Schema Compare for Oracle 1.3

July 29th, 2010

Note: this documentation applies to an old version of this product.

For the latest documentation, see documentation.red-gate.com

Contents

Getting started

Schema Compare for Oracle enables you to compare and deploy Oracle database schemas.

This is useful, for example, in a development environment when you need to transfer changes made to a local database to a live database on a remote server. Traditionally, this meant spending hours scrutinizing the database structure and hand-generating migration scripts. Schema Compare for Oracle automates this process for you.

You can use Schema Compare for Oracle to compare and deploy Oracle Database 9i, 10g and 11g databases.

Requirements

The following are required to use Schema Compare for Oracle:

- Windows XP, Windows Server 2003, Windows Server 2008, Windows Vista®, or Windows 7.

- Microsoft .NET Framework version 4.0 or later.

  You can download the 32-bit framework (http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=0 856eacb-4362-4b0d-8edd-aab15c5e04f5), or the x64 framework (http://www.microsoft.com/downloads/details.aspx?familyid=B44A0000-ACF8-4FA1-AFFB-40E78D788B00&displaylang=en).

Schema Compare for Oracle: step-by-step

1. Choose the schemas to compare (page 17).
2. View the comparison results (page 30).
3. Set up the deploymen (page 37)t.
4. Create a deployment script (page 40).

Worked example

Learn more about Schema Compare for Oracle by following this detailed example:

- Comparing and deploying database schemas (page 4).

Worked example: Comparing and deploying databases

This worked example demonstrates a basic comparison and deployment of two schemas in an Oracle database.

In the example, The Wooly Widget Company has an Oracle database running on a live web server. This database contains many tables, views, indexes, packages, and other objects. The Wooly Widget Company's development team have been working on an upgrade to to their website. As part of this upgrade, they have made a number of changes to the structure of the development schema. They need to transfer the changes from the development schema to the test schema. This worked example uses Schema Compare for Oracle to transfer these changes.

The example has four steps:

1. Set up the schemas (page 4).

    Create the example database schemas on your Oracle server.

2. Set up the comparison (page 4).

    Specify the schemas you want to compare.

3. Select objects to deployment (page 6).

    Review the comparison results and select the objects you want to deployment.

4. Deploy the schemas (page 8).

    Create and run a deployment script.

1. Set up the schemas

The worked example uses the *WIDGETDEV and WIDGETTEST* schemas:

*   *WIDGETDEV* is the development schema
*   *WIDGETTEST* is the test schema

To create the schemas on your Oracle server:

1. Click here to view the SQL creation script (/support/Schema_Compare_for_Oracle/help/1.0/WidgetDatabases.sql) for the schemas.
2. Copy this script, paste it into your SQL editor, and run it on any database you choose.

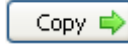   The schemas are created.

2. Set up the comparison

1. Start Schema Compare for Oracle if it is not already running.

The Project Configuration dialog box is displayed showing your most recent project:
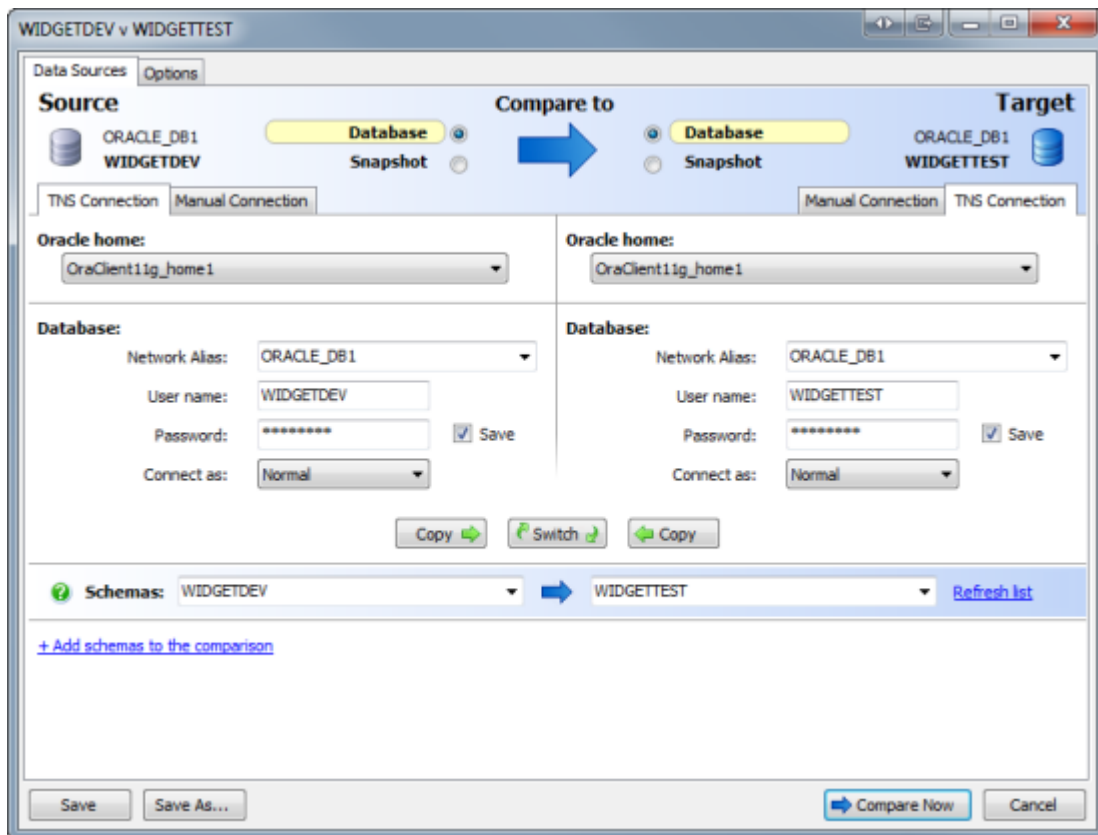
In this example, we will create a new project.

2. Click **Cancel** to close the dialog box.

3. On the toolbar, click ⬜ **New Project**.

   A new Project Configuration dialog box is displayed.

4. In the shaded upper pane, ensure both Source and Target are set to **Database**.

   In this example, we are comparing schemas from a live database; you can also compare schemas from saved snapshots.

5. Select a connection method to connect to the database on which you set up the schemas:

   ♦ If you want to connect using aliases in your *tnsnames.ora* configuration file, under **Source**, select the **TNS Connection** tab.

   ♦ If you do not not have Oracle client software installed, or cannot use a *tnsnames.ora* file, select the **Manual Connection** tab.

6. Enter connection details for the database on which you set up the schemas.

7. In the **User name** box, type *WIDGETDEV*, and in the **Password** box, type *password.*

8. To set the target database to the same as the source, click Copy ➡.

The connection details you entered for the source database are automatically entered for the target.

9. Under **Target**, in the **User name** box, type *WIDGETTEST*, and in the **Password** box, type *password.*

10. Under **Source**, in the **Schemas** box, select the *WIDGETDEV* schema*.*

11. Under **Target**, in the **Schemas** box, select the *WIDGETTEST* schema.

In this example, we are comparing only one source schema and one target schema. Schema Compare for Oracle allows you to compare as many schemas as you like. For more information, see Selecting schemas to compare (/supportcenter/Content.aspx?p=Schema Compare for Oracle&c=Schema_Compare_for_Oracle/help/1.0/sco_setting_data_sources.htm &toc=Schema_Compare_for_Oracle/help/1.0/toc1098210.htm#o10986).
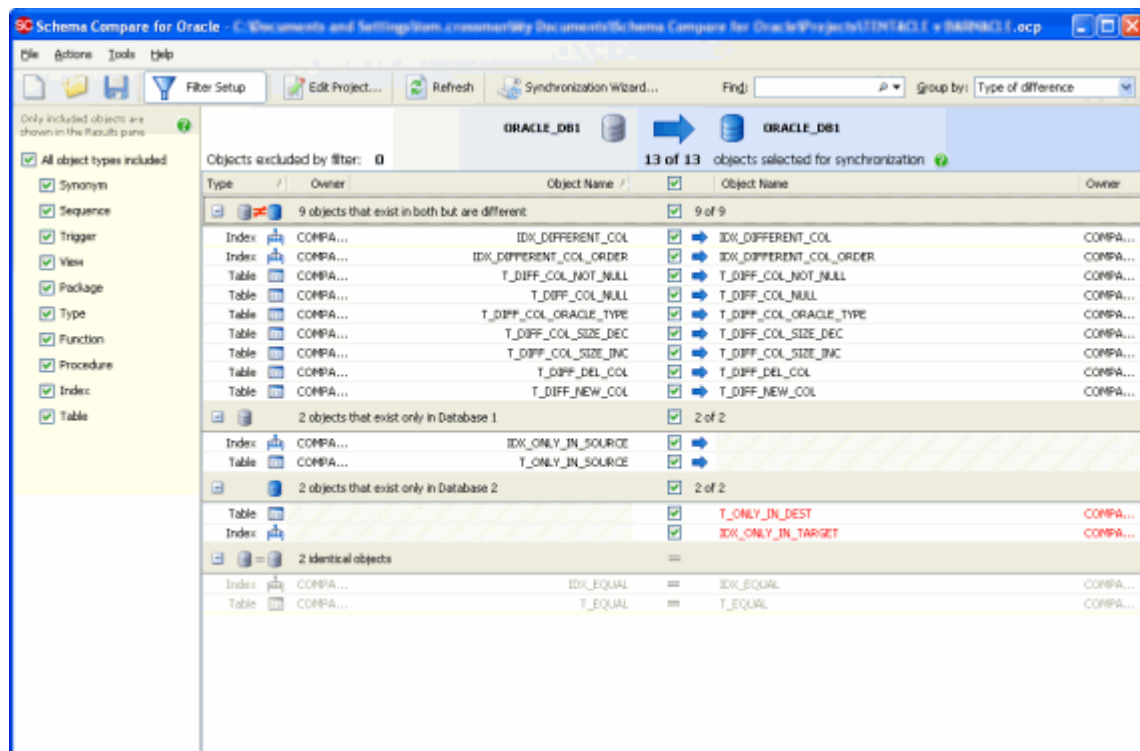
12. Click **Compare Now**.

Schema Compare for Oracle displays a message dialog box that shows the progress of the comparison.

13. When the comparison is complete, to close the message box, click **OK**.

3. Select objects to deployment

The results of the comparison are displayed:

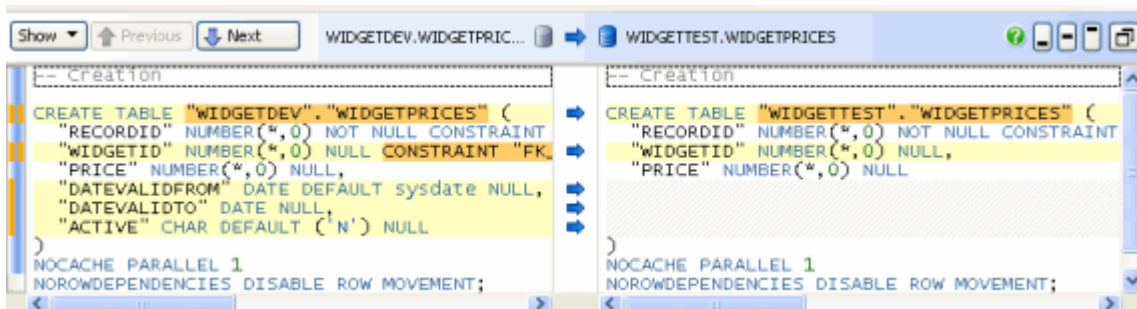
The results are grouped by:

   objects that exist in both databases but are different

objects that exist in *WIDGETDEV* but do not exist in *WIDGETTEST*

objects that exist in both databases and are identical

To view the objects in a group, click ⊞:

To display a side-by-side, color-coded listing of the differences in the object creation scripts, click an object in the upper pane. The SQL Differences pane is displayed. This example shows the *WIDGETPRICES* table:

For more information, see:

- Viewing the comparison results (page 30)
- Viewing the SQL differences (page 34)

To select objects for deployment, use the check boxes in the middle of the results.

In this example, we will deployment all objects that are different:

1. To the left-hand side of the comparison results, in the Filter pane, ensure the default filter *All object types included* is selected.

   The filter defines which objects are displayed. When you use the filter to exclude an object, it is removed from the Results pane and cannot be selected for deployment.

   For more information, see Using the filter (/supportcenter/Content.aspx?p=Schema Compare for

Oracle&c=Schema_Compare_for_Oracle/help/1.0/sco_viewing_comparison_resul
ts.htm&toc=Schema_Compare_for_Oracle/help/1.0/toc1098219.htm#o9487).

2. To select all objects for deployment, in the central column of the Results pane, select the top level check box:
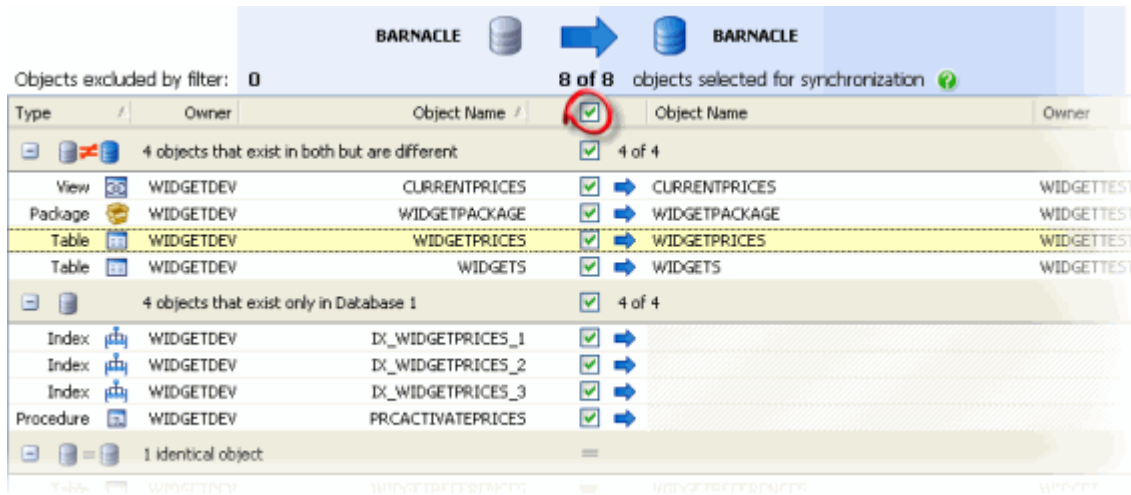
All objects are selected, and the 🔄 **Deployment Wizard** button becomes available.

3. Click 🔄 **Deployment Wizard**.

4. Synchronize the schemas

The Synchronization wizard creates the SQL script to make the objects you selected (page 6) in the comparison results identical.

On the first page of the wizard you can choose to create and save a synchronization script, or perform the synchronization using Schema Compare for Oracle.

In this example, we will synchronize using Schema Compare for Oracle:
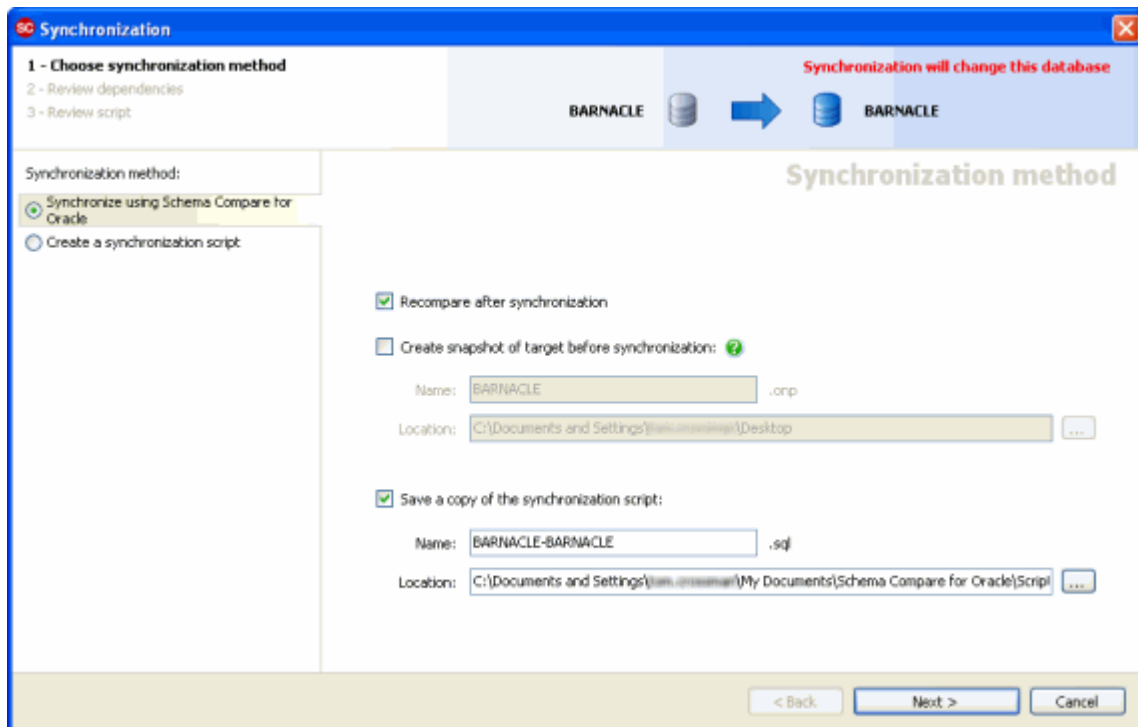
1. On the left side of the wizard, select **Synchronize using Schema Compare for Oracle**, if is not already selected.

2. Clear the **Create snapshot of target before synchronization** check box.

    In this example, we will not create a snapshot before we synchronize.

3. Ensure the **Recompare after synchronization** and the **Save copy of the synchronization script** check boxes are selected.

    In this example, we will run the script from Schema Compare for Oracle, and compare the databases afterwards to see that the synchronization has been successful. We will also save a copy of the synchronization script.

4. Click **Next**.

The **Review dependencies** page of the wizard lists any objects that you did not select for synchronization that reference, or are referenced by, objects you did select for synchronization:
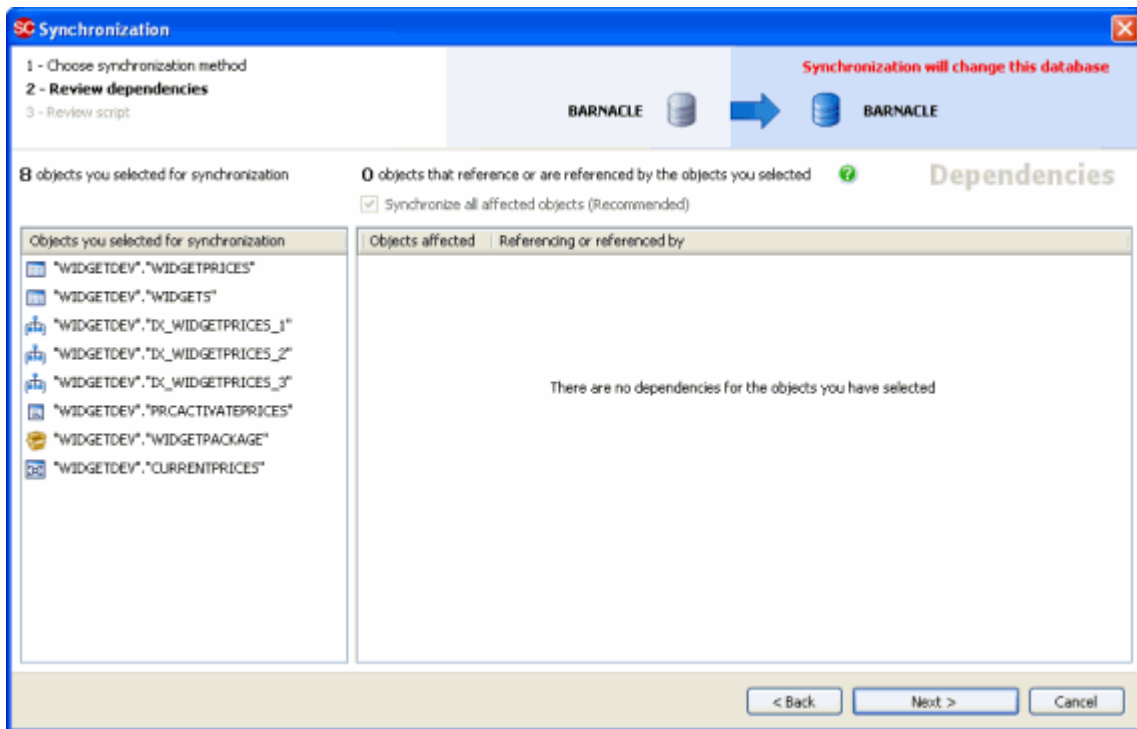
All the objects you selected for synchronization are listed in the left-hand pane, and any affected objects are listed in the right hand pane. For more information, see Review dependencies (/supportcenter/Content.aspx?p=Schema Compare for Oracle&c=Schema_Compare_for_Oracle/help/1.0/sco_using_the_synchronization_wizard.htm&toc=Schema_Compare_for_Oracle/help/1.0/toc1098225.htm#o9527).

In this example there are no affected objects.

Review script

The final page of the wizard displays information about the synchronization:
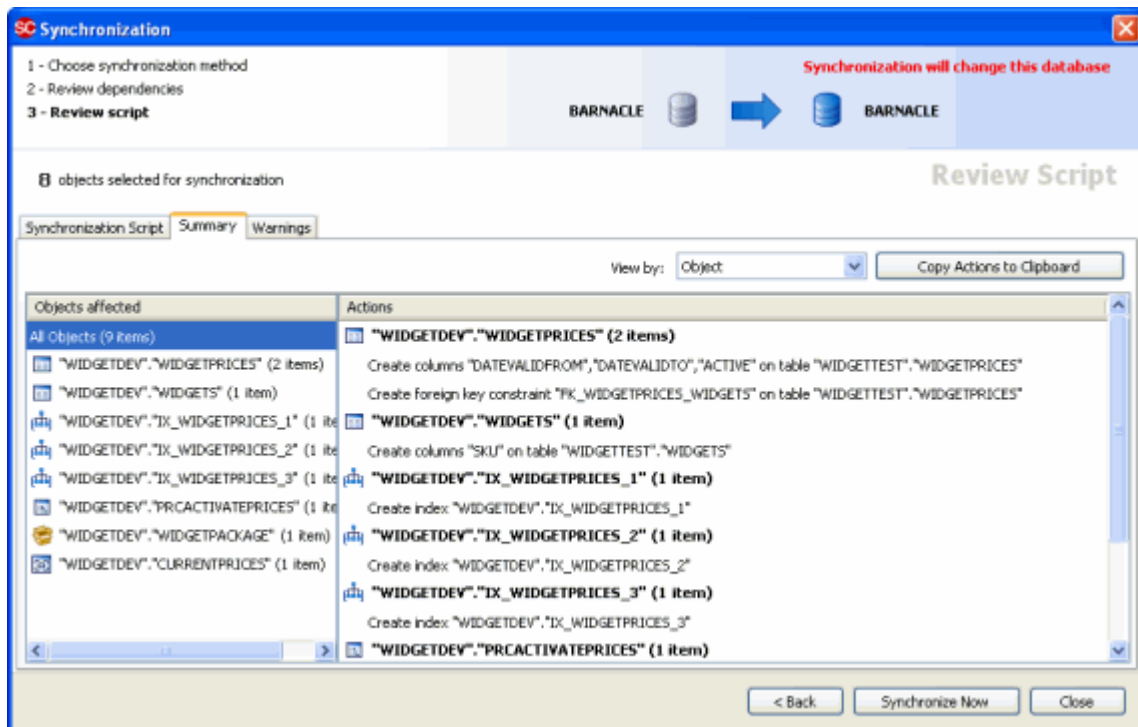
There are three tabs on the **Review script** page:

- **Synchronization script** displays the script Schema Compare for Oracle has created to synchronize the data sources.

  You can search the script, save it, or copy it to the clipboard.

- **Summary** displays a synopsis of the actions in the synchronization script.

  You can view the summary grouped by the objects affected, by the type of modification, or by the order in which the script modifies the target.

- **Warnings** displays a list of any warnings about unexpected behavior that may occur when you synchronize the databases.

  In this example there are no warnings.

Performing the synchronization

When you have reviewed the script, synchronize the schemas:

1. Click **Synchronize Now**.

2. A confirmation dialog box is displayed; to continue, click **Synchronize Now**.

3. Schema Compare for Oracle displays a message dialog box that shows the progress of the synchronization.

   When the synchronization is complete, click **OK** to close the message box.

Schema Compare for Oracle then re-compares the databases. The results are shown in the main window. In this example, all objects are shown to be identical, confirming that the synchronization has been a success:

You can launch Schema Compare for Oracle directly from Oracle SQL Developer using the Schema Compare for Oracle extension.

To install the extension:

1. In Oracle SQL Developer, on the **Help** menu, click **Check for Updates**.
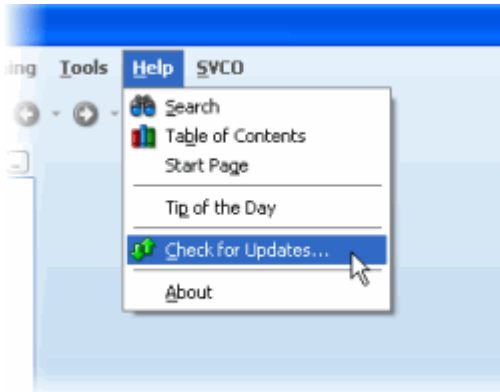
2. On the Welcome page of the Check for Updates wizard, click **Next**.

3. On the Source page of the wizard, ensure that the **Third Party SQL Developer Extensions** check box is selected, and click **Next**.
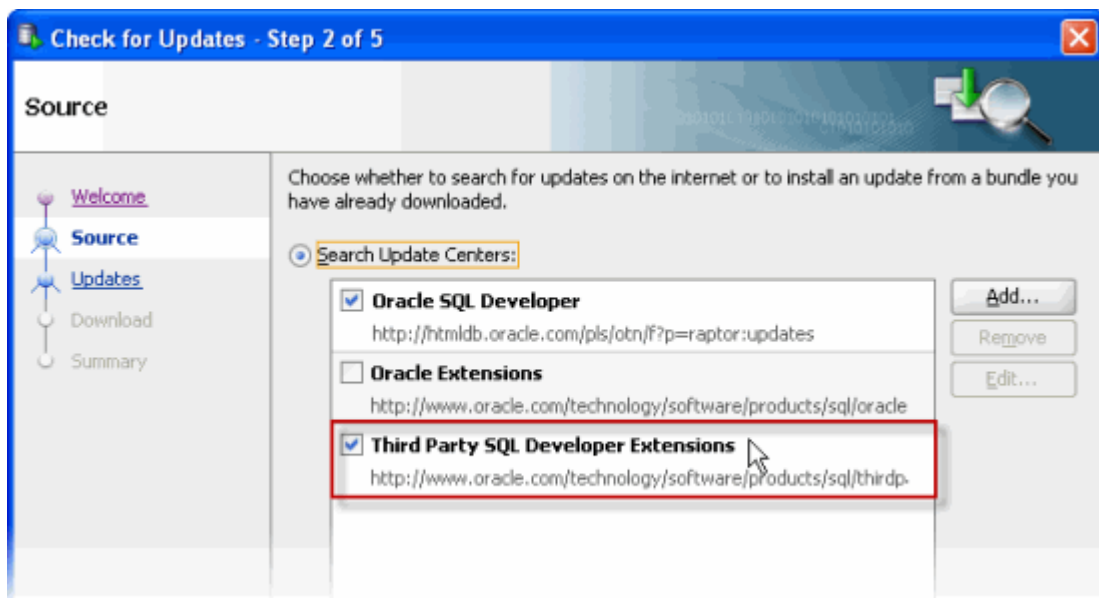
4. Select the **Schema Compare for Oracle** check box, and click **Finish**.

   The Schema Compare for Oracle extension is installed. Note that you must restart Oracle SQL Developer to use the extension.

To launch Schema Compare for Oracle using the extension:

1. On the Oracle SQL Developer menu bar, click ![SC].

2. If Schema Compare for Oracle is already installed on your computer, select **Use an existing installation of product**, browse to the location where you installed Schema Compare for Oracle, and select *RedGate.Oracle.Compare.UI.exe*.

   If you have not installed Schema Compare for Oracle, select **Install Schema Compare for Oracle**.

3. Click **OK**.

   If you selected to install Schema Compare for Oracle, the installer runs. Follow the instructions to install Schema Compare for Oracle on your computer.

4. Restart Oracle SQL Developer.

5. On the Oracle SQL Developer menu bar, click ![SC].

Working with projects

Whenever you compare database schemas, you set up a project. If you have any existing projects, the Project Configuration dialog box for your most recently used project is displayed when you start Schema Compare for Oracle.

A project contains details of:

- which data sources (page 17) you selected

- the connection details for your data sources

- which schemas you selected to compare

- which project configuration options (page 26) you selected

- which objects you have selected for deployment (page 37)

- your filter (/supportcenter/Content.aspx?p=Schema Compare for Oracle&c=Schema_Compare_for_Oracle/help/1.0/sco_viewing_comparison_resul ts.htm&toc=Schema_Compare_for_Oracle/help/1.0/toc1098219.htm#o9487) settings

Finding a project

On the toolbar, click to display the **Open Project** browser:
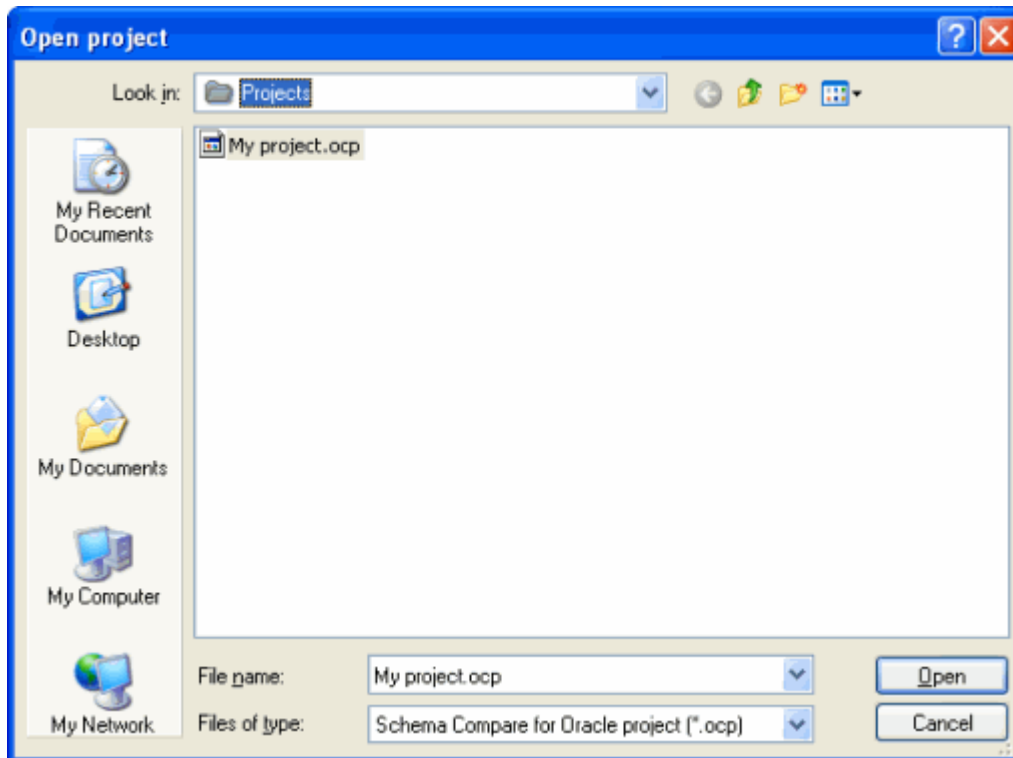
The browser allows you to locate and open saved project files on your computer.

By default, Schema Compare for Oracle project files are saved in:

%ALLUSERSPROFILE%\My Documents\Schema Compare for Oracle\Projects

Project files are saved with the extension *.ocp*

Creating and saving a project

To create a new project, on the toolbar, click **New**.

To save a project, on the toolbar, click **Save**. Alternatively, on the Project Configuration dialog box, click **Save**.

You can also save a project when you are reviewing its comparison results (page 30). This can be useful if you want to save your object selections with the project.

If there are unsaved changes in the current project, you will be prompted to save when you create a new project, open another project, or when you close Schema Compare for Oracle.

Setting data sources

When you create a new project, Schema Compare for Oracle requires information about which two data sources you want to compare, and how to connect to them.

This topic describes how to connect to data sources in Schema Compare for Oracle.

Selecting data sources

You enter information about the data sources you want to compare on the Project Configuration dialog box.
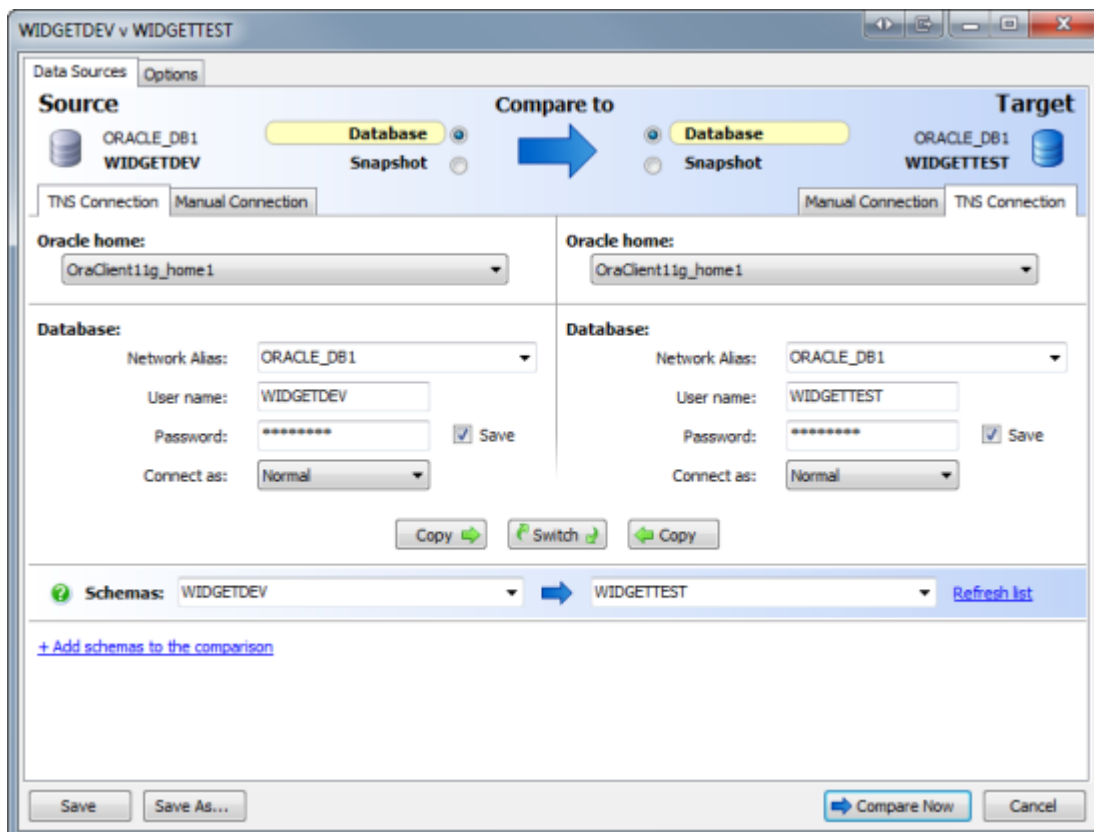
Specify the two data sources you want to compare in the **Data Sources** tab. You specify a *source* and a *target*. The *source* is the data source that will not change; the *target* is the data source that will change.

To switch the source and target, click .

You can compare the following types of data source:

- Database

  A database on an Oracle server that you can connect to.

  You will need to enter connection details. You can connect to an Oracle database using a TNS connection (page 18) or a manual connection (page 18).

- Snapshot

  A file created by Schema Compare for Oracle that contains information about the structure of database schemas.

  If you select a snapshot as the target, the snapshot file will not be modified. Instead, a deployment script is generated to modify the database from which the snapshot was made.

  You can compare any combination of data source types in your project.

Using a TNS connection

A TNS connection enables you to connect to a database using an alias specified in your *tnsnames.ora* configuration file.

By default, *tnsnames.ora* is located in:

ORACLE_HOME/network/admin

To connect using a TNS connection:

1. Under Source or Target, select **Database**.

2. Select the **TNS Connection** tab, if it is not already selected.

3. In the **Oracle home** box, type or select the name of the Oracle home.

   An Oracle home is the location of an Oracle Database installation.

4. Under **Database**, in the **Network Alias** box, type or select the alias (network service name) of the database and then enter the **User name** and **Password**.

   If you want Schema Compare for Oracle to remember your password, select the **Save** check box.

5. In the **Connect as** box, select the privileges you want to connect with.

Using a manual connection

A manual connection can be useful if:

- you do not not have Oracle client software installed, and cannot use a *tnsnames.ora* file

- you do not have an alias entry for a database you want to compare in your *tnsnames.ora* file

- you are experiencing problems connecting to a database using a TNS connection

- you want to connect to a database without an Oracle client installed, using a direct connection (page 20)

To connect using a manual connection:

1. Under Source or Target, select **Database** as the data source.

2. Select the **Manual Connection** tab.

3. In the **Host name** box, type the host system name for the database .

    A host system name can be:

    ♦ an IP address

    ♦ a computer name

    ♦ *localhost*, if you connect to a database that is on the same computer as Schema Compare for Oracle

4. In the **Port** box, type the listener port number.

5. From the **Database** menu, select **SID** or **Service name**.

    A SID (system identifier) is a unique name for an Oracle database on a specific host; a service name is an alias for a database specified in your *tnsnames.ora* configuration file.

6. Type the SID or service name as appropriate, and enter the **User Name** and **Password**.

    If you want Schema Compare for Oracle to remember your password, select the **Save** check box.

7. In the **Connect as** box, select the privileges you want to connect with.

Selecting a snapshot

1. Under Source or Target, select **Snapshot**.

2. In the **Snapshot** box, type the file path of a saved snapshot file or click [...] to browse to a snapshot file.

Schema Compare for Oracle displays information about the database from which the snapshot was created.

Selecting schemas to compare

When you have specified source and target data sources, you can select the schemas to compare. You can compare a single schema from each data source, or multiple schemas.

To compare a single schema from each data source:

1. Under **Source**, in the **Schemas** box, type or select a schema.

   If a schema with the same name exists in the target data source, it is automatically selected.

2. If you want to compare to a different schema, under **Target**, select the required schema.

If no schemas are displayed in **Schemas**, click **Refresh list**.

Note that if you are using a snapshot, you can only select from the schemas that were included when the snapshot was created.

To compare multiple schemas from each data source:

1. In the **Schemas** boxes, select a source and a target schema to compare.

2. Click **+Add schemas to the comparison**.
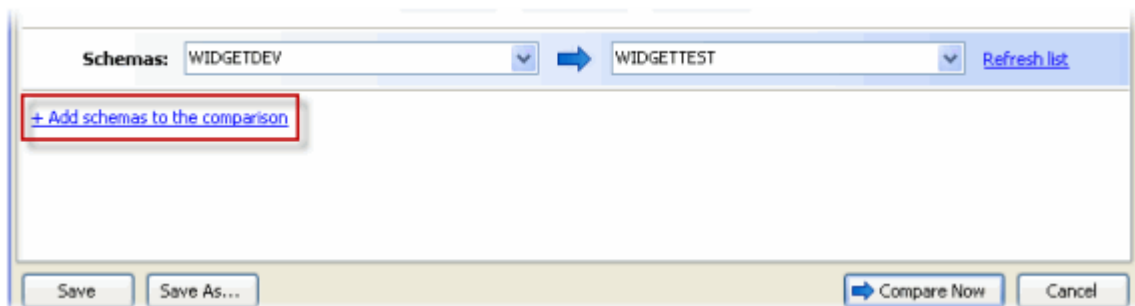
The schemas you selected are added to the comparison, and displayed in the lower pane.
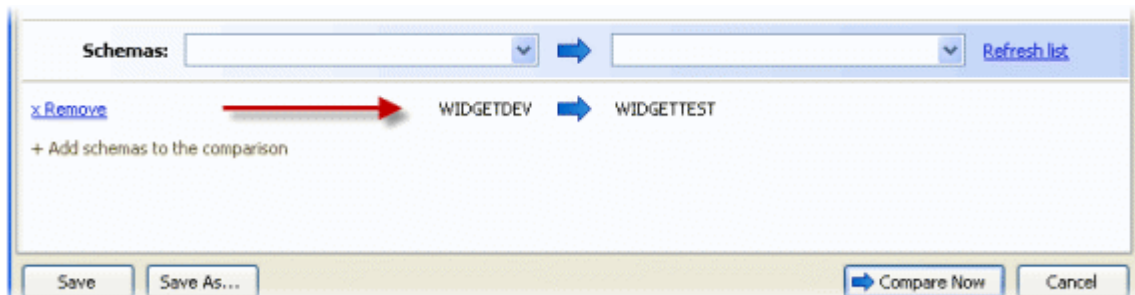
3. Repeat this process for as many schemas as you want to compare.

Note that the schemas selected in the **Schemas** boxes and the schemas in the lower pane are all compared when you run the comparison.

If you want to remove schemas that you have added to the comparison, click **x Remove**.
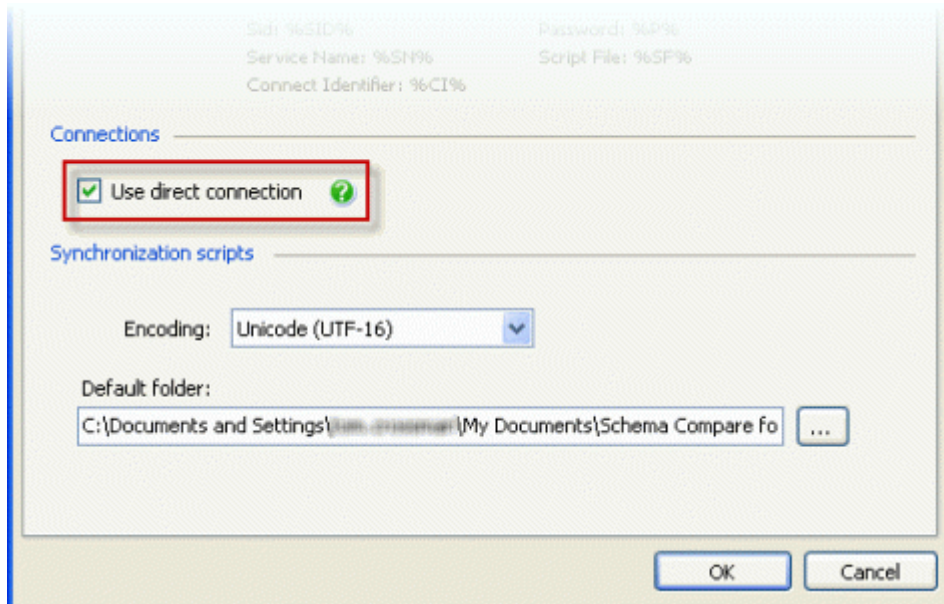
Using a direct connection

You can choose to connect to a database directly over TCP/IP when you are using a manual connection (page 18).

A direct connection does not require an Oracle client, and can be useful if you are experiencing problems connecting to databases.

To use a direct connection:

1. On the **Tools** menu, click **Application Options**.

2. Under **Connections**, select the **Use direct connection** check box.

3. Click **OK**.

   You can now use a manual connection (page 18) to connect to a database directly.

Note that if you use a direct connection, you cannot use a service name to connect to a database.

Working with snapshots

A snapshot is a compressed XML file containing information about the structure of one or more database schemas.

You can use snapshots to save the structure of schemas at a specific point in time. You can then compare a live database with a saved snapshot to see what changes have been made. Any changes can then be restored by using the snapshot as the source for deployment.

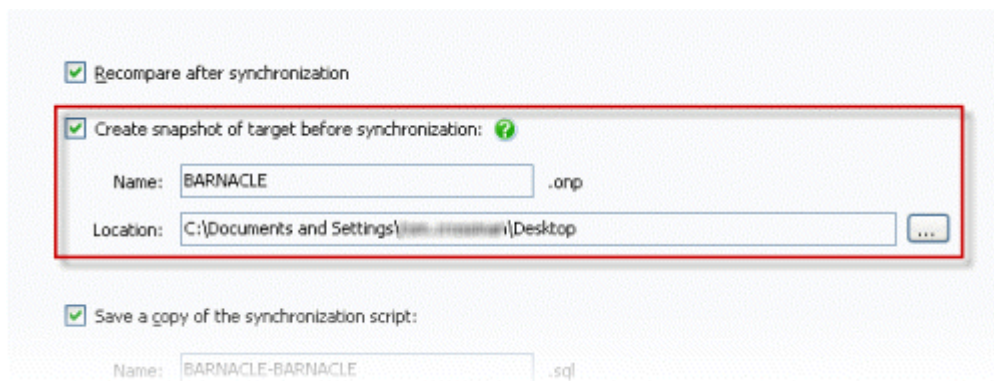Note that snapshots do not contain any table data.

You can create a snapshot of:

- the target schemas before you deploy them
- the source or target schema(s) that you have compared
- schemas from a selected database

Creating a snapshot of the target schemas before deployment

In the Deployment Wizard (page 40), you have the option to automatically create a snapshot of the target schemas you selected for comparison, before you deploy them.

On the **Choose deployment method** page of the Deployment Wizard, select the **Create snapshot of target before deployment** check box, and enter a name and location for the snapshot:
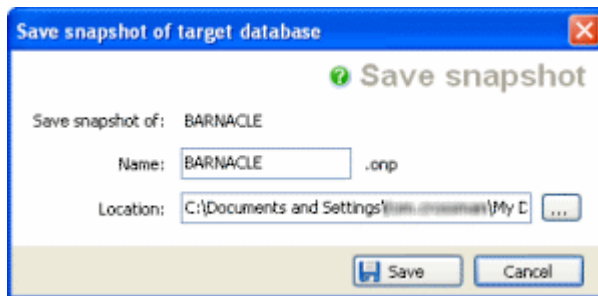

Creating a snapshot of the source or target schema(s) you have compared

To create a snapshot of the schemas you selected for comparison in the source or target data source:

1. Select the data sources (page 17) to compare, and run the comparison.

   The comparison results are displayed.

2. On the **File** menu, click either **Create Snapshot of Source** or **Create Snapshot of Target**.

    The **Create Snapshot** dialog box is displayed:

3. Specify a name and location for the snapshot, and click **Create Snapshot**.

Note that:

- you can create a snapshot of the source or target schemas only when you have run the comparison

- you cannot select individual objects to include in the snapshot; all objects in the schema(s) you selected for comparison are included

- if ghost objects (/supportcenter/Content.aspx?p=Schema%20Compare%20for%20Oracle&c=Schema_Compare_for_Oracle/help/0.1Early_Access/scoEAP_dependencies.htm&toc=Schema_Compare_for_Oracle/help/0.1Early_Access/toc.htm#o9695) are included in the comparison, they will be included in the snapshot

Creating a snapshot of schemas from a selected database

To create a snapshot of schemas from a selected database without running a comparison:

1. On the **File** menu, click **Create Snapshot**.

The **Create Snapshot** dialog box is displayed:

2. Under **Data source details**, enter connection details for the database you want to create the snapshot from.

   For information about connecting to databases, see Setting data sources (page 17).

3. Under **Schemas**, click **Refresh Schemas** to display the list of schemas in the database.

4. Select schemas to include in the snapshot by selecting the check box next to each schema.

5. Specify a name and location for the snapshot, and click **Create Snapshot**.

Deploying snapshots

When a snapshot is the source data source and a database is the target data source, deploying updates the database to deploy it to the snapshot.

When a snapshot is the target data source, deploying creates a script to update the database from which the snapshot was created. Note that snapshots cannot be modified directly.

Setting project options

Project options enable you to modify the comparison and deployment behavior of Schema Compare for Oracle.

For example, you can set a project option so that when you run a comparison, certain differences between two objects are ignored.
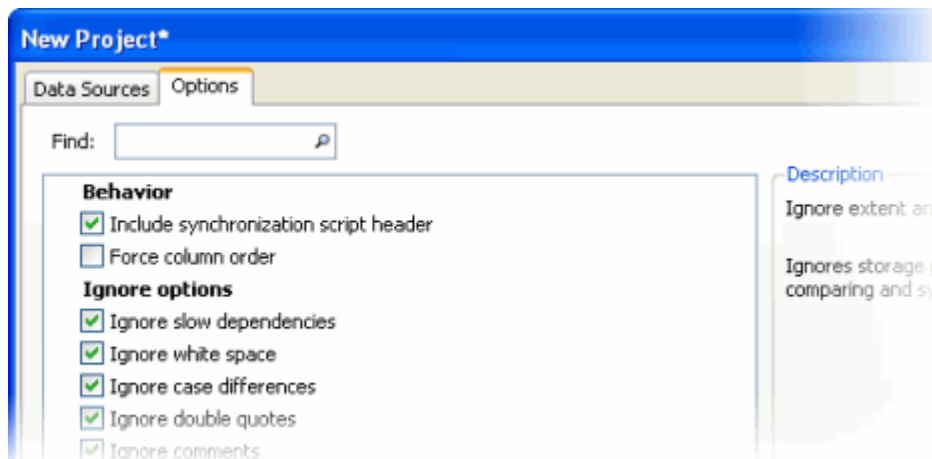
To set project options:

1. Open the Project Configuration dialog box if it is not displayed.

   - If you want to set options for a new project, on the toolbar, click 🗋 **New**

   - If you want to set options for a saved project, on the toolbar, click 📁 **Open**, select a project, and click **Open**

   - If you are reviewing comparison results for an open project, on the toolbar, click 📝 **Edit Project**

1. On the Project Configuration dialog box, click the **Options** tab.

   The list of available options is displayed:

2. For each option you want to set, select its check box.

To search for an option, type search text in the **Find** box. The list of options is filtered to display only options that contain the search text.

The options you set are saved for each project. For more information on projects, see Working with projects (page 15).

Schema Compare for Oracle project options

The project options you can set are described below.

Include deployment script header

Includes a comment header at the top of deployment scripts. The header includes:

- the date and time the script was created
- the Schema Compare for Oracle build number used to create the script

Force column order

If deployment requires that additional columns are inserted into the middle of a table, this option forces a rebuild of the table so that column order is preserved following deployment.

A table is rebuilt in four steps:

1. A new table is created.
2. Data from the original table is copied into the new table.
3. The original table is dropped.
4. The new table is renamed as the original table.

Ignore slow dependencies

Ignores certain dependencies that affect comparison performance when comparing databases. The following dependencies are ignored:

- type objects in your schema that are referenced by an object in another user's schema
- REF constraints in your schema that reference, or are referenced by, objects in another user's schema

Note that if this option is not selected, all dependencies will be read, and comparisons may be slow.

Ignore white space

Ignores white space (newlines, tabs, spaces, and so on) in object SQL creation scripts when comparing databases.

Note that white space will not be ignored when the databases are deployed.

Ignore case differences

Ignores case differences in object SQL creation scripts when comparing databases. For example, if you set this option, *MYTABLE* and *mytable* are not considered different table names.

Note that case differences in strings and double quoted identifiers are not ignored. Case differences will not be ignored when the databases are deployed.

Ignore double quotes

Ignores double quotation marks around identifiers when comparing databases.

Note that double quotation marks will not be ignored when the databases are deployed.

Ignore comments in PL/SQL blocks

Ignores comments in PL/SQL blocks when comparing databases.

Note that comments will not be ignored when the objects are deployed.

Ignore constraint names

Ignores the names of foreign keys, primary keys, and default, unique, and check constraints when comparing databases.

Note that the constraint names will not be ignored when the databases are deployed.

Ignore storage

Ignores storage properties (physical properties and partitioning clauses) on tables when comparing and deploying databases.

Note that table organization (heap-organized or index-organized) will not be ignored.

Ignore sequence current value

Ignores the current value of sequences when comparing and deploying databases.

If this option is set and you deploy a sequence, the current value of the target sequence is retained. Note that if the current value of the target sequence is not within the MINVALUE and MAXVALUE limits of the source sequence, the current value will be reset to a default value.

If this option is not set and you deploy a sequence, the current value of the source sequence is used as the current value for the target sequence.

Default options

To save your option settings as the default options for all new projects, click **Save as My Defaults**. To revert to your default settings after making changes, click **My Defaults**.

To reset all the options to their original settings, click **Red Gate Defaults**. The Red Gate default options are as follows:

- Include deployment script header
- Ignore slow dependencies
- Ignore white space
- Ignore case differences
- Ignore double quotes
- Ignore comments
- Ignore constraint names
- Ignore storage
- Ignore sequence current value

Viewing the comparison results

When you have compared the data sources, Schema Compare for Oracle displays the comparison results. The Results pane displays all the objects you can select for deployment (page 37):

You can define which objects are displayed by setting up a filter. You can also view the differences in the objects' creation scripts in the SQL Differences pane (page 34):

To compare the data sources again using the same project configuration, and update the comparison results, click **Refresh**.

Object groups

Objects in the results are displayed in groups. You can select how objects are grouped using the **Group By** box:
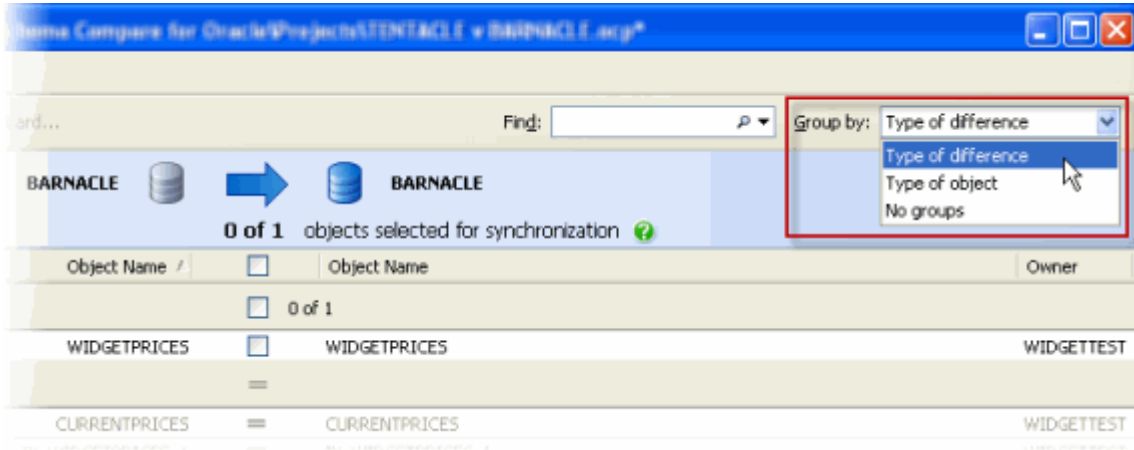
You can group objects by:

- Type of difference

    In the Results pane, when objects are grouped by *Type of difference,* the **Type** column indicates the difference:

≠	objects that exist in both data sources but are different
	objects that exist only in the *Source*
	objects that exist only in the *Target*
=	objects that exist in both data sources and are identical

    Type of difference is the default grouping.

- Type of object

    In the Results pane, when objects are grouped by *Type of object*, the **Type** column indicates the type of object:

	Tables		Views
	Procedures	f(x)	Functions
	Indexes		Types
	Triggers		Synonyms
	Sequences		Packages

    The **Owner** column displays the owner, or schema, of the object.

    Note that this column is shown only when more than one schema in the database is compared.

- No groups

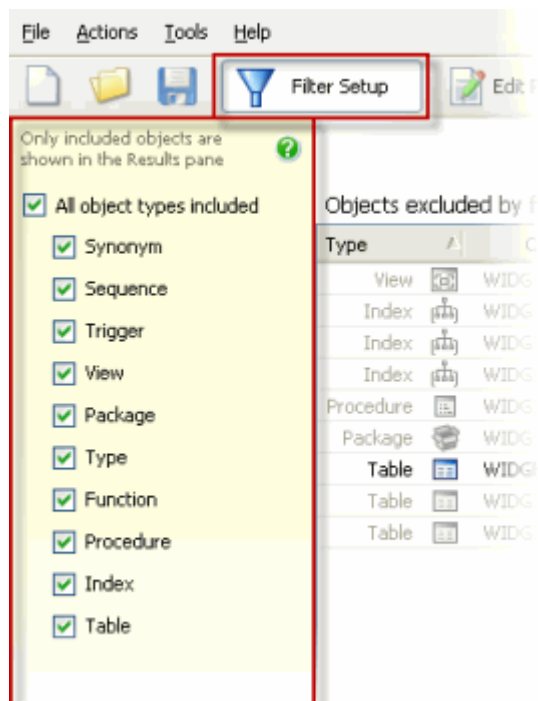 All objects are listed individually; they are not displayed in groups.

To view the individual objects within a group, click ⊞, or click the group heading bar:
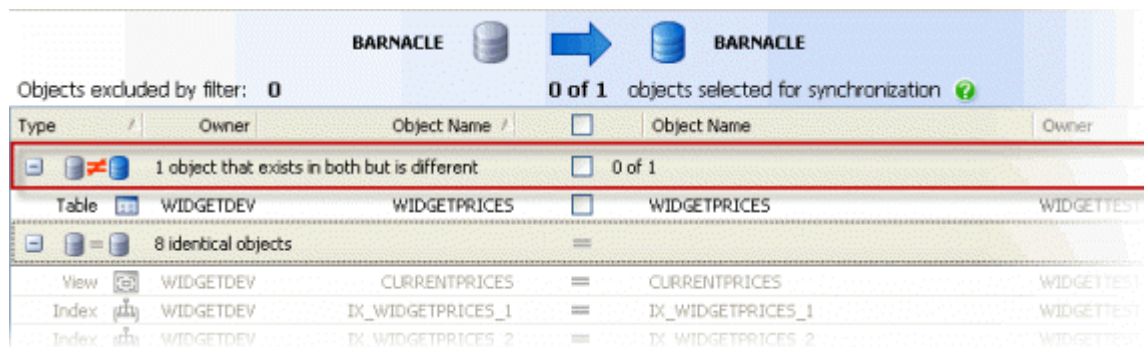
Using the filter

You can specify which objects are included in, or excluded from, the results, by using the **Filter** pane.

To display the Filter pane, click **Filter Setup**:

The default filter is *All objects included*, which includes all objects in the Results pane.

To exclude an object type from the results, clear its check box. If you only want one type of object to be displayed in the results, first clear the *All object types included* check box, and then select the check box for that object type.

Note that if you select an object for deployment and then set up a filter that excludes that object type, the object is not included in the deployment. Only selected objects that are shown in the comparison results are included.

For example, if you select *TableA* for deployment, and then set up a filter to exclude all tables, no tables are shown. If you subsequently remove the filter, *TableA* is displayed and remains selected for deployment.

Finding an object

You can also use the **Find** box to assist you with your selection.

To locate objects, in the **Find** box, type the search text. To select a recent search, click the **Find** arrow button ▾

As you type, objects are grouped in the upper pane by whether they match or do not match what you type.

Schema Compare for Oracle searches object names and owners (schemas).

Note that the search is not case-sensitive.

To clear the **Find** box, click the ✕ button.

Note that if an object matches the term in the **Find** box, *and* is excluded by a filter, it is not displayed in the results.

Viewing the SQL differences

When you are reviewing the comparison results (page 30), a side-by-side listing of differences in the creation SQL script for an object is displayed in the lower (SQL Differences) pane. To display the SQL Differences pane, click an object in the upper (Results) pane.
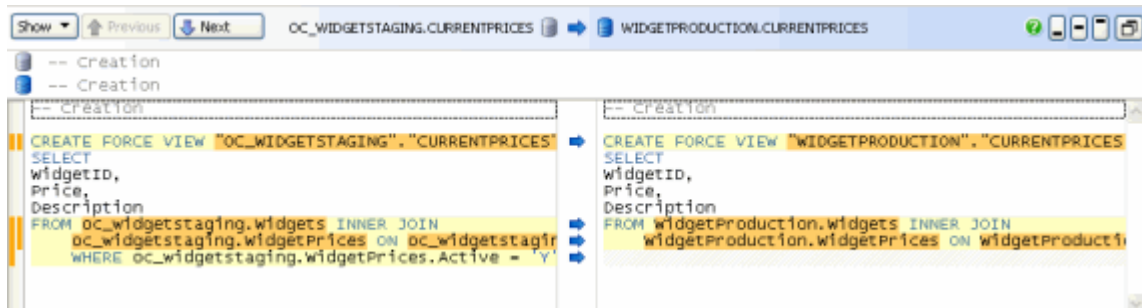
You can adjust the height of the SQL Differences pane by dragging it up or down, or by using the ⬛⬛⬛ buttons to move the pane to a pre-set height.

Click 🗗 to open the SQL Differences pane in a separate window. If you are working with multiple monitors, it can be useful to move this window to another monitor. Click 🗗 again to re-dock the window.

If you close the SQL differences pane, click an object in the Results pane to display it again.

Viewing differences

Lines that contain differences are displayed with a shaded background; text within a line that is different is displayed with a darker shaded background.

The central column shows the type of difference:
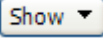
    ≠   there are differences in the group of SQL statements

    ➡   this line of SQL will be added if you deploy this object (the
    ⬅   direction of the arrow indicates the database that will be updated)

   ✕   this line of SQL will be removed if you deploy this object

There is no icon if the two lines are identical.

Use ⬇ **Next** and ⬆ **Previous** to go to lines that contain a difference. Alternatively, use Alt + Up Arrow and Alt + Down Arrow.

The Line Differences bar

The Line Differences bar displays the selected line of the SQL creation script in both data sources one on top of the other. This is especially useful when the lines are too long to view all the text.

To display the Line Differences bar, click Show ▾ and then click **Line Differences**.
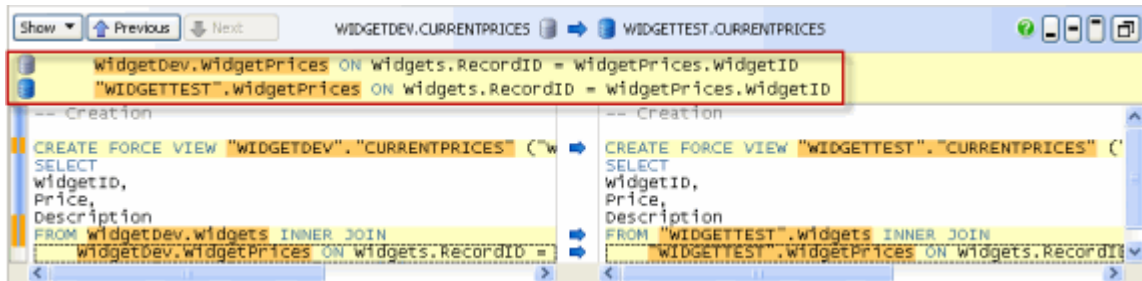
Scroll bar

Colored blocks in the left scroll bar indicate the location in the script of lines that are different.

a line of SQL that exists only in the object script on the left

a line of SQL that exists only in the object script on the right

a line of SQL that exists in both object scripts, but is different

Searching and copying the creation script

To search the SQL statements, right-click in the relevant box, and click **Find**.

To repeat a search in the other data source, click either **Find in target** or **Find in source**.

The search is not case-sensitive.

Creating a report

When you have run a comparison, you can create a report of the results.

To create a report:

1. On the **Tools** menu, click **Create Report**.

   The **Create Report** dialog box is displayed:
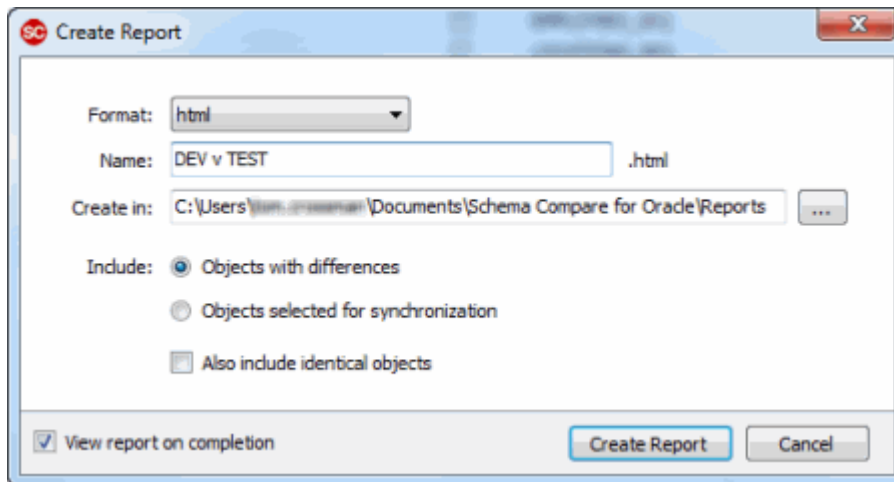
2. In the **Format** box, select your required output format. You can create a report in one of three formats:

   ♦ Simple HTML

   ♦ XML

   ♦ CSV

3. Specify a name and location for the report.

4. To include only objects with differences in the report, under **Include**, select **Objects with differences**.

   To include all the objects that you have selected for deployment (page 37), select **Objects selected for deployment**.

   Additionally, you can select the **Also include identical objects** check box to include identical objects in the report.

5. Click **Create Report**.

Setting up the deployment

When you have reviewed the comparison results (page 30), you can select the objects you want to deployment.

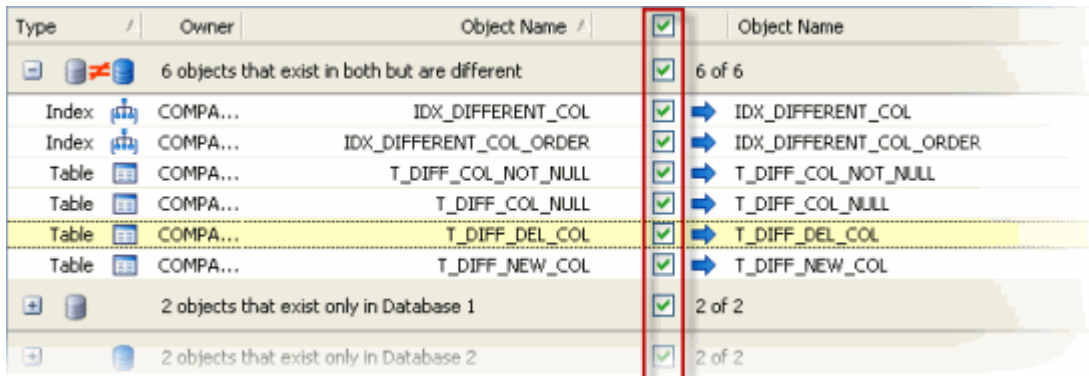By default, no objects are selected for deployment. You select objects to deploy using the central check boxes in the results pane:

To select all the objects in a group for deployment, select the check box on the grouping bar for that group; alternatively, you can right-click within the group and then click **Include All Objects in this Group**.

To exclude all the objects in a group from the deployment, clear the check box on the grouping bar for that group; alternatively, you can right-click the group and then click **Exclude All Objects in this Group**.

If only some objects in a group are selected for deployment, the check box on the grouping bar shows a mixed state:

To include or exclude all objects that are displayed in the results pane, use the top-level check box in the central column:

You can also filter the object types (/supportcenter/Content.aspx?p=Schema Compare for Oracle&c=Schema_Compare_for_Oracle/help/1.0/sco_viewing_comparison_results. htm&toc=Schema_Compare_for_Oracle/help/1.0/toc1098219.htm#o9487) and use the Find box (/supportcenter/Content.aspx?p=Schema Compare for Oracle&c=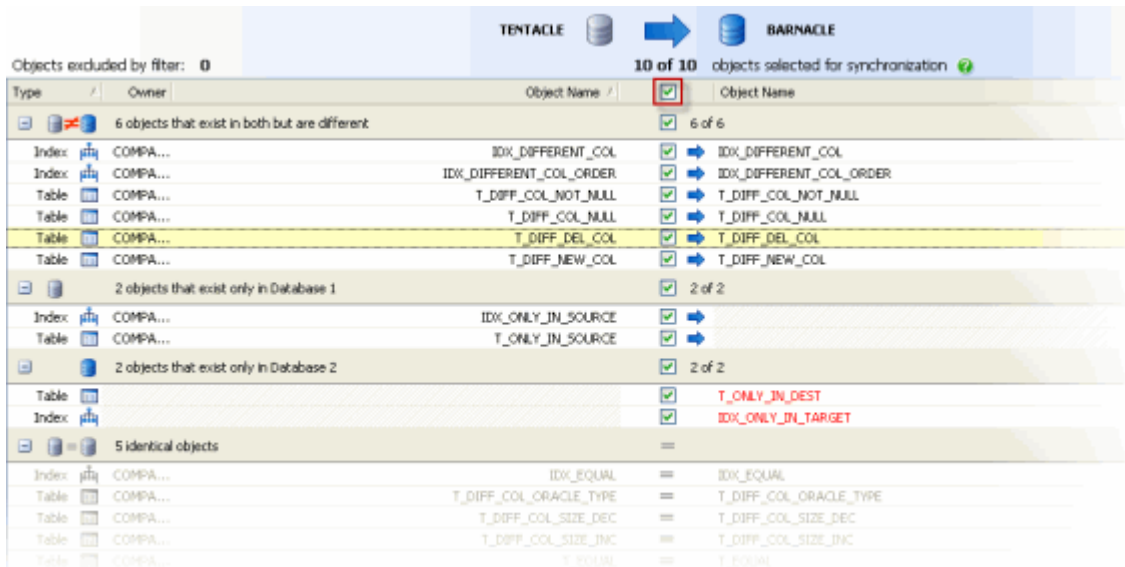Schema_Compare_for_Oracle/help/1.0/sco_viewing_comparison_results. htm&toc=Schema_Compare_for_Oracle/help/1.0/toc1098219.htm#o9505) to assist you with your object selections.

Object selections are remembered when you save a project. Note that if you save a project with a grouping set to include all objects in that group, the next time you use the project all objects in that group are selected for deployment, even if they did not exist when the project was saved.

When you have selected the objects you want to deploy, click 🖳 **Deployment Wizard** to start the Deployment wizard (page 40).

Example: Selecting only views

To select only views for deployment:

1. In the central column of the results, clear the top-level check box if it is selected.

2. In the **Filter** pane, ensure that the *All object types included* check box is selected.

3. From the **Group by** box, select *Type of object*.

    The objects are now grouped by their object type.

4. On the grouping bar for **views**, select the check box to include all of the objects in this group for deployment.

Example: Selecting objects that exist only in the source

To select all objects that exist only in the source database for deployment:

1. In the central column of the results, clear the top-level check box if it is selected.

2. In the **Filter** pane, ensure that the *All object types included* check box is selected.

3. From the **Group by** box, select *Type of difference* if it is not already selected.

   The objects are now grouped by whether they are different, identical, or present in only one of the data sources.

4. On the grouping bar for **objects that exist only in *source database name***, select the check box to include all of the objects in this group for deployment.

Example: Selecting only tables that exist in both databases but are different

To select only tables that exist in both databases but are different for deployment:

1. In the central column of the results, clear the top-level check box if it is selected.

2. In the **Filter** pane, clear the *All object types included* check box, and then select the *Table* check box.

   Only tables are now displayed in the results.

3. From the **Group by** box, select *Type of difference* if it is not already selected.

   The objects are now grouped by whether they are different, identical, or present in only one of the data sources.

4. On the grouping bar for **objects that exist in both but are different**, select the check box to include all of the tables in this group for deployment.

Using the Synchronization wizard

When you have selected the objects (page 37) that you want to synchronize, you can use the Synchronization wizard to create the SQL script that will synchronize the databases.

To start the Synchronization wizard, click **Synchronization Wizard**.

There are four possible steps in the wizard:

1. Choose synchronization method (page 40).

    Choose to create and save a synchronization script, or synchronize using Schema Compare for Oracle.

2. Review dependencies (page 43).

    View a list of any objects that reference, or are referenced by, the objects you have selected to synchronize. You can choose to synchronize these affected objects.

3. Configure script (page 46).

    View a list of issues that affect the synchronization, and select actions to update the synchronization script. If there are no synchronization issues, this step is not shown in the wizard.

4. Review script (page 48).

    View the synchronization script, review a summary of the synchronization actions, and see information about any warnings.

1. Choose synchronization method

On the first page of the Synchronization wizard you can choose to create and save a synchronization script, or synchronize using Schema Compare for Oracle.

If you want to create a synchronization script that you can run at the end of the wizard, in the left-hand pane, select **Synchronize using Schema Compare for Oracle**:
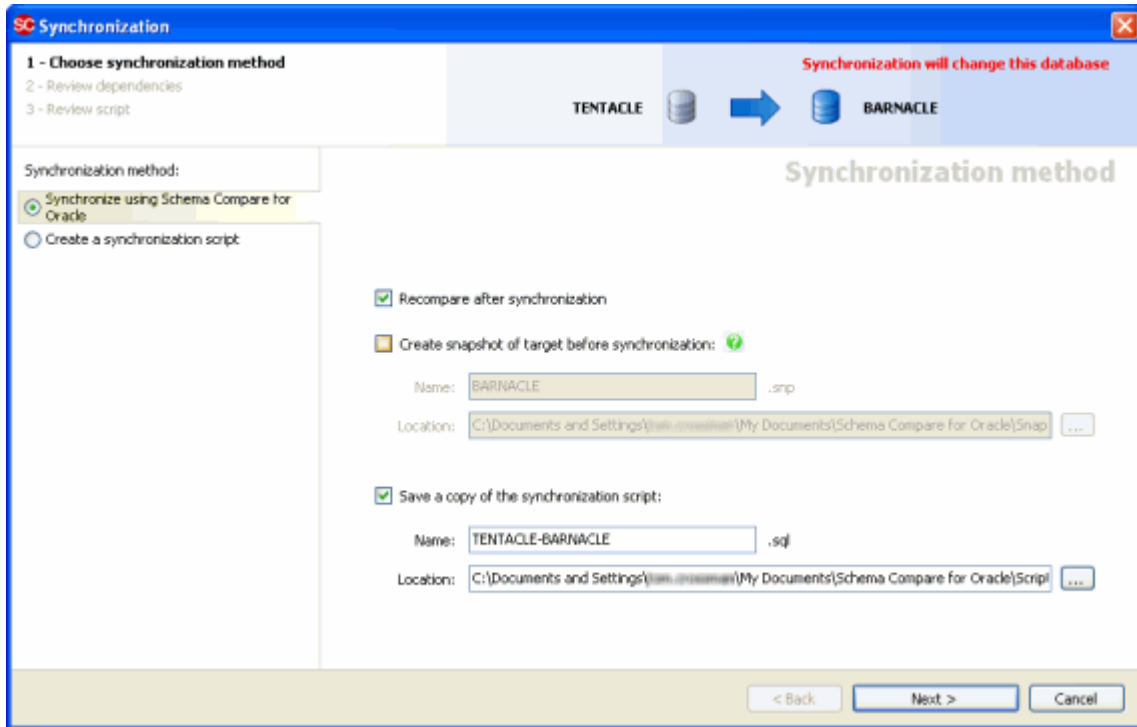
Note that if the target data source is a snapshot, the option to synchronize using Schema Compare for Oracle is not available.

When a snapshot is the source data source, and a database is the target, synchronization updates the database to synchronize it with the snapshot.

When a snapshot is the target data source, synchronization creates a script to update the database from which the snapshot was created. Note that snapshots cannot be modified directly.

You can create a snapshot of the target database schemas before synchronization. The snapshot preserves the state of the target before the synchronization, and later can be used as a source, to restore the target to that state.

Create a synchronization script

If you want to create a synchronization script to open in your SQL editor at the end of the wizard, in the left-hand pane, select **Create synchronization script**:
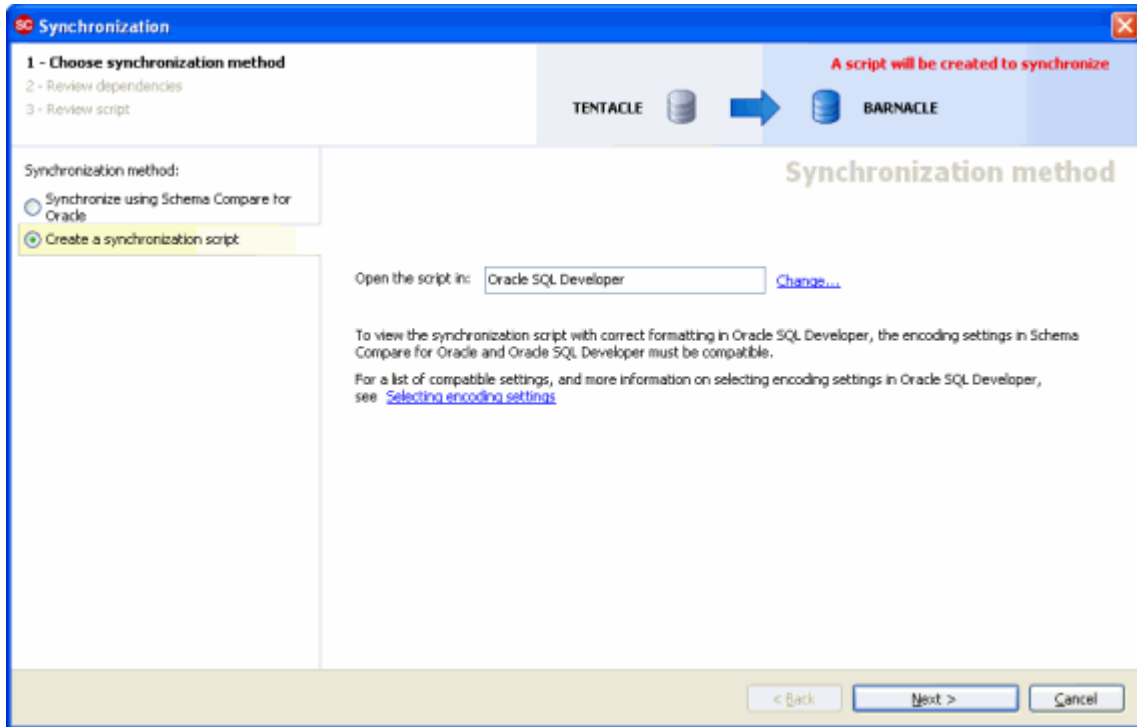
To change the SQL editor used to open the script, click **Change**. The Application Options dialog box is displayed, and you can specify a default editor:
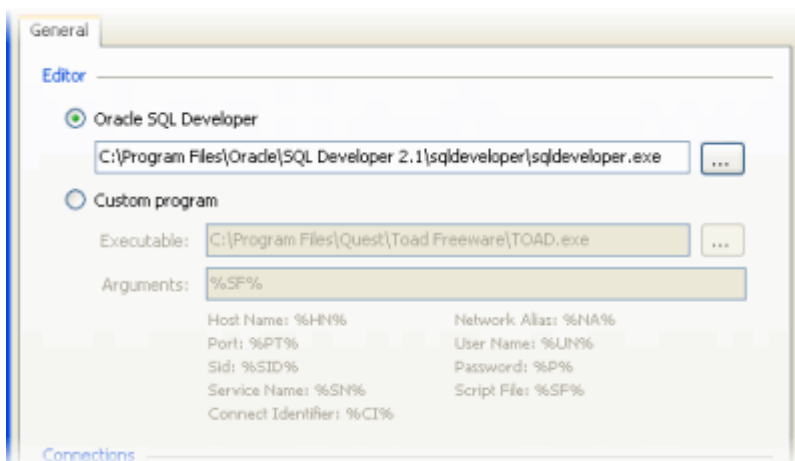
Note that if you use Oracle SQL Developer, the encoding settings in Schema Compare for Oracle and Oracle SQL Developer must be compatible. For more information, see Selecting encoding settings (page 49).

2. Review dependencies

The **Review dependencies** page lists any objects that reference, or are referenced by, the objects you have selected to deploy:
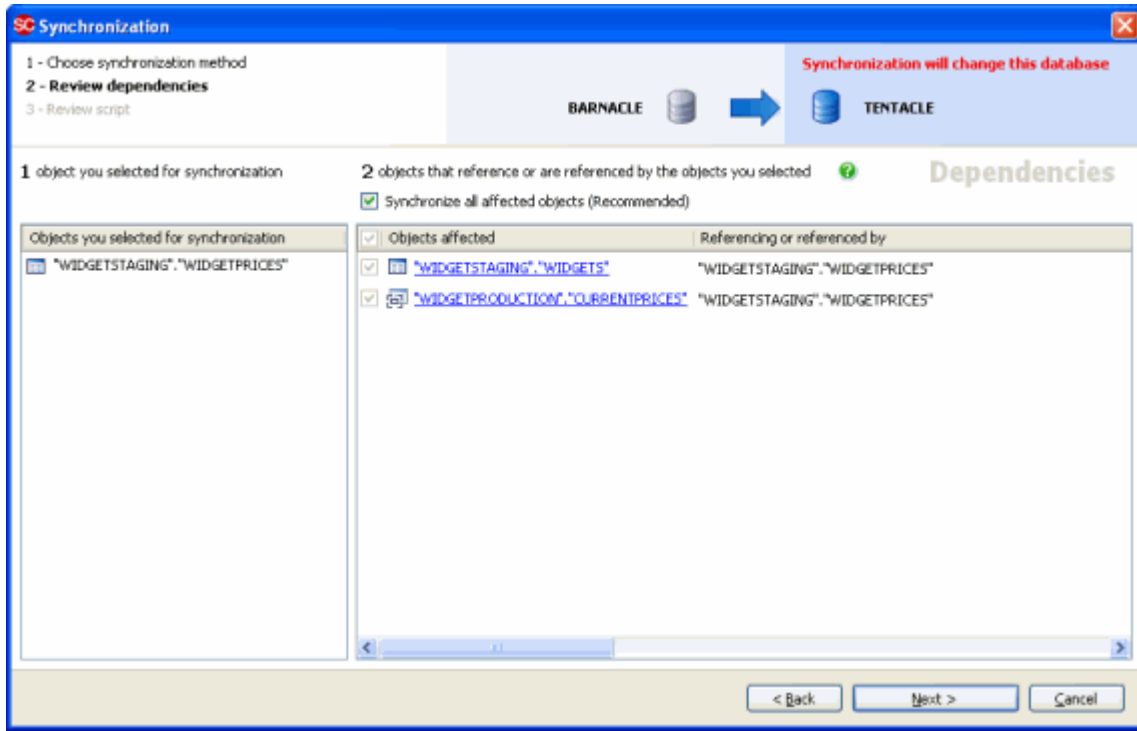
All the objects you selected for deployment are listed in the left-hand pane. If any of these objects reference, or are referenced by, objects that you included in the comparison but did not select for deployment, the objects you did not select are listed in the right-hand pane.

For example, if a view references a table, and you did not select the table for deployment, the table is listed in the right-hand pane.

Additionally, g*host objects* may be listed in the right-hand pane. For more information, see Ghost objects (page 44).

You can view the SQL creation script (page 34) for any object in the right-hand pane by clicking its object name in the **Objects affected** column. The creation script for the selected object in both data sources is displayed, and any differences are highlighted:
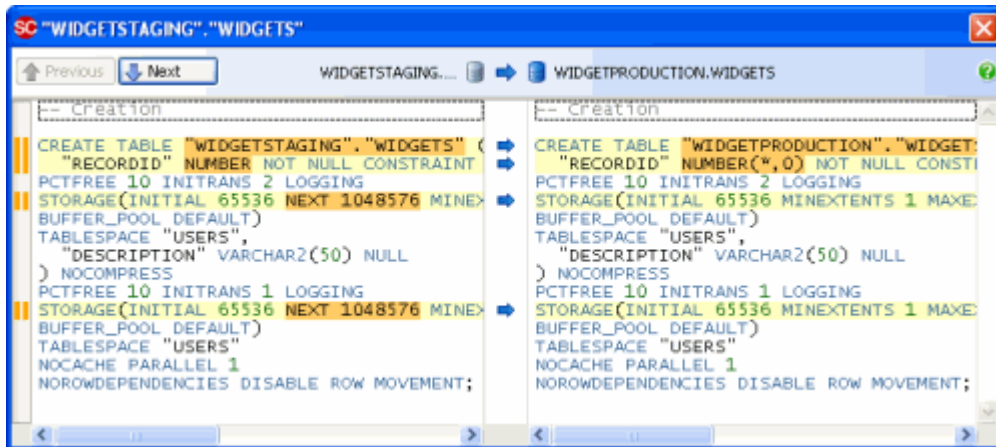
By default, Schema Compare for Oracle deploys all affected objects.

We recommended you deploy all affected objects. If you do not, the deployment script may fail, or produce unexpected results.

To exclude an affected object from deployment, clear the **Deploy all affected objects** check box, and then clear the check box for the object.

Ghost objects

A ghost object is an object that was not included in the comparison, but references, or is referenced by, an object that was included.

For example, if a table in the comparison references a stored procedure in a schema that you did not include for comparison, the stored procedure is a ghost object.

Schema Compare for Oracle includes ghost objects in the comparison automatically. This can be useful, for example, if you want to deploy a table that references a stored procedure, but forget to include the stored procedure in the comparison.

Schema Compare for Oracle lists any ghost objects in the Review dependencies (page 43) page of the Deployment Wizard.

We strongly recommend you deploy all ghost objects. If you do not, the deployment script may fail, or produce unexpected results.

Note that:

- ghost objects are not displayed in the comparison results
- if you compare schemas with objects which reference, or are referenced by many ghost objects, the comparison may be slow
- if you save a snapshot of the source or target database, ghost objects may be included in the snapshot

Example: Deploying a table with dependencies

The following example demonstrates how Schema Compare for Oracle includes ghost objects in the deployment.

In the example, you have already compared *SchemaA* in the *Dev* database to the same schema in the *Test* database*:*

TableA is a table in *SchemaA* in *Dev*. You have added a new column to *TableA*, which you want to deploy to *Test:*

The new column references a new data type *mytype*, which you have created in another schema in *Dev*, *SchemaB:*
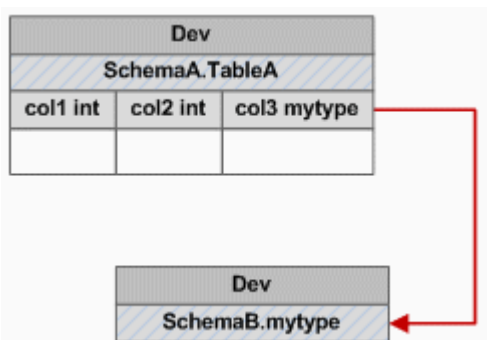
If you select *TableA* for deployment, and you run the Deployment Wizard, *mytype* appears in the list affected objects on the Review dependencies page.

To deploy *mytype*, ensure its check box is selected, and run the deployment script.

To exclude *mytype* from the deployment, clear the **Deploy all affected objects** check box, and then clear the check box for *mytype* before you deploy.

3. Configure script

If there are any issues with the deployment that might cause the script to fail, the **Configure script** page is added to the Deployment Wizard.

This page lists any issues that affect the deployment, and allows you to select actions to update the deployment script.

There are two types of issue:

- No value specified for a NOT NULL column

- Data type must be converted

No value specified for a NOT NULL column
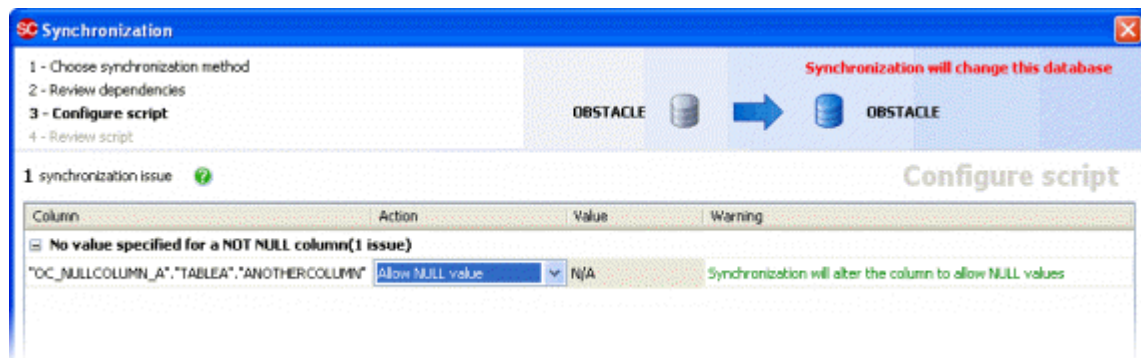
If no default value is specified for a column with a NOT NULL constraint, you can select one of the following actions:

- Allow NULL value

  The column is altered to allow NULL values.

- Specify custom value

  A value you specify is used as the default for the column. To specify a value, in the **Value** column for the issue, type any constant that is valid for a default expression, or any valid SQL expression:
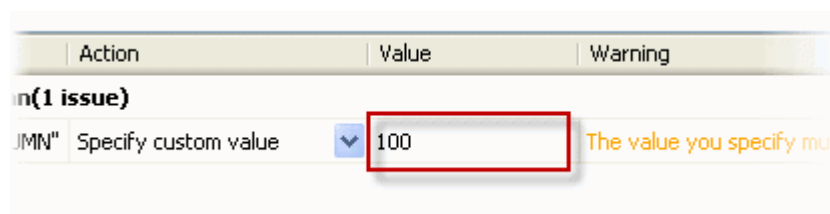
- Ignore issue

  If you select this action and run the deployment script, the deployment will fail. You are strongly recommended to review and edit the deployment script before running it on your target database.

Data type must be converted
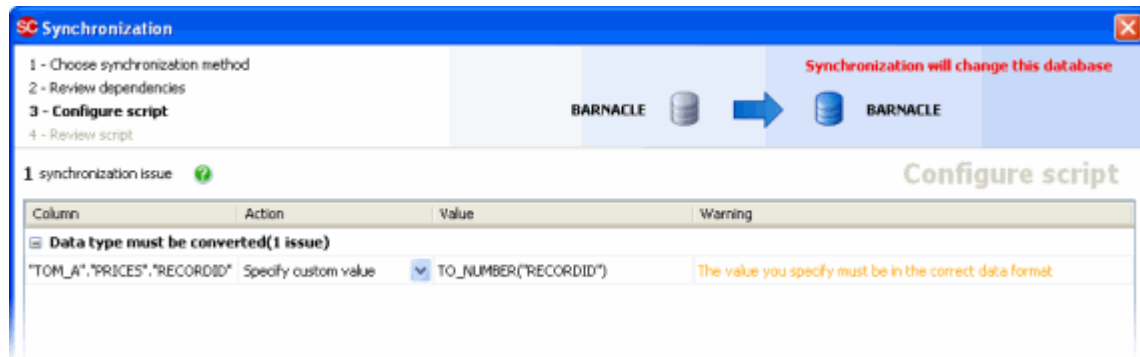
 If the data type for a column must be converted in the deployment, you can select one of the following actions:

- Specify custom value

  A value you specify is used to convert the data type for the column. To specify a value, in the **Value** column for the issue, type any valid SQL expression for an INSERT INTO select statement.

- Ignore issue

  If you select this action and run the deployment script, the deployment will fail. You are strongly recommended to review and edit the deployment script before running it on your target database.

When you have selected an action for each issue, click **Next** to review the deployment script.

4. Review script

The final page of the wizard displays information about the synchronization:
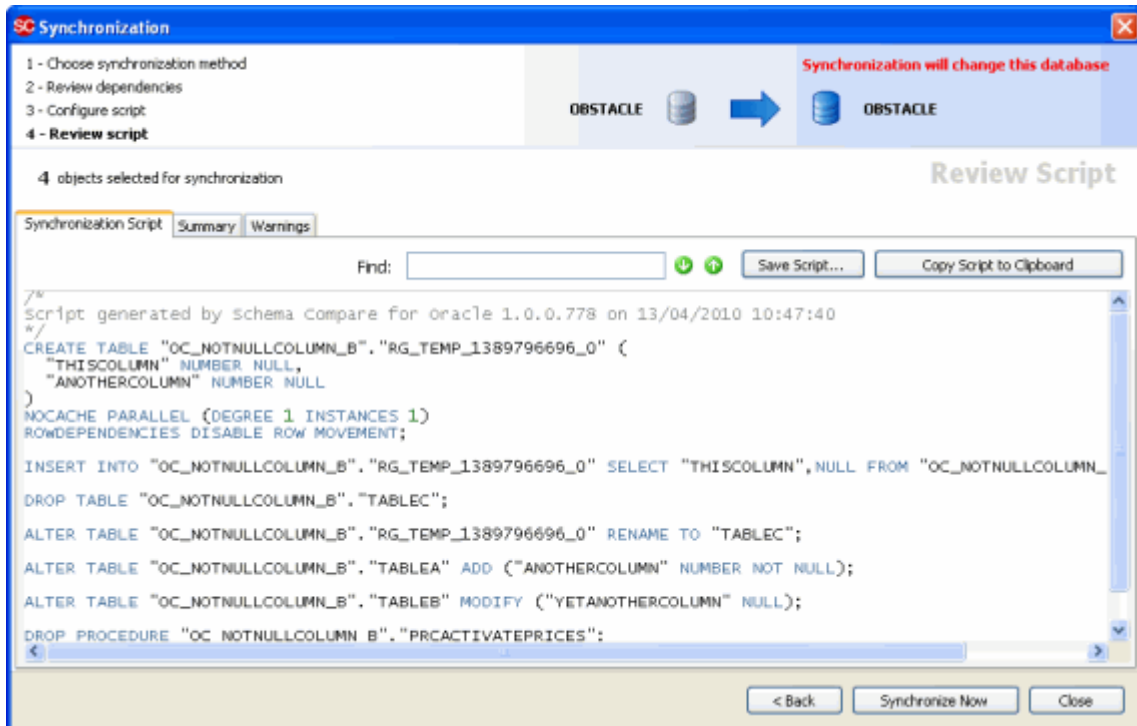
There are three tabs:

- **Synchronization script** shows the script to synchronize the data sources.

  You can search the script, save it, or copy it to the clipboard.

- **Summary** shows a synopsis of the actions in the synchronization script.

  You can view the summary grouped by the objects affected, by the type of modification, or by the order in which the script modifies the target.

- **Warnings** shows a list of any warnings about unexpected behavior that may occur when you synchronize the databases.

When you have reviewed the script, to perform the synchronization click **Synchronize Now**.

Selecting encoding settings

To view the deployment script with correct formatting in Oracle SQL Developer, the encoding settings in Schema Compare for Oracle and Oracle SQL Developer must be compatible.

The following is a recommended list of compatible settings:

Schema Compare for Oracle	Oracle SQL Developer
UTF-8, UTF-8 with preamble	UTF-8, UTF8
UTF-16	UTF-16, UTF16, UTF_16
ASCII	ASCII, Windows-1252

To select an encoding setting in Schema Compare for Oracle:

1. On the **Tools** menu, click **Application Options**.

2. Select the **General** tab.

3. Under **Deployment scripts**, in the **Encoding** box, select the encoding setting you want to use.

To select an encoding setting in Oracle SQL Developer:

1. On the **Tools** menu, click **Preferences**.

2. Under **Environment**, in the **Encoding** box, select the encoding setting you want to use.

Warnings

On the **Review script** page of the Deployment Wizard (page 40), you can click the **Warnings** tab to view information about inefficiencies in the deployment script, or reasons the script may fail.
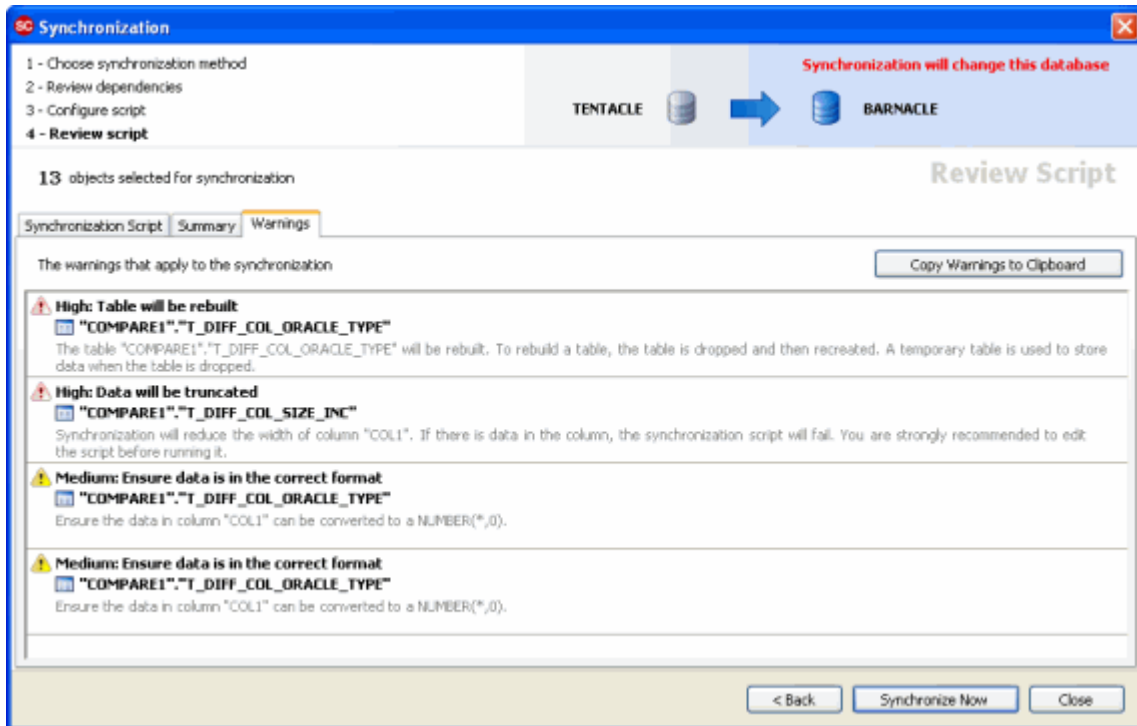
When warnings are displayed, we strongly recommended you review the deployment script and make any required changes before running it on your target database.

The most common warnings that Schema Compare for Oracle may display are listed below.

Table will be rebuilt

Deployment will rebuild a table. The table is rebuilt in four steps:

1. A new table is created.

2. Data from the original table is copied into the new table.

3. The original table is dropped.

4. The new table is renamed as the original table.

A table is rebuilt when deployment requires making changes that cannot be specified in an ALTER TABLE statement.

Columns will be dropped

When a table is rebuilt, if a column in the target table does not have a matching column in the source table, deployment will drop the target column. Data in the target column will be lost.

Data will be truncated

Deployment will reduce the width of a column in a table. If there is data in the column, the deployment script will fail.

No value specified for NOT NULL column

If no default value is specified for a NOT NULL column in a table, the deployment script will fail.

To specify a default value:

1. Click **Back** to display the Configure script (/supportcenter/Content.aspx?p=Schema%20Compare%20for%20Oracle&c=Schema_Compare_for_Oracle/help/1.0/sco_using_the_synchronization_wizard.htm&toc=Schema_Compare_for_Oracle/help/1.0/toc1098225.htm#o9528) page.

2. In the **Value** column for the issue, enter the value you require.

Default value will be added

Deployment will set a value specified on the Configure script (/supportcenter/Content.aspx?p=Schema%20Compare%20for%20Oracle&c=Schema_Compare_for_Oracle/help/1.0/sco_using_the_synchronization_wizard.htm&toc=Schema_Compare_for_Oracle/help/1.0/toc1098225.htm#o9528) page as the new default for a column.

To specify a different default value:

1. Click **Back** to display the Configure script page.

2. In the **Value** column for the issue, enter the value you require.

Data type cannot be converted

Deployment requires that a data type is converted to an incompatible data type. For example, Schema Compare for Oracle cannot convert a BFILE data type to a NUMBER data type. If you run the deployment script, data in the target column will be lost.

Type object cannot be deployed

Deploying type objects is not supported. If the type object is not referenced by another object, it will not be deployed. If the type object you want to deploy is referenced by another object, the deployment script will fail.

Sequence current value will be lost

The current value of the target sequence will be lost because it is not within the MINVALUE and MAXVALUE limits of the source sequence. The current value will be reset to a default value.

Partitioning will change

Deployment will make changes to the partitioning of a table. The table will be rebuilt.

You are strongly recommended to review and make any changes to the table rebuild section of the deployment script before running it on your target database.

System partitioning cannot be changed

Making changes to the partitioning of a system partitioned table is not supported. If you run the deployment script, the table will not be deployed.

REF constraints cannot be deployed

Deploying REF constraints is not supported. If you run the deployment script without making any changes, it may produce unexpected results.