

Getting Started With SSAS 2012 Tabular

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Objectives

- Overview of Tabular
- Analysis Services Tabular from 10,000 Feet
- Analysis Services Options: SSAS Multidimensional or SSAS Tabular?

Overview of Tabular

- **Why Tabular Now?**
- **Objectives of Tabular**

Why Tabular Now?

- **“Streamlined” BI Model that**
 - Offers simplicity and efficiency
 - Promotes rapid BI development
 - Lends itself to both Personal and Organizational BI projects
 - Supports an “upgrade” path
- **To leverage hardware and other advances**
- **To feed the demand for self-service BI**

Objectives of Tabular

A mantra in two parts ...

- Simplicity of Use
- “High performance by default”

Simplicity of Use ...

- **Targets business information workers**
- **Assumes no expert technical skills / knowledge**
- **More intuitive entity representation**
- **Relational concepts (tables, relationships, etc.)**
... versus Multidimensional constructs (cubes, dimensions, etc.)
- **Straightforward Business Logic Layer (Excel-formula-like DAX)**
- **Data Access Layer – easy import from many sources without in-depth query / scripting knowledge**
- **Simplified Data Reporting and Analysis**
 - Familiar Excel PivotTable / PivotChart or Power View
 - Less reporting authoring experience required

“High Performance by Default”

- **Less ongoing requirement for “special tuning”**
- **In-memory data base (xVelocity) that leverages column-based storage**
- **A great fit for data that is typically analyzed “by columns”**
- **Leverages recent and upcoming hardware advances**
- **DAX is optimized for modern multi-core processors**

Caveat ...



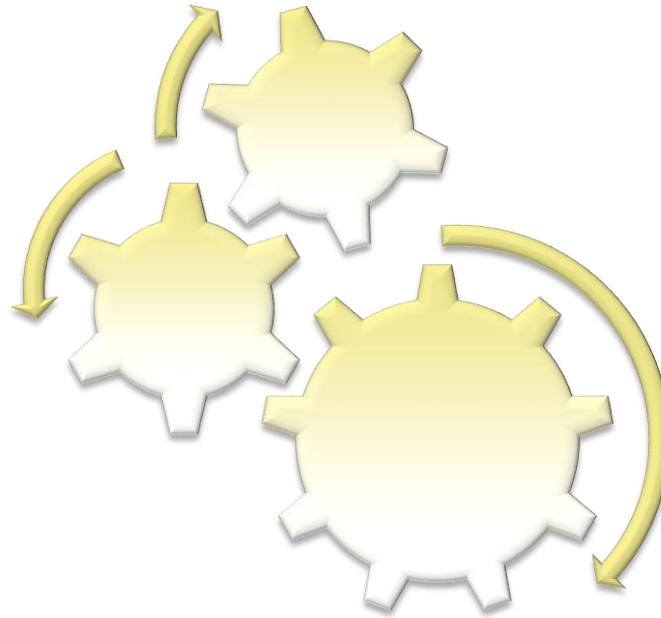
Keep in mind that Tabular is less-feature-rich and scalable than MultiDimensional ...

Analysis Services Tabular from 10,000 Feet

The Steps:

- **Create a New Tabular Model Project**
- **Add Data**
- **Basic Preparation: Rename Columns & Mark Date Table**
- **Create Relationships**
- **Create Calculated Columns**
- **Create Measures**
- **Perform Analysis in the Tabular Model**
- **Deploy the Tabular Model**

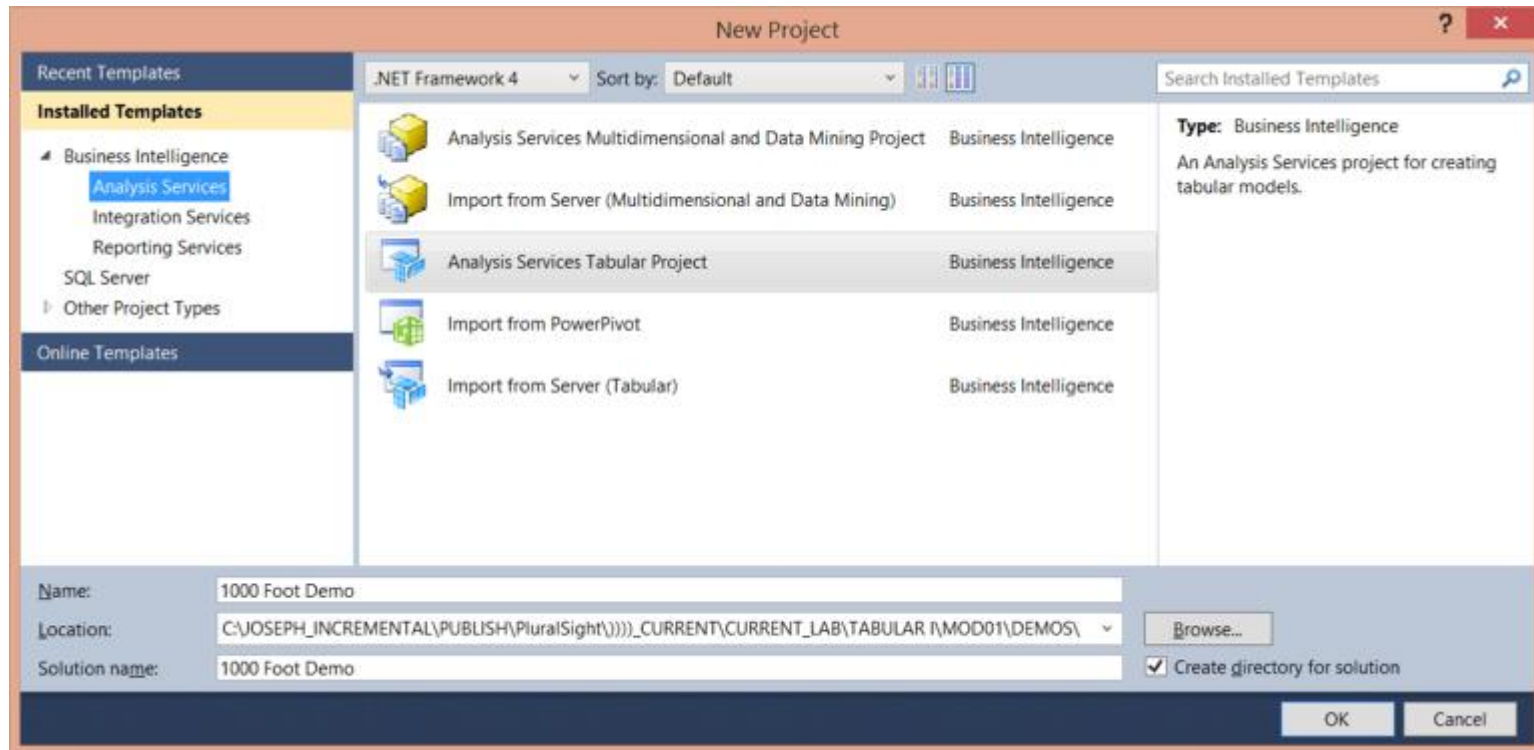
Steps in Building the Tabular Model



Let's Take a Look:

We'll do a high-level walkthrough of each these steps ...

Create a New Tabular Project



Add Data

Table Import Wizard

?

×

Select Tables and Views

Select the tables and views that you want to import data from.

Server: JOSEPH

Database: AdventureWorksDW2012

Tables and Views:

<input type="checkbox"/>	Source Table	Schema	Friendly Name	Filter Details
<input type="checkbox"/>	AdventureWorksDWBuildVer...	dbo		
<input type="checkbox"/>	DatabaseLog	dbo		
<input type="checkbox"/>	DimAccount	dbo		
<input type="checkbox"/>	DimCurrency	dbo		
<input checked="" type="checkbox"/>	DimCustomer	dbo	Customer	
<input checked="" type="checkbox"/>	DimDate	dbo	Date	
<input type="checkbox"/>	DimDepartmentGroup	dbo		
<input type="checkbox"/>	DimEmployee	dbo		
<input checked="" type="checkbox"/>	DimGeography	dbo	Geography	
<input type="checkbox"/>	DimOrganization	dbo		
<input checked="" type="checkbox"/>	DimProduct	dbo	Product	
<input checked="" type="checkbox"/>	DimProductCategory	dbo	Product Category	
<input checked="" type="checkbox"/>	DimProductSubcategory	dbo	Product Subcategory	
<input type="checkbox"/>	DimPromotion	dbo		
<input type="checkbox"/>	DimReseller	dbo		
<input type="checkbox"/>	DimSalesReason	dbo		
<input type="checkbox"/>	DimSalesTerritory	dbo		
<input type="checkbox"/>	DimScenario	dbo		

Select Related Tables

Preview & Filter

< Back

Next >

Finish

Cancel

Basic Preparation

The screenshot shows the SQL Server Enterprise Developer interface. The main window displays a table with columns: YearlyIncome, TotalChildren, No Children At Home, EnglishEducation, SpanishEducation, and FrenchEducation. The 'Table' menu is open, and the 'Date' option is selected. A 'Mark as Date Table' dialog box is open, showing the 'FullDateAlternateKey' column selected as the unique identifier for the date table.

Table Data:

YearlyIncome	TotalChildren	No Children At Home	EnglishEducation	SpanishEducation	FrenchEducation
\$30,000.00	0			udios universitario...	Baccalaur
\$30,000.00	0			udios universitario...	Baccalaur
\$30,000.00	0			udios universitario...	Baccalaur
\$30,000.00	0			udios universitario...	Baccalaur
\$30,000.00	0			udios universitario...	Baccalaur
\$30,000.00	0			udios universitario...	Baccalaur
\$30,000.00	0			udios universitario...	Baccalaur

Table Data (Date Table):

Date...	FullDateAlternateKey	Day
20050701	7/1/2005 12:00:00 AM	1 Sunday
20050702	7/2/2005 12:00:00 AM	2 Monday
20050703	7/3/2005 12:00:00 AM	3 Tuesday
20050704	7/4/2005 12:00:00 AM	4 Wednesday
20050705	7/5/2005 12:00:00 AM	5 Thursday
20050706	7/6/2005 12:00:00 AM	
20050707	7/7/2005 12:00:00 AM	

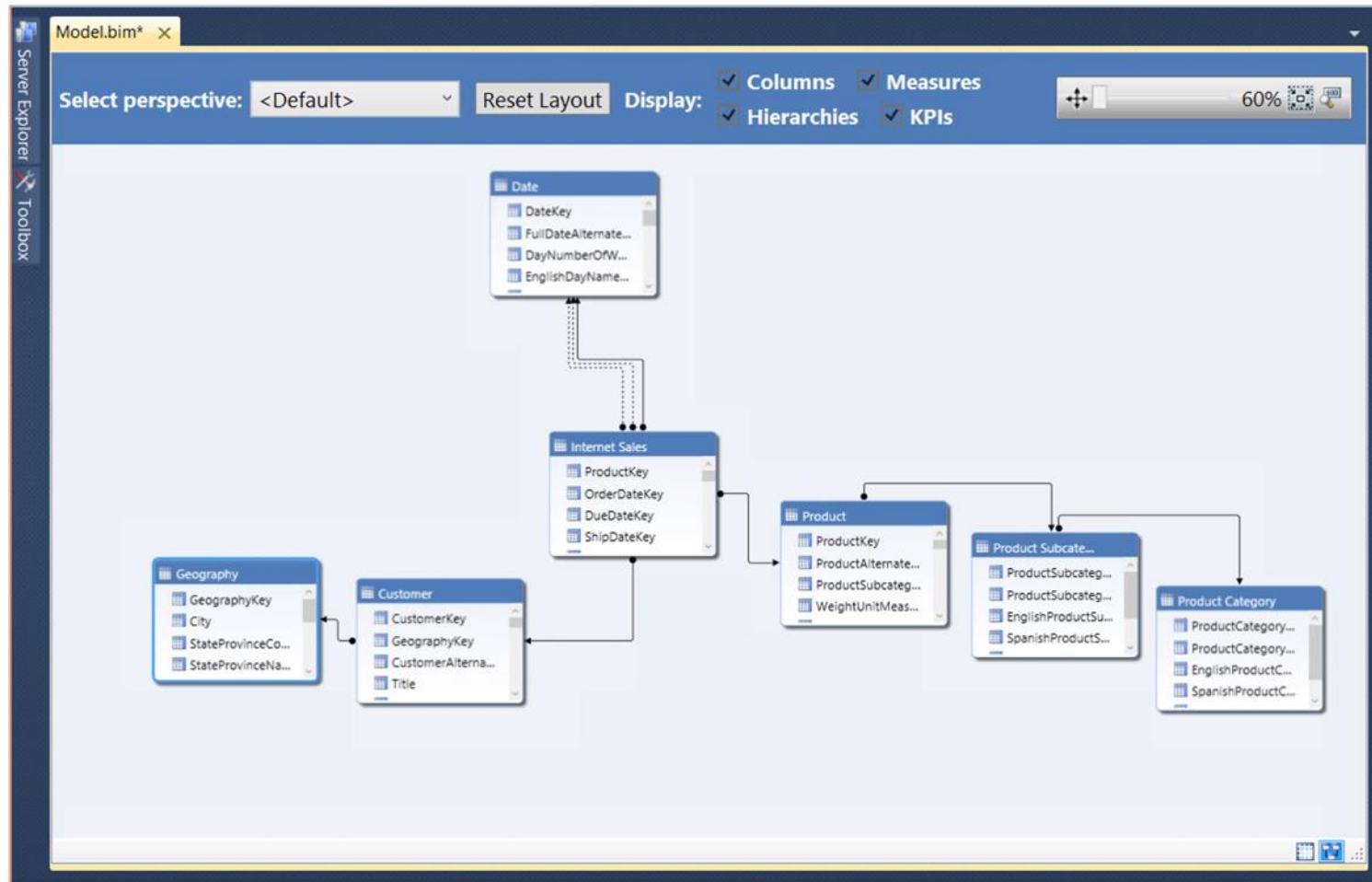
Mark as Date Table Dialog:

Select a column to be used as unique identifier for the date table. The selected column must be of the date data type and must contain unique values only.

Date: FullDateAlternateKey

OK Cancel

Create Relationships



Create Calculated Columns

Model.bim* X

[CalculatedColumn1] fx =RIGHT(" " & FORMAT([Month],"#0"), 2) & " - " & [Month Name]

Month	CalendarQuarter	CalculatedColumn1	CalendarYear
7	3	7 - July	2005
7	3	7 - July	2005
7	3	7 - July	2005
7	3	7 - July	2005
7	3	7 - July	2005

Create Measures

Model.bim* X						
[DateKey]		fx Measure 1:=COUNTROWS(DATESQTD('Date'[Date]))				
DateKey	Date	DayNumberOfWeek	EnglishDayNameOfWeek	SpanishDayName		
20050701	7/1/2005 12:00:00 AM	6	Friday	Viernes		
20050702	7/2/2005 12:00:00 AM	7	Saturday	Sábado		
20050703	7/3/2005 12:00:00 AM	1	Sunday	Domingo		
20050704	7/4/2005 12:00:00 AM	2	Monday	Lunes		
20050705	7/5/2005 12:00:00 AM	3	Tuesday	Martes		
20050706	7/6/2005 12:00:00 AM	4	Wednesday	Miércoles		
20050707	7/7/2005 12:00:00 AM	5	Thursday	Jueves		
20050708	7/8/2005 12:00:00 AM	6	Friday	Viernes		
20050709	7/9/2005 12:00:00 AM	7	Saturday	Sábado		
20050710	7/10/2005 12:00:00 AM	1	Sunday	Domingo		
20050711	7/11/2005 12:00:00 AM	2	Monday	Lunes		
20050712	7/12/2005 12:00:00 AM	3	Tuesday	Martes		
20050713	7/13/2005 12:00:00 AM	4	Wednesday	Miércoles		
20050714	7/14/2005 12:00:00 AM	5	Thursday	Jueves		
20050715	7/15/2005 12:00:00 AM	6	Friday	Viernes		
20050716	7/16/2005 12:00:00 AM	7	Saturday	Sábado		
20050717	7/17/2005 12:00:00 AM	1	Sunday	Domingo		
20050718	7/18/2005 12:00:00 AM	2	Monday	Lunes		
20050719	7/19/2005 12:00:00 AM	3	Tuesday	Martes		
20050720	7/20/2005 12:00:00 AM	4	Wednesday	Miércoles		
Measure 1: 92						

Perform Analysis in the Tabular Model

The screenshot illustrates the process of performing analysis in the Tabular Model using Excel. The main window shows the SQL Server Enterprise Manager interface with the 'Model.bim' file open. The 'Model' menu is expanded, showing the 'Analyze in Excel' option. The 'Analyze in Excel' dialog box is open, prompting the user to choose the setting to use when browsing the model in Excel. The dialog box includes options for 'Current Windows User' (selected) and 'Other Windows User', a 'Role' dropdown, and a 'Perspective' dropdown set to '(Default)'. The background shows a data table with columns like 'ProductKey', 'Product', 'OrderDate', and 'SalesOrderKey'.

Model.bim

ProductKey	Product	OrderDate	SalesOrderKey
528	20070801	1487	4 SOS190
528	20070802	1531	4 SOS194
528	20070804	1638	4 SOS204
528	20070804	1547	4 SOS204
528	20070805	1586	4 SOS209
528	20070807	2601	4 SOS217
528	20070807	1476	4 SOS219
528	20070819	1476	4 SOS223
528	20070819	1476	4 SOS224
528	20070819	1476	4 SOS230
528	20070819	1476	4 SOS231
528	20070819	1476	4 SOS234
528	20070819	1476	4 SOS238
528	20070819	1476	4 SOS249
528	20070819	1476	4 SOS250
528	20070819	1476	4 SOS254
528	20070819	1476	4 SOS259
528	20070819	1476	4 SOS262
528	20070819	1476	4 SOS263
528	20070819	1476	4 SOS269
528	20070819	1476	4 SOS274

Analyze in Excel

Choose the setting to use when browsing the model in Excel.

Specify the user name or role to use to connect to the model:

☒ Current Windows User
☐ Other Windows User

Role:

Perspective:

OK Cancel

PivotTable Fields

Show fields: (All)

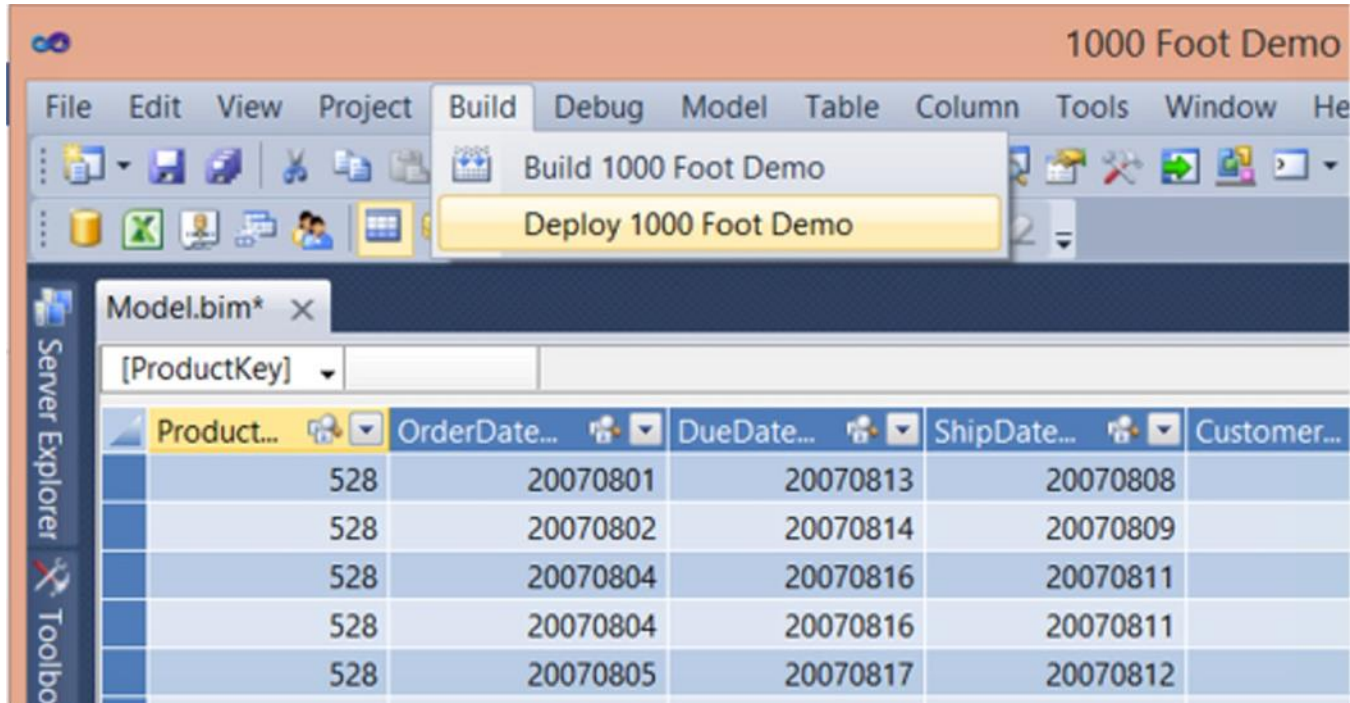
Customer
Date
Geography
Internet Sales

Drag fields between areas below:

FILTERS
ROWS
VALUES

Defer Layout Update

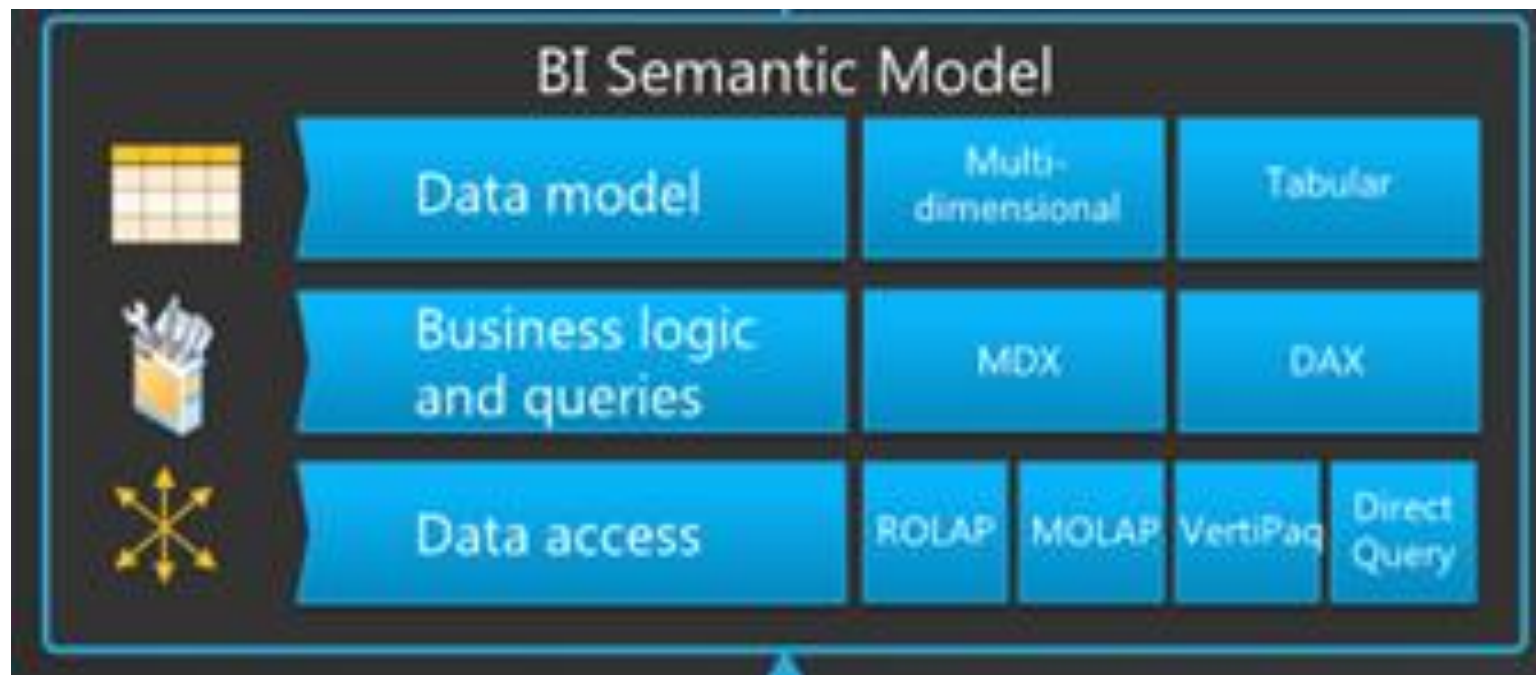
Deploy the Tabular Model



Analysis Services Options: SSAS Multidimensional or SSAS Tabular?

- **Architectural Comparison, Layer-by-layer**
- **Making the Choice**

Architectural Comparison, Layer-by-Layer



Architectural Comparison

Data Access Layer

Component	MultiDimensional	Tabular
Data Sources	Relational (single DB ideal)	Relational, Multidimensional, Flat files, SSRS, OData
Primary Storage	Disk	RAM
Storage Modes	MOLAP, ROLAP, HOLAP, Proactive caching	xVelocity, DirectQuery
Aggregations	Yes	N/A
Partitions	Parallel or serial processing	Serial processing

Architectural Comparison

Business Logic Layer

Component	MultiDimensional	Tabular
Constructional Elements	Calculated members, Scope assignments, Named sets	Calculated columns, Calculated measures
Expression Language	MultiDimensional eXpressions (MDX)	Data Analysis Expressions (DAX)
Extensions	.NET Stored Procedures	No

Architectural Comparison

Data Model Layer

Component	MultiDimensional	Tabular
Foundational Schema	MultiDimensional (Cubes, Dimensions)	Relational (Tables, Columns)
Consumer Constructs	KPI's, Actions, Perspectives, Translations	KPI's, Drill-through action (default), Perspectives
Aggregation Options	Sum, Average, Min, Max, Count, DistinctCount, Semi-Additive	Sum, Average, Min, Max, Count, DistinctCount
Definable Entity Relationships	Regular, Role-playing, Many-to-many, Parent-child, Referenced, Data-mining	Regular, Role-playing (via DAX), Many-to-many (via DAX)

Making the Choice

- **General Considerations, Layer-by-layer**
 - Data Access
 - Business Logic
 - Data Model

General Considerations: Data Access Layer

- **With the exception of Distinct Count calculations, don't expect dramatic performance gains moving from Multidimensional to Tabular**
(MultiDimensional caches in memory, too ...)
- **Tabular may perform better, in general, than a sub-optimally designed cube**
- **While both models support partitioning, Tabular partitions within a table sequentially, and may therefore be much slower with large tables**
- **High cardinality (many unique values) columns in the underlying data will reduce xVelocity compression ratio, so performance may not be better than via Multidimensional, if we cannot eliminate such columns**
- **When working with a single data warehouse, MultiDimensional shines**
- **When multiple sources exist, or there is a need to bring external data into the model, Tabular shines**

General Considerations: Data Access Layer (cont'd) ...

- **PowerPivot / Tabular dominates as a rapid prototyping / design tool**
- **When estimating Tabular memory requirements, account for at least twice the size of the disk footprint to allow memory for data refreshment, etc.**
- **Tabular models deployed to a dedicated Analysis Services server support basic paging, where memory is paged to disk under memory pressure**
- **MultiDimensional offers extensive paging support, and is designed to scale to terabytes of data**

General Considerations: Business Logic Layer

- **MultiDimensional uses Calculated Members / Measures in the manner that Tabular uses Measures to deliver aggregations**
 - Dynamically evaluated
- **Tabular exposes Calculated Columns, defined via DAX, that materialize expression results**
 - (nearest parallel in MultiDimensional: Named Calculations in the Data Source View)
- **Tabular does not support the Scope Assignment capability found in Multidimensional**
 - This means a Calculated Measure must be created for EVERY column (such as Sales YTD, Order Quantity QTD, etc.) that needs a custom aggregation
 - Poses challenges from both usability and maintenance perspectives
- **Many other Business Logic layer considerations**
 - Capabilities of MDX vs DAX, etc.

General Considerations: Data Model Layer

- **MultiDimensional is more sophisticated and mature, and carries a steeper learning curve**
- **Novice users may find Tabular easier (relationally architected)**
- **Options in MultiDimensional that have no Tabular equivalent may require consideration (and even, perhaps, drive choices):**
 - Custom rollup
 - Default members
 - Discretized attributes
 - Unary operators
 - Attribute types
 - Visibility of hierarchy levels
 - Many other properties and settings

Getting Started With SSAS 2012 Tabular Summary

- **Overview of Tabular**
 - Why Tabular Now?
 - Objectives of Tabular
- **Analysis Services Tabular from 10,000 Feet**
- **Analysis Services Options: SSAS Multidimensional or SSAS Tabular?**
 - Architectural Comparison, Layer-by-layer
 - Making the Choice