

In the early 90s of the last century, when the world began to realize the potential of big data, companies faced the need to analyze huge amounts of information in order to make informed decisions. Traditional data analysis methods were inefficient and time-consuming. It was then that the concept of Business Intelligence (BI) appeared, which combined various tools and technologies for data analysis. BI allowed companies to gain valuable information about their operations, customers and the market, which helped them make more informed decisions. However, with the growth of data volumes and the complexity of analytical tasks, it became clear that BI needs more powerful tools to process large amounts of information. This is how Online Analytical Processing (OLAP) appeared, which allows you to analyze data and get quick answers to complex questions.

Online Analytical Processing (OLAP) technology

Online Analytical Processing (OLAP) is a data processing technology that can be used to analyze large amounts of information in real time. OLAP is based on multidimensional cubes, a data structure organized in several dimensions. This allows you to analyze data from different angles and get up-to-date results. OLAP is a modern tool for analyzing large amounts of data. It makes it possible to study information at different levels of detail and from different angles. Unlike traditional analysis methods, OLAP makes it possible to interact with data in real time. Users can instantly change views, filters, and aggregation parameters to get dynamic data analysis.

The main characteristics of OLAP are the multidimensionality of data and the ability to quickly aggregate it at different levels of detail. This makes it possible to obtain generalized results and analyze at different levels of aggregation. This is especially useful for making informed decisions in business, marketing analysis, financial modeling, and other fields. To work with data, it is necessary that they be assembled into special structures – OLAP cubes. Which allow you to quickly and effectively analyze information from different points of view. Cubes are multidimensional models where each side contains data on a specific aspect, such as sales by month, region, and product type. OLAP technology is used wherever it is necessary to deeply understand data in order to optimize processes and increase efficiency, OLAP becomes an indispensable tool.

Business Intelligence (BI) Technology

Business Intelligence (BI) technology is a set of tools and programs that companies use to make management decisions by analyzing large amounts of data.

Business Intelligence (BI) systems collect, process and visualize data about the company's work. They help to find trends, patterns and problems.

These systems are used by different departments of the company, for example, marketing, sales, finance and production. They help you track key performance indicators (KPIs), analyze data, monitor projects, and optimize processes. BI systems provide users with interactive dashboards where they can see summary tables, graphs and charts, as well as track the state of affairs in the company.

BI systems operate based on two main roles: the dashboard developer and the dashboard user. The dashboard developer analyzes the needs of various departments of the company and creates dashboards that are user-friendly. The dashboard user uses these tools to find useful information and make decisions.

There are many BI platforms on the market, including paid and free solutions. The choice of a suitable BI system depends on the tasks, resources, complexity of the data and the scale of the

company.

Basic principles of operation

OLAP and BI are used in various business areas such as finance, marketing, sales, logistics and manufacturing. They help companies analyze data on sales, customers, inventory, production and other aspects of their business in order to make informed decisions and optimize processes.

There are several key principles of working with OLAP and BI technologies:

The first is data access. Effective analysis is possible only if high-quality and up-to-date data are available. Therefore, the first task of OLAP and BI is to collect data from various sources.

The second is data structuring. After collection, the data should be structured and organized for ease of analysis. OLAP provides multidimensional data organization, and BI processes it to create reports and visualizations.

The third is the analysis and presentation of information. OLAP allows for complex multidimensional data analysis, while BI provides tools for presenting data in a convenient way, which simplifies their interpretation.

The fourth is decision support. All of the above steps are aimed at supporting management decisions based on accurate, well-founded data. The ability to respond quickly to changes in the business environment is a key factor for competitiveness.

Conclusion

OLAP and BI are important tools for data analysis and decision support in business. They allow companies to gain valuable insights, identify trends, predict results, and make informed decisions.

The use of BI and OLAP technologies in the Russian Railways holding can significantly improve the quality of management and decision-making. Here are some examples of how this can be done:

Passenger traffic analysis: The use of BI and OLAP technologies will allow you to analyze passenger traffic data in real time. This will help optimize train schedules, identify the busiest destinations and stations, and identify potential capacity problems.

Inventory Management: BI and OLAP can be used to analyze spare parts and materials inventory data. This will optimize purchases, prevent shortages and reduce costs.

Infrastructure monitoring: Collecting data on the state of railway infrastructure (tracks, stations, rolling stock) and analyzing them using BI and OLAP technologies will allow timely detection and troubleshooting, prevent accidents and ensure traffic safety.

Analysis of financial indicators: BI and OLAP will help to analyze the financial performance of JSC "Russian Railways", such as income, expenses, profit. This will optimize the budget, increase the efficiency of resource use and improve the financial condition of the company.

Marketing research: BI and OLAP can be used to analyze data on passenger preferences, the effectiveness of advertising campaigns and other marketing initiatives. This will help to develop more effective marketing strategies and increase customer satisfaction.

Demand forecasting: Analyzing historical data on passenger traffic and other factors can help predict future rail demand. This will allow you to plan the development of infrastructure and optimize the use of resources.

Human Resources Management: BI and OLAP can be used to analyze data on employee productivity, qualifications and training. This will help to optimize the staff, increase work efficiency and ensure the professional development of staff.

The use of BI and OLAP technologies in JSC Russian Railways will allow the company to become more flexible, adaptive and efficient, which in turn will increase its competitiveness and stability in the market.