ModelDesk

Ontology matching, *interaction between AI and semantic models.*

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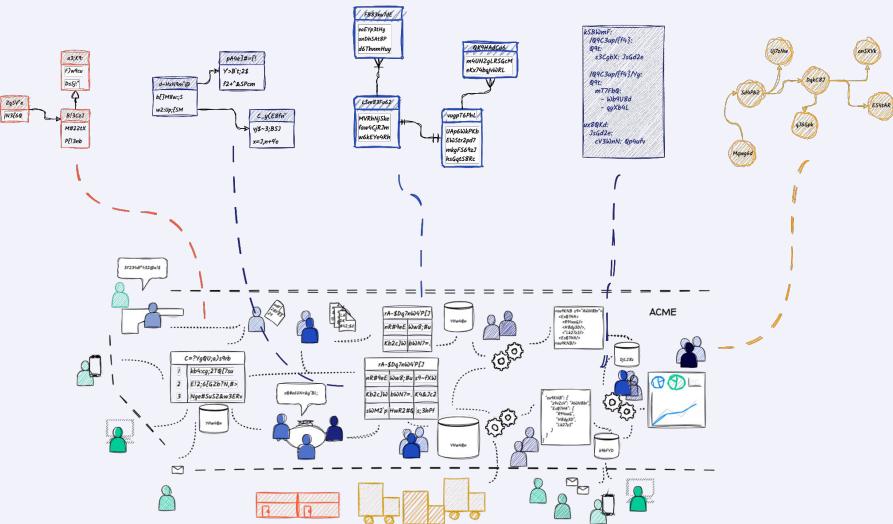2026-01-27

The problem we're working on

Connecting **data**, **metadata**, and **knowledge** across organizations and domains

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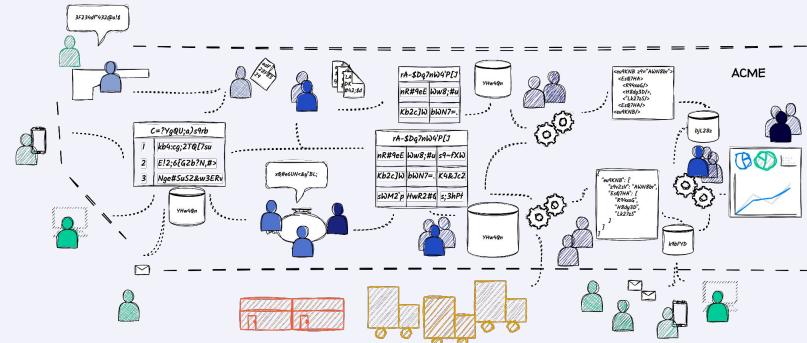
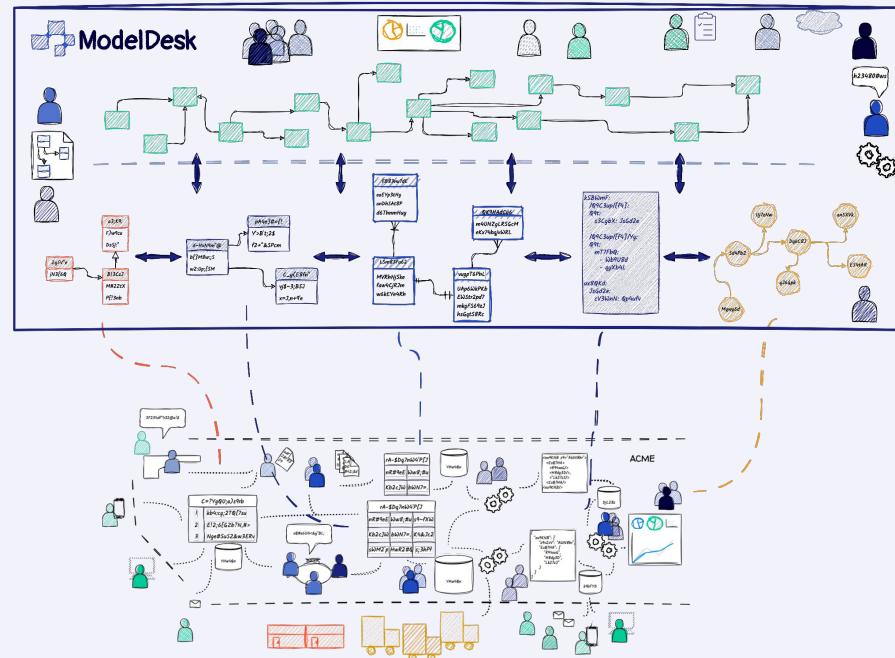# Data always has a model

Whether we express it or not.

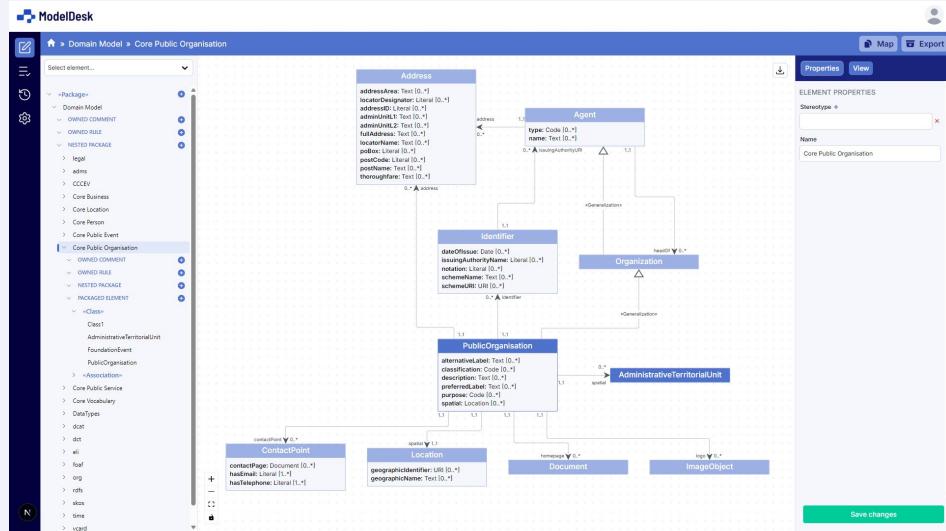In fact, each piece of data has multiple models.

Our solution

A platform to **build**, **collaborate** on, and **maintain** models in **any** modeling language

**Connect** models with each other and with the underlying data.

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Modeling in ModelDesk

- Visually manage and connect models

- Versioning and collaboration

- Various ways of sharing and publishing


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Models all the way up

- Same concept, many expressions

- Connecting across levels

- We help you trace from physical data through logical structure to conceptual meaning
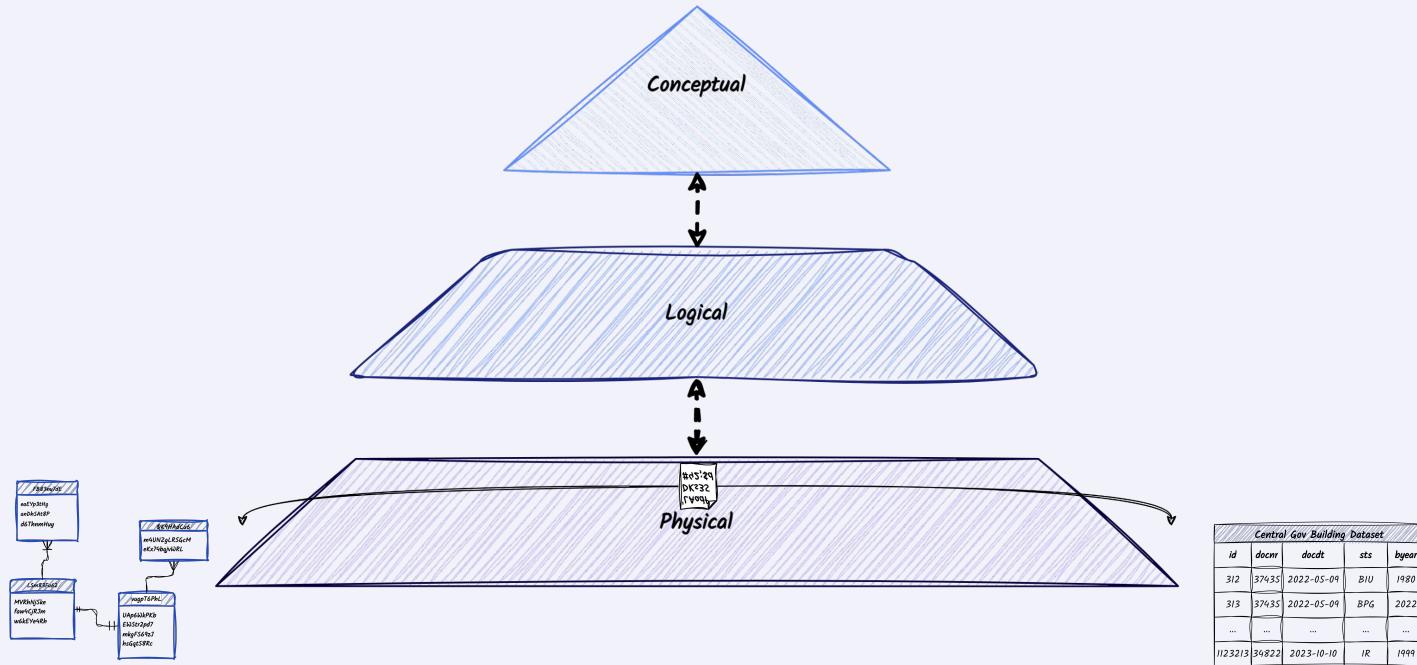
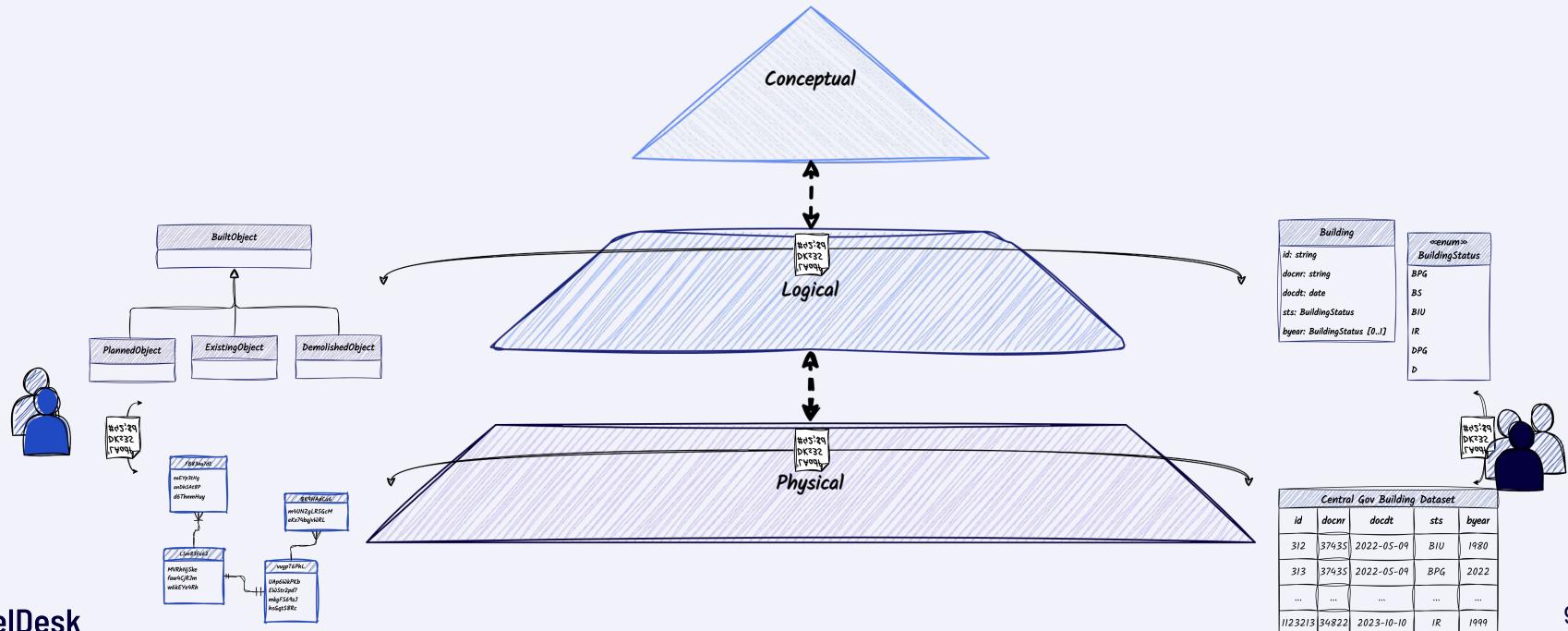ModelDesk
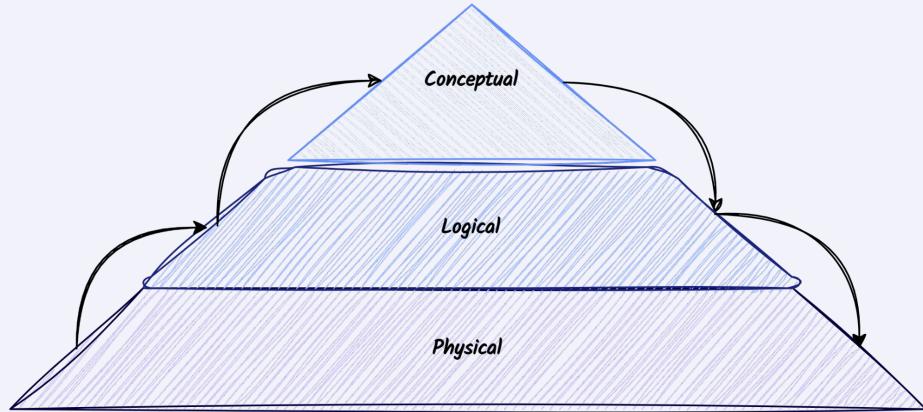
The vision: Connected models driving data

- Harness the power logical and conceptual modelling and connect it to your physical models and your data.

- Drive
  - Data integration
  - Business intelligence
  - Information and knowledge exchange
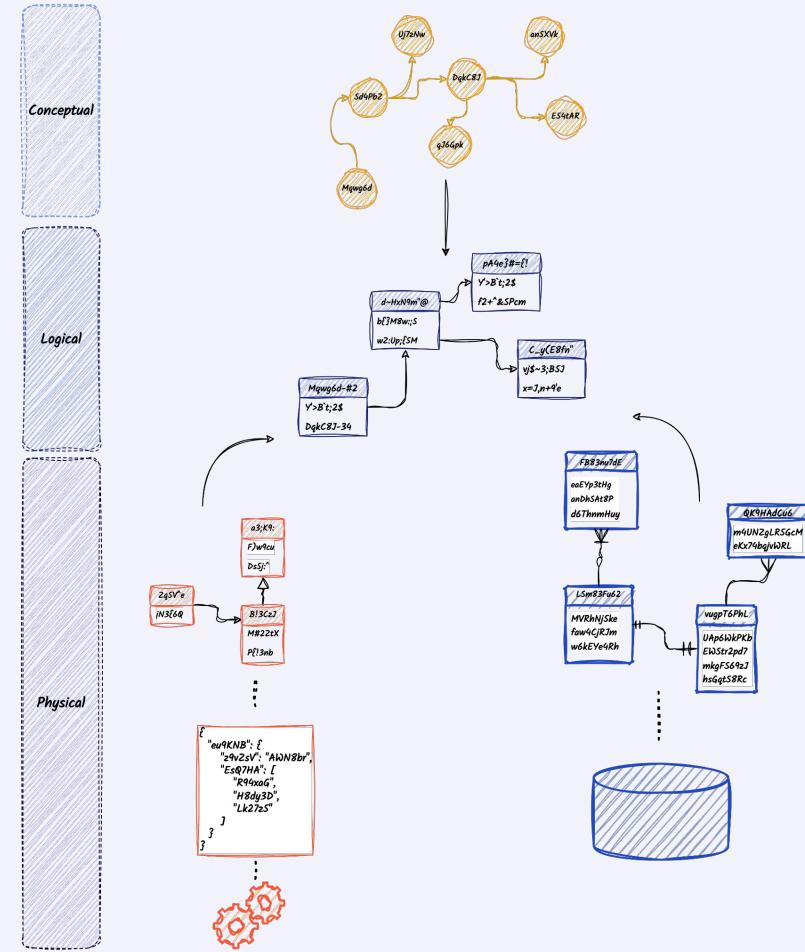
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Model driven data integration
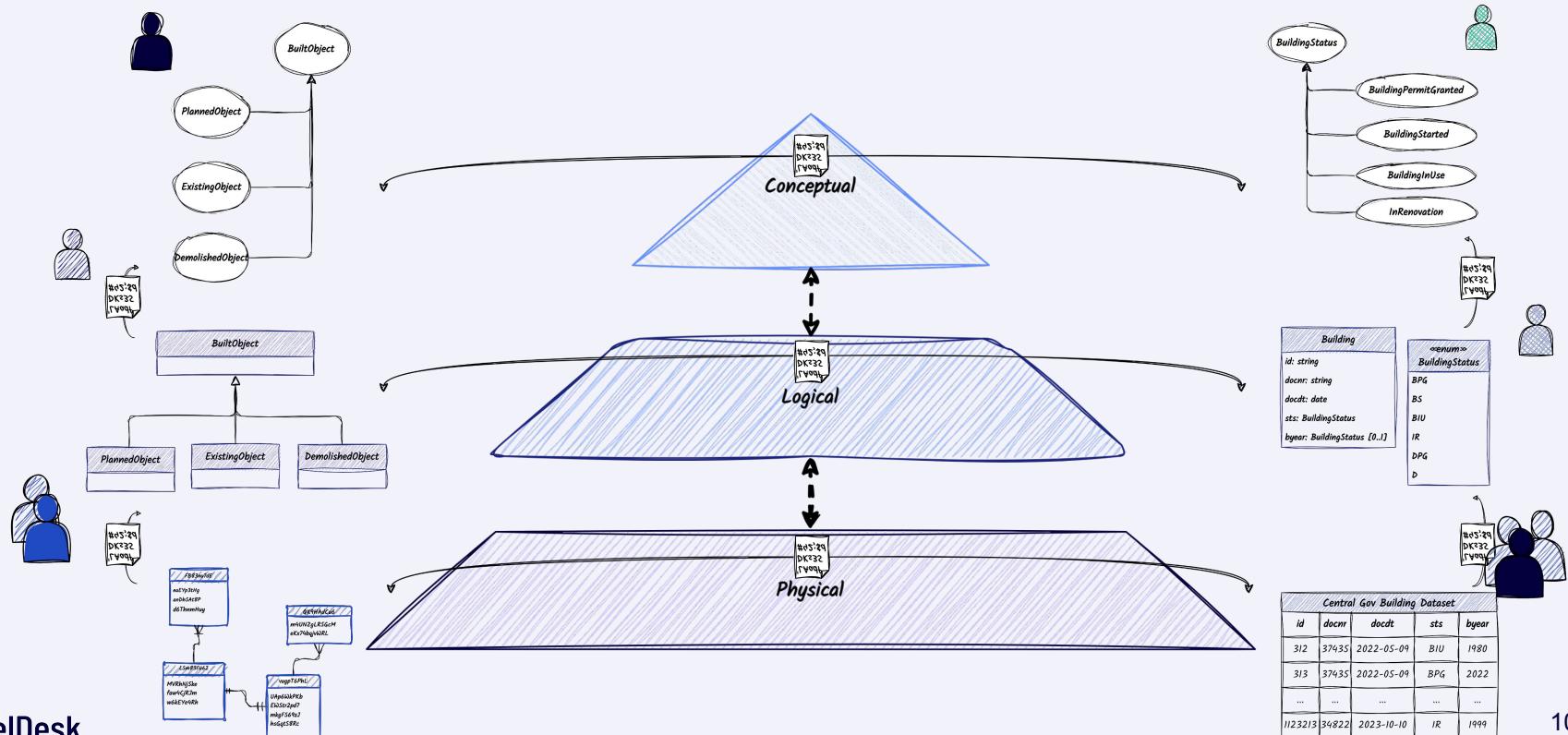
Model driven data integration

Model driven data integration

Mapping at the conceptual level

How do we create these mappings?

- Models use different vocabularies, structures, standards

We can create alignment models:

- A model that sits in between a source and a target model and semantically relates concepts between them
- "A translation dictionary between concepts"

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Ontology matching

- Ontology matching is the process of automatically discovering correspondences between concepts in different knowledge models.

- What does ontology matching provide?
  - Automatic discovery of equivalent concepts
  - Detection of subset and overlap relationships
  - Confidence scores for proposed mappings
  - Foundation for human review and refinement

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Ontology matching: How does it work?

Traditional:

- **String matching**
  - Compare names and labels
- **Structure**
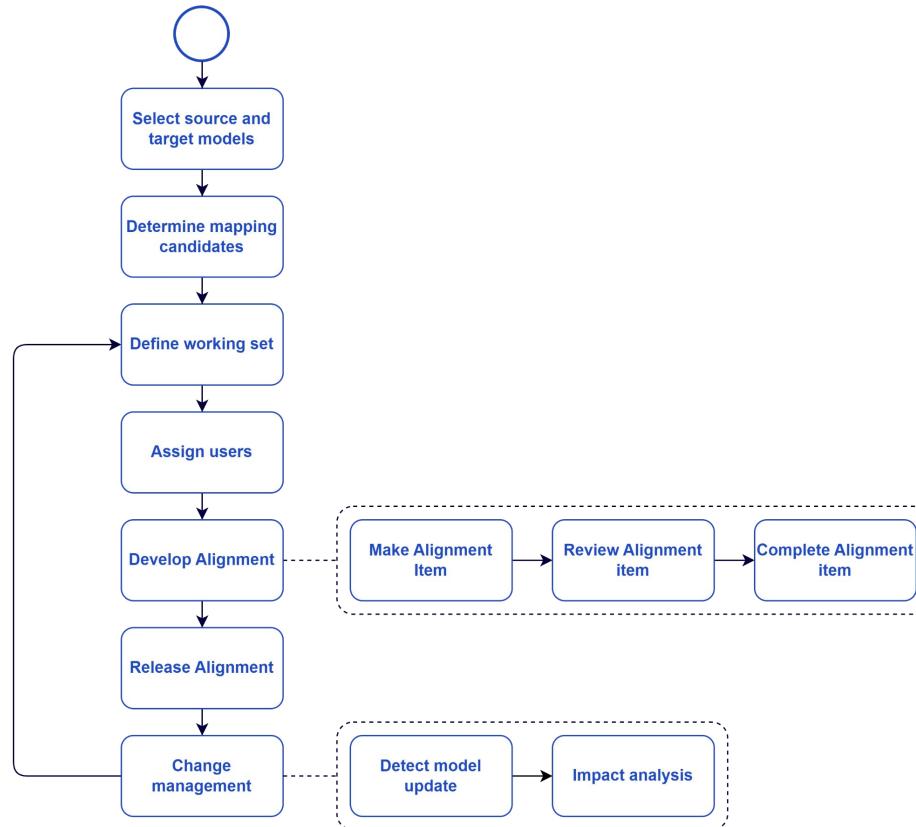 - Follow the hierarchy – if parents match, children might too

AI-Powered:

- **Embeddings**
  - Convert concepts to numbers, find similar ones
- **Learning**
  - Train on known matches, predict new ones
- **Language models**
  - BERT, GPT, understand context and meaning
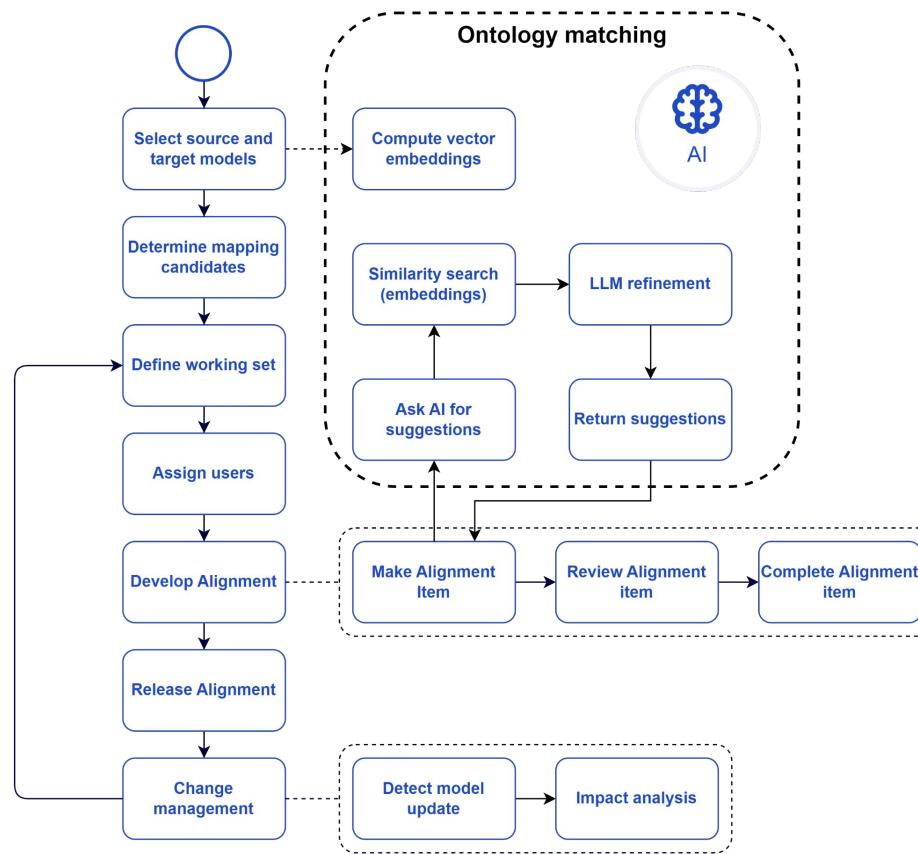
Hybrid (State of Art):

- **Best of both**
  - AI finds candidates, logic verifies them
- **LLM + RAG**
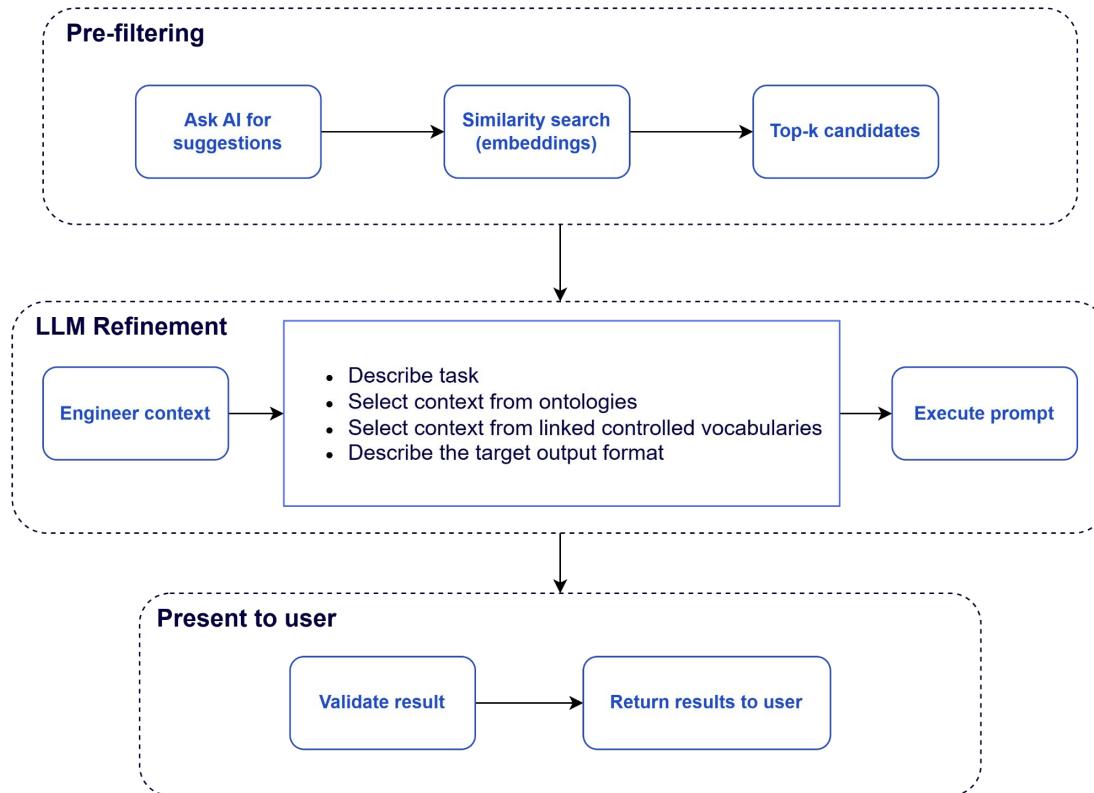 - Retrieve extra info for context, then generate mappings

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Model alignments in ModelDesk

Incorporating ontology matching

Suggestion process

Pre-filtering

Ask AI for suggestions → Similarity search (embeddings) → Top-k candidates

LLM Refinement

Engineer context →
- Describe task
- Select context from ontologies
- Select context from linked controlled vocabularies
- Describe the target output format

→ Execute prompt

Present to user

Validate result → Return results to user

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Demo

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Takeaways

- Mappings must be reusable, not buried in code.

- Domain experts need help to express technically correct alignments.

- AI should suggest, humans should decide.

- How to deal with maintaining the user's critical thinking with the application of AI?

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Thanks!

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