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MEANINGFUL DATA

Graph Technology
A New Horizon in Banking Industry

Innovate & Initiate Digital Transformation by solving complex issues with actual real-time solutions using Knowledge Graphs.

“Knowledge has a beginning but no end.”

Geeta Iyengar

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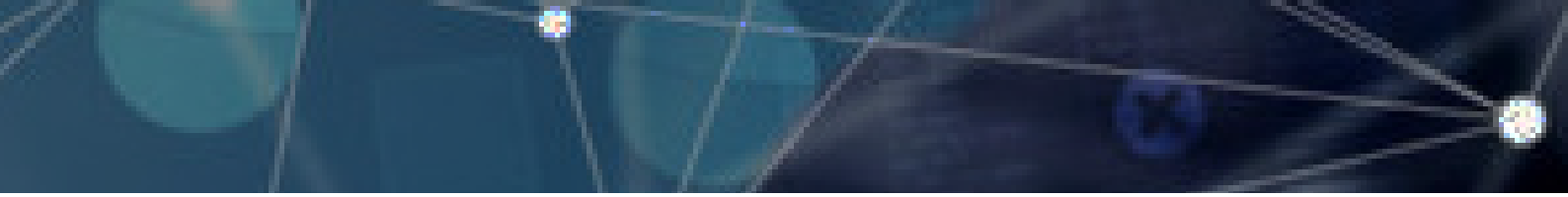
Introduction

Most **Banks, NBFCs & FinTech** are wrestling with essential control over challenging & complex situations in **digital transformation**. **Traditional technologies** are suffering to fulfill those demanding situations and will eventually call for **innovative methods** that can help in **solving complex problem statements** that exists or may arise in the future.

The parallel financial industry is facing a major challenge in providing business users with the data they need, when they need it, without sacrificing quality or governance. Many data-driven companies are still caught up, utilizing many technologies to compete on an entirely **new data -driven playing field.**

They cannot **deal** with and **use legacy** siloed data, their clients and business users are dissatisfied with slow responses to simple requests, and those in charge of change are drowning in complexity. These firms face growing challenges from regulators and partly fossilized humongous data.

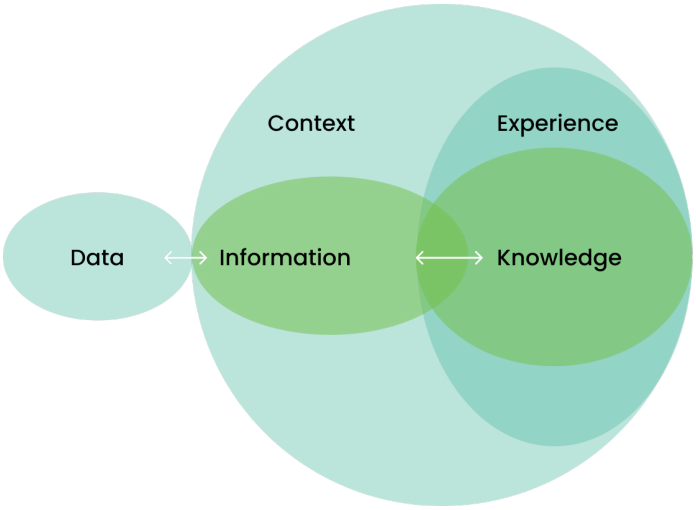
To overcome these new age challenges, many monetary groups are leaning towards, **Graph Database, Semantic Data, Knowledge Graphs, RDF & Digital Twins.**



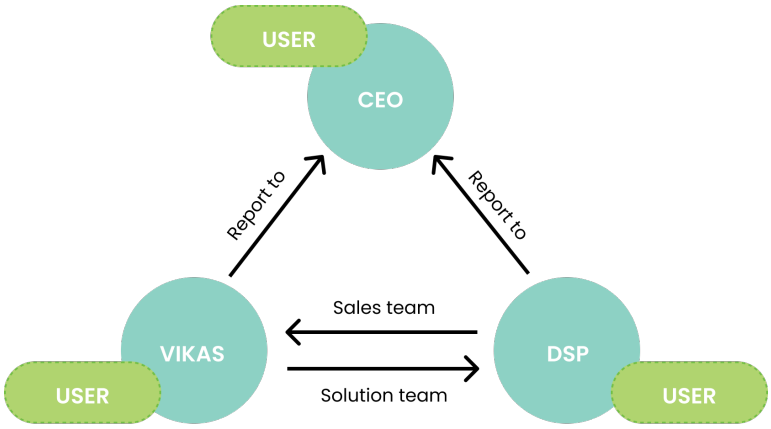
"A new horizon of data-driven decisions will be focused on hybrid intelligence which is data fusing with business knowledge"

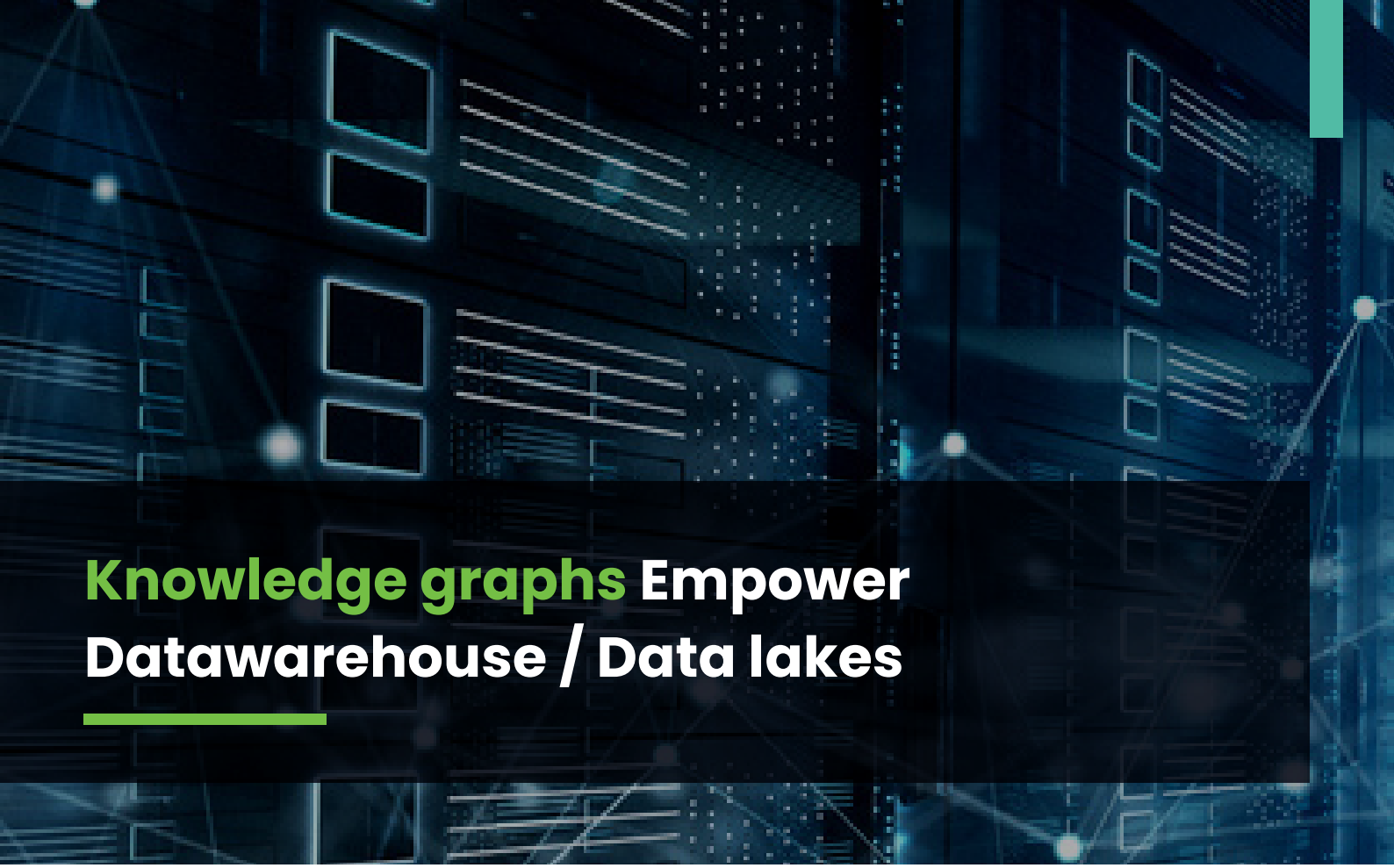
KNOWLEDGE refers to reasoning, process, rules, business, cognition, objects, events, concepts, & so on...

Representing knowledge in the form of graphical networks consisting of nodes & relationships is **GRAPHICAL DATA**



Below is a sample how graph data is represented





Knowledge graphs Empower Datawarehouse / Data lakes

Data warehouses continue to be valuable **for providing analytics** for a wide range of use cases. You may be among the many who are completely rethinking their data warehouse or using **different in-house** technologies to tackle the task of **increasing data & existing databases,** which are not scalable to a large extent.

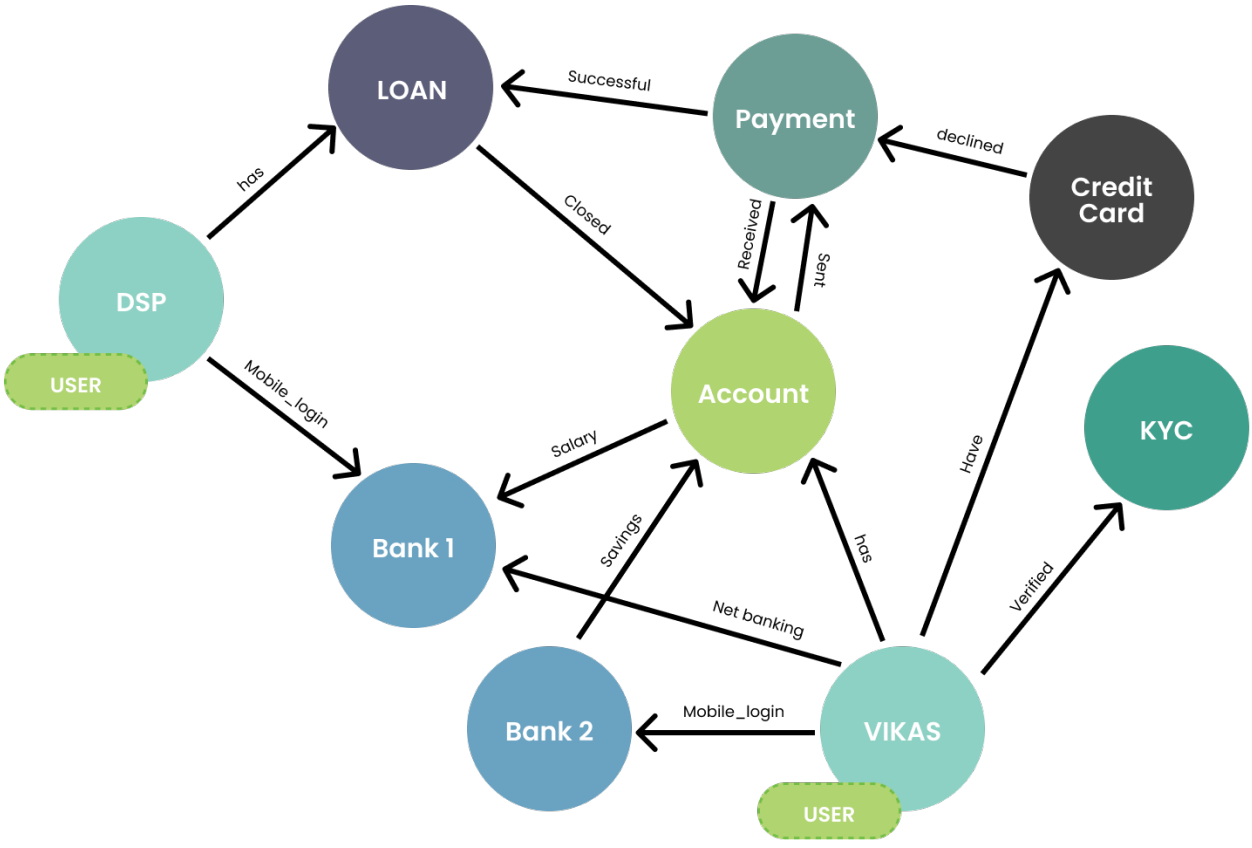
Today's trend is for companies to consider new deployment options such as the cloud, new licensing models like subscriptions, open source, community, and even **new paradigms for analyzing data** that can save time, cost, and resources.

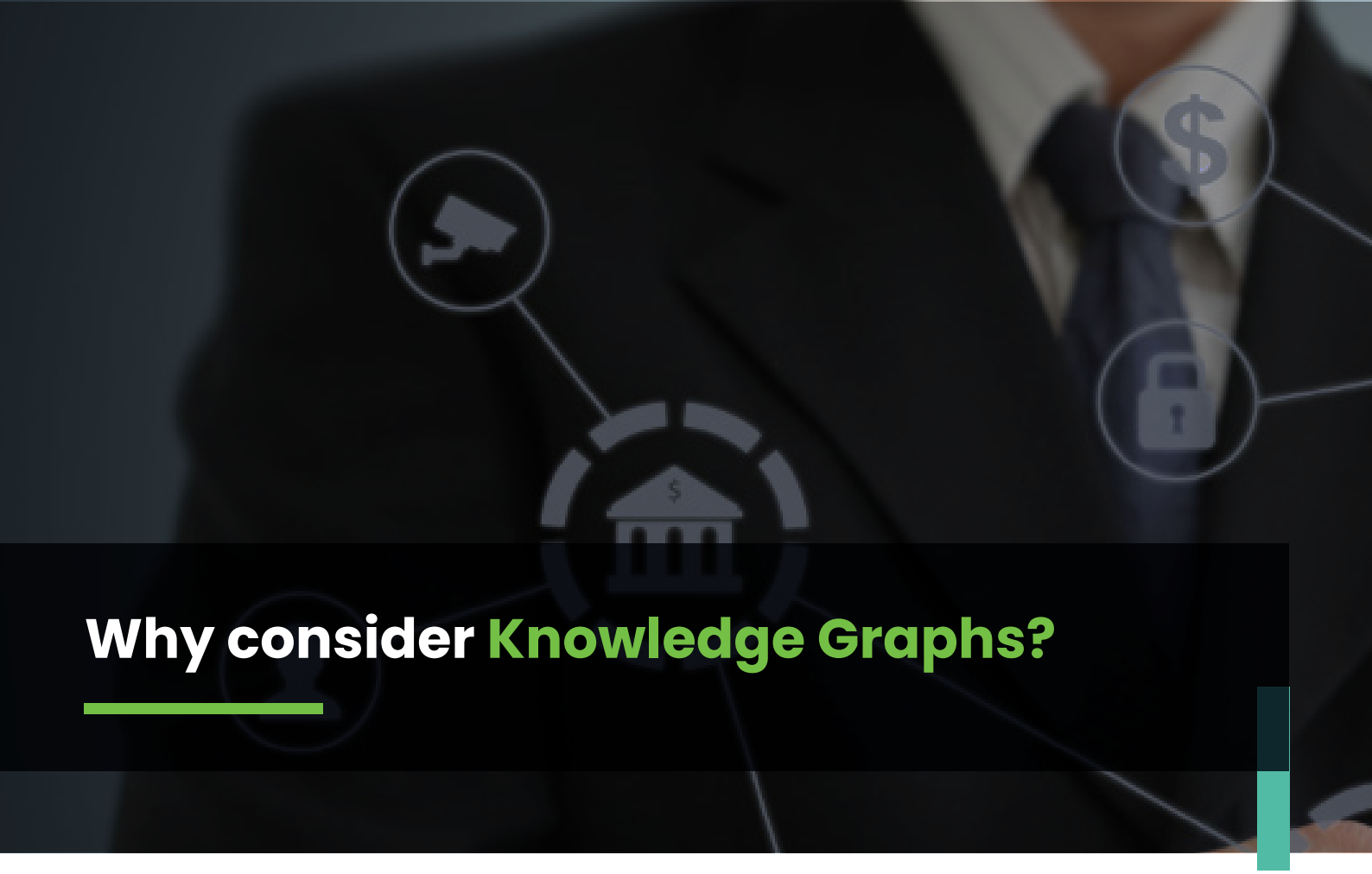
Here is a **solution: Graph databases** are **schema free** & will **work with structured & unstructured data.** They **enable complex analytics** against the data and, can operate in **real-time.** Graph databases, to be used in conjunction with traditional data warehouses. This in turn reinforces the whole concept of the logical data warehouse which, in turn, means consideration of what you **need to support a distributed, heterogeneous** warehouse environment that is required at any time for users.

Graph data helps in **simplifying Metadata** & **Master data**, the data team has less time to manage schema for incoming data from multiple sources. Handling Schemas & potential changes are **time-consuming** challenges; however, NoSQL Databases are popular for their ease of use due to flexible schemas. **Graph databases** can power up data-warehouses & data lakes simplifying meta data management, by configuring all your data with **unlimited scalability** & limiting your need to set up **complicated ETL** & data transformation.

A key component of master data management (MDM) is to **supply meaningful** views of disparate data. The fact/property underpinnings of a graph databases are designed to optimize those views. You can **easily model** both hierarchical and nonhierarchical master data in a graph, making it easier than an RDBMS for visualizing data relationships.

Below is a simple representation of Graph database in BANKS





Why consider Knowledge Graphs?

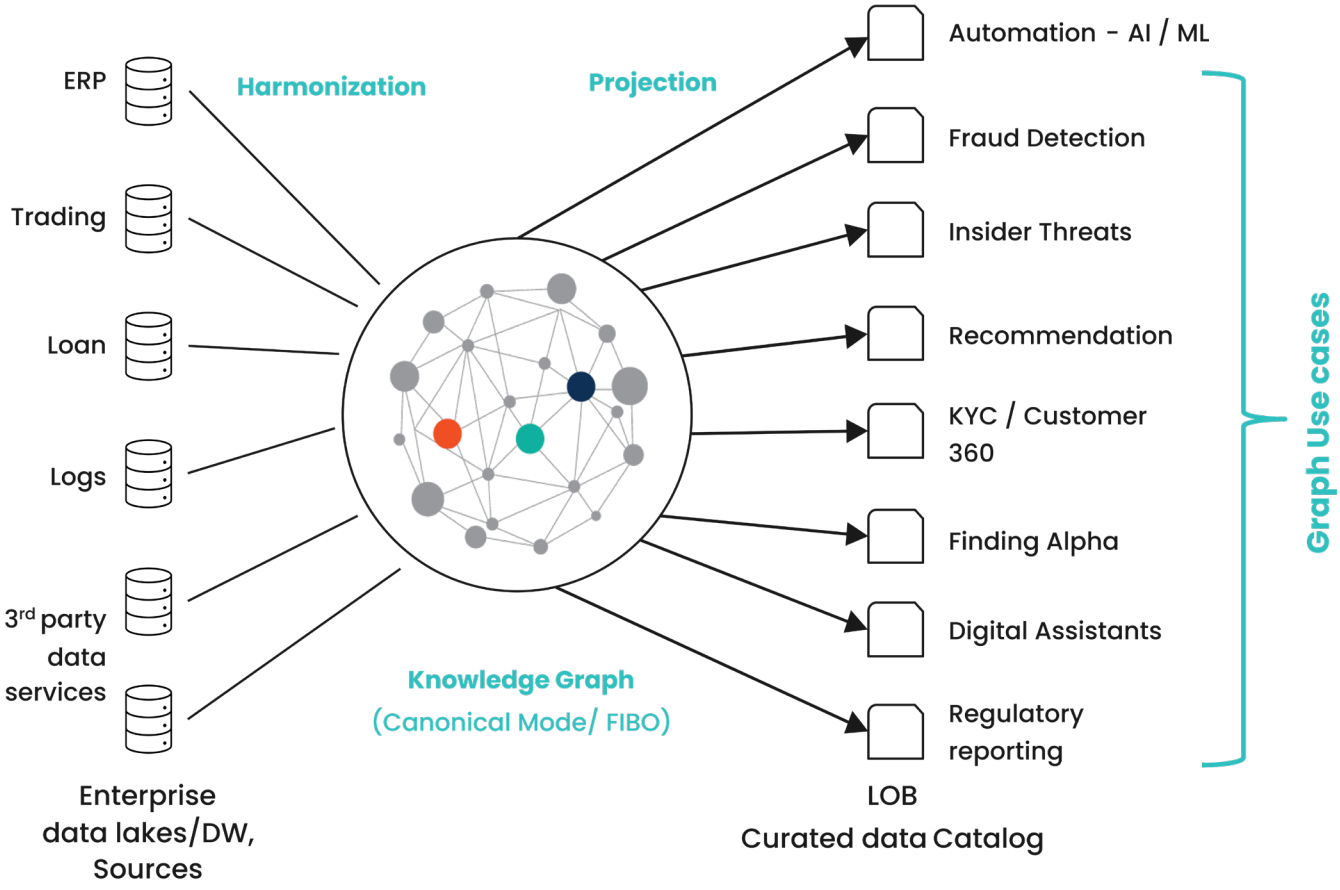
One of the most valuable and **fundamental uses** of Knowledge Graphs is to **express relationships** between **data**. **Knowledge Graphs** visualize the nature of the underlying relationships and how they are **interconnected** to gain sufficient understanding of the landscape to improve **intelligent strategic business decisions.**

On a high level, **Knowledge Graphs** helps industry with the following benefits:

1. Combined **siloed** data.
2. Combine **structured** & **unstructured** data.
3. Help businesses & operations make more **informed decisions.**
4. Summarize relationships.
5. Insights from hierarchical Data.
6. Revealing communities.
7. Visualizing a **flow of information.**
8. Network data.

Data is increasing! The problem with existing **traditional databases are not scalable upto large scale** which in fact organizations need to have huge infrastructures again which will be built on pipelines. Where **knowledge graphs can make difference** in data use cases listed few below,

- Knowledge graphs help **facilitate end-to-end analytics** enabling **maximum utilization of AI & ML.**
- Prevent **missing relationships** by enabling users to answer questions which **were not solved from long time.**
- **Semantic Graphs** help to capture & connect data outside the operational use case.
- Graph databases connect in a **multi-direction** with all users **from producers to consumers.**
- Less expenditure **on data infrastructure.**
- Overcome end-user **discovery challenges** within seconds.
- Clear ownership of **core concepts.**
- Less involvement of the data team to fix the mess.
- Come out of **technical debt** easily with a long term solution.
- One-time **investment in increasing** queries complexity.
- Actual **real-time** solutions for all your data needs.
- No investment in multiple products to build solutions.



Source: Cambridge semantics

Use Cases for Banking Industry

Use case 1:

Alternative data for any Analytics & Machine Learning

The number of data sets is **expected to grow** in the next few years, and diverse formats & sources of these data sets **will be difficult to onboard, integrate, & manage** as some of the data sets might be at the **semantic layer**.

Knowledge graphs can **streamline & accelerate** these processes, enabling the integration of these sources without coding and allowing analysts to explore the data in any dimension without knowing specific questions in advance.

It also supports the preparation of **features to feed ML and AI** applications Alternative data is expensive? Unless it's knowledge graphs, **Banks are exploring** machine learning and alternative data sets to find new **sources of Alpha.**

Business benefits:

- **Improve the prescreen process**, Unless traditional data is pulled in credit checks, alternative data can include rent, utility payments, part-time income, rental income, & more from many sources.
- Credit card **transactions.**
- Credit **evaluation.**
- Data scrapped from **internet.**
- Indication of the **future performance** of the company outside of traditional sources, such as **company fillings broker forecasts, & management guidance.**
- Expand small business and product portfolios.
- **Real-time identification** of ideal prospects.
- Grow **existing customer** relationships with customer offers for every individual.

Use case 2:

Smart Trade Surveillance

Regulatory obligations have been **steadily growing** over the last decade, and multiple new requirements are needed to be addressed. All this required a smarter approach in **spotting suspicious** trading patterns. Financial organizations **need a solution** that could improve **the efficiency** of the **alert review process** and provide better signals for **potential risks.**

Knowledge graphs help compliance officers to review the alerts based on the **actual trades** enriched with additional **contextual information** (news, emails, voice communications, market data, historical trading activities performed by the trader) to determine whether **the alerts need further investigation** or are they false positives.

Knowledge graphs help financial organizations to **improve efficiency & precision** of the alerts review process in **real-time**, with existing & new process derived environments as per regulatory.

Business benefits:

- Discover all **alerts related** to **Trader** & group together similar alerts.
- Discover all **similar traders** based on **trading style, instruments, purchase concentration, etc.**
- Discover all communications related to the **buying of traders.**
- Accelerate the **alert review process** with **real-time identification** of suspicious trades that happened previously, relate them, take actions, and define or align different **regulations & businesses.**
- Smoothly integrate the aggregated data, which allows **monitoring traders** who closed a lot of deals and generated a lot of alerts.
- Business **unit hierarchies** will have a better picture of what was normal and where to look for **deviations** from **normal.**
- Allow **investigators** to drill deeply into potential **compliance** issues by asking and answering questions in **real-time.**
- Easily deploy **proactive and customizable** compliance dashboards and **automated** reports to monitor activity with new or **updated policies and procedures.**

Use case 3:

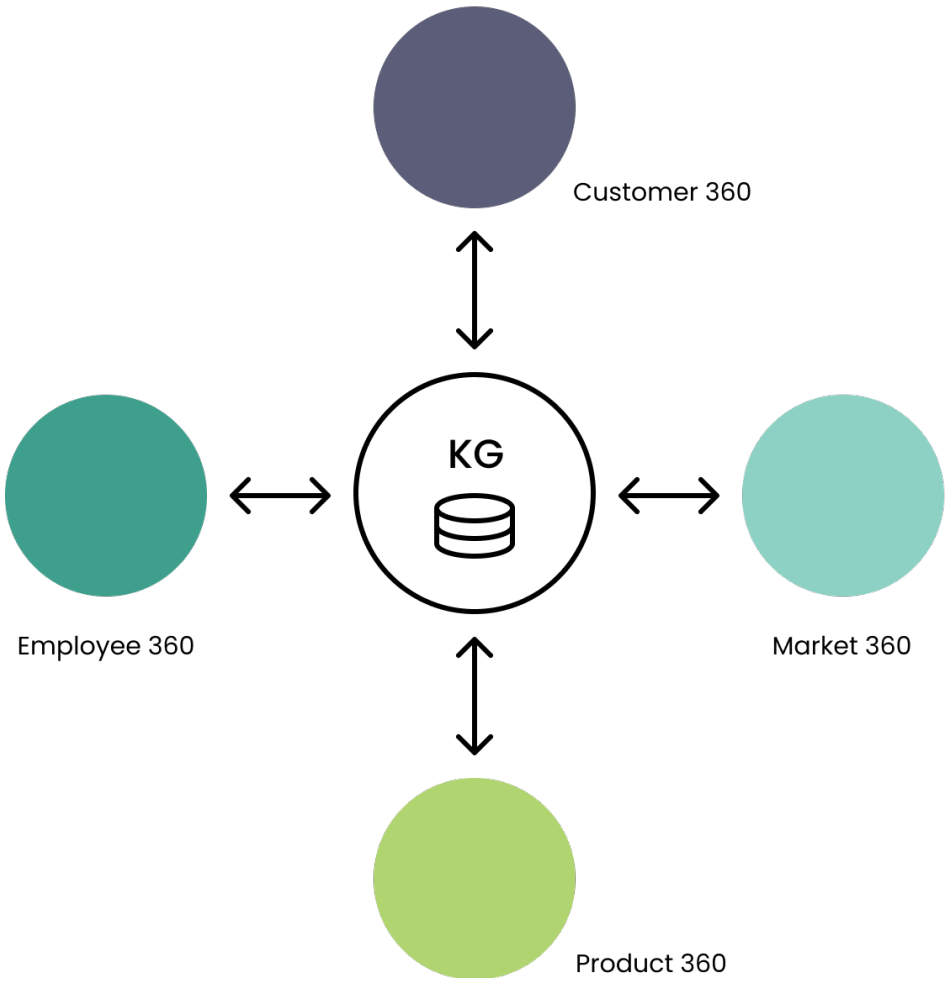
360 ° view of Risk & Value

The **key to the successful** digital transformation of any company is to be able **to dynamically generate 360-degree views of core systems**, processes, and business The challenge for financial institutions seeking **competitive advantages** in the market is not a lack of information; it is the flow of information from diverse sources with complex and huge silos of data.

Knowledge graphs enable companies to **semantically** integrate diverse data and draw connections at an unprecedented scale. They also allow users to connect external sources of data efficiently, regardless of their **underlying data formats and models.**

Business benefits:

- Keeps transformations **discrete & granular.**
- Create a comprehensive and **accurate picture** of all business objects and their relationships in the context of core **business processes.**
- Company will be able **to dynamically generate** comprehensive 360-degree views of core processes and business objects.
- Understand each **customer** as they **progress** along their customer journey, including their **individual needs.**
- Create a **suitable database** for a complete 360 data from **various** systems including external sources.
- Benefit from **accurate, real-time recommendations** & **excellent assistance** with **complex configuration problems.**
- **Increase competitiveness** through better reuse of **existing knowledge assets.**


Customer 360
KG
Employee 360
Market 360
Product 360

Use case 4:

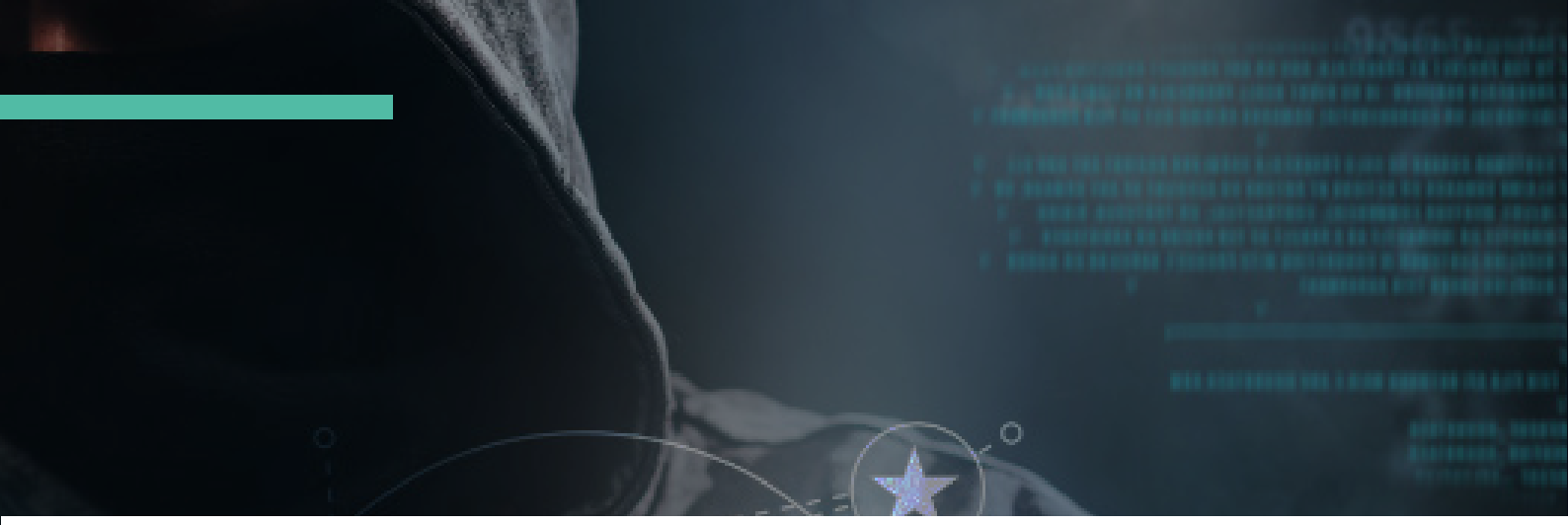
Real-time Fraud Detection and Financial Crime Analytics

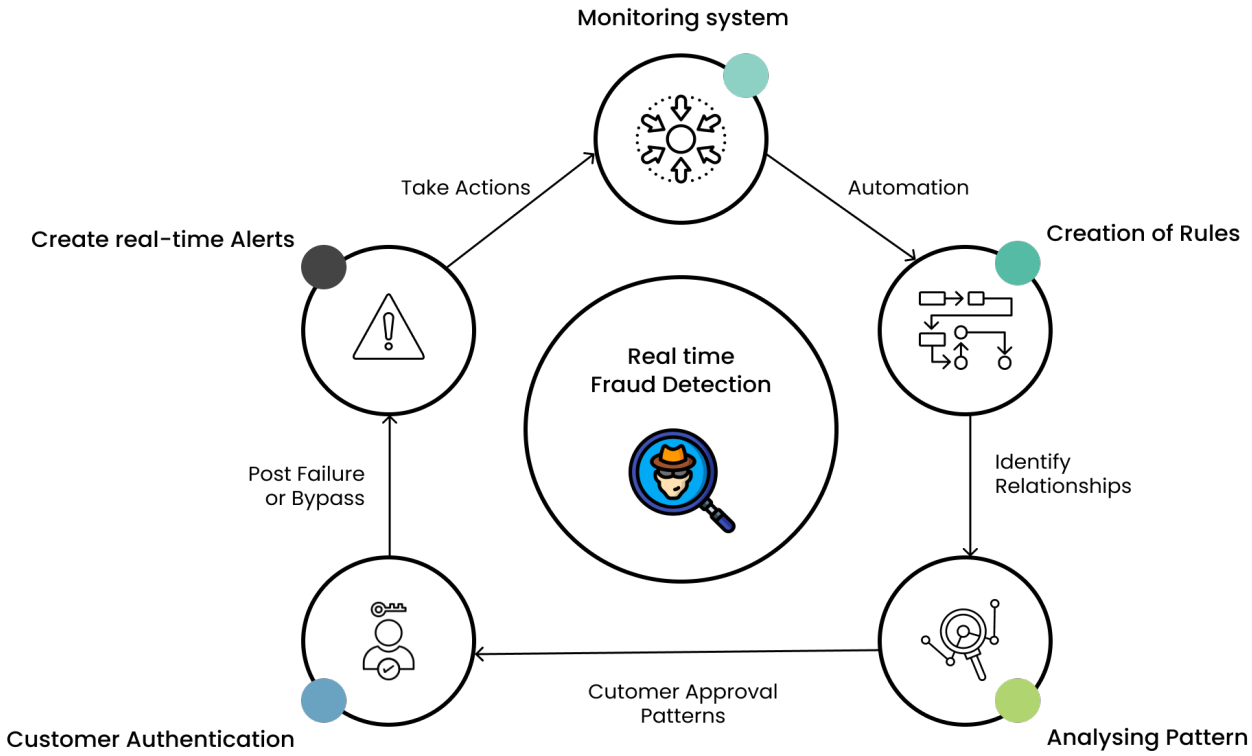
Fraud is an unwanted side effect of financial systems and needs to be prevented. Due to the **high number** of processed **data per day**, it is difficult to catch which of them are **suspicious** and which are not. Fraudsters use methods that are **based on certain patterns of behaviour**. Such patterns can be **identified** using **graphs.** Fraud techniques are continually **evolving.** Fraudsters may involve an individual or a group of people working together to commit a fraudulent transaction.

It is not only essential to detect fraud but to be able to prevent it. It is cardinal to **think one step ahead** and **detect** fraud **early** before significant losses occur. The fundamental structure, also called a **graph's topology**, gives many insights which are not easily discoverable in the traditional way of analysis, but also help to **examine in real-time.**

Rings in graphs are a **powerful** way to highlight subgraphs that have nodes **with common characteristics.** These common characteristics can indicate family members, groups of **loyal customers,** or **incidents of identity fraud.**

The general tendency is that a group of people working collectively to commit fraud might use **overlapping** identity documents. This may be because of **deliberately generated synthetic identities** or **stolen identities** arranged to support their **criminal intentions.**





Business benefits:

- **Data anonymization** can address this issue with RDF by **connecting a semantic** data layer of **multiplex data,** which will result in hiding confidential information while maintaining the **analytical** utility of the data.
- Keep tracking network users activities over different time **stamps & patterns.**
- Easily **investigate** inherent **behavior** of users
- Clear visibility at every step of the user **journey** including ads, fake listings, promotions, fake accounts, logins, devices, tools, & many other techniques.
- **Uncover** influential individuals and identify **high-frequency paths in fraud detection.**
- Define **suspicious patterns** such common attributes short path transactions, patterns outside normal transactions.
- **Using graph technology,** anti-fraud teams augment **discrete data scrutiny** with connected data analysis. Teams then identify the relationships between people, accounts, business entities, transactions, and other data.
- Identify key relationships to **detect & trace funds** in **real-time**.
- Proactively **stop** sophisticated **fraud** rings.
- Reduce false positives in data that **impede valid transactions.**

Use case 5:

Compliance Management & Reporting

Knowledge graphs leverage the power of **semantic technologies** to not only unify and **interlink** various sources of compliance data, but also to apply complex rules and patterns for **semi-automated compliance monitoring. Financial compliance** requires companies to maintain sophisticated customer screening and transaction surveillance systems that pose data quality and data availability challenges.

Current compliance systems are focus mainly on data collection and data consolidation, leaving less time for in-depth analysis. In order to optimize compliance checks, **knowledge graphs combine** contextual domain knowledge with **Natural Language Processing (NLP) and Machine Learning.**

Business benefits:

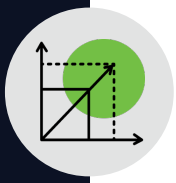
- **Unambiguously** identify the parties, transactions, markets, and instruments involved in the activity.
- Enrich the **existing data** with additional information from **third-party sources.**
- Provide **rich analytical context** by grouping the information into different hierarchies and logical models.
- Interpret the existing data and infer new facts by using the formal **semantics of knowledge graphs.**
- Provide **additional suggestions** on the basis of semantic or graph similarities.
- Interpret **each alert** not only against the latest version of the organizational structure, but also against its state at the time when it happened.
- Complement the structured data with **risk or opportunity** signals from unstructured sources.
- **Create** task-specific dashboards and analytics UIs for the SME to consume and act on the information.
- Normalize data to compliance or industry models such as the **Financial Industry Business Ontology (FIBO), SEC, or FCA** glossaries by **ingesting information** in knowledge graphs.
- Iteratively **improve the quality** of the **events and alerts** processing by involving SMEs, historical events, and regulatory mandated patterns.
- **Automate** the **repetitive tasks** for process monitoring and measurement data updates, software operation, etc.
- Meet the **KPIs for operation and process** efficiency, data, and information quality, software resiliency, and productivity.
- Provide **analytical dashboards** for data points monitoring, related to the key data element. Identify patterns and **correlations between multiple alert events**. Suggest specific information or subsets of information about suspicious activities.
- Visual information consumption and **investigative** interfaces, **replicating** and enhancing the SMEs **workflow.**

ROI with Knowledge Graphs

Businesses care about results, and knowledge graphs deliver unmatchable ROIs. Knowledge graphs deliver more than 500% ROI in any specific use case. Organizations that use these Graph technologies enjoy impressive ROI due to:

Reduce cost by 65% on your data infrastructure.

Increase reliability with a single data platform for any type of use case, LOB and analytics.



Greater scalability from GB, TB, to PB supporting billions of nodes, relationships, & properties.

Increased productivity by 70% with the data team & 60% with the business team.

20x faster & better decision making.

Accelerate innovation 8x faster in digital transformation.

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