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Generalized abstract class for audit data services

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# Introduction

The objective of this project is to establish a generalized abstract class framework for audit data services, aimed at enhancing the standardization, consistency, and extensibility of business and accounting processes. This framework is designed to unify various business transactions and accounting ledgers under a set of abstract classes, facilitating a cohesive structure for managing and auditing financial data across different business contexts.

# Business Transactions and Accounting Ledgers

## General

Business transactions deal with the operational side of business events, while accounting ledgers focus on the financial implications and record-keeping of those transactions. In the context of specialization, business transactions and accounting ledgers represent two different concepts, each serving distinct purposes in business processes:

Audit Data’ provides a foundational data model that adheres to the semantic data model standards for audit data services. The abstract classes 'Business Transaction' and 'Accounting Ledger' shall include identical properties as defined in this class. Similarly, any classes within audit data services shall comply with these specified properties.

Similarly, ‘Audit Data Line’ provides a foundational data model that adheres to the semantic data model standards for audit data services. The abstract classes 'Business Transaction Line' and 'Accounting Ledger Line' shall include identical properties as defined in this class. Similarly, any classes to classify line item level detail within audit data services shall comply with these specified properties.

### Audit Data

The 'Audit Data' class ensures accurate financial statements and compliance by recording crucial details such as dates and their corresponding accounting periods. This information ensures that related transactions are properly recognized within the correct period, even if the data does not directly affect journal entries.

The 'Activities' class records system users' activities, including who performed each activity and when it was performed. This data is crucial for auditing the internal control status of accounting systems.

The 'Business Segment' class provides the business context within which each record was produced. This context is essential for auditing irregular events that deviate from the usual period, ensuring a comprehensive assessment of critical business factors.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Property type** | **I** | **M** | **Property term** | **R** | **Associated class** |
| Attribute | PK | 1..1 | ID | Identifier |  |
| Attribute |  | 0..1 | Date | Date |  |
| Reference Association |  | 0..1 |  |  | Accounting Period |
| Composition |  | 0..1 |  |  | Activities |
| Reference Association |  | 0..\* |  |  | Business Segment |
| Attribute |  | 0..1 | Remark | Text |  |
| Key  I: Identifier  M: Multiplicity  R: Representation term | | | | | |

NOTE Some of the tables in the audit data collection include active indicators to record effectiveness during the recorded period. Auditing historical records may require more sophisticated properties, such as tracking when data becomes effective and when it becomes obsolete, beyond simply noting its active status. For master data, understanding the meaning of collected data may necessitate versioning or maintaining agency data.

### Audit Data Line

| **Property type** | **I** | **M** | **Property term** | | **R** | **Associated class** |
| --- | --- | --- | --- | --- | --- | --- |
| Attribute | PK | 1..1 | Line ID | Identifier | |  |
| Attribute |  | 0..1 | Number | Char | |  |
| Attribute |  | 0..1 | Description | Text | |  |
| Reference Association |  | 0..1 |  |  | | Activities |
| Reference Association |  | 0..\* |  |  | | Business Segment |
| Composition |  | 0..1 |  |  | | Amounts |
| Composition |  | 0..\* |  |  | | Tax |
| ●Composition |  | 0..1 | Local |  | | Amount |
| ●Composition |  | 0..1 | Transaction |  | | Amount |
| ●Reference Association |  | 0..1 | Credit |  | | Ledger Account |
| ●Reference Association |  | 0..1 | Debit |  | | Ledger Account |
| ●Reference Association |  | 0..1 |  |  | | Tax Type |
| Reference Association |  | 0..1 |  |  | | Inventory Product |
| Key  I: Identifier  M: Multiplicity  R: Representation term  NOTE ● indicates properties in the associated class of a composition. | | | | | | |

## Business Transaction

### Overview

A business transaction refers to an event or an action that occurs as part of the business operations, such as purchasing goods, selling products, or providing services. These transactions are recorded in the system to track the flow of goods, services, or finances between entities.

In terms of specialization, business transactions can be further categorized into specific types, such as Purchase Contracts, Sales Orders, Invoices, etc., each with their respective lines (e.g., Purchase Order Line, Sales Invoice Line). These are often linked to logistical actions like receiving materials or shipping products.

### Business Transaction

Abstract class ‘Business Transaction’ contains the following properties.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Property type** | **I** | **M** | **Property term** | **R** | **Associated class** | **Audit Data** | **Business Transaction** |
| Attribute | PK | 1..1 | ID | Identifier |  | x | x |
| Attribute |  | 0..1 | Date | Date |  | x | x |
| Reference Association |  | 0..1 |  |  | Accounting Period | x | x |
| Composition |  | 0..1 |  |  | Activities | x | x |
| Reference Association |  | 0..\* |  |  | Business Segment | x | x |
| Attribute |  | 0..1 | Remark | Text |  | x | x |
| Key  I: Identifier  M: Multiplicity  R: Representation term | | | | | | | |

### Business Transaction Line

Abstract class ‘Business Transaction Line’ contains the following properties.

| **Property type** | **I** | **M** | **Property term** | **R** | **Associated class** | **Audit Data Line** | **Business Transaction Line** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute | PK | 1..1 | Line ID | Identifier |  | x | x |
| Attribute |  | 0..1 | Number | Char |  | x | x |
| Attribute |  | 0..1 | Description | Text |  | x | x |
| Reference Association |  | 0..1 |  |  | Activities | x | x |
| Reference Association |  | 0..\* |  |  | Business Segment | x | x |
| Composition |  | 0..1 |  |  | Amounts | x | x |
| Composition |  | 0..\* |  |  | Tax | x | x |
| ●Composition |  | 0..1 | Local |  | Amount | x | x |
| ●Composition |  | 0..1 | Transaction |  | Amount | x | x |
| ●Reference Association |  | 0..1 | Credit |  | Ledger Account | x | x |
| ●Reference Association |  | 0..1 | Debit |  | Ledger Account | x | x |
| ●Reference Association |  | 0..1 |  |  | Tax Type | x | x |
| Reference Association |  | 0..1 |  |  | Inventory Product | x | x |
| Key  I: Identifier  M: Multiplicity  R: Representation term  NOTE 1● indicates properties in the associated class of a composition.  NOTE 2 Amount and Quantity value is always positive. | | | | | | | |

## Abstract class ‘Accounting Ledger’

### Overview

An accounting ledger, on the other hand, is a record-keeping book where all financial transactions are recorded, classified, and summarized. The ledger contains accounts that track the financial state of the business, including assets, liabilities, equity, income, and expenses.

Specialization within the accounting ledger context typically involves different types of ledger entries, such as those related to specific accounts like General Ledger, Accounts Receivable, or Accounts Payable. These can be tied back to the business transactions but focus on the financial impact rather than the operational details.

### Accounting Ledger

Accounting Ledger contains multicurrency monetary amounts class Amounts and Ledger Account for both Debit and Credit. Additionally it requires reference association for General Ledger Journal Entry Line. Abstract class ‘Accounting Ledger’ contains the following properties.

| **Property type** | **I** | **M** | **Property term** | **R** | **Associated class** | **Audit Data** | **Accounting Ledger** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute | PK | 1..1 | ID | Identifier |  | x | x |
| Attribute |  | 0..1 | Date | Date |  | x | x |
| Reference Association |  | 0..1 |  |  | Accounting Period | x | x |
| Composition |  | 0..1 |  |  | Activities | x | x |
| Reference Association |  | 0..\* |  |  | Business Segment | x | x |
| Attribute |  | 0..1 | Remark | Text |  | x | x |
| Composition |  | 0..1 |  |  | Amounts |  | x |
| ●Composition |  | 0..1 | Functional |  | Amount |  | x |
| ●Composition |  | 0..1 | Transaction |  | Amount |  | x |
| ●Composition |  | 0..1 | Local |  | Amount |  | x |
| ●Composition |  | 0..1 | Reporting |  | Amount |  | x |
| Reference Association |  | 0..1 | Debit |  | Ledger Account |  | x |
| Reference Association |  | 0..1 | Credit |  | Ledger Account |  | x |
| Reference Association |  | 0..1 |  |  | General Ledger Journal Entry Line |  | x |
| Key  I: Identifier  M: Multiplicity  R: Representation term  NOTE 1 ● indicates properties in the associated class of a composition.  NOTE 2 Amount and Quantity value is always positive. | | | | | | | |

### Accounting Ledger Line

‘Accounting Ledger Line’ contains ‘Ledger Account’ for both Debit and Credit and reference association for ‘General Ledger Journal Entry Line’. Additionally it requires Tax information including Tax Ledger Account for both Debit and Credit. Abstract class ‘Accounting Ledger Line’ contains the following properties.

| **Property type** | **I** | **M** | **Property term** | **R** | **Associated class** | **Audit Data Line** | **Accounting Ledger Line** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute | PK | 1..1 | Line ID | Identifier |  | x | x |
| Attribute |  | 0..1 | Description | Text |  | x | x |
| Reference Association |  | 0..1 |  |  | Activities | x | x |
| Reference Association |  | 0..\* |  |  | Business Segment | x | x |
| Composition |  | 0..1 |  |  | Amounts | x | x |
| Reference Association |  | 0..1 |  |  | General Ledger Journal Entry Line | x | x |
| Composition |  | 0..\* |  |  | Tax | x | x |
| ●Composition |  | 0..1 | Local |  | Amount | x | x |
| ●Composition |  | 0..1 | Transaction |  | Amount | x | x |
| ●Reference Association |  | 0..1 | Credit |  | Ledger Account | x | x |
| ●Reference Association |  | 0..1 | Debit |  | Ledger Account | x | x |
| ●Reference Association |  | 0..1 |  |  | Tax Type | x | x |
| Reference Association |  | 0..1 |  |  | Inventory Product | x | x |
| Key  I: Identifier  M: Multiplicity  R: Representation term  NOTE 1 ● indicates properties in the associated class of a composition.  NOTE 2 Amount and Quantity value is always positive. | | | | | | | | |

# Extended properties

## Business Transaction

### Business Transaction

The ‘Purchase Requisition’ class, along with the abstract classes ‘Contract’, ‘Order’, ‘Logistics Transaction’, and ‘Invoice’, specialize an abstract class ‘Business Transaction’ with additional properties specific to each.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | **Purchase Requisition** |  |  |  |  |
| **Abstract Class** | | | | | |  | **Contract** | **Order** | **Logistics Transaction** | **Invoice** |
| **Specialization** | | | | | See Class term in a cell | **Business Transaction** | **Business Transaction** | **Business Transaction** | **Business Transaction** | **Business Transaction** |
| A | PK | 1..1 | ID | Identifier |  | x | x | x | x | x |
| A |  | 0..1 | Date | Date |  | x | REQUIRED a | x | x | x |
| R |  | 0..1 |  |  | Accounting Period | REQUIRED b | REQUIRED a | x | x | x |
| C |  | 0..1 |  |  | Activities | x | x | x | x | x |
| R |  | 0..\* |  |  | Business Segment | x | x | x | x | x |
| A |  | 0..1 | Remark | Text |  | x | x | x | x | x |
| A |  | 0..1 | Number | Char |  | x | x | x | x | x |
| A |  | 0..1 | Reference Number | Char |  |  |  |  | x |  |
| A |  | 0..1 | Effective Date | Date |  |  |  |  |  | x |
| A |  | 0..1 | Beginning Date | Date |  |  | x |  |  |  |
| A |  | 0..1 | Ending Date | Date |  |  | x |  |  |  |
| A |  | 0..1 | Due Date | Date |  |  |  |  |  | x |
| A |  | 0..1 | Type Name | Name |  |  | x | x |  | x |
| C |  | 0..1 | Transaction |  | Amount | REQUIRED c | REQUIRED c | x |  | x |
| C |  | 0..1 | Local |  | Amount |  |  |  |  | REQUIRED d |
| R |  | 0..1 |  |  | Payment Term |  | x | x |  | x |
| R |  | 0..1 |  |  | Settlement Method |  | x | x |  | x |
| A |  | 0..1 | Official Invoice Code | Char |  |  |  |  |  | x |
| A |  | 0..1 | Shipping Method | Char |  |  |  |  | x |  |
| A |  | 0..1 | Shipping Company | Name |  |  |  |  | x |  |
| A |  | 0..1 | Adjustment Indicator | Indicator |  |  |  |  | x |  |
| A |  | 0..1 | Terms Discount Percentage | Decimal |  |  |  |  |  | x |
| A |  | 0..1 | Terms Discount Days | Integer |  |  |  |  |  | x |
| A |  | 0..1 | Terms Due Days | Integer |  |  |  |  |  | x |
| C |  | 0..\* |  |  | Tax0 e |  |  |  |  | x |
| ●C |  | 0..1 | Local |  | Amount |  |  |  |  | REQUIRED d |
| ●C |  | 0..1 | Transaction |  | Amount |  |  |  |  | x |
| ●R |  | 0..1 | Credit |  | Ledger Account |  |  |  |  | NOT USED e |
| ●R |  | 0..1 | Debit |  | Ledger Account |  |  |  |  | NOT USED e |
| ●R |  | 0..1 |  |  | Tax Type |  |  |  |  | x |
| A |  | 0..1 | Status | Code |  |  |  |  |  | x |
| R |  | 0..1 | Transaction |  | Currency |  | NOT REQUIRED f |  |  |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a Knowing the contract date and accounting period for a recorded contract is crucial for accurate financial statements and compliance, even if the contract doesn’t directly affect journal entries. This ensures related transactions are properly recognized in the correct period.  b Knowing the accounting period for a recorded requisition is crucial for accurate financial statements and compliance, even if the contract doesn’t directly affect journal entries. This ensures related transactions are properly recognized in the correct period.  c Knowing the total transaction amount for a recorded requisition or contract is crucial for ensuring accurate financial statements and compliance, even if the contract does not directly affect journal entries. This knowledge helps ensure that related transactions are properly recognized in the correct period.  d Since adjustment data utilize local tax amounts, corresponding data in the business transaction may be required to verify the correctness of the transaction.  e Although a line may specify it, the corresponding Debit/Credit Ledger Account is not defined for the invoice document. The newly defined Tax0 class contains only the tax amount and tax type.  f The Amount class contains a reference association to Currency, which is not required here. | | | | | | | | | | |

### Business Transaction Line

The ‘Purchase Requisition Line’ class, along with the abstract classes ‘Contract Line’, ‘Order Line’, ‘Logistics Transaction Line’, and ‘Invoice Line’, specialize an abstract class ‘Business Transaction Line’ with additional properties specific to each.

| **T** | | **I** | **M** | | **Property term** | | **R** | **Associated class** | **Class** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | | | **Purchase Requisition Line** |  |  |  |  |
| **Abstract Class** | | | | | | | | |  | **Contract Line** | **Order Line** | **Logistics Transaction Line** | **Invoice Line** |
| **Specialization** | | | | | | | | See Class term in a cell | **Business Transaction Line** | **Business Transaction Line** | **Business Transaction Line** | **Business Transaction Line** | **Business Transaction Line** |
| A | PK | | | 1..1 | | Line ID | Identifier |  | x | x | x | x | x |
| R |  | | | 0..1 | |  |  | Activities | x | x | x | x | x |
| R |  | | | 0..\* | |  |  | Business Segment | x | x | x | x | x |
| A |  | | | 0..1 | | Description | Text |  |  | x | x | x | x |
| R |  | | | 0..1 | |  |  | Inventory Product | x | x | x | x | x |
| A |  | | | 0..1 | | Number | Char |  | x | x | x | x | x |
| A |  | | | 0..1 | | Grouping Code | Char |  |  |  |  |  | x |
| A |  | | | 0..1 | | Payer ID | Char |  |  |  | x |  |  |
| A |  | | | 0..1 | | Due Date | Date |  | x | x | x |  |  |
| A |  | | | 0..1 | | Status | Code |  | x | x | x |  |  |
| C |  | | | 0..1 | | Tax Exclude |  | Amount |  | x | x |  | x |
| C |  | | | 0..1 | | Tax Include |  | Amount |  | x | x |  | x |
| C |  | | | 0..1 | | Tax Exclude Unit Price |  | Amount |  | x | x |  | x |
| C |  | | | 0..1 | | Tax Include Unit Price |  | Amount |  | x | x |  | x |
| C |  | | | 0..1 | | Unit Price |  | Amount |  |  |  | NOT REQUIRED a |  |
| C |  | | | 0..1 | | Transaction |  | Amount |  |  | NOT REQUIRED b | NOT REQUIRED b | NOT REQUIRED b |
| C |  | | | 0..\* | |  |  | Tax0 c |  | x | x |  |  |
| ●C |  | | | 0..1 | | Local |  | Amount |  | REQUIRED d | REQUIRED d |  |  |
| ●C |  | | | 0..1 | | Transaction |  | Amount |  | x | x |  |  |
| ●R |  | | | 0..1 | |  |  | Tax Type |  | x | x |  |  |
| C |  | | | 0..\* | |  |  | Tax |  |  |  |  | x |
| ●C |  | | | 0..1 | | Local |  | Amount |  |  |  |  | REQUIRED d |
| ●C |  | | | 0..1 | | Transaction |  | Amount |  |  |  |  | x |
| ●R |  | | | 0..1 | | Credit |  | Ledger Account |  |  |  |  | x  NOTE e |
| ●R |  | | | 0..1 | | Debit |  | Ledger Account |  |  |  |  | x  NOTE e |
| ●R |  | | | 0..1 | |  |  | Tax Type |  |  |  |  | x |
| C |  | | | 0..1 | | Requisition |  | Quantity | x |  |  |  |  |
| C |  | | | 0..1 | | Approved |  | Quantity | x |  |  |  |  |
| C |  | | | 0..1 | |  |  | Quantity |  | x | x  NOTE e | x | x  NOTE e |
| ~~C~~ |  | | | ~~0..1~~ | | ~~Basic UOM~~ ~~e~~ |  | ~~Quantity~~ |  |  | ~~x~~ |  | ~~x~~ |
| C |  | | | 0..1 | | Invoice |  | Quantity |  |  | x |  | x |
| R |  | | | 0..1 | | Purchase Organization |  | Business Segment | x |  |  |  |  |
| R |  | | | 0..1 | | Requisition Organization |  | Business Segment | x |  |  |  |  |
| R |  | | | 0..1 | |  |  | Project | x |  |  |  |  |
| R |  | | | 0..1 | |  |  | Supplier | x |  |  |  |  |
| R |  | | | 0..1 | | Credit |  | Ledger Account |  |  |  |  | x  NOTE f |
| R |  | | | 0..1 | | Debit |  | Ledger Account |  |  |  |  | x  NOTE f |
| R |  | | | 0..1 | | Purchase |  | Measurement Unit | NOT REQUIRED g |  |  |  |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a A logistics transaction does not necessarily include a unit price. If a unit price is required, it should specify whether it is tax-excluded or tax-included. Alternatively, a tax-inclusive flag may need to be included with the unit price for the line.  b Both the tax-included (transaction) amount and the tax-excluded (transaction) amount are recorded, so the neutral transaction amount is not needed here.  c It is common for the corresponding Debit/Credit Ledger Account to not be defined during a business transaction. An accountant determines the appropriate Debit/Credit Ledger Account when recording this entry in the journal. In some cases, two tax classes may be required: one associated with a reference to the Debit/Credit Ledger Account in the Accounting Ledger, and another not associated with these in the Business Transaction. The newly defined Tax0 class contains only the tax amount and tax type.  d Since adjustment data utilize local tax amounts, corresponding data in the business transaction may be required to verify the correctness of the transaction. For invoices in foreign currency, including local currency for tax accounting is mandatory.  e The '(Basic UOM) Quantity' property in Contract Line and Invoice Line is the same as the Quantity property in Order Line and Logistics Transaction Line..  f While typical business transactions may not always require Ledger Accounts, ISO 21378:2019 and AICPA ADS define the concept of Debit/Credit Ledger Accounts. Some ERP software systems may include corresponding Ledger Account information in the Invoice record.  g The Quantity class contains a Reference Association to Measurement Unit, which is not required here. | | | | | | | | | | | | | |

### Purchase Document

‘Purchase Requisition’ is a specialized class of the abstract class ‘Business Document’. It represents an internal document requesting the procurement of goods or services.

‘Purchase Contract’ is a specialized class of the abstract class ‘Contract’. It represents an agreement with a vendor for the provision of goods or services within a specified period.

‘Purchase Order’ is a specialized class of the abstract class ‘Order’. It represents a formal request to a vendor for the supply of goods or services within a specified period.

‘Purchase Materials Received’ is a specialized class of the abstract class ‘Logistics Transaction’. It captures the details of goods received against purchase orders within a specified period.

‘Purchase Invoice’ is a specialized class of the abstract class ‘Invoice’. It represents a vendor-issued document that details charges for goods or services provided within a specified period.

Extended properties for these documents are listed below.

| **T** | **I** | **M** | **Property term** | | **R** | **Associated class** | **Class** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | **Purchase Requisition** | | **Purchase Contract** | | **Purchase Order** | | **Purchase Materials Received** | | **Purchase Invoice** |
| **Specialization** | | | | | | See Class term in a cell | | **Business Transaction** | | **Business Transaction** | | **Business Transaction** | | **Business Transaction** | **Business Transaction** |
| A | PK | 1..1 | ID | Identifier | |  | | x | | x | | x | | x | x |
| A |  | 0..1 | Date | Date | |  | | x | | x | | x | | x | x |
| R |  | 0..1 |  |  | | Accounting Period | | x | | x | | x | | x | x |
| C |  | 0..1 |  |  | | Activities | | x | | x | | x | | x | x |
| R |  | 0..\* |  |  | | Business Segment | | x | | x | | x | | x | x |
| A |  | 0..1 | Remark | Text | |  | | x | | x | | x | | x | x |
| **Specialization** | | | | | | See Class term in a cell | |  | | **Contract** | | **Order** | | **Logistics Transaction** | **Invoice** |
| A |  | 0..1 | Number | Char | |  | | x | | x | | x | | x | x |
| A |  | 0..1 | Reference Number | Char | |  | |  | |  | |  | | x |  |
| A |  | 0..1 | Effective Date | Date | |  | |  | |  | |  | |  | x |
| A |  | 0..1 | Beginning Date | Date | |  | |  | | x | |  | |  |  |
| A |  | 0..1 | Ending Date | Date | |  | |  | | x | |  | |  |  |
| A |  | 0..1 | Due Date | Date | |  | |  | |  | |  | |  | x |
| A |  | 0..1 | Type Name | Name | |  | |  | | x | | x | |  | x |
| C |  | 0..1 | Transaction |  | | Amount | |  | | x | | x | |  | x |
| C |  | 0..1 | Local |  | | Amount | |  | | x | | x | |  | x |
| R |  | 0..1 |  |  | | Payment Term | |  | | x | | x | |  | x |
| R |  | 0..1 |  |  | | Settlement Method | |  | | x | | x | |  | x |
| A |  | 0..1 | Official Invoice Code | Char | |  | |  | |  | |  | |  | x |
| A |  | 0..1 | Shipping Method | Char | |  | |  | |  | |  | | x |  |
| A |  | 0..1 | Shipping Company | Name | |  | |  | |  | |  | | x |  |
| A |  | 0..1 | Adjustment Indicator | Indicator | |  | |  | |  | |  | | x |  |
| A |  | 0..1 | Terms Discount Percentage | Decimal | |  | |  | |  | |  | |  | x |
| A |  | 0..1 | Terms Discount Days | Integer | |  | |  | |  | |  | |  | x |
| A |  | 0..1 | Terms Due Days | Integer | |  | |  | |  | |  | |  | x |
| C |  | 0..\* |  |  | | Tax0 | |  | |  | |  | |  | x |
| ●C |  | 0..1 | Local |  | | Amount | |  | |  | |  | |  | x |
| ●C |  | 0..1 | Transaction |  | | Amount | |  | |  | |  | |  | x |
| ●R |  | 0..1 |  |  | | Tax Type | |  | |  | |  | |  | x |
| A |  | 0..1 | Status | Code | |  | |  | |  | |  | |  | x |
| R |  | 0..1 |  | |  | Supplier | |  | | x | | x | | x | x |
| R |  | 0..1 | Purchaser | |  | Employee | |  | | x | | x | |  |  |
| A |  | 0..1 | Grouping Code | | Char |  | |  | |  | |  | |  | x |
| R |  | 0..1 |  | |  | Purchase Requisition | |  | | REQUIRED a | |  | |  |  |
| R |  | 0..1 |  | |  | Purchase Contract | |  | |  | | REQUIRED b | |  |  |
| R |  | 0..1 |  | |  | Purchase Order | |  | |  | |  | | x | REQUIRED c |
| R |  | 0..1 |  | |  | Purchase Materials Received | |  | |  | |  | |  | REQUIRED d |
| R |  | 0..1 | Purchase Organization | |  | Business Segment | |  | | x | | x | |  |  |
| R |  | 0..1 | Receipt Organization | |  | Business Segment | |  | |  | |  | | x |  |
| R |  | 0..1 | Settlement Organization | |  | Business Segment | |  | |  | |  | |  | x |
| C |  | 0..\* |  | |  | See Class term in a cell | | **Purchase Requisition Line** | | **Purchase Contract Line** | | **Purchase Order Line** | | **Purchase Materials Received Line** | **Purchase Invoice Line** |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a Some purchase contracts are based on purchase requisitions and may need to have this information recorded.  b Some purchase orders are based on purchase contract and may need to have this information recorded.  c 2-way matching verifies that invoice details match the purchase order (PO) before payment. It ensures quantities, prices, and terms align with what was ordered. This process is crucial to prevent overpayment or errors, commonly used for services or direct deliveries.  d 3-way matching verifies that invoice details align with the purchase order (PO) and delivery record before payment. It ensures that quantities, prices, and terms match what was originally ordered, which is crucial for preventing overpayments or errors. This process is commonly used for services or direct deliveries. | | | | | | | | | | | | | | | |

### Purchase Document Line

| **T** | | **I** | | **M** | **Property term** | | | **R** | | **Associated class** | | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | | | | | | **Purchase Contract Line** | **Purchase Order Line** | **Purchase Materials Received Line** | **Purchase Invoice Line** |
| **Specialization** | | | | | | | | | | See Class term in a cell | | **Business Transaction Line** | | **Business Transaction Line** | **Business Transaction Line** | **Business Transaction Line** |
| A | | PK | | 1..1 | | | Line ID | Identifier | |  | | x | | x | x | x |
| R | |  | | 0..1 | | |  |  | | Activities | | x | | x | x | x |
| R | |  | | 0..\* | | |  |  | | Business Segment | | x | | x | x | x |
| A | |  | | 0..1 | | | Description | Text | |  | | x | | x | x | x |
| R | |  | | 0..1 | | |  |  | | Inventory Product | | x | | x | x | x |
| **Specialization** | | | | | | | | | | See Class term in a cell | | **Contract Line** | | **Order Line** | **Logistics Transaction Line** | **Invoice Line** |
| A | |  | | 0..1 | | | Number | Char | |  | | x | | x | x | x |
| A | |  | | 0..1 | | | Grouping Code | Char | |  | |  | |  |  | x |
| A | |  | | 0..1 | | | Payer ID | Char | |  | |  | | x |  |  |
| A | |  | | 0..1 | | | Due Date | Date | |  | | x | | x |  |  |
| A | |  | | 0..1 | | | Status | Code | |  | | x | | x |  |  |
| C | |  | | 0..1 | | | Tax Exclude |  | | Amount | | x | | x |  | x |
| C | |  | | 0..1 | | | Tax Include |  | | Amount | | x | | x |  | x |
| C | |  | | 0..1 | | | Tax Exclude Unit Price |  | | Amount | | x | | x |  | x |
| C | |  | | 0..1 | | | Tax Include Unit Price |  | | Amount | | x | | x |  | x |
| C | |  | | 0..\* | | |  |  | | Tax0 | | x | | x |  |  |
| ●C | |  | | 0..1 | | | Local |  | | Amount | | x | | x |  |  |
| ●C | |  | | 0..1 | | | Transaction |  | | Amount | | x | | x |  |  |
| ●R | |  | | 0..1 | | |  |  | | Tax Type | | x | | x |  |  |
| C | |  | | 0..\* | | |  |  | | Tax | |  | |  |  | x |
| ●C | |  | | 0..1 | | | Local |  | | Amount | |  | |  |  | x |
| ●C | |  | | 0..1 | | | Transaction |  | | Amount | |  | |  |  | x |
| ●R | |  | | 0..1 | | | Credit |  | | Ledger Account | |  | |  |  | x |
| ●R | |  | | 0..1 | | | Debit |  | | Ledger Account | |  | |  |  | x |
| ●R | |  | | 0..1 | | |  |  | | Tax Type | |  | |  |  | x |
| C | |  | | 0..1 | | |  |  | | Quantity | | x | | x | x | x |
| C | |  | | 0..1 | | | Invoice |  | | Quantity | |  | | x |  | x |
| R | |  | | 0..1 | | | Credit |  | | Ledger Account | |  | |  |  | x |
| R | |  | | 0..1 | | | Debit |  | | Ledger Account | |  | |  |  | x |
| R | |  | | 0..1 | | | Receipt Organization |  | | Business Segment | | x | |  |  |  |
| R | |  | | 0..1 | | | Purchase |  | | Measurement Unit | |  | |  |  | NOT REQUIRED a |
| R | |  | | 0..1 | | |  |  | | Project | |  | | x |  |  |
| R | |  | | 0..1 | | |  |  | | Purchase Requisition | | REQUIRED b | | x |  |  |
| R | |  | | 0..1 | | |  |  | | Purchase Requisition Line | | REQUIRED b | | x |  |  |
| R | |  | | 0..1 | | |  |  | | Purchase Contract | |  | | x |  |  |
| R | |  | | 0..1 | | |  |  | | Purchase Contract Line | |  | | x |  |  |
| R | |  | | 0..1 | | |  |  | | Purchase Order | |  | |  | REQUIRED c | x |
| R | |  | | 0..1 | | |  |  | | Purchase Order Line | |  | |  | x | x |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a The Quantity class contains a Reference Association to Measurement Unit, which is not required here.  b Some purchase orders are based on purchase contract and may need to have this information recorded.  c The Purchase Materials Received Line may require a reference to the Order, similar to the Invoice Line. | | | | | | | | | | | | | | | | |

### Sales Document

‘Sales Contract’ is a specialized class of the abstract class ‘Contract’. It is a legal agreement between a seller and a buyer related to the sale of goods or services. It specifies the obligations and rights of both parties involved in the transaction.

‘Sales Order’ is a specialized class of the abstract class ‘Order’. It represents a formal request from a customer for the delivery of goods or services within a specified period.

‘Sales Shipment Made’ is a specialized class of the abstract class ‘Logistics Transaction ‘. It captures the details of goods shipped to customers in fulfillment of sales orders within a specified period.

‘Sales Invoice’ is a specialized class of the abstract class ‘Invoice ‘. It represents a document that details charges for goods or services delivered to a customer within a specified period.

Extended properties for these documents are listed below.

| **T** | **I** | **M** | **Property term** | | | **R** | **Associated class** | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | | **Sales Contract** | **Sales Order** | **Sales Shipment Made** | **Sales Invoice** |
| **Specialization** | | | | | | | See Class term in a cell | **Business Transaction** | **Business Transaction** | **Business Transaction** | **Business Transaction** |
| A | PK | 1..1 | ID | | | Identifier |  | x | x | x | x |
| A |  | 0..1 | Date | | | Date |  | x | x | x | x |
| R |  | 0..1 |  | | |  | Accounting Period | x | x | x | x |
| C |  | 0..1 |  | | |  | Activities | x | x | x | x |
| R |  | 0..\* |  | | |  | Business Segment | x | x | x | x |
| A |  | 0..1 | Remark | | | Text |  | x | x | x | x |
| **Specialization** | | | | | | | See Class term in a cell | **Contract** | **Order** | **Logistics Transaction** | **Invoice** |
| A |  | 0..1 | Number | | | Char |  | x | x | x | x |
| A |  | 0..1 | | Reference Number | Char | |  |  |  | x |  |
| A |  | 0..1 | | Effective Date | Date | |  |  |  |  | x |
| A |  | 0..1 | | Beginning Date | Date | |  | x |  |  |  |
| A |  | 0..1 | | Ending Date | Date | |  | x |  |  |  |
| A |  | 0..1 | | Due Date | Date | |  |  |  |  | x |
| A |  | 0..1 | | Type Name | Name | |  | x | x |  | x |
| C |  | 0..1 | | Transaction |  | | Amount | x | x |  | x |
| C |  | 0..1 | | Local |  | | Amount |  |  |  | x |
| R |  | 0..1 | |  |  | | Payment Term | x | x |  | x |
| R |  | 0..1 | |  |  | | Settlement Method | x | x |  | x |
| A |  | 0..1 | | Official Invoice Code | Char | |  |  |  |  | x |
| A |  | 0..1 | | Shipping Method | Char | |  |  |  | x |  |
| A |  | 0..1 | | Shipping Company | Name | |  |  |  | x |  |
| A |  | 0..1 | | Adjustment Indicator | Indicator | |  |  |  | x |  |
| A |  | 0..1 | | Terms Discount Percentage | Decimal | |  |  |  |  | x |
| A |  | 0..1 | | Terms Discount Days | Integer | |  |  |  |  | x |
| A |  | 0..1 | | Terms Due Days | Integer | |  |  |  |  | x |
| C |  | 0..\* | |  |  | | Tax |  |  |  | x |
| ●C |  | 0..1 | | Local |  | | Amount |  |  |  | x |
| ●C |  | 0..1 | | Transaction |  | | Amount |  |  |  | x |
| ●R |  | 0..1 | | Credit |  | | Ledger Account | NOT USED | NOT USED | NOT USED | NOT USED |
| ●R |  | 0..1 | | Debit |  | | Ledger Account | NOT USED | NOT USED | NOT USED | NOT USED |
| ●R |  | 0..1 | |  |  | | Tax Type |  |  |  | x |
| A |  | 0..1 | | Status | Code | |  |  |  |  | x |
| R |  | 0..1 |  | | |  | Customer | x | x | x | x |
| R |  | 0..1 | Salesperson | | |  | Employee | x | x |  |  |
| A |  | 0..1 | Grouping Code | | | Char |  |  |  |  | x |
| R |  | 0..1 |  | | |  | Sales Contract |  | REQUIRED a |  |  |
| R |  | 0..1 |  | | |  | Sales Order |  |  | x | REQUIRED b |
| R |  | 0..1 | Sales Organization | | |  | Business Segment | x | x |  |  |
| R |  | 0..1 | Dispatch Organization | | |  | Business Segment |  |  | x |  |
| C |  | 0..\* |  | | |  | See Class term in a cell | **Sales Contract Line** | **Sales Order Line** | **Sales Shipment Made Line** | **Sales Invoice Line** |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a Some sales orders are based on sales contract and may need to have this information recorded.  b 2-way matching verifies that sales invoice details match the sales order before billing. It ensures quantities, prices, and terms align with what was ordered. This process is crucial to prevent billing errors or disputes, commonly used for products or services. | | | | | | | | | | | |

### Sales Document Line

| **T** | | | **I** | **M** | | | **Property term** | | **R** | | **Associated class** | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | | | | | | **Sales Contract Line** | **Sales Order Line** | **Sales Shipment Made Line** | **Sales Invoice Line** |
| **Specialization** | | | | | | | | | | See Class term in a cell | | **Business Transaction Line** | **Business Transaction Line** | **Business Transaction Line** | **Business Transaction Line** |
| A | PK | | | | 1..1 | Line ID | | Identifier | |  | | x | x | x | x |
| R |  | | | | 0..1 |  | |  | | Activities | | x | x | x | x |
| R |  | | | | 0..\* |  | |  | | Business Segment | | x | x | x | x |
| A |  | | | | 0..1 | Description | | Text | |  | | x | x | x | x |
| R |  | | | | 0..1 |  | |  | | Inventory Product | | x | x | x | x |
| **Specialization** | | | | | | | | | | See Class term in a cell | | **Contract Line** | **Order Line** | **Logistics Transaction Line** | **Invoice Line** |
| A |  | | | | 0..1 | Number | | Char | |  | | x | x | x | x |
| A |  | | | | 0..1 | Grouping Code | | Char | |  | |  |  |  | x |
| A |  | | | | 0..1 | Payer ID | | Char | |  | |  | x |  |  |
| A |  | | | | 0..1 | Due Date | | Date | |  | | x | x |  |  |
| A |  | | | | 0..1 | Status | | Code | |  | | x | x |  |  |
| C |  | | | | 0..1 | Tax Exclude | |  | | Amount | | x | x |  | x |
| C |  | | | | 0..1 | Tax Include | |  | | Amount | | x | x |  | x |
| C |  | | | | 0..1 | Tax Exclude Unit Price | |  | | Amount | | x | x |  | x |
| C |  | | | | 0..1 | Tax Include Unit Price | |  | | Amount | | x | x |  | x |
| C |  | | | | 0..\* |  | |  | | Tax0 | | x | x |  |  |
| ●C |  | | | | 0..1 | Local | |  | | Amount | | x | x |  |  |
| ●C |  | | | | 0..1 | Transaction | |  | | Amount | | x | x |  |  |
| ●R |  | | | | 0..1 |  | |  | | Tax Type | | x | x |  |  |
| C |  | | | | 0..\* |  | |  | | Tax | |  |  |  | x |
| ●C |  | | | | 0..1 | Local | |  | | Amount | |  |  |  | x |
| ●C |  | | | | 0..1 | Transaction | |  | | Amount | |  |  |  | x |
| ●R |  | | | | 0..1 | Credit | |  | | Ledger Account | |  |  |  | x |
| ●R |  | | | | 0..1 | Debit | |  | | Ledger Account | |  |  |  | x |
| ●R |  | | | | 0..1 |  | |  | | Tax Type | |  |  |  | x |
| C |  | | | | 0..1 |  | |  | | Quantity | | x | x | x | x |
| C |  | | | | 0..1 | Invoice | |  | | Quantity | |  | x |  | x |
| R |  | | | | 0..1 | Credit | |  | | Ledger Account | |  |  |  | x |
| R |  | | | | 0..1 | Debit | |  | | Ledger Account | |  |  |  | x |
| R | |  | | | 0..1 | Dispatch Organization | | |  | Business Segment | | x | x | x |  |
| R | |  | | | 0..1 |  | | |  | Sales Contract | |  | x |  |  |
| R | |  | | | 0..1 |  | | |  | Sales Contract Line | |  | x |  |  |
| R | |  | | | 0..1 |  | | |  | Sales Order | |  |  | REQUIRED a | x |
| R | |  | | | 0..1 |  | | |  | Sales Order Line | |  |  | x | x |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a The Purchase Materials Received Line may require a reference to the Order, similar to the Invoice Line. | | | | | | | | | | | | | | | |

### Specialization dependencies

**Figure 1** illustrates the specialization dependencies among business transaction document and line classes.

A diagram of a computer network

Description automatically generated

Figure －Specialization dependencies among business transaction document and line classes

## Accounting Ledger

### Understanding Debit and Credit Effects on Different Account Types

Accounting ledger classes contain a 'Debit or Credit Code' that indicates whether the corresponding monetary amount is a debit or a credit. Every monetary amount, except for balances, is recorded as a positive number. This code specifies whether the amount increases or decreases the target account balance.

Debiting an account increases the balance of assets, expenses, and losses. Crediting an account increases the balance of liabilities, income, and gains.

In the context of accounts receivable, debiting would increase the amount owed by customers. Crediting would decrease the amount owed by customers.

In the context of accounts payable, debiting would decrease the amount owed to suppliers. Crediting would increase the amount owed to suppliers.

| **Account Type** | **Debiting Effect** | **Crediting Effect** |
| --- | --- | --- |
| Assets | Increases balance | Decreases balance |
| Expenses | Increases balance | Decreases balance |
| Losses | Increases balance | Decreases balance |
| Accounts Receivable | Increases the amount owed by customers | Decreases the amount owed by customers |
| Liabilities | Decreases balance | Increases balance |
| Sales / Income | Decreases balance | Increases balance |
| Gains | Decreases balance | Increases balance |
| Accounts Payable | Decreases the amount owed to suppliers | Increases the amount owed to suppliers |

### General Ledger Journal Entry and Accounting Adjustment

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | **Accounts Receivable Adjustment** | **Accounts Payable Adjustment** | **General Ledger Journal Entry** |
| **Specialization** | | | | | See Class term in a cell | **Accounting Ledger** | **Accounting Ledger** | **Accounting Ledger** |
| A | PK | 1..1 | ID | Identifier |  | x | x | x |
| A |  | 0..1 | Date | Date |  | x | x | x |
| R |  | 0..1 |  |  | Accounting Period | x | x | x |
| C |  | 0..1 |  |  | Activities | x | x | x |
| R |  | 0..\* |  |  | Business Segment | x | x |  |
| A |  | 0..1 | Remark | Text |  |  |  | Description |
| C |  | 0..1 |  |  | Amounts | x | x |  |
| ●C |  | 0..1 | Functional |  | Amount | x | x |  |
| ●C |  | 0..1 | Transaction |  | Amount | x | x |  |
| ●C |  | 0..1 | Local |  | Amount | x | x |  |
| ●C |  | 0..1 | Reporting |  | Amount | x | x |  |
| R |  | 0..1 | Debit |  | Ledger Account | x | x |  |
| R |  | 0..1 | Credit |  | Ledger Account | x | x |  |
| R |  | 0..1 |  |  | General Ledger Journal Entry Line | x | x |  |
| A |  | 0..1 | Number | Char |  | x | x |  |
| A |  | 0..1 | Effective Date | Date |  |  |  | x |
| A |  | 0..1 | Document Number | Char |  | x | x |  |
| R |  | 0..1 |  |  | Journal Entry Type |  |  | x |
| C |  | 0..\* |  |  | Tax | x | x |  |
| ●C |  | 0..1 | Local |  | Amount | x | x |  |
| ●C |  | 0..1 | Transaction |  | Amount | x | x |  |
| ●R |  | 0..1 | Credit |  | Ledger Account | x | x |  |
| ●R |  | 0..1 | Debit |  | Ledger Account | x | x |  |
| ●R |  | 0..1 |  |  | Tax Type | x | x |  |
| A |  | 0..1 | Debit or Credit Code | Code |  | REQUIRED d | REQUIRED d |  |
| C |  | 1..\* |  |  | See Class term in a cell | **Accounts Receivable Adjustment Line** | **Accounts Payable Adjustment Line** | **General Ledger Journal Entry Line** |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a Composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a Although open accounts are usually calculated by software, tracking the initiation, approval, and last modification details is crucial for accountability, transparency, and auditing. This ensures that all actions are properly documented and comply with financial controls.  c Cash application accounting often requires locating specific journal entry lines to match payments with open invoices or receivables, ensuring accurate application and record-keeping. This process is crucial for maintaining the integrity of financial records.  d Monetary amounts are recorded as positive values, and it is required to specify whether these values are debits or credits to the balance amount. | | | | | | | | |

The ‘ General Ledger Journal Entry Line ‘ class, along with the classes ‘ Accounting Adjustment Line ‘, specialize an abstract class ‘ Accounting Ledger Line’ with additional properties specific to each.

NOTE The classes 'Open Account', 'Cash Application', and 'Financial Transaction' do not have a composite association line class.

| **T** | **I** | | **M** | | **Property term** | **R** | **Associated class** | **Class** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | | **Accounts Receivable Adjustment Line** | **Accounts Payable Adjustment Line** | **General Ledger Journal Entry Line** |
| **Specialization** | | | | | | | See Class term in a cell | **Accounting Ledger Line** | **Accounting Ledger Line** | **Accounting Ledger Line** |
| A | | PK | | 1..1 | Line ID | Identifier |  | x | x | x |
| R | |  | | 0..1 |  |  | Activities | REQUIRED a | REQUIRED a | REQUIRED a |
| R | |  | | 0..\* |  |  | Business Segment | x | x | x |
| A | |  | | 0..1 | Description | Text |  | REQUIRED b | REQUIRED b | REQUIRED b |
| C | |  | | 0..1 |  |  | Amounts | x | x | x |
| ●C | |  | | 0..1 | Functional |  | Amount | x | x | x |
| ●C | |  | | 0..1 | Transaction |  | Amount | x | x | x |
| ●C | |  | | 0..1 | Local |  | Amount | x | x | x |
| ●C | |  | | 0..1 | Reporting |  | Amount | x | x | x |
| C | |  | | 0..1 |  |  | General Ledger Journal Entry Line | x | x | x |
| A | |  | | 0..1 | Number | Char |  | x | x | x |
| C | |  | | 0..1 | Debit |  | Ledger Account | x | x |  |
| C | |  | | 0..1 | Credit |  | Ledger Account | x | x |  |
| A | |  | | 0..1 | Debit or Credit Code c | Code |  |  |  | x |
| C | |  | | 0..1 |  |  | Ledger Account |  |  | x |
| A | |  | | 0..1 | Reversal Indicator | Code |  |  |  | x |
| A | |  | | 0..1 | Reversal Journal ID | Char |  |  |  | x |
| A | |  | | 0..1 | Cancellation Indicator | Indicator |  |  |  | x |
| C | |  | | 0..1 |  |  | Bill |  |  | x |
| R | |  | | 0..1 |  |  | Settlement Method |  |  | x |
| C | |  | | 0..\* |  |  | Tax | x | x |  |
| ●C | |  | | 0..1 | Local |  | Amount | x | x |  |
| ●C | |  | | 0..1 | Transaction |  | Amount | x | x |  |
| ●C | |  | | 0..1 | Credit |  | Ledger Account | x | x |  |
| ●C | |  | | 0..1 | Debit |  | Ledger Account | x | x |  |
| ●C | |  | | 0..1 |  |  | Tax Type | x | x |  |
| C | |  | | 0..1 |  |  | Quantity |  |  | x |
| R | |  | | 0..1 | Account Segment |  | Bank Account |  |  | x |
| R | |  | | 0..1 | Account Segment |  | Employee |  |  | x |
| R | |  | | 0..1 | Account Segment |  | Project |  |  | x |
| C | |  | | 0..\* |  |  | Account Segment |  |  | x |
| R | |  | | 0..1 |  |  | See Class term in a cell | **Sales Invoice** | **Purchase Invoice** |  |
| R | |  | | 0..1 |  |  | See Class term in a cell | **Sales Invoice Line** | **Purchase Invoice Line** |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a Since 'Accounting Period' is crucial for auditing financial reports and is mandatory.  b While this attribute may not directly relate to audit verification, it can convey valuable information in certain situations.  c There are alternative approaches to reporting Debit/Credit Ledger Accounts. One approach specifies whether each entry is a Debit or Credit and records the corresponding Ledger Account. Another approach records both the Debit Ledger Account and Credit Ledger Account for each business transaction in the journal entry. Reporting both Ledger Accounts reduces the need for additional handling, compared to specifying whether an entry is a Debit or Credit and then recording the Ledger Account. | | | | | | | | | | |

### Accounting Ledger Document

The ‘ General Ledger Journal Entry’ class, along with the abstract classes ‘Accounting Adjustment’, ‘Open Account’, Cash Application’. and ‘Financial Transaction’ specialize an abstract class ‘Accounting Ledger’ with additional properties specific to each.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | |  |  |  | |
| **Abstract Class** | | | | | | **Open Account** | **Cash Application** | **Financial Transaction** | |
| **Specialization** | | | | | See Class term in a cell | **Accounting Ledger** | **Accounting Ledger** | **Accounting Ledger** | |
| A | PK | 1..1 | ID | Identifier |  | x | x | x | |
| A |  | 0..1 | Date | Date |  | x | x | x | |
| R |  | 0..1 |  |  | Accounting Period | x | x | x | |
| C |  | 0..1 |  |  | Activities | REQUIRED a | x | x | |
| R |  | 0..\* |  |  | Business Segment | x | x | x | |
| A |  | 0..1 | Remark | Text |  | x | x | x | |
| C |  | 0..1 |  |  | Amounts | x | x | x | |
| ●C |  | 0..1 | Functional |  | Amount | x | x | x | |
| ●C |  | 0..1 | Transaction |  | Amount | x | x | x | |
| ●C |  | 0..1 | Local |  | Amount | x | x | x | |
| ●C |  | 0..1 | Reporting |  | Amount | x | x | x | |
| R |  | 0..1 | Debit |  | Ledger Account |  | x | x | |
| R |  | 0..1 | Credit |  | Ledger Account |  | x | x | |
| R |  | 0..1 |  |  | General Ledger Journal Entry Line | x | REQUIRED c | x | |
| A |  | 0..1 | Number | Char |  |  |  | x | |
| A |  | 0..1 | Reference Number | Char |  | x |  | x | |
| A |  | 0..1 | Reference Date | Date |  | x |  | x | |
| A |  | 0..1 | Effective Date | Date |  |  |  |  | |
| A |  | 0..1 | Beginning Date | Date |  |  |  |  | |
| A |  | 0..1 | Ending Date | Date |  |  |  |  | |
| A |  | 0..1 | Due Date | Date |  | x |  |  | |
| A |  | 0..1 | Document Number | Char |  |  |  |  | |
| R |  | 0..1 |  |  | Journal Entry Type |  |  |  | |
| R |  | 0..1 |  |  | Payment Term |  |  |  | |
| R |  | 0..1 |  |  | Settlement Method |  | x | x | |
| R |  | 0..1 |  |  | Project | x |  | x | |
| A |  | 0..1 | Official Invoice Code | Char |  |  | x | x | |
| A |  | 0..1 | Shipping Method | Char |  | x |  | x | |
| C |  | 0..1 | Balance |  | Amounts | x |  |  | |
| C |  | 0..\* |  |  | Tax |  |  |  | |
| ●C |  | 0..1 | Local |  | Amount |  |  |  | |
| ●C |  | 0..1 | Transaction |  | Amount |  |  |  | |
| ●R |  | 0..1 | Credit |  | Ledger Account |  |  |  | |
| ●R |  | 0..1 | Debit |  | Ledger Account |  |  |  | |
| ●R |  | 0..1 |  |  | Tax Type |  |  |  | |
| A |  | 0..1 | Debit or Credit Code | Code |  |  | REQUIRED d | x | |
| C |  | 1..\* |  |  | See Class term in a cell |  |  |  | |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a Composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a Although open accounts are usually calculated by software, tracking the initiation, approval, and last modification details is crucial for accountability, transparency, and auditing. This ensures that all actions are properly documented and comply with financial controls.  c Cash application accounting often requires locating specific journal entry lines to match payments with open invoices or receivables, ensuring accurate application and record-keeping. This process is crucial for maintaining the integrity of financial records.  d Monetary amounts are recorded as positive values, and it is required to specify whether these values are debits or credits to the balance amount. | | | | | | | | |

### Accounts[[1]](#footnote-1) Payable Document

‘Accounts Payable Adjustment’ is a specialized class of the abstract class ‘ Accounting Adjustment’. It contains records of modifications to invoice balances, such as write-offs or credit memos, that occurred within a specified timeframe.

‘Accounts Payable Open Account’ is a specialized class of the abstract class ‘ Open Account’’. It records the total amount due to suppliers from unresolved payable transactions as of a particular date, summarized at the invoice level.

‘Accounts Payable Cash Application’ is a specialized class of the abstract class ‘ Cash Application’. It details the application of cash payments against supplier invoice obligations within a specific period.

‘Accounts Payable Payment Made’ is a specialized class of the abstract class ‘ Financial Transaction’. It documents the details of payment transactions to suppliers, including payment amounts and dates, conducted during a specified period.

Extended properties for these documents are listed below.

| **T** | **I** | | **M** | | **Property term** | **R** | **Associated class** | **Class** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | | **Accounts Payable Open Account** | **Accounts Payable Cash Application** | **Accounts Payable Payment Made** |
| **Specialization** | | | | | | | See Class term in a cell | **Accounting Ledger** | **Accounting Ledger** | **Accounting Ledger** |
| A | PK | 1..1 | | ID | | Identifier |  | x | x | x |
| A |  | 0..1 | | Date | | Date |  | x | x | x |
| R |  | 0..1 | |  | |  | Accounting Period | x | x | x |
| C |  | 0..1 | |  | |  | Activities | x | x | x |
| R |  | 0..\* | |  | |  | Business Segment | x | x | x |
| A |  | 0..1 | | Remark | | Text |  | x | x | x |
| C |  | 0..1 | |  | |  | Amounts | x | x | x |
| ●C |  | 0..1 | | Functional | |  | Amount | x | x | x |
| ●C |  | 0..1 | | Transaction | |  | Amount | x | x | x |
| ●C |  | 0..1 | | Local | |  | Amount | x | x | x |
| ●C |  | 0..1 | | Reporting | |  | Amount | x | x | x |
| R |  | 0..1 | | Debit | |  | Ledger Account | x | x | x |
| R |  | 0..1 | | Credit | |  | Ledger Account | x | x | x |
| R |  | 0..1 | |  | |  | General Ledger Journal Entry Line | x | x | x |
| **Specialization** | | | | | | | See Class term in a cell | **Open Account** | **Cash Application** | **Financial Transaction** |
| A |  | 0..1 | | Number | | Char |  |  |  | x |
| A |  | 0..1 | | Reference Number | | Char |  | x |  | x |
| A |  | 0..1 | | Reference Date | | Date |  | x |  | x |
| A |  | 0..1 | | Due Date | | Date |  | x |  |  |
| A |  | 0..1 | | Document Number | | Char |  |  |  |  |
| R |  | 0..1 | |  | |  | Settlement Method |  | x | x |
| R |  | 0..1 | |  | |  | Project | x |  | x |
| A |  | 0..1 | | Official Invoice Code | | Char |  |  | x | x |
| A |  | 0..1 | | Shipping Method | | Char |  | x |  | x |
| C |  | 0..1 | | Balance | |  | Amounts | x |  |  |
| C |  | 0..\* | |  | |  | Tax |  |  |  |
| ●C |  | 0..1 | | Local | |  | Amount |  |  |  |
| ●C |  | 0..1 | | Transaction | |  | Amount |  |  |  |
| ●R |  | 0..1 | | Credit | |  | Ledger Account |  |  |  |
| ●R |  | 0..1 | | Debit | |  | Ledger Account |  |  |  |
| ●R |  | 0..1 | |  | |  | Tax Type |  |  |  |
| A |  | 0..1 | | Debit or Credit Code | | Code |  |  |  | x |
| R |  | 0..1 | |  | |  | Customer | x | x | x |
| A |  | 0..1 | | Grouping Code | | Char |  | x |  |  |
| A |  | 0..1 | |  | |  | Purchase Contract | x |  | x |
| R |  | 0..1 | |  | |  | Purchase Contract | x |  | x |
| R |  | 0..1 | |  | |  | Purchase Invoice | x | x |  |
| R |  | 0..1 | |  | |  | Accounts Payable Payment Made |  | x |  |
| C |  | 0..\* | |  | |  | See Class term in a cell |  |  |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a Composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive. | | | | | | | | | | |

### Accounts Receivable Document

‘Accounts Receivable Adjustment’ is a specialized class of the abstract class ‘Accounting Adjustment’. It contains records of modifications to invoice balances, such as write-offs or credit memos, that occurred within a specified timeframe.

‘Accounts Receivable Open Account’ is a specialized class of the abstract class ‘Open Account’. It represents the aggregate amount of outstanding customer transactions expected to be received as of a specific date, consolidated at the invoice level.

‘Accounts Receivable Cash Application’ is a specialized class of the abstract class ‘Cash Application’. It logs all payment transactions received during a certain period.

‘Accounts Receivable Payment Made’ is a specialized class of the abstract class ‘Financial Transaction’. It records all received payment transactions during a certain period.

Extended properties for these documents are listed below.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | **Accounts Receivable Open Account** | **Accounts Receivable Cash Application** | **Accounts Receivable Cash Received** | |
| **Specialization** | | | | | See Class term in a cell | **Accounting Ledger** | **Accounting Ledger** | **Accounting Ledger** | |
| A | PK | 1..1 | ID | Identifier |  | x | x | x | |
| A |  | 0..1 | Date | Date |  | x | x | x | |
| R |  | 0..1 |  |  | Accounting Period | x | x | x | |
| C |  | 0..1 |  |  | Activities | x | x | x | |
| R |  | 0..\* |  |  | Business Segment | x | x | x | |
| A |  | 0..1 | Remark | Text |  | x | x | x | |
| C |  | 0..1 |  |  | Amounts | x | x | x | |
| ●C |  | 0..1 | Functional |  | Amount | x | x | x | |
| ●C |  | 0..1 | Transaction |  | Amount | x | x | x | |
| ●C |  | 0..1 | Local |  | Amount | x | x | x | |
| ●C |  | 0..1 | Reporting |  | Amount | x | x | x | |
| R |  | 0..1 | Debit |  | Ledger Account | x | x | x | |
| R |  | 0..1 | Credit |  | Ledger Account | x | x | x | |
| R |  | 0..1 |  |  | General Ledger Journal Entry Line | x | x | x | |
| **Specialization** | | | | | See Class term in a cell | **Open Account** | **Cash Application** | **Financial Transaction** | |
| A |  | 0..1 | Number | Char |  |  |  | x | |
| A |  | 0..1 | Reference Number | Char |  | x |  | x | |
| A |  | 0..1 | Reference Date | Date |  | x |  | x | |
| A |  | 0..1 | Due Date | Date |  | x |  |  | |
| A |  | 0..1 | Document Number | Char |  |  |  |  | |
| R |  | 0..1 |  |  | Settlement Method |  | x | x | |
| R |  | 0..1 |  |  | Project | x |  | x | |
| A |  | 0..1 | Official Invoice Code | Char |  |  | x | x | |
| A |  | 0..1 | Shipping Method | Char |  | x |  | x | |
| C |  | 0..1 | Balance |  | Amounts | x |  |  | |
| C |  | 0..\* |  |  | Tax |  |  |  | |
| ●C |  | 0..1 | Local |  | Amount |  |  |  | |
| ●C |  | 0..1 | Transaction |  | Amount |  |  |  | |
| ●R |  | 0..1 | Credit |  | Ledger Account |  |  |  | |
| ●R |  | 0..1 | Debit |  | Ledger Account |  |  |  | |
| ●R |  | 0..1 |  |  | Tax Type |  |  |  | |
| A |  | 0..1 | Debit or Credit Code | Code |  |  |  | x | |
| R |  | 0..1 |  |  | Customer | x | x | x | |
| A |  | 0..1 | Grouping Code | Char |  | x |  |  | |
| R |  | 0..1 |  |  | Sales Contract | x |  | x | |
| R |  | 0..1 |  |  | Sales Order |  |  |  | |
| R |  | 0..1 |  |  | Sales Invoice | x | x |  | |
| R |  | 0..1 |  |  | Accounts Receivable Cash Received |  | x |  | |
| C |  | 0..\* |  |  | See Class term in a cell |  |  |  | |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a Composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a Within a Journal Entry Line, there is a reference to an originating business document in the ‘Bill’ class, which includes: Originating Business Document Type: Indicates the type of business document (such as an invoice, purchase order, etc.) that initiated the transaction. Identifier: Specific identifier or reference number associated with that originating document. | | | | | | | | |

### Specialization dependencies

**Figure 2** illustrates the specialization dependencies among accounting ledger document and line classes.

A diagram of a computer flowchart

Description automatically generated

Figure －Specialization dependencies among accounting ledger document and line classes

## Inventory

### General

ISO 21378:2019 specifies recording both document-level and line-level data in a single table, implying the existence of two distinct classes: Inventory Document and Inventory Document Line. These classes represent the document-level and line-level details of inventory transactions, respectively, aligning with the standard's approach to managing inventory data within a structured and hierarchical framework.

|  |  |  |  |
| --- | --- | --- | --- |
| Table | Key Fields |  |  |
| INV\_On\_Hand | Inventory\_ID | Location\_ID | Inventory\_Product\_ID |
| INV\_Physical\_Inventory |  | Inventory\_Count\_Sheet\_ID | Inventory\_Count\_Sheet\_Line\_ID |
| INV\_Period\_Balance |  | Location\_ID | Inventory\_Product\_ID |
| INV\_Transaction |  | Transaction\_Document\_ID | Transaction\_Document\_Line\_ID |

The INV\_On\_Hand table defines Inventory\_ID as the primary key, with Location\_ID and Inventory\_Product\_ID serving as reference identifiers. This structure indicates that one location can store multiple products, allowing for precise tracking of inventory items by location. Together, these tables provide a comprehensive and structured approach to managing inventory data, consolidating both transaction and on-hand details within a unified framework that supports robust inventory control and data accuracy.

Additionally, the INV\_Transaction table records both document-level and line item data in a single table using a combined primary key of Transaction\_Document\_ID and Transaction\_Document\_Line\_ID. This design further emphasizes the representation of inventory transactions through Inventory Document and Inventory Document Line classes, ensuring that the hierarchical and structured management of inventory data is maintained in line with ISO 21378:2019.

### Inventory Document

The 'Inventory Document' abstract class specializes the 'Business Document' abstract class by extending the business segments related to inventory.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | **Business Transaction** | **Inventory Document** |
| **Specialization** | | | | | See Class term in a cell |  | **Business Transaction** |
| A | PK | 1..1 | ID | Identifier |  | x | x |
| A |  | 0..1 | Date | Date |  | x | x |
| R |  | 0..1 |  |  | Accounting Period | x | x |
| C |  | 0..1 |  |  | Activities | x | x |
| R |  | 0..\* |  |  | Business Segment | x | x |
| A |  | 0..1 | Remark | Text |  | x | x |
| R |  | 0..1 | Cost Organization |  | Business Segment |  | x |
| R |  | 0..1 | Inventory Organization |  | Business Segment |  | x |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term | | | | | | | |

The AWI 'Inventory Physical' class defines a combined unique identifier with 'Count Sheet ID' and 'Count Sheet Line ID', representing the Count Sheet and its lines. The separation into document class and document line class resulted from semantic data model analysis. The original 'Inventory Physical' class has been split into 'Inventory Physical' and 'Inventory Physical Line' classes.

The AWI 'Inventory Period Balance' class maintains consistent values for 'Accounting Period', 'Business Segment', 'Cost Organization Business Segment', 'Inventory Organization Business Segment', and 'Inventory Location' across various entries for 'Inventory Product'. This consistent structure ensures uniformity in audit data document and line structure. Following semantic data model analysis, the class was separated into 'Inventory Period Balance' and 'Inventory Period Balance Line' classes.

The 'Inventory Document' abstract class is further specialized by adding specific properties related to 'Inventory Location', 'Inventory Physical', 'Inventory On Hand', and 'Inventory Period Balance'.

| **T** | **I** | **M** | **Property term** | | **R** | **Associated class** | **Class** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | | **Inventory Document** |  |  |  |  |
| **Class** | | | | | | |  | **Inventory Location** | **Inventory Physical** | **Inventory On Hand** | **Inventory Period Balance** |
| **Specialization** | | | | | | See Class term in a cell |  | **Inventory Document** | **Inventory Document** | **Inventory Document** | **Inventory Document** |
| A | PK | 1..1 | ID | Identifier | |  | x | x | Count Sheet ID a | x | REQUIRED b |
| A |  | 0..1 | Date | Date | |  | x | REQUIRED c | Count Date | As Of Date |  |
| R |  | 0..1 |  |  | | Accounting Period | x | REQUIRED c | REQUIRED d | REQUIRED d | x |
| C |  | 0..1 |  |  | | Activities | x | REQUIRED e | x | REQUIRED e | REQUIRED e |
| R |  | 0..\* |  |  | | Business Segment | x | x | REQUIRED f | x | x |
| A |  | 0..1 | Remark | Text | |  | x | x |  |  |  |
| R |  | 0..1 | Cost Organization |  | | Business Segment | x | REQUIRED g | REQUIRED g | x | x |
| R |  | 0..1 | Inventory Organization |  | | Business Segment | x | x | x | x | x |
| A |  | 0..1 | Count Sheet Number | Char | |  |  |  | x | x |  |
| A |  | 0..1 | Last Count Date | Date | |  |  |  |  | x |  |
| A |  | 0..1 | Type h | Char | |  |  | x |  |  |  |
| C |  | 0..1 | Physical |  | | Address |  | x |  |  |  |
| A |  | 0..1 | Active Indicator | Indicator | |  |  | x |  |  |  |
| A |  | 0..1 | Code | Char | |  |  | x |  |  |  |
| C |  | 1..\* |  |  | | See Class term in a cell |  |  | **Inventory Physical Line** | **Inventory On Hand Line** |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  a In the ‘Inventory Physical’ class, there are two identifier attributes. 'Count Sheet ID' serves as the primary identifier, while 'Count Sheet Number' is a secondary unique identifier. 'Count Sheet ID' has been designated as the unique identifier for this class.  b Although the 'Inventory Period Balance' table originally uses a combined primary key consisting of 'Inventory Location ID' and 'Inventory Product ID', a new unique identifier 'ID' has been introduced in 'Inventory Period Balance' for clearer modeling. This new 'ID' allows for potential changes to the original primary key combination in the future, while also simplifying references to this class.  c Although the 'Inventory Location' master class currently lacks 'Date' and 'Accounting Period' attributes, it is crucial to manage historical data maintenance for this class. Therefore, it is necessary to record the effective and obsolete dates of this data using 'Start' and 'End' dates. To maintain consistency with other classes, an 'Effective Date' attribute is being introduced to indicate when the data becomes active. Additionally, a reference association to 'Accounting Period' is implemented to specify the period during which this master data record, without obsolete data, is extracted. This approach ensures accurate tracking of historical changes to master data.  d Since 'Accounting Period' is crucial for auditing financial reports and is mandatory.  e Since 'Activities' are crucial for auditing financial reports to track user activity such as entry, approval, or last modification, and their timestamps, it is mandatory.  f Since 'Business Segment' is crucial for auditing financial reports within the business context, it is mandatory.  g Given that 'Cost Organization Business Segment' is crucial for cost management, it should be defined within the 'Inventory Location' class and verified against other inventory-related business documents.  h Inventory Location Type is the classification that describes the type or category of the inventory location. | | | | | | | | | | | |

### Inventory Document Line

The 'Inventory Document Line' abstract class specializes the 'Business Document Line' abstract class.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | **Business Transaction Line** | **Inventory Document Line** |
| **Specialization** | | | | | See Class term in a cell |  | **Business Transaction Line** |
| A | PK | 1..1 | Line ID | Identifier |  | x | x |
| C |  | 0..1 |  |  | Activities | x | x |
| R |  | 0..\* |  |  | Business Segment | x | x |
| A |  | 0..1 | Description | Text |  | x | x |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term | | | | | | | | |

The 'Inventory Document Line' abstract class is specialized by adding no property related to 'Inventory Physical Line', 'Inventory On Hand Line', and 'Inventory Period Balance Line'. In contrast, the 'Inventory Location' class is a simple listing of locations and does not include line-level details.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | | **Inventory Document Line** |  |  |  |
| **Class** | | | | | | |  | **Inventory Physical Line** | **Inventory On Hand Line** | **Inventory Period Balance Line** |
| **Specialization** | | | | | | See Class term in a cell |  | **Inventory Document Line** | **Inventory Document Line** | **Inventory Document Line** |
| A | PK | 1..1 | Line ID | Identifier | |  | x | Count Sheet Line ID a | x | REQUIRED a |
| C |  | 0..1 |  |  | | Activities | x | x | REQUIRED b | REQUIRED b |
| R |  | 0..\* |  |  | | Business Segment | x | x | x | x |
| A |  | 0..1 | Description | Text | |  | x | Comment |  |  |
| A |  | 0..1 | Count Sheet Line Number | Char | |  |  | x |  |  |
| R | PK a | 0..1 |  |  | | Inventory Product |  | x | x | x |
| A |  | 0..1 | Lot Number | Char | |  |  | x | x | x |
| A |  | 0..1 | Serial Number | Char | |  |  | x | x |  |
| R | PK a | 0..1 |  |  | | Inventory Location |  | x | x | x |
| R |  | 0..1 | Cost Organization |  | | Business Segment |  |  |  | x |
| R |  | 0..1 | Inventory Organization |  | | Business Segment |  |  |  | x |
| C |  | 0..1 | Credit |  | | Amount |  |  |  | x |
| C |  | 0..1 | Debit |  | | Amount |  |  |  | x |
| R |  | 0..1 | Functional |  | | Currency |  |  | NOT REQUIRED c |  |
| A |  | 0..1 | ABC Code | Code | |  |  |  | x |  |
| A |  | 0..1 | Bin ID | Char | |  |  | x | x |  |
| A |  | 0..1 | Bin Location | Char | |  |  |  | x |  |
| A |  | 0..1 | Cost Method | Char | |  |  |  | x |  |
| C |  | 0..1 | Average Cost |  | | Amount |  |  | x |  |
| C |  | 0..1 | Cost |  | | Amount |  |  | x |  |
| C |  | 0..1 | List Price |  | | Amount |  |  | x |  |
| C |  | 0..1 | Specific Cost |  | | Amount |  |  | x |  |
| C |  | 0..1 | Standard Cost |  | | Amount |  |  | x |  |
| C |  | 0..1 | Beginning Balance |  | | Amount |  |  |  | x |
| C |  | 0..1 | Ending Balance |  | | Amount |  |  |  | x |
| C |  | 0..1 | System Quantity |  | | Quantity |  |  | x |  |
| C |  | 0..1 | Book |  | | Quantity |  |  | x |  |
| C |  | 0..1 | Inventory Purchase Year To Date |  | | Quantity |  |  | x |  |
| C |  | 0..1 | Inventory Sold Year To Date |  | | Quantity |  |  | x |  |
| C |  | 0..1 | Beginning |  | | Quantity |  |  |  | x |
| C |  | 0..1 | Dispatched |  | | Quantity |  |  |  | x |
| C |  | 0..1 | Received |  | | Quantity |  |  |  | x |
| C |  | 0..1 | Ending |  | | Quantity |  |  |  | x |
| C |  | 0..1 | System |  | | Quantity |  | x |  |  |
| C |  | 0..1 | Physical Count |  | | Quantity |  | x | x |  |
| R |  | 0..1 | Purchasing |  | | Measurement Unit |  |  | NOT REQUIRED d |  |
| R |  | 0..1 | Selling |  | | Measurement Unit |  |  | NOT REQUIRED d |  |
| R |  | 0..1 | Costing |  | | Measurement Unit |  |  | NOT REQUIRED d |  |
| R |  | 0..1 | Stocking |  | | Measurement Unit |  | NOT REQUIRED d | NOT REQUIRED d |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a In the ‘Inventory Physical Line’ class, there are two identifier attributes. 'Count Sheet Line ID' serves as the primary identifier, while 'Count Sheet Number' is a secondary unique identifier. 'Count Sheet ID' has been designated as the unique identifier for this class.  b Since 'Activities' are crucial for auditing financial reports to track user activity such as entry, approval, or last modification, and their timestamps, it is mandatory.  c The Amount class contains a reference association to Currency, which is not required here.  d The Quantity class contains a reference association to Measurement Unit, which is not required here. | | | | | | | | | | |

### Inventory Transaction

Designing inventory sales transactions, inventory purchase transactions, and inventory management transactions as subclasses of the abstract superclass Inventory Transaction is advantageous for the reasons outlined in clause **2**.

This approach leverages reusability, structured hierarchy, specialization, data integrity, and future extensibility to create a robust and adaptable data model for inventory-related transactions, resulting in a more modular, maintainable, and extensible design for handling inventory sales, purchase, and management transactions within audit data services.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | **Business Transaction** | **Inventory Transaction** |
| **Specialization** | | | | | See Class term in a cell |  | **Business Transaction** |
| A | PK | 1..1 | ID | Identifier |  | x | x |
| A |  | 0..1 | Date | Date |  | x | x |
| R |  | 0..1 |  |  | Accounting Period | x | x |
| R |  | 0..\* |  |  | Business Segment | x | x |
| A |  | 0..1 | Remark | Text |  | x | x |
| R |  | 0..1 | Cost Organization |  | Business Segment |  | x |
| R |  | 0..1 | Inventory Organization |  | Business Segment |  | x |
| A |  | 0..1 | Time | Time |  |  | x |
| A |  | 0..1 | Document Type (RENAMED FROM ‘Type’) a | Char |  |  | x |
| A |  | 0..1 | Transaction Type  (RENAMED FROM ‘Type System’) b | Char |  |  | x |
| A |  | 0..1 | Inventory System Or External Source | Code |  |  | x |
| A |  | 0..1 | Received And Dispatched Indicator | Indicator |  |  | x |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a The attribute 'Transaction Type' in Inventory Transaction classifies the inventory transaction, specifying the nature of the movement or adjustment. The attribute name was changed from 'Type' to 'Transaction Type' to avoid confusion with 'System Type' and clarify its purpose.  b 'System Type' refers to the internal code used by the accounting software to identify the transaction type. This definition corresponds to the attribute now named 'Transaction Type', which was changed from 'System Type'. | | | | | | | |

The ‘Inventory Transaction’ abstract class is further specialized by adding specific properties related to ‘Inventory Purchase Transaction’, ‘Inventory Sales Transaction’, ‘Inventory Control Transaction'.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | **Inventory Transaction** |  |  |  |
| **Class** | | | | | |  | **Inventory Purchase Transaction** | **Inventory Sales Transaction** | **Inventory Control Transaction** |
| **Specialization** | | | | | See Class term in a cell |  | **Inventory Transaction** | **Inventory Transaction** | **Inventory Transaction** |
| A | PK | 1..1 | ID | Identifier |  | x | Document ID | Document ID | Document ID |
| A |  | 0..1 | Date | Date |  | x | x | x | x |
| R |  | 0..1 |  |  | Accounting Period | x | REQUIRED a | REQUIRED a | REQUIRED a |
| C |  | 0..1 |  |  | Activities | x | REQUIRED b | REQUIRED b | REQUIRED b |
| R |  | 0..\* |  |  | Business Segment | x | x | x | x |
| A |  | 0..1 | Description | Text |  | x | x | x | x |
| R |  | 0..1 | Cost Organization |  | Business Segment | x | REQUIRED c | REQUIRED c | REQUIRED c |
| R |  | 0..1 | Inventory Organization |  | Business Segment | x | x | x | x |
| A |  | 0..1 | Time | Time |  | x | x | x | x |
| A |  | 0..1 | Document Type(RENAMED FROM ‘Type’) d | Char |  | x | x | x | x |
| A |  | 0..1 | Transaction Type  (RENAMED FROM ‘Type System’) e | Char |  | x | x | x | x |
| A |  | 0..1 | Inventory System Or External Source | Code |  | x | x | x | x |
| A |  | 0..1 | Received And Dispatched Indicator | Indicator |  | x | x | x | x |
| R |  | 0..1 |  |  | Supplier |  | x |  |  |
| R |  | 0..1 |  |  | Customer |  |  | x |  |
| A |  | 0..1 | Inventory Reference Document Number | Char |  |  | x | x |  |
| R |  | 0..1 |  |  | Purchase Order |  | x |  |  |
| R |  | 0..1 |  |  | Sales Order |  |  | x |  |
| A |  | 0..1 | Inventory Transaction Document ID | Char |  |  |  |  | x |
| C |  | 1..\* |  |  | See Class term in a cell |  | **Inventory Purchase Transaction Line** | **Inventory Sales Transaction Line** | **Inventory Control Transaction Line** |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a Since 'Accounting Period' is crucial for auditing financial reports and is mandatory.  b Since 'Activities' are crucial for auditing financial reports to track user activity such as entry, approval, or last modification, and their timestamps, it is mandatory.  c Given that 'Cost Organization Business Segment' is crucial for cost management, it should be defined within the 'Inventory Location' class and verified against other inventory-related business documents.  d The attribute 'Transaction Type' in Inventory Transaction classifies the inventory transaction, specifying the nature of the movement or adjustment. The attribute name was changed from 'Type' to 'Transaction Type' to avoid confusion with 'System Type' and clarify its purpose.  e 'System Type' refers to the internal code used by the accounting software to identify the transaction type. This definition corresponds to the attribute now named 'Transaction Type', which was changed from 'System Type'. | | | | | | | | | | |

### Transaction Type for inventory movement

The transaction type includes the following, as defined in UNTDID 4499, which specifies the reason for an inventory movement;

|  |  |  |
| --- | --- | --- |
| **Code** | **Value** | **Description** |
| 1 | Reception | Goods received at warehouse from another party or warehouse. |
| 2 | Delivery | Goods which have been delivered from the inventory to another party or warehouse. |
| 3 | Scrapped parts | Adjustment due to scrapped parts. |
| 4 | Difference | The difference between the inventory, as physically counted, and the inventory recorded by the system. |
| 5 | Property transfer within warehouse | An inventory movement issued when goods are moved (physically or logically) from one owner to another, whenever inventories are held in account of several owners of the same product within the same warehouse. |
| 6 | Inventory recycling | This inventory movement is due to recycling of goods. For instance, defective goods have been repaired and are put back to the available inventory. |
| 7 | Reversal of previous movement | This inventory movement is issued to cancel a previously processed movement. |
| 8 | Defects (technical) | This inventory movement corresponds to parts with technical defect. |
| 9 | Commercial | The inventory movement has been issued for commercial reasons. |
| 10 | Conversion | The inventory movement is due to conversion of goods. |
| 11 | Consumption | The inventory movement corresponds to goods taken out of consigned inventory for consumption. |

### Inventory Transaction Line

The 'Inventory Transaction Line' abstract class specializes the 'Business Document Line' abstract class.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | **Inventory Document Line** | **Inventory Transaction Line** |
| **Specialization** | | | | | See Class term in a cell |  | **Inventory Document Line** |
| A | PK | 1..1 | Line ID | Identifier |  | x | x |
| C |  | 0..1 |  |  | Activities | x | x |
| R |  | 0..\* |  |  | Business Segment | x | x |
| A |  | 0..1 | Description | Text |  | x |  |
| R |  | 0..1 |  |  | Inventory Product |  | x |
| R |  | 0..1 | From |  | Inventory Location |  | x |
| R |  | 0..1 | To |  | Inventory Location |  | x |
| A |  | 0..1 | Lot Number | Char |  |  | x |
| A |  | 0..1 | Serial Number | Char |  |  | x |
| R |  | 0..1 | Cost Organization |  | Business Segment |  | x |
| R |  | 0..1 | Inventory Organization |  | Business Segment |  | x |
| R |  | 0..1 |  |  | Project |  | x |
| A |  | 0..1 | Status | Code |  |  | x |
| A |  | 0..1 | Required By | Name |  |  | x |
| C |  | 0..1 | Credit |  | Ledger Account |  | x |
| C |  | 0..1 | Debit |  | Ledger Account |  | x |
| C |  | 0..1 | Adjustment Cost |  | Amount |  | x |
| C |  | 0..1 | Inventory Cost |  | Amount |  | x |
| R |  | 0..1 | Functional |  | Currency |  | NOT REQUIRED a |
| C |  | 0..1 |  |  | Quantity |  | x |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a The Amount class contains a reference association to Currency, which is not required here. | | | | | | | | |

The ‘Inventory Transaction Line’ abstract class is further specialized by adding specific properties related to ‘Inventory Purchase Transaction Line’, ‘Inventory Sales Transaction Line’, ‘Inventory Control Transaction Line'.

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | **Inventory Transaction Line** |  |  |  |
| **Class** | | | | | |  | **Inventory Purchase Transaction Line** | **Inventory Sales Transaction Line** | **Inventory Control Transaction Line** |
| **Specialization** | | | | | See Class term in a cell | **Inventory Document Line** | **Inventory Transaction Line** | **Inventory Transaction Line** | **Inventory Transaction Line** |
| A | PK | 1..1 | Line ID | Identifier |  | x | Document Line ID | Document Line ID | Document Line ID |
| C |  | 0..1 |  |  | Activities | x | x | x | x |
| R |  | 0..\* |  |  | Business Segment | x | x | x | x |
| A |  | 0..1 | Description | Text |  | x | x | x | x |
| R |  | 0..1 |  |  | Inventory Product | x | x | x | x |
| R |  | 0..1 | From |  | Inventory Location | x | x | x | x |
| R |  | 0..1 | To |  | Inventory Location | x | x | x | x |
| A |  | 0..1 | Lot Number | Char |  | x | x | x | x |
| A |  | 0..1 | Serial Number | Char |  | x | x | x | x |
| R |  | 0..1 | Cost Organization |  | Business Segment | x | x | x | x |
| R |  | 0..1 | Inventory Organization |  | Business Segment | x | x | x | x |
| R |  | 0..1 |  |  | Project | x | x | x | x |
| A |  | 0..1 | Status | Code |  | x | x | x | x |
| A |  | 0..1 | Required By | Name |  | x | x | x | x |
| C |  | 0..1 | Credit |  | Ledger Account | x | x | x | x |
| C |  | 0..1 | Debit |  | Ledger Account | x | x | x | x |
| C |  | 0..1 | Adjustment Cost |  | Amount | x | x | x | x |
| C |  | 0..1 | Inventory Cost |  | Amount | x | x | x | x |
| C |  | 0..1 |  |  | Quantity | x | x | x | x |
| A |  | 0..1 | Inventory Reference Document Line Number | Char |  |  | x | x |  |
| R |  | 0..1 |  |  | Purchase Order Line |  | x |  |  |
| R |  | 0..1 |  |  | Sales Order Line |  |  | x |  |
| A |  | 0..1 | Inventory Transaction Document Line ID | Char |  |  |  |  | x |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a The Amount class contains a reference association to Currency, which is not required here. | | | | | | | | | | |

### Specialization dependencies

**Figure 3** illustrates the specialization dependencies among inventory document and line classes.

A computer screen shot of a computer screen

Description automatically generated

Figure －Specialization dependencies among inventory document and line classes

## PPE

### Business Transaction

‘PPE Master’ class is a central repository that comprehensively catalogs each item of property, plant, and equipment (PPE).

‘PPE Addition’ is a class of newly acquired property, plant, and equipment assets, detailing the identification, classification, and properties for each addition.

‘PPE Removal’ captures the disposal of property, plant, and equipment (PPE).

‘PPE Change’ class captures adjustments to property, plant, and equipment (PPE) details, excluding additions or disposals. It includes changes like revaluations, historical cost adjustments, alterations in depreciation methods, transfers, and status updates.

Extended properties for these documents are listed below.

| **T** | **I** | | **M** | | **Property term** | | **R** | | **Associated class** | | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | | | | | **PPE Master** | **PPE Addition** | **PPE Change** | **PPE Removal** |
| **Specialization** | | | | | | | | | | See Class term in a cell | **Business Transaction** | **Business Transaction** | **Business Transaction** | **Business Transaction** |
| A | | PK | | 1..1 | | ID | | Identifier | |  | x | x | x | x |
| A | |  | | 0..1 | | Date | | Date | |  | REQUIRED a | x | x | x |
| R | |  | | 0..1 | |  | |  | | Accounting Period | REQUIRED b | x | x | x |
| C | |  | | 0..1 | |  | |  | | Activities | x | x | x | x |
| R | |  | | 0..\* | |  | |  | | Business Segment | x | x | x | x |
| A | |  | | 0..1 | | Remark | | Text | |  | x | x | x | x |
| R | |  | |  | |  | |  | | PPE Master |  | NOT REQUIRED c | NOT REQUIRED c | NOT REQUIRED ce |
| A | |  | | 0..1 | | Tag Number | | Char | |  |  | x | x | x |
| A | |  | | 0..1 | | Operation Type (RENAMED FROM ‘Type Name’) d | | Name | |  |  | x | x | x |
| A | |  | | 0..1 | | Reason | | Text | |  |  | x | x | x |
| C | |  | | 0..1 | |  | |  | | Quantity | Quantity On Hand | x |  | x |
| C | |  | | 0..1 | | Original Cost | |  | | Amount e |  | x |  | x |
| A | |  | | 0..1 | | Content Before Change | | Text | |  |  |  | x |  |
| A | |  | | 0..1 | | Content After Change | | Text | |  |  |  | x |  |
| C | |  | | 0..1 | | Cash Proceeds | |  | | Amount e |  |  |  | x |
| C | |  | | 0..1 | | Expense | |  | | Amount e |  |  |  | x |
| C | |  | | 0..1 | | Non Cash Proceeds | |  | | Amount e |  |  |  | x |
| C | |  | | 0..1 | | Realized Gain Loss | |  | | Amount e |  |  |  | x |
| C | |  | | 0..1 | | Residual Value | |  | | Amount e | x |  |  | x |
| R | |  | | 0..1 | | Realized Gain Loss Account | |  | | Ledger Account |  |  |  | x |
| R | |  | | 0..1 | | Unrealized Gain Loss Account | |  | | Ledger Account |  |  |  | x |
| C | |  | | 0..1 | | Accumulated Depreciation | |  | | Amount e | x |  |  |  |
| R | |  | | 0..1 | | Accumulated Depreciation Account | |  | | Ledger Account | x |  |  |  |
| A | |  | | 0..1 | | Useful Life | | Integer | |  | x |  |  |  |
| A | |  | | 0..1 | | Useful Life Remaining | | Integer | |  | x |  |  |  |
| R | |  | | 0..1 | |  | |  | | Ledger Account | x |  |  |  |
| R | |  | | 0..1 | | Impairment Provision Account | |  | | Ledger Account | x |  |  |  |
| R | |  | | 0..1 | |  | |  | | PPE Type | x |  |  |  |
| A | |  | | 0..1 | | Serial Number | | Char | |  | x |  |  |  |
| A | |  | | 0..1 | | Bar Code | | Char | |  | x |  |  |  |
| A | |  | | 0..1 | | Code | | Char | |  | x |  |  |  |
| A | |  | | 0..1 | | Lot Number | | Char | |  | x |  |  |  |
| A | |  | | 0..1 | | Condition Name | | Name | |  | x |  |  |  |
| A | |  | | 0..1 | | Manufacturer | | Name | |  | x |  |  |  |
| A | |  | | 0..1 | | Name | | Name | |  | x |  |  |  |
| A | |  | | 0..1 | | Feature | | Text | |  | x |  |  |  |
| A | |  | | 0..1 | | Location Description | | Text | |  | x |  |  |  |
| A | |  | | 0..1 | | Acquisition Date | | Date | |  | x |  |  |  |
| A | |  | | 0..1 | | Placed Into Service Date | | Date | |  | x |  |  |  |
| R | |  | | 0..1 | |  | |  | | Inventory Product | x |  |  |  |
| C | |  | | 0..1 | | Book Value | |  | | Amount e | x |  |  |  |
| C | |  | | 0..1 | | Fair Value | |  | | Amount e | x |  |  |  |
| C | |  | | 0..1 | | Impairment Provision | |  | | Amount e | x |  |  |  |
| C | |  | | 0..1 | | Replacement Cost | |  | | Amount e | x |  |  |  |
| R | |  | | 0..1 | |  | |  | | Purchase Order | x |  |  |  |
| R | |  | | 0..1 | |  | |  | | Purchase Order Line | x |  |  |  |
| R | |  | | 0..1 | |  | |  | | Supplier | x |  |  |  |
| R | |  | | 0..1 | | Functional | |  | | Currency | NOT REQUIRED f | NOT REQUIRED f |  | NOT REQUIRED f |
| R | |  | | 0..1 | |  | |  | | Measurement Unit | NOT REQUIRED g |  |  |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a The inclusion of a date is essential for managing collected data.  b Master data undergoes changes during business operations, making it crucial to accurately identify data in the PPE Master by its ID and Accounting Period. Effective management of master data also requires consideration of modification dates, which may necessitate effective date ranges independent of the Accounting Period.  c The ID of the PPE Master serves as a reference association and unique identifier across other classes. We do not need redundant properties.  d Renaming the property from 'Type Name' to 'Operation Type' clarifies that it describes the type of operation (addition, change, removal) and is not related to the PPE Type in the PPE Master. 'Type Name' is easily understood as the name of the PPE Type.  e Although the amounts related to PPE should be recorded in the functional currency, it may be necessary to report these amounts in multicurrency for auditing purposes during the annual report.  f The Amount class contains a reference association to Currency, which is not required here.  g The Quantity class contains a reference association to Measurement Unit, which is not required here. | | | | | | | | | | | | | | |

### Depreciation

‘PPE Department Allocation’ class holds details regarding the allocation of expenses among departments benefiting from using the property, plant, and equipment (PPE), particularly depreciation expenses.

‘PPE Depreciation Method’ class records the different methods used to depreciate property, plant, and equipment (PPE).

‘PPE Depreciation’ class contains information about the depreciation of property, plant and equipment (PPE) during a specified period.

Extended properties for these documents are listed below.

| **T** | **I** | **M** | | **Property term** | **R** | **Associated class** | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Class** | | | | | | | **PPE Master** | **PPE Department Allocation** | **PPE Depreciation Method** | **PPE Depreciation** |
| **Specialization** | | | | | | See Class term in a cell | **Business Transaction** | **Business Transaction** | **Business Transaction** | **Business Transaction** |
| A | PK | 1..1 | ID | | Identifier |  | x | REQUIRED a | x | REQUIRED a |
| A |  | 0..1 | Date | | Date |  | REQUIRED b | REQUIRED b | REQUIRED b | REQUIRED b |
| R |  | 0..1 |  | |  | Accounting Period | REQUIRED c | REQUIRED c | REQUIRED c | x |
| C |  | 0..1 |  | |  | Activities | x | REQUIRED d | REQUIRED d | x |
| R |  | 0..\* |  | |  | Business Segment | x | x | x | x |
| A |  | 0..1 | Remark | | Text |  |  |  |  |  |
| R |  | 0..1 |  | |  | PPE Master | - | NOT REQUIRED e | NOT REQUIRED e | NOT REQUIRED e |
| A |  | 0..1 | Tag Number | |  |  |  |  |  | REQUIRED f |
| A |  | 0..1 | Depreciation Allocation Proportion | | Decimal |  |  | x |  |  |
| R |  | 0..1 | Department | |  | Business Segment |  | x |  |  |
| A |  | 0..1 | Name | | Name |  | x |  | x |  |
| A |  | 0..1 | Description | | Text |  |  |  | x |  |
| A |  | 0..1 | Depreciation Formula | | Text |  |  |  | x |  |
| R |  | 0..1 |  | |  | PPE Depreciation Method |  |  |  | x |
| A |  | 0..1 | Useful Life | | Integer |  | x |  |  | X |
| A |  | 0..1 | Useful Life Remaining | | Integer |  | x |  |  | X |
| C |  | 0..1 | Accumulated Depreciation | |  | Amount g | x |  |  | x |
| C |  | 0..1 | Carrying | |  | Amount g |  |  |  | x |
| C |  | 0..1 | Depreciable Basis | |  | Amount g |  |  |  | x |
| C |  | 0..1 | Depreciation | |  | Amount g |  |  |  | x |
| C |  | 0..1 | Original Cost | |  | Amount g | x |  |  | x |
| C |  | 0..1 | Residual Value | |  | Amount g | x |  |  | x |
| R |  | 0..1 | Depreciation Account | |  | Ledger Account |  |  |  | x |
| R |  | 0..1 | Accumulated Depreciation Account | |  | Ledger Account |  |  |  | x |
| R |  | 0..1 |  | |  | Inventory Product | X |  |  |  |
| A |  | 0..1 | Code | | Char |  | X |  |  |  |
| A |  | 0..1 | Tag Number | | Char |  | X |  |  |  |
| A |  | 0..1 | Feature | | Text |  | X |  |  |  |
| A |  | 0..1 | Bar Code | | Char |  | X |  |  |  |
| A |  | 0..1 | Serial Number | | Char |  | X |  |  |  |
| A |  | 0..1 | Lot Number | | Char |  | X |  |  |  |
| A |  | 0..1 | Manufacturer | | Name |  | x |  |  |  |
| A |  | 0..1 | Location Description | | Text |  | X |  |  |  |
| A |  | 0..1 | Condition Name | | Name |  | X |  |  |  |
| A |  | 0..1 | Acquisition Date | | Date |  | X |  |  |  |
| A |  | 0..1 | Placed Into Service Date | | Date |  | X |  |  |  |
| C |  | 0..1 | Book Value | |  | Amount g | X |  |  |  |
| C |  | 0..1 | Fair Value | |  | Amount g | X |  |  |  |
| C |  | 0..1 | Impairment Provision | |  | Amount g | X |  |  |  |
| C |  | 0..1 | Replacement Cost | |  | Amount g | X |  |  |  |
| R |  | 0..1 | Functional | |  | Currency | NOT REQUIRED h |  |  |  |
| C |  | 0..1 | Quantity On Hand | |  | Quantity | X |  |  |  |
| R |  | 0..1 |  | |  | Measurement Unit | NOT REQUIRED i |  |  |  |
| R |  | 0..1 |  | |  | Ledger Account | X |  |  |  |
| R |  | 0..1 | Impairment Provision Account | |  | Ledger Account | X |  |  |  |
| R |  | 0..1 |  | |  | PPE Type | X |  |  |  |
| R |  | 0..1 |  | |  | Purchase Order | X |  |  |  |
| R |  | 0..1 |  | |  | Purchase Order Line | X |  |  |  |
| R |  | 0..1 |  | |  | Supplier | X |  |  |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term  NOTE Amount and Quantity value is always positive.  a The unique identifier for each class is essential and mandatory.  b The inclusion of a date is essential for managing collected data.  c Master data undergoes changes during business operations, making it crucial to accurately identify data in the PPE Master by its ID and Accounting Period. Effective management of master data also requires consideration of modification dates, which may necessitate effective date ranges independent of the Accounting Period.  d Tracking initiation, approval, and last modification details is crucial for accountability, transparency, and auditing, ensuring all actions are properly documented and compliant with financial controls.  e The ID of the PPE Master serves as a reference association and unique identifier across other classes. We do not need redundant properties.  f Tag Number uniquely identifies PPE object and is essential in each operation.  g Although the amounts related to PPE should be recorded in the functional currency, it may be necessary to report these amounts in multicurrency for auditing purposes during the annual report.  h The Amount class contains a reference association to Currency, which is not required here.  i The Quantity class contains a reference association to Measurement Unit, which is not required here. | | | | | | | | | | |

# Master

| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | **Audit Data** |  |  |  |  |
| **Class** | | | | | |  | **User** | **Employee** | **Customer** | **Supplier** |
| **Specialization** | | | | | See Class term in a cell |  | **Audit Data** | **Audit Data** | **Audit Data** | **Audit Data** |
| A | PK | 1..1 | ID | Identifier |  | x | x | x | Account ID | Account ID |
| A |  | 0..1 | Date | Date |  | x | REQUIRED | REQUIRED | REQUIRED | REQUIRED |
| R |  | 0..1 |  |  | Accounting Period | x | REQUIRED | REQUIRED | REQUIRED | REQUIRED |
| C |  | 0..1 |  |  | Activities | x | REQUIRED | REQUIRED | x | x |
| R |  | 0..\* |  |  | Business Segment | x | REQUIRED | REQUIRED | REQUIRED | REQUIRED |
| A |  | 0..1 | Remark | Text |  | x | x | x | x | x |
| R |  | 0..1 | Department |  | Business Segment |  | x | x |  |  |
| A |  | 0..1 | Status Modified Date | Date |  |  | x |  |  |  |
| A |  | 0..1 | Inactive Date | Date |  |  |  |  | x |  |
| A |  | 0..1 | Code | Char |  |  |  | x |  |  |
| A |  | 0..1 | Type Code | Char |  |  |  | x |  |  |
| A |  | 0..1 | Type Name | Name |  |  |  | x |  |  |
| A |  | 0..1 | Academic Degree | Char |  |  |  | x |  |  |
| A |  | 0..1 | Employment Date | Date |  |  |  | x |  |  |
| R |  | 0..1 | Termination Date | Date |  |  |  | x |  |  |
| R |  | 0..1 |  |  | User |  |  | x |  |  |
| A |  | 0..1 | Name | Name |  |  | x | x |  |  |
| A |  | 0..1 | Job Title | Char |  |  | x | x |  |  |
| A |  | 0..1 | Role Responsibility | Char |  |  | x |  |  |  |
| A |  | 0..1 | Account Number | Char |  |  |  |  | x | x |
| A |  | 0..1 | Account Name | Name |  |  |  |  | x | x |
| A |  | 0..1 | Abbreviation | Name |  |  |  |  | x | x |
| A |  | 0..1 | TIN | Char |  |  |  |  | x | x |
| A |  | 0..1 | Group | Char |  |  |  |  |  | x |
| A |  | 0..1 | Terms Discount Percentage | Decimal |  |  |  |  | x | x |
| A |  | 0..1 | Terms Discount Days | Integer |  |  |  |  | x | x |
| A |  | 0..1 | Terms Due Days | Integer |  |  |  |  | x | x |
| C |  | 0..1 | Billing |  | Address |  |  |  | x | x |
| C |  | 0..1 | Physical |  | Address |  |  |  | x | x |
| C |  | 0..1 | Total Credit Limit |  | Amount |  |  |  | x | x |
| C |  | 0..1 | Transaction Credit Limit |  | Amount |  |  |  | x | x |
| C |  | 0..1 | Primary |  | Contact |  |  |  | x | x |
| R |  | 0..1 |  |  | Customer Type |  |  |  | x |  |
| R |  | 0..1 |  |  | Supplier Type |  |  |  |  | x |
| R |  | 0..1 | Corresponding |  | See Class term in a cell |  |  |  | Supplier | Customer |
| A |  | 0..1 | Active Indicator | Indicator |  |  | x | x |  |  |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **T** | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | |
| **Abstract Class** | | | | | | **Audit Data** |  |  |
| **Class** | | | | | |  | **Tax Regulatory** | **Bank Account** |
| **Specialization** | | | | | See Class term in a cell |  | **Audit Data** | **Audit Data** |
| A | PK | 1..1 | ID | Identifier |  | x | Code | Number |
| A |  | 0..1 | Date | Date |  | x | REQUIRED | REQUIRED |
| R |  | 0..1 |  |  | Accounting Period | x | REQUIRED | REQUIRED |
| C |  | 0..1 |  |  | Activities | x | REQUIRED | REQUIRED |
| R |  | 0..\* |  |  | Business Segment | x | x | x |
| A |  | 0..1 | Remark | Text |  | x |  |  |
| R |  | 0..1 | Reporting Organization |  | Business Segment |  | x |  |
| A |  | 0..1 | Name | Name |  |  | x | x |
| A |  | 0..1 | Country Code | Code |  |  | x |  |
| A |  | 0..1 | Region | Name |  |  | x |  |
| A |  | 0..1 | Role | Char |  |  | x |  |
| A |  | 0..1 | Regulator ID | Char |  |  | x |  |
| R |  | 0..1 | Accrual |  | Ledger Account |  | x |  |
| R |  | 0..1 | Expense |  | Ledger Account |  | x |  |
| R |  | 0..1 | Payable |  | Ledger Account |  | x |  |
| A |  | 0..1 | Bank Code | Code |  |  |  | x |
| A |  | 0..1 | Bank Name | Name |  |  |  | x |
| A |  | 0..1 | Branch Code | Code |  |  |  | x |
| A |  | 0..1 | Branch Name | Name |  |  |  | x |
| A |  | 0..1 | Branch Country Code | Code |  |  |  | x |
| A |  | 0..1 | Branch Region | Name |  |  |  | x |
| A |  | 0..1 | Active Indicator | Indicator |  |  | x | x |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term | | | | | | | | |

# Type

| **T** | | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | | **Audit Data** |  |  | |
| **Class** | | | | | | |  | **Customer Type** | **Supplier Type** | |
| **Specialization** | | | | | | See Class term in a cell |  |  |  | |
| A | | PK | 1..1 | ID | Identifier |  | x | ID | ID | |
| A | |  | 0..1 | Date | Date |  | x |  |  | |
| R | |  | 0..1 |  |  | Accounting Period | x |  |  | |
| C | |  | 0..1 |  |  | Activities | x |  |  | |
| R | |  | 0..\* |  |  | Business Segment | x |  |  | |
| A | |  | 0..1 | Remark | Text |  | x |  |  | |
|  | |  | 1..1 | Code | Char |  |  | x | x | |
| A | |  | 0..1 | Name | Name |  |  | x | x | |
| A | |  | 0..1 | Abbreviation | Char |  |  |  |  | |
| A | |  | 0..1 | Description | Text |  |  |  |  | |
| A | |  | 0..1 | Tax Code Description | Text |  |  |  |  | |
| A | |  | 0..1 | Tax Percentage | Decimal |  |  |  |  | |
| R | |  | 0..\* |  |  | Business Segment |  |  |  | |
| R | |  | 0..1 |  |  | Tax Regulatory |  |  |  | |
| A | |  | 0..1 | Active Indicator | Indicator |  |  |  |  | |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term | | | | | | | | |

| **T** | | **I** | **M** | **Property term** | **R** | **Associated class** | **Class** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Abstract Class** | | | | | | | **Audit Data** |  |  |  | |
| **Class** | | | | | | |  | **Bill Type** | **Journal Entry Type** | **Tax Type** | |
| **Specialization** | | | | | | See Class term in a cell |  | **Audit Data** | **Audit Data** | **Audit Data** | |
| A | | PK | 1..1 | ID | Identifier |  | x | Code | Code | Code | |
| A | |  | 0..1 | Date | Date |  | x |  |  |  | |
| R | |  | 0..1 |  |  | Accounting Period | x |  |  |  | |
| C | |  | 0..1 |  |  | Activities | x |  |  |  | |
| R | |  | 0..\* |  |  | Business Segment | x |  |  |  | |
| A | |  | 0..1 | Remark | Text |  | x |  |  |  | |
| A | |  | 1..1 | Code | Char |  |  |  |  |  | |
| A | |  | 0..1 | Name | Name |  |  | x | x | Tax Name | |
| A | |  | 0..1 | Abbreviation | Char |  |  |  | x |  | |
| A | |  | 0..1 | Description | Text |  |  |  |  | x | |
| A | |  | 0..1 | Tax Code Description | Text |  |  |  |  | x | |
| A | |  | 0..1 | Tax Percentage | Decimal |  |  |  |  | x | |
| R | |  | 0..\* |  |  | Business Segment |  |  |  | x | |
| R | |  | 0..1 |  |  | Tax Regulatory |  |  |  | x | |
| A | |  | 0..1 | Active Indicator | Indicator |  |  | x |  |  | |
| Key  T: Property type  A: Attribute, R : Reference Association, C: Composition  ● indicates properties in the associated class of a composition.  I: Identifier  M: Multiplicity  R: Representation term | | | | | | | | | |

1. The phrase "Account payable/receivable" is not typically used because it does not follow standard English grammar and financial terminology conventions. Here’s why:

   Singular vs. Plural: In financial contexts, terms like "Accounts payable" and "Accounts receivable" are used in the plural form to denote categories or types of financial transactions. This is because these terms refer to multiple transactions or amounts owed (payable) or receivable.

   Consistency: Using "Accounts payable" and "Accounts receivable" maintains consistency with other financial terms such as "Accounts receivable turnover" or "Accounts payable turnover," which are also used in the plural form.

   Clarity and Precision: The plural form "Accounts payable" clearly indicates that it refers to all amounts owed by a company to its suppliers, rather than a single account or transaction. Similarly, "Accounts receivable" refers to all amounts owed to a company by its customers.

   Standardization: Financial statements, reports, and accounting practices universally use "Accounts payable" and "Accounts receivable" in the plural form. This standardization helps in clear communication and understanding across different financial contexts and jurisdictions.

   Therefore, "Account payable/receivable" is not typically used because it does not accurately reflect the plural nature of these terms and may cause confusion or ambiguity in financial reporting and analysis. [↑](#footnote-ref-1)