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FORRESTER® WAVE LEADER 2020 Graph Data Platforms

Gartner COOL VENDOR 2020™

# Double the Performance of Your Fraud Detection System with Graph DB and Machine Learning

Abhishek Mehta - Director Sales Engineering

Feb 2021

# Today's Presenter

## Abhishek Mehta

Director of Sales Engineer

- McKinsey, Bloomberg, Cisco & Dabizmo (NLP Startup) Founder
- 15+ years designing and implementing complex analytics solutions for Fortune 100 companies
- Patents in NLP spanning Conceptunary Ontology Design, Language Pattern Recognition, and Conversion
- Email: abhi@tigergraph.com

**Please join me for a roundtable tomorrow - "Real-time fraud detection: Is it real?"**

# Who is TigerGraph?



- We provide advanced analytics and machine learning on connected data
  - The only scalable graph database for the enterprise: 40-300x faster than competition
  - Foundational for AI and ML solutions
  - Designed for efficient concurrent OLTP and OLAP workloads
  - SQL-like query language (GSQL) accelerates development
  - Cloud Neutral: Google GCP Microsoft Azure, aws
- Our customers include:
  - The largest companies in financial, healthcare, telecoms, media, utilities and innovative startups in cybersecurity, ecommerce and finserv
- Founded in 2012, HQ in Redwood City, California





Corporate Overview Video

# Advanced Analytics and Machine Learning on Connected Data

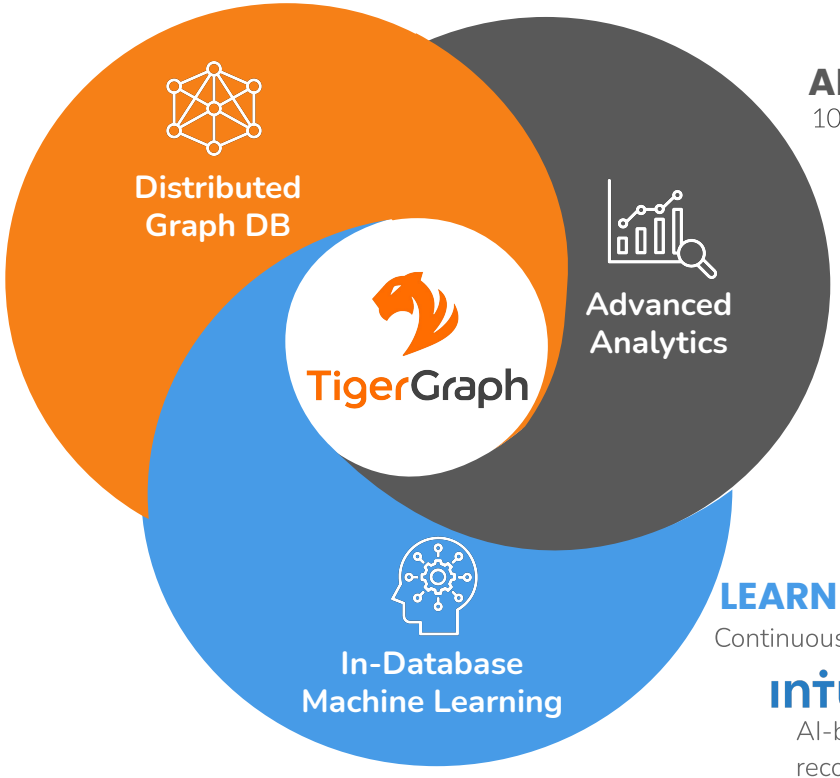
## CONNECT ALL DATASETS AND PIPELINES

Friction-free scale up from GB to TB to Petabyte with lowest cost of ownership

UNITEDHEALTH GROUP®
Customer 360 connecting 200+ datasets and pipelines

**Fortune 50 Retailer**
Item 360 for eCommerce across 100+ datasets

xandr AT&T
Identity graph connecting multiple data pipelines




## ANALYZE CONNECTED DATA

10-100X faster than current solutions

**Jaguar Land Rover**
Supply chain planning accelerated from 3 weeks to 45 minutes

China Mobile International
Fraud Detection - batch to real-time for 750 million calls/day

## LEARN FROM CONNECTED DATA

Continuous graph-based feature generation and training

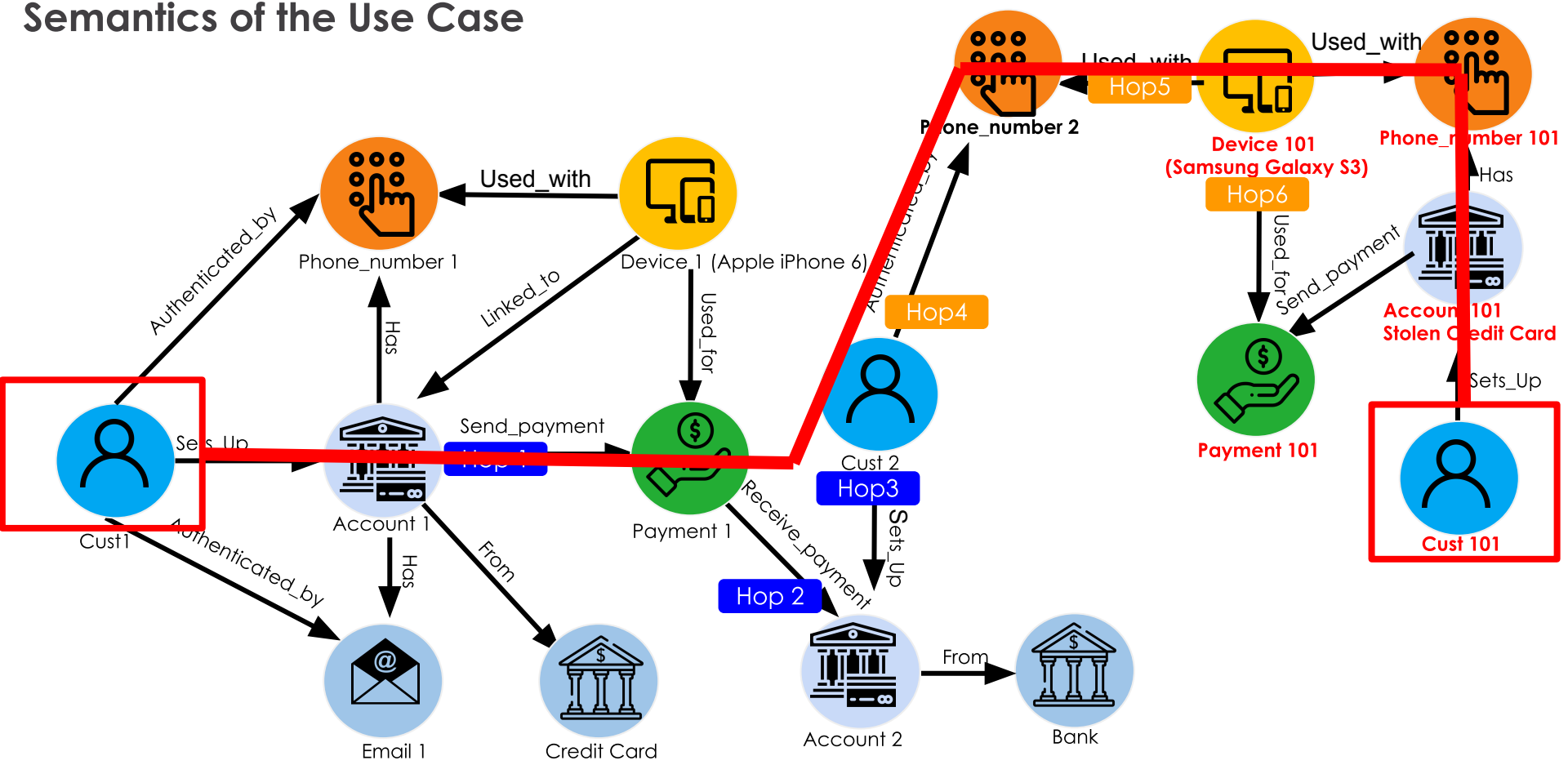
intuit.
AI-based Customer 360 for entity resolution, recommendation engine, fraud detection

**7 out of top 10 global banks**
Real-time fraud detection and credit risk assessment

# Fraud Detection: Business drivers behind Graph & ML

- $30 billion loss to fraud transactions worldwide.
- Only 1 in 5 blocked transactions are actually fraudulent  (4 out of 5 are false positives)
- $118 billion of blocked sales in the U.S. with 15% of cardholders experiencing blocked sales, whereas the cost of real card fraud only amounts to $8-9 billion
- 40% of denied users are attempting to pay a greater than $250 transaction
- High-income consumers (over $75,000 in income per year) are at a higher risk of false positives at a rate of 22% experiencing at least one false positive in the last year
- Younger consumers (<35 years old) tend to be misidentified more often than older customers with 24% of young consumers experience at least one false positive

# Semantics of the Use Case




*Learn more by reading this article: How the World's Largest Banks Use Graph Analytics to Fight Fraud*

Sign up FREE for TigerGraph Cloud to use the starter kit for fraud detection (payments)





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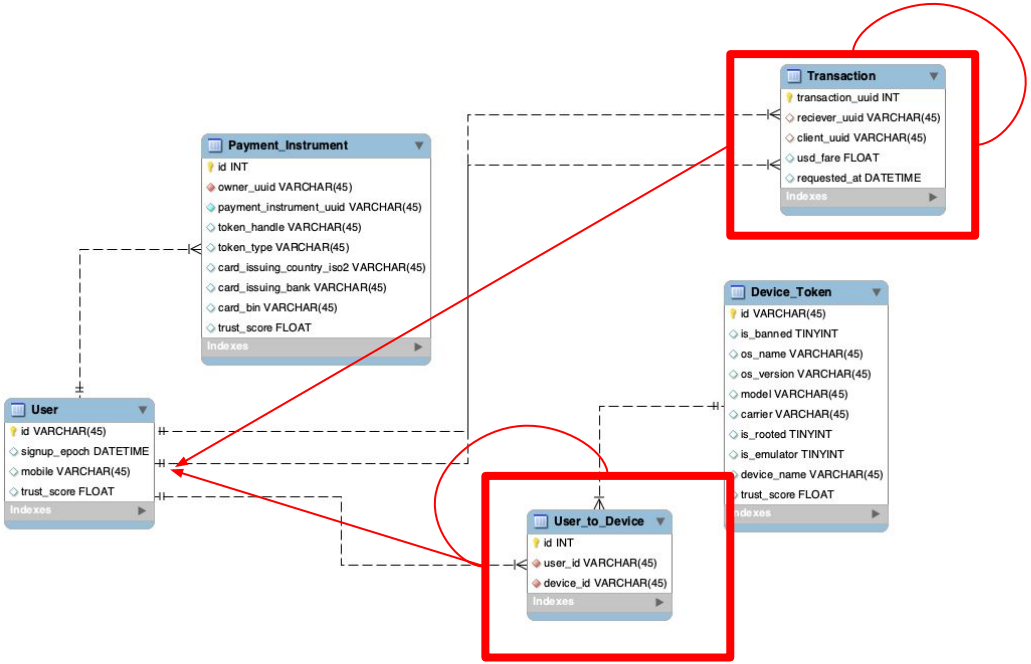
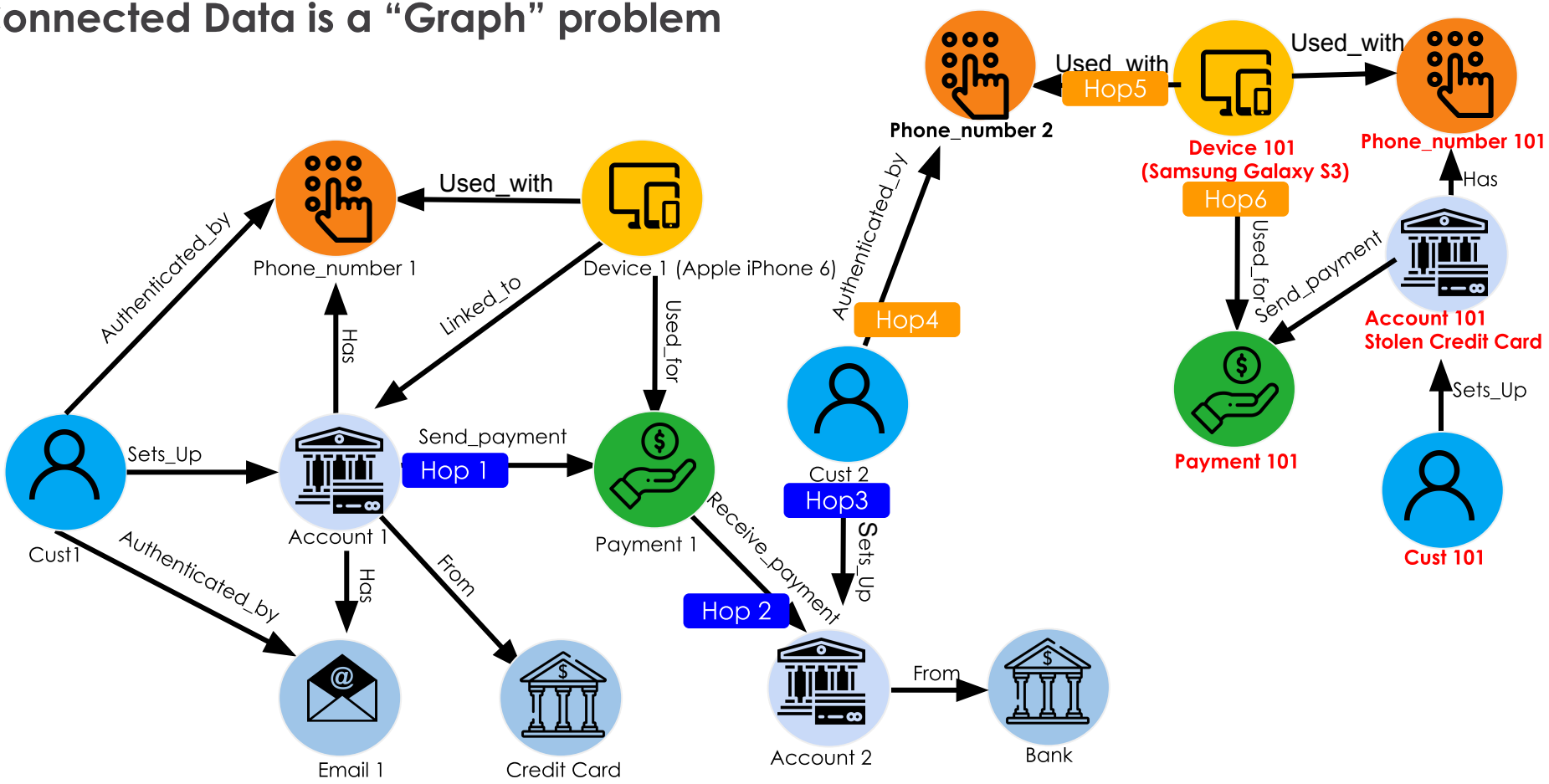
# RDBMS Look-alike



# Connected Data is a "Graph" problem

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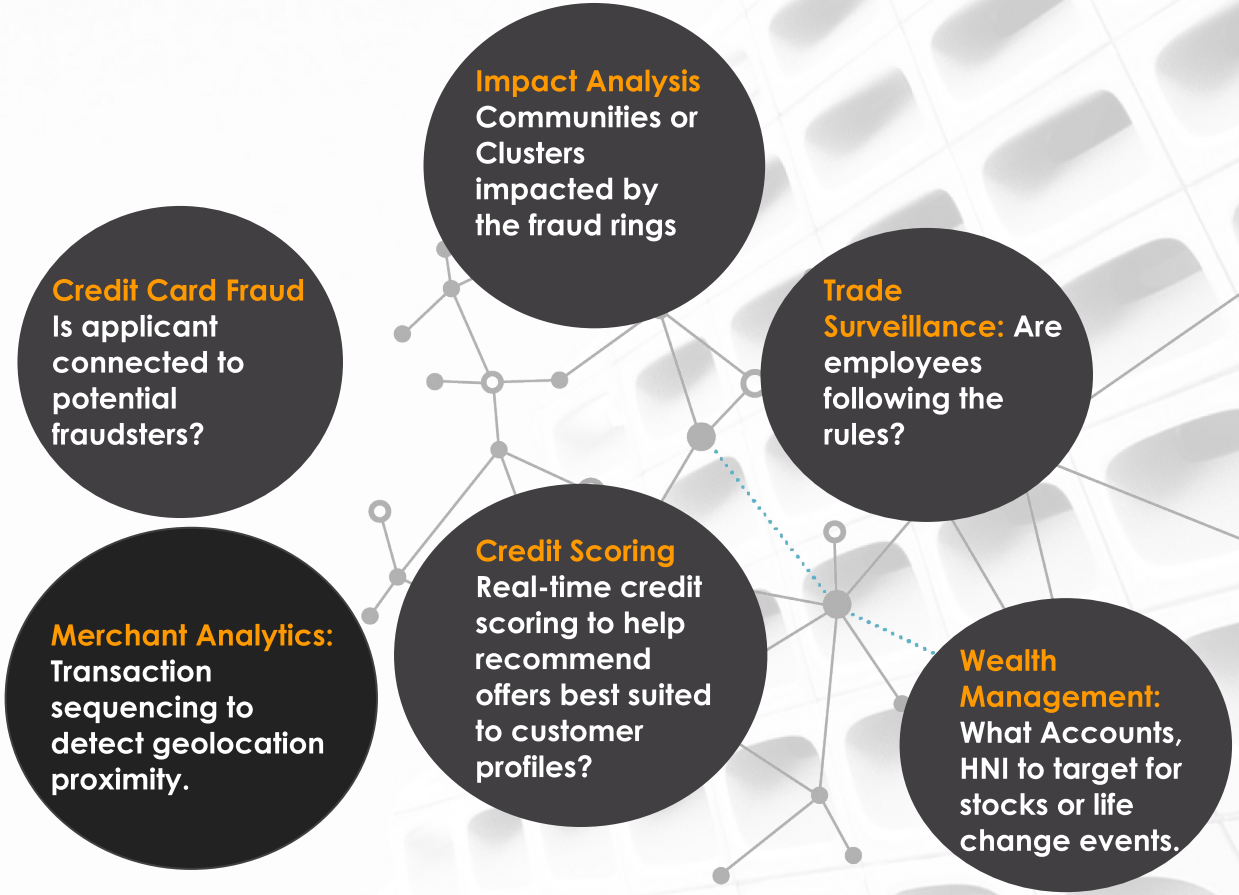
# 7 of the Top 10 Global Banks Use TigerGraph



# TigerGraph - Product Overview & Differentiators

1. **A Native Parallel and Distributed Graph Database** - Graph 3.0, MPP architecture
2. **Scalability** - Scale Up and Scale Out
3. **Performance** - Analytical and ML performance combined with Up/Insert Performance
4. **Enterprise Features -** Delivery modes, High Availability, Security, API Integration
5. **GSQL** - SQL-like, easy-to-learn, high performance query language that is Turing complete.
6. **Deep Link Analytics** - traverse graph in parallel, filter and do graph computations, 12+ hops in production
7. **Graph Algorithms Library** - open source on github, flexibility & rapid time to value
8. **MultiGraph service** for multi tenancy with RBAC permissioning
9. **GraphStudio** - Comprehensive visual SDK; from graph design to deployment
10. **Advanced data compression technology -** approximately 50%, better TCO
11. **Machine learning feature generation** - generate deep-link (multi-hop) graph features in real-time for massive datasets for feeding ML solutions
12. **ACID Compliant** - can do both OLTP + OLAP on single platform, cost effective



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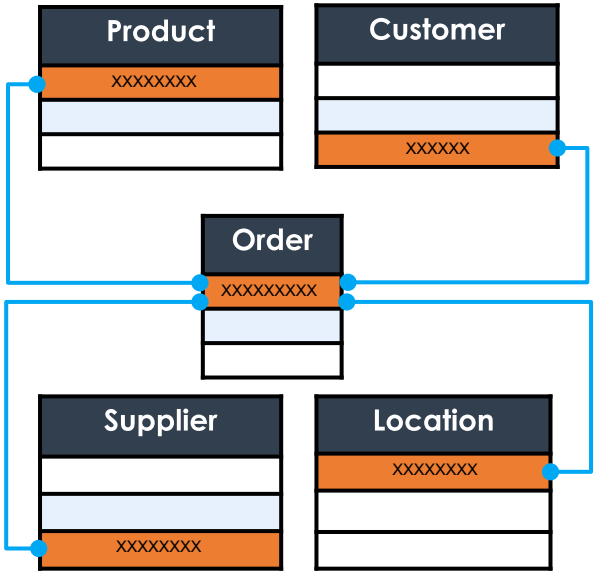
# Demo

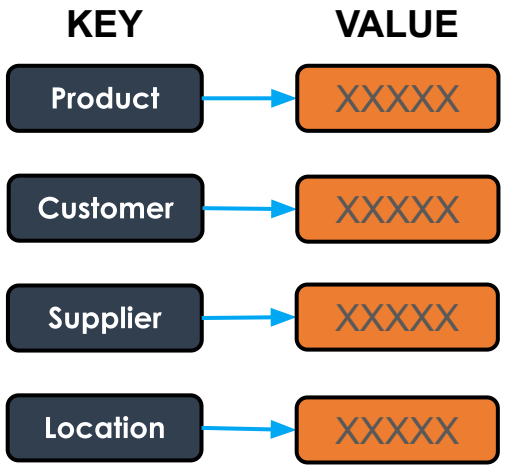
# Graph As A Solution

## Relational Database




- Rigid schema
- High performance for transactions
- Poor performance for deep analytics

## Key-Value Database




- Highly fluid schema/no schema
- High performance for simple transactions
- Poor performance deep analytics

## Graph Database


- Flexible schema
- High performance for complex transactions
- High performance for deep analytics





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# Preventing Fraudulent Loans with TigerGraph

## Tier 1 U.S. Bank

### Business Challenge

A leading U.S. bank needed to search across **20TB** of data for possible connections between credit card applications known to be fraudulent and applications of unknown status - relational databases and other graph providers were not up to the task, as they were unable to deliver the **speed and scale** required.

### Solution

- Pairing **graph technology with machine learning** to identify fraudulent activity at scale and intervene **in real-time.**
- Leveraging deep analytics to find hidden connections across 20TB+ of data.

### Business Benefits

- Able to score and prevent fraudulent loan applications on a massive scale – minimum **30% uplift** and **$15M annual incremental fraud avoidance**. **$1.5M through cost savings** on false positives.

**20TB**
Card applications data

**6 weeks**
PoC elapsed time

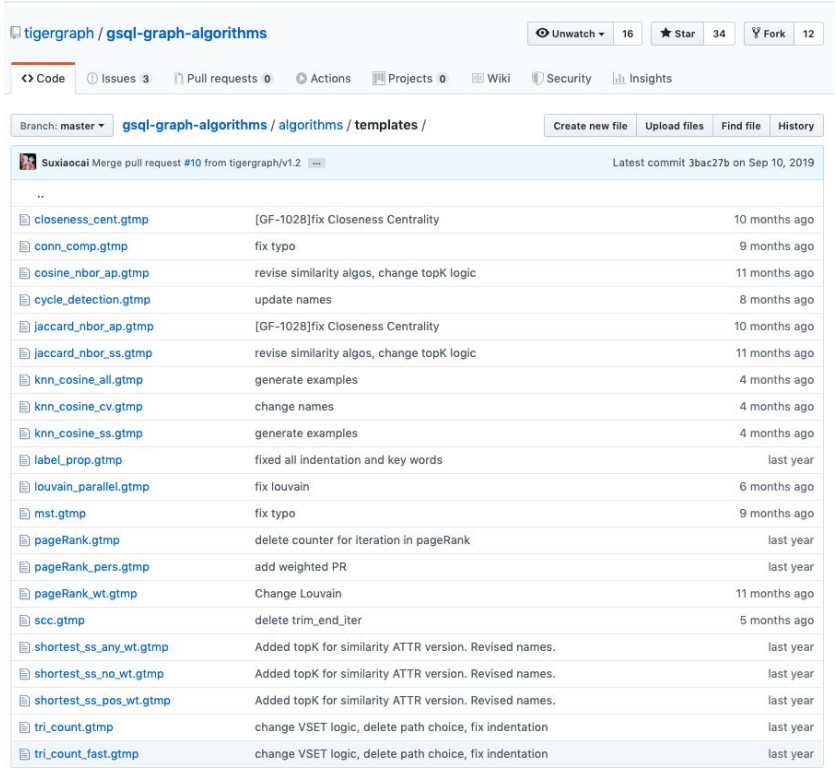
**3 months**
Time to build and fully deploy platform to production

**$16.5M**
1st year ROI with 30% uplift in fraud detection

**CLV Impact > $100M**

# TigerGraph GSQL Graph Algorithm Library

- Call each algorithm as a GSQL query or as a RESTful endpoint
- Run the algorithms in-database (don't export the data)
- Option to update the graph with the algorithm results
- Able to modify/customize the algorithms. Turing-complete language.
- Massively parallel processing to handle big graphs





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# Detecting Fraud Rings with TigerGraph Tier 1 U.S. Bank

**Business Challenge**

A leading U.S. bank wanted a better way to detect and remove fraudsters from their credit-card network. Prototypes had shown that a combination of advanced graph algorithms gave significant gains – big-data tools and other graph technologies either couldn't scale to the full customer base or gave inconsistent results.

**Solution**

- Implementing PageRank and Louvain [fraud] community detection in an MPP native-parallel database.
- Leveraging deep analytics to find hidden connections across 20TB+ of data.

**Business Benefits**

- Able to expose fraud rings, shut down connected cards, and combat fraudulent activity on a massive scale –**35% uplift** and **$50M incremental fraud avoidance**. >**$1.5 million through cost savings** on false positives, infrastructure and TCO

**10TB**
Card applications data

**6 weeks**
PoC elapsed time

**3 months**
Time to build and fully deploy platform to production

**+$50M**
1st year ROI with 35% uplift in fraud detection

CLV Impact > $200M

# Enterprise View

### Operational Groups

1 Fraud Analyst, Compliance , Regulations, Forecasting, Reporting, Visualizatoins

### Modelling Group

2 Statisticians, Domain Experts, Play/Rule books, Experts in Credit, Fraud Behaviour

### Core Technology Groups

3 Machine Learning, Data Science Groups, Enterprise Architecture, Infrastructure



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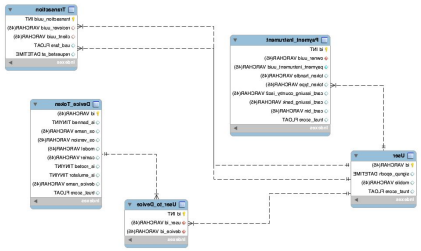
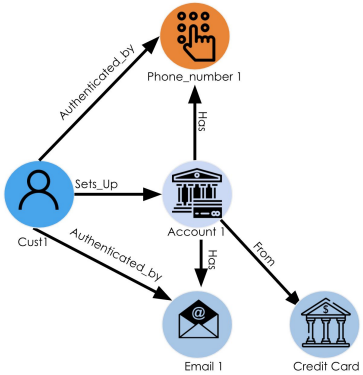
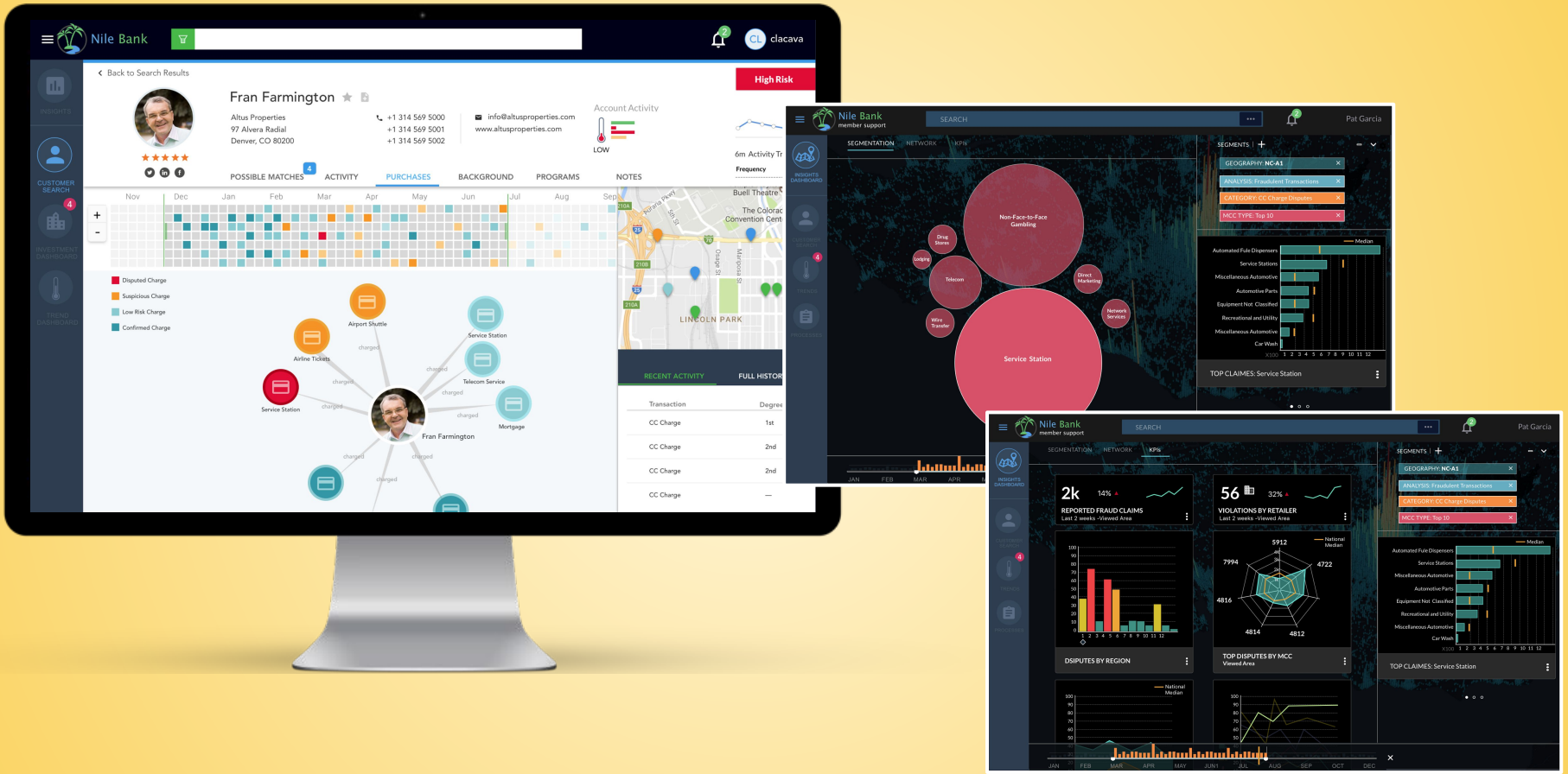
# Feature Extraction for ML/AI



| Variable description | Variables in use currently | Variables usable with a graph database |
|---|---|---|
| Total value of all transactions for merchant | | 1 |
| Total number of frauds detected for merchant | | 2 |
| Total value of all transactions for merchant category | | 3 |
| Total number of frauds detected for customer | | 4 |
| Total number of transactions performed by customer | | 5 |
| Amount of transaction | 3 | 6 |
| Maximum value of one transaction for merchant | | 7 |
| Customer | 4 | 8 |
| Total number of frauds detected for merchant category | | 9 |
| Maximum value of one transaction for merchant category | | 10 |
| Merchant category | 2 | 11 |
| Merchant | 1 | 12 |
| Total number of transactions for merchant category | | 13 |
| Total number of transactions for merchant | | 14 |
| Total amount of all transactions by this customer | | 15 |
| Maximum value of a transaction for customer | | 16 |



# Examples | AML Connect to KYC & C360



# Get Started


START FREE

Start in minutes, build in hours and deploy in days with
the industry's first and only distributed graph database-as-a-service.

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