WhereScape® RED

WHERESCAPE RED TERADATA TUTORIALS

6.8.4.0

www.wherescape.com

WhereScape®

WhereScape RED Teradata Tutorials

WhereScape USA, Inc

1915 NW AmberGlen Parkway
Suite 400, Beaverton
Oregon 97006
United States
T: 503-466-3979
F: 503-466-3978

WhereScape Limited

P.O.Box 56569, Auckland 1446
Level 3, WhereScape Towers
38 Wyndham Street
Auckland 1010, New Zealand
T: +64-9-358-5678
T: US toll free 1-877-237-3980
F: +64-9-358-5679

WhereScape Europe

Reading Enterprise Centre
Earley Gate, Whiteknights Rd
Reading RG6 6BU
United Kingdom
T: +44-118-914-4509
F: +44-118-914-4508

WhereScape Asia Pte. Ltd

300 Tampines Avenue 5
#09-02 Singapore 529653
T: +65-6679-5728

WhereScape®

CONTENTS

WhereScape®

CHAPTER 1
TUTORIAL OVERVIEW

In Tutorial 1 we will create a basic Star Schema Fact Table.

Additional Tutorials may be available on the WhereScape website.

IN THIS CHAPTER

WhereScape®

THE FIRST STEP

The first step

To get started you need to follow the steps in the **WhereScape Installation and Administration Guide** to create the required environment. The basic steps in this process are:

The basic steps in this process are:

1. Install the WhereScape product suite.
2. Create a database user under which to load the WhereScape metadata repository.
3. Install the WhereScape metadata repository.

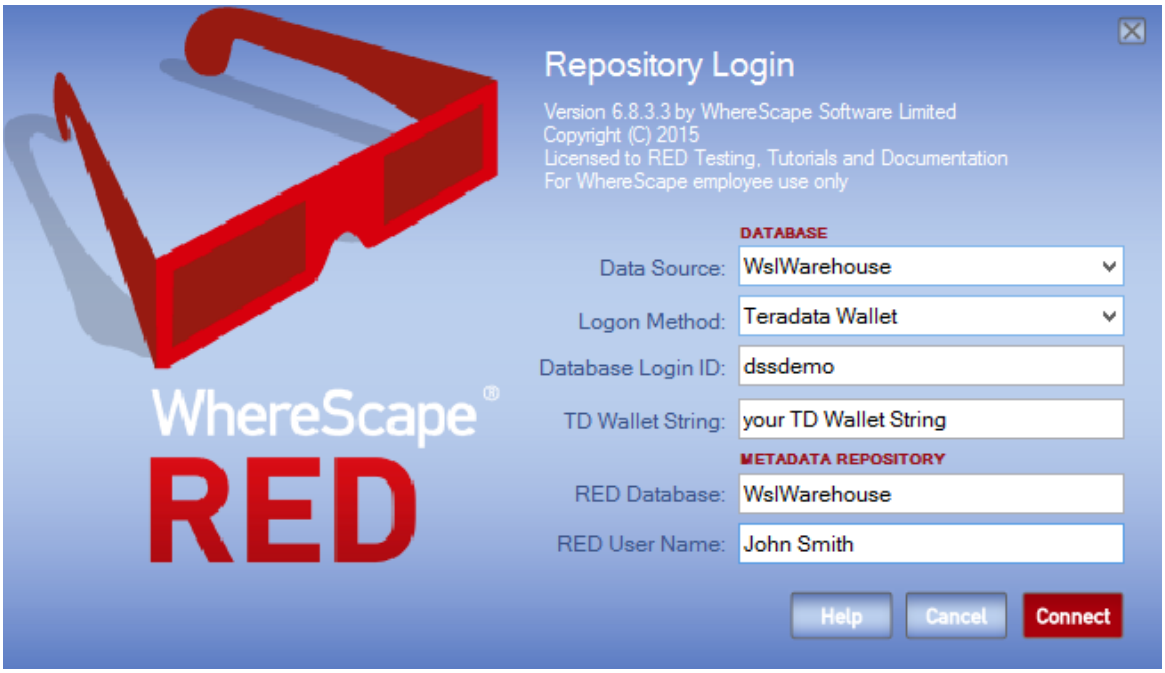
You are now ready to ***log on*** (see "***Logging In***" on page 3) to the repository you have created.

LOGGING IN

Having completed the first step, and using WhereScape RED, you can now log on to the repository you have created .

To log in:

1 Click WhereScape RED from the Start menu. The Access Control screen displays. See sample screen below:



2 The **Data Source** is the ODBC connection for your database. This connection must have been established prior to logon. Refer to the Installation and Administrator Guide if the connection doesn't exist.

3 The **Logon Method** is the Method chosen to login. Select either DB User/Password or Teradata Wallet method from the drop-down menu.

4 The **Database Login ID** is the User Name where the user has been granted access to the user under which the metadata repository has been loaded.

5 The **TD Wallet String** is the string replacing the user name and password for your connection. Teradata TD Wallet is a Teradata product part of the TTU (Tools and Utilities). Refer to Teradata documentation if you don't have a TD Wallet created already.

6 The **RED Database** is the User Name for the metadata repository.

7 The **RED User Name** is the name that will be associated with any procedures, tables, etc, and scheduled jobs that are created within RED. Normally this would be your full name.

8 Click **OK**. The Builder screen displays.

WhereScape®

CHAPTER 2
TUTORIAL 1 - BASIC STAR SCHEMA FACT TABLE

IN THIS CHAPTER

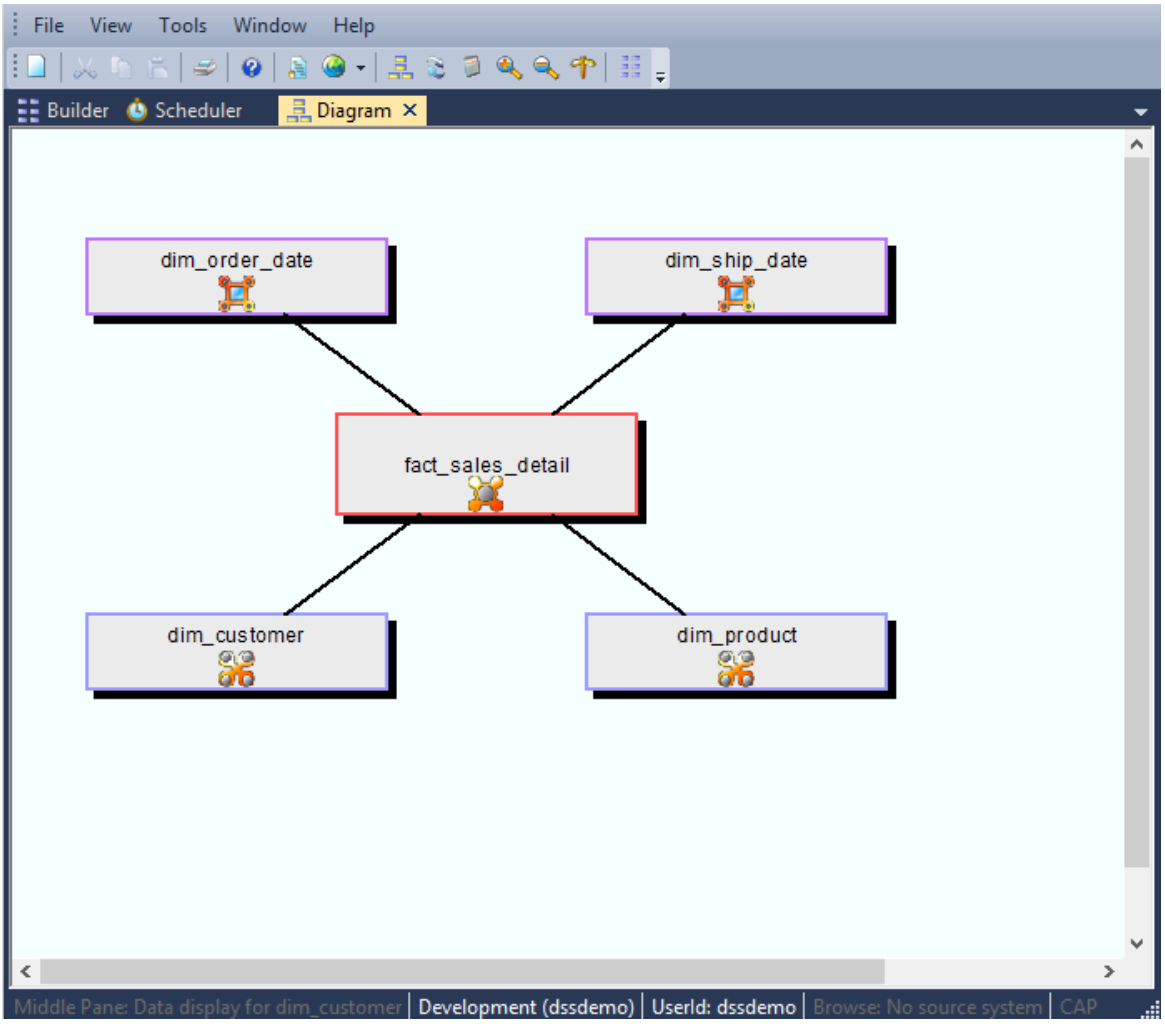
1.1 PURPOSE AND ROADMAP

Purpose

This tutorial is designed to introduce you to basic development using WhereScape RED. At the end of the tutorial you will have built a simple dimensional analysis area of a data warehouse, with identity column surrogate keys.

Note: Surrogate keys using identity columns are not always the recommended approach in Teradata. This first tutorial uses them for simplicity. It is important to note that WhereScape RED can be used with and without surrogate keys and when used with surrogate keys, they can be derived from identity columns or using any other user defined approach.

The tutorial will build the star-schema shown below. This star-schema comprises a central fact table, fact_sales_detail, joined to four dimension tables. Data will be loaded from tables in another Teradata database.
In the process of creating this star-schema you will learn to create load, stage, fact and dimension tables. You will also see how data flows from the data source, through the different tables enroute to its fact or dimension table destination.



Tutorial Roadmap

This tutorial works through a number of steps. These steps and the relevant section within the chapter are summarized below to assist in guiding you through the tutorial.

Step in Tutorial	Section
Create a new odbc data source for the RED tutorial source system	Adding an Odbc Data Source
Create a new RED connection object for the RED tutorial source system	Creating a Connection
Create and load the load tables for • Customer • Product • Order_line • Order_header	Loading Source Tables

Step in Tutorial	Section
Create (and update from load tables) the following dimension tables • Dim_customer • Dim_product	Building Dimensions
Create dimensions for • Dim_order_date • Dim_ship_date These are views on the dim_date table	Creating Dimension Views
Create the stage_sales_detail table • Create stage table using columns from load_order_line and load_order_header • Specify join condition • Include links to the following dimensions (dim_customer, dim_product, dim_order_date, dim_ship_date)	Defining the Staging Table Including Dimension Links
Create the fact_sales_detail table	Creating a Fact Table
View the WhereScape generated documentation	Switching to Diagrammatic View Producing Documentation

1.1.1 PREREQUISITE ACTIONS

Before commencing this tutorial, please perform the following tasks:

1. Install RED metadata
2. Install Tutorial data

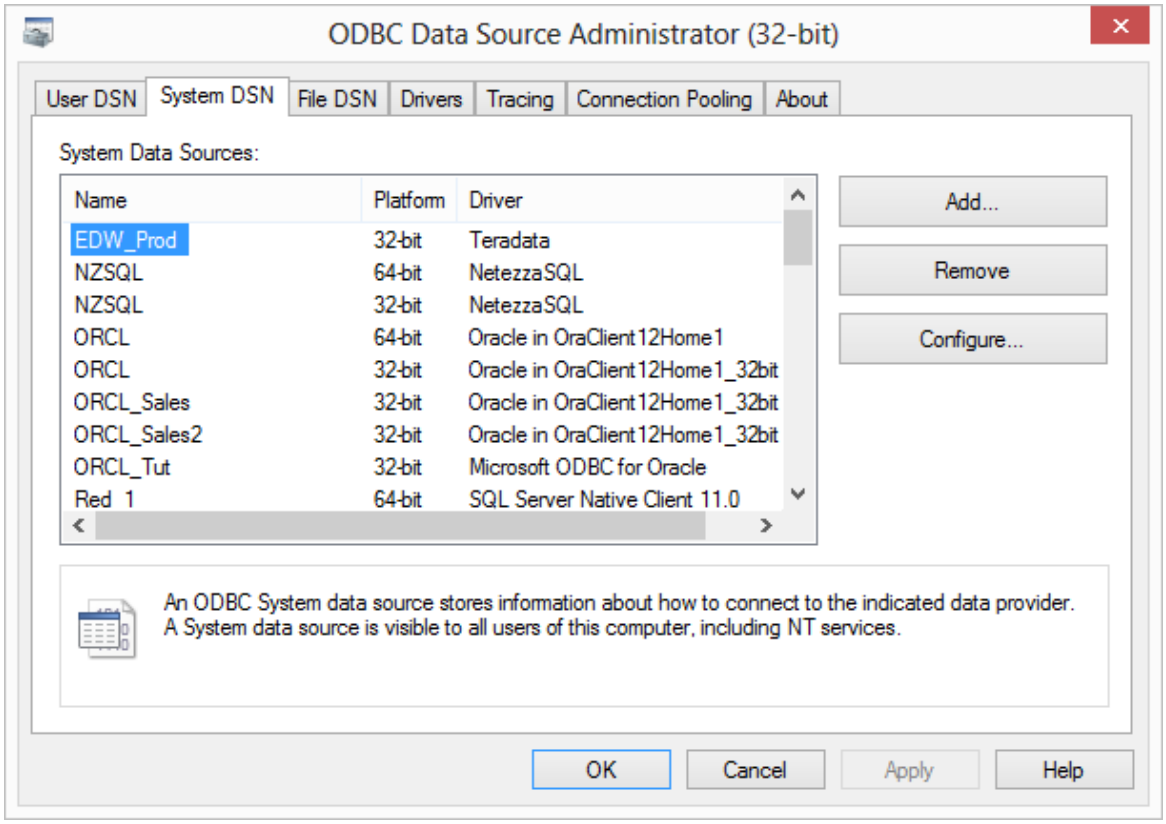
For more information, refer to the **WhereScape Installation and Administration Guide**.

1.2 ADDING AN ODBC DATA SOURCE

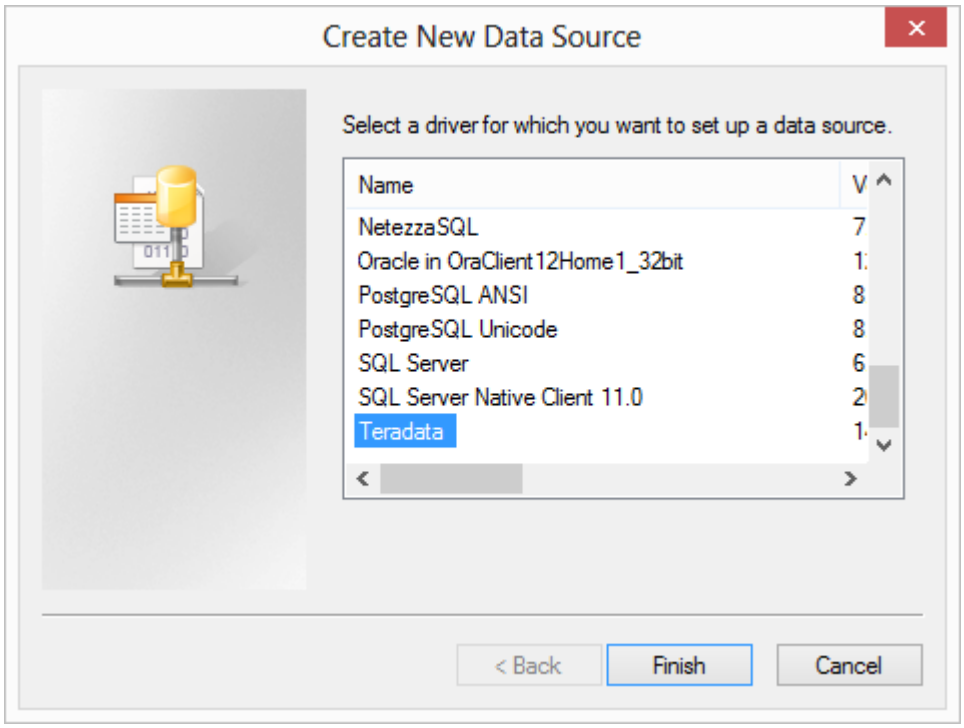
We need to add an Odbc DSN called TutorialTDAT, which will be used to connect to the Tutorial Source data.

1 Open **WhereScape Administrator** and select **PC Setup > Validate / Add Odbc Source**.

2 Right-click in the middle work pane and click **Add Odbc entry**. **WhereScape Administrator** will open ODBC Administrator. Choose the **System DSN** tab and click **Add** to add a System Data Source.

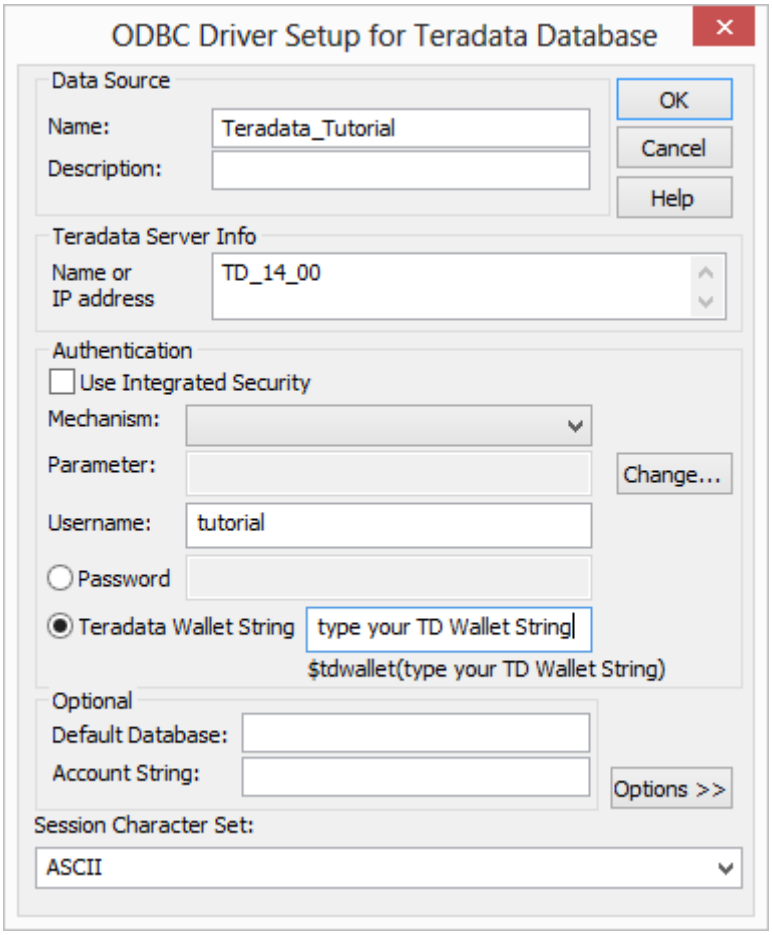


3 Select a driver for your Data Source, choose **Teradata** and click **Finish**.

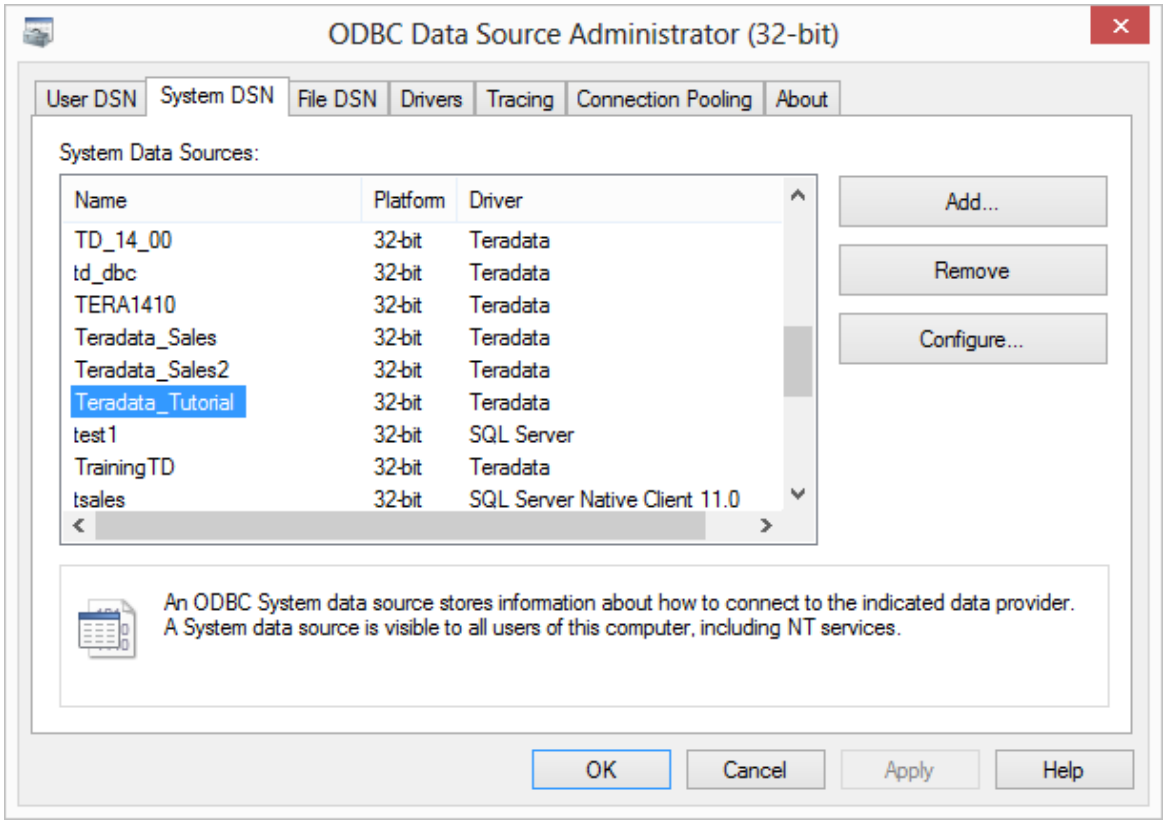


4 Enter a Data Source **Name** of **Teradata_Tutorial**. As the Teradata Server is environment specific, enter the name of your Teradata Server.

5 Enter either User name and Password or your TD Wallet String. **Click Ok**.



6 Click **OK** to close.



7 In the left pane, click on **Validate / Add Odbc Source** again to refresh the middle pane and display the new ODBC Source Teradata_Tutorial.

1.3 CREATING A CONNECTION

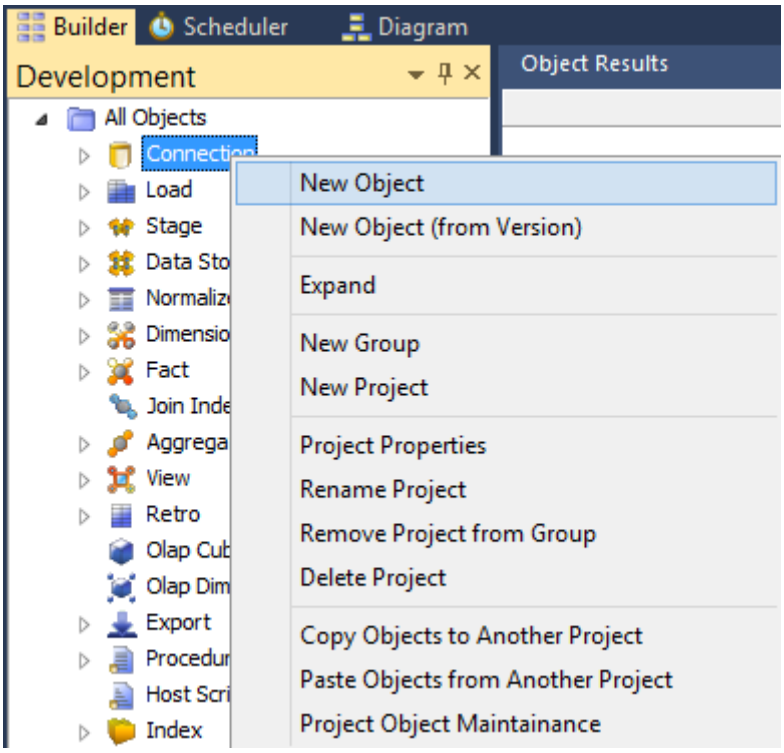
In order to populate the metadata repository, a connection needs to be created for the tutorial source system.

This section describes how to create this new connection.

TIP: In order to use the drag and drop features there must always be a connection to the data warehouse itself.

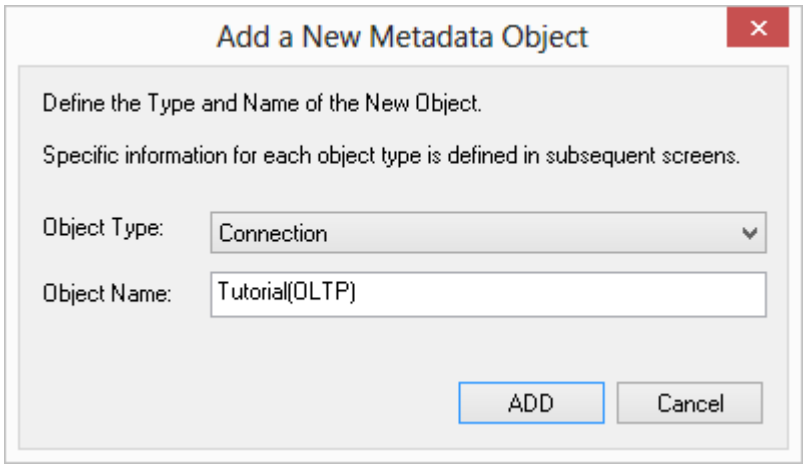
1 In the left pane of the RED Builder, click on and highlight the **Connection object group**. (This selects the object group to be worked on.)

- From the right mouse menu select **New Object**.



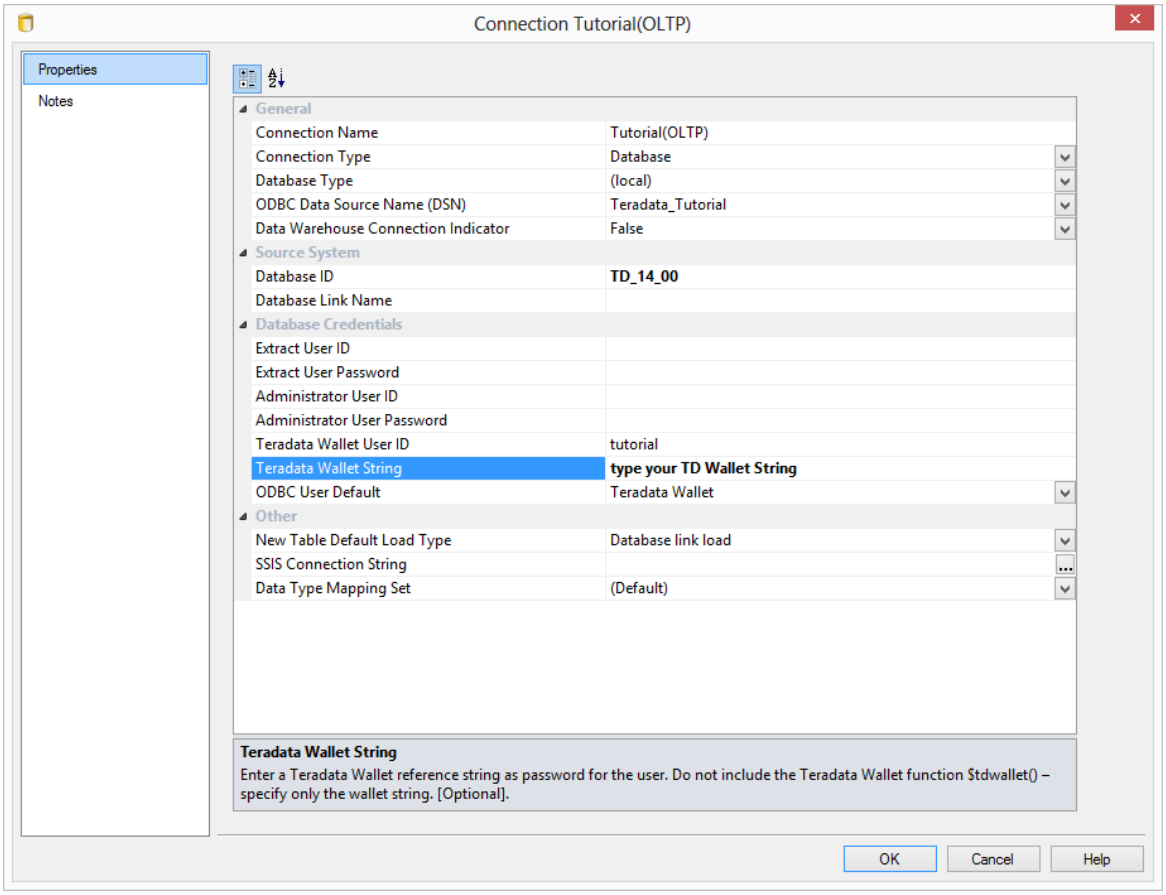
2 A dialog box displays with the Object Type defaulted to Connection.

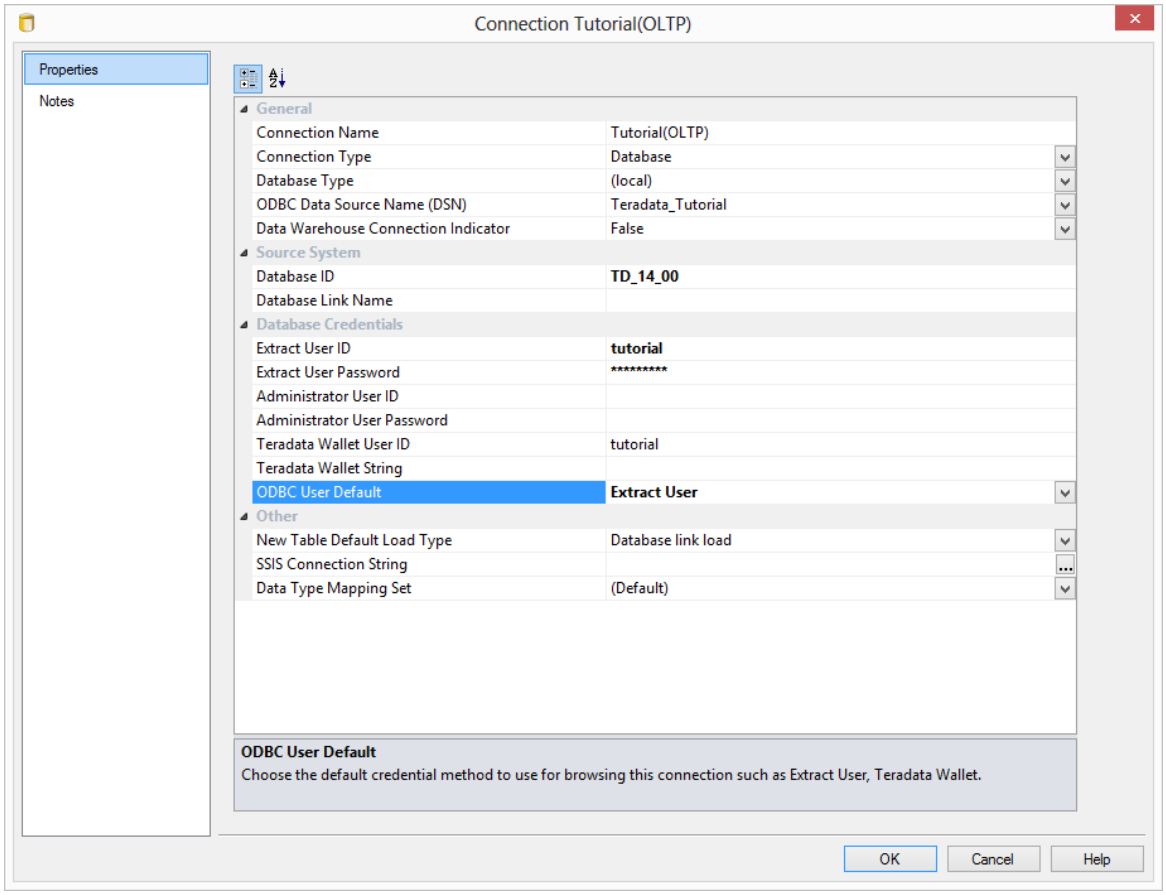
- Name your connection **Tutorial(OLTP)** and click **ADD**.



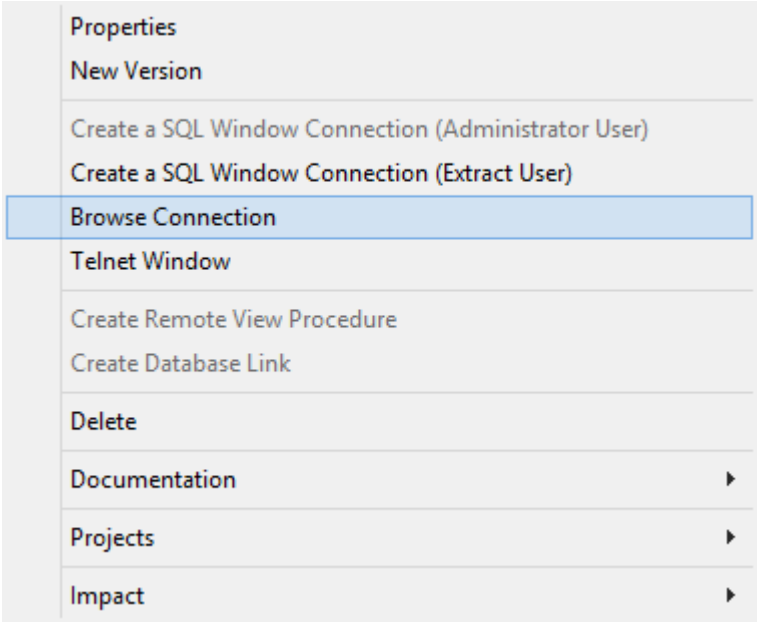
3 The Connection Definition dialog displays next. Complete the details as below and click **OK**:

- The **ODBC source** is Teradata_Tutorial.
- The **Database ID (SID)** can be left blank.
- The **Database Link ID** can be left blank.
- The **Extract User ID** and **password** are the user name and password for a user who has select access to the tutorial database (or user) where the source tables reside.
- If the **ODBC User Default** is set to Teradata Wallet, enter the User ID who has select access to the tutorial database and the relevant Teradata Wallet String.
- The **Administrator User ID** and **password** can be left blank for the tutorial.
- The **New Table Default Load Type** enables you to set the default load type at connection level for ODBC and Database Connections. Set to 'Database link load'.
- Leave **Data Type Mapping** set as 'Default'.



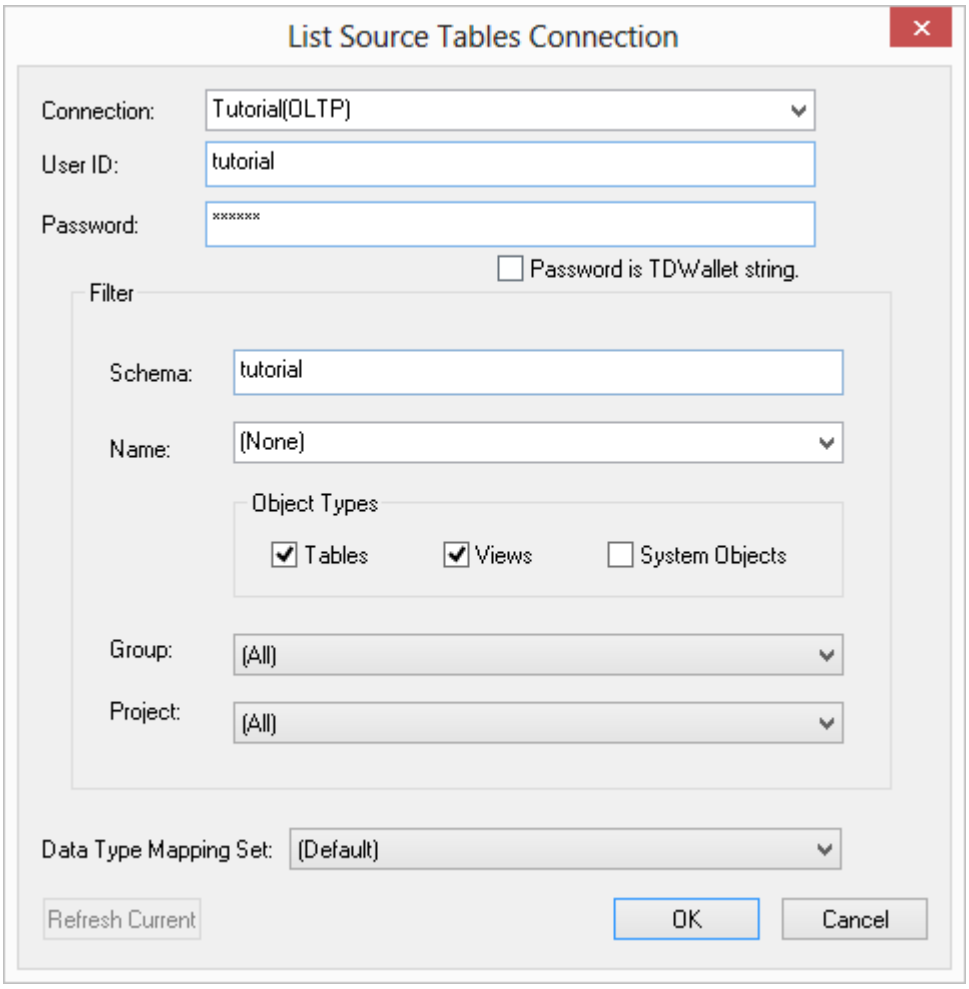


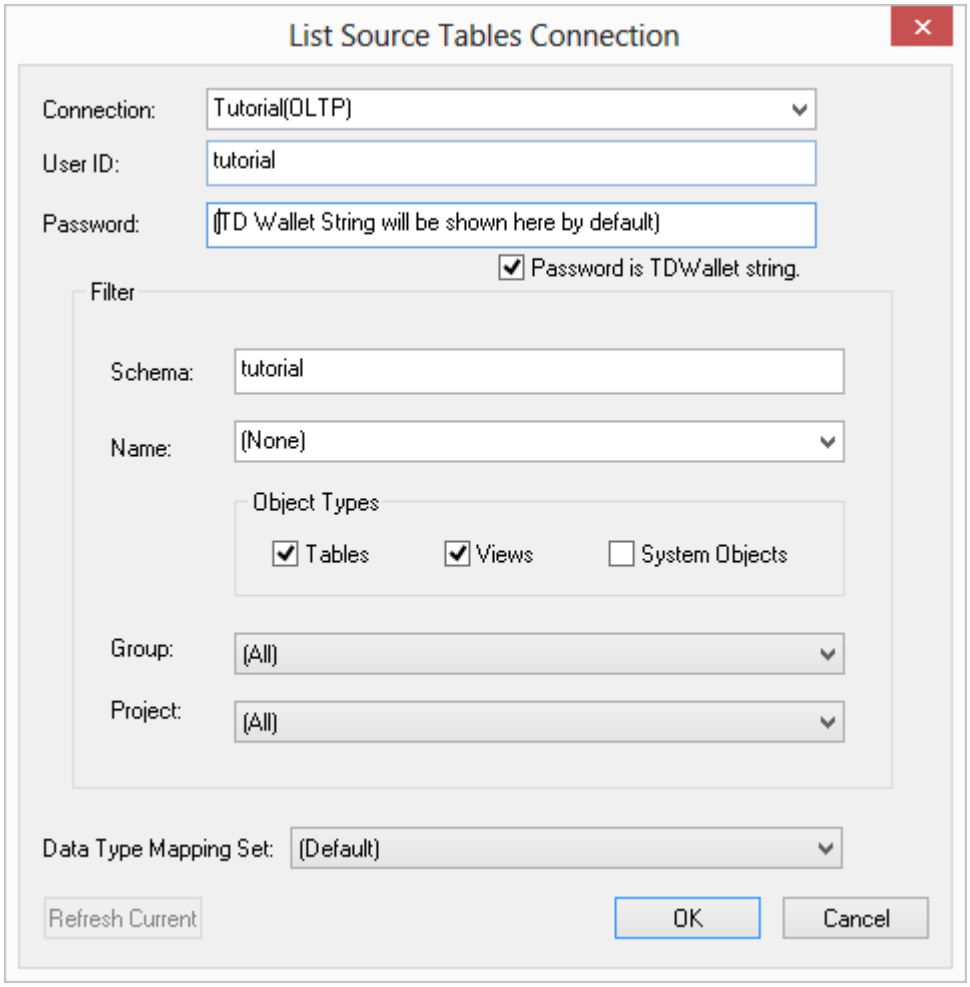
4 To confirm that you have connected to the system correctly, right-click on the new connection object in the left pane and select **Browse Connection.**



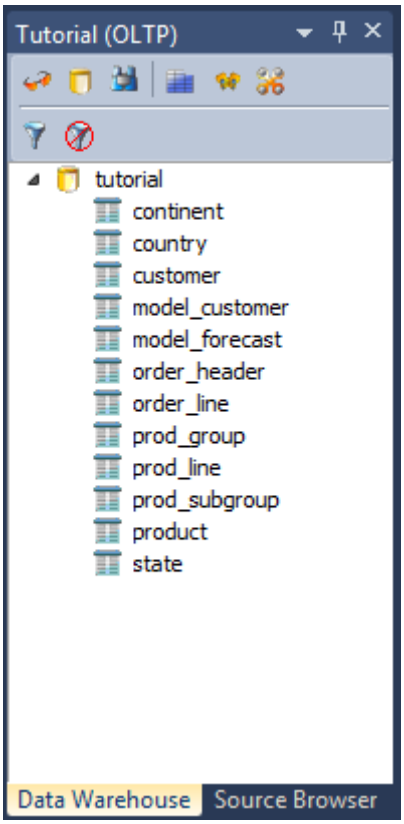
5 Ensure the **Schema** is set to the database (or user) where tutorial tables have been created and click **OK**.

Note: If the Extract User ID is selected, the Schema will have the user ID and the password encrypted. If the TD Wallet has been selected instead, the Browse Connection Window will show the TD Wallet String by default on the password window and the TD Wallet String check-box will be ticked.




List Source Tables Connection
Connection:
Tutorial(OLTP)
User ID:
tutorial
Password:
(TD Wallet String will be shown here by default)
Password is TDWallet string.
Filter
Schema:
tutorial
Name:
(None)
Object Types
Tables
Views
System Objects
Group:
(All)
Project:
(All)
Data Type Mapping Set:
(Default)
Refresh Current
OK
Cancel

6 A third pane on the right displays the tables contained in the tutorial source system:



You have created a database connection for the source system **Tutorial (OLTP)** and are now ready to proceed to the next step - ***Loading Source Tables*** (see "***1.4 Loading Source Tables***" on page 20)

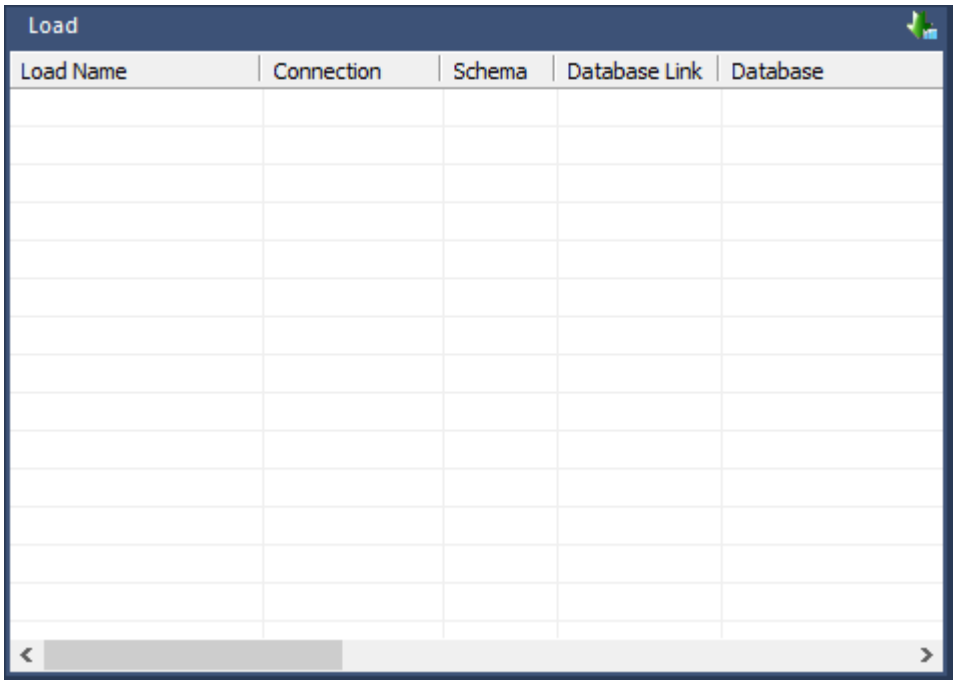
1.4 LOADING SOURCE TABLES

In this step you will load data from the tutorial source system into load tables in the data warehouse.
Dragging and dropping from the source system (using the previously defined connection) will create the metadata.
You will be prompted to create and load the tables which will create the physical tables in the data warehouse and then load the data.

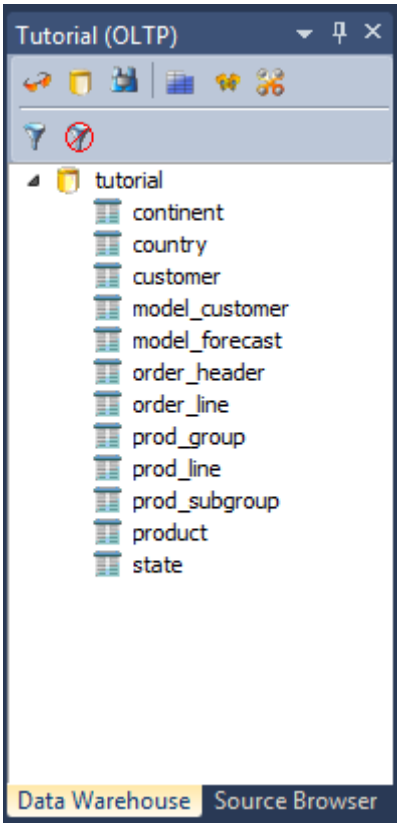
TIP: In order to utilize the drag and drop features, ensure that your source system is displayed in the right pane.

---

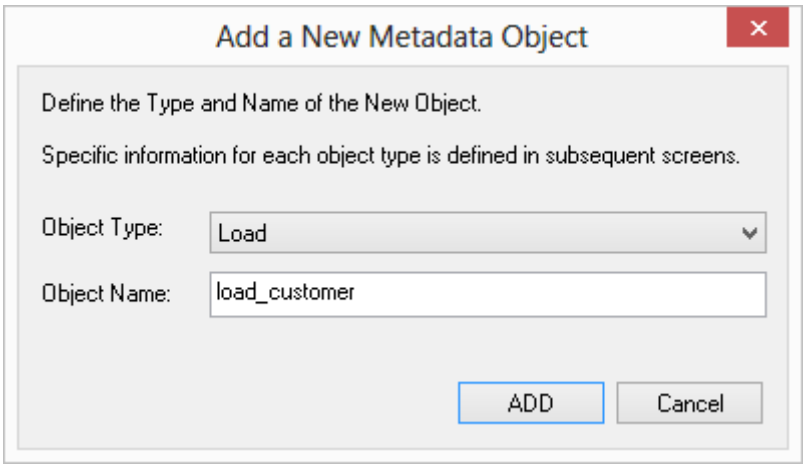
1 Double click on the **Load Table object group** on the Object Tree in the left pane.
The first column heading in the middle pane should read **Load**.



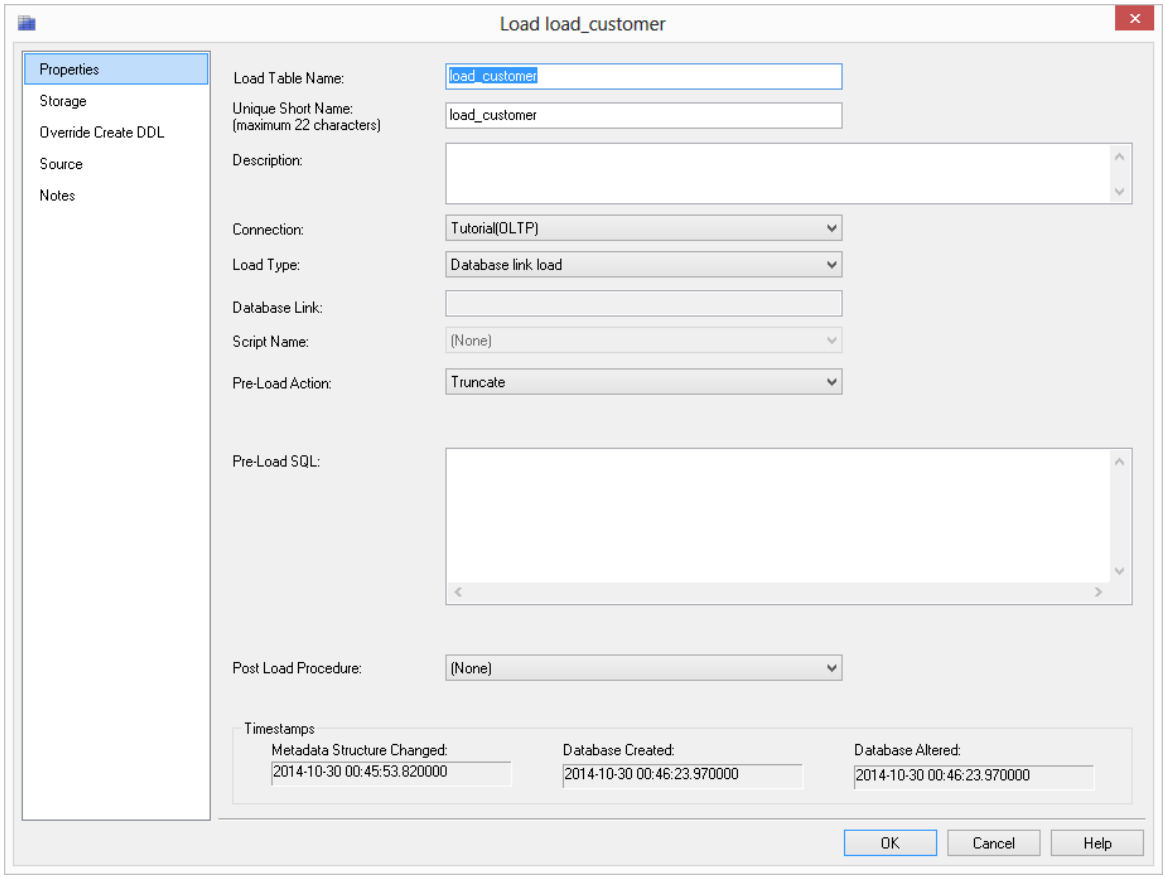
2 Ensure the Object Tree is expanded in the right pane.



3 Click on **customer** and drag this table into the middle pane, placing it anywhere in the pane. A dialog box displays with the name of the object defaulted to **load_customer**.

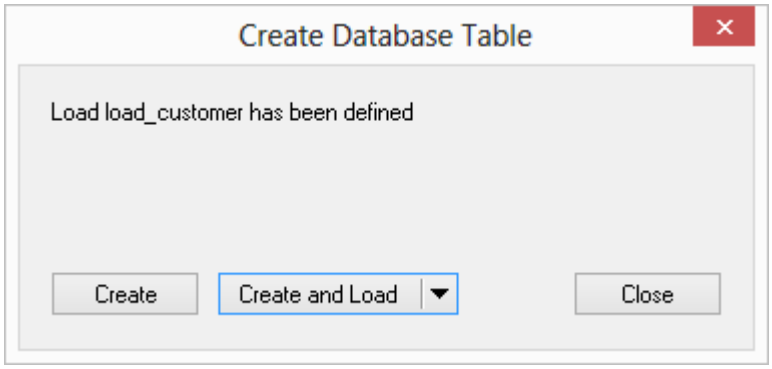


4 Click **Add** and the following table definition will display:

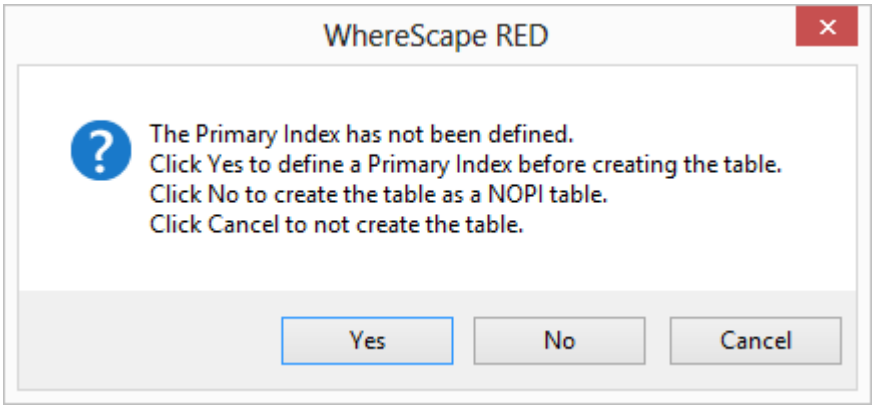


Note: For the purposes of this tutorial, all the necessary details have been created automatically, so click **OK**. See the Loading Data chapter for explanations of the load table fields and options.

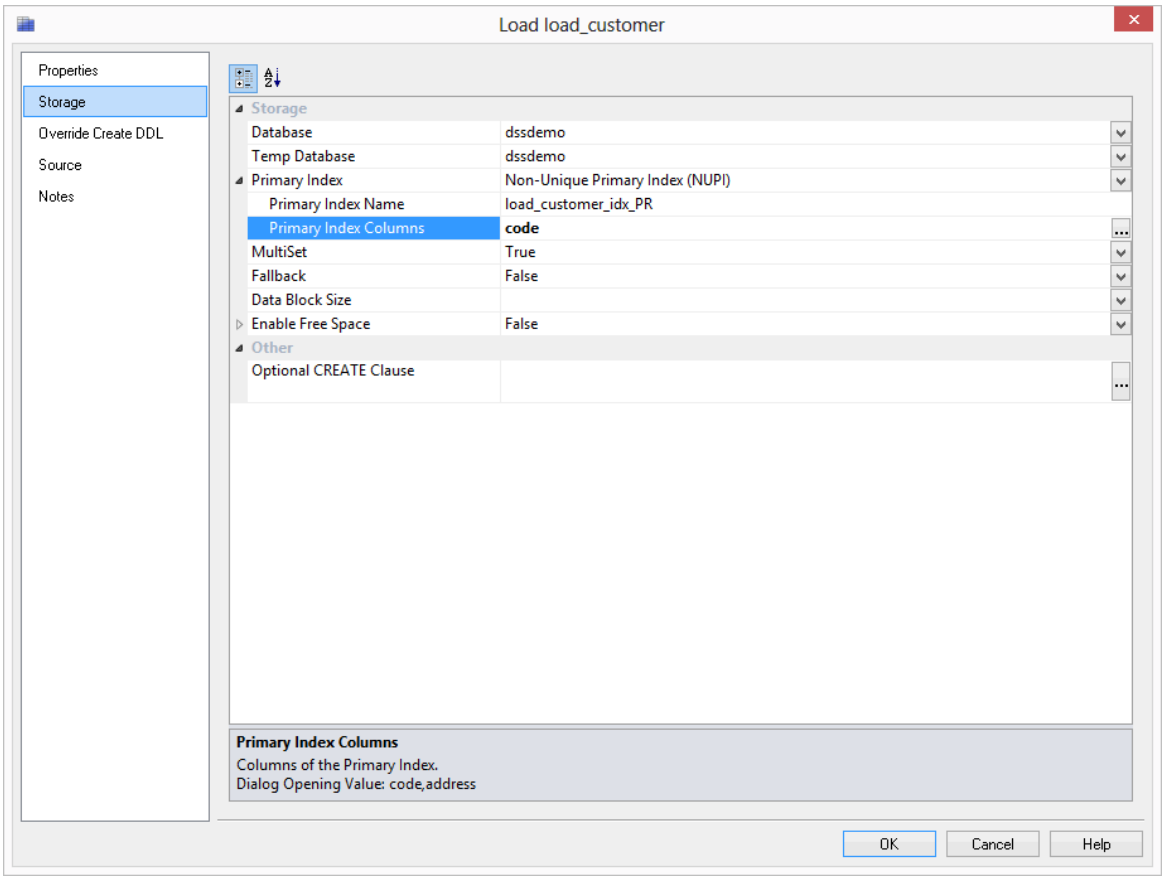
5 A dialog box displays showing that the load table **load_customer** has been defined and asks if you want to create and load the table.
Click **Create and Load**.



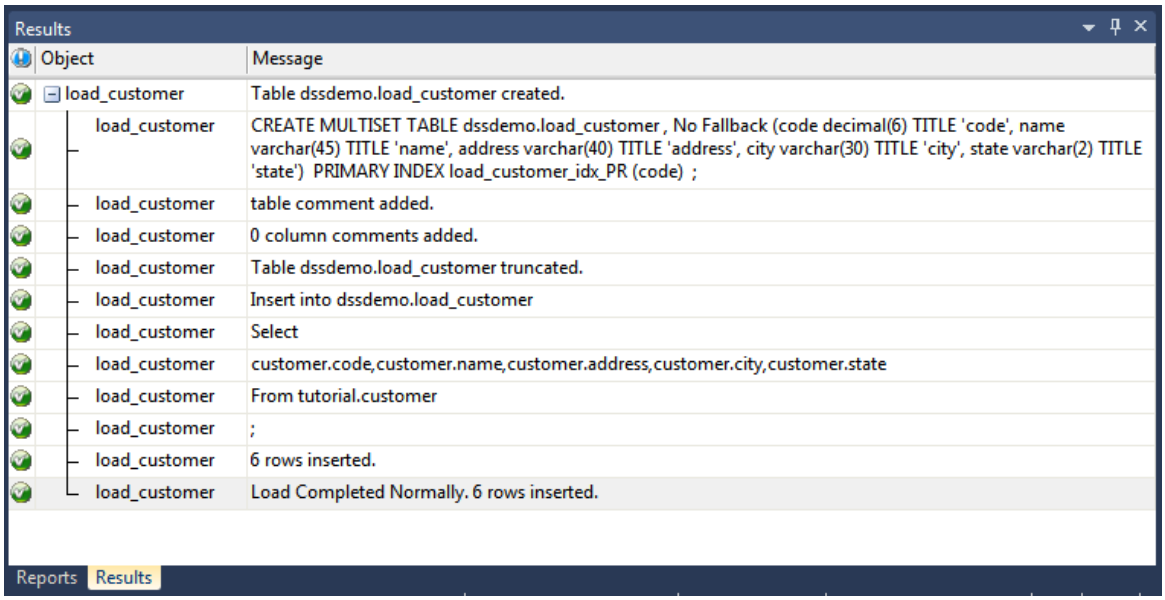
6 Click **Yes** to define a Primary Index.



7 Type **code** as the on the Primary Index Columns field. This will create the physical tables in the data warehouse and load the data.
Click **OK** on the Storage screen.



8 The physical tables will now be created in the data warehouse and the data will be loaded. The results will be posted in the results pane.



9 Notice that the Load Table object group in the left pane now has a dependent/child.

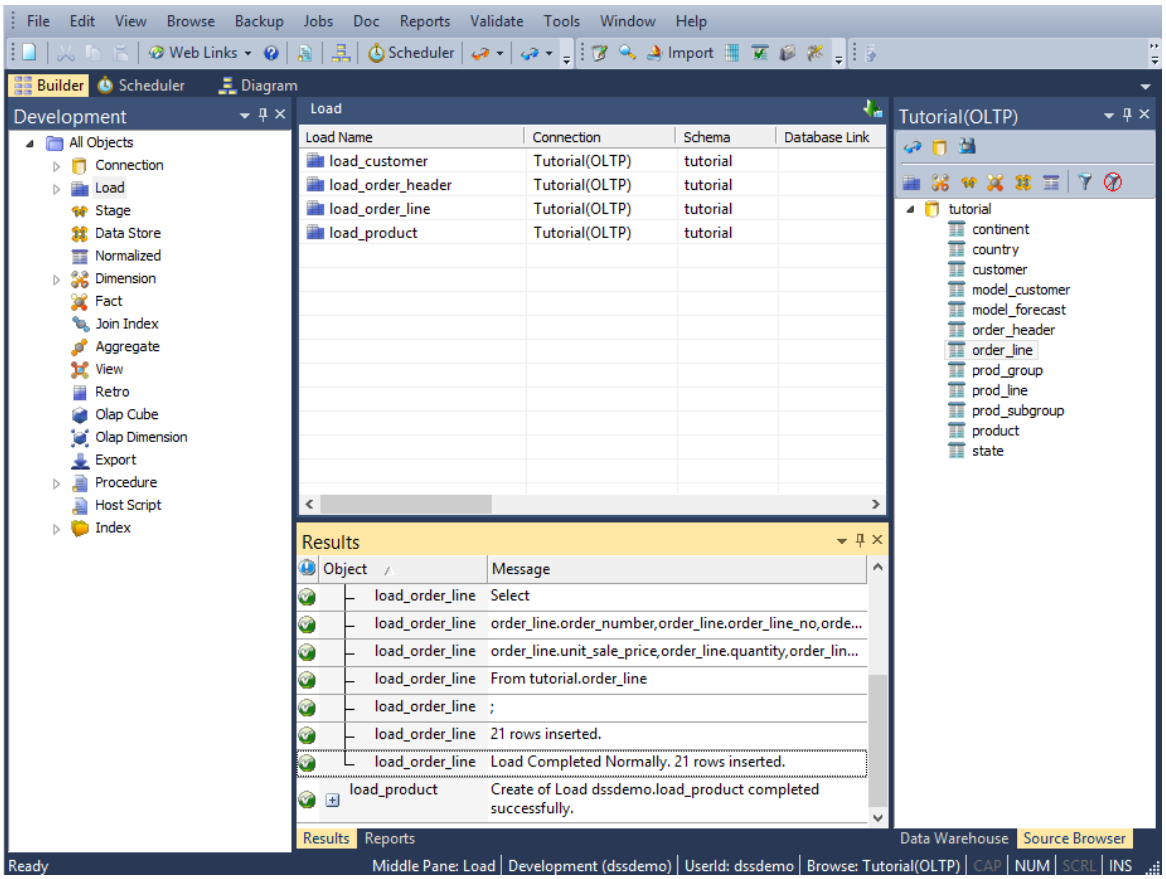
10 Repeat this process (steps 1 - 7) for the source tables **product**, **order_header**, and **order_line**. When selecting the Primary Index for each table, choose:

- **code** for product table
- **order_number** for order_header table
- **order_number** for order_line table

TIP: Remember to double click on the left pane Load Table object group between loading each of the source tables to ensure that you are reassigning the target, rather than adding to the columns in the middle pane.

---

11 Your screen should look something like this:

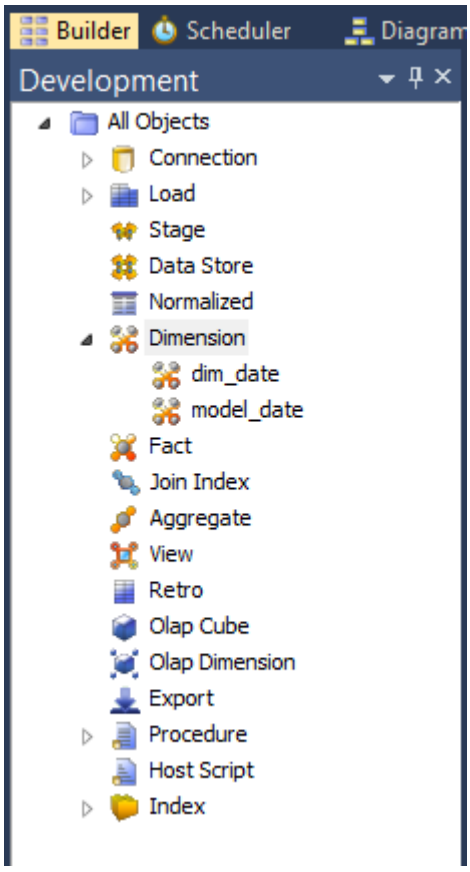


You are now ready to proceed to the next step - ***Building Dimensions*** (see "***1.5 Building Dimensions***" on page 26)

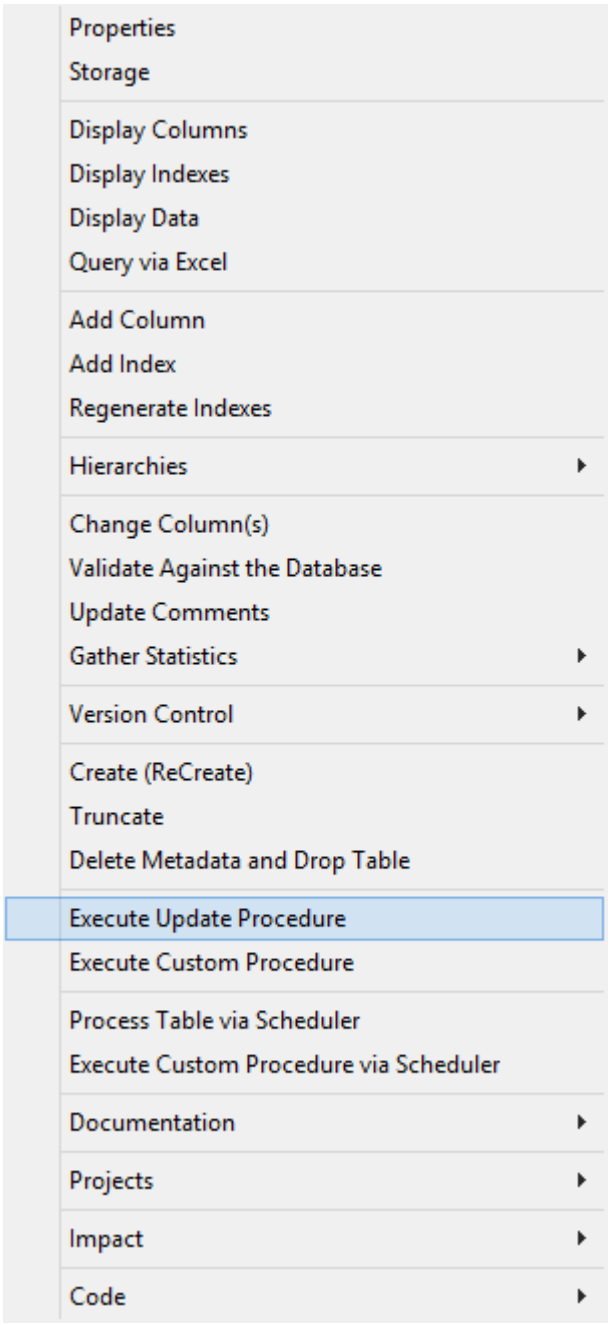
1.5 BUILDING DIMENSIONS

The necessary source tables have been loaded into the data warehouse. Now the dimensions of the data warehouse can be built.
When building dimensions you will be prompted as to how you would like the dimension managed. WhereScape RED generates code for normal, slowly changing and date ranged dimensions.
You will also be prompted for the business (or natural) key of the dimension. This is needed so WhereScape RED knows when to add new dimensional records.

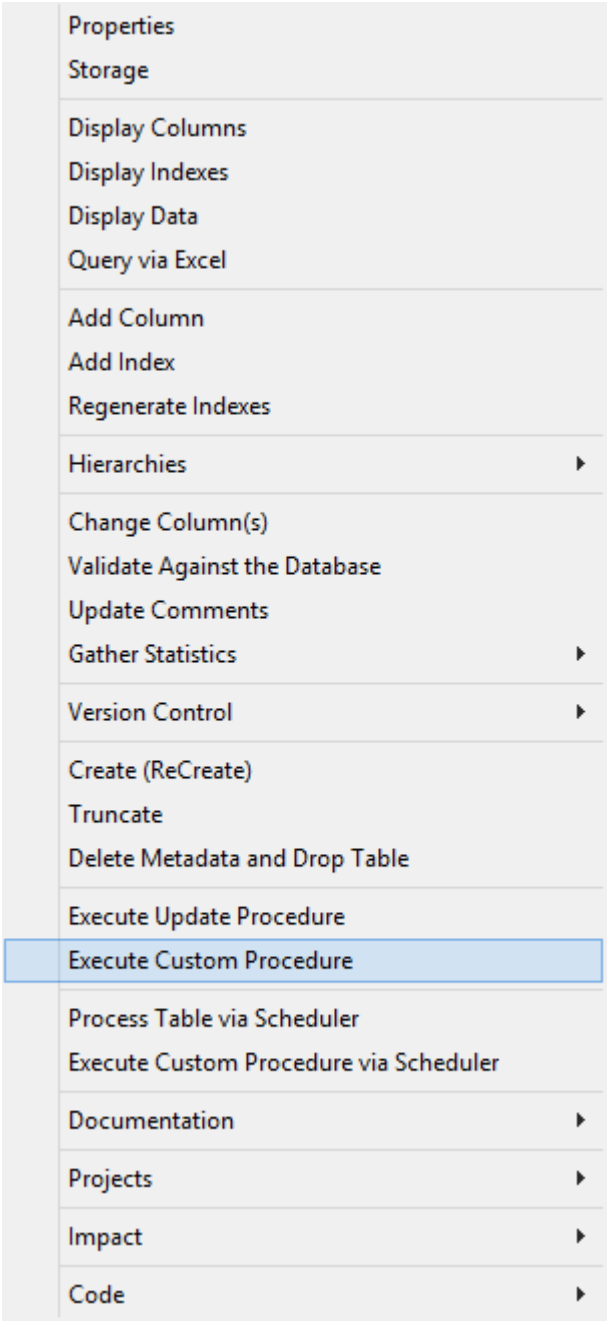
1 Double-click on the **Dimension Table object group** to expand the dimension folder in the left pane.



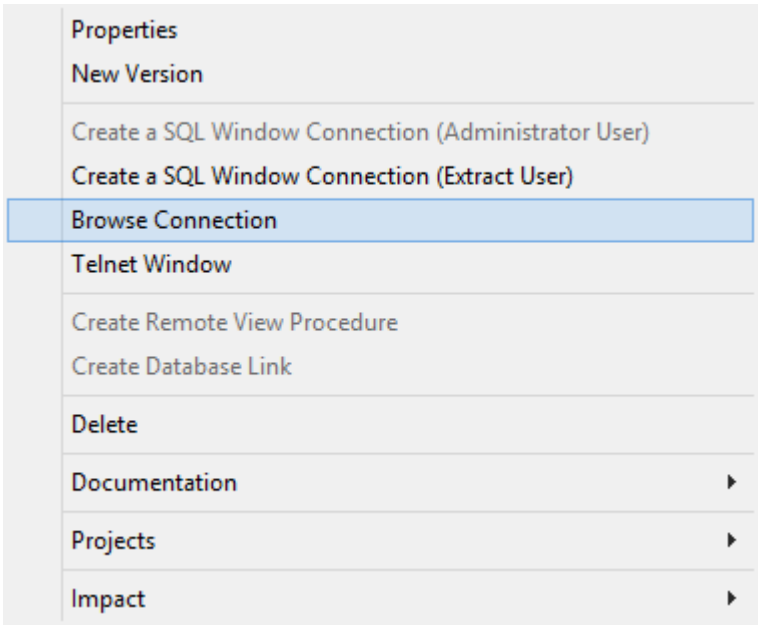
2 Right-click on **dim_date** and select **Execute Update Procedure**.



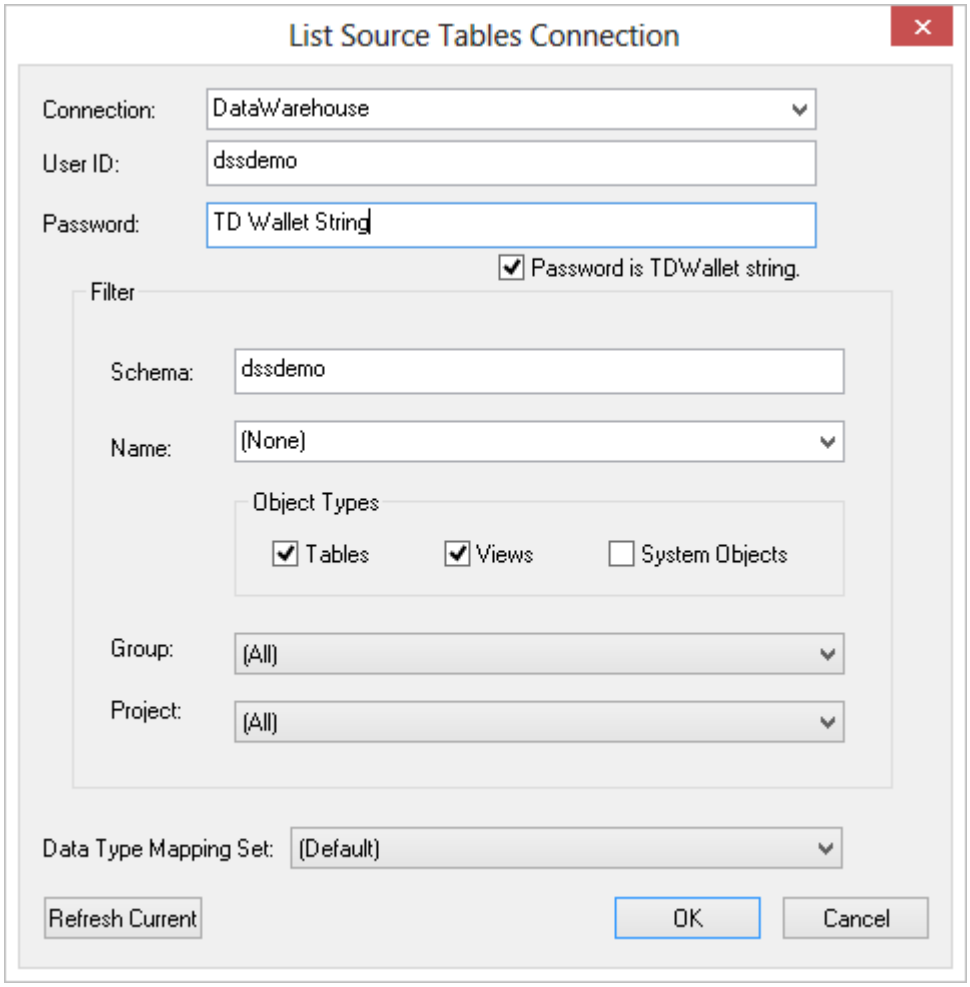
3 Right-click on **dim_date** and select **Execute Custom Procedure**.



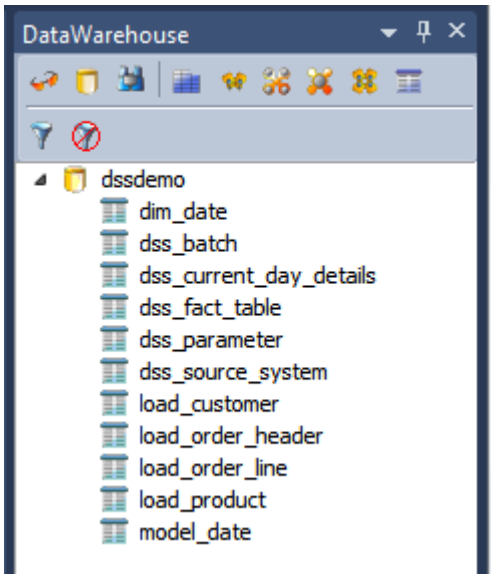
4 Right-click on the **DataWarehouse** connection in the left pane and select **Browse Connection**.



5 The Source Tables Connection will display either your encrypted password or your TD Wallet string depending on the connection properties database credentials' option chosen.
Click **OK**.

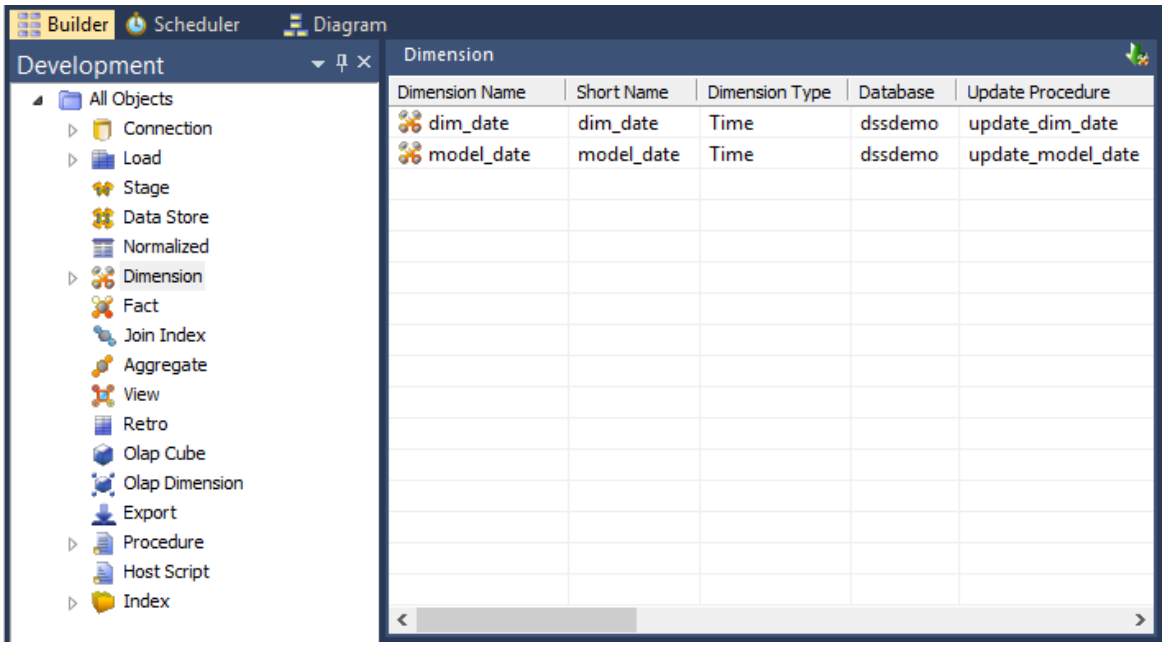


6 This shows the data warehouse tables and views in the right pane.



Note: From this point on, all work is performed within the data warehouse.

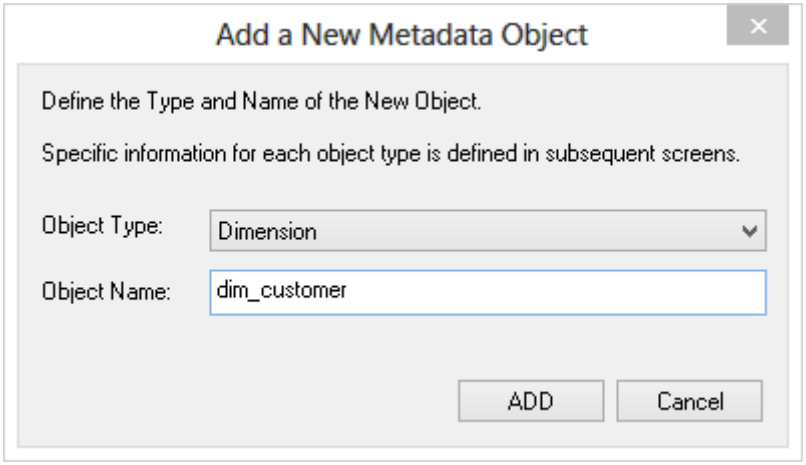
7 Double click on the **Dimension object group** in the object tree in the left pane.
The first column of the middle pane now reads **Dimension**.



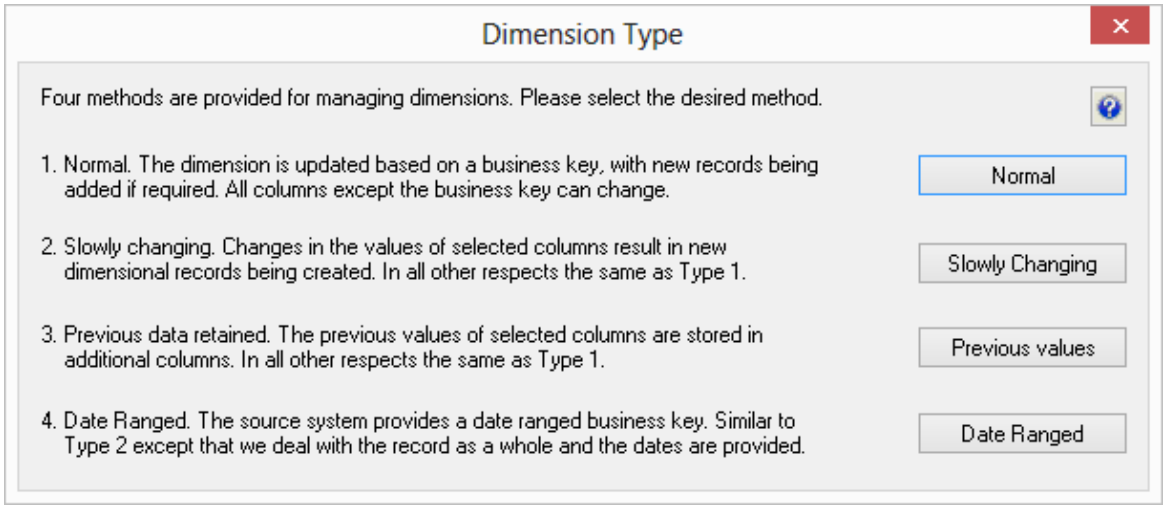
Note: You will see that some dimensions have already been created for you.

8 Click and drag the **load_customer** table from the data warehouse schema in the right pane into the middle pane.

A dialog box displays defaulting the name of the object to **dim_customer**.
Click **ADD.**

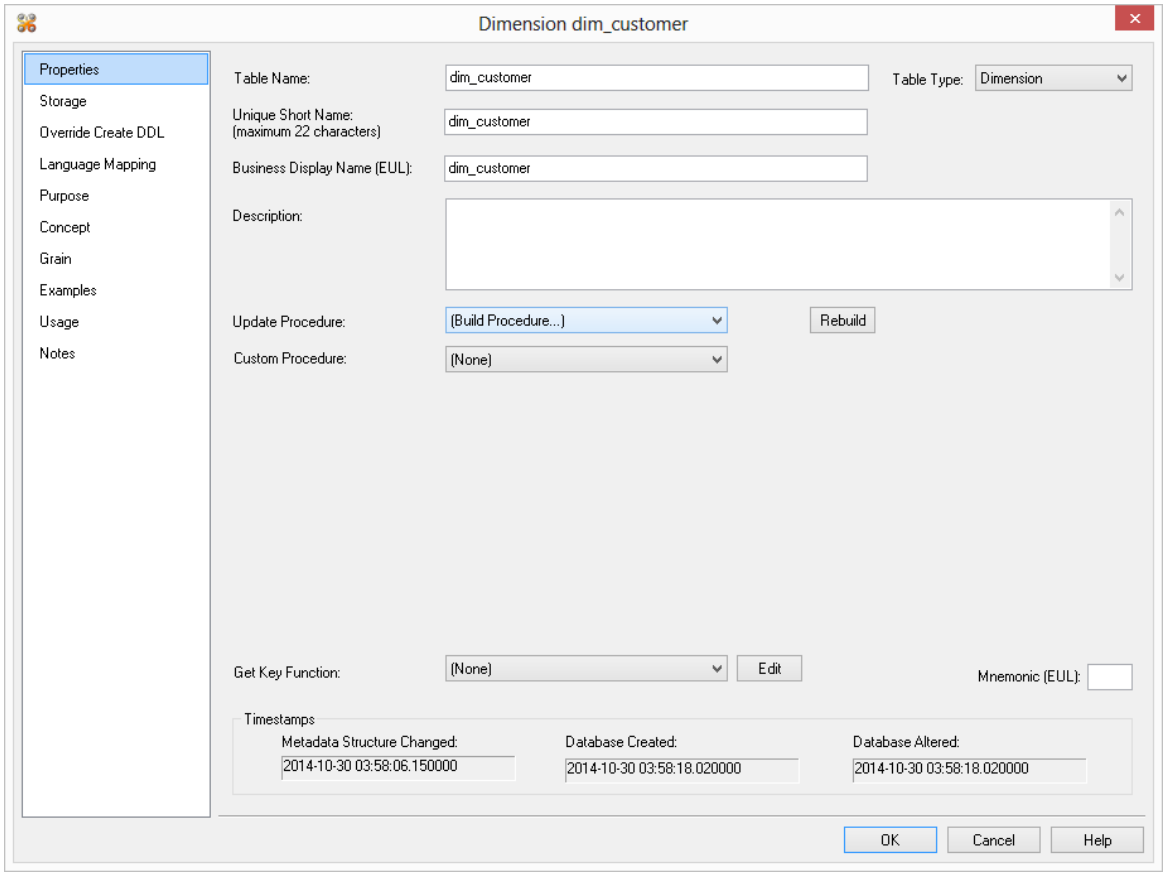


9 A Dimension Type dialog is displayed.
Click **Normal**.

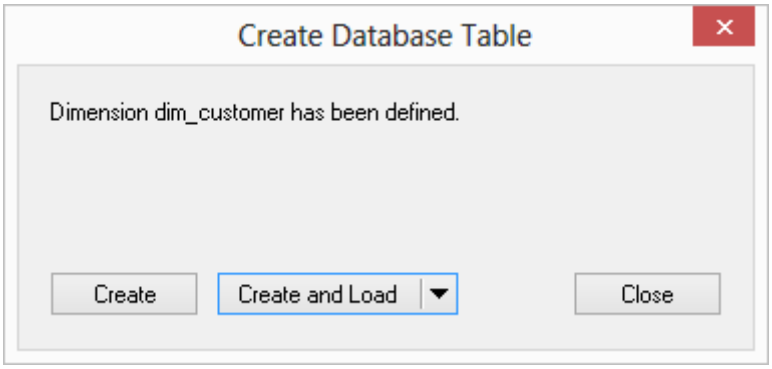


10 A table definition displays with all the necessary defaults completed.

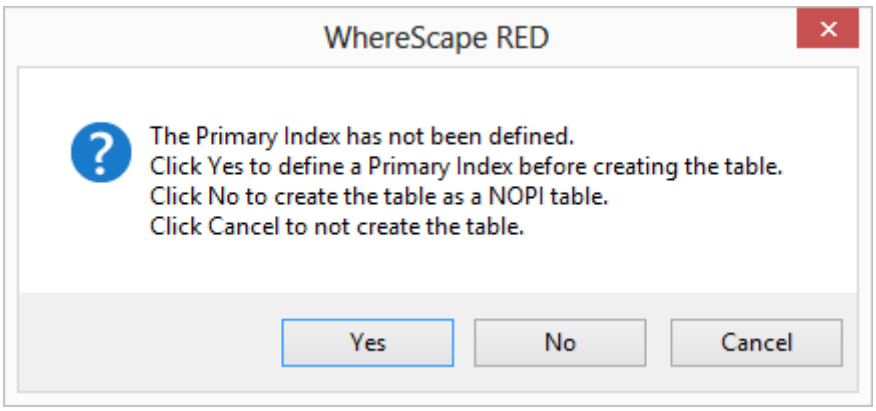
- Make one change - Select **(Build Procedure...)** from the Update Procedure drop-down list box - this will generate procedures to get surrogate (artificial) keys based on the business key and to update the dimension.
- Click **OK**.



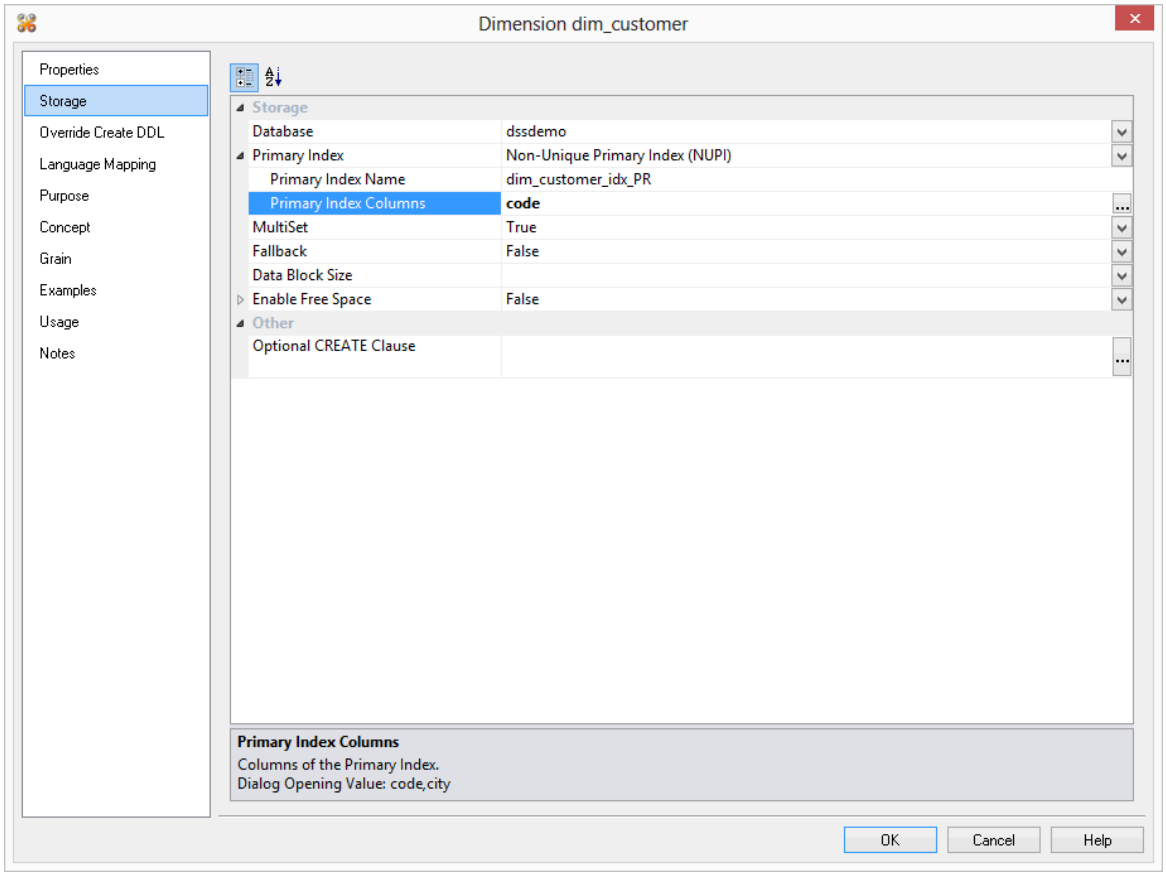
11 A dialog box displays confirming that the dimension table **dim_customer** has been defined and asking if you want to create and load the table.
Click **Create and Load**.



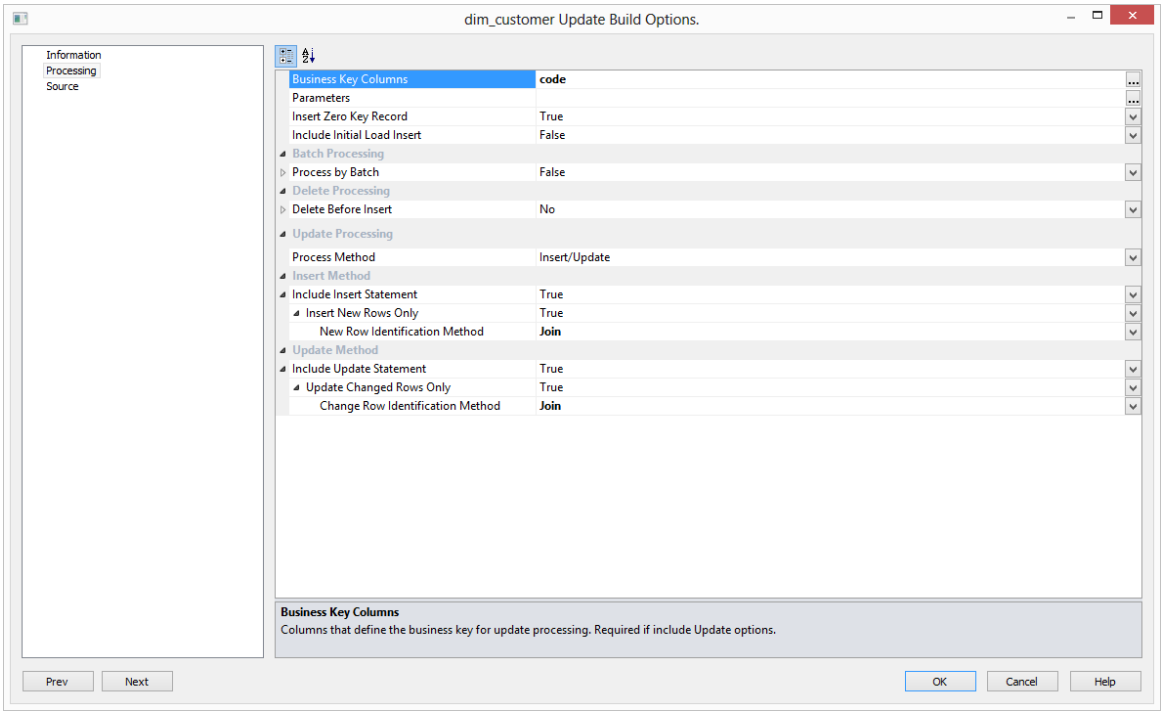
12 Click **Yes** to define a Primary Index.



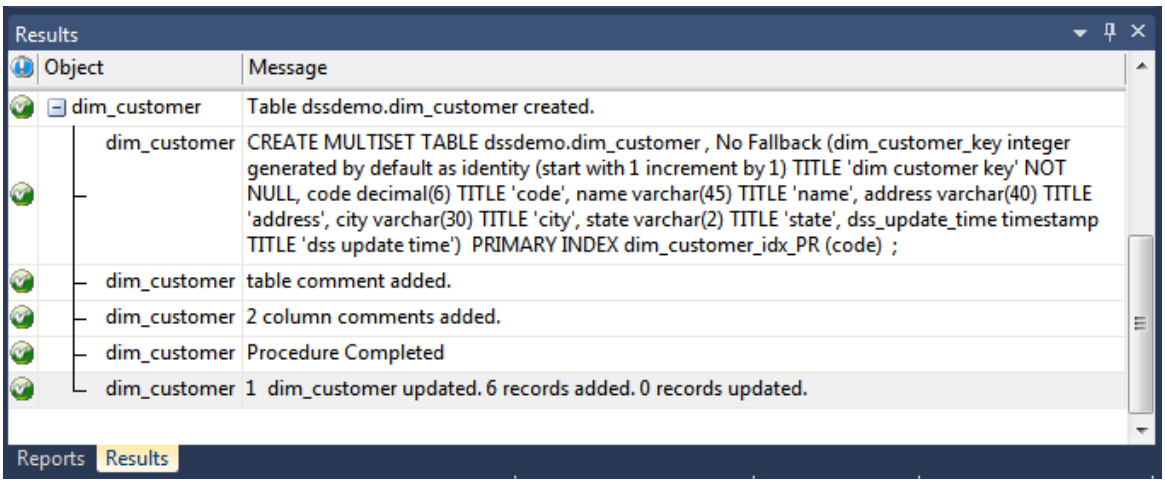
13 Type **code** as the Primary Index Column and click **OK** on the Storage screen.



14 Define the Business Key as below when the next dialog appears. The business (natural) key is the unique identifier for the dimensional record.
Type **Code** and and click **OK**.



15 Notice that the results will be posted in the Results pane.

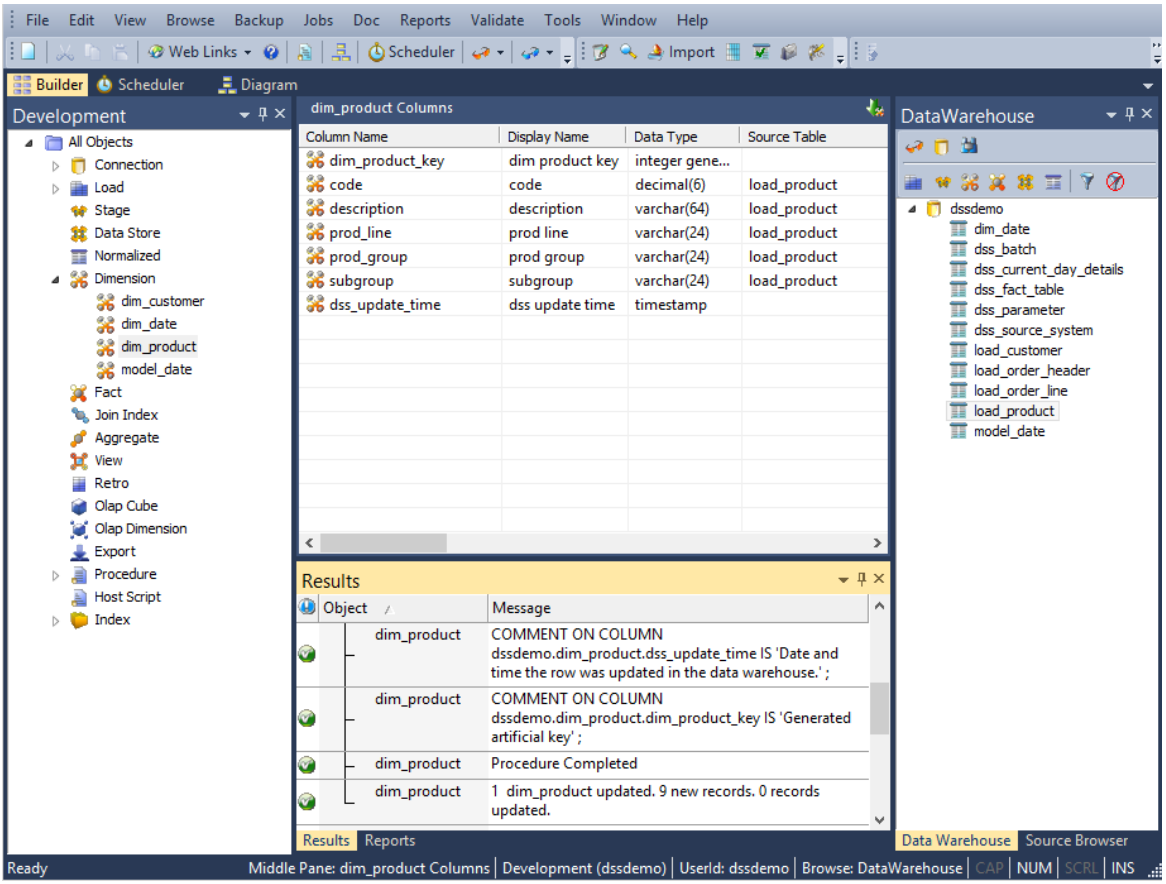


16 Repeat this same process (steps 7 through 16) for the load table **load_product**. The Primary Index and Business key will be **code**.

TIP: Remember to double-click on the left pane Dimension Table object group between loading each of the above dimension tables.

17 Double click **Dimension** in the left pane.

18 The WhereScape RED screen should look like this:

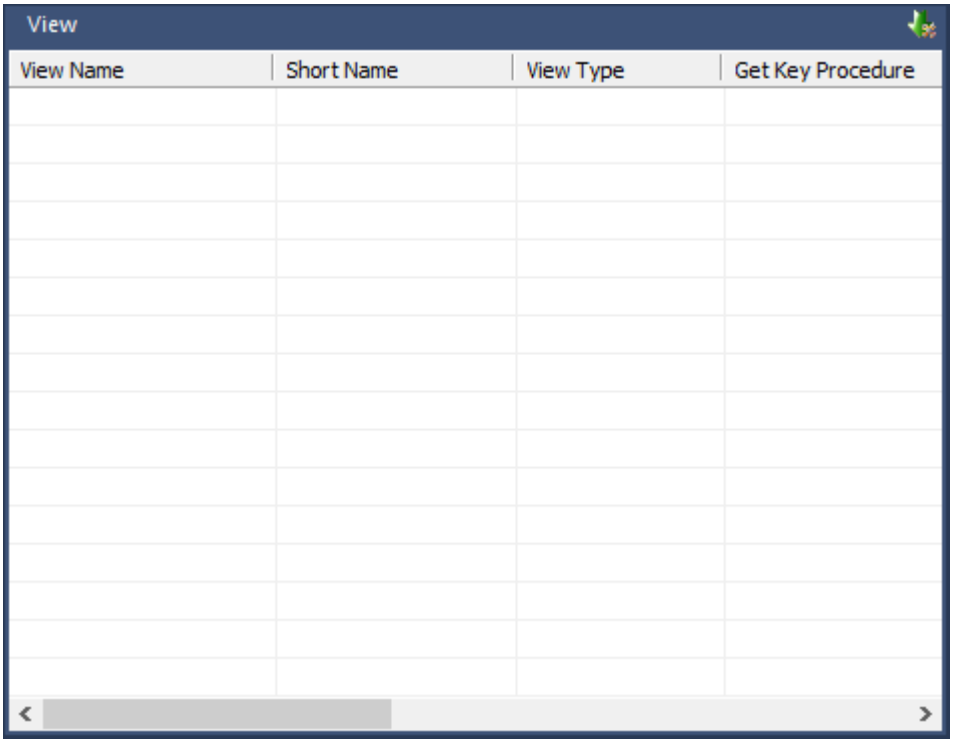


You are now ready to proceed to the next step - ***Creating Dimension Views*** (see "***1.6 Creating Dimension Views***" on page 37)

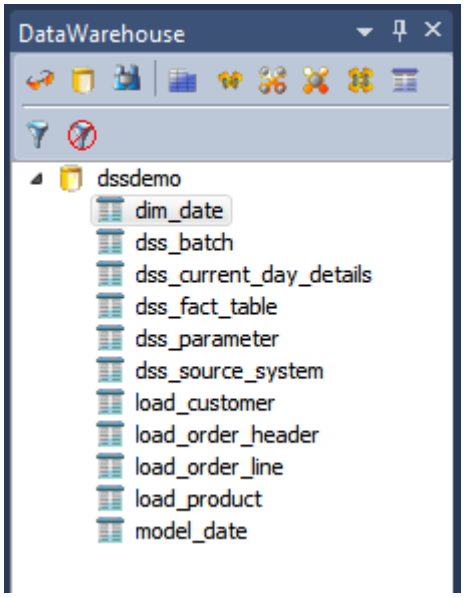
1.6 CREATING DIMENSION VIEWS

A dimension view is a database view of a dimension table. It may be a full or partial view. It is typically used in such cases as date dimensions where multiple date dimensions exist for one fact table.
In this step you will create dimension views from an existing dimension. In many cases dimension views are built as part of the end user layer, but creating them in the data warehouse means they are available regardless of the end user tools used. This process is essentially the same as creating a dimension, but you are creating a view of an existing dimension, in this instance, dim_date.

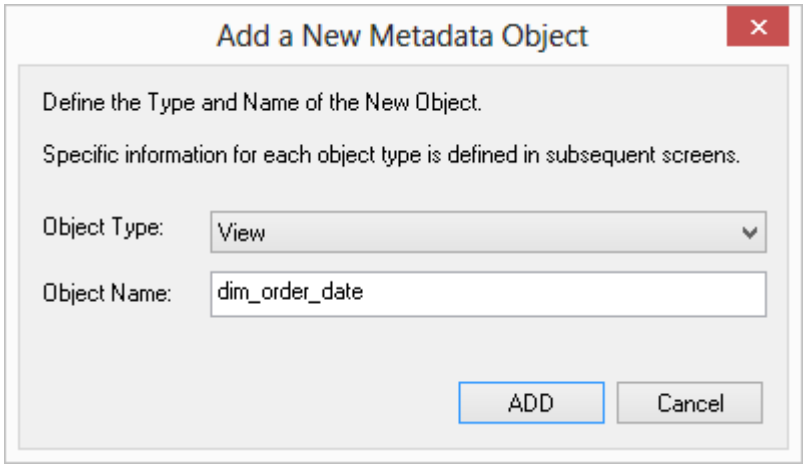
1 Double-click on **View** in the left pane. The first column heading in the middle pane should read **View**.



2 Click and drag **dim_date** from the right pane into the middle pane.

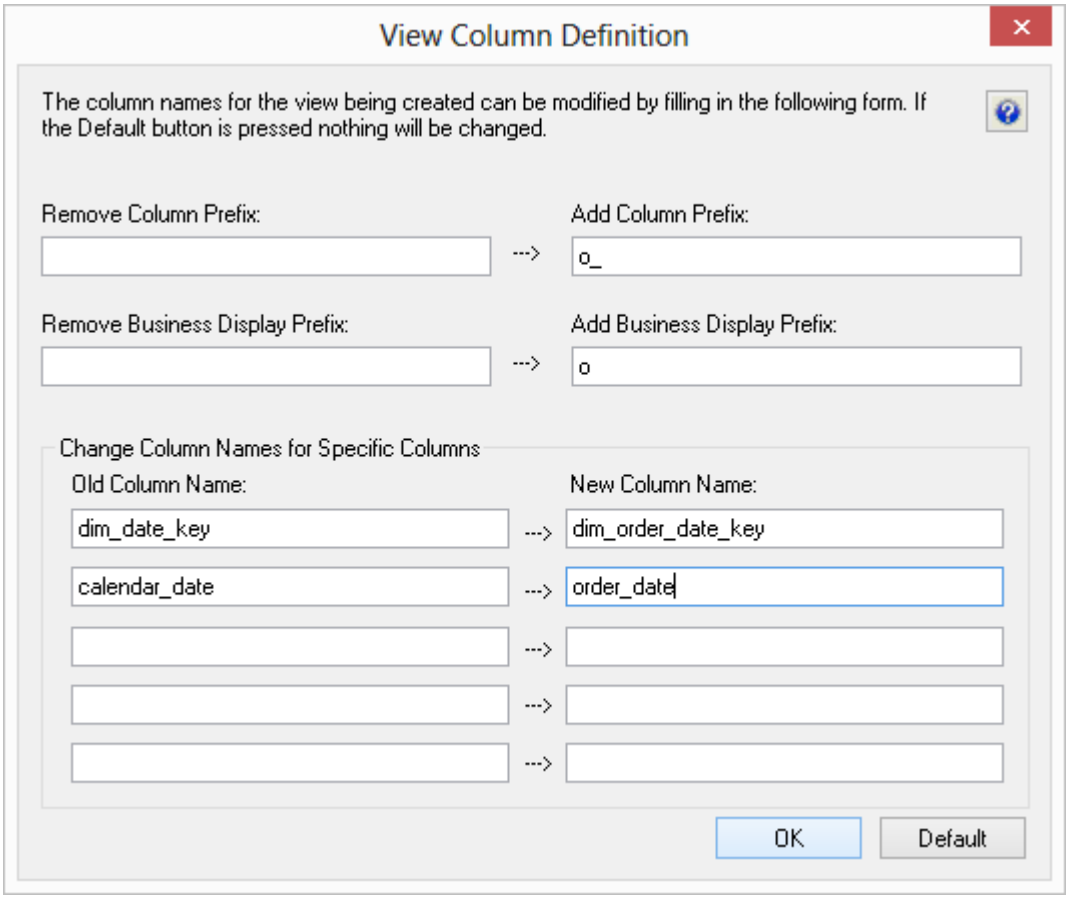


3 The dialog box that displays defaults the object type to a dimension view, and names the view **view_date.**
We want to create two dimension views from the same source, dim_date, so we need to change this dimension view name to one that is more meaningful, specifically **dim_order_date.**

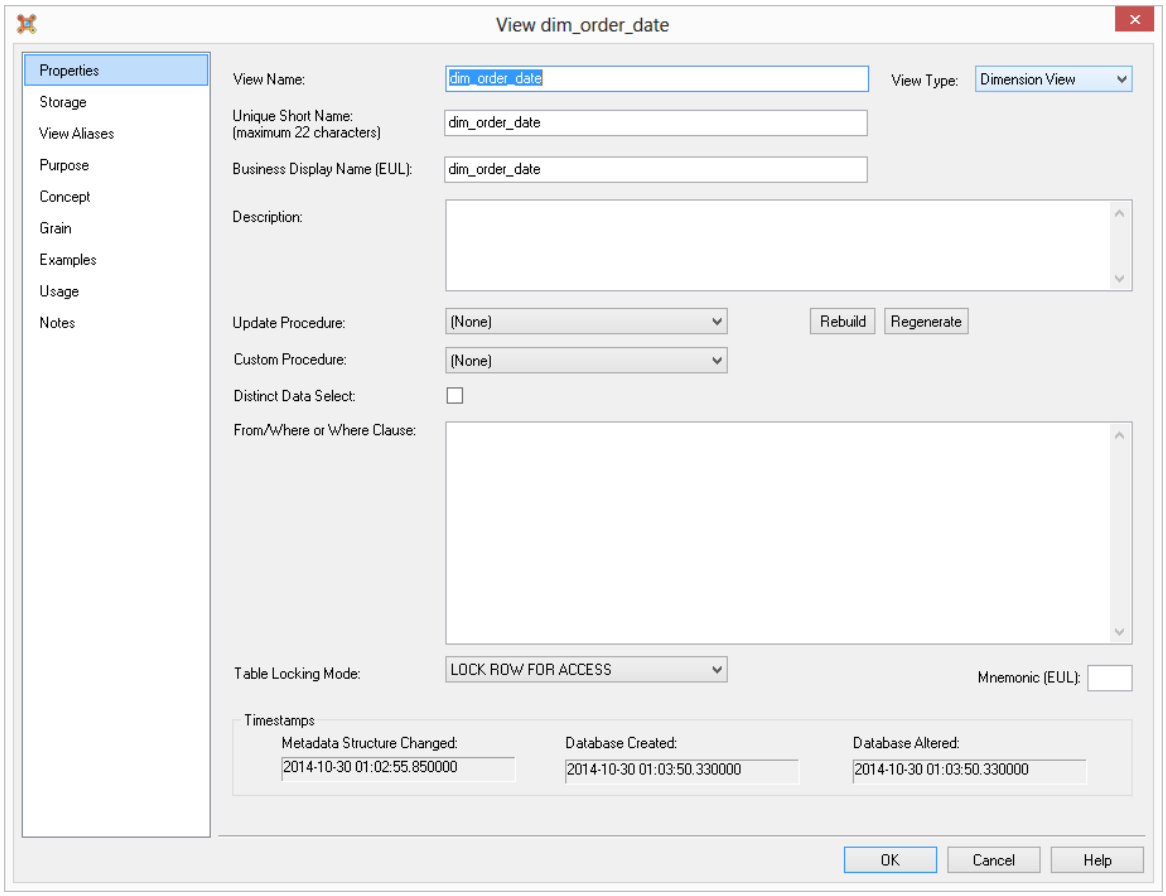


4 Make this change and click **ADD**.

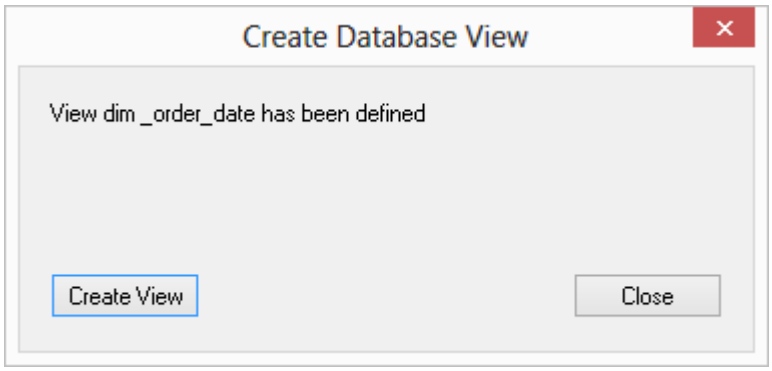
5 Make the following changes to the Column Definition dialog and click **OK**.



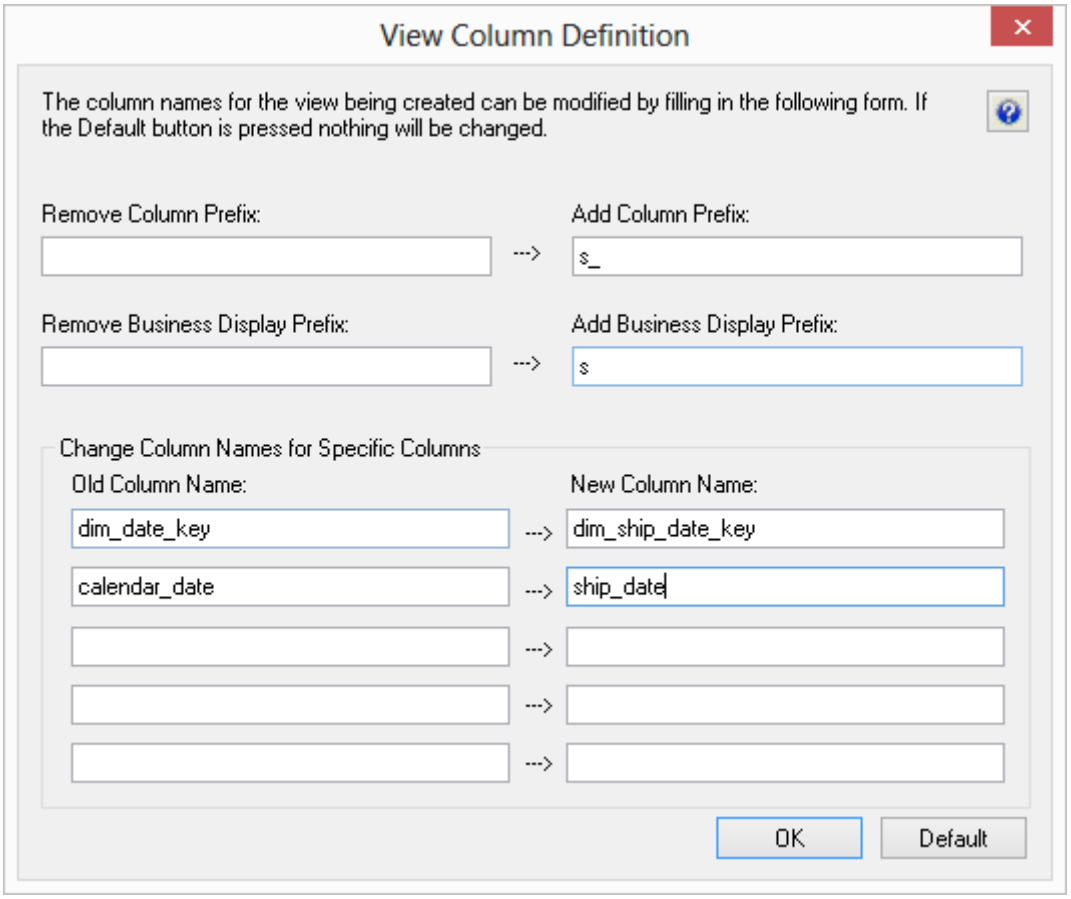
6 On the dim_order_date Properties dialog, change the View Type to **Dimension View** and click **OK**.



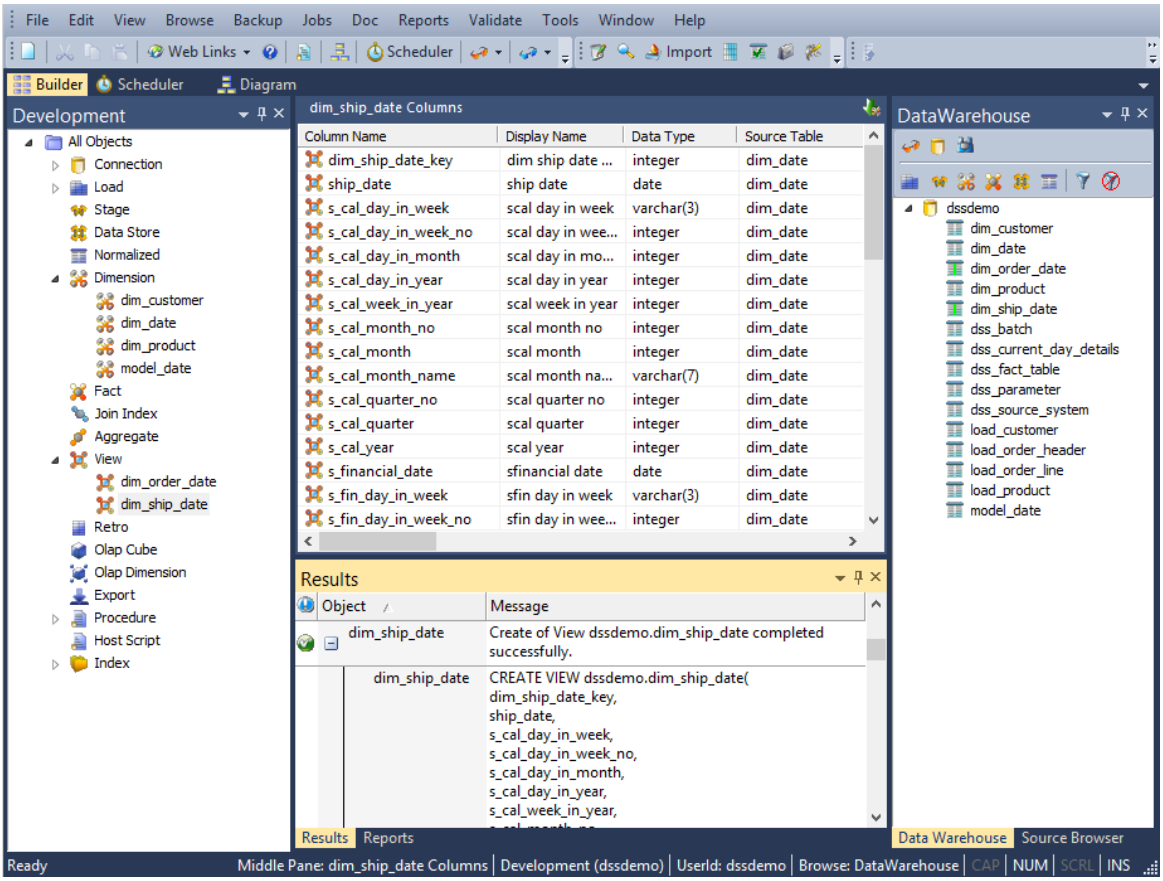
7 Click **Create View**.



8 Repeat steps 1-7 to create the dimension view **dim_ship_date**. On the column Definition dialog, make the following changes:



9 Click in the right pane and press F5 to refresh the Data Warehouse table view in the right pane. Your screen should look something like this:



You are now ready to proceed to the next step - ***Defining the Staging Table*** (see "***1.7 Defining the Staging Table***" on page 43).

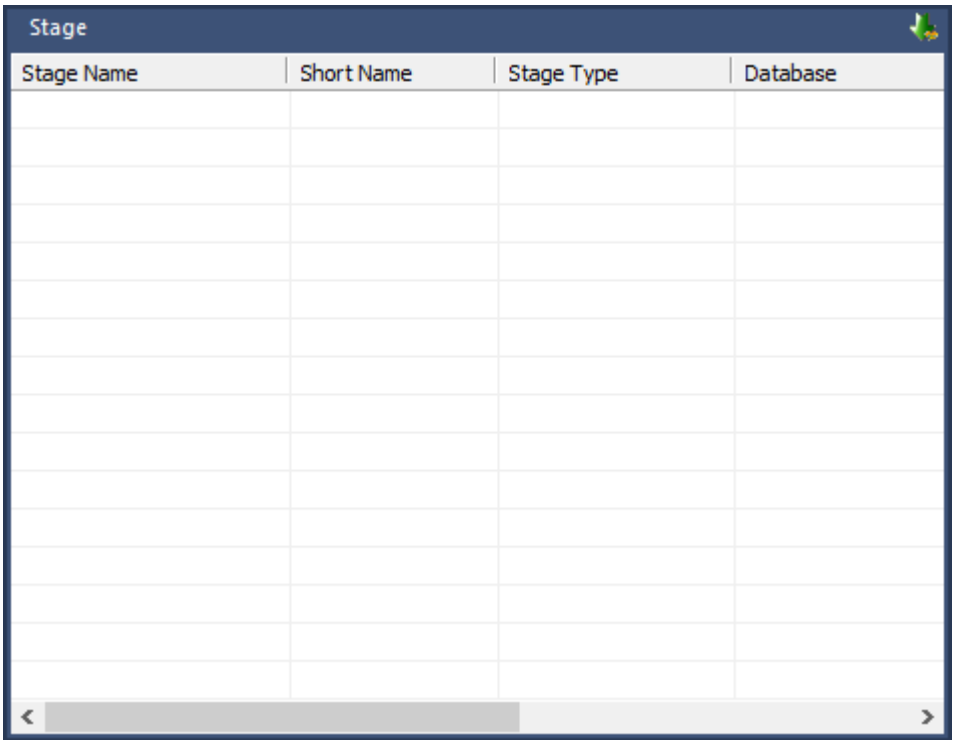
1.7 DEFINING THE STAGING TABLE

In this step you will create a stage table from two load tables. A stage table is used to build the format of the fact table, and generally contains changed or new data that will be added to the fact table. As stage tables contain dimensional keys, they should be defined after the dimensions.

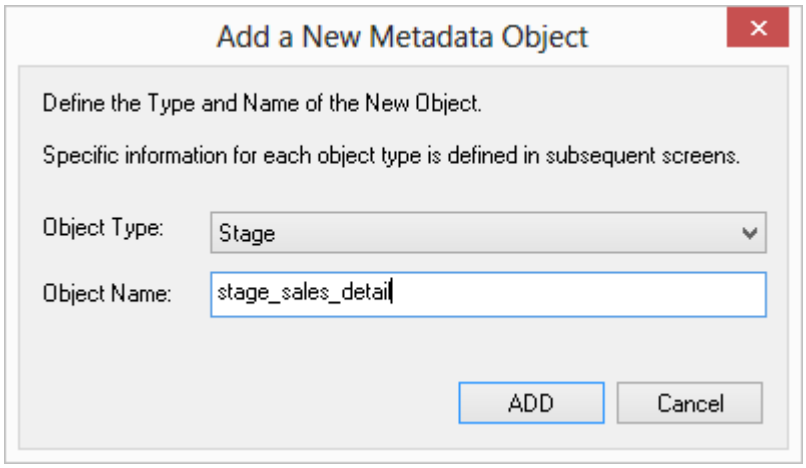
NOTE: The source of data for the stage table will be the load tables load_order_line and load_order_header.

---

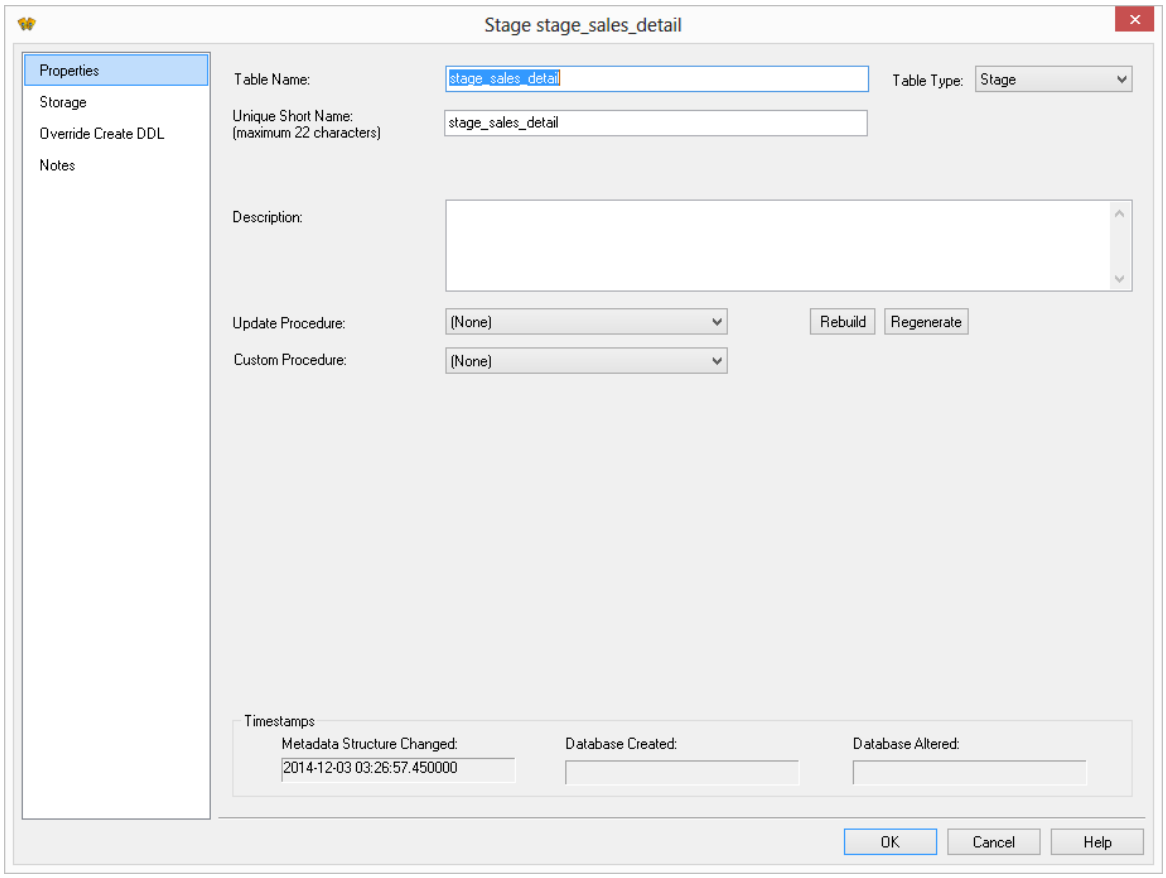
1 Double click on the Stage Table object group in the object tree in the left pane to create a stage table target.
The first column heading in the middle pane reads Stage.



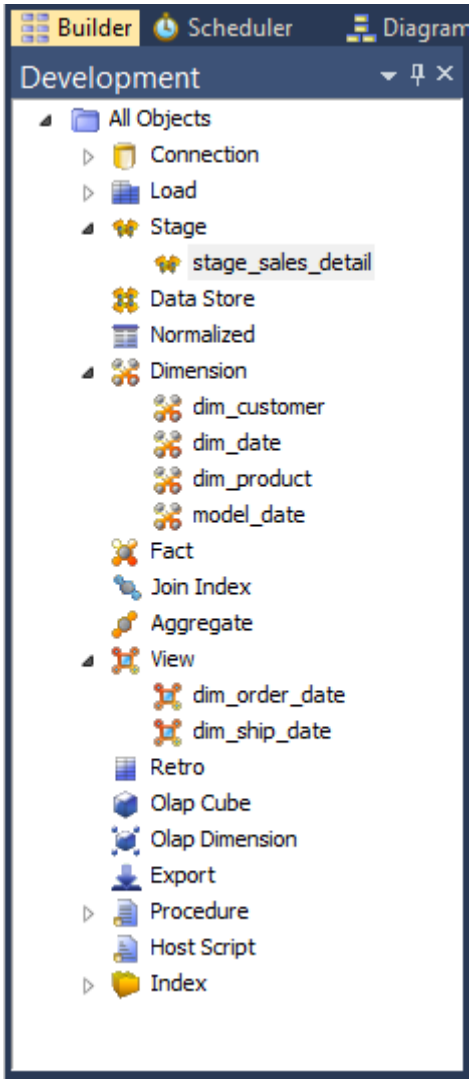
2 Click and drag the load_order_header table from the right hand pane data warehouse schema. Drop it in the middle pane.
A dialog box displays defaulting the name of the object to stage_order_header.
To make it a more meaningful name, change the name of the object to **stage_sales_detail** and click **ADD**.



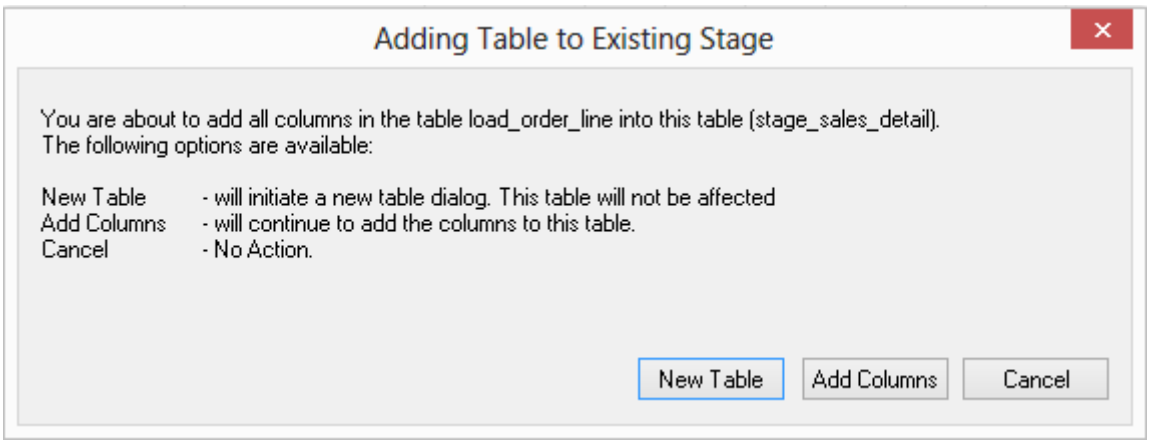
3 A table definition displays with all the required defaults completed.
Click **OK**



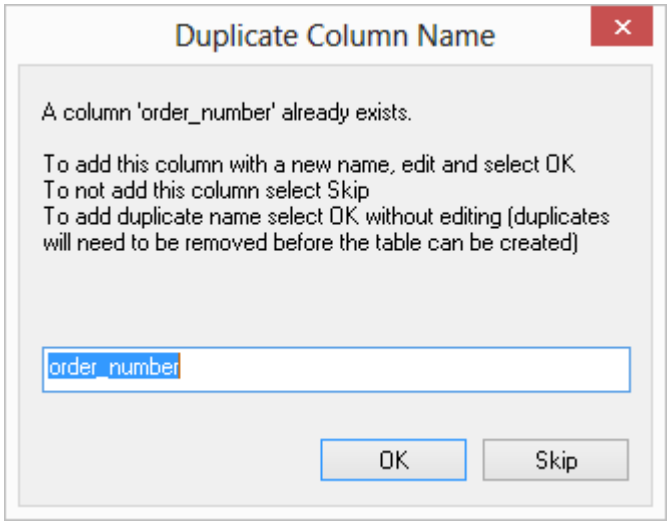
4 The Stage Table object in the left pane now has a dependent/child.



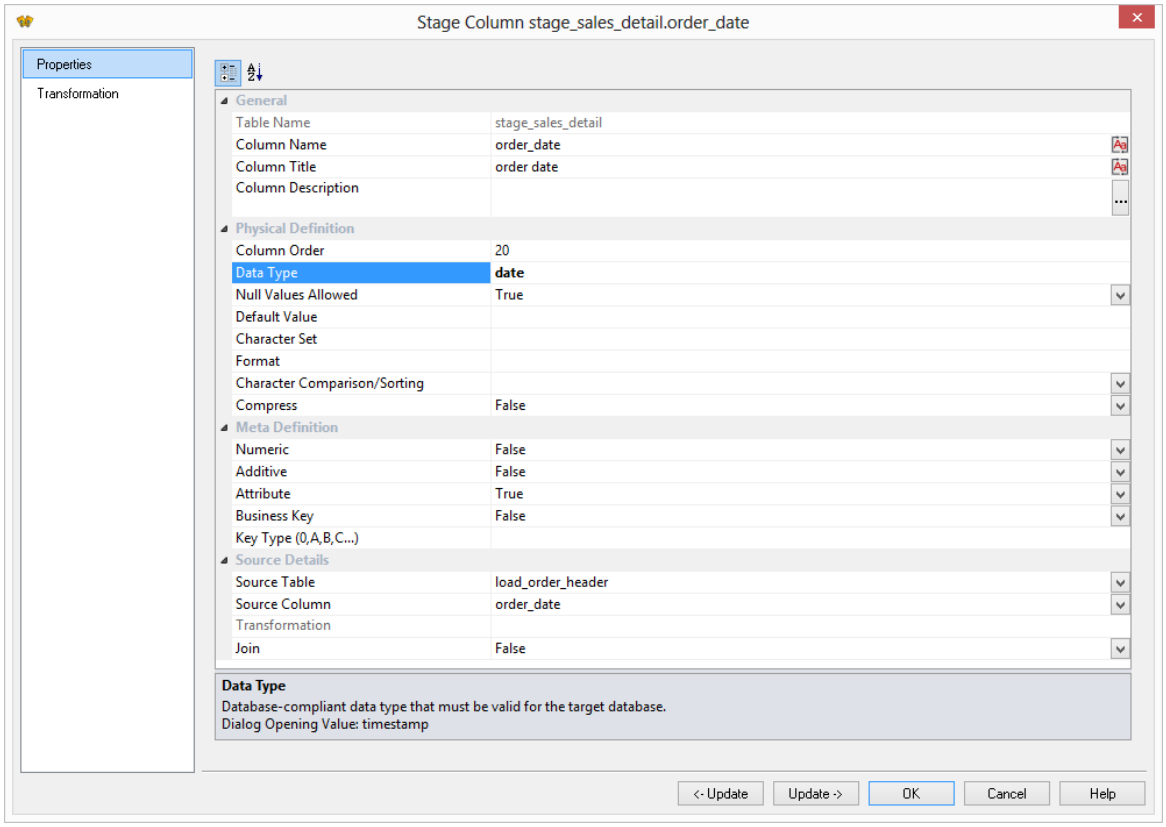
5 To add the remaining information from the second load table, click on stage_sales_detail in the left pane. Next drop load_order_line from the right pane and into the middle pane.
A message is displayed with options to create a 'New Table' or to 'Add Columns'.
Click **Add Columns**.



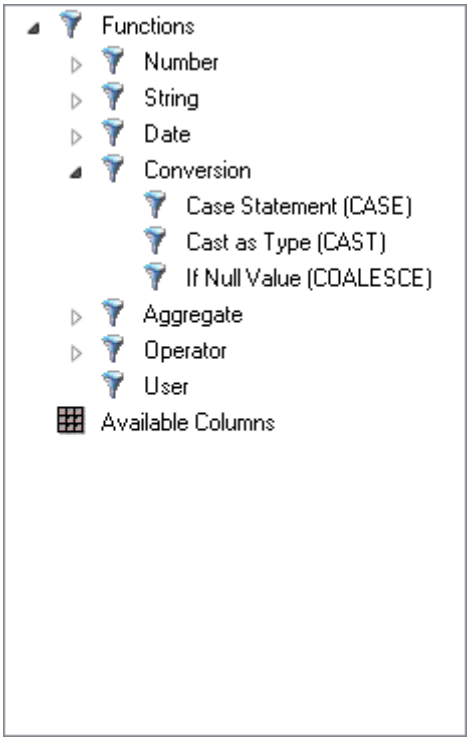
6 WhereScape RED detects duplicate columns. As both load_order_header and load_order_line have the order number field, the following is displayed.
Click **Skip** to exclude the second instance of order_number - this combines data from two load tables (load_order_header and load_order_line) into one stage table.



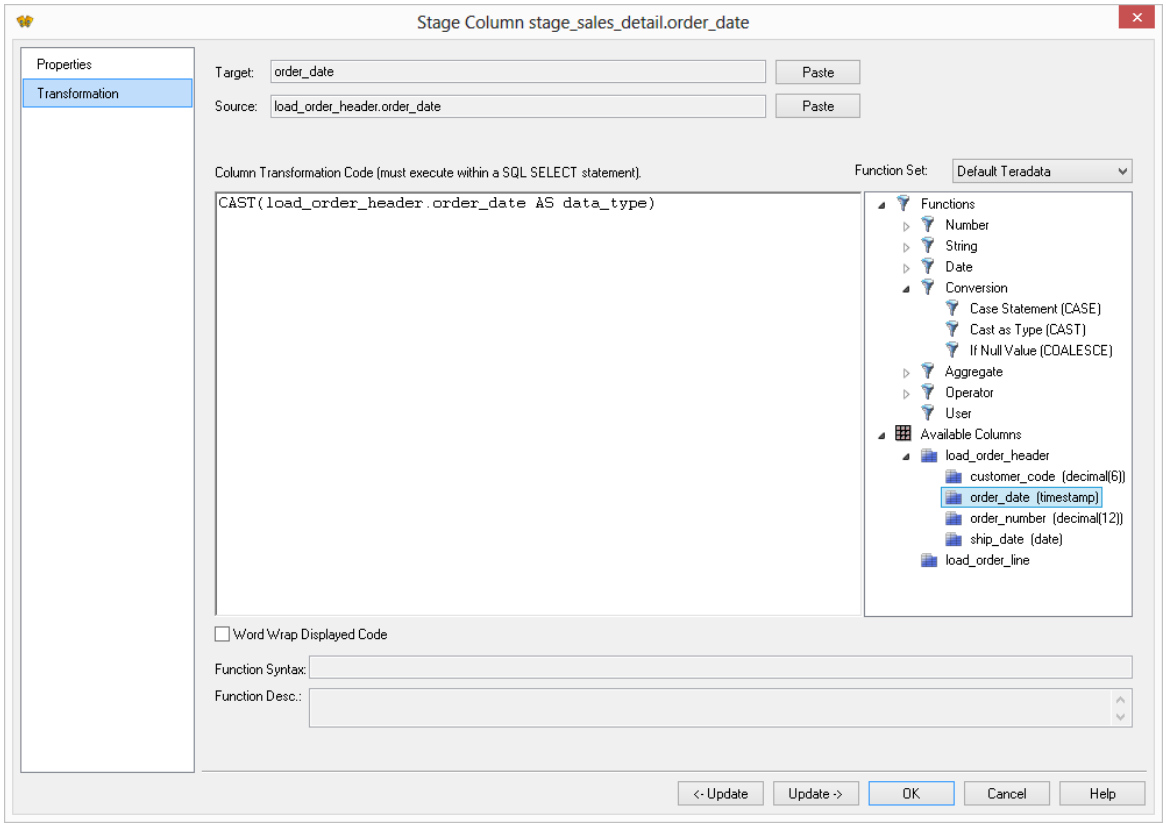
7 In the middle pane, double-click on order_date to bring up the Properties screen for that column and change the Data Type to date.



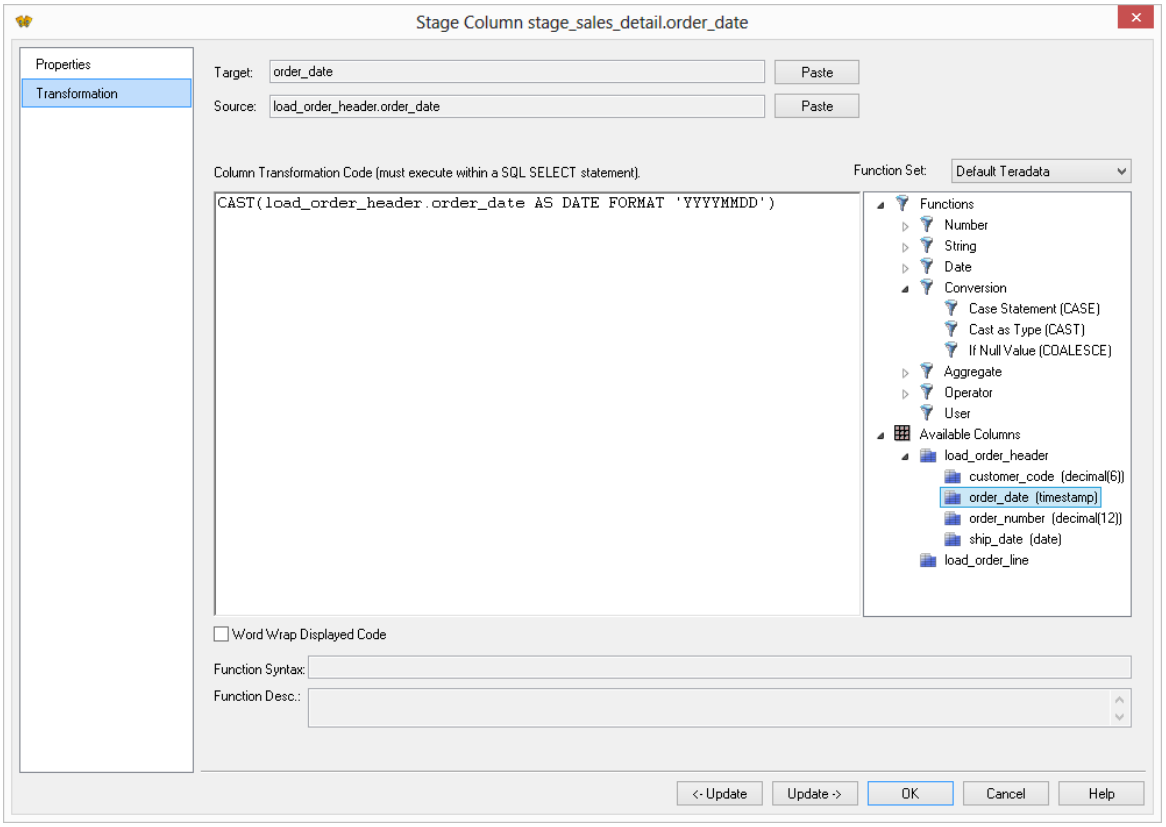
8 Click on the 'Transformation' tab, double-click on Functions, double-click on Conversion and then double-click on Cast as Type (CAST) to add the Cast function to the 'Column Transformation code' in the middle pane.



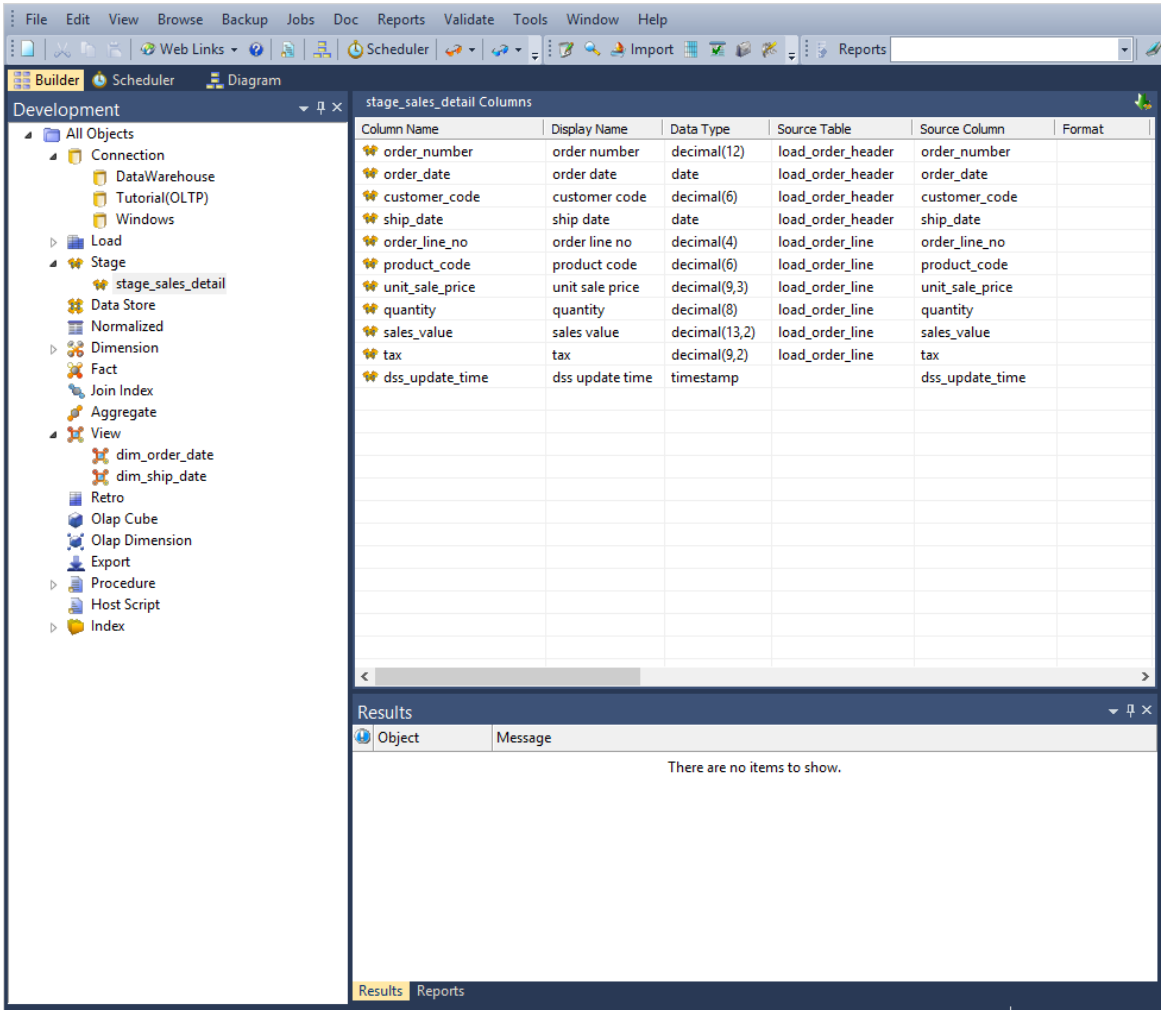
9 Double-click on Available Columns, load_order_header and then order_date to enter the correct column in the 'Column Transformation Code' in the middle pane.



10 Finally, replace 'data_type' with DATE FORMAT 'YYYYMMDD' and click OK.



Your screen should look something like this:



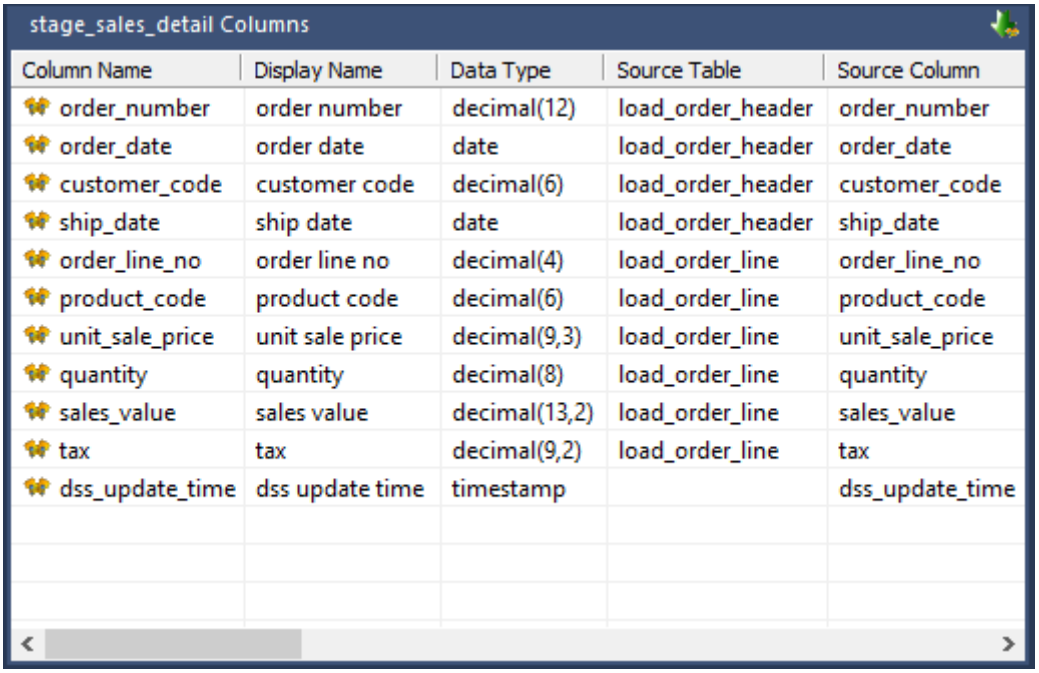
In the middle pane under Source Table you can see the source of each of the columns.

You are now ready to proceed to the next step - ***Including Dimension Links*** (see "***1.8 Including Dimension Links***" on page 51).

1.8 INCLUDING DIMENSION LINKS

The dimension links that allow us to create the fact-like star schema now need to be included:

1 In the left pane, click on the **stage_sales_detail** table in the Stage Table object group. The middle pane should display the contents of this stage table.

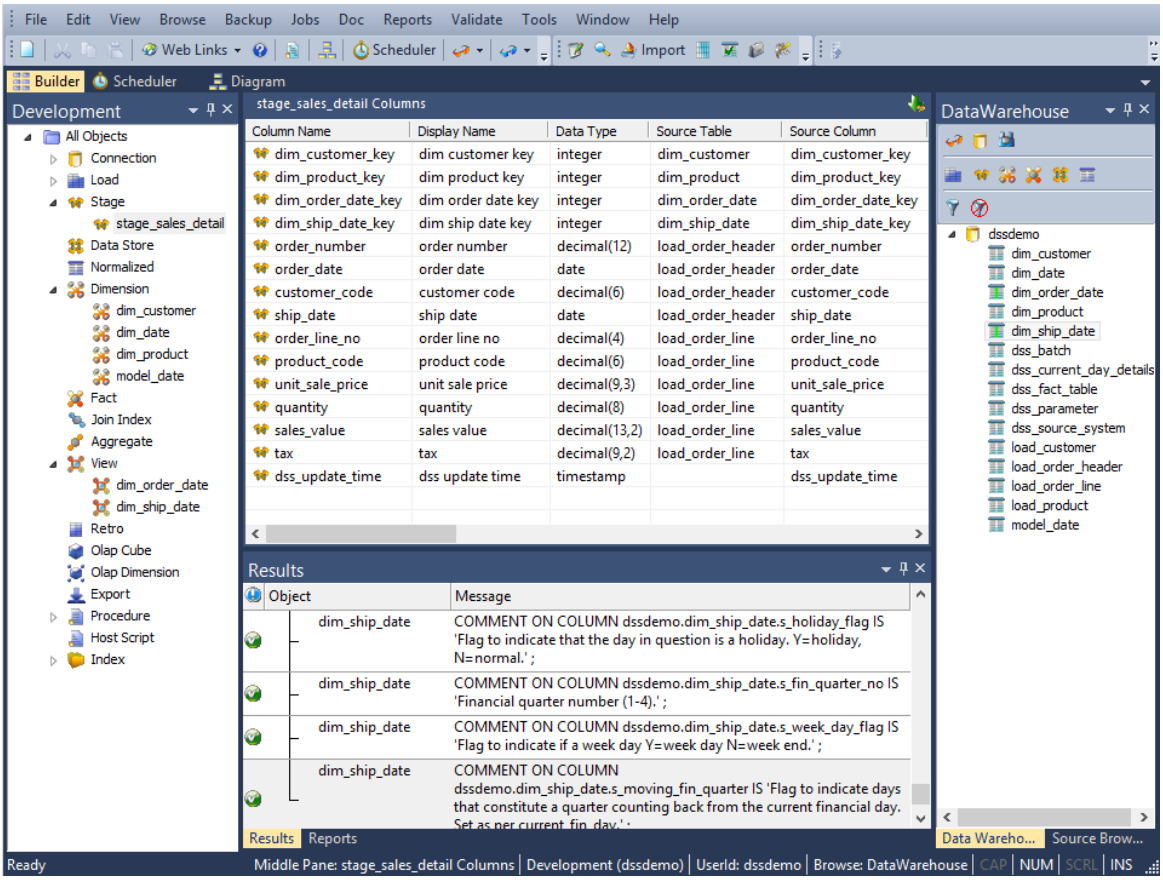

stage_sales_detail Columns

Column Name	Display Name	Data Type	Source Table	Source Column
order_number	order number	decimal(12)	load_order_header	order_number
order_date	order date	date	load_order_header	order_date
customer_code	customer code	decimal(6)	load_order_header	customer_code
ship_date	ship date	date	load_order_header	ship_date
order_line_no	order line no	decimal(4)	load_order_line	order_line_no
product_code	product code	decimal(6)	load_order_line	product_code
unit_sale_price	unit sale price	decimal(9,3)	load_order_line	unit_sale_price
quantity	quantity	decimal(8)	load_order_line	quantity
sales_value	sales value	decimal(13,2)	load_order_line	sales_value
tax	tax	decimal(9,2)	load_order_line	tax
dss_update_time	dss update time	timestamp		dss_update_time

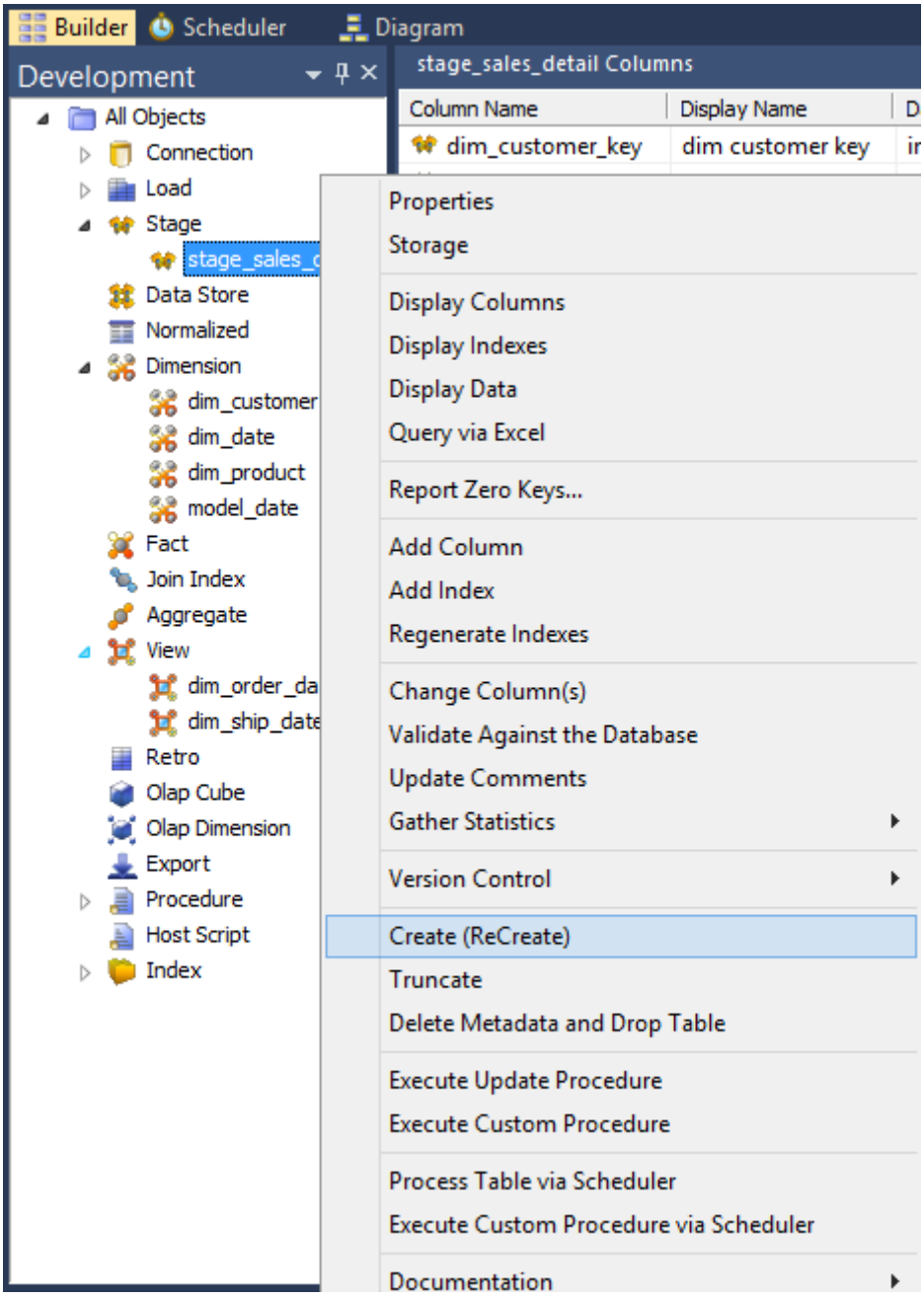
2 Drag each of the following dimensions from the right pane into the stage table in the middle pane:

- **dim_customer**
- **dim_product**
- **dim_order_date**
- **dim_ship_date**

3 This adds the dimension keys from each dimension to the stage table. Your screen should look something like this:

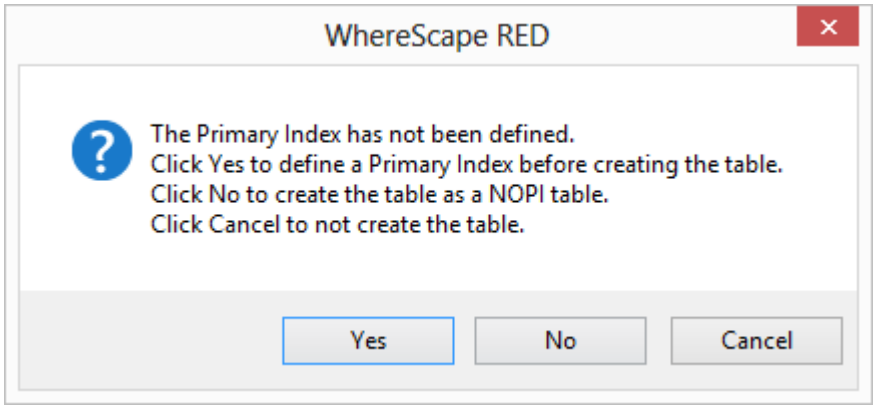


4 The stage table metadata has been defined, but the stage table has not been created.
To create the stage table in the data warehouse, right-click on **stage_sales_detail** in the left pane and select **Create (ReCreate)**.

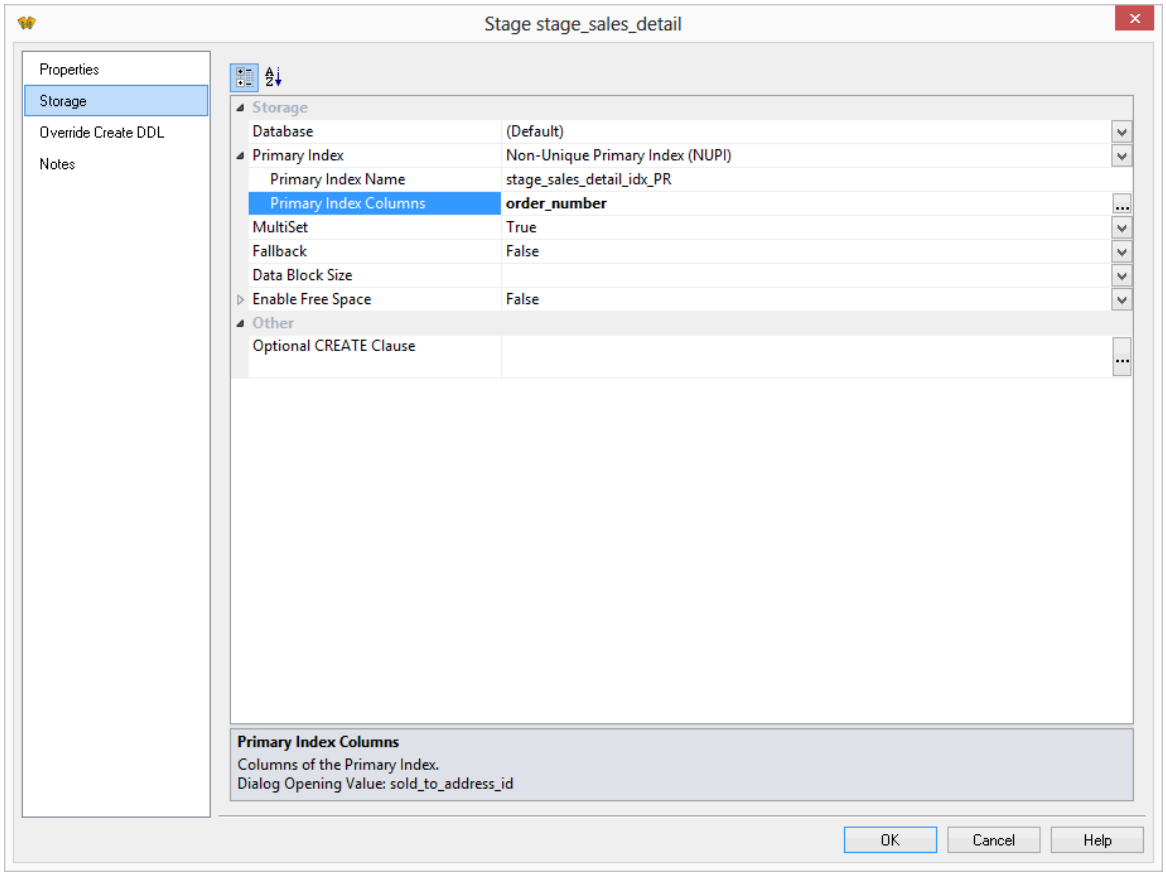


Note: The table must exist in the data warehouse before we can proceed to the next step. If the table has not been physically created then the procedure in step 5 will fail to compile.

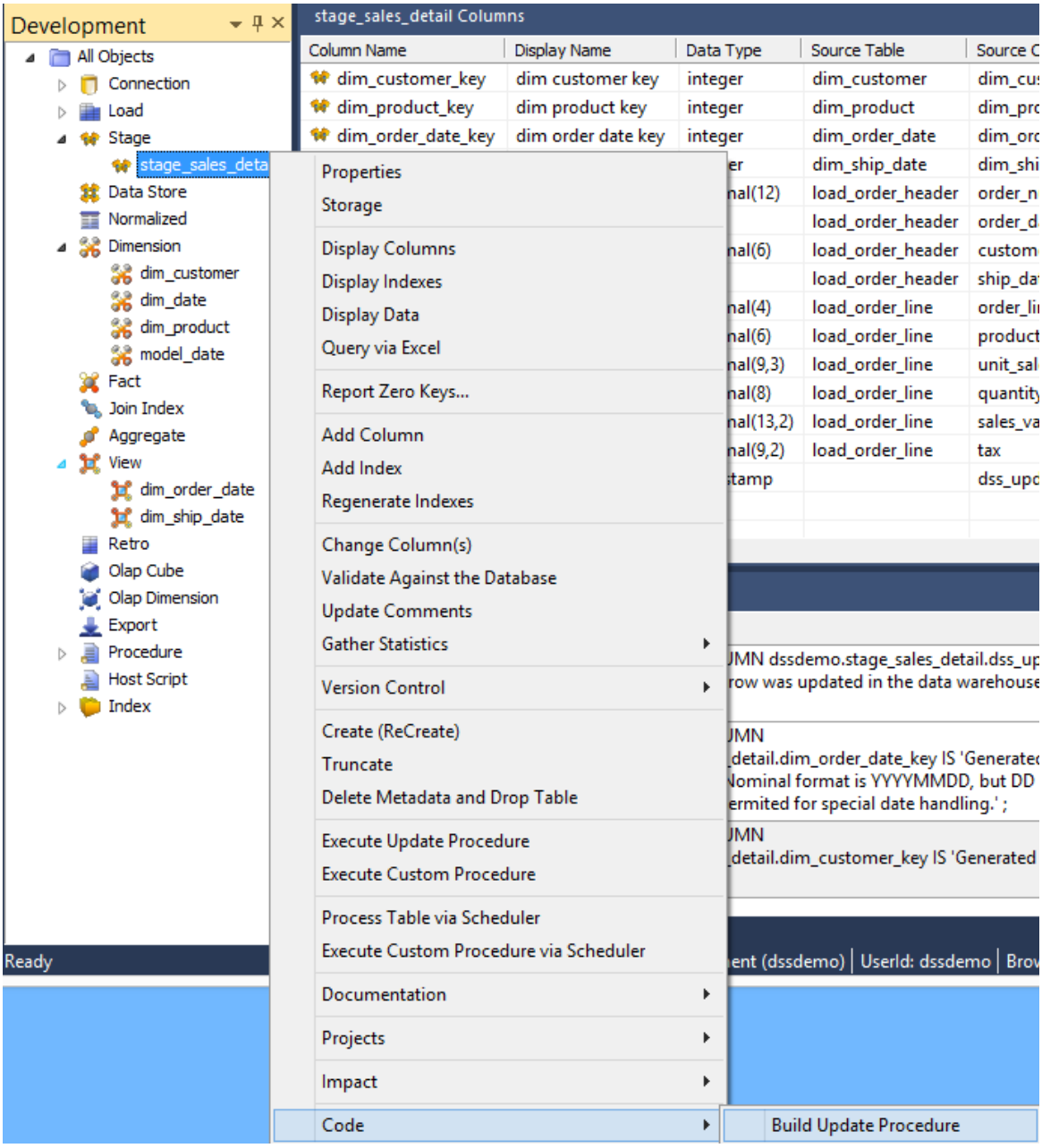
5 Click **Yes** to define a Primary Index.



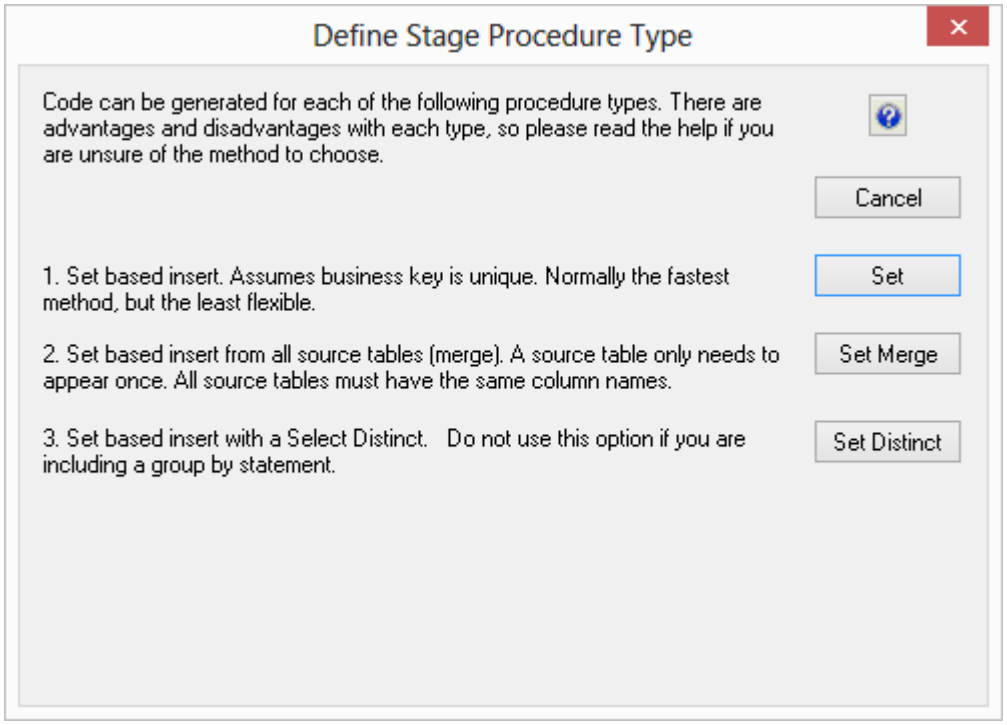
6 Type **order_number** as the Primary Index and click **OK** on the storage screen.



7 Right-click on **stage_sales_detail**, choose **Code** and then **Build Update Procedure.**



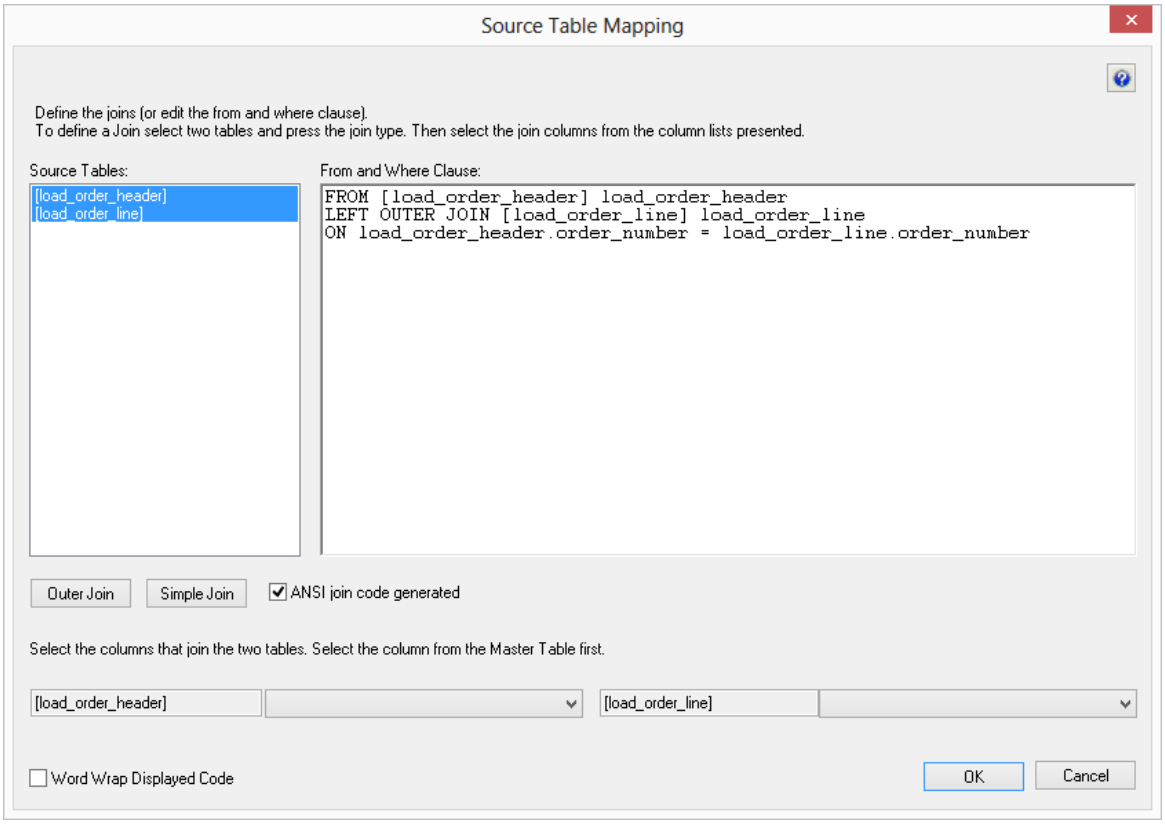
8 Choose the **Set** based procedure generation from the stage procedure type dialog box.



9 Click **OK** on the Parameters dialog.

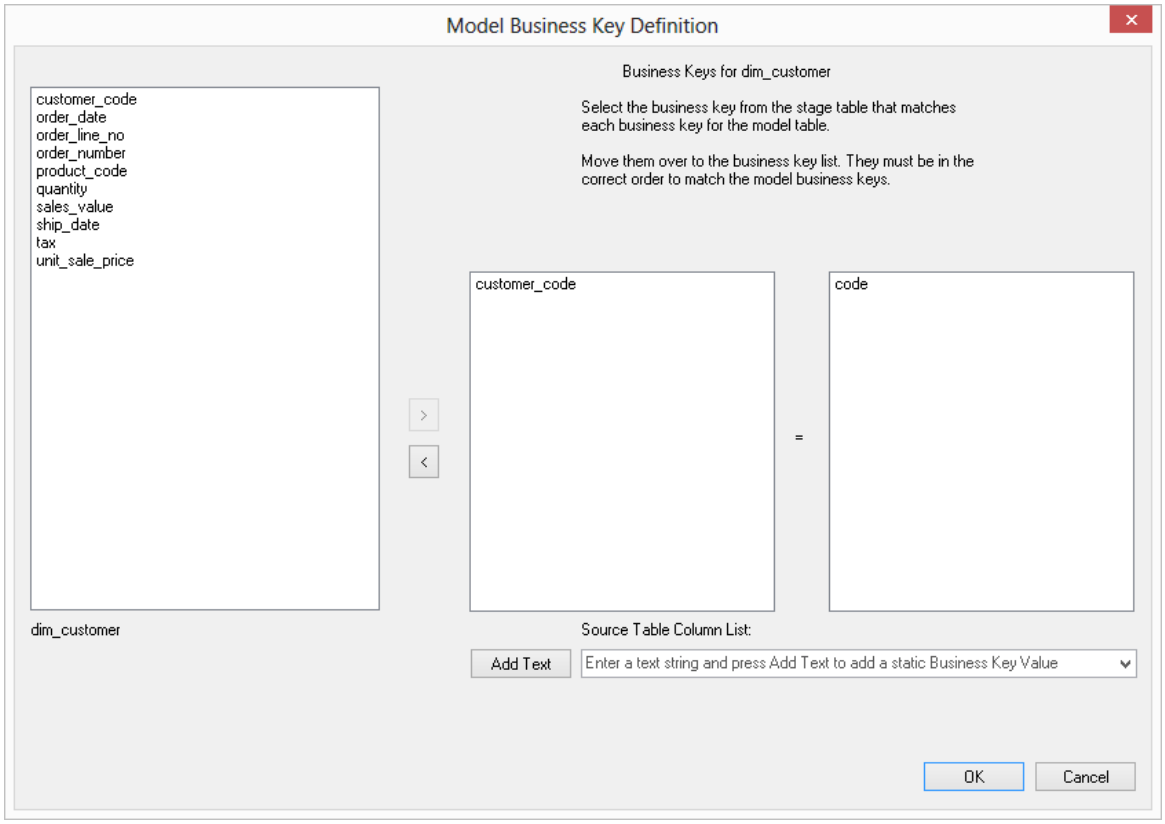
10 On the Source Table Mapping screen, highlight the two tables in the left pane and click **Outer Join**.

- Select order_number from the load_order_header empty drop-down box at the bottom of the screen.
- Again select order_number from the load_order_line drop-down list box. This will create a join statement in the right pane.
- Click **OK**.



11 You need to match the dimension business keys with the business keys in the stage table. This associates the correct dimensional record to each stage table record.
A dialog box displays for each dimensional join:

- For the **dim_customer**, select **customer_code**.
- Click **>** and **OK**.

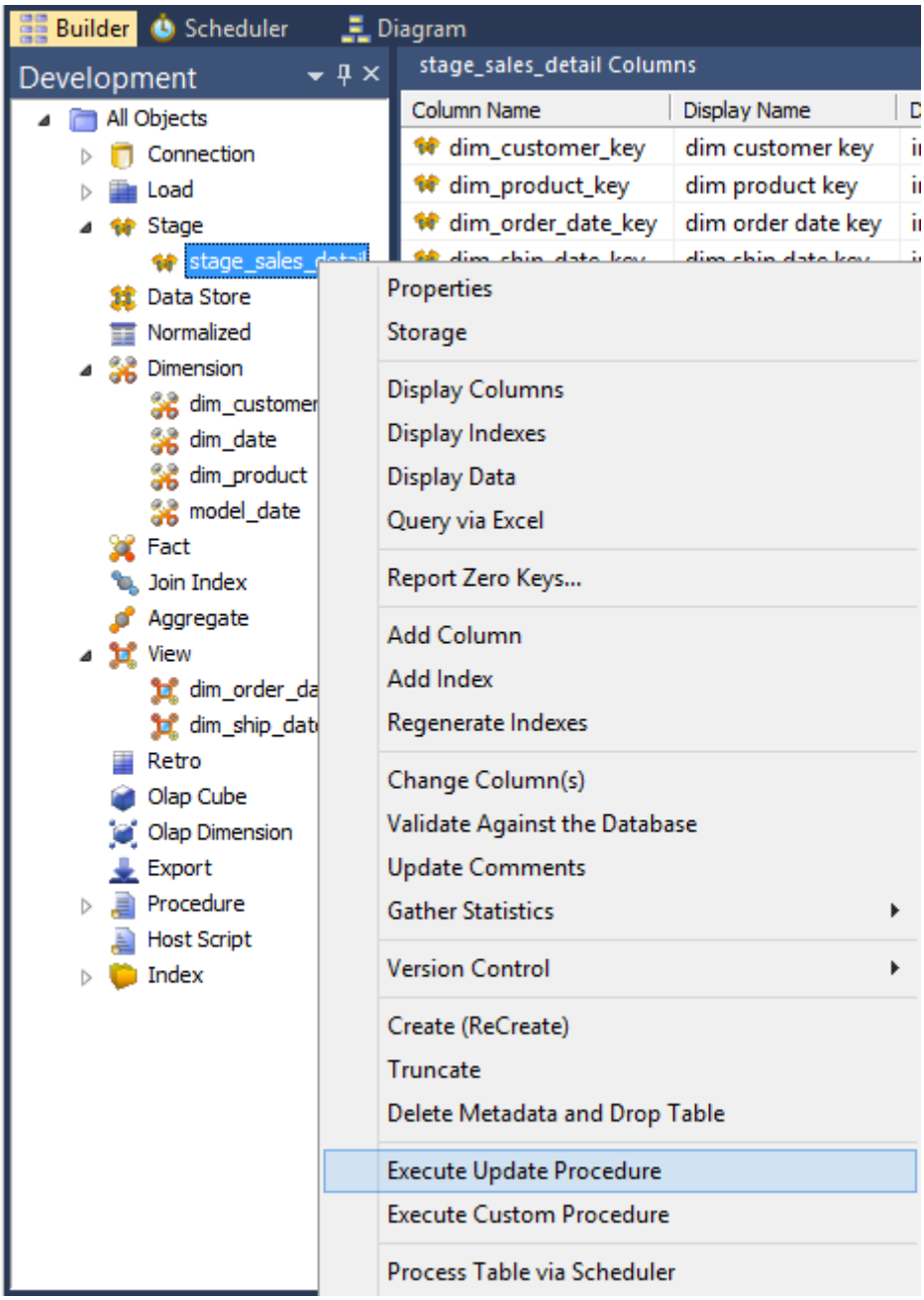


12 For **dim_product**, select **product_code**. Click **>** and **OK**.

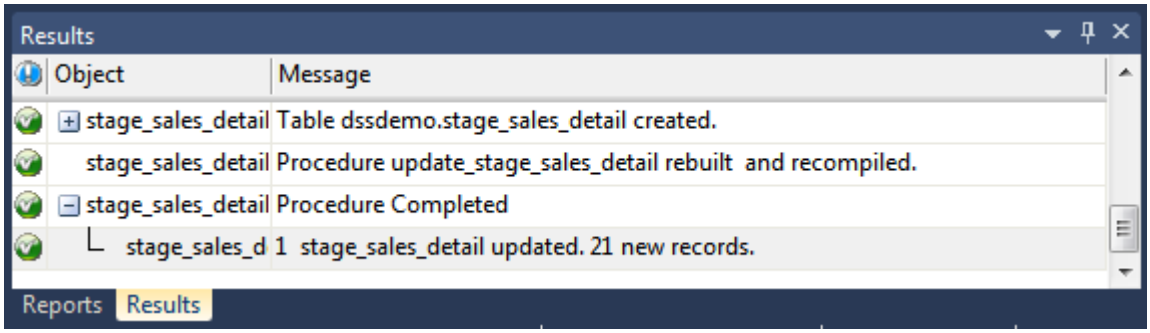
- The business key for dim_order_date has the same column name in the stage table and the dimension view, allowing WhereScape RED to automatically move **order_date** to the left hand side.
- Click **OK** to progress to dim_ship_date, where ship_date has also been automatically chosen.
- Click **OK** again.

13 The final step is the population of the stage table.

- Click on **stage_sales_detail** in the left pane, right-click and select **Execute Update Procedure**.



14 The output from the stage table being updated can now be seen in the **Results** window:

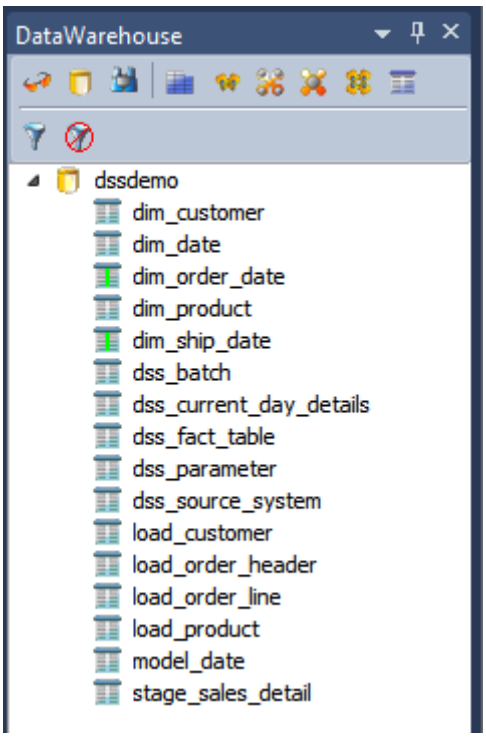


You are now ready to proceed to the next step - ***Creating a Fact Table*** (see "***1.9 Creating a Fact Table***" on page 61).

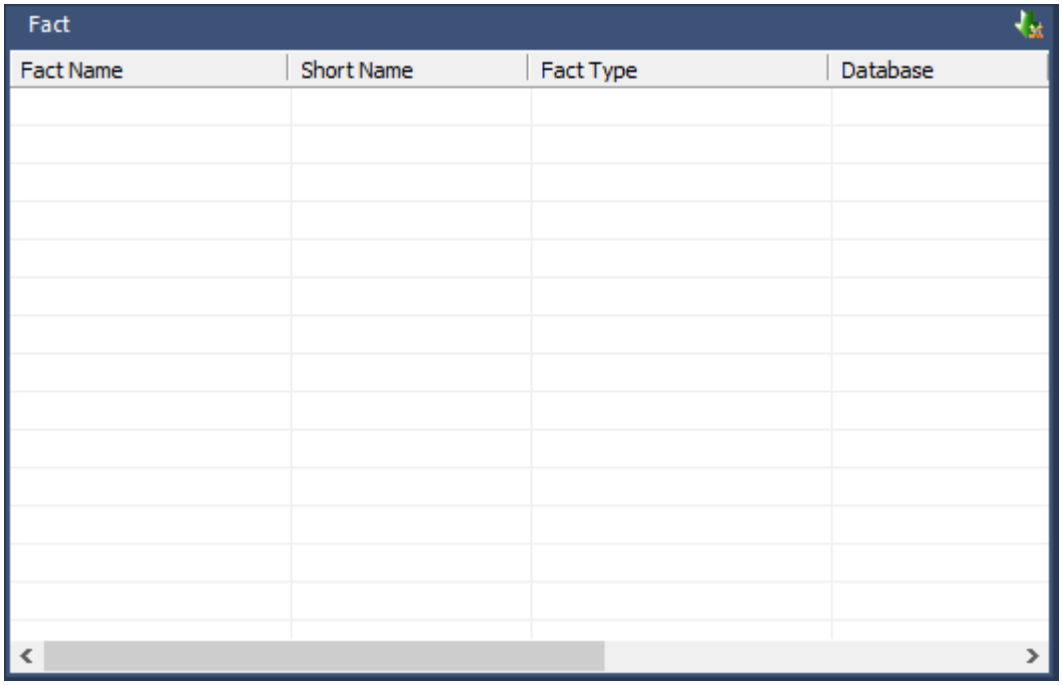
1.9 CREATING A FACT TABLE

In this step you will create a fact table.

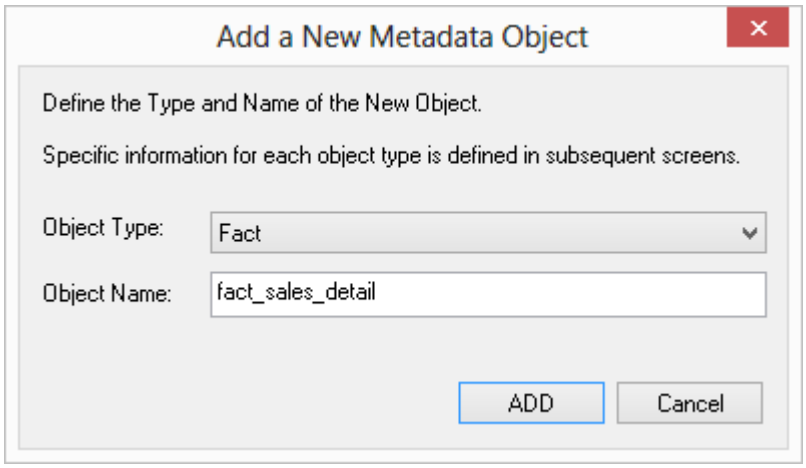
1 Click in the right pane and press F5 to refresh the Data Warehouse table view in the right pane.



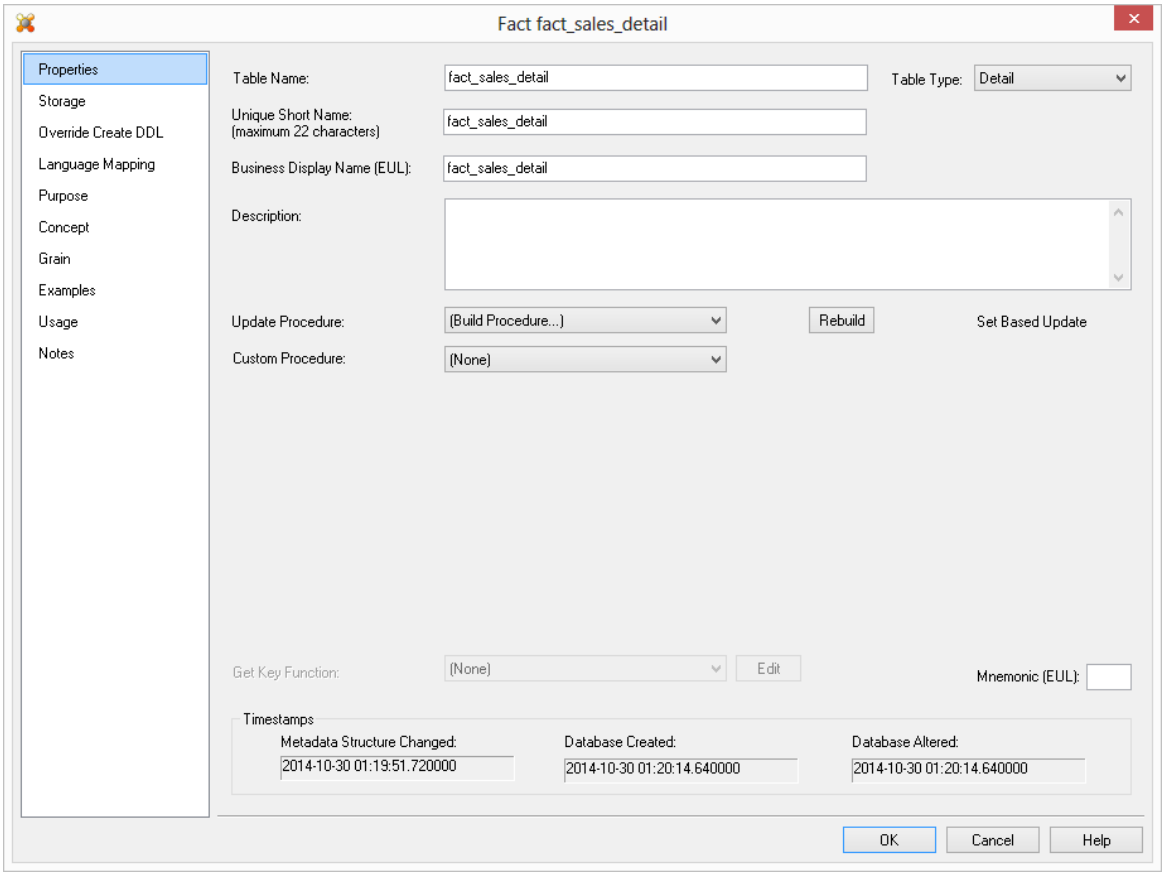
2 Create a drop target by double-clicking on the **Fact Table object group** in the left pane.



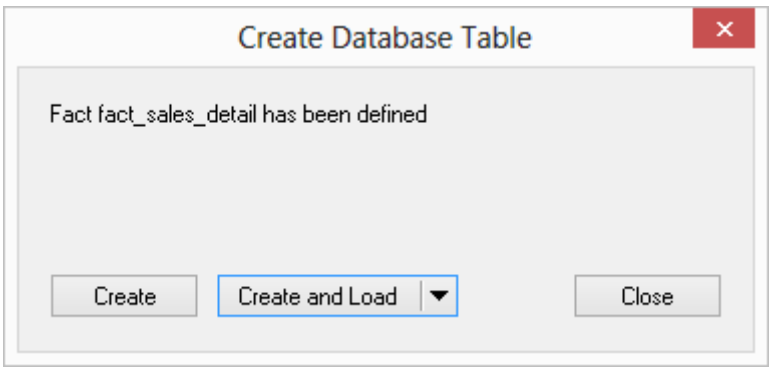
3 Drag the stage table **stage_sales_detail** over from the right pane into the middle pane. In the following dialog, accept the name **fact_sales_detail** and click **ADD**.



4 The fact_sales_detail table Properties screen will appear.
Select **(Build Procedure...)** in the update procedure drop-down and click **OK.**

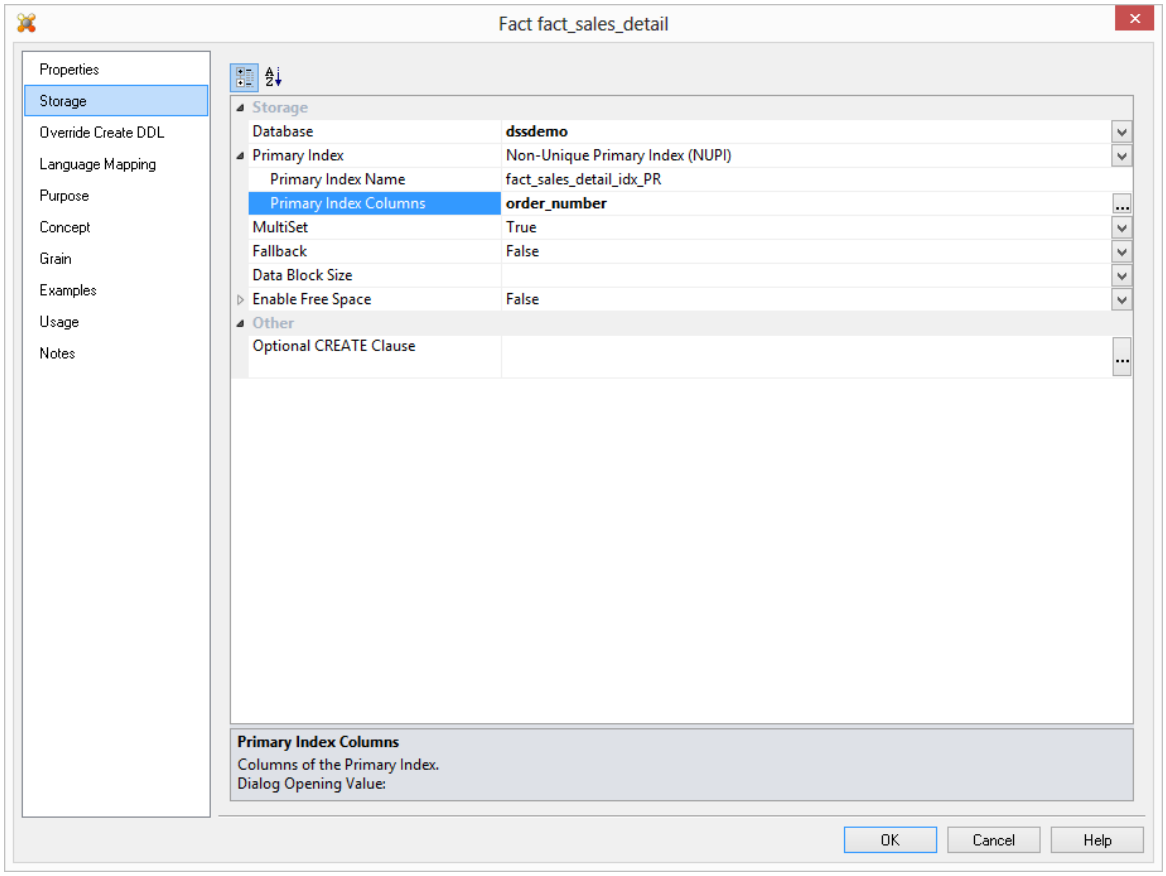


5 Select **Create and Load** to create and load the table now:



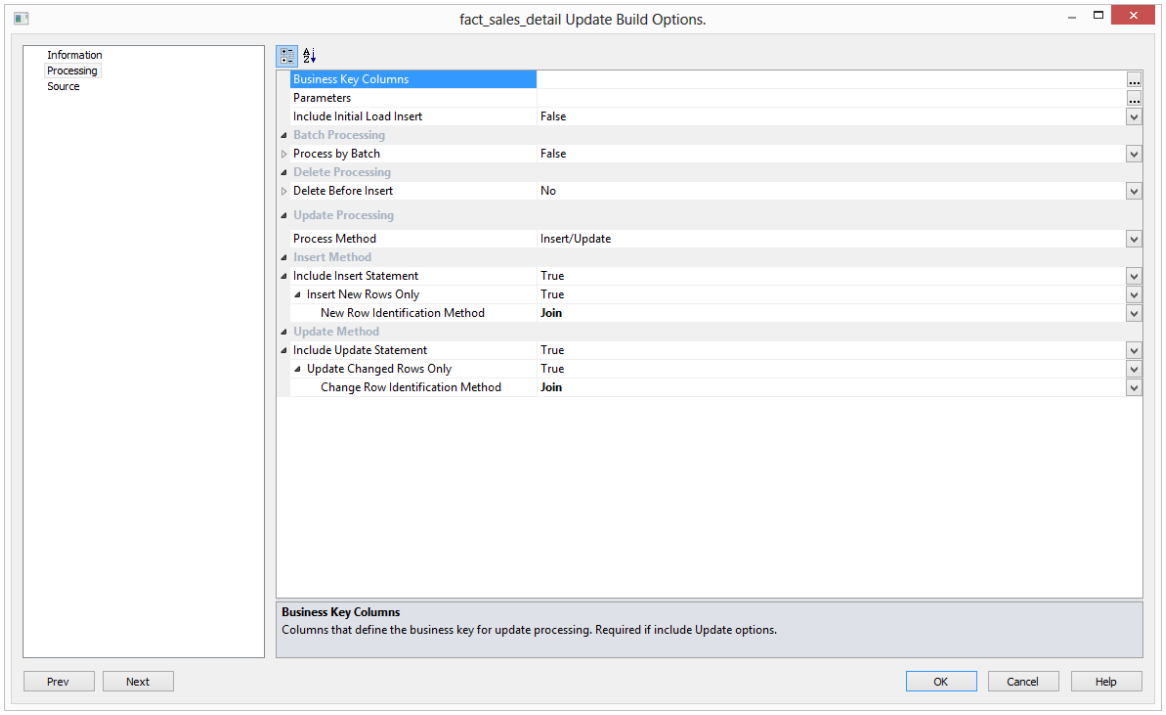
6 Click **Yes** to define a Primary Index on the next dialog.

7 Type **order_number** as the Primary Index and click **OK.**

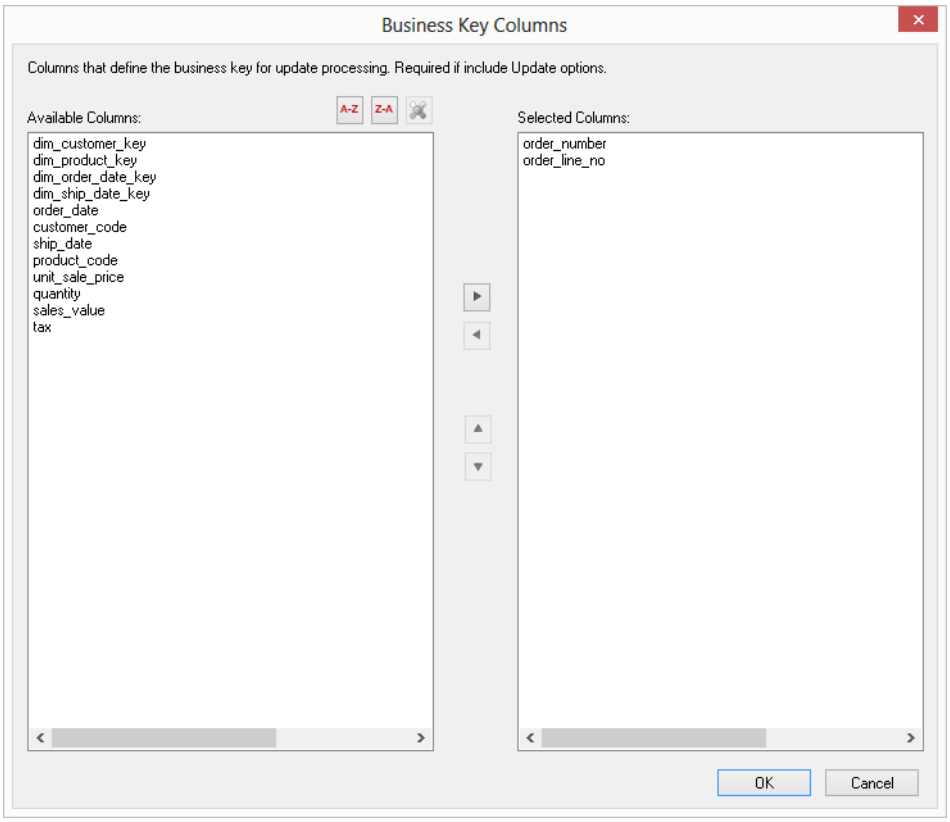


.

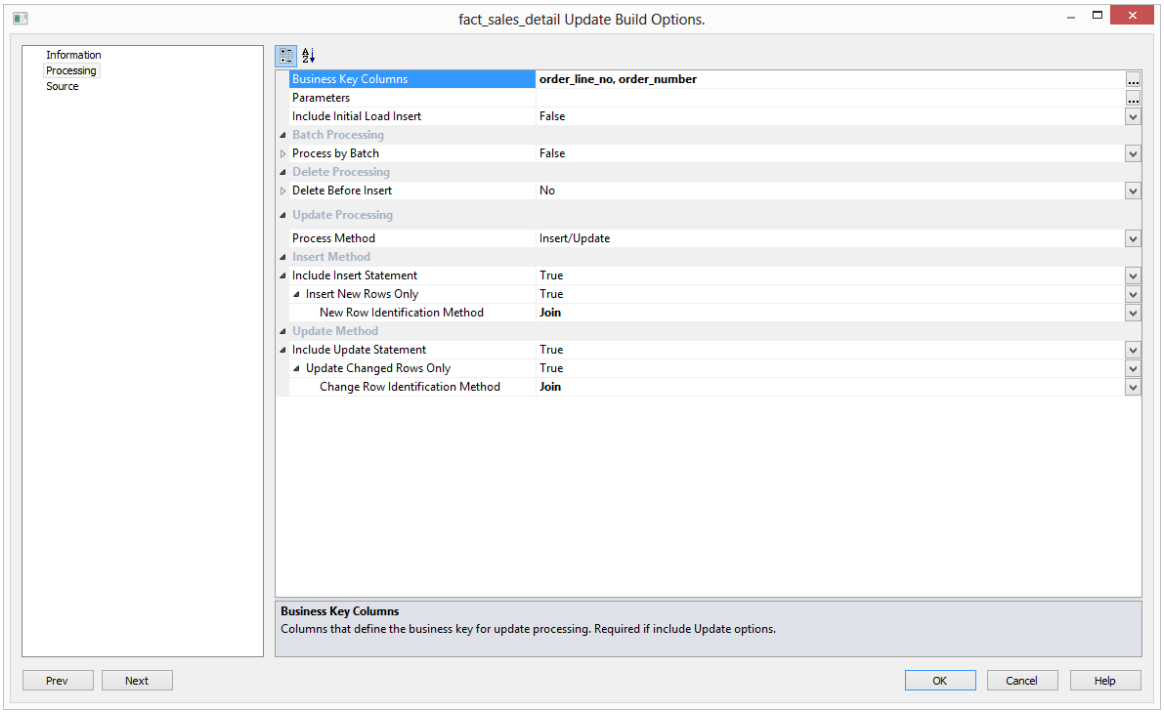
8 Select the **Business Key** for the fact table by clicking on the ellipsis button on the right hand side of the Business Key Columns field.



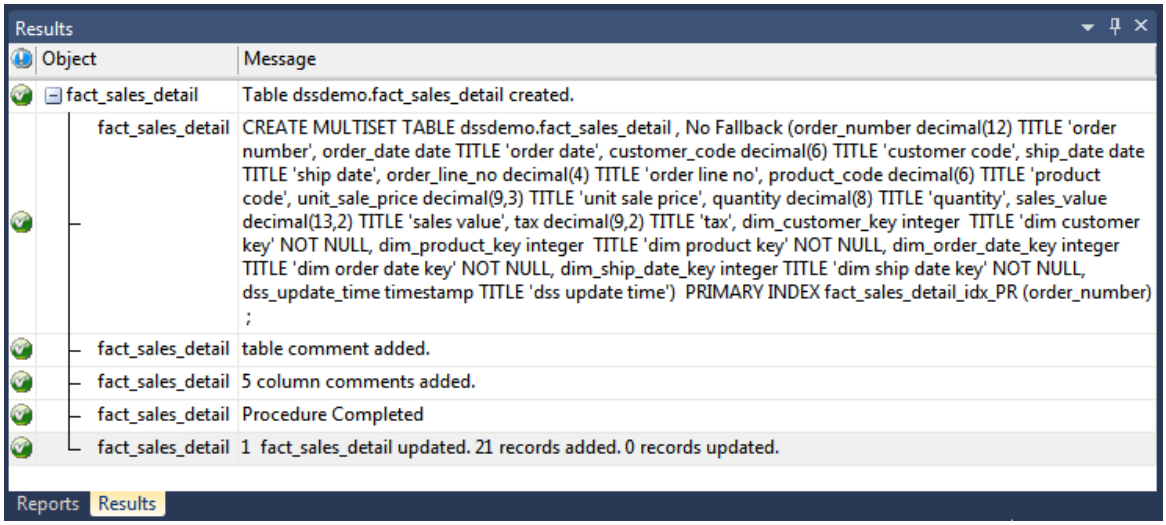
9 Choose **order_number** and **order_line_no**.
Click **>** and then **OK.**



10 Click **OK** on the **Update Build Options** screen.



11 The output from the fact table being created and updated can now be seen in the **Results** window.

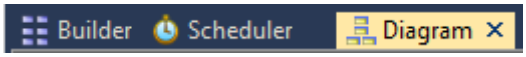


You are now ready to proceed to the next step - ***Switching to Diagrammatic View*** (see "***1.10 Switching to Diagrammatic View***" on page 67).

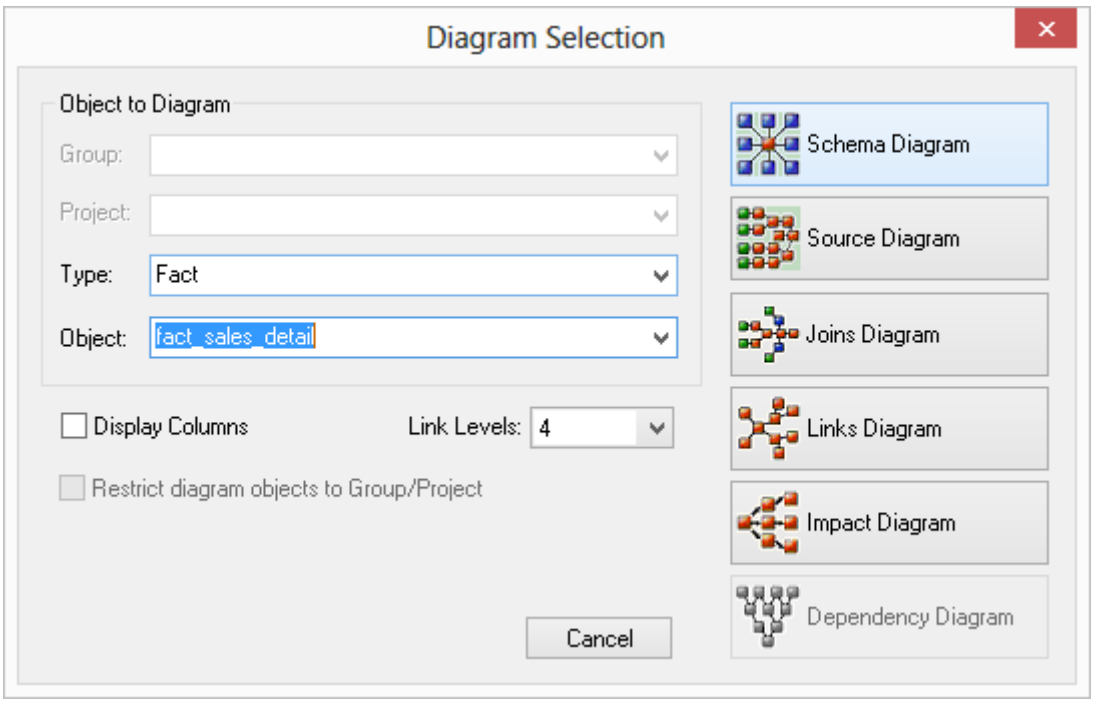
1.10 SWITCHING TO DIAGRAMMATIC VIEW

WhereScape RED provides the ability to diagrammatically view the data warehouse you have created.

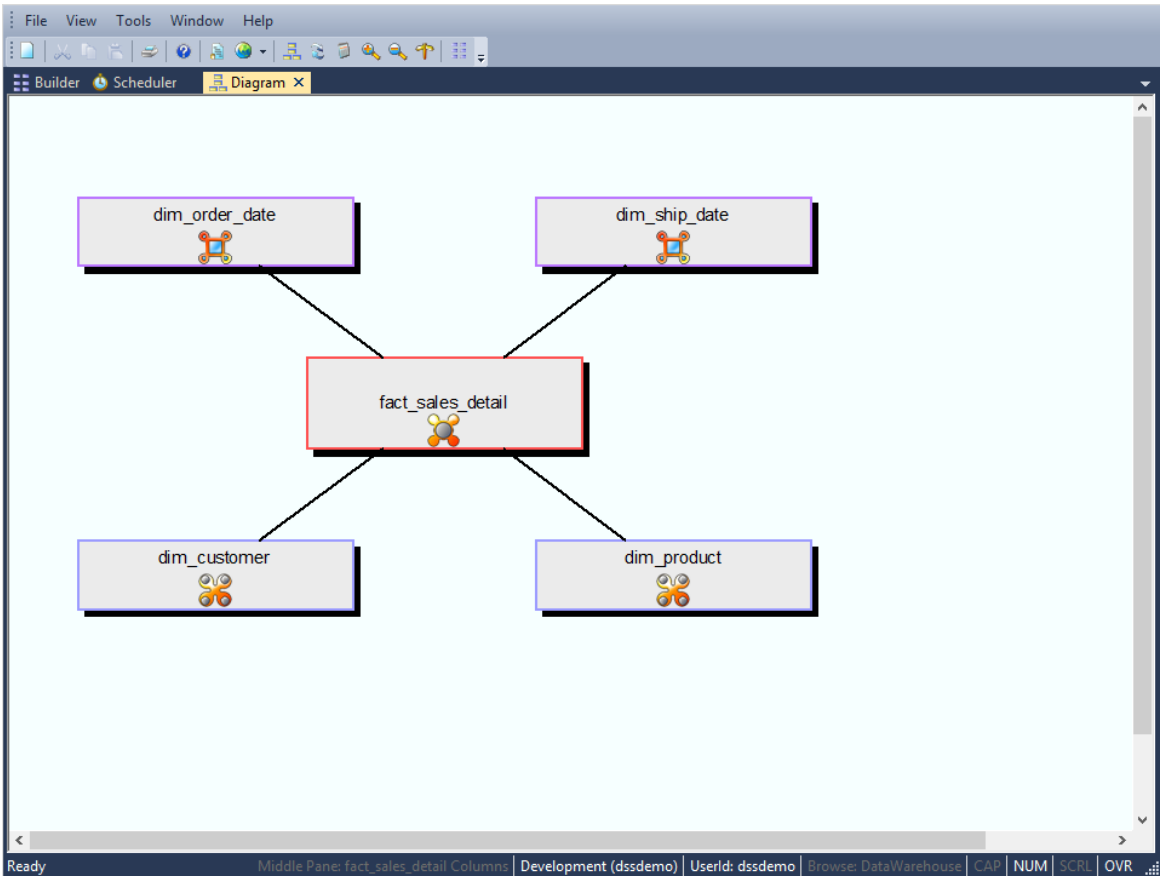
1 Click on the Diagram tab to display the **Diagram Selection** dialog.



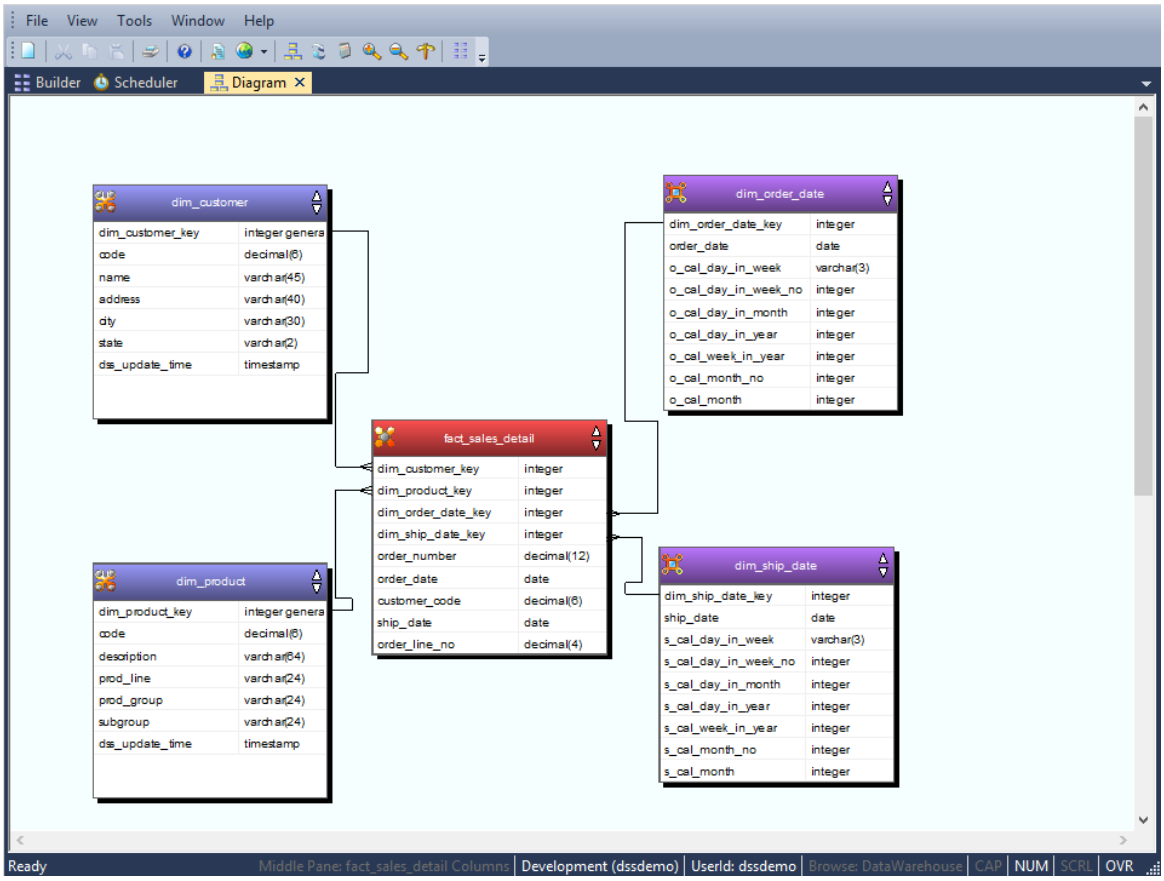
2 Select an object **Type** of **Fact** to narrow the selection list and then select **fact_sales_detail.** Click on the **Schema Diagram** button to display a star schema diagram.



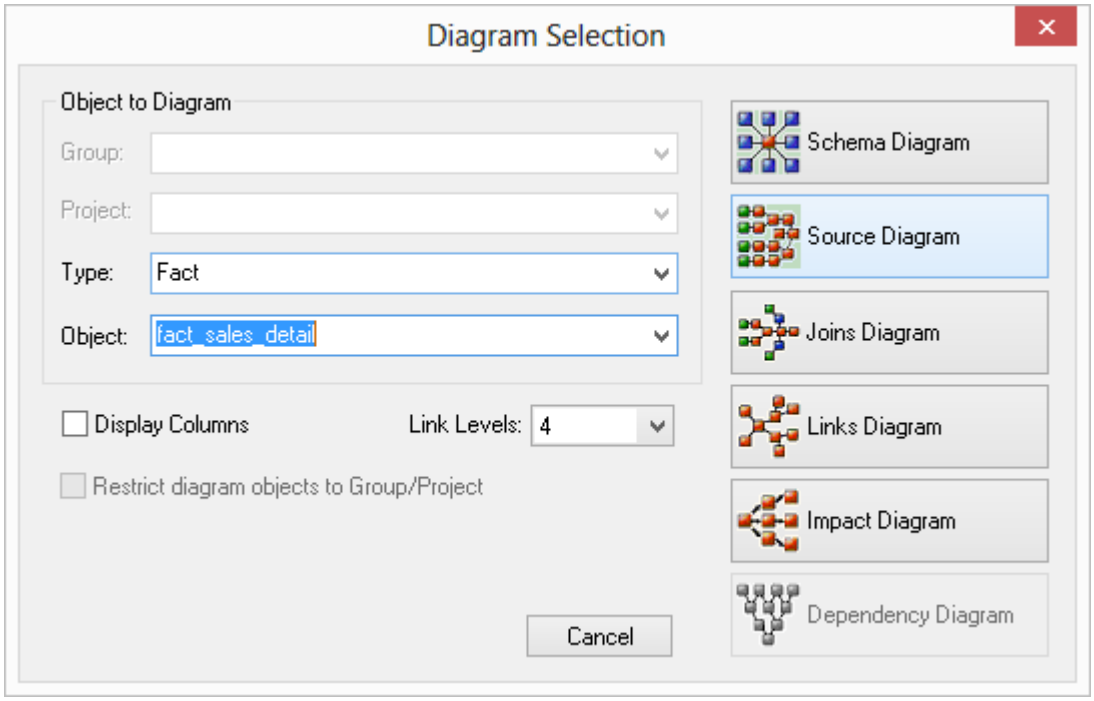
3 The diagram will be displayed.



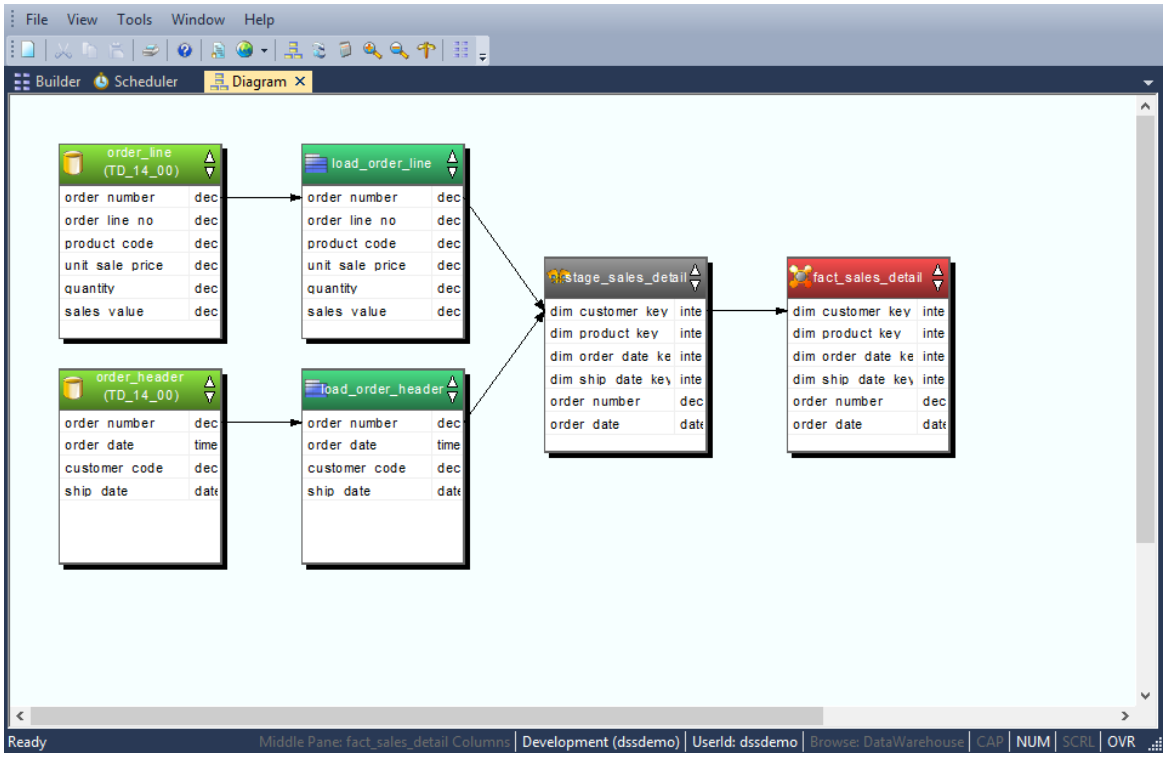
4 To view a more detailed diagram, click on the Toggle button  You will need to use the Zoom In button to see the diagram more clearly.



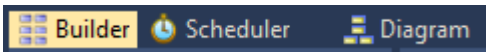
TIP: To view the source tracking of the **fact_sales_detail** table, click once more on the  button, choose the **fact_sales_detail** table and then click on the **Source Diagram** button.



5 The diagram will be displayed.



6 To close the diagrammatic view, click on the **X** on the diagram tab, or alternatively, return to the Builder section by clicking the Builder tab.

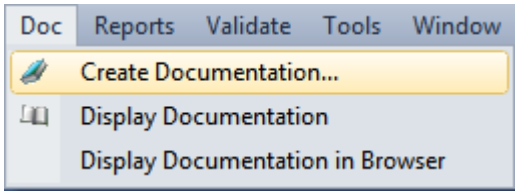


You are now ready to proceed to the next step - ***Producing Documentation*** (see "***1.11 Producing Documentation***" on page 72).

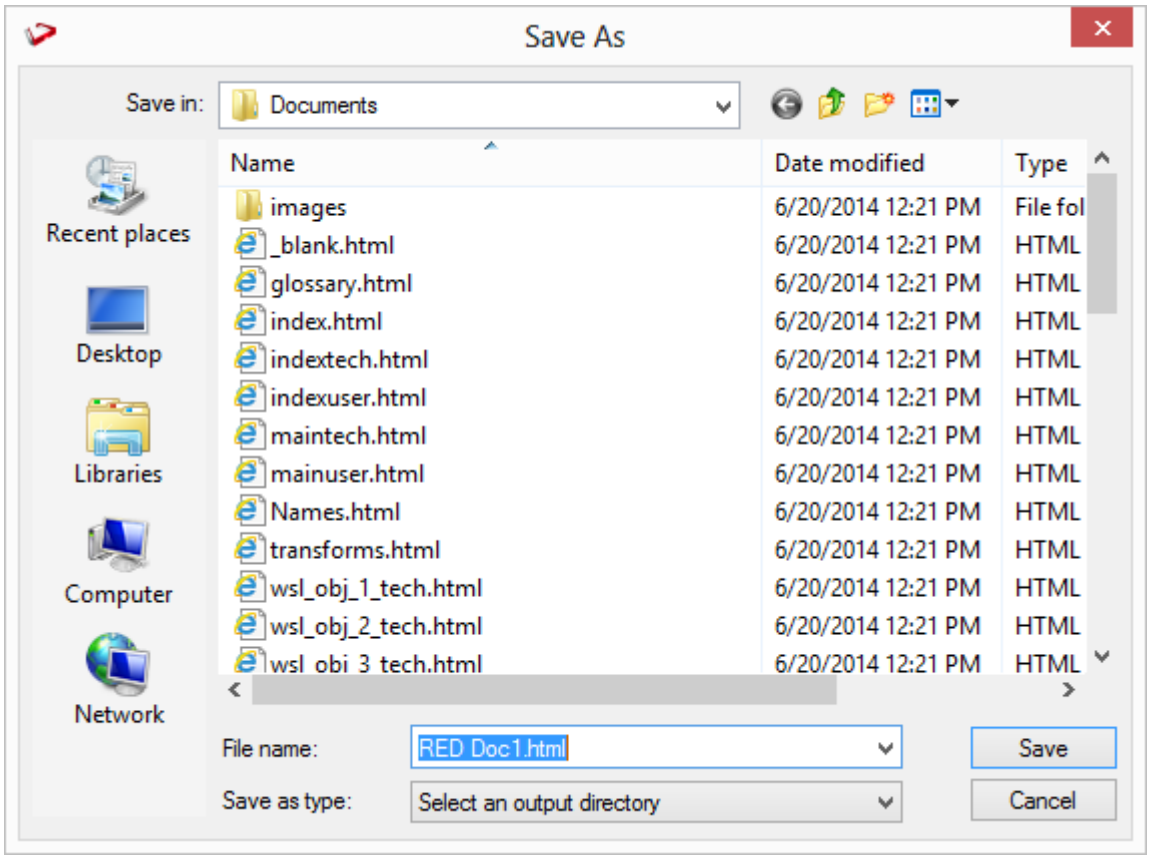
1.11 PRODUCING DOCUMENTATION

WhereScape RED also provides the ability to produce user and technical documentation.
This is obviously of more value if the descriptive data has been entered against the columns and tables in the data warehouse, which we have not done during this tutorial.

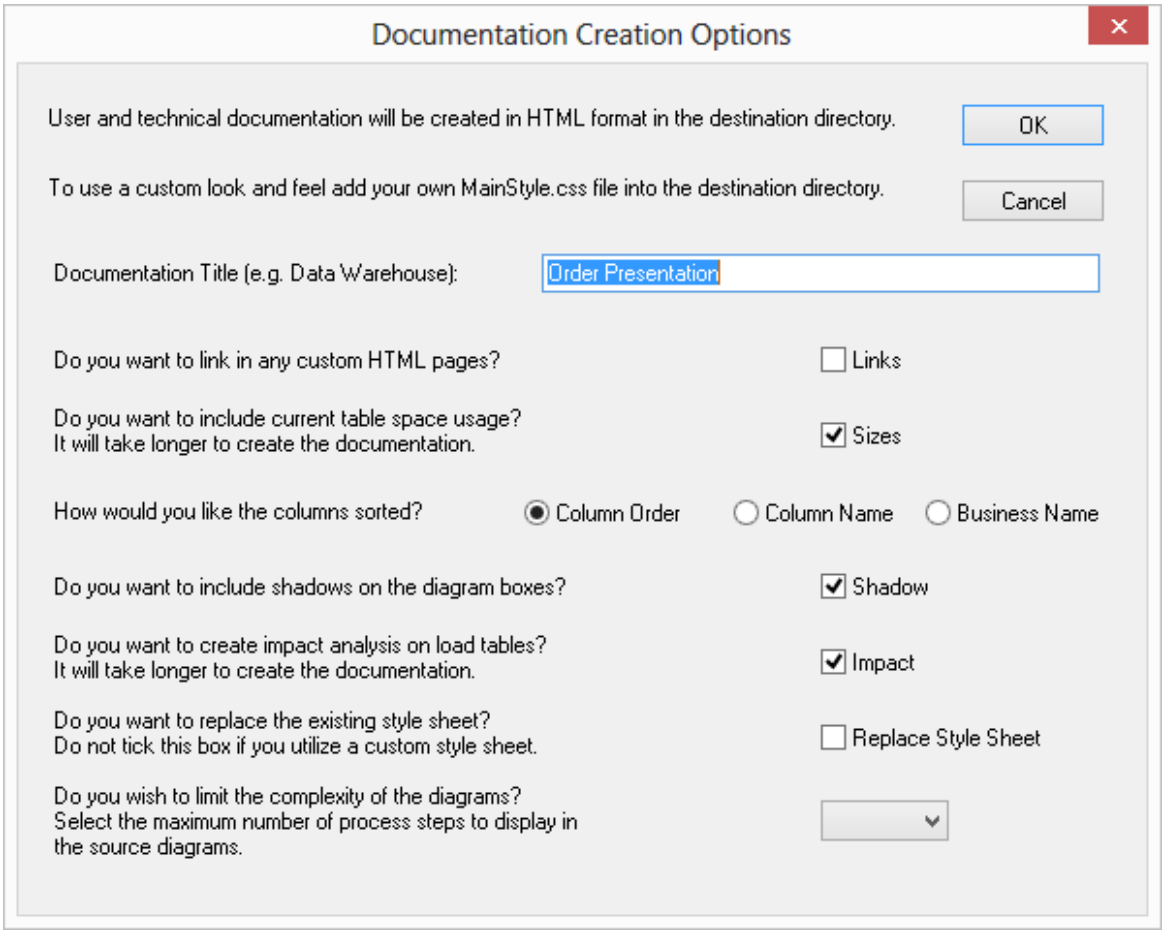
1 To view the documentation for the components of the data warehouse, select **Doc > Create Documentation**.



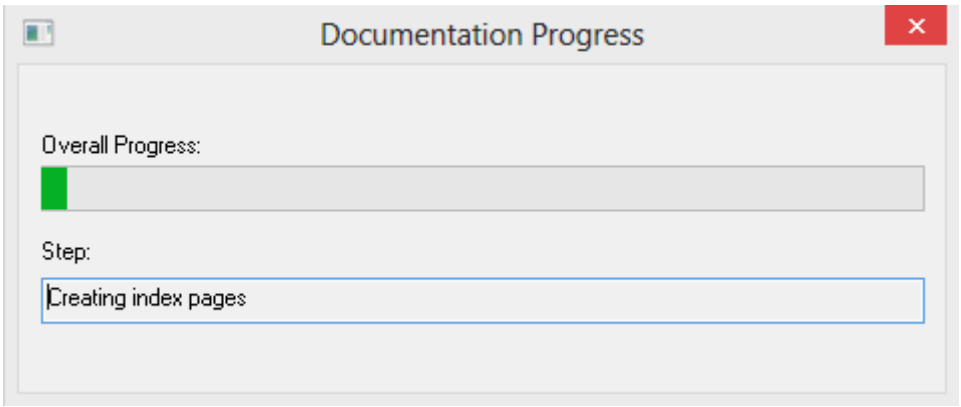
2 Select a file path (directory) under which to save the HTML files that will be produced. Click **Save**.



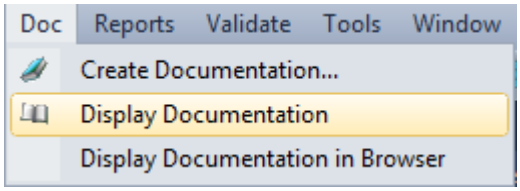
3 The next screen allows for the inclusion of a banner and user defined links. Leave the **Links** option un-ticked and click **OK** to proceed.



4 The documentation will run.



TIP: To view the documentation, select **Doc > Display Documentation** on the main menu tabs


Doc
Reports
Validate
Tools
Window
Create Documentation...
Display Documentation
Display Documentation in Browser