SQL Server 2005

Analysis Services

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Analysis Services

- OLAP engine of SQL Server 2005
- Every source is associated to an external database
- The source is the relational database where the fact and dimension tables are present
  - Relational data warehouse
- Analysis Services exploits data from sources to feed the cubes

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Cubes

- The cubes
  - Are similar to the materialized views of the relational model
  - Are stored in an OLAP database which exploits proper data structures to save multidimensional data
- Every cube can be associated to
  - A complete fact
  - A portion of a fact
    - To optimize specific queries

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Creating the data source

- The first step is to define the data source
  - Indicating the following parameters
    - Remote (or local) computer network address
    - User
    - Authentication method
      - Username/password
      - Windows user
    - Database to be used

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Creating dimensions and cubes

- Basic steps
  - Define the data source
  - Define a data source view to select the needed tables
  - Define the dimension structures
  - Define the cube dimensions

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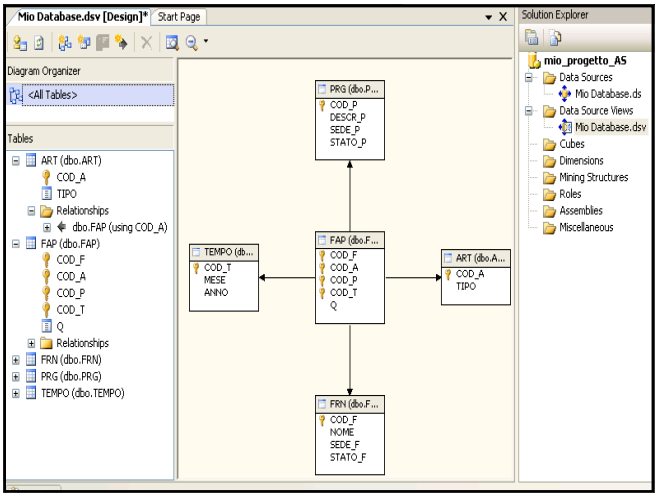
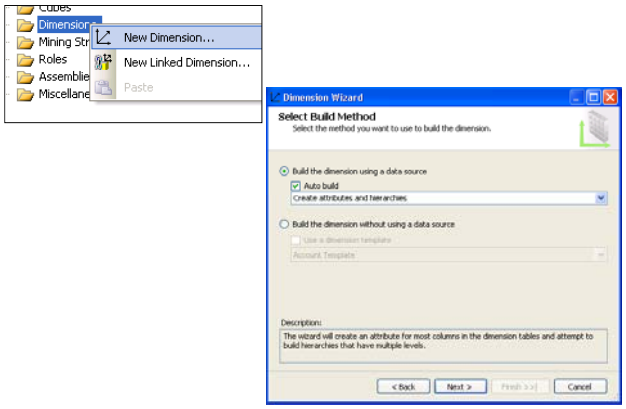


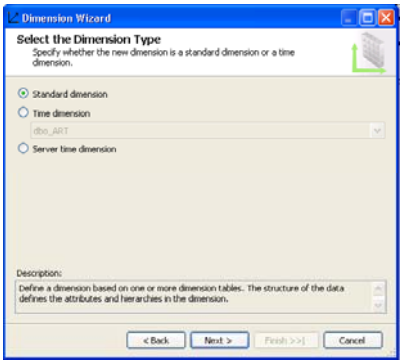
Creating a dimension

- Use the “New dimension” command
  - Select the “auto build” option if you want SQL Server to automatically define attributes and hierarchies



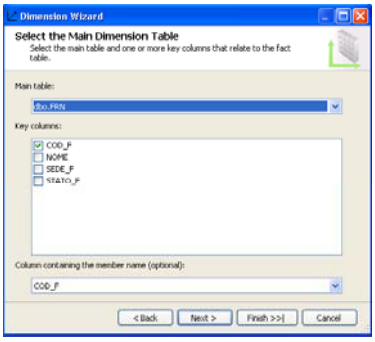
Creating a dimension (2)

- Choose the type of the dimension
  - Standard
  - Temporal
    - Automatic managing of the time dimension



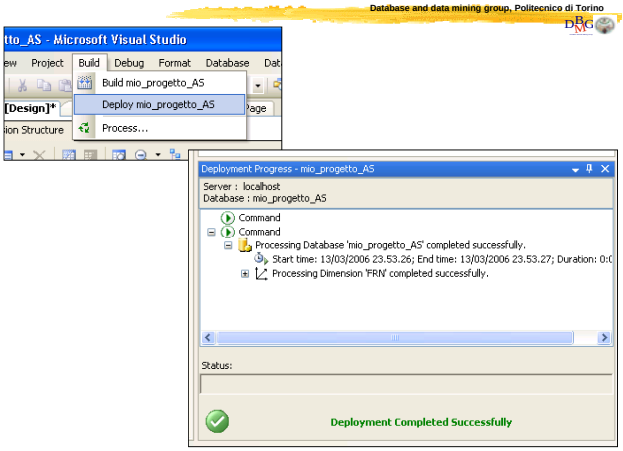
Creating a dimension (3)

- Choose the table to be used as data source for the dimension
- Choose the primary key of the table



Project deploy

- Transfer the created structures on the OLAP server
  - SQL Server automatically creates a new OLAP database for the project
- During the deploy phase
  - the dimension is processed
  - the data are loaded

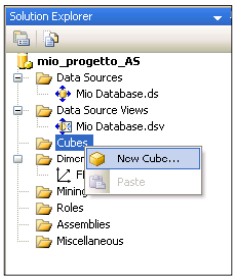


Browsing a dimension

- Using the “browser”
  - an attribute or a hierarchy can be selected
  - its data can be read

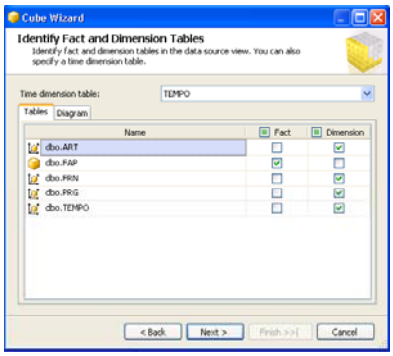
Creating a cube

- Choose the “New Cube” command
  - Use the wizard
- Choose the fact table
- Choose the cube measures
  - Numerical attributes
- Choose the cube dimensions
  - Create the dimensions if needed
  - Use previously created dimensions



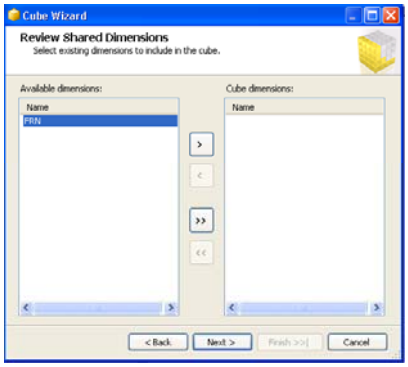
Creating a cube (2)

- Choose the data source
  - Data source view
- Choose the fact and dimension tables
  - Identify the fact table
  - Identify the tables associated to the desired dimensions



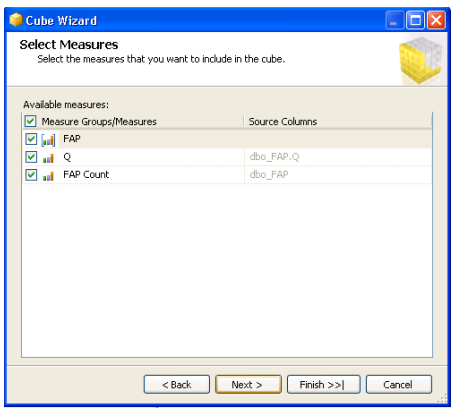
Creating a cube (3)

- Choose the dimensions to be used
  - The SQL Server wizard presents a list of existing dimensions



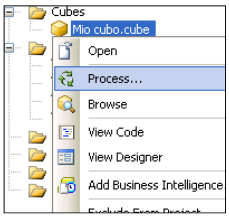
Creating a cube (4)

- Choose the measures of the cube
  - Besides the measures of the fact table, SQL Server provides additional measures
    - Example: COUNT, the number of tuples of every rollup operation



Cube processing

- Before using the cube, we need to "compute" its content
  - Loading the data inside the cube
- Execute the cube deploy and processing
  - If new structures have been introduced, SQL Server deploys the new ones and then processes the cube (updates the cube data)

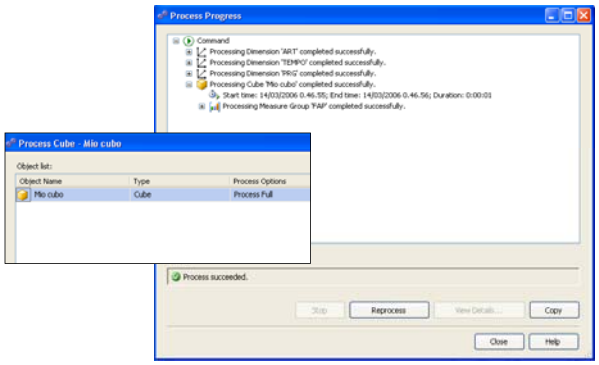


Cube processing (2)

- Cube processing types
  - Full Process
    - Creates the physical structure of the cube and computes its content (aggregated measures)
  - Refresh update
    - Delete the data of the cube and recomputes the aggregated measures
  - Incremental update
    - Updates the cube content by adding new data from data sources

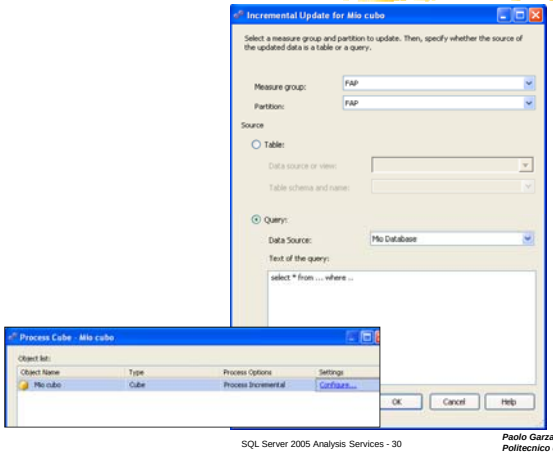
Cube processing (3)

- Full Process option
  - It is the only option available when the content is computed for the first time



Cube processing (4)

- Incremental Update option
  - Updates the content of the cube with data from data sources
  - Selects the data which satisfy the query

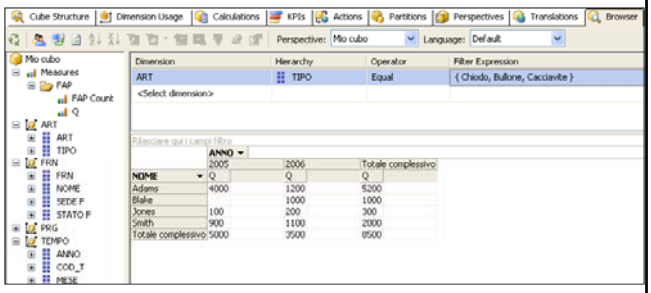


Querying a cube

- The content of a cube can be browsed
  - With the graphic browser of SQL Server BI Development Studio
  - MDX queries
    - Ad-hoc Microsoft language
  - Excel
  - Third party reporting tools

Graphic browser

- Select the cube and choose the "Browser" tab
- Drag and drop the information to show on the schema
  - Select the measures
  - Select the dimensions
  - Select the filters



Aggregations in cubes

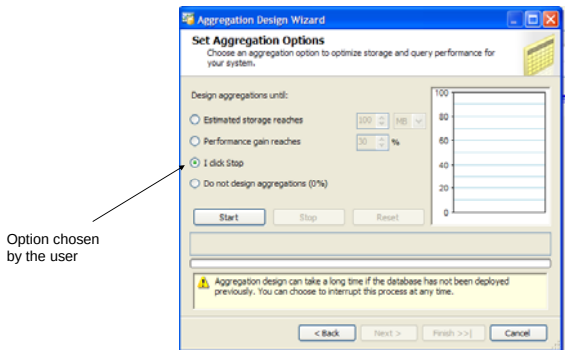
- Many queries use only a portion of the cube
  - They perform aggregations on the cube
- Response time can be optimized by pre-computing aggregations
  - Aggregations are chosen by SQL Server according to
    - User preferences
    - Frequent queries

Aggregations in cubes (2)

- The user can choose some parameters
  - The maximum available disk space
  - The desired percentage of performance gain in terms of time
  - An interactive choice can be performed based on a graph showing
    - the performance gain vs used disk space
  - No aggregations

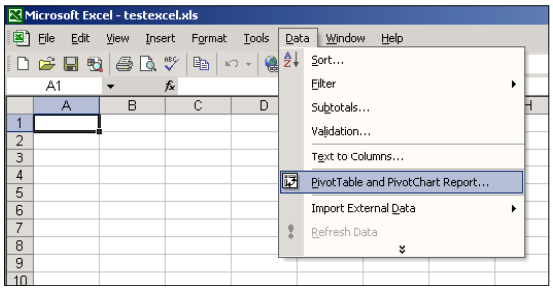
Aggregations in cubes (3)

- To start the aggregations choice
  - Select the desired cube
  - Select the "Partitions" tab
  - Choose the "Design Aggregations" wizard



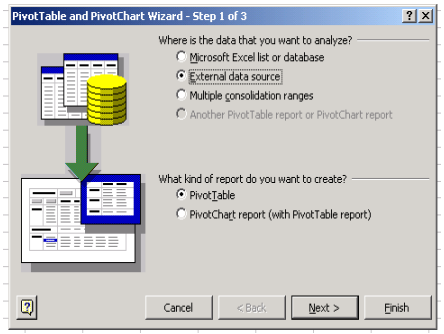
Using Excel to query a cube

- Open Excel
- Use the command
  - Data menu
  - Pivot Table
  - PivotChart Report



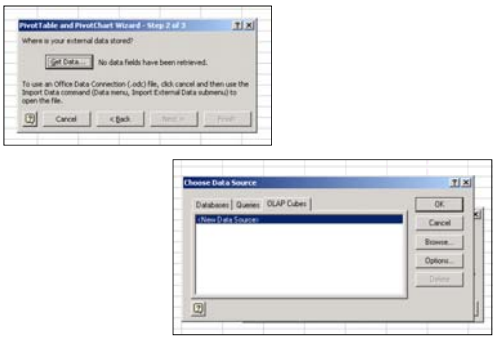
Using Excel to query a cube (2)

- Choose the “External data source” option



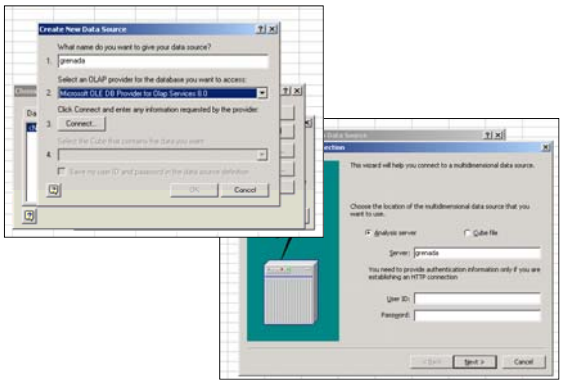
Using Excel to query a cube (3)

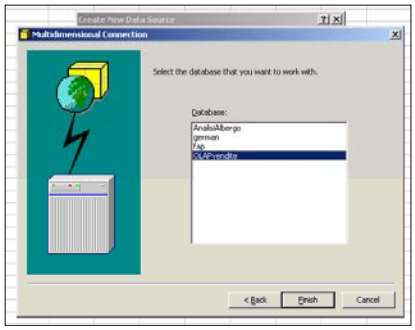
- Choose the connection to the desired OLAP cube
  - Get Data
- The first time, the connection has to be created
  - Get Data
  - Olap Cubes -> New data source -> OK

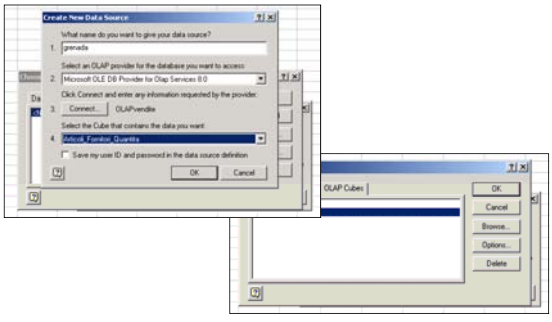


Using Excel to query a cube (4)

- Creating a new connection
  - Choose a name for the connection
  - Choose the provider to connect to
  - Choose “Analysis server” and write the name of the OLAP server
  - Choose the name of the desired OLAP database
  - Choose the name of the desired cube







Using Excel to query a cube (5)

- Place the desired dimensions and measures on the Excel spreadsheet

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