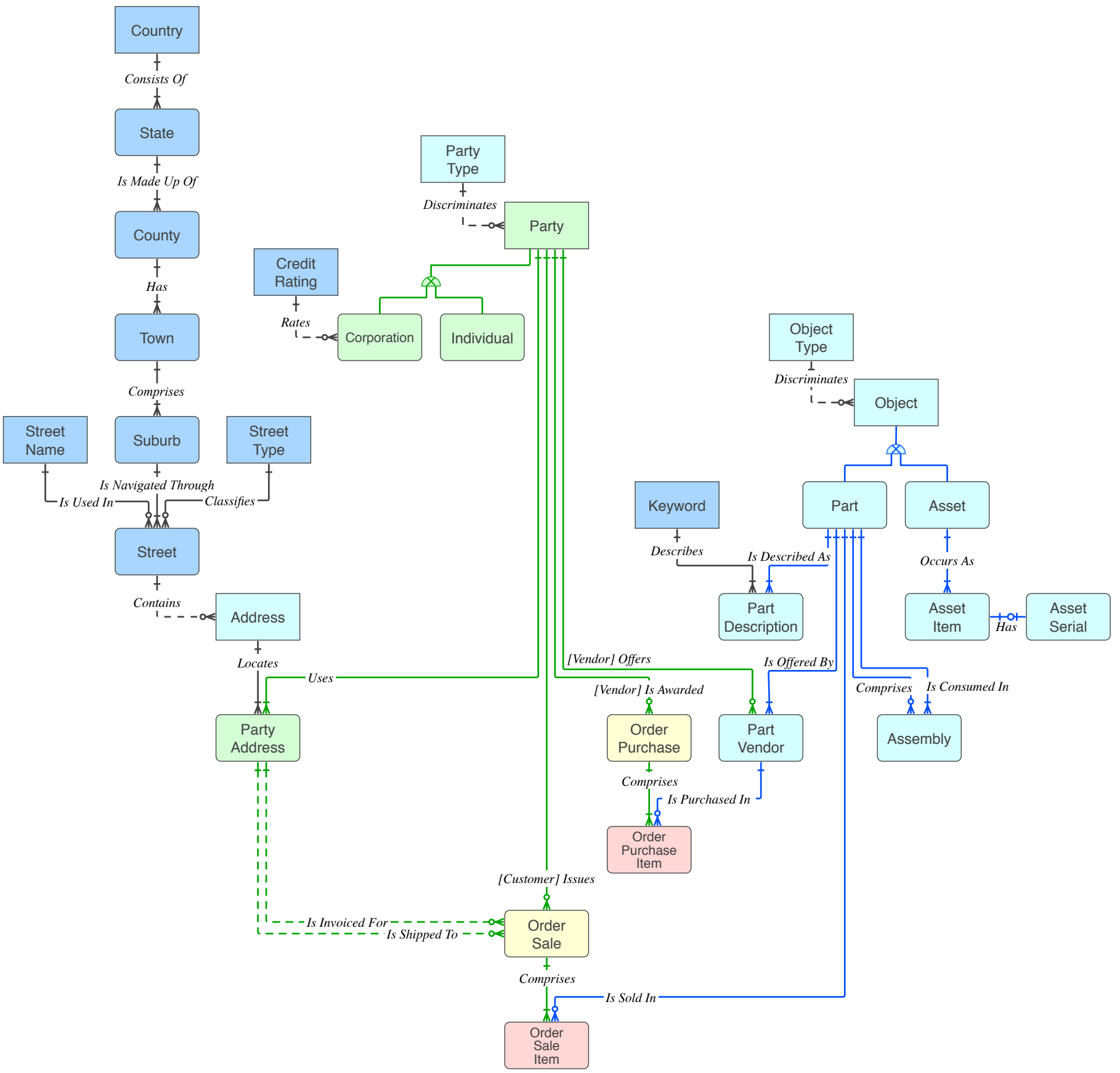
# Table Relation

SOFTWARE GEMS




## Purpose

This is a case study of a database that is:

- a faithful implementation of the **Relational Model** (Dr E F Codd, not the pretenders)
- produced using the **IDEF1X** Methodology & Standard, plus our **Extensions**
- correctly **Normalised to Fifth Normal Form**: devoid of Update Anomalies & Nulls; all Functional, Multi-Valued & Join Dependencies have been resolved
- almost all Business Rules implemented as **Declarative Constraints** (no code dependencies)
- demonstrates the correct use of **Relational Keys**
- in a PDF document that is complete with cross-references (select an item for further detail)
- contains the minimum level of complexity for education re **Relational Database Design** in general, and the highlit subjects in particular.

## Domain

- Is shown to the extent possible in IDEF1X
- Coloured relationship lines further identify the Domains, the Relational Sets, within the limits of IDEF1X. Black is used for the unimportant sets.
- The **Hierarchical Layout** Extension is employed here

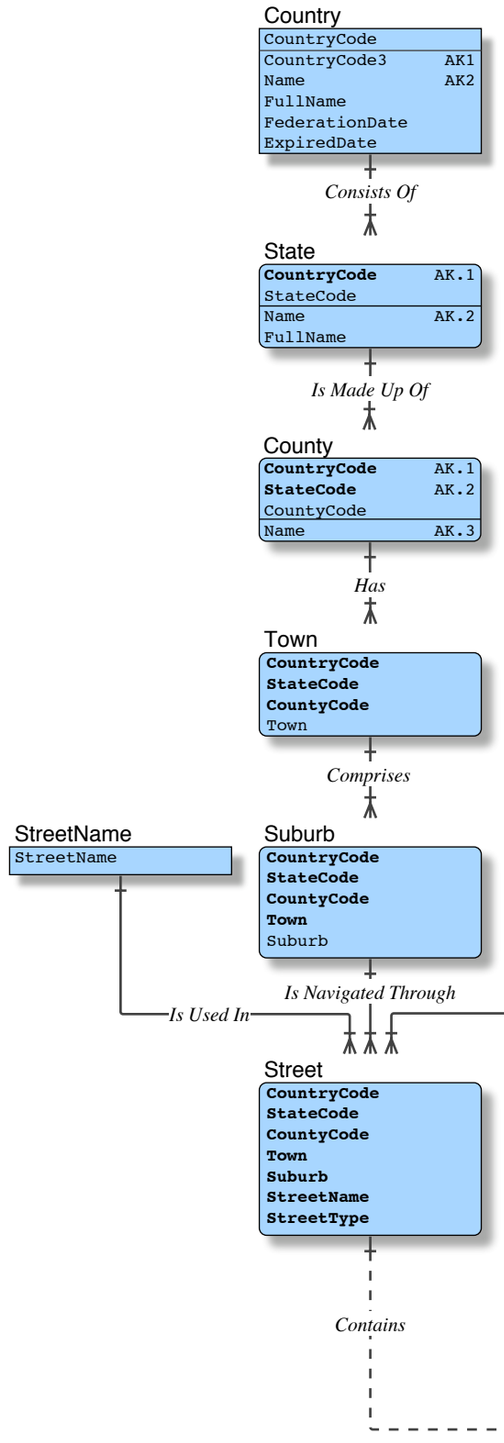
**Entity Type**

- Reference
- Identifying/Major
- Identifying
- Transaction
- TransactionDetail
- History, Audit

IDEF1X Notation

Select any table to open it

# Address




## Context

This document was initially placed in the public domain, as a real example, that I could refer to, in order to facilitate robust discussions about the subject matter on the sites that I attend. Evidently, the document is being downloaded and used beyond that. While I welcome that, there is a problem with it: the context is absent. Nothing can be studied effectively when it is removed from its context. Therefore, additional notes are warranted.

- The Data Model was developed as a case study which is used in several different courses. There is a separate version of this model for each stage of Data Modelling/Normalisation
- This document is not the education, it is not the case study, it is only the data model of the case study of the course.
- This version/stage of the Data Model is Normalised **correctly**, up to **5NF**, allowing the remaining steps to proceed unhindered
- The level/stage of Normalisation is higher than that which most designers achieve, and therefore it was chosen for the said discussions.
- It is not Normalised **completely**; two steps remain, before full **DKNF** (the full intention as per the **Relational Model**, not the deranged definition) is achieved.
- As per my custom, every version/stage of the model retains two mistakes, for participants to detect, and to resolve, in the next version/stage.

## Relational Key

- Natural Keys, Relational Integrity and power is retained
- Surrogates always constitute:
  - an additional column & index (the natural Key provides row uniqueness)
  - a breach of the *Relational Model*: **Keys must be made up from the data**
- Further, except when assigned at the top of a Data Hierarchy (eg, `PartyNo`), they (eg. `AddressNo`) constitute:
  - a breach of the *Relational Model*: **Access Path Independence**, and Relational Integrity and power is lost at that location.
- Only two surrogates are used: `AddressNo` (on this page) and `PartyNo`.
- `County` and `Suburb` are optional (standard Null Substitute)
- These Reference tables are fully loaded from Post Office data; both data entry and spelling errors are eliminated
  - `Street` provides an existence check, eliminating false addresses
  - Only `Address` needs to be added for new addresses, requiring a valid `Street` row
- Null values are not stored. Two techinques are given for optional columns:
  - Columnar Normalisation such that Nulls are eliminated (`AssetSerial`)
  - `County` and `Suburb` (this page) using Null Substitutes
- Views are, by definition (a) derived from tables, thus (b) they are the flattened (or "denormalised") form:
  - as such, they contain Nullable columns.
  - Developers and "theoreticians" typically implement views as "tables"
- SG extensions: Hierarchical Layout; etc.
- Physical-only columns (eg. `TimeStamp`, `UserStamp`) not shown

**Entity Type**

- Reference
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- Identifying
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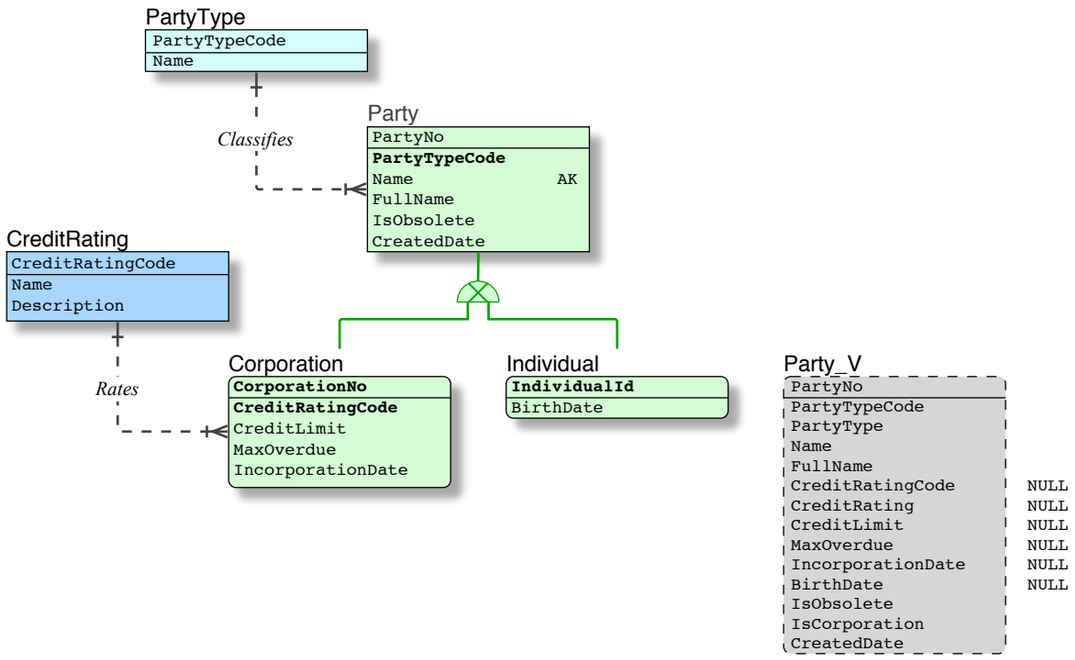
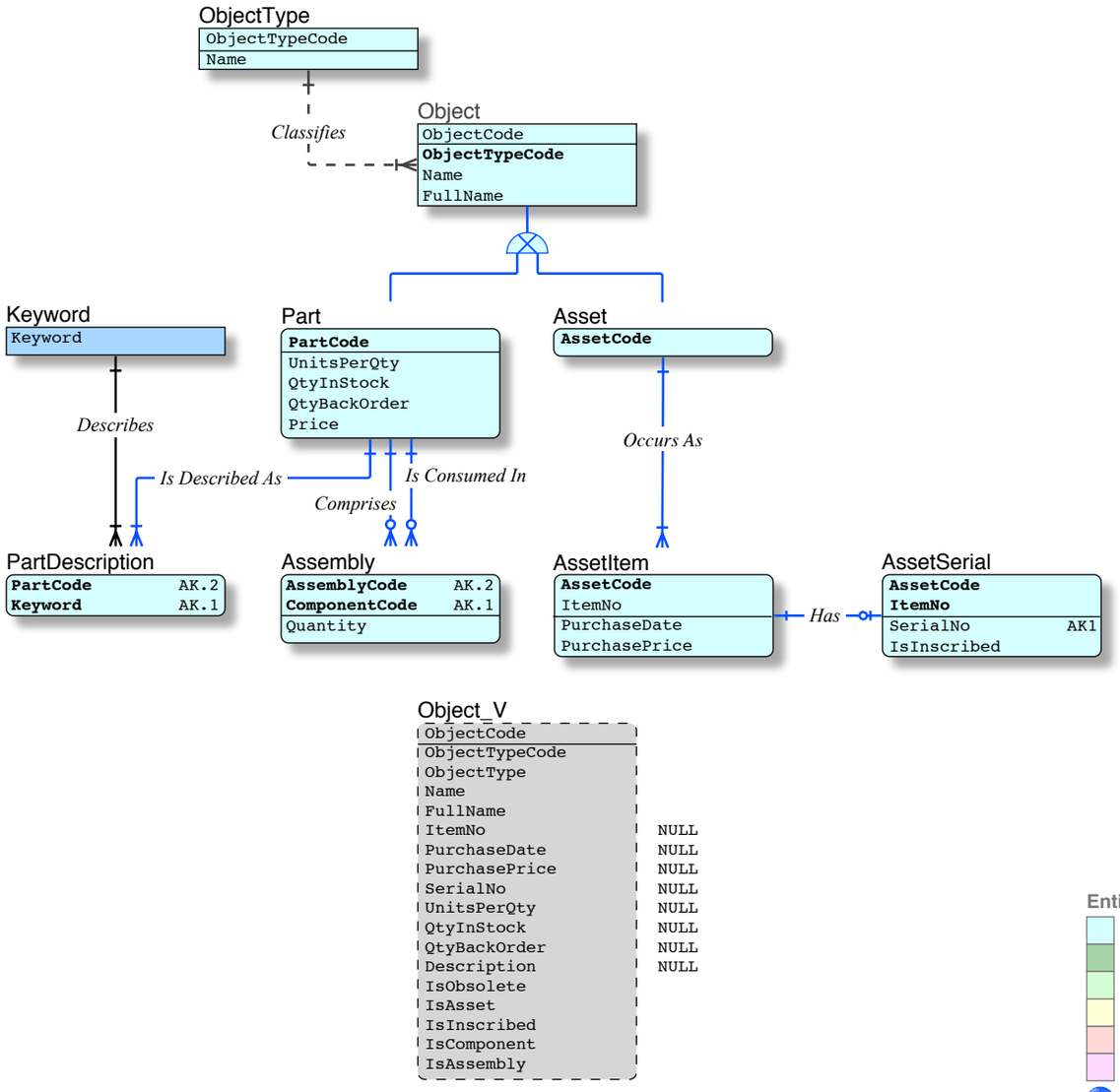
IDEF1X Notation

# Party & Object




Entity Type
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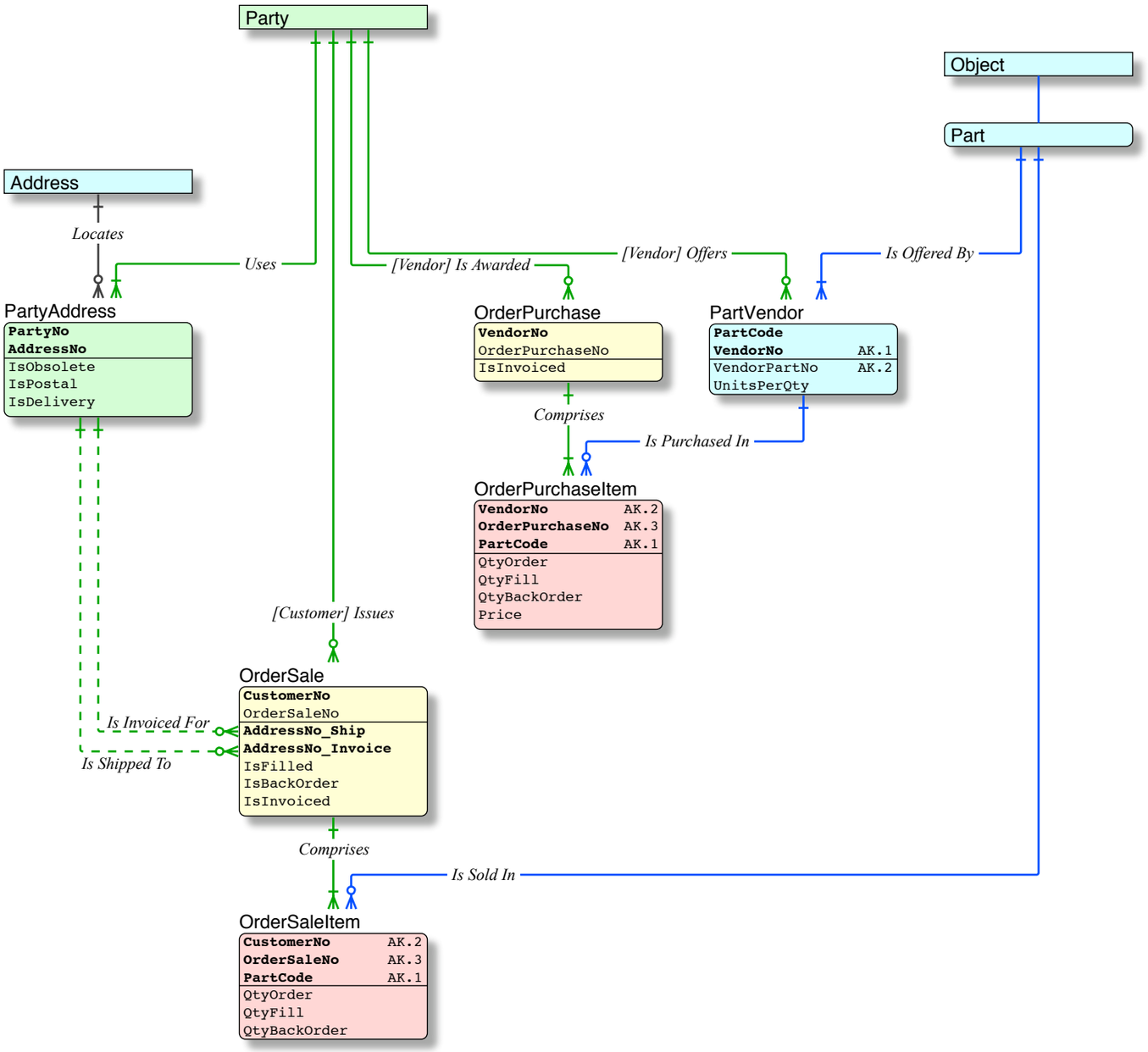
IDEF1X Notation

# Inventory




## Relational Key

- Natural Keys, Relational Integrity and power is retained
- This provides Data Distribution & high Concurrency
  `OrderSaleNo` is sequential within `CustomerNo`
  `OrderPurchaseNo` is sequential within `VendorNo`
- In Transaction tables such Keys serve multiple purposes
- Keys are migrated and used as **Roles** as per the *Relational Model and* IDEF1X:

| | |
|---|---|
| `AddressNo` | `AddressNo_Ship` |
| | `AddressNo_Invoice` |
| `PartyNo` | `CustomerNo` |
| | `VendorNo` |

## Domain

- Is shown to the extent possible in IDEF1X (ie. no Domain Extension)
- Coloured relationship lines further identify the Domains, the Relational Sets, within the limits of IDEF1X. Black is used for the unimportant sets.
- The **Hierarchical Layout** & **Collapsed Entity** Extensions are employed here

**Entity Type**

- Reference
- Identifying/Major
- Identifying
- Transaction
- TransactionDetail
- History, Audit

IDEF1X Notation

Select any collapsed table to open it