

Visualizing fraud, waste and abuse

Graph analytics and machine learning drive the future of program integrity



Digging through massive amounts of data to identify fraud, waste and abuse (FWA) is a huge challenge for federal, state and local agencies. While they may have collected data that points to FWA, without a way to organize and interpret the data it's nearly impossible to identify the types of actions that waste taxpayer money – through errors or, worse yet, intentional fraud.

Fortunately, as fraudulent activities evolve, so does technology. Today's data science capabilities can use advanced analytics and artificial intelligence to turn all that data into clear, actionable insights. Two leading tools – graph analytics and machine intelligence – are an essential part of any modern program integrity program.



Graph analytics: A powerful tool against FWA

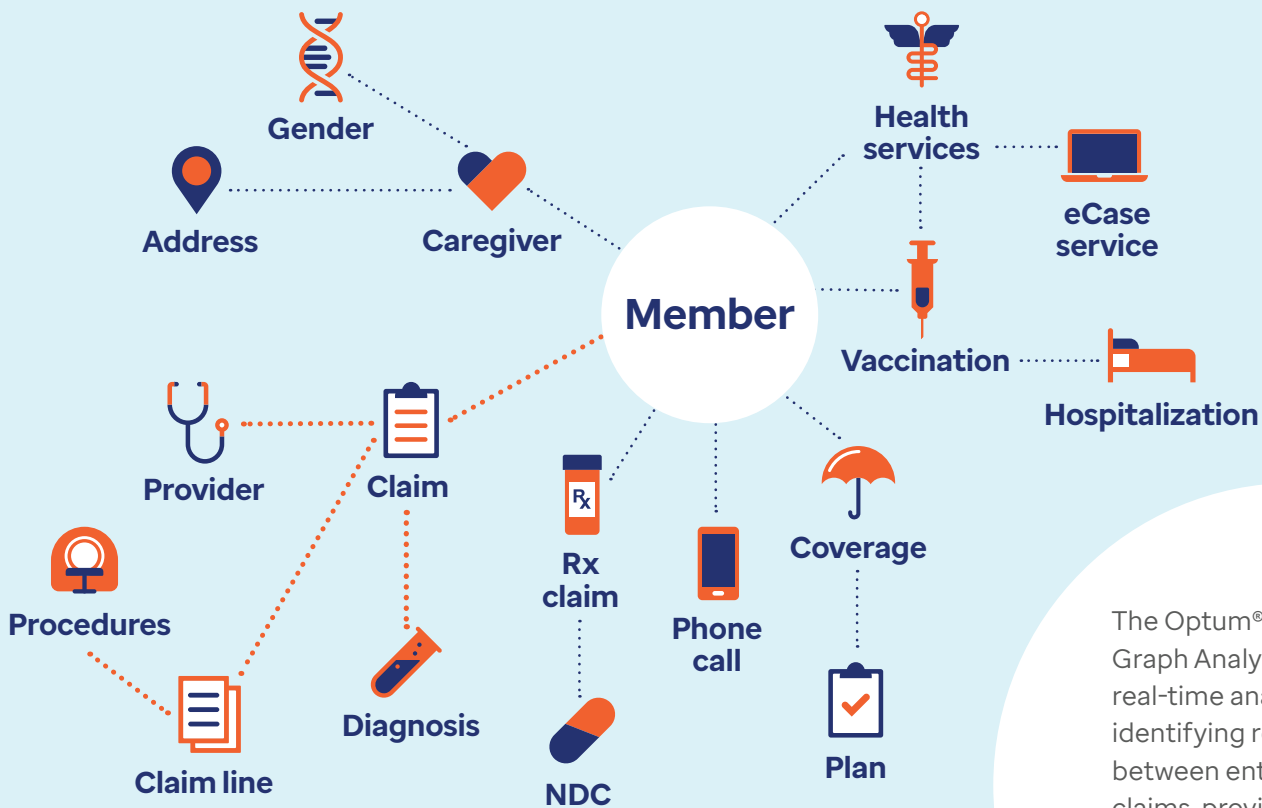
With graph analytics, information is displayed in graph form so viewers can see the visual relationships and interactions between data points. Presented this way, data can reveal insightful trends and hidden relationships that would be much harder to spot when viewed numerically. By transforming vast databases of information into visual patterns, groups and relationships, graph analytics helps users understand, interpret and apply the data more easily.

This type of representation allows users to look at diverse data sets from various angles in different combinations, focusing on what's most important to them. In essence, it turns a database into raw material that can be used in virtually unlimited ways. It's extremely flexible too. As agencies gather feedback and collect new data, they can apply it to the graph at any time, revealing new insights and patterns.



A more natural way to interpret data

Humans are naturally visual observers and learners. So when information is communicated graphically, it's easier for us to see how data points relate to each other and to the whole. This leads to deeper, more meaningful insights and a higher level of understanding that would be hard to achieve by simply looking at sets of numbers. Graph visualization tools use visual elements such as networks and maps to provide a simplified way to see and understand trends, outliers and patterns in data. When data is presented visually, it's also much more accessible. Anyone can look at relationships and draw conclusions – even those without a technical background. This can be especially helpful when FWA cases need to be presented in a court setting.



The Optum® Health Care Graph Analytics provides a real-time analytics tool for identifying relationships between entities including claims, providers, diagnoses, locations and more.

While graphs are extremely useful for analyzing historical data, they're also a uniquely accurate way to predict future behaviors. With graph analytics, government agencies can better detect patterns, recognize fraud schemes and take steps to prevent problems before they escalate – saving time and money.



Enhancing graph analytics with machine learning

Machine learning can make graph analytics even more effective. A machine learning system learns by making predictions based on past behavior or data and then comparing them against new data. The algorithm evaluates, adjusts and then repeats the process to become smarter, producing increasingly accurate insights and results.

A machine learning algorithm alone can become outdated as fraudulent behaviors move in different directions. But when it's combined with graph analytics, agencies can identify shifting relationships and patterns that can help steer the machine learning system in the right direction. The two systems work in tandem to provide feedback that refines the data and boosts the accuracy of the model. This greatly improves the value of the data – and the ability to identify and prevent FWA.



Graph analytics in action

While graph analytics and machine learning are well-established tools in the commercial space, they're just now growing in use among federal agencies. Uses include:

- **Social network analysis.** Graph analytics is an effective way to identify social relationships. For health care agencies, this could mean detecting suspicious behaviors, such as doctors overprescribing opioids or other medications.
- **Identity resolution.** Graph analytics can pinpoint identity information across various touch points and reconcile it into a single profile, improving the quality of data and preventing possible identity fraud.
- **Geospatial patterns.** Whether it's noticing that a patient and prescriber are nowhere near each other on the map or spotting a suspicious trend of doctors colluding in a certain community, the study of geographic or temporal patterns can accurately identify many potential FWA issues.



Strengthening program integrity with a wealth of data

Advanced technologies from Optum Serve give federal agencies the power to leverage a variety of custom frameworks and diverse data sets. With the industry's largest health care database, Optum offers several terabytes of data encompassing 19 billion entities, 109 billion relationships and 23,000 users. It's a vast resource designed to enhance your program and help uncover FWA.



Learn more about how graph analytics can support your agency's program integrity initiatives at optumserve.com/contact.

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