

Resiliência de negócio? Use a replicação inter-regiões Oracle Cloud

Thamires Samira Ferreira

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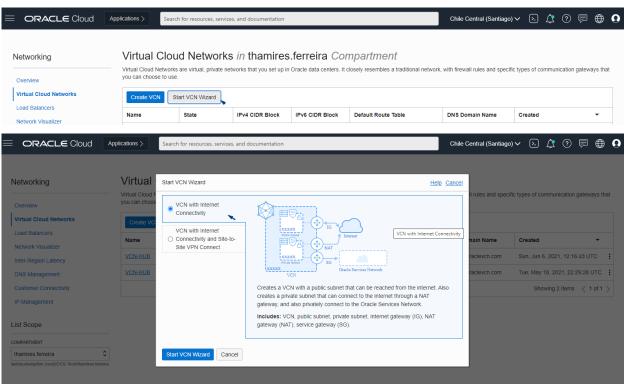
CONFIGURAÇÕES DE REDE E CONECTIVIDADE

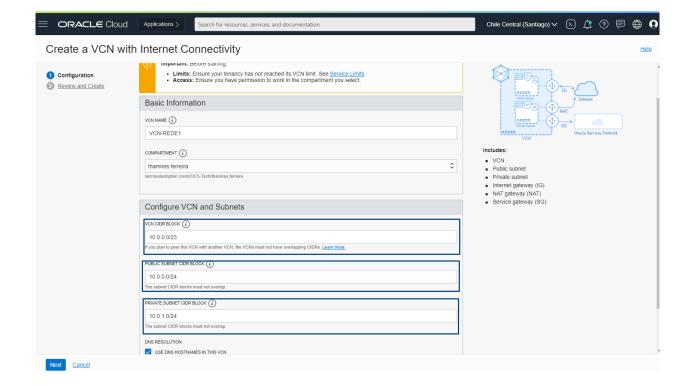
O primeiro passo é estabelecer a conectividade e garantir que as redes não tenham sobreposição (overlap).

As subnets serão os CIDR marcados na coluna "Join" como /24 e as VCNs /23

Subnet address	Netmask	Range of addresses	Useable IPs	Hosts	Divide	Joi	n
10.0.0.0/24	255.255.255.0	10.0.0.0 - 10.0.0.255	10.0.0.1 - 10.0.0.254	254	<u>Divide</u>	/24	27
10.0.1.0/24	255.255.255.0	10.0.1.0 - 10.0.1.255	10.0.1.1 - 10.0.1.254	254	<u>Divide</u>	/24	3
10.0.2.0/24	255.255.255.0	10.0.2.0 - 10.0.2.255	10.0.2.1 - 10.0.2.254	254	<u>Divide</u>	/24	12
10.0.3.0/24	255.255.255.0	10.0.3.0 - 10.0.3.255	10.0.3.1 - 10.0.3.254	254	<u>Divide</u>	/24	3
10.0.4.0/24	255.255.255.0	10.0.4.0 - 10.0.4.255	10.0.4.1 - 10.0.4.254	254	<u>Divide</u>	/24	77
10.0.5.0/24	255.255.255.0	10.0.5.0 - 10.0.5.255	10.0.5.1 - 10.0.5.254	254	<u>Divide</u>	/24	ü
10.0.6.0/24	255.255.255.0	10.0.6.0 - 10.0.6.255	10.0.6.1 - 10.0.6.254	254	<u>Divide</u>	/24	27
10.0.7.0/24	255.255.255.0	10.0.7.0 - 10.0.7.255	10.0.7.1 - 10.0.7.254	254	<u>Divide</u>	/24	23

A OCI conta com um assisstente que já estabelece redes públicas e privadas com rotas security lists e gateways padrão:

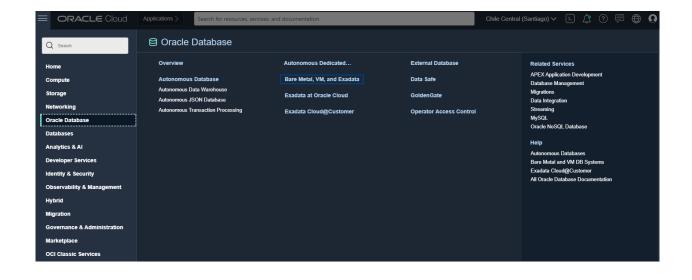


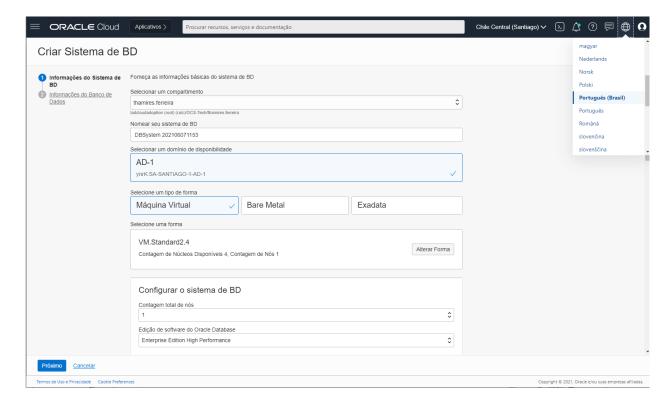


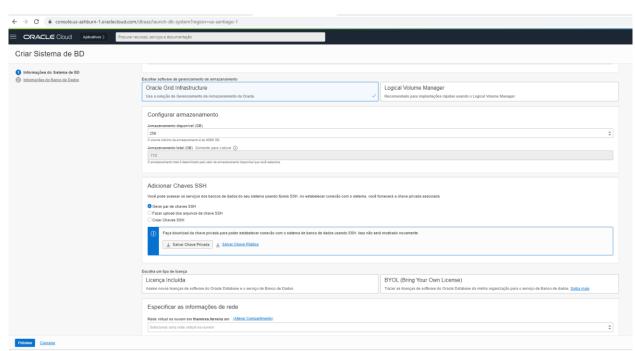
CRIAÇÃO DOS BANCOS DE DADOS

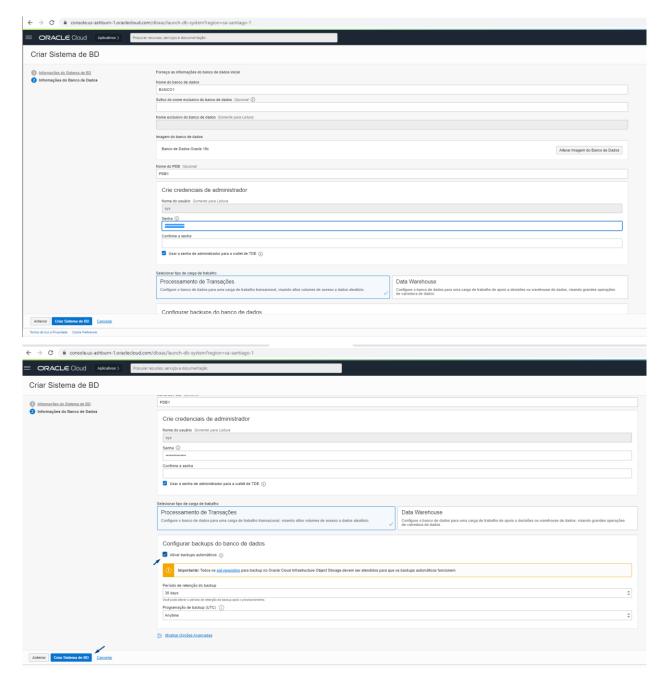
Para essa demonstração já deixaremos ativados os backups automáticos, assim o banco já será criado em archivelog mode.

O procedimento de criação precisa ser feito nas duas ou mais regiões de interesse.









CONFIGURAÇÃO DATA GUARD

Note que esse passo a passo foi elaborado para ambientes de laborátorio. Para ambientes produtivos verificações adicionais e cuidados extras seão necessários respeitando a particularidade de cada ambiente.

VERIFICAÇÕES E CONFIGURAÇÕES DE INICIAIS

1. Verifique se o ambiente de origem e destino estão no modo ARCHIVELOG

Caso o ambiente esteja no modo NOARCHIVELOG, execute o comando abaixo:

```
SQL> SHUTDOWN IMMEDIATE;
SQL> STARTUP MOUNT;
SQL> ALTER DATABASE ARCHIVELOG;
```

Verifique o parâmetro FORCE LOGGING

```
SQL> ALTER DATABASE FORCE LOGGING;
```

- 3. Crie os logs de redo standby nos bancos de dados de origem e de destino, mas antes disso verifique:
 - A localização do caminho dos logs de redo
 - O tamanho dos redo logs para criar os redo logs standby com o mesmo tamanho deles.

```
DESTINO
SQL> select GROUP#, MEMBER from v$logfile;
   GROUP# TYPE MEMBER
       3 ONLINE +RECO/TARGET IAD1XR/ONLINELOG/group 3.259.1065461691
        2 ONLINE +RECO/TARGET IAD1XR/ONLINELOG/group 2.258.1065461691
        1 ONLINE +RECO/TARGET IAD1XR/ONLINELOG/group 1.257.1065461689
SQL> select GROUP#,THREAD#,SEQUENCE#,bytes/1024/1024, MEMBERS,STATUS from gvslog;
   GROUP# THREAD# SEQUENCE# BYTES/1024/1024 MEMBERS STATUS
       1 1 7 1024 1 INACTIVE 2 1 8 1024 1 CURRENT
                                          1024
                                                       1 INACTIVE
SOL> ALTER DATABASE ADD STANDBY LOGFILE ('+RECO') SIZE 1024M;
SQL> ALTER DATABASE ADD STANDBY LOGFILE ('+RECO') SIZE 1024M;
SQL> ALTER DATABASE ADD STANDBY LOGFILE ('+RECO') SIZE 1024M;
SQL> col member format a50
SQL> select GROUP#, TYPE, MEMBER from v$logfile;
   GROUP# TYPE MEMBER
        3 ONLINE +RECO/TARGET IAD1XR/ONLINELOG/group 3.259.1065461691
        2 ONLINE +RECO/TARGET IAD1XR/ONLINELOG/group 2.258.1065461691
        1 ONLINE +RECO/TARGET IAD1XR/ONLINELOG/group 1.257.1065461689
        4 STANDBY +RECO/DBMEETUP IAD2N5/ONLINELOG/group 4.272.1067533271
        5 STANDBY +RECO/DBMEETUP IAD2N5/ONLINELOG/group 5.273.1067533281
        6 STANDBY +RECO/DBMEETUP IAD2N5/ONLINELOG/group 6.274.1067533295
[grid@dbmeet ~]$ asmcmd
ASMCMD> 1s
DATA/
RECO/
ASMCMD> cd RECO/
ASMCMD> 1s
```

```
DBMEETUP IAD2N5/
ASMCMD> cd DBMEETUP IAD2N5/
ASMCMD> ls
ONLINELOG/
ASMCMD> cd ONLINELOG/
ASMCMD> 1s
group 1.257.1064323355
group 2.258.1064323355
group 3.259.1064323355
group_4.272.1067533271
group_5.273.1067533281
group_6.274.1067533295
SOURCE
{\tt SQL}{\gt} col member format a50
SQL> select GROUP#, MEMBER from v$logfile;
   GROUP# MEMBER
           +RECO/TARGET IAD1XR/ONLINELOG/group_3.259.1065461691
            +RECO/TARGET IAD1XR/ONLINELOG/group 2.258.1065461691
             +RECO/TARGET IAD1XR/ONLINELOG/group 1.257.1065461689
SQL> select GROUP#, THREAD#, SEQUENCE#, bytes/1024/1024, MEMBERS, STATUS from gv$log;
   GROUP# THREAD# SEQUENCE# BYTES/1024/1024 MEMBERS STATUS
                            7
8
                                           1024
1024
                                                         1 INACTIVE
                   1
                   1
                                                         1 CURRENT
                                           1024
                                                         1 INACTIVE
SQL> ALTER DATABASE ADD STANDBY LOGFILE ('+RECO') SIZE 1024M;
SQL> ALTER DATABASE ADD STANDBY LOGFILE ('+RECO') SIZE 1024M;
SQL> ALTER DATABASE ADD STANDBY LOGFILE ('+RECO') SIZE 1024M;
[grid@zdmtarget ~]$ asmcmd
ASMCMD> 1s
DATA/
RECO/
ASMCMD> cd RECO/
ASMCMD> 1s
TARGET_IAD1XR/
ASMCMD> cd TARGET IAD1XR/
ASMCMD> 1s
ONLINELOG/
ASMCMD> cd ONLINELOG/
ASMCMD> 1s
group_1.257.1065461689
group_2.258.1065461691
group 3.259.1065461691
group_4.270.1067532997
group_5.271.1067533099
group_6.272.1067533113
```

4. Verifique os parâmetros DB_NAME e DB_UNIQUE_NAME no banco de dados de origem.

```
db_name string TARGET

SQL> show parameter db_unique_name

NAME TYPE VALUE

db_unique_name string TARGET_iad1xr
```

O DB_NAME no banco de dados de destino terá o nome como banco de dados de origem. Mas, o DB_UNIQUE_NAME deve ser diferente.

2. Verifique o parâmetro STANDBY_FILE_MANAGEMENT.

```
NAME TYPE VALUE
standby_file_management string MANUAL

SQL> ALTER SYSTEM SET STANDBY_FILE_MANAGEMENT=AUTO;

System altered.

SQL> show parameter STANDBY_FILE_MANAGEMENT

NAME TYPE VALUE

standby_file_management string AUTO
```

AMBIENTE DE ORIGEM

3. Verifique o IP do ambiente de origem

```
[oracle@zdmtarget admin]$ ip a sh

2: ens3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9000 qdisc mq state UP group default
qlen 1000
    link/ether 00:00:17:00:6c:ba brd ff:ff:ff:ff:
    inet 10.0.0.2/24 brd 10.0.0.255 scope global dynamic ens3
```

Listener.ora file – **origem**

Obs .: lembre-se de trocar o PORT, deve ser diferente de 1521.

```
(GLOBAL_DBNAME = TARGET)
    (ORACLE_HOME = /u01/app/oracle/product/19.0.0.0/dbhome_1)
    (SID_NAME = TARGET)
    )
    )
    ADR_BASE_LISTENER = /u01/app/oracle
```

tnsnames.ora file - origem

```
[oracle@zdmtarget admin] $ cat tnsnames.ora
# tnsnames.ora Network Configuration File:
/u01/app/oracle/product/19.0.0.0/dbhome 1/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.
LISTENER TARGET =
  (ADDRESS = (PROTOCOL = TCP) (HOST = 129.213.93.115) (PORT = 1521))
TARGET PRIMARY =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = 129.213.93.115) (PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SID = TARGET)
    )
  )
DBMEETUP STANDBY =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = 150.136.125.55) (PORT = 1521))
    (CONNECT DATA =
      (SERVER = DEDICATED)
      (SID = DBMEETUP)
```

Start the listener

```
[oracle@zdmtarget admin] $ lsnrctl start LISTENER_PRY

[oracle@zdmtarget admin] $ ps -ef | grep lsn
oracle 10607 79101 0 17:06 pts/0 00:00:00 grep --color=auto lsn
grid 55480 1 0 Feb25 ? 00:17:11 /u01/app/19.0.0.0/grid/bin/tnslsnr
ASMNET1LSNR_ASM -no_crs_notify -inherit
grid 55493 1 0 Feb25 ? 00:01:33 /u01/app/19.0.0.0/grid/bin/tnslsnr
LISTENER -no_crs_notify -inherit
oracle 98330 1 0 16:51 ? 00:00:00
/u01/app/oracle/product/19.0.0.0/dbhome_1/bin/tnslsnr LISTENER_PRY -inherit
```

AMBIENTE DE DESTINO

4. Verifique o IP do ambiente de **destino**

```
[oracle@dbmeet admin]$ ip a sh

2: ens3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9000 qdisc mq state UP group default qlen 1000
    link/ether 02:00:17:0b:37:4f brd ff:ff:ff:ff:
    inet 10.0.0.100/24 brd 10.0.0.255 scope global dynamic ens3
```

Listener.ora file – destino

Obs .: lembre-se de trocar o PORT, deve ser diferente de 1521.

tnsnames.ora - destino

```
[oracle@dbmeet admin] $ cat tnsnames.ora
# tnsnames.ora Network Configuration File:
/u01/app/oracle/product/19.0.0.0/dbhome 1/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.
LISTENER DBMEETUP =
  (ADDRESS = (PROTOCOL = TCP) (HOST = dbmeet) (PORT = 1521))
TARGET_PRIMARY =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = zdmtarget) (PORT = 1521))
    (CONNECT DATA =
      (SERVER = DEDICATED)
      (SID = TARGET)
    )
DBMEETUP STANDBY =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = dbmeet) (PORT = 1521))
    (CONNECT DATA =
      (SERVER = DEDICATED)
      (SID = DBMEETUP)
```

Start the listener.

```
[oracle@dbmeet admin] $ lsnrctl start LISTENER_STNDY

[oracle@dbmeet admin] $ ps -ef | grep lsn
grid 56411 1 0 Feb12 ? 00:02:05 /u01/app/19.0.0.0/grid/bin/tnslsnr
LISTENER -no_crs_notify -inherit
grid 56428 1 0 Feb12 ? 00:24:29 /u01/app/19.0.0.0/grid/bin/tnslsnr
ASMNET1LSNR_ASM -no_crs_notify -inherit
oracle 64943 1 0 17:02 ? 00:00:00
/u01/app/oracle/product/19.0.0.0/dbhome_1/bin/tnslsnr LISTENER_STNDY -inherit
oracle 68004 75751 0 17:06 pts/0 00:00:00 grep --color=auto lsn
```

Tnsping from ORIGEM to STANDBY

```
ORIGEM
[oracle@zdmtarget admin] $ tnsping DBMEETUP_STANDBY
TNS Ping Utility for Linux: Version 19.0.0.0.0 - Production on 25-MAR-2021 17:41:59
Copyright (c) 1997, 2020, Oracle. All rights reserved.
Used parameter files:
/u01/app/oracle/product/19.0.0.0/dbhome 1/network/admin/sqlnet.ora
Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP) (HOST
150.136.125.55) (PORT = 1521)) (CONNECT DATA = (SERVER = DEDICATED) (SID = DBMEETUP)))
OK (10 msec)
TARGET
[oracle@dbmeet admin]$ cat tnsnames.ora
# tnsnames.ora Network Configuration File:
/u01/app/oracle/product/19.0.0.0/dbhome_1/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.
LISTENER DBMEETUP =
  (ADDRESS = (PROTOCOL = TCP) (HOST = dbmeet) (PORT = 1521))
TARGET PRIMARY =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = zdmtarget) (PORT = 1521))
    (CONNECT DATA =
      (SERVER = DEDICATED)
      (SID = TARGET)
 )
DBMEETUP STANDBY =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = dbmeet) (PORT = 1521))
    (CONNECT DATA =
      (SERVER = DEDICATED)
      (SID = DBMEETUP)
    )
[oracle@dbmeet admin] $ tnsping DBMEETUP STANDBY
TNS Ping Utility for Linux: Version 19.0.0.0.0 - Production on 25-MAR-2021 17:42:36
Copyright (c) 1997, 2020, Oracle. All rights reserved.
Used parameter files:
/u01/app/oracle/product/19.0.0.0/dbhome_1/network/admin/sqlnet.ora
Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP) (HOST = dbmeet) (PORT
= 1521)) (CONNECT_DATA = (SERVER = DEDICATED) (SID = DBMEETUP)))
OK (0 msec)
```

6. Altere o log_archive_config

```
NAME TYPE VALUE

log_archive_config string

SQL> alter system set
log_archive_config='DG_CONFIG=(TARGET_PRIMARY,DBMEETUP_STANDBY)' scope=both;

SQL> show parameter log_archive_config

NAME TYPE VALUE

log_archive_config string DG_CONFIG=(TARGET_iadlxr,DBMEETUP_iadlns)
```

7. Tente fazer uma conexão entre os ambientes da seguinte maneira:

ORIGEM

```
Teste origem para destino

[oracle@zdmtarget admin]$ sqlplus sys/M2C_2020_Brasil@DBMEETUP_STANDBY as sysdba

SQL> exit
```

STANDBY

```
Teste destino para origem

[oracle@dbmeet admin]$ sqlplus sys/M2C_2020_Brasil@TARGET_PRIMARY as sysdba

SQL> exit
```

ORIGEM

8. DGMGRL

- Access the DGMGRL
- Create a new configuration
- Add the standby database

```
[oracle@zdmtarget admin]$ dgmgrl /

DGMGRL> create configuration dg_config as primary database is TARGET_iadlxr connect identifier is TARGET_PRIMARY;

Configuration "dg_config" created with primary database "target_iadlxr"

DGMGRL> ADD DATABASE DBMEETUP_iad2n5 AS CONNECT IDENTIFIER IS DBMEETUP_STANDBY MAINTAINED AS PHYSICAL;

Database "dbmeetup_iad2n5" added

DGMGRL> show configuration;
```

```
Configuration - dg_config

Protection Mode: MaxPerformance
Members:
target_iad1xr - Primary database
dbmeetup_iad2n5 - Physical standby database

Fast-Start Failover: Disabled

Configuration Status:
SUCCESS (status updated 34 seconds ago)
```

9. Switchover

To make the switchover, connect as **sys** user

```
[oracle@zdmtarget admin] $ dgmgrl
DGMGRL for Linux: Release 19.0.0.0.0 - Production on Fri Mar 26 17:30:38 2021
Version 19.9.0.0.0
Copyright (c) 1982, 2019, Oracle and/or its affiliates. All rights reserved.
Welcome to DGMGRL, type "help" for information.
DGMGRL> connect sys/M2C 2020 Brasil@TARGET PRIMARY <=== service name
(tnsnames.ora)
Connected to "TARGET iad1xr"
Connected as SYSDBA.
DGMGRL> SWITCHOVER TO DBMEETUP iad2n5;
Performing switchover NOW, please wait...
Operation requires a connection to database "dbmeetup_iad2n5"
Connecting ...
Connected to "DBMEETUP iad2n5"
Connected as SYSDBA.
New primary database "dbmeetup iad2n5" is opening...
Oracle Clusterware is restarting database "target_iad1xr" ...
Connected to "TARGET iad1xr"
Connected to "TARGET_iad1xr"
Switchover succeeded, new primary is "dbmeetup iad2n5"
DGMGRL> show configuration;
Configuration - dg config
 Protection Mode: MaxPerformance
 Members:
 dbmeetup_iad2n5 - Primary database
                - Physical standby database
 target_iad1xr
Fast-Start Failover: Disabled
Configuration Status:
SUCCESS (status updated 97 seconds ago)
```

DESTINO

10. Check the target environment after the switchover.

```
DGMGRL> show configuration;

Configuration - dg_config

Protection Mode: MaxPerformance
Members:
dbmeetup_iad2n5 - Primary database
target_iad1xr - Physical standby database

Fast-Start Failover: Disabled

Configuration Status:
SUCCESS (status updated 47 seconds ago)
```

Origem

11. Reinstate

```
DGMGRL> reinstate database target iad1xr;
Reinstating database "target_iadlxr", please wait...
Error: ORA-16815: member does not need to be reinstated
[oracle@zdmtarget ~]$ sqlplus / as sysdba
SQL> alter database open;
SQL> select open mode from v$database;
OPEN_MODE
_____
READ WRITE
[oracle@zdmtarget ~]$ dgmgrl /
DGMGRL> show configuration;
Configuration - dg_config
 Protection Mode: MaxPerformance
 Members:
 target_iad1xr - Primary database
   dbmeetup iad2n5 - Physical standby database
Fast-Start Failover: Disabled
Configuration Status:
SUCCESS (status updated 50 seconds ago)
```

Fast-Start Failover

Origem

```
DGMGRL> edit configuration set property FastStartFailoverLagLimit = 30;
```

Standby

```
[oracle@dbmeet ~]$ dgmgrl /
DGMGRL> connect sys
Password: M2C_2020_Brasil
DGMGRL> start observer
Observer 'dbmeet' started
[W000 2021-03-29T14:30:45.911+00:00] Observer trace level is set to USER
[W000\ 2021-03-29T14:30:45.911+00:00] Try to connect to the primary.
[W000 2021-03-29T14:30:45.911+00:00] Try to connect to the primary target primary.
[W000\ 2021-03-29T14:30:45.928+00:00] The standby dbmeetup_iad2n5 is ready to be a FSFO
target
[W000 2021-03-29T14:30:47.928+00:00] Connection to the primary restored!
[W000 2021-03-29T14:30:49.936+00:00] Disconnecting from database target primary.
DGMGRL> show configuration;
Configuration - dg config
 Protection Mode: MaxPerformance
 Members:
 target iad1xr - Primary database
   dbmeetup_iad2n5 - (*) Physical standby database
Fast-Start Failover: Enabled in Potential Data Loss Mode
Configuration Status:
SUCCESS (status updated 48 seconds ago)
If necessary, you can stop the observer:
DGMGRL> stop observer;
```

Origem

```
DGMGRL> show configuration;

Configuration - dg_config

Protection Mode: MaxPerformance

Members:

target_iad1xr - Primary database

dbmeetup_iad2n5 - (*) Physical standby database
```

```
Fast-Start Failover: Enabled in Potential Data Loss Mode

Configuration Status:

SUCCESS (status updated 38 seconds ago)
```

REFERÊNCIAS PARA SOLUÇÃO DE POSSÍVEIS PROBLEMAS

- Add Standby Database To Data Guard Configuration Returns ORA-01033 (Doc ID 2133681.1)
- 12c: Data Guard Physical Standby Managing password files in a RAC Physical Standby (Doc ID 1984091.1)
- Step by Step How to Recreate Dataguard Broker Configuration (Doc ID 808783.1)
- DGMGRL Start Observer Fails with DGM-16979 (Doc ID 2698956.1)
- Step by Step Guide on How to Reinstate Failed Primary Database into Physical Standby (Doc ID 738642.1)