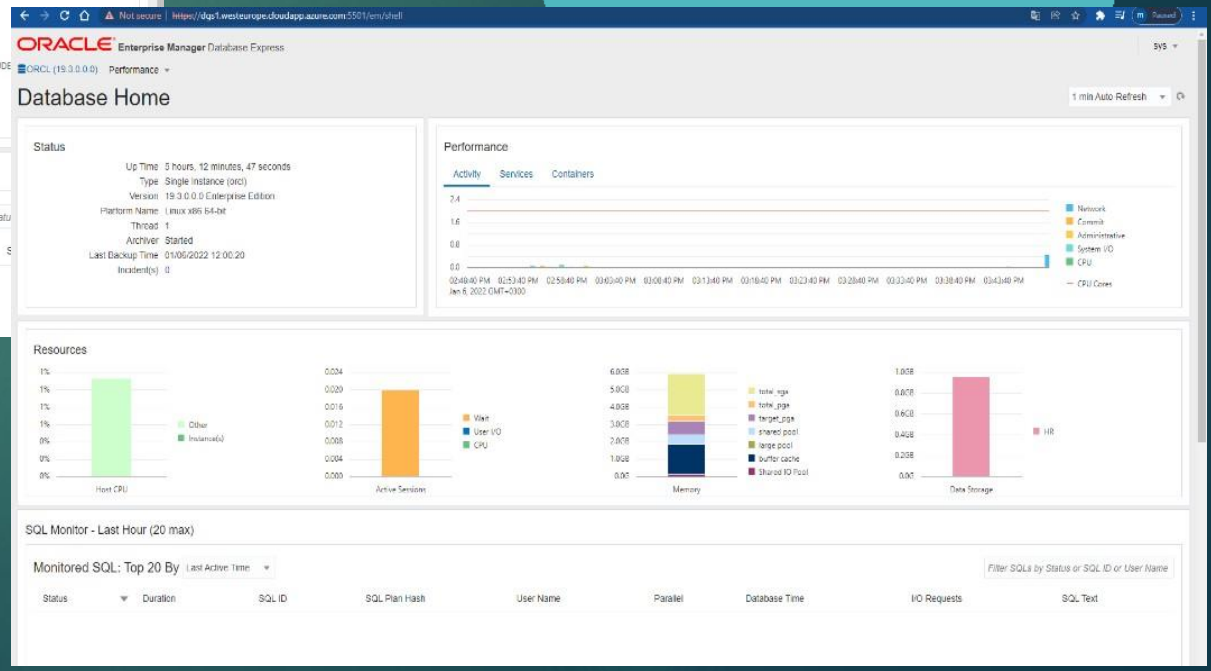


Adding ports to start using EM

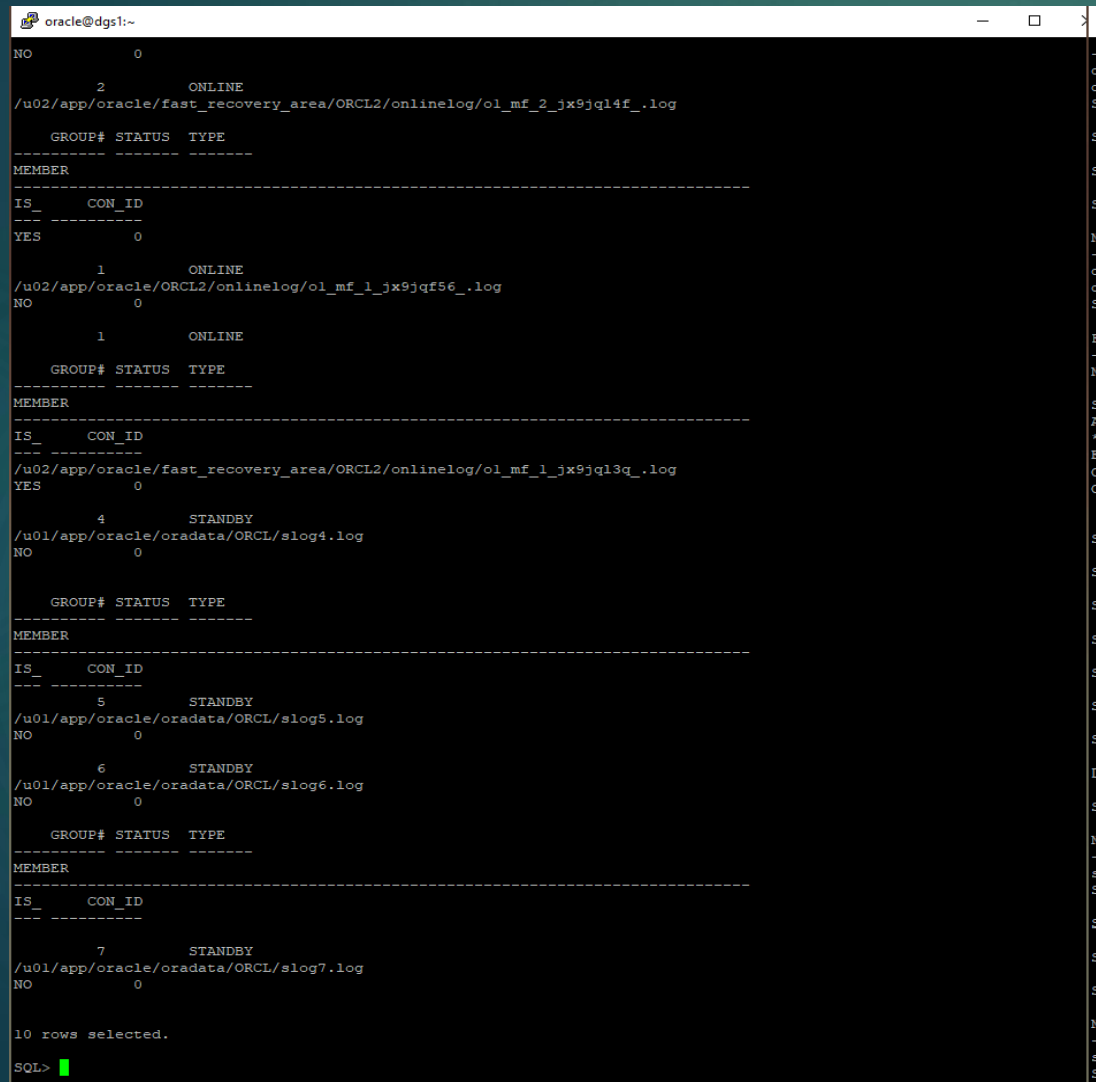
Priority	Name	Port	Protocol	Source	Destination	Action
300	SSH	22	TCP	Any	Any	Allow
320	HTTPS	443	TCP	Any	Any	Allow
340	HTTP	80	TCP	Any	Any	Allow
1000	oracle	1521	Any	Any	Any	Allow
1010	oracleem	5500	Any	Any	Any	Allow
1020	oracleem1	5501	Any	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

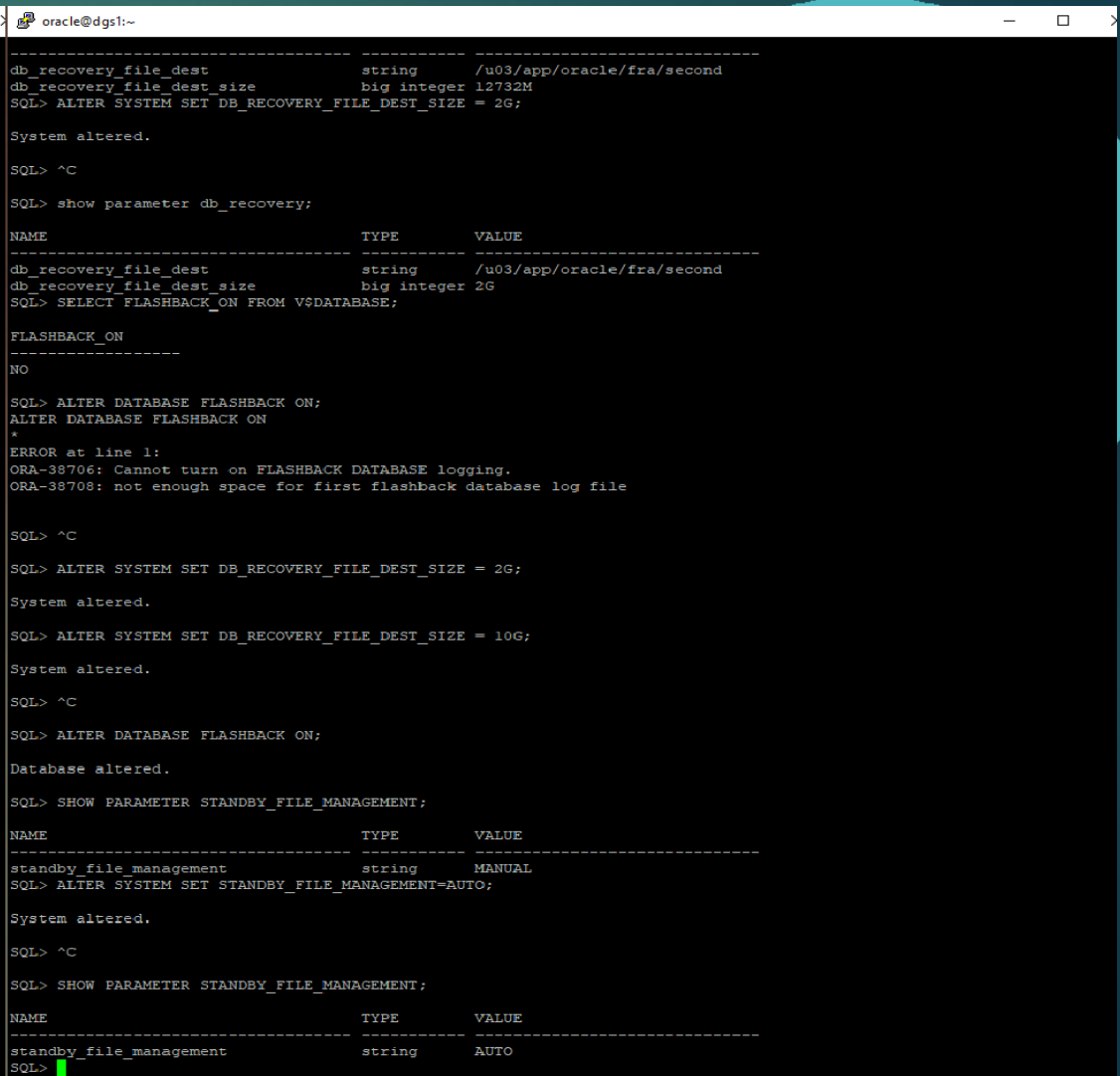
Analyzing in EM in both databases



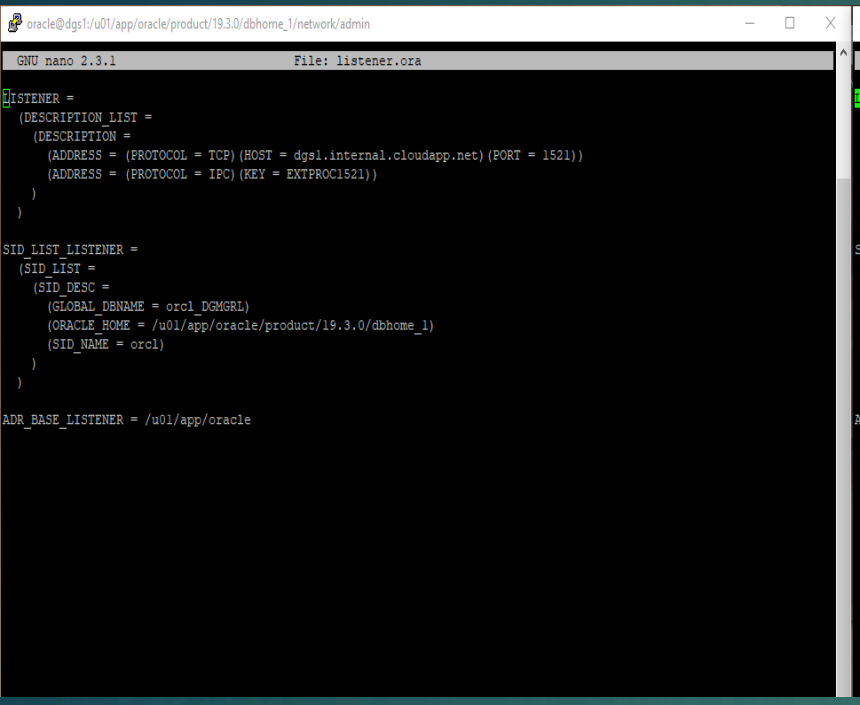


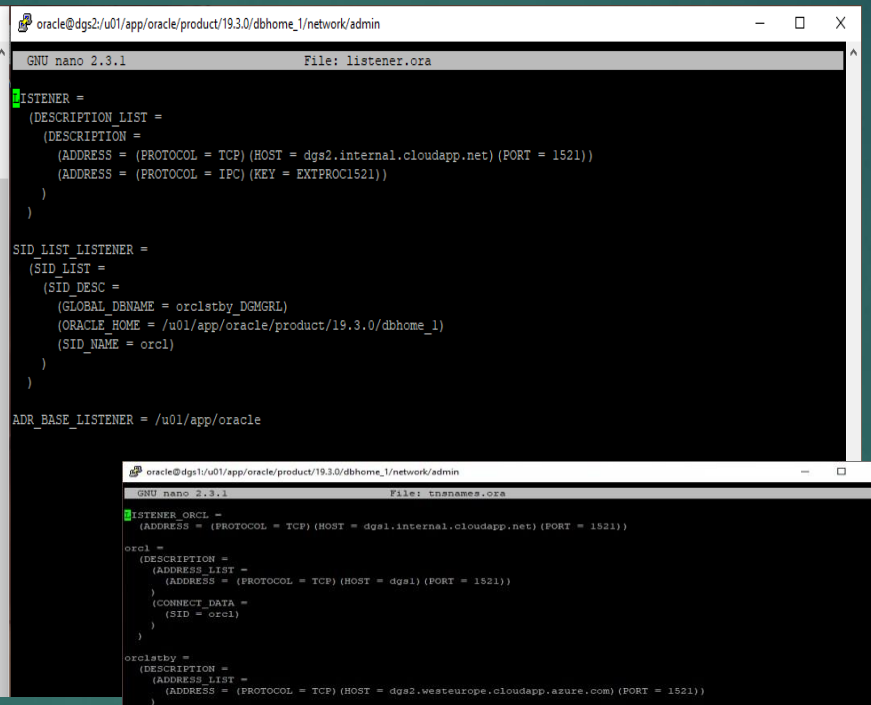
Start implementing data guard by adding standby log files

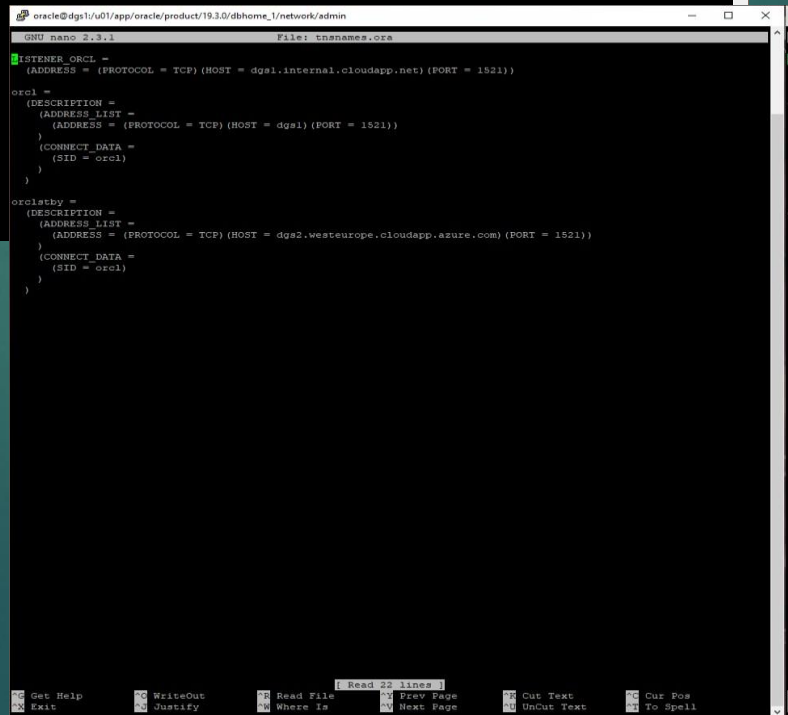


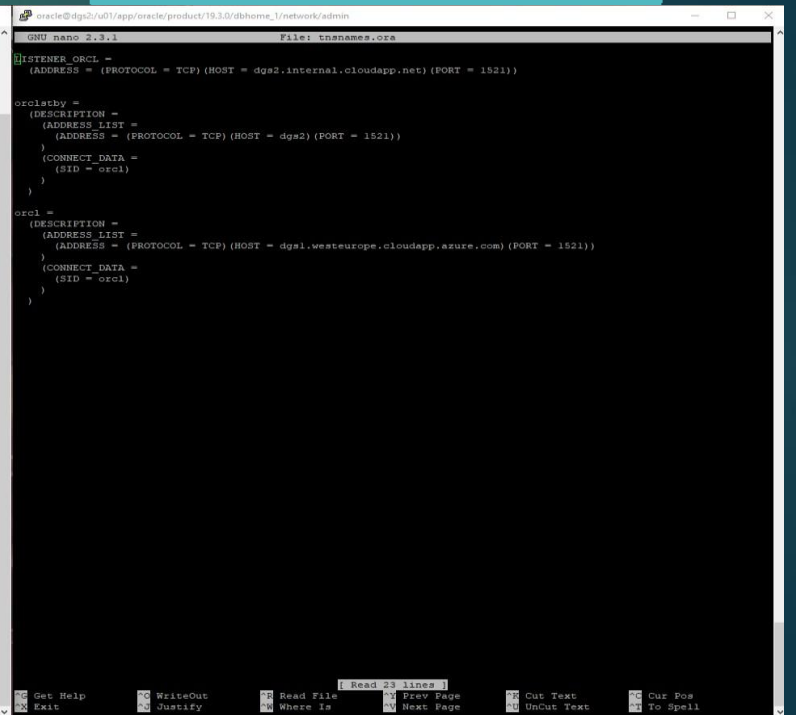


Adjust listener and tnsnames files

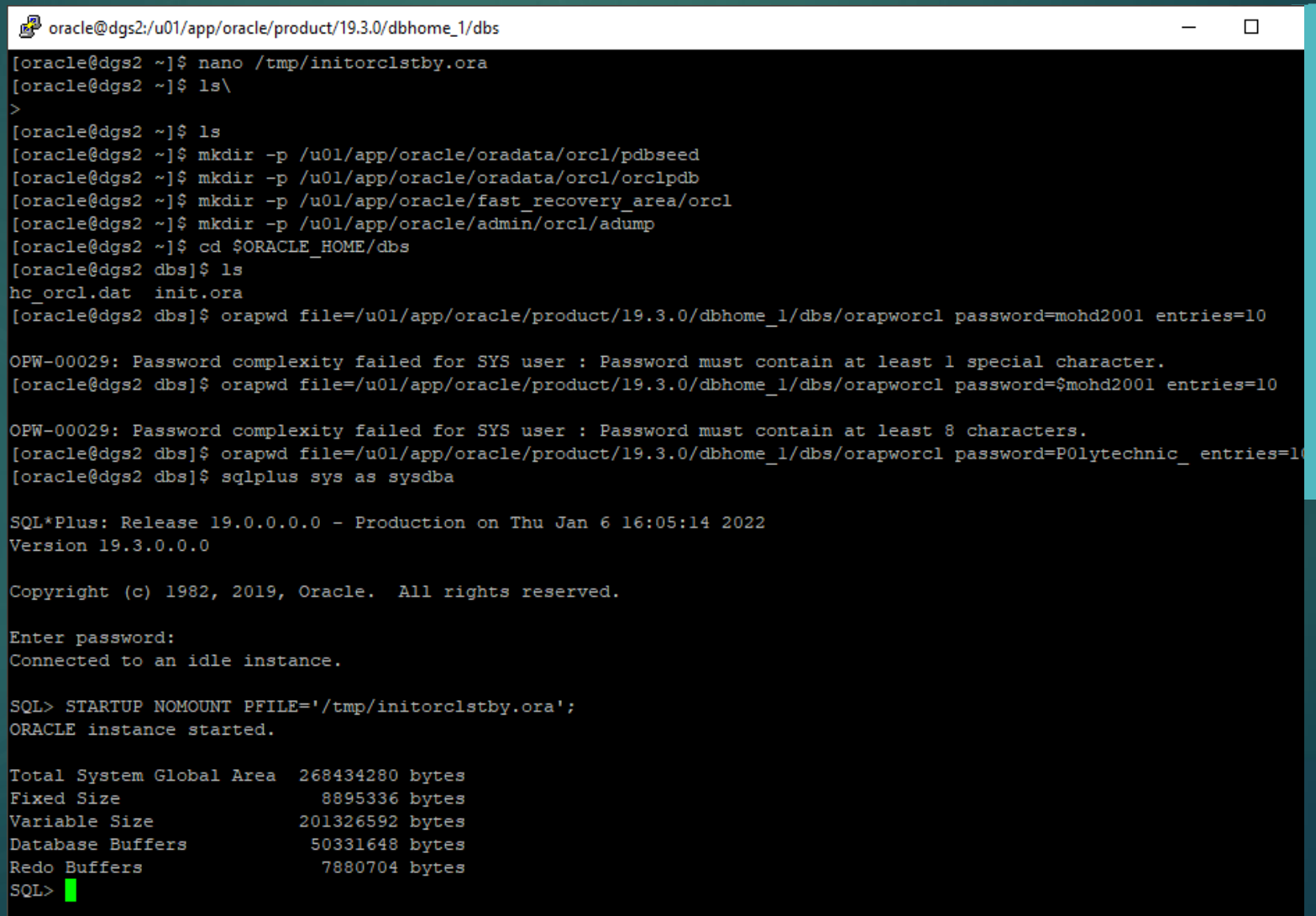




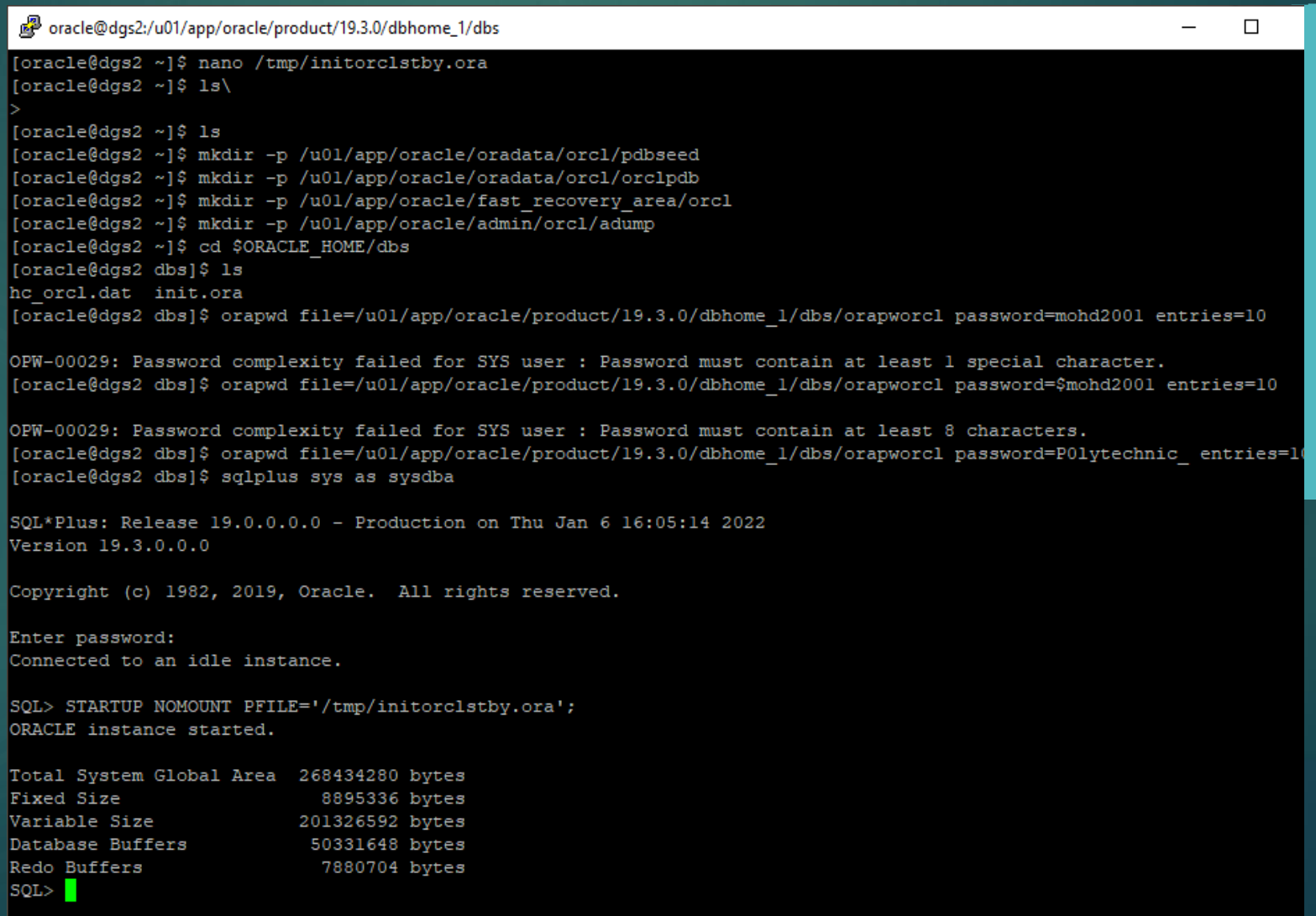




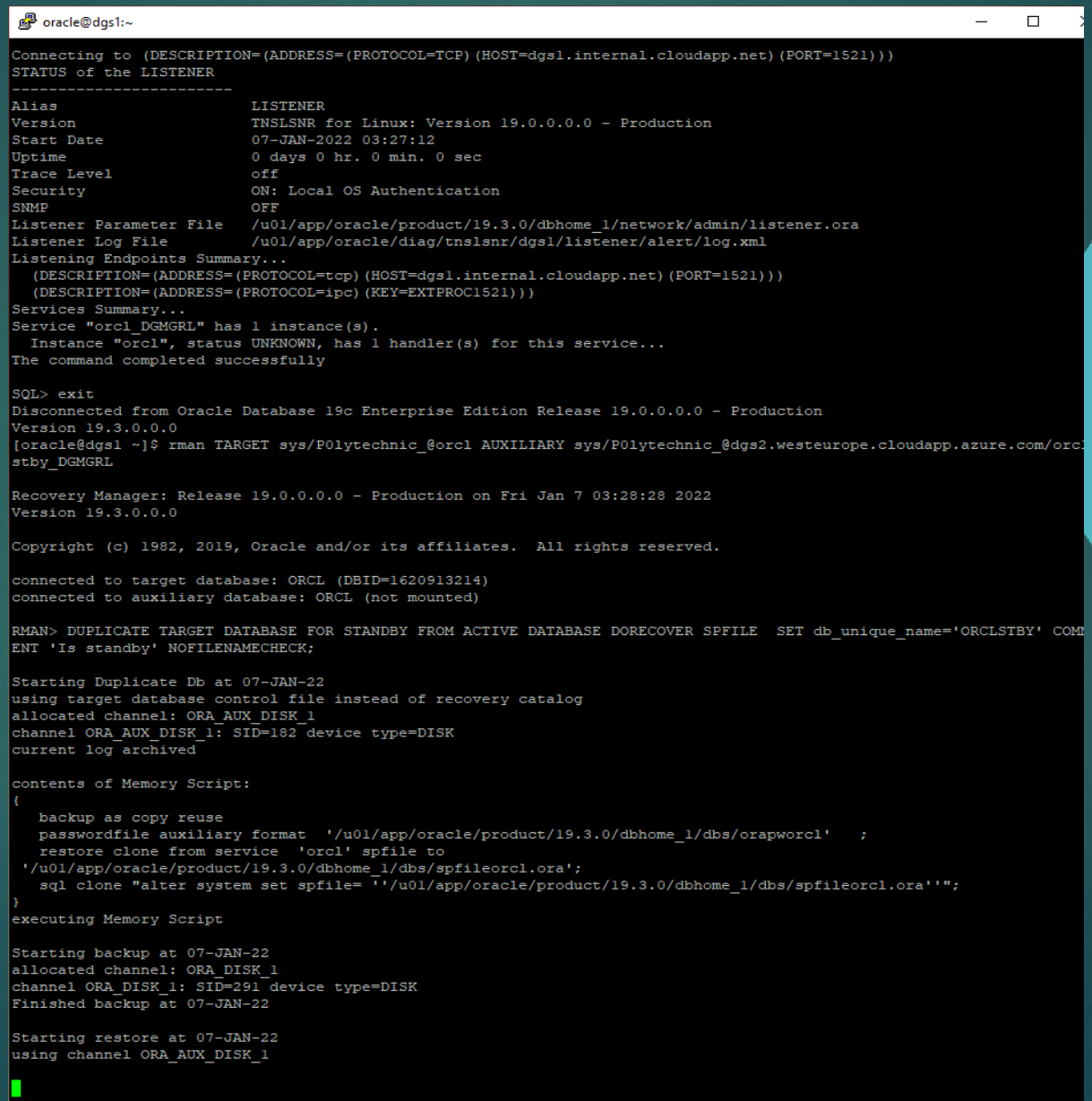
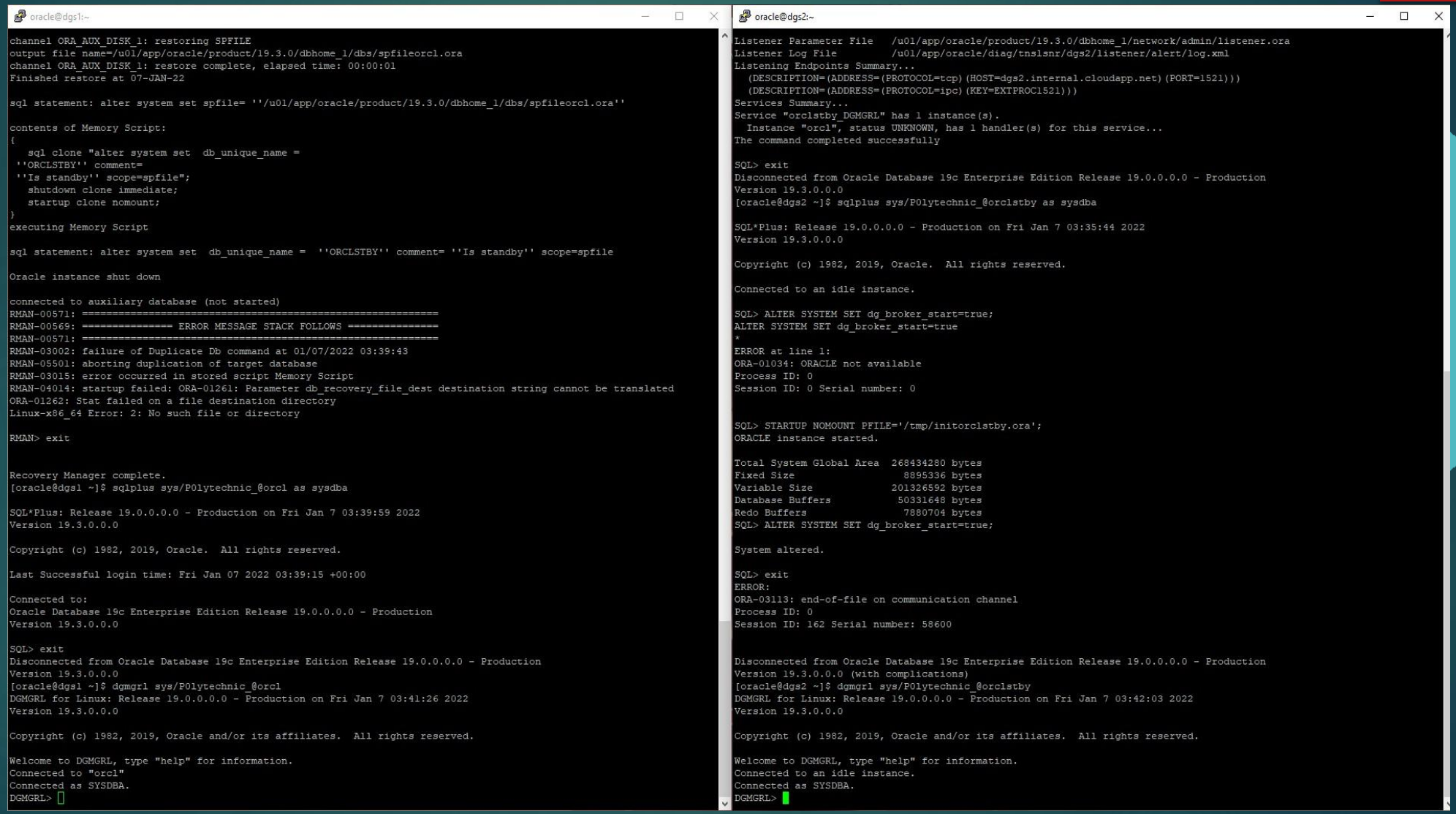
Creating initial server parameter for the standby DB



Creating initial server parameter for the standby DB



Duplicate target



Entering DGMGRL