WhereScape®
RED

WHERESCAPE RED TUTORIALS

6.8.4.0

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WhereScape®

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WhereScape USA, Inc

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

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 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 Asia Pte. Ltd

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

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WhereScape®

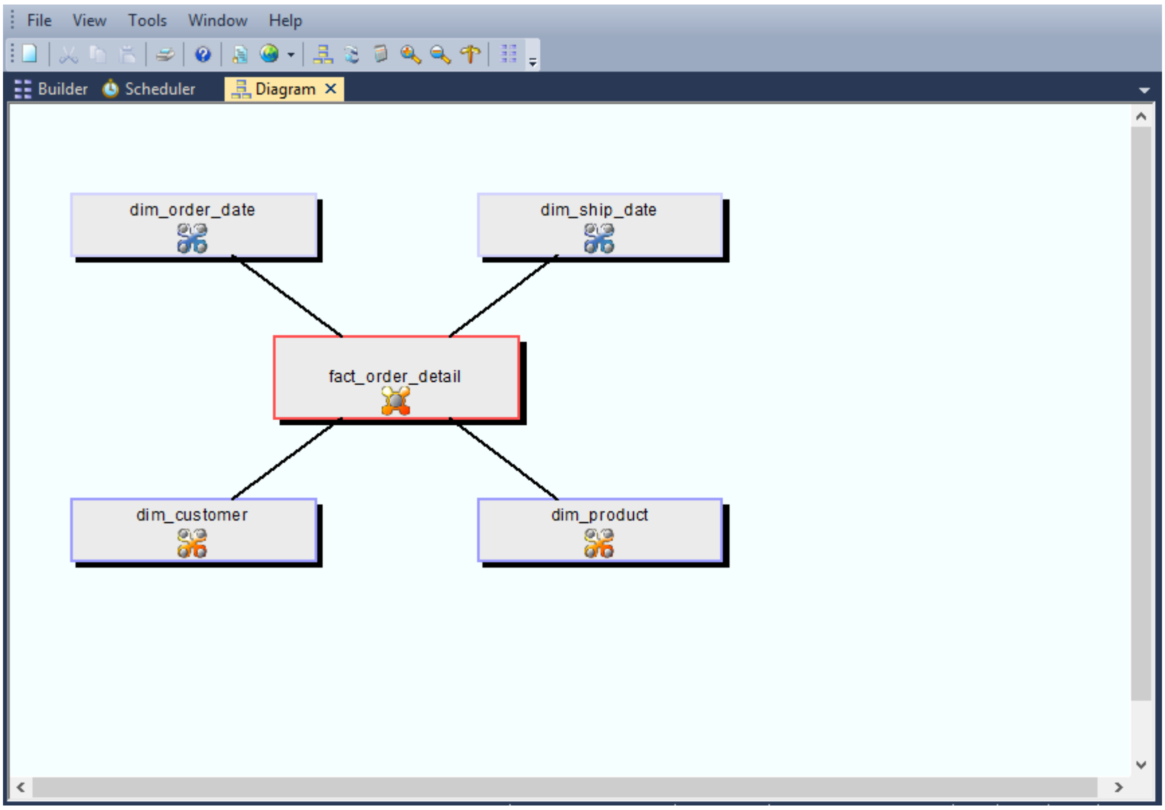
TUTORIAL 1
BASIC STAR SCHEMA FACT TABLE

IN THIS TUTORIAL

1.1 PURPOSE AND ROADMAP

Purpose

This tutorial is designed to introduce you to the basic objects used by WhereScape RED. At the end of the tutorial you will have built a simple dimensional analysis area of a data warehouse.
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 SQL Server database, Oracle schema or DB2 schema.
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 Environment

This tutorial has been completed using Microsoft SQL Server. All of the features illustrated in this tutorial are available in SQL Server, Oracle and DB2 (unless otherwise stated).
Any differences in usage of WhereScape RED between these databases are highlighted.

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
Setup the WhereScape tool • Install WhereScape • Set-up tablespace defaults • Set-up default prefixes for tables • Create connection (to data source)	• The First Step • Logging In • Tablespace Defaults • Table Name Defaults • Creating a Connection
Create and load the load tables for • Customer • Product • Order_line • Order_header	Loading Source Tables
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

Step in Tutorial	Section
View the WhereScape generated documentation	Switching to Diagrammatic View Producing Documentation

1.2 The First Step

The first step

To get started you need to follow the steps in the WhereScape Setup Administrator to create the required environment.
The basic steps in this process are:

Oracle and IBM DB2 data warehouse

1. Install the WhereScape product suite.
2. Create a database schema for the WhereScape metadata repository.
3. Install the WhereScape metadata repository.

SQL Server data warehouse

1. Install the WhereScape product suite onto a computer.
2. Use the Quick Start option in the Setup Administrator utility to load the metadata and repository.

NOTE: See the **RED Installation Guide** (sections 2, 7 - SQL Server, 9 - Oracle and 10 - DB2) for these procedures.
For Oracle this tutorial assumes source data resides in the wtutorial schema and that the metadata has been loaded under the dssadm schema which has select access to the tutorial tables.
For SQL Server it assumes that the data warehouse is in the WslWarehouse database and that the source data resides in the WslTutorial database.
For DB2 it assumes that the data warehouse is in the WhereScape RED schema.

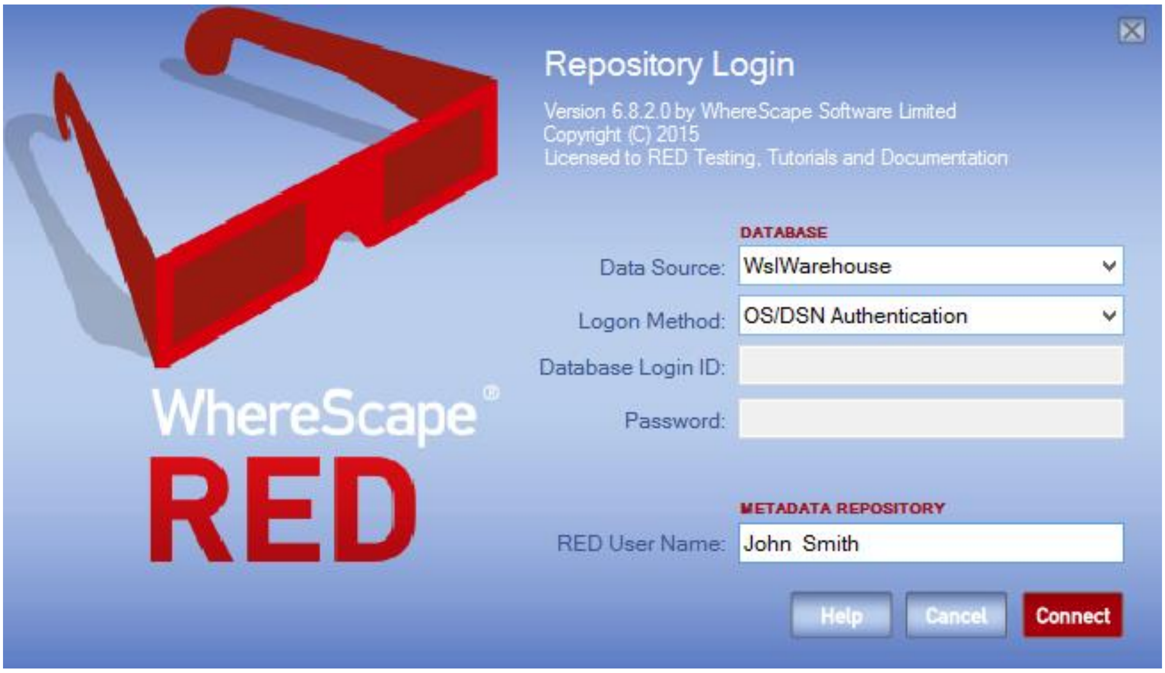
You are now ready to ***log on*** (see "***1.2.1 Logging In***" on page 6) to the repository you have created.

1.2.1 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:



Repository Login

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DATABASE

Data Source: WslWarehouse

Logon Method: OS/DSN Authentication

Database Login ID:

Password:

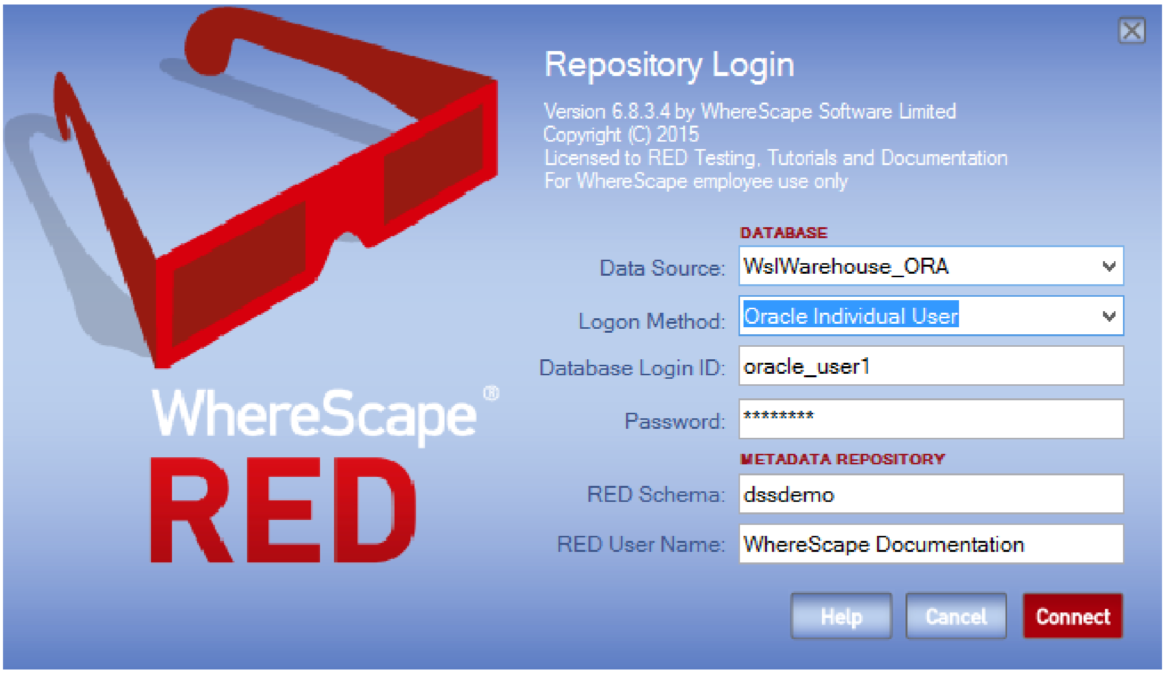
METADATA REPOSITORY

RED User Name: John Smith

2 For SQL Server, the **Data Source**, **Logon Method** and **RED Database** are the fields required to logon to the database server if choosing the OS/DSN Authentication Logon Method. If using the DB/Password Logon Method and a trusted connection is being used enter dbo as the username.

3 For **Oracle**, select the **DB User/Password** option on the Logon Method drop-down menu and enter the Database Login ID and Password. These should be the credentials of the user under which the metadata repository has been loaded.

4 To log in as a specific individual user, select the **Oracle Individual User** option from the Logon Method drop-down menu and enter the user name and password for the user. For more details about the Oracle Individual User see section **9.3.1 Creating an Oracle Individual User** of the Installation Guide.



Repository Login

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DATABASE

Data Source: WslWarehouse_ORA

Logon Method: Oracle Individual User

Database Login ID: oracle_user1

Password: ********

METADATA REPOSITORY

RED Schema: dssdemo

RED User Name: WhereScape Documentation

5 See ***Switching Between Databases*** (see "***1.2.2 Switching Between Databases***" on page 8) for details on logging into IBM DB2.

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

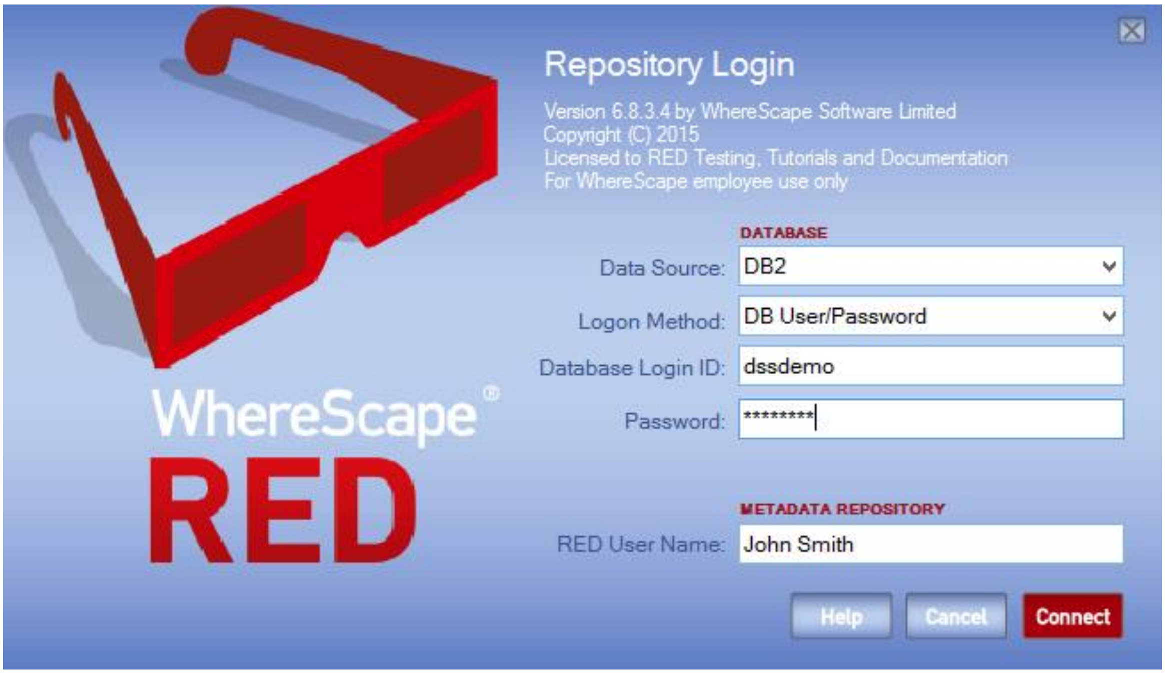
7 Click **Connect**. The Builder screen displays.

Note: ODBC is the only supported connection method. This connection must have been established prior to logon. Refer to the RED Installation Guide if no such connection exists.

You are now ready to proceed to the next step where you define the ***Repository Defaults*** (see "***1.3 Repository Defaults***" on page 9). For IBM DB2 authenticated connections see section 1.2.2.

1.2.2 SWITCHING BETWEEN DATABASES

The following sample logon screen shows the details entered for **IBM DB2** for an operating system authenticated connection:



Repository Login

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DATABASE

Data Source: DB2

Logon Method: DB User/Password

Database Login ID: dssdemo

Password: ********

METADATA REPOSITORY

RED User Name: John Smith

For DB2, the **Data Source**, **Database Login ID** and **Password** as well as the **Metadata Schema** are those required to logon to the database server.

- Select the **DB/User Password** option from the drop-down menu and enter the Database Login ID and Password.

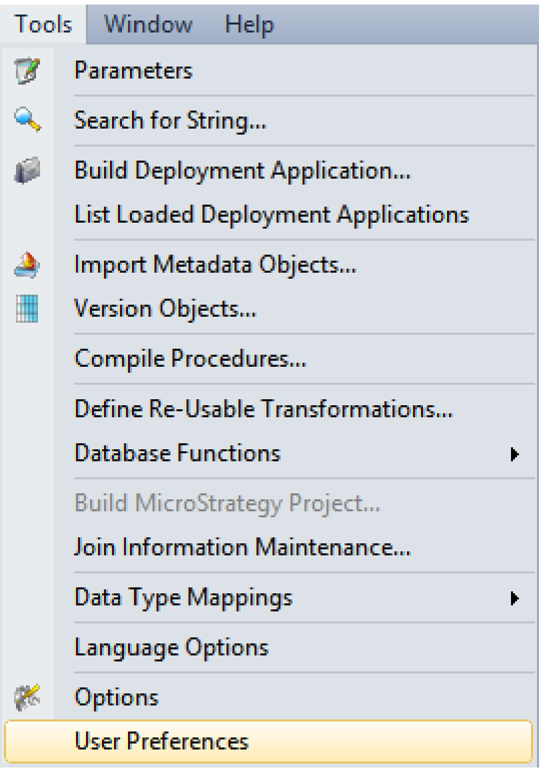
NOTE1: A user name and password will be required if operating system authentication is not being used.

NOTE2: Ignore the Metadata Schema field if connecting to an Oracle or SQL Server repository after successfully connecting to DB2.

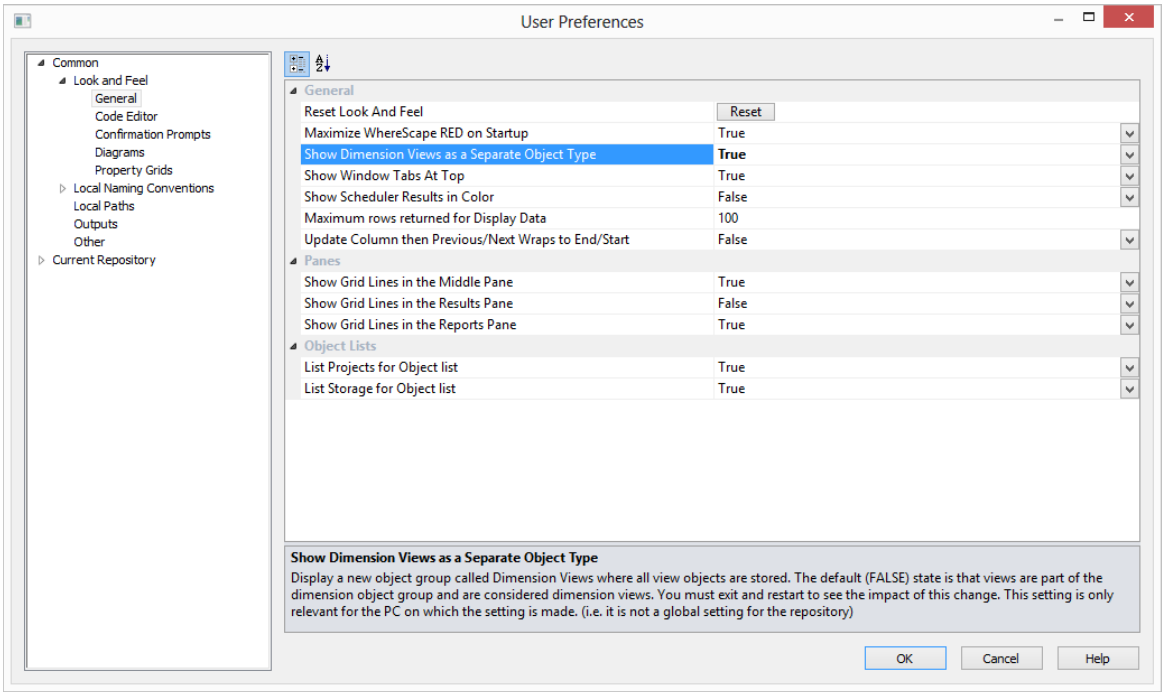
1.3 Repository Defaults

Before you begin to create the data warehouse, you can choose the defaults for the repository. You can do this from the **Tools** menu, by either selecting **Options** or **User Preferences**. There is no need to change the defaults for the tutorials.

1 From the **Tools** menu, select **User Preferences**.


Tools
Window
Help
Parameters
Search for String...
Build Deployment Application...
List Loaded Deployment Applications
Import Metadata Objects...
Version Objects...
Compile Procedures...
Define Re-Usable Transformations...
Database Functions
Build MicroStrategy Project...
Join Information Maintenance...
Data Type Mappings
Language Options
Options
User Preferences

2 In **Common / Look And Feel / General**, select **Show Dimension Views as a Separate Object Type** and set to **True**. Click **OK**.



General	
Reset Look And Feel	Reset
Maximize WhereScape RED on Startup	True
Show Dimension Views as a Separate Object Type	**True**
Show Window Tabs At Top	True
Show Scheduler Results in Color	False
Maximum rows returned for Display Data	100
Update Column then Previous/Next Wraps to End/Start	False
Panes	
Show Grid Lines in the Middle Pane	True
Show Grid Lines in the Results Pane	False
Show Grid Lines in the Reports Pane	True
Object Lists	
List Projects for Object list	True
List Storage for Object list	True

Show Dimension Views as a Separate Object Type

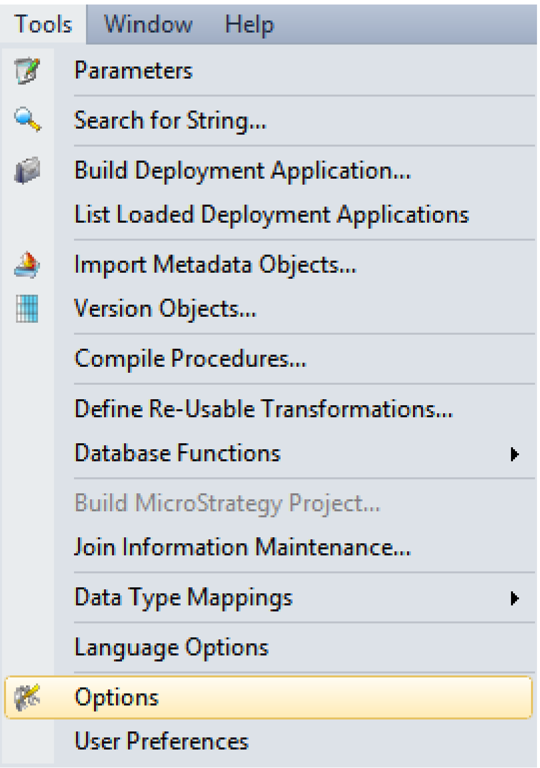
Display a new object group called Dimension Views where all view objects are stored. The default (FALSE) state is that views are part of the dimension object group and are considered dimension views. You must exit and restart to see the impact of this change. This setting is only relevant for the PC on which the setting is made. (i.e. it is not a global setting for the repository)

You are now ready to proceed to the next step where you define the ***Tablespace (FileGroup) Defaults*** (see "***1.4 Tablespace (FileGroup) Defaults***" on page 11)

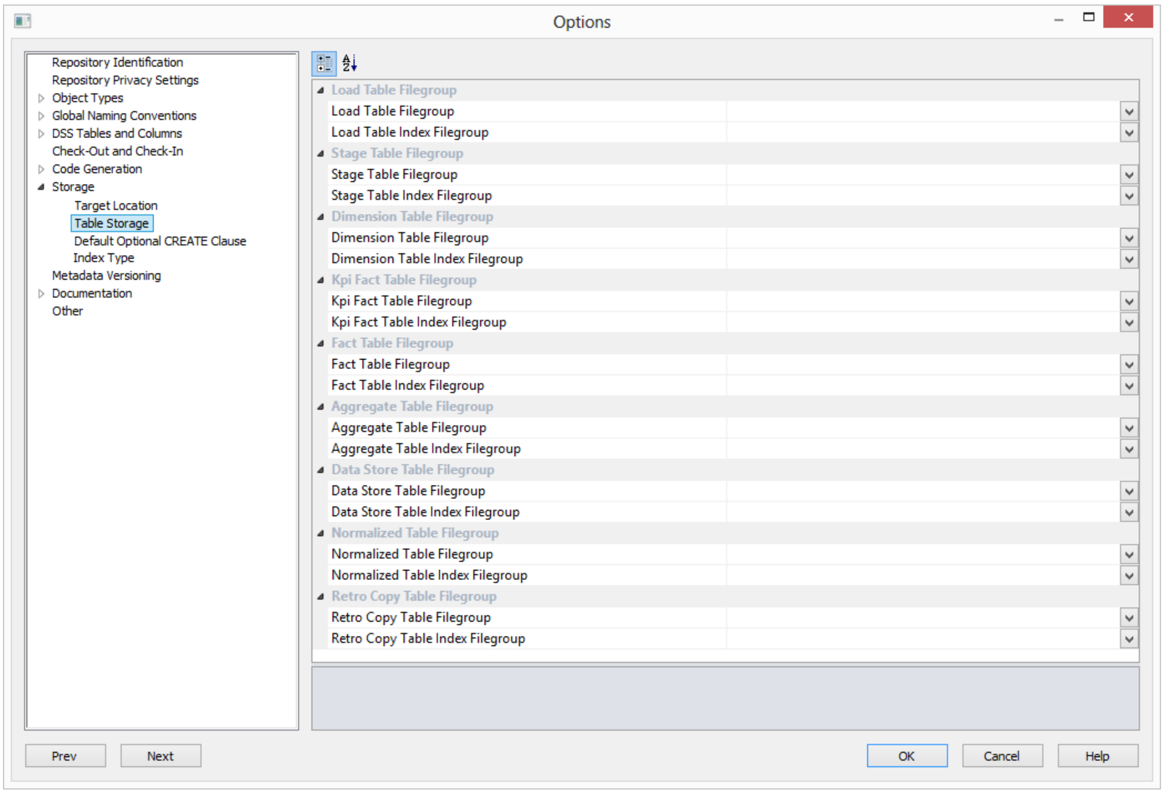
1.4 Tablespace (Filegroup) Defaults

Before you begin to create the data warehouse, you can choose the defaults for the tablespaces (filegroups for SQL Server).
There is no need to change the defaults for this tutorial.

1 From the **Tools** menu, select **Options**.


Tools
Window
Help
Parameters
Search for String...
Build Deployment Application...
List Loaded Deployment Applications
Import Metadata Objects...
Version Objects...
Compile Procedures...
Define Re-Usable Transformations...
Database Functions
Build MicroStrategy Project...
Join Information Maintenance...
Data Type Mappings
Language Options
Options
User Preferences

2 Click on **Storage** and make the appropriate tablespace/filegroup choice for each option. Click **OK**.



Load Table Filegroup
- Load Table Filegroup
- Load Table Index Filegroup

Stage Table Filegroup
- Stage Table Filegroup
- Stage Table Index Filegroup

Dimension Table Filegroup
- Dimension Table Filegroup
- Dimension Table Index Filegroup

Kpi Fact Table Filegroup
- Kpi Fact Table Filegroup
- Kpi Fact Table Index Filegroup

Fact Table Filegroup
- Fact Table Filegroup
- Fact Table Index Filegroup

Aggregate Table Filegroup
- Aggregate Table Filegroup
- Aggregate Table Index Filegroup

Data Store Table Filegroup
- Data Store Table Filegroup
- Data Store Table Index Filegroup

Normalized Table Filegroup
- Normalized Table Filegroup
- Normalized Table Index Filegroup

Retro Copy Table Filegroup
- Retro Copy Table Filegroup
- Retro Copy Table Index Filegroup

Note: The default table space or filegroup for the user will be used if no settings are selected.

You are now ready to proceed to the next step where you define the ***Table Name Defaults*** (see "***1.5 Table Name Defaults***" on page 13).

1.5 Table Name Defaults

Before you begin to create the data warehouse, you can choose the defaults for the table names. There is no need to change the defaults for this tutorial, and the examples given reflect the default naming convention.

1. From the **Tools** menu, select **User Preferences** and then **Local Naming Conventions**. Alter the defaults as required.
2. From the **Tools** menu, select **Options** and then **Global Naming Conventions**. Alter the defaults as required.
3. If no changes are made, the default table names will be:
   - **load_** load tables with data copied from a source system
   - **stage_** tables for manipulating and transforming data prior to publishing
   - **dim_** dimension tables
   - **fact_** fact tables, detail, rollup and snapshot
   - **agg_** aggregate or summary tables built from fact tables
   - **olap_** Analysis Services Olap cubes built from stage or fact tables

You are now ready to proceed to the next step ***Creating a Connection*** (see "***1.6 Creating a Connection***" on page 14).

1.6 CREATING A CONNECTION

In order to populate the metadata repository, connections need to be made to the source data. There must also be a connection to the data warehouse itself.
This section describes how to make two new connections.

Note: The following two connections should have been automatically created. They should however be validated to ensure they are correct for the environment.

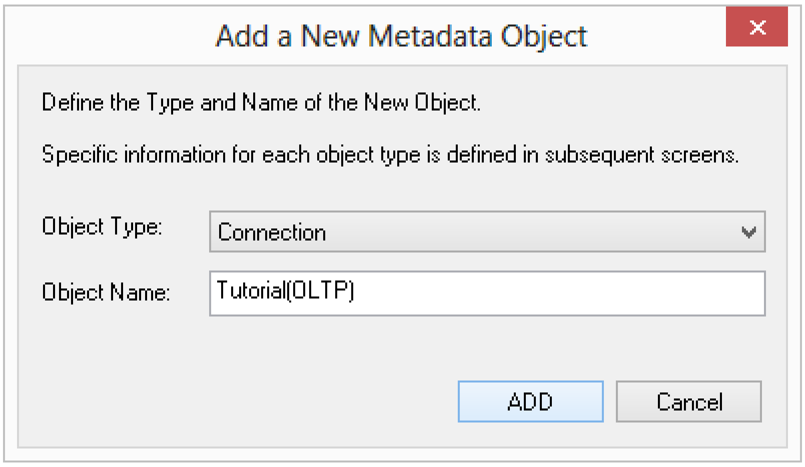
The first connection is to the source system. For **Oracle** this is the user within your Oracle database, for **SQL Server** the database that contains the tutorial tables and for **DB2** this is another schema within your database.
The second connection will be to the data warehouse tables.

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

How to create a connection

1 Click on and highlight the **Connection** object group in the left pane. This selects the object group to be worked on.

2 Select **File|New**, or right-click and select **New Object**. A dialog box displays with the Object Type defaulted to Connection. Name your connection. In this instance type **Tutorial(OLTP)** and click **ADD**.



Add a New Metadata Object

Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Connection

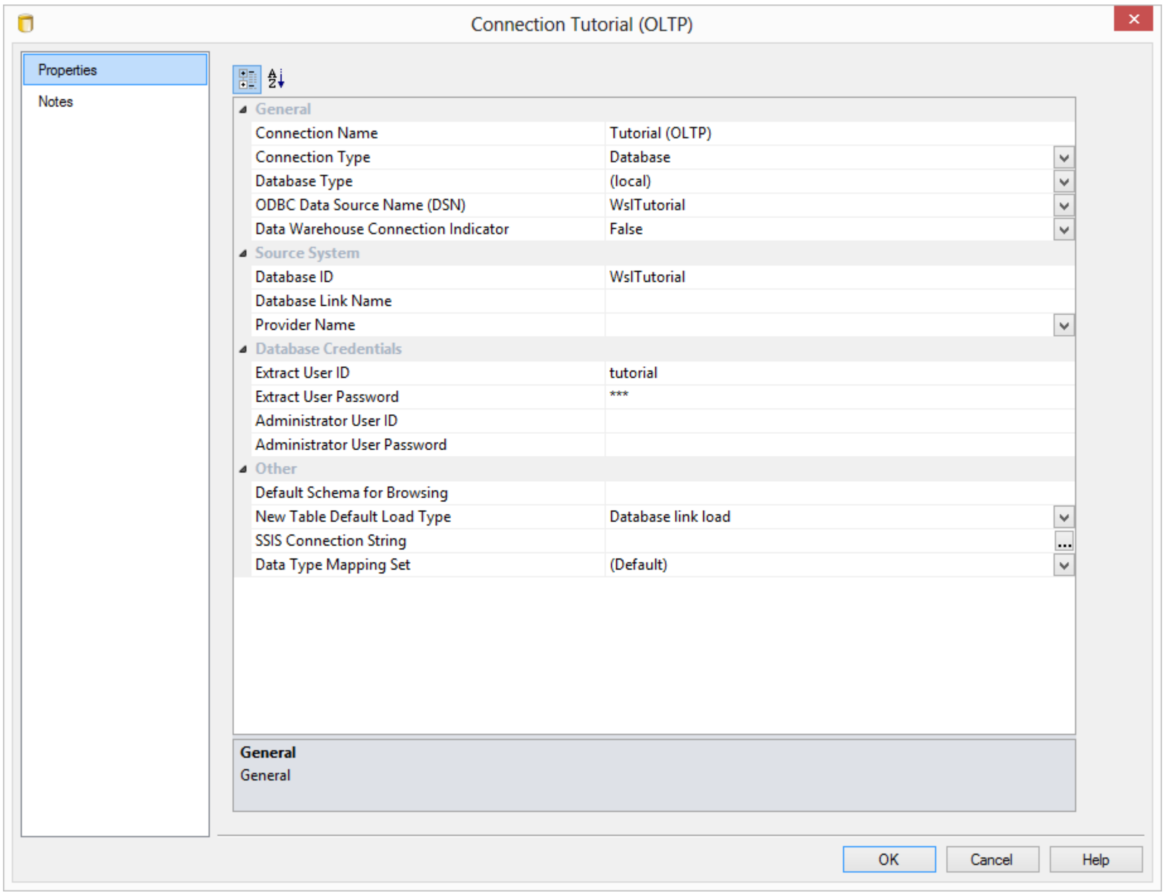
Object Name: Tutorial(OLTP)

3 A Properties dialog will display.
SQL Server:
If running a SQL Server data warehouse then proceed as follows.
In the Properties dialog, complete the details as below, and then select **Update**:

- The **ODBC Data Source Name (DSN)** is the ODBC connection which has been defined to connect to the database. In this case the ODBC connection to the database that holds the tutorial tables.
- The **Provider Name** identifies the type of connection that SQL Server will make in the case of a linked server. In this case it is not required as we are using tutorial tables in a SQL Server database on the same server.
- The **Database ID (SID)** is the SQL Server database name of the database being connected to. In this case the SID of the tutorial database.
- The **Database Link Name** is a SQL Server linked server link to connect from the data warehouse database to the source system database.

Note: This link is only required if the source database is on a different server from the data warehouse database. For the purposes of this tutorial, the database link ID is not required as the tutorial data is usually loaded into a database on the same server as the metadata.

- The **Extract User ID** and **Password** are the username and password required to logon to the tutorial database. If a trusted connection is being used then set the Extract User ID to "dbo".
- The **Administrator User ID** and **Password** are the administrator logon to the source location (tutorial). These 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.
- The **SSIS Connection String** is a valid SSIS connection string that can be used to connect to the data source or destination. The Reset button will attempt to construct a valid connection string from the connection information supplied in the connection details consisting of the Database ID, Database Link ID (Instance name), Provider Name, Extract User details. Leave this field blank.
- **Data Type Mapping Set** - XML files have been created to store mappings from one set of data types to another. Setting this field to "(Default)" will cause RED to automatically select the relevant mapping set; otherwise you can choose one of the standard mapping sets from the drop-down list or create a new one.



General	
Connection Name	Tutorial (OLTP)
Connection Type	Database
Database Type	(local)
ODBC Data Source Name (DSN)	WslTutorial
Data Warehouse Connection Indicator	False
Source System	
Database ID	WslTutorial
Database Link Name	
Provider Name	
Database Credentials	
Extract User ID	tutorial
Extract User Password	***
Administrator User ID	
Administrator User Password	
Other	
Default Schema for Browsing	
New Table Default Load Type	Database link load
SSIS Connection String	
Data Type Mapping Set	(Default)

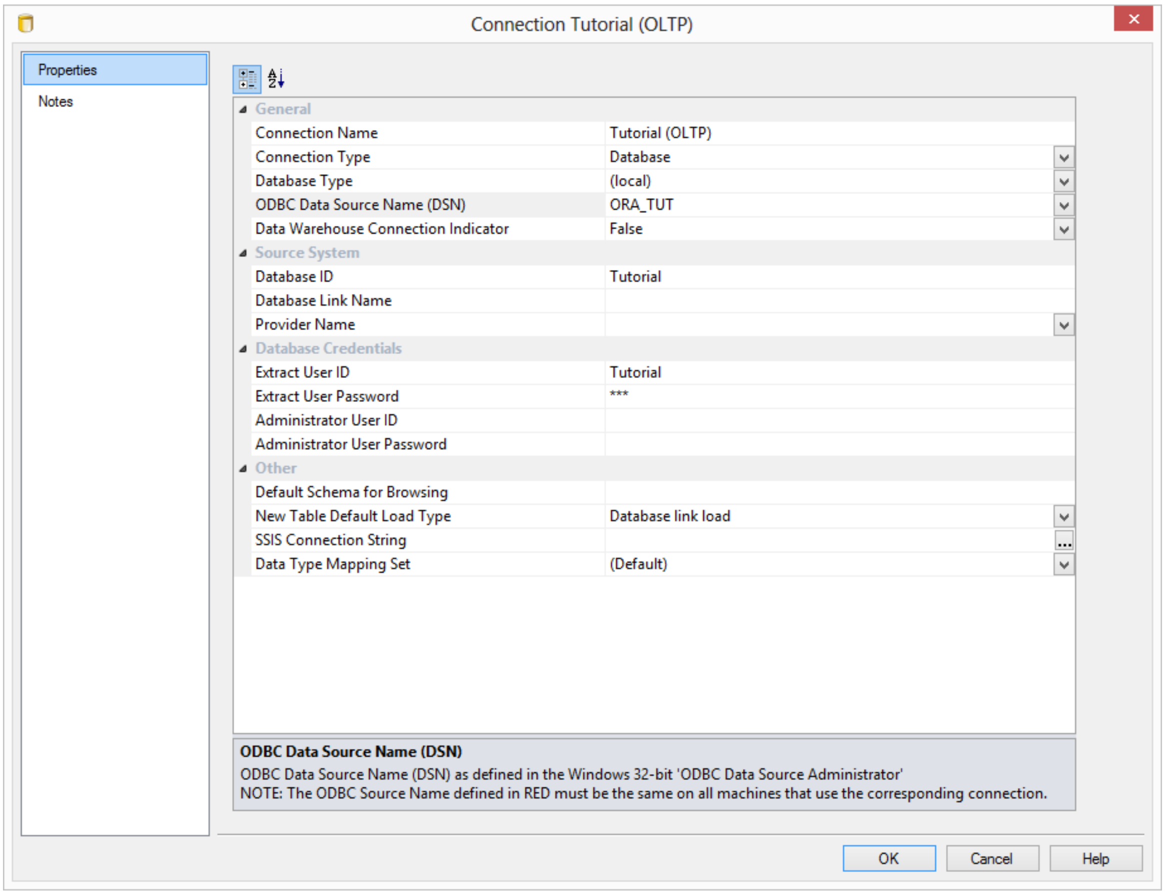
General
General

Oracle:
If running an Oracle data warehouse then proceed as follows.
In the Properties dialog, complete the details as below, and then select **Update**:

- The **ODBC Data Source Name** is the ODBC connection which has been defined to connect to the database. In this case the ODBC connection to the database that holds the tutorial tables.
- The **Provider Name** identifies the type of connection that Oracle will make in the case of a linked server.   In this case it is not required as we are using tutorial tables in an Oracle database on the same server.
- The **Database ID (SID)** is the Oracle SID of the database being connected to. In this case the SID of the tutorial database.
- The **Database Link Name** is an Oracle database link to connect from the data warehouse database to the source system database.

Note: This link is only required if the source database is different to the data warehouse database. For the purposes of this tutorial, the database link ID is not required as the tutorial data is usually loaded into the same database as the metadata.

- The **Extract User ID** and **Password** are the username and password for the schema where the source tables reside. For the tutorial this is the user where the tutorial files have been loaded.
- The **Administrator User ID** and **Password** are the administrator logon to the source location (tutorial). These 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.
- **Data Type Mapping Set** - XML files have been created to store mappings from one set of data types to another. Setting this field to "(Default)" will cause RED to automatically select the relevant mapping set; otherwise you can choose one of the standard mapping sets from the drop-down list or create a new one.

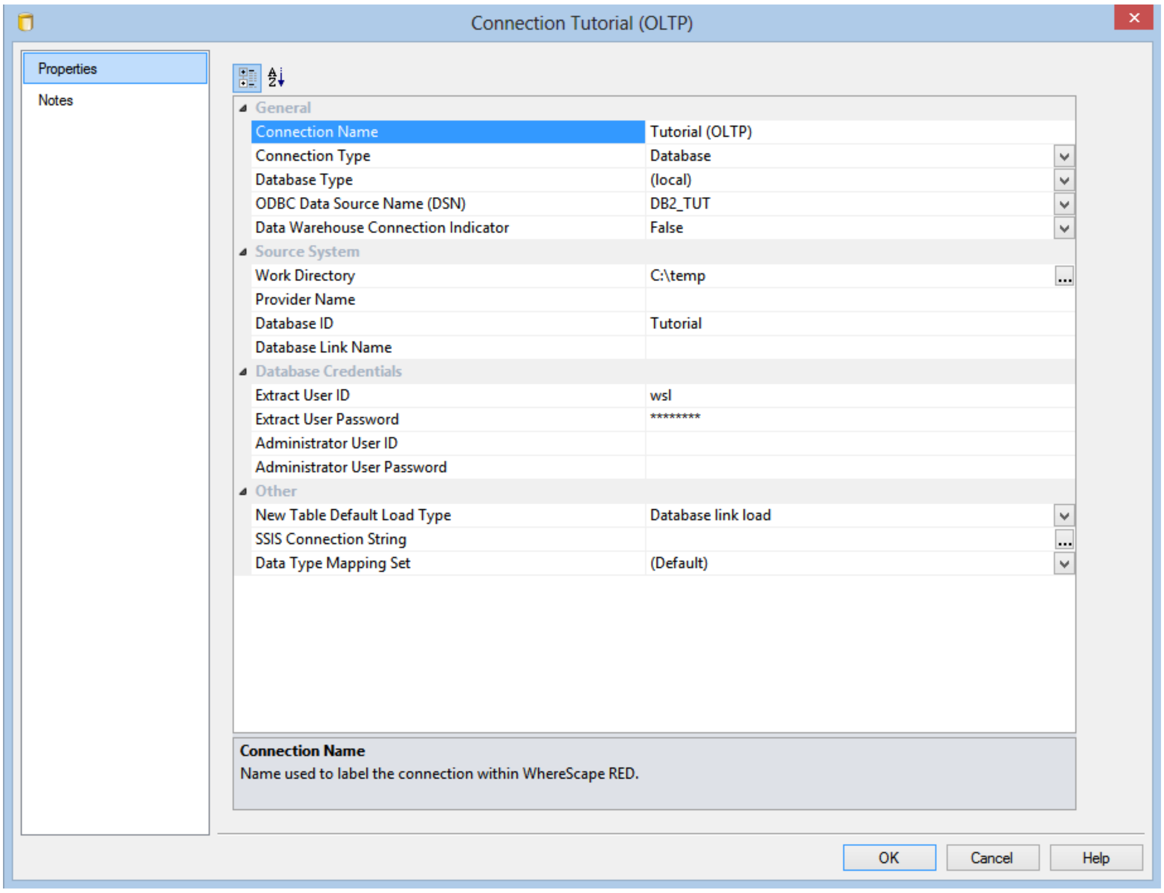


General	
Connection Name	Tutorial (OLTP)
Connection Type	Database
Database Type	(local)
ODBC Data Source Name (DSN)	ORA_TUT
Data Warehouse Connection Indicator	False
Source System	
Database ID	Tutorial
Database Link Name	
Provider Name	
Database Credentials	
Extract User ID	Tutorial
Extract User Password	***
Administrator User ID	
Administrator User Password	
Other	
Default Schema for Browsing	
New Table Default Load Type	Database link load
SSIS Connection String	
Data Type Mapping Set	(Default)

ODBC Data Source Name (DSN)
ODBC Data Source Name (DSN) as defined in the Windows 32-bit 'ODBC Data Source Administrator'
NOTE: The ODBC Source Name defined in RED must be the same on all machines that use the corresponding connection.

IBM DB2:
If running an IBM DB2 data warehouse then proceed as follows.
In the Properties dialog, complete the details as below, and then select **Update**:

- The **ODBC Data Source Name** is the ODBC connection which has been defined to connect to the database. In this case the ODBC connection to the database that holds the tutorial tables.
- The **Provider Name** identifies the type of connection that DB2 will make in the case of a linked server. In this case it is not required as we are using tutorial tables in a DB2 database on the same server.
- The **Work directory** is not used.
- The **Database ID (SID)** is not used.
- The **Database Link Name** is not used.
- The **Extract User ID** and password are the username and password required to logon to the tutorial database. If an operating system authenticated connection is being used then leave the Extract User ID and Password blank.
- The **Administrator User ID** and password are the administrator logon to the source location (tutorial). These 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.
- **Data Type Mapping Set** - XML files have been created to store mappings from one set of data types to another. Setting this field to "(Default)" will cause RED to automatically select the relevant mapping set; otherwise you can choose one of the standard mapping sets from the drop-down list or create a new one.



General	
Connection Name	Tutorial (OLTP)
Connection Type	Database
Database Type	(local)
ODBC Data Source Name (DSN)	DB2_TUT
Data Warehouse Connection Indicator	False
Source System	
Work Directory	C:\temp
Provider Name	
Database ID	Tutorial
Database Link Name	
Database Credentials	
Extract User ID	wsl
Extract User Password	********
Administrator User ID	
Administrator User Password	
Other	
New Table Default Load Type	Database link load
SSIS Connection String	
Data Type Mapping Set	(Default)

Connection Name
Name used to label the connection within WhereScape RED.

4 To confirm that you have connected to the system correctly, select **Source Tables** from the **Browse** menu, or click on one of the browse icons from the main tool bar or right pane tool bar.

- Select the connection you want to view, in this instance **Tutorial (OLTP)**, and click **OK**. For SQL Server the schema must be set to **dbo**. For Oracle the schema should be the tutorial schema.
- A third pane on the right, displays showing the tables contained under the tutorial source system.

5 Repeat steps 1 through 3 to create the connection for the Data Warehouse.

- The Connection name will be **Data Warehouse**
- Enter an extract user id (we have used **dssadm**) and a password (we have used **wsl**) for the metadata repository. For a SQL Server trusted connection set the extract user id to **dbo**.

You have now created two database connections, one to the source system (**Tutorial**), and one to the **Data Warehouse**.
You are now ready to proceed to the next step - ***Loading Source Tables*** (see "***1.7 Loading Source Tables***" on page 21).

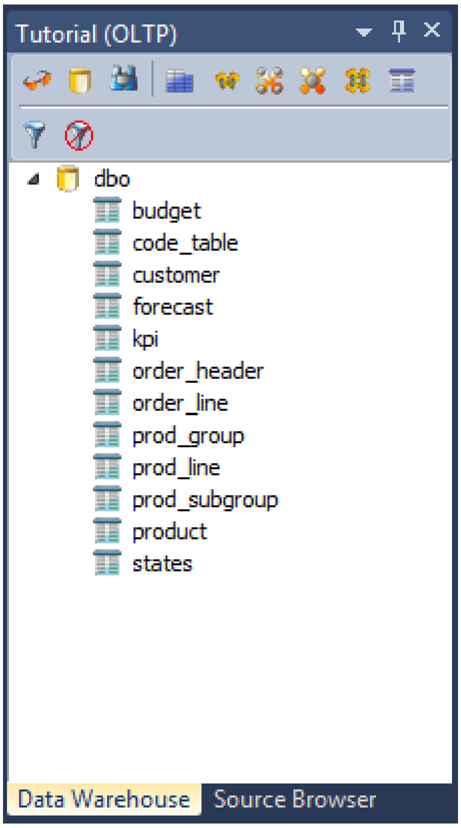
1.7 Loading Source Tables

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 then be prompted to create and load the tables which will create the physical tables in the data warehouse, and then load the data.

TIP: Ensure that your source system is displayed in the right pane, by selecting **Source Tables** from the **Browse** menu, then **Tutorial (OLTP)** from the **Connection List.** For **SQL Server** the schema must be **dbo.** For Oracle the schema should be the tutorial schema. Click **OK**.

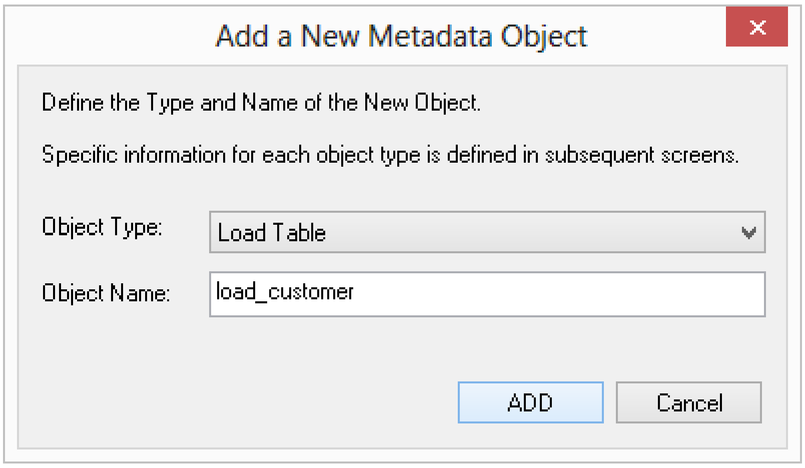
1. Double-click on the **Load Table object group** on the Object Tree in the left pane. The first column heading in the middle pane should read *Load Table Name*.
2. Expand the source table Object Tree in the right pane.



Tutorial (OLTP)

- dbo
  - budget
  - code_table
  - customer
  - forecast
  - kpi
  - order_header
  - order_line
  - prod_group
  - prod_line
  - prod_subgroup
  - product
  - states

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**. Click **ADD**.



Add a New Metadata Object

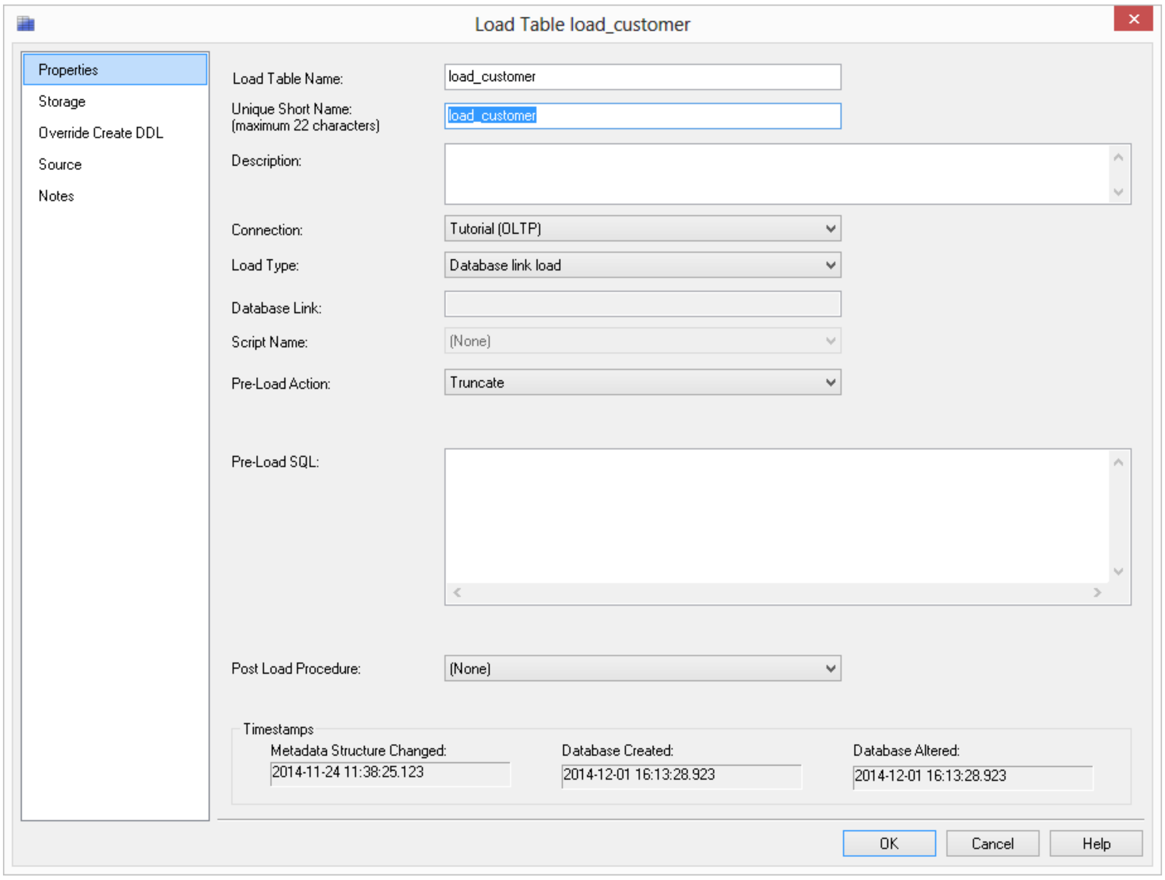
Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Load Table

Object Name: load_customer

4 The following table definition will display. Click **OK**.



Load Table load_customer

Load Table Name: load_customer

Unique Short Name: (maximum 22 characters) load_customer

Description:

Connection: Tutorial (OLTP)

Load Type: Database link load

Database Link:

Script Name: (None)

Pre-Load Action: Truncate

Pre-Load SQL:

Post Load Procedure: (None)

Timestamps

Metadata Structure Changed: 2014-11-24 11:38:25.123

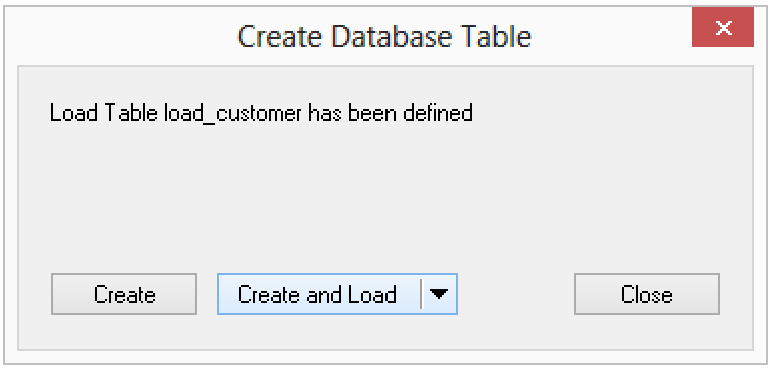
Database Created: 2014-12-01 16:13:28.923

Database Altered: 2014-12-01 16:13:28.923

Note1: For the purposes of this tutorial, all the necessary details have been automatically created. See the Loading Data chapter for explanations of the load parameters.

Note2: In IBM DB2, short names are limited to 12 characters.

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**.



Load Table load_customer has been defined

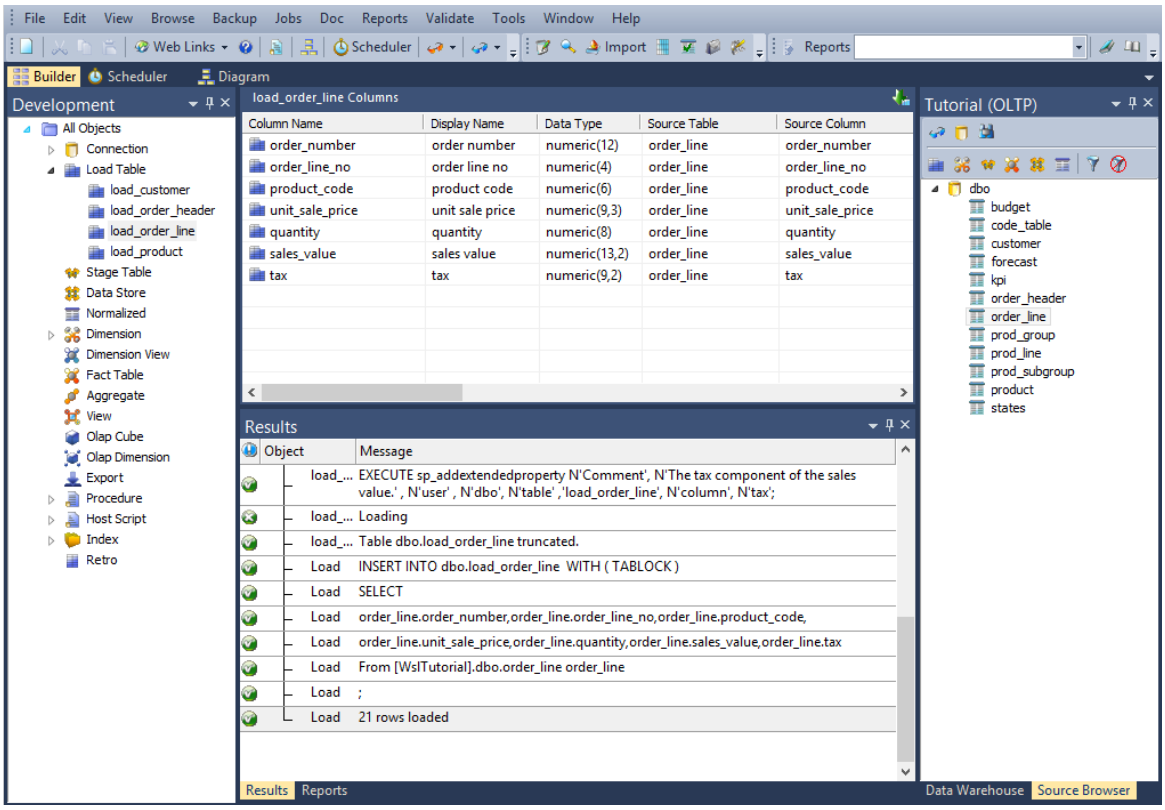
6 This will create the physical tables in the data warehouse and load the data.

7 Results will be posted in the results pane. Note that the Load Table object group in the left pane now has a dependent/child.

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.

8 Repeat this process (steps 2 - 7) for the source tables **product**, **order_header**, and **order_line**.

9 Your screen should look something like this:



load_order_line Columns

Column Name	Display Name	Data Type	Source Table	Source Column
order_number	order number	numeric(12)	order_line	order_number
order_line_no	order line no	numeric(4)	order_line	order_line_no
product_code	product code	numeric(6)	order_line	product_code
unit_sale_price	unit sale price	numeric(9,3)	order_line	unit_sale_price
quantity	quantity	numeric(8)	order_line	quantity
sales_value	sales value	numeric(13,2)	order_line	sales_value
tax	tax	numeric(9,2)	order_line	tax

Results

Object	Message
load_...	EXECUTE sp_addextendedproperty N'Comment', N'The tax component of the sales value.' , N'user' , N'dbo', N'table' ,'load_order_line', N'column', N'tax';
load_...	Loading
load_...	Table dbo.load_order_line truncated.
Load	INSERT INTO dbo.load_order_line WITH (TABLOCK)
Load	SELECT
Load	order_line.order_number,order_line.order_line_no,order_line.product_code,
Load	order_line.unit_sale_price,order_line.quantity,order_line.sales_value,order_line.tax
Load	From [WslTutorial].dbo.order_line order_line
Load	;
Load	21 rows loaded

You are now ready to proceed to the next step - ***Building Dimensions*** (see "***1.8 Building Dimensions***" on page 32).

1.7.1 Loading Source Tables using Schemas (Oracle and SQL Server Only)

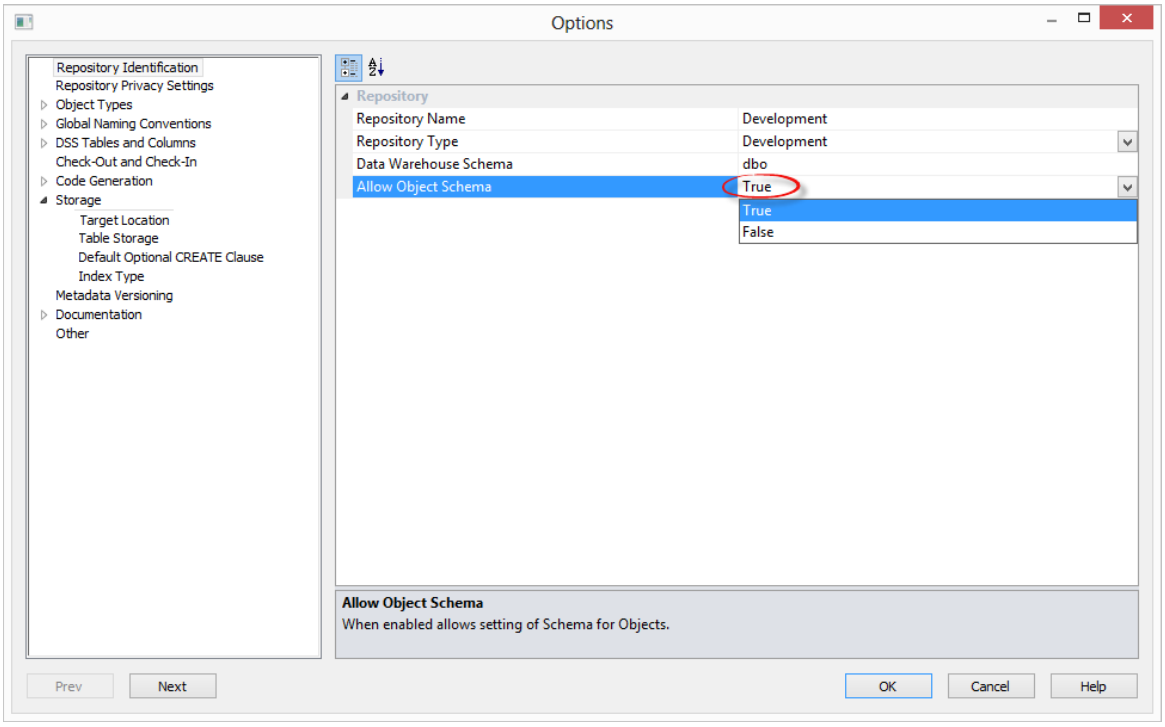
TIP: This an optional/informative tutorial only that has been designed for users that want to place objects across multiple schemas in WhereScape RED.

RED allows objects to be placed across multiple schemas for Oracle and SQL Server databases. Before creating any tables using an Oracle source, the RED user needs to be granted a set of specific privileges.
In SQL Server, the specific shemas will need to be created in the SQL database. The required Oracle privileges and SQL Server schema instructions are described at the end of this section.

The steps to use schemas in WhereScape RED are:

- Ensure the **Schema** you need exists in Oracle or SQL Server. Create any schema that does not exist.
- Enable **Schema** use by switching on the **Allow Object Schema** in **Tools>Options**.
- Add one **Target** to the Data Warehouse connection in RED for each **Schema** you intend to use.
- Configure the Data Warehouse connection in RED to browse all required schema by default.
- Set the default **Target** for **load tables** in **Tools>Options**.
- When you are defining a new table in RED, check and ensure the correct target is set on the **storage** tab.

1 After logging in to WhereScape RED, make sure the **Allow object Schema** option is set in the **Tools->Options->Repository Identification** settings.



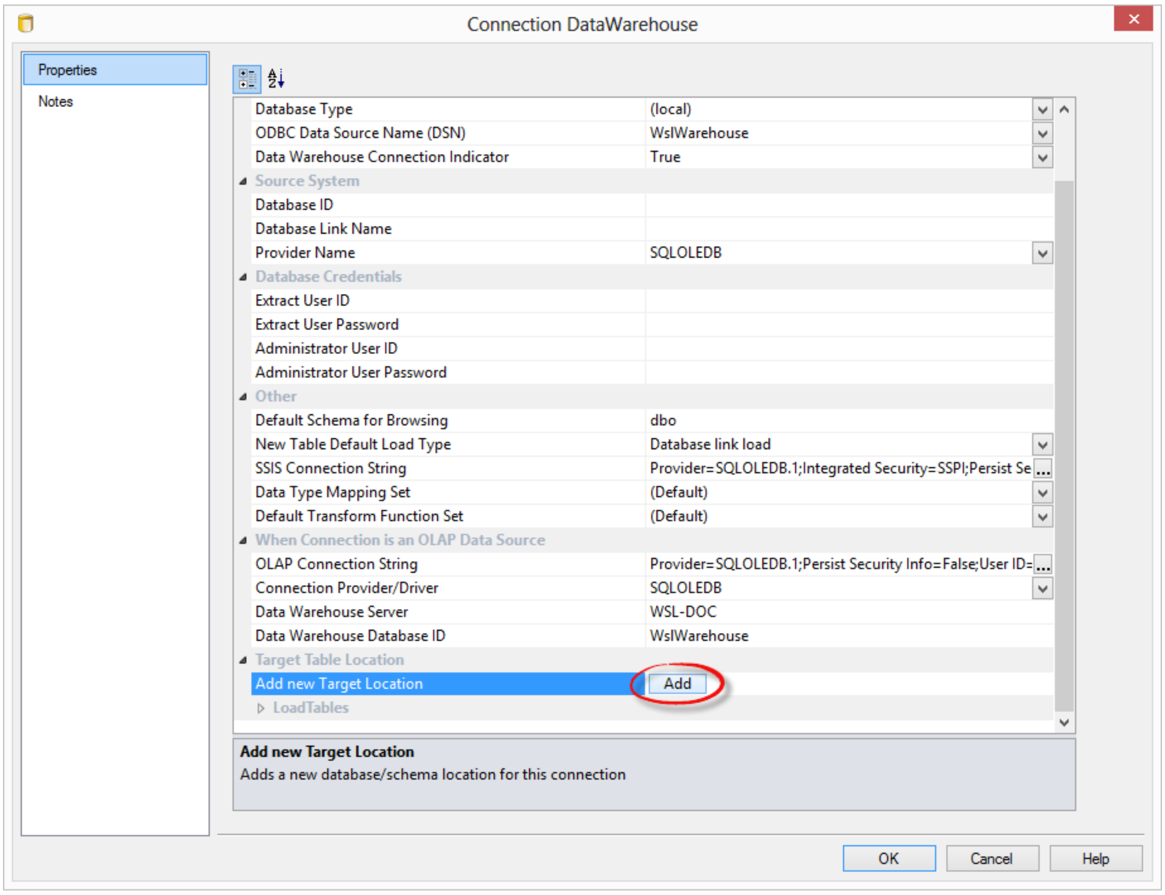
Options

Repository	
Repository Name	Development
Repository Type	Development
Data Warehouse Schema	dbo
Allow Object Schema	True

Allow Object Schema
When enabled allows setting of Schema for Objects.

2 Add one Target to the Data Warehouse connection in RED for each Schema you want to use:

- Click the **Add** button to add the required target schemas for this connection.

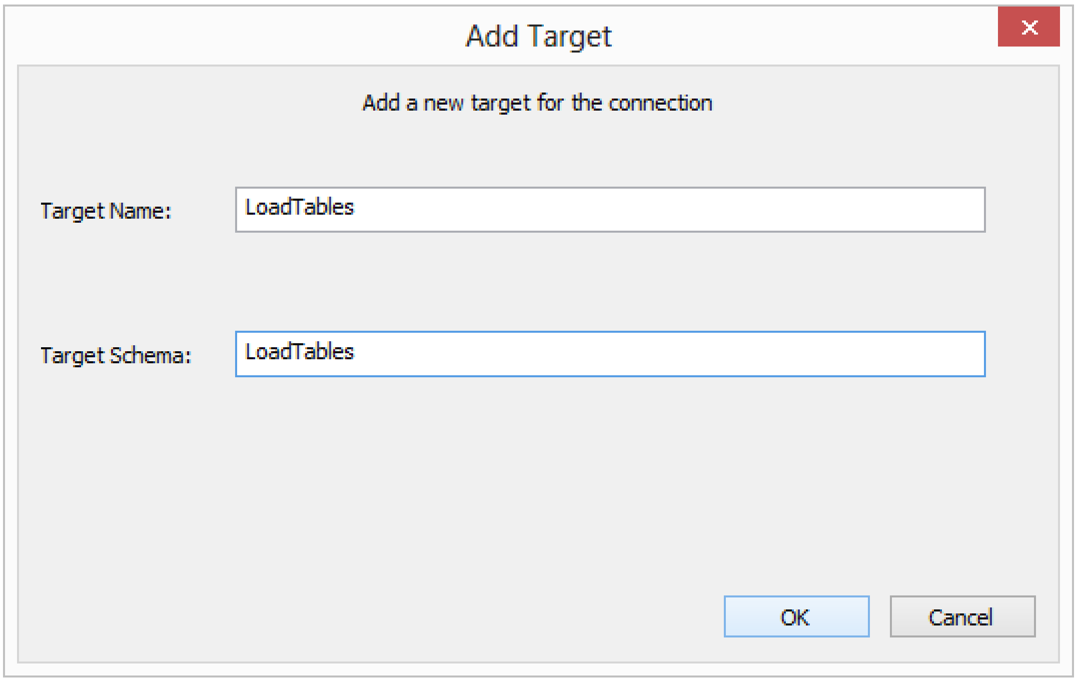


Connection DataWarehouse

Database Type	(local)
ODBC Data Source Name (DSN)	WslWarehouse
Data Warehouse Connection Indicator	True
Source System	
Database ID	
Database Link Name	
Provider Name	SQLOLEDB
Database Credentials	
Extract User ID	
Extract User Password	
Administrator User ID	
Administrator User Password	
Other	
Default Schema for Browsing	dbo
New Table Default Load Type	Database link load
SSIS Connection String	Provider=SQLOLEDB.1;Integrated Security=SSPI;Persist Se
Data Type Mapping Set	(Default)
Default Transform Function Set	(Default)
When Connection is an OLAP Data Source	
OLAP Connection String	Provider=SQLOLEDB.1;Persist Security Info=False;User ID=
Connection Provider/Driver	SQLOLEDB
Data Warehouse Server	WSL-DOC
Data Warehouse Database ID	WslWarehouse
Target Table Location	
Add new Target Location	Add
LoadTables	

Add new Target Location
Adds a new database/schema location for this connection

3 Give the new target a name and then enter the target's schema. It is best to set the target name to the same name as the schema.



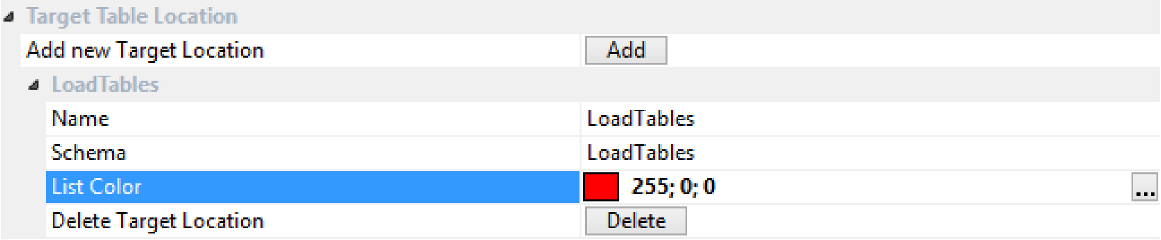
Add Target

Add a new target for the connection

Target Name: LoadTables

Target Schema: LoadTables

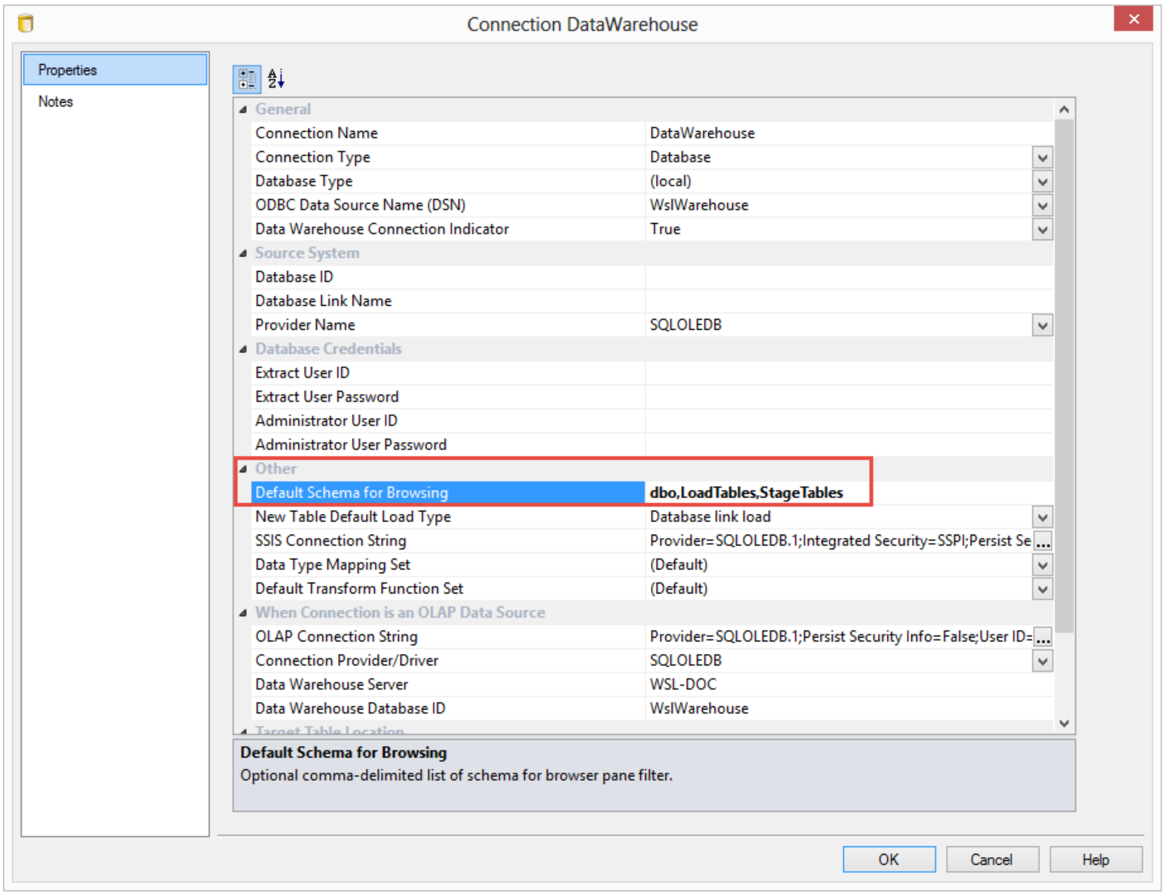
4 Expand the target locations to change schema colors or to delete schemas.



Target Table Location	
Add new Target Location	Add
LoadTables	
Name	LoadTables
Schema	LoadTables
List Color	🟥 255; 0; 0 ...
Delete Target Location	Delete

5 Still in the DataWarehouse connection, add the new schemas to the **Default Schema for Browsing** field separated by commas.

- While browsing this connection, RED will then display a list with all the schemas and their associated objects on the right-hand browser pane.



Connection DataWarehouse

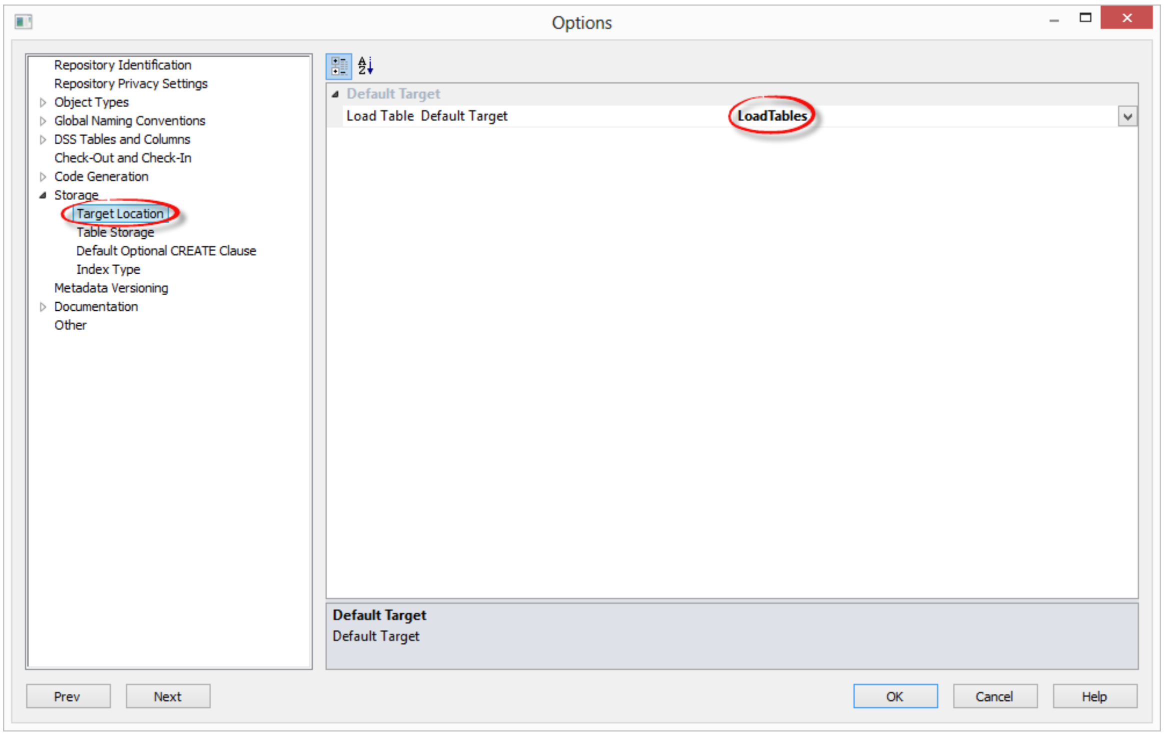
General	
Connection Name	DataWarehouse
Connection Type	Database
Database Type	(local)
ODBC Data Source Name (DSN)	WslWarehouse
Data Warehouse Connection Indicator	True
Source System	
Database ID	
Database Link Name	
Provider Name	SQLOLEDB
Database Credentials	
Extract User ID	
Extract User Password	
Administrator User ID	
Administrator User Password	
Other	
Default Schema for Browsing	dbo,LoadTables,StageTables
New Table Default Load Type	Database link load
SSIS Connection String	Provider=SQLOLEDB.1;Integrated Security=SSPI;Persist Se
Data Type Mapping Set	(Default)
Default Transform Function Set	(Default)
When Connection is an OLAP Data Source	
OLAP Connection String	Provider=SQLOLEDB.1;Persist Security Info=False;User ID=
Connection Provider/Driver	SQLOLEDB
Data Warehouse Server	WSL-DOC
Data Warehouse Database ID	WslWarehouse
Target Table Location	

Default Schema for Browsing
Optional comma-delimited list of schema for browser pane filter.

NOTE: In **SQL Server**, you will probably also want to include dbo in this list. Similarly, in **Oracle** you will probably also want to include the metadata schema.

6 You are also able to set the default location for new **Load Tables** in **Tools>Options**.

- This default target location is only applied when a new load table is created.

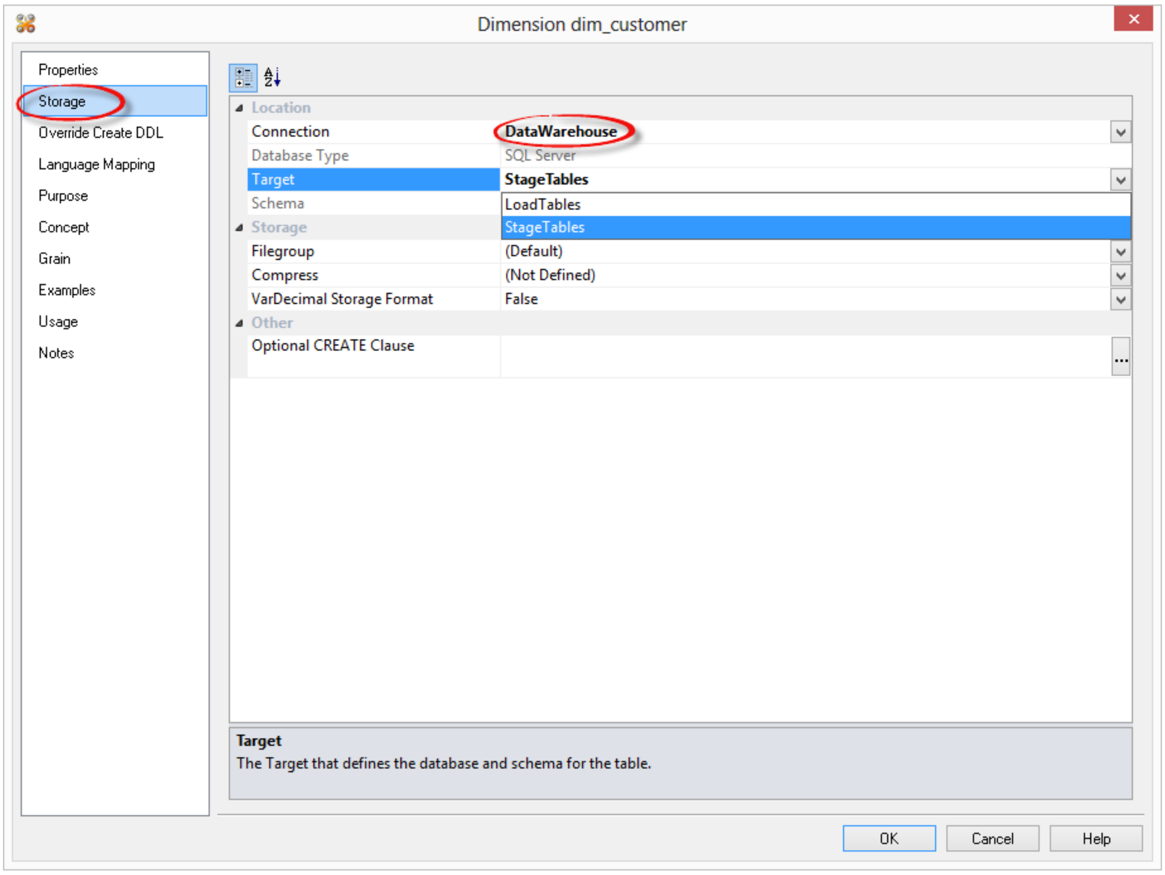


Default Target
Load Table Default Target LoadTables

Default Target
Default Target

7 When defining a new table in RED, check and ensure the correct target is set on the **Storage** tab before creating the table in the database.
A new Load table will have a Target value set by default as defined in step 6. You're able to change this as required on each table using the **Storage** tab of each object's Properties screen.
When using drag and drop, other object types will inherit the default Target value of the object you create them from. You are also able to change this as required on each table using the **Storage** tab of each object's Properties screen.

- To locate tables in different schemas, select **DataWarehouse** from the drop-down menu and then select the **Target** schema from the target drop-down menu.
- Alternatively, leave this field blank or select (local) for a local table.



Dimension dim_customer

Properties
Storage
Override Create DDL
Language Mapping
Purpose
Concept
Grain
Examples
Usage
Notes

Location	
Connection	DataWarehouse
Database Type	SQL Server
Target	StageTables
Schema	LoadTables StageTables
Storage	
Filegroup	(Default)
Compress	(Not Defined)
VarDecimal Storage Format	False
Other	
Optional CREATE Clause	

Target
The Target that defines the database and schema for the table.

WARNING: By default objects will be placed in the source table's schema for table types other than Load tables.

NOTE: When upgrading from a RED version previous to 6.8.2.0 and moving existing objects to a target location, all procedures that reference those objects will need to be rebuilt.
Any **FROM** clauses will also need to be manually regenerated in order for the table references to be updated to the new [TABLEOWNER] form.

8 To create any of these objects in RED, the RED user will need to be granted a specific set of privileges in Oracle. For SQL Server, the specific schemas will need to be created in the SQL database.

9 SQL Server

- To use object placement across multiple schemas, the required schemas need to be created in the SQL database.

10 Oracle

- To use object placement across multiple schemas in WhereScape RED, the RED user should be granted the following privileges:

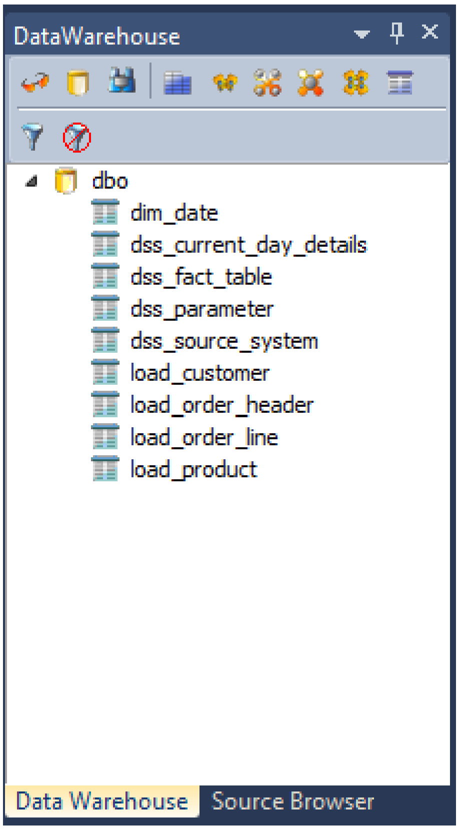
```
grant select any table to dssdemo;
grant create any view to dssdemo;
grant drop any view to dssdemo;
grant create any table to dssdemo;
grant drop any table to dssdemo;
grant delete any table to dssdemo;
grant insert any table to dssdemo;
grant update any table to dssdemo;
grant alter any table to dssdemo;
grant global query rewrite to dssdemo;
grant create any materialized view to dssdemo;
grant drop any materialized view to dssdemo;
grant alter any materialized view to dssdemo;
grant create any index to dssdemo;
grant drop any index to dssdemo;
grant alter any index to dssdemo;
grant select any sequence to dssdemo;
grant create any sequence to dssdemo;
grant drop any sequence to dssdemo;
grant alter any sequence to dssdemo;
grant analyze any to dssdemo;
```

1.8 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 for how you would like the dimension managed. WhereScape RED generates code for normal, slowly changing, previous value 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 Change the right pane view to show the Data Warehouse tables by selecting DataWarehouse from the Browse menu OR click the tab along the bottom of the source window.

Note: For SQL Server the Data Warehouse schema must be **dbo**.



DataWarehouse

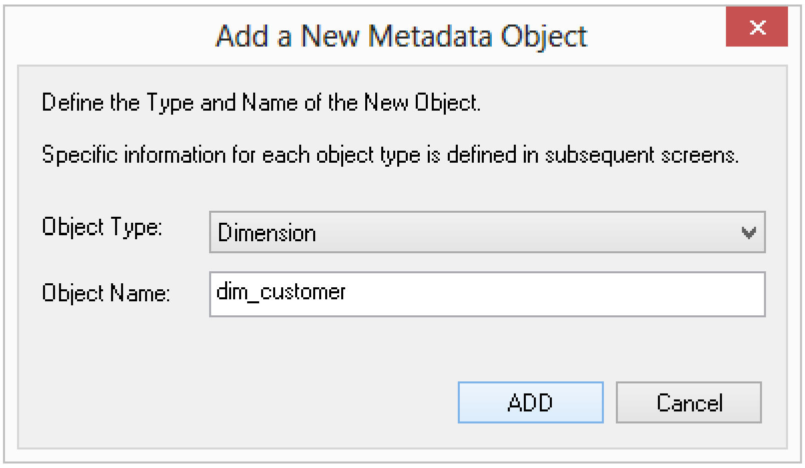
dbo
- dim_date
- dss_current_day_details
- dss_fact_table
- dss_parameter
- dss_source_system
- load_customer
- load_order_header
- load_order_line
- load_product

Note: From this point onwards, all work will be performed within the data warehouse.

2 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 Name*.

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

3 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**.



Add a New Metadata Object

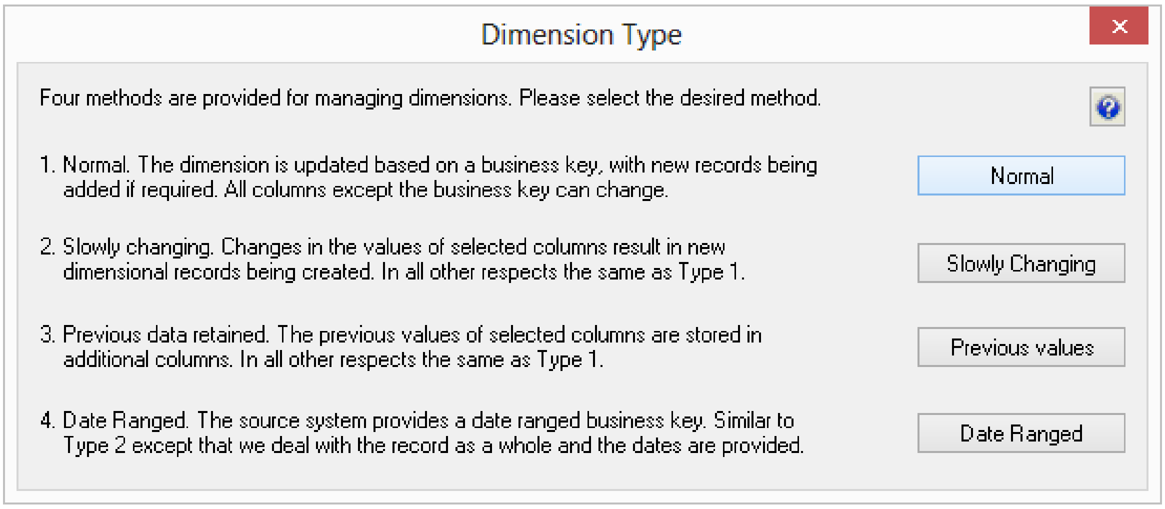
Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Dimension

Object Name: dim_customer

4 A dialog box displays asking how you want the dimension managed. Click **Normal.**



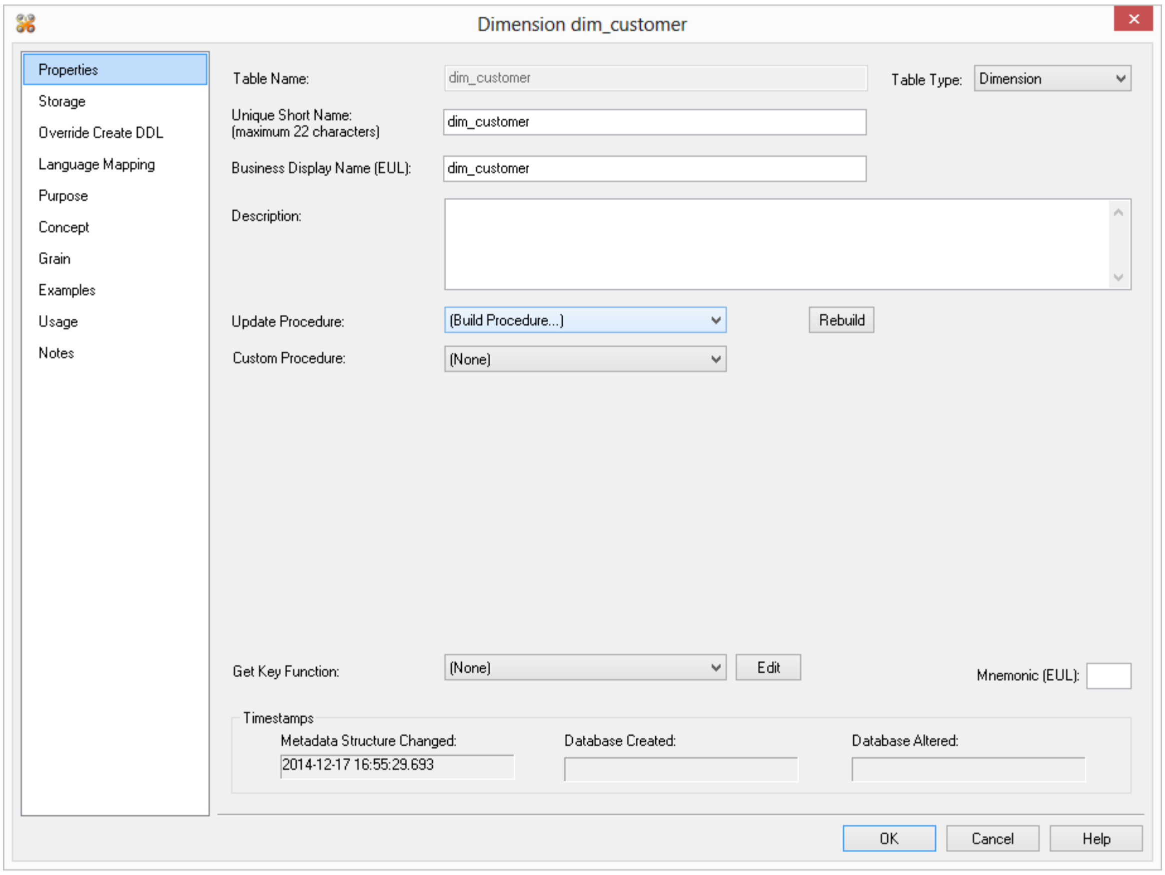
Dimension Type

Four methods are provided for managing dimensions. Please select the desired method.

1. Normal. The dimension is updated based on a business key, with new records being added if required. All columns except the business key can change.
2. Slowly changing. Changes in the values of selected columns result in new dimensional records being created. In all other respects the same as Type 1.
3. Previous data retained. The previous values of selected columns are stored in additional columns. In all other respects the same as Type 1.
4. Date Ranged. The source system provides a date ranged business key. Similar to Type 2 except that we deal with the record as a whole and the dates are provided.

5 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**.



Dimension dim_customer

Table Name: dim_customer

Table Type: Dimension

Unique Short Name: (maximum 22 characters) dim_customer

Business Display Name (EUL): dim_customer

Description:

Update Procedure: (Build Procedure...)

Custom Procedure: (None)

Get Key Function: (None)

Mnemonic (EUL):

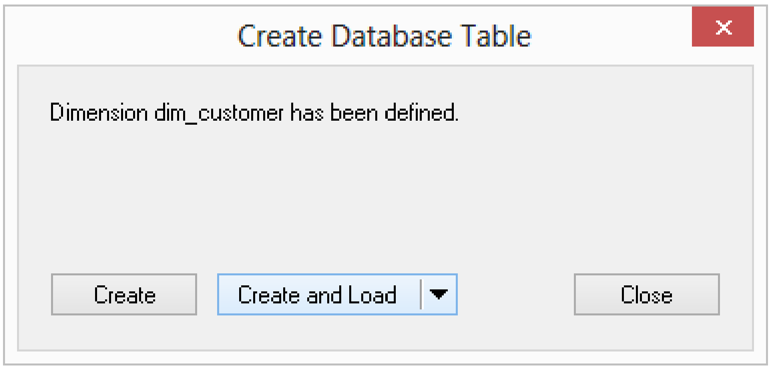
Timestamps

Metadata Structure Changed: 2014-12-17 16:55:29.693

Database Created:

Database Altered:

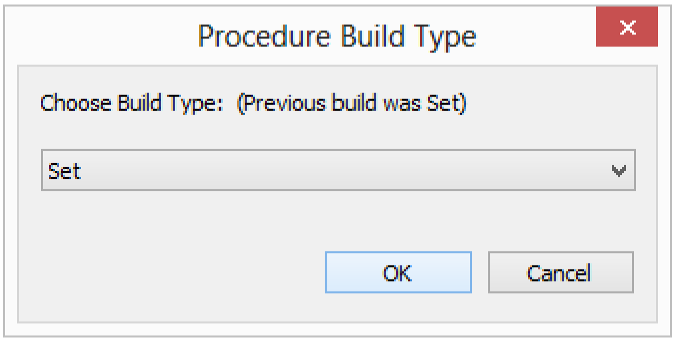
6 A dialog box displays confirming that the dimension table **dim_customer** has been defined and asking if you want to create and load the table. Click **Create and Load**.



Create Database Table

Dimension dim_customer has been defined.

7 A Procedure Build Type dialog will appear. Select **Cursor/Set** and then click **OK**.



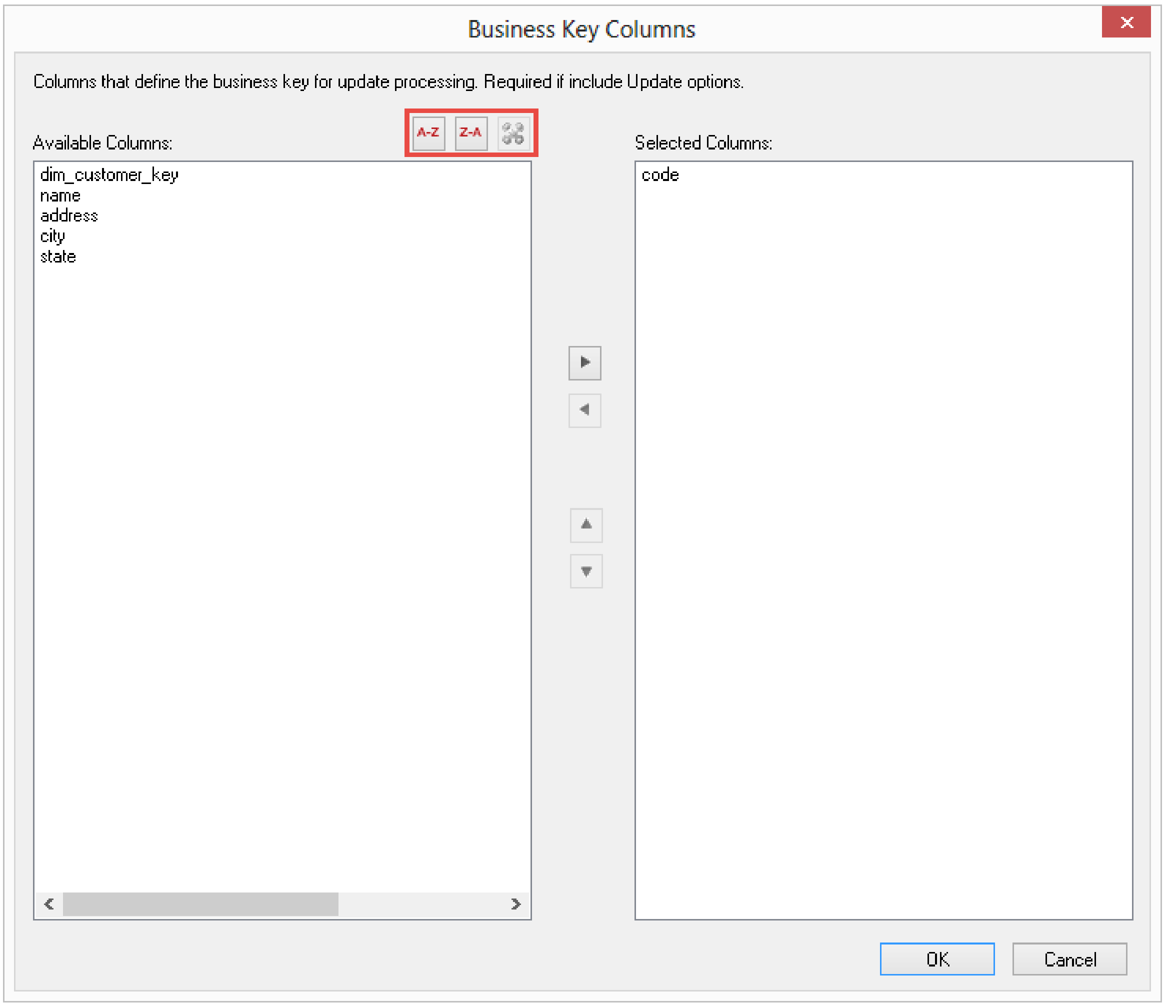
Procedure Build Type

Choose Build Type: (Previous build was Set)

Set

8 Define the Business Key by clicking on the **ellipsis** button of the Update Build Options screen.The business (natural) key is the unique identifier for the dimensional record. Select **code** and **>** (or double-click on **code**) on the Business Key Column dialog and click **OK**.

TIP: The toggle sort button button can help to sort Business Key columns into alphabetic order.



Business Key Columns

Columns that define the business key for update processing. Required if include Update options.

Available Columns:

dim_customer_key
name
address
city
state

Selected Columns:

code

9 The procedure results display and can be reviewed.

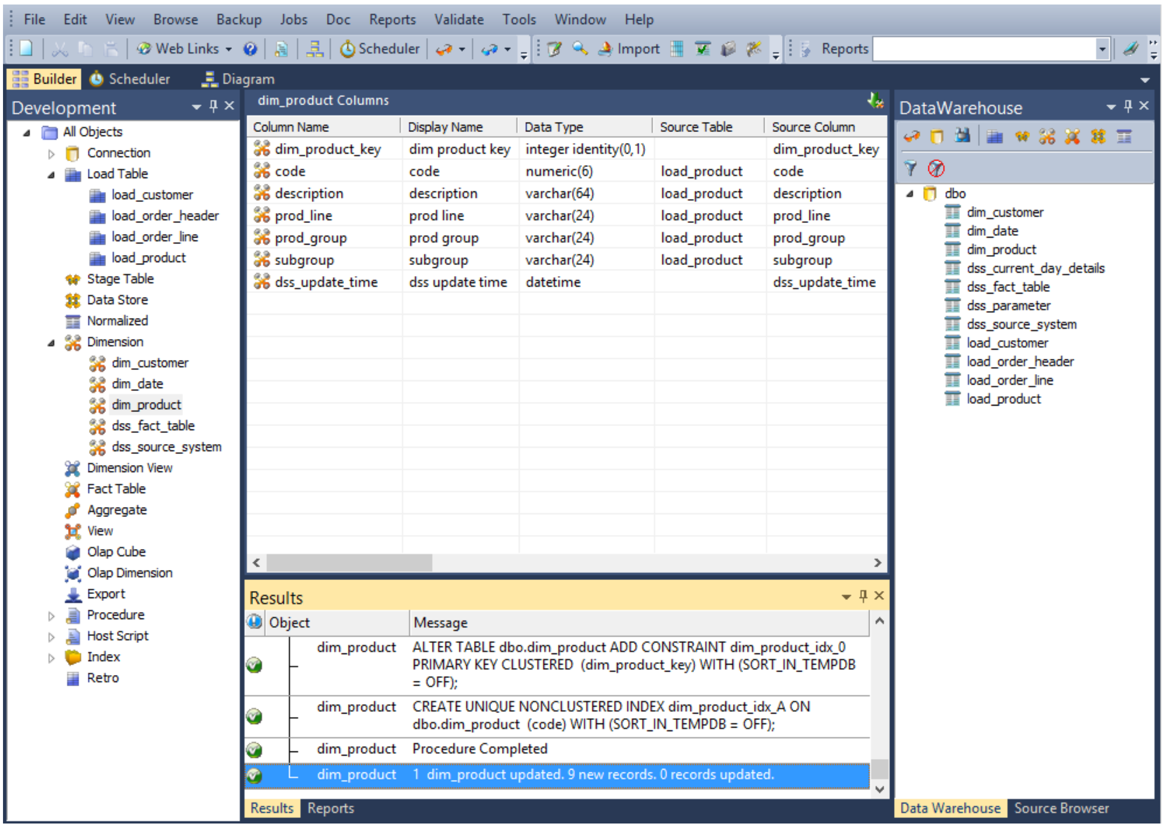
NOTE: The Dimension Table object group in the left pane now has added **dim_customer** as a dependent/child.

10 Repeat this same process (steps 2 through 9) for the load table **load_product**. The 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.

11 Refresh the Data Warehouse pane on the right (F5).

Your screen should look something like this:



dim_product Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_product_key	dim product key	integer identity(0,1)		dim_product_key
code	code	numeric(6)	load_product	code
description	description	varchar(64)	load_product	description
prod_line	prod line	varchar(24)	load_product	prod_line
prod_group	prod group	varchar(24)	load_product	prod_group
subgroup	subgroup	varchar(24)	load_product	subgroup
dss_update_time	dss update time	datetime		dss_update_time

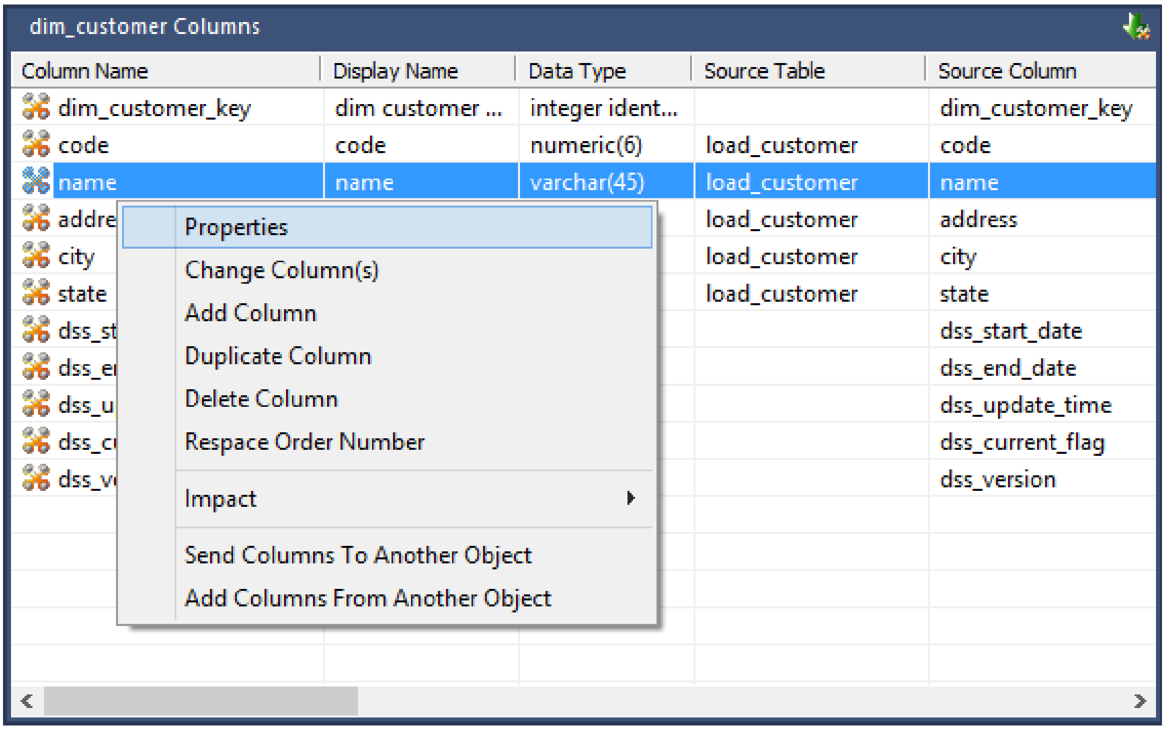
Results

Object	Message
dim_product	ALTER TABLE dbo.dim_product ADD CONSTRAINT dim_product_idx_0 PRIMARY KEY CLUSTERED (dim_product_key) WITH (SORT_IN_TEMPDB = OFF);
dim_product	CREATE UNIQUE NONCLUSTERED INDEX dim_product_idx_A ON dbo.dim_product (code) WITH (SORT_IN_TEMPDB = OFF);
dim_product	Procedure Completed
dim_product	1 dim_product updated. 9 new records. 0 records updated.

Note: Analysis Services does not like **name** as a column name. For dim_customer it will therefore be necessary to change the column name from **name** to **cname**.

12 Click on **dim_customer** in the left pane to display the dim_customer columns in the middle pane.

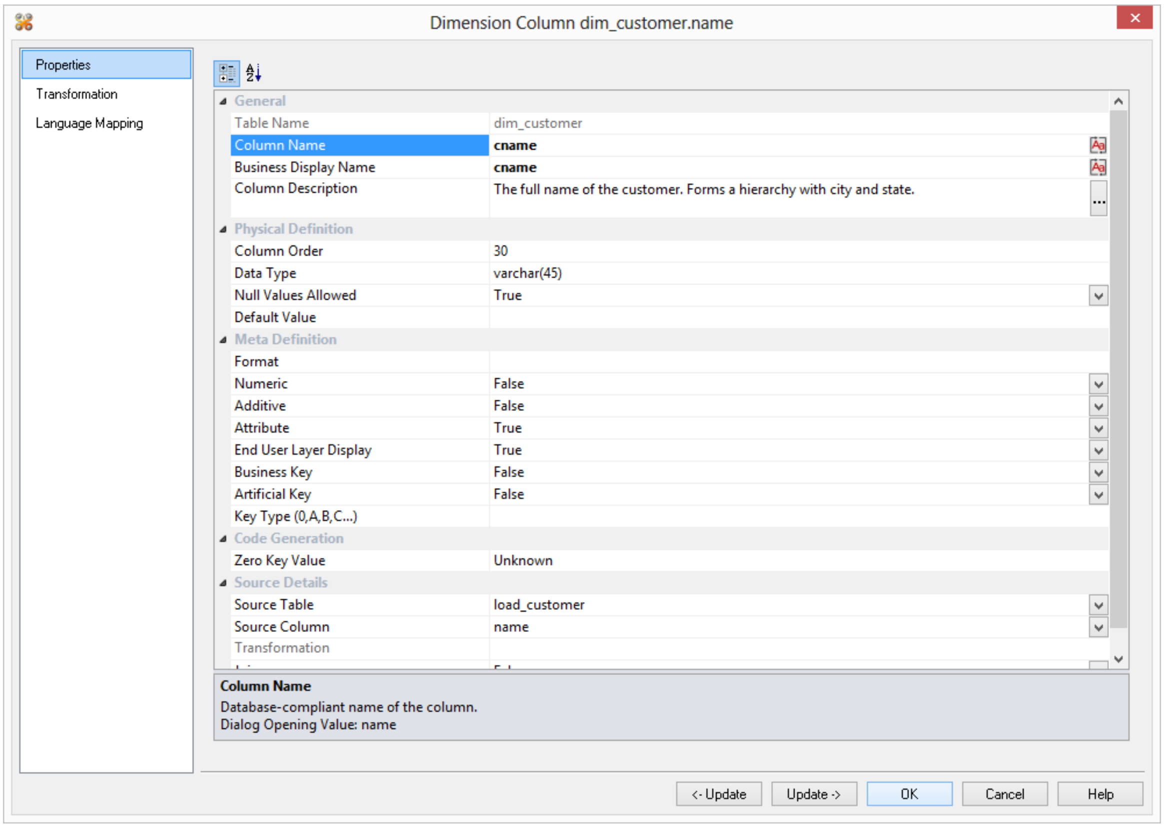
13 When positioned on the column **name** in the middle pane, right-click and select **Properties** from the drop-down menu.



dim_customer Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer ident...		dim_customer_key
code	code	numeric(6)	load_customer	code
name	name	varchar(45)	load_customer	name
addre			load_customer	address
city			load_customer	city
state			load_customer	state
dss_st				dss_start_date
dss_e				dss_end_date
dss_u				dss_update_time
dss_c				dss_current_flag
dss_v				dss_version

14 Change the column name and business display name from **name** to **cname** as shown below. Click **OK.**

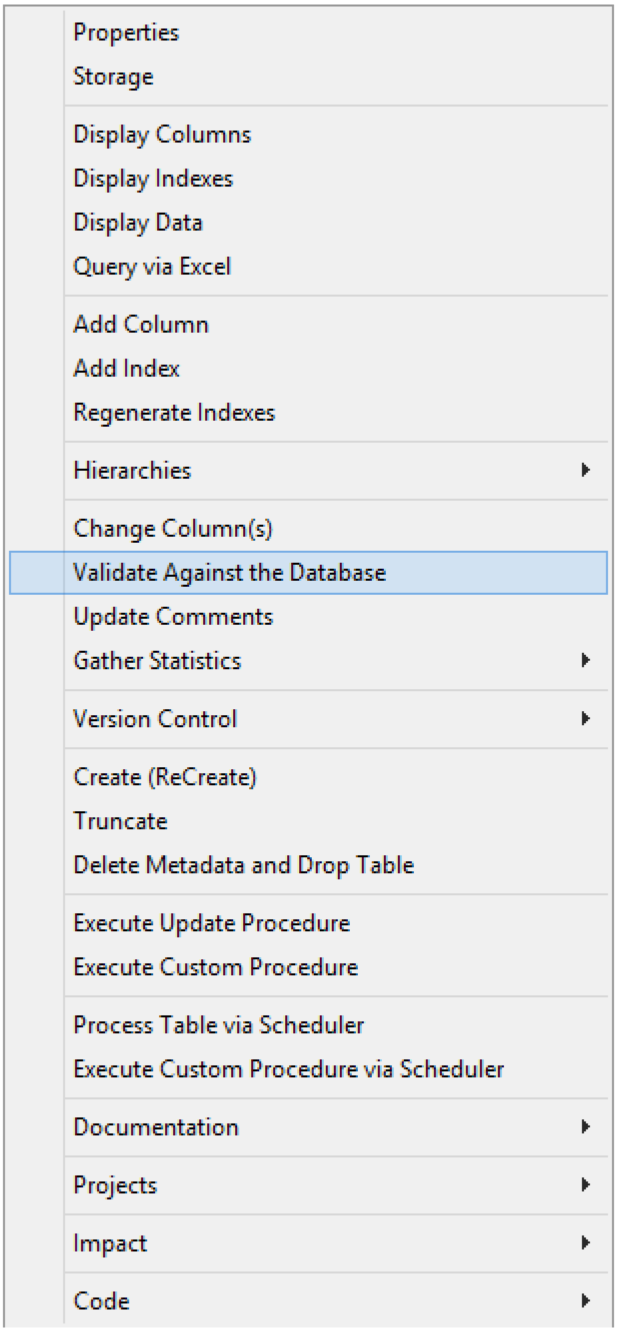


Dimension Column dim_customer.name

General	
Table Name	dim_customer
Column Name	cname
Business Display Name	cname
Column Description	The full name of the customer. Forms a hierarchy with city and state.
Physical Definition	
Column Order	30
Data Type	varchar(45)
Null Values Allowed	True
Default Value	
Meta Definition	
Format	
Numeric	False
Additive	False
Attribute	True
End User Layer Display	True
Business Key	False
Artificial Key	False
Key Type (0,A,B,C...)	
Code Generation	
Zero Key Value	Unknown
Source Details	
Source Table	load_customer
Source Column	name
Transformation	

Column Name
Database-compliant name of the column.
Dialog Opening Value: name

15 Right-click on **dim_customer** in the left pane and select **Validate against the Database**.



16 The results will show that the metadata has been changed to **cname** while the column name in the database is still **name**.

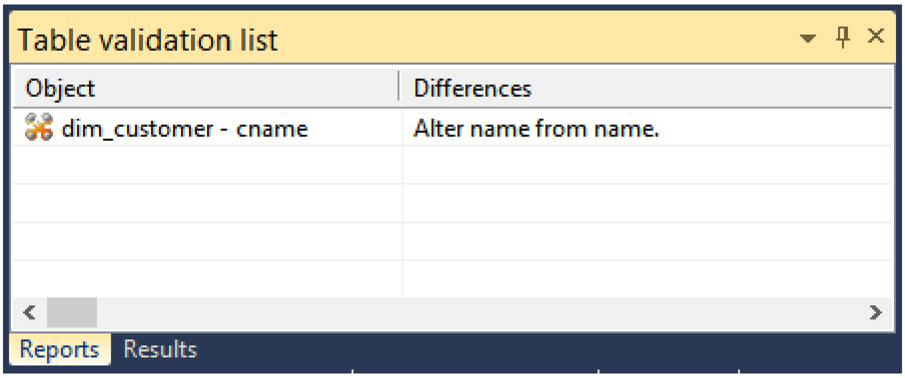
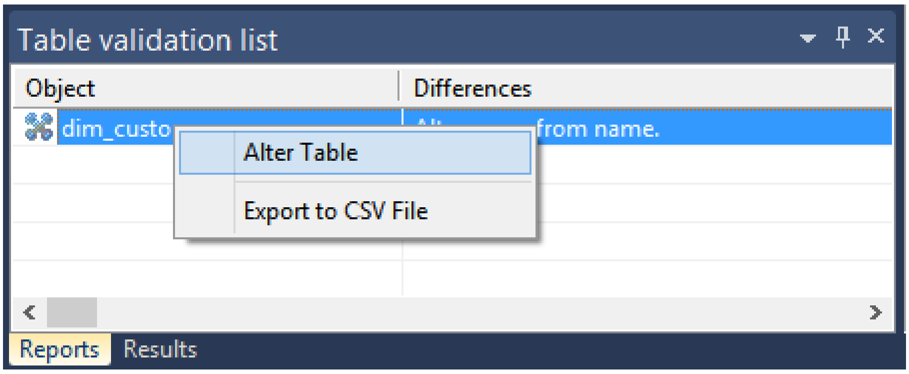


Table validation list

Object	Differences
dim_customer - cname	Alter name from name.

TIP: You can right click on the dimension name and select **Sync Column order with database** to reorder the metadata columns to match the column order in the database table.

17 Right-click on **dim_customer** in the bottom pane and select **Alter table** from the drop-down list.



18 A warning dialog will appear, displaying the table and column name to be altered. Select **Alter Table**.

19 A dialog will appear confirming that dim_customer has been altered. Click **OK**.

20 Right-click on the **dim_customer** object in the left pane and select **Properties** from the drop-down menu. Choose the **Rebuild** button.

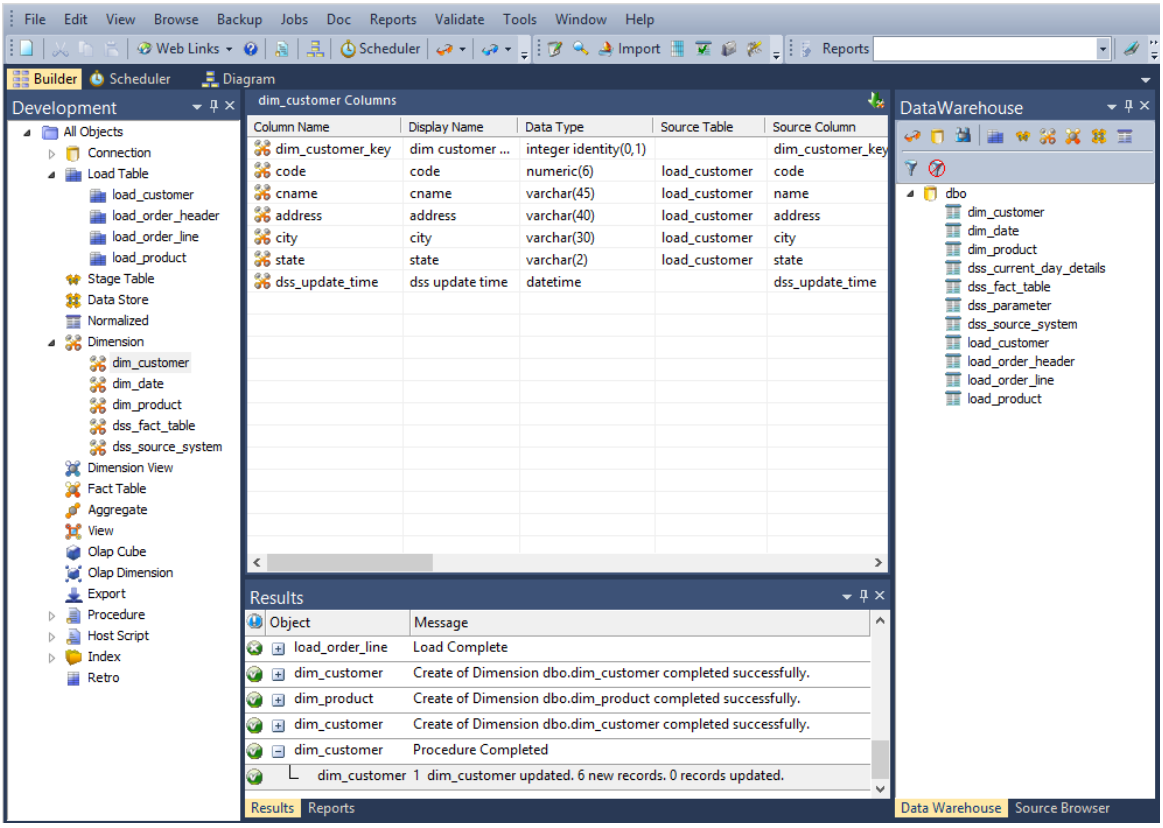
21 A Procedure Build Type dialog will appear. Select **Cursor** and then **OK**.

22 Leave the Business key as **Code** and click **OK**.

23 Right-click on **dim_customer** in the left pane and select **Execute Update Procedure.**

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

25 Your screen should look something like this:



dim_customer Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer identity(0,1)		dim_customer_key
code	code	numeric(6)	load_customer	code
cname	cname	varchar(45)	load_customer	name
address	address	varchar(40)	load_customer	address
city	city	varchar(30)	load_customer	city
state	state	varchar(2)	load_customer	state
dss_update_time	dss update time	datetime		dss_update_time

Results

Object	Message
load_order_line	Load Complete
dim_customer	Create of Dimension dbo.dim_customer completed successfully.
dim_product	Create of Dimension dbo.dim_product completed successfully.
dim_customer	Create of Dimension dbo.dim_customer completed successfully.
dim_customer	Procedure Completed
└ dim_customer 1	dim_customer updated. 6 new records. 0 records updated.

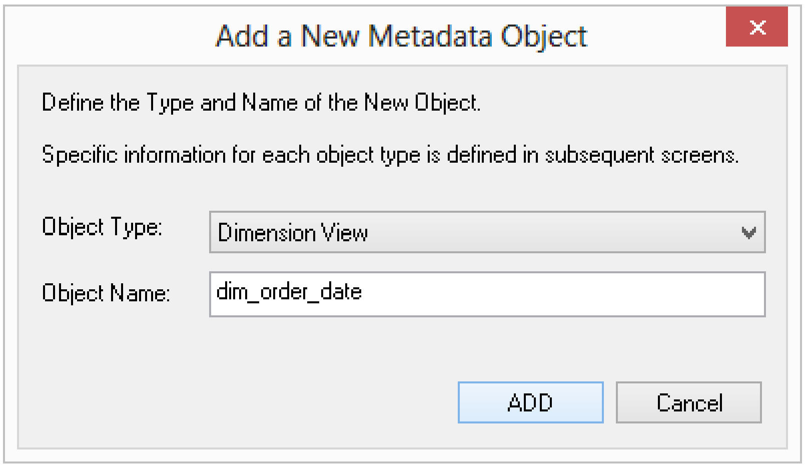
You are now ready to proceed to the next step - ***Creating Dimension Views*** (see "***1.9 Creating Dimension Views***" on page 41)

1.9 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 After double-clicking on **Dimension View** in the left pane, click and drag **dim_date** from the right pane into the middle pane.

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


Add a New Metadata Object

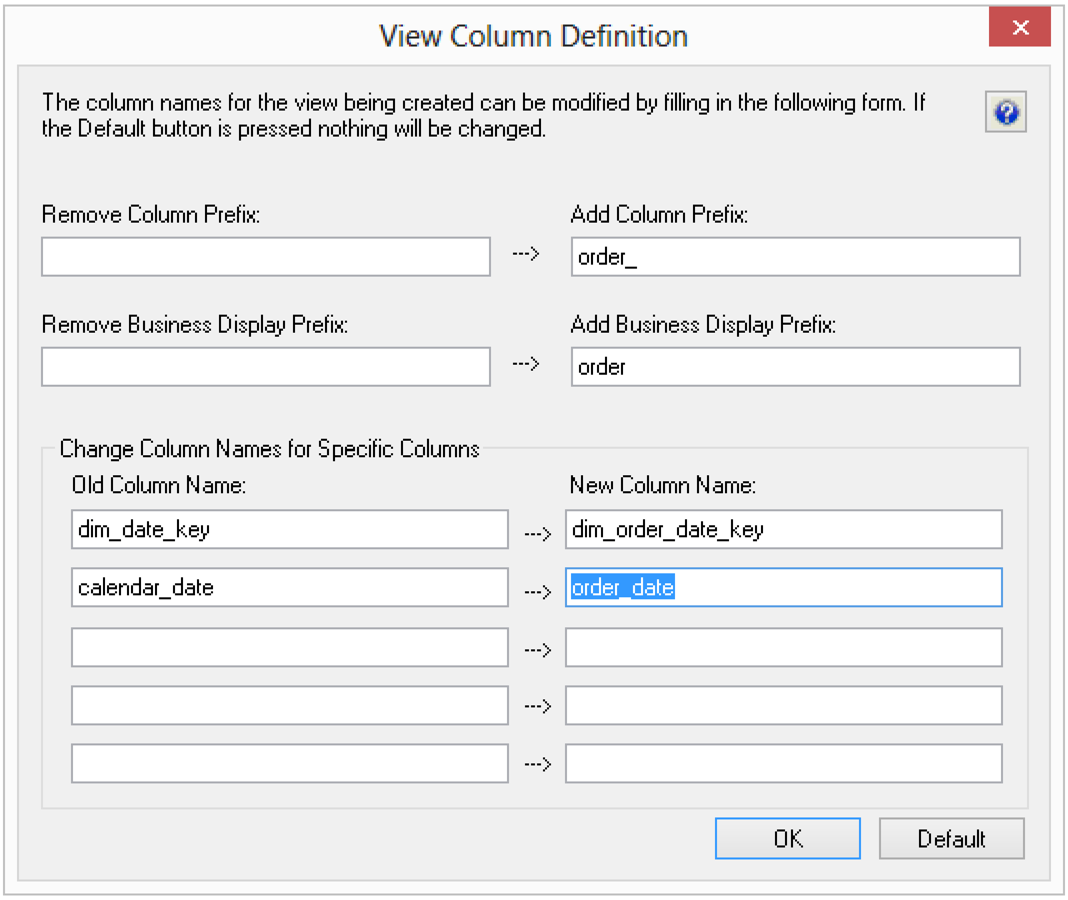
Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Dimension View

Object Name: dim_order_date

2 A dialog box displays to provide a means of re-mapping some of the column names in the view if required. Rename **calendar_date** to **order_date** and click **OK**.



View Column Definition

The column names for the view being created can be modified by filling in the following form. If the Default button is pressed nothing will be changed.

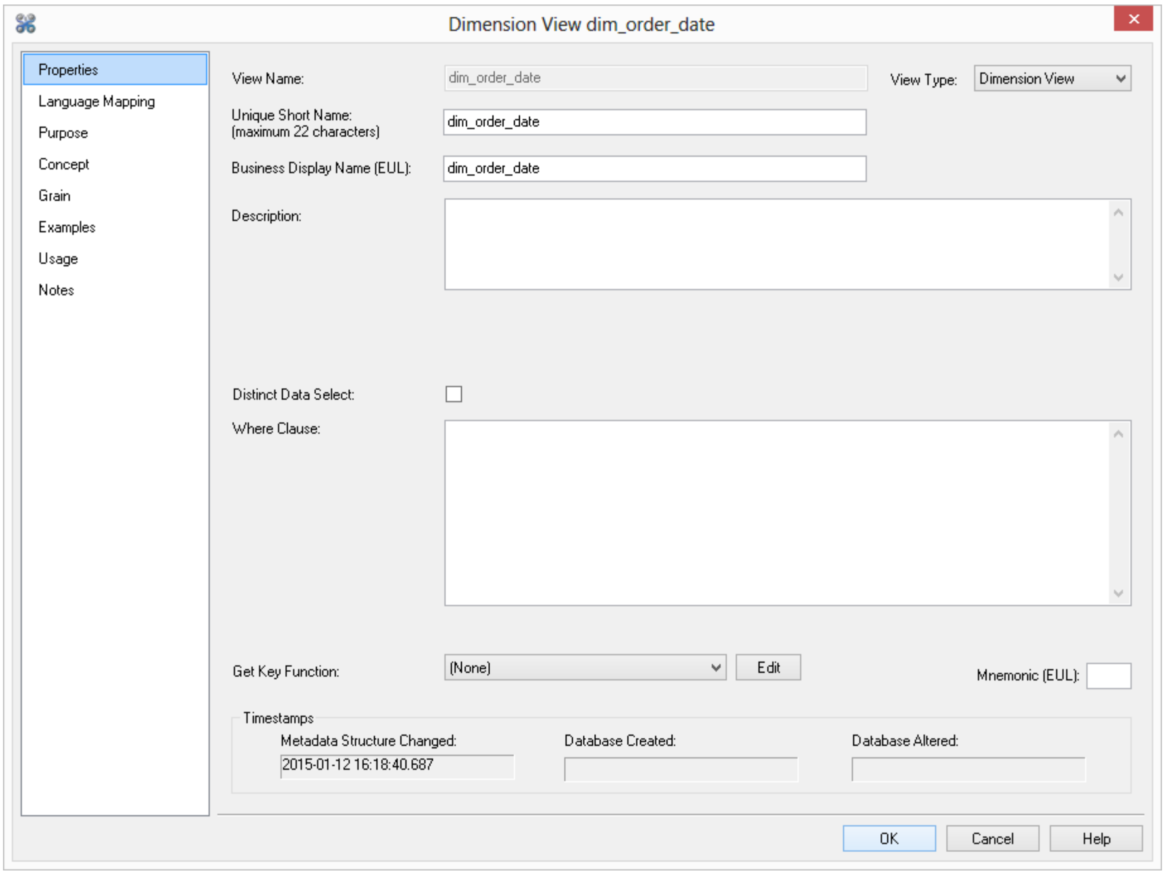
Remove Column Prefix: (empty) ---> Add Column Prefix: order_

Remove Business Display Prefix: (empty) ---> Add Business Display Prefix: order

Change Column Names for Specific Columns

Old Column Name:		New Column Name:
dim_date_key	--->	dim_order_date_key
calendar_date	--->	order_date
	--->	
	--->	
	--->	

3 The dim_order_date view property defaults have all been completed as necessary so click **OK**.



Dimension View dim_order_date

View Name: dim_order_date

View Type: Dimension View

Unique Short Name: (maximum 22 characters) dim_order_date

Business Display Name (EUL): dim_order_date

Description:

Distinct Data Select: □

Where Clause:

Get Key Function: (None)

Mnemonic (EUL):

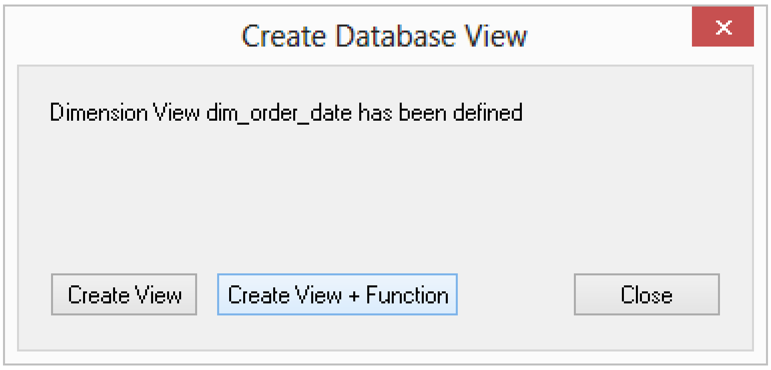
Timestamps

Metadata Structure Changed: 2015-01-12 16:18:40.687

Database Created:

Database Altered:

4 A dialog box displays indicating that the dimension view dim_order_date has been defined and asks if you want to create the view now. Select **Create View + Function.**



Create Database View

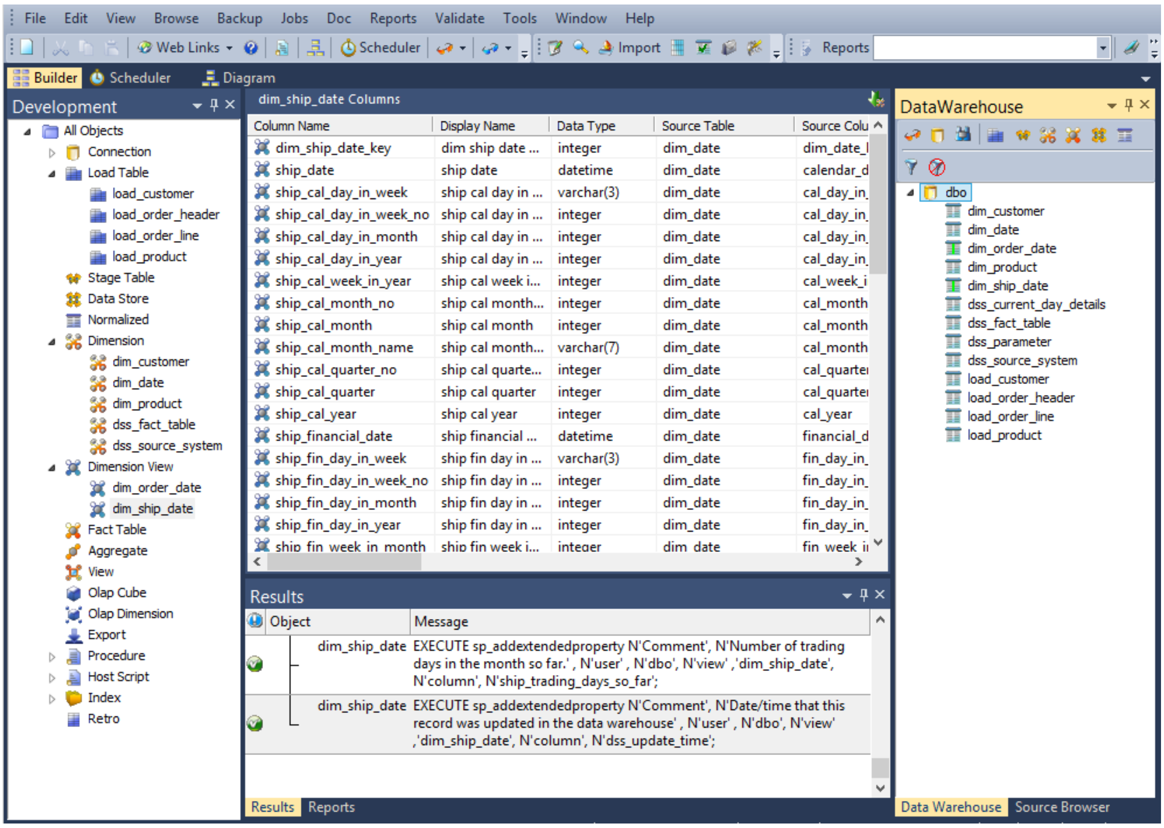
Dimension View dim_order_date has been defined

5 Click **OK** on the Business Key dialog.

6 Repeat steps (1) to (5) to create the dimension view **dim_ship_date**.

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

8 Your screen should look something like this:



dim_ship_date Columns

Column Name	Display Name	Data Type	Source Table	Source Colu
dim_ship_date_key	dim ship date ...	integer	dim_date	dim_date_l
ship_date	ship date	datetime	dim_date	calendar_d
ship_cal_day_in_week	ship cal day in ...	varchar(3)	dim_date	cal_day_in_
ship_cal_day_in_week_no	ship cal day in ...	integer	dim_date	cal_day_in_
ship_cal_day_in_month	ship cal day in ...	integer	dim_date	cal_day_in_
ship_cal_day_in_year	ship cal day in ...	integer	dim_date	cal_day_in_
ship_cal_week_in_year	ship cal week i...	integer	dim_date	cal_week_i
ship_cal_month_no	ship cal month...	integer	dim_date	cal_month
ship_cal_month	ship cal month	integer	dim_date	cal_month
ship_cal_month_name	ship cal month...	varchar(7)	dim_date	cal_month
ship_cal_quarter_no	ship cal quarte...	integer	dim_date	cal_quarte
ship_cal_quarter	ship cal quarter	integer	dim_date	cal_quarte
ship_cal_year	ship cal year	integer	dim_date	cal_year
ship_financial_date	ship financial ...	datetime	dim_date	financial_d
ship_fin_day_in_week	ship fin day in ...	varchar(3)	dim_date	fin_day_in_
ship_fin_day_in_week_no	ship fin day in ...	integer	dim_date	fin_day_in_
ship_fin_day_in_month	ship fin day in ...	integer	dim_date	fin_day_in_
ship_fin_day_in_year	ship fin day in ...	integer	dim_date	fin_day_in_
ship_fin_week_in_month	ship fin week i...	integer	dim_date	fin_week_i

Results

Object	Message
dim_ship_date	EXECUTE sp_addextendedproperty N'Comment', N'Number of trading days in the month so far.' , N'user' , N'dbo', N'view' ,'dim_ship_date', N'column', N'ship_trading_days_so_far';
dim_ship_date	EXECUTE sp_addextendedproperty N'Comment', N'Date/time that this record was updated in the data warehouse' , N'user' , N'dbo', N'view' ,'dim_ship_date', N'column', N'dss_update_time';

You are now ready to proceed to the next step - ***Defining the Staging Table*** (see "***1.10 Defining the Staging Table***" on page 45).

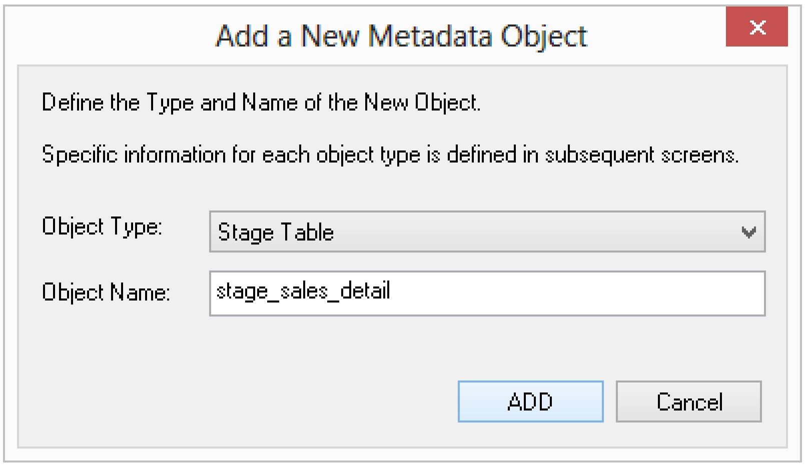
1.10 Defining the Staging Table

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 Table Name*.

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



Add a New Metadata Object

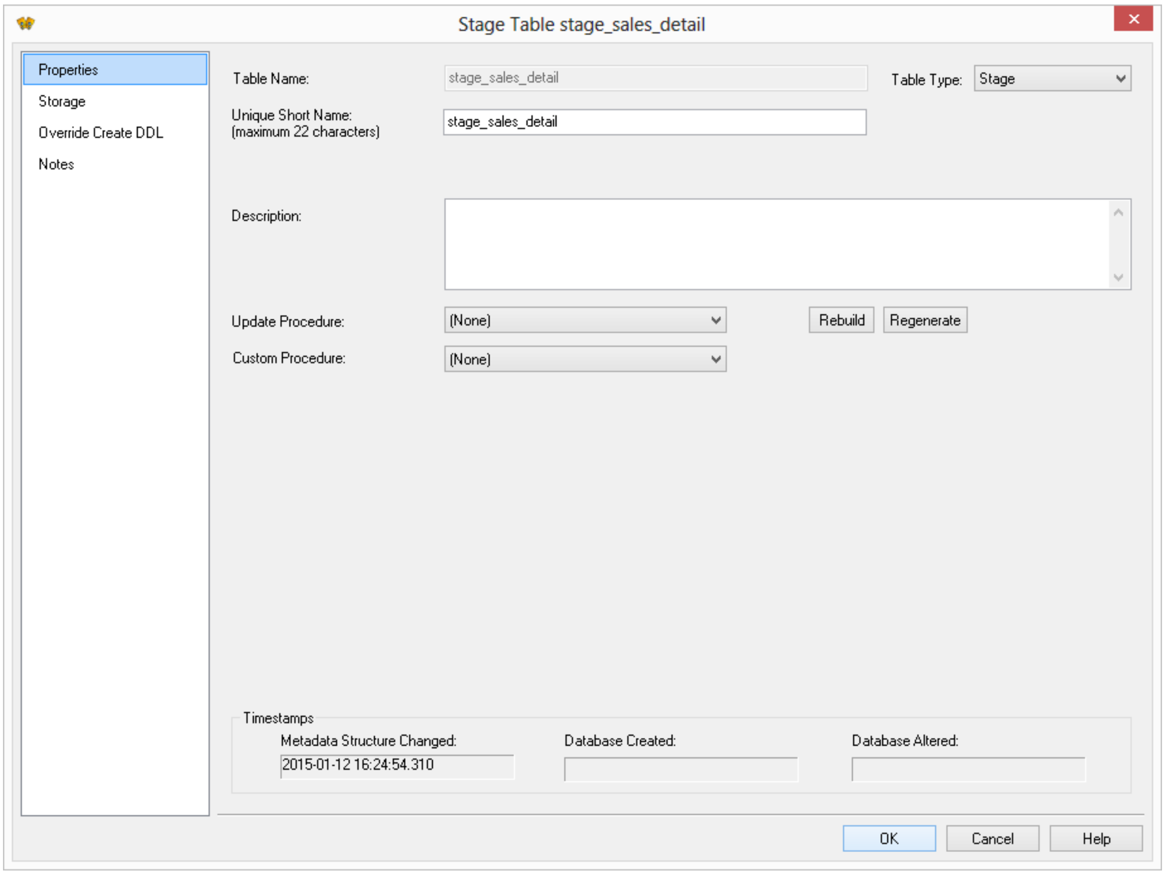
Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Stage Table

Object Name: stage_sales_detail

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



Stage Table stage_sales_detail

Table Name: stage_sales_detail

Table Type: Stage

Unique Short Name: (maximum 22 characters) stage_sales_detail

Description:

Update Procedure: (None)

Custom Procedure: (None)

Timestamps

Metadata Structure Changed: 2015-01-12 16:24:54.310

Database Created:

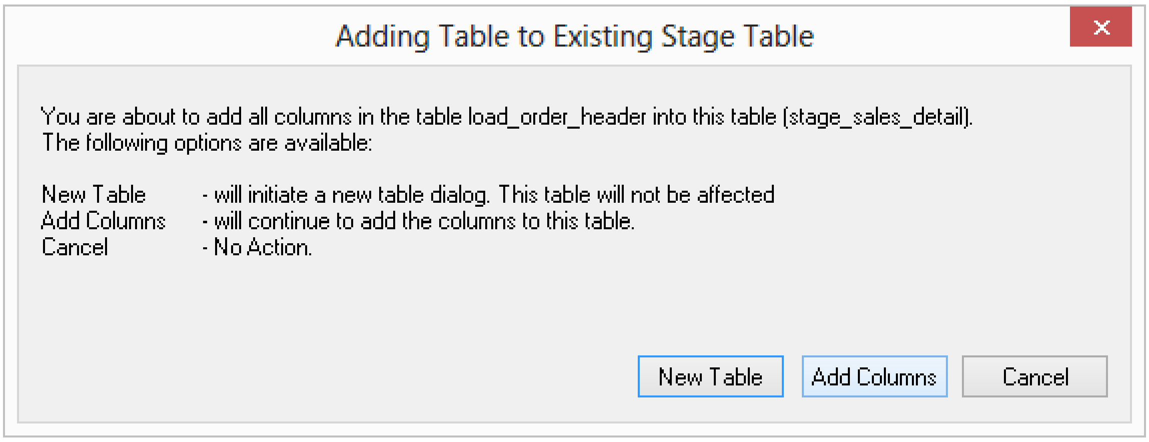
Database Altered:

Note: The Stage Table object group in the left pane now has a dependent/child.

---

4 To add the remaining information from the second load table, click on **stage_sales_detail** in the left pane. Next drop **load_order_header** from the right pane into the middle pane.

5 A message is displayed with options to create a "New table" or to "Add columns". Click **Add Columns**.

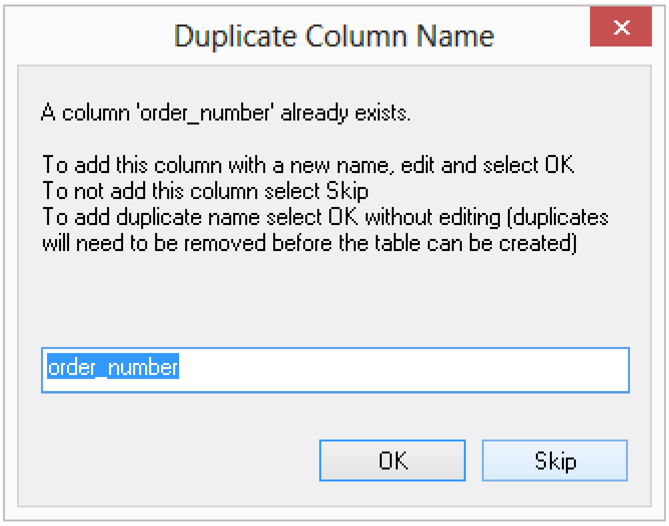


Adding Table to Existing Stage Table

You are about to add all columns in the table load_order_header into this table (stage_sales_detail).
The following options are available:

New Table - will initiate a new table dialog. This table will not be affected
Add Columns - will continue to add the columns to this table.
Cancel - No Action.

6 WhereScape RED detects duplicated 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.



Duplicate Column Name

A column 'order_number' already exists.

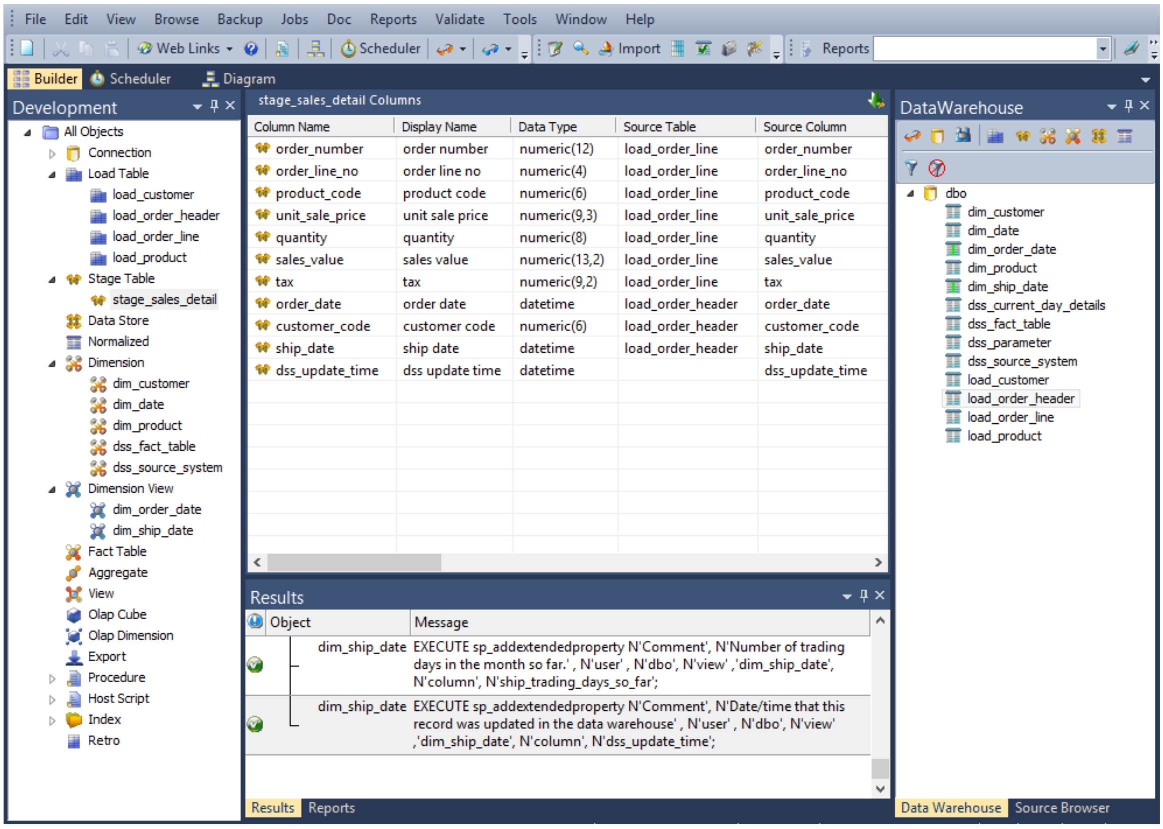
To add this column with a new name, edit and select OK
To not add this column select Skip
To add duplicate name select OK without editing (duplicates will need to be removed before the table can be created)

order_number

Note: If the second instance of order_number is required, then click **OK**.

7 This combines data from two load tables (**load_order_header** and **load_order_line**) into one stage table. In the middle pane under *Source Table, notice* the source of each of the columns.

8 Your screen should look something like this:



stage_sales_detail Columns

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

Results

Object	Message
dim_ship_date	EXECUTE sp_addextendedproperty N'Comment', N'Number of trading days in the month so far.' , N'user' , N'dbo', N'view' ,'dim_ship_date', N'column', N'ship_trading_days_so_far';
dim_ship_date	EXECUTE sp_addextendedproperty N'Comment', N'Date/time that this record was updated in the data warehouse' , N'user' , N'dbo', N'view' ,'dim_ship_date', N'column', N'dss_update_time';

You are now ready to proceed to the next step - ***Including Dimension Links*** (see "***1.11 Including Dimension Links***" on page 49).

1.11 Including Dimension Links

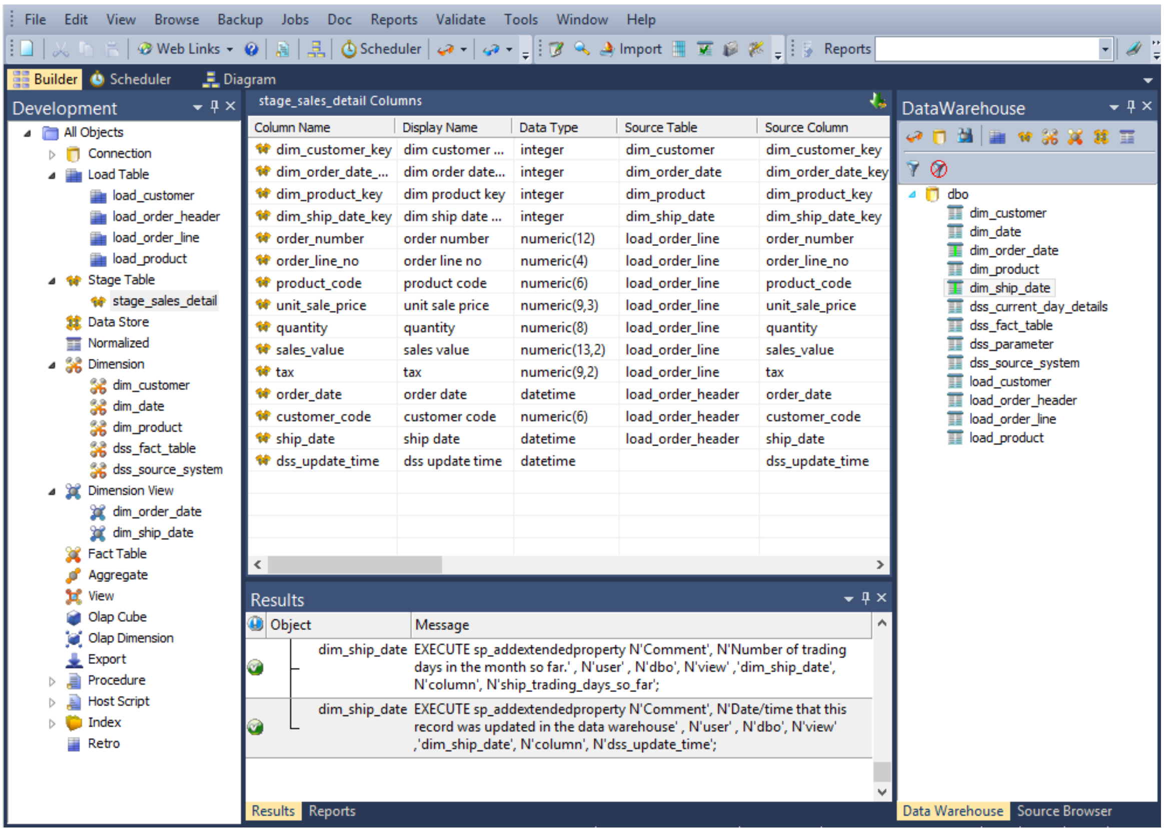
The dimension links that allow us to create the fact-like star schema now need to be included:

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.

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

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

This adds the dimension keys from each dimension to the stage table. Your WhereScape RED screen should now look like this:

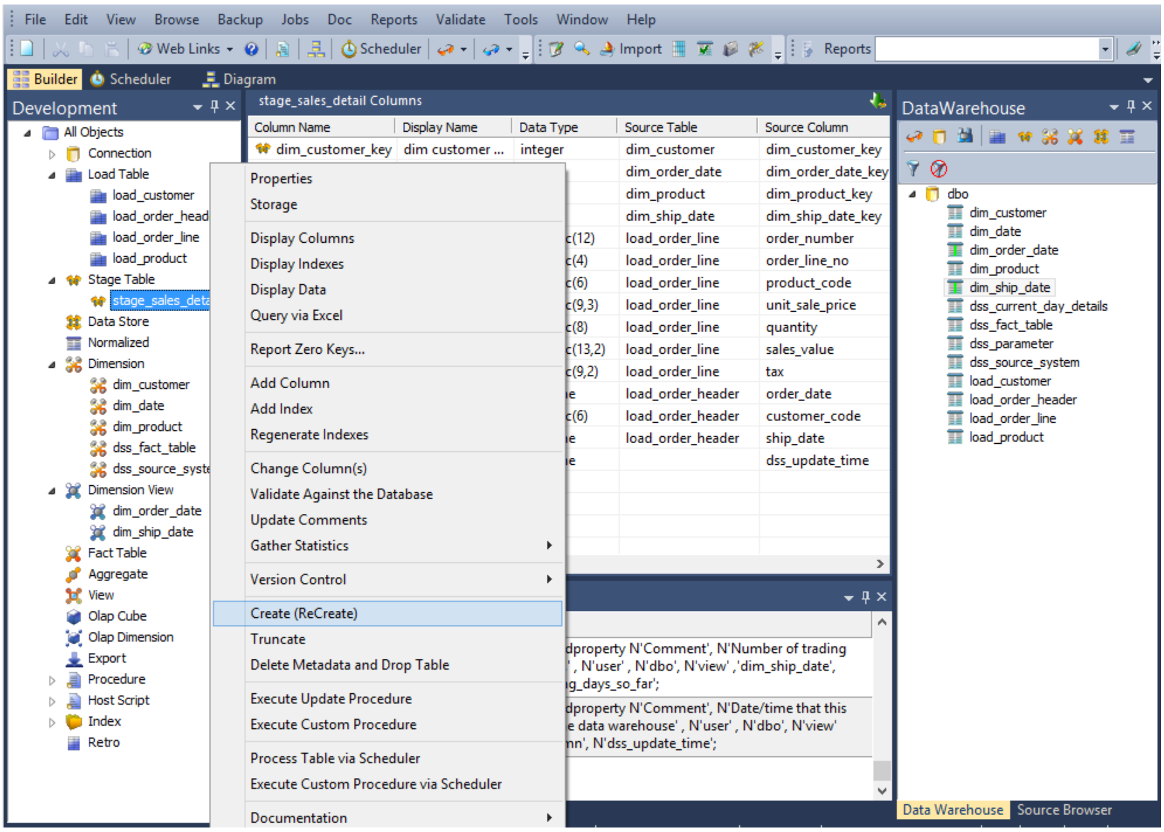


stage_sales_detail Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer	dim_customer	dim_customer_key
dim_order_date_...	dim order date...	integer	dim_order_date	dim_order_date_key
dim_product_key	dim product key	integer	dim_product	dim_product_key
dim_ship_date_key	dim ship date ...	integer	dim_ship_date	dim_ship_date_key
order_number	order number	numeric(12)	load_order_line	order_number
order_line_no	order line no	numeric(4)	load_order_line	order_line_no
product_code	product code	numeric(6)	load_order_line	product_code
unit_sale_price	unit sale price	numeric(9,3)	load_order_line	unit_sale_price
quantity	quantity	numeric(8)	load_order_line	quantity
sales_value	sales value	numeric(13,2)	load_order_line	sales_value
tax	tax	numeric(9,2)	load_order_line	tax
order_date	order date	datetime	load_order_header	order_date
customer_code	customer code	numeric(6)	load_order_header	customer_code
ship_date	ship date	datetime	load_order_header	ship_date
dss_update_time	dss update time	datetime		dss_update_time

Object	Message
dim_ship_date	EXECUTE sp_addextendedproperty N'Comment', N'Number of trading days in the month so far.' , N'user' , N'dbo', N'view' ,'dim_ship_date', N'column', N'ship_trading_days_so_far';
dim_ship_date	EXECUTE sp_addextendedproperty N'Comment', N'Date/time that this record was updated in the data warehouse' , N'user' , N'dbo', N'view' ,'dim_ship_date', N'column', N'dss_update_time';

3 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).**



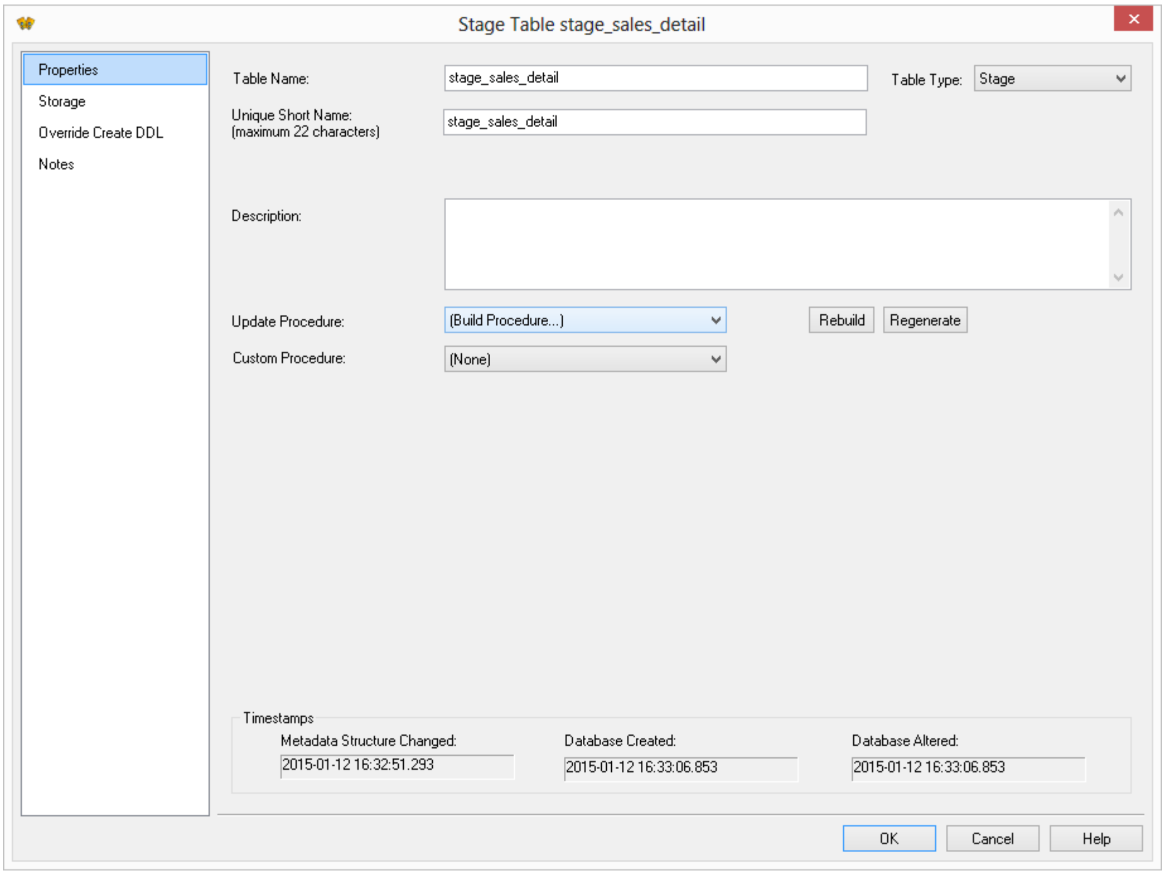
Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer	dim_customer	dim_customer_key
			dim_order_date	dim_order_date_key
			dim_product	dim_product_key
			dim_ship_date	dim_ship_date_key
		c(12)	load_order_line	order_number
		c(4)	load_order_line	order_line_no
		c(6)	load_order_line	product_code
		c(9,3)	load_order_line	unit_sale_price
		c(8)	load_order_line	quantity
		c(13,2)	load_order_line	sales_value
		c(9,2)	load_order_line	tax
		e	load_order_header	order_date
		c(6)	load_order_header	customer_code
		e	load_order_header	ship_date
		e		dss_update_time

```
dproperty N'Comment', N'Number of trading
' , N'user' , N'dbo', N'view' ,'dim_ship_date',
g_days_so_far';
dproperty N'Comment', N'Date/time that this
e data warehouse' , N'user' , N'dbo', N'view'
nn', N'dss_update_time';
```

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.

4 Double-click on the stage table to select **Properties.**

5 Under Update Procedure, choose **(Build Procedure...)** to create an update stage procedure. Click **OK**.



Stage Table stage_sales_detail

Table Name: stage_sales_detail

Table Type: Stage

Unique Short Name: (maximum 22 characters) stage_sales_detail

Description:

Update Procedure: (Build Procedure...)

Custom Procedure: (None)

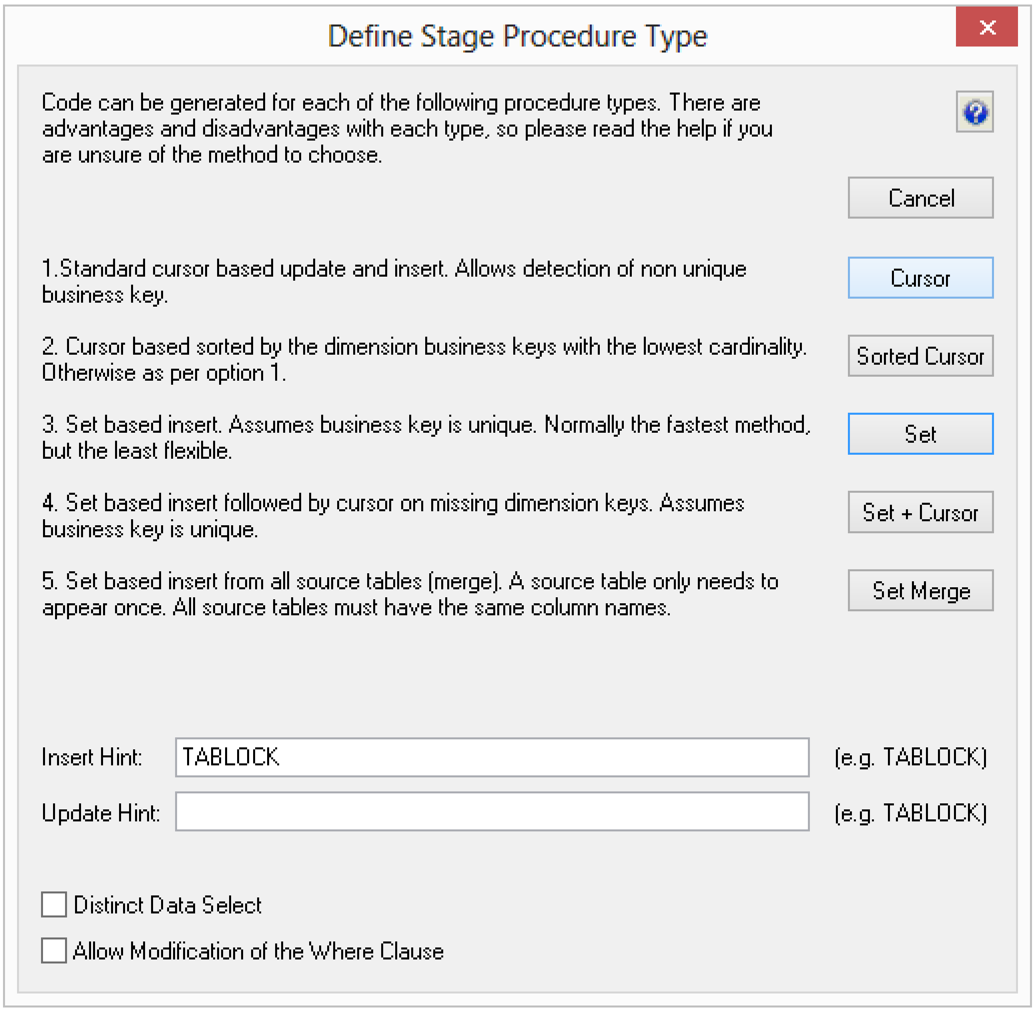
Timestamps

Metadata Structure Changed: 2015-01-12 16:32:51.293

Database Created: 2015-01-12 16:33:06.853

Database Altered: 2015-01-12 16:33:06.853

6 Select the **Cursor** based procedure generation from the stage procedure type dialog box.



Define Stage Procedure Type

Code can be generated for each of the following procedure types. There are advantages and disadvantages with each type, so please read the help if you are unsure of the method to choose.

1.Standard cursor based update and insert. Allows detection of non unique business key.

2. Cursor based sorted by the dimension business keys with the lowest cardinality. Otherwise as per option 1.

3. Set based insert. Assumes business key is unique. Normally the fastest method, but the least flexible.

4. Set based insert followed by cursor on missing dimension keys. Assumes business key is unique.

5. Set based insert from all source tables (merge). A source table only needs to appear once. All source tables must have the same column names.

Insert Hint: TABLOCK (e.g. TABLOCK)

Update Hint: (e.g. TABLOCK)

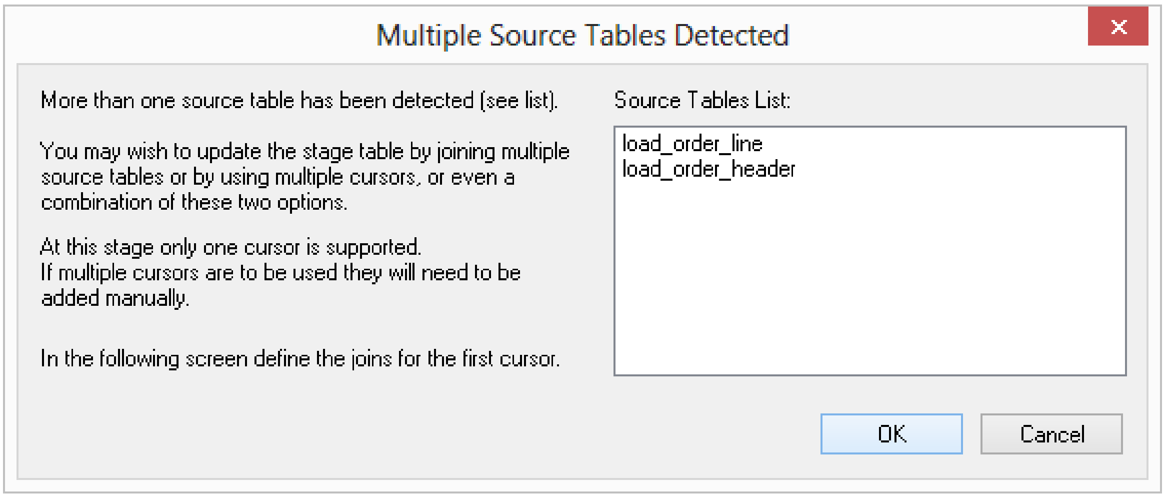
□ Distinct Data Select

□ Allow Modification of the Where Clause

Note: When building an Oracle data warehouse, this dialog has an additional option for bulk bind procedures. See Staging generating the update procedure for more information.

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

8 A dialog box will display indicating that multiple source tables have been detected. Click **OK**.



Multiple Source Tables Detected

More than one source table has been detected (see list).

You may wish to update the stage table by joining multiple source tables or by using multiple cursors, or even a combination of these two options.

At this stage only one cursor is supported.
If multiple cursors are to be used they will need to be added manually.

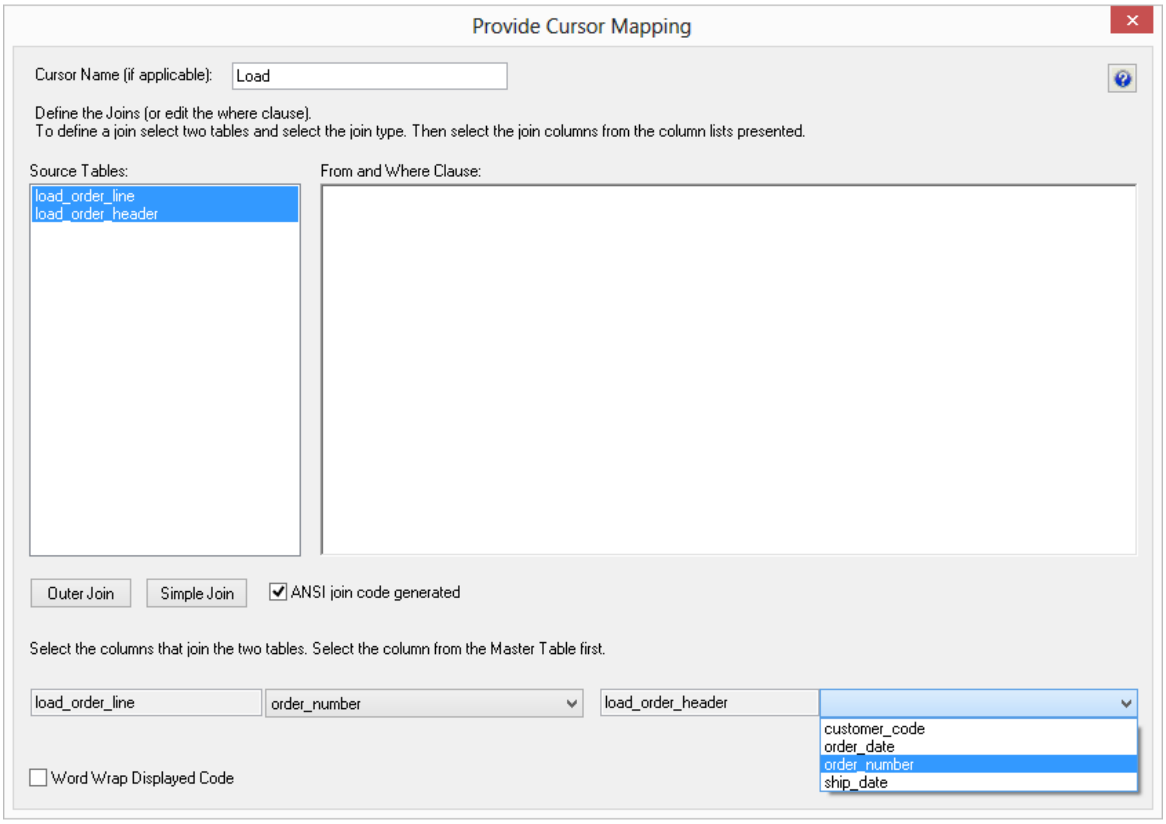
In the following screen define the joins for the first cursor.

Source Tables List:

load_order_line
load_order_header

9 Highlight the source tables **load_order_line** and **load_order_header** which are to be joined by **order_number**.

- With the two tables highlighted click **Outer Join**. See the chapter on Staging data for an explanation of the join types and options.
- Select **order number** from the **load_order_line** empty drop-down list box at the bottom of the screen. Then select order number from the **load_order_header** drop-down list box.



Provide Cursor Mapping

Cursor Name (if applicable): Load

Define the Joins (or edit the where clause).
To define a join select two tables and select the join type. Then select the join columns from the column lists presented.

Source Tables:

load_order_line
load_order_header

From and Where Clause:

☑ ANSI join code generated

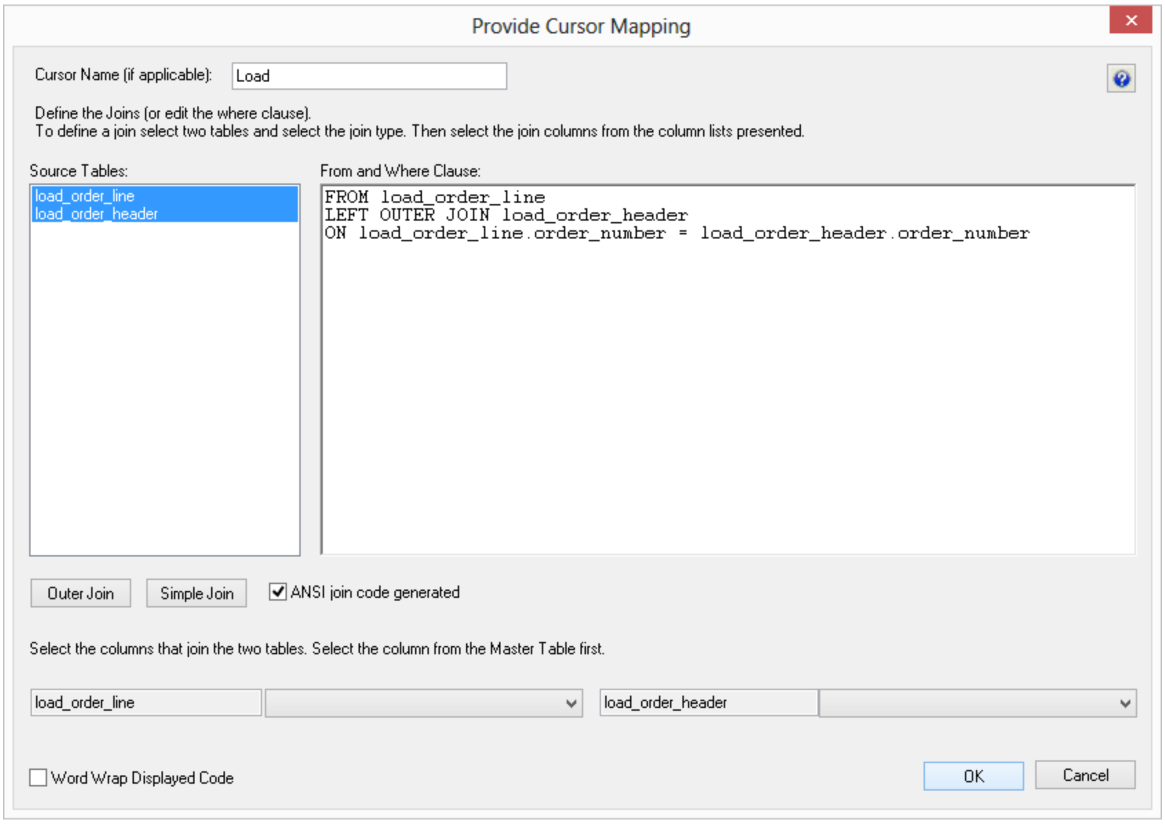
Select the columns that join the two tables. Select the column from the Master Table first.

load_order_line order_number load_order_header

customer_code
order_date
order_number
ship_date

□ Word Wrap Displayed Code

- This will create a join statement in the right window. Click **OK**.



Cursor Name (if applicable): Load

Define the Joins (or edit the where clause).
To define a join select two tables and select the join type. Then select the join columns from the column lists presented.

Source Tables:
load_order_line
load_order_header

From and Where Clause:

```
FROM load_order_line
LEFT OUTER JOIN load_order_header
ON load_order_line.order_number = load_order_header.order_number
```

☑ ANSI join code generated

Select the columns that join the two tables. Select the column from the Master Table first.

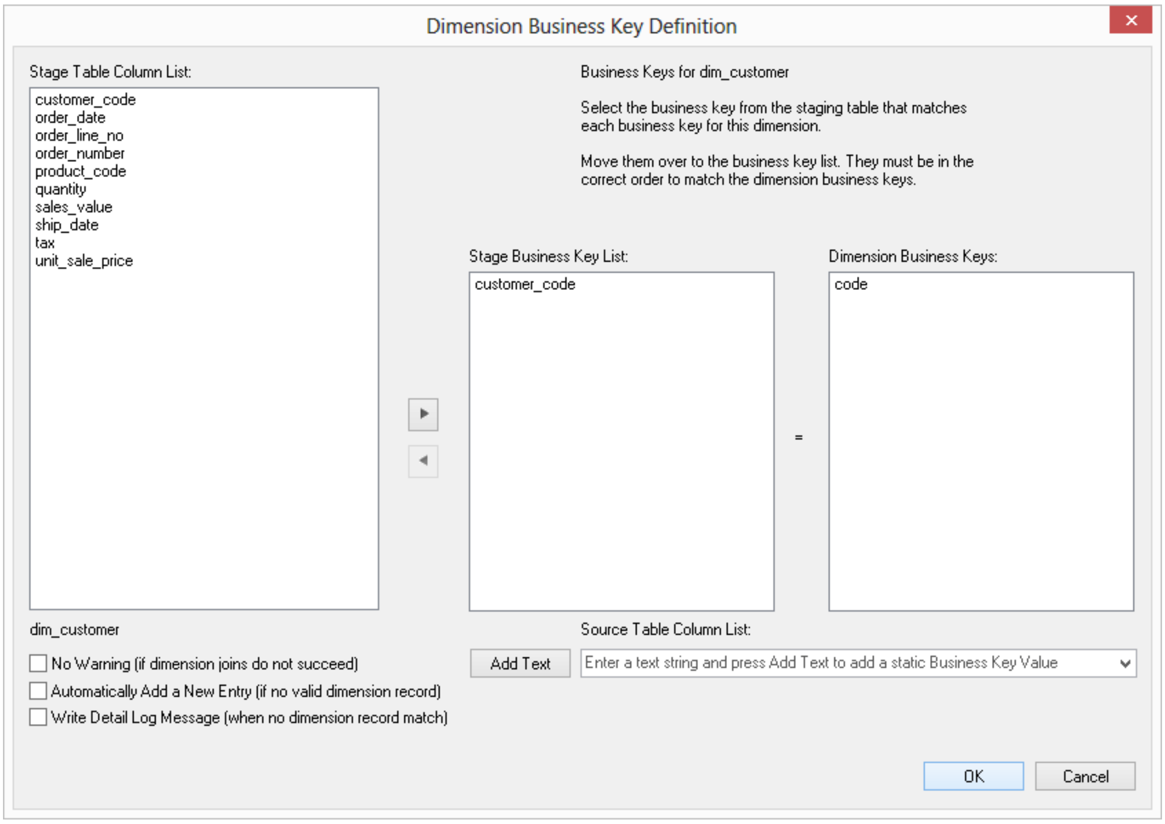
load_order_line

load_order_header

□ Word Wrap Displayed Code

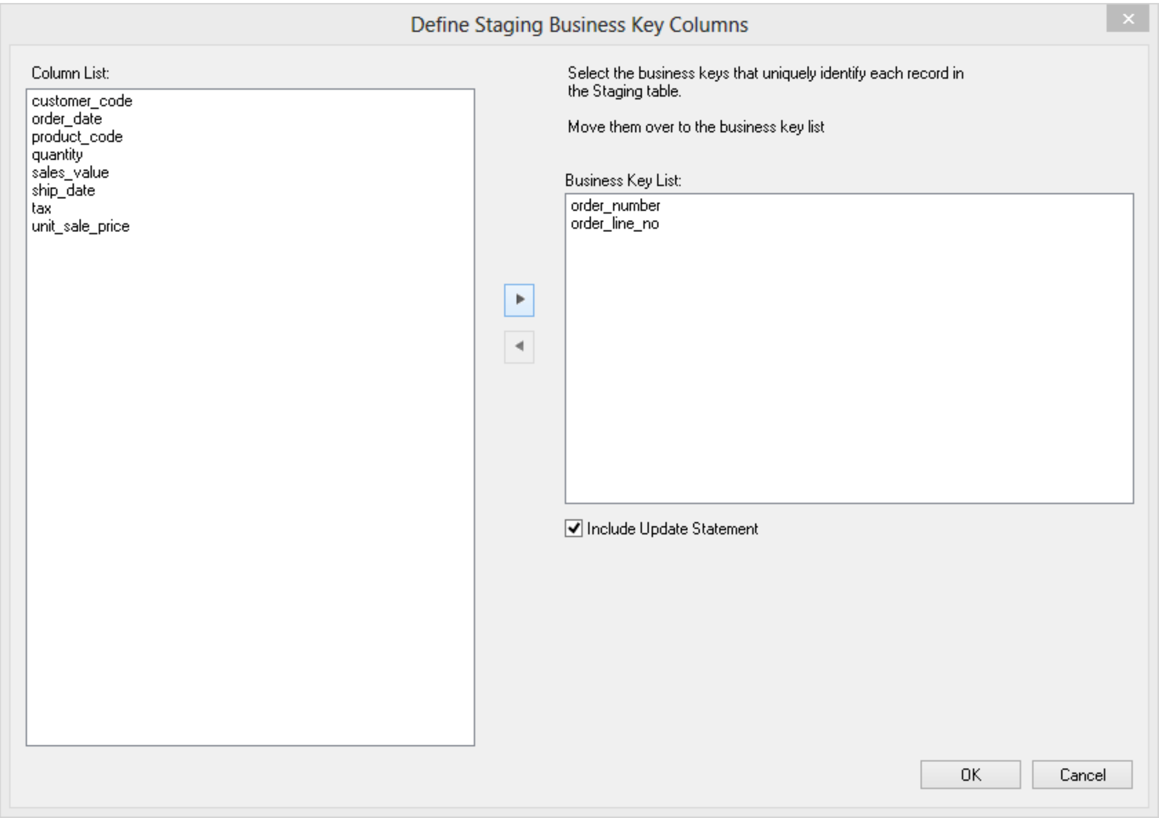
10 You need to match the dimension business keys with the business keys in the stage table. This associates the correct dimensional record to each stage table record. A dialog box displays for each dimensional join.

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


Dimension Business Key Definition
Stage Table Column List:
customer_code
order_date
order_line_no
order_number
product_code
quantity
sales_value
ship_date
tax
unit_sale_price
Business Keys for dim_customer
Select the business key from the staging table that matches each business key for this dimension.
Move them over to the business key list. They must be in the correct order to match the dimension business keys.
Stage Business Key List:
customer_code
=
Dimension Business Keys:
code
dim_customer
☐ No Warning (if dimension joins do not succeed)
☐ Automatically Add a New Entry (if no valid dimension record)
☐ Write Detail Log Message (when no dimension record match)
Source Table Column List:
Add Text
Enter a text string and press Add Text to add a static Business Key Value
OK
Cancel

- 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 side.
- For **dim_product**, select **product_code.** Click **>** and **OK.**
- As you progress to dim_ship_date, notice that **ship_date** has also been automatically chosen. Click **OK** again.

11 Next you must select the business keys to uniquely identify each record in the staging table itself. This essentially defines the business key we will be using in the fact table, and as such defines the grain of the fact table. For this example the grain is order line. Select **order_number** and **order_line_no.** Click **>** and **OK.**



Define Staging Business Key Columns

Column List:

customer_code
order_date
product_code
quantity
sales_value
ship_date
tax
unit_sale_price

Select the business keys that uniquely identify each record in the Staging table.

Move them over to the business key list

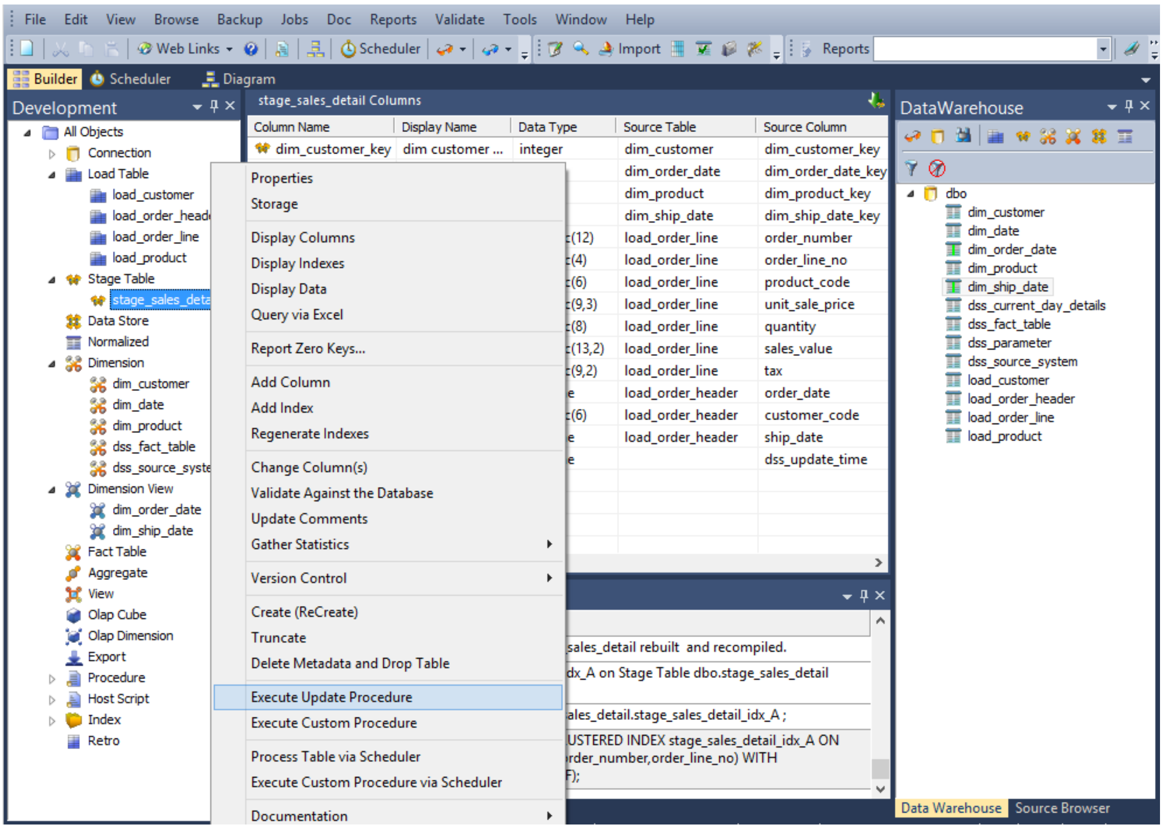
Business Key List:

order_number
order_line_no

☑ Include Update Statement

12 WhereScape RED now builds and compiles the update procedure. The results pane shows any indexes that were created.

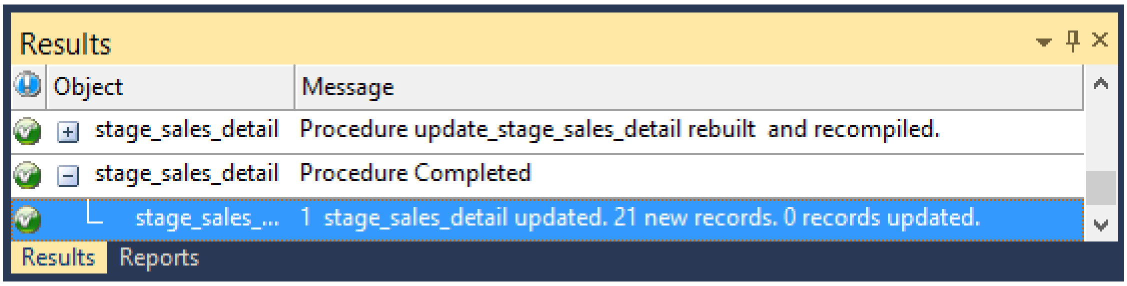
13 The final step is the population of the stage table. Right-click on **stage_sales_detail** in the left pane and select **Execute Update Procedure.**



Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer	dim_customer	dim_customer_key
			dim_order_date	dim_order_date_key
			dim_product	dim_product_key
			dim_ship_date	dim_ship_date_key
		(12)	load_order_line	order_number
		(4)	load_order_line	order_line_no
		(6)	load_order_line	product_code
		(9,3)	load_order_line	unit_sale_price
		(8)	load_order_line	quantity
		(13,2)	load_order_line	sales_value
		(9,2)	load_order_line	tax
		e	load_order_header	order_date
		(6)	load_order_header	customer_code
		e	load_order_header	ship_date
		e		dss_update_time

```
sales_detail rebuilt  and recompiled.
dx_A on Stage Table dbo.stage_sales_detail
ales_detail.stage_sales_detail_idx_A ;
USTERED INDEX stage_sales_detail_idx_A ON
rder_number,order_line_no) WITH
F);
```

14 Output from the stage table being updated can now be seen in the **Results** window.



Object	Message
stage_sales_detail	Procedure update_stage_sales_detail rebuilt and recompiled.
stage_sales_detail	Procedure Completed
stage_sales_...	1 stage_sales_detail updated. 21 new records. 0 records updated.

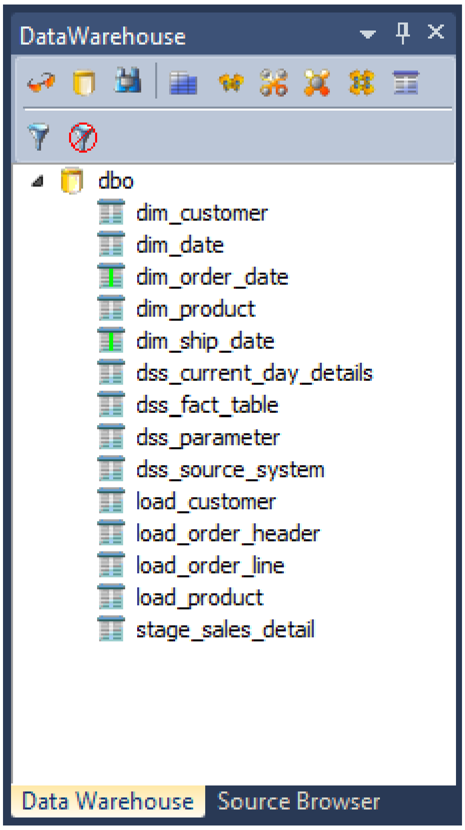
You are now ready to proceed to the next step - ***Creating a Fact Table*** (see "***1.12 Creating a Fact Table***" on page 58).

1.12 CREATING A FACT TABLE

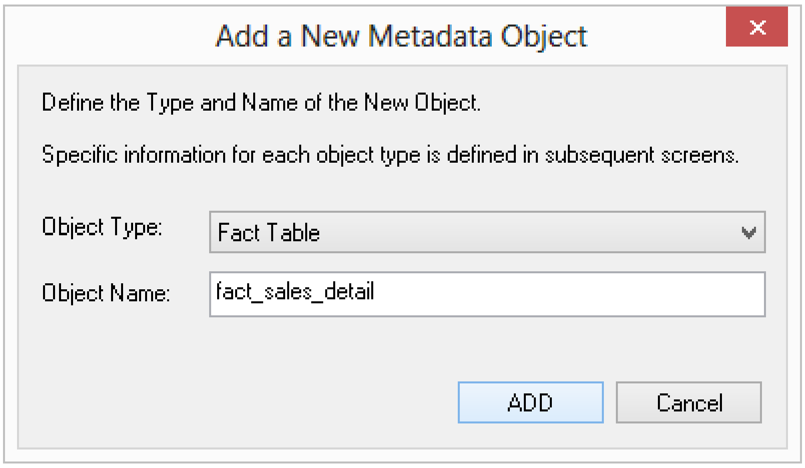
In this step you will create a fact table.

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

2 Browse the data warehouse connection again (or refresh the data warehouse connection):



3 Drag the stage table **stage_sales_detail** over from the right pane into the middle pane. The following dialog is displayed. Click **ADD**.



Add a New Metadata Object

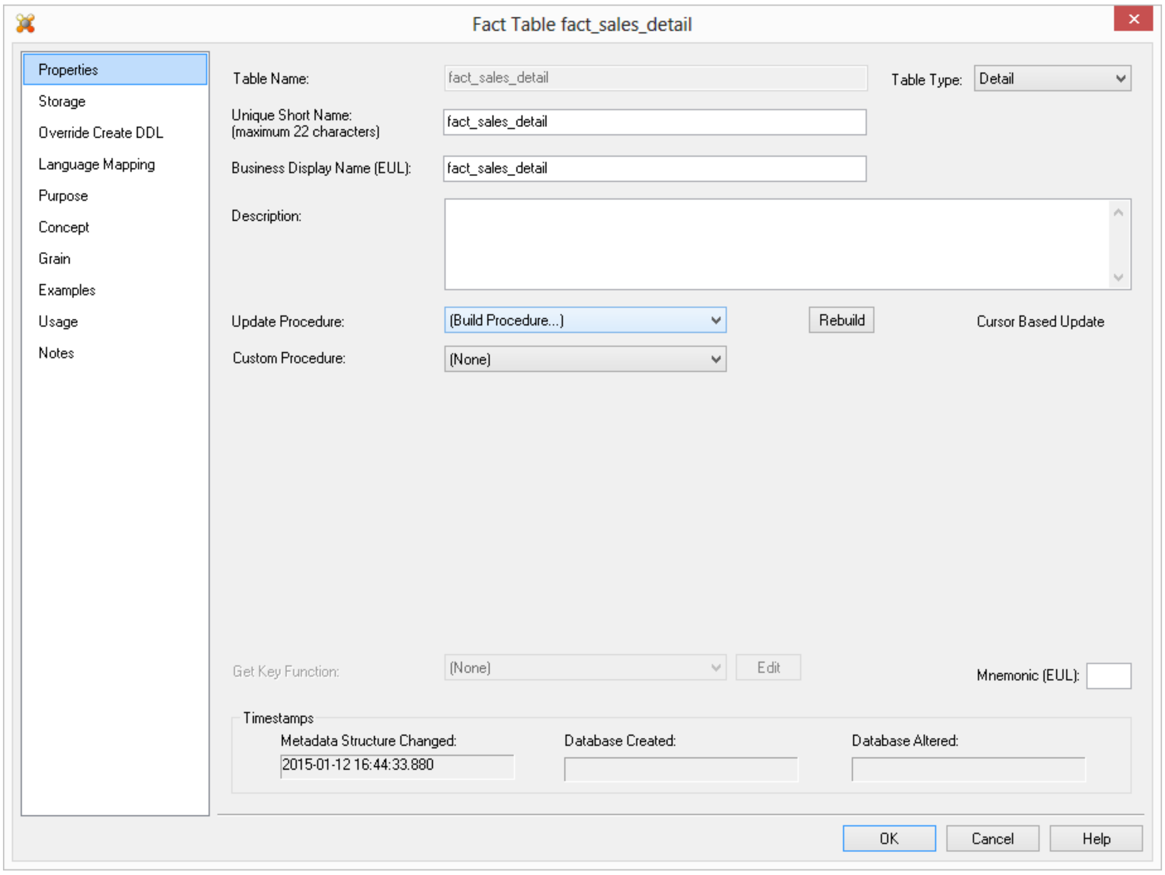
Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Fact Table

Object Name: fact_sales_detail

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



Fact Table fact_sales_detail

Table Name: fact_sales_detail

Table Type: Detail

Unique Short Name: (maximum 22 characters) fact_sales_detail

Business Display Name (EUL): fact_sales_detail

Description:

Update Procedure: (Build Procedure...)

Cursor Based Update

Custom Procedure: (None)

Get Key Function: (None)

Mnemonic (EUL):

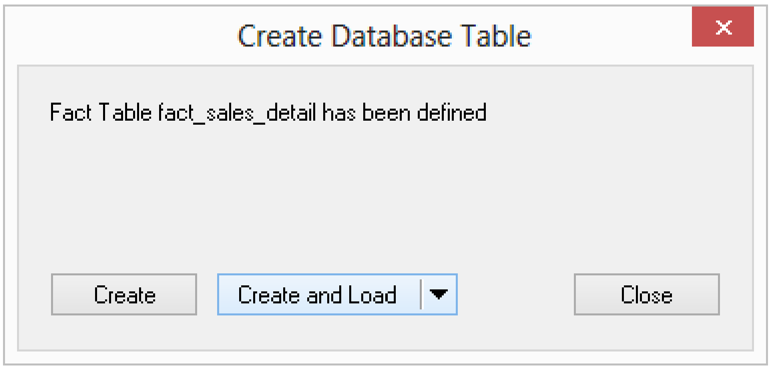
Timestamps

Metadata Structure Changed: 2015-01-12 16:44:33.880

Database Created:

Database Altered:

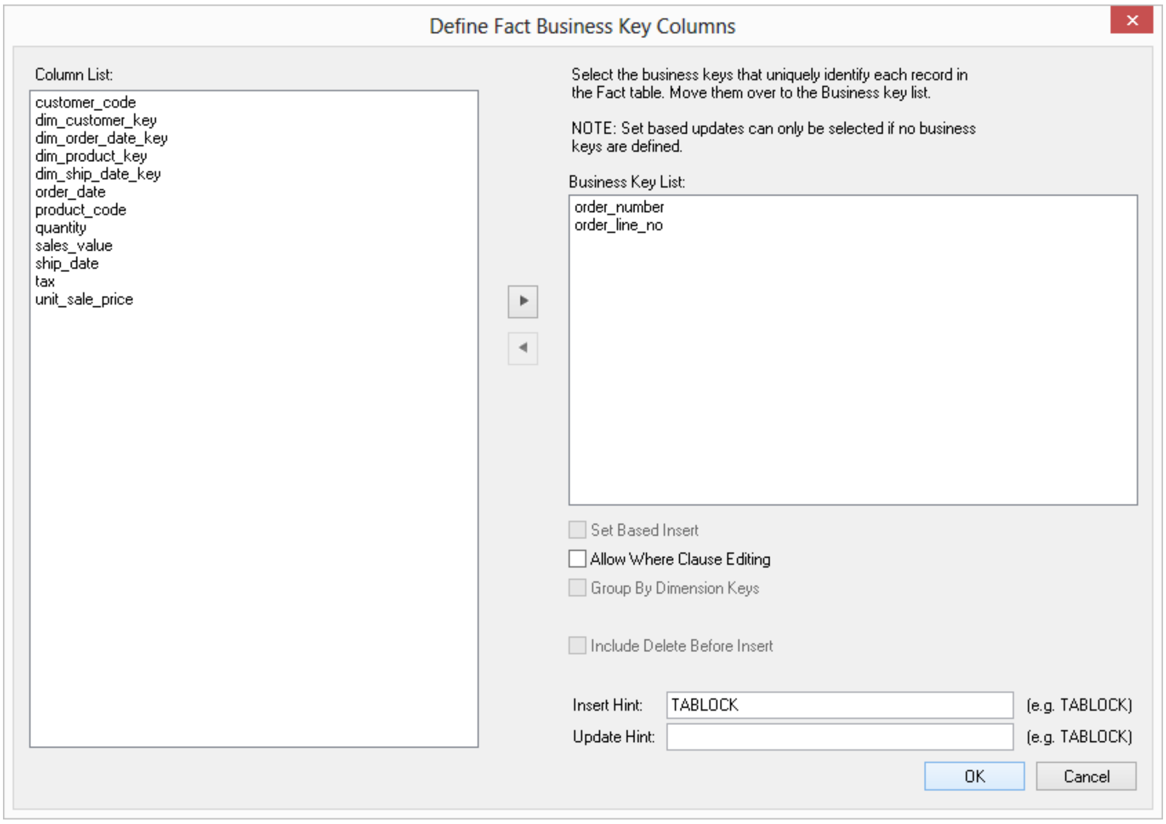
5 Select **Create and Load** to create and load the table now.



Create Database Table

Fact Table fact_sales_detail has been defined

6 Select the Business Key for the fact table. Choose **order_number** and **order_line_number**. Click **>** and then **OK.**



Define Fact Business Key Columns

Column List:

customer_code
dim_customer_key
dim_order_date_key
dim_product_key
dim_ship_date_key
order_date
product_code
quantity
sales_value
ship_date
tax
unit_sale_price

Select the business keys that uniquely identify each record in the Fact table. Move them over to the Business key list.

NOTE: Set based updates can only be selected if no business keys are defined.

Business Key List:

order_number
order_line_no

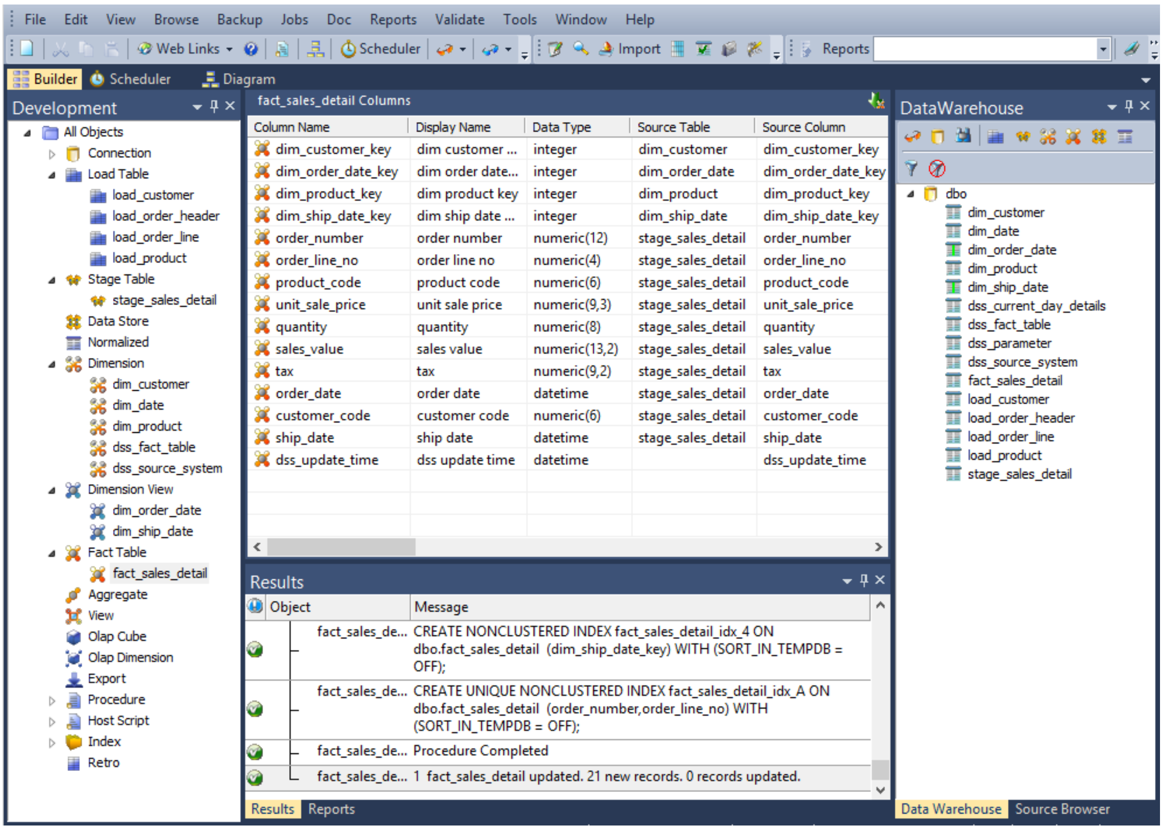
□ Set Based Insert
□ Allow Where Clause Editing
□ Group By Dimension Keys

□ Include Delete Before Insert

Insert Hint: TABLOCK (e.g. TABLOCK)
Update Hint: (e.g. TABLOCK)

7 Output from the fact table being created and updated can now be seen in the **Results** window. Refresh the Data Warehouse in the right pane.

8 Your screen should look something like this:



fact_sales_detail Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer	dim_customer	dim_customer_key
dim_order_date_key	dim order date...	integer	dim_order_date	dim_order_date_key
dim_product_key	dim product key	integer	dim_product	dim_product_key
dim_ship_date_key	dim ship date ...	integer	dim_ship_date	dim_ship_date_key
order_number	order number	numeric(12)	stage_sales_detail	order_number
order_line_no	order line no	numeric(4)	stage_sales_detail	order_line_no
product_code	product code	numeric(6)	stage_sales_detail	product_code
unit_sale_price	unit sale price	numeric(9,3)	stage_sales_detail	unit_sale_price
quantity	quantity	numeric(8)	stage_sales_detail	quantity
sales_value	sales value	numeric(13,2)	stage_sales_detail	sales_value
tax	tax	numeric(9,2)	stage_sales_detail	tax
order_date	order date	datetime	stage_sales_detail	order_date
customer_code	customer code	numeric(6)	stage_sales_detail	customer_code
ship_date	ship date	datetime	stage_sales_detail	ship_date
dss_update_time	dss update time	datetime		dss_update_time

Results

Object	Message
fact_sales_de...	CREATE NONCLUSTERED INDEX fact_sales_detail_idx_4 ON dbo.fact_sales_detail (dim_ship_date_key) WITH (SORT_IN_TEMPDB = OFF);
fact_sales_de...	CREATE UNIQUE NONCLUSTERED INDEX fact_sales_detail_idx_A ON dbo.fact_sales_detail (order_number,order_line_no) WITH (SORT_IN_TEMPDB = OFF);
fact_sales_de...	Procedure Completed
fact_sales_de...	1 fact_sales_detail updated. 21 new records. 0 records updated.

You are now ready to proceed to the next step - ***Switching to Diagrammatic View*** (see "***1.13 Switching to Diagrammatic View***" on page 62)

1.13 Switching to Diagrammatic View

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

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

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

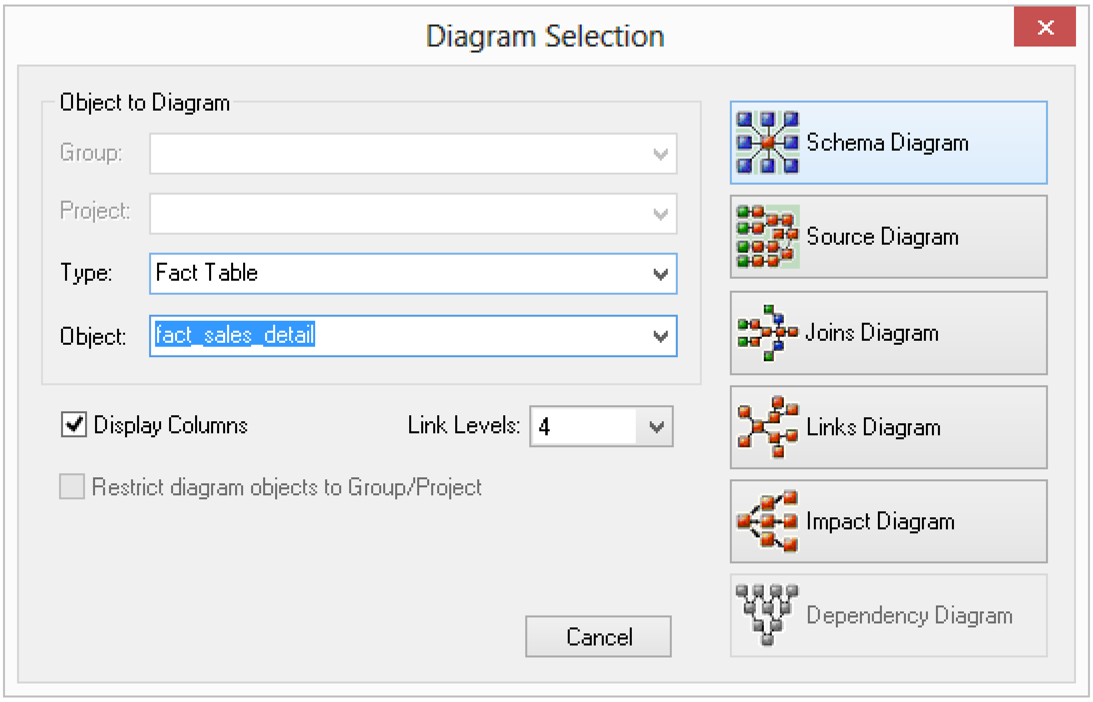


Diagram Selection

Object to Diagram

Group:

Project:

Type: Fact Table

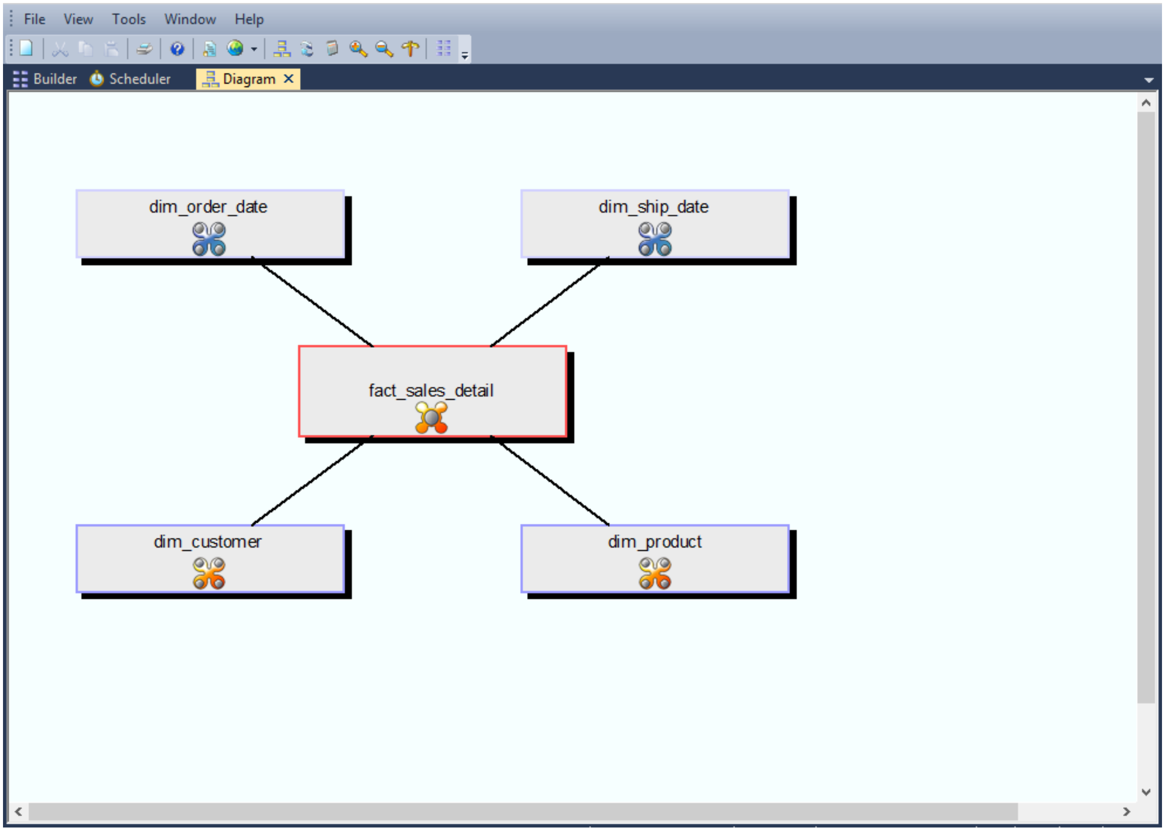
Object: fact_sales_detail

☑ Display Columns

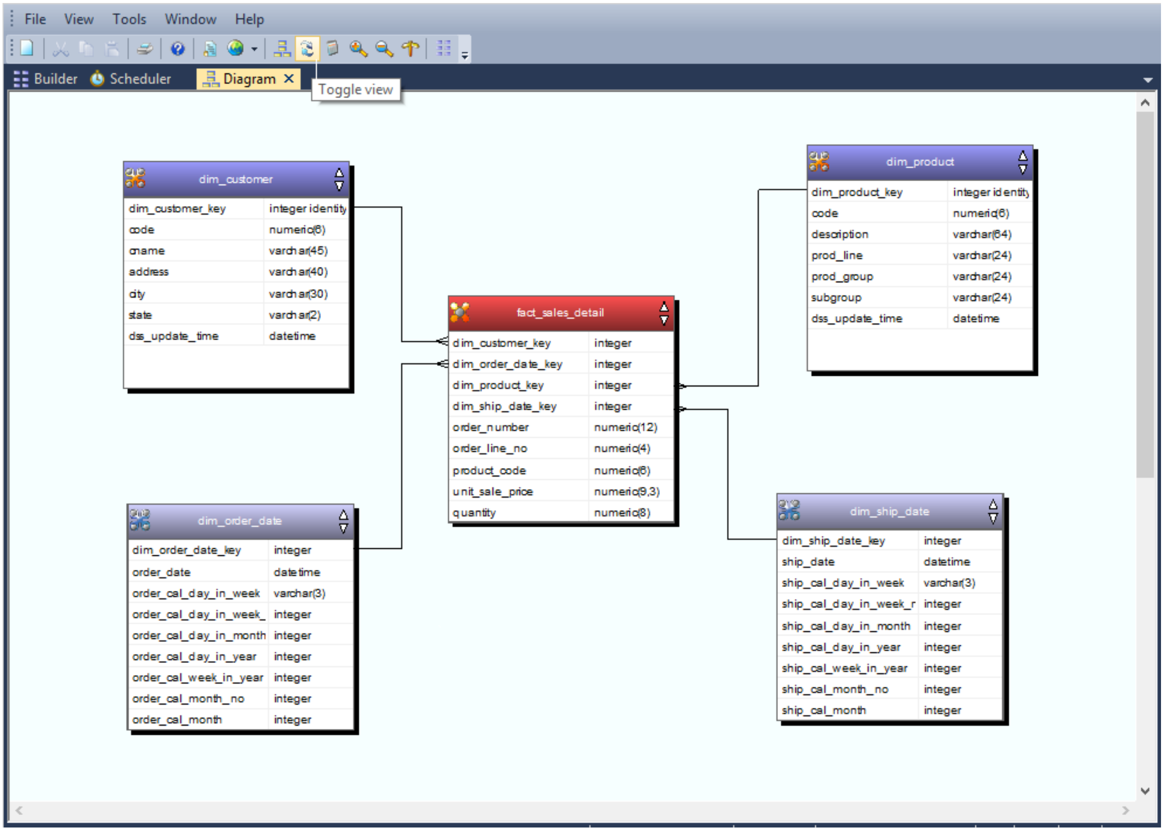
Link Levels: 4

□ Restrict diagram objects to Group/Project

The diagram looks like this:



The **toggle** button will enable you to switch between the detailed and standard diagrams.



dim_customer

dim_customer_key	integer identity
code	numeric(6)
cname	varchar(45)
address	varchar(40)
city	varchar(30)
state	varchar(2)
dss_update_time	datetime

fact_sales_detail

dim_customer_key	integer
dim_order_date_key	integer
dim_product_key	integer
dim_ship_date_key	integer
order_number	numeric(12)
order_line_no	numeric(4)
product_code	numeric(6)
unit_sale_price	numeric(9,3)
quantity	numeric(8)

dim_product

dim_product_key	integer identity
code	numeric(6)
description	varchar(64)
prod_line	varchar(24)
prod_group	varchar(24)
subgroup	varchar(24)
dss_update_time	datetime

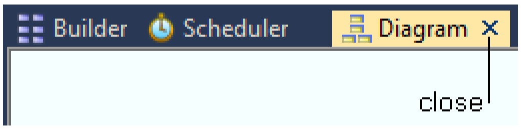
dim_order_date

dim_order_date_key	integer
order_date	datetime
order_cal_day_in_week	varchar(3)
order_cal_day_in_week_	integer
order_cal_day_in_month	integer
order_cal_day_in_year	integer
order_cal_week_in_year	integer
order_cal_month_no	integer
order_cal_month	integer

dim_ship_date

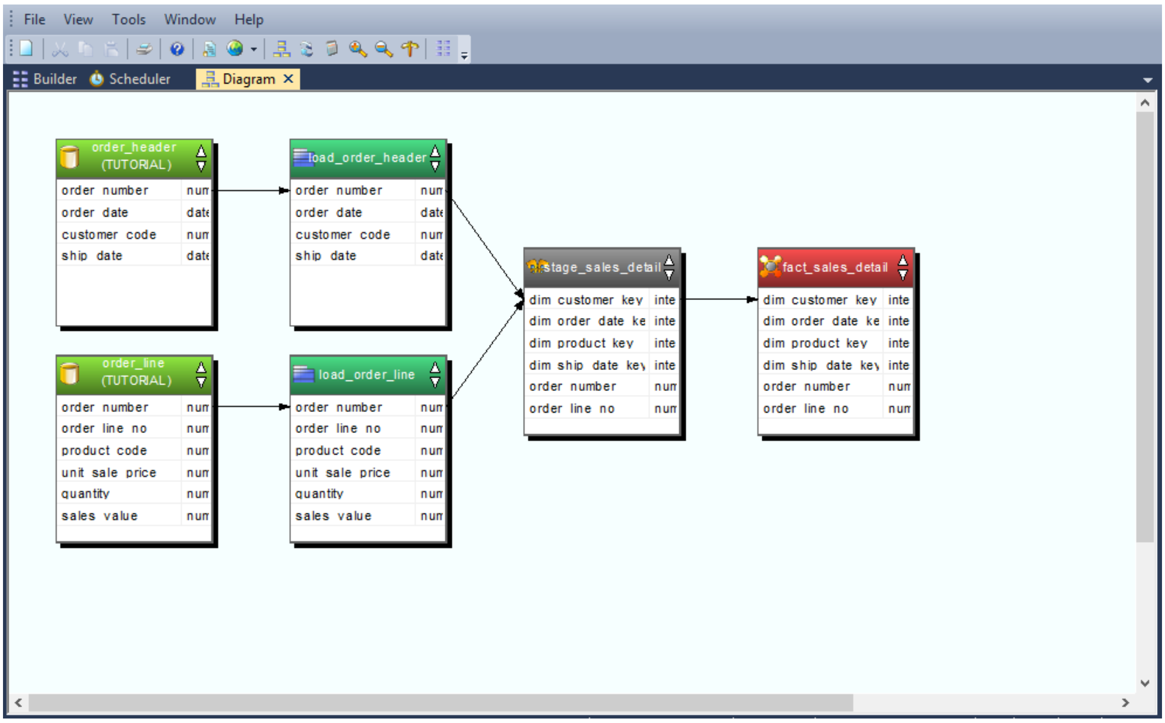
dim_ship_date_key	integer
ship_date	datetime
ship_cal_day_in_week	varchar(3)
ship_cal_day_in_week_r	integer
ship_cal_day_in_month	integer
ship_cal_day_in_year	integer
ship_cal_week_in_year	integer
ship_cal_month_no	integer
ship_cal_month	integer

3 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.



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.

The diagram looks like this:



order_header (TUTORIAL)
order number nun
order date date
customer code nun
ship date date

load_order_header
order number nun
order date date
customer code nun
ship date date

order_line (TUTORIAL)
order number nun
order line no nun
product code nun
unit sale price nun
quantity nun
sales value nun

load_order_line
order number nun
order line no nun
product code nun
unit sale price nun
quantity nun
sales value nun

stage_sales_detail
dim customer key inte
dim order date ke inte
dim product key inte
dim ship date key inte
order number nun
order line no nun

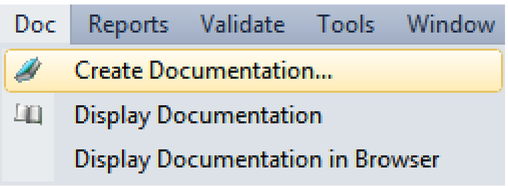
fact_sales_detail
dim customer key inte
dim order date ke inte
dim product key inte
dim ship date key inte
order number nun
order line no nun

You are now ready to proceed to the next step - ***Producing Documentation*** (see "***1.14 Producing Documentation***" on page 65).

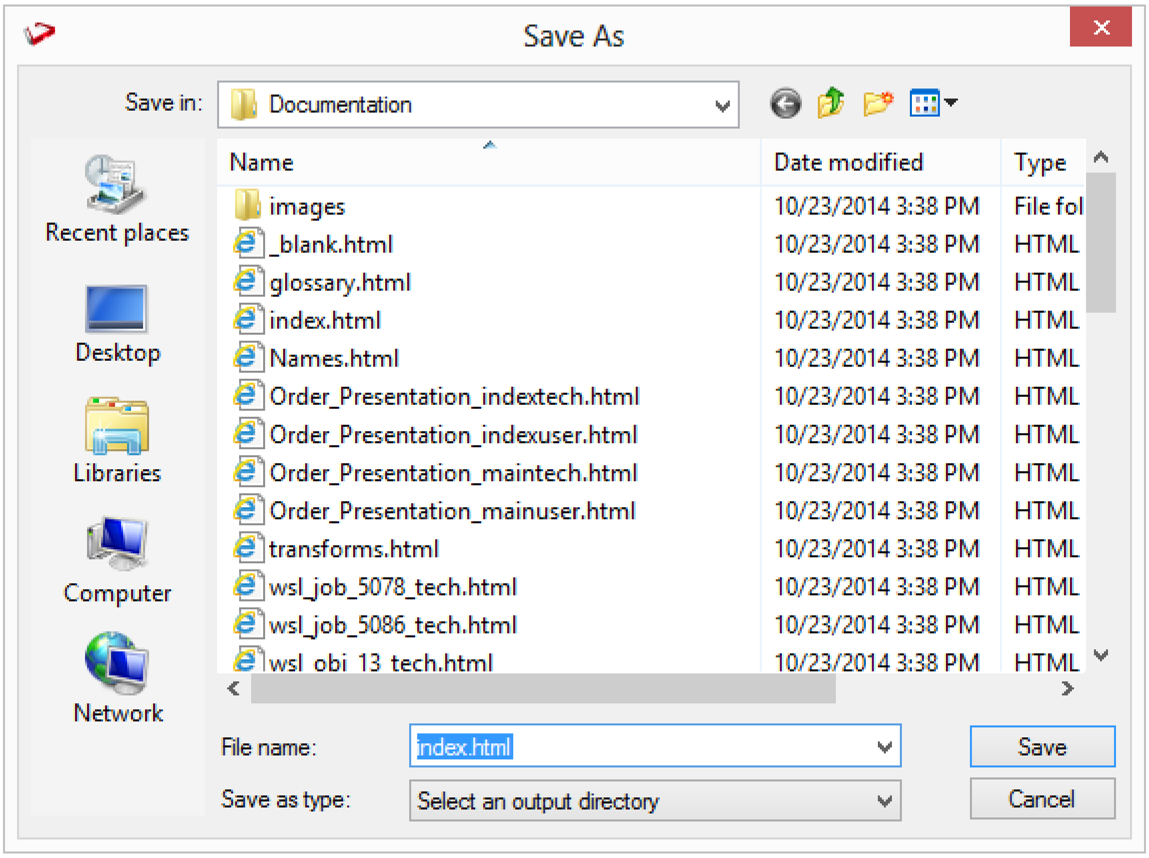
1.14 PRODUCING DOCUMENTATION

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** from the menu, then **Create Documentation**.



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



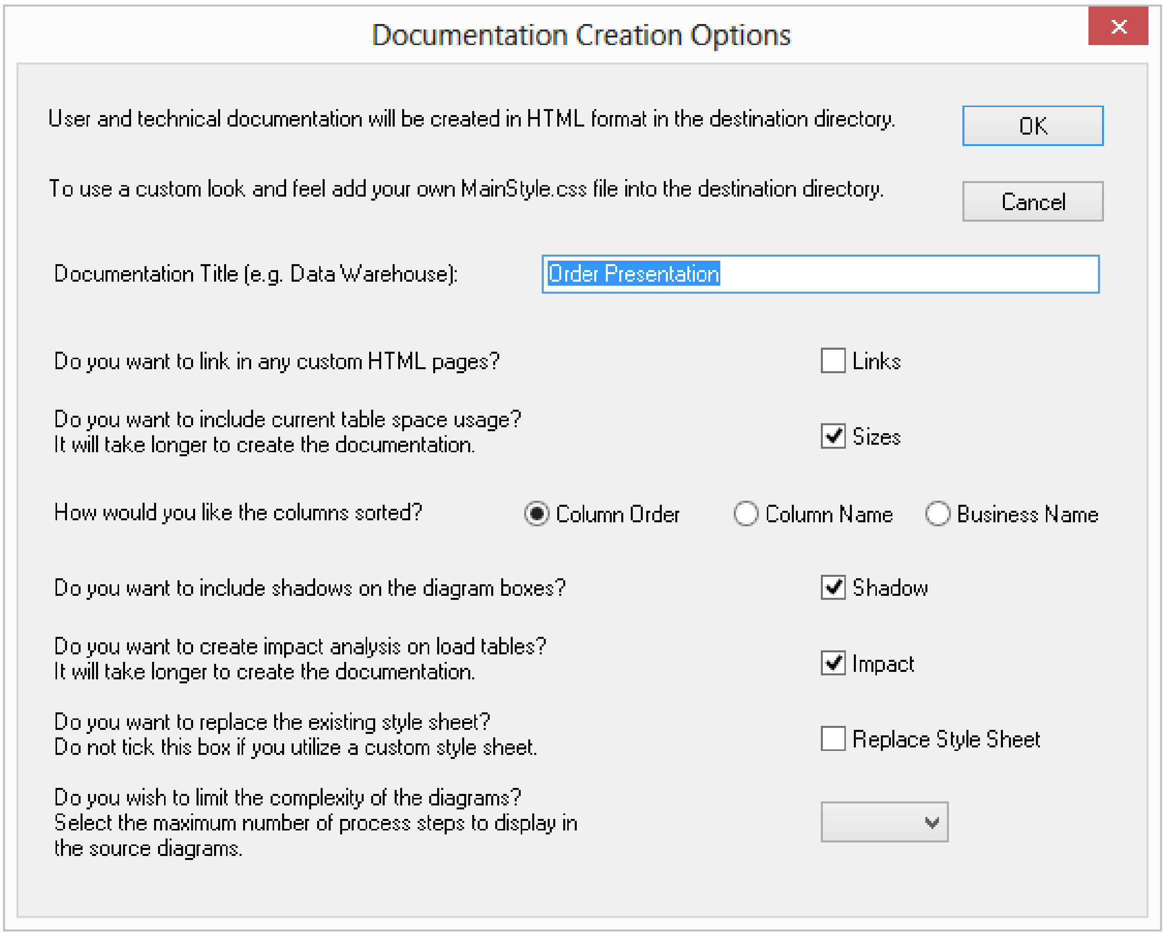
Save in: Documentation

Name	Date modified	Type
images	10/23/2014 3:38 PM	File fol
_blank.html	10/23/2014 3:38 PM	HTML
glossary.html	10/23/2014 3:38 PM	HTML
index.html	10/23/2014 3:38 PM	HTML
Names.html	10/23/2014 3:38 PM	HTML
Order_Presentation_indextech.html	10/23/2014 3:38 PM	HTML
Order_Presentation_indexuser.html	10/23/2014 3:38 PM	HTML
Order_Presentation_maintech.html	10/23/2014 3:38 PM	HTML
Order_Presentation_mainuser.html	10/23/2014 3:38 PM	HTML
transforms.html	10/23/2014 3:38 PM	HTML
wsl_job_5078_tech.html	10/23/2014 3:38 PM	HTML
wsl_job_5086_tech.html	10/23/2014 3:38 PM	HTML
wsl_obj_13_tech.html	10/23/2014 3:38 PM	HTML

File name: index.html

Save as type: Select an output directory

3 The next screen allows for the inclusion of a banner and user defined links. Leave these options unchecked and click **OK** to proceed.



Documentation Creation Options

User and technical documentation will be created in HTML format in the destination directory.

To use a custom look and feel add your own MainStyle.css file into the destination directory.

Documentation Title (e.g. Data Warehouse): Order Presentation

Do you want to link in any custom HTML pages? □ Links

Do you want to include current table space usage? It will take longer to create the documentation. ☑ Sizes

How would you like the columns sorted? ● Column Order ○ Column Name ○ Business Name

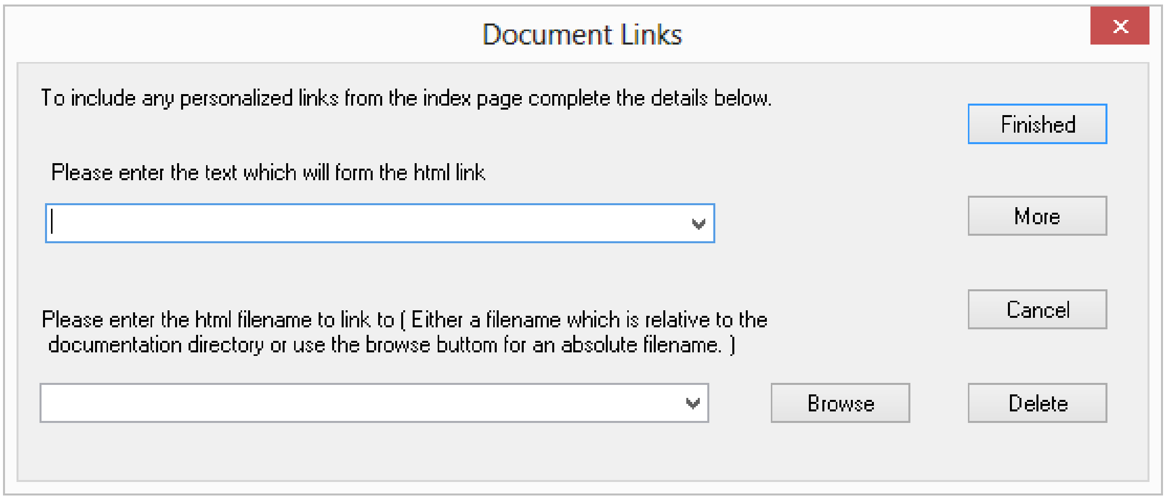
Do you want to include shadows on the diagram boxes? ☑ Shadow

Do you want to create impact analysis on load tables? It will take longer to create the documentation. ☑ Impact

Do you want to replace the existing style sheet? Do not tick this box if you utilize a custom style sheet. □ Replace Style Sheet

Do you wish to limit the complexity of the diagrams? Select the maximum number of process steps to display in the source diagrams.

4 Include any personalized links if required and click **Finish**.



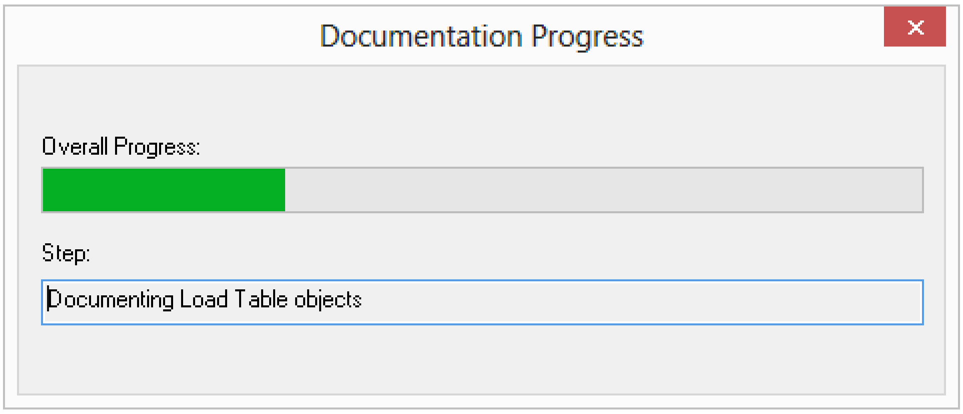
Document Links

To include any personalized links from the index page complete the details below.

Please enter the text which will form the html link

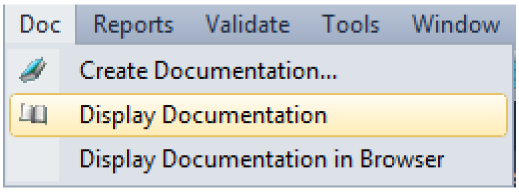
Please enter the html filename to link to (Either a filename which is relative to the documentation directory or use the browse buttom for an absolute filename.)

The documentation runs:



Documenting Load Table objects

TIP: To view the documentation select Doc, Display Documentation:

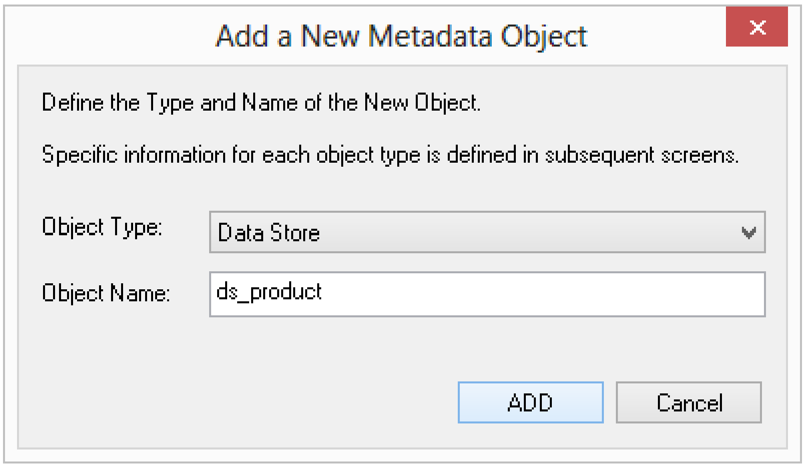


You are now ready to proceed to the next step - ***Data Store Objects*** (see "***1.15 Data Store Objects (Optional)***" on page 68)

1.15 DATA STORE OBJECTS (OPTIONAL)

Data Store objects are used to provide a persistent storage of load tables. These objects are not licensed for every installation and hence this section is optional.

1. Browse the **Data Warehouse** in the right pane.
2. Double-click the **data store** object in the left pane.
3. Drag **load_product** from the right pane into the middle pane.
4. Accept the default name of **ds_product** and click **ADD**.



Add a New Metadata Object

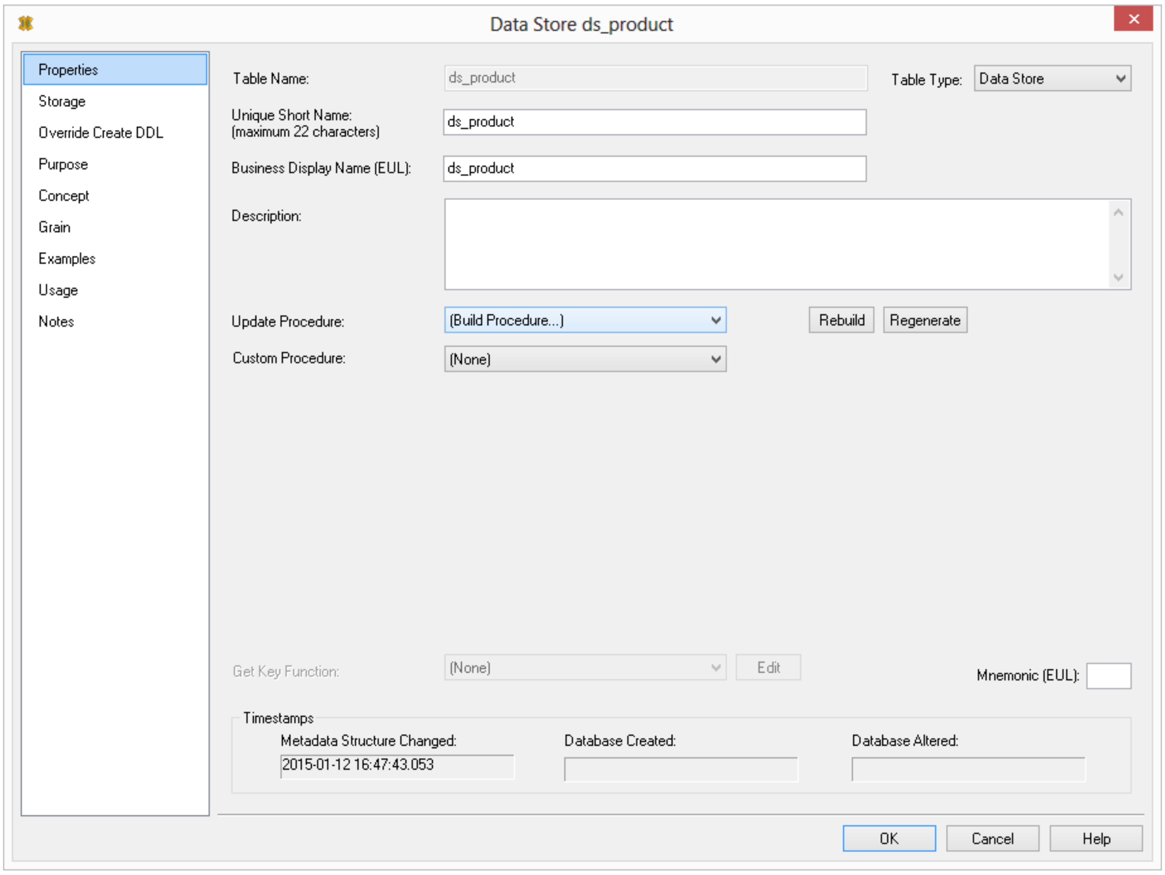
Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Data Store

Object Name: ds_product

5 Select **(Build Procedure...)** from the Update Procedure drop-down list. Click **OK**.



Data Store ds_product

Table Name: ds_product

Table Type: Data Store

Unique Short Name: (maximum 22 characters) ds_product

Business Display Name (EUL): ds_product

Description:

Update Procedure: (Build Procedure...)

Custom Procedure: (None)

Get Key Function: (None)

Mnemonic (EUL):

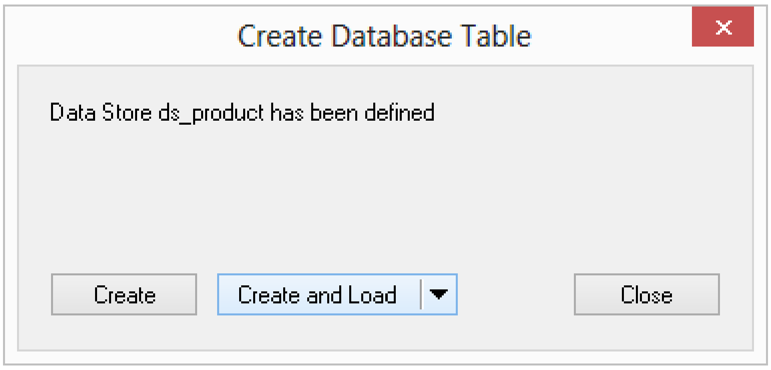
Timestamps

Metadata Structure Changed: 2015-01-12 16:47:43.053

Database Created:

Database Altered:

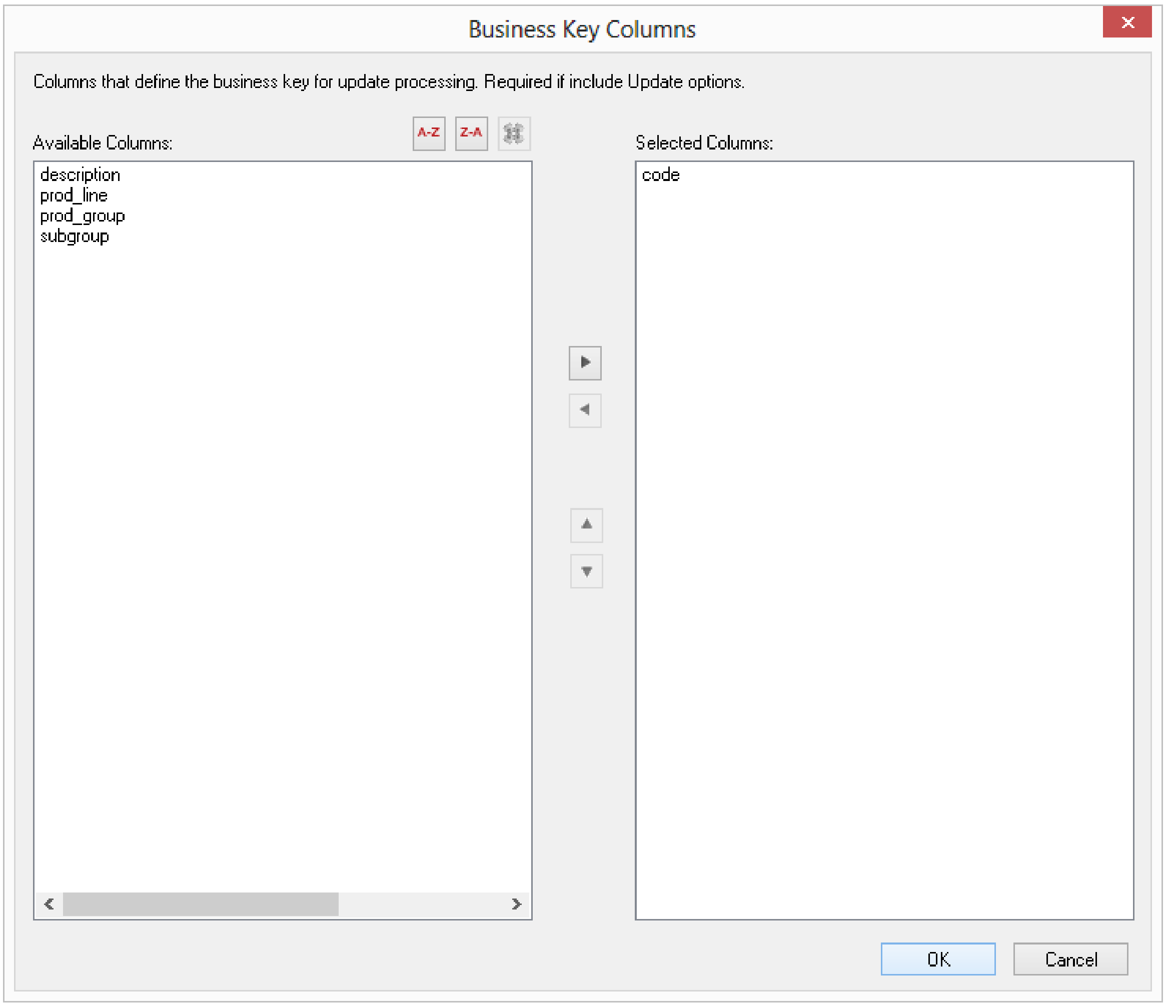
6 Click **Create and Load**.



Create Database Table

Data Store ds_product has been defined

7 Select **code** as the business key by clicking on the **ellipsis** button to the right of the Business Key Columns field by clicking code, selecting **>** or by double-clicking on code. Click **OK**.



Business Key Columns

Columns that define the business key for update processing. Required if include Update options.

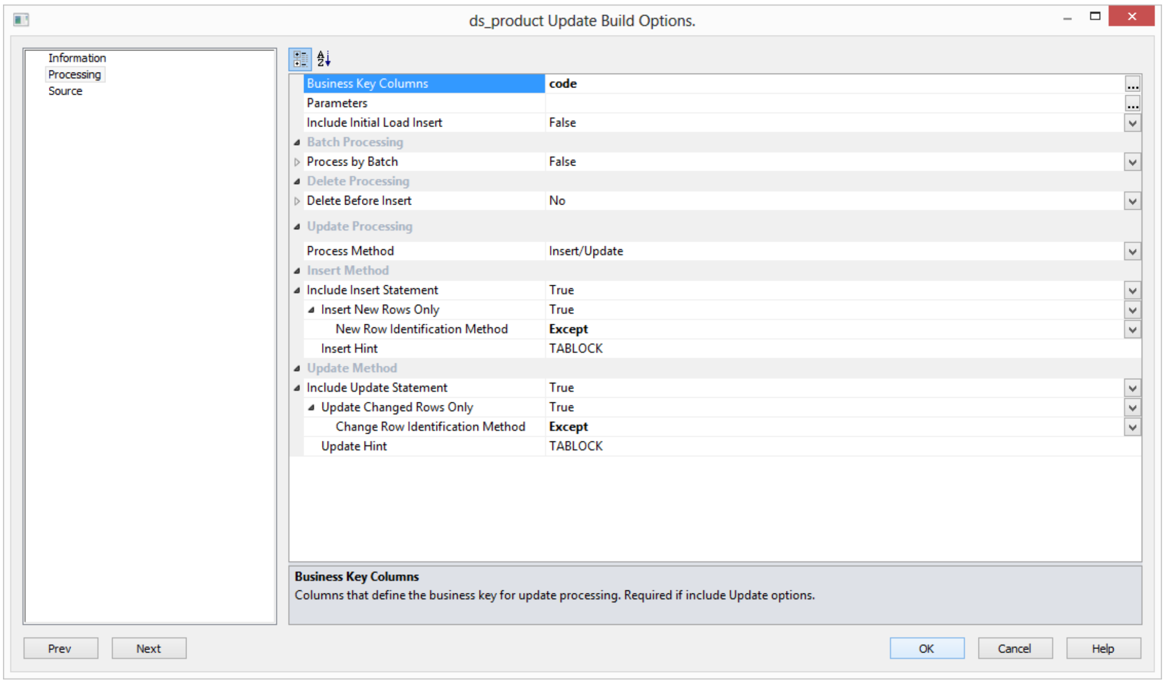
Available Columns:

description
prod_line
prod_group
subgroup

Selected Columns:

code

8 Make sure the options as set as shown below and click **OK**.

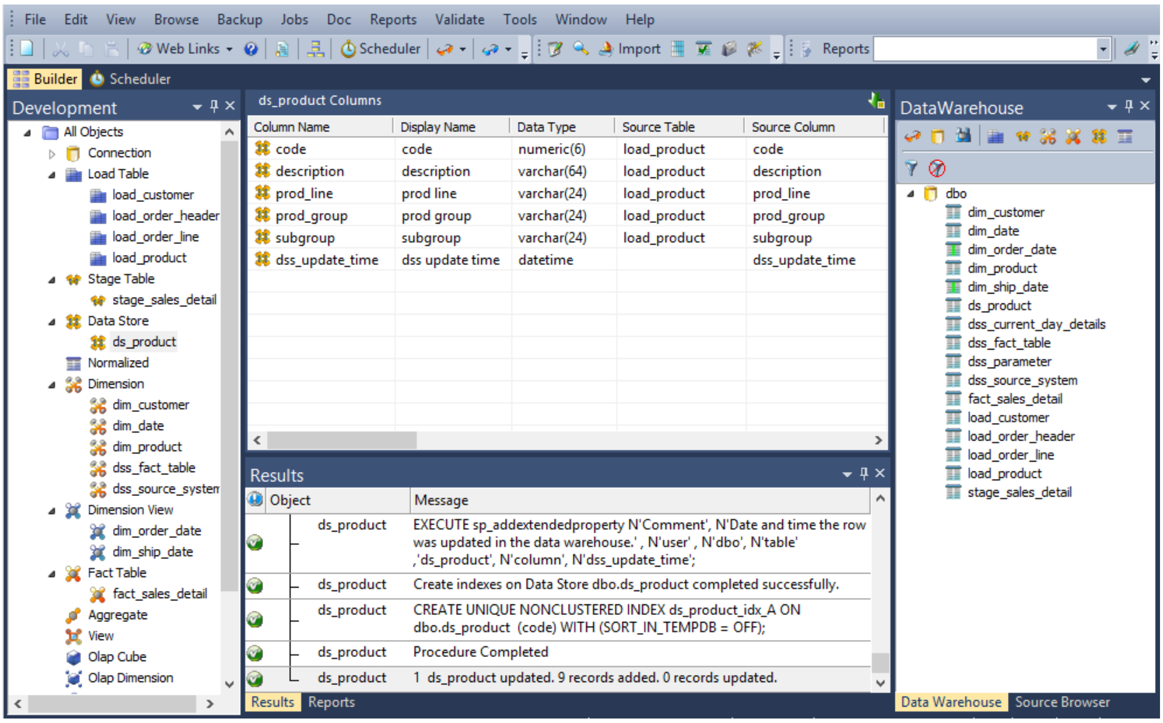


Business Key Columns	code
Parameters	
Include Initial Load Insert	False
Batch Processing	
Process by Batch	False
Delete Processing	
Delete Before Insert	No
Update Processing	
Process Method	Insert/Update
Insert Method	
Include Insert Statement	True
Insert New Rows Only	True
New Row Identification Method	Except
Insert Hint	TABLOCK
Update Method	
Include Update Statement	True
Update Changed Rows Only	True
Change Row Identification Method	Except
Update Hint	TABLOCK

Business Key Columns
Columns that define the business key for update processing. Required if include Update options.

9 Data should now be loaded into the ds_product table. Refresh the Data Warehouse in the right pane (F5).

10 Your screen should look something like this:



ds_product Columns

Column Name	Display Name	Data Type	Source Table	Source Column
code	code	numeric(6)	load_product	code
description	description	varchar(64)	load_product	description
prod_line	prod line	varchar(24)	load_product	prod_line
prod_group	prod group	varchar(24)	load_product	prod_group
subgroup	subgroup	varchar(24)	load_product	subgroup
dss_update_time	dss update time	datetime		dss_update_time

Results

Object	Message
ds_product	EXECUTE sp_addextendedproperty N'Comment', N'Date and time the row was updated in the data warehouse.' , N'user' , N'dbo', N'table' ,'ds_product', N'column', N'dss_update_time';
ds_product	Create indexes on Data Store dbo.ds_product completed successfully.
ds_product	CREATE UNIQUE NONCLUSTERED INDEX ds_product_idx_A ON dbo.ds_product (code) WITH (SORT_IN_TEMPDB = OFF);
ds_product	Procedure Completed
ds_product	1 ds_product updated. 9 records added. 0 records updated.

11 Repeat the exercise for **order_line**, **order_header** and **customer**.

TUTORIAL 2

ROLLUP FACT TABLES, ASCII FILE LOADS, AGGREGATES

Before you start on this chapter you should have:

- Completed ***Tutorial 1 - Basic Star Schema Fact Table*** (see "***Basic Star Schema Fact Table***" on page 1)
- Successfully completed ***Creating a Fact Table*** (see "***1.12 Creating a Fact Table***" on page 58)

This chapter deals with fine tuning the data warehouse by creating roll-up fact tables and aggregates. It also includes loading an ascii file into a new load table.

IN THIS TUTORIAL

2.1 PURPOSE AND ROADMAP

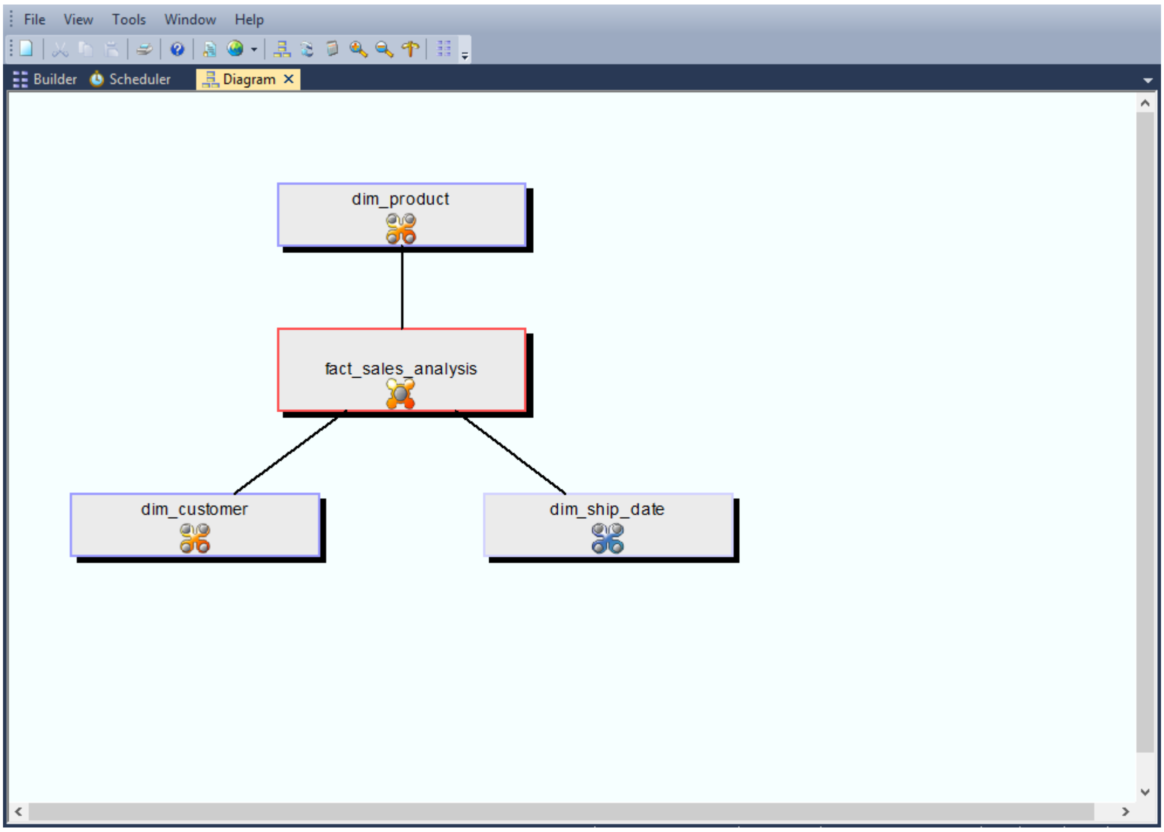
Purpose

This tutorial will walk you through the process to:

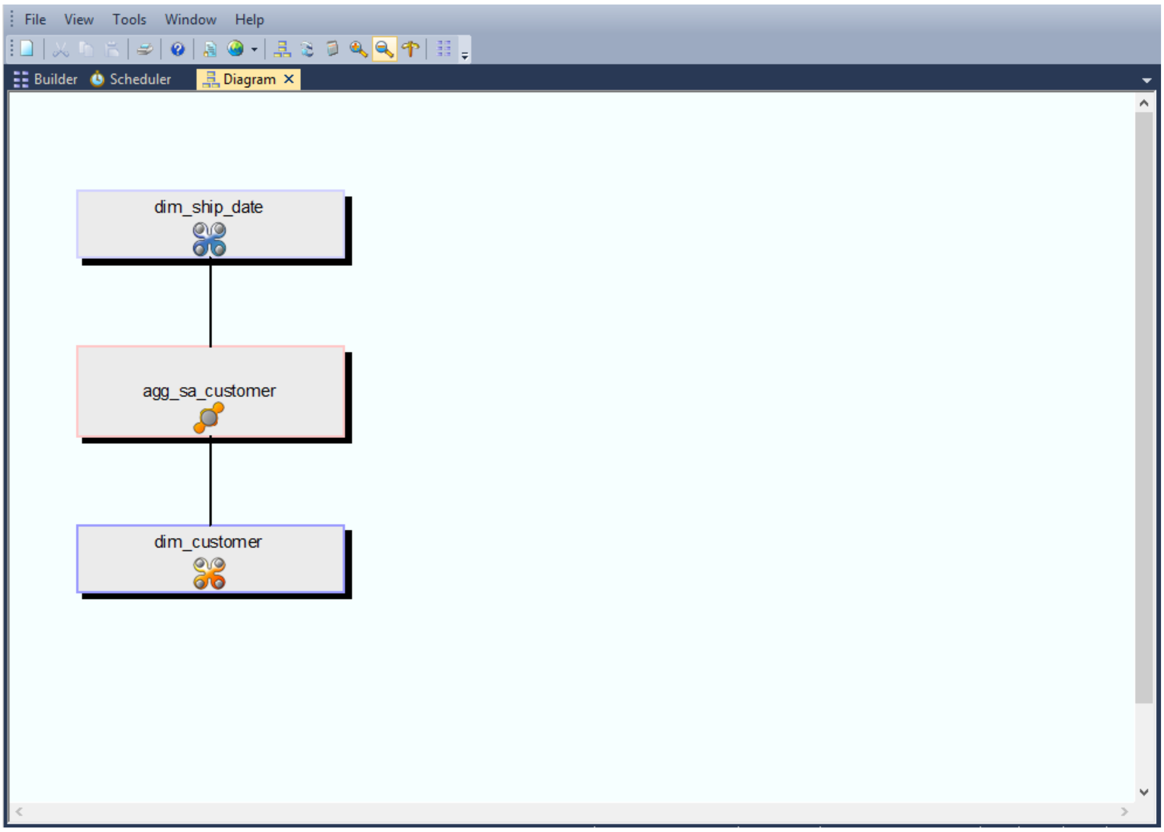
- Load data from flat files (in Tutorial 1 source data was obtained via database links)
- Create a rollup fact table that allows users to see budgeted, forecast, and actual sales amounts and quantities broken down by customer, product and month
- Create separate aggregate tables that summarize data in the rollup table by (i) product and (ii) customer

In short, this tutorial loads budget and forecast data from flat files into their own load, stage and fact tables. This data is then combined with data from the fact_sales_detail table (created in Tutorial 1) and summarized to create a new rollup fact table, fact_sales_analysis. Further summarization is done on the rollup table to create two separate aggregate tables.
The following are diagrams showing (i) the rollup table, fact_sales_analysis and (ii) the customer aggregate table, agg_sa_customer that will be created as part of this tutorial.

Rollup **fact_sales_analysis**:



Aggregate **agg_sa_customer**:



Tutorial Environment

This tutorial has been completed using IBM DB2. All of the features illustrated in this tutorial are available in SQL Server, Oracle and DB2 (unless otherwise stated).
Any differences in usage of WhereScape RED between these databases are highlighted.

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 connection to allow data to be loaded in from flat files on C: drive.	Making a Connection to Windows

Step in Tutorial	**Section**
Create (and load) the data for • load_budget • load_forecast Note: Data is loaded from flat files on C: drive	Loading Tables from Flat Files
Create the following stage tables • stage_budget • stage_forecast Stage table creation entails using corresponding load tables and including links to the following dimensions: (dim_customer, dim_product, dim_date)	Creating Stage Tables
Create the following fact tables • fact_budget • fact_forecast	Creating Fact Tables
Create the rollup fact table, fact_sales_analysis This rollup combines forecast, budget and sales data from fact_budget, fact_forecast and fact_sales_detail tables respectively. The data is rolled-up (grouped) by product, customer and month. Note that dimension keys are used for the rollup.	Rollup/Snapshot Fact Tables
Create product aggregate (agg_sa_product) table. This aggregate summarizes fact_sales_analysis data by product	Aggregate Tables
Create customer aggregate (agg_sa_customer) table. This aggregate summarizes fact_sales_analysis data by customer.	Creating a Customer Aggregate

This tutorial starts with the section ***Making a Connection to Windows*** (see "***2.2 Creating a Connection to Windows***" on page 77).

2.2 Creating a Connection to Windows

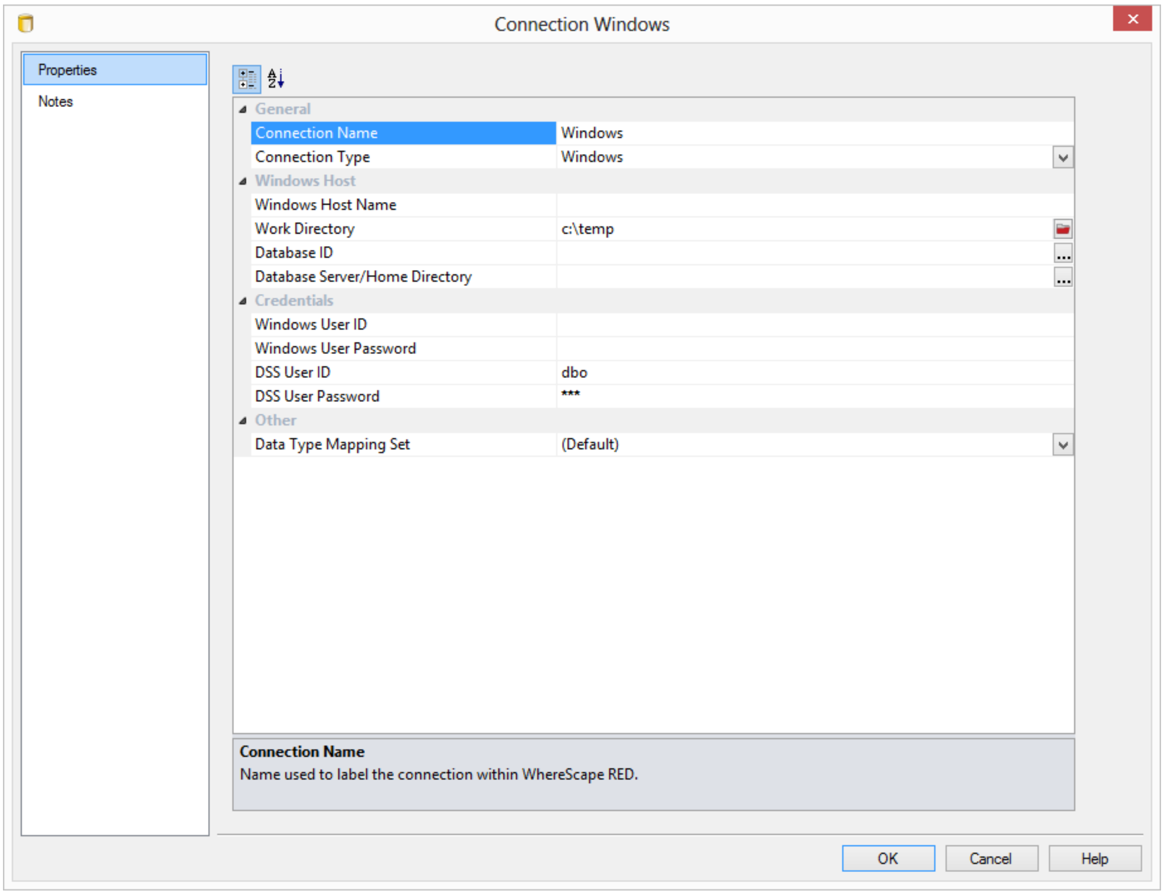
This follows a similar process to the earlier ***connections*** (see "***1.6 Creating a Connection***" on page 14) made, but differs in that the connection is within the computer.

Note: The following connection should have been automatically created. It should however be validated to ensure that it is correct for the environment.

1. Log on to WhereScape RED.
2. In the left pane, double-click on the **Connection** object group.
3. Select **File | New**, or right-click the **Connection** object and select **New Object**.
4. Enter **Windows** in the 'Name of Object' text box and select **Add**.
5. Enter the Connection properties as below:

Field	Description
Connection Name	Windows
Connection Type	Windows
Host Name	Not required
Work Directory	Required. Must be an existing valid directory on the PC, e.g, c:\temp
Database id (SID)	For Oracle, the appropriate SID for your metadata installation, e.g. ORCL. For SQL Server and DB2 leave this field blank.
Database home directory	This is only required for Oracle and if the Database SID is in a non-default directory
Windows User ID	Leave blank
Windows Password	Leave blank
Dss User ID	For Oracle, this is the data warehouse username. This is the database logon for SQL Server and DB2. It should be dbo if a trusted connection is being used for SQL Server. If an OS authenticated user is being used for DB2 this should be left blank.
Dss password	For Oracle, this is the data warehouse password. This is the database password for SQL Server and DB2. It should be left blank if a trusted connection is being used for SQL Server or if an OS authenticated user is being used for DB2.

Sample SQL Server **Properties**



General

Connection Name	Windows
Connection Type	Windows

Windows Host

Windows Host Name	
Work Directory	c:\temp
Database ID	
Database Server/Home Directory	

Credentials

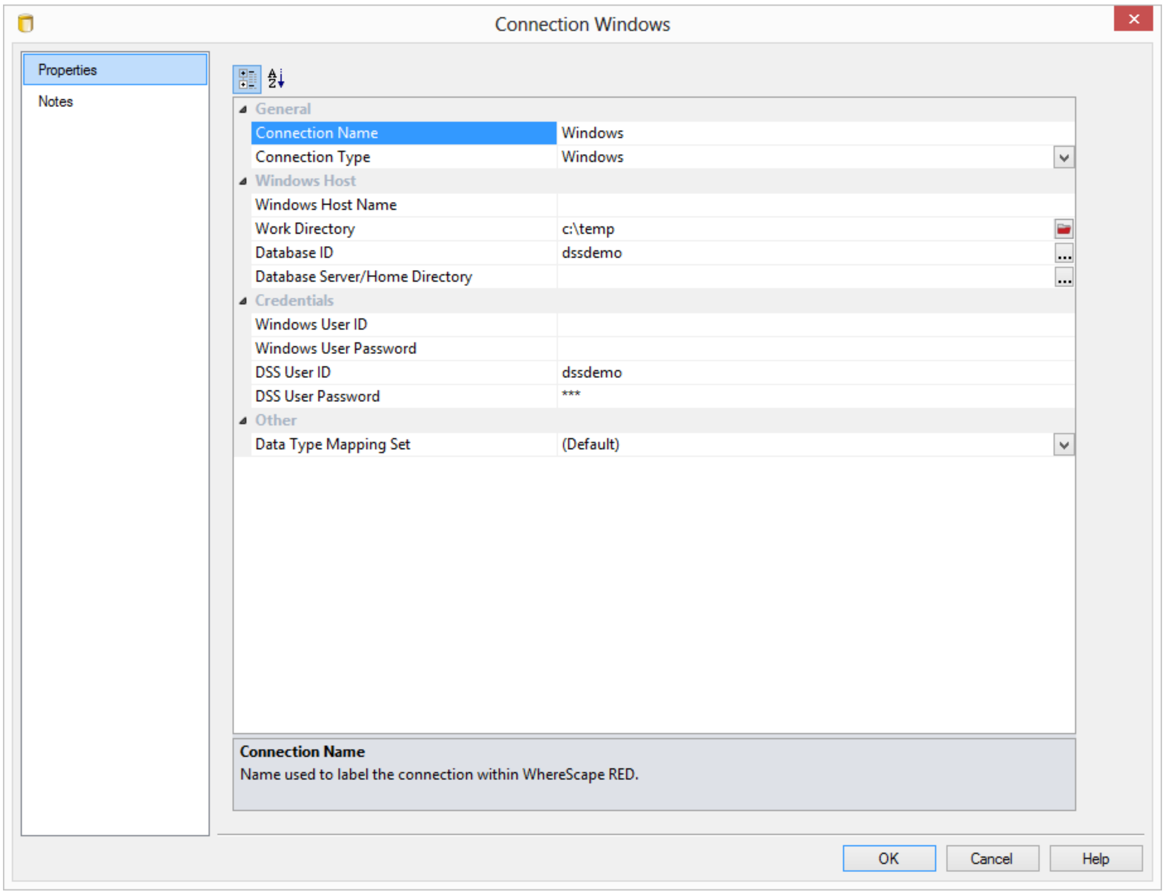
Windows User ID	
Windows User Password	
DSS User ID	dbo
DSS User Password	***

Other

Data Type Mapping Set	(Default)

Connection Name
Name used to label the connection within WhereScape RED.

Sample Oracle **Properties:**



General

Connection Name	Windows
Connection Type	Windows

Windows Host

Windows Host Name	
Work Directory	c:\temp
Database ID	dssdemo
Database Server/Home Directory	

Credentials

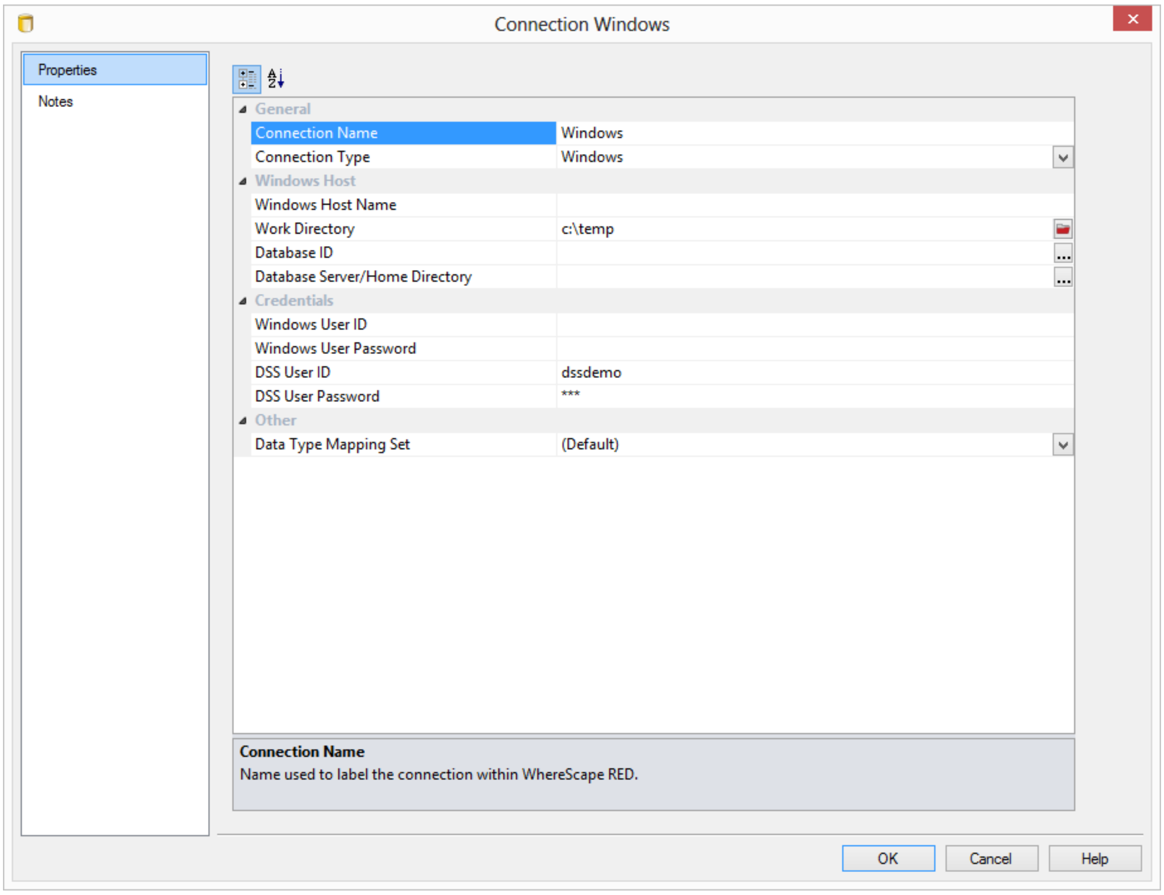
Windows User ID	
Windows User Password	
DSS User ID	dssdemo
DSS User Password	***

Other

Data Type Mapping Set	(Default)

Connection Name
Name used to label the connection within WhereScape RED.

Sample DB2 **Properties:**



General	
Connection Name	Windows
Connection Type	Windows
Windows Host	
Windows Host Name	
Work Directory	c:\temp
Database ID	
Database Server/Home Directory	
Credentials	
Windows User ID	
Windows User Password	
DSS User ID	dssdemo
DSS User Password	***
Other	
Data Type Mapping Set	(Default)

Connection Name
Name used to label the connection within WhereScape RED.

You are now ready to proceed to the next step - ***Loading Tables from Flat files*** (see "***2.3 Loading Tables from Flat Files***" on page 81).

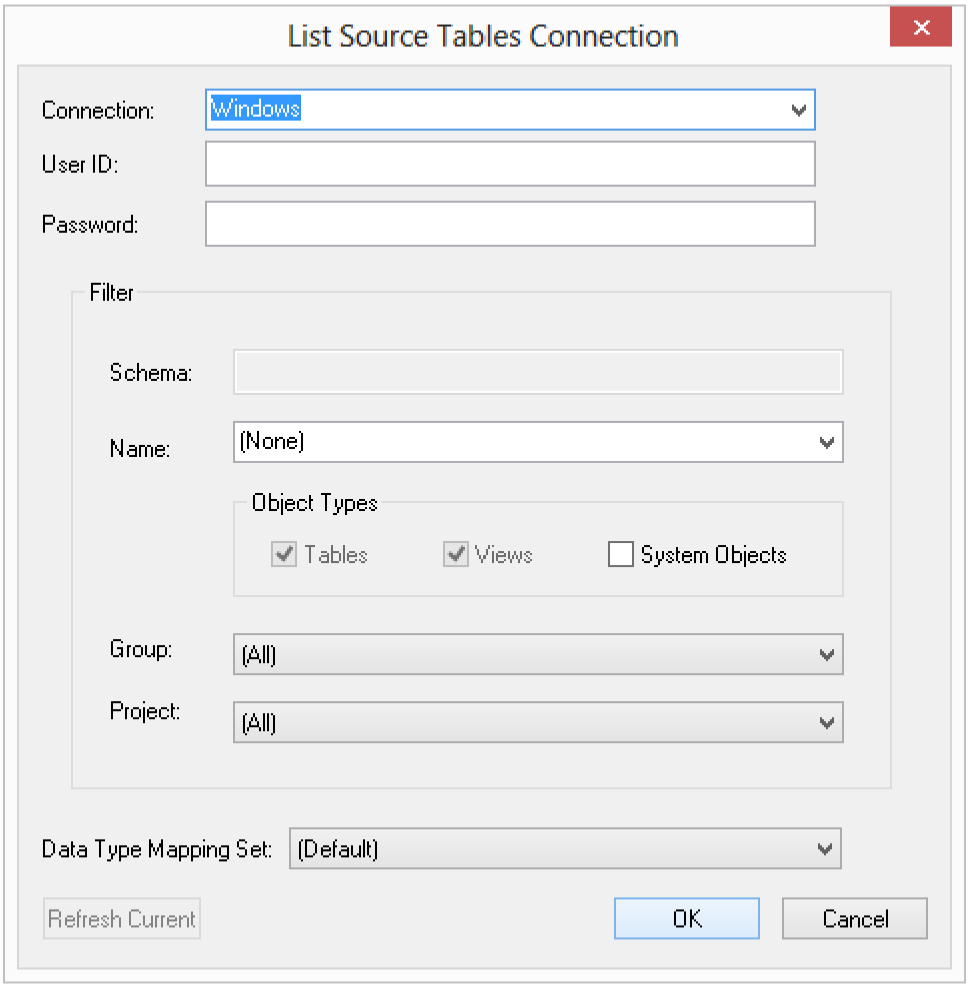
2.3 LOADING TABLES FROM FLAT FILES

In this step you will parse and load a file from Windows into a load table in the data warehouse.

1 Double-click on the **Load Table** object group in the left pane. This will list all load tables in the middle pane and make the middle pane a drop target for new load tables.

2 Browse to the Windows connection in the right pane by selecting **Browse** | **Source Tables** from the menu strip at the top of the screen.

3 Select **Windows** as the Connection. Leave the Schema field blank. Click **OK**.



List Source Tables Connection

Connection: Windows
User ID:
Password:

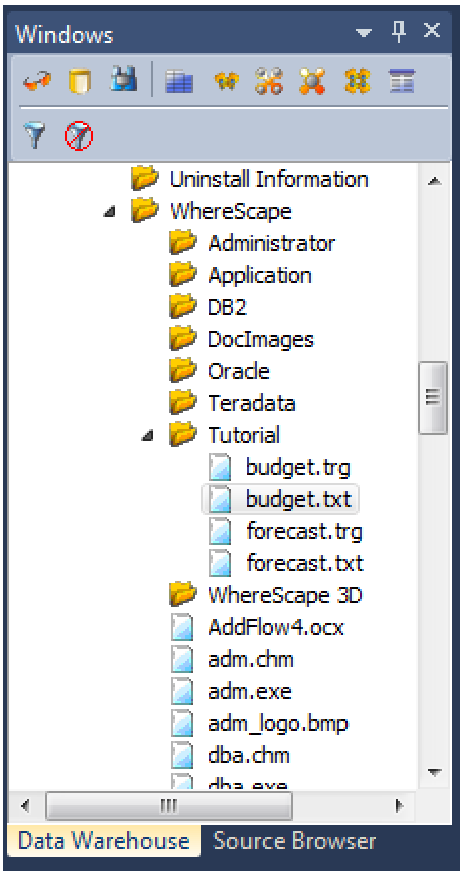
Filter
Schema:
Name: (None)
Object Types
☑ Tables ☑ Views □ System Objects
Group: (All)
Project: (All)

Data Type Mapping Set: (Default)

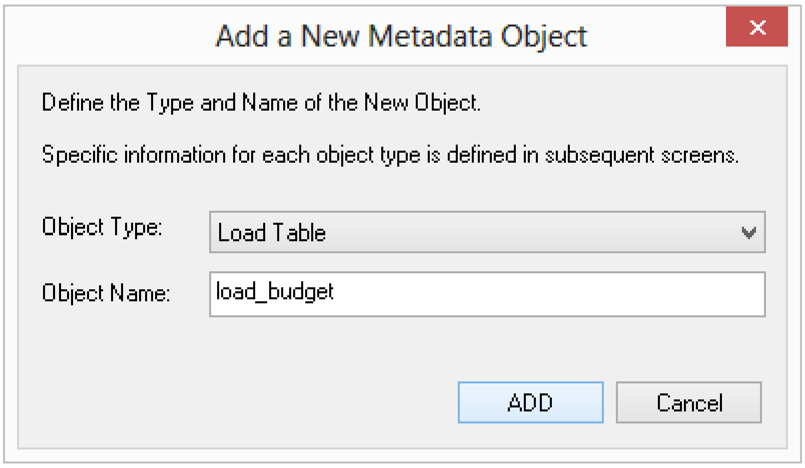
4 In 32 bit systems navigate to **c:\Program Files\WhereScape\Tutorial** folder, click on **budget.txt** and drag it into the middle pane.

5 For 64 bit systems, navigate to **c:\Program Files (x86)\WhereScape\Tutorial** instead.

The path above may be different if WhereScape has not been installed in the default location.



6 Accept **load_budget** as the object name and click **ADD**.


Add a New Metadata Object

Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Load Table

Object Name: load_budget

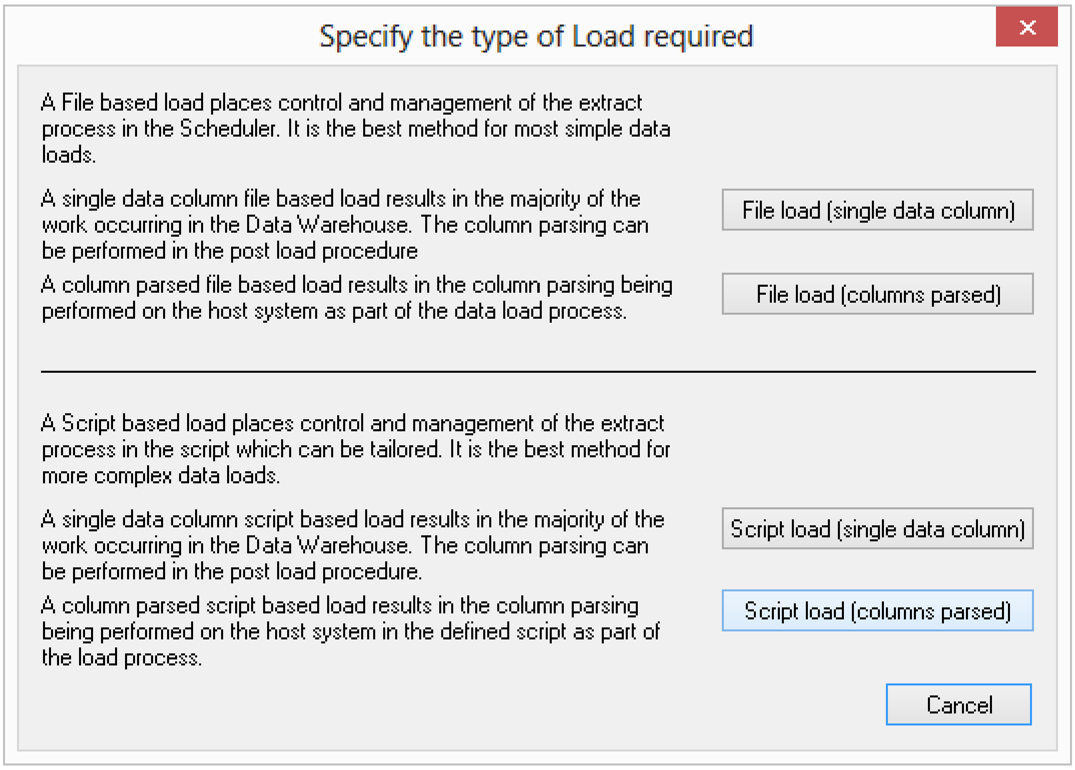
Specifying the load type

You must now specify the type of load you require from the four options given:

- File load (single data column)
- File load (columns parsed)
- Script load (single data column)
- Script load (columns parsed)

For more information on load types see the section on flat file loads in the loading data chapter.

1 For this tutorial select **Script load (columns parsed).**



Specify the type of Load required

A File based load places control and management of the extract process in the Scheduler. It is the best method for most simple data loads.

A single data column file based load results in the majority of the work occurring in the Data Warehouse. The column parsing can be performed in the post load procedure

A column parsed file based load results in the column parsing being performed on the host system as part of the data load process.

A Script based load places control and management of the extract process in the script which can be tailored. It is the best method for more complex data loads.

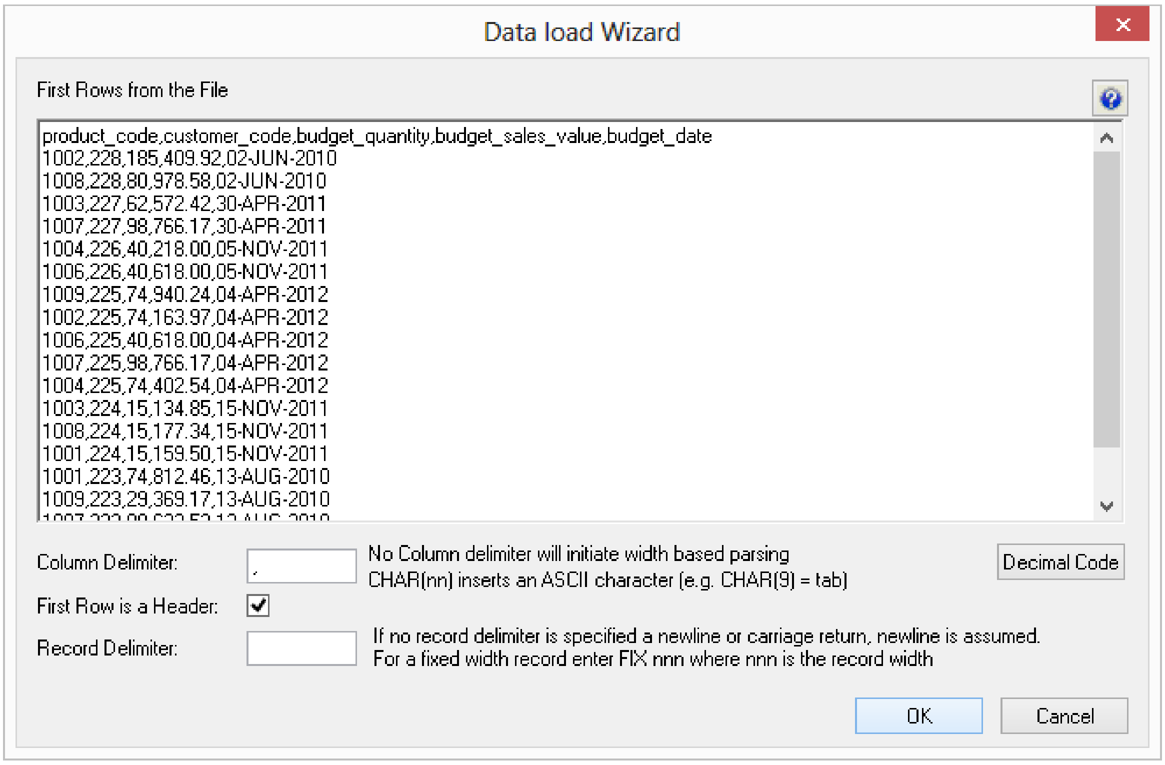
A single data column script based load results in the majority of the work occurring in the Data Warehouse. The column parsing can be performed in the post load procedure.

A column parsed script based load results in the column parsing being performed on the host system in the defined script as part of the load process.

File load (single data column)
File load (columns parsed)
Script load (single data column)
Script load (columns parsed)
Cancel

Note: For DB2, file loads are not available in this dialog.

2 From the data load wizard enter a comma (**,**) in the Column Delimiter field. As the first row is a header, place a **check** in the box and click **OK.**



```
product_code,customer_code,budget_quantity,budget_sales_value,budget_date
1002,228,185,409.92,02-JUN-2010
1008,228,80,978.58,02-JUN-2010
1003,227,62,572.42,30-APR-2011
1007,227,98,766.17,30-APR-2011
1004,226,40,218.00,05-NOV-2011
1006,226,40,618.00,05-NOV-2011
1009,225,74,940.24,04-APR-2012
1002,225,74,163.97,04-APR-2012
1006,225,40,618.00,04-APR-2012
1007,225,98,766.17,04-APR-2012
1004,225,74,402.54,04-APR-2012
1003,224,15,134.85,15-NOV-2011
1008,224,15,177.34,15-NOV-2011
1001,224,15,159.50,15-NOV-2011
1001,223,74,812.46,13-AUG-2010
1009,223,29,369.17,13-AUG-2010
```

Column Delimiter: ,

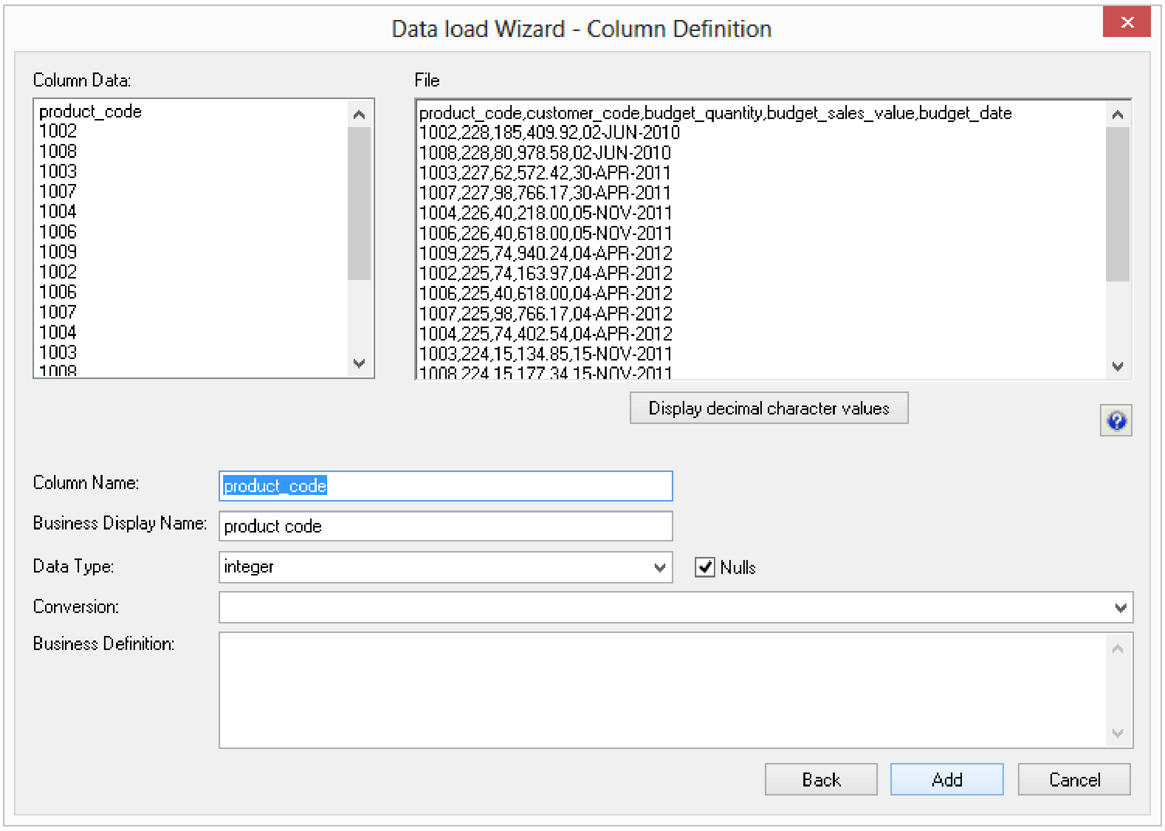
No Column delimiter will initiate width based parsing
CHAR(nn) inserts an ASCII character (e.g. CHAR(9) = tab)

First Row is a Header: ☑

Record Delimiter:

If no record delimiter is specified a newline or carriage return, newline is assumed.
For a fixed width record enter FIX nnn where nnn is the record width

3 WhereScape RED uses the header row as suggested column names. For each following column confirm the **name** and **data type**. You may have to change it to a more appropriate value. Click **Add**.



Data load Wizard - Column Definition

Column Data:

```
product_code
1002
1008
1003
1007
1004
1006
1009
1002
1006
1007
1004
1003
1008
```

File

```
product_code,customer_code,budget_quantity,budget_sales_value,budget_date
1002,228,185,409.92,02-JUN-2010
1008,228,80,978.58,02-JUN-2010
1003,227,62,572.42,30-APR-2011
1007,227,98,766.17,30-APR-2011
1004,226,40,218.00,05-NOV-2011
1006,226,40,618.00,05-NOV-2011
1009,225,74,940.24,04-APR-2012
1002,225,74,163.97,04-APR-2012
1006,225,40,618.00,04-APR-2012
1007,225,98,766.17,04-APR-2012
1004,225,74,402.54,04-APR-2012
1003,224,15,134.85,15-NOV-2011
1008,224,15,177.34,15-NOV-2011
```

Column Name: product_code

Business Display Name: product code

Data Type: integer ☑ Nulls

Conversion:

Business Definition:

4 Click **OK** on the load_budget **Properties** dialog.

5 Click **OK** for the DB2 Load cannot skip header rows dialog.

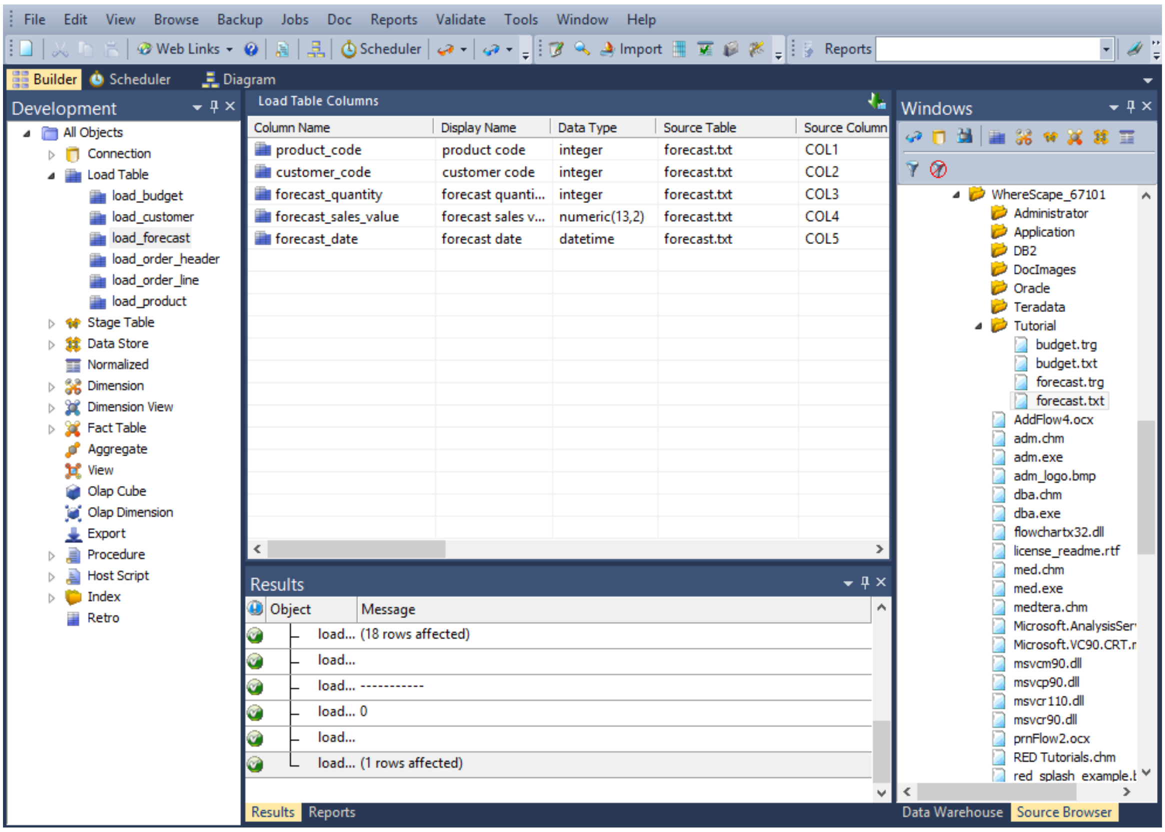
6 Click **OK** on the **New script created** dialog.

7 Select **Yes** on the prompt to **create and load** the table now.

Note: Loading files with a header row into **DB2** will result in an error message.

8 Repeat steps (1) to (9) for the **forecast.txt** file to create and load the table load_forecast.

9 Your screen should look something like this:



Column Name	Display Name	Data Type	Source Table	Source Column
product_code	product code	integer	forecast.txt	COL1
customer_code	customer code	integer	forecast.txt	COL2
forecast_quantity	forecast quanti...	integer	forecast.txt	COL3
forecast_sales_value	forecast sales v...	numeric(13,2)	forecast.txt	COL4
forecast_date	forecast date	datetime	forecast.txt	COL5

Object	Message
load...	(18 rows affected)
load...	
load...	-----------
load...	0
load...	
load...	(1 rows affected)

You are now ready to proceed to the next step - ***Creating Stage Tables*** (see "***2.4 Creating Stage Tables***" on page 87).

2.4 Creating Stage Tables

Two separate stage tables need to be created for **load_budget** and **load_forecast**. This is the same as the procedure from the first tutorial for ***Defining the Staging Table*** (see "***1.10 Defining the Staging Table***" on page 45).

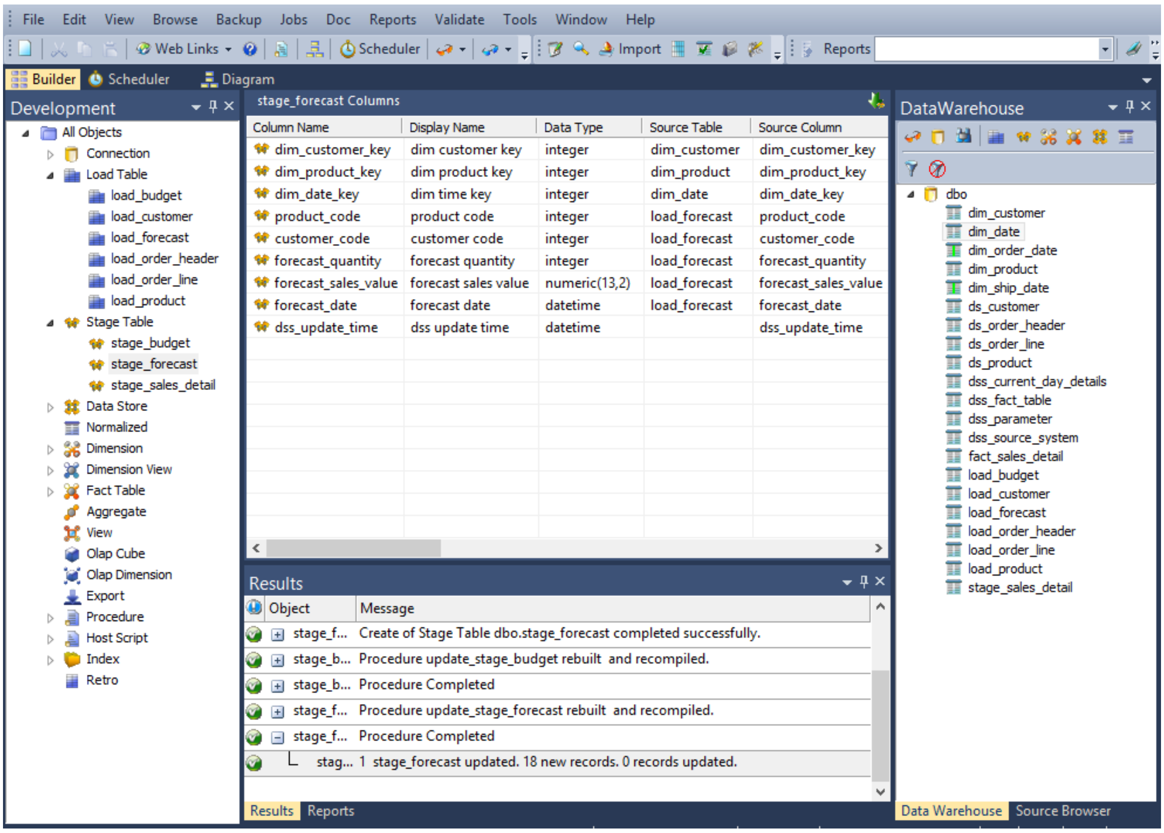
1. Double-click the **stage table** object group in the left pane. This will list the existing stage table in the middle pane.
2. Browse to the data warehouse **Browse/Source Tables** or click on the orange glasses in the toolbar.
3. Drag the table **load_budget** from the right pane to the middle pane and drop.
4. Click **ADD** to add the stage table called stage_budget.
5. Click **OK** on the Properties dialog.
6. Now bring in the following keys from the right pane into the new table. Click the stage table name in the left pane to list the stage table columns in the middle pane; this also makes the middle pane a drop target for new columns:

   - dim_customer_key

   - dim_product_key

   - dim_date_key
7. Now in the left pane, right-click on **stage_budget** and select **Create (ReCreate)**.
8. In the left pane, right-click on **stage_budget** and select **Properties**. In the Update Procedure field select **(Build Procedure...)**. Click **OK.**
9. Select **Cursor** as the update procedure type.
10. Click **OK** on the Parameters dialog.
11. SQL Server data warehouse users will now see an additional join screen. This screen is presented even though no joins are required. This screen allows the selection of either a 'Where' based join or an ANSI standard join. The default will be ANSI standard join. Click **OK** to proceed.
12. Select the dimension keys:
    - dim_customer - customer code
    - dim_product - product code
    - dim_date - budget/forecast date (depending on which stage table you are working on).
    - Click **>** then **OK** for each one.
13. Now define the business keys. Add **customer_code**, **product_code**, and **budget/forecast_date** to the business key list, and click **OK**.
14. Right-click on the stage table in the left pane, and select **Execute Update Procedure**.
15. Repeat steps (1) to (14) to create stage table **stage_forecast** from **load_forecast**.
16. Refresh the Data Warehouse in the right pane (F5).

17 Your screen should look something like this:



stage_forecast Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer key	integer	dim_customer	dim_customer_key
dim_product_key	dim product key	integer	dim_product	dim_product_key
dim_date_key	dim time key	integer	dim_date	dim_date_key
product_code	product code	integer	load_forecast	product_code
customer_code	customer code	integer	load_forecast	customer_code
forecast_quantity	forecast quantity	integer	load_forecast	forecast_quantity
forecast_sales_value	forecast sales value	numeric(13,2)	load_forecast	forecast_sales_value
forecast_date	forecast date	datetime	load_forecast	forecast_date
dss_update_time	dss update time	datetime		dss_update_time

Results

Object	Message
stage_f...	Create of Stage Table dbo.stage_forecast completed successfully.
stage_b...	Procedure update_stage_budget rebuilt and recompiled.
stage_b...	Procedure Completed
stage_f...	Procedure update_stage_forecast rebuilt and recompiled.
stage_f...	Procedure Completed
stag...	1 stage_forecast updated. 18 new records. 0 records updated.

You are now ready to proceed to the next step - ***Creating Fact Tables*** (see "***2.5 Creating Fact Tables***" on page 89) for these two new stage tables.

2.5 Creating Fact Tables

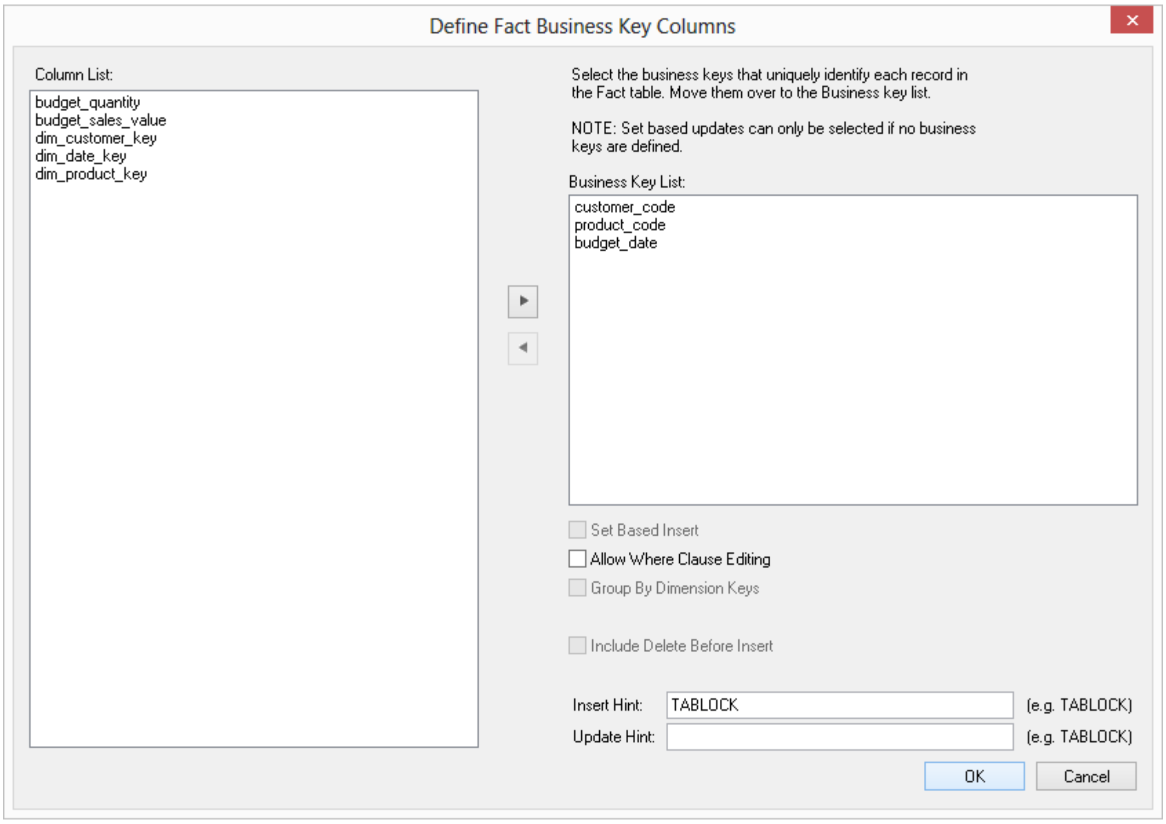
1 Double-click on the **Fact Table object group** in the left pane.

2 Click and drag **stage_budget** into the middle pane. Accept the name **fact_budget** and click **ADD**.

3 Select **(Build Procedure...)** from the update procedure drop-down list and click **OK**.

4 Click **Create and Load** when asked if you wish to create and load the table now.

5 Select the Business Key definitions. Add **customer_code**, **product_code**, and **budget_date** and click **OK**.



Define Fact Business Key Columns

Column List:

budget_quantity
budget_sales_value
dim_customer_key
dim_date_key
dim_product_key

Select the business keys that uniquely identify each record in the Fact table. Move them over to the Business key list.

NOTE: Set based updates can only be selected if no business keys are defined.

Business Key List:

customer_code
product_code
budget_date

□ Set Based Insert
□ Allow Where Clause Editing
□ Group By Dimension Keys

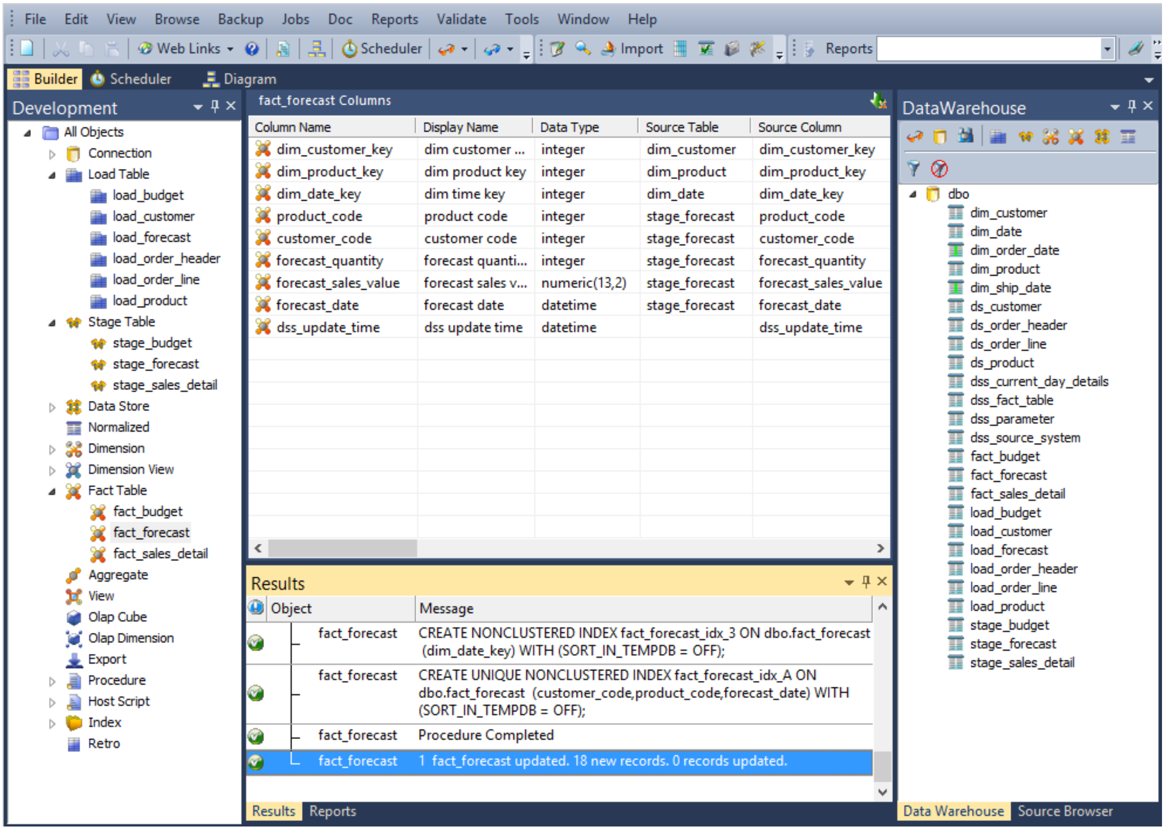
□ Include Delete Before Insert

Insert Hint: TABLOCK (e.g. TABLOCK)
Update Hint: (e.g. TABLOCK)

6 Repeat steps (1) to (5) on **stage_forecast** to create **fact_forecast** (with a business key of **customer_code**, **product_code**, and **forecast_date**).

7 Refresh the Data Warehouse in the right pane (F5).

8 Your screen should look something like this:



fact_forecast Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer	dim_customer	dim_customer_key
dim_product_key	dim product key	integer	dim_product	dim_product_key
dim_date_key	dim time key	integer	dim_date	dim_date_key
product_code	product code	integer	stage_forecast	product_code
customer_code	customer code	integer	stage_forecast	customer_code
forecast_quantity	forecast quanti...	integer	stage_forecast	forecast_quantity
forecast_sales_value	forecast sales v...	numeric(13,2)	stage_forecast	forecast_sales_value
forecast_date	forecast date	datetime	stage_forecast	forecast_date
dss_update_time	dss update time	datetime		dss_update_time

Results

Object	Message
fact_forecast	CREATE NONCLUSTERED INDEX fact_forecast_idx_3 ON dbo.fact_forecast (dim_date_key) WITH (SORT_IN_TEMPDB = OFF);
fact_forecast	CREATE UNIQUE NONCLUSTERED INDEX fact_forecast_idx_A ON dbo.fact_forecast (customer_code,product_code,forecast_date) WITH (SORT_IN_TEMPDB = OFF);
fact_forecast	Procedure Completed
fact_forecast	1 fact_forecast updated. 18 new records. 0 records updated.

You are now ready to proceed to the next step - ***Rollup/Snapshot Fact Table*** (see "***2.6 Rollup/Combined Fact Table***" on page 91)

2.6 Rollup/Combined Fact Table

A rollup table enables the viewing and combining of different levels of granularity in the data, such as sales, budget and forecast detail. The result is that the end user can compare, for example, sales against budget against forecast on a monthly basis.

1 Double-click on the **Fact Table object group** in the left pane.

2 Click and drag **fact_sales_detail** to the middle pane, and change the new object name to **fact_sales_analysis**.

Note: Do not make any changes to the table definition and click **Close** when asked if you want to create and load the table now.

3 Because this level of granularity is no longer required, *delete* the following columns:

- customer_code
- product_code
- order_date
- ship_date
- dim_order_date_key
- unit_sale_price
- order_number
- order_line_no

Note: A new column has appeared - dss_fact_table_key. This is used to identify which fact table has populated a row in the rollup fact table and should not be removed.The dss_update_time field must also be present to record the time that the record was updated in the data warehouse

4 In the left pane click the **fact_sales_analysis** table. In the right pane open fact_budget and drag **budget_quantity** and **budget_sales_value** into the middle pane (within fact_sales_analysis).

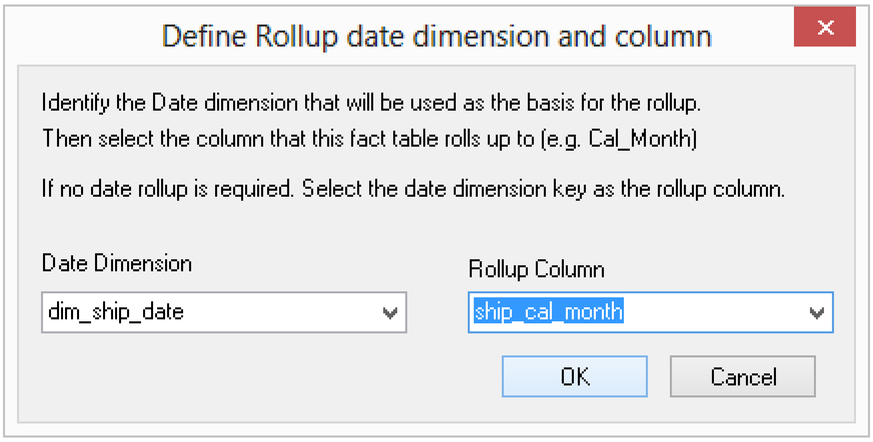
5 In the right pane open fact_forecast and drag **forecast_quantity** and **forecast_sales_value** into the middle pane (within fact_sales_analysis).

6 In the left pane, right-click on **fact_sales_analysis** and select **Create (ReCreate)**.

7 In the left pane, again right-click on **fact_sales_analysis** and select **Properties**. In the Update Procedure field select **(Build Procedure...)** and then click **OK**.

8 Rollup tables are rolled up via a dimensional hierarchy. You will be given the opportunity to specify what to roll up on. From the dialog "Define rollup date dimension and column" select the following then click **OK.**

- Date dimension - **dim_ship_date**
- Rollup column - **ship_cal_month:**


Define Rollup date dimension and column

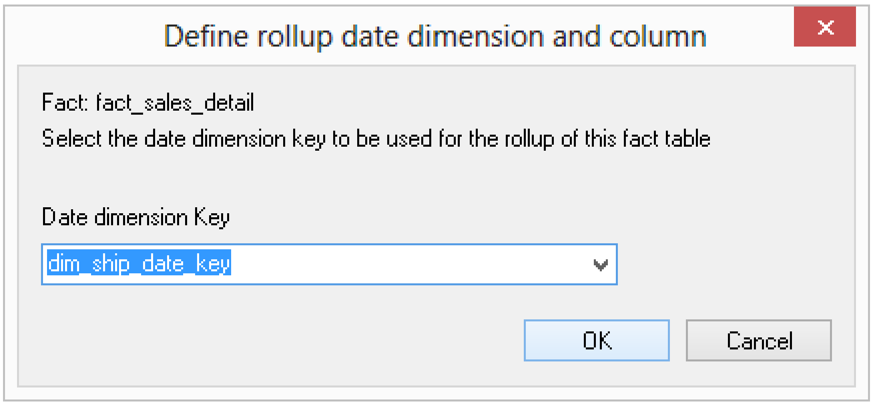
Identify the Date dimension that will be used as the basis for the rollup.
Then select the column that this fact table rolls up to (e.g. Cal_Month)

If no date rollup is required. Select the date dimension key as the rollup column.

Date Dimension: dim_ship_date

Rollup Column: ship_cal_month

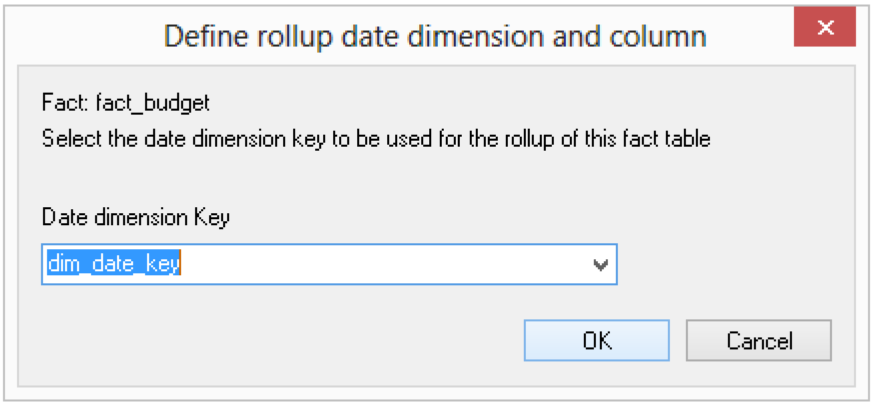
9 Now select the date dimension for each of the detail tables. For fact_sales_detail, choose **dim_ship_date_key** and click **OK.**


Define rollup date dimension and column

Fact: fact_sales_detail
Select the date dimension key to be used for the rollup of this fact table

Date dimension Key: dim_ship_date_key

10 For fact_budget choose **dim_date_key** and click **OK**:



Define rollup date dimension and column

Fact: fact_budget

Select the date dimension key to be used for the rollup of this fact table

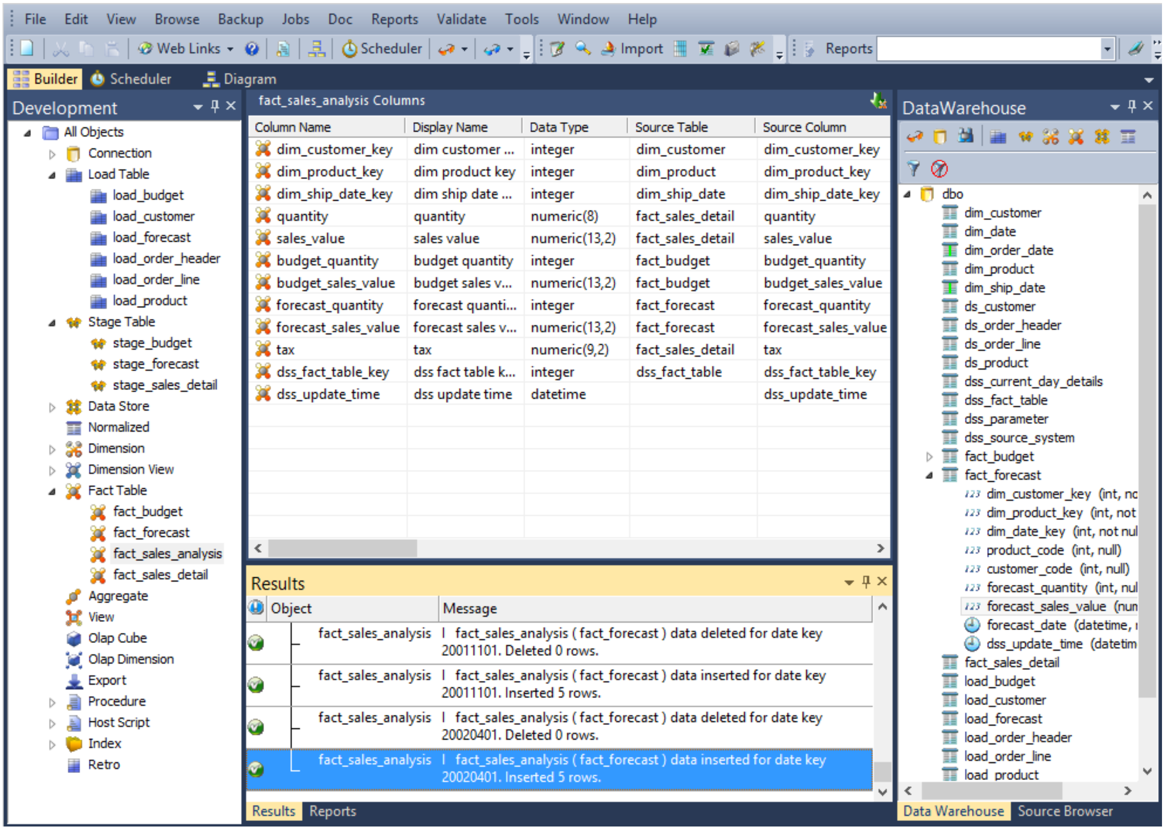
Date dimension Key

dim_date_key

11 Finally for fact forecast again choose **dim_date_key** and click **OK.** This is required so WhereScape RED knows which dimension to use to rollup each of these detail fact tables.

12 Populate the fact rollup table by right-clicking on **fact_sales_analysis** and choosing **Execute Update Procedure**.

13 Your screen should look something like this:



fact_sales_analysis Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer	dim_customer	dim_customer_key
dim_product_key	dim product key	integer	dim_product	dim_product_key
dim_ship_date_key	dim ship date ...	integer	dim_ship_date	dim_ship_date_key
quantity	quantity	numeric(8)	fact_sales_detail	quantity
sales_value	sales value	numeric(13,2)	fact_sales_detail	sales_value
budget_quantity	budget quantity	integer	fact_budget	budget_quantity
budget_sales_value	budget sales v...	numeric(13,2)	fact_budget	budget_sales_value
forecast_quantity	forecast quanti...	integer	fact_forecast	forecast_quantity
forecast_sales_value	forecast sales v...	numeric(13,2)	fact_forecast	forecast_sales_value
tax	tax	numeric(9,2)	fact_sales_detail	tax
dss_fact_table_key	dss fact table k...	integer	dss_fact_table	dss_fact_table_key
dss_update_time	dss update time	datetime		dss_update_time

Results

Object	Message
fact_sales_analysis	fact_sales_analysis (fact_forecast) data deleted for date key 20011101. Deleted 0 rows.
fact_sales_analysis	fact_sales_analysis (fact_forecast) data inserted for date key 20011101. Inserted 5 rows.
fact_sales_analysis	fact_sales_analysis (fact_forecast) data deleted for date key 20020401. Deleted 0 rows.
fact_sales_analysis	fact_sales_analysis (fact_forecast) data inserted for date key 20020401. Inserted 5 rows.

You are now ready to proceed to the next step - ***Aggregate Tables*** (see "***2.7 Aggregate Tables***" on page 95)

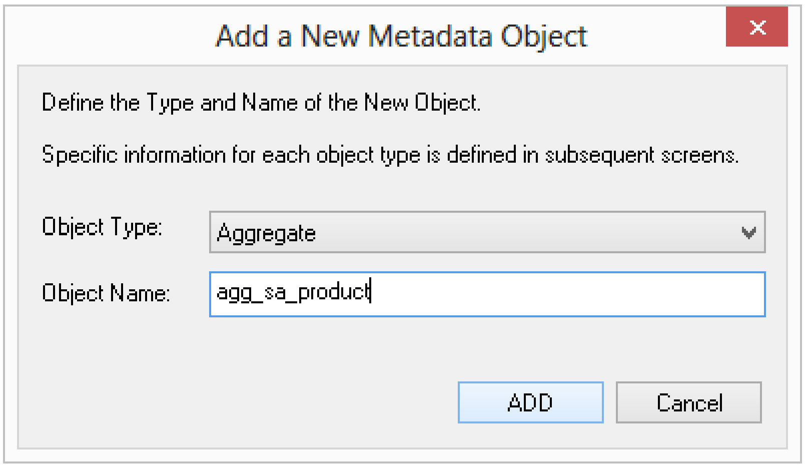
2.7 Aggregate Tables

Aggregate tables are used to improve performance. They provide a subset of the main fact table which the end user tools can navigate for a faster query time. An aggregate is typically created by the deletion of items that don't make sense when summarized and by deleting one or more of the dimension keys.

TIP: It is common practice to create two or more aggregate tables for large fact tables.

1 Double-click on the **Aggregate object group** in the left pane. Refresh the Data Warehouse source table in the right pane (F5).

2 From the right pane drag **fact_sales_analysis** into the middle pane, changing the name to **agg_sa_product**. Click **ADD**.



Add a New Metadata Object

Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Aggregate

Object Name: agg_sa_product

3 Click **OK** on the **Properties** dialog.

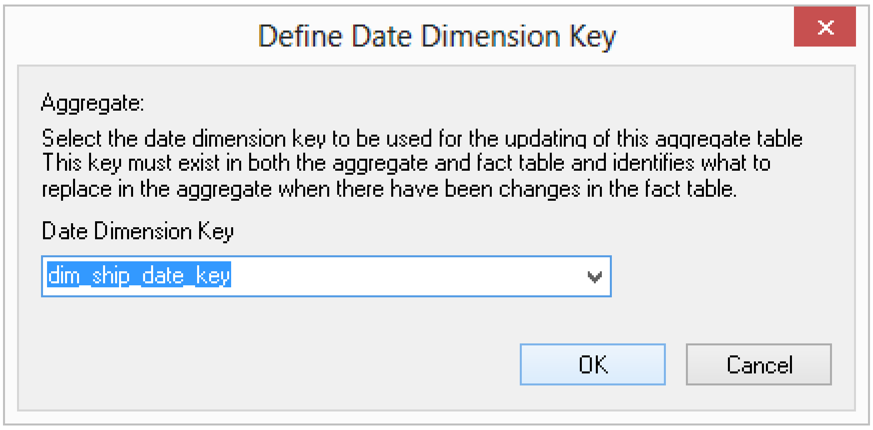
4 Click **Close** on the **Create Database Table** dialog.

5 Delete **dss_fact_table_key** so that data can be summarized from various source fact tables. Also delete **dim_customer_key** and **dss_update_time**.

6 Create the aggregate table.

7 In the left pane right-click **agg_sa_product** and select **Properties**. Select **(Build Procedure...)** in the Update Procedure field and click **OK** on the Properties screen.

8 Select **dim_ship_date_key** as the date dimension key and click **OK**.



Define Date Dimension Key

Aggregate:

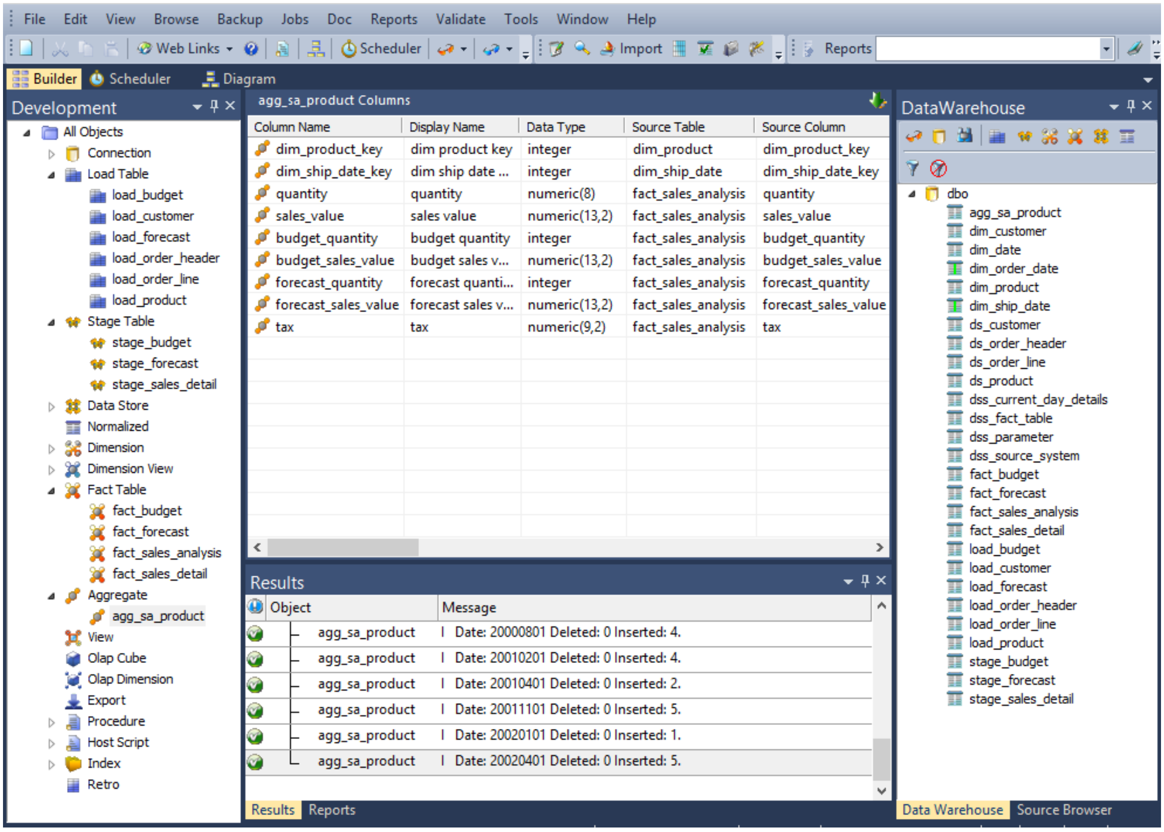
Select the date dimension key to be used for the updating of this aggregate table This key must exist in both the aggregate and fact table and identifies what to replace in the aggregate when there have been changes in the fact table.

Date Dimension Key: dim_ship_date_key

9 Update the table.

10 Refresh the Data Warehouse in the right pane (F5).

11 Your screen should look something like this:



agg_sa_product Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_product_key	dim product key	integer	dim_product	dim_product_key
dim_ship_date_key	dim ship date ...	integer	dim_ship_date	dim_ship_date_key
quantity	quantity	numeric(8)	fact_sales_analysis	quantity
sales_value	sales value	numeric(13,2)	fact_sales_analysis	sales_value
budget_quantity	budget quantity	integer	fact_sales_analysis	budget_quantity
budget_sales_value	budget sales v...	numeric(13,2)	fact_sales_analysis	budget_sales_value
forecast_quantity	forecast quanti...	integer	fact_sales_analysis	forecast_quantity
forecast_sales_value	forecast sales v...	numeric(13,2)	fact_sales_analysis	forecast_sales_value
tax	tax	numeric(9,2)	fact_sales_analysis	tax

Results

Object	Message
agg_sa_product	Date: 20000801 Deleted: 0 Inserted: 4.
agg_sa_product	Date: 20010201 Deleted: 0 Inserted: 4.
agg_sa_product	Date: 20010401 Deleted: 0 Inserted: 2.
agg_sa_product	Date: 20011101 Deleted: 0 Inserted: 5.
agg_sa_product	Date: 20020101 Deleted: 0 Inserted: 1.
agg_sa_product	Date: 20020401 Deleted: 0 Inserted: 5.

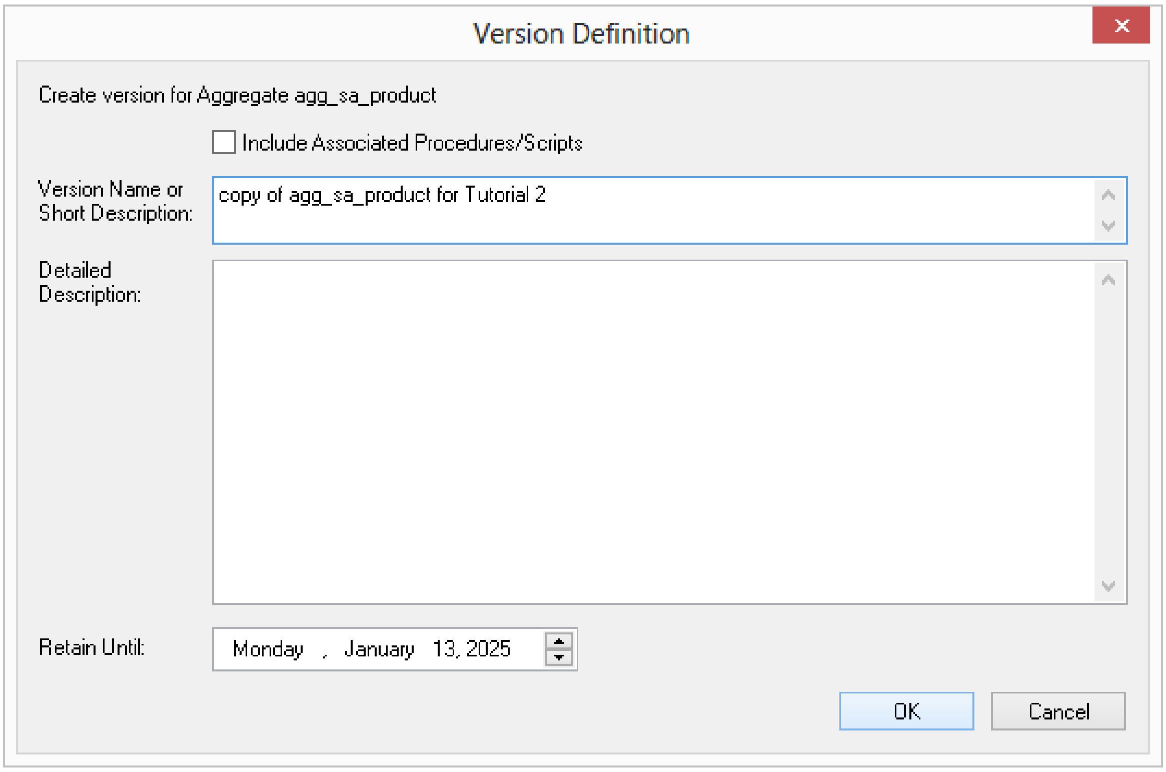
TIP: For Oracle data warehouses. If you receive an "insufficient privileges" notification in the Procedure Results, you need to grant the following privileges to the data warehouse user:
* Create materialized view
* Query rewrite
If you are unable to do this for any reason, contact your database administrator.

You are now ready to proceed to the next step - ***Creating a Customer Aggregate*** (see "***2.8 Creating a Customer Aggregate***" on page 98)

2.8 Creating a Customer Aggregate

This aggregate uses an alternative process to that described in **Aggregate Tables**. For this process we will create a version of the product aggregate table's metadata and create a new aggregate from this version.

1. In the left pane, right-click on **agg_sa_product** and select **Version Control** / **New Version.**
2. The following screen displays. Enter a name for the new version and click **OK**.



Version Definition

Create version for Aggregate agg_sa_product

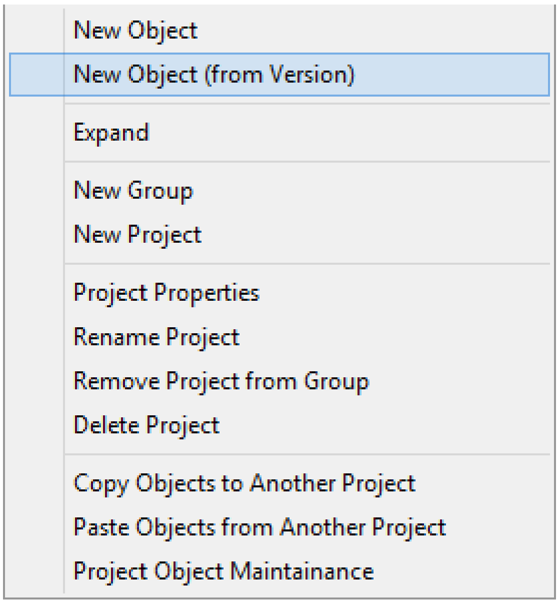
□ Include Associated Procedures/Scripts

Version Name or Short Description: copy of agg_sa_product for Tutorial 2

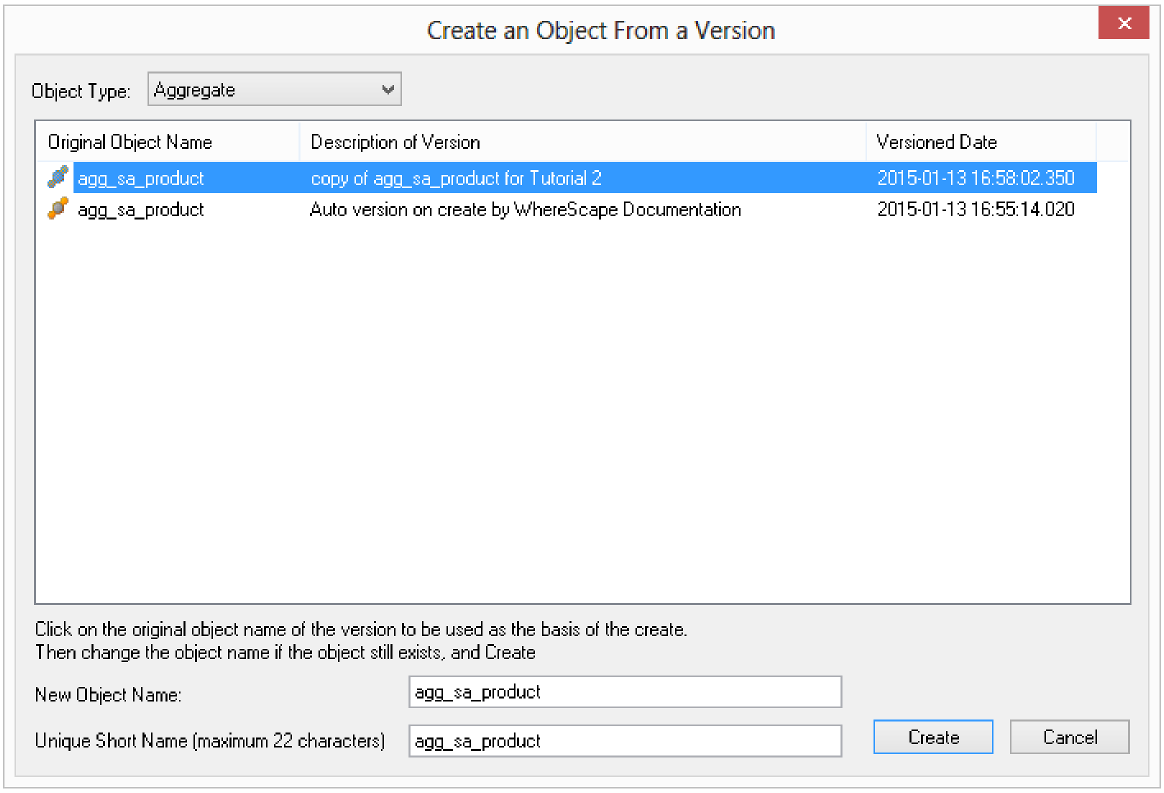
Detailed Description:

Retain Until: Monday , January 13, 2025

3 In the left pane, right-click on **Aggregate** and select **New Object (from Version).**


New Object
New Object (from Version)
Expand
New Group
New Project
Project Properties
Rename Project
Remove Project from Group
Delete Project
Copy Objects to Another Project
Paste Objects from Another Project
Project Object Maintainance

4 Double-click on the copy of **agg_sa_product** to select it.


Create an Object From a Version

Object Type: Aggregate

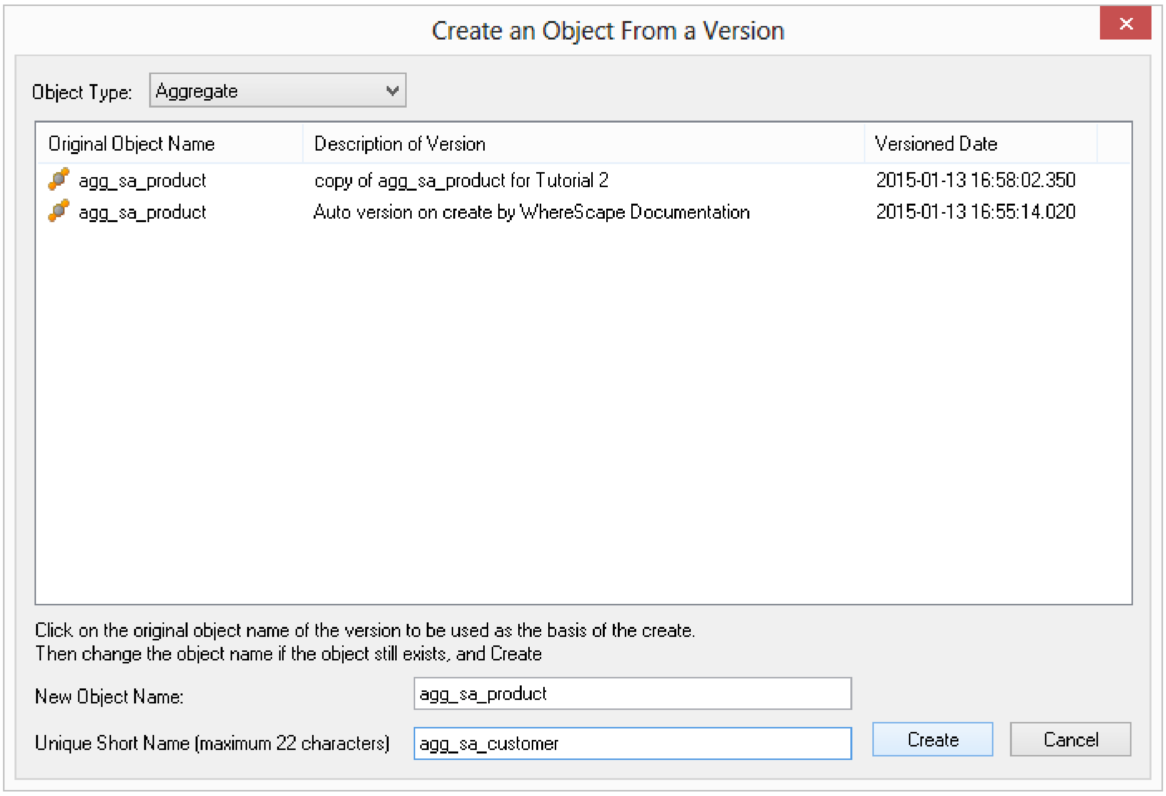
Original Object Name	Description of Version	Versioned Date
agg_sa_product	copy of agg_sa_product for Tutorial 2	2015-01-13 16:58:02.350
agg_sa_product	Auto version on create by WhereScape Documentation	2015-01-13 16:55:14.020

Click on the original object name of the version to be used as the basis of the create.
Then change the object name if the object still exists, and Create

New Object Name: agg_sa_product

Unique Short Name (maximum 22 characters) agg_sa_product

5 Change the name and short name to **agg_sa_customer**. Click **Create.**



Object Type: Aggregate

Original Object Name	Description of Version	Versioned Date
agg_sa_product	copy of agg_sa_product for Tutorial 2	2015-01-13 16:58:02.350
agg_sa_product	Auto version on create by WhereScape Documentation	2015-01-13 16:55:14.020

Click on the original object name of the version to be used as the basis of the create.
Then change the object name if the object still exists, and Create

New Object Name: agg_sa_product

Unique Short Name (maximum 22 characters) agg_sa_customer

Note: Short names are used by WhereScape RED to derive names for associated objects (such as index, procedures, cursor, etc). The table short name is limited in size to 22 characters in Oracle and SQL Server and to twelve characters in DB2. It must be unique.

6 Select the new **agg_sa_customer** table in the left pane.

7 Delete the **dim_product_key** column, as this will be a customer and not a product based aggregate.

8 Browse to the Data Warehouse and from the **fact_sales_analysis** table, drag **dim_customer_key** into the middle pane.

9 In the left pane right-click **agg_sa_customer** and select **Create (ReCreate)**.

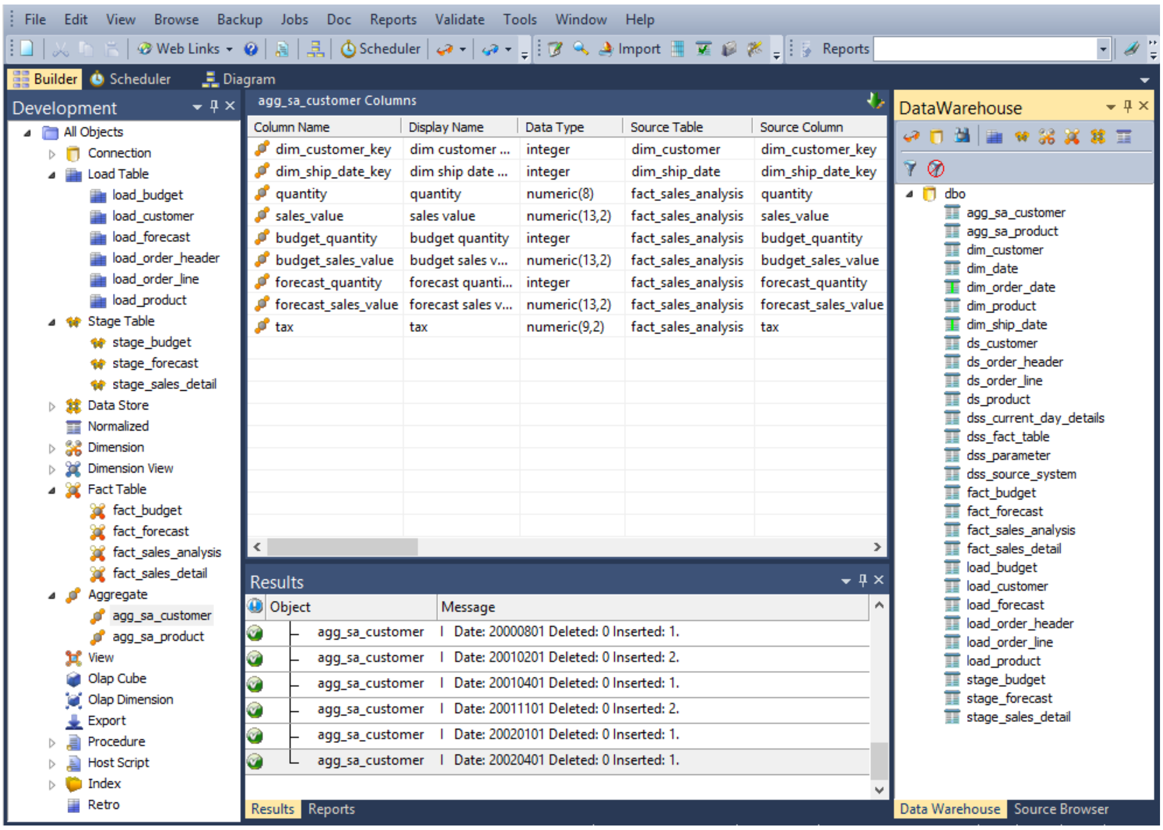
10 In the left pane right-click **agg_sa_customer** and select **Properties**. For the Update Procedure field select **(Build Procedure...)** and click **OK**.

11 Select **dim_ship_date_key** as the date dimension and click **OK**.

12 Right-click on the table in the left pane and select **Execute Update Procedure**.

13 Refresh the Data Warehouse in the right pane (F5).

14 Your screen should look something like this:



agg_sa_customer Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer ...	integer	dim_customer	dim_customer_key
dim_ship_date_key	dim ship date ...	integer	dim_ship_date	dim_ship_date_key
quantity	quantity	numeric(8)	fact_sales_analysis	quantity
sales_value	sales value	numeric(13,2)	fact_sales_analysis	sales_value
budget_quantity	budget quantity	integer	fact_sales_analysis	budget_quantity
budget_sales_value	budget sales v...	numeric(13,2)	fact_sales_analysis	budget_sales_value
forecast_quantity	forecast quanti...	integer	fact_sales_analysis	forecast_quantity
forecast_sales_value	forecast sales v...	numeric(13,2)	fact_sales_analysis	forecast_sales_value
tax	tax	numeric(9,2)	fact_sales_analysis	tax

Results

Object	Message
agg_sa_customer	Date: 20000801 Deleted: 0 Inserted: 1.
agg_sa_customer	Date: 20010201 Deleted: 0 Inserted: 2.
agg_sa_customer	Date: 20010401 Deleted: 0 Inserted: 1.
agg_sa_customer	Date: 20011101 Deleted: 0 Inserted: 2.
agg_sa_customer	Date: 20020101 Deleted: 0 Inserted: 1.
agg_sa_customer	Date: 20020401 Deleted: 0 Inserted: 1.

TUTORIAL 3
SCHEDULING AND DEPENDENCIES

Before you start on this chapter you should have:

- Completed ***Tutorial 1 - Basic Star Schema Fact Table*** (see "***Basic Star Schema Fact Table***" on page 1)
- Successfully completed ***Creating a Fact Table*** (see "***1.12 Creating a Fact Table***" on page 58)

This chapter deals with the scheduling of the data warehouse objects created in the first tutorial.

We will cover the scheduling of a job and the editing of both the dependencies and the job.

IN THIS TUTORIAL

3.1 PURPOSE AND ROADMAP

Purpose

The scheduler allows jobs (e.g. data loads and updates) to be run in background mode and/or at a pre-determined time.
In this tutorial you will learn (i) how to set-up jobs and their associated job tasks (ii) create task dependencies, and (iii) view job results.
This tutorial focuses on creating a job to update the fact_sales_detail star-schema created in Tutorial 1.

Tutorial Environment

This tutorial has been completed using Oracle. All of the features illustrated in this tutorial are available in SQL Server, Oracle and DB2 (unless otherwise stated). Any differences in usage of WhereScape RED between these databases are highlighted.

Tutorial Roadmap

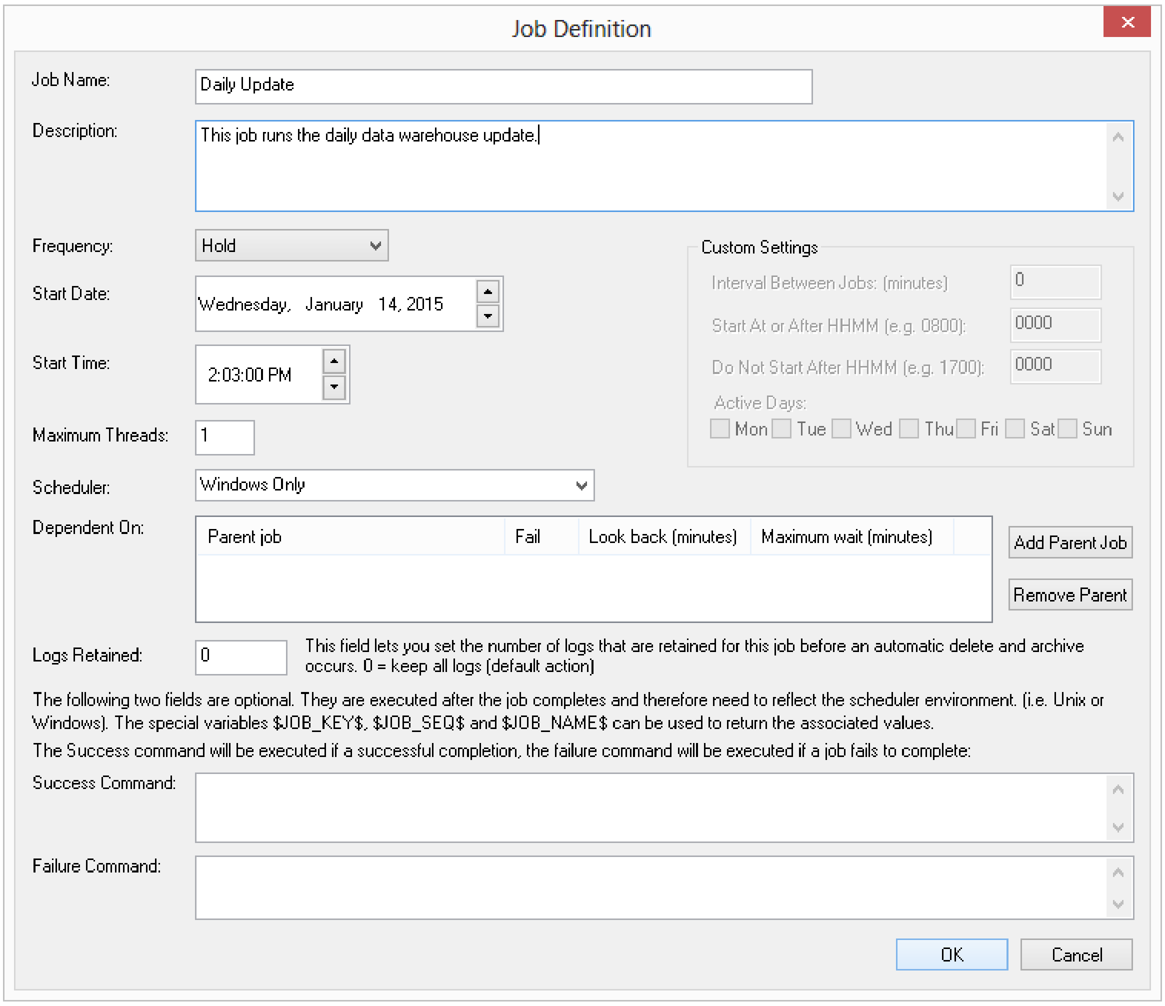
Step in Tutorial	Section
Create a new job for 'Daily Update'.	Creating and Scheduling a Job
Add tasks to • Load load_customer • Load load_order_header • Load load_order_line • Load load_product • Update dim_customer • Update dim_date • Update dim_product • Update stage_sales_detail • Update fact_sales_detail • Analyze fact_sales_detail.	Creating and Scheduling Tasks
Setup task dependencies so that an analyze of fact_sales_detail occurs after the table has been updated.	Task Dependencies
Modify scheduling and runtime options (that is, edit the job properties).	Editing a Scheduled Job
Check job results.	Job Results

The tutorial starts with the ***Creating and Scheduling a Job*** (see "***3.2 Creating and Scheduling a Job***" on page 105) section.

3.2 Creating and Scheduling a Job

To schedule a job click on the **Scheduler** button Scheduler. This will open the scheduler window. A new job can be initiated by selecting the **File/New Job** menu option.
The new job dialog will appear.

1 Change the job name to **Daily Update** and enter in the **Description**.



Job Definition

Job Name: Daily Update

Description: This job runs the daily data warehouse update.

Frequency: Hold

Start Date: Wednesday, January 14, 2015

Start Time: 2:03:00 PM

Maximum Threads: 1

Scheduler: Windows Only

Custom Settings

Interval Between Jobs: (minutes) 0

Start At or After HHMM (e.g. 0800): 0000

Do Not Start After HHMM (e.g. 1700): 0000

Active Days:
□ Mon □ Tue □ Wed □ Thu □ Fri □ Sat □ Sun

Dependent On:

Parent job	Fail	Look back (minutes)	Maximum wait (minutes)

Logs Retained: 0

This field lets you set the number of logs that are retained for this job before an automatic delete and archive occurs. 0 = keep all logs (default action)

The following two fields are optional. They are executed after the job completes and therefore need to reflect the scheduler environment. (i.e. Unix or Windows). The special variables JOB_KEY, JOB_SEQ and JOB_NAME can be used to return the associated values.
The Success command will be executed if a successful completion, the failure command will be executed if a job fails to complete:

Success Command:

Failure Command:

2 Click **OK.**

You are now ready to proceed to the next step - ***Adding Tasks*** (see "***3.3 Adding Tasks***" on page 106)

3.3 ADDING TASKS

The task selection window contains an object tree in the left pane. Objects are selected from this tree and added to the scheduled list of tasks in the right pane.
Perform the following actions to schedule an update of our fact table and dimensions.

1 Open the object tree by double-clicking on the **All Objects** project in the left pane.

2 Double-click on the **Load Table** object group.

3 Double-click on **load_product**, **load_customer**, **load_order_line** and **load_order_header**. Note that as each object is double-clicked it is added to the right pane.

4 Double-click on the **Dimension** object group.

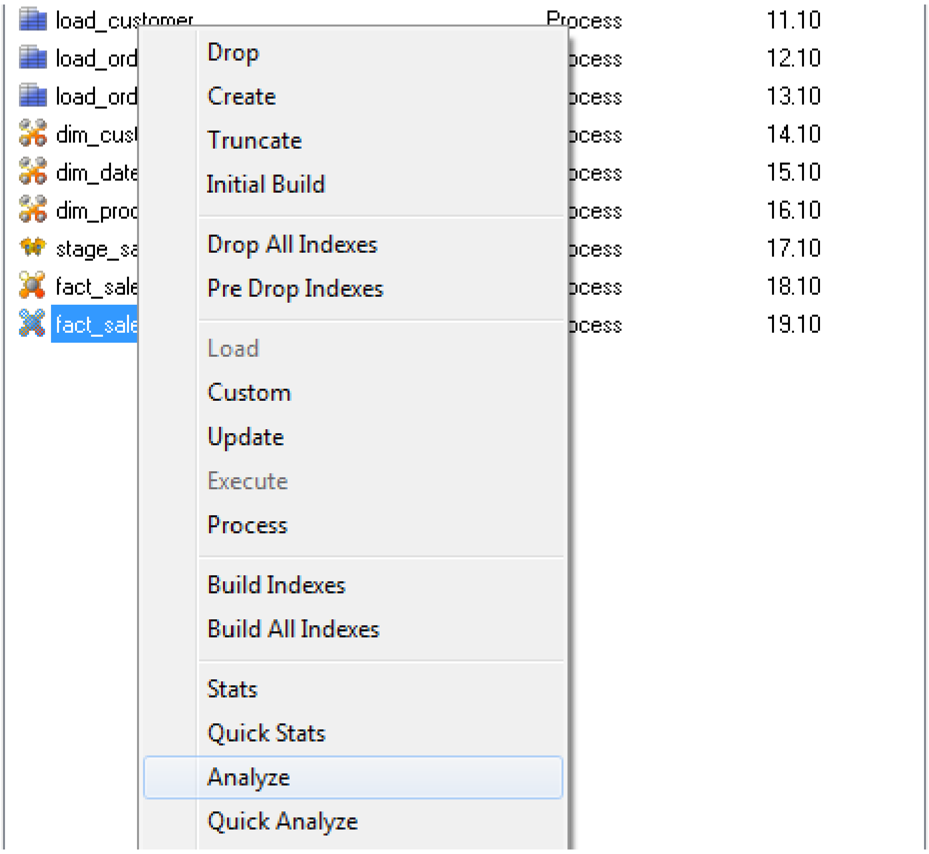
5 Double-click on **dim_customer**, **dim_date** and **dim_product**. As each object is double-clicked it is added to the right pane. We do not add the date views since they do not alter, only the underlying date dimension does.

6 Double-click on the **Stage Table** object group to expand it and then double-click on **stage_sales_detail** to add this object to the right pane.

7 Double-click on the **Fact Table** object group to expand it and then double-click on **fact_sales_detail** to add this object to the right pane.

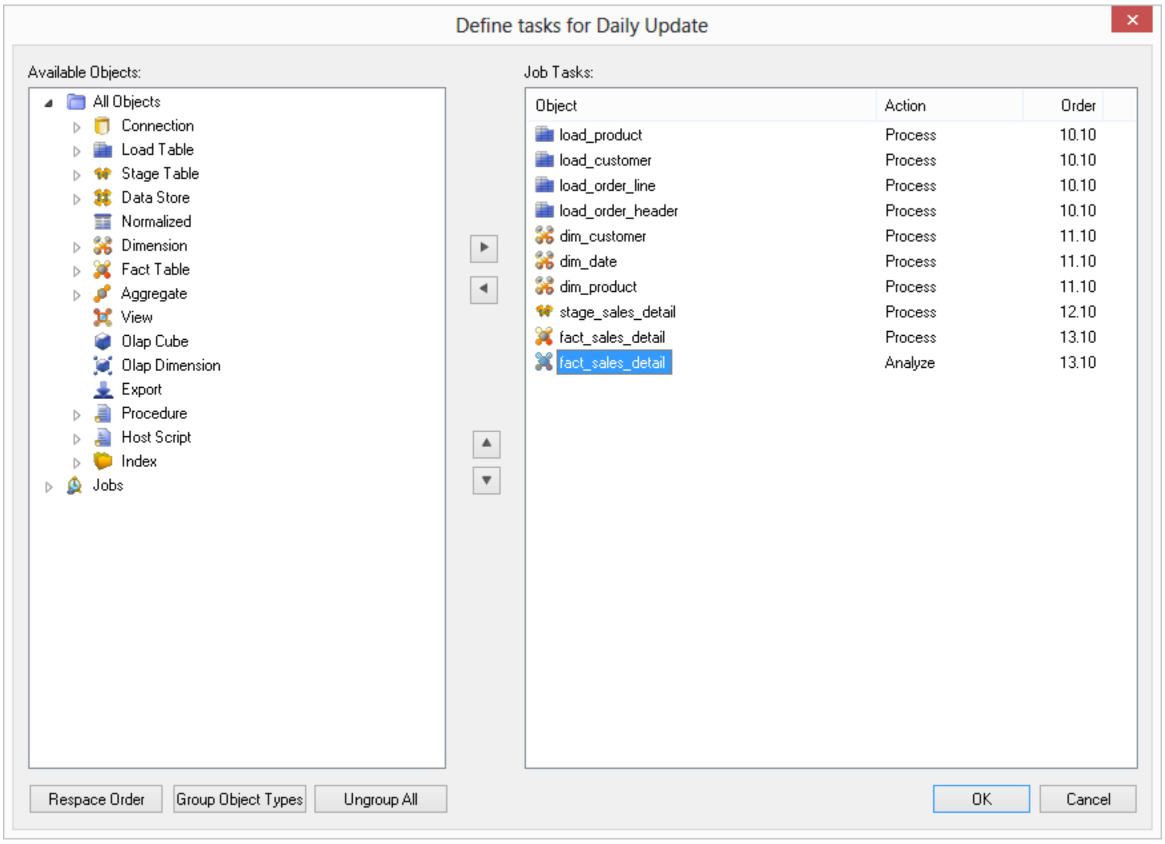
8 Double-click again on **fact_sales_detail** to add a second copy of this object to the right pane.

9 Right-click on the second **fact_sales_detail** and select **Analyze**.



10 The 'Order' column defines the basic dependencies of the tasks. If the two numbers are the same, then the tasks can run at the same time. In this example no tasks will run at the same time. The job will process the tasks sequentially.

11 Click the **Group Object Types** button. You will notice that the order number for tasks of the same type now have the same number. This will allow objects of the same type to run concurrently. (i.e. all the load tables can be processed at the same time if there are sufficient processing threads).
Your task selection window should now look like the following.



Object	Action	Order
load_product	Process	10.10
load_customer	Process	10.10
load_order_line	Process	10.10
load_order_header	Process	10.10
dim_customer	Process	11.10
dim_date	Process	11.10
dim_product	Process	11.10
stage_sales_detail	Process	12.10
fact_sales_detail	Process	13.10
fact_sales_detail	Analyze	13.10

12 Notice that the tasks all have an action of Process with the exception of the last task which is set to **Analyze**.|
The fact table fact_sales_detail has two actions. The first will process and update the table, the second will analyze the table. At present these two actions can run at the same time. They should however be sequential. We could alter the order of the second task by using the right-click menu option **Increase the Order**. This would be the normal method, but we will leave these two tasks with the same order and address the sequence of events in the next section.

13 Click **OK** to close.

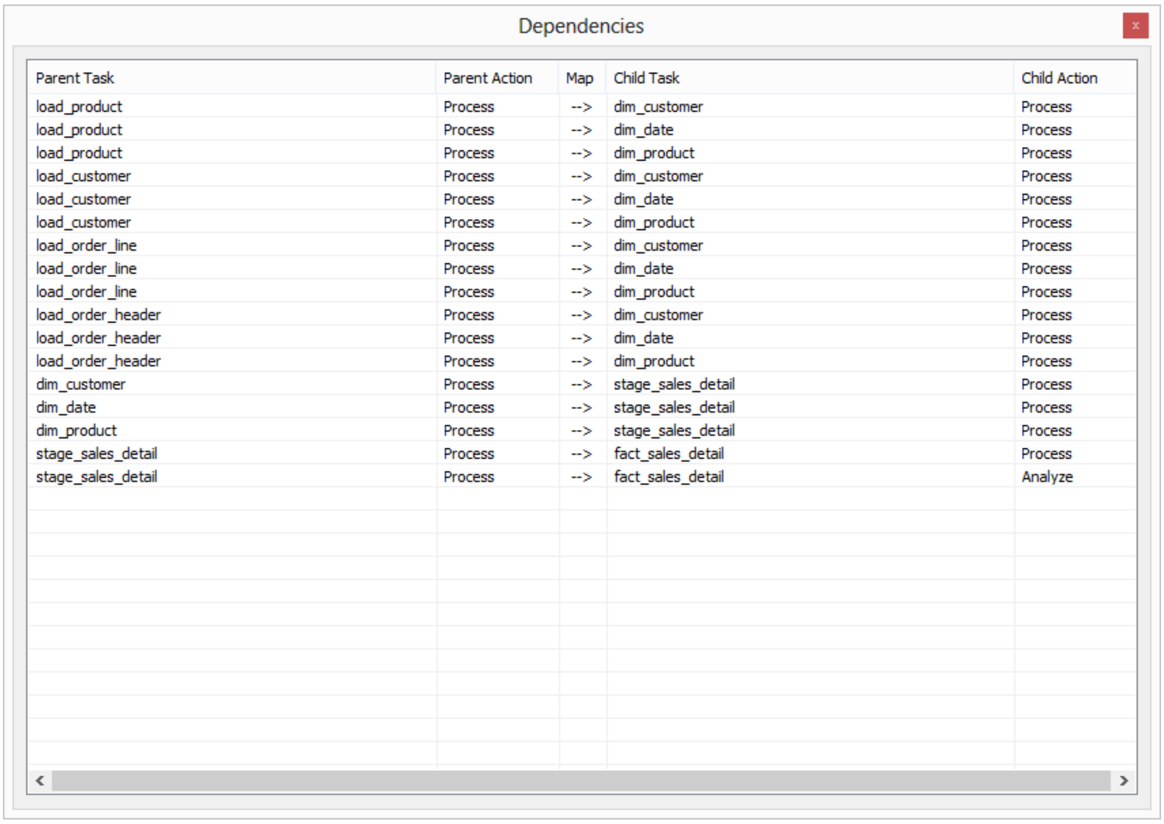
You are now ready to proceed to the next step - ***Task Dependencies*** (see "***3.4 Task Dependencies***" on page 109).

3.4 Task Dependencies

A scheduled job that is in a **Hold** or **Waiting** state can have its task dependencies altered. To alter the dependencies for our newly defined job proceed as follows:

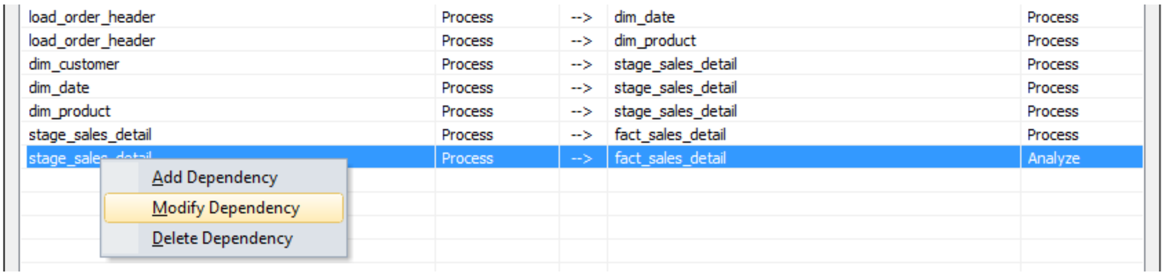
1 Click on the **All Jobs** button in the toolbar to display our Daily Update job in the top pane.

2 Position over the job name **Daily Update** and using the right-click pop-up menu select **Edit Dependencies**. A list of the current task dependencies will be displayed. You will see that the final two dependencies are from stage_sales_detail to each of the fact table tasks.



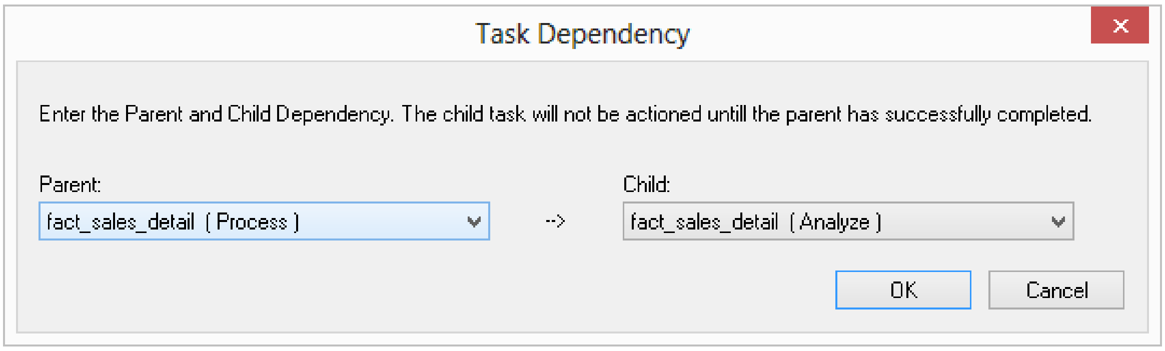
Parent Task	Parent Action	Map	Child Task	Child Action
load_product	Process	-->	dim_customer	Process
load_product	Process	-->	dim_date	Process
load_product	Process	-->	dim_product	Process
load_customer	Process	-->	dim_customer	Process
load_customer	Process	-->	dim_date	Process
load_customer	Process	-->	dim_product	Process
load_order_line	Process	-->	dim_customer	Process
load_order_line	Process	-->	dim_date	Process
load_order_line	Process	-->	dim_product	Process
load_order_header	Process	-->	dim_customer	Process
load_order_header	Process	-->	dim_date	Process
load_order_header	Process	-->	dim_product	Process
dim_customer	Process	-->	stage_sales_detail	Process
dim_date	Process	-->	stage_sales_detail	Process
dim_product	Process	-->	stage_sales_detail	Process
stage_sales_detail	Process	-->	fact_sales_detail	Process
stage_sales_detail	Process	-->	fact_sales_detail	Analyze

3 Right-click on the **Parent task** for the last dependency and select **Modify Dependency.**



load_order_header	Process	-->	dim_date	Process
load_order_header	Process	-->	dim_product	Process
dim_customer	Process	-->	stage_sales_detail	Process
dim_date	Process	-->	stage_sales_detail	Process
dim_product	Process	-->	stage_sales_detail	Process
stage_sales_detail	Process	-->	fact_sales_detail	Process
stage_sales_detail	Process	-->	fact_sales_detail	Analyze

4 Change the Parent task from **stage_sales_detail (Process)** to **fact_sales_detail (Process)**. Click **OK** to record the change. An example of this change is shown in the screen shot below.



Task Dependency

Enter the Parent and Child Dependency. The child task will not be actioned untill the parent has successfully completed.

Parent: fact_sales_detail (Process) --> Child: fact_sales_detail (Analyze)

5 Examine the new dependency list and see that the fact processing will now occur after the stage processing and the fact analyze will occur after the fact processing.

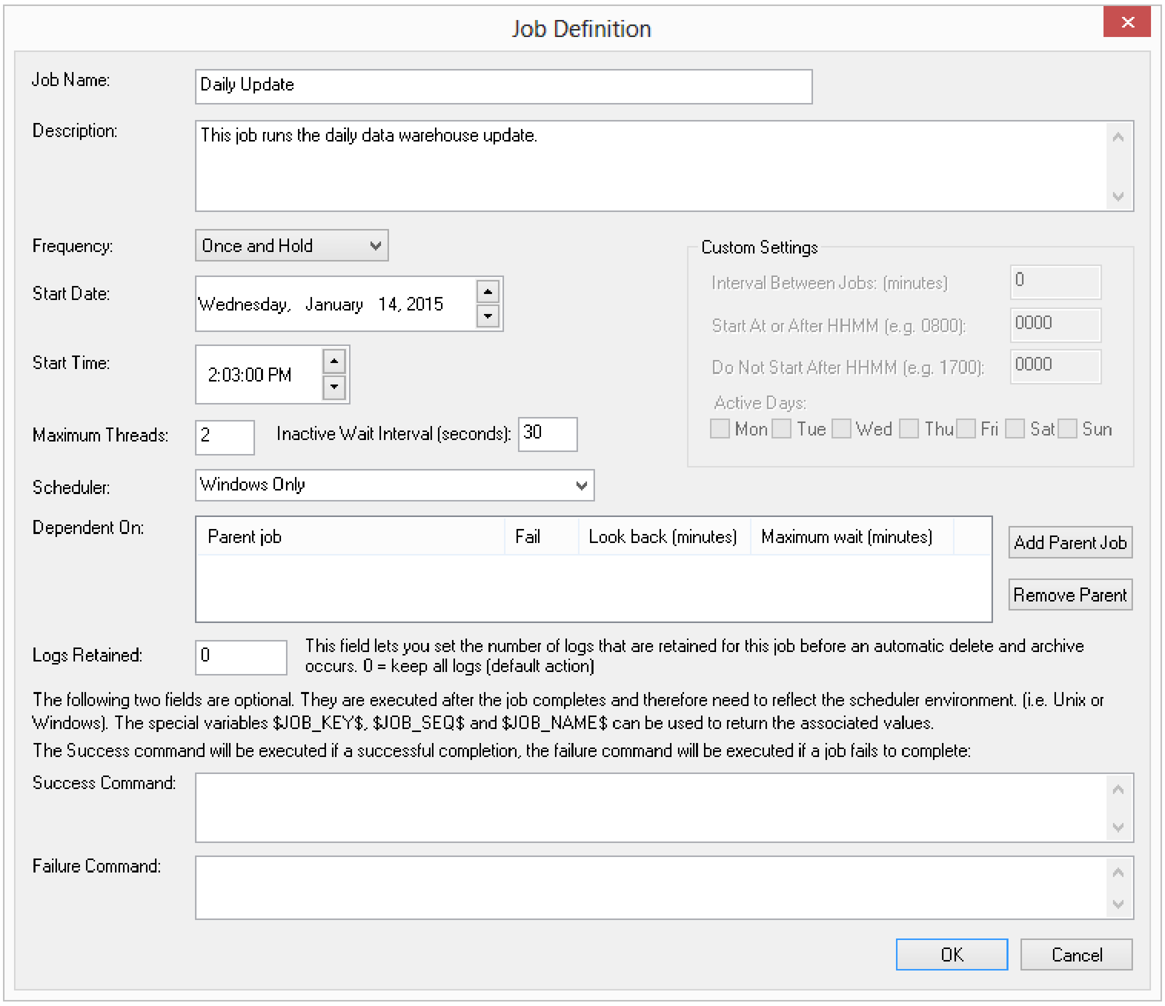
6 Close the **Dependencies** dialog.

We are now ready to release the job, which is done in the next section - ***Editing a Scheduled Job*** (see "***3.5 Editing a Scheduled Job***" on page 111).

3.5 EDITING A SCHEDULED JOB

Our job is now all set-up and ready to be released. We need to edit the job and change it from a held job to one that the scheduler can action. Proceed as follows:

1. Click on the **All Jobs** button in the toolbar. Our daily update job will be displayed in the top pane. Note that it is in an **On Hold** state.
2. Right-click on the job **Daily Update** and select **Edit Job**. The job definition screen will re-appear.
3. Change the **Frequency** to **Once and Hold**. This will result in the job being run and then a copy of the job being placed back in an 'On Hold' state so that it may be rescheduled for some future processing. Note that other options exist under Frequency including 'Daily', 'Custom' etc.
4. Change the **Start Time** to be 2 minutes from now.
5. Change the **Max Threads** counter to **2**. This will allow two tasks to run concurrently. This may not be a big help here, as the run should be very quick.



Job Definition

Job Name: Daily Update

Description: This job runs the daily data warehouse update.

Frequency: Once and Hold

Start Date: Wednesday, January 14, 2015

Start Time: 2:03:00 PM

Maximum Threads: 2

Inactive Wait Interval (seconds): 30

Scheduler: Windows Only

Custom Settings

Interval Between Jobs: (minutes) 0

Start At or After HHMM (e.g. 0800): 0000

Do Not Start After HHMM (e.g. 1700): 0000

Active Days: □ Mon □ Tue □ Wed □ Thu □ Fri □ Sat □ Sun

Dependent On:

Parent job	Fail	Look back (minutes)	Maximum wait (minutes)

Logs Retained: 0

This field lets you set the number of logs that are retained for this job before an automatic delete and archive occurs. 0 = keep all logs (default action)

The following two fields are optional. They are executed after the job completes and therefore need to reflect the scheduler environment. (i.e. Unix or Windows). The special variables JOB_KEY, JOB_SEQ and JOB_NAME can be used to return the associated values.

The Success command will be executed if a successful completion, the failure command will be executed if a job fails to complete:

Success Command:

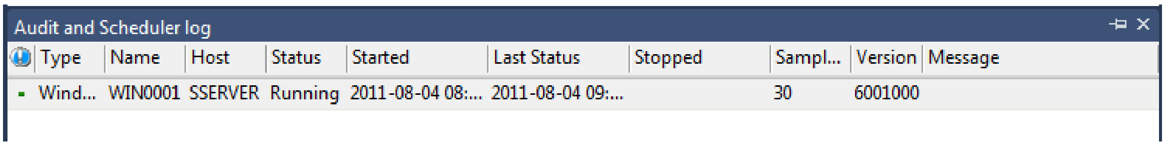
Failure Command:

6 Click **OK** to save the changes.

7 Click on the **All Jobs** button in the toolbar. Our daily update job will be displayed in the top pane. Note that its state should now be 'Waiting' or maybe 'Running'. If the job is in the 'Running' state we can double-click on the Job name to see the state of the individual tasks.

TIP: If you don't need to change a job and wish to run it immediately, select **Start the Job** from the job's popup menu.

8 If the job does not go into a **Running** state after 30 seconds, check that a scheduler is running by clicking on the **Scheduler Status** in the scheduler menu.



Audit and Scheduler log

Type	Name	Host	Status	Started	Last Status	Stopped	Sampl...	Version	Message
Wind...	WIN0001	SSERVER	Running	2011-08-04 08:...	2011-08-04 09:...		30	6001000	

9 If no schedulers are running, refer to the Setup and Administration Guide on how to start a scheduler.

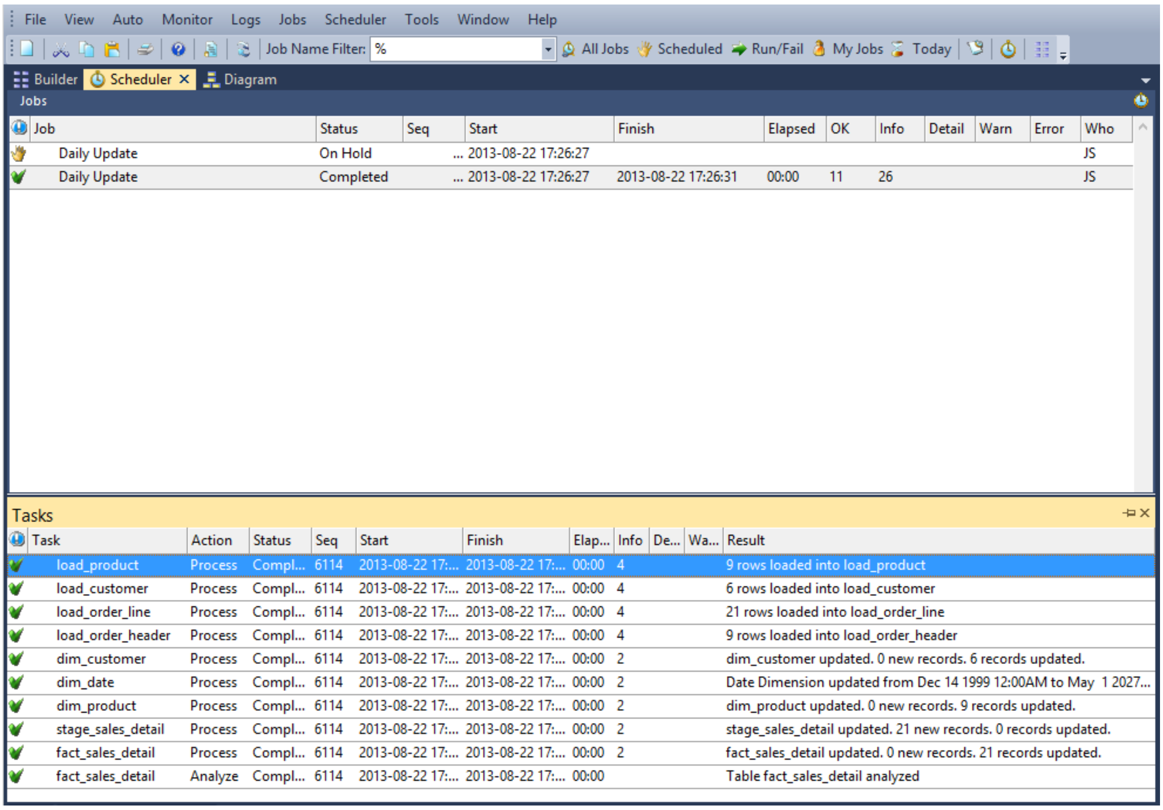
We are now ready to proceed to the next section - ***Job Results*** (see "***3.6 Job Results***" on page 113)

3.6 Job Results

Once a job has completed, or in fact while it is running, we can check on the results of each of the tasks by proceeding as follows:

1. Click on the **All Jobs** button in the toolbar. Our daily update job will be displayed in the top pane. Note that if the job has started or is completed there will be two entries. One is in an 'On Hold' state and one is in a 'Completed', 'Running' or 'Failed' state.
2. Double-click on the job **Daily Update** in a 'Completed', 'Running' or 'Failed' state to display the individual tasks within the job.
3. Double-click on the **fact_sales_detail** task with action **Process** to display the messages returned from this task. These messages should include information on any indexes dropped and created.

4. Your screen should look something like this:



Job	Status	Seq	Start	Finish	Elapsed	OK	Info	Detail	Warn	Error	Who
Daily Update	On Hold	...	2013-08-22 17:26:27								JS
Daily Update	Completed	...	2013-08-22 17:26:27	2013-08-22 17:26:31	00:00	11	26				JS

Task	Action	Status	Seq	Start	Finish	Elap...	Info	De...	Wa...	Result
load_product	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	4			9 rows loaded into load_product
load_customer	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	4			6 rows loaded into load_customer
load_order_line	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	4			21 rows loaded into load_order_line
load_order_header	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	4			9 rows loaded into load_order_header
dim_customer	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	2			dim_customer updated. 0 new records. 6 records updated.
dim_date	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	2			Date Dimension updated from Dec 14 1999 12:00AM to May 1 2027...
dim_product	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	2			dim_product updated. 0 new records. 9 records updated.
stage_sales_detail	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	2			stage_sales_detail updated. 21 new records. 0 records updated.
fact_sales_detail	Process	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00	2			fact_sales_detail updated. 0 new records. 21 records updated.
fact_sales_detail	Analyze	Compl...	6114	2013-08-22 17:...	2013-08-22 17:...	00:00				Table fact_sales_detail analyzed

We are now ready to proceed to the next section - ***Diagrammatic View for Jobs*** (see "***3.7 Diagrammatic View for Jobs***" on page 114)

3.7 Diagrammatic View for Jobs

WhereScape RED provides the ability to diagrammatically view the job dependencies for the job you have created.

1 To bring up the **Diagram Selection** dialog, click on the button.

2 Select an object **Type** of **Job** to narrow the selection list and then select **Daily Update**. Click on the **Dependency Diagram** button.

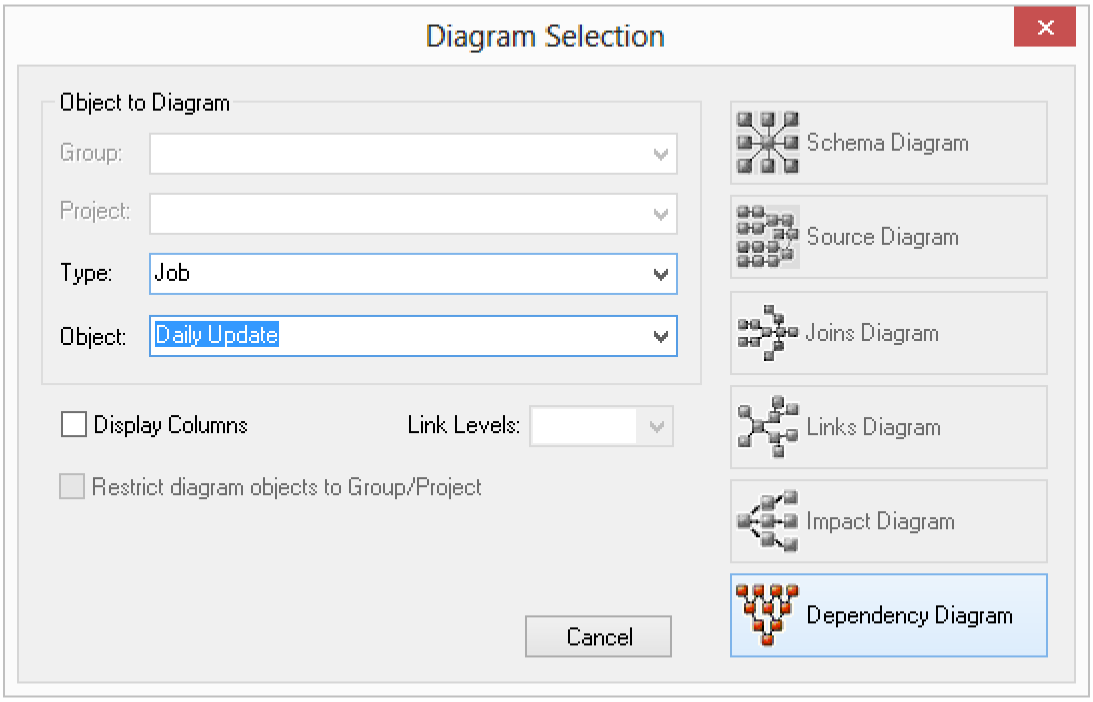


Diagram Selection

Object to Diagram

Group:

Project:

Type: Job

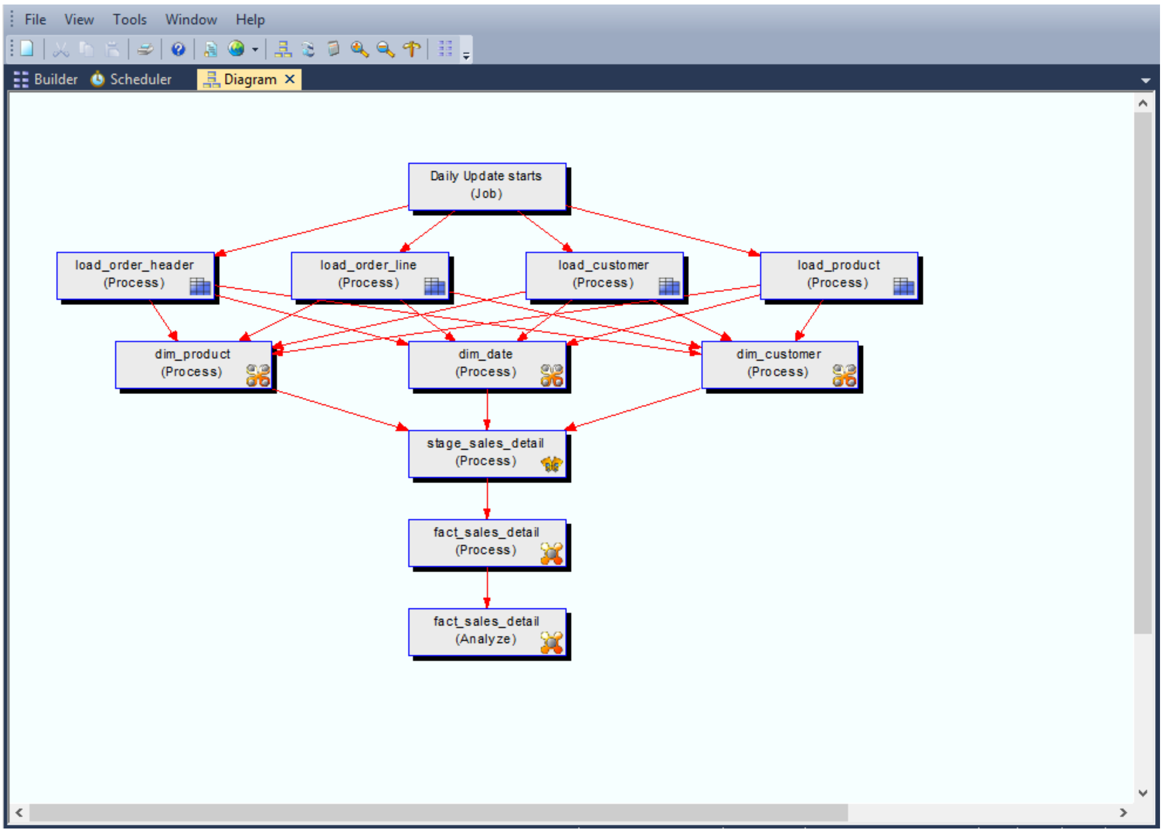
Object: Daily Update

□ Display Columns

Link Levels:

□ Restrict diagram objects to Group/Project

The diagram looks like this:


File View Tools Window Help
Builder
Scheduler
Diagram
Daily Update starts (Job)
load_order_header (Process)
load_order_line (Process)
load_customer (Process)
load_product (Process)
dim_product (Process)
dim_date (Process)
dim_customer (Process)
stage_sales_detail (Process)
fact_sales_detail (Process)
fact_sales_detail (Analyze)

TUTORIAL 4
COMPLEX DIMENSIONS AND HIERARCHIES

Before you start on this chapter you should have:

- Completed ***Tutorial 1 - Basic Star Schema Fact Table*** (see "***Basic Star Schema Fact Table***" on page 1)
- Successfully completed ***Creating a Fact Table*** (see "***1.12 Creating a Fact Table***" on page 58)

This chapter deals with fine tuning the data warehouse by creating complex dimensions and hierarchies.

IN THIS TUTORIAL

4.1 Purpose and Roadmap

Purpose

This tutorial will walk you through the process to:

- Create a slowly changing dimension
- Creating a complex dimension with multiple table sources
- Adding hierarchies to a dimension for external maintenance and for use in Analysis Services cubes.

In short, this tutorial alters the existing customer and product dimensions. The customer dimension is converted to a slowly changing dimension and the product dimension has its content enriched from additional data sources. Hierarchies are built on all dimensions that will be used in the next tutorial.

Tutorial Environment

This tutorial has been completed using Oracle. All of the features illustrated in this tutorial are available in SQL Server, Oracle and DB2 (unless otherwise stated). Any differences in usage of WhereScape RED between these databases are highlighted.

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**
Convert the customer dimension to a slowly changing dimension.	Creating a slowly changing dimension
Add additional data sources to the product dimension	Multiple source table dimension
Create hierarchies for the following tables: • dim_date • dim_customer • dim_product	Creating a dimension hierarchy

This tutorial starts with the section ***Creating a Slowly Changing Dimension*** (see "***4.2 Creating a Slowly Changing Dimension***" on page 118)

4.2 Creating a Slowly Changing Dimension

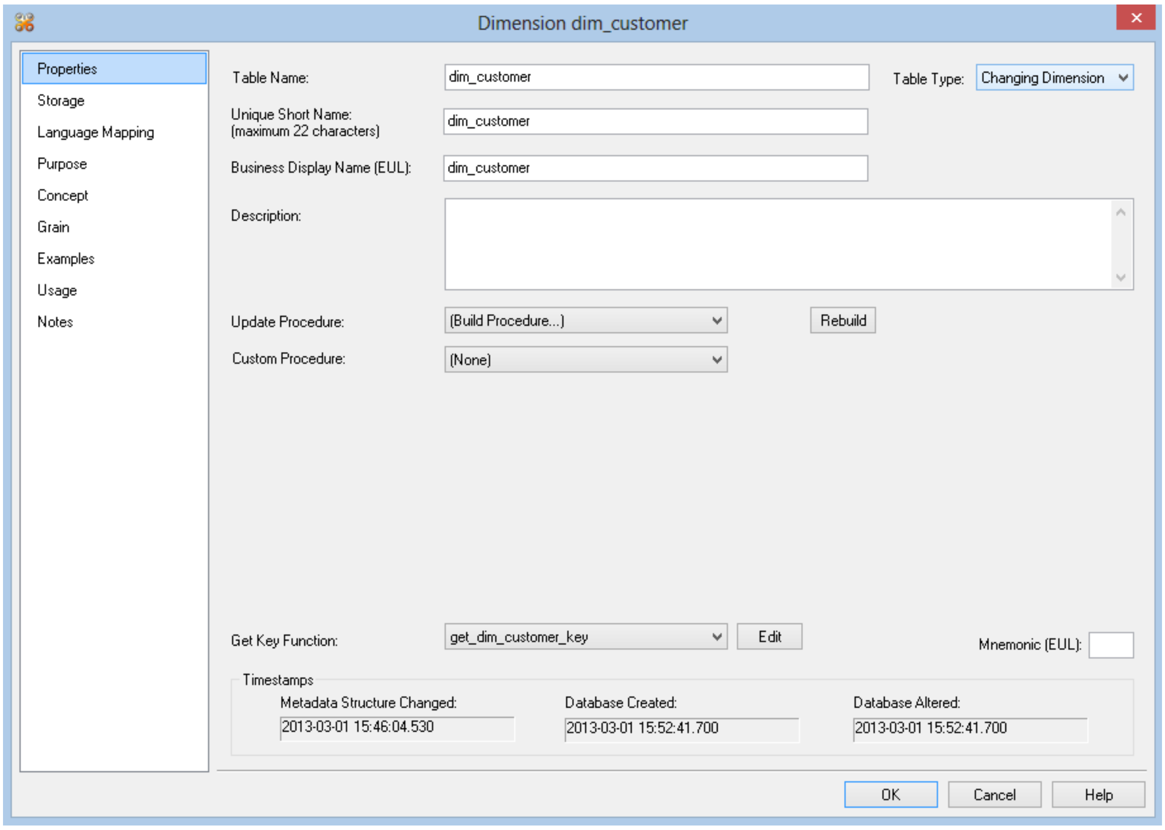
The process of creating a slowly changing dimension is largely the same as creating a normal dimension. Two additional questions are asked during the dimension creation process when the 'Slowly changing dimension' button is chosen during the dimension create. In this section we will cover the more common scenario of changing an existing normal dimension to a slowly changing dimension.

The dimension dim_customer created in tutorial one will be changed to a slowly changing dimension.

1 Right-click on **dim_customer** and select **Properties.**

2 On the dimension Properties change the **Update Procedure** drop-down to select **(Build Procedure...)**.

3 Use the **Table Type** drop-down to select **Changing Dimension.** Click **OK.**



Dimension dim_customer

Table Name: dim_customer

Table Type: Changing Dimension

Unique Short Name: (maximum 22 characters) dim_customer

Business Display Name (EUL): dim_customer

Description:

Update Procedure: (Build Procedure...)

Custom Procedure: (None)

Get Key Function: get_dim_customer_key

Mnemonic (EUL):

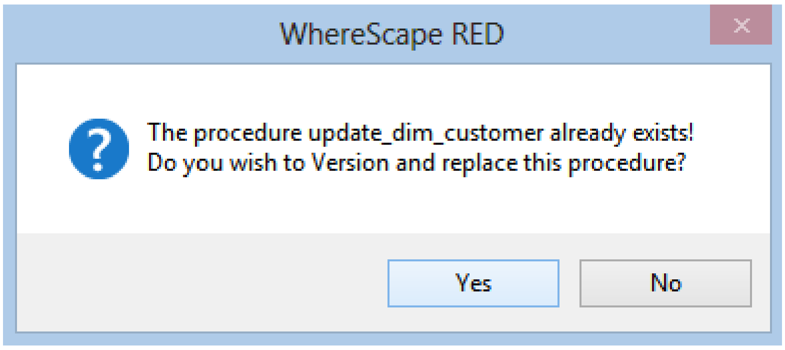
Timestamps

Metadata Structure Changed: 2013-03-01 15:46:04.530

Database Created: 2013-03-01 15:52:41.700

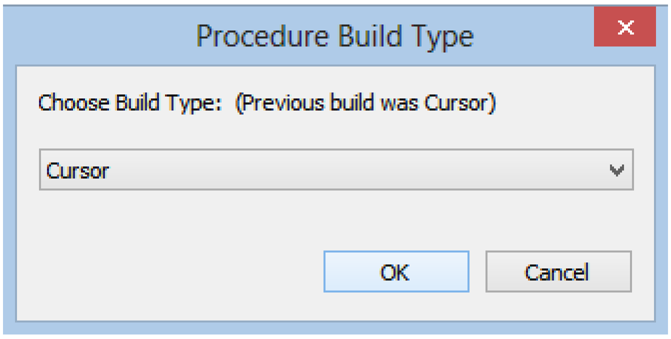
Database Altered: 2013-03-01 15:52:41.700

4 You will be asked if you wish to version and replace the update and get key procedures. Answer **Yes** to both prompts.



The procedure update_dim_customer already exists!
Do you wish to Version and replace this procedure?

5 A Procedure Build Type dialog will appear. Select **Cursor**.

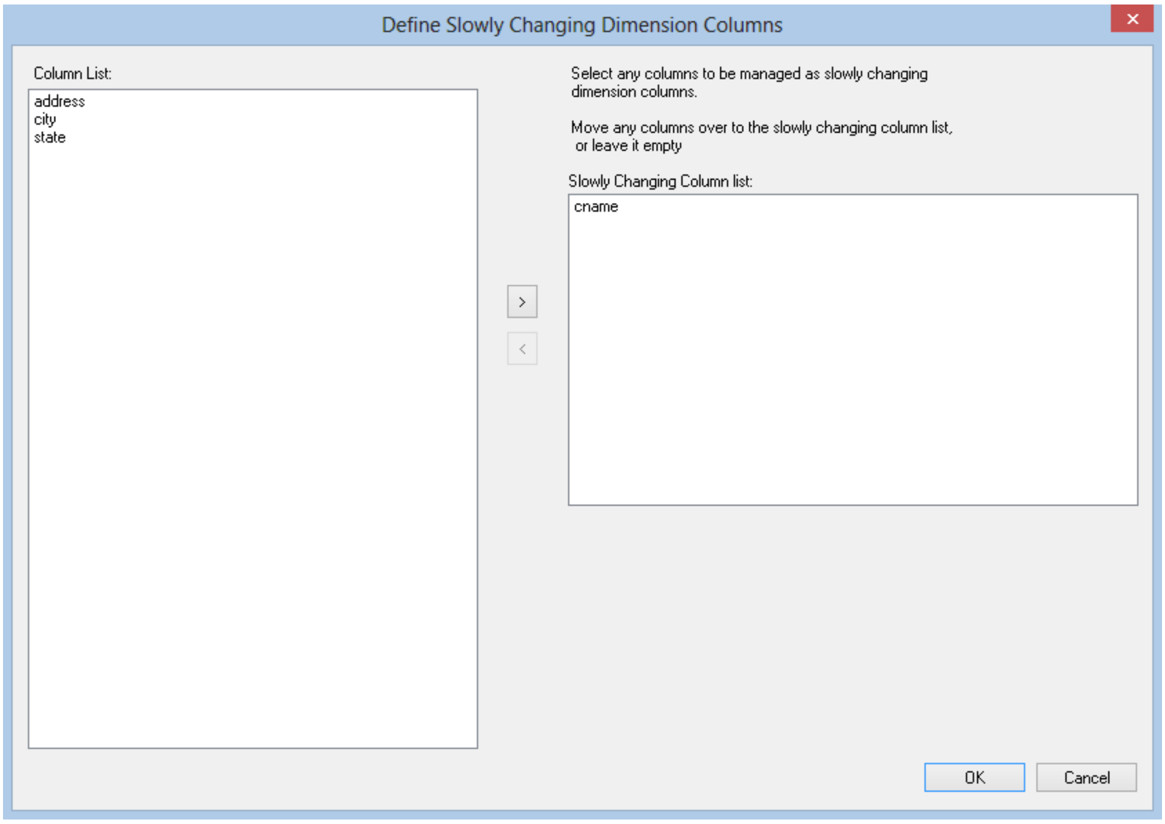


Choose Build Type: (Previous build was Cursor)

Cursor

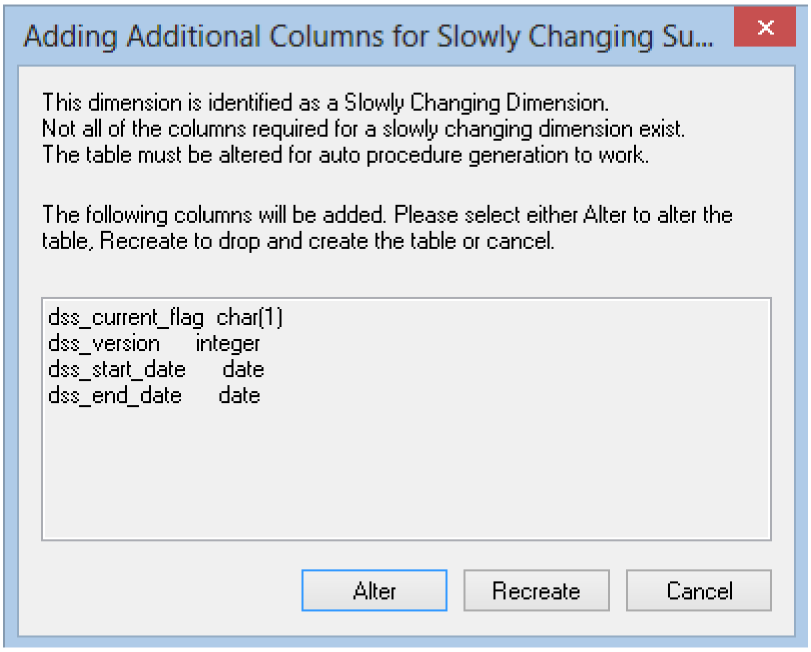
6 The **Define Dimension Business Key(s)** dialog will be presented. The existing business key **code** should already be the default value so click **OK** to proceed to the next screen.

7 The **Define Slowly Changing Dimension Columns** dialog will now be presented. Multiple columns can be selected to be handled as slowly changing. Double-click on **cname** to add it to the list of slowly changing columns. Click **OK**.


Define Slowly Changing Dimension Columns
Column List:
address
city
state
Select any columns to be managed as slowly changing dimension columns.
Move any columns over to the slowly changing column list, or leave it empty
Slowly Changing Column list:
cname
>
<
OK
Cancel

Note: Refer to the Dimensions chapter for an explanation of slowly changing dimensions.

8 A dialog box will appear indicating that a number of additional columns will need to be added to the dimension table in order to support a slowly changing model. The table can be Altered (i.e. the columns added to the table) or re-created. As we have fact tables that use this dimension we cannot re-create the table. To do so would make all of the joins in the fact tables to this dimension invalid. Therefore we will alter the dimension. Click the **Alter** button.



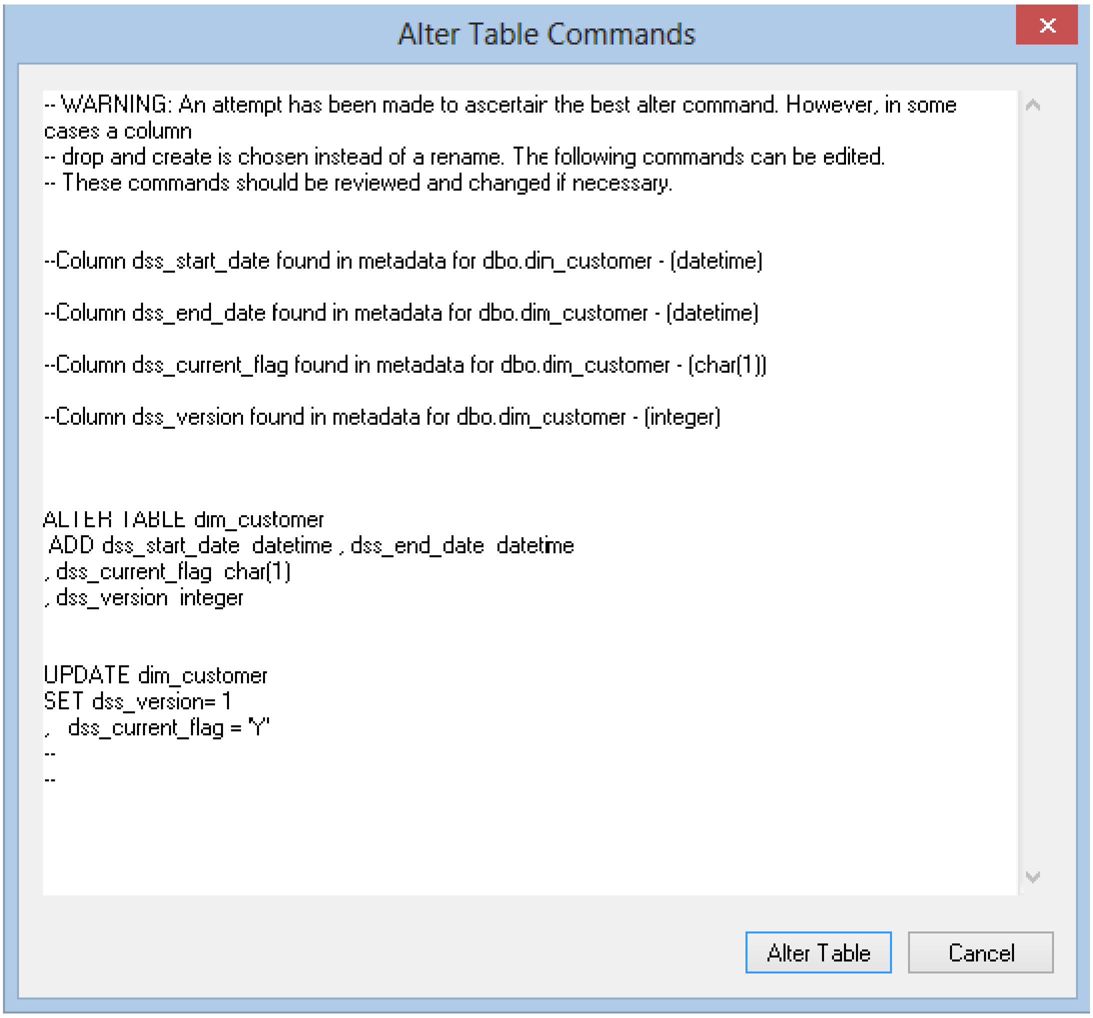
Adding Additional Columns for Slowly Changing Su...

This dimension is identified as a Slowly Changing Dimension.
Not all of the columns required for a slowly changing dimension exist.
The table must be altered for auto procedure generation to work.

The following columns will be added. Please select either Alter to alter the table, Recreate to drop and create the table or cancel.

```
dss_current_flag  char(1)
dss_version      integer
dss_start_date      date
dss_end_date      date
```

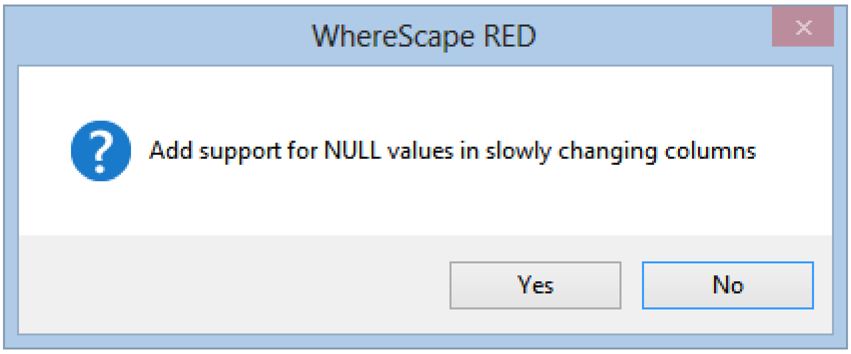
9 A dialog will now be presented with the SQL commands that will be executed to add the new columns and set default values for the dss_version and dss_current_flag columns. Click the **Alter Table** button to alter the table in the database. It is worth noting that whenever a database table is altered from within WhereScape RED the SQL commands should be reviewed. These commands can be changed if a different result is required.



```
-- WARNING: An attempt has been made to ascertain the best alter command. However, in some
cases a column
-- drop and create is chosen instead of a rename. The following commands can be edited.
-- These commands should be reviewed and changed if necessary.


--Column dss_start_date found in metadata for dbo.dim_customer - (datetime)

--Column dss_end_date found in metadata for dbo.dim_customer - (datetime)

--Column dss_current_flag found in metadata for dbo.dim_customer - (char(1))

--Column dss_version found in metadata for dbo.dim_customer - (integer)



ALTER TABLE dim_customer
 ADD dss_start_date  datetime , dss_end_date  datetime
, dss_current_flag  char(1)
, dss_version  integer


UPDATE dim_customer
SET dss_version= 1
,   dss_current_flag = 'Y'
--
--
```

10 A message box will appear informing you that the table was altered in the database. Click **OK**.

11 A dialog box will appear asking if you want to allow NULL support for the slowly changing columns. The normal response would be No. Refer to the Dimensions chapter for a detailed explanation. Click the **No** button.



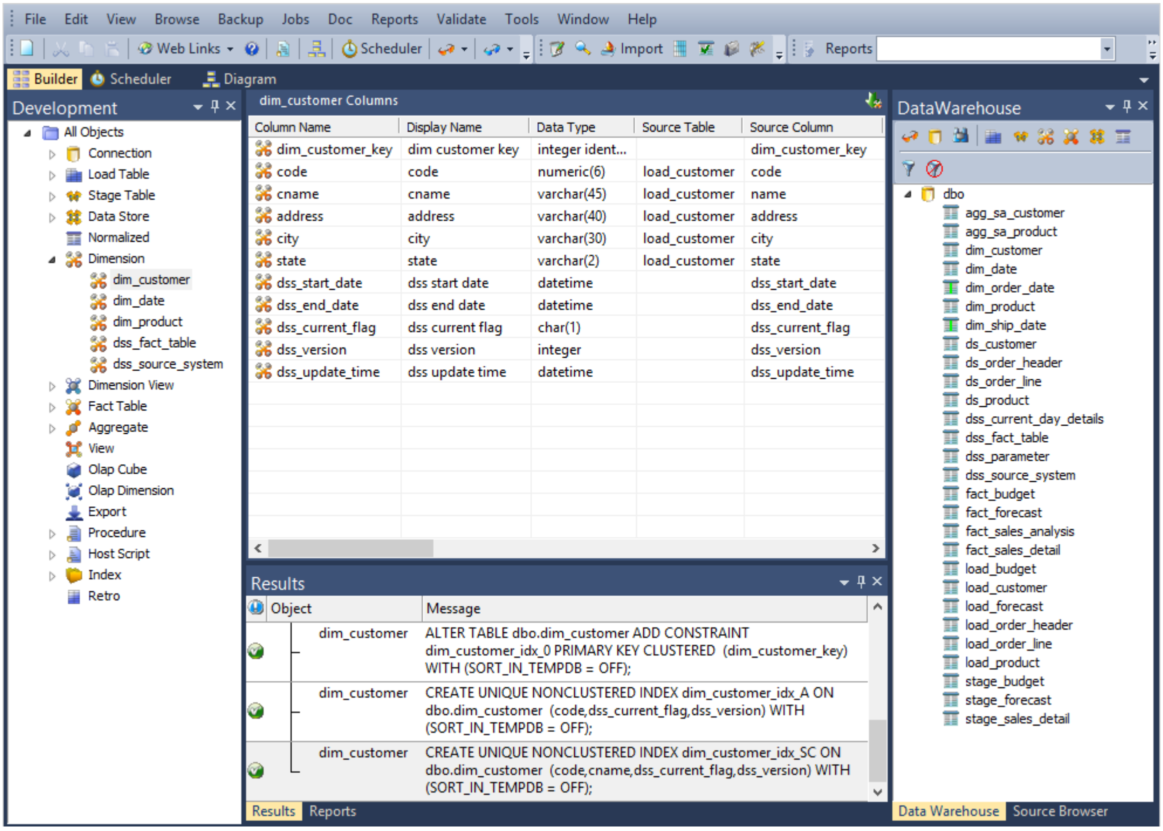
Add support for NULL values in slowly changing columns

12 The results dialog will show the indexes that were created/re-created for the dimension.

Note: There is a new index with a suffix of _SC to support the slowly changing dimension.

The dimension has now been converted to a slowly changing dimension. If a customer now has a name change a new version of the customer record will be created to allow the tracking of the customer by both the old and new name.

Your screen should look something like this:



dim_customer Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_customer_key	dim customer key	integer ident...		dim_customer_key
code	code	numeric(6)	load_customer	code
cname	cname	varchar(45)	load_customer	name
address	address	varchar(40)	load_customer	address
city	city	varchar(30)	load_customer	city
state	state	varchar(2)	load_customer	state
dss_start_date	dss start date	datetime		dss_start_date
dss_end_date	dss end date	datetime		dss_end_date
dss_current_flag	dss current flag	char(1)		dss_current_flag
dss_version	dss version	integer		dss_version
dss_update_time	dss update time	datetime		dss_update_time

Object	Message
dim_customer	ALTER TABLE dbo.dim_customer ADD CONSTRAINT dim_customer_idx_0 PRIMARY KEY CLUSTERED (dim_customer_key) WITH (SORT_IN_TEMPDB = OFF);
dim_customer	CREATE UNIQUE NONCLUSTERED INDEX dim_customer_idx_A ON dbo.dim_customer (code,dss_current_flag,dss_version) WITH (SORT_IN_TEMPDB = OFF);
dim_customer	CREATE UNIQUE NONCLUSTERED INDEX dim_customer_idx_SC ON dbo.dim_customer (code,cname,dss_current_flag,dss_version) WITH (SORT_IN_TEMPDB = OFF);

Note: This conversion to a slowly changing dimension has changed the get key function for the dimension. This function is called from the stage tables that use this dimension. We must now rebuild the update procedures for the stage tables that use this dimension.

Rebuild Stage Update Procedures

As the customer dimension is used in the stage tables stage_sales_detail, stage_budget and stage_forecast we will need to rebuild these procedures. Proceed as follows:

1 Right-click on **stage_sales_detail** and select **Properties**.

2 Use the Update procedure drop-down to select **(Build Procedure...)**.

3 Click **OK** to leave the Properties page.

4 Answer **Yes** to the procedure versioning question.

5 Select **Cursor** for the procedure type.

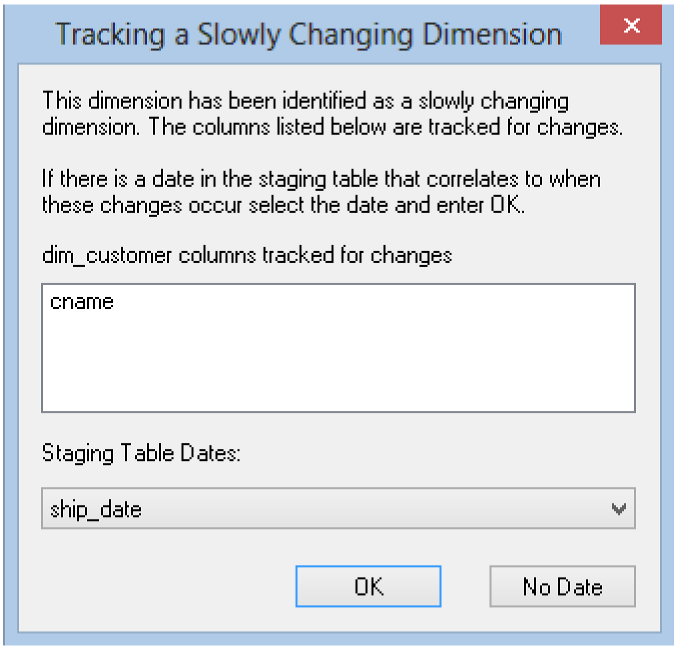
6 Click **OK** on the Parameters dialog.

7 Click **OK** on the screen informing of multiple source tables.

8 Accept the previous entries by clicking **OK** on the cursor mapping screen.

9 Click **OK** on the business key join for each of the dimensions. The previously chosen business key should be the default value provided.

10 An additional dialog will appear after the customer dimension join. Select **ship_date** from the date list and click **OK**.



Tracking a Slowly Changing Dimension

This dimension has been identified as a slowly changing dimension. The columns listed below are tracked for changes.

If there is a date in the staging table that correlates to when these changes occur select the date and enter OK.

dim_customer columns tracked for changes

cname

Staging Table Dates:

ship_date

11 Click **OK** on any other dimension joins.

12 Click **OK** on the business key for the stage table.

13 The update procedure will now be rebuilt to handle the fact that the customer dimension is now slowly changing. Repeat steps **(1) through (11)** for the other stage tables **stage_budget** and **stage_forecast**. Use the dates **budget_date** and **forecast_date** to track the dimension changes.

You have successfully converted the dimension dim_customer to a slowly changing dimension, and made all dependent changes.

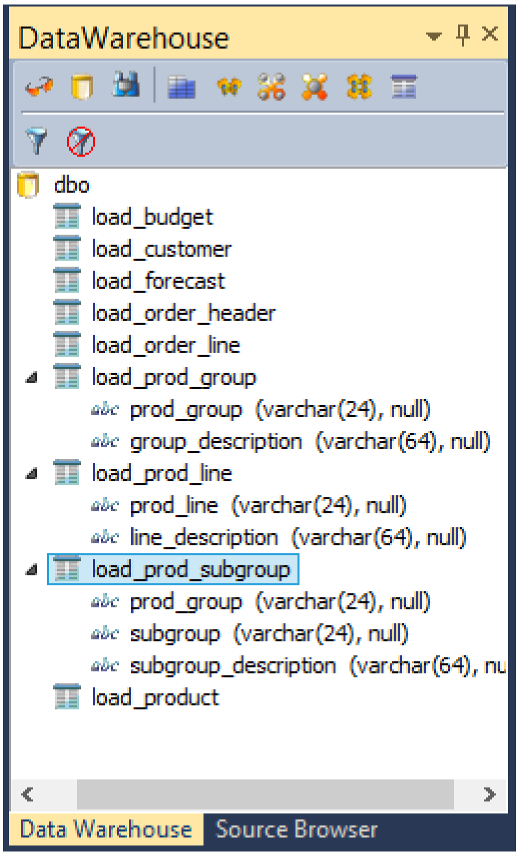
You are now ready to proceed to the next section - ***Multiple Source Table Dimension*** (see "***4.3 Multiple Source Table Dimension***" on page 126).

4.3 Multiple Source Table Dimension

Dimensions typically get their information from multiple sources. A common scenario is to have a series of codes that relate to the dimension. The descriptions of these codes are often stored in a code lookup table. The following example will clarify the practice of producing a dimension from multiple source tables.

The dimension dim_product created in tutorial one will be enhanced to provide additional descriptions for the code values already present.

1. In the right pane, browse to the **Tutorial** connection that was created in tutorial one. Click on the glasses or select the Browse/Source tables menu option. The tutorial tables should now be shown in the right pane.
2. We need to acquire a number of additional source tables from the tutorial database. Double-click on the **Load Table object group** in the left pane. This will list all the load tables in the middle pane and make the middle pane a drop target for additional load tables.
3. Select the **prod_group** table from the right pane and holding the left mouse down drag to the middle pane. Click **ADD** to add the new object and then **OK** on the Properties screen. Select the **Create and Load** button.
4. Repeat steps **(2) and (3)** above to bring in and load from the **prod_subgroup** and **prod_line** tables.
5. In the left pane click on **dim_product**. This will display all of the dimension columns in the middle pane and make the middle pane a drop target for additional dimension columns. We will be adding descriptions to it.
6. Browse to the **Data Warehouse** connection. The right pane should now show the data warehouse tables. You can position the mouse in this right pane and select the menu option '**Filter - Load**' to restrict the display to just load tables.
7. Expand **load_prod_group**, **load_prod_subgroup** and **load_prod_line** by **double-clicking** on each table name.



DataWarehouse

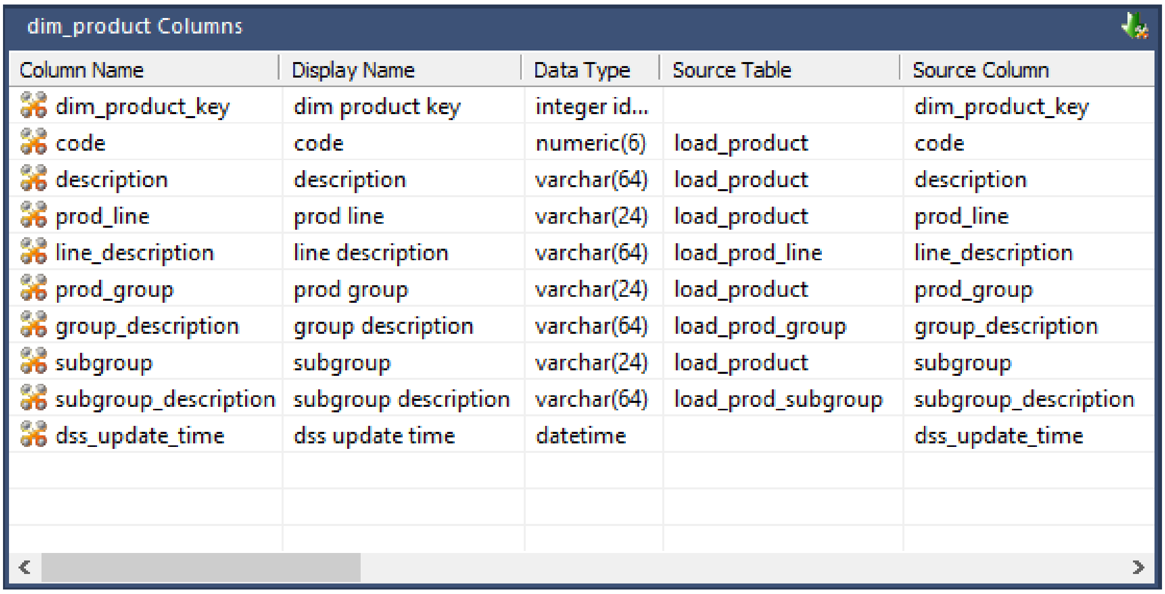
- dbo
  - load_budget
  - load_customer
  - load_forecast
  - load_order_header
  - load_order_line
  - load_prod_group
    - prod_group (varchar(24), null)
    - group_description (varchar(64), null)
  - load_prod_line
    - prod_line (varchar(24), null)
    - line_description (varchar(64), null)
  - load_prod_subgroup
    - prod_group (varchar(24), null)
    - subgroup (varchar(24), null)
    - subgroup_description (varchar(64), nu
  - load_product

8 Drag **group_description** from load_prod_group into the middle pane. This will add it to the product dimension columns.

9 Drag **subgroup_description** from load_prod_subgroup into the middle pane. This will add it to the product dimension columns.

10 Drag **line_description** from load_prod_line into the middle pane. This will add it to the product dimension columns.

11 Review the product columns displayed in the middle pane. Expand the '**source table**' column to see that we now have four different tables that contribute to the dimension.



dim_product Columns

Column Name	Display Name	Data Type	Source Table	Source Column
dim_product_key	dim product key	integer id...		dim_product_key
code	code	numeric(6)	load_product	code
description	description	varchar(64)	load_product	description
prod_line	prod line	varchar(24)	load_product	prod_line
line_description	line description	varchar(64)	load_prod_line	line_description
prod_group	prod group	varchar(24)	load_product	prod_group
group_description	group description	varchar(64)	load_prod_group	group_description
subgroup	subgroup	varchar(24)	load_product	subgroup
subgroup_description	subgroup description	varchar(64)	load_prod_subgroup	subgroup_description
dss_update_time	dss update time	datetime		dss_update_time

Right-click on **dim_product** in the left pane and select **Validate against database.** This option will compare the metadata as displayed within WhereScape RED with the physical table dim_product as it exists in the database. We have added new columns to the metadata in the steps above, but the physical table has not been changed. A message will appear in the middle pane as follows.

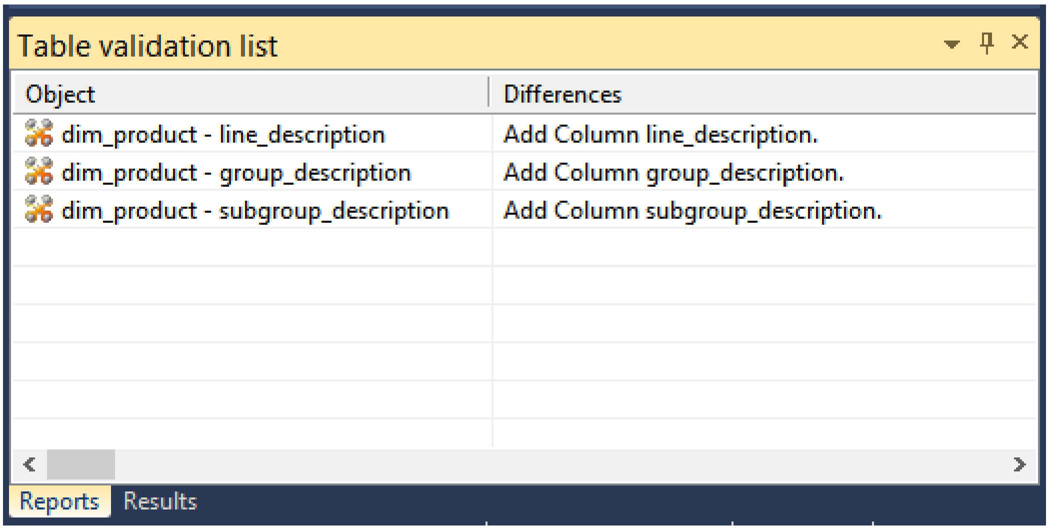


Table validation list

Object	Differences
dim_product - line_description	Add Column line_description.
dim_product - group_description	Add Column group_description.
dim_product - subgroup_description	Add Column subgroup_description.

12 We now need to alter the physical table in the database. The message in the middle pane shows that the metadata has additional columns not present in the dss table. Right-click on **dim_product** in the **middle pane** and select **Alter Table**.

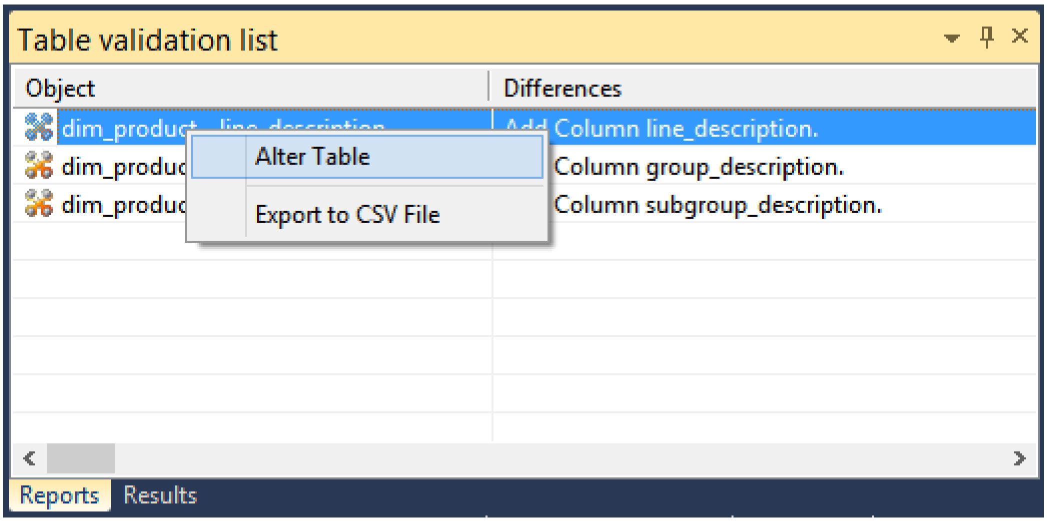


Table validation list
Object
Differences
dim_product - line_description
Add Column line_description.
dim_produc
Column group_description.
dim_produc
Column subgroup_description.
Alter Table
Export to CSV File
Reports
Results

13 An alter table commands dialog will appear with the SQL commands that will be used to alter the database table. Click the **Alter Table** button.

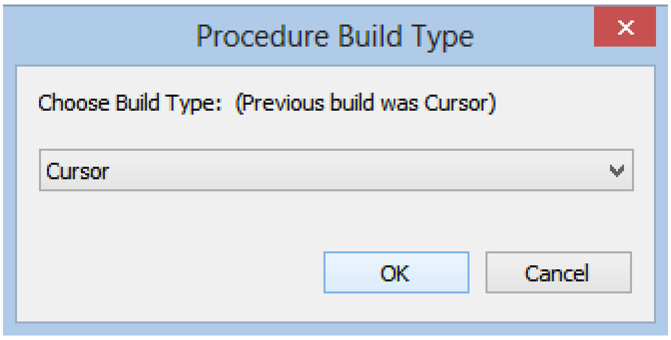
14 A message will display advising that the table was altered. Click **OK** to clear the message.

15 Repeat steps (12) to (14) for the other two changes.

16 Right-click on **dim_product** in the left pane and select **Properties.**

17 Click **Rebuild**.

18 A Procedure Build Type dialog will appear. Select **Cursor**.

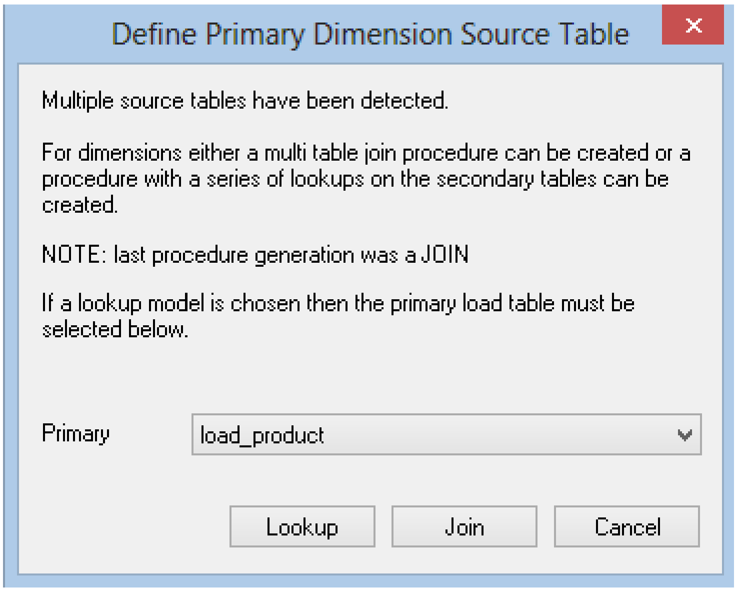


Procedure Build Type

Choose Build Type: (Previous build was Cursor)

Cursor

19 A dialog will now appear asking you to define the primary source table and to choose between a join of the source tables or a series of lookups. Refer to the Dimensions chapter for an explanation on these two choices. The **load_product** should have been selected as the primary source table. If it has not been selected then select it. Click the **Lookup** button.



Define Primary Dimension Source Table

Multiple source tables have been detected.

For dimensions either a multi table join procedure can be created or a procedure with a series of lookups on the secondary tables can be created.

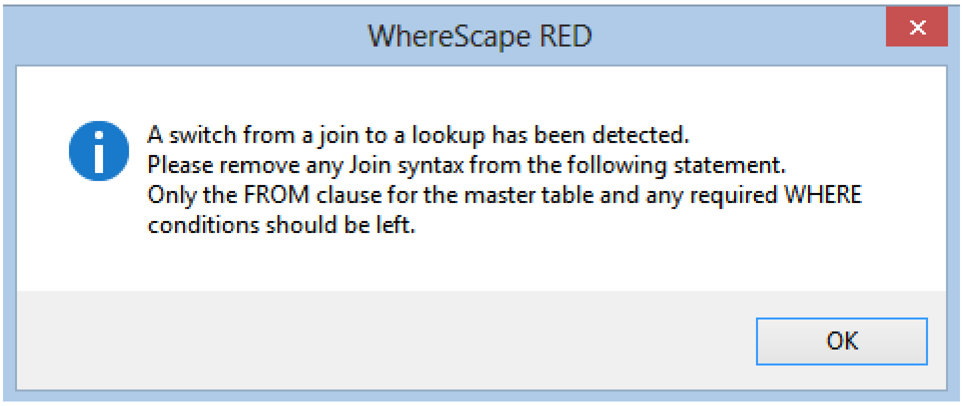
NOTE: last procedure generation was a JOIN

If a lookup model is chosen then the primary load table must be selected below.

Primary load_product

20 The **Define Dimension Business Key(s)** dialog will be presented. The existing business key **code** should already be the default value so click **OK** to proceed to the next screen.

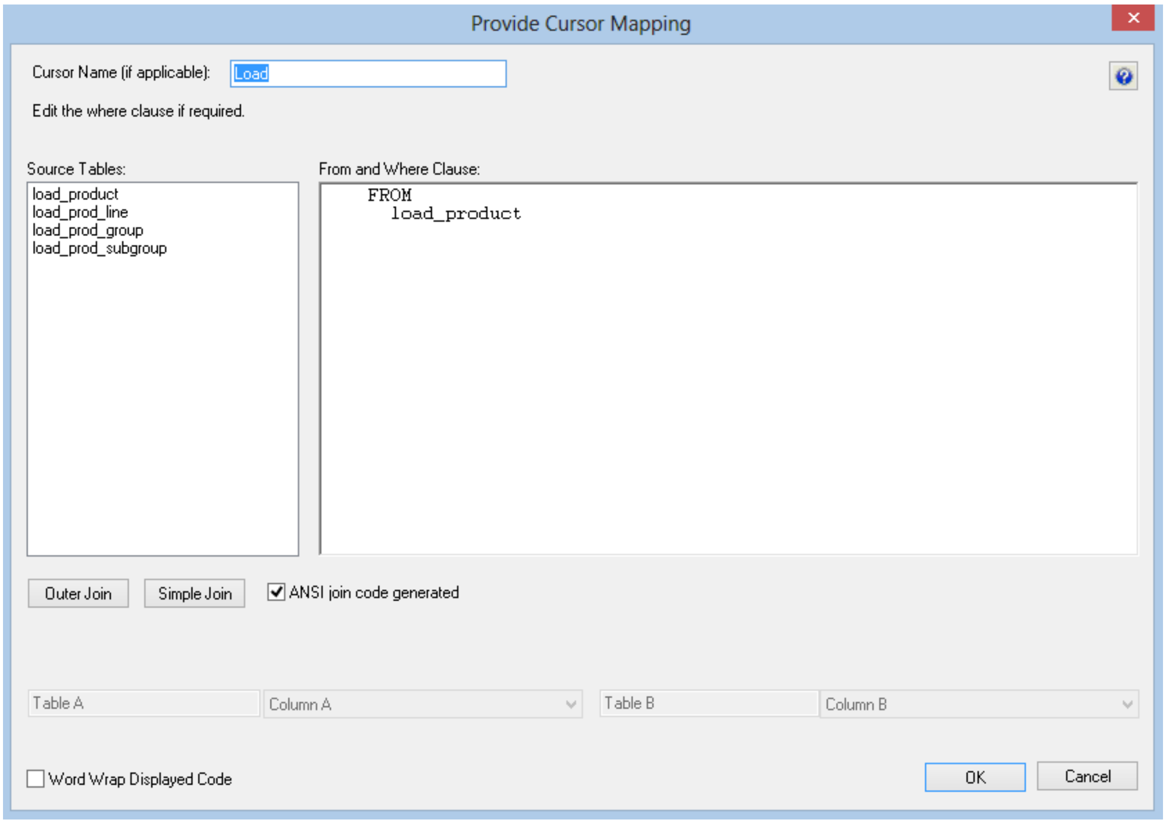
21 A message is displayed, asking you to ensure that any join syntax be removed from the statement in the dialog to follow. Click **OK**.



WhereScape RED

A switch from a join to a lookup has been detected.
Please remove any Join syntax from the following statement.
Only the FROM clause for the master table and any required WHERE conditions should be left.

22 Click **OK** on the **Cursor Mapping** screen.



Provide Cursor Mapping

Cursor Name (if applicable): Load

Edit the where clause if required.

Source Tables:
load_product
load_prod_line
load_prod_group
load_prod_subgroup

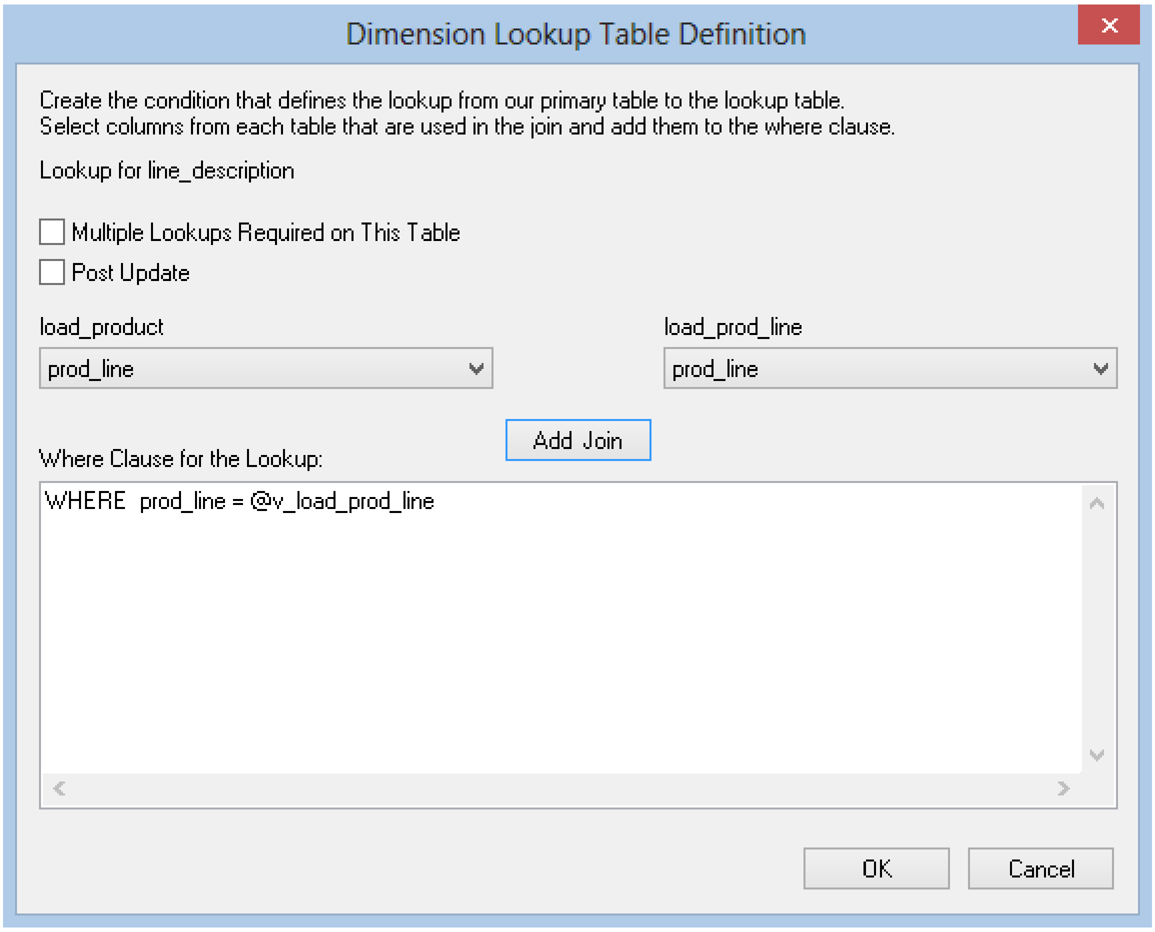
From and Where Clause:

```
    FROM
      load_product
```

☑ ANSI join code generated

□ Word Wrap Displayed Code

23 The Dimension lookup definition screen should now appear. Two drop-down boxes are available. The left drop-down shows the columns for the table chosen as the primary source table. The right drop-down shows the columns for the source table we wish to lookup. There is a reminder above the left drop-down informing you which table is being looked up.



Dimension Lookup Table Definition

Create the condition that defines the lookup from our primary table to the lookup table.
Select columns from each table that are used in the join and add them to the where clause.

Lookup for line_description

☐ Multiple Lookups Required on This Table

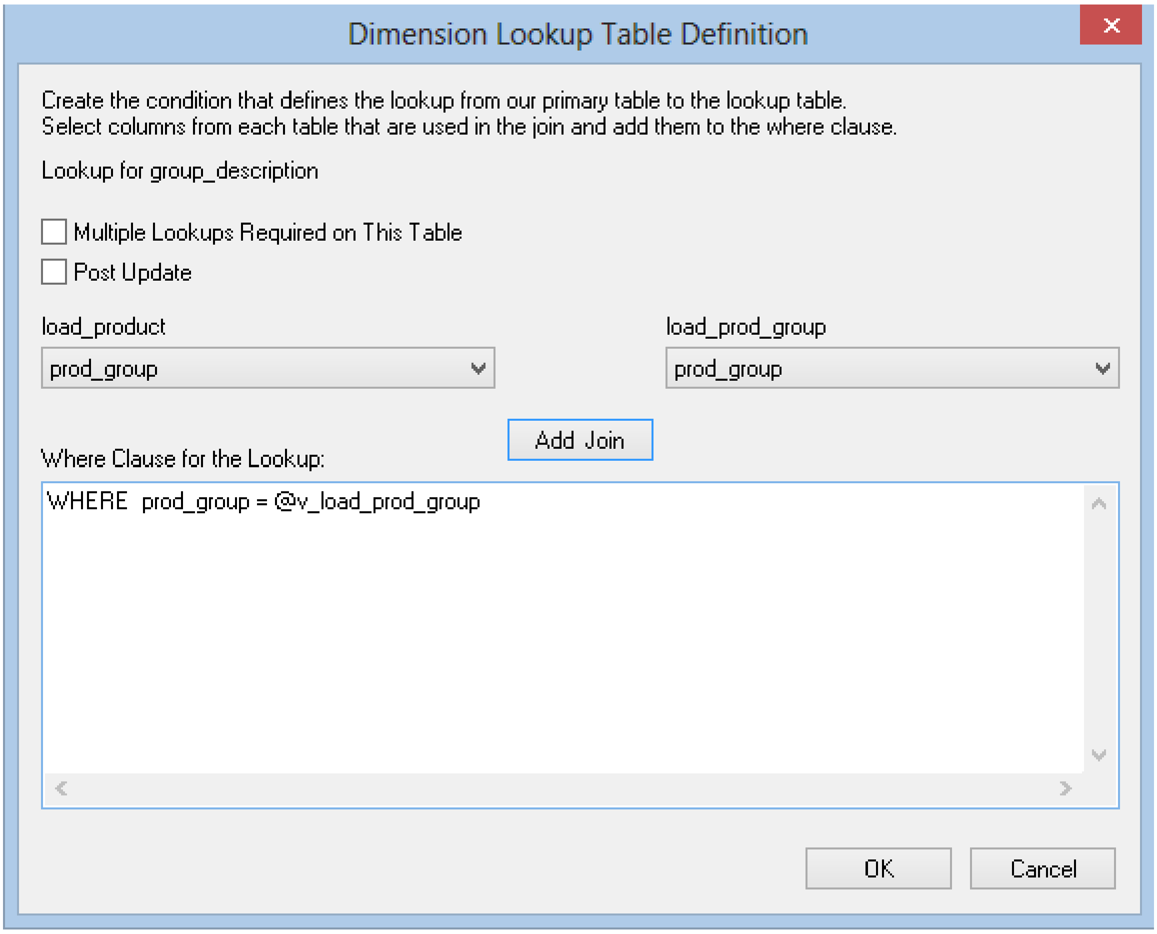
☐ Post Update

load_product: prod_line

load_prod_line: prod_line

Where Clause for the Lookup:

```
WHERE  prod_line = @v_load_prod_line
```



Create the condition that defines the lookup from our primary table to the lookup table.
Select columns from each table that are used in the join and add them to the where clause.

Lookup for group_description

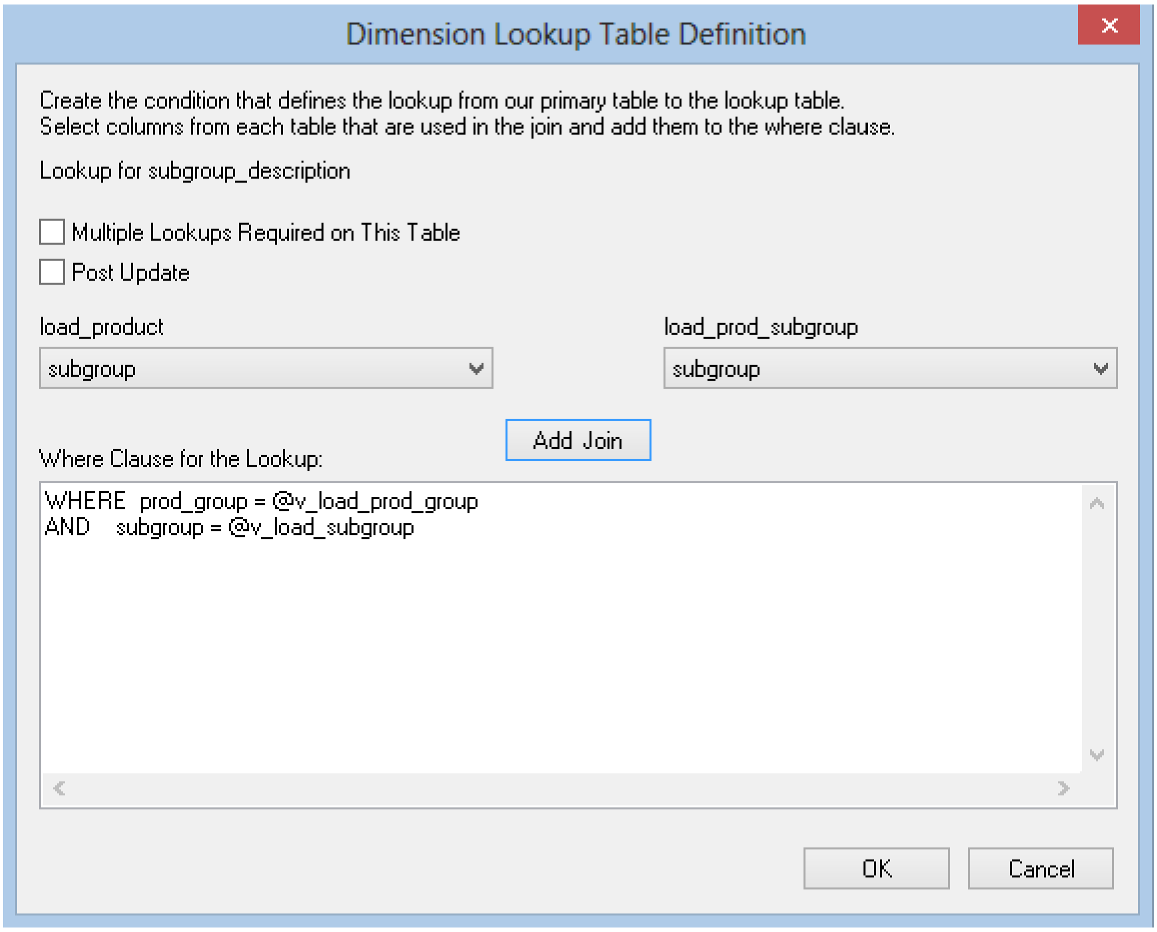
☐ Multiple Lookups Required on This Table
☐ Post Update

load_product: prod_group

load_prod_group: prod_group

Where Clause for the Lookup:

```
WHERE  prod_group = @v_load_prod_group
```



Create the condition that defines the lookup from our primary table to the lookup table.
Select columns from each table that are used in the join and add them to the where clause.

Lookup for subgroup_description

□ Multiple Lookups Required on This Table

□ Post Update

load_product: subgroup

load_prod_subgroup: subgroup

Where Clause for the Lookup:

```
WHERE  prod_group = @v_load_prod_group
AND    subgroup = @v_load_subgroup
```

Although not being used at this point there are a number of features in these dialogs which are worth noting. The first is that there is a checkbox to allow a table to be the source of multiple lookups. This would be used where a generic code table was used to lookup descriptions and we would need to make multiple lookups on the same table to get different descriptions. The second is that procedure variables are available in the drop-down list of the primary load table. Using this feature it is possible to make lookups that are dependent on the results from previous lookups. This is done by selecting the columns that would have been populated by the earlier lookups.

The lookups require that a join be defined for the two tables involved. The relevant joins for our example are as follows. Step through the dialog boxes making these joins. First select the column from each drop-down list and then click the **Add Join** button.

Lookup table	**Primary src (load_product)**	**Lookup column**
load_prod_group	prod_group	prod_group
load_prod_subgroup	prod_group prod_subgroup	prod_group prod_subgroup

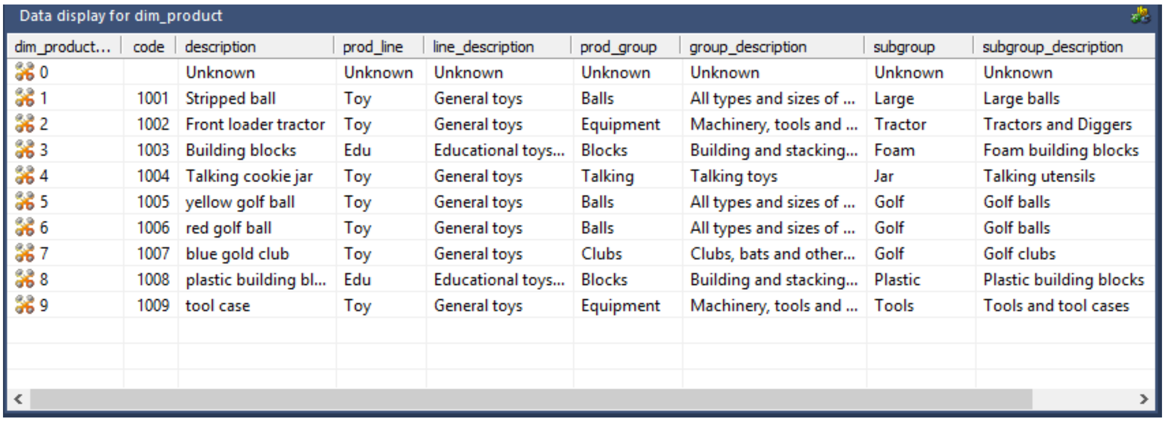
load_prod_line	prod_line	prod_line

Note: The load_prod_subgroup lookup will require two joins. After each join is made click the **OK** button to move to the next dialog.

24 Once the lookups have been completed the procedure will be generated and the results dialog will show the indexes that were created/re-created.

25 Right-click on **dim_product** in the left pane and select **Execute Update Procedure**. The dimension will now be refreshed.

26 Right-click on **dim_product** in the left pane and select **Display Data**. Provided the lookups were done correctly, the descriptions should now be populated.



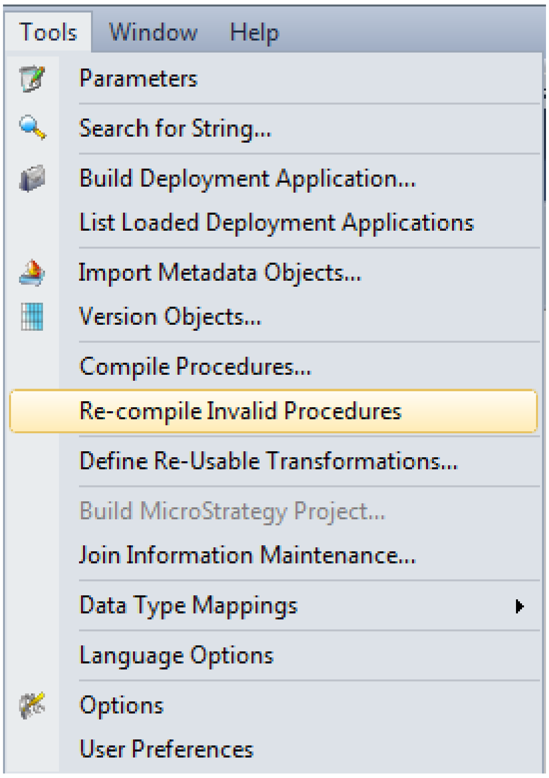
Data display for dim_product

dim_product...	code	description	prod_line	line_description	prod_group	group_description	subgroup	subgroup_description
0		Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
1	1001	Stripped ball	Toy	General toys	Balls	All types and sizes of ...	Large	Large balls
2	1002	Front loader tractor	Toy	General toys	Equipment	Machinery, tools and ...	Tractor	Tractors and Diggers
3	1003	Building blocks	Edu	Educational toys...	Blocks	Building and stacking...	Foam	Foam building blocks
4	1004	Talking cookie jar	Toy	General toys	Talking	Talking toys	Jar	Talking utensils
5	1005	yellow golf ball	Toy	General toys	Balls	All types and sizes of ...	Golf	Golf balls
6	1006	red golf ball	Toy	General toys	Balls	All types and sizes of ...	Golf	Golf balls
7	1007	blue gold club	Toy	General toys	Clubs	Clubs, bats and other...	Golf	Golf clubs
8	1008	plastic building bl...	Edu	Educational toys...	Blocks	Building and stacking...	Plastic	Plastic building blocks
9	1009	tool case	Toy	General toys	Equipment	Machinery, tools and ...	Tools	Tools and tool cases

Oracle Procedure Invalidation

If running this as a tutorial in an *Oracle Data Warehouse* then the procedures update_stage_sales_detail, update_stage_budget and update_stage_forecast will have been invalidated. These procedures all use the function get_dim_product_key. This function was re-compiled as part of the process above, but has not changed in structure.

Select the menu option **Tools/Re-compile Invalid Procedures**:


Tools
Window
Help
Parameters
Search for String...
Build Deployment Application...
List Loaded Deployment Applications
Import Metadata Objects...
Version Objects...
Compile Procedures...
Re-compile Invalid Procedures
Define Re-Usable Transformations...
Build MicroStrategy Project...
Join Information Maintenance...
Data Type Mappings
Language Options
Options
User Preferences

Click **Yes** to proceed. The three procedures will be re-validated and the results shown in the middle pane.

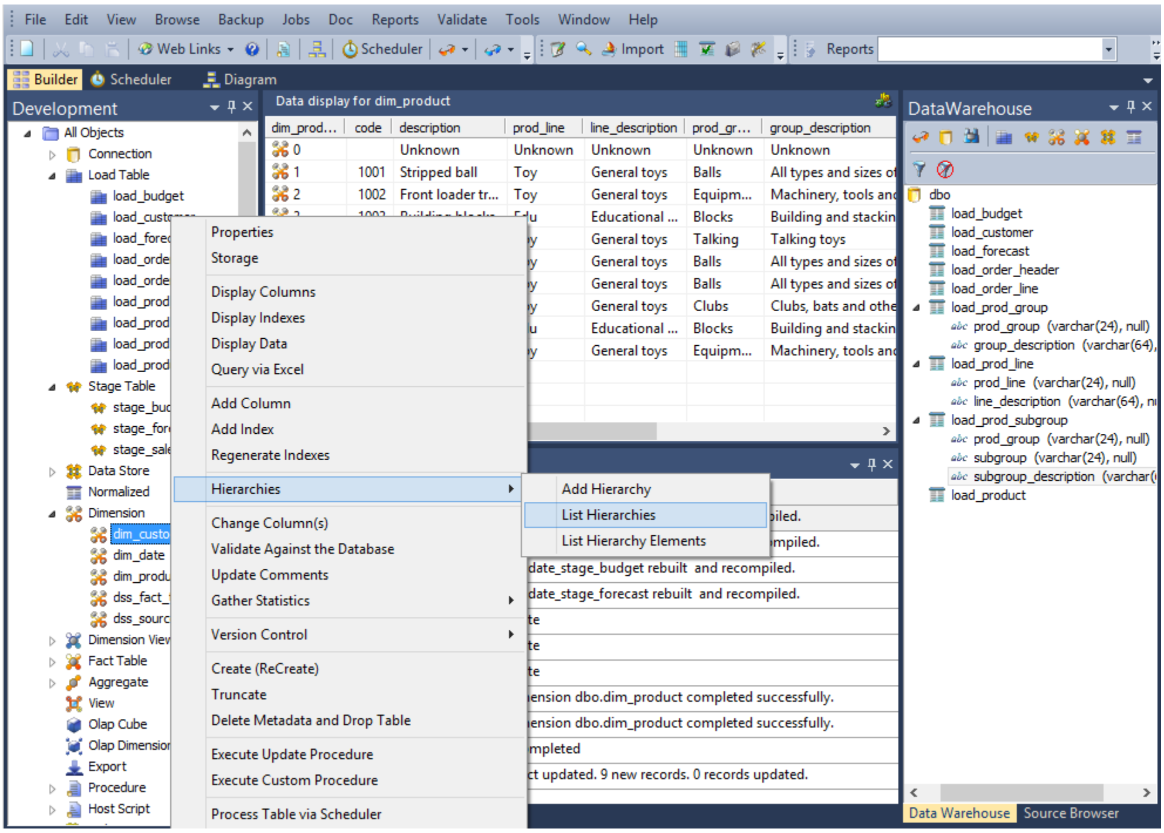
You are now ready to proceed to the next section - ***Creating a Dimension Hierarchy*** (see "***4.4 Creating a Dimension Hierarchy***" on page 136)

4.4 Creating a Dimension Hierarchy

Dimensions often have a number of hierarchical levels. An example is the date dimension which has a natural hierarchy of year, month and day. WhereScape RED allows the definition of a hierarchy against a dimension. A dimension may have multiple hierarchies defined. These dimension hierarchies are used in the generation of Analysis Services cubes. Every dimension in a cube must have a hierarchy with at least one element in it. Hierarchies can also be accessed and the underlying data maintained with the Hierarchy maintenance utility shipped with the enterprise version of WhereScape RED. This utility allows a user to maintain a hierarchy structure in a different database or schema so that the data warehouse can use this structure as input to the dimension. See the hierarchy section in the Dimension chapter for more details.

We will add a hierarchy to the dimensions dim_product and dim_customer created in the first tutorial. We will also check that a hierarchy exists for the date dimension and if not present, add one.

1 Right-click on **dim_customer** in the left pane and select **Hierarchies / List Hierarchies**.



Data display for dim_product

dim_prod...	code	description	prod_line	line_description	prod_gr...	group_description
0		Unknown	Unknown	Unknown	Unknown	Unknown
1	1001	Stripped ball	Toy	General toys	Balls	All types and sizes of
2	1002	Front loader tr...	Toy	General toys	Equipm...	Machinery, tools and
			u	Educational ...	Blocks	Building and stackin
			y	General toys	Talking	Talking toys
			y	General toys	Balls	All types and sizes of
			y	General toys	Balls	All types and sizes of
			y	General toys	Clubs	Clubs, bats and othe
			u	Educational ...	Blocks	Building and stackin
			y	General toys	Equipm...	Machinery, tools and

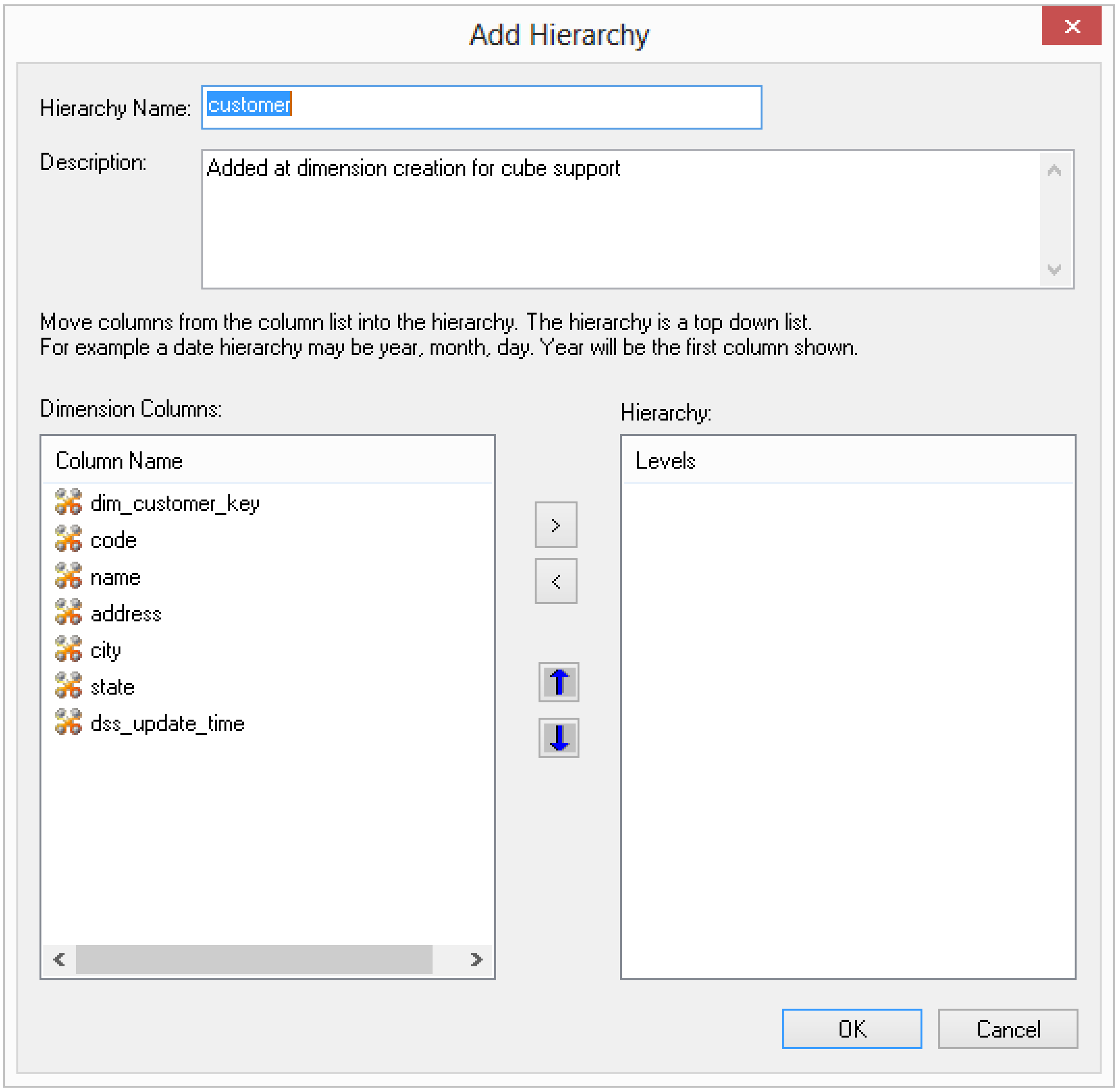
```
piled.
mpiled.
date_stage_budget rebuilt and recompiled.
date_stage_forecast rebuilt and recompiled.
te
te
te
ension dbo.dim_product completed successfully.
ension dbo.dim_product completed successfully.
mpleted
t updated. 9 new records. 0 records updated.
```

2 A list of any existing hierarchies will be shown in the middle pane. Initially there are no hierarchies defined.

3 Right-click on **dim_customer** in the left pane and select **Hierarchies** / **Add Hierarchy**.

4 A dialog will appear asking for a hierarchy name and the hierarchy elements. Enter **customer** for the name and add **state**, **city**, **address** and **code** as hierarchy elements.

5 Enter a meaningful **Description** for the hierarchy and click **OK** to exit the add hierarchy dialog.



Add Hierarchy

Hierarchy Name: customer

Description: Added at dimension creation for cube support

Move columns from the column list into the hierarchy. The hierarchy is a top down list.
For example a date hierarchy may be year, month, day. Year will be the first column shown.

Dimension Columns:

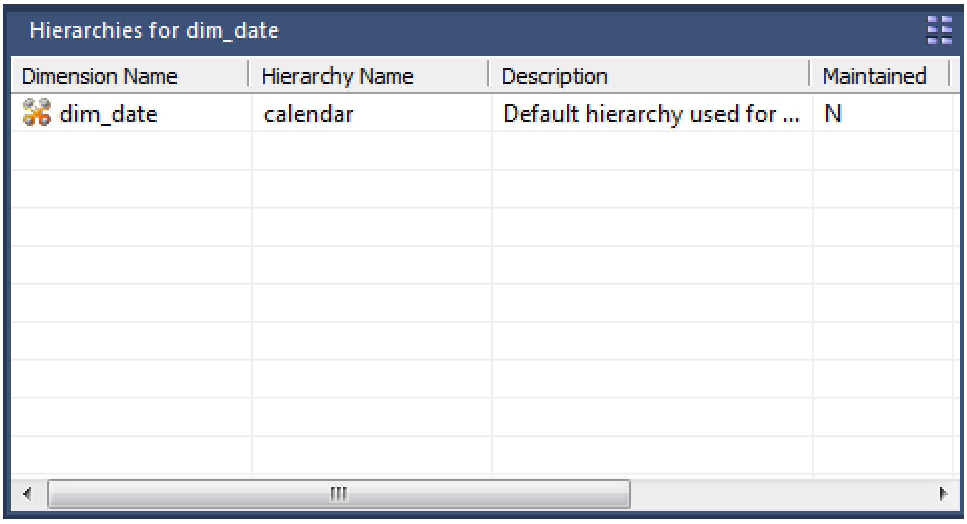
Column Name
dim_customer_key
code
name
address
city
state
dss_update_time

Hierarchy:

Levels

6 Repeat steps **(1) through (4)** for **dim_product** defining a top down hierarchy of **line_description**, then **group_description, subgroup_description**, and **code**.

7 Check to see if a hierarchy exists for **dim_date**. If no hierarchy exists then add a top down hierarchy of **cal_year, cal_month and calendar_date**.



Dimension Name	Hierarchy Name	Description	Maintained
dim_date	calendar	Default hierarchy used for ...	N

As mentioned above these hierarchies are utilized by other processes within the data warehouse. In this case we will use the hierarchies created in the building of Analysis Services cubes in the next tutorial.

TUTORIAL 5 ANALYSIS SERVICES CUBES

Before you start on this chapter you should have:

- Completed ***Tutorial 1 - Basic Star Schema Fact Table*** (see "***Basic Star Schema Fact Table***" on page 1)
- Completed ***Tutorial 2 - Rollup Fact Tables, ASCII File Loads, Aggregates*** (see "***Rollup Fact Tables, ASCII File Loads, Aggregates***" on page 73)
- Completed ***Tutorial 4 - Complex Dimensions and Hierarchies*** (see "***Complex Dimensions and Hierarchies***" on page 116)

This chapter deals with fine tuning the data warehouse by adding Analysis Services cubes.

IN THIS TUTORIAL

5.1 Purpose and Roadmap

Purpose

This tutorial will walk you through the process to:

- Create an analysis services cube.

In short, this tutorial uses existing fact tables to generate a "multi-measure group cube" based on fact_sales_detail and fact_budget. It also shows you how to query the cube.

Tutorial Environment

This tutorial has been completed using Microsoft SQL Server. All of the features illustrated in this tutorial are available in SQL Server, Oracle and DB2 (unless otherwise stated) using Analysis Services Cubes. Any differences in usage of WhereScape RED between these databases are highlighted. Refer to ***Cube Connections for Other Databases*** (see "***5.4 Cube Connections for Other Databases***" on page 184) for more information on configuring the DataWarehouse connection for Oracle or DB2 data warehouses.

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 an Analysis Services cube from fact_sales_detail	Creating a Cube Object
Add a measure group to the cube based on fact_budget	Adding a Measure Group object

This tutorial starts with the section ***Creating an OLAP Cube Object*** (see "***5.2 Creating an OLAP Cube Object***" on page 141).

5.2 Creating an OLAP Cube Object

The process of creating a cube object is largely the same as creating any other data warehouse object. By dragging a fact or aggregate table into an **OLAP Cube** drop target an **OLAP Cube** and **OLAP Dimensions** are defined.

OLAP Cubes are more complex than some other objects in WhereScape RED, primarily due to the functionality available in Microsoft Analysis Services.

This tutorial covers creating a basic cube. Refer to the chapter on Analysis Services Cubes in the WhereScape RED User Guide for more information.

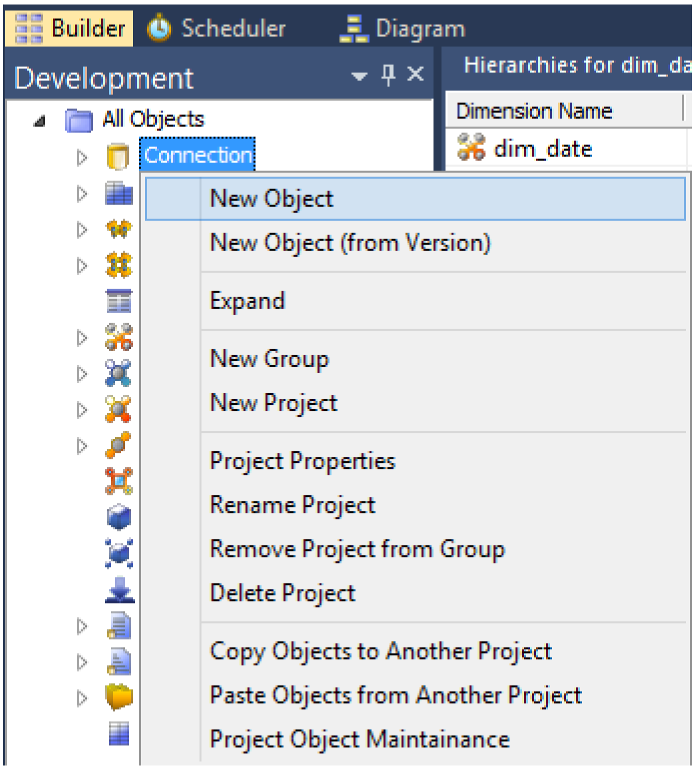
In this step we will create an **OLAP Cube** from the *fact_sales_detail* table. Before we start we need to have access to a Microsoft Analysis Services server with appropriate security rights to create an OLAP database.

Analysis Services is supplied with Microsoft SQL Server. You will also need to know the name of this server.

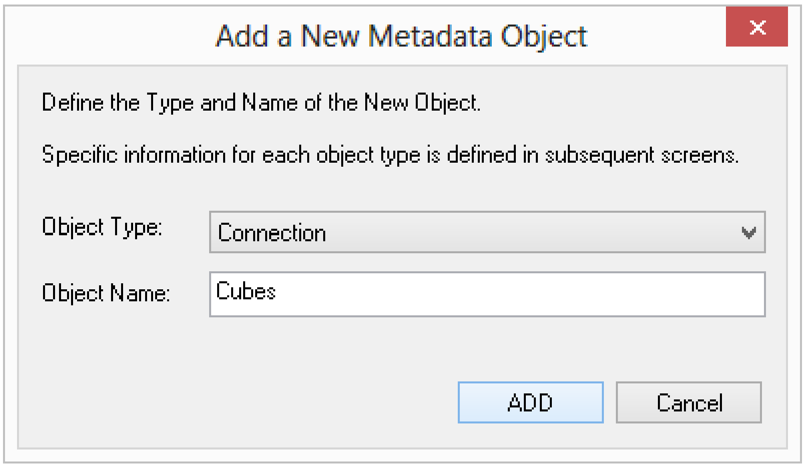
Note: This tutorial is only possible if an Analysis Services server is available

If the Analysis Services server is located on another machine then the Analysis Services client software will need to be loaded onto the computer running WhereScape RED.

1 Create a new **connection** for the Analysis Services server. Right-click on the **Connection** object group in the left pane and select **New Object**.



2 Enter a name of **Cubes** for the connection and click **ADD.**



Add a New Metadata Object

Define the Type and Name of the New Object.

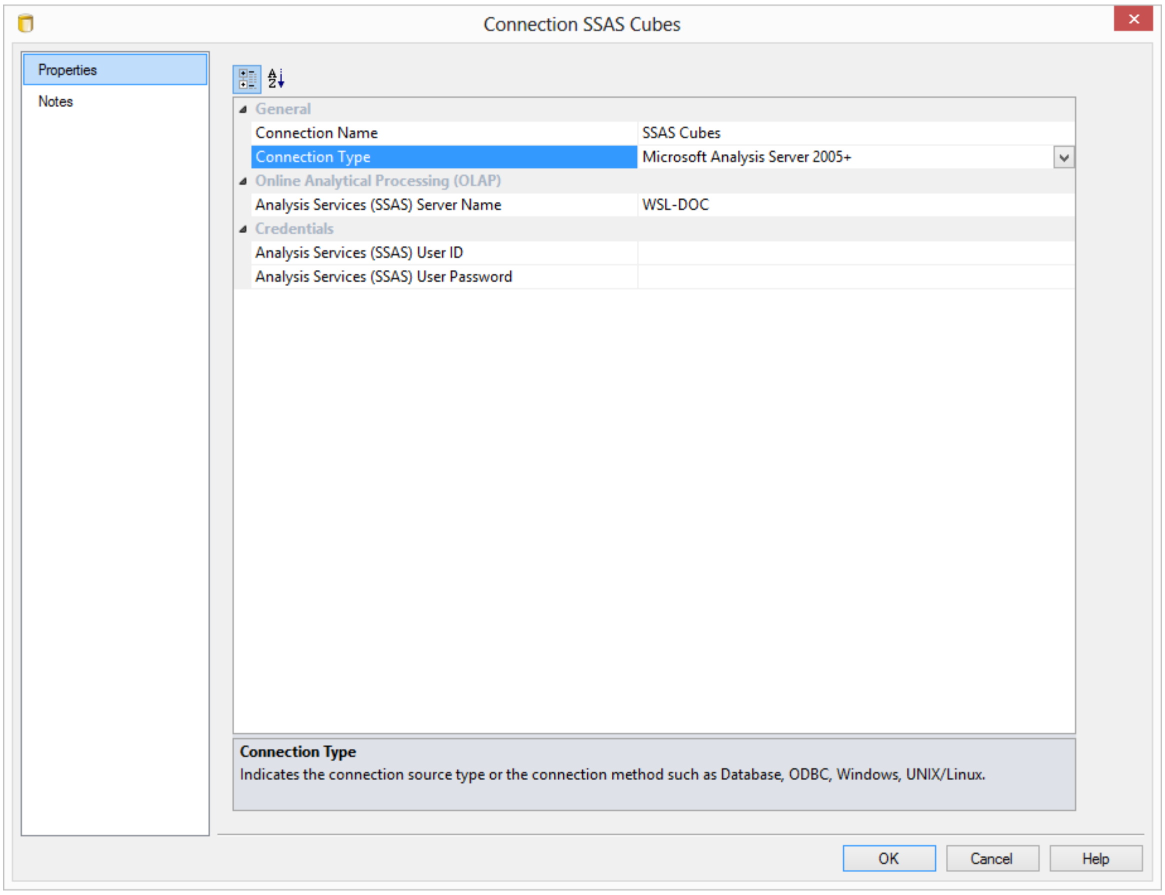
Specific information for each object type is defined in subsequent screens.

Object Type: Connection

Object Name: Cubes

3 The connection Properties screen displays. Select the connection type **Microsoft Analysis Server 2005+**.

- Enter the **name** of the server for the Analysis Server. Leave the username and password blank.
- Enter the server and database details for your **Analysis Services** server.
- A sample is shown here. Click **OK** on the connection screen.



Connection SSAS Cubes

General

Connection Name	SSAS Cubes
Connection Type	Microsoft Analysis Server 2005+

Online Analytical Processing (OLAP)

Analysis Services (SSAS) Server Name	WSL-DOC

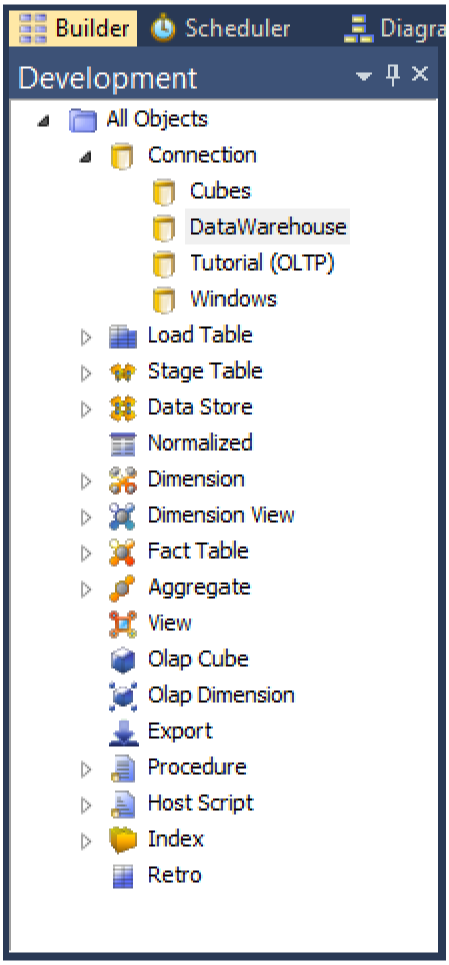
Credentials

Analysis Services (SSAS) User ID	
Analysis Services (SSAS) User Password	

Connection Type
Indicates the connection source type or the connection method such as Database, ODBC, Windows, UNIX/Linux.

Note: Microsoft Analysis Services 2005 and 2008 use "Microsoft Analysis Server 2005+".

4 Expand the Connection object group in the left pane and double-click on the DataWarehouse connection to bring up the **Properties** dialog.

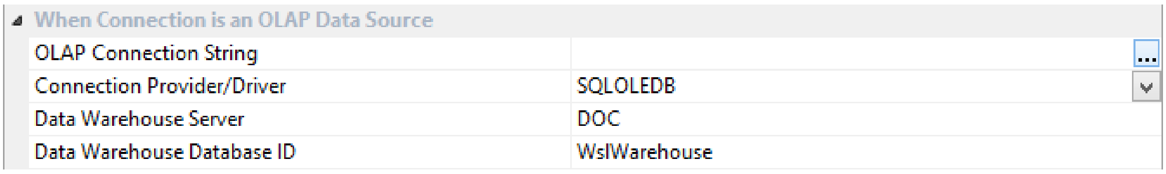


5 The Properties dialog has some additional columns at the bottom of the screen. These are required so that the data warehouse can be used as a source for the Analysis Services cubes. These fields are:

- OLAP Connection String
- Connection Provider/Driver
- Data Warehouse Server
- Data Warehouse Database ID

6 For a SQL Server data warehouse:

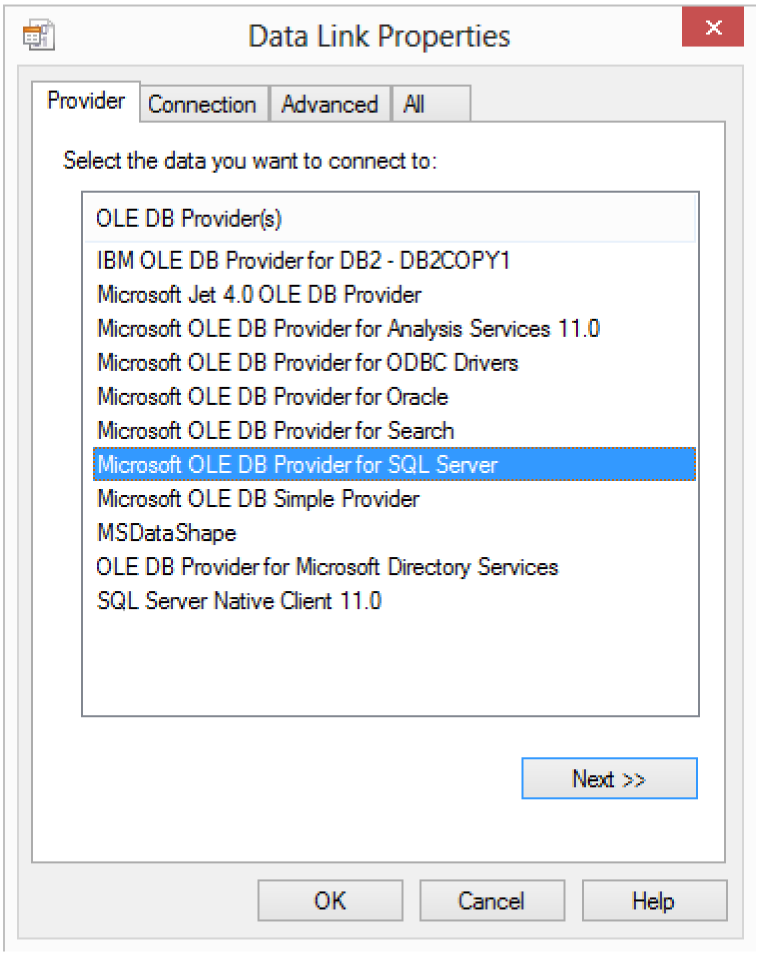
- The **OLAP Connection String** is built using a wizard. To activate the wizard, click on the eliipsis button.



When Connection is an OLAP Data Source

OLAP Connection String	
Connection Provider/Driver	SQLOLEDB
Data Warehouse Server	DOC
Data Warehouse Database ID	WslWarehouse

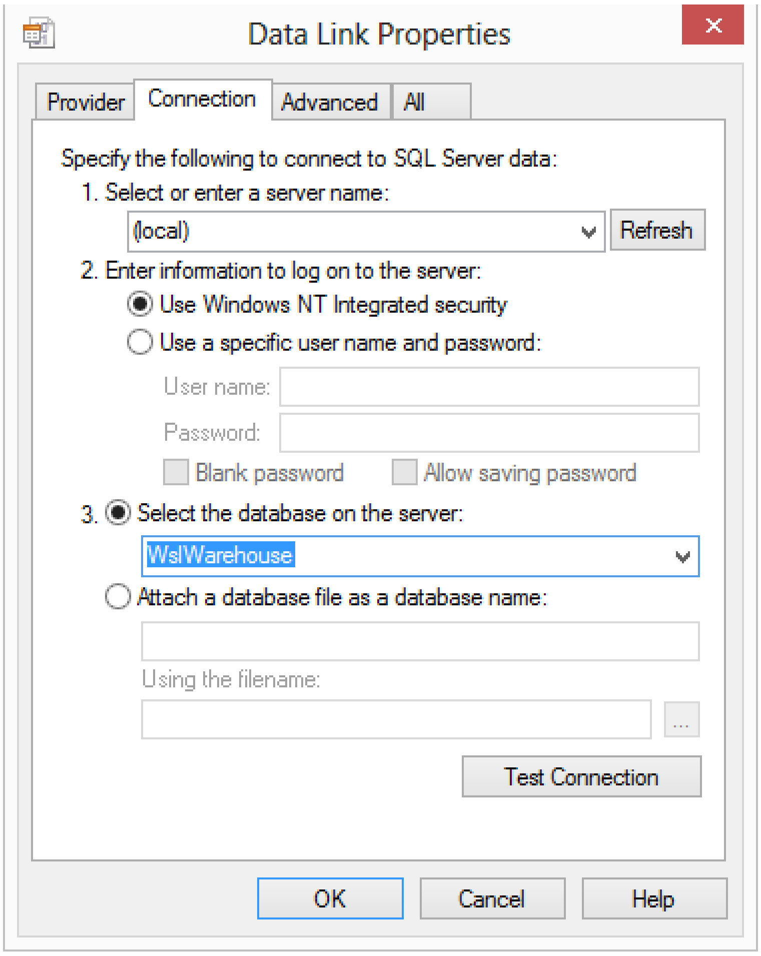
7 On the Provider tab, select the **OLE DB Provider** and click **Next**.



Select the data you want to connect to:

OLE DB Provider(s)
IBM OLE DB Provider for DB2 - DB2COPY1
Microsoft Jet 4.0 OLE DB Provider
Microsoft OLE DB Provider for Analysis Services 11.0
Microsoft OLE DB Provider for ODBC Drivers
Microsoft OLE DB Provider for Oracle
Microsoft OLE DB Provider for Search
Microsoft OLE DB Provider for SQL Server
Microsoft OLE DB Simple Provider
MSDataShape
OLE DB Provider for Microsoft Directory Services
SQL Server Native Client 11.0

8 Enter the connection details and click Test Connection.



Data Link Properties

Specify the following to connect to SQL Server data:

1. Select or enter a server name:

(local)

2. Enter information to log on to the server:

● Use Windows NT Integrated security

○ Use a specific user name and password:

User name:

Password:

□ Blank password □ Allow saving password

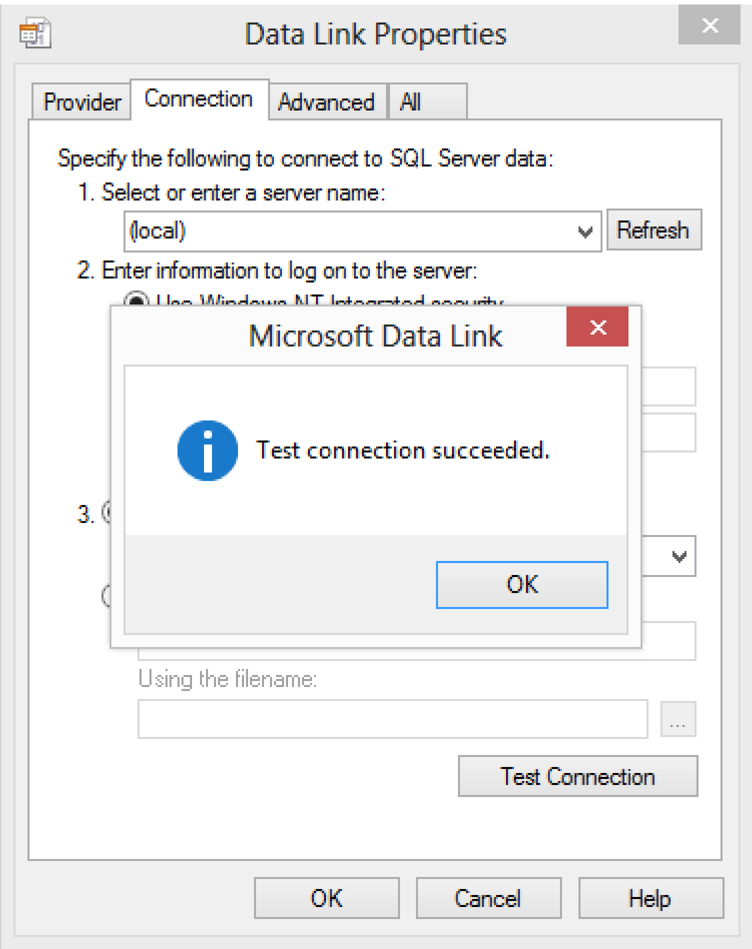
3. ● Select the database on the server:

WslWarehouse

○ Attach a database file as a database name:

Using the filename:

9 Click **OK** on the success message and then **OK** again on the Data Link Properties screen.



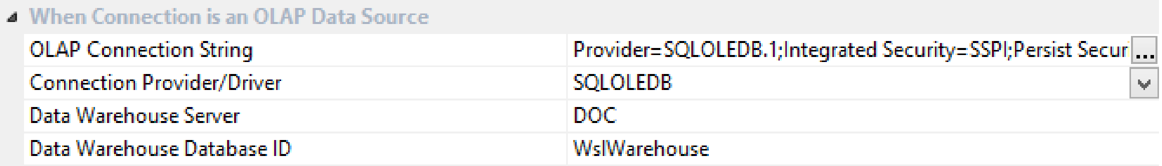
Test connection succeeded.

10 The **OLAP connection string** will be displayed on the connections screen.

11 Set the **Connection Provider/Driver** to *SQLOLEDB*

- Set the **Data Warehouse Server** to the SQL Server *server name*
- Set the **Data Warehouse Database ID** to the SQL Server *database name*

12 A SQL Server sample:



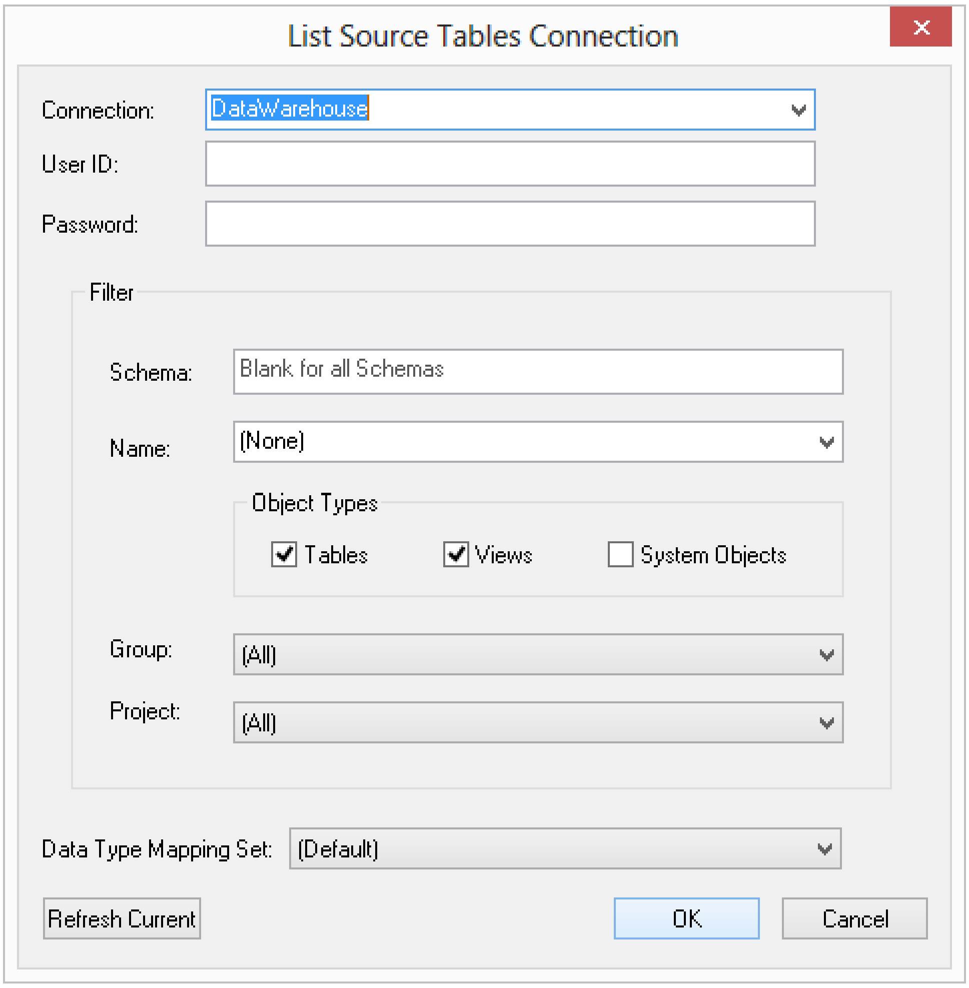
When Connection is an OLAP Data Source

OLAP Connection String	Provider=SQLOLEDB.1;Integrated Security=SSPI;Persist Secur
Connection Provider/Driver	SQLOLEDB
Data Warehouse Server	DOC
Data Warehouse Database ID	WslWarehouse

13 Click **OK**.
See ***Cube Connections for Other Databases*** (see "***5.4 Cube Connections for Other Databases***" on page 184) for more details on Oracle and DB2.

14 Now you need to browse the *DataWarehouse* connection to see available fact tables.

- Right-click **DataWarehouse connection** from the left pane and select **Browse Connection**.



List Source Tables Connection

Connection: DataWarehouse

User ID:

Password:

Filter

Schema: Blank for all Schemas

Name: (None)

Object Types

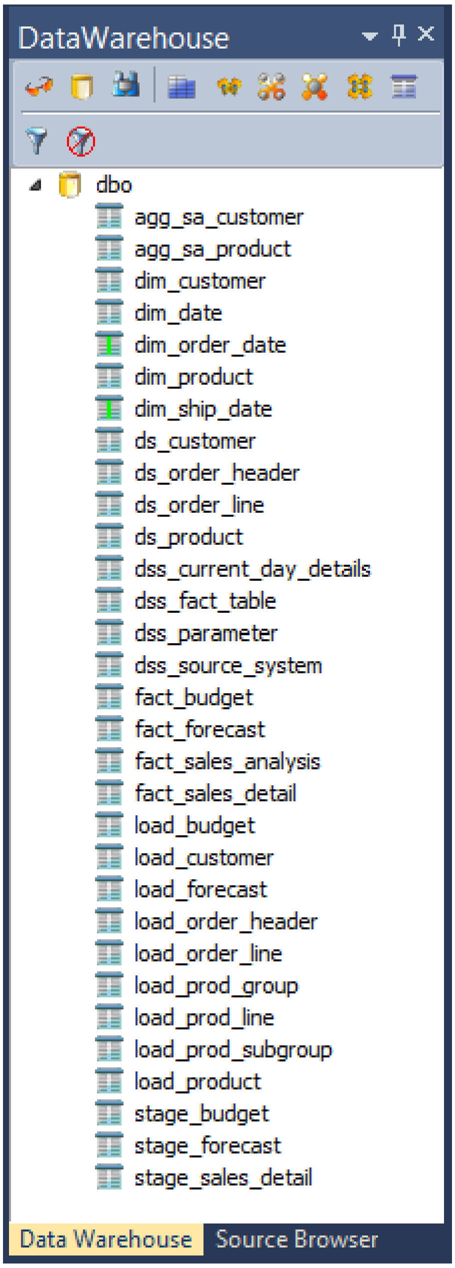
☑ Tables ☑ Views □ System Objects

Group: (All)

Project: (All)

Data Type Mapping Set: (Default)

15 The following browse pane displays on the right.



dbo

agg_sa_customer

agg_sa_product

dim_customer

dim_date

dim_order_date

dim_product

dim_ship_date

ds_customer

ds_order_header

ds_order_line

ds_product

dss_current_day_details

dss_fact_table

dss_parameter

dss_source_system

fact_budget

fact_forecast

fact_sales_analysis

fact_sales_detail

load_budget

load_customer

load_forecast

load_order_header

load_order_line

load_prod_group

load_prod_line

load_prod_subgroup

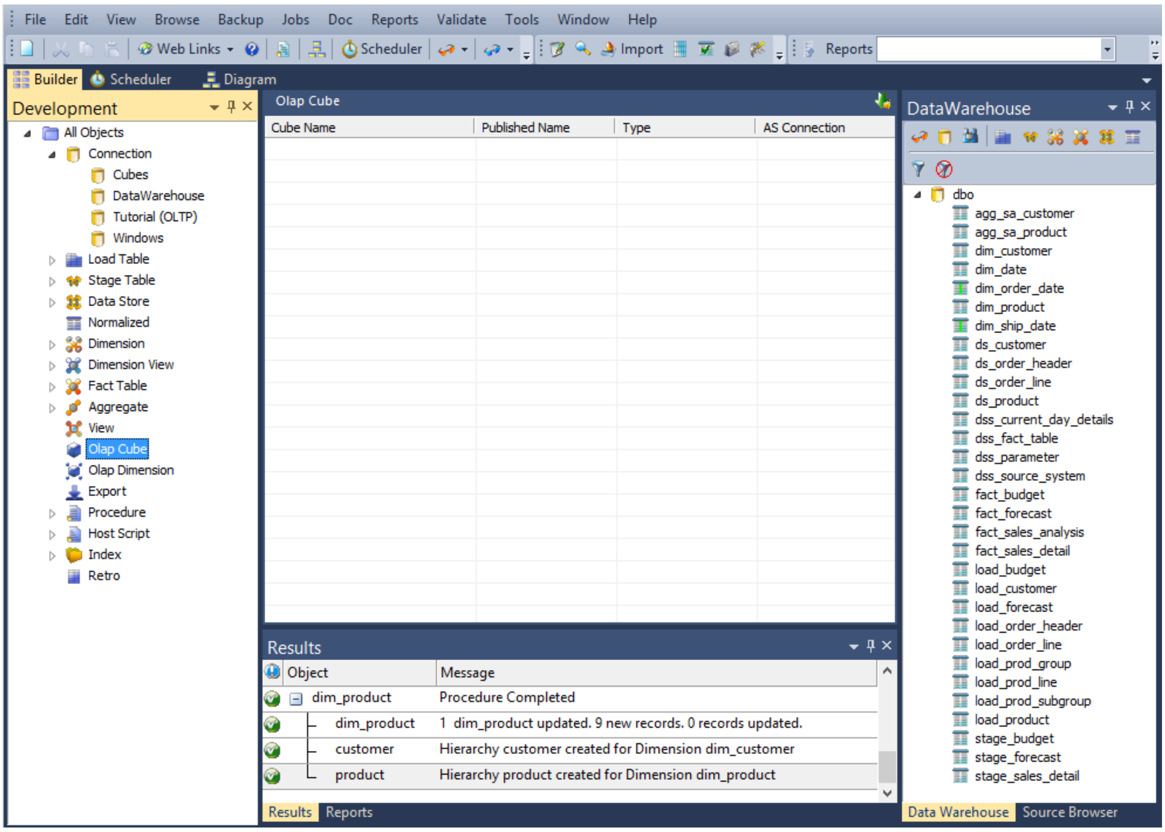
load_product

stage_budget

stage_forecast

stage_sales_detail

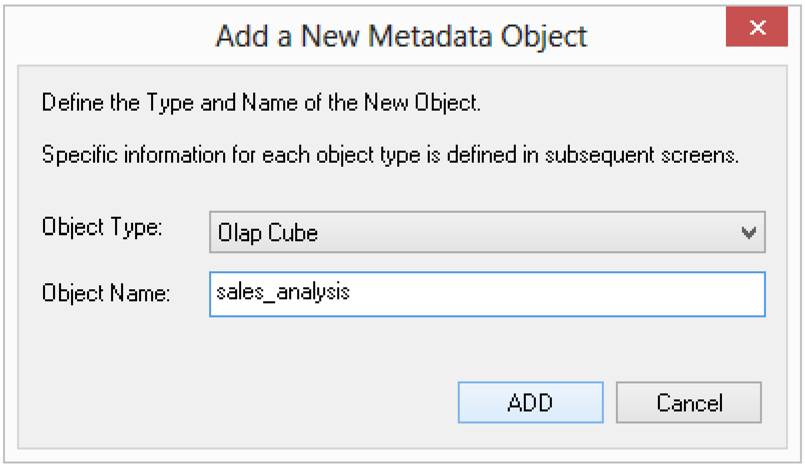
16 Double-click on the **OLAP Cube** object group in the left pane to list all cubes in the middle pane. This makes the middle pane a drop target for cubes. Your screen should look something like this:



Object	Message
dim_product	Procedure Completed
dim_product	1 dim_product updated. 9 new records. 0 records updated.
customer	Hierarchy customer created for Dimension dim_customer
product	Hierarchy product created for Dimension dim_product

Note: As **OLAP Cubes** have not been created yet, the middle pane is empty.

17 Drag **fact_sales_detail** from the browser (right pane) and drop it into the middle to create a new **OLAP Cube** object. Give the OLAP Cube a name of **sales_analysis** as follows and click **ADD**.



Add a New Metadata Object

Define the Type and Name of the New Object.

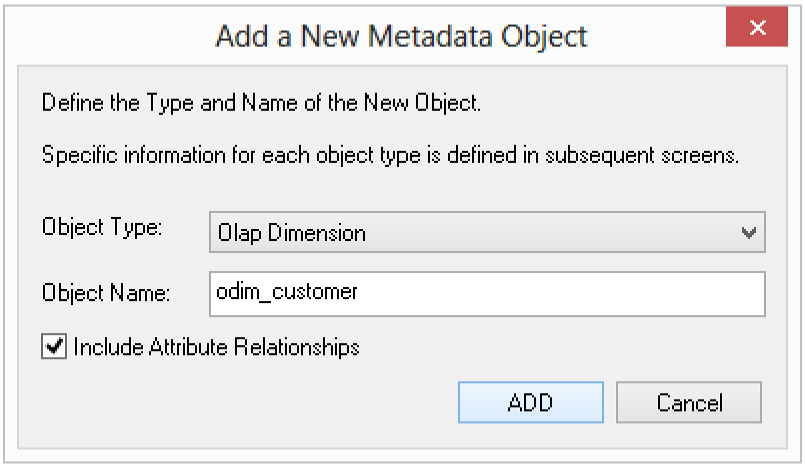
Specific information for each object type is defined in subsequent screens.

Object Type: Olap Cube

Object Name: sales_analysis

18 WhereScape RED will now cycle through each dimension associated with that **fact table** and will create an **OLAP Dimension** object for each, displaying the following dialog first.

- Tick the **Include Attribute relationships** check- box to include Attribute Relationships in Analysis Services for this dimension.
- Click **ADD** for the *Customer* dimension.



Add a New Metadata Object

Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

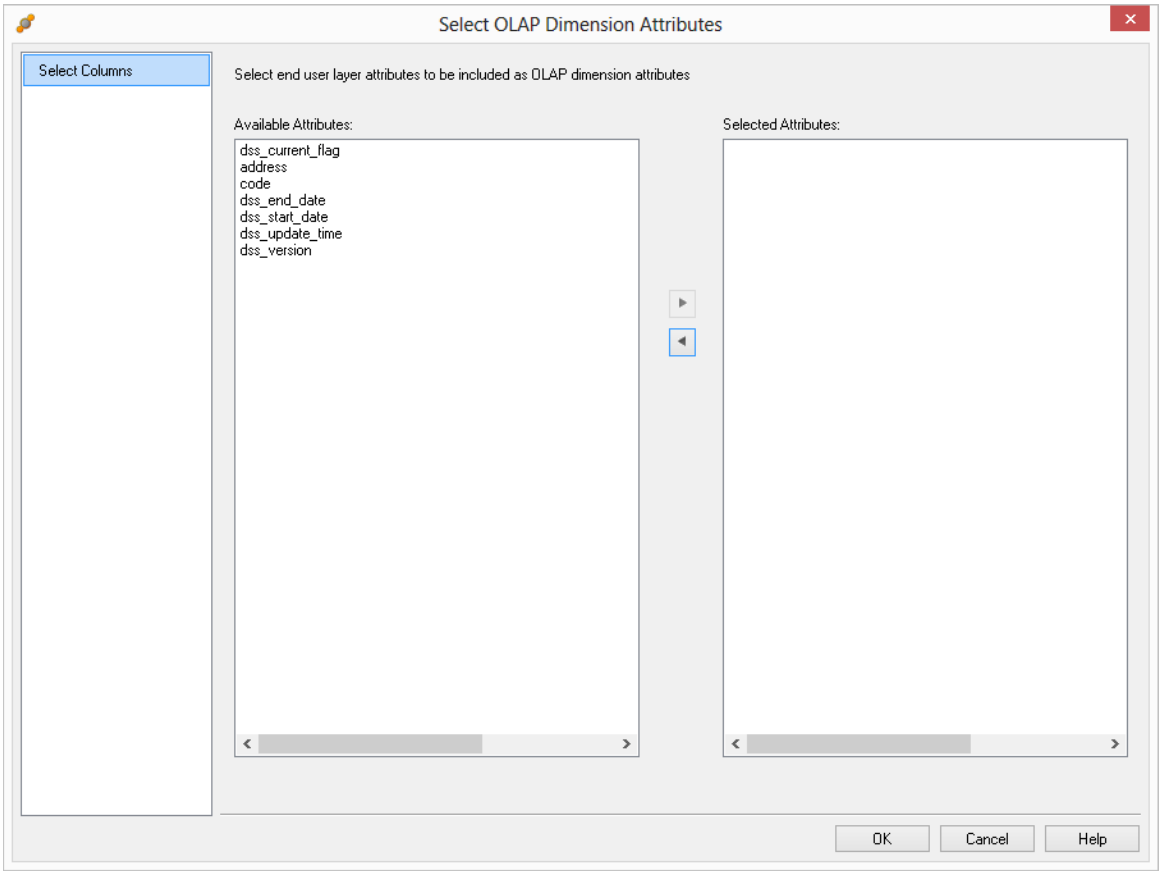
Object Type: Olap Dimension

Object Name: odim_customer

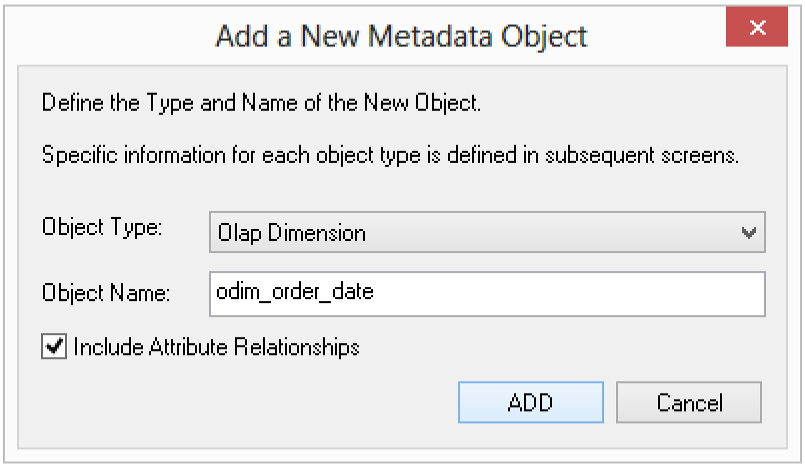
☑ Include Attribute Relationships

19 The following dialog appears, prompting you to select the attributes to be included in the *Customer* OLAP dimension. The attributes available for selection are in the left column. To select an attribute, click on the attribute in the left column and click **>**. This will move the attribute to the right column.

- To de-select an attribute, click on the attribute in the right column and click **<**. This will move the attribute to the left column.



20 Repeat **steps (9) and (10)** for the remaining **OLAP Dimensions.**



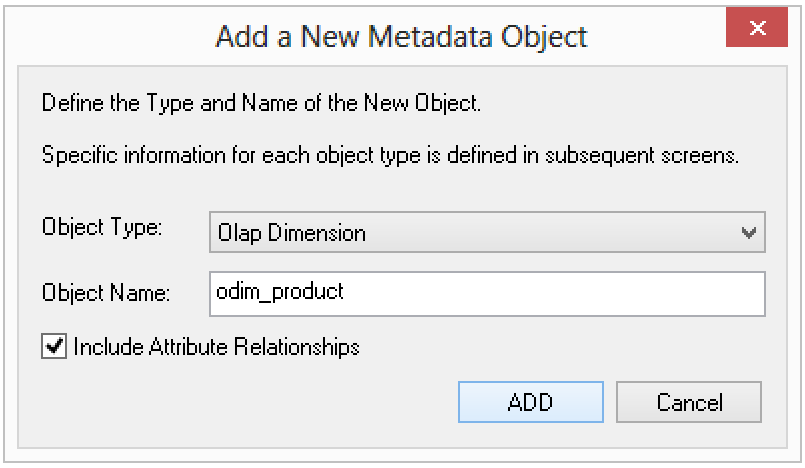
Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Olap Dimension

Object Name: odim_order_date

☑ Include Attribute Relationships



Add a New Metadata Object

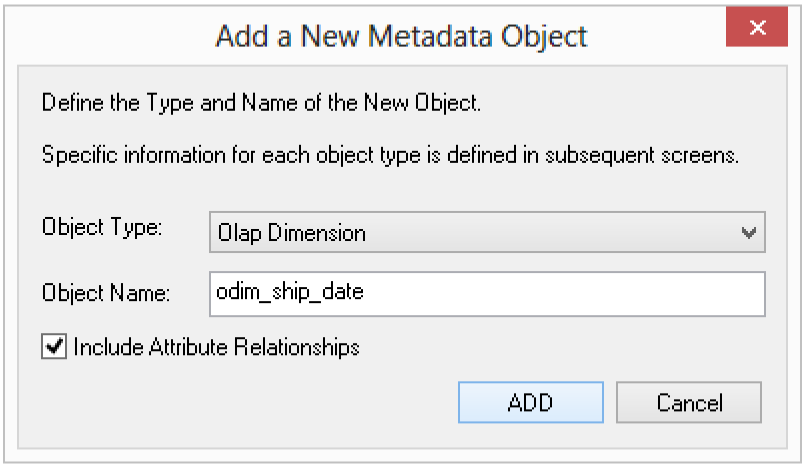
Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Olap Dimension

Object Name: odim_product

☑ Include Attribute Relationships



Add a New Metadata Object

Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Olap Dimension

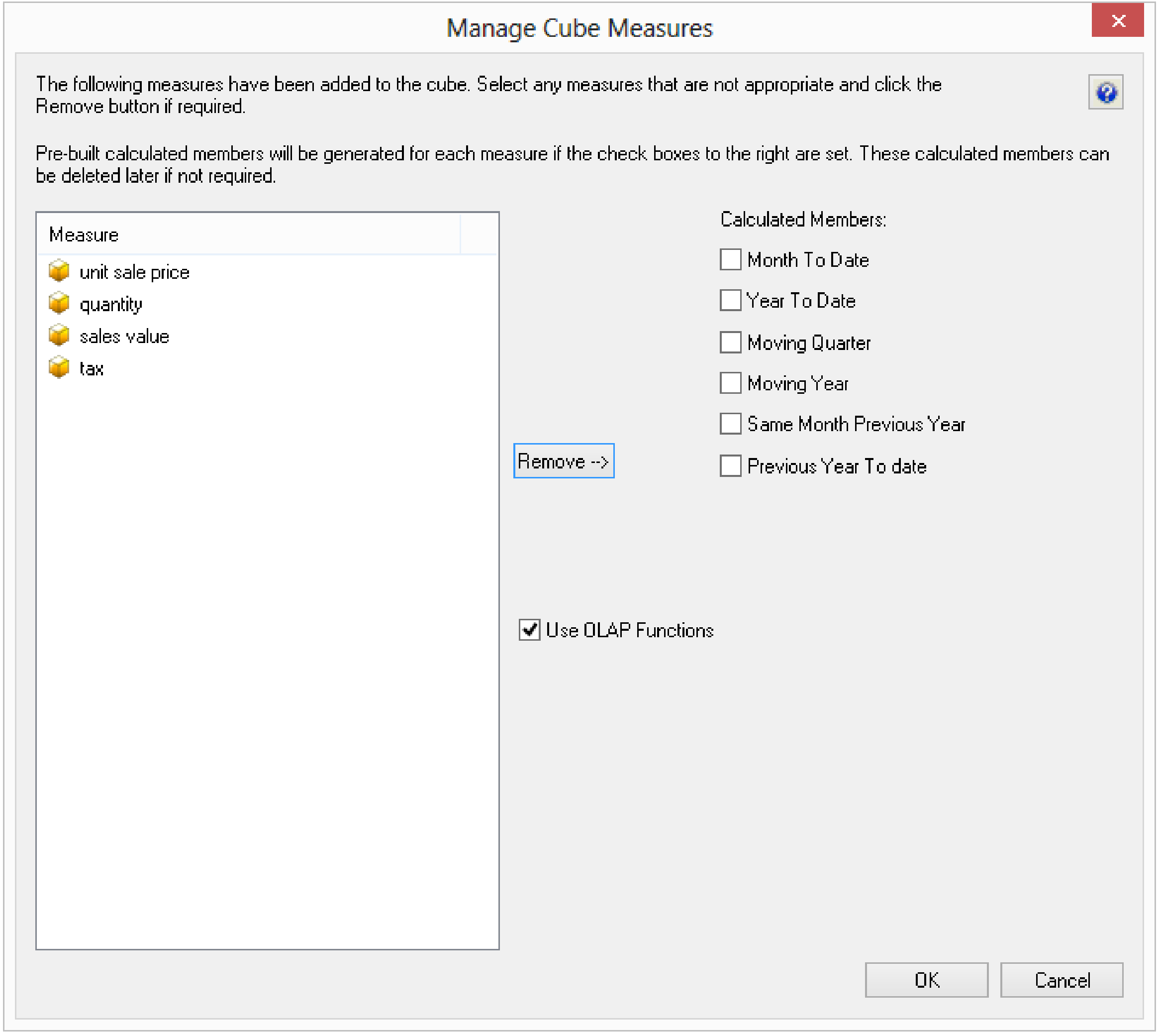
Object Name: odim_ship_date

☑ Include Attribute Relationships

21 The **Manage cube measures** dialog is displayed next. Remove all non-measure columns (that is, columns that cannot be aggregated) from the **Measure** list by highlighting them and clicking the **Remove** button.
The columns to remove are:

- **order number**
- **order line no**
- **product code**
- **customer code**

22 At this stage, your dialog should look like this:



Manage Cube Measures

The following measures have been added to the cube. Select any measures that are not appropriate and click the Remove button if required.

Pre-built calculated members will be generated for each measure if the check boxes to the right are set. These calculated members can be deleted later if not required.

Measure
unit sale price
quantity
sales value
tax

Calculated Members:

- □ Month To Date
- □ Year To Date
- □ Moving Quarter
- □ Moving Year
- □ Same Month Previous Year
- □ Previous Year To date

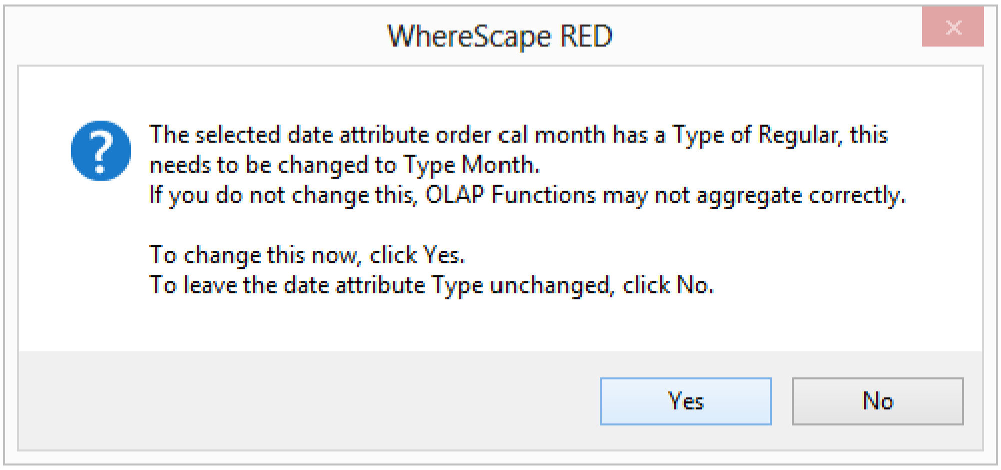
☑ Use OLAP Functions

23 Choose to create some date based calculated members using OLAP functions by selecting the **Month to date**, **Year to date**, and **Use OLAP functions** check-boxes.
The calculated measures drop-downs display below.

24 Select the required **date hierarchy** information. Specifically:

- for **Date Dimension**, select *dim_order_date* and the **Date Hierarchy** will automatically be populated with *calendar*
- for **Month Level**, select *order cal month*

25 After selecting the **Month level**, you will be asked to confirm changing the **attribute type** to **Months** for the the *order cal month* attribute in Analysis Services as follows. Click **Yes**.

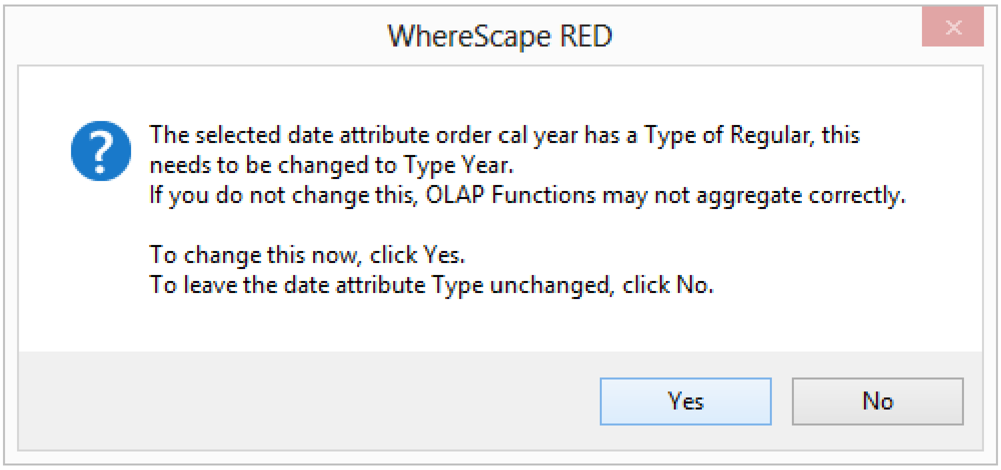


The selected date attribute order cal month has a Type of Regular, this needs to be changed to Type Month.
If you do not change this, OLAP Functions may not aggregate correctly.

To change this now, click Yes.
To leave the date attribute Type unchanged, click No.

26 For **Year Level**, select *order cal year*.

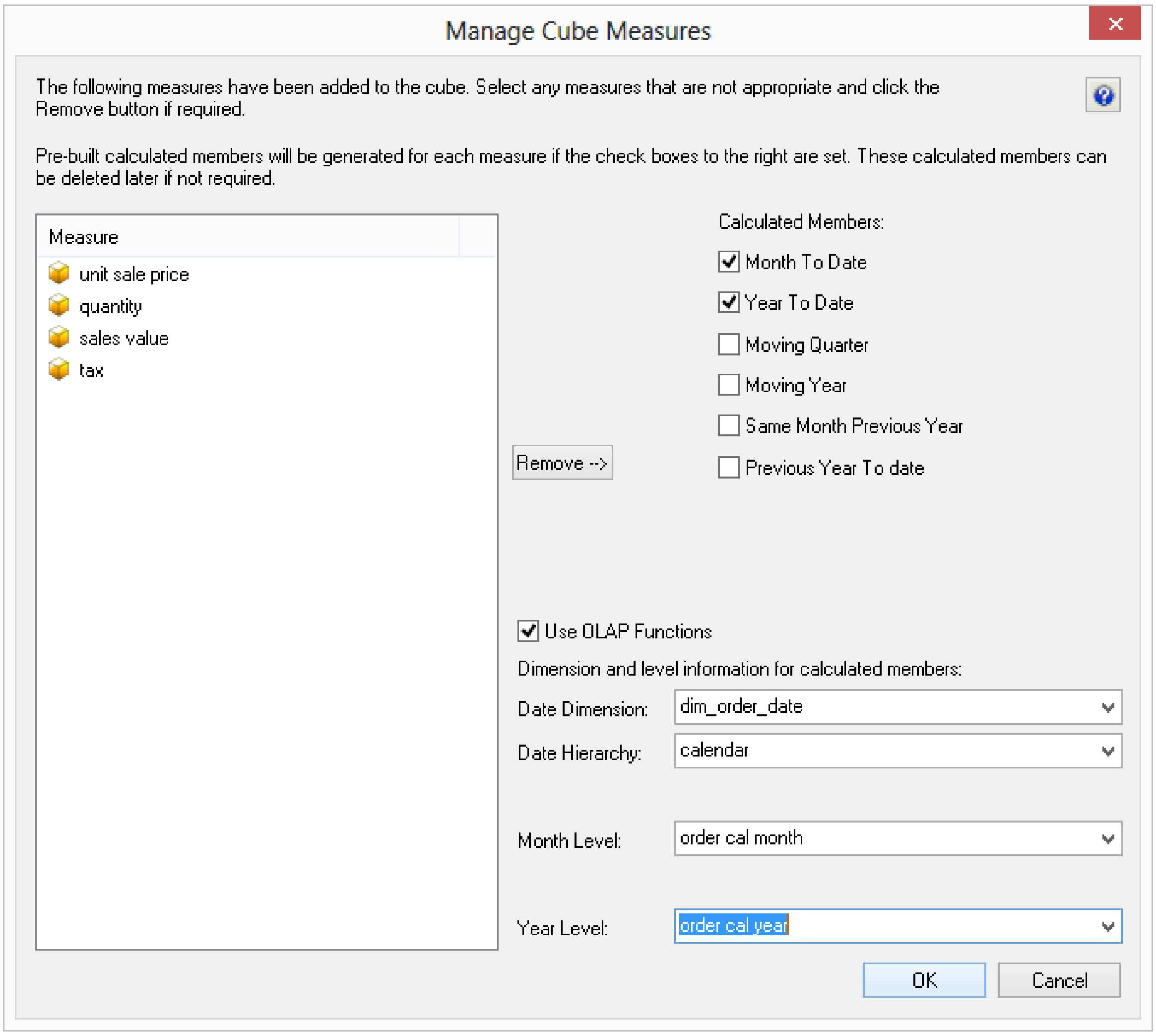
- Similarly, selecting the **Year level**, you will be asked to confirm changing the **attribute type** to *Years* for the the *order cal year* attribute in Analysis Services as follows. Again click **Yes**.



The selected date attribute order cal year has a Type of Regular, this needs to be changed to Type Year.
If you do not change this, OLAP Functions may not aggregate correctly.

To change this now, click Yes.
To leave the date attribute Type unchanged, click No.

27 Your **Manage cube measures** dialog should now look like this. Click **OK** to complete the definition of the cube.



Manage Cube Measures

The following measures have been added to the cube. Select any measures that are not appropriate and click the Remove button if required.

Pre-built calculated members will be generated for each measure if the check boxes to the right are set. These calculated members can be deleted later if not required.

Measure
unit sale price
quantity
sales value
tax

Calculated Members:

☑ Month To Date

☑ Year To Date

☐ Moving Quarter

☐ Moving Year

☐ Same Month Previous Year

☐ Previous Year To date

☑ Use OLAP Functions

Dimension and level information for calculated members:

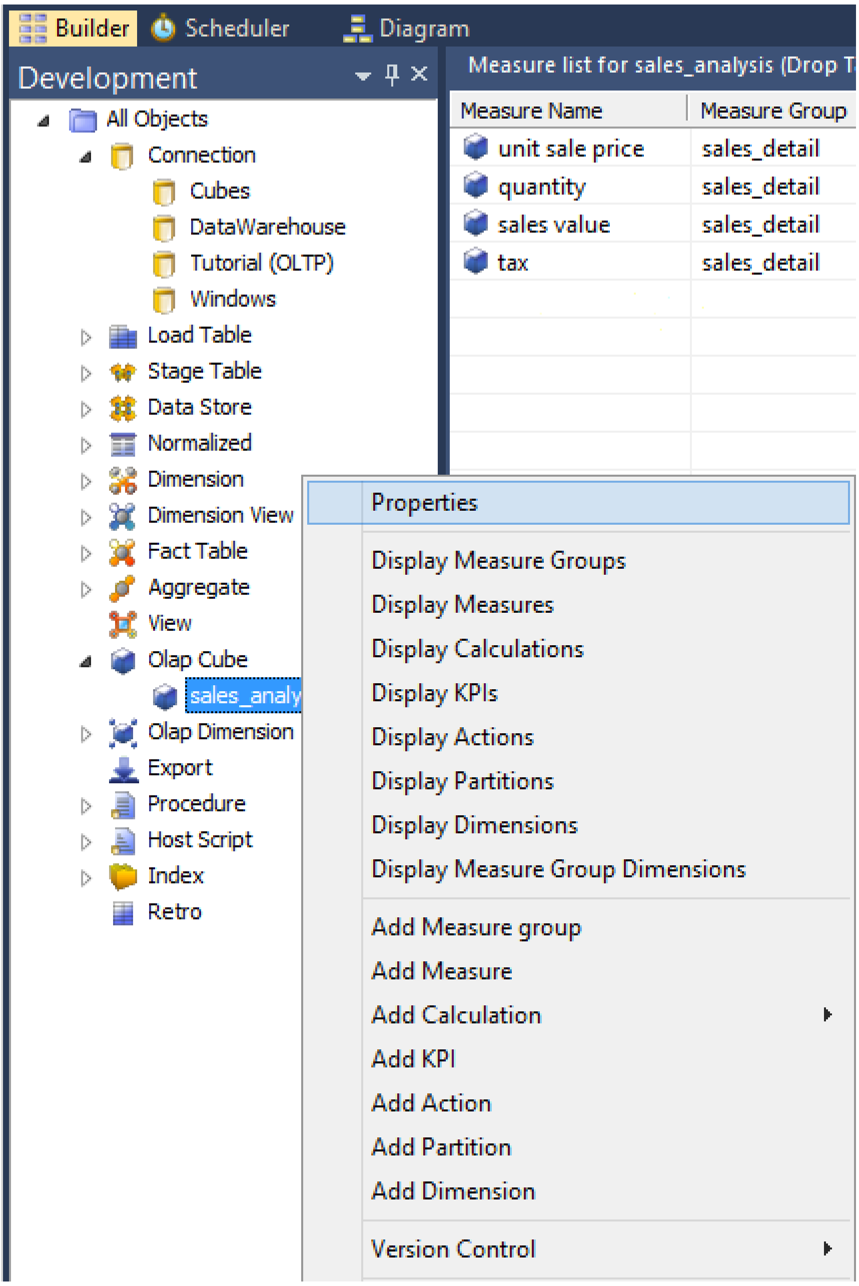
Date Dimension: dim_order_date

Date Hierarchy: calendar

Month Level: order cal month

Year Level: order cal year

28 Right-click on the OLAP Cube **sales_analysis** in the left pane and select **Properties.**

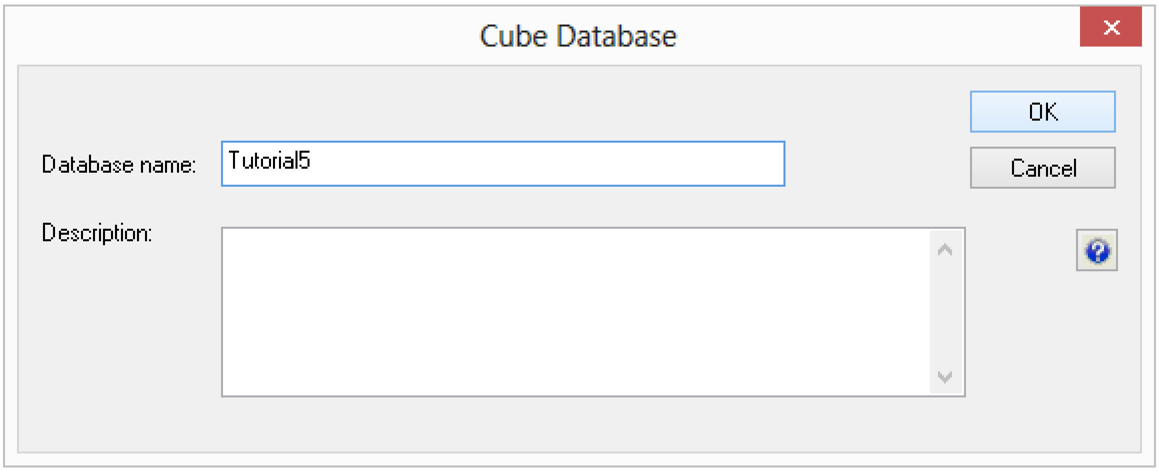


Measure list for sales_analysis (Drop T

Measure Name	Measure Group
unit sale price	sales_detail
quantity	sales_detail
sales value	sales_detail
tax	sales_detail

29 Click on the drop-down list for the **Cube Database name** field and select the option **(Define New Cube Database).**

30 This will bring up the **Cube database** dialog box. Enter a new cube Database name of **Tutorial5**. Click **OK.**



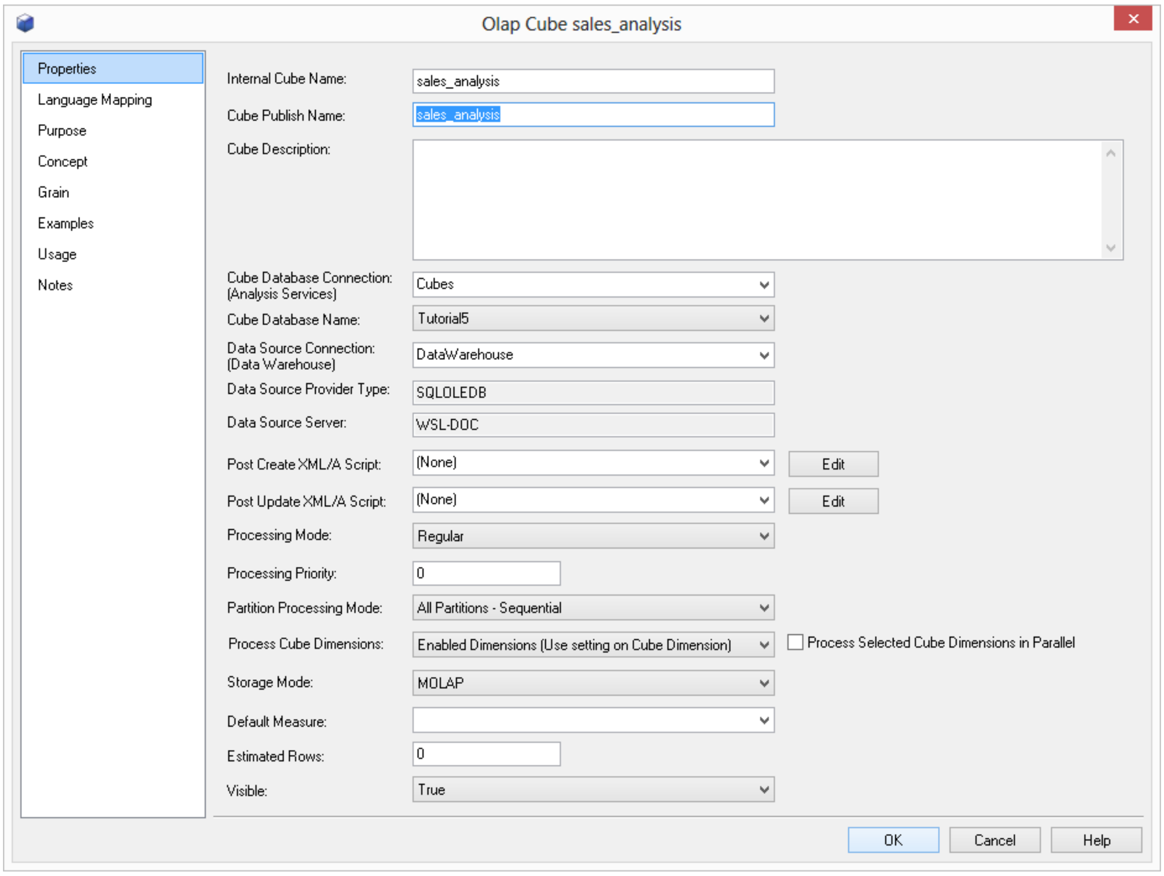
Cube Database

Database name: Tutorial5

Description:

31 Change the Cube publish name to be **sales_analysis** and ensure the **Cube database connection** is Cubes and the **Cube Database Name** is Tutorial5.

- Click **OK** to close the dialog and save the changes you've made.



Olap Cube sales_analysis

Internal Cube Name: sales_analysis

Cube Publish Name: sales_analysis

Cube Description:

Cube Database Connection: (Analysis Services) Cubes

Cube Database Name: Tutorial5

Data Source Connection: (Data Warehouse) DataWarehouse

Data Source Provider Type: SQLOLEDB

Data Source Server: WSL-DOC

Post Create XML/A Script: (None)

Post Update XML/A Script: (None)

Processing Mode: Regular

Processing Priority: 0

Partition Processing Mode: All Partitions - Sequential

Process Cube Dimensions: Enabled Dimensions (Use setting on Cube Dimension)

□ Process Selected Cube Dimensions in Parallel

Storage Mode: MOLAP

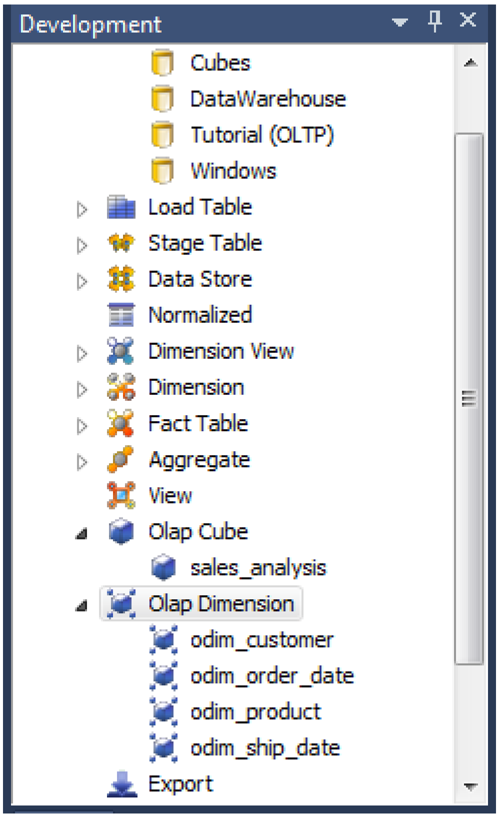
Default Measure:

Estimated Rows: 0

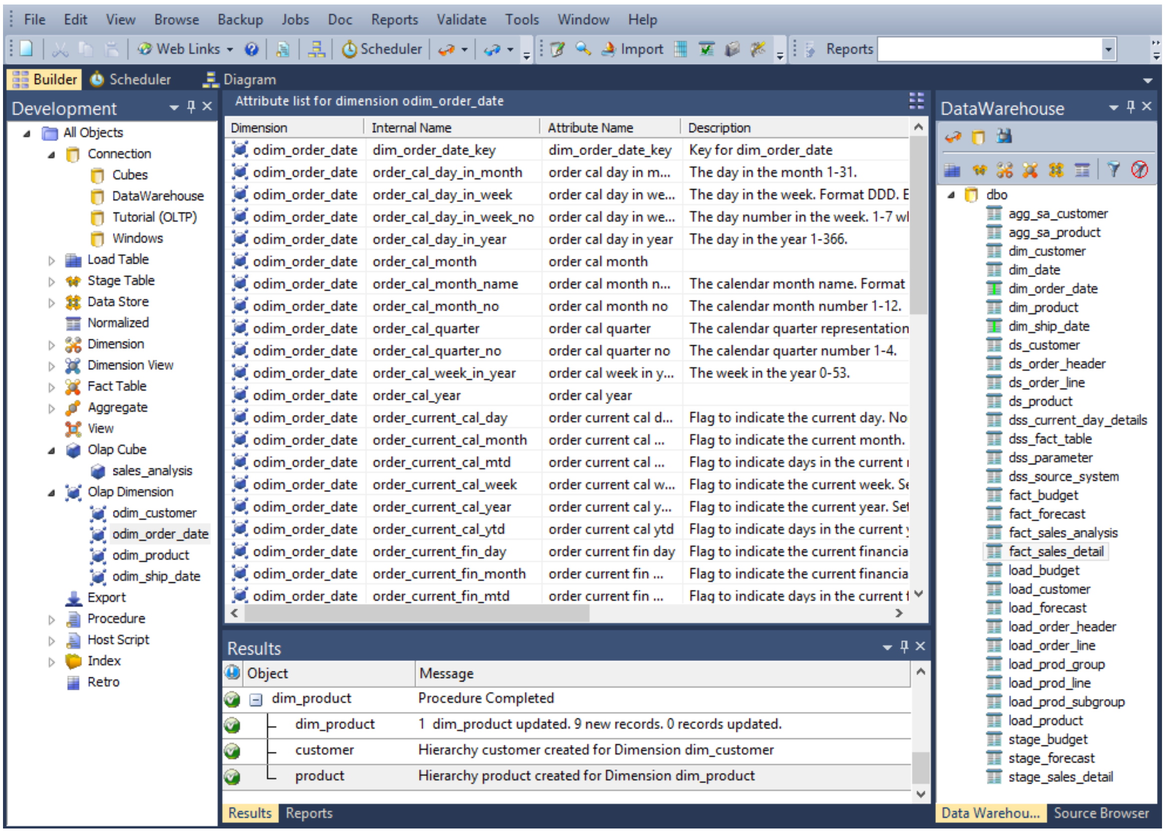
Visible: True

32 Now you need to check that the date dimension supports using OLAP functions.

- Expand the **OLAP Dimension** object type in the left pane to display the four **OLAP Dimensions**.
- Your object tree should contain the following **OLAP Dimensions.**



33 Click on the **odim_order_date** OLAP Dimension in the left pane to show the dimension attributes in the middle pane as below.



Attribute list for dimension odim_order_date

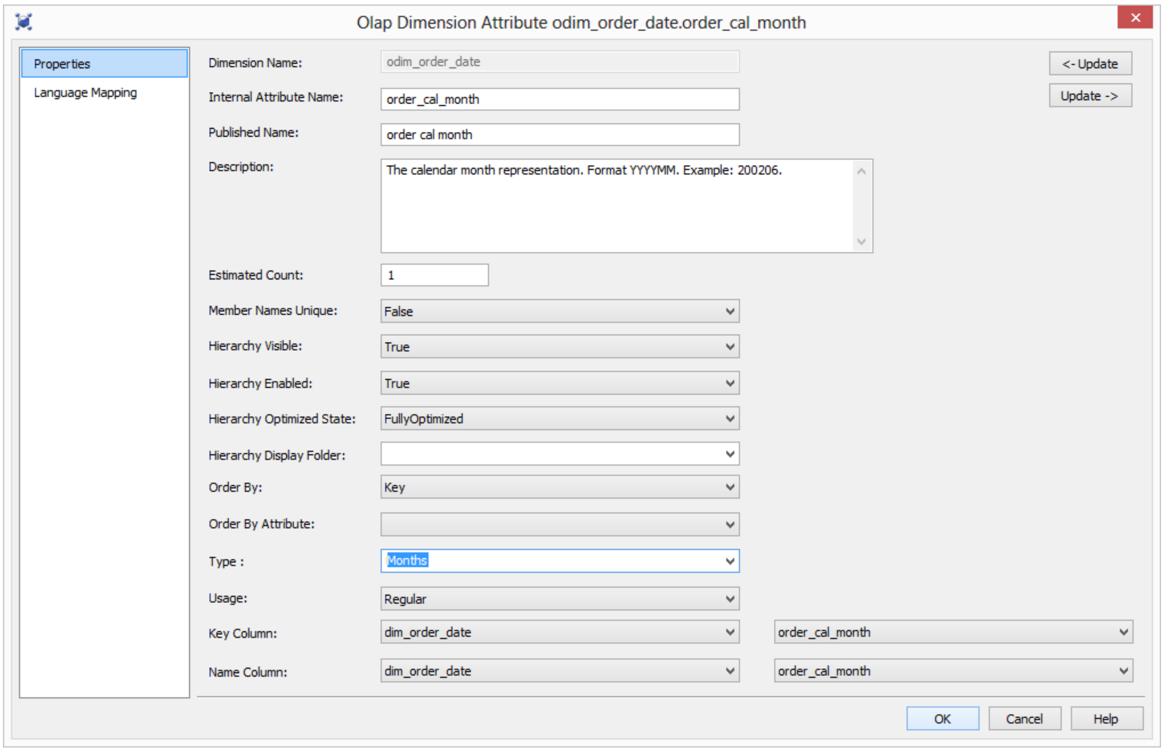
Dimension	Internal Name	Attribute Name	Description
odim_order_date	dim_order_date_key	dim_order_date_key	Key for dim_order_date
odim_order_date	order_cal_day_in_month	order cal day in m...	The day in the month 1-31.
odim_order_date	order_cal_day_in_week	order cal day in we...	The day in the week. Format DDD. E
odim_order_date	order_cal_day_in_week_no	order cal day in we...	The day number in the week. 1-7 wl
odim_order_date	order_cal_day_in_year	order cal day in year	The day in the year 1-366.
odim_order_date	order_cal_month	order cal month	
odim_order_date	order_cal_month_name	order cal month n...	The calendar month name. Format
odim_order_date	order_cal_month_no	order cal month no	The calendar month number 1-12.
odim_order_date	order_cal_quarter	order cal quarter	The calendar quarter representation
odim_order_date	order_cal_quarter_no	order cal quarter no	The calendar quarter number 1-4.
odim_order_date	order_cal_week_in_year	order cal week in y...	The week in the year 0-53.
odim_order_date	order_cal_year	order cal year	
odim_order_date	order_current_cal_day	order current cal d...	Flag to indicate the current day. No
odim_order_date	order_current_cal_month	order current cal ...	Flag to indicate the current month.
odim_order_date	order_current_cal_mtd	order current cal ...	Flag to indicate days in the current i
odim_order_date	order_current_cal_week	order current cal w...	Flag to indicate the current week. Se
odim_order_date	order_current_cal_year	order current cal y...	Flag to indicate the current year. Set
odim_order_date	order_current_cal_ytd	order current cal ytd	Flag to indicate days in the current y
odim_order_date	order_current_fin_day	order current fin day	Flag to indicate the current financia
odim_order_date	order_current_fin_month	order current fin ...	Flag to indicate the current financia
odim_order_date	order_current_fin_mtd	order current fin ...	Flag to indicate days in the current f

Results

Object	Message
dim_product	Procedure Completed
dim_product	1 dim_product updated. 9 new records. 0 records updated.
customer	Hierarchy customer created for Dimension dim_customer
product	Hierarchy product created for Dimension dim_product

34 Right-click on the **order_cal_month** attribute and select **Properties**.

- This displays the Attribute Properties dialog. Check the **Type** is set to **Months**. If not, change it. Click **OK**.



Olap Dimension Attribute odim_order_date.order_cal_month

Dimension Name: odim_order_date

Internal Attribute Name: order_cal_month

Published Name: order cal month

Description: The calendar month representation. Format YYYYMM. Example: 200206.

Estimated Count: 1

Member Names Unique: False

Hierarchy Visible: True

Hierarchy Enabled: True

Hierarchy Optimized State: FullyOptimized

Hierarchy Display Folder:

Order By: Key

Order By Attribute:

Type : Months

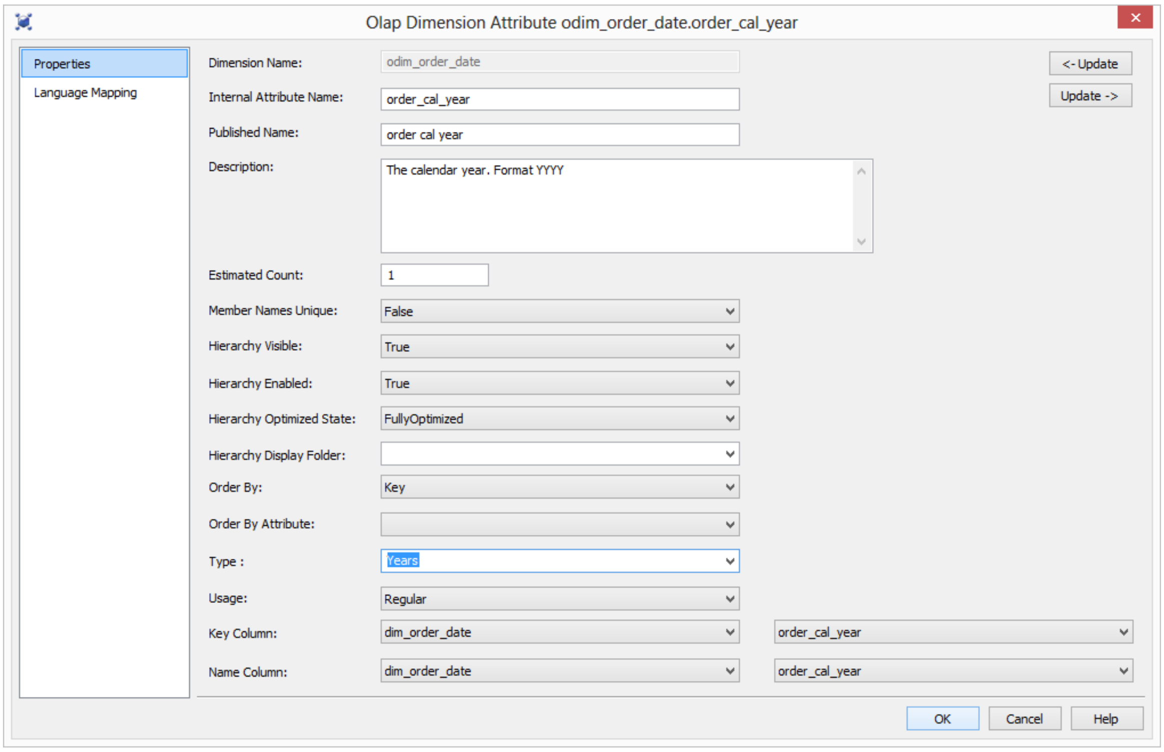
Usage: Regular

Key Column: dim_order_date order_cal_month

Name Column: dim_order_date order_cal_month

35 Repeat the process for the **order_cal_year** attribute, checking the **Type** is set to the **Years** and changing it if it is not.

- Click **OK**.



Olap Dimension Attribute odim_order_date.order_cal_year

Dimension Name: odim_order_date

Internal Attribute Name: order_cal_year

Published Name: order cal year

Description: The calendar year. Format YYYY

Estimated Count: 1

Member Names Unique: False

Hierarchy Visible: True

Hierarchy Enabled: True

Hierarchy Optimized State: FullyOptimized

Hierarchy Display Folder:

Order By: Key

Order By Attribute:

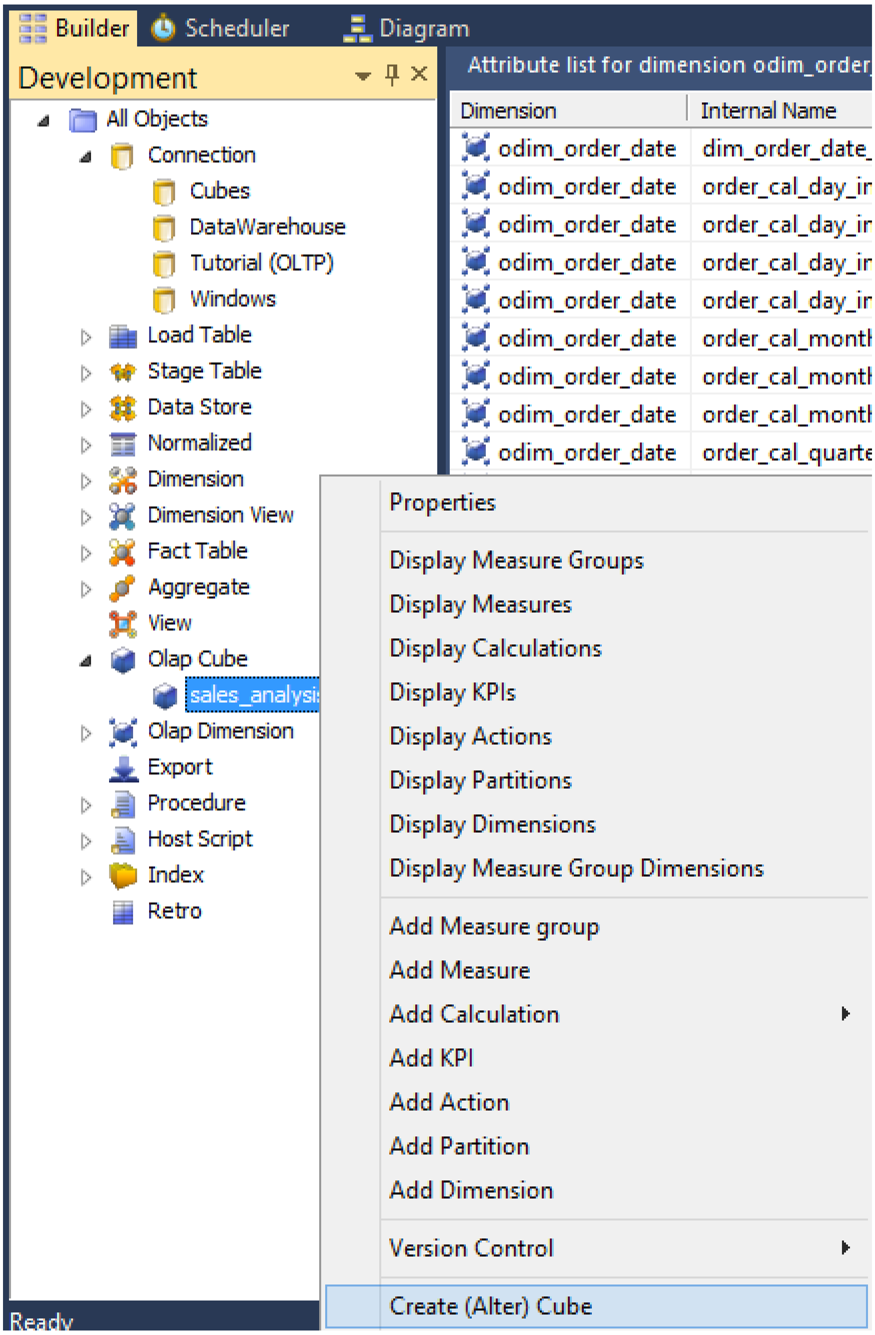
Type : Years

Usage: Regular

Key Column: dim_order_date order_cal_year

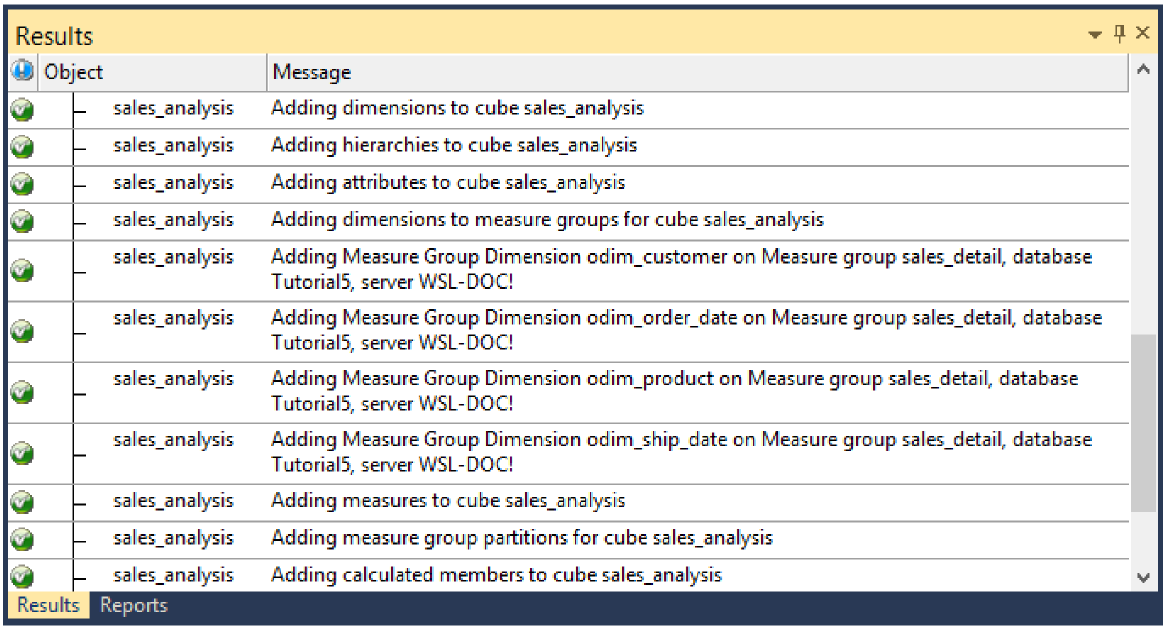
Name Column: dim_order_date order_cal_year

36 To create the cube in Analysis Services, right-click on the **sales_analysis** olap cube in the left pane and select **Create (Alter) Cube**.



Dimension	Internal Name
odim_order_date	dim_order_date_
odim_order_date	order_cal_day_ir
odim_order_date	order_cal_day_ir
odim_order_date	order_cal_day_ir
odim_order_date	order_cal_day_ir
odim_order_date	order_cal_montl
odim_order_date	order_cal_montl
odim_order_date	order_cal_montl
odim_order_date	order_cal_quarte

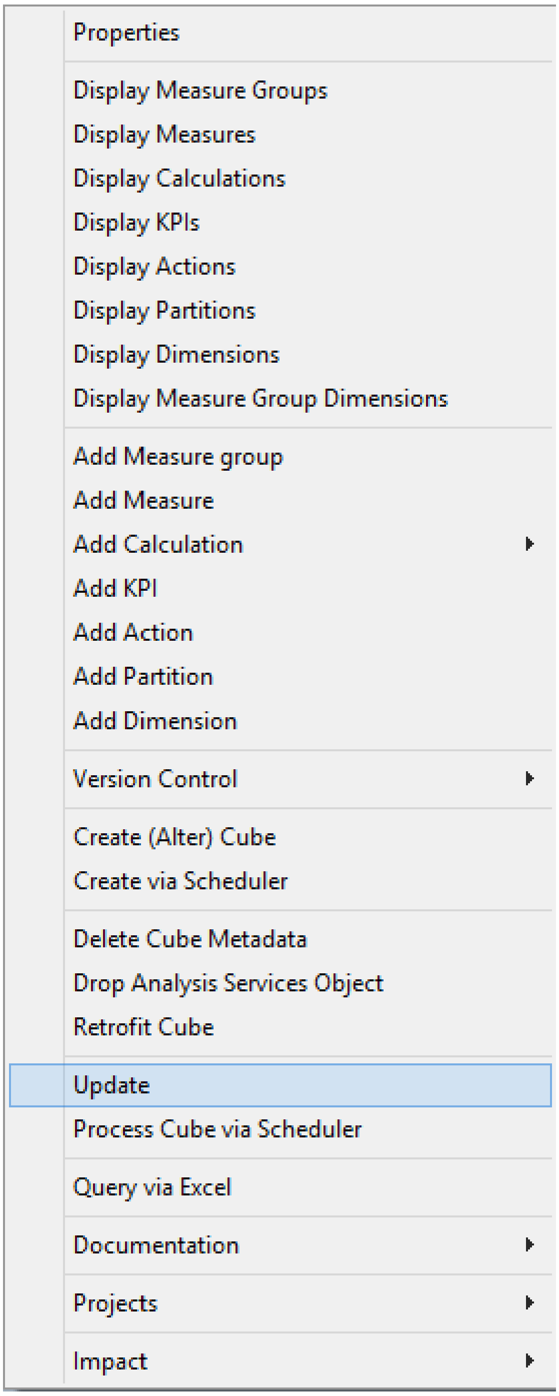
37 This will open the WSL Cube executable that connects to Analysis Services to create the *sales_analysis* cube structure.
You will see the successful completion in the results pane.



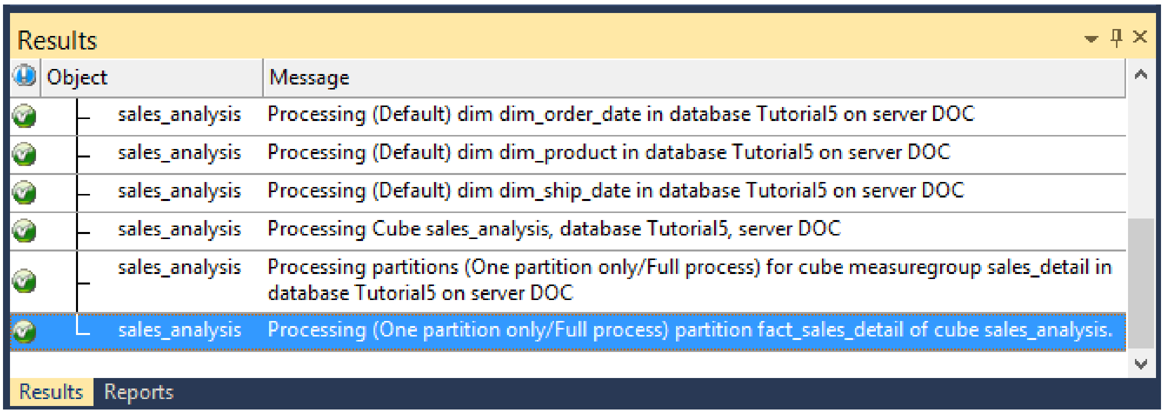
Results

	Object	Message
✓	sales_analysis	Adding dimensions to cube sales_analysis
✓	sales_analysis	Adding hierarchies to cube sales_analysis
✓	sales_analysis	Adding attributes to cube sales_analysis
✓	sales_analysis	Adding dimensions to measure groups for cube sales_analysis
✓	sales_analysis	Adding Measure Group Dimension odim_customer on Measure group sales_detail, database Tutorial5, server WSL-DOC!
✓	sales_analysis	Adding Measure Group Dimension odim_order_date on Measure group sales_detail, database Tutorial5, server WSL-DOC!
✓	sales_analysis	Adding Measure Group Dimension odim_product on Measure group sales_detail, database Tutorial5, server WSL-DOC!
✓	sales_analysis	Adding Measure Group Dimension odim_ship_date on Measure group sales_detail, database Tutorial5, server WSL-DOC!
✓	sales_analysis	Adding measures to cube sales_analysis
✓	sales_analysis	Adding measure group partitions for cube sales_analysis
✓	sales_analysis	Adding calculated members to cube sales_analysis

38 To process the cube *sales_analysis* in Analysis Services right-click the **sales_analysis** cube in the left pane and select **Update.**

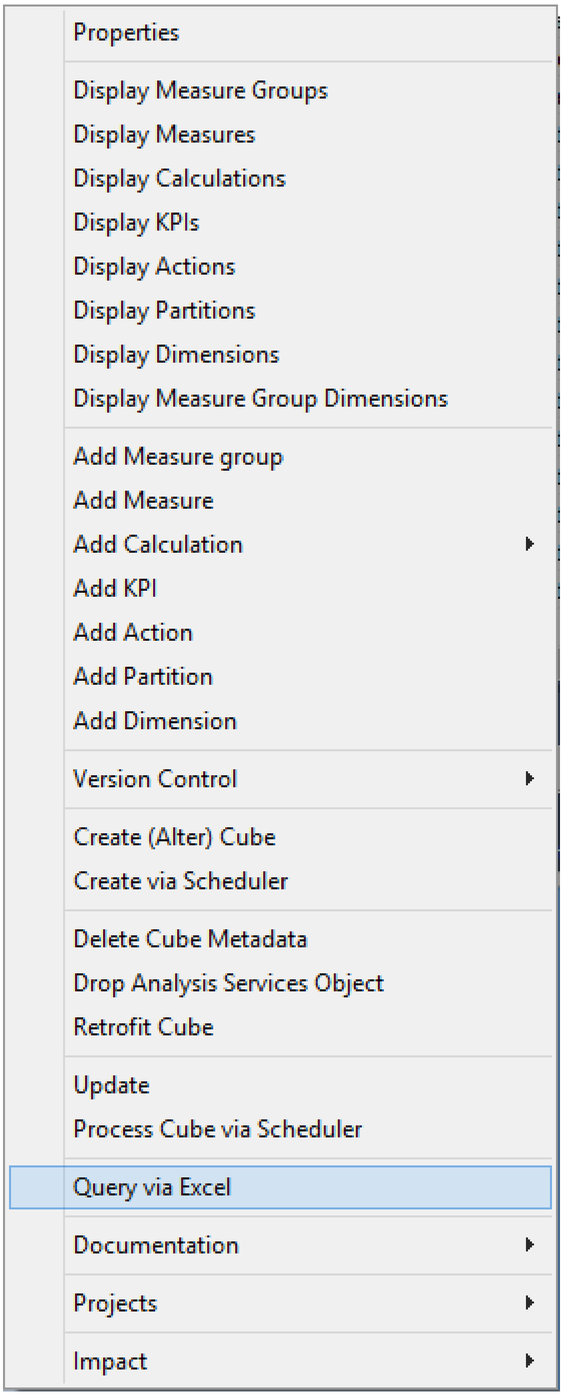


39 This will open the WSL Cube executable to process data into the cube structure. Once the cube is processed it can be viewed. Again, you will see the successful completion in the results pane.



	Object	Message
✓	sales_analysis	Processing (Default) dim dim_order_date in database Tutorial5 on server DOC
✓	sales_analysis	Processing (Default) dim dim_product in database Tutorial5 on server DOC
✓	sales_analysis	Processing (Default) dim dim_ship_date in database Tutorial5 on server DOC
✓	sales_analysis	Processing Cube sales_analysis, database Tutorial5, server DOC
✓	sales_analysis	Processing partitions (One partition only/Full process) for cube measuregroup sales_detail in database Tutorial5 on server DOC
✓	sales_analysis	Processing (One partition only/Full process) partition fact_sales_detail of cube sales_analysis.

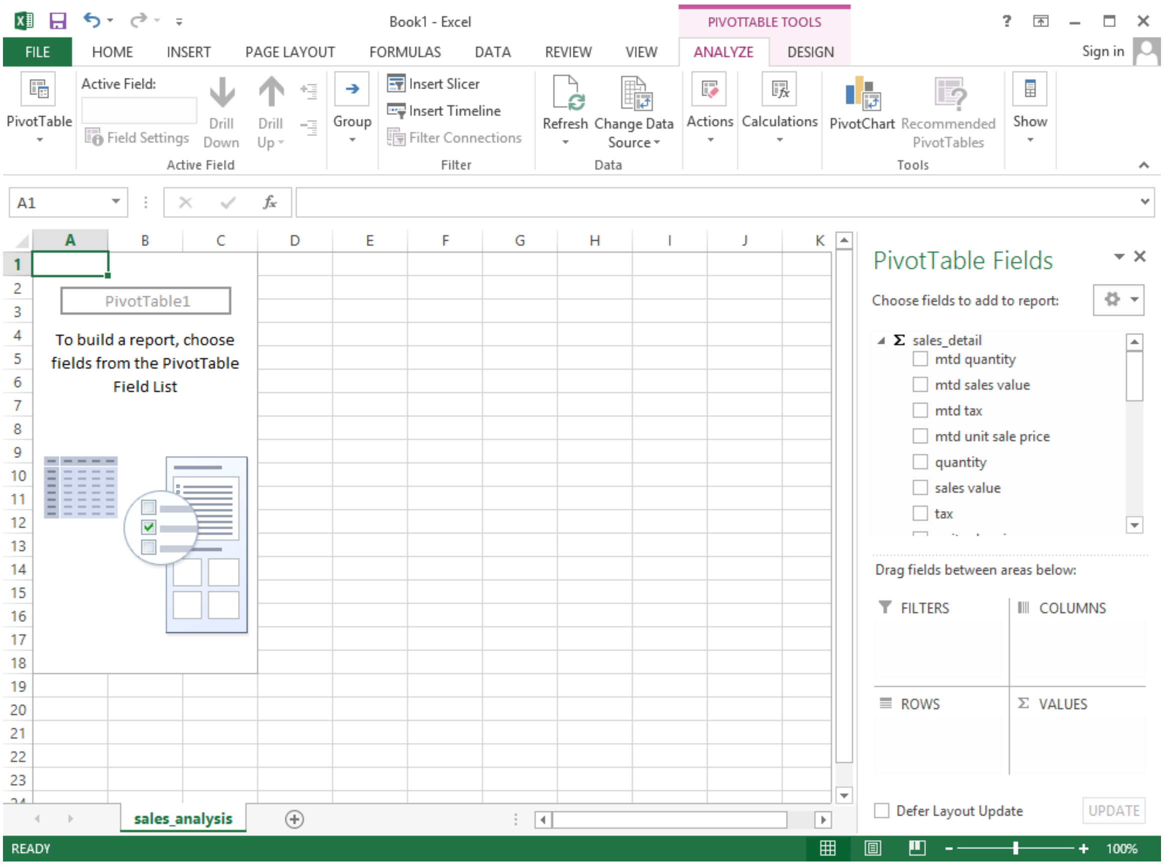
40 To view the cube in Excel right-click the **sales_analysis** cube in the left pane and select **Query cube Via Excel** as follows.



41 This will open Excel if it is installed.

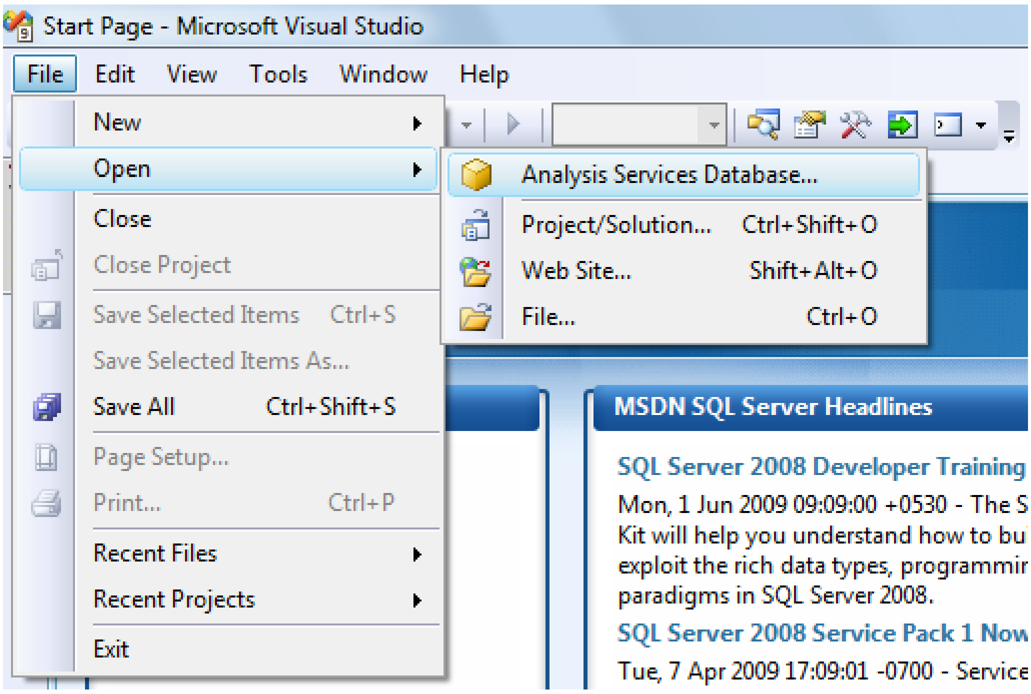
Note: If Excel displays a security notice dialog box, click **Enable.**
However, note that this dialog box may not be displayed.

42 Excel then opens a connection to the cube for querying in a pivot table:



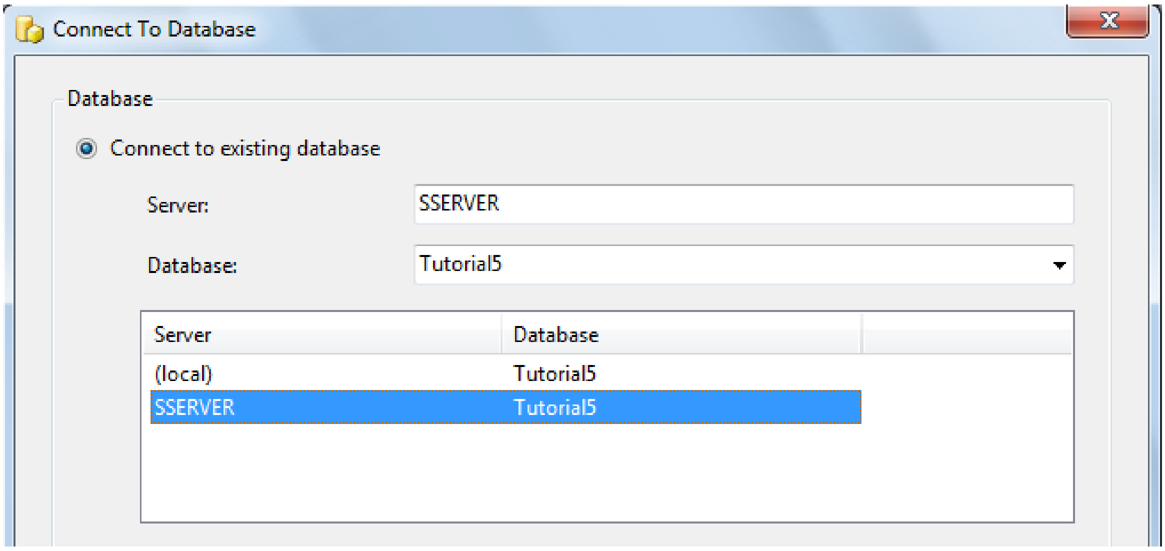
Note: In order for Excel to open the cube the **OQY** file extension in Windows explorer needs to be associated with Excel.

43 In addition, the cube structure can be opened in the Microsoft Business Intelligence Development Studio (BIDS). Open **BIDS** in Windows, then select **Open / Analysis Services Database**.



Start Page - Microsoft Visual Studio
File
Edit
View
Tools
Window
Help
New
Open
Close
Close Project
Save Selected Items Ctrl+S
Save Selected Items As...
Save All Ctrl+Shift+S
Page Setup...
Print... Ctrl+P
Recent Files
Recent Projects
Exit
Analysis Services Database...
Project/Solution... Ctrl+Shift+O
Web Site... Shift+Alt+O
File... Ctrl+O
MSDN SQL Server Headlines
SQL Server 2008 Developer Training
Mon, 1 Jun 2009 09:09:00 +0530 - The S
Kit will help you understand how to bu
exploit the rich data types, programmir
paradigms in SQL Server 2008.
SQL Server 2008 Service Pack 1 Now
Tue, 7 Apr 2009 17:09:01 -0700 - Service

44 Choose the server and Tutorial5 cube database. A sample is shown. Click **OK**.



Connect To Database

Database

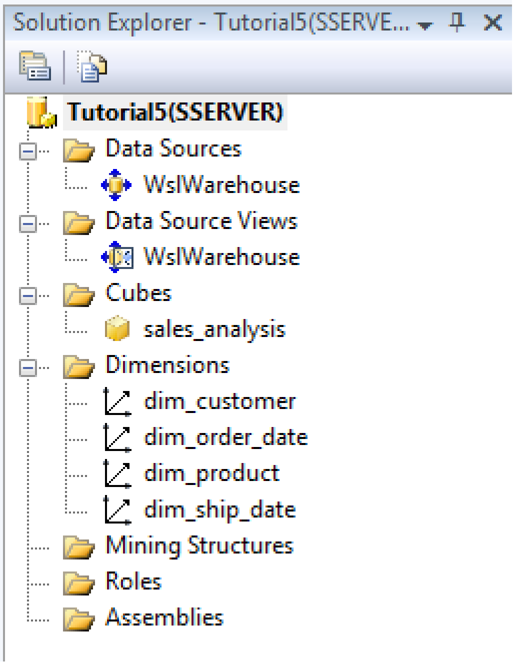
● Connect to existing database

Server: SSERVER

Database: Tutorial5

Server	Database
(local)	Tutorial5
SSERVER	Tutorial5

45 This now displays the cube database definition from the Analysis Services server.



Solution Explorer - Tutorial5(SSERVE...

- Tutorial5(SSERVER)
  - Data Sources
    - WslWarehouse
  - Data Source Views
    - WslWarehouse
  - Cubes
    - sales_analysis
  - Dimensions
    - dim_customer
    - dim_order_date
    - dim_product
    - dim_ship_date
  - Mining Structures
  - Roles
  - Assemblies

46 Close BIDS when finished.

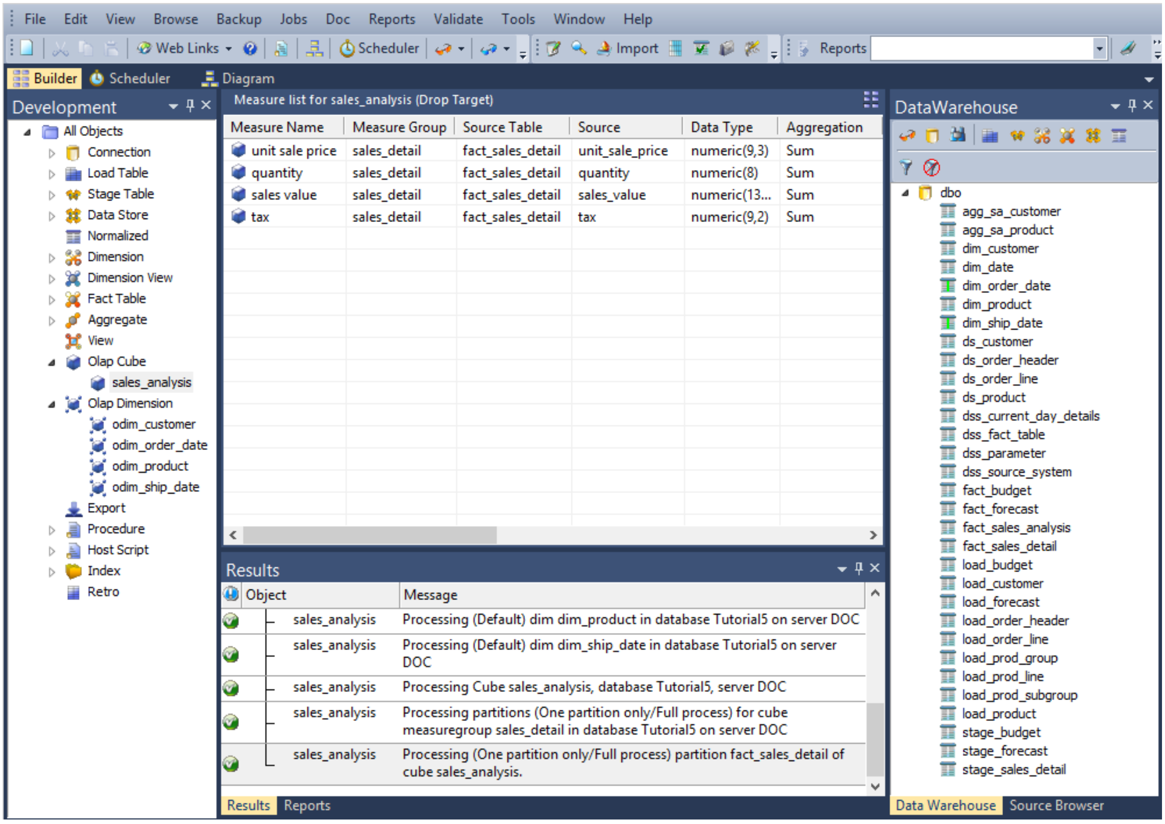
Oracle In the latest version of RED, the default 0 key date for all databases has been set to 1st Jan 1753. Prior to 6.5.4.2 however, procedure update_dim_date uses sysdate-700000 which gives a date in year 0095. SSAS does not support dates before year 0100 using the oracle OLEDB driver. If using a previous version of RED, or upgrading from a previous version, it will therefore be necessary for you to replace 'sysdate - 700000' with 'TO_DATE('17530101','YYYYMMDD')' in procedure update_dim_date and to recreate the dim_date table.

You are now ready to proceed to the next section - ***Adding a Measure Group*** (see "***5.3 Adding a Measure Group***" on page 170)

5.3 Adding a Measure Group

A cube can contain multiple **Measure Groups**. In WhereScape RED, a Measure Group relates to a relational star schema.
The cube ties Measure Groups together through **shared dimensions** that are conformed in the relational data warehouse.
Measure Groups can be added to an existing cube by dragging additional fact tables into the cube.

1 Click on the OLAP Cube **sales_analysis** in the left pane to show the Measures associated with the cube.
Your screen should look something like this:



Measure list for sales_analysis (Drop Target)

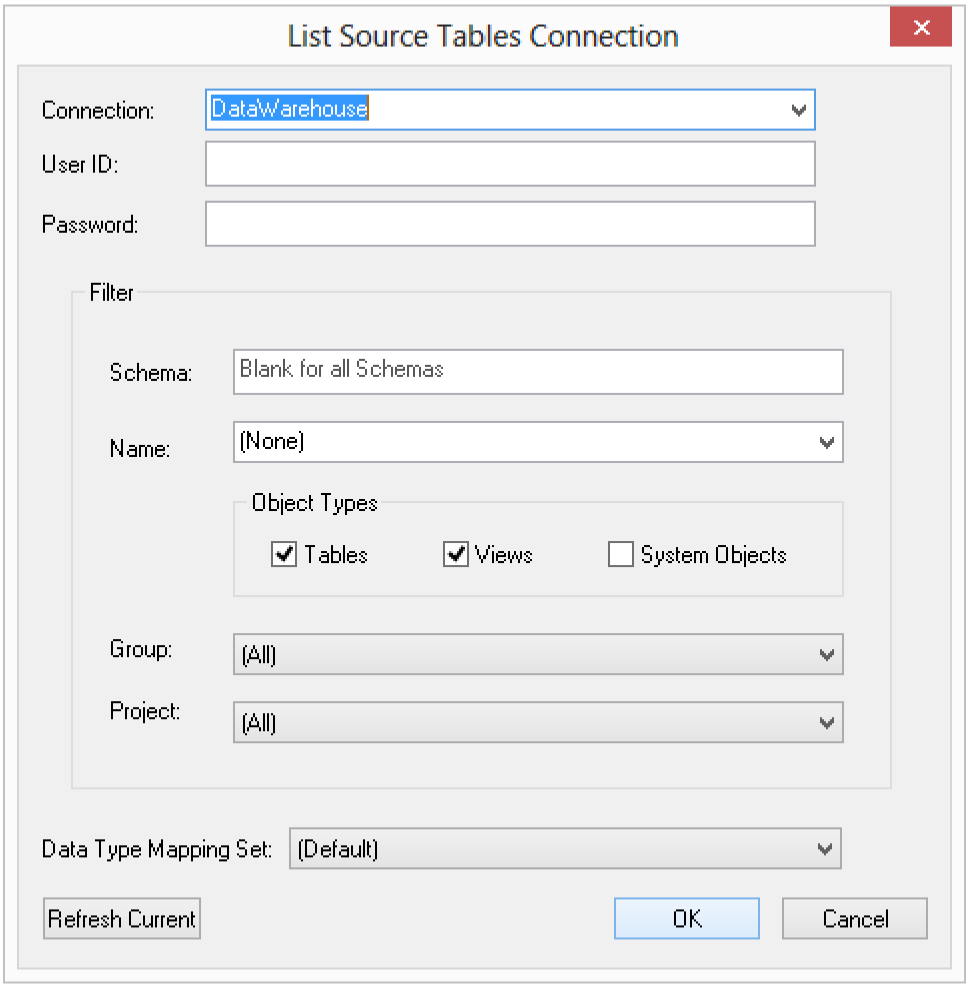
Measure Name	Measure Group	Source Table	Source	Data Type	Aggregation
unit sale price	sales_detail	fact_sales_detail	unit_sale_price	numeric(9,3)	Sum
quantity	sales_detail	fact_sales_detail	quantity	numeric(8)	Sum
sales value	sales_detail	fact_sales_detail	sales_value	numeric(13...	Sum
tax	sales_detail	fact_sales_detail	tax	numeric(9,2)	Sum

Results

Object	Message
sales_analysis	Processing (Default) dim dim_product in database Tutorial5 on server DOC
sales_analysis	Processing (Default) dim dim_ship_date in database Tutorial5 on server DOC
sales_analysis	Processing Cube sales_analysis, database Tutorial5, server DOC
sales_analysis	Processing partitions (One partition only/Full process) for cube measuregroup sales_detail in database Tutorial5 on server DOC
sales_analysis	Processing (One partition only/Full process) partition fact_sales_detail of cube sales_analysis.

2 Now you need to browse the *DataWarehouse* connection to see available fact tables.

- Right-click **DataWarehouse connection** from the left pane and select **Browse Connection**.



List Source Tables Connection

Connection: DataWarehouse

User ID:

Password:

Filter

Schema: Blank for all Schemas

Name: (None)

Object Types

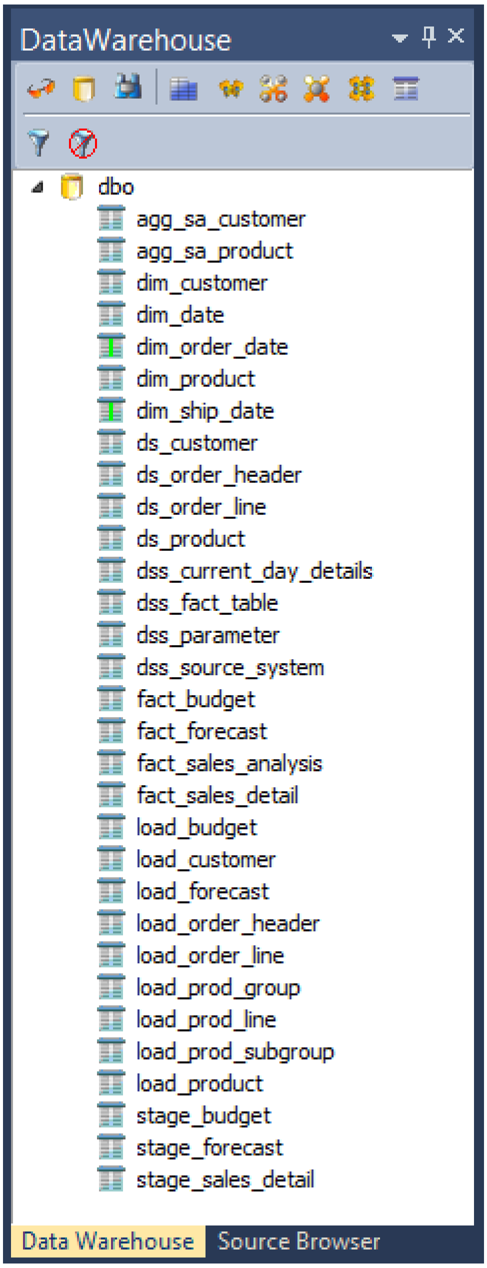
☑ Tables ☑ Views □ System Objects

Group: (All)

Project: (All)

Data Type Mapping Set: (Default)

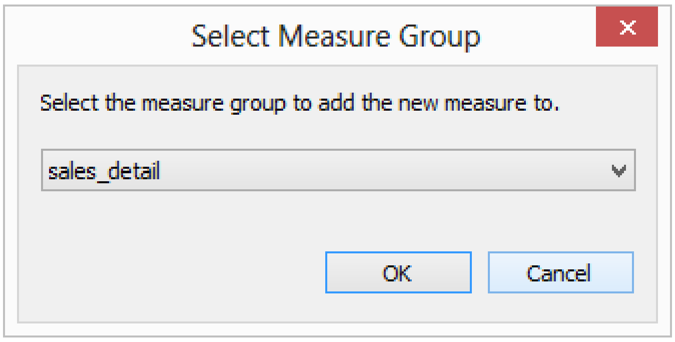
3 The following browse pane displays on the right.



DataWarehouse

dbo
- agg_sa_customer
- agg_sa_product
- dim_customer
- dim_date
- dim_order_date
- dim_product
- dim_ship_date
- ds_customer
- ds_order_header
- ds_order_line
- ds_product
- dss_current_day_details
- dss_fact_table
- dss_parameter
- dss_source_system
- fact_budget
- fact_forecast
- fact_sales_analysis
- fact_sales_detail
- load_budget
- load_customer
- load_forecast
- load_order_header
- load_order_line
- load_prod_group
- load_prod_line
- load_prod_subgroup
- load_product
- stage_budget
- stage_forecast
- stage_sales_detail

4 Drag the **fact_budget** table into the middle pane. The following dialog will appear. Select **Cancel**.



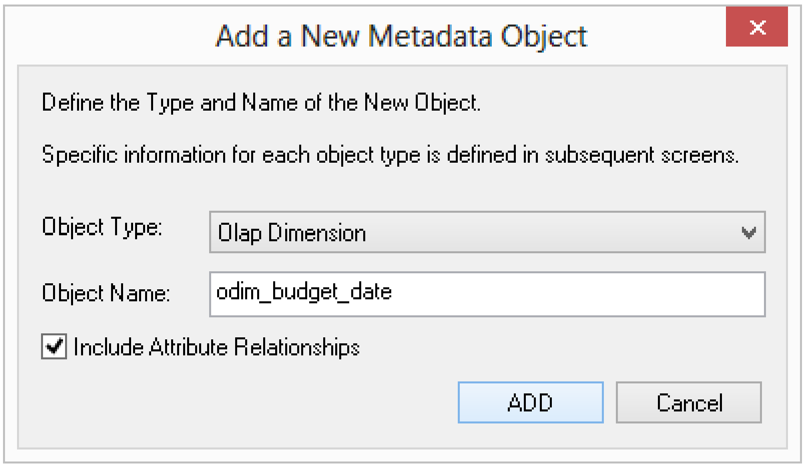
Select Measure Group

Select the measure group to add the new measure to.

sales_detail

5 WhereScape RED will confirm that it is OK to add a new **OLAP Dimension** for the date dimension.

- Change the Name of object to **odim_budget_date.**
- If you want to include Attribute Relationships in Analysis Services for this dimension, tick the **Include Attribute Relationships** check-box.
- Click **ADD.**



Add a New Metadata Object

Define the Type and Name of the New Object.

Specific information for each object type is defined in subsequent screens.

Object Type: Olap Dimension

Object Name: odim_budget_date

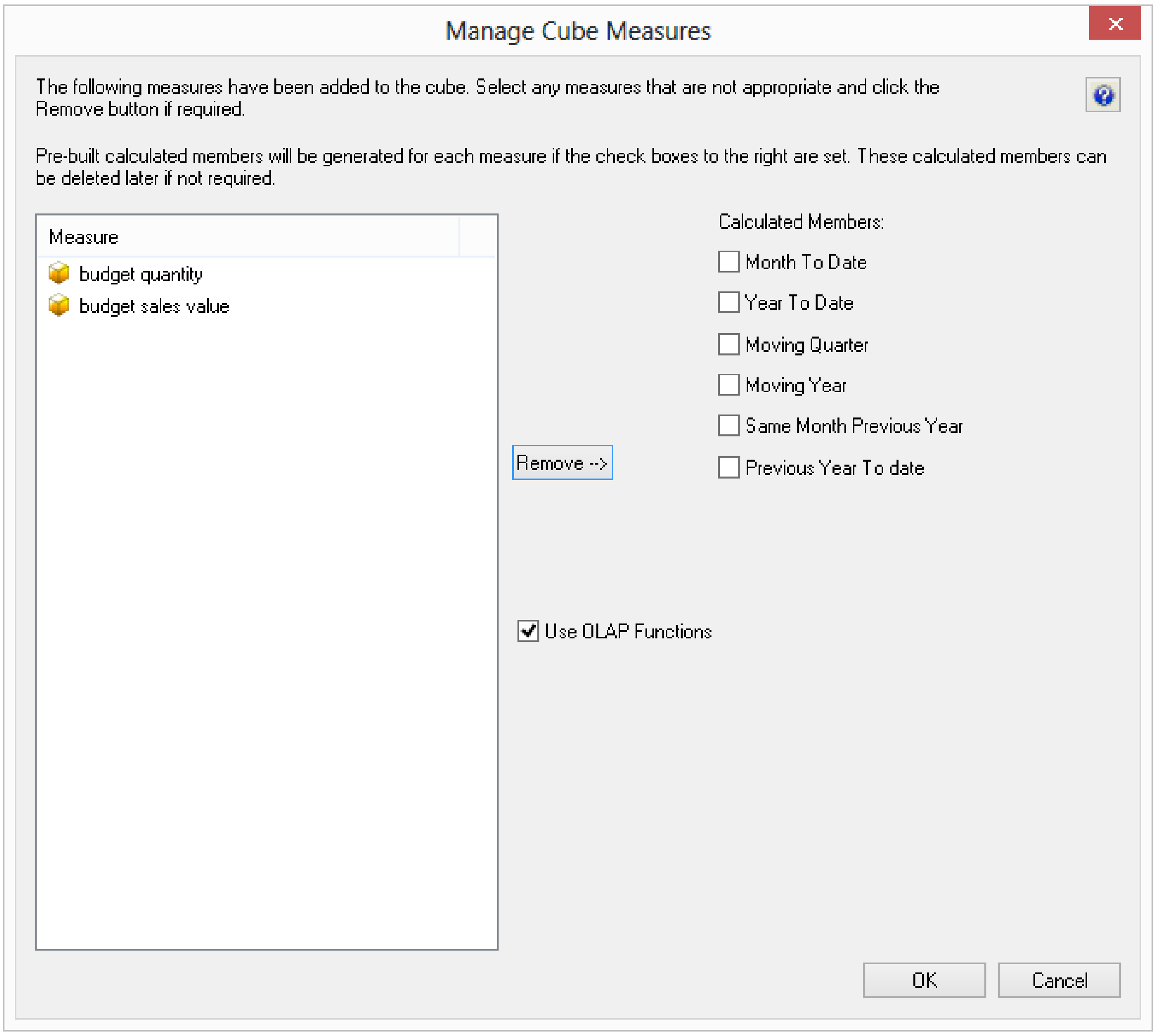
☑ Include Attribute Relationships

6 Click **OK** on the Attributes screen.

7 The **Manage Cube Measures** dialog displays.
Remove all non-measure columns (that is, columns that cannot be aggregated) from the **Measure** list by highlighting them and clicking the Remove button. The columns to remove are:

- Product Code
- Customer Code

8 At this stage, your dialog should look like this.



Manage Cube Measures

The following measures have been added to the cube. Select any measures that are not appropriate and click the Remove button if required.

Pre-built calculated members will be generated for each measure if the check boxes to the right are set. These calculated members can be deleted later if not required.

Measure
budget quantity
budget sales value

Calculated Members:

- □ Month To Date
- □ Year To Date
- □ Moving Quarter
- □ Moving Year
- □ Same Month Previous Year
- □ Previous Year To date

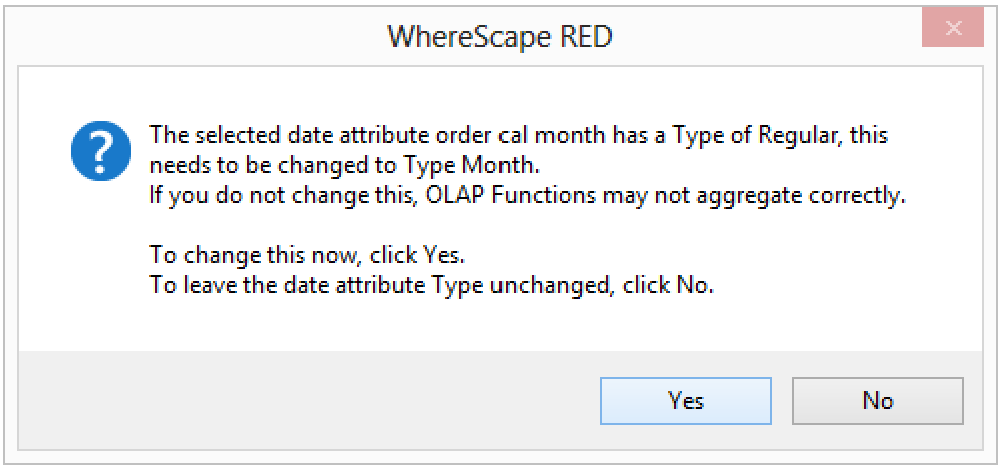
☑ Use OLAP Functions

9 Choose to create some date based calculated members using OLAP functions by selecting the **Month to date**, **Year to date**, and the **Use OLAP Functions** check-boxes.
The calculated measures drop-down list display below.

10 Select the required **date hierarchy** information. Specifically:

- for **Date Dimension**, select *Date Dimension* and the **Date Hierarchy** will automatically be populated with *calendar*
- for **Month Level**, select *cal month*

11 After selecting the **Month level**, you will be asked to confirm changing the **attribute type** to **Months** for the the *cal month* attribute in Analysis Services. Click **Yes**.

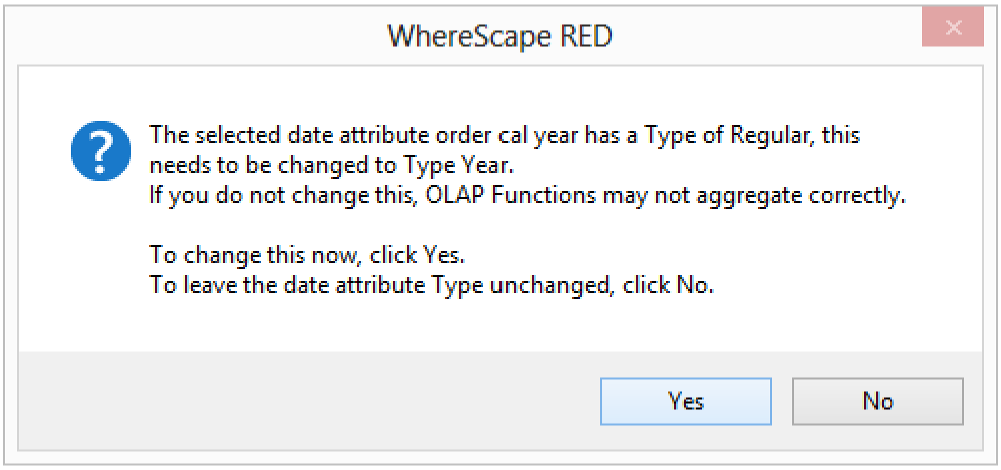


The selected date attribute order cal month has a Type of Regular, this needs to be changed to Type Month.
If you do not change this, OLAP Functions may not aggregate correctly.

To change this now, click Yes.
To leave the date attribute Type unchanged, click No.

12 Next, for **Year Level**, select *cal year*

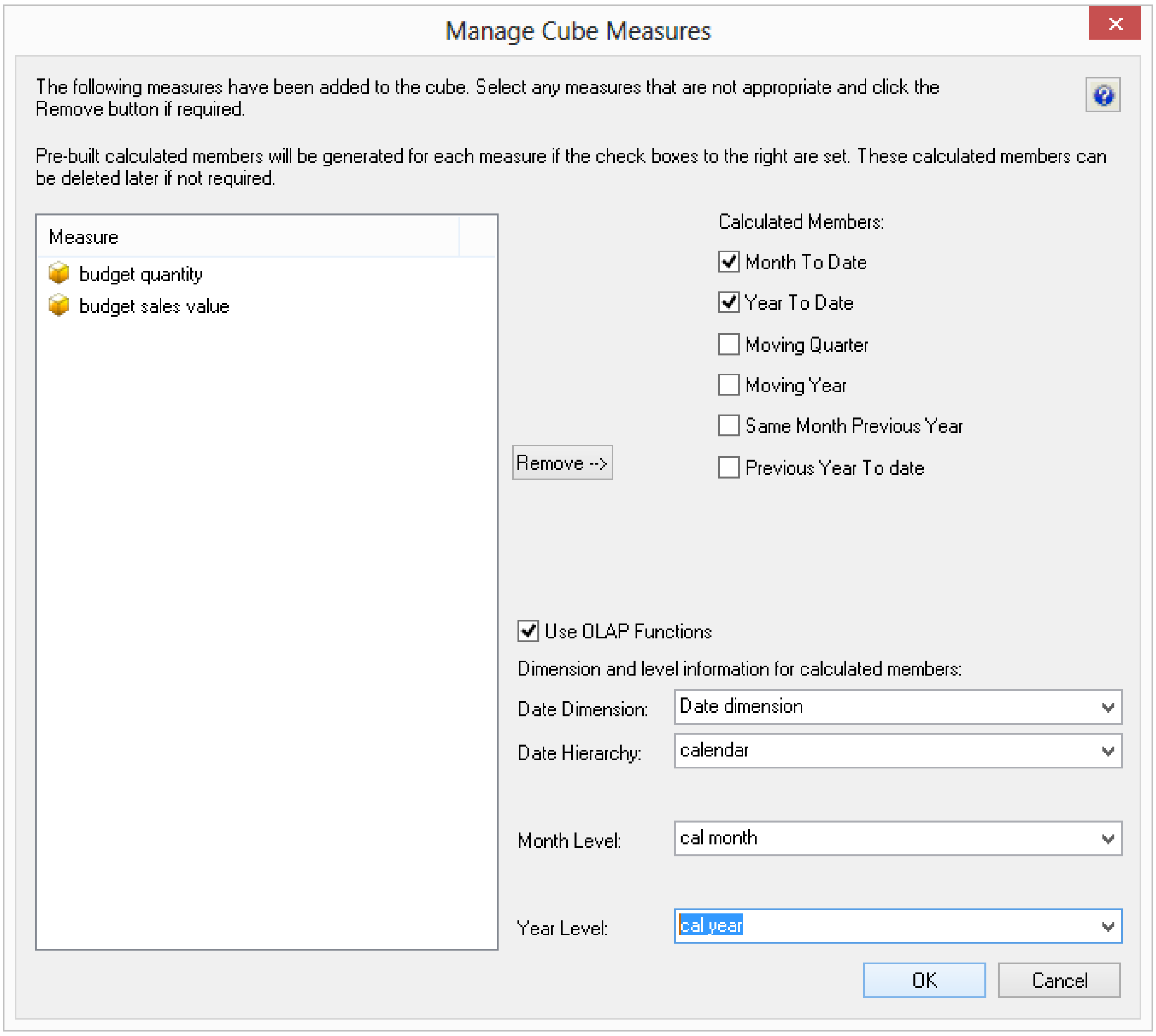
- Similarly, selecting the **Year level**, you will be asked to confirm changing the **attribute type** to *Years* for the the *cal year* attribute in Analysis Services. Again click **Yes**.



The selected date attribute order cal year has a Type of Regular, this needs to be changed to Type Year.
If you do not change this, OLAP Functions may not aggregate correctly.

To change this now, click Yes.
To leave the date attribute Type unchanged, click No.

13 Your **Manage cube measures** dialog should now look like this. Click **OK**.



Manage Cube Measures

The following measures have been added to the cube. Select any measures that are not appropriate and click the Remove button if required.

Pre-built calculated members will be generated for each measure if the check boxes to the right are set. These calculated members can be deleted later if not required.

Measure
budget quantity
budget sales value

Calculated Members:

☑ Month To Date
☑ Year To Date
□ Moving Quarter
□ Moving Year
□ Same Month Previous Year
□ Previous Year To date

☑ Use OLAP Functions

Dimension and level information for calculated members:

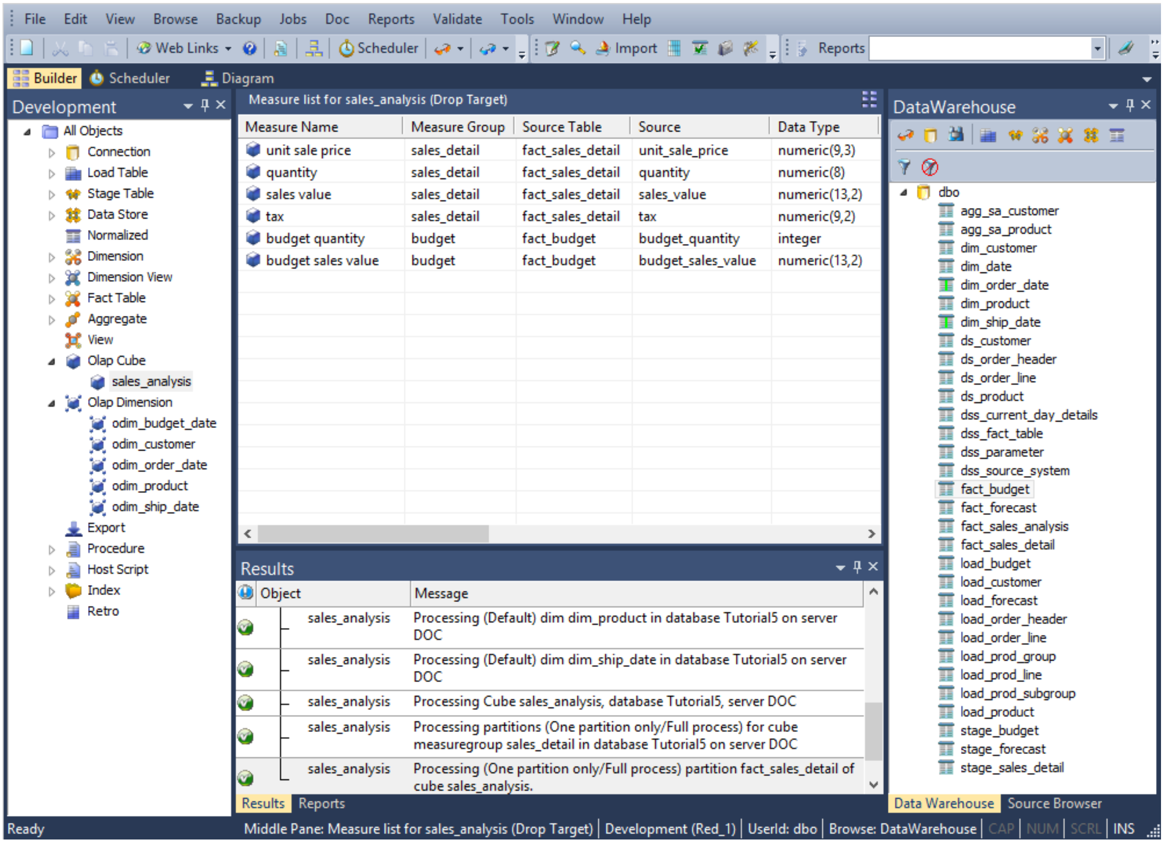
Date Dimension: Date dimension

Date Hierarchy: calendar

Month Level: cal month

Year Level: cal year

14 Click on the OLAP Cube **sales_analysis** in the left pane to show the updated Measures associated with the cube.
You should now see measures from both fact tables in the middle pane:



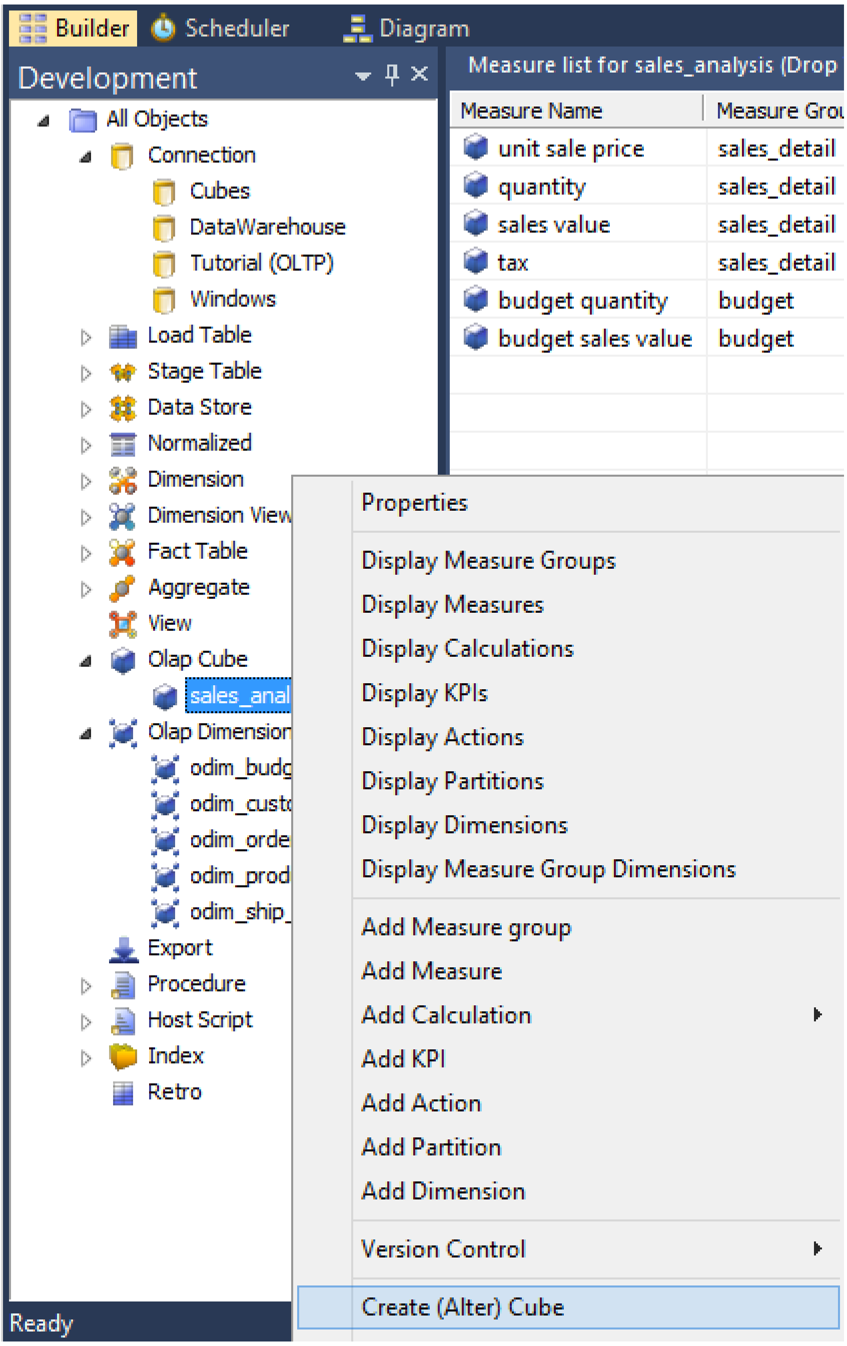
Measure list for sales_analysis (Drop Target)

Measure Name	Measure Group	Source Table	Source	Data Type
unit sale price	sales_detail	fact_sales_detail	unit_sale_price	numeric(9,3)
quantity	sales_detail	fact_sales_detail	quantity	numeric(8)
sales value	sales_detail	fact_sales_detail	sales_value	numeric(13,2)
tax	sales_detail	fact_sales_detail	tax	numeric(9,2)
budget quantity	budget	fact_budget	budget_quantity	integer
budget sales value	budget	fact_budget	budget_sales_value	numeric(13,2)

Results

Object	Message
sales_analysis	Processing (Default) dim dim_product in database Tutorial5 on server DOC
sales_analysis	Processing (Default) dim dim_ship_date in database Tutorial5 on server DOC
sales_analysis	Processing Cube sales_analysis, database Tutorial5, server DOC
sales_analysis	Processing partitions (One partition only/Full process) for cube measuregroup sales_detail in database Tutorial5 on server DOC
sales_analysis	Processing (One partition only/Full process) partition fact_sales_detail of cube sales_analysis.

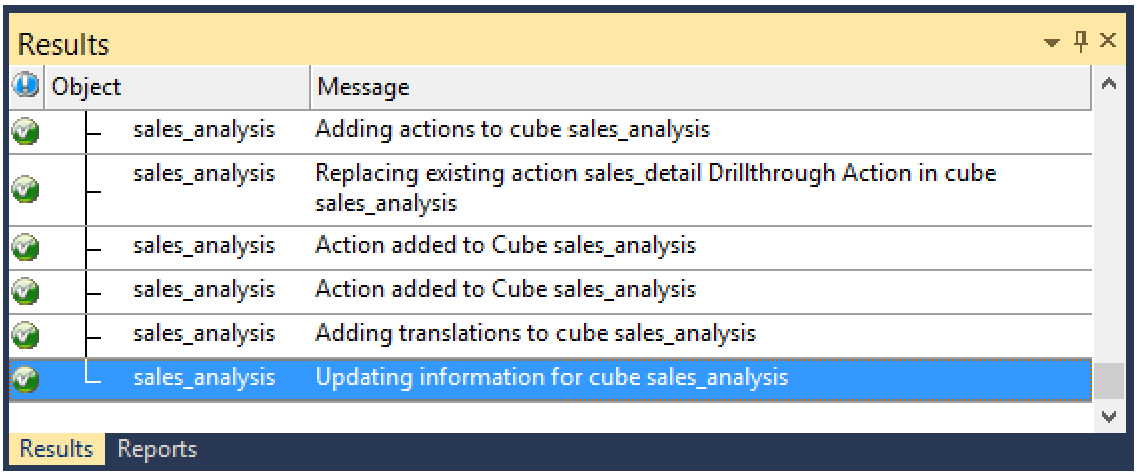
15 To apply the changes made in the WhereScape RED metadata to Analysis Services, right-click on the **sales_analysis** OLAP Cube in the left pane and select **Create (Alter) Cube**.



Measure list for sales_analysis (Drop

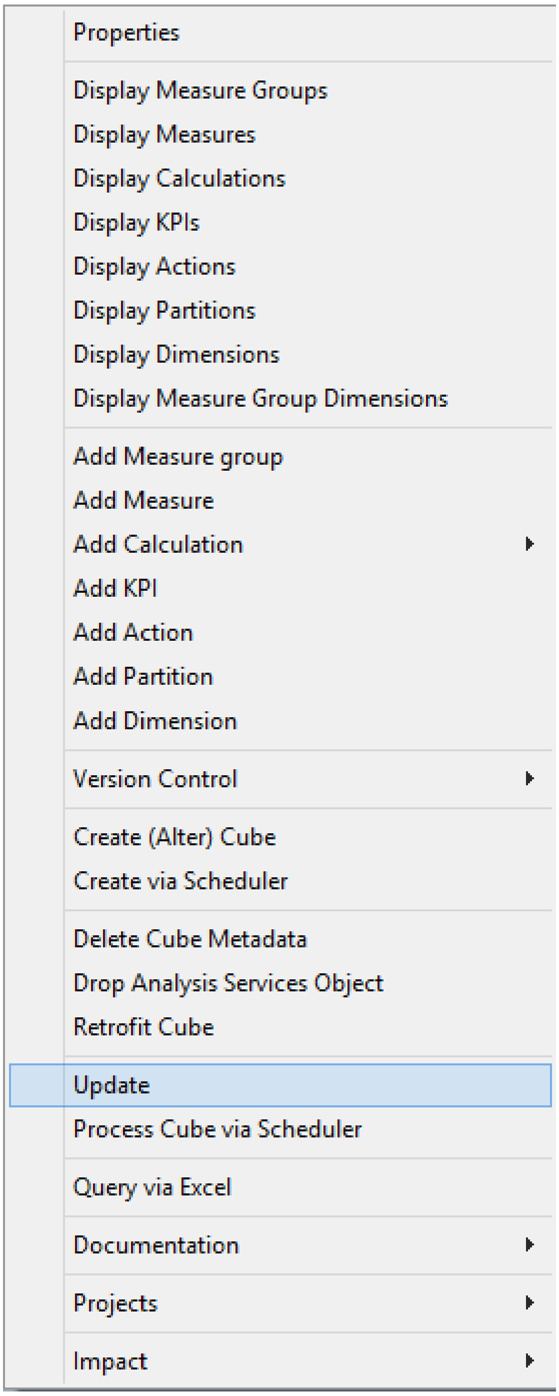
Measure Name	Measure Grou
unit sale price	sales_detail
quantity	sales_detail
sales value	sales_detail
tax	sales_detail
budget quantity	budget
budget sales value	budget

16 This will open the WSL Cube executable that connects to Analysis Services to create the sales_analysis cube structure.
You will see the successful completion in the results pane.

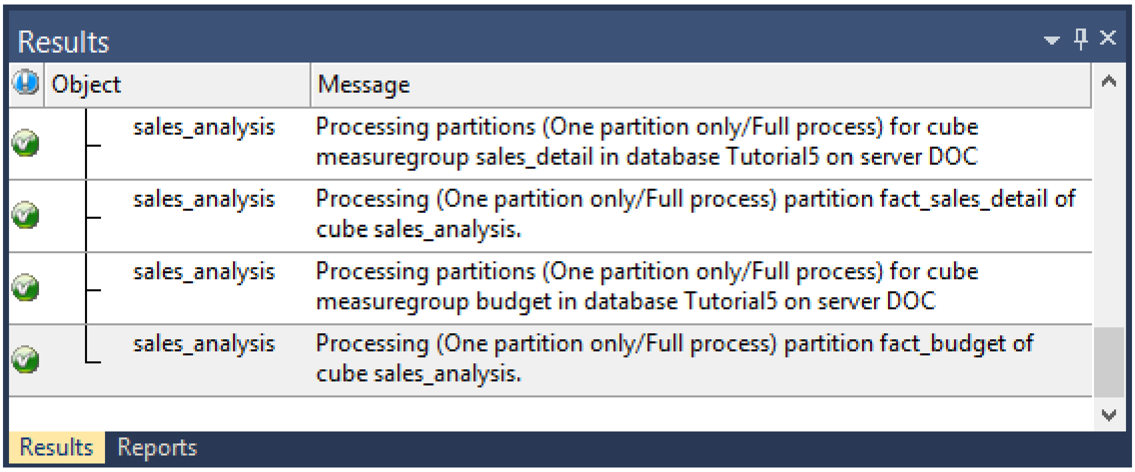


	Object	Message
✓	sales_analysis	Adding actions to cube sales_analysis
✓	sales_analysis	Replacing existing action sales_detail Drillthrough Action in cube sales_analysis
✓	sales_analysis	Action added to Cube sales_analysis
✓	sales_analysis	Action added to Cube sales_analysis
✓	sales_analysis	Adding translations to cube sales_analysis
✓	sales_analysis	Updating information for cube sales_analysis

17 Next, reload the **OLAP Cube** in Analysis Services by right-clicking on the **sales_analysis** cube in the left pane and choosing **Update**.

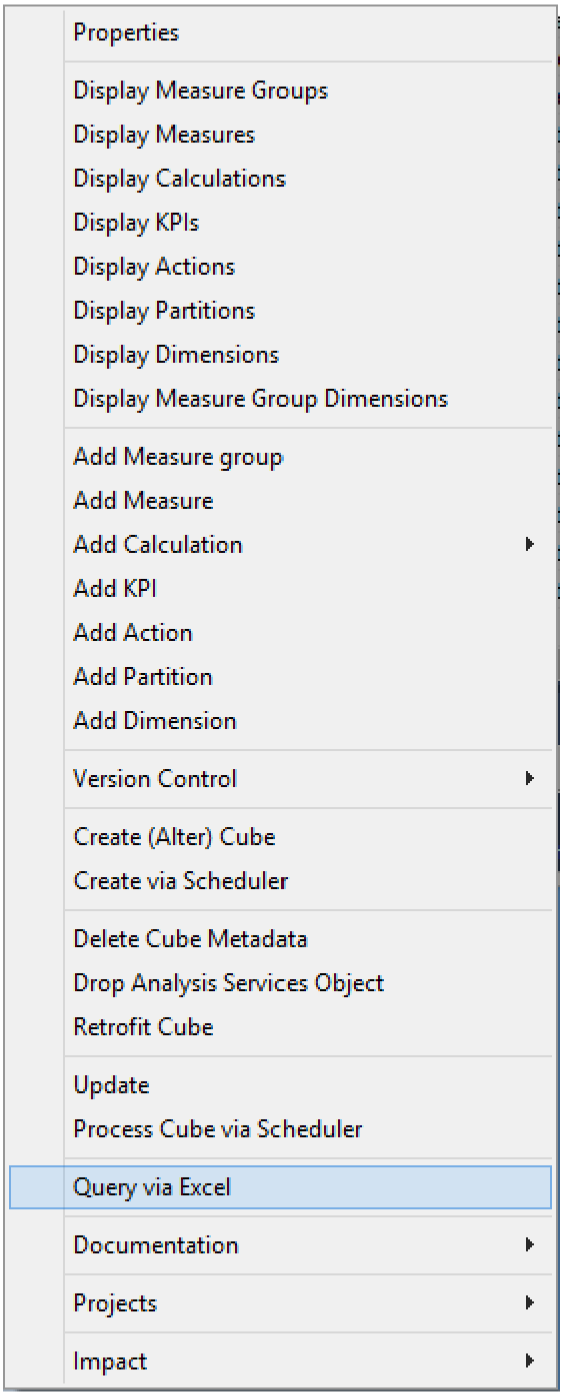


18 This will open the OLAP Cube executable to process data into the cube structure. Once the cube is processed it can be viewed. Again, you will see the successful completion in the results pane.



	Object	Message
✓	sales_analysis	Processing partitions (One partition only/Full process) for cube measuregroup sales_detail in database Tutorial5 on server DOC
✓	sales_analysis	Processing (One partition only/Full process) partition fact_sales_detail of cube sales_analysis.
✓	sales_analysis	Processing partitions (One partition only/Full process) for cube measuregroup budget in database Tutorial5 on server DOC
✓	sales_analysis	Processing (One partition only/Full process) partition fact_budget of cube sales_analysis.

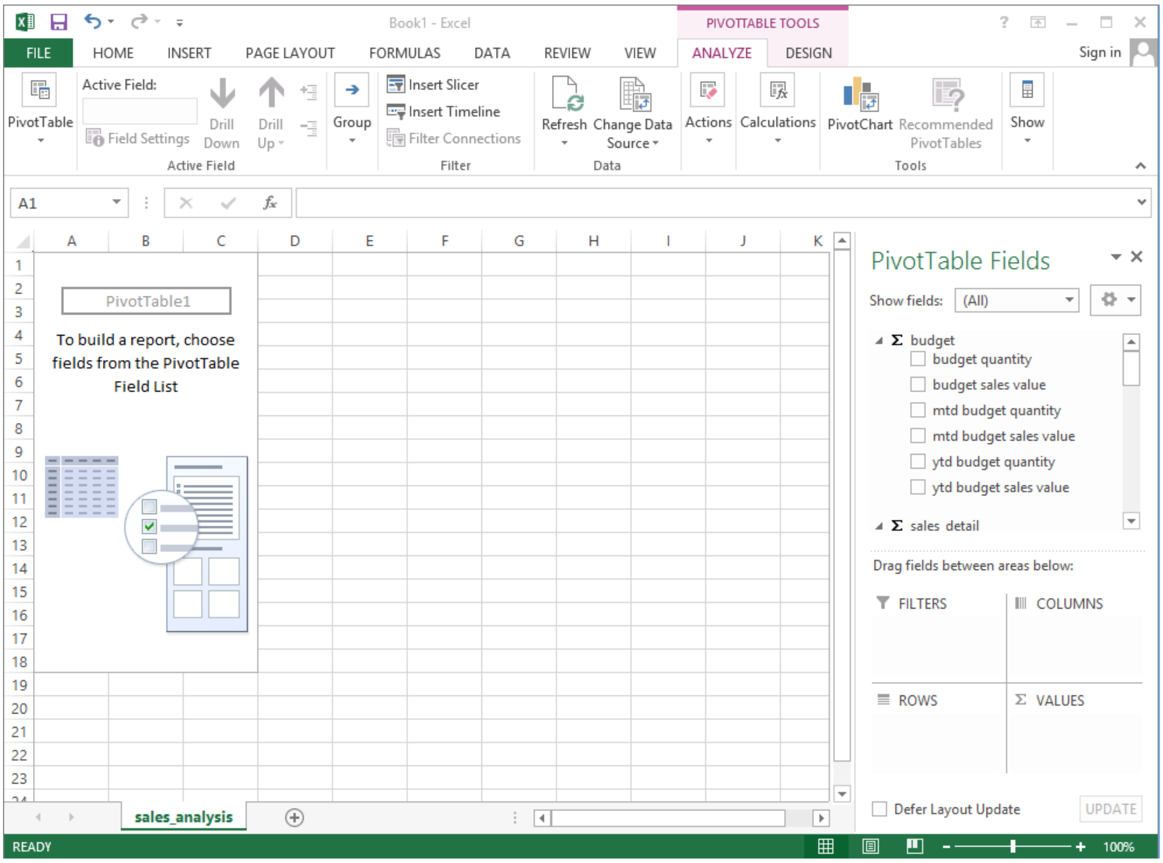
19 To view the cube in Excel, right-click the *sales_analysis* cube in the left pane and select **Query cube Via Excel**.



20 This will open Excel if it is installed.

Note: If Excel displays a security notice dialog box, click **Enable.**
However, note that this message may not be displayed.

21 Excel then opens a connection to the cube for querying in a pivot table:



Note: the two measure groups are now displayed in the Field list.

You are now ready to proceed to the next section - ***Cube Connections for Other Databases*** (see "***5.4 Cube Connections for Other Databases***" on page 184)

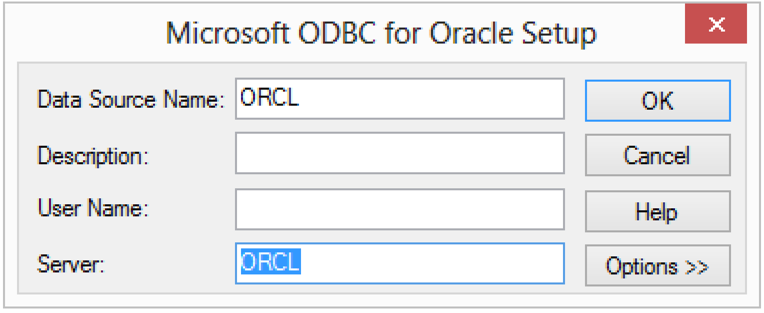
5.4 Cube Connections for Other Databases

This tutorial has been completed using Microsoft SQL Server as the data warehouse database. If you wish to use Oracle or DB2, the data warehouse connections need to be set differently as follows.
This section shows how to configure the DataWarehouse connection for either an Oracle or a DB2 data warehouse database.

Oracle Configuration

1 Select *MSDAORA* for the **Connection Provider/Driver**

- Enter the oracle **TNS Server Name** for the **Data Warehouse Server**, specifically the **Server** field in the ODBC set up screen as in the screenshot below:



Microsoft ODBC for Oracle Setup

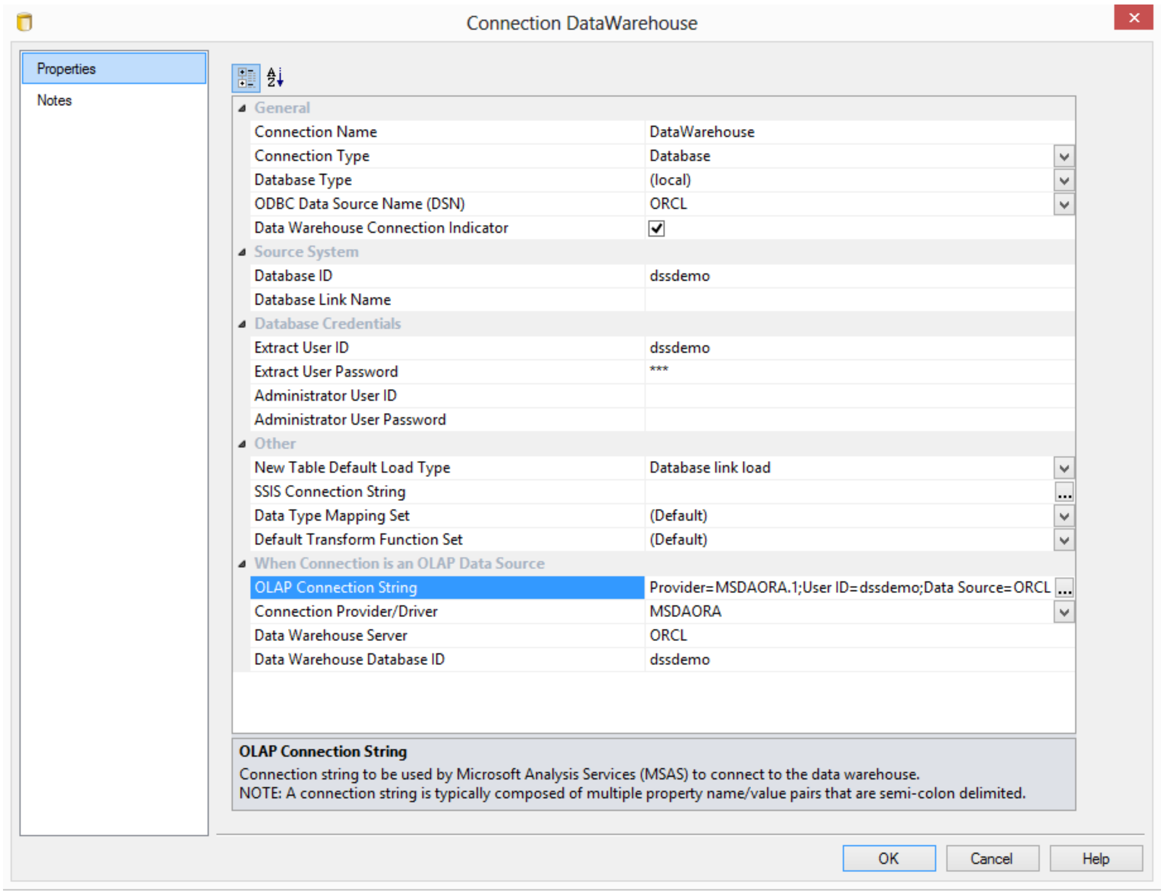
Data Source Name: ORCL

Description:

User Name:

Server: ORCL

2 Enter the data warehouse "schema" for the **Data Warehouse Database ID** field.
Here is an **Oracle** example:



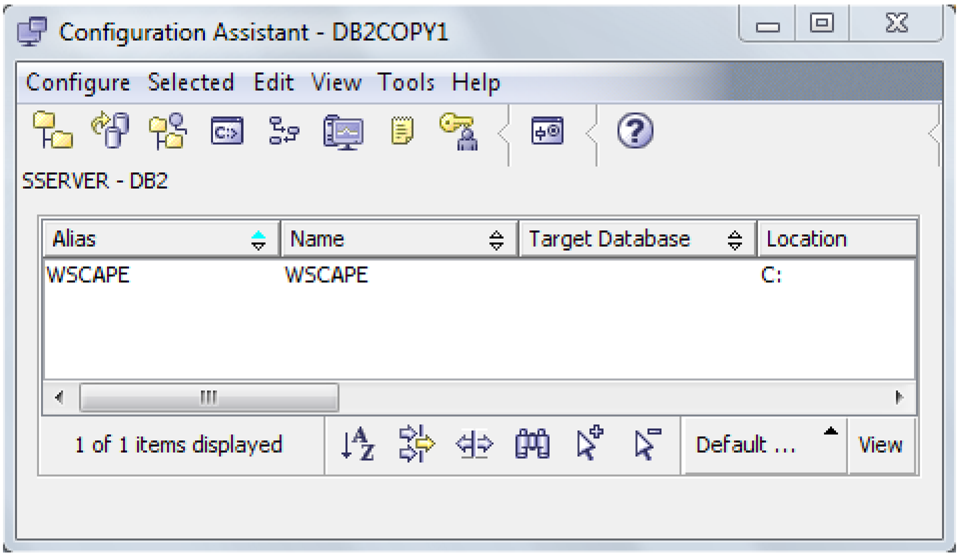
General	
Connection Name	DataWarehouse
Connection Type	Database
Database Type	(local)
ODBC Data Source Name (DSN)	ORCL
Data Warehouse Connection Indicator	☑
Source System	
Database ID	dssdemo
Database Link Name	
Database Credentials	
Extract User ID	dssdemo
Extract User Password	***
Administrator User ID	
Administrator User Password	
Other	
New Table Default Load Type	Database link load
SSIS Connection String	
Data Type Mapping Set	(Default)
Default Transform Function Set	(Default)
When Connection is an OLAP Data Source	
OLAP Connection String	Provider=MSDAORA.1;User ID=dssdemo;Data Source=ORCL
Connection Provider/Driver	MSDAORA
Data Warehouse Server	ORCL
Data Warehouse Database ID	dssdemo

OLAP Connection String
Connection string to be used by Microsoft Analysis Services (MSAS) to connect to the data warehouse.
NOTE: A connection string is typically composed of multiple property name/value pairs that are semi-colon delimited.

DB2 Configuration

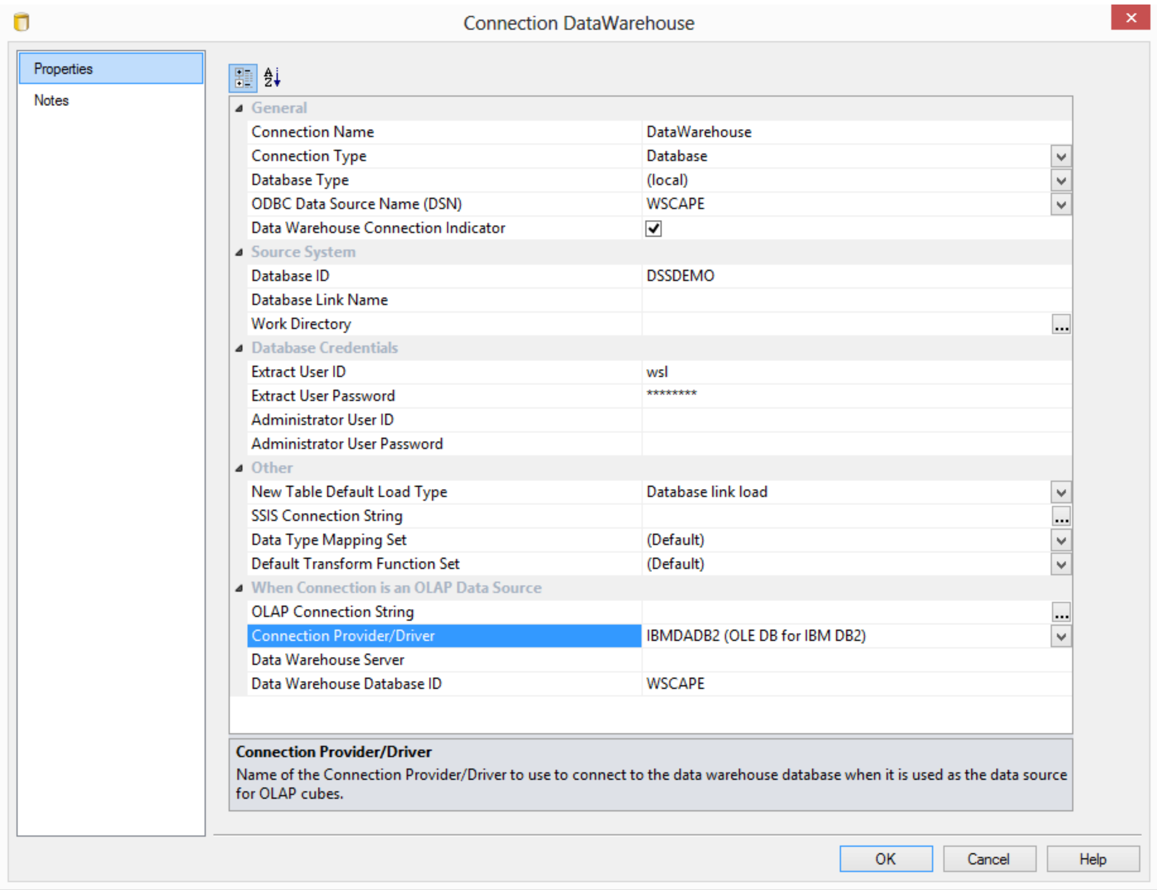
1 Select *IBMDADB2* for the **Connection Provider/Driver**

- The **Data Warehouse Server** field is left empty for DB2
- Enter the database server alias for the **Data Warehouse Database ID** field, specifically the **alias** field for the IBM DB2 connection in the following DB2 Configuration Assistant screen:


Configuration Assistant - DB2COPY1
Configure Selected Edit View Tools Help
SSERVER - DB2
1 of 1 items displayed
Default ...
View

Alias	Name	Target Database	Location
WSCAPE	WSCAPE		C:

2 Here is an **IBM DB2** example:



General	
Connection Name	DataWarehouse
Connection Type	Database
Database Type	(local)
ODBC Data Source Name (DSN)	WSCAPE
Data Warehouse Connection Indicator	☑
Source System	
Database ID	DSSDEMO
Database Link Name	
Work Directory	
Database Credentials	
Extract User ID	wsl
Extract User Password	********
Administrator User ID	
Administrator User Password	
Other	
New Table Default Load Type	Database link load
SSIS Connection String	
Data Type Mapping Set	(Default)
Default Transform Function Set	(Default)
When Connection is an OLAP Data Source	
OLAP Connection String	
Connection Provider/Driver	IBMDADB2 (OLE DB for IBM DB2)
Data Warehouse Server	
Data Warehouse Database ID	WSCAPE

Connection Provider/Driver
Name of the Connection Provider/Driver to use to connect to the data warehouse database when it is used as the data source for OLAP cubes.