

# Graph-Powered Fraud Detection in Payments Ecosystem

## Challenge

A large e-commerce firm faced a rise in coordinated fraud involving: Fake merchants and customers placing orders to trigger payouts. Reused device IDs, IP addresses, and payment instruments across multiple accounts. Rule-based systems detecting only individual anomalies, missing ring-level collusion. Transaction-level data lacked relational visibility between entities.

## Objectives

To identify and prevent collusive fraud rings in real-time by leveraging graph network connections and relationship-based anomaly detection, enhancing fraud prevention accuracy while reducing false positives.

## Key Results

**27%** Fraud loss reduced within three months

## Approach

- Built a multi-entity payment network graph connecting: Customers, payment instruments, merchants, devices, IPs, and delivery partners.
- Defined edges (relationships) such as “used same card,” “shared IP,” or “delivered from same address.”

## Solution

- Created a graph database with nodes (entities) and edges (relationships) for the transactions.
- Computed network centrality, degree, betweenness, and clustering coefficient for every entity
- Implemented Breadth-First Search (BFS) to explore connections up to two hops away.
- Built unsupervised clustering models on graph metrics to detect abnormal clusters of linked accounts
- Provided risk dashboards highlighting fraud rings and top suspicious clusters.
- Integrated real-time alerts into the transaction authorization engine.

**\$3.5 M** Saved annually

## About Straive

As a data analytics and AI operationalization company, we don't just build top-tier data analytics and AI solutions—we integrate them seamlessly into your core workflows. This approach drives enhanced efficiency, improves user experience, and boosts revenue, setting you apart from the competition.

Serving a diverse range of industries— including Pharmaceutical & Life Sciences, Logistics, Supply Chain & Manufacturing, Research & Publishing, Information Services, EdTech, Banking & Financial services, and Retail Tech, Entertainment & Media— we have a global client base spanning over 30 countries.

Our strategically positioned resource pool operates across seven countries, including the Philippines, India, the United States, Nicaragua, Vietnam, the United Kingdom, and Singapore, where the company is headquartered.