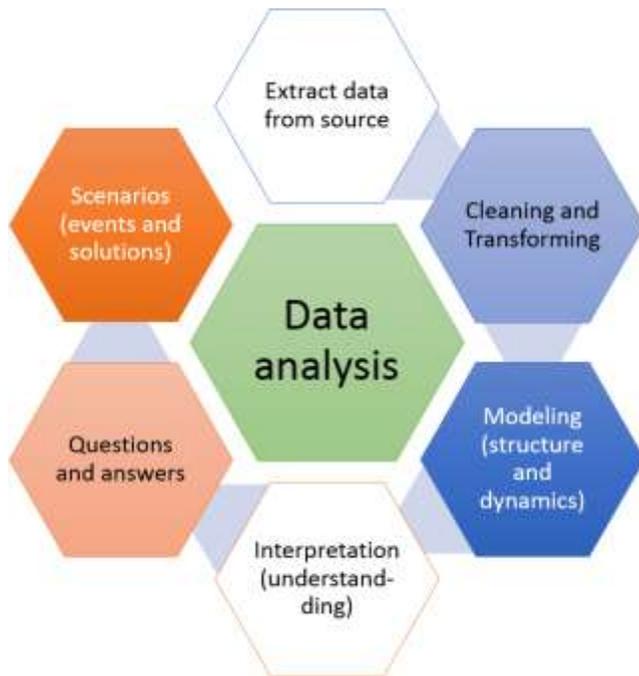# Maturity of BI-Solutions

Sergey Minyurov

Business Intelligence has several fundamental aspects:

1. Fact sources and data warehouse;
2. Extraction and presentation of knowledge;
3. Decision support.

An important task is to find data sources and extract the required information from them, since the result depends on it. The more the initial data, the more reliable and qualitative analysis.

Data sources can be internal, from the company's own information system. Equally important may be external data from public sources, from partners or purchased by subscription, for example, statistics on a particular industry.

Technology stack

Using the example of solutions from Microsoft, one can see that modern technologies and professional practices provide an efficient solution of technical problems.
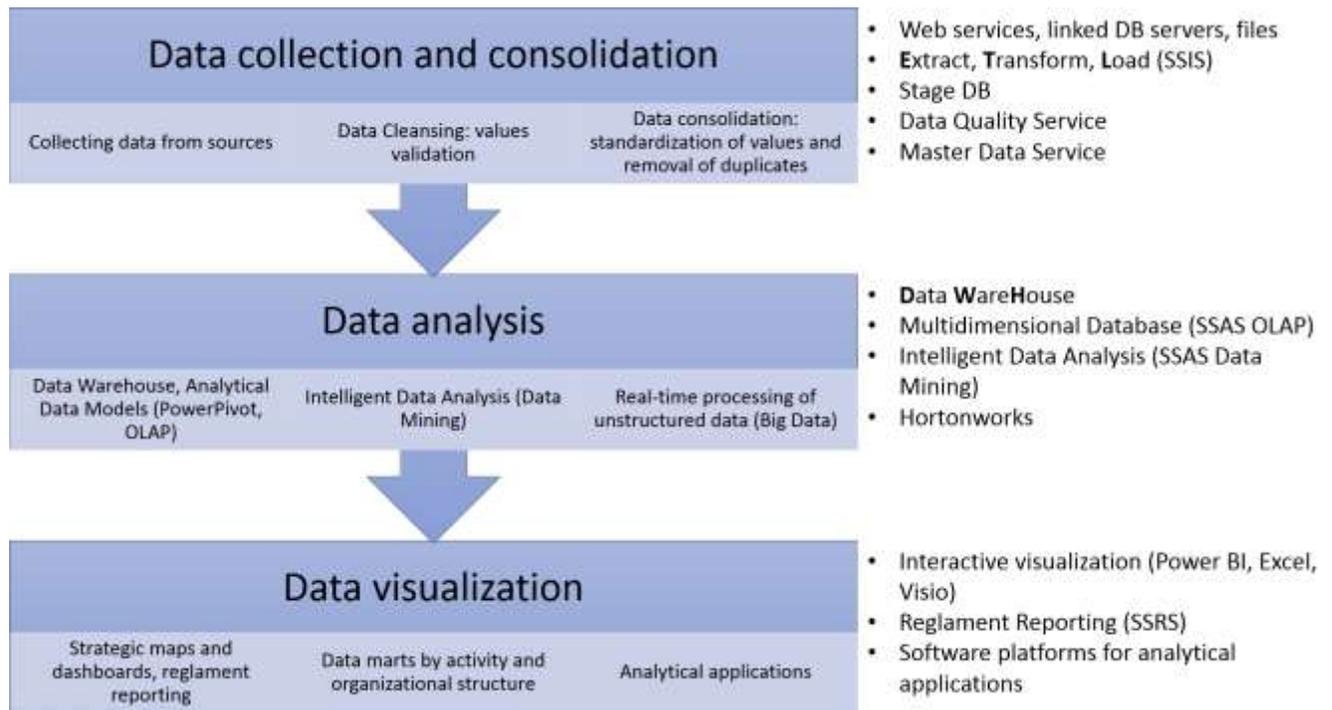
The first in terms of importance and complexity is the task of analyzing the subject area and system analysis when developing solutions.

Approaches

Technocratic. When building a BI-solutions can be used different approaches. If the Customer does not have enough experience in the scope of analysis and management, we have to go from available data and current problems. In this case, a solution in which may be formed by a very large amount of information, but this information is not sufficiently structured and does not provide an efficient and transparent decision support.

Consluting. The other extreme is the fascination concepts and lack of attention to technical detail, to how it will work for a particular enterprise. In this case, you can also get beautiful presentations on the system, but it is unclear to employees, and poorly linked to real problems.

Organic. An experienced developer can find simple and fast solutions for critical tasks. And then gradually develop the architecture and functionality, clearly focusing on the goals and priorities in the activities of the Customer.

Reengineering. If the enterprise or the market in which it operates develops rapidly (or vice versa, is in crisis), then reengineering of activities can be justified, i.e. qualitative restructuring of activities for the formation of new opportunities and a significant increase in efficiency. The key to success in this lies in the close cooperation and mutual support of the Customer and the Developer.

Enterprise system with feedback

Feedback (comparison of the forecast with the facts, evaluation of the effectiveness of decisions, integration with the operating system) is a key task in building an analytical system.

An effective data analysis system provides decision support, allows you to analyze various decision-making scenarios and evaluate the results of their implementation. Employees are provided with a clear goal setting and definition of success criteria.

Maturity levels

At the beginning, regulatory reports are created for monitoring and evaluating the activities of departments and employees. Excel is used as a powerful personal analytics tool to explore data and solve analytical problems.

For complex and automated analysis of the need to collect large amounts of data from internal and external sources. With a significant number of sources required to create a single data store. For in-depth analysis on the basis of storage develop specialized analytical data model via PowerPivot or OLAP. In simple cases, analytical models built directly from data sources.

Since analytical data can be used for different tasks and in the most unexpected way, it is impossible to develop in advance all the necessary reports and presentations. Therefore, it is important to ensure that the user can flexibly customize reports using parameters or create interactive visualization using Excel, Power BI, PerformancePoint, etc. If the analysis is the foundation of the enterprise, then need to develop analytical applications.

An important task is to identify hidden patterns and forecasting, development of possible scenarios. To do this, use mathematical statistics (Data Mining), incl. when processing unstructured data (Big Data).

Decision support requires the integration of an analytical system with business applications (for example, via a BPMS[1] or an ESB[2]). It also requires the development of analytical applications for experts and managers to develop decision-making scenarios and evaluate the effectiveness of their implementation. Or need to add these features to existing business applications.

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[1] BPMS – Business process management system.
[2] ESB – Enterprise Service Bus.

System architecture

Collecting and consolidating data from multiple sources can be technically one of the most difficult and time-consuming tasks. The solution to this problem may consist of several components:

1. Data Integration Packages (SSIS[3]) - upload data from sources and process them (ETL[4] operations).
2. Data buffer (Stage Db) - an auxiliary database in which data is stored during upload and preparation for loading into the data warehouse.
3. Master Data - consolidated data from different systems.
4. Data Warehouse (DWH) is a relational database designed for data analysis with historical support.
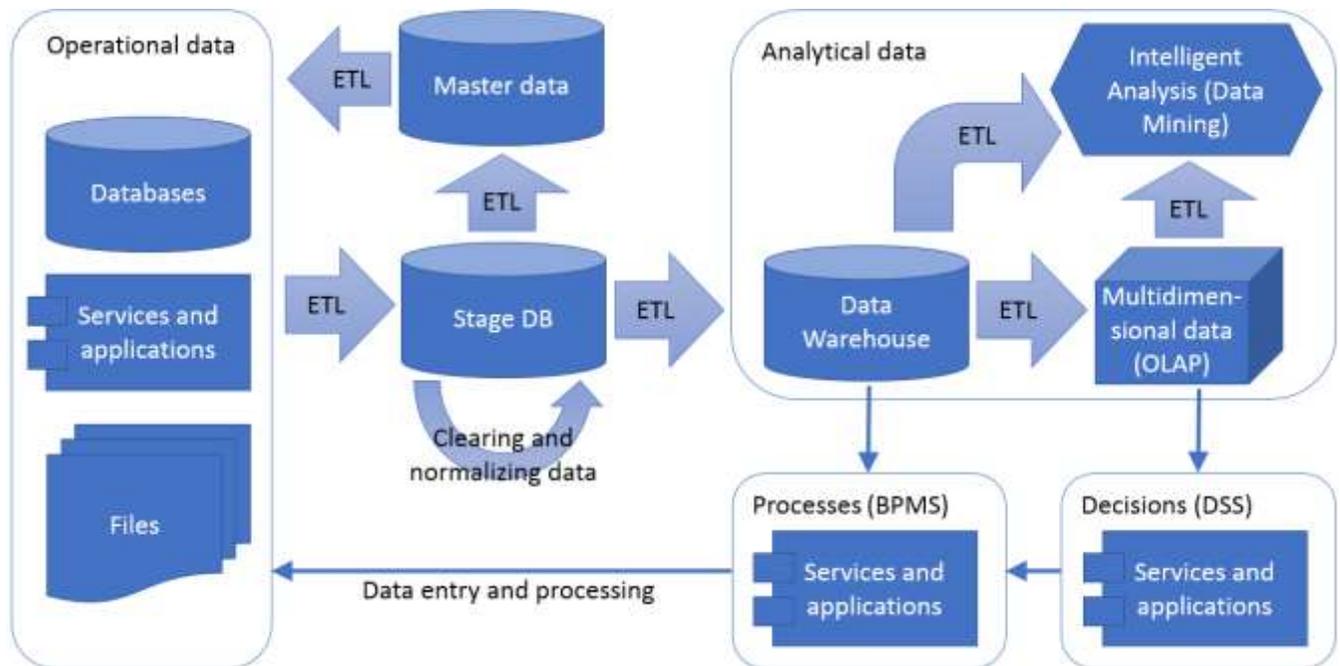
Using SQL, you can solve any analytical tasks, but the use of specialized solutions, such as multidimensional databases (OLAP[5]) or data mining (Data Mining) can facilitate their technical implementation and speed up the execution of analytical queries.

Decision support[6]

Developing decision support requires a deep understanding of business processes, scenarios, and decision-making mechanisms.

When developing reports and understanding the user's tasks, how and why he uses this report, can add a visual indication or a schedule that will make important information visual, and thereby help the user not to overlook the problem and make the necessary decision in time.

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[3] SSIS – Microsoft SQL Server Integration Service
[4] ETL – Extract, Transform, Load (key data integration tasks).
[5] OLAP – Online Analytical Processing (multidimensional database).
[6] Based on the book James Taylor, Nell Raden «Smart (Enough) Systems: How to Deliver Competitive Advantage by Automating the Decisions Hidden in Your Business»

When developing solutions main task is to formalize knowledge, the development of a mechanism of inference and filling the knowledge base.
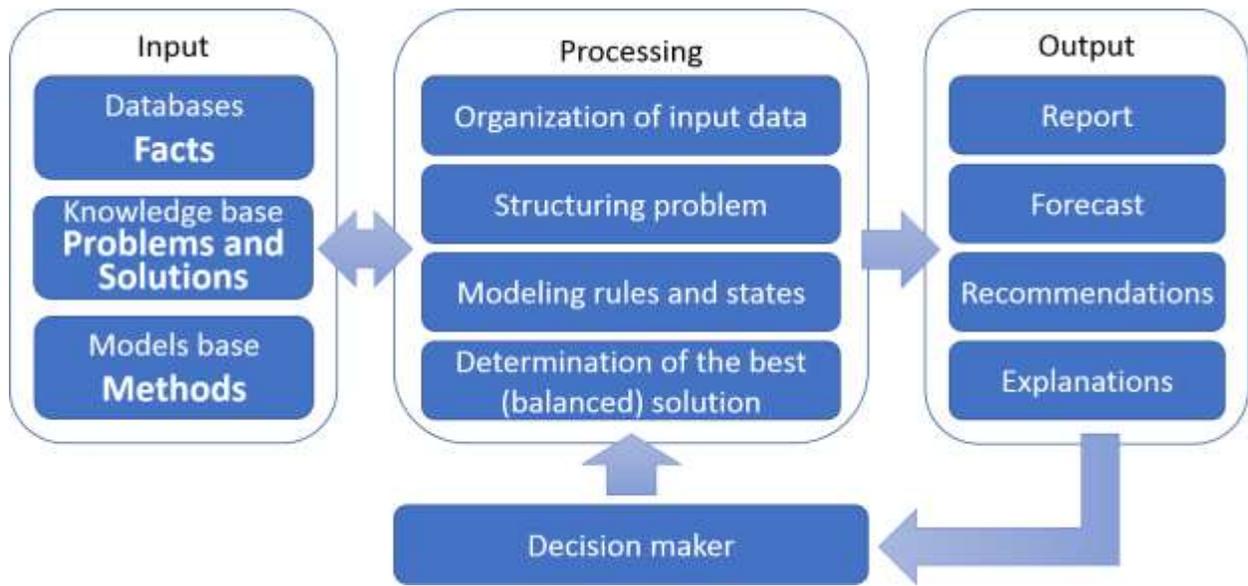
Also an important task is the flexibility and transparency of work for the user, so that he understands why such a decision is recommended, can trust the system and quickly customize its work.
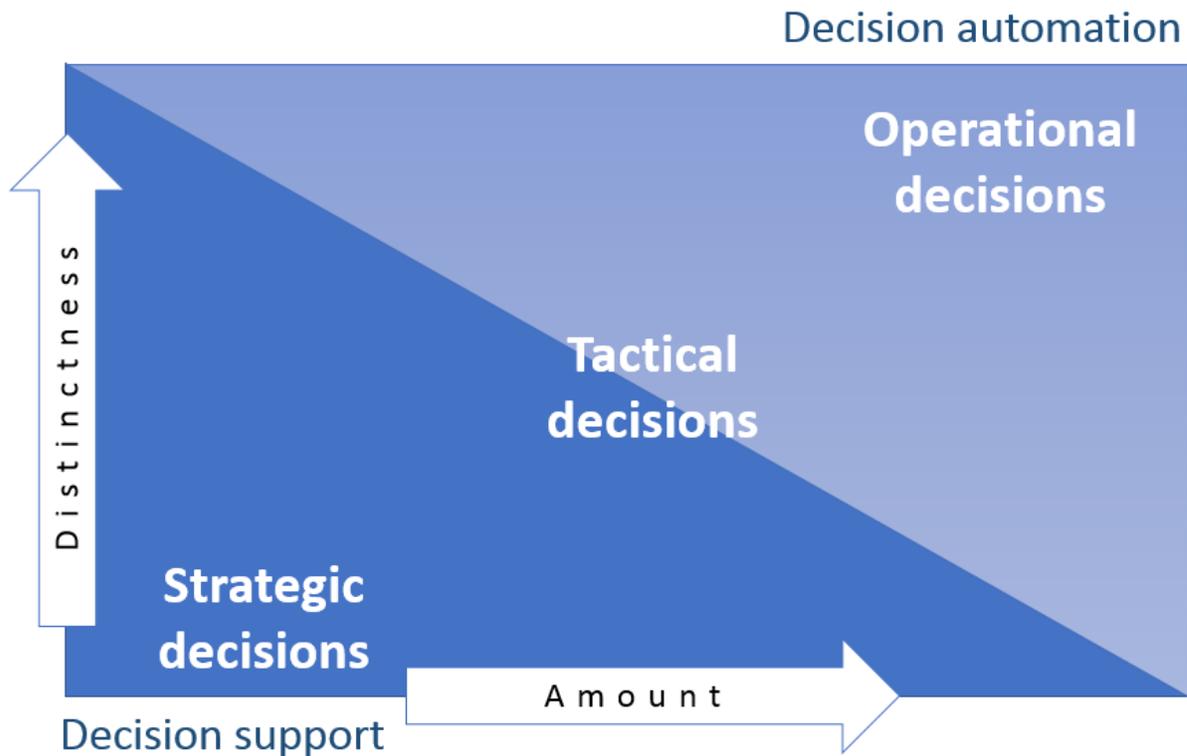
If there is a large number of operational decisions for which a certain system of rules can be developed, then it is technically enough for them to simply implement complete automation. This can significantly speed up workflows.

For strategic decisions it is important to provide full informational and analytical support, providing, including analysis of data on the execution of decisions.