

Objectives

An illustration on the left side of the slide shows a person in a red shirt and dark pants climbing a white ladder. The ladder is positioned against a large, green, textured rock formation. At the top of the ladder, there is a small, floating island with a brown and orange patterned surface. The background of the slide features a light green, wavy, concentric pattern.

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

Create Custom Database & Grid Infrastructure Images

Overview » Oracle Exadata Database Service on Dedicated Infrastructure » Software images

Resources

Software images

List scope

Compartment

MyDemo

ocidbaasprmt (root)/tbednar/MyDemo

Filters

Image type

All

Service Type

ExaDB-D

Software images in MyDemo compartment

Grid Infrastructure software images are resources containing Oracle Grid Infrastructure software used to provision and patch Oracle Grid Infrastructure and Oracle Grid Infrastructure Homes. Grid Infrastructure software images are either Oracle-published software releases or custom software images created by your organization that include specified patches and updates. [Learn more](#)

Database software images are resources containing Oracle Database software used to provision and patch Oracle Databases and Oracle Database Homes. Database software images are either Oracle-published software releases or custom software images created by your organization that include specified patches and updates. [Learn more](#)

Create software image

Display name	Lifecycle state	Image type	Service	Version	Created
No items found.					

Showing 0 items < 1 of 1 >

Create software image

Software images can be created for Oracle Exadata Database Service on Dedicated Infrastructure. [Learn more](#)

Image type

Database software image
Create custom gold software images for Databases ✓

Grid Infrastructure software image
Create custom gold software images for Grid Infrastructure.

Provide basic information for the database software image

Display name

MyCustom23aiDBImage

Select a compartment

MyDemo

ocidbaasprmt (root)/tbednar/MyDemo

Configure the Grid Infrastructure software image

Grid Infrastructure release

23ai

Choose a Grid Infrastructure version (release update) ⓘ

23.4.0.24.05

Enter one-off patch numbers Optional

You can use a comma-separated list to enter multiple patch numbers.

Upload an Oracle Home inventory Optional ⓘ

Drop files here. [Or browse.](#)

Show advanced options

Create software image Cancel

Create Custom Database & Grid Infrastructure Images

Overview » Oracle Exadata Database Service on Dedicated Infrastructure » Software images

Resources

Software images

List scope

Compartment

MyDemo

ocidbaasprmt (root/tbednar/MyDemo)

Filters

Image type

All

Service Type

ExaDB-D

Software images in MyDemo compartment

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Image type

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Create custom gold software images for Grid Infrastructure.

Provide basic information for the database software image

Display name

MyCustom23aiDBImage

Select a compartment

MyDemo

ocidbaasprmt (root/tbednar/MyDemo)

Configure the database software image

Database release

23ai

Choose a Database version (release update) ⓘ

23.4.0.24.05

Enter one-off patch numbers *Optional*

You can use a comma-separated list to enter multiple patch numbers.

Upload an Oracle Home inventory *Optional* ⓘ

Drop files here. [Or browse.](#)

Show advanced options

Create software image Cancel

Overview » Oracle Exadata Database Service on Dedicated Infrastructure » Software images

Resources

Software images

List scope

Compartment

MyDemo

ocidbaasprmt (root/tbednar/MyDemo)

Filters

Image type

All

Service Type

ExaDB-D

Software images in MyDemo compartment

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Database software images are resources containing Oracle Database software used to provision and patch Oracle Databases and Oracle Database Homes. Database software images are either Oracle-published software releases or custom software images created by your organization that include specified patches and updates. [Learn more](#)

Create software image

Display name	Lifecycle state	Image type	Service	Version	Created
MyCustom23aiGIImage	Available	Grid Infrastructure	ExaDB-D	23.4.0.24.05	Sat, May 25, 2024, 19:06:44 UTC
MyCustom23aiDBImage	Available	Database	ExaDB-D	23.4.0.24.05	Sat, May 25, 2024, 19:05:53 UTC

Showing 2 items < 1 of 1 >



Exadata Database Service

Create Database Home

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



This screenshot shows the 'Create database home' form in the Oracle Cloud console. The form includes the following fields and controls:

- Database Home display name:** A text input field containing 'MyDemo23aiDBHome01', highlighted with a red box.
- Unified Auditing:** A checkbox that is checked, with an information icon (i) to its right.
- Database image:** A dropdown menu showing 'Oracle Database 23ai', highlighted with a red box. A 'Change database image' button is located to the right of the dropdown.
- Information message:** A blue box with an information icon (i) containing the text: 'A 23ai based database home can only be provisioned on a VM cluster running Grid Infrastructure 23ai and later.'
- Show advanced options:** A link with a gear icon to expand the form.
- Create button:** A dark button at the bottom left, highlighted with a red box.
- Cancel link:** A blue link at the bottom right.



Exadata Database Service

Create Database

Create Database



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

MyDemoDB

Provide a unique name for the database Optional

MyDemo19cCDB

Select a Database version

23ai

Provide a PDB name Optional

MyPDB01

Specify a database home

Database Home source

☒ Select an existing Database Home ☐ Create a new Database Home

Database Home display name

MyCustom23aiDBHome (23.5.0.24.07)

Create administrator credentials

Username Read-only

sys

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

Configure database backups

☒ Enable automatic backups

Important: For automatic backups to function, all prerequisites must be met.

Backup destination

Autonomous Recovery Service (Recommended)

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

Protection policy in MyDemo

Silver (35-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 FieldDemo

MyDemoVault

Master encryption key in FieldDemo

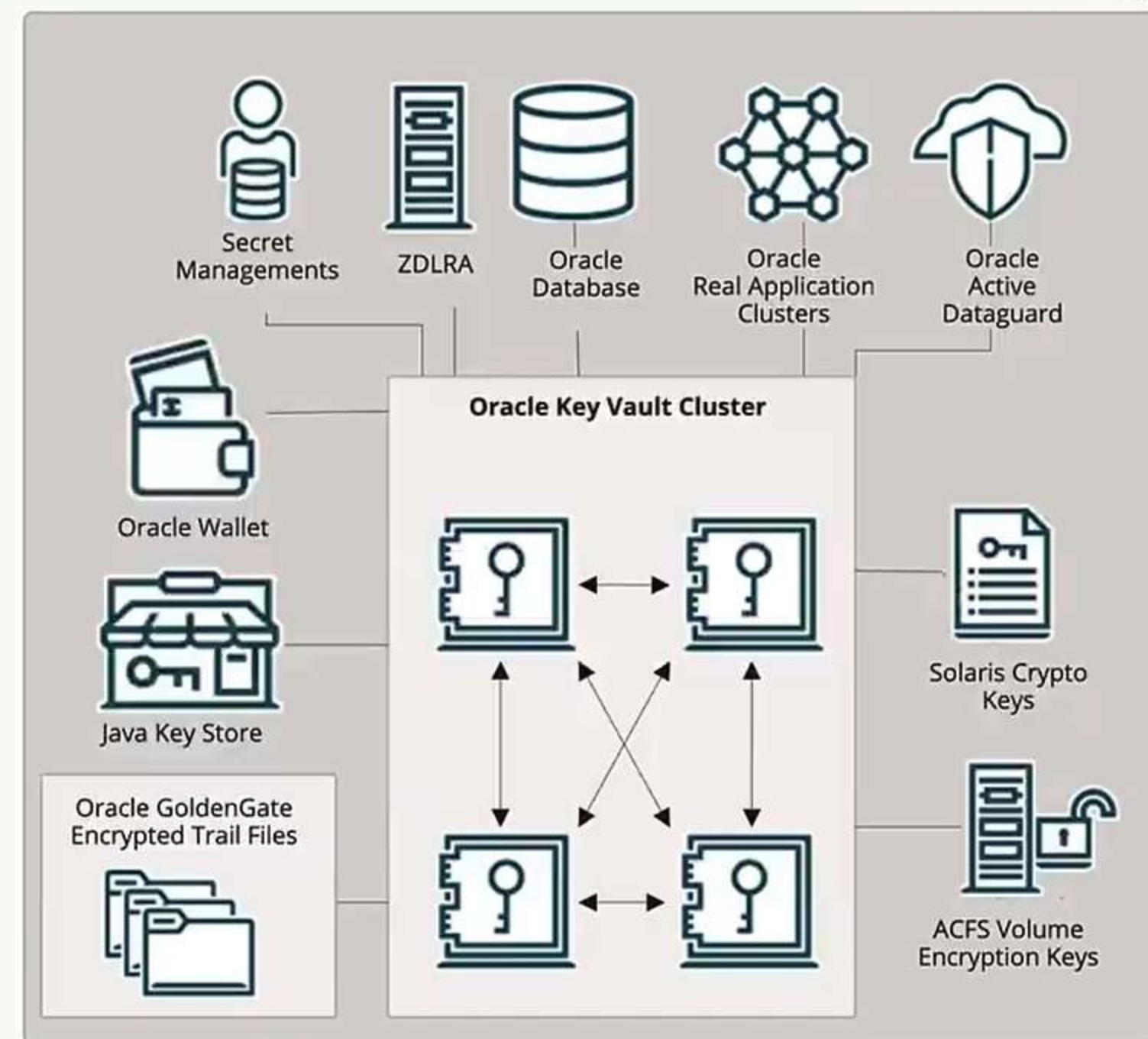
MyDemoKey

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.





Exadata Database Service

—
Pluggable Database Management

Pluggable Database Lifecycle Management

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

Resources

Metrics

Backups (7)

Data Guard Associations (0)

Pluggable Databases (1)

Work requests (10)

Pluggable Databases

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

Metrics

Backups (7)

Data Guard Associations (0)

Pluggable Databases (2)

Work requests (10)

Pluggable Databases

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 displays the 'Pluggable Database Details' page for a database named 'MYPDB01'. The breadcrumb navigation at the top reads: Overview > Oracle Exadata Database Service on Dedicated Infrastructure > Exadata VM Cluster > Exadata VM Cluster Details > Database Home Details > Database Details > Pluggable Database Details. On the left, a green square with 'PDB' in white is labeled 'AVAILABLE'. To the right of this are buttons for 'PDB connection', 'Performance Hub', 'Clone' (highlighted with a red box), 'Start', and 'More actions'. Below these buttons are two tabs: 'Database information' and 'Tags'. The 'Database information' tab is active, showing 'General information' with the following details: Lifecycle state: Available; OCID: ...22ycwa (with 'Show' and 'Copy' links); Database: MyExaDB; Created: Mon, May 20, 2024, 17:54:22 UTC; Refreshable clone: No; Open Mode: Read Write. To the right of the general information is the 'Associated services' section, which shows 'Database Management: Not enabled' (with an 'Enable' link and an information icon) and 'Ops Insights: Not enabled' (with an 'Enable' link and an information icon).

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***

The screenshot shows the 'Clone pluggable database' interface. At the top, there are three tabs: 'Local clone' (selected with a checkmark), 'Remote clone', and 'Refreshable clone'. Below the tabs, the 'Destination' section shows 'Exadata VM Cluster in MyDemo' and 'MyDemoVMCluster' selected. The 'Database' section shows 'Read-only' and 'MyExaDB' selected. A note states: 'The destination database should be on the same or higher version than the source database'. The 'Configure new PDB' section has fields for 'PDB name' and 'Database TDE wallet password'. There is a checkbox for 'Unlock the PDB admin account' with a sub-note: 'Provide a PDB admin password to unlock the PDB admin account.' At the bottom, there is a checkbox for 'Take a backup of the PDB immediately after cloning it.' and a link for 'Show advanced options'. The 'Clone pluggable database' button is highlighted with a red box.

Clone pluggable database

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. ⓘ

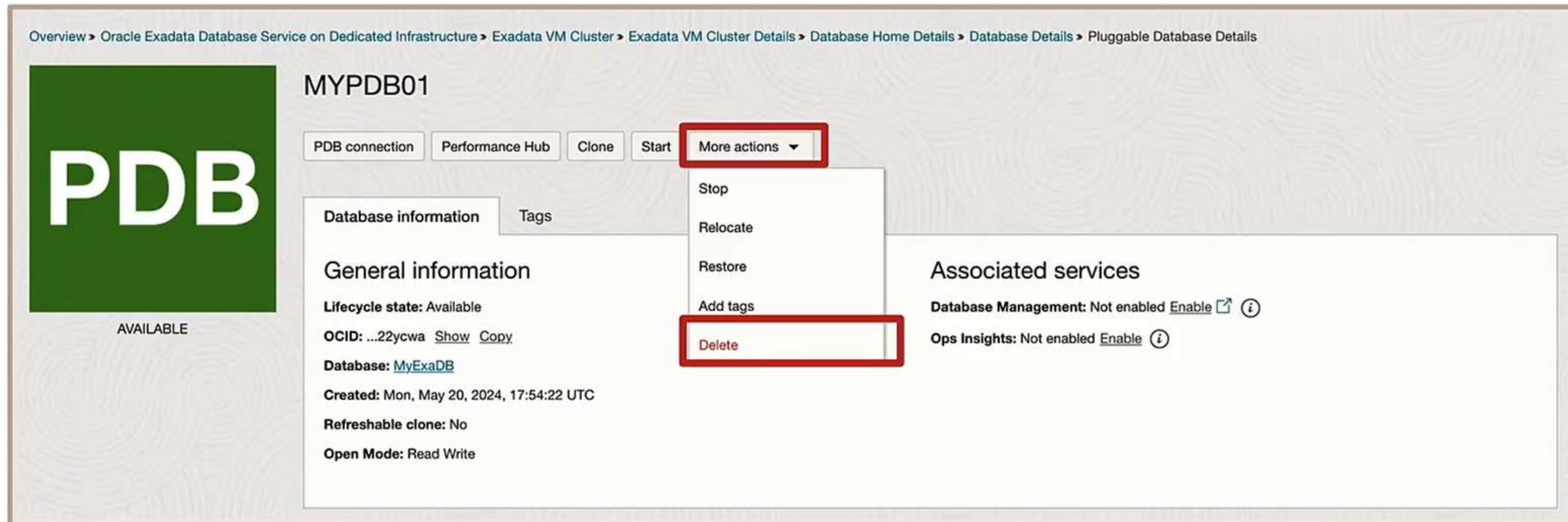
[Show advanced options](#)

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 displays the Oracle Exadata Database Service console interface for a Pluggable Database (PDB). The breadcrumb navigation at the top reads: Overview > Oracle Exadata Database Service on Dedicated Infrastructure > Exadata VM Cluster > Exadata VM Cluster Details > Database Home Details > Database Details > Pluggable Database Details.

The main content area is titled "MYPDB01". On the left, there is a green square with the text "PDB" and the status "AVAILABLE" below it. To the right of this, there are buttons for "PDB connection", "Performance Hub", "Clone", "Start", and "More actions". The "More actions" button is highlighted with a red box, and its dropdown menu is open, showing options: "Stop", "Relocate", "Restore", "Add tags", and "Delete". The "Delete" option is highlighted with a red box.

Below the buttons, there are tabs for "Database information" and "Tags". The "Database information" tab is active, showing the following details:

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

On the right side of the console, there is a section titled "Associated services" with the following information:

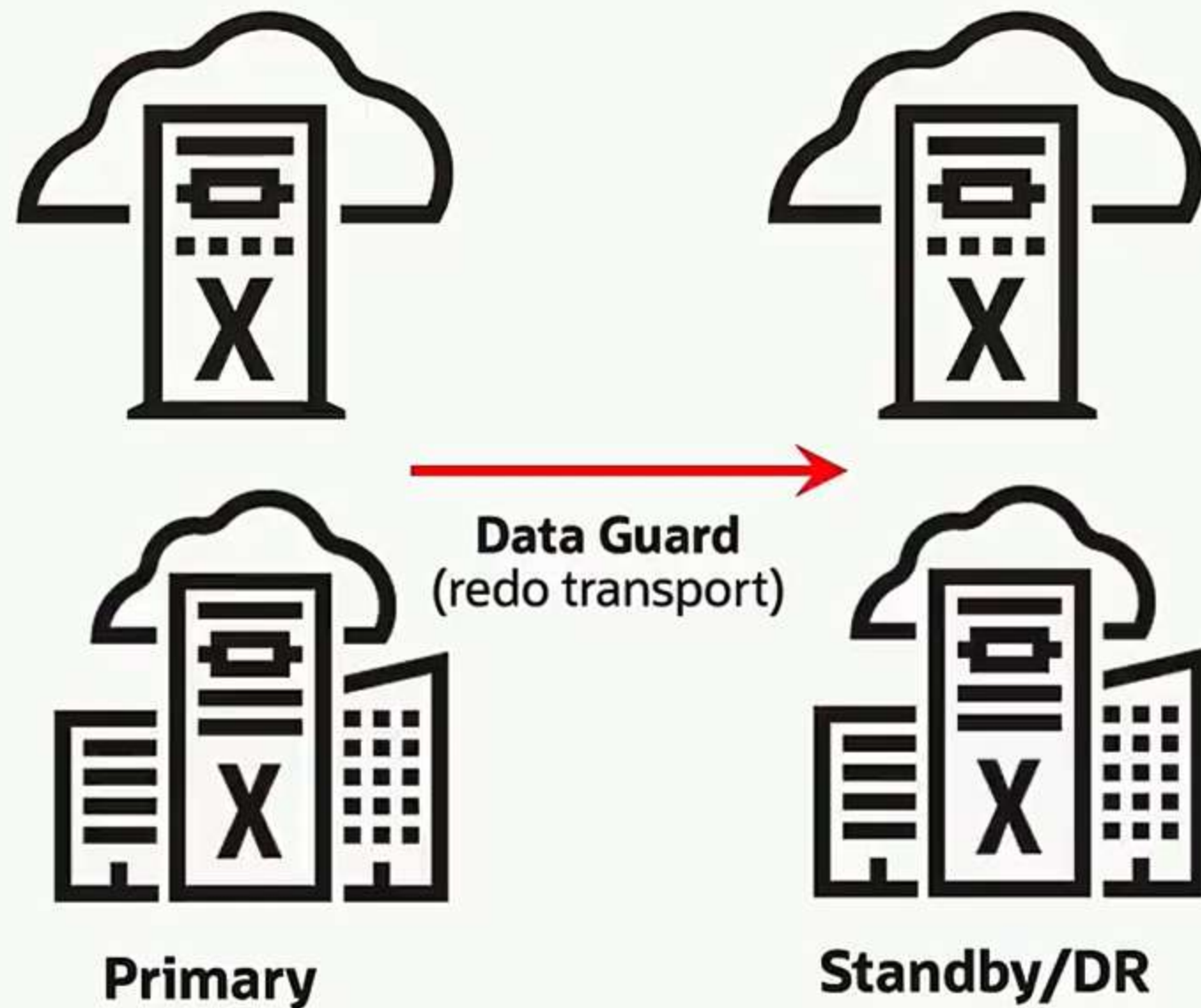
- Database Management:** Not enabled [Enable](#) [i](#)
- Ops Insights:** Not enabled [Enable](#) [i](#)



Exadata Database Service

—
Enable Data Guard Association

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

Enable Data Guard

Select peer VM Cluster

Peer region
Germany Central (Frankfurt)

Primary database is in region Germany Central (Frankfurt)

Select availability domain
vPly-EU-FRANKFURT-1-AD-1

Primary database is in availability domain vPly-EU-FRANKFURT-1-AD-1

Select Exadata infrastructure in FieldDemo [Change compartment](#)
MyExaInfra

Your selected infrastructure is a flexible shape with 2 database servers and 3 storage servers.

Select a VM cluster in FieldDemo [Change compartment](#)
MyExaVMCluster01

Oracle recommends that you place your peer VM cluster in a different Exadata Infrastructure from the primary VM cluster to ensure maximum availability.

Data Guard association details

Data Guard Type
Active Data Guard

Active Data Guard is a licensed 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 DML Offload, Automatic Block Repair, Standby 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 create, maintain, manage, and monitor one or more standby databases to enable production Oracle databases to survive disasters and data corruptions. Data Guard maintains these standby databases as transactionally consistent copies of the production database. [Learn more](#)

Protection mode
Select protection mode

Transport type
First select protection mode

Choose Database Home

☒ Select an existing Database Home ☐ Create a new Database Home

Database Home display name
Choose Database Home

Only 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.

[Show advanced options](#)

Enable Data Guard Cancel

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