

Quick Start for HVR - Oracle

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This quick start guide helps you to get started with HVR for replicating data between Oracle databases.

To proceed with this replication you must have basic understanding about HVR's [architecture](#) and [terminologies](#) like Hub, Location, Channel, Location Groups, Actions etc.

The example here demonstrates how to replicate tables from one Oracle schema (source location) to another Oracle schema (target location).

In real-life scenarios, the source location(s) and the target location(s) reside on different machines and the HVR hub can reside on source or target or a separate machine. However, in this example, for simplicity we have the source, target, and HVR hub on the same machine i.e., a single Oracle instance with three schemas.

Before proceeding with this example ensure that the requirements for using HVR with Oracle are met.

For information about access privileges and advanced configuration changes required for performing replication using Oracle, see [Requirements for Oracle](#).

Create Demo Schemas and Tables

The initial step of this demonstration is to create:

- a schema in the source location
- tables in the source schema (and insert values into these tables)
- a schema in the target location

Source Location

Skip this section if you already have a database with tables which you plan to use for this replication.

For this demonstration, in the source location, create a schema (e.g. **sourcedb**) with two tables (e.g. **dm51_product** and **dm51_order**), and insert values into these tables.

Following are sample SQL statements to create schema and tables in source location, and also to insert values in the tables.

Create Source Schema

```
create user sourcedb identified by hvr default tablespace users temporary
tablespace temp quota unlimited on users;
```

Create Tables in Source Schema

```
create table sourcedb.dm51_product
(
  prod_id number(10) not null,
  prod_price number(10,2) not null,
  prod_descrip varchar2(100) not null,
  primary key (prod_id)
);
```

```
create table sourcedb.dm51_order
(
  prod_id number(10) not null,
  ord_id number(10) not null,
  cust_name varchar2(100) not null,
  cust_addr varchar2(100),
  primary key (prod_id, ord_id)
);
```

Insert Values in Source Tables

```
insert into sourcedb.dm51_product values (100, 90, 'Book');
```

```
insert into sourcedb.dm51_order values (100, 123, 'Customer1', 'P.O. Box
122, Anytown, Anycountry');
```

Target Location

Create a schema (e.g. **targetdb**) in the target location.

```
create user targetdb identified by hvr
default tablespace users
temporary tablespace temp
quota unlimited on users;
```

HVR automatically creates tables in target location during **HVR Refresh** (initial loading) and it is the recommended method for creating tables in the target location. However, if you want to manually create tables in target location, the same can be achieved by executing the required SQL statements.

Sample SQL statements to create tables in the target location:

Create Tables in Target Schema

```
create table sourcedb.dm51_product
(
prod_id number(10) not null,
prod_price number(10,2) not null,
prod_descrip varchar2(100) not null,
primary key (prod_id)
);
```

```
create table sourcedb.dm51_order
(
prod_id number(10) not null,
ord_id number(10) not null,
cust_name varchar2(100) not null,
cust_addr varchar2(100),
primary key (prod_id, ord_id)
);
```

Create Hub Database

This section describes how to create a hub database (schema). The hub database is a repository database that HVR uses to control its replication activities. It contains HVR [catalog tables](#) that hold all specifications of replication such as the names of the replicated databases, the replication direction and the list of tables to be replicated. For more information about HVR hub server and database, see section [Hub Server](#) in [System Requirements](#).

HVR supports the creation of a hub database on certain databases (location classes) only. For the list of supported location classes, see section [Hub Database](#) in [Capabilities](#).

For this demonstration, the hub database (e.g. **hvrhub**) is created in Oracle.

- Create the hub database (**hvrhub**) with password (**hvr**).

```
create user hvrhub
identified by hvr
default tablespace users
temporary tablespace temp
quota unlimited on users;
```

Grants/Access Privileges

This section describes the grants/access privileges required for the source schema, target schema, and hub database.

1. Configure the privileges for source schema (**sourcedb**). For more information, see section [Grants for Log-Based Capture](#) in [Requirements for Oracle](#).

```
grant create session to sourcedb;
grant create table to sourcedb;
grant alter any table to sourcedb;
grant select any dictionary to sourcedb;
grant select any transaction to sourcedb;
```

2. Configure the privileges for target schema (**targetdb**). For more information, see section [Grants for Integrate and Refresh](#) in [Requirements for Oracle](#).

```
grant create session to targetdb;
grant create table to targetdb;
```

3. Configure the privileges for hub schema (**hvrhub**). For more information, see section [Grants for Hub Schema](#) in [Requirements for Oracle](#).

```
grant create session to hvrhub;  
grant create table to hvrhub;  
grant create procedure to hvrhub;  
grant create trigger to hvrhub;  
grant execute on dbms_alert to hvrhub;
```

A user with **dba** privileges should grant **execute on dbms_alert** to the hub database user (e.g. *hvruser*).

Download and Install HVR

An HVR distribution is available for download at <https://www.hvr-software.com/account/>. To request a trial version, visit <https://www.hvr-software.com/free-trial/>.

Install HVR on a hub machine. For details on installing HVR, see the respective operating system sections:

- [Installing HVR on UNIX or Linux](#)
- [Installing HVR on Windows](#)
- [Installing HVR on macOS](#)

The HVR distribution requires a license key in order for the software to operate. Please see the HVR [licensing page](#) for more details on how to install the HVR license.

After the installation, you can control HVR using the HVR graphical user interface (**HVR GUI**).

- If the hub machine is Windows, then **HVR GUI** can be executed directly on the hub machine.
 - To control HVR remotely from your PC, connect to the hub machine using Windows Remote Desktop Connection and launch **HVR GUI** on the hub machine.
- If the hub machine is Linux, then **HVR GUI** can be executed directly on the hub machine. However, an application like X Server or VNC viewer must be installed to run **HVR GUI** directly on Linux.
 - To control HVR remotely from your PC, install HVR on the PC (with Windows or macOS) and configure the **HVR Remote Listener** on the hub machine.
- If the hub machine is Unix, then **HVR GUI** should typically be run remotely from a PC to control HVR installed on the hub machine. To do this, install HVR on the PC (with Windows or macOS) and configure the **HVR Remote Listener** on the hub machine.

The **HVR Remote Listener** allows you to connect **HVR GUI** available on your PC to the remote HVR hub machine. For more information about connecting to remote HVR installation, see [Configuring Remote Installation of HVR on Unix or Linux](#) and [Configuring Remote Installation of HVR on Windows](#).

Launch HVR GUI

This section describes how to launch **HVR GUI** on various operating systems.

- On Windows and macOS, double-click the HVR shortcut icon available on the desktop or execute command **hvrgui** in the CLI.
- On Linux, double-click the hvrgui file available in the HVR_extracted_path/bin directory or execute command **hvrgui** in the CLI.

Linux requires applications like X server or VNC viewer to execute **HVR GUI**.

- On Unix, **HVR GUI** is not supported. So, **HVR GUI** should be run on a remote PC (with Windows, Linux, or macOS) to control HVR installed on the Unix machine.

Register Hub

This section describes how to connect **HVR GUI** to the hub database.

When you launch HVR GUI for the first time, the **Register Hub** dialog is displayed automatically. The **Register Hub** dialog can also be accessed from menu **File** by selecting **Register Hub**. Skip steps 1 to 4 if you want to run **HVR GUI** directly on the hub machine.

1. Click **Connect to HVR on remote machine**.

To connect **HVR GUI** on a PC to a remote HVR hub machine, the **HVR Remote Listener** must be configured and running on the HVR hub machine.

2. Enter the name or IP address of the hub machine in the **Node** field (e.g. **myserver**).
3. Enter the port number (defined in the **HVR Remote Listener** of the hub machine) in the **Port** field (e.g. **4343**).
4. Enter the **Login** (e.g. **myserveradmin**) and **Password** for the hub machine. By default, this is the operating system login credentials of the hub machine.
5. Select **Oracle** in the **Class** pane.
6. Specify **Database Connection** details.
 - a. Enter the directory path in **ORACLE_HOME**. You can also click the browse button to select the directory path.
 - b. Enter the Oracle System ID in **ORACLE_SID** or **TNS** credentials.
 - c. Enter the user name of the hub database in **User** (e.g. **hvrhub**).
 - d. Enter the password for the hub database in **Password** (e.g. **hvr**).
7. Click **Connect**.

The screenshot shows the 'Register Hub' dialog box. At the top, there is a checked checkbox 'Connect to HVR on remote machine'. Below it, the 'Node' field contains 'myserver', the 'Port' field contains '4343', the 'Login' field contains 'myserveradmin', and the 'Password' field is masked with dots. There are radio buttons for 'Password' (selected) and 'Prompt for password'. An 'Encryption' button is located below the password field. The 'Class' section on the left has radio buttons for 'Oracle' (selected), 'Ingres / Vector(H)', 'SQL Server', 'DB2 Linux/Unix/Windows', 'DB2 for i', 'PostgreSQL/Aurora', 'MySQL/MariaDB/Aurora', and 'Teradata'. The 'Database Connection' section on the right has radio buttons for 'ORACLE_SID' (selected) and 'TNS'. The 'ORACLE_HOME' field contains 'D:\prade\1210' with a browse button. The 'User' field contains 'hvrhub' and the 'Password' field is masked with dots. At the bottom, there are 'Connect', 'Cancel', and 'Help' buttons.

8. Click **Yes** in the prompt dialog asking to create catalog tables in the hub database.

HVR displays this prompt when connecting to a hub database for the first time.

On connecting successfully to the hub database, the navigation tree pane displays the hub machine and the hub database. **Location Configuration**, **Channel Definitions**, and **Scheduler** are displayed under the hub database.

Create Locations

This section describes how to create [locations](#) in HVR GUI. Location is a storage place (for example, database or file storage) from where HVR captures (source location) or integrates (target location) changes.

Create one source location (**src**) connected to source schema (**sourcedb**) and one target location (**tgt**) connected to target schema (**targetdb**).

1. In navigation tree pane, right-click **Location Configuration** **New Location**.
2. Enter **Location** name and **Description** for the location.
3. Select **Oracle** in **Class**.
4. Provide **Database Connection** details. For more information on **Database Connection** fields, see section [Location Connection](#).
 - a. Enter directory path for **ORACLE_HOME**. You can also click browse to select directory path.
 - b. Enter Oracle System ID in **ORACLE_SID** or **TNS** credential or **RAC** credential.

For **RAC** connectivity, ensure to provide remote machine connection details under **Connection** tab.

 - c. Enter user name of schema in **User**. For example, **sourcedb**.
 - d. Enter password for schema in **Password**. For example, **hvr**.
5. Click **Test Connection** to verify the connection to location database.
6. Click **OK**.

The screenshot shows the 'New Location' dialog box with the following configuration:

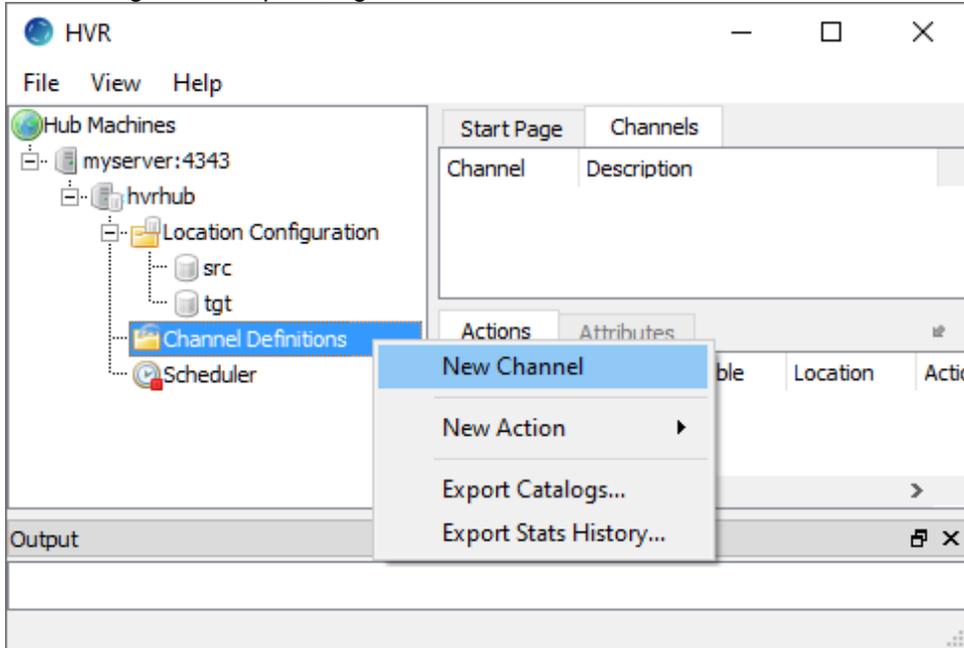
- Location:** src
- Description:** Source Oracle Location
- Class:** Oracle
- Database Connection:**
 - ORACLE_HOME: D:\oracle\1210
 - ORACLE_SID: ORA1210
 - TNS: (unchecked)
 - RAC: (unchecked)
 - SCAN: 1521
 - Service: (empty)
 - User: sourcedb
 - Password:
- Test Connection:** (button highlighted with a red box)

Repeat the above steps to create target location.

Create Channel

This section describes how to create a [channel \(hvrdemo\)](#) in HVR. A channel groups together the locations and tables that are involved in replication. It also contains actions that control the replication.

1. In the navigation tree pane, right-click **Channel Definitions** **New Channel**.



2. In the **New Channel** dialog, enter **Channel name** and **Description** for the channel.
3. Click **OK**.

Create Location Groups

This section describes how to create location groups in a channel. The location groups are used for defining action on the location. Typically a channel contains two location groups - one for the source location and one for the target location. Each location group can contain multiple locations.

In this example, create one source location group (**SRCGRP**) and one target location group (**TGTGRP**).

1. In navigation tree pane, click **+** next to the channel (**hvrdemo**).
2. Create source location group (**SRCGRP**):
 - a. Right-click **Location Groups** **New Group**.
 - b. Enter **Group Name** and **Description** for the location group.

- c. Select source location (**src**) from **Group Membership**.

The screenshot shows the 'New Group' dialog box with the following fields and table:

Channel: hvrdemo
Group Name: SRCGRP
Description: Source location group

	Location	Class	Node	Description
<input checked="" type="checkbox"/>	src	oracle		Oracle sourec location
<input type="checkbox"/>	tgt	oracle		Oracle target location

Buttons: OK, Cancel, Help

- d. Click **OK**.

3. Create target location group (**TGTGRP**):

- a. Right-click **Location Groups** **New Group**.
b. Enter **Group Name** and **Description** for the location group.
c. Select target location (**tgt**) from **Group Membership**.

The screenshot shows the 'New Group' dialog box with the following fields and table:

Channel: hvrdemo
Group Name: TGTGRP
Description: Target location group

	Location	Class	Node	Description
<input type="checkbox"/>	src	oracle		Oracle sourec location
<input checked="" type="checkbox"/>	tgt	oracle		Oracle target location

Buttons: OK, Cancel, Help

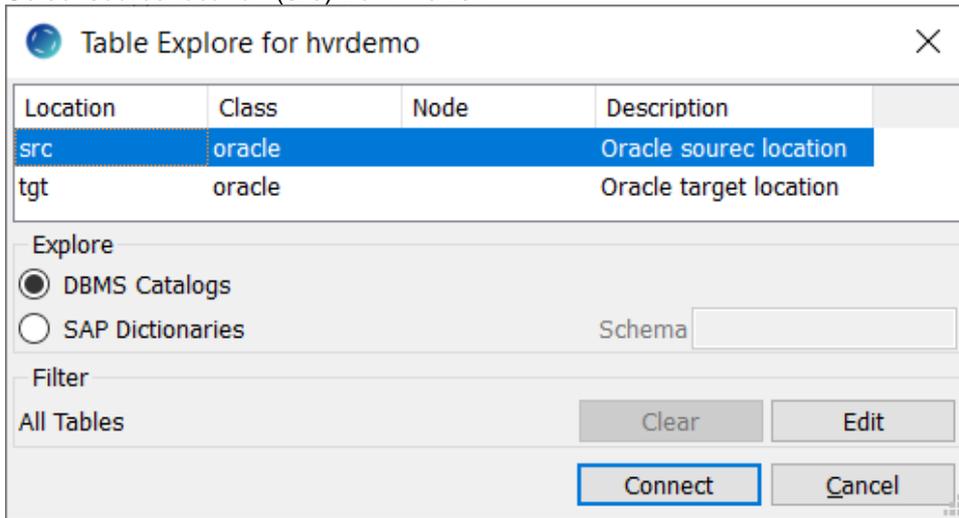
- d. Click **OK**.

Select Table(s)

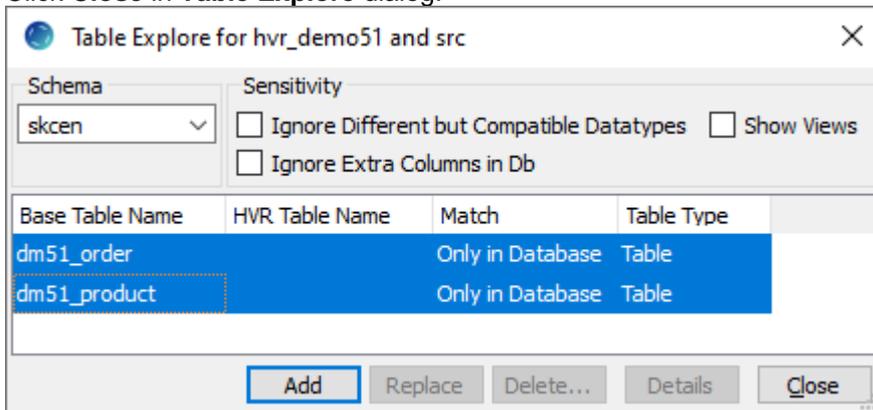
This section describes how to select the tables (**dm51_product** and **dm51_order**) from source location for replication. **Table Explore** allows you to select schema(s) and/or table(s) for replication.

1. Right-click **Tables** **Table Explore**.

2. Select source location (**src**) from the list.



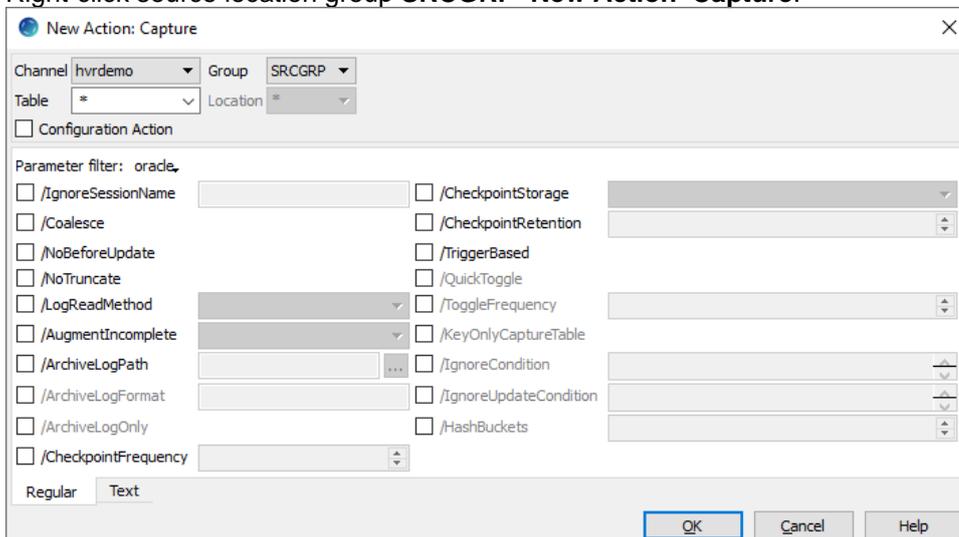
3. Click **Connect**.
4. Select tables from **Table Explore** dialog. Press **Shift** key to select multiple tables or **Ctrl+A** to select all tables.
5. Click **Add** to add the selected tables.
6. Click **OK** in **HVR Table Name** dialog.
7. Click **Close** in **Table Explore** dialog.



Define Actions

This section describes how to define **Actions** on the location groups (**SRCGRP** and **TGTGRP**). Actions define the behavior of a replication activity.

1. Define action **Capture** to capture changes from all tables in the source location group.
 - a. Right-click source location group **SRCGRP** **New Action Capture**.



- b. Click **OK**.
2. Define action **Integrate**.
 - a. Right-click target location group **TGTGRP** **New Action Integrate**.

- b. Click **OK**.

The **Actions** pane only displays actions related to the object selected in the navigation tree pane. Click on the channel name (**hvrdemo**) to view actions defined for all location groups in the selected channel.

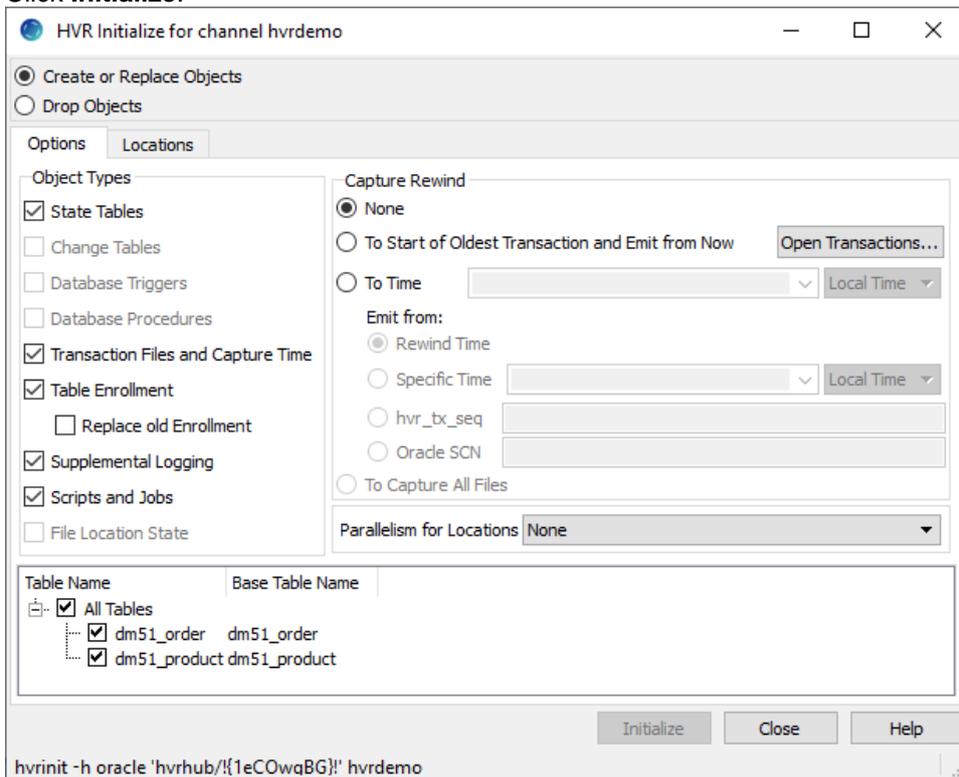
Initialize

This section describes how to initialize the replication. **HVR Initialize** first checks the channel and creates replication jobs in the **HVR Scheduler**.

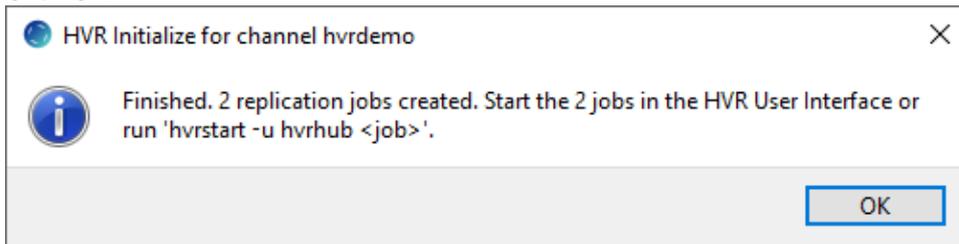
In this example, **HVR Initialize** creates one capture job (**hvr_demo-cap-src**) and one integrate job (**hvr_demo-integ-tgt**).

1. Right-click channel **hvrdemo** **HVR Initialize**.
2. Select **Create or Replace Objects** in **HVR Initialize** dialog.

3. Click **Initialize**.



4. Click **OK**.



5. Click **Close**.

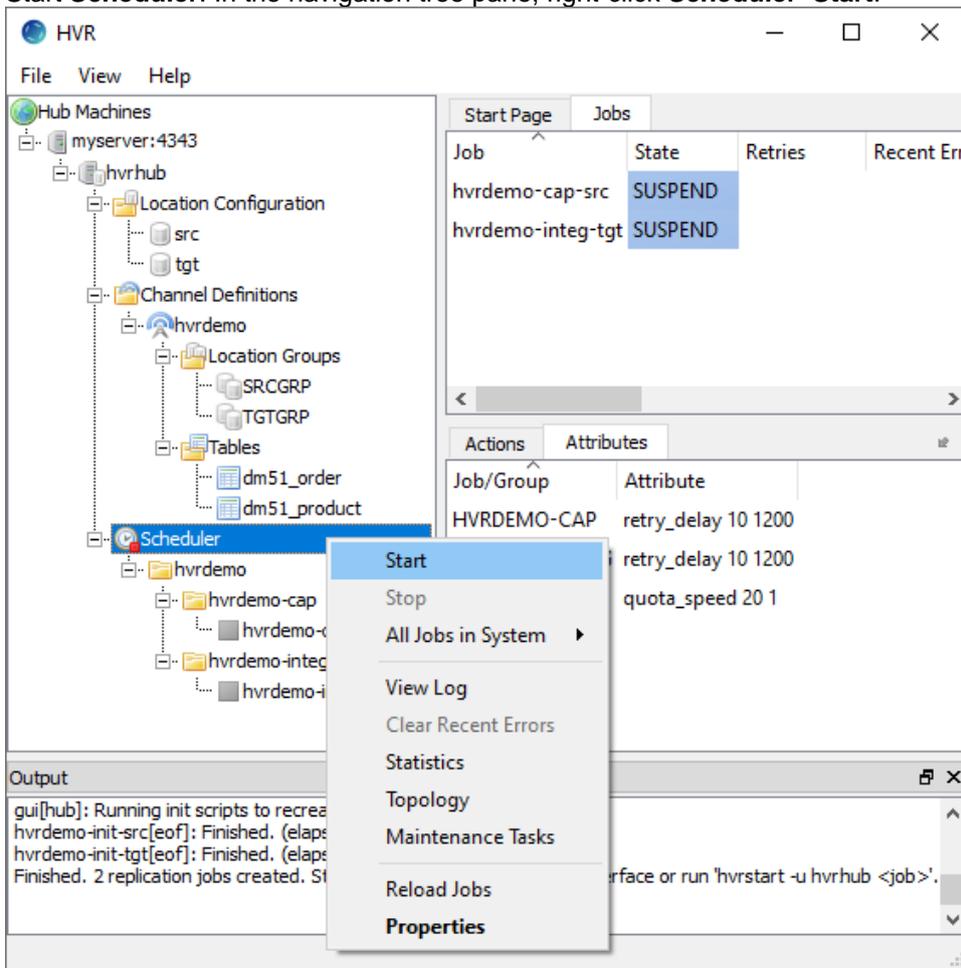
Click **Scheduler** node in navigation tree pane to view the capture and integrate jobs in **Jobs** tab.

For more information about initiating replication in HVR, see [Replication Overview](#).

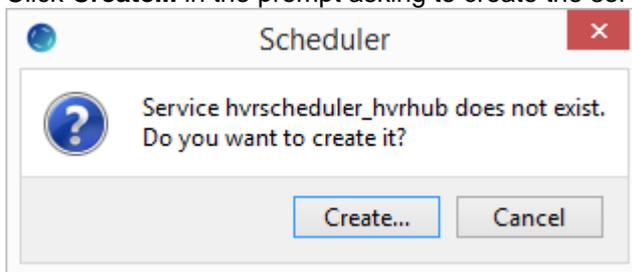
Start Scheduler

This section describes how to start the **HVR Scheduler**. The **HVR Scheduler** is a process which runs jobs defined in the catalog table **HVR_JOB**. This catalog table can be found in the hub database. On Unix or Linux, the **HVR Scheduler** runs as a daemon. On Windows, the **HVR Scheduler** runs as a system service.

1. Start **Scheduler**. In the navigation tree pane, right-click **Scheduler Start**.



2. On Windows, the following steps are required to create the **HVR Scheduler** system service.
 - a. Click **Create...** in the prompt asking to create the service **hvr_scheduler_hvrhub**.



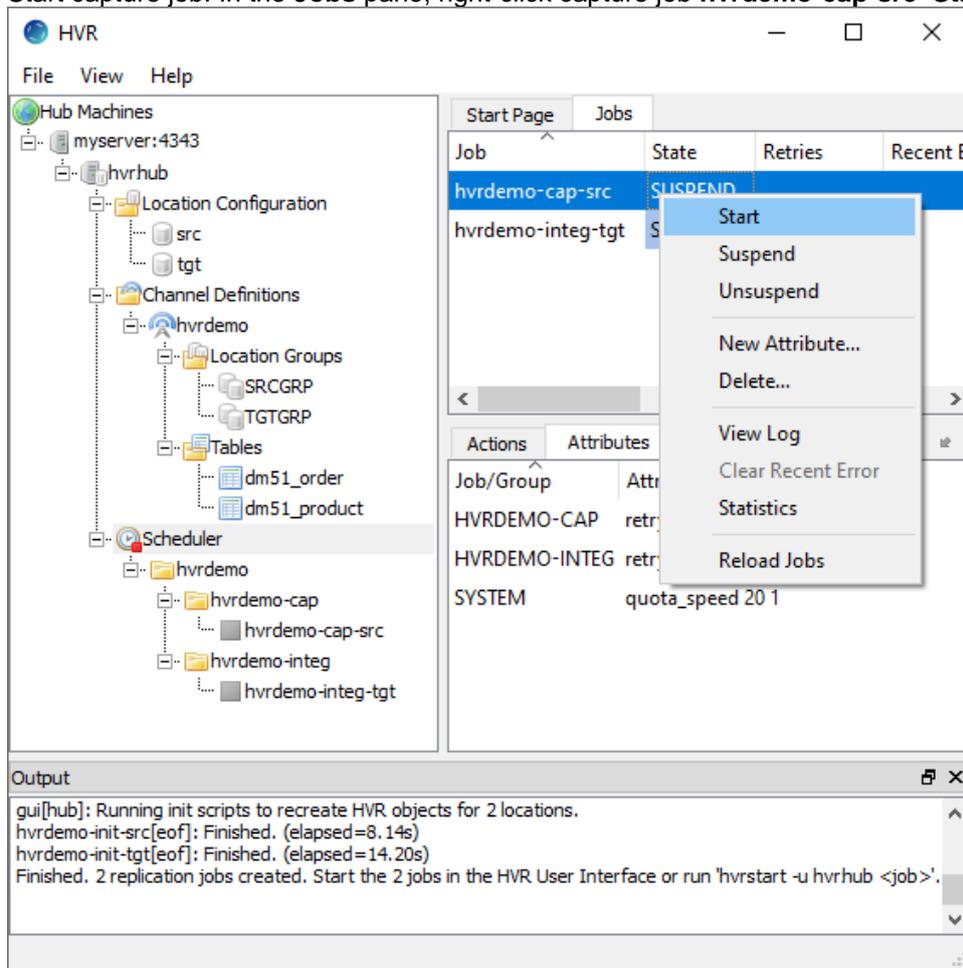
- b. In the **Create Windows Service** dialog, select **Local System Account ('SYSTEM')** and click **Create**.

Start Capture Job

This section describes how to start the job for capturing changes from source location (**src**). By starting the **Capture** job in **HVR Scheduler**, HVR begins capturing all changes since the moment **HVR Initialize** was executed. This 'capture begin moment' can be modified using the option **Capture Rewind** available in the **Advanced Options** tab of **HVR Initialize** dialog.

1. In the navigation tree pane, click **Scheduler**.

2. Start capture job. In the **Jobs** pane, right-click capture job **hvrdemo-cap-src** **Start**.



3. Click **Yes** in **Start** dialog.

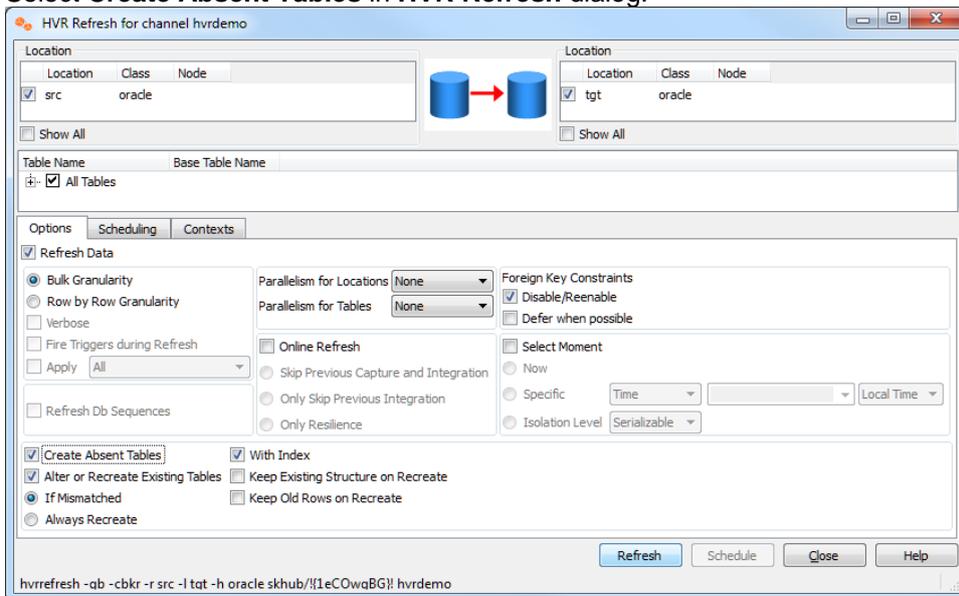
On starting the capture job (**hvrdemo-cap-src**) successfully, the status of the job changes from **SUSPEND** to **RUNNING**.

Refresh

This section describes how to perform initial load into the target database. **HVR Refresh** copies all existing data from source location (**src**) to the target location (**tgt**) and optionally creates new tables and keys in target location.

1. In the navigation tree pane, right-click channel **hvrdemo** **HVR Refresh**.

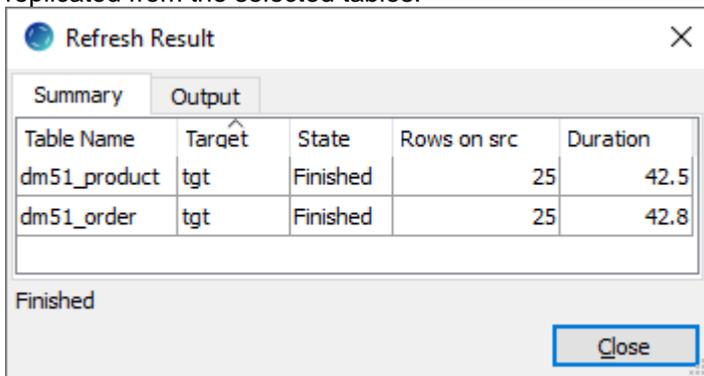
2. Select **Create Absent Tables** in **HVR Refresh** dialog.



3. Click **Refresh**.

4. Click **Yes** to begin **HVR Refresh**.

When the refresh is completed, the **Refresh Result** dialog displays the total number of rows replicated from the selected tables.



5. Click **Close** in **Refresh Result** dialog.

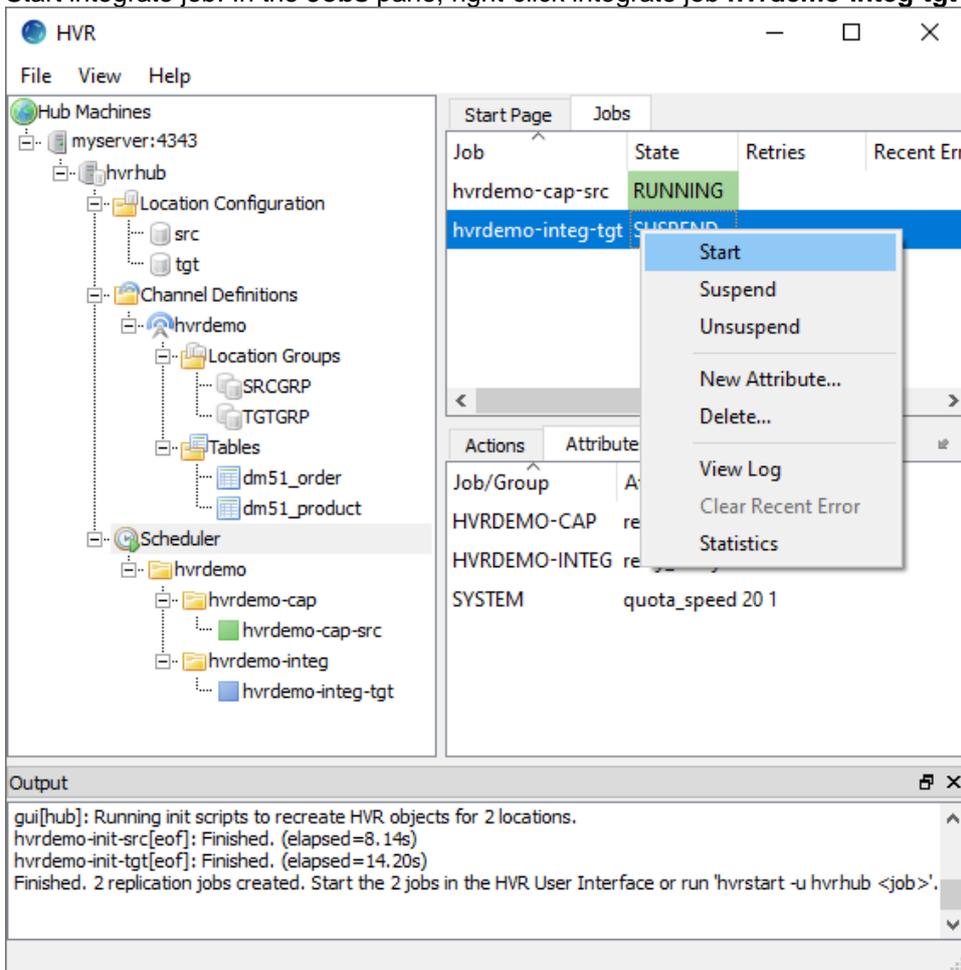
6. Click **Close** in **HVR Refresh** dialog.

Start Integrate Job

This section describes how to start the job to integrate changes into the target location (**tgt**).

1. In the navigation tree pane, click **Scheduler**.

2. Start integrate job. In the **Jobs** pane, right-click integrate job **hvrdemo-integ-tgt** **Start**.



3. Click **Yes** in **Start** dialog.

On starting the integrate job (**hvr_demo-integ-tgt**) successfully, the status of the job changes from **SUSPEND** to **RUNNING**.

Verify Replication

This section describes the two methods for verifying HVR's replication activity.

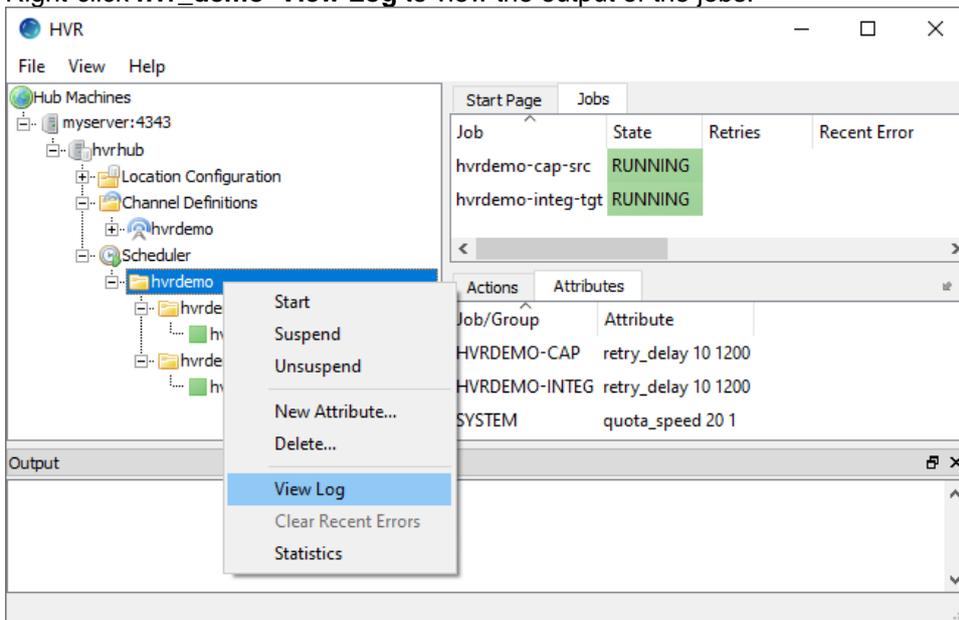
- [Viewing Log File](#)
- [Using HVR Compare](#)

Viewing Log File

HVR creates separate log file for the hub, channel (**hvrdemo**), and for each replication jobs (**hvrdemo-cap-src** and **hvrdemo-integ-tgt**). This log file contains the details of the changes captured and integrated. To view the replication activity log,

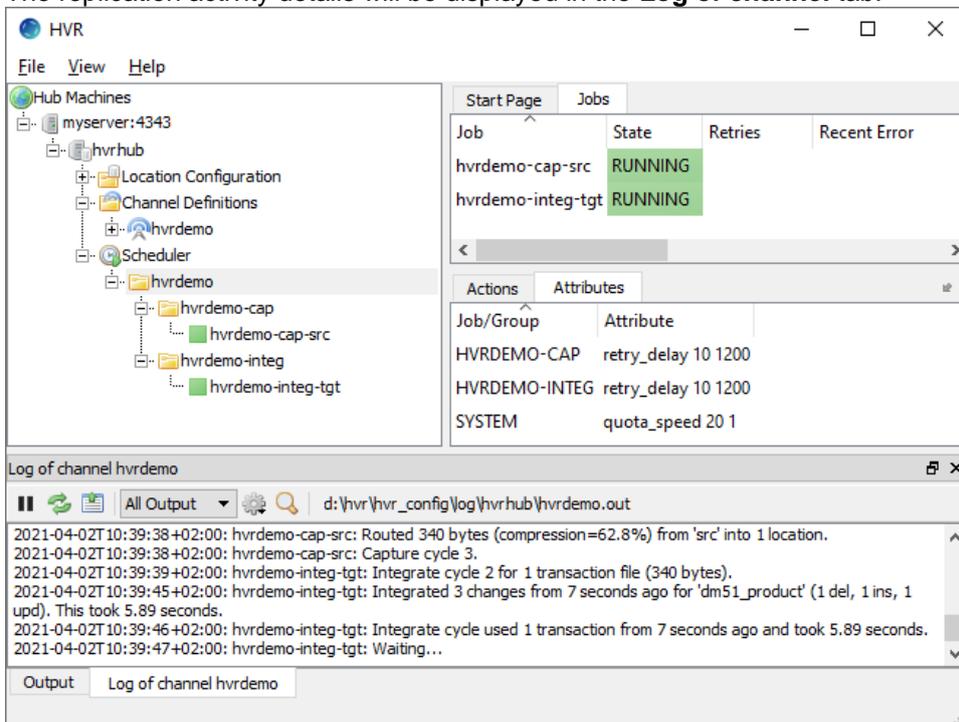
1. In navigation tree pane, click **+** next to the **Scheduler**.

2. Right-click **hvr_demo** **View Log** to view the output of the jobs.



3. Update the value(s) in source location database.

4. The replication activity details will be displayed in the **Log of channel** tab.



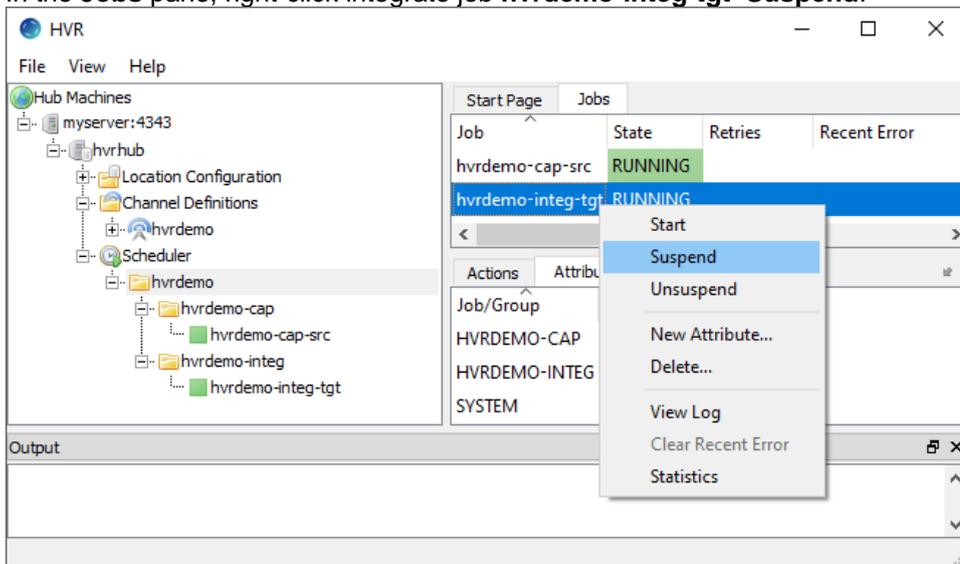
The directory path for HVR log files is displayed in the **Log of channel** tab.

Using HVR Compare

HVR Compare allows you to verify the replication activity by comparing the data in source and target locations. To compare the source and target locations,

1. Stop the Integrate job (**hvrdemo-integ-tgt**),
 - a. In the navigation tree pane, click **Scheduler**.

b. In the **Jobs** pane, right-click integrate job **hvrdemo-integ-tgt Suspend**.

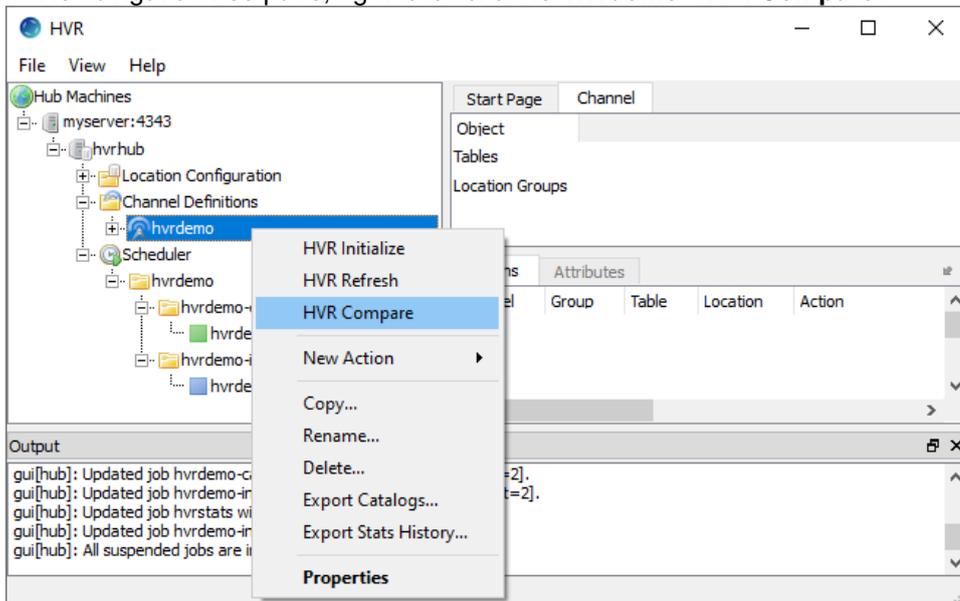


c. Click **Yes** in **Start** dialog.

2. Update the value(s) in source location database.

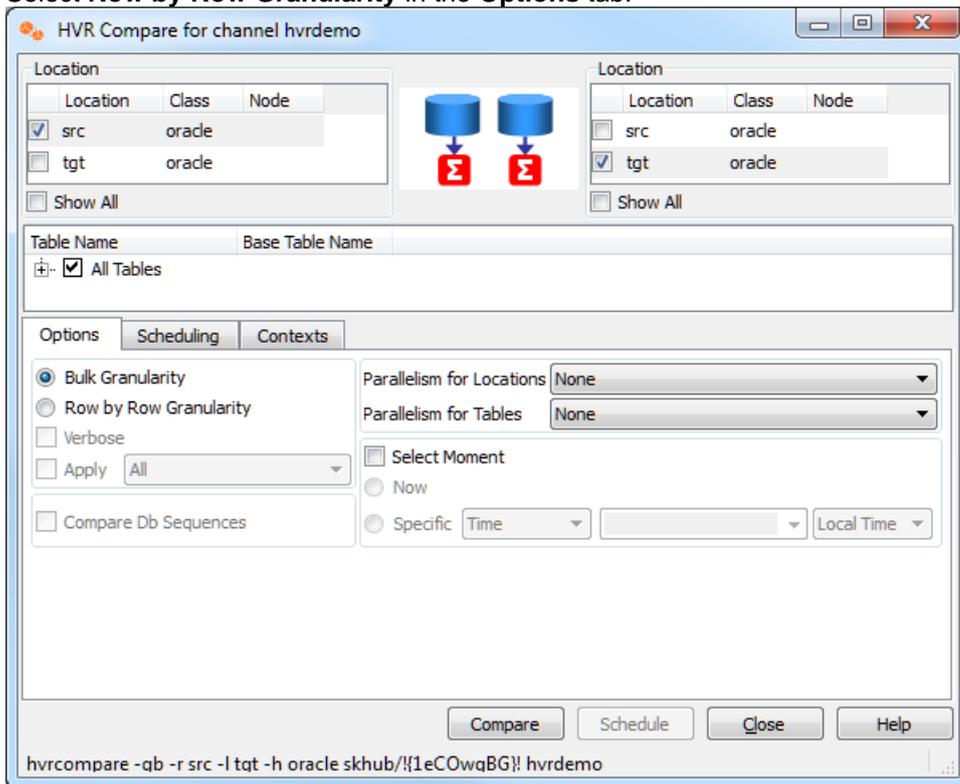
3. Execute **HVR Compare**,

a. In the navigation tree pane, right-click channel **hvrdemo HVR Compare**.



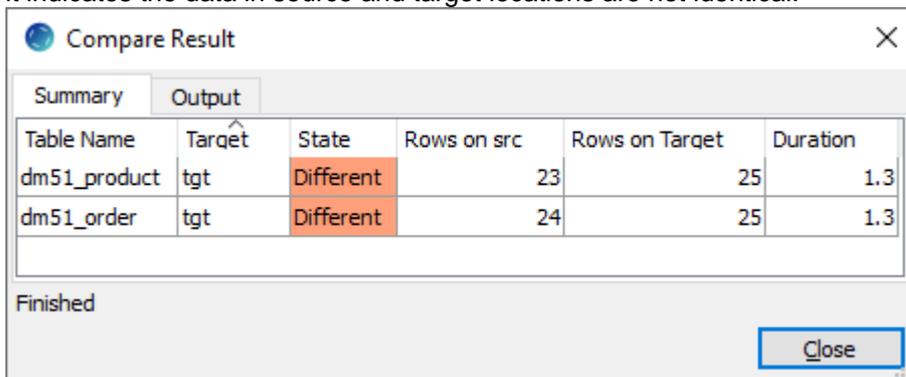
b. Select source location (**src**) on the left side and target location (**tgt**) on the right side.

c. Select **Row by Row Granularity** in the **Options** tab.



d. Click **Compare**.

e. On completion, **Compare Result** dialog is displayed. If the **State** column displays **Different**, it indicates the data in source and target locations are not identical.



f. Click **Close** in **Compare Result** dialog and **HVR Compare** dialog.

4. Start **Integrate Job** (**hvrdemo-integ-tgt**).

5. Execute **HVR Compare** again (step 3). In **Compare Result** dialog, if the **State** column displays **Identical**, it indicates the changes are replicated successfully.

