

Graph analytics enable data scientists and business users to identify and explore complex relationships in healthcare datasets. In a recent report, Gartner Research said, “Graph analysis is possibly the single most effective competitive differentiator¹ for organizations pursuing data-driven operations and decisions after the design of data capture.” Gartner estimates that the graph analytics and database market will grow at 100 percent annually through 2022².

Native parallel graphs, the most advanced type of graph analytics, enable data scientists and business users to analyze their data on graph - a database designed to link datasets across multiple domains. With graph, you can easily add another dataset to your analysis and be able to harvest the data to find frequent patterns and suggest the next best action.

WHAT CAN TIGERGRAPH DO FOR YOU?

TigerGraph is the leading vendor of native parallel graphs and provides the advanced analytics tools to:

- Link data across your multiple domains to find new patterns and relationships in your data
- Harvest the frequent patterns to recommend next best action
- Easily add new datasets, internal or external, like FAERS or open FDA to your analysis
- Designed to integrate with your enterprise data and governance systems

According to a distinguished engineer at a Fortune 10 healthcare company, “TigerGraph is the only system today that can help us make real-time care-path recommendations using knowledge of 50 million patients.”

TIGERGRAPH LINKS DISPARATE DATA SOURCES TO IMPROVE QUALITY OF CARE WHILE CONTROLLING COSTS

Americans spent [\\$3.65 trillion on healthcare in 2018 based](#) on estimates from the U. S. Federal government actuaries. That’s an increase of 4.4% over 2017 and it is estimated to [accelerate to 5.5% per annum](#) through 2027. The United States, though, is not the only country facing this challenge and [global spending on healthcare per capita is estimated to more than double by 2040](#). The healthcare industry is exploring opportunities to contain the rising cost of healthcare while improving the quality of care. In order to deliver on this imperative, it’s important for all interested parties to understand the relationships among members, or patients, and prescribers, or doctors, especially as they pertain to the members’ journeys to wellness.

Unfortunately, the bulk of the current tools for storing and analyzing healthcare data are built on relational databases. These databases store the data for each entity such as member, provider, claim and facility (eg, hospital or treatment center) in separate tables or even separate databases. In order to understand the relationships among members, providers, facilities and the claims connecting them to each other, all of these tables or databases must be joined together. As the size and complexity of the data grows, database table joins become time-consuming and computationally expensive, thereby making the relational database an impractical solution for understanding and analyzing relationships.

¹ Source - <https://www.gartner.com/doc/2852717/it-market-clock-database-management>.

² Source - <https://www.gartner.com/en/newsroom/press-releases/2019-02-18-gartner-identifies-top-10-data-and-analytics-technolo>.
Gartner press release Feb 18, 2019 “Gartner Identifies Top 10 Data and Analytics Technology Trends for 2019”

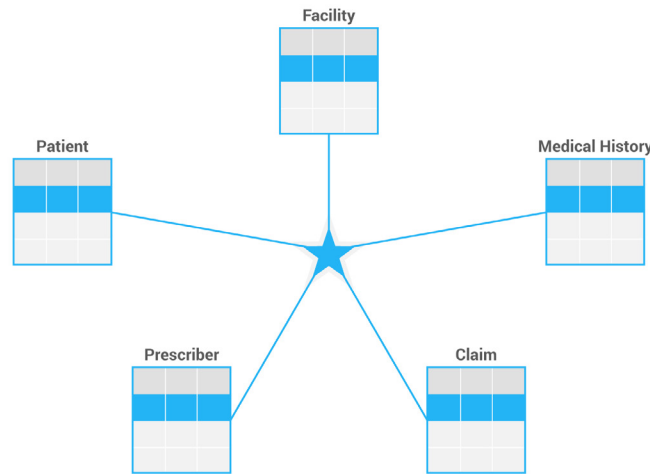


Figure 1: Complex table joins needed with a relational database for quality of care analysis

TIGERGRAPH FINDS NEW AND FREQUENT PATTERNS TO REDUCE WASTE

Tens of billions of dollars are lost to healthcare fraud, waste, and abuse in the United States each year. The opioid crisis has made the problem worse since fraud is often central to schemes to illegally distribute the medications. A dramatic example came in 2017, the Boston Globe [uncovered](#) a massive network of brokers who specialized in enrolling multiple patients with phony addresses via healthcare.gov, the Affordable Care Act portal. These patients were signed up for out-of-state insurance plans and enrolled in treatment centers where the administrators provided tens of thousands of dollars in kickbacks per patient to the brokers as well as the physicians who refer the patients. In reality, these patients never receive any care from the treatment center and instead received a kickback for participating in exploiting the insurance companies with generous PPO plans.

Finding these fraudulent activities is challenging. It requires analysis of internal data regarding the patients, opioid treatment facility centers, and referring physicians. and connecting it with external data such as recently used addresses and phone numbers to find the hidden connections among patients, doctors, and the opioid treatment facilities.

It also requires benchmarking the end-to-end cost care for every member across a network of doctors and opioid treatment facilities to identify higher than the average cost of care.

BY LINKING INTERNAL AND EXTERNAL DATA SOURCES TIGERGRAPH CAN PROVIDE NEXT BEST RECOMMENDATION TO REDUCE ADVERSE REACTIONS TO DRUGS

According to a study published in the US National Library of Medicine, [6.2% of hospital admissions were due to adverse drug reactions](#). At a minimum these reactions resulted in costs to healthcare organizations, while some caused permanent health damage, and even death. Not surprisingly, a major imperative for healthcare organizations is gaining insights into drug and treatment efficacy by linking public data such as FDA Adverse Event Reporting System (FAERS) and openFDA with internal health records.

This requires connecting up the adverse reactions observed with a specific drug as a part of treating patients with the publicly reported data to understand if the guidelines for usage for the drug need to be updated. This has been especially challenging because the information infrastructure for the healthcare industry is built on the relational databases that require several months to integrate with the new data sources. As a result, healthcare organizations are looking for a more agile solution to integrate and connect public data with internal data in order to improve the quality of care for their members.

TIGERGRAPH OFFERS HEALTHCARE ORGANIZATIONS A WAY TO MEASURE MEMBER SATISFACTION AND IMPROVE NET PROMOTER SCORES

About 10% of members switch medical insurance plans each year on average according to the [Kaiser Family Foundation](#). If we assume that the revenue per member is around \$800 per month, a 10% churn rate in a plan of 100,000 members, results in \$96 million in lost reimbursements. Alternatively, an ability to reduce churn by, say 1%, would increase revenue by \$9.6 million dollars per year in the same plan.

Net promoter score, or NPS, is commonly used as the key metric to measure and improve member satisfaction. The NPS surveys cover a small fraction of the members and provide useful but limited insights into member satisfaction. The behavior of the member is a better indicator of their satisfaction with the healthcare services. Are they calling customer service often with issues? Have they missed or canceled multiple appointments with their primary care provider or specialist? Are they refilling their prescriptions on time?

All of this information regarding the patient journey is key in driving NPS and requires the healthcare industry to build a 360-degree view of the member or patient combining data from all parts of the organization.

TIGERGRAPH POWERS MEMBER AND PROVIDER 360 VIEWS IN REAL TIME

Building and maintaining a real-time member and provider 360 view is challenging. It requires combining three types of data from a variety of internal sources.

- The first of these is the master data about members or patients, providers, healthcare providers, hospitals and their various facilities - this covers information such as name, address, email, and phone number as well as details regarding specialty, subspecialty, and equipment, as well as healthcare services offered.
- The second type of data is the operational or transactional data - this includes healthcare claims and payments as well as the member's electronic health records which are updated throughout the member's journey to wellness.
- The third type of data is historical data - petabytes of information stored in data warehouses, data marts and massive Hadoop data lakes. All of this internal data must be combined with the data from partners such as hospitals, other healthcare providers, third-party data sources such as OpenCorporates, the world's largest open database of corporate information, Thomson Reuters and Dunn and Bradstreet, as well as public data sources including FAERS and openFDA.

A native parallel graph database, such as TigerGraph, is purpose-built to combine these three types of data in real-time to deliver the four strategic imperatives: improve the quality of care while controlling costs; detect and prevent waste, abuse and fraud; avoid adverse reactions to drugs by link public and internal data; and measure member satisfaction and improve net promoter scores.

TigerGraph is uniquely qualified to provide enable healthcare organizations the ability to build the wellness journey for each member, resulting in better outcomes for payers, providers and members/patients.

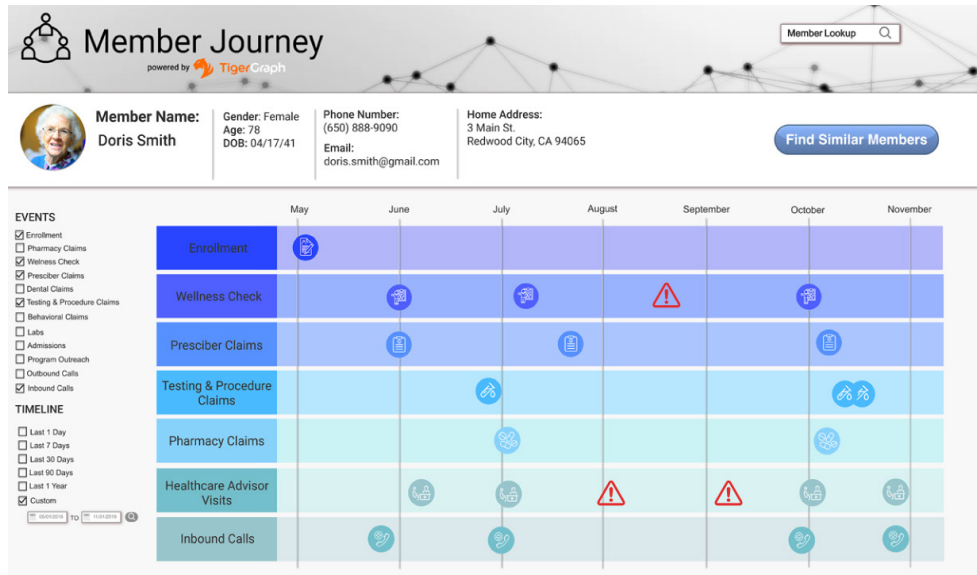


Figure 2: TigerGraph is able to traverse millions of member/patient records from different sources, identify and match patterns and analyze temporal data, in real time.

TIGERGRAPH IS THE BEST WAY FOR ORGANIZATIONS TO MAKE CARE-PATH RECOMMENDATIONS USING KNOWLEDGE OF MILLIONS OF PATIENTS IN REAL TIME

Graph database and analytics enable data scientists to understand, explore and analyze the complex relationships in healthcare data, often going 10 or more levels deep, in real-time, across billions of claims and millions of members and providers. This capability can have a profound impact on cost of patient care, patient population management, fraud detection and much more.

TigerGraph is working closely with many healthcare providers to ensure that native parallel graph technology continues to push the boundaries of data science. Indeed, as data scientists within the healthcare industry expand their prowess with graph the uses cases they can examine and the insights they can obtain will expand beyond anything we can think of today.

Get started today with TigerGraph Cloud (www.tigergraph.com/cloud) which contains multiple starter kits for healthcare demonstrating the seven key capabilities delivered by a native parallel graph.