CASE STUDY

Faster Fraud Investigations with Neo4j

To automate fraud detection, Zurich Switzerland relies on graph technology. Neo4j provides investigators with the context they need to make quick decisions.

BY THE NUMBERS

20M nodes

35M relationships

50K hours saved per year

INDUSTRY

Financial Services

USE CASE

Fraud Detection

OBJECTIVE

Fast and efficient review of suspected fraud cases

CHALLENGE

Difficult to identify fraud in a flood of automatically generated alerts; required cumbersome research across several systems

SOLUTION

Intuitive visualization of all relationships and multiple data sources on one screen

RESULTS

- Significant time savings for triage as well as investigative work
- Increased productivity and job satisfaction for field investigators
- Uncovering new or unknown fraud patterns

The Company

Zurich Switzerland is part of the Zurich Insurance Group. More than 1.4 million customers in Switzerland place their trust in products in the property/casualty and life insurance segments. These include private individuals as well as small, medium, and large companies. A total of 6,100 employees answer a million calls at the claims center each year and process 500,000 claims.

The Challenge

Zurich Switzerland began automating fraud detection early on. The insurer relies on rule-based software that analyzes cases according to defined criteria and assigns them a risk score. At a certain level, the case is passed on to a team of 25 field investigators, who examine the suspected case as part of the triage process.

However, the automated reports soon became almost impossible to check manually and cost the internal team of investigators a lot of time. "We were surprised by the flood of data ourselves," explained Paul Kühne, head of fraud prevention at Zurich Switzerland. "It was not always comprehensible for our investigators why the alert occurred or how the risk score was derived. In addition, there was a lack of context. Cross-references to bank accounts, addresses, customer data, and policies had to be researched separately using other systems."

To triage cases efficiently, the field investigators needed to be able to see the connections in the data. In his search for a solution, Christof Aschwanden, Senior Project Manager, came across the Panama Papers – and thus Neo4j. "After the first tests, it was already clear to us: This is exactly what we need," said Aschwanden. "Not only can claims be displayed holistically in the graph, but new information is automatically linked, which ensures that data is reconciled in real time."

The Solution

Zurich Switzerland triages potential fraud cases using data stored in Neo4j, visualized in Linkurious. Investigators switch directly from the rule-based risk tool to the graph-based application and open all relevant data in a single view. Zurich stores about 20 million nodes and 35 million relationships in the graph.

Claims reports are linked to data from insurance policies, customer information, insured property (e.g., vehicles), and payment and financial data. External data from national databases, blacklists, and economic data (e.g., creditworthiness, ownership) is added.

If I were to tell our investigators today that we are doing away with Neo4j, there would be a huge outcry. The solution is indispensable for their daily work."

Paul Kühne, Head of Fraud Prevention, Zurich Switzerland

"At first glance, mapping standard relationships in a graph may seem trivial. But as new data is added and the network of nodes and edges continues to unfold, it's like magic," says Aschwanden. "Often, the goal is not necessarily to detect complex patterns or large fraud networks. Rather, Neo4j helps us sift through and rapidly identify issues in the flood of information we receive."

An unobstructed view of all data is crucial for triage. It often becomes immediately clear whether a reported suspicious case actually needs to move to special fraud processing. "In the graph, I can see the context, view the particular claim, compare it with past reports, consider the people involved, and get a much better picture," said Kühne.

The majority of claims are not suspicious and are processed and settled normally. But some are also clearly criminal activities, for example, traffic accidents staged in a "crash for cash" scheme. Investigators must be able to quickly answer key questions. Who are the vehicle drivers, owners, and policyholders really? Are there any suspicious similarities between those involved in the accident (for example, residing at the same address)? And do different claims payments flow into the same bank account?

The Results

With the combination of a rule-based risk system, graph database, and graph visualization, Zurich Switzerland further automates and accelerates fraud detection. Some cases can be closed within a day. In addition, field investigators sometimes find connections that would normally be lost in the mass of data.

"If I were to tell our investigators today that we were doing away with Neo4j, there would be a huge outcry," said Kühne. "The solution is indispensable for our daily work. Our employees greatly reduce time spent on triage and easily save five to 10 minutes per case. With an average of 10 claims per day, this adds up to a considerable amount, which ultimately also has an impact on costs."

The potential in graph technology is far from exhausted. Investigators are already using graph algorithms such as shortest path to identify the shortest connection between people or companies. "One vision is to generate a risk score using graph analytics with graph data science," Aschwanden explains. "Basically, our goal is to increase the level of automation even more and minimize our false positive rate."

Questions about Neo4j?

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