



Barents GDB Data Specifications

April 2008

Version 3.1

PREFACE

The Barents GDB Data Specifications was prepared by and issued under the authority of the project called Geographic Information Technology within the Barents Region (GIT Barents).

The detailed specifications for the contents of Barents GDB have been written by the members of Project Work Group A; Owe Palmér (Project Manager), Frank Arntsen, Andja Zimic, Heikki Lantto and Vladimir Plechkov (Technical Project Managers). These specifications are derived from the Barents GDB conceptual model and describe the data set, the data model, and the feature and attribute coding structure.

The normative references used in the Barents GDB Data Specification can be found in chapter "References". The Work Group likes to present special thanks to all of their colleagues who have participated into the working process. Furthermore, special thanks are given to the Digital Geographic Information Working Group, to the Open GIS Consortium, and to the National Resources Canada who are the authors of the documents the Work Group has been mostly referring to.

Barents GDB Data Specifications describes an integrated multi-national database. Should other multi-national databases come into existence, the standards of this document can easily be applied, since international agreements (ISO standards) have been considered as far as published and known to the Work Group. For bi- or multi-national system developments, this document should apply. The availability of standard data specifications that can be used multiple times will reduce costs of data acquisition and simplify the process of product specification for geographic datasets.

Any proposed changes or comments should be keyed to the specific page, paragraph and line of text. Reason should be provided for each change or comment to ensure understanding and complete evaluation. Comments should be addressed to the national representative.

The Barents GDB Data Specifications is intended for internal use as well as for external users of Barents GDB. International distribution of Barents GDB Data Specifications will be the responsibility of GIT Barents, through the national representatives of Mapping Agencies within each participating country. The national representatives can distribute freely outside their own nations.

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INTRODUCTION

The National Mapping Agencies of Norway, Sweden, Finland and Russia has been collecting, managing and using digital topographic data for the last twenty years. Concerning printed maps and digital geographic information, all countries have created their own individual standards. There has been a lack of homogeneity, which makes it difficult to merge maps from the different countries with each other.

Geographic information provides new opportunities for critical trans-national areas (areas or regions which are shared or affected by several countries, yet must be managed as a whole) and activities which require different kinds of information to be put together. Although new GI technologies and applications are developing rapidly, future growth of regional cooperation is hampered by major differences in the way GIS is collected, stored and distributed in the different countries and in different sectors of government and commerce.

To meet the demand of better structured digital geographic data covering the Barents Euro Arctic Region the National Mapping Agencies of Norway, Sweden, Finland and Russia have undertaken the development of Barents GDB as a second phase of a larger development project called Geographic Information Technology within the Barents Region (GIT Barents). As a first step towards its implementation, a conceptual model has been written to single out the objectives and constraints of the data base. Because data applications are much diversified, it has been decided to gather only the basic data. Such data tend to keep the topological level of the data structure as low as possible and allow a maximum of flexibility for the users.

This document presents the integrated data specifications for the Barents GDB. These specifications are derived from the Barents GDB conceptual model and describe the data set, the data model, and the feature and attribute coding structure.

The reader should note that some definitions appearing in this document are specific to Barents GDB context although the main part of the terms and definitions used are based on the working draft document called Collection of terms from ISO/TC 211 Geographic information/ Geomatics and guidelines for terminology.

You can also find the latest version of this document on the internet – <http://www.gitbarents.com>.

BARENTS GEOGRAPHIC DATA BASE

Content of the Barents GDB

The design of the Barents GDB has been guided by the following main principles:

- 1) The information associated with the real world phenomenon is saved according to their own natural character and structure.
- 2) Information describing the same phenomenon is connected with each other (feature type) and information describing the same group of phenomena are grouped together (feature type category).
- 3) Should there be additional information on the feature type in other data sets and there is a definite and permanent identifier attribute access to it, this identifier attribute must be referred to in the feature and attribute coding structure.

The real world phenomena which are described in the conceptual model for Barents GDB has been grouped into eight (8) feature type categories as follows:

- 1) Administrative structure
- 2) Transport
- 3) Hydrography
- 4) Land cover
- 5) Settlements
- 6) Geographical names
- 7) Elevation
- 8) Protected areas

As a main rule each feature type category includes all information of one phenomenon or group of phenomena so, that each feature type is included only into one feature category. In exceptional cases features describing the same or similar phenomenon have been grouped into different feature type categories. Furthermore some feature type categories may include partially same information. All this means that the feature type categories are not fully independent of each other, but have a number of logical connections on the conceptual model level.

In the conceptual model the feature types and their relationships are described in a manner which is generally applicable rather than application specific.

Map Projection and Coordinate System

Coordinates belong to a coordinate system. Coordinate systems have a datum definition together with an axes definition. The datum may be geodetic or local. A Geodetic Coordinate Systems are based on geodetic data; otherwise the coordinate system is local. A geodetic datum defines an orientation of the model in relation to the earth. A local datum has no geodetic reference model. The axes definition describes the names, units and order of axes in a coordinate system. The order of the axes is significant when coordinates are listed. If either of the datum or axes definition is changed then a different coordinate systems is

created. The coordinate system components are illustrated in figure 1.

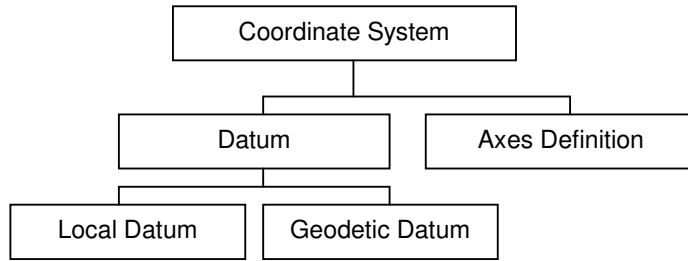


Figure 1: Coordinate System Components

Location in three-dimensional space is often described through concurrent use of two-dimensional ellipsoidal coordinate system with complimentary but independent one-dimensional vertical coordinate system. This is not a true 3D coordinate system for the horizontal component can be transformed without altering the vertical, and vice versa. The term “compound”, or 2.5D is used to distinguish these coordinate system combinations from genuine 3D systems. The components of some common compound systems are shown in figure 2.

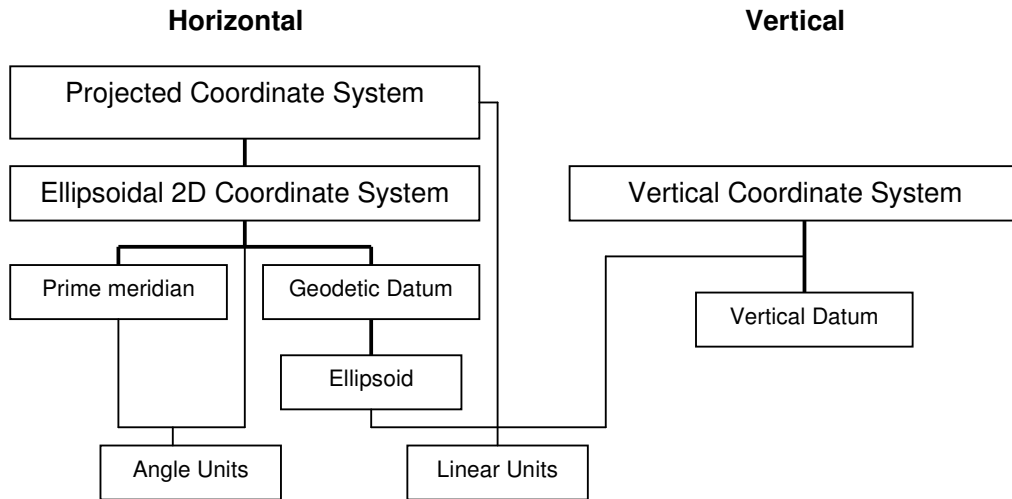


Figure 2: Common Compound Coordinate System

Horizontal Datum and Horizontal Coordinate System

The common world wide reference datum of World Geodetic System 1984 (WGS84) is used as the reference system for ellipsoidal 2D coordinates (X,Y). The ellipsoidal 2D coordinates (latitude/longitude) are expressed as decimal degrees.

Vertical Datum and Vertical Coordinate System Elevations

Latitude and longitude values are part of a two-dimensional coordinate system describing locations on the surface of a 3-dimensional earth. To describe location in three dimensions it is necessary to supplement these horizontal coordinates with an ordinate in the third, vertical dimension. Vertical ordinates belong to a one dimensional vertical coordinate system.

For the Barents GDB Elevations (Z) are orthometric and are expressed in reference to the Mean Sea Level. Vertical coordinates are expressed using national vertical datum with different determinations. Heights relative to these datum are measured along the direction of gravity. As with geodetic datum, the detailed definition of the vertical datum is often useful, but for practical geographical information processing is not essential so long the vertical datum is identified through its name or abbreviation. The used vertical datum is: NN1954 (Norway), RH70 (Sweden), N60 (Finland) and Baltic (Russia). The elevation differences between the different geoids are ignored and the elevations of each country will be presented in the same layer by using the national vertical datum.

DATA MODEL

The Barents GDB utilizes the vector geo-relational data model to support a vector-based, thematically layered database. The Barents GDB is designed for vector based Geographic Information Systems which are defined by the vectorial representation of their geographic data. According with the characteristics of this data model, geographic objects are explicitly represented and, within the spatial characteristics, the thematic aspects are associated.

To represent a geographic feature (feature entity) in the Barents GDB, two distinct data elements are needed:

- entity (objects with common properties)
- geometric representation (geometrical data entity).

Furthermore, to represent the spatial relationships (topological relations) between geographic features, one additional data element is needed:

- topology (topological data entity).

Vector data represents the “Universe of Discourse” in terms of the boundaries and attributes of individual features. Features are real items that can be identified on the earth, such as a river or a road, or they are abstract items such as political boundaries. Attributes may be ascribed to features which describe what type of item they are, and also provide information to the particular instance of the item. A specific feature is defined by a unique list of attributes; a unique set of attribute codes and associated values, and relations to other entities.

Features may be either of Point, Line or Area type. A simple point feature defines a zero-dimensional location that is composed of one (or more) node primitive(s); for example height point. A simple line feature defines a linear (one-dimensional) structure, which is composed of one or more edge primitives. Area feature encloses a region; for example, a lake, administrative area or glacier. Simple area feature implies the use of face primitive. Simple features are composed of topological elements of same type only (i.e. face, edge or node). Simple features are homogenous in attribution. Contiguous simple features homogeneous in attribution are permitted but not encouraged. A complex feature is composed of more than one simple feature. All this means that the spatial extent of features is described in terms of Node, Edge and Face elements. These topological primitives carry positional attributes. The relationship between these primitive spatial elements is optionally described in terms of topology.

Barents GDB permits topological relationships to be described to four different levels of sophistication. Barents GDB provides a single vector data model which can carry any of the four identified levels of topology.

The logical entity types and links (mandatory one-way relation) between features and topological entities in the Barents GDB data model (at various levels of topology) are illustrated in figure 3.

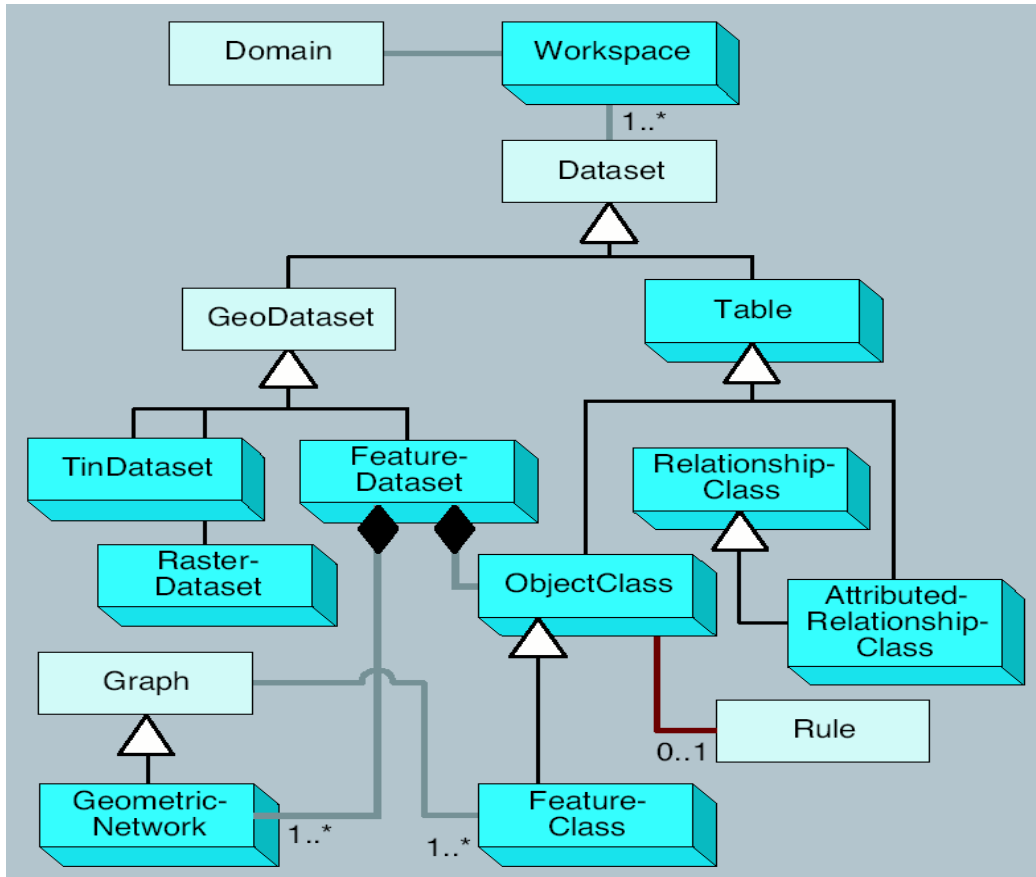


Figure 3: Barents GDB Data Model.

Note: The arrow indicates, for example, that an isolated (entity) node refers to its containing face, but faces do not refer to nodes. The relationship between nodes, edges and faces are described at different levels of topology.

Entity

An entity is a thing (object) distinguishable from its surroundings, about which information is required. For Barents GDB purposes an entity (feature entity) is the digital representation of the descriptive component of a geographic feature. It is associated with a name in order to distinguish it from other entities (e.g. railway, road, contour).

An attribute is a characteristic that describes an entity, (or a geometric representation). The number of attributes associated with a particular entity (or a geometric representation) varies. The feature type catalogue describes these attributes for each entity (e.g. attributes for railway are railway gauge, railway traction, relationship to the ground etc.)

To represent a particular geographic feature, Barents GDB gives a value to every attribute of an entity. This set of values constitutes an instance of an entity (e.g. for a particular instance of the entity "railway", attribute values are "standard, electrified, in tunnel, etc.").

In order to distinguish between distinct instances of entities (or geometric representation) in

a given data set, the identifier attribute is used. Its value is given by a sequential number incremented at each instance.

Geometric Representation

Geographic features carries information that positions them relatively to earth coordinates, or relative to each other. The most common technique for conveying the shape and placement of a geographic feature is with geometry. For Barents GDB purposes geometric representation is a spatial representation of a feature by coordinates and mathematical functions.

The Barents GDB database supports three different types of geometric representation: the features are represented as points, lines or areas (geometric primitives). Furthermore the Barents GDB database supports one cartographic primitive: names or other alphanumeric information associated to objects are represented as text. Each geographic feature may be associated with more than one type of geometric representation.

In the vector geometric model the fundamental tool for the geometric representation of features is the point. As we will see, points are strung together in sequences to make lines, and lines are grouped to make polygons.

Point

A zero-dimensional geometric representation (geometric primitive) of a point entity maid up of a single pair of co-ordinates (X,Y). A point is used to geometrically describe a geographic feature perceived as a point for Barents GDB purposes. A point normally represents a geographic feature too small to be displayed as a line or area (e.g. the location of a village on a small-scale map). A point may support an elevation (Z).

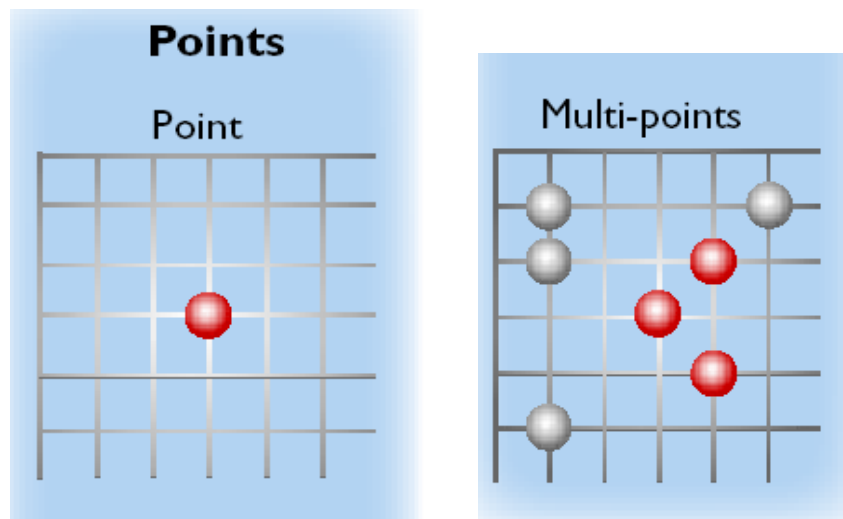


Figure 4: Point

Line

A one-dimensional geometric representation (geometric primitive) of a linear entity maid up of a series of two or more distinct vertices (V_1, V_2, \dots, V_n) sequentially linked. A line may support an elevation (Z). A line is used to geometrically describe a geographic feature perceived as a line for Barents GDB purposes, or the geometric representation that delimits, in whole or in part, a surficial entity. The location and shape of a line is defined by at least two distinct vertices sequentially linked.

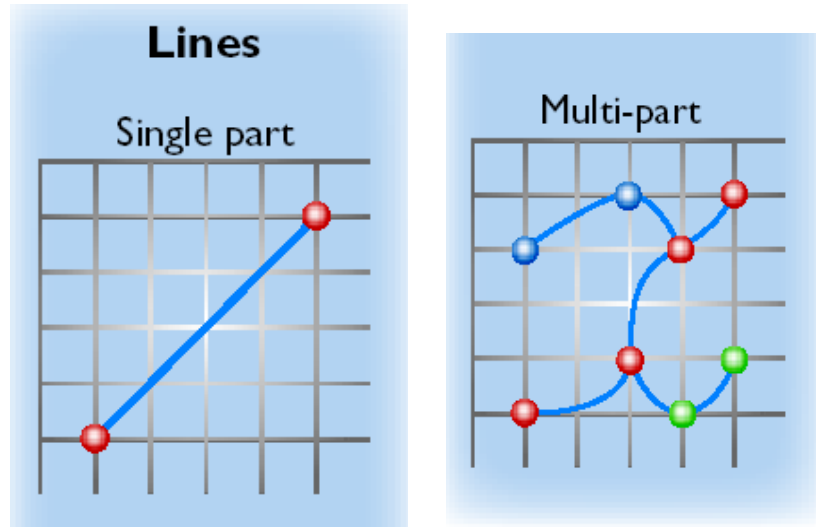


Figure 5: Vertices forming a line

Area

A two-dimensional geometric representation (geometric primitive) of a surficial entity made up of a line or a series of lines used for its delimitation. An area is used to geometrically describe a geographic feature perceived as an area for Barents GDB purposes. An area may be simple or complex. A complex area is made of inclusive and exclusive lines.

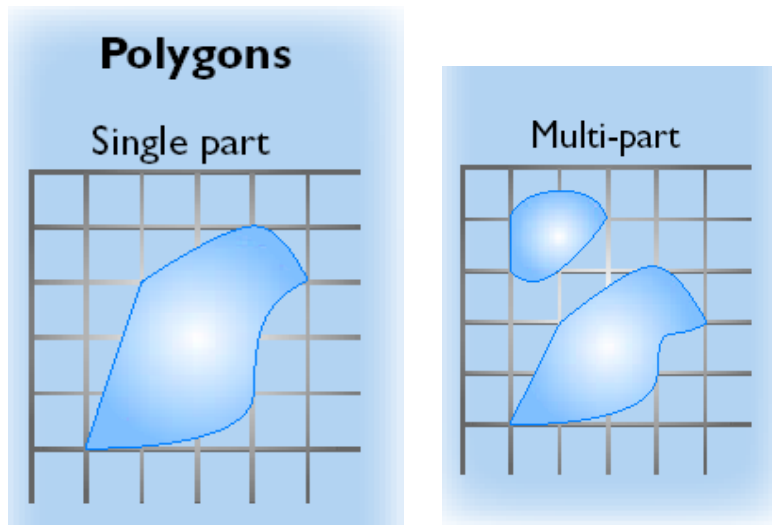


Figure 6: Area types

Text

A pseudo feature (cartographic primitive) associated to an entity, or otherwise completing the representation of an entity. Text is a cartographic, rather than a geometric, feature, and

exists to provide an annotation capability which can have attributes similar to the geographic features. Topological relationships do not apply to text. The text can be a name of an entity, or other alphanumeric information associated to an entity.

For Barents GDB purposes text is represented by minimum of a couple pair of co-ordinates (X,Y). The X,Y co-ordinate pairs show the position for placement of the text itself along a line.

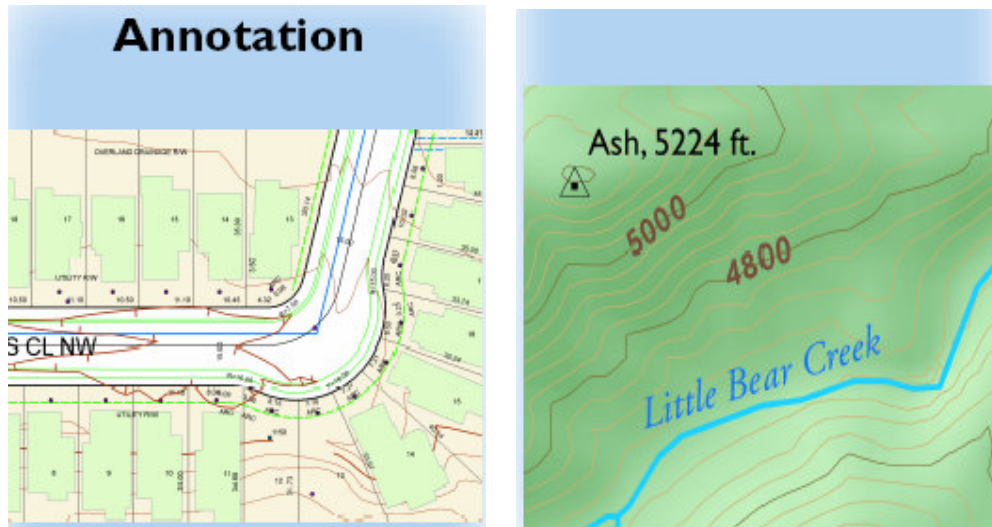


Figure 7. Representation of text object.

Topology

Conceptually, the three possible topological data entities – node, edge and face – form the building block of a complete and consistent topological representation of the two-dimensional space covered by a given database. Well-defined topological relationships exist between the different topological entities. In addition, a succinct set of rules is defined to which each entity must conform. The geographic features – point, line, area (and complex) – in the database are then represented by one or more topological entities.

Topological Elements

Node entity

- Node entities shall be used to represent the end point of edges (connected node) or the location of point features (isolated node; called also “entity node”).
- There shall be topological relations between connected nodes and edges: “start node” and “end node” (for Levels 1, 2 and 3).
- There shall be topological relations between isolated (entity) nodes and faces: “containing face” (for Level 3 only).

Edge entity

- Edge entities shall be used to represent the topological boundary of a face or the location of line features.

- There shall be topological relations between connected nodes and edges: “start node” and “end node” (for Levels 1, 2 and 3).
- There shall be topological relations between faces and edges: “left face” and “right face” (for Level 3 only).

Face entity

- Face entities shall be used to represent the topological faces (Level 3 only).

Topological Levels

The topological relationships are described in the Barents GDB to four different level of sophistication depending on the feature type in question. These four levels of topology are based on the same data model with additional topological relationships described at higher level. Each topological level can be defined by:

- a list of topological elements,
- a list of topological relations, and
- a list of topological rules or constraints applying to the existing set of topological elements.

Level 0 Topology (Spaghetti Data):

The most basic vector data that does not describe any topological relationships between topological primitives. Spaghetti data in the strictest interpretation can be used to represent only line and point features. However, area information may be captured in spaghetti data by use of “closed lines” which circumscribe an area.

- Nodes or edges, there is no face entity.
- No topological relations; topological entities are considered to be independent from each other.
- An edge record may be defined as “closing on itself” when used for defining the boundary of an area record (the first coordinate equals the last coordinate while other topology remains nodeless). The edges do not have start and end nodes identified.

Level 1 Topology (Chain Node Data):

The next level of vector data that describes edge-to-node topological relationships, where every edge must begin and end on a node; however, edges may cross without intersecting. This level of topology is sufficient to describe connectivity.

- Nodes or edges, there is no face entity.
- The “start/end node” topological relation is mandatory.
- The organization of the set of nodes and edges is driven by a semantic point of view, as opposed to a geometric one (e.g. a communication network)
 - Two nodes may occupy the same coordinate point.
 - A node may intersect an edge at any point.
 - Edges may intersect or overlap any other edge, or itself.

Level 2 Topology (Planar Graph Data):

The next level of vector data introduces the additional mathematical constraint that edges may not cross except at a node. This permits adjacency to be calculated although it is not directly stored in the structure.

- Nodes or edges, there is no face entity.
- The “start/end node” topological relation is mandatory.
 - Each edge will have a consistent description of its start node and end node.
- The set of nodes and edges will constitute a planar graph.
 - No two nodes may occupy the same coordinate point.
 - A node will intersect edges at their start/end point.
 - No edge will intersect or overlap any other edge, or itself.
 - As a result of the above rules, topological entities may exist without being component of any simple feature.
 - Topological nodes will be created as the intersection of two contiguous edges.

Level 3 Topology (Full Topology Data):

The highest level of vector data introduces the concept of a face and describes face-to-edge as well as node-to-face topological relationships. This carries adjacency, left face/right face topological relationships as well as node-in-face-containment.

- Nodes, edges or faces, rings are used to describe boundaries of faces.
- The “start/end node”, “left/right face” and “containing face” topological relations are mandatory.
 - Each edge will have a consistent description of its start node, end node, left face and right face.
 - Each isolated node will have a consistent description of its containing face.
- The coordinate surface is considered to be partitioned in a set of mutually exclusive and collectively exhaustive faces. The boundaries of the faces are composed of edges. The faces may contain isolated nodes.
 - No two nodes may occupy the same coordinate point.
 - A node will intersect edges at their start/end point.
 - No edge will intersect or overlap any other edge, or itself.
 - No two faces will overlap.
 - An isolated node is contained in single face.

Logical Consistency

A vector data set is defined as being logically consistent when all the following conditions are true:

- All mandatory relations between topological entities for the chosen topological level

are present and non-null (e.g. pointers to “left face”, “right face”, “start node”, “end node” and “containing face” are present for Level 3 – full topology);

- All topological entities necessary to represent simple feature within the data set are present;
- All relational pointers are satisfied (i.e. the record pointed to will be present in the data set).

In practice, if these conditions are true, the data is free from any spatial inconsistencies such as overshoots, undershoots or area disclosures. To easily obtain this result in the Barents GDB two relations are defined: connection and sharing.

Connection

Feature instances are connected when and only when the two following conditions are satisfied:

- there is a planimetric intersection between the geographic features involved;
- the B1000 supports this relationship.

Connection relationship requires that the planimetric coordinates (X,Y) of the connection point are duplicated for each geometric primitive involved in the relationship (see figures 8 and 10 for examples of the connection relationship). A connection relationship generally provokes geometric representation segmentation (see section Segmentation).

All the required connection relationships between features are listed in the Feature Type Catalogue.

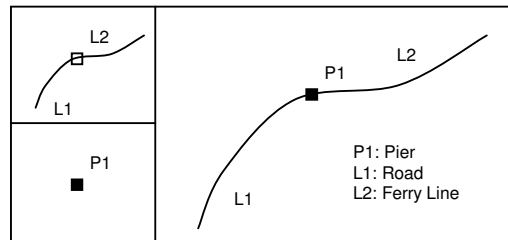


Figure 8: Point Entity and Linear Entities Connect

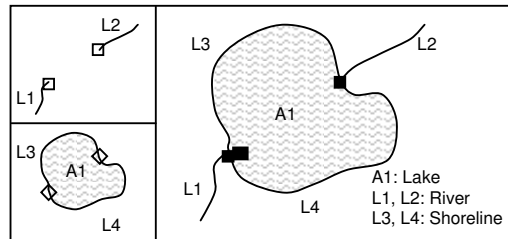


Figure 9: Linear Entity and Surficial Entity that are Connect

Sharing

Sharing exists between feature instances when and only when the two following conditions are satisfied:

- geographic features, perceived as lines or areas are partially or totally contiguous or

coincident;

- the Barents GDB supports this relationship.

Sharing relationship requires that the planimetric coordinates (X,Y) of the shared lines are duplicated for each feature instances involved in the relation. A sharing relationship implies that the planimetric coordinates (X,Y) of each point of connection, both located at each extremity of the shared line, may be duplicated in each geometric primitive ending to this point (see figures 10-12 for examples of the sharing relationship).

The words “contiguous” and “coincident” are used in their broad sense: a certain tolerance is allowed. Features may have been clipped with tolerance of 0.5 m each other so that they don’t overlap.

Examples of sharing relation imply adjacent or superimposed areas see figures 11 and 12. All the share relationships between feature instances are listed in the Feature Type Catalogue.

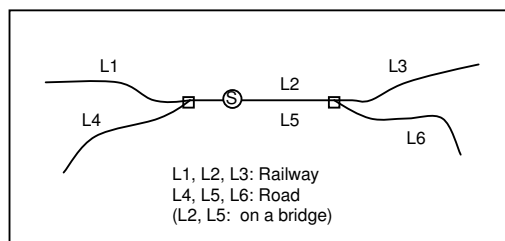


Figure 10: Linear Entities that Share a Line

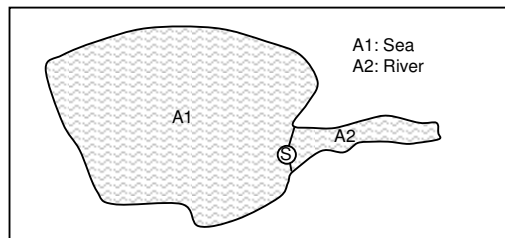


Figure 11: Surficial Entities that Share a Line (Adjacent Areas)

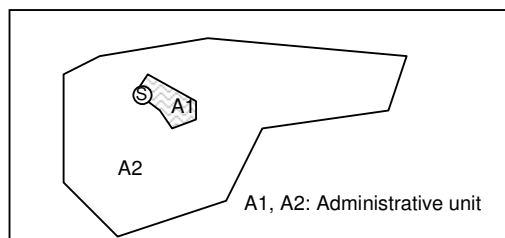


Figure 12: Superimposed Areas that Share a Line

Segmentation

Segmentation is the creation of new lines as a result of the fragmentation of an existing line. In a data set, a geographic feature is usually represented by a single entity and geometric representation instance. Only in the following cases is segmentation allowed and required:

- when a change in feature attribute value leads to segmentation of the entity's geometric representation at the point of change
- when a relationship of connection, may lead to segmentation of the geometric representation of one or more instances of entities at the point of connection
- when a relationship of sharing, may lead to segmentation of a line at either ends of the linear portion shared by two or more feature instances.

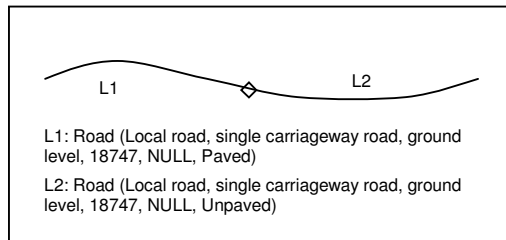


Figure 13: Segmentation by Changing of Attribute Values (Linear Entity)

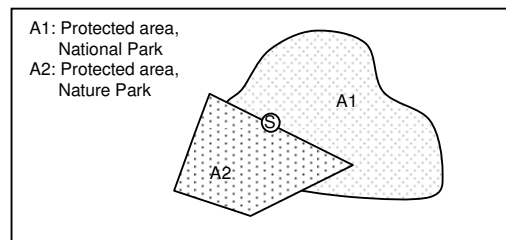


Figure 14: Segmentation by Changing of Attribute Values (Surficial Entity)

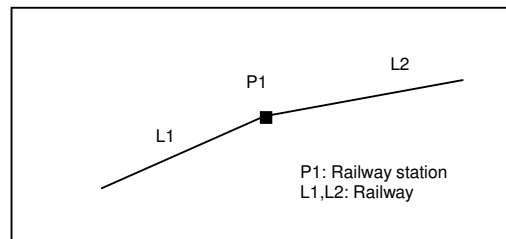


Figure 15: Point-Line Segmentation brought about by Connection

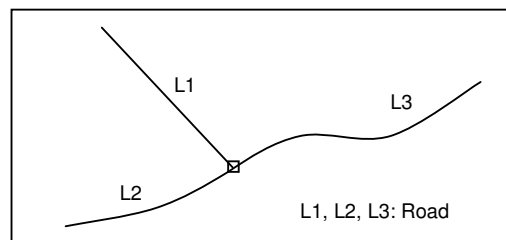


Figure 16: Segmentation of lines brought about by Connection

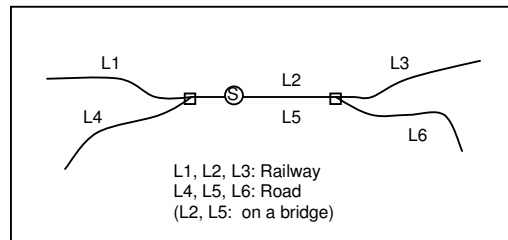


Figure 17: Segmentation of Coincident Lines brought about by Sharing

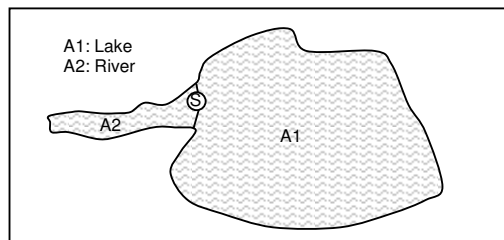


Figure 18: Segmentation of Coincident Limits of Areas brought about by Sharing

FEATURE TYPE CATALOGUE

The feature type catalogue presents the abstraction of real world phenomena in a set of geographic data as a defined classification of phenomena. The basic level of classification in the feature type catalogue is the feature type.

Geographical information bases typically describe the same set of core concepts, namely geographical features, their attributes and interrelationships. Geographic features are digitally represented at two levels: instances and types. At instance level, a geographic feature is represented as a discrete phenomenon that is associated with its geographic coordinates and may be portrayed by a particular graphic symbol. These individual feature instances are grouped into classes with common characteristics – feature types.

Organization of the Feature Type Catalogue

The feature type categories are organized in the following order: administrative structure, transport, hydrography, land cover, settlements, geographical names, elevation and protected areas. For each feature type category one will find a general description of the feature type category and a list of feature types organized according to their geometric representations.

The information within each feature type category is organized alphabetically by the feature type. For each feature type one will find: its name, representation, code and definition; its selection criterion; its attributes, and their definitions, authorized values and value descriptions; and its relationships and notes.

For each feature type, the following items are found:

- **FEATURE TYPE NAME (Geometric representation) - CODE**

- Definition**

- The “**FEATURE TYPE NAME**” corresponds to real world phenomena about which information is required: it is a text string uniquely identifying the feature type within the data set. Beside the feature type name one will find the feature type’s “**geometric representation**” (P: point, L: line, A: area (or T: text)) and “**code**” (a five-character code uniquely identifying the feature type), and immediately after the name the “**definition**” of the feature type in a natural language.*

- **SELECTION CRITERION**

- Size or other corresponding criterion, which determines if a feature type conforming to the feature type definition is either included or excluded from the database.*

- **ATTRIBUTES**

- **FEATURE ATTRIBUTE NAME**

- The “**FEATURE ATTRIBUTE NAME**” is a string uniquely identifying the feature attribute.*

- **Value Domain Type, Value Data Type (number of characters)**

The “**Value Domain Type**” indicates whether or not the domain for feature attribute values is enumerated (fixed domain/variable domain). The “**Value Data Type**” indicates the data type of the attribute value (character (C), integer (I) or real (R) value). The “**number of characters**” (digits) indicates the number of digits allowed in the code (fixed domain) or the number of digits needed to describe the possible values of the feature attribute (variable domain). For each attribute value of the fixed domain the number of characters allowed in the code is:

- 1, if the allowed number of attribute values is between 0 – 9;
- 2, if the allowed number of attribute values is between 10 – 99;
- etc.

- **Definition**

The “**Definition**” defines the feature attribute in a natural language.

- **Feature Attribute Domain Values (Note: only for Fixed Domain)**

For each attribute value of the fixed domain (enumerated) there is a corresponding value code, value label and attribute value definition (“**Feature Attribute Domain Values**”). Attribute values of the fixed domain are stored with a code that is always of integer (I) type.

Example of feature type ADMINISTRATIVE BOUNDARY:

Attribute: BLEVEL - Administrative boundary level

Domain type, data type (number of characters):

Fixed domain, I (1)

Definition: Level of the administrative area enclosed by the boundary.

Domain: Value code - Value label: Value definition

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Defined country border: Official country boundary agreed upon in an official convention.

2 - Middle Administrative level border: Official county boundary determined by government.

3 - Lowest Administrative level border: Municipal administrative boundary or other corresponding lowest administrative boundary.

RELATIONSHIPS

This section presents the relationships that the feature may have with other features. One will find for each feature type, in order, the feature type name, its geometry (P: point, L: line or A: area), the relationship, its cardinality, and the name of the related feature type with its geometry. The following is an example of the relations of the Feature Types Administrative unit and Ferry Line:

<i>Feature type (geometry)</i>	<i>Relation</i>	<i>Cardinality</i>	<i>Feature type (geometry)</i>
Administrative unit (A)	Share	(1,N)	Administrative boundary (L)
Ferry Line (L)	Connect	(0,2)	Traffic Site (P)

The cardinality expresses the minimum and maximum number of times one feature instance can be involved in a relation. If the maximum value is undetermined, the letter N identifies it. For example, an administrative unit sharing with administrative boundary has cardinality to a minimum value of 1 and a maximum value of N (1,N). This means that every administrative unit always shares its face with at least one administrative boundary but it can share face with several boundaries. In the other example, ferry line connected to traffic site (pier or port) has cardinality (0,2). This means that a ferry line is not necessarily connected to any traffic site, but at most it can be connected with two traffic sites.

NOTES

This section gives any peculiarity or complementary information pertaining to the feature type.

Coding Structure

Within the feature type catalogue each feature type is identified by a unique five-character code. The first character corresponds to the feature type category and has a numeric value from 1 through 8. The categories are as follows:

<i>1st Character</i>	<i>Feature type category</i>
1	Administrative structure
2	Transport
3	Hydrography
4	Land cover
5	Settlements
6	Geographical names
7	Elevation
8	Protected areas

Each feature type category is further divided into subcategories, which are identified by the second and third character of the five-digit code containing a numeric value from 21 through 99. The subcategories that have currently been defined for each feature type category are as follows:

<i>1st character - Feature type category</i>	<i>2nd and 3rd character</i>	<i>Feature type</i>
1 - Administrative structure	21	Administrative boundary
	22	Administrative unit
2 - Transport	21	Ferry line
	31	Railway
	41	Road
	51	Traffic site
3 - Hydrography	21	Sea
	31	Water body
	32	Watercourse (A/L)
	41	Shoreline
4 - Land cover	21	Agriculture
	22	Forest
	23	Glacier
	31	Wetland
	10	Unclassified
5 - Settlements	21	Settlement (A/L)
6 - Geographical names	21	Geographical name
7 - Elevation	21	Height Contour line
	21	Depth Contour line
	22	Height point
8 - Protected areas	21	Protected area (A/P)

Finally, the fourth and fifth characters of the five-character feature type code are numeric values from 00 through 99. These last two digits are reserved for Data Set-specific usage, and for Barents GDB purposes the value of these digits is 00.

Administrative Structure

The feature type category ANDMINISTRATIVE STRUCTURE includes administrative divisions prescribed by acts, decrees, and decisions of the Council of state, ministries or other authorities.

Feature types represented as lines: ADMINISTRATIVE BOUNDARY

Feature types represented as areas: ADMINISTRATIVE UNIT

ADMINISTRATIVE BOUNDARY (L) - 12100

Non-physical line indicating the limit or extent of an officially designated division of an area or territory.

SELECTION CRITERION

All municipal administrative boundaries (lowest level administrative boundaries) and higher level administrative boundaries except enclaves.

ATTRIBUTES

BLEVEL - Level of the administrative area enclosed by the boundary

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Defined country border: Official country boundary agreed upon in an official convention.

2 - Middle Administrative level border: Official county boundary determined by government.

3 - Lowest Administrative level border: Municipal administrative boundary or other corresponding lowest administrative boundary.

RELATIONSHIPS

Administrative boundary (L), Connect, (0,N), Administrative boundary (L)

Administrative boundary (L), Share, (1,2), Administrative unit (A)

NOTES

Enclaves, inside or at the periphery (outline) are not allowed. They will be merged with the surroundings (enclaves inside), or with neighbouring polygons that have the largest shared border between them (enclaves at the periphery).

Capes with average width less 1000 m are removed.

ADMINISTRATIVE UNIT LOW (A) - 12200

An officially designated division of an area or territory.

SELECTION CRITERION

All municipalities or other corresponding administrative units.

ATTRIBUTES

CLEVEL - Country code (ISO)

Variable domain, C (3)

MLEVEL - An official identification code for middle administrative unit

Variable domain, C (3)

LLEVEL - An official identification code for lowest administrative unit

Variable domain, C (4)

NAME1 - The name of the lowest administrative unit in English

Variable domain, C (32)

NAME2 - The name of the lowest administrative unit in national
language

Variable domain, C (32)

NAME3 - The name of the lowest administrative unit in regional
language

Variable domain, C (32)

RELATIONSHIPS

Administrative Unit (A), Share, (1,N), Administrative Boundary (L)

Administrative Unit (A), Share, (1,N), Administrative Unit (A)

NOTES

The boundary lines are formed by the feature type Administrative Boundary.

ADMINISTRATIVE UNIT MIDDLE (A) - 12200

An officially designated division of an area or territory.

SELECTION CRITERION

All municipalities or other corresponding administrative units.

ATTRIBUTES

CLEVEL - Country code (ISO)

Variable domain, C (3)

MLEVEL - An official identification code for middle administrative unit

Variable domain, C (3)

LLEVEL - An official identification code for lowest administrative unit

Variable domain, C (4)

NAME1 - The name of the lowest administrative unit in English

Variable domain, C (32)

NAME2 - The name of the lowest administrative unit in national
language

Variable domain, C (32)

NAME3 - The name of the lowest administrative unit in regional
language

Variable domain, C (32)

RELATIONSHIPS

Administrative Unit (A), Share, (1,N), Administrative Boundary (L)

Administrative Unit (A), Share, (1,N), Administrative Unit (A)

NOTES

The boundary lines are formed by the feature type Administrative Boundary.

Transport

The feature type category TRANSPORT consists of transport connections on land and water and related facilities. On the basis of road numbers, information on roads can be linked with other information related to the description of roads.

Feature types represented as points: TRAFFIC SITE

Feature types represented as lines: FERRY LINE, RAILWAY, ROAD

FERRY LINE (L) - 22100

Vehicular ferries and ferries having other regular traffic (passengers or goods).

SELECTION CRITERION

All ferry lines which have regular passenger or vehicular traffic or international traffic (passengers or goods).

ATTRIBUTES

FLTYPE - Type of the ferry transport

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Car ferry service, only for cars, other vehicles and passenger transport. These ferry lines are a completion of the road network.

2 - Other ferry/boat services mainly for goods and passengers transport.

RELATIONSHIPS

Ferry Line (L), Connect, (0,N), Ferry Line (L)

Ferry Line (L), Connect, (0,N), Road (L)

Ferry Line (L), Connect, (0,2), Traffic Site (P)

NOTES

RAILWAY (L) - 23100

A transport facility equipped with rails that is used for passenger and/or goods transportation and sidings.

SELECTION CRITERION 1:1M

All lines used for passenger and goods transportation, but not tram lines and sidings with length less than 3 km.

SELECTION CRITERION 1:3M

All lines used for passenger and goods transportation, but not tram lines and sidings with length less than 10 km.

ATTRIBUTES

GAUGE - Size of Gauge used

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Broad: Railway in which the rails are 1524 mm apart.

2 - Standard: Railway in which the rails are 1435 mm apart.

3 - Narrow: Railway in which the rails are less than 1435 mm apart.

TRACTION - The form of locomotion

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Electrified: Provides electric power for engines.

2 - Non-electrified: Does not provide electric power for engines.

GROUND – Relationship to ground

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - On the ground: Railway goes on the ground.

2 - Tunnel: Railway goes in a tunnel.

3 - Bridge: Railway goes on a bridge.

TRACKS – Number of tracks

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not

applicable or that it is impossible to determine.

1 - Single: Railway has only one track.

2 - Double: Railway has two tracks.

3 - Three or more: Railway has more than two tracks.

RELATIONSHIPS

Railway (L), Connect, (0,N), Railway (L)

Railway (L), Connect, (0,2), Traffic Site (P)

Railway (L), Share, (0,1), Road (L)

NOTES

A railway is recorded as a centre-line of the railway or tracks. Railways form a continuous, coherent transportation network.

As a principal rule the change in feature attribute value leads to segmentation at the point of change only if the segment will have length greater than 3 km. Segments which are shorter than 3 km are merged into neighbouring segment (single segment into the longest neighbouring segment; successive segments so that the change of attribute values will be minimized).

Crossing the national border causes always segmentation. The change in the attribute value of the attribute 'Relationship to Ground' leads to segmentation if the segment will have length greater than 1000 m.

ROAD (L) - 24100

A road or a street which is maintained for motor traffic.

SELECTION CRITERION 1:1M

All roads which serve local transportation needs, or transportation needs on larger areas, and all roads which have a road number except winter roads and paths.

SELECTION CRITERION 1:3M

All roads which serve local transportation needs, or transportation needs on larger areas, and all roads which have a road number except winter roads and paths.

ATTRIBUTES

CLASS - Functional classification of a road

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Main road: European roads (E-roads) and roads connecting main cities or regions.

2 - Regional road: Roads used mainly for regional traffic.

3 - Local road: Roads used mainly for local traffic within different parts of regions, like within one or a few municipalities.

CARWAY - Number of carriageways of the road

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Motorway: Road with two or more carriageways (Motorway).

2 - Single carriageway road: Road having only one carriageway (including roads with one carriageway but more than one lane for both directions).

NATNUM - National road number assigned to a road

Variable domain, C (8)

EURNUM - European road number assigned to a road

Variable domain, C (8)

SURF - Composition of the road surface

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not

applicable or that it is impossible to determine.

1 - Paved: Surface made of concrete, asphalt or other corresponding material.

2 - Unpaved: Surface made of gravel.

RELGRD - Relationship to ground

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - On the ground: Road goes on the ground.

2 - Tunnel: Road goes in a tunnel.

3 - Bridge: Road goes on a bridge.

RELATIONSHIPS

Road (L), Connect, (0,N), Ferry Line (L)

Road (L), Connect, (0,2), Traffic Site (P)

Road (L), Share, (0,1), Railway (L)

NOTES

A road is recorded as a centre-line of the road or carriageways of a motorway or other dual carriageway roads. Roads form a continuous, coherent transportation network. Roads can be omitted in areas where road network is very dense (adjacent roads are closer than 150 m).

The change in feature attribute value leads to segmentation of the entity's geometric representation only when the segment's length is more than 1 km. Segments shorter than 1 km are merged into the longest neighbouring segment (one segment), or so that the change of attribute values will be minimized (two or more successive segments).

TRAFFIC SITE (P) - 25100

A traffic site used by railway, air or line traffic, and customs checkpoints for roads and railways.

SELECTION CRITERION

All traffic sites which have regular passenger traffic or international traffic (passengers or goods).

ATTRIBUTES	CATEGORY - Functional classification of a traffic site based on the transportation form or type it is used Fixed domain, I (1) 0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine. 1 - Railway station: A traffic site used for railway traffic or other traffic on rails. 2 - International airport: A traffic site used for international air traffic. 3 - National airport: A traffic site used for national air traffic. 4 - Main port: A traffic site used for line traffic on sea. 5 - Pier: A traffic site used for local line traffic on sea or river. 6 - Customs checkpoint: Customs checkpoint for roads or railways.
	NAME1 - Name of the traffic site in English Variable domain, C (32)
	NAME2 - Name of the traffic site in national language Variable domain, C (32)
	NAME3 - Name of the traffic site in regional language Variable domain, C (32)

RELATIONSHIPS

Traffic Site (P), Connect, (0,1), Ferry Line (L)

Traffic Site (P), Connect, (0,N), Railway (L)

Traffic Site (P), Connect, (0,N), Road (L)

NOTES

SEA (A) - 32100

Area of salt water cover forming part of the natural water cycle.

SELECTION CRITERION 1:1M

All sea areas. Islands smaller than 0.8 km² are merged into the sea area. Islands with area under 0.8 km² that are considered to be important to be included may be enlarged and/or aggregated to fulfill the selection criterion.

SELECTION CRITERION 1:3M

All sea areas. Islands smaller than 7 km² are merged into the sea area. Islands with area under 7 km² that are considered to be important to be included may be enlarged and/or aggregated to fulfill the selection criterion.

ATTRIBUTES

NAME1 - The name of the sea in English

Variable domain, C (32)

NAME2 - The name of the sea in national language.

Variable domain, C (32)

NAME3 - The name of the sea in regional language.

Variable domain, C (32)

RELATIONSHIPS

Sea (A), Connect, (0,N), Watercourse (L)

Sea (A), Share, (1,N), Shoreline (L)

Sea (A), Share, (0, N), Watercourse (A)

NOTES

The boundary lines are formed by the feature type Shoreline.

SHORELINE (L) - 34100

A boundary line demarcating water areas.

SELECTION CRITERION

All boundaries of water areas which are demarcating the areas of SEA, WATER BODY and WATERCOURSE (except WATERCOURSE as a line entity).

ATTRIBUTES

SLTYPE – Shoreline type

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Sea and watercourse line: Demarcation line between sea and watercourse.

2 - Water body and watercourse line: Demarcation line between water body and watercourse.

3 - Sea shoreline: Demarcation line between sea and land.

4 - Water body shoreline: Demarcation line between water body and land.

5 - Watercourse shoreline: Demarcation line between watercourse and land.

6 - Dam: Barrier constructed across a water course to control the level or flow of water in the watercourse or the level of water in a reservoir.

RELATIONSHIPS

Shoreline (L), Connect, (0,N), Shoreline (L)

Shoreline (L), Connect, (0,2), Watercourse (L)

Shoreline (L), Share, (1,2), Sea (A)

Shoreline (L), Share, (1,2), Water Body (A)

Shoreline (L), Share, (1,2), Watercourse (A)

NOTES

WATER BODY (A) - 33100

Area of continuous water cover forming part of the natural water cycle whose water level remains the same across the water area and in which there is no significant flow rate. Fresh water lakes and reservoirs/artificial lakes are considered as water bodies.

SELECTION CRITERION 1:1M

All water bodies bigger than 0.8 km². The minimum island in a water body is 0.8 km². Lakes with area under selection criterion that are considered to be important to have included may be enlarged and/or aggregated to fulfill the selection criterion.

SELECTION CRITERION 1:3M

All water bodies bigger than 7 km². The minimum island in a water body is 7 km². Lakes with area under selection criterion that are considered to be important to have included may be enlarged and/or aggregated to fulfill the selection criterion.

ATTRIBUTES

WBTYPE - The type of the water body

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Lake: Natural fresh water area without water flow.

2 - Reservoir: Artificial Lake used for storage and regulation of water.

ELEVATION - The water level of the lake and the reservoir

Variable domain, I (4)

NAME1 - The name of the water body in English

Variable domain, C (32)

NAME2 - The name of the water body in national language

Variable domain, C (32)

NAME3 - The name of the water body in regional language

Variable domain, C (32)

RELATIONSHIPS

Water Body (A), Connect, (0,N), Watercourse (L)

Water Body (A), Share, (1,N), Shoreline (L)

Water Body (A), Share, (0,N), Water Body (A)

Water Body (A), Share, (0,N), Watercourse (A)

NOTES

The boundary lines are formed by the feature type Shoreline. The mean water level of the lake and the maximum water level of the reservoir.

WATERCOURSE (A/L) - 33200

Area of permanent or periodic water cover forming part of the natural water cycle and which may have or has a flow rate (includes brooks, rivers, streams and canals, ditches excluded).

SELECTION CRITERION 1:1M

All watercourses with width more than 3 m when they are connecting water bodies or when their length is more than 15 km, and all watercourses with width more 5 m when their length is more than 10 km, and all watercourses with width more than 20 m when their length is more than 3 km.

Watercourses with width less than 300 m are recorded as lines. Watercourses with width more than 300 m and area greater than 0.8 km² are recorded as areas. Watercourses with width of more than 300 m and area less than 0.8 km² are recorded as areas only if they connect water bodies and sea. Otherwise they are merged into longest neighboring feature instance.

SELECTION CRITERION 1:3M

All watercourses with width less than 20 m when their length is more than 30 km, and all watercourse with width more than 20 m when their length is more than 10 km.

Watercourses with width more than 1000 m and area greater than 7 km² are recorded as areas.

ATTRIBUTES

WCTYPE - The type of the watercourse

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - River or brook: Natural areas of permanent or periodic water cover which has a flow rate.

2 - Canal: Artificial watercourse for navigability and drainage.

WIDTH - The width of the watercourse

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Width > 300 m: The width of the watercourse is more than 300 meters. The watercourse is represented as a centerline of the watercourse. The watercourse is also stored in feature class "Watercourse area".

2 - Width 100 - 300 m: The width of the watercourse is 100 - 300 meters.

3 - Width 20 -100 m: The width of the watercourse is 20 - 100 meters.

4 - Width < 20 m: The width of the watercourse is less than 20 meters.

NAME1 - The name of the watercourse in English

Variable domain, C (32)

NAME2 - The name of the watercourse in national language

Variable domain, C (32)

NAME3 - The name of the watercourse in regional language

Variable domain, C (32)

RELATIONSHIPS

Watercourse (L), Connect, (0,1), Sea (A)

Watercourse (L), Connect, (0,2), Shoreline (L)

Watercourse (L), Connect, (0,2), Water Body (A)

Watercourse (L), Connect, (0,2), Watercourse (A)

Watercourse (A), Connect, (0,N), Watercourse (L)

Watercourse (L), Connect, (0,N), Watercourse (L)

Watercourse (A), Share, (1,N), Shoreline (L)

Watercourse (A), Share, (0,2), Water Body (A)

Watercourse (A), Share, (0,2), Watercourse (A)

NOTES 1:1M

The change in feature attribute value leads to segmentation at the point of chance only if the segment will have length greater than 3 km. Segments, fictitious centre lines excluded, which are shorter than 3 km are merged into the longest neighbouring segment (one segment), or so that the change of attribute values will be minimized (two or more successive segments).

All segments for each main watercourse will be presented in other class as route. Segments presented as areas will be replace to line in this route.

NOTES 1:3M

The change in feature attribute value leads to segmentation at the point of chance only if the segment will have length greater than 10 km. Segments, fictitious centre lines excluded, which are shorter than 10 km are merged into the longest neighbouring segment (one segment), or so that the change of attribute values will be minimized (two or more successive segments).

Land Cover

The feature category LAND COVER contains a set of mutually exclusive compartments covering a part of land areas. The compartments include information on land cover.

Feature types represented as areas: AGRICULTURE, FOREST, GLACIER, WETLAND and UNCLASSIFIED

UNCLASSIFIED (A) – 41000

A land area is not classified in this database.

SELECTION CRITERION 1:1M

All areas larger than 0.8 km²

SELECTION CRITERION 1:3M

All areas larger than 7 km²

ATTRIBUTES

RELATIONSHIPS

NOTES

AGRICULTURE (A) - 42100

An area used or available for pasture, cultivation of grass, corn, plants, berries or fruits.

SELECTION CRITERION 1:1M

All areas larger than 0.8 km² and *important* areas down to 0.2 km².

SELECTION CRITERION 1:3M

All areas larger than 7 km².

ATTRIBUTES

RELATIONSHIPS

NOTES

FOREST (A) - 42200

All kinds of forested areas including all classifications of forest soils from high productive forest to taller thicket in the mountains.

SELECTION CRITERION 1:1M

All areas larger than 0.8 km². The minimum size of "islands" in a forest is 0.8 km².

SELECTION CRITERION 1:3M

All areas larger than 7 km².

ATTRIBUTES

RELATIONSHIPS

NOTES

GLACIER (A) - 42300

Areas covered by snow and ice throughout the year.

SELECTION CRITERION 1:1M

All areas larger than 0.8 km².

SELECTION CRITERION 1:3M

All areas larger than 7 km².

ATTRIBUTES

RELATIONSHIPS

NOTES

WETLAND (A) - 43100

A peat land area which is mainly occupied by peat land plants as well as trees or area with thick peat stratum.

SELECTION CRITERION 1:1M

All areas larger than 0.8 km². The minimum size of "islands" in wetland is 0.8 km².

SELECTION CRITERION 1:3M

All areas larger than 7 km².

ATTRIBUTES**RELATIONSHIPS****NOTES**

In the Finnish part of the Barents GDB Wetland and Forest areas can intersect each other. Only Open Wetland areas are without the cover of the Forest layer.

Settlements

The feature category SETTLEMENTS contains of densely developed areas.

Feature types represented as areas: SETTLEMENT

Feature types represented as points: SETTLEMENT

SETTLEMENT (P/A) - 52100

Cities and other densely developed areas.

SELECTION CRITERION

All densely developed areas with more than 1000 inhabitants and important settlements with less than 1000 inhabitants.

ATTRIBUTES

STATUS - An administrative classification of cities

Fixed domain, I (1)

An administrative classification of cities. Refer to the Administrative Levels in the feature type category ADMINISTRATIVE STRUCTURE.

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Capital: The Capital of the highest administrative level.

2 - County capital: The main city of the middle administrative level.

3 - Main city: The main city of the lowest administrative level

4 - Other city: Other cities

5 - Village: Smaller populated areas.

POPULATION - The number of inhabitants of densely populated areas

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Less than 1000 inhabitants

2 - 1000 - 9999 inhabitants

3 - 10000 - 49999 inhabitants

4 - 50000 - 99999 inhabitants

5 - 100000 - 499999 inhabitants

6 - Over 500000 inhabitants

NAME1

Variable domain, C (32)

The name of the settlement in English.

NAME2

Variable domain, C (32)

The name of the settlement in national language.

NAME3

Variable domain, C (32)

The name of the settlement in regional language.

DISTPART1 - The name of the distant part in English

Variable domain, C (32)

DISTPART2 - The name of the distant part in regional language

Variable domain, C (32)

DISTPART3 - The name of the distant part in regional language

Variable domain, C (32)

RELATIONSHIPS**NOTES**

Refer to the Administrative Levels in the feature type category ADMINISTRATIVE STRUCTURE.

Settlements with less than 10000 inhabitants are recorded as points. Settlements with 10000 or more inhabitants are recorded as areas (only in scale 1:1M)

All settlements are recorded as point in scale 1:3M.

Geographical Names

The feature category GEOGRAPHICAL NAMES contains of names of geographic feature entities.

Feature types represented as texts: GEOGRAPHICAL NAME

GEOGRAPHICAL NAME (T) - 62100

Names of geographic feature entities.

SELECTION CRITERION

Names of the major geographic objects. The number of names is compiled to fit the map scale in 1 : 1 000 000.

ATTRIBUTES

TEXTSTRING - The name as a text string

Variable domain, C (48)

NAMECODE

Fixed domain, I (5)

Describes the geographical object represented by the name.

0 - Generic/Unknown

24121 - Main road

24131 - Regional road

25121 - Railway station

25131 - Airport

25141 - Main port

25151 - Custom check point

32121 - Large sea area

32131 - Middle sea area

33121 - Large lake, reservoir, area > 900 km²

33131 - Middle lake, reservoir, area 200 - 900 km²

33141 - Smaller lake, reservoir, area 18 - 200 km²

33221 - River, canal, width > 300 m

33231 - River, canal, width 100 - 300 m

33241 - River, canal, width 20 - 100 m

33251 - River, canal, width < 20 m

52321 - Settlement < 1000 inhabitants

52331 - Settlement 1000 – 9 999 inhabitants

52341 - Settlement 10 000 – 49 999 inhabitants

52351 - Settlement 50 000 – 99 999 inhabitants

52361 - Settlement 100 000 – 499 999 inhabitants

82121 - National park > 10 000 km²

82221 - Nature reserve/park > 10 000 km²

91011 - Middle administrative level
91012 - Highest administrative level
91021 - Extra large island > 3 000 km², or archipelago
91022 - Large island 400 – 3 000 km², or archipelago
91023 - Island 50 - 400 km², or archipelago
91024 - Small island < 50 km², or archipelago
91031 - Glacier
91041 - Name of mountain top
91042 - Name of mountain area
91043 - Height of mountain top
91051 - Name of geographic region (seashore etc)
91052 - Name of valley
91071 - Part of lake
91072 - Large fjord (Bay)
91073 - Fjord (Bay)
91074 - Strait
91075 - Gulf
91081 - Large peninsula
91082 - Peninsula
91091 - Cape

OBJECT_X - The reference point (x co-ordinate) of the object that the text refers to (object reference point).

Variable domain, F (8)

OBJECT_Y - The reference point (y co-ordinate) of the object that the text refers to (object reference point)

Variable domain, F (8)

JUSTIFICATION - The justification of the text according to the point of text placement

Fixed domain, C (2)

LL – lower left, the default

LC – lower center
LR – lower right
CL – center left
CC – center center
CR – center right
UL – upper left
UC – upper centre
UR – upper right

RELATIONSHIPS**NOTES**

Geographical name is represented by two or several geodetic (geographical) co-ordinate pairs in decimal seconds.

Object reference points of polygons are situated within the polygon, and of lines along the line.

The languages of the names are Norwegian, Swedish, Finnish, Lappish and Russian. The Latin alphabet (Roman letters) is used.

Elevation

The feature category ELEVATION contains full descriptions of land surface represented as isolines and height points and sea depths represented as isobaths.

Feature types represented as lines: HEIGHT CONTOUR LINE

 DEPTH CONTOUR LINE

Feature types represented as points: HEIGHT POINT

HEIGHT CONTOUR LINE (L) - 72100

Height contour line describing a fixed ELEVATION above the sea level.

SELECTION CRITERION 1:1M

Contour lines 50 (optional), 100, 150 (optional), 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900 and 2000 m. Height contour lines with perimeter less than 3500 m only within steep areas (e.g. mountain tops).

SELECTION CRITERION 1:3M

Height contour lines 100, 200, 300, 400, 600, 800, 1000, 1200, 1400, 1600, 1800 and 2000 m. Height contour lines with perimeter less than 10000 m only within steep areas (e.g. mountain tops).

ATTRIBUTES ELEVATION - The elevation above sea level (m)
Variable domain, I (4)

RELATIONSHIPS

Height contour Line (L), Connect, (0,2) Height contour Line (L)

NOTES

Optional height contour lines are used within flat areas.

HEIGHT POINT (P) – 72200

Terrain point with a recorded ELEVATION.

SELECTION CRITERION

Characteristic height terrain points supplementing the descriptions of the elevation given with contour lines.

ATTRIBUTES ELEVATION - The elevation above sea level in meters
Variable domain, I (4)

RELATIONSHIPS

NOTES

DEPTH CONTOUR LINE (L) - 72300

Depth contour line describing a fixed DEPTH below the sea level.

SELECTION CRITERION 1:1M

Depth contour lines 25 (optional), 50 (optional), 100, 150 (optional), 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900 and 2000 m. Depth contour lines with perimeter less than 3500 m only within steep areas (e.g. deep places).

SELECTION CRITERION 1:3M

Depth contour lines 100, 200, 300, 500, 700, 1000, 1300, 1600, 1900 and 2000 m. Depth contour lines with perimeter less than 10000 m only within steep areas (e.g. deep places).

ATTRIBUTES ELEVATION - The elevation below sea level (m)
 Variable domain, I (4)

RELATIONSHIPS

Depth contour Line (L), Connect, (0,2) Depth contour Line (L)

NOTES

Optional depth contour lines are used within shallow areas.

Protected Areas

The feature category PROTECTED AREAS contains natural features protected by law or decree.

Feature types represented as points: PROTECTED AREA

Feature types represented as areas: PROTECTED AREA

PROTECTED AREA (A/P) - 82100

General nature reserves/parks formed to preserve the nature of an intact area, or national parks formed to preserve areas of considerable natural beauty or otherwise valuable nature to be preserved as such or for the protection of an animal or plant species.

SELECTION CRITERION

All protected areas having the nature reserve/nature park status or national park status.

Protected areas larger than 10 km² are represented as areas and protected areas less than 10 km² are represented as points.

ATTRIBUTES

PATYPE - The type of protected area

Fixed domain, I (1)

0 - Generic/Unknown: Value indicating that an attribute value is not applicable or that it is impossible to determine.

1 - Nature Reserve/Nature Park: Protected areas with the nature reserve/nature park status.

2 - National Park: Protected areas with the national park status.

NAME1 - The name of the protected area in English

Variable domain, C (48)

NAME2 - The name of the protected area in national language

Variable domain, C (48)

NAME3 - The name of the protected area in regional language

Variable domain, C (48)

RELATIONSHIPS

Protected Area (A), Share, (0,N), Protected Area (A)

NOTES

Each protected area is represented only with one point, or with one or more polygons.

GLOSSARY

Area – a generic term for a bounded, continuous, two-dimensional object that may or may not include its boundary

Attribute – a characteristic of an object or entity

Attribute value – value assigned to a feature attribute

Boundary – closed non-self-intersecting curve or set of curves that bounds a surface

Cardinality – a two digit expression that represents the minimum and maximum number of times one occurrence of an entity, a geometric representation can be involved in a relation. If the maximum value is undetermined, the letter N identifies it.

Chain node graph – spatial complex consisting nodes and edges

Code – representation of a label according to a specified scheme

Complex area – a specific kind of area that involves a complex geometry. This type of area is formed of inclusive and exclusive lines. Inclusive lines define the external delimitation of the area, while exclusive lines delimit the internal zones to be excluded.

Complex feature – feature composed of other features

Conceptual model – model that defines concepts of a universe of discourse

Connected node – node related to one or more edges

Coordinate – an ordered set of N numbers designating the location in a coordinate system based on a positional reference frame

Coordinate system – the mathematical description of the position of a point and the geometric relation between points in space, in a plane, or in a line, based on a positional reference frame

Curve – bounded, connected 1-dimensional geometric primitive

Data – reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or processing

Data element – unit of data that, in a certain context, is considered indivisible

Data set – identifiable collection of related data

Data type – kind of value that can be assigned to a data element

Domain – a well-defined set of elements. NOTE: Domains are used to define the domain set and range of set of operators.

Edge – 1-dimensional topologic primitive

Elevation – vertical distance measured in reference to a vertical datum

Entity – class of objects with common properties

Face – 2-dimensional topologic primitive

Feature – representation of a real world phenomenon

Feature attribute – characteristic of a specific feature

Feature attribute type – type of characteristic relevant for features belonging to a certain

feature type

Feature type catalogue – definition and description of the features, together with their feature attributes and feature relationships, occurring in one or more sets of geographic data

Feature relationship – logical link between features. NOTE: A feature may have a feature relationship to itself.

Feature relationship type – type of link between feature types

Feature type – class of features with common characteristics

Geodetic coordinates – geodetic latitude and longitude with or without height

Geodetic datum - a mathematical model designed to best fit part or all of the geoid. It is defined by an ellipsoid and the relationship between the ellipsoid and a point on the topographic surface established as the origin of datum.

Geodetic reference system – coordinate system based on a geodetic datum, which defines the position of the origin and the orientation of the axes

Geographic data – data with implicit or explicit reference to a location relative to the Earth

Geographic feature – representation of a real world phenomenon associated with a location relative to the Earth

Geographic information – information concerning phenomena implicitly or explicitly associated with a location relative to the Earth

Geoid – equipotential surface of the earth's gravity field which most closely approximates mean sea level globally

Geometric primitive – spatial component of a feature described in terms of coordinates and mathematical functions that is treated as a non-decomposable element

Identifier – label that uniquely identifies an item or a group of items

Height – the height of a point relative to a reference point or surface, such as the geoid, the geodetic ellipsoid, or a specific elevation datum

Information – knowledge concerning objects, such as facts, events, things, processes, or ideas, including concepts that within a certain context have a particular meaning

Instance – geographic feature and the information describing the characteristics of the geographic feature

Instance level – abstraction level consisting of instances. NOTE: The instance level is the lowest level within a set of layered abstraction levels.

Isolated node – node not related to any edge

Line – a generic term for a one-dimensional object

Map projection – a one-to-one conversion of geodetic coordinates to planar coordinates

Model – abstraction of some aspects of reality

Node – 0-dimensional topologic primitive

Orthometric elevation – Height (elevation) of a point measured along the local vertical in reference to the geoid (Mean Sea Level (MSL)).

Planar graph – chain node graph geometrically realizable on a two dimensional plane in which all intersections are at nodes

Planar graph with faces – spatial complex composed of a planar graph collection of faces,

which correspond to the contiguous surfaces within the planar realization of the graph

Point – 0-dimensional geometric primitive

Primitive – smallest spatial component of which all features are composed. EXAMPLE: There are three geometric primitives (point, line, area) and one cartographic primitive (text).

Real world phenomenon – expression used when referring to the real world

Spaghetti – spatial complex composed of geometric primitives for which topology are not explicitly represented

Surface – bounded 2-dimensional geometric primitive

Topologic primitive – non-decomposable element of topology

Topology – refers to properties of geometric forms that remain invariant when the forms are deformed or transformed by bending, stretching, or shrinking. NOTE: Among the topological properties of concern in the geographic information are connectivity, order, and neighbourhood.

Universe of discourse – view of the real or hypothetical world that includes everything of interest

Value domain – set of accepted values

Vector data – data represented by geometric primitives

Vertex – Geometric representation of the beginning or end of a line or of the intersection of two consecutive segments composing the line. It is defined by its coordinates (X,Y).

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