SYBASE
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AOK Hessen

"A SINGLE ANALYSIS MAY PROCESS BETWEEN 10 AND 20 GB OF DATA—WITH RESPONSE TIMES OF LESS THAN 30 SECONDS."

—MICHAEL SCHIMMELPFENNIG, SERVICE MANAGER, IT-BUSINESS DEPARTMENT, AOK HESSEN

CUSTOMER CASE STUDY

INDUSTRY

- Healthcare

SYBASE TECHNOLOGY

- Sybase IQ
- Sybase partner Qyte GmbH's RayQ data mining tool

KEY BENEFITS

- Accelerates data loads by 20%
- Provides flexible, efficient analysis based directly on compressed original data
- Empowers specialist departments to run their own queries – relieving the IT team
- Presents new query qualification options
- Compresses data by 70%

Hesse's largest public health insurance organization, AOK Hessen built an analytical data warehouse to accumulate all information on benefit claims (with patient names replaced by pseudonyms), enabling sophisticated statistical and artificial intelligence (AI) based analysis. Users can analyze the company's enormous data assets in flexible ways to better understand the structure of their client base, develop innovative needs-oriented benefits, and closely monitor claims and disbursements. The company needed to enable its divisions to analyze all data assets flexibly and independently without involving the IT department. The traditional OLTP database within the existing data warehouse was unable to handle large data volumes and process queries within a reasonable timeframe, so AOK Hessen implemented Sybase IQ, integrated with Sybase partner Qyte's RayQ data mining tool. As a result, AOK Hessen created the first analytical data warehouse on the market capable of running direct, end-user initiated AI evaluations.

INSURING GERMANY

AOK Hessen is the largest statutory health insurance company of the German state of Hesse, responsible for approximately 1.6 million insured individuals. Two years ago, AOK Hessen generated a profit of USD $136 million. The insurance company attributes this result to its commitment to a strong membership and performance management strategy.

DETECTING PATTERNS ACROSS 800 MILLION RECORDS

New products and policy proposals, custom-tailored prevention, and treatment strategies for specific patient groups are all examples of the rapidly changing conditions in the German healthcare market. These conditions are forcing statutory insurance companies to adapt their benefit offerings and respond quickly to emerging requirements. In addition, new legislation assigns new responsibilities to health insurance companies, such as active involvement in verifying contract physicians' billing practices to curb the cost explosion. Facing these challenges, AOK Hessen is establishing a solid technical basis to enable comprehensive, detailed, flexible analyses of its massive data assets. To tackle this project, the company had to find answers to some difficult technical questions.

What are the typical evolutionary patterns of certain diseases? Which therapies are most successful to avoid inpatient treatment? Are there any billing peculiarities, such as unusual ratios of diagnoses to prescriptions? By probing its voluminous data assets covering treatment protocols and invoices submitted by doctors, hospitals, pharmacists, and other partners, a health insurance company can gain valuable insight. AOK Hessen therefore decided to establish a centralized data warehouse and deploy an ETL process to load it with data from various operational systems.

Aggregating the data was just the first step. AOK Hessen also needed a powerful tool capable of correlating data of any type, allowing selective, hypothesis-based evaluations as well as general data analysis not derived from a specific assumption but aiming at detecting hidden interrelationships or patterns. To accomplish this, the company chose the data mining tool RayQ from Qyte GmbH.

"THE DIVISIONS NEED TO BE ABLE TO RUN ANALYSIS ON THEIR OWN AND CUSTOMIZE THEM AS NEEDED. TO ACCOMPLISH THIS, WE NEED AN IT SYSTEM THAT IS EASY TO UNDERSTAND, FLEXIBLE AND, ABOVE ALL, VERY FAST."

—ANDREAS SEIBERT, HEAD OF IT-BUSINESS DEPARTMENT, AOK HESSEN

To obtain truly meaningful insight, it is necessary to consider all existing information simultaneously. This means that data on medication and outpatient care must be compared with other benefit-related data (such as hospitalization) in a single analysis. As a result of this broad-ranging view, the data volumes involved are extremely large.

The sheer extent of the requirements became evident during the recent deployment of oscare®, the comprehensive IT solution for Germany's statutory health insurance companies that covers all of the company's business processes. Developed by AOK Systems, the software package is based on the platform components of the mySAP Business Suite and the SAP solution for the insurance industry. "The SAP BW (Business Warehouse) only evaluates aggregated data," explains Michael Schimmelpfennig, service manager in AOK Hessen's IT-Business department. "However, what we need to do is evaluate the much larger body of source data, which we select and mix as required. This is the only way we can conduct the unrestricted research necessary to answer all the questions that interest us."

AOK Hessen's data warehouse now comprises about 80 tables with over 800 million records (including key data and content). "Some tables contain up to 400 million records, extending across 10 to 15 columns," Schimmelpfennig emphasizes. "As a consequence, tables can easily grow to 200 GB. The traditional, transactional database we had originally deployed was unable to process such volumes."

Andreas Seibert, head of the IT-Business department, describes how this affected the users, "For each individual analytical query, our divisions had to submit a formal request to our IT department and then wait for IT to deliver the report. In addition, the operational OLTP database often took an extremely long time to run a query and return the results. We wanted to enable our divisional users to run queries by themselves and customize those queries as necessary. To accomplish this, we needed a system that is easy to understand, flexible and, above all, very fast."

INTEGRATING SYBASE IQ AND QYTE RAYQ STEP-BY-STEP

AOK Hessen finally found a solution that delivers both flexibility for analytics and efficient processing of extremely large amounts of data—a combination of Sybase IQ and RayQ for the data warehouse. The system runs on an 8-core server with 16 GB RAM.

RayQ allows users to perform a wide variety of mathematical and statistical analysis. In addition, users can apply neural algorithms to scrutinize the data for multidimensional interrelationships and detect hidden interdependencies. Doing so does not require any SQL knowledge. Instead, users rely entirely on a graphical user interface in which they drag-and-drop the desired analytical functions from various modules onto their workspace. This enables users to design analysis flexibly.

Additionally and most importantly, users can run queries directly on the company's original data assets. The results are displayed and saved in two and three dimensional representations, a fact that increases the data volume. For the first time, all financial data can be saved and analyzed at once by using Sybase IQ. "Data loading has been accelerated by 20 percent," says Schimmelpfennig. "At the same time, data compression reduces the storage space requirement by 70 percent. In contrast to the OLTP database, we no longer have any table size-related problems."

Meanwhile, the multi-staged project to integrate Sybase IQ with RayQ continues under the leadership of AOK. In the future, data will no longer have to be loaded into the tool's cache for processing. Instead, computational operations will be carried out directly within Sybase IQ. The results will be saved in Sybase IQ, so they can be compressed, accessed, and processed by the same high-performance application.

"This functionality will allow RayQ to take full advantage of the power of Sybase IQ and analyze the compressed data directly," emphasizes Jürgen Hirsch, general manager of Qyte GmbH. "For the first time ever, the market offers an analytical data warehouse that can be accessed directly by a large number of end users. Users no longer have to rely on data excerpts, reports or aggregations—they can run high-performance, real-time statistical analysis, data-mining operations for pattern detection, as well as other BI analysis directly on extremely large data assets.""

NEW ANALYSIS OPTIONS FOR AOK'S DIVISIONS

As a result of both the accessibility of a comprehensive data pool and the flexibility and high performance of a new data warehouse, AOK Hessen is now in a position to run an entire new range of analysis. To date, approximately 60 divisional users have been given access. Users define analysis themselves and receive results in an instant, working directly on original data. They can then adjust their criteria to modify or narrow down their searches. "A single analysis may process between 10 and 20 GB of data—with response times of less 30 seconds," says Schimmelpfennig, expressing his satisfaction with the performance enhancements. "Once we complete the integration of RayQ and Sybase IQ, we will reach yet another level of performance."

The new analysis options allow AOK to better understand the structure of its client base and develop custom-tailored offerings for specific member groups accordingly. This applies to all types of benefits—outpatient, inpatient, and integrated care (physician networks, family-doctor model, etc.), nursing, and prevention. Thorough examination of claims and benefits information empowers AOK's divisions to perform sophisticated tasks, such as identifying high-risk groups for specific diseases or pinpointing the most successful therapies for a particular ailment. This allows AOK to custom design products, individualized policies, coverage models, education, or special prevention and health improvement programs. The company can now simulate draft policies to see whether they will achieve the desired results. Newly developed policy strategies or specific benefit offerings can thus be prepared more effectively and reviewed later in an actual vs. target performance comparison to determine whether they developed as originally intended.

Analyses also support the legally mandated verification of invoices submitted by doctors, pharmacists, hospitals, therapists, and other healthcare providers. The AOK divisions can identify groups of providers causing disproportionate costs. The company can discover conspicuous trends by performing plausibility checks comparing the type and scope of a service invoiced with the respective diagnosis. And, research options are plentiful. Recently, pattern analysis and identification has allowed AOK Hessen to detect 179 cases of fraudulent invoicing and reclaim USD $3.2 million of unjustified charges.

Of course, in examining all of its data assets, AOK must strictly comply with all legal requirements relating to privacy protection and obligation of secrecy. This is why the records are assigned pseudonyms when stored in the data warehouse. The keys identifying each insured individual are scrambled at the database level so the identity of the individual originally associated with each dataset can no longer be traced back. If a conspicuous pattern is detected, only a properly authorized department has access to the identity data for follow-up if there is reasonable evidence of manipulation.

One positive effect of the Sybase IQ/RayQ integrated system has been obvious almost from the beginning, says Schimmelpfennig, "The divisions currently using the tool run a significantly greater number of analyses than ever before. They keep discovering new ways of drilling down into the data while working with the software."

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