EDM COUNCIL WEBINAR SERIES

KNOWLEDGE GRAPH IN ACTION

JULY 2, 2020
11:00AM EDT / 4:00 PM BST

John Bottega
President
EDM Council
Agenda

Part 1
- Knowledge Graph - Industry Update
- EDMC Open Knowledge Graph Agenda
- Use Cases - Knowledge Graph In Action

Part 2
- EDMC’s Open Knowledge Graph Support
- Knowledge Graph Training & Education
- *EDMC Open Knowledge Graph Shared Lab*
TODAY’S SPEAKERS

Joe Bugajski
Practice VP
Gartner

Mike Meriton
COO, Co-Founder
EDM Council

Harsh Sharma
CDO Advisory
Knowledge Graph Expert

Robert Trypuz
OKG/FIBO Project Manager
MakoLab

Dan Weitzner
Co-Founder
VP R&D, timbr.ai

Nav Mathur
Sr. Director Global Solutions, Neo4j

Jesús Barrasa
Director of Sales Engineering EMEA, Neo4j
Knowledge Graph Industry Update

Graph’s Time Has Come!

Joe Bugajski
Practice VP, Gartner
Joseph M. Bugajski
Practice Vice President

Joseph (Joe) Bugajski leads Gartner’s Data and Analytics Practice. His analysts guide chief data officers (CDOs) and chief analytics officers (CAOs) with data and analytics strategy, organization formation, budgeting, staffing, MDM, culture change and governance.

Mr. Bugajski is cofounded MIT's CDO program with Prof. Rich Wang. And, as Visa’s first CDO, he was globally responsible for data and analytics. Prior to Visa, Joe was CEO of Triada, a machine learning software company.

Joseph (Joe) Bugajski
Gartner; California
Graph’s Time Has Come

Joseph M. Bugajski
Practice VP for D&A Leaders
Gartner, Inc.
Graphs are intuitive and powerful. They can tell you what questions to ask.

Erick Brethenoux, Gartner
By 2023, graph technologies will facilitate more rapid decision making in 30% of organizations worldwide.
Graphs do more than just connect data. They can imitate our brains in ways we actually work.

Gartner, Inc. 2020
You Are Using Graph Algorithms Everyday

- GPS
- Search
- Recommendation Engines
# Graphs are practical...

<table>
<thead>
<tr>
<th>Explore information the way we think about it</th>
<th>Traverse complex networks</th>
<th>Build semantic and knowledge networks</th>
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<tbody>
<tr>
<td>Who else knew what else at a different time?</td>
<td>Whose card was used for which purchase at what retailers?</td>
<td>When can we safely reopen Santa Clara County?</td>
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Summary
Recommendation: Start Using Graphs

- Speed your “situational awareness” for decision-making.
- Start proofs of concept that use graphs. Document your findings and successes.
- Work with standards groups such as OMG and EDMC. Share your knowledge.
- Educate your data specialists about graph’s capabilities. Task them to investigate how graphs can improve their clients’ situations.
- Augment your metadata with knowledge graphs. Use it to create richer business contexts to better govern your data by traversing data silos, discovering hidden relationships and evaluate data reliability.
Recommended Gartner Research

- An Introduction to Graph Data Stores and Applicable Use Cases
  Sumit Pal (G00361957)

- The Future of Data and Analytics: Tales and Trends From the Center to the Edge
  Frank Buytendijk, Svetlana Sicular and Others (G00351779)

- Hype Cycle for Analytics and Business Intelligence, 2019
  Jim Hare and Kurt Schlegel (G00369713)

- Predicts 2020: Data and Analytics Strategies — Invest, Influence and Impact
  Lydia Clougherty Jones, Ehtisham Zaidi and Others (G00463674)

- Artificial Intelligence Hype: Managing Business Leadership Expectations
  Erick Brethenoux (G00343734)
EDMC Open
Knowledge Graph
Agenda

OKG Updates

Mike Meriton
COO, Co-Founder, EDMC
**OPEN KNOWLEDGE GRAPH**

What is Open Knowledge Graph and OKG FIBO

- **Open Knowledge Graph**
  An EDM Council Initiative dedicated to supporting Knowledge Graph Capabilities Cross Industry through training, education, shared lab and industry ontologies

- **OKG FIBO / OKG AUTO**
  An Open Source Ontology for the Financial Industry and is available for download from the EDM Council web site to also include OKG AUTO (automotive ontology)

- We invite and encourage SMEs to contribute content, extensions and new structures
- OKG focus is on **Business Use Cases** to demonstrate value of graph technology
They are many companies that are already using FIBO for themselves or their end clients.

We want to promote FIBO through business use cases.

Call to Action:
- Call for business use cases and sample data sets
- Publish and share with the EDMC Open Knowledge Graph Community
- Continue to advance awareness and success
Knowledge Graph in Action
Knowledge Graph
In Action – Use Case

COVID-19 SQL Knowledge Graph

Dan Weitzner
Co-Founder, VP R&D, Timbr.ai
Dan Weitzner
Co-Founder, VP R&D, Timbr.ai

Dan co-founded and leads the software development team at Timbr.ai. He has been developing software and database infrastructure for over 10 years. Together with his co-founders and development team at Timbr.ai, Dan helped to develop a breakthrough technology that empowers any database with reasoning capabilities and brings knowledge graphs “to the masses”. Dan has extensive experience as a full-stack software developer and leader of cross-functional teams. He is a graduate of the Data Scientist program at the Technion-Israel’s Institute of Technology and earned his B.Sc. Computer Science at FAU.
COVID-19 Knowledge Graph

July 2, 2020
Integrate the publicly available data sources generated worldwide in the fight against COVID-19 into a Knowledge Graph available to researchers, analysts and data scientists to evaluate and develop recommendations in the fight against COVID-19.
Constraints

- Avoid need to acquire new skills
- Integrate continuously updating stream of heterogeneous databases
- Integrate to BI tools to enable complex analytics by analysts
- Fast implementation
Enabling Technology

• Implementation of the Semantic Web in SQL
• Virtual layer over SQL and NoSQL databases
• Seamless integration with BI tools
• No need to learn new query languages
• No ETL operations
• No retraining of IT personnel
Implementation

Data Sources

200+ links
300+ tables

Ontology Creation and Data Mapping

Big Data Semantic Knowledge Graph working directly over data warehouses and data lakes

Use

Access to Analysts, Data Scientists and Researches
Dataflow Architecture
Demo

COVID-19 SQL Knowledge Graph
Thanks
Knowledge Graph In Action – Use Case

Neo4j’s Fraud & AML Framework

Nav Mathur
Sr. Director Global Solutions, Neo4j

Jesús Barrasa
Director of Sales Engineering EMEA, Neo4j
NAV MATHUR

Sr. Director Global Solutions, Neo4j

Nav leads Neo4j’s Solutions Organization, setting the vision, strategy and building reusable frameworks, demos and project accelerators that help clients with significantly faster realization of their projects and understanding the business value of graphs.

With over 20+ years of experience building Business & IT solutions, Nav seamlessly straddles both business and technology domains in the context of client needs. From his past experience with Wipro, TCS, Cambridge Technology Partners & Novell, he has perfected his craft of understanding business value, optimal technology architecture, and enterprise transformation challenges.

Nav holds a Masters degree in Software Engineering from Boston University and a Bachelors degree in Computer Engineering from Bangalore University (India). He has also completed an executive management course from Babson College.

JESÚS BARRASA

Director of Sales Engineering EMEA, Neo4j

Jesús combines over 15 years of professional experience in the Information Management space with a focus on both the RDF and the Property Graph stacks. He holds a PhD in AI/Knowledge Representation (Semantic Technologies). Prior to joining Neo Technology, Jesús worked at Ontology (now EXFO) for seven years, where he got first-hand experience with large RDF Graph deployments in many successful projects for major Telco companies all over the world.

He’s currently heading the Sales Engineering team in EMEA and also leads the Neosemantics project for Neo4j Labs.
Because of its connected nature, money laundering & fraud are massive data challenges.

Billions of dollars from illegal activity is generated on a yearly basis – of which substantial amounts attempts to be laundered.

Financial services firms have to deal with fines, if they’re not in compliance with regulations.

Firms risk of suffering severe damage to their brands in the eyes of the public, when failing to address money laundering issues.
Key AML Scenarios

**Structure**
Shared personal attributes

**Layering & Behaviour**
Circular payments, payment chains, pass-thru payments

**Flagging**
For example wired overseas to high risk geography

**Concentration**
Multiple daily transactions above a threshold

**Accumulation**
Large cash deposits/low withdrawals

**Rapid movements**
Rapid cash deposits, rapid movement of funds
Anatomy of Fraud & AML Solution Framework

1. Data Capture
   - User Behavior
   - Transactions
   - CRM
   - Organisation Data
   - Macro & 3rd Party
   - Market Data

2. Data Model & Storage
   - Choosing the right tool for the right job
   - Table
   - Key-Value
   - Column
   - Graph
   - Document

3. Processing & Analytics
   - AI / ML Pipeline (Recommendations)

4. Applications & Insights
   - Applications & Actionable Insights
   - Feedback loops

neo4j
Data Modeling

Account Holder

- Email
- Tax Number
- Phonetic Soundex
- Device
- IP Address
- Account Session
- Phone Number
- Postal Code
- Street Address
- City
- State
- Country

Relationships:
- HAS_EMAIL
- IDENTIFIED_BY
- HAS_EIN
- SOUNDS_LIKE
- USES_DEVICE
- SESSION_IP
- SESSION_DEVICE
- CURRENT_RESIDENCE
- BUSINESS_ADDRESS
- HAS_PHONE
- IN_CITY
- IN_STATE
- IN_COUNTRY
Data Modeling
Data Modeling
Data Modeling
Data Modeling
Fraud & AML Knowledge Graph
Keymaker

Analytics Pipeline

- Scoring Scenarios
- Recommending Fraudsters
Detecting Money Laundering Behavior

Graph Algorithms

Enable reasoning about network structure

**Connected components**
Identify disjointed groups sharing identifiers

**PageRank**
Measure influence and transaction volumes

**Louvain**
Identify communities that frequently interact

**Jaccard**
Measure account similarity
FIBO interoperability

- Align Graph Schema with the FIBO Ontology
- Enable instant interoperability with FIBO/RDF consuming apps
DEMO

Integrating FIBO Via Neo-Semantics
Bringing it together into a complete solution
Latest updates on EDMC’s Support

Brief Tour

Robert Trypuz
OKG/FIBO Project Manager
OKG FIBO update

1. **ACTIVE OPEN-SOURCE DEVELOPMENT COMMUNITY**
   - 80+ active inquiries per quarter
   - Regular Quarterly Releases (Q2 2020 Released June)
   - Active Work Groups
     - SECURITIES
     - DERIVATIVES
     - INDICIES & INDICATORS

2. OKG FIBO integration with *Solidatus*, *Neo4J* and *TigerGraph* platforms

3. OKG FIBO Industry Survey...
The new branch of OKGs for Automotive Industry

1. The new branch of the EDMC OKG initiative focused on Automotive Industry applications of Knowledge Graphs

2. Based on previous works for the automotive extension of schema.org and Generic Automotive Ontology

3. The new activity will engage members of existing W3C’s Automotive Ontology Community Group.

4. The planned activities will address a wide range of vital applications – from the unique aspects of traditional and autonomous vehicles safety to the cross-industry edge computing applications.
LATEST UPDATES ON EDMC’S SUPPORT

OKG websites

- spec.edmcouncil.org
- spec.edmcouncil.org/fibo
- spec.edmcouncil.org/auto
DAY 1
1. Knowledge Graph Business Case and Market Adoption
   • Perspective On Data
   • Industry Use Cases
   • takeaways
2. Knowledge Graph Enterprise Architecture
   • Enterprise Architecture overview
   • Data languages (RDF, RDFS, SKOS)
   • Query language (SPARQL)
   • Modeling Language (OWL)
   • Enterprise Architecture Ecosystem

DAY 2
3. FIBO Industry Model review
   • Structure
   • Content
   • Infrastructure
4. Knowledge Graph Hands-on exercise
   • Swaps in Finance
   • Toxic byproducts in Agriculture
   • Automotive manufacturing
5. Course Summary & Accreditation
   • Summary / Survey / Accreditation
UPCOMING VIRTUAL TRAINING

Open Knowledge Graph & FIBO Training and Certification

- **EMEA/INDIA – July 13 & 14**
  - 08:30am – 02:30pm BST
  - 09:30am – 03:30pm CEST
  - 01:00pm – 07:00pm IST

- **AMERICAS – July 27 & 28**
  - 08:00am – 02:00pm Pacific
  - 11:00am – 05:00pm Eastern

To register for the classes, click [here](#)

Or schedule your company dedicated (virtual) class
OPEN KNOWLEDGE GRAPH LAB

DELIVERING GRAPH POWERED INTELLIGENCE

Harsh W. Sharma
CDO Advisor, Knowledge Graph Expert
Knowledge Graph
the “Enterprise Digital Brain”
Connect the dots and enable continuous enrichment of Business Insights
Hyper-growth of Knowledge Graph Market

- $3B Graph database market over next 4 years; 23% CAGR
- $300M plus raised in VC funding

Deliver Business Value

- Personalized recommendation systems, customer experience & trust
- Supply-chain optimization & risk mitigation
- Real-time Fraud detection
- Harnessing alternative data for competitive advantage

Courtesy Marketsandmarkets
EDM Council has launched the Open Knowledge Graph Lab to accelerate adoption of newer architectures and solutions to drive agile, actionable intelligence.

- Enabling adoption via training, benchmarking & C-suite interactions
- Accelerating the development of business-driven mutualized Knowledge Graphs
- Fostering a global, cross-industry community and launch Knowledge Graph Marketplace
### OKGL Path Forward...

#### Launch

**Q2 2020**

- Lab and Website launched
- AML/Fraud Ontology review & Graph training
- Industry Ontologies of interest (Financial - FIBO, Fraud, Automotive)

#### Mutualized Use Cases

**Q3-Q4 2020**

- Launch FS Work Group: Identify mutualized Knowledge Graph use case (Anti-Money Laundering)
- Identify additional Ontologies, workgroups of interest (IoT, Healthcare)
- Graph Reference Architecture, Standards
- OKGL Cloud Sandbox to support prototypes, benchmarking etc.

#### Accelerated Adoption

**Q1 2021**

- Launch additional Working Groups, mutualized use cases
- Benchmarking – Use Case adoption analysis & reporting
- Cloud Marketplace launch
Completed Use Case - Knowledge Graph-powered AML/Risk Detection

Client
- Independent organization

Executive Sponsor
- Senior Audit Leader

Business Goal
- Leadership wanted to ensure that financial awards and other related processes provide a fair and equal opportunity
- Ability to detect AML/Risk cases leveraging best practices and inferencing capabilities

Deliverables & Value

Timeline: 4 weeks
- Trained the team on Knowledge Graph architecture & implementation
- Reviewed AML/Risk model and recommended best practices, modeling and domain standards

Completed Deliverables
- Customized Knowledge Graphs Fundamentals training
- AML/Risk model revisions, configurations and tools

Value Delivered
- Accelerated development of AML/Risk model
- In-house skilled resources for future Ontology & Graph development
- Potential future opportunity to leverage AML/Risk model for other OKGL use cases
Next Steps

Financial Services Working Group
Launch Q3, 2020

• Fraud: AML Knowledge Graph
  – Scope, assets/deliverables, participants, sponsorship discussions underway

• OKGL Sandbox
  – Test-bed for AML Graph powered analytics

Other Working Groups Under Discussion
Q4, 2020

• Automotive
  – Ontologies, IoT/Edge-Computing

• Healthcare
  – Supply chain, call center operational efficiency…
EDMC-OKGL AML KNOWLEDGE GRAPH WORKING GROUP

Annual NA AML Cost – $31.5 B; $14.3M average for a mid-large Size bank

McKinsey
• 85% of Financial crimes compliance and AML activities remain administrative or non-analytical (manual collection of data)
• Need clarity on high-risk connections and beneficial ownership, by using more automated data and intelligence sharing from public and private sources

Scope (TBC)

Customer Identity Management (KYC)
Real-time Customer Risk detection & portability of KYC processes

Transaction Monitoring Systems
Beneficiary relationships analysis & suspicious patterns in payments

AML Regulatory Requirements
Standardized, highest priority Regulatory Report(s)

Key Assets

Industry Standard Ontology, Dictionary
(KYC, Transaction, Regulatory Terms/Definitions)

AML Knowledge Graph
Architecture, Schema, sample mapping of Bank/synthetic data, mutualized value ML models

Cloud test-bed
Vendor tools, synthetic data for prototype development...

Kick-off session
planned for week of July 20th
If interested, please notify Mike Meriton
mmeriton@edmcouncil.org
OPEN KNOWLEDGE GRAPH LAB CONTACTS

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OKGL Website  
okg@edmcouncil.org
Thank You

Next Webinar: ...