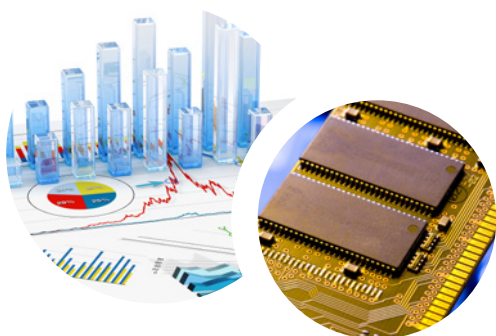


BI IN-MEMORY



The idea of using a computer's operating memory (RAM) to store data and perform calculations is not a new one. As early as 2000, Larry Page, the co-founder of Google, delivered a speech at an Intel conference where he stated that his company wanted to put the contents of the entire Internet on a computer's operating memory.

At that time Page, as his company, was almost unknown, and his idea was dismissed as eccentric musings and quickly forgotten. RAM was too expensive and too inefficient to be of any such use. 13 years later, Page's idea was named by Gartner, one of the largest consulting companies in the world, on its list of the 10 most important IT initiatives of 2013. So what has caused the market to so drastically shift its perspective on the concept of storing data on operating memory in the last decade? This document will attempt to find the answer.

A few **words on technology**

The following description of in-memory technology has been given in the context of Business Intelligence, although how it works is in effect the same in all its use cases.

Traditional Business Intelligence systems see data stored on a server's hard drives. When carrying out any operation on the data, it needs to be acquired on the disk, which takes a certain amount of time. Additionally, the data is usually compressed in order to take up less space. The structure of the data is more complex, which extends the response time even further. This happens with every action which results in a change to the report and a need to query the server again.

13 seconds

The time a standard query was completed in – from a standard of 77 minutes.

With in-memory technology, the data is not stored on the hard drive, but loaded to the computer's operating memory. This results in a significant decrease in all response times for any actions taken on the report, and a reduction in network load.

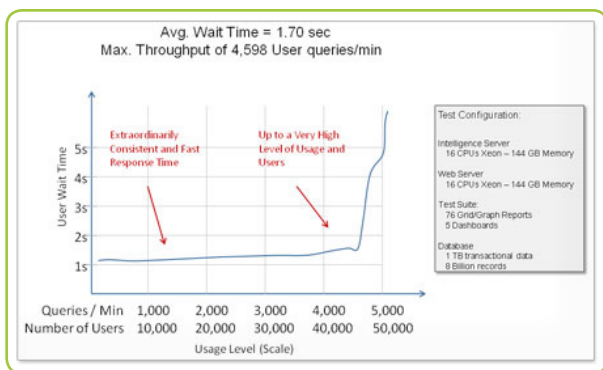
A major factor in the development of in-memory technology was undoubtedly the significant drop in

the cost of RAM. Nowadays buying a large amount of memory doesn't bring the same costs as it used to just a few years ago, and for a company it is practically negligible. Another deciding role was played by the development of operating systems. 32-bit systems can only use up to 4GB of RAM, so even with a larger number of units in-memory solutions were not effective. It was only with the popularization of 64-bit systems, supporting up to 1TB of RAM, that the full potential of in-memory could be reached.

Advantages of in-memory

Easier navigation and the possibility to modify queries in real-time is clearly the greatest advantage of in-memory for business users. Since the data on reports and dashboards is immediately updated, users gain real-time access to data and the possibility to create reports in a matter of minutes, a key factor in every application of Business Intelligence.

Thanks to the application of in-memory technology the source database is queried only once, at the beginning of the report creation process. This reduces the load on servers and networks, enabling more effective management of the hardware architecture. By placing the data power in the computer's operating memory during the night, we obtain full access to the server during the day, when users need it most.



Apart from these advantages, loading data onto the computer's memory means that operations such as indexing or aggregating the data, e.g. in OLAP cubes, become unnecessary. This then speeds up the time it takes to implement BI solutions in the company, and makes it easier, which automatically reduces implementation and maintenance costs.

The ability to quickly perform and update analyses and reports is particularly useful in areas such as call centers, where users need rapid access to the most current information to make appropriate decisions.

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Disadvantages of in-memory

For in-memory solutions, the proportion of required RAM to the number of users may be problematic. Although when data is stored on the server's hard drive, the amount of disk space or RAM required grows relatively slowly in relation to the number of BI users, adding a new user to an in-memory system requires a relatively large increase in operating memory. Even though RAM has become much cheaper in the last few years, for the largest projects, where BI is used by a few hundred, or even a few thousand users, the technological difficulty of collecting and connecting the required amount of operating memory in one place is significant. One solution in this case may be a cloud-based BI system, an idea which is gaining popularity every month.

In-memory from a business perspective

The business value of in-memory analyses is based mainly on the ability to make decisions in real time, based on accurate, current information concerning the business processes. These possibilities for analysis exist for both levels of management:

- Operational – by accelerating the data capture and simplifying analytical processes, management teams can reduce inventory levels, minimize business risk, reduce operational costs, observe current market trends, increase productivity and meet customers' needs in a better way.
- Strategic – by accelerating the decision making and planning processes, management teams can react faster to market conditions, identify threats from competitors earlier, better cope with sudden market instabilities, or escape the economic crises faster.

For many companies analysts spend most of their time... running and modifying report and statement queries and inquiries. Inquiries can take many hours, or even days, depending on their complexity. Everything changes with the introduction of in-memory. After switching to in-memory technology a client for whom a standard report took 77 minutes had the waiting time reduced to 13 seconds. The question of whether the possibility of having results in a matter of seconds rather than hours influences a company's quality and performance is purely rhetorical.

Business analysts often spend 90% of their time processing queries rather than actually analyzing the data. A more quickly-generated queries, more time on analysis – everything leads to an overall improvement in a company's business performance.

Comarch Approach

For some time now at Comarch, we have been aware of the advantages that the in-memory technology brings. We have made Business Intelligence systems available to our clients by loading data to computer operating memories. The market has been very welcoming.

At present, we are focusing on making in-memory technology available for our cloud solutions. After paying a subscription, each client will be able to avail of Comarch's resources, without the necessity of having a server in their company.

An advanced system for allocating the correct amount of RAM – depending on the complexity of the report – ensures that all functions performed on analyses are performed lightning-fast.

More about Comarch
Business Intelligence

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Comarch Spółka Akcyjna with its registered seat in Kraków at Aleja Jana Pawła II 39A, entered in the National Court Register kept by the District Court for Kraków-Śródmieście in Kraków, the 11th Commercial Division of the National Court Register under no. KRS 000057567. The share capital amounts to 8.051.637,00 zł. The share capital was fully paid.

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