

# Webinar



## DATA CROSSROADS

Consulting firm, focused on data management maturity assessment, data management, governance frameworks, and data lineage business cases. Learn more at [datacrossroads.nl](http://datacrossroads.nl)



Software firm, offering a patent-pending no-code knowledge graph solution which can be based on bespoke or public ontologies. Trigyan transforms “uncurated data” to “actionable data” which you can trust to make business decisions. Learn more at [trigyan.com](http://trigyan.com)



# SPEAKER

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**DATA CROSSROADS**



Dr. Irina Steenbeek





# Semantic Data Mapping in the Data Lineage Context

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# Semantic Data Mapping in the Data Lineage Context

What?



- The concepts of “data lineage,” “semantic data mapping,” and “data mapping”
- The relationships between these concepts

Why?



- Key areas of applications

How?



- Semantic Data Mapping in practice

# Semantic Data Mapping in the Data Lineage Context

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What?



- The concepts of “data lineage,” “semantic data mapping,” and “data mapping”
- The relationships between these concepts

Why?



- Key areas of applications

How?



- Semantic Data Mapping in practice

# Data Lineage



DEFINITION

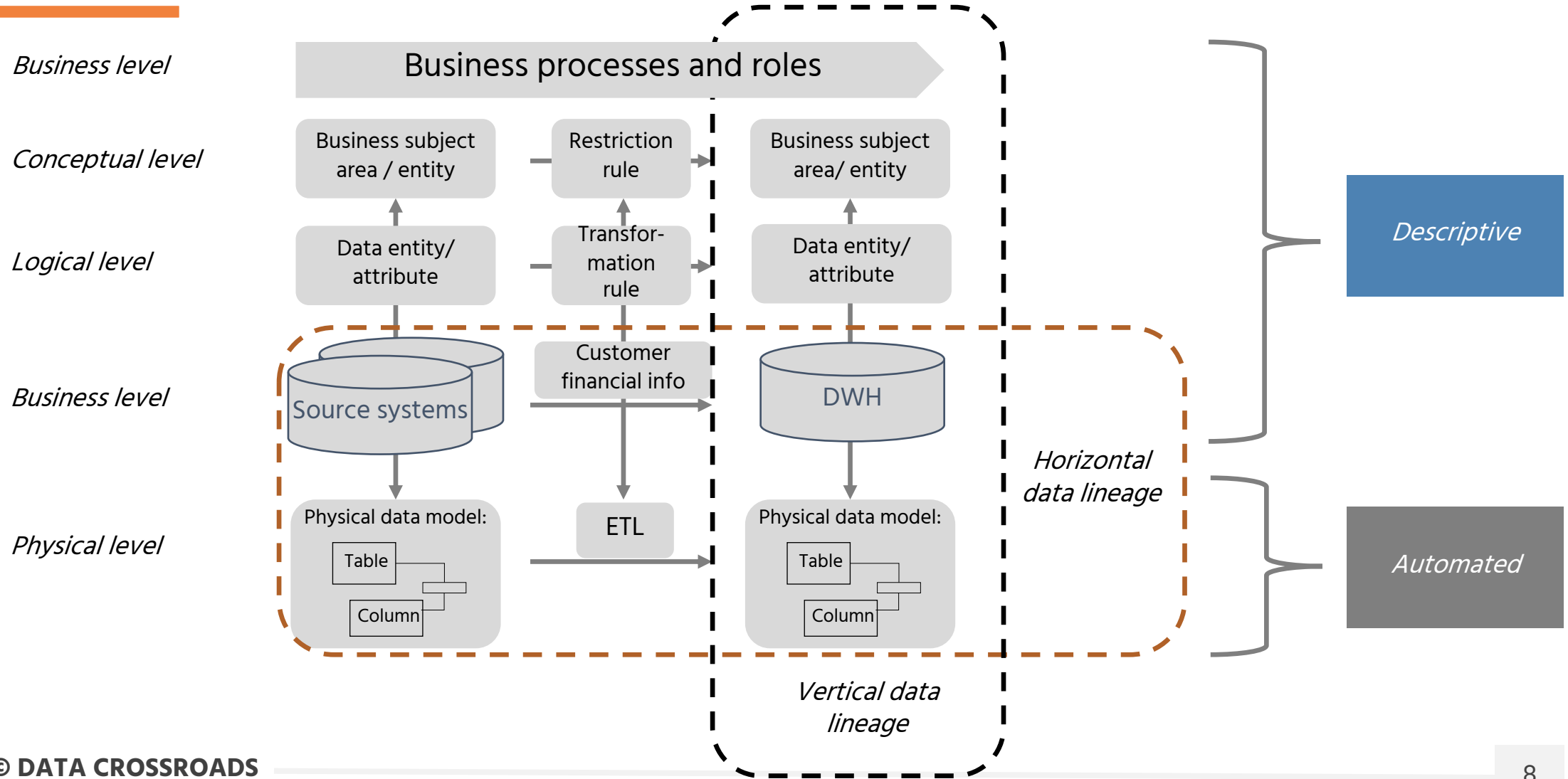
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## Data Lineage

A DESCRIPTION OF DATA MOVEMENTS AND TRANSFORMATIONS AT VARIOUS ABSTRACTION LEVELS ALONG DATA CHAINS, AND RELATIONSHIPS BETWEEN DATA AT THESE LEVELS



# Metadata Lineage Can Be Classified Differently:

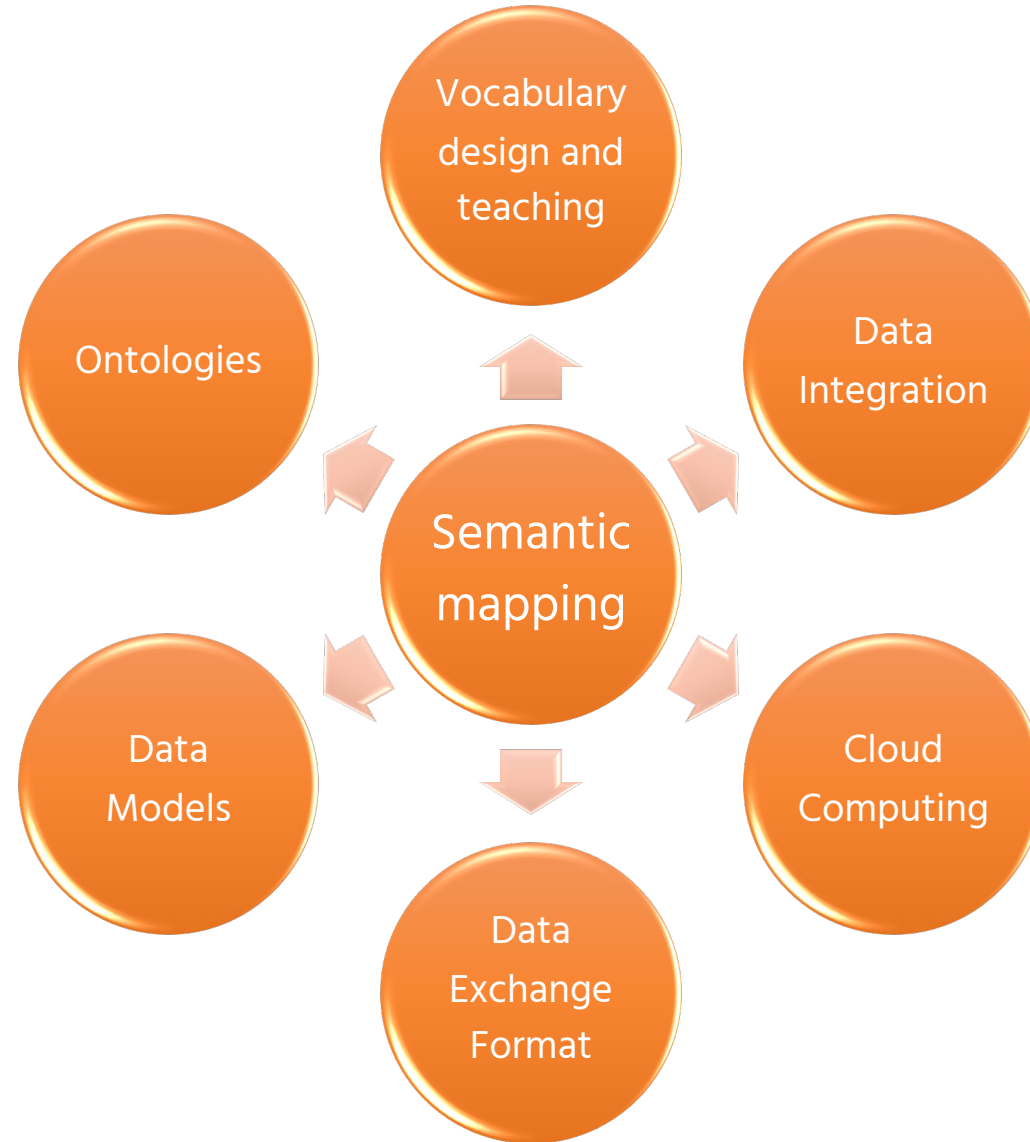




# Semantic Data Mapping



# The Term “Semantic Data Mapping” Appears In Different Contexts



# Different Contexts Lead to Various Definitions

*"a semantic mapping is a query expression that relates a **schema**  $S$  with a schema  $T$ "*

Source: Doan, AnHai, and Zachary Ives. "Principles of Data Integration." *ScienceDirect*, 2012, <https://www.sciencedirect.com/book/9780124160446/principles-of-data-integration>.

*"The **semantic mappings** in the source descriptions describe the **relationship** between the sources and the mediated schema"*

Source: Doan, AnHai, and Zachary Ives. "Principles of Data Integration." *ScienceDirect*, 2012, <https://www.sciencedirect.com/book/9780124160446/principles-of-data-integration>.

*"**Semantic mapping** (literacy), a **technique** in which graphical models are used to help school students learn **vocabulary**"*

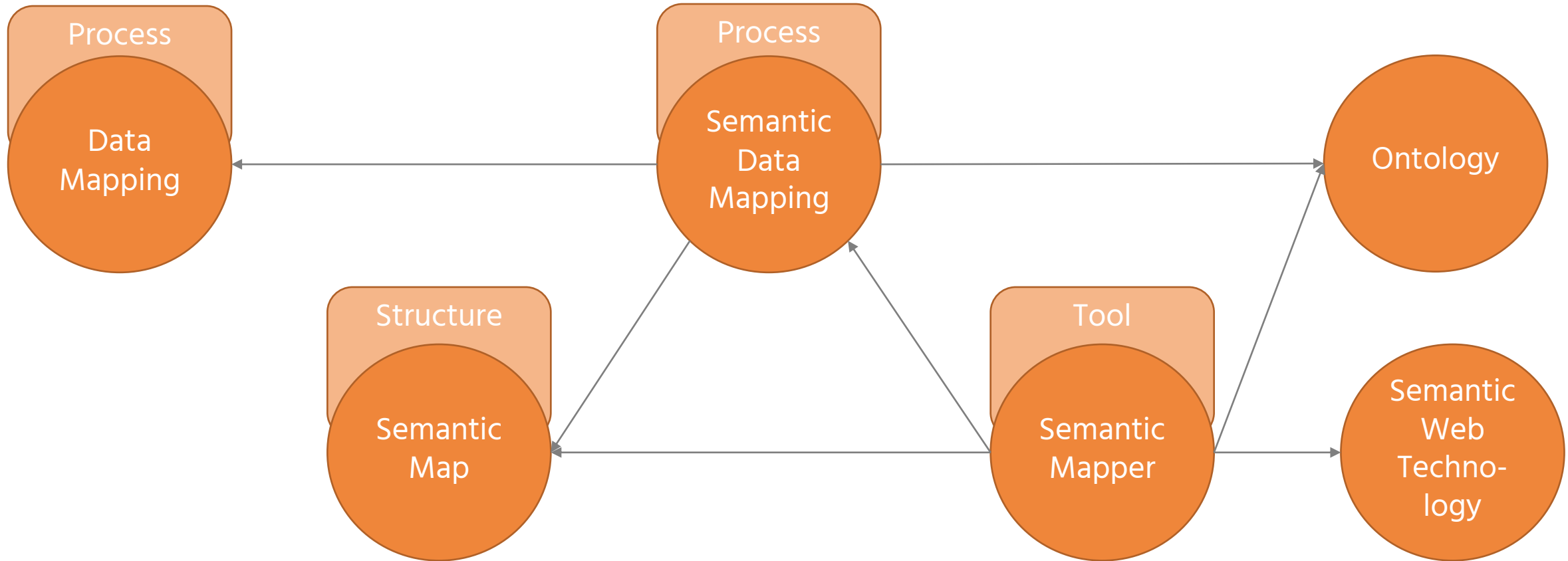
Source: "Semantic Mapping." *Wikipedia*, Wikimedia Foundation, 12 May 2020, [https://en.wikipedia.org/wiki/Semantic\\_mapping#:~:text=Semantic%20mapping%20\(literacy\)%2C%20a,performed%20by%20a%20semantic%20mapper](https://en.wikipedia.org/wiki/Semantic_mapping#:~:text=Semantic%20mapping%20(literacy)%2C%20a,performed%20by%20a%20semantic%20mapper).

*"**Semantic maps** are maps that can visually display a word or phrase and a set of related words or concepts."*

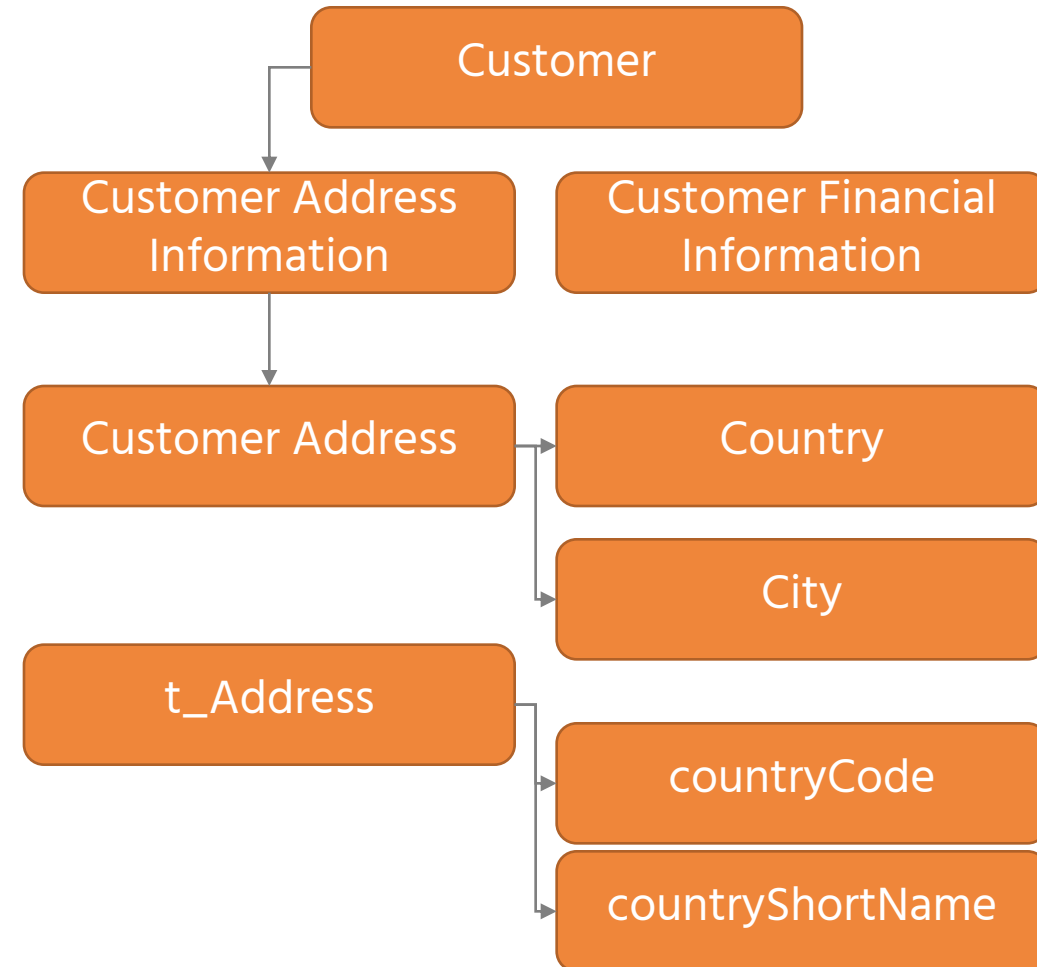
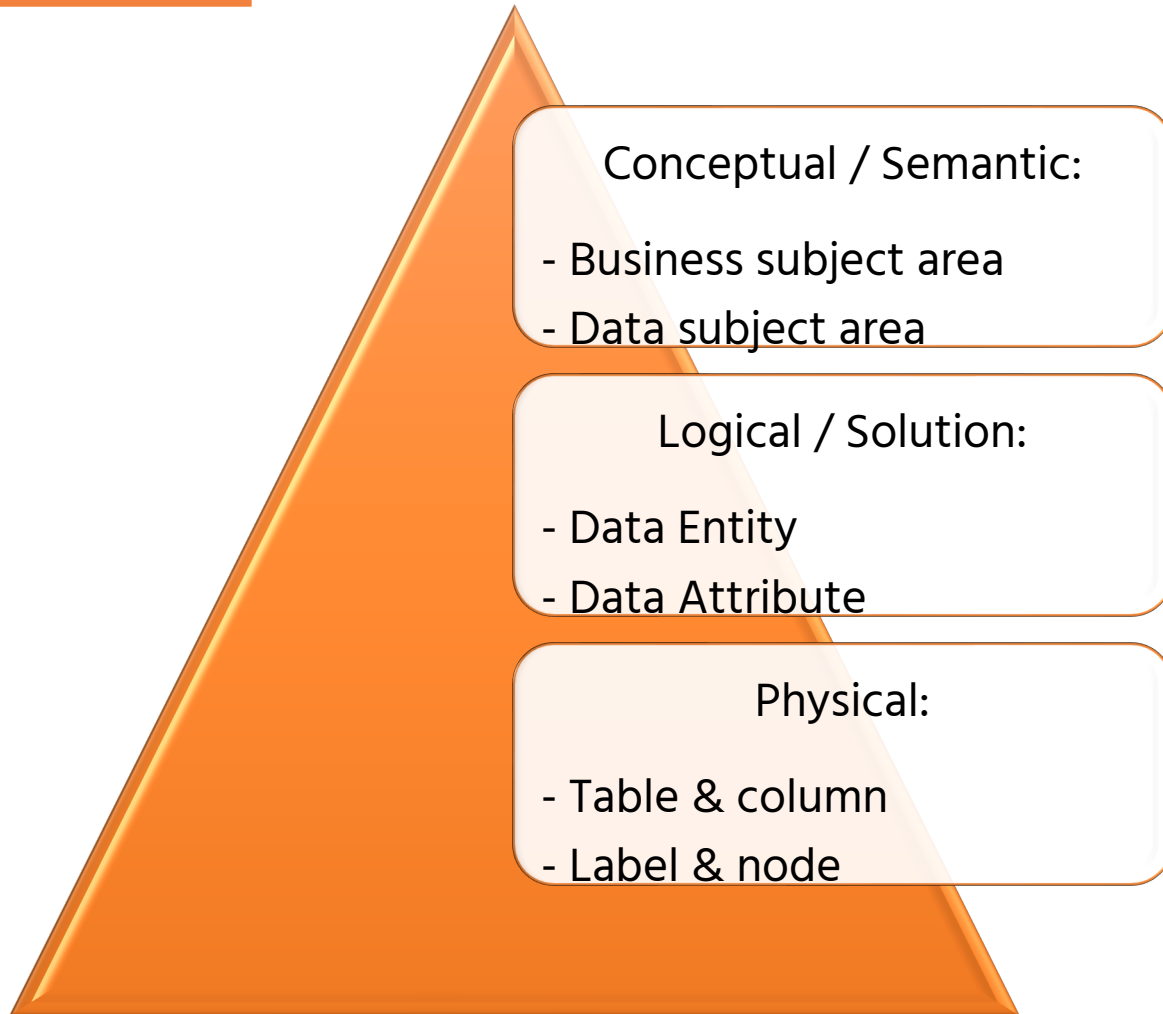
Source: "Semantic Mapping: Power up What Works." *Semantic Mapping | Power Up What Works*, <https://powerupwhatworks.org/strategy-guide/semantic-mapping>.



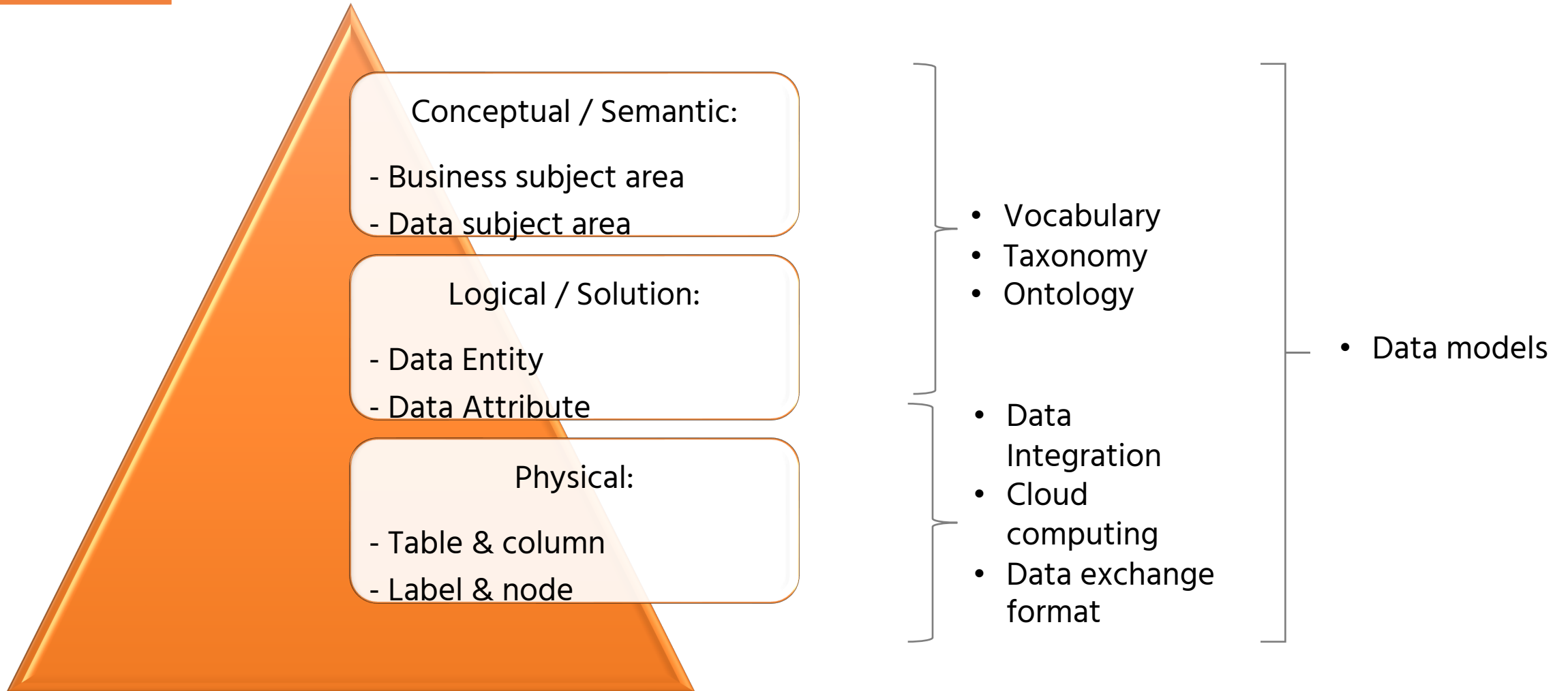
# “Semantic Data Mapping” Relates to Multiple Other Concepts



# A Data Model Structure Assists in Defining the Relations between Different Contexts and Definitions



# Different Contexts of Semantic Mapping Relate to Different Abstraction Levels of a Data Model



DEFINITION

# Semantic Data Mapping

THE METHOD TO INTEGRATE DATA BETWEEN VARIOUS ABSTRACTION LEVELS BY  
MAPPING METADATA OBJECTS



## DEFINITION

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# Data Integration and Interoperability

MANAGING THE MOVEMENT AND CONSOLIDATION OF DATA WITHIN AND BETWEEN APPLICATIONS AND ORGANIZATIONS

SOURCE: DAMA International. DAMA-DMBOK: Data Management Body of Knowledge, Second Edition. Bradley Beach, N.J.: Technics Publications, 2017, p.271





## DEFINITION

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# Data Integration

“THE PLANNED AND CONTROLLED:  
a) MERGE USING SOME FORM OF REFERENCE  
b) TRANSFORMATION USING A SET OF BUSINESS RULES, AND  
c) FLOW OF DATA FROM A SOURCE TO A TARGET  
FOR OPERATIONAL AND/OR ANALYTIC USE”

SOURCE: DAMA International. The DAMA Dictionary of Data Management, Second Edition: Technics Publications, 2011, p.77



# Three Key Words Characterize Data Integration

“Data lineage and data flows are also names for this [Data Integration Architecture] concept”

Source: Mosley, Mark., and Michael Brackett. The DAMA Guide to the Data Management Body of Knowledge (DAMA-DMBOK Guide), First Edition. Bradley Beach, N.J.: Technics Publications, 2010, p.79.



Data  
movement



Data  
transformation



Data flow



# Data Mapping



DEFINITION

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# Data Mapping

THE PROCESS OF MAPPING / INTEGRATING DATA ELEMENTS TWO DATA MODELS  
AT DIFFERENT ABSTRACTION LEVELS

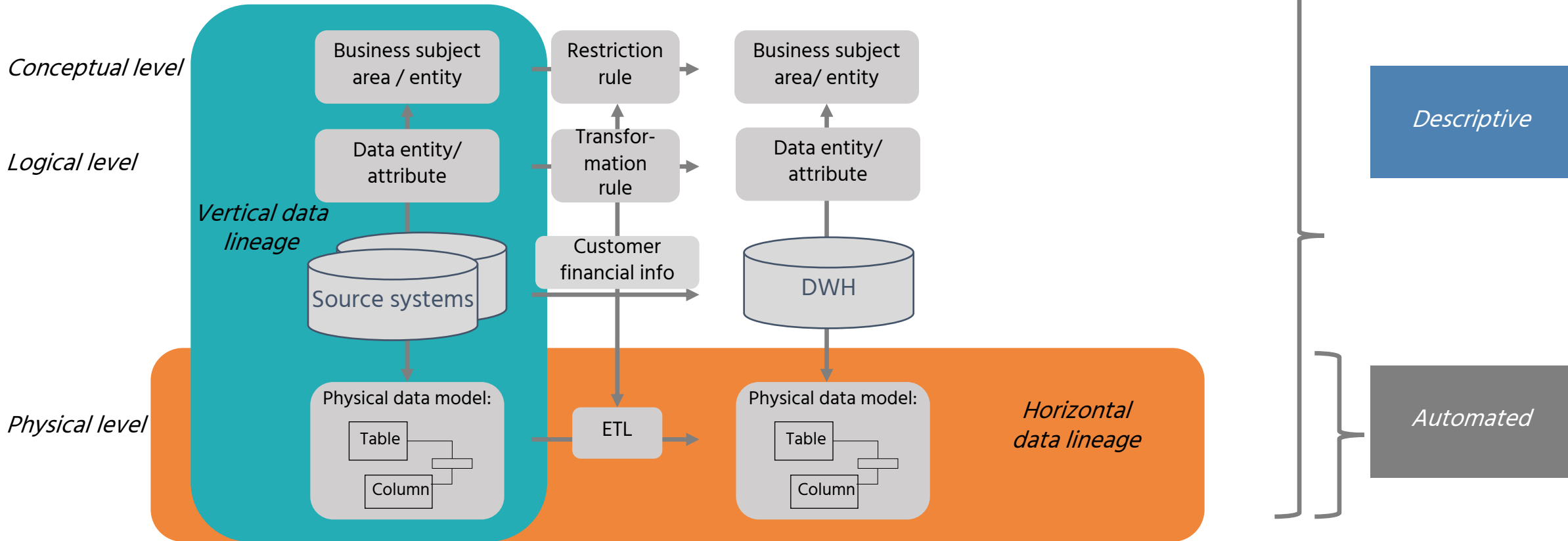


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# Relationships between Three Concepts



# Metadata Lineage Describes Data Movement, Transformation, and Integration Performed by Means of Semantic Data Mapping and Data Mapping at Various Abstraction Levels



# Semantic Data Mapping and Data Mapping Transform and Integrate Data at and between Various Abstraction Levels by:



IMPLEMENTING DATA TRANSFORMATION  
AND CONSOLIDATION



APPLYING BUSINESS RULES



USING TAXONOMIES AND ONTOLOGIES



# Semantic Data Mapping in the Data Lineage Context

What?



- Different contexts
- Definitions
- Related concepts

Why?



- Key areas of applications

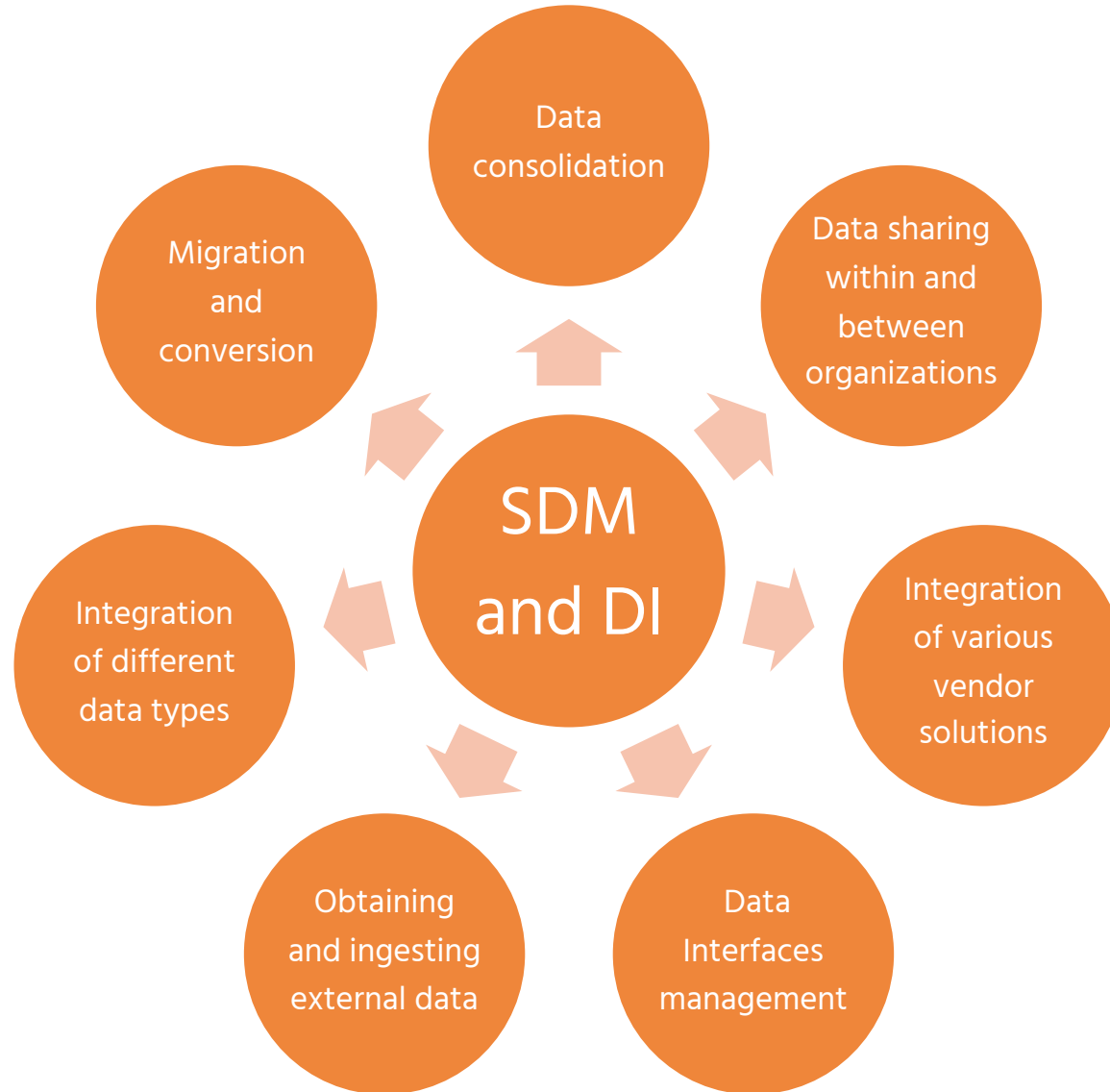
How?



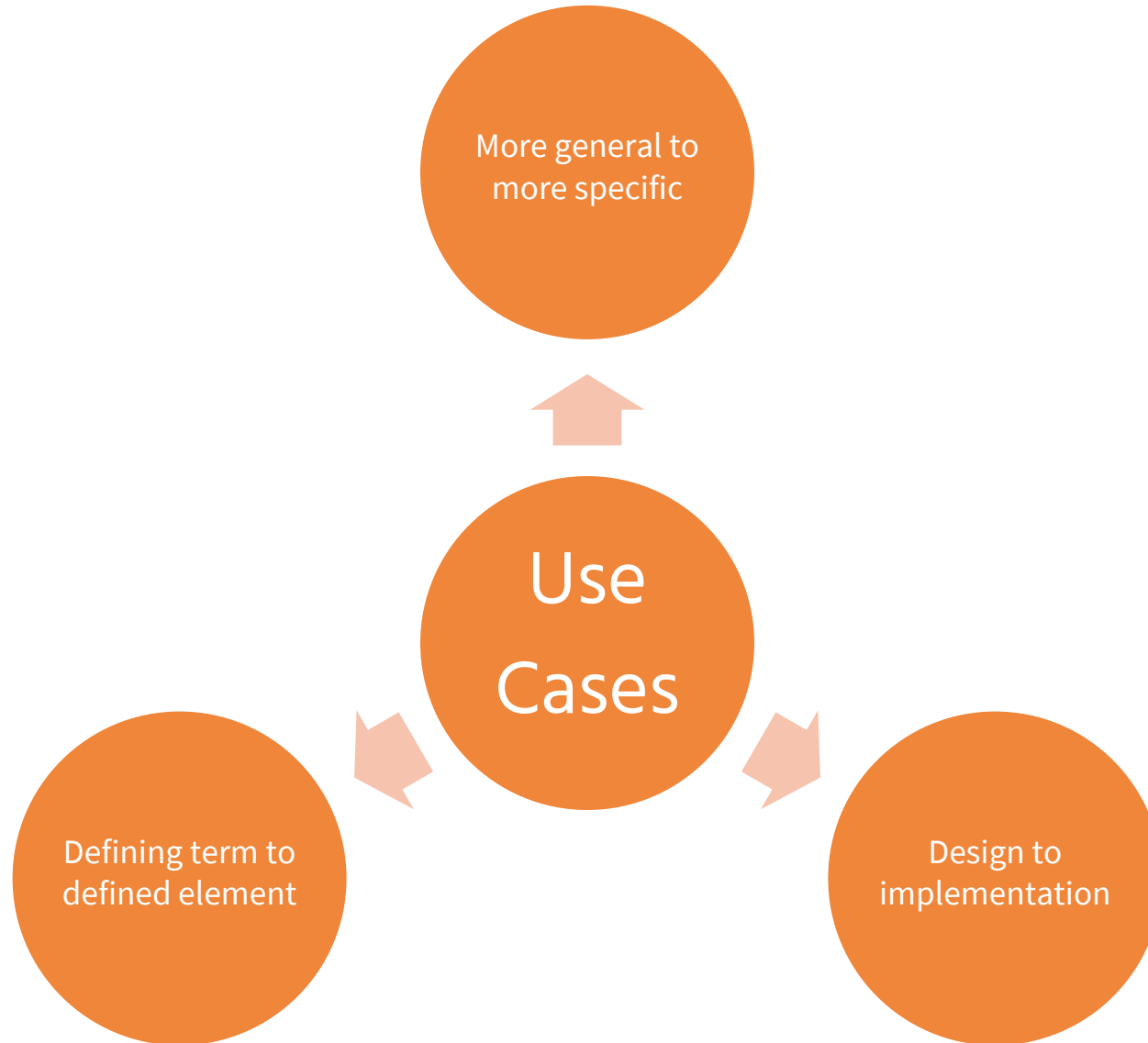
- Semantic Data Mapping in practice



# Semantic Data Modeling Serves Various Purposes of Data Integration:



# Semantic Links Can Be Used for the Following Use Cases:



# Semantic Data Mapping in the Data Lineage Context

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What?



- Different contexts
- Definitions
- Related concepts

Why?



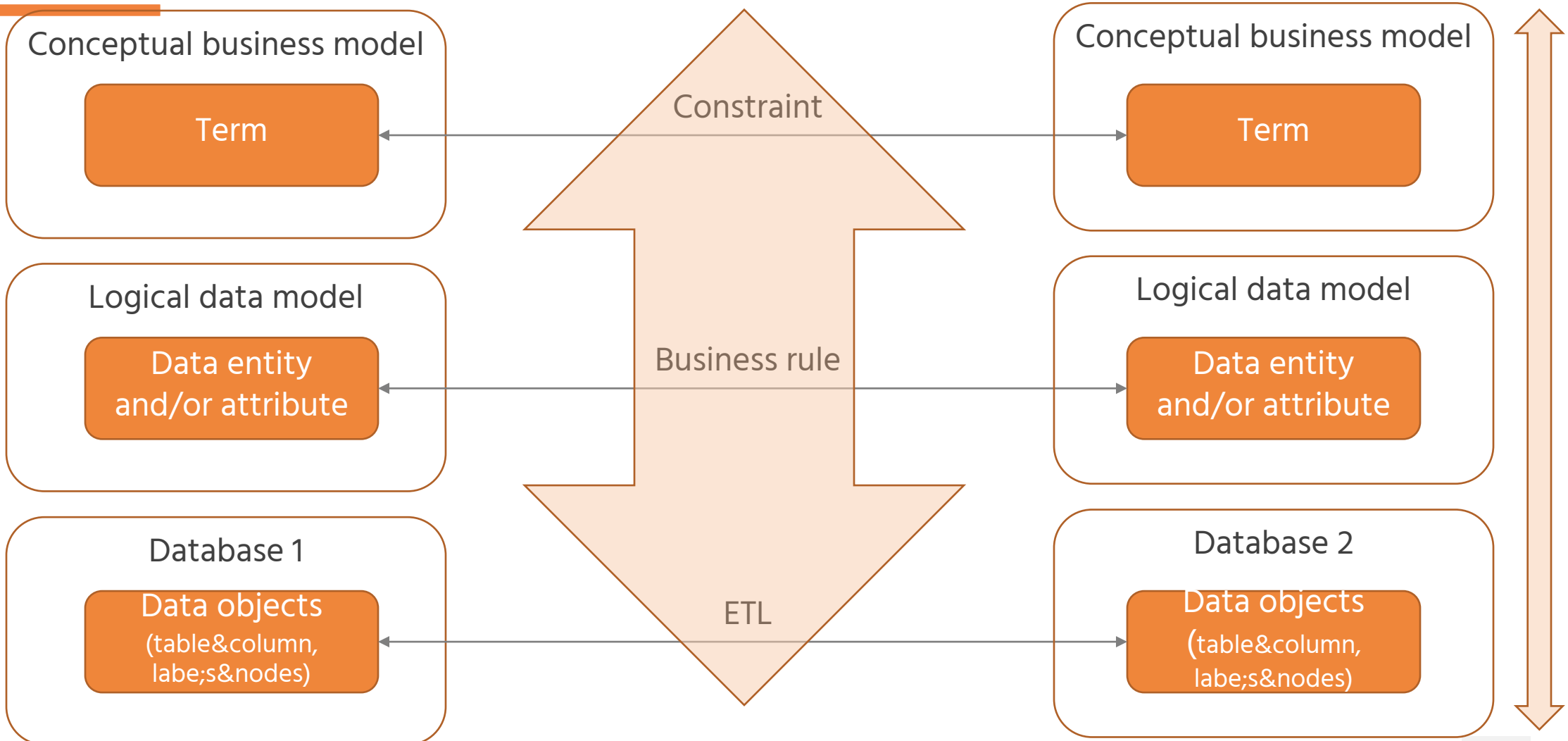
- Key areas of applications

How?

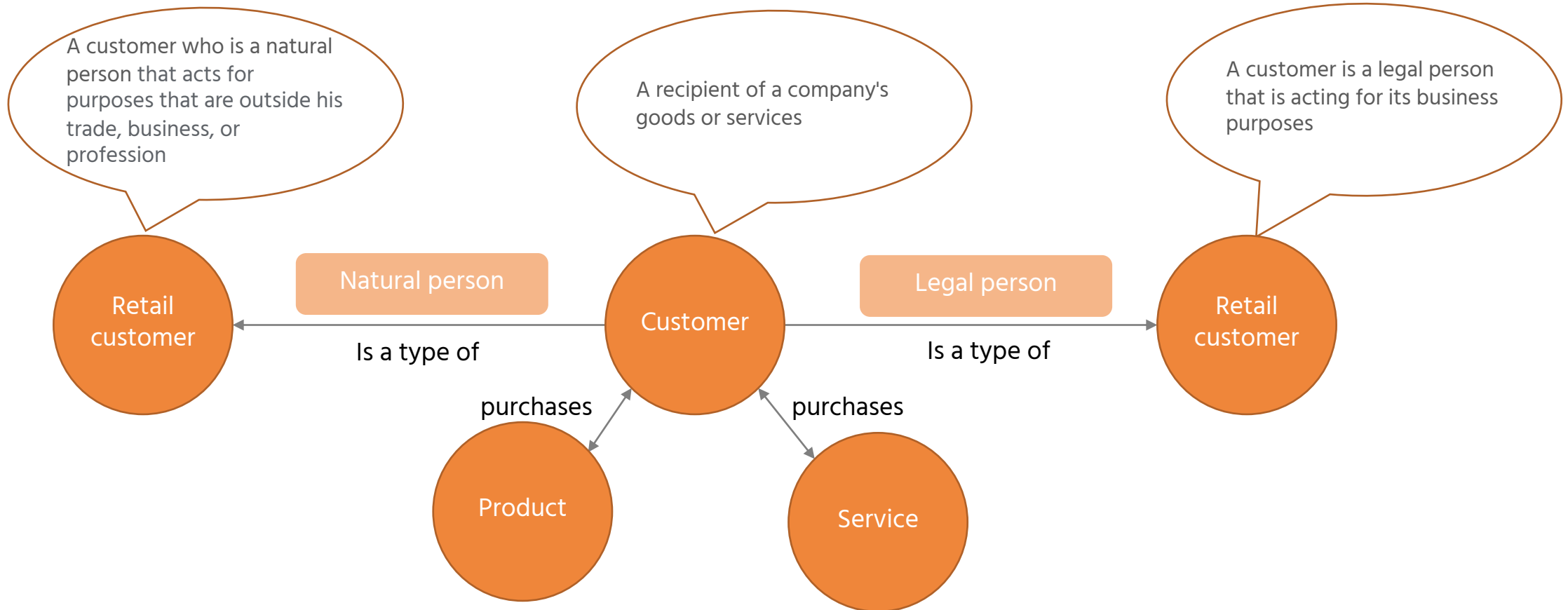


- Semantic Data Mapping in practice

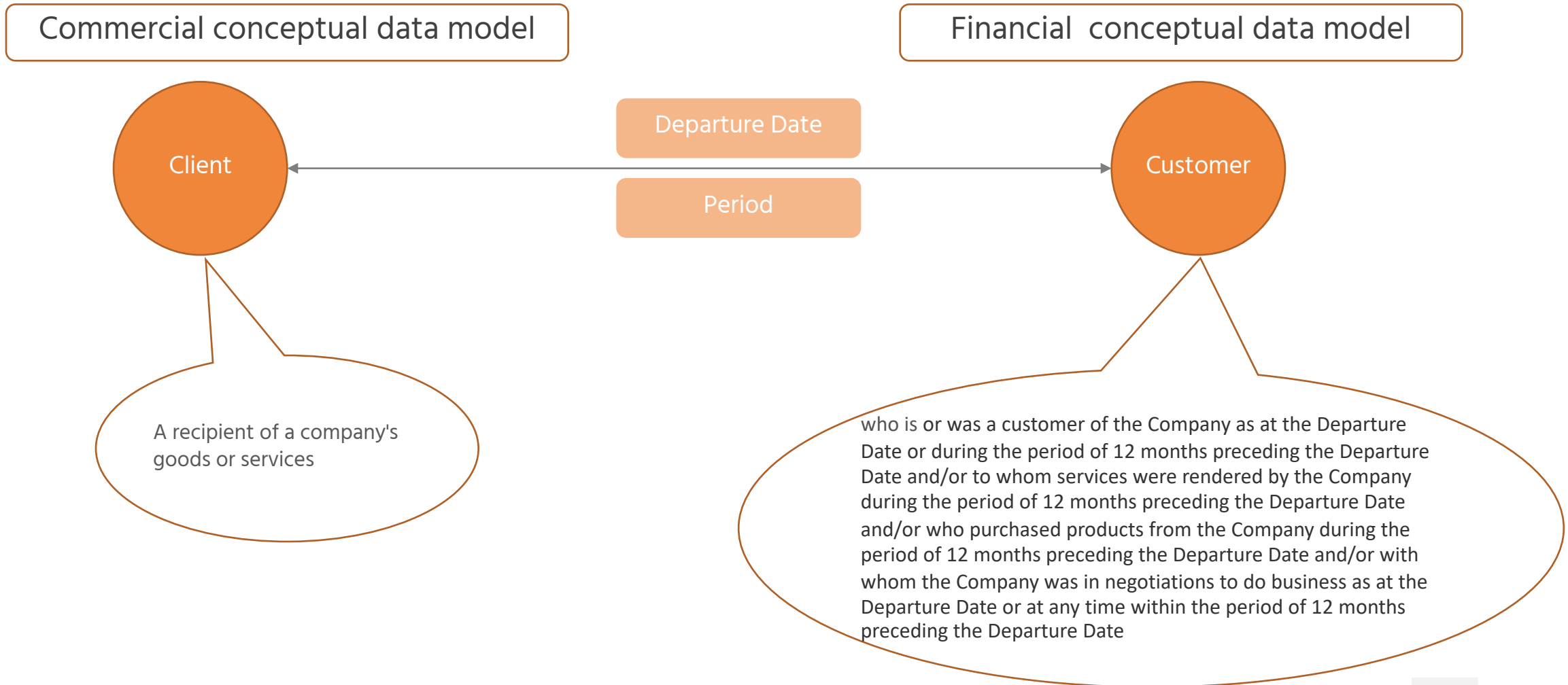
# (Semantic) Data Mapping should Map the Following Objects:



# (Semantic) Data Mapping at the Conceptual Level Links Terms within One Conceptual Data Model

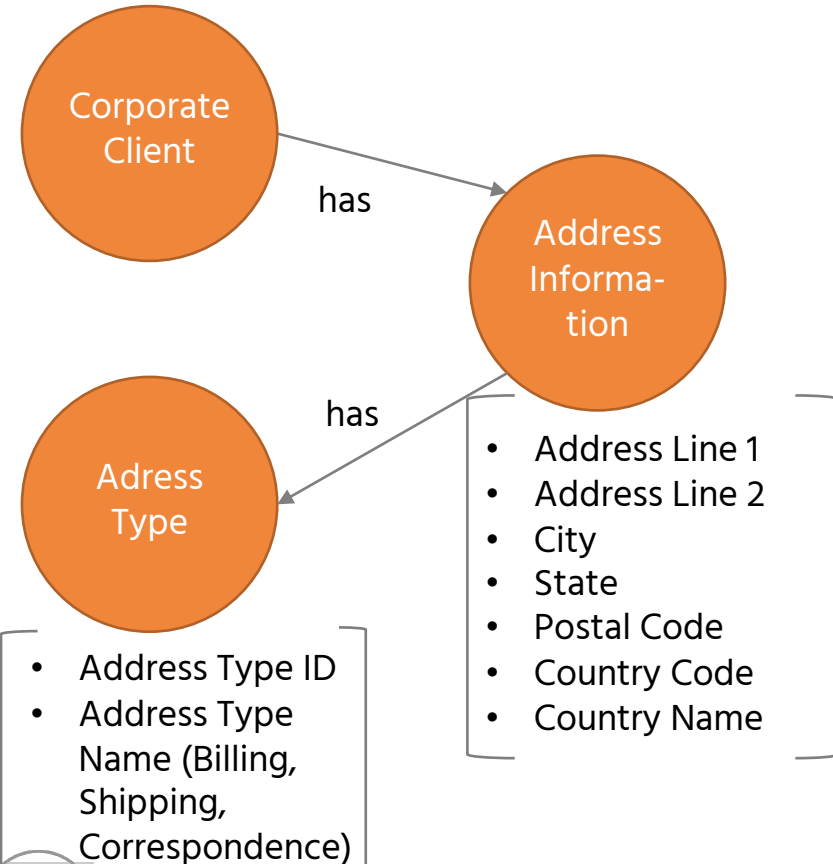


# (Semantic) Data Mapping at the Conceptual Level Links Terms between Multiple Conceptual Data Models

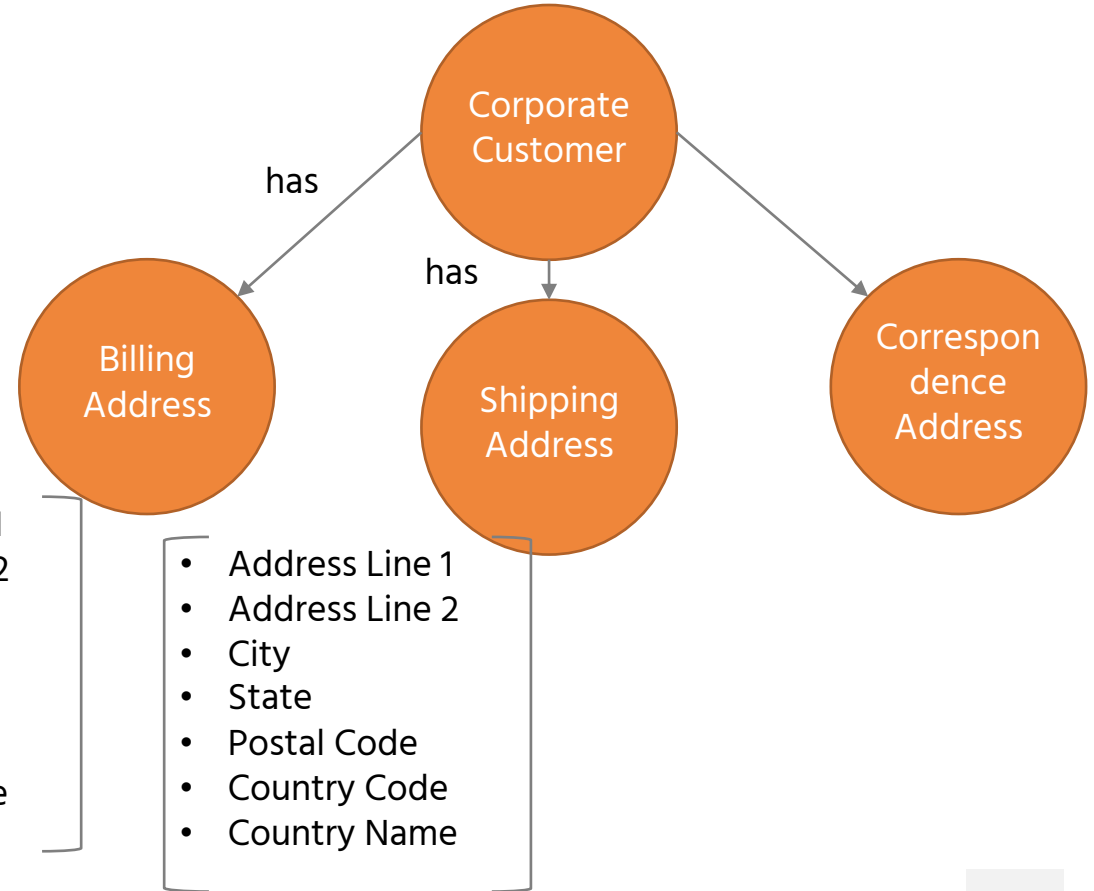


# (Semantic) Data Mapping at the Logical Level Links Data Entities and Attributes within One or between Several Data Models

Commercial logical data model



Financial logical data model

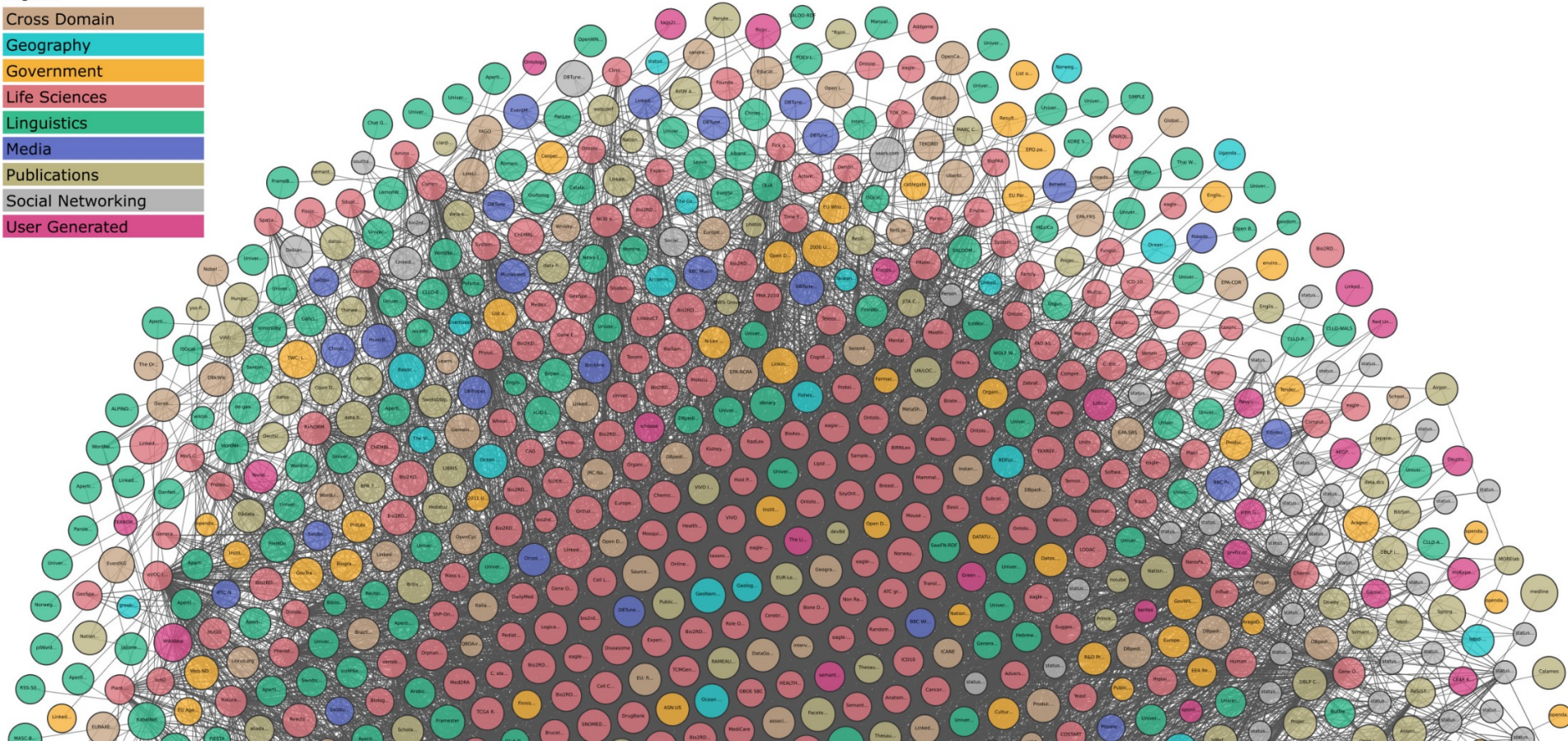


# Semantic Data Mapping at the Physical Level Links Data Objects within One or Between Several Data Models

The **Linked Open Data** Cloud

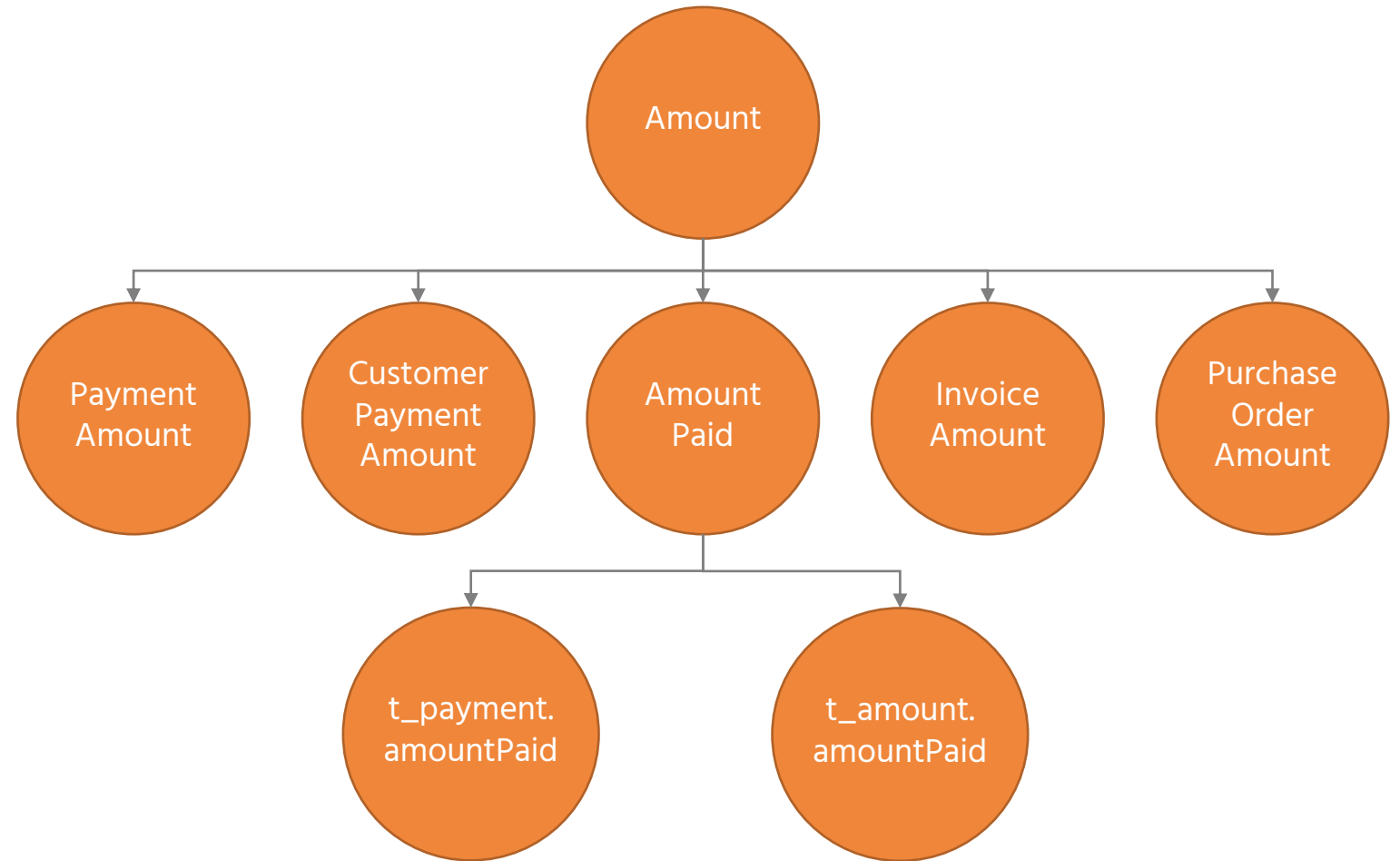
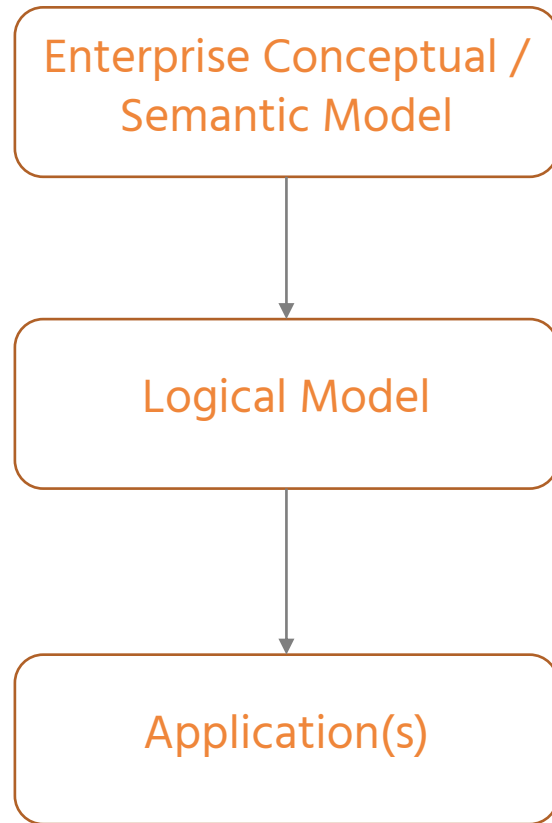
Legend

- Cross Domain
- Geography
- Government
- Life Sciences
- Linguistics
- Media
- Publications
- Social Networking
- User Generated

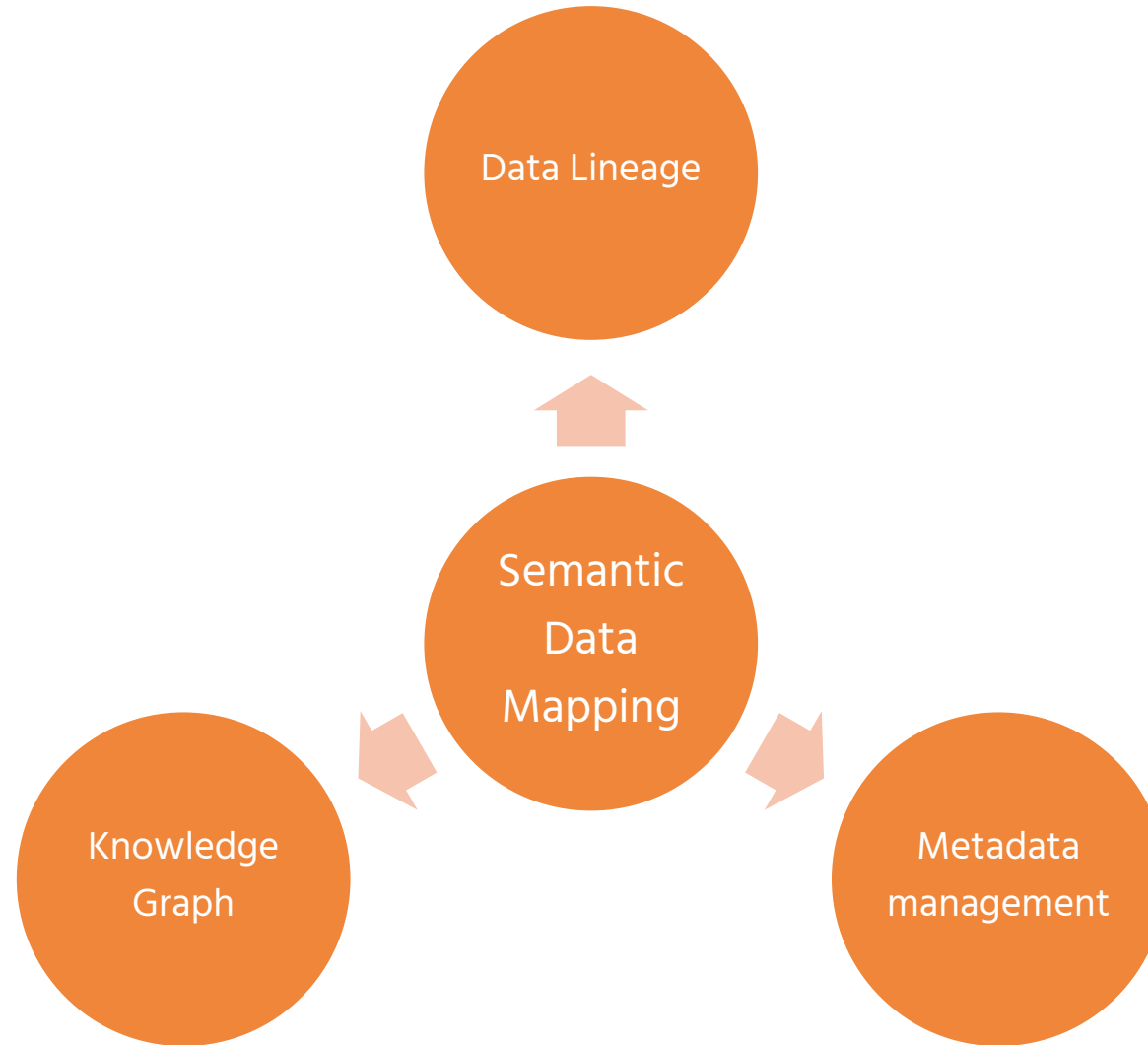




# Semantic Data Mapping Maps Data Objects between Different Abstraction Levels



# Different IT Solutions Deliver Semantic Data Mapping Capability



# Q&A



Do you have any questions?

Get in touch with us at

**DATA CROSSROADS.NL**



**TRANSFORM “UNCURATED  
DATA” TO “ACTIONABLE DATA”**

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