Health Insurance Fraud Detection and Prevention with Sybase IQ

Improve accuracy of fraud detection, increase speed of investigation, and reduce financial costs
Fraudulent insurance claims represent a significant portion of all claims received, at a cost of billions of dollars annually.

Fraud is a well-known problem in the insurance industry. It is costly for both policy holders and insurance companies in all sectors of the industry, including healthcare. Fraud can occur at many different stages in the process of an insurance transaction, creating a sense of urgency to detect and prevent fraud as the sophistication and volume of fraudulent claims continues to increase. Also, new regulatory requirements, the negative impact on profitability, and the need to manage a widening range of risks mandate that insurance companies begin to use more cutting-edge technologies and analyses to battle fraud.

To successfully address these challenges, insurance companies are equipping their fraud examiners with advanced analytics technologies and tools to accurately identify fraudulent activity earlier in the process and seek out indicators or patterns of fraud in the data. These analyses with data mining and other analysis tools, require a high performance analytics server to run complex statistical/mathematical models in real-time against massive data sets with large dimensionalities.

An analytics server that gives them the ability to see complex changes, ask difficult questions, and get to answers faster than any other approach. Additionally, they need to be able to join together huge quantities of information and ask previously unanswerable questions. This requires the ability to integrate information silos and use data “as is” to perform cross-sectional analyses.

Specifically, insurance companies expect their analytical models and the server they run on help them achieve four key fraud detection and prevention goals:

• Improve the accuracy of fraud detection by reducing both the number of false-positive and false-negative detections
• Increase the speed of investigation to identify fraudulent claims before payment occurs
• Reduce the financial cost of fraud by building the most advanced detection systems that can leverage all available information.
• Minimize operational costs by centralizing data into one data warehouse without resorting to expensive hardware solutions

INCREASE ANALYTICS PERFORMANCE UP TO 100X WITH SYBASE IQ

Health insurance companies worldwide have selected Sybase IQ for fraud detection and prevention. As a high performance analytics server designed specifically for mission-critical business intelligence, Sybase IQ enables insurance organizations to analyze massive data sets in real-time using advanced data mining and statistical techniques, facilitating more accurate detection and prevention of fraud.
Because of its unique column-based data architecture, Sybase IQ can execute complex queries 50-100x faster than traditional database systems, and can do so across entire data sets (not just data samples), thereby increasing accuracy. It can leverage advanced data mining techniques and statistical methods including supervised learning, neural networks, principal component analysis, and clustering methods, and can also mine a wide range of document types for critical fraud indicators. Additionally, Sybase IQ can store all data in one data warehouse without ballooning storage costs, because of advanced data compression technology.

Leading insurance companies such as Prudential, Allianz, and AOK Hessen have chosen Sybase IQ over other alternatives because of four primary differentiating benefits:

• **Performance** – Sybase IQ has been optimized for analytic workloads, and provides much higher performance for solving fraud detection searches than conventional solutions. Sybase IQ’s column-based structure, patented indexing technology, and unique query optimizer allow it to deliver superior query performance, especially on complex or ad hoc queries. Query optimization is achieved through the use of metadata and multiple column indices in priority order to achieve the fastest response. This means that more potential fraud cases can be identified sooner and more lengthy histories can be searched for fraud patterns.

• **Accuracy** – Sybase IQ speeds design, scoring, tuning, and implementation of predictive models up to 400 times faster on large data sets and complex queries. Sybase IQ supports complex fraud detection models running against full data sets — no need for samples or pre-aggregation of data which limit the amount of data analyzed, which results in incomplete or inaccurate analyses. The in-database analytics capabilities of Sybase IQ are especially important when technical analysis needs to happen on large datasets and requires high accuracy. Data does not need to be moved between Sybase IQ and the fraud detection application, so the improvement in query performance is significant and complex relationships can be identified more accurately.

• **Data types** – Sybase IQ can analyze all types of structured and unstructured data types, including text data. The ability to analyze textual data such as email and other documents is extremely valuable for fraud detection and prevention. Insurance claims processes collect and generate large volumes of text-based information, and text analytics software accesses this, parses it to distill meaningful insights, and analyzes the newly created data to gain a deeper understanding of the claim.

• **Cost effectiveness** – Conventional solutions solve analytics problems by using more computer hardware, often driving up costs for only marginal improvements. Sybase IQ takes a different approach — it stores the data in a column-oriented architecture and provides sophisticated data compression which allows it to search data while still compressed. These techniques allow Sybase IQ to search data sets that are often 50% to 75% smaller than the original raw data, with 10-100x fewer input/output operations when compared to traditional databases. Data compression saves on storage and maintenance costs.

**HEALTHCARE PAYERS DETECT AND PREVENT FRAUD WITH SYBASE IQ**

Using Sybase IQ for fraud analysis, health insurers can extract relevant data from claims systems, external data sources, and unstructured text, as well as import business rules for known fraud, waste, and abuse schemes from existing rules engines. They can employ advanced scoring based on statistical and predictive modeling techniques that enable discovery of emerging suspicious claims activity that would otherwise go undetected. Typical statistical techniques used with Sybase IQ for these purposes include:

• Profiling models that model the behavior of groups or individuals, building models of usual and customary behavior from history, either for that individual or for peer groups

• Clustering that identifies abnormal groups of claims, either because they are outliers in every respect, abnormal in relation to a selected base (such as customer segment or profile), or contain values that are abnormal in relation to each other

• Data-mining tools and build programs that produce fraud propensity scores—adjusters simply enter data, and claims are automatically scored for their likelihood to be fraudulent and made available for review

“FOR EACH INDIVIDUAL ANALYTICAL QUERY, THE OPERATIONAL OLTP DATABASE OFTEN TOOK AN EXTREMELY LONG TIME TO 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.”

Andreas Seibert, Head of IT-Business Department, AOK Hessen

“MOST BUSINESSES DON’T WANT IT TO DISAPPEAR INTO A BACK ROOM FOR NINE TO 12 MONTHS, THEN COME OUT AND SAY ‘LOOK WHAT WE’VE DONE! BUSINESSES WANT VISIBLY FAST RESULTS, WHICH IS WHAT WE’VE GIVEN THEM WITH SYBASE IQ AND INDUSTRY WAREHOUSE STUDIO. FROM OCTOBER TO DECEMBER WE ACHIEVED THE COMPLETE IMPLEMENTATION OF OUR DATA WAREHOUSE INFRASTRUCTURE, COMPLETE WITH SCALABILITY TO SUPPORT OUR FUTURE NEEDS. THIS WAS PROBABLY ONE OF THE FASTEST DATA WAREHOUSE IMPLEMENTATIONS IN HISTORY.”

Scott Wyld, Project Manager, Allianz Australia

www.sybase.com/detail?id=1033709

www.sybase.fr/detail?id=1059440
Sybase IQ has been effectively used to detect fraud in health insurance firms for typical usage scenarios involving member group characteristics analysis, outpatient, inpatient, and integrated care data, analyzing invoices from doctors, pharmacists, hospitals, and therapists, identifying out of ordinary costs, and performing trend analysis of scope of services relative to treatment diagnosis.

Additionally, Sybase IQ is part of an integrated ecosystem of technologies that support fraud analysis for health insurance payers, including:

- **Sybase Industry Warehouse™ Studio for Health Insurers** – A pre-built business intelligence application suite that contains sample data, schema, scripts, and pre-built reports that are based on lessons learned from “hands-on” experience gained over many years in the health insurance industry

- **SAP® BusinessObjects EIM Data Services** – A versatile data movement technology suite that includes a Data Integrator ETL tool optimized for loading Sybase IQ from a variety of data sources and a robust data quality module

- **SAP BusinessObjects Enterprise for Reporting** – Enables managing performance and governing compliance using market-leading reporting, charting, and dashboarding tools with highly secure access rights

**IN SUMMARY**

Sybase IQ successfully supports fraud detection and prevention worldwide for health insurance payers, helping them improve the accuracy of detection, increase the speed of investigation, and reduce financial losses. In addition to all of the capabilities enumerated in this brochure, Sybase IQ also offers the following options which are highly beneficial for preventing fraud:

- **Very Large Database (VLDB)** – Large data sets are critical in looking for historical fraud patterns in the data. The VLDB option enhances the manageability of very large datasets, which is typical with enterprise-wide fraud management initiatives.

- **Unstructured Data Analytics** – Textual data such as email and other documents are often analyzed for fraudulent claims. The Sybase IQ Unstructured Data Analytics option provides an application friendly and scalable text analysis functionality to detect fraud patterns in unstructured data.

- **In-database Analytics with Quantitative Libraries** – Performing deep data mining and statistical analysis is a key aspect of fraud detection. The Sybase IQ In-database Analytics option with the sophisticated quantitative library—DBlytix from Fuzzy Logix—provides the ability to sift through vast amounts of structured and unstructured data to look for fraudulent patterns.

- **Advanced Security** – The need to provide secure data in-flight and at-rest necessitates use of advanced capabilities such as strong encryption and authentication. The Advanced Security option helps prevent unauthorized access to data and reports that opens up opportunities for fraud.