



DAT225x

Developing an Analysis Services Tabular Model

Lab 04 | Managing the Tabular Model

Estimated time to complete this lab is 60 minutes

Overview

In this lab, you will add partitions, configure row-level security to enforce dynamic data permissions, and deploy the Tabular Project to Analysis Services.

Note: The four labs in this course are accumulative. You cannot complete this lab if you did not successfully complete **Lab 03**.

It is possible to commence from the solution available in the **F:\Labs\Lab03\Solution** folder, providing that you execute **F:\Labs\Lab02\Assets\Script-01.sql** first.

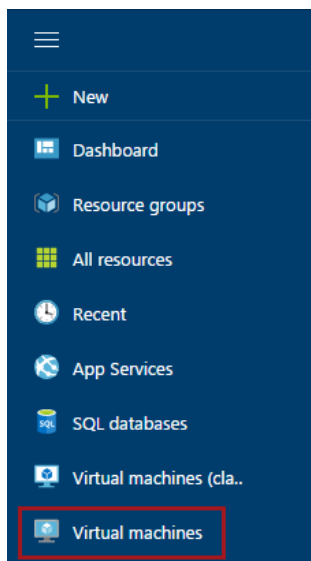
Getting Started

In this exercise, you will get started with the VM created in **Lab 01**.

Getting Started

In this task, you will start the VM, and then connect to it to complete the exercises in this lab.

1. Sign in to the **Azure Portal** by using your subscription.
2. In the left pane, select **Virtual Machines**—do not select **Virtual Machines (Classic)**.

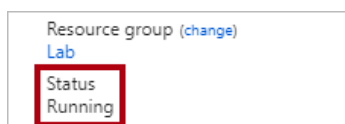


3. In the **Virtual Machines** blade, select the VM you provisioned in **Lab 01**.
4. In the VM blade, click **Start**.



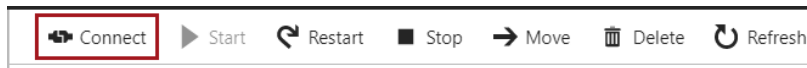
5. Wait for the VM status to update to **Running**.

It usually takes 1-2 minutes for the VM to start.



6. To connect to the VM, click **Connect**.

Take care not to use the RDP file downloaded in the previous lab. It is likely that a different IP address has been assigned.



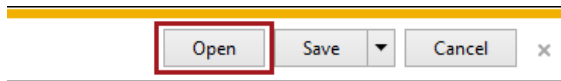
7. In the **Connect to Virtual Machine** pane (located at the right), click **Download RDP File**.



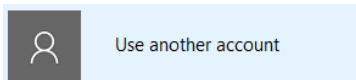
A Remote Desktop File (.rdp) file is downloaded to your computer.

This file can be used to reconnect to the remote desktop session, but note that if you deallocate the VM and later re-start the VM, it will be likely that a different IP address will be assigned.

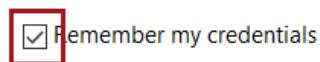
8. If prompted by the web browser to open the Remote Desktop File, click **Open**, otherwise, locate the downloaded file, and then double-click it.



9. If prompted to connect to the unknown publisher, click **Connect**.
10. If prompted, in the **Windows Security** dialog window, click **Use Another Account**.

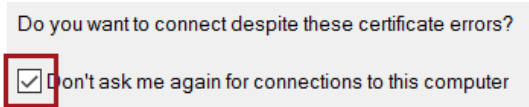


11. Enter the credentials you created for your VM.
12. Check the **Remember My Credentials** checkbox.

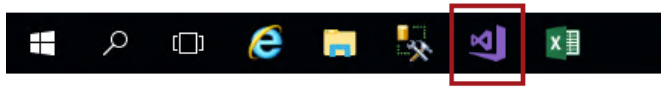


13. Click **OK**.

14. In the **Remote Desktop Connection** dialog window, check the **Don't Ask Me Again for Connections to This Computer** checkbox.



15. Click **Yes**.
16. Open **Visual Studio 2017**.



17. On the **File** menu, select **Recent Projects and Solutions** to re-open your project and the model designer.

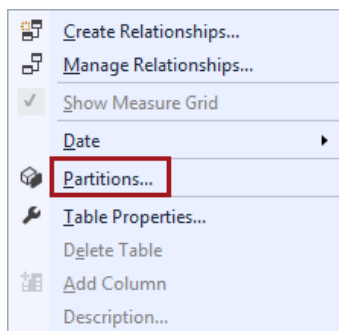
Exercise 1: Adding Partitions

In this exercise, you will define partitions for the **Sales** table to allow its data to be refreshed for individual years.

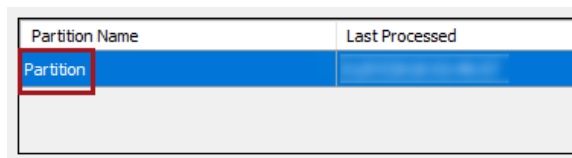
Adding Partitions

In this task, you will define partitions for the **Sales** table to allow its data to be refreshed for individual years.

1. In **Tabular Model Explorer**, right-click the **Sales** table, and then select **Partitions**.



2. In the **Partition Manager** window, notice that there is one partition named **Partition**.

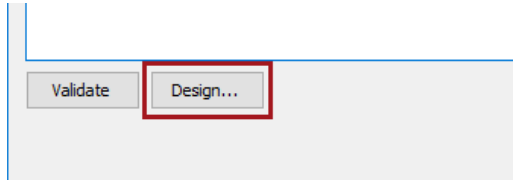


3. In the **Partition Name** box, modify the text to **Sales CY2014**.
4. Click **OK**.

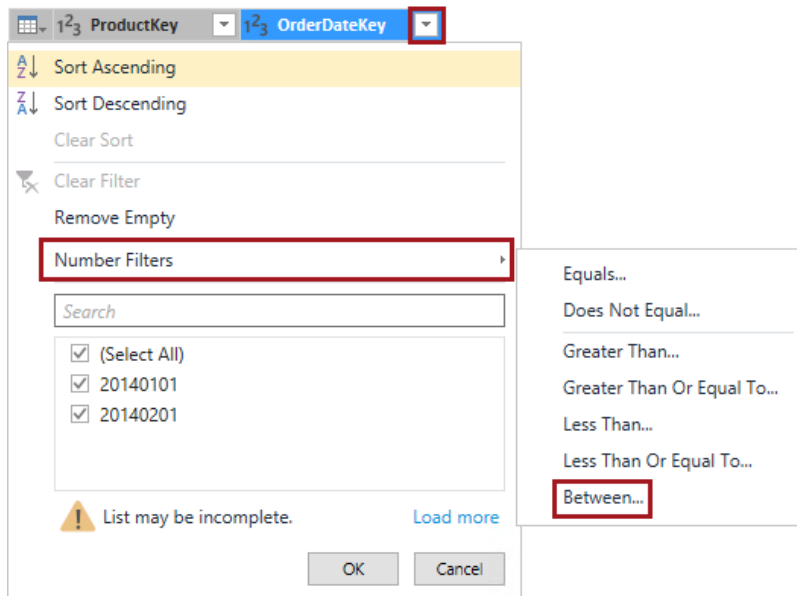
*There is a bug in the current version of the designer that requires you to close and re-open the **Partition Manager** window to continue configuring the query expression.*

5. Re-open the **Partition Manager** window for the **Sales** table.

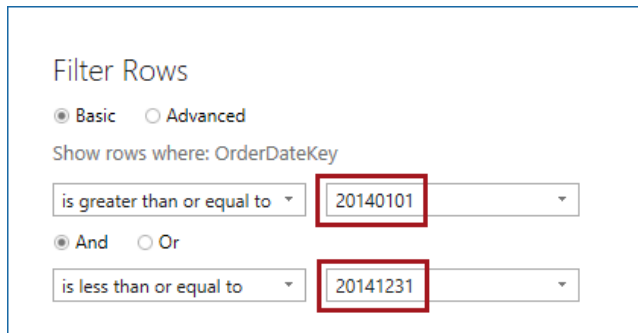
6. To modify the query expression, at the bottom-left corner, click **Design**.



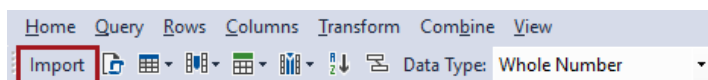
7. When the **Power Query Editor** window opens, maximize the window.
8. Apply a filter on the **OrderDateKey** column, by selecting **Number Filters | Between**.



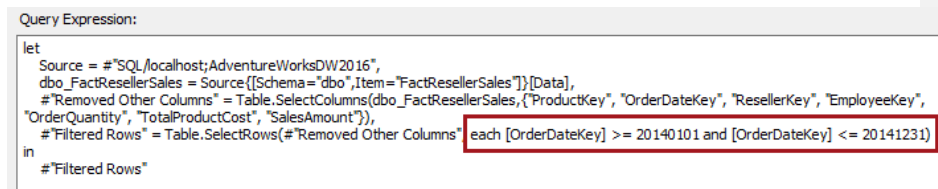
9. In the **Filter Rows** window, enter the values **20140101** and **20141231**.



10. Click **OK**.
11. To update the query expression, on the toolbar, click **Import**.



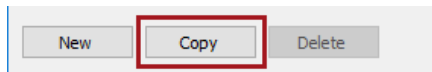
12. In the **Partition Manager** window, in the **Query Expression** box, notice that the query now includes an applied step to filter the **OrderDateKey** column.



```
let
    Source = #"SQL/localhost/AdventureWorksDW2016",
    dbo_FactResellerSales = Source[Schema="dbo",Item="FactResellerSales"][Data],
    #"Removed Other Columns" = Table.SelectColumns(dbo_FactResellerSales,{"ProductKey", "OrderDateKey", "ResellerKey", "EmployeeKey",
    "OrderQuantity", "TotalProductCost", "SalesAmount"}),
    #"Filtered Rows" = Table.SelectRows(#"Removed Other Columns" each [OrderDateKey] >= 20140101 and [OrderDateKey] <= 20141231)
in
    #"Filtered Rows"
```

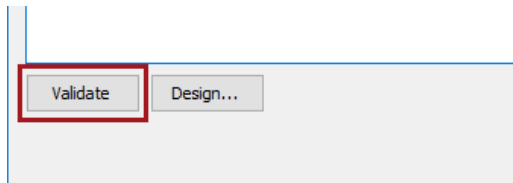
Defining multiple partitions for a table allows the efficient removal of data from the model, and also allows refreshing data at partition level. There is no need to refresh partitions, particularly historical ones, where the source data has not changed.

13. To add a new partition based on the existing one, click **Copy**.



14. In the **Partition Name** box, modify the text to **Sales CY2015**.
15. In the **Query Expression** box, modify the **OrderDateKey** values in the final step to **20150101** and **20151231**, respectively.

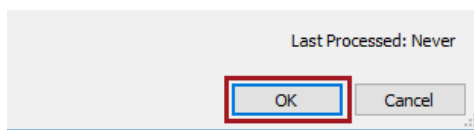
16. To validate the query, click **Validate**.



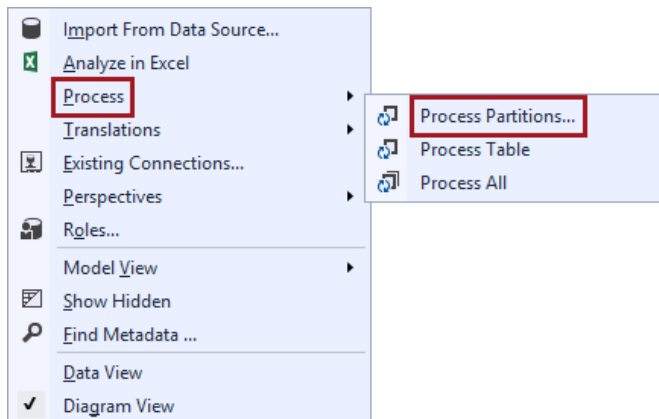
17. Verify that the query statement is valid.
18. Create two additional partitions based on the following:

Partition Name	OrderDateKeyFrom	OrderDateKey To
Sales CY2016	20160101	20161231
Sales CY2017	20170101	20171231

19. Click **OK**.



20. To process only the **Sales** table, ensure that the **Sales** table is selected (either the table is in focus in Data View, or the table is selected in Diagram View).
21. In **Tabular Model Explorer**, right-click the **Reseller Sales** model, and then select **Process | Process Partitions**.



22. In the **Process Partitions** window, in the **Mode** dropdown list, select **Process Full**.
23. Check all four partitions.

Process Partitions

Specify the partitions to process and the processing mode.

Mode: **Process Full**

Name	Process
Sales CY2014	<input checked="" type="checkbox"/>
Sales CY2015	<input checked="" type="checkbox"/>
Sales CY2016	<input checked="" type="checkbox"/>
Sales CY2017	<input checked="" type="checkbox"/>

24. Click **OK**.
25. Verify that the status of each work item looks like the following.

Success

4	Total	0	Cancelled
4	Success	0	Error

Details:

	Work Item	Status	Message
✓	Sales CY2014	Success. 8,459 rows transferred.	
✓	Sales CY2015	Success. 16,818 rows transferred.	
✓	Sales CY2016	Success. 16,818 rows transferred.	
✓	Sales CY2017	Success. 0 rows transferred.	

If you add up the rows for each partition they come to 60,855—the number contained in the table, and the original partition.

Lab Check

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How many rows were loaded into the **Sales CY2015** partition?

You may need data from this step to answer a Lab-based Knowledge Check associated with this module.

At this time, we recommend that you open the **Module 3 Lab-based Knowledge Check** portion of the course in EdX to answer the questions as you complete this lab.

Commented [PM1]: 21,670

26. Click **Close**.

Partitions can also be managed by administrators using the Object Explorer in SQL Server Management Studio. In addition to the ability to create partitions, delete partitions, define the partition queries and refresh partitions, it is also possible to merge partitions.

It is not uncommon that partitions are created, defined and managed by administrators using SQL Server Management Studio, or automated via scripts executed during an Extract, Transform and Load (ETL) process.

27. To save the project, on the **File** menu, select **Save All**.

Exercise 2: Adding Row-Level Security

In this exercise, you will define a security role to limit retrieving data for the sales region to which the salesperson is assigned.

Exploring the Salesperson Table Data

In this task, you will explore the **Salesperson** table data.

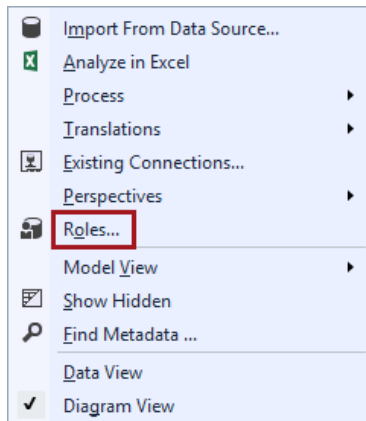
1. Go to the **Salesperson** table in Data View.
2. If necessary, widen the **LoginID** column to view all the values in the column.
3. Notice that the salesperson **Pamela Ansman-Wolfe** has your login ID (used to login to the lab virtual machine). Also, notice that this salesperson belongs to the **Region** with the value **Northwest**.

	Employ...	Employ...	LoginID	Region	Country	Group	Salesperson
1	272	AW502097814	adventure-works\stephen0	NA	NA	NA	Stephen Jiang
2	277	AW112432117	adventure-works\brian3	NA	NA	NA	Brian Welcker
3	281	AW841560125	adventure-works\michael9	Northeast	United St...	North A...	Michael Blythe
4	282	AW191644724	adventure-works\linda3	Southwest	United St...	North A...	Linda Mitchell
5	283	AW615389812	adventure-works\jillian0	Central	United St...	North A...	Jillian Carson
6	284	AW234474252	adventure-works\garrett1	Canada	Canada	North A...	Garrett Vargas
7	285	AW716374314	adventure-works\tsvi0	Southeast	United St...	North A...	Tsvi Reiter
8	286	AW61161660	adventure-works\pamela0	Northwest	United St...	North A...	Pamela Ansm...
9	287	AW139397894	adventure-works\shu0	Southwest	United St...	North A...	Shu Ito

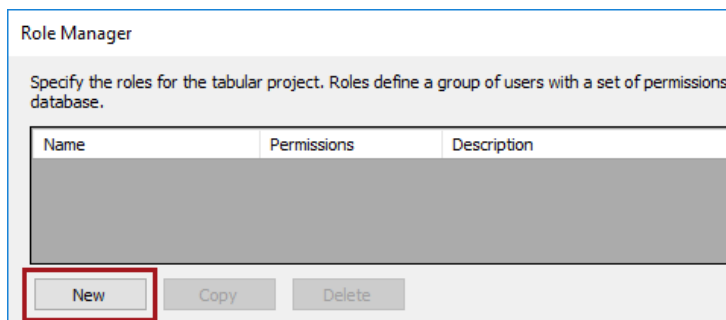
Adding a Role

In this task, you will define a security role to limit retrieving data for the sales region to which the salesperson is assigned.

1. In **Tabular Model Explorer**, right-click the **Reseller Sales** model, and then select **Roles**.

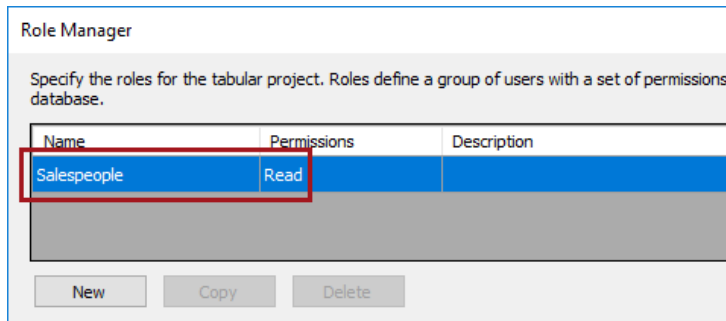


2. In the **Role Manager** window, click **New**.



3. In the **Name** box, replace the text with **Salespeople**.

4. In the **Permissions** dropdown list, select **Read**.



The screenshot shows the 'Role Manager' window. At the top, it says 'Specify the roles for the tabular project. Roles define a group of users with a set of permissions database.' Below this is a table with three columns: 'Name', 'Permissions', and 'Description'. The first row is highlighted in blue and contains the text 'Salespeople', 'Read', and an empty 'Description' field. A red rectangle is drawn around the 'Salespeople' and 'Read' cells. Below the table are three buttons: 'New', 'Copy', and 'Delete'.

Name	Permissions	Description
Salespeople	Read	

New Copy Delete

5. In the **Row Filters** tab, in the **Salesperson** table row, in the **DAX Filter** box, enter the following expression, and then press **Enter**.

*For convenience, the expressions defined in this exercise can be copied from the **F:\Labs\Lab04\Assets\Snippets.txt** file.*

DAX

```
=[Region] = LOOKUPVALUE(Salesperson[Region], Salesperson[LoginID], USERNAME())
```

*This expression uses the **LOOKUPVALUE** function to retrieve the **SalesTerritoryKey** value for the current user. This way the role will allow salespeople to see data related to other salespeople within their own region. This is considered a dynamic filter.*

6. Select the **Members** tab.

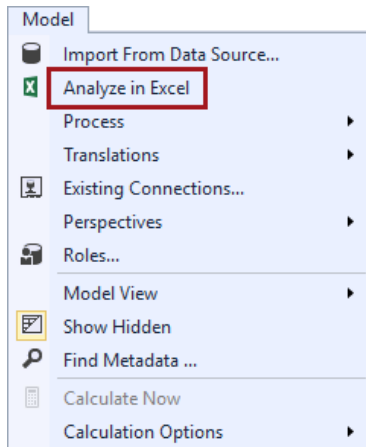
Members consist of security groups and users. In this lab, you will not configure any members. In the next task, you will be able to test the permissions.

7. In the **Role Manager** window, click **OK**.
8. To save the project, on the **File** menu, select **Save All**.

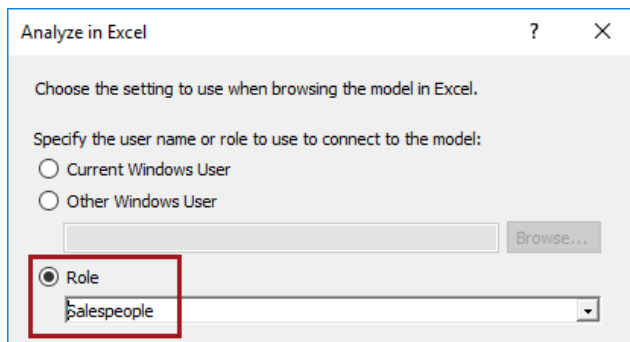
Testing Data Permissions

In this task, you will test the **Salespeople** role.

1. On the **Model** menu, select **Analyze in Excel**.



2. In the **Analyze in Excel** window, select the **Role** option, and then in the dropdown list, check **Salespeople**, and then click **OK**.



This will allow you test as if you were connecting to the model as Pamela Ansman-Wolfe.

3. Click **OK**.
4. In Excel, if prompted to activate Office, click **Cancel**.
5. In the PivotTable, from the **Salesperson** table, add the **Salespeople** hierarchy to the rows.
6. From the **Sales** table, add the **Sales** measure.

7. Notice that the PivotTable now displays only **North America**.
8. Drill down to reveal the **Country** and **Region** levels.

	A	B
1	Row Labels	Sales
2	North America	
3	United States	
4	Northwest	\$9,367,593.64
5	Grand Total	\$9,367,593.64

9. Drill down to the **Salesperson** level.

	A	B
1	Row Labels	Sales
2	North America	
3	United States	
4	Northwest	
5	David Campbell	\$3,729,945.35
6	Pamela Ansman-Wolfe	\$3,325,102.60
7	Tete Mensa-Annan	\$2,312,545.69
8	Grand Total	\$9,367,593.64

Pamela Ansman-Wolfe can see the Northwest region total, and also her colleagues' sales results.

10. Apply a filter to the PivotTable report by using the **Calendar** hierarchy for **CY2015**.

Lab Check

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What exact sales amount was achieved in the **Northwest** region for **CY2015**?

You may need data from this step to answer a Lab-based Knowledge Check associated with this module.

At this time, we recommend that you open the **Module 3 Lab-based Knowledge Check** portion of the course in EdX to answer the questions as you complete this lab.

Commented [PM2]: \$2,621,576.68

11. Close Excel, and do not save any changes.

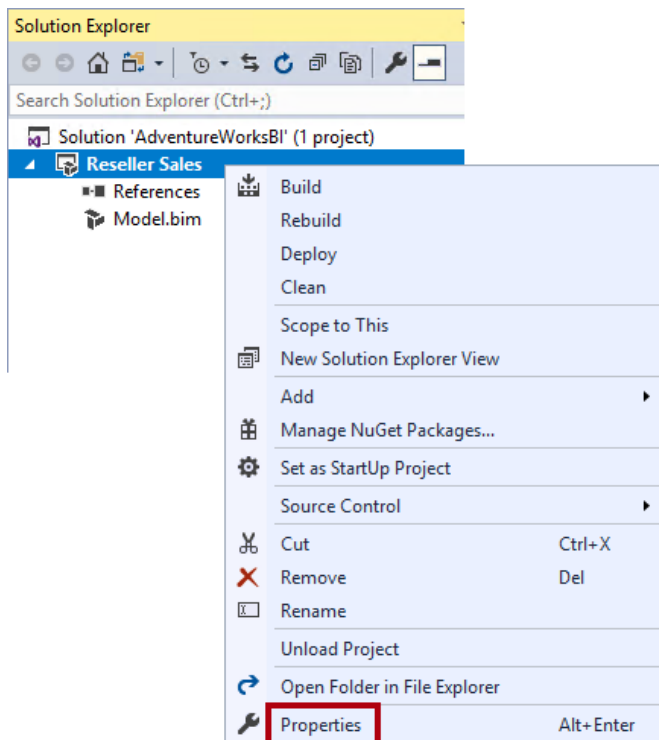
Exercise 3: Deploying the Tabular Project

In this exercise, you will deploy the Tabular Project.

Deploying the Tabular Project

In this task, you will deploy the Tabular Project.

1. In **Solution Explorer**, right-click the **Reseller Sales** project, and then select **Properties**.



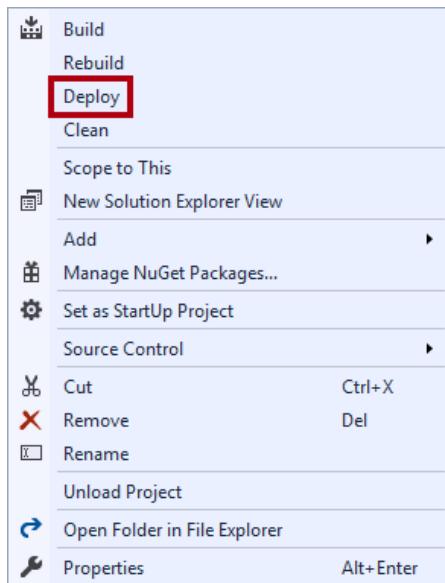
2. In the properties pages window, review the **Deployment Options** and **Deployment Server** properties.

Deployment Options	
Processing Option	Default
Transactional Deployment	False
Deployment Server	
Server	localhost
Edition	Developer
Database	Reseller Sales
Model Name	Model
Version	Unknown

The project will deploy the Analysis Services on **localhost**, creating a database named **Reseller Sales**. The processing option will process any objects (tables or partitions) requiring processing.

There is no need to change the default properties in this lab.

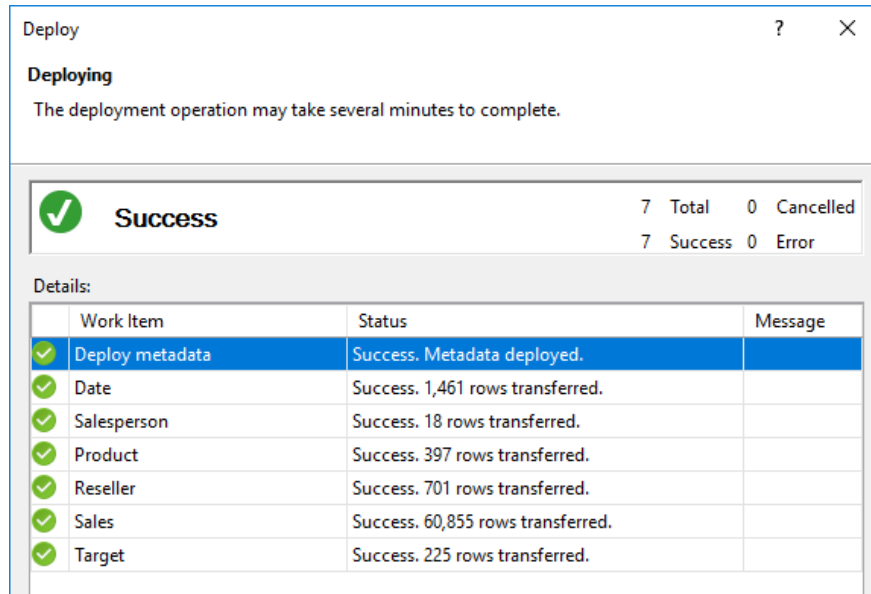
3. Click **Cancel**.
4. To deploy the project, in **Solution Explorer**, right-click the **Reseller Sales** project, and then select **Deploy**.



5. If prompted to overwrite an existing database, click **Yes**.

*This is the database deployed in **Lab 01**.*

6. When deployment has completed, verify that the deployment succeeded.



7. Click **Close**.
8. To close Visual Studio, on the **File** menu, select **Exit**.

Closing the tabular project will remove the workspace database from the workspace server.

You have now completed the lab.

*When you are ready, you should complete the **Finishing Up** exercise to delete the VM.*

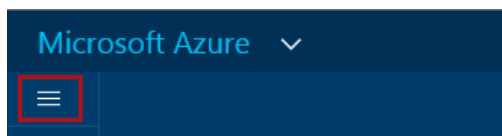
Finishing Up

In this exercise, you will delete the VM.

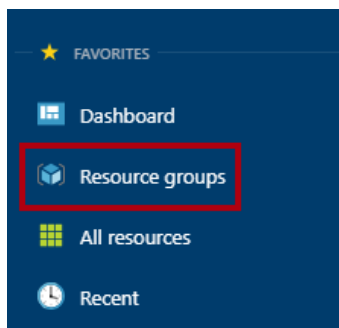
Finishing Up

In this task, you will delete the **Lab** resource group, which will delete the VM.

1. Close the remote desktop window.
2. In the **Azure Portal** Web browser page, open the left pane.



3. Select **Resource Groups**.




4. In the **Resource Groups** blade, select the **Lab** resource group.



5. In the **Lab** blade, click **Delete Resource Group**.



- When prompted to delete the resource group, in the **Type the Resource Group Name** box, enter **Lab**.



Warning! Deleting the "Lab" resource group is irreversible. The action you're about to take can't be undone. Going further will delete this resource group and all the resources in it permanently.

TYPE THE RESOURCE GROUP NAME:

Lab

✓

- Click **Delete**.

Delete

Cancel

- Sign out of the **Azure Portal**.