

AI4EIA: A Practical and Hands-on Guide to Enterprise Information Architecture - From AI-Driven Ontology Modeling to Knowledge Graph Insights via Conversational AI

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Abstract. Enterprise Information Architecture (EIA) provides a strategic blueprint for managing an organization’s information assets, encompassing how data flows, is stored, governed, and utilized across the enterprise. It establishes a systematic framework to ensure efficient data integration, enhance decision-making, and improve operational efficiency. Knowledge Graphs have proven to be the best technology to support EIA in real-world scenarios. In this hands-on tutorial, the participants will learn how to use Knowledge Graphs for EIA using metaphactory, an industry-proven solution. Starting from visual modelling of ontologies supported by an AI agent to describe information assets from across the enterprise, such as processes and business objects, to mapping physical data source to domain ontologies, and to finally getting insights into the connected Enterprise Knowledge Graph using a Conversational AI Interface. The participants will be guided by examples and have their own metaphactory instances to follow all hands-on exercises.

Keywords: Enterprise Information Architecture · Knowledge Graph · AI Agent

1 Content and Program

This tutorial is divided into two parts, each delivered in two sessions focusing on a distinct set of tasks that are independent but collectively contribute to the overall workflow. Participants may choose to attend either part or both considering that the attendance in the first part is not a prerequisite for attending the second. The first part introduces an Enterprise Information Architecture (EIA) framework that leverages semantic modeling [4] to address interoperability challenges. Unlike most semantic modeling approaches and tools, which are mainly designed for engineers and knowledge graph experts, our approach uses a visual semantic modeling tool, metaphactory [2], tailored for domain experts and business users as well. It also supports semantic enrichment through intuitive visual creation and management of controlled vocabularies. Finally, we explore how AI agents can be used to assist in both visual modeling and semantic enrichment processes.

In the second part, we demonstrate how semantic models can be used to automatically harmonize the representation of physical data schemas. These harmonized data representations, combined with an ontology-based representation of the domain, enable seamless integration of data from heterogeneous sources, ultimately building an enterprise knowledge graph [1]. In the final session of this tutorial, we demonstrate how to connect an AI Agent powered by a Large Language Model (LLM) to create a conversational interface for the enterprise knowledge graph. The natural language capabilities of the LLM enable intuitive data access for business users, while the knowledge graph ensures explainability and traceability of the provided results.

1.1 Motivation

Enterprise data is distributed across multiple systems and portals that mostly operate independently. The lack of integration across data silos compromises enterprise architecture efforts to connect and link the data. An EIA relying on a semantic model provides a robust foundation for addressing interoperability and data integration challenges in alignment with the FAIR principles [3]. It also enhances transparency and explainability when using LLM-powered services, such as question answering over enterprise data. By grounding responses in a structured semantic framework, the results provided by AI agents can be traced back to their sources, increasing trust and accountability in AI-driven interactions.

1.2 Format

This full-day tutorial is structured into two main parts, each consisting of two sessions that focus on a specific set of tasks. While the parts are independent, they together form a cohesive end-to-end workflow. Participants are welcome to attend either part or both, as participation in the first part is not a prerequisite for the second. Each session includes only a brief introductory presentation and is mainly hands-on, with step-by-step explanations provided in parallel. Each participant will receive their own instance of metaphactory to follow along as they learn to build an ontology, controlled vocabulary, and harmonize physical data source schema representation. In addition, participants will learn how to leverage an AI agent to assist with these tasks. Furthermore, participants will develop a conversational interface powered by the knowledge graph. No technical expertise is required to set up or configure the interface within metaphactory. The tutorial is designed to be comprehensive, therefore it is planned as a full day program. However, a condensed half-day version is also available, featuring one part comprising two sessions that summarize the key concepts and takeaways from both parts and all sessions.

1.3 Schedule

This tutorial is structured into four sessions. The planned content for each session is outlined below.

- **Session one:** Introducing the EIA framework that leverages semantic modeling. Visual creation and management of OWL/SHACL ontologies, ontology versioning, governance, and compliance workflows, along with, AI agent assistance in semantic modeling.
- **Session two:** Creation and management of SKOS vocabularies to enable semantic enrichment, versioning, governance, and leveraging an AI agent.
- **Session three:** Harmonizing physical data schema, creating mappings between the schema elements and the corresponding elements in the generated ontologies, and AI agent-driven mappings.
- **Session four:** Preparing an AI agent conversational interface to extract insights from enterprise data and facilitate information extraction.

The first two sessions will take place in the morning, from 9:00-10:40 and 11:10-12:50 with a break in between. The final two sessions will be held in the afternoon from 14:10-15:50 and 16:20-18:00.

2 Learning Objective

Each part of the tutorial comprised of two sessions, is designed to equip participants with both conceptual understanding and hands-on skills in a specific area, as outlined in the following sections.

- The first part of the tutorial will equip participants with a solid understanding of EIA, semantic modeling, semantic enrichment, versioning, and governance strategies for building scalable and maintainable solutions. They will also learn to create and manage ontologies and vocabularies, with or without assistance from an AI agent.
- By the end of the second part of the tutorial, participants will be able to harmonize physical datasource schemas representations and map the elements of these representations to the elements of ontologies. To create mapping, they will learn to apply two approaches, one using the manual mapping editor and the other one applying an AI agent assistance. Finally, they learn to build a conversational interface to facilitate knowledge extraction. The conversation AI provides an easy-to-use interface for non-experts and business users to communicate with an AI agent which deploys the enterprise knowledge graph to extract knowledge and answer the questions.

2.1 Target Audience

The tutorial is application- and tool-focused; designed to be largely self-explanatory, i.e., necessary introductions provided in each section. However, a basic understanding of semantic web technologies can be helpful. This tutorial is especially beneficial for individuals in the following roles.

- Knowledge Graph Engineers and Scientists
- Data/Knowledge Engineers and Scientists

- Enterprise Information Architects
- Business Users
- Enterprise Architects
- CTOs, CIOs, and Digital Transformation Leaders

3 Presenter

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4 Related Event

Session four of this tutorial was recently held at The Knowledge Graph Conference (KGC) 2025¹. The tutorial received approximately 80 registrations from which about 50 participants attending in person. Additionally, around 50 people viewed the session recording afterward.

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¹ <https://metaphacts.com/metaphacts-at-the-knowledge-graph-conference-2025>