ORACLE

Play Beyond the Rules: Fight Money Laundering with Graph Analytics

Essential Guidance for
Chief Compliance Officers

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Financial institutions are locked in a battle against sophisticated criminal networks.

Good people in financial institutions everywhere work tirelessly to do honest business, free from corruption and scandal. But they can't keep up with malicious global criminal networks that find new and more complex means of laundering ill-gotten gains through legitimate financial systems.

Financial institutions hire bigger compliance teams and file more suspicious activity reports than ever. Regulators issue new statutes and hand out record fines to provide tougher enforcement on the problem. Yet, as the forces for good crack down, the bad slip through more and more innovative cracks in existing systems.

Financial institutions play a key role in this fight. Unfortunately, most of their anti-money laundering (AML) systems use only static rules to detect money laundering, an approach that yields low detection and wastes compliance staff time on false positives and data gathering.

Legacy, rules-only AML systems are at their breaking point: already inefficient, they are not equipped to address the increasing sophistication of these global money laundering networks.

It's time to fight money launderers in their own territory - beyond the limits of rules-only systems. Finally, a technology has emerged which levels the playing field and exposes the complex webs of deception confounding rules-only AML platforms - that technology is graph analytics.

Now is the dawn of a new era - one where financial institutions can effectively protect their organizations, reputations and customers from invasive criminal activity.

Criminals hiding in plain sight have broken rules-only AML systems

How money launderers avoid detection

We all know the best place to hide is in plain sight, and money launderers know that especially well.

They deploy tactics which are difficult to detect without a holistic view of wider networks and relationships.

1 Making suspicious money look like everyday transactions

Breaking large deposits and withdrawals up into small ones keeps them under the radar of rules-based flagging.

2 Not interacting with the same person too often

By transacting through various agents of various financial institutions, they spread the money out across different systems and stakeholders to avoid detection.

3 Using third-party "smurfs"

Powerful criminal organizations can have hundreds of people they pay, bribe or force to make deposits for them, and rules-only systems aren't designed to detect these individuals' connections to people on watch lists.

4 Working in cooperation with business owners and employees

Legitimate businesses can be used as 'fronts' to push transactions through the system.

5 Recruiting friends and family members with clean records

Rules-only systems can't detect correlations, such as shared tax identification numbers and addresses, among these people and the criminals who are using them.

6 Setting up shell corporations

These entities, with no assets or employees, can obtain a bank account and make financial transactions. Since even legitimate shell companies are made for privacy, it's hard to connect shell companies with known criminals.

Why financial institutions and regulators should stop playing by the rules

How a rules-only AML system works

- Applies rules to transaction data
- Flags suspicious transactions
- Pushes these anomalies to a human investigator

Limits of rules-only AML systems:

- Don't take advantage of vast data stores in institutions
- Don't consider other types of data that help detect and prevent criminal activity
- Can't understand relationships among entities
- Not able to identify larger patterns and trends
- The systems are rigid where criminals can be flexible

Should financial institutions replace or refit rules-only systems?

Despite their weak spots, there's no denying that rules have some advantages. They are auditable by regulators. They are simple and explainable; bank staff (who are seldom also data scientists) can easily access and edit them. For detecting well-known financial crime patterns, rules are, actually, quite effective.

However, as money launderers learn the rules, they learn how to be undetectable. A flexible, innovative criminal network can easily outmaneuver a rigid system. That's why, to enhance rules, we suggest financial institutions bring in a flexible, innovative technology: graph analytics.

The fight against money laundering has reached **a tipping point** as effective AML mitigation is becoming more challenging in an ever evolving regulatory and business ecosystem. With heavy reliance on **rules-based detection** and highly manual investigative processes, the financial services industry is rapidly embracing **graph analytics technology**. By visually connecting customers and parties, related accounts and payments, and other data, graph analytics can deliver more holistic customer profiles, uncover hidden risks, and optimize financial crime detection and investigations, while simultaneously easing the burden on staffing and elevating the customer experience.

Aite Group

Introducing graph analytics: To beat money launderers at their own game, don't stick to the rules.

Graph analytics is a mathematical model that analyzes data in graph format. Data is structured as data points (or "nodes") and relationships among those data points (or "edges"). This system allows users to connect data sets and evaluate any type of pattern or connection among entities. Because graph analytics can evaluate complex relationships and distant connections, it helps uncover and explain previously invisible patterns.

Applications of graph analytics span industries, providing insights that were unfathomable until recently. The best part for chief compliance officers? Graph analytics can arm financial institutions to defend themselves against malicious networks of money launderers.

Energy
Analyze electric power grids to identify critical assets.

Telecom
Analyze SMS messages to cluster accounts and identify influencers.

Internet
Detect anomalous traffic for cyber threat intelligence.

Retail
Analyze purchase history to correlate buyers and items to make personalized recommendations.

Medical
Analyze clinical data to discover similar cases and draw attention to risky ones.

Financial
Analyze customer and transaction data to identify fraud and money laundering.

Graph analytics from Oracle Financial Crime and Compliance Management

Graph analytics is a natural fit for AML because it allows succinct expression of complex money movement patterns, detects multi-hop relationships, and identifies hubs and spokes of suspicious activities.

Oracle Financial Crime and Compliance Management (FCCM) first incorporated graph analytics in 2018 based on research from Oracle Labs. Our graph analytics capabilities are supported by our advantages in data, querying, processing and visualizations.

Example of a graph that combines internal, external and negative news data.

Data at the core

- Graph analytics for FCCM is powered by our Financial Services Data Foundation (FSDF), which comprises one of the most comprehensive anti-financial crime data models in the industry. We have been refining it for over 20 years.

- Our inbuilt, proprietary Financial Crime Graph Model (FCGM) seamlessly consolidates and indexes FSDF data so that it can be analyzed and visualized using graph analytics. Flexible and easily extensible, there is no predefined schema, which is particularly useful for sparse data.

- A multi-model configuration (such as Oracle Database) provides users with the flexibility to decide how the query and manage their data.

- FCGM pulls from data lakes, relational databases, one-off datasets (in Excel, CSV, etc.) and third-party data feeds. This allows users to model connections among all their data sources, painting a bigger picture of customers and their relationships.

- Our Quantifind integration provides on-demand, risk-rated information based on unstructured, open-source intelligence and external data sources such as trade finance documents.

- We prepackage International Consortium of Investigative Journalists (famous for releasing the Panama Papers) data into the graph to instantly reveal and resolve potential bad actors.
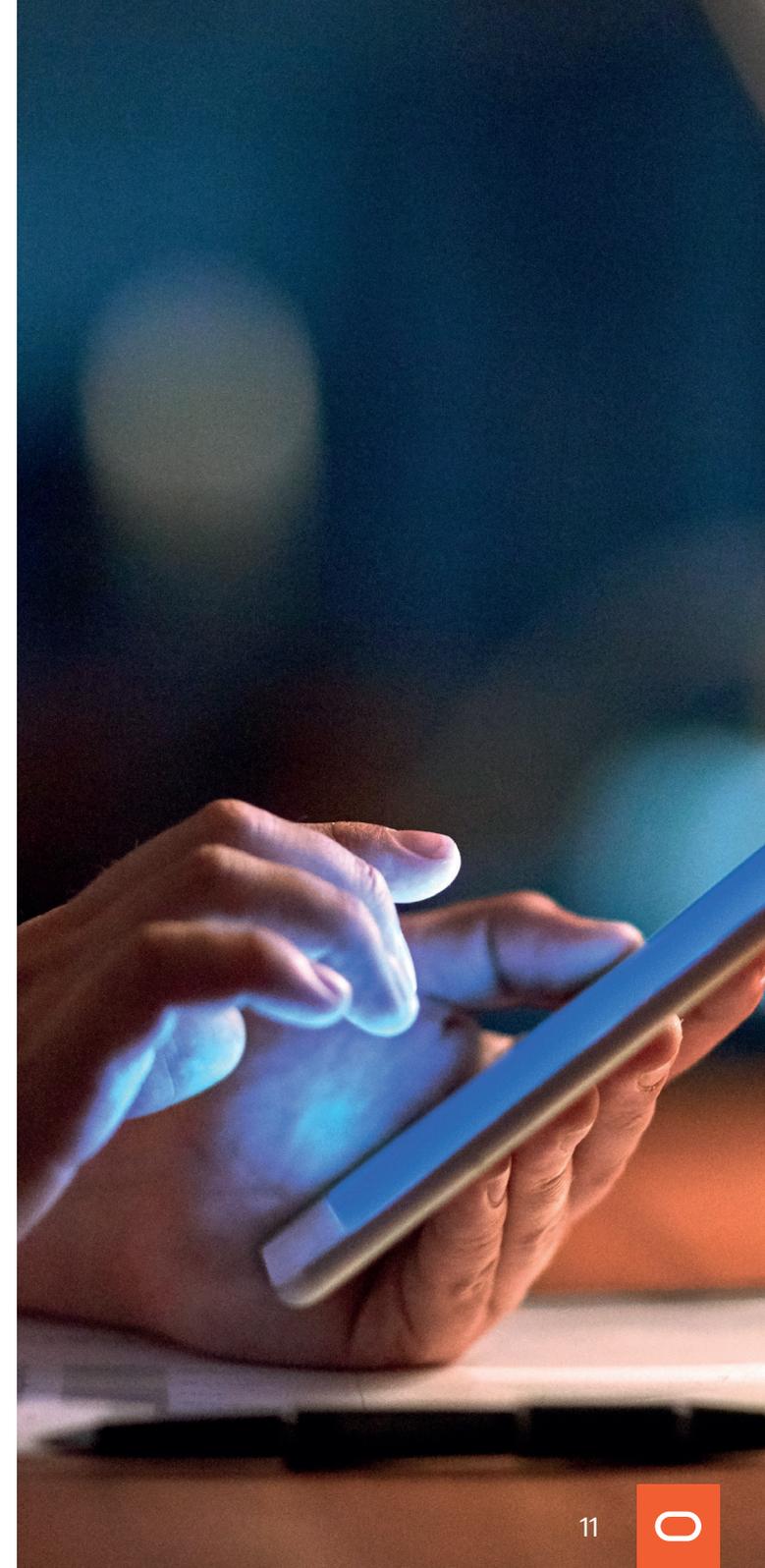
Superior query language

- Graph query language uses logic that simplifies the expression of pattern (paths through the graph) within complex, indirect or distant data relationships. It's easy to use and simple to understand.

- Property Graph Query Language (PGQL) is Oracle's proprietary, SQL-like language. It expresses queries in a compact way, which makes coding and processing easier and faster. PGQL is an open-sourced project led by Oracle.

- PGQL queries can be processed 1-2 orders of magnitude faster than similar queries run in SQL on tabular data tables.

"With graphs, data can be managed in more intuitive ways, closer to how people organize their thoughts on a white board. Our system takes advantage of parallel processing and the huge amounts of memory available in modern servers. This allows us to directly model the relationships among all of our data."

Hassan Chafi
Senior Director, Research and Advanced Development at Oracle Labs

Faster processing

- Oracle uses a specialized, highly scalable, in-memory graph analytics engine called Oracle Parallel Graph Analytics, or Oracle PGX.

- Parallel processing and huge amounts of available memory allow for lightning-fast response.

- Built-in PhD-level algorithms let users quickly perform some of the most common queries. Users can customize these algorithms and modify constraints to suit their needs.

- An API allows users to build their own algorithms, improving accuracy for those who want complete customization.
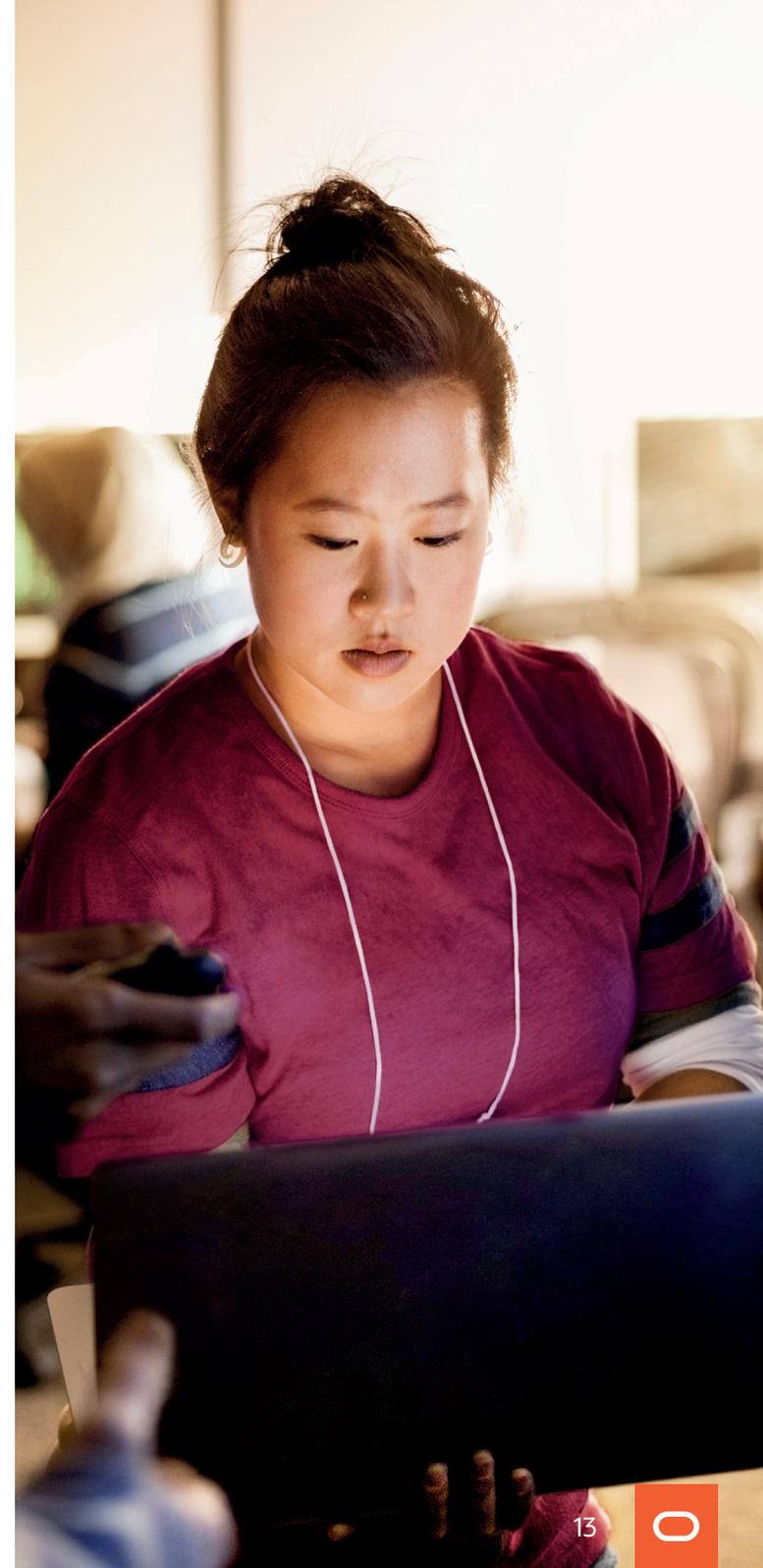
Powerful visualizations

- Allow users to intuitively explore relationships among all sorts of data points by simply clicking from one node to the next.

- Graph analytics visualizations, powered by open source data science notebooks, are embedded in our Enterprise Case Management (ECM) application via the Investigation Hub module.

- Each visualization is instantly updated in real time. The visualizations are intuitive and help provide context around risk scores.

- Once a data scientist can visualize connections, it's easier to create an algorithm. Having graph analytics as part of a machine learning ecosystem, therefore, improves accuracy.
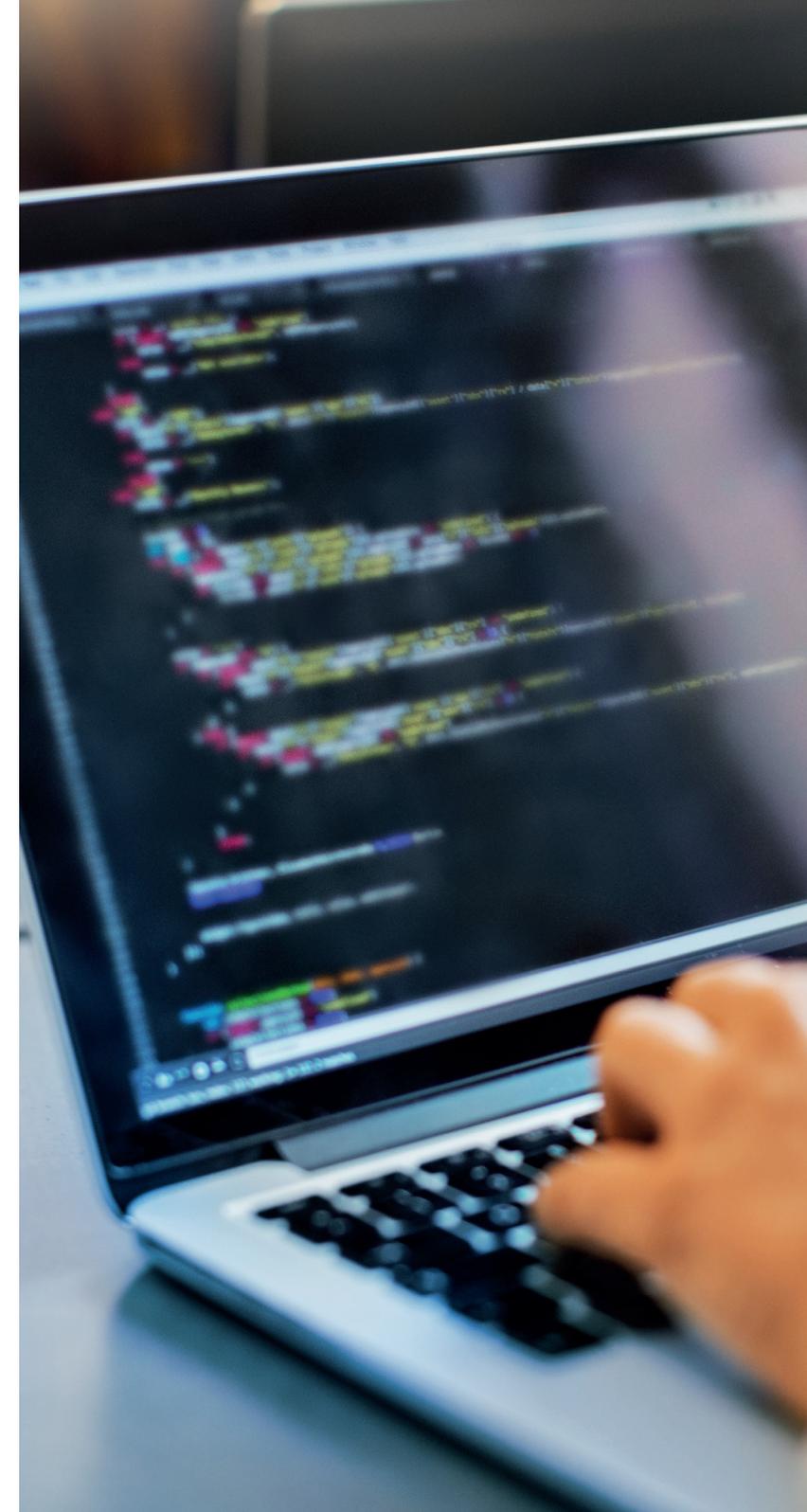
How graph analytics turns the tables on money launderers: A day in the life of an AML investigator

Every day, Oracle builds a new global graph. The AML investigator begins her investigation with a partial view of this global graph in Oracle's Investigation Hub module. She uses the graph to gain insights into emerging financial crime patterns and trends.

The investigator explores any data point ('node') she wishes and uses graph algorithms to better understand, for example, the shortest path to a suspicious activity report (SAR) from a given account.

With prebuilt functions and filters, there's no need for the investigator to code anything (though she can build her own PGQL queries if she wishes)–she simply clicks a button. She can take a preconfigured 'smart hop' to a SAR node, or to a customer that has a risk score over a certain threshold.

She does this without disrupting her workflow in Oracle's Enterprise Case Management (ECM) application. Importantly, Investigation Hub keeps track of risk factors and all activity in the graph to create an investigative summary in a natural language narrative block. A natural language narrative is also saved to Oracle ECM to provide a basis to support a SAR or STR filing.

The investigator's process ends when she decides whether something is unusual: that either creates a SAR/STR filing, or the case is closed.

Using graph analytics to support other advanced capabilities for better investigations

Beyond visualizations, graph analytics and machine learning support powerful capabilities that help make AML investigators more accurate and efficient:

Scoring
- Intelligent case creation: We leverage graph algorithms to interrogate the global graph and intelligently build cases based on broader behaviors, not just transactional triggers.

- Automated case recommendations: Use previously decisioned graphs to help analysts make inferences about other graphs.

- Automated case decisions: Automate investigative decisions, helping investigators focus on activity that's risky to the firm, even as the regulatory environment changes.
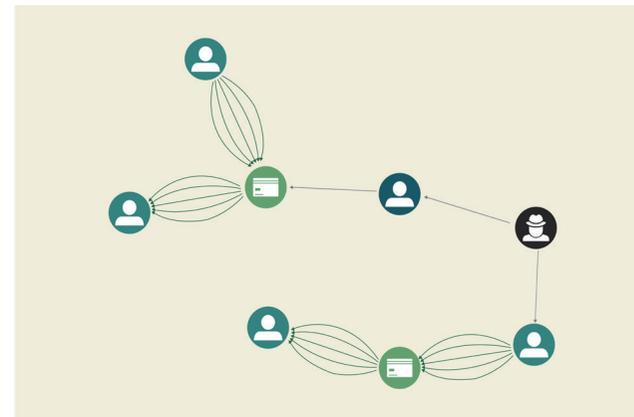
Example of a graph that has identified similar unusal patterns.

Pattern discovery
- Use completed behavior graphs to feed deep learning for pattern discovery.

- Use identified patterns to filter large networks for certain behaviors, and to inform new scenarios.
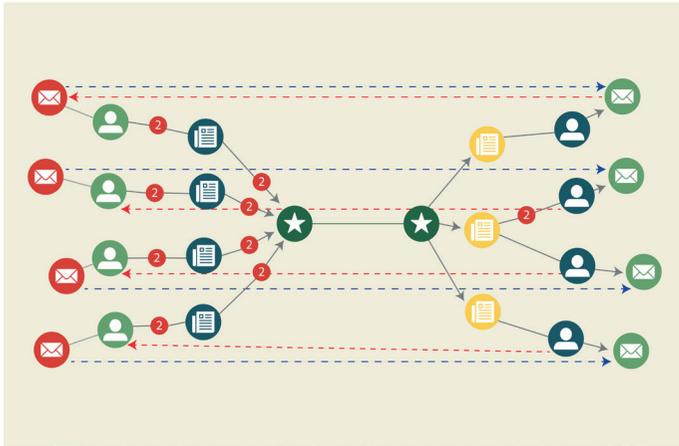
Example of a graph that has identified the same entity across two different data sources.

Entity resolution

- Organize data in a graph model to easily identify the same individual across systems and customer records.

- Use this connected data to identify an individual for purposes of behavior detection.

- Better understand external parties and how they relate to each other and your customers.

- See all the connections they have internally, externally, and against supplementary data sets, exposing those who are deceitfully trying to appear anonymous.

- Perform entity resolution on third-party data feeds, like corporate registries or beneficial owner registries, in order to build networks seamlessly across internal and external data.

- Uncover hidden connections, making it easier to find criminal shell companies and U-turn money flows.

Helping your compliance program go beyond the rules with graph analytics

Because graph analytics has the potential to vastly reshape your investigators' workflows by drastically reducing the amount of time they spend gathering data, an organized rollout is a must. Here are some best practices for deploying graph analytics across your compliance program.

Getting started

- Involve the entire team. To drive success and long-term change, align your technology, risk, and investigations leaders around a common vision.

- Have a multi-year operating plan. Aim for steady progress; work to achieve short-term accomplishments that help lay the groundwork for more advanced investigations in the future.

- Develop your staff. Comprehensive, graph-based investigations require a strong skill set that may require time to develop internally. Moving into the next generation of AML is not just about acquiring and deploying technology; it's also about people and how they adapt to new ways of doing things.
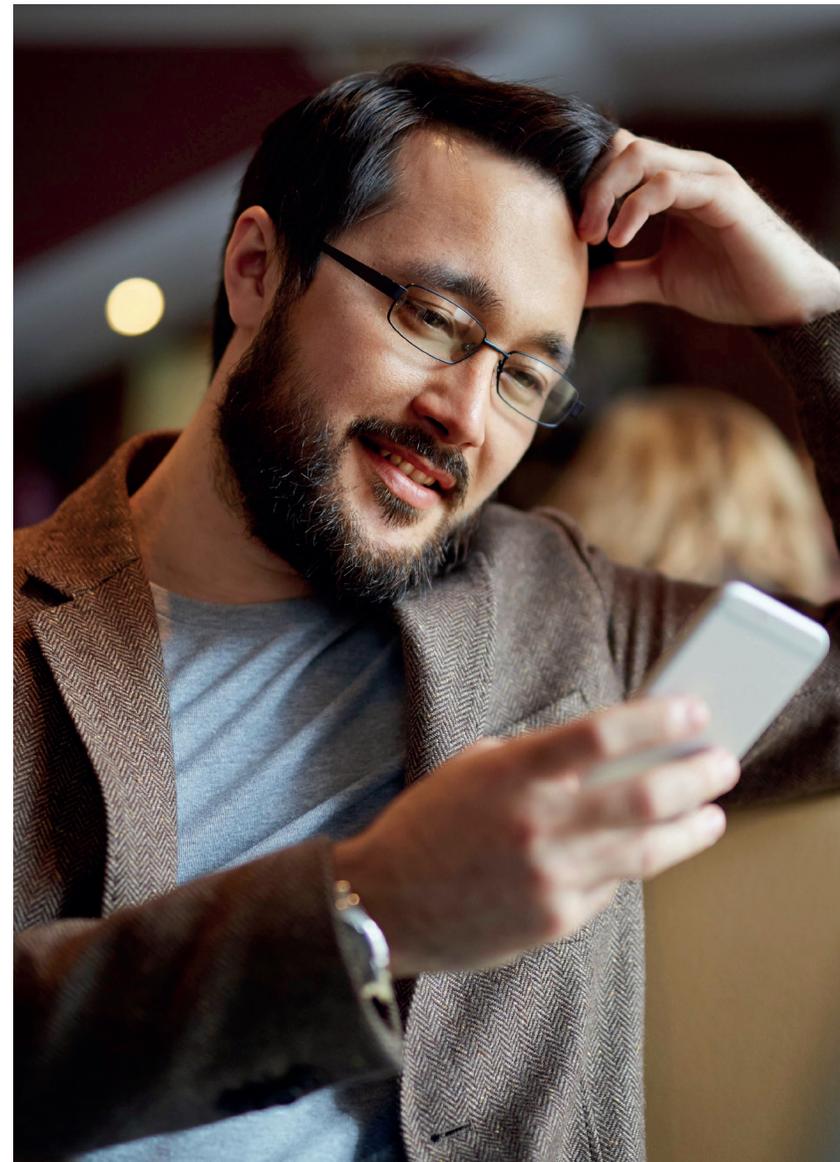
Training best practices

- Assess current skills: Assessing where staff skills lie when planning to bring in more context-aware cases will not only help inform technical deployments, but it can also be crucial in developing a long-term training plan that maximizes the value in your investment.

- Identify leaders: Find out which investigators currently do the most complex cases–this may be a Special Investigations Unit, or advanced Financial Intelligence Unit. This group may already use tools to document cases in more visual ways, or with greater context. It's likely a manual process, so they'll have an intimate understanding of how these complex cases are composed–and how to break them down. Identify the early adopters in that group: they'll help drive your strategic vision forward, becoming key trainers and teachers for the larger team.

- Learn from experience: These investigators can also help curate training cases. Use experience from advanced users to demonstrate what a "normal" network looks like and what an "unusual" network looks like. They can distinguish key factors that led them to their decisions, which helps demystify networks to new or less-experienced users. From a technology perspective, these findings and risk factors can be automatically applied to graphs to create visual cues that help investigators navigate and thoroughly understand a graph.

Forging a better future

Money laundering is a pervasive crime, one whose consequences become more and more serious as global criminal networks grow more complex. Understanding not only individual criminals but also their relationships is now crucial to stopping money laundering quickly and effectively. The current standard of a rules-based system is not enough to contend with criminals today–at least, not alone.

Graph analytics is a flexible, intelligent system that can complement the solid foundation of a rules-based system. It takes full advantage of data, greatly expanding the toolbox of skilled investigators and allowing for broader and deeper insights. Oracle Financial Crime and Compliance Management lets you use both rules and graph analytics - together, on the same data - enabling a frictionless transition to the next generation of AML technology.

We invested in graph because we believe it's the future–and we believe in a future that's better and safer all over the world.