

Training Handbook

Implementing a Data Warehouse with SQL Server 2014

Some elements of this workshop are subject to change. This workshop is for informational purposes only.

Module 2: Creating Multidimensional Analysis Solutions

Lab 2: Creating a Multidimensional Analysis Solution

Lab Scenario

You have been asked to develop a basic Analysis Services solution to demonstrate some of the features of SQL Server Analysis Services. You will create a new Analysis Services project, create a data source for a database, create and modify a data source view, create and modify a cube, and finally browse the cube using both SQL Server Data Tools for Visual Studio 2013 and Microsoft Office Excel 2013.

Logon Information

Virtual machine: NY-SQL-01

Username: Administrator

Password: Pa\$\$w0rd

Estimated Time

40 minutes.

Exercise 1: Creating a Data Source

Scenario

You are a junior database developer at Adventure Works. The senior database developer has asked you to develop a new Analysis Services solution in order to demonstrate your ability with SQL Server 2014 to the database development team.

Exercise Overview

In this exercise, you will use SQL Server Data Tools to create a new Analysis Services project and a data source.

The main tasks for this exercise are as follows:

1. Start the NY-SQL-01 virtual machine and log on as Administrator
2. Create a new SQL Server user
3. Create a data source for the AdventureWorksDW relational database

Task 1: Start the NY-SQL-01 virtual machine and log on as Administrator

1. Start NY-SQL-01, and log on as **Administrator** with the password of **Pa\$\$w0rd**.

Task 2: Create a new SQL Server user

1. Use **SQL Server Management Studio** to create a new user on the **AdventureWorksDW** database.
2. Name the user **sqlserver**, set the default schema to **dbo**, grant the user database role membership in **db_owner** and **db_securityadmin**.

Task 3: Create a new Analysis Services project

1. Use **SQL Server Data Tools for Visual Studio 2013** to create a new **Analysis Services** project.
2. Name the project **Adventure Works OLAP**, and save it in the **D:\Mod02-03\Labfiles\Starter** folder.

Task 4: Create a data source for the AdventureWorksDW relational database

1. Use the **Data Source Wizard** in the **SQL Server Data Tools**.
2. The **AdventureWorksDW** database is on the server **NY-SQL-01**.
3. Use **Windows Authentication** to connect to the data source.
4. Use the service account for the impersonation information.
5. Name the data source **Adventure Works Data Warehouse**.

Results: After this exercise, you should see the **Adventure Works Data Warehouse.ds** data source in the **Data Sources** folder.

Exercise 1: Answer Key (detailed steps)

Task 1: Start the NY-SQL-01 virtual machine and log on as Administrator

1. Open **Hyper-V Manager**.
2. Under **Virtual Machines**, right-click the **NY-SQL-01** virtual machine, and then click **Start**.
3. Under **Virtual Machines**, right-click the **NY-SQL-01** virtual machine, and then click **Connect**. The **Virtual Machine Connection** window opens.
4. Log on to **NY-SQL-01** as **Administrator** using the password **Pa\$\$w0rd**.

Task 2: Create a new SQL Server user

1. Click **Start**, point to **All Programs**, click **Microsoft SQL Server 2014**, and then click **SQL Server Management Studio**.
2. In the **Connect to Server** dialog box, verify that **Server type** is set to **Database Engine** and **Server name** is set to **NY-SQL-01**, and then click **Connect**.
3. Maximize **Microsoft SQL Server Management Studio**.
4. Expand **NY-SQL-01 | Databases | AdventureWorksDW2008 | Security**, right-click on the **Users** folder, and then click **New User**.
5. The **Database User - New** window opens.
6. On the **General** page, in the **User name** field, enter **sqlserver**.
7. In the **Login name** field enter **NY-SQL-01\sqlserver**.
8. In the **Default schema** field, enter **dbo**.

9. On the **Select a page** list, click **Owned Schemas**.
10. Under the **Schemas owned by this user** section, ensure that **db_owner** and **db_securityadmin** checkboxes are checked.
11. On the **Select a page** list, click **Membership**.
12. Under the **Database role membership** section, ensure that **db_owner** and **db_securityadmin** checkboxes are checked.
13. Click **OK** to close the **Database User - New** window.
14. Close **Microsoft SQL Server Management Studio**.

Task 3: Create a new Analysis Services project

1. Click **Start**, point to **All Programs**, point to **Microsoft SQL Server 2014**, and then click **SQL Server Data Tools for Visual Studio 2013**.
2. On the **FILE** menu, point to **New**, and click **Project**. The **New Project** dialog box appears.
3. In the **Installed Templates** pane, click **Analysis Services Multidimensional and Data Mining Project**.
4. Click **Browse**, browse to the **D:\MOD02-03\Labfiles\Starter** folder, and then click **Select Folder**.
5. Change the value in the **Name** box to **Adventure Works OLAP**, and then click **OK**.

Task 4: Create a data source for the AdventureWorksDW2008 relational database

1. In **Solution Explorer**, right-click the **Data Sources** folder, and then click **New Data Source**. The **Data Source Wizard** dialog box appears.
2. On the **Welcome to the Data Source Wizard** page, click **Next**.
3. On the **Select how to define the connection** page, click **New**. The **Connection Manager** dialog box appears.
4. In the **Connection Manager** dialog box, in the **Server name** box, type **NY-SQL-01**.
5. In the **Log on to the server** area, ensure that **Use Windows Authentication** is selected.
6. In the **Connect to a database** area, click **AdventureWorksDW2008** in the **Select or enter a database name** drop-down, and then click **OK**.
7. On the **Select how to define the connection** page, click **Next**.
8. On the **Impersonation Information** page, select **Use a specific Windows user name and password** radio button.
9. Type **sqlserver** in the **User name** textbox and **Pa\$\$w0rd** in the **Password** textbox, and then click **Next**.
10. On the **Completing the Wizard** page, change the data source name to **Adventure Works Data Warehouse**, and then click **Finish**.

Results: After this exercise, you should see the Adventure Works Data Warehouse.ds data source in the Data Sources folder.

Exercise 2: Creating and Modifying a Data Source View

Scenario

In this exercise, you will build upon your Analysis Services solution in order to further demonstrate your competency with SQL Server 2014 to the database development team at Adventure Works.

Exercise Overview

The main tasks for this exercise are as follows:

1. Create a data source view
2. Modify the data source view

Task 1: Create a data source view

1. Use the **Data Source View Wizard** in the **SQL Server Data Tools for Visual Studio 2013**.
2. Use the **Adventure Works Data Warehouse** data source.
3. Include the **DimCustomer**, **DimGeography**, **DimProduct**, **DimTime**, and **FactInternetSales** tables.
4. Name the data source view **Adventure Works DSV**.

Task 2: Modify the data source view

1. Use the **Data Source View Designer** in the **SQL Server Data Tools**.
2. Change the **FriendlyName** of **FactInternetSales** to **InternetSales**.
3. Change the **FriendlyName** of the remaining tables to remove the "dim" prefix from the name.
4. Add a named calculation to the **Customer** table.
 - a. Name the named calculation **Full Name**.
 - b. The expression should concatenate the **FirstName**, **MiddleName** (if it exists), and **LastName** columns.
5. Add named calculations to the **Date** table.
6. Create a calculation named **Simple Date** that uses the **DATENAME** function to concatenate the month, day, and year portions of the **FullDateAlternateKey** column.
7. Create a calculation named **Calendar Semester Description** that formats the semester string as "H1 CY" for the first half of the year and as "H2 CY" for the second half of the year.
8. Create a calculation named **Calendar Quarter Description** that formats the quarter string to place a "Q" before the quarter number of the year, followed by "CY".

<p>Results: After this exercise, you should see the Adventure Works DSV.dsv data source view in the Data Source Views folder.</p>
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Exercise 2: Answer Key (detailed steps)

Task 1: Create a data source view

1. In the **Solution Explorer**, right-click the **Data Source Views** folder, and then click **New Data Source View**. The **Data Source View Wizard** appears.
2. On the **Welcome to the Data Source View Wizard** page, click **Next**.
3. On the **Select a Data Source** page, verify that the **Adventure Works Data Warehouse** data source is selected, and then click **Next**.
4. In the **Available objects** list, click **DimCustomer (dbo)**, and then hold down the CTRL key and click **DimDate (dbo)**, **DimGeography (dbo)**, **DimProduct (dbo)**, and **FactInternetSales (dbo)**.
5. On the **Select Tables and Views** page, click the > button to add the selected tables to the **Included objects** list, and then click **Next**.
6. On the **Completing the Wizard** page, change the name of the data source view to **Adventure Works DSV**, and then click **Finish**. Note that the **Data Source View Designer** opens automatically after you click **Finish**.

Task 2: Modify the data source view

1. In the **Data Source View Designer**, use the **Zoom** icon to change the zoom level to 50%.
2. In the **Diagram** pane, click the **FactInternetSales** table.
3. In the **Properties** pane, in the **FriendlyName** box, type **InternetSales**.
4. In the **Diagram** pane, click the **DimCustomer** table.
5. In the **Properties** pane, in the **FriendlyName** box, type **Customer**.
6. Change the **FriendlyName** of the remaining tables to remove the **dim** prefix.
7. In the **Diagram** pane, right-click the **Customer** table, and then click **New Named Calculation**. The **Create Named Calculation** dialog box appears.
8. In the **Create Named Calculation** dialog box, type **Full Name** in the **Column name** box.
9. In the **Expression** box, type the following:

```
CASE
  WHEN MiddleName IS NULL THEN
    FirstName + ' ' + LastName
  ELSE
    FirstName + ' ' + MiddleName + ' ' + LastName
END
```

10. In the **Create Named Calculation** dialog box, click **OK**.
11. In the **Diagram** pane, right-click the **Date** table, and then click **New Named Calculation**. The **Create Named Calculation** dialog box appears.
12. In the **Create Named Calculation** dialog box, type **Simple Date** in the **Column name** box.
13. In the **Expression** box, type the following:

```
DATENAME(mm, FullDateAlternateKey) + ' ' +
DATENAME(dd, FullDateAlternateKey) + ' ' +
DATENAME(yy, FullDateAlternateKey)
```

14. In the **Create Named Calculation** dialog box, click **OK**.
15. On the **File** menu, click **Save All**.
16. In the **Diagram** pane, right-click the **Date** table, and then click **New Named Calculation**. The **Create Named Calculation** dialog box appears.
17. In the **Create Named Calculation** dialog box, type **Calendar Semester Description** in the **Column name** box.
18. In the **Expression** box, type the following:

```
CASE
  WHEN CalendarSemester = 1 THEN
    'H1' + 'CY' + CONVERT(CHAR(4), CalendarYear)
  ELSE
    'H2' + 'CY' + CONVERT(CHAR(4), CalendarYear)
END
```

19. In the **Create Named Calculation** dialog box, click **OK**.
20. In the **Diagram** pane, right-click the **Date** table, and then click **New Named Calculation**. The **Create Named Calculation** dialog box appears.
21. In the **Create Named Calculation** dialog box, type **Calendar Quarter Description** in the **Column name** box.
22. In the **Expression** box, type the following:

```
'Q' + CONVERT(CHAR(1), CalendarQuarter) + ' CY ' + CONVERT(CHAR(4), CalendarYear)
```

23. In the **Create Named Calculation** dialog box, click **OK**.
24. On the **File** menu, click **Save All**.

Results: After this exercise, you should see the Adventure Works DSV.dsv data source view in the Data Source Views folder.

Exercise 3: Creating and Modifying a Cube

Scenario

In this exercise, you will expand on your existing Analysis Services solution in order to demonstrate to the Information Services department of Adventure Works that you can work with cubes and cube data.

Exercise Overview

The main tasks for this exercise are as follows:

1. Create a cube
2. Modify the cube
3. Modify dimensions
4. Modify attribute columns

5. Browse the cube

Task 1: Create a cube

1. Use the **Cube Wizard** in the **SQL Server Data Tools for Visual Studio 2013** to create a new cube.
2. Build the cube using existing tables.
3. Have the **Cube Wizard** suggest measure group tables.
4. Use all suggested dimensions except for **Internet Sales**.
5. Name the cube **Adventure Works Cube**.

Task 2: Modify the cube

1. Change the name of the **Unit Price Discount Pct** measure to **Unit Price Discount Percent**.
2. Change the name of the **Tax Amt** measure to **Tax Amount**.
3. Change **FormatString** to **Currency** for the following measures:
 - a. Unit Price
 - b. Extended Amount
 - c. Discount Amount
 - d. Product Standard Cost
 - e. Total Product Cost
 - f. Sales Amount
 - g. Tax Amount
4. Change **FormatString** to **Percent** for the **Unit Price Discount Percent** measure.

Task 3: Modify dimensions

1. Open the **Customer** dimension in **Dimension Designer**.
2. Add all the attributes from the **Geography** and **Customer** tables to the dimension.
3. Open the **Product** dimension in **Dimension Designer**.
4. Add all the attributes from the **Product** table to the dimension.
5. Remove the **Large Photo** attribute from the dimension.
6. Open the **Date** dimension in **Dimension Designer**.
7. Add all the attributes except **Calendar Semester Description** and **Calendar Quarter Description** to the dimension.

Task 4: Modify attribute columns

1. Modify the **Calendar Quarter** attribute.
 - a. In the properties of the **Calendar Quarter** attribute, set the **KeyColumns** property so that the **Key Columns** are **CalendarYear** followed by **CalendarQuarter**.
 - b. Set the **NameColumn** property so that the **Source Column** value is **Calendar Quarter Description**.
2. Modify the **English Month Name** attribute.

- a. In the properties for the **English Month Name** attribute, change the **Name** property to **Month**.
 - b. Set the **KeyColumns** property so that the **Key Columns** are **Calendar Year** followed by **MonthNumberOfYear**.
 - c. Set the **NameColumn** property so that the **Source Column** value is **EnglishMonthName**.
3. Modify the **Calendar Semester** attribute.
 - a. In the properties of the **Calendar Semester** attribute, set the **KeyColumns** property so that the **Key Columns** are **CalendarYear** followed by **CalendarSemester**.
 - b. Set the **NameColumn** property so that the **Source Column** value is **Calendar Semester Description**.

Task 5: Browse the cube

1. Deploy the **Adventure Works OLAP** project.
2. Use the **Cube Browser** to view the **Adventure Works Cube**.
3. Add the **Sales Amount**, **Internet Sales Count** and **Unit Price Discount Percent** measures to the **Data** area to view the different **FormatString** fields you configured.
4. Add the **Order Date.Calendar Year** hierarchy on rows.
5. Browse the **Full Name** members of the **Customer** dimension to verify the named calculation you created.
6. Open **Microsoft Office Excel 2013** and make a connection to **NY-SQL-01**.
7. Select **Internet Sales Count** from the **Internet Sales** measure in the **PivotTable Field List**.
8. Select **Full Name** from the **Customer** dimension in the **PivotTable Field List**.

<p>Results: After this exercise, you should have successfully deployed the cube and reviewed the modifications made to ensure they are reflected when browsing the cube.</p>

Exercise 3: Answer Key (detailed steps)

Task 1: Create a cube

1. In the **Solution Explorer**, right-click the **Cubes** folder, and then click **New Cube**. The **Cube Wizard** dialog box appears.
2. On the **Welcome to the Cube Wizard** page, click **Next**.
3. On the **Select Creation Method** page, verify that **Use existing tables** is selected, and then click **Next**.
4. On the **Select Measure Group Tables** page, click **Suggest**. Take note that the wizard selects the **InternetSales** table as the measure group table, and then click **Next**.
5. On the **Select Measures** page, click **Next**.
6. On the **Select New Dimensions** page, clear the **Internet Sales** checkbox, and then click **Next**. Take note that the **InternetSales** checkbox clears automatically.

7. On the **Completing the Wizard** page, change the **Cube** name to **Adventure Works Cube**, and then click **Finish**. Notice that the **Cube Designer** opens automatically after you click **Finish**.

Task 2: Modify the cube

1. In the **Measures** pane of the **Cube Designer**, expand the **Internet Sales** measure group, right-click the **Unit Price Discount Pct** measure, and then click **Rename**.
2. Rename **Unit Price Discount Pct** to **Unit Price Discount Percent**.
3. In the **Measures** pane, right-click **Tax Amt** and then click **Rename**.
4. Rename **Tax Amt** to **Tax Amount**.
5. In the **Measures** pane, right-click anywhere, point to **Show Measures in**, and then click **Grid**.
6. In the **Measures** pane, click **Unit Price**, and then hold the CTRL key and click the **Extended Amount**, **Discount Amount**, **Product Standard Cost**, **Total Product Cost**, **Sales Amount**, and **Tax Amount** measures.
7. In the **Properties** pane, click **Currency** in the **FormatString** box.
8. In the **Measures** grid, click **Unit Price Discount Percent**.
9. In the **Properties** pane, click **Percent** in the **FormatString** box.
10. On the **File** menu, click **Save All**.

Task 3: Modify dimensions

1. In **Solution Explorer**, right-click **Customer.dim**, and then click **View Designer**.
2. In the **Data Source View** pane, in the **Geography** table, click **City**.
3. Hold SHIFT and then click **SalesTerritoryKey**, and then drag the selected columns to the **Attributes** pane.
4. In the **Data Source View** pane, in the **Customer** table, click **CustomerAlternateKey**.
5. Scroll to the bottom of the **Customer** table, hold SHIFT and then click **Full Name**.
6. Drag the selected columns to the **Attributes** pane.
7. On the **File** menu, click **Save All**.
8. Close the **Customer.dim** dimension designer.
9. In **Solution Explorer**, right-click **Product.dim**, and then click **View Designer**.
10. In the **Data Source View** pane, in the **Product** table, click **ProductAlternateKey**.
11. Scroll to the bottom of the **Product** table, hold SHIFT and then click **Status**.
12. Drag the selected columns to the **Attributes** pane.
13. In the **Attributes** pane, right-click **Large Photo** and then click **Delete**. The **Delete Objects** dialog box appears.
14. In the **Delete Objects** dialog box, click **OK**.
15. On the **File** menu, click **Save All**.
16. Close the **Product.dim** dimension designer.
17. In **Solution Explorer**, right-click **Date.dim**, and then click **View Designer**.
18. In the **Data Source View** pane, in the **Date** table, click **FullDateAlternateKey**.
19. Scroll to the bottom of the **Date** table, hold SHIFT and then click **Simple Date**.
20. Drag the selected columns to the **Attributes** pane.

Task 4: Modify attribute columns

1. In the **Attributes** pane, click **Calendar Quarter**.
2. In the **Properties** pane, scroll down to the **Source** section.
3. Click the **KeyColumns** field, and then click the **ellipsis (...)** button.
4. In the **Key Columns** page, in the **Available Columns** table, click **Calendar Year**, and then click the **right arrow (>)** icon.
5. Click the up arrow to move **CalendarYear** above **CalendarQuarter** and then click **OK**.
6. In the **Properties** pane, click the **NameColumn** field, and then click the **ellipsis (...)** button.
7. In the **Name Column** page, in the **Source** column field, click **Calendar Quarter Description** and then click **OK**.
8. In the **Attributes** pane, click **English Month Name**.
9. In the **Properties** pane, change the **Name** field to **Month**.
10. Scroll down to the **Source** section, click the **KeyColumns** field, and then click the **ellipsis (...)** button.
11. In the **Key Columns** page, in the **Key Columns** table, click **EnglishMonthName** and then click the **left arrow (<)** icon.
12. In the **Available Columns** table, click **Calendar Year**, and then click the **right arrow (>)** icon.
13. In the **Available Columns** table, click **MonthNumberOfYear** and then click the **right arrow (>)** icon, and then click **OK**.
14. In the **Properties** pane, click the **NameColumn** field, and then click the **ellipsis (...)** button.
15. In the **Name Column** page, in the **Source** column field, click **EnglishMonthName** and then click **OK**.
16. In the **Attributes** pane, click **Calendar Semester**.
17. In the **Properties** pane, scroll down to the **Source** section.
18. Click the **KeyColumns** field, and then click the **ellipsis (...)** button.
19. In the **Key Columns** page, in the **Available Columns** table, click **Calendar Year**, and then click the **right arrow (>)** icon.
20. Click the up arrow to move **CalendarYear** above **CalendarSemester** and then click **OK**.
21. In the **Properties** pane, click the **NameColumn** field, and then click the **ellipsis (...)** button.
22. In the **Name Column** page, in the **Source** column field, click **Calendar Semester Description** and then click **OK**.
23. On the **File** menu, click **Save All**.
24. Close the **Date.dim** dimension designer.

Task 5: Browse the cube

1. In **Solution Explorer**, right-click the **Adventure Works OLAP** project, and then click **Deploy**. The **Deployment Progress – Adventure Works OLAP** dialog box appears.
2. When deployment has completed successfully, close the **Deployment Progress – Adventure Works OLAP** dialog box and then, click the **Browser** tab in the **Cube Designer**.

Tip: Click the **Auto Hide** icon on the various panes in SQL Server Data Tools for Visual Studio 2013 to make it easier to see the entire Cube Browser window.

3. In the **Measure Group** pane, expand **Measures**, expand **Internet Sales**, right-click the **Sales Amount** measure, and then click **Add to Query**.
4. In the **Measure Group** pane, drag **Internet Sales Count** and drop it next to the **Sales Amount** column.
5. In the **Measure Group** pane, drag **Unit Price Discount Percent** and drop it next to the **Internet Sales Count** column.
6. Verify that the format strings for the measures are correct.
7. In the **Measure Group** pane, expand the **Order Date** dimension, right-click the **Order Date.Date Key** hierarchy, and then click **Add to Query**.
8. In the **Measure Group** pane, expand the **Customer** dimension, expand the **Full Name** attribute, expand the **Members** node, expand the **All** node, and verify that the named calculation created in Exercise 2 is functioning.
9. Minimize **SQL Server SQL Server Data Tools for Visual Studio 2013**.
10. Click **Start**, point to **All Programs**, click **Microsoft Office 2013**, and then click **Excel 2013**.
11. Click **Blank workbook**.

Note: If the **Product Deactivated** dialog box appears, perform the following steps:

1. Close the **Product Deactivated** dialog box.
2. Click **File | Account**.
3. Click **Sign out**. The **Remove Account** dialog box appears.
4. Click **Yes** to close the **Remove Account** dialog box.
5. Click **Sign In**. The **Sign In** dialog box appears.
6. Type **student<integer number>@k365labs.onmicrosoft.com** in the **Type your email address** textbox and then click **Next**.
7. Type **P2ssw0rd** in the **Password** textbox and then click **Sign In**. This process may take several minutes.
8. Click **Resolve**. The **Product Deactivated** dialog box appears.
9. Click **Sign In**. The **Microsoft Office 365 ProPlus** dialog box appears. This process may take several minutes.
10. Click **Close** to close the **Microsoft Office 365 ProPlus** dialog box when completed. The **Microsoft Excel** dialog box appears.
11. Review the message in the dialog box and then click **OK** to close the **Microsoft Excel** dialog box. Another **Microsoft Excel** dialog box appears.
12. Review the message in the dialog box and then click **OK** again to close the **Microsoft Excel** dialog box.
13. Close **Microsoft Office Excel 2013**.
14. Repeat step 10.

12. On the toolbar click **DATNY-A**, then click **Get External Data**, then click **From Other Sources**, and then click **From Analysis Services**. The **Data Connection Wizard** dialog box appears.
13. In the **Server name** field of the **Data Connection Wizard** enter **NY-SQL-01**, verify that **Use Windows Authentication** is selected, and then click **Next**.
14. On the **Select Database and Table** page of the **Data Connection Wizard**, select **Adventure Works Cube**, and then click **Next**.
15. On the **Save Data Connection File and Finish** page, click **Finish**.
16. On the **Import Data** dialog box, select **PivotTable Report** and then click **OK**.
17. In the **PivotTable Fields**, under the Σ **Internet Sales** measure, click **Internet Sales Count**.
18. Scroll down the **PivotTable Fields**, under the **Customer** dimension, click **Full Name**.
19. Choose other fields from the **PivotTable Fields** to continue browsing the cube.
20. When you are finished browsing the **Adventure Works Cube** cube in **Microsoft Office Excel 2013**, close the window without saving the changes.
21. Maximize **SQL Server SQL Server Data Tools for Visual Studio 2013**.
22. On the **File** menu, click **Save All** to save your project.
23. Turn off the **NY-SQL-01** virtual machine.

Note: This solution is used in the lab for module 3, so do not delete changes.

Results: After this exercise, you should have successfully deployed the cube and reviewed the modifications made to ensure they are reflected when browsing the cube.

Module 3: Working with Cubes and Dimensions

Lab 3: Defining Dimensions

Lab Scenario

You have been modifying a simple cube that was designed to demonstrate the benefits of Analysis Services to your company, but since then several junior database developers have received daily database inclusion requests and so the complexity of the cube has greatly increased. The senior database developer has asked that you create several dimensions, dimension relationships, and attribute hierarchies to improve cube usability and user productivity.

Logon Information

Virtual machine: NY-SQL-01

Username: Administrator

Password: Pa\$\$w0rd

Estimated Time

90 minutes.

Exercise 1: Configuring Dimensions

Scenario

Several users of the Adventure Works company have reported that they are having problems with browsing the cube because the cube is just too complex. The senior database developer has requested that you add dimensions to the existing cube space to improve usability of the cube. In this exercise, you must configure additional settings for several dimensions in the cube.

Exercise Overview

The main tasks for this exercise are as follows:

1. Open the Adventure Works OLAP solution.
2. Remove attributes from the Customer dimension.
3. Remove an attribute from the Product dimension.
4. Add dimension intelligence.

Task 1: Open the Adventure Works OLAP solution

1. Start NY-SQL-01 and logon as **Administrator** using the password **Pa\$\$w0rd**.
2. Use SQL Server Data Tools for Visual Studio 2013 to open the **Adventure Works OLAP** solution.

3. The Adventure Works OLAP.sln file is located in the D:\Mod02-03\Labfiles\Starter\Adventure Works OLAP folder.

Task 2: Remove attributes from the Customer dimension

1. Use the Dimension Designer to modify **Customer** dimension.
2. The company will not be using translations at this time, so remove all attributes that start with the words "French" or "Spanish".

Task 3: Remove an attribute from the Product dimension

1. Use the Dimension Designer to modify the **Product** dimension.
2. Remove the **Thai Product Description**.

Task 4: Add dimension intelligence

1. Start the Business Intelligence Wizard on the **Date** dimension.
2. Add dimension intelligence.
3. Specify that the **Date** dimension is a **Time** dimension.
4. Map the dimension attribute columns as follows:
 - a. **CalendarYear** for **Year**
 - b. **CalendarSemester** for **Half Year**
 - c. **CalendarQuarter** for **Quarter**
 - d. **Month** for **Month**
 - e. **Simple Date** for **Date**

Exercise 1: Answer Key (detailed steps)

Task 1: Open the Adventure Works OLAP solution

1. Open **Hyper-V Manager**.
2. Under **Virtual Machines**, right-click the **NY-SQL-01** virtual machine, and then click **Start**.
3. Under **Virtual Machines**, right-click the **NY-SQL-01** virtual machine, and then click **Connect**. The Virtual Machine Connection tool opens.
4. Log on to NY-SQL-01 as **Administrator** using the password **Pa\$\$w0rd**.
5. Click **Start**, point to **All Programs**, point to **Microsoft SQL Server 2014**, and then click **SQL Server SQL Server Data Tools for Visual Studio 2013**.
6. On the **File** menu, point to **Open**, and then click **Project/Solution**.
7. In the **Open Project** window, browse to the D:\Mod02-03\Labfiles\Starter\AdventureWorksOLAP folder, click the **AdventureWorksOLAP** solution file, and then click **Open**.

Task 2: Remove attributes from the Customer dimension

1. In Solution Explorer, right-click the **Customer.dim** dimension, and then click **View Designer**.

2. In the **Attributes** pane, press the CTRL key and click the **French Country Region Name**, **French Education**, **French Occupation**, **Spanish Country Region Name**, **Spanish Education**, and **Spanish Occupation** attributes, right-click any of the highlighted attributes, and then click **Delete**. The **Delete Objects** dialog box appears.
3. In the **Delete Objects** dialog box, click **OK**.
4. On the **File** menu, click **Save All**.
5. In the **Customer Dimension Designer**, click the **Close** icon.

Task 3: Remove an attribute from the Product dimension

1. In Solution Explorer, right-click the **Product.dim** dimension, and then click **View Designer**.
2. In the **Attributes** pane, right-click the **Thai Description** attribute, and then click **Delete**. The **Delete Objects** dialog box appears.
3. In the **Delete Objects** dialog box, click **OK**.
4. On the **File** menu, click **Save All**.
5. In the **Product Dimension Designer**, click the **Close** icon.

Task 4: Add dimension intelligence

1. In Solution Explorer, right-click **Date.dim**, and then click **Add Business Intelligence**. The **Business Intelligence Wizard** wizard dialog box appears.
2. On the **Welcome to the Business Intelligence Wizard** page, click **Next**.
3. On the **Choose Enhancement** page, click **Define dimension intelligence**, and then click **Next**.
4. On the **Define Dimension Intelligence** page, in the **Dimension type** field, click **Time**.
5. In the **Dimension attributes** table, select the **Include** checkbox for the following **Attribute Types**, and select the corresponding item in the **Dimension Attribute** column.

Attribute Type	Dimension Attribute
Year	Calendar Year
Half Year	Calendar Semester
Quarter	Calendar Quarter
Month	Month
Date	Simple Date

6. Click **Next**, and then click **Finish**.

Results: After this exercise, you should see that the Customer, Product, and Date dimensions have been modified, and time intelligence has been added to the date dimension.

Exercise 2: Defining Relationships and Hierarchies

Scenario

The senior database developer at Adventure Works has received requests from several other departments who have also reported as having issues with browsing the cube, and has asked that you make additional modifications to the database in order to make browsing the cube easier for your users which will, in turn, improve productivity. In this exercise, you will define attribute relationships and create natural and non-natural hierarchies.

Exercise Overview

The main tasks for this exercise are as follows:

1. Create attributes in the Date dimension.
2. Create a natural hierarchy in the Date dimension.
3. Create hierarchies in the Customer dimension.

Task 1: Create attribute relationships in the Date dimension

1. Open the **Date** dimension in Dimension Designer.
2. Change the **Name** property of the **Simple Date** attribute to **Date**.
3. In the **Attribute Relationships** tab, create the following relationships:

Source Type	Related Attribute
Date	Month
Month	Calendar Quarter
Calendar Quarter	Calendar Semester
Calendar Semester	Calendar Year

Task 2: Create a natural hierarchy in the Date dimension

1. In the Dimension Structure for the **Date** dimension, drag the **Calendar Year** attribute to the **Hierarchies** pane.
2. Add the following attributes to the hierarchy in this order: **Calendar Semester**, **Calendar Quarter**, **Month**, and **Date**.
3. Change the hierarchy name to **Calendar Date**.

Task 3: Create hierarchies in the Customer dimension

1. Open the **Customer** dimension in Dimension Designer.
2. Rename the **English Country Region Name** attribute to **Country-Region**.
3. Rename the **State Province Name** attribute to **State-Province**.
4. Drag the **Country-Region** attribute to the Hierarchies pane.
5. Add the following attributes to the hierarchy in this order: **State-Province**, **City**, **Postal Code**, and **Full Name**.
6. Change the hierarchy name to **Customer Geography**.
7. Drag the **Gender** attribute to the **Hierarchies** pane.
8. Add the **Marital Status** to the hierarchy.
9. Change the name of the hierarchy to **Gender - Marital Status**.

Results: After this exercise, you should have created a Calendar Date hierarchy, a Customer Geography hierarchy, and a Gender - Marital Status hierarchy.

Exercise 2: Answer Key (detailed steps)

Task 1: Create attribute relationships in the Date dimension

1. In Solution Explorer, right-click the **Date.dim** dimension, and then click **View Designer**.
2. In the **Attributes** pane, click the **Simple Date** attribute.
3. In the **Properties** pane, change **Simple Date** to **Date** in the **Name** box.
4. Click the **Attributes Relationships** tab.
5. In the **Attribute Relationships** pane, right-click an empty space, and then click **New Attribute Relationship**. The **Create Attribute Relationship** dialog box appears.
6. In the **Create Attribute Relationship** dialog box, in the **Source Attribute** section, in the **Name** field, click **Date**.
7. In the **Related Attribute** section, in the **Name** field, click **Month**, and then click **OK**.
8. Repeat step 5 to create the following relationships:

Source Type	Related Attribute
Month	Calendar Quarter
Calendar Quarter	Calendar Semester
Calendar Semester	Calendar Year

Task 2: Create a natural hierarchy in the Date dimension

1. Click the **Dimension Structure** tab.
2. In the **Attributes** pane, drag **Calendar Year** into the **Hierarchies** pane.
3. In the **Attributes** pane, drag the following attributes one-by-one to the **Hierarchies** pane and drop them on to the **<new level>** area: **Calendar Semester**, **Calendar Quarter**, **Month**, and **Date**.
4. In the **Hierarchies** pane, click the title bar of the **Hierarchy** hierarchy.
5. In the **Properties** pane, change the **Name** field to **Calendar Date**.
6. On the **File** menu, click **Save All**.
7. Close the **Date Dimension Designer**.

Task 3: Create a natural hierarchy in the Customer dimension

1. In Solution Explorer, right-click the **Customer.dim** dimension, and then click **View Designer**.
2. In the **Attributes** pane, right-click **English Country Region Name**, and then click **Rename**. Rename the attribute to **Country-Region**.
3. Rename the **State Province Name** attribute to **State-Province**.
4. In the **Attributes** pane, drag **Country-Region** into the **Hierarchies** pane.

5. In the **Attributes** pane, drag the following attributes one-by-one to the **Hierarchies** pane and drop them on to the <new level> area: **State-Province**, **City**, **Postal Code**, and **Full Name**.
6. In the **Hierarchies** pane, click the title bar of the **Hierarchy** hierarchy.
7. In the **Properties** pane, change the **Name** field to **Customer Geography**.

Note: The hierarchy may display a warning icon. This can be ignored.

8. In the **Attributes** pane, drag **Gender** into an empty area of the **Hierarchies** pane.
9. In the **Attributes** pane, drag **Marital Status** to the <new level> area beneath **Gender** in the **Hierarchies** pane.
10. In the **Hierarchies** pane, click the title bar of the **Hierarchy** hierarchy.
11. In the **Properties** pane, change the **Name** field to **Gender - Marital Status**.

Note: The hierarchy may display a warning icon. This can be ignored.

12. On the **File** menu, click **Save All**.
13. Close the **Customer Dimension Designer**.

Results: After this exercise, you should have created a Calendar Date hierarchy, a Customer Geography hierarchy, and a Gender - Marital Status hierarchy.

Exercise 3: Sorting and Grouping Dimension Attributes

Scenario

In this exercise, you will modify the sort order of months in the Time dimension. You will also group the members of the Yearly Income attribute hierarchy together into groups.

Exercise Overview

The main tasks for this exercise are as follows:

1. Modify the sort order of the Month attribute.
2. Group the Yearly Income attribute hierarchy members in the Customer dimension.

Task 1: Modify the sort order of the Month attribute

1. Browse the **Calendar Time** hierarchy in the **Time** dimension, and note that the Months level is sorted in alphabetical rather than chronological order.
2. Use the **New Attribute from Column** option to add an attribute for the **MonthNumberOfYear** column.
3. Set the following property values for the new attribute:
 - a. **AttributeHierarchyEnabled**: False
 - b. **AttributeHierarchyOptimizedState**: NotOptimized

- c. **AttributeHierarchyOrdered**: False
- 4. Expand the **TimeKey** attribute and notice that all attributes are directly related to the **TimeKey** attribute.
- 5. Create a relationship between the **Month** and the **Month Number of Year** attributes by dragging the **Month Number of Year** attribute to the <new attribute relationship> tag under the **Month** attribute.
- 6. Set the **Month** attribute to be ordered by the **Month Number of Year** attribute key.
- 7. Deploy the project and browse the **Calendar Time** hierarchy to verify that the values are now sorted in the correct order.

Task 2: Group the Yearly Income attribute hierarchy members in the Customer dimension

- 1. Organize the **Yearly Income** attribute members into five groups.
- 2. Use the **Automatic DiscretizationMethod** to have Analysis Services distribute the values into discretized groups automatically.
- 3. Use the **DiscretizationBucketCount** property to specify the number of groups to create (in this case, five).
- 4. Browse the **Yearly Income** attribute hierarchy to verify that the values have been discretized.

Results: After this exercise, you should be able to view the correctly sorted and grouped dimensions in the cube.

Exercise 3: Answer Key (detailed steps)

Task 1: Modify the sort order of the Month attribute

- 1. In Solution Explorer, right-click the **Date.dim** dimension, and then click **View Designer**.
- 2. In Solution Explorer, right-click the **Adventure Works OLAP** project, and then click **Deploy**. The **Deployment Progress – Adventure Works OLAP** dialog box appears.
- 3. Wait for the **Deploy Completed Successfully** message in the dialog box appears.
- 4. Close the **Deployment Progress – Adventure Works OLAP** dialog box.
- 5. Click the **Browser** tab of the **Date.dim Dimension Designer**, and then click the **Reconnect** icon.
- 6. In the designer pane, right-click **All**, and then click **Expand All**. Notice that the months are listed under the correct quarter, semester, and year, but that they are sorted in alphabetical order instead of chronological order.
- 7. Click the **Dimension Structure** tab.
- 8. In the **Attributes** column, click **Month Number of Year**.
- 9. In the **Properties** pane, set the following values:

Property	Value
AttributeHierarchyOptimizedState	NotOptimized
AttributeHierarchyOrdered	False

10. Click the **Attribute Relationships** tab. In the **Attributes** pane, right-click **Month**, and then click **New Attribute Relationship**. The **Create Attribute Relationship** dialog box appears.
11. In the **Create Attribute Relationship** dialog box, in the **Related Attribute** section, in the **Name** field, click **Month Number of Year**, and then click **OK**.
12. Click the **Dimension Structure** tab.
13. In the **Attributes** pane, click **Month**.
14. In the **Properties** pane, click **AttributeKey** in the **OrderBy** box, and then in the **OrderByAttribute** box, click **Month Number Of Year**.
15. On the **File** menu, click **Save All**.
16. In Solution Explorer, right-click the **Adventure Works OLAP** project, and then click **Deploy**. The **Deployment Progress – Adventure Works OLAP** dialog box appears.
17. Wait for the **Deploy Completed Successfully** message in the dialog box appears.
18. Close the **Deployment Progress – Adventure Works OLAP** dialog box.
19. On the **Browser** tab of the **Date.dim Dimension Designer**, click the **Reconnect** icon.
20. If necessary, in the **Hierarchy** box, click **Calendar Date**. Expand the hierarchy to the month level and notice that the months are now in date order rather than alphabetical order.

Task 2: Group the Yearly Income attribute hierarchy members in the Customer dimension

1. In Solution Explorer, right-click the **Adventure Works DSW.dsv** data source view, and then click **View Designer**.
2. In the **Data Source View** pane, right-click the **Customer** table, and then click **Explore Data**. Notice the range of values for the **YearlyIncome** column.
3. On the **Explore Customer Table** tab, click the **Close** icon.
4. In Solution Explorer, right-click the **Customer.dim** dimension, and then click **View Designer**.
5. In the **Attributes** pane, click **Yearly Income**.
6. In the **Properties** pane, click **Automatic** in the **DiscretizationMethod** box, and then type **5** in the **DiscretizationBucketCount** box.
7. In Solution Explorer, right-click the **Adventure Works OLAP** project, and then click **Deploy**. The **Deployment Progress – Adventure Works OLAP** dialog box appears.
8. Wait for the **Deploy Completed Successfully** message in the dialog box appears.
9. Close the **Deployment Progress – Adventure Works OLAP** dialog box.
10. On the **Browser** tab of the **Customer.dim Dimension Designer**, click the **Reconnect** icon.
11. In the **Hierarchy** box, click **Yearly Income**.
12. Expand the **All** level and view the salary ranges created.
13. Click **File**, and then click **Save All**.
14. Turn off the **NY-SQL-01** virtual machine.

Results: After this exercise, you should be able to view the correctly sorted and grouped dimensions in the cube.

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