

MDX: From WITH To WHERE

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About Jessica M. Moss

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- BI Mentor with Solid Quality Mentors
- Microsoft SQL Server MVP
- MCDBA, MCTS: 2005 BI, MCITP: 2005 BI
- Active member of PASS and SQL User Groups
- Blog: <http://www.jessicammoss.com>



Agenda

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- Glossary
- Syntax
- Functions
- Calculated Measures
- Business Scenario
- Performance Tuning
- References
- Questions

Glossary

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□ Cube

▣ Cell

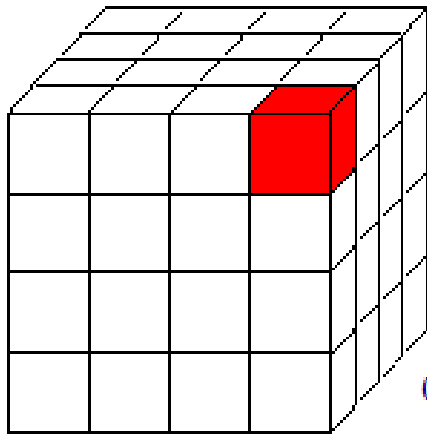
■ Measure / fact

□ Dimension

▣ Member

▣ Level

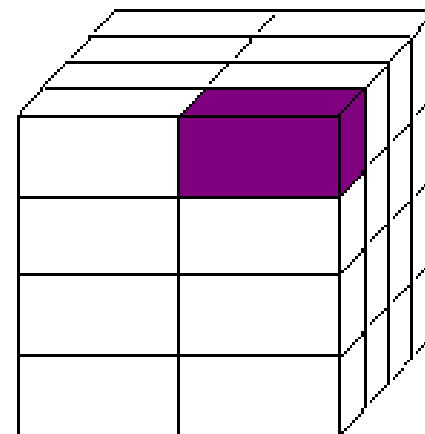
▣ Hierarchy



Date.Fiscal

Geography.Geography

Product Categories.Product



Date.Fiscal

Geography.Geography

Product Categories.Subcategory

Glossary

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□ Axes

□ Column

□ Row

□ Page

□ 3

□ 4

□ 5

```
SELECT
```

```
    {column set} on COLUMNS ← Axis
```

```
    , {row set} on ROWS ← Axis
```

```
FROM cube
```

```
WHERE {slice set} ← Slicer
```

□ Slicer

Glossary

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□ Tuple

- ▣ Intersection of dimensions that results in one cell
- ▣ Uses one member from each dimension

```
([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal  
Year].[FY 2005])
```

Glossary

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□ Set

- ▣ Collection of tuples with same dimensionality
- ▣ One tuple is also a set

```
{ ([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal  
Year].[FY 2005])  
, ([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal  
Year].[FY 2004]) }
```

Tuple or Set?

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```
([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal Year].[FY 2005])
```

TUPLE

```
{ ([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal Year].[FY 2005])  
, ([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal Year].[FY 2004]) }
```

SET

```
([Product].[Hitch Rack - 4-Bike])
```

TUPLE

```
([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal Year])
```

TUPLE

```
{ ([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal Semester].[H1 FY 2005])  
, ([Product].[Hitch Rack - 4-Bike], [Date].[Fiscal Semester].[H2 FY 2005]) }
```

SET

```
{ ([Product].[Hitch Rack - 4-Bike])  
    , ([Date].[Fiscal Year].[FY 2005])  
    , ([Date].[Fiscal Year].[FY 2004]) }
```

NEITHER

Basic Syntax

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```
SELECT { [Measures].[Reseller Sales Amount] } ON COLUMNS
      , [Product].[Product Model Categories].[Subcategory] ON
      ROWS
FROM [Adventure Works]
WHERE [Product].[Subcategory].&[2]
```

Advanced Syntax

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```
WITH MEMBER [Reseller Ratio to Parent Product] AS
Case
    When [Product].[Product Model Categories].
        CurrentMember.Level.Ordinal = 0
    Then 1
    Else [Measures].[Reseller Sales Amount] /
        ( [Product].[Product Model Categories].
            CurrentMember.Parent,
            [Measures].[Reseller Sales Amount] )
End
SELECT { [Reseller Ratio to Parent Product]
        , [Measures].[Reseller Sales Amount] } ON COLUMNS
    , DESCENDANTS([Product].[Product Model Categories].
        [Subcategory]) ON ROWS
FROM [Adventure Works]
WHERE [Product].[Subcategory].&[2]
```

Functions - Standard

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- **Sum**
 - Called on: Set
 - Returns: Number
- **Count**
 - Called on: Set
 - Returns: Number
- **Avg**
 - Called on: Set
 - Returns: Number
- **Tail**
 - Called on: Set
 - Returns: Set
- **Max**
 - Called on: Set
 - Returns: Number
- **Min**
 - Called on: Set
 - Returns: Number

Functions - Family Ties

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□ CurrentMember

- Called on: Dimension

- Returns: Member

□ PrevMember

- Called on: Member

- Returns: Member

□ Children

- Called on: Member

- Returns: Set

□ Parent

- Called on: Member

- Returns: Member

□ Siblings

- Called on: Member

- Returns: Set

Functions - Timing

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□ YTD

- Called on: Dimension

- Returns: Set

□ ParallelPeriod

- Called on: Level or Member

- Returns: Member

Functions - Advanced

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- **CrossJoin (*)**
 - Called on: Set
 - Returns: Set
- **Non Empty**
 - Called on: Set
 - Returns: Set
- **NonEmptyCrossJoin**
 - Called on: Set
 - Returns: Set
- **NonEmpty**
 - Called on: Set
 - Returns: Set

Calculated Members & Sets

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- Evaluate a condition based on other dimensions and measures in the cube
- Can be built within the cube or can be query scoped
- Examples:

```
WITH MEMBER [Internet Gross Profit] AS
    [Measures].[Internet Sales Amount]
    - [Measures].[Internet Total Product Cost]
```

```
WITH SET [Large Resellers] AS
    Exists (
        [Reseller].[Reseller].[Reseller].Members,
        [Reseller].[Number of Employees].[Number of Employees].[81 -
        100]
    )
```

Calculated Members & Sets

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- Power of calculated members becomes apparent when using current members
- Example:

```
WITH MEMBER [Reseller Ratio to Parent Product] AS
```

```
Case
```

```
  When [Product].[Product Model Categories].
```

```
    CurrentMember.Level.Ordinal =
```

```
    0
```

```
  Then 1
```

```
  Else [Measures].[Reseller Sales Amount] /
```

```
    ( [Product].[Product Model Categories].CurrentMember.Parent,  
      [Measures].[Reseller Sales Amount] )
```

```
End
```

Business Scenario

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- Business wants to discover trends in past internet sales
- Moving averages will be useful to hide anomalies in the data
- Must be able to decide over how many time periods the data will be averaged
- Must have the ability to determine time period and number of periods independently

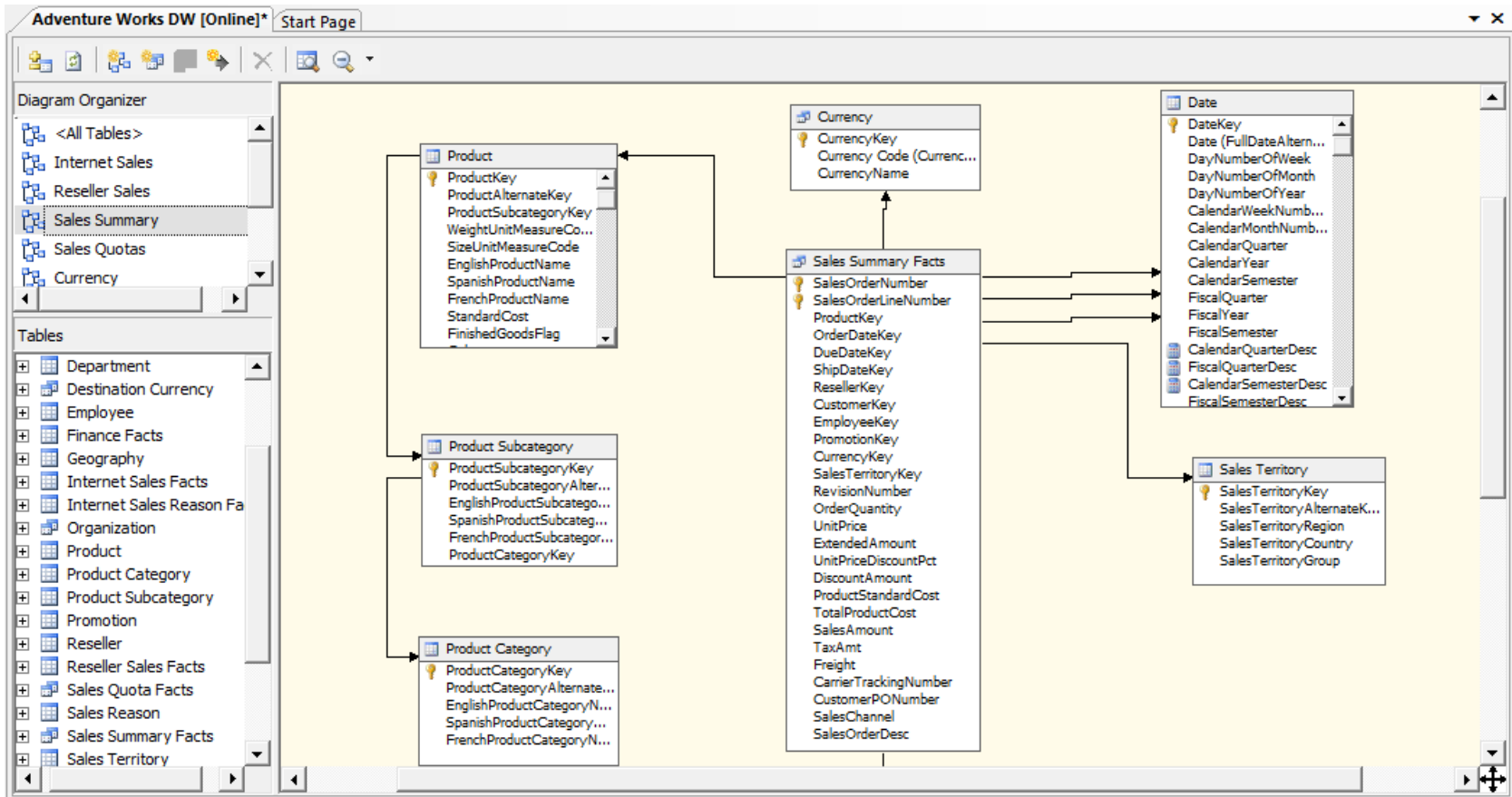
Cube Overview

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- ❑ Database: Adventure Works DW 2008
- ❑ Cube: Adventure Works
- ❑ Measures: Sales, Orders, Targets
- ❑ Dimensions: Customer, Date, Employee, Product, etc.

Cube Overview

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Performance Tuning

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- MDXStudio

References

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- Fast Track to MDX
 - Whitehorn, Zare, Pasumansky
- MDXStudio
 - <http://www.mosha.com/msolap/mdxstudio.htm>

Questions

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