Fast-Track Training

Key Principles of Business Data Modeling to Enable Scalable AI

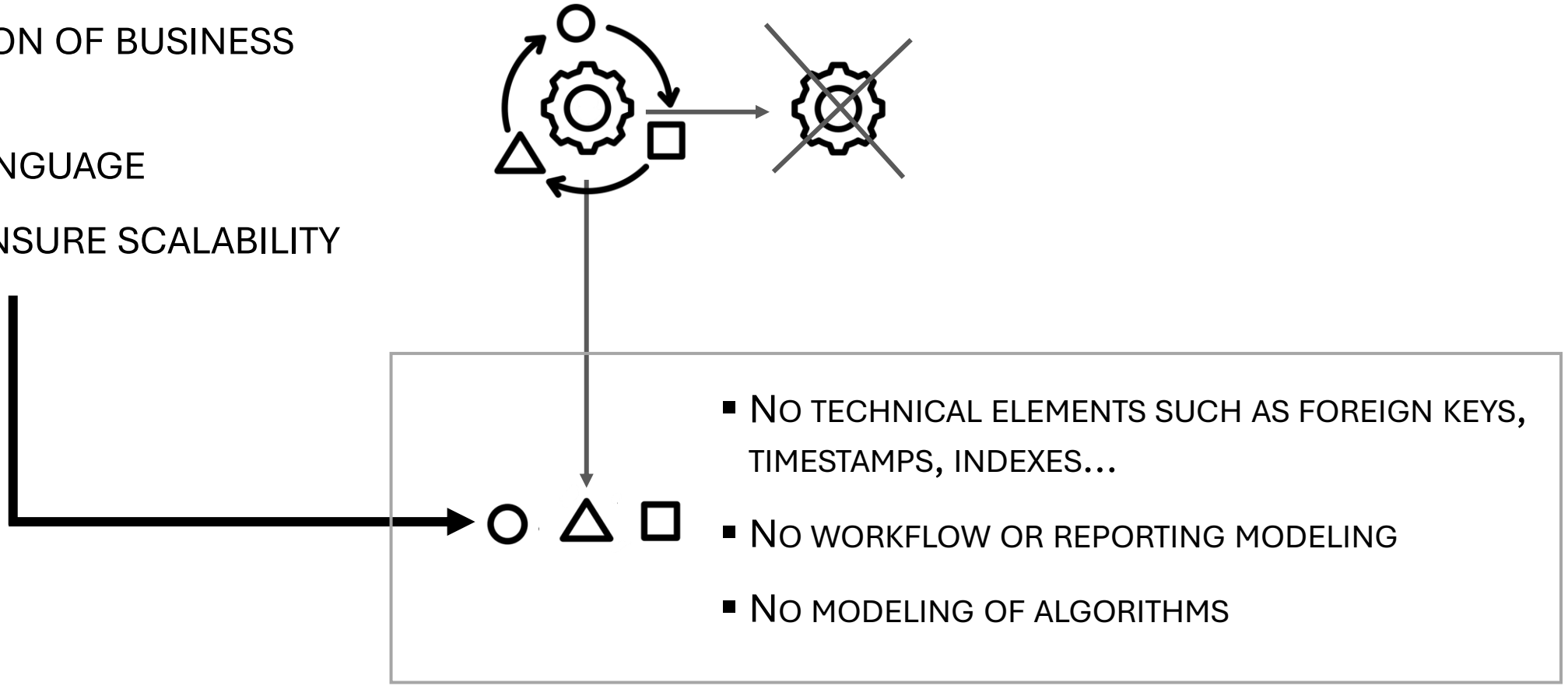
September 13, 2025

creative commons

Recap of Business Data Modeling

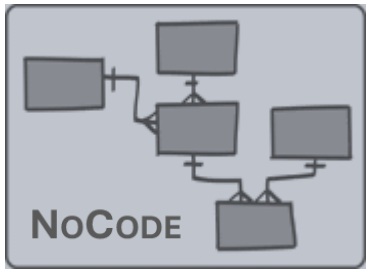
Objectives

- REPRESENTATION OF BUSINESS KNOWLEDGE
- IN NATURAL LANGUAGE
- GENERIC TO ENSURE SCALABILITY



- NO TECHNICAL ELEMENTS SUCH AS FOREIGN KEYS, TIMESTAMPS, INDEXES…
- NO WORKFLOW OR REPORTING MODELING
- NO MODELING OF ALGORITHMS

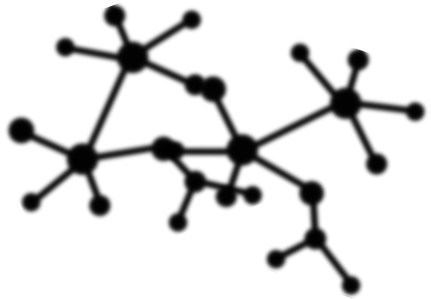
How is it useful?



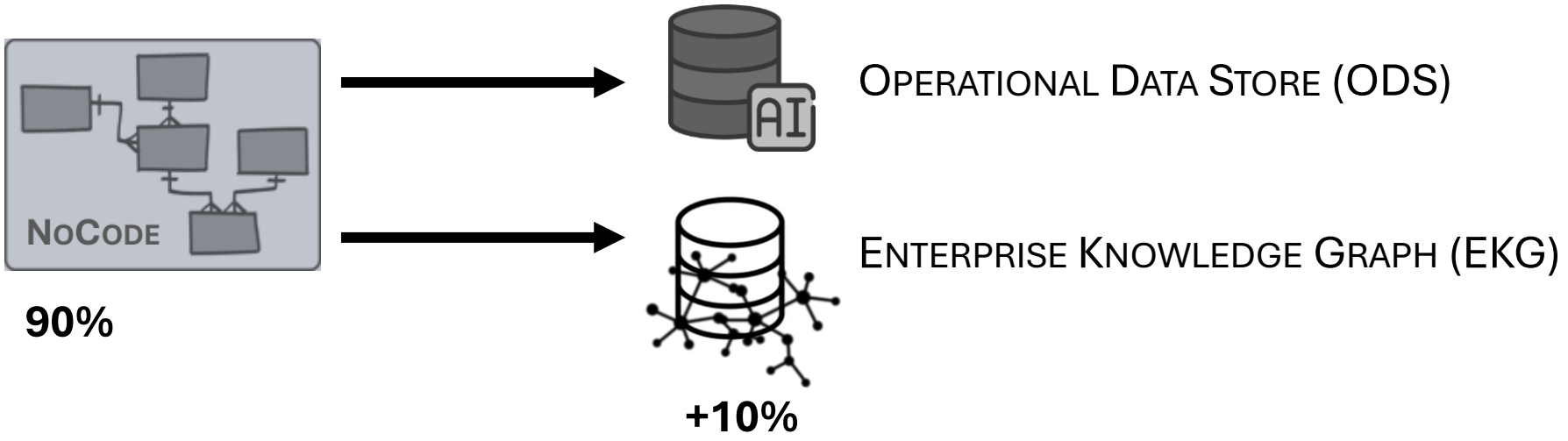
Thanks to NoCode-
LowCode the data model... → ... is translated into a database

Operational Data Store (ODS)
required for AI automations

Ontology

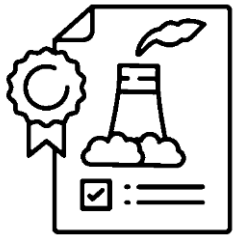


- THE BUSINESS DATA MODEL REPRESENTS 90% OF THE ONTOLOGY
- THE REMAINING 10% IS ADDED WHEN THE DATA MODEL IS PLACED INTO AN ENTERPRISE KNOWLEDGE GRAPH (EKG) WITH HEURISTICS



Business description

+



THE DESCRIPTIONS OF THE COMPANY'S ACTIVITY IN THE FORM OF NARRATIVE USE CASES NOT WORKFLOWS

STANDARD MODELING PATTERNS BASED ON ERP, CRM, AND THE COMPANY'S INDUSTRY SECTOR

AI as a Game Changer

IMPORTANT

TO HAVE A UNIFIED DATABASE WAS NOT AS CRITICAL FOR A COMPANY

IT WAS A **NICE-TO-HAVE** WHEREAS —AI→ NOW IT IS A **MUST-HAVE**

COMPLEXITY REQUIRED LABORIOUS MANUAL WORK TO ESTABLISH THE BUSINESS GLOSSARY AND MODELING

AI MODELING PROMPTS →

- THE LEVEL OF COMPLEXITY NO LONGER IMPACTS THE DATA MODELING WORKLOAD
- COMBINED WITH NOCODE–LOWCODE DATABASES -> THE TRANSITION FROM THE MODEL TO THE DATABASE IS ACCELERATED

Practices

https://www.visual-paradigm.com/

Legal Notice: The data models presented in this training are original work created by the author. Visual Paradigm is used solely as a modeling tool. Visual Paradigm and its interface elements remain the property of Visual Paradigm International Ltd.

Vocabulary

ERD = Entity- Relationship Diagram = UML Class Diagram = Data Model

Class = Table

Relation = Association

Recap - Engineering Process

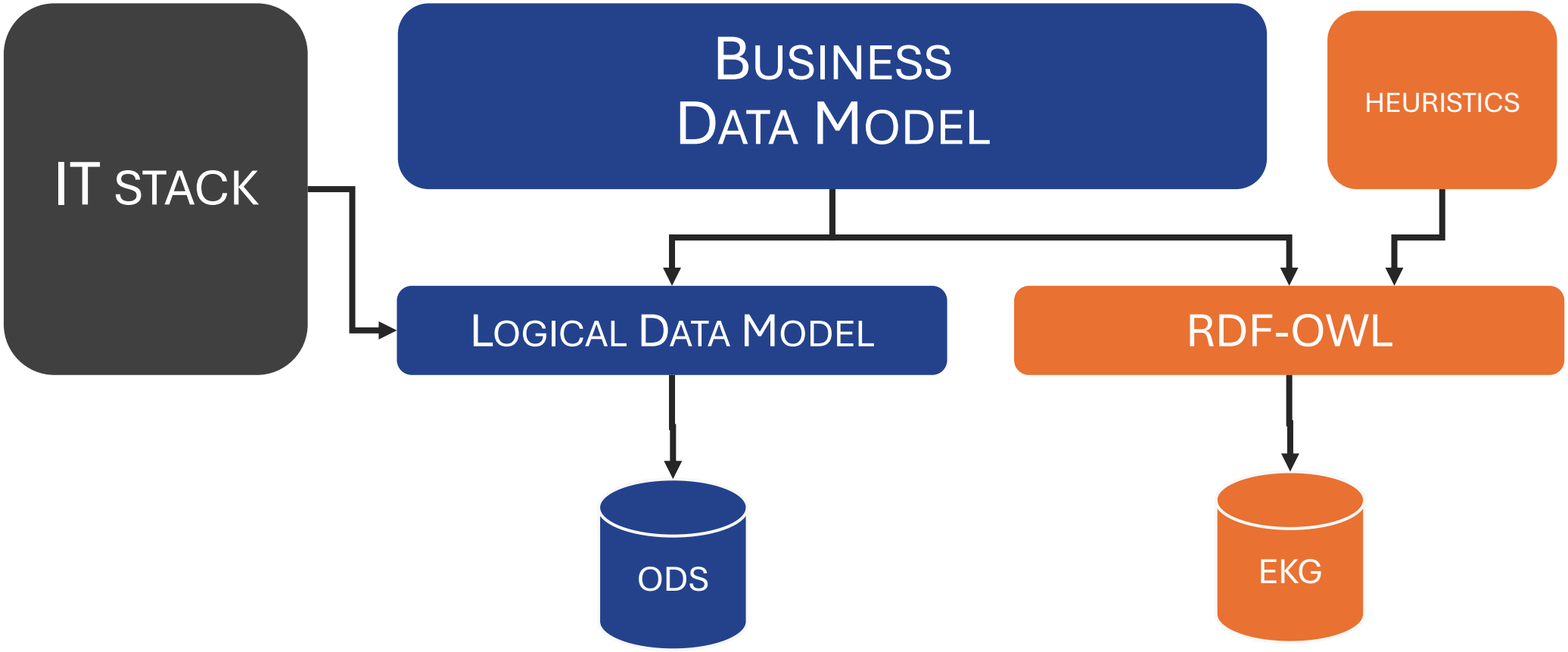


Diagram navigator

Provides a flat list of all diagrams created in the project (Class Diagrams, BPMN, ERDs, etc.)

VERSUS

Model Explorer

Organizes all model elements (classes, attributes, associations, packages, etc.) in a hierarchy

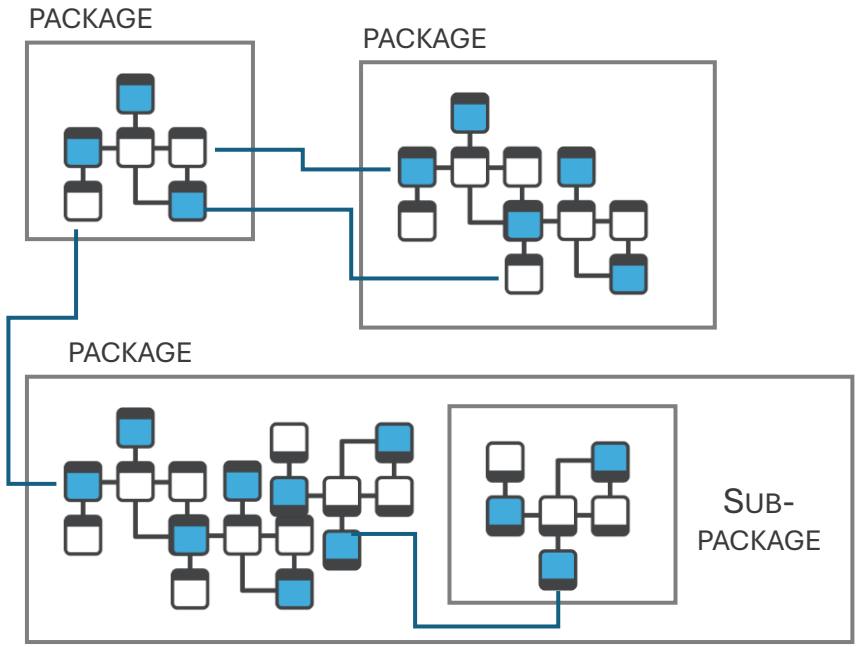
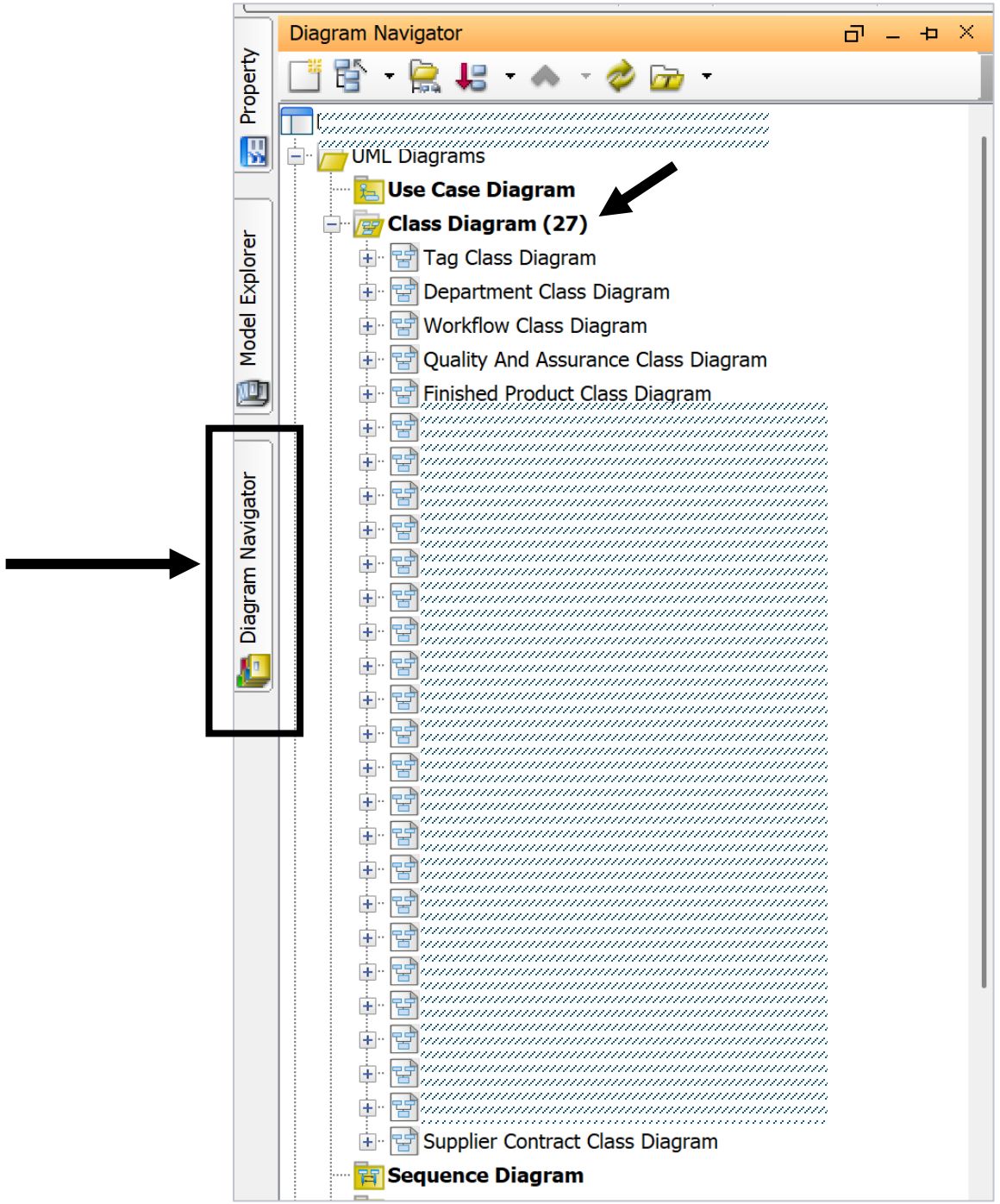


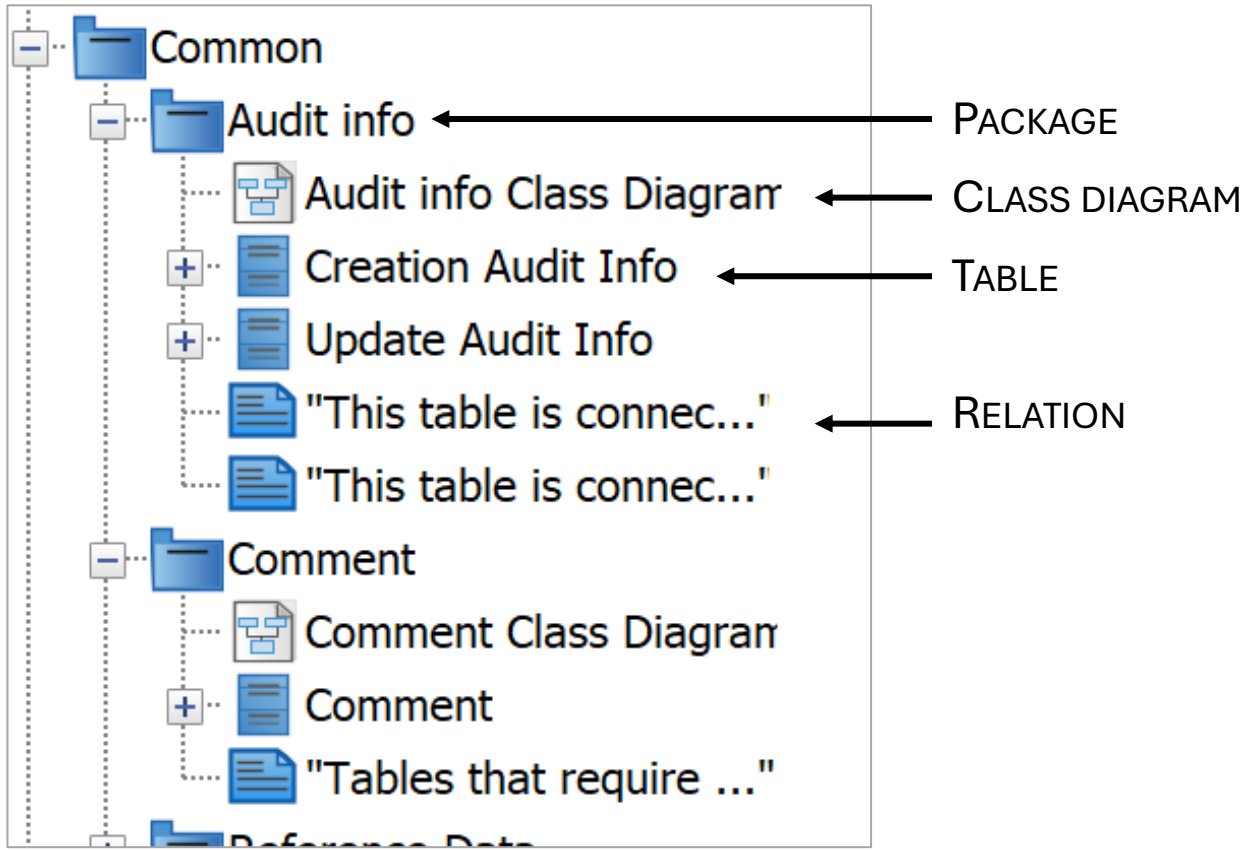
DIAGRAM NAVIGATOR

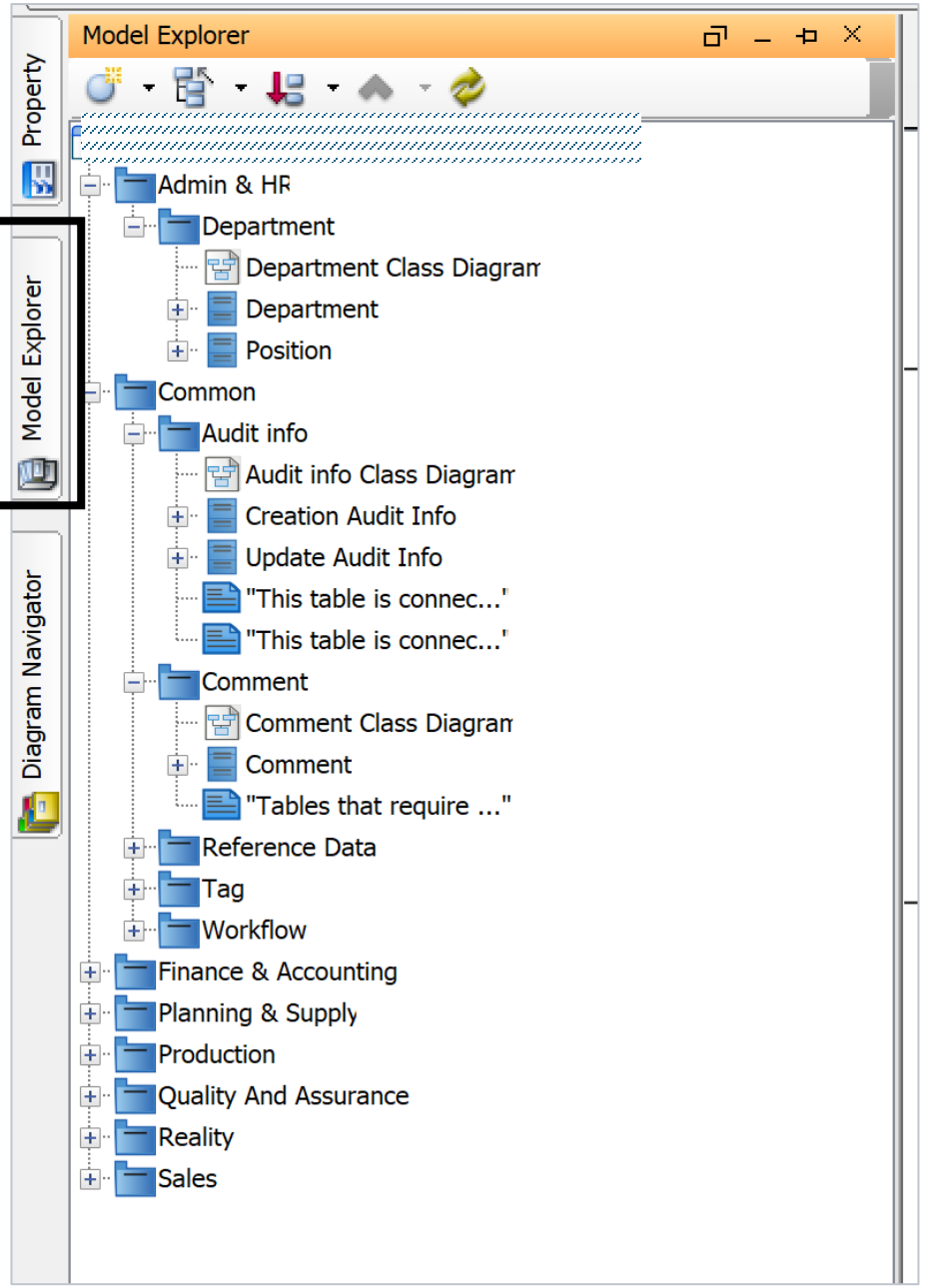
USEFUL WHEN YOU WANT A QUICK ENTRY POINT TO A SPECIFIC DIAGRAM BUT NOT IDEAL FOR MAINTAINING A WELL-ORGANIZED REPOSITORY



Model Explorer

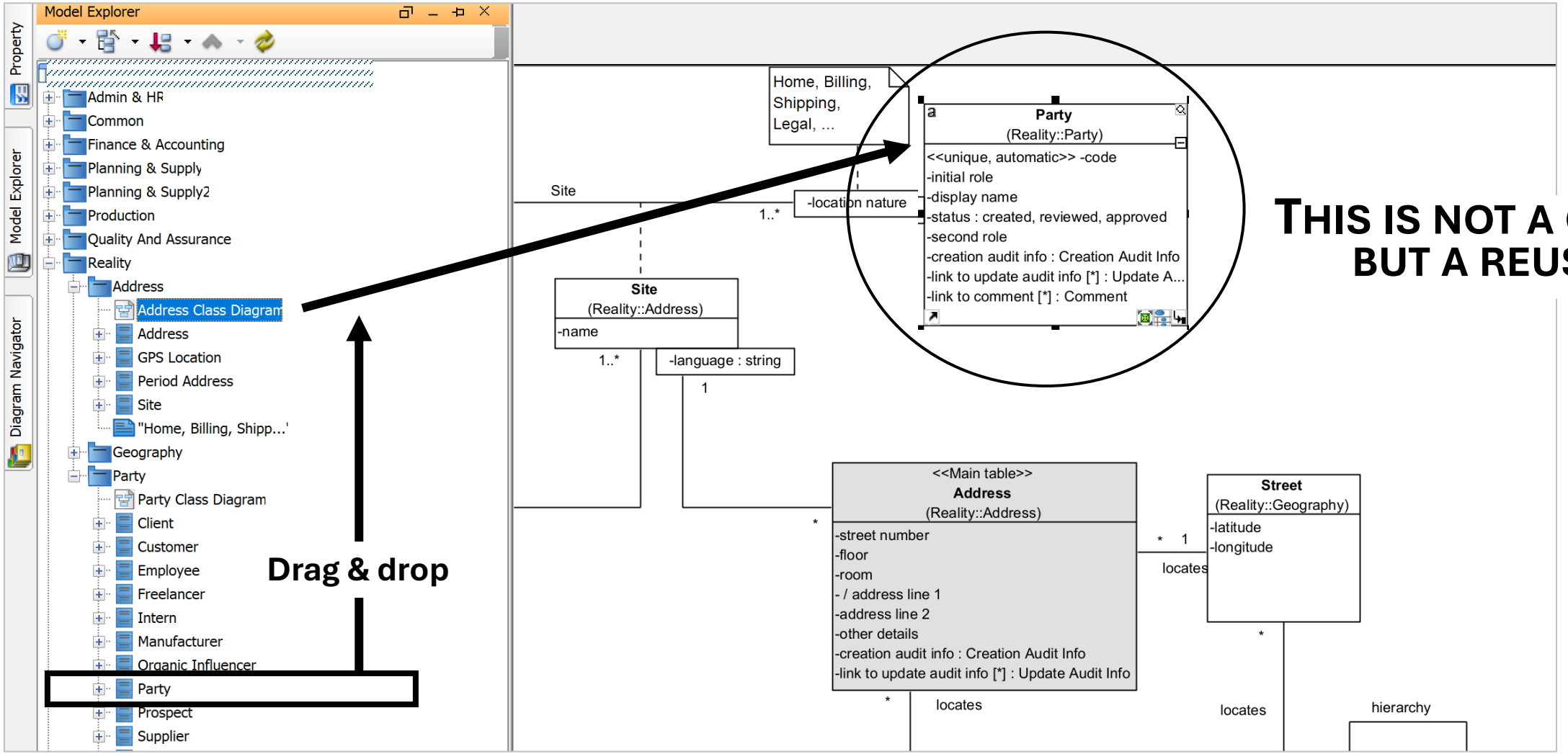
Recommended for projects where the goal is to build a long-term, structured repository rather than ad-hoc drawings





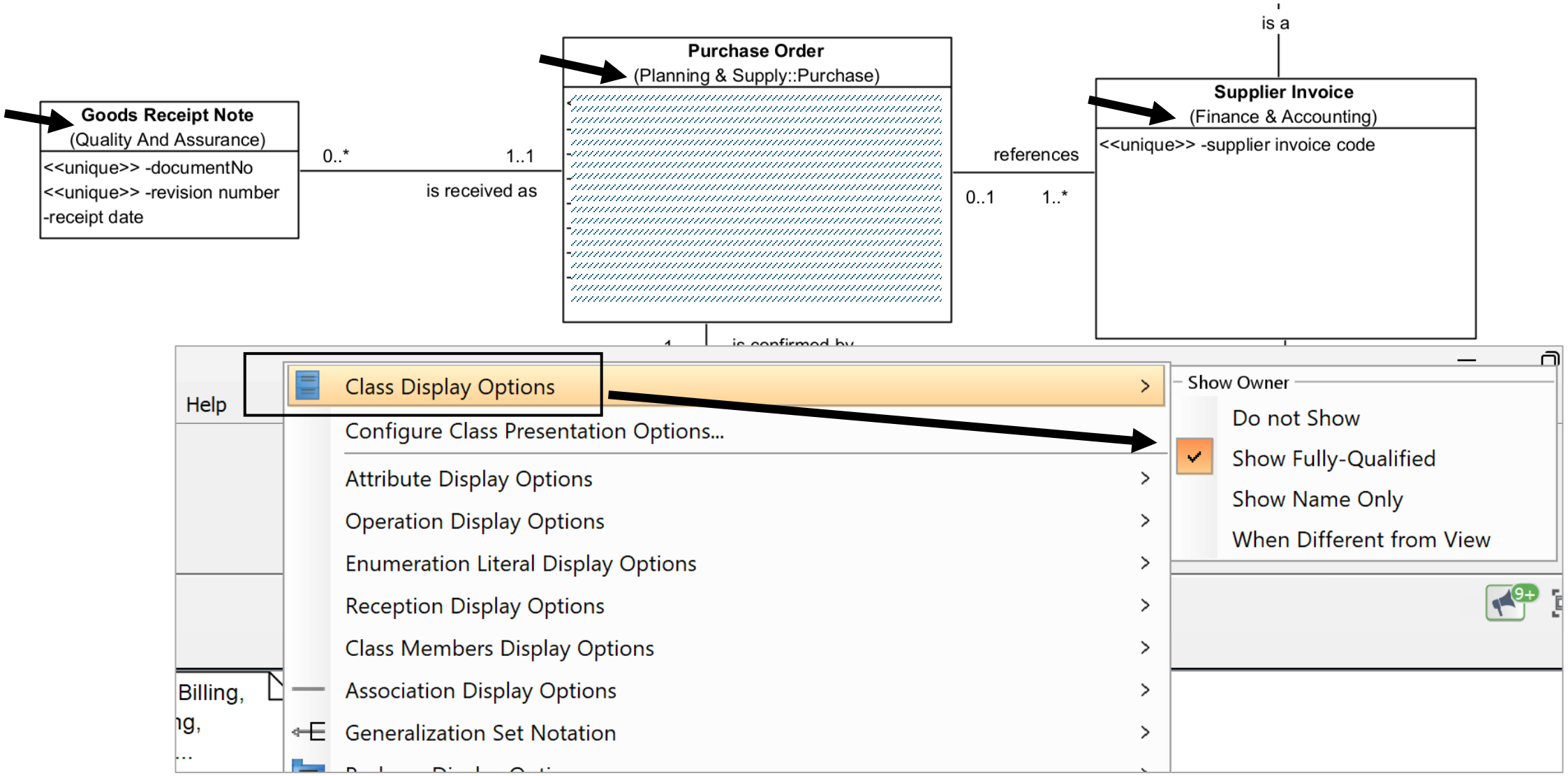
ENGAGE META

REUSING TABLES ACROSS PACKAGES



THIS IS NOT A COPY, BUT A REUSE

NAMING WITH PACKAGE LOCATION OF THE TABLE OWNER



ENGAGE META

How packages are determined

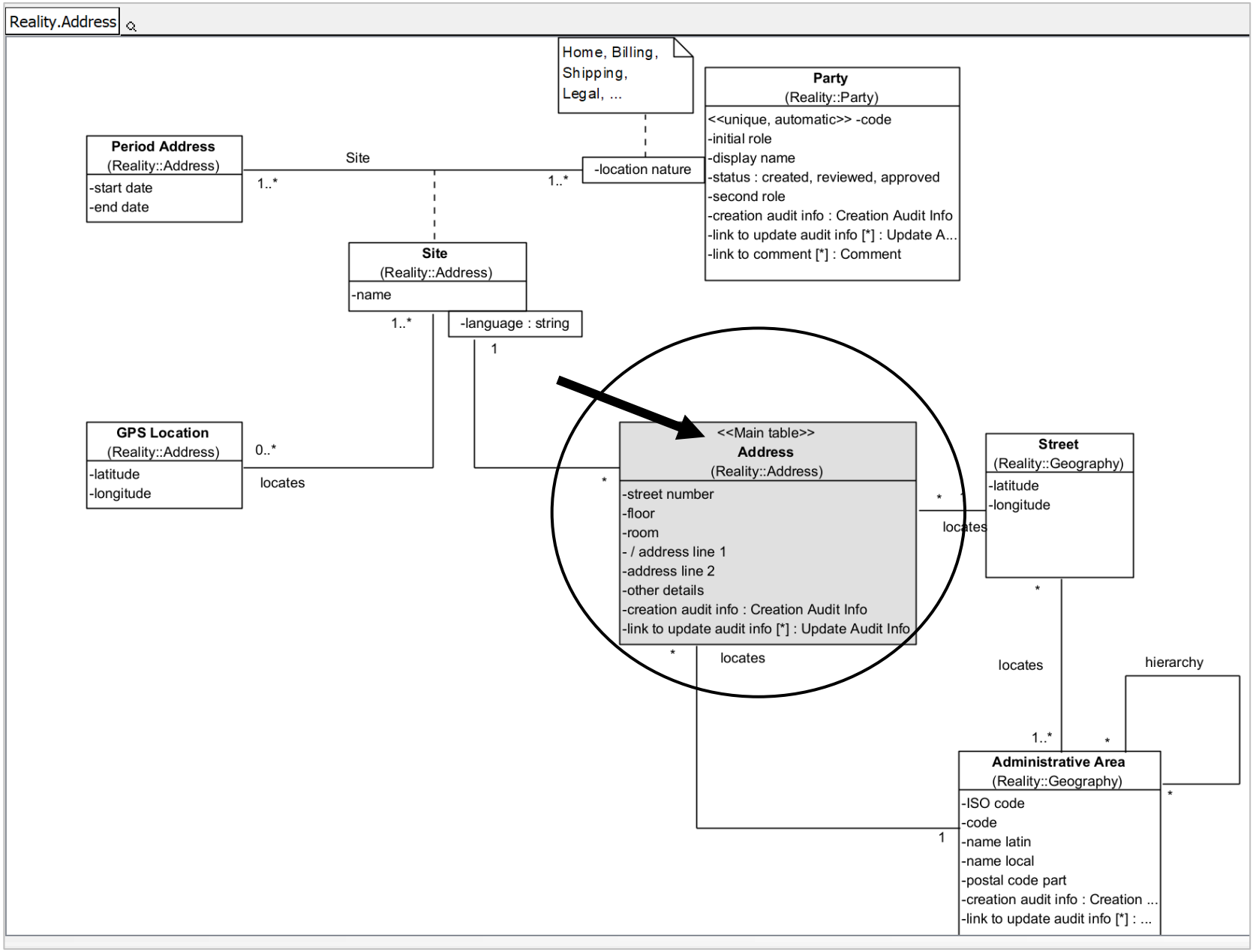
MAIN TABLE

A MAIN TABLE REPRESENTS A **BUSINESS CONCEPT** OF STRONG SEMANTIC SIGNIFICANCE, TYPICALLY MODELED WITH NO MORE THAN **TWENTY TABLES**

SYNONYM: CATEGORY

A CATEGORY (IN BOOCH'S UML) IS A CONCEPTUAL GROUPING OF CLASSES THAT SHARE A COMMON PURPOSE, USED TO PARTITION A SYSTEM'S MODEL INTO MEANINGFUL SUBSETS. IN MODERN UML, YOU WOULD NORMALLY USE A PACKAGE FOR THIS ROLE

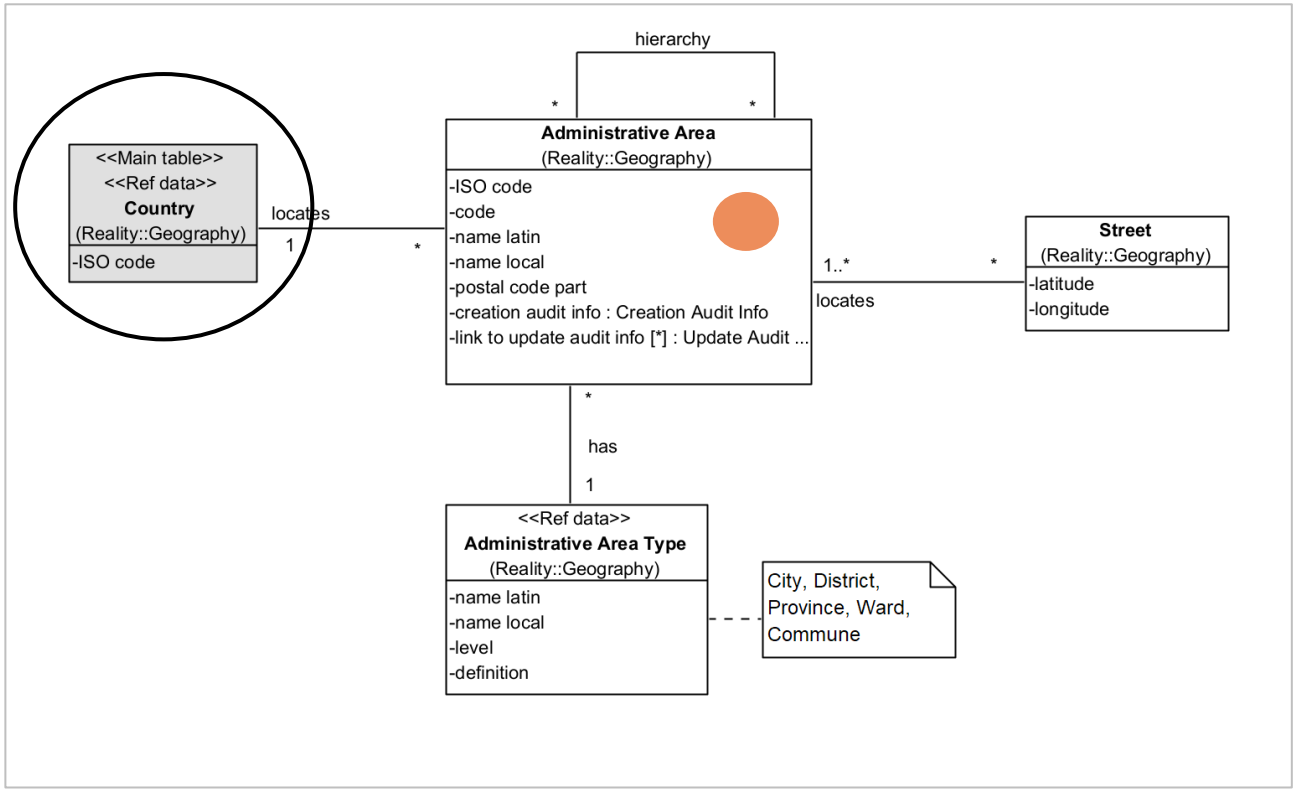
EACH PACKAGE CONTAINS ONE AND ONLY ONE MAIN TABLE



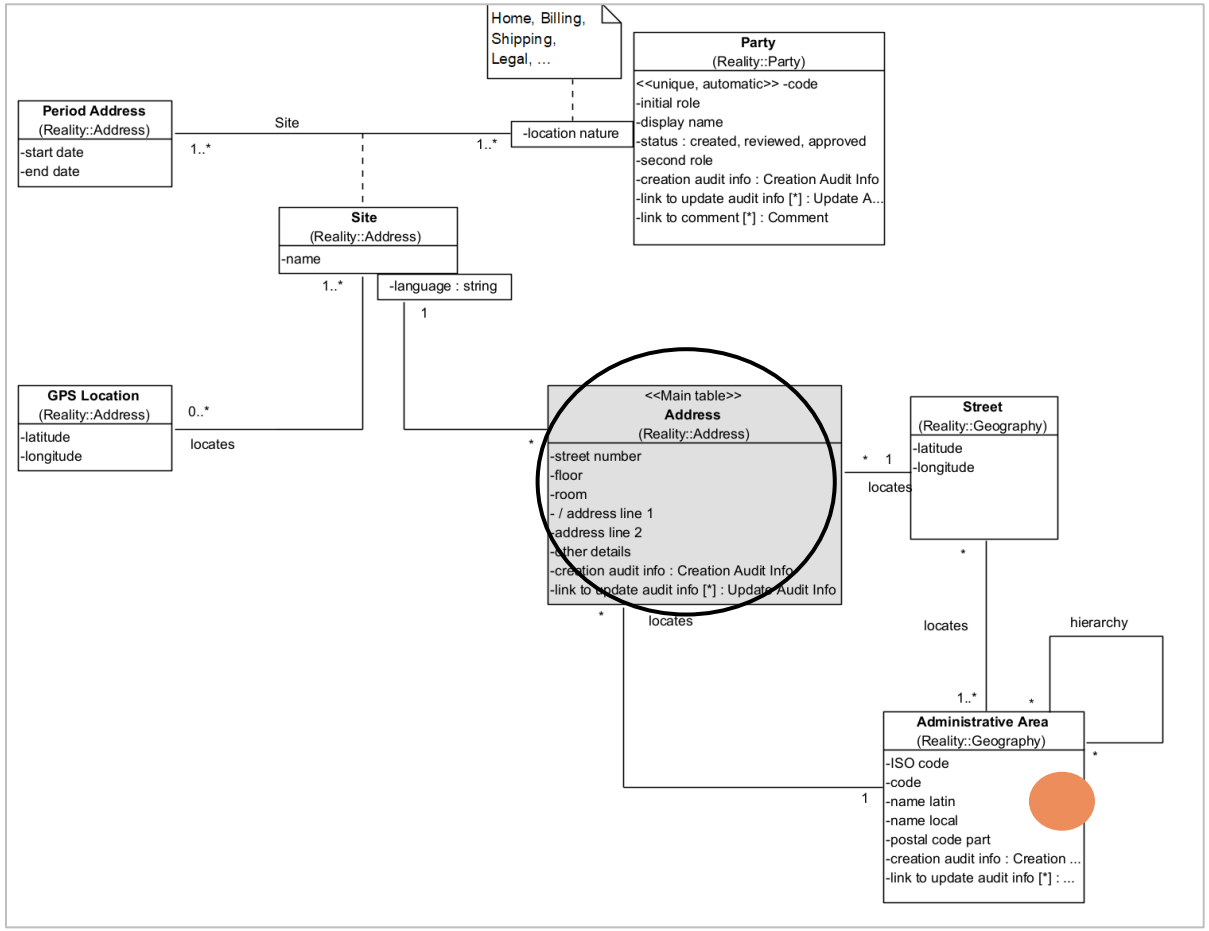
ENGAGE META

EACH PACKAGE CONTAINS ONE AND ONLY ONE MAIN TABLE

PACKAGE: GEOGRAPHY -> MAIN TABLE "COUNTRY"



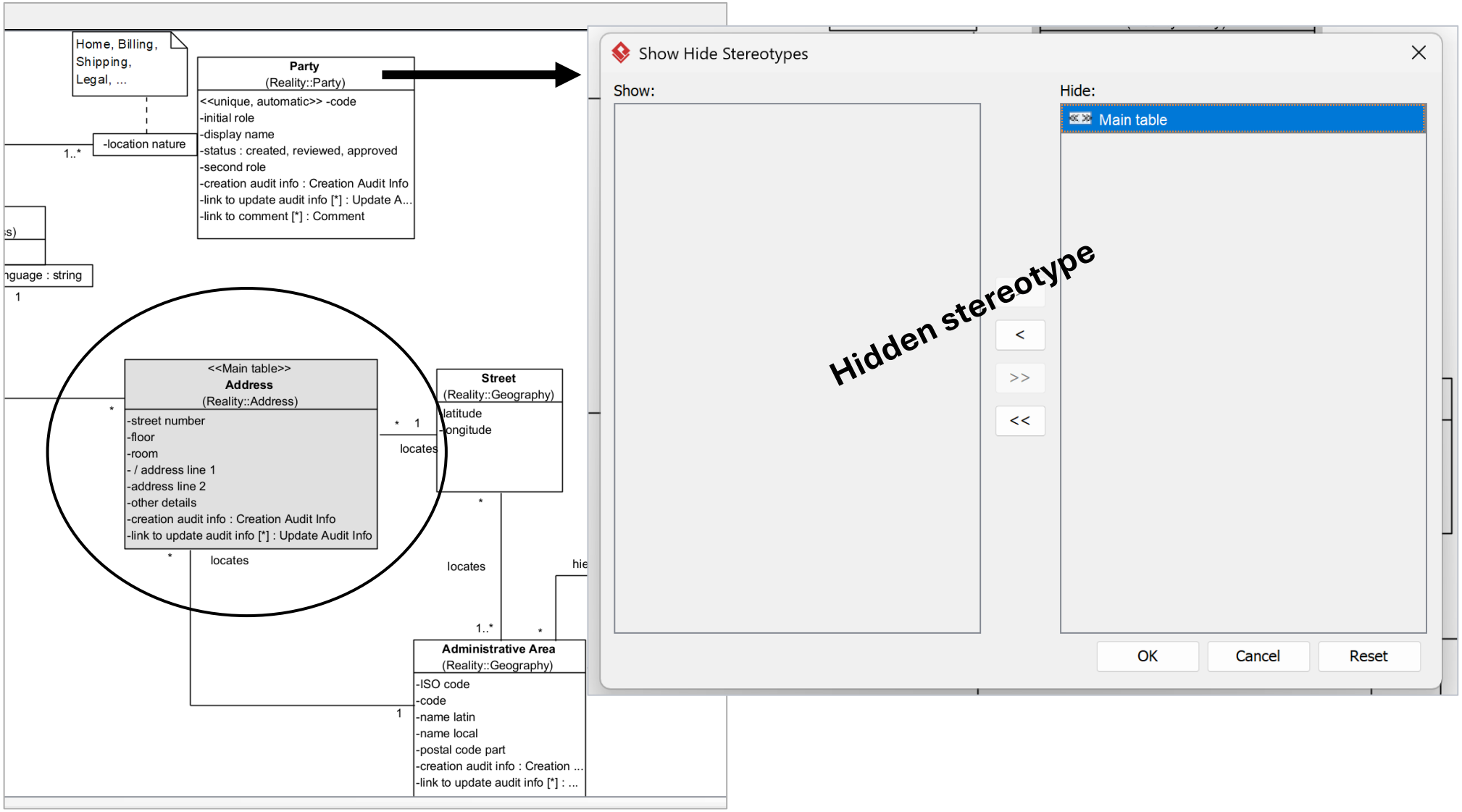
PACKAGE: ADDRESS -> MAIN TABLE "ADDRESS"



THE JUNCTION POINT BETWEEN THE TWO DATA MODELS

ENGAGE META

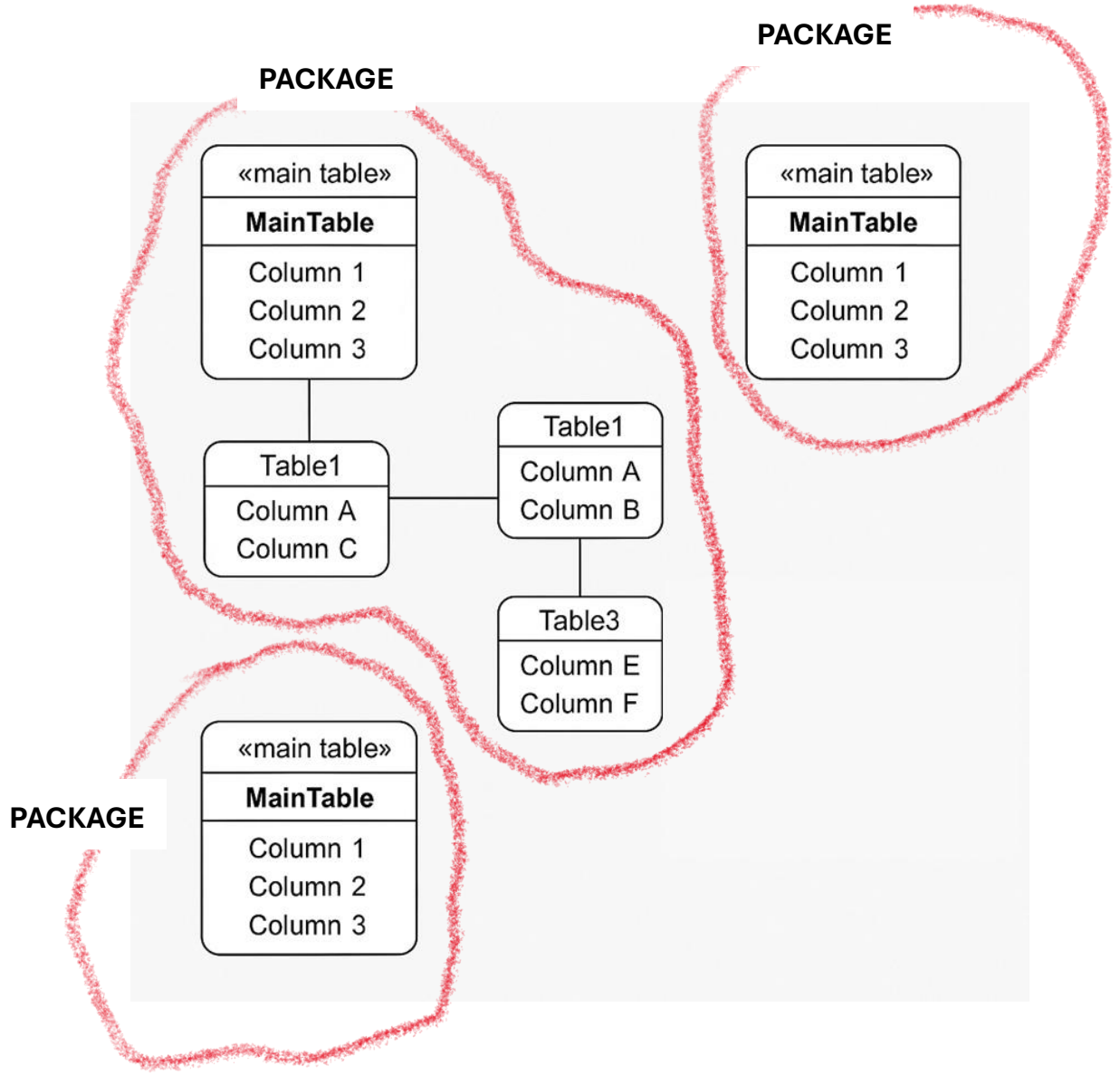
WHEN REUSING A MAIN TABLE FROM ANOTHER PACKAGE ITS STEREOTYPE IS NOT DISPLAYED



ENGAGE META

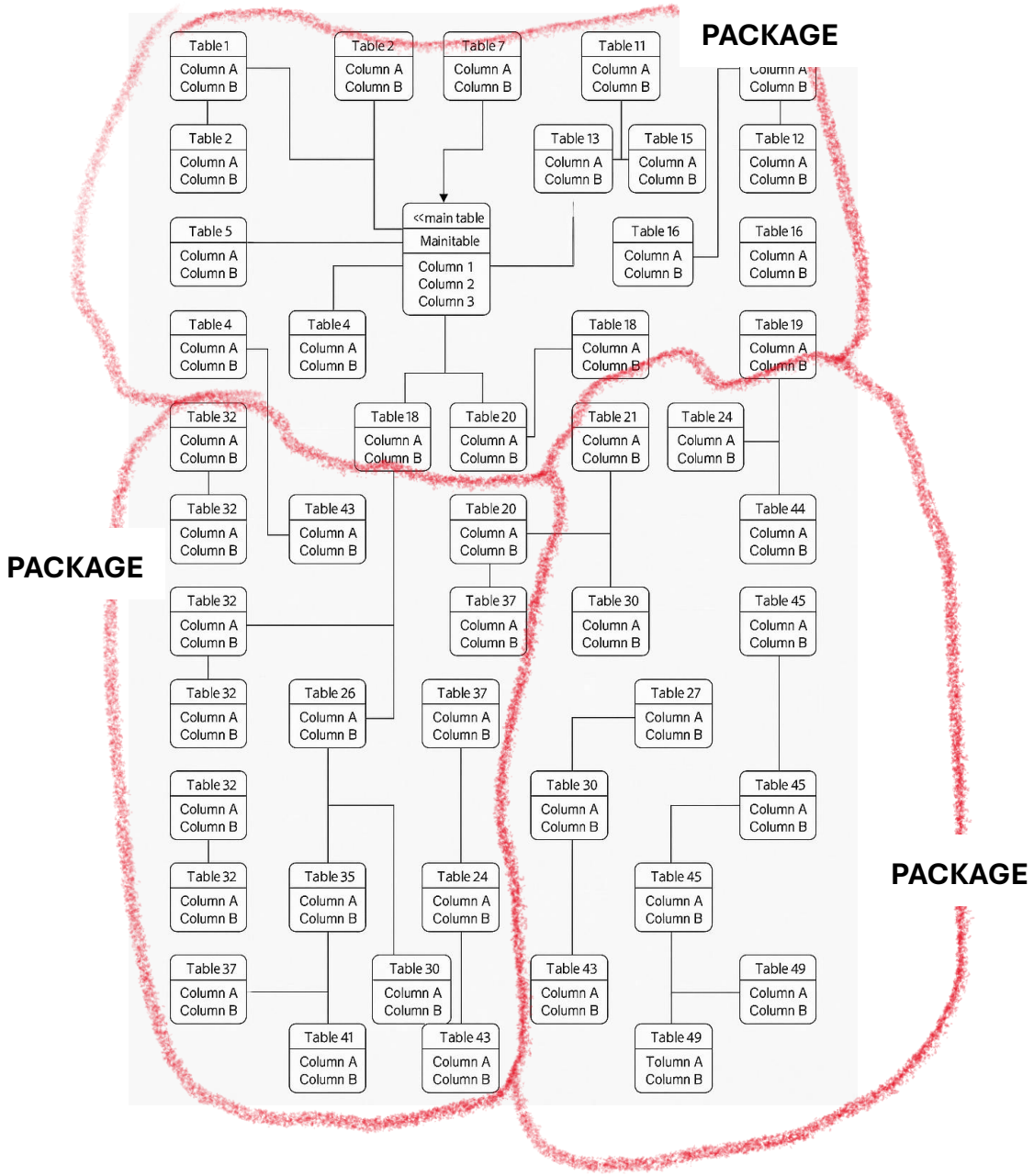
MAIN TABLE – BEST PRACTICES

WHEN A DATA MODEL CONTAINS TABLES THAT ARE ISOLATED FROM THE REST OF THE DESIGN, IT USUALLY INDICATES THE PRESENCE OF SEVERAL BUSINESS CONCEPTS, AND THEREFORE MULTIPLE MAIN TABLES

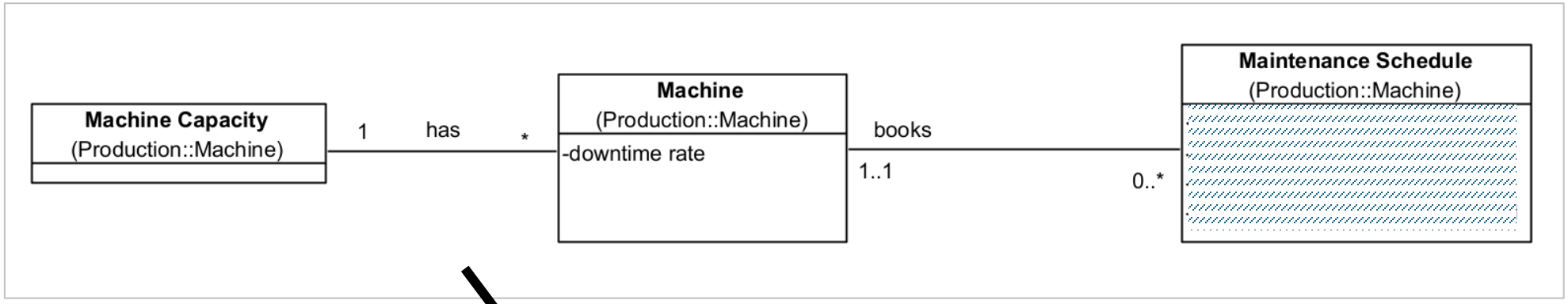


MAIN TABLE – BEST PRACTICES

WHEN A DATA MODEL HAS TOO MANY TABLES (MORE THAN 20), IT SHOULD BE DIVIDED INTO PACKAGES, AS THIS USUALLY INDICATES THE PRESENCE OF SEVERAL IMPORTANT BUSINESS CONCEPTS, EACH CORRESPONDING TO A MAIN TABLE



Naming Convention & Business Glossary



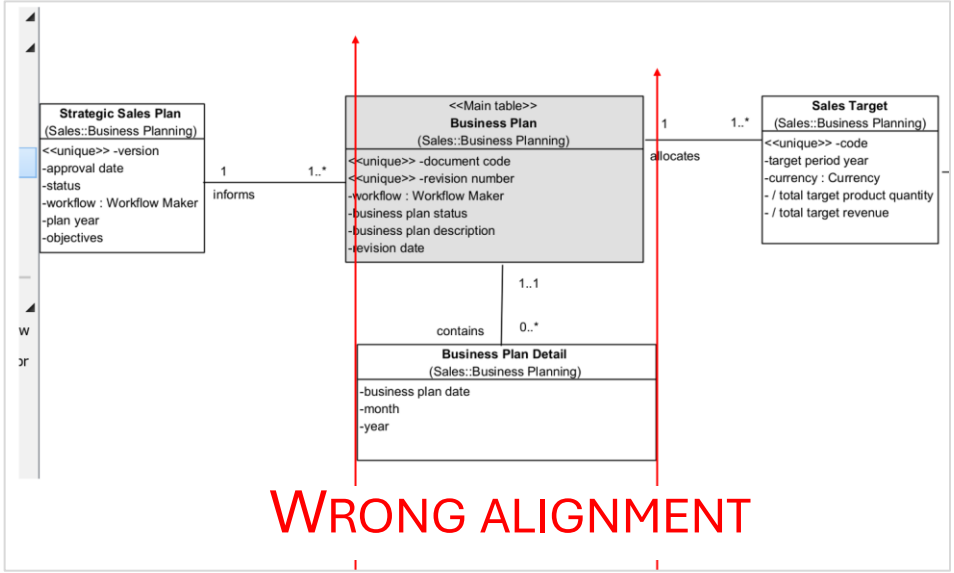
The names of the tables, key attributes, and relationships are defined in the business glossary, which forms the foundation of the ontology

Business Glossary

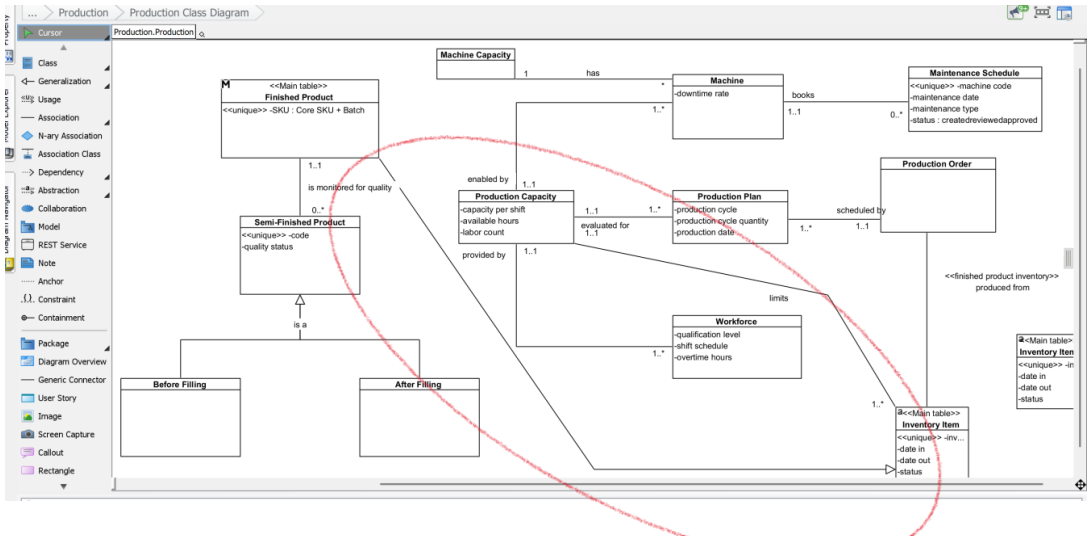
#	Business Term	Category *To add manually*	Definition	
67	[redacted]			Materia
68	Machine	Table	[redacted]	Produ
69	Machine Capacity	Table	Machine Capacity is the maximum production or output rate that a filling, packaging, or processing line at [redacted] can achieve within a given time period under standard operating conditions. It defines the upper technical and operational limit of production lines and is used to ensure that Order-Based Production Plans do not exceed feasible manufacturing capability.	
70	Maintenance Schedule	Table	Timetable for preventive maintenance	

Spatial Layout

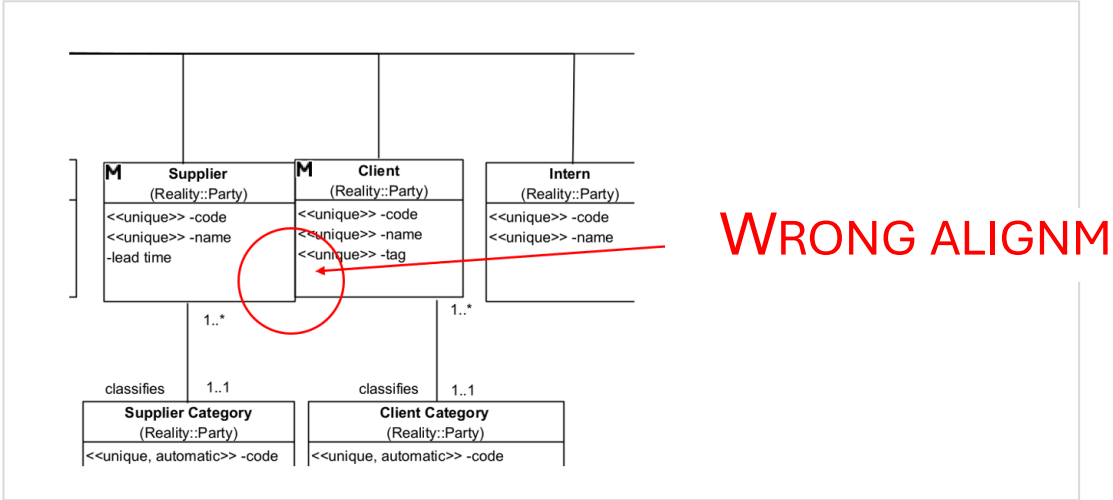
- Center the diagram in the window by default
- Minimize crossing lines
- Avoid forcing scrolling



Wrong alignment



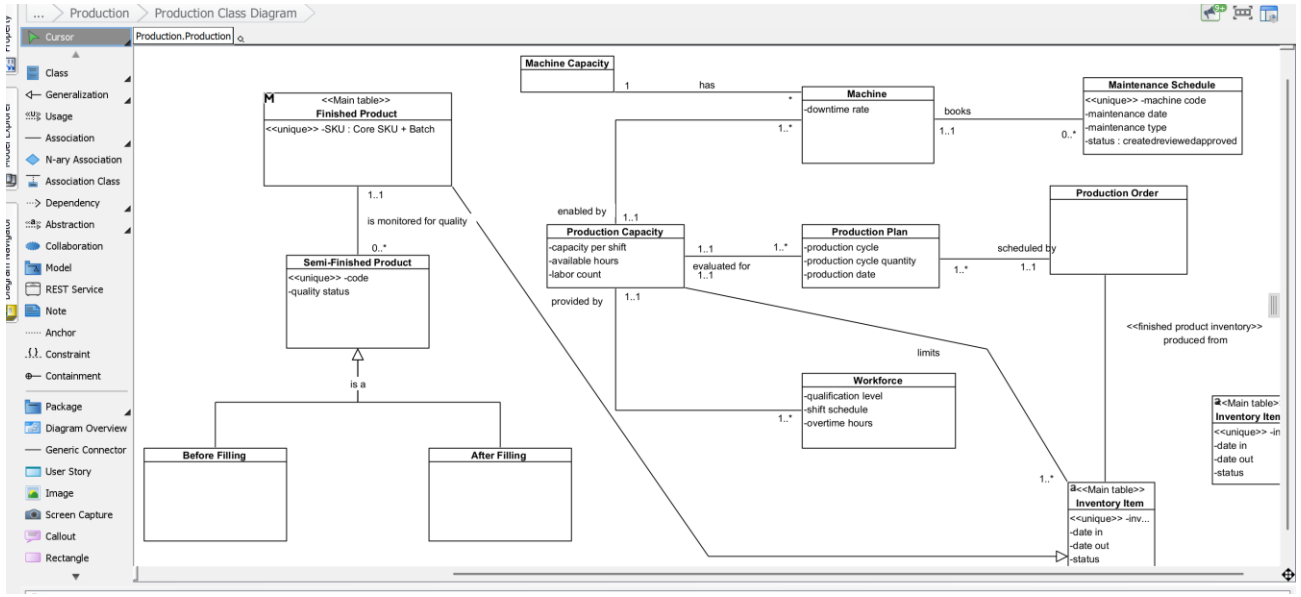
Crossing Lines

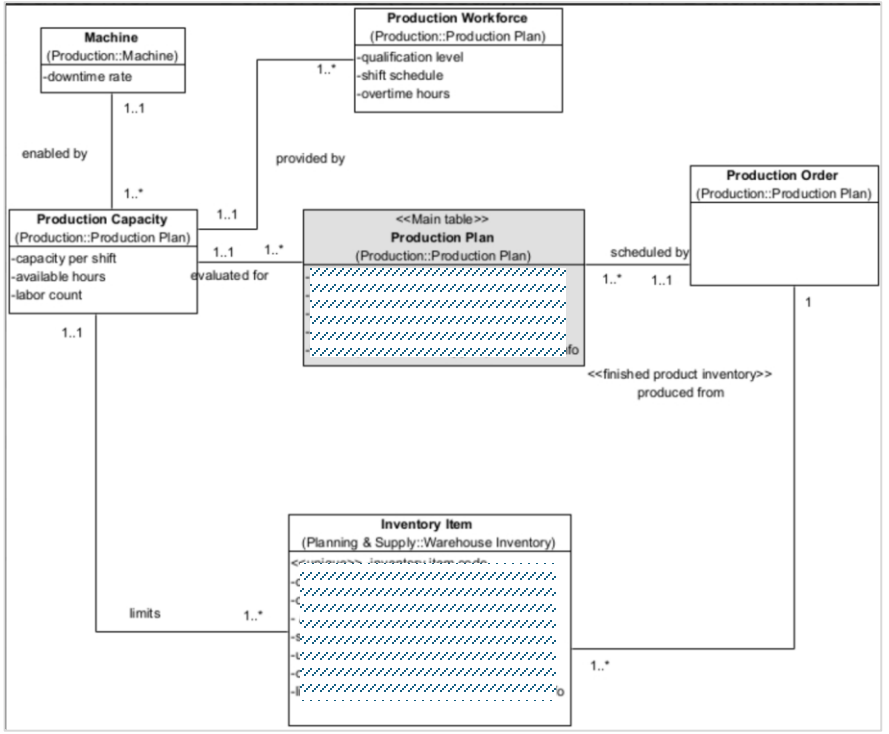


Wrong alignment

ENGAGE META

Spatial Layout

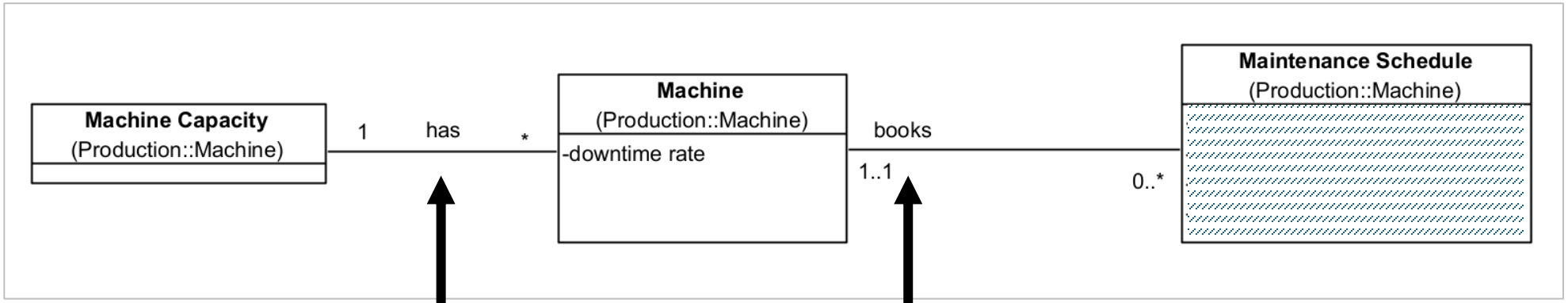




Reorganization of the presentation of tables, relationships, and packages

Reading Of Association

Standard UML representation: formal presence of cardinalities expressed as an (min, max) pair



The name of the association is either placed in the middle of the connection: Two possible directions of reading...

...or at the edge of the table where the reading begins. For example, in this case it should be read as “Machine” books “Maintenance Schedule

Types Of Associations

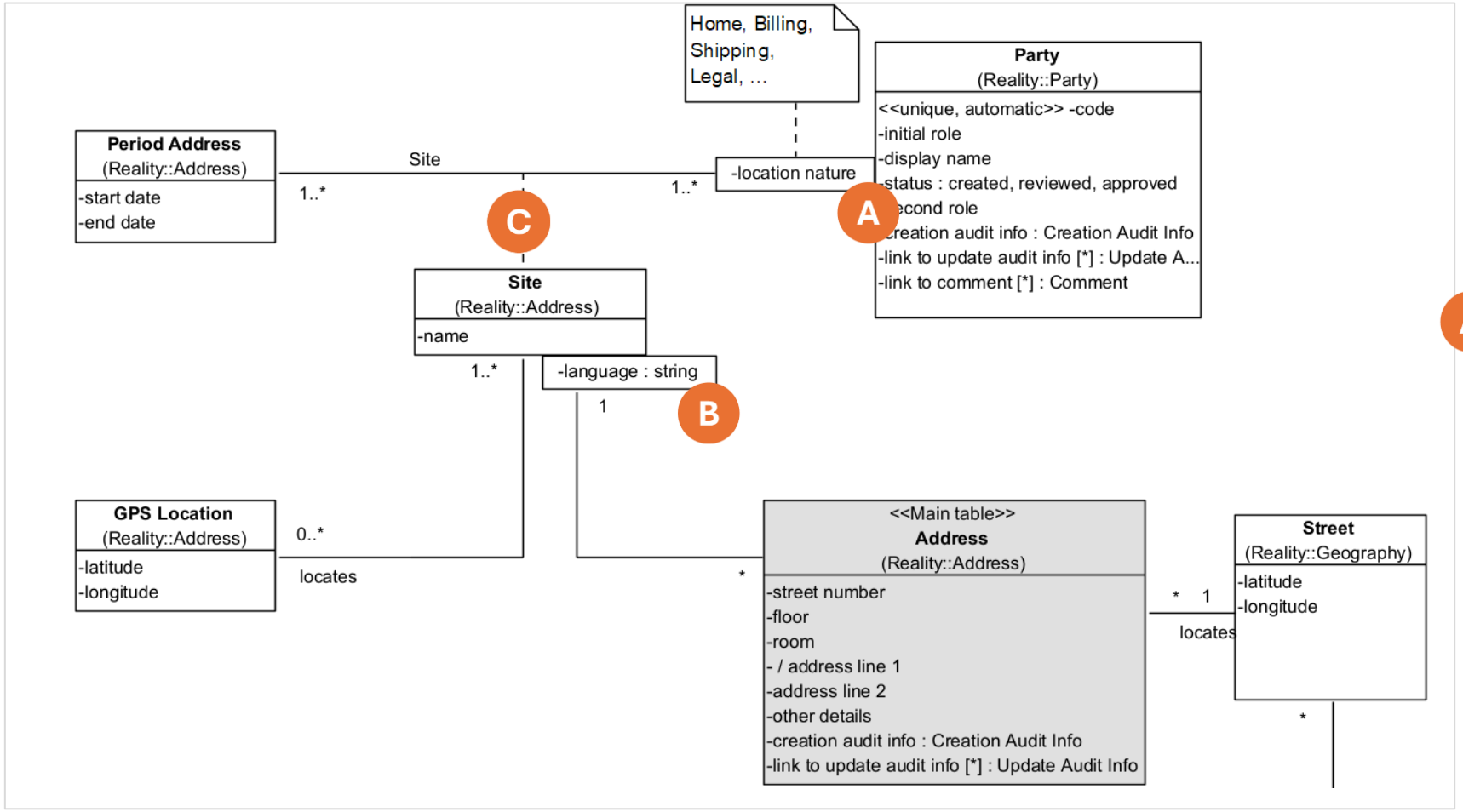
- Qualifier Attribute
- Associative Class
- Ternary Relation

See next slides

Qualifier Attribute + Associative Class

Qualifier attribute A B

Associative class C



Party: ABC Company

C

Site: French Headquarters

A Location nature = Legal Address

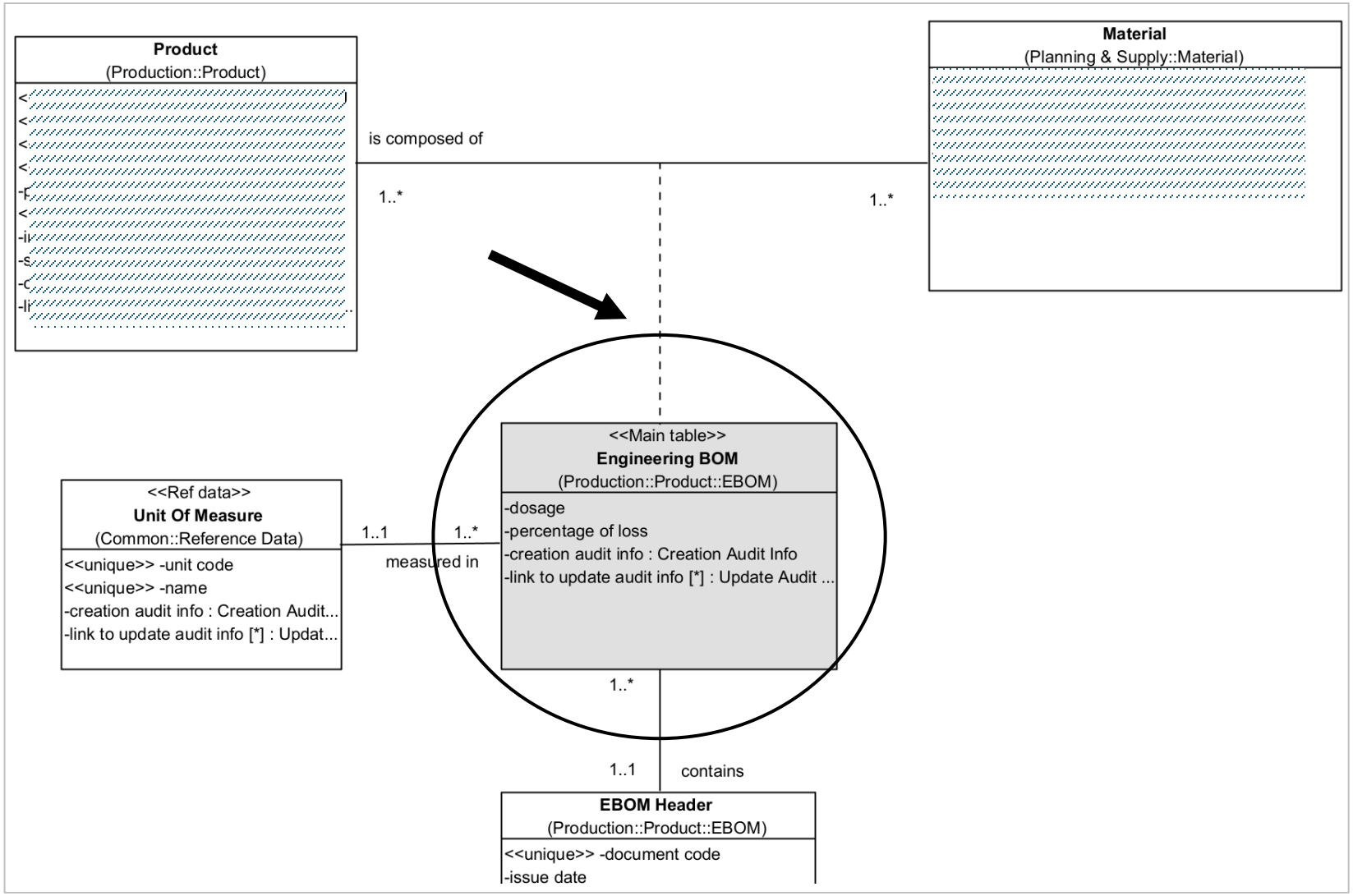
Address Language = English

Address Language = Japanese

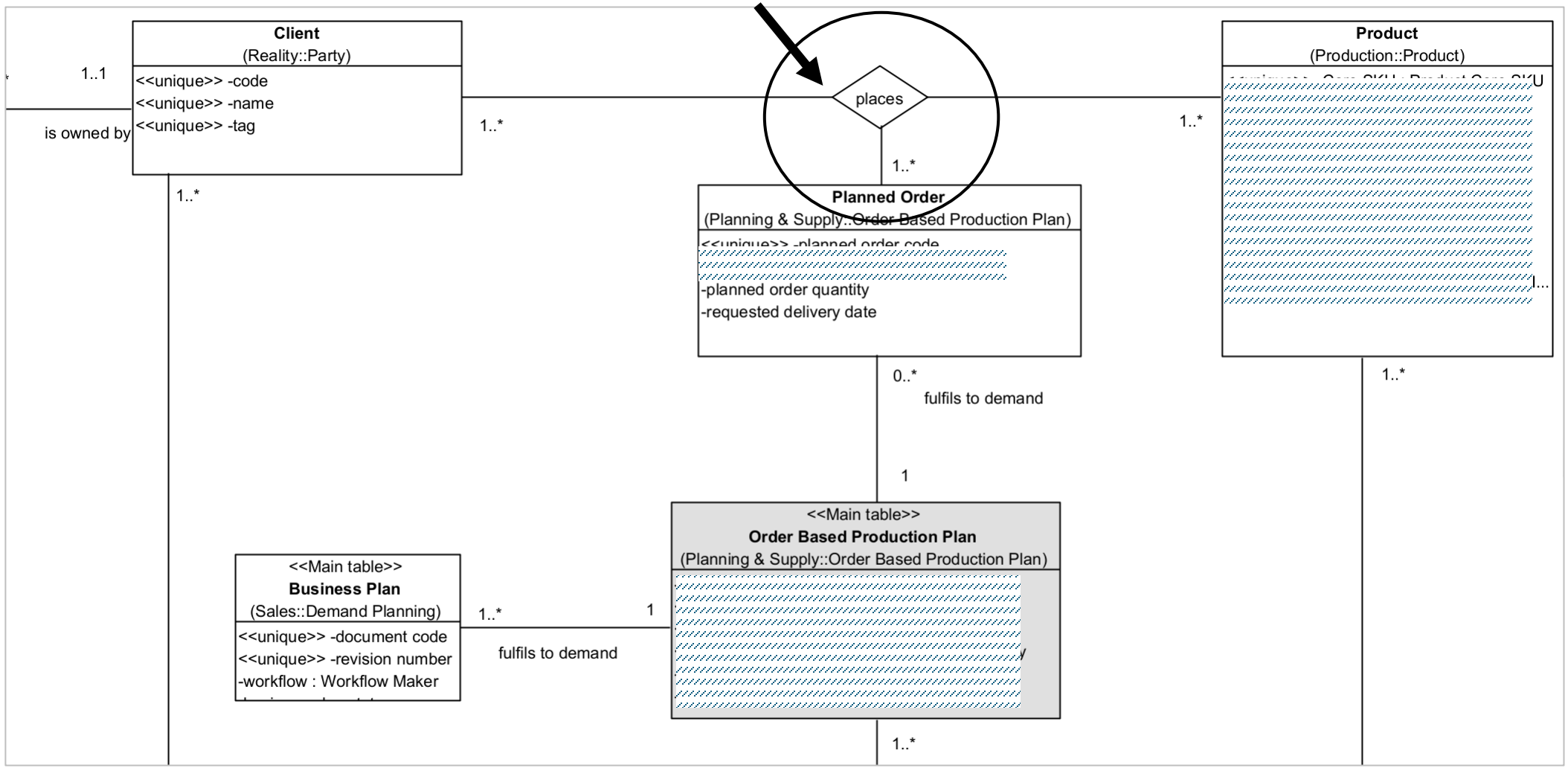
B

ASSOCIATIVE CLASS

EACH RECORD IN THE ASSOCIATIVE CLASS CORRESPONDS TO **ONE UNIQUE PAIR OF RECORDS FROM THE TWO RELATED CLASSES**

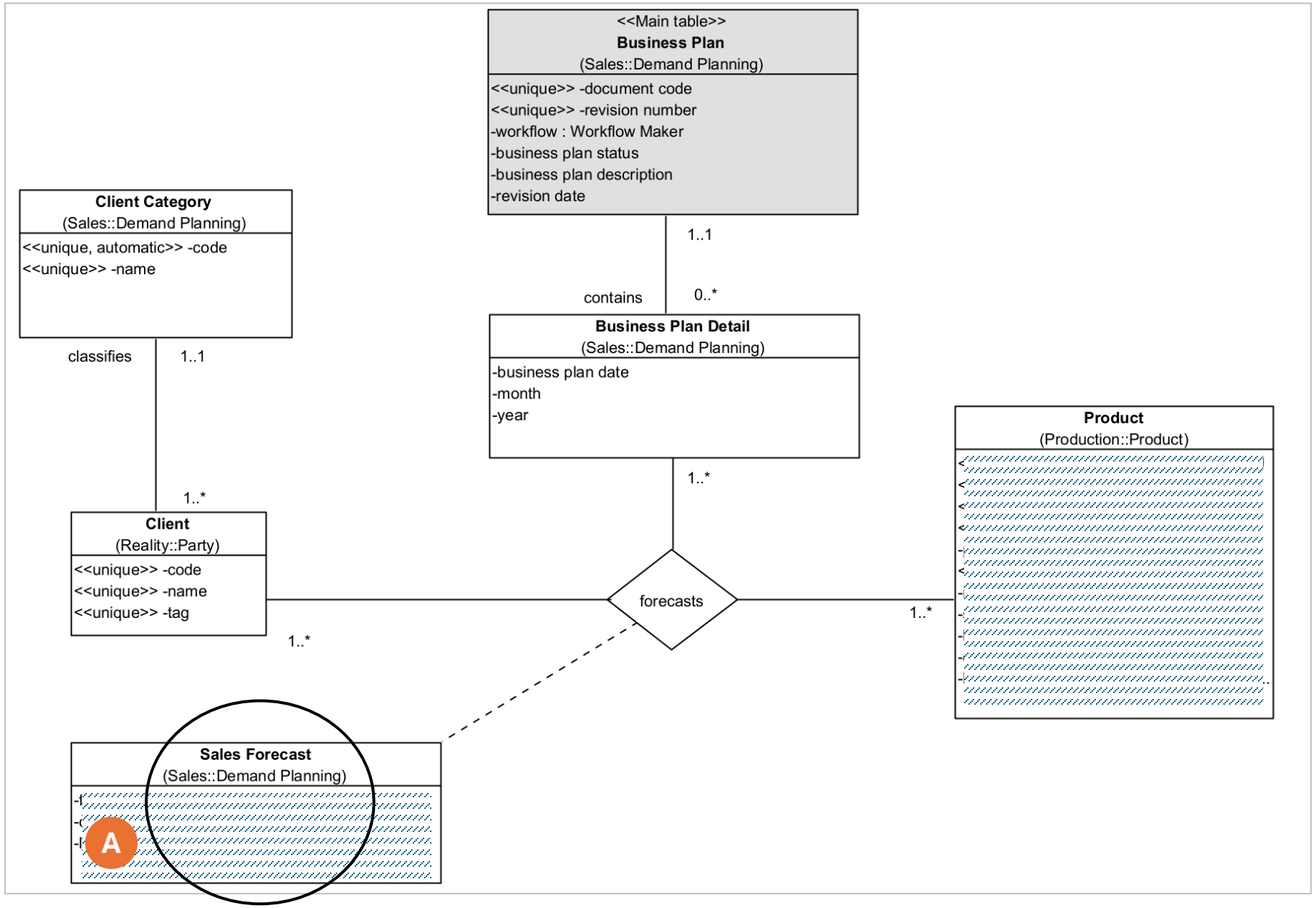


TERNARY ASSOCIATION



Ternary Association + Associative Class

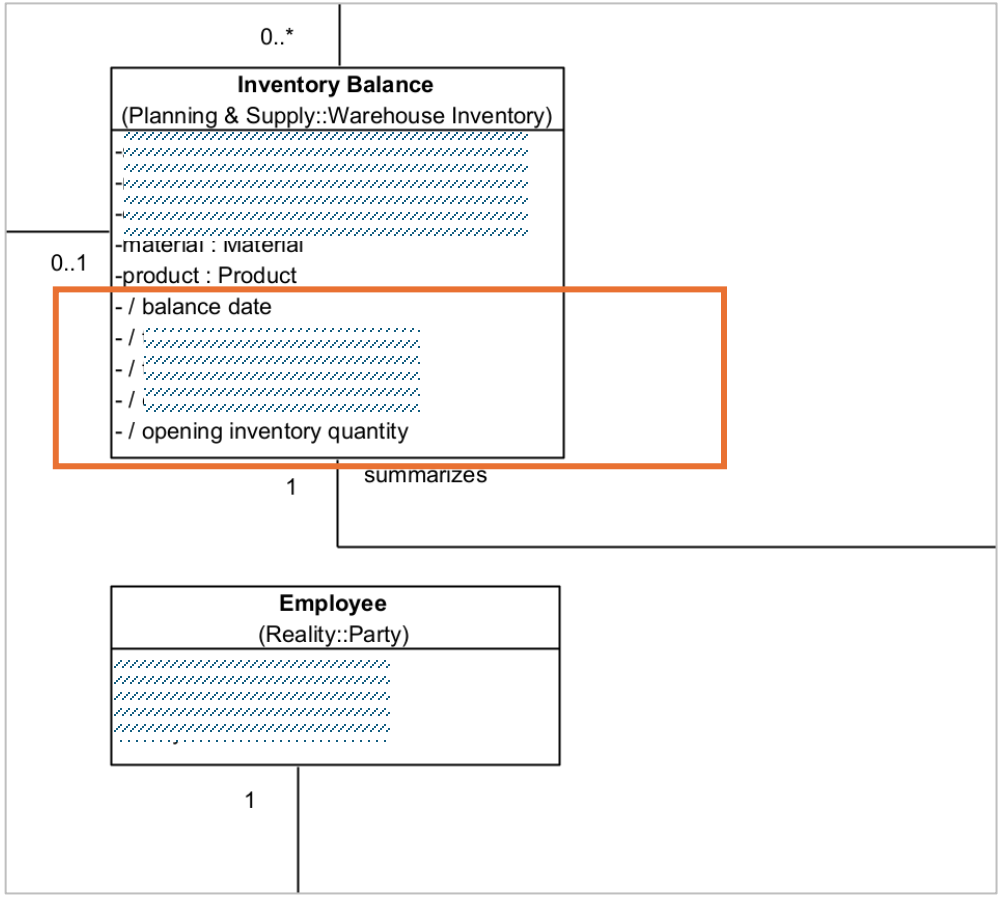
- Attributes are cleanly separated in their own class
- Association class can be referenced by other relationships
- Can be reused across multiple triples (different Business Plan Detail × Client × Product combinations)



ENGAGE META

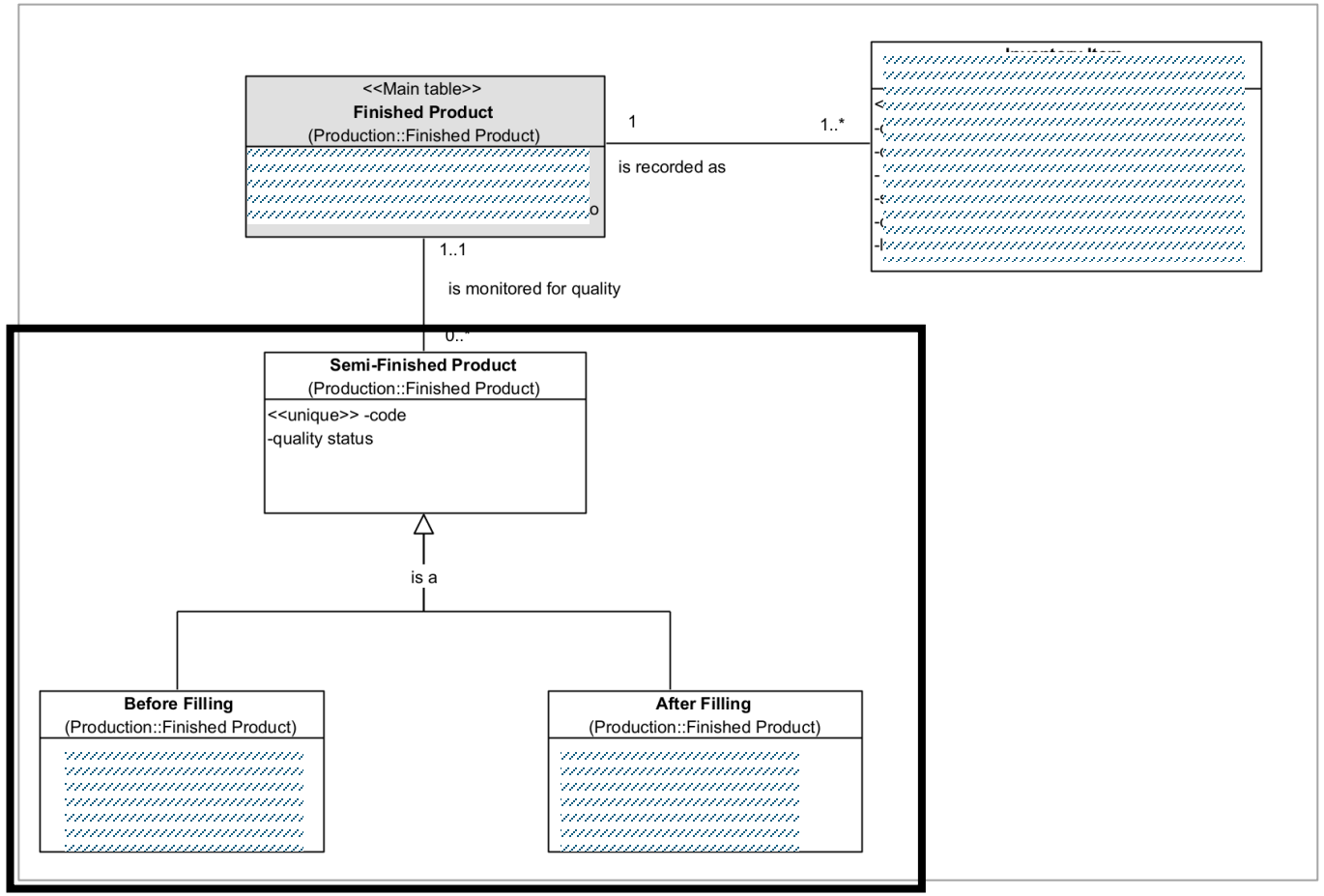
Derived attribute is calculated by the system

If a table consists only of "derived" attributes, then it relates solely to a consolidation or reporting need

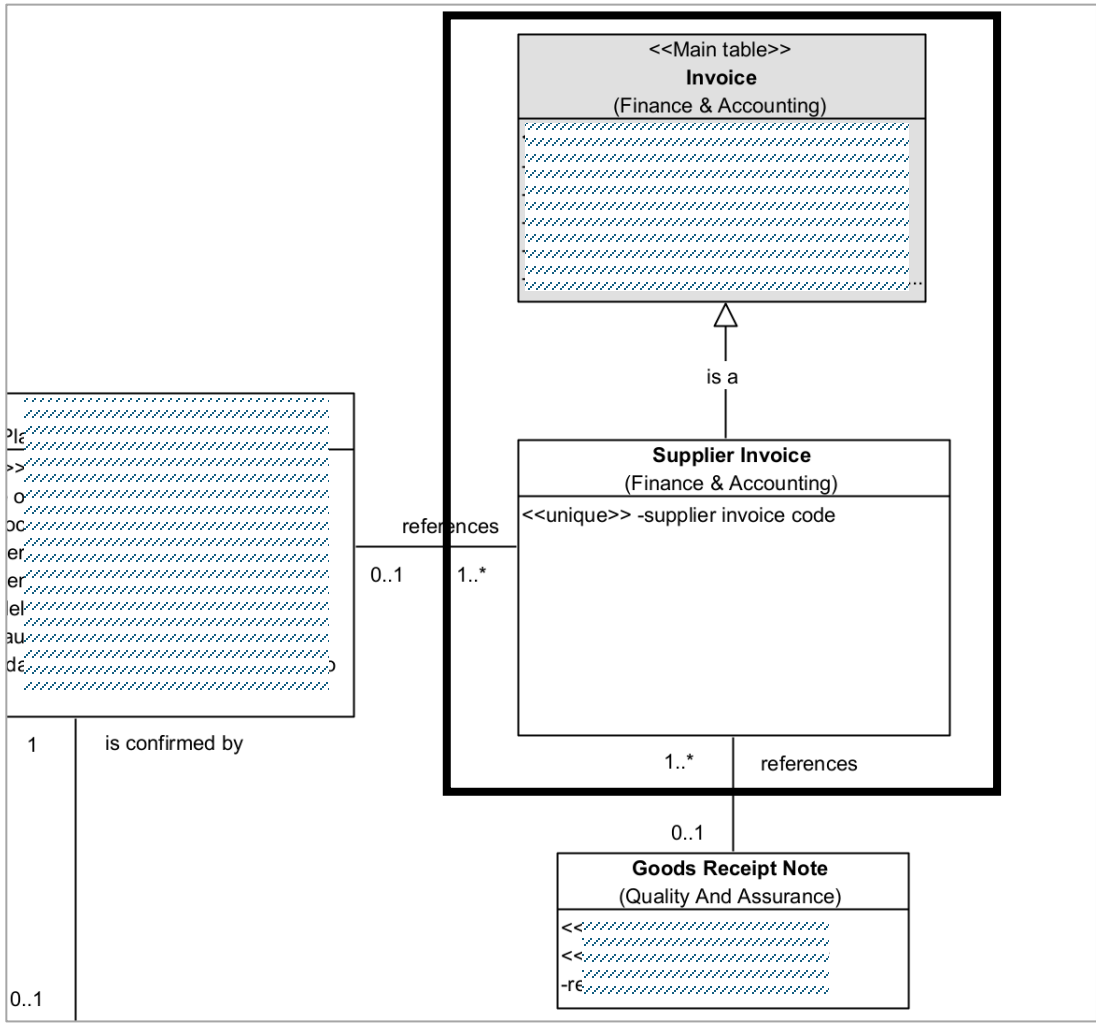


GENERICITY – INHERITANCE

TO COVER AN EXISTING NEED

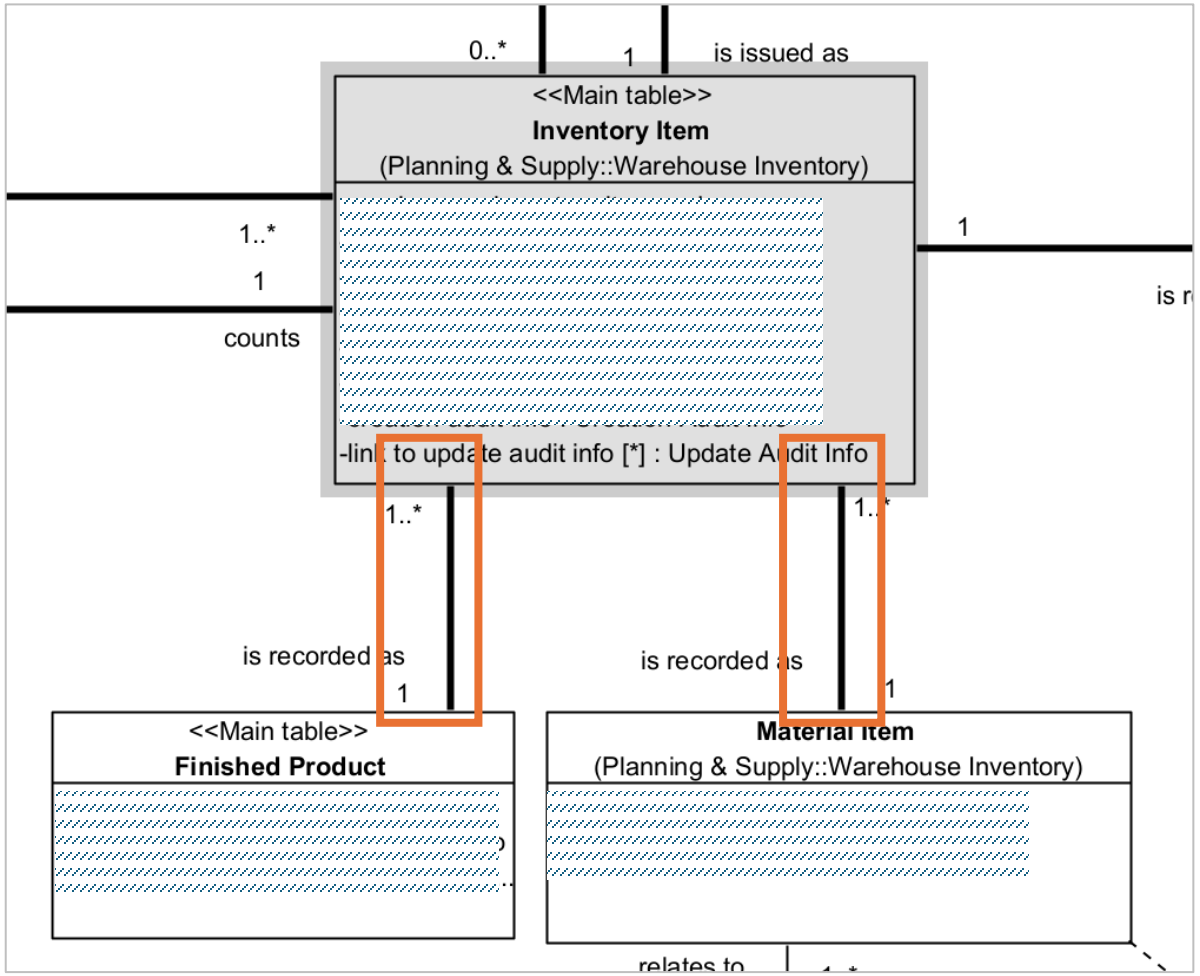


TO ANTICIPATE A FUTURE REQUIREMENT



GENERICITY – INHERITANCE

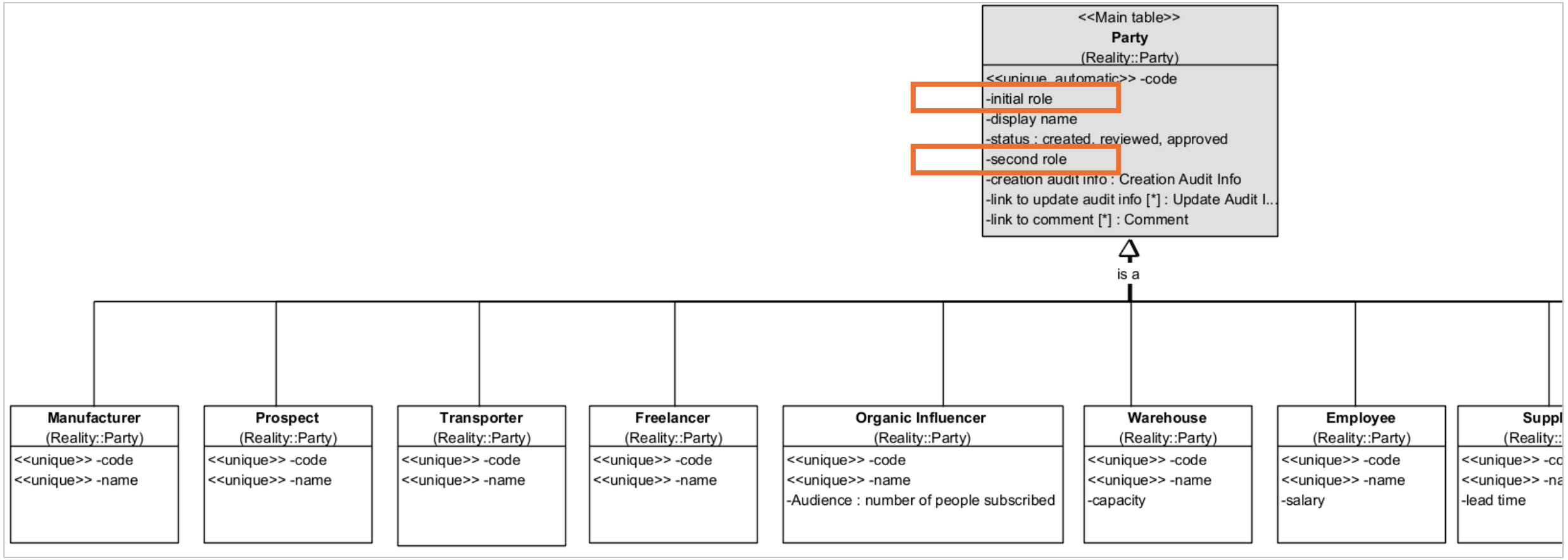
USE INHERITANCE ONLY WHEN THE PARENT–CHILD LINK IS UNIQUE OTHERWISE PREFER AN N-N RELATIONSHIP



ENGAGE META

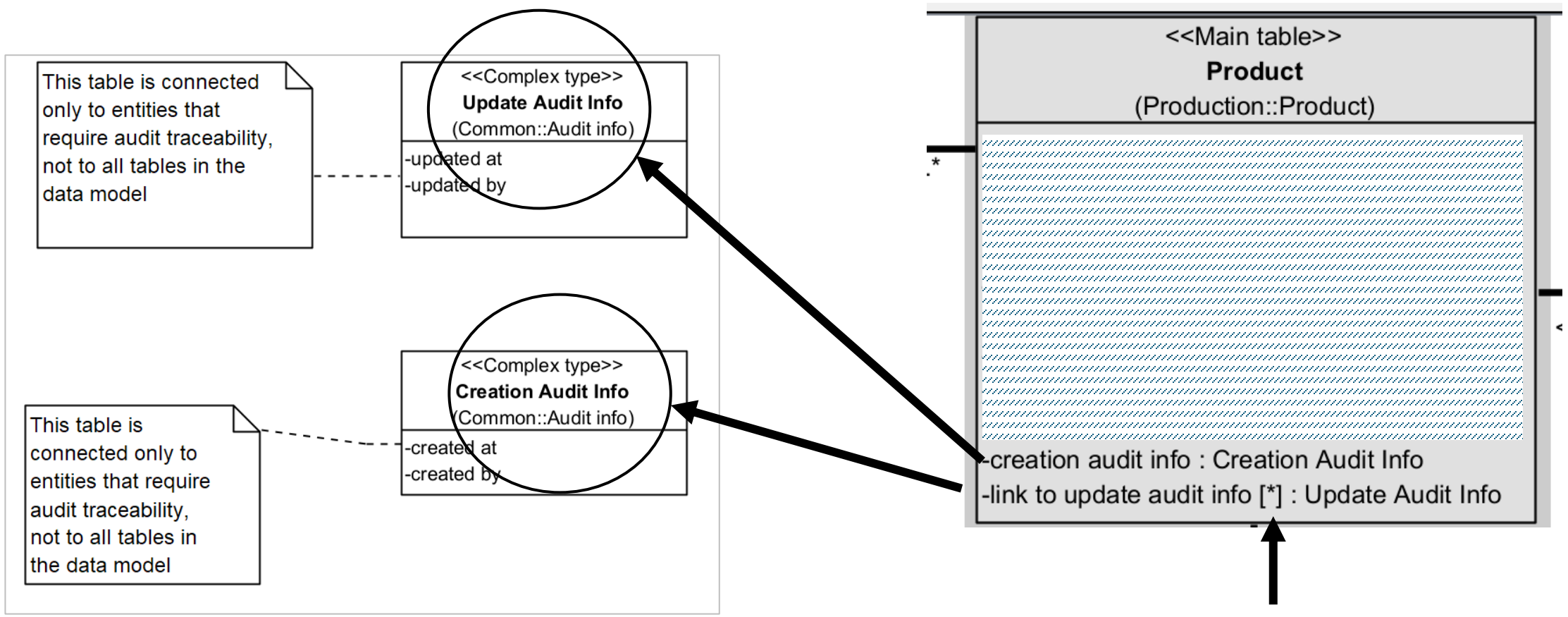
GENERICITY – INHERITANCE

MULTIPLE INHERITANCE CAN BE ENFORCED BECAUSE THE SPECIALIZED TABLES CONTAIN SPECIFIC ATTRIBUTES

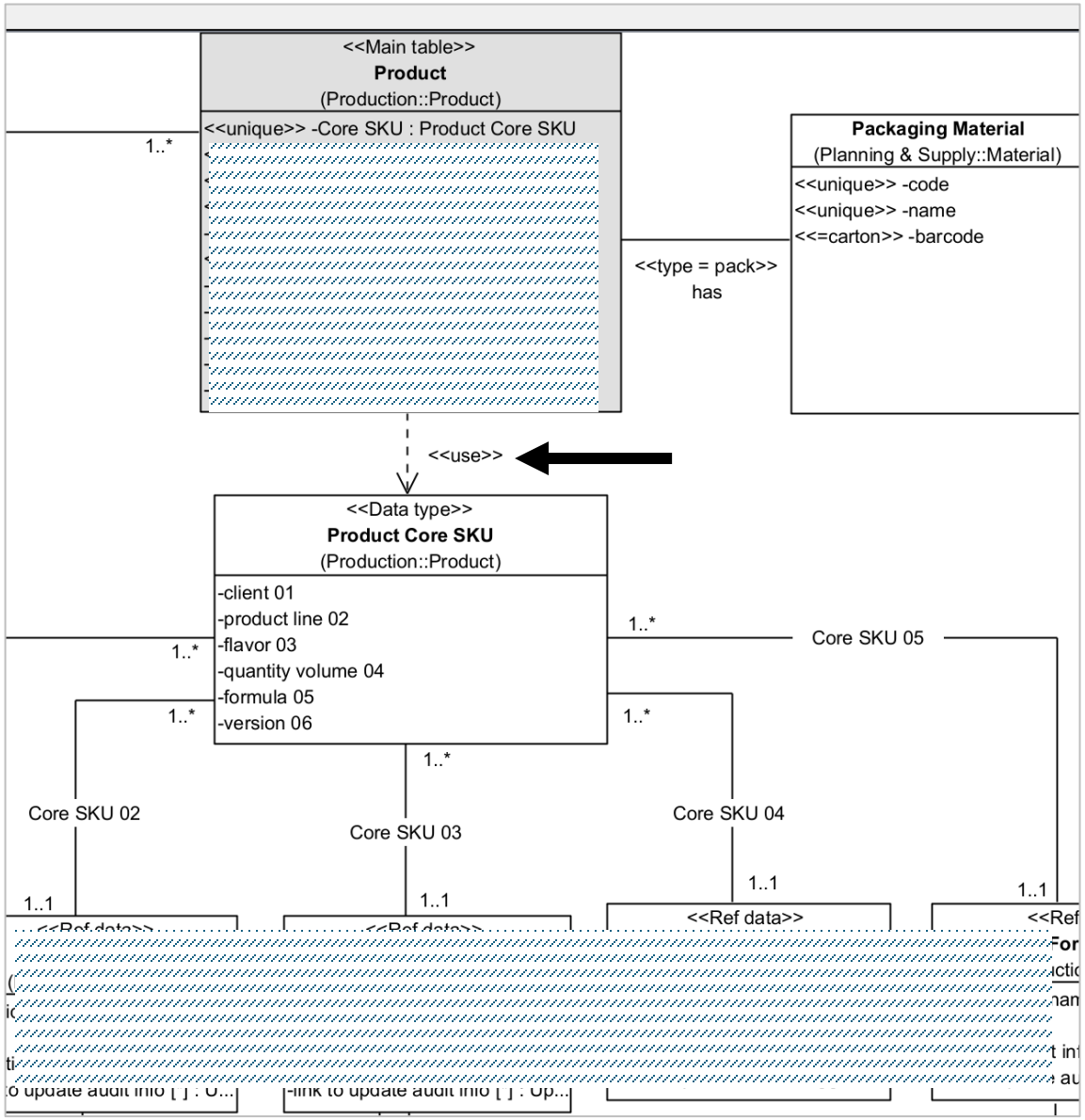


Complex Data Type

Complex Type is used to group multiple related attributes into a reusable structure



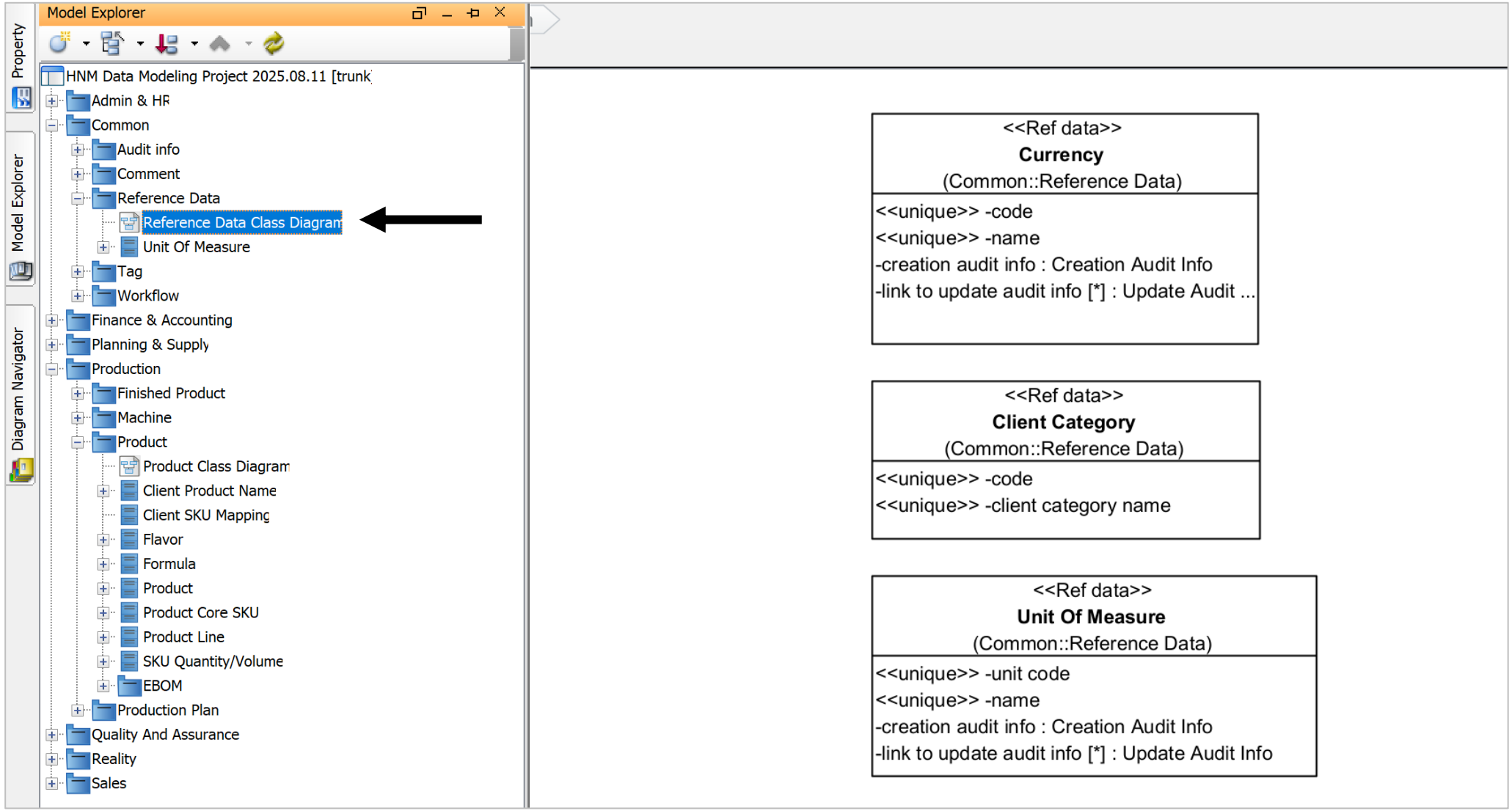
Complex Data Type



Show Complex Type usage with a "uses" dependency when emphasizing model readability

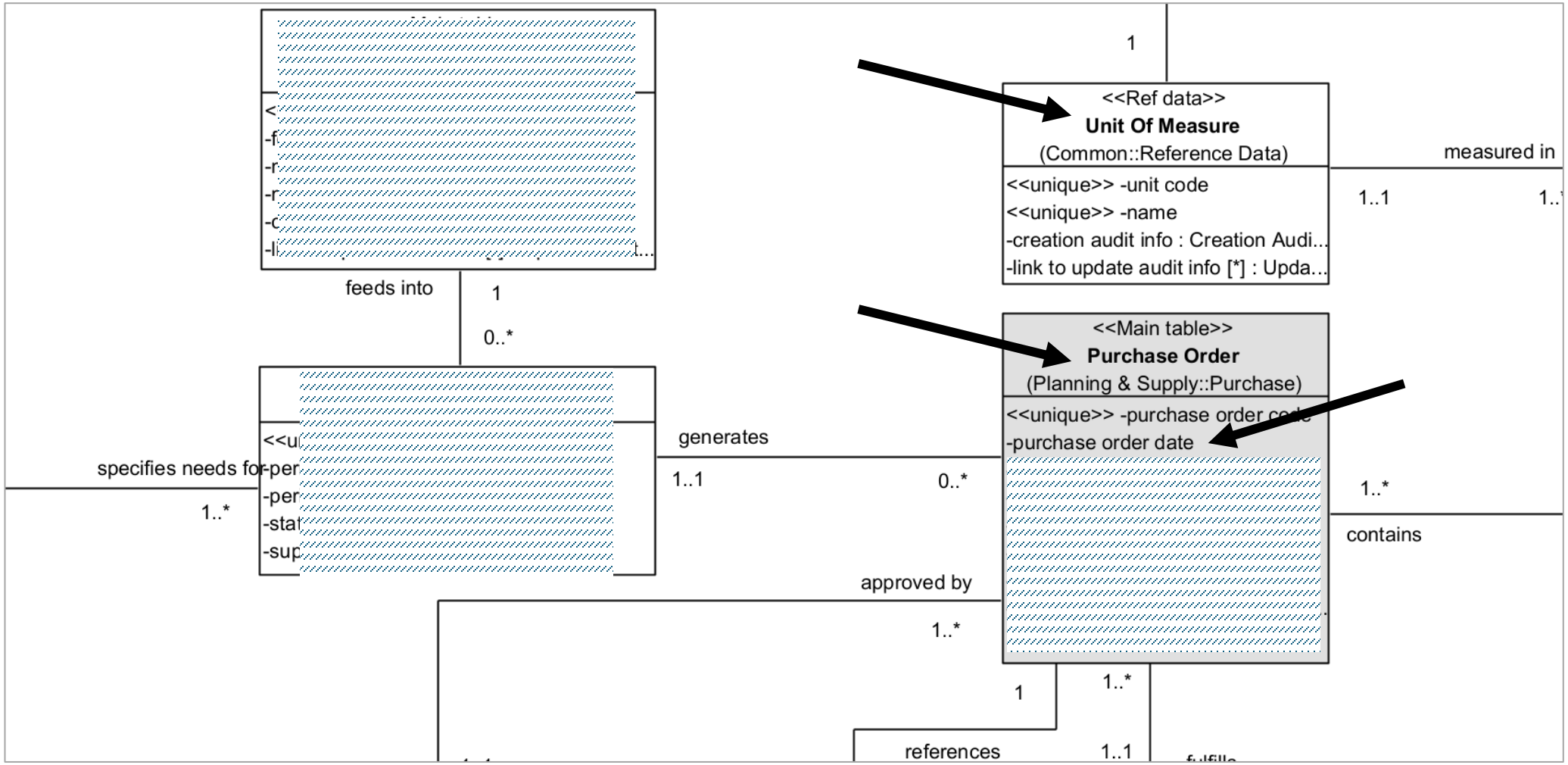
Common Reference Data

Group general reference tables in a dedicated package



UNAMBIGUOUS NAMING

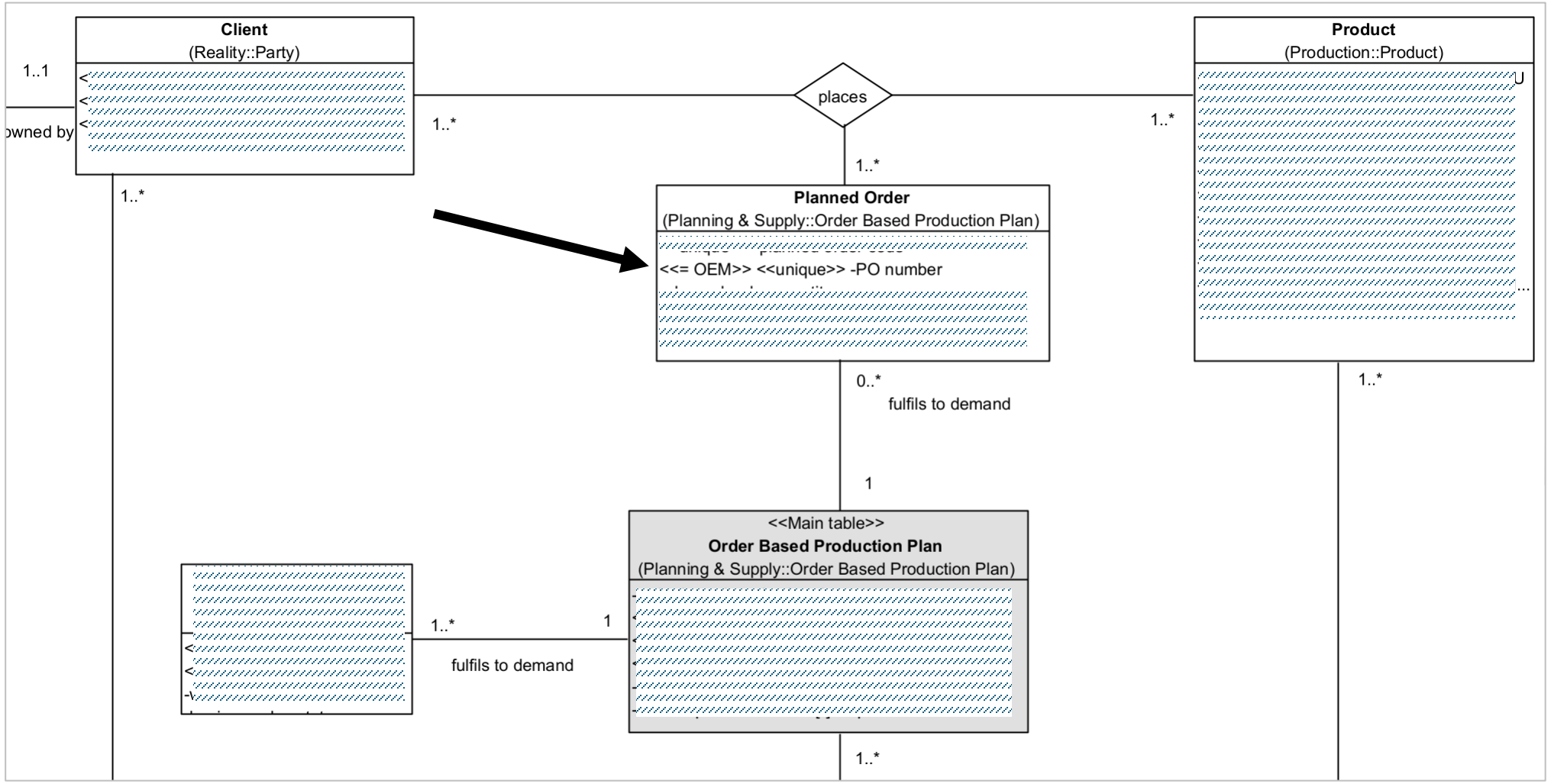
THE NAME OF EACH TABLE AND EACH ATTRIBUTE MUST FULLY CONVEY ITS SEMANTICS TO AVOID ANY AMBIGUITY



ENGAGE META

Unambiguous Naming

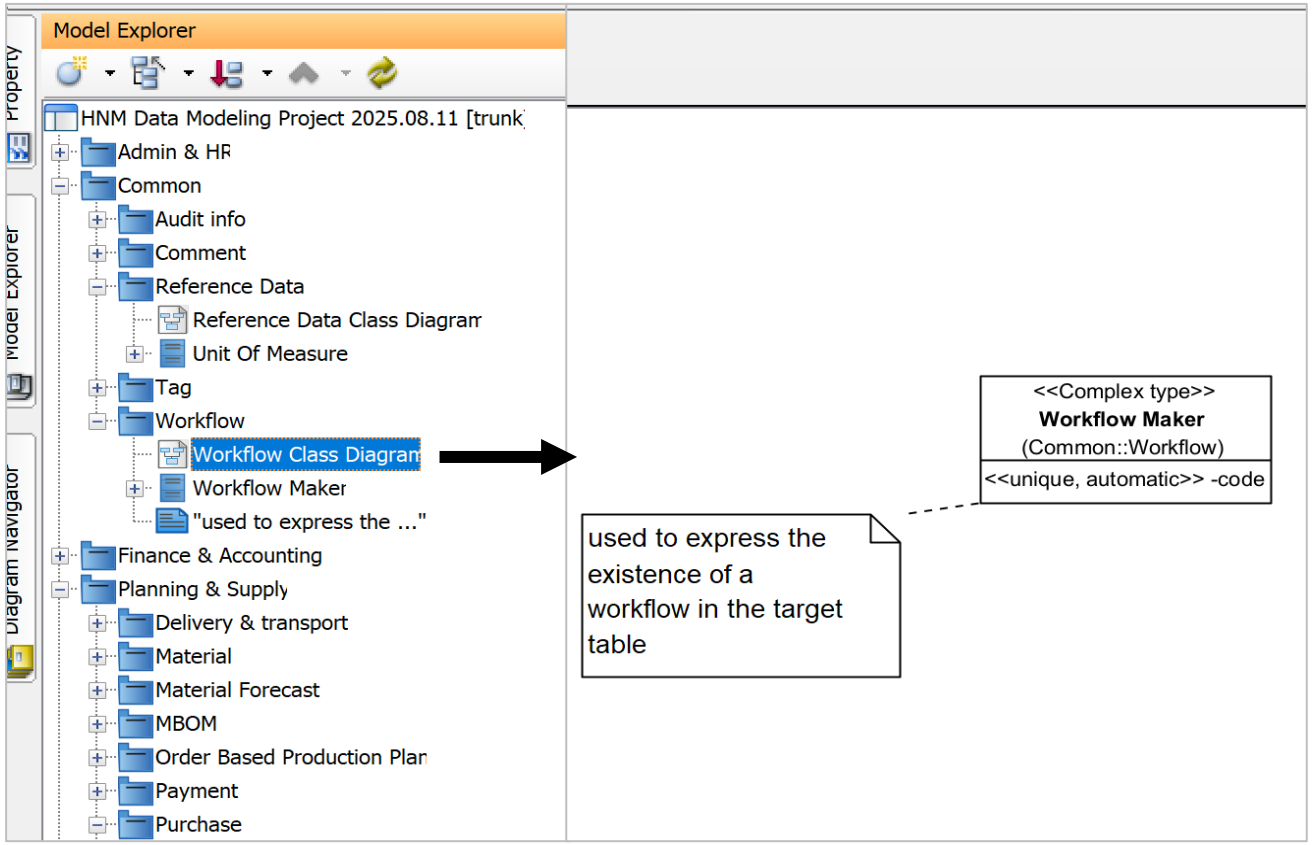
It is possible to use tags to enhance the expressiveness of attributes

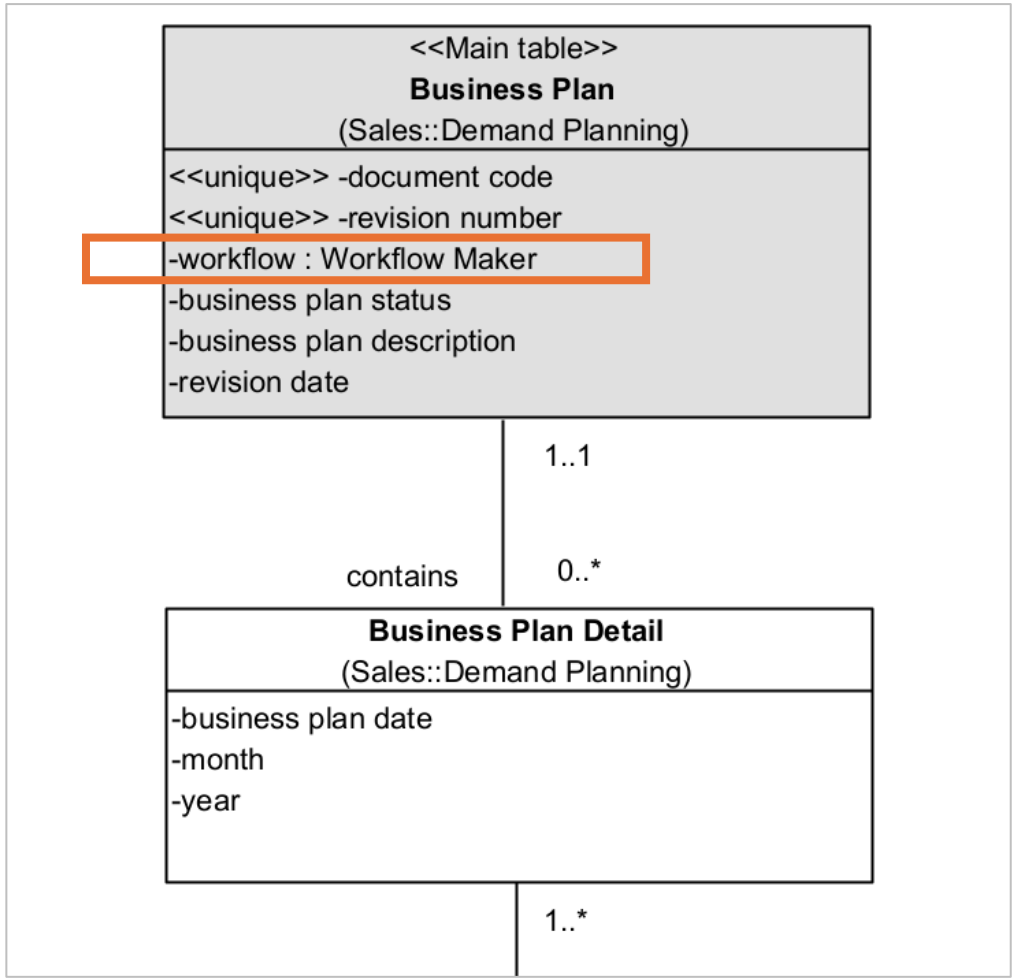


ENGAGE META

WORKFLOW

USE A WORKFLOW COMPLEX TYPE AS AN ANCHOR



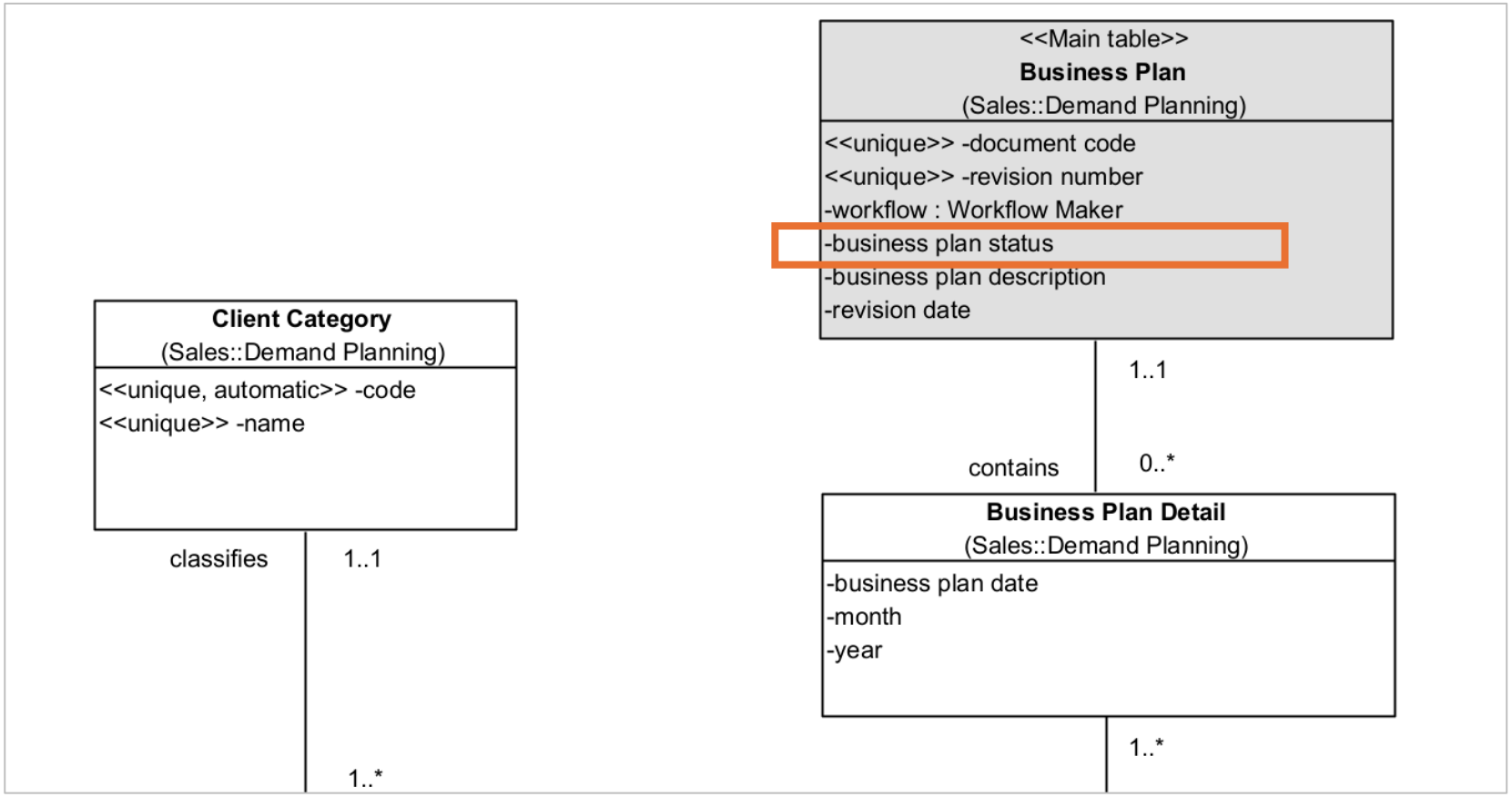


ENGAGE META

STATUS

STATUS REPRESENTS THE BUSINESS STATES A RECORD MAY TAKE OVER TIME, INDEPENDENT OF PROCESS DESIGN

(E.G., CREATED → REVIEWED → APPROVED): **SEE STATE MACHINE DIAGRAM TRAINING**



End