

From Data to Decisions: AI + Knowledge Graphs

Emil Eifrem | Co-Founder & CEO, Neo4j

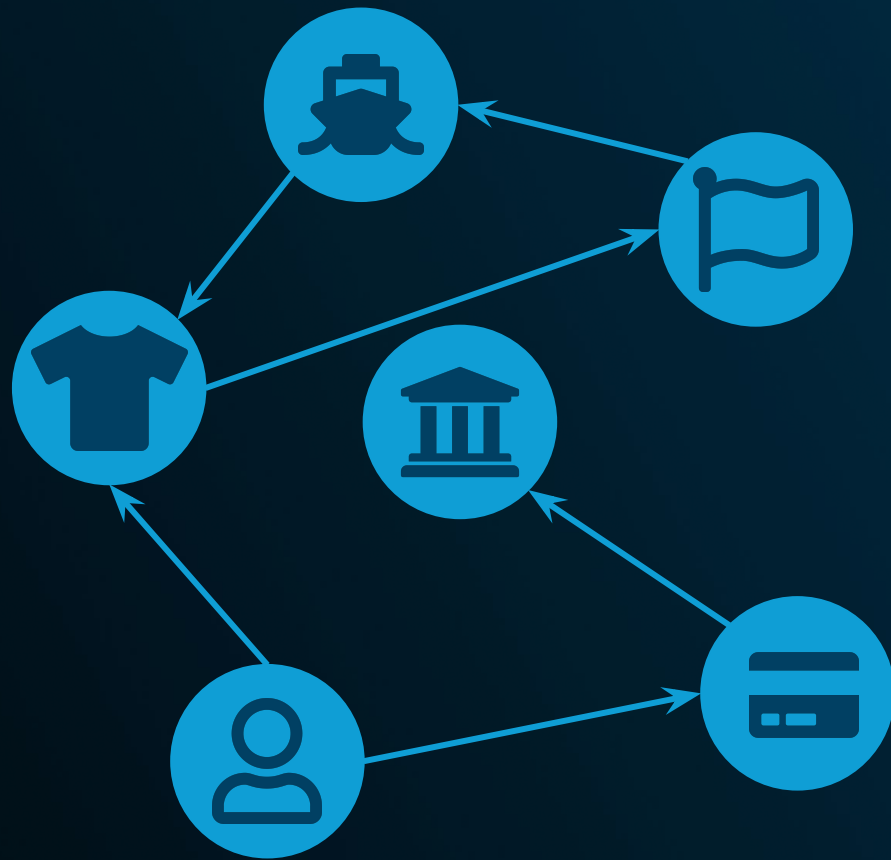


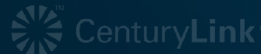
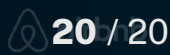












9 / 10



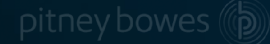
Trusted by 84 of the
FORTUNE
100



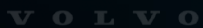
9 / 10
Top Telcos



8 / 10



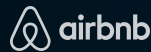
10 / 10
Top Technology & Software



8 / 10

Top Insurance Companies

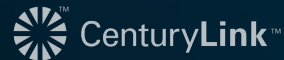




AIRBUS



Boston Scientific



DAIMLER



Deloitte.

Discovery

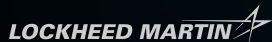


FUJITSU

2,100+ Customers Worldwide

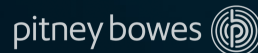
INTUIT

LEVI STRAUSS & CO.



NASA

NORDSTROM



SAMSUNG



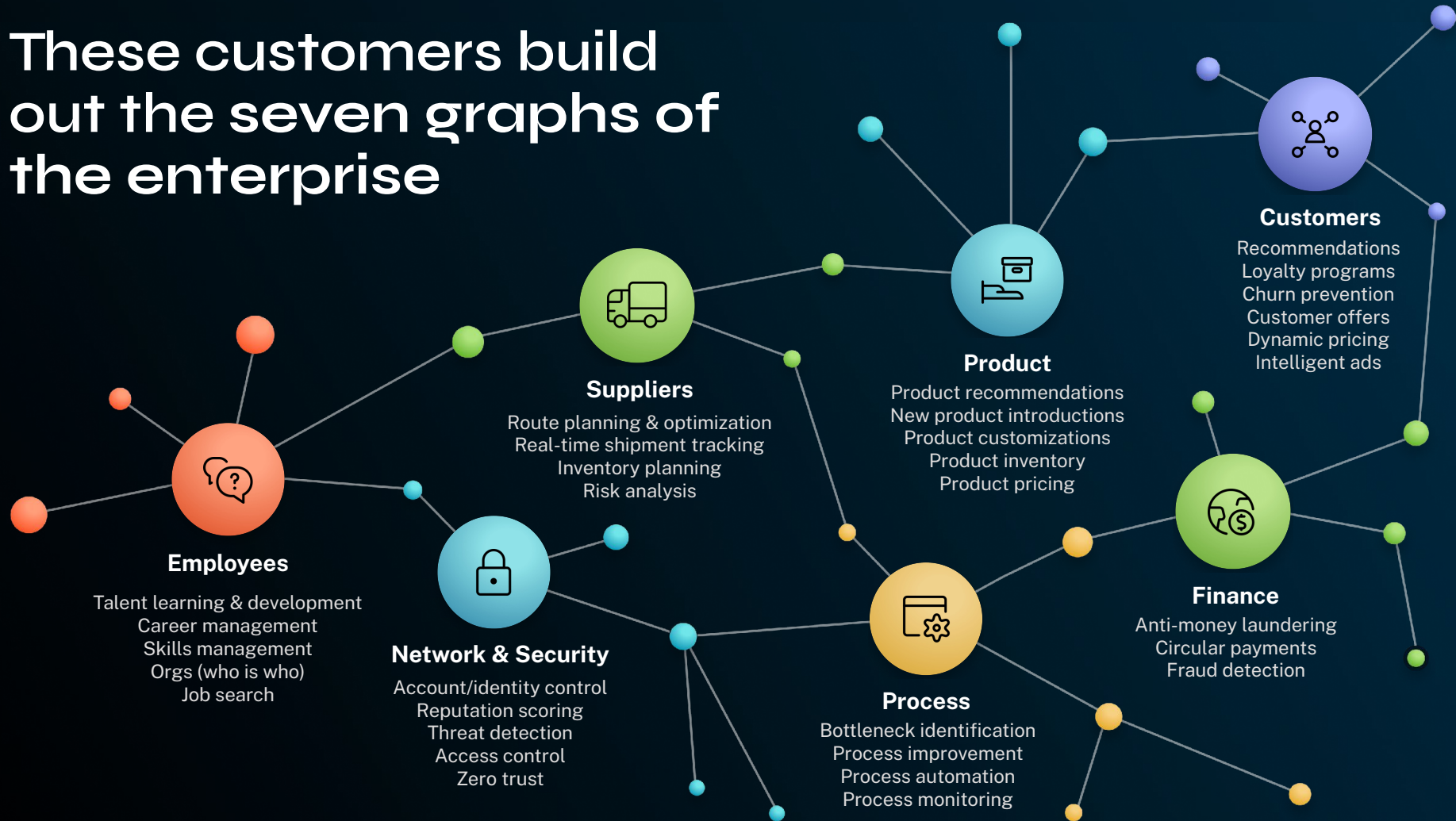
verizon



Walmart



These customers build out the seven graphs of the enterprise



AI is changing how we develop applications. **Quickly.**

AXIOS

"AI is fundamentally disrupting software development ..."

HARVARD BUSINESS REVIEW

"[GenAI]...will disrupt the very software that enabled the last wave of transformation."

Gartner

"Organizations with rich, [connected] knowledge graphs will have a significant competitive advantage..."

 **IDC**

"...AI pipelines need dynamic schemas to [handle] evolving sources."

VentureBeat

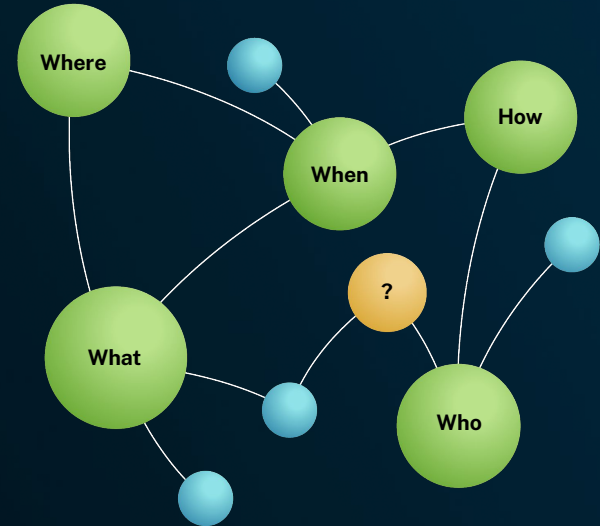
"A business data fabric reduces latency and powers advanced AI..."

Why we build applications is NOT changing

Problem to solve

Business process to map

Questions to answer



Predefined
workflows on
simple CRUD
data models



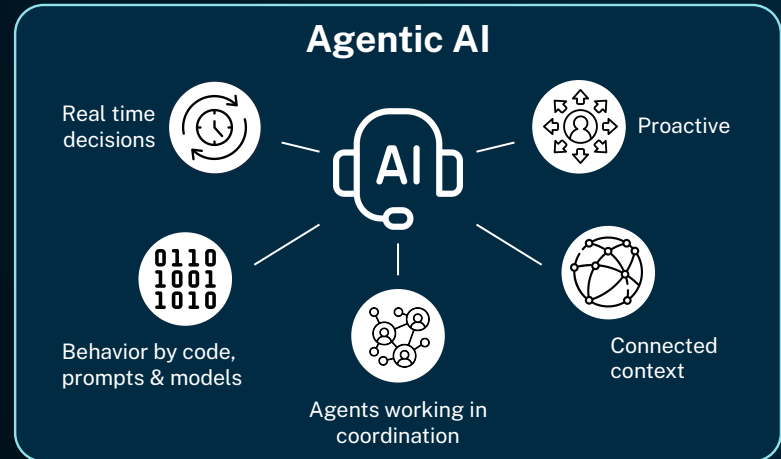
Dynamic,
context-aware &
autonomous
applications

● ● **CRUD** (Create, Read, Update, Delete)

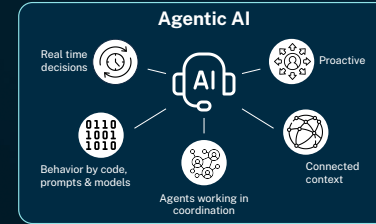
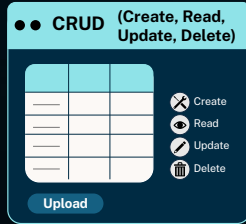
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- Create
- Read
- Update
- Delete

Upload



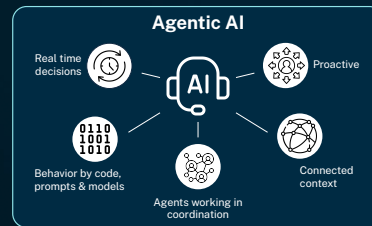
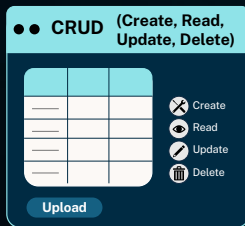
① From Static Logic to Dynamic Reasoning



Hardcoded
rules defined at
compile-time

Reason, adapt & make
decisions in real time
based on goals, context
& changing inputs

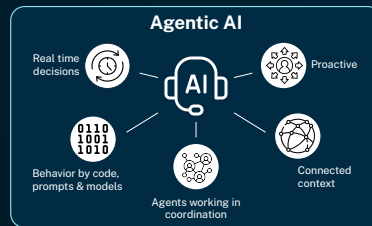
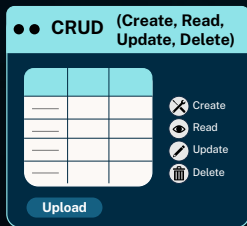
② From Request-Response to Goal-Oriented



React to
user input

Proactively pursue goals,
orchestrate tasks, and
learn from feedback

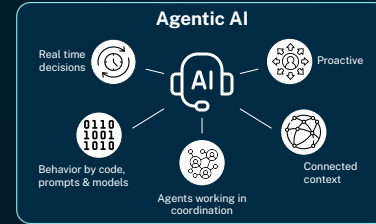
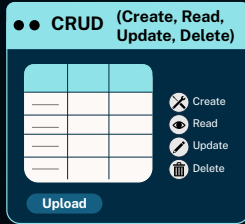
3 From Monoliths to Composable Systems



Tightly coupled architecture

Multiple specialized agents working in coordination

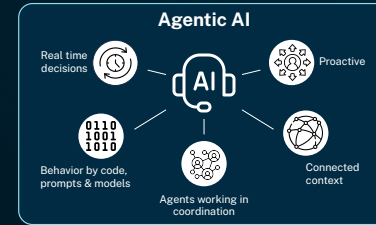
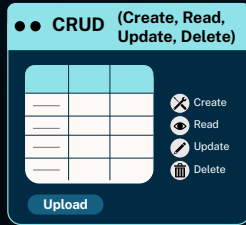
4 From Code-Centric to Prompt-Driven



Behavior defined
exclusively
by code

Behavior defined by a
combination of code,
prompts and AI models

5 From CRUD to Context



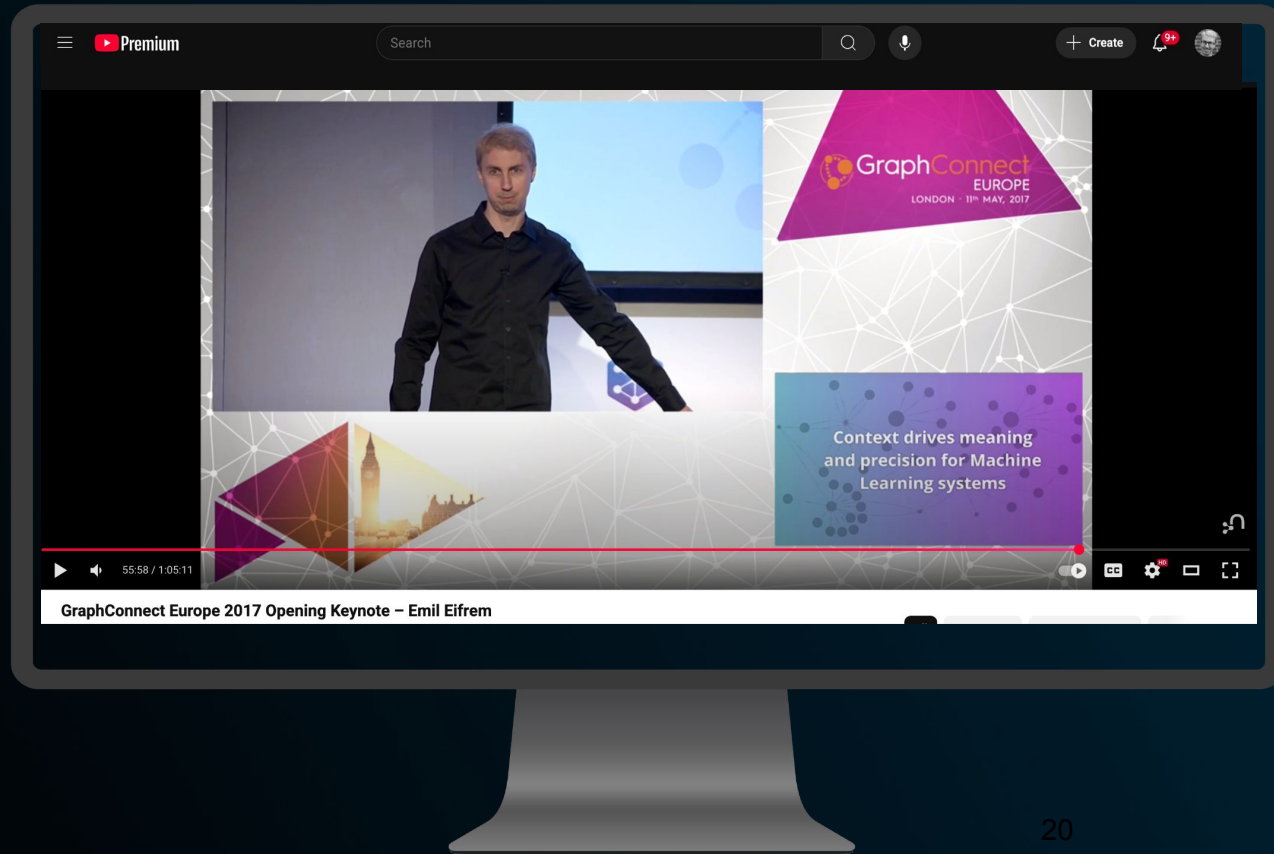
Logic centered
around
Create Read
Update Delete

Logic set by reasoning,
goals & rich, connected
context (users, tasks,
history, environment)

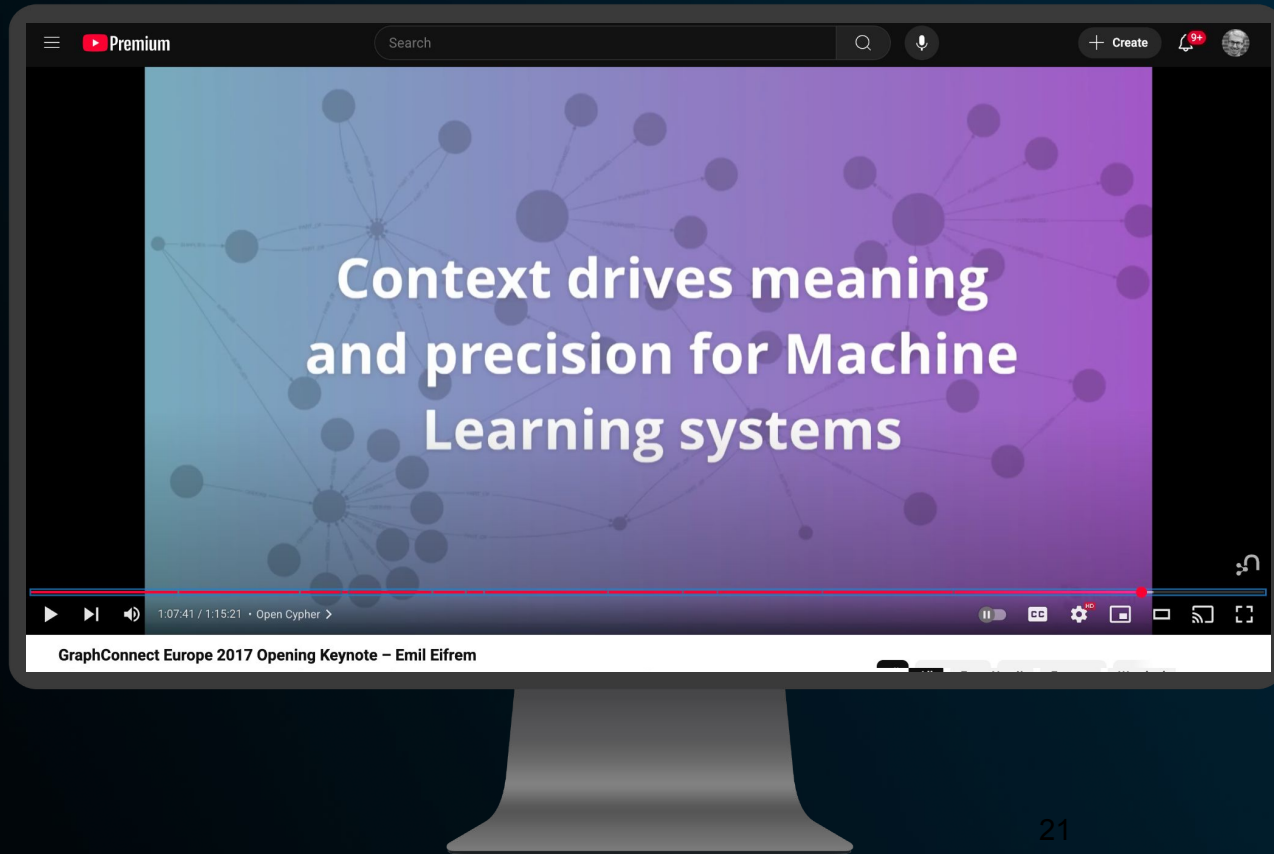
Software Engineering Is Changing COMPLETELY

- 1 From Static Logic to Dynamic Reasoning
- 2 From Request-Response to Goal-Oriented
- 3 From Monoliths to Composable Systems
- 4 From Code-Centric to Prompt-Driven
- 5 From CRUD to Context

Spring of 2017...



Spring of 2017...



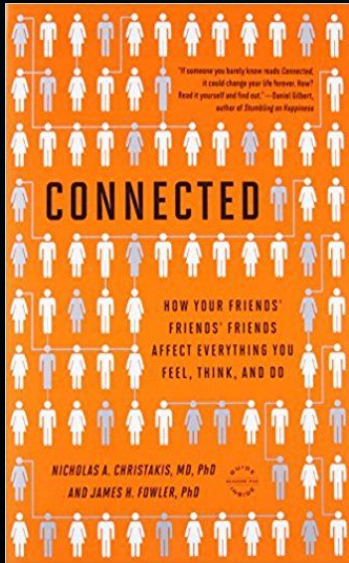
Spring of 2017...

The screenshot shows a YouTube video player interface. At the top, there is a search bar and navigation icons. The main content area displays a graph visualization centered on a silhouette of a person's head. The graph consists of several nodes connected to the central node by labeled edges. The nodes and their corresponding icons are:

- MARRIED_TO**: A node with an icon of a couple.
- PLAYS**: A node with an icon of a building.
- WATCHES**: A node with an icon of a television.
- BORN_IN**: A node with an icon of a map outline.
- DRIVE**: A node with an icon of a car.
- FATHER_OF**: A node with an icon of a family.
- WORKS_AT**: A node with an icon of a globe.

The video player controls at the bottom show a progress bar at 1:08:48 / 1:15:21, with the text "Open Cypher >". The video title is "GraphConnect Europe 2017 Opening Keynote – Emil Eifrem".

Relationships are the strongest predictor of behavior



“Increasingly we're learning that you can make **better predictions** about people by getting all the **information from their friends and their friends' friends** than you can from the information you have about the person themselves.”

Context in AI: Context Engineering



Andrej Karpathy ✓

@karpathy



+1 for "context engineering" over "prompt engineering".

People associate prompts with short task descriptions you'd give an LLM in your day-to-day use. When in every industrial-strength LLM app, context engineering is the delicate art and science of filling the context window with just the right information for the next step. Science

12-Factor Agents - Principles for building reliable LLM applications

Code Apache 2.0 Content CC BY-SA 4.0 chat discord aidotengineer conf talk (17m) youtube deep dive

In the spirit of [12 Factor Apps](#). The source for this project is public at <https://github.com/humanlayer/12-factor-agents>, and I welcome your feedback and contributions. Let's figure this out together!

💡 Tip

Missed the AI Engineer World's Fair? [Catch the talk here](#)

Looking for Context Engineering? [Jump straight to factor 3](#)

Want to contribute to `npx/uvx create-12-factor-agent` - check out [the discussion thread](#)

Factor 1 - Natural Language -> Tool (API) Calls

Add a ticket to restock the file cabinet

Read this email thread and update the CRM for AlexCorp.

What's the status of my package? That's wrong, use the XYZ project



Factor 2 - Own your prompts

```
Agent:
  read api
  post api
  parse(api): str

Task:
  instructions: str
  expected_output: type[thinkable]
  tools: [read()]

agent.run(task)
```

lack control



full control

Factor 3 - Own your context building

```
{ "role": "system", "content": "You are a helpful assistant" },
{ "role": "user", "content": "What's the weather in Tokyo?" },
{ "role": "assistant", "content": "The weather in Tokyo is sunny." },
{ "role": "user", "content": "What's the status of my package?" },
{ "role": "assistant", "content": "Your package is delayed." }

[ ... ]
```

"Everything is context engineering. LLMs are stateless functions that turn inputs into outputs. To get the best outputs, you need to give them the best inputs."



Dex Horthy
HUMANLAYER



AI's trillion-dollar opportunity: Context graphs

12.22.2025 | By: [Jaya Gupta](#), [Ashu Garg](#)

Context graphs, one month in

Ashu Garg, Foundation Capital
["Context Graphs, one month in"](#) Jan 31, 2026

Then came the inbound. CIOs at Fortune 500 companies reached out to ask what this means for their roadmaps. Founders at unicorn AI startups relayed that it's changing how they think about product architecture. Friends at OpenAI and Anthropic told us the piece was circulating in company Slack channels as a must-read. We even heard from senior government officials asking how context graphs might work for accountability and compliance.

Context Graphs: AI's Next Big Idea



The AI Daily Brief: Artificial Intelligence News
570K subscribers



Aaron Levie
@Levie

The Era of Context

Last updated Jan 27, 2026.

Context is the next data platform— and why context graphs are key to understanding processes

5 minutes read



Arvind Jain
CEO



DEVIN +

BLOG

CONTACT US

CAREERS ↗

TRY D

January 29, 2026

Agent Trace: Capturing the Context Graph of Code

Context Graphs: The Elegant Idea Everyone's Talking About

...and why I'm both excited and skeptical

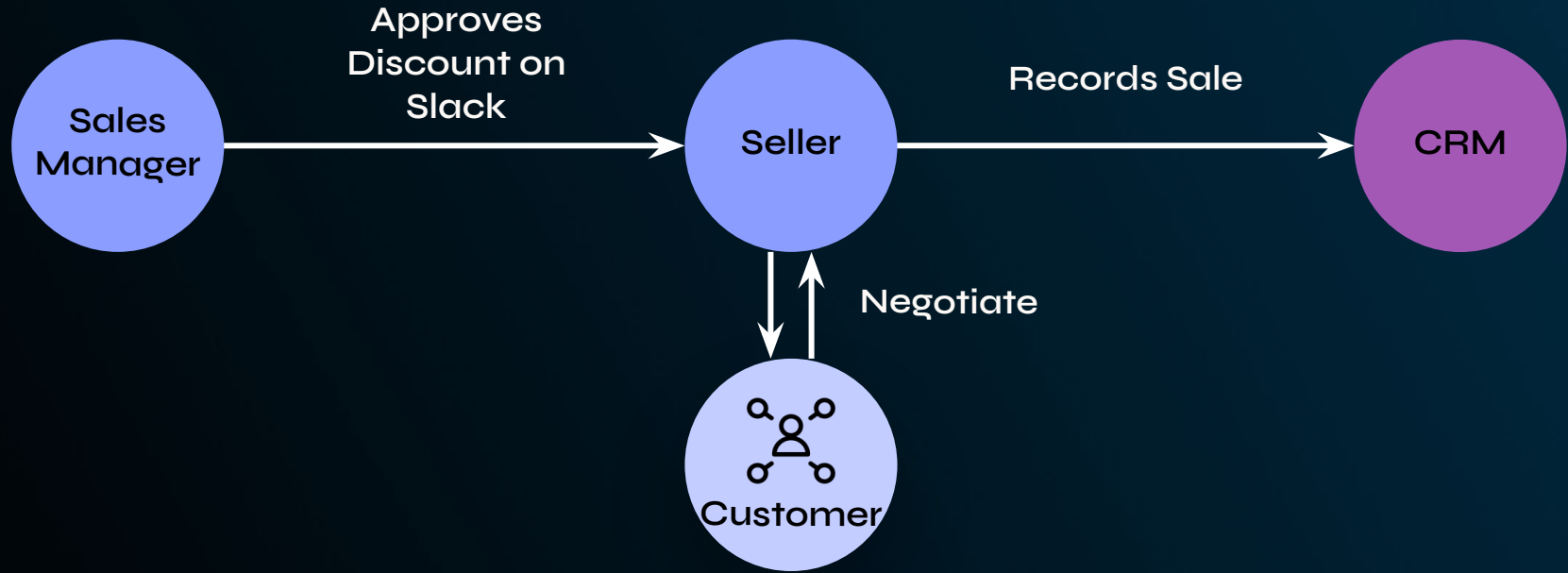


[Dharmesh Shah](#)
January 08, 2026



So, what is a Context Graph?

**It's the record of how
decisions actually happen.**



CRM: The Result (What)

Context Graph: The Trace (Who & Why)

Predefined workflows on simple CRUD data models

Dynamic, context-aware & autonomous applications

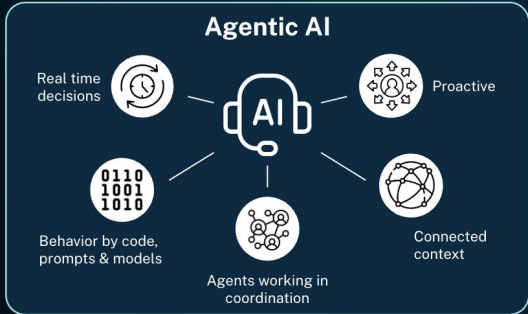
What data is required to make these successful in the real world?

●● **CRUD** (Create, Read, Update, Delete)

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- Create
- Read
- Update
- Delete

Upload



1

2

3

4

1 Operational Databases

"System of Record for the Present"



Capture what's true right now



How many customers do we have?



How many vacation days does this employee have available?



What is the quantity of SKU B currently in stock?

2 Analytical Data Platforms

"System of Record for the Past"



Capture what was true "then"

What was the average lead-to-close ratio for the EMEA region in 2024?

What was the attrition rate in Marketing over the last 24 months?

What were peak stock levels for SKU B in Q4 2025?

3 Agentic Memory

"System of Record for Conversations"



cognex



Capture short-term and long-term agentic state

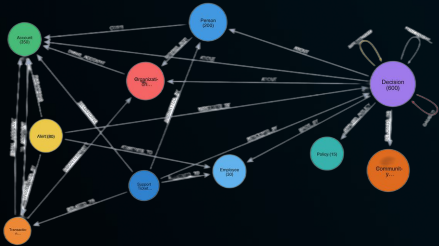
Which critical features did this prospect mention in our last calls?

Which modules did this new hire struggle with last week?

How did we resolve inventory discrepancies for SKU B?

4 Context Graph

"System of Record for Decisions"



Capture decision traces

Why was a 25% discount applied for this deal and who approved it?

Why was a higher salary approved for this role?

What events led to the decision to write off this batch?

Operational Databases



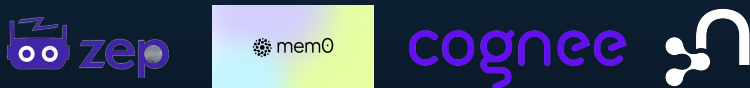
"System of Record for the Present"
Captures current state, what's true right now.

Analytical Data Platforms



"System of Record for the Past"
Captures historical snapshots, what was true "then."

Agentic Memory



Captures short-term & long-term state required for agents to be personalized & consistent across sessions.

Context Graph



Captures real-world decision traces that allow agents to find precedents to make reliable, autonomous decisions.

Leading Gaming Company Eliminates Data Silos to Power AI

When millions in revenue hang in the balance - knowledge graph powered agents prove invaluable

CHALLENGE

- 150+ non-technical analysts need real-time access to data using natural language
- No holistic view across silos
- Get answers to complex questions, e.g. *“How do competitor launches impact our sales?”*

10X

faster time-to-insight compared to traditional analytics

92%

reduction in analyst time on routine requests



AI Agents



Gaming Data



Analyst Reports



Sales



Subscriptions



Marketing

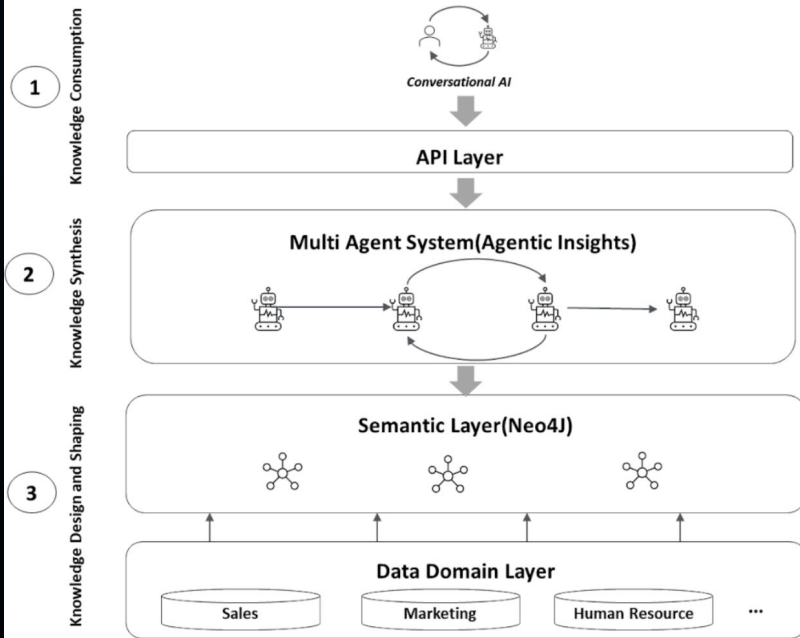


Internal Forecasts

Leading Gaming Company - Knowledge Layer Architecture

Agentic Insights | Reference architecture

Three core parts of the solution



Knowledge Consumption

Enables users of the system to have conversation with the agentic systems to discover data insights

Knowledge Synthesis

A group of agents, each specialized to do a particular task very well (e.g. entity extraction, search, SQL generation etc.) work together to synthesize knowledge and generate data narrative

Knowledge Design and Shaping

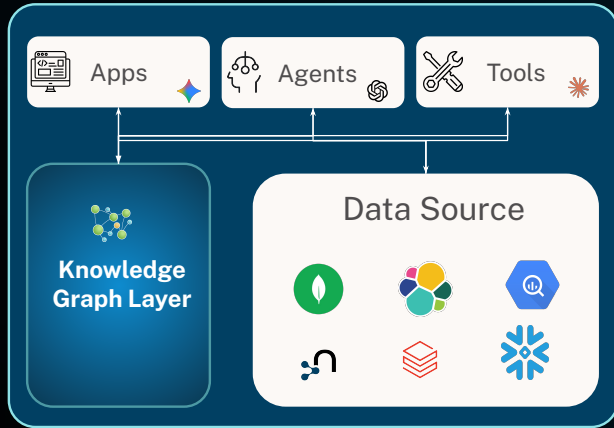
A semantic layer which captures not only the technical attributes of the data entities but also the domain relationships within the entities



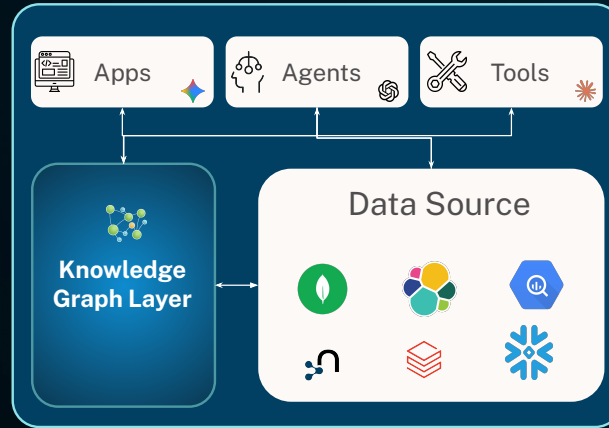
Above: The company's natural language query solution reference architecture

Three Common Architecture Patterns

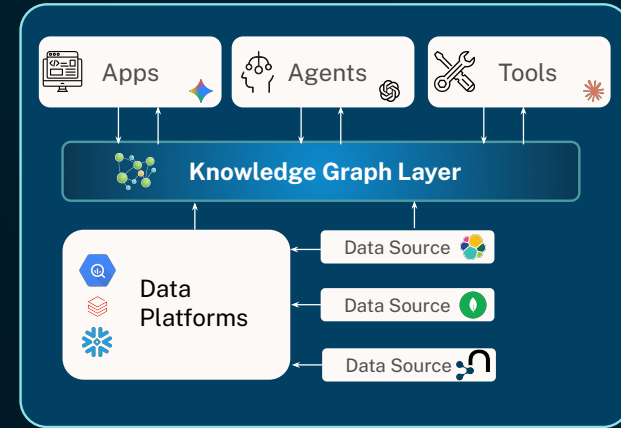
Semantic Layer / Map



Hybrid: Semantic Map + Some Domain Data



Semantic Map + All Data For Your Use Case



Quarles: Transforming Legal Services with GraphRAG

From “Not Viable” to Production-Grade AI for Complex Legal Queries

7.5M

Legal matters across 20
business units

100X

Improvement in query
performance

95%

Accuracy with GraphRAG
vs. vector hallucinations

CHALLENGE

- Legal queries spanning 8+ siloed systems, 20 business units
- Complex queries often “not viable” with standard RAG
- High cost and slow turnaround: >10 hours & billable expert time

SOLUTION

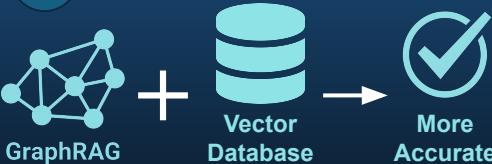
- Neo4j Knowledge Graph integrating 5 data types (matters, cases, IP, finance, people) across 8 systems
- GraphRAG Engine providing context-aware retrieval + semantic search
- Agent Swarm: 9 domain agents with persistent memory

IMPACT

- **Simple queries:** previously took 45min to a day; now instant
 - **Complex queries:** previously unviable; now resolved in 30 secs
 - **Accuracy:** from constant hallucinations to 95%+ accuracy
- Demonstrates that Graphs are the best DB for complex agentic applications at scale**

Five Benefits Customers Experience with Graphs in Agentic AI


1



GraphRAG + Vector Database → More Accurate

GraphRAG delivers more accurate results than vector only RAG


2



Knowledge Graphs → Enterprise Data Lake ← Agent

Knowledge graphs are the semantic map of the enterprise data lake enabling agents to reason and retrieve the right information

3



Memory

Agentic Memory is best represented as a knowledge graph


4



Agent

Context Graphs and decision traces are essential for accurate decision making

5



Multi-hop reasoning enables agents to perform complex tasks required in enterprise use cases

Top Data & Analytics Trends in Banking and Insurance for 2026

3 February 2026 - ID G00843275 - 27 min read

By: Sudarshana Bhattacharya, Kimberly Harris-Ferrante, Jasleen Kaur Sindhu
Initiatives: Technologies and Markets

Building strategic differentiation and creating continued value from the D&A function in financial services firms is critical. This note highlights the top five D&A trends impacting banking and insurance in 2026 that CIOs must address to scale data and AI efforts.

Insights at a Glance

In 2026, scaling AI and intelligent automation within financial services is a major priority for banking and insurance CIOs. This requires a deliberate shift toward decision-ready data, semantic grounding, and computable D&A governance, to enable AI to operate safely inside regulated workflows and produce demonstrable outcomes.

Key Insights

- **Decision-ready data products** enable CIOs to justify IT costs by delivering business value incrementally across workflows.
- **Knowledge graphs** enable connected data, definitions, and relationships into a semantic layer that grounds AI outputs in verifiable business meaning and traceable lineage while resolving complex logic.
- **Agentic AI for D&A governance** reduces manual stewardship effort by right tooling for AI-driven automation to continuously classify, monitor, and enforce data policies.

Top Trends in D&A for 2026: Handling Complex Use Cases With GraphRAG

17 February 2026 - ID G00843955 - 10 min read

By: Yogesh Bhatt, Christopher Long, David Pidsley

Initiatives: CxO Leadership

Most retrieval-augmented generation initiatives fail when high thresholds of accuracy are required. Data and analytics leaders can overcome RAG's limitations in handling complex use cases by supporting LLM interactions with contextual information and knowledge graphs using GraphRAG.

Emerging Tech: AI Vendor Race: The New Essential Infrastructure for Agentic Systems: How Context Graphs Are Solving AI's Institutional Memory Problem

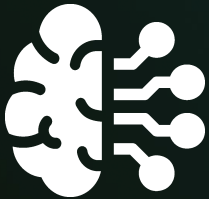
13 February 2026 - ID G00846665 - 8 min read

By: Radu Miclaus, Tom Coshov

Initiatives: Technologies and Markets

Context graphs represent an evolution of traditional knowledge graphs, purpose-built to enhance AI model performance, specifically engineered for agentic AI grounding, expanding beyond data and knowledge staging into decisions logic, workflows and event tracing and state management. Product leaders building agentic systems are driving contextual reasoning when implementing context graphs.

Most powerful
database for
graphRAG



Most
developer-friendly
platform for
agentic AI



Deep integrations
across the
AI ecosystem



What Now?

Speak with your
Neo4j
representative



Get access to the
AI SWAT Team



Experiment



Neo4j Startup Program

Free Aura Credits



Free Help From
Graph Experts



Co-Marketing
Support



NODES AI 2026

The largest technical community gathering dedicated to Graph + AI

CONFERENCE DATE

April 15, 2026 - Leonhard Euler's Birthday

PRE-EVENT

Five 2 hour AI workshops

March 5, 11, 17, 26 and 31

EVENT

- One day free online conference
- Live technical sessions from community experts
- From: 10:00 am ET / 4:00 pm CET
To: 5:00 pm ET / 11:00 pm CET

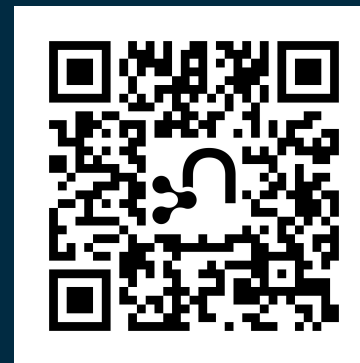
AI-FOCUSED SESSIONS IN THREE TRACKS

- Knowledge Graphs and GraphRAG
- Graph Memory and Agents
- Graph + AI in Production

WHO SHOULD PARTICIPATE

Anyone interested in Graphs + AI

REGISTER: neo4j.com/nodes-ai





Relationships are everywhere

They transform your **data into knowledge**

To power your **intelligent applications & systems**



Thank You!