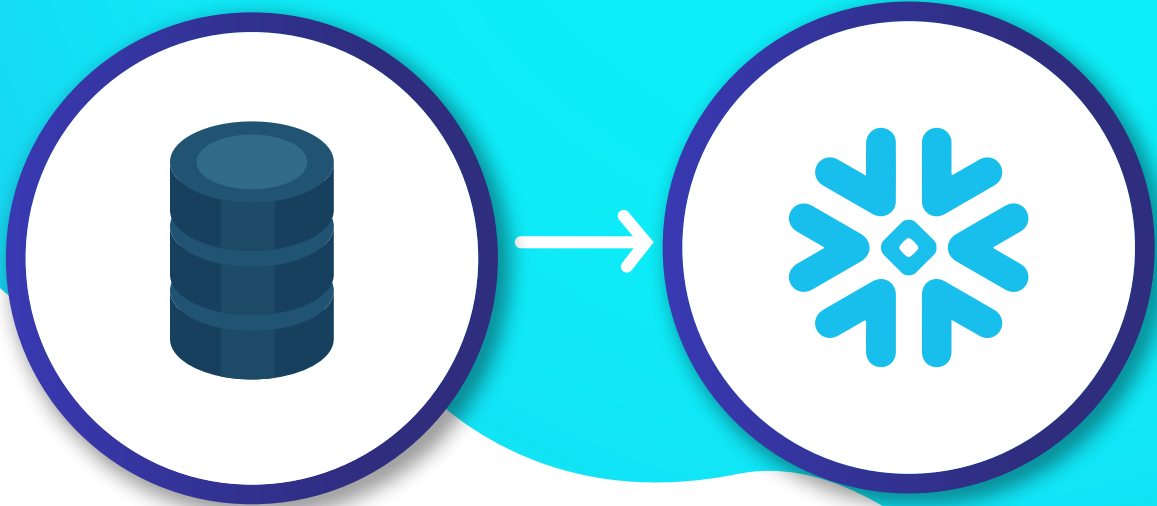


# DATABASE MIGRATION TO SNOWFLAKE:

## A Complete How-to Guide

---







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# Introduction

This guide will show you how to migrate<sup>1</sup> a relational database from Microsoft SQL Server 2019 for example, to Snowflake.

Then how to manually manage your SAP BusinessObjects content:

- Universe(s) and their connections to Snowflake

And if necessary, how to:

- Repoint your Web Intelligence document(s) to your Snowflake Universe(s)
- Repoint your Crystal Reports document(s) to your Snowflake ODBC



1. Identify which Universes, Reports, and Users will be impacted by repointing the database connectivity to Snowflake.

This step can also be used to identify and document which tables and columns in your databases are used (and not used) by SAP BusinessObjects. This can help identify the data that needs to be migrated, in which order or not at all.

2. This is the migration step by the customer.
3. There are two scenarios:

---

<sup>1</sup> More definitions here: <https://mssql.tosnowflake.com/>



- a. Simply repointing the Universe Connection to Snowflake works, the Universe passes all integrity checks, you can start the validation of the Webi reports (step 5).

If you have Crystal Reports pointing directly at the database and not via a Universe, they will need to be updated with the new database connections (step 4).

- b. Due to changes in the Snowflake Schema, Column Type or just vendor-specific SQL inside the Universe means that we need to make changes to the Universe.

This step is also applicable if you are converting from a UNV to a UNX.

Here we will work with a copy of the existing Universe and apply the necessary changes so they are fully operational. Depending on your strategy, you may need to later repoint all the documents that use the old Universe to the new one (step 4).

4. Back-up: before making any changes to your content, make sure that you have a reliable and performant back-up.
5. Repointing Webi and Crystal Documents ([tutorial video here](#)) to the new / updated universes.
6. Testing and Validation: ensure user satisfaction and meet regulatory needs by testing the data, its security, the layout of the documents, the network connectivity and performance of your documents.



# Disclaimer

This blog demonstrates the concepts of a database migration and how to manage SAP BusinessObjects content affected by this project. Every case is different and the steps mentioned here may not be the same for you. Here we took the example of a migration from a Microsoft SQL Server to Snowflake, but this guide can apply to a multitude of different databases.

For completeness of this document we are simulating the workflow where migrating the database will require changes to the schema: database name, table names therefore involving changes in the Universe(s).



## Scenario 1: Lift and Shift

- Source: Relational database
- No schema transformation
- Universes need no modification

### What you need:

- Pre-migration assessment
  - Impact Analysis
- Validate
  - Data regression
  - Performance



## Scenario 2: Transformation Project

- Source: Non-relational database
- Relational with schema changes
- New Universes and new Reports

### What you need:

- Pre-migration assessment
  - Data Inventory
- Validate
  - Performance



## Scenario 3: Lift and Shift-Advanced

- Snowflake schema is not identical
- Universe needs significant update
- Universe is a UNV

### What you need:

- Pre-migration assessment
- Bulk update repair the Universes
- Back-up your Documents
- Bulk repoint Webi and Crystal
- Validate
  - Data regression
  - Performance

This guide will cover the Lift & Shift Advanced scenario showing all the steps involved when simply changing the Universe connection is not sufficient.



# Readme.txt

Before any migration project, it is important to carry out a Pre-Migration Impact Analysis first in order to decide what needs to be migrated over. You should also analyze what will be impacted by this project to help avoid any risks during the whole process.

Examples:

- Universes:
  - List of Connections pointing to the database(s) to Migrate
  - List of Universes pointing to these Universe Connections
  - List of Universe Restrictions (aka overloads)
  - Document Universes Usage / Non-Usage
  - Document Universe Objects (dimensions, details, measure) Usage / Non-Usage
- Content:
  - List of Web Intelligence, Crystal Reports and other documents pointing to these Universes
  - List of Web Intelligence, Crystal Reports and other documents directly pointing to these database(s). E.g. Crystal Reports 2016
  - Document Web Intelligence formulas that might be affected
  - Document impacted content Usage / Non-Usage
  - Document Instances impacted by this migration
- Users:
  - Document users impacted (based on actions and ownership) - For better communication
- Data:
  - Document Database Tables to be migrated based on Impact Analysis and Usage / Non-Usage
  - Document Columns in Tables to be migrated based on Impact Analysis and Usage / Non-Usage





# Pre-Requisites

This blog assumes you have [SAP BusinessObjects 4.2 SP08](#) or higher as it is the earliest release officially supporting Snowflake.

It also assumes you have Universe(s), Web Intelligence and Crystal Reports documents pointing to a Microsoft SQL Server Database. This scenario can similarly be applied to any relational database.

Also, you need to have Snowflake ODBC and/or JDBC connectivity configured for SAP BusinessObjects. See this blog for more details:

<https://blogs.sap.com/2020/03/12/snowflake-for-sap-businessobjects-4.2-sp08/>



# Microsoft SQL Server

Version: Microsoft SQL Server 2019

Database to Migrate: AdventureWorks2017

(<https://docs.microsoft.com/en-us/sql/samples/adventureworks-install-configure?view=sql-server-ver15>)

Database Size: 336 MB (71 Tables for over 760k rows)

| \SQLEXPRESS (SQL Server 15.0.2000 - \Administrator)\Databases\AdventureWorks2017\Tables |                |                  |
|-----------------------------------------------------------------------------------------|----------------|------------------|
| Name                                                                                    | Schema         | Create Date      |
| Address                                                                                 | Person         | 27/10/2017 14:33 |
| AddressType                                                                             | Person         | 27/10/2017 14:33 |
| AWBuildVersion                                                                          | dbo            | 27/10/2017 14:33 |
| BillOfMaterials                                                                         | Production     | 27/10/2017 14:33 |
| BusinessEntity                                                                          | Person         | 27/10/2017 14:33 |
| BusinessEntityAddress                                                                   | Person         | 27/10/2017 14:33 |
| BusinessEntityContact                                                                   | Person         | 27/10/2017 14:33 |
| ContactType                                                                             | Person         | 27/10/2017 14:33 |
| CountryRegion                                                                           | Person         | 27/10/2017 14:33 |
| CountryRegionCurrency                                                                   | Sales          | 27/10/2017 14:33 |
| CreditCard                                                                              | Sales          | 27/10/2017 14:33 |
| Culture                                                                                 | Production     | 27/10/2017 14:33 |
| Currency                                                                                | Sales          | 27/10/2017 14:33 |
| CurrencyRate                                                                            | Sales          | 27/10/2017 14:33 |
| Customer                                                                                | Sales          | 27/10/2017 14:33 |
| DatabaseLog                                                                             | dbo            | 27/10/2017 14:33 |
| Department                                                                              | HumanResources | 27/10/2017 14:33 |
| Document                                                                                | Production     | 27/10/2017 14:33 |
| EmailAddress                                                                            | Person         | 27/10/2017 14:33 |
| Employee                                                                                | HumanResources | 27/10/2017 14:33 |
| EmployeeDepartmentHistory                                                               | HumanResources | 27/10/2017 14:33 |

# Snowflake

Create an empty database in Snowflake

Database Name: AdventureWorks2017

**SQL**

```

1 CREATE DATABASE AdventureWorks2017 COMMENT = 'Migrated from Microsoft SQL
  Server';

```

Select SQL

Close

Note: Unless you create tables and columns using double-quotes (therefore case sensitive) these identifiers will be displayed in uppercase but are case-insensitive. Suggested Reading: [Identifiers in Snowflake](#)



Databases

Shares

Warehouses

Worksheets

History

**Databases**

+

 Create...
 

📄

 Clone...
 

✕

 Drop...
 

🔗

 Transfer Ownership

1/4 databases

| Database           | Origin | ↓ Creation Time | Owner    | Comment                            |
|--------------------|--------|-----------------|----------|------------------------------------|
| ADVENTUREWORKS2017 |        | 12:31 PM        | SYSADMIN | Migrated from Microsoft SQL Server |

Schema (PUBLIC) available:





  
Databases

  
Shares

  
Warehouses

  
Worksheets

  
History

Databases > ADVENTUREWORKS2017

TablesViewsSchemasStagesFile FormatsSequences

 Create...

 Clone...

 Alter...

 Drop...

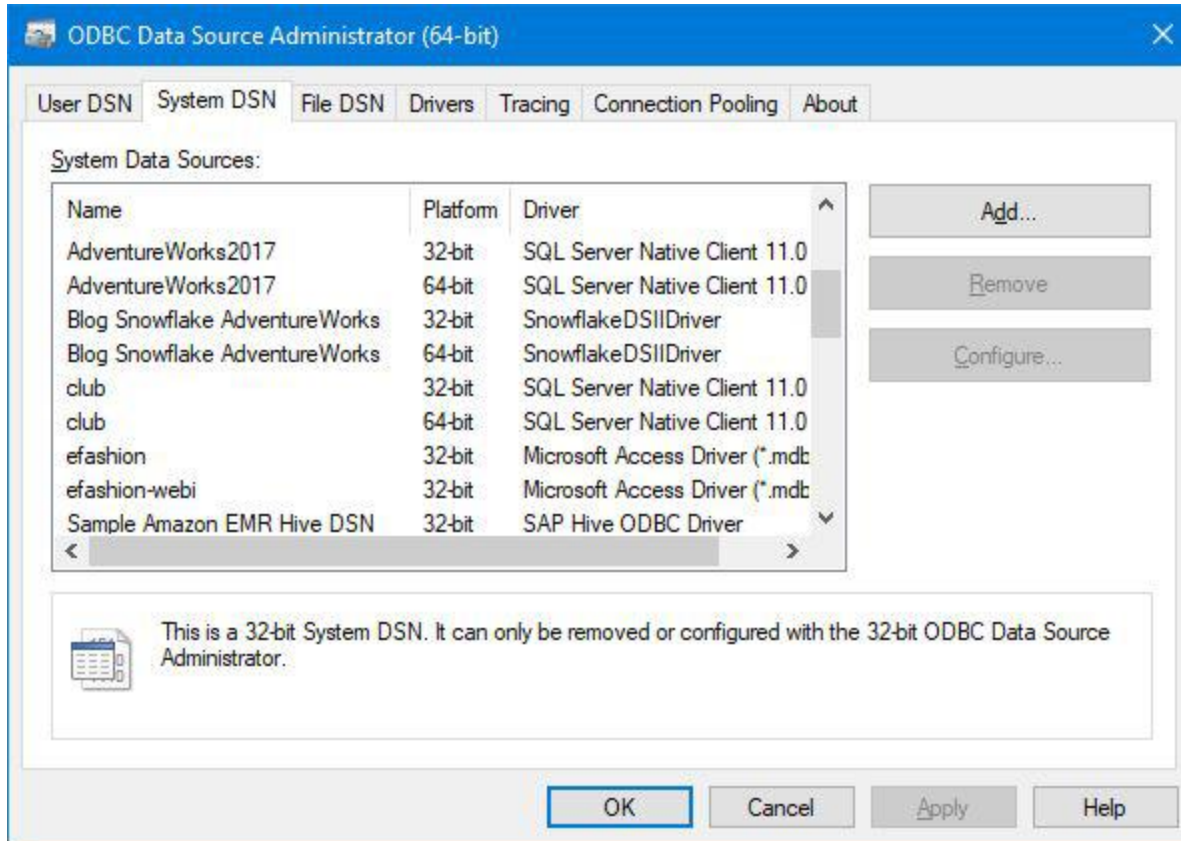
 Transfer Ownership

| Schema             | Creation Time ▼ | Owner    | Managed Access | Comment                                                   |
|--------------------|-----------------|----------|----------------|-----------------------------------------------------------|
| INFORMATION_SCHEMA | 3:16:23 PM      |          |                | Views describing the contents of schemas in this database |
| PUBLIC             | 12:31:53 PM     | SYSADMIN |                |                                                           |

## Create identical 32-bit and 64-bit ODBC connections to Snowflake

Note: See this blog for more details:

<https://blogs.sap.com/2020/03/12/snowflake-for-sap-businessobjects-4.2-sp08/>



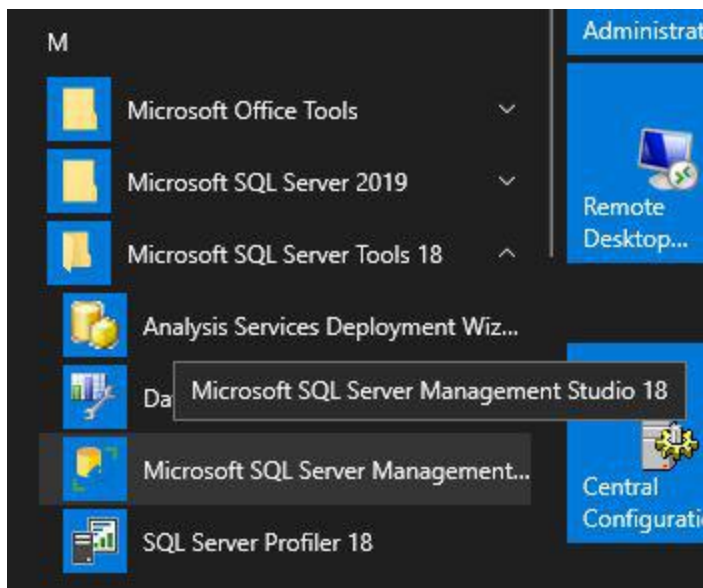
Note: You can use JDBC connections if you prefer. Please refer to the blog above.

# Migrating the Database

Move the database from Microsoft SQL Server to Snowflake

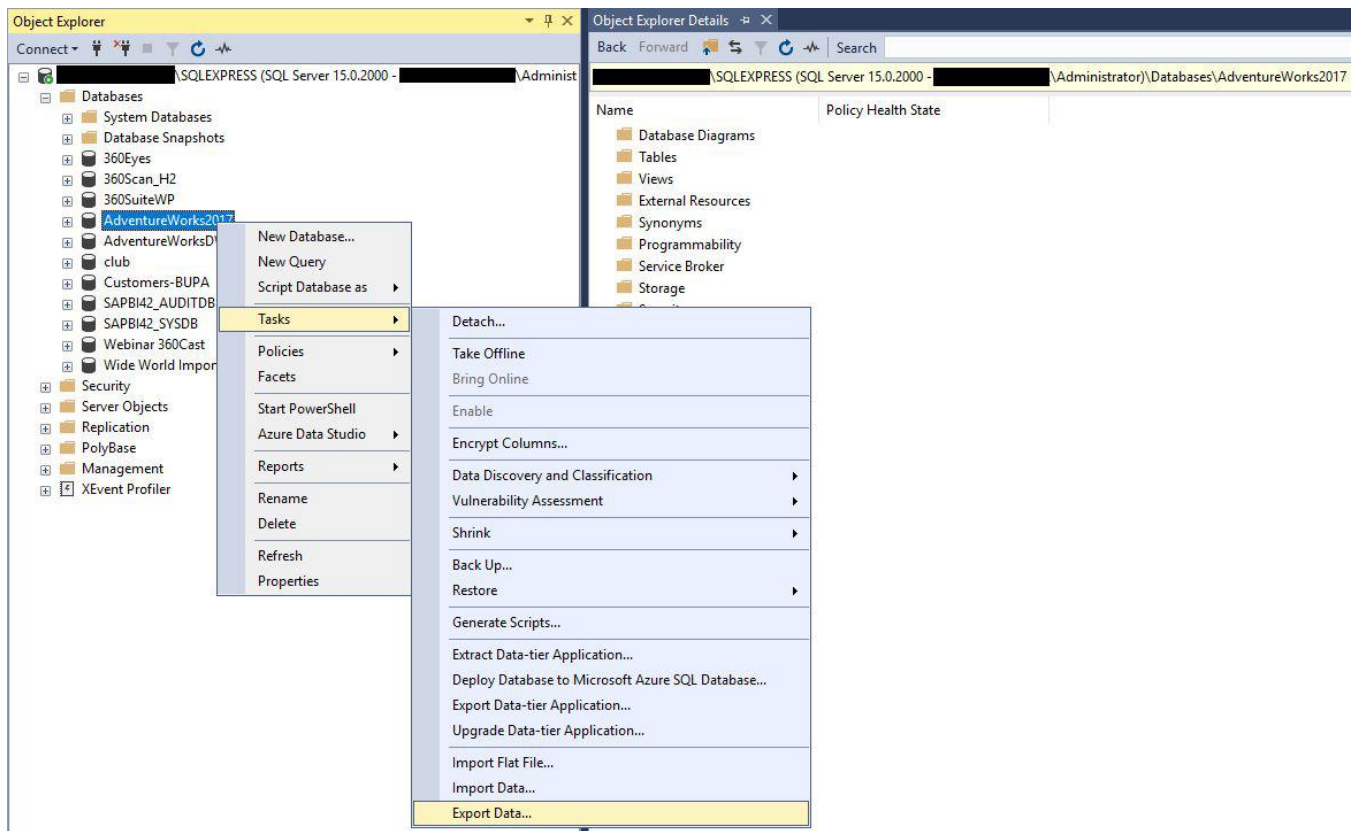
There are many strategies to run this task. In this blog, we'll use the *SQL Server Import and Export Wizard* via SQL Server Integration Services (SSIS) to generate Comma Separated Values (CSV) file and manually import them into Snowflake.

Open Microsoft SQL Server Management Studio



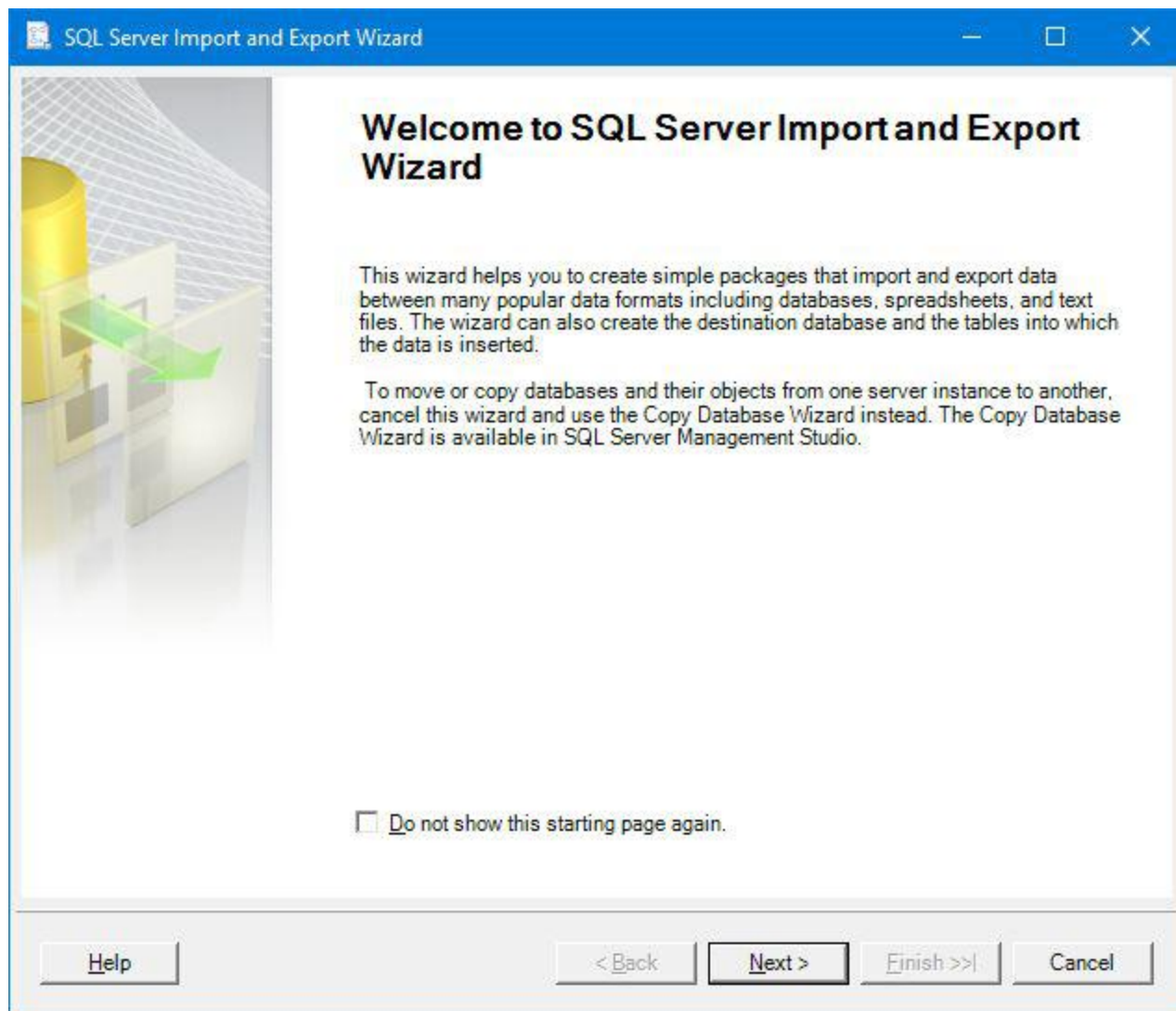


Select the database to migrate (e.g.: AdventureWorks2017)



Right-Click > Tasks > Export Data...

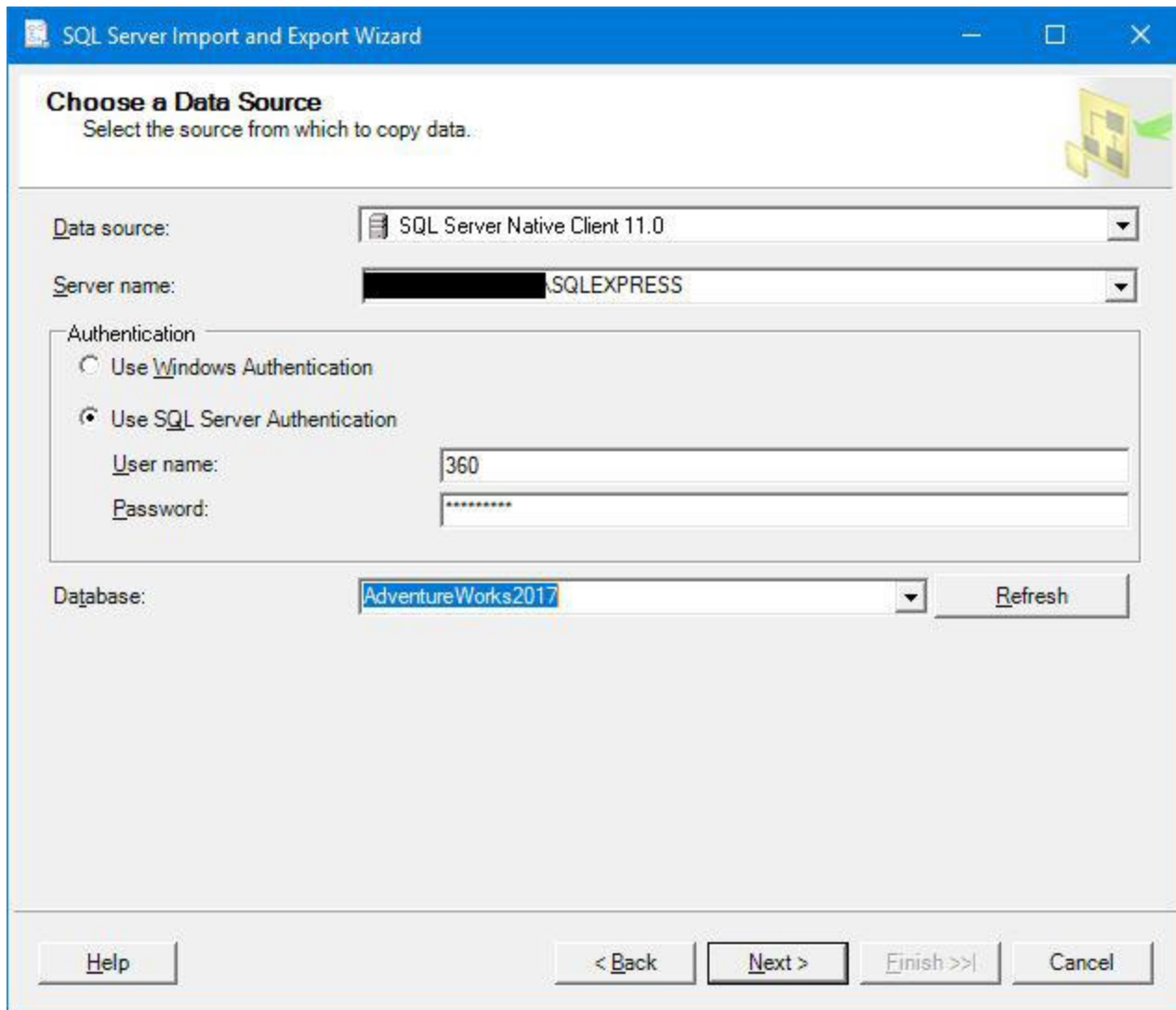




Click: Next



## Choose a Data Source



The screenshot shows the 'SQL Server Import and Export Wizard' window, specifically the 'Choose a Data Source' step. The window has a blue title bar and a light gray background. The title bar contains the text 'SQL Server Import and Export Wizard' and standard window controls. The main area is titled 'Choose a Data Source' with the instruction 'Select the source from which to copy data.' Below this, there are several fields and options: 'Data source:' is a dropdown menu showing 'SQL Server Native Client 11.0'; 'Server name:' is a dropdown menu showing '[REDACTED].SQLEXPRESS'; 'Authentication' is a section with two radio buttons: 'Use Windows Authentication' (unselected) and 'Use SQL Server Authentication' (selected); 'User name:' is a text box containing '360'; 'Password:' is a text box with masked characters; 'Database:' is a dropdown menu showing 'AdventureWorks2017' with a 'Refresh' button next to it. At the bottom, there are five buttons: 'Help', '< Back', 'Next >', 'Finish >>', and 'Cancel'.

Data source: SQL Server Native Client 11.0

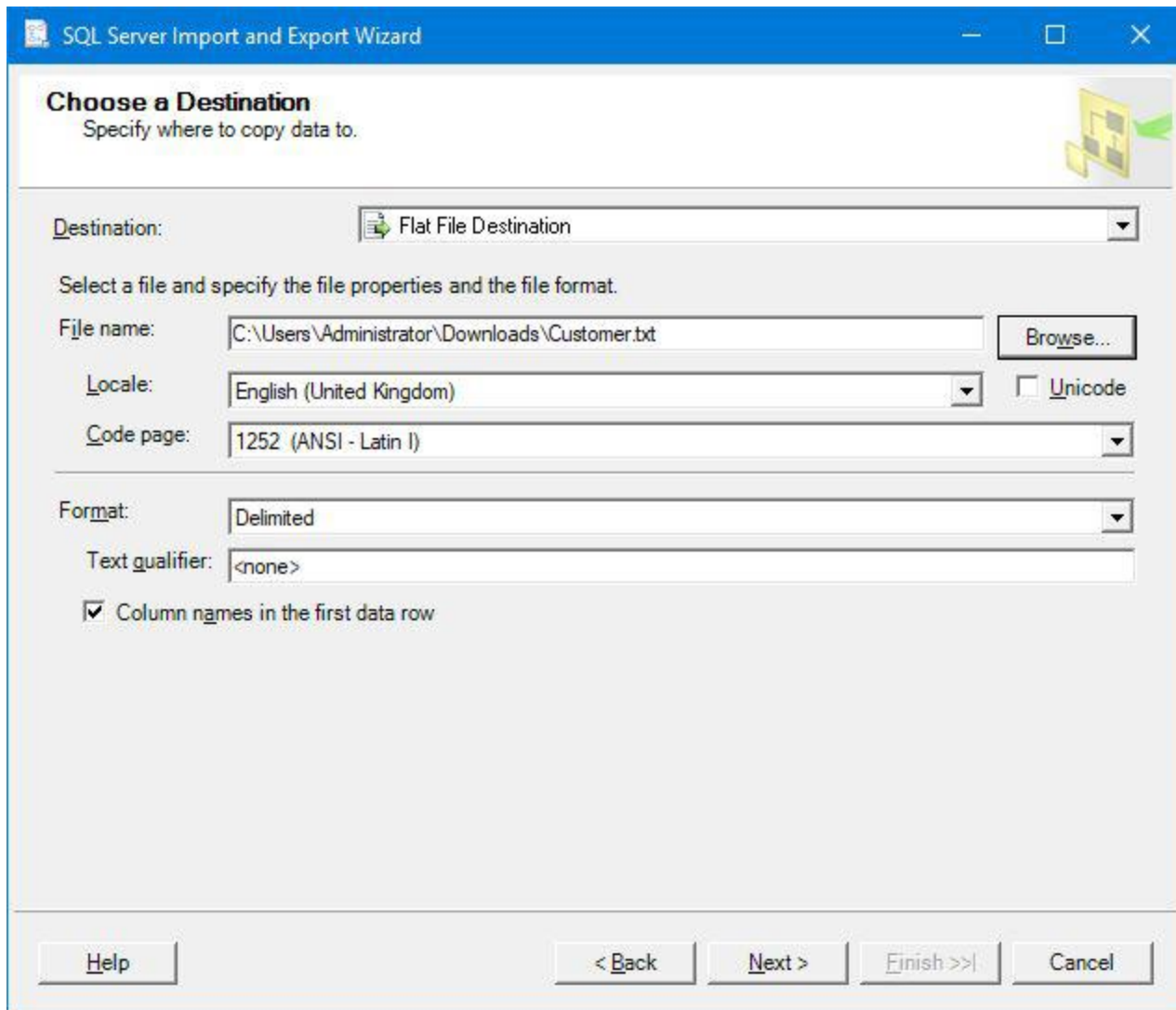
Server name: [ENTER YOUR SERVER NAME / INSTANCE]

Authentication: [ENTER YOUR CREDENTIALS]

Database: [ENTER YOUR DATABASE] (E.g.: AdventureWorks2017)

Click: Next

## Choose a Destination



The screenshot shows the 'SQL Server Import and Export Wizard' window, specifically the 'Choose a Destination' step. The window has a blue title bar and a light gray background. The main area contains the following fields and controls:

- Destination:** A dropdown menu showing 'Flat File Destination'.
- Select a file and specify the file properties and the file format.** (Instructional text)
- File name:** A text box containing 'C:\Users\Administrator\Downloads\Customer.txt' and a 'Browse...' button.
- Locale:** A dropdown menu showing 'English (United Kingdom)' and an unchecked 'Unicode' checkbox.
- Code page:** A dropdown menu showing '1252 (ANSI - Latin I)'.
- Format:** A dropdown menu showing 'Delimited'.
- Text qualifier:** A text box containing '<none>'.
- Column names in the first data row:** A checked checkbox.

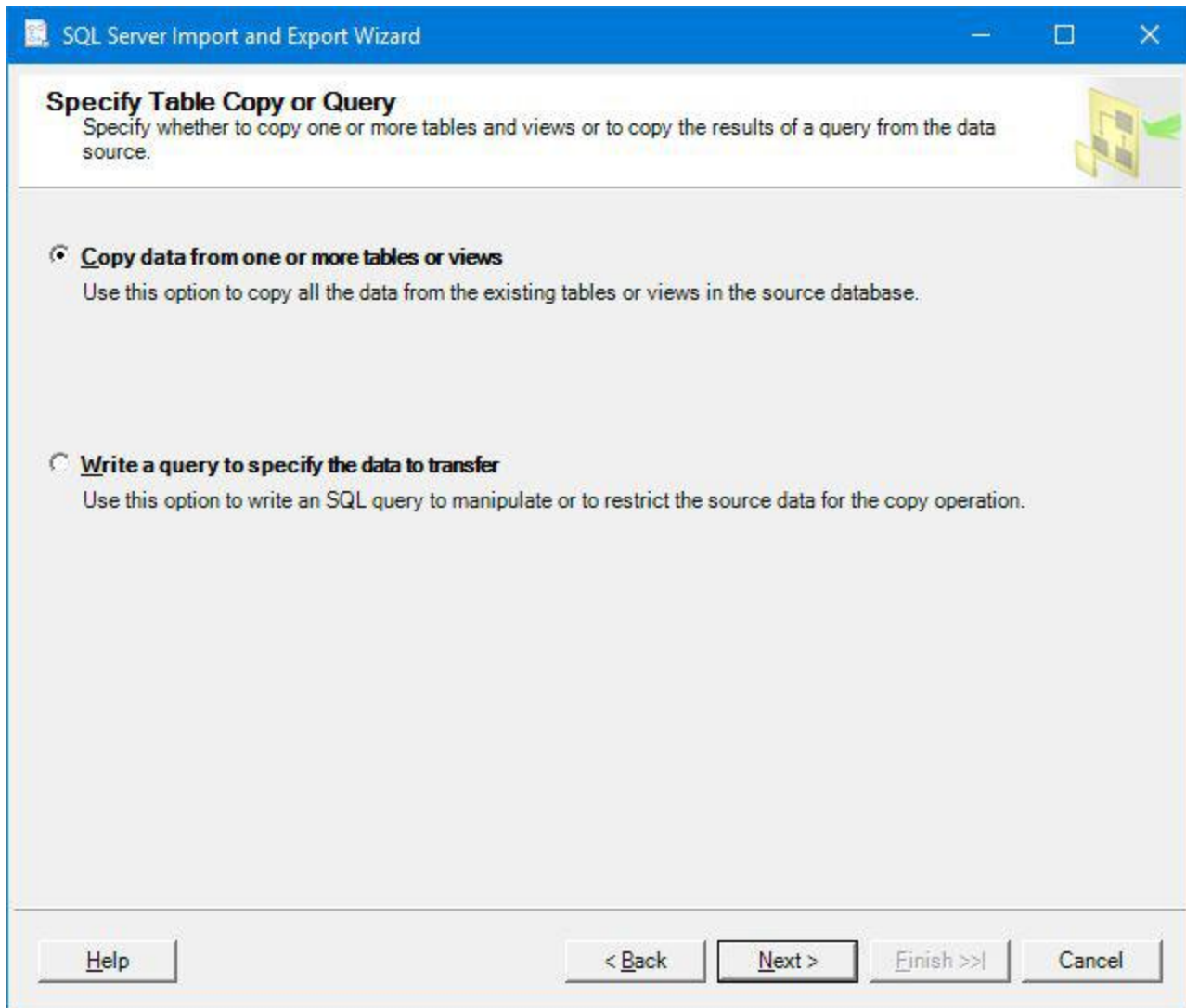
At the bottom of the window, there are four buttons: 'Help', '< Back', 'Next >', and 'Finish >>'. The 'Finish >>' button is disabled.

Destination: Flat File Destination

File name: [BROWSE TO PATH AND ENTER A FILE NAME]

Click: Next

## Specify Table Copy or Query



The screenshot shows the 'SQL Server Import and Export Wizard' window. The title bar reads 'SQL Server Import and Export Wizard'. The main heading is 'Specify Table Copy or Query' with a subtitle: 'Specify whether to copy one or more tables and views or to copy the results of a query from the data source.' There are two radio button options: 'Copy data from one or more tables or views' (selected) and 'Write a query to specify the data to transfer'. The 'Next >' button is highlighted.

**Specify Table Copy or Query**  
Specify whether to copy one or more tables and views or to copy the results of a query from the data source.

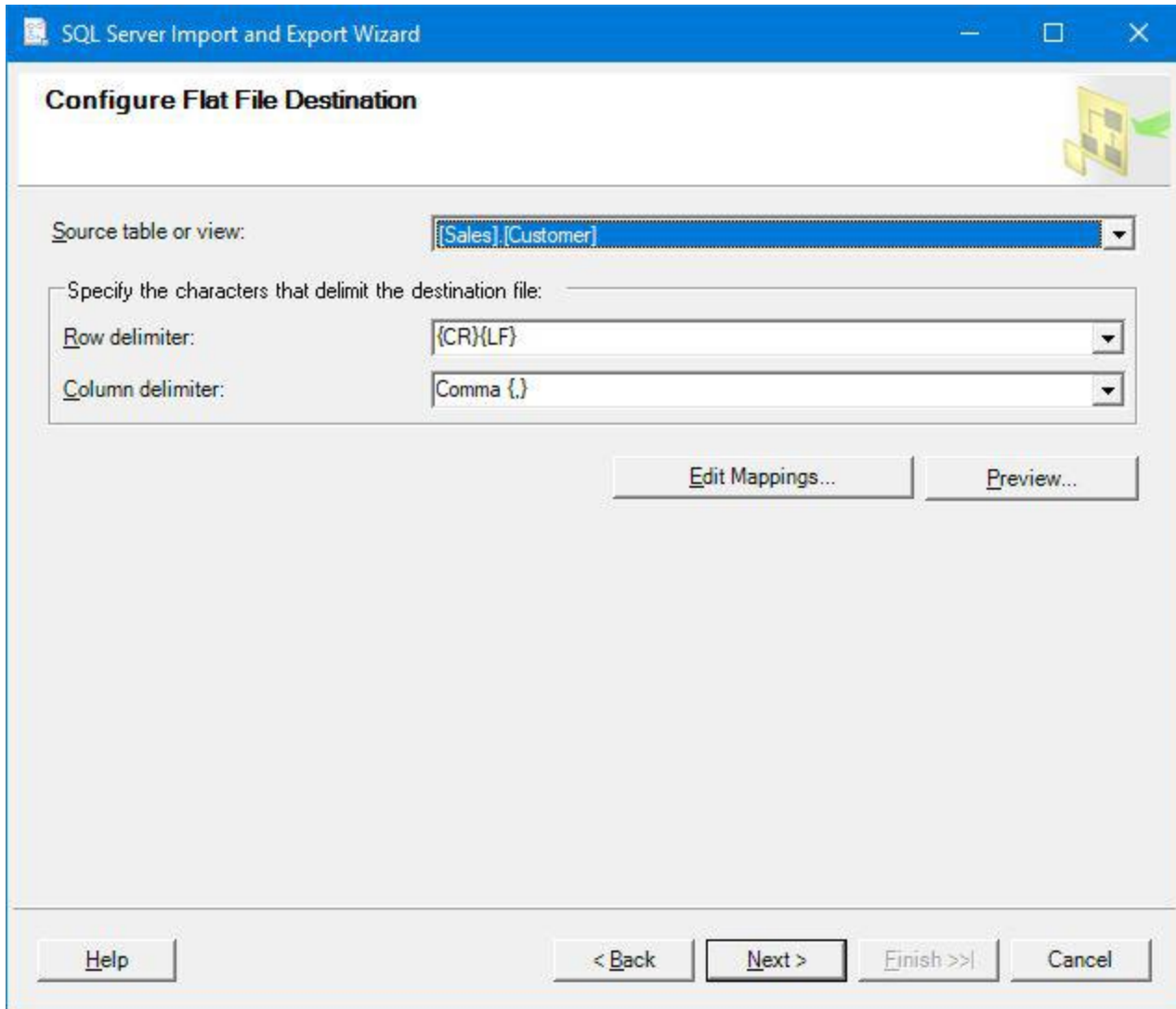
☒ **Copy data from one or more tables or views**  
Use this option to copy all the data from the existing tables or views in the source database.

☐ **Write a query to specify the data to transfer**  
Use this option to write an SQL query to manipulate or to restrict the source data for the copy operation.

Help      < Back      **Next >**      Finish >>      Cancel

Click: Next

## Configure Flat File Destination



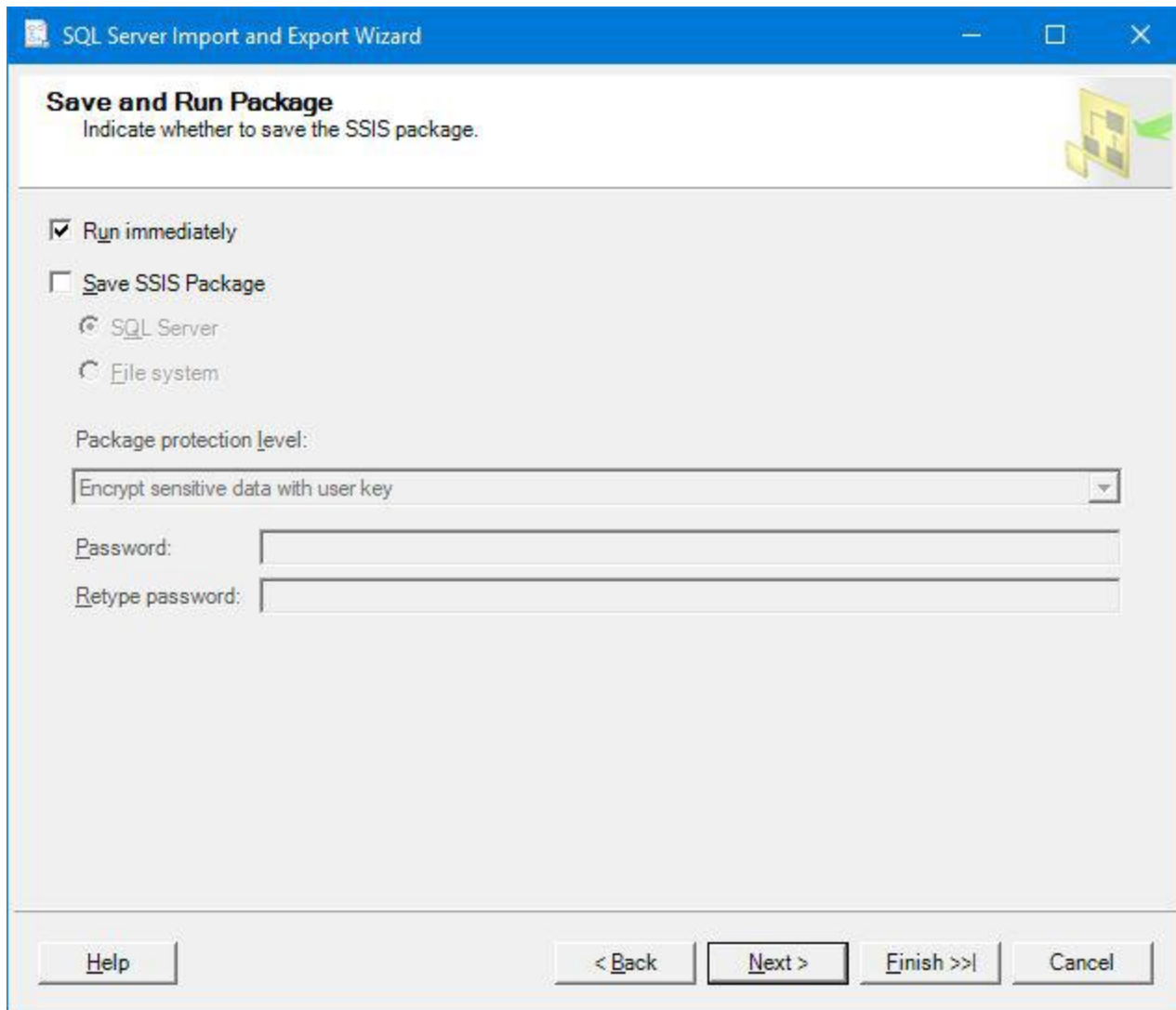
The screenshot shows the 'Configure Flat File Destination' step of the 'SQL Server Import and Export Wizard'. The window title is 'SQL Server Import and Export Wizard'. The main heading is 'Configure Flat File Destination'. Below the heading, there is a section for 'Source table or view:' with a dropdown menu showing '[Sales].[Customer]'. Below this, there is a section for 'Specify the characters that delimit the destination file:'. This section contains two dropdown menus: 'Row delimiter:' set to '{CR}{LF}' and 'Column delimiter:' set to 'Comma (,)'. To the right of these dropdowns are two buttons: 'Edit Mappings...' and 'Preview...'. At the bottom of the window, there are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'.

Select: [Sales].[Customer]

Note: These are the tables used in our SAP BusinessObjects Universe.

Click: Next

## Save and Run Package



The screenshot shows the 'SQL Server Import and Export Wizard' window, specifically the 'Save and Run Package' step. The window title is 'SQL Server Import and Export Wizard'. The main heading is 'Save and Run Package' with a subtitle 'Indicate whether to save the SSIS package.' and a small icon of a package being saved. The 'Run immediately' checkbox is checked. The 'Save SSIS Package' checkbox is unchecked. Under 'Save SSIS Package', there are two radio buttons: 'SQL Server' (selected) and 'File system'. The 'Package protection level:' dropdown menu is set to 'Encrypt sensitive data with user key'. Below this are two text boxes for 'Password:' and 'Retype password:'. At the bottom, there are four buttons: 'Help', '< Back', 'Next >', and 'Finish >>|'. The 'Next >' button is highlighted.

SQL Server Import and Export Wizard

**Save and Run Package**  
Indicate whether to save the SSIS package.

☒ Run immediately

☐ Save SSIS Package

☒ SQL Server

☐ File system

Package protection level:

Encrypt sensitive data with user key

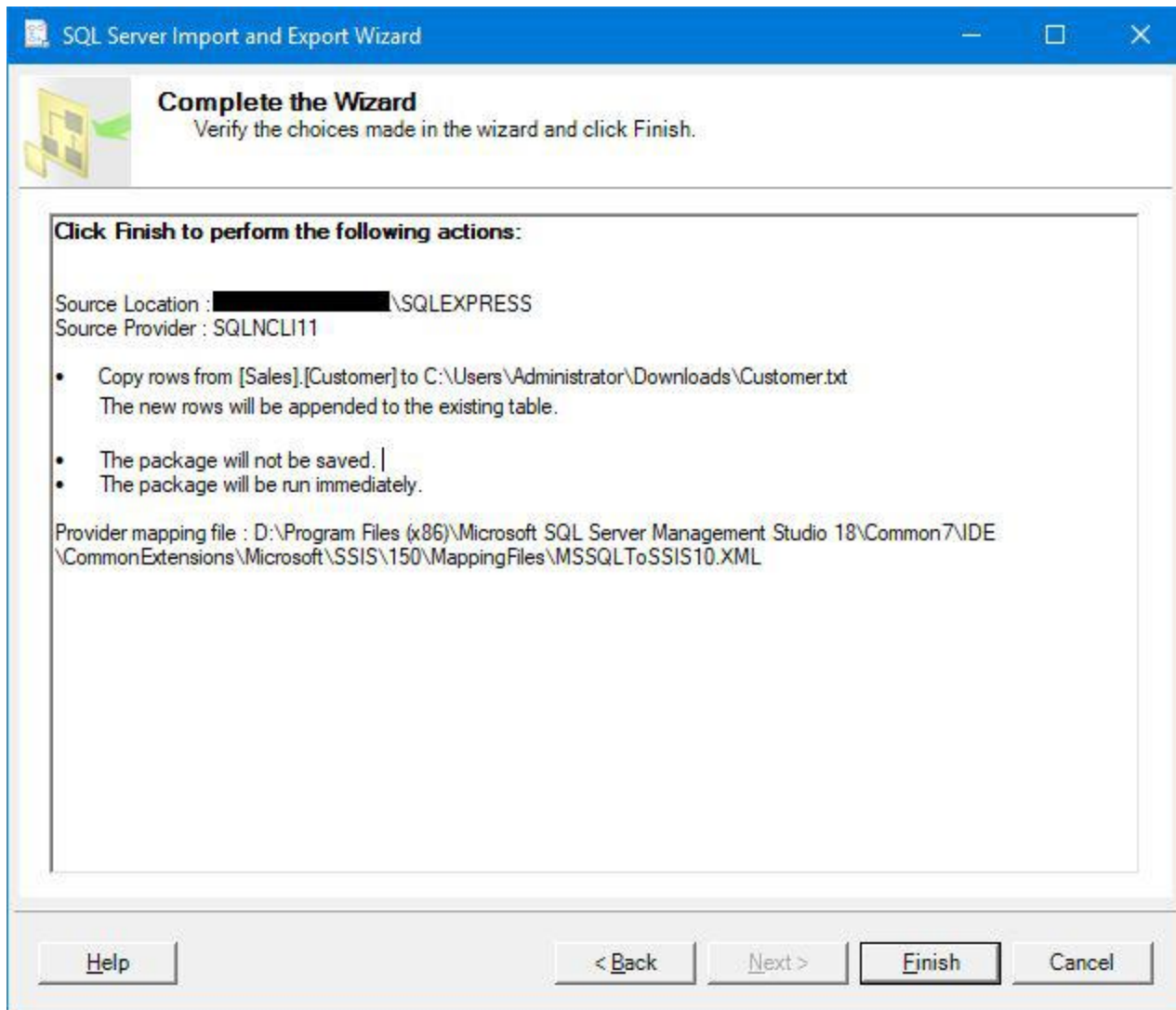
Password:

Retype password:

Help < Back Next > Finish >>| Cancel

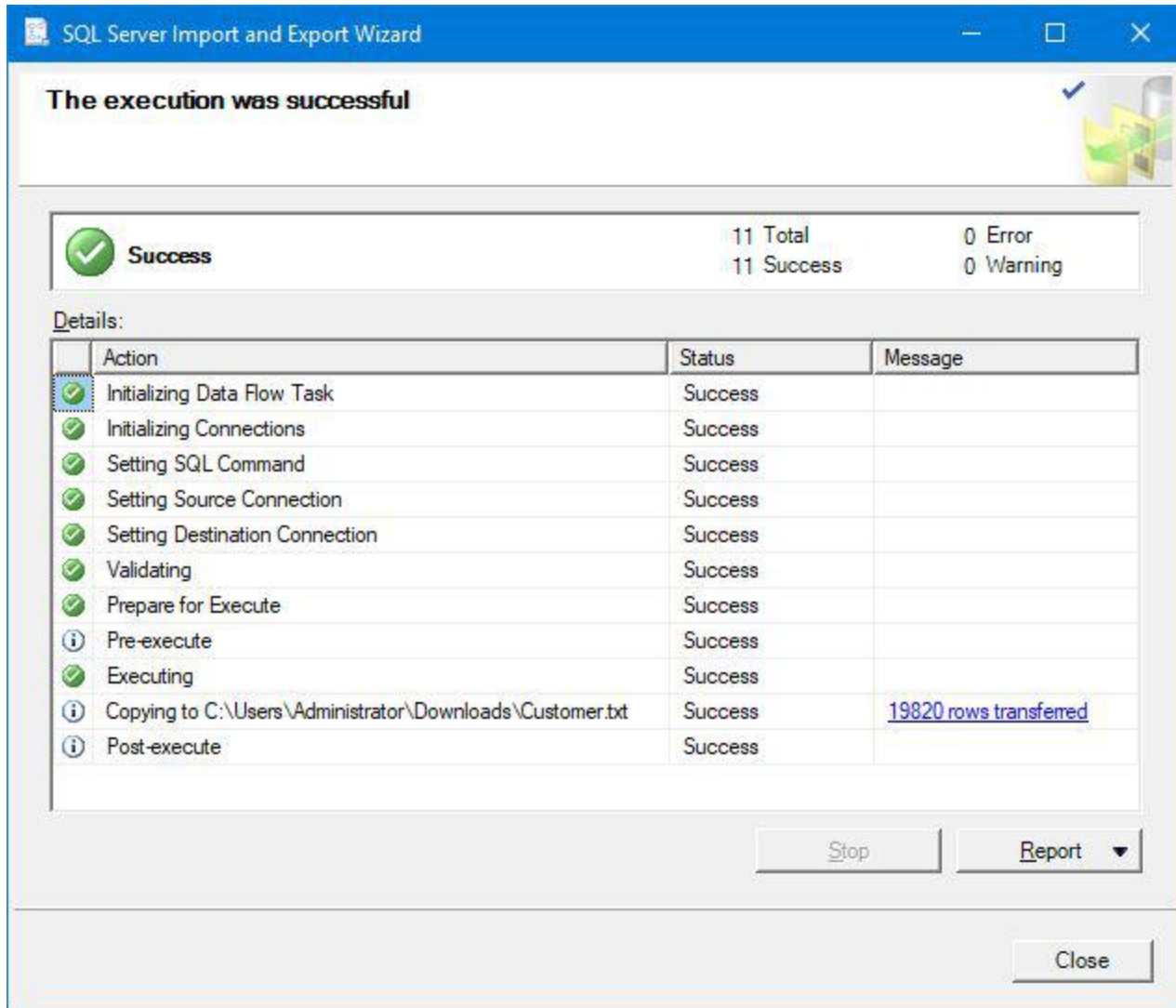
Click: Next

## Complete the Wizard



Click: Finish

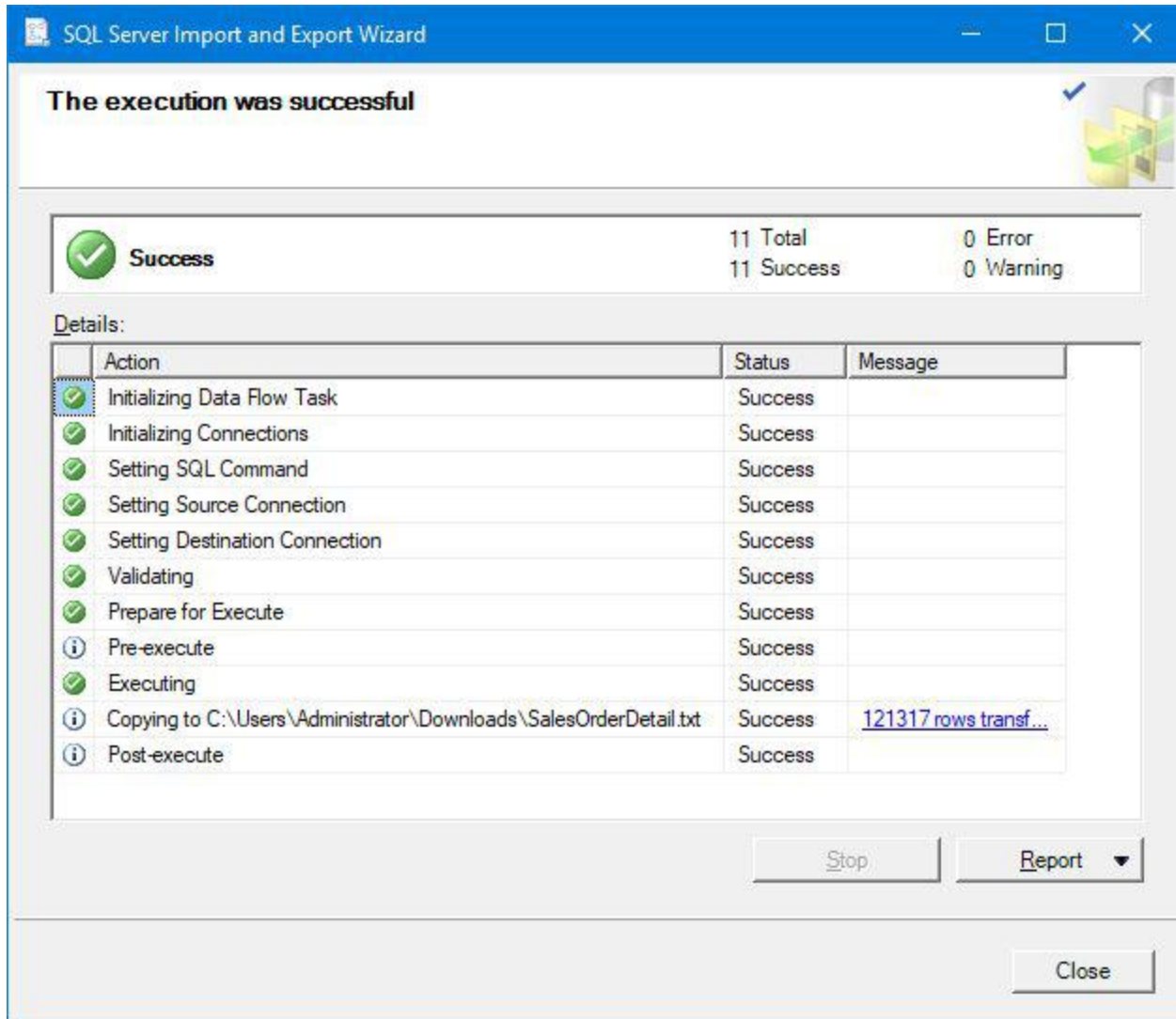
The execution was successful



Click: Close



Repeat for SalesOrderDetail and SalesOrderHeader







SQL Server Import and Export Wizard

**The execution was successful**

**Success** 11 Total 0 Error  
11 Success 0 Warning

Details:

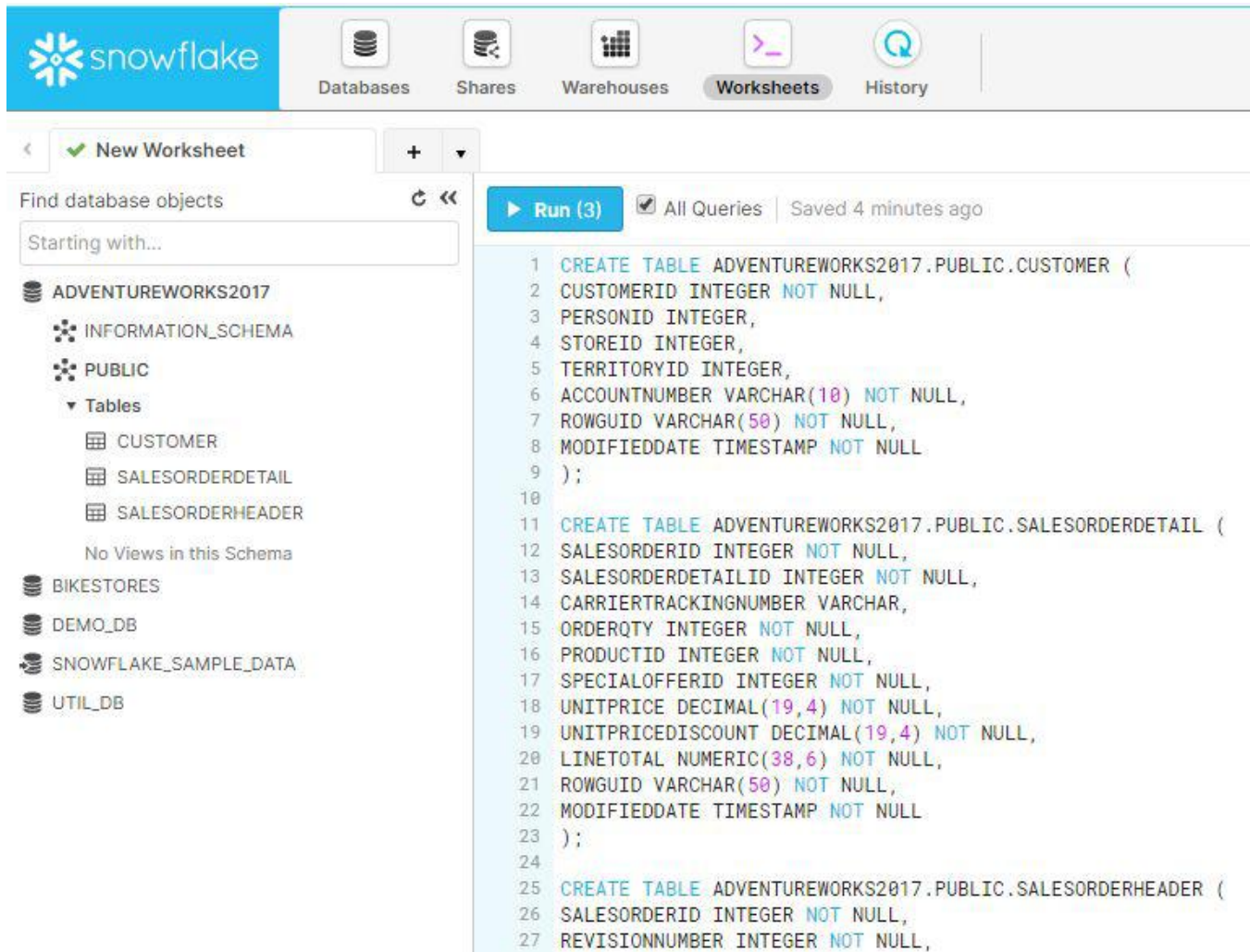
| Action                                                           | Status  | Message                                |
|------------------------------------------------------------------|---------|----------------------------------------|
| Initializing Data Flow Task                                      | Success |                                        |
| Initializing Connections                                         | Success |                                        |
| Setting SQL Command                                              | Success |                                        |
| Setting Source Connection                                        | Success |                                        |
| Setting Destination Connection                                   | Success |                                        |
| Validating                                                       | Success |                                        |
| Prepare for Execute                                              | Success |                                        |
| Pre-execute                                                      | Success |                                        |
| Executing                                                        | Success |                                        |
| Copying to C:\Users\Administrator\Downloads\SalesOrderHeader.txt | Success | <a href="#">31465 rows transferred</a> |
| Post-execute                                                     | Success |                                        |

|                      |                  |               |           |
|----------------------|------------------|---------------|-----------|
| Customer.txt         | 30/03/2020 13:35 | Text Document | 1,852 KB  |
| SalesOrderDetail.txt | 30/03/2020 11:17 | Text Document | 12,648 KB |
| SalesOrderHeader.txt | 30/03/2020 11:19 | Text Document | 7,323 KB  |

# Create Tables in Snowflake

Login to Snowflake

Click: Worksheets



The screenshot shows the Snowflake web interface. At the top, there's a navigation bar with icons for Databases, Shares, Warehouses, Worksheets (selected), and History. Below this, a sidebar on the left shows a tree view of database objects. The main area on the right contains a SQL editor with a 'Run (3)' button and a status bar indicating 'All Queries' and 'Saved 4 minutes ago'.

**Database Objects:**

- ADVENTUREWORKS2017
  - INFORMATION\_SCHEMA
  - PUBLIC
    - Tables
      - CUSTOMER
      - SALESORDERDETAIL
      - SALESORDERHEADER
    - No Views in this Schema
- BIKESTORES
- DEMO\_DB
- SNOWFLAKE\_SAMPLE\_DATA
- UTIL\_DB

**SQL Code:**

```

1 CREATE TABLE ADVENTUREWORKS2017.PUBLIC.CUSTOMER (
2   CUSTOMERID INTEGER NOT NULL,
3   PERSONID INTEGER,
4   STOREID INTEGER,
5   TERRITORYID INTEGER,
6   ACCOUNTNUMBER VARCHAR(10) NOT NULL,
7   ROWGUID VARCHAR(50) NOT NULL,
8   MODIFIEDDATE TIMESTAMP NOT NULL
9 );
10
11 CREATE TABLE ADVENTUREWORKS2017.PUBLIC.SALESORDERDETAIL (
12   SALESORDERID INTEGER NOT NULL,
13   SALESORDERDETAILID INTEGER NOT NULL,
14   CARRIERTRACKINGNUMBER VARCHAR,
15   ORDERQTY INTEGER NOT NULL,
16   PRODUCTID INTEGER NOT NULL,
17   SPECIALOFFERID INTEGER NOT NULL,
18   UNITPRICE DECIMAL(19,4) NOT NULL,
19   UNITPRICEDISCOUNT DECIMAL(19,4) NOT NULL,
20   LINETOTAL NUMERIC(38,6) NOT NULL,
21   ROWGUID VARCHAR(50) NOT NULL,
22   MODIFIEDDATE TIMESTAMP NOT NULL
23 );
24
25 CREATE TABLE ADVENTUREWORKS2017.PUBLIC.SALESORDERHEADER (
26   SALESORDERID INTEGER NOT NULL,
27   REVISIONNUMBER INTEGER NOT NULL,

```



Copy / Paste this SQL Query to create the new tables:

```
CREATE TABLE ADVENTUREWORKS2017.PUBLIC.CUSTOMER (  
CUSTOMERID INTEGER NOT NULL,  
PERSONID INTEGER,  
STOREID INTEGER,  
TERRITORYID INTEGER,  
ACCOUNTNUMBER VARCHAR(10) NOT NULL,  
ROWGUID VARCHAR(50) NOT NULL,  
MODIFIEDDATE TIMESTAMP NOT NULL  
);
```

```
CREATE TABLE ADVENTUREWORKS2017.PUBLIC.SALESORDERDETAIL (  
SALESORDERID INTEGER NOT NULL,  
SALESORDERDETAILID INTEGER NOT NULL,  
CARRIERTRACKINGNUMBER VARCHAR,  
ORDERQTY INTEGER NOT NULL,  
PRODUCTID INTEGER NOT NULL,  
SPECIALOFFERID INTEGER NOT NULL,  
UNITPRICE DECIMAL(19,4) NOT NULL,  
UNITPRICEDISCOUNT DECIMAL(19,4) NOT NULL,  
LINETOTAL NUMERIC(38,6) NOT NULL,  
ROWGUID VARCHAR(50) NOT NULL,  
MODIFIEDDATE TIMESTAMP NOT NULL  
);
```

```
CREATE TABLE ADVENTUREWORKS2017.PUBLIC.SALESORDERHEADER (  
SALESORDERID INTEGER NOT NULL,  
REVISIONNUMBER INTEGER NOT NULL,  
ORDERDATE TIMESTAMP NOT NULL,  
DUEDATE TIMESTAMP NOT NULL,  
SHIPDATE TIMESTAMP,  
STATUS INTEGER NOT NULL,  
ONLINEORDERFLAG BOOLEAN NOT NULL,  
SALESORDERNUMBER VARCHAR NOT NULL,  
PURCHASEORDERNUMBER VARCHAR,  
ACCOUNTNUMBER VARCHAR,  
CUSTOMERID INTEGER NOT NULL,  
SALESPERSONID INTEGER,
```



```
TERRITORYID INTEGER,  
BILLTOADDRESSID INTEGER NOT NULL,  
SHIPTOADDRESSID INTEGER NOT NULL,  
SHIPMETHODID INTEGER NOT NULL,  
CREDITCARDID INTEGER,  
CREDITCARDAPPROVALCODE VARCHAR(15),  
CURRENCYRATEID INTEGER,  
SUBTOTAL DECIMAL(19,4) NOT NULL,  
TAXAMT DECIMAL(19,4) NOT NULL,  
FREIGHT DECIMAL(19,4) NOT NULL,  
TOTALDUE DECIMAL(19,4) NOT NULL,  
COMMENT VARCHAR,  
ROWGUID VARCHAR(50) NOT NULL,  
MODIFIEDDATE TIMESTAMP NOT NULL  
);
```

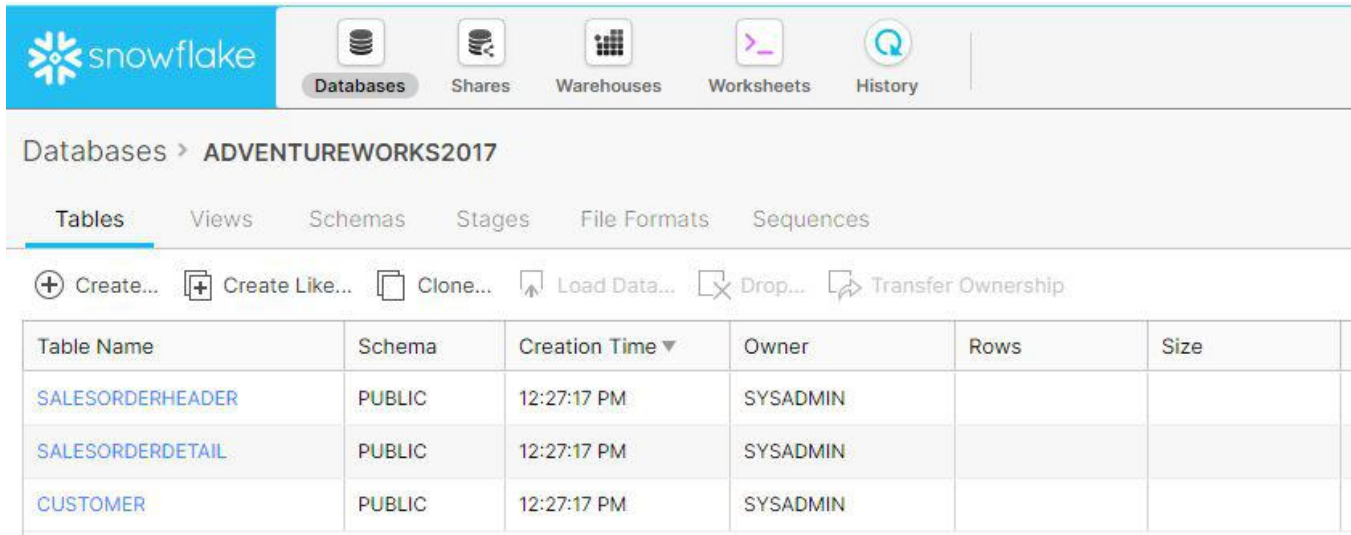
Click: Run

# Import Data via CSV into Snowflake

Logon to Snowflake

Click: Databases

Click: ADVENTUREWORKS2017



The screenshot shows the Snowflake web interface. At the top, there's a navigation bar with icons for Databases, Shares, Warehouses, Worksheets, and History. Below this, the breadcrumb 'Databases > ADVENTUREWORKS2017' is displayed. A sub-navigation bar includes 'Tables', 'Views', 'Schemas', 'Stages', 'File Formats', and 'Sequences'. The 'Tables' tab is active, showing a toolbar with actions: '+ Create...', '+ Create Like...', 'Clone...', 'Load Data...', 'Drop...', and 'Transfer Ownership'. Below the toolbar is a table listing the database's tables:

| Table Name                       | Schema | Creation Time ▼ | Owner    | Rows | Size |
|----------------------------------|--------|-----------------|----------|------|------|
| <a href="#">SALESORDERHEADER</a> | PUBLIC | 12:27:17 PM     | SYSADMIN |      |      |
| <a href="#">SALESORDERDETAIL</a> | PUBLIC | 12:27:17 PM     | SYSADMIN |      |      |
| <a href="#">CUSTOMER</a>         | PUBLIC | 12:27:17 PM     | SYSADMIN |      |      |

Select: CUSTOMER

Click: Load Data...



## Load Data - Warehouse

**Load Data**

Warehouse

Source Files

File Format

Load Options

Which warehouse do you want to use to load the files?

COMPUTE\_WH

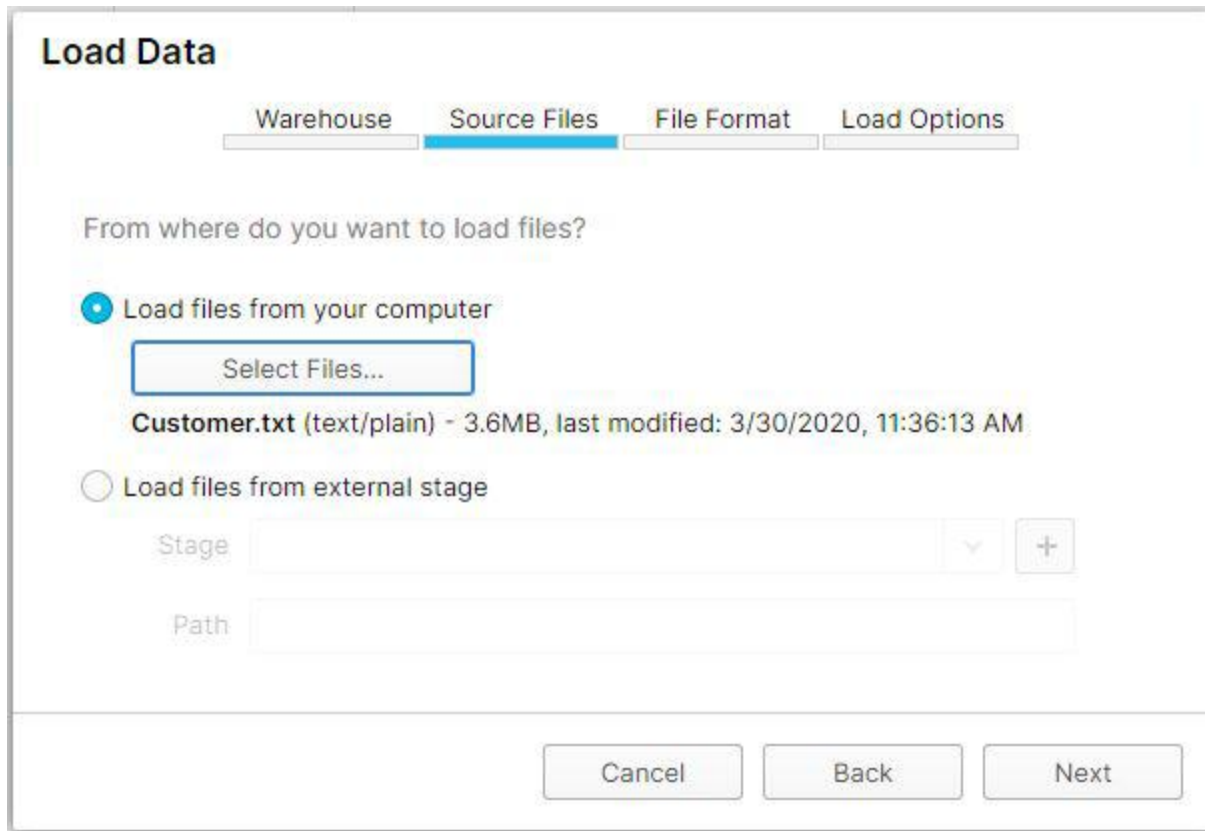
CancelNext

Click: Next

## Load Data - Source Files

Click: Select Files...

Browse: customer.txt



The 'Load Data' dialog box features four tabs: 'Warehouse', 'Source Files' (which is selected and highlighted with a blue underline), 'File Format', and 'Load Options'. Below the tabs, the text 'From where do you want to load files?' is displayed. There are two radio button options. The first option, 'Load files from your computer', is selected with a blue dot. Below this option is a 'Select Files...' button. Underneath the button, the text 'Customer.txt (text/plain) - 3.6MB, last modified: 3/30/2020, 11:36:13 AM' is shown. The second option, 'Load files from external stage', is unselected. Below this option are two input fields: 'Stage' and 'Path'. The 'Stage' field has a dropdown arrow and a '+' button to its right. The 'Path' field is a standard text input box. At the bottom of the dialog, there are three buttons: 'Cancel', 'Back', and 'Next'.

Click: Next



## Load Data - File Format

Click: +

**Load Data**

Warehouse

Source Files

File Format

Load Options

▼

+

[Show SQL](#)

Cancel

Back

Next

Load



Name: [ENTER A NAME]

Header lines to skip: Change 0 to 1

### Create File Format

Name \*

CSV\_No\_Header

Schema Name

PUBLIC

▼

Format Type

CSV

▼

Compression Method

AUTO

▼

?

Column separator

,

▼

?

Row separator

\n

▼

?

Header lines to skip

1

▲▼

?

Field optionally enclosed by

NONE

▼

?

Null String

\N

▼

?

☐ Trim space before and after 

?

[Show SQL](#)

Cancel

Finish

Click: Finish



## Load Data

Warehouse Source Files **File Format** Load Options

CSV\_NO\_HEADER



[Show SQL](#)

Cancel

Back

Next

Load

Click: Load

## Load Results

| Loaded | File         | Rows Parsed | Rows Loaded |
|--------|--------------|-------------|-------------|
| ✓      | Customer.txt | 19820       | 19820       |

OK



Repeat for SALESORDERDETAIL and SALESORDERHEADER

snowflake

Databases Shares Warehouses Worksheets History

Databases > ADVENTUREWORKS2017

Tables Views Schemas Stages File Formats Sequences

+ Create... + Create Like... Clone... Load Data... Drop... Transfer Ownership

| Table Name       | Schema | Creation Time ▼ | Owner    | Rows   | Size    |
|------------------|--------|-----------------|----------|--------|---------|
| SALESORDERHEADER | PUBLIC | 12:27:17 PM     | SYSADMIN | 31.5K  | 2.5MB   |
| SALESORDERDETAIL | PUBLIC | 12:27:17 PM     | SYSADMIN | 121.3K | 5.5MB   |
| CUSTOMER         | PUBLIC | 12:27:17 PM     | SYSADMIN | 19.8K  | 874.5KB |

# What's Next?

Now that we have our data into Snowflake, we need to work with SAP BusinessObjects to make its content e.g.: Universes and Connections, Web Intelligence and Crystal Reports point to the new data source.

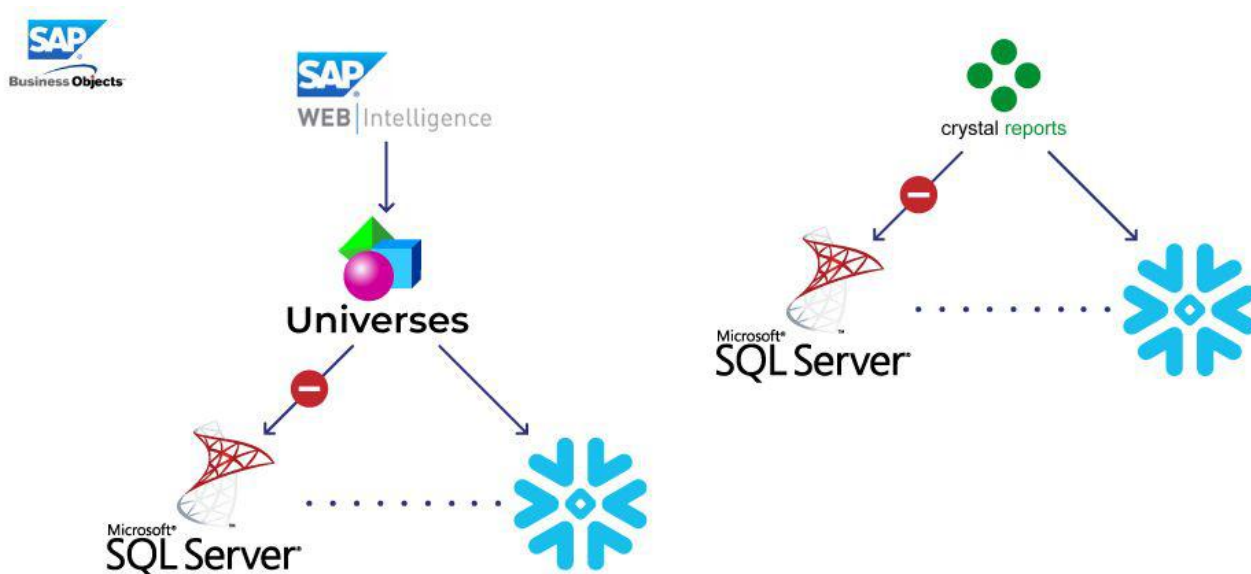
As mentioned in the introduction, some of you will only be required to repoint the Universe Connection to Snowflake. This may be true if there are no changes to the owners, qualifiers, schema or presence of vendor specific SQL in the Universes.

Others for reasons mentioned above will need first to make a copy of the existing Universe to not affect Production before repointing it to Snowflake. Next is to repair the Universes where required. Finally and based on your scenario, you may have to repoint all content to this new Universe.

The next sections will demonstrate this use case. Not all steps may be applicable to your project.

These steps can be done manually and/or via automated solutions by [360Suite](#) to reduce time, cost, and risks.

Finally, it is important to perform enough functional, data, and performance testing to ensure the project is successful.



# Updating SAP BusinessObjects

## Copying Universes

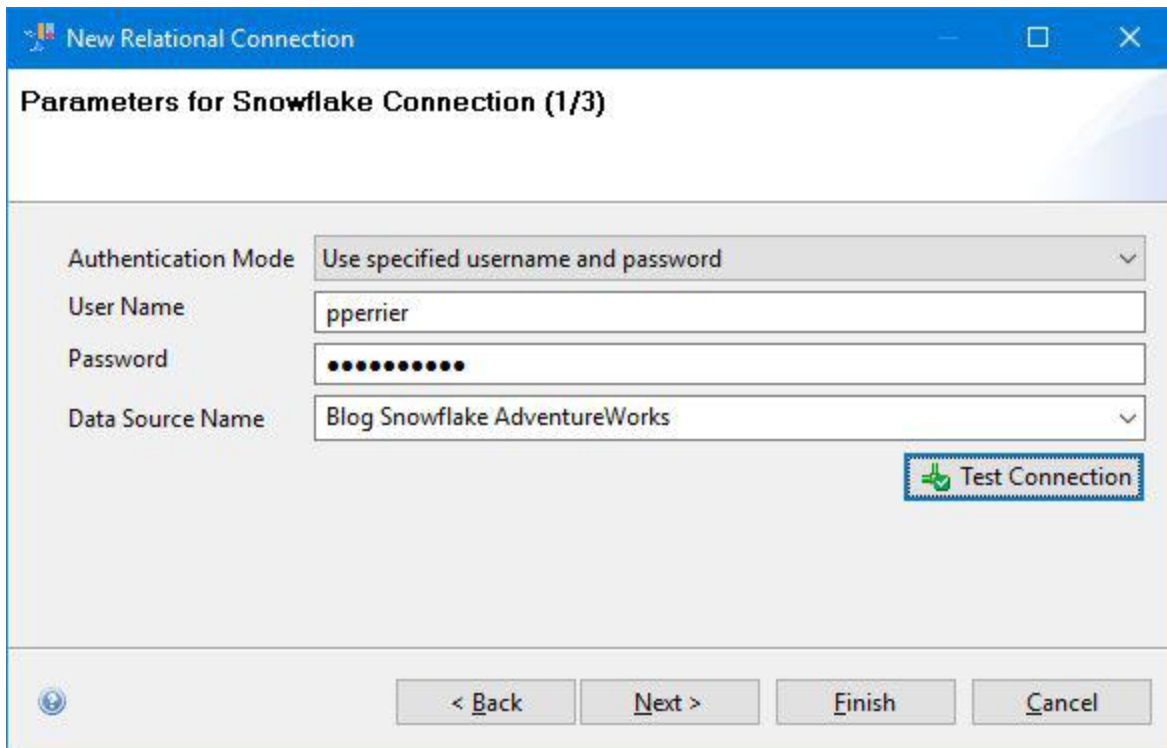
The first step is to create a copy of the existing *AdventureWorks2017* currently pointing to Microsoft SQL Server and make it use the new Snowflake database.

By the end of this section, before you repoint your documents (e.g.: Web Intelligence, Crystal Reports) you want to make sure the Universe is working correctly by performing a *Check Integrity*.

It may highlight vendor specific SQL syntax that won't work with Snowflake. Issues with data type, etc. In case there are a lot of objects to repair, we suggest doing this in bulk to save time and avoid mistakes using 360Univ.

### Create a Universe Connection to Snowflake

This step can be done using the 32-bit ODBC or JDBC connection you did earlier in this document.



**New Relational Connection**

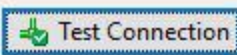
**Parameters for Snowflake Connection (1/3)**

Authentication Mode: Use specified username and password

User Name: pperrier

Password: .....

Data Source Name: Blog Snowflake AdventureWorks

 Test Connection

< Back   Next >   Finish   Cancel



Test Result

Test Successful

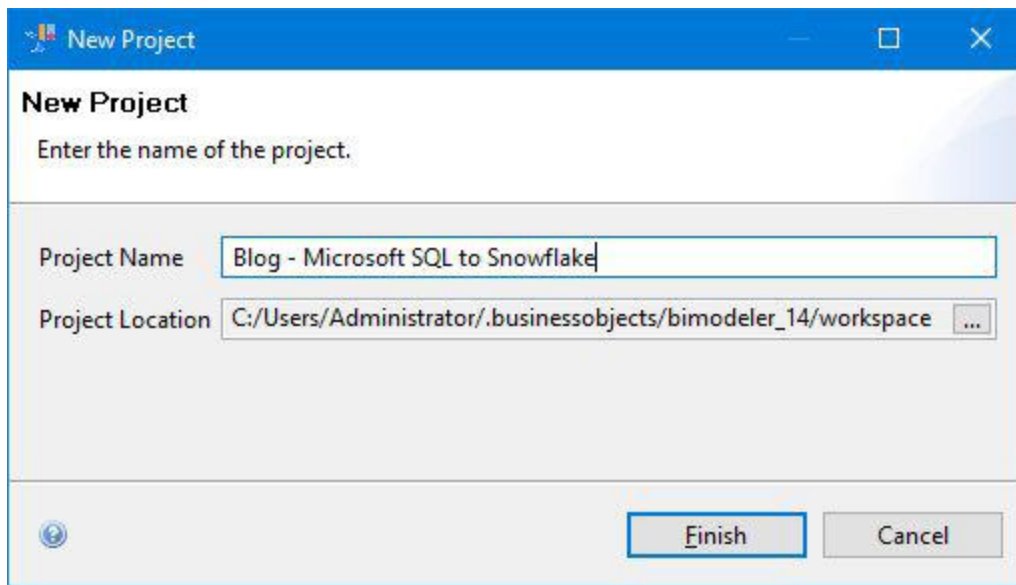
| Name                                     | Value                                                                                                                                     |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BusinessObjects Configuration</b>     |                                                                                                                                           |
| Version                                  | 3.4.0.0                                                                                                                                   |
| Build                                    | 14.2.8.3426                                                                                                                               |
| Network Layer                            | ODBC                                                                                                                                      |
| DBMS Engine                              | Snowflake                                                                                                                                 |
| Language                                 | en                                                                                                                                        |
| Charset                                  |                                                                                                                                           |
| Library                                  | D:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\drivers\lib64\dbd_wodbc3.dll |
| SBO                                      | D:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\odbc\snowflake.sbo           |
| RSS                                      | D:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\odbc\snowflake.rss           |
| PRM                                      | D:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\odbc\snowflake.prm           |
| Strategies                               | Not Defined                                                                                                                               |
| <b>Middleware and DBMS Configuration</b> |                                                                                                                                           |
| Driver architecture                      | 64                                                                                                                                        |
| Charset                                  | UCS2                                                                                                                                      |
| Driver version                           | 2.20.2                                                                                                                                    |
| Driver API level                         | 03.80                                                                                                                                     |
| ODBC Manager version                     | 03.81.17763.0000                                                                                                                          |
| ODBC Manager API level                   | 03.80.0000                                                                                                                                |
| DBMS name                                | Snowflake                                                                                                                                 |
| DBMS version                             | 4.10.2                                                                                                                                    |

▲ Hide Details Close

Note: See this blog for more details:

<https://blogs.sap.com/2020/03/12/snowflake-for-sap-businessobjects-4.2-sp08/>

## Create a New Local Project



The image shows a 'New Project' dialog box with a blue title bar. The main area is white with a light blue gradient on the right. It contains a text input field for 'Project Name' with the text 'Blog - Microsoft SQL to Snowflake' and a text input field for 'Project Location' with the text 'C:/Users/Administrator/.businessobjects/bimodeler\_14/workspace'. At the bottom right are 'Finish' and 'Cancel' buttons. A help icon is at the bottom left.

**New Project**

Enter the name of the project.

Project Name

Project Location

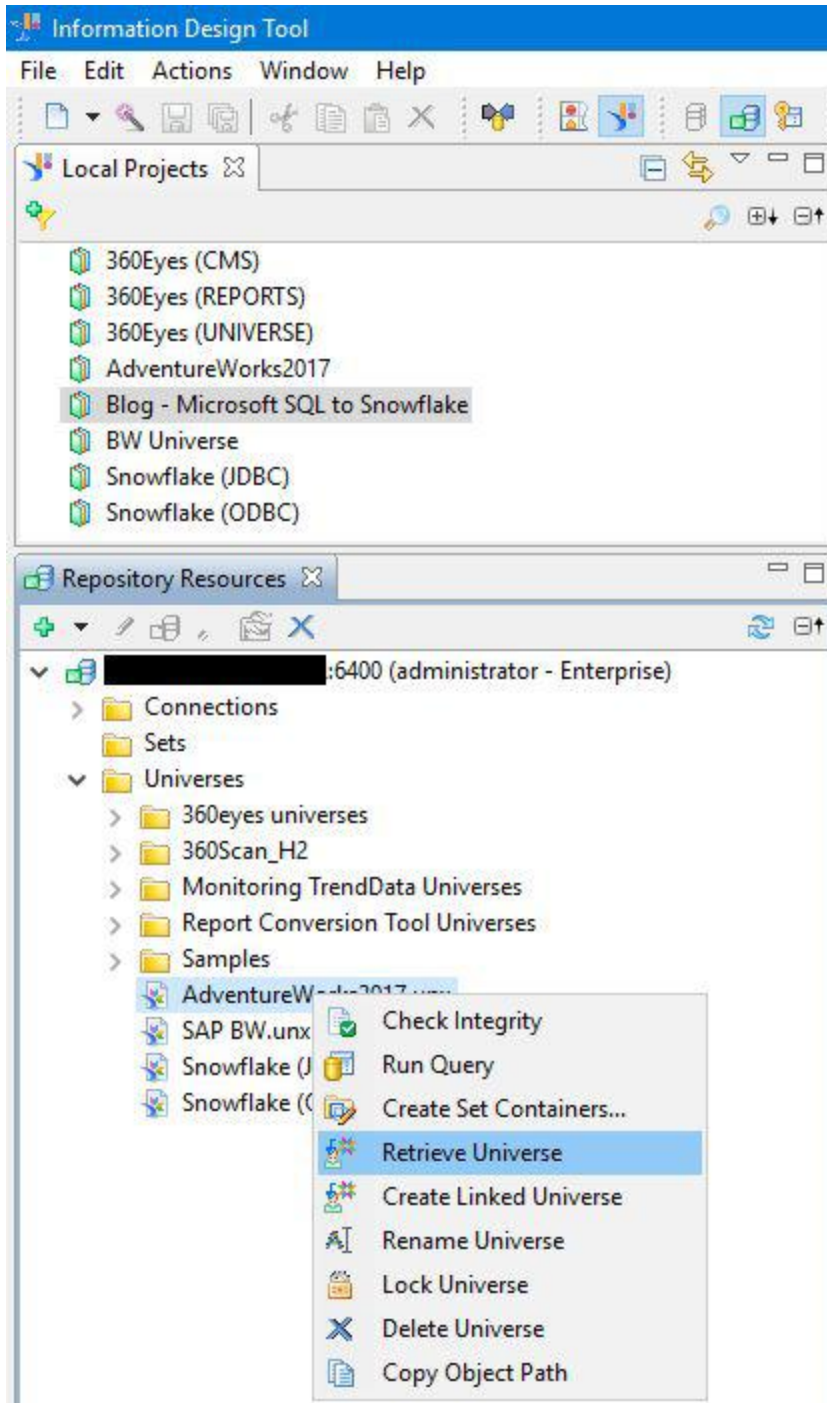


Project Name: Blog - Microsoft SQL to Snowflake

Click: Finish

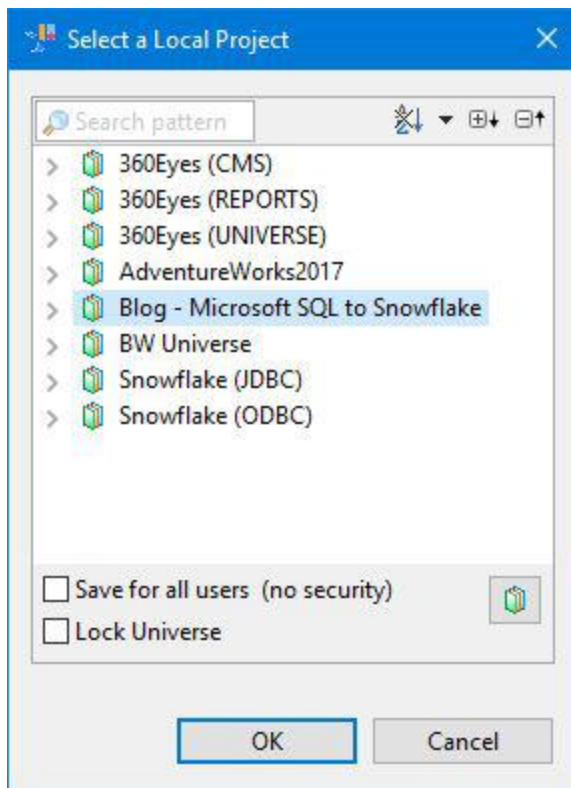


## Retrieve the Universe



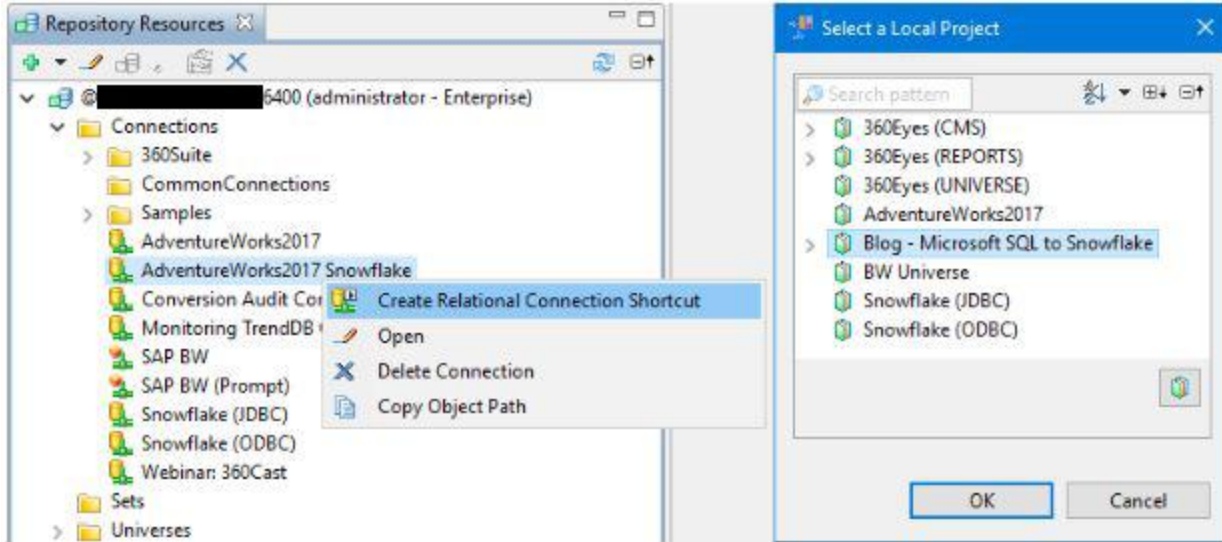


Select a Local Project



Click: OK

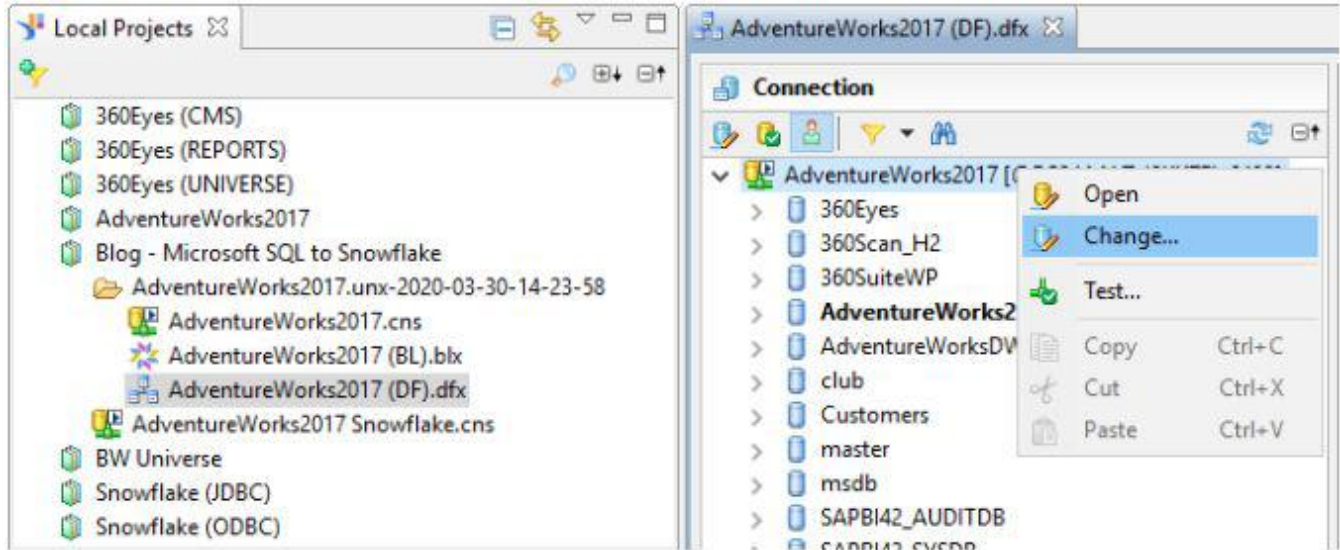
## Create a Relational Connection Shortcut



1. Right-Click AdventureWorks2017 Snowflake
2. Click: Create Relational Connection Shortcut
3. Select a Local Project: Blog - Microsoft SQL to Snowflake
4. Click: OK

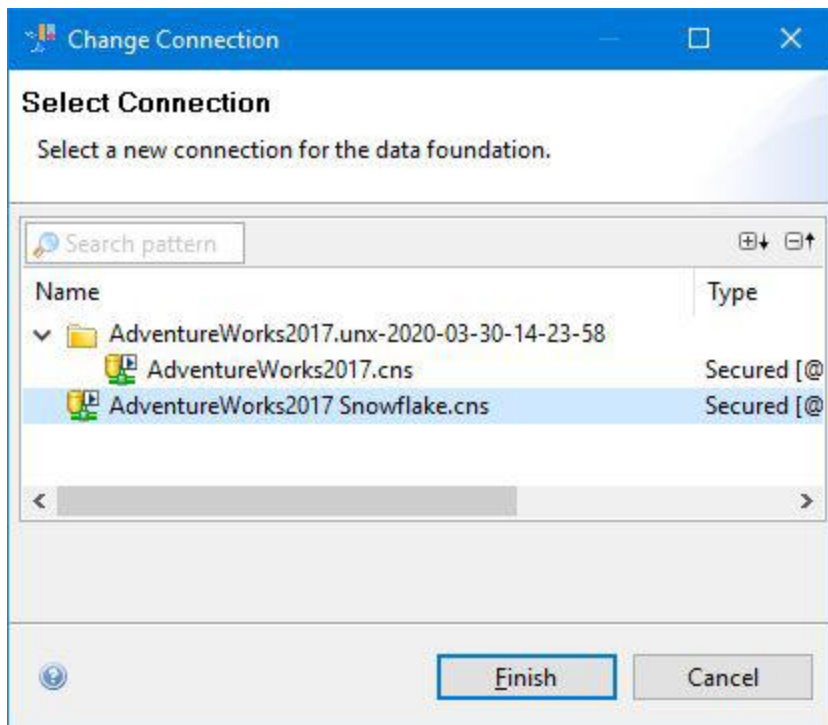
## Repoint the Data Foundation to the Snowflake Connection

1. Open AdventureWorks2017 (DF).dfx



Under Connection > Right-Click AdventureWorks2017  
Click: Change...

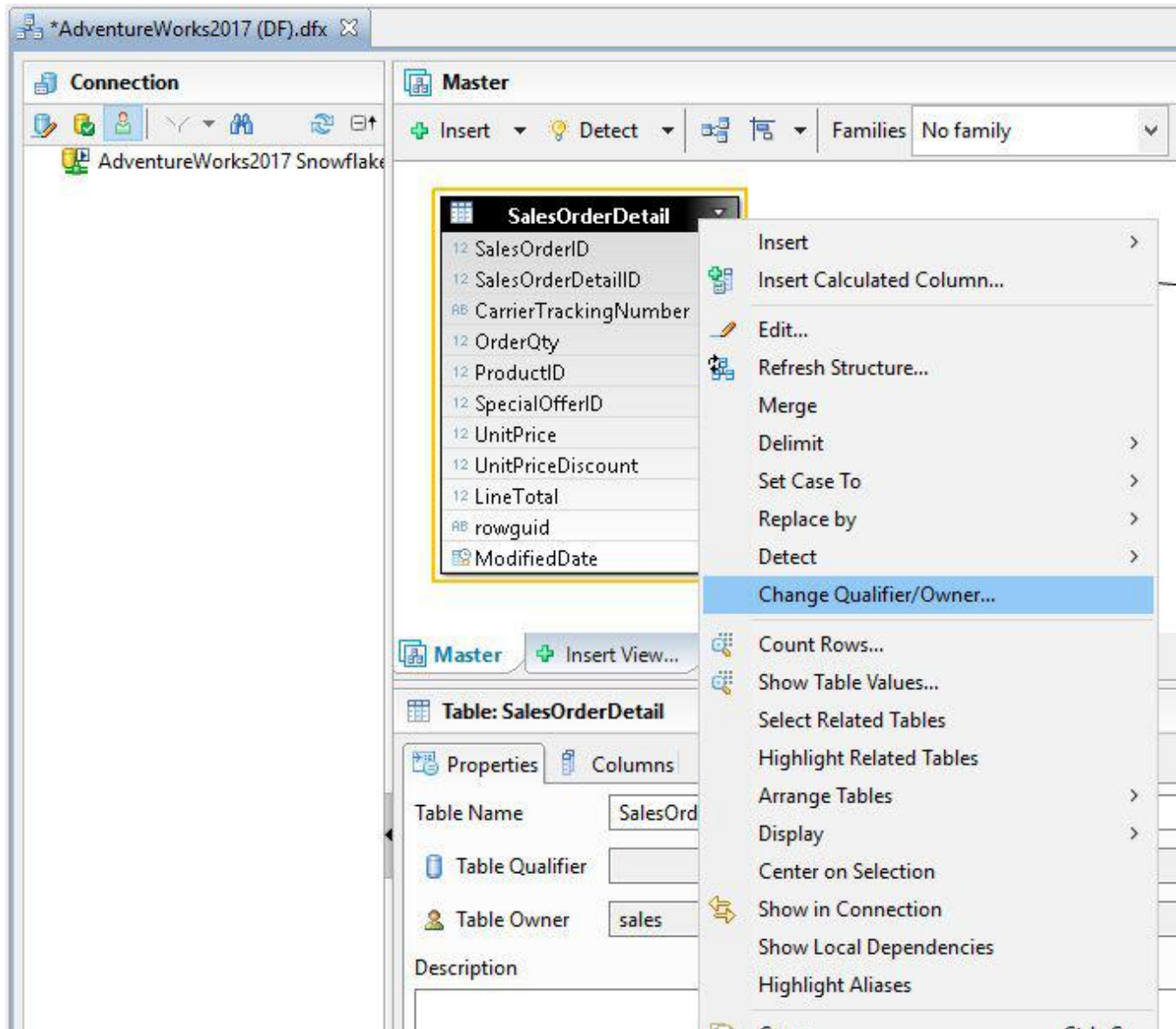
2. Select: AdventureWorks2017 Snowflake.cns



3. Click: Finish
4. Save the Data Foundation

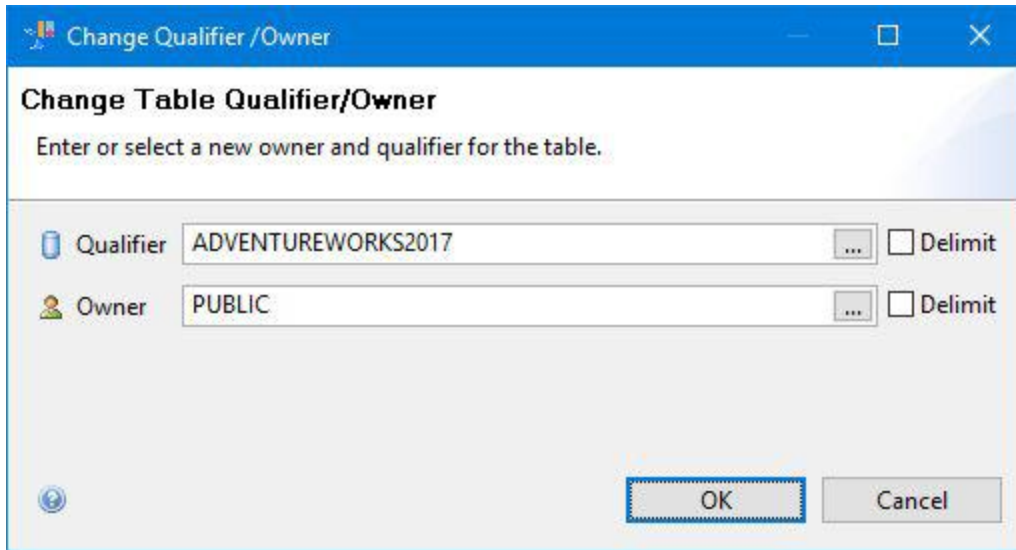
## Change the Qualifier/Owner of the Tables in the Data Foundation

1. Open AdventureWorks2017 (DF).dfx



Under Master > Right-Click: SalesOrderDetail table  
Select Change Qualifier/Owner...

2. Change Table Qualifier/Owner



**Change Qualifier / Owner**

Enter or select a new owner and qualifier for the table.

Qualifier:   ☐ Delimit

Owner:   ☐ Delimit

Enter Qualifier: ADVENTUREWORKS2017

Enter Owner: PUBLIC

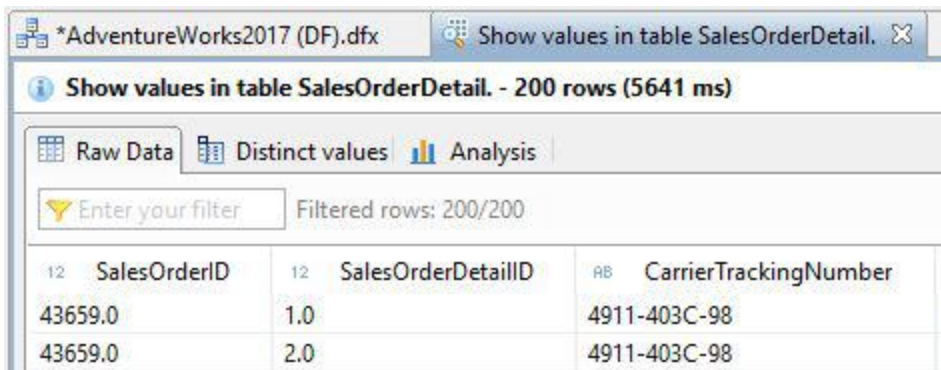
Click: OK

- Repeat for tables: SalesOrderHeader and Customer

Note: You can multiple select tables and change qualifiers in bulk.

- Save the Data Foundation

Note: At this stage you are able to preview data from the tables in the Data Foundation using "Show Table Values".



**Show values in table SalesOrderDetail. - 200 rows (5641 ms)**

Raw Data | Distinct values | Analysis

Enter your filter: Filtered rows: 200/200

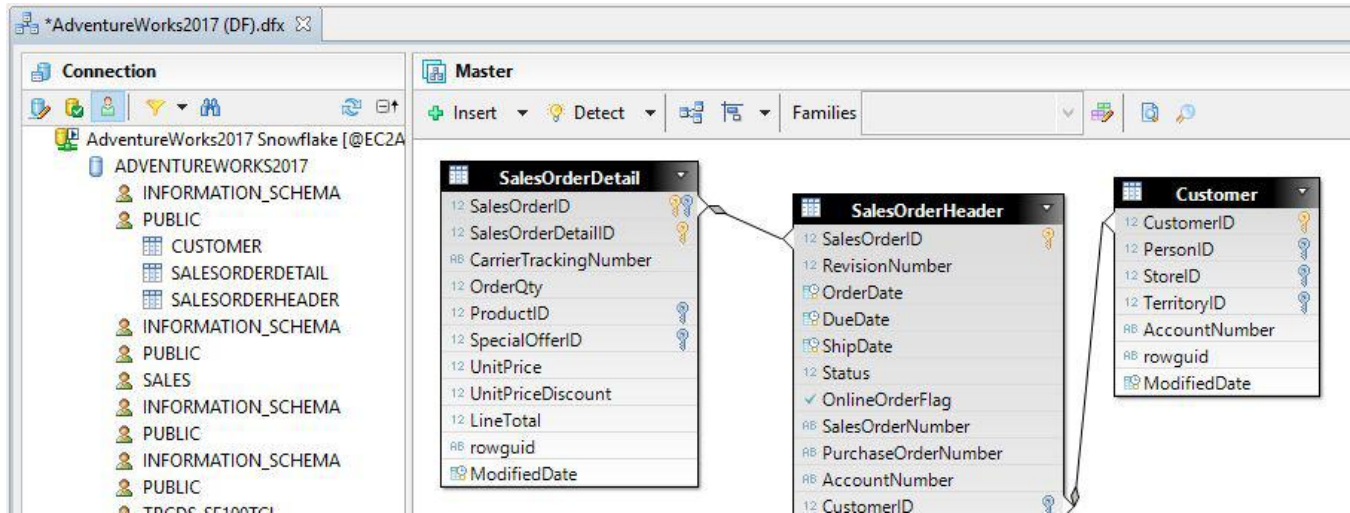
| 12      | SalesOrderID | 12  | SalesOrderDetailID | AB | CarrierTrackingNumber |
|---------|--------------|-----|--------------------|----|-----------------------|
| 43659.0 |              | 1.0 |                    |    | 4911-403C-98          |
| 43659.0 |              | 2.0 |                    |    | 4911-403C-98          |



## Set the Tables and Columns Case

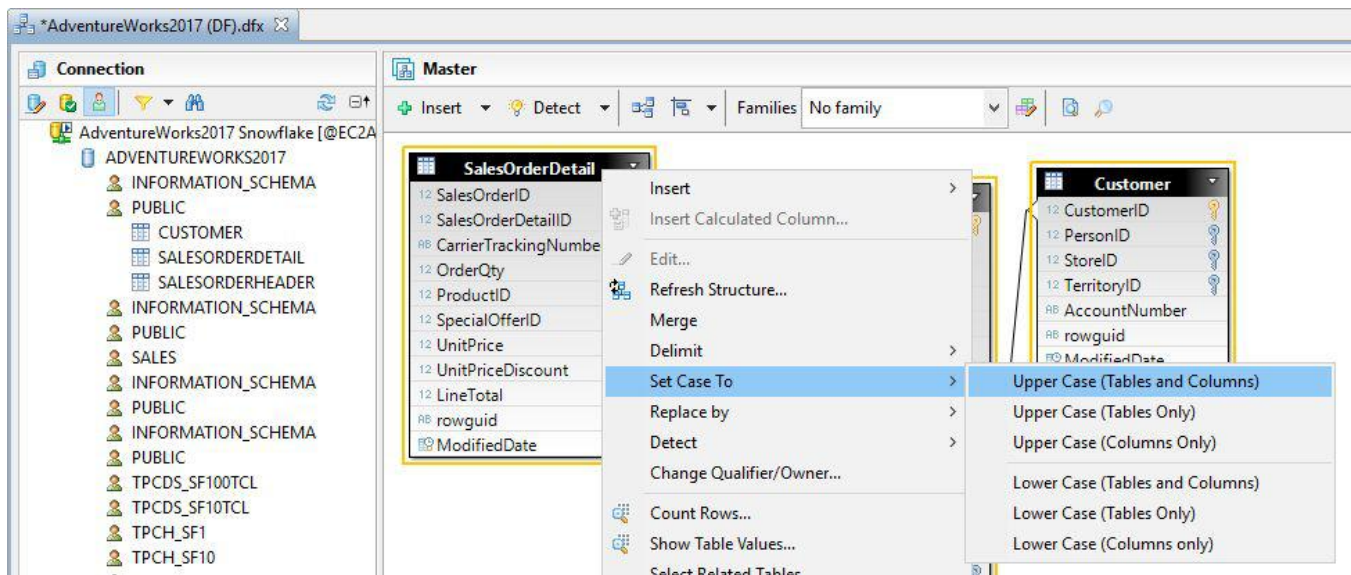
Although you can now preview data, the Information Design Tool doesn't correctly identify the tables in uppercase under Connection (left) with the tables in mixed case under Master (right).

As mentioned in the introduction, this is because the identifiers in Snowflake are case-insensitive but displayed in uppercase.



The following step could be seen as optional as at this stage, the Universe is functional. But if you check the integrity of the Universe it will fail because of this.

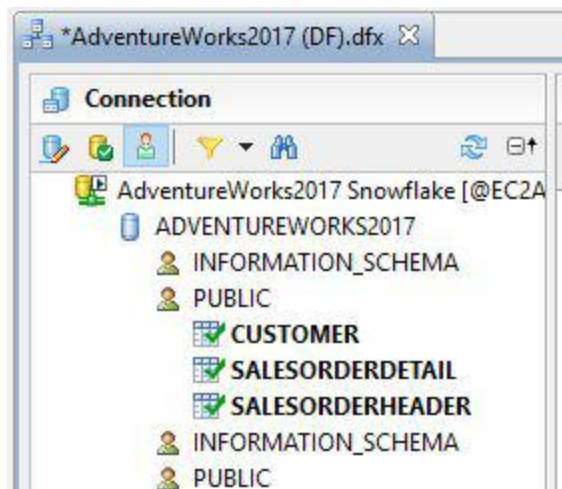
## 5. Open AdventureWorks2017 (DF).dfx



Under Master > Right-Click: SalesOrderDetail table  
Click: Set Cast To > Upper Case (Tables and Columns)

## 6. Repeat for tables: SalesOrderHeader and Customer

Note: You can multiple select tables and change qualifiers in bulk.

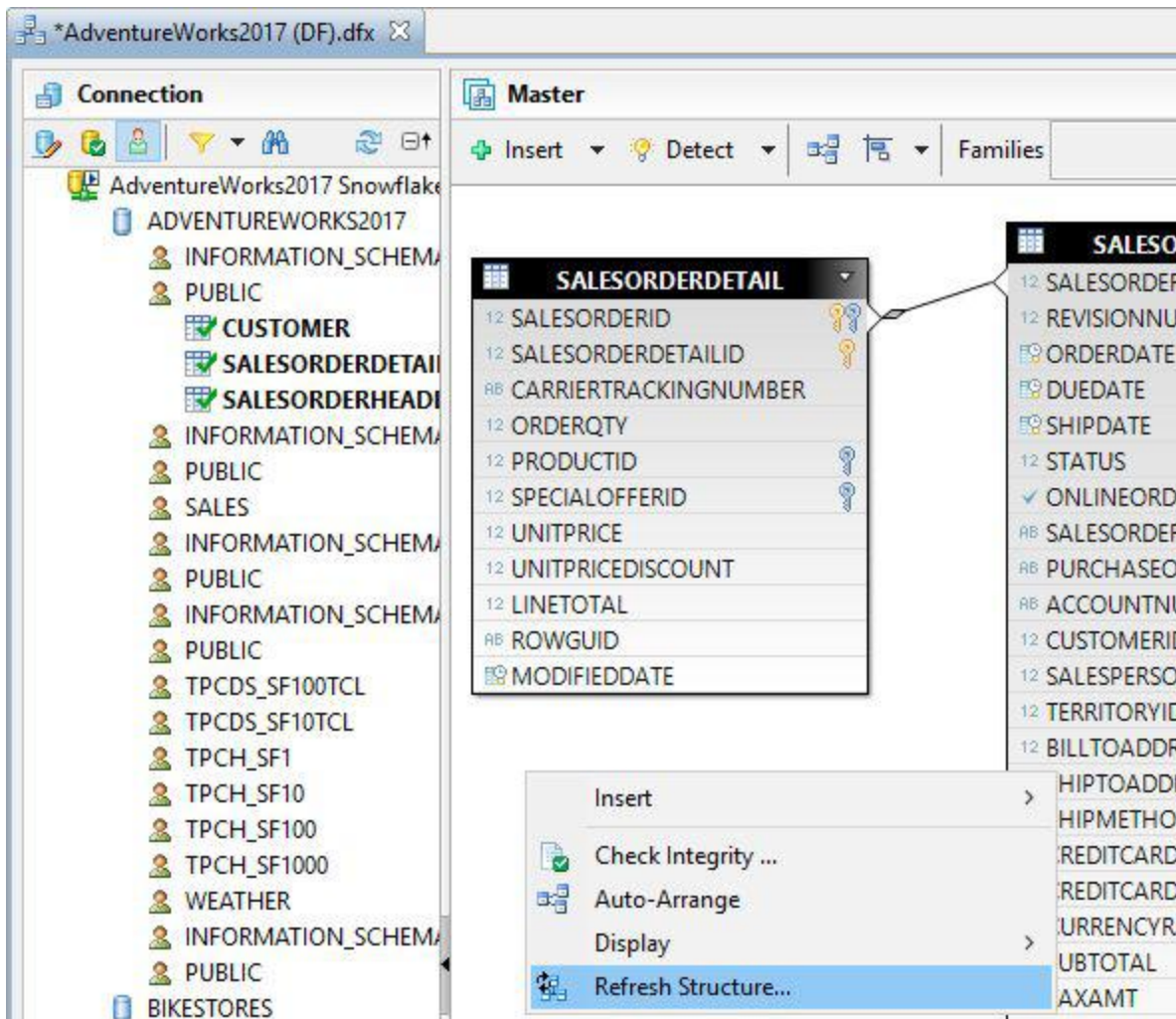


## 7. Save the Data Foundation



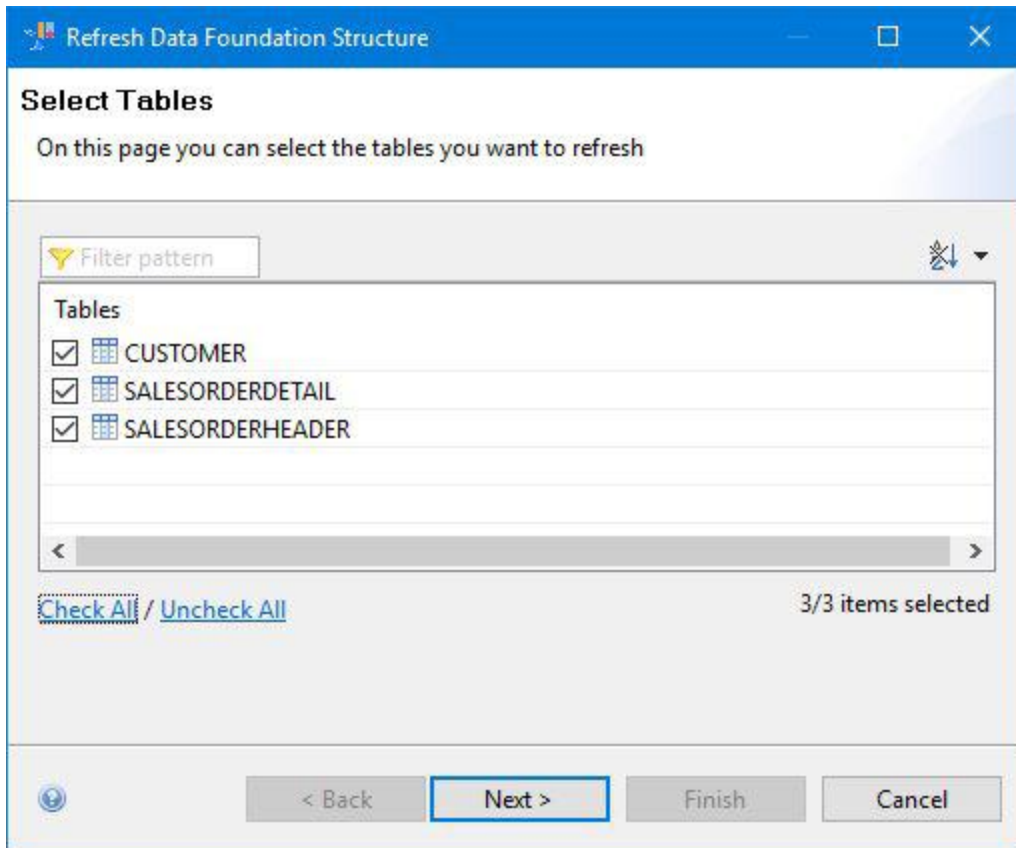
## Refresh Universe Foundation Structure

1. Open AdventureWorks2017 (DF).dfx



Under Master > Right-Click in the white area  
Click: Refresh Structure...

## 2. Select Tables



**Refresh Data Foundation Structure**

**Select Tables**

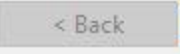
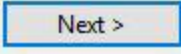
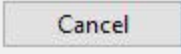
On this page you can select the tables you want to refresh

Filter pattern 

**Tables**

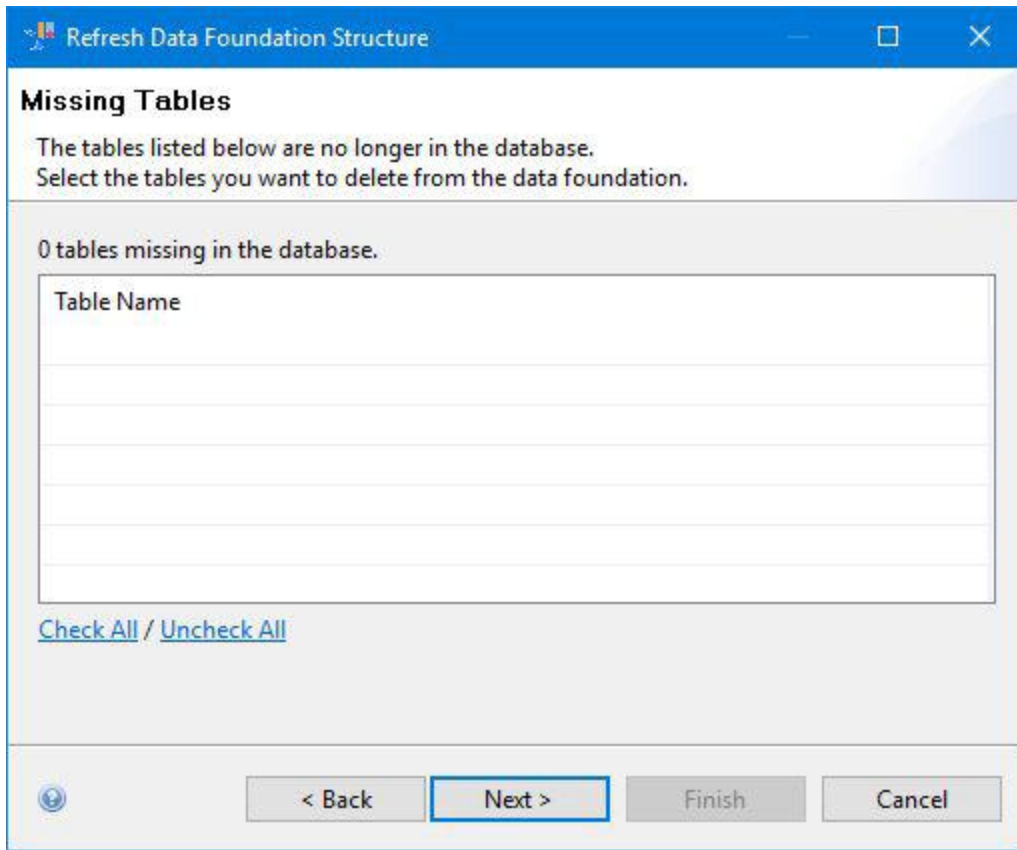
|                                     |                                                                                                    |
|-------------------------------------|----------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> |  CUSTOMER         |
| <input checked="" type="checkbox"/> |  SALESORDERDETAIL |
| <input checked="" type="checkbox"/> |  SALESORDERHEADER |

[Check All](#) / [Uncheck All](#) 3/3 items selected

Click: Next

### 3. Missing Tables



The dialog box is titled "Refresh Data Foundation Structure". It has a blue header bar with standard window controls. The main content area is titled "Missing Tables" and contains the text: "The tables listed below are no longer in the database. Select the tables you want to delete from the data foundation." Below this text, it says "0 tables missing in the database." There is a table with the header "Table Name" and several empty rows. Below the table, there are links for "Check All" and "Uncheck All". At the bottom, there is a status bar with a help icon, and four buttons: "< Back", "Next >" (which is highlighted with a blue border), "Finish", and "Cancel".

**Refresh Data Foundation Structure**

**Missing Tables**

The tables listed below are no longer in the database.  
Select the tables you want to delete from the data foundation.

0 tables missing in the database.

| Table Name |
|------------|
|            |
|            |
|            |
|            |
|            |
|            |

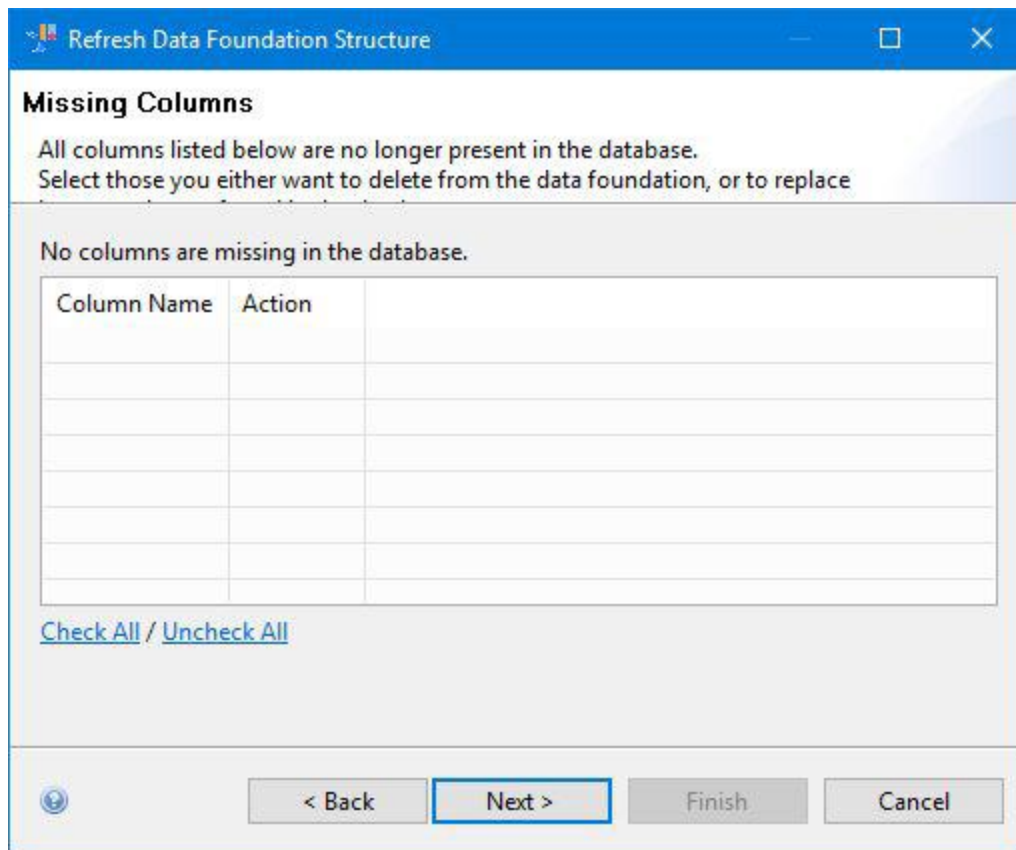
[Check All](#) / [Uncheck All](#)



Click: Next



#### 4. Missing Columns



The dialog box is titled "Refresh Data Foundation Structure". It has a blue header bar with standard window controls. Below the header, the title "Missing Columns" is displayed in bold. A message states: "All columns listed below are no longer present in the database. Select those you either want to delete from the data foundation, or to replace". Below this message, a light gray box contains the text "No columns are missing in the database." and a table with two columns: "Column Name" and "Action". The table is currently empty. Below the table, there are two links: "Check All" and "Uncheck All". At the bottom of the dialog, there is a navigation bar with four buttons: "< Back", "Next >" (which is highlighted with a blue border), "Finish", and "Cancel".

**Missing Columns**

All columns listed below are no longer present in the database.  
Select those you either want to delete from the data foundation, or to replace

No columns are missing in the database.

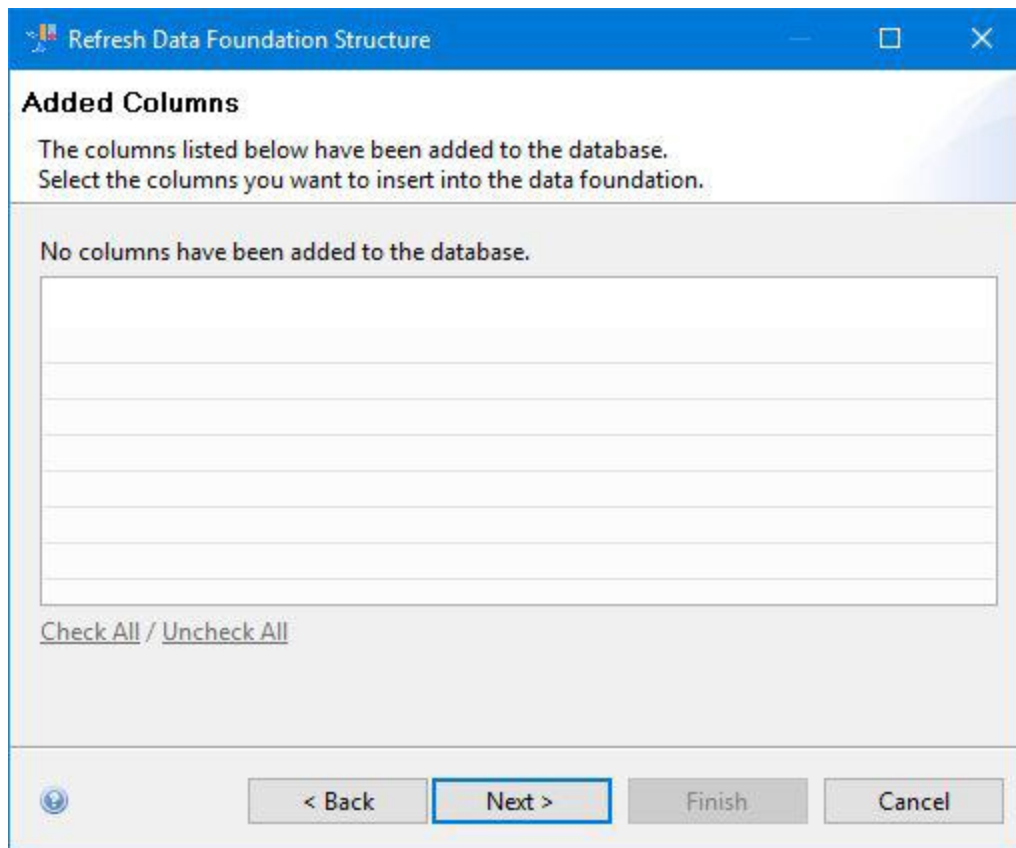
| Column Name | Action |
|-------------|--------|
|             |        |
|             |        |
|             |        |
|             |        |
|             |        |
|             |        |
|             |        |

[Check All](#) / [Uncheck All](#)

< Back   **Next >**   Finish   Cancel

Click: Next

## 5. Added Columns



Click: Next

## 6. Modified Columns

**Refresh Data Foundation Structure**

**Modified Columns**

The columns listed below have been modified in the database.  
Select the columns you want to update in the data foundation.

Modified Columns

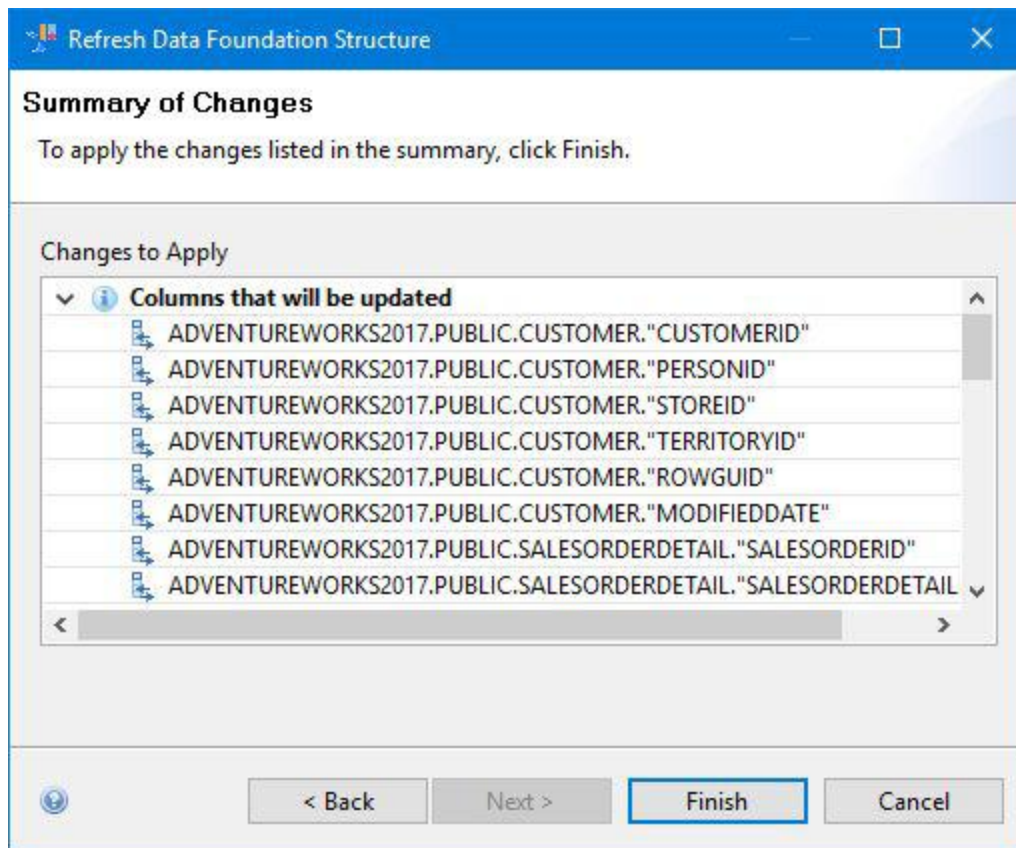
| Column ...                                                                                                                        | Current Data Type | Database Data Type | Cur... | Dat... | Cur... | Dat... |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------|--------|--------|--------|--------|
| <input checked="" type="checkbox"/>  S           |                   |                    |        |        |        |        |
| <input checked="" type="checkbox"/>  12 INTEGER  | 12 INTEGER        | 12 DECIMAL         | 11     | 40     |        |        |
| <input checked="" type="checkbox"/>  12 INTEGER  | 12 INTEGER        | 12 DECIMAL         | 11     | 40     |        |        |
| <input checked="" type="checkbox"/>  AB          | AB                | AB                 | 25     | 167... |        |        |
| <input checked="" type="checkbox"/>  12 SMALLINT | 12 SMALLINT       | 12 DECIMAL         | 6      | 40     |        |        |
| <input checked="" type="checkbox"/>  12 INTEGER  | 12 INTEGER        | 12 DECIMAL         | 11     | 40     |        |        |
| <input checked="" type="checkbox"/>  12 INTEGER  | 12 INTEGER        | 12 DECIMAL         | 11     | 40     |        |        |
| <input checked="" type="checkbox"/>  12 NUMERIC  | 12 NUMERIC        | 12 DECIMAL         |        |        |        |        |

[Check All](#) / [Uncheck All](#)

 < Back Next > Finish Cancel

Click: Next

## 7. Summary of Changes



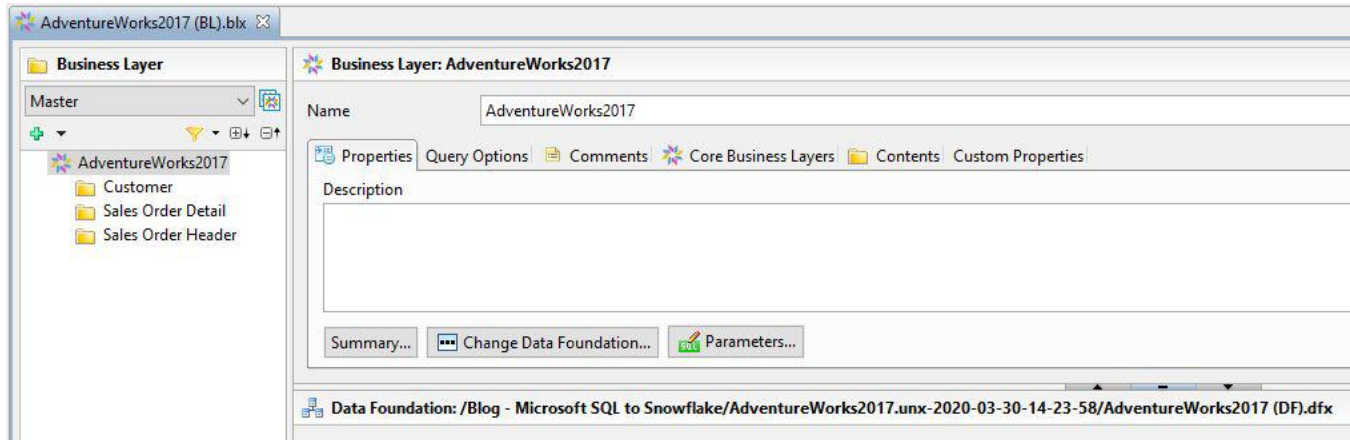
Click: Finish

## 8. Save the Data Foundation

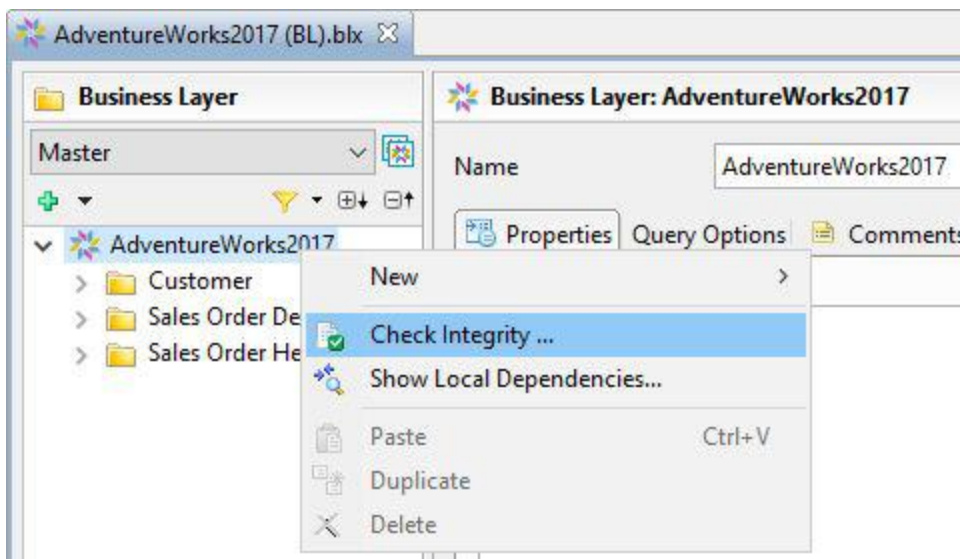


## Validate the Business Layer with the Snowflake Data Foundation

1. Open AdventureWorks2017 (BL).blx

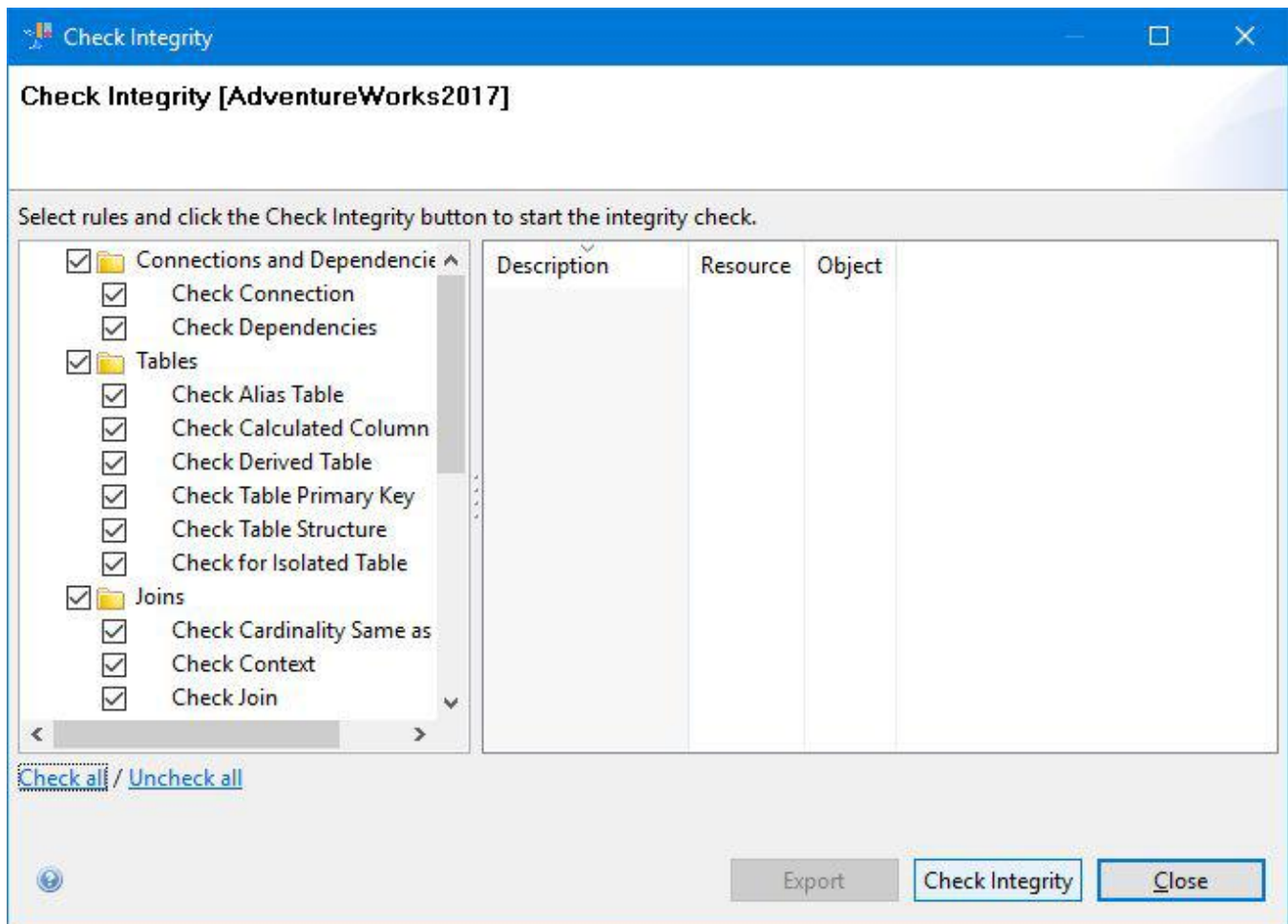


2. Check Integrity...



Under Business Layer > Right-Click Adventureworks2017  
Click: Check Integrity...

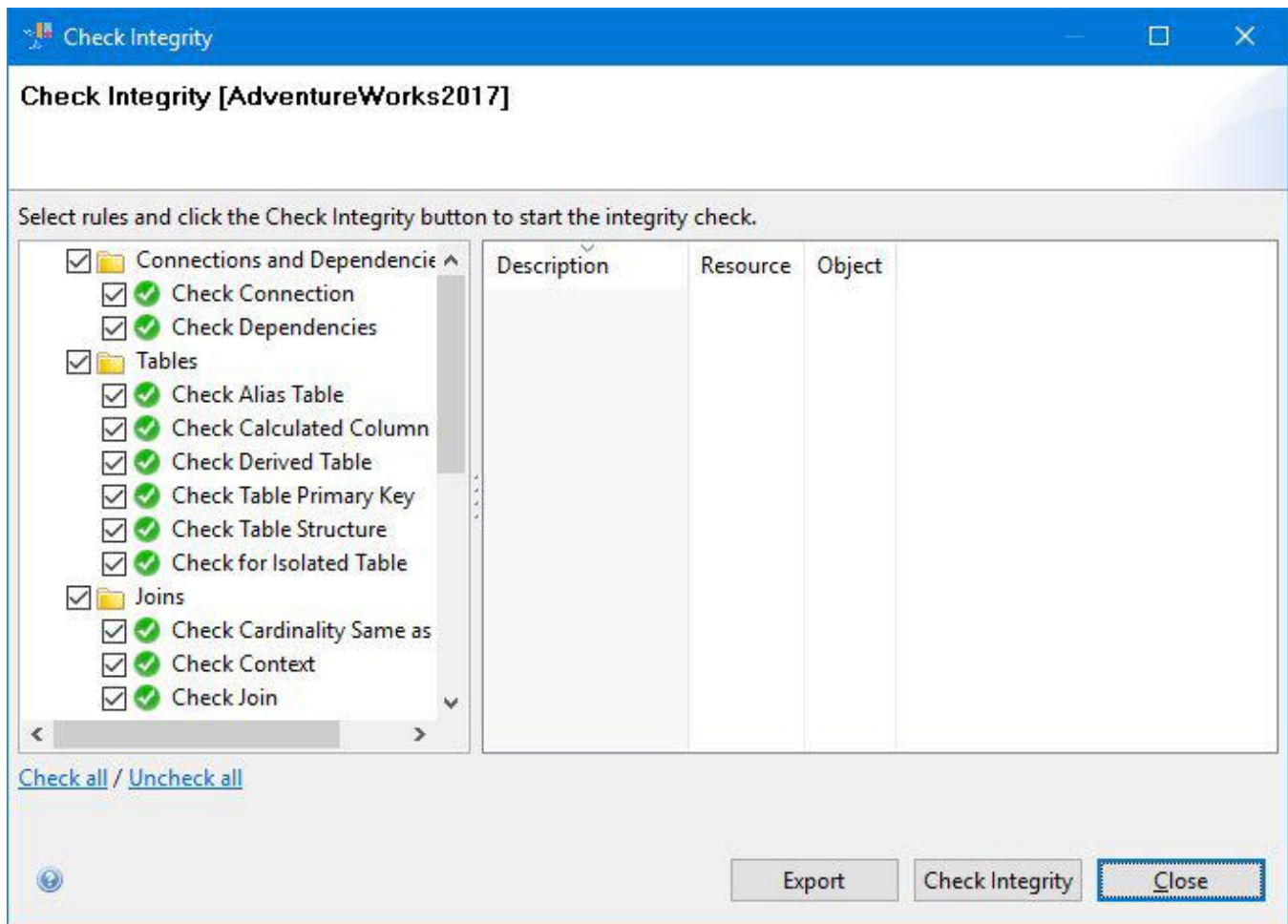
### 3. Check Integrity



Click: Check all

Click: Check Integrity

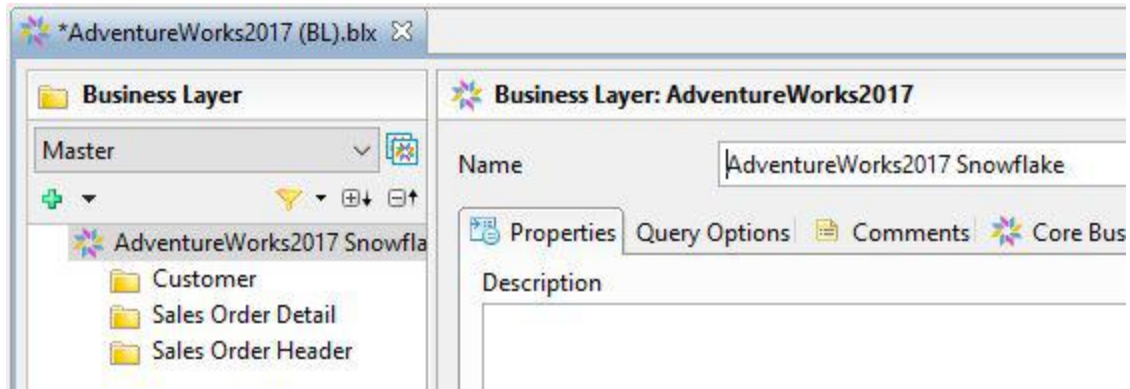
#### 4. Confirm Results



Click: Close

## Rename the Universe

1. Open AdventureWorks2017 (BL).blx

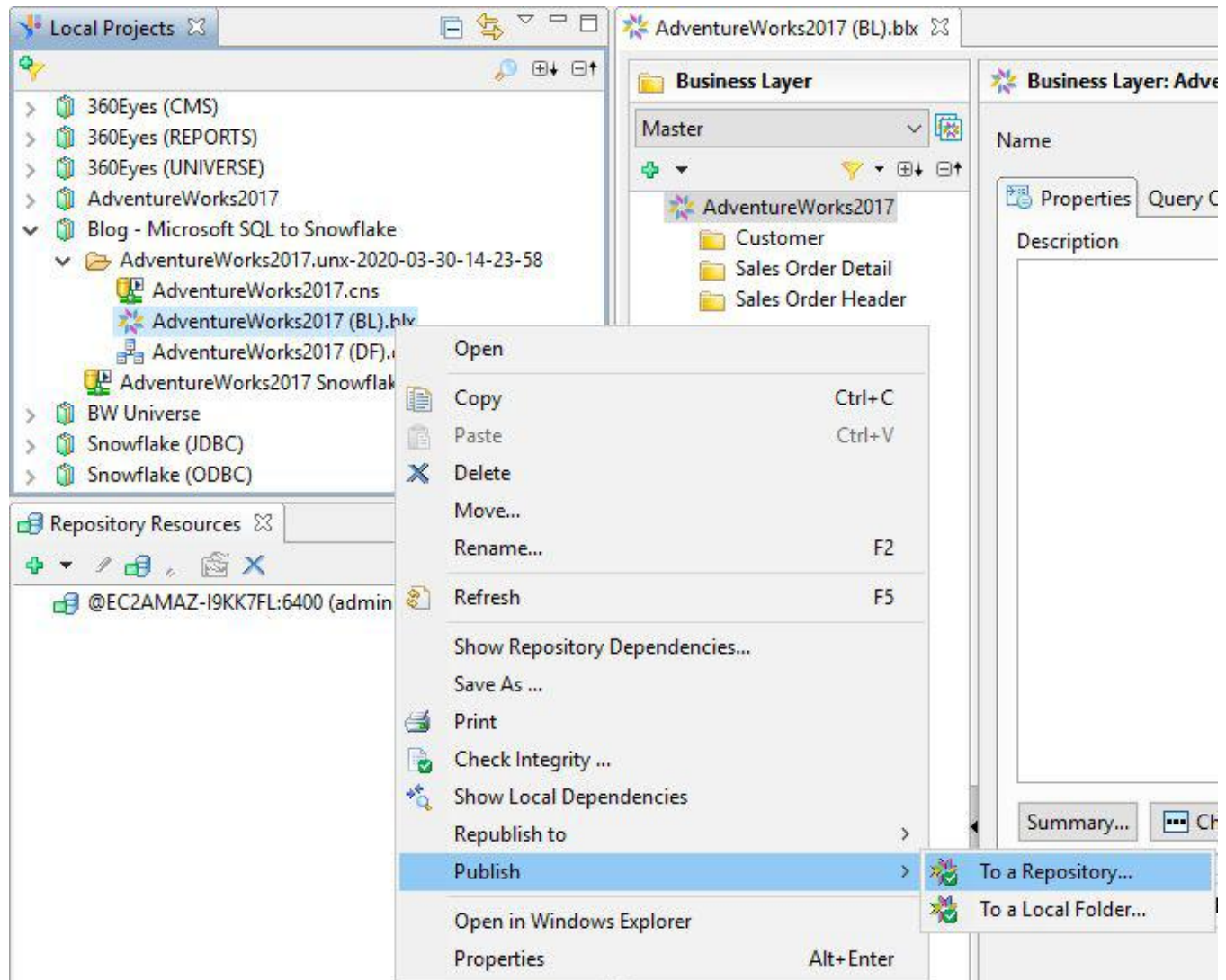


Name: [ENTER NEW NAME] E.g. AdventureWorks2017 Snowflake

2. Save the Business Layer

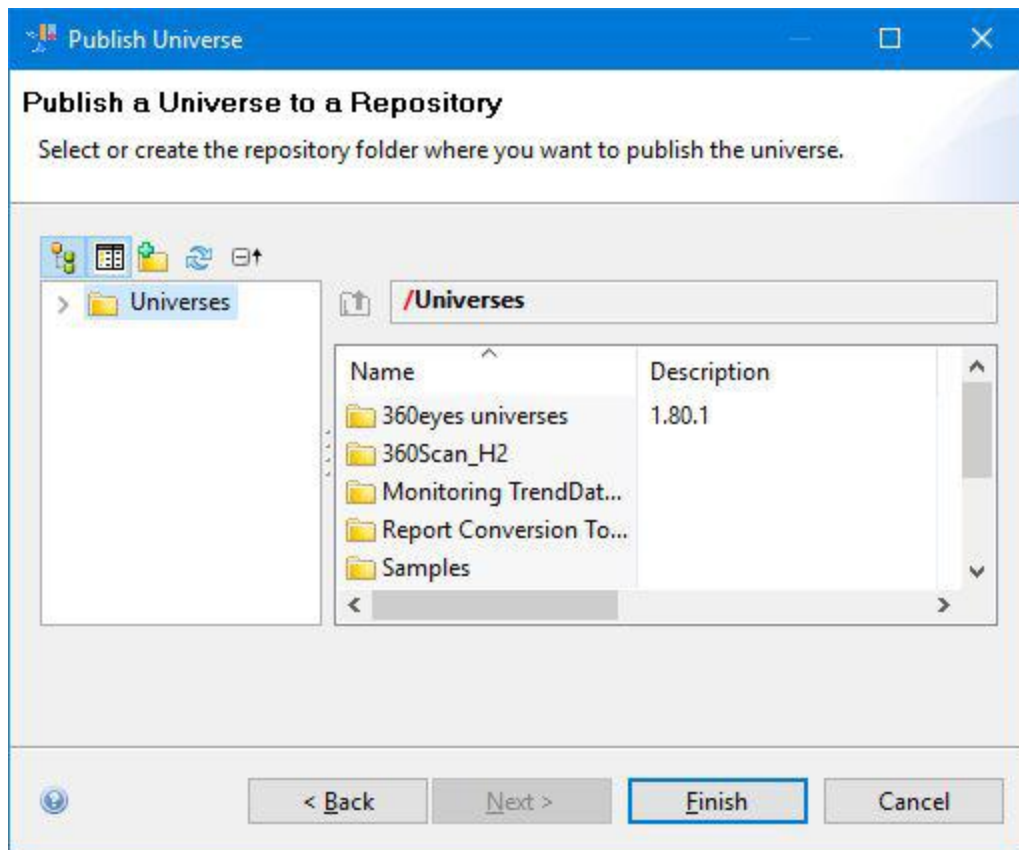
## Publish the Business Layer with the Snowflake Data Foundation

1. Open AdventureWorks2017 (BL).blx

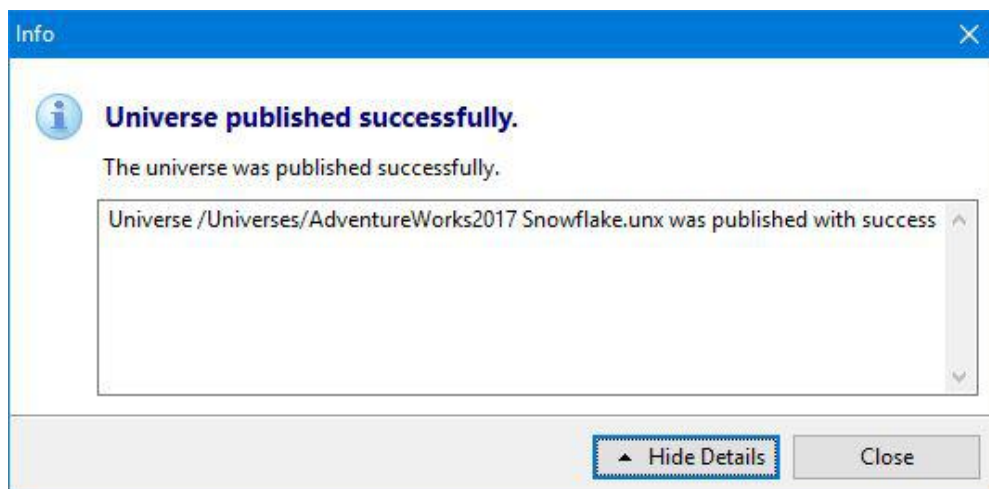


Under Local Projects > Right-Click Adventureworks2017 (BL).blx  
 Click: Publish > To a Repository  
 Click: Next

Select where you want to save the Universe



Click: Finish



Click: Close



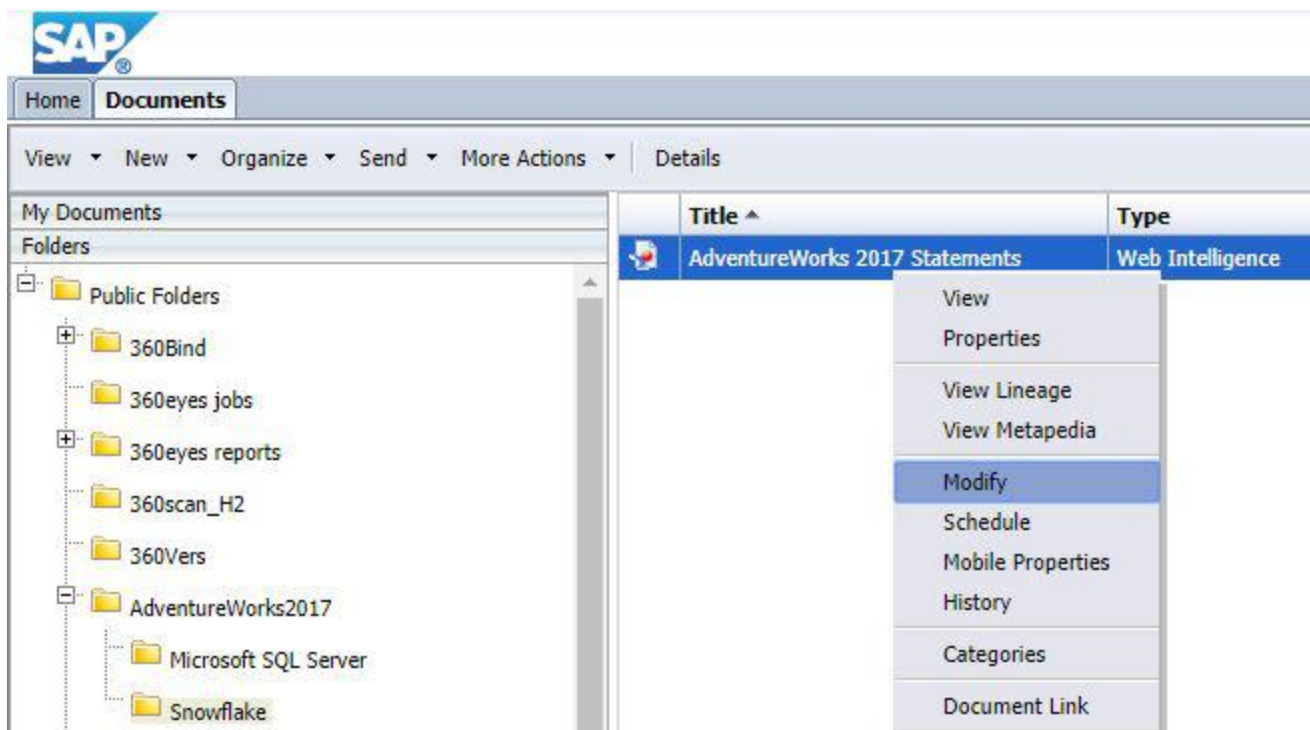
## Updating Web Intelligence

These steps are to update your Web Intelligence documents to point to the new Snowflake Universe.

You can do this either within your current report or as we will do here, make a copy (backup) first and then modify the new one.

Note: These steps are to be repeated for every document.

Modify your Web Intelligence

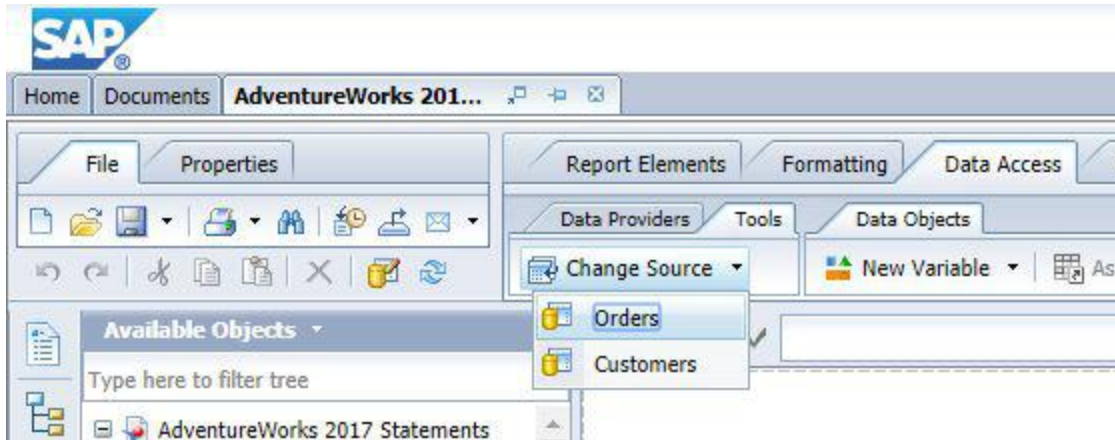


Right-Click the Web Intelligence  
Click: Modify



## Change Data Source

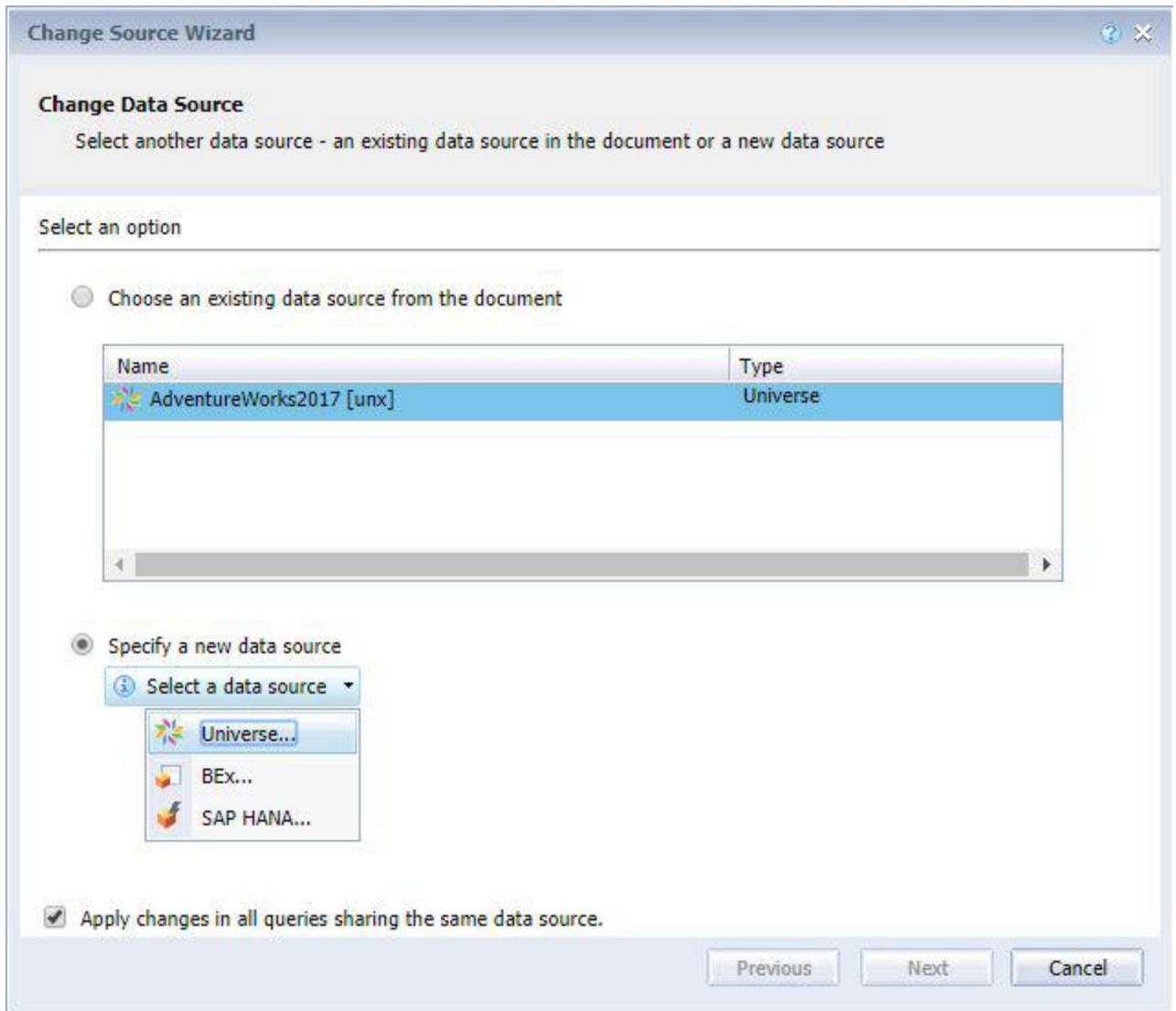
### 1. Change Source



Click Data Access tab > Tools tab > Change Source

Click: Orders (this is the query to modify)

## 2. Change Source Wizard



**Change Source Wizard**

**Change Data Source**  
Select another data source - an existing data source in the document or a new data source

Select an option

☐ Choose an existing data source from the document

| Name                                                                                                       | Type     |
|------------------------------------------------------------------------------------------------------------|----------|
|  AdventureWorks2017 [unx] | Universe |

☒ Specify a new data source

 Select a data source ▼

-  Universe...
-  BEx...
-  SAP HANA...

☒ Apply changes in all queries sharing the same data source.

Previous Next Cancel

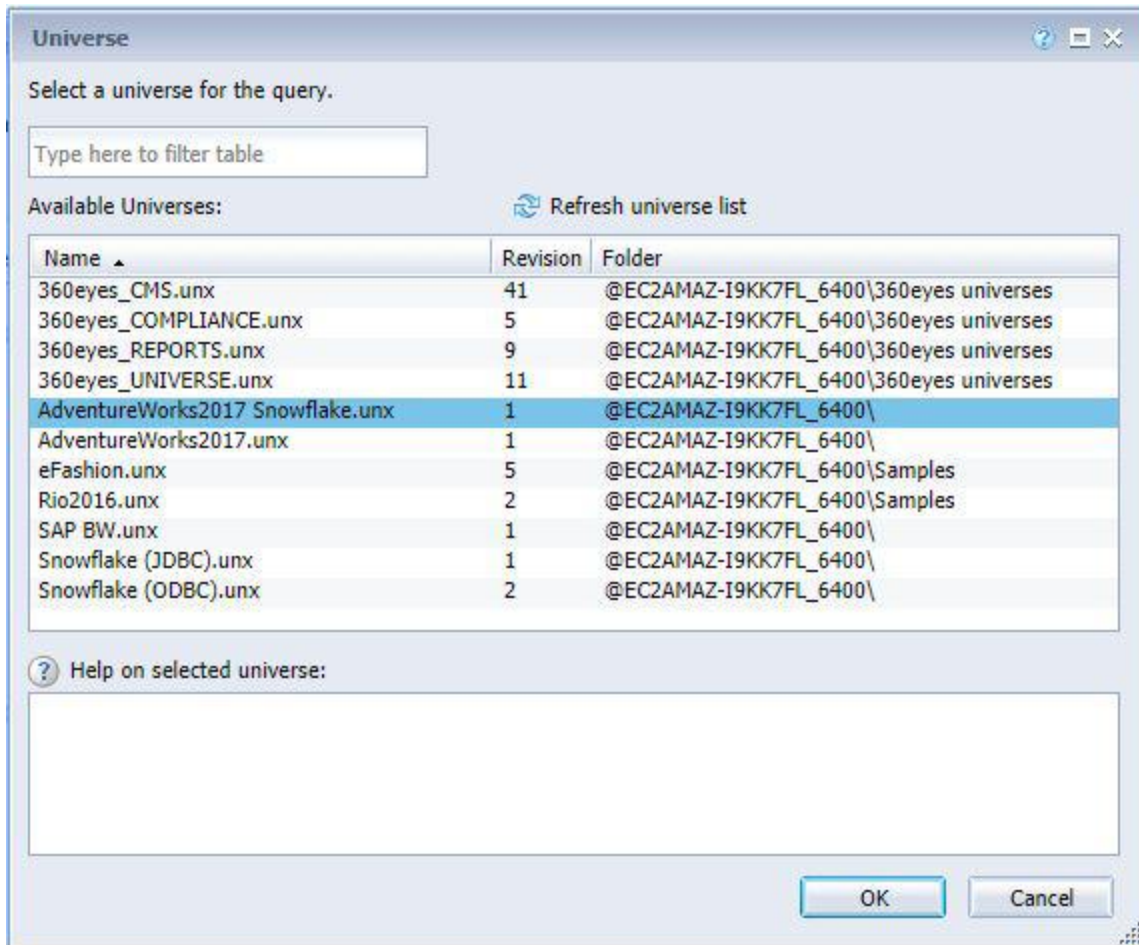
Click: Specify a new data source

Check: Apply changes in all queries sharing the same data source.

Click: Universe...

Note: You will need to repeat these steps for queries not sharing the same data source.

### 3. Select a universe for the query



Click: AdventureWorks2017 Snowflake.unx

Click: OK



**Change Source Wizard**

**Change Data Source**  
Select another data source - an existing data source in the document or a new data source

Select an option

☐ Choose an existing data source from the document

| Name                     | Type     |
|--------------------------|----------|
| AdventureWorks2017 [unx] | Universe |

☒ Specify a new data source

Select a data source ▼

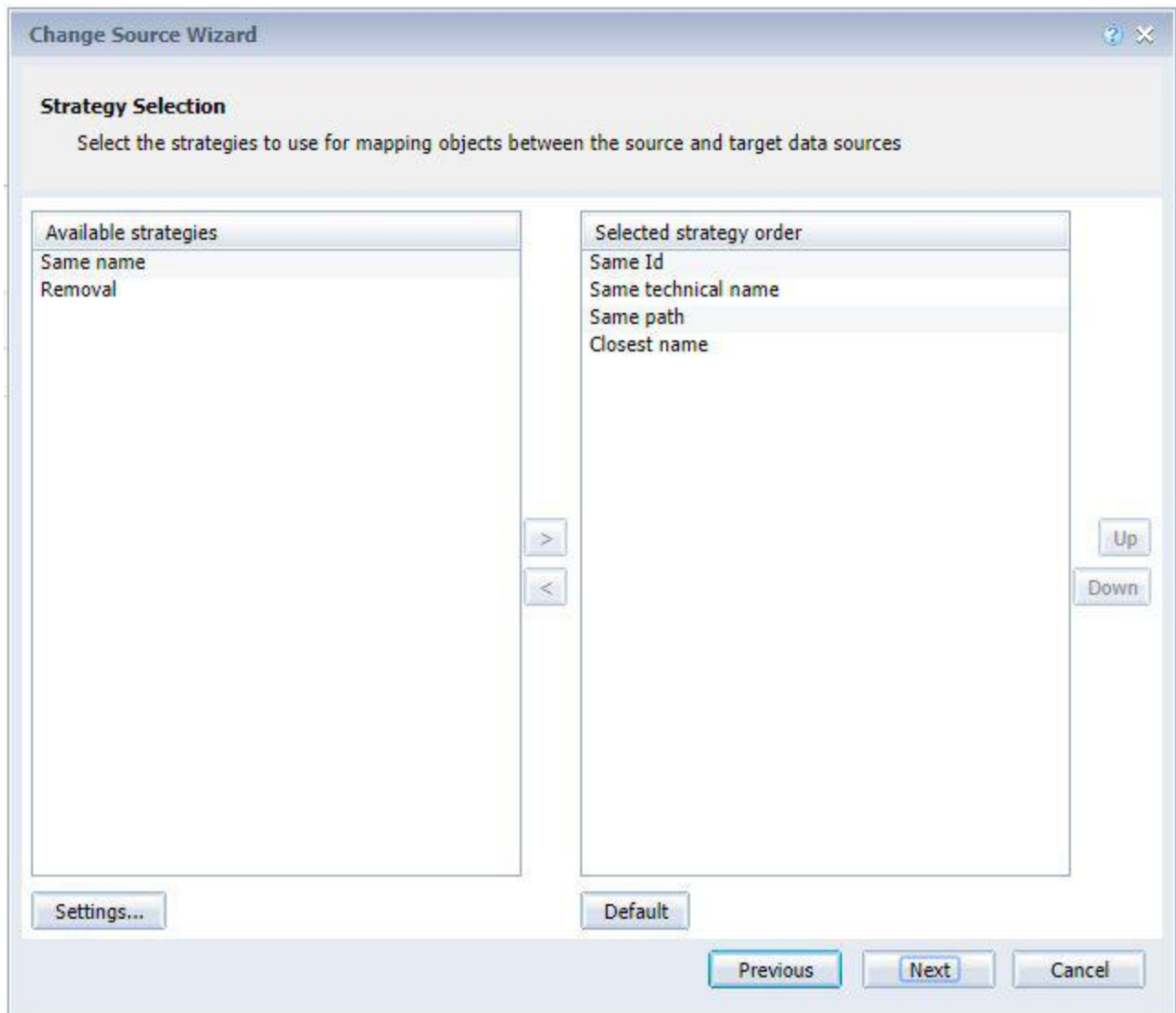
**AdventureWorks2017 Snowflake.unx** | **Change...**  
Type: Universe

☒ Apply changes in all queries sharing the same data source.

Previous Next Cancel

Click: Next

#### 4. Strategy Selection



Click: Next

## 5. Object Mapping

**Change Source Wizard**

**Object Mapping**  
Show how each object in the original data source is replaced by an object in the destination data source or removed

Map source and target objects:

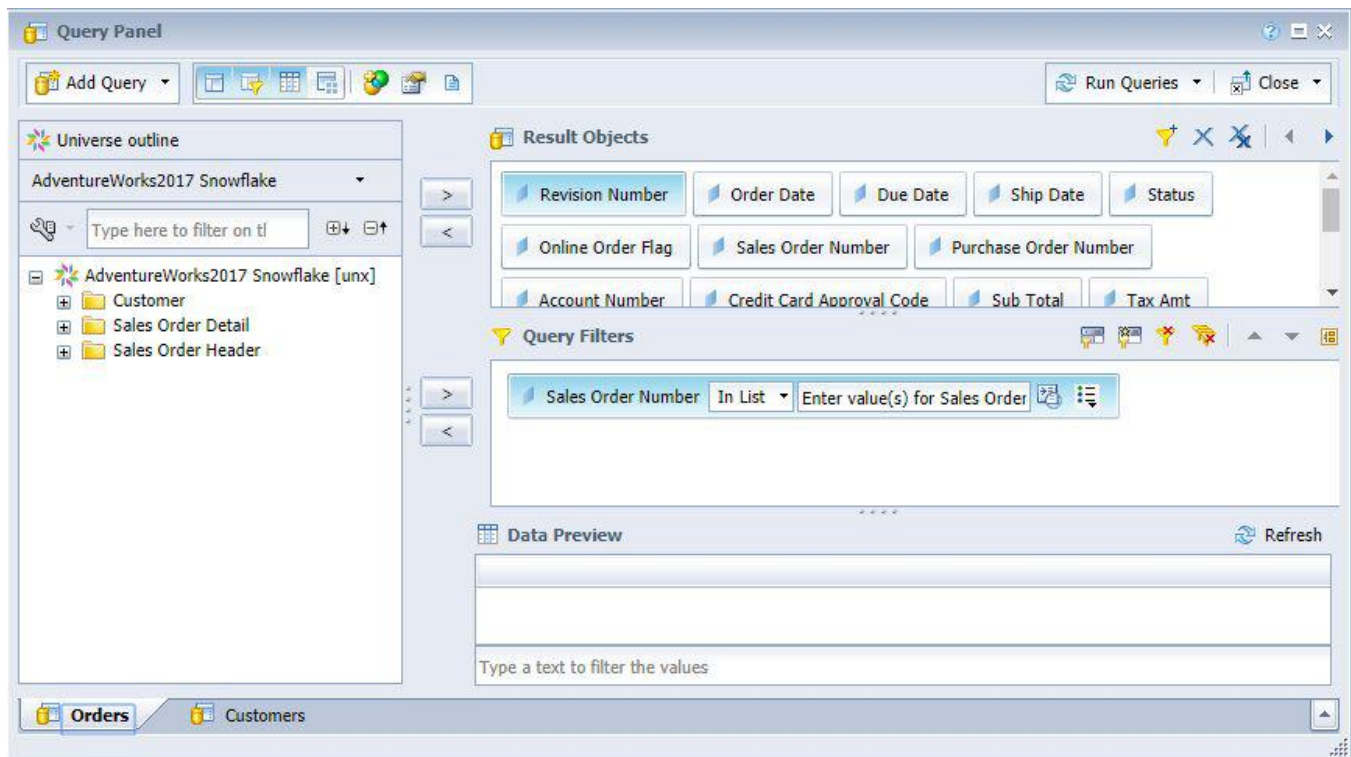
| Current                                          | New                                                         |     |
|--------------------------------------------------|-------------------------------------------------------------|-----|
| <input type="checkbox"/> Account Number          | <input checked="" type="checkbox"/> Account Number          | ... |
| <input type="checkbox"/> Carrier Tracking Number | <input checked="" type="checkbox"/> Carrier Tracking Number | ... |
| <input type="checkbox"/> Order Qty               | <input checked="" type="checkbox"/> Order Qty               | ... |
| <input type="checkbox"/> Unit Price              | <input checked="" type="checkbox"/> Unit Price              | ... |
| <input type="checkbox"/> Unit Price Discount     | <input checked="" type="checkbox"/> Unit Price Discount     | ... |
| <input type="checkbox"/> Line Total              | <input checked="" type="checkbox"/> Line Total              | ... |
| <input type="checkbox"/> Revision Number         | <input checked="" type="checkbox"/> Revision Number         | ... |
| <input type="checkbox"/> Order Date              | <input checked="" type="checkbox"/> Order Date              | ... |
| <input type="checkbox"/> Due Date                | <input checked="" type="checkbox"/> Due Date                | ... |
| <input type="checkbox"/> Ship Date               | <input checked="" type="checkbox"/> Ship Date               | ... |
| <input type="checkbox"/> Status                  | <input checked="" type="checkbox"/> Status                  | ... |
| <input type="checkbox"/> Online Order Flag       | <input checked="" type="checkbox"/> Online Order Flag       | ... |
| <input type="checkbox"/> Sales Order Number      | <input checked="" type="checkbox"/> Sales Order Number      | ... |

Strategies...

Finish Cancel

Click: Finish

## 6. Query Panel



Click: Run Queries

## 7. Save the Web Intelligence document





## Updating Crystal Reports

These steps are to update your Crystal Reports documents to update the database connection string(s) within the reports.

You can do this either within your current report or as we will do here, make a copy (backup) first and then modify the new one.

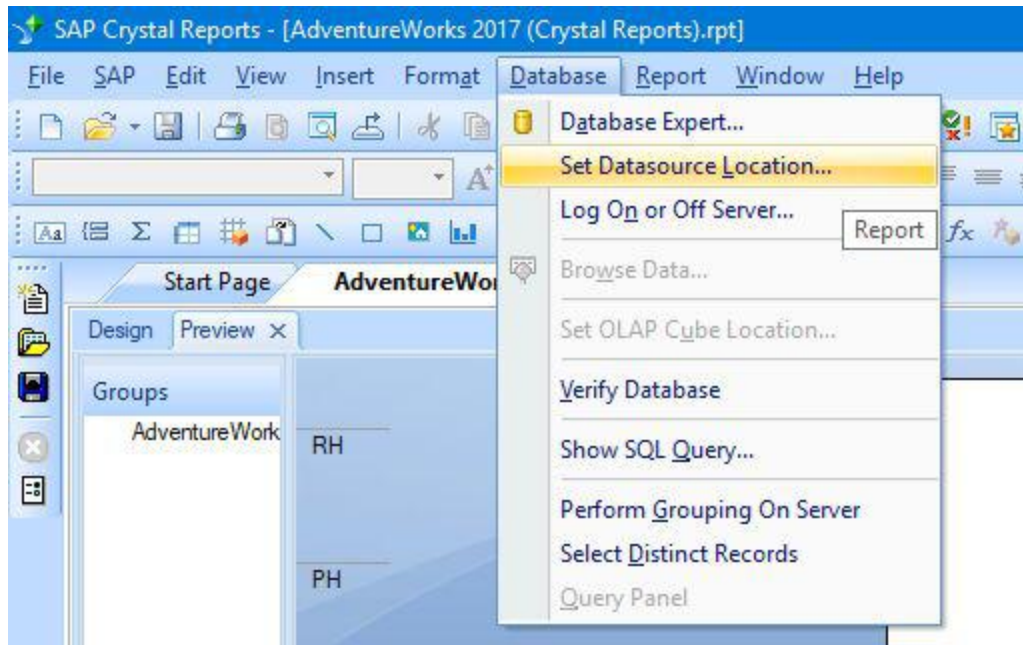
There are two methods:

1. In Crystal Reports "Desktop"
2. In the Central Management Console (CMC)

Note: These steps are to be repeated for every document.

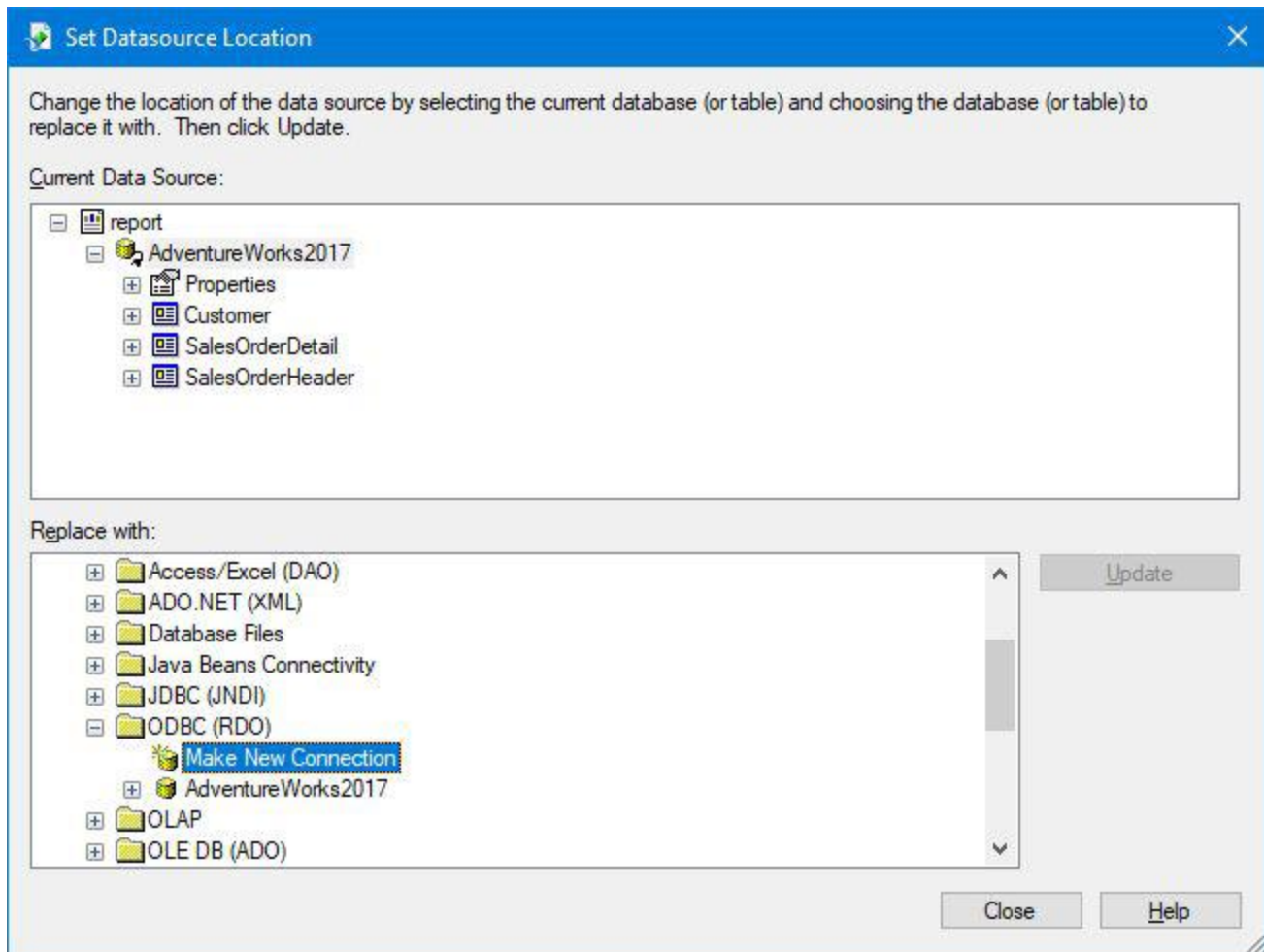
## Crystal Reports “Desktop”

1. Open your Crystal Reports



Under Database  
Select: Set Datasource Location...

2. Set Datasource Location



Under ODBC (RDO)  
Select: Make a New Connection



ODBC (RDO) ✕

**Data Source Selection**  
Choose a data source from the list or open a file dsn from the browse button

Select Data Source: ☒

Data Source Name: 

360Cast  
360Eyes  
360EyesDS  
360Scan  
360Scan\_H2  
AdventureWorks2017  
**Blog Snowflake AdventureWorks**  
club  
club-webi  
efashion

Find File DSN: ☐

File DSN:  ...

Enter Connection String: ☐

Connection String:

< Back **Next >** Finish Cancel Help

Select: Blog Snowflake AdventureWorks  
Click: Next



ODBC (RDO) ✕

**Connection Information**  
Provide necessary information to log on to the chosen data source

Server:

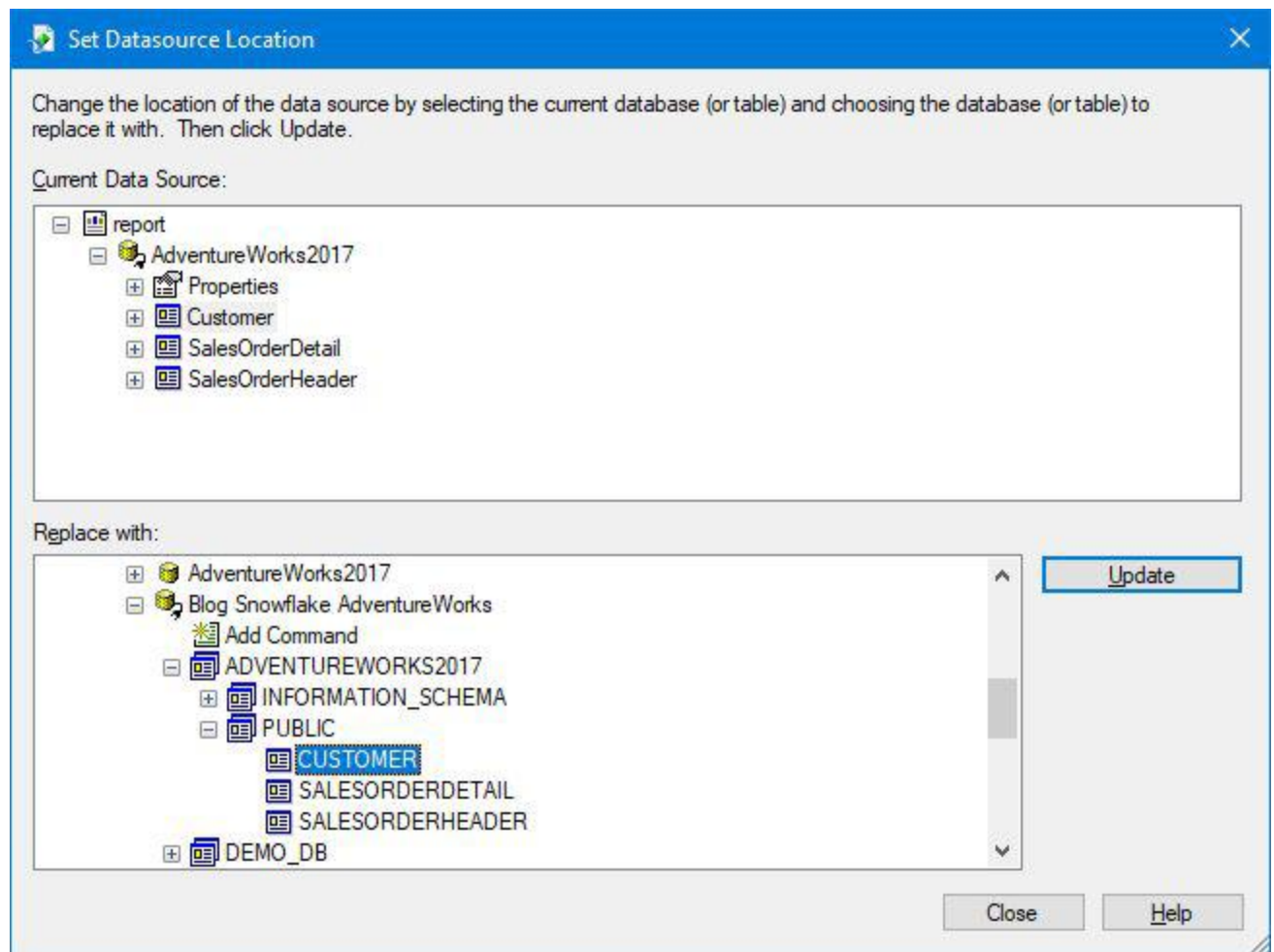
User ID:

Password:

Enter: User ID

Enter: Password

Click: Finish



If your table names are identical you can simply map the database name.

In this case, the tables are in uppercase so we need to map the tables individually:

Under Current Data Source

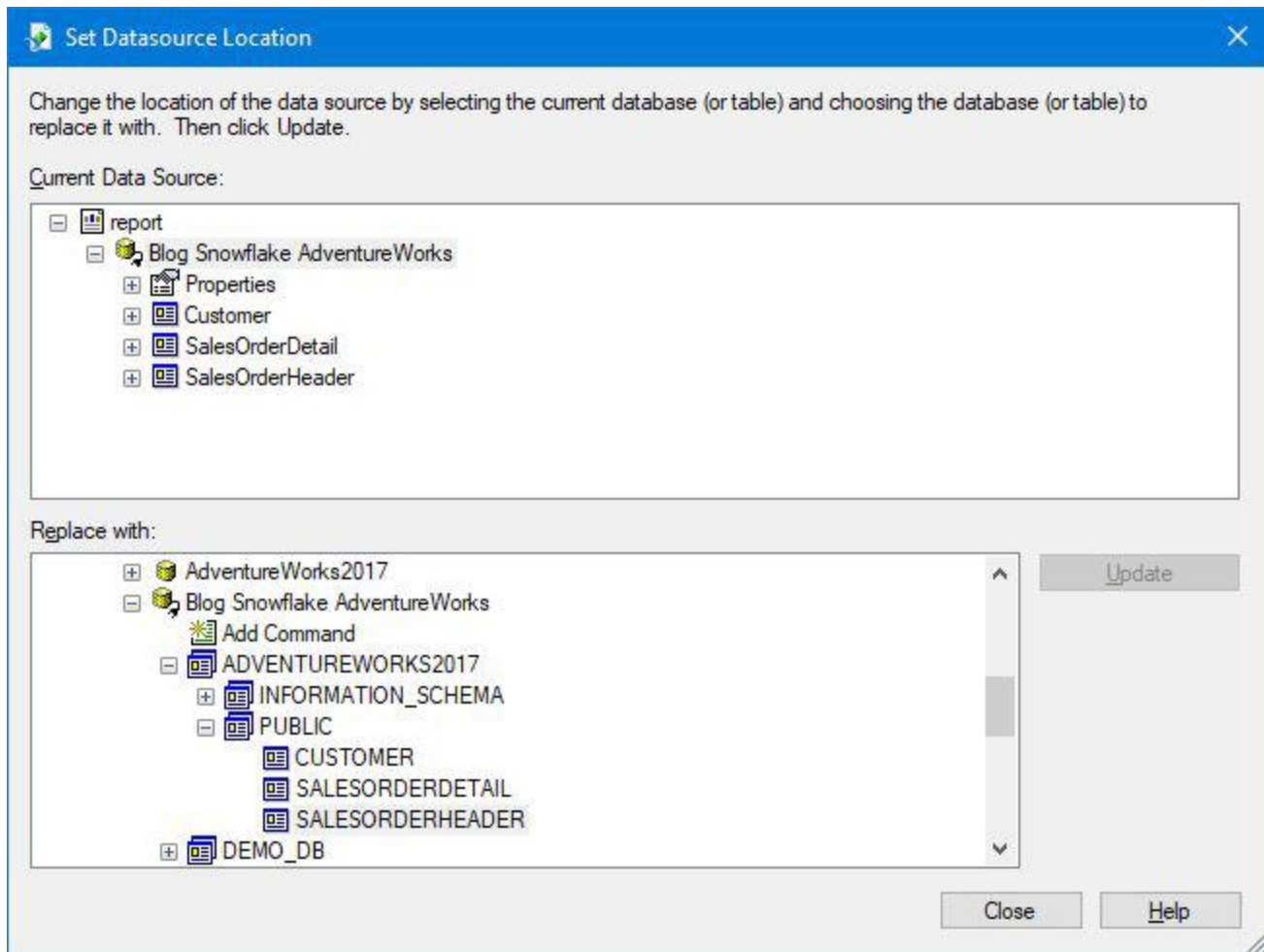
Select: Customer

Under Replace with

Select CUSTOMER

Click Update

Repeat for tables SalesOrderDetail and SalesOrderHeader.



Tables are now remapped to Blog Snowflake Adventure Works

Click: Close

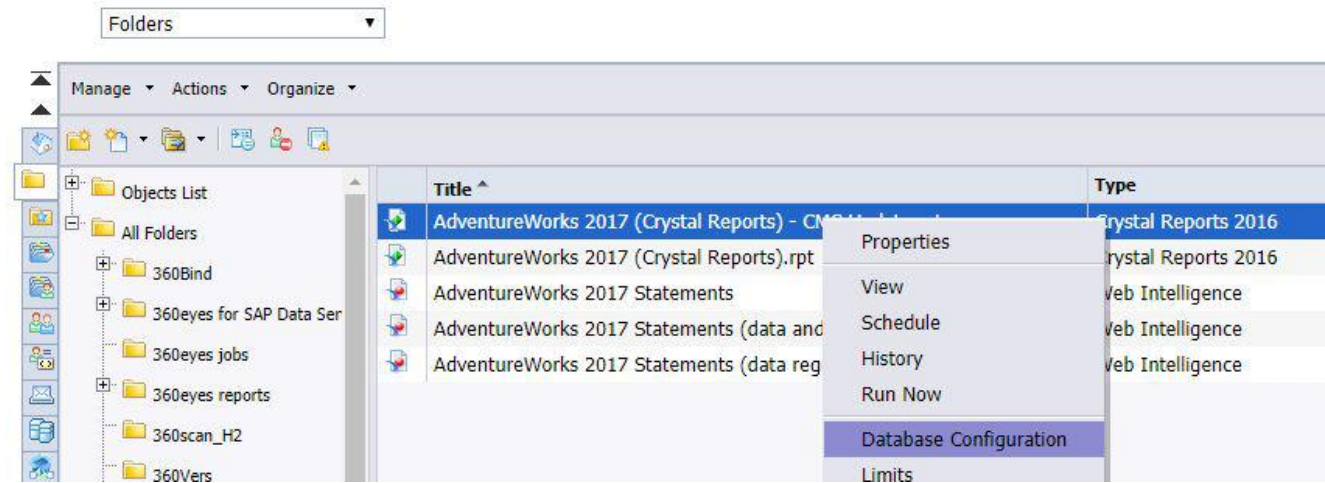
### 3. Save the Crystal Reports



## Central Management Console (CMC)

1. Logon to the Central Management Console (CMC)

### Central Management Console



Find your Crystal Reports  
Right-Click > Database Configuration

### 3. Database Configuration

**Default Settings: AdventureWorks 2017 (Crystal Reports) - CMC Update.rpt**

Hide Navigation

- ▼ Default Settings
  - Recurrence
  - Schedule For
  - Notification
  - Database Configuration**
  - Filters
  - Formats
  - Destinations
  - Print Settings
  - Events
  - Scheduling Server Group
  - Viewing Server Group
  - Extensions
  - Thumbnail
  - Languages
- Properties
- Categories
- Mobile Properties
- Schedule
- User Security
- History
- Limits

Data Sources: AdventureWorks2017 ▼

When viewing and scheduling report: Use same database logon as when report is run ▼

Database logon information:

☐ Use original database logon information from the report.

Server: AdventureWorks2017

Database: AdventureWorks2017

User: 360

Password:

☒ Use custom database logon information specified here.

Database Type: ☒ Select a database driver  
ODBC ▼

☐ Specify a custom driver

Server: Blog Snowflake AdventureWorks

Database:

User: test360suite

Password: .....

Table Prefix: AdventureWorks2017.Sales. ▼

☐ Use default table prefix

☒ Specify a custom table prefix  
ADVENTUREWORKS2017.PUBLIC.

Select: Use custom database logon information specified here.

Enter: Server: Blog Snowflake AdventureWorks

Enter: Table Prefix > Specify a custom table prefix

ADVENTUREWORKS.PUBLIC.

Click: Save



Note: If the name (and case) of your tables are not exactly the same, you cannot update your Crystal Reports this way and you will need to use the method described previously, in Crystal Reports “Desktop”.

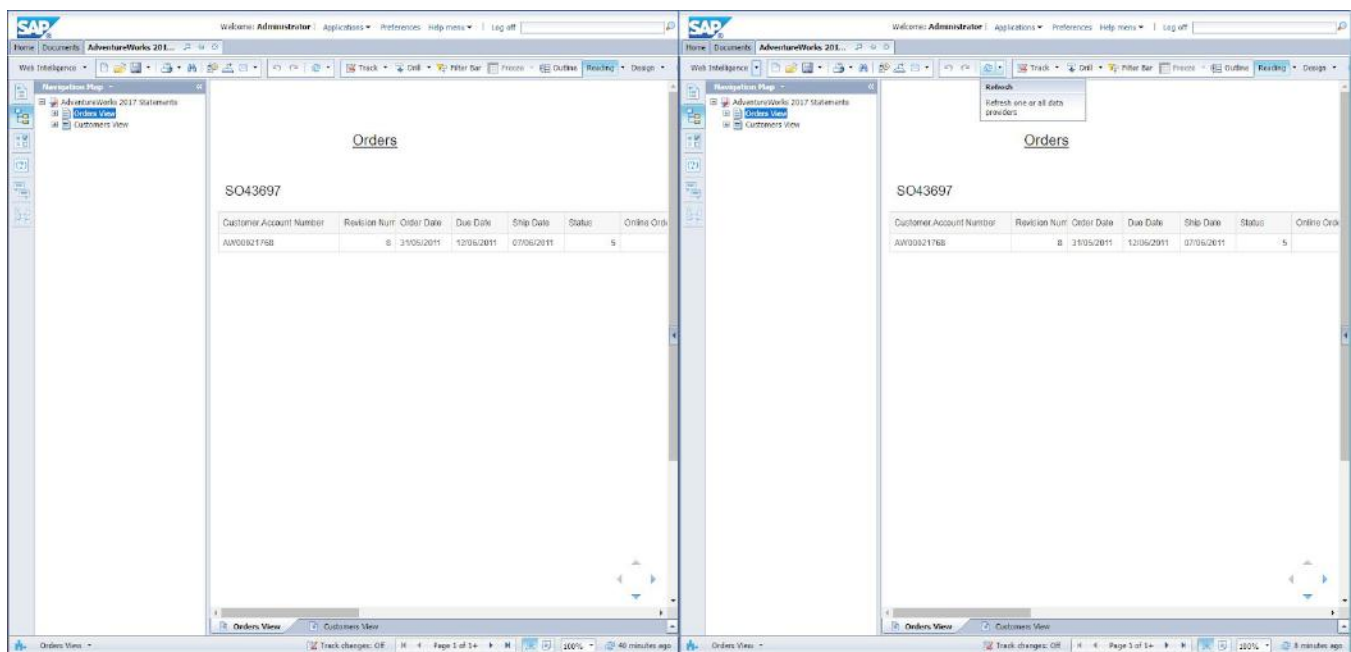
# Testing Content

If you have made a copy of your Web Intelligence documents, you can do side by side comparisons.

In this section, we will validate that the documents appear to be the same and compare the refresh time between Microsoft SQL Server and Snowflake.

## Comparing Data

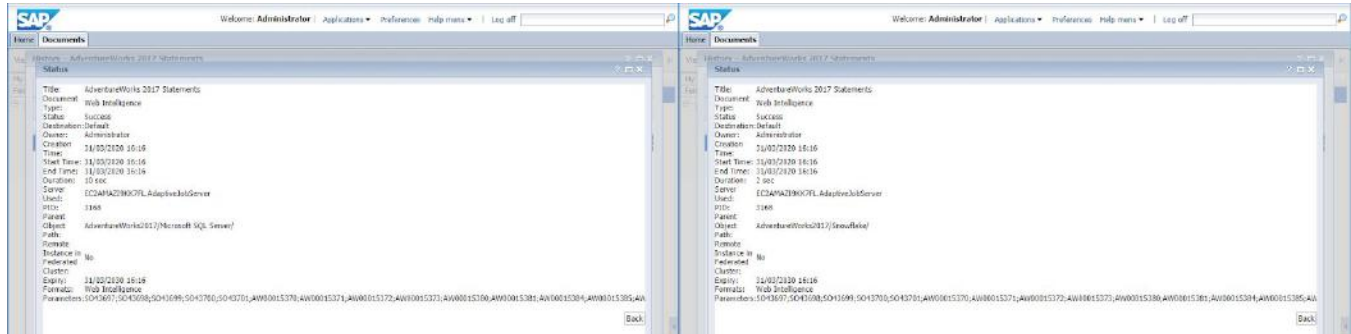
Unfortunately, using SAP BusinessObjects, this manual task involves opening both Web Intelligence documents and comparing values.



Note: As this task is manual (i.e. not automated), it will be time-consuming to execute therefore you will likely only test a subset of your reports. Mistakes are very likely as documents will have a lot of tables, columns, rows over many pages. It will be difficult to document evidence of testing and accuracy of these tests.

## Comparing Performance

Unfortunately, once again using SAP BusinessObjects, this manual task is to schedule both Web Intelligence documents and compare running times.



Note: As this task is manual (i.e. not automated), it will be time-consuming to execute therefore you will likely only test a subset of your reports. It will be difficult to document.



## With 360Suite Automation: Reducing time, cost and risks



### **Pre-Migration Assessment**

Identify what will be impacted by repointing the database connectivity to Snowflake. This helps you prevent hidden side effects and helps you define the scope of the migration.



### **Universe Update**

Required in most migration projects, you'll need to apply the necessary changes to the universes (tables, columns, measures, SELECT, WHERE).



### **Back-up**

Make sure to have a reliable back-up before making any changes.



### **Document Update**

Bulk repoint your Webi and Crystal reports to the new, updated universes.



### **Validation**

Automate your testing and identify the regressions (layout, data, performance, connectivity) in order to fix your documents and universes. Avoid any risk and validate the migration.

# Schedule Your Pre-Migration Assessment With Us



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