E06 – Visualization (Dashboard)

Business Intelligence

Exercise

Winter Term 2025/2026

Agenda

- Introduction
  - Introduction
  - Notes on Software
- Exercise
  - Tasks
- Credits and Materials

Introduction

The main goal of the “Visualization” exercise is to introduce students in the world of the business intelligence and data analytics using one of the available out there data analytics tools. Usually, various kinds of visualization tools are used to deliver to decision makers the results of an analysis in form of reports, dashboards, ah-hoc queries. Despite this set of exercises focused on a limited number of software tools, obtained knowledge and hands-on experience could be very useful and could be easily re-used for other similar software solutions.

In this exercise you are going to use “Metabase” software.

Notes on Software

See the materials from the previous exercise **E02, E03** and **E05**

Additional instructions on the infrastructure (online platform) for this course can be found in
E00 - Infrastructure

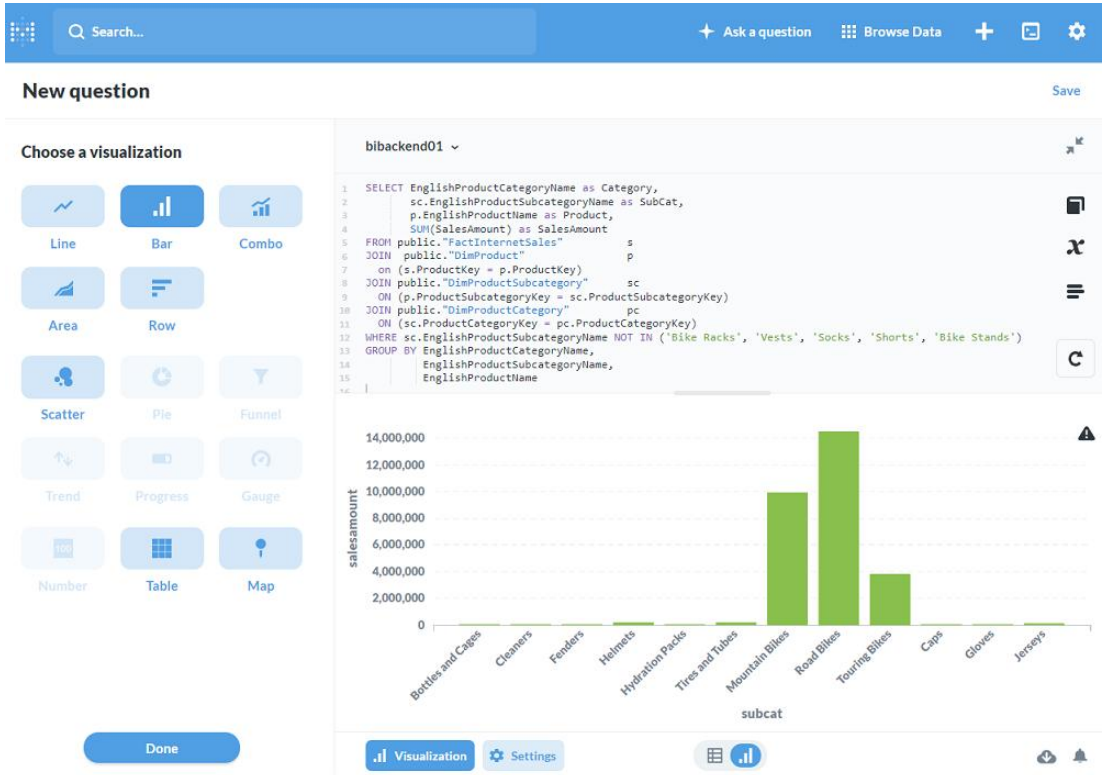
Start

- In this exercise the “Metabase” visualization tool is used
- There are 3 possibilities/options to get access to this tool
  - (option 1) use provide to you instance of Metabase - for further details refer to “**E00 – Infrastructure.pdf”**
  - (option 2) use docker - https://www.metabase.com/start/oss/
  - (option 3) use jar file - https://www.metabase.com/start/oss/
- You will need a DBMS to work with this data
  - You could use offered infrastructure
    - For further details refer to “**E00 – Infrastructure.pdf”**
  - Note that the data are already available, if not that
    - (option 1) import the data into your database using web UI
    - ~~(option 2) see the schema **bicourse_db_demo**~~
    - (option 3) import the data use SQL statements or CSV files into your own database
- About data
  - To import data use SQL statements, CSV files or Python script provide to you
  - The table fields and data type should be self-descriptive

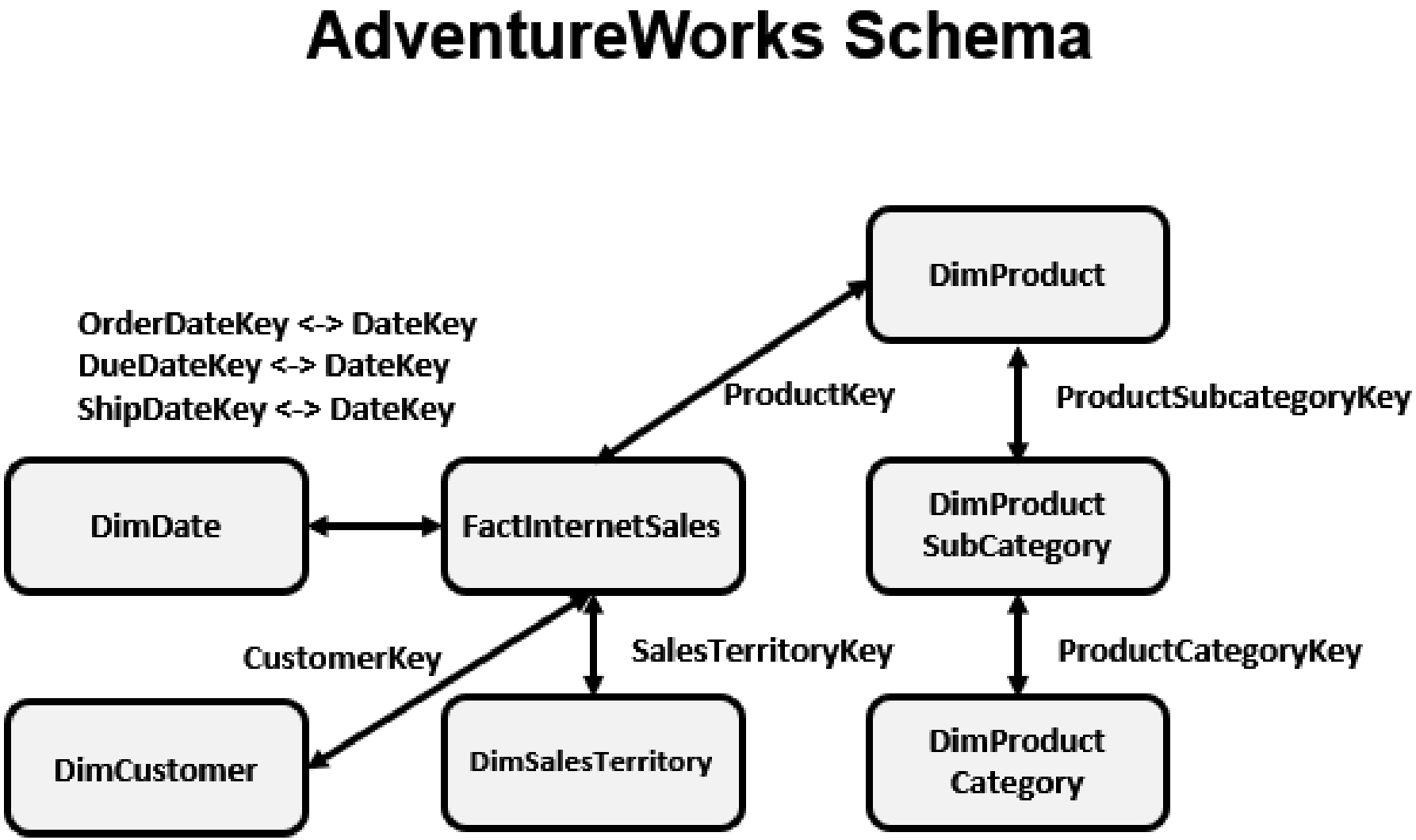
Exercise

Description - Metabase

Metabase is a simple and powerful online analytics tool that lets anyone discover insights and make decisions based on their and external data. It easy to use tool with the number of important features, which facilitates smooth visualization experience and story telling with data



Description - Star Schema (Snowflake) of the Internet Sales



Tasks

Task – Part 0

1. For this exercise you need to use data from **E04**
2. You should address business questions and create dashboard that reflects your answers and visualize them
3. You should create your dashboard using Metabase
4. Please, put all SQL queries your created for this tasks into your report in addition to screenshot and explanations

Task – Part 1

1. Please, present following aggregated information on your dashboard

    a. Total amount of customers
    b. Total amount of facts
    c. Start date and finish date of sales
    d. Available products / not available products
    e. Average time spent on processing of order (see order_date and ship_date)

Task – Part 2

1. Visualize on different plots revenue aggregated by the following time dimensions
   a. Week
   b. Month
   c. Year
2. Create plot that compares two selected weeks bases on weekdays (e.g. calendar week 14 vs calendar week 15, etc.)
3. Create plot that compares two months from the different years (e.g. May 2012 vs May 2013)
4. Create plot that shows revenue for top 10 products from of a pre-selected year (e.g. 2013)
5. Display top 10 products with processing time, which is bigger or equal than average time spent on processing for all products (see order_date and ship_date)

Task – Part 3

1. Present following information on a “typical” customer profiles
   a. Define customers profiles based on following fields - income, married/non-married, children, gender, education, house owners, car owners
   b. Present each of your customer profiles (at least you should define 3) on your dashboard
   c. Think about, how customer profiles could be potentially used for designing and answering business questions
   d. Define 2 business questions, which should involve usage of the customer profiles
   e. Answer your 2 business questions using visualizations and put them on your dashboard
2. Could you use your customer profiles to identify a good / middle / bad customers?
   a. Define your own KPI to identify good / middle / bad customers. You should describe your own KPI as a text.
   b. Provide an exact calculation approach for own KPI in order to demonstrate, how it should work (e.g., SQL query, meth equations, etc.)
   c. Apply your own KPI to visualize on your dashboard good / middle / bad customers

Submission

- Use StudIP to upload your solution (PDF report)

- You should upload one of the following document
  - Report as a PDF file with your solutions
  - Each answer (e.g., SQL query) should be annotated by you
    - Original question (+ number of the task)
    - Answer

- Name convention for your submission file (without extension)
  - **E06**_FIRSTNAME LASTNAME

- Submission deadline (it is a “soft” deadline)
  - 10 days after this exercise starts
  - Some exercises could take a bit more time and could be submitted later
  - NOTE: to receive feedback, you should first submit your progress

Credits and Materials

- *Get started with SQL: Plan and design a database* by Thomas Nield
- Tutorial "Beginner's Guide to Data Modelling" via http://www.databaseanswers.org/tutorial4_data_modelling/index.htm
- “Industry Data Models” via http://www.databaseanswers.org/data_models/
- MOOC course on databases Introduction to Databases by Jennifer Widom.
- “SQL Exercises, Practice, Solution” via http://www.w3resource.com/sql-exercises/
- "SQLBolt - Learn SQL with simple, interactive exercises" via https://sqlbolt.com/
- SQL tasks with different difficulty levels can be found on HackeRank