

# Dimensional Model Development

Building the data foundation

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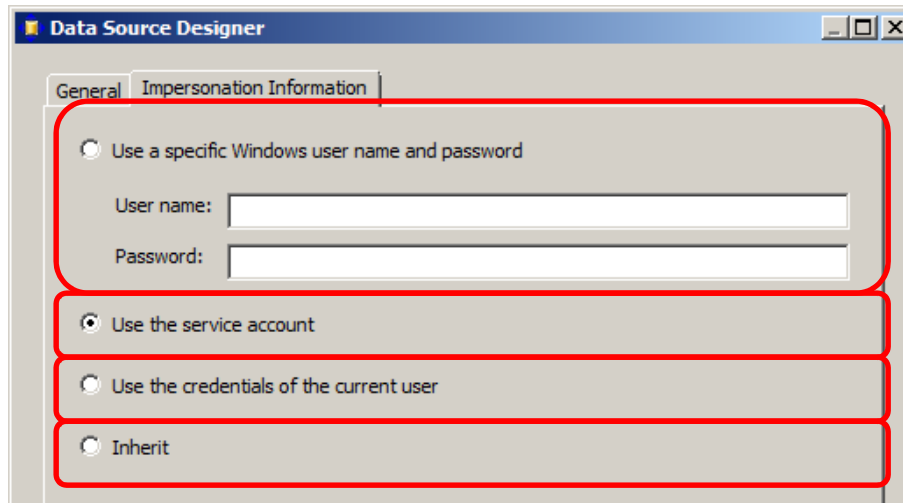


# Overview

- Data Source
- Top Down versus Bottom Up Design
- Cube Wizard
- Dimension Designer
- Schema Generation Wizard
- Data Source View

# Data Source

- **Connection information for cube and dimension data sources**
  - Select connection provider
    - Managed Microsoft .NET provider
    - Native OLE DB provider
  - Specify location (server, database) and authentication
- **Impersonation information for connections**



The screenshot shows the 'Data Source Designer' window with the 'Impersonation Information' tab selected. The tab contains four radio button options, each enclosed in a red rounded rectangle. The first option is 'Use a specific Windows user name and password', which includes 'User name:' and 'Password:' text boxes. The second option is 'Use the service account'. The third option is 'Use the credentials of the current user'. The fourth option is 'Inherit'.

Impersonation account  
must have  
READ permissions  
on source

# Top Down versus Bottom Up Design

## ■ Top Down

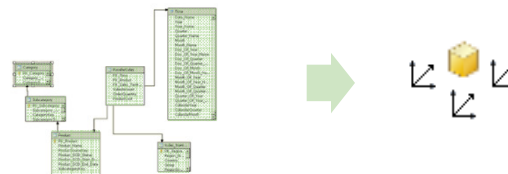
- Design the cube and dimensions free-form or from template
- Generate the schema to build the relational tables
- Populate the tables using an ETL process



Cube  
and  
Dimension Wizards  
support  
both approaches

## ■ Bottom Up

- Populate the tables using an ETL process
- Design the cubes and dimensions based on the table metadata



# “Top Down” Design: Cube Wizard

**Select Creation Method**  
Cubes can be created by using existing tables, creating an empty cube, or generating tables in the data source.

How would you like to create the cube?

☐ Use existing tables

☐ Create an empty cube

☒ Generate tables in the data source

Template:  
(None)

Description:  
Create tables in the underlying data source the underlying data source.

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**Define New Measures**  
Define new measures and measure groups. You can edit them later in Cube Designer.

Add new measures:

Measure Name	Measure Group
SalesAmount	ResellerSales
OrderQuantity	ResellerSales
ProductCost	ResellerSales

Add new measure

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Next >

**Define New Dimensions**  
Define new dimensions and set basic properties for them. You can edit the dimensions later in Dimension Designer.

Select dimensions from template:

Type	Name	SCD	Attributes
<input checked="" type="checkbox"/>	Time	<input type="checkbox"/>	Days

Add new dimensions:

Name	SCD	Attributes
Product	<input checked="" type="checkbox"/>	Product, Product SCD Start Date, Product S...
Subcategory	<input type="checkbox"/>	Sales Territory
Category	<input type="checkbox"/>	Category
Sales Territory	<input type="checkbox"/>	Sales Territory

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Next >

Finish >>





Cancel

SUM  
MIN  
MAX  
COUNT  
Etc.







# "Top Down" Design: Dimensions

Primary key – Surrogate key




## Star Schema Dimension

	Name	Usage	Type	Key Column	Name Column
	Region	Key	Regular	Integer	Separate column
	RegionSourceKey	Regular	Regular	Integer	Same as key
	Country	Regular	Regular	WChar	Same as key
	Group	Regular	Regular	WChar	Same as key



## Snowflake Dimension

	Name	Usage	Type	Key Column	Name Column
	Product	Key	Regular	Integer	Separate column
	Product SCD End Date	Regular	ScdEndDate	Date	Same as key
	ProductSourceKey	Regular	ScdOriginalID	Integer	Same as key
	Product SCD Start Date	Regular	ScdStartDate	Date	Same as key
	Product SCD Status	Regular	ScdStatus	WChar	Same as key
	SubcategoryKey	Regular	Regular	Integer	Same as key

	Name	Usage	Type	Key Column	Name Column
	Subcategory	Key	Regular	Integer	Separate column
	SubcategorySourceKey	Regular	Regular	Integer	Same as key
	CategoryKey	Regular	Regular	Integer	Same as key

	Name	Usage	Type	Key Column	Name Column
	Category	Key	Regular	Integer	Separate column
	CategorySourceKey	Regular	Regular	Integer	Same as key

# Schema Generation Wizard

**Schema Generation Wizard**

**Specify Target**  
Specify the data source view in which to generate the schema.

☒ Create a new data source view  
Data source view name:  
Data source:  
A new data source view will be created for you.

☐ Use existing data source view  
The selected data source view and its data source will be used.

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**Schema Generation Wizard**

**Subject Area Database Schema Options**  
Specify the schema generation options for the subject area database.

Owning schema:

☒ Create primary keys on dimension tables  
☒ Create indexes  
☒ Enforce referential integrity  
☒ Preserve data on regeneration

Populate time table(s):

< Back   Next >   Finish >>

**Schema Generation Wizard**

**Specify Naming Conventions**  
Specify the naming conventions you want to use in the new schema.

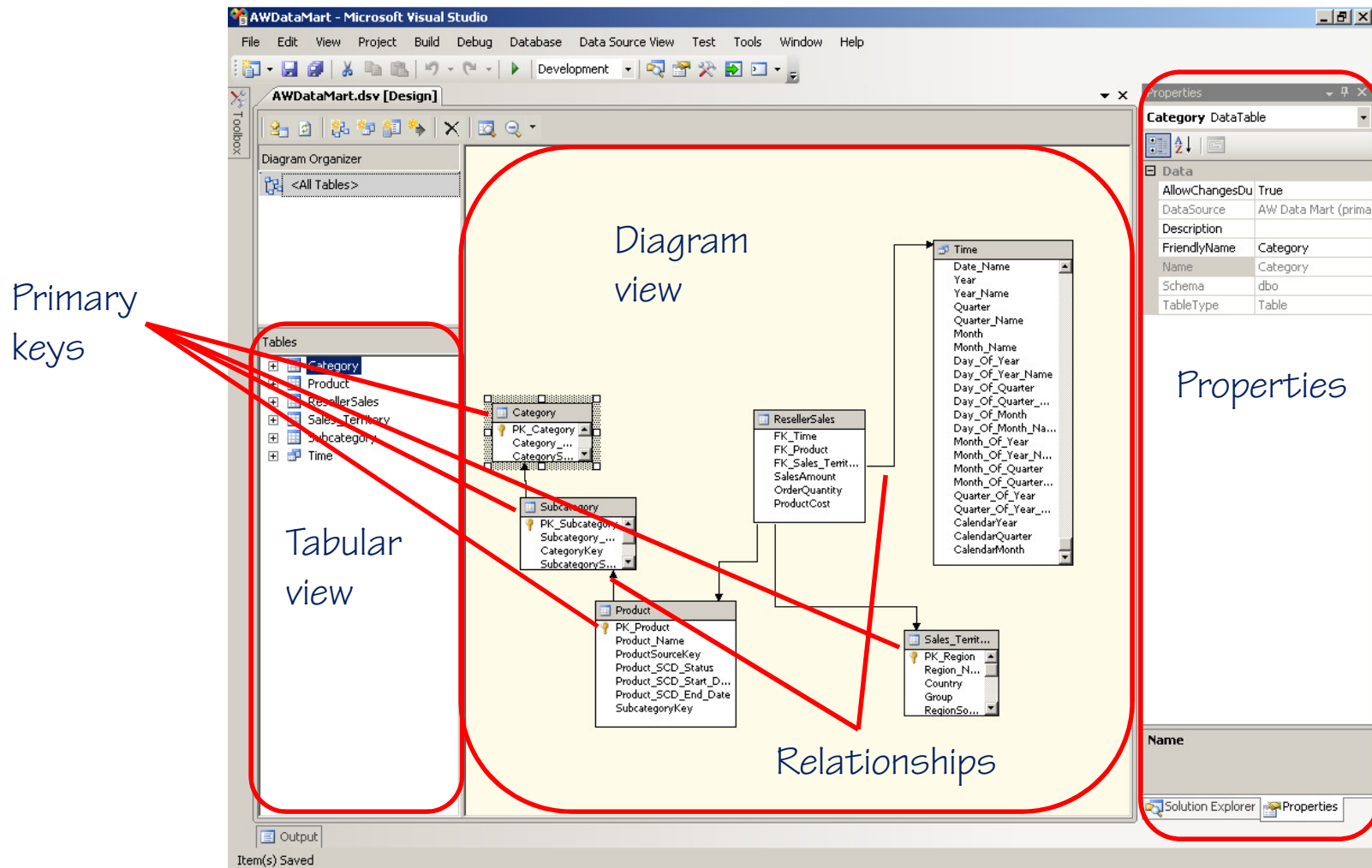
Option	Value
Separator	Underscore
Primary key column prefix	PK
Foreign key column prefix	FK
Attribute name suffix	Name
Custom rollup suffix	CustomRollup
Custom rollup properties suffix	CustomRollupProperties
Unary operator suffix	UnaryOperator
Skipped levels suffix	SkippedLevels
Value column suffix	Value

< Back   Next >   Finish >> | Cancel

Populate  
Do not populate  
Populate if empty



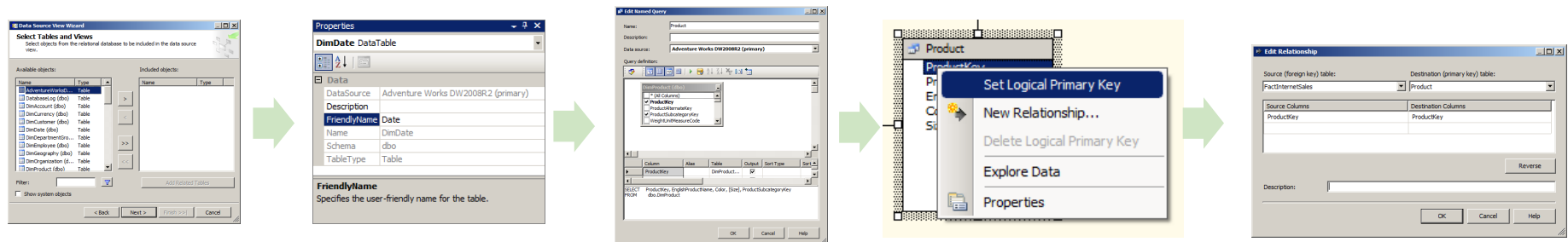
# Data Source View





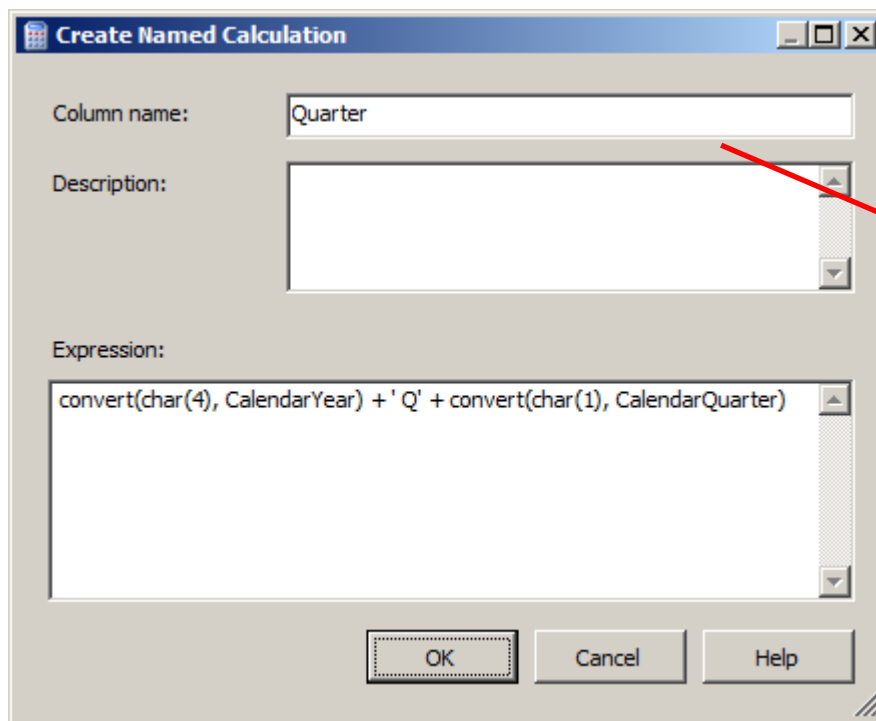
# Data Source View Tasks

- Select tables or views
- Rename tables and columns
- Replace table with named query
  - Reduce complexity by eliminating columns
  - Add expressions to concatenate strings or perform mathematical operations
- Set logical primary keys on dimension tables
- Create relationships between fact and dimension tables

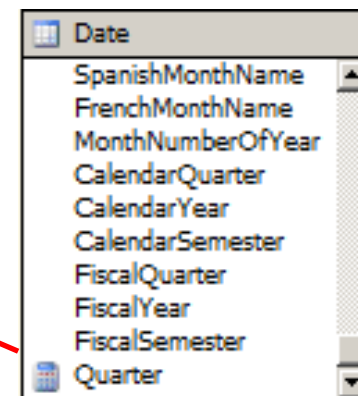


# Named Calculation

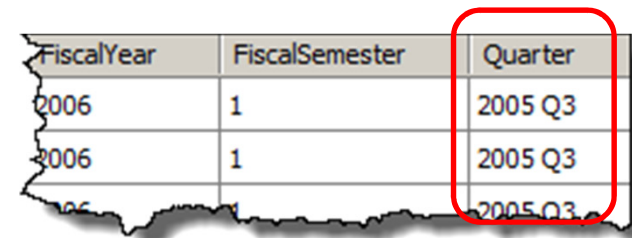
- Pass-through SQL expression
- Additional “column” in table identified with calculator icon



The 'Create Named Calculation' dialog box is shown. It has three main sections: 'Column name:' with the text 'Quarter', 'Description:' with an empty text area, and 'Expression:' with the SQL expression `convert(char(4), CalendarYear) + ' Q' + convert(char(1), CalendarQuarter)`. At the bottom are 'OK', 'Cancel', and 'Help' buttons. A red arrow points from the 'Quarter' column name to the 'Quarter' entry in the adjacent list.



A list of date-related functions is shown, including SpanishMonthName, FrenchMonthName, MonthNumberOfYear, CalendarQuarter, CalendarYear, CalendarSemester, FiscalQuarter, FiscalYear, FiscalSemester, and Quarter. The 'Quarter' function is highlighted with a calculator icon and a red arrow pointing to it from the 'Quarter' column name in the dialog box.

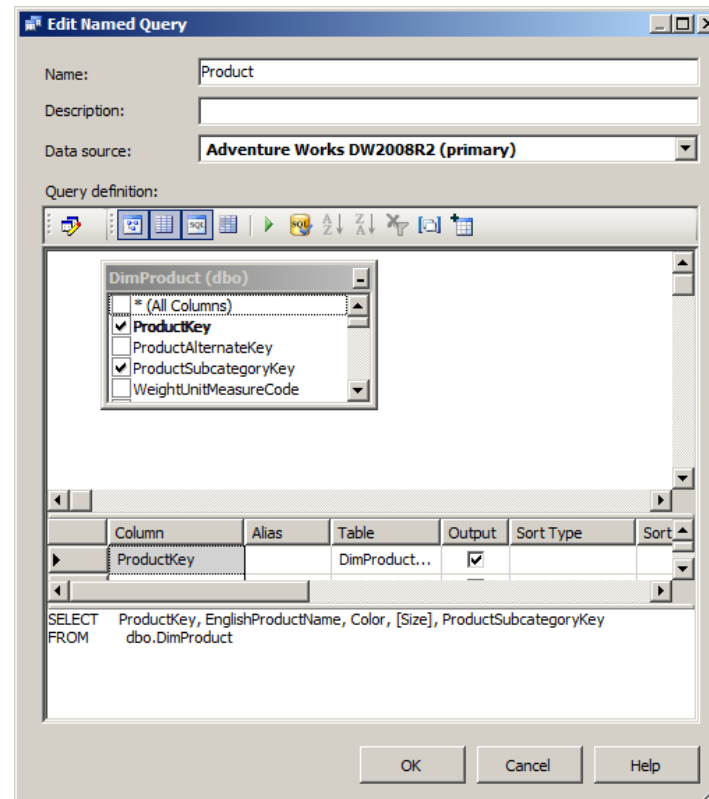


A table with three columns: FiscalYear, FiscalSemester, and Quarter. The data rows are 2006, 1 and 2005, 1. The 'Quarter' column contains the values '2005 Q3' and '2005 Q3'. A red box highlights the 'Quarter' column.

FiscalYear	FiscalSemester	Quarter
2006	1	2005 Q3
2006	1	2005 Q3

# Named Query

- SELECT statement replaces a table
- Graphical query builder available for SQL Server



# Summary

- **Data Source**
  - Connection information, impersonation information
- **Top Down versus Bottom Up Design**
  - Design -> tables (top down), tables -> design (bottom up)
- **Cube Wizard**
  - Measures, measure groups, aggregation functions, dimensions
- **Dimension Designer**
  - Key column, name column, additional attributes
- **Schema Generation Wizard**
  - Database schema options, naming conventions
- **Data Source View**
  - Table/view selection, named calculations, named queries, logical keys, relationships

# References

- **Designing the Star Schema Database**
  - <http://tinyurl.com/5lks76>
- **Designing Data Sources**
  - <http://msdn.microsoft.com/en-us/library/ms175608.aspx>
- **Designing Multidimensional Objects without an Existing Relational Schema**
  - <http://msdn.microsoft.com/en-us/library/ms365368.aspx>
- **Designing Data Source Views**
  - <http://msdn.microsoft.com/en-us/library/ms174778.aspx>