

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

Create Custom Database & Grid Infrastructure Images

Overview > Oracle Exadata Database Service on Dedicated Infrastructure > Software Images

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](#)

Resources

Software images (selected)

List scope

Compartment: MyDemo ocidbaaspm (root@tbednar/MyDemo)

Create software image (highlighted)

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

Showing 0 Items < 1 of 1 >

Filters:

Image type: All

Service Type: ExaDB-D

Create software image

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

Image type

Database software image (selected) 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 ocidbaaspm (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

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](#)

Resources

Software images (highlighted with a red box)

List scope

Compartment: MyDemo (highlighted with a red box)

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 (highlighted with a red box) 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 (highlighted with a red box)

ocidbaaspmt (root/tbednar/MyDemo)

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

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](#)

Resources

Software images

List scope

Compartment: MyDemo

Display name Lifecycle state Image type Service Version Created

MyCustom23aiGImage 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 >

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 (highlighted with a red box) [Cancel](#)



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

The dialog box has the title 'Create database home' at the top. It contains the following fields:

- Database Home display name:** A text input field containing 'MyDemo23aiDBHome01'.
- Unified Auditing:** A checked checkbox with a help icon.
- Database image:** A dropdown menu currently set to 'Oracle Database 23ai', with a 'Change database image' link next to it.
- Information message:** A blue info icon with 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 to expand additional configuration options.
- Create and Cancel buttons:** At the bottom of the dialog.



Exadata Database Service

Create Database

Create Database

Resources

Databases

Create database

Databases (8)

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 ⓘ [Change compartment](#)
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

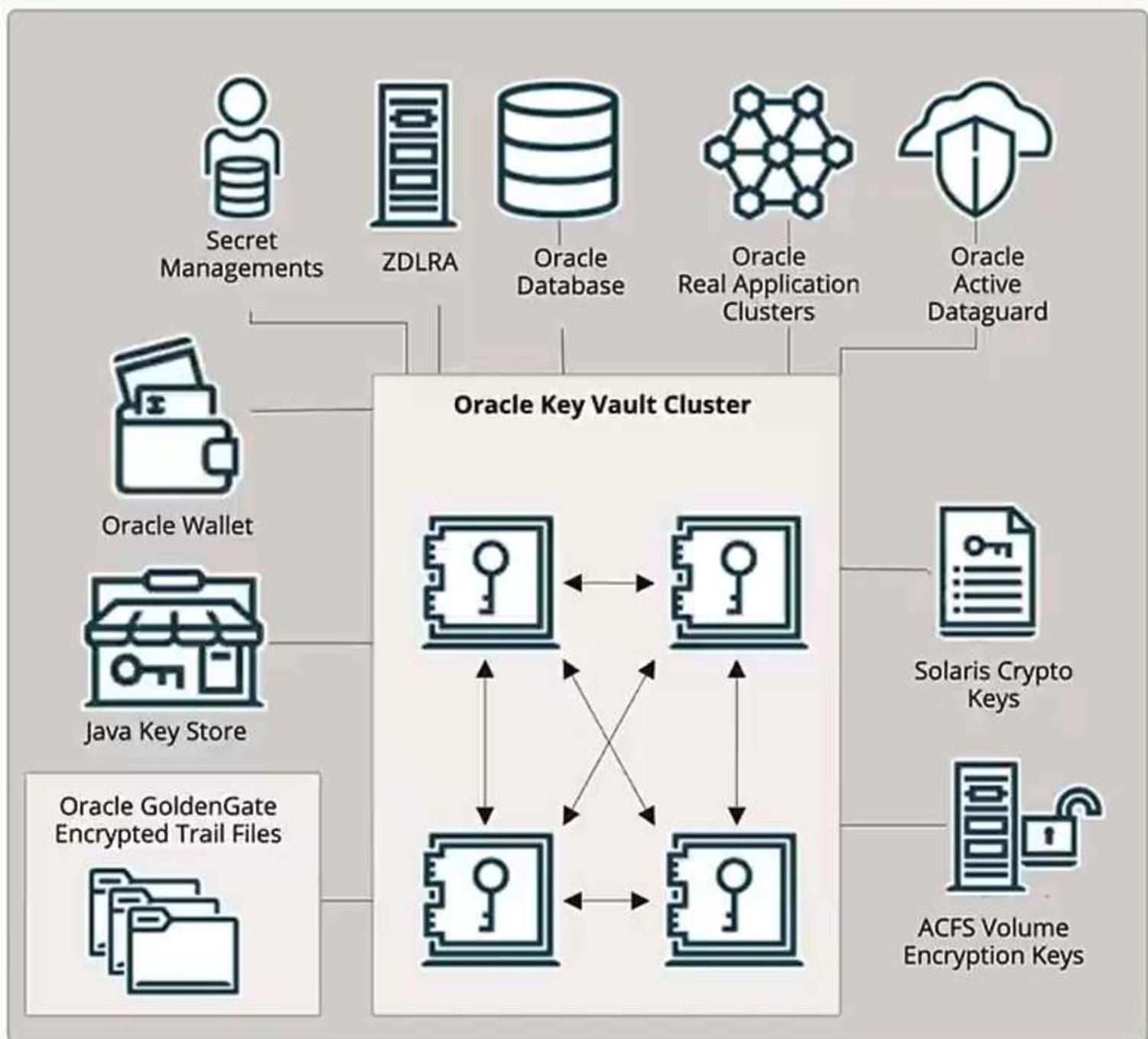
Scheduled time for daily backup (UTC) ⓘ
Anytime

Take the first backup immediately ⓘ

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

Pluggable Databases

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

Showing 1 item < 1 of 1 >

Metrics
Backups (7)
Data Guard Associations (0)
Pluggable Databases (1)
Work requests (10)

Create pluggable database

Resources

Pluggable Databases

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 >

Metrics
Backups (7)
Data Guard Associations (0)
Pluggable Databases (2)
Work requests (10)

Create pluggable database

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 interface. The URL in the browser's address bar is: 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 title is "MYPDB01". The top navigation bar includes "PDB connection", "Performance Hub", a red-bordered "Clone" button, "Start", and "More actions". Below the title, there are tabs for "Database information" and "Tags". The "Database information" section contains the following details:

- 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

The "Associated services" section shows:

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

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

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.

Help

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***

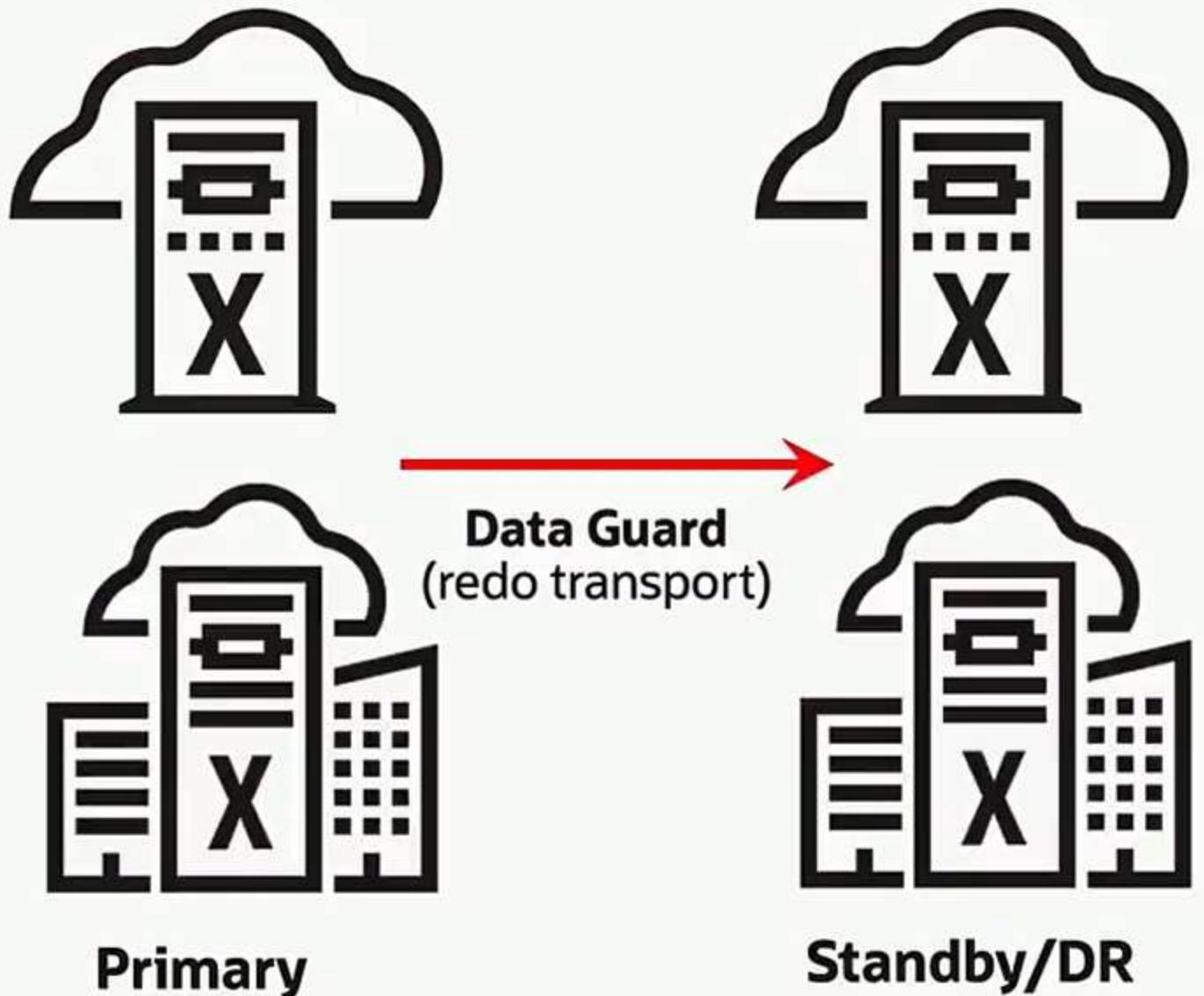
The screenshot shows the Oracle Exadata Database Service interface. The top navigation bar includes links: Overview > Oracle Exadata Database Service on Dedicated Infrastructure > Exadata VM Cluster > Exadata VM Cluster Details > Database Home Details > Database Details > Pluggable Database Details. The main content area displays a database named "MYPDB01". On the left, there is a large green box labeled "PDB" and "AVAILABLE". 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 "General information" section lists the following details: Lifecycle state: Available, OCID: ...22ycwa, Database: MyExaDB, Created: Mon, May 20, 2024, 17:54:22 UTC, Refreshable clone: No, and Open Mode: Read Write. To the right, under "Associated services", it shows Database Management: Not enabled and Ops Insights: Not enabled, both with "Enable" buttons.



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: vPAy:EU-FRANKFURT-1-AD-1
Primary database is in availability domain vPAy:EU-FRANKFURT-1-AD-1

Select Exadata Infrastructure in FieldDemo: MyExaInfra
MyExaInfra

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

Select a VM cluster in FieldDemo: 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