Oracle® Healthcare Translational Research

Installation Guide

Release 4.1

ORACLE®

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Preface

This preface contains the following sections:

- Documentation accessibility
- Access to Oracle Support

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.

1

Installation Overview

This chapter describes the Oracle Healthcare Translational Research (OHTR) installation requirements. It contains the following topics:

- Supported platforms
- Supported browsers
- Technology stack
- Before you begin

Supported platforms

The following platforms are supported.

- **Database Tier**: Oracle Healthcare Translational Research supports all platforms supported for the Oracle Healthcare Foundation database, and the Oracle Healthcare Translational Research database tier should be installed on the Oracle Healthcare Foundation database.

- **Middle Tier**: Oracle Healthcare Translational Research supports all platforms supported for the Oracle Healthcare Foundation middle tier.

Supported browsers

Oracle Healthcare Translational Research supports browsers supported by the ADF framework:

- Windows Internet Explorer IE 11 or later
- Mozilla Firefox v17 or later
- Google Chrome

> **Note:**
>
> To ensure the best performance when using Oracle Healthcare Translational Research, use Mozilla Firefox as your browser.

> **✎ Note:**
>
> Internet Explorer, Edge, and the Google Chrome browser on Windows10 touch-screen laptops displays some issues with the Oracle Healthcare Translational Research application such as on the dragging of the attributes and UI elements. There is a patch for WebLogic that can be installed to resolve this issue.
>
> For more information about this patch: https://support.oracle.com/epmos/faces/DocumentDisplay?id=2394229.1

Oracle Healthcare Translational Research Next Gen supports browsers supported by Oracle JET (OJET).

Technology stack

The required technology stack for Oracle Healthcare Translational Research should contain:

- Oracle Healthcare Foundation; for release information see Before you begin.
- Oracle Analytics Server (OBIEE) 12.2.1.4
- Oracle Application Development Framework (ADF) Runtime 12.2.1.4
- Oracle Database 19c, Version 19.3 or Oracle Database 12 c, Release 2 with a cumulative database patch from Oct 2019 or later
- Oracle WebLogic Server 12.2.1.4
- Java Development Kit (JDK) 1.8
- Python 2.X (2.6 or higher). Python 3.X is not compatible.

Before you begin

If the Self Service Analytics are required, remember to create a separate middleware home with Oracle WebLogic Server 12.2.1.4 for Oracle Analytics Server.

If everything is in order and Oracle Healthcare Foundation 8.1.1 is installed, you can move on to installing or upgrading to Oracle Healthcare Translational Research 4.1.

Go to the Oracle Help Center to see more details on the Oracle Healthcare Foundation installation process

- For details on how to install Oracle Healthcare Foundation 8.1.1, see the Oracle Healthcare Foundation*Installation Guide*, on the Oracle Help Center. Note that to upgrade to Oracle Healthcare Foundation version 8.1.1 requires that you upgrade from version 8.1.
- For details on how to properly install Oracle Analytics Server 12.2.1.4, and create a separate middleware home with Oracle WebLogic Server, see the Oracle Fusion Middleware *Installation Guide* for Oracle Analytics on the Oracle Help Center.

2

Install the Database Tier

This chapter describes security considerations and the installation process for the database tier. You will learn how to:

- Check prerequisites
- Prepare to run the installer
- Install the Database Tier
- Upgrade the Database Tier

Check prerequisites

Install or upgrade the Oracle Healthcare Foundation (OHF) database tier to the release required for the Oracle Healthcare Translational Research release you are installing or upgrading to. See the release notes for more information.

Install the latest RDBMS patch set onto the Oracle Healthcare Foundation database before installing the Oracle Healthcare Translational Research database tier. The minimal recommended patch set is Database Patch 30116802 - GI Oct 2019 Release Update 12.2.0.1.191015.

The installation environment can be either:

- the database server (Exadata computing node) where the Oracle Healthcare Foundation database is installed
- a stand-alone Linux server that has the following additional software available:
  - Python 2x (2.6.6 or later)
  - Oracle 12c client with net services configured to access the Oracle Healthcare Foundation database

The following five database schemas are required by the Oracle Healthcare Translational Research application. They are installed during the Oracle Healthcare Foundation database installation. Each schema and tablespace may have the default name or a name provided during Oracle Healthcare Foundation installation. Note these details, which you will need when you run the Oracle Healthcare Translational Research Installer.

- CDM - Cohort Data Mart (CDM) schema stores the clinical information that is refreshed by ETLs.
- ODB - Omics Data Bank (ODB) schema stores the omics data linked to patients as well as genetic reference data to link.
- SVC - Services schema is used by ODB loader APIs.
- ENT - The Enterprise (ENT) schema stores system-wide configuration information like product version.
- JOB_ENGINE - Job Engine (JOB) schema tracks all jobs executed and provides templates for jobs.

Two additional database schemas, APP and DATA_STUDIO, are required by Oracle Healthcare Translational Research. The APP schema stores metadata information used in the user interface. The DATA_STUDIO schema stores metadata for Oracle Healthcare Translational Research notebooks. If desired, these schemas and their associated tablespaces can be created earlier in the Oracle Healthcare Foundation database by a DBA. If either of these schemas exist, the Oracle Healthcare Translational Research installer uses it to store the application. Otherwise, it creates the tablespaces and schemas first.

Prepare to run the installer

1. Download the Oracle Healthcare Translational Research installation package from the Media Pack and extract the files into a directory on the installation server.

2. Go to the *<media_pack_location>*/folder.

3. Using the following command, unzip the `OHTR_Linux-x64.zip` file to the folder where you want to launch the installer:

```
unzip -a OHTR_Linux-x64.zip
```

4. Go to the `Disk1/install` folder.

5. Change the protection on files using the following command:

```
chmod 755 *
```

Install the Database Tier

> **Note:**
>
> Ensure that all prerequisites (Check prerequisites) have been fulfilled.

To install the Oracle Healthcare Translational Research database framework:

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

   - If the database server is on the machine where the Installer is running, execute: `sh runInstaller.sh`

   - If the database server is on a different machine, execute: `sh runInstaller.sh remote_installation=true`

   - If you are executing the Installer on Linux, change the directory to `Disk1/install` and run the following command:

     ```
     bash$  chmod +x unzip runInstaller runInstaller.sh
     ```

   If the schema name provided here already exists in the Oracle Healthcare Foundation database, then that schema is used to install Oracle Healthcare Translational Research objects. If it does not exist, the schema is created.

   While creating the Oracle Healthcare Translational Research application schema, the Installer prompts for the default and temporary tablespaces for this user. If

these tablespaces already exist, they are assigned to the user and quota unlimited is granted on them. Otherwise these tablespaces are created with the datafile located in the user-supplied file destinations:

Database Schema	Default Tablespace	Temporary Tablespace
APP	APP_DATA	TRC_TEMP_TS
DATA_STUDIO	DS_DATA	TRC_TEMP_TS

2. The Welcome screen appears. Click **Next**.

3. In the Select a Product to Install screen, select the **Oracle Healthcare Translational Research DB Tier 4.1** option, and click **Next**.

4. In the Specify Home Details screen, enter the installation home name and location, and click **Next**.

5. In the Verify Installation Prerequisites screen, verify if all the prerequisites are met before proceeding. Click **Next**.

6. In the Oracle Client Home Configuration screen, specify the Oracle client home path. The installer validates this path. Click **Next**.

7. In the Enter DB Connection details screen, enter values for the following fields and click **Next**:

   • **Hostname**: by default, the system host name appears.

   • **Port**: by default, the port number is 1521. You can edit this field if required.

   • **Service name**

   • **System user password**

   • **Sys user password**

8. In the Enter OHF Schema Details screen, enter values for the following fields and click **Next**:

   > **Note:**
   >
   > Make sure that the user names and passwords are not the same for all entered schemas.

   • Omics data bank schema name

   • Omics data bank schema password

   • Common data mart schema name

   • Common data mart schema password

   • Enterprise schema name

   • Enterprise schema password

   • Job Engine schema name

   • Job Engine schema password

9. In the Enter OHF Schema Details screen, enter values for the following fields and click **Next**.

- • Services schema name

- • Services schema password

10. In the Enter Schema Details screen, enter values for the following fields and click **Next**.

    - • OHTR application schema name

    - • OHTR application schema password

11. In the Specify Tablespace details screen, enter values for the following fields and click **Next**.

    - • Default tablespace for APP schema

    - • Temp tablespace for APP schema

12. In the Database Verification screen, verify all the details.

    - • Click **Back** to make any changes.

    - • After verifying that all details are correct, click **Next**.

13. In the Verify Configuration Parameters screen, verify all the details.

    - • Click **Back** to make any changes.

    - • After verifying that all details are correct, click **Next**.

14. In the Summary screen, take one last look at the details. If everything is alright, click **Install**.

15. When the installation is complete, the End of Installation screen appears. Review the information and click **Exit**.

16. At the confirmation prompt, click **Yes** to exit the Installer.

17. Review the generated installation log files for errors. If necessary, contact Oracle support to fix any errors.

Upgrade the Database Tier

For upgrading the Database Tier, follow the same steps as in section Install the Database Tier, except for step 11.

For an upgrade, in the Enter Schema details screen, if you use existing APP schema values, you will no longer go through the Specify Tablespace details screen that is mentioned in step 11.

3

Install and configure the Middle Tier

The Oracle Healthcare Translational Research Middle Tier Installer installs the Oracle Healthcare Translational Research and Oracle Healthcare Translational Research Next Gen user interface application along with the application roles in the Oracle WebLogic Server.

This chapter describes the installation and configuration steps for the middle tier. In it you will find out how to:

- Check prerequisites
- Prepare to run the installer
- Run the installer
- Check the log files
- Upgrade the Middle Tier
- Browse these frequently asked questions (FAQs)
- Update the TRC.properties file
- Support for OHF and OHTR on Oracle Cloud Infrastructure using a PAAS model
  This topic outlines how Oracle Healthcare Foundation (OHF) and Oracle Healthcare Translational Research (OHTR) are supported on Oracle Cloud Infrustructure (OCI) using a PAAS model.
- Uninstall the Oracle Healthcare Translational Research Middle Tier if needed

Check prerequisites

Make sure that:

- Oracle WebLogic Server is installed on the machine.
- Oracle Healthcare Foundation Data Model schemas are installed using the Oracle Healthcare Foundation Data Tier installer.
- The Oracle Healthcare Foundation Middle Tier is created using the Oracle Healthcare Foundation Middle Tier installer and oh_domain is present in Oracle WebLogic Server.
- Oracle Healthcare Translational Research Data model schemas are installed using the Oracle Healthcare Translational Research Data Tier installer.

Prepare to run the installer

1. Extract the contents of the Oracle Healthcare Translational Research media pack to your system.
2. Open the *<media_pack_location>*/folder.

3. Execute the following command to unzip the TRC Installer and extract its contents to the location where you want to launch the installer.

```
unzip -a <TRC_installer_file>.zip
```

4. Open the `Disk1/install` folder.

5. Change the protection on files as follows:

```
chmod 755 *
```

Run the installer

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

```
./runInstaller
```

The Welcome screen appears. Click **Next**.

2. In the Specify Inventory directory and Credentials screen, enter the path of the inventory directory and click **Next**.

> **Note:**
>
> This screen is displayed only if the Inventory Location has not already been set up through the Installer.

3. In the Select a Product to Install screen, select **Oracle Healthcare Translational Research Middle Tier 4.1** and click **Next**.

4. In the Specify Home Details screen, enter the location where you want to install the product. and click **Next**.

5. In the Install Type screen, select one and click **Next**:

   • **Yes** to perform a fresh installation.

   • **No** to upgrade your existing Oracle Healthcare Translational Research installation.

6. In the Verify Install Prerequisites screen, verify that all prerequisites have been completed and click **Next**.

7. **(Fresh installation only)** In the Java Home screen, specify the path where JDK has been installed. The Installer validates this path. Click **Next**.

8. In the Fusion Middleware Home screen, enter the path to the WebLogic middleware home. The Installer validates the path. Click **Next**.

9. In the AdminServer Configuration screen, enter the following details and click **Next**:

   • Listen Address

   • Listen Port

   • SSL Lister Port

   • Username - WebLogic administrator username

- • Password - WebLogic administrator password

- • Verify password: Enter the WebLogic administrator password again.

- • Managed Server Port: Enter the managed server port. If there is more than one in the cluster, enter one of them.

10. In the NodeManager Configuration screen, enter the following details and click **Next**:

- • NodeManager User Name

- • NodeManager Password

- • NodeManager Port Number

11. (Fresh installation only) In the OHTR Schema Details screen, enter the following details and click **Next**:

- • Database host name

- • Database port

- • Service name

- • Cohort Explorer application (Apps) schema name

- • Cohort Explorer application (Apps) schema password

- • Data Studio application schema name

- • Data Studio application schema password

12. In the Choose Network Proxy Configuration screen, select one and click **Next**:

- • **Yes** to continue with network configuration.

- • **No** if you do not want to configure the network at this time.

13. In the Network Proxy Configuration screen, enter the following details and click **Next**:

- • HTTPS proxy host

- • HTTPS proxy port

14. In the OHTR Configurations screen, select one and click **Next**:

- • **Yes** to continue with Oracle Healthcare Translational Research configuration.

- • **No** if you do not want to configure Oracle Healthcare Translational Research at this time.

15. In the Summary screen, verify all of the details.

- • Click **Back** to make any changes.

- • If all details are correct, click **Install**.

16. When the installation is complete, the End of Installation screen appears. At the confirmation prompt, click **Yes** to exit the Installer.

Check the log files

The installation log files are located at `$ORACLE_BASE/oraInventory/logs`. For example, `/u01/app/oraInventory/logs`. The log files are time stamped and each installation session creates a new set of log files. The following installation log files are generated while installing the Oracle Healthcare Translational Research middle tier:

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

If necessary, contact Oracle Support to resolve any errors. While reporting any problems that occur during middle tier installation, make sure that you include all the above log files.

Upgrade the Middle Tier

> **Note:**
>
> Because this version of Oracle Healthcare Translational Research 4.1 requires Oracle WebLogic Server infrastructure 12.2.1.4, the upgrade path from the previous versions of Oracle Healthcare Translational Research is not supported. Instead, you should choose the fresh install option of Oracle Healthcare Translational Research.

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

   ```
   ./runInstaller
   ```

   The Welcome screen appears. Click **Next**.

2. In the Specify Inventory directory and credentials screen, enter the path of the inventory directory and click **Next**.

   > **Note:**
   >
   > This screen is displayed only if the Inventory Location has not already been set up through the Installer.

3. In the Select a Product to Install screen, select **Oracle Healthcare Translational Research Middle Tier 4.1** and click **Next**.

4. In the Specify Home Details screen, enter the location where you want to install the product. and click **Next**.

> **✏ Note:**
>
> For an upgrade choose the same Oracle Healthcare Translational Research Home path that you used for a fresh installation. This preserves any configurations that were made to the `trc.properties` file.

5.   In the Choose Install Type screen, select **No** to upgrade your existing Oracle Healthcare Translational Research installation, and click **Next**.

6.   In the Verify Upgrade Prerequisites screen, verify that all prerequisites have been completed and click **Next**.

7.   In the Oracle Fusion Middleware Home screen, enter the path to the WebLogic middleware home. The Installer validates the path. Click **Next**.

8.   In the AdminServer Configuration screen, enter the following details and click **Next**:

   •   Listen Address

   •   Listen Port

   •   SSL Lister Port

   •   Username - Oracle WebLogic Server administrator username

   •   Password - Oracle WebLogic Server administrator password

   •   Verify password: Enter the Oracle WebLogic Server administrator password again.

9.   In the NodeManager Configuration screen, enter the following details and click **Next**:

   •   NodeManager User Name

   •   NodeManager Password

   •   NodeManager Port Number

10.   In the Network Proxy Configuration screen, select one and click **Next**:

   •   **Yes** to continue with network configuration.

   •   **No**, if you do not want to configure the network at this time.

11.   In the next Network Proxy Configuration screen, enter the following details and click **Next**:

   •   HTTPS proxy host

   •   HTTPS proxy port

   For an upgrade, the values you enter overwrite the values provided during the previous installation.

12.   In the OHTR Configurations screen, select one and click **Next**:

   •   **Yes** to continue with Oracle Healthcare Translational Research configuration.

   •   **No** if you do not want to configure Oracle Healthcare Translational Research at this time. **For an upgrade, if you choose No, the values provided during the previous installation are preserved.**

13.   In the Summary screen, verify all the details.

   •   Click **Back** to make any changes.

   •   If all details are correct, click **Install**.

14. When the upgrade is complete, the End of Installation screen appears. At the confirmation prompt, click **Yes** to exit the Installer.

Browse these frequently asked questions (FAQs)

How can I prevent wrapping of data type objects?
The MT installer performs the steps to prevent wrapping data type installers. To verify this configuration:

1. Log into the Administration Console.

2. In the Domain Structure tree, select **Services** > **Data Sources**.

3. On the Summary of Data Sources page, click **OH-TRC-DS**.

4. Select the **Connection Pool** tab.

5. Scroll down and click **Advanced** to show the advanced connection pool options.

6. Verify if **Wrap Data Types** check box is not selected.

Why is the application running out of connections?

- This issue can be resolved by increasing the number of connections as mentioned below.

- Better performance can be achieved by modifying the following attributes:

  - **Initial Capacity**

  - **Maximum Capacity**: Maximum number of connections depends on the number of users. For example, if there are10 users the suggested number of connections should always be multiplied by 10 (that is, 10 *10 = 100).

  - **Capacity Increment**: This value depends upon the multiplication factor being used to calculate maximum capacity (as per above scenario, it is 10).

For more information, see **Tuning Data Source Connection Pools** available at https://docs.oracle.com/middleware/12212/wls/JDBCA/ jdbc_datasources.htm#JDBCA712

How can I increase the connection pool size?
Perform the following steps to increase the connection pool size:

1. Log into the Oracle WebLogic Server console.

2. Go to **Services** > **Data Sources**.

3. Click the data source for which you want to increase the connection pool size.

4. Go to the **Connection Pool** tab.

5. Specify the number of connections in the attribute **Maximum Capacity**. Oracle recommends that you set this to at least 100.

6. For details on this configuration, click **More Info…** right across this attribute.

How can I increase the default row fetch size?
For better performance, increase the default row fetch size to 100 for the Oracle Healthcare Translational Research data source.

1. Log into the Oracle WebLogic Server console.

2. Go to **Services** > **Data Sources** under oh_domain.

3. Select the data source **OH-TRC-DS**.

4. Go to **Configuration** > **Connection pool**.

5. Edit the property field `oracle.jdbc.defaultRowPrefetch` as shown in the following example:

```
user=app
oracle.jdbc.defaultRowPrefetch=100
```

How can I increase the Heap Size?

To optimize performance, Oracle recommends that you update the heap memory of the Oracle WebLogic Server with the following values:

- **Exadata**

  Initial Heap Size: 8 GB or higher

  Max Heap Size: 32 GB or higher

- **Non-Exadata**

  Initial Heap Size: 4 GB or higher

  Max Heap Size: 32 GB or higher

There are different ways to increase the heap memory. For example, to change the Java Heap size for a managed server:

1. If you have not already done so, in the Change Center of the Administration Console, click **Lock & Edit**.

2. In the left pane of the console, expand **Environment** > **Servers**.

3. In the **Servers** table, click the managed server where Oracle Healthcare Translational Research is deployed to configure.

4. On the **Configuration** tab, click **Server Start**.

5. In the **Arguments** field, specify the Java option to increase the initial and maximum heap size.

   For example,

   ```
   -Xms8G -Xmx16G, for Exadata
   -Xms4G -Xmx8G, for Non-Exadata
   ```

6. Click **Save**.

7. To activate these changes, in the Change Center of the Administration Console, click **Activate Changes**. Not all changes take effect immediately—some require a restart.

8. After you finish, you must restart the managed server, so it uses the new heap values.

Update the TRC.properties file

The `TRC.properties` file contains configurable values used in the user interface of the Oracle Healthcare Translational Research application. The `TRC.properties` file is uploaded in the root directory of the Oracle WebLogic Server (*<FMW_HOME>*/ `user_projects/domains/oh_domain`, where *FMW_HOME* is the home directory of Oracle Fusion Middleware).

Following are descriptions of the file properties.

Table 3-1   Properties in `TRC.properties` File

Property	User Interface	Description
SF_HOME	View Record	This corresponds to the location of the file system where the result files are stored. This should correspond to TRC_ODB_PERM Oracle directory object used when loading result files into the ODB schema. This location must have the necessary permissions to ensure that the Oracle WebLogic Server user can access this path and read from this location.
MAX_FILE_SIZE	View Record	This corresponds to the maximum file size (in MB) that a user can download.
PT_LIST.MAX_PATIENT_ID	Cohort List	This corresponds to the maximum number of patients or subjects that can be saved in the Cohort List. The maximum value that can be provided is 1000.
GENOMIC.MAX_PATIENT_COUNT	Genomic Data Export	This corresponds to the maximum count of patients or subjects that can be selected for generating the genomic data. This is applicable for all the 3 options on selecting the patients (active query, library query and the ad-hoc patients). If the count of patients or subjects selected is more than this value, an error message is displayed when the **Submit** button is clicked.
GENOMIC.REPORTS_MAX_PATIENT_COUNT	Cohort Reports	This corresponds to the maximum number of patients whose data can be viewed in the reports. This applies to all options of selecting the Patients/Subjects. If the count of patients or subjects selected is more than this value, a warning message is displayed. You can either continue to plot with a large number of patients/subjects, which might impact performance or change the selected cohort for a smaller number of patients / subjects.

Table 3-1   (Cont.) Properties in `TRC.properties` File

Property	User Interface	Description
DEFAULT_ACTIVE_QUERY_LIMIT	Cohort Reports	This corresponds to the maximum number of patients /subjects whose data is plotted when the patient selection mode is Active Query, but the patients/subjects have not been filtered using the Cohort Query screen. If this count is exceeded, then an error message is displayed.
MAX_SPEC_REPORT	Cohort Reports	This corresponds to the maximum number of specimens for which a sample matrix can be plotted. If the number of specimens exceeds this limit, then a warning message is shown and a summary report of genomic information is displayed.
GENOMIC.MAX_GENE_COUNT	Cohort Reports or Genomic Data Export	This corresponds to the maximum count of Gene names that can be selected for generating genomic data. This applies to the Ad-hoc list Gene selection in the screen. If the count of Genes selected is more than this value, an error message is displayed when the **Submit** button is clicked.
VARIANT_DISPLAY_LIMIT	View Record	This corresponds to the maximum number of records that can be retrieved from the database for displaying variant data.
DEMOGRAPHICS_DISABLED	Cohort Query	Setting this value to *True* disables the Demographics criteria on the Cohort Query screen.
CONSENT_DISABLED	Cohort Query	Setting this value to *True* disables the Consent criteria on the Cohort Query screen.
DIAGNOSIS_DISABLED	Cohort Query	Setting this value to *True* disables the Diagnosis criteria on the Cohort Query screen.
CLINICAL_ENCOUNTER_DISABLED	Cohort Query	Setting this value to *True* disables the Clinical Encounter criteria on the Cohort Query screen.
PROCEDURE_DISABLED	Cohort Query	Setting this value to *True* disables the Procedure criteria on the Cohort Query screen.
MEDICATION_DISABLED	Cohort Query	Setting this value to *True* disables the Medication criteria on the Cohort Query screen.
PATIENT_HISTORY_DISABLED	Cohort Query	Setting this value to *True* disables the History criteria on the Cohort Query screen.

Table 3-1 (Cont.) Properties in `TRC.properties` File

Property	User Interface	Description
TEST_OBSERVATION_DISABLED	Cohort Query	Setting this value to *True* disables the Test Or Observation criteria on the Cohort Query screen.
SPECIMEN_DISABLED	Cohort Query	Setting this value to *True* disables the Specimen criteria on the Cohort Query screen.
STUDY_DISABLED	Cohort Query	Setting this value to *True* disables the Study criteria on the Cohort Query screen.
RELATIVE_TIME_EVENTS_DISABLED	Cohort Query	Setting this value to *True* disables the Relative Time Events criteria on the Cohort Query screen.
SEQUENCE_VARIANTS_DISABLED	Cohort Query	Setting this value to *True* disables the Sequence Variants criteria on the Cohort Query screen.
COPY_NUMBER_VARIATION_DISABLED	Cohort Query	Setting this value to *True* disables the Copy Number Variation criteria on the Cohort Query screen.
MICROARRAY_EXPRESSION_DISABLED	Cohort Query	Setting this value to *True* disables the MicroArray Expression criteria on the Cohort Query screen.
RNA_SEQ_EXPRESSION_DISABLED	Cohort Query	Setting this value to *True* disables the RNA Sequencing criteria on the Cohort Query screen.
GENOMIC.CHROMOSOME_RANGE	Genomic Query - Variant Search	This corresponds to the maximum chromosome range that can be provided for searching variants using a Genomic Position in the variant search functionality of the Genomic Query.

Support for OHF and OHTR on Oracle Cloud Infrastructure using a PAAS model

This topic outlines how Oracle Healthcare Foundation (OHF) and Oracle Healthcare Translational Research (OHTR) are supported on Oracle Cloud Infrustructure (OCI) using a PAAS model.

Support on OCI as a PAAS model includes:

- Installing OHF and OHTR Data Models on the Oracle Data Warehouse (ADW).

- Installing the OHF and OHTR Middle Tier on OCI virtual machines (VM) using the OHF and OHTR Installers.

- Pre-installing the Oracle Weblogic Server in the VM.

- Using a staging database. The OHF and OHTR Middle Tier installation in OCI requires a staging database that holds the Weblogic Repository Configuration

Utility (RCU) schemas. This database also serves as an intermediate staging database during the install process.

- Additional configurations. After installing OHTR using the OHTR Installer, additional configurations are made to switch to the ADW database to connect to the OHF and OHTR in ADW.

Please contact Oracle Support for assistance when installing OHTR on Oracle Cloud Infrastructure.

Uninstall the Oracle Healthcare Translational Research Middle Tier if needed

To uninstall the Oracle Healthcare Translational Research middle tier:

1. Log in to the Oracle WebLogic Server Admin Console.
2. Click **Lock and Edit**.
3. Select **Deployments**, then **Control**, then select the ear files to undeploy:
   - OHF-TRC-App: Cohort Explorer UI Application
4. Click **Stop**.
5. Select **Configuration**, then **Install**, then select the ear files and undeploy and delete them.
6. Click **Activate Changes**.

4

Install Oracle Healthcare Translational Research Notebook

Follow the instructions below for setting up and running the Oracle Healthcare Translational Research Notebook solution. The following steps install the Notebook interpreter docker images and start the docker containers. The notebooks that are installed as part of the Oracle Healthcare Translational Research Middle installer work with these interpreters to provide the data for the notebooks to display the contents.

> **Note:**
>
> These steps are only required if using the Oracle Healthcare Translational Research Notebook solution.

For more information, see:

- Prerequisites
- Install the Data Studio Interpreters
- Advanced Configurations

Prerequisites

The notebook interpreters are docker images and run as docker containers. Hence docker and docker-compose is needed for running the interpreters.

Verify that the docker is installed on the host VM where you want to run the docker container using docker -v. The docker version should be at least 18.0 or above. If docker is not installed, install Docker as documented in Docker website at https://docs.docker.com.

Verify that docker-compose is installed on the host VM by docker-compose -v. If it is not available, install as documented in Docker website at https://docs.docker.com/compose/install/.

> **Note:**
>
> To execute the docker commands, the user should either be root or should have sudo access. For example, run as sudo docker -v.

Verify that a file system that holds `/var/lib/docker` has sufficient space to accommodate additional 15 GB to store docker images.

Install the Data Studio Interpreters

The Data Studio interpreters are part of the Oracle Healthcare Translational Research Notebook solution. This installation assumes that the docker containers for the interpreters are to be running in the same host VM as the Oracle Healthcare Translational Research Middle Tier. The installation and configurations are easier if they are run on the same VM. However, if running on a different host, see the advanced section on Running on a different Host.

1. Download the Part 1 and Part 2 zip files of the Data Studio interpreters from Oracle e-delivery/MOS (refer to the *Release Notes*). Copy them to the host VM.

   • `PgXDataStudio-Docker_4.1.0.0_part1.zip`

   • `PgXDataStudio-Docker_4.1.0.0_part2.zip`

2. Create a directory and move the zip files to this directory.

3. Unzip the zip files onto the directory:

   • unzip -a `PgXDataStudio-Docker_4.1.0.0_part1.zip`

   • unzip -a `PgXDataStudio-Docker_4.1.0.0_part2.zip`

   > **Note:**
   >
   > The subfolder `docker-images` contains the tar file of the Docker images. The `PgXDataStudio` folder contains the configuration and set up files.

4. Copy the `docker-load.sh` file from the folder `PgXDataStudio/docker` onto the `docker-images` folder.

5. Change directories (`cd`) into the `docker-images` folder and run the `docker-load.sh` file (`sudo sh ./docker_load.sh`).

   > **Note:**
   >
   > The docker images are loaded from the tar files into the local docker registry. This takes a few minutes and the progress is visible in the console.

6. Create the Oracle wallet for storing the Oracle Healthcare Translational Research database API schema credentials for Python interpreter as follows:

   a. Create a directory `shared_volume` inside the `PgxDataStudio` directory (or any other location).

   b. Change directory (`cd`) into the `PgxDataStudio/database/utilities` folder. Edit the `cx_oracle_conn_config.sh` file and provide the values specified in the file.

      • database hostname, port and service name

      • API (CGA) schema name for API_SCHEMA_NAME

      • Weblogic Home directory full path for WEBLOGIC_HOME

- • Java Home directory full path for JAVA_HOME

- • full path to the `shared_volume` directory created above for HOST_TNS_ADMIN

c. Run the script `create_cx_oracle_conn.sh`. The script prompts for the API schema password. Upon successful completion, the `shared_volume` directory contains the `sqlnet.ora`, `tnsnames.ora`, and the wallet directory.

7. Change directories (`cd`) into the `PgxDataStudio/docker` folder. Edit the `docker-compose.yml` file.

   For the Python interpreter entry (`python-interpreter` and the PGX interpreter (`pgx-interpreter`) entry, update the volumes entry to map to the host `shared_volume` directory location. That is, you are mapping the host directory path of `/conf` to that of the docker volumes:

   `full_path_till_pgx-conf`/pgx-conf/conf:/conf

8. Copy the file `PgXDataStudio/database/utilities/.env` into `PgXDataStudio/docker/`.

9. Start the datastudio docker containers using `docker-compose` as `sudo docker-compose up -d`.

   This step starts all the docker containers. The console shows the status. To confirm, verify using `sudo docker ps`. This command should list the 5 data studio docker containers listed in the `docker-compose` file.

You can now log in to the Oracle Healthcare Translational Research Next Gen and click on the datastudio images to navigate to the Data Studio notebooks.

- • Post-Installation Configuration Steps

Post-Installation Configuration Steps

One of the login users should be given the notebook admin role. In the Oracle Healthcare Translational Research Middle Tier WebLogic console, assign the user with the pgxds_admin_group role. This can be done in Users & Groups of Security Realm in the WebLogic console.

The following configuration steps are needed to enable and work with data studio:

- • Oracle Healthcare Translational Research Middle Tier WebLogic - Listen Address
- • Configurations in Notebooks

Oracle Healthcare Translational Research Middle Tier WebLogic - Listen Address

The Data Studio apps deployed in WebLogic communicate within and with interpreters. By default, "localhost" is used in the configurations. The managed server should be reachable using this address.

1. In the Oracle Healthcare Translational Research Middle Tier WebLogic, go to the managed server (hosting the apps). In the Configurations tab, if there is a value specified for the Listen Address, clear the field. Note that you will have to first **Lock & Edit**, then clear the value and click **Save**.
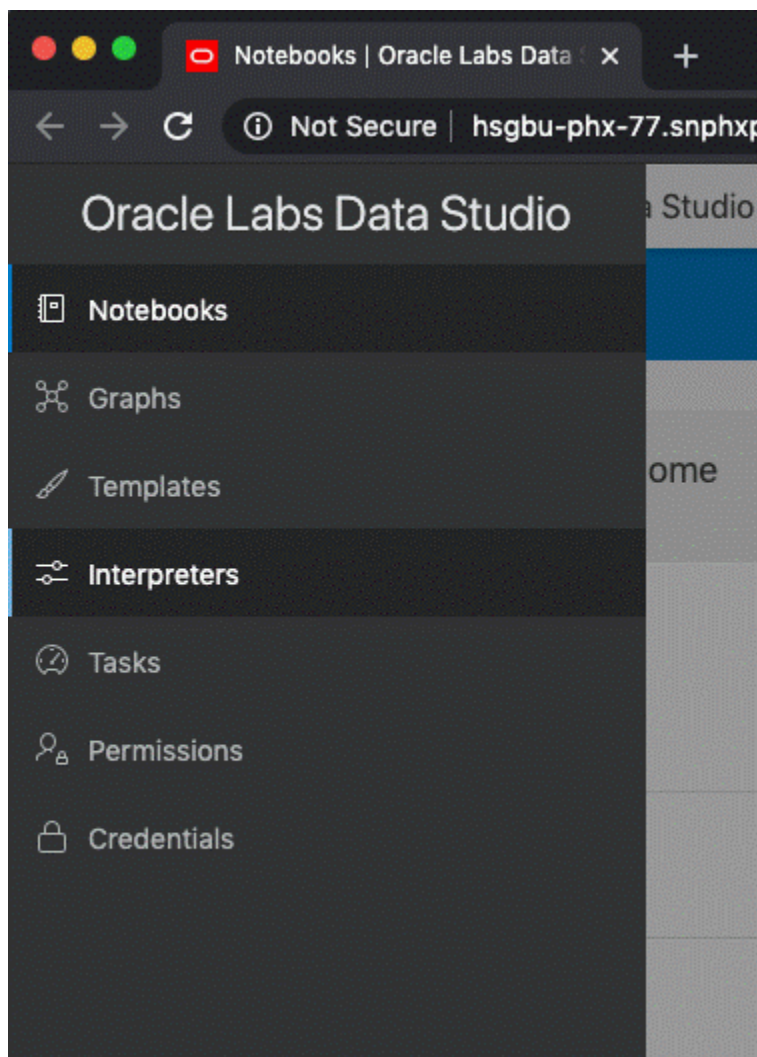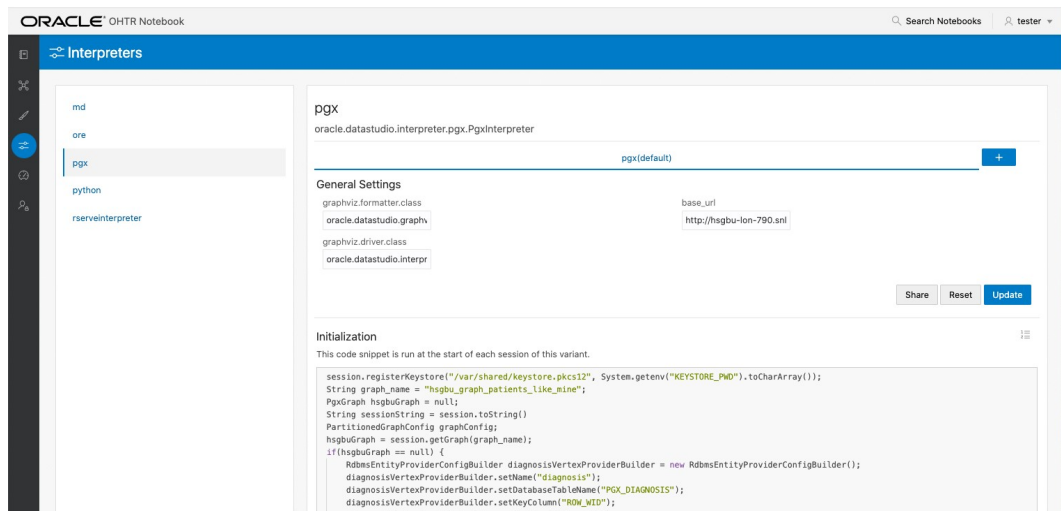
2. Restart the Managed Server.

Configurations in Notebooks

1. Log in to Next Gen with the notebook admin user and navigate to the Data Studio by clicking on the left nav.

   The Data Studio app is displayed in a separate tab and the user will be logged into the Data Studio with this user ID.

2. Navigate to the Interpreters tab in the notebook.

3. Navigate to the pgx tab in the interpreters list.

4. Update the `base_url` to point to the pgx server running in the managed server.

   Because the pgx-server is, by default, running on 7781, the format is:

   ```
   http://myhostname:7781
   ```

5. Click **Update**.

   That's it. Now you can navigate to the Notebooks tab to access the notebooks.

Advanced Configurations

The ports 7780 to 7790 in the host are reserved for the Data Studio interpreters. These ports in the host VM should be available for the interpreters to run.

For more information, see:

- Running on a Different Host

Running on a Different Host

If the interpreter docker images are running in a different VM than the Oracle WebLogic Server, then the configurations must be updated to point to the VM. By default, the configurations is set to `localhost`.

In the Oracle WebLogic Server VM , navigate to the `oh_domain/interpreter-scripts` folder. Edit the following files and change the value of *host* to the hostname/ip address of the VM that has the docker images running. By default, the entry is *host:localhost*.

   python.json
   pgx-interpreter.json
   ore.json
   markdown.json

In order to have these changes take effect, the Data Studio schema objects need to be truncated. The values are repopulated when the Data Studio restarts.

1. Stop the managed server of Oracle Healthcare Translational Research Middle Tier WebLogic.

2. Connect to the data studio schema.

3. Run the `drop_datastudio_objects.sql` connecting to this Data Studio schema. This file is available as part of the `PgXDataStudio-Docker` in the `PgXDataStudio/database/scripts` folder.

4. Restart the Oracle Healthcare Translational Research Middle Tier WebLogic managed server.

5
Configure network data encryption and integrity for Oracle servers and clients

For information on how to configure native Oracle Net Services data encryption and integrity for, see *Oracle® Database Security Guide 12c Release 2*, "Part IV - Configuring Oracle Database Native Network Encryption and Data Integrity" on the Oracle Help Center.

6

Configure Oracle Analytics Server

This chapter describes how to set up the Oracle Analytics Server server with the RPD and catalog for *ad hoc* reporting needs as required. It contains the following topics:

- Deploy the RPD and Catalog
- Create Oracle Analytics Server groups and users

Deploy the RPD and Catalog

To deploy the RPD and Catalog:

1. Install Oracle Analytics Server 12.2.1.4.

    > **Note:**
    >
    > The existing Oracle Analytics Server installation for Oracle Healthcare Foundation can be used. However, please remember to create a new domain for TRC RPD, instead of using the domain that might have been created for Oracle Healthcare Foundation RPD.

2. While running the configuration, create an Oracle Analytics Server domain.

    Remember that you can now deploy TRC CDM and HCD RPD on the same Oracle Analytics Server server by creating different Oracle Analytics Server domains. For details, see *Oracle® Fusion Middleware Installing and Configuring Oracle Business Intelligence*, "Chapter 4 - Configuring Oracle Business Intelligence".

    For details on how to create a Oracle WebLogic Server domain, see the *Oracle® WebLogic Server 12c (12.2.1) Creating a Domain Guide*, "Chapter 2 - Creating a WebLogic Server 12c (12.2.1) Domain", on the Oracle Help Center.

3. Go to the following location on the middle tier installation home: `<TRC_MTIER_HOME>/trcmt/ohf_products/OBIEE/`

4. Copy `RPD.zip` and `OracleHealthSciencesCohortExplorer.zip` to the Oracle Analytics Server server.

5. Extract them to a folder on the Oracle Analytics Server server. This yields the RPD file and the catalog folder.

6. In the Oracle Analytics Administration Tool, open the extracted Oracle Analytics repository (`OracleHealthSciencesCohortExplorer.rpd`) in offline mode and configure database connections.

    > **Note:**
    >
    > A 64-bit Windows OS is required to run the Oracle Analytics Administration tool.

a. In the Oracle Analytics Administration Tool, from the **File** menu, select **Open**, then **Offline**.

b. Select **OracleHealthSciencesCohortExplorer.rpd**.

c. Enter the repository password to log into the `OracleHealthSciencesCohortExplorer.rpd` file. The default password is **cohort**.

> **Note:**
>
> Change the RPD password by selecting Change Password from the File menu. Enter the old and new passwords.

d. Click **OK**.

7. Modify the connection pools in the RPD:

a. In the physical layer, expand the OracleHealthScienceCohortExplorer node and double-click **Connection Pool**.

b. Change the following:

Data source name: Enter the TNS entry name of the Oracle Healthcare Foundation database instance where Oracle Healthcare Translational Research is installed.

User name: Provide the APP schema user name.

Password: Provide the password of the APP schema user. Confirm the new password and click **OK**.

c. From the **File** menu, select **Save** to save the RPD. When the "Do you wish to check global consistency" dialog box appears, click **No**.

8. Upload the RPD using the following command:

```
<OBIEE_DOMAIN_HOME>/bitools/bin/datamodel.sh uploadrpd -I <Path
extracted to as mentioned in step
5>\OracleHealthSciencesCohortExplorer.rpd -SI ssi -U weblogic -P
<weblogic credentials>
```

You are prompted for to add the RPD password. For this password, contact your Oracle Product Manager.

9. Copy the contents of the catalog folder to `<OBIEE_DOMAIN_HOME>/bidata/service_instances/ssi [Service Instance Name]/metadata/content/catalog`

10. Check whether tnsnames.ora is present in the location. If not, create it and add a TNS entry for the DB connection. To create the file:

`<OBIEE_DOMAIN_HOME>/config/fmwconfig/bienv/core/tnsnames.ora`

To add the TNS entry:

```
trcpdb = (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP)(HOST
= <ohfdb_server.domain>)(PORT = <PORT_NUMBER>))) (CONNECT_DATA =
(SERVICE_NAME = <OHDFDB_SERVICE_NAME>)))
```

11. Restart the Oracle Analytics Server services from the Oracle Enterprise Manager:

    a. Log into the Oracle Enterprise Manager.

    b. Expand the **Target Navigation Menu** and go to **Business Intelligence** > **biinstance**.

    c. Click the **Availability** tab.

    d. In the **Processes** tab, click **Restart All**. This restarts the Oracle Analytics Instance services.

    e. Log into Oracle Analytics Server.

Create Oracle Analytics Server groups and users

This section contains the following topics:

- Create Oracle Analytics Server groups
- Create Oracle Analytics Server users
- Map default Oracle Analytics Server roles to user groups
- Deploy help files for Oracle Analytics Server dashboard

Create Oracle Analytics Server groups

1. Log into the Administrator Console for the Oracle Analytics Server Server at http://<obiee_server>:<admin_port>/console.

   <admin_port> is the port where Oracle Analytics Server WebLogic Enterprise Manager is installed.

2. Click **Security Realms** in the **Domain Structure** panel.

3. Go to **myrealm** > **Users and Groups**.

4. Click the **Groups** subtab.

5. Click **New** and create the following groups:

   - BIServiceAdministrators
   - BIContentAuthors
   - BIConsumers

6. Click **OK.**

Create Oracle Analytics Server users

Create a user having the same credentials as the application user for Oracle Healthcare Translational Research and add them to one of the appropriate groups created in Create Oracle Analytics Server groups.

1. Log into the Administrator Console for the Oracle Analytics Server Server at http://*<obiee_server>*:*<admin_port>*/console.

   <admin_port> is the port where Oracle Analytics Server WebLogic Enterprise Manager is installed.

2. Click **Security Realms** in the Domain Structure panel.

3. Go to **myrealm** > **Users and Groups**.

4. Click **New**. Create the user with appropriate credentials.

5. Select the user from the list, and click the **Groups** Tab.

6. Assign one of the user groups (created in Create Oracle Analytics Server groups) to the user.

> **Note:**
>
> The user name created for Oracle Healthcare Translational Research and Oracle Analytics Server WebLogic servers should match for access to data based on the VPD policies and other configurations.

Map default Oracle Analytics Server roles to user groups

1. Log into the Oracle Analytics Server Enterprise Manager at http://*<obiee_server>*:*<admin_port>*/em.

2. Click the **Weblogic Domain** drop-down menu.

3. Select **Security** > **Application Roles**.

4. In the drop-down **Application Stripe** ensure obi is entered and click **Search Application Roles** (arrow icon). A list is displayed.
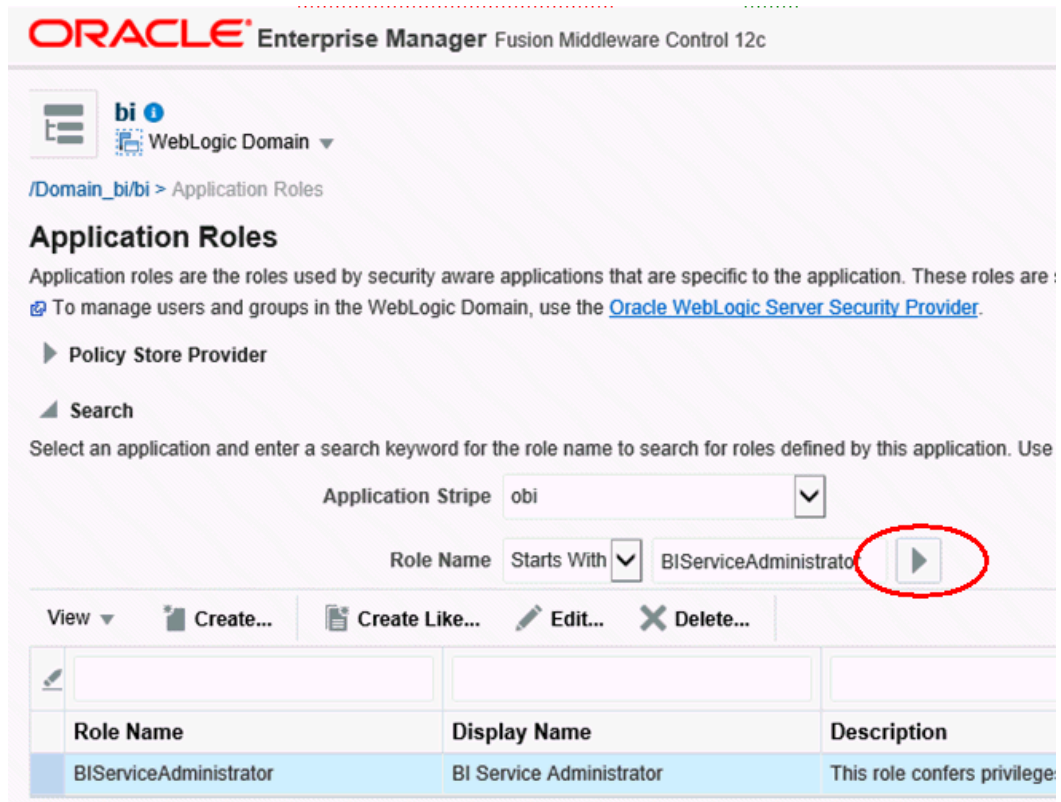
5. Select the row for **BIServiceAdministrator** and click **Edit**.

6. In the **Members** table, click **Add**. The search dialog is displayed.

7. Select **Type as Group**.

8. Click **Principal Name** > **Starts With**.

9. Enter **BIServiceAdministrators**.

10. Click the arrow button to search.

11. In the **Searched Principals**, select the row for **BIServiceAdministrators**.

12. Click **OK** to add the group as a member.

13. Click **OK** to save the changes.

14. Repeat steps 3-13 to add:

    • Role **BIContentAuthor** to group **BiContentAuthors**

    • Role **BIConsumer** to group **BIConsumers**

15. Log into the Analytics application
    http://*<OBIEE_SERVER>*:*<ANALYTICS_PORT>*/analytics with the user created in
    Create Oracle Analytics Server users.

Grantine BIAuthors to Create New Analysis

1. Log into the Analytics application as the "weblogic" user or a user that is part of the
   BIServiceAdministrators group.

2. Click **Administration**.

3. Select **Manage Privileges**.

4. Locate the entry **Subject Area: TRC**.

5. Click the BI Service Administrator hyperlink. A dialog box is displayed.

6. Click **+** to search roles to be added for the Oracle Analytics Content Author.

7. Select the Oracle Analytics Content Author entry and click the arrow button to add it to the Selected Members list.

8. Check whether **Set Permission** to is set to **Granted**.

9. Click **OK**.

10. Ensure that the Oracle Analytics Content Author role is selected and click **OK** to reflect the changes for the Subject Area: TRC.

11. Log in as a user who is a part of the group BIContenAuthors and verify that you have access to the TRC subject area.

Deploy help files for Oracle Analytics Server dashboard

1. Copy the file **OHTR_MTIER_HOME/ohf_products/Weblogic/TrcDashboardHelp.war** to the Oracle Analytics Server server location from where it can be deployed.

   For example, create a folder *upload* in the location `OBIEE_DOMAIN_HOME/servers/bi_server1/`.

2. Log into the Administrator Console for the Oracle Analytics Server Server at `http://`**`OBIEE_SERVER:ADMIN_PORT`**`/console`.

3. Go to the **Deployments** page.

4. Click **Lock & Edit**.

5. In the **Summary of Deployments** page, click **Install**.

6. Provide the path where `TrcDashboardHelp.war` is copied. For example, `OBIEE_DOMAIN_HOME\servers\bi_server1\upload`.

7. Select **TrcDashboardHelp.war** from the location and click **Next**.

8. Select **Install this deployment as an application**.

9. Let the scope remain **Global** and click **Next**.

10. In the **Available targets for TrcDashboardHelp**, select the **Clusters** (for example, bi_cluster) check box.

11. Click **Next**.

12. Retain the default options in the remaining screens and click **Finish**.

13. Click **Activate Changes**. The following message appears:

    ```
    All changes have been activated. No restarts are necessary.
    ```

14. Verify that the TrcDashboardHelp application is started by going to **Deployments**, and then **Control** tab.

15. Search for the application **TrcDashboardHelp**.

16. If it's not in the **Active State**, select the check box for TrcDashboardHelp and click **Start**, and **Servicing all requests**.

17. Context-sensitive help in the dashboard is available.