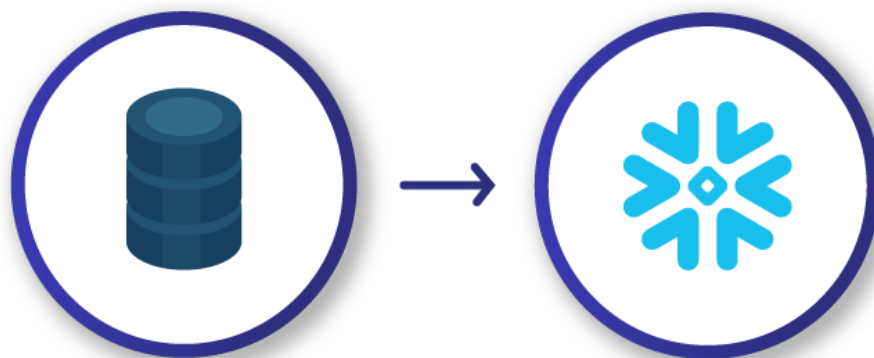


# Database Migration to Snowflake: A Complete How-to Guide





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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](https://blogs.sap.com/2020/03/12/snowflake-for-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 - [redacted])\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


Search Databases






1/4 databases

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

Schema (PUBLIC) available:










**Databases**SharesWarehousesWorksheetsHistory

Databases > **ADVENTUREWORKS2017**

TablesViews**Schemas**StagesFile FormatsSequences

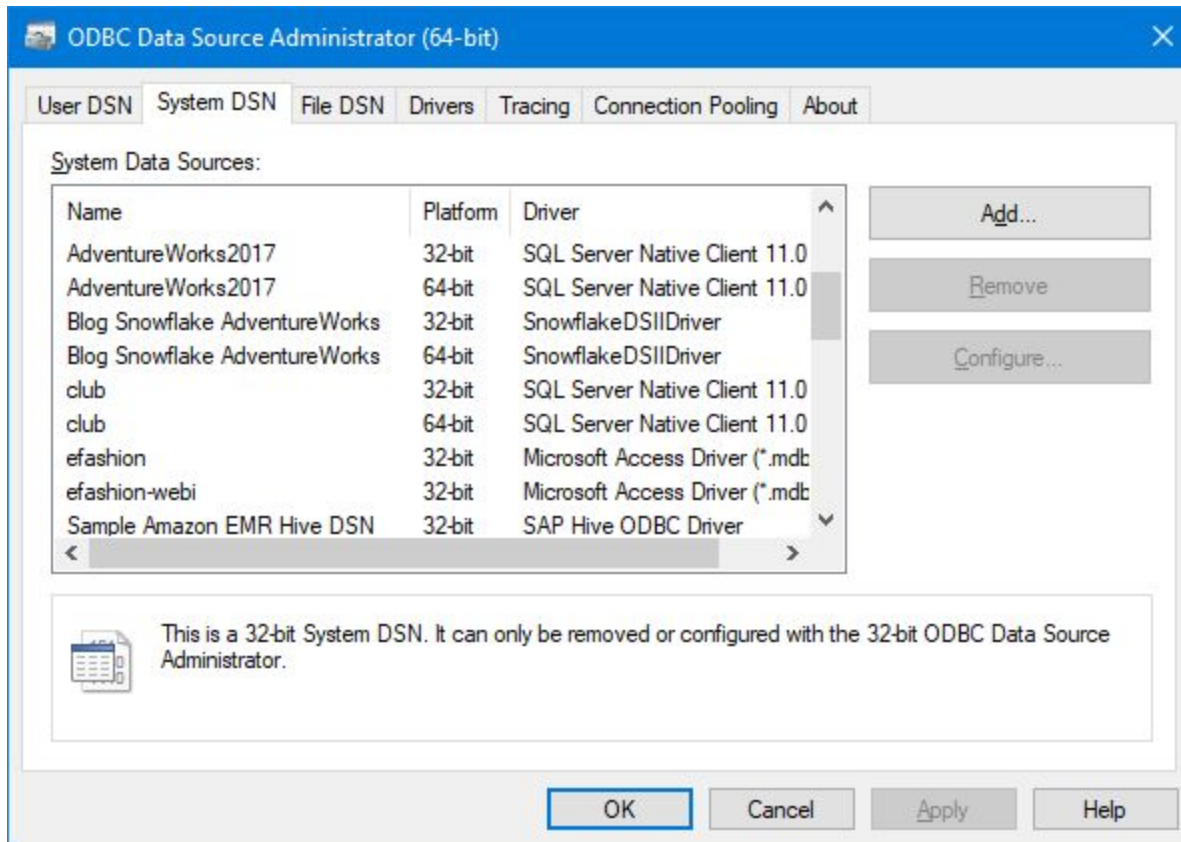
 Create... Clone... Alter... Drop... Transfer Ownership

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/>



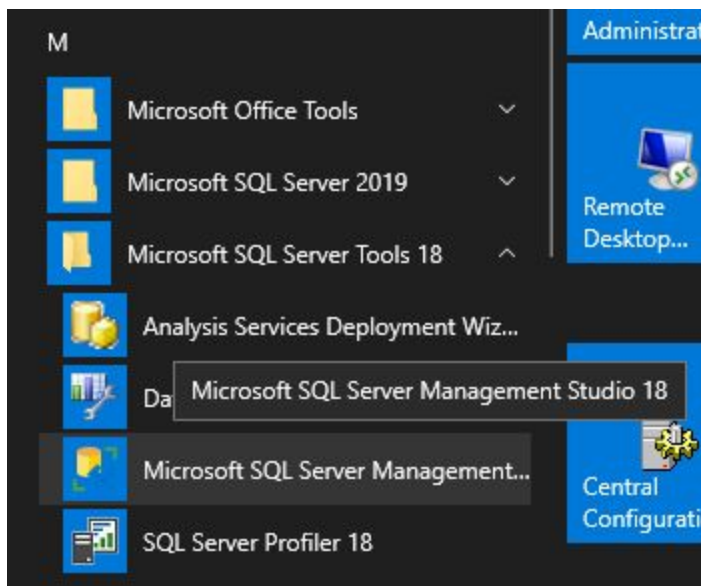
Note: You can use JDBC connections if you prefer. Please refer to the blog above.

# Migrating the Database

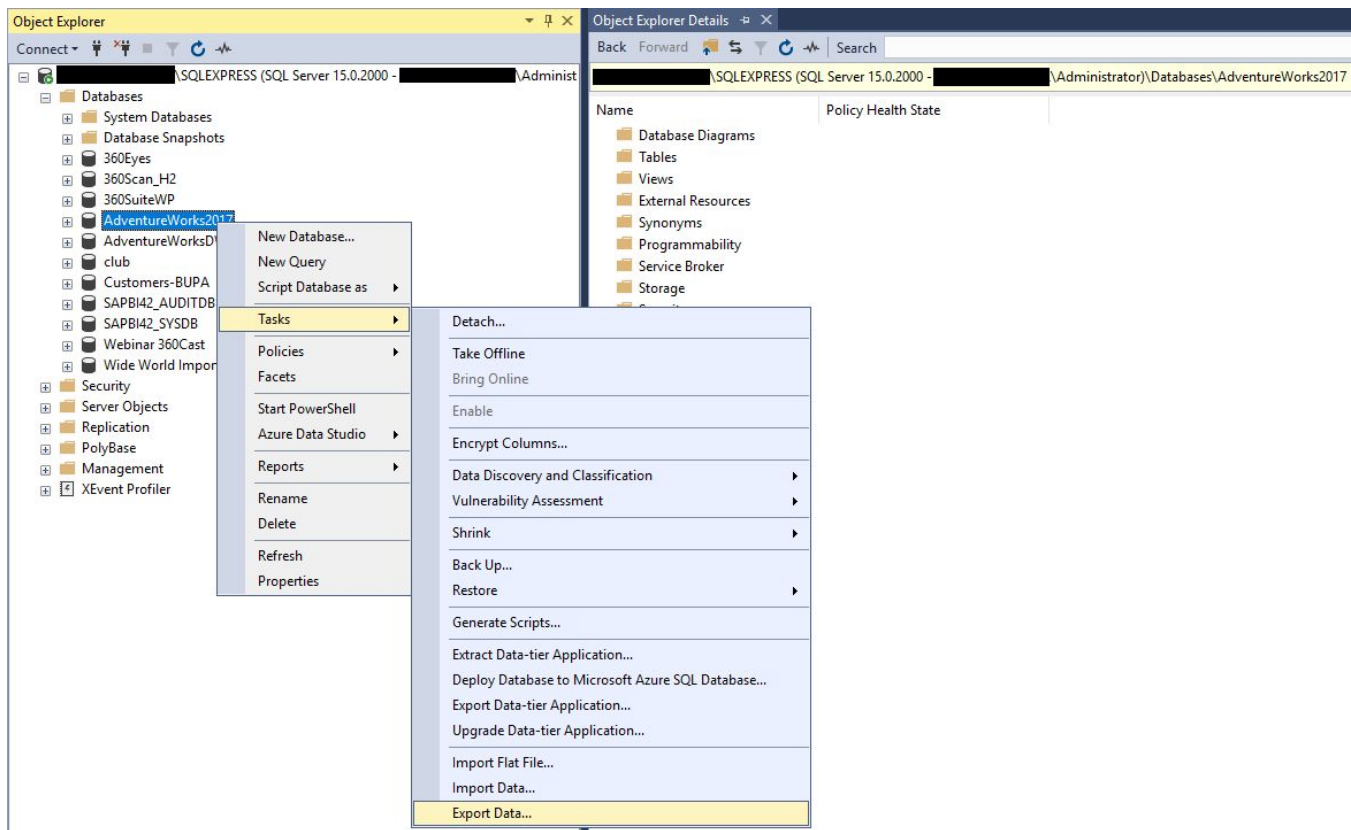
Move the database from Microsoft SQL Server to Snowflake

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.

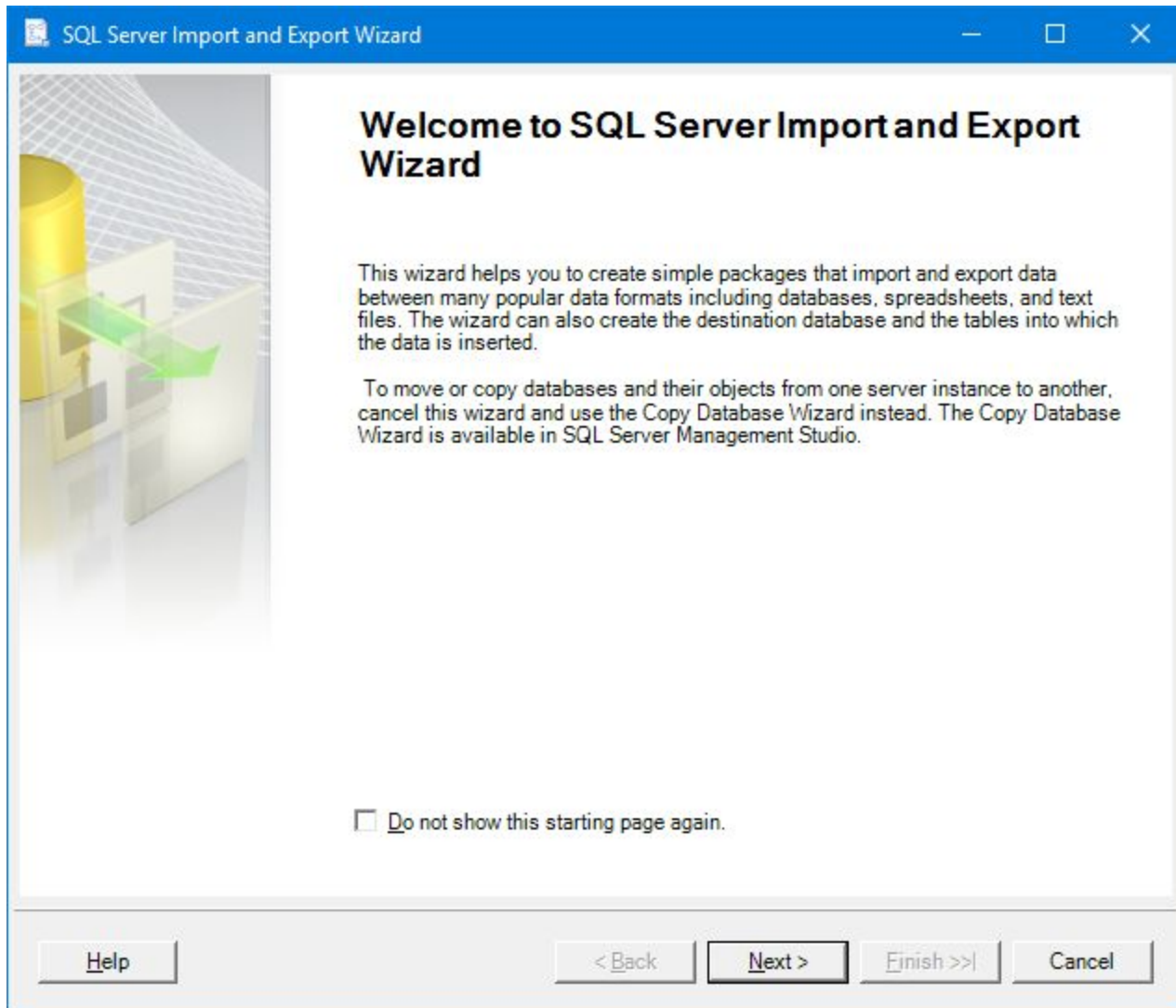
Open Microsoft SQL Server Management Studio



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



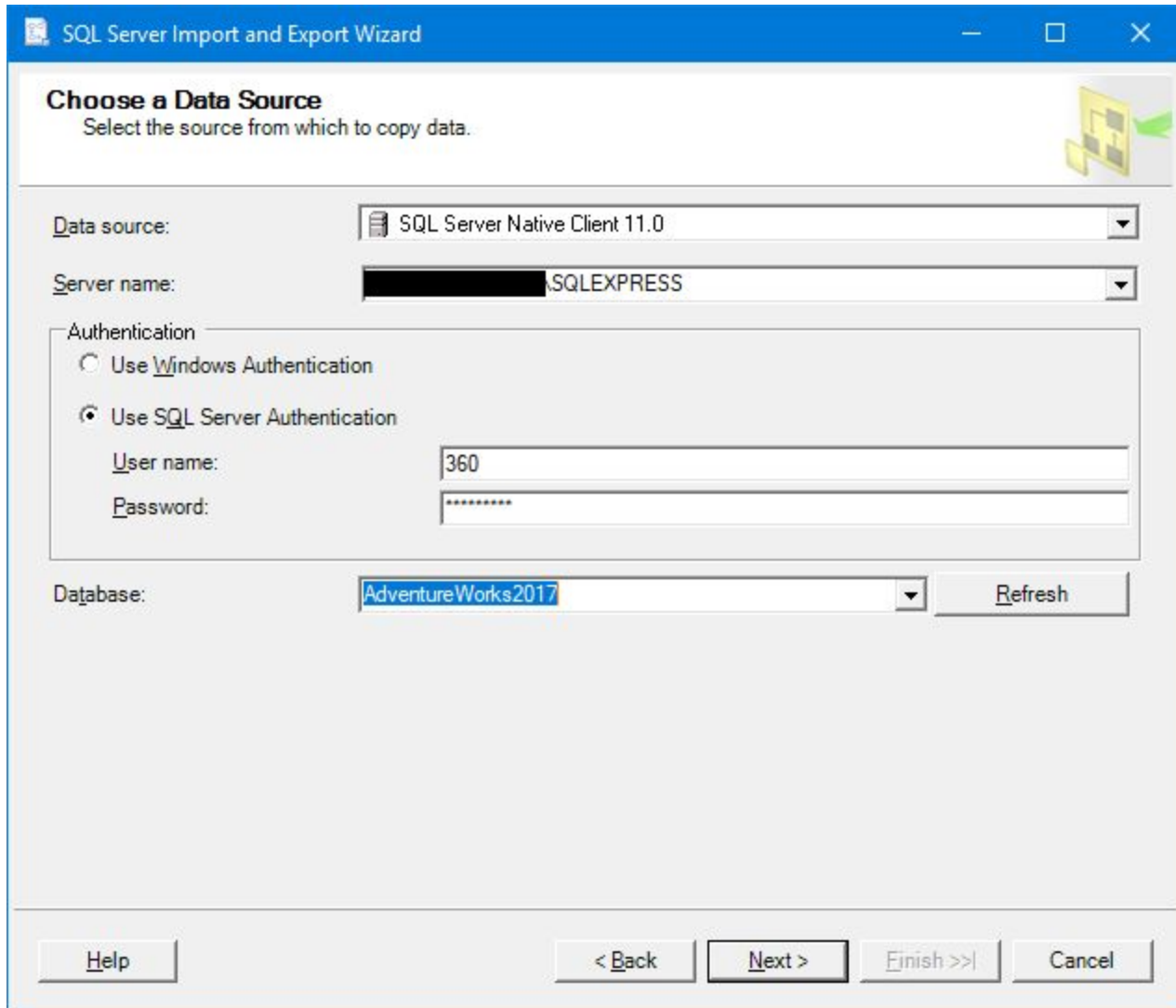
Right-Click > Tasks > Export Data...



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 'SQL Server Import and Export Wizard' is in the top left. Below the title bar, the step name 'Choose a Data Source' is displayed in bold, followed by the instruction 'Select the source from which to copy data.' in a smaller font. On the right side of the window, there is a small icon of a yellow folder with a green arrow pointing into it. The main area of the wizard contains several input fields and buttons. The 'Data source:' field is a dropdown menu showing 'SQL Server Native Client 11.0'. The 'Server name:' field is a text box containing '[REDACTED]SQLEXPRESS'. Below these, there is a section for 'Authentication' with two radio buttons: 'Use Windows Authentication' (unselected) and 'Use SQL Server Authentication' (selected). Under 'Use SQL Server Authentication', there are two text boxes: 'User name:' containing '360' and 'Password:' containing a series of asterisks. Below the authentication section, the 'Database:' field is a dropdown menu showing 'AdventureWorks2017', with a 'Refresh' button to its right. At the bottom of the wizard, there are five buttons: 'Help', '< Back', 'Next >', 'Finish >>', and 'Cancel'.

SQL Server Import and Export Wizard

**Choose a Data Source**  
Select the source from which to copy data.

Data source: SQL Server Native Client 11.0

Server name: [REDACTED]SQLEXPRESS

Authentication

☐ Use Windows Authentication

☒ Use SQL Server Authentication

User name: 360

Password: \*\*\*\*\*

Database: AdventureWorks2017 Refresh

Help < Back Next > Finish >> Cancel

Data source: SQL Server Native Client 11.0

Server name: [ENTER YOUR SERVER NAME / INSTANCE]

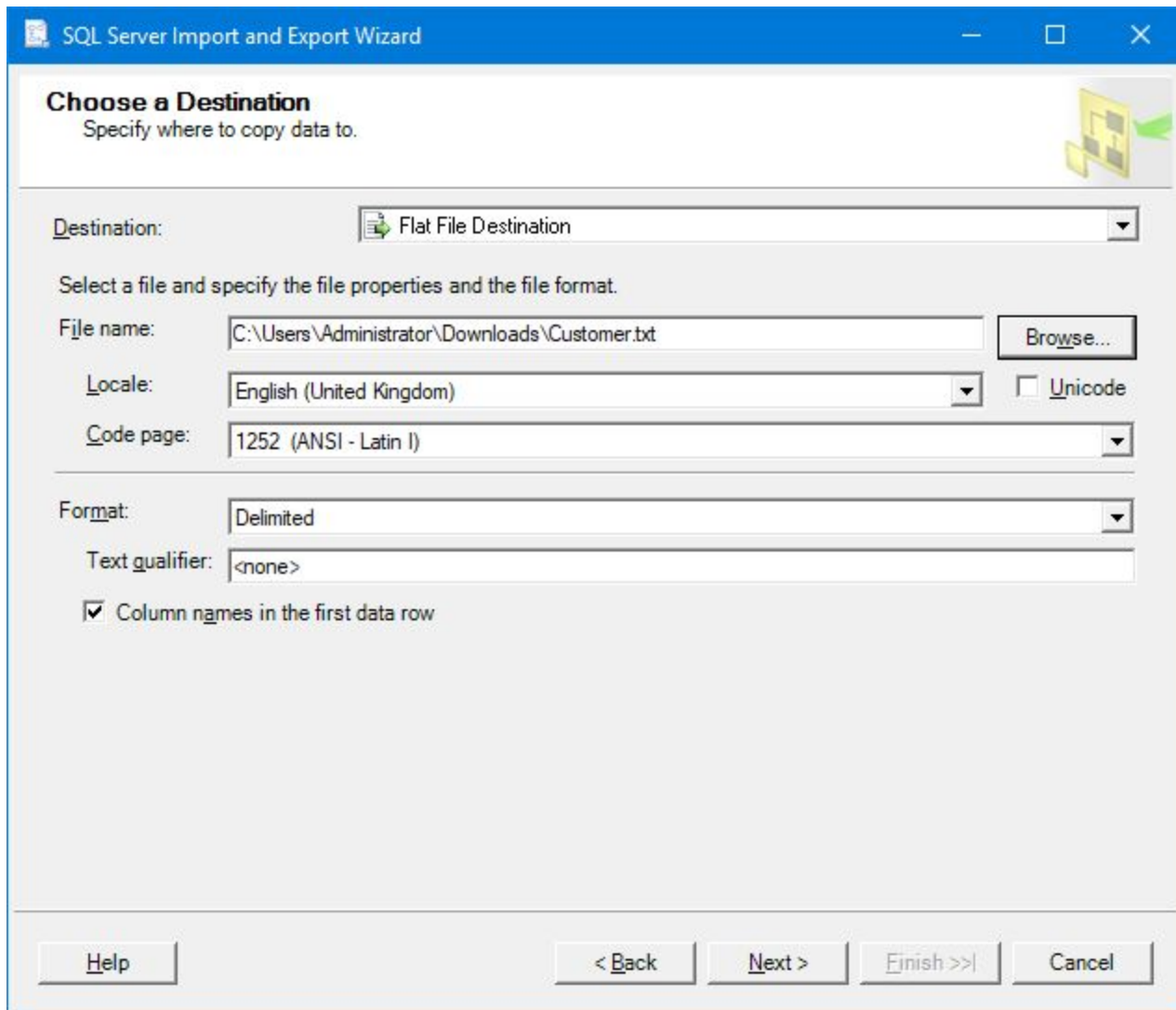
Authentication: [ENTER YOUR CREDENTIALS]

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 title is 'SQL Server Import and Export Wizard'. The main heading is 'Choose a Destination' with the subtitle 'Specify where to copy data to.' Below this, there is a 'Destination:' dropdown menu set to 'Flat File Destination'. A section titled 'Select a file and specify the file properties and the file format.' contains several fields: 'File name:' with the text 'C:\Users\Administrator\Downloads\Customer.txt' and a 'Browse...' button; 'Locale:' with a dropdown set to 'English (United Kingdom)' and an unchecked 'Unicode' checkbox; 'Code page:' with a dropdown set to '1252 (ANSI - Latin I)'; 'Format:' with a dropdown set to 'Delimited'; and 'Text qualifier:' with a dropdown set to '<none>'. There is also a checked checkbox for 'Column names in the first data row'. At the bottom, there are buttons for 'Help', '< Back', 'Next >', 'Finish >>', and 'Cancel'.

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' (which is selected) and 'Write a query to specify the data to transfer'. Below each option is a brief description. At the bottom, there are five buttons: 'Help', '< Back', 'Next >', 'Finish >>', and 'Cancel'. The 'Next >' button is highlighted with a black border.

**SQL Server Import and Export Wizard**

**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.

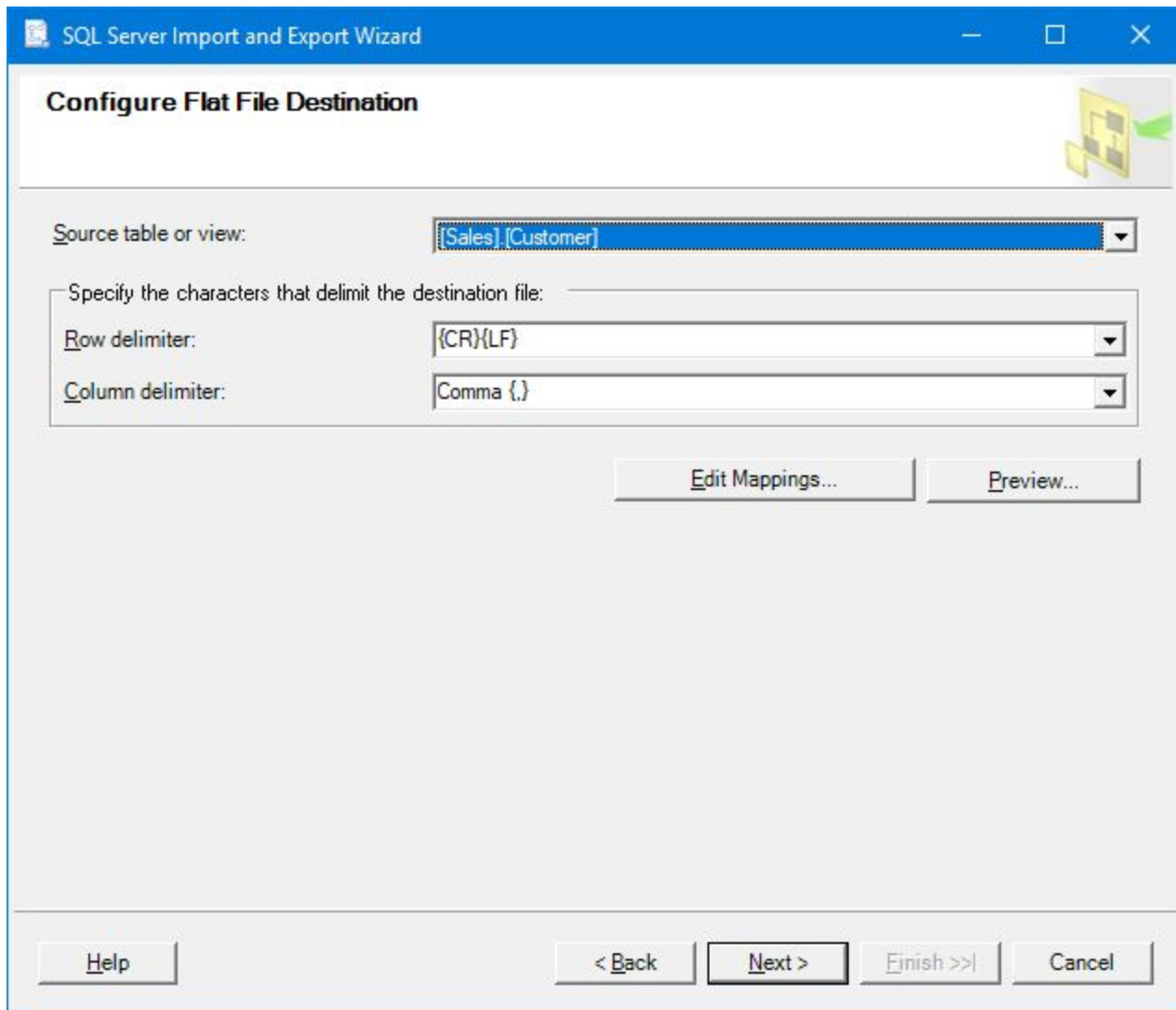
☒ **Copy data from one or more tables or views**  
Use this option to copy all the data from the existing tables or views in the source database.

☐ **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 title is 'Configure Flat File Destination'. The 'Source table or view:' dropdown is set to '[Sales].[Customer]'. The 'Specify the characters that delimit the destination file:' section has 'Row delimiter:' set to '{CR}{LF}' and 'Column delimiter:' set to 'Comma (,)'.

Source table or view: [Sales].[Customer]

Specify the characters that delimit the destination file:

Row delimiter: {CR}{LF}

Column delimiter: Comma (,)

Edit Mappings... Preview...

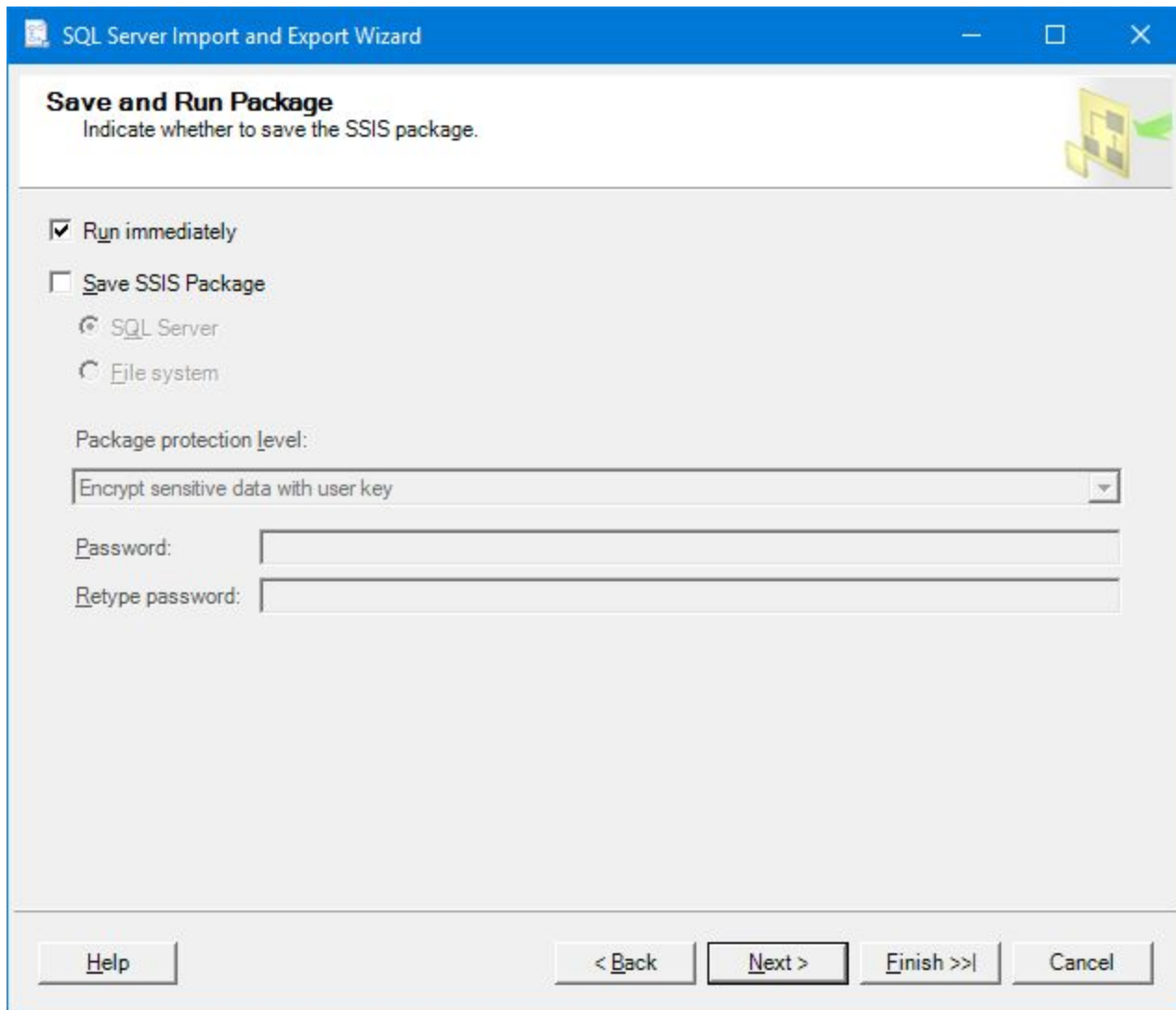
Help < Back Next > Finish >> Cancel

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 title bar reads 'SQL Server Import and Export Wizard'. The main heading is 'Save and Run Package' with the instruction 'Indicate whether to save the SSIS package.' and a small icon of a package being saved. The window contains several options: 'Run immediately' is checked, while 'Save SSIS Package' is unchecked. Under 'Save SSIS Package', there are radio buttons for 'SQL Server' and 'File system'. Below these is a 'Package protection level:' section with a dropdown menu set to 'Encrypt sensitive data with user key'. There are also input fields for 'Password:' and 'Retype password:'. At the bottom, there are buttons for 'Help', '< Back', 'Next >', 'Finish >>|', and 'Cancel'.

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

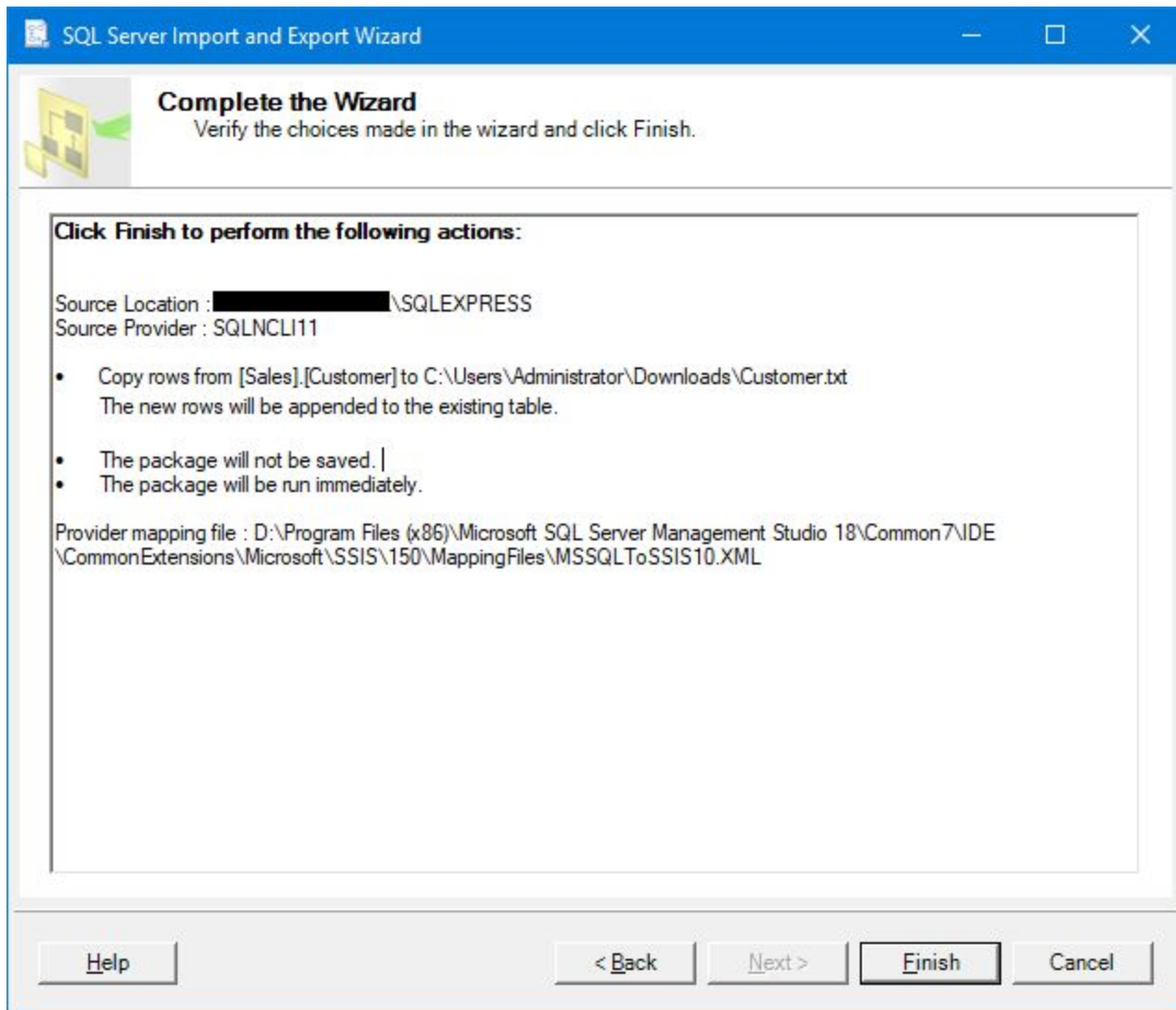
Password:

Retype password:

Help < Back Next > Finish >>| Cancel

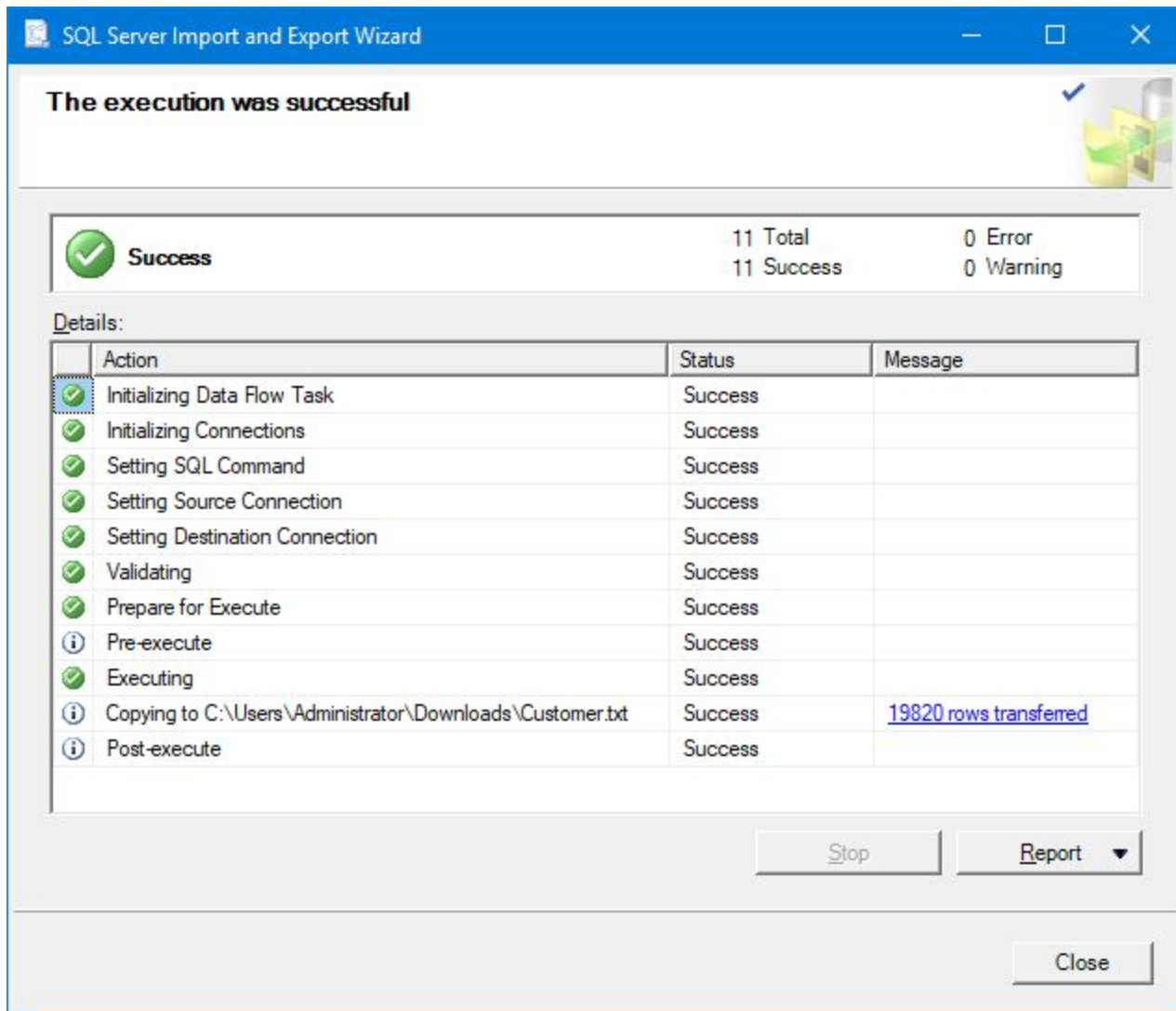
Click: Next

## Complete the Wizard



Click: Finish

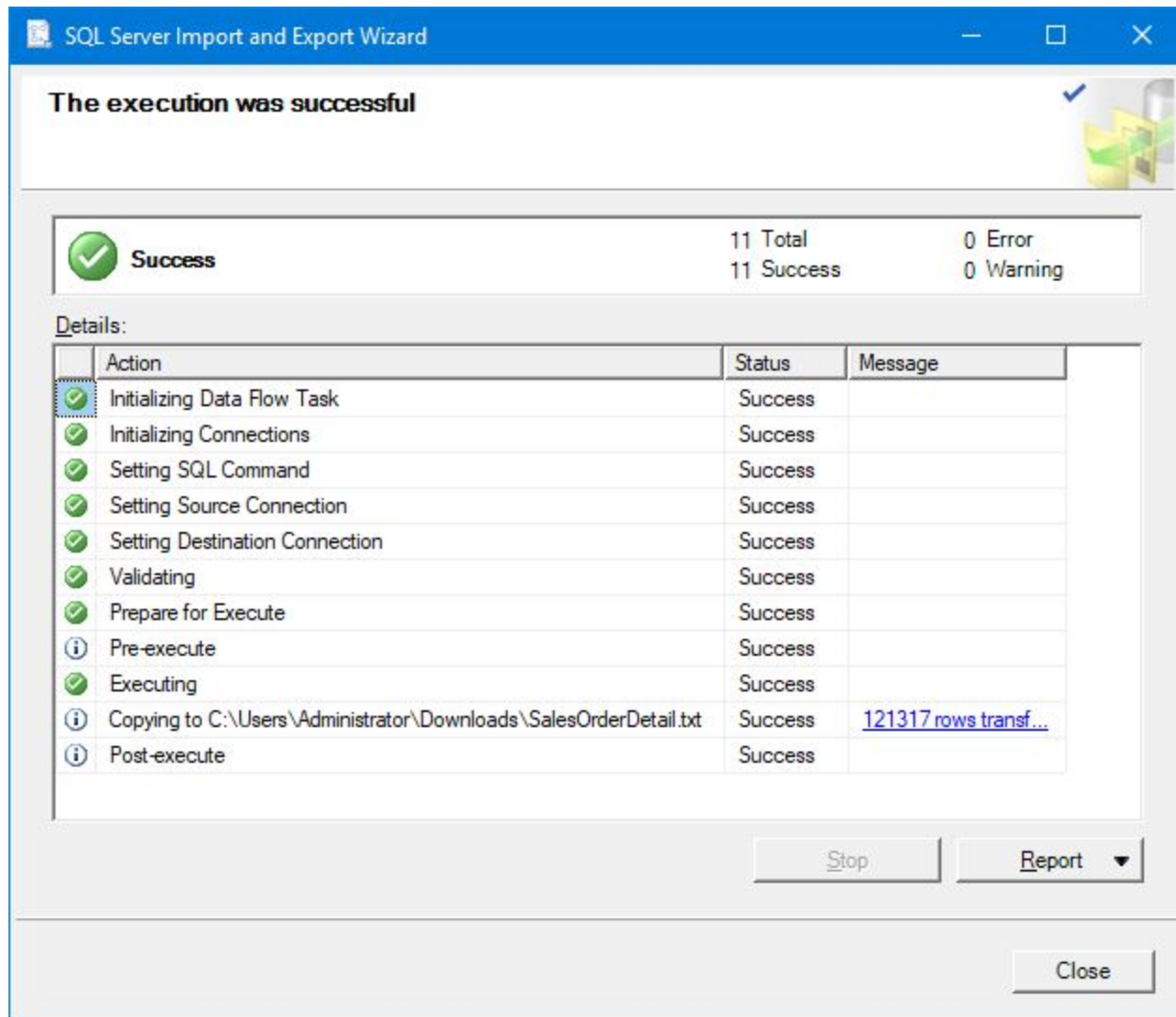
The execution was successful



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	

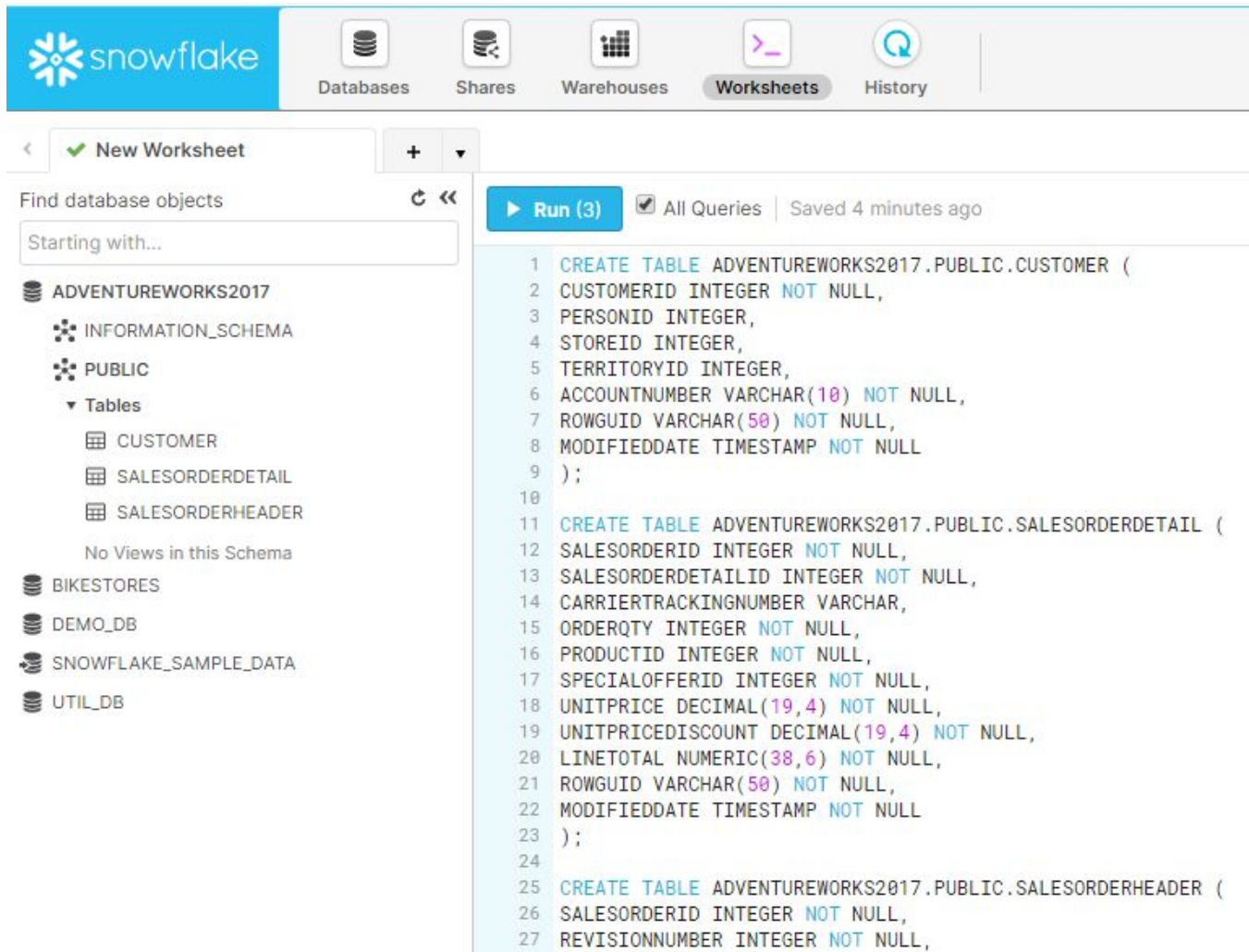
Stop Report Close

 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

Logon 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 "New Worksheet" button is visible. On the left, a sidebar shows the database structure: ADVENTUREWORKS2017, INFORMATION\_SCHEMA, PUBLIC (with a sub-menu for Tables containing CUSTOMER, SALESORDERDETAIL, and SALESORDERHEADER), and other databases like BIKESTORES, DEMO\_DB, SNOWFLAKE\_SAMPLE\_DATA, and UTIL\_DB. The main area displays a SQL query editor with three CREATE TABLE statements. A "Run (3)" button is present above the code. The status bar at the bottom indicates "All Queries" and "Saved 4 minutes ago".

```

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 'Databases' tab is selected, and the 'ADVENTUREWORKS2017' database is chosen. Under the 'Tables' sub-tab, a table list is displayed with columns: Table Name, Schema, Creation Time, Owner, Rows, and Size. The table list contains three entries: SALESORDERHEADER, SALESORDERDETAIL, and CUSTOMER, all in the PUBLIC schema and owned by SYSADMIN. Above the table list, there are action buttons: Create..., Create Like..., Clone..., Load Data..., Drop..., and Transfer Ownership.

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

▼

Cancel

Next

Click: Next

## Load Data - Source Files

Click: Select Files...

Browse: customer.txt

### Load Data

Warehouse

Source Files

File Format

Load Options

From where do you want to load files?

☒ Load files from your computer

Select Files...

**Customer.txt** (text/plain) - 3.6MB, last modified: 3/30/2020, 11:36:13 AM

☐ Load files from external stage

Stage

▼

+

Path

Cancel

Back

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





**Databases**SharesWarehousesWorksheetsHistory


Databases > ADVENTUREWORKS2017


TablesViewsSchemasStagesFile FormatsSequences

 Create...

 Create Like...

 Clone...

 Load Data...

 Drop...


 Transfer Ownership

Table Name	Schema	Creation Time ▼	Owner	Rows	Size
<a href="#">SALESORDERHEADER</a>	PUBLIC	12:27:17 PM	SYSADMIN	<div><div></div></div> 31.5K	<div><div></div></div> 2.5MB
<a href="#">SALESORDERDETAIL</a>	PUBLIC	12:27:17 PM	SYSADMIN	<div><div></div></div> 121.3K	<div><div></div></div> 5.5MB
<a href="#">CUSTOMER</a>	PUBLIC	12:27:17 PM	SYSADMIN	<div><div></div></div> 19.8K	<div><div></div></div> 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.

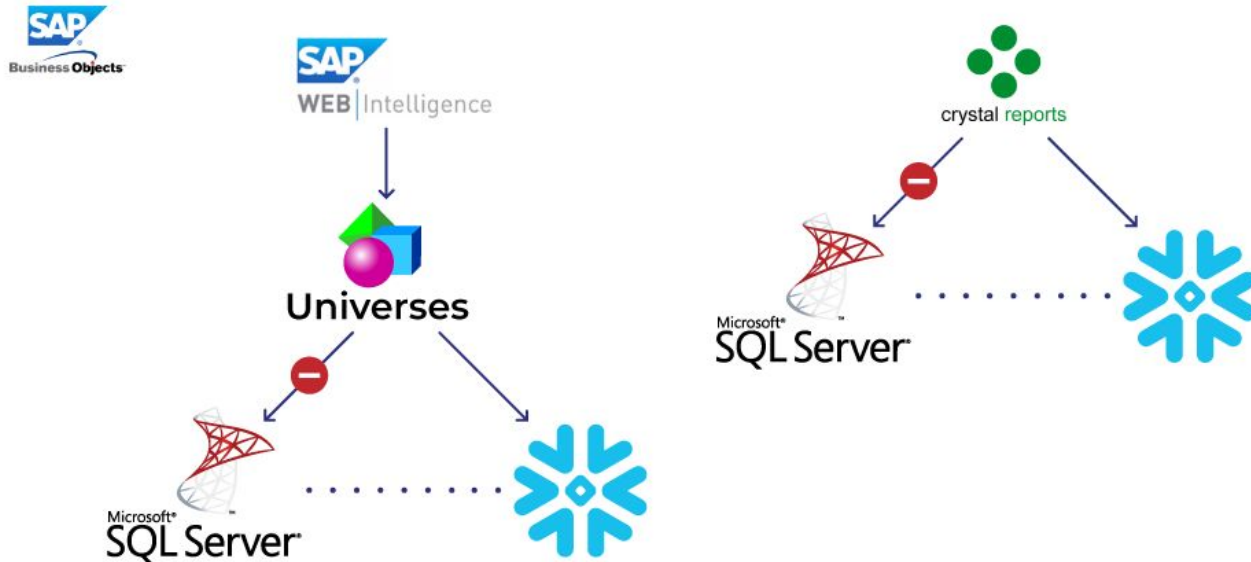
As mentioned in the introduction, some of you will only be required to repoint the Universe Connection to Snowflake. This may be true if there are no changes to the owners, qualifiers, schema or presence of vendor specific SQL in the Universes.

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

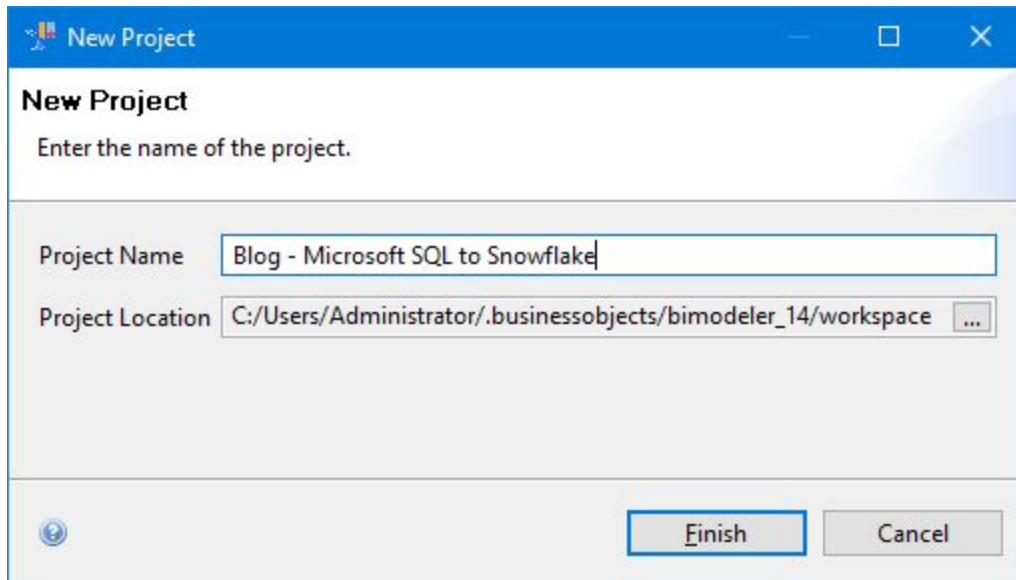
Name	Value
BusinessObjects Configuration	
Version	3.4.0.0
Build	14.2.8.3426
Network Layer	ODBC
DBMS Engine	Snowflake
Language	en
Charset	
Library	D:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\drivers\lib64\dbd_wodbc3.dll
SBO	D:\Program Files (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
Middleware and DBMS Configuration	
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 header containing the text 'New Project' and 'Enter the name of the project.' Below this, there are two input fields: 'Project Name' with the text 'Blog - Microsoft SQL to Snowflake' and 'Project Location' with the text 'C:/Users/Administrator/.businessobjects/bimodeler\_14/workspace'. At the bottom right, there are two buttons: 'Finish' and 'Cancel'.

**New Project**  
Enter the name of the project.

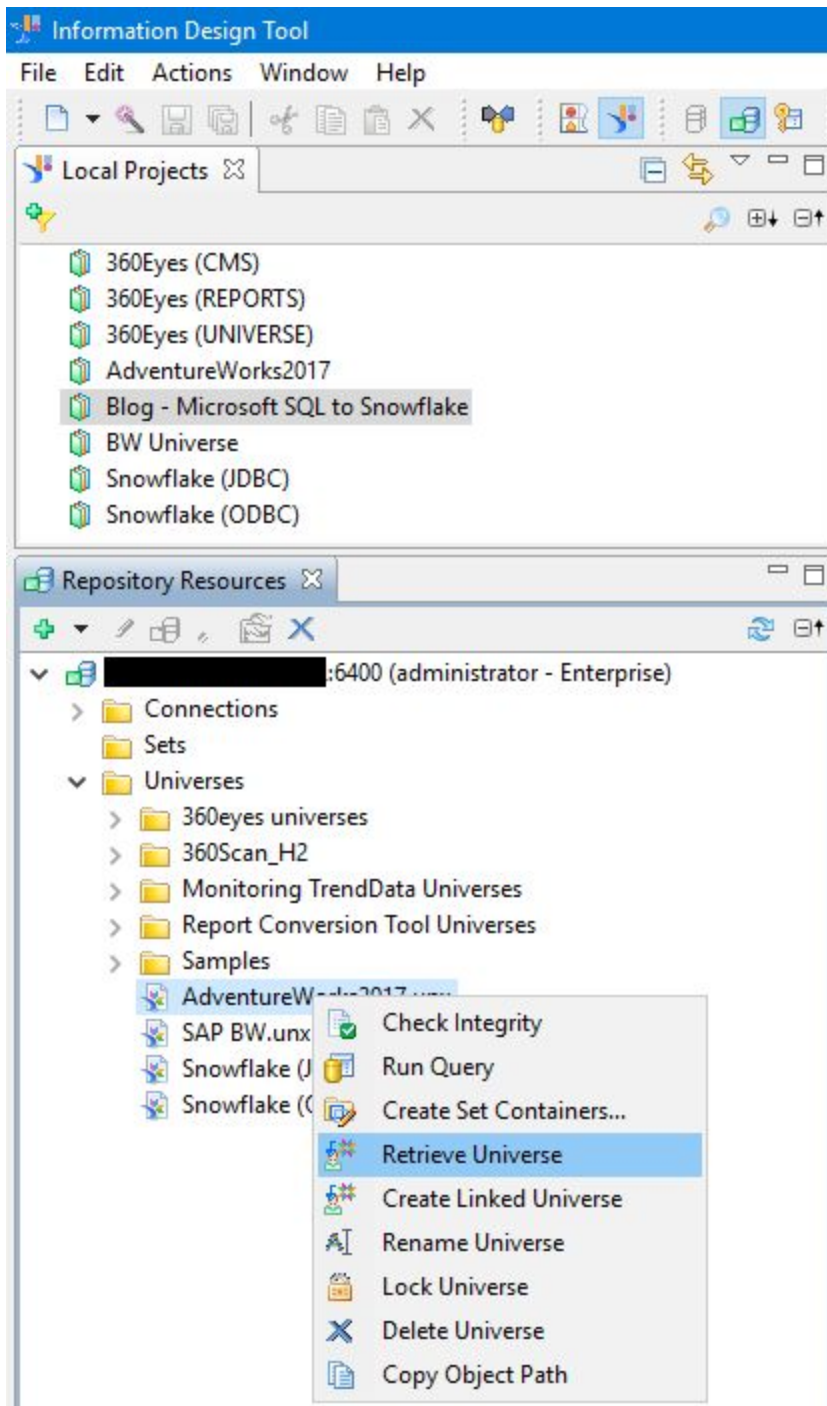
Project Name

Project Location

Project Name: Blog - Microsoft SQL to Snowflake

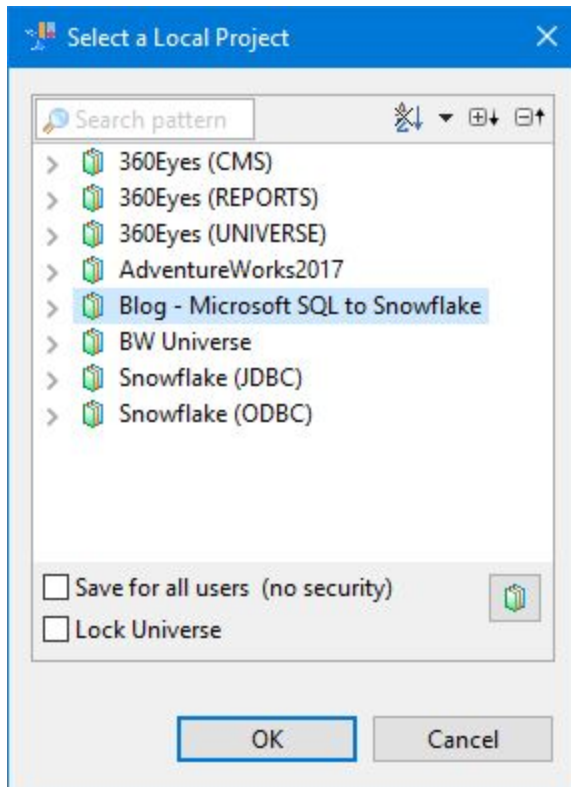
Click: Finish

## Retrieve the Universe





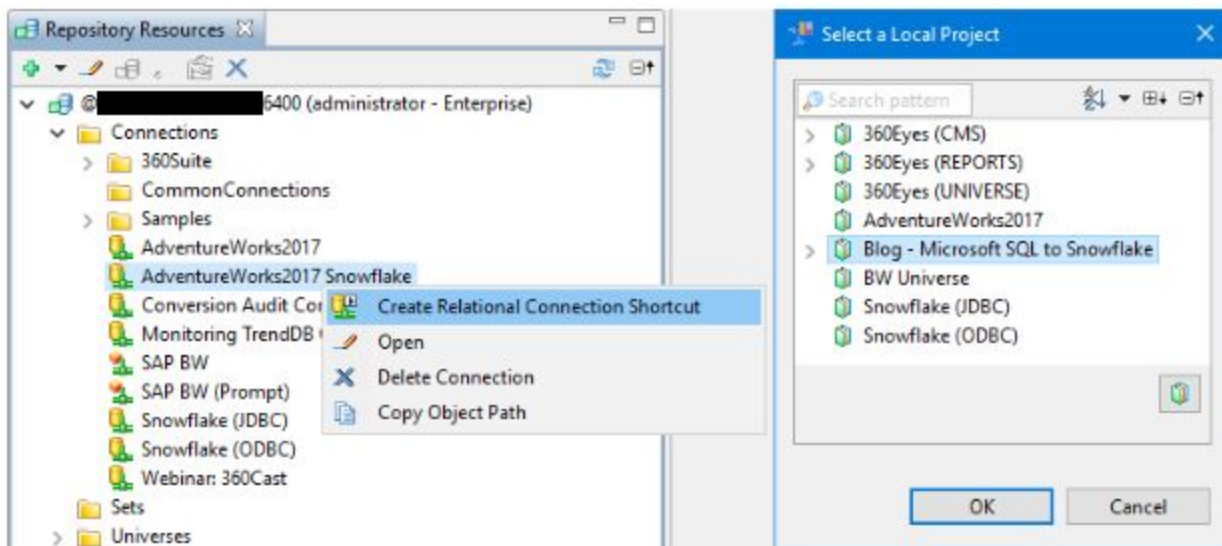
Select a Local Project



Click: OK



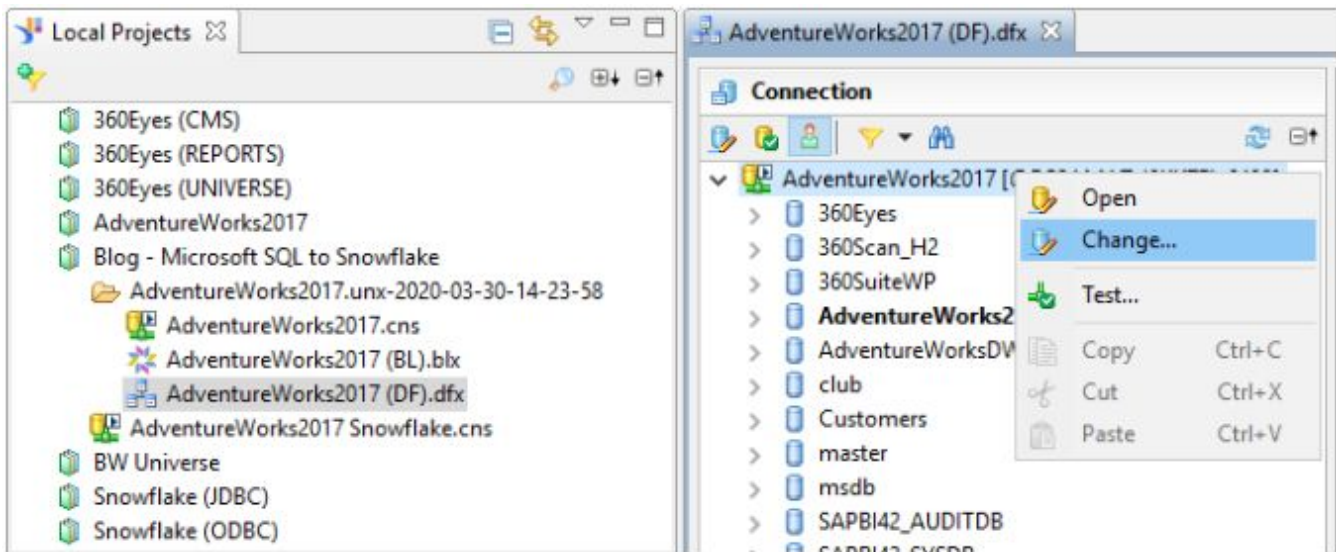
## Create a Relational Connection Shortcut



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

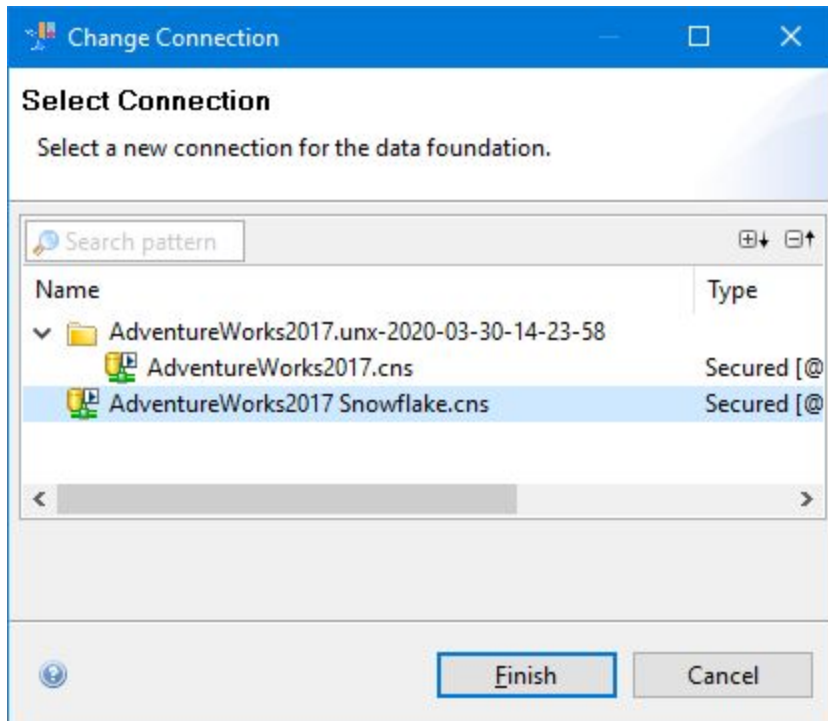
1. Open AdventureWorks2017 (DF).dfx



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



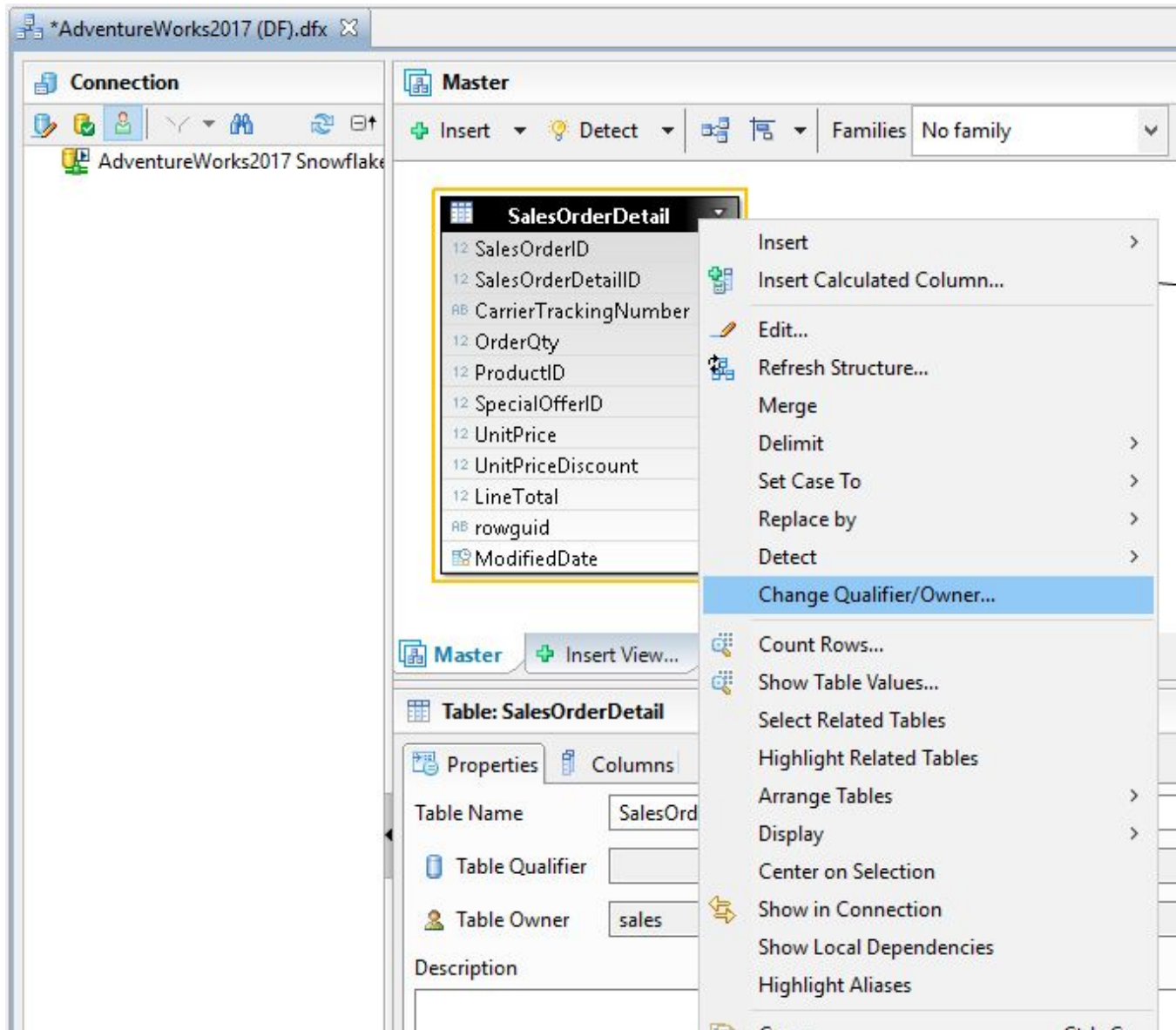
2. Select: AdventureWorks2017 Snowflake.cns



3. Click: Finish
4. Save the Data Foundation

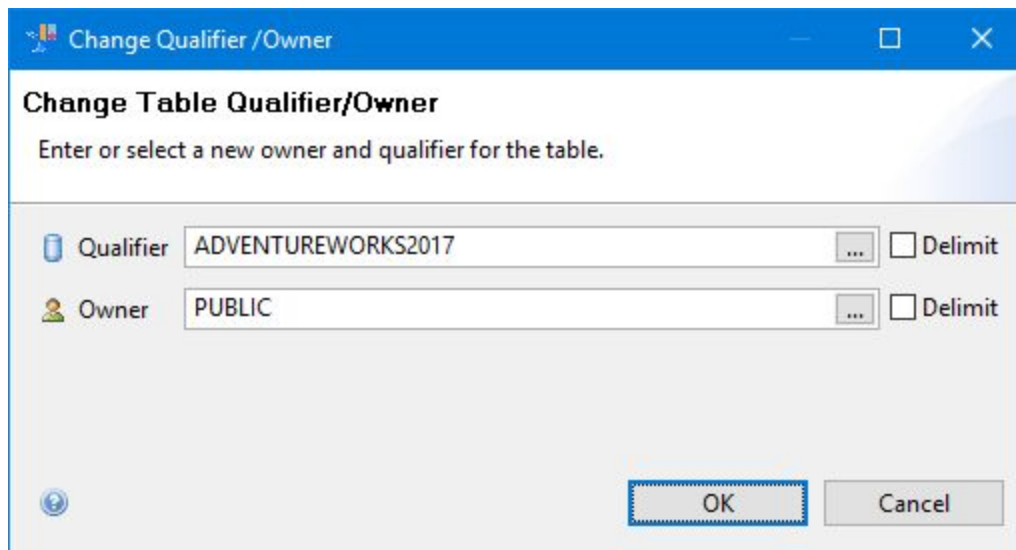
## Change the Qualifier/Owner of the Tables in the Data Foundation

1. Open AdventureWorks2017 (DF).dfx



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

2. Change Table Qualifier/Owner



Enter Qualifier: ADVENTUREWORKS2017

Enter Owner: PUBLIC

Click: OK

3. Repeat for tables: SalesOrderHeader and Customer

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

4. 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".



\*AdventureWorks2017 (DF).dfx Show values in table SalesOrderDetail. X

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

Raw Data Distinct values Analysis

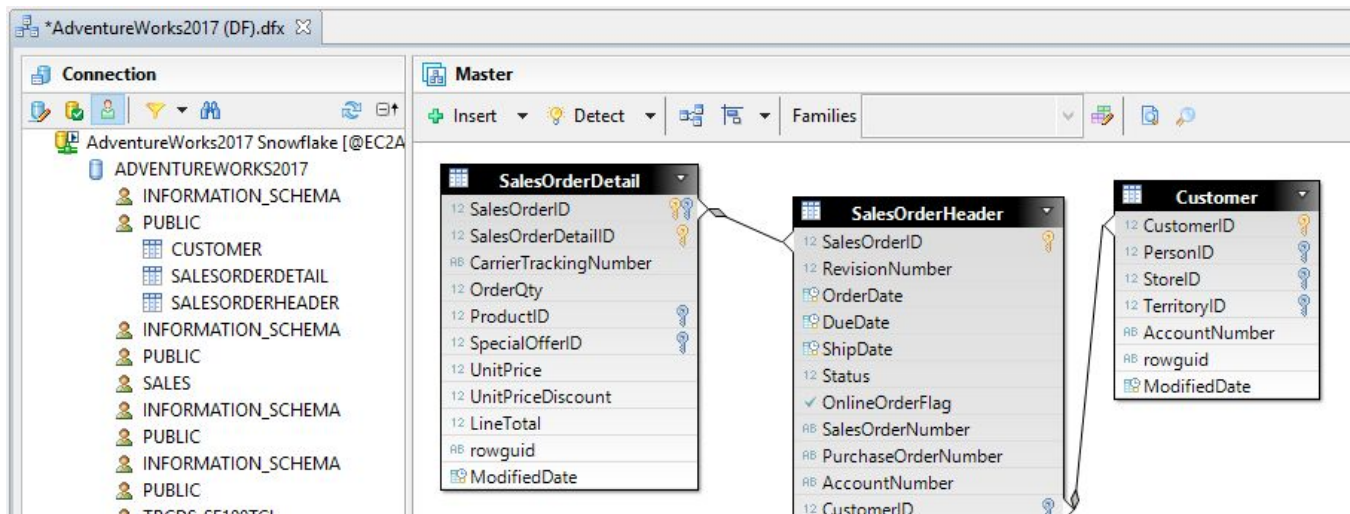
Enter your filter Filtered rows: 200/200

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).

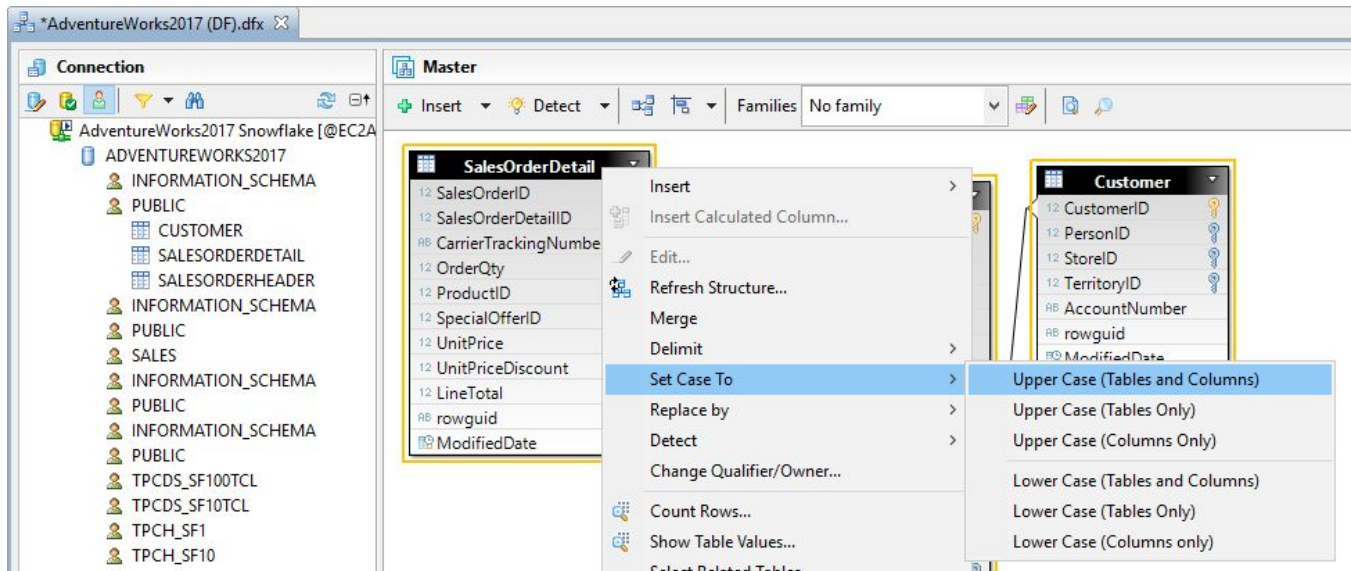
As mentioned in the introduction, this is because the identifiers in Snowflake are case-insensitive but displayed in uppercase.



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.



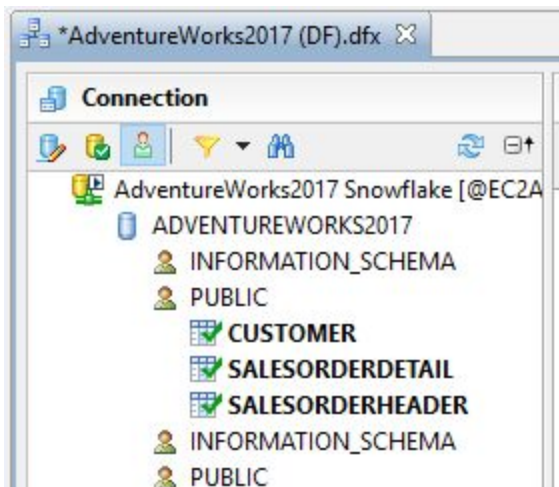
## 5. Open AdventureWorks2017 (DF).dfx



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.

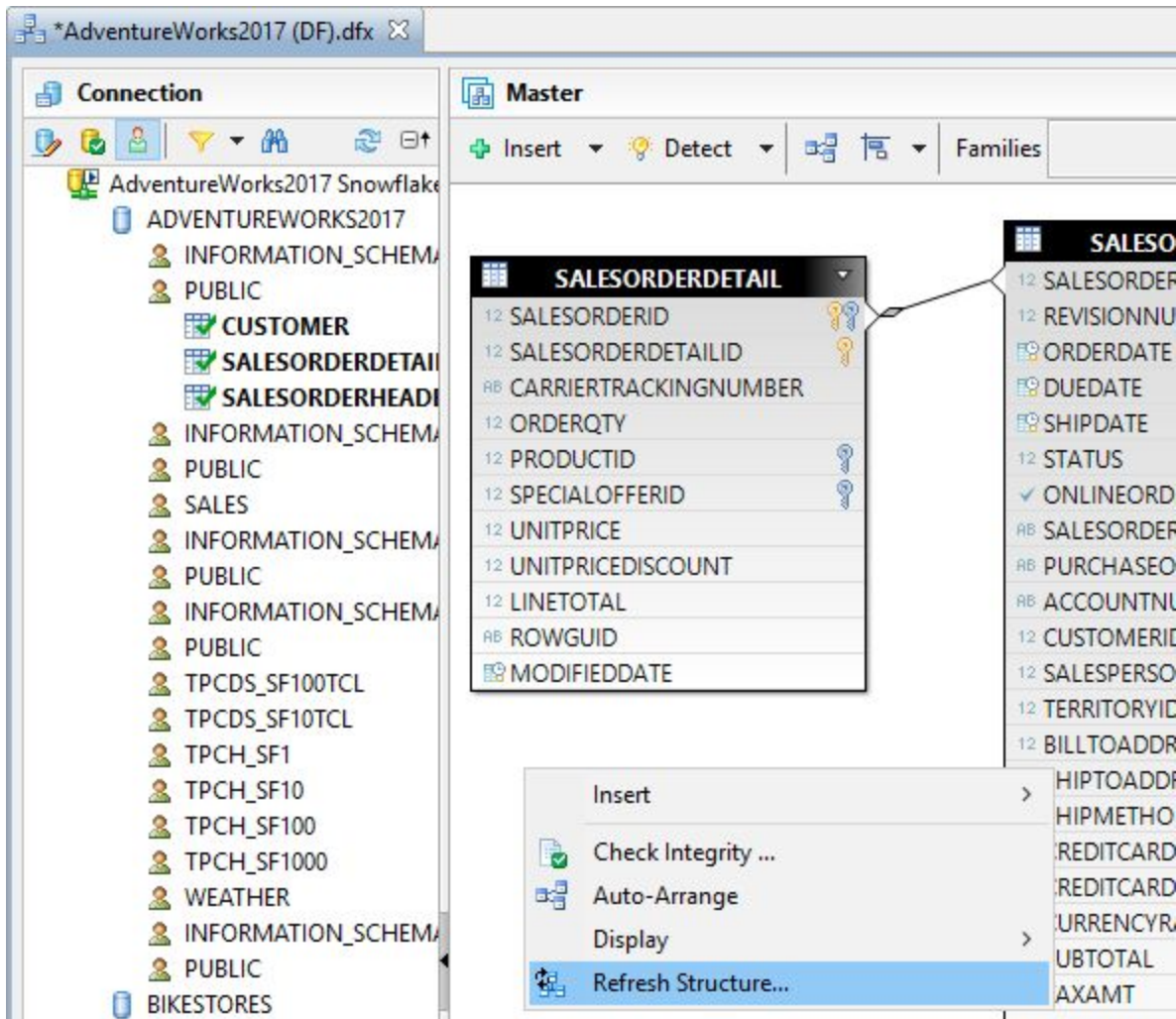


## 7. Save the Data Foundation



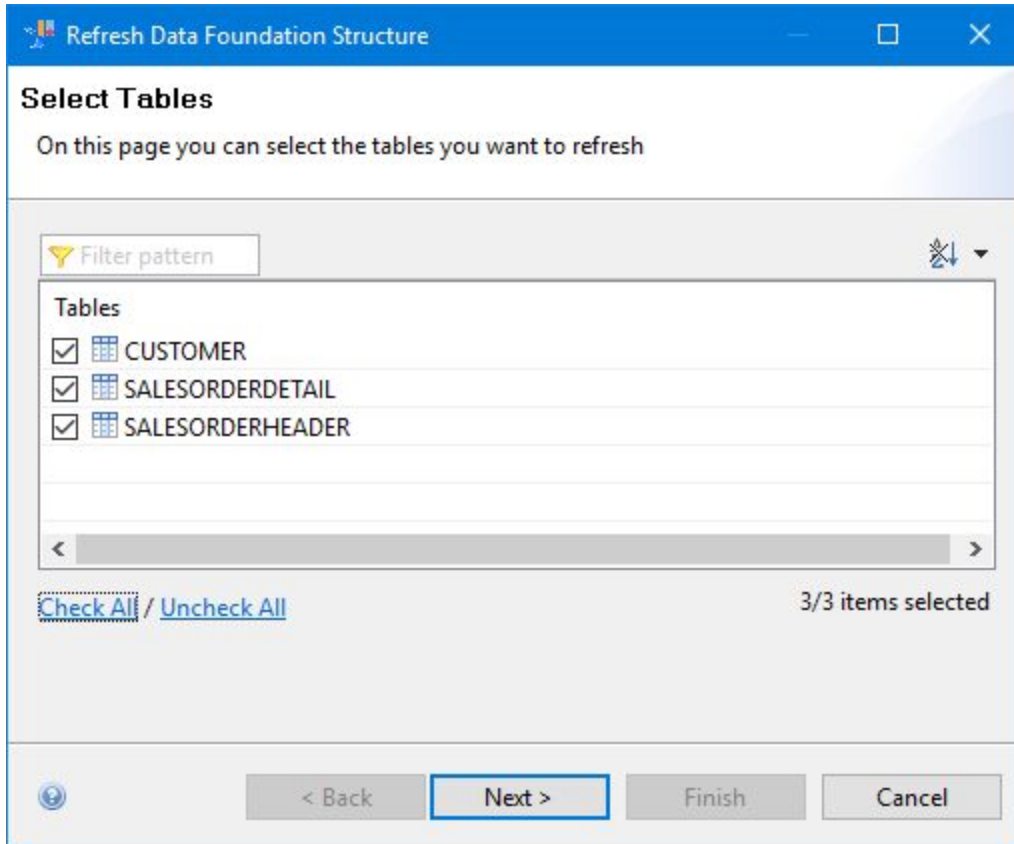
## Refresh Universe Foundation Structure

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

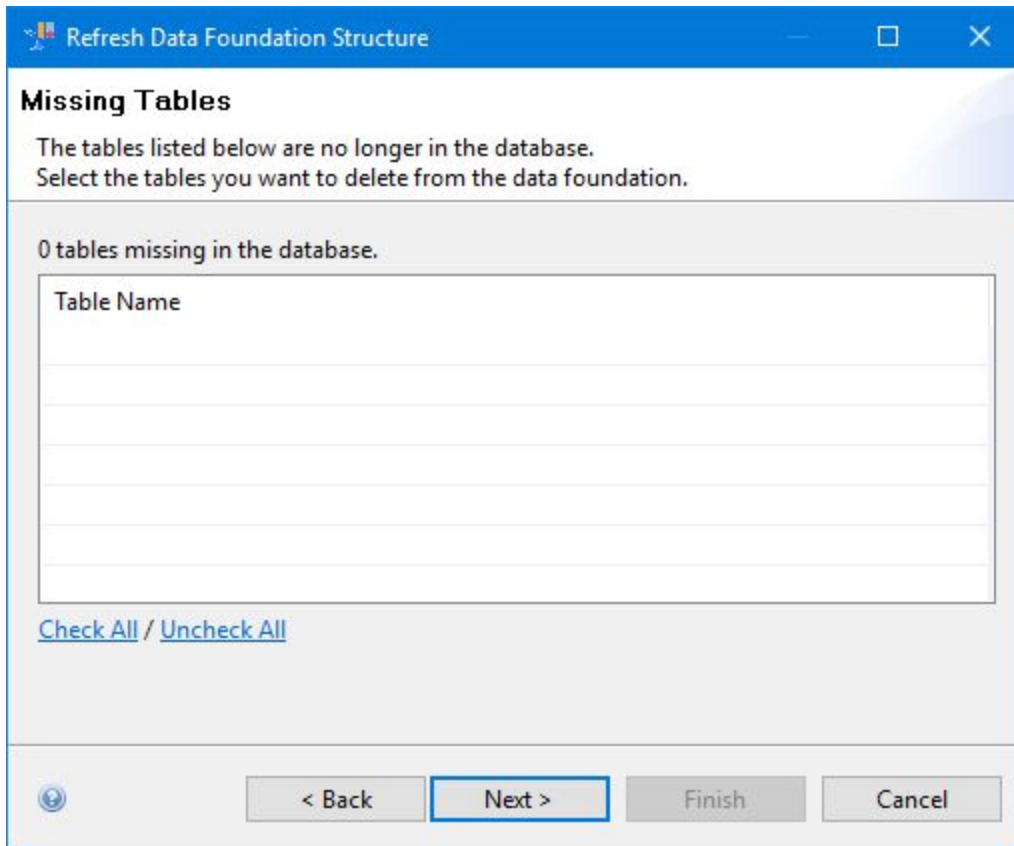
<input checked="" type="checkbox"/>	CUSTOMER
<input checked="" type="checkbox"/>	SALESORDERDETAIL
<input checked="" type="checkbox"/>	SALESORDERHEADER

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

< Back **Next >** Finish Cancel

Click: Next

### 3. Missing Tables

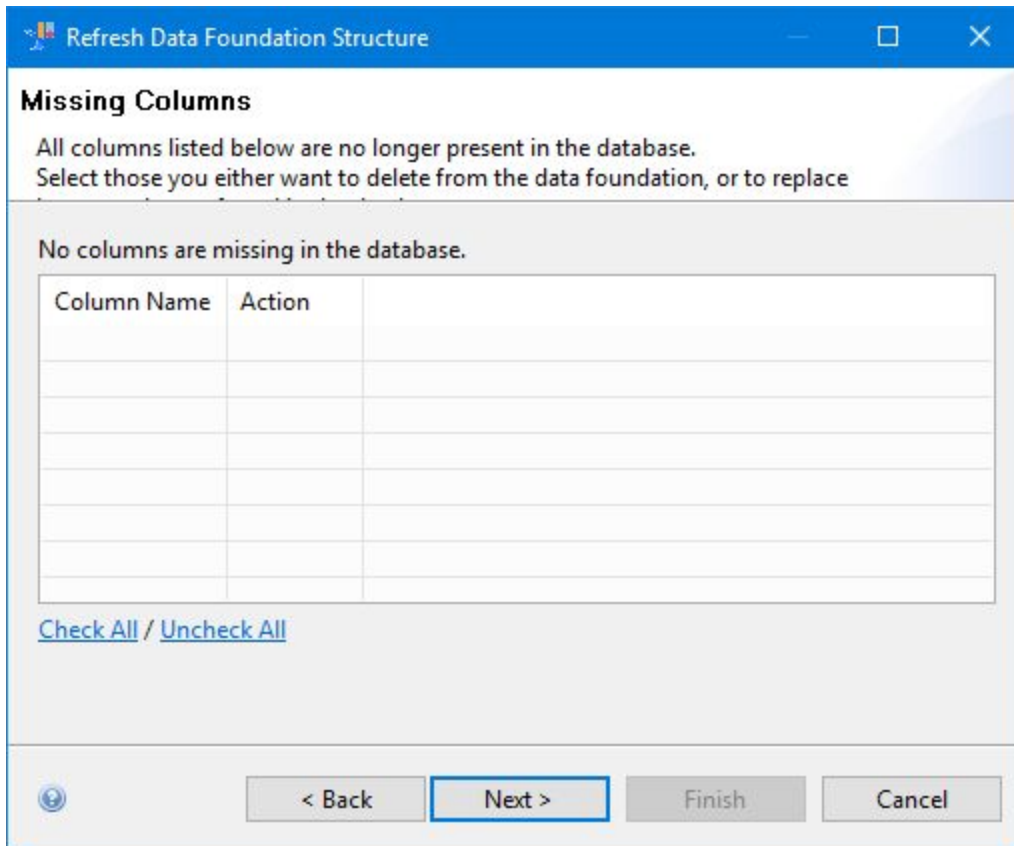


The dialog box is titled "Refresh Data Foundation Structure". It has a blue header bar with standard window controls. The main content area is white and contains the following elements:

- Missing Tables**: A bold heading.
- Instructions**: "The tables listed below are no longer in the database. Select the tables you want to delete from the data foundation."
- Status**: "0 tables missing in the database."
- Table List**: A table with one header row "Table Name" and several empty rows below it.
- Links**: "[Check All](#) / [Uncheck All](#)"
- Buttons**: "< Back", "Next >" (highlighted with a blue border), "Finish", and "Cancel".

Click: Next

#### 4. Missing Columns



**Refresh Data Foundation Structure**


**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.

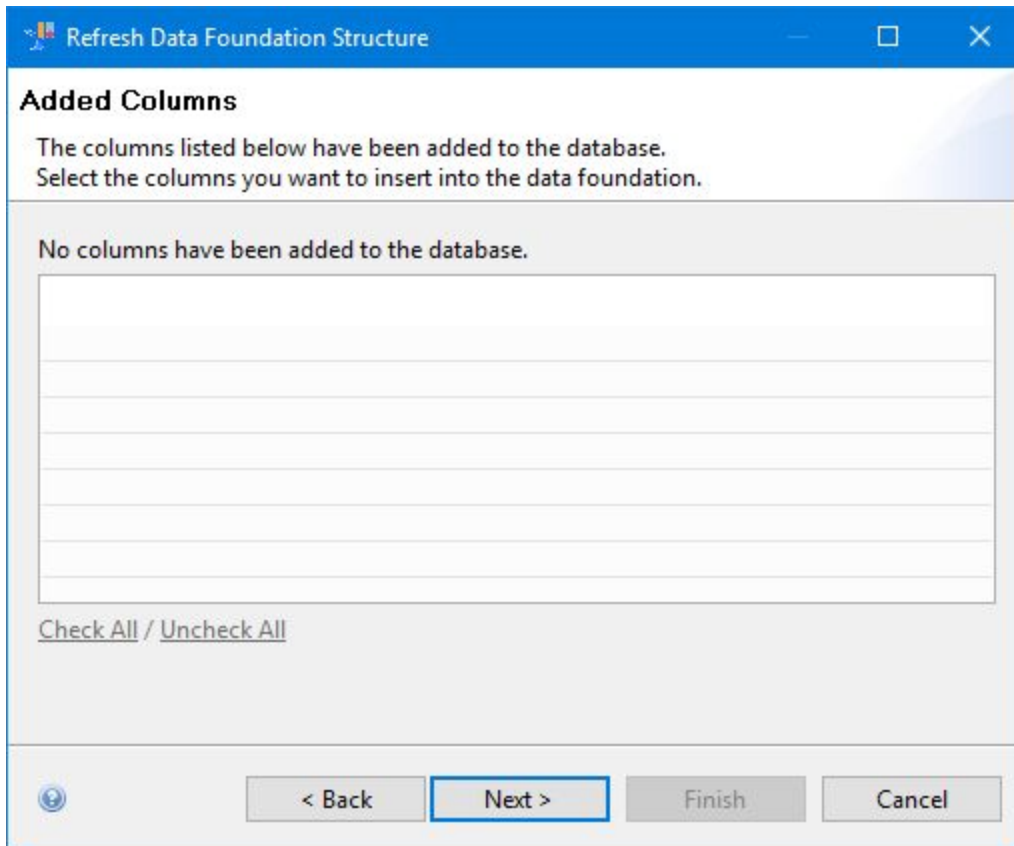
Column Name	Action

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



Click: Next

## 5. Added Columns



The screenshot shows a Windows-style dialog box titled "Refresh Data Foundation Structure". The "Added Columns" tab is selected. The text inside the dialog reads: "The columns listed below have been added to the database. Select the columns you want to insert into the data foundation." Below this text is a large, empty rectangular area with horizontal lines, intended for a list of columns. At the bottom of this area is a link that says "Check All / Uncheck All". At the very bottom of the dialog are four buttons: "< Back", "Next >" (which is highlighted with a blue border), "Finish", and "Cancel".

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

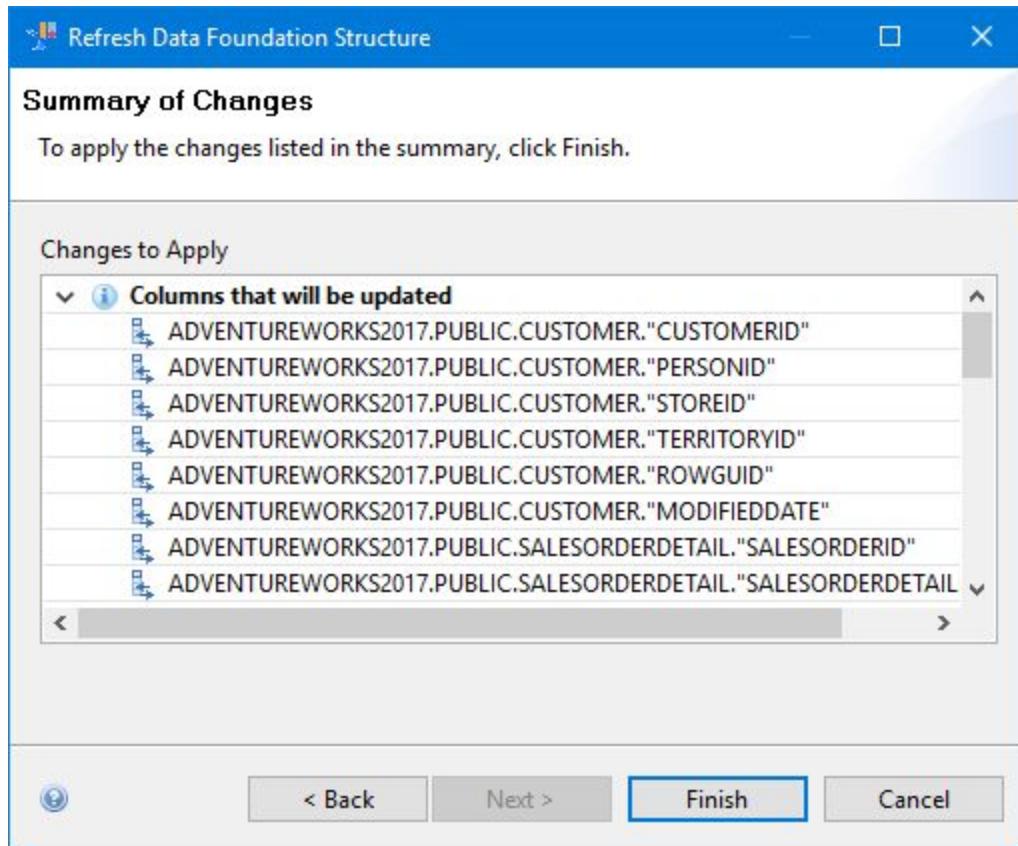
Column ...	Current Data Type	Database Data Type	Cur...	Dat...	Cur...	Dat...
<input checked="" type="checkbox"/>  S						
<input checked="" type="checkbox"/>  12 INTEGER	12 INTEGER	12 DECIMAL	11	40		
<input checked="" type="checkbox"/>  12 INTEGER	12 INTEGER	12 DECIMAL	11	40		
<input checked="" type="checkbox"/>  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



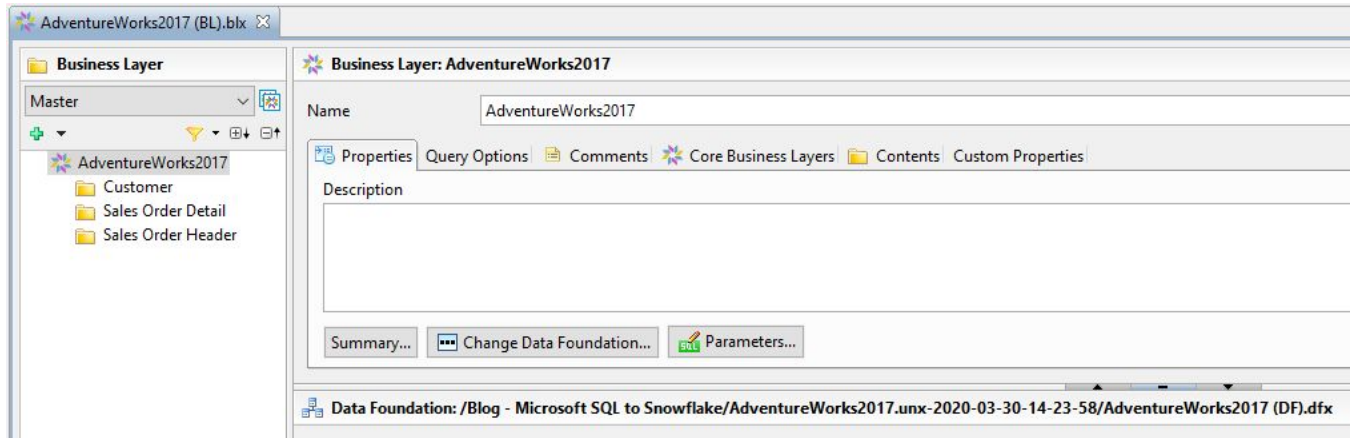
Click: Finish

## 8. Save the Data Foundation

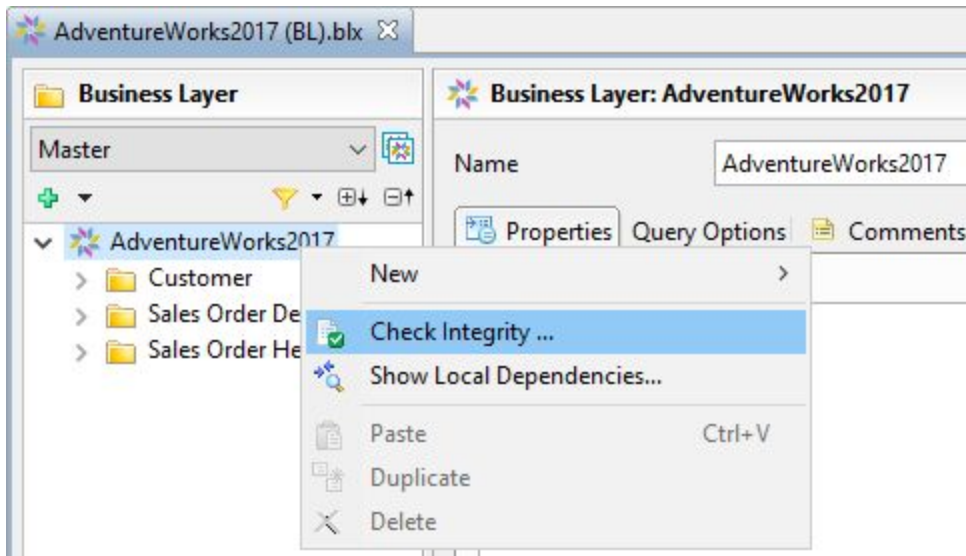


## Validate the Business Layer with the Snowflake Data Foundation

1. Open AdventureWorks2017 (BL).blx



2. Check Integrity...

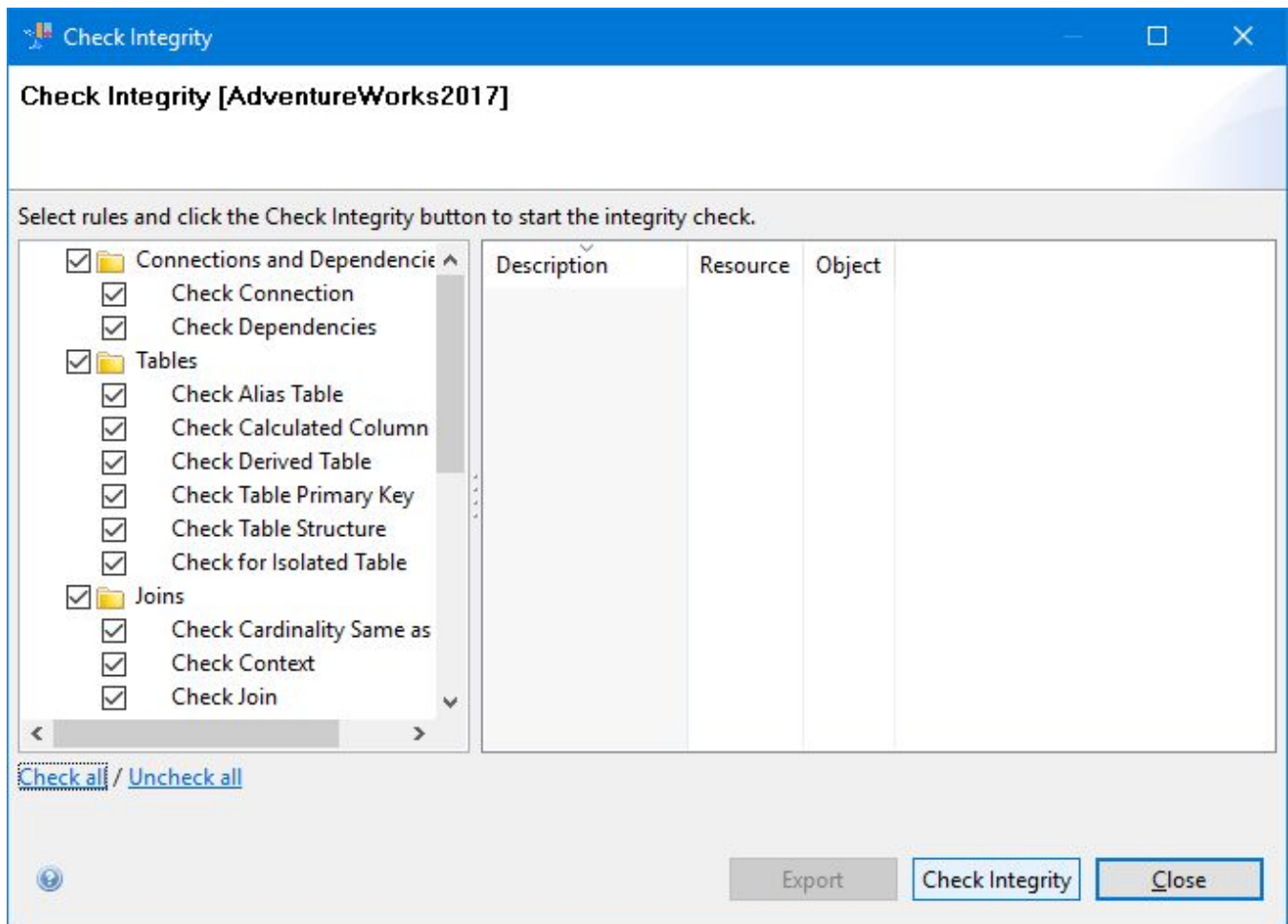


Under Business Layer > Right-Click Adventureworks2017  
Click: Check Integrity...





### 3. Check Integrity

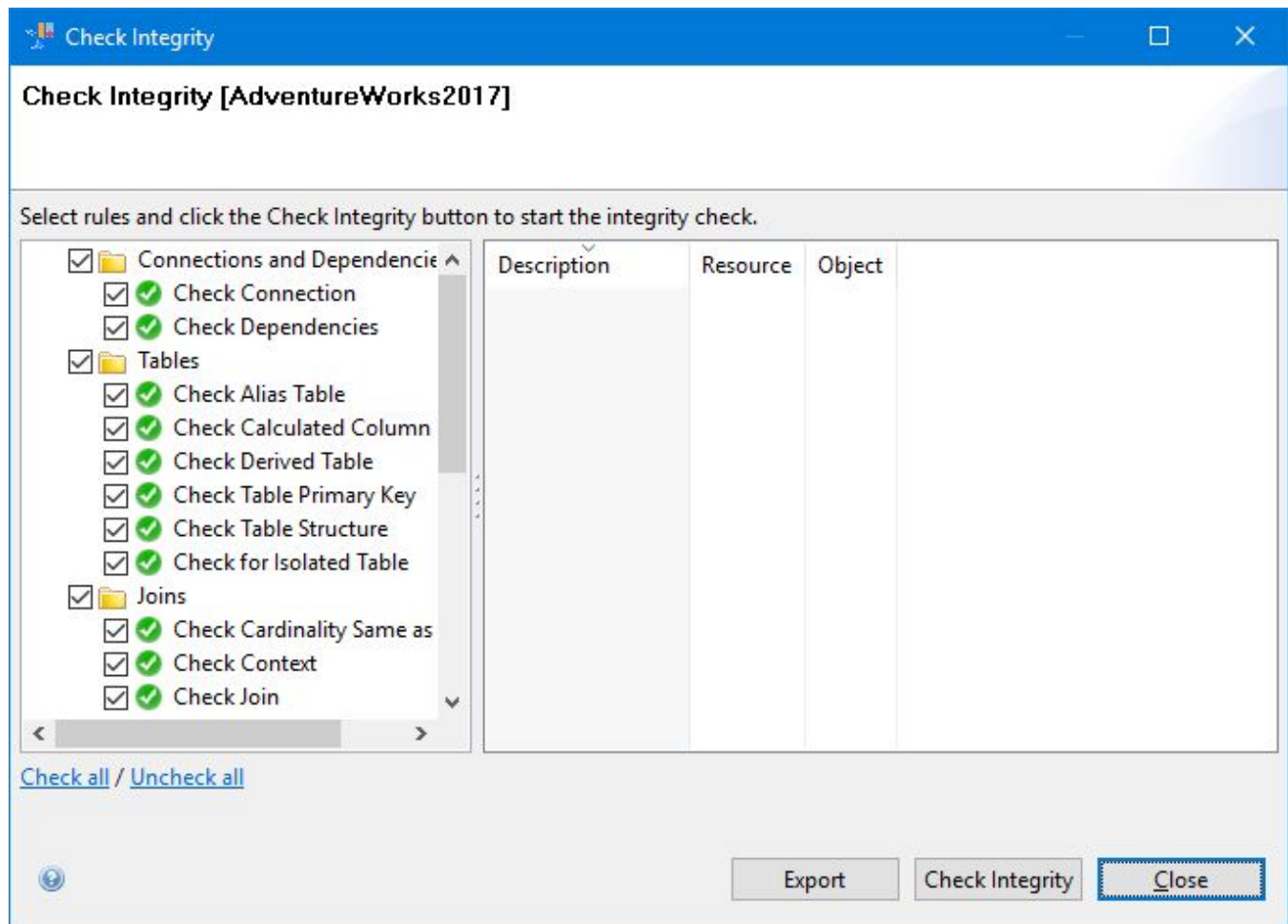


Click: Check all

Click: Check Integrity



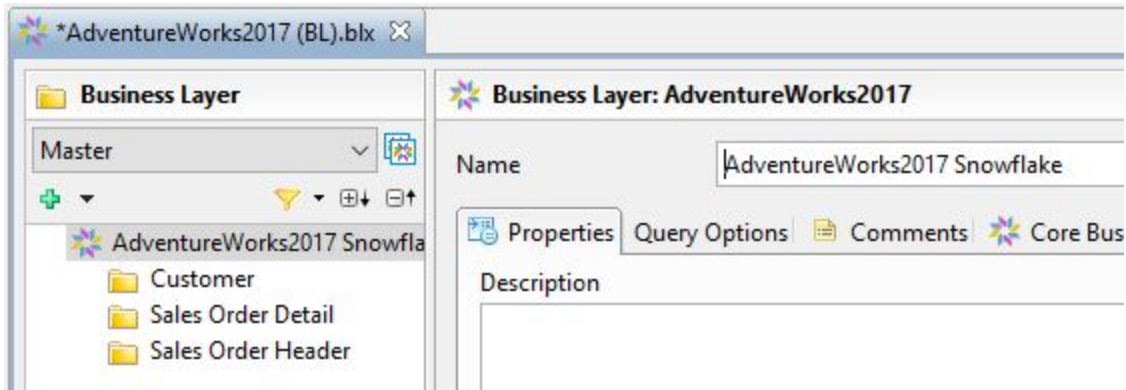
#### 4. Confirm Results



Click: Close

## Rename the Universe

1. Open AdventureWorks2017 (BL).blx

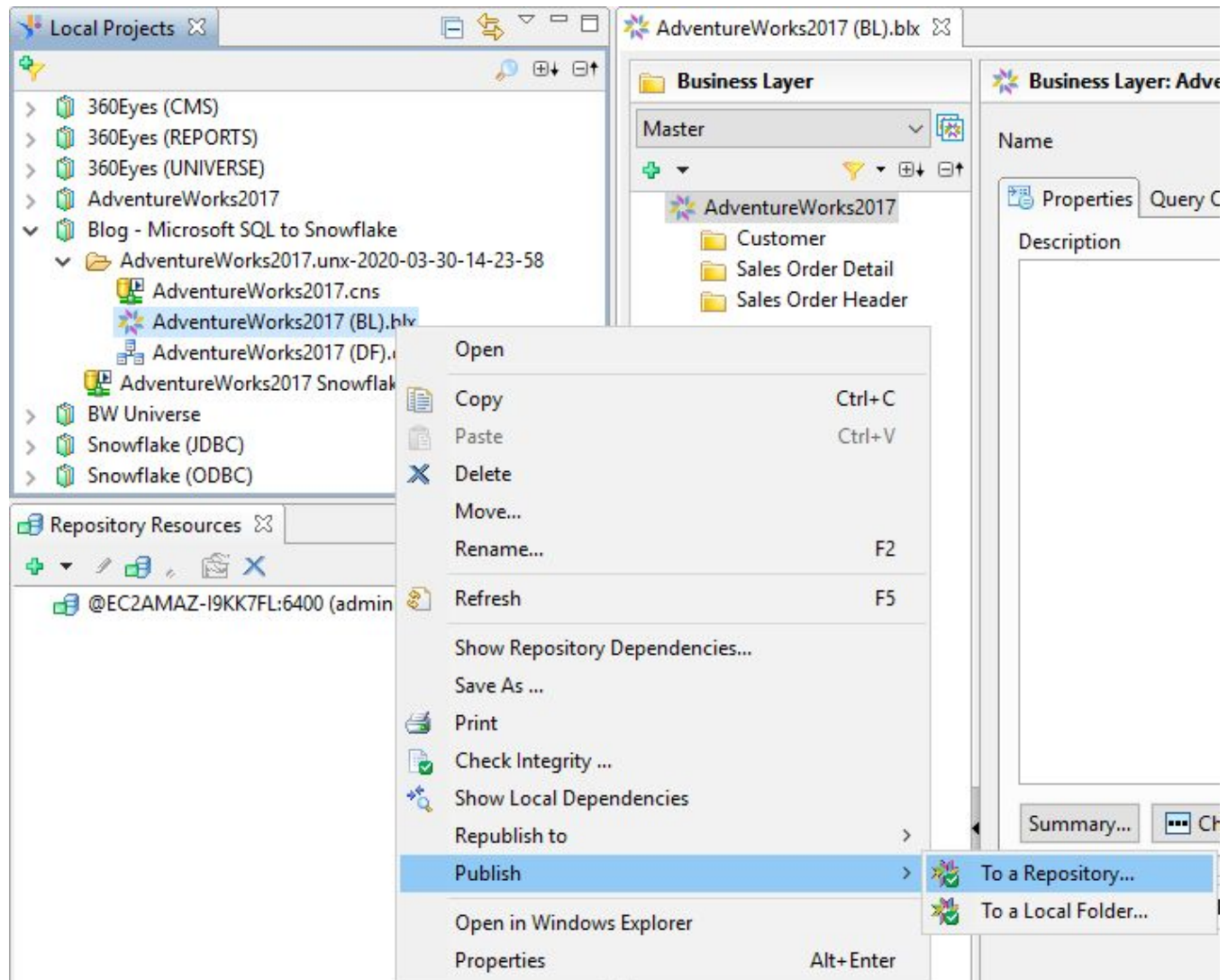


Name: [ENTER NEW NAME] E.g. AdventureWorks2017 Snowflake

2. Save the Business Layer

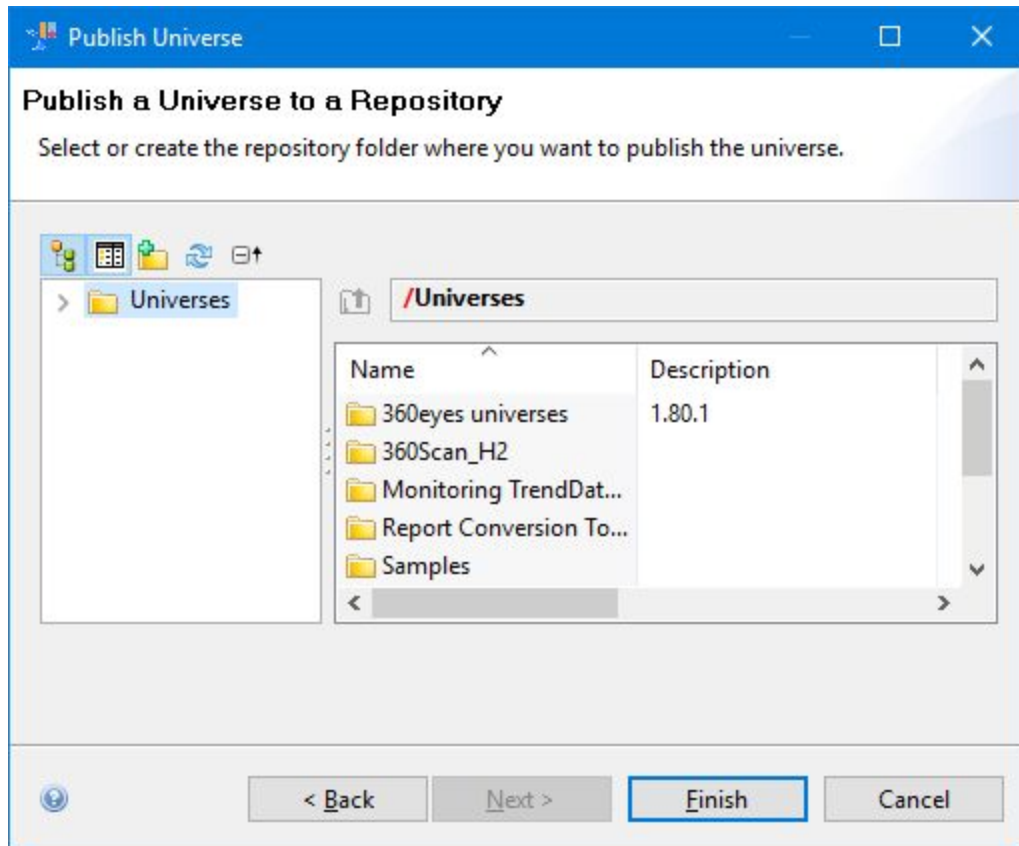
## Publish the Business Layer with the Snowflake Data Foundation

1. Open AdventureWorks2017 (BL).blx

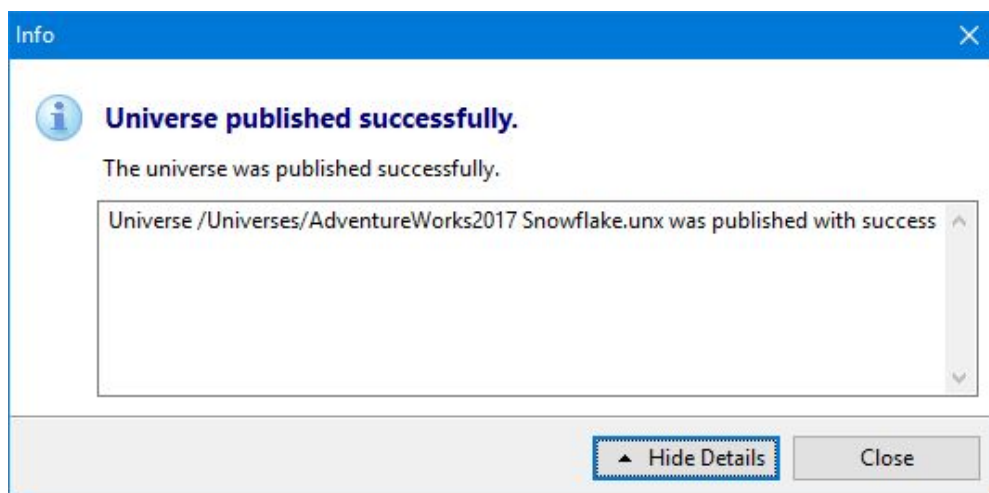


Under Local Projects > Right-Click Adventureworks2017 (BL).blx  
Click: Publish > To a Repository  
Click: Next

Select where you want to save the Universe



Click: Finish



Click: Close

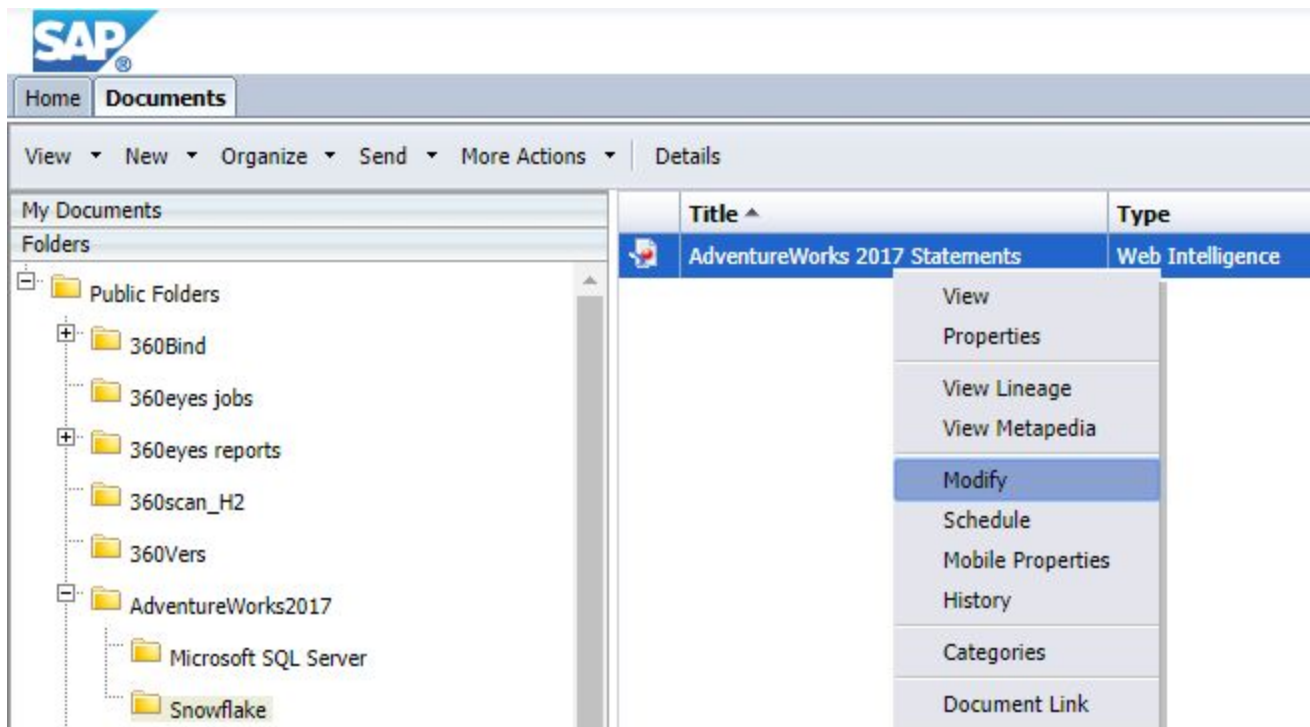
## Updating Web Intelligence

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

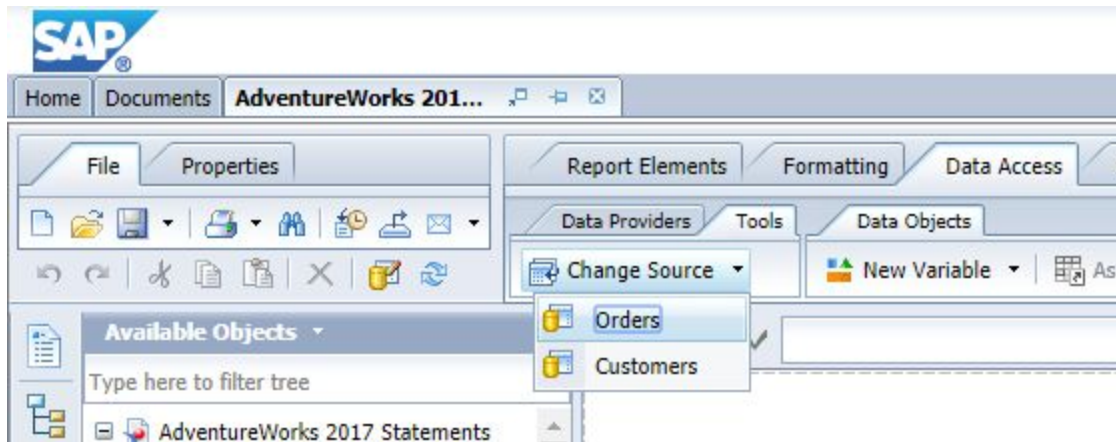


Right-Click the Web Intelligence  
Click: Modify



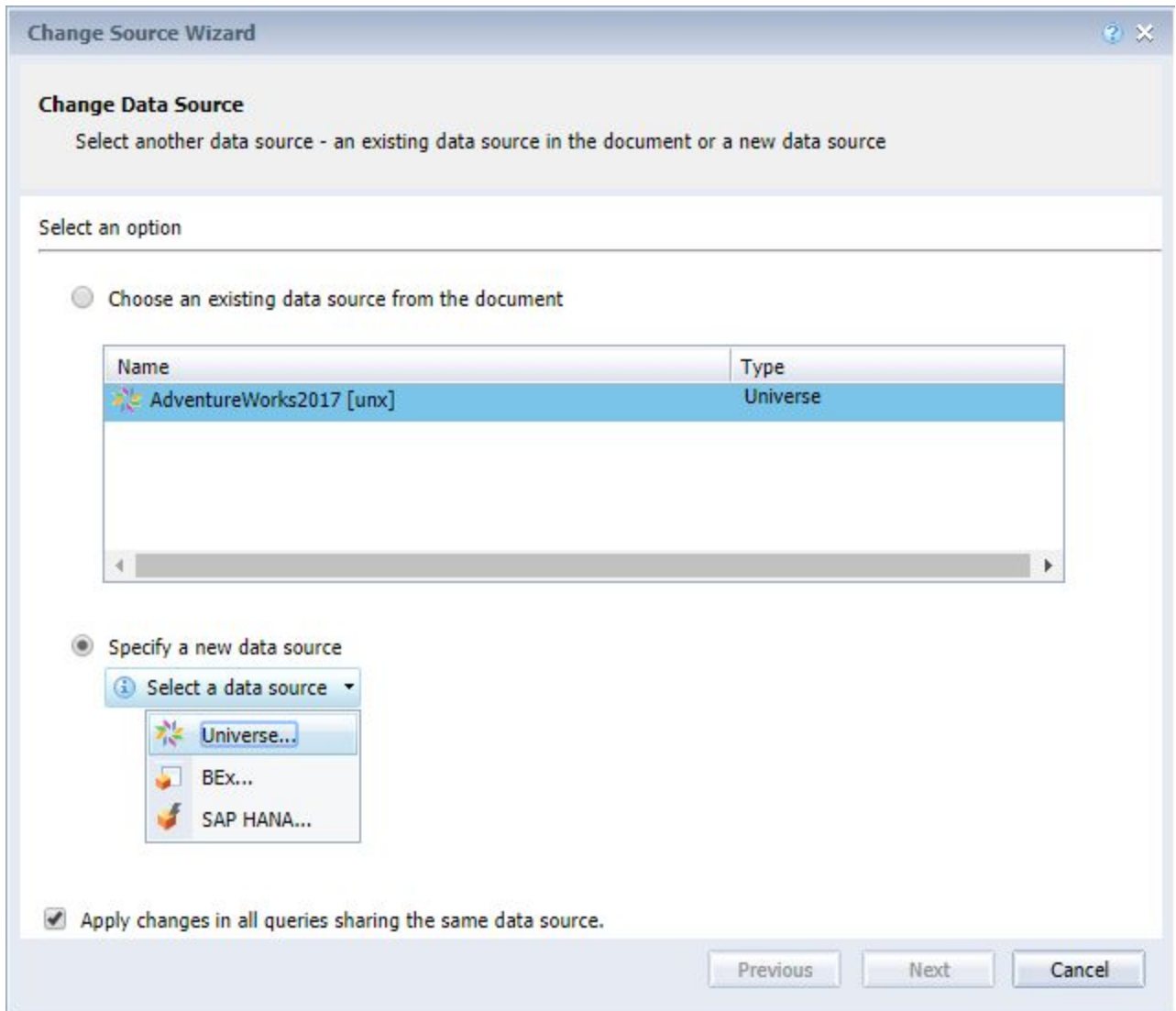
## Change Data Source

### 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

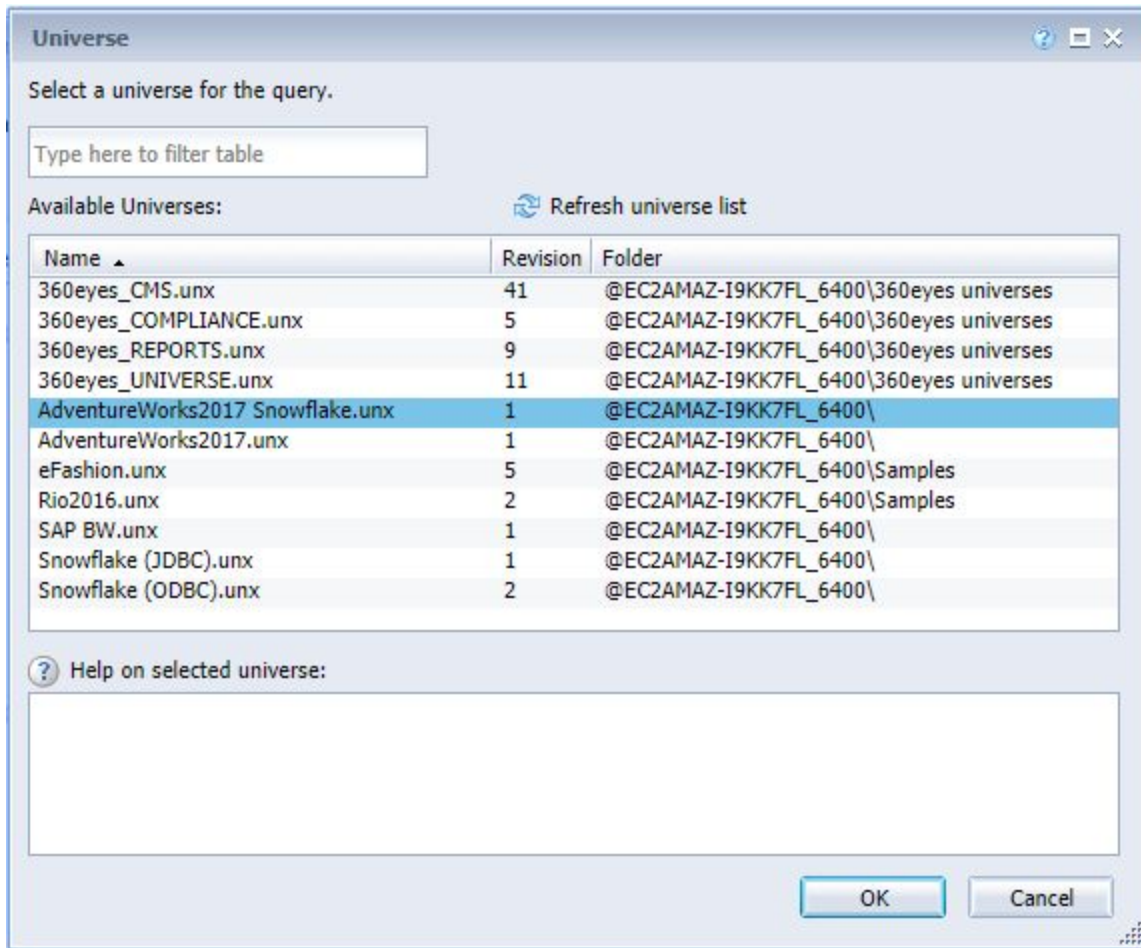
Check: Apply changes in all queries sharing the same data source.

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

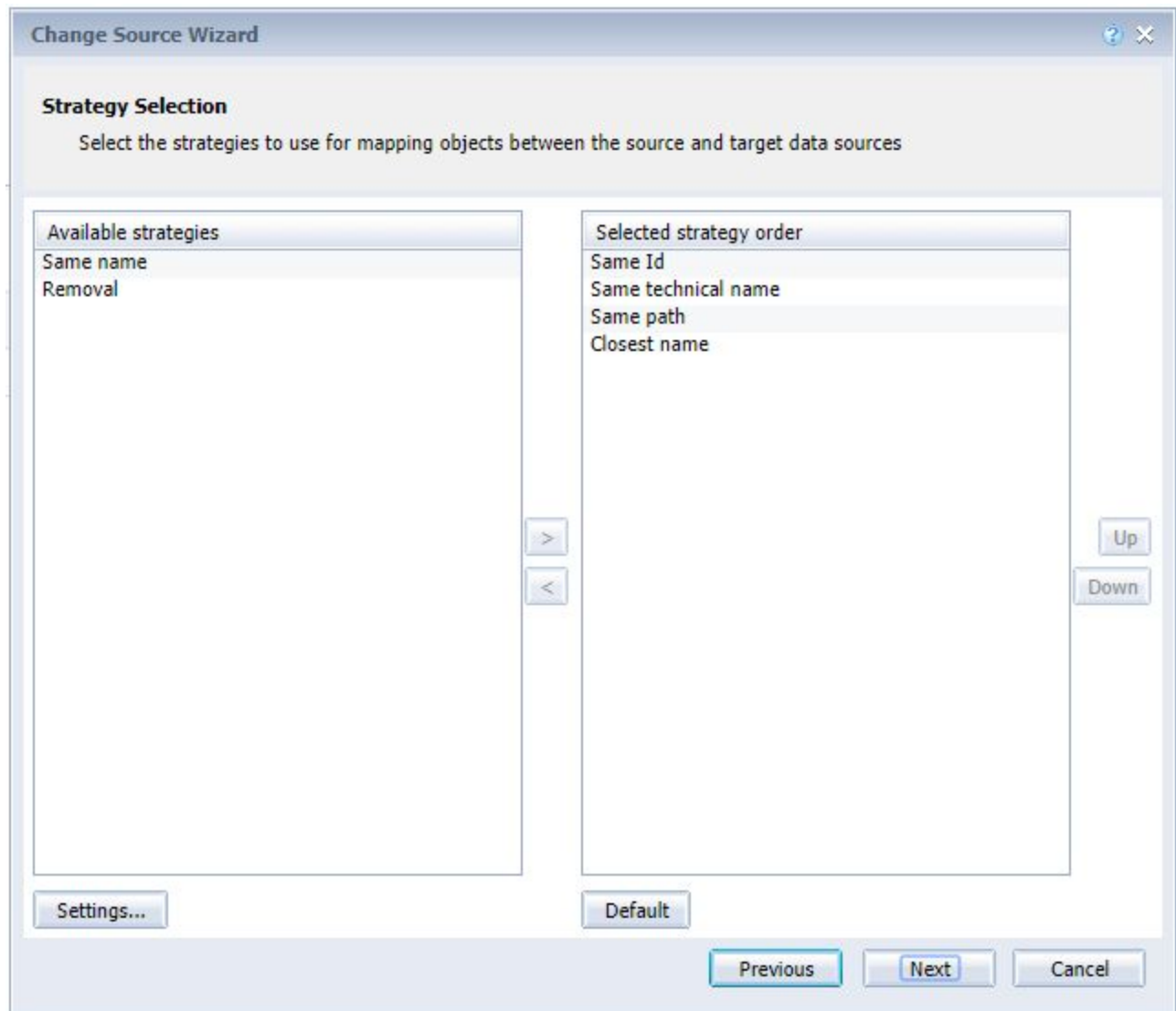
☒ Apply changes in all queries sharing the same data source.

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:

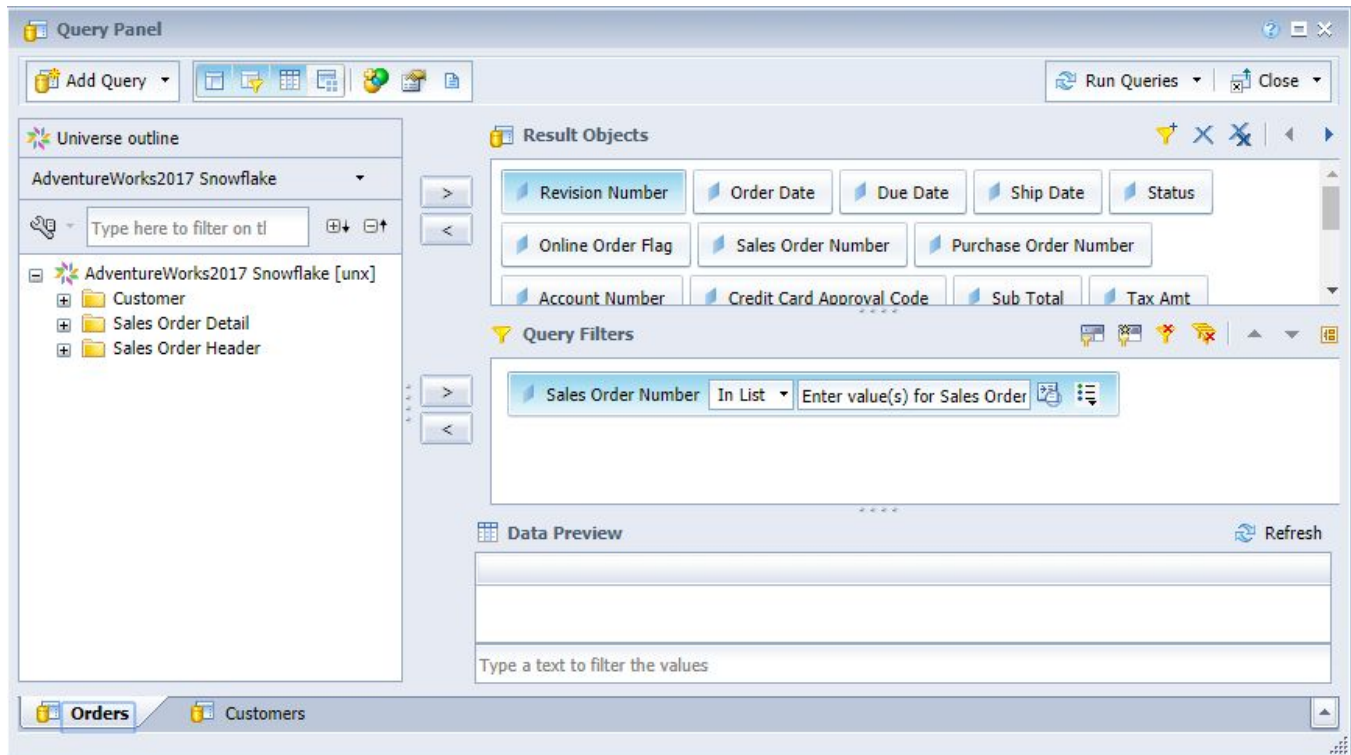
<input type="checkbox"/> Current		<input checked="" type="checkbox"/> New		
<input type="checkbox"/>	Account Number	<input checked="" type="checkbox"/>	Account Number	...
<input type="checkbox"/>	Carrier Tracking Number	<input checked="" type="checkbox"/>	Carrier Tracking Number	...
<input type="checkbox"/>	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.

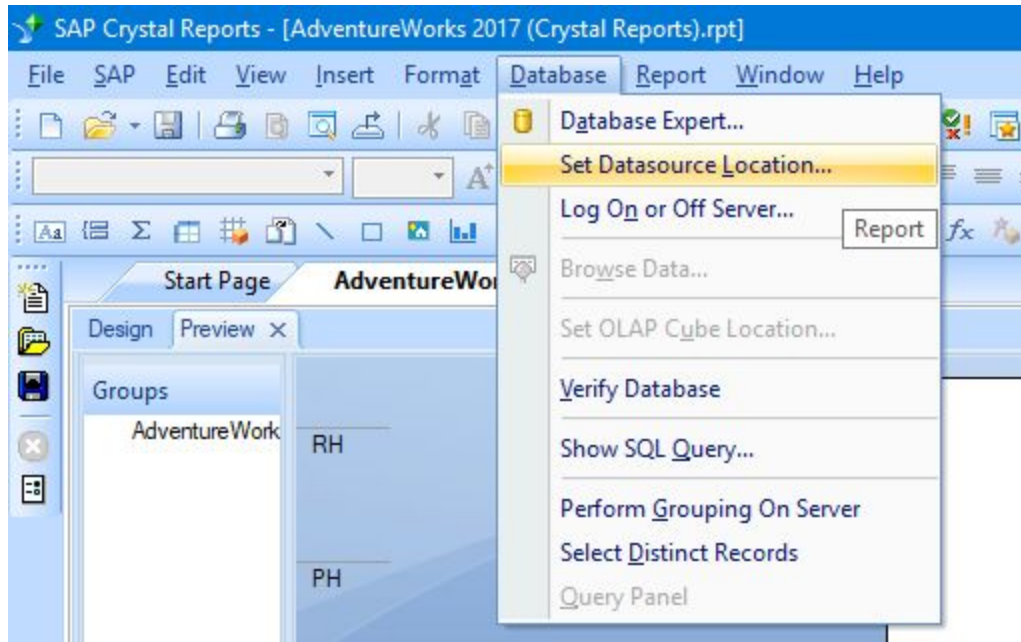
There are two methods:

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”

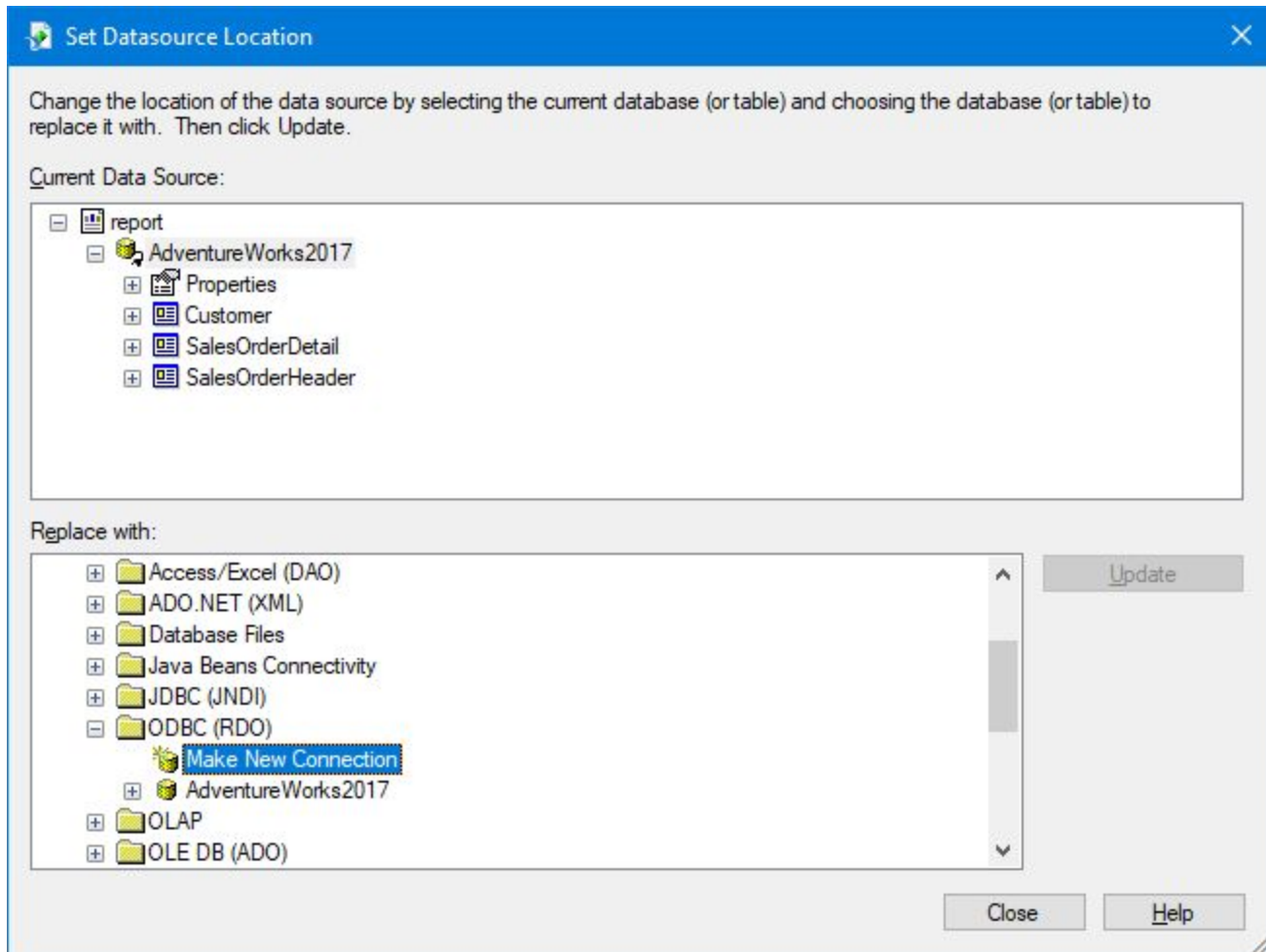
1. Open your Crystal Reports



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) ✕

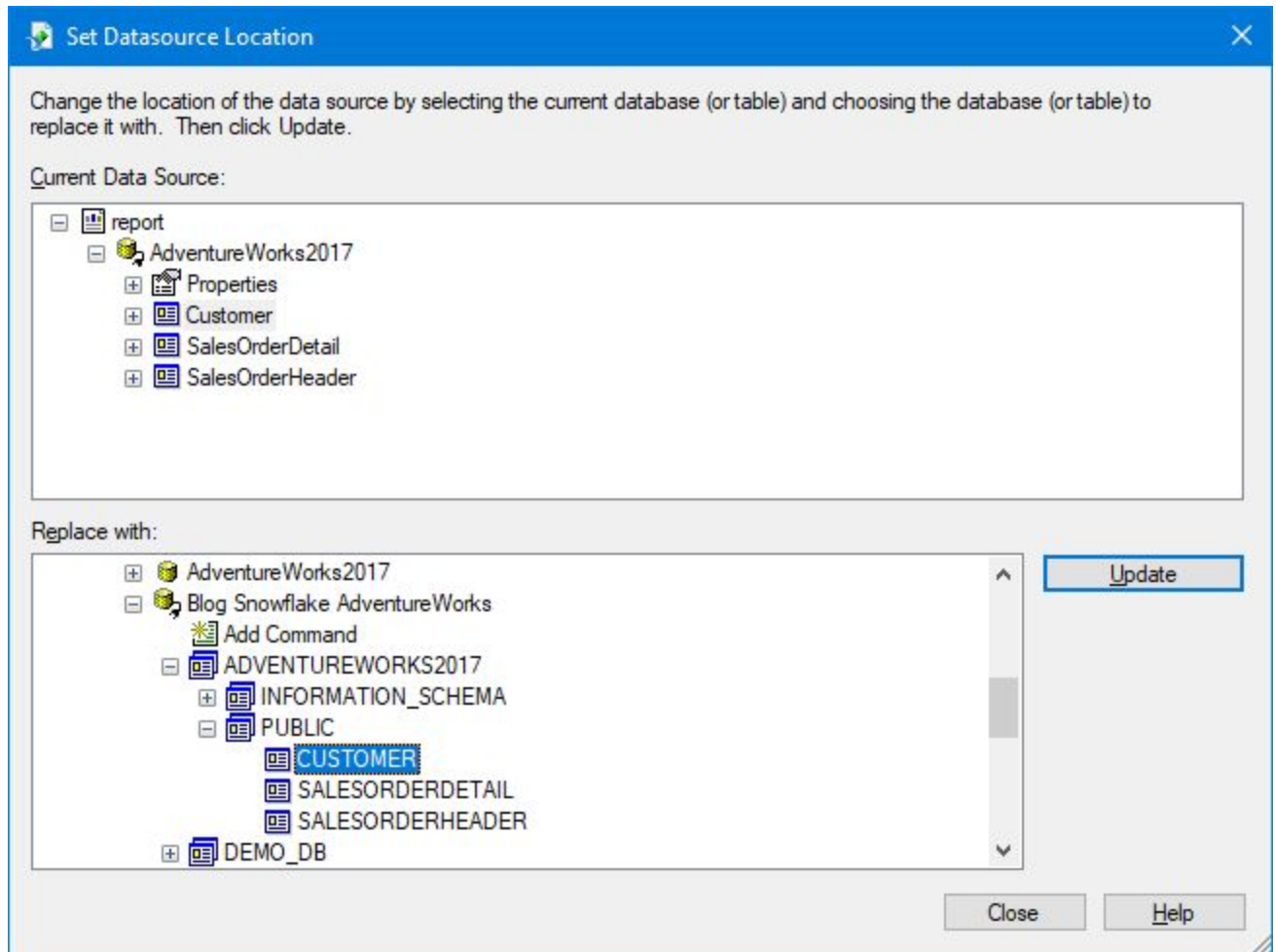
**Connection Information**  
Provide necessary information to log on to the chosen data source

Server:

User ID:

Password:

Enter: User ID  
Enter: Password  
Click: Finish



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

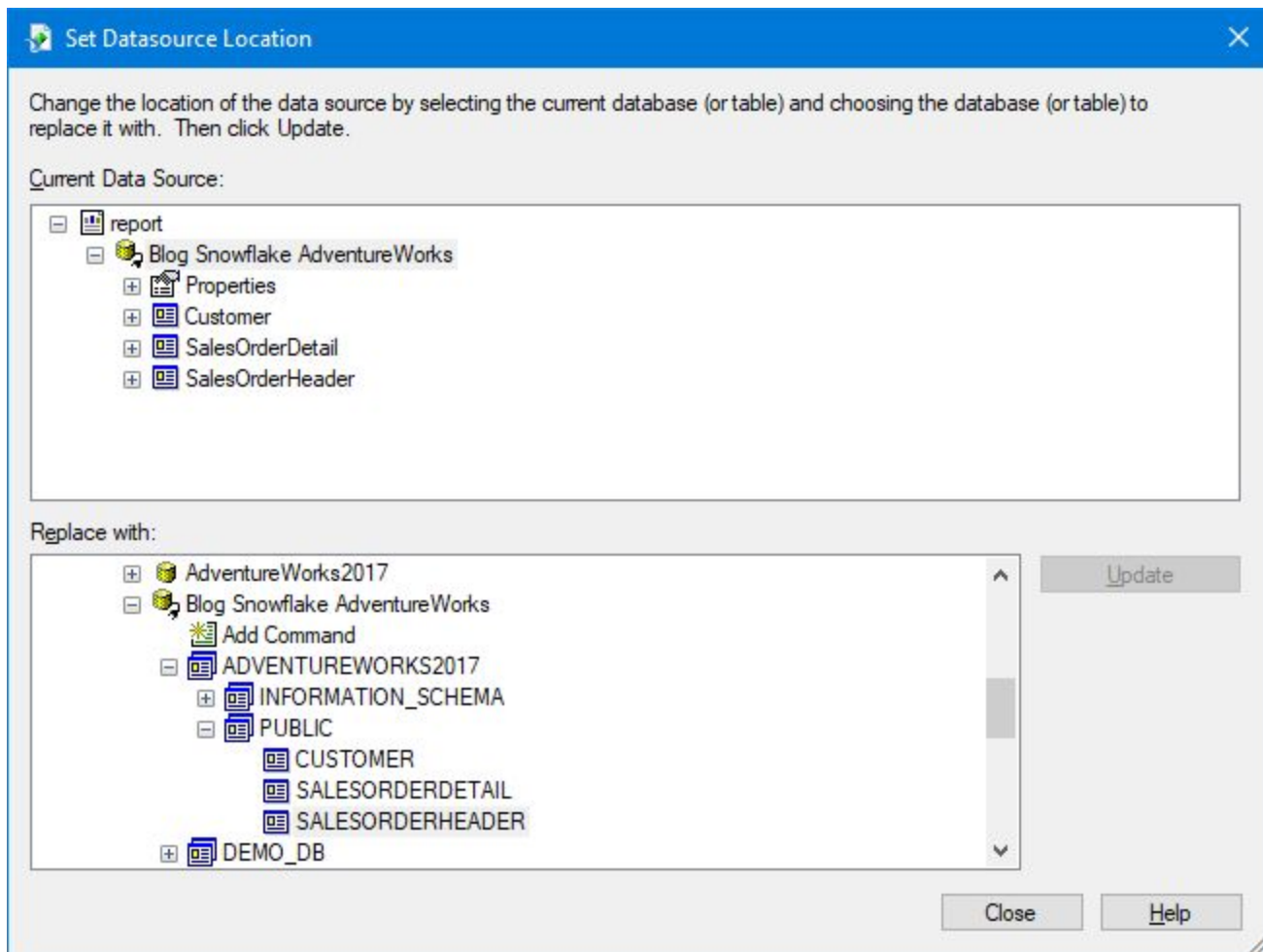
In this case, the tables are in uppercase so we need to map the tables individually:

Under Current Data Source  
Select: Customer

Under Replace with  
Select CUSTOMER

Click Update

Repeat for tables SalesOrderDetail and SalesOrderHeader.



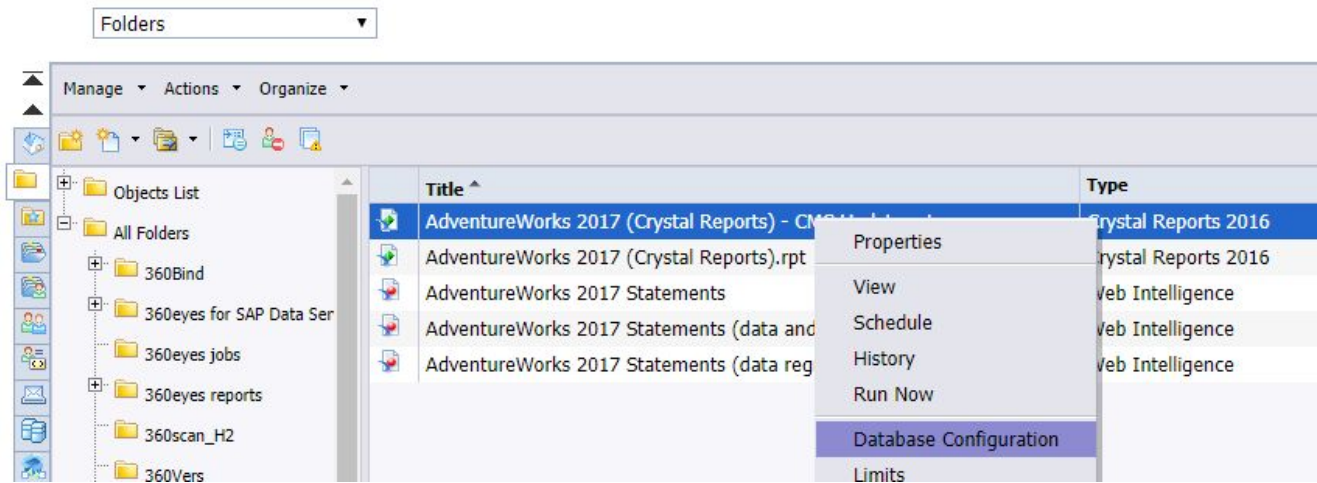
Tables are now remapped to Blog Snowflake Adventure Works  
Click: Close

### 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 C
  - Viewing Server Gro
  - 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”.

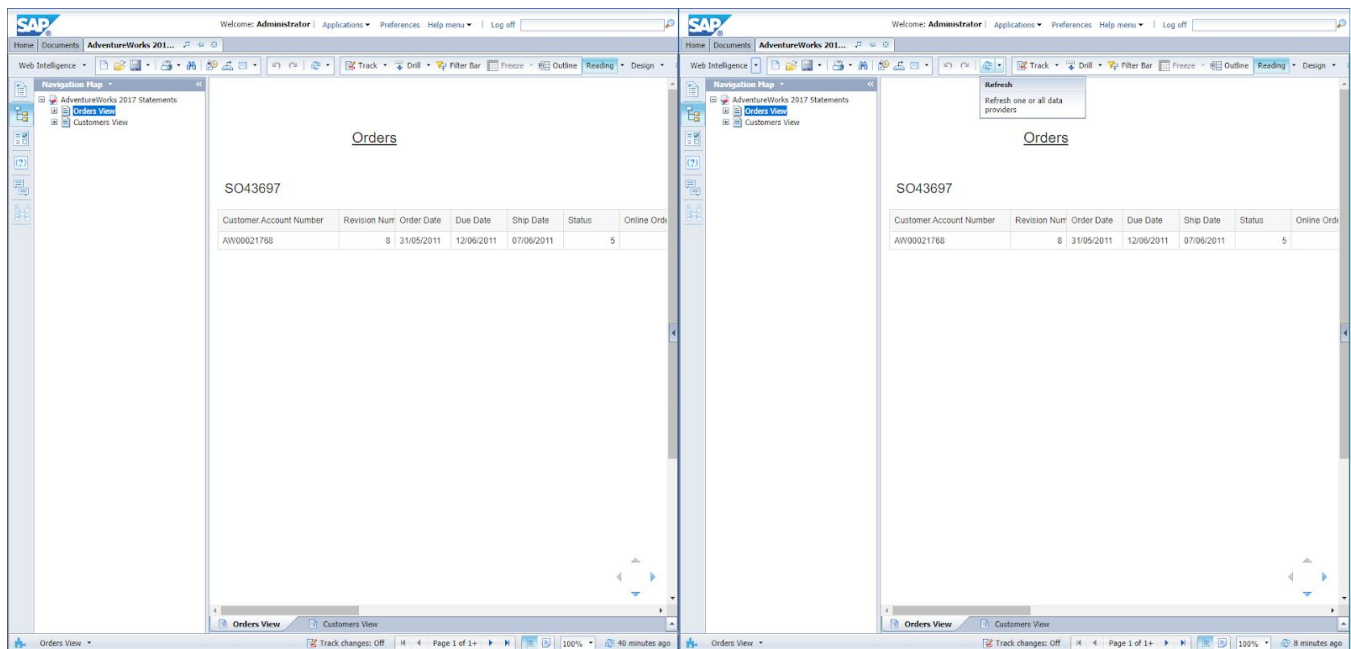
## Testing Content

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

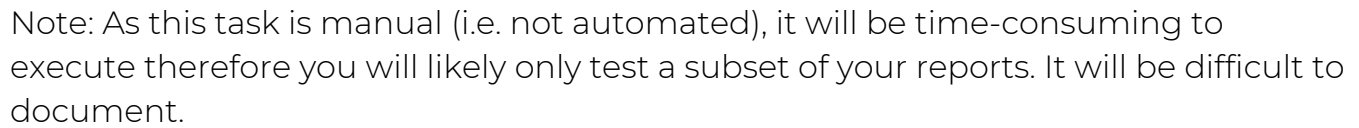
Unfortunately, using SAP BusinessObjects, this manual task involves opening both Web Intelligence documents and comparing values.



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.



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





## 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

**Request Your trial**



## **Author:**



Patrick Perrier is Analytics CoE Director and is passionate about helping companies maximize their SAP BusinessObjects investment with complex issues such as regulations, migration, and administration. He has over 20 years of experience in Business Intelligence, starting back when he worked at Crystal Decisions and then Business Objects. More recently, he held roles such as Head of Technical Architecture, BI, and Training

