

Enterprise Semantic Layer for Firm-Wide Risk Management at a Financial Services Firm



The Challenge

A top-five global financial services and investment banking firm encountered a critical operational challenge stemming from the excessive labor required of subject matter experts, an inability to trace and manage data across disparate systems, and an incomplete representation of institutional knowledge. A primary driver of this issue was the reliance on divergent vocabularies and drafting conventions across business units and geographic regions, which impeded the establishment of a standardized operational terminology. This condition was further exacerbated by a heavy reliance on manually maintained spreadsheets across more than ten departments, unstructured documentation (such as policy records and review artifacts), and proprietary legacy systems. Consequently, information reusability was severely constrained, rendering data static, inefficient to generate, and difficult to audit.

These inconsistencies were amplified by deep-seated silos and technical design gaps that hindered global aggregation efforts and slowed responses to leadership and regulatory changes. Technically, the absence of a shared data language across systems and applications made it difficult to connect relevant information. For instance, related systems often failed to update their source taxonomies simultaneously, leading to conflicting and outdated data. Furthermore, internal design complexities, such as the use of polyhierarchical structure (where a single term can be placed in multiple locations or have multiple "parents" simultaneously), created problems for downstream systems.

This weak semantic model hindered the firm's ability to identify emerging risks and meet regulatory reporting requirements. Large volumes of free-text risk data existed across the organization, with many referring to the same event using inconsistent terminology. As a result, business units spent weeks conducting independent risk assessments before additional time was required to identify enterprise-wide trends. The lack of standardized semantic relationships meant metadata connections had to be manually recreated for each analysis, resulting in incomplete or inaccurate data linkages, delayed reporting, and limited visibility into critical firm-wide risks.



The Solution

EK applied its deep expertise in enterprise taxonomy, semantic technologies, knowledge graphs, and AI to transform the firm's fragmented information landscape. The solution focused on four integrated areas: taxonomy design, system architecture, operational model enablement, and AI integration.

Enterprise Semantic Layer for Firm-Wide Risk Management at a Financial Services Firm

Semantic Layer Model Design

To break down data silos, resolve inconsistent terminology, and remove reliance on unstructured risk data, EK designed and deployed a suite of enterprise-level and program-specific taxonomies. By launching seven new taxonomies and refining five existing ones, EK built a standardized enterprise-wide framework for structuring and categorizing information. Functioning as the definitive categorization benchmark, these taxonomies enhanced system interoperability, facilitated seamless cross-departmental data sharing across risk, finance, and enterprise data and technology, and unlocked advanced analytics capabilities by ensuring vocabulary consistency across five risk applications and more than fifteen other enterprise application systems.

EK additionally enriched the taxonomies with descriptive metadata to facilitate faceted search, interactive filtering, and refined risk discovery. To enhance data quality and maintainability, EK implemented automated editing rules to generate metadata fields, identifiers, and URIs. Furthermore, SHACL (Shapes Constraint Language) validation, a W3C standard framework for defining and verifying structural constraints on RDF (Resource Description Framework), enforced rigorous modeling standards, detected architectural discrepancies, and preserved data integrity.

System Architecture to Enable a Connected Tooling Ecosystem

To eliminate inconsistent taxonomy usage across applications, EK designed and implemented a centralized semantic layer consumption service that exposes the firm's semantic models (metadata, taxonomies, ontologies, and a knowledge graph) through APIs. This service became the single source of truth for semantic model content. Every downstream system consistently consumed the latest approved taxonomies, which ended the version drift that had previously left related systems with conflicting and outdated data, while also reducing duplicate integrations and maintenance effort.

More importantly, because the five risk platforms and a number of enterprise applications now tag and describe information using the same concepts and identifiers, data that once sat in isolated systems became connected. A risk event recorded in one application could be linked automatically to the related controls, policies, business units, and subject matter experts held in others, with no need to rebuild metadata connections by hand for each analysis. Teams across risk, finance, and enterprise data and technology could trace information end to end, aggregate it firm-wide, and answer cross-functional questions from leadership and regulators in a fraction of the time.

Operating Model & Business Unit Enablement

Technology alone would not sustain long-term success, so EK established the governance and operational processes required to manage enterprise taxonomies at scale.

Enterprise Semantic Layer for Firm-Wide Risk Management at a Financial Services Firm

EK developed governance frameworks, change management procedures, and collaborative modeling and lifecycle management workflows that defined how semantic models would be created, reviewed, approved, and maintained over time. Working alongside the firm's ontologists, EK established modeling standards based on semantic web technologies—including SKOS, OWL, and RDF—to ensure consistency across domains.

EK provided strategic advisory, enablement playbooks, and hands-on onboarding and training to drive long-term adoption, empowering internal teams to autonomously govern and advance their semantic ecosystem. Additionally, EK established standardized, repeatable onboarding workflows for knowledge graphs, allowing new teams to integrate with the existing risk knowledge graph or deploy new ones following unified governance and technical standards.

Building on the success of the initial program taxonomies, EK expanded the effort into an enterprise taxonomy program. This initiative established governance structures and repeatable processes for creating, enriching, and maintaining taxonomies across stakeholder communities. Through a holistic assessment of product categorization across the firm, EK identified redundancies and gaps while implementing a scalable governance model capable of supporting enterprise-wide taxonomy management.

AI Integration

EK designed the semantic layer ecosystem to both leverage AI and enable future AI-powered capabilities.

First, EK implemented human-in-the-loop AI pipelines that transformed thousands of free-text risk data into standardized taxonomy concepts, dramatically reducing manual classification effort while improving consistency.

Second, the taxonomies became foundational components of the firm's broader semantic architecture, providing the structured context required for AI applications to understand business concepts and relationships. This semantic foundation enabled enhanced enterprise search, intelligent recommendations, interactive reporting, advanced analytics, and future generative AI use cases.

Enterprise Semantic Layer for Firm-Wide Risk Management at a Financial Services Firm



The EK Difference

The firm needed more than a taxonomy—it needed an enterprise semantic foundation capable of connecting information across business units, improving risk visibility, and supporting future AI initiatives. EK brought the specialized expertise to design, implement, and operationalize that foundation.

EK was specifically engaged due to three differentiating strengths no generalist consulting firm could match.

- **Deep specialization:** As the largest dedicated firm for Knowledge Management and Semantic Solutions, EK brings unmatched expertise in taxonomy design, semantic web standards, and data science/engineering—expertise that proved essential for solving the firm’s complex non-financial risk and systemic data challenges.
- **Full-spectrum delivery:** EK’s consultants do more than advise; they own projects end-to-end, from initial design through full implementation and long-term governance, ensuring solutions are not only technically sound but operationally embedded.
- **Strategic scalability.** In this engagement, the initial taxonomy program functioned as a pilot that demonstrated the advantages of connected data services, ultimately expanding into a comprehensive, enterprise-wide taxonomy program.

The key difference EK delivered was establishing the taxonomy as a definitive, technical source of truth to ensure enterprise-wide interoperability. The developed taxonomies became a golden source of truth, utilized as structured data to support consuming applications across the firm. Furthermore, EK provides deep expertise in semantic web standards, specifically SKOS, OWL, and RDF. This adherence to standardized semantic technology ensured that the new models would be interoperable across the firm’s disparate systems.



The Results

EK's engagement delivered measurable gains for the risk program and produced enterprise taxonomies and a repeatable model that related teams quickly asked to build on.

Enterprise Semantic Layer for Firm-Wide Risk Management at a Financial Services Firm

Immediate Operational Impact

By deploying human-in-the-loop Large Language Models (LLMs), EK streamlined free-text risk data, cutting overall volume by over 90%. This significant reduction enabled the organization to perform firm-wide non-financial risk aggregation for the first time.

The connected data infrastructure also cut the time business units needed to find the right subject matter expert from several days to about five minutes.

A Repeatable Model for New Teams

As the dissemination of these outcomes progressed, the enterprise semantic layer emerged as a highly sought-after capability. Teams that previously operated isolated data silos and customized vocabularies opted to integrate with the core framework rather than build separate solutions. Designed as adaptable enterprise assets, the taxonomies, ontologies, and knowledge graph enabled incoming teams to adopt core models and attach domain-specific extensions without starting anew. What initiated as a targeted risk management project now underpins initiatives in fraud detection and third-party vendor management, serving as the organization's benchmark for information governance and integration.

Together, these results reflect EK's core value: establishing a standardized, scalable, and interconnected data architecture that delivers immediate operational gains and lasting structural improvement.

Want to improve your organization's content data quality and architecture?
Contact us today!

Enterprise Knowledge (EK) is a services firm that integrates Knowledge Management, Information Management, Information Technology, and Agile Approaches to deliver comprehensive solutions. Our mission is to form true partnerships with our clients, listening and collaborating to create tailored, practical, and results-oriented solutions that enable them to thrive and adapt to changing needs.

Our core services include strategy, design, and development of Knowledge and Information Management systems, with proven approaches for Data and Information Management, Knowledge Graph Implementation in support of NLP, ML, and AI initiatives, Taxonomy Design, Project Strategy and Road Mapping, Brand and Content Strategy, Change Management and Communication, and Agile Transformation and Facilitation. At the heart of these services, we always focus on working alongside our clients to understand their needs, ensuring we can provide practical and achievable solutions on an iterative, ongoing basis.