# Retail Industry Ontology (RIO) Cross Reference to Digital Receipts API

## 1 Overview

The purpose of this Annex is to map the terms presented in the Digital Receipts API specification to the terms defined within the Retail Industry Ontology (RIO). This is to accommodate the ontology requirement for the API specification which is bringing forward legacy terminology from its origination in the Association for Retail Technology Standards (ARTS) and translating it into the current retail ontology work.

The Retail Industry Ontology (RIO) Annex to the Digital Receipts Application Programming Interface (API) specification provides metamodels, in the form of ontologies, and model files that consist of individuals defined by those metamodels, representing commonly used vocabulary of the retail industry. The scope of this annex is limited to the subset of retail vocabulary appropriate for the digital receipt's terminology. This annex specifies an ontology corresponding to the content exchanged by the API specified herein, enabling consistent, precise, and clearly defined representation of that content for higher fidelity communications, and reporting as well as to facilitate decision support and other analyses that act on the same information.

The original source of the Digital Receipts API, as well as the ontology content was the ARTS Reference Data Model and ARTS Digital Receipts XML which is published on the OMG site. RIO is taking this work as a foundation and re-evaluating that base to better represent today's retail landscape, as well as integrating with the existing OMG ontology domains where appropriate. The Retail Domain Task Force anticipates that the scope of the ontology will grow over time through subsequent submissions, including submissions that are critical for retail but whose coverage may reflect an entirely different sub-domain area. As a consequence, the name and URI selected for the annex differs from the name and URI of this specification.

### 1.1 Background Information

The OMG Retail Domain Task Force (RDTF) was formed as a result of the Association for Retail Technology Standards (ARTS), a unit of the National Retail Federation (NRF), being brought into the OMG domain.

ARTS had been developing standards for retail for over 20 years and over that time had amassed a rich retail vocabulary that was maintained in the form of a relational data model. This form of data management provides a useful platform to capture terms, definitions, properties, and relationships for the retail vocabulary. The model, along with an informational narrative, is available on the OMG Retail Domain Task Force site. However, to bring this knowledge base forward, it was determined that an ontology project should be started to transform the legacy data maintained in the ARTS model into a form that is more suitable for the variety of purposes and technologies it could support and not be simply in the form of a database model. In addition, this effort would look to modernize the terminology to be appropriate for the current and future retail environment which has undergone tremendous change in recent years.

Since the volume of data in the existing ARTS model is extensive, it was decided that the retail ontology be developed in multiple steps, each with a fairly limited scope and tied to active standards work. This will enable the deliverables to be produced in a shortened timeframe and will be relevant to topics that have contributor's attention.

For the initial work on the ontology, the scope of the work is based on the use cases that support the Fiscal API RFP. This project is to define a standard that will support the fiscal reporting regulations required by many countries in all areas of the world. Since the payload for the Fiscal API has a significant overlap with the terms described in the Digital Receipts API, the Retail Industry Ontology, as of this writing, will cover most but not all of the terms identified in the mapping section. These terms have been determined to need a more thorough analysis before they can be incorporated into the ontology and so for this mapping they will be identified as 'Out of Scope' and will worked into the ontology as they can be addressed. One aspect of this excluded work is regarding how to extend the core ontology to support various retail business verticals such as Food Service, Pharmacy, Forecourt, and others. The Digital Receipt API includes some Food Service elements that, if modeled, would extend the 'sale' class with a subclass for a 'food service sale', and the 'sale line item' class with a subclass for 'food service sale line item'.

## 1.2 Cross Reference Contents

The cross reference of the Digital Receipts API to the Retail Industry Ontology specification includes two parts:

1. Mapping of the Terms used in the Digital Receipts API specification to the terms in RIO:
    - Party Representation, which provides the concepts and relationships defining the participants is retail activities.
    - Party Role Representation, which provides the concepts and relationships defining the roles that a party plays in retail activities

2. Subset of the Retail Industry Ontology that convers the terms and properties that are involved in the Digital Receipts API:
    - Location, which provides the conceptual hierarchy and definition for physical places
    - Sites which identify where business activity occurs and can include virtual as well as physical sites
    - Addresses which are a reference to use for communication to a physical or virtual place. This may be unnecessary if a generic OMG addresses ontology becomes available.

# 2 Mapping of JSON terms to RIO terms and properties

The table below shows the mapping of the terms represented in the Digital Receipts JSON schema to the terms defined within the Retail Industry Ontology. To help cross reference back to the JSON API document, a reference to the chapter and section of the term in that document is included along with terms in the JSON that are there as a grouping or header.

| JSON Specification Chapter / Section | Layer or Grouping Name | ARTS JSON Term Name | RIO Term / Property |
|---|---|---|---|
| 3.1 | Digital Receipt | DigitalReceipt | Term: 'receipt' |
| 3.2 | Transaction Information | | |
| 3.2 | | TrainingModeFlag | Term: 'transaction'<br>Data Property: 'is in training mode' |
| 3.2 | | TypeCode | Term: 'retail transaction'<br>Subclasses: 'sale', 'return', 'exchange' |
| 3.3 | Business Unit Information | | |
| 3.3.1 | Business Unit ID | | |
| 3.3.1 | | TypeCode | Term; 'retail business unit'<br>Subclasses: 'retail store', 'distribution center', 'administration center' |
| 3.3.1 | | Name | Term: 'retail business unit'<br>Data Property: 'has name' |
| 3.3.1 | | value | Term; 'retail business unit'<br>Object Property: 'is identified by' |
| 3.3.2 | Business Unit Address | | |
| 3.3.2 | | TypeCode | Term: 'address role'<br>Subclasses: 'home address, 'work address', ‘billing address’, 'delivery address', etc. |

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|---|---|---|---|
| 3.3.2 | | AddressLine | Term: 'conventional street address'<br>Data Property: 'has address line 1', 'has address line 2', 'has address line 3' |
| 3.3.2 | | City | Term: 'postal address'<br>Object Property: 'has city' |
| 3.3.2 | | PostalCode | Term: 'postal address'<br>Data Property: 'has postal code' |
| 3.3.2 | | FullAddress | Term: 'postal address' |
| 3.3.3 | Business Unit Telephone Number | Telephone | Term: 'telephone number' |
| 3.4 | Company information | | |
| 3.4 | | ID (Company ID) | Term: 'business entity'<br>Object Property: 'is identified by' |
| 3.4 | | value (Company Name) | Term: 'business entity'<br>Data Property: 'has name' |
| 3.5 | Logo | | |
| 3.5 | | LogoFormat | Term: 'logo'<br>Property: 'has format' |
| 3.5 | | FileName | Term: 'file'<br>Property: 'has name' |
| 3.5 | | LogoBinary | OUT OF SCOPE for initial RIO work |
| 3.6 | Workstation Information | WorkstationID | Term: 'workstation'<br>Property: 'is identified by' |
| 3.7 | Transaction ID | TransactionID | Term: 'transaction'<br>Property: 'is identified by' |
| 3.8 | Operator information | | |
| 3.8 | | OperatorName | Term: 'operator'<br>Property: 'has name' |
| 3.8 | | OperatorType | Term: 'party in role'<br>Subclasses: 'operator', 'manager', 'server', '... |

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| 3.8 | | value (Operator Code) | Term: 'operator'<br>Object Property: 'is identified by' |
| 3.9 | Currency Code | CurrencyCode | Term: Currency Identifier |
| 3.10 | Receipt issuer registration No. | VATRegistrationNumber | Term: ‘value-added tax identification number' |
| 3.11 | Receipt Date Time | ReceiptDateTime | Term: 'receipt'<br>Property: 'has issue date time' |
| 3.12 | Receipt Number | ReceiptNumber | Term: 'receipt'<br>Property: 'is identified by' |
| 3.13 | Receipt Image | ReceiptImage | OUT OF SCOPE for initial RIO work |
| 3.13 | | ReceiptLine | Term: 'record constituent'<br>Property: 'has sequence number' |
| 3.14 | Invoice Number | InvoiceNumber | Term: Invoice<br>Property: 'is identified by' |
| 3.15 | Retail transaction information | RetailTransaction | Term: Retail Transaction |
| 3.16 | Line Item | LineItem | Term: Retail Line Item |
| 3.17 | Sales information | Sale | Term: Sale |
| 3.17.1 | Product information | ItemID | |
| 3.17.1 | | - Name | Term: 'retail item'<br>Property: 'has name' |
| 3.17.1 | | - Type | Term: 'product code'<br>Subclasses: 'global trade item number', 'universal product code', etc. |
| 3.17.1 | | - value | Term: 'product code' |
| 3.17.2 | Product Classification Information | | |
| 3.17.2 | | ID (Classification Code) | Term: 'product classification code' |

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| 3.17.2 | | Name (Classification Name) | Term: 'product classifier'<br>Property: 'has name' |
| 3.17.2 | | Type (Classification Type) | Term: 'product classification scheme' |
| 3.17.3 | Sales Description | Description | Term: 'product line item'<br>Property: 'has description' |
| 3.17.4 | | UnitListPrice | Term: 'product line item'<br>Property: 'has unit list price' |
| 3.17.5 | | RegularSalesUnitPrice | Term: 'product line item'<br>Property: 'has regular unit price' |
| 3.17.6 | | ActualSalesUnitPrice | Term: 'product line item'<br>Property: 'has actual unit price' |
| 3.17.7 | | ExtendedAmount | Term: 'product line item'<br>Property: 'has extended amount' |
| 3.17.8 | | Quantity | Term: 'product line item'<br>Property: 'has quantity value' |
| 3.17.9 | Sales Price Change Information | RetailPriceModifier | Term: 'amount modifier' |
| 3.17.9 | | MethodCode | Term: 'amount modification reason'<br>Term: 'amount override'<br>note: the enumeration of Method Code combined two concepts which have been separated in the ontology. |
| 3.17.9.1 | | SequenceNumber | Term: 'amount modifier'<br>Property: 'has sequence number' |
| 3.17.9.2 | | Amount | Term: 'amount modifier'<br>Property: 'has monetary amount' |
| 3.17.9.2 | | Action | Term: 'amount modifier'<br>Subclasses: 'discount', 'surcharge', 'markup', 'markdown' |
| 3.17.9.2 | | value (change price value) | Term: 'amount modifier'<br>Property: 'has monetary amount' |
| 3.17.9.3 | | Percent | Term: 'amount modifier'<br>Property: 'has percent' |

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|---|---|---|---|
| 3.17.9.3 | | Action | Term: 'amount modifier'<br>Subclasses: 'discount', 'surcharge', 'markup', 'markdown' |
| 3.17.9.3 | | value (change rate value) | Term: 'amount modifier'<br>Property: 'has percent' |
| 3.17.9.4 | | PreviousPrice | Term: ‘amount modifier’<br>Property: ‘has previous amount’ |
| 3.17.9.5 | | PromotionID | Term: 'promotion'<br>Property: 'is identified by' |
| 3.17.9.6 | | ReasonCode | Term: 'amount modification reason' |
| 3.17.10 | Tax information | | |
| 3.17.10 | | TaxType | Term: 'tax line item'<br>Property: 'has tax type' |
| 3.17.10.1 | | Amount | Term: 'tax line item'<br>Property: 'has tax amount' |
| 3.17.10.2 | | Percent | Term: 'tax line item'<br>Property: 'has tax rate' |
| 3.17.11 | | ItemLink | OUT OF SCOPE for initial RIO work |
| 3.17.12 | Food Service Information | | |
| 3.17.12 | | DestinationType | OUT OF SCOPE for initial RIO work |
| 3.18 | Return information | Return | Term: 'return line item' |
| 3.18.1 | | ItemID | Term: 'retail item identifier' |
| 3.18.2 | | ExtendedAmount | Term: 'return line item'<br>Property: 'has extended amount' |
| 3.18.3 | Linked transction | TransactionLink | Term: 'return'<br>Property: 'is return from' |
| 3.18.3 | | ReasonCode | Term: 'return reason' |

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| 3.18.3.1 | | TransactionID | Term: 'transaction'<br>Property: 'is identified by' |
| 3.18.3.2 | | BusinessUnit | Term; 'retail business unit'<br>Property: 'is identified by' |
| 3.18.3.3 | | WorkstationID | Term: 'workstation'<br>Property: 'is identified by' |
| 3.18.3.4 | | BusinessDayDate | Term: ‘transaction’<br>Property: ‘has transaction date’ |
| 3.18.3.5 | | SequenceNumber | Term: ‘return’<br>Property: ‘has sequence number’ |
| 3.19 | Discount information | | |
| 3.19 | | MethodCode | Term: 'amount modification reason' |
| 3.19.1 | | SequenceNumber | Term: 'discount'<br>Property: 'has sequence number' |
| 3.19.2 | Discounted amount | | |
| 3.19.2 | | Action | Term: 'discount line item'<br>Term: 'surcharge line item' |
| 3.19.2 | | value | Term: 'discount line item'<br>Property: 'has discount amount'<br>Term: 'surcharge line item'<br>Object Property: 'has surcharge amount' |
| 3.19.3 | Discounted percent | | |
| 3.19.3 | | Action | Term: 'discount line item'<br>Term: 'surcharge line item' |
| 3.19.3 | | value | Term: 'discount line item'<br>Property: 'has discount percent'<br>Term: 'surcharge line item'<br>Object Property: 'has surcharge percent' |
| 3.19.4 | | PromotionID | Term: 'promotion'<br>Property: 'is identified by' |
| 3.19.5 | | DiscountID | Term: 'discount'<br>Property: 'is identified by' |

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| 3.20 | Loyalty Redemption | | |
| 3.20.1 | Points Redeemed | | |
| 3.20.1 | | Type | Term: ‘loyalty reward'<br>Property: ‘is redeemed as’ ‘retail line item’ |
| 3.20.1 | | value | Term: ‘loyalty reward'<br>Property: ‘has point quantity’ quantity<br>Property: ‘has value expressed in’ ‘monetary amount’ |
| 3.21 | LoyaltyReward | | |
| 3.21.1 | | LoyaltyProgramID | |
| 3.21.1 | | - Name | Term: 'loyalty program'<br>Property: 'has name' |
| 3.21.1 | | - value | Term: 'loyalty program'<br>Property: 'is identified by' |
| 3.21.1 | | LoyaltyAccountID | Term: 'loyalty account'<br>Property: 'is identified by' |
| 3.21.2 | Points Awarded | | |
| 3.21.2 | | Type (point type) | Term: ‘loyalty reward'<br>Property: ‘is earned from’ |
| 3.21.2 | | value (point value) | Term: ‘loyalty reward'<br>Property: ‘has point quantity’ quantity<br>Property: ‘has value expressed in’ ‘monetary amount’ |
| 3.22 | Tender Information | | |
| 3.22 | | TenderType | Term: 'tender'<br>Subclasses: 'cash', 'check', 'payment card', etc. |
| 3.22.1 | Tender Amount | | |

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|---|---|---|---|
| 3.22.1 | | Currency | Term: 'monetary amount'<br>Property: 'has currency' |
| 3.22.1 | | value | Term: 'tender line item'<br>Property: 'has monetary amount' |
| 3.22.2 | Change Information | | |
| 3.22.2 | | TenderType | Term: 'tender'<br>Subclasses: 'cash', 'check', 'payment card', etc. |
| 3.22.2.1 | Change Amount | | |
| 3.22.2.1 | | Currency | Term: 'monetary amount'<br>Property: 'has currency' |
| 3.22.2.1 | | value | Term: 'tender line item'<br>Property: 'has monetary amount' |
| 3.22.3 | Credit/Debit Card | | |
| 3.22.3 | | CardType | Term: ‘payment card'<br>Subclasses: ‘credit card', ‘debit card' |
| 3.22.3 | | TypeCode | Term: 'payment card'<br>Property: ‘uses’ some ‘payment card network’ |
| 3.22.3.1 | | PrimaryAccountNumber | Term: 'account'<br>Property: 'is identified by' |
| 3.22.4 | Coupon | | |
| 3.22.4 | | Name | Term: 'coupon'<br>Property: 'has name' |
| 3.22.4 | | Quantity | Term: ‘coupon’<br>Property: ‘has count’ |
| 3.22.4 | | PromotionCode | Term: 'promotion'<br>Property: 'is identified by' |

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|---|---|---|---|
| 3.22.4 | | RewardValue | Term: 'coupon'<br>Property: 'has face value' |
| 3.22.5 | Money Voucher | | |
| 3.22.5 | | TypeCode | Term: 'voucher'<br>Subclasses: 'food voucher', 'gift certificate', 'rain check' |
| 3.22.5 | | FaceValueAmount | Term: 'voucher'<br>Property: 'has face value' |
| 3.22.5 | | UnspentAmount | Term: 'voucher'<br>Property: 'has available amount' |
| 3.22.6 | Gift Card | | |
| 3.22.6 | | CardNumber | Term: 'prepaid gift card'<br>Property: 'is identified by' |
| 3.22.6 | | ExpirationDate | Term: 'prepaid gift card'<br>Property: 'has expiration date' |
| 3.22.6 | | InitialBalance | Term: ‘prepaid gift card’<br>Property: ‘has starting balance’ |
| 3.22.6 | | CurrentBalance | Term: 'prepaid gift card'<br>Property: 'has balance' |
| 3.22.7 | Point Cards<br>- Loyalty Redemption | | |
| 3.22.7 | | TypeCode | Term: ‘loyalty reward’<br>Property: ‘is redeemed as’ |
| 3.22.7.1 | | PointsRedeemed | Term: ‘loyalty reward’<br>Property: 'has point quantity’ |
| 3.22.7.2 | - Loyality Program | | |
| 3.22.7.2 | | TypeCode | Term: ‘reward unit’<br>Subclasses: ‘points’, ‘miles’, ‘meals’, ‘monetary amount’ |
| 3.22.7.3 | | LoyaltyProgramID | |

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|---|---|---|---|
| 3.22.7.3 | | - Name | Term: 'loyalty program'<br>Property: 'has name' |
| 3.22.7.3 | | - value | Term: 'loyalty program'<br>Property: 'is identified by' |
| 3.22.7.4 | | LoyaltyAccountID | Term: 'loyalty account identifier' |
| 3.22.7.5 | | Amount | Term: 'tender line item'<br>Property: 'has monetary amount' |
| 3.23 | Coupon Information | | |
| 3.23 | | Use | Term: ‘coupon’<br>Property ‘is earned from’<br>Property ‘is redeemed in’ |
| 3.23 | | CouponType | Term: 'coupon'<br>Subclasses: 'discount coupon', 'payment coupon' |
| 3.23 | | Description | Term: 'coupon'<br>Property: 'has description' |
| 3.23 | | Quantity | Term: ‘coupon’<br>Property: ‘has count’ |
| 3.23 | | FamilyCode | Term: ‘coupon’<br>Property: ‘is classified by’ |
| 3.23 | | ExpirationDate | Term: 'coupon'<br>Property: 'has expiration date' |
| 3.23 | | PromotionCode | Term: 'promotion'<br>Property: 'is identified by' |
| 3.23 | | ScanCode | Term: 'coupon'<br>Property: 'is offering of' some 'retail item Identifier |
| 3.23.1 | | BusinessUnit | Term: 'store coupon'<br>Property: 'is issued by' |
| 3.23.1 | | Name | Term: 'retail business unit'<br>Property: 'has name' |

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|---|---|---|---|
| 3.23.1 | | TypeCode | Term; 'retail business unit'<br>Subclasses: 'retail store', 'distribution center', 'administration center', 'ecommerce unit' |
| 3.23.1 | | value | Term: 'retail business unit'<br>Property: 'is identified by' |
| 3.23 | | WorkstationID | Term: 'workstation'<br>Property: 'is identified by' |
| 3.23 | | CouponID | Term: 'coupon'<br>Property: 'is identified by' |
| 3.23 | | IssuingDate | Term: 'coupon'<br>Property: 'has date of issuance' |
| 3.23 | | TermesOfUse | Term: 'coupon'<br>Property: 'is qualified by' some 'qualification' |
| 3.23 | | ItemID | Term: 'coupon'<br>Property: 'is offering of' some 'retail item Identifier |
| 3.23.2 | | Image | OUT OF SCOPE for initial RIO work |
| 3.23.2 | | TypeCode | OUT OF SCOPE for initial RIO work |
| 3.23.2 | | value | OUT OF SCOPE for initial RIO work |
| 3.23 | | ImageNumber | OUT OF SCOPE for initial RIO work |
| 3.23 | | ImageURI | OUT OF SCOPE for initial RIO work |
| 3.23 | | Discount | Term: 'coupon'<br>Property: 'has discount amount' |
| 3.23 | | CertificationID | OUT OF SCOPE for initial RIO work |
| 3.23 | | Points | Term: 'coupon'<br>Property: 'has point quantity' |
| 3.23 | | Amount | Term: 'coupon'<br>Property: 'has face value' |
| 3.23 | | Percent | Term: 'coupon'<br>Property: 'has discount percent' |
| 3.24 | Pre Paid Type Card Information | | |

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|---|---|---|---|
| 3.24 | | Action | Term: ‘payment card action code’ |
| 3.24.1 | | ItemID | |
| 3.24.1 | | - Name | Term: 'retail item'<br>Property: 'has name' |
| 3.24.1 | | - value | Term: ‘retail item’<br>Property: ‘is identified by’ |
| 3.24 | | ExtendedAmount | Term: ‘product line item’<br>Property: ‘has extended amount’ |
| 3.25 | Advertising Information | | |
| 3.25 | | AdvertisingID | OUT OF SCOPE for initial RIO work |
| 3.25 | | ImageData | OUT OF SCOPE for initial RIO work |
| 3.25 | | ImageNumber | OUT OF SCOPE for initial RIO work |
| 3.25 | | ImageURI | OUT OF SCOPE for initial RIO work |
| 3.25 | | Text | OUT OF SCOPE for initial RIO work |
| 3.25 | | Code | OUT OF SCOPE for initial RIO work |
| 3.25 | | Barcode | OUT OF SCOPE for initial RIO work |
| 3.25 | | URI | OUT OF SCOPE for initial RIO work |
| 3.26 | Line Item Sequence No. | SequenceNumber | Term: ‘retail line item’<br>Property: ‘has sequence number’ |
| 3.27 | Amount Information | | |
| 3.27 | | TotalType | Term: 'retail transaction'<br>Property: 'has total' some 'gross total'<br>Property: 'has total' some 'net total'<br>Property: ‘has total’ some ‘tax total’ |
| 3.27 | | value | Term: ‘monetary amount’ |
| 3.28 | Customer Information | | |
| 3.28 | | CustomerID | Term: 'customer identifier' |

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|---|---|---|---|
| 3.28.1 | | Name | Term: 'customer'<br>Object Property: 'has identity' exactly 1 'party'<br>Term: 'party'<br>Data Property: 'has name' |
| 3.28.1 | | MailingName | Term: 'electronic mail address' |
| 3.29 | Loyalty Account | LoyaltyAccount | Term: 'loyalty account' |
| 3.29 | | CustomerID | Term: 'customer identifier' |
| 3.29.1 | - Loyalty Account Information | | |
| 3.29.1 | | ExpirationDate | Term: 'loyalty account'<br>Property: 'has expiration date' |
| 3.29.1.1 | - Loyalty Account Points Information | | |
| 3.29.1.1 | | Type | Term: 'loyalty account'<br>Object Property: 'has points balance'<br>Object Property: 'has points earned'<br>Object Property: 'has points redeemed |
| 3.29.1.1 | | value | Term: ‘quantity value’ |
| 3.29.1.2 | - Loyalty Account Point Expiration Information | | |
| 3.29.1.2 | | ToBeExpiredPoints | Term: 'loyalty account'<br>Property: 'has points to expire' |
| 3.29.1.2 | | PointsExpirationDate | Term: 'loyalty account'<br>Property: 'has points expiration date' |
| 3.29.2 | - Loyalty Program Information | | |
| 3.29.2 | | Action | Term: ‘program action code’ |
| 3.29.2.1 | - Loyalty Program ID information | | |

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|---|---|---|---|
| 3.29.2.1 | | Descripton | Term: 'loyalty program'<br>Property: 'has description' |
| 3.29.2.1 | | Name | Term: 'loyalty program'<br>Property: 'has name' |
| 3.29.2.1 | | value | Term: 'loyalty program'<br>Property: 'is identified by' |
| 3.29.2.2 | | LoyaltyAccountID | Term: 'loyalty account identifier' |
| 3.29.2.3 | - Loyalty Program Points Information | | |
| 3.29.2.3 | | Type | Term: 'loyalty account'<br>Property: 'has points balance'<br>Property: 'has points earned'<br>Property: 'has points redeemed |
| 3.29.2.3 | | value | Term: 'quantity value' |
| 3.30 | Food Service Information | | |
| 3.30 | | TableID | OUT OF SCOPE for initial RIO work |
| 3.30 | | SeatID | OUT OF SCOPE for initial RIO work |
| 3.30 | | PartySize | OUT OF SCOPE for initial RIO work |

# 3 Retail Industry Ontology Details

## 3.1 References

### 3.1.1 Normative References

| *Reference* | *Description* |
|---|---|
| [Dublin Core] | DCMI Metadata Terms, Issued 2013-06-14 by the Dublin Core Metadata Initiative. Available at http://www.dublincore.org/documents/dcmi-terms/. |
| [Commons] | Commons Ontology Library, Available at https://www.omg.org/spec/COMMONS/ |
| [FIBO 2] | FIBO 2, Financial Industry Business Ontology Version 2, see http://www.omg.org/cgi-bin/doc?finance/18-09-23.pdf |
| [ISO 704] | ISO 704:2000 Terminology Work – Principles and Methods |
| [ISO 1087] | ISO 1087-1:2000 Terminology – Vocabulary – Part 1: Theory and application |
| [ISO 11179-3] | ISO/IEC 11179-3:2013 Information technology – Metadata registries (MDR) – Registry metamodel and basic attributes, Third edition, 2013-02-15 |
| [ISO 3166-1] | ISO 3166-1:2013<br>Codes for the representation of names of countries and their subdivisions – Part 1: Country codes |
| [MOF Core] | Meta Object Facility (MOF™) Core. Available at http://www.omg.org/spec/MOF/ |
| [MOF XMI] | MOF 2/XMI (XML Metadata Interchange) Mapping Specification. Available at http://www.omg.org/spec/XMI/ |
| [ODM] | Ontology Definition Metamodel (ODM. Available at http://www.omg.org/spec/ODM/ |
| [OMG AB Specification Metadata] | OMG Architecture Board recommendations for specification of ontology metadata, Available at http://www.omg.org/techprocess/ab/SpecificationMetadata.rdf |
| [OWL 2] | OWL 2 Web Ontology Language Quick Reference Guide (Second Edition), W3C Recommendation 11 December 2012. Available at http://www.w3.org/TR/2012/REC-owl2-quick-reference-20121211/. |
| [RDF Concepts] | RDF 1.1 Concepts and Abstract Syntax. Richard Cyganiak, David Wood and Markus Lanthaler, Editors. W3C Recommendation, 25 February 2014. Available at http://www.w3.org/TR/rdf11-concepts/ |
| [RDF Schema] | RDF Schema 1.1. Dan Brickley and R.V. Guha, Editors. W3C Recommendation, 25 February 2014. Available at http:// www.w3.org/TR/rdf-schema/. |
| [SKOS] | SKOS Simple Knowledge Organization System Reference, W3C Recommendation 18 August 2009. Available at http://www.w3.org/TR/2009/REC-skos-reference-20090818/. |
| [UML2] | Unified Modeling Language™ (UML®). Available at http://www.omg.org/spec/UML/ |
| [Unicode] | *The Unicode Standard, Version 3*, The Unicode Consortium, Addison-Wesley, 2000. ISBN 0-201-61633-5, as updated from time to time by the publication of new |

| | |
|---|---|
| | versions. (See http:// www.unicode.org/unicode/standard/versions/ for the latest version and additional information on versions of the standard and of the Unicode Character Database). |
| [UTF-8] | RFC 3629: UTF-8, a transformation format of ISO 10646. F. Yergeau. IETF, November 2003, http://www.ietf.org/rfc/rfc3629.txt |
| [W3C Datatypes in RDF and OWL] | XML Schema Datatypes in RDF and OWL, W3C Working Group Note 14 March 2006, Available at http://www.w3.org/TR/2006/NOTE-swbp-xsch-datatypes-20060314/. |
| [XML Schema Datatypes] | XML Schema Part 2: Datatypes. W3C Recommendation 28 October 2004. Available at http://www.w3.org/TR/xmlschema-2/. |

### 3.1.2 Non-Normative References

The following informative documents are referenced in this specification:

| *Reference* | *Description* |
|---|---|
| [DL Handbook] | THE DESCRIPTION LOGIC HANDBOOK: Theory, implementation, and applications. Baader, McGuinness, Nardi, and Patel-Schneider, editors. Cambridge University Press, Cambridge, United Kingdom, 2003. |
| [OE] | *Ontology Engineering*, Elisa Kendall and Deborah McGuinness, *Synthesis Lectures on the Semantic Web: Theory and Technology*, Ying Ding and Paul Groth, Editors, Morgan & Claypool Publishers, 2019, see https://www.morganclaypool.com/toc/wbe.1/1/1 |

## 3.2 Terms and Definitions

For the purposes of this specification, the following terms and definitions apply. See section 7 in this specification for more detailed definitions of several of the terms listed below.

| **Term** | **Definition** |
|---|---|
| Retailer | A business or person that sells goods to the consumer, as opposed to a wholesaler or supplier, who normally sell their goods to another business – *BusinessDictionary.com* |
| Ontology | An ontology specifies a rich description of the<br>• Terminology, concepts, nomenclature<br>• Relationships among and between concepts and individuals<br>• Sentences distinguishing concepts, refining definitions and relationships (constraints, restrictions, regular expressions)<br>relevant to a particular domain or area of interest [OE]. - *Languages, Countries and Codes (LCC)* |

## 3.3 Symbols

### 3.3.1 Symbols

There are no symbols introduced by this specification

### 3.3.2 Abbreviations

The following abbreviations are used throughout this specification:

API – Application Program Interface

IRI – Internationalized (Uniform) Resource Identifier

OWL – Web Ontology Language

ODM – Ontology Definition Metamodel

RDF – Resource Definition Framework

UML – Unified Modeling Language

URI – Uniform Resource Identifier

URL – Uniform Resource Locator

XMI – XML Metadata Interchange

XML – eXtensible Markup Language

## 3.4 Additional Information

### 3.4.1 Acknowledgments

The following organization submitted this specification:

- Object Management Group, Retail Domain Task Force

### 3.4.2 Notation

The diagrams included herein are ODM-compliant UML diagrams, in other words, they conform to the UML Profiles for RDF and OWL specified in the OMG's Ontology Definition Metamodel [ODM] Specification. This includes the set of UML stereotypes and graphical notation used in the diagrams provided.

The color scheme employed in these diagrams includes:

- Basic OWL Classes: amber for classes defined within the current (local) ontology, white for classes defined within an imported (referenced) ontology

These colors are provided for clarification purposes only and are non-normative.

Within the context of this, a module is a group of ontologies, organized as a subdomain with respect to the Fiscal Compliance namespace. Several ontologies are contained in each of the modules in this specification, which include Parties, Locations, Products, Transactions and Documents. Each of the primary ontologies in a given module is defined as an ODM-compliant UML model as well as in OWL. The normative ontology is expressed in ODM XMI (*i.e.*, XMI that conforms to the ODM metamodels for RDF and OWL), ODM UML XMI (*i.e.*, that conforms to the UML Profiles for RDF and OWL in the ODM specification), and in RDF/XML serialized OWL 2.

The notation used to represent description logic expressions (*i.e.*, the expressions in the Parent columns in class tables containing ontology details) is consistent with the notation defined in the Description Logic Handbook [DL Handbook]. Some of the basics are described in Table 6-1, below. Note that this is not intended to be comprehensive but includes the primary patterns that are used in the Fiscal Compliance specification, for property restrictions in particular.

**Table 6.1 Description Logic Expressions Notation**

| Construct | Description | Notation |
|---|---|---|
| ***Boolean Connectives and Enumerations*** | | |
| intersection | The intersection of two classes consists of exactly those individuals which are instances of both classes. | C ∩ D |
| union | The union of two classes contains every individual which is contained in at least one of these classes. | C U D |
| enumeration | An enumeration defines a class by enumerating all its instances. | oneOf($i_1$,$i_2$,$i_3$,…$i_n$) |

| Construct | Description | Notation |
|---|---|---|
| | | |
| ***Property Restrictions*** | | |
| universal quantification | Universal quantification is used to specifiy a class of individuals for which all related individual must be instances of a given class (i.e. allValuesFrom in OWL). | ∀R.C, where R is the relation (property) and C is the class that constrains some values for related individuals. |
| existential quantification | Existential quantification is used to specifiy a class as the set of all individual that are connected via a particular property to at least one individual which is an instance of a certain class (i.e. someValuesFrom in OWL). | ∃R.C, where R is the relation (property) and C is the class that constrains some values of related individuals. |
| individual value | Individual value restrictions are used to specify classes of individuals that are related to one particular individual (i.e., hasValue in OWL). | ∀R.I where R is the relation (property) and I is the individual. |
| exact cardinality | Cardinality (number) restrictions specify classes by restricting the cardinality on the sets of fillers for roles (relationship, or properties in OWL). Exact cardinality restrictions restrict the cardinality of possible fillers to exactly the number specified. | =n R (for unqualified restrictions)<br><br>= n R.C (for qualified restrictions, i.e. including onClass or onDateRange) |
| maximum cardinality | Maximum cardinality restrictions restrict the cardinality of possible fillers to at most the number specified (inclusive). | ≤ n R (for unqualified restrictions)<br><br>≤ n R.C (for qualified restrictions) |
| minimum cardinality | Minimum cardinality restrictions restrict the cardinality of possible fillers to at least the number specified (inclusive). | ≥ n R (for unqualified restrictions)<br><br>≥ n R.C (for qualified restrictions) |
| ***Class Axioms*** | | |
| equivalent classes | Two classes are considered equivalent if they contain exactly the same individuals. | ≡ C |
| disjoint classes | Disjointness means that membership in one class specifically exclude membership in another. | ¬ C |

Within the tabular representation for the restrictions in the tables included herein, the identifiers for the restrictions shown in the diagrams are included parenthetically following the logic expressions. These are not part of the logic but are included for comparison purposes.

Additionally, some restrictions are nested, whereby the content of an embedded (nested) restriction is also included parenthetically. In these cases, all of the identifiers will be included, also parenthetically, following the complete specification of the complex restriction. Note too that in the case of complex restrictions, where there are nested elements in parentheses, the “dot notation” used as a separator between a property and the role filler is replaced with the embedded parenthetical filler definition. A “role” from a description logic perspective is essentially a property in OWL, and the role “filler” is the class or individual that provides the value for that role in a given axion (i.e., in a restriction or other logic expression).

The majority of the property restrictions specified in the Tender ontology are defined as necessary conditions for class membership, rather than sufficient conditions. As a result, the tables assume that necessary conditions are the default and only in cases where restriction imposes sufficient conditions will that be stated.

## 3.5 Architecture

### 3.5.1 "About" the RIO Ontologies

The "about" files for RIO provide content describing the specification and each of the modules, complementing the content in this specification and in some cases duplicating it in the form of RDF/OWL metadata. These files are designed to (1) describe the machine-readable content of the specification for people who download that content directly, via content negotiations, and import it into tools that can interpret and display those files, (2) for potential use in tagging the specification document on the OMG site, and (3) to provide high-level ontologies including AboutRIO-1.0.rdf that import all of the constituent ontologies for ease of use (similar to "make files" for software).

### 3.5.2 Namespace Definitions

The namespaces and prefixes corresponding to external elements required for use in RIO are provided. Table 7-1 lists the prefixes and namespaces on which RIO depends that are external to RIO. Table 7-2 provides the namespace declarations required for use of RIO itself. The prefixes provided in Tables 7-1 and 7-2 are normative, and their use is required in any conformant extension.

**Table 7-1 Prefix and Namespaces for referenced/external vocabularies**

| Namespace Prefix | Namespace |
|---|---|
| rdf | https://www.w3.org/1999/02/22-rdf-syntax-ns# |
| rdfs | https://www.w3.org/2000/01/rdf-schema# |
| owl | https://www.w3.org/2002/07/owl# |
| xsd | https://www.w3.org/2001/XMLSchema# |
| dct | https://purl.org/dc/terms/ |
| skos | https://www.w3.org/2004/02/skos/core# |
| sm | https://www.omg.org/techprocess/ab/SpecificationMetadata/ |

The namespace approach taken for RIO is based on OMG guidelines and is constructed as follows:

- A standard prefix `http://www.omg.org/spec/`
- The abbreviation for the specification: in this case `RIO`
- The ontology name (including the module)

Note that the URI/IRI strategy for the ontologies in RIO takes a "slash" rather than "hash" approach, in order to accommodate server-side applications. Namespace prefixes are constructed as follows with the components separated by "-":

- The specification abbreviation: `RIO`
- An abbreviation for the ontology name

The namespaces and prefixes corresponding for the Tender Type Codes ontologies are summarized in Table 7-2. These are given by module, and within a module in alphabetical order, rather than with any intent to show imports relationships. The table includes the namespace definitions for the "about" files that are part of the machine-readable deliverables for the

specification, but that are not required for imports closure. Note that these are not versioned, although version IRIs are included in every OWL ontology and are documented in the metadata for each of them.

**Table 7-2 Prefix and Namespaces for Retail Industry Ontology (RIO)**

| Namespace Prefix | Namespace |
|---|---|
| rio-spc | http://www.omg.org/spec/RIO/AboutRIO/ |
| rio-pty | http://www.omg.org/spec/RIO/Parties/AboutParties/ |
| rio-ptr | http://www.omg.org/spec/RIO/Parties/PartyRepresentation/ |
| rio-loc | http://www.omg.org/spec/RIO/Locations/AboutLocations/ |
| rio-lr | http://www.omg.org/spec/RIO/Locations/LocationRepresentation/ |
| rio-prd | http://www.omg.org/spec/RIO/Products/AboutProducts/ |
| rio-prr | http://www.omg.org/spec/RIO/Products/ProductRepresentation/ |
| rio-doc | http://www.omg.org/spec/RIO/Documents/AboutDocuments/ |
| rio-dr | http://www.omg.org/spec/RIO/Documents/DocumentRepresentation/ |
| rio-trn | http://www.omg.org/spec/RIO/Documents/AboutTransactions/ |
| rio-tr | http://www.omg.org/spec/RIO/Documents/TransactionRepresentation/ |

## 3.6 Retail Industry Ontologies

### 3.6.1 Overview

The Retail Industry Ontology is comprised of five ontology modules. Each module defines the terms, definitions, relationships, and additional logic specified in the ontologies that make up the Fiscal Compliance Ontology.

**Ontology Modules:**

- **Parties**, which provides high-level unifying concepts to allow for common roles for participants in retail activity to be associated to the union of all persons and organizations.
- **Locations**, defining a particular place, site or address in which something occurs.
- **Products**, which may be a good, service or right that is transferred in the retail transaction.
- **Documents**, which include classifications of documents involved in the retail domain including a request document or confirmation document such as an invoice or receipt respectively.
- **Transactions**, which details the transactions that represent the business activities that includes all exchanges or transfers of Items including goods, services, tenders, rights or commitments and may include other important business events essential for audit and retail operations management important business events essential for audit and retail operations management.
- **Designations**, which provides high-level unifying concepts to allow for a representation for something, or for a conceptualization thereof, that denotes it in a domain or subject.

**Table 8-1 Fiscal Compliance Ontology Metadata**

| Metadata Term | Value |
|---|---|
| sm:fileName | FiscalAPITerminology.rdf |
| Ontology IRI | https://www.omg.org/spec/RIO/FiscalAPITerminology/ |
| owl:versionIRI | https://www.omg.org/spec/RIO/20201101/FiscalAPITerminology/ |
| sm:moduleName | Fiscal API Terminology |
| sm:moduleAbbreviation | RIO-FAT |
| sm:moduleVersion | 20201101 |
| sm:moduleAbstract | This ontology represents the terms commonly used in the retail business related to the parties involved, the roles they play, locations in which transactions may occur and the types of documents involved to identify the transaction. |

### 3.6.2 Module: Parties

The Parties module includes two ontologies; one representing the parties themselves, and the other representing the roles that a party could play in the context of the retail domain.

In this module, all classes that were created for RIO are colored gold. The classes in white are classes in existing ontologies including FIBO, and LCC.

#### *3.6.2.1 Ontology: Parties*

This ontology defines the high-level concepts of parties that represent the persons and organizations that may be identified as playing a role in the retail events related to fiscal compliance.

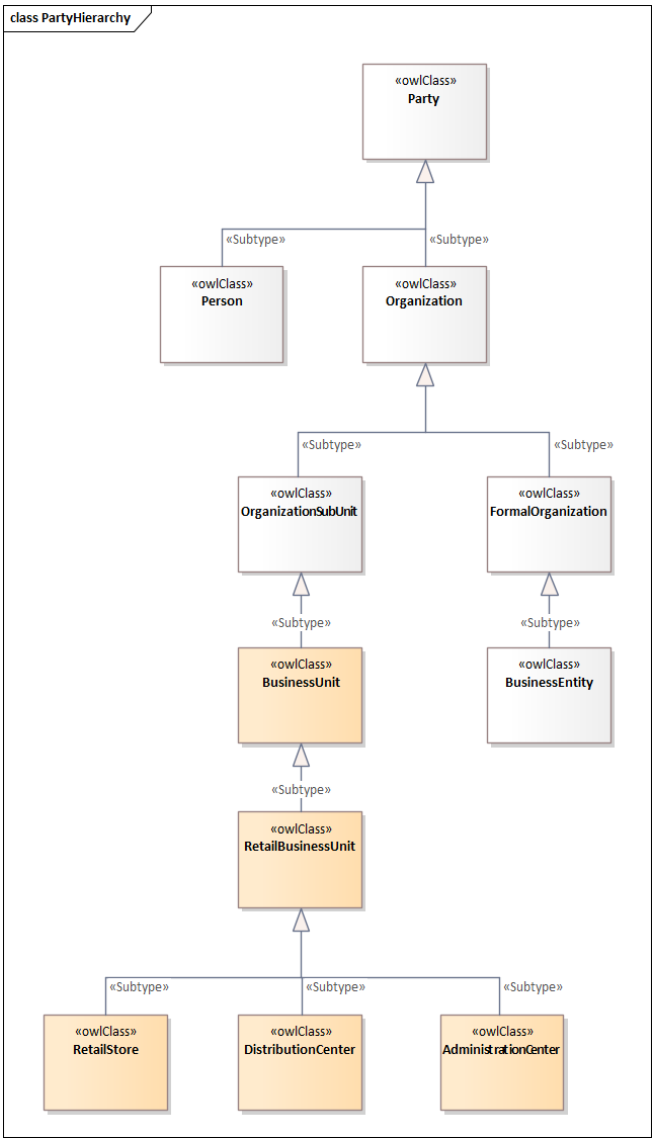


**Figure 3.1 Party Class Hierarchy**

Figure 3.1 provides the primary inheritance hierarchy for parties.

**Table 3-1 Parties Ontology Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Administration Center | Definition: an area of the business in which the retail enterprise conducts administrative (non-selling) operations such as management<br><br>Explanatory Note: An Administration Center may be co-located at a Site with other Retail Business Units.<br><br>Source: Association for Retail Technology Standards (ARTS) Data Model | Parent Class: Retail Business Unit |
| Business Unit | Definition: a logical element or segment of a company representing a specific business function or purpose, and a definite place on an organizational chart, under the domain of a manager<br><br>Source: Adapted from BusinessDictionary.com | Parent Class: Organization |
| Distribution Center | Definition: a warehouse or other storage facility that receives merchandise in bulk from suppliers and supplies merchandise to retail stores<br><br>Explanatory Note: A Distribution Center may be co-located at a Site with other Retail Business Units.<br><br>Source: Association for Retail Technology Standards (ARTS) Data Model | Parent Class: Retail Business Unit |

| Name | Annotations | Class Expressions |
|---|---|---|
| Party | Definition: any person or organization capable of performing any role pertaining to the business of retail, recognized as having legal rights and duties, able to make commitments, and fulfill resulting obligations<br><br>Source: ISO 15944-4 | Parent Class: |
| Person | Definition: a human entity, as distinguished from a corporate entity (which is sometimes referred to as an 'artificial person')<br><br>Source: ISO 20022 | Parent Class: Party |
| Retail Business Unit | Definition: a business unit that segments the retailer by the sites at which it conducts retail operations such as a retail store, distribution center or administration center.<br><br>Source: Adapted from Association for Retail Technology Standards Data Model<br><br>Note: A retail unit has been identified to refer to a select set of business units that are commonly used in segmenting the retail enterprise. | Parent Class: Business Unit |
| Retail Store | Definition: a retail outlet that sells merchandise and services through either a physical location, catalog, web page or other channel<br><br>Explanatory Note: A Retail Store may be co-located at a Site with other Retail Business Units.<br><br>Source: Association for Retail Technology Standards (ARTS) Data Model | Parent Class: Retail Business Unit |

#### *3.6.2.2 Ontology: Party Roles*

This ontology defines the high-level concepts of the roles that persons and organizations play in context of the retail events related to fiscal compliance.

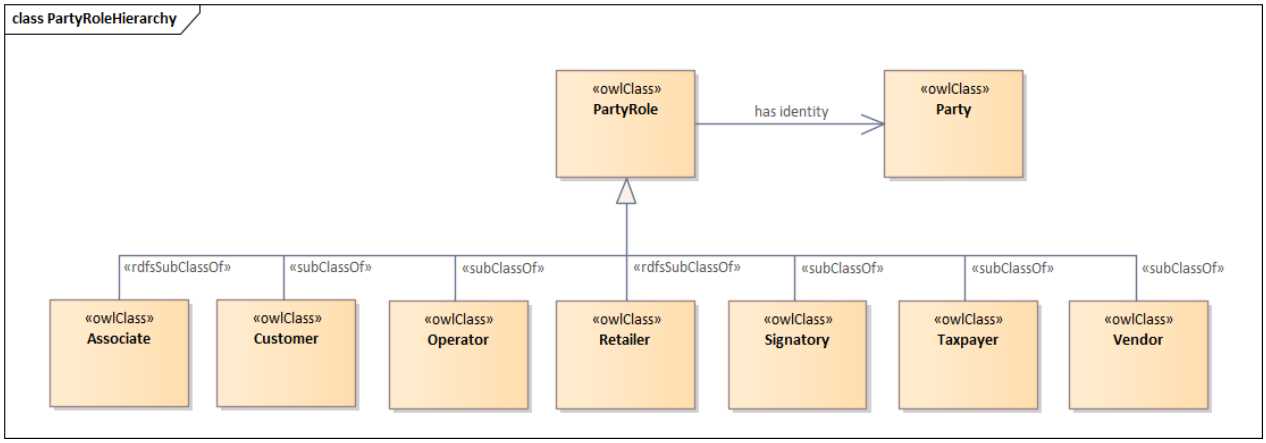


**Figure 3.2 Party Role Class Hierarchy**

Figure 3.2 provides the primary inheritance hierarchy for parties in roles.

**Table 3-2 Party in Role Ontology Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Associate | Definition: a person united with another or others in an act, enterprise, or business<br><br>Source: Adapted from Wiktionary.com<br><br>Note: In retail, an associate is a person who provides services to a retail store and may be either an employee or a contractor. | Parent Class: Party Role |
| Customer | Definition: one who purchases or receives a good, service or right from a business or merchant, or intends to do so.<br><br>Source: Adapted from Wiktionary.com<br><br>Note: the relationship between a retailer and a customer may be established at the point that the customer opens an account, registers with a loyalty program, or elects to receive correspondence. In these cases, the customer is then known to the retailer. A party may also be considered a customer at the point at which | Parent Class: Party Role |

| Name | Annotations | Class Expressions |
|---|---|---|
| | an initial purchase is made. In this case, the customer's identity may be unknown to the retailer, for example in the case of a cash purchase at a store. The purchases made by anonymous customers are still handled by retailers in much the same way as known customers, but as a group. | |
| Operator | Definition: an individual or organization that operates the system<br><br>Source: ISO/IEC 25000:2014 | Parent Class: Party Role |
| Party Role | Definition: agent role that is played by person or organization, that typically holds for some period of time<br><br>Source: MVF | Parent Class: |
| Retailer | Definition: a business that sells goods to the consumer, as opposed to a wholesaler or supplier, who normally sell their goods to another business<br><br>Source: BusinessDictionary.com | Parent Class: Party Role |
| Vendor | Definition: a party from whom the retail enterprise may purchase goods or services.<br><br>Source: Adapted from Association for Retail Technology Standards | Parent Class: Party Role |

## Properties

| Name | Annotations | Property Axioms |
|---|---|---|
| hasIdentity | Definition: provides a means for identifying something that fills a particular role | |

### 3.6.3 Module: Locations

The Locations module includes three ontologies; one representing the locations themselves which are physical places, the second representing sites which identify where business activity occurs and can include virtual sites, and the third representing addresses which are references used for communication to a physical or virtual place.

#### *3.6.3.1 Ontology: Addresses*

This ontology defines the high-level concepts of addresses that represent a reference to enable communication to a physical or virtual place. Addresses are commonly used to identify a location which may be within the jurisdiction of a tax authority that has fiscal compliance requirements at that location. As well, some or all of the address components may be required in the data provided to the tax authority.

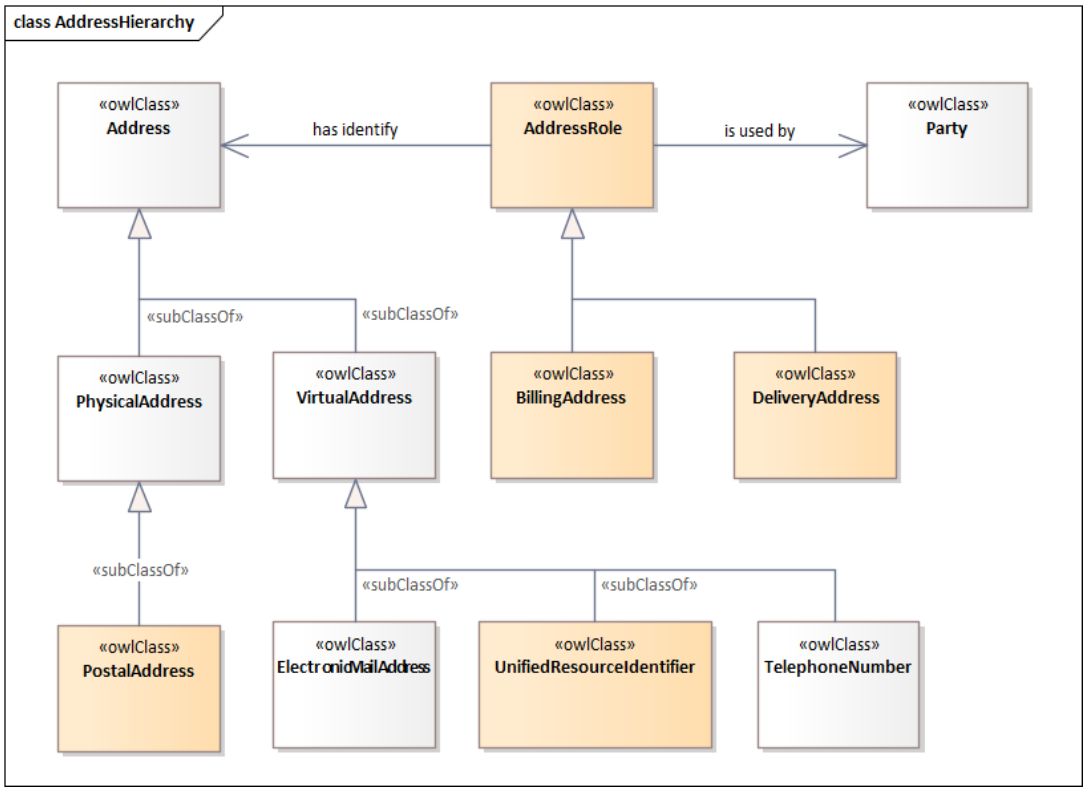


**Figure 3.3 Address Class Hierarchy**

Figure 3.3 provides the primary inheritance hierarchy for addresses.

**Table 3-3 Addresses Ontology Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Address | Definition: an established reference for a site to which communications may be delivered<br><br>Source: Adapted from Financial Industry Business Ontology<br><br>Note: This could include postal addresses, email addresses or any other referenceable destination | Parent Class: Reference |
| AddressRole | Definition: a relative concept that ties an address to the role that the address plays in any communication to a person or organization<br><br>Source: RDTF | Parent Class: Thing In Role |
| Billing Address | Definition: an address that is used to deliver billing information to facilitate payment for a purchase of goods, services, or other physical or digital item<br><br>Source: RDTF | Parent Class: Address Role |
| Delivery Address | Definition: an address that is used to facilitate the delivery of goods, services, correspondence, or other physical or digital items to a recipient<br><br>Source: RDTF | Parent Class: Address Role |
| Postal Address | Definition: a physical address used by delivery services to deliver mail, packages or other physical goods and correspondence<br><br>Source: RDTF | Parent Class: Physical Address |
| Unified Resource Identifier | Definition: compact sequence of characters that identifies an abstract or physical resource available on the Internet | Parent Class: Virtual Address |

| Name | Annotations | Class Expressions |
| --- | --- | --- |
| | Source: ISO 19770-5:2015 | |

### 3.6.4 Module: Products

The Products module includes one ontology representing the products that can be bought or sold in a retail transaction where a retail item represents a specific instance of a product in that retail event.

#### *3.6.4.1 Ontology: Products*

This ontology defines the high-level concepts of products that represent the goods services or rights that may be involved in the conduct of the retail events related to fiscal compliance.

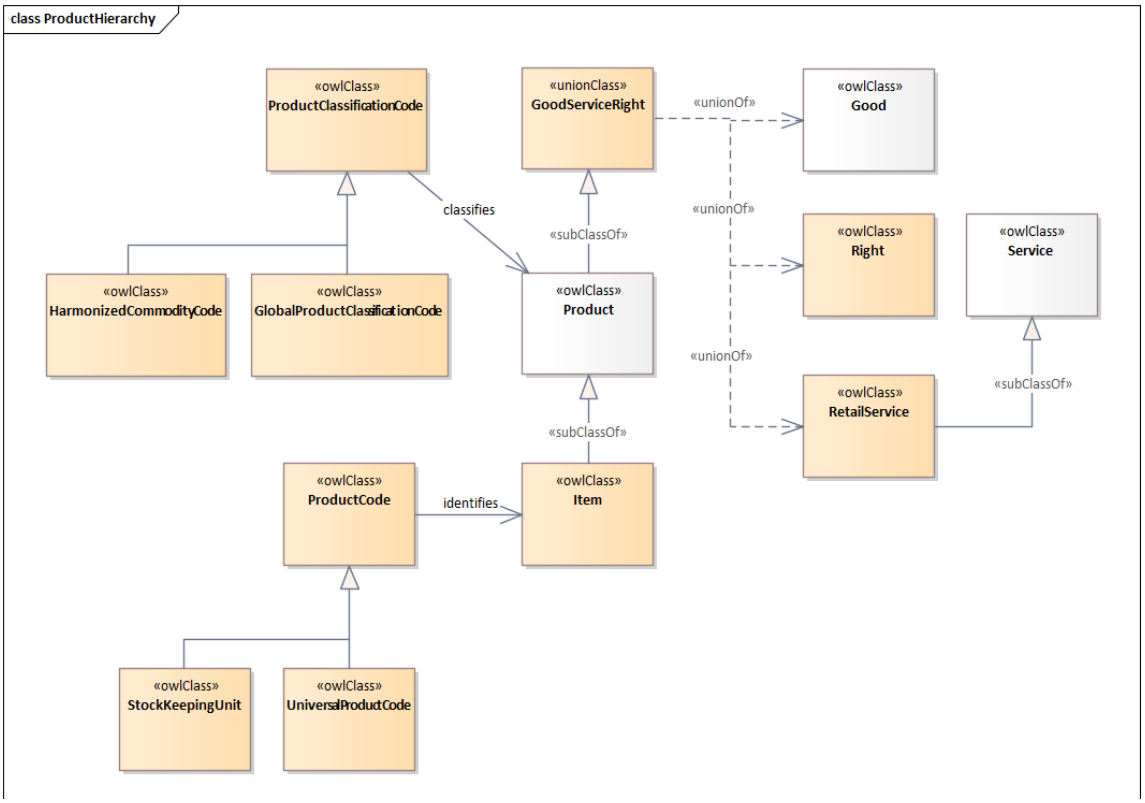


**Figure 3.4 Product Class Hierarchy**

Figure 3.4 provides the primary inheritance hierarchy for products.

**Table 3-4 Products Ontology Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Good Service Right | Definition: The union of all classes describing products or service types, either by nature or purpose.<br><br>Source: Adapted from Good Relations | Parent Class: |
| Good | Definition: a physical product that can be delivered to a purchaser and that involves the transfer of ownership from seller to customer<br><br>Source: ISO 20022 | Parent Class: |
| Global Product Classification Code | Definition: the GS1 Global Product Classification (GPC) standard helps global trading partners to group products in the same way, everywhere in the world<br><br>Source: GS1 | Parent Class: Product Classification Code |
| Harmonized Commodity Code | Definition: the Harmonized Commodity Description and Coding System, also known as the Harmonized System of tariff nomenclature, is an internationally standardized system of names and numbers to classify traded products<br><br>Source: Wikipedia | Parent Class: Product Classification Code |
| Product | Definition: any good, service or right that a retailer orders, markets, prices and offers for sale<br><br>Source: RDTF | Parent Class: Good Service Right |
| Product Classification Code | Definition: product classification or product taxonomy is a type of economic taxonomy which organizes products for a variety of purposes<br><br>Source: Wikipedia | Parent Class: Code Element |

| Name | Annotations | Class Expressions |
|---|---|---|
| Product Code | Definition: a unique identifier, assigned to each finished/manufactured product which is ready to be marketed or for sale<br><br>Source: Wikipedia<br><br>Note: Product codes such as SKU or UPC contain the detail necessary to identify a specific retail item rather than a product in general. | Parent Class: Code Element |
| Item | Definition: The lowest level of products for which inventory and/or sales records are retained within the retail enterprise<br><br>Source: ARTS Data Model<br><br>Note: Some retailers use the term Stock Keeping Unit (SKU) to refer to item as defined here<br><br>Note: a product is differentiated from an item in that an item is specific enough to potentially be priced independently and can be given a specific SKU or other identifier. For example, a product could be "Men's Lee Straight-Leg Jeans". Here, the manufacturer or brand is specified along with a particular style. This product could be selected as something that a customer wishes to purchase, but they may need to specify size, color, and/or regular vs. long fit. Those additional attributes identify a product that is specific enough to have its own SKU (or other identifier) and may even suggest a separate price (such as additional cost for long fit). | Parent Class: Product |
| Retail Service | Definition: a service that is offered by a retailer for purchase where the benefit of that service may be provided to the customer either through human handling or automation<br><br>Source: RDTF | Parent Class: Service |

| Name | Annotations | Class Expressions |
|---|---|---|
| Right | Definition: an intangible resource that entitles the holder authorized use or claim of something such as warranties (a right to make a claim) or rentals (a right to use an asset for a period of time)<br><br>Source: RDTF | Parent Class: |
| Service | Definition: the means by which the needs of a recipient are brought together with the capabilities of a provider<br><br>Source: Adapted from OASIS Reference Model | Parent Class: |
| Stock Keeping Unit | Definition: a distinct type of item for sale, such as a product or service, and all attributes associated with the item type that distinguish it from other item types<br><br>Source: Wikipedia<br><br>Alternative Label: SKU | Parent Class: Product Code |
| Universal Product Code | Definition: a type of code printed on retail product packaging to aid in identifying a particular item<br><br>Source: Shopify.com<br><br>Alternative Label: UPC<br><br>Note: A UPC consists of two parts – the machine-readable barcode, which is a series of unique black bars, and the unique 12-digit number beneath it | Parent Class: Product Code |

### 3.6.5 Module: Documents

The Documents module includes an ontology representing the documents that may be prepared from the recorded information of retail processes and which may be based on a specified form for that document.

#### *3.6.5.1 Ontology: Documents*

This ontology defines the high-level concepts of documents that represent the rendering of recorded data that can be used to provide information or evidence. The documented evidence needed to support fiscal compliance may take many forms depending on the requirements of the jurisdiction and media used to provide the information. In addition, the fiscal compliance process includes the assignment of a confirmation code or signature that validates that a document is legitimate and has met requirements.

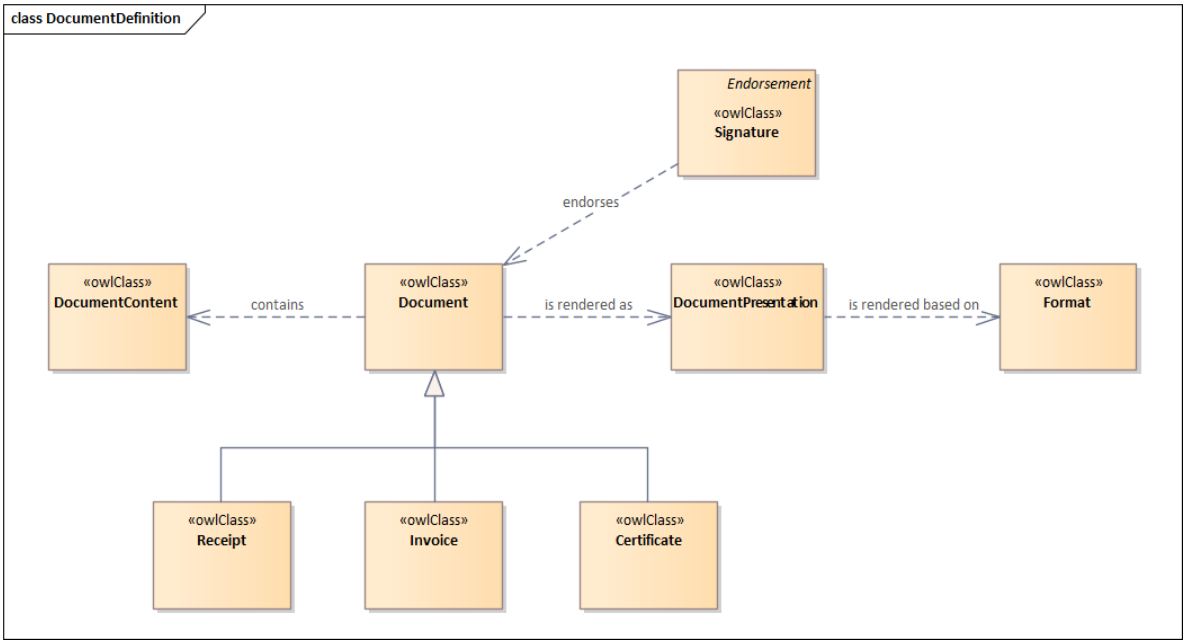


**Figure 3.5 Document Class Hierarchy**

Figure 3.5 provides the primary inheritance hierarchy for documents.

**Table 3-5 Documents Ontology Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Certificate | Definition: a document attesting to the truth of some fact or set of facts<br><br>Source: Financial Industry Business Ontology | Parent Class: Document |
| Document | Definition: a piece of written, printed, or electronic matter that provides information or evidence or that serves as an official record and can be relied on as the basis, proof, or support of something<br><br>Source: Retail Industry Ontology | Parent Class: |
| Document Content | Definition: substantive information or creative material viewed in contrast to its actual or potential manner of presentation in a document<br><br>Source: Retail Industry Ontology | Parent Class: |
| Document Presentation | Definition: the way in which something is shown, arranged, explained, etc. in the rendering of a document<br><br>Source: Adapted from macmillandictionary.com | Parent Class: |
| Exemption Certificate | Definition: the form presented by an exempt organization or individual to the seller when making a tax-exempt purchase<br><br>Source: Sales Tax Institute | Parent Class: Certificate |
| Form | Definition: a logical structure for a document with a fixed arrangement of named spaces, designed for entering, extracting, or communicating the required information<br><br>Source: Retail Industry Ontology | Parent Class: Arrangement |

| Name | Annotations | Class Expressions |
|---|---|---|
| Invoice | Definition: a nonnegotiable commercial instrument issued by a seller to a buyer<br><br>Source: BusinessDictionary.com<br><br>Note: An invoice identifies both the trading parties and lists, describes, and quantifies the items sold, shows the date of shipment and mode of transport, prices and discounts (if any), and delivery and payment terms. In several areas of the world the term invoice is more broadly interpreted since it may be commonly used as a form of receipt. For this ontology, the definition will stay non-ambiguous | Parent Class: Request Document |
| Receipt | Definition: a confirmation document, issued by a retailer, that proves and validates payment for a retail transaction<br><br>Source: RDTF<br><br>Explanatory Note: a receipt acknowledges and provides proof that the Retailer has received a payment or issued a refund in relation to transfer of goods or rendering of services to a Customer. The receipt can be printed or digital | Parent Class: Confirmation Document |
| Signature | Definition: an endorsement by a signatory with the intention of accepting, authenticating, and/or executing a document<br><br>Source: Retail Industry Ontology<br><br>Note: In some instances, a mark, seal, stamp, or symbol may also be considered a signature. | Parent Class: Endorsement |

## Properties

| Name | Annotations | Property Axioms |
|---|---|---|
| isEndorsedBy | Definition: is approved via some form of authorization | |
| isRenderedBasedOn | Definition: is formatted according to some set of rules or format for presentation | |
| isRenderingOf | Definition: is a rendered presentation of a document of other set of information and graphics | |

### 3.6.6 Module: Transaction

The Transactions module includes one ontology detailing the transactions that represent the business activities that includes all exchanges or transfers of Items including goods, services, tenders, rights or commitments and may include other important business events essential for audit and retail operations management important business events essential for audit and retail operations management.

#### *3.6.6.1 Ontology: Transaction*

This ontology defines the high-level concepts of transactions that can be generally classified as either retail transactions such as sales, returns and exchanges, or control transactions that are operational actions that the retailer needs to perform to track and run the business.

A retail transaction generally involves an exchange of merchandise for tender between a retailer and its customer. While this exchange may happen all at once, it is now common for the total fulfillment of a transaction to occur over a span of time. The initiation of a commitment to engage in the transaction can occur at one time and place while the payment for and/or receipt of purchased items can occur at any number of other times and places. To accommodate this, we look at a retail transaction as the full consummation of the exchange, while individual transaction events that facilitate that exchange need to be recognized, described and tracked.

In addition, the life cycle of a purchase can be seen to include the processes of assembling the items to be purchased and "ringing them up" or detailing them in an Order along with any instructions or promotions. The retail transaction is initiated when the order is placed, but we include these to complete the shopping experience.

For a purchase that is made at a physical retail store location it is often not the case that one would create an actual order to initiate the transaction. However, we could look at ringing up the items as creating and placing an order which will be fulfilled immediately by making payment and receiving the purchased items. This would simply be considered a degenerate case of the purchasing process.

##### 3.6.6.1.1 Transactions

This aspect of the ontology defines the high-level concepts of transactions that represent the occurrence of essential retail business activities. Such activities include all exchanges or transfers of Items (merchandise and non-merchandise), Tenders, rights or commitments. They also may include other important business events essential for audit and retail operations management.

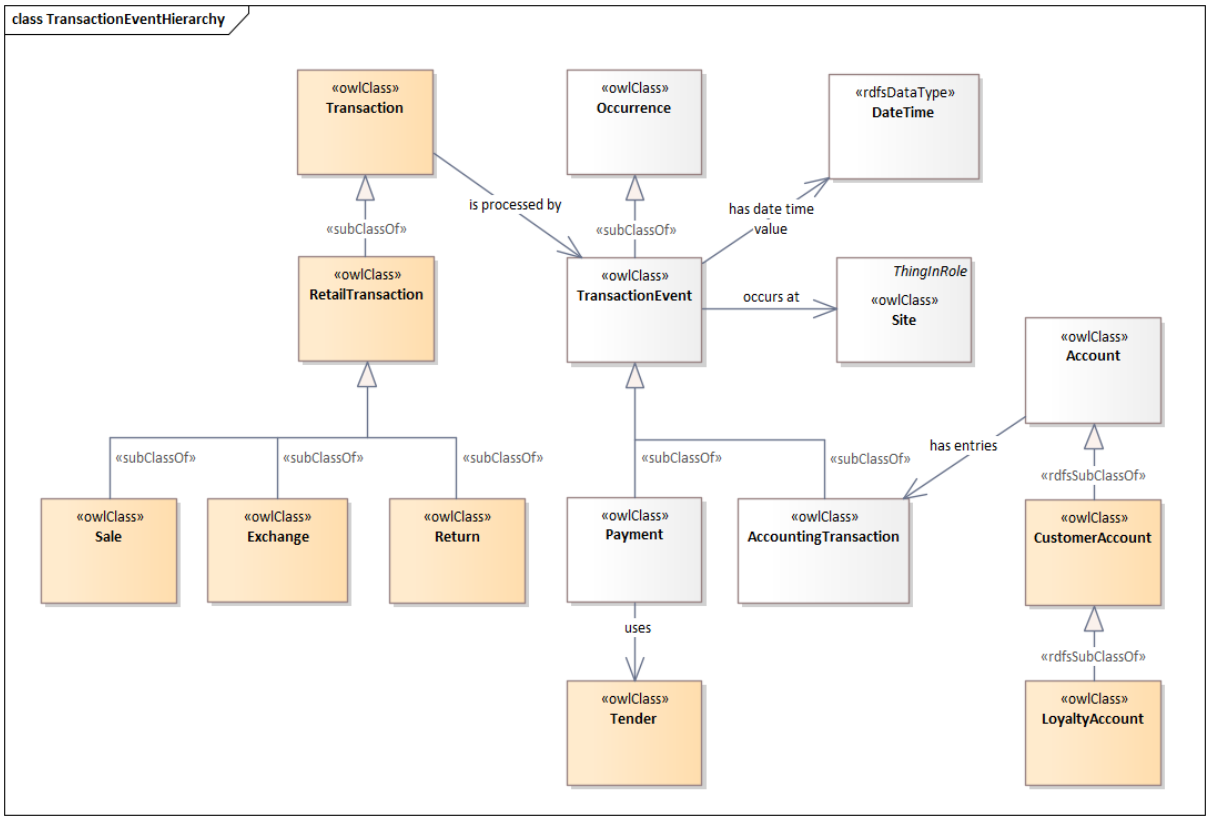


**Figure 3.6 Transaction Event Class Hierarchy**

Figure 3.6 provides the primary inheritance hierarchy for Transaction Events as well as the restriction that the occurrence of a transaction event takes place for a specified transaction, at a specified time and at a specified site, whether physical or virtual.

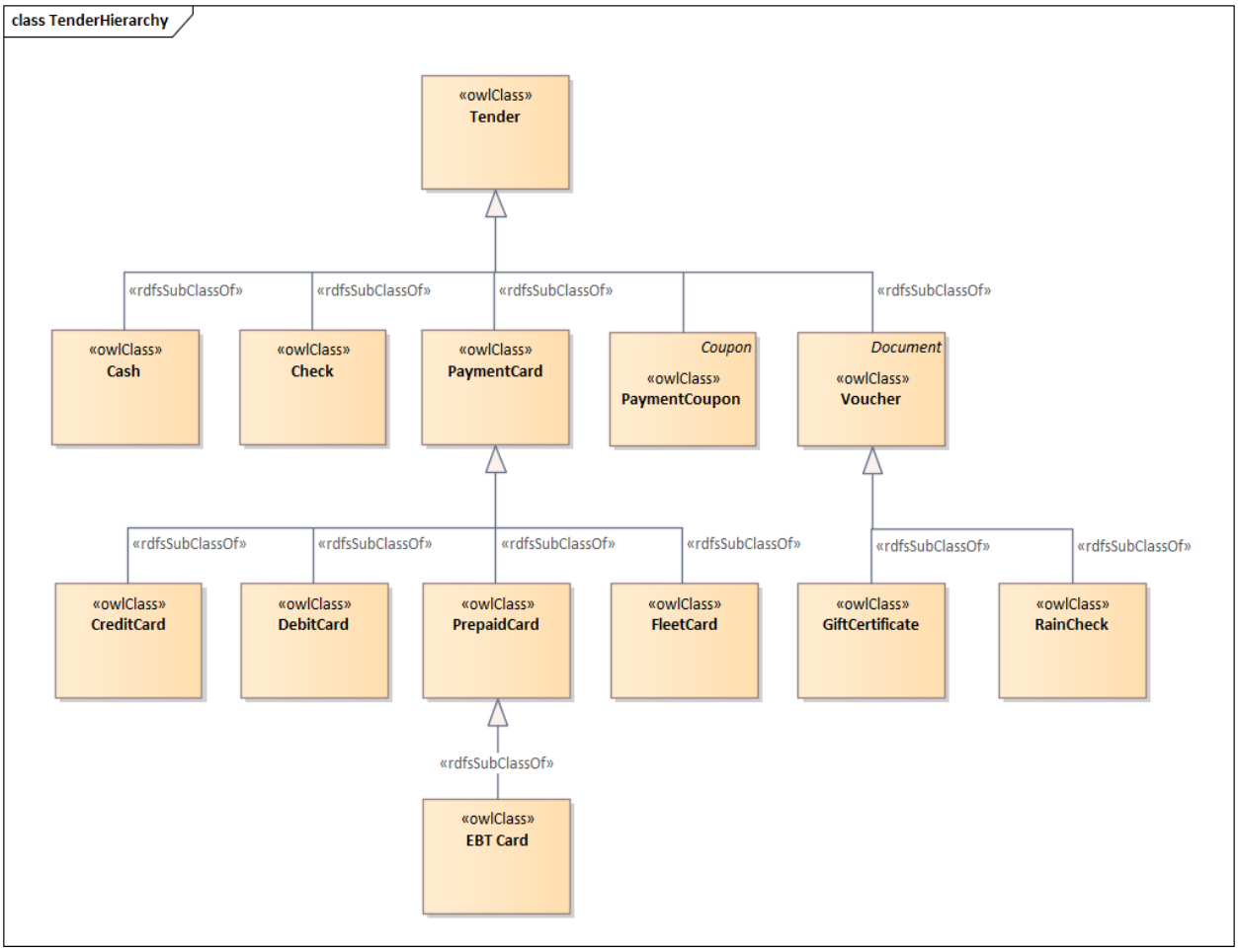


**Figure 3.7 Payment Method Class Hierarchy**

Figure 3.7 provides the primary inheritance hierarchy for Payment Methods, also referred to as Tender Types.

**Table 3-6 Transactions Ontology Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Cash | Definition: a tender in physical form such as banknotes and coins<br><br>Source: RDTF | Parent Class: Payment Method |

| Name | Annotations | Class Expressions |
|---|---|---|
| Check | Definition: a tender in a form of a document that contains unconditional order from payor to a bank to pay a specific amount of money from payor's bank account to the payee<br><br>Source: RDTF | Parent Class: Payment Method |
| Credit Card | Definition: a payment card issued to users (cardholders) to enable the cardholder to pay a merchant for goods and services based on the cardholder's promise to the card issuer to pay them for the amounts so paid plus the other agreed charges<br><br>Source: RDTF<br><br>Note: The card issuer (usually a bank or financial organization) creates a revolving account and grants a line of credit to the cardholder, from which the cardholder can borrow money for payment to a merchant or as a cash advance. | Parent Class: Payment Card |
| Customer Account | Definition: an identified, named collection of balances and cumulative totals used to summarize customer transaction-related activity over a designated period of time<br><br>Source: Adapted from ARTS | Parent Class: Account |
| Debit Card | Definition: a payment card that is used to withdraw the funds directly from the cardholder's bank account when the cardholder makes a purchase<br><br>Source: RDTF | Parent Class: Payment Card |

| Name | Annotations | Class Expressions |
|---|---|---|
| EBT Card | Definition: a card for Electronic Benefits Transfer (EBT) which is a benefit delivery system that provides public assistance recipients with electronic access to their cash and Supplemental Nutrition Assistance Program (SNAP) benefits<br><br>Source: Department of Human Services<br><br>Note: An EBT card is similar to a bank ATM or debit card to receive and use their benefits which are automatically deposited onto the card by the State | Parent Class: Prepaid Card |
| Exchange | Definition: a retail transaction involving transfer of the possession and ownership of a previously purchased good or property, or the entitlement to a service, back to the retailer in exchange for another good or service<br><br>Source: RDTF<br><br>Note: An exchange can be for an item of equal value such that there is no monetary compensation required, or there could be a resulting balance to be paid to either the customer or the retailer. | Parent Class: Retail Transaction |
| Fleet Card | Definition: a type of payment card that allows businesses to manage expenses associated with the vehicles they own and operate<br><br>Source: RDTF<br><br>Note: Fleet cards, also known as fuel cards, act just like credit cards and are provided by major oil and/or specialized credit companies. Businesses provide their personnel—namely transportation employees—with fleet cards for fuel, vehicle repairs, maintenance, and other specified item categories. | Parent Class: Payment Card |

| Name | Annotations | Class Expressions |
|---|---|---|
| Gift Certificate | Definition: a gift voucher entitling the bearer to a free product or service, intended to be purchased as a gift<br><br>Source: Wiktionary | Parent Class: Voucher |
| Loyalty Account | Definition: a type of customer account used to accumulate earned rewards and redeemed rewards based on a customer's net purchase history as well as other actions that correlate with longer term value to the retailer<br><br>Source: Adapted from ARTS | Parent Class: Customer Account |
| Payment Card | Definition: a tender in a form of a device (usually embossed plastic card) that enables its owner to make a payment by electronic transfer of funds<br><br>Source: RDTF | Parent Class: Payment Method |
| Prepaid Card | Definition: a payment card that stores its monetary balance on an external account specifically created for the purpose of Maintaining the cards balance<br><br>Source: RDTF<br><br>Note: A Prepaid card is used as an alternative to cash. It is similar to the Debit card, but the latter is typically linked to a general-purpose cardholder's bank account. The prepaid card is different from Stored Value card that stores the monetary balance on the card itself. | Parent Class: Prepaid Card |

| Name | Annotations | Class Expressions |
|---|---|---|
| Rain Check | Definition: a voucher that is issued to a consumer that does not take advantage of an offer or event at the current time but may redeem the voucher later.<br><br>Source: RDTF<br><br>Note: a Rain Check in retail is often one of two type; one to honor a discount at a later time and the other to honor money paid for an event or service to be used at a later time. | Parent Class: Voucher |
| Retail Transaction | Definition: a transaction that involves an exchange of items, including goods, services, tenders, rights or commitments, between a retailer and its customers such as in a sale, return or exchange<br><br>Source: RDTF | Parent Class: Transaction |
| Return | Definition: a retail transaction involving transfer of the possession and ownership of a good or property, or the entitlement to a service, back to the retailer from which a previous purchase was made<br><br>Source: RDTF | Parent Class: Retail Transaction |
| Sale | Definition: a retail transaction involving transfer of the possession and ownership of a good or property, or the entitlement to a service, in exchange for money or value<br><br>Source: Business Dictionary | Parent Class: Retail Transaction |

| Name | Annotations | Class Expressions |
|---|---|---|
| Tender | Definition: a means of payment recognized and accepted by a Retailer in exchange for goods and/or services or to meet financial obligations<br><br>Source: RDTF<br><br>Note: A common term used in retail for Payment Method is Tender. This would include payments that use Legal Tenders as well as any other payment instrument. | Parent Class: |
| Transaction | Definition: an essential business activity that represents an auditable unit of work<br><br>Source: RDTF<br><br>Note: includes exchanges or transfers of Items including goods, services, tenders, rights or commitments as well as other important business events essential for audit and retail operations management | Parent Class: |
| Transaction Event | Definition: the occurrence of an activity that is part of the life cycle of a transaction<br><br>Source: RDTF | Parent Class: Occurence |
| Voucher | Definition: a tender in a form of a document which is worth a certain monetary value<br><br>Source: RDTF<br><br>Note: Vouchers are issued by the retailer or a trusted third party. They can be restricted to purchases of particular goods and/or services from a particular retailer. | Parent Class: Payment Method |

## Properties

| Name | Annotations | Property Axioms |
|---|---|---|
| hasPointBalance | Definition: indicates the number of points held in a membership account at a point in time | |
| hasPointsEarned | Definition: indicates the number of points earned in a membership account at a point in time | |
| hasPointsExpirationDate | Definition: the date that a specified number of points held in a membership account are set to expire | |
| hasPointsRedeemed | Definition: indicates the number of points redeemed against a membership account at a point in time | |
| hasPointsToExpire | Definition: indicates the number of points that are set to expire for a membership account at a point in time | |
| isInTrainingMode | Definition: identifies that a transaction is being processed as training for the operator | |
| isProcessedBy | Definition: identifies some party or something that performs the processing required to achieve a result | |
| isProcessedFor | Definition: identifies some party or something that receives the result of a process | |
| hasDateTimeValue | Definition: specifies an actual literal (explicit) date and time | |
| occursAt | Definition: identifies the site at which an action or event takes place | |

### 3.6.6.1.2 Line Items

The Line Item module includes one ontology representing the individual units of information in a document, record, or statement, shown on a separate line.

This ontology defines the high-level concepts of line items that represent the individual constituents of a collection of recorded information that are to be represented as a unit of information involved in the occurrence of a retail order placement or transaction. Much of the detail that needs to be provided to a tax authority for fiscal compliance is contained at the line item.

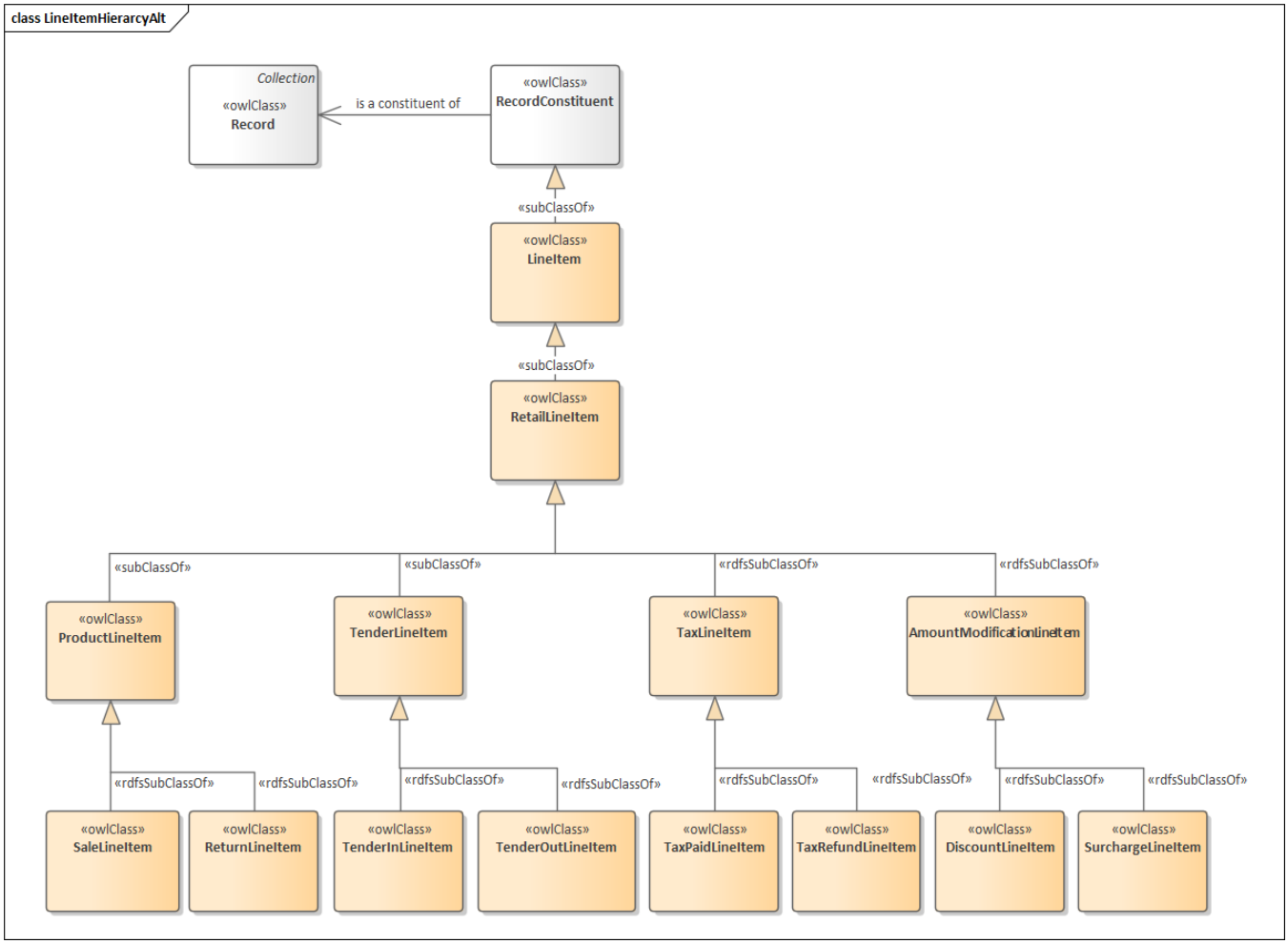


**Figure 3.8 Line Item Class Hierarchy**

Figure 3.8 provides the primary inheritance hierarchy for line items.

**Table 3-7 Line Item Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Discount Line Item | Definition: a line item component of a Retail Transaction that records the granting of a reduction of price on the items in the transaction<br><br>Source: Adapted from Association for Retail Technology Standards | Parent Class: Retail Line Item |
| Line Item | Definition: a unit of information in a document, record, or statement, shown on a separate line of its own<br><br>Source: BusinessDictionary.com | Parent Class: Record Constituent |
| Payment Line Item | Definition: a line item component of a Retail Transaction that records the settlement of that transaction with an offsetting, valid tender type<br><br>Source: Association of Retail Technology Standards (ARTS) | Parent Class: Retail Line Item |
| Product Line Item | Definition: a line item component of a Retail Transaction that records the exchange in ownership of a merchandise item (i.e. a sale or return) or the sale or refund related to a service or right<br><br>Source: Adapted from Association for Retail Technology Standards<br><br>Note: the product line item often includes attributes that contain information that is similar to what is contained in other line items but applies specifically at the product level. For example, a discount could be applied on an entire transaction or may apply only for a specific product. Similarly, tax is most often determined at the product level, but may be summarized at the transaction level in a tax line item. | Parent Class: Retail Line Item |

| Name | Annotations | Class Expressions |
|---|---|---|
| Record Constituent | Definition: an artifact that is one of the individual parts of which a composite record is made up<br><br>Source: Adapted from Freedictionary.org | Parent Class: |
| Retail Line Item | Definition: a line item that records or documents a specific unit of information involved in the occurrence of a retail order placement or transaction<br><br>Source: Adapted from Association for Retail Technology Standards | Parent Class: Line Item |
| Return Line Item | Definition: a line item component of a Retail Transaction that records the exchange in ownership of a merchandise item from a customer to a retailer or the termination of an obligation of the retailer to provide a service or right.<br><br>Source: Adapted from Association for Retail Technology Standards<br><br>Note: the return line item often includes attributes that contain information that is similar to what is contained in other line items but applies specifically at the product level. For example, a discount could be applied on an entire transaction or may apply only for a specific product. Similarly, tax is most often determined at the product level, but may be summarized at the transaction level in a tax line item. | Parent Class: Retail Line Item |

| Name | Annotations | Class Expressions |
|---|---|---|
| Sale Line Item | Definition: a line item component of a Retail Transaction that records the exchange in ownership of a merchandise item from a retailer to a customer or the provision of a service or right to the customer<br><br>Source: Adapted from Association for Retail Technology Standards<br><br>Note: the sale line item often includes attributes that contain information that is similar to what is contained in other line items but applies specifically at the product level. For example, a discount could be applied on an entire transaction or may apply only for a specific product. Similarly, tax is most often determined at the product level, but may be summarized at the transaction level in a tax line item. | Parent Class: Retail Line Item |
| Surcharge Line Item | Definition: a line item component of a Retail Transaction that records the increase of price on the items in the transaction<br><br>Source: Adapted from Association for Retail Technology Standards | Parent Class: Retail Line Item |
| Tax Paid Line Item | Definition: a line item component of a Retail Transaction that records the charging and offsetting liability credit for sales tax on merchandise items and services sold by the store<br><br>Source: Association of Retail Technology Standards (ARTS) | Parent Class: Retail Line Item |
| Tax Refund Line Item | Definition: a line item component of a Retail Transaction that records the refunding and offsetting debit for merchandise returned to the store<br><br>Source: Association of Retail Technology Standards (ARTS) | Parent Class: Retail Line Item |

| Name | Annotations | Class Expressions |
|---|---|---|
| Tender In Line Item | Definition: a line item component of a Retail Transaction that records the payment by a customer of a monetary amount in the form of some valid tender type<br><br>Source: RDTF | Parent Class: Retail Line Item |
| Tender Out Line Item | Definition: a line item component of a Retail Transaction that records the return to customer a monetary amount in the form of some valid tender type.<br><br>Source: Association of Retail Technology Standards (ARTS)<br><br>Note: the return of tender may be to offset the value of items returned by the customer or may be an amount of change due back to the customer for an overpayment, usually as cash. | Parent Class: Retail Line Item |

## Properties

| Name | Annotations | Property Axioms |
|---|---|---|
| hasActualUnitPrice | Definition: the actual per-unit price paid by the customer for this particular sale. It is obtained by applying applicable price derivation rules to the regular unit price | |
| hasRegularUnitPrice | Definition: the regular or lookup per-unit price for the item before any discounts have been applied | |
| hasTaxAmount | Definition: specifies the amount of money involved in a tax payment | |
| hasTaxRate | Definition: specifies the rate applied to determine the amount of tax imposed | |

| Name | Annotations | Property Axioms |
|---|---|---|
| hasTotal | Definition: relates a transaction to a sum amount of money involved in that transaction event | |
| hasUnitListPrice | Definition: the price at which the manufacturer recommends that the retailer sell the product | |
| isDetailFor | Definition: relates a constituent part or piece of information to the thing that it is describing. | |

#### 3.6.6.1.3 Transaction Reward

The transaction reward module includes one ontology representing the individual information to earn or redeem a reward that is associated with a promotional offer.

This ontology defines the high-level concepts of earning and redeeming rewards as a result of transaction activity that meets the criteria specified to issue the reward.

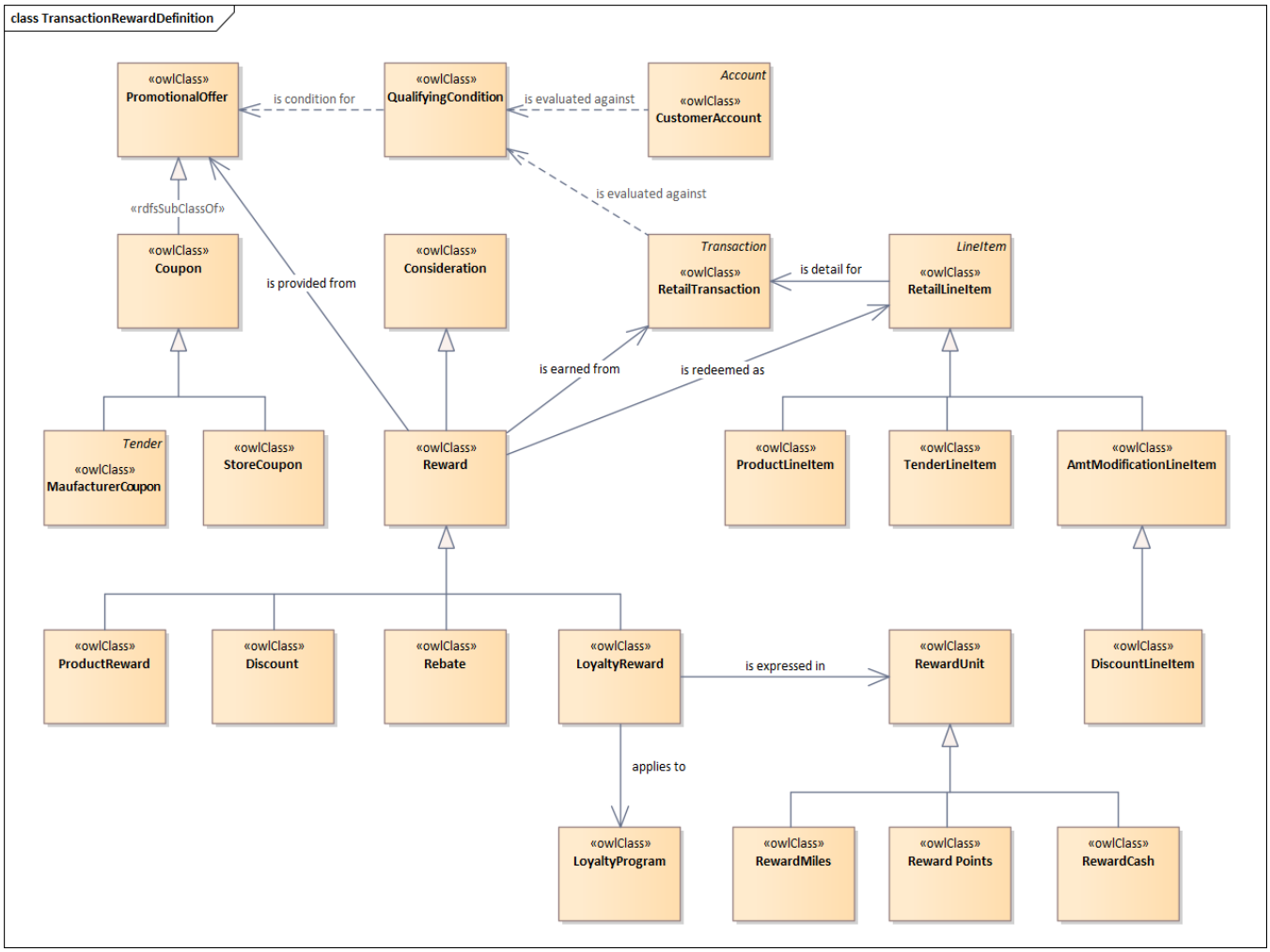


**Figure 3.9 Transaction Reward Class Hierarchy**

Figure 3.9 provides the primary inheritance hierarchy for Rewards as well as the associations to the Promotional Offer that implemented the reward and the transaction details that specify where a reward is earned or redeemed.

**Table 3-8 Transaction Reward Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Consideration | Definition: something of value provided by one party to another<br><br>Source: Wall Street Words<br><br>Note: Consideration usually takes the form of a monetary payment in exchange for goods or services received, but could involve, for example, the direct exchange of one product for another (as in barter), or points that can be accumulated for future benefits. | Parent Class: |
| Discount Reward | Definition: a reward that is redeemable as a discount on the purchase of individual items or on the total for a transaction<br><br>Source: RDTF | Parent Class: Reward |
| Loyalty Reward | Definition: a reward that is earned or redeemed by a member of a loyalty program for meeting the stated criteria<br><br>Source: RDTF | Parent Class: Reward |
| Product Reward | Definition: a reward that is earned or redeemed as one or more retail items based on meeting the stated criteria<br><br>Source: RDTF<br><br>Note: a product reward, such as a Buy One-Get One offer, could be seen as a type of discount reward where the discount on the free item is 100% | Parent Class: Reward |

| Name | Annotations | Class Expressions |
|---|---|---|
| Promotional Offer | Definition: A promotional offer is a specific proposition to customers that specifies a reward and customer behavioral criteria for earning a reward.<br><br>Source: Adapted from Freedictionary.org<br><br>Note: The recognition and issue of the reward is captured through a retail transaction, customer order, rebate claim, rebate redemption or customer interaction. Each of these point in time customer actions captures customer actions and relevant context information to determine what (if any) reward is earned, what triggered the issue of the reward and when and where it was triggered. | Parent Class: Offering |
| Reward | Definition: a reward is an identified, named benefit provided by a retailer or 3rd party to customers in exchange for customer actions (like purchasing products, visiting web sites or stores, referring other customers, renting items, etc.)<br><br>Source: Association for Retail Technology Standards | Parent Class: Consideration |
| Reward Unit | Definition: a measurement unit that is used to quantify the amount of a reward that is earned or redeemed<br><br>Source: RDTF | Parent Class: Measurement Unit |

| Name | Annotations | Class Expressions |
|---|---|---|
| Qualifying Condition | Definition: a stipulation that specifies conditions that must be met before some aspect of an offer takes effect<br><br>Source: RDTF<br><br>Note: Qualifying conditions include events or states of affairs that act as triggers for the terms of some offering to come into effect, such as attaining a purchase threshold, accumulating loyalty points, making a purchase of a number or combination of goods or services, making a purchase within a specified timeframe, and many other possibilities. | Parent Class: Legal Construct |

## Properties

| Name | Annotations | Property Axioms |
|---|---|---|
| isEarnedFrom | Definition: relates an earned reward to a transaction that met the criteria stated by an offer | |
| isEvaluatedAgainst | Definition: relates an earned reward to a transaction that met the criteria stated by an offer | |
| isRedeemedAs | Definition: relates a redeemed reward to a transaction detail that specifies how the reward was provided | |

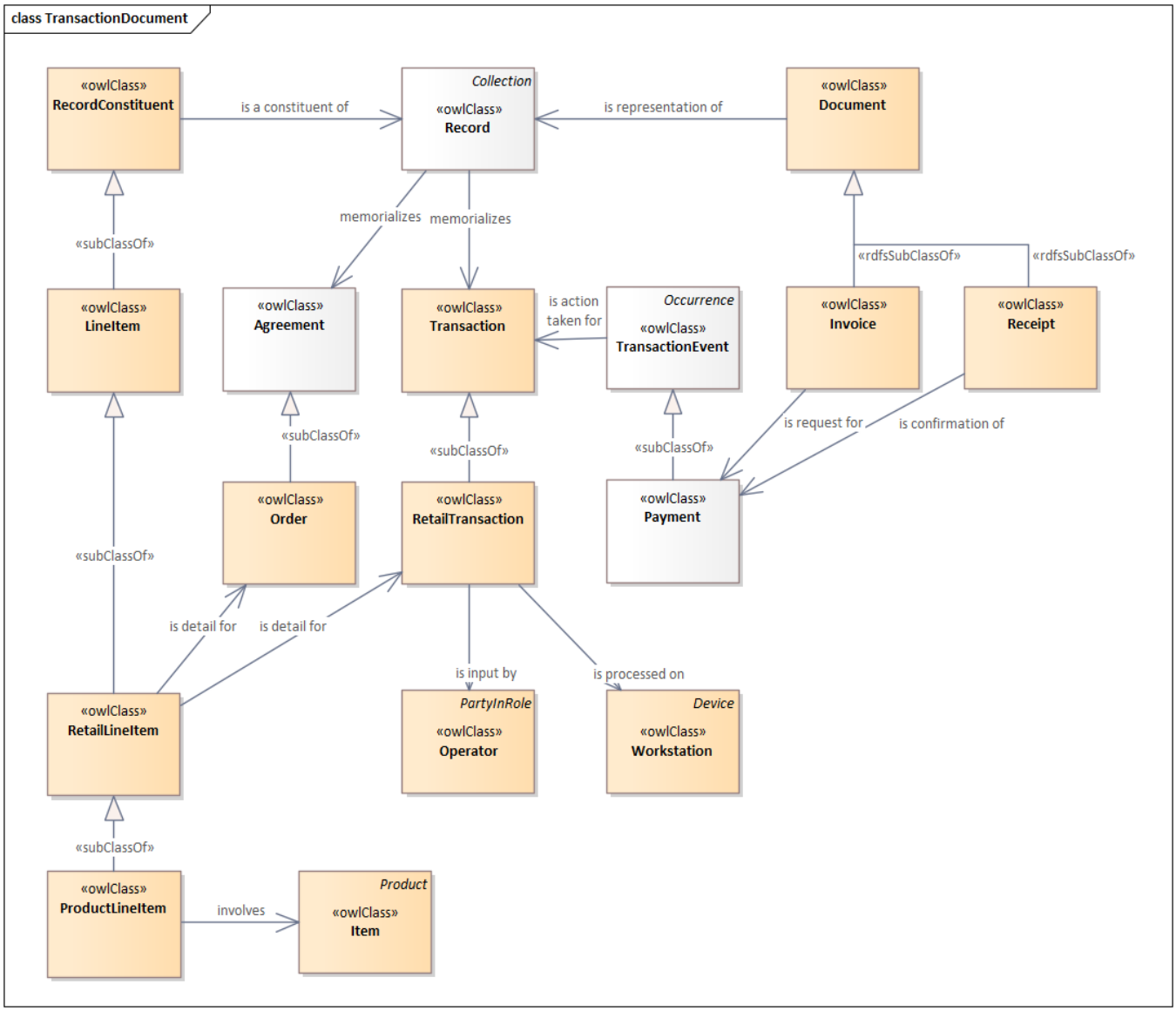


**Figure 3-10 Transaction Line Item Document Details**

Figure 3.10 identifies the association of the Retail Transaction details to the Receipt document that is produced as a confirmation of those details.

Since all of these classes have been described in earlier sections, the details have not been repeated here.

### 3.6.7 Module: Designation

The Designations module includes one ontology detailing the designations that are used to represent or identify the things that are referenced in retail business events and operations.

#### *3.6.7.1 Ontology: Designation*

This ontology defines the high-level concepts of designations that represent the means of referencing or identifying some person, place or thing that is designated in retail.

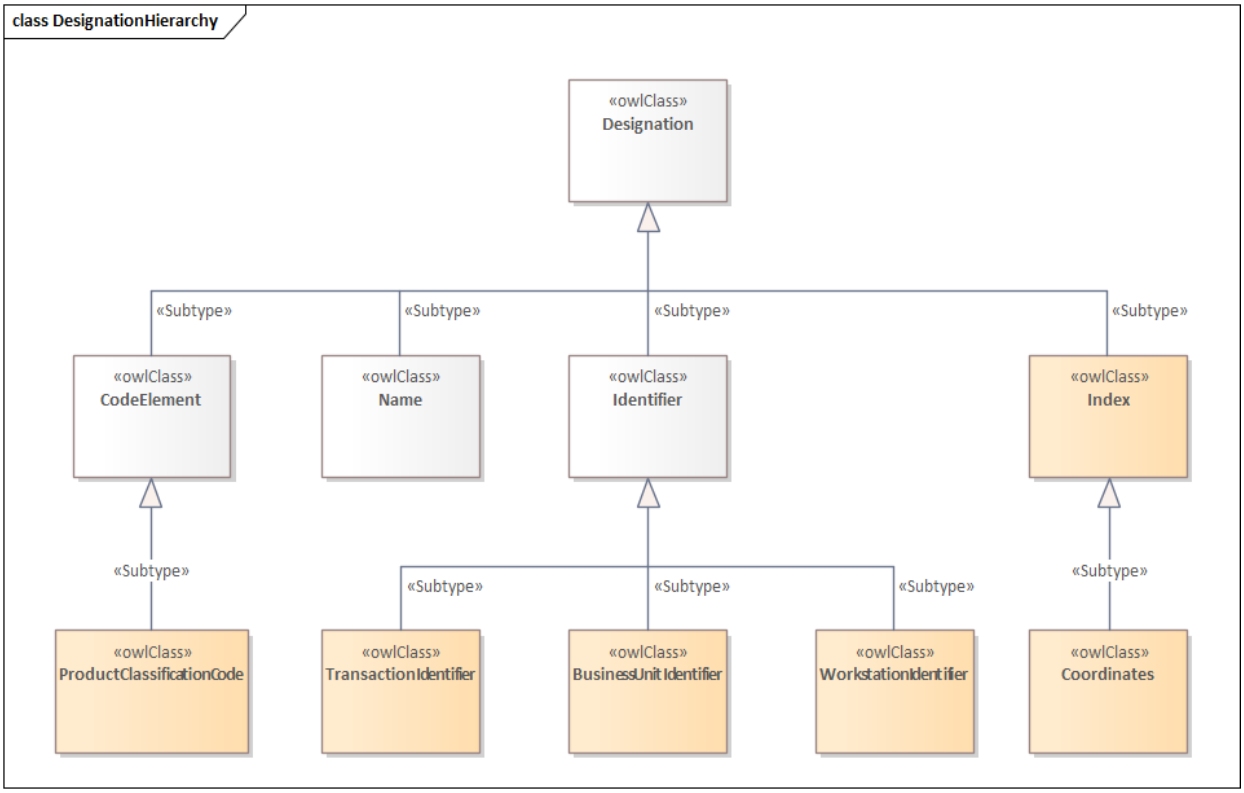


**Figure 3.11 Designation Hierarchy**

Figure 3.11 provides the primary inheritance hierarchy for designations.

**Table 3-9 Designation Ontology Details**

## Classes

| Name | Annotations | Class Expressions |
|---|---|---|
| Business Unit Identifier | Definition: sequence of characters uniquely identifying a business unit within the context of a larger retail business<br><br>Source: Retail Industry Ontology | Parent Class: Identifier |
| Code Element | Definition: sequence of characters denoting something for some purpose, within a specified context, according to some rule set<br><br>Source: ISO/IEC 11179-3 Information technology | Parent Class: Designation |
| Coordinates | Definition: index to a precise position in physical space or on a representation of physical space (maps, planograms, etc.), using an established reference system<br><br>Source: Association for Retail Technology Standards (ARTS) | Parent Class: Index |
| Designation | Definition: representation for someone or something by a sign that denotes it<br><br>Source: ISO 1087 Terminology work and terminology science<br><br>Note: A designation can be a term including appellations, a proper name, or a symbol.<br><br>Synonym: Designator | Parent Class: |
| Fiscal Transaction Identifier | Definition: A unique identifier of a fiscal transaction that is either generated by a fiscal device or generated according to a country's specific fiscal rules<br><br>Source: Retail Industry Ontology | Parent Class: Transaction Identifier |
| Identifier | Definition: sequence of characters uniquely identifying that with which it is associated<br><br>Source: ISO/IEC 11179-3 Information technology | Parent Class: Designation |

| Name | Annotations | Class Expressions |
|---|---|---|
| Index | Definition: indirect shortcut derived from and pointing into, a greater volume of values, data, information, or knowledge<br><br>Source: Wikipedia | Parent Class: Designation |
| Name | Definition: distinctive designation for an individual (person, organization, or thing)<br><br>Source: ISO/IEC 11179-3 Information technology | Parent Class: Code Element |
| Product Classification Code | Definition: product classification or product taxonomy is a type of economic taxonomy which organizes products for a variety of purposes<br><br>Source: Wikipedia | Parent Class: Designation |
| Transaction Identifier | Definition: an identifier assigned to an instance of a transaction that is unique and immutable within the context of a business domain.<br><br>Source: ISO/IEC 11179-3 Information technology | Parent Class: Identifier |
| Workstation Identifier | Definition: an identifier assigned to an instance of a workstation that is unique within the context of a business domain.<br><br>Source: ISO/IEC 11179-3 Information technology | Parent Class: Identifier |