GeoBase

National Road Network, Canada, Level 1 Data Models

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REVISION HISTORY

Date	Version	Description
January – 2003	1.0	Original version

FUTURE WORK

Key word	Description

# TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

LRM   Linear Reference Method

LRS   Linear Reference System

NID   National Identifier

NRCan   Natural Resources Canada

NRNC1   National Road Network, Canada, Level 1

TERMS AND DEFINITIONS

1   Overview

The data model can (and must) extend beyond the smallest common denominator obtained with the partners.   The model must therefore contain two levels of information: mandatory data (white boxes) and optional data (yellow boxes).   Data homogeneity will thereby be ensured by a minimum set of data. Beyond the minimum level, the model serves as a target for all partners.   Over the years, we will therefore work towards raising the minimum and redefining new targets. Minimum content has been defined for attributive and geometric data (see Figure 1 – Specifications expansion).
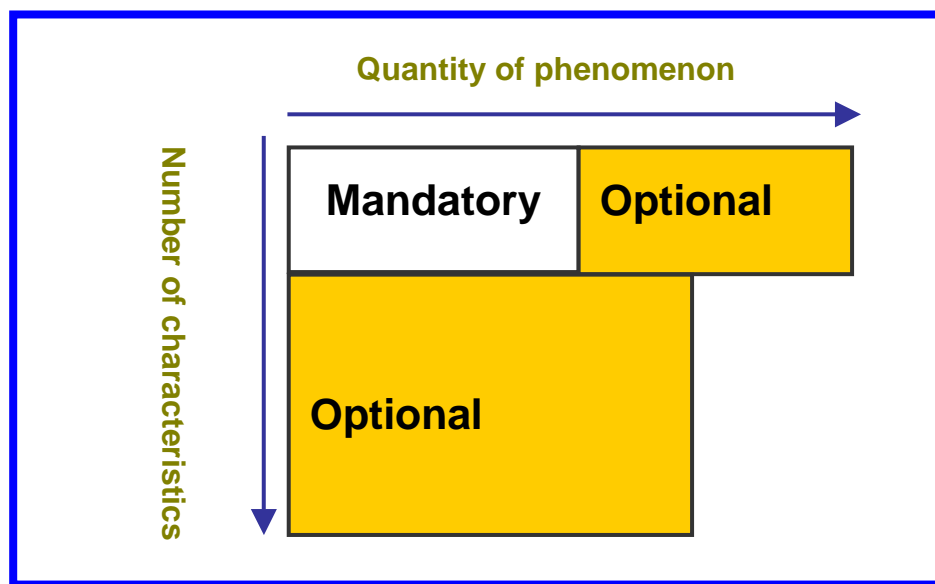
2   LRS

The Linear Reference System (LRS) is considered the most viable approach for managing and distributing geospatial information when several distinct organizations are involved (distributed approach).

This method makes it possible to divide a standard spatial object into two parts: the geometric and attribute parts. The geometric part (Road Element and Ferry Connection in the NRNC1) describes the feature's position but not its nature. The attribute part (or event) describes specific information observed along its linear geometric representation. Events information doesn't alter the geometric representation in any way. The event's position is given by measurements from the beginning of the linear geometric representation. A Point Event is determined by a specific location, while a Linear Event is defined by a starting and ending measurement. Several Linear Methods (LRMs) can be used (not discussed herein). This approach provides the means for sharing a common geometry while allowing each application to add a set of attributes (events) in relationship with the Road Network geometry.

The NRNC1 data model is based on an LRS approach. Two packages (see Figure 2 NRNC1 Packages) have been defined: the *Road Network* package contains all geometric information, while the *Events* package contains attributive information.
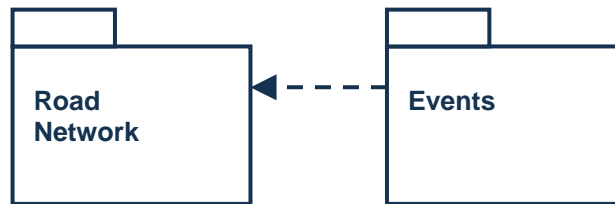

Figure 2 NRNC1 Packages

3   Data Views

Although LRS Modeling will be the adopted method, a more conventional view is needed for standard GIS software. A Segmented view has been developed to convey the NRN data in this well-known form. The LRS view contains the complete data model (mandatory and optional requirements) while in the segmented view presents the minimal attribute requirements. Consequently, two views of the data will be offered: *LRS* and *Segmented*. Details for both models can be found in the following section and in *National Road Network, Canada, Level 1 - Data Catalogues*[1].

4   Perceptory

Perceptory pictograms were added to the UML [1] diagram. Perceptory [2] uses Plug-ins for Visual Language (PVLs) that yield better descriptions of spatiotemporal object classes, attributes, and associations. Only the pictograms used in defining NRN models are described herein.

4.1   Geometric representation pictograms

The geometric type representation is indicated by two specifics pictograms:

- OD   Simple Point primitive

- 1D   Simple Line primitive

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[1] These documents can be found in the Data section at http://www.geobase.ca/.

4.2   Temporal pictograms

The following text has been taken in part from the Perceptory Web site [2]. This Web site provides a detailed description of several aspects of spatiotemporal modeling. This section explains the basic concepts for managing data over time. The detailed characteristics of the NRN and its evolution over time are described in *National Vector Data – Change Management*[2] document.

Existence:
   The *existence* is defined for an object; its boundaries are the "birth" and "death" of the object. The *existence* is represented in the model by the following pictogram:

   - 1D Existence

Evolution:
   The concept of evolution is applicable when the state of the object changes, when this one exists. There are two kinds of *evolution*: descriptive evolution and spatial evolution. Descriptive evolution is applicable on object attributes when a value of this attribute is changed. Spatial evolution is used when the user wants to manage the changes on the location and shape of a cartographic object. Evolution is defined by the starting and ending date of a stability period. *Evolution* is represented in the model by the following pictograms:

   - Punctual geometry evolution

   - Linear geometry evolution

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[2] This document can be found in the Data section at http://www.geobase.ca/.

5   LRS View

The following document link contains the LRS Model (PDF format).

6   Segmented View

The following document link contains the Segmented Model (PDF format).

References

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1   Muller, P.A**.** "Modélisation objet avec UML." Éditions Eyrolles, 1997, 421 p.

2   http://sirs.scg.ulaval.ca/perceptory/