

Exadata Database Service

Database Lifecycle Management

Eddie Ambler

SENIOR TECHNICAL PRODUCT MANAGER
ORACLE

Objectives



After completing this lesson, you should be able to:

Create Custom Database & Grid Infrastructure Software Images

Create Database Home

Create Database

Perform PDB Management

Enable Data Guard

Perform User-Managed Maintenance Updates



Exadata Database Service

Create Custom Software Image

Create Custom Database & Grid Infrastructure Images

The screenshot illustrates the process of creating custom database and grid infrastructure images in the Oracle Exadata Database Service on Dedicated Infrastructure.

Initial State: The user is on the "Software images" page for the "MyDemo" compartment. A red box highlights the "Software images" link in the sidebar. Another red box highlights the "Create software image" button. The table below shows no items found.

Display name	Lifecycle state	Image type	Service	Version	Created
No items found. Showing 0 items < 1 of 1 >					

Action: The user clicks the "Create software image" button, which opens a new window titled "Create software image".

Create Software Image Window: This window has two tabs: "Database software image" (selected) and "Grid Infrastructure software image". Both tabs have a sub-section "Create custom gold software images for [Database/Infrastructure]". The "Database software image" tab also includes a "Display name" field set to "MyCustom23aDBImage" and a "Select a compartment" dropdown set to "MyDemo".

Configure Database Software Image Window: This window is shown in a red box. It contains fields for "Database release" (set to "23ai"), "Choose a Database version (release update)" (set to "23.4.0.24.05"), and "Enter one-off patch numbers" (with a note about comma-separated lists). It also has an "Upload an Oracle Home Inventory" section with a "Drop files here" area and a "Show advanced options" link. At the bottom is a "Create software image" button.

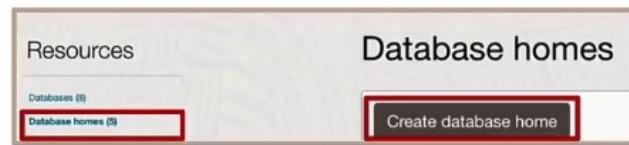
Final State: The user has returned to the "Software images" page, where the newly created "MyCustom23aDBImage" is listed in the table. A red arrow points from the "Create software image" button back to the "Create software image" button in the configuration window.

Display name	Lifecycle state	Image type	Service	Version	Created
MyCustom23aDBImage	Available	Grid infrastructure	ExaDB-D	23.4.0.24.05	Sat, May 25, 2024, 19:05:44 UTC
MyCustom23aDBImage	Available	Database	ExaDB-D	23.4.0.24.05	Sat, May 25, 2024, 19:05:53 UTC
Showing 2 items < 1 of 1 >					

Bottom Bar: The browser's bottom bar shows various icons and the time "4:35 / 18:22".



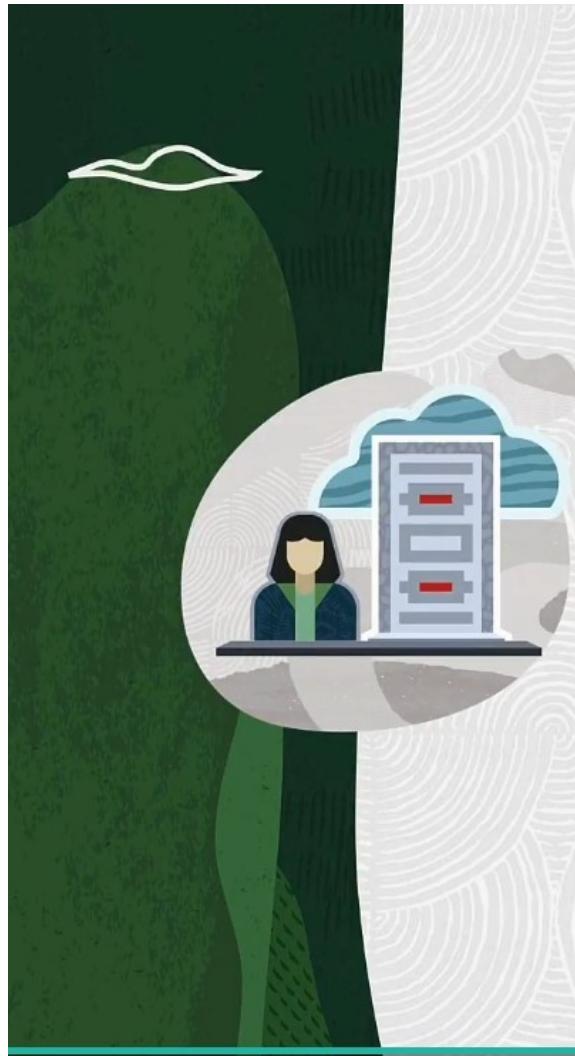
Create Database Home



Create a Database Home

- Provide the **Database Home display name**
- Select the **Database Image Version** to use
 - ❖ Select from **Oracle Provided or Custom Database Software Images**
- Click on **Create button** to proceed

The screenshot shows the 'Create database home' dialog box. At the top, it says 'Create database home'. In the 'Database Home display name' field, 'MyDemo23aiDBHome01' is entered. The 'Unified Auditing' checkbox is checked. The 'Database image' dropdown is set to 'Oracle Database 23ai', which is also highlighted with a red box. Below the dropdown, a note states: 'A 23ai based database home can only be provisioned on a VM cluster running Grid Infrastructure 23ai and later.' There is a 'Change database image' link next to the dropdown. At the bottom, there are 'Create' and 'Cancel' buttons, with 'Create' being highlighted with a red box. The status bar at the bottom shows '1x' and other icons.



Exadata Database Service

Create Database

Create Database

Resources Databases

Create a Database

- Provide the **Database name**
 - Specify **Database Home** to use
 - Create **Admin Credentials**
 - Configure **Database Backup** details
 - Select **Encryption Key Management**
 - Click on **Create Database** button

Create database

Basic information for the database

Provide the database name

Provide a unique name for the database Optional ⓘ

Select a Database version

Provide a PDB name Optional ⓘ

Specify a database home

Database Home source

Select an existing Database Home Create a new Database Home

Database Home display name

Create administrator credentials

Username Read-only

Password ⓘ

Confirm password

Use the administrator password for the TDE wallet ⓘ

If you are going to use customer-managed keys stored in a vault, the TDE wallet is not applicable.

[Create database](#) [Cancel](#)

Create database

[Help](#)

Configure database backups

Enable automatic backups [?](#)

Important: For automatic backups to function, all [constraints](#) must be met.

Backup destination [?](#)
Autonomous Recovery Service (Recommended)

Autonomous Recovery Service has the lowest operational cost and highest performance.

Protection policy in MyDemo [\(Change compartment\)](#)
Silver (5 days recovery window)

Real-time data protection [?](#)

Deletion options after database termination [?](#)

Retain backups according to the protection policy retention period

Retain backups for 72 hours, then delete

Scheduled time for daily backup (UTC) [?](#)
Anytime

Take the first backup immediately [?](#)

[Hide advanced options](#)

[Management](#) [Encryption](#) [Tags](#)

Configure key management

Use Oracle-managed keys
Data is encrypted with an encryption key that Oracle maintains.

Use customer-managed keys
Data is encrypted with a valid Vault Service encryption key. [Learn more](#)

Vault in **MyDemo** [\(Change compartment\)](#)
MyDemoVault

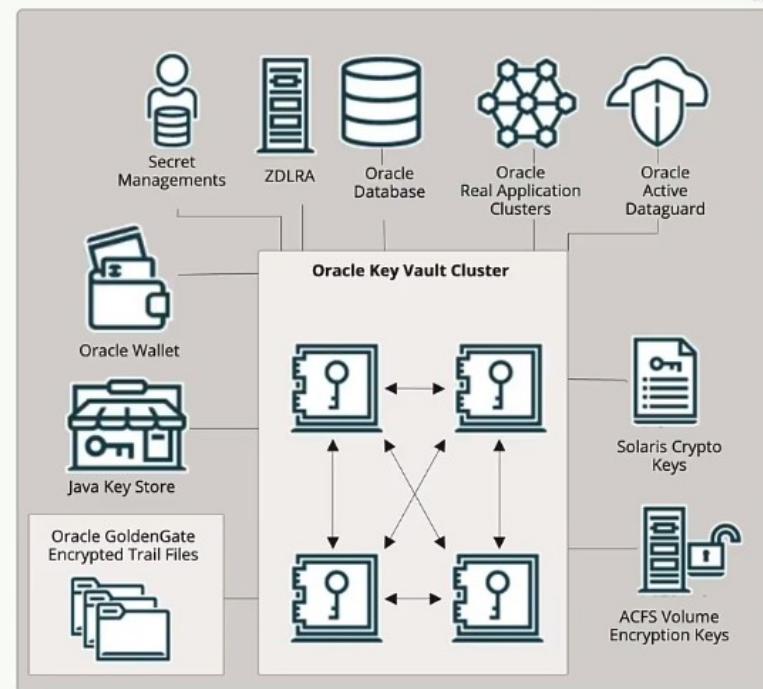
Master encryption key in **MyDemo** [\(Change compartment\)](#)
MyDemokey

Only 256-bit encryption keys are supported.

[Create database](#) [Cancel](#)

Oracle Key Vault Integration for Exadata Cloud@Customer

- You can Integrate your on-premises Oracle Key Vault (OKV) with Exadata Cloud@Customer to secure your critical data on-premises.
- Oracle Key Vault integration enables you to take complete control of your encryption keys and store them securely on an external, centralized key management device.
- OKV is optimized for Oracle wallets, Java keystores, and Oracle Advanced Security Transparent Data Encryption (TDE) master keys.
- OKV also provides a REST interface for clients to auto-enroll endpoints and setup wallets and keys.





Pluggable Database Lifecycle Management

- Create additional PDBs within the same container database (CDB)

Resources

Pluggable Databases

Metrics

Backups (7)

Data Guard Associations (0)

Pluggable Databases (1)

Work requests (10)

Create pluggable database

Name	State	Refreshable clone	Created
MYPDB01	● Available	No	Mon, May 20, 2024, 17:54:22 UTC

Showing 1 item < 1 of 1 >

Resources

Pluggable Databases

Metrics

Backups (7)

Data Guard Associations (0)

Pluggable Databases (2)

Work requests (10)

Create pluggable database

Name	State	Refreshable clone	Created
MyPDB02	● Available	No	Sat, May 25, 2024, 21:35:19 UTC
MYPDB01	● Available	No	Mon, May 20, 2024, 17:54:22 UTC

Showing 2 items < 1 of 1 >

Pluggable Database Lifecycle Management

From the the ***Pluggable Database Details page*** you can perform the following:

- **Connect to individual PDBs** using either Easy Connect or Long Connect strings
- **Open Performance Hub**
- **Clone PDB**

The screenshot shows the Oracle Exadata Database Service on Dedicated Infrastructure interface. The main title is "Pluggable Database Lifecycle Management". Below it, the specific page title is "Pluggable Database Details" for "MYPDB01". The top navigation bar includes "Overview", "Oracle Exadata Database Service on Dedicated Infrastructure", "Exadata VM Cluster", "Exadata VM Cluster Details", "Database Home Details", "Database Details", and "Pluggable Database Details". The main content area has a green header box labeled "PDB" and "AVAILABLE". Below this, there are tabs for "Database information" (which is selected) and "Tags". The "Database information" section contains the following details:

- Lifecycle state: Available
- OCID: ...22yowa [Show](#) [Copy](#)
- Database: [MyExaDB](#)
- Created: Mon, May 20, 2024, 17:54:22 UTC
- Refreshable clone: No
- Open Mode: Read Write

On the right side, under "Associated services", there are two entries:

- Database Management: Not enabled [Enable](#) [?](#) [i](#)
- Ops Insights: Not enabled [Enable](#) [?](#) [i](#)

A red box highlights the "Clone" button in the top navigation bar.



Pluggable Database Lifecycle Management

From the the **Clone Pluggable Database page** you can perform the following:

- **Clone the Source PDB**
 - 1) *Into same CDB*
 - 2) *Into another existing CDB*
 - 3) *As Refreshable Clone*

Clone pluggable database

[Help](#)

Local clone Create a copy of the source PDB in the same database.	Remote clone Create a copy of the source PDB in a different database.	Refreshable clone Create a refreshable copy of the source PDB in a different database.
---	---	--

Destination

Exadata VM Cluster in **MyDemo** (Change compartment)

MyDemoVMCluster

Database Read-only

MyExaDB

The destination database should be on the same or higher version than the source database

Configure new PDB

PDB name

Database TDE wallet password

Unlock the PDB admin account
 Provide a PDB admin password to unlock the PDB admin account.

Take a backup of the PDB immediately after cloning it. ⓘ

ⓘ Show advanced options



Clone pluggable database **Cancel**

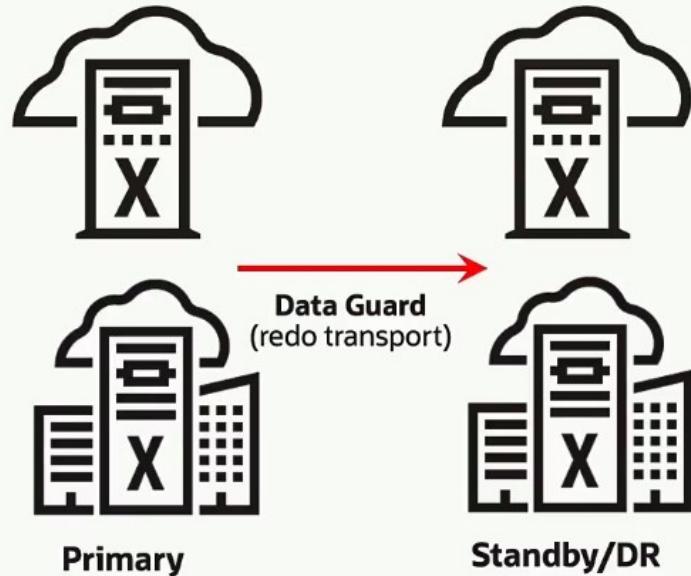
Pluggable Database Lifecycle Management

From the **More Actions Tab** you can perform the following:

- **Start and Stop a PDB**
- **Relocate and Restore a PDB**
- **Delete a PDB**

The screenshot shows the Oracle Exadata Database Service interface. The top navigation bar includes links for Overview, Oracle Exadata Database Service on Dedicated Infrastructure, Exadata VM Cluster, Exadata VM Cluster Details, Database Home Details, Database Details, and Pluggable Database Details. The main content area displays a Pluggable Database named "MYPDB01". A large green box on the left contains the letters "PDB" and the word "AVAILABLE" below it. The "More actions" dropdown menu is open, showing options: Stop, Relocate, Restore, Add tags, and Delete. The "Delete" option is highlighted with a red box. The "Associated services" section indicates that Database Management is not enabled and Ops Insights is also not enabled.

Enable Disaster Recovery & Local HA using Data Guard



Data Guard / Active Data Guard Replication

- Real-time, database-optimized disaster recovery
- Zero data loss (RPO), near-zero recovery time (RTO)
- Cloud automation for Create/Delete/Switchover/Failover/Reinstate
- Asynchronous or synchronous replication

The screenshot shows the 'Enable Data Guard' configuration dialog. It includes sections for selecting a peer VM cluster, defining association details, choosing a database home, and configuring a standby database. A note at the bottom of the association section states: 'Oracle recommends that you place your peer VM cluster in a different Exadata infrastructure from the primary VM cluster to ensure maximum availability.'

Select peer VM Cluster
Peer region: Germany Central (Frankfurt)
Primary database is in region Germany Central (Frankfurt)
Select availability domain: vPhy-EU-FRAWKF-UDT-1-AD-1
Primary database is in availability domain vPhy-EU-FRAWKF-UDT-1-AD-1
Select Exadata infrastructure in FieldDemo [Change compartment](#)
MyExadata
Your selected infrastructure is a flexible cluster with 2 database servers and 2 storage servers.
Select a VM cluster in FieldDemo [Change compartment](#)
MyExaVMCluster01

Data Guard association details
Data Guard Type: Active Data Guard
Active Data Guard is an optional option to the Oracle Database Enterprise Edition and enables advanced capabilities that extend the basic Data Guard functionality. These capabilities include Real-Time Query and RMAN Online Automatic Block Change Tracking, Far Sync, Global Data Services, and Application Continuity. [Learn more](#).

Data Guard
Oracle Data Guard ensures high availability, data protection, and disaster recovery for enterprise data. Data Guard provides a comprehensive set of services that ensure, monitor, manage, and recover one or more standby databases to enable production Oracle databases to survive disasters and data corruption. Data Guard maintains these standby databases as transactionally consistent copies of the production database. [Learn more](#).

Protection mode: Select protection mode
Transport type: First selected protection mode

Choose Database Home
 Select an existing Database Home Create a new Database Home
Database Home display name: Choose Database Home
Any Database Homes compatible with the source database's Oracle Database version and patch level are listed.

Configure standby database
Database unique name (Optional):
Specify a value for the DB_UNIQUE_NAME database parameter. This value must be unique across the primary and standby cloud VM clusters. Enter up to 30 characters. If not specified, the system automatically generates a database unique name value. [Learn more](#)
Database password:
The standby database admin password must be the same as the primary database admin password.

Role Transitions: Switchover and Failover

Oracle Data Guard supports two role-transition operations:

- **Switchover**

- Planned role reversal
- Reduces downtime for OS or hardware maintenance/upgrade & database patching

- **Failover**

- Unplanned role reversal
- Emergency use
- Invoked from Standby that will become the new Primary database
- Can enable automatic failover by manually configuring *fast-start failover*



Data Guard Requirements

- Both DB Systems must be in the same compartment
- If your primary and standby databases are in the same region, then both must use the same virtual cloud network (VCN)
- If your primary and standby databases are in different regions, then you must peer the virtual cloud networks (VCNs) for each database
- The database versions must be the same
- Each database in a Data Guard association must have a unique name `DB_UNIQUE_NAME` value; the primary and standby database can use the same database name `DB_NAME` value
- Configure the security list ingress and egress rules for the subnets of both DB systems in the Oracle Data Guard association to enable TCP traffic to move between the applicable ports; ensure that the rules you create are stateful (the default)
- The minimum requirement for Oracle Data Guard to work is to enable egress for TCP traffic only for the SCAN listener port, which has a default of 1521

