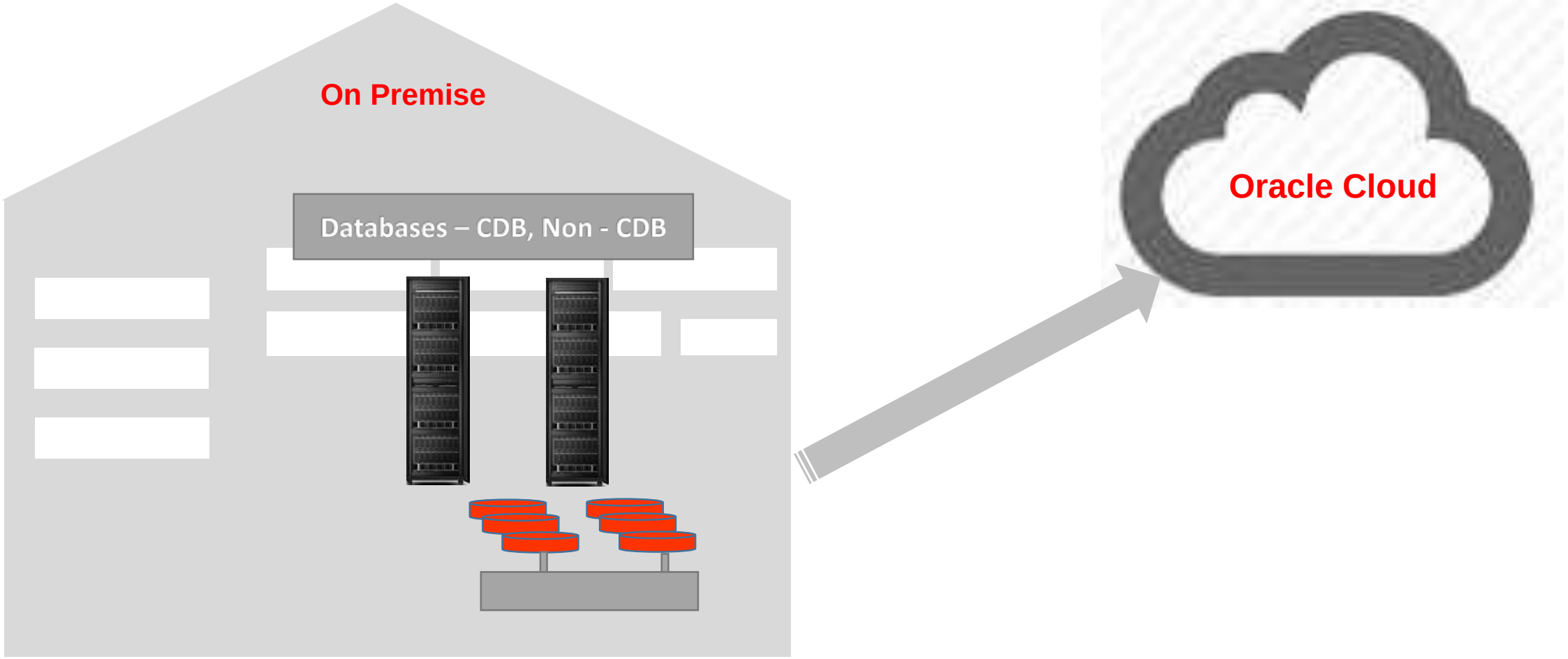
Hot Cloning of On-Premise Non Container Database(Non-CDB) to Oracle Database Cloud Service (DBaaS) Container Database (CDB)



Sudipta Ganguly

About Me

- Oracle Database Professional with 19+ years of experience.
- Expertise in Database Migration (On-Premise to On-Premise and On-Premise to Oracle and Amazon Cloud), Database Replication, Database Upgrade, DBaaS, IaaS and Exadata
- Oracle Certified Professional in Oracle 11g and 12c
- Oracle Certified Professional in Cloud Administration (DBaaS)
- Oracle Certified Expert in Real Application Cluster – 11g
- Oracle Implementation Specialist in Exadata, GoldenGate
- AWS Certified Solution Architect – Associate
- IBM Certified Cloud Solution and Infrastructure Architect

Oracle 12c Cloning Pluggable Database

- Introduction
- Cloning PDB’s
- PDB Cloning Types
- PDB Cloning Methods
- Provisioning: Database Service on Oracle Cloud
- Cloning Process

Introduction

- Prior to Oracle 12c Cloning a Database is a difficult process
- RMAN is the most efficient tool to clone a database but with quite a number of steps
- In 12c, CDB cloning required similar efforts but not PDB’s
- PDB cloning can be done with execution of 3-4 commands
- PDB’s stores all user data so is the most important component in multitenancy

Cloning PDB’s

- Great feature of Oracle 12c
- Database can be cloned in as soon as 30 minutes
- Very useful feature for database consolidation

PDB Cloning Types

- Non-Container Database to Container Database
- PDB can be LOCALLY cloned
- PDB can be REMOTE cloned
- PDB's can be HOT cloned

Comparison between HOT and COLD CLONE

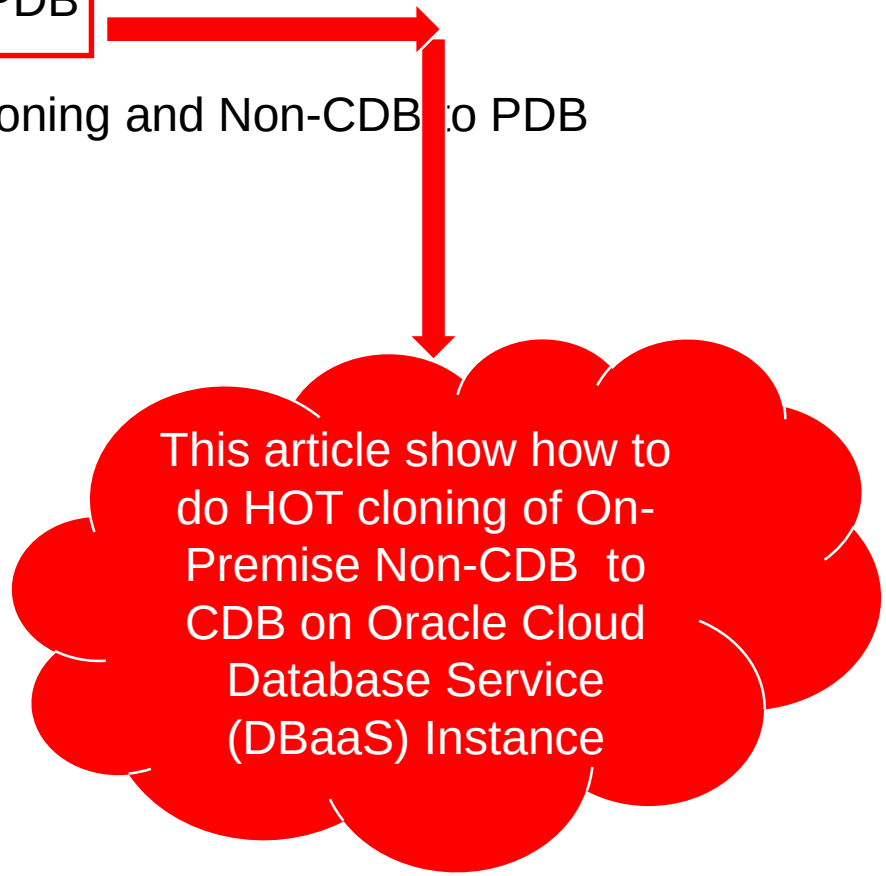
	HOT	COLD
Availability	12c Release 2	12c Release 1
Database Mode	READ WRITE	READ ONLY
Cloning Mode	Non-CDB to CDB, PDB-PDB in Same CDB, Remote PDB	Non-CDB to CDB, PDB-PDB in Same CDB, Remote PDB

PDB Cloning Methods

- CREATE PLUGGABLE DATABASE XXX from YYY – LOCAL cloning of PDB within same CDB
- DBLINK – Remote PDB – PDB Cloning and Non-CDB to PDB
- DBMS_PDB Procedure – LOCAL, Remote PDB – PDB Cloning and Non-CDB to PDB
- Oracle Data Pump Export/Import
- GoldenGate Replication

PDB Cloning Methods

- CREATE PLUGGABLE DATABASE XXX from YYY – LOCAL cloning of PDB within same CDB
- DBLINK – Remote PDB – PDB Cloning and Non-CDB to PDB
- DBMS_PDB Procedure – LOCAL, Remote PDB – PDB Cloning and Non-CDB to PDB
- Oracle Data Pump Export/Import
- GoldenGate Replication



Environment

Location	Host	Database Name	Container Database
On-Premise	premise	PNONCDB	No
		CDBPROD	Yes
Oracle Cloud	SGNON-CDB-CDBMIG12C	CDBPROD	Yes

Step 1: Prepare On-Premise Non-CDB Database

```
[oracle@premise ~]$ . oraenv
ORACLE_SID = [PNONCDB] ? PNONCDB
The Oracle base remains unchanged with value /u01/app/oracle
[oracle@premise ~]$ sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Wed Oct 18 17:32:43 2017

Copyright (c) 1982, 2016, Oracle.  All rights reserved.


Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> SELECT CDB FROM V$DATABASE;

CDB
---
NO

SQL> --CHECK USER SCOTT HAS SOME TABLE. THIS WE WILL REQUIRE TO VALIDATE ONCE THE PDB IS CLONED TO ORACLE CLOUD (CDBPROD - CONTAINER DATABASE)

SQL>
SQL> SELECT COUNT (1) FROM SCOTT.MYTAB;

  COUNT(1)
----------
         4
```

Create Target Database in Oracle Cloud (DBaaS)

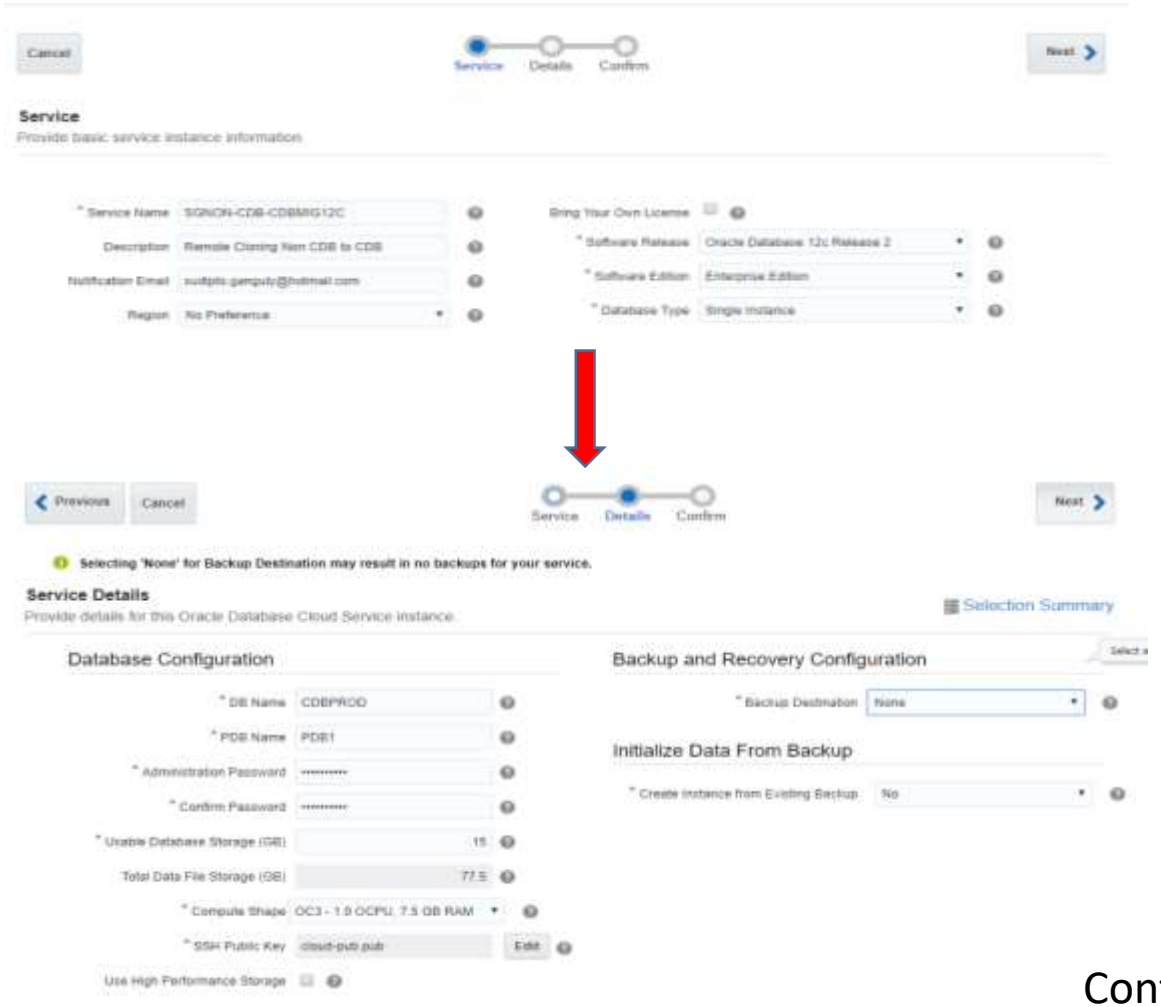
1. From Database Service Page in Oracle Cloud click Create Service

Enter following information on Service Page

Instance Name	-	SGNON-CDB-CDBMIG12C
Software Release	-	Oracle Database 12c Release 2
Software Edition	-	Enterprise Edition
Database Type	-	Single Instance

Enter following information on Service Detail Page

Database Name	-	CDBPROD
Administrative Pwd	-	Set per your choice
SSH Public Key	-	Load Public Key
Backup Destination	-	None

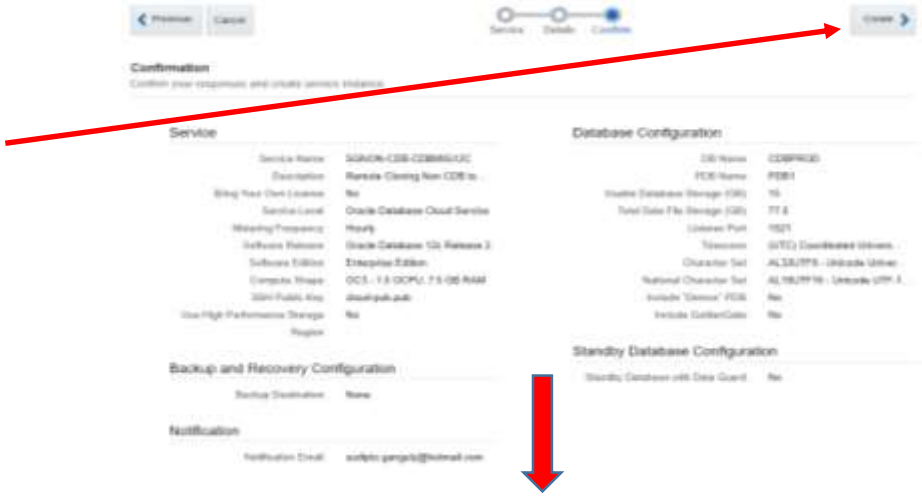


Cont...

Create Target Database in Oracle Cloud (DBaaS)

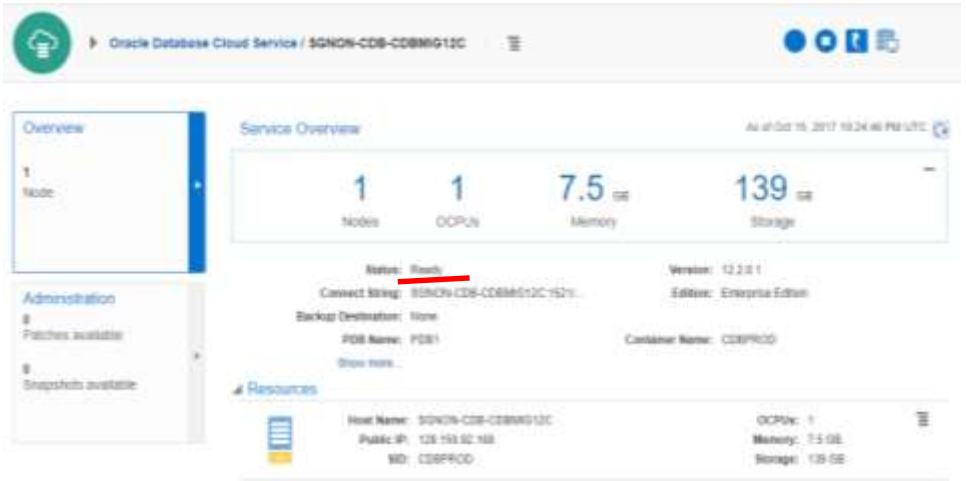
1. From Database Service Page in Oracle Cloud click Create Service

Review information and click Create to Create Database Service Instance



Wait for 20 – 30 minutes for the Cloud Database Instance to created successfully.

Note down Host Name and IP address as this will require to set up SSH tunnel and to connect cloud database from On-Premise

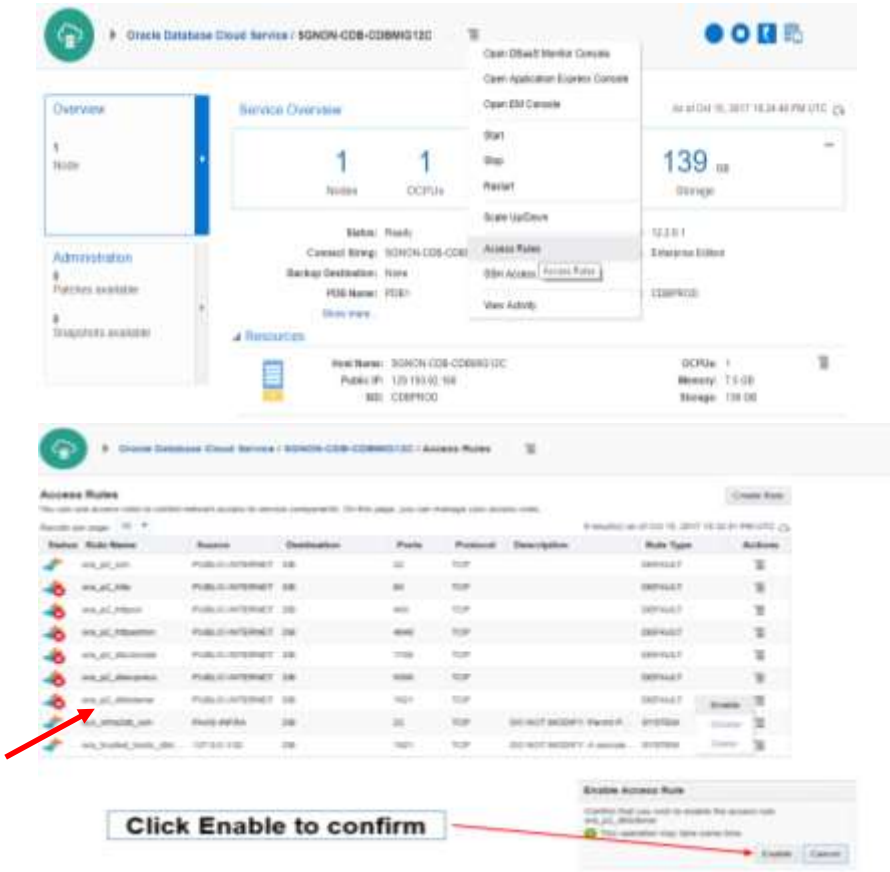


Cont...

Create Target Database in Oracle Cloud (DBaaS)

2. Enable dblistener access rule

Dblistner access rule needs to be enabled in order to access cloud database from outside cloud environment (On-Premise).
From Database Service Page, select Access rules from



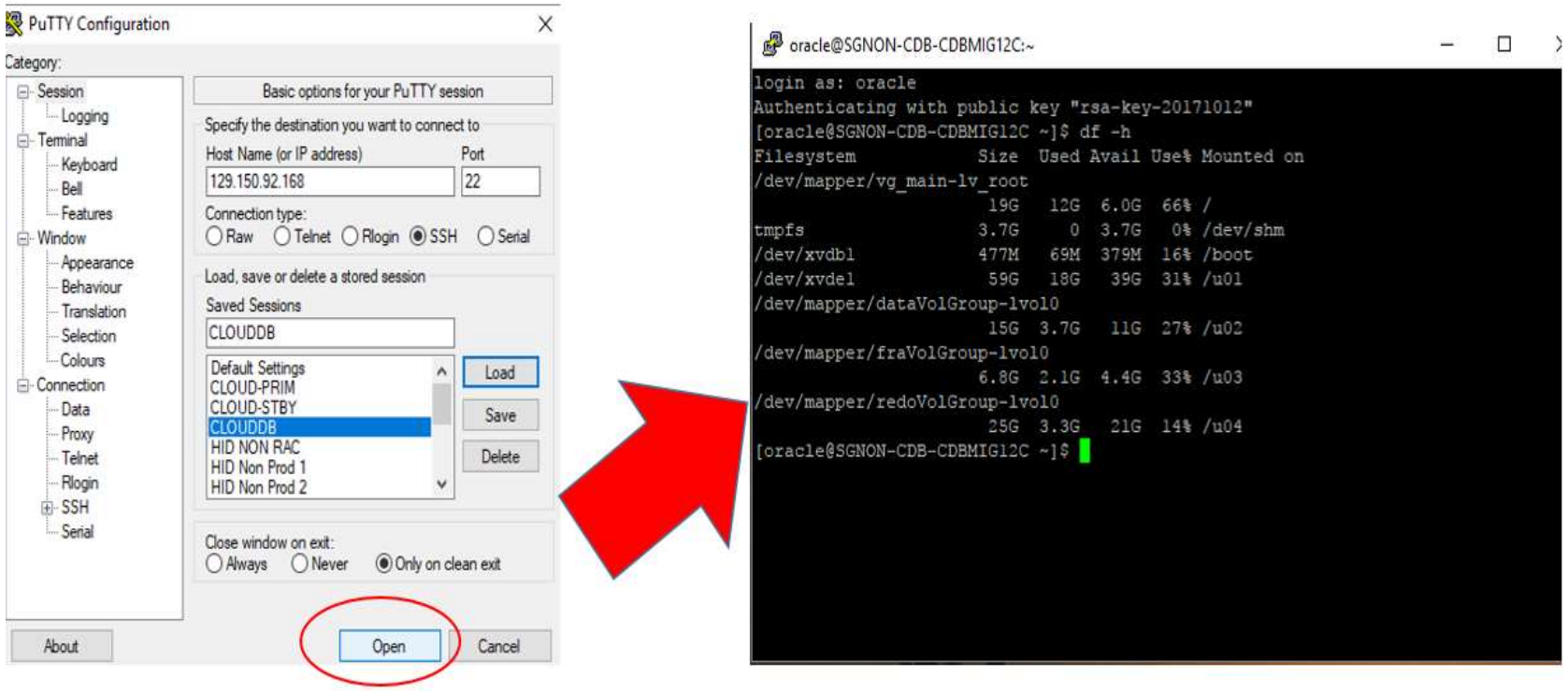
Go to ora_p2_listener and select Enable

Cont...

Create Target Database in Oracle Cloud (DBaaS)

3. Open Putty and check connectivity from On-Premise to Cloud

Open a Putty from On-Premise and check connectivity to the Oracle Database Cloud computing node.



Step 2: Check Cloud Database - CDBPROD

```
[SGNON-CDB-CDBMIG12C ~]. oraenv
ORACLE_SID = [oracle] ? CDBPROD
The Oracle base has been set to /u01/app/oracle
[SGNON-CDB-CDBMIG12C ~]sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Wed Oct 18 17:41:22 2017

Copyright (c) 1982, 2016, Oracle.  All rights reserved.


Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> SELECT CDB FROM V$DATABASE;

CDB
---
YES

SQL> SHOW PDBS

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
SQL>
```

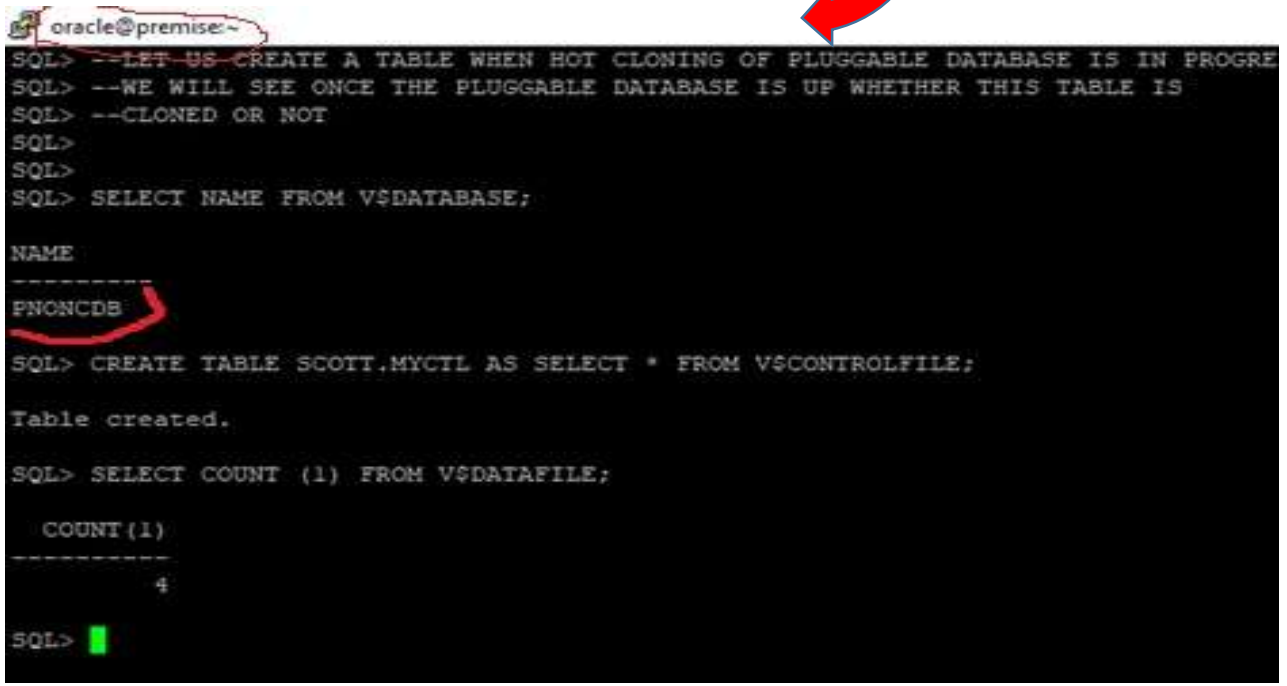
Step 3: Create Database Link to On-Premise Database

```
[SGNON-CDB-CDBMIG12C ~]. oraenv
ORACLE_SID = [oracle] ? CDBPROD
The Oracle base has been set to /u01/app/oracle
[SGNON-CDB-CDBMIG12C ~]sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Wed Oct 18 17:41:22 2017

Copyright (c) 1982, 2016, Oracle.  All rights reserved.


Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL>SQL> --CREATE DATABASE LINK TO ON-PREMISE DATABASE (PNONCDB)
SQL>
SQL> CREATE DATABASE LINK ON_PREMISE CONNECT TO system IDENTIFIED BY oracle8i USING
'PNONCDB';

Database link created.

SQL>
```

Step 4: Create Pluggable Database on Oracle Cloud from On-Premise

```
SQL> --CREATE HOT CLONE OF ON-PREMISE DATABASE ON ORACLE CLOUD. THIS STATEMENT AUTOMATICALLY
CREATES DIRECTORY FOR NEW PLUGGABLE DATABASE.
SQL>
SQL> CREATE PLUGGABLE DATABASE PREMDB FROM PNONCDB@ON_PREMISE FILE_NAME_CONVERT =
('/u02/oradata/PNONCDB/data/PNONCDB/','/u01/app/oracle/oradata/CDBPROD/premdb/');

Pluggable database created.

SQL>
```

Go to On-Premise and create a table



Step 5: Check CDBPROD Environment once again

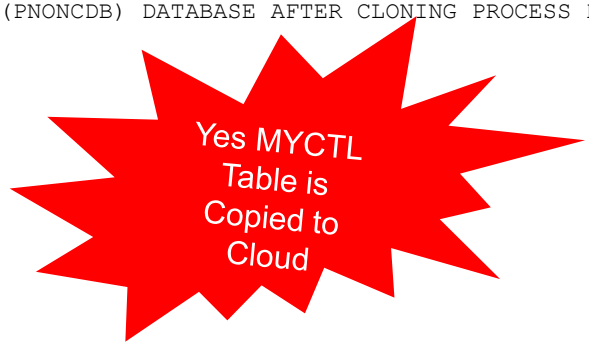
```
[SGNON-CDB-CDBMIG12C ~]. oraenv
ORACLE_SID = [oracle] ? CDBPROD
The Oracle base has been set to /u01/app/oracle
[SGNON-CDB-CDBMIG12C ~]sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Wed Oct 18 17:41:22 2017

Copyright (c) 1982, 2016, Oracle.  All rights reserved.


Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> SHOW PDBS

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         4 PREMDB                         MOUNTED

SQL> ALTER SESSION SET CONTAINER=PREMDB;

Session Altered.
SQL>
SQL>--WE HAVE PLUGGED A NON-CDB DATABASE INTO CONTAINER DATABASE SO WE HAVE TO EXECUTE "noncdb_to_pdb.sql" SCRIPT
SQL>--THIS STEP IS NOT REQUIRED IN CASE ON-PREMISE DATABASE IS A CONTAINER DATABASE (CDB)
SQL>
SQL> @/u01/app/oracle/product/12.2.0.1/db_1/rdbms/admin/noncdb_to_pdb.sql
```

Step 6: Open PREMDB Database on Cloud

```
SQL> SHOW PDBS

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         4 PREMDB                         MOUNTED
SQL> SHOW CON_NAME

CON_NAME
------------------------------
PREMDB
SQL> --OPEN PREMDB DATABASE ON ORACLE CLOUD
SQL>
SQL> ALTER DATABASE PREMDB OPEN;

Database altered.

SQL> SHOW PDBS

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         4 PREMDB                         READ WRITE NO
```

Step 7: Validate Clone by Querying the tables

```
SQL> --OPEN PREMDB DATABASE ON ORACLE CLOUD
SQL>
SQL> ALTER DATABASE PREMDB OPEN;

Database altered.

SQL> SHOW PDBS

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         4 PREMDB                         READ WRITE NO
SQL> show user
USER is "SYS"


SQL> ALTER SESSION SET CONTAINER=PREMDB;

Session altered.

SQL> SELECT COUNT (1) FROM SCOTT.MYTAB;

  COUNT(1)
----------
         4

1 row selected.

SQL> --NOW LET'S SELECT MYCTL TABLE WHICH HAS BEEN CREATED ON ON-PREMISE (PNONCDB) DATABASE AFTER CLONING PROCESS HAS STARTED
SQL>
SQL> SELECT COUNT (1) FROM SCOTT.MYCTL;

  COUNT(1)
----------
         2
```




THANK
YOU