



**Corporate Services for the Natural Resource
Sector**

Information Management Branch

Domain Data Modelling Standards for the Natural Resource Sector

Last Updated: October , 2014
Version: 1.0.0
Document: NRS_Domain_Modelling_Standards_1.0.0

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1. Version Control

Document Version	Revision	Date	Author(s)	Change Reference
1.0.0	Draft	October 10, 2014	Data Architecture	Initial release

2. Introduction

2.1 Purpose

This document was created by the Data Architecture section of Information Management Branch to document the minimal set of domain data modelling standards for the Natural Resource Sector data models based on Unified Modeling Language (UML) 2.0.

This guide illustrates and explains the form, standards, and conventions to be used for UML domain data models for applications intended for any of the information processing environments within the Natural Resource Sector.

2.2 Audience

The guide is intended for data designers, data architects and data analysts who have knowledge of the techniques and procedures involved in data modelling and will be creating or maintaining object UML data models for the Sector.

2.3 Scope/Exclusions

The scope of this document covers all UML data models delivered to or maintained by the sector.

Where conflicts, if any, are perceived between this document and other standards, the Business Portfolio Manager must be consulted.

2.4 Assumptions

It is assumed that the audience has working knowledge of the Sector's System Development Life Cycle (SDLC) process, standards around the content of those documents, familiarity with object data modelling and the Sparx Systems Enterprise Architect modelling tool used to create and maintain these models.

2.5 Definitions

The following definitions apply throughout this document.

2.5.1 Standards

A standard is a specific statement of the rules and constraints governing the naming, contents, and operations of software. A standard must be followed. There is a contractual obligation on the part of the vendor/developer to adhere to all relevant standards.

2.5.2 Guidelines

A guideline is a method or custom, which through common usage has become an accepted method of work. A guideline is not enforced, and is not a standard.

2.5.3 Sector

Unless otherwise specified, "Sector" is taken to collectively mean the Ministries and agencies which are included under the umbrella of the Natural Resource Sector. All are served by a

common Corporate Services Division and thus Information Management Branch (IMB) with the mandate to formulate and maintain application development standards.

2.6 Contacts

All inquiries regarding these standards should be directed to the Data Architect assigned to the project or contact the IMB Data Architecture Services mailbox at CSNR.Data.Architecture.Services@gov.bc.ca

3 Domain Data Model

A key purpose of the model is to depict the relationships between critical data elements within the scope of the business problem being addressed at a high-level. This diagram is developed to address the concerns of business stakeholders.

Data elements in the model could include a person, place, thing, event, or concept about which the Natural Resource Sector (NRS) is interested, as well as any related facts that are gathered and recorded as part of NRS business. The model is designed to show enough high-level data to support the business requirements and allows for easy interpretation of the data elements and flow without needing a technical background

3.1 Domain Model for Natural Resource Sector

The model for the NRS;

- Is database and technology agnostic; i.e. it is independent of the physical structure in which it may eventually be implemented.
- Includes data elements held within the NRS, as well as data shared with or by external agencies.

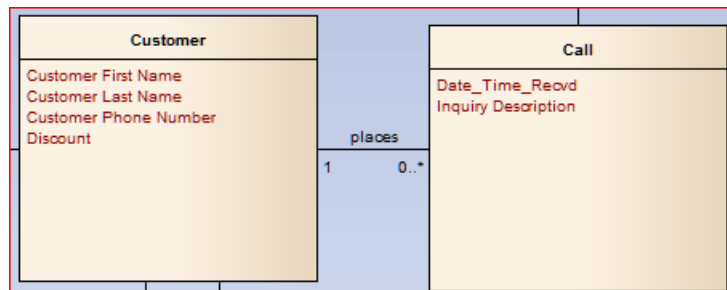
The following list includes basic requirements for the domain model:

- It shows the high-level information needs of the business and is designed at a conceptual level to identify major classes.
- Major data attributes may also be included where they are obvious or important to the business at this stage.
 - audit fields should not be included in the domain model.
- Lists of valid values that are significant to the business should be reflected on the model as an Enumeration with some of the enumerated values listed in the description.
 - Code tables are not included in the domain model, only Enumerations with examples of the list of enumerated values. Whether to implement these as either code and description validation values or just enumerated list validation values will be determined in the model design.
- High-level generalizations/specializations to identify different types of high-level business requirements may be included.
- Class descriptions, which contain:
 - the name of the Class,
 - a textual definition of the purpose of the Class.
- Attribute (data element) descriptions, which contain the following for each attribute:

- the name of the Attribute,
- a textual definition of the purpose of the Attribute .
- Business keys showing the unique business identifier of the business data.
- Associations between classes are defined, with a meaningful label and an indication of multiplicity.
- Association types can be Dependency, Aggregation, Generalization or Association.

3.2 Associations (between one or more classes)

- Associations between classes are shown as follows;
 - Each Association is drawn as a line connecting the two classes.
 - Each Association is given a name that indicates what information it imparts the following:
 - Association names must be meaningful.
 - "catchall" phrases (EG 'has' 'is' 'related to', 'associated with') are avoided in favour of more descriptive Association names.
 - Association names do not contain '_' (underscores).
 - Association names are all lower case
 - Association names read from source to target
 - e.g. each Customer(source) places (association name) zero to many Call (target)



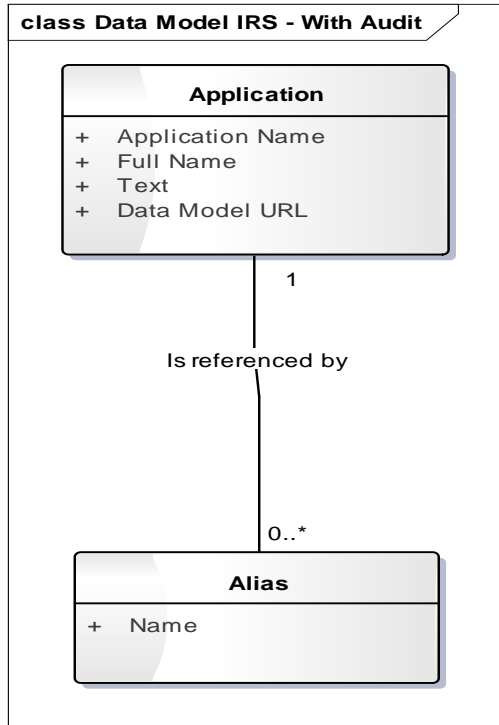
- Cardinality of the Association

3.2.1 Association Types – Approximate Graphic Symbol:

	UML
Zero to Many Association (Left to Right) Many to One Association (Right to Left)	<u>0..1</u> <u>1..*</u>
Zero to Many Association (Left to Right) Many to One Association (Right to Left)	<u>0..1</u> <u>0..*</u>
Zero to One Association (Left to Right) One to One Association (Right to Left)	<u>0..1</u> <u>1</u>
Zero to One Association (Left to Right) Zero to One Association (Right to Left)	<u>0..1</u> <u>0..1</u>
Many to Many Association (Both Ways Zero to Many)	<u>0..*</u> <u>0..*</u>

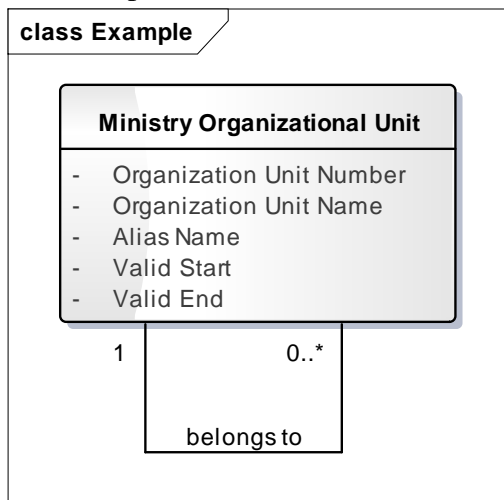
3.2.2 Association Examples

For Example:

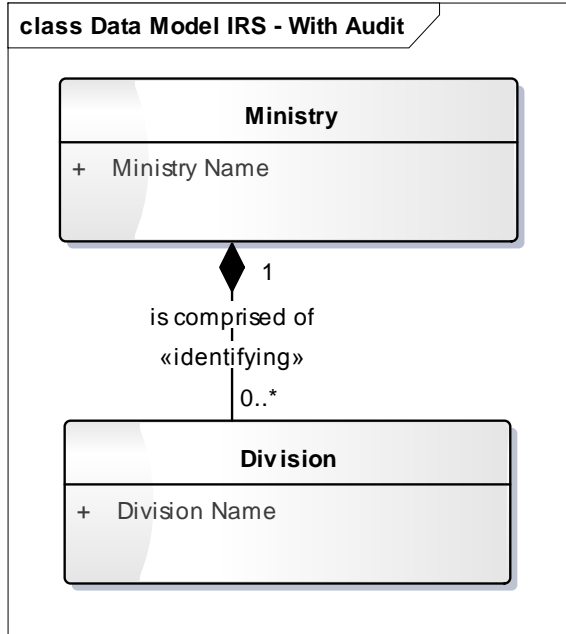


A recursive Association can be used to implement hierarchies and are represented by a single Association from a class to itself

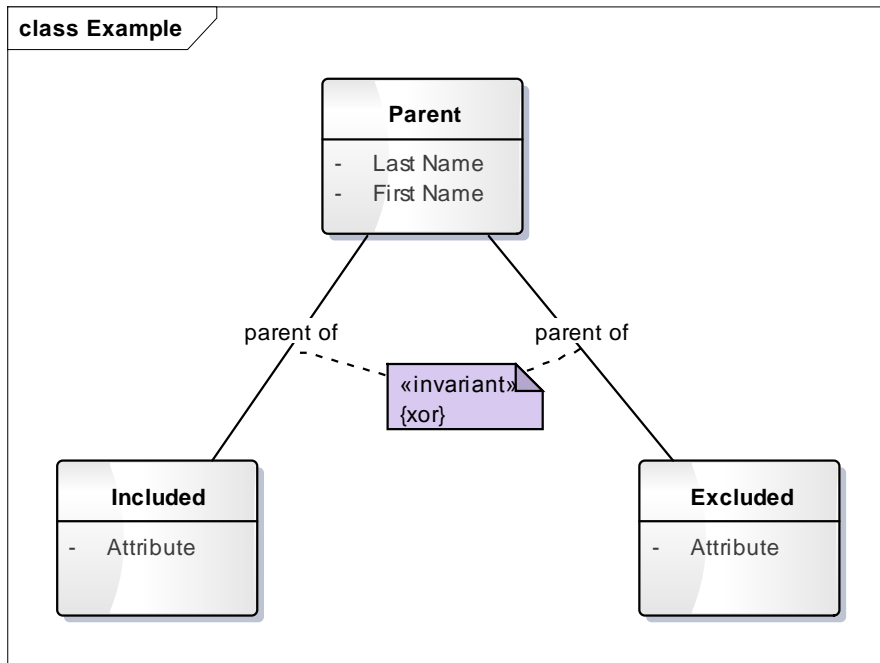
For Example:



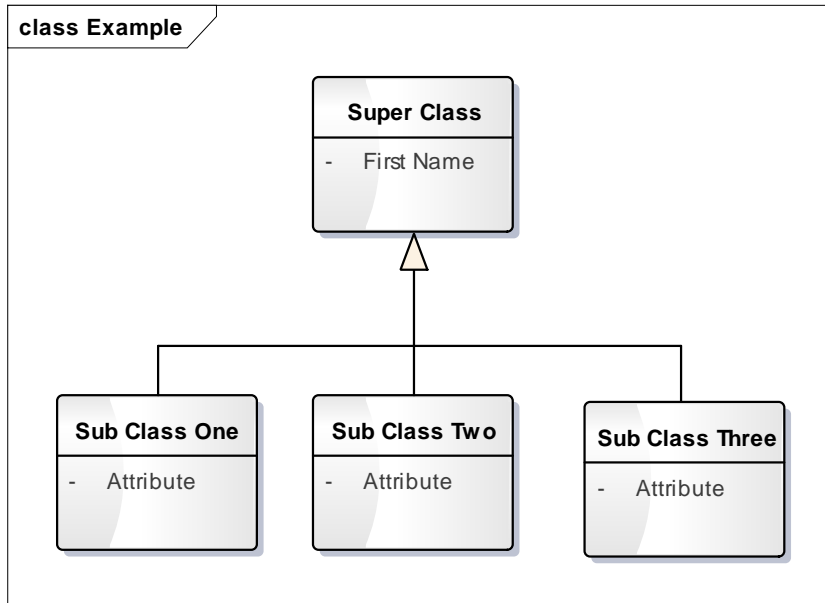
Identifying Associations are indicated by adding the stereotype 'identifying' to the Association between classes, which shows that a foreign key is being used as a primary identifier (or part of the primary identifier) in the class closest to the tag and makes it easy to see which classes are dependent on other classes



Mutually exclusive Associations are represented by a constraint between 2 or more Associations. For Example:



Example of Sub-Types



3.2.3 References

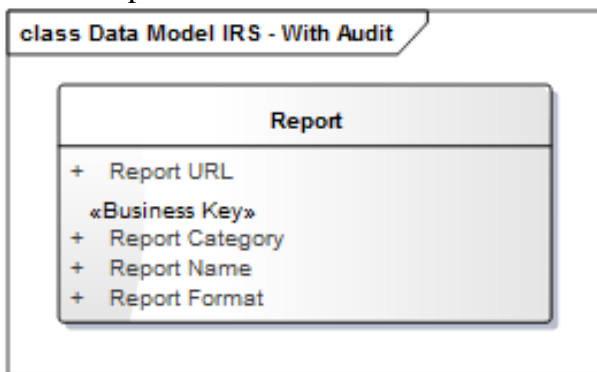
http://www.odtms.org/wp-content/uploads/2013/11/Data_Modeling_ConcepttoDBMS.pdf

<http://www.irmac.ca/1213/1.%20UML%20and%20Data%20Modeling%20-%20A%20Reconciliation.ppt>

3.3 Business Keys

The data model should not contain an extra ID# (surrogate key) on each entity, but instead should use a proper BUSINESS KEY which is unique. If this is not available or the business key is volatile, then a surrogate key is okay, e.g. Project Id.

For Example:



3.4 Further Requirements Phase Considerations

While not required at the Requirements phase, consideration should be given to what eventual data types will be applied to attributes. Data names will eventually have length limitations in subsequent modelling phases.

4 Data Naming Formats

4.1 General Format of Class Names

The name used to define each class must be unique within the model. This is accomplished by placing qualifiers or quantifiers in front of the class name if the class name is not unique within the model without qualification.

The general form of the class name is:

- The name must be derived from the business use or purpose;
- The name must be meaningful to the business;
- The name must be self-documenting (by looking at the name, the reader should have a good idea what the name means without having to read the description);
- The name must be repeatable (different people from different areas of the sector reading the name at different times must have the same understanding of what the name means -- a corporate-wide use of the name);
- The full name is in mixed case, delimited by spaces;
- Use <class name> – where class name is unique business name within the model
e.g.: Student
- Use <modifiers> <class name> – where name needs qualification for uniqueness
e.g.: Domestic Student
Foreign Student
- Use singular names to emphasize that the class is a pattern for every instance of the object that is being defined
e.g.: Use “Client”, not “Clients”

4.2 General Format of Attribute Names

Each attribute of a class must be unique only within that class. The class-attribute combination follows through, with some limitations, to the physical model's table-column definition. In both cases, the following rules for choosing names should be applied:

- The name must be derived from the business use or purpose;
- The name must be meaningful to the business;
- The name must be self-documenting (by looking at the name, the reader should have a good idea what the name means without having to read the description);
- The name must be unique within the class
- Use singular names to emphasize that the attribute name (and corresponding definition) is a pattern for every instance of the object that is being defined
- The full name is in mixed case, delimited by spaces;
- Use <noun> alone wherever possible
e.g. “Contract”;

- Use <adjective><noun>, or if needed <adjective><adjective><noun> delimited by spaces to clarify meaning, but see next point
e.g.: “Lease Contract”
“Purchase Contract”
- Minimize the use of adjectives when they are not completely necessary
e.g.: use “Contractor”, not “Contract Employee”
use “Warehouse”, not “Storage Building”
- Acronyms are acceptable and even encouraged where they are universally understood, accepted and stable, especially where the acronym is more commonly used than the long form. Examples of accepted acronyms are: OAP, SIN. However, application acronyms are generally only accepted where the table is specific to only one application (now and in the future) and is more technical in nature, e.g. “ECAS Audit Event”.

4.3 General Format of Association Names

Associations between classes are shown and must have meaningful names to identify the business data flowing between the classes. Where multiplicity and optionality are available they must be shown.

The general form of the association name is:

- An association must be meaningfully named.
- "catchall" phrases (EG 'has', 'hasa', 'is', 'isa', 'related', 'associated') are avoided in favour of more descriptive association names.
- Association names do not contain '_' (underscores).
- Association names are all lower case.

5 Class and Attribute Descriptions

Descriptions are used to enhance the understanding of class and attribute names. Generally the description must explain what the class and attribute are to non-application personnel, or non-business users.

In general, the descriptions should follow these guidelines:

- Where possible, the intent of the class should be shown. This allows the reader to understand the rationale for the class and fit their own understanding of the business into the one represented by this class.
- Where there may be confusion between two similar attributes in a class, either because their names are similar or because their descriptions are similar, there should be explicit text which explains the difference between the attributes.
- For each attribute, if it has an acronym in its definition, the acronym must be fully qualified, in the suggested format: “Full Name (acronym)”
e.g.: “Universal Transverse Mercator (UTM)”
- An example of the usage of the acronym or attribute should be included for clarity

Examples

Class Descriptions:

- ‘Planning Review’
A Planning Review is an undertaking by a Local Government or a Ministry of the Provincial Government to establish a course of action or direction on future land use that is of interest
- ‘CIP Crop By Unit’
Crop Insurable Plant (CIP) Crop By Unit is a subtype of Crop Type that contains crops that are insured on a number of Plant units basis.
- ‘Lot’
Lot is an area of a farm used for growing one or more crops
- ‘SPC Dtl Acreage Report’
Statement of Premiums and Coverage (SPC) Detailed (Dtl) Acreage Report contains acreage loss details for SPC reports while they are being generated.
- ‘SPC Dtl Plant Report’
Statement of Premiums and Coverage (SPC) Detailed (Dtl) Plant Report contains plant details for SPC reports while they are being generated.

Attribute Descriptions:

- Attribute ‘Local Gov Document Name’ on ‘Planning Review’
Local Gov Document Name is the name of the Local Government assigned the Planning Review
- Attribute ‘Unit Measurement Type’ on ‘CIP Crop By Unit’
Unit Measurement Type is the unit of measurement used for the Crop Type
- Attribute ‘Legal Description’ on ‘Lot’
Legal Description is the description used by the BC Land Survey System for a Lot of land. An example would be: "LOT 14, SECTION 18, RANGE 6, MOUNTAIN DISTRICT, PLAN VIP79784"