



## **Embarcadero® Change Manager™ 5.1 Evaluation Guide**

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## Introduction to Change Manager™

Embarcadero® Change Manager™ offers database administrators and developers a powerful tool to simplify and automate the database change management lifecycle. The schema compare and alter, data compare and synchronization, and configuration auditing capabilities enable you to report on database changes, roll out new releases, and troubleshoot database performance problems that result from both planned and unplanned changes. Change Manager supports IBM® DB2® for LUW, Microsoft® SQL Server, Oracle®, and Sybase®.

### Product Benefits

Change Manager provides a means of simplifying and automating database change management, streamlining development cycles, and ensuring database performance, availability, and compliance. Data comparison enables the creation and execution of comparison jobs between the data repositories of two data sources within an enterprise for the purposes of validating and keeping reference and test data synchronized between development, staging, testing, and production environments when implementing new systems, keeping lookup data stored in multiple repositories synchronized, troubleshooting replication issues by determining what changes need to be made between two data sources, ensuring the correct data has been added/removed between two data sources, data migration, and repository change tracking between a data source and its backup over time.

Configuration comparison enables the creation and execution of comparison jobs between two data source configuration settings. It is important to have the ability to monitor and maintain the configuration settings between two data sources from a database administrator perspective, in order to provide maximum performance and availability for each data source in the network. The management of configuration settings through data source comparison helps DBAs tune data source performance and quickly diagnose problems.

Using configuration comparison jobs, administrators can define configuration setting standards based on existing data sources, archives, and customized values, and run comparison jobs to ensure the configuration settings of data sources that compose the enterprise meet the specified requirements. Schema comparison provides a means to manage schema changes on database platforms, for the purpose of identifying environment changes when databases are implemented through development, testing, and production cycles. Schema comparison also features archive functionality, as well as the ability to run comparison jobs against two or more instances of a data source.

## About This Evaluation Guide

This evaluation guide is intended to help you get started with Change Manager.

After completing this guide, you will have the foundation needed to fully utilize the features and benefits of the product and apply them to your own enterprise. This guide contains information on running and maintaining data, configuration, and schema comparison jobs, how to create and maintain standards and archives, and additional information related to adding, configuring, and organizing the management of data sources.

This guide is divided into five sections:

**Session 1: Getting Started with Change Manager**

**Session 2: Running Data Comparison Jobs**

**Session 3: Running Configuration Comparison Jobs**

**Session 4: Running Schema Comparison Jobs**

**Session 5: Defining Batch Files for Bulk Job Execution**

Once you've started, you can select **Help** from the Menu Bar to find many additional resources that complement and build on the features and tasks presented in this guide.

Additionally, this section contains a section that outlines the new features of the product.

## What's New in Change Manager 5.1

### Data Masking

Data masking is the process of securing sensitive data for testing or development purposes by masking or “scrambling” valid production data. It is often performed as a security or compliance measure that protects important information, while still providing data that represents your production environment for further database development operations.

Change Manager provides masking for data comparison jobs and features two masking functions: randomization and shuffling. Randomization inspects each value on a Source and then adds a corresponding new value to the Target. Shuffling randomly assigns different values between the source and target data sources of a job.

### Auto-Synchronization for Data Comparison and Schema Comparison Jobs

New options in data comparison and schema comparison jobs can be selected that enable automatic synchronization of a target data source when a job is executed.

The auto-synchronization option is located on the **Options** tabs of **Data Comparison Job Editor** and **Schema Comparison Job Editor**. When selected, Change Manager automatically deletes all of the data on the target data source and replaces it with all of the data from the source. If this option is left de-selected, normal synchronization operations will be required for the job.

### DBMS Unicode Support

Change Manager now fully supports data sources with Japanese, Korean, and other foreign characters for data, schema object names, and configuration values.

### Cross-Platform Support for Schema Comparison Jobs

Cross-platform schema comparisons are now supported between Oracle and SQL Server platforms, as well as Sybase and SQL Server platforms for the following objects:

- **Tables**
- **Unique Keys**
- **Check Constraints**
- **Foreign Keys**
- **Indexes**
- **Primary Keys**
- **Views**

### Project Creation and Management

The **Explorer** view enables you to create projects in addition to the **Change Management** default project. Subsequently, Jobs, Standards, and Synchronization Scripts can be saved to different projects for file organization and performance needs.

### Job Notification Enhancements

Job Notification options have been expanded to include file system parameters that send notifications to local or network directories, and system tray parameters, that enable pop-up notifications on the Desktop.

To access the new notification options, from any Job Editor, click the **Notifications** tab.

### **New History Tab on the Data Comparison Job Editor**

A **History** tab has been added to **Data Comparison Job Editor**. This new tab tracks the execution activities of the specified job and displays information including the date of execution, host name, and the synchronization methods that were used each time the job was run (None, Script, or Automatic Synchronization.)

### **Enhanced Data Comparison Mapping**

The Mapping tab of the Data Comparison Job Editor has been enhanced to feature high-level alerts and warnings when invalid or incomplete mapping is detected.

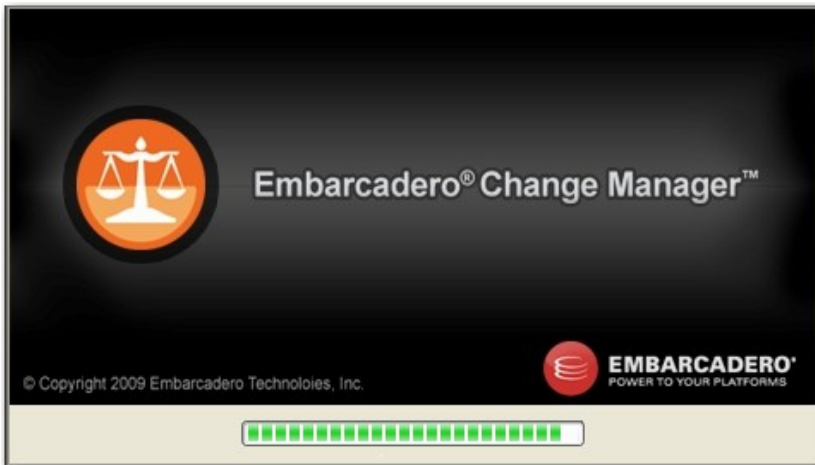
Additionally, new mapping functionality enables you to set custom warning levels for criteria such as length mismatches, constraints on the target, and precision and scale differences.

## Session 1: Getting Started with Change Manager

### Download, Install, and Start Change Manager

Change Manager is packaged with a 30-day trial license that activates upon installation. After the trial period expires, you must purchase a permanent license to continue using the product.

Launch the installation program via the MSI Installer included in the package and follow the instructions provided by the Installation Wizard. You may be required to restart your machine once the Wizard is finished. It is also recommended you copy the MSI Installer to the Desktop of the machine on which you are installing the software prior to running it.



*The Change Manager Installation Wizard will guide you through the installation process.*

If this is your first time using Change Manager, you will be prompted by a message that asks if you want to import data sources from an existing catalog. You can choose to import them now, or at a later point in time via commands in the Change Manager interface.

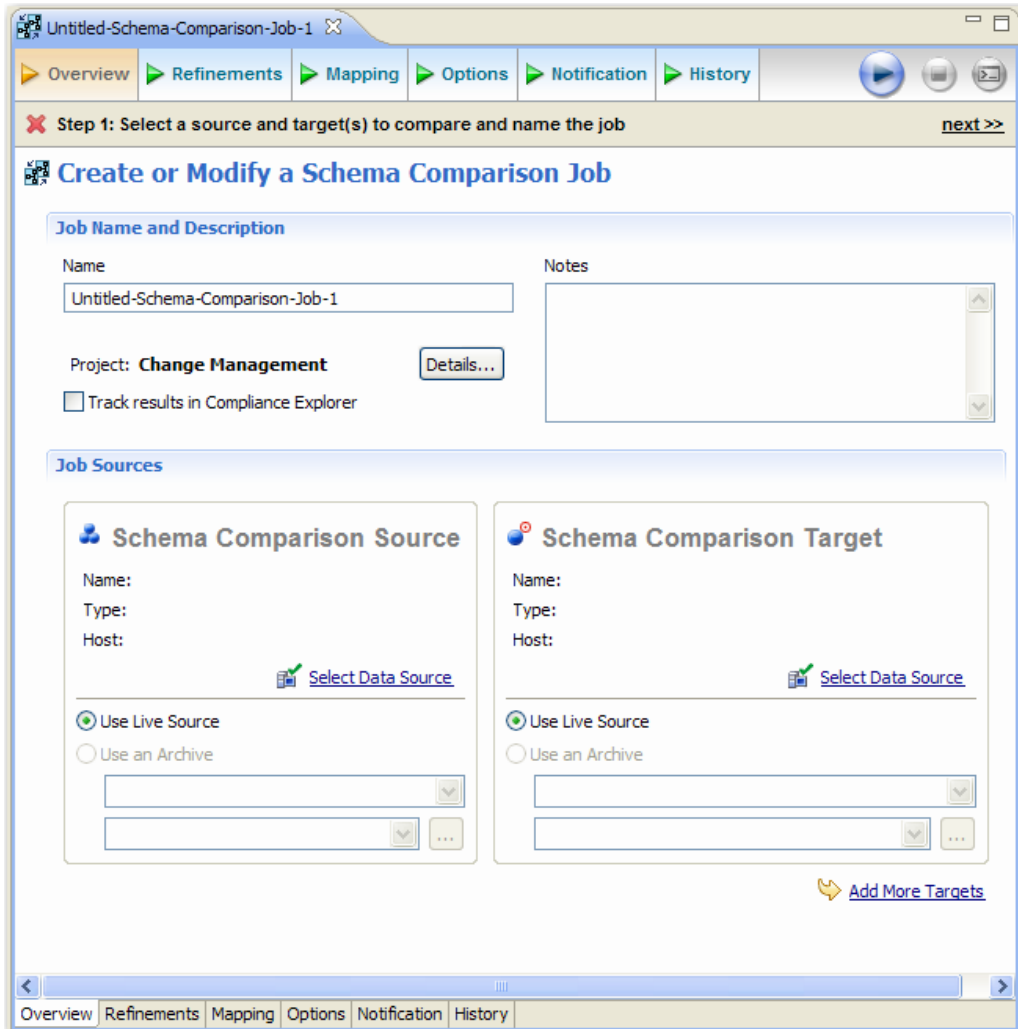
### To start Change Manager:

- From the Desktop, choose the Windows Start menu and then select **Programs > Embarcadero > Change Manager 5.0 > Change Manager 5.0**.



## User Interface Overview

The Change Manager application environment is known as the **Workbench**. The Workbench provides an interface through which you create, manage, and execute comparison jobs.



The Change Manager Workbench provides an environment to define, manage, and execute comparison jobs.

The Workbench is composed of common interface elements that provide tools to accomplish the creation, management, and execution of comparison jobs. These objects provide a uniform system for working with jobs and data sources.

- The **Welcome Page** is the first screen you will see when you initially launch the application. The screen provides links to documentation, cheat sheets, and other help files and tutorials to further familiarize you with the product. It provides easy access to information that may be of value to new users.
- The **Menu Bar** and **Command Toolbar** contain commands that execute various functional aspects of the application, such as launching Views and Editors, navigation commands, and environment preference settings. The **Toolbar** contains icons that represent specific menu commands. For example, the **Search** command can be launched via the **Search > Search** menu in the Menu Bar, and also via the **Search** icon in the Command Toolbar.

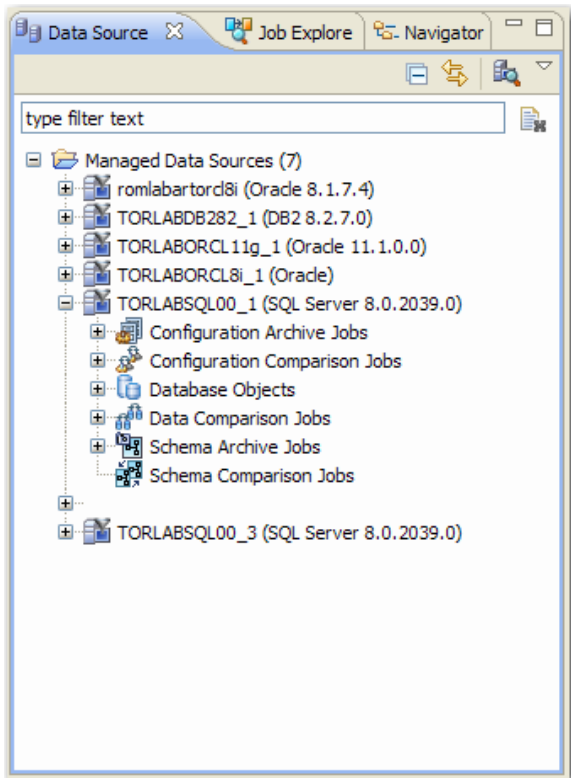
- **Views** are Workbench interface components typically used to navigate a hierarchy of information, open Editors, or display the properties of various application elements. For example, the **Data Source Explorer** view provides a tree of all data sources in the environment and the comparison jobs associated with each. You can launch these jobs directly, modify the connection properties or data sources, or create and edit configuration archives from the View.
- **Editors** are Workbench interface components typically used to access Change Manager functionality such as job execution. For example, the **Data Comparison Editor** is used to define and execute data comparison jobs. Editors are largely differentiated from Views in that they operate on an individual level rather than a supportive one.

## Adding Data Sources

In order to define and run comparison jobs, you need to register data sources to be used as sources in the environment by providing connection information and other details to Change Manager.

Data sources are registered and managed in **Data Source Explorer**. Each time you register a new data source you need to specify its connection information and organize it in the view, as needed.

Once a data source has been registered, it remains stored in a catalog and does not need to be reregistered each time you open Change Manager. It can be used in multiple jobs, archived, or otherwise “shared” with regards to the general functionality of the application.



*Data Source Explorer provides an organizational tree of registered data sources and the comparison jobs and archives associated with them.*

### To add a data source:

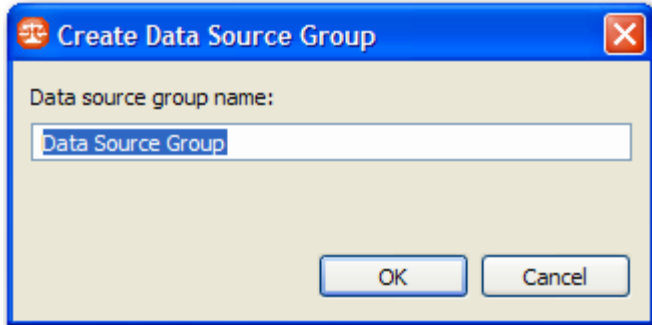
1. Highlight Data Source Explorer and Choose File > New > Data Source from the Menu Bar. The Data Source Wizard appears.
2. Follow the steps in the Data Source Wizard by selecting the data source platform and entering the appropriate connectivity parameters in the fields provided. Click **OK** when you are finished. The new data source appears in Data Source Explorer.

**Note:** You can also import data source definitions from other sources via the **File > Import** command in the Main Menu. If you have other Embarcadero products on your machine, you can click the **Auto Discover Data Sources** icon in **Data Source Explorer** and Change Manager automatically adds any definitions it finds to the organizational tree.

## Managing Data Sources

In large enterprises where data sources exist on multiple platforms, are located in multiple physical locations, or serve multiple purposes or different departments, it can become unwieldy to keep data sources, archives, configuration standards, and individual comparison jobs organized within the application environment.

In **Data Source Explorer**, you can create folders named **Data Source Groups** and then drag and drop data sources into the appropriate folders as needed. For example, you could create a folder named **Oracle** and place all Oracle-based data sources you register in Data Source Explorer inside of it.



*The Create Data Source Group Wizard enables you to define folders to organize data sources in Data Source Explorer.*

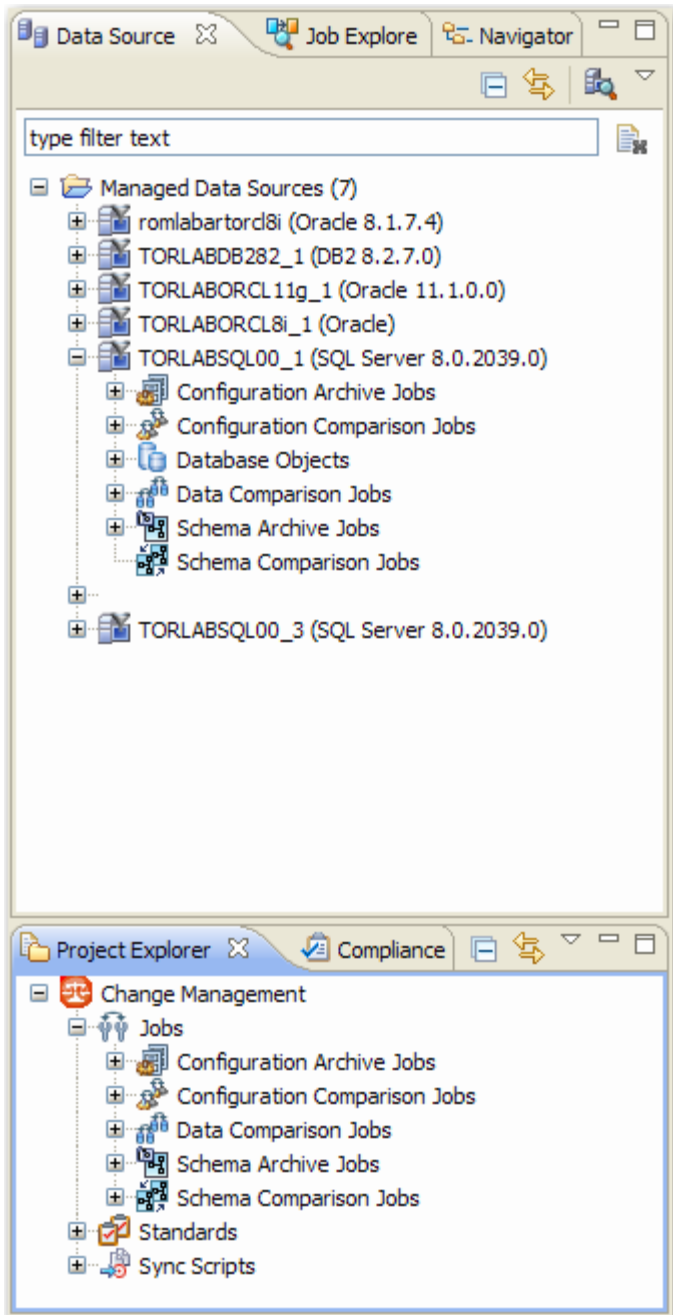
### To create Data Source Group folders and organize Data Source Explorer objects:

1. Right-click on the **Managed Data Sources** node in **Data Source Explorer** and select **New > Data Source Group**.
2. Enter a meaningful name for the new group in the **Name** field and choose a parent folder, if any.
3. Click **Finish**. The **Data Source Group** folder is added to **Data Source Explorer**. You can drag and drop data sources in the folder or add new data sources to the folder, as needed.

## Adding Jobs

In addition to organizing the data sources in your enterprise within the application environment, it is important to maintain the organization of comparison jobs, archives, and configuration standards, especially when maintaining a particularly large system or when jobs need to be run periodically on a set schedule for maintenance purposes.

When you define a new comparison job, archive, or standard, you can save the job (in any state) and it is automatically added to the tree in **Data Source Explorer** or **Job Explorer**. Saved jobs stored in these views can then be opened at a later point to be re-executed or completed.



*Data Source Explorer and Job Explorer store saved jobs so they can be re-used without having to redefine the job.*

**To add a job:**

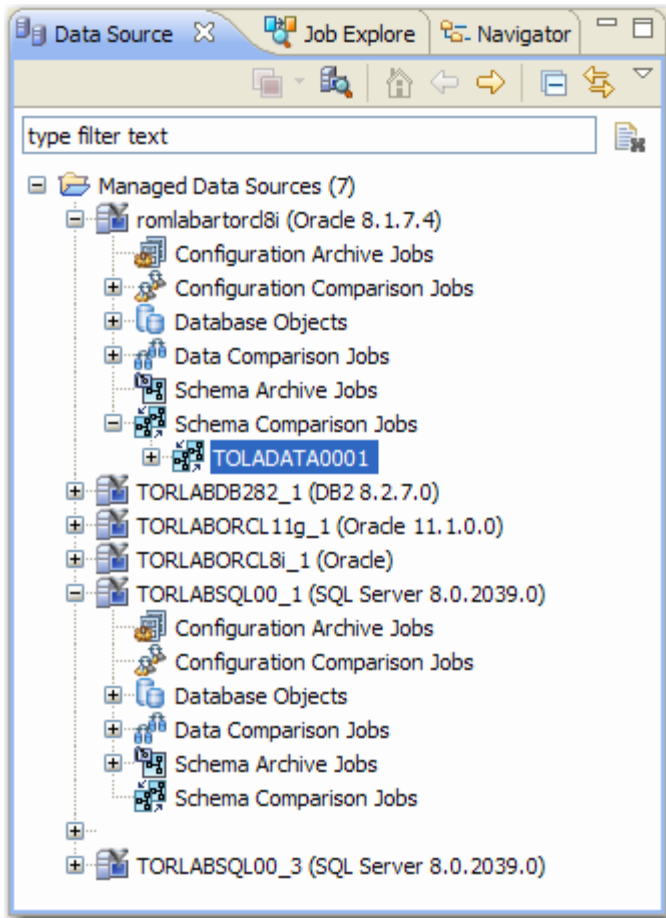
1. Create a new comparison job, archive, or standard and ensure that the specified editor is selected.
2. Select **File > Save** or **File > Save All** from the Menu Bar, depending on the command that is available.
3. The job is saved and automatically added to the appropriate view, as a child of the node to which it applies.

## Managing Jobs

In large enterprises composed of many data sources with strict configuration and data retention guidelines that require many jobs, archives, and standards, the organization of jobs in Data Source Explorer and Standards Explorer can grow unwieldy.

**Data Source Explorer** provides nodes that organize data source jobs and configuration archives by type as children of the data sources that were included in the job when it was defined, or in the case of archives, the data source from which the archive was defined. Additionally, **Job Explorer** provides a list of all configuration standards that have been defined in the application.

Furthermore, both views contain right-click menus that enable you to delete and rename jobs in the tree for organizational purposes. These menus provide easy access to organizational commands such as **Rename** and **Delete** in order to better help you control the contents of the Views.



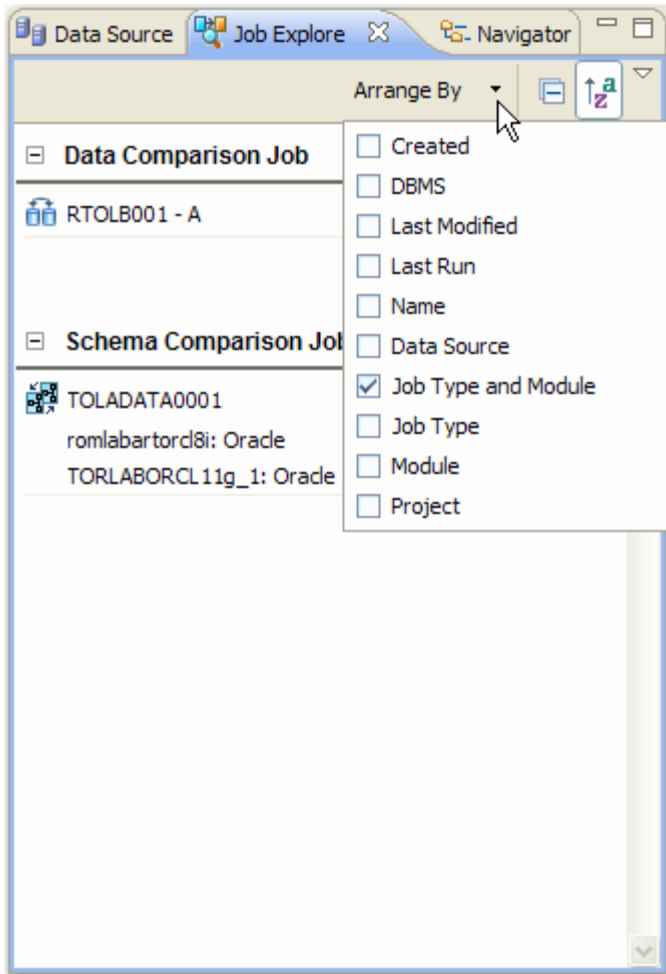
*The right-click menu provides commands to help you organize jobs in Data Source Explorer.*

### To manage jobs:

1. Right-click on a job node in Data Source Explorer, or Job Explorer, respectively.
2. Choose **Delete** to remove the job node from the view or **Rename** to enter a more meaningful name in the field. The job will be removed from the tree altogether (and thus the application) or appear with your newly defined name, depending on the command you selected. The **Open** command opens the job in its respective editor, while the **Run** command will execute it.

Additionally, **Job Explorer** also provides enhanced organization functionality by providing a full history of all jobs defined and saved in the application. Jobs can be organized by date created, source and target platform type, last modified, last executed, job name, data source name, and job type.

Double-click on a job in the view to open it in its respective editor. Use Job Explorer when searching for jobs of a specific type or name.



*Job Explorer enables you to organize jobs based on a variety of criteria.*

#### To view jobs in Change Explorer:

1. Navigate to **Job Explorer** and click **Arrange By** to view a list of categories by which you can organize the view.
2. Select a category. Job Explorer displays all jobs based on your new selection.
3. Double-click a job to open it in its respective editor. Alternatively, right-click on the job and select **Run** to execute the job immediately.

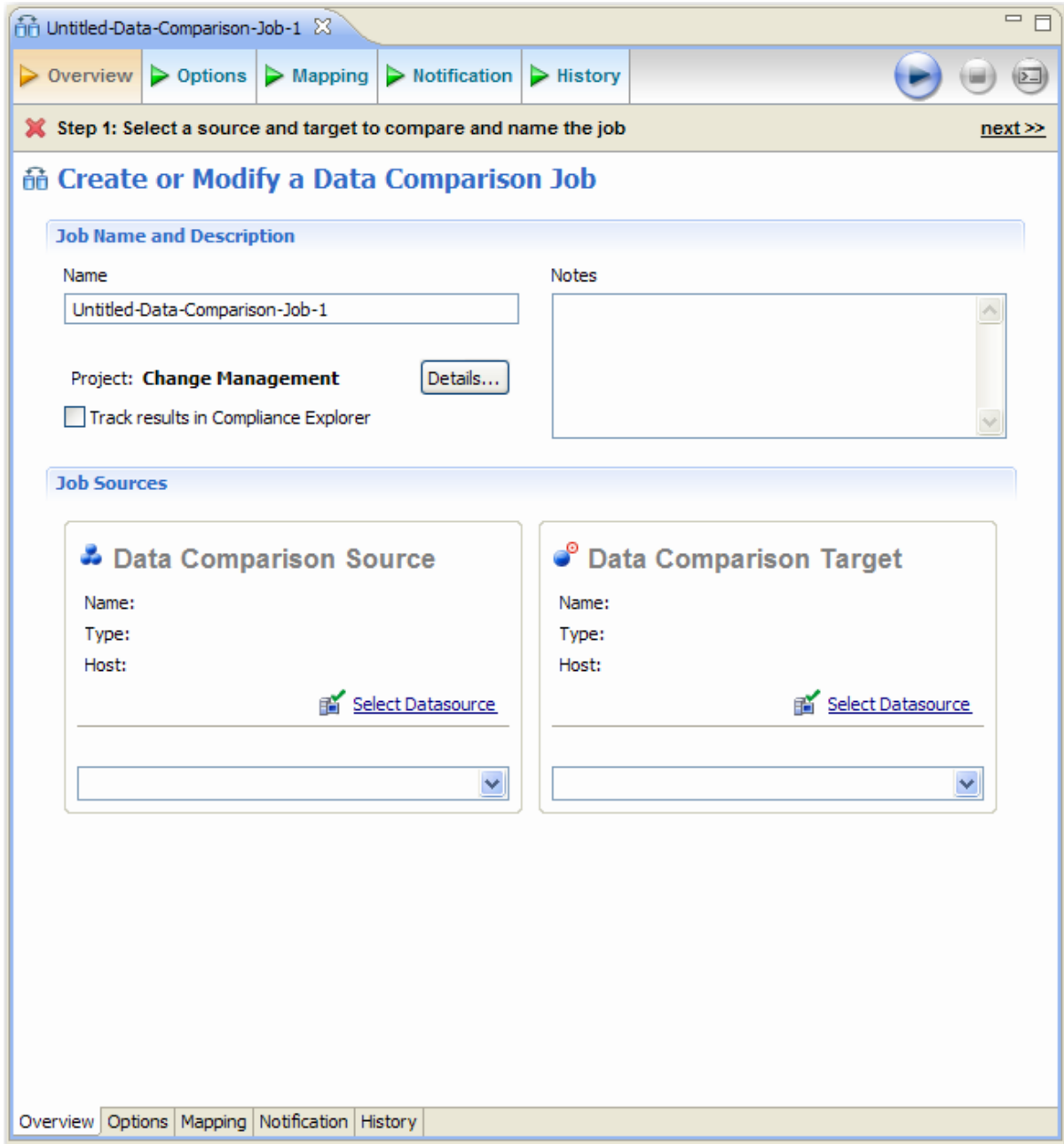


## Session 2: Running Data Comparison Jobs

Data retention or synchronization between a data source and its backup repository can be a difficult and time-consuming job to monitor and maintain in the manual sense. Further time must be spent if data repositories are found to be out of synchronization and must be checked and corrected at the table row level to determine and correct any discrepancies between the servers. In system implementations, keeping data synchronized between test and production environments is also crucial, as is the synchronization of lookup data stored on multiple repositories, the troubleshooting of replication issues, and data migration confirmations when moving large amounts of data between two data sources during upgrade or maintenance phases.

Change Manager provides the ability to run data comparison jobs that automate much of the data repository comparison and correction process between a pair of data sources at the database, table, and row level. A data comparison job enables you to select a pair of data sources from Data Source Explorer, map databases and tables between your two selections for comparison purposes, and then execute the job. Change Manager then compares the information you provided and returns a results screen with details such as an overall percentage of data that matched between your selections, and discrepancies between the two databases in terms of data values that exist on only one of the two data sources.

Once a data comparison job has executed, you can then correct any synchronization issues by running an automated SQL script that will add missing rows and update out-of-sync values. Additionally, Change Manager enables you to modify the script prior to execution, and stores the script for later usage, as needed.



The Data Comparison Job Editor enables you to analyze and correct the data repositories of two data sources automatically.

#### To define and run a data comparison job:

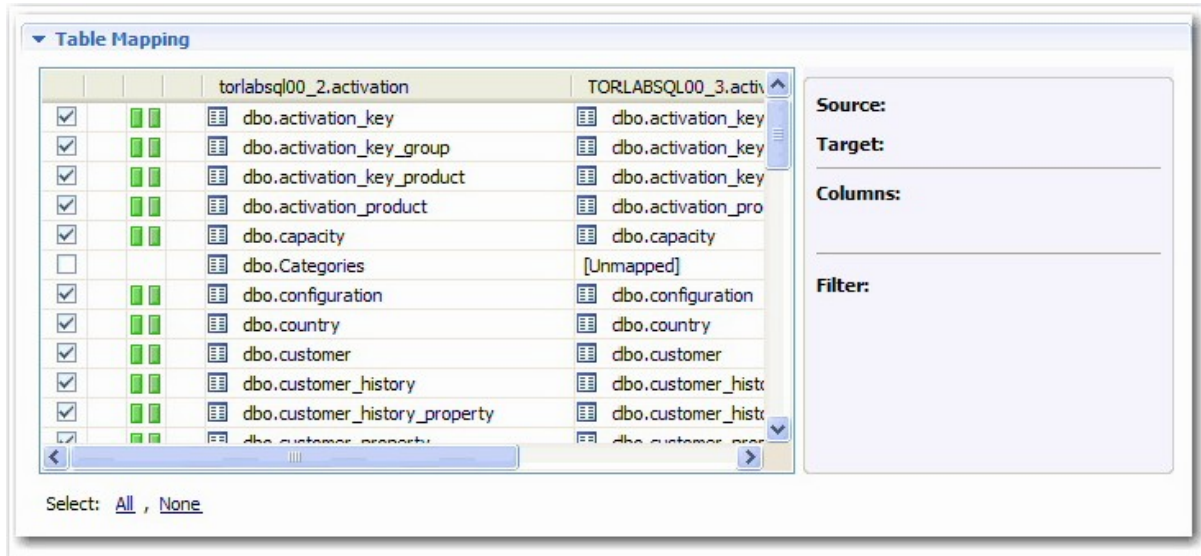
1. Select File > New > Data Comparison Job. The Data Comparison Job Editor opens.
2. Type the name of the job in the **Name** field.
3. Click and drag a data source from **Data Source Explorer** to the **Data Comparison Source** and **Data Comparison Target** boxes, or click **Select Data Source** in the appropriate box to specify high-level mapping by choosing a database, owner, or schema from the list provided. This selection will affect the items that appear in the mapping table in the following step.

4. Navigate to the **Options** tab and select or de-select the options in the **Mapping Options** section, as required.
5. Navigate to the **Mapping** tab. The Data Comparison Job Editor attempts to automatically map databases and tables between the source and target. Manually adjust or finish defining incomplete mapping parameters between the source and target before continuing.
6. To manually modify database pairings, select or de-select the check box beside each database pair, as needed. Use the **All** and **None** commands at the bottom of the table to select all or none of the rows in the table, respectively.
7. To manually modify table pairings, click the corresponding item in the Target data source column and define it via the drop down menu, as with database pairings. If you click Edit in the appropriate pairing, the Columns, Comparison Key, and Filter dialog enables you to further detail mapping refinements in terms of defining table roles in the execution of the job.
8. Click the Notifications tab to specify email, file system, or system tray notifications for this job, as needed.
9. Click the Run icon located in the upper-right hand corner of the tab to execute the job. The Results tab appears and displays the progress of the comparison job.
10. Review the job results for individual pairs by clicking the **View** command in the **Results** column on individual pairs. The **Database Results** tab shows detailed results for the tables and rows of the selected databases.
11. Specify the type of Resolution by clicking All, Mismatched, Source, Only Source, Target, or Only Target.
12. Click Generate an SQL Script and then select the Execute Script icon to synchronize the specified data.
13. If you want to create a report, select View Report. The report opens in a separate window where additional report options are available.

## Understanding Table Mapping

In the process of data source migration and the general upkeep and maintenance of a data source and its backup, databases and tables can be modified and re-defined so naming conventions no longer apply between two repositories that contain data. This is especially true when moving systems into production from a testing environment.

Data comparison jobs enable you to modify the mapping parameters of a given data comparison job manually by choosing to exclude paired elements or re-define those pairings altogether, from the database level to the row level. Customized mapping is performed on the **Mapping** tab of the **Data Comparison Job Editor**.



Data comparison features customized mapping for individual data comparison jobs to the row level of a pair of data sources.

### To view and refine the database, table, and row mappings of a data comparison job:

1. The mapping table provides a list of paired rows at the database and table level between the Source and Target data sources.
2. Use the check boxes to include or exclude pairs and/or redefine the mappings themselves by using the drop down menus in the target column.
3. To modify table mappings, click View Column Mapping in the appropriate selection. The Columns, Comparison Key, and Filter dialog enables you to further detail mapping refinements in terms of defining table roles in the execution of a job.
  - The **Columns** and **Comparison Key** tab enables the mappings of columns to compare between the paired tables.
  - The **Comparison Filter** tab enables you to manually insert a WHERE clause for execution when the job runs.

### Specifying the 'Fast Compare' Option

The comparison of large repositories with many databases, tables, and rows can be a time consuming and tedious process, especially when you are required to check at the row level to ensure complete accuracy between a data source and its backup, or during migration procedures from testing to production that require optimum levels of accuracy.

Data comparison features a **Compression Comparison** option that enables an algorithm during the execution process of a job. The algorithm allows Change Manager to compare at a table level instead of the row level initially. Each table in a pair is assigned a value and if the values match the comparison process moves to the next pair of tables. If the values do not match, the process performs a more detailed comparison at the row level. This feature allows for a faster comparison process in general, without losing any accuracy during the process.

**Compression Comparison**

With this option enabled data on your datasources is compressed before being transmitted to the workbench and compared. In certain situations data compression enables the job to run at a much faster rate by removing the need to transfer and compare large volumes of data.

*The Compression Comparison job option enables an algorithm that enables Change Manager to compare at the table level instead of the row level, initially.*

#### To enable fast-compare:

- Before executing a job, navigate to the **Options** tab and select **Compression Comparison** in the **Execution Options** section. Fast Compare is enabled and when the job executes, the system will perform the comparison, as appropriate.

## Session 3: Running Configuration Comparison Jobs

The monitoring and maintenance of configuration settings between two data sources in an enterprise is important to provide maximum performance and availability of each data source in the network, and enables DBAs to tune performance and quickly diagnose problems. However, like data comparison, the manual effort required to investigate and correct the configuration settings of multiple data sources can be a time-consuming and tedious task.

Configuration comparison provides the ability to run configuration comparison jobs that automate the comparison process between two data sources by examining the configuration settings of two specified data sources and outlining the differences between the two sets of parameters. A configuration comparison job enables you to select a pair of data sources from Data Source Explorer, refine the property comparisons prior to job execution and then run the job and view the results, enabling you to correct any issues you find between the pair.

Furthermore, configuration comparison jobs utilize configuration archives and standards as well as registered data sources. Archives provide an older snapshot of the configuration settings of a data source, while standards are customized sets of properties with threshold operators that allow you to create the 'perfect' configuration against which you can compare existing data source settings.

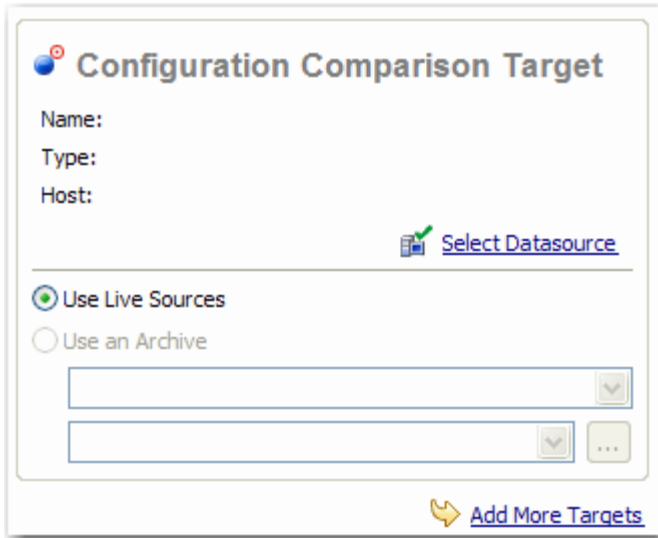
*The Configuration Comparison Job Editor enables you to analyze the configuration settings of two data sources automatically.*

**To define and run a configuration comparison job:**

1. Select **File > New > Configuration Comparison Job**. The **Configuration Comparison Job Editor** opens.
2. Type the name of the job in the **Name** field.
3. Click and drag a data source or archive from **Data Source Explorer** to the **Configuration Comparison Source** or **Configuration Comparison Target** boxes, or click and drag a standard from **Standards Explorer** to the **Configuration Comparison Source** box. Alternatively, click **Select Data Source** in the appropriate box and choose a data source from the dialog.
4. Navigate to the **Options** tab and select or de-select the Extract DDL check box to turn this function on or off, respectively.
5. Navigate to the **Refinements** tab and select or de-select the configuration properties in the table listing. Selected properties are included in the comparison job, and de-selected properties are ignored during job execution.
6. Click the **Run** icon located in the upper right-hand corner of the tab to execute the job. The **Comparison Results** tab appears and displays the progress of the comparison job.
7. Review the job results once it completes on the **Comparison Results** tab.
8. Click the **Execute** icon. Change Manager executes the code on the specified data source. Results of the execution are displayed in the same tab or in a new tab.
9. Click **View Report** command on the **Results** tab. From the report window, you can save, print, or otherwise modify the report file for storage or distribution purposes.

### Adding Multiple Targets to a Configuration Comparison Job

The Configuration Comparison Target box enables you to add multiple comparison targets via the **Add More Targets** command. This allows you to associate multiple target data sources for comparison purposes against a single data source.



The screenshot shows a dialog box titled "Configuration Comparison Target". It has a title bar with a red close button. Below the title, there are three labels: "Name:", "Type:", and "Host:", each followed by an empty text input field. To the right of these fields is a "Select Datasource" button with a green checkmark icon. Below a horizontal line, there are two radio buttons: "Use Live Sources" (which is selected) and "Use an Archive". Below the "Use an Archive" radio button are two empty text input fields, each with a dropdown arrow on its right side. At the bottom right of the dialog is an "Add More Targets" button with a yellow hand cursor icon.

*The Add More Targets command enables you to compare multiple targets against a single source.*

#### To add more than one target to a configuration comparison job:

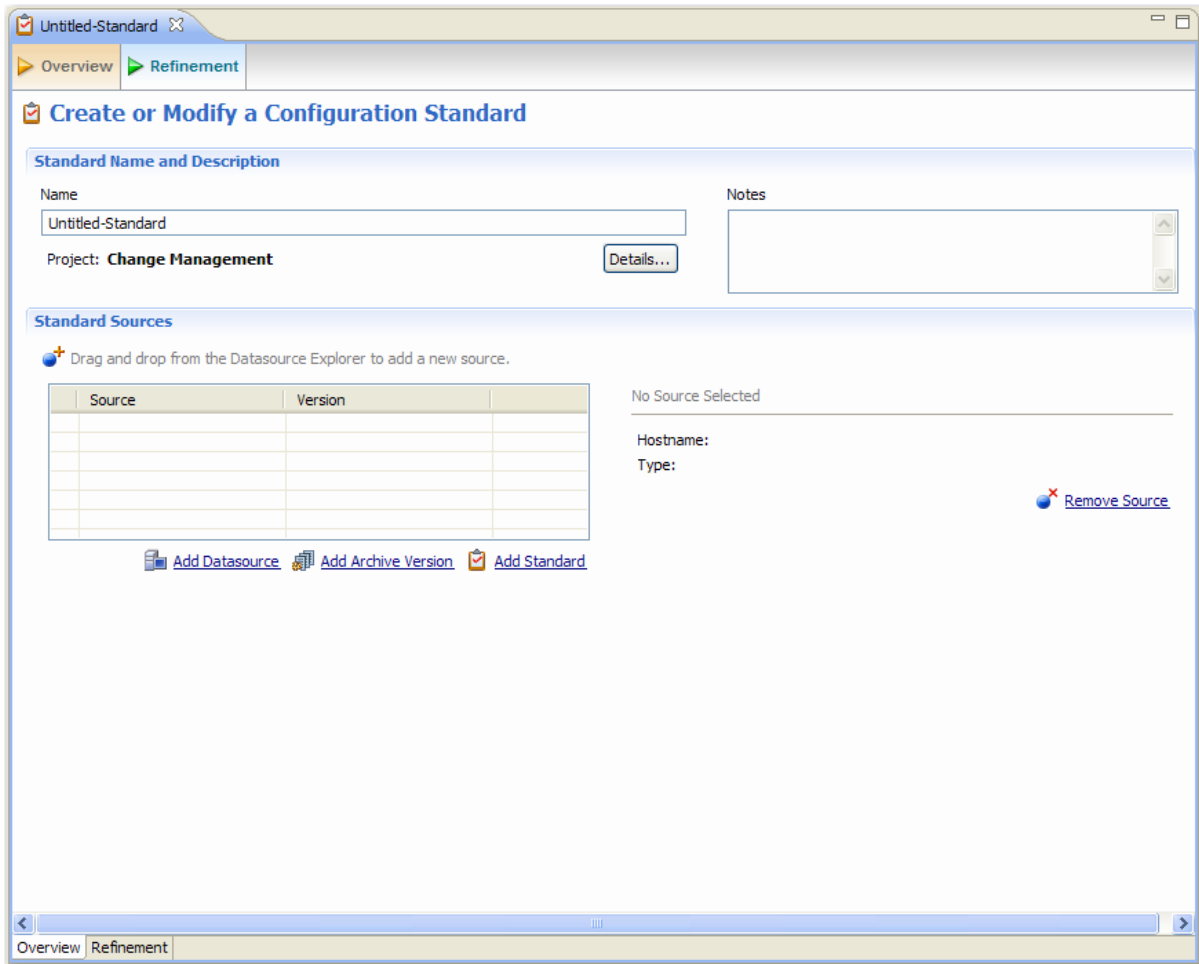
1. Click the **Add More Targets** command. The box changes to a column list view.
2. Drag and drop additional sources from **Data Source Explorer** to the **Configuration Comparison Target** box, or click the **Add Archive** or **Add Data Source** commands beneath the table and select the appropriate target from the dialog provided.\



## Defining Configuration Standards

In many cases, it is often desirable to maintain a list of ideal configuration settings that each system in your enterprise should maintain, or, at minimum, fall between certain thresholds in order to maintain acceptable levels of performance and data retention.

A configuration standard is a configuration comparison job object that is composed of user-defined configuration properties (static or dynamically updated based on the source values) with customized values that include threshold comparison operators (greater than, less than, falls within or is a member of a specified set, etc.) Once defined, standards can be used in configuration comparison jobs against registered data sources and archives in order to determine if target data sources meet and fall within the specified values of the standard's requirements.



The Standards Editor is used to define and modify configuration standards.

Standards are defined in the **Project Editor**. Once a standard is defined it appears in the **Project Explorer** view and contains the interface and navigation functionality of a registered data source object with the exception that it can only be used as a **Source** in comparison jobs.

### To define a configuration standard:

1. Select **File > New > Configuration Standard**. The **Standards Editor** opens.
2. Enter the name of the Standard in the **Name** field.

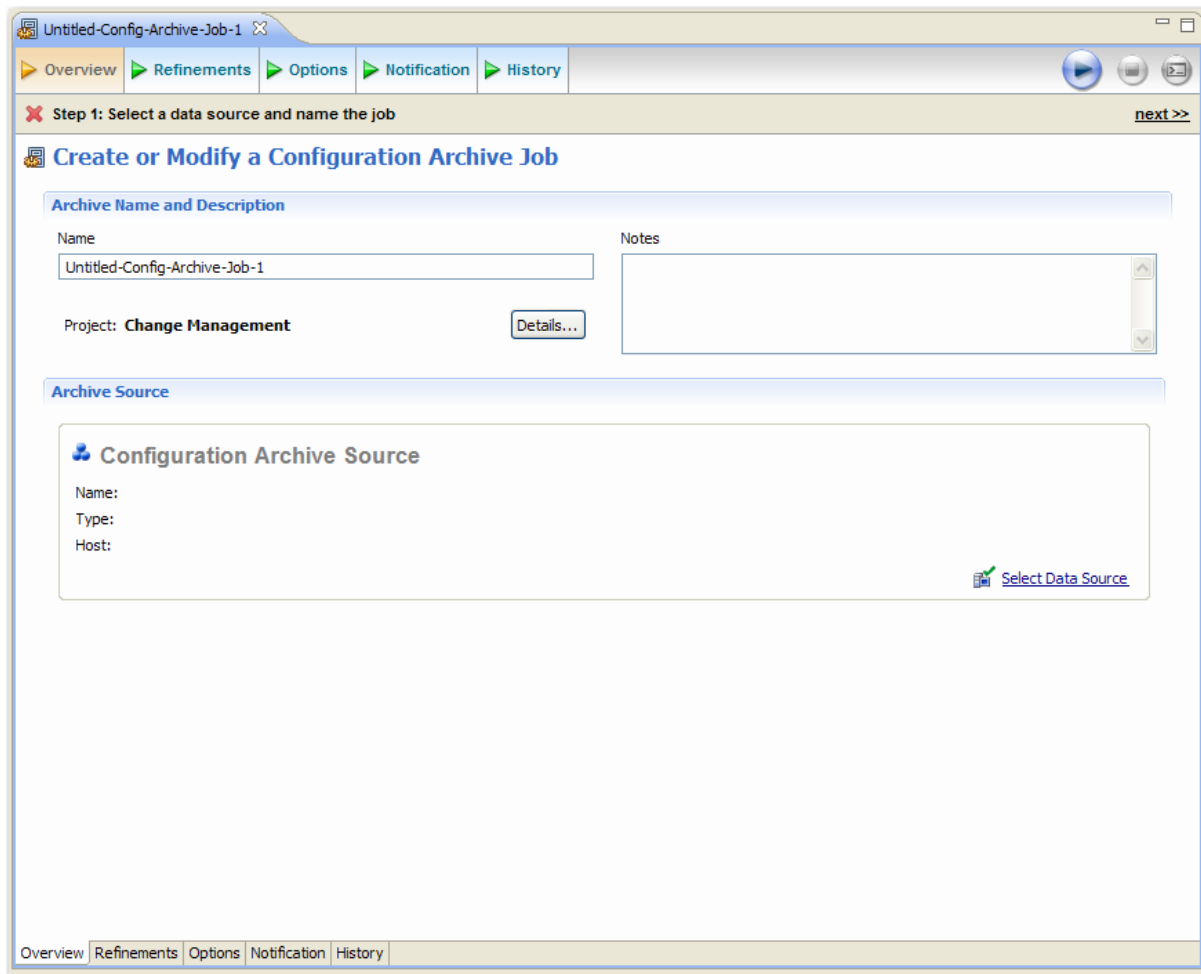
3. Drag and drop a data source, archive, or standard from **Data Source Explorer** to the **Standard Sources** table. Alternatively, use the **Add Data Source** and **Add Archive Version** commands beneath the table to add properties to the standard.
4. Navigate to the **Standard Refinement** tab and define each listed property as **Linked** or **Static** by clicking the appropriate row value in the **Type** column and choosing a selection from the drop down menu.
5. Define each property operator by clicking the appropriate row value in the **Operator** column and choosing a selection from the drop down menu.
6. Select **File > Save** or **File > Save All** to save the Standard. It automatically appears in **Standards Explorer**.
7. Drag and drop the new standard from **Standards Explorer** to the **Comparison Source** box in the **Configuration Comparison Job Editor**. You can now proceed to run a job using the standard's properties as you would a registered data source or an archive.

## Defining Configuration Archives

A snapshot of a data source's configuration properties at various points in time is often useful for backup and restoration purposes as well as to monitor value slippage and otherwise preserve older settings that may or may not impact your enterprise in the near or far future.

An archive is a static view of a single data source's configuration properties from a specific point in time. A single archive can contain multiple versions that enable you to periodically capture the property values of a data source over the course of time.

Archives are defined in the **Archive Job Editor** and appear as child nodes of the appropriate data source in Data Source Explorer. Once an archive is defined, its various versions can be used in configuration comparison jobs with data sources and configuration standards.



The Archive Job Editor is used to capture and save data source properties at a specific point in time.

### To define a configuration archive:

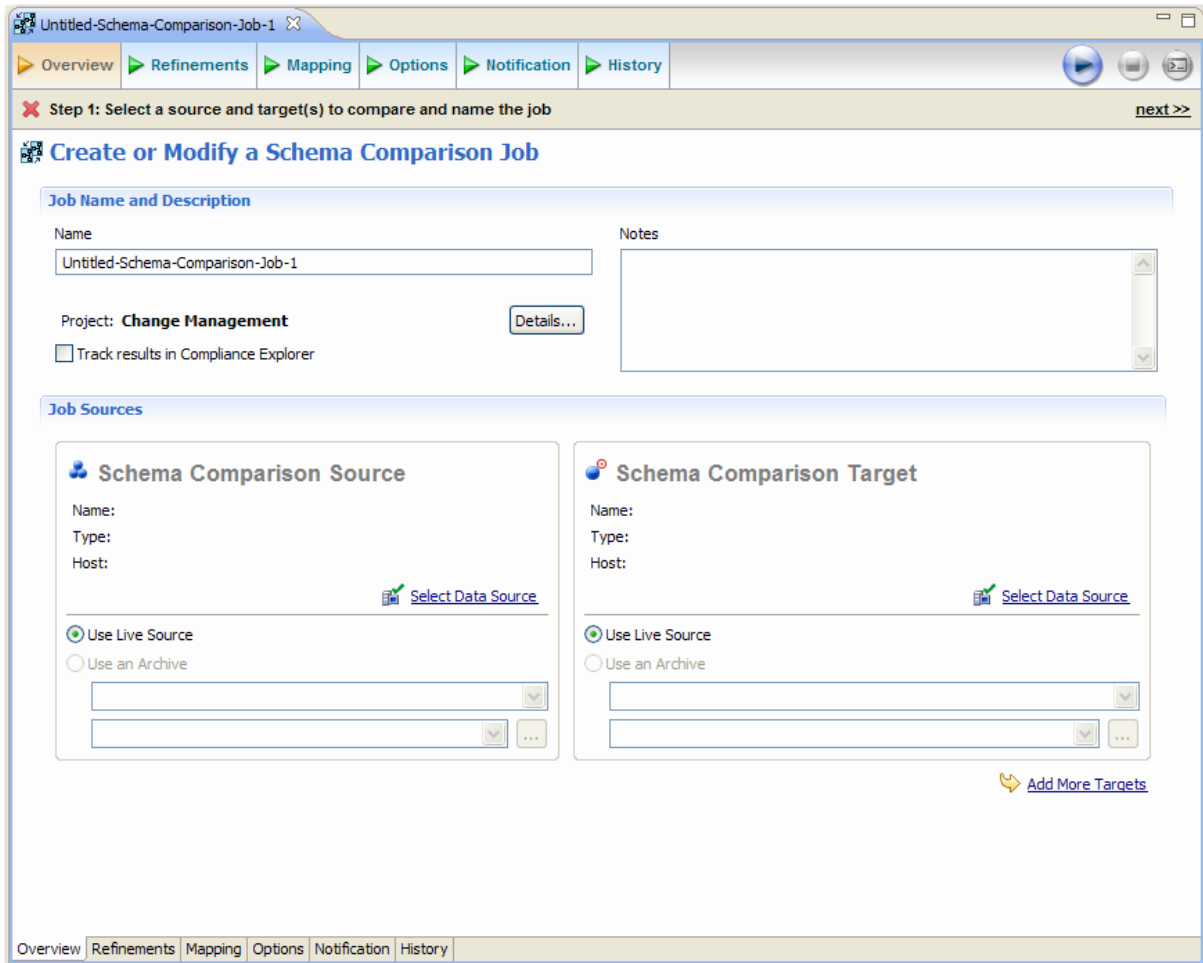
1. Right-click on a data source in **Data Source Explorer** and select **Archive > Configuration Archive Job** from the menu. The Archive Job Editor opens.
2. Enter the name of the Archive in the **Name** field.
3. Drag and drop the data source to be archived from **Data Source Explorer** to the **Configuration Archive Source** box.

4. Navigate to the **Refinements** tab and use the check boxes to select or de-select properties, as needed. Selected properties are included in the Archive, while de-selected properties are ignored.
5. Navigate to the **Notifications** tab and modify the settings, as appropriate. Email, file system, and system tray notification options are labeled and contained in separate sections on the interface.
6. Click the **Run Job** icon in the upper right-hand corner of the Editor. A tab named **Unsaved Version** appears containing the properties of the captured source.
7. Select **File > Save**. The **Unsaved Version** tab changes to **Version 1** and Version 1 appears in the Archive Versions table on the Overview tab with a time stamp. You can create more versions by clicking the **Run Job** icon again.
8. Click the **View Report** command on the **Results** tab. The report opens in a new window.
9. Drag and drop the new archive version from **Data Source Explorer** to the **Source** or **Target** boxes in **Configuration Comparison Job Editor**. You can now proceed to run a job using the archive properties as you would a registered data source.

## Session 4: Running Schema Comparison Jobs

Schema comparison supports the capture and comparison of database schema in your enterprise. This can be used to create a baseline of your database schema for analyzing schema and permission changes between the baseline and the live environment.

In order to create a baseline of your schema, you must first capture and store it. Once it has been captured, you can use this archive to compare it against the live environment. If needed, the schema comparison editor then provides the ability to synchronize the schema of a live data source with the archive.



The Schema Comparison Job Editor is used to compare the schema of two or more data sources in your environment.

### To define a schema comparison:

1. Select **File > New > Schema Comparison Job** in the Menu Bar. The **Schema Comparison Job Editor** opens.
2. Enter the name of the job in the **Name** field of the **Data Comparison Job Editor**.
3. Click and drag a data source from **Data Source Explorer** to the **Schema Comparison Source** or **Schema Comparison Target** box.

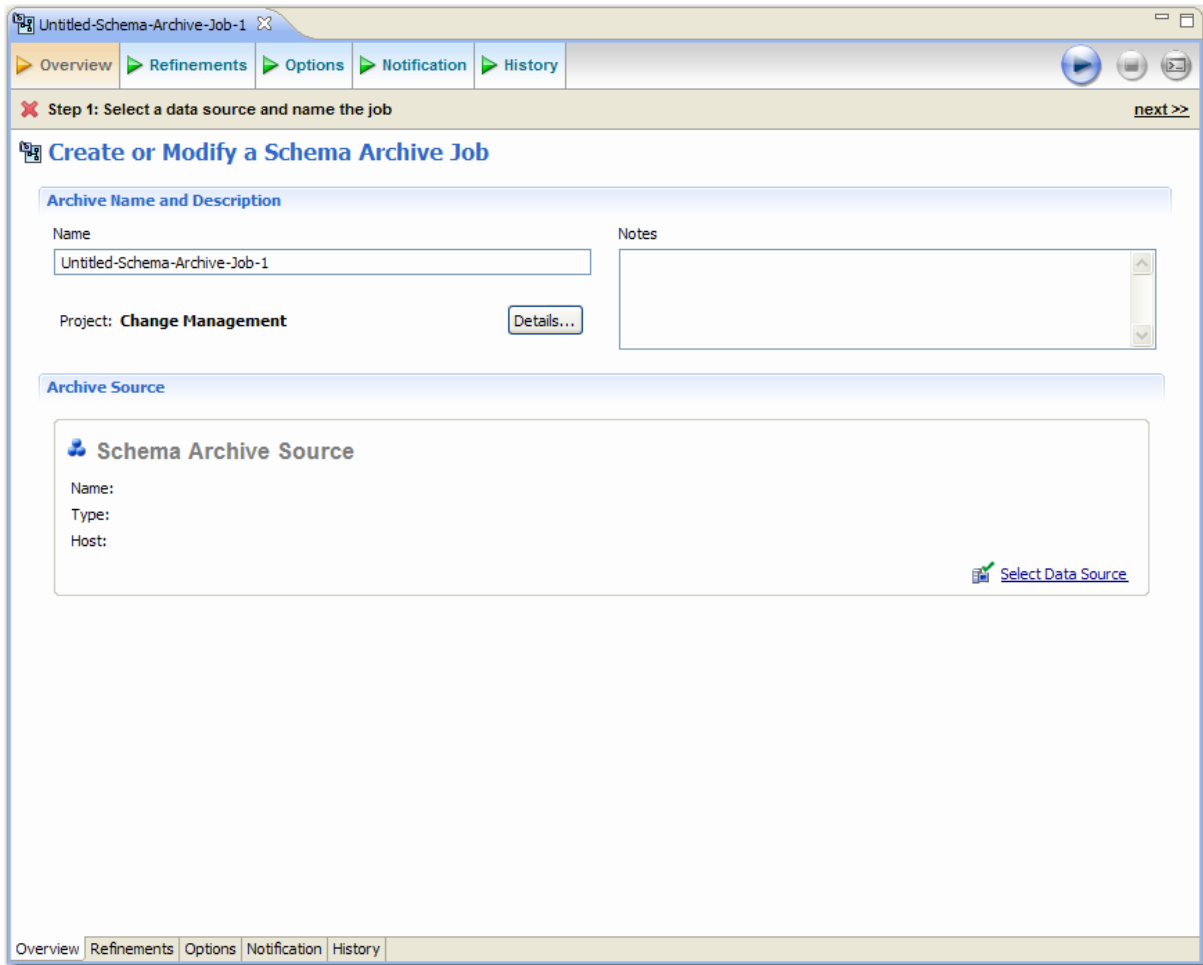
4. Navigate to the **Refinements** tab and select or de-select the objects in the table, as required. Selected objects are included in the comparison job, and de-selected properties are ignored during job execution.
5. If you want to re-define the object pairings, navigate to the **Mapping** tab and click the target of the pair you want to change. You can use the drop down menu to re-define the schema object pairing, as needed.
6. If you want to change the job options, navigate to the **Options** tab and modify the options, as needed. Options are grouped into execution, mapping, comparison, and resolution sections.
7. Navigate to the **Notifications** tab and modify the settings, as appropriate. Email, file system, and system tray notification options are labeled and contained in separate sections on the interface.
8. Click the **Run** icon located in the upper right-hand corner of the editor. The **Results** tab appears and displays the progress of the comparison job.
9. Click **View Report** to view a report of the executed job.
10. On the **Results** tab, click **Sync All** in the **Resolution** column of the **Comparison Results** table. A synchronization script is produced in another window.
11. Modify the script as needed, save it via the **File > Save** command, or use the commands in the **Run** menu on the Workbench toolbar to execute the script, as needed.

## Defining a Schema Archive

An archive is an object related to schema comparison that contains a snapshot of the schema of a registered data source. A schema archive is used in schema comparisons against other data sources and archives as a baseline to monitor data loss and inconsistencies when moving between testing and production environments.

Schema archives are composed of a name, description, and schema derived from a single live data source at a specific point in time. Additionally, archives have versioning functionality and can be periodically updated with the current values of an associated data source. Older versions are retained within an archive and can be recalled as needed.

Archives are created in the **Schema Archive Job Editor**, and, once saved, are organized in **Data Source Explorer**, on the **Schema Archive Jobs** node of the corresponding data source.



The Schema Archive Job Editor allows you to take a snapshot of data source schema at a specific point in time.

### To define a schema archive:

1. Select **File > New > Schema Archive** from the Main Menu. The **Schema Archive Job Editor** opens.
2. Enter the name of the archive in the **Name** field of the **Archive Job Editor**.

3. Drag and drop the data source to be archived from **Data Source Explorer** to the **Schema Archive Source** box.
4. Navigate to the **Refinements** tab and use the check boxes to select or de-select schema objects, as needed. Selected objects are included in the archive while de-selected objects are ignored.
5. Navigate to the **Options** tab and use the drop down menu to specify the **DDL Extraction** settings for the archive process. This setting defines how DDL is extracted and stored when the archive job runs. If you choose to store extracted DDL, the directory location of the files can be viewed on the **History** tab once archive versions have been created.
6. Navigate to the **Notifications** tab and modify the settings, as appropriate. Email, file system, and system tray notification options are labeled and contained in separate sections on the interface.
7. Click the **Run Job** icon. After saving a version, it appears in the **Job History** table on the **History** tab and contains various archive information such as version number, timestamp, DDL location, host name, and number of errors.
8. You can compare the archive version with its live source by right-clicking the **Archive Contents** table and selecting **Compare**. **Schema Comparison Job Editor** opens and designates the archive version and its original as the source and target data sources, respectively.
9. If you want to extract the DDL of the archive contents, choose **Extract** from the right-click menu.
10. To generate a report, click the **History** tab and then right-click on the version you want to create a report for. From the menu, select **View Report**. A summary report of the schema archive appears in a separate window.
11. To use the archive in a schema comparison job, click and drag the appropriate version from **Data Source Explorer** to the **Source** or **Target** box in **Schema Comparison Editor**.



## Session 5: Defining Batch Files for Bulk Job Execution

In scenarios where you are required to run the same jobs multiple times over a repetitive time frame (for example, you may be required to archive the properties of a data source on a daily basis), it is desirable to set up automated tasks that execute the jobs on a regular schedule. Change Manager provides the ability to extract a command line executable from each job defined in the environment.

The command line syntax can then be used to trigger a job outside the Workspace, or multiple executables can be contained inside a batch file and triggered at the same time.

On each tab in the editors of Change Manager, the **Command Line Syntax** icon provides the means to automatically create command line syntax for the specified job. The icon is located beside **Run Job** in the upper right-hand corner of the editor. When selected, it opens the **Script Generation Wizard**.

**Job Selection**

Please specify a report directory for all Jobs that specify one or more report types.

Job	CSV	XML	HTML	PDF	RTF	Report Directory
Archive - TORLABSQL00_2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Up  
Down  
Select All  
Deselect All  
Add...  
Remove

Report Output

Format:  CSV  XML  HTML  PDF  RTF

Directory:  Browse...

< Back Next > Finish Cancel

The Script Generation Wizard provides command line syntax for the specified job.

In addition to providing the syntax needed to execute the job outside of the Change Manager environment, the **Script Generation Wizard** also enables you to generate a batch file that contains the specified command line. Once a batch file has been defined, multiple execution commands can be added to the file in order to create a script that will automatically run Change Manager bulk jobs when executed.

**To define command line syntax and generate batch files:**

1. Open the job you want to define an execution script for, and select the **Command Line Syntax** icon in the lower-right hand corner of any tab. The **Script Generation Wizard** appears.
2. Add output report options, as needed, and specify the Directory where the files will be generated. Click **Next**.
3. Specify the **Location** where the batch file will be generated and provide a file format for the script.
4. Click **Finish**. The batch file is generated in the directory you specified in Step 3.
5. In the **Location** field, specify the directory path and file name of the batch file to be generated.
6. Click **Finish**. The batch file is generated as defined in Step 2.
7. If you want to add multiple jobs to the batch file, generate a batch file as normal, and then copy the script syntax to the clipboard for each job you want to add to the batch file. You can then add them to the existing batch file manually.

## Additional Evaluation Resources

### Embarcadero Technologies Product Support

The Embarcadero Web site is an excellent source of additional product information, including white papers, articles, FAQs, discussion groups and the Embarcadero Knowledge Base.

Go to [www.embarcadero.com/support](http://www.embarcadero.com/support) or click any of the links below to find:

- [Documentation](#)
- [Technical Papers](#)
- [Discussion Forums](#)
- [Knowledge Base](#)