

## CUSTOMER STORY

# Leading US Insurance Company Uses Graph Analytics to Enhance In-house Fraud Detection System

### INDUSTRY

Insurance

### PROFILE

Using Memgraph to improve in house fraud detection

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### CHALLENGE

Rules engines struggled to efficiently analyze complex, interconnected data, leading to higher false positives.

### MEMGRAPH SOLUTION

Memgraph helped by connecting data silos and using graph analytics to level up existing client solutions for fraud detection.

## About Customer

This multinational insurance organization, based out of the US, offers a wide range of insurance products and services such as coverage for auto, home, life, health, and business insurance needs. With a strong reputation in the global insurance market, this leading insurance company focuses on customer satisfaction by offering tailored insurance solutions to meet individual needs.

## Impact Highlights

### Increased detection efficiency

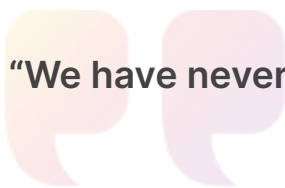
135% increase in detection efficiency across various types of claims. This improvement demonstrates the effectiveness of graph technology in enhancing fraud detection capabilities.

### Cost savings

Significant reductions in expenses related to fraud detection. Specifically, the use of Memgraph enabled this multinational insurance company to identify instances of fraud that would have otherwise gone undetected, potentially resulting in 7-figure financial losses.

### Enhanced Machine Learning Models

Memgraph was used to enhance the underlying machine learning models for fraud detection. By combining the power of graph technology with existing models, the overall fraud detection capabilities were significantly improved.



**“We have never seen our data like this before, with such clarity. It is the first time it all makes sense.”**

-Head of Analytics, US Insurance Company

# Key Memgraph Features for US Insurance Company

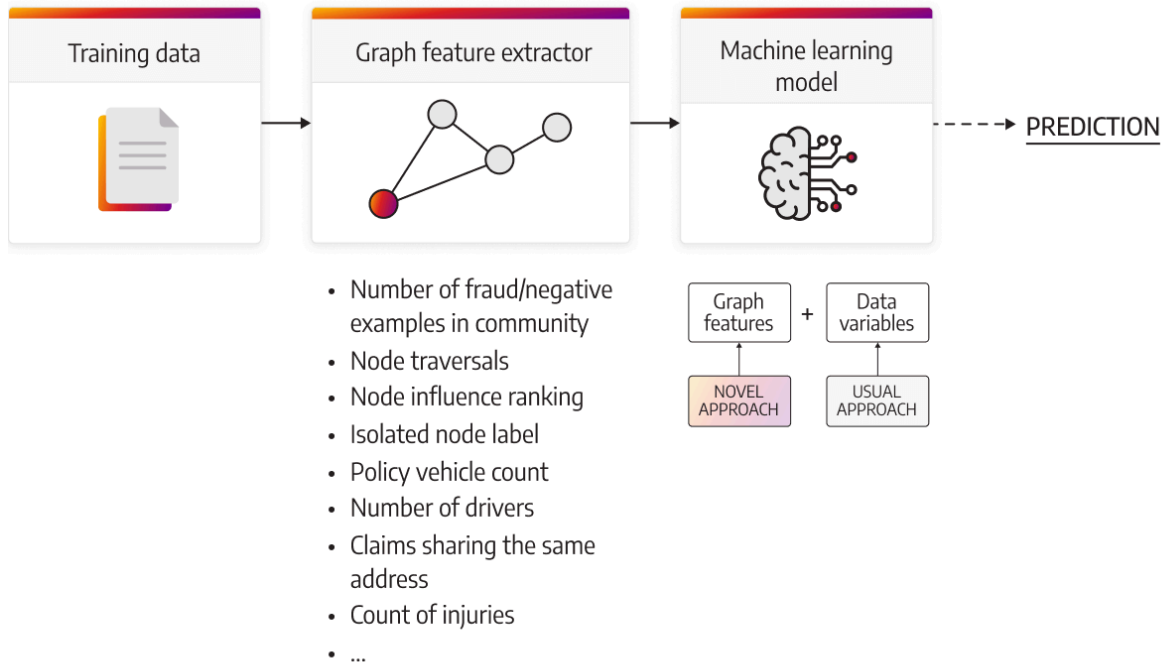
- **Deep path analysis**
  - For an in-depth relationship analysis of their datasets, the insurance company used deep path graph analysis. This enabled them to get a deeper understanding of the interconnected nature of fraudulent behavior, going beyond traditional rule-based methods.
- **Graph model visualization**
  - The company was able to visualize their datasets in a unified view, transcending the limitations imposed by various data silos. [Memgraph Lab](#) allowed for real-time visualization, even as new claims were processed.
- **In-memory graph analytics**
  - Memgraph is an in-memory database that processes and analyzes data much faster than traditional disk-based systems. This speed and efficiency are crucial when detecting insurance fraud as it enables real-time analysis of vast amounts of interconnected data.
- **Graph traversals and algorithms**
  - Memgraph's graph traversals and algorithms, such as graph centrality and community detection, played a key role in identifying hidden connections and patterns in fraudulent activities. Read more about [Understanding Community Detection Algorithms](#).

## Backstory

This multinational insurance company offers a wide range of insurance products, including auto, home, life, health, and business coverage. They focus on customer satisfaction by offering personalized insurance solutions tailored to meet individual needs.

The company uses **rules engines** and machine learning for fraud detection. These engines apply predefined rules to incoming data or transactions to identify potential fraud. This is done by matching specific conditions or triggering particular actions. These rules are typically based on historical data, industry knowledge, and expertise in fraud patterns. Flagged cases are then further investigated by claims investigators or anti-fraud units

On top of a rules-based engine, the insurance company uses **machine learning models** to improve fraud detection. These models are trained on historical data to identify patterns that might indicate fraudulent activity. Unlike rules engines, which follow explicit rules, machine learning models can learn and infer patterns, potentially catching fraud that doesn't exactly fit predefined criteria.



### Challenge:

**Rules engines could not quickly analyze complex relationships and interconnected data to reduce false positives.**

**Challenge 1 - Challenges in connecting disparate data silos, hindering a comprehensive analysis of fraud patterns.** In this leading insurance company, rules-based engines are effective at identifying basic cases of fraud but struggle with more sophisticated schemes. Insurance data is special because it's highly interconnected and there are many relationships between various entities. Also, new data is continuously incoming and you need real-time analysis.

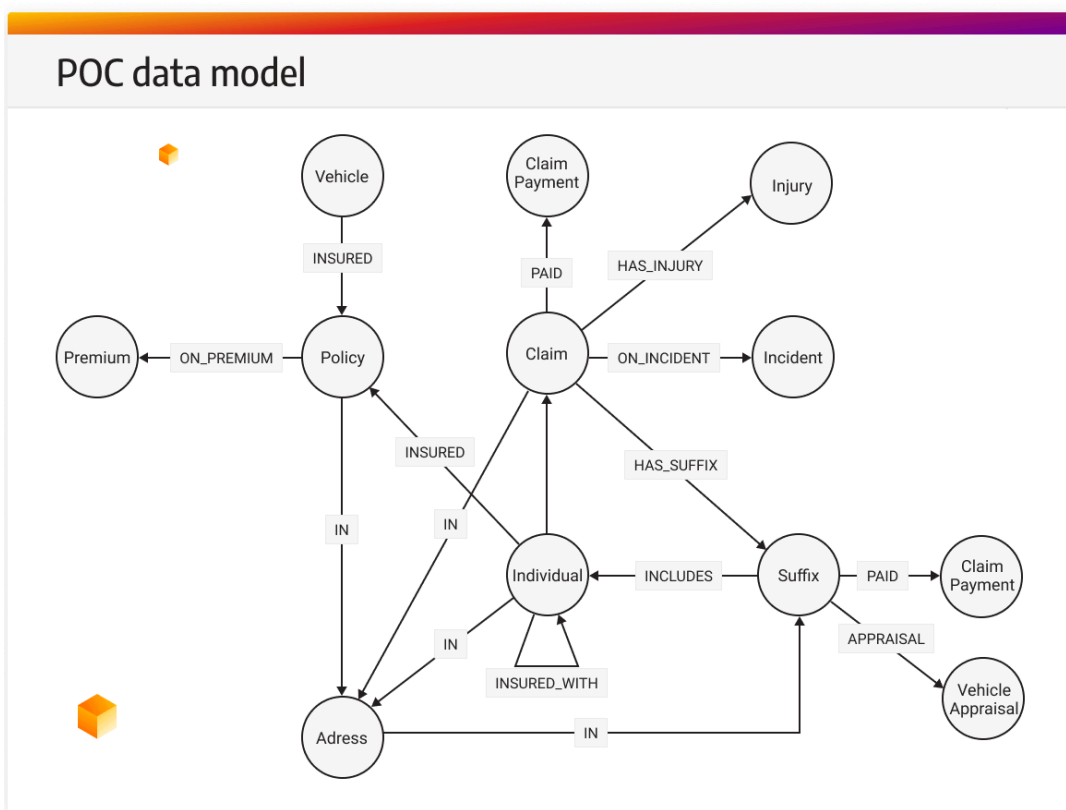
**Challenge 2 - A high incidence of false positives, causing unnecessary investigations and potential customer dissatisfaction.** The reliance on predefined rules led to a high number of false positives—legitimate claims flagged as potentially fraudulent. This not only increased the workload for investigation teams but also

risked damaging customer relationships due to unnecessary investigations and delays in claim processing.

**Challenge 3 - Limited scalability and flexibility, making it difficult to adapt to evolving fraud tactics.**

As fraudsters continuously evolve their tactics, the rules-based systems require frequent updates to rules, which is a time-consuming and reactive process. This limitation hindered the system's ability to quickly adapt to new fraud patterns and techniques, making it less effective over time.

The existing system struggled to connect data from different silos within the organization, limiting the ability to gain a comprehensive view of the data.



## Why Memgraph?

This US insurance company needed a solution on top of their existing fraud detection platform —an enhancement rather than a replacement.

- **Real-time fraud detection** as new, large, data continues to come in. It enables this insurance company to identify and respond to fraudulent activities as they

occur, rather than after the fact, significantly reducing the window of opportunity for fraudsters to exploit the system.

- **In-memory graph analytics to enhance machine learning models.** The in-memory nature of Memgraph allows for high-speed data processing and analytics. This is particularly important for handling complex queries across large datasets, common in fraud detection. By analyzing the interconnected data, Memgraph helps identify complex patterns and relationships that are indicative of fraudulent behavior. This then improves the predictive power of machine learning models.
- **Complex relationship analysis.** Fraud detection often involves analyzing complex relationships between entities such as individuals, vehicles, claims, suffices, policies, and other. Memgraph's graph database structure is inherently designed to model and navigate these relationships efficiently.
- **Advanced analytics capabilities.** Algorithms like community detection, centrality analysis, and pathfinding can identify unusual or suspicious patterns within the data. Memgraph helps in identifying clusters or groups of entities with similar behaviors or attributes. Machine learning models can use this information to predict potential fraud within similar groups or to identify outliers within these communities.
- **Data visualization.** Memgraph Lab offers real-time visualization of data and the insurance company can see the interconnected relationships within their datasets.

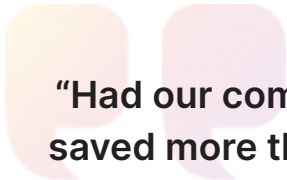
## Results

The highlight was that for this leading US based insurance company, the use of Memgraph and graph technology resulted in a **135% increase in the efficiency of detecting fraudulent claims.**

Implementing Memgraph resulted in **significant financial savings for the company, preventing millions of dollars in potential losses** from undetected fraud.

Adding Memgraph to their existing solutions (rule-based engine and machine learning) led to a **substantial reduction in false positives**, improving operational efficiency and customer satisfaction.

The ability to **visualize and analyze data in real time with Memgraph Lab** enabled the multinational insurance company to respond more quickly to emerging fraud patterns, staying one step ahead of fraudsters.

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**“Had our company been using Memgraph before, we would have saved more than 7 figures in missed fraud on the same datasets.”**

- Head of Advanced Analytics, US insurance company

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Find out how Memgraph performs  
compared to Neo4j

[View Benchgraph](#)

Let's see how Memgraph fits into  
your environment

[Contact us](#)