Lab 2a: Build and use a cube for a business analysis

In this lab, you will build an analytical data warehouse (DW), by using Microsoft Analysis Services tools and Visual Studio 2019. The lab is divided into two parts: (i) tutorial, and (ii) assignment.

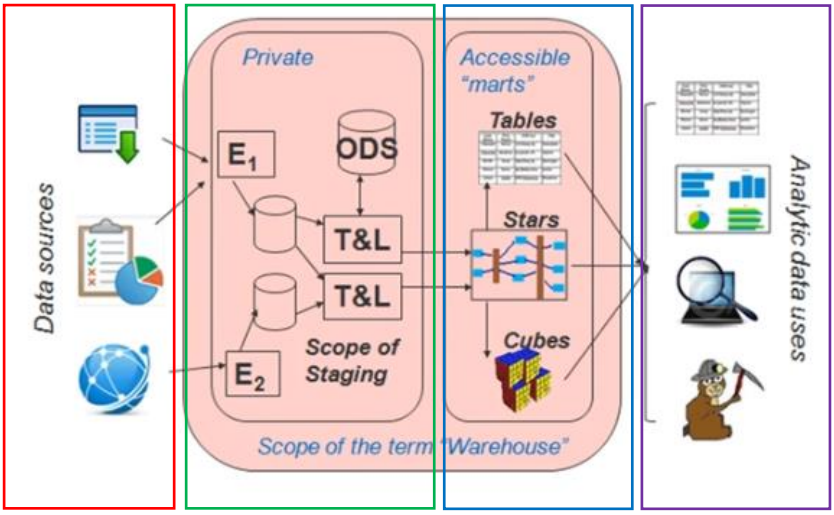


Figure 1. *Components of a DW.*

Figure 1 illustrates the flow of data through the components of the DW. Any organization has several operational systems that collect or generate data to support the company's day-to-day business (Fig. 1, red frame). Then, the data are extracted from the sources and copied into a temporary staging area (Fig. 1, green frame). If they are multiple sources, some data transformations may be needed to conform them to unified standards. The new data are then added to the data stars (Fig. 1, blue frame). For instance, new sales records can be added to the foot of the facts tables and any changes to the surrounding descriptors being recorded by amending the dimension tables. In this lab, we are going to use a single star database with several facts tables that share some of the dimension descriptors. Finally, in addition to the stars and cubes available for use, a DW has several analytical tools, such as reports, dashboards, self-service data drilling tools (e.g., Excel), and data mining systems (Fig. 1, magenta frame).

I. Tutorial

Here, you will have to follow the tutorial that explains you how to build a cube from scratch:

https://www.sqlshack.com/build-cube-scratch-using-sql-server-analysis-services-ssas/

In order to follow this tutorial, you will have to install several software applications and database summarized in section III.

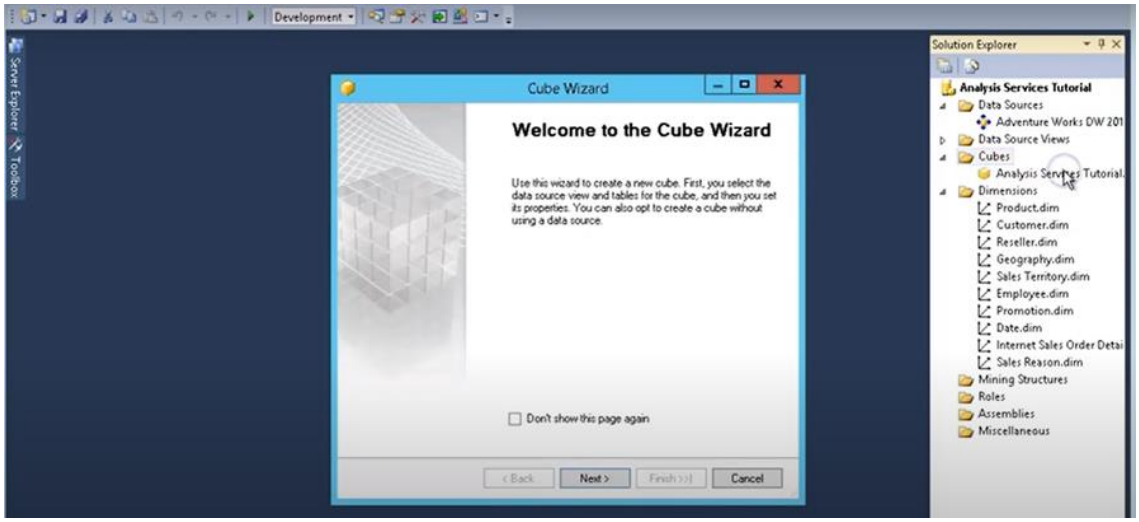
II. Assignment

Now, imagine yourself as the CEO of a company, who has created the DW from the database AdventureWorksDW2019.ds and wants to improve his/her business. As CEO, you are interested in comparing your sales through the Reseller vs. Internet.

To do so, you will have to:

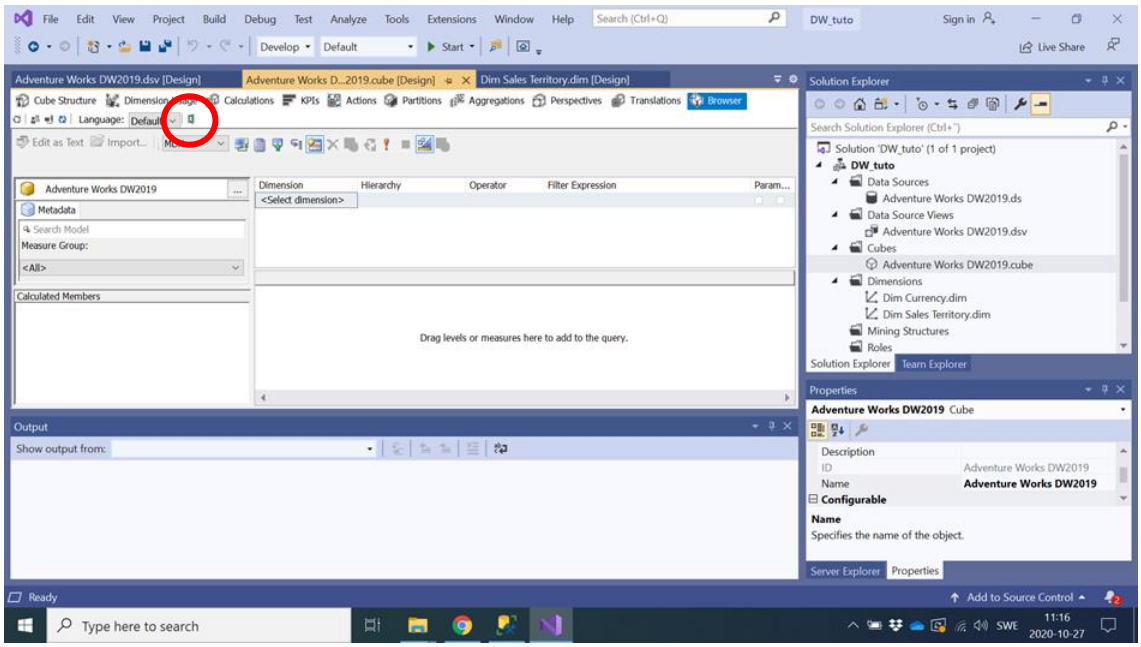
1. Create a new project, which will consist of creating a new cube that will include the table “Fact Internet Sales”.

2. Choose few relevant dimensions, such as Product.dim, Customer.dim, Geography.dim, Sales Territory.dim, Promotion.dim, Date.dim…, in order to support your comparison.

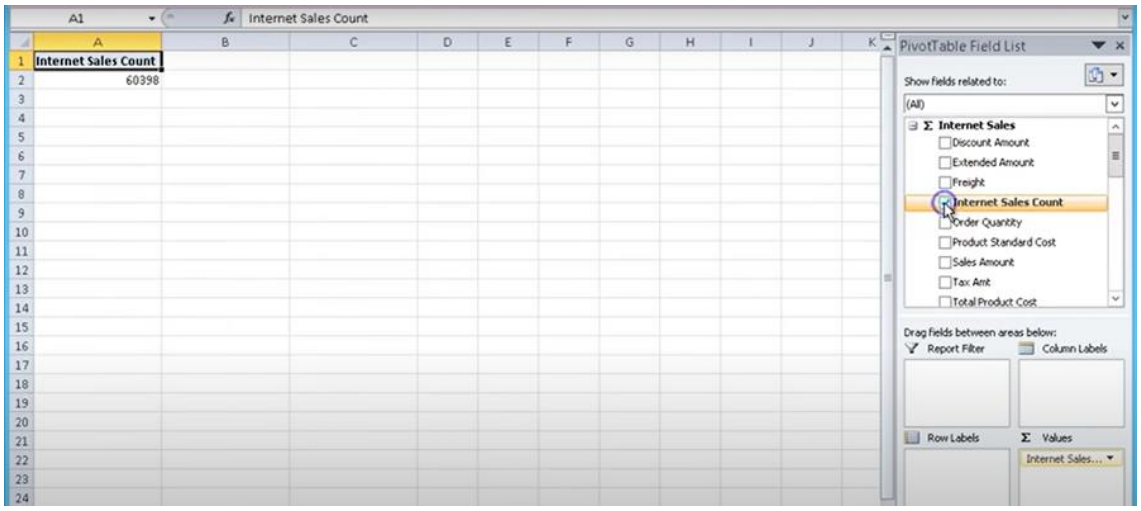


3. Populate the cube with data from the Data Sources by deploying the cube.

4. Investigate the resulting cube by selecting the Browser button and open the link to an Excel file (highlighted by the red circle in the screenshot below).



5. In the Excel sheet, analyse the data by comparing the Internet Sales to the Reseller Sales over the years (use the option Order Date).



6. From this analysis, draw conclusions regarding the total volume of sales and its trend for each method (internet vs shop).

III. Summary of the software/material to install/download on your machine

- Visual Studio 2019 (you will have to add the feature Analysis Services Multidimensional, in order to make possible the creation of an Analysis Services project).

- SQL Server (https://www.microsoft.com/en-us/sql-server/sql-server-downloads).

- Microsoft SQL Server Management Studio.

- AdventureWorksDW2019.bak database, available in LEARN or from https://docs.microsoft.com/en-us/sql/samples/adventureworks-install-configure?view=sql-server-ver15&tabs=ssms (instruction to restore a .bak file to SQL Server is provided on this webpage).