About me

➢ **17 Years working with Oracle Technology**
➢ **Oracle Technology Network Expert "OTN" Expert 2003 Award**
➢ **Oracle ACE 2004 Award**
➢ **Oracle ACE Director 2012 Award**
➢ **Consulting Tasks, Conferences and activities related to, in over 50 countries around the globe**
➢ **OCM (Oracle Certified Master)**

ORACLE
ACE Director

Let's Start..

What is the real and practical meaning of databases in the Cloud ?
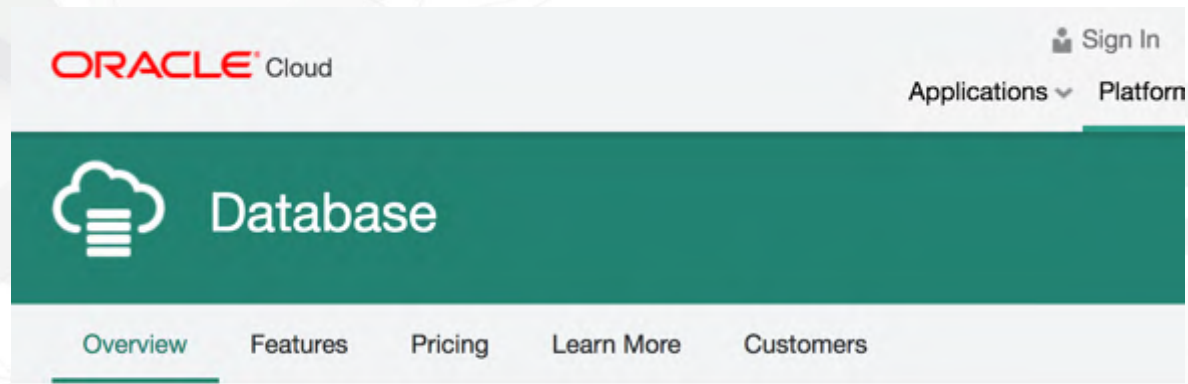
What is the regular concept of "Cloud" for people not involved deeply in IT ?

Before I had many databases at another Data Center, that's means I had already databases in the cloud? If yes, what is the difference with Oracle Databases in the Cloud ?
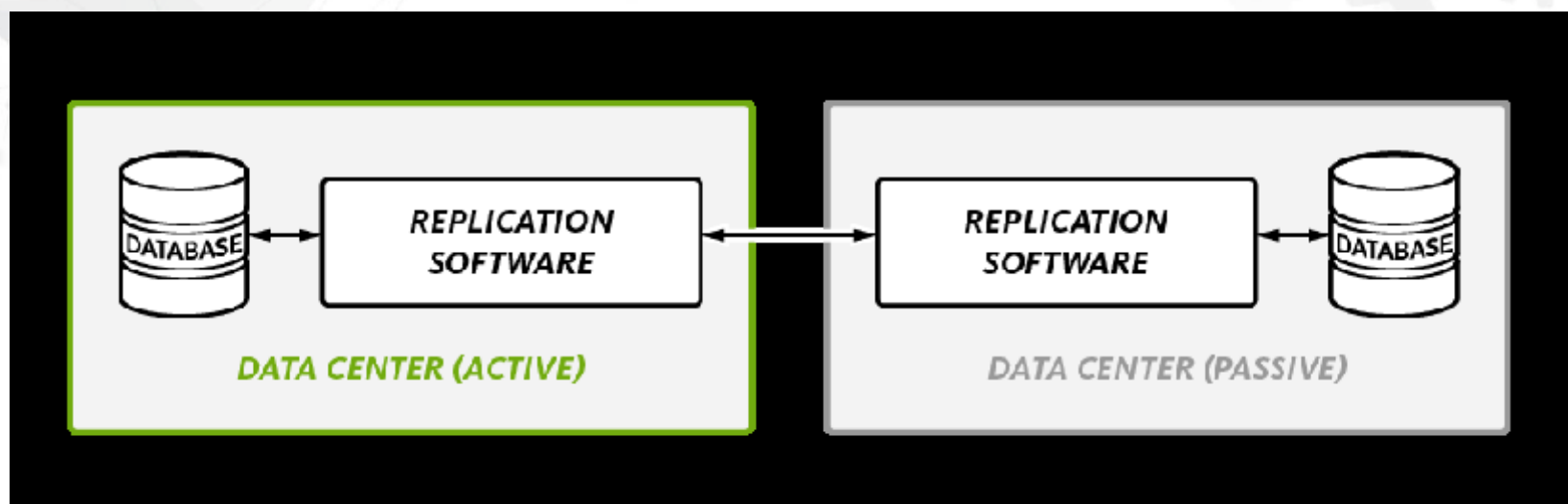
Oracle Cloud and Oracle Database Services in the Cloud

Oracle Databases in the Cloud..
What kind of services I can choose to deploy my Oracle databases in the cloud ?

Oracle Database Cloud – Overview of Services

| Oracle Database Exadata Express Cloud Service | Oracle Database Cloud Service | Oracle Database Exadata Cloud Service | Oracle Database Backup Cloud Service |

➕ Oracle Database Cloud Service

Database Cloud Service offers elastic database services for application development, test and production deployment. The service delivers an easy to use web console user interface and RESTful API to provision and administer Oracle Database on Oracle Compute Cloud Offerings.

Oracle Database Cloud Service Offerings

Database as a Service - Full Database Instance Service

Virtual Image
VM + DB + Disk Image

- Similar to Azure image or AMI
- Full distribution extracted on disk
- Same as on premise

Database Cloud Service
VM + DB + Full Provisioning

- Backup/recovery automation
- Patching and upgrade automation
- Data Guard setup
- Monitoring & management portals
- Local management console

- Oracle Linux 6.6
- On-demand storage & compute
- Choice of editions SE1, EE and Database 12c 12.1.0.2, and 11g 11.2.0.4
- Bundles: EE High Performance, EE Extreme Performance
- Full network, VM and OS isolation, Full SQL*Net access
- Self-managed with SSH access into VM with root privilege

Database Schema Service

Database Schema
Shared Database

- Fully managed
- Dedicated Schema
- Sizes 5GB, 20GB, 50GB
- Data access using: Java service, Oracle APEX, RESTful Web Services

Oracle Database Exadata Express Cloud Service

A Fully Managed Experience for Small-to-Medium Sized Cloud Databases

- Launch platform for Oracle's newest release – Oracle Database 12c Release 2

- Runs directly on world's #1 engineered system – Oracle Exadata

- Leverages Pluggable Database (PDB) containerization technology

- Packed with benefits for developing modern cloud applications

- All-inclusive subscriptions starting at only $175 / month
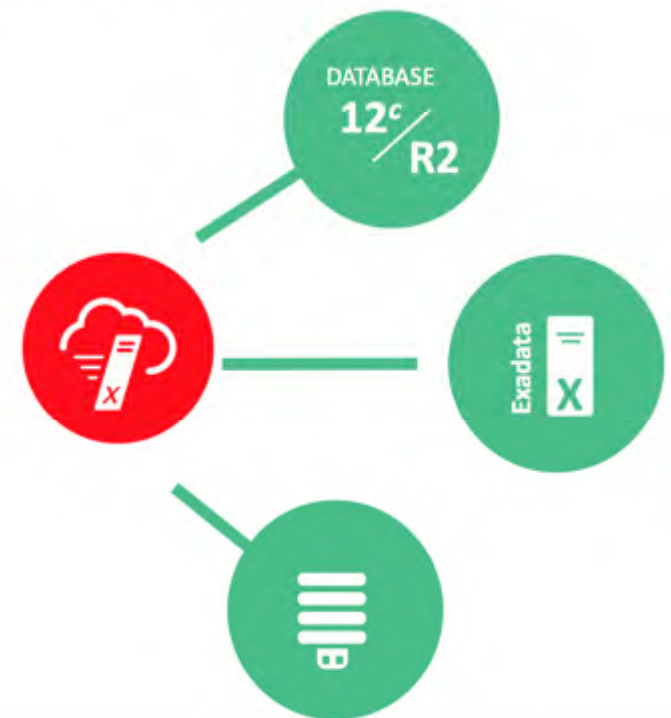
Oracle Database Cloud Service

A full instance of Oracle running in the cloud

- Full database instance of Oracle

- Choose from Standard Edition or Enterprise Edition

- Versions 11gR2 and 12cR1 Available now (12.2 coming soon)

- Choose the edition bundle that fits your needs

- Customer deals with the OS and Database, Oracle handles the infrastructure

- For Databases as small as 15 GB and up to 12 TB in size

- Only cloud vendor with supported RAC and Active Data Guard in the cloud

Characteristics of Oracle Database Services in the Cloud

Fast

Oracle Database in highly available and scalable configurations rapidly provisioned and ready for use in minutes.

Elastic

Add capacity on-demand and scale OLTP and Data Warehouse workloads as your business grows from startup to the largest enterprise.

Secure

Security on Oracle Cloud protects the entire lifecycle of data both in transit and at rest. Database access is monitored and recorded for audit and control at all times.

Simple

Oracle Database with administration fully managed by Oracle or under your control with one-click built in automation. Supports modern agile development with RESTful APIs for quick, automated and repeatable use.

Choice

Shared, dedicated, virtualized, bare metal (coming soon) and engineered deployment targets to optimize cost in a pay per need model.

Oracle Database Cloud Service

Full portability across the hybrid cloud

On Premises

Same Architecture
Same Software
Same Skills

Oracle Cloud

ORACLE®
ENTERPRISE MANAGER
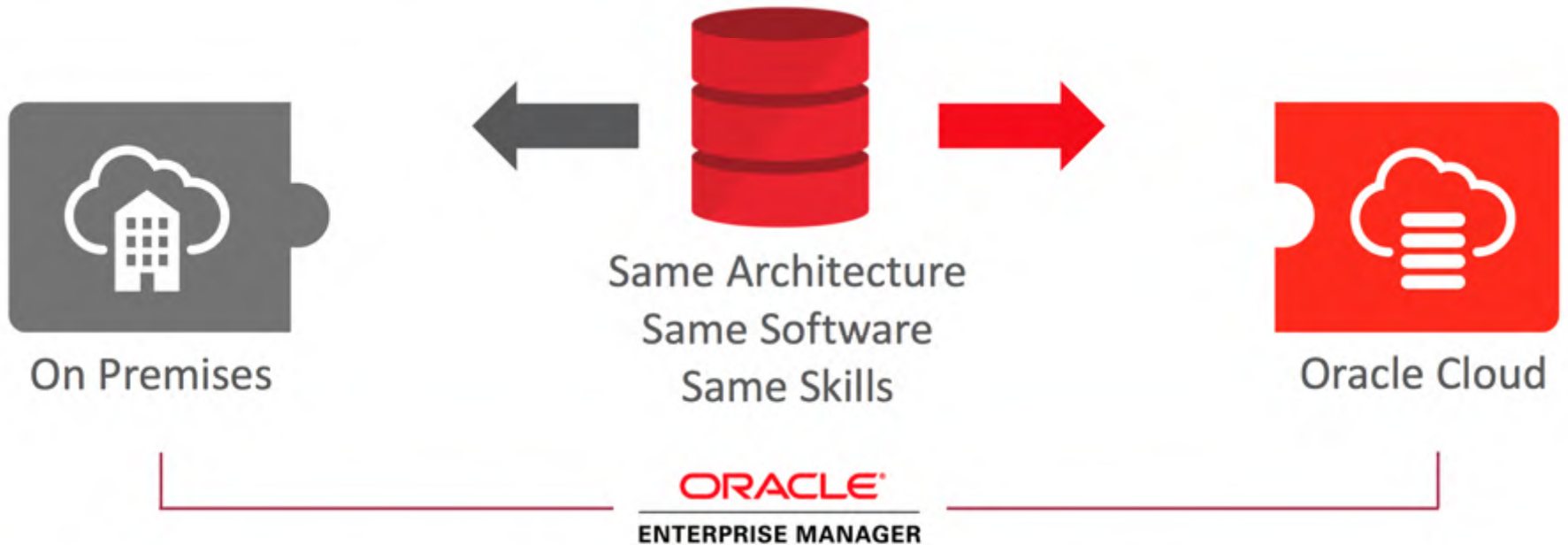
Enterprise Manager manages both On Premises and Cloud

Example..

○ Create an Oracle Database Cloud Service (DBCS) Instance

http://www.oracle.com/webfolder/technetwork/tutorials/obe/cloud/
ggcs/Get_Started_with_OGGCS/Get_Started_with_GGCS.html#sectio
n2

Once the Database Service is created, What you get ?

Once the Database Service is created, What you get ?

Oracle Database Cloud – Key Use Cases

New Application Development
Projects (including APEX, Java)

Lift and Shift
Dev/Test and Apps

Oracle Database 12c –
Upgrade/Test/POC

Backup Database to
Oracle Cloud

Production Database
OLTP/DW Deployment

Oracle Database Cloud Service
Data Loading into the Exadata Express Edition

- SQL Developer
  - Cart
  - SQLCLI
- APEX Data Loaders
  - csv
  - SQL scripts
- ORDS

Oracle Database Cloud Service
Data Loading into a Database/Exadata Cloud Service

- SQL*Loader
- Import/export (5+)
- Oracle Data Pump Export/Import Utility (10.2+)
- Transportable Tablespaces (8i+)
- Pluggable Databases (PDBs) (12c)
  - Remote Cloning
  - Lift and Shift
- APEX/SQL Developer Data Loaders
- External Tables

Migration/Moving Methods

Many methods exist to move/migrate Oracle databases to Oracle Database Cloud Service.

Which of these methods apply to a given migration scenario depends on several factors, including the version, character set, and platform endian format of the source and target databases.

- Data Pump Conventional Export/Import
- Data Pump Full Transportable
- Data Pump Transportable Tablespace
- Remote Cloning a PDB
- Remote Cloning Non-CDB
- RMAN Cross-Platform Transportable PDB
- RMAN Cross-Platform Transportable Tablespace Backup Sets
- RMAN Transportable Tablespace with Data Pump
- RMAN CONVERT Transportable Tablespace with Data Pump
- SQL Developer and INSERT Statements to Migrate Selected Objects
- SQL Developer and SQL*Loader to Migrate Selected Objects
- Unplugging/Plugging a PDB
- Unplugging/Plugging Non-CDB

Ways to move the Data to the Cloud

30,000 Foot Overview
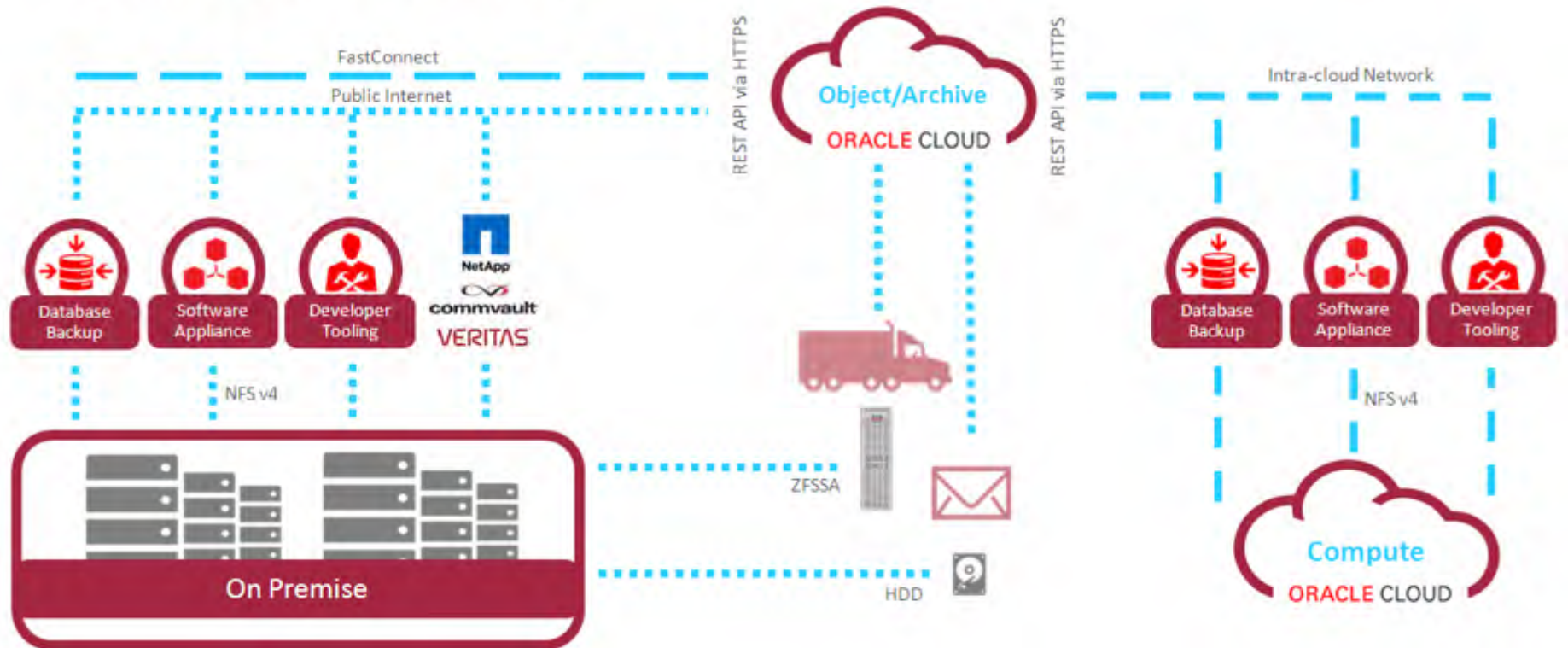
ZFS Storage Appliance

*Unified Control Plane
For Your Cloud*

**ZFS Storage
Appliance**
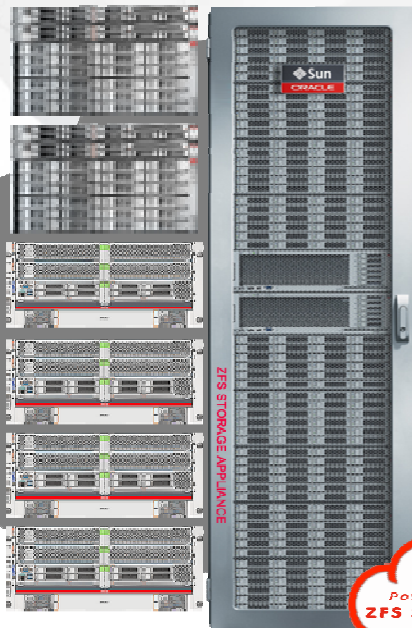
ORACLE

ENTERPRISE MANAGER

**ZFS Storage
Appliance**

Private Cloud

Public Cloud

Powered by
ZFS STORAGE

Powered by
ZFS STORAGE

Key points to Move a database to the Cloud

1.- Choose a type of Database Service based on your needs (Oracle Database Exadata Express Cloud Service, Oracle Database Cloud Service, Oracle Database Exadata Cloud Service, Oracle Database Bare Metal.. etc)

2.- Buy a subscription for that type of service chosen

3.- Based on many factors like: Version, Size, downtime, Character set, Endian format and more, choose the method for moving your database to the cloud

4.- Integrate your cloud services with the monitoring tools you have in your organization

Data Pump Conventional Export/Import

You can use this method regardless of the endian format and database character set of the on-premises database.

To migrate an on-premises source database, tablespace, schema, or table to the database on an Oracle Database Cloud Service database deployment using Data Pump Export and Import, you perform these tasks:

1.- On the on-premises database host, invoke Data Pump Export and export the on-premises database.

2.- Use a secure copy utility to transfer the dump file to the Database Cloud Service compute node.

3.- On the Database Cloud Service compute node, invoke Data Pump Import and import the data into the database.

4.- After verifying that the data has been imported successfully, you can delete the dump file.

Data Pump Full Transportable

You can use this method only if the source database release version is 11.2.0.3 or later, and the database character sets of your on-premises database and Oracle Database Cloud Service database are compatible.

You can use the Data Pump full transportable method to copy an entire database from your on-premises host to the database on an Oracle Database Cloud Service database deployment.

To migrate an Oracle Database 11g on-premises database to the Oracle Database 12c database on a Database Cloud Service database deployment using the Data Pump full transportable method, you perform these tasks:

1.- On the on-premises database host, prepare the database for the Data Pump full transportable export by placing the user-defined tablespaces in READ ONLY mode.

2.- On the on-premises database host, invoke Data Pump Export to perform the full transportable export.

Data Pump Full Transportable

3.- Use a secure copy utility to transfer the Data Pump Export dump file and the datafiles for all of the user-defined tablespaces to the Database Cloud Service compute node.

4.- Set the on-premises tablespaces back to READ WRITE.

5.- On the Database Cloud Service compute node, prepare the database for the tablespace import.

6.- On the Database Cloud Service compute node, invoke Data Pump Import and connect to the database.

7.- After verifying that the data has been imported successfully, you can delete the dump file

Data Pump Transportable Tablespace

You can use this method only if the on-premises platform is little endian, and the database character sets of your on-premises database and Oracle Database Cloud Service database are compatible.

The Transportable Tablespace method is generally much faster than a conventional export/import of the same data because the data files containing all of the actual data are simply copied to the destination location. You use Data Pump to transfer only the metadata of the tablespace objects to the new database.

To migrate an on-premises source database to the database deployment on Oracle Database Cloud Service using the Data Pump Transportable Tablespace method, you perform these tasks:

1.- On the on-premises database host, prepare the database for the Data Pump transportable tablespace export.

2.- On the on-premises database host, invoke Data Pump Export to perform the transportable tablespace export.

Data Pump Transportable Tablespace

3.- Use a secure copy utility to transfer the Data Pump Export dump file and the tablespace datafiles to the Database Cloud Service compute node.

4.- Set the on-premises tablespaces back to READ WRITE.

5.- On the Database Cloud Service compute node, prepare the database for the tablespace import.

6.- On the Database Cloud Service compute node, invoke Data Pump Import and connect to the database.

7.- Set the tablespaces on the Database Cloud Service database to READ WRITE mode.

8.- After verifying that the data has been imported successfully, you can delete the dump file.

Remote Cloning a PDB

You can use this method only if the on-premises platform is little endian, the on-premises database release is 12.1.0.2 or higher, and the on-premises database and Database Cloud Service database have compatible database character sets and national character sets.

You can use the remote cloning method to copy a PDB from your on-premises Oracle Database 12c database to a PDB in an Oracle Database 12c database on Oracle Database Cloud Service.

To migrate an Oracle Database 12c PDB to a PDB in a Database Cloud Service database deployment using the remote cloning method, you perform these tasks:

1.- On the on-premises database host, invoke SQL*Plus and close the on-premises PDB and then reopen it in READ ONLY mode

2.- On the Database Cloud Service compute node, invoke SQL*Plus and create a database link that enables a connection to the on-premises database.

Remote Cloning a PDB

3.- On the Database Cloud Service compute node, execute the CREATE PLUGGABLE DATABASE command to clone the on-premises PDB.

4.- On the Database Cloud Service compute node, open the new PDB by executing the ALTER PLUGGABLE DATABASE OPEN command.

5.- Optionally, on the on-premises database host invoke SQL*Plus and set the on-premises PDB back to READ WRITE mode.

Remote Cloning Non-CDB

You can use this method only if the on-premises platform is little endian, the on-premises database release is 12.1.0.2 or higher, and the on-premises database and Database Cloud Service database have compatible database character sets and national character sets.

You can use the remote cloning method to copy an Oracle Database 12c non-CDB on-premises database to a PDB in an Oracle Database 12c database on Oracle Database Cloud Service.

To migrate an Oracle Database 12c non-CDB database to a Database Cloud Service database deployment using the remote cloning method, you perform these tasks:

1.- On the on-premises database host, invoke SQL*Plus and set the on-premises database to READ ONLY mode.

2.- On the Database Cloud Service compute node, invoke SQL*Plus and create a database link that enables a connection to the on-premises database.

3.- On the Database Cloud Service compute node, execute the CREATE PLUGGABLE DATABASE command to clone the on-premises non-CDB database.

Remote Cloning Non-CDB

4.- On the Database Cloud Service compute node, execute the $ORACLE_HOME/rdbms/admin/noncdb_to_pdb.sql script.

5.- On the Database Cloud Service compute node, open the new PDB by executing the ALTER PLUGGABLE DATABASE OPEN command.

6.- Optionally, on the on-premises database host invoke SQL*Plus and set the on-premises database back to READ WRITE mode.

RMAN Cross-Platform Transportable PDB

This method can be used only if the on-premises platform is little endian, and the database character sets of your on-premises database and Oracle Database Cloud Service database are compatible.

To migrate an Oracle Database 12c PDB to a PDB in an Oracle Database 12c database on an Oracle Database Cloud Service deployment using the RMAN cross-platform transportable PDB method, you perform these tasks:

1.- On the on-premises database host, invoke SQL*Plus and close the on-premises PDB.

2.- On the on-premises database host, execute the ALTER PLUGGABLE DATABASE UNPLUG command to generate an XML file containing the list of datafiles that will be plugged in on the cloud database.

3.- On the on-premises database host, invoke RMAN and connect to the root. Execute the BACKUP FOR TRANSPORT PLUGGABLE DATABASE command.

RMAN Cross-Platform Transportable PDB

4.- Use a secure copy utility to transfer the XML file and the backup set to the Database Cloud Service compute node.

5.- On the Database Cloud Service compute node, invoke RMAN and connect to the root. Execute the RESTORE ALL FOREIGN DATAFILES command.

6.- the Database Cloud Service compute node, invoke SQL*Plus and connect to the root. Execute the CREATE PLUGGABLE DATABASE command.

7.- the Database Cloud Service compute node, execute the ALTER PLUGGABLE DATABASE OPEN command.

RMAN Cross-Platform Transportable Tablespace Backup Sets

You can use this method only if the database character sets of your on-premises database and Oracle Database Cloud Service database are compatible.

To migrate Oracle Database 12c on-premises tablespaces to an Oracle Database 12c database on an Oracle Database Cloud Service deployment using the RMAN cross-platform transportable backup sets method, you perform these tasks:

1.- On the on-premises database host, prepare the database by placing the user-defined tablespaces that you intend to transport in READ ONLY mode.

2.- On the on-premises database host, invoke RMAN and use the BACKUP command with the TO PLATFORM or FOR TRANSPORT clause and the DATAPUMP clause to create a backup set for cross-platform transport. See in "BACKUP" in Oracle Database Backup and Recovery Reference for Release 12.2 or 12.1 for more information on the BACKUP command.

3.- Use a secure copy utility to transfer the backup sets, including the Data Pump export dump file, to the Database Cloud Service compute node.

RMAN Cross-Platform Transportable Tablespace Backup Sets

4.- Set the on-premises tablespaces back to READ WRITE.

5.- On the Database Cloud Service compute node, prepare the database by creating the required schemas.

6.- On the Database Cloud Service compute node, invoke RMAN and use the RESTORE command with the foreignFileSpec subclause to restore the cross-platform backup.

7.- On the Database Cloud Service compute node, set the tablespaces on the database to READ WRITE mode.

RMAN Transportable Tablespace with Data Pump

You can use this method only if the on-premises platform is little endian, and the database character sets of your on-premises database and Oracle Database Cloud Service database are compatible.

You can use this method to eliminate placing the tablespaces in READ ONLY mode, as required by the Data Pump Transportable Tablespace method.

To migrate an on-premises source database to a database deployment on Oracle Database Cloud Service using the RMAN Transportable Tablespace with Data Pump method, you perform these tasks:

1.- On the on-premises database host, invoke RMAN and create the transportable tablespace set.

2.- Use a secure copy utility to transfer the Data Pump Export dump file and the tablespace datafiles to the Database Cloud Service compute node.

RMAN Transportable Tablespace with Data Pump

3.- On the Database Cloud Service compute node, prepare the database for the tablespace import.

4.- On the Database Cloud Service compute node, invoke Data Pump Import and connect to the database. Import the data into the database using the TRANSPORT_DATAFILES option.

5.- After verifying that the data has been imported successfully, you can delete the dump file.

RMAN CONVERT Transportable Tablespace with Data Pump

You can use this method only if the database character sets of your on-premises database and Oracle Database Cloud Service database are compatible.

This method is similar to the Data Pump Transportable Tablespace method, with the addition of the RMAN CONVERT command to enable transport between platforms with different endianness. Query V$TRANSPORTABLE_PLATFORM to determine if the on-premises database platform supports cross-platform tablespace transport and to determine the endian format of the platform. The Oracle Database Cloud Service platform is little-endian format.

To migrate tablespaces from your on-premises Oracle database to a database deployment on Database Cloud Service using RMAN, you perform these tasks:

1.- On the on-premises database host, prepare the database for the Data Pump transportable tablespace export.

2.- On the on-premises database host, invoke Data Pump Export to perform the transportable tablespace export.

RMAN CONVERT Transportable Tablespace with Data Pump

3.- On the on-premises database host, invoke RMAN and use the CONVERT TABLESPACE command to convert the tablespace datafile to the Oracle Database Cloud platform format. Refer to the Oracle Database Backup and Recovery Reference for more information on the CONVERT command.

4.- Use a secure copy utility to transfer the Data Pump Export dump file and the converted tablespace datafiles to the Database Cloud Service compute node.

5.- Set the on-premises tablespaces back to READ WRITE.

6.- On the Database Cloud Service compute node, prepare the database for the tablespace import.

7.- On the Database Cloud Service compute node, invoke Data Pump Import and connect to the database.

RMAN CONVERT Transportable Tablespace with Data Pump

8.- On the Database Cloud Service compute node, set the tablespaces in the database to READ WRITE mode.

9.- After verifying that the data has been imported successfully, you can delete the dump file.

SQL Developer and INSERT Statements to Migrate Selected Objects

You can use SQL Developer to create a cart into which you add selected objects to be loaded into an Oracle Database 12c database on Oracle Database Cloud Service.

In this method, you use SQL INSERT statements to load the data into your cloud database.

To migrate selected objects to an Oracle Database 12c database on a Database Cloud Service deployment using SQL Developer and INSERT statements, you perform these tasks:

1.- Launch SQL Developer, connect to your on-premises database and create a cart containing the objects you want to migrate.

2.- In SQL Developer, click the Export Cart icon and select "Insert" in the Format menu.

3.- In SQL Developer, open a connection to the Oracle Database 12c database on Database Cloud Service and execute the generated script to create the database objects.

4.- In SQL Developer, open a connection to the Oracle Database 12c database on Database Cloud Service and run the generated script to create the objects and load the data.

Unplugging/Plugging a PDB

You can use this method only if the on-premises platform is little endian, and the on-premises database and Database Cloud Service database have compatible database character sets and national character sets.

You can use the unplug/plug method to migrate an Oracle Database 12c PDB to a PDB in an Oracle Database 12c database on an Oracle Database Cloud Service database deployment.

If your source PDB is encrypted, you must export the master encryption key and then import it on the database deployment.

To migrate an Oracle Database 12c PDB to a PDB in the Oracle Database 12c database on a Database Cloud Service database deployment using the plug/unplug method, you perform these tasks:

1.- On the on-premises database host, invoke SQL*Plus and close the on-premises PDB.

2.- On the on-premises database host, execute the ALTER PLUGGABLE DATABASE UNPLUG command to generate an XML file containing the list of datafiles that will be plugged in to the database on Database Cloud Service.

Unplugging/Plugging a PDB

3.- Use a secure copy utility to transfer the XML file and the datafiles to the Database Cloud Service compute node.

4.- On the Database Cloud Service compute node, invoke SQL*Plus and execute the CREATE PLUGGABLE DATABASE command to plug the database into the CDB.

5.- On the Database Cloud Service compute node, open the new PDB by executing the ALTER PLUGGABLE DATABASE OPEN command.

Unplugging/Plugging Non-CDB

You can use this method only if the on-premises platform is little endian, and the on-premises database and Database Cloud Service database have compatible database character sets and national character sets.

You can use the unplug/plug method to migrate an Oracle Database 12c non-CDB database to a PDB in an Oracle Database 12c database on an Oracle Database Cloud Service database deployment. This method provides a way to consolidate several non-CDB databases into a single Oracle Database 12c multitenant database on Database Cloud Service.

To migrate an Oracle Database 12c non-CDB database to the Oracle Database 12c database on a Database Cloud Service database deployment using the plug/unplug method, you perform these tasks:

1.- On the on-premises database host, invoke SQL*Plus and set the on-premises database to READ ONLY mode.

2.- On the on-premises database host, execute the DBMS_PDB.DESCRIBE procedure to generate an XML file containing the list of datafiles that will be plugged in on the cloud database.

Unplugging/Plugging Non-CDB

3.- Use a secure copy utility to transfer the XML file and the datafiles to the Database Cloud Service compute node.

4.- On the Database Cloud Service compute node, invoke SQL*Plus and execute the CREATE PLUGGABLE DATABASE command to plug the database into the CDB.

5.- On the Database Cloud Service compute node, execute the $ORACLE_HOME/rdbms/admin/noncdb_to_pdb.sql script to delete unnecessary metadata from the SYSTEM tablespace of the new PDB.

6.- On the Database Cloud Service compute node, open the new PDB by executing the ALTER PLUGGABLE DATABASE OPEN command.

7.- Optionally, on the on-premises database host invoke SQL*Plus and set the on-premises database back to READ WRITE mode.

Database Cloud Management

- EM 12c R5 Hybrid Agent
- Cloud.oracle.com Database Service consoles
- Enteprise Manager Express
- Database Cloud Services monitor (DBaaS Monitor)
- SQL Developer
- REST Data Services
- Appliction Express (APEX)
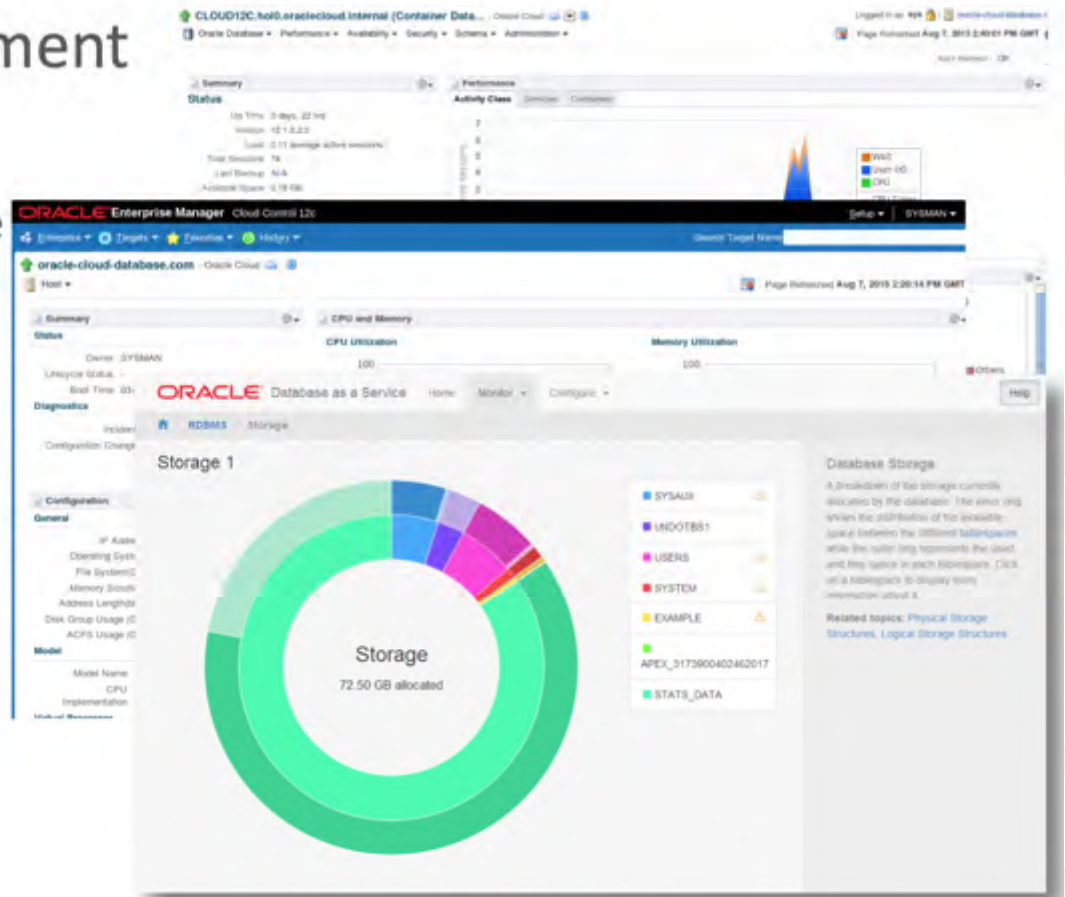
Best Practices for Moving Your Oracle Database to the Cloud
Key Points to Remember

- Same Software in the cloud as on premises
- Fast Provisioning
  - All Database Options can be used!
- Application Development Choice
- Unified management: on-premises and cloud
- Backup and High Availability Options
- Multiple levels of Security

For More Information

About Oracle Database Cloud Service
https://cloud.oracle.com/database

Oracle Database Cloud 30-Day Free Trial
https://cloud.oracle.com/database

Join the Conversation
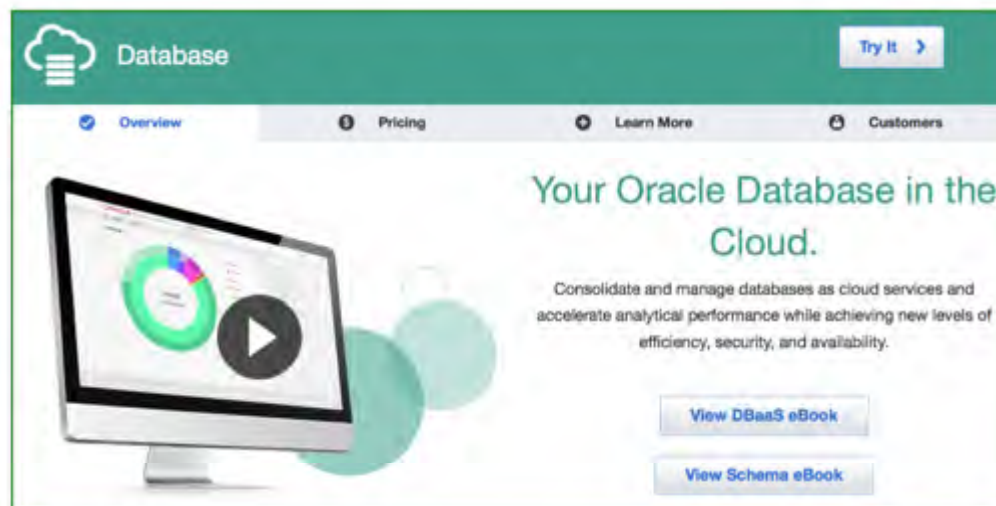
 https://blogs.oracle.com/dbaas

 www.facebook.com/OracleCloudComputing

 @OracleCloudZone   #OracleCloud

Joel Pérez

<u>Contact:</u>

➢ **ACE Director Profile:**
https://apex.oracle.com/pls/otn/f?p=19297:4:17113909871
[97101::NO:4:P4_ID:157](https://apex.oracle.com/pls/otn/f?p=19297:4:1711390987197101::NO:4:P4_ID:157)
➢ **OCM Profile:**
http://education.oracle.com/education/otn/JoelPerez.htm
➢ **Linked in:**
https://apex.oracle.com/pls/otn/f?p=19297:4:17113909871
97101::NO:4:P4_ID:157
➢ **www.Enmotech.com**

Q & A