

# IDERA Comparison Toolset for Oracle Database 3.0

I D E R A

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## Quickly Compare and Safely Synchronize Oracle Databases

- Compare and synchronize data and schema objects
- Easy navigation of user interface improves efficiency
- Automate comparison and synchronization operations
- Customize schema compare and synchronization sessions
- Generate ready-to-use database synchronization scripts

## Release notes

IDERA Comparison Toolset for Oracle Database is a bundle of two products, IDERA Schema Compare and IDERA Data Compare. While Schema Compare allows you to compare Oracle database schemas and propagate schema changes from one environment to another, Data Compare lets you compare and synchronize tables across servers, databases, and versions when performing data migrations, copying databases, or auditing data.

To get a quick glimpse into the newest features, fixed issues, and known issues in this release of IDERA Comparison Toolset, review the following sections of the Release Notes:

- [New features and fixed issues](#)
- [Review issues fixed by this release](#)
- [See known issues](#)

## New features and fixed issues

This is the first release of IDERA Comparison Toolset for Oracle Database and therefore there are no new features or fixed issues.

## Known issues

IDERA strives to ensure our products provide quality solutions for your database needs. The following known issues are described in this section. ***If you need further assistance with any issue***, please contact [IDERA Support](#).

## Known issues

There are no known issues in this release.



# Welcome to Comparison Toolset for Oracle Database

The IDERA Comparison Toolset for Oracle Database provides many different tools to diagnose, administer, and analyze Oracle databases across your enterprise.

When you need to quickly identify and synchronize data and object changes, you can use IDERA Comparison Toolset for Oracle Database to:

- Quickly and easily compare schema and data and synchronize schema and database changes across instances and versions of Oracle
- Generate scripts for comparing and synchronizing schema and data
- Customize comparison sessions by adding databases, credentials, options, mapping rules, scripting options, and more to allow for flexibility in comparison operations
- Use the command-line interface to automate and integrate schema and data comparison and synchronization operations

This wiki contains useful information that will help you get started and take full advantage of the best Oracle database comparison and synchronization tools in the market. The products covered in this wiki include:

- [IDERA Schema Compare for Oracle Database](#)
- [IDERA Schema Compare Command Line](#)
- [IDERA Data Compare for Oracle Database](#)
- [IDERA Data Compare Command Line](#)

## What is IDERA Comparison Toolset for Oracle Database?

Data schema and data comparison is sometimes an extremely time consuming and confusing task when completed manually, and the process can be prone to error. Rather than spending hours digging through and scrutinizing data and the overall database structure, then manually generating scripts, wouldn't it be much easier if there was a tool to automate this process?

IDERA Comparison Toolset for Oracle Database provides an easy, automated way to compare schema and data, generate synchronization scripts, and deploy those scripts to synchronize databases with your SQL Server and Oracle Databases. Whether migrating changes from test to production or repairing unwanted changes, IDERA Comparison Toolset for Oracle Database saves you time and reduce the headaches of performing manual database comparisons mistakenly applied and unwanted changes.

## How Comparison Toolset for Oracle Database Helps

When you need to quickly identify and synchronize data and object changes, you can use IDERA Comparison Toolset for Oracle Database to:

- Perform Data Compare and Schema Compare tasks and synchronization across your SQL Server and Oracle Databases
- Capture schema snapshots to preserve change history
- Synchronize SQL data automatically via command-line
- Customize your environment using workspaces and saved comparison options

## Document conventions

IDERA documentation uses consistent conventions to help you identify items throughout the printed online library.

Convention	Specifying
<b>Bold</b>	Window items
<i>Italics</i>	Book and CD titles Variable names New terms
Fixed Font	File and directory names Commands and code examples Text typed by you
Straight brackets, as in [value]	Optional command parameters
Curly braces, as in {value}	Required command parameters
Logical OR, as in value 1   value 2	Exclusively command parameters where only one of the options can be specified

## About IDERA

IDERA is a leading provider of application and server management solutions. We have a wide variety of performance management products for Microsoft SQL Server, and award-winning server backup solutions for both managed service providers and enterprise customers. IDERA products install in minutes and start solving server problems immediately, giving administrators more time, reduced overhead and expenses, and increased server performance and reliability. We

are a Microsoft Gold Certified partner, headquartered in Houston, Texas, with offices in Asia Pacific, Australia, New Zealand, Europe, Africa, and Latin America. So we're everywhere your IT needs are.

## IDERA products

Our tools are engineered to scale from managing a single server to enterprise deployments with thousands of servers. IDERA products combine ease of use with a design that installs in minutes, configures in hours, and deploys worldwide in days. To learn more about IDERA products, visit the IDERA Web site at [www.idera.com](http://www.idera.com).

## Contact IDERA

Please contact IDERA with your questions and comments. We look forward to hearing from you. For support around the world, please contact us or your local partner.

For a complete list of our partners, please visit our IDERA website.

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Sales Email	<a href="mailto:sales@idera.com">sales@idera.com</a>
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## Getting started

When you download the IDERA Comparison Toolset for Oracle Database from our web site, you receive an .msi file that you can run to install the IDERA Comparison Toolset for Oracle package. The installation set up adds the IDERA file group under the All Programs menu as well as places shortcuts of the IDERA Schema Compare and IDERA Data Compare on the desktop.

For two weeks from the installation date the products are fully functional and have no restrictions. After the trial period expires, you must acquire a license. You can purchase a license from our website at [IDERA.com](http://IDERA.com).

## Requirements

Minimum requirements for running IDERA Comparison Toolset for Oracle Database are:

- .NET Framework 3, available from the [Microsoft Developer Tools Download Center](#)
- at least 50MB of free space on the hard drive where the application will be installed
- Windows XP SP3 or later / higher versions of Windows operating systems
- minimum of 512MB of memory; 1GB or higher recommended
- minimum resolution of 1024x768 suggested for the GUI

## Cloud

IDERA Comparison Toolset for Oracle Database runs on cloud virtual machines (such as Microsoft Azure VM and AWS EC2) with Microsoft Windows. It supports Oracle Database instances on cloud virtual machines (such as Microsoft Azure VM and AWS EC2).

## Supported platforms

IDERA Comparison Toolset for Oracle Database supports:

- Oracle Database 12c
- Oracle Database 11g
- Oracle Database 10g
- Oracle Database 9i

IDERA Comparison Toolset for Oracle Database does not install any components, dynamic link libraries, SQL scripts, stored procedures, or tables on the instances of Oracle Database.

## Activating a license

If you have acquired a license, you can quickly activate. Go to **Start > All Programs > IDERA > Comparison Toolset for Oracle Database > License Activation**. In the License Activation window, type or paste the license number you received, and then click **Activate License**. The license activate utility will connect to a web service running on our web servers that will validate the license you provided. Within a few seconds you should see a confirmation message indicating that the product was successfully upgraded.

## Updates and support

We update our products periodically but will only notify our customers via email when we publish an update that contains a critical fix or that is considered a major upgrade. Therefore, to ensure that you are always running the latest version of our products, we recommend that you check our site, [www.idera.com](http://www.idera.com), regularly for product updates.



# IDERA Schema Compare for Oracle Database

Welcome to IDERA Schema Compare for Oracle Database, the tool of choice for thousands of DBAs and developers around the globe. Identifying schema differences between two Oracle databases and synchronizing those schemas is easy, fast, and safe with IDERA Schema Compare for Oracle Database.

This release IDERA Schema Compare for Oracle Database is built on top of a new, robust, efficient and scalable comparison framework.

Please direct any questions, comments and suggestions about the IDERA Schema Compare for Oracle Database to [support@idera.com](mailto:support@idera.com).

## Schema Compare Application window

IDERA Schema Compare for Oracle Database divides the main application window into three areas:

1. **The ribbon.** The context sensitive ribbon provides all the command buttons and icons you need to do your job quickly. The ribbon is organized in three distinct tabs each of which corresponding to the main steps of the database schema comparison and synchronization process and containing the relevant command buttons.
2. **Main panel.** The main panel contains a permanent tab called the [Workspace](#) which you cannot close, and a tab for each active comparison session.
3. **Output window.** The output window provides a running log of the tasks being performed in IDERA Schema Compare for Oracle Database.

## Schema Compare Application Settings

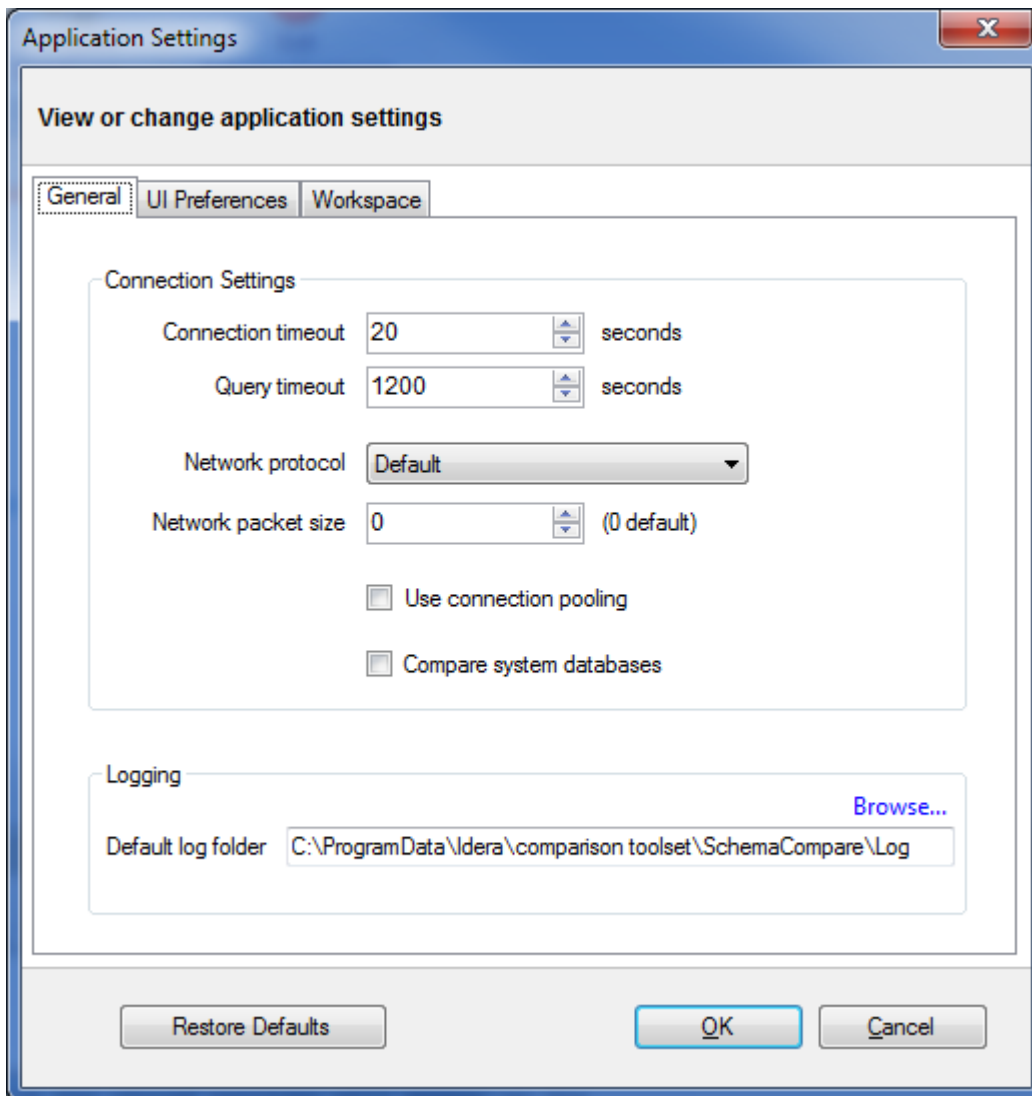
Application settings allow you to tweak the behavior of IDERA Schema Compare. It can be accessed from the drop-down menu off of the top-left corner product icon or from the link at the bottom-left corner on the Workspace tab.

Application level settings are grouped into the General, UI Preferences, and Workspace tabs.

### General

- **Connection Settings.** Generally, there is no need to change the connection settings, however, in certain scenarios you might need to adjust those values. From the application settings window you can set the **Connection Timeout**, **Query Timeout**, **Network Protocol**, and **Network Packet Size**.

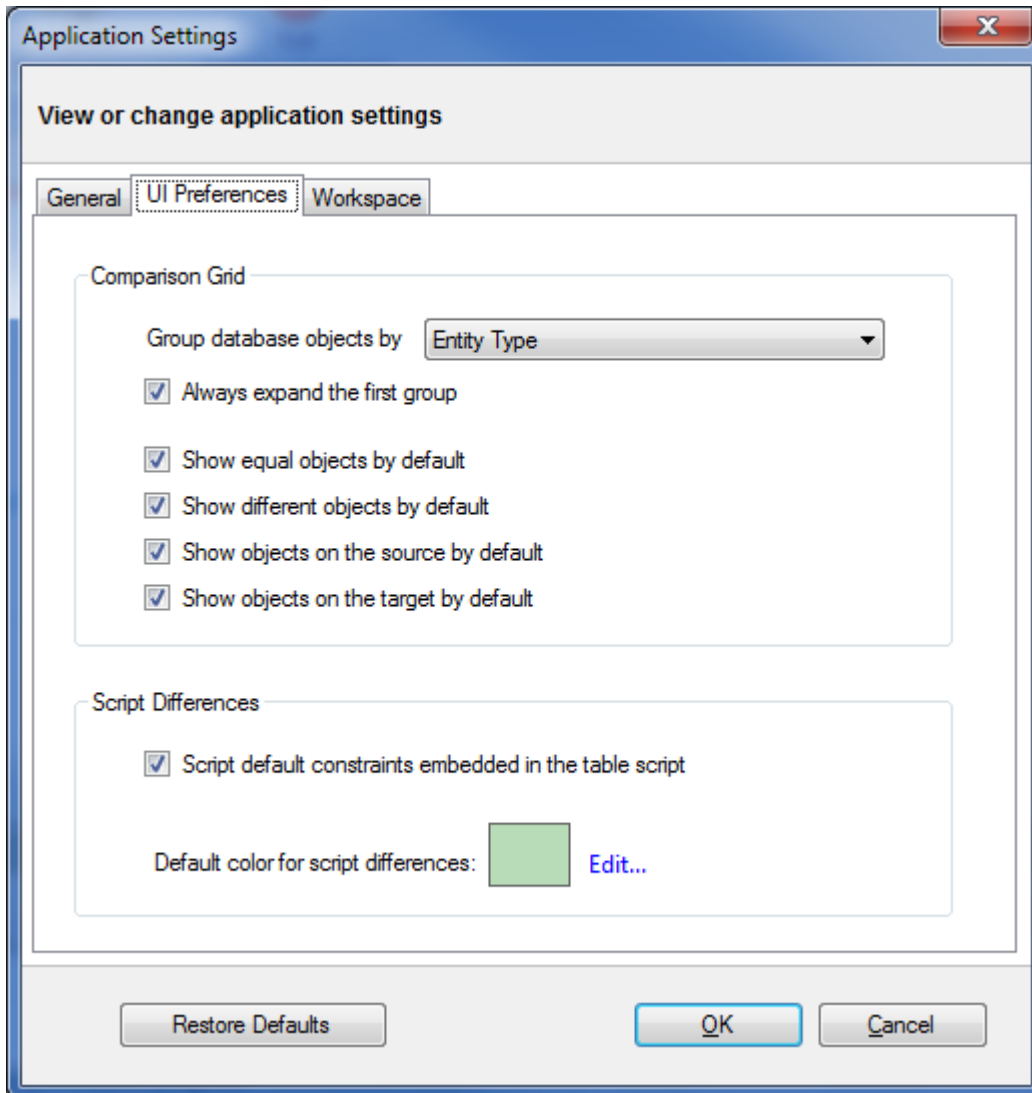
- **Log Setting.** Indicates the location where the IDERA Schema Compare log files are saved.



## UI Preferences

- **Comparison Grid.** Allow you to adjust the behavior of the comparison results grid based on your preferences.
- **Script Differences.** Allow you to change the highlight color for the script differences as well as determine how the default constraints are scripted. The way the default constraints are scripted has no bearing on the comparison results or on the synchronization script, the only difference is on where you see those constraints scripted. By embedding the default constraints in the table script it is easier to see why two columns might be marked as different. If the default constraints are scripted

separately then you might see two seemingly identical columns marked as different and you will need to scroll down below the table script to see what is different.



## Workspace

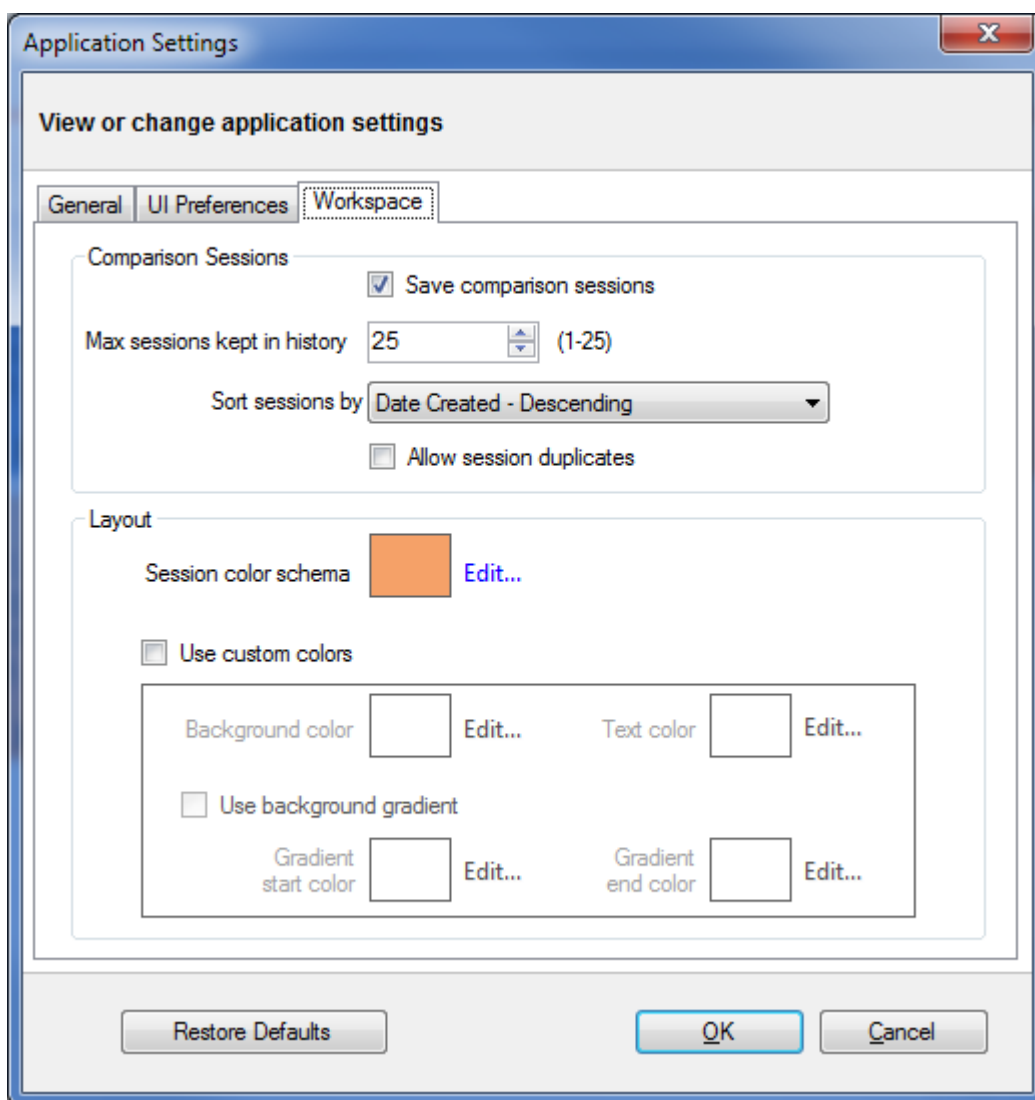
Contains settings related to the workspace and comparison sessions.

- **Sessions**

- **Save sessions.** By default is checked. It instructs the IDERA Schema Compare to save comparison sessions for future use. A saved session contains all the necessary information so

that you can rerun the comparison with one click. Saved sessions appear on the main panel of the Workspace tab.

- **Max sessions kept in history.** By default IDERA Schema Compare keeps the last 25 sessions. Although there is no noticeable performance difference on application launch related to the number of sessions stored you may choose to set this parameter to a lower number. Allowable values are 1 to 25.
  - **Sort sessions by:** change the order in which the stored sessions appear in the Workspace tab.
- **Layout**
    - Allows you to custom session coloring. You can select from built-in color schemas or pick custom colors.



## Schema Compare Workspace

IDERA Schema Compare for Oracle Database Workspace is the storage and the interface for saving and managing databases, credentials, comparison sessions and other UI options.

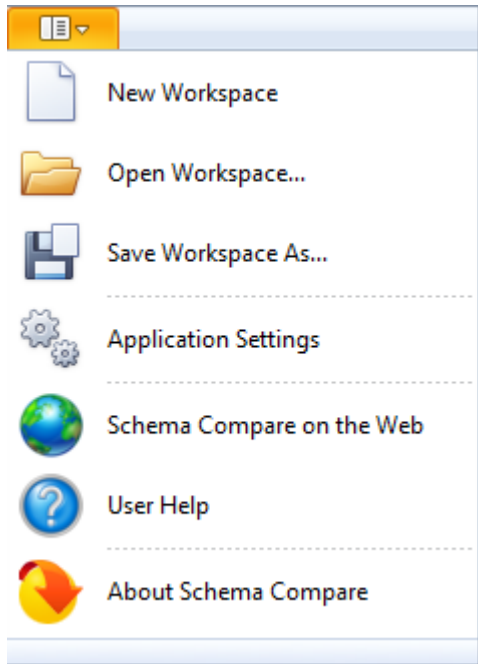
The Workspace window is divided into four sections:

1. **Workspace actions.** Provides links that allow you to create a new workspace, add databases to the current workspace, compare schema, or change application settings. The **New Workspace** action resets the current workspace by erasing the comparison history and removing all registered databases.
2. **Databases/Snapshots.** Contains the list of databases and snapshots that have been registered in the workspace. On mouse over two action links appear for a registered server:
  - **Edit.** Allows you to change the connection settings for that server and/or add and remove databases.
  - **Remove.** Un-registers a server (deletes all the server information from the workspace).  
When you move your cursor over a database name, the following action links related to that database appear:
    - **Take a Snapshot.** Allows you to take a snapshot of the schema of that database.
    - **Remove Database.** Removes the database from the workspace.
3. **Comparison History.** Displays up to 25 comparison sessions from the most recent one to the oldest one. You can rerun a session by clicking on it.
4. **Output.** Displays each workspace event as it occurs.

## Saving and loading workspaces

Schema Compare for Oracle Database Workspace stores the data in a set of xml files. There is always one master file that keeps databases and credentials, and a separate xml file for each comparison session. The workspace is saved by default in a subfolder under the common folder for application data that is used by all users. It is usually found under `\ProgramData\Idera\comparison toolset\SchemaCompare\Workspace`.

The workspace is managed automatically, so no action is required to save it or load it. However, if you wish to have multiple copies of the workspace, you can save it to a custom path. Functions for saving and loading the workspace are located in the quick menu of the application button:



**i** When you choose to save the workspace to a custom location, you specify the path and the name of the workspace master file. The session files are saved in the same directory as the master file, but their names will be auto-generated by Schema Compare for Oracle Database. Similarly, when you load a workspace from a custom location, you select the workspace master file. Schema Compare for Oracle Database expects the session files to be in the same folder as the master file.

## Schema Compare Add Databases

Before comparing databases, you will need to add them to the workspace. The **Add Databases** functionality can be accessed from the ribbon (the **Home** tab) or from the **Add Databases** action link at the top left section of the Workspace tab.

On the Add Database dialog window, choose the server where you want the new database(s) to reside. You can click on the **Refresh** item of the database drop down to discover the instances running on your network. If the application is not able to discover the instance you are looking for because it is not exposing itself or it is not running on your local area network, or it is not listening on the default port, then you can type in [ServerName or IP Address] \InstanceName on the drop-down box. If the server is not listening on the default port you can also specify a custom port on the following format: [ServerName or IP Address] \ [Instance Name] , [PortNumber]

Once you have chosen the server and the authentication method (including login name and password if you chose database authentication), you can click **Refresh** at the top of the Databases box at which point the application will connect to the server using the information you provided and populate the Databases box with the list of all user databases in that server. You can select one or more databases to add to the workspace.

By default, IDERA Schema Compare will use the connection properties set at the Application Settings, however, you can change the connection properties for this server only if you need to.

In the Other Properties edit box, you can specify additional connection properties as name=value pairs separated by semicolons: name1=value1;name2=value2;...

## Schema Compare Add Snapshots

A schema snapshot is a compact file that contains all the schema information for a database. The schema information is stored in a proprietary format and can only be read by IDERA Schema Compare for Oracle Database. The schema snapshot does not contain data, only schema information.

Schema snapshots allow you to maintain a history of schema changes. You can take schema snapshots at different points in time and then you can compare those snapshots to each other or compare the snapshots to the live database to get a clear and accurate picture of the "evolution" of the database schema.

### Take a snapshot

To take a schema snapshot, simply move the mouse over the name of the database on the left panel of the Workspace and you will see a "camera" icon appear on the side of the database name. Click on that icon to take the snapshot - you will be asked to choose the name of the snapshot and the location where you wish to save it.

### Adding snapshots to the workspace

Before comparing snapshots to each other or to live databases you will need to add the snapshots you need to the workspace. The **Add Snapshots** functionality can be accessed from the ribbon (the Home tab).

On the Add Snapshots dialog window that appears, click **Browse...** to browse to the location where the snapshot(s) you wish to add to the workspace have been stored. You can select as many snapshots as you want from different locations. For each snapshot you select the application will display the file name, the database the snapshot was taken from, the date when the snapshot was taken, and database version.

## Schema Compare Remove Databases

There are two ways to remove a database or a schema snapshot from the workspace:

- Move the mouse over the name of database or the schema snapshot you wish to remove under the Registered Databases on the left panel of the Workspace. The database/snapshot name will be highlighted and a **Remove** icon/link will become visible. Simply click on that icon and confirm the removal when prompted. Note, that in the same way you can remove a registered server and all its databases from the workspace.

- Click **Remove Databases** on the Home tab of the ribbon. A remove databases dialog window appears showing all the registered servers/databases - select the server or database you wish to remove and click on the **Remove Selected SQL Server / Database...** link at the top right corner and then confirm the removal when prompted.

## Schema Compare Comparing Schemas

To use Schema Compare for Oracle Database to start a comparison between two databases, click **Compare Databases** on the Home tab of the ribbon. The Database Selection dialog window appears and allows you to choose the server(s) where the databases you wish to compare reside as well as the databases themselves.

From this window, you can also access the Comparison Options that will be applied during the comparison.


## Schema Compare Object Types

IDERA Schema Compare for Oracle Database supports many different types of database objects. By default, all but a handful of object types will be included in the comparison and synchronization. The only categories that are excluded by default are:

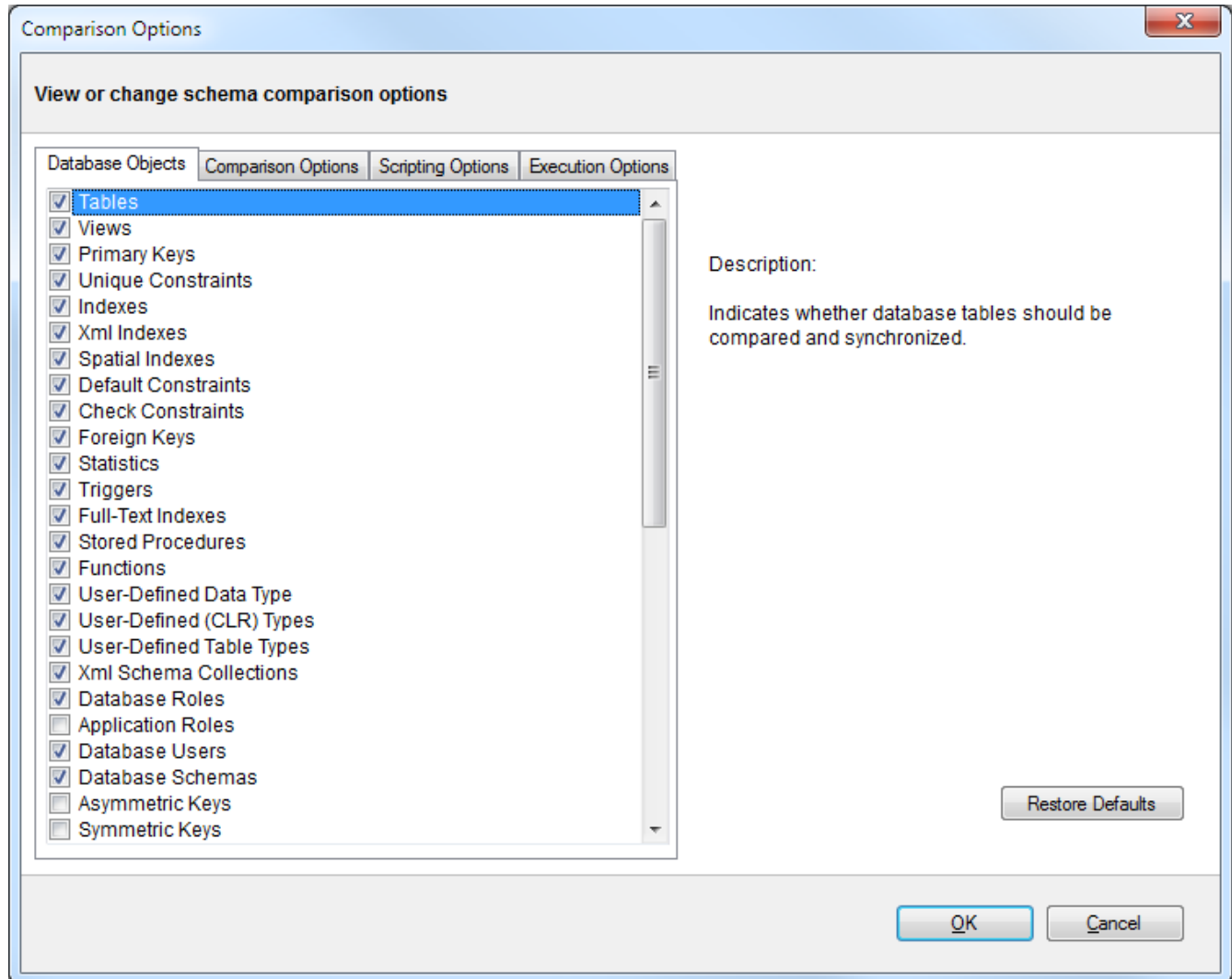
- Asymmetric Keys
- Symmetric Keys
- Certificates
- Broker Priorities

In the majority of the cases, you should not need to change the default settings. There are scenarios in which you might wish to exclude certain categories that are included by default or include those that are excluded by default.

To exclude or include certain object types, click **Comparison Options**. The first tab on the Comparison Options window that appears is the Database Objects tab which provides a brief description for each object type and allows you to select or clear the object types you want.

 Because of the dependencies between database objects, excluding all objects of a given type may result on a synchronization script that will fail to execute due to invalid dependencies. For more information about the handling of dependencies, see [Schema Compare Comparison Options](#).





## Schema Compare Options

IDERA Schema Compare for Oracle Database exposes many different options that provide the user with highly granular control of the behavior of the comparison and synchronization engine.

The defaults have been carefully selected to match the most common scenarios so that in the majority of the cases you don't even need to look at those options at all, however, every implementation is different and there is no "one size fits all" scenario.

For clarity and easy access, the options have been organized on three different tabs:

- [Schema Compare Comparison Options](#)
- [Schema Compare Scripting Options](#)

- [Schema Compare Execution Options](#)

## Schema Compare Comparison Options

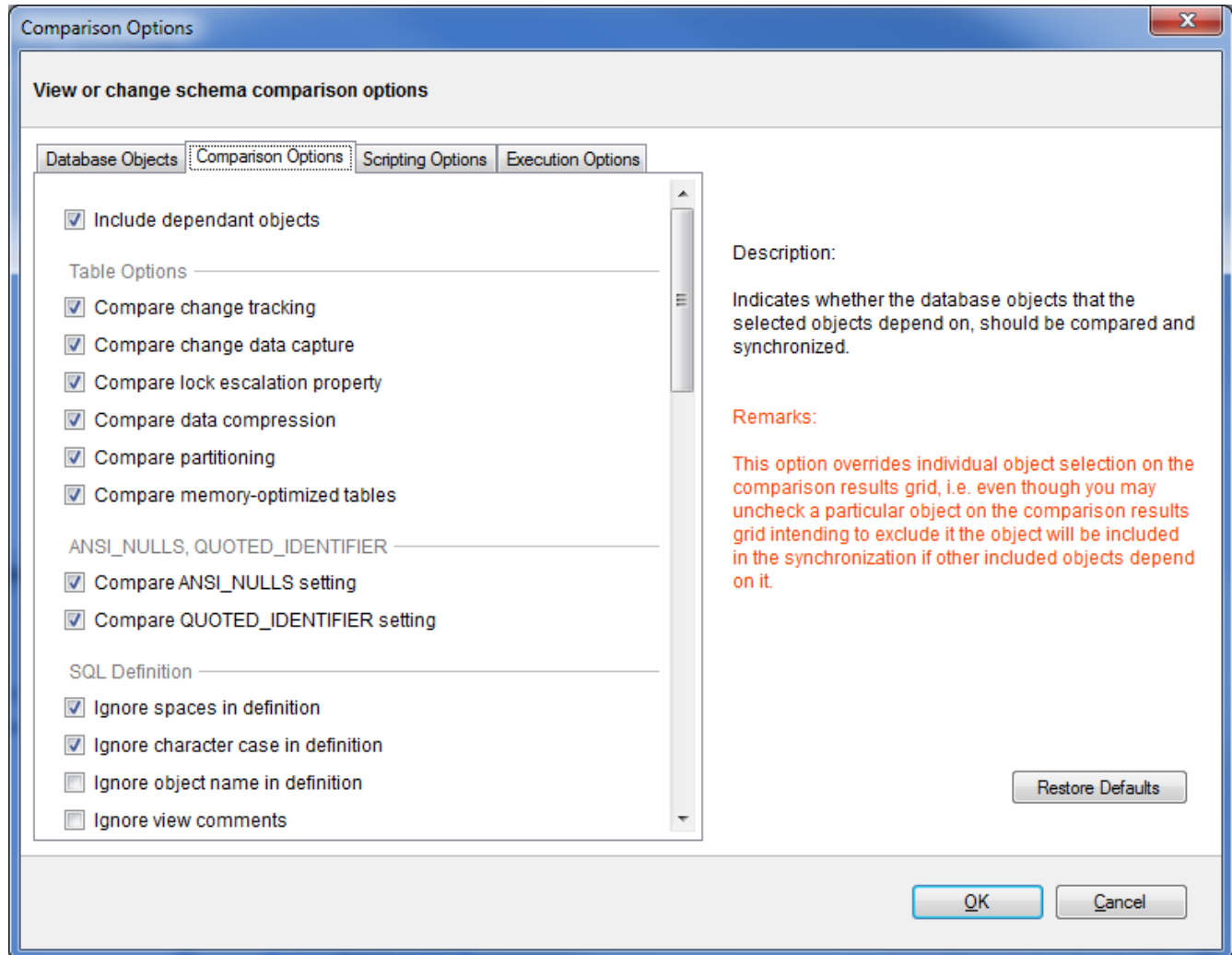
When are two database objects equal? The answer is: it depends! It depends on what you want to compare those objects on - for example: is "Equal" equal to "equal"? The comparison options allow you to have complete control over the comparison engine which considers those options before deciding to mark a pair of objects as equal or different.

So, when two object are found to be different by the comparison engine while you believe they should be equal, or they are found to be equal while you believe they should be different don't panic - investigate the differences and carefully review the comparison options - more likely than not one of those options holds the answer to your surprise.

The comparison options tab provides a description and important remarks for each option while also allowing you to turn those options ON or OFF. To view the description and remarks for a given option simply move the mouse over that option as shown on the image below.

Most of the comparison options are self-explanatory, and for those that are not the description and remarks provided on the "comparison options" window are sufficient. However, there are two options that merit special attention:

- **Script New Columns As NULL.** In cases when the synchronization of the schema requires adding a NOT NULL column on the target but, no default constraint has been specified then the server will reject the action and the synchronization will fail. In such scenarios the best course of action would be to add a default constraint on the source, however, if for one reason or another you cannot add the constraint on the source you can add the column to the target as a "NULL ALLOWED" column to ensure the schema synchronization operation completes successfully. After the synchronization you can connect to the target and handle the changing of that particular column from NULL ALLOWED to NOT NULL.
- **Script New Constraints WITH NOCHECK.** When the schema synchronization requires adding new constraints like foreign key constraints and check constraints on tables that contain data there is a it is possible that the existing data violates those constraints in which case SQL Server will reject the action and the synchronization script will fail to execute. To bypass this obstacle and allow the synchronization operation to go through you can choose to add those constraints WITH NO CHECK first and then check to see if the existing data violates the constraint. When this option is ON then Idera SQL schema compare will generate two synchronization scripts that are executed one after the other:
  - **Synchronization Script.** This will create the new constraints with NOCHECK so the script will execute successfully.
  - **Constraint Enabling Script.** This script enables the constraints that were created WITH NOCHECK and runs on a separate transaction. If the existing data violates one or more of those constraints then the script will fail but that failure does not affect the overall synchronization of the schemas. In case of failure you will need to address the constraint violations on case by case bases.

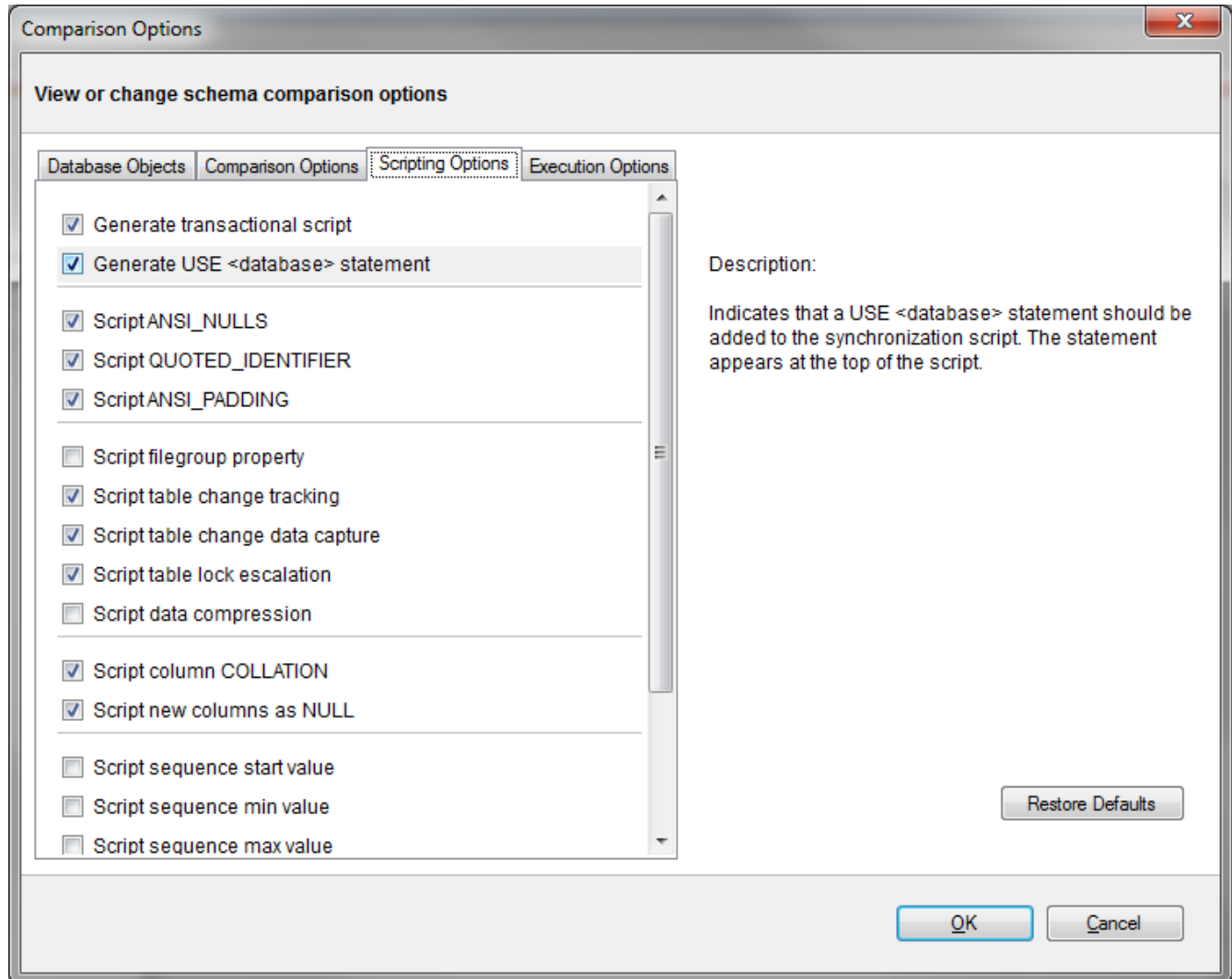


## Schema Compare Scripting Options

IDERA Schema Compare for Oracle Database exposes a wide variety of options to let you tweak the way the comparison engine works. From ignoring white spaces to performing automated file group translation you have control over it all. The default options have been carefully selected to match the most common scenarios however, every SQL Server implementation is different and there is no "one size fits all" scenario.

When an object is found to be different by the comparison engine while you believe it should be equal, or the other way around, don't panic - investigate the differences and carefully review those options - more likely than not one of those options holds the answer to your surprise.

Rule of thumb: whenever you are not sure what options would be better for your scenario, click **Default Options**.

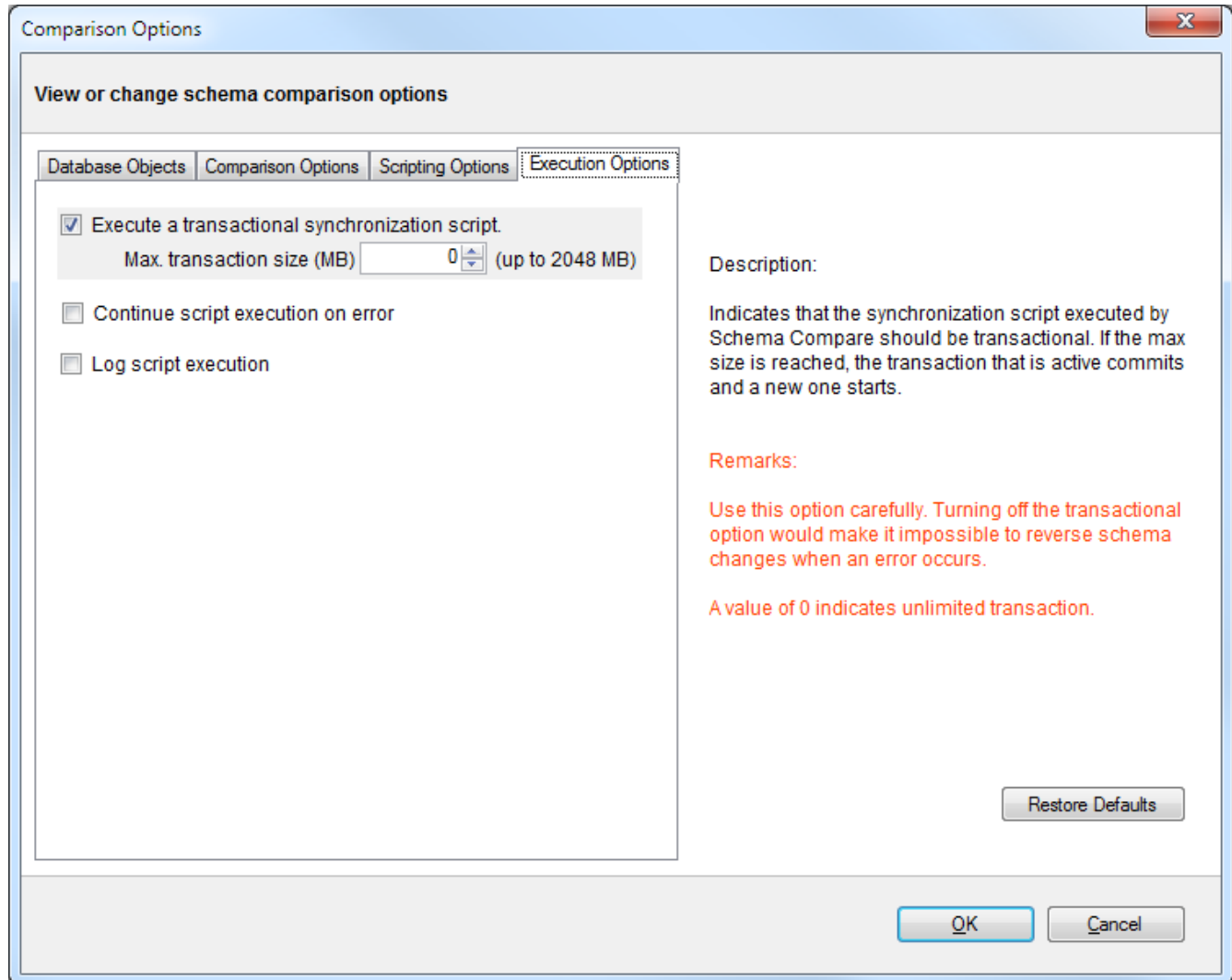


## Schema Compare Execution Options

IDERA Schema Compare for Oracle Database exposes a wide variety of options to let you tweak the way the comparison engine works. From ignoring white spaces to performing automated file group translation you have control over it all. The default options have been carefully selected to match the most common scenarios however, every implementation is different and there is no "one size fits all" scenario.

When an object is found to be different by the comparison engine while you believe it should be equal, or the other way around, don't panic - investigate the differences and carefully review those options - more likely than not one of those options holds the answer to your surprise.

Rule of thumb: whenever you are not sure what options would be better for your scenario, click **Default Options**.



## Schema Compare Comparison Results

Upon completion of the schema compare operation, the results of the comparison are displayed on a new comparison session tab. The Comparison Results window is divided into three main sections:

1. **Comparison summary.** The main section displays the list of all objects that were compared, grouped by object type, indicating for each object the result of the comparison (equal, different, exists only on one of the databases). By default, all the objects are displayed including the ones that are identical, however, a handy context menu allows you to filter objects based on object type or/and based on the result of the comparison.
2. **Differences.** The bottom section of the results window contains three tabs.

- The Differences tab displays, side by side, the scripts of the object pair that has been selected in the top section of the results grid in both of the databases being compared. The differences are highlighted using a simple color coding scheme.
  - The Left Database Script contains the t-sql script that you would need to execute on the left database to make the selected object on the left side the same as the corresponding object on the right side.
  - The Right Database Script contains the t-sql script that you would need to execute on the right database to make the selected object on the right side the same as the corresponding object on the left side.
3. **Action.** The right panel provides quick access to action buttons/links that allow you to generate synchronization scripts, view/change comparison options, refresh comparison results etc.

## Schema Compare Equal but Different

Making sense of the comparison results

**Columns are marked as different but they seem to be identical!** In some cases you may see a table pair marked as different and when you look at the "Schema Differences" tab on the bottom you may notice that one or more columns have been highlighted as being different but there is no visible difference on the script! In these cases you will need to dig deeper to find out why those columns are marked as different. To do that expand the table on the top section and then click on the column you are interested on - on the bottom section of the screen you will see the script for that particular column with the different section highlighted. This difference will be visible on the table script as well however it is a lot easier to "spot" on the column script.

Differences on default constraints, check constraints, default bindings, rule bindings, or extended properties can cause the columns to be flagged as different.

**Columns are different but are not marked as such!** The highlighting of the differences on the script of an object is controlled by the comparison engine so if the comparison engine marks two objects as equal then nothing will be highlighted on the scripts of those objects even though there might be visible differences on the script. Why does this happen? The answer lies in the comparison options - there are a few options related to collation, nullability, replication, identity etc. that affect the column comparison. So if you have for example chosen to ignore the column collation then even though the column on the left might have a different collation from that on the right the columns will be marked as equal and therefore the collation difference on the script will not be highlighted.

## Schema Compare Refreshing Results

When you make changes to comparison options after you have compared two databases the comparison results might no longer reflect your choices. For example, when you compared the databases, the option **Ignore spaces on definition** was ON so let's say a view named VW1 is marked as being equal on both sides. Now you go to options and uncheck the **Ignore spaces on definition** at which point the VW1 is technically different since let's say its definition on

the left database contains a few extra spaces compared to its definition on the right database. Any time you make such changes after the comparison IDERA Schema Compare for Oracle Database considers the effect of the changes on the comparison results and if necessary prompts you to refresh the results. The refreshing of the results is accomplished by either a partial or a full re-compare of the schemas.

You can also refresh the comparison results on demand by clicking **Refresh Results** on the ribbon, or by clicking **Refresh Comparison Grid** on the action panel on the lower-right hand side of the comparison results window.

## Schema Compare Working with Filegroups

The following topics describe the filegroup options in detail:

- [Comparing and Synchronizing Filegroups and Data Files](#)
- [Working with Filegroup Mapping Rules](#)

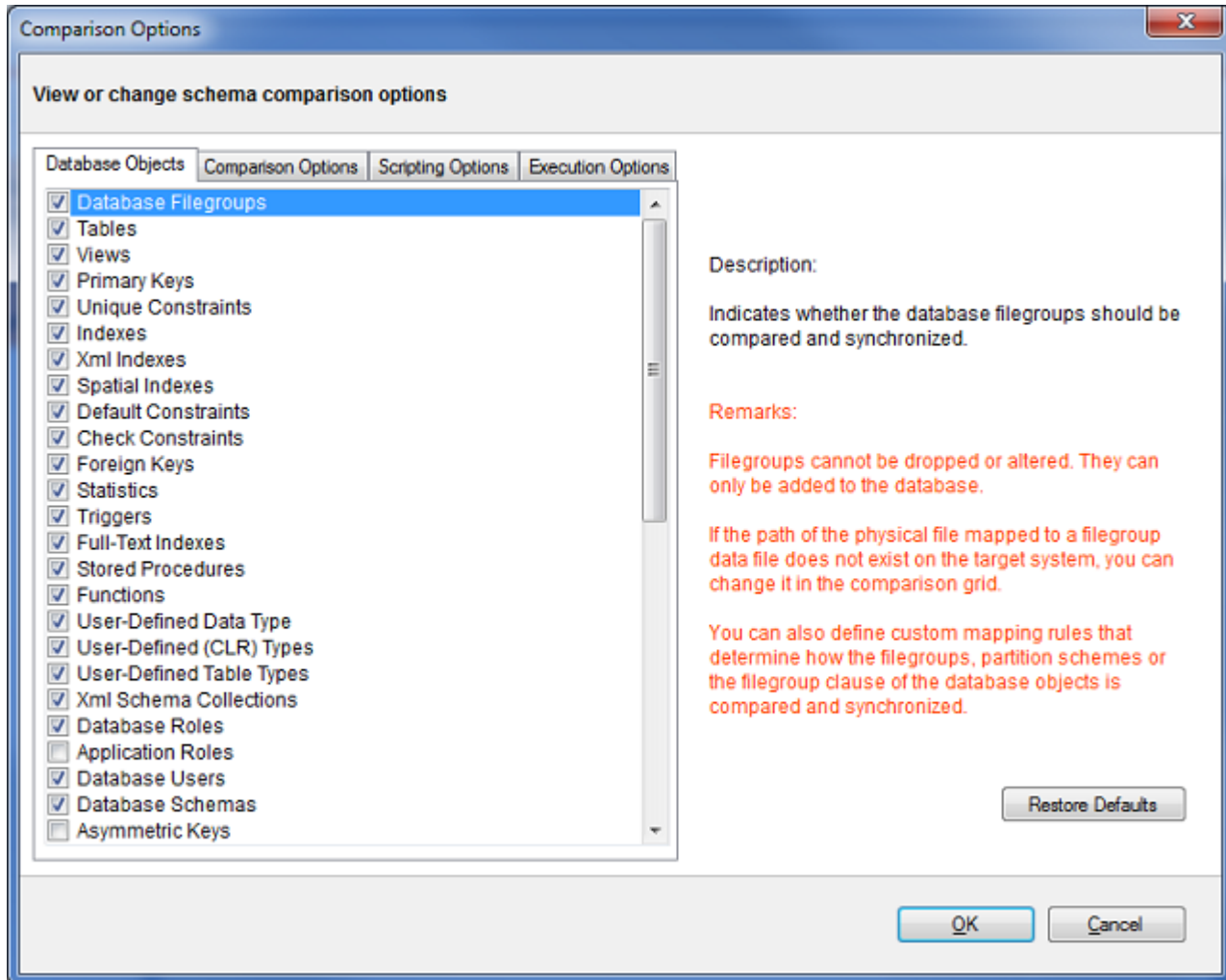
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## Schema Compare Comparing Filegroups

IDERA Schema Compare for Oracle Database allows you to compare and synchronize database filegroups including the filegroup data files. Database log files are not supported.

Comparing filegroups is similar to other database objects. You start by selecting the **Database Filegroups** option in the Comparison Options window (by default filegroups are not selected):



When the filegroup option is selected, a filegroup category appears in the comparison grid. The plus sign adjacent to the filegroup allows you to view the data files associated with the filegroup. Depending on the type of the filegroup, the data file is mapped to one of the following:

- A file, usually with the .mdf or .ndf extension, for a data filegroup.
- A path for a filestream or a filegroup that contains memory-optimized tables.

When you choose to synchronize the database filegroups, it is important to remember that the path of the physical file mapped to the data files must exist on the target system. If this is not the case, you can change the path and filename of the data file in the comparison grid as follows:

- Expand the filegroup that you wish to change
- In the data file section of the comparison grid, enter the new filename in the Filename column

You can also exclude filegroups or specific data files, similar to other database objects. Excluded items will not be synchronized.

The following restrictions apply to filegroup synchronization:



- Filegroups can only be added to the database. They cannot be altered or removed.
- Data files are only added to the new filegroups. Data files on existing filegroups are not modified.
- SQL Server does not support transactional execution of DDL statements for filegroups or data files, which means that changes to the filegroup structure cannot be rolled back.

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## Schema Compare Filegroup Mappings

Filegroup mappings allow you to compare and synchronize filegroups. Mappings are accessed from the comparison grid context menu.

### About filegroup mappings

Filegroup mappings provide a way to map, compare and script filegroups for databases that have different filegroup structures. Consider, for example, what happens when you compare the following databases:

Database: DB\_1  
Contains the filegroup: FG\_1  
Contains the Employees table created on FG\_1 filegroup

Database: DB\_2  
Contains the filegroup: FG\_2  
Contains the Employees table created on FG\_2 filegroup

The default comparison finds a schema difference in the Employees table triggered by the filegroup clause. The script generated for the DB\_2 database attempts to create the table on FG\_1 filegroup, while the script generated for DB\_1 attempts to create the table on FG\_2 filegroup.

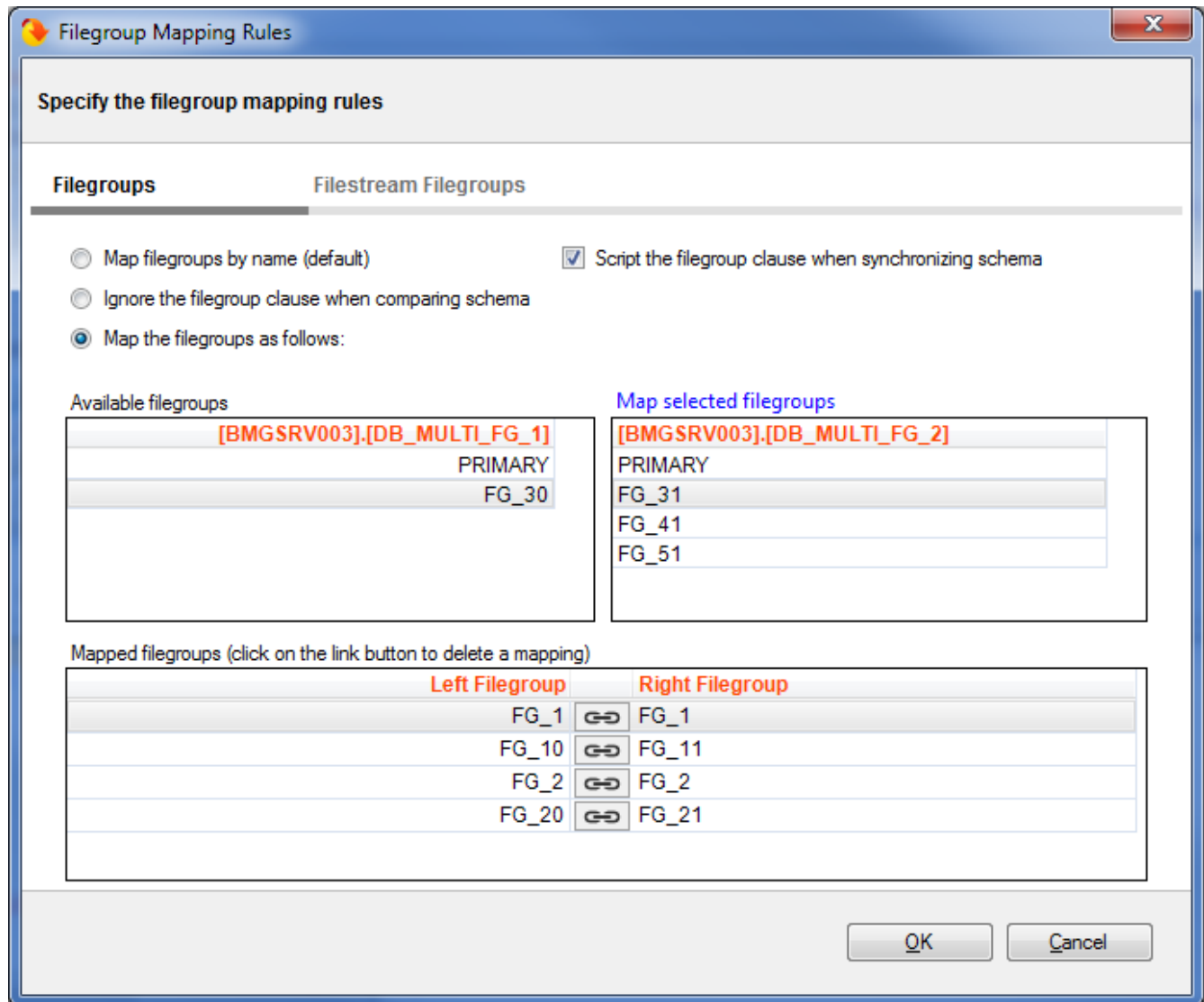
While this could work in most of the cases, there are scenarios in which you might want to keep the filegroup unchanged when transferring objects between the DB\_1 and the DB\_2 databases. You can achieve this by creating a mapping for the filegroups FG\_1 and FG\_2. When a mapping exist, the comparison and scripting of the Employees table changes as follows:

- FG\_1 and FG\_2 are considered equivalent, which means that no schema difference is triggered by the filegroup clause of the Employees table.
- If other schema differences require the Employees table to be synchronized, it will be created on the "mapped" filegroup, not the original one.

## Working with filegroup mappings

IDERA Schema Compare for Oracle Database provides a few mapping rules that you can choose:

- Mapping filegroups by name: it is the default mapping option.
- Ignoring filegroups when comparing schema: indicates that the filegroup clause is ignored and does not trigger a schema difference between objects.
- Custom mappings: allows you to create custom mappings between database filegroups.




You can create a filegroup mapping as follows:

- Select a filegroup from the list of filegroups on the left database.

- Select a filegroup from the list of filegroups on the right database.
- Click **Map Selected Filegroup**. A mapping row will appear in the **Mapped Filegroup** grid.

To delete a mapping, select the mapping row in the **Mapped Filegroup** grid, and then click **Link**. The members of the mapped filegroup will appear on the **Available Filegroup** grids.

 If one of the databases contains filestream filegroups, a second tab appears in the mapping form that allows you to map filestream filegroups in the same way you map the regular filegroups.

## Scripting filegroups

The mapping form provides an additional option that affects the scripting of the filegroup clause for various database objects. When unchecked, database objects that support the filegroup clause are created in the DEFAULT filegroup or, in some cases depending on the object, the filegroup option is ignored.

## Objects affected by filegroup mappings

Database objects affected by the filegroup mapping option include:

- **Tables**. Affects the filegroup, text filegroup, filestream filegroup and the filegroup option of the change data capture
- **Primary Keys**. Affects the filegroup and the filestream filegroup clause
- **Unique Constraints**. Affects the filegroup and the filestream filegroup clause
- **Relational Indexes**. Affects the filegroup and the filestream filegroup clause
- **Spatial Indexes**. Affects the filegroup clause
- **Full-Text Indexes**. Affects the filegroup clause
- **Service Broker Queues**. Affects the filegroup clause
- **Partition Schemes**

The following object are NOT affected by the filegroup scripting options:

- **Database Filegroups**
- **Partition Schemes**

## Best practices and restrictions

Mapping the filegroups, when not done properly, could produce unexpected results. These simple rules and restrictions can help you achieve the intended results:

- Filegroup mappings are one-to-one.
- Even though it is not required, we recommend that you map all filegroups. The filegroups that are not mapped explicitly, will be mapped by name (the default rule).

- Filestream filegroups are mapped separately from the regular filegroups. You will notice that if one of the databases that you are comparing contains filestream filegroups, the mapping form includes an additional tab for filestream filegroups. The mapping rules are the same as the ones for regular filegroups.
- The filegroup scripting option, when unchecked, effects database objects differently. Some objects, such as tables, indexes, are scripted with the DEFAULT filegroup clause. Other objects, such as change data capture, ignore the filegroup option entirely. The database filegroups and partition schemes are not effected by the scripting option.

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## Schema Compare Entity Filters

Entity filters allow you to include or exclude database objects based on some predefined criteria. You can access the entity filters from the context menu of the comparison grid.

To learn more about entity filters, click on the following topics:

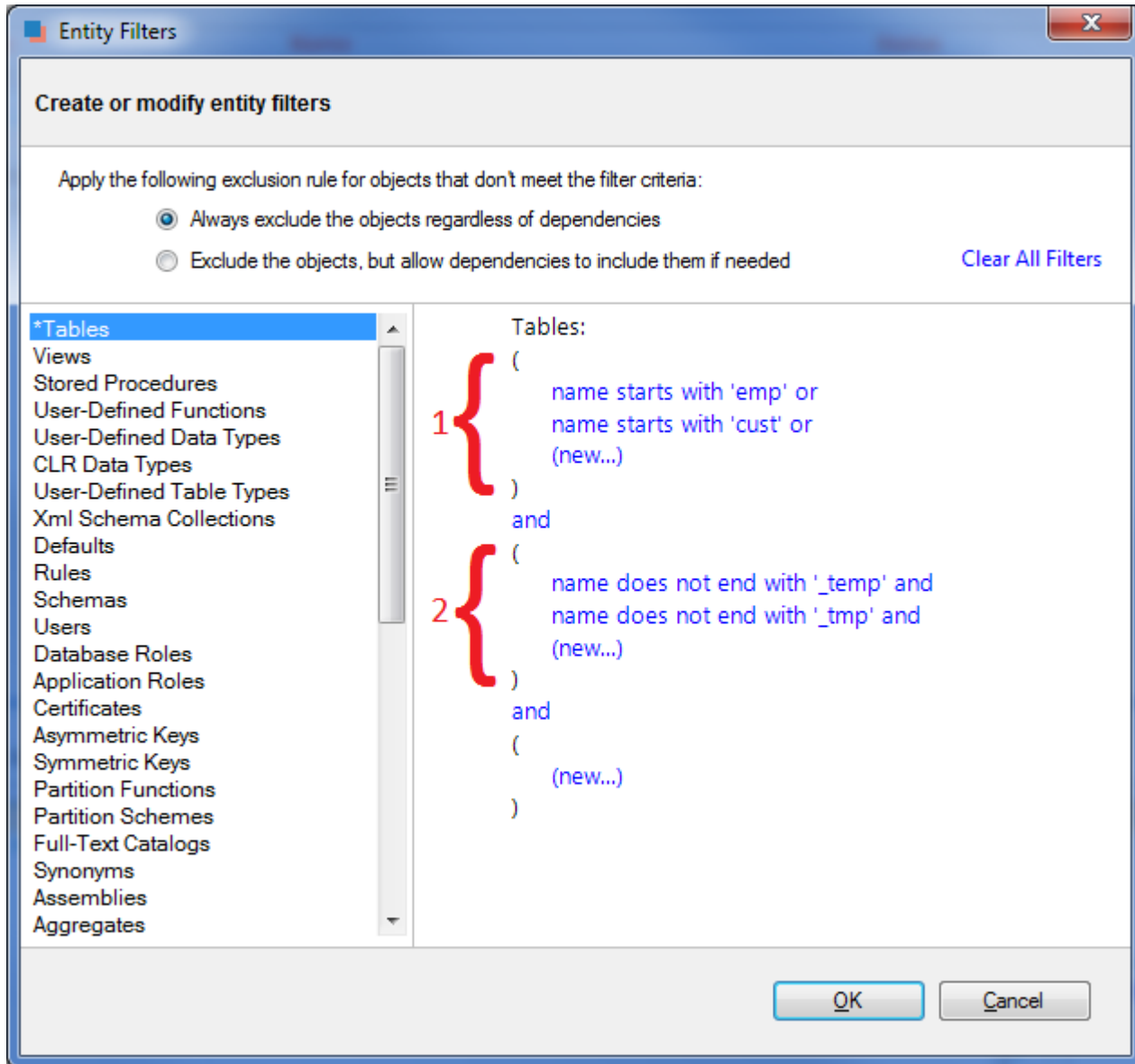
- [Entity filters overview](#)
- [Creating exclusion rules](#)
- [Working with entity filters](#)

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## Schema Compare Entity Filters Overview

The entity filter is a collection of conditions that allows you to include or exclude database objects. Conditions are organized into units called groups. A single group contains conditions combined with the same operator: AND/OR. The groups themselves can be combined with an operator that may be the same as or different from the conditions' operator.



There is no limit to the number of groups that a filter can have or the number of conditions contained in a single group. In order to keep the filter simple, we recommend that you place all conditions that can be combined with a common operator in the same group. Create additional groups only if you need conditions that require a different operator.

The following filter, for example, defines two conditions combined with the AND operator. It requires only one group.

- name does not start with "v\_temp" and
- name does not contain "temp"


The following filter, on the other hand, contains conditions that requires different operators, therefore two groups are needed.

## Group 1:

- name starts with "emp" or
- name ends with "emp"

## Group 2:

- name does not start with "tmp" and
- name does not start with "#" and
- name does not start with "##"

 An entity filter, similar to other comparison settings, is saved in the comparison session and it is applied automatically when you launch the session.

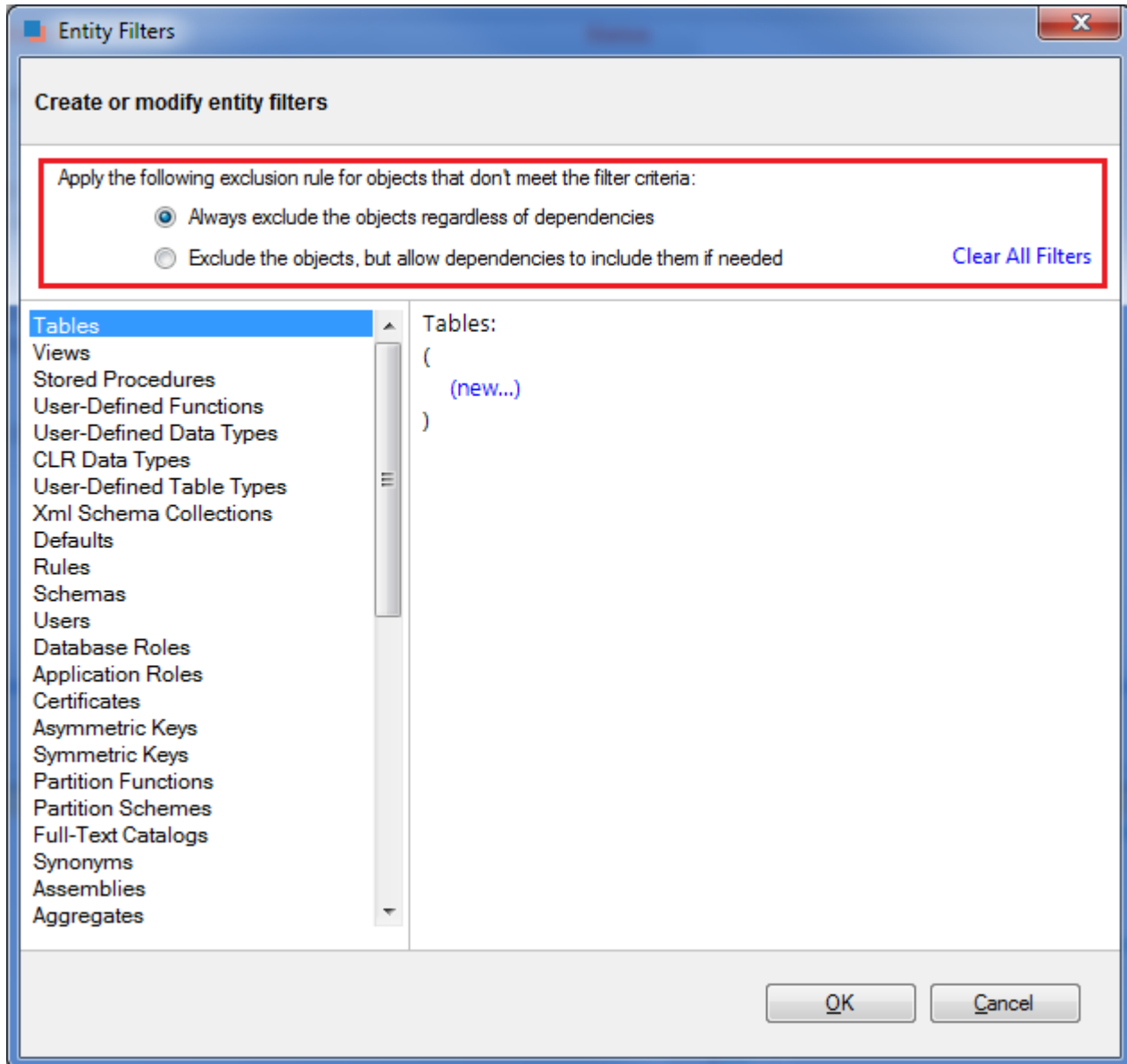
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## Schema Compare Exclusion Rules

An entity filter provides two options, located at the top of the filter form, that determine the method by which database objects are excluded:

- The first option always excludes objects that do not meet the filter criteria. The excluded objects do NOT appear in the comparison grid at all.
- The second option excludes objects that do not meet the filter criteria, but allow the database dependencies to include them (if these objects are needed). Excluded objects in this case appear unchecked in the comparison grid.



Please note that the second exclusion rule could produce, in some cases, unexpected results. You might notice that database objects, explicitly excluded by the filter, still appear in the synchronization script.

Consider, for example, the following scenario:

A database contains a table named "employees" and a view named "v\_employees" that depends on it. A table filter has been defined that excludes the "employees" table. Since the view "v\_employees" depends on the "employees" table, the "employees" table will be included if the view needs to be synchronized.

If you wish to always exclude database objects that do not meet the filter criteria, regardless of the dependencies, do one of the following:

- Select the first exclusion rule OR
- Leave the second rule selected, but go to the Comparison Options form and uncheck the option "Include dependent objects".

The first option is recommended.

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## Schema Compare Working with Entity Filters

Entity filters can be accessed from the context menu of the comparison grid. The conditions for an entity filter can be created or modified via the links provided in the filter definition section.

To create a new condition:

1. From the list of objects, select the object type to which the filter applies.
2. Click on the (new...) link.
3. Enter the condition criteria and click **OK**.

 Database object types with an associated filter have a star \* in front of the name and appear at the top of the list.

To modify or delete an existing condition:

1. In the filter definition, click on the condition that you wish to modify.
2. In the condition dialog, change the condition's property and click **OK**, or click **Delete** to remove it.
3. To change an operator, simply click on it and the operator flips from AND to OR or vice versa.

## Filter Conditions

The conditions are the basic filter criteria that are evaluated to determine whether an object should be included or excluded. A filter condition exposes the following properties:



Filter Condition

Apply condition to: Name

Condition type: Starting With

Case sensitive

Condition expression: emp

Buttons: Delete, OK, Cancel

- **Name/Schema.** Indicates whether the condition will be checked against the name or the schema of the database object
- **Condition type.** Determines the type of the condition, such as "Starting With", "Equals To" etc.
- **Case sensitive.** Indicates whether the condition should honor the character case
- **Condition expression.** Defines the condition expression

Most of the conditions types are straightforward. The filter supports also two conditions that are based on regular expression for more complex criteria.

The following condition, for example, selects the database objects that have at least one digit in their name:

Filter Condition

Apply condition to: Name

Condition type: Match a Regular Expression

Case sensitive

Condition expression: \d+

Buttons: Delete, OK, Cancel

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## Schema Compare Synchronizing Schemas

Propagating database schema changes from one environment to another (often from development to production) safely and efficiently is the most critical functionality that IDERA Schema Compare for Oracle Database provides to software developers and database administrators.

After the comparison of the schemas of two databases has been completed you can select the objects you want to include in the synchronization and generate the schema synchronization script. The generated script will be displayed on a new tab where you will be able to review and execute it.

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## Schema Compare Selecting Objects

By default all the objects that were found to be different during the comparison of the two databases are marked for inclusion in the synchronization script. However, you can choose to exclude or include certain objects from the comparison by checking or clearing the **Synchronize** checkbox next to each object. Selecting or clearing a parent object also affects the dependent objects. For example, if the checkbox for a table is cleared, then all of its primary keys, foreign keys, indexes etc. are also cleared.

### Cleared but included

You may be surprised to see included in the synchronization script an object that you explicitly excluded. Why are those objects included? To answer this you need to look under the comparison / synchronization options and see if the option to "include dependent objects" is **ON**. When that option is **ON**, an included object will cause all the objects on which it depends to also be included in the synchronization script. For example, if you have a table T1 that contains foreign keys coming from tables T2 and T3 then, even though you may have cleared tables T2 and T3 if T1 is checked then both T2 and T3 will be included. When the "include dependent objects" option is **OFF**, then your object selection is respected, however, in this case you should be aware that the resulting synchronization script might not execute successfully.

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## Schema Compare Synchronization Script

Once the schema comparison operation is finished you are now ready to start the synchronization operation.

By default all objects that are found to have differences are automatically marked to be included in the synchronization. You can however easily change which objects should or should not be included in the script by checking or clearing the Synchronization checkbox (see [Schema Compare Selecting Objects](#)).

Once you have made your selections you can generate the synchronization script to either change the database on the right of the comparison to make it the same as that on the left or the other way around. There are three ways to start the script generation:

- **Ribbon.** In the Review Compare tab of the ribbon there are two big buttons in the middle under the grouping **Generate Script**. Each button is labeled with the name of the server plus the name of the database for which the script will be generated.
- **Action Links** on the right panel. (listed under the label **Generate the script for**) Clicking on the [server] . [database] link generates the synchronization script that will make that database the same as the other one.
- **Context menu.** When you right click on the comparison results grid a context menu will pop up. The context menu allows you to access the comparison options and trigger the generation of the synchronization script in addition of other context relevant actions.

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## Schema Compare Working with the Script

The data synchronization script will be displayed on a new window within the comparison sessions tab. The new window is named with the [server] . [database] for which the script was generated and it contains two sub-tabs. The Synchronization Script tab contains the actual script whereas the Synchronization Log tab contains a summary of the actions that will be performed on the target database.

## Warnings section

It is important that you pay special attention to the warnings displayed at the top section of the synchronization script window. When the synchronization requires dropping objects such as columns or tables that may contain data or in situations when the synchronization has to be performed through an intermediary table IDERA Schema Compare for Oracle Database will display a warning indicating the potential risk that such action carries.

Both the ribbon and context menu allow you to open the script in SSMS, save the script, copy, print, or jump to a certain line in the script.

Note that if you go back to the comparison results tab and redo the comparison the corresponding synchronization script may be out of sync as the script is not automatically re-generated. To refresh the script, click **generate the script...** on the Comparison Results tab.

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## Schema Compare Executing Synchronization Script

After reviewing the synchronization script and making sure that the script will do what you intend it to do, you can execute it.

**Warning!** This action will make permanent changes to the content of the target database. It is common sense and we strongly recommend that before executing the script you:

- Make a full backup of the target database. Keep in mind that if columns or tables that contain data will be dropped by the synchronization script the only way to reverse the changes will be to restore the data from a full backup of the database.
- Save the script you are about to execute so that you know exactly what was done to the database and when.

You can execute the script directly from IDERA Schema Compare SSMS and execute it from there. Please pay attention to the Action section on the header of the synchronization script to make sure that the script will be executed against the correct database.

Note that by default, the synchronization script will be executed within a transaction so if you cancel the execution of the script before it completes the transaction will roll back and undo all the changes that were done up to that point. Therefore, the cancellation of the script execution is not instantaneous as depending on the scenario it may take significant amount of time to roll the changes back.

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## Schema Compare Comparison Sessions

Depending on the scenario, the first time you compare two particular databases you might have to spend some time to configure the comparison and synchronization just the way you want it. IDERA Schema Compare for Oracle Database automatically saves all your configuration choices on a "comparison session" so that next time you might need to compare and synchronize those same databases you can do that with one click without having to go through that configuration effort again.

You can also name the comparison sessions to make it easier to identify them. Up to 25 sessions are saved and displayed on the Workspace tab.

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## Schema Compare Tools and Utilities

IDERA Schema Compare for Oracle Database provides the following tool to help you work with database snapshots. In the default installation path, tools are installed under All Programs > IDERA > Comparison Toolset > Tools menu. Click on the following link to view details about the tool:

- [IDERA Snapshot Utility](#)

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## Schema Compare IDERA Snapshot Utility

IDERA Snapshot Utility is a tool that allows you to create database snapshots via the command line. A snapshot is a file that contains all the schema information for a database. The schema information is stored in a proprietary format and can only be read by the IDERA Schema Compare user interface or command line. The schema snapshot does not contain data, only schema information.

The Snapshot Utility accepts parameters in the format `/name:value`. There are no spaces between the name and the value and the value is separated from the name with a colon `<:>`. If the value itself contains spaces, it should be surrounded in double quotes.

IDERA Snapshot Utility supports the following arguments:

- `/s:<server>` Specifies the instance.
- `/d:<database>` Specifies the database name.
- `/t`: Indicates that the connection to the database should be a trusted connection. If not specified, the connection by default is trusted.
- `/u:<username>` Specifies the username when the database uses the database authentication.
- `/p:<password>` Specifies the password when the database uses the database authentication.
- `/sp:<filename>` Saves the snapshot to the specified filename. If the filename is not set, the snapshot file will be named as `database.snp`.
- `/cs:<connection_string>` Specifies the connection string to the database. Use this option when you need to set additional settings that are not supported directly such as the connection timeout.
- `/f:<setting_file>` Creates the snapshot using the settings in the specified file. When the `/f` parameter is specified, all other parameters are ignored. In addition of being easier to manage, using a setting file allows you also to create snapshots for multiple databases. In this case use one line per database.

Samples:

The following command creates a snapshot for the database AdventureWorks on the local server using a trusted connection:

```
xSQLSnapshot /s:(local) /d:AdventureWorks /sp:"c:\AdventureWorks.snp"
```

The following command creates the snapshot by specifying a connection string:

```
xSQLSnapshot /cs:"Persist Security Info=False;User
ID=<username>;Password=<password>;Initial Catalog=AdventureWorks;Data Source=(local)" /
sp:"c:\AdventureWorks.snp"
```

The following command uses the setting file `snapshot.txt` to create the snapshot for two databases:

```
xSQLSnapshot /f:"c:\snapshot.txt"
```

The setting file `snapshot.txt` contains the following lines:

```
/s:(local) /d:AdventureWorks_DEV /sp:"c:\AdventureWorks_DEV.snp"
/s:(local) /d:AdventureWorks_PROD /sp:"c:\AdventureWorks_PROD.snp"
```

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## IDERA Schema Compare command line

IDERA Schema Compare for Oracle Database command line allows you to compare and synchronize database schema via the command line. With the command line you can:

- Perform automated schema comparison and synchronization;
- Compare and synchronize database schema as part of your setup and deployment solution;
- Compare database schemas and execute the synchronization scripts in batch files;
- Schedule the comparison.

All command line settings are specified in an xml config file. You can create an xml config file via one of the following methods:

- **Using the Schema Compare command line wizard.** You can access the wizard from the start menu, under **Start > All Programs > IDERA > comparison tools > Command Lines**.
- **Using the Schema Compare interface.** Simply compare the databases for which you wish to create a command line config file, set the options and other comparison preferences and click **Create a command line config file** in the Ribbon, context menu or in the right panel.
- **Manually, using any text editor, such as Notepad.**

The command line comes with samples for most typical data comparison scenarios. The sample configuration files are located under `\Program Files\Idera\comparison toolset\Command Line Samples\Schema Compare\`.

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## Schema Compare Command Line Arguments

The command line supports the following arguments:

Argument	Description
<b>xmlfile</b>	Specifies the xml file that contains comparison settings, such as databases, credentials, options, object exclusion, schema filters and more.
<b>/v, /validate</b>	Validates the xml configuration file without performing a schema comparison.
<b>/i, /logfile:filename</b>	Specifies the filename where operational messages should be saved. If no log is specified, messages are displayed on the screen.
<b>/e, /error:errorlog</b>	Specifies the error log. Depending on the <b>/t</b> option, this parameter could indicate a file or a Windows event log.



<b>/t, /logtype: (windowslog)</b>	Indicates the type of the error log. If <b>/t:windowslog</b> is specified, the error log set via <b>/e</b> parameter is considered a Windows event log; otherwise the log is considered a file. By default errors are logged to a file.
<b>/o, /overwrite</b>	Indicates whether the log files should be overwritten. By default the command line appends to the log files.
<b>/q, /quiet</b>	Indicates the "quiet" mode of operation, which suppresses all messages from being displayed on the screen or logged to a file.
<b>/en, /encoding: (UTF7 UTF8  UNICODE  ASCII)</b>	Specifies the encoding that should be used for all output files. ANSI encoding is used if no encoding is specified.
<b>/? , /h, /help</b>	Displays the command line arguments.

The following command performs a schema comparison using the settings in the config.xml file:

```
xSQLSchemaCmd config.xml
```

The following command validates the config.xml file:

```
xSQLSchemaCmd config.xml /v
```

**i** Apart from **/v** and **/?**, all other command line arguments are supported and can be set in the xml config file. We strongly recommend, as a good practice, that you specify the comparison options in the xml config file instead of using the command line arguments. When an option is set via the command line parameter and in the xml file, the command line parameter takes precedence.

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## Schema Compare XML Config File

The command line uses an xml config file for all comparison options and settings. The xml file allows you to:

- Specify databases, credentials and connection settings
- Specify the snapshots that contain the database schema
- Change the comparison options
- Customize the comparison by excluding objects, setting schema filters or changing object mappings

- Specify filegroup comparison options
- Specify the files for the synchronization script, logs, warnings and errors
- Execute the schema synchronization script

The xml config file contains the following sections:

Section	Description
Database <LeftDatabase> <RightDatabase>	Use this element to specify databases, credentials or the snapshots containing the schema that should be compared.
Comparison Options <ComparisonOptions> Selected Comparison Options <SelectedComparisonOptions> Excluded Comparison Options <ExcludedComparisonOptions>	Use these elements to select or exclude comparison options.
Object Type Selection <ObjectTypeSelection>	Use this element to include or exclude database objects by type.
Object Selection <ObjectSelection>	Use this element to include or exclude database objects by name.
Schema Filters <SchemaFilters> Schema Filter Expressions <SchemaFilterExpressions>	Use these elements to specify schema filters. A schema filter allows you to include or exclude database objects based on matching criteria.
Filegroup Settings <FileGroupSettings>	Use this element to specify the filegroup options.
Filestream Filegroup Settings <FileStreamFileGroupSettings>	Use this element to specify the filestream filegroup options.

Object Mappings <Mappings>	Use this element to specify the mapping type for various database objects. Command line supports mappings by name or schema and name.
Command Line Settings <CommandLineSettings>	Use this element to specify various comparison settings such as the output files, the target database, whether databases should only be compared or compared and synchronized, and more.

The following is a typical xml config file:

```
<?xml version="1.0" encoding="utf-8" ?>
<CommandLineParameters xmlns="http://www.xsql.com/sqlschemacmd.xsd">
  <LeftDatabase>
    <SqlServer>(local)</SqlServer>
    <DatabaseName>Left_DB</DatabaseName>
    <TrustedConnection>>true</TrustedConnection>
  </LeftDatabase>
  <RightDatabase>
    <SqlServer>(local)</SqlServer>
    <DatabaseName>Right_DB</DatabaseName>
    <TrustedConnection>>true</TrustedConnection>
  </RightDatabase>
  <CommandLineSettings>
    <SchemaScriptFile>script.sql</SchemaScriptFile>
    <SchemaLogFile>log.txt</SchemaLogFile>
    <SchemaWarningsFile>warnings.txt</SchemaWarningsFile>
    <ErrorLogName>error.txt</ErrorLogName>
    <CompareSchema Direction="RightAsLeft" Synchronize="true"></CompareSchema>
  </CommandLineSettings>
</CommandLineParameters>
```

This config file forces the command line to perform the followings:


- It compares database **Left\_DB** and **Right\_DB** on the local SQL Server instance. A trusted connection is used for both databases.
- It saves the synchronization script to the file **script.sql** indicated by the <SchemaScriptFile> element.
- It saves the synchronization log to the file **log.txt** indicated by the <SchemaLogFile> element.
- It saves any warnings that are generated during the comparison to the file **warnings.txt** indicated by the <SchemaWarningsFile> element.
- It saves errors that might occur during the execution of the synchronization script to the file **error.txt** indicated by the <ErrorLogName> element.
- It sets the Right\_DB as the target database indicated by the attribute **Direction="RightAsLeft"** under the element <CompareSchema>. The command line will generate a script that makes the Right\_DB the same as the Left\_DB.
- It executes the synchronization script and makes permanent changes in target database indicated by the attribute **Synchronize="true"** under the element <CompareSchema>. By default the command line generates the synchronization script, but does not execute it.

The following command performs a schema comparison using the settings in config.xml:

```
xSQLSchemaCmd config.xml
```

The following command validates the file config.xml:

```
xSQLSchemaCmd config.xml /v
```

 The xml elements and attributes are case-sensitive.

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## Schema Compare Comparing Databases

With the command line you can compare live databases or snapshot files. A snapshot is a file where the database schema is serialized. It does not contain data, just the schema information. The information is stored in a proprietary format and can only be read by the IDERA Schema Compare for Oracle Database user interface or command line. Snapshots do not require authentication, live databases or the other hand can use either Windows or database authentication.

All database-related settings are specified in the xml config file under the <LeftDatabase> and <RightDatabase> elements. The following xml fragment specifies Left\_DB and Right\_DB on the local SQL Server. Trusted connection is used for the Left\_DB database and database authentication is used for the Right\_DB database:

```
<LeftDatabase>
  <SqlServer>(local)</SqlServer>
  <DatabaseName>Left_DB</DatabaseName>
  <TrustedConnection>>true</TrustedConnection>
</LeftDatabase>
```

```
<RightDatabase>
  <SqlServer>(local)</SqlServer>
  <DatabaseName>Right_DB</DatabaseName>
  <TrustedConnection>>false</TrustedConnection>
  <Username>username</Username>
  <Password>password</Password>
</RightDatabase>
```

To compare snapshots instead of live databases, use the <SnapshotFile> element as in the following xml fragment:

```
<LeftDatabase>
  <SnapshotFile>AdventureWorks_DEV.snpx</SnapshotFile>
</LeftDatabase>
```

```
<RightDatabase>
  <SnapshotFile>AdventureWorks_PROD.snpx</SnapshotFile>
</RightDatabase>
```

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## Schema Compare Creating Snapshots

You can use the command line to create a database snapshot before comparing the schema.

The following xml config creates a snapshot for the database AdventureWorks\_DEV and compares AdventureWorks\_DEV and AdventureWorks\_PROD database in the local SQL Server:

```
<?xml version="1.0" encoding="utf-8" ?>
<CommandLineParameters xmlns="http://www.xsql.com/sqlschemacmd.xsd">
  <LeftDatabase>
    <SqlServer>(local)</SqlServer>
    <DatabaseName>AdventureWorks_DEV</DatabaseName>
    <TrustedConnection>>true</TrustedConnection>
    <CreateSnapshot>AdventureWorks_DEV.snpx</CreateSnapshot>
  </LeftDatabase>
  <RightDatabase>
    <SqlServer>(local)</SqlServer>
    <DatabaseName>AdventureWorks_PROD</DatabaseName>
    <TrustedConnection>>true</TrustedConnection>
  </RightDatabase>
  <CommandLineSettings>
    <SchemaScriptFile>script.sql</SchemaScriptFile>
    <SchemaLogFile>log.txt</SchemaLogFile>
    <SchemaWarningsFile>warnings.txt</SchemaWarningsFile>
    <ErrorLogName>error.log</ErrorLogName>
    <CompareSchema Direction="RightAsLeft" Synchronize="false"></CompareSchema>
  </CommandLineSettings>
</CommandLineParameters>
```

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## Customizing Schema Compare

The command line provides a great deal of customization to meet your comparison requirements. It allows you to:

- Compare live databases or snapshot files
- Take a snapshot before comparing live databases.
- Include or exclude an entire class of objects by type, such as tables, views and more
- Include or exclude database objects by name
- Include or exclude database objects via schema filter
- Change the comparison options
- Change the filegroup comparison options
- Change the filestream filegroup comparison options
- Change the default mapping of various database objects

The following sections describe each scenario in details.

- [Schema Compare Excluding Objects](#)
- [Schema Compare Changing Comparison Options](#)
- [Schema Compare Entity Filters customization](#)
- [Schema Compare Schema Filters](#)
- [Schema Compare Changing Filegroup Settings](#)
- [Schema Compare Changing Object Mappings](#)

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## Schema Compare Excluding Objects

The command line provides two methods for excluding database objects:

- [Excluding objects by type](#)
- [Excluding objects by name](#)

The following topics describe each method in detail.

- [Schema Compare Excluding Objects by Type](#)
- [Schema Compare Excluding Objects by Name](#)

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## Schema Compare Excluding Objects by Type

Type-based method allows you to include or exclude an entire class of objects, such as tables or views. To exclude objects by type, use the <ObjectTypeSelection> element and specify two attributes:

- **Type**. Indicates the object type
- **Include="true|false"**. A flag that indicates whether the specified type should be included or excluded

The following xml fragment excludes tables and views from the comparison.

```
<ObjectTypeSelection>
  <ObjectType Type="Table" Include="false" />
  <ObjectType Type="View" Include="false" />
</ObjectTypeSelection>
```

The command line provides a list of predefined types that you can choose to include or exclude:

- Table
- MemoryTable
- View
- StoredProcedure
- UserDefinedFunction
- UserDefinedDataType
- ClrDataType
- UserDefinedTableType
- XmlSchemaCollection
- Default
- Rule
- Schema
- User
- DatabaseRole
- ApplicationRole
- Certificate
- AsymmetricKey
- SymmetricKey
- PartitionFunction
- PartitionScheme
- FullTextCatalog
- Synonym
- Assembly
- Aggregate
- Sequence
- DatabaseTrigger
- PrimaryKey
- UniqueConstraint

- Index
- XmlIndex
- SpatialIndex
- FullTextIndex
- ForeignKey
- DefaultConstraint
- CheckConstraint
- Trigger
- Statistic
- BrokerMessageType
- BrokerContract
- BrokerQueue
- BrokerRoute
- BrokerService
- BrokerRemoteServiceBinding
- BrokerPriority
- Permission
- ExtendedProperty
- FullTextStopList
- FullTextStopListWord
- SearchPropertyList
- SecurityPolicy
- ColumnMasterKey
- ColumnEncryptionKey

In addition to these types, the command line supports also three macro-types in order to facilitate the selection:

- **All**. When specified it includes all object types
- **None**. When specified it excludes all object types
- **DefaultObjects**. When specified it includes the most common objects.

The Include attribute is ignored for macro-types. Object types included by DefaultObjects macro-option are those that you see in the Schema Compare User-Interface option screen when you click on the **Restore Defaults** button. More details are provided [here](#).

Depending on your scenario, you could combine one of the macro-types with the actual types to achieve the desired result. For example, to exclude only views and procedures, you could use the following xml fragment:

```
<ObjectTypeSelection>
  <ObjectType Type="DefaultObjects" />
  <ObjectType Type="View" Include="false" />
  <ObjectType Type="StoredProcedure" Include="false" />
</ObjectTypeSelection>
```

or just:

```
<ObjectTypeSelection>
  <ObjectType Type="View" Include="false" />
```



```
<ObjectType Type="StoredProcedure" Include="false" />
</ObjectTypeSelection>
```

To include only tables and exclude all other objects, you could combine the None macro-type with the Table type as in the following xml fragment:

```
<ObjectTypeSelection>
  <ObjectType Type="None" />
  <ObjectType Type="Table" Include="true" />
</ObjectTypeSelection>
```

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## Schema Compare Excluding Objects by Name

While the type-based selection excludes an entire class of objects, the name-based method allows you to exclude specific objects by name.

To exclude an object by name, use the <ObjectSelection> element of the xml config file and specify one or multiple <Object> elements with the following attributes:

- **Schema.** Contains the object schema. If not specified, the command line will locate the object by name. We recommend you always specify the schema.
- **Name.** Contains the object name
- **Type.** Contains the object type
- **Include="true|false".** Indicates whether the object should be included or excluded.

The following xml fragment excludes the table employees and the view v\_employees:

```
<ObjectSelection>
  <Object Schema="dbo" Name="employees" Type="Table" Include="false"/>
  <Object Schema="dbo" Name="v_employees" Type="View" Include="false"/>
</ObjectSelection>
```

The following list contains the object type that you can exclude:

- Table
- MemoryTable
- View
- StoredProcedure
- UserDefinedFunction
- UserDefinedDataType
- ClrDataType
- UserDefinedTableType
- XmlSchemaCollection
- Default


- Rule
- Schema
- User
- DatabaseRole
- ApplicationRole
- Certificate
- AsymmetricKey
- SymmetricKey
- PartitionFunction
- PartitionScheme
- FullTextCatalog
- Synonym
- Assembly
- Aggregate
- DatabaseTrigger
- Sequence
- BrokerMessageType
- BrokerContract
- BrokerQueue
- BrokerRoute
- BrokerService
- BrokerRemoteServiceBinding
- BrokerPriority
- FullTextStopList
- SearchPropertyList
- SecurityPolicy
- ColumnMasterKey
- ColumnEncryptionKey

In addition to these types, one macro-type is supported as well:

- **None.** Excludes all database objects

You can combine the macro-type None with the real types to achieve the desired results. For example, to include a table named employees and exclude all other objects, you could use following xml fragment:

```
<ObjectSelection>
  <Object Name="" Type="None" />
  <Object Schema="dbo" Name="employees" Type="Table" Include="true"/>
</ObjectSelection>
```

 Level-two objects, such as columns, constraints, indexes, triggers, statistics, extended properties, permissions can't be excluded directly. These objects are excluded when the parent object is excluded.

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## Schema Compare Changing Comparison Options

You can change the comparison options using the following elements:

- **<ComparisonOptions>** or **<SelectedComparisonOptions>** Contain the options that should be selected or set to true.
- **<ExcludedComparisonOptions>** Contains the comparison options that should be excluded or set to false.

The following xml fragment selects the options **IgnoreSpacesInDefinition**, **IgnoreCaseInDefinition**, **IgnoreDefaultConstraintName** and excludes the option **StandardizeNameInDefinition**. The max transaction size is also set to 65536 bytes:

```
<SelectedComparisonOptions TransactionSize="65536">
  <ComparisonOption>IgnoreSpacesInDefinition</ComparisonOption>
  <ComparisonOption>IgnoreCaseInDefinition</ComparisonOption>
  <ComparisonOption>IgnoreDefaultConstraintName</ComparisonOption>
</SelectedComparisonOptions>

<ExcludedComparisonOptions>
  <ComparisonOption>StandardizeNameInDefinition</ComparisonOption>
</ExcludedComparisonOptions>
```

The options you can choose from are predefined and can be one of the following:

- IncludeDependantObjects
- IgnoreSpacesInDefinition
- IgnoreCaseInDefinition
- IgnoreNameInDefinition
- StandardizeNameInDefinition
- CompareAnsiNullsSetting
- CompareQuotedIdentifierSetting
- ComparePartitioning
- CompareDataCompression
- CompareTableChangeTracking
- CompareTableChangeDataCapture
- CompareTableLockEscalation
- IgnorePrimaryKeyName
- CompareIndexPadding
- CompareIndexStatsNoRecompute

- CompareIndexRowLocks
- CompareIndexPageLocks
- CompareIndexColumnOrder
- IgnoreDefaultConstraintName
- IgnoreCheckConstraintName
- CompareColumnOrdinal
- CompareColumnCollation
- CompareIdentity
- CompareIdentitySeed
- CompareIdentityIncrement
- CompareNullability
- IgnoreViewComments
- AlterViewWithDropCreate
- IgnoreProcedureComments
- AlterProcedureWithDropCreate
- IgnoreFunctionComments
- AlterFunctionWithDropCreate
- IgnoreTriggerComments
- CompareUserLogin
- PreventSchemaDrop
- CompareSynonymServer
- CompareSynonymDatabase
- CompareSequenceStartValue
- CompareSequenceMinValue
- CompareSequenceMaxValue
- GenerateTransactionalScript
- GenerateUseDatabaseStatement
- ScriptFileGroup
- ScriptTableChangeTracking
- ScriptTableChangeDataCapture
- ScriptTableLockEscalation
- ScriptConstraintsWithNoCheck
- ScriptDataCompression
- ScriptAnsiNullsSetting
- ScriptQuotedIdentifierSetting
- ScriptAnsiPaddingSetting
- ScriptCollation
- ScriptNewColumnsAsNull
- ScriptFullTextCatalogPath
- ScriptSequenceStartValue
- ScriptSequenceMinValue
- ScriptSequenceMaxValue

- ExecuteTransactionalScript
- LogScriptExecution
- ContinueExecutionOnError
- CompareNotForReplication
- CompareIndexFillFactor
- CompareReplicatedTables
- CompareDiagramObjects
- TransactionSize
- CompareColumnEncryption
- CompareColumnMask
- CompareColumnMasterKeyProvider
- CompareColumnMasterKeyPath
- CompareSystemVersioning
- IgnoreSystemVersioningHistoryTableName
- ScriptColumnEncryption
- ScriptColumnMask
- ScriptSystemVersioning
- DropSystemVersioningHistoryTable
- CompareHashIndexBucketCount
- CompareRemoteDataArchiving
- ScriptRemoteDataArchiving
- ScriptHistoryRemoteDataArchiving
- AbandonRemoteDataWhenDisablingArchiving

**i** Both elements **<ComparisonOptions>** and **<SelectedComparisonOptions>** can be used to set the selected comparison options. Use the **<SelectedComparisonOptions>** element in order to avoid ambiguities.

**TransactionSize** is the only comparison option that must be set as an attribute of **<ComparisonOptions>**, **<SelectedComparisonOptions>**, or **<ExcludedComparisonOptions>** element. Specify a decimal value that indicates the max size of the schema transaction size in bytes. The default value is 0, which indicates an "unlimited" transaction. Use this option carefully. In most comparison scenarios, the default setting is sufficient.

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## Schema Compare Entity Filters customization

An entity filter is a new feature introduced in the version 4 of the command line that replaces the schema filters supported by the previous versions. It allows you to include or exclude database objects based on some predefined criteria.

**i** Schema filters supported by the previous versions of the command line are depreciated and will be removed in a future release.

An entity filter is composed by groups combined with an operator: AND/OR. Each group contains conditions, which act as the filter criteria. When the filter is applied, the conditions are evaluated against the name or the schema of a database object. If the object meets the condition criteria, it is included in the comparison, otherwise it is excluded.

The following xml fragment defines a filter that selects views the name of which starts with the prefix v\_emp:

```
<EntityFilters>
  <filter entitytype="View">
    <condition>
      <conditiontype>StartingWith</conditiontype>
      <expression>v_emp</expression>
    </condition>
  </filter>
</EntityFilters>
```

The following xml fragment defines a filter that contains two conditions. It selects tables the name of which does not start with "#" and "##":

```
<entityfilters>
  <filter entitytype="Table">
    <group conditionoperator="And">
      <condition>
        <conditiontype>NotStartingWith</conditiontype>
        <expression>#</expression>
      </condition>
      <condition>
        <conditiontype>NotStartingWith</conditiontype>
        <expression>##</expression>
      </condition>
    </group>
  </filter>
</entityfilters>
```

**i** The command line provides samples for the most common entity filter scenarios. You will find them in the command line sample folder under **\Program Files\Idera\comparison toolset\Command Line Samples\Schema Compare\EntityFilters**.

The structure of the entity filters supported by the command line xml config file is as follows:

```
<entityfilters exclusionrule="ExcludeAlways|ExcludeIfPossible">
  <filter entitytype="object_type" groupoperator="And|Or">
    <group conditionoperator="And|Or" includematches="true|false">
      <condition casesensitive="true|false" namecondition="true|false">
        <conditiontype>condition_type</conditiontype>
        <expression>expression</expression>
      </condition>
    </group>
  </filter>
</entityfilters>
```

xml Element/ Attribute	Description	Usage
EntityFilters	The starting element of the entity filters.	
ExclusionRule: <i>ExcludeAlways/ ExcludeIfPossible</i>	Determines the rule that should be used to exclude objects that don't meet the filter criteria with respect to dependencies: <ul style="list-style-type: none"> <li>• <b>ExcludeAlways</b> indicates that objects should be excluded regardless of dependencies.</li> <li>• <b>ExcludeIfPossible</b> indicates that objects should be excluded, but database dependencies might include them if needed.</li> </ul>	Optional. Default value is <i>ExcludeAlways</i> .
Filter	Starts a filter element. Multiple filters are supported, each for a specific object type.	
EntityType	Indicates the type of the database objects associated with the filter. Nearly all database are supported, except for the following: <ul style="list-style-type: none"> <li>• Filegroups</li> <li>• Full-Text Indexes</li> <li>• Permissions</li> <li>• Extended Properties</li> </ul>	Required.
GroupOperator: <i>And/ Or</i>	Determines the operator that combines the groups that participate in the filter.	Optional. Default value is <i>And</i> .

Group	Starts a filter group. Multiple groups can be included in a single filter.	Optional when the filter contains only one condition, otherwise required.
ConditionOperator: <i>And/Or</i>	Determines the operator that combines filter conditions associated with a group.	Optional. Default value is <i>Or</i> .
IncludeMatches: <i>true/false</i>	Indicates whether the database objects that meet the group criteria should be included in the comparison.	Optional. Default value is <i>true</i> .
Condition	Starts a filter condition.	Required.
CaseSensitive: <i>true/false</i>	Indicates whether the condition should honor the character case.	Optional. Default value is <i>false</i> .
NameCondition: <i>true/false</i>	Determines whether the filter condition should be evaluated against the name of a database object. If false, the condition is checked against the schema.	Optional. Default value is <i>true</i> .
ConditionType	One of the following condition types: <ul style="list-style-type: none"> <li>StartingWith</li> <li>NotStartingWith</li> <li>EndingWith</li> <li>NotEndingWith</li> <li>Containing</li> <li>NotContaining</li> <li>EqualsTo</li> <li>DifferentFrom</li> <li>RegExMatching</li> <li>RegExNotMatching</li> </ul>	Required.
Expression	A text expression that defines the condition criteria.	Required.

The following xml fragment is a more complete example that defines three entity filters:

- The first filter creates two conditions that select database views starting with v\_emp or v\_cust. Both conditions are case-sensitive.
- The second filter selects stored procedures that belong to HumanResource or Personal schema. In addition to schema, the procedure name should contain at least one digit.
- The third filter selects functions that do not end with \_temp and \_tmp



```

<entityfilters exclusionrule="ExcludeAlways">
  <filter entitytype="View">
    <group conditionoperator="Or">
      <condition casesensitive="true">
        <conditiontype>StartingWith</conditiontype>
        <expression>v_emp</expression>
      </condition>
      <condition casesensitive="true">
        <conditiontype>StartingWith</conditiontype>
        <expression>v_cust</expression>
      </condition>
    </group>
  </filter>
  <filter entitytype="StoredProcedure" groupoperator="And">
    <group conditionoperator="Or">
      <condition namecondition="false">
        <conditiontype>EqualsTo</conditiontype>
        <expression>HumanResource</expression>
      </condition>
      <condition namecondition="false">
        <conditiontype>EqualsTo</conditiontype>
        <expression>Personal</expression>
      </condition>
    </group>
    <group>
      <condition namecondition="true">
        <conditiontype>RegExMatching</conditiontype>
        <expression>\d+</expression>
      </condition>
    </group>
  </filter>
  <filter entitytype="UserDefinedFunction">
    <group conditionoperator="And">
      <condition>
        <conditiontype>NotEndingWith</conditiontype>
        <expression>_temp</expression>
      </condition>
      <condition>
        <conditiontype>NotEndingWith</conditiontype>
        <expression>_tmp</expression>
      </condition>
    </group>
  </filter>
</entityfilters>


```

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## Schema Compare Schema Filters

Schema filters allow you to include or exclude database objects based on matching criteria. You can exclude, for example, tables the name of which start with "tmp\_" or include views that belong to the schema HumanResources.

 Schema filters are deprecated and will be removed in a future version of the command line utility. Use [entity filters](#) instead.

A schema filter affects only the objects that belong to the class of objects for which the filter is defined. A table filter, for example, affects tables only. When a schema filter is defined, the command line performs one of the following actions:

- If the filter is defined as an "Include" filter, objects that pass the filter criteria are included; all other objects that do not pass the filter criteria are excluded.
- If the filter is defined as an "Exclude" filter, objects that do NOT pass the filter criteria are included; all other objects that pass the filter criteria are excluded.

The command line provides two elements for defining schema filters:

- Simple filters that contain just a few criteria can be defined under the element <SchemaFilters>
- Complex filter with multiple criteria, different validation types and specific case-sensitivity can be defined under the element <SchemaFilterExpressions>

Simple filters are defined as <SchemaFilter> under <SchemaFilters> elements with the following attributes:

- **Criteria** Contains the filter matching criteria.
- **ObjectType** Indicates the type of object on which the filter will be applied.
- **Action="Exclude|Include"** Indicates whether the object that satisfies the filter criteria should be included or excluded.
- **FilterType** Indicates the filter type which can be one of the following:
  - StartsWith
  - EndsWith
  - Contains
  - EqualsTo
  - Schema
  - RegularExpression

The following xml fragment adds a filter that excludes all tables whose name ends with "\_tmp":

```
<SchemaFilters>
  <SchemaFilter Criteria="_tmp" FilterType="EndsWith" ObjectType="Table"
  Action="Exclude"/>
</SchemaFilters>
```

Schema filters defined under <SchemaFilters> element are sufficient in most comparison scenarios. If you need more control over the filter criteria, you can define the filters as <SchemaFilterExpression> under the <SchemaFilterExpressions> element. The <SchemaFilterExpression> element contains two attributes:

- **ObjectType** Indicates the type of object on which the filter should be applied
- **FilterValidationType="AllCriteria|AtLeastOneCriteria"** Indicates the type of validation that should be performed when the filter contains multiple criteria. If AllCriteria is specified, an object must pass all criteria in order to satisfy the filter; otherwise one criteria is sufficient. If not specified the validation is set by default to AtLeastOneCriteria.

Under the <SchemaFilterExpression> element, you can define one or multiple filter criteria. Each criteria is a <SchemaFilterCriteria> element with the following attributes:

- **Criteria** Contains the filter criteria
- **Action="Exclude|Include"** Indicates whether the object that satisfies the filter criteria should be included or excluded.
- **FilterType** Indicates the filter type and can be one of the followings:
  - **StartsWith**
  - **EndsWith**
  - **Contains**
  - **EqualsTo**
  - **Schema**
  - **RegularExpression**
  - **IgnoreCase="true|false"** Indicates whether the character case should be ignored when the criteria is applied. By default the filter ignores the case.

The following xml fragment defines two filters: one for views and one for stored procedures. The view filter has three criteria. It selects only views that start with v1\_, v2\_ or v3\_. The procedure filter has two criteria. It excludes procedures the name of which contain \_p1\_ AND \_p2\_. The first criteria of the procedure filter is case-sensitive:

```
<SchemaFilterExpressions>
  <SchemaFilterExpression ObjectType="View">
    <SchemaFilterCriteria Action="Include" FilterType="StartsWith"
Criteria="v1_" />
    <SchemaFilterCriteria Action="Include" FilterType="StartsWith"
Criteria="v2_" />
    <SchemaFilterCriteria Action="Include" FilterType="StartsWith"
Criteria="v3_" />
  </SchemaFilterExpression>
  <SchemaFilterExpression ObjectType="StoredProcedure"
FilterValidationType="AllCriteria">
    <SchemaFilterCriteria Action="Exclude" FilterType="Contains" Criteria="_p1_"
IgnoreCase="false" />
    <SchemaFilterCriteria Action="Exclude" FilterType="Contains" Criteria="_p2_" /
>
  </SchemaFilterExpression>
</SchemaFilterExpressions>
```

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## Schema Compare Changing Filegroup Settings

The command line allows you to customize the way the filegroups are mapped and compared. By default, filegroups are mapped by name, but you can choose to ignore them or map them differently.


Consider, for example, a table named employees that in the source database is stored on the filegroup LEFT\_FG and in the target database on the filegroup RIGHT\_FG. When the table is compared, the difference in the filegroup will trigger a table rebuild. If you change the filegroup settings and map LEFT\_FG to RIGHT\_FG, the filegroup difference will not trigger any action on the table.

You can change the comparison settings for regular filegroups via the elements <FileGroupSettings>. Filestream filegroup settings can be set under the <FileStreamFileGroupSettings> element. To alter the settings, specify the following elements:

- **ComparisonType="Ignore|ByName|ByMappings"** Indicates the type of comparison that should be applied to filegroups.
- **Mappings** Contains the filegroup mappings when the ComparisonType is set to "ByMappings". Mappings are set as <LEFT\_FG>:<RIGHT\_FG>. When more than one mapping is required, separate them with a semicolon <;>

The following xml fragment sets the filegroup comparison option to a compare by mappings:

```
<FileGroupSettings>
  <ComparisonType>ByMappings</ComparisonType>
  <Mappings>LEFT_FG_1:RIGHT_FG_1;LEFT_FG_2:RIGHT_FG_2</Mappings>
</FileGroupSettings>
```

 Filegroup settings affect the existing database filegroups and the filegroup clause of tables and indexes. Missing database filegroups are NOT created by default.

To create missing database filegroups, include the database objects DatabaseFileGroup and DatabaseDataFile as in the following xml fragment:

```
<ObjectTypeSelection>
  <ObjectType Type="DatabaseFileGroup" Include="true" />
  <ObjectType Type="DatabaseDataFile" Include="true" />
</ObjectTypeSelection>
```

We strongly recommend that you create the missing filegroups manually.

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## Schema Compare Changing Object Mappings

Mapping determines the way database objects are paired together. The command line supports two types of mapping: by name, or by schema and name. The default mapping is by schema and name.

The following xml fragment changes the mapping for tables and views to name-based mapping:

```
<Mappings>
  <Mapping MatchingType="Name" ObjectType="Table" />
  <Mapping MatchingType="Name" ObjectType="View" />
</Mappings>
```

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## Schema Compare Error Codes

The command line returns the following error codes:

Code	Description
0	Indicates success.
1	Invalid command line switches.
2	Invalid xml file.
4	Invalid output file.
8	Generic error.
12	Missing or expired license.

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## IDERA Data Compare for Oracle Database

Welcome to IDERA Data Compare for Oracle Database, the tool of choice for thousands of DBAs and developers around the globe.

IDERA Data Compare supports all editions of Oracle from 9i to 12c.

We are indebted to you, users of our tools, for all the comments and suggestions you have given us over time – we truly appreciate your help and attribute much of our success to you! Please continue to help us in our quest to make IDERA Data Compare even better by sending us unfiltered feedback on the current version and suggestions for the future versions at [support@idera.com](mailto:support@idera.com).

Everything in this document, unless it is explicitly stated otherwise, applies to all editions of IDERA Data Compare for Oracle Database.

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## Data Compare Application window

IDERA Data Compare for Oracle Database divides the main application window into three areas:

1. **The ribbon.** The context sensitive ribbon provides all the command buttons and icons you need to do your job quickly. The ribbon is organized in three distinct tabs each of which corresponding to the main steps of the database comparison and synchronization process and "housing" the relevant command buttons.
2. **Main panel.** The main panel contains a permanent tab called the [Workspace](#) and a tab for each active comparison session.
3. **Output window.** The output window provides a running log of the tasks being performed in IDERA Data Compare.

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## Data Compare Workspace

IDERA Data Compare for Oracle Database workspace is the storage and the interface for saving and managing databases, credentials, comparison sessions and other UI options.

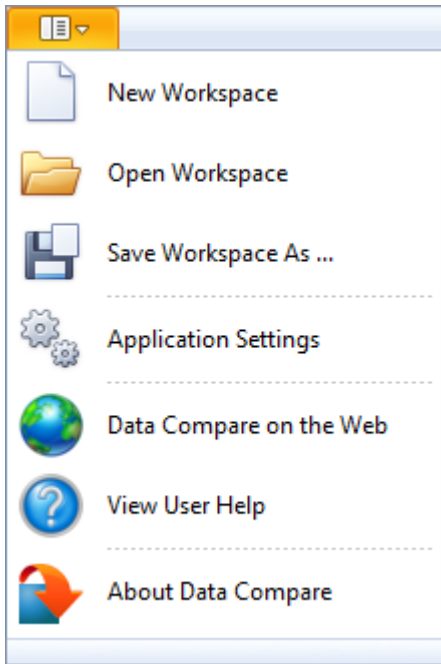
The Workspace window is divided into the following sections:

- **Workspace actions.** This section provides links that allow you to create a new workspace, add databases to the current workspace, compare database and view application settings. The **New Workspace** action resets the current workspace by erasing the comparison history and the registered databases.
- **Registered Databases.** Shows the list of servers/databases that have been registered. On mouse over two action links appear for a registered server: **Edit** allows you to change the connection settings for that server and/or add and remove databases; and **Remove** un-registers a server (deletes all the server information from the workspace).
- **Comparison History.** Lists up to 25 comparison sessions from the most recent one to the oldest one. To re-open a comparison session, simply click it. The two links at the bottom-right of each session allow you to edit a session or delete it. For each session, data compare displays the following information:
  - The left and the right databases included in the session. These are the databases that are compared when you launch the session.
  - The date and time when the session was created
  - The session execution count, which indicates the number of times to session has been opened. A new sort order, under the application settings, allows you to arrange the sessions in the workspace by execution count, so that the ones that you use the most are always at the top. You can also change the execution count by editing the session.

## Saving and Loading Workspaces

Data Compare workspace stores the data in a set of xml files. There is always one master file that keeps databases and credentials, and a separate xml file for each comparison session. The workspace is saved by default in a subfolder under the common folder for application data that is used by all users. It is usually found under `\ProgramData\Idera\comparison toolset\DataCompare\Workspace`.

The workspace is managed automatically, so no action is required to save it or load it. However, if you wish to have multiple copies of the workspace, you can save it to a custom path. Functions for saving and loading the workspace are located in the quick menu of the application button:



**i** When you choose to save the workspace in a custom location, you specify the path and the name of the workspace master file. The session files will be saved in the same directory as the master file, but their names will be auto-generated. Similarly, when you load a workspace from a custom location, you select the workspace master file. Data Compare expects the session files to be in the same folder as the workspace master file.

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## Data Compare Add Databases

Before comparing databases, you will need to add them to the workspace. The IDERA Data Compare Add Databases functionality can be accessed from the ribbon (the Home tab) or from the **Add Databases** action link at the top left section of the Workspace tab.

On the Add Database dialog window choose the server where the database(s) you want to add resides. You can click on the **Refresh** item of the drop down to discover the SQL Server instances running on your network. If the application is not able to discover the instance you are looking for either because it is not exposing itself, or it is not running on your local area network, or it is not listening on the default port then you can type in ServerName (or IP address)\Instance Name on the drop down box. If the SQL Server is not listening on the default port you can specify a custom port on the following format:

*[ServerName or IP Address]\[Instance Name],PortNumber*

Once you have chosen the server and the authentication method (including login name and password if you chose database authentication) you can click on the **Refresh** link at the top of the Databases box and the application will connect to the server using the information you provided and populate the Databases box with the list of all user databases in that server. You can select one or more databases to add to the workspace.

By default, IDERA Data Compare will use the connection properties set at the Application Settings, however, you can change the connection properties for this server only if you need to.

In the other properties edit box, you can specify additional connection properties as name=value pairs separated by semicolons: name1=value1;name2=value2;...

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## Data Compare Remove Databases

Using IDERA Data Compare for Oracle Database, there are two ways to remove a database from the workspace:

- Move the mouse over the name of database you want to remove under the Registered Databases on the left panel of the Workspace. The database name is highlighted and a **Remove** link is available.
- Click **Remove Databases** on the Home tab of the IDERA Data Compare ribbon. A remove databases dialog window appears showing all the registered servers/databases. Select the database you want to remove, and then click **Remove Selected Database...** at the top right corner.

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## Data Compare Application Settings

Application settings allow you to tweak the behavior of the IDERA Data Compare for Oracle Database and can be accessed from the drop down menu off of the top left corner product icon or from the Application Settings link at the top left corner on the Workspace tab.

Under the General tab, you will find:

- **Connection Settings** If you are reading this you are already familiar with the database connection settings. Under normal circumstances you do not need to change any of these settings.
- **Check custom keys uniqueness** Before comparing the data IDERA Data Compare will pair the rows based on a unique key that is automatically determined. However, you can choose to pair the rows based on some custom key that you define either because the tables in question do not have a predefined unique key or because you wish to use a different key. In this case there is an option to validate the chosen key. By default the validation simply checks for type compatibility. If you wish to ensure that the chosen key is unique you can check this option. Please note however that depending on the size of those tables the validation for uniqueness may take from a few seconds to minutes to complete.
- **Data temp folder** Indicates the temp folder that Data Compare uses for row and script serialization. Note that if you change the temp folder, you need to restart Data Compare for the new setting to take effect.

Under the Workspace tab you will find:

- **Sessions** Contains settings related to comparison sessions:
  - **Save sessions** By default it is checked. It instructs the IDERA Data Compare to store comparison sessions for future use. A stored session contains all the necessary information to allow you to repeat the comparison with one click. Stored sessions will appear on the main panel of the Workspace tab.
  - **Max sessions kept in history** By default IDERA Data Compare will store the last 25 comparison sessions. Although there is no noticeable performance difference on application launch related to the number of sessions stored you may choose to set this parameter to a lower number. Allowable values are 1 to 25.
  - **Sort sessions by** Change the order that stored sessions appear on the workspace tab.
- **Layout** Allows you to change the color schema of a session. You can choose from built-in colors or pick custom ones.

To revert all settings back to their default values, click **Restore Defaults**.

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## Data Compare Comparing

Comparing the data in two databases is part of the core functionality of IDERA Data Compare for Oracle Database.

The databases you wish to compare (or tables within them) can be virtually anywhere – as long as you have access to them you can compare and synchronize them. Furthermore, the databases do not have to be of the same version or flavor.

In the case of cross version comparison IDERA Data Compare will map the data types that can be mapped and ignore the columns that are of a type that cannot be mapped.

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## Data Compare Comparing Databases

To start a comparison between two databases, click on the IDERA Data Compare for Oracle Database **Compare Databases** button on the Home tab of the ribbon. The Database Selection dialog window that appears allows you to chose the server(s) where the databases you wish to compare reside as well as the databases themselves.

From this window, you can also access the [Comparison Options](#) that are applied during the comparison.

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## Data Compare Comparing Selected Tables


To start a comparison between select tables and/or indexed views click on the IDERA Data Compare for Oracle Database **Compare Tables/Views** button on the Home tab of the ribbon. On the Object Compare dialog window that appears you can first select the servers and databases on which the objects you wish to compare reside. In case there is

a large number of objects in those databases you may wish to specify a pattern for the name of the objects you are looking for (ex. all tables that start with a). That will make it easier to find those objects.

- **Comparing Views.** IDERA Data Compare, in addition to tables, has the ability to compare views as well. The option **Compare and Synchronize Views** determines whether views should be included in the comparison and synchronization. However, use this option with caution. There are several limitations that SQL Server imposes on views:
  - Not all views are updatable.
  - If a view has indexes, Data Compare will select one in the same order as table's indexes; otherwise you must define a custom index in order to be able to compare the view.
  - Because SQL Server does not support SET IDENTITY\_INSERT ON|OFF on views, the insert statements might fail if one of the view's underlying tables contains an identity column.
  - Data Compare cannot synchronize views that contain large binary fields such as varbinary(max) and image, or views with large text field such as varchar(max), nvarchar(max), text and ntext.

Once you have made your selections above you can click on the **Read Database Objects** link. IDERA Data Compare will read the schemas of the two databases and populate the two left bottom windows with the list of tables / views available.

Now you can map those objects one at a time irrespective of the object names. Select an object on the left, then select an object on the right and click the left to right arrow button to map those two objects.

 The [Data Compare Comparison Options](#) affect the ability to compare objects. For example, if you clear the **Compare and synchronize tables** option, then you cannot compare the tables but can only view and map them. The same holds true for indexed views which by default are not included in the comparison.

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## Data Compare Comparison Options

IDERA Data Compare for Oracle Database exposes a series of options that allow you to customize the way the comparison is performed. On mouse over a description of the highlighted option is displayed on the right panel of the options window.

You can access the Data Compare options from the Compare Databases and Compare Tables dialog windows before the object mapping operation. After the objects (tables and indexed views) have been mapped you can access the

Comparison Options from the Review Comparison tab of the ribbon as well as from the action links on the right panel of the Mapped Objects tab.

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## Data Compare Scripting Options

Scripting Options are listed on the second tab of the IDERA Data Compare Options window. Those options affect the way the synchronization script is generated but do not affect the comparison operation.

- Transaction size.** Determines the size of the script that will be wrapped in a single transaction. Depending on the size of the databases/tables being compared the synchronization script may get to be extremely large (for example, millions of insert/update/delete statements are needed to make database DB2 the same as DB1). Wrapping such large scripts in a single transaction may not be possible due to transaction size limitations, and may not be acceptable for performance and other reasons. So, it is necessary to split the script into smaller "chunks" and wrap each of those "chunks" in individual transactions.  
 If the synchronization process is canceled or fails due to errors, only the current open transaction is rolled back. Changes committed prior to that transaction are permanent and cannot be reversed. To have an unlimited transaction size specify 0 as the max value. Having an unlimited transaction size ensures that all changes in the database are rolled back if an error occurs, but might be rejected by SQL Server.  
 Finding the right transaction size depends on many factors - please adjust this option carefully to suit your specific environment.
- Batch size.** Determines the size of data that is transmitted to SQL Server in one execution. A transaction normally contains many batches, but the batch itself is a single unit of work that cannot be divided any further.

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## Data Compare Preparing the Comparison

Before comparing the content of two databases, IDERA Data Compare for Oracle Database will analyze the schemas of both databases (or the selected tables). If you manually map the tables between the two databases, Data Compare will use that mapping as is and proceed with analyzing the pairs of tables. If you compare whole database it will first perform an automatic mapping of the tables based on their names (owner name + table name) - every table on one database is paired with a table (when possible) on the other database. Then, it proceeds to analyze the pairs of tables to map individual columns, determine the available comparison keys and choose a key that will be used to pair rows during the data compare.

During this preparation phase you will be able to customize the object mapping, include and exclude certain tables and certain columns within those tables, choose comparison keys and define data filters to compare only subsets of rows from certain tables.

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## Data Compare Mapped Objects

The results of the schema analyses and the automatic mapping operation are displayed on the IDERA Data Compare Mapped Objects tab. For each pair of mapped objects the following information is displayed:

- **Object Type.** The object can be a table or an indexed view. The type is indicated through the small icon in the second column of the grid.
- **Compare.** A checkbox indicating whether the pair should be included in the comparison. By default, all mapped pairs will be included in the comparison. You can quickly select / deselect all objects using the **Select All Objects** and **ClearSelection** commands in the ribbon.
- **Owner and object name.** For both sides. In a default mapping the Left Owner and Left Name would be identical to respectively Right Owner and Right Name.
- **Mapping Status.** A blank value indicates that the objects have been fully mapped, that is, there was a complete match of columns. A **Partial** value indicates that some columns were not matched and will not be included in the comparison.
- **Left/Right Keys.** Those are the unique keys that have been selected by Data Compare to be used in the mapping of the rows during the data comparison. If those two fields are empty for a given pair that means that Data Compare was not able to identify a unique key that could be used. If you do not choose a custom key for this pair then those objects will not be included in the comparison.

**i** **Changing the comparison options.** Please note that changing the comparison options after the mapping operation has completed will trigger a refresh of the Mapped Objects tab. For example if you uncheck the **Compare and synchronize tables** option the table pairs will be removed from the mapped objects grid.

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## Data Compare Mapping Rules

In most cases the default mapping mechanism that pairs the objects based on the schema name and the object name is what is needed. However, there are often scenarios in which the same table may be owned by different schemas in different databases, or the tables on the development server for example may have the names prefixed with dev\_ whereas the same tables in the production server do not have that prefix. In such cases you may want to define certain mapping rules that would allow you to pair objects that would otherwise not be paired together by IDERA Data Compare.

The Mapping Rules can be accessed from the ribbon or from the action links on the right panel of the comparison tab.

There are three types of rules you can set:

- **Schema Mapping Rules.** By default, Data Compare performs an exact match of the schema names, however you have two additional options:
  - **Ignore schema name.** In this case table [dbo].[T1] on database 1 will be paired with table [user1].[T1] on database 2, in other words the schema name is irrelevant.
  - **Manually map the schema names.** This allows you to choose which schema name from database 1 to map to which schema name from database 2. If you map schema [S1] from DB1 to schema [S2] from DB2 then [S1].[T1] from DB1 will be paired with [S2].[T1] from DB2. To un-map a pair of schemas double click on the icon in the middle of the schema pairs on the Mapped Schemas box; that will break the mapping and move the pair of schemas to the **Unmapped Schemas** area. To map two schemas click on the schema on the left to select it; click on the schema you want to map it to on the right box and then click on the **Map Selected Schemas** link.
- **Name Mapping Rules.** By default, Data Compare performs an exact match on the object names, however, you can choose to ignore certain prefix and/or postfix. For example you can indicate that on the left database the dev\_ prefix and the \_old postfix and on the right database the qa\_ prefix and the

\_new postfix should be ignored. In such case table [dev\_T1\_old] from the left database will be paired with [qa\_T1\_new].

- **Data Type Mapping Rules.** By default, data types are mapped by compatibility. If column C1 of table T1 on DB1 is of the type varchar but the same column of table T1 on DB2 is of type nvarchar then those two columns will be paired together since those two data types are compatible with each other. However, you have the option to enforce an exact type match for your comparison. When you choose the **Map data types by name** then two columns will only be paired if they are of the same exact type.

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## Data Compare Include/Exclude Objects

The first step in customizing your comparison after the objects have been paired is to choose which objects you wish to include in the comparison and for each object pair which columns you wish to include or exclude. The options available in IDERA Data Compare for Oracle Database:

- **Include/Exclude object pairs.** By default all objects (tables and indexed views) are marked to be included in the comparison. You can decide which pairs you want to include/exclude by checking / unchecking the **Compare** checkbox for each object pair. To de-select or select all object pairs in one click you can use the **Select all objects** and **Clear selection** buttons in the ribbon.
- **Include/Exclude mapped columns.** For each object pair you can click on the details button (the first column of the Mapped Objects grid) to further customize the comparison. By default all the mapped columns are marked to be included in the comparison. However, you may choose to exclude certain columns from the comparison (example: image or text type columns that would take a long time to compare). To exclude columns simply uncheck the **Compare** checkbox for that column pair. Important: note that the column(s) that are part of the key that has been selected to be used as the comparison key will always be included in the comparison regardless of whether you have checked or un-checked them in the Mapped Columns tab.

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## Data Compare Comparison Keys


The IDERA Data Compare Unique Keys tab is divided in two main sections. The top section contains two boxes with the list of unique keys that are potential candidates to be used as the comparison key for each table in the pair. Initially the boxes contain only the predefined unique keys that Data Compare found, but you can add other unique keys that can be a combination of any and all the columns on the given table. The bottom section contains a box with the pair of unique keys that have been selected as the key to be used for the data comparison operation. Data Compare picks the comparison key in the following order (whichever is found first):

1. User-defined keys. User-defined keys (or custom keys) takes precedence over the built-in keys and indexes.
2. Primary Key
3. Unique Constraint
4. Unique Index. Indexes that are not unique are not considered.

When the selected keys are not those that were picked by Data Compare you should validate the keys by clicking on the **Validate** button. If the selected keys are not valid you will not be able to compare the those tables. By default the keys are only validated for type compatibility. If you wish to validate your custom defined keys for uniqueness then you should check that option in the Application Settings. User-defined key validation is done as follows:

1. Columns participating in the the user-defined key in both objects in the pair must have the same names
2. Columns that participate in the key must have the same data type. Only the name of the type is checked. The length and other type properties are not considered.
3. The uniqueness of the key is checked only if the **Check custom key uniqueness** option in the application settings under Miscellanies section is checked.

**Selecting a key for the comparison.** Double-clicking on a unique key on the top section will replace the selected key with the new one.

 User-defined keys are not supported on Memory Tables.

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## Data Compare Where Clause

For large tables the comparison operation may take time since all the rows from both sides will have to be read and compared. So, if you know for example that out of 10 million rows that 9 million of them are equal it would be very inefficient to compare those equal rows. Furthermore, regardless of how many rows may be different you might need to do a quick comparison of just a subset of rows, for example, only rows that were modified today.

IDERA Data Compare for Oracle Database allows you to set where clauses for each object being compared so that you can read and compare only the rows you need to. When defining a where clause by default the same filter will be applied to both tables in the pair, however, if you wish to define different filters for each of the tables you can un-check the **Use the same where clause** checkbox. We suggest you validate the data filters to ensure they have been defined correctly.

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## Data Compare Comparing Data

After completing the preparation phase of the comparison you are ready to compare the data in all those mapped objects (tables and views). To start the comparison, either click on the **Compare Data** button on the ribbon (under the Review Comparison tab) or click on the **Compare Data** on the right panel of the Mapped Objects window. A progress window displays the start time, elapsed time and the names of the objects being compared. If you cancel the comparison operation IDERA Data Compare will display partial comparison results.

On completion of the data compare operation the results are displayed on a new window called "Comparison Result" within that comparison session's tab. The "Comparison Result" window is divided into five sections:

1. **Comparison summary.** Displays the list of table/view pairs that were compared indicating the total number of rows on each of the tables in the pair, the number of rows that were found to be equal ("Equal Rows"), number of rows that were found only on the left/right table/view and could not be paired with a corresponding row on the right/left table/view ("Left Rows", "Right Rows"), and number of rows that exist in both the left and the right table/view but have at least one column that contains a different value on the left table/view from the right.

Notes on the comparison summary grid:

- Database objects that have some differences are displayed in bold.
- The check box, which indicates whether the a pair of objects can be synchronized, appears only for the object that have a valid data compare key and for which the comparison completed without error.

- If the comparison is interrupted, Data Compare displays the result of the process up to the point of cancellation and marks the objects that were not compared with a question mark.
  - In the comparison summary grid, an invalid object is considered an object without a valid key.
2. **Comparison details.** When you select a pair of objects that were found to be different in the comparison results grid, depending on the differences found one to three tabs will appear on the bottom section of the Comparison Results window: Left Rows, Right Rows, and Different Rows. For the different rows the paired columns from both tables are shown next to each other so that you can easily see the differences. You can zoom in on a particular row to take a closer look - right click on the row you wish to inspect and click on **View Row Details**.
- Notes on details grid:
- Columns colored in the light-blue represent columns that participate in the selected data key for that particular table or view. The key label appears in the column header as well.
  - Cells colored in orange represent data that found different.
  - The grey shades that alternate between columns are for displaying purposes only to distinguish between pairs of mapped columns.
  - By default rows that are equal are not displayed in the row grid unless the data comparison option **Report rows that are equal** is checked.
3. **Generate synchronization script.** Those links will trigger the generation of the synchronization script for one direction or the other.
4. **Comparison action links.** The action items provided in this section are also available on the Review Comparison tab of the ribbon. Clicking on the **Refresh Results** link will trigger a re-compare of the data.
5. **Legend.** Provides a list of symbols used in the data compare results grid. The first two symbols, Database table and Database view are used in the first column which is un-named and indicate whether the objects in that pair are tables or indexed views. The other three symbols are used in the **Status** column to indicate cases when the pair of objects was not included in the comparison.

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## Data Compare Synchronizing

Identifying the data differences between two databases helps you as a DBA/Developer in many ways but often your job does not end there - you need to migrate those changes from one database to another. IDERA Data Compare allows you to do just that - after comparing the contents of two databases you can use it to generate the synchronization script - a

T-SQL script that will update the target database (or just the selected tables/rows) to make it the same as the source database.

The data synchronization operation consists of three key actions:

- **Update.** All rows that exist in both sides will be updated on the target database to match the source.
- **Insert.** All rows that exist only on the source database but not on the target will be inserted on the target database.
- **Delete.** All the rows that exist only on the target database but not on the source will be deleted from the target database.

In case you do not wish to delete the rows that only exist on the target database you can change the comparison options so that those rows are not included in the synchronization.

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## Data Compare Generating Synchronization Script

Once the data comparison operation is finished you are now ready to start the data synchronization operation.

By default, all tables that are found to have differences and all the different rows in those tables are automatically marked to be included in the synchronization. You can however easily change which tables, and which rows in those tables, should or should not be included in the script by checking or un-checking the **Sync** checkbox.

Once you have made your selections you can generate the synchronization script to either change the database on the right of the comparison to make it the same as that on the left or the other way around. There are three ways to start the script generation:

- **Ribbon.** In the Review Comparison tab of the ribbon there are two big buttons in the middle under the grouping **Generate Differences Script**. Each button is labeled with the name of the server + name of the database for which the script will be generated.
- **Action Links on the right panel.** Are listed under the label **Generate the script for:**. Clicking on the [server].[database] link generates the synchronization script that will make that database the same as the other one.
- **Context menu.** When you right click on the comparison results grid a context menu will pop up. The context menu allows you to access the comparison options and trigger the generation of the synchronization script in addition of other context relevant actions.

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## Data Compare Working with the Script

IDERA Data Compare for Oracle Database displays the data synchronization script on a new window within the comparison session tab. The new window name includes the [server] . [database] for which the script was generated.

- i** If the data synchronization script exceeds 32MB, Data Compare displays only the first 32MB-size block of the script in order to preserve the memory. However, if you choose to execute the script, the entire script and not just the first block is executed. If you want to view the whole script, you can save it to a file, and then open the file using a text editor.

A handy context menu allows you to save, copy, print, and add line numbers to the script as well as jump to a certain line in the script.

Here you can review the script to ensure that it is doing what you intend it to do. You may want to start the review from the Synchronization Log so that you can quickly identify the areas of the script that may require a closer look. you can access the synchronization log from the ribbon by clicking **View Sync Log** or from the action links on the right panel. The synchronization log contains a summary of the actions that you want to perform on the target database.

Other actions include:


- **Refreshing the comparison and regenerating the script.** While reviewing the script you may discover that you should have done something different during the preparation phase before running the compare. Data Compare allows you to change the options at any point during the process and simply click **Refresh Result** on the ribbon to redo the comparison without having to go through the whole exercise of selecting columns and keys etc. Note however that this refresh action does not affect the synchronization script already generated. To refresh the script window, simply re-generate the script.
- **Opening the script in SSMS.** From the script window you can transfer the script directly to SQL Server Management Studio (SSMS) assuming you have SSMS installed on your machine. Simply right click anywhere on the script, and then click **Launch SSMS** or click **Open in SSMS** in the ribbon (under the Synchronize tab).

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## Data Compare Executing Synchronization Script

Once you have reviewed and you are comfortable with the synchronization script you can execute it on the target database.

 This action will make permanent changes to the content of the target database. It is common sense and we strongly recommend that before executing the script you:

- Make a full backup of the target database;
- Save the script you are about to execute so that you know exactly what was done to the database and when.

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## Data Compare Comparison Sessions

The preparation phase of the data compare can be a time consuming process if you need to exclude certain objects, do custom mapping, define custom comparison keys and set data filters. IDERA Data Compare automatically saves all your preparation work so that you can repeat the same comparison in the future with a single click without having to go through that process again.

You can also name the comparison sessions to make it easier to identify them. Up to 25 sessions are saved and displayed on the Workspace tab.

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## IDERA Data Compare command line

IDERA Data Compare for Oracle Database command line provides for comparing and synchronizing the content of Oracle databases via the command line. With the command line you can:

- Perform automated data comparison and synchronization;
- Compare and synchronize database content as part of your setup and deployment solution;
- Compare database content and execute the data synchronization script in batch files;
- Schedule the comparison.

All command line settings are specified in an xml config file. You can create an xml config file via one of the following methods:

- Using the data compare command line wizard. You can access the wizard from the start menu, under **Start > All Programs > IDERA > comparison tools > Command Lines**.
- Using the data compare interface. Simply compare the databases for which you wish to create a command line config file, set the options and other comparison preferences and click **Create a command line config file** link in the Ribbon, context menu or in the right panel.
- Manually, using any text editor, such as Notepad.

The command line comes with samples for most typical data comparison scenarios. The sample configuration files are located under **\Program Files\Idera\comparison toolset\Command Line Samples\Data Compare\**.

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## Data Compare Command Line Arguments Overview

### Command line switches

The command line supports two categories of options.

- Options that are specified as command line switches. Most of the command line switches have a short and a long name and separate the name from the value by a semicolon.
- Options that are specified via an xml configuration file. We strongly recommend that you set all command line options via the xml configuration file.

When the option can be specified via the command line and xml file, the command line switch takes precedence.

IDERA Data Compare command line supports the following command line switches:

Option	Description
<b>xmlfile</b>	Performs a data comparison using settings in the specified <b>xmlfile</b> .
<b>/ datascript:filename</b>	Specifies a file name for the data synchronization script. We recommend you set this option in the xml configuration file.
<b>/ datalog:filename</b>	Specifies a file name for the data synchronization log. We recommend you set this option in the xml configuration file.
<b>/en, /encoding: (UTF7   UTF8   UNICODE   ASCII)</b>	Indicates the encoding that should be used for output files. ANSI encoding is used if no encoding is specified.
<b>/t, /logtype: (windowslog)</b>	Indicates the type of error log. You can specify <b>windowslog</b> to log the errors in Windows Event log.
<b>/e, /error:errorlog</b>	Specifies the error log. Depending on the /t option, it could indicate a file or a Windows Event log.
<b>/l, /logfile:filename</b>	Specifies a file for the data compare operational log. We recommend you specify the option in the xml configuration file.
<b>/o, /overwrite</b>	Indicates whether the log files should be overwritten. By default command line appends to output logs.
<b>/q, /quiet</b>	Specifies the "quiet" mode of operation, which suppresses all messages from being displayed on the console.
<b>/d, /direction: (leftasright   rightasleft)</b>	Indicates whether the command line should make the right database the same as the left database or vice versa. You can specify <b>leftasright</b> or <b>rightasleft</b> . We recommend you set this option in the xml configuration file.
<b>/s, /sync</b>	Indicates whether the command line should synchronize databases. By default data is only compared but the synchronization script is NOT executed. Use this option carefully since it makes permanent changes in the target database.
<b>/mappingtype: (auto   custom)</b>	Indicates the mapping of database tables and views. If auto is specified, objects are mapped based on the default mapping: schema.name. If custom is selected, the pairs of objects must be specified manually. The default mapping type is auto. We recommend you set this option in the xml file.



<b>/v, /validate</b>	Validates the xml configuration file.
<b>/? , /h, /help</b>	Displays the command line options.

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## Data Compare XML Configuration File Overview

Xml configuration file allows you to specify all data compare options and settings. Even though some settings can be set via command line switches, we recommend you specify them in the xml file.

With the xml configuration file you can:

- Specify databases and login credentials;
- Define the comparison options;
- Customize data compare by excluding objects, defining custom keys and where clauses;
- Specify mapping rules;
- Specify the files for the synchronization script and logs;
- Execute the data synchronization script.

The xml file groups the comparison options into the following sections:

Section	Description
Database <LeftDatabase> <RightDatabase>	Contains the source and target database.
Data Compare Options <DataCompareOptions>	Contains the data compare options.
Table Mapping Rules <TableMappingRules>	Contains the rules that determine how database tables are mapped.
View Mapping Rules <ViewMappingRules>	Contains the rules that determine how database views are mapped.
Table Pairs <TablePairs>	Contains the pairs of tables that should be mapped manually or pairs that should be excluded.

View Pairs <ViewPairs>	Contains the pairs of views that should be mapped manually or pairs that should be excluded.
Command Line Settings <CommandLineOptions>	Contains additional data compare settings.

A typical xml configuration file has the following structure:

```
<?xml version="1.0" encoding="utf-8" ?>
<SqlDataCompareCmdConfig xmlns="http://www.xsqlsoftware.com/schemas/xSQLDataCompareCmdSchema.xsd">
  <LeftDatabase>
    <SqlServer>(local)</SqlServer>
    <DatabaseName>DB_Test1</DatabaseName>
    <TrustedConnection>>true</TrustedConnection>
  </LeftDatabase>
  <RightDatabase>
    <SqlServer>(local)</SqlServer>
    <DatabaseName>DB_Test2</DatabaseName>
    <Username>username</Username>
    <Password>password</Password>
  </RightDatabase>
  <CommandLineOptions>
    <Synchronize>>true</Synchronize>
    <DataScriptFile>script.sql</DataScriptFile>
    <DataLogFile>script.log</DataLogFile>
    <ComparisonLogFile>log.txt</ComparisonLogFile>
    <ErrorLogName>error.log</ErrorLogName>
  </CommandLineOptions>
</SqlDataCompareCmdConfig>
```

- <LeftDatabase> and <RightDatabase> elements specify the source and the target database referred to as the left and the right database respectively.
- No explicit data compare options are set. The command line will use the default options.
- <CommandLineSettings> contains the following settings:
  - <Synchronize> true: Indicates that the command line should synchronize the target database by executing the data synchronization script. This setting forces command line to make permanent changes in the target database
  - <DataScriptFile>: Specifies a file name for data synchronization script.
  - <DataLogFile>: Specifies a file name for data synchronization log.
  - <ComparisonLogFile>: Specifies a file name for data compare operational log.
  - <ErrorLogName>: Specifies a file name for logging the errors that might occur during the comparison.

You can run the command line with a xml configuration file as follows:

```
IderaDataCmd <config.xml>
```

You can validate an xml file as follows:

```
IderaDataCmd <config.xml> /v
```

where: <config.xml> is the name of the xml file.

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## Customizing Data Compare

There are various comparison options that you can customize via the command line. You can:

- Choose specific data comparison options instead of the default ones.
- Select the mapping type between database objects. Instead of default mapping, you can define a custom mapping and manually specify the pair of tables or views.
- Exclude specific tables, views or columns from the comparison.
- Override default comparison keys with custom keys.
- Specify where clauses for tables or views.
- Define mapping rules for tables or views.

The following sections describe the most common scenarios in details.

- [Data Compare Modifying Comparison Options](#)
- [Data Compare Changing Mapping Type](#)
- [Data Compare Excluding Database Objects](#)
- [Data Compare Excluding Columns](#)
- [Data Compare Defining Custom Keys](#)
- [Data Compare Defining Mapping Rules](#)
- [Data Compare Specifying WHERE Clauses](#)

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## Data Compare Modifying Comparison Options

Comparison options can be specified under the xml element <DataCompareOptions>.

The following xml fragment specifies two additional comparison options: GenerateDetailedLog and LogScriptExecution

```
<?xml version="1.0" encoding="utf-8" ?>
<SqlDataCompareCmdConfig xmlns="http://www.xsqlsoftware.com/schemas/
xSQLDataCompareCmdSchema.xsd">
  <LeftDatabase>
    <SqlServer>(local)</SqlServer>
    <DatabaseName>DB_Test1</DatabaseName>
    <TrustedConnection>>true</TrustedConnection>
  </LeftDatabase>
  <RightDatabase>
    <SqlServer>(local)</SqlServer>
    <DatabaseName>DB_Test2</DatabaseName>
    <Username>username</Username>
    <Password>password</Password>
  </RightDatabase>
  <DataCompareOptions>
    <GenerateDetailedLog>>true</GenerateDetailedLog>
    <LogScriptExecution>>true</LogScriptExecution>
  </DataCompareOptions>
  <CommandLineOptions>
    <Synchronize>>true</Synchronize>
    <DataScriptFile>DataScript.sql</DataScriptFile>
    <Direction>RightAsLeft</Direction>
    <ComparisonLogFile>log.txt</ComparisonLogFile>
  </CommandLineOptions>
</SqlDataCompareCmdConfig>
```

For the full list of supported options, check [Xml Reference](#).

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## Data Compare Changing Mapping Type

Mapping type determines how database tables and views are paired together. Default mapping is based on the full name of the object schema.name. A table/view on the "left" database can only be mapped to a table/view with the same name on the "right" database. You can change the mapping type by choosing a "Custom" mapping and specify the objects that should be paired together that might not necessarily have the same name.

To define custom mappings, you need to:

- Set the <TableMappingSchema> under <CommandLineOptions> element to Custom.
- Specify the custom pairs of Tables/Views under the element <TablePairs> or <ViewPairs>


The following xml fragment defines custom mappings:

```
<CommandLineOptions>
  <TableMappingSchema>Custom</TableMappingSchema>
```

```

</CommandLineOptions>
<TablePairs>
  <Pair>
    <LeftObject Name="dbo.Table_A"></LeftObject>
    <RightObject Name="dbo.Table_AA"></RightObject>
  </Pair>
  <Pair>
    <LeftObject Name="dbo.Table_B"></LeftObject>
    <RightObject Name="dbo.Table_BB"></RightObject>
  </Pair>
</TablePairs>

```

 Specify the full name of the objects in the custom mappings set.

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## Data Compare Excluding Database Objects

You can exclude specific tables or views from data compare by listing them under the xml element `<TablePairs>` or `<ViewPairs>`.

Rules for excluding database objects are as follows:

- The attribute Action of `<Pair>` element should be set to Exclude
- The left and right object must be both specified for each excluded pair

The following xml fragment excludes the tables `dbo.Employees` and `dbo.Customers` from the comparison:

```

<TablePairs>
  <Pair Action="Exclude">
    <LeftObject Name="dbo.Employees"></LeftObject>
    <RightObject Name="dbo.Employees"></RightObject>
  </Pair>
  <Pair Action="Exclude">
    <LeftObject Name="dbo.Customers"></LeftObject>
    <RightObject Name="dbo.Customers"></RightObject>
  </Pair>
</TablePairs>

```

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## Data Compare Excluding Columns

Command line allows you to exclude specific columns from data compare. In order to exclude columns, you must identify the pair of entities that columns belong to.

Rules for excluding columns are as follows:

- Excluded columns should be listed under the xml element `<ColumnPair>` of the `<Columns>` element
- The attribute `Action` of the `<Columns>` element should be set to `Exclude`

The following xml fragment excludes the columns `DateCreated`, `CreatedBy` from the table `dbo.Employees` and the column `Address` from the table `dbo.Customers`:

```
<TablePairs>
  <Pair>
    <LeftObject Name="dbo.Employees"></LeftObject>
    <RightObject Name="dbo.Employees"></RightObject>
    <Columns Action="Exclude">
      <ColumnPair>
        <LeftColumn>DateCreated</LeftColumn>
        <RightColumn>DateCreated</RightColumn>
      </ColumnPair>
      <ColumnPair>
        <LeftColumn>CreatedBy</LeftColumn>
        <RightColumn>CreatedBy</RightColumn>
      </ColumnPair>
    </Columns>
  </Pair>
  <Pair>
    <LeftObject Name="dbo.Customers"></LeftObject>
    <RightObject Name="dbo.Customers"></RightObject>
    <Columns Action="Exclude">
      <ColumnPair>
        <LeftColumn>Address</LeftColumn>
        <RightColumn>Address</RightColumn>
      </ColumnPair>
    </Columns>
  </Pair>
</TablePairs>
```

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## Data Compare Defining Custom Keys

You can specify a custom key when the table or view has no built-in key or when the existing key is not suitable for data compare.

The following rules apply to custom keys:

- A custom key can be defined under the xml element <LeftObject> or <RightObject> of the <Pair> element
- A custom key must have a name and one or more columns
- The columns that participate in the custom key should exist in the parent table or view
- The key must be defined for each object in the pair of entities.
- The columns that participate in the custom key must be identical for both objects in the specified pair.

The following xml fragment defines a custom key for the pair of table dbo.Employees:

```
<TablePairs>
  <Pair>
    <LeftObject Name="dbo.Employees">
      <Key Name="Custom_Key">
        <Column>EmployeeID</Column>
      </Key>
    </LeftObject>
    <RightObject Name="dbo.Employees">
      <Key Name="Custom_Key">
        <Column>EmployeeID</Column>
      </Key>
    </RightObject>
  </Pair>
</TablePairs>
```

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## Data Compare Defining Mapping Rules

Mapping rules are used to override the default data compare mapping that is based on schema.name. Mapping rules are usually created to reflect the characteristics of a particular environment. If you have, for example, two databases that have the same structure but different schema, you can create a mapping rule that ignores the schema.

The command line supports three types of mapping rules:

- Mapping rules that apply to object name
- Mapping rules that apply to object scheme
- Mapping rules that apply to data types.

Mapping rules that apply to the name of objects should be specified for each database that participates in the comparison.

The following xml fragment defines two mapping rules: A name rule that ignores the name postfix "\_temp" on the left database and a schema rule that ignores the schema on both databases:

```
<TablesMappingRules>
  <NameMapping MappingRule="IgnorePostfix" IgnoreLeftName="_temp" />
  <SchemaMapping MappingRule="IgnoreSchema"></SchemaMapping>
</TablesMappingRules>
```

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## Data Compare Specifying WHERE Clauses

A where clause is an expression that is used as a data filter. Only the records that meet the where clause criteria are compared and synchronized. You can specify any valid expression as the where clause. The "where" keyword should not be included in the expression.

The command line supports where clauses via three elements under the <Pair> element:

- WhereClause: sets a where clause for both members of a pair
- LeftWhereClause: sets a where clause for the left member of the pair
- RightWhereClause: sets a where clause for the right member of the pair

The following xml fragment defines a where clauses on the employees table that excludes records with emp\_id = 3. The where clause is set for both the left and the right database:

```
<TablePairs>
  <Pair>
    <LeftObject Name="dbo.employees"/>
    <RightObject Name="dbo.employees"/>
    <WhereClause>emp_id != 3</WhereClause>
  </Pair>
</TablePairs>
```

The following xml fragment defines separate where clauses on the employees table for the left and the right database. On the left database, it excludes records with emp\_id = 3; on the right database, it excludes records with emp\_id = 4.

```
<TablePairs>
  <Pair>
    <LeftObject Name="dbo.employees"/>
    <RightObject Name="dbo.employees"/>
    <LeftWhereClause>emp_id != 3</LeftWhereClause>
    <RightWhereClause>emp_id != 4</RightWhereClause>
  </Pair>
</TablePairs>
```



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## Data Compare XML Configuration File Reference

```

<SqlDataCompareCmdConfig>
  <LeftDatabase>
    <SqlServer>string</SqlServer>
    <DatabaseName>string</DatabaseName>
    <Username>string</Username>
    <Password>string</Password>
    <TrustedConnection>boolean</TrustedConnection>
    <ConnectionTimeout>int</ConnectionTimeout>
    <CommandTimeout>int</CommandTimeout>
  </LeftDatabase>
  <RightDatabase>
    <SqlServer>string</SqlServer>
    <DatabaseName>string</DatabaseName>
    <Username>string</Username>
    <Password>string</Password>
    <TrustedConnection>boolean</TrustedConnection>
    <ConnectionTimeout>int</ConnectionTimeout>
    <CommandTimeout>int</CommandTimeout>
  </RightDatabase>
  <DataCompareOptions>
    <CompareTables>boolean</CompareTables>
    <CompareMemoryTables>boolean</CompareMemoryTables>
    <CompareColumnStoreTables>boolean</CompareColumnStoreTables>
    <CompareViews>boolean</CompareViews>
    <DisableTriggers>boolean</DisableTriggers>
    <ForeignKeyAction>ForeignKeyActions</ForeignKeyAction>
    <GenerateDetailedLog>boolean</GenerateDetailedLog>
    <LogScriptExecution>boolean</LogScriptExecution>
    <ScriptExecutionLogFile>string</ScriptExecutionLogFile>
    <GenerateTransactionalScript>boolean</GenerateTransactionalScript>
    <IgnoreCharCase>boolean</IgnoreCharCase>
    <TrimSpaces>boolean</TrimSpaces>
    <PerformDependencyAnalysis>boolean</PerformDependencyAnalysis>
    <ReportEqualRows>boolean</ReportEqualRows>
    <SynchronizeDifferentRows>boolean</SynchronizeDifferentRows>
    <SynchronizeLeftRows>boolean</SynchronizeLeftRows>
    <SynchronizeRightRows>boolean</SynchronizeRightRows>
    <TransactionSize>int</TransactionSize>
    <BatchSize>int</BatchSize>
    <IgnoreDatabaseCollation>boolean</IgnoreDatabaseCollation>
    <RoundApproximateNumber>boolean</RoundApproximateNumber>
    <RoundPrecision>int</RoundPrecision>
  </DataCompareOptions>
  <CommandLineOptions>

```

```

    <ComparisonLogFile>string</ComparisonLogFile>
    <OverwriteComparisonLog>boolean</OverwriteComparisonLog>
    <ErrorLogName>string</ErrorLogName>
    <ErrorLogType>ErrorLogTypes</ErrorLogType>
    <QuietMode>boolean</QuietMode>
    <DataScriptFile>string</DataScriptFile>
    <DataLogFile>string</DataLogFile>
    <FileEncoding>Encodings</FileEncoding>
    <Direction>CompareDirections</Direction>
    <Synchronize>boolean</Synchronize>
    <TableMappingSchema>TableMappingSchemaTypes</TableMappingSchema>
</CommandLineOptions>
<TablesMappingRules>
    <NameMapping>NameMappingType</NameMapping>
    <SchemaMapping>SchemaMappingType</SchemaMapping>
    <TypeMapping>TypeMappingType</TypeMapping>
</TablesMappingRules>
<ViewsMappingRules>
    <NameMapping>NameMappingType</NameMapping>
    <SchemaMapping>SchemaMappingType</SchemaMapping>
    <TypeMapping>TypeMappingType</TypeMapping>
</ViewsMappingRules>
<TablePairs>Pairs</TablePairs>
<ViewPairs>Pairs</ViewPairs>
<NameMappingType>
    <MappingRule>NameMappingRules</MappingRule>
    <IgnoreLeftName>string</IgnoreLeftName>
    <IgnoreRightName>string</IgnoreRightName>
</NameMappingType>
<SchemaMappingType>
    <MappingRule>SchemaMappingRules</MappingRule>
    <SchemaPairs>SchemaPairs</SchemaPairs>
</SchemaMappingType>
<TypeMappingType>
    <MappingRule>TypeMappingRules</MappingRule>
</TypeMappingType>
<NameMappingRules>ExactMatch|IgnorePrefix|IgnorePostfix</NameMappingRules>
<SchemaMappingRules>ExactMatch|IgnoreSchema|Custom</SchemaMappingRules>
<SchemaPairs>[1..*]SchemaPairType</SchemaPairs>
<SchemaPairType>
    <LeftSchema>string</LeftSchema>
    <RightSchema>string</RightSchema>
</SchemaPairType>
<TypeMappingRules>ByDefinition|ByCompatibilityMatrix</TypeMappingRules>
<Pairs>[0..*]Pair</Pairs>
<Pair>
    <LeftObject>TableOrView</LeftObject>
    <RightObject>TableOrView</RightObject>
    <Columns>Columns</Columns>
    <WhereClause>string</WhereClause>
    <LeftWhereClause>string</LeftWhereClause>
    <RightWhereClause>string</RightWhereClause>

```

```

        <Action>Actions</Action>
    </Pair>
    <TableOrView>
        <Key>DataKey</Key>
        <Name>string</Name>
    </TableOrView>
    <DataKey>
        <Name>string</Name>
        <Column>[1..*]string</Column>
    </DataKey>
    <Columns>
        <Action>Actions</Action>
        <ColumnPair>[1..*]ColumnPair</ColumnPair>
    </Columns>
    <Actions>Include|Exclude</Actions>
    <ColumnPair>
        <LeftColumn>string</LeftColumn>
        <RightColumn>string</RightColumn>
    </ColumnPair>
    <ForeignKeyActions>DisableAndEnable|DropAndCreate|None</ForeignKeyActions>
    <ErrorLogTypes>File|WindowsLog</ErrorLogTypes>
    <Encodings>Unicode|UTF7|UTF8|ASCII|ANSI</Encodings>
    <CompareDirections>LeftAsRight|RightAsLeft</CompareDirections>
    <TableMappingSchemaTypes>Auto|Custom</TableMappingSchemaTypes>
</SqlDataCompareCmdConfig>

```

The main elements of xml schema are described in the following section:

Element	Description
SqlDataCompareCmdConfig	Root element.
LeftDatabase, RightDatabase	The elements that specify the left and the right database that participate in the data comparison.
SqlServer	Defines the name of the SQL Server instance.
DatabaseName	Defines the database name.
Username, Password	Define database credentials.
TrustedConnection	Defines the connection type.

ConnectionTimeout	Defines the connection timeout in seconds, which the amount of time that command line waits before aborting a connection.
CommandTimeout	Defines the execution timeout of SQL queries in seconds, which the amount of time that command line waits for a query to complete before aborting it.
CompareTables	Indicates whether database tables should be compared and synchronized.
CompareMemoryTables	Indicates whether the memory tables supported by SQL 2014 should be compared and synchronized.
CompareColumnStoreTables	Indicates whether the columnstore tables supported by SQL 2014 should be compared and synchronized.
CompareViews	Indicates whether database views should be compared and synchronized.
DisableTriggers	Specifies the type of action on DML triggers that should be performed by synchronization script.
ForeignKeyAction	Specifies the type of action on foreign keys that should be performed by synchronization script.
GenerateDetailedLog	Indicates whether the command line should generate a detailed synchronization log.
LogScriptExecution	Specifies whether the command line should save to a log file SQL statements executed during data synchronization.
ScriptExecutionLogFile	Defines the file name of the execution log.
GenerateTransactionalScript	Indicates whether the generated synchronization script should be transactional.
IgnoreCharCase	Indicates whether the character chase should be ignored when comparing string columns.
TrimSpaces	Indicates whether the leading and trailing spaces should be ignored when comparing string columns.
PerformDependencyAnalysis	Specifies whether command line should analyze object dependencies (based on foreign key relationship between them) and order the synchronization script accordingly.

ReportEqualRows	Indicates whether the command line should keep the equal rows in the internal row collections. By default equal rows are discarded.
SynchronizeDifferentRows	Indicates whether the rows that have been found different should be synchronized.
SynchronizeLeftRows	Indicates whether the rows found on the left database should be synchronized.
SynchronizeRightRows	Indicates whether the rows found on the right database should be synchronized.
TransactionSize	Defines the max size of SQL Server transaction that should be used when executing synchronization script.
BatchSize	Defines the max batch size that should be used when executing synchronization script.
IgnoreDatabaseCollation	Indicates whether collation should be ignored when comparing databases.
RoundApproximateNumber	Indicates whether approximate SQL Server types such as float and real should be rounding to a specified precision and then compared.
RoundPrecision	Defines the rounding precision for approximate data types such as real and float. Rounding effects only the comparison of approximate types, not the scripting of these types.
ComparisonLogFile	Defines a file name for data compare operational messages.
OverwriteComparisonLog	Indicates whether the command line should overwrite all log files. By default command line appends to log file.
ErrorLogName	Defines a file name for errors that might occur during data compare.
ErrorLogType	Indicates whether errors should be logged to file or Windows event log.
QuietMode	Indicates the quiet mode which suppresses messages from being displayed on the console.
DataScriptFile	Defines a file name for the data synchronization script.
DataLogFile	Defines a file name for the data synchronization log.

FileEncoding	Defines the encoding of all output file.
Direction	Indicates the "direction" of synchronization whether the left database is synchronized with the right database or vice versa.
Synchronize	Indicates whether the command line should synchronize databases. By default databases are only compared.
TableMappingSchema	Defines the mapping type of database objects whether is Auto or Custom.
TablesMappingRules	Defines the mapping rules for tables.
ViewsMappingRules	Defines the mapping rules for views.
NameMapping	Defines the mapping rule that applies to objects name.
SchemaMapping	Defines the mapping rule that applies to objects schema (owner).
TypeMapping	Defines the mapping rule that applies to data types.
TablePairs	Defines that pair of tables that should be mapped manually. Manual pairs require the option TableMappingSchema to be set to Custom.
ViewPairs	Defines that pair of views that should be mapped manually. Manual pairs require the option TableMappingSchema to be set to Custom.

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## Data Compare Error Codes

Data Compare command line returns the following error codes:

Error Code	Description
0	No error
1	Invalid command line switches
2	Invalid xml file
4	Invalid output files
8	Invalid or missing options
16	Generic error
32	License missing or expired

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