Oracle® Healthcare Foundation

Installation Guide

Release 7.2

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Oracle Healthcare Foundation Installation Guide, Release 7.2

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Contents

B Configuration Guide for Non-Exadata

Overview

This document explains the installation and initial setup of Oracle Healthcare Foundation. The user installing Oracle Healthcare Foundation (OHF) should have knowledge of Oracle, Informatica or Oracle Data Integrator, WebLogic, and the Linux operating system.

The Oracle Healthcare Foundation installer lets you install the components below on the Linux OS in the following order:

1. Oracle Healthcare Foundation Data Model
2. Oracle Healthcare Foundation Data Management Assembly for ODI

   or

   Oracle Healthcare Foundation Data Management Assembly for Informatica
3. Oracle Healthcare Foundation Middle-Tier

> **Note:** Oracle Healthcare Foundation should be installed by the same user who installed the RDBMS or WebLogic.

This chapter contains the following topics:

Software Requirements

Component	Software Required
Common requirements for all components	■ Oracle Linux 6.7 (64-bit) or above, or Oracle Linux 7 (64-bit) operating system (OS) ■ Oracle Database 12.2.0.1 Enterprise Edition If you are installing OHF on an Exadata environment, apply the Oracle database patch 19562381 (Doc ID 19562381.8). ■ Python 2 (version 2.6.6 or above)
Data Model	No additional requirements
Data Management Assembly (Oracle Data Integrator)	■ Oracle Data Integrator (ODI) 12.2.1.2.6 Standalone or Enterprise edition Oracle Fusion Middleware Infrastructure 12.2.1.2 is required for ODI Enterprise edition ■ Java Development Kit (JDK) 1.8 ■ Oracle WebLogic server 12.2.1.2 (optional)
Data Management Assembly (Informatica)	■ Informatica PowerCenter 9.6.1 or 10.2
Middle-Tier	You must install the Middle-Tier on a different WebLogic server than the ODI server. ■ Oracle Fusion Middleware Infrastructure 12.2.1.2.0 with Oracle WebLogic server 12.2.1.2.0 ■ Java Development Kit (JDK) 1.8 Update 111 (JDK 1.8 u111) or above
Self-Service Analytics (optional)	■ Oracle Business Intelligence Enterprise Edition (OBIEE) 12.2.1.2.0 ■ Oracle Business Intelligence Developer Client Tools 12.2.1.2.0 ■ Java Runtime Environment (JRE) 1.8 Update 111 (JRE 1.8 u111) or above

Media Pack Content

The media pack from the Oracle Software Delivery Cloud (OSDC) contains the installer for:

- Oracle Healthcare Foundation Linux (**OHF_V72_Linux-x64.zip**)

General Guidelines for Installation

- Linux X-windows should be used for the Linux Oracle Universal Installer (OUI) installation (Linux Graphical User Interface).
- Before running the installer, make sure that the ORACLE_HOME and PATH environment variables are setup in your session.

  For example,

```
export ORACLE_HOME=/u01/app/oracle/product/122010

export PATH=$PATH:$ORACLE_HOME/bin
```

- When re-executing the installer due to a failure, enter the same details in the question prompting phase at all times. Do not delete any objects in the installation folder.
- When re-executing the installer, if you receive OUI-10030 error messages, ignore the messages to continue using the existing OHF installation HOME path.
- Convert the installer execution shell to SH shell as the installer script executes in the SH shell of Linux OS.
- Text enclosed within <> in the following chapters, indicate parameters and you must provide an appropriate value.

Supported Upgrade Paths

The following are the supported upgrade paths:

- HDWF 6.1/OHADI 3.1 to OHF 7.2
- OHF 7.0.1 to OHF 7.2
- OHF 7.1 to OHF 7.2
- OHF 7.1.x to OHF 7.2
- OHTR 3.1.0.2/3.1.0.3/3.1.0.4 to OHF 7.2

  Only the CDM, ODB, Enterprise, and Job Engine schemas are updated as part of the OHF 7.2 upgrade. The Apps schema is upgraded during the OHTR 3.2.1 upgrade.

Where to Find the Product Documentation

The product documentation is available from the following locations:

- My Oracle Support (https://support.oracle.com)
- Oracle Help Center (https://docs.oracle.com/en/industries/health-sciences/oracle-healthcare-foundation/index.html)

If the software is available for download, the documentation set is available from the Oracle Software Delivery Cloud (https://edelivery.oracle.com).

All documents may not be updated for every release. Therefore, the version numbers for the documents in a release may differ.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Part I

Installation

1

Data Model Installation

This chapter describes how to install the OHF Data Model. There are two ways to install the Data Model, depending on how you create the user schemas. The installer can create the user schemas during the installation or you can create them manually, prior to the installation:

- Install the Data Model without Pre-created User Schemas
- Install the Data Model with Pre-created User Schemas

1.1 Install the Data Model without Pre-created User Schemas

This section describes how to install the Data Model by using the installer to create fresh user schemas.

1. Check Prerequisites
2. Prepare the Installer
3. Run the Installer
4. Check the Installation

1.1.1 Check Prerequisites

- ☐ Install Oracle Database 12.2.0.1 Enterprise Edition.
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ If you are installing OHF on an Exadata environment, apply the Oracle database patch 19562381 (Doc ID 19562381.8).
- ☐ Create a container database with a single pluggable database instance with the help of a Database Administrator.
- ☐ Make sure the database initialization parameter MAX_STRING_SIZE is set to STANDARD (default value).
- ☐ Install Java Virtual Machine on the database server.
- ☐ Set the NLS_LENGTH_SEMANTICS parameter to either CHAR or BYTE, based on your requirements.

  For Oracle Healthcare Foundation Globalization Support information, see *Oracle Database Globalization Support Guide* and set your database character set accordingly.

- ☐ Enable database connection through SERVICE_NAME. Make sure that you are connecting to the pluggable database instance.

  Verify the database connectivity using the following command:

  ```
  SQL>connect <username>@<hostname>:<port number>/<service name>
  ```

  or

  ```
  sqlplus
  <username>@'(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=<dbhost>)(PORT=<dbport>))(CONNECT_
  DATA=(SERVICE_NAME=<dbservicename>)))'
  ```

- ☐ Make sure that the Sqlplus utility is available in the installation server.
- ☐ Make sure that the password expiry notification message does not display for the Sys and system schemas.
- ☐ To create an encrypted tablespace during the installation, set up your environment for tablespace encryption. For more information, see *Oracle Database Advanced Security Guide 12.2*. The installer only creates the tablespace and does not handle prerequisites like setting up the keystore, opening it, etc. The installer only checks whether the keystore is open if the sys and system passwords are provided during the installation.
- ☐ Set the GLOBAL_NAMES database initialization parameter to false.
- ☐ For remote installations, make sure the following are available on the client machine:
  - Oracle Linux 6.7 (64-bit) OS or above
  - Oracle Database 12.2.0.1.0 client
- ☐ If you are installing OHF on an Exadata database machine, see the **Exadata Machine** and **Exadata Implementation** sections in the *Oracle Healthcare Foundation Programmer's Guide*.
- ☐ Table compression strategy is decided based on the number of updates in tables. If the number of updates is high, select the **Advanced compression** option instead of HCC (QUERY HIGH).
- ☐ If you are installing OHF on an Exadata environment, selecting the compression type as **HCC (QUERY HIGH)** will slow down the first few incremental loads.
- ☐ Make sure that you have an appropriate database license for the compression methods you choose.
- ☐ The installer does not validate the tablespace data files location. If the database server is on the remote server, make sure the location physically exists or the installer will fail.

1.1.2 Prepare the Installer

- ☐ Extract the contents of the OHF media pack to your system.
- ☐ Open the **<media_pack_location>/** folder.
- ☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

  ```
  unzip -a OHF_72_Linux-x64.zip
  ```

- ☐ Open the **Disk1/install** folder.
- ☐ Change the protection on files as follows:

  ```
  chmod 755 *
  ```

1.1.3 Run the Installer

Start the Oracle Universal Installer (OUI) using the following command:

- If the database server (Exadata or non-Exadata) is on the machine where the installer is running, execute:

  ```
  sh runInstaller.sh -local
  ```

- If the database server is on a different machine, execute:

```
sh runInstaller.sh -local remote_installation=true
```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Model 7.2.0.0.0** option.
☐	Specify Home Details	Enter the installation home name and location.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Oracle Client Home Configuration	Specify the Oracle (version 12.2.0.1.0) client home path.
☐	Database Configuration	Enter values for the following fields: ■ Hostname - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port - By default, the port number is 1521. You can edit this field if required. ■ Service name ■ System user password ■ Sys user password
☐	Table Compression	On an Exadata setup, use the following compression options: **Interface Tables schema** ■ Hybrid columnar compression (default) ■ No Compression **Data Warehouse schema** ■ No Compression (default) ■ Advanced Compression: Preferred if updates are high. If you don't have a license for Advanced Compression, select Hybrid Columnar Compression. ■ Hybrid Columnar Compression **Common Data Mart schema** ■ No Compression (default) ■ Advanced Compression **Cohort Data Mart schema** ■ No Compression (default) ■ Advanced Compression **Omics Data Bank schema** ■ Hybrid columnar compression (default) On a non-Exadata setup, for each of the above schemas, choose either No Compression (default) or Advanced Compression.

	Screen	Action
☐	Data Model Configuration	Enter values for the following fields: ■ Interface Tables schema name ■ Interface Tables schema password ■ Data Warehouse schema name ■ Data Warehouse schema password ■ Common Data Mart schema name ■ Common Data Mart schema password ■ Omics Data Bank schema name ■ Omics Data Bank schema password
☐	Data Model Configuration	Enter values for the following fields: ■ Cohort Data Mart schema name ■ Cohort Data Mart password ■ Enterprise schema name ■ Enterprise schema password ■ Job Engine schema name ■ Job Engine schema password ■ Services schema name ■ Services schema password
☐	Data Model Configuration Verification	Click **Next**.
☐	Tablespace Data File Location	Specify the location of the Tablespace data files. This is the directory on the database server where the data files are created during the installation. For example, Unix: `/u01/oradata/dbname` ASM: `+DATA_EX02/hashas01/datafile` **Note:** ■ The ASM location must always start with +. ■ The path should not end with /.

	Screen	Action
☐	Tablespace Details	The installer creates the following tablespaces. Make sure that these tablespaces do not exist in the database. ■ hdi_ts - Default tablespace used for Interface tables (hdi) schema ■ hdm_ts - Default tablespace used for Data Warehouse (hdm) schema ■ hcd_ts - Default tablespace used for Common Data Mart (hcd) schema ■ odb_data_ts - Default tablespace used for Omics Data Bank (odb) schema ■ odb_index_ts - Tablespace used for indexes of the Omics Data Bank (odb) schema ■ odb_lob_ts - Tablespace used for LOB columns in the Omics Data Bank (odb) schema ■ cdm_data_ts - Default tablespace used for Cohort Data Mart (cdm) schema ■ cdm_index_ts - Tablespace used for indexes of the Cohort Data Mart (cdm) schema ■ ent_ts - Default tablespace used for Enterprise (ent) schema ■ job_data_ts - Default tablespace for Job Engine (job) schema ■ job_index_ts - Tablespace used for indexes of the Job Engine (job) schema ■ job_store_ts - Database File System (DBFS) store is created as part of the Job Engine installation ■ job_lob_ts - Tablespace used to store LOB data in the DBFS store created for the JOB ENGINE schema user ■ job_tbs_ts - Tablespace used for the DBFS store created for the JOB_ENGINE schema ■ svc_ts - Default tablespace used for services schema (svc) For each schema, you can edit the default tablespace name, initial size, max size, and tablespace encryption.
☐	Temporary Tablespace Details	The installer creates the following temporary tablespaces. Make sure that these tablespaces do not exist in the database. ■ hdi_temp - Temporary tablespace for the Interface tables schema (hdi) ■ hdm_temp - Temporary tablespace for the Data warehouse schema (hdm) ■ hcd_temp - Temporary tablespace for the Common data mart schema (hcd) ■ odb_temp - Temporary tablespace for the Omics Data bank schema (odb) ■ cdm_temp - Temporary tablespace for the Cohort data mart schema (cdm) ■ ent_temp - Temporary tablespace for the Enterprise schema (ent) ■ job_temp - Temporary tablespace for the Job Engine schema (job) ■ svc_temp - Temporary tablespace for the Services schema (svc) For each schema, you can edit the temporary tablespace name, initial size and max size.

	Screen	Action
☐	Omics Data Bank and Cohort Data Mart Parameters	Enter values for the following fields: ■ Result Partition - Used to partition result tables in the ODB schema. The available options are: – GENE (Default) – STUDY ■ Promoter Offset - Numerical value to specify a portion of the gene used as a promoter in the ODB schema. The default value is 200. ■ Flanking Offset - Numerical value to specify the region before and after a gene to link results to a gene in the ODB schema. The default value is 200. ■ Max Parallel Degree - An option to specify the maximum degree of parallelism to be set on tables or used in the SQL statements for the CDM or ODB schema. It is dependent on the machine configuration of the database server. The default value is 2. ■ Job Store Name If you are using the same database instance for multiple environments, enter a unique job store name for each job schema.
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

1.1.4 Check the Installation

☐ Review the generated installation log files for errors. For details, see Installation Log Files.

☐ Contact Oracle support, if necessary, to resolve any errors.

1.2 Install the Data Model with Pre-created User Schemas

This section describes how to install the Data Model by creating OHF user schemas and tablespaces outside the installer, then using the installer to create database objects in the respective user schemas.

1. Check Prerequisites
2. Create Default Tablespaces
3. Create Temporary Tablespaces
4. Prepare the Installation Files
5. Create Database Roles
6. Create User Schemas
7. Run the Installation Scripts
8. Start the Installer
9. Run the Installer
10. Check the Installation
11. Revoke Privileges

1.2.1 Check Prerequisites

- ☐ Install Oracle Database 12.2.0.1 Enterprise Edition.
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ If you are installing OHF on an Exadata environment, apply the Oracle database patch 19562381 (Doc ID 19562381.8).
- ☐ Create a container database with a single pluggable database instance with the help of a Database Administrator.
- ☐ Make sure the database initialization parameter MAX_STRING_SIZE is set to STANDARD (default value).
- ☐ Install Java Virtual Machine on the database server.
- ☐ Set the NLS_LENGTH_SEMANTICS parameter to either CHAR or BYTE, based on your requirements.

  For Oracle Healthcare Foundation Globalization Support information, see *Oracle Database Globalization Support Guide* and set your database character set accordingly.
- ☐ Enable database connection through SERVICE_NAME. Make sure that you are connecting to the pluggable database instance.

  Verify the database connectivity using the following command:

  ```
  SQL>connect <username>@<hostname>:<port number>/<service name>
  ```

  or

  ```
  sqlplus
  <username>@'(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=<dbhost>)(PORT=<dbport>))(CONNECT_
  DATA=(SERVICE_NAME=<dbservicename>)))'
  ```
- ☐ Make sure that the Sqlplus utility is available in the installation server.
- ☐ Make sure that the password expiry notification message does not display for the Sys and system schemas.
- ☐ To create an encrypted tablespace during the installation, set up your environment for tablespace encryption. For more information, see *Oracle Database Advanced Security Guide 12.2*. The installer only creates the tablespace and does not handle prerequisites like setting up the keystore, opening it, etc. The installer only checks whether the keystore is open if the sys and system passwords are provided during the installation.
- ☐ Set the GLOBAL_NAMES database initialization parameter to false.
- ☐ For remote installations, make sure the following are available on the client machine:
  - Oracle Linux 6.7 (64-bit) OS or above
  - Oracle Database 12.2.0.1.0 client
- ☐ If you are installing OHF on an Exadata database machine, see the **Exadata Machine** and **Exadata Implementation** sections in the *Oracle Healthcare Foundation Programmer's Guide*.
- ☐ Table compression strategy is decided based on the number of updates in tables. If the number of updates is high, select the **Advanced compression** option instead of HCC (QUERY HIGH).
- ☐ If you are installing OHF on an Exadata environment, selecting the compression type as **HCC (QUERY HIGH)** will slow down the first few incremental loads.
- ☐ Make sure that you have an appropriate database license for the compression methods you choose.

1.2.2 Create Default Tablespaces

Create the following default tablespaces. You can use different tablespace names than the ones listed below.

	Tablespace Name	Big File Tablespace	Description
☐	hdi_ts	Yes	Default tablespace for the Interface Tables (hdi) schema
☐	hdm_ts	Yes	Default tablespace for the Data Warehouse (hdm) schema
☐	hcd_ts	Yes	Default tablespace for the Common Data Mart (hcd) schema
☐	odb_data_ts	Yes	Default tablespace for the Omics Data Bank (odb) schema
☐	odb_index_ts	Yes	Used for indexes of the Omics Data Bank (odb) schema
☐	odb_lob_ts	Yes	Used for LOB columns in the Omics Data Bank (odb) schema
☐	cdm_data_ts	Yes	Default tablespace for the Cohort Data Mart (cdm) schema
☐	cdm_index_ts	Yes	Used for indexes of the Cohort Data Mart (cdm) schema
☐	ent_ts	No	Default tablespace for the Enterprise (ent) schema
☐	job_data_ts	No	Default tablespace for the Job Engine (job) schema
☐	job_index_ts	No	Used for indexes of the Job Engine (job) schema
☐	job_store_ts	No	Database File System (DBFS) store created as part of the Job Engine installation
☐	job_lob_ts	No	Name of the tablespace to store LOB data in the DBFS store created for the JOB ENGINE schema user
☐	job_tbs_ts	No	Name of the tablespace to be used for the DBFS store created for the JOB_ENGINE schema
☐	svc_ts	No	Default tablespace used for the Services (svc) schema

1.2.3 Create Temporary Tablespaces

Create the following temporary tablespaces. You can use different tablespace names than the ones listed below.

	Tablespace Name	Big File Tablespace	Description
☐	hdi_temp	Yes	Temporary tablespace for the Interface Tables (hdi) schema
☐	hdm_temp	Yes	Temporary tablespace for the Data Warehouse (hdm) schema
☐	hcd_temp	Yes	Temporary tablespace for the Common Data Mart (hcd) schema
☐	odb_temp	Yes	Temporary tablespace for the Omics Data Bank (odb) schema
☐	cdm_temp	Yes	Temporary tablespace for the Cohort Data Mart (cdm) schema
☐	ent_temp	No	Temporary tablespace for the Enterprise (ent) schema
☐	job_temp	No	Temporary tablespace for the Job Engine (job) schema
☐	svc_temp	No	Temporary tablespace for the Services (svc) schema

1.2.4 Prepare the Installation Files

- ☐ Extract the contents of the OHF media pack to your system.
- ☐ Open the **<media_pack_location>/** folder.
- ☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

```
unzip -a OHF_72_Linux-x64.zip
```

1.2.5 Create Database Roles

- ☐ Navigate to the directory **<media_pack_location>/Disk1/stage/Components/oracle.hsgbu.hc.datamodel/7.2.0.0.0/1/DataFiles/Expanded/filegroup1**.
- ☐ Unzip the **master_install.zip** file.
- ☐ Connect to Oracle SYS from the extracted content and create database roles by executing the `roles.sql` script.

1.2.6 Create User Schemas

Create the following user schemas and assign the appropriate default and temporary tablespaces. Refer to Create Default Tablespaces and Create Temporary Tablespaces for details. If you created tablespaces with different names, use those names instead.

	Schema	Default Tablespace	Temporary Tablespace
☐	Interface Tables (hdi)	hdi_ts	hdi_temp
☐	Data Warehouse (hdm)	hdm_ts	hdm_temp
☐	Common Data Mart (hcd)	hcd_ts	hcd_temp
☐	Omics Data Bank (odb)	odb_data_ts	odb_temp
☐	Cohort Data Mart (cdm)	cdm_data_ts	cdm_temp
☐	Enterprise (ent)	ent_ts	ent_temp
☐	Job Engine (job)	job_data_ts	job_temp
☐	Services (svc)	svc_ts	svc_temp

1.2.7 Run the Installation Scripts

Execute the following scripts/commands as a DBA user. When prompted, enter the respective schema names.

When prompted for the application role, enter OHF_APPLICATION_ROLE.

- ☐ `@hdi_install/grant_schema_priv.sql`
- ☐ `@hdm_install/grant_schema_priv.sql`

- ☐ `@hcd_install/grant_schema_priv.sql`
- ☐ `@odb_install/grant_schema_priv.sql`

  Execute the following commands:

  `> ALTER USER <odb> QUOTA UNLIMITED on <odb_index_ts>`

  `> ALTER USER <odb> QUOTA UNLIMITED on <odb_lob_ts>`
- ☐ `@cdm_install/grant_schema_priv.sql`

  Execute the following command:

  `> ALTER USER <cdm> QUOTA UNLIMITED on <cdm_index_ts>`
- ☐ `@enterprise_install/grant_schema_priv.sql`
- ☐ `@job_install/grant_schema_priv.sql`

  Execute the following commands:

  `> ALTER USER <job> QUOTA UNLIMITED on <job_index_ts>`

  `> ALTER USER <job> QUOTA UNLIMITED on <job_store_ts>`

  `> ALTER USER <job> QUOTA UNLIMITED on <job_lob_ts>`

  `> ALTER USER <job> QUOTA UNLIMITED on <job_tbs_ts>`
- ☐ `@svc_install/grant_schema_priv.sql`

1.2.8 Start the Installer

- ☐ Make sure that all the OHF schemas are disconnected from the database by querying `gv_$session` from the sys user:

  `select * from sys.gv_$session where status <> 'KILLED' and username in ('<OHF Schemas>');`
- ☐ Navigate to the **<media_pack_location>/Disk1/install** folder.
- ☐ Change the protection on files as follows:

  `chmod 755 *`
- ☐ Start the Oracle Universal Installer (OUI) using the following command:
  - If the database server is on the machine where the installer is running and is an Exadata instance:

    `sh runInstaller.sh -local dba_tasks=false db_platform=exadata`
  - If the database server is on the machine where the installer is running and is a non-Exadata instance:

    `sh runInstaller.sh -local dba_tasks=false db_platform=default`
  - If the database server is on a different machine and is an Exadata instance:

    `sh runInstaller.sh -local remote_installation=true dba_tasks=false db_platform=exadata`
  - If the database server is on a different machine and is a non-Exadata instance:

    `sh runInstaller.sh -local dba_tasks=false db_platform=default remote_installation=true`

  The `-local` option tells the installer to install on the local node, irrespective of the cluster nodes specified on the installer machine.

  The `dba_tasks=false` option tells the installer not to create user schemas and tablespaces.

1.2.9 Run the Installer

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Model 7.2.0.0.0** option.
☐	Specify Home Details	Enter the installation home name and location.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Oracle Client Home Configuration	Specify the Oracle (version 12.2.0.1.0) client home path. The installer validates this path.
☐	Database Configuration	Enter values for the following fields: ■ Hostname - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port - By default, the port number is 1521. You can edit this field if required. ■ Service name The installer will not validate the database connectivity. Make sure that you are able to connect to the database from SQLPlus.
☐	Table Compression	On an Exadata setup, use the following compression options: **Interface Tables schema** ■ Hybrid columnar compression (default) ■ No Compression **Data Warehouse schema** ■ No Compression (default) ■ Advanced Compression: Preferred if updates are high. If you don't have a license for Advanced Compression, select Hybrid Columnar Compression. ■ Hybrid Columnar Compression **Common Data Mart schema** ■ No Compression (default) ■ Advanced Compression **Cohort Data Mart schema** ■ No Compression (default) ■ Advanced Compression **Omics Data Bank schema** ■ Hybrid columnar compression (default) On a non-Exadata setup, for each of the above schemas, choose either No Compression (default) or Advanced Compression.

	Screen	Action
☐	Data Model Configuration	Enter values for the pre-created schemas: ■ Interface Tables schema name ■ Interface Tables schema password ■ Data Warehouse schema name ■ Data Warehouse schema password ■ Common Data Mart schema name ■ Common Data Mart schema password ■ Omics Data Bank schema name ■ Omics Data Bank schema password
☐	Data Model Configuration	Enter values for the pre-created schemas: ■ Cohort Data Mart schema name ■ Cohort Data Mart password ■ Enterprise schema name ■ Enterprise schema password ■ Job Engine schema name ■ Job Engine schema password ■ Services schema name ■ Services schema password
☐	Data Model Configuration Verification	Click **Next**.
☐	Tablespace Details	Click **Next**.
☐	Temporary Tablespace Details	Click **Next**.

	Screen	Action

☐	Omics Data Bank and Cohort Data Mart Parameters	Enter values for the following fields:
		▪ Result Partition - Used to partition result tables in the ODB schema. The available options are:
		– GENE (Default)
		– STUDY
		▪ Promoter Offset - Numerical value to specify a portion of the gene used as a promoter in the ODB schema. The default value is 200.
		▪ Flanking Offset - Numerical value to specify the region before and after a gene to link results to a gene in the ODB schema. The default value is 200.
		▪ Max Parallel Degree - An option to specify the maximum degree of parallelism to be set on tables or used in the SQL statements for the CDM or ODB schema. It is dependent on the machine configuration of the database server. The default value is 2.
		▪ Job Store Name
		Execute the following query to find all store names in the database (created by all previous installations) by connecting to the SYS user:
		`SELECT DISTINCT owner,object_type,object_name,created FROM all_objects WHERE object_name LIKE '%JOB_STORE%';`
		Note: If you have store names in the database that do not match the `%JOB_STORE%` pattern, run the following query to find the correct names:
		`SELECT DISTINCT owner,object_type,object_name,created FROM all_objects WHERE owner =<Job Username/schemaname> AND object_type IN ('TABLE','VIEW');`

☐	Tablespace Parameters	Enter values for the fields below from the existing or pre-created CDM, ODB, and Job engine schemas. Make sure that these tablespaces exist or were created before the installation. Refer to Create Default Tablespaces for the tablespace names to be used. ▪ cdm_index_ts_name ▪ odb_index_ts_name ▪ odb_lob_ts_name ▪ job_index_ts_name ▪ job_lob_ts_name ▪ job_tbs_ts_name
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

1.2.10 Check the Installation

☐ Review the generated installation log files for errors. For details, see Installation Log Files.

☐ Contact Oracle support, if necessary, to resolve any errors.

1.2.11 Revoke Privileges

After the Cohort Data Mart (CDM) and Omics Data Bank (ODB) data model installation, connect to the database user with DBA privilege, and execute the following scripts to revoke privileges:

```
REVOKE CREATE ANY DIRECTORY FROM <odb user>
REVOKE CREATE ANY CONTEXT FROM <cdm user>
```

where,

<odb_user> is the ODB schema name.

<cdm_user> is the CDM schema name.

2

Data Management Assembly for Oracle Data Integrator Installation

This chapter describes how to install the OHF Data Management Assembly for Oracle Data Integration (ODI). There are two ways to install the Data Management Assembly for ODI, depending on how you create the user schemas. The installer can create the user schemas during the installation or you can create them manually, prior to the installation. The two methods are described below:

- Installing the Data Management Assembly without Pre-Created User Schemas
- Installing the Data Management Assembly with Pre-Created User Schemas

2.1 Installing the Data Management Assembly without Pre-Created User Schemas

1. Check Prerequisites
2. Prepare the Installer
3. Run the Installer
4. Check the Installation
5. Create a New ODI Repository Login

2.1.1 Check Prerequisites

- ☐ The user is familiar with Oracle Database (DB), ODI, and Linux OS.
- ☐ The OHF Data Model is installed.

  Follow the instructions in Chapter 1, "Data Model Installation" or Chapter 8, "Data Model Upgrade".
- ☐ The Data Management Assembly installer is run on the system where the ODI server is installed.
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ ODI services can connect to the Data Model 7.2 database mentioned in the Oracle TNS file (TNS entries of the required database must be available in the installation server tnsnames.ora file).
- ☐ The password expiry notification message does not display for the system user.

- ☐ The terminology loaders source file location exists. The installer creates an archive directory. For example,

  /scratch/home/oemora/TL_Source is the source file location specified during installation, which already exists.

  /scratch/home/oemora/TL_Archive_Files is created by the installer as the archive directory.

- ☐ The path of the data file (Configuration schema/Repository schema tablespace) mentioned when creating the tablespace is correct. Make sure that the database user has write privileges.
- ☐ Enough space is available in the installation directory and the Oracle Home directory.
- ☐ The Sqlplus utility is available on the installation server.
- ☐ The impdp utility is available on the repository database server.
- ☐ The installation user has read, write, and execute privileges to the $ODI_HOME/odi/agent/bin folder. The installer creates product specific files under this location.
- ☐ For remote installations, where the installation server and the ODI Repository Database server are different machines, make sure that:
  - A directory from the remote database server is mounted to the installation server with appropriate read and write privileges.
  - The remote directory is accessible from the installation server on mounting.
  - The user that owns Oracle db services on the remote server has privilege 755 for the directory that was mounted on the installation server.
  - If the database is on an Exadata machine, provide the database single node (the node which is mounted) as the host name when prompted during installation.
- ☐ GLOBAL_NAMES database initialization parameter is set to false.
- ☐ In case of an OHF upgrade, back up the following csv files under $ODI_HOME/odi/agent/bin if it exists:
  - bus_susp_day.csv
  - daylght_svngs_day.csv
  - hosp_hol_day.csv
  - time_odi.csv
- ☐ In case of an OHF upgrade, if the Terminology Loaders source folder is shared, make a backup of the following files:
  - Code Axes.txt
  - Code Descriptions.txt
  - Code Hierarchy.txt
  - Code.txt
  - Related Entity.txt
  - Relations Type.txt
  - Relations.txt
  - Relationship Type.txt
  - time.txt

  The installer will overwrite any existing files from the list above.

Note: The installer auto-populates some of the user parameters and lets you edit them.

2.1.2 Prepare the Installer

- ☐ Extract the contents of the OHF media pack to your system.
- ☐ Navigate to the **<media_pack_location>/** folder.
- ☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

  ```
  unzip -a OHF_72_Linux-x64.zip
  ```

- ☐ Navigate to the **Disk1/install** folder.
- ☐ Change the protection on files as follows:

  ```
  chmod 755 *
  ```

2.1.3 Run the Installer

Start the Oracle Universal Installer by running the following command:

- If the ODI repository schemas (master and work) to be created are on the database instance of the installation server, execute:

  ```
  sh runInstaller.sh -local
  ```

- If the ODI repository database or OHF data model database is on the database instance of another server, execute:

  ```
  sh runInstaller.sh -local remote_installation=true
  ```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Management Assembly for ODI 7.2.0.0.0** option.
☐	Specify Home Details	Enter the installation home path.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Select the Oracle Home Configuration	Specify the Oracle client home path.
☐	Select the ODI Home Location	Specify the ODI home location. The ODI home should be one level above the **/oracle_common** directory. For example: **/u01/app/oracle/Oracle_ODI1**.
☐	Select Database Server for ODI Repository Schemas	Select one of the following options for the ODI repository schemas: ■ If the ODI repository database server is on the installation server, select the **Installation database server** option. ■ Else, select the **Remote database server** option.

	Screen	Action

☐	Specify Mount Path Details (applicable only for remote installations)	Enter the configuration details for the mounted remote server directory:
		■ Mounted directory path on the remote server
		■ Mount path on the installation server
		To obtain the available storage drives, on the Linux machine, execute the `df -h` command. If the remote server directory is mounted on the installation server, the mounting is displayed as follows:
		`<Remote Server name>:<Remote server path>`
		`<total size> <used up space> <Available space> <use%> <Path in installation server where mounting was done>`
		For example,
		`abc:/scratch/dump`
		`191G 138G 44G 76% /installation server`
		Note:
		■ The directory of the remote database server should be mounted to the installation server with appropriate read and write privileges for the IMPDB utility.
		■ If the remote server mounted path is displayed as **/**, provide the absolute mounted path of the remote server.

☐	Specify Healthcare Data Model Database Instance Details	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port number ■ Service name ■ System user password ■ Select this database instance for repository schema creation If you select **Yes**, the installer uses the same Data Model database instance for ODI repository schema creation.
☐	Specify ODI Repository Database Instance Details (applicable only if you selected **No** in the previous screen for Select this database instance for repository schema creation)	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port ■ Service name ■ System user password
☐	Specify ODI Supervisor Password	Specify the supervisor password used for the ODI console login.
☐	Select Terminology Loaders Source Location	Specify the Terminology loaders source file location. This location is used to read the terminology loaders source data files. You can change this location when required. The installer creates an archive directory at the same level as the source directory. Make sure that the create directory privileges exist for the installation user.

	Screen	Action
☐	Specify Healthcare Data Model Schema Details	Enter values for the following fields: ■ Interface table schema name ■ Interface table schema password ■ Data warehouse schema name ■ Data warehouse schema password ■ Common data mart (hcd) schema name ■ Common data mart (hcd) schema password ■ Cohort data mart (cdm) schema name ■ Cohort data mart (cdm) schema password
☐	Specify Healthcare Data Model Schema Details	Enter values for the following fields: ■ Enterprise schema name ■ Enterprise schema password.
☐	Specify Terminology Loader Details	Enter values for the following fields: ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password Specify the new schema names for the Master and Work repository. The installer creates the Master and Work repository schemas, and imports loaders into them.
☐	Specify Warehouse Integration Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password The installer creates the configuration schema if it does not exist. Specify the new schema names for the Master and Work repository. The installer creates the Master and Work repository schemas, and imports loaders into them.
☐	Specify Healthcare Common Data Mart Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password The installer creates the configuration schema if it does not exist. Specify the new schema names for the Master and Work repository. The installer creates the Master and Work repository schemas, and imports loaders into them.

	Screen	Action
☐	Specify Healthcare Cohort Data Mart Loader Details	Enter values for the following fields: ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password Specify the new schema names for the Master and Work repository. The installer creates the Master and Work repository schemas, and imports loaders into them. The configuration schema is not required for CDM.
☐	Specify RCU Prefix and Password	Specify an RCU prefix to be appended to the schemas created by the ODI Repository Creation Utility (RCU). The RCU creates 3 schemas: ■ <RCU prefix>_STB ■ <RCU prefix>_WLS ■ <RCU prefix>_WLS_RUNTIME **Note:** The RCU Prefix must be unique. The prefix should be alphabetic only. It cannot have special characters and cannot start with a number. The length of the prefix must not exceed 8 characters. Specify a password for schemas created using the ODI Repository Creation Utility (RCU). **Note:** The password must be between 8 and 12 alphanumeric characters long and must include at least one number. The password cannot start with a number.
☐	Specify the Tablespace Details	Specify the tablespace names for the configuration schemas. The installer creates these tablespaces if they do not exist. ■ Configuration schema default tablespace name ■ Configuration schema temporary tablespace name
☐	Specify the Tablespace Details	Specify the tablespace names for repository schemas: ■ wil_odi_ts - Default tablespace for ODI temporary objects for Warehouse Integration Loaders ■ hcd_odi_ts - Default tablespace for ODI temporary objects for Healthcare Common Data mart Loaders ■ cdm_odi_ts - Default tablespace for ODI temporary objects for Cohort Data mart Loaders ■ tl_odi_ts - Default tablespace for ODI temporary objects for Terminology Loaders
☐	Specify Tablespace for Creation of ODI Temporary Objects	Specify tablespace names for the creation of temporary objects used by the ODI Loaders. The installer creates these tablespaces if they do not exist. ■ Warehouse Integration Loaders ■ Healthcare Common Data mart Loaders ■ Cohort Data mart Loaders ■ Terminology Loaders It is recommended to provide different tablespace names for each component.
☐	Specify Tablespace Location for Configuration Schemas	Specify the tablespace location for configuration schemas. The location should be present in the data model database server with write privileges. If the OHF data model database is not on the installation server, you must enter the location manually.

	Screen	Action
☐	Specify Tablespace Location for Repository Schemas	Specify the tablespace location for the ODI repository schema. The location should be present in the repository database server with write privileges. If the repository database is not on the installation server, you must enter the location manually.
☐	Verify Configuration Parameters	Click **Next**.
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

2.1.4 Check the Installation

☐ Review the generated installation log files for errors. For details, see Installation Log Files.

☐ Contact Oracle support, if necessary, to resolve any errors.

2.1.5 Create a New ODI Repository Login

Perform the following steps to create a new ODI repository login:

☐ Navigate to **ODI > File > New > Create a New ODI Repository Login**.

☐ Click **OK**. The Repository Connection Information screen is displayed.

☐ Enter the following values:

- Login Name - For example, WIL_REPOSITORY_LOGIN
- User - SUPERVISOR
- Password - Provide the ODI Login password entered during installation (see Run the Installer)
- User - <database schema created for the master repository>
- Password - <database schema password created for the master repository>
- Driver List - Select **OracleJDBC Driver** from the drop-down list
- Driver Name - oracle.jdbc.oracledriver
- Url - Set appropriate values based on your database details
- Work Repository - Select the **Work Repository** option, browse to select the work repository shown (for example, for Warehouse Integration loader, select **WIL_WORK_REPOSITORY**), and click **OK**.

☐ Click **OK**. The login name is created with the name specified at the previous step.

☐ Navigate to **ODI > Connect > ODI Studio**.

☐ Enter the following details:

- Login Name - Select **WIL_REPOSITORY_LOGIN**
- User - Supervisor
- Password - Provide the ODI login password that was entered during installation (see "Run the Installer").

Similarly, follow the above steps to create the login for the Terminology loaders, Common Data Mart loader, and Cohort Data Mart loader.

2.2 Installing the Data Management Assembly with Pre-Created User Schemas

1. Check Prerequisites
2. Create Default and Temporary Tablespaces
3. Create User Schemas
4. Prepare the Installer
5. Run the Installer
6. Check the Installation
7. Revoke Privileges

2.2.1 Check Prerequisites

- ☐ The user is familiar with Oracle Database (DB), ODI, and Linux OS.
- ☐ The OHF Data Model is installed.

  Follow the instructions in Chapter 1, "Data Model Installation" or Chapter 8, "Data Model Upgrade".
- ☐ The Data Management Assembly installer is run on the system where the ODI server is installed.
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ ODI services can connect to the Data Model 7.2 database mentioned in the Oracle TNS file (TNS entries of the required database must be available in the installation server tnsnames.ora file).
- ☐ The password expiry notification message does not display for the pre-created schemas or system user.
- ☐ The terminology loaders source file location exists. The installer creates an archive directory. For example,

  /scratch/home/oemora/TL_Source is the source file location specified during installation, which already exists.

  /scratch/home/oemora/TL_Archive_Files is created by the installer as the archive directory.
- ☐ The path of the data file (Configuration schema/Repository schema tablespace) mentioned when creating the tablespace is correct. Make sure that the database user has write privileges.
- ☐ Enough space is available in the installation directory and the Oracle Home directory.
- ☐ The Sqlplus utility is available on the installation server.
- ☐ The impdp utility is available on the repository database server.
- ☐ The installation user has read, write, and execute privileges to the $ODI_HOME/odi/agent/bin folder. The installer creates product specific files under this location.

- ☐ For remote installations, where the installation server and the ODI Repository Database server are different machines, make sure that:
  - A directory from the remote database server is mounted to the installation server with appropriate read and write privileges.
  - The remote directory is accessible from the installation server upon mounting.
  - The user that owns Oracle DB services on the remote server has privilege 755 for the directory that has been mounted on the installation server.
  - If the database is on an Exadata machine, provide the database single node (the node which is mounted) as the host name when prompted during installation.
- ☐ GLOBAL_NAMES database initialization parameter is set to false.
- ☐ In case of an OHF upgrade, back up the following csv files under $ODI_HOME/odi/agent/bin if it exists:
  - bus_susp_day.csv
  - daylght_svngs_day.csv
  - hosp_hol_day.csv
  - time_odi.csv
- ☐ In case of an OHF upgrade, if the Terminology Loaders source folder is shared, make a backup of the following files:
  - Code Axes.txt
  - Code Descriptions.txt
  - Code Hierarchy.txt
  - Code.txt
  - Related Entity.txt
  - Relations Type.txt
  - Relations.txt
  - Relationship Type.txt
  - time.txt

  The installer will overwrite any existing files from the list above.

Note: The installer auto-populates some of the user parameters and lets you edit them.

2.2.2 Create Default and Temporary Tablespaces

Create the following default and temporary tablespaces with appropriate quotas. You can use different tablespace names than the ones listed below.

Note: The hmc_ts and hmc_temp tablespaces must be created in the Data Model database instance.

	Tablespace Name	Big File Tablespace	Description
☐	odirep_ts	Yes	Default tablespace for the Repository schema.
☐	odirep_temp	Yes	Temporary tablespace for the Repository schema.
☐	hmc_ts	Yes	Default tablespace for the Configuration schema.

	Tablespace Name	Big File Tablespace	Description
☐	hmc_temp	Yes	Temporary tablespace for the Configuration schema.
☐	wil_odi_ts	Yes	Default tablespace for ODI temporary objects for Warehouse Integration loaders.
☐	hcd_odi_ts	Yes	Default tablespace for ODI temporary objects for Healthcare Common Data mart loaders.
☐	cdm_odi_ts	Yes	Default tablespace for ODI temporary objects for Cohort Data mart loaders.
☐	tl_odi_ts	Yes	Default tablespace for ODI temporary objects for terminology loaders.

2.2.3 Create User Schemas

Create the following user schemas and assign the appropriate default and temporary tablespaces. Refer to Create Default and Temporary Tablespaces for details. If you created tablespaces with different names, use those instead.

	Schema Name	Schema Description	Default Tablespace	Temporary Tablespace
☐	wil_hmc	Warehouse Integration Loader Configuration schema	hmc_ts	hmc_temp
☐	hcd_hmc	Healthcare Common Data Mart Configuration schema	hmc_ts	hmc_temp
☐	tl_master_rep_72	Terminology Loader Master Repository schema	odirep_ts	odirep_temp
☐	tl_work_rep_72	Terminology Loader Work Repository schema	odirep_ts	odirep_temp
☐	wil_master_rep_72	Warehouse Integration Loader Master Repository schema	odirep_ts	odirep_temp
☐	wil_work_rep_72	Warehouse Integration Loader Work Repository schema	odirep_ts	odirep_temp
☐	hcd_master_rep_72	Healthcare Common Data Mart Master Repository schema	odirep_ts	odirep_temp
☐	hcd_work_rep_72	Healthcare Common Data Mart Work Repository schema	odirep_ts	odirep_temp
☐	cdm_master_rep_72	Healthcare Cohort Data Mart Master Repository schema	odirep_ts	odirep_temp
☐	cdm_work_rep_72	Healthcare Cohort Data Mart Work Repository schema	odirep_ts	odirep_temp

2.2.4 Prepare the Installer

☐ Extract the contents of the OHF media pack to your system.

☐ Navigate to the **<media_pack_location>/** folder.

☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

```
unzip -a OHF_72_Linux-x64.zip
```

- ☐ Navigate to the **<media_pack_location>/Disk1/stage/Components/oracle.hsgbu.hc.dma.odi/7.2.0.0.0/1/DataFiles/Expanded/filegroup1** directory.
- ☐ Unzip the **dma_odi_master_install.zip** file.
- ☐ Navigate to the **dma_odi_master_install/hmc_odi_install/** directory.
- ☐ Connect to the system user and execute the following scripts:
  - `@odi_hdi_user_privilege.sql <HDI_SCHEMA_NAME>`
  - `@odi_hmc_user_privilege.sql <WIL_HMC_SCHEMA_NAME> <HCD_HMC_SCHEMA_NAME>`
  - `@odi_rep_user_privilege.sql <HLI_MASTER_REP_USR> <WIL_MASTER_REP_USR> <AT_MASTER_REP_USR> <HLI_WORK_REP_USR> <WIL_WORK_REP_USR> <AT_WORK_REP_USR> <CDM_MASTER_REP_USR> <CDM_WORK_REP_USR>`
- ☐ Navigate to the **<media_pack_location>/Disk1/install** folder.
- ☐ Change the protection on files as follows:

  ```
  chmod 755 *
  ```

2.2.5 Run the Installer

Start the Oracle Universal Installer by running the following command:

- If the ODI repository schemas (master and work) to be created are on the database instance of the installation server, execute:

  ```
  sh runInstaller.sh -local dba_tasks=false
  ```

- If the ODI repository database or OHF data model database is on the database instance of another server, execute:

  ```
  sh runInstaller.sh -local remote_installation=true dba_tasks=false
  ```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Management Assembly for ODI 7.2.0.0.0** option.
☐	Specify Home Details	Enter the installation home path.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Select the Oracle Home Configuration	Specify the Oracle client home path.
☐	Select the ODI Home Location	Specify the ODI home location. The ODI home should be one level above the **/oracle_common** directory. For example, **/u01/app/oracle/Oracle_ODI1**.
☐	Select Database Server for ODI Repository Schemas	Select one of the following options for the ODI repository schemas: ■ If the ODI repository database server is on the installation server, select the **Installation database server** option. ■ Else, select the **Remote database server** option.

	Screen	Action

☐	Specify Mount Path Details (applicable only for remote installations)	Enter the configuration details for the mounted remote server directory:
		■ Mounted directory path on the remote server.
		■ Mount path on the installation server.
		To obtain the available storage drives, on the Linux machine, execute the `df -h` command. If the remote server directory is mounted on the installation server, the mounting is displayed as follows:
		`<Remote Server name>:<Remote server path>`
		`<total size> <used up space> <Available space> <use%> <Path in installation server where mounting was done>`
		For example:
		`abc:/scratch/dump`
		`191G 138G 44G 76% /installation server`
		Note:
		■ The directory of the remote database server should be mounted to the installation server with appropriate read and write privileges for the IMPDB utility (folder with **dba** group).
		■ If the remote server mounted path is displayed as **/**, provide the absolute mounted path of the remote server.

☐	Specify Healthcare Data Model Database Instance Details	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port number ■ Service name ■ Select this database instance for repository schema creation If you select **Yes**, the installer uses the same Data Model database instance for ODI repository schema creation.
☐	Specify ODI Repository Database Instance Details (applicable only if you selected **No** in the previous screen for Select this database instance for repository schema creation)	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port ■ Service name
☐	Specify ODI Supervisor Password	Specify the supervisor password used for the ODI console login.
☐	Select Terminology Loaders Source Location	Specify the Terminology loaders source file location. This location is used to read the terminology loaders source data files. You can change this location when required. The installer creates an archive directory at the same level as the source directory. Make sure that the create directory privileges exist for the installation user.

	Screen	Action
☐	Specify Healthcare Data Model Schema Details	Enter values for the pre-created schemas: ■ Interface table schema name ■ Interface table schema password ■ Data warehouse schema name ■ Data warehouse schema password ■ Common data mart (hcd) schema name ■ Common data mart (hcd) schema password ■ Cohort data mart (cdm) schema name ■ Cohort data mart (cdm) schema password
☐	Specify Healthcare Data Model Schema Details	Enter values for the pre-created schemas: ■ Enterprise schema name ■ Enterprise schema password.
☐	Specify Terminology Loader Details	Enter values for the pre-created schemas: ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password The installer imports loaders into the pre-created terminology loaders repository schemas.
☐	Specify Warehouse Integration Loader Details	Enter values for the pre-created schemas: ■ Configuration schema name ■ Configuration schema password ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password The installer imports loaders into the pre-created warehouse integration loaders repository schemas.
☐	Specify Healthcare Common Data Mart Loader Details	Enter values for the pre-created schemas: ■ Configuration schema name ■ Configuration schema password ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password The installer imports loaders into the pre-created common data mart loaders repository schemas.

	Screen	Action
☐	Specify Healthcare Cohort Data Mart Loader Details	Enter values for the pre-created schemas: ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password The installer imports loaders into the pre-created cohort data mart loaders repository schemas. The configuration schema is not required for CDM.
☐	Specify RCU Prefix and Password	Specify an RCU prefix to be prepended to the schemas created by the ODI Repository Creation Utility (RCU). The RCU creates 3 schemas: ■ <RCU Prefix>_STB ■ <RCU Prefix>_WLS ■ <RCU Prefix>_WLS_RUNTIME **Note:** The RCU Prefix must be unique. The prefix should be alphabetic only. It cannot have special characters and cannot start with a number. The length of the prefix must not exceed 8 characters. Specify a password for schemas created using the ODI Repository Creation Utility (RCU). **Note:** The password must be between 8 and 12 alphanumeric characters long and must include at least one number. The password cannot start with a number.
☐	Specify Tablespace for Creation of ODI Temporary Objects	Specify tablespace names for the creation of temporary objects used by the ODI loaders. The installer creates the following tablespaces if they do not exist: ■ Warehouse Integration Loaders ■ Healthcare Common Datamart Loaders ■ Cohort Datamart Loaders ■ Terminology Loaders It is recommended to provide different tablespace names for each component.
☐	Verify Configuration Parameters	Click **Next**.
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

2.2.6 Check the Installation

☐ Review the generated installation log files for errors. For details, see Installation Log Files.

☐ Contact Oracle support, if necessary, to resolve any errors.

2.2.7 Revoke Privileges

After the Data Management Assembly for ODI installation, run the following scripts from a user with DBA privileges:

```
@<OHF_Install_Home>/dma_odi_master_install/hmc_odi_install/dma_directory_
drop.sql
```

```
@@<OHF_Install_Home>/dma_odi_master_install/hmc_odi_install/dma_revoke_
privilege.sql <WIL_MASTER_REP_USR> <HCD_MASTER_REP_USR> <CDM_MASTER_REP_
USR> <HLI_MASTER_REP_USR>
```

where,

<OHF_Install_Home> - OHF installation home directory

<WIL_MASTER_REP_USR> - Warehouse integration loader master repository schema name

<HCD_MASTER_REP_USR> - Healthcare common data mart loader master repository schema name

<CDM_MASTER_REP_USR> - Cohort data mart loader master repository schema name

<HLI_MASTER_REP_USR> - Terminology loader master repository schema name

3

Data Management Assembly for Informatica Installation

This chapter describes how to install the OHF Data Management Assembly for Informatica. There are two ways to install the Data Management Assembly for Informatica, depending on how you create the user schemas. The installer can create the user schemas during the installation or you can create them manually, prior to the installation. After the installation is complete, you must assign the integration service to the workflows:

- Installing the Data Management Assembly without Pre-Created User Schemas
- Installing the Data Management Assembly with Pre-Created User Schemas
- Assigning the Integration Service

3.1 Installing the Data Management Assembly without Pre-Created User Schemas

1. Check Prerequisites
2. Prepare the Installer
3. Run the Installer
4. Check the Installation

3.1.1 Check Prerequisites

- ☐ The user is familiar with Oracle Database (DB), Informatica, and Linux OS.
- ☐ The OHF Data Model is installed.

  Follow the instructions in Chapter 1, "Data Model Installation" or Chapter 8, "Data Model Upgrade".
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ The Informatica domain is running and no user is connected to the Informatica Admin Console.
- ☐ Informatica services can connect to the Data Model 7.2 database mentioned in the Oracle TNS file (TNS entries of the required database must be available in the installation server tnsnames.ora file).
- ☐ You can connect the database using EZCONNECT syntax. For example, sqlplus <user>/<password>@<hostname>:<port>/<service name>.

- ☐ The password expiry notification message does not display for the system user.
- ☐ The installer is run on the system where the Informatica server is installed.
- ☐ The terminology loaders source file location exists. The installer creates an archive directory. For example,

  /scratch/home/oemora/TL_Source is the source file location specified during installation, which already exists.

  /scratch/home/oemora/TL_Archive_Files is created by the installer as the archive directory.
- ☐ The path of the data file (Configuration schema/Repository schema tablespace) mentioned when creating the tablespace is correct. Make sure that the database user has write privileges.
- ☐ Enough space is available in the installation directory and the Oracle Home directory.
- ☐ The Sqlplus utility is available on the installation server.
- ☐ The impdp utility is available on the repository database server.
- ☐ The installation user has read, write, and execute privileges to the $INFA_HOME/server folder. The installer creates product specific folders and parameter files under this location.
- ☐ For remote installations, where the installation server and the Informatica Repository Database are on different machines, make sure that:
  - The remote database server directory is mounted to the installation server with appropriate read and write privileges.
  - The remote directories are accessible after mounting from the installation server.
  - The Linux user of the remote server, who executes the Oracle process, has privilege 755 for the directory (datapump).
  - The Oracle user has privilege for the mount path directory.
  - If the repository DB is on an Exadata machine, the repository DB single node (the node which is mounted) TNSENTRY should be added to the tnsnames.ora file on the installation server. After installation, revert TNSENTRY to the original entry.
- ☐ GLOBAL_NAMES database initialization parameter is set to false.
- ☐ Back up the following csv files under $INFORMATICA_HOME/server/infa_shared/SrcFiles if it exists:
  - bus_susp_day.csv
  - daylght_svngs_day.csv
  - hosp_hol_day.csv
  - time_am.csv
  - time_pm.csv
- ☐ If the Terminology Loaders source folder is shared, make a backup of the following files:
  - Code Axes.txt
  - Code Descriptions.txt
  - Code Hierarchy.txt
  - Code.txt
  - Related Entity.txt
  - Relations Type.txt
  - Relations.txt
  - Relationship Type.txt
  - time.txt

  The installer will overwrite any existing files from the list above.

3.1.2 Prepare the Installer

- ☐ Extract the contents of the OHF media pack to your system.
- ☐ Navigate to the **<media_pack_location>/** folder.
- ☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

  ```
  unzip -a OHF_72_Linux-x64.zip
  ```

- ☐ Navigate to the **Disk1/install** folder.
- ☐ Change the protection on files as follows:

  ```
  chmod 755 *
  ```

3.1.3 Run the Installer

Start the Oracle Universal Installer by running the following command:

- If the Informatica repository schemas to be created are on the database instance of the installation server, execute:

  ```
  sh runInstaller.sh -local
  ```

- If the Informatica repository database or OHF data model database is on the database instance of another server, execute:

  ```
  sh runInstaller.sh -local remote_installation=true
  ```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Management Assembly for Informatica 7.2.0.0.0** option.
☐	Specify Home Details	Enter or select the installation home path.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Oracle Home Configuration	Specify the Oracle client home path.
☐	Select the Informatica Home Location	Specify the Informatica home location. The Informatica home should be one level above the **/server** directory. For example, <path>/Informatica/961/.
☐	Select Database Server for Informatica Repository Schemas	Select one of the following options for the Informatica repository schemas: ■ If the Informatica repository database server is on the installation server, select the **Installation database server** option. ■ For remote installations, select the **Remote database server** option.

	Screen	Action

☐	Specify Mount Path Details (applicable only for remote installations)	Enter the following mounted directory configuration details in which the remote server directory is mounted:
		■ Mount path in the repository database server - Remote server path
		■ Mount path in the installation server - Path on the installation server where the mounting is performed
		To obtain the available storage drives, on the Linux machine, execute the `df -h` command. If the remote server directory is mounted on the installation server, the mounting is displayed as follows:
		`<Remote Server name>:<Remote server path>`
		`<total size> <used up space> <Available space> <use%> <Path in installation server where mounting was done>`
		For example,
		`abc:/scratch/dump`
		`191G 138G 44G 76% /installation server`
		Note:
		■ The (datapump) directory of the remote database server should be mounted to the installation server with appropriate read and write privileges for the IMPDB utility (folder with **dba** group).
		■ Make sure that the remote directories are accessible after mounting from the installation server.
		■ If the remote server mounted path is displayed as **/**, provide the absolute mounted path of the remote server.
		■ The remote server Linux user that executes the Oracle process, must have minimum privilege of 755 to the directory.

☐	Specify Healthcare Data Model Database Instance Details	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port number ■ Service name ■ System user password ■ Select this database instance for repository schema creation If you select **Yes**, the installer uses the same Data Model database instance for Informatica repository schema creation.
☐	Specify Informatica Repository Database Instance Details (applicable only if you selected **No** in the previous screen for Select this database instance for repository schema creation)	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port ■ Service name ■ System user password
☐	Select Terminology Loaders Source Location	Specify the Terminology loaders source file location. This location is used to read the terminology loaders source data files. You can change this location when required. The installer creates an archive directory at the same level as the source directory. Make sure that the create directory privileges exist for the installation user.

	Screen	Action
☐	Specify Healthcare Data Model Schema Details	Enter values for the following fields: ■ Interface table schema name ■ Interface table schema password ■ Data warehouse schema name ■ Data warehouse schema password ■ Common data mart (hcd) schema name ■ Common data mart (hcd) schema password ■ Cohort data mart (cdm) schema name ■ Cohort data mart (cdm) schema password
☐	Specify Healthcare Data Model Schema Details	Enter values for the following fields: ■ Enterprise schema name ■ Enterprise schema password.
☐	Specify Warehouse Integration Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Repository name ■ Repository schema name ■ Repository schema password The installer creates a configuration schema if it does not exist. If you provide an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). It creates a repository service (<Repository name>) and integration service (Is_<Repository name>). The installer creates a repository schema if it does not exist in the database. If you enter an existing repository schema, the installer overwrites the content with the new one, and you will lose all existing objects.
☐	Specify Healthcare Common Data Mart Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Repository name ■ Repository schema name ■ Repository schema password The installer creates a configuration schema if it does not exist. If you provide an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). It creates a repository service (<Repository name>) and integration service (Is_<Repository name>). The installer creates a repository schema if it does not exist in the database. If you enter an existing repository schema, the installer overwrites the content with the new one, and you will lose all existing objects.

	Screen	Action
☐	Specify Healthcare Cohort Data Mart Loader Details	Enter values for the following fields: ■ Repository name ■ Repository schema name ■ Repository schema password If you enter an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). It creates a repository service (<Repository name>) and integration service (Is_<Repository name>). The installer creates a repository schema if it does not exist in the database. If you enter an existing repository schema, the installer overwrites the content with the new one, and you will lose the existing objects. The configuration schema is not required for CDM.
☐	Specify Tablespace Details (if prompted)	Specify the tablespace names for the configuration schemas. The installer creates these tablespaces if they do not exist. ■ Configuration schema default tablespace name ■ Configuration schema temporary tablespace name
☐	Specify Tablespace Details (if prompted)	Specify the tablespace names for repository schemas. The installer creates these tablespaces if they do not exist in the database. ■ Repository schema default tablespace name ■ Repository schema temporary tablespace name
☐	Specify Tablespace Location for Configuration Schema (if prompted)	Specify the tablespace location for the Configuration schema. The location should be present in the OHF data model database server with write privileges. If the OHF data model database is not on the installation server, you must enter the location manually.
☐	Specify Tablespace Location for Repository Schema (if prompted)	Specify the tablespace location for the repository schemas. When the repository database is not on the installation server, you must enter the location manually. The location should be present on the repository database server with write privileges.

	Screen	Action
☐	Specify Informatica Domain Details	Specify the following parameters: ■ Domain name ■ Domain code page ID ■ Node name ■ License name ■ Informatica host name ■ Informatica port number ■ Informatica administrator user name ■ Informatica administrator password Contact your Informatica Administrator for the Domain Code Page ID and provide a valid Code Page ID. Make sure that the code page is compatible with the domain code page for creating the Integration Service. For a domain compatible code page, see any existing and active integration service code pages from the Informatica admin console. A list of sample code pages and their IDs are as follows: ■ US-ASCII (ID 1) - 7-bit ASCII ■ Latin1 (ID 4) - ISO 8859-1 Western European ■ JapanEUC (ID 18) - Japanese Extended Unix Code (including JIS X 0212) ■ UTF-8 (ID 106) - Unicode Transformation Format, multibyte ■ MS932 (ID 2024) - MS Windows Japanese, Shift-JIS ■ MS1252 (ID 2252) - MS Windows Latin1 (ANSI), superset of Latin1
☐	Verify Configuration Parameters	Click **Next**.
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

3.1.4 Check the Installation

☐ Review the generated installation log files for errors. For details, see Installation Log Files.

☐ Contact Oracle support, if necessary, to resolve any errors.

3.2 Installing the Data Management Assembly with Pre-Created User Schemas

1. Check Prerequisites
2. Create Default and Temporary Tablespaces
3. Create User Schemas
4. Prepare the Installer
5. Run the Installer
6. Check the Installation
7. Revoke Privileges

3.2.1 Check Prerequisites

- ☐ The user is familiar with Oracle Database (DB), Informatica, and Linux OS.
- ☐ The OHF Data Model is installed.

  Follow the instructions in Chapter 1, "Data Model Installation" or Chapter 8, "Data Model Upgrade".
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ The Informatica domain is running and no user is connected to the Informatica Admin Console.
- ☐ Informatica services can connect to the Data Model 7.2 database mentioned in the Oracle TNS file (TNS entries of the required database must be available in the installation server tnsnames.ora file).
- ☐ You can connect the database using EZCONNECT syntax. For example, sqlplus <user>/<password>@<hostname>:<port>/<service name>.
- ☐ The password expiry notification message does not display for the system user or pre-created schemas.
- ☐ The installer is run on the system where the Informatica server is installed.
- ☐ The terminology loaders source file location exists. The installer creates an archive directory. For example,

  /scratch/home/oemora/TL_Source is the source file location specified during installation, which already exists.

  /scratch/home/oemora/TL_Archive_Files is created by the installer as the archive directory.
- ☐ The path of the data file (Configuration schema/Repository schema tablespace) mentioned when creating the tablespace is correct. Make sure that the database user has write privileges.
- ☐ Enough space is available in the installation directory and the Oracle Home directory.
- ☐ The Sqlplus utility is available on the installation server.
- ☐ The impdp utility is available on the repository database server.
- ☐ The installation user has read, write, and execute privileges to the $INFA_HOME/server folder. The installer creates product specific folders and parameter files under this location.
- ☐ For remote installations, where the installation server and the Informatica Repository Database are on different machines, make sure that:
  - The remote database server directory is mounted to the installation server with appropriate read and write privileges.
  - The remote directories are accessible after mounting from the installation server.
  - The Linux user of the remote server, who executes the Oracle process, has privilege 755 for the directory (datapump).
  - The Oracle user has privilege for the mount path directory.
  - If the repository DB is on an Exadata machine, the repository DB single node (the node which is mounted) TNSENTRY should be added to the tnsnames.ora file on the installation server. After installation, revert TNSENTRY to the original entry.
- ☐ GLOBAL_NAMES database initialization parameter is set to false.

- ☐ Back up the following csv files under $INFORMATICA_HOME/server/infa_shared/SrcFiles if it exists:
  - bus_susp_day.csv
  - daylght_svngs_day.csv
  - hosp_hol_day.csv
  - time_am.csv
  - time_pm.csv
- ☐ If the Terminology Loaders source folder is shared, make a backup of the following files:
  - Code Axes.txt
  - Code Descriptions.txt
  - Code Hierarchy.txt
  - Code.txt
  - Related Entity.txt
  - Relations Type.txt
  - Relations.txt
  - Relationship Type.txt
  - time.txt

  The installer will overwrite any existing files from the list above.

3.2.2 Create Default and Temporary Tablespaces

Create the following default and temporary tablespaces with appropriate quotas. You can use different tablespace names than the ones listed below.

Note: The hmc_ts and hmc_temp tablespaces must be created in the Data Model database instance.

	Tablespace Name	Big File Tablespace	Description
☐	infarep_ts	Yes	Default tablespace for the Repository schema
☐	infarep_temp	Yes	Temporary tablespace for the Repository schema
☐	hmc_ts	Yes	Default tablespace for the Configuration schema
☐	hmc_temp	Yes	Temporary tablespace for the Configuration schema

3.2.3 Create User Schemas

Create the following user schemas and assign the appropriate default and temporary tablespaces. Refer to Create Default and Temporary Tablespaces for details. If you created tablespaces with different names, use those instead.

	Schema Name	Schema Description	Default Tablespace	Temporary Tablespace
☐	wil_hmc	Warehouse Integration Loader Configuration schema	hmc_ts	hmc_temp
☐	hcd_hmc	Healthcare Common Data Mart Configuration schema	hmc_ts	hmc_temp
☐	wil_rep_711	Warehouse Integration Loader Repository schema	infarep_ts	infarep_temp

	Schema Name	Schema Description	Default Tablespace	Temporary Tablespace
☐	hcd_rep_711	Healthcare Common Data Mart Repository schema	infarep_ts	infarep_temp
☐	cdm_rep_711	Healthcare Cohort Data Mart Repository schema	infarep_ts	infarep_temp

3.2.4 Prepare the Installer

☐ Extract the contents of the OHF media pack to your system.

☐ Navigate to the **<media_pack_location>/** folder.

☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

```
unzip -a OHF_72_Linux-x64.zip
```

☐ Navigate to the **<media_pack_location>/Disk1/stage/Components/oracle.hsgbu.hc.dma.infa/7.2.0.0.0/1/DataFiles/Expanded/filegroup1** directory.

☐ Unzip the **dma_infa_master_install.zip** file.

☐ Navigate to the **dma_infa_master_install/hmc_infa_install/** directory.

☐ Connect to the system user and execute the following scripts:

- `@infa_hdi_user_privilege.sql <HDI_SCHEMA_NAME>`
- `@infa_hmc_user_privilege.sql <WIL_HMC_SCHEMA_NAME> <HCD_HMC_SCHEMA_NAME>`
- `@infa_rep_user_privilege.sql <WIL_INFA_REP_DB_USER> <HCD_INFA_REP_DB_USER> <CDM_INFA_REP_DB_USER>`

☐ Navigate to the **<media_pack_location>/Disk1/install** folder.

☐ Change the protection on files as follows:

```
chmod 755 *
```

3.2.5 Run the Installer

Start the Oracle Universal Installer by running the following command:

- If the Informatica repository database or the OHF data model database is on the database instance of the installation server, execute:

  ```
  sh runInstaller.sh -local dba_tasks=false
  ```

- If the Informatica repository schemas to be created are on the database instance of another server, execute:

  ```
  sh runInstaller.sh -local remote_installation=true dba_tasks=false
  ```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

	Screen	Action
☐	Welcome	Click **Next**.

	Screen	Action
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Management Assembly for Informatica 7.2.0.0.0** option.
☐	Specify Home Details	Enter or select the installation home path.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Oracle Home Configuration	Specify the Oracle client home path.
☐	Select the Informatica Home Location	Specify the Informatica home location. The Informatica home should be one level above the **/server** directory. For example, <path>/Informatica/961/.
☐	Select Database Server for Informatica Repository Schemas	Select one of the following options for the Informatica repository schemas: ■ If the Informatica repository database server is on the installation server, select the **Installation database server** option. ■ For remote installations, select the **Remote database server** option.

☐	Specify Mount Path Details (applicable only for remote installations)	Enter the following mounted directory configuration details in which the remote server directory is mounted:
		■ Mount path in the repository database server - Remote server path
		■ Mount path in the installation server - Path on the installation server where the mounting is performed
		To obtain the available storage drives, on the Linux machine, execute the `df -h` command. If the remote server directory is mounted on the installation server, the mounting is displayed as follows:
		`<Remote Server name>:<Remote server path>`
		`<total size> <used up space> <Available space> <use%> <Path in installation server where mounting was done>`
		For example,
		`abc:/scratch/dump`
		`191G 138G 44G 76% /installation server`
		Note:
		■ The (datapump) directory of the remote database server should be mounted to the installation server with appropriate read and write privileges for the IMPDB utility (folder with **dba** group).
		■ Make sure that the remote directories are accessible after mounting from the installation server.
		■ If the remote server mounted path is displayed as /, provide the absolute mounted path of the remote server.
		■ The remote server Linux user that executes the Oracle process, must have minimum privilege of 755 to the directory.

☐	Specify Healthcare Data Model Database Instance Details	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port number ■ Service name ■ Select this database instance for repository schema creation If you select **Yes**, the installer uses the same Data Model database instance for Informatica repository schema creation.

	Screen	Action
☐	Specify Informatica Repository Database Instance Details (applicable only if you selected **No** in the previous screen for Select this database instance for repository schema creation)	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port number ■ Service name
☐	Select Terminology Loaders Source Location	Specify the Terminology loaders source file location. This location is used to read the terminology loaders source data files. You can change this location when required. The installer creates an archive directory at the same level as the source directory. Make sure that the create directory privileges exist for the installation user.
☐	Specify Healthcare Data Model Schema Details	Enter values for the following fields: ■ Interface table schema name ■ Interface table schema password ■ Data warehouse schema name ■ Data warehouse schema password ■ Common data mart (hcd) schema name ■ Common data mart (hcd) schema password ■ Cohort data mart (cdm) schema name ■ Cohort data mart (cdm) schema password
☐	Specify Healthcare Data Model Schema Details	Enter values for the following fields: ■ Enterprise schema name ■ Enterprise schema password.
☐	Specify Warehouse Integration Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Repository name ■ Repository schema name ■ Repository schema password Provide the pre-created hmc schema details. If you enter an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). It creates a repository service (<Repository name>) and integration service (Is_<Repository name>). If you enter an existing repository schema name, the installer overwrites the content with the new one, and you will lose the existing objects.

	Screen	Action
☐	Specify Healthcare Common Data Mart Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Repository name ■ Repository schema name ■ Repository schema password Provide the pre-created hmc schema details. If you enter an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). The installer creates a repository service (<Repository name>) and integration service (Is_<Repository name>). If you create an existing repository schema name, the installer overwrites the content with the new one, and you will lose the existing objects.
☐	Specify Healthcare Cohort Data Mart Loader Details	Enter values for the following fields: ■ Repository name ■ Repository schema name ■ Repository schema password The configuration schema is not required for CDM. If you enter an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). The installer creates a repository service (<Repository name>) and integration service (Is_<Repository name>). If you enter an existing repository schema, the installer overwrites the content with the new one, and you will lose the existing objects.
☐	Specify Informatica Domain Details	Specify the following parameters: ■ Domain name ■ Domain code page ID ■ Node name ■ License name ■ Informatica host name ■ Informatica port number ■ Informatica administrator user name ■ Informatica administrator password Contact your Informatica Administrator for the Domain Code Page ID and provide a valid Code Page ID. Make sure that the code page is compatible with the domain code page for creating the Integration Service. For a domain compatible code page, see any existing and active integration service code pages from the Informatica admin console. A list of sample code pages and their IDs are as follows: ■ US-ASCII (ID 1) - 7-bit ASCII ■ Latin1 (ID 4) - ISO 8859-1 Western European ■ JapanEUC (ID 18) - Japanese Extended Unix Code (including JIS X 0212) ■ UTF-8 (ID 106) - Unicode Transformation Format, multibyte ■ MS932 (ID 2024) - MS Windows Japanese, Shift-JIS ■ MS1252 (ID 2252) - MS Windows Latin1 (ANSI), superset of Latin1
☐	Verify Configuration Parameters	Click **Next**.
☐	Summary	Click **Install**.

	Screen	Action
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

3.2.6 Check the Installation

- ☐ Review the generated installation log files for errors. For details, see Installation Log Files.
- ☐ Contact Oracle support, if necessary, to resolve any errors.

3.2.7 Revoke Privileges

After the Data Management Assembly for Informatica installation, run the following scripts from System user:

```
@<OHF_Install_Home>/dma_infa_master_install/hmc_infa_install/dma_
directory_drop.sql
```

```
@<OHF_Install_Home>/dma_infa_master_install/hmc_infa_install/dma_revoke_
privilege.sql <WIL_INFA_REP_DB_USER> <HCD_INFA_REP_DB_USER> <CDM_INFA_REP_
DB_USER>
```

where,

`<OHF_Install_Home>` - OHF installation home directory

`<WIL_INFA_REP_DB_USER>` - Warehouse integration loader repository schema name

`<HCD_INFA_REP_DB_USER>` - Healthcare common data mart loader repository schema name

`<CDM_INFA_REP_DB_USER>` - Cohort data mart loader repository schema name

3.3 Assigning the Integration Service

You must assign the integration service manually after the installation is complete. You can assign the integration service for all the workflows from the Workflow Manager:

- ☐ Open the Workflow Manager.
- ☐ Connect to the repository.
- ☐ Click on any folder in the repository.
- ☐ Under **Menu**, click on **Service** and select **Assign Integration Service**.
- ☐ In the dialog box that opens, choose **Integration Service** from the drop-down list.
- ☐ Select all the folders and check **Select all displayed workflows**.
- ☐ Click **Assign**.

4

Middle-Tier Installation

The OHF Middle-Tier installs the following Web application:

- Administration Console

The OHF Middle-Tier installs the following REST services:

- Data Pipeline Service
- File Upload Service

First, you must install the Middle-Tier on a primary node. This creates a WebLogic domain named **oh_domain** with a cluster named **oh_cluster**.

After you install the Middle-Tier on the primary node, you can optionally extend **oh_cluster** on secondary nodes, by running the installer on their corresponding machines.

This chapter contains the following sections:

4.1 Installing the Middle-Tier on the Primary Node

4.1.1 Check Prerequisites

- ☐ Fusion Middleware Infrastructure is installed on the machine (see Software Requirements).
- ☐ There is no WebLogic domain named "oh_domain" on the machine.
- ☐ All the OHF Data Model schemas exist.
- ☐ The Oracle external table DIRECTORY object is created for Omics Data Bank.
- ☐ If you have already installed OHF 7.0.1 or 7.1 Middle-Tier components on WebLogic 12.1.3, uninstall the existing oh_domain and applications and install WebLogic 12.2.1.2.

4.1.2 Prepare the Installer

- ☐ Extract the contents of the OHF media pack to your system.
- ☐ Open the **<media_pack_location>/** folder.
- ☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

```
unzip -a OHF_72_Linux-x64.zip
```

- ☐ Open the **Disk1/install** folder.
- ☐ Change the protection on files as follows:

```
chmod 755 *
```

4.1.3 Run the Installer

Start the Oracle Universal Installer (OUI) by running the following command.

```
./runInstaller
```

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Middle-Tier 7.2.0.0.0** option
☐	Specify Home Details	Enter the Middle-Tier install home name and location.
☐	Choose Install Type	Select **Yes** to perform a fresh installation.
☐	Verify Install Prerequisites	Verify if all the prerequisites are met.
☐	Java Home	Specify the JDK installation path. The installer validates this path.
☐	Fusion Middleware Home	Specify the WebLogic with ADF installation path. The installer validates this path.
☐	Cluster Configuration	Select **Yes** to create a domain and make the machine a primary node where the WebLogic AdminServer is located.
☐	AdminServer Configuration	Enter values for the following fields: ■ Listen address ■ Listen port ■ SSL listen port ■ User name - WebLogic administrator user ■ Password - WebLogic administrator password
☐	NodeManager Configuration	Enter values for the following fields: ■ Listen address ■ Listen port ■ User name - Node manager administrator user ■ Password - Node manager administrator password ■ Verify password

	Screen	Action
☐	Managed Server Configuration	Enter values for the following fields: ■ Number of Managed Servers on this machine ■ Managed Servers listen port start index - This is used as a starting point for incrementing the port numbers. For example, if the number of managed servers is 3, and the listen port start index is 8081, three managed servers with listen ports 8081, 8082, and 8083 are created.
☐	FMW Repository Creation Utility (RCU) Configuration	For Exadata or ASM groups, create the RCU schema outside the installer (see https://docs.oracle.com/middleware/1212/core/RCUUG/rcu.htm#RCUUG244 for details). While creating the RCU, select all MDS, IAU, IAU_APPEND, IAU_VIEWER, OPSS, UMS, WLS, and STB schemas. The Fusion Middleware (FMW) RCU requires an Oracle Database user with DBA or SYSDBA privileges. Using the installer, you can create new RCU repositories, or use pre-created repositories using the WebLogic RCU utility. ■ Database host ■ Database port ■ Service name ■ Schema prefix ■ DBA user name - This field is optional if the RCU repositories are pre-created using the RCU utility ■ DBA password - This field is optional if the RCU repositories are pre-created using the RCU utility ■ Schemas common password
☐	Oracle Healthcare Foundation Data Model Configuration - part 1	Enter values for the following fields: ■ Database host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Database port ■ Service name
☐	Oracle Healthcare Foundation Data Model Configuration - part 2	Enter values for the following fields: ■ Omics Data Bank schema name ■ Omics Data Bank schema password ■ Services schema name ■ Services schema password ■ HDM schema name ■ HDM schema password ■ Enterprise schema name ■ Enterprise schema password
☐	Oracle Healthcare Foundation Data Model Configuration - part 3	Enter values for the following fields: ■ Cohort Data Mart (CDM) schema name ■ Cohort Data Mart (CDM) schema password
☐	Service Configuration	■ To provide the service configuration now, select **Yes** and click **Next** to go to the next step (File Upload Service Configuration). ■ To provide the service configuration after the installation, select **No** and click **Next** to proceed to the Summary screen.

	Screen	Action
☐	File Upload Service Configuration	Enter values for the following fields: ■ File retention period in days ■ File storage location ■ Max file size in MB ■ Max zip extract size in MB ■ Simultaneous upload limit
☐	Omics Loader Service Configuration	Enter values for the following fields: ■ Oracle data directory object ■ Ensembl and SwissProt directory
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

4.1.4 Check the Installation

☐ Check the log file located in **ORACLE_BASE/oraInventory/logs**.

☐ Review the generated installation log files for errors. For details, see Middle-Tier Troubleshooting.

☐ Contact Oracle support, if necessary, to resolve any errors.

4.2 Installing the Middle-Tier on a Secondary Node

1. Check Prerequisites
2. Prepare the Installer
3. Run the Installer
4. Check the Installation

4.2.1 Check Prerequisites

☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

```
select * from v$parameter where name = 'compatible';
```

If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.

☐ Fusion Middleware Infrastructure is installed on the machine in the same file system location as on the primary node.

☐ There is no WebLogic domain named "oh_domain" on the machine.

☐ All OHF Data Model schemas exist.

☐ The Oracle external table DIRECTORY object is created for Omics Data Bank.

4.2.2 Prepare the Installer

- ☐ Extract the contents of the OHF media pack to your secondary node system.
- ☐ Open the **<media_pack_location>/** folder.
- ☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

```
unzip -a OHF_72_Linux-x64.zip
```

- ☐ Open the **Disk1/install** folder.
- ☐ Change the protection on files as follows:

```
chmod 755 *
```

4.2.3 Run the Installer

Start the Oracle Universal Installer (OUI) by running the following command.

```
./runInstaller -local
```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

Follow the instructions below for each screen in the installation wizard:

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Middle-Tier 7.2.0.0.0** option.
☐	Specify Home Details	Enter the Middle-Tier install home name and location.
☐	Choose Install Type	Select **Yes** to perform a fresh installation.
☐	Verify Install Prerequisites	Verify if all the prerequisites are met.
☐	Java Home	Specify the JDK installation path. The installer validates this path.
☐	Fusion Middleware Home	Specify the WebLogic with ADF installation path. The installer validates this path.
☐	Cluster Configuration	Select **No** to migrate an existing domain created by running this installer on the primary node to scale the cluster and add more machines to the domain.
☐	AdminServer Configuration	Enter values for the following fields: ■ Listen address - Running AdminServer listen address provided as part of the primary node installation ■ Listen port - Running AdminServer listen port provided as part of the primary node installation ■ SSL listen port - Running AdminServer SSL listen port provided as part of the primary node installation ■ User name - WebLogic administrator user ■ Password - WebLogic administrator password

	Screen	Action
☐	NodeManager Configuration	Enter values for the following fields: ■ Listen address ■ Listen port ■ User name ■ Password ■ Verify password
☐	Managed Server Configuration	Enter values for the following fields: ■ Number of Managed Servers on this Machine ■ Managed Servers listen port start index - This is used to increment the port number. For example, if the number of managed servers is 3, and listen port start index is 8081, three managed servers with listen ports 8081, 8082, and 8083 are created.
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

4.2.4 Check the Installation

☐ Check the log file located in **ORACLE_BASE/oraInventory/logs**.

☐ Review the generated installation log files for errors. For details, see Installation Log Files.

☐ Contact Oracle support, if necessary, to resolve any errors.

5

JDBC GridLink Data Source Configuration (optional)

You can optionally configure the WebLogic server GridLink data source to distribute database connections to Oracle RAC instances.

Before you create a multi-data source, edit the existing generic data source, create the generic data sources that the multi-data source will manage, and deploy them to the same targets where you want to deploy the multi-data source. You can create data sources and multi-data sources in a single edit session.

1. Edit the Existing Generic Data Source
2. Create the JDBC GridLink Data Source

5.1 Edit the Existing Generic Data Source

- ☐ In the **Administration Console**, in the **Change Center**, click **Lock & Edit**.
- ☐ In the **Domain Structure** tree, expand **Services** and select **Data Sources**.
- ☐ Select the desired data source and, under the **Configuration** tab, select **General**.
- ☐ Change **JNDI Name** to a unique value.

  Note: You can use a numeric suffix, like -1, to make a value unique. For instance, you can change "jdbc/OHF-ODB" to "jdbc/OHF-ODB-1"..
- ☐ Click **Save** to save the JDBC data source changes.
- ☐ In the **Administration Console**, in the **Change Center**, click **Activate Changes**.

  Note: Not all changes may take effect immediately. Some changes may require a restart.

5.2 Create the JDBC GridLink Data Source

Follow the instructions described in https://support.oracle.com/epmos/faces/DocumentDisplay?&id=1382656.1, using the following parameters:

- ☐ The data source **Name** and **JNDI Name** must be unique.
- ☐ Use the **JNDI Name** used by the application. For OMICS, this is `jdbc/OHF-ODB`.

- ☐ Use the following default values for OHF Data Source creation:
  - Add the following value to Properties: oracle.jdbc.defaultRowPrefetch=100
  - Initial Capacity: 10
  - Maximum Capacity: 10
  - Minimum Capacity: 10
  - Wrap Data Types: Unchecked for Omics Data Source

6

Oracle Healthcare Foundation Omics Data Bank Loaders Installation

You can load Omics data files by using REST APIs or PL/SQL loaders.

For information on how to load Omics data files using REST APIs, see the *Oracle Healthcare Foundation Application Programming Interface Guide*.

For information on how to load Omics data files using PL/SQL loaders, follow the instructions below:

1. Prerequisites
2. Installing the Oracle Healthcare Foundation Omics Data Bank Loaders

6.1 Prerequisites

To install Omics Data Bank Loaders, the Data Model must be installed. For Data Model installation instructions, see Chapter 1.

Installing Java

1. Download JRE 1.8 from `http://www.oracle.com/technetwork/java/javase/downloads/index-jsp-138363.html`
2. Install JRE on the system that you will use as the client tier. The EMBL and Swissprot loaders require JRE 1.8 to be installed on the machine from where they will be run.
3. Make sure that the path for Java 1.8 is set in the environment variable.

Note: If you plan to execute multiple loaders, make sure that you execute each loader from a separate directory. You must copy .sh/.bat files to another directory to execute the loaders in parallel.

6.2 Installing the Oracle Healthcare Foundation Omics Data Bank Loaders

Copy the ODB Loaders folder or ODB_Loaders.zip file from the OHF **<INSTALL_HOME>/**.

If you are executing the loaders on an operating system that supports the bash shell command language, make sure that the .sh files have execute privileges.

For example,

```
chmod +x <filename>
```

For more details, refer to the Omics Data Bank chapter in the *Oracle Healthcare Foundation Programmer's Guide*.

7

Oracle Healthcare Foundation Self-Service Analytics Installation

This chapter describes how to install the OHF Self-Service Analytics:

1. Installation Overview
2. "Prerequisites"
3. Install the Oracle Healthcare Foundation Self-Service Analytics

7.1 Installation Overview

OHF Self-Service Analytics (SSA) is available in the **OHF_72_Linux-x64.zip** file of the media pack. It is an optional component that can be installed to perform Self Service Analytics via OBIEE.

OHF SSA consists of the following components:

- OBIEE RPD file for the Healthcare Common Data Mart, which is used for Self-Service Analytics.
- OBIEE Catalog File with reports and dashboards built using the OBIEE RPD file for the Healthcare Common Data Mart, covering various subject areas.
- Self-Service Analytics tool, to generate an OBIEE RPD file for data marts built based on the Healthcare Common Data Mart.

The following is the structure of the Self-Service Analytics package:

```
/selfserviceanalytics
    /hcd_rpd
        ohf_ssa_hcd.rpd
        obieeIds.csv
    /hcd_catalog
        Oracle Healthcare Foundation.catalog
        Oracle Healthcare Foundation Images.catalog
    /software
        ohf_ssa_tool.zip
```

7.2 Prerequisites

OHF Data Model must be installed. For other prerequisites, see Software Requirements.

7.3 Install the Oracle Healthcare Foundation Self-Service Analytics

To install the OHF Self-Service Analytics:

1. Navigate to the **selfserviceanalytics** folder in the media pack.
2. Open the RPD file, **ohf_ssa_hcd.rpd**, available in the selfserviceanalytics\hcd_rpd folder using the Oracle BI Administration Tool, and perform the following steps:
   a. Navigate to **Manage > Variables**, update the default value of the puser variable to point to the HCD schema name, and click **OK**.
   b. In the Physical layer, expand **localhost** and double-click **Relation Connection**.

      - Update the Data source name with the database host name, port number, and service name where the HCD schema is installed.

      - Update the HCD schema password and confirm.
   c. In the Physical layer, expand **localhost** and double-click **Initialization Block Connection**.

      - Update the Data source name with the database host name, port number, and service name where the HCD schema is installed.

      - Update the HCD schema password and confirm.
   d. In the Physical layer, expand **OHF Data Lineage** and double-click **OHF Data Lineage Connection Pool**.

      - Update the Data source name with the database host name, port number, and service name of the Enterprise Schema (ENT).

      - Update the ENT schema password and confirm.
3. Save the **ohf_ssa_hcd.rpd** file (select **No** when prompted for consistency check) and deploy it on the OBIEE server for analytics and reporting:
   a. Navigate to the `[OBIEE_HOME]/user_projects/domains/bi/bitools/bin` folder.
   b. Use the `datamodel.sh` command line utility to upload the RPD file to the OBIEE server (look in the `<OBIEE Home>/user_projects/domains/bi/bidata/service_instances` directory to find the service instance name):

      ```
      ./datamodel.sh uploadrpd -I <location of rpd file to be uploaded>
      -W <RPDpwd> -SI <service instance name> -U <weblogic user> -P
      <weblogic password>
      ```
4. Create a folder **OHF_SSA_HOME** in a preferred drive.
5. Copy the **ohf_ssa_tool.zip** file available in the selfserviceanalytics\software folder to the OHF_SSA_HOME folder.
6. Extract the contents of **ohf_ssa_tool.zip** file in the OHF_SSA_HOME folder.

   The Self-Service Analytics tool is now available in the OHF_SSA_HOME\ohf_ssa_tool folder.

For details on how to generate the OBIEE RPD using the Self-Service Analytics tool, see the *Oracle Healthcare Foundation Programmer's Guide*.

For details on how to set up the Usage Tracking feature, see the *Oracle Healthcare Foundation Dashboards User's Guide*.

7.4 Deploy the Oracle Healthcare Foundation Catalog in OBIEE

1. Open the OBIEE Analytics Page in a Web Browser. For example:

   http://<obiee host name>:<port number>/analytics.

2. Navigate to the **Catalog** menu and, under **Shared Folders**, click **Unarchive**.

3. Specify the path to the OHF catalog file:

   ```
   <OHF Media Pack>/selfserviceanalytics/hcd_catalog/ Oracle Healthcare
   Foundation.catalog
   ```

4. In the **Unarchive** pop-up window, select **None** in the **Replace** field and **Preserve** in the **ACL** field.

5. Specify the path to the OHF images catalog file:

   ```
   <OHF Media Pack>/selfserviceanalytics/hcd_catalog/ Oracle Healthcare
   Foundation Images.catalog
   ```

6. In the **Unarchive** pop-up window, select **None** in the **Replace** field and **Preserve** in the **ACL** field.

The OHF catalog is now deployed in the OBIEE shared folders location as Oracle Healthcare Foundation.

To test if the catalog has been deployed successfully, see if the Oracle Healthcare Foundation entry is available under Dashboards > My Dashboards.

Part II

Upgrade

8

Data Model Upgrade

For a list of the supported upgrade paths, see Supported Upgrade Paths.

To upgrade the OHF Data Model, follow the instructions below:

1. Check Prerequisites
2. Upgrading from Healthcare Data Warehouse Foundation or a Previous OHF Version
3. Data Migration (Not Applicable When Upgrading from OHF 7.1)

8.1 Check Prerequisites

- ☐ Make sure the OBIEE service is shut down.
- ☐ Make sure Oracle Database 12.2.0.1 Enterprise Edition is installed.
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ If you are upgrading OHF on an Exadata environment, make sure the Oracle database patch 19562381 (Doc ID 19562381.8) is applied.
- ☐ Create a container database with a single pluggable database instance with the help of a Database Administrator.
- ☐ Make sure the database initialization parameter MAX_STRING_SIZE is set to STANDARD (default value).
- ☐ Make sure Java Virtual Machine is installed on the database server.
- ☐ Set the NLS_LENGTH_SEMANTICS parameter to either CHAR or BYTE based on your requirements.

  For Oracle Healthcare Foundation Globalization Support information, see *Oracle Database Globalization Support Guide* and set your database character set accordingly.
- ☐ Enable database connection through SERVICE_NAME. Make sure that you are connecting to the pluggable database instance.

  Verify the database connectivity using the following command:

  ```
  SQL>connect <username>@<hostname>:<port number>/<service name>
  ```

  or

  ```
  sqlplus
  <username>@'(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=<dbhost>)(PORT=<dbport>))(CONNECT_
  DATA=(SERVICE_NAME=<dbservicename>)))'
  ```

☐ Make sure the Sqlplus utility is available on the installation server.

☐ Make sure the password expiry notification message does not display for the Sys, system and all OHF schemas.

☐ If you have OHTR 3.1.x installed, make backups of the CDM, ODB, Enterprise, Job Engine and Apps schemas. Import CDM, ODB, Enterprise, Job Engine, and Apps schemas in the Pluggable database instance created for OHF.

The CDM, ODB, Enterprise, and Job Engine schemas are updated as part of the OHF 7.2 upgrade. The Apps schema is upgraded during the OHTR 3.2 upgrade.

If you are importing existing OHTR schemas into different schemas, update the tables below after importing the dump. Connect to the ODB schema and run the following commands:

1. `select * from W_EHA_DATASOURCE`

   In this table, update the CDM schema name to the schema where you imported the existing CDM dump.

2. `select * from W_EHA_PRODUCT_PROFILE`

   In this table, update the CDM, ODB, APPS and Job schema names with the appropriate schema where you imported the existing dumps.

☐ Before you upgrade to Oracle Healthcare Foundation 7.2, back up the data model schemas of the existing Oracle Healthcare Data Warehouse Foundation (HDWF) environment and the OHTR schemas (if you have installed older versions of OHTR).

☐ During the upgrade, certain objects are dropped irrespective of prefixes or naming conventions. This includes objects such as packages, stored procedures, views, materialized views, scheduler jobs, and synonyms.

Make a backup of the custom scripts before the upgrade and re-execute the custom scripts for all custom objects after the upgrade.

☐ Set the GLOBAL_NAMES database initialization parameter to false.

☐ For remote upgrades, make sure the following are available on the client machine:

- Oracle Linux 6.7 (64-bit) OS or above
- Oracle Database 12.2.0.1.0 client

☐ Before you run the OHF installer to upgrade the existing schema, execute the following query as a SYSTEM user to validate if the data model user has OHF_APPLICATION_ROLE as the default role.

```
select grantee, DEFAULT_ROLE from dba_role_privs where granted_role='OHF_APPLICATION_ROLE' AND
DEFAULT_ROLE='NO';
```

Data model users are schema users that are used during the installation of the OHF Data Model. If this is not a default role, execute the following command as a SYSTEM user to set this as a default role:

```
alter user <data model user> default role all;
```

Where `<data model user>` should be assigned to each of the following users:

- Data warehouse schema name (HDM)
- Interface tables schema name (HDI)
- Common data mart schema name (HCD)
- Cohort data mart schema name (CDM)
- Job engine schema name (JOB)
- Services schema name (SVC)
- Omics data bank schema name (ODB)

Note: If you don't have OHTR products installed, assign `<data_model_user>` only to the HDM, HDI, and HCD schemas.

- ☐ Make sure that the SELECT privilege on the ALL_TAB_COLS view is granted to the PUBLIC role.

  Log in as SYS user and execute the following query:

  ```
  select * from dba_tab_privs where table_name = 'ALL_TAB_COLS';
  ```

  If the privilege is not found, execute the below query as SYS user to grant the privileges to the PUBIC role:

  ```
  grant select on SYS.ALL_TAB_COLS to PUBLIC with grant option;
  ```

- ☐ Table compression strategy is decided based on the number of updates in tables. If the number of updates is high, select the **Advanced compression** option instead of HCC (QUERY HIGH). Also, cross-check the compression used in the previous version.
- ☐ Make sure that you have an appropriate database license for the compression methods you choose.
- ☐ The installer does not validate the tablespace data files location. If the database server is on the remote server, make sure the location physically exists or the installer will fail.

8.2 Upgrading from Healthcare Data Warehouse Foundation or a Previous OHF Version

For the list of supported upgrade paths, see Supported Upgrade Paths.

If you are upgrading from Healthcare Data Warehouse Foundation (HDWF) 6.1 to Oracle Healthcare Foundation, you must install Oracle Healthcare Analytics Data Integration (OHADI) 3.1.

> **Note:** After upgrading, continue to Data Migration (Not Applicable When Upgrading from OHF 7.1) for instructions on how to migrate data from HDWF to OHF.

To upgrade from HDWF 6.1 to OHF, upgrade the HDWF 6.1 database instance to the Oracle Database 12.2.0.1 Enterprise Edition.

8.2.1 Prepare the Installer

- ☐ Make sure that all the OHF schemas are disconnected from the database by querying `gv_$session` from the sys user:

  ```
  select * from sys.gv_$session where status <> 'KILLED' and username in ('<OHF Schemas>');
  ```

- ☐ Extract the contents of the OHF media pack to your system.
- ☐ Open the **<media_pack_location>/** folder.
- ☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

  ```
  unzip -a OHF_72_Linux-x64.zip
  ```

- ☐ Open the **Disk1/install** folder.
- ☐ Change the protection on files as follows:

  ```
  chmod 755 *
  ```

8.2.2 Run the Installer

Start the Oracle Universal Installer (OUI) using the following command:

- If the database server (Exadata or non-Exadata) is on the machine where the installer is running, execute:

```
sh runInstaller.sh -local
```

- If the database server is on a different machine, execute:

```
sh runInstaller.sh -local remote_installation=true
```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Model 7.2.0.0.0** option.
☐	Specify Home Details	Enter the installation home name and location.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Oracle Client Home Configuration	Specify the Oracle (version 12.2.0.1.0) client home path. The installer validates this path.
☐	Database Configuration	Enter values for the following fields: ■ Hostname - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port - By default, the port number is 1521. You can edit this field if required. ■ Service name ■ System user password ■ Sys user password
☐	Table Compression	On an Exadata setup, use the following compression options: **Interface Tables schema** ■ Hybrid columnar compression (default) ■ No Compression **Data Warehouse schema** ■ No Compression (default) ■ Advanced Compression: Preferred if updates are high. If you don't have a license for advanced Compression, select Hybrid Columnar Compression. ■ Hybrid Columnar Compression **Common Data Mart schema** ■ No Compression (default) ■ Advanced Compression **Cohort Data Mart schema** ■ No Compression (default) ■ Advanced Compression **Omics Data Bank schema** ■ Hybrid columnar compression (default) On a non-Exadata setup, for each of the above schemas, choose either No Compression (default) or Advanced Compression.

	Screen	Action
☐	Data Model Configuration	Enter values for the pre-created schemas: ■ Interface Tables schema name ■ Interface Tables schema password ■ Data Warehouse schema name ■ Data Warehouse schema password ■ Common Data Mart schema name ■ Common Data Mart schema password ■ Omics Data Bank schema name ■ Omics Data Bank schema password
☐	Data Model Configuration	Enter values for the pre-created schemas. If OHTR schemas exist, provide the existing schema names, otherwise provide new schema names. ■ Cohort Data Mart schema name ■ Cohort Data Mart password ■ Enterprise schema name ■ Enterprise schema password ■ Job Engine schema name ■ Job Engine schema password ■ Services schema name ■ Services schema password
☐	Data Model Configuration Verification	Click **Next**.

	Screen	Action

☐	Omics Data Bank and Cohort Data Mart Parameters	Enter values for the following fields. Make sure you use the same values you are currently using for: Result Partition, Promoter Offset, Flanking Offset and Job Store Name. If you don't have existing OHTR schemas, then choose appropriate options.
		■ Result Partition - Used to partition result tables in the ODB schema. The available options are:
		– GENE (Default)
		– STUDY
		■ Promoter Offset - Numerical value to specify a portion of the gene used as a promoter in the ODB schema. The default value is 200.
		■ Flanking Offset - Numerical value to specify the region before and after a gene to link results to a gene in the ODB schema. The default value is 200.
		■ Max Parallel Degree - An option to specify the maximum degree of parallelism to be set on tables or used in the SQL statements for the CDM or ODB schema. It is dependent on the machine configuration of the database server. The default value is 2.
		■ Job Store Name
		Execute the following query to find all store names in the database (created by all previous installations) by connecting to the SYS user:
		`SELECT DISTINCT owner,object_type,object_name,created FROM all_objects WHERE object_name LIKE '%JOB_STORE%';`
		Note: If you have store names in the database that do not match the `%JOB_STORE%` pattern, run the following query to find the correct names:
		`SELECT DISTINCT owner,object_type,object_name,created FROM all_objects WHERE owner =<Job Username/schemaname> AND object_type IN ('TABLE','VIEW');`
		Note: If you are using the same database instance for multiple environments, enter a unique job store name for each job schema.

☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

8.2.3 Check the Installation

☐	Review the generated installation log files for errors. For details, see Installation Log Files.
☐	Contact Oracle support, if necessary, to resolve any errors.

8.3 Data Migration (Not Applicable When Upgrading from OHF 7.1)

Note: Data Migration is not required for OHF 7.1.

To upgrade from a previous OHF version (other than 7.1.x) or to migrate the data from Healthcare Data Warehouse Foundation 6.1, follow the steps below:

1. Check the Migration Scripts
2. Execute Schema Migration Scripts After Modifications

8.3.1 Check the Migration Scripts

Data migration for interface tables and data warehouse schema is not performed by the installer. You need to review the data migration scripts in **<INSTALL_HOME>/dm/hdi_install/post_ddl_upgrade.sql** and **<INSTALL_HOME>/dm/hdm_install/post_ddl_upgrade.sql** (note that there are references to other scripts within the main script). You can modify the scripts before executing them.

Note: Migration scripts execution is mandatory and needs to be completed before the ETL execution.

Note: Both sections below (HDWF 6.1 to OHF 7.0.1 Data Migration Summary and OHF 7.0.1 to 7.1.1 Data Migration Summary) are applicable for migrating from HDWF 6.1 to OHF 7.1.1.

8.3.1.1 HDWF 6.1 to OHF 7.0.1 Data Migration Summary

- Specimen.Intervention ID/VN is deprecated and data is migrated to Intervention Specimen.
- Specimen Processing Procedure. Specimen Processing Procedure Subtype is added as a mandatory attribute to Specimen Processing Procedure. This is initialized with the appropriate seed data coded value 'SPP_SUBTYP_GEN' during the migration.
- Schedule Block.Schedule Block Subtype is added as a mandatory attribute to Schedule Block. This is initialized with the appropriate seed data coded value 'SCH_BLCK_SUBTYP_GEN' during the migration.
- Schedule.Service Provider is deprecated and data is transferred to Schedule Service Provider.
- Observation. Specimen ID/VN is deprecated and data is transferred to Observation Specimen. On the interface tables schema, data is transferred from Observation, Assessment, and Image Instance to Observation Specimen.
- Data is migrated from Encounter Service Provider to Encounter.Responsible Service Provider for Encounter Service Provider Relationship Type="Responsible Service Provider". If the same encounter is associated to multiple service providers for a given value of Encounter and Relationship Type="Responsible Service Provider", the service provider that was inserted last will be migrated to Encounter.
- The integration ID of the parent table is used wherever a new table is populated based on an existing table.
- The migration scripts use the seed data values given below provided by Oracle. If you have used a different set of seed data values in Encounter Service Provider to represent a Responsible Service Provider relationship, change it in the migration script for both Interface Tables and Data Warehouse schema, and run `post_ddl_upgrade.sql`.
- The following are the seed data values that are used for filtering Encounter Service Provider. Encounter Service Provider Relationship Type in the migration scripts:
  - HDI_ENC_SVCPRV.ENC_SVCPRV_RLTYP_CD='ENC_SVCPRV_RLSHPTYP_RSPNSBL_SVCPRV' (CD_NM='Responsible Service Provider' AND

INTEGRATION_ID='ENC_SVCPRV_RLSHPTYP_RSPNSBL_SVCPRV~EHA_CUSTOM_CD_SYS~1.0' AND SYS_INT_ID='EHA_CUSTOM_CD_SYS~1.0' AND SYS_DAT_SRC_NUM_ID=1 AND CREATED_BY_USER_ID='EHA_USER' AND CREATED_BY_USER_DS_NUM_ID=1)

– On the Data Warehouse schema, it corresponds to HDM_ENC_SVCPRV.ENC_SVCPRV_RLSHPTYP_ID/VN resolving to the following code:

CD='ENC_SVCPRV_RLSHPTYP_RSPNSBL_SVCPRV' AND CD_NM='Responsible Service Provider' AND INTEGRATION_ID='ENC_SVCPRV_RLSHPTYP_RSPNSBL_SVCPRV~EHA_CUSTOM_CD_SYS~1.0'

The values mentioned above are presented in a logical way and is not the exact physical representation of the values present in the migration scripts. See **sql files <INSTALL_HOME>/dm/hdi_install/pkb/hdi_upgrade_7_0.pkb** and **<INSTALL_HOME>/dm/hdm_install/pkb/hdm_upgrade_7_0.pkb** for the exact seed data values.

- Key steps related to data migration are logged into the HDI_RSLT_LOG and HDM_RSLT_LOG tables in the respective schemas.

8.3.1.2 OHF 7.0.1 to 7.1.1 Data Migration Summary

- Bill Line Item.Bill Diagnosis ID/VN is deprecated and the corresponding data is migrated to Bill Diagnosis as new records.
- Claim Line Item.ClaimDiagnosis ID/VN is deprecated and the corresponding data is migrated to Claim Diagnosis as new records.

  The values mentioned above are presented in a logical way and is not the exact physical representation of the values in the migration scripts. For exact details, see the SQL files:

  <INSTALL_HOME>/dm/hdi_install/pkb/hdi_upgrade_7_1.pkb and **<INSTALL_HOME>/dm/hdm_install/pkb/hdm_upgrade_7_1.pkb**.
- HDM_INTVN_SPCMN. INTVN_SPCMN_RLSHPTYP_ID/VN is populated with the value -1 corresponding to the default value of CODEID_NAV configured in the HMC schema. If you have modified the seed data, change the script `<INSTALL_HOME>/dm/hdm_install/post_ddl_upgrade.sql` accordingly.
- Review the integration ID pattern for records populated using the migration scripts and change it accordingly if needed.
- It is assumed that the time stamps for SRC_CHANGED_ON_DT, match from the parent to the child reference on the interface schema. For example, the value of HDI_ENC_SVCPRV. ENC_SRC_CHANGED_ON_DT should be same as that of the parent, that is, HDI_ENC.SRC_CHANGED_ON_DT for the same record being referred in both tables right up to the seconds. If it is not the same, change the migration script accordingly.

8.3.2 Execute Schema Migration Scripts After Modifications

Follow the instructions below to migrate the Interface Tables schema:

☐ Open the command prompt and navigate to the **<INSTALL_HOME>/dm/hdi_install/** folder.

☐ Connect to the interface tables schema through command prompt using the `SQL*Plus` utility.

- ☐ Execute the script using the command `'@post_ddl_upgrade.sql'`.

Follow the instructions below to migrate the Data Warehouse schema:

- ☐ Open the command prompt and navigate to the **<INSTALL_HOME>/dm/hdm_install/** folder.
- ☐ Connect to the interface tables schema through command prompt using the `SQL*Plus` utility.
- ☐ Execute the script using the command `'@post_ddl_upgrade.sql'`.

9

Data Management Assembly for Oracle Data Integrator Upgrade

For a list of the supported upgrade paths, see Supported Upgrade Paths.

To upgrade the OHF Data Management Assembly for Oracle Data Integration (ODI), follow the instructions below:

1. Check Prerequisites
2. Prepare the Installer
3. Run the Installer
4. Check the Installation and Delete E$_tables
5. Create a New ODI Repository Login

9.1 Check Prerequisites

- ☐ The user is familiar with Oracle Database (DB), ODI, and Linux OS.
- ☐ The OHF Data Model is installed.

  Follow the instructions in Chapter 1, "Data Model Installation" or Chapter 8, "Data Model Upgrade".
- ☐ The Data Management Assembly installer is run on the system where the ODI server is installed.
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ OHF uses separate HMC schemas for the WIL and HCD loaders. If you have a common HMC schema for OHADI (WIL) and HCD, designate different HMC schemas for WIL (the existing HMC) and HCD (the new HMC_HCD) by performing the following steps:
  1. Create a new HMC schema for HCD loaders. For example: HMC_HCD.
  2. Provide the newly created HMC_HCD schema with the same privileges as the existing HMC schema.
  3. Move the HCD* tables from the existing HMC schema to the new HMC_HCD schema and remove them from existing HMC schema.
- ☐ ODI services can connect to the Data Model 7.2 database mentioned in the Oracle TNS file (TNS entries of the required database must be available in the installation server tnsnames.ora file).
- ☐ The password expiry notification message does not display for the system user or existing schemas.

- ☐ The terminology loaders source file location exists. The installer creates an archive directory. For example,

  /scratch/home/oemora/TL_Source is the source file location specified during installation, which already exists.

  /scratch/home/oemora/TL_Archive_Files is created by the installer as the archive directory.

- ☐ The path of the data file (Configuration schema/Repository schema tablespace) mentioned when creating the tablespace is correct. Make sure that the database user has write privileges.

- ☐ Enough space is available in the installation directory and the Oracle Home directory.

- ☐ The Sqlplus utility is available on the installation server.

- ☐ The impdp utility is available on the repository database server.

- ☐ The installation user has read, write, and execute privileges to the $ODI_HOME/odi/agent/bin folder. The installer creates product specific files under this location.

- ☐ For remote installations, where the installation server and the ODI Repository Database server are different machines, make sure that:
  - A directory from the remote database server is mounted to the installation server with appropriate read and write privileges.
  - The remote directory is accessible from the installation server upon mounting.
  - The user that owns Oracle db services on the remote server has privilege 755 for the directory that has been mounted on the installation server.
  - If the database is on an Exadata machine, provide the database single node (the node which is mounted) as the host name when prompted during installation.

- ☐ GLOBAL_NAMES database initialization parameter is set to false.

- ☐ Back up the following csv files under $ODI_HOME/odi/agent/bin if it exists:
  - bus_susp_day.csv
  - daylght_svngs_day.csv
  - hosp_hol_day.csv
  - time_odi.csv

- ☐ If the Terminology Loaders source folder is shared, make a backup of the following files:
  - Code Axes.txt
  - Code Descriptions.txt
  - Code Hierarchy.txt
  - Code.txt
  - Related Entity.txt
  - Relations Type.txt
  - Relations.txt
  - Relationship Type.txt
  - time.txt

  The installer will overwrite any existing files from the list above.

- ☐ If any previous ETLs are in the failed status, make sure that they execute successfully before upgrading.

- ☐ Make sure that the data models are upgraded to OHF 7.2.

- ☐ The OUI displays default configuration schema (hmc) names. You must change these schema names to the existing hmc schema names.

  The installer upgrades the configuration schemas to OHF 7.2.

☐ Back up the existing hmc schemas.

Note: The installer auto-populates some of the user parameters and lets you edit them.

9.2 Prepare the Installer

☐ Extract the contents of the OHF media pack to your system.

☐ Navigate to the **<media_pack_location>/** folder.

☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

```
unzip -a OHF_72_Linux-x64.zip
```

☐ Navigate to the **Disk1/install** folder.

☐ Change the protection on files as follows:

```
chmod 755 *
```

9.3 Run the Installer

Start the Oracle Universal Installer by running the following command:

- If the ODI repository schemas (master and work) to be created are on the database instance of the installation server, execute:

  ```
  sh runInstaller.sh -local
  ```

- If the ODI repository database or OHF data model database is on the database instance of another server, execute:

  ```
  sh runInstaller.sh -local remote_installation=true
  ```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Management Assembly for ODI 7.2.0.0.0** option.
☐	Specify Home Details	Enter the installation home path.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Select the Oracle Home Configuration	Specify the Oracle client home path.
☐	Select the ODI Home Location	Specify the ODI home location. The ODI home should be one level above the /oracle_common directory. For example: /u01/app/oracle/Oracle_ODI1.

	Screen	Action
☐	Select Database Server for ODI Repository Schemas	Select one of the following options for the ODI repository schemas: ■ If the ODI repository database server is on the installation server, select the **Installation database server** option. ■ Else, select the **Remote database server** option.

☐	Specify Mount Path Details (applicable only for remote installations)	Enter the configuration details for the mounted remote server directory:
		■ Mounted directory path on the remote server
		■ Mount path on the installation server
		To obtain the available storage drives, on the Linux machine, execute the `df -h` command. If the remote server directory is mounted on the installation server, the mounting is displayed as follows:
		`<Remote Server name>:<Remote server path>`
		`<total size> <used up space> <Available space> <use%> <Path in installation server where mounting was done>`
		For example:
		`abc:/scratch/dump`
		`191G 138G 44G 76% /installation server`
		Note: If the remote server mounted path is displayed as **/**, provide the absolute mounted path of the remote server.

☐	Specify Healthcare Data Model Database Instance Details	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port number ■ Service name ■ System user password ■ Select this database instance for repository schema creation If you select **Yes**, the installer uses the same Data Model database instance for ODI repository schema creation.
☐	Specify ODI Repository Database Instance Details (applicable only if you selected **No** in the previous screen for Select this database instance for repository schema creation)	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port ■ Service name ■ System user password
☐	Specify ODI Supervisor Password	Specify the supervisor password used for the ODI console login.
☐	Select Terminology Loaders Source Location	Specify the Terminology loaders source file location. This location is used to read the terminology loaders source data files. You can change this location when required. The installer creates an archive directory at the same level as the source directory. Make sure that the create directory privileges exist for the installation user.

	Screen	Action
☐	Specify Healthcare Data Model Schema Details	Enter values for the pre-created schemas: ■ Interface table schema name ■ Interface table schema password ■ Data warehouse schema name ■ Data warehouse schema password ■ Common data mart (hcd) schema name ■ Common data mart (hcd) schema password ■ Cohort data mart (cdm) schema name ■ Cohort data mart (cdm) schema password
☐	Specify Healthcare Data Model Schema Details	Enter values for the pre-created schemas: ■ Enterprise schema name ■ Enterprise schema password.
☐	Specify Terminology Loader Details	Enter values for the following fields: ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password Specify the new schema names for the Master and Work repository. The installer creates the Master and Work repository schemas, and imports loaders into them.
☐	Specify Warehouse Integration Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password Enter the existing Configuration schema name to upgrade it. Specify the new schema names for the Master and Work repository. The installer creates the Master and Work repository schemas, and imports loaders into them.
☐	Specify Healthcare Common Data Mart Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password Enter the existing Configuration schema name to upgrade it. Specify the new schema names for the Master and Work repository. The installer creates the Master and Work repository schemas, and imports loaders into them.

	Screen	Action
☐	Specify Healthcare Cohort Data Mart Loader Details	Enter values for the following fields: ■ Master repository schema name ■ Master repository schema password ■ Work repository schema name ■ Work repository schema password Specify the new schema names for the Master and Work repository. The installer creates the Master and Work repository schemas, and imports loaders into them. The configuration schema is not required for CDM.
☐	Specify RCU Prefix and Password	Specify an RCU Prefix to be prepended to the schemas created by the ODI Repository Creation utility (RCU). The RCU creates 3 schemas: ■ <RCU Prefix>_STB ■ <RCU Prefix>_WLS ■ <RCU Prefix>_WLS_RUNTIME **Note:** The RCU Prefix must be unique. The prefix should be alphabetic only. It cannot have special characters and cannot start with a number. The length of the prefix must not exceed 8 characters. Specify a password for schemas created using the ODI Repository Creation Utility (RCU). **Note:** The password must be between 8 and 12 alphanumeric characters long and must include at least one number. The password cannot start with a number.
☐	Specify the Tablespace Details	Specify the tablespace names for the configuration schemas. The installer creates these tablespaces if they do not exist. ■ Configuration schema default tablespace name ■ Configuration schema temporary tablespace name
☐	Specify the Tablespace Details	Specify the tablespace names for repository schemas: ■ wil_odi_ts - Default tablespace for ODI temporary objects for Warehouse Integration Loaders ■ hcd_odi_ts - Default tablespace for ODI temporary objects for Healthcare Common Data mart Loaders ■ cdm_odi_ts - Default tablespace for ODI temporary objects for Cohort Data mart Loaders ■ tl_odi_ts - Default tablespace for ODI temporary objects for Terminology Loaders
☐	Specify Tablespace for Creation of ODI Temporary Objects	Specify tablespace names for the creation of temporary objects used by the ODI Loaders. The installer creates the following tablespaces if they do not exist: ■ Warehouse Integration Loaders ■ Healthcare Common Datamart loaders ■ Cohort Datamart loaders ■ Terminology loaders It is recommended to provide different tablespace names for each component.
☐	Specify Tablespace Location for Configuration Schemas	Specify the tablespace location for configuration schemas. The location should be present in the data model database server with write privileges. If the OHF data model database is not on the installation server, you must enter the location manually.

	Screen	Action
☐	Specify Tablespace Location for Repository Schemas	Specify the tablespace location for the ODI repository schema. The location should be present in the repository database server with write privileges. If the repository database is not on the installation server, you must enter the location manually.
☐	Verify Configuration Parameters	Click **Next**.
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

9.4 Check the Installation and Delete E$_tables

☐ Review the generated installation log files for errors. For details, see Installation Log Files.

☐ Contact Oracle support, if necessary, to resolve any errors.

☐ Delete all E$_ tables under HCD schema.

9.5 Create a New ODI Repository Login

Perform the following steps to create a new ODI repository login:

☐ Navigate to **ODI > File > New > Create a New ODI Repository Login**.

☐ Click **OK**. The Repository Connection Information screen is displayed.

☐ Enter the following values:

- Login Name - For example, WIL_REPOSITORY_LOGIN
- User - SUPERVISOR
- Password - Provide the ODI Login password entered during installation (see Run the Installer)
- User - <database schema created for the master repository>
- Password - <database schema password created for the master repository>
- Driver List - Select **OracleJDBC Driver** from the drop-down list
- Driver Name - oracle.jdbc.oracledriver
- Url - Set appropriate values based on your database details
- Work Repository - Select the **Work Repository** option, browse to select the work repository shown (for example, for Warehouse Integration loader, select **WIL_WORK_REPOSITORY**), and click **OK**.

☐ Click **OK**. The login name is created with the name specified at the previous step.

☐ Navigate to **ODI > Connect > ODI Studio**.

☐ Enter the following details:

- Login Name - Select **WIL_REPOSITORY_LOGIN**
- User - Supervisor
- Password - Provide the ODI login password entered during installation (see "Run the Installer").

Similarly, follow the above steps to create the login for the Terminology loaders, Common Data Mart loader, and Cohort Data Mart loader.

10

Data Management Assembly for Informatica Upgrade

For a list of the supported upgrade paths, see Supported Upgrade Paths.

To upgrade the OHF Data Management Assembly for Informatica, follow the instructions below:

1. Check Prerequisites
2. Prepare the Installer
3. Run the Installer
4. Check the Installation

10.1 Check Prerequisites

- ☐ The user is familiar with Oracle Database (DB), Informatica, and Linux OS.
- ☐ The OHF Data Model is installed.

  Follow the instructions in Chapter 1, "Data Model Installation" or Chapter 8, "Data Model Upgrade".
- ☐ Make sure that the database compatible parameter is set to 12.2.0.1.0 by connecting to the DBA user and running the query below:

  ```
  select * from v$parameter where name = 'compatible';
  ```

  If the parameter is not set to 12.2.0.1.0, ask your database administrator to set it.
- ☐ OHF uses separate HMC schemas for the WIL and HCD loaders. If you have a common HMC schema for OHADI (WIL) and HCD, designate different HMC schemas for WIL (the existing HMC) and HCD (the new HMC_HCD) by performing the following steps:
  1. Create a new HMC schema for HCD loaders. For example: HMC_HCD.
  2. Provide the newly created HMC_HCD schema with the same privileges as the existing HMC schema.
  3. Move the HCD* tables from the existing HMC schema to the new HMC_HCD schema and remove them from existing HMC schema.
- ☐ The Informatica domain is running and no user is connected to the Informatica Admin Console.
- ☐ Informatica services can connect to the Data Model 7.2 database mentioned in the Oracle TNS file (TNS entries of the required database must be available in the installation server tnsnames.ora file).
- ☐ You can connect the database using EZCONNECT syntax. For example, sqlplus <user>/<password>@<hostname>:<port>/<service name>.
- ☐ The password expiry notification message does not display for the system user or the existing schemas.

- ☐ The installer is run on the system where the Informatica server is installed.
- ☐ The terminology loaders source file location exists. The installer creates an archive directory. For example,

  /scratch/home/oemora/TL_Source is the source file location specified during installation, which already exists.

  /scratch/home/oemora/TL_Archive_Files is created by the installer as the archive directory.
- ☐ The path of the data file (Configuration schema/Repository schema tablespace) mentioned when creating the tablespace is correct. Make sure that the database user has write privileges.
- ☐ Enough space is available in the installation directory and the Oracle Home directory.
- ☐ The Sqlplus utility is available on the installation server.
- ☐ The impdp utility is available on the repository database server.
- ☐ The installation user has read, write, and execute privileges to the $INFA_HOME/server folder. The installer creates product specific folders and parameter files under this location.
- ☐ For remote installations, where the installation server and the Informatica Repository Database are on different machines, make sure that:
  - The remote database server directory is mounted to the installation server with appropriate read and write privileges.
  - The remote directories are accessible after mounting from the installation server.
  - The Linux user of the remote server, who executes the Oracle process, has privilege 755 for the directory (datapump).
  - The Oracle user has privilege for the mount path directory.
  - If the repository DB is on an Exadata machine, the repository DB single node (the node which is mounted) TNSENTRY should be added to the tnsnames.ora file on the installation server. After installation, revert TNSENTRY to the original entry.
- ☐ GLOBAL_NAMES database initialization parameter is set to false.
- ☐ Back up the following csv files under $INFORMATICA_HOME/server/infa_shared/SrcFiles if it exists:
  - bus_susp_day.csv
  - daylght_svngs_day.csv
  - hosp_hol_day.csv
  - time_am.csv
  - time_pm.csv
- ☐ If the Terminology Loaders source folder is shared, make a backup of the following files:
  - Code Axes.txt
  - Code Descriptions.txt
  - Code Hierarchy.txt
  - Code.txt
  - Related Entity.txt
  - Relations Type.txt
  - Relations.txt
  - Relationship Type.txt
  - time.txt

  The installer will overwrite any existing files from the list above.
- ☐ If any previous ETLs are in the failed status, make sure that they execute successfully before upgrading.
- ☐ Make sure that the data models are upgraded to OHF 7.2.

- ☐ The OUI displays default configuration schema (hmc) names. You must change these schema names to the existing hmc schema names.

  The installer upgrades the configuration schemas to OHF 7.2.

- ☐ Back up the existing hmc schemas.

10.2 Prepare the Installer

- ☐ Extract the contents of the OHF media pack to your system.
- ☐ Navigate to the **<media_pack_location>/** folder.
- ☐ Unzip the **OHF_72_Linux-x64.zip** file where you want to launch the installer using the following command:

  ```
  unzip -a OHF_72_Linux-x64.zip
  ```

- ☐ Navigate to the **Disk1/install** folder.
- ☐ Change the protection on files as follows:

  ```
  chmod 755 *
  ```

10.3 Run the Installer

Start the Oracle Universal Installer by running the following command:

- If the Informatica repository schemas to be created are on the database instance of the installation server, execute:

  ```
  sh runInstaller.sh -local
  ```

- If the Informatica repository database or OHF data model database is on the database instance of another server, execute:

  ```
  sh runInstaller.sh -local remote_installation=true
  ```

where, the `-local` option is to install on the local node irrespective of the cluster nodes specified on the installer machine.

	Screen	Action
☐	Welcome	Click **Next**.
☐	Select a Product to Install	Select the **Oracle Healthcare Foundation Data Management Assembly for Informatica 7.2.0.0.0** option.
☐	Specify Home Details	Enter or select the installation home path.
☐	Verify Installation Prerequisites	Verify if all the prerequisites are met before proceeding.
☐	Oracle Home Configuration	Specify the Oracle client home path.
☐	Select the Informatica Home Location	Specify the Informatica home location. The Informatica home should be one level above the **/server** directory. For example, <path>/Informatica/961/.

	Screen	Action
☐	Select Database Server for Informatica Repository Schemas	Select one of the following options for the Informatica repository schemas: ■ If the Informatica repository database server is on the installation server, select the **Installation database server** option, and **skip the next step**. ■ For remote installations, select the **Remote database server** option, and **go to the next step**.

☐	Specify Mount Path Details (applicable only for remote installations)	Enter the following mounted directory configuration details in which the remote server directory is mounted:
		■ Mount path in the repository database server - Remote server path
		■ Mount path in the installation server - Path on the installation server where the mounting is performed
		To obtain the available storage drives, on the Linux machine, execute the `df -h` command. If the remote server directory is mounted on the installation server, the mounting is displayed as follows:
		`<Remote Server name>:<Remote server path>`
		`<total size> <used up space> <Available space> <use%> <Path in installation server where mounting was done>`
		For example,
		`abc:/scratch/dump`
		`191G 138G 44G 76% /installation server`
		Note:
		■ The (datapump) directory of the remote database server should be mounted to the installation server with appropriate read and write privileges for the IMPDB utility (folder with **dba** group).
		■ Make sure that the remote directories are accessible after mounting from the installation server.
		■ If the remote server mounted path is displayed as **/**, provide the absolute mounted path of the remote server.
		■ The remote server Linux user that executes the Oracle process, must have minimum privilege of 755 to the directory.

☐	Specify Healthcare Data Model Database Instance Details	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port number ■ Service name ■ System user password ■ Select this database instance for repository schema creation If you select **Yes**, the installer uses the same Data Model database instance for Informatica repository schema creation.
☐	Specify Informatica Repository Database Instance Details (applicable only if you selected **No** in the previous screen for Select this database instance for repository schema creation)	Enter values for the following fields: ■ Host name - By default, the system host name appears. For remote installations, set this value to the host name of the remote machine. ■ Port ■ Service name ■ System user password

	Screen	Action
☐	Select Terminology Loaders Source Location	Specify the Terminology loaders source file location. This location is used to read the terminology loaders source data files. You can change this location when required. The installer creates an archive directory at the same level as the source directory. Make sure that the create directory privileges exist for the installation user.
☐	Specify Healthcare Data Model Schema Details	Enter values for the following fields: ■ Interface table schema name ■ Interface table schema password ■ Data warehouse schema name ■ Data warehouse schema password ■ Common data mart (hcd) schema name ■ Common data mart (hcd) schema password ■ Cohort data mart (cdm) schema name ■ Cohort data mart (cdm) schema password
☐	Specify Healthcare Data Model Schema Details	Enter values for the following fields: ■ Enterprise schema name ■ Enterprise schema password.
☐	Specify Warehouse Integration Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Repository name ■ Repository schema name ■ Repository schema password Provide an existing HMC schema. If you provide an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). It creates a repository service (<Repository name>) and integration service (Is_<Repository name>). The installer creates a repository schema if it does not exist in the database. If you enter an existing repository schema, the installer overwrites the content with the new one, and you will lose all existing objects.
☐	Specify Healthcare Common Data Mart Loader Details	Enter values for the following fields: ■ Configuration schema name ■ Configuration schema password ■ Repository name ■ Repository schema name ■ Repository schema password Specify an existing HMC schema. If you provide an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). It creates a repository service (<Repository name>) and integration service (Is_<Repository name>). The installer creates a repository schema if it does not exist in the database. If you enter an existing repository schema, the installer overwrites the content with the new one, and you will lose all existing objects.

	Screen	Action
☐	Specify Healthcare Cohort Data Mart Loader Details	If you are upgrading the Informatica repository schemas from Enterprise Healthcare Analytics (EHA) 6.1 and OHF 7.0.1 to OHF 7.1.1, the repository name, tablespace, and temp space name should be the same as in the previous version. Enter values for the following fields: ■ Repository name ■ Repository schema name ■ Repository schema password If you enter an existing repository name, the installer removes the repository and the corresponding integration service (Is_<Repository name>). It creates a repository service (<Repository name>) and integration service (Is_<Repository name>). The installer creates a repository schema if it does not exist in the database. If you enter an existing repository schema, the installer overwrites the content with the new one, and you will lose the existing objects. The configuration schema is not required for CDM.
☐	Specify Tablespace Details (if prompted)	Specify the tablespace names for the configuration schemas. The installer creates these tablespaces if they do not exist. ■ Configuration schema default tablespace name ■ Configuration schema temporary tablespace name
☐	Specify Tablespace Details (if prompted)	Specify the tablespace names for repository schemas. The installer creates these tablespaces if they do not exist in the database. ■ Repository schema default tablespace name ■ Repository schema temporary tablespace name
☐	Specify Tablespace Location for Configuration Schema (if prompted)	Specify the tablespace location for the Configuration schema. The location should be present in the OHF data model database server with write privileges. If the OHF data model database is not on the installation server, you must enter the location manually.
☐	Specify Tablespace Location for Repository Schema (if prompted)	Specify the tablespace location for the repository schemas. When the repository database is not on the installation server, you must enter the location manually. The location should be present on the repository database server with write privileges.

	Screen	Action
☐	Specify Informatica Domain Details	Specify the following parameters: ■ Domain name ■ Domain code page ID ■ Node name ■ License name ■ Informatica host name ■ Informatica port number ■ Informatica administrator user name ■ Informatica administrator password Contact your Informatica Administrator for the Domain Code Page ID and provide a valid Code Page ID. Make sure that the code page is compatible with the domain code page for creating the Integration Service. For a domain compatible code page, see any existing and active integration service code pages from the Informatica admin console. A list of sample code pages and their IDs are as follows: ■ US-ASCII (ID 1) - 7-bit ASCII ■ Latin1 (ID 4) - ISO 8859-1 Western European ■ JapanEUC (ID 18) - Japanese Extended Unix Code (including JIS X 0212) ■ UTF-8 (ID 106) - Unicode Transformation Format, multibyte ■ MS932 (ID 2024) - MS Windows Japanese, Shift-JIS ■ MS1252 (ID 2252) - MS Windows Latin1 (ANSI), superset of Latin1
☐	Verify Configuration Parameters	Click **Next**.
☐	Summary	Click **Install**.
☐	End of Installation	Click **Exit** after reviewing the installation information. At the confirmation prompt, click **Yes** to exit the installer.

10.4 Check the Installation

☐ Review the generated installation log files for errors. For details, see Installation Log Files.

☐ Contact Oracle support, if necessary, to resolve any errors.

11

Middle-Tier Upgrade

For a list of the supported upgrade paths, see Supported Upgrade Paths.

To upgrade the OHF Middle-Tier, follow the instructions below:

1. Check Prerequisites
2. Uninstall the Previous Middle-Tier Setup
3. Do a Fresh Middle-Tier Installation

11.1 Check Prerequisites

- ☐ Fusion Middleware Infrastructure is installed on the machine.
- ☐ The Data Management Assembly is installed on the machine. See Data Management Assembly for Oracle Data Integrator Installation or Data Management Assembly for Informatica Installation for instructions on how to install the Data Management Assembly.
- ☐ The oh_domain WebLogic domain is present on the OHF version you will update.
- ☐ All the OHF Data Model schemas exist.
- ☐ The Oracle external table DIRECTORY object is created for Omics Data Bank.
- ☐ If you have already installed OHF Middle-Tier components on WebLogic 12.1.3, uninstall the existing oh_domain and applications and install WebLogic 12.2.1.2.

11.2 Uninstall the Previous Middle-Tier Setup

Follow the instructions in Section 15, "Middle-Tier Uninstall" to uninstall the middle tier.

11.3 Do a Fresh Middle-Tier Installation

Follow the instructions in Section 4, "Middle-Tier Installation" to perform a fresh Middle-Tier installation.

Part III

Uninstall

12

Data Model Uninstall

This chapter describes how to uninstall the OHF Data Model.

> **Note:** Oracle recommends that you uninstall the Data Model only from the development environment. Also, make sure you have backups of the user schemas before dropping them.

Execute the following commands to drop user schemas by connecting to the system user. Replace the user schema names and tablespace names with the values provided during the installation.

```
drop user <hdi> cascade;
drop user <hdm> cascade;
drop user <hcd> cascade;
drop user <odb> cascade;
drop user <cdm> cascade;
drop user <ent> cascade;
drop user <job> cascade;
drop user <svc> cascade;
drop tablespace <hdi_temp> INCLUDING CONTENTS and datafiles;
drop tablespace <hdm_temp> INCLUDING CONTENTS and datafiles;
drop tablespace <hcd_temp> INCLUDING CONTENTS and datafiles;
drop tablespace <odb_temp> INCLUDING CONTENTS and datafiles;
drop tablespace <cdm_temp> INCLUDING CONTENTS and datafiles;
drop tablespace <ent_temp> INCLUDING CONTENTS and datafiles;
drop tablespace <job_temp> INCLUDING CONTENTS and datafiles;
drop tablespace <svc_temp> INCLUDING CONTENTS and datafiles;
drop tablespace <hdi_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <hdm_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <hcd_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <odb_data_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <odb_index_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <odb_lob_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <cdm_data_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <cdm_index_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <ent_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <job_data_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <job_index_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <job_store_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <job_lob_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <job_tbs_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <svc_ts> INCLUDING CONTENTS and datafiles;
```

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Data Management Assembly for Oracle Data Integrator Uninstall

Note: This section is applicable only to uninstall Data Management Assembly only from the development environment.

☐ Execute the following commands to drop user schemas by connecting to the system user. If you have installed Data Model Assembly, replace the user schema name and tablespace names with the values provided during the installation.

```
drop user <HCD_WORK_REP_72> cascade;
drop user <HCD_MASTER_REP_72> cascade;
drop user <WIL_WORK_REP_72> cascade;
drop user <TL_MASTER_REP_72> cascade;
drop user <CDM_WORK_REP_72> cascade;
drop user <TL_WORK_REP_72> cascade;
drop user <WIL_MASTER_REP_72> cascade;
drop user <CDM_MASTER_REP_72> cascade;
drop user <WIL_HMC72> cascade;
drop user <HCD_HMC72> cascade;
drop tablespace <hmc_temp72> INCLUDING CONTENTS and datafiles;
drop tablespace <odirep_temp72> INCLUDING CONTENTS and datafiles;
drop tablespace <odirep_ts72> INCLUDING CONTENTS and datafiles;
drop tablespace <hmc_ts72> INCLUDING CONTENTS and datafiles;
drop tablespace <wil_odi_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <hcd_odi_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <cdm_odi_ts> INCLUDING CONTENTS and datafiles;
drop tablespace <tl_odi_ts> INCLUDING CONTENTS and datafiles;
commit;
```

☐ Invoke the `rcu` script available in the `$ODI_HOME/oracle_common/bin/` folder. For example:

```
cd $ODI_HOME/oracle_common/bin/
./rcu
```

☐ Navigate to the ODI domains directory and drop all the OHF domain folders created during the OHF installation. For example:

```
cd $ODI_HOME/user_projects/domains
rm -rf ${RCU_PREFIX}_WIL_domain_01
rm -rf ${RCU_PREFIX}_AT_domain_01
rm -rf ${RCU_PREFIX}_CDM_domain_01
rm -rf ${RCU_PREFIX}_TL_domain_01
```

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Data Management Assembly for Informatica Uninstall

Note: This section is applicable only to uninstall Data Management Assembly only from the development environment.

☐ Execute the following commands to drop user schemas by connecting to the system user.

```
drop user <WIL_HMC_USR>  cascade;
drop user <WIL_INFA_REP_DB_USER>  cascade;
drop user <AT_HMC_USR>  cascade;
drop user <AT_INFA_REP_DB_USER>  cascade;
drop user <CDM_INFA_REP_DB_USER> cascade;
drop tablespace <INFA_REP_TBSP> INCLUDING CONTENTS and datafiles;
drop tablespace <INFA_REP_TMP_TBSP> INCLUDING CONTENTS and datafiles;
drop tablespace <HMC_SCHEMA_TBSP> INCLUDING CONTENTS and datafiles;
drop tablespace <HMC_SCHEMA_TMP_TBSP> INCLUDING CONTENTS and datafiles;
commit;
```

☐ Log in to the Informatica Admin console and delete the following repositories and integration services:

- Repositories
  - <WIL_REP_NAME>
  - <AT_REP_NAME>
  - <CDM_REP_NAME >
- Integration Services
  - <WIL_INT_SRVC >
  - <AT_INT_SRVC >
  - <CDM_INT_SRVC>

Note:

- Ensure that there are no db (.dbf files) files in <INSTALL_HOME>.

  If they exist, do not execute the following command:

  ```
  rm -r  <INSTAL_HOME>
  ```

  Contact the Database Administrator for guidance.

- Back up any user-specific files (apart from installer default files) in the installation directory.

15

Middle-Tier Uninstall

Note: In case of failure, always uninstall the middle-tier before re-running the middle-tier installer.

- ☐ On the primary node WebLogic server machine, stop all managed servers, the node manager, and the administration server for oh_domain. Refer to the *Oracle Fusion Middleware Administering Server Startup and Shutdown for Oracle WebLogic Server* (https://docs.oracle.com/middleware/12212/wls/START/START.pdf) for details.
- ☐ If you installed the Middle-Tier on secondary nodes, stop the node manager for oh_domain on these machines. Refer to the *Oracle Fusion Middleware Administering Server Startup and Shutdown for Oracle WebLogic Server* (https://docs.oracle.com/middleware/12212/wls/START/START.pdf) for details.
- ☐ Make sure that no processes related to oh_domain are running.
- ☐ Log in to the primary node WebLogic server machine and:
  1. Make a backup of the <WLS_HOME>/user_projects directory.
  2. Remove the <WLS_HOME>/user_projects/domains/oh_domain directory.
  3. Remove the <WLS_HOME>/user_projects/applications/oh_domain directory.
  4. Make a backup of <WLS_HOME>/domain-registry.xml.
  5. Remove the **oh_domain** entry from <WLS_HOME>/domain-registry.xml.
- ☐ On any secondary nodes where you installed the Middle-Tier, log in to the WebLogic server machine and:
  1. Make a backup of the <WLS_HOME>/user_projects directory.
  2. Remove the <WLS_HOME>/user_projects/domains/oh_domain directory.
  3. Remove the <WLS_HOME>/user_projects/applications/oh_domain directory.
  4. Make a backup of <WLS_HOME>/domain-registry.xml.
  5. Remove the **oh_domain** entry from <WLS_HOME>/domain-registry.xml.
  6. Remove the <WLS_HOME>/user_projects/templates directory.

☐ Drop the RCU repository:

1. Start the RCU from the terminal:

   ```
   cd <WLS_HOME>/oracle_common/bin
   ./rcu
   ```

2. In the Welcome screen, click **Next**.
3. Select **Drop Repository** and click **Next**.
4. Fill in the following values:
   - Database Type: eg. Oracle Database
   - Host Name: Host where the database is running
   - Port: Database service listener port
   - Service Name: Database service name
   - User Name: User name with SYSDBA privilege
   - Password: Password for the above sysdba user
   - Role: SYSDBA

   Click **Next**.
5. Choose **Select existing prefix** for your drop and select all the components in the bottom table. Click **Next**.
6. Click **Drop** to drop all the schemas with the selected prefix.
7. After the drop is completed, click **Finish**.

Part IV

Troubleshooting

16

Data Model Troubleshooting

16.1 Installation Log Files

While installing the Data Model, the installer generates the following log files:

Table 16–1 Installation Log Files

File Name	Description
installActions<timestamp>.log	Records the actions of the installer and can be used to diagnose issues with the installer.
oraInstall<timestamp>.out	Records the output of the SQL scripts run by the installer. Database objects are installed using the Python framework.
oraInstall<timestamp>.err	Records the errors from the SQL scripts run by the installer. You can ignore the following error: `java.io.FileNotFoundException: /<INSTALL_ HOME>/inventory/Components21/ oracle.hsgbu.hc.datamodel/7.2.0.0.0/context.xml` The log files are time stamped and each installation session creates a new log file. On a Linux machine, the log files are located at **$ORACLE_BASE/oraInventory/logs**. For example, /u01/app/oraInventory/logs.
<INSTALL_ HOME>/dm/install.err	Contains any SQL errors. Database objects are installed using the Python framework and the error logging is redirected to this location.
<INSTALL_ HOME>/reports/dm_ install<timestamp>.html	Contains the installation summary for the Data Model installation.

If the installation fails, check the log files for errors. You must fix the issues and rerun the installer from the installation home location.

While reporting any problems that occur during installation, make sure that you include all the above log files. Check which components were installed successfully using the following query by connecting to the enterprise schema:

```
Select * from W_EHA_PRODUCT_VERSION
```

Send the result of the query when reporting any problems to Oracle support.

16.2 Seed Data Troubleshooting

Seed data scripts are executed as part of the installation process for both the HDI schema and the HDM schema. The seed data that is loaded in each schema is identical although the format is specific to each of the two schemas.

16.2.1 Error Logging and Debugging

These errors that occur while populating seed data using the seed data load procedures are logged in the HDM_X_SEED_DATA_ERR_LOG table for the HDM schema and the HDI_X_ SEED_DATA_ERR_LOG table for the HDI schema.

The following are the key columns in the error log table (HDM_X_SEED_DATA_ERR_LOG or HDI_X_SEED_DATA_ERR_LOG):

- **ERR_ID** - Unique identifier for a record in the error log table.
- **ERR_TBL_NM** - Specifies the table name for which the error record was logged. For example, for an error in the HDM code repository will have a value **HDM_CD_REPOSITORY** in this column.
- **ERR_TYP** - Indicates the type of error that is logged. There are five types of errors that can be logged. For the different types of errors, see Seed Data Error Types.
- **ERR_DESC** - A short description of the error.
- **ERR_INT_ID** - Indicates the integration ID of the record for which the error was logged. This column along with the error table name (ERR_TBL_NM) can be used to debug the error. The Integration ID for tables that are populated with seed data has the following pattern:

Table 16–2 Integration ID Pattern for Tables Populated with Seed Data

Table Name	Columns to be Concatenated to Generate the Integration ID
HDM_USER	LOGIN
HDM_CD_SYS	SYS_CD~SYS_VERSION
HDM_CD_REPOSITORY	CD~SYS_CD~SYS_VERSION
HDM_CD_TYP	TYP_CD
HDM_CD_REPOSITORY_CD_TYP	CD~SYS_CD~ SYS_VERSION~ TYP_CD

16.2.2 Seed Data Error Types

This section describes the different error types that can be logged and the resolution:

Note: In Table 16–3, non-EHA user refers to individuals using the application.

Table 16–3 Seed Data Error Types

Error Type	Description	Resolution for HDM Identification	Resolution for HDI Identification

Error Type - EHA_WARNING: Code name exists	Code name: <*CODE NAME*> exists. New Oracle seed data record inserted with same code name.	Search Code Repository for the record with the code name specified in the Error Description.
		`select * from HDM_CD_REPOSITORY where CD_NM = '<CODE NAME SPECIFIED IN THE ERROR STATEMENT>';`
		For example,
		`SQL> select * from HDM_CD_REPOSITORY where CD_NM = 'Patient Withdrew';`
			Search Code Repository for the record with the code name as specified in the Error Description.
			`select * from HDI_CD_REPOSITORY where CD_NM = '<CODE NAME SPECIFIED IN THE ERROR STATEMENT>';`
			For example,
			`SQL> select * from HDI_CD_REPOSITORY where CD_NM = 'Patient Withdrew';`

		Resolution After identifying the code name, select one of the following options: ■ Delete the conflicting seed data record inserted by the Oracle seed data procedure (identified by the EHA user) and use your own seed data. ■ Delete the data record that you have inserted which caused the code clash and instead use the Oracle seed data record.	**Resolution** After identifying the code name, select one of the following options: ■ Delete the conflicting seed data record inserted by the Oracle seed data procedure (identified by the EHA User) and use your own seed data. ■ Delete the data record that you have inserted which caused the code clash and instead use the Oracle seed data record.

Table 16–3 (Cont.) Seed Data Error Types

Error Type	Description	Resolution for HDM Identification	Resolution for HDI Identification

EHA_ERROR: Insert failed: Creation of version failed	Non-EHA user has versioned a record. Unable to create a new version of the record.	Navigate to the table identified in HDM_X_SEED_DATA_ERR_LOG.ERR_TBL_NM and use HDM_X_SEED_DATA_ERR_LOG.ERR_INT_ID to identify the error record.
		`select * from <HDM_X_SEED_DATA_ERR_LOG.ERR_TBL_NM> where INTEGRATION_ID = '<HDM_X_SEED_DATA_ERR_LOG.ERR_INT_ID>' and CURRENT_FLG='Y';`
		For example,
		`SQL> select * from HDM_CD_REPOSITORY where INTEGRATION_ID ='SPCMN_TYP_CD_IVFEHA_CUSTOM_CD_SYS1.0' and CURRENT_FLG='Y';`
			Navigate to the table identified in HDI_X_SEED_DATA_ERR_LOG.ERR_TBL_NM and use HDI_X_SEED_DATA_ERR_LOG.ERR_INT_ID to identify the error record.
			`select * from <HDI_X_SEED_DATA_ERR_LOG.ERR_TBL_NM> t1 where INT_ID = <HDI_X_SEED_DATA_ERR_LOG.ERR_INT_ID> and SRC_CHANGED_ON_DT = (select max(SRC_CHANGED_ON_DT) from <HDI_X_SEED_DATA_ERR_LOG.ERR_TBL_NM> t2 where t1.int_id = t2.int_id);`
			For example,
			`SQL> select *from HDI_CD_REPOSITORY cr1 where INT_ID ='SPCMN_TYP_CD_ IVFEHA_CUSTOM_CD_SYS1.0' and SRC_CHANGED_ON_DT = (select max(SRC_CHANGED_ON_DT) fromHDI_CD_REPOSITORY cr2 where cr1.int_id = cr2.int_id);`

		Resolution This error occurs when Oracle provided seed data was previously updated and versioned by a non-EHA user. This indicates that you have taken "ownership" of the data and any subsequent updates through the Oracle seed data process are rejected with this error message. Ignore the Oracle provided seed data.	**Resolution** This error occurs when Oracle provided seed data was previously updated and versioned by a non-EHA user. This indicates that you have taken "ownership" of the data and any subsequent updates through the Oracle seed data process are rejected with this error message. Ignore the Oracle provided seed data.

Table 16–3 (Cont.) Seed Data Error Types

Error Type	Description	Resolution for HDM Identification	Resolution for HDI Identification

EHA_ERROR: Update failed	Non-EHA user has changed the record. Unable to update the record.	Navigate to the table identified in HDM_X_SEED_DATA_ERR_LOG.ERR_TBL_NM and use HDM_X_SEED_DATA_ERR_LOG.ERR_INT_ID to identify the error record.
		`select * from <HDM_X_SEED_DATA_ERR_LOG.ERR_TBL_NM> where INTEGRATION_ ID=<HDM_X_SEED_DATA_ERR_LOG.ERR_INT_ID> and CURRENT_FLG='Y';`
		For example,
		`SQL> select *from HDM_CD_REPOSITORY where INTEGRATION_ID ='SPCMN_TYP_CD_IVFEHA_CUSTOM_CD_SYS1.0' and CURRENT_FLG='Y';`
		Resolution
		This error occurs when Oracle provided seed data has previously been updated by a non-EHA user. This indicates that you have taken "ownership" of the data and any subsequent updates through the Oracle seed data process are rejected with this error message. Ignore the Oracle provided seed data.
			This error will not occur in HDI as no updates are supported in HDI.

Table 16–3 (Cont.) Seed Data Error Types

Error Type	Description	Resolution for HDM Identification	Resolution for HDI Identification

EHA_ERROR: Insert failed: Duplicate integration ID	Non-EHA user has created a record with the same integration ID. Unable to create a new record.	Navigate to the table identified in HDM_X_SEED_DATA_ERR_LOG.ERR_TBL_NM and use HDM_X_SEED_DATA_ERR_LOG.ERR_INT_ID to identify the error record.
		`select * from <HDM_X_SEED_DATA_ERR_LOG.ERR_TBL_NM> where INTEGRATION_ID = <HDM_X_SEED_DATA_ERR_LOG.ERR_INT_ID> and CURRENT_FLG='Y';`
		For example,
		`SQL> select * from HDM_CD_REPOSITORY where INTEGRATION_ID ='SPCMN_TYP_CD_IVFEHA_CUSTOM_CD_SYS1.0' and CURRENT_FLG='Y';`
			Navigate to the table identified in HDI_X_SEED_DATA_ERR_LOG.ERR_TBL_NM and use HDI_X_SEED_DATA_ERR_LOG.ERR_INT_ID to identify the error record.
			`select * from <HDI_X_SEED_DATA_ERR_LOG.ERR_TBL_NM> t1 where INT_ID=<HDI_X_ SEED_DATA_ERR_LOG.ERR_INT_ID> and SRC_CHANGED_ON_DT=(select max(SRC_CHANGED_ON_DT) from <HDI_X_SEED_DATA_ERR_LOG.ERR_TBL_NM> t2 where t1.int_id = t2.int_id);`
			For example,
			`SQL> select * from HDI_CD_REPOSITORY cr1 where INT_ID ='SPCMN_TYP_CD_IVFEHA_CUSTOM_CD_SYS1.0' and SRC_CHANGED_ON_DT = (select max(SRC_CHANGED_ON_DT) from HDI_CD_REPOSITORY cr2 where cr1.int_id = cr2.int_id);`

		Resolution After examining the conflicting data, select one of the following options: ■ To insert Oracle seed data, modify the integration ID of the conflicting record that you have inserted and run the seed data procedure again. ■ If the Oracle supplied seed data is not required, ignore the Oracle provided seed data.	**Resolution** After examining the conflicting data, you can select one of the following options: ■ To insert Oracle seed data, modify the integration ID of the conflicting record that you have inserted and run the seed data procedure again. ■ If the Oracle supplied seed data is not required, ignore the Oracle provided seed data.
EHA_ERROR: PL/SQL_ERROR	-	Other PL SQL errors that are encountered when inserting seed data.	Other PL SQL errors that are encountered when inserting seed data.

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Data Management Assembly for Oracle Data Integrator Troubleshooting

17.1 Installation Log Files

While installing the Data Management Assembly, the installer generates the following log files. When the installer is running the python script, the execution log is redirected to the below log files:

Table 17–1 Installation Log Files

File Name	Description
installActions<timestamp>.log	Records the action of the installer and can be used to diagnose issues with the installer.
oraInstall<timestamp>.out	Records the output of SQL scripts run by the installer.
oraInstall<timestamp>.err	Records the errors from the SQL scripts run by the installer. The log files are time stamped and each installation session creates a new log file. On a Linux machine, the log files are located at **$ORACLE_BASE/oraInventory/logs**. For example, /u01/app/oraInventory/logs.
When the installer runs the `ksh` script, the execution log is redirected to the below log files:	
<INSTALL_HOME>/dma_odi_master_install/dmalogs/dma_etl_install.log	Contains a consolidated log file that is archived to **<INSTALL_ HOME>/dma_odi_master_ install/dmalogs/tmplogs/** with the time stamp for next execution of the installer. In case of restart, logs are appended to the existing dma_etl_install.log file.
<INSTALL_HOME>/dma_odi_master_ install/dmalogs/tmplogs/<script_name>.error	Contains an error file if the script is not executed successfully.
<INSTALL_HOME>/dma_odi_master_ install/dmalogs/tmplogs/<script_name>.done	Indicates that the script is executed successfully.
The installer generates the following report:	

Table 17–1 (Cont.) Installation Log Files

File Name	Description
<INSTALL_ HOME>/reports/dma_odi_ install<time_stamp>.html	Contains the installation summary of the Data Management Assembly for ODI installation.

17.2 Troubleshooting Guidelines

- The OUI installer does not fix any issues automatically. If the installation fails, you must verify and fix the issues before restarting the installer.
- You must provide unique repository schema names. The installer imports the ETL metadata into these schemas. However, upon restarting the installer for any failures, you must specify the same values that were entered for the previous execution.
- When reporting any problems that occur during installation, make sure that you include all the above log files. Check which components were installed successfully using the following query by connecting to the enterprise schema:

  ```
  Select * from W_EHA_PRODUCT_VERSION
  ```

  Send the result of the query when reporting any problems to Oracle support.

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Data Management Assembly for Informatica Troubleshooting

18.1 Installation Log Files

While installing Data Management Assembly, the installer generates the following log files. When the installer is running the python script, the execution log is redirected to the below log files:

Table 18–1 Installation Log Files

File Name	Description
installActions<timestamp>.log	Records the action of the installer and can be used to diagnose issues with the installer.
oraInstall<timestamp>.out	Records the output of SQL scripts run by the installer.
oraInstall<timestamp>.err	Records the errors from the SQL scripts run by the installer. The log files are time stamped and each installation session creates a new log file. On a Linux machine, the log files are located at **$ORACLE_BASE/oraInventory/logs**. For example, /u01/app/oraInventory/logs.
When the installer is running the `ksh` script, the execution log is redirected to the below log files:	
<INSTALL_HOME>/dma_infa_master_install/dmalogs/dma_etl_install.log	Contains a consolidated log file that is archived to **<INSTALL_HOME>/ dma_infa_master_install /dmalogs/tmplogs/** with the time stamp for next execution of the installer. In case of restart, logs are appended to the existing dma_etl_install.log file.
<INSTALL_HOME>/dma_infa_master_ install/dmalogs/tmplogs/<script_name>.error	Contains an error file if the script is not executed successfully.

Table 18–1 (Cont.) Installation Log Files

File Name	Description
<INSTALL_HOME>/dma_infa_master_install/dmalogs/tmplogs/<script_name>.done	Indicates that the script is executed successfully.
The installer generates the following reports:	
ORACLE_HOME/reports/dma_infa_install<time_stamp>.html	Contains the installation summary of the Data Management Assembly for Informatica installation.

18.2 Troubleshooting Guidelines

- The OUI installer does not fix any issues automatically. If the installation fails, you must verify and fix the issues before restarting the installer.
- You must provide unique repository schema names. The installer imports the ETL metadata into these schemas. However, upon restarting the installer for any failures, you must specify the same values that were entered for the previous execution.
- When reporting any problems that occur during installation, make sure that you include all the above log files. Check which components were installed successfully using the following query by connecting to the enterprise schema:

  ```
  Select * from W_EHA_PRODUCT_VERSION
  ```

  Send the result of the query when reporting any problems to Oracle support.

18.3 Troubleshooting

- If the installer fails while executing the python script:
  a. Review the logs.
  b. Analyze and fix the issue.
  c. Restart the installer with same installation home parameters.

  For example, if the password expiry notification is displayed, reset the password and restart the installer.
- If the installer fails while executing the `ksh` script:
  a. Review the logs.
  b. Analyze and fix the issue.
  c. Restart the installer with same installation home parameters.

  For example, if a particular directory does not have the write permission, provide the permission and restart the installer.
- To skip any execution process, create a zero byte **done** file in the temp directory using the following steps:
  a. Navigate to the following folders and select the appropriate script:

     ```
     <INSTALL_HOME>/dma_infa_master_install/dmascripts/
     ```

  b. Remove **.ksh** from the file, append **.done** to the file, and place a zero byte file in the temp log folder.

```
<INSTALL_HOME>/dma_infa_master_install/dmalogs/tmplogs
```

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Middle-Tier Troubleshooting

19.1 Installation Log Files

The installation log files are located at $**ORACLE_BASE/oraInventory/logs**. For example: /u01/app/oraInventory/logs.

When installing the OHF Middle-Tier, the installer generates the following installation log files:

Log File	Description
installActions<timestamp>.log	Records the actions of the installer and can be used to diagnose issues with the installer.
oraInstall<timestamp>.out	Records the outputs of all the scripts run by the installer.
oraInstall<timestamp>.err	Records the errors from all the scripts run by the installer.

The log files are time stamped and each installation session creates a new set of log files.

An installation summary with all the parameters provided for the installer is saved at:

<INSTALL_HOME>/reports/dps_install_<timestamp>.html

> **Note:** When reporting any problems that occur during Middle-Tier installation, make sure that you include all the above log files.

19.2 Troubleshooting the Primary Node Installation

Issue	Fix
The installer fails due to the time taken by the node manager process to start.	Check the machine network configuration to make sure that other processes are listening on same port, and that the user running the installer has the required file system permissions.

Issue	Fix
The AdminServer fails to start because the node manager process is not available.	Verify if the node manager process is still running.
A wrong database configuration is provided.	Modify the database configuration from the WebLogic Admin console.

19.3 Troubleshooting the Secondary Node Installation

Issue	Fix
The installer fails to connect to the AdminServer	Verify if the AdminServer is running on the primary node by accessing the WebLogic Admin console from the secondary node.
The installer fails due to a wrong FMW path.	Make sure WebLogic is installed in the same file system location as on the primary node.

19.4 Troubleshooting Coherence Cluster Errors

Sometimes, a primary or secondary node may not start due to one of the following errors in the weblogic log files:

- `<Warning> (thread=Cluster, member=n/a): Received a discovery message that indicates the presence of an existing cluster that does not respond to join requests; this is usually caused by a network layer failure.`
- `<Warning> (thread=Cluster, member=n/a): Delaying formation of a new cluster; IpMonitor failed to verify the reachability of senior Member…`
  `…`
  `If this persists it is likely the result of a local or remote firewall rule blocking either ICMP pings, or connections to TCP port 7.`

To overcome these errors, make sure that the DNS resolutions for the primary and secondary node machines lead to the same IP address when you ping the machines from the local system or from other systems.

A

Configuration Guide for Exadata

This guide describes the Exadata configuration for Oracle Healthcare Foundation. It contains minimum parameter requirements for a large deployment of about 10 million patients.

The contents of this guide apply only to the Oracle Healthcare Foundation ETL platform and does not consider any application stack.

This guide contains the following sections:

- System Configuration
- Application Considerations

A.1 System Configuration

- Exadata Component Configuration
- Database Configuration

A.1.1 Exadata Component Configuration

Table A–1 Exadata Components and Configuration

Component	Configuration
Exa check	Run the Exachk utility and verify the adherence to the recommended Exadata best practices. For more information, see article ID 1070954.1 on My Oracle Support (https://support.oracle.com).
RAC	Use defaults and native load balance.
High performance disks	We recommend 15000 revolutions per minute (RPM) high performance disks.

A.1.2 Database Configuration

A.1.2.1 Database I/O Calibration

Run the I/O calibration tool for each database to set the automatic degree of parallelism.

For more information on I/O calibration and automatic degree of parallelism, see article IDs 727062.1 and 1269321.1 on My Oracle Support (https://support.oracle.com).

A.1.2.2 Resource Manager

Use the Oracle Resource Manager to manage and prioritize the resource allocation for different applications, databases, instances, users, and so on.

For more information, see article ID 1339769.1 on My Oracle Support (https://support.oracle.com) and the White Paper *Using Oracle Database Resource Manager* at *http://www.oracle.com/technetwork/database/database-technologies/performance/resource-manager-twp-133705.pdf*.

A.1.2.3 Database Parameters

Table A–2 Recommended Settings for Database Parameters

Database Parameter	Recommended Settings
processes	1500
parallel_max_servers	500-1280
parallel_min_servers	128
parallel_degree_policy	LIMITED
parallel_adaptive_multi_user	TRUE
parallel_degree_limit	CPU
parallel_force_local	TRUE
sga_target	40 GB
sga_max_size	40 GB
pga_aggregate_target	If HugePages is used, set this parameter to 20 GB. Else, set it to 12 GB.
memory_target	If HugePages is used, set this parameter to 0. Else, set it to 60 GB.
memory_max_target	If HugePages is used, set this parameter to 0. Else, set it to 60 GB.
db_block_size	8192
workarea_size_policy	AUTO
db_cache_size	2 GB
shared_pool_size	2 GB
optimizer_features_enable	See Optimizer Features Enable
optimizer_secure_view_merging	False
_px_join_skew_handling	FALSE
result size max	0
_optimizer_dsdir_usage_control	0

A.1.2.4 Parallel Degree Policy

Set the parallel_degree_policy parameter to LIMITED to use the automatic degree of parallelism and smart scans.

- The Omics Data Bank (ODB) application uses Exadata SQL processing innovations. Setting this parameter to LIMITED, disables the in-memory parallel execution that leads to better use of smart scans.
- Statement queuing is disabled to avoid any waits under heavy load where there are chances of draining all PX servers thereby impacting response times.

A.1.2.4.1 Parallel Degree Limit

Set the parallel_degree_limit parameter to CPU or below to improve the response time. A resource-intensive query may request too many PX servers, draining available resources. Use the Resource Manager to limit the resource allocation to intensive or long running processes.

A.1.2.4.2 Adaptive Tuning

Set the parallel_adaptive_multi_user parameter to TRUE, which lets Oracle downgrade PX requests under stress. You should not over-burden the database CPUs by allocating all requested PX servers, especially when the database nodes are running at over 80% CPU load.

Alternatively, you can use the Resource Manager to control resources.

A.1.2.4.3 Parallel Max Servers

Set the parallel_max_servers parameter between 500-1280 to make sure that there are enough PX server processes to allocate to concurrent user requests. In benchmark tests, this was set to 512.

A.1.2.4.4 Parallel Min Servers

Set the parallel_min_servers parameter to CPU to ensure the availability of a specific number of PX server processes at startup.

A.1.2.4.5 Memory Settings

Set the Automatic Memory Management (AMM) using the memory_target parameter to 60 GB.

Also, you have to set the Program Global Area (PGA) (pga_aggregate_target parameter) to a minimum of 20/10 GB depending upon whether Hugepages is used and the System Global Area (SGA) (sga_max_size parameter) to a minimum of 40 GB.

Note: If you use HugePages, set all DB memory parameters appropriately as AMM does not work with HugePages. If you encounter any shared pool issues with HugePages, switch to alternate recommended settings.

A.1.2.4.6 Optimizer Features Enable

Although Oracle Healthcare Foundation is benchmarked with 12.2.0.1, we recommend you to upgrade to the latest version of the optimizer when it is available.

If the SQL execution plans are not optimized in the later version, consider using the 12.2.0.1 optimizer.

A.1.2.4.7 Processes

Set the processes parameter to a sizeable number based on the expected concurrency. The minimum value should be 1024. In internal benchmarks, it was set to 2000 based on concurrent loads.

A.1.2.5 Oracle Automatic Stats Job

Disable the Oracle Automatic Stats job if it is configured.

Automatic statistics scheduler jobs run under different maintenance windows (such as daily, weekly, and so on). This may potentially generate bad statistics due to data availability (for example, the application may have transient data or no data in stage tables).

A.1.2.6 Tablespace and Redo Log Recommendations

Table A–3 Tablespace Recommendations

Tablespace	Recommended
TEMP	500 GB across all nodes.
UNDO	500 GB per instance.

Note: Use the BigFile tablespace for TEMP, UNDO, and user (HDI, HDM, and HCD) tablespaces to ease tablespace maintenance.

Configure the redo logs to have at least five groups per instance with each member having a size of 500 MB or higher.

A.1.2.7 ASM Recommendations

Redundancy - Oracle uses NORMAL redundancy for all benchmarks. You can use HIGH redundancy as per the data mirroring requirements. However, note that the usable storage is lower when using ASM with HIGH redundancy disk groups.

ASM AU Size - We recommend you to use the default setting for the disk sequential reads.

A.1.2.8 Maximum Availability Recommendations

You may want to consider the recommendations in the White Paper *Best Practices for Database Consolidation on Exadata Database Machine* at *http://www.oracle.com/technetwork/database/features/availability/exadata-consolidation-522500.pdf*.

A.2 Application Considerations

A.2.1 General Recommendations

- Oracle Table or Schema Statistics:

Configure the scheduled jobs to collect the Oracle statistics using the following method. This should be configured after the initial load is complete.

```
exec dbms_stats.gather_schema_stats (ownname=> '<OWNER>', method_ opt=>
'for all columns size auto', estimate_percent=> dbms_ stats.auto_
sample_ size, cascade=>true, block_sample => true, options => 'GATHER
STALE')
```

- Data files or flat files (for example, ODB result and reference data files) should be staged on Database File System (DBFS) as the Oracle DB provides much better security, availability, robustness, transactions, and scalability than the traditional file systems. For setting up DBFS, see article ID 1954431.1 on My Oracle Support (https://support.oracle.com).

A.2.2 Oracle Healthcare Foundation

- See Data Model Installation for Exadata-specific configurable compression options and index reduction notes.
- If advanced compression is used during installation (for certain business cases), you may still want to consider HCC compression for cold (least DML activity) or old table partitions. Use the following method to implement HCC and for better compression ratios for cold or old table partitions:
  - **a.** Perform annual or biannual maintenance to change the table partition compression mode to HCC Query High.
  - **b.** Rebuild the table partitions using the `alter table .. move ..` SQL command.

    Rebuilding all the unique and non-unique indexes on these tables is necessary as the table or partition rebuild invalidates index structure. See *Oracle Healthcare Foundation Administrator's Guide* (`hdm_hcc_maintenance_exadata.sql`)to change the compression for partitioned tables to hybrid columnar compression (QUERY HIGH).
- Oracle Table or Schema Statistics:

  HDI source tables should have proper table statistics before the initial load. See *Oracle Healthcare Foundation Administrator's Guide* for details on gathering statistics and for ETL specific recommendations regarding parallel options.
- Oracle Healthcare Foundation Data loads:
  - When you load HDI data, make sure that you load data using the direct path insert to obtain a high compression ratio. For more information about improving INSERT performance with Direct-Path INSERT, see the *Oracle Database Administrator Guide*, and implement accordingly for your ETL loads to HDI.
  - If direct path insert is not possible due to code or ETL limitations, rebuild the tables or partitions using the `alter table .. move ..` SQL command (indexes on these tables should be rebuilt) to achieve better compression. However, this leads to regular maintenance of these tables to achieve maximum compression. Oracle recommends you to create scripts or ETL to support direct path insert rather than resorting to regular maintenance. For more details, see *Oracle Healthcare Foundation Programmer's Guide*.

A.2.3 Cohort Data Model

See *Oracle Health Sciences Translational Research Center Installation Guide* for Exadata specific configurable partitioning and parallel options.

A.2.4 Omics Loaders

- Run the result files in parallel to achieve maximum performance.

  Note: You can execute maximum 4gVCF loaders on a single Exa node.

- For better storage savings, load more than 60 samples or 200 million rows per result table. Small sample sets may not compress up to 90%. Run the post processing script, `load_exadata.sh`, at the end of the day after loading a minimum of 60 samples or more than 200 million rows for high compression using HCC.
- See Data Model Installation for Exadata specific configurable partitioning and parallel options.

B

Configuration Guide for Non-Exadata

This guide details the Non-Exadata configuration for the Oracle Healthcare Foundation. It contains minimum parameter requirements for a medium deployment (about 3 million patients).

The contents of this guide apply only to the Oracle Healthcare Foundation ETL platform and does not consider any application stack.

This guide contains the following sections:

- Database Configuration
- Application Considerations

B.1 Database Configuration

B.1.1 Database I/O Calibration

Run the I/O calibration tool for each database to set the automatic degree of parallelism.

For more information on I/O calibration and automatic degree of parallelism, see article IDs 727062.1 and 1269321.1 on My Oracle Support (https://support.oracle.com).

B.1.2 Resource Manager

Use the Oracle Resource Manager to manage and prioritize the resource allocation for different applications, databases, instances, users, and so on.

For more information, see article ID 1339769.1 on My Oracle Support (https://support.oracle.com) and the White Paper *Using Oracle Database Resource Manager* at *http://www.oracle.com/technetwork/database/database-technologies/performance/resource-manager-twp-133705.pdf*.

B.1.3 Database Parameters

Table B–1 Recommended Settings for Database Parameters

Database Parameter	Recommended Settings
processes	2000

Table B–1 (Cont.) Recommended Settings for Database Parameters

Database Parameter	Recommended Settings
parallel_max_servers	384
parallel_min_servers	32
parallel_degree_policy	LIMITED
parallel_adaptive_multi_user	TRUE
parallel_degree_limit	16
parallel_force_local	TRUE
sga_target	20 GB
sga_max_size	20 GB
pga_aggregate_target	If HugePages is used, set this parameter to 20 GB. Else, set it to 10 GB.
memory_target	If HugePages is used, set this parameter to 0. Else, set it to 40 GB.
memory_max_target	If HugePages is used, set this parameter to 0. Else, set it to 60 GB.
db_block_size	8000
workarea_size_policy	AUTO
db_cache_size	2 GB
shared_pool_size	2 GB
optimizer_features_enable	See Optimizer Features Enable
optimizer_secure_view_merging	FALSE
_px_join_skew_handling	FALSE
result size max	0
_optimizer_dsdir_usage_control	0

B.1.4 Parallel Degree Policy

Set the parallel_degree_policy parameter to LIMITED to use the automatic degree of parallelism.

Statement queuing is disabled to avoid any waits under heavy load where there are chances of draining all PX servers, thereby impacting response times.

B.1.4.1 Parallel Degree Limit

Set the parallel_degree_limit parameter to 16 or below to improve the response time. A resource intensive query may request too many PX servers, draining available resources. Use the Resource Manager to limit the resource allocation to intensive or long running processes.

B.1.4.2 Adaptive Tuning

Set the parallel_adaptive_multi_user parameter to TRUE, which lets Oracle downgrade PX requests under stress. You should not over-burden the database (DB)

CPUs by allocating all requested PX servers, especially when the DB nodes are running over 80% CPU consumption.

Alternatively, you can use the Resource Manager to control resources.

B.1.4.3 Parallel Max Servers

Set the parallel_max_servers parameter to 384 or less to make sure that there are enough PX server processes to allocate to concurrent user requests.

B.1.4.4 Parallel Min Servers

Set the parallel_min_servers parameter to 32 to ensure the availability of a specific number of PX server processes at startup.

B.1.4.5 Memory Settings

Set the Automatic Memory Management (AMM) using the memory_target parameter to 40 GB.

You should also set the Program Global Area (PGA) (pga_aggregate_target parameter) to a minimum of 20/10 GB depending on whether Hugepages is used and the System Global Area (SGA) (sga_max_size parameter) to a minimum of 20 GB.

> **Note:** If you use HugePages, set all DB memory parameters appropriately as AMM does not work with HugePages. If you encounter any shared pool issues with HugePages, switch to alternate recommended settings.

B.1.4.6 Optimizer Features Enable

Although Oracle Healthcare Foundation is benchmarked with 12.2.0.1, Oracle recommends you to upgrade to the latest version of the optimizer when it is available.

If the SQL execution plans are not optimized in the later version, consider using the 12.2.0.1 optimizer.

B.1.4.7 Processes

Set the processes parameter to a sizeable number based on the expected concurrency. In internal benchmarks, it was set to 2000 based on concurrent loads.

B.1.5 Oracle Automatic Stats Job

Disable Oracle Automatic Stats Job if it is configured.

Automatic statistics scheduler jobs run under different maintenance windows (such as daily, weekly, and so on). This may potentially generate bad statistics due to data availability (for example, an application may have transient data or no data in stage tables).

B.1.6 Tablespace and Redo Log Recommendations

Table B–2 Tablespace Size Recommendations

Tablespace	Recommended Size
TEMP	500 GB across all nodes.

Table B–2 (Cont.) Tablespace Size Recommendations

Tablespace	Recommended Size
UNDO	500 GB per instance.

Note: Use the BigFile tablespace for TEMP, UNDO, and user (HDI, HDM, and HCD) tablespaces to ease tablespace maintenance.

Configure the redo logs to have at least five groups per instance with each member having a size of 500 MB or higher.

B.1.7 ASM Recommendations

Redundancy - Oracle uses NORMAL redundancy for all benchmarks. You can use HIGH redundancy as per the data mirroring requirements. However, note that the usable storage is lower when using ASM with HIGH redundancy disk groups.

ASM AU Size - We recommend you to use the default setting for the disk sequential reads.

B.2 Application Considerations

- General Recommendations
- Oracle Healthcare Foundation
- Cohort Data Model
- Omics Loaders

B.2.1 General Recommendations

- Oracle Table or Schema Statistics:

  Configure the scheduled jobs to collect the Oracle statistics using the following method. This should be configured after the initial load is complete.

  ```
  exec dbms_stats.gather_schema_stats (ownname=> '<OWNER>', method_ opt=>
  'for all columns size auto', estimate_percent=> dbms_ stats.auto_
  sample_ size, cascade=>true, block_sample => true, options => 'GATHER
  STALE')
  ```

- Data files or flat files (for example, ODB result and reference data files) should be staged on Database File System (DBFS) as the Oracle DB provides much better security, availability, robustness, transactions, and scalability than the traditional file systems. For setting up DBFS, see article ID 1054431.1 on My Oracle Support (https://support.oracle.com).

B.2.2 Oracle Healthcare Foundation

Oracle Table or Schema Statistics:

HDI source tables should have proper table statistics before the initial load. See *Oracle Healthcare Foundation Administrator's Guide* for ETL specific recommendations regarding parallel options.

B.2.3 Cohort Data Model

See *Oracle Health Sciences Translational Research Center Installation Guide* for Non-Exadata specific configurable partitioning and parallel options.

B.2.4 Omics Loaders

- Run the result files in parallel to achieve maximum performance.
- For the better storage savings, load more than 60 samples or 200 million rows per result table. Small sample sets may not compress up to 90%. Run the post processing script, `load_exadata.sh`, at the end of the day after loading minimum 60 samples or more than 200 million rows for high compression using HCC.
- See Data Model Installation for Non-Exadata specific configurable partitioning and parallel options.