

5 MANAGING MEASURES



MODULE OBJECTIVE

Each cube is made up of one or more measure groups, and each measure group in a cube contains one or more measures. In this module we will explore all there is to know about measures and measure groups, and we'll also cover calculated members.

MODULE TOPICS

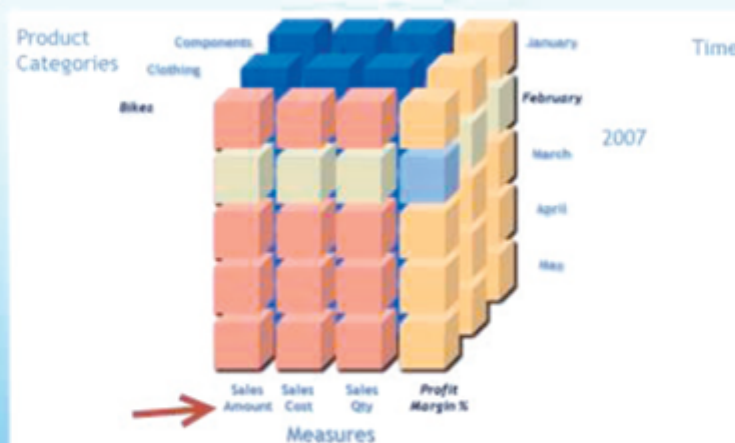
MODULE TOPICS

- Measures and Measure Groups
- Calculated Members



UNDERSTANDING MEASURES AND MEASURE GROUPS

UNDERSTANDING MEASURES AND MEASURE GROUPS



MEASURES (FACTS)

- Measures are a dimension and have one level (All).
- This cube (above) has three dimensions, Measures, Time, and Product

Categories.

Facts are often numeric and additive, although that is not a requirement. Facts are sometimes called measures. For the purpose of this course the two terms are interchangeable. An example of a fact is gross sales amount.

Measures are the values that you are going to analyze; they are united in the measure groups by their relationships to dimensions in the cube. Measures are ultimately the most important semantic part of the cube because they are based on the fact data that you're going to analyze. They usually contain numeric metrics that describe the results of business activity.

Measures define which data is available for analysis, and in what form and by what rules that data can be transformed. The measure group defines how the data is bound to the multidimensional space of the cube.

MEASURE GROUPS

Fact data defines the fact space of the data in the cube. In many respects, they define the behavior of the physical data model.

- ▶ What data will be loaded into the system
- ▶ How the data will be loaded
- ▶ How the data is bound to the conceptual model of the multidimensional cube

Measures of the same granularity are united in one measure group (fact). That granularity defines the dimensionality of the fact space and the position of the fact in the attribute tree of each dimension.

DEMONSTRATION

VIDEO: MEASURES AND MEASURE GROUPS





EXERCISE A.1: MEASURES AND MEASURE GROUPS

Objective: in this exercise we will explore and create measures and measure groups.

A.1.1 Navigate down to the taskbar, right-click **SQL Server Data Tools** icon, right-click the new **SQL Server Data Tools** icon showing, and then click **Run as administrator**.

A.1.2 In the **User Account Control** dialog box, click **Yes**.

- A.1.3 When **Microsoft Visual Studio** opens, navigate to the upper-left, click **File | Open | Analysis Services Database....**
- A.1.4 In the **Connect To Database** dialog box, review the settings and options available.
- A.1.5 Navigate to the box below the **Database** setting, and click to select the existing connection into **AdventureWorksDW2012Multidimensional-EE**.
- A.1.6 Click **OK**.
- A.1.7 Move to **Solution Explorer** pane on the right, and review the results.
- A.1.8 Navigate to the **Cubes** folder, and double-click **Adventure Works** cube. Review the results.
- A.1.9 Move to the **Measures** pane on the left, and review the measure groups listed.
- A.1.10 Expand **Internet Sales** measure group. Review the results and the listed measures.
- A.1.11 Click to select **Internet Sales Amount** measure.
- A.1.12 Navigate to the **Properties** pane in the lower-right, and double-click the title bar to expand the window and review the current settings.
- A.1.13 Locate the **Source** setting, click into the corresponding row, and then click the provided ellipsis.
- A.1.14 When the **Measure Source** dialog box opens, review the options available and note the current settings.
- A.1.15 Click **Cancel**.
- A.1.16 Back in the **Properties** window, navigate to the upper-right and click  then click **Dock**. Review the results.
- A.1.17 Move up to the toolbar and click  (**New Measure Group**).
- A.1.18 When the **New Measure Group** dialog box opens, review the options available.

A.1.19 Move down to the warning stating **The following tables are already used by other measure groups** and review the tables listed.

A.1.20 Click **Cancel**.

A.1.21 Click **Dimension Usage** tab.

A.1.22 Review the **Measure Groups**, the corresponding **Dimensions** and their relationships.

A.1.23 Navigate to the **Reseller Sales** column, locate the corresponding **Employee** row, click the intersecting cell containing **Employee**, and then click the provided ellipsis.

A.1.24 When the **Define Relationship** dialog box opens, review the current settings and options available.

A.1.25 Click **Cancel**.

A.1.26 Navigate to the **Internet Sales** column, locate the corresponding **Geography** row, click the intersecting cell, and then click the provided ellipsis.

A.1.27 When the **Define Relationship** dialog box opens, review the current settings and options available.

A.1.28 Move to the **Select relationship type** setting, use the provided drop-down arrow, and review the options available.

A.1.29 Click **Cancel**.

A.1.30 Click **Cube Structure** tab.

EXPLORING CALCULATED MEMBERS

EXPLORING CALCULATED MEMBERS

```
WITH
MEMBER [Product].[Category].[All Products].[Accessories and Bikes] as
([Product].[Category].[Bikes]) + ([Product].[Category].[Accessories])
SELECT
{
{([Date].[Calendar Year].[CY 2006]),
([Date].[Calendar Year].[CY 2007])}
} ON COLUMNS,
{
{([Product].[Category].[Accessories]),
([Product].[Category].[Bikes]),
([Product].[Category].[Clothing]),
([Product].[Category].[Components]),
([Product].[Category].[Accessories and Bikes])}
} ON ROWS
FROM [Adventure Works]
```

[Accessories and Bikes] is the Calculated Member. It is created in the [All Products] level

```
Select
[Product].[Category].members
on 0
from [Adventure Work]
```

[All Products] is a member and a level so it has members also

Messages	Results
All Products	\$80,450,596.96
Access	\$571.2
Bikes	\$66,302...
Clothing	\$1,777.6
Components	\$11,799...

In MDX a calculated member is a member that is resolved by calculating an MDX expression to return a value. The ability to construct and use calculated members in an MDX query provides a great deal of manipulation capability for multidimensional data. If a calculated member is only required for a single query, you can define that calculated member by using the WITH keyword. **A calculated member that is created by using the WITH keyword no longer exists after the query has finished running.**

You can create calculated members at any point within a hierarchy. You can also create calculated members that depend not only on existing members in a cube, but also on other calculated members defined in the same MDX expression.

You can define a calculated member to have one of the following contexts:

- ▶ **Query-scoped** To create a calculated member that is defined as part of an MDX query, and therefore whose scope is limited to the query, you use the WITH keyword such as shown in the PowerPoint. You can then use the calculated member within an MDX SELECT statement. Using this approach, the calculated member created by using the WITH keyword can be changed without disturbing the SELECT statement.
- ▶ **Session-scoped** To create a calculated member whose scope is wider than the context of the query, that is, whose scope is the lifetime of the MDX session,

you use the CREATE MEMBER statement. A calculated member defined by using the CREATE MEMBER statement is available to all MDX queries in that session. The CREATE MEMBER statement makes sense, for example, in a client application that consistently reuses the same set in a variety of queries.

DEMONSTRATION

VIDEO: CALCULATED MEMBERS




EXERCISE B.1: CALCULATED MEMBERS

Objective: in this exercise we will create a calculated member.

B.1.1 Click **Calculations** tab. Review the results.

B.1.2 Notice you see a **Script Organizer** pane in the upper-left, scroll through and review its contents.

B.1.3 Click to select **[Reseller Average Unit Price]** and review the current settings.

B.1.4 Click  (**New Calculated Member**). Review the results noticing the blank form.

B.1.5 Navigate to the **Name** text box and change the name from **[Calculated Member]** to **[Freight and Tax]**.

B.1.6 Move to the **Expression** text box and click within the text box.

B.1.7 Navigate to the lower-left in the **Calculation Tools** section, and expand **Measures**.

B.1.8 Expand **Internet Sales** folder.

B.1.9 Locate **Internet Freight Cost**, then using drag-and-drop, drop it into the **Expression** text box. Review the results.

B.1.10 Move back to the **Expression** text box, and place your cursor at the end of the existing code.

B.1.11 Enter a space, followed by + and another space.

B.1.12 Navigate back to the lower-left in the **Calculation Tools** section, scroll through the **Measure Group** pane, locate **Internet Tax Amount**, then using drag-and-drop, drop it into the **Expression** text box at the end of the existing code. Review the results.

✦ Expression

```
[Measures].[Internet Freight Cost] + [Measures].[Internet Tax Amount]
```

B.1.13 Move to the **Format string** setting, use the corresponding drop-down arrow,

review the options available, and then click **“Currency”**.

B.1.14 Navigate down to the **Associated measure group** setting, use the corresponding drop-down arrow, review the options available, and then click **Internet Sales**.

B.1.15 Click  (Check Syntax).

B.1.16 In the **Check Syntax** dialog box advising **The syntax check was successful**, click **OK**.

B.1.17 Navigate back to the **Script Organizer** pane in the upper-left, right-click **[Freight and Tax]**, and click **Delete**.

B.1.18 In the **Delete Objects** dialog box advising **The following objects will be deleted**, click **OK**.

B.1.19 Click **Cube Structure** tab.

MODULE REVIEW



MODULE OBJECTIVE

Each cube is made up of one or more measure groups, and each measure group in a cube contains one or more measures. In this module we will explore all there is to know about measures and measure groups, and we'll also cover calculated members.

REVIEW QUESTIONS



1. _____ are the values that you are going to analyze.
2. Measures of the same granularity are united in one _____ (fact).
3. You can define a calculated member to have one of two contexts; name the two contexts.
4. To create a calculated member that is defined as part of an MDX query, and therefore whose scope is limited to the query, you use the _____ keyword.
5. To create a calculated member whose scope is wider than the context of the query, that is, whose scope is the lifetime of the MDX session, you use the _____ statement.

REVIEW QUESTIONS ANSWERED



1. _____ are the values that you are going to analyze.
 - a. Measures
2. Measures of the same granularity are united in one _____ (fact).
 - a. Measure group
3. You can define a calculated member to have one of two contexts; name the two contexts.
 - a. Query-scoped, and session-scoped
4. To create a calculated member that is defined as part of an MDX query, and therefore whose scope is limited to the query, you use the _____ keyword.
 - a. WITH
5. To create a calculated member whose scope is wider than the context of the query, that is, whose scope is the lifetime of the MDX session, you use the _____ statement.
 - a. CREATE MEMBER