

Document for Operation

Digital Topographic Map Data
Product Specifications Creation Manual

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Infrastructure Management Department
Japan International Cooperation Agency

Table of contents

Foreword	1
Revision history.....	1
Scope	1
Compliant Standards	1
Reference Documents.....	1
Introduction.....	2
1. About the Digital Topographic Map Data Product Specifications Creation Manual ...	2
2. Structure of the manual and how to use it	2
Part 1 Guidance	3
1. What is a product specification?	3
2. Regarding the operation of product specifications.....	3
Part 2 Explanation	9
1. Overview	12
2. Specification scopes.....	17
3. Data product identification	18
4. Data content and structure.....	21
5. Reference systems.....	69
6. Data quality	74
7. Data capture	85
8. Data maintenance.....	86
9. Portrayal	87
10. Data product delivery.....	96
11. Additional information.....	97
12. Metadata.....	98

Foreword

Digital topographic map data product specifications (hereinafter referred to as product specifications) are required when preparing digital topographic map data that complies with Geographic Information-Data Product Specifications (ISO19131). The Digital Topographic Map Data Product Specifications Creation Manual (hereinafter referred to as this manual) summarizes how product specifications should be written.

Revision history

Outline of regulations	Created date	Creation organization
Enactment	February 28, 2022	Japan International Cooperation Agency

Scope

This manual describes the items that should be included in the product specifications and their contents.

This manual can be used when preparing digital topographic map data in accordance with Geographical Information-Data Product Specifications (ISO19131), or when using digital topographic map data that has already been prepared.

This manual is a guideline, and not a standard, for creating product specifications conforming to Geographical Information-Data Product Specifications (ISO19131).

In addition, the guidelines are provided to assist the development of product specifications so that they can be easily understood and achieve their intended purpose.

Compliant Standards

ISO19131:2007, Amd.1:2011(JIS X7131:2014) Geographic Information-Data Product Specification

Reference Documents

Geographic Information Standard Profile (JPGIS)

Japan Metadata Profile (JMP) 2.0

Manual for preparing geospatial data product specifications, November 2020, GSI.

Introduction

1. About the Digital Topographic Map Data Product Specifications Creation Manual

This manual is based on Geographical Information-Data Product Specifications (ISO19131), a digital topographic map data standard, and provides explanations and examples of how to use these standards when creating product specifications.

2. Structure of the manual and how to use it

This manual consists of the following two sections. Their content and uses are described below.

Part I : Guidance

This part introduces what product specifications are and how they are used in overseas digital topographic map data production operations.

It is intended for those who want to know the general outline of product specifications, such as when placing an order for digital topographic map data prepared based on product specifications.

Part II : Explanation

This part shows the contents and description examples that should be described in the product specifications, and aims to support the creation of the product specifications. It is for those who understand the outline of the product specifications.

Part 1 Guidance

1. What is a product specification?

Product specifications are documents that specify requirements such as the structure of digital topographic map data, quality standards, and data formats.

Product specifications are used as "detailed design documents" in data maintenance situations and as "instruction manuals" in data distribution situations.

Therefore, product specifications are used to describe the requirements of data to be created and used by data creators in managing digital topographic map data. In the data utilization, it can also be used as a guide for generated digital topographic map data.

In both situations, product specifications are important and indispensable and must be developed and utilized as a set with digital topographic map data.

In current overseas operations, however, it is often the case that Japanese side puts tremendous effort to understand the recognitions of accuracy standards and quantitative evaluation of deliverables with the counterparts in the partner country when creating deliverables based on specifications, surveying work rules, etc.

In the future, it is expected that by preparing product specifications, data definitions, structures, quality, recording methods, etc. will be clarified by a set of common rules, and there will be no discrepancies between the parties involved.

The product specifications created in accordance with this manual can provide information on digital topographic map data in a consistent and unified format.

Point

- The product specifications are "detailed design documents" for the digital topographic map data to be created, and "instruction manuals" for utilizing the digital topographic map data which is created in accordance with the product specifications.
- When creating digital topographic map data, a product specification is created and shown to the data creator.
- When utilizing digital topographic map data, digital topographic map data and product specifications are delivered as a set.
- By preparing product specifications in overseas operations, they can act as common rules to clarify data definitions, structures, quality, recording methods, etc., to eliminate discrepancies between the parties involved.

2. Regarding the operation of product specifications

Product specifications are used in situations where digital topographic map data is prepared and utilized. Several situations are described below regarding the usage of product specifications.

(1) When preparing digital topographic map data

Typical situations when creating product specifications for preparing digital topographic map data can be classified into the following three patterns.

① If you have standard product specifications

If there are standard product specifications or similar product specifications, create the product specifications with reference to them. If the content of the product specifications to be referred is different from the content shown in this manual, it is desirable to give due consideration to the content shown in this manual.

② When creating a new product specification

When creating a new product specification, create the product specification according to this manual

③ When ordering product specification creation and digital topographic map data maintenance as a set

When ordering to an external party the maintenance of digital topographic map data and creation of product specifications, extract from this manual the necessary items for what is contained in the product specifications. Using the extracted necessary items, discuss the details of the digital topographic map data to be maintained with the digital topographic map data creator, and proceed to the process of maintaining the digital topographic map data. In this case, the contractor must prepare a product specification that describes the specifications of the finalized digital topographic map data and submit it to the orderer by the time the maintenance work is completed.

(2) When utilizing digital topographic map data

When utilizing digital topographic map data, the information in the product specifications can be easily understood by attaching them to the digital topographic map data. The product specifications describe the detailed structure, format, quality, etc. of the provided digital topographic map data, and are important information for users when utilizing the digital topographic map data.

Point

- Product specifications are indispensable information to be paired with digital topographic map data when preparing and utilizing digital topographic map data.
- Take advantage of existing product specifications when creating new ones.

3. About the stepwise utilization of product specifications in the business life cycle

(1) Overview

When the maintenance of digital topography data using product specifications is introduced into the overseas digital topography data maintenance business, the work of the orderer, counterpart and contractor (digital topography data creator) will be based on the product specifications. This will allow all parties to gain a common understanding of the contents of digital topographic map data, resulting in the creation of the expected digital topographic map data, and the data quality will

satisfy the quality requirements. In addition, product specifications are used by users to understand the detailed structure, format, quality, etc. of data at the utilization stage, and are useful throughout the life cycle of the product.

For reference, in the cases of grant aid and technical cooperation, the recommended items described in the product specifications in each phase of the project are shown in Fig. 1-1. It can be seen that the requirements for description of the items described in the product specifications differ depending on the procedure and characteristics of the business. For example, in grant aid, all items to be described are detailed at the preparatory survey stage, so the specifications of the digital topographic map data to be created will be finalized, and it is possible to implement the next phase of the project using the product specifications.

The recommended items for grant aid in Figure 1-1 require detailed descriptions for all items, but in the Geographical Information-Data Product Specifications (ISO19131), "7. Data acquisition" and "8. Data maintenance," "9. Drawing method" and "11. Additional information" are optional items. In implementing the actual business, please make efforts to create and utilize appropriate product specifications in consideration of the circumstances of each business.

Point

- Product specifications can be used at each step in the business life cycle.

	Grant assistance			Technical cooperation		
	Preparatory investigation	Project implementation	Utilization stage	Formulation of detailed plans	Project implementation	Utilization stage
○ : Outline description ◎ : Detailed description △ : Description correction/ addition — : Description completed						
1.OVERVIEW	◎	△	—	◎	△	—
2.SPECIFICATION SCOPES	◎	△	—	◎	△	—
3.DATA PRODUCT IDENTIFICATION	◎	△	—	◎	△	—
4.DATA CONTENTS AND STRUCTURE	◎	△	—	○	◎	—
5.REFERENCE SYSTEMS	◎	△	—	◎	△	—
6.DATA QUALITY	◎	△	—	○	◎	—
7.DATA CAPTURE	◎	△	—	○	◎	—
8.DATA MAINTENANCE	◎	△	△	○	◎	△
9.PORTRAYAL	◎	△	—	○	◎	—
10.DATA PRODUCT DELIVERY	◎	△	△	○	◎	△
11.ADDITIONAL INFORMATION	◎	△	△	○	◎	△
12.METADATA	◎	△	△	○	◎	△

Fig.1-1 Recommended items to be stated in the product specifications in each phase of the business

(2) Items described in product specifications during work planning

Fig.1-2 shows a draft standard for the items described in the product specifications before the project implementation (grant aid) or before the project implementation (technical cooperation).

① When using in a grant aid project

At the preparatory survey stage, product specifications that basically cover the recommended items in Figure 1-2 are created, and the main work is carried out based on the product specifications. In addition, by modifying and adding the items described as necessary at the project implementation and utilization stages, the product specifications become documents in which the specifications of the digital topographic map data to be created are described in detail and will be important information when utilizing the data.

② When using in a technical cooperation project

At the detailed plan formulation stage, basically five the recommended items in Fig.1-2, "1. Overview," "2. Scope of application," "3. Data product identification," "4. Data content and Structure (describe the data acquisition items comprehensively)" and "5. Reference system" (of

which "5.1 Spatial Reference System (Horizontal) and "5.2 Spatial Reference System (Vertical)" should be described for preparing for project implementation.

Therefore, most of "4. Data content and structure," "6. Data quality," "7. Data acquisition," "8. Data maintenance," "9. Drawing method," "10. Data product distribution," "11. Additional information" and "12. Metadata" may be left blank at the detailed plan formulation stage.

In creating the product specifications for both (1) Grant Aid Project and (2) Technical Cooperation Project, use the product specification format described in << Product Specification Description Example >> (same as "Digital Topographic Map Data Product Specifications Standard Format" in the separate document.) and modify by deleting the contents of the light yellow sections, and describing the contents that match the digital topographic map to be created in the project.

<input checked="" type="radio"/> Recommendation <input type="radio"/> Option	Grant assistance		Technical cooperation	
	Formulation level	Description	Formulation level	Description
1. OVERVIEW				
1.1. Information about the creation of the data product specification	<input checked="" type="radio"/>		<input checked="" type="radio"/>	
1.2. Terms and definitions	<input checked="" type="radio"/>	Amend / add at any time during project implementation	<input checked="" type="radio"/>	Amend / add at any time during project implementation
1.3. Abbreviations	<input checked="" type="radio"/>	Amend / add at any time during project implementation	<input checked="" type="radio"/>	Amend / add at any time during project implementation
1.4. The name and any acronyms of the data product	<input checked="" type="radio"/>	Change as necessary at the time of project implementation	<input checked="" type="radio"/>	Change as necessary at the time of project implementation
1.5. An informal description of the data product	<input checked="" type="radio"/>	Amend / add at any time during project implementation	<input checked="" type="radio"/>	Amend / add at any time during project implementation
2. SPECIFICATION SCOPES	<input checked="" type="radio"/>	Change as necessary at the time of project implementation	<input checked="" type="radio"/>	Change as necessary at the time of project implementation
3. DATA PRODUCT IDENTIFICATION	<input checked="" type="radio"/>	Change as necessary at the time of project implementation	<input checked="" type="radio"/>	Change as necessary at the time of project implementation
4. DATA CONTENTS AND STRUCTURE				
4.1. Application Schema	<input checked="" type="radio"/>			
4.2. Feature Catalogue	<input checked="" type="radio"/>		<input checked="" type="radio"/>	Describe the data acquisition items comprehensively
Appendix 1 (application schema referred to in 4.1. Application schema)	<input checked="" type="radio"/>	<ul style="list-style-type: none"> · It may be described collectively in 4.1. · Expressions other than UML class diagrams may be used in the schema definition. · Amend / add at any time during project implementation 		
Appendix 2 (feature catalogue referred to in 4.2 Feature Catalog)	<input checked="" type="radio"/>	<ul style="list-style-type: none"> · It may be described collectively in 4.2. · Amend / add at any time during project implementation 		
5. REFERENCE SYSTEMS				
5.1. Spatial Reference System (Horizontal)	<input checked="" type="radio"/>	· Conversion parameters to WGS84 are optional	<input checked="" type="radio"/>	· Conversion parameters to WGS84 are optional
5.2. Spatial Reference System (Vertical)	<input checked="" type="radio"/>		<input checked="" type="radio"/>	
5.3. Temporal Reference System	<input type="radio"/>	Option		
6. DATA QUALITY	<input checked="" type="radio"/>			
Appendix 3 (data quality referred to in 6. Data quality)	<input checked="" type="radio"/>	<ul style="list-style-type: none"> · It may be described collectively in 6. · Amend / add at any time during project implementation 		
7. DATA CAPTURE	<input checked="" type="radio"/>			
8. DATA MAINTENANCE	<input type="radio"/>	Option		
9. PORTRAYAL	<input checked="" type="radio"/>			
Appendix 4 (portrayal catalogue referred to in 9. Portrayal)	<input checked="" type="radio"/>	<ul style="list-style-type: none"> · It may be described collectively in 9. · Amend / add at any time during project implementation 		
10. DATA PRODUCT DELIVERY	<input checked="" type="radio"/>	Change as necessary at the time of project implementation		
11. ADDITIONAL INFORMATION	<input type="radio"/>	Option		
12. METADATA	<input type="radio"/>	Option		

Fig.1-2 Standard draft of product specifications that should be set before project implementation (free of charge) or before project implementation (technical cooperation)

(3) Utilization stage

Since the product specification is a document that accurately describes the content, accuracy, quality, etc. of the provided digital topographic map, it can be effectively used as an explanatory document when providing data for the counterpart organization.

In addition, product specifications provide information such as the coordinate system (spatial reference system) and distribution format which is necessary to correctly read digital topographic maps into GIS as well as to superimpose and analyze the information possessed by the user. They are indispensable documents for data users in using the obtained digital topographic maps.

Part 2 Explanation

This second part contains the contents to be described in the product specifications and example descriptions, as well as explanations of each product specification item. The explanations are useful for creating product specifications, understanding the contents of product specifications created by a third party, and verifying the contents of product specifications.

List of items described in product specifications

1. Overview
2. Specification Scopes
3. Data product Identification
4. Data content and Structure
5. Reference Systems
6. Data Quality
7. Data Capture
8. Data Maintenance
9. Portrayal
10. Data Product Delivery
11. Additional Information
12. Metadata

In the second part, the items to be described in the above product specifications are explained in the format of Fig. 2.

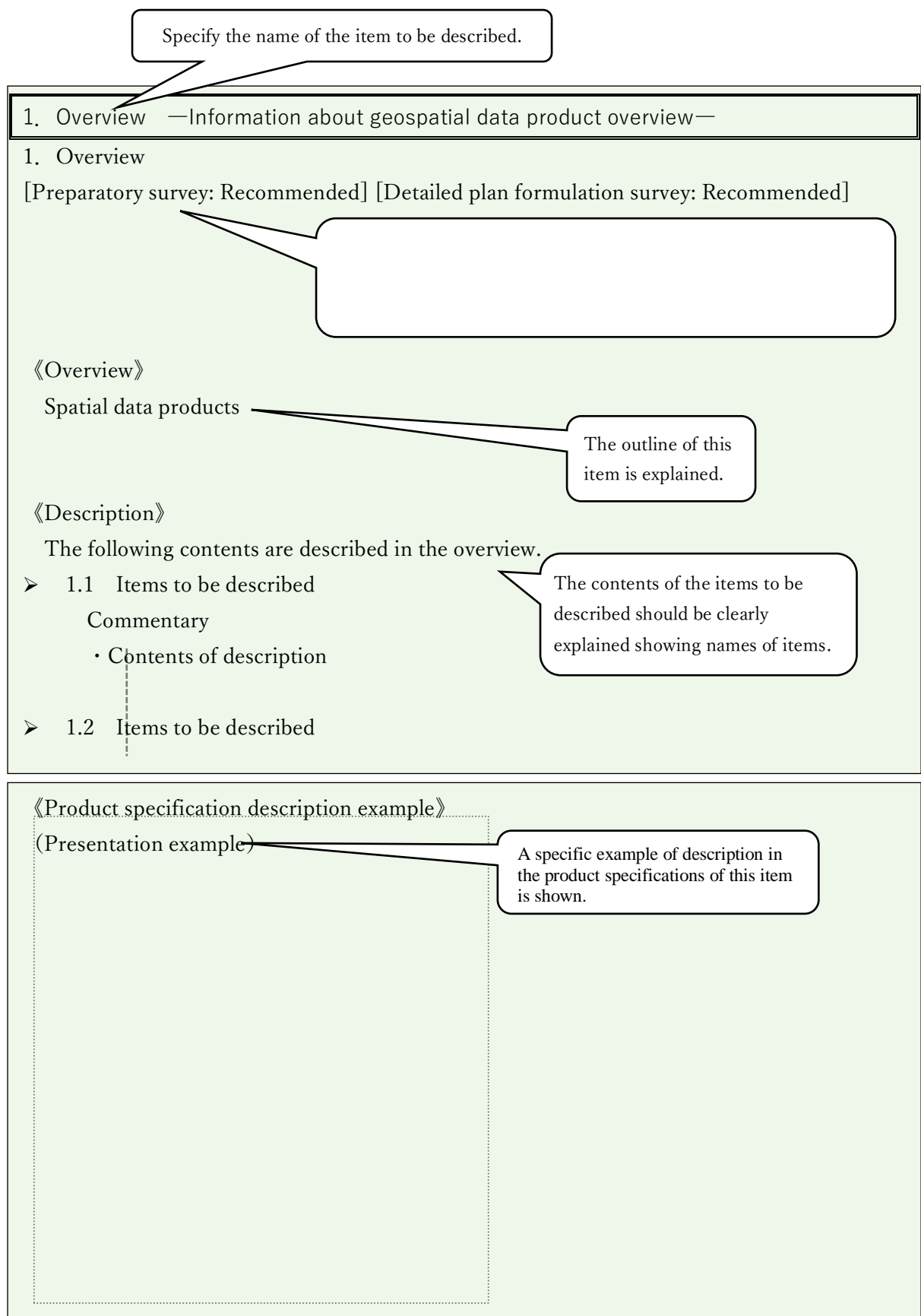


Fig. 2 Explanation format in this manual for each item described in the productspecifications

➤ **Target geospatial data products**

This manual only shows the examples of 1:2,500 digital topographic map. Basic structure and contents, however, can be applied to other digital maps with different scales.

The product specification description example describes a digital topographic map data file of Japan with the map information level of 2500.

The name of the item to be described.

[Preparatory survey: ○○] [Detailed plan formulation survey: ○○]

"recommended," "unnecessary," or "option," is shown at the place of ○○ mark so that it is clear whether this item is a recommended or unnecessary item before the project implementation (grant aid) or before the project implementation (technical cooperation).

The distinction corresponds to ◎, "space," and ○ mark at the column of titled "Formation level" in Fig. 1-2

《**Overview**》

The overview explains what should be described and what should be noted.

《**Description**》

The description explains the content to be described while showing specific items.

《**Product specification description example**》

This is an example of description in the actual product specifications.

1. Overview – Information about geospatial data product overview –

1. Overview

[Preparatory survey: Recommended] [Detailed plan formulation survey: Recommended]

《Overview》

The Overview provides a general overview of geospatial data products, and a cursory knowledge of geospatial data products can be obtained by referring to this content.

The contents include information about the creation of product specifications, explanations of terms and their definitions, abbreviations used in the product specifications, specific purposes for creating geospatial data products, spatial range and time range applicable to geospatial data, etc., standards to be cited.

Considering utilization of data products, describe them so that even non-experts in geospatial data can understand them.

《Description》

Description of the product specifications contains the following content. The content shown here are the items that are recommended to be described in the Overview.

➤ 1.1. Information about the creation of the data product specification

Include the title of the data product specifications (*Same as the one described on the cover of the product specifications to be created. The standard name is "data name" + "product specifications")

- **Title**

Parties responsible for the data product specifications

- **Responsible party**

- **Name**

- **Representative**

- **Phone**

- **E-mail**

- **Date**

➤ 1.2. Terms and definitions

Shows the terminology used in product specifications and their definitions.

- **Terms**

- **Definitions**

*May be left blank initially. Mainly describe terms that are expected to cause inconsistencies and terms that actually cause inconsistencies. It may also be used as a reference glossary, if

necessary.

➤ **1.3. Abbreviations**

Contains an explanation of the abbreviations used in the product specifications and their full names.

- **Abbreviation**
- **Full name**

Abbreviations do not need to be written if none are used.

➤ **1.4. The name and any acronyms of the data product**

Contains the names and acronyms of data products which are defined in the data product specifications.

No description is required if an acronym is unnecessary.

- **The name of the data product**
- **Acronyms of the data product**

➤ **1.5. An informal description of the data product**

The free description of the data product briefly introduces the specifications of the data product and describes information that makes it easier for the reader to understand what the created geospatial data looks like, such as through example drawings. At the planning stage of the data product, it is sufficient to describe within information available.

The points of the contents to be described are as follows.

- Describe the content of the product to be created (describe it so that even non-experts can understand).
- Describe the purpose, scope, source of the original data (when and how the data was acquired), creation method (how it was created based on the original data), etc. in an easy-to-understand manner, including the use of figures and tables.
- Any changes or specific decisions made in the process of creating a product (for example, shooting date) will be revised each time.

Examples of recommended items are as follows.

< Fixed item >

- **The content of the dataset**
- **The extent (both spatial and temporal) of the data**
- **The specific purpose for which the data shall be or has been collected**
- **The data sources and data production processes**
- **The maintenance of the data**

< Free description >

Try to make it easier to understand by using figures and tables in addition to sentences.

《Product specification description example》

1. Overview

1.1. Information about the creation of the data product specifications

Title	Data Product Specifications of 1:2,500 Scale Digital Topographic Map (draft)	
Responsible party	Name	Name of Survey Department, Country
	Representative	****
	Phone	xxx-xxx-xxxx
	E-mail	xxxx@xxxx.xx
	Reference date	yyyy-mm-dd

1.2. Terms and definitions

Terms	Description
application	manipulation and processing of data in support of user requirements
application schema	conceptual schema for data required by one or more applications
conceptual model	model that defines concepts of a universe of discourse
conceptual schema	formal description of a conceptual model
coverage	feature that acts as a function to return values from its range for any direct position within its spatial, temporal, or spatiotemporal domain
data product	dataset or dataset series that conforms to a data product specification
data product specification	detailed description of a dataset or dataset series together with additional information that will enable it to be created, supplied to, and used by another party
dataset	identifiable collection of data
dataset series	collection of datasets sharing the same product specification
domain	well-defined set
feature	abstraction of real-world phenomena
feature association	relationship that links instances of one feature type with instances of the same or a different feature type
feature attribute	characteristic of a feature
geographic data	data with implicit or explicit reference to a location relative to the Earth
metadata	data about data
model	abstraction of some aspects of reality
portrayal	presentation of information to humans
quality	totality of characteristics of a product that bear on its ability to satisfy stated and implied needs
universe of discourse	view of the real or hypothetical world that includes everything of interest

*The above is quoted from ISO 19131:2007.

1.3. Abbreviations

Abbreviation	Full name
GC	Gregorian Calendar
GNSS	Global Navigation Satellite System
GSD	Ground Sampling Distance
GSI	Geospatial Information Authority of Japan
JST	Japan Standard Time
UML	Unified Modeling Language
UTC	Coordinated Universal Time

1.4. The name and any acronyms of the data product

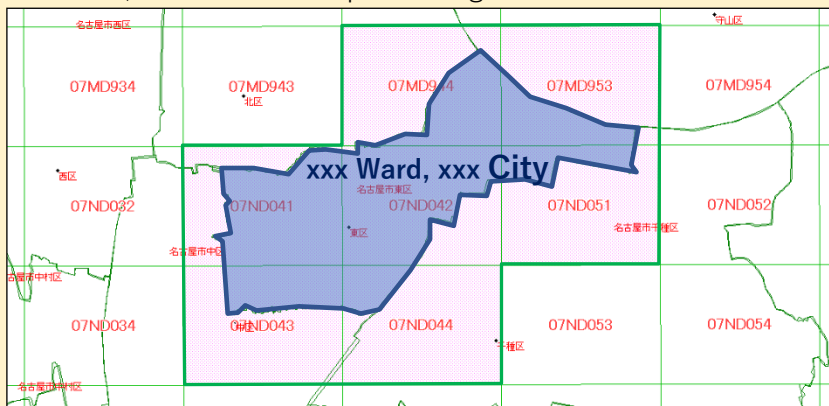
The name of the data product	1:2,500 Scale Digital Topographic Map
Acronyms of the data product	DM2500

1.5. An informal description of the data product

Informal description of the data product	
The content of the dataset	1:2,500 Scale Digital Topographic Map
The extent (both spatial and temporal) of the data	Topographic Map of xxx Ward, xxx City, as of 2015.
The specific purpose for which the data shall be or has been collected	Base map for City Planning and Construction.
The data sources and data production processes	Aerial Photogrammetry using aerial photographs taken in 2015.
The maintenance of the data	Approximately once every 5 years.

Informal description of the data product (other information)

The spatial range of this data product is the range filled in purple color in the figure below, and the data files that record this data product are divided into seven map sheet units of 1:2,500 scale (07MD944, 07MD953, 07ND041, 07ND042, 07ND043, 07ND044, 07ND051) that cover the spatial range.



This data product converts general features (road, river, building, etc.) into data, and the portrayal example is as follows.



2. Specification scopes – Information about the scope of application –

2. Specification scopes

[Preparatory survey: Recommended] [Detailed plan formulation survey: Recommended]

《Overview》

The "Specification scopes" section describes the scope to which the contents of the product specifications are applied.

《Description》

The specifications of the data product shall clearly state the extent to which they apply.
This manual covers the entire 1: 2,500 digital topographic map.

《Product specification description example》

2. Specification scopes

Specification Scopes (a description of its scope)

Dataset of 1:2,500 Scale Digital Topographic Map for xxx city planning
(The scope of this specification is the entire dataset)

3. Data product identification

– Information on the identification of spatial data products –

3. Data product identification

[Preparatory survey: Recommended] [Detailed plan formulation survey: Recommended]

《Overview》

The "Data product identification" should describe the following information to distinguish a geospatial data product based on one product specifications from another geospatial data product.

《Description》

The contents related to data product identification are shown by the following items.

- **Title**

Show the title (name) for the geospatial data product.

It is usually the data name in the title of the data product specifications.

- **Abstract**

Give a brief summary of the contents of the geospatial data product.

It may be the same as the overview.

- **Date**

Specify the creation date of the geospatial data product.

- **Topic category**

Specify the subject of the geospatial data product.

- **Geographic description**

Describe the geographic extent of the geospatial data product.

A detailed example of the geographical (spatial) boundary range of the data product is shown.

The following methods ①, ②, ③, and ④ are for describing the geographical range, and one of them should be selected and defined.

① The geographic bounding box is described by the latitude and longitude of the northern, southern, eastern and western boundaries.

【Example】 Spatial range

Geographical element: Geographical boundary box Reference system: JGD2011/(B, L)

Latitude of the eastern boundary: 136.907171

Latitude of the western boundary: 136.965843

Latitude of the southern boundary: 35.169322

Latitude of the northern boundary: 35.199475

* JGD2011 / (B, L) is the latitude and longitude based on the Japan Geodetic System 2011.

② The geographic bounding box (Coordinate) is described based on the coordinates of the northern, southern, eastern, and western boundaries.

【Example】 Spatial range

Geographical element: Coordinate box Reference system: JGD2011/9 (X, Y)

Western boundary coordinates: -23628.915 Eastern boundary coordinates: -18293.105

Southern boundary coordinates: -92124.783 Northern boundary coordinates: -88792.132

* JGD2011/9(X, Y) is the coordinate values of the plane rectangular coordinate system IX based on the Japan Geodetic System 2011.

③ The geographic bounding polygons (Coordinate) are described as the horizontal range of geospatial data as a polygon.

Boundary polygons are described through the coordinates of each vertex of the polygon.

【Example】 Spatial range

Geographical element: Boundary polygon Reference system: JGD2011/9 (X, Y)

Boundary polygon: 965000, 85200	106000, 67000	104800, 37100
47500, 27600	24800, -20100	-18600, 28200
-30000, 93600		

④ Geographical description is described as a geographic identifier indicating a place name, specific place, or area.

【Example】 Spatial range

Geographical element: Geographical identifier

Example: ●● prefecture ●● city ●● ward

3. Data product identification

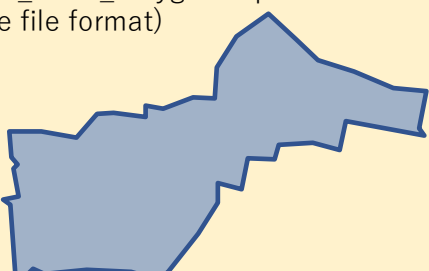
Title		1:2,500 Scale Digital Topographic Map	
Abstract		1:2,500 Digital Topographic Map of xxx Ward of xxx City according to the Operating Specifications of Public Survey.	
Date		20211228	
Topic category		Topographic map	
Geographic description	Geographic bounding box	Reference system	JGD2011/ (B, L)
		West bound longitude	E:136.907171
		East bound longitude	E:136.965843
		South bound latitude	N:35.169322
		North bound latitude	N:35.199475

*The reference system should be consistent with the definition of section 5.1. Spatial reference system (Horizontal)

Other options: (Instead of line “Geographic description” above, it may be defined by one of the followings)

Geographic description	Geographic bounding box (Coordinate*)	Reference system	JGD2011/7(X, Y)
		West bound coordinate	-23628.915 m
		East bound coordinate	-18293.105 m
		South bound coordinate	-92124.783 m
		North bound coordinate	-88792.132 m

*The reference system should be consistent with the definition of section 5.1. Spatial reference system (Horizontal)

Geographic description	Geographic bounding polygon (Coordinate*)	Reference system	JGD2011/7(X, Y)
		Xxx_City_xxx_Ward_Polygon.shp (ESRI shape file format)	
			

*The reference system should be consistent with the definition of section 5.1. Spatial reference system (Horizontal)

Geographic description	Geographic identifier	xxx Ward, xxx City, xxx Prefecture
------------------------	-----------------------	------------------------------------

4. Data content and structure – Application schema –

4. Data content and structure

[Preparatory survey: Recommended] [Detailed plan formulation survey: Partially recommended]

《Overview》

"Data content and structure" expressed by the application schema that describes the content, structure, and characteristics of data to be created or created geospatial data in detail can express various models freely, so it is often used. However, considering the characteristics of project implementation and the degree of freedom on the part of the contractor, description of data structure by other means than application schema is allowed.

In this manual, the patterns described using the application schema are shown below, which are used as reference materials for understanding the data contents and structure.

In order to accurately convey the content, structure and characteristics of geospatial data to users of product specifications, the application schema is shown by the following two documents.

- ① The document that expresses the structure of features and the relationships between features using UML (Unified Modeling Language) class diagrams. This document is also called the application schema
- ② The document called the feature catalogue that describes in detail information that cannot be shown in the UML class diagram.

(1) About the definition of features

In the application schema, the features are designed using the GFM (General Feature Model) defined in the "Rules of the application schema" as a metamodel, and are defined using the UML class diagram.

1) Application schema UML class diagram

The application schema UML class diagram is a realization of the structure of geospatial data to be created or created by the UML class diagram.

A class defines common properties and conditions for each object or concept.

For example, in a building, "Mr. A's house" and "Mr. B's house" are individual objects (instances), and each has information such as the shape, owner, and number of floors for the house. Since this information is common to "houses," it can be summarized as "house class".

2) UML notation

UML is an acronym of the Unified Modeling Language and generates a model of a system abstracted by a diagram.

(2) Feature catalogue (application schema document)

The feature catalogue is created as paired information with the application schema UML class diagram.

Figure 3 shows the basic structure of the feature catalogue.

In the feature catalogue, information on predetermined items is described for each class in each package.

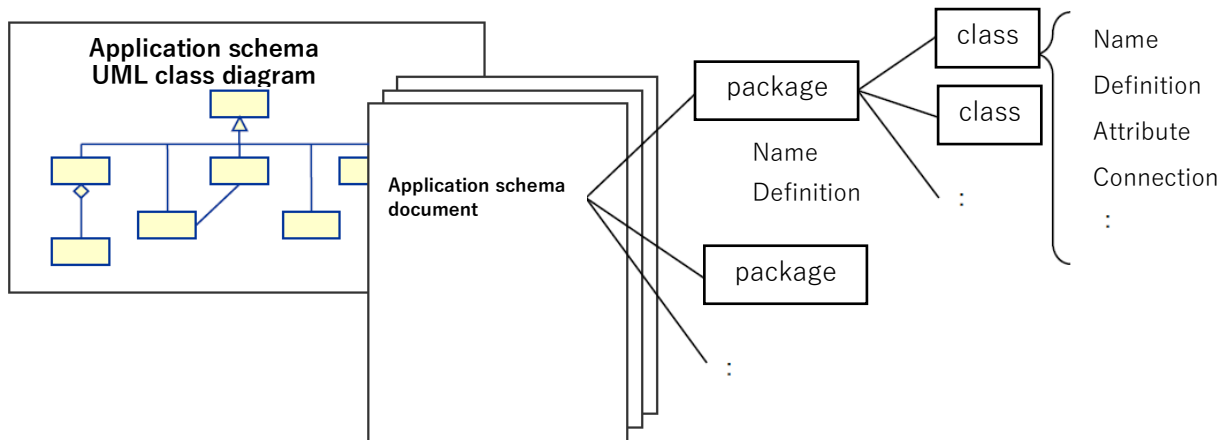


Fig.3 Basic structure of feature catalogue

《Description》

➤ 4. Data content and structure

The data content and structure of the product specifications are described based on the application schema and feature catalogue.

The application schema is described in 4.1. Application Schema, and the feature catalogue is described in 4.2. Feature Catalogue.

In detailed plan formulation surveys, the items to be acquired as data shall be described comprehensively. Then, at the time of project implementation, it will be completed as a feature catalogue.

➤ 4.1. Application Schema

[Preparatory survey: Recommended] [Detailed plan formulation survey: Not required]

It is standard to describe the application schema in a separate file, and if the separate file is Appendix 1, describe it as Appendix 1 Application Schema of 1:2,500 Scale Digital Topographic Map (draft) as a reference.

➤ 4.2. Feature Catalogue

[Preparatory survey: Recommended] [Detailed plan formulation survey: Not required]

It is standard to describe the feature catalogue in a separate file, and if the separate file is Appendix 2, describe it as Appendix 2 Feature Catalogue of 1:2,500 Scale Digital Topographic Map (draft) as a reference.

4. Data content and structure

Narrative description	Is described by the application schema and feature catalogue of 1:2,500 Scale Digital Topographic Map.
-----------------------	--

4.1. Application schema

Application schema citation (See the document on the right)	Title	Appendix 1 Application Schema of 1:2,500 Scale Digital Topographic Map (draft)	
	Date	Date	20211228
		Revision	December 2021

4.2. Feature catalogue

Feature catalogue citation (See the document on the right)	Title	Appendix 2 Feature Catalogue of 1:2,500 Scale Digital Topographic Map (draft)	
	Date	Date	20211228
		Revision	December 2021

➤ **4.3. Application Schema referred to in 4.1. Application Schema**

In the separate file (specifically, "Appendix 1 Application Schema of 1:2,500 Scale Digital Topographic Map (draft)") referred to in 4.1 Application Schema, the data structure and contents of the data product are defined using the UML class diagram.

➤ **Appendix 1 1. Application Schema**

As shown in 《Overview》 of "4. Data contents and structure" above, describe that the structure of the feature and the relationship between the features are represented using the UML class diagram.

➤ **Appendix 1 1.1. Definition of features**

Similarly, describe that the definition is made using GFM as shown in << Overview >>.

➤ **Appendix 1 1.1.1. Basic idea of feature instances**

Describe the basics for representing feature instances corresponding to individual features. They are generally expressed as point features, line features, or surface features according to the spatial shape of the feature.

➤ **Appendix 1 1.1.2. Classification of shape and relationship of feature instances**

The reference destinations for the shape pattern/intersection pattern regarding the spatial shape of the feature instance and the interrelationship between the feature instances are described.

The specific pattern is described in Appendix 2 Feature Catalogue of 1:2,500 Scale Digital Topographic Map (draft).

➤ **Appendix 1 1.1.3. Common definition of feature instances**

Describe various conditions for the spatial shape of the feature instance. An example is shown below.

-There must be no extremely short linear or planar features.

-The same coordinate values must not be consecutive at the constituent points of linear and planar features.

If the distance between the constituent points is less than 0.01 m, they are considered to be at the same coordinate value.

➤ **Appendix 1 1.1.4 Relationship between feature instances with thresholds**

Describe various conditions for interrelationships between feature instances.

In 《Product Specifications Description Example》 1.1.4., which will be described later, 1) intersection and connection of line features, 2) overlap of line features, 3) connection of surface features, 4) overlap of surface features are shown.

➤ Appendix 1 1.2. Application Schema(UML class diagram)

Describe that the application schema of 1:2,500 topographic map is described in accordance with the application schema standard defined by ISO19107.

However, it is also possible to describe the data structure by other methods.

➤ Appendix 1 1.2.1. Package configuration

Describes the package structure of the application schema of the 1:2,500 digital topographic map.

A package is a set of related classes, and the classes contained in a package must not be contained in any other package.

By dividing the whole package into several sub packages and clearly stating the reference relationships between the packages, the overall picture of the data to be created becomes clear.

A 1:2,500 scale digital topographic map in Japan's public survey generally consists of the following sub packages.

DM_Basic sub package

DM_Boundary sub package

DM_Transportation_Facilities sub package

DM_Building sub package

DM_Small_object sub package

DM_Water sub package

DM_Land_Use sub package

DM_Terrain sub package

DM_Annotation sub package

DM_Irregular_Feature sub package

In the UML class diagram, the classes are shown in the three-tiered square in the upper left of Fig. 4. The stereotype name and class name are described in the first row, the attributes are described in the second row, and the operation is described in the third row. For digital topographic maps created in Japan's public survey, the third stage operation is left blank.

Fig. 4 shows an example of an administrative boundary line class as a specific example.

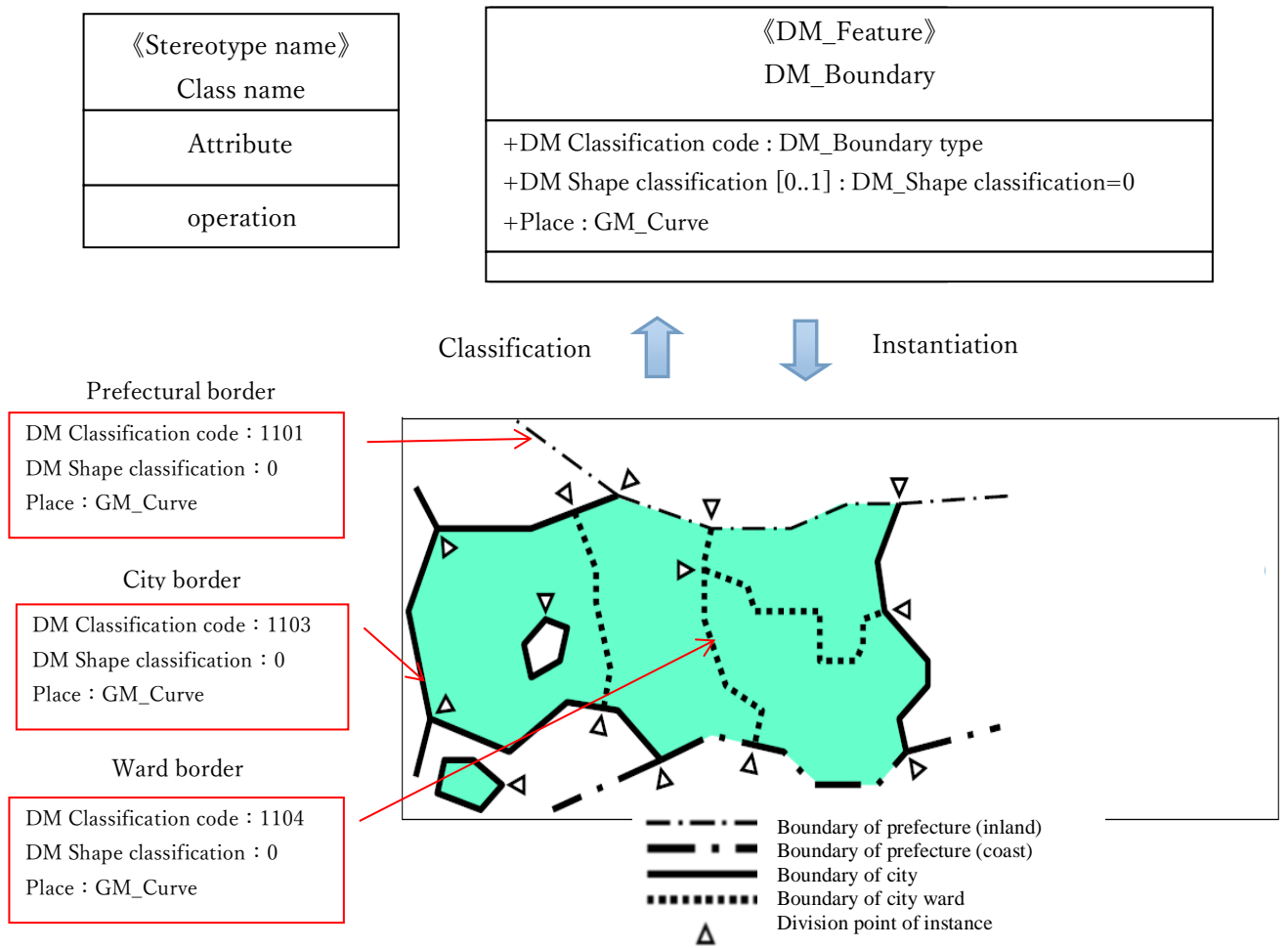


Fig.4 Boundary class diagram and administrative boundary class example

Regarding the relationships between classes, there is association, aggregation, and composition.

Associations connect classes with a line segment when there is some relationship between the classes. Write the role name and multiplicity at both ends of the line segment.

In aggregation, when there is a relationship of whole and a part between two classes, the classes are connected by a line segment and a white diamond is attached to the class to be aggregated.

In composition, when there is a relationship of whole and apart between two classes and when they are strongly connected, the classes are connected by a line segment and the destination class is given a black diamond.

In addition, in the case of an abstract feature and a feature class that embodies it, such as "road" and "national road," the embodied class is said to inherit the original abstract class. Add a white triangle to the original class. Also, when the relationship between classes is unidirectional, an arrow is added to the relationship destination.

Stereotypes indicate differences in the roles and usage of classes and packages. The following is a list of

stereotypes.

- «Abstract» Abstract class that cannot be instantiated directly
- «Feature» Used to define features
- «Enumeration» This is an enumeration type used when the data type is a character type list. It is used when the possible values can be limited in the application schema.
- «Type» Used for classes used as attribute types.

It has an identifier and can be referred to by others.

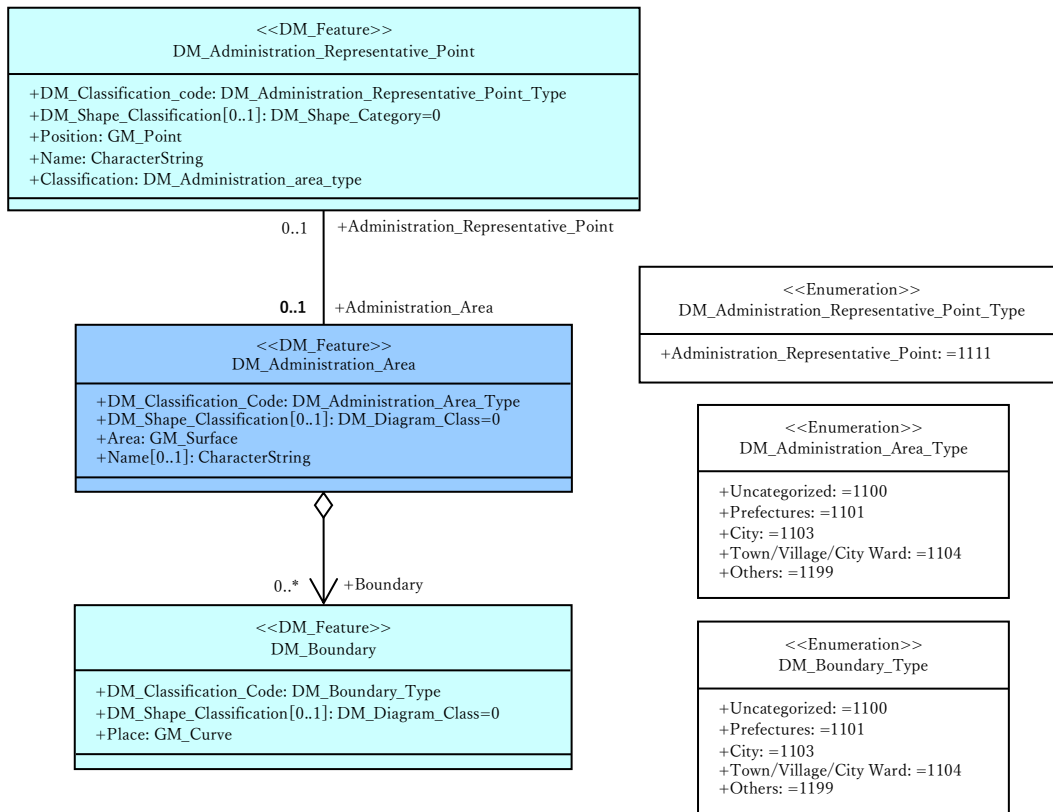
For example, consider the following data structure for administrative units and their boundaries.

- The administrative units are prefectures, cities, towns/villages/city wards, prefectures are composed of cities and towns/villages, and cities are composed of city wards.
- Represent the range of prefectures, cities, towns/villages/city wards as administrative units of surface features.
- The position of an appropriate place in an administrative unit expresses the representative point of an administrative unit as a point features.
 - The boundary line of an administrative unit is expressed as boundary which is a line feature.
 - The codes for prefecture, city, town/village/city are 1101, 1103, 1104.
 - The code of the representative point of the administrative unit is 1111.

In this case

- Administrative unit representative point class has association with administrative unit class
- The boundaries of administrative unit classes are aggregated from the boundaries class
- Codes such as administrative unit representative points, administrative units, and boundaries are limited.

Therefore, an application schema as shown in the figure below can be considered as a package of administrative units and their boundaries.



In the product specification format, the application schema is described in the following sections of Appendix 1.

Specific description methods are shown in the description example.

- Appendix 1 1.2.2. DM basic sub package
- Appendix 1 1.2.3. DM boundary sub package
- Appendix 1 1.2.4. DM transportation facilities sub package
- Appendix 1 1.2.5. DM building sub package
- Appendix 1 1.2.6. DM small object sub package
- Appendix 1 1.2.7. DM water area sub package
- Appendix 1 1.2.8. DM land use sub package

- Appendix 1 1.2.9. DM terrain sub package

- Appendix 1 1.2.10. DM annotation sub package

- Appendix 1 1.2.11. DM irregular feature sub package

《Product specification description example》

1. Application Schema

This application schema provides the formal description of the data structure and content of the data product using a UML class diagram.

(For these data product specifications, only one feature package quoted from "Data Product Specification of 1:2,500 Scale Digital Topographic Map (2014), Geospatial Information Authority in Japan (in Japanese)" is illustrated.)

1.1. Definition of features

The features of this application schema are designed using the GFM defined in ISO 19107 as a metamodel, and are defined using a UML class diagram.

1.1.1. Basic idea of feature instances

All features in this application schema hold only one geometric object.

A feature that has GM_Point as a geometric object is called a Point-shaped feature.

A feature that has GM_Curve as a geometric object is called a Line-shaped feature.

A feature that has GM_Surface or GM_PolyhedralSurface as a geometric object is called a Surface-shaped feature.

The common definition for each feature instance based on the above is as follows.

Feature	Common definition for each instance	Remarks
Point-shaped feature	Point-shaped features are instances that are different for each point. In the feature class, there must be only one instance where all of attributes are the same, except for the feature ID.	
Line-shaped feature	Line-shaped features are instances of continuous line segments within a city, ward, town, or village. Even if it is a continuous entity, the part with different thematic attribute values becomes another instance. In the feature class, there must be only one instance where all of attributes are the same, except for the feature ID.	
Surface-shaped feature	A Surface-shaped feature is a continuous area as one instance. Even if it is a continuous entity, the parts with different thematic attribute values become another instance. In the feature class, there must be only one instance where all of attributes are the same, except for the feature ID.	Whether or not the feature is divided by the municipal boundary is defined by each feature.

1.1.2. Classification of shape and relationship of feature instances

The spatial shape expressed by the spatial attributes of the feature instance and the interrelationship between the instances are based on the shape pattern/intersection pattern shown in Appendix 2 Feature Catalogue of 1:2,500 Scale Digital Topographic Map (draft).

The feature instances must comply with the conditions defined using these patterns and quality assessments must be performed using the patterns.

1.1.3. Common definition of feature instances

This section describes the rules that should be observed for all features of digital topographic map data. These rules are premised on determining the conditions under which the shape of each feature instance and the interrelationship between feature instances are allowed, and are rules that must be observed in all features.

1) The feature must comply with the following rules.

Rule 1: (Target: All features)

There must be no feature instance that has the same spatial and temporal attributes in the same feature class.

2) The spatial attributes of the feature must comply with the following rules.

Rule 2: (Target: Line-shaped features)

A line-shaped feature instance must consist of a continuous polygonal line connecting two or more points.

Rule 3: (Target: Surface-shaped features)

A surface-shaped feature instance must consist of a line segment or polygonal line connecting three or more points (four points or more when the end point is added) that are not on a straight line.

Rule 4: (Target: Line-shaped features/Surface-shaped features)

The neighboring points of the point constituting the line-shaped feature instance and the surface-shaped feature instance must not have the same coordinate values. In this specification, if the distance between the constituent points is less than 0.01 m, it is regarded as the same coordinate value.

Rule 5: (Target: Linear-shaped features)

In a line-shaped feature instance, there must be no micro lines that are not valid as features.

Rule 6: (Target: Surface-shaped features)

In a surface-shaped feature instance, there must be no micro polygons that are not valid as features.

1.1.4. Relationships between feature instances with thresholds

The shape pattern and the intersection pattern defined in this section are determined by an operation that considers the threshold value of each feature. There is a proximity threshold value and an overlap threshold value. The operations using these thresholds will be described below. The proximity threshold value is 0.01 m and the overlap threshold value is 0.5 m.

1) Crossing and connecting of linear-shaped features

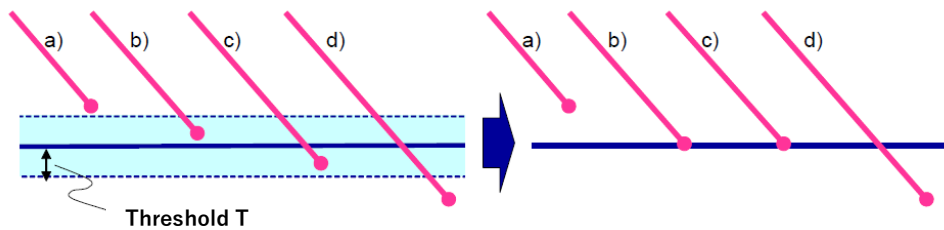
This is the case in which the proximity threshold value "T" is set for the intersection/connection relationship of two lines segment.

When a buffer area with a threshold value is created for one line segment, if the end point of the other line segment is within the buffer area, the latter is said to be connected to the former. When the other line segment crosses the buffer area and its end point is outside the buffer area, the two segments are said to intersect.

The left half of the figure below shows the state in which the proximity threshold is set, and the right half shows the state in which the proximity threshold is not set.

Since the end points exist in the proximity threshold buffer in b) and c) on the left, they are interpreted as b) and c) on the right and are connected.

Since a) does not fall within the proximity threshold range on the left, it is not crossed nor connected. Since d) exceeds the proximity threshold range, it intersects.

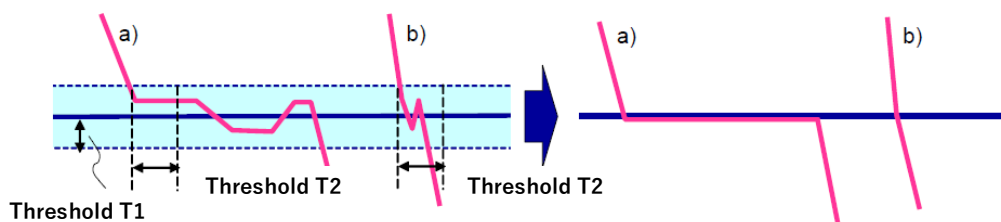


2) Overlapping of linear features

The case in which the proximity threshold value "T1" and the overlapped threshold value "T2" are set in the overlap relationship between two lines segment.

When a buffer area with a proximity threshold is created for one line segment, the continuous part of the other line segment is in the buffer area, and the continuous length is longer than the overlap threshold. If so, the latter is said to overlap the former.

In the figure below, a) shows overlapping, and b) shows not overlapping but intersecting.

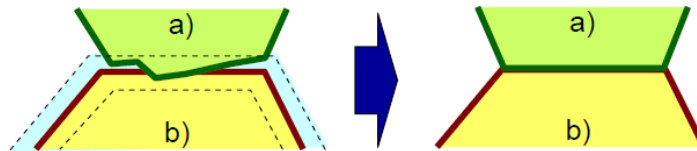


3) Connection of surface-shaped features

The case in which the proximity threshold "T" is set in the connection relationship between the two surfaces.

When the boundaries of the two surfaces overlap but not intersect with this proximity threshold, and the interiors of the two surfaces do not overlap except for their boundaries, then the two surfaces are said to be connected.

Since the boundary line of surface a) in the left half of the figure below is within the range of the proximity threshold value set for boundary line of surface b), the relationship is regarded as shown in the right half of the figure, and the surfaces are connected to each other.

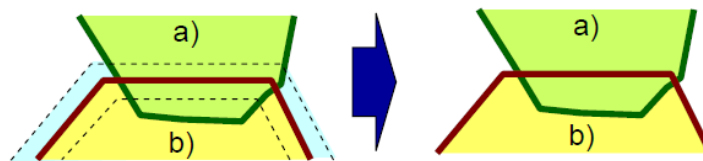


4) Overlapping of surface-shaped features

The case in which the proximity threshold "T" is set in the connection relationship between the two surfaces.

When the boundaries of two surfaces intersect with this proximity threshold, the two surfaces are said to be overlapping.

Since the boundary lines of the surfaces a) and b) on the left half of the figure below intersect beyond the range of the proximity threshold value, the relationship is regarded as shown in the figure on the right half, and the surfaces overlap each other.

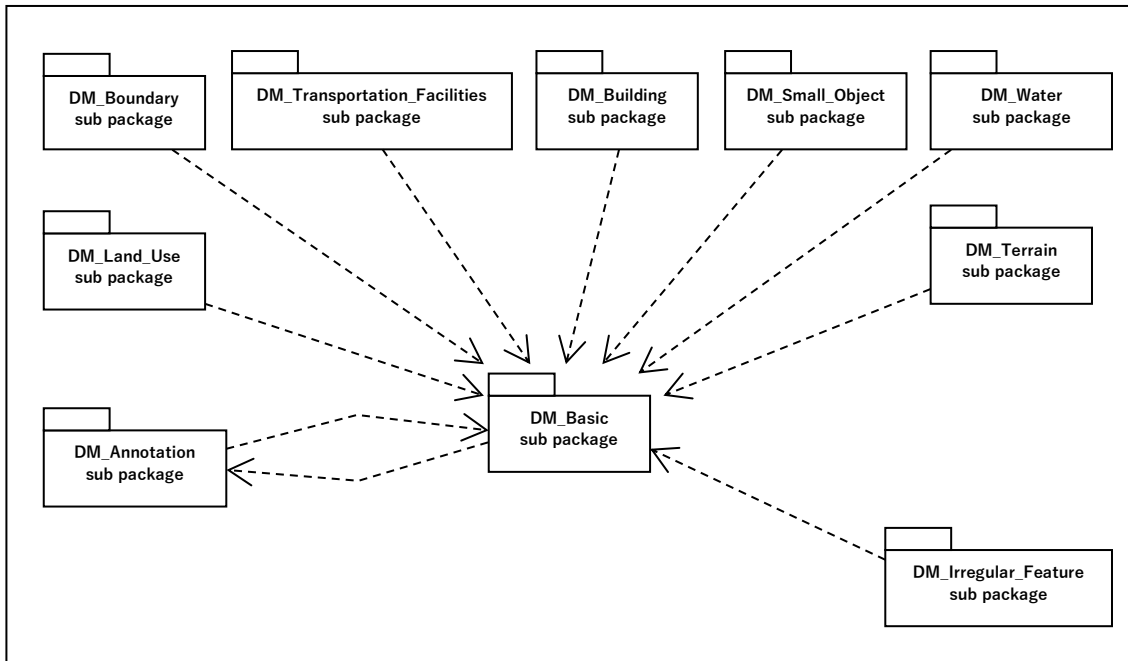


1.2. Application Schema (UML class diagram)

In this section, the application schema of 1:2,500 Scale Digital Topographic Maps is designed in accordance with ISO 19107 and described using a UML class diagram. (However, another method such as tabular format may be used instead of the UML class diagram.)

1.2.1. Package configuration

The package configuration (overall) of the Application Schema of 1:2,500 Scale Digital Topographic Map is shown in the figure below.

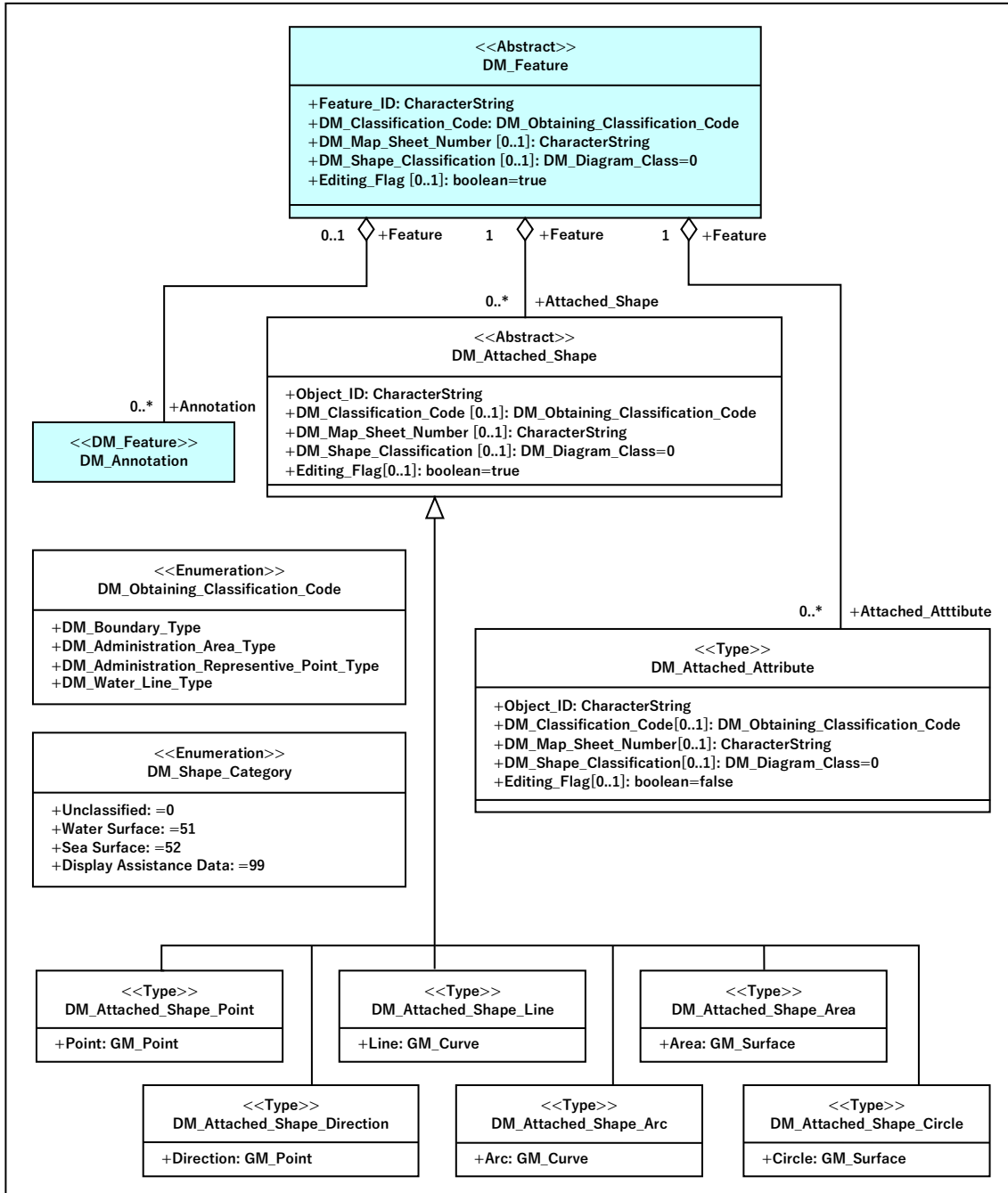


DM Data package (UML class diagram)

1.2.2. DM_Basic sub package

This sub package defines the DM_Feature class and ties it to related classes, which are the super classes of all digital topographic map data features.

- Feature class: DM_feature, DM_Annotation, DM_Attached_Shape
- Enumeration type: DM_Obtaining_Classification_Code, DM_Shape_Category



DM_Basic sub package (UML class diagram)

1.2.3. DM_Boundary sub package

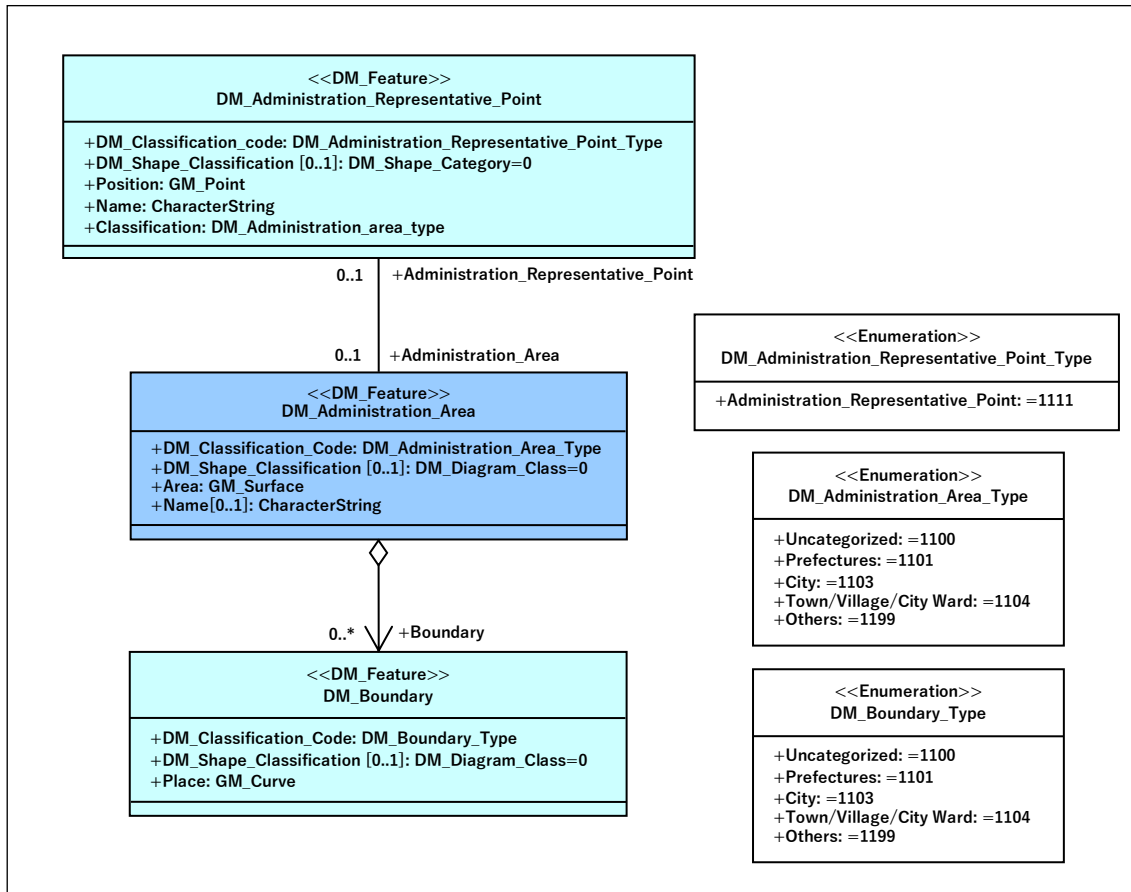
DM_Boundary subpackages are a group of feature classes that define the details of the "Boundaries."

- Feature class:

DM_Administration_Representative_Point, DM_Administration_Area, DM_Boundary

- Enumeration type:

DM_Administration_Representative_Point_Type, DM_Administration_Area_Type, DM_Boundary_Type



DM_Boundary sub package (UML class diagram)

1.2.4. DM_Transportation_Facilities sub package

The description of DM_Transportation_Facilities sub package is omitted.

1.2.5. DM_Building sub package

The description of DM_Building sub package is omitted.

1.2.6. DM_Small_Object sub package

The description of DM_Small_Object sub package is omitted.

1.2.7. DM_Water sub package

The description of DM_Water sub package is omitted.

1.2.8. DM_Land_Use sub package

The description of DM_Land_Use sub package is omitted.

1.2.9. DM_Terrain sub package

The description of DM_Terrain sub package is omitted.

1.2.10. DM_Annotation sub package

The description of DM_Annotation sub package is omitted.

1.2.11. DM_Irregular_Feature sub package

The description of DM_Irregular_Features sub package is omitted.

- **4.4. Feature Catalogue referred to in 4.2 Feature Catalogue**

Items to be described in another file referred to in 4.2 Feature Catalogue (specifically, "Appendix 2 Scale 1:2500 Digital Topographic Map Feature Catalogue (draft)") are as follows.

➤ Appendix 2 1. Feature Catalogue

➤ Appendix 2 1.1. Feature Catalogue

Describe that detailed information on all feature types defined as application schemas for digital topographic maps is defined in the feature catalogue.

➤ Appendix 2 1.1.1. Feature catalogue information

Describe the name of the feature catalogue of the digital topographic map, its target range, number of editions, date of issue, and the organization that created it.

➤ Appendix2 1.1.2. Feature information (Feature catalogue configuration)

For each sub package defined in the application schema, describe the information in the required items for each class included in the package. The description items for each class are as follows. Not all items need to be described, only the related items.

- Feature class
- Superclass
- Abstract/Concrete
- Attribute inherited from superclass and refined
- Attribute: Describes the name, multiplicity, type, initial value, definition, acquisition standard, and domain of each attribute of the class.
- Aggregation
- Connection
- Composition (strong aggregation)
- Relationship
- Units of Instance
- Relationship with other instances
- Instance example
- Enumeration type
- Enumeration value
- Remarks

As an example, the above-mentioned administrative units and their boundary package boundary class are shown below.

Feature class: DM Boundary, etc.

Superclass: DM Feature

Attribute inherited from superclass and redefined:

DM Classification Code: Attribute value is set from enumerated data of boundary equal type

DM Shape Classification [0..1]: 0 is set

Attribute: Place: GM_Curve

Enumeration type: Boundary, etc. type

Enumeration value: Uncategorized: = 1100

Prefectural border: = 1101

City boundary: =1103

Town/village/city boundary: = 1104

Others: = 1199

➤ Appendix 2 1.1.3. Package configuration

Describe that the package configuration is specified in Appendix 1.

In the product specification format, information on features is described in the following sub package sections of Appendix 2. A specific description method is shown in the description example.

➤ Appendix 2 1.1.4. DM basic sub package

➤ Appendix2 1.1.5. DM boundary sub package

➤ Appendix2 1.1.6. DM transportation facilities sub package

➤ Appendix 2 1.1.7. DM building sub package

➤ Appendix 2 1.1.8. DM small object sub package

➤ Appendix 2 1.1.9. DM water area sub package

- Appendix 2 1.1.10. DM land use sub package
- Appendix 2 1.1.11. DM terrain sub package
- Appendix 2 1.1.12. DM annotation sub package
- Appendix2 1.1.13. DM irregular feature sub package

1. Feature Catalogue

1.1. Feature Catalogue

This section provides detailed information for all feature classes defined in the 1:2,500 Scale Digital Topographic Map application schemas as a feature catalogue.

1.1.1. Feature catalogue information

Describes the basic information of the feature catalogue.

Feature catalogue name	Feature Catalogue of 1:2,500 Scale Digital Topographic Map (draft)
Scope	All features defined by the application schema
Revision	Same version as that of Appendix 2.
Date	Same date as that of Appendix 2.
Responsible party	Same responsible party shown in the product specifications.

1.1.2. Feature information (Feature catalogue configuration)

Depending on the feature class, some of the following items for all feature classes defined in the application schema of 1:2,500 Scale Digital Topographic Map (draft) are described. The description is organized in the same sub package unit as the application schema.

*In this document, only part of DM_Basic subpackage and DM_Boundary subpackage are described

- Feature class:
- Superclass:
- Is Abstract:
- Attributes inherited from superclass and redefined:
- Attributes:
- Aggregation:
- Association:
- Composition:
- Relationship:
- Units of instance:
- Relationship with other instances:
- Instance example:
- Enumeration type:
- Enumeration value:
- Notes:

1.1.3 Package configuration

Package configuration is described in clause 1.2.1 of "Appendix 1 Application Schema of the 1:2,500 Scale Digital Topographic Map (draft)."

1.1.4 DM_Basic sub package

This subpackage defines the DM_Feature class, which is the superclass of all digital topographic map data features, and its related classes.

DM_Feature

This is an abstract class of all features.

In the application schema UML class diagram, all classes with stereotype <DM_Feature> inherit this class.

Superclass: None

Is Abstract: True

Attributes:

Feature ID: CharacterString

Feature ID uniquely identifies the feature in all digital topographic map data, and all features should retain this ID.

DM Classification Code: DM_Obtaining_Classification_Code

This value is for obtaining a classification code.

(Use alphanumeric characters)

DM Map Sheet Number [0..1]: CharacterString

The map sheet identification number of the digital topographic map data.

(Use alphanumeric characters)

If it is not necessary to identify the map sheet number for the feature, this attribute value should be omitted.

DM Shape Classification [0..1]: DM_Shape_Class=0

The value of the Shape classification for this feature instance.

This value is "0."

Editing Flag [0..1]: Boolean=false

Indicates that the editing process for each feature has been performed. (e.g. This feature has been newly added. The shape of this feature has changed.)

True Editing process was performed

False No editing process was performed (Default value)

Aggregation:

Attached Shape [0..1]: DM_Attached_Shape

Shape information attached to this DM_Feature.

Attached Attribute [0..*]: DM_Attached_Attribute

Attribute information attached to this DM_Feature.

Annotation [0..*]: DM_Annotation

Annotation information attached to this DM_Feature.

If the annotation attached to the DM_Feature can be clarified, an aggregate relationship is defined.

DM_Attached_Shape

A type for expressing shape information attached to DM_Feature.

[Superclass: None](#)

[Is Abstract: True](#)

[Attributes:](#)

Object ID: **CharacterString**

Uniquely identifies the object in all digital topographic map data.
The value of the Object ID is an OID data type-based character string.

DM Classification Code: **DM_Obtaining_Classification_Code**

This value is for obtaining a classification code.
If the classification code is the same as the DM_Feature of the aggregation source, it can be omitted.

DM Map Sheet Number [0..1]: **CharacterString**

The map sheet identification number of the digital topographic map data.
(Use alphanumeric characters)

Editing Flag [0..1]: **Boolean=false**

Indicates that the editing process for each feature has been performed. (e.g. This feature has been newly added. The shape of this feature has changed.)

true	Editing process was performed
false	No editing process was performed (Default value)

DM_Attached_Shape_Point

A type for expressing point shape information is attached to DM_Feature.

[Superclass: DM_Attached_Shape](#)

[Attributes:](#)

Point: **GM_Point**

This is the position of the point shape.
This spatial attribute is composed of the point element P1 Pattern.

[Units of instance:](#)

Use a separate instance for each point to be represented.

[Relationship with other instances:](#)

See description of DM_Feature.

[Instance example:](#)

See description of DM_Feature.

DM_Attached_Shape_Direction

A type for expressing directional shape information attached to DM_Feature.

[Superclass: DM_Attached_Shape](#)

[Attributes:](#)

Direction: GM_Point

The position of the second point of the directional shape.

This spatial attribute is composed of the point element P1 Pattern.

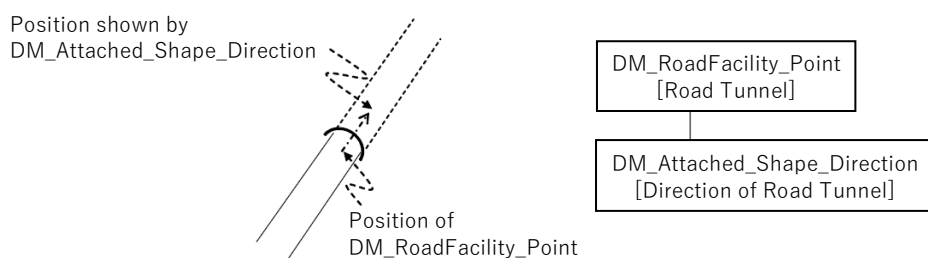
[Units of instance:](#)

Use a separate instance for each direction to be shown.

[Relationship with other instances:](#)

See description of DM_Feature.

[Instance example:](#)



DM_Attached_Shape_Line

A type for expressing line shape information attached to DM_Feature.

[Superclass: DM_Attached_Shape](#)

[Attributes:](#)

Line: GM_Curve

The position of the line shape.

This spatial attribute is composed of the line element L1 Pattern.

[Units of instance:](#)

The same instance for the range in which the attribute value does not change.

[Relationship with other instances:](#)

See description of DM_Feature.

[Instance example:](#)

See description of DM_Feature.

DM_Attached_Shape_Arc

A type for expressing arc shape information attached to DM_Feature.

[Superclass: DM_Attached_Shape](#)

[Attributes:](#)

Arc: GM_Curve

The shape of the arc shape.

[Units of instance:](#)

An instance is an arc represented by three points on the same circle.

[Relationship with other instances:](#)

See description of DM_Feature.

[Instance example:](#)

See description of DM_Feature.

DM_Attached_Shape_Area

A type for expressing area shape information attached to DM_Feature.

[Superclass: DM_Attached_Shape](#)

[Attributes:](#)

Area: GM_Surface

The area of the surface shape.

This spatial attribute is composed of the area element A1 Pattern.

[Units of instance:](#)

The range in which the attribute value does not change is the same instance.

[Relationship with other instances:](#)

See description of DM_Feature.

[Instance example:](#)

See description of DM_Feature.

DM_Attached_Shape_Circle

A type for expressing circle area shape information attached to DM_Feature.

[Superclass: DM_Attached_Shape](#)

[Attributes:](#)

Area: GM_Surface

The area of the circular surface shape.

GM_SurfacePatch in this GM_Surface is composed of one GM_Circle.

This spatial attribute is composed of the area element A2 Pattern.

[Units of instance:](#)

There is a separate instance for each circular shape.

[Relationship with other instances:](#)

See description of DM_Feature.

[Instance example:](#)

See description of DM_Feature.

DM_Attached_Attribute

A type for expressing attributes information attached to DM_Feature.

[Superclass: None](#)

[Attributes:](#)

Object ID: CharacterString

Uniquely identifies the object in all digital topographic map data.

The value of the Object ID is an OID data type-based character string.

DM Classification Code: DM_Obtaining_Classification_Code

This value is for obtaining a classification code.

If the classification code is the same as the DM_Feature of the aggregation source, it can be omitted.

DM Map Sheet Number [0..1]: CharacterString

The map sheet identification number of the digital topographic map data.

(Use alphanumeric characters)

Editing Flag [0..1]: Boolean=false

Indicates that the editing process for each feature has been performed. (e.g. This attached attribute has been newly added. The attribute of this feature has changed.)

True Editing process was performed

False No editing process was performed (Default value)

[Units of instance:](#)

It becomes a separate instance for each attribute unit that can be classified by attribute name.

[Relationship with other instances:](#)

See description of DM_Feature.

[Instance example:](#)

See description of DM_Feature.

DM_Obtaining_Classification_Code (Enumeration type)

An enumeration type to represent classification codes of the DM data held by DM_Feature, DM_Attached_Shape, and DM_Attached_Attribute.

[Aggregation element of Enumeration value:](#)

DM_Boundary_Type

DM_Administration_Area_Type

DM_Administration_Representation_Point_Type

DM_Water_Line_Type

1.1.5. DM_Boundary sub package

This clause defines the information about boundary features.

*In this document, the structure of an administrative unit is assumed to be as follows:

First level: Country

Second level: Prefecture

Third level: Gun and city (referred to collectively as "city")

Forth level: Town, village, and city ward

DM_Boundary

The boundary of the administration includes Prefectural boundaries (DM Classification Code=1101), City boundaries (DM Classification Code=1103), Town/Village/City ward boundaries (DM Classification Code=1104), and Others (DM Classification Code=1199).

[Superclass: DM_Feature](#)

[Attributes inherited from superclass and redefined:](#)

DM Classification Code: DM_Boundary_Type

The value of the acquisition classification code for this feature instance.

The enumeration data defined in DM_Boundary_Type is set to the value of this attribute.

(*Higashi Ward of Nagoya City has DM Classification Code = 1104)

DM Shape Classification [0..1]: DM_Shape_Class=0

The value of the shape classification for this feature instance.

This value is "0."

[Attributes:](#)

Place: GM_Curve

Place of boundaries.

This spatial attribute consists of Line element L1 pattern.

[Notes:](#)

If you create a DM_Administration_Area polygon and it refers to a boundary, then a DM_Boundary instance must exist seamlessly as the boundary of the DM_Administration_Area polygon.

Since DM_Administration_Area has a coastline as a boundary, there are many parts where DM_Water_Line instances and DM_Boundary instances overlap on the coastline.

If the existing DM_Boundary instance does not completely close DM_Administration_Area, you need to create an additional DM_Boundary instance and close DM_Administration_Area. In this case, set the edit execution flag of the added feature to "true".

Units of instance:

For each of Prefecture, City, and Town/Village/City Ward, a continuous line segment indicating the boundary is regarded as one DM_Boundary instance, and the instance is divided at the place that meets the following conditions.

(1) Where the boundary of administration area (DM_Boundary etc.) branches

Note) For example, when creating a city boundary, if the boundary between the city and neighboring cities branches, divide it at that point as well. This is the instance split required for boundary references.

(2) Where the type of DM_Boundary instance changes

- DM_Boundary instances must not self-cross.
- If a DM_Boundary instance constitutes a ring and there is no point that meets the above conditions, one instance constitutes the shape of the ring. In this case, the coordinate values of the start point and the end point must match.
- The DM_Boundary instance, which was additionally created to configure the DM_Administrative_Area polygon as a closed area, becomes a separate instance from the existing instances, and "execution flag=true" is set.

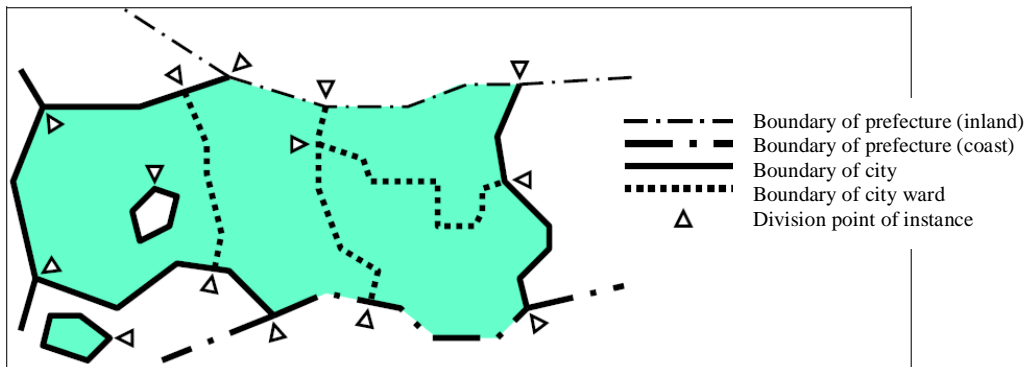
Relationship with other instances:

Relative positional relationship and connection relationship with other feature instances

Counterpart feature	Procedure to keep relative positional relationship	Selectable intersection patterns
DM_Boundary (Same class)	-- DM_Boundary instances do not intersect or overlap each other. (Except when they are not the boundary of the adjacent municipality) -- Connect everything except the undecided boundary. -- The instance is divided only at the branch point of the boundary with the higher type and the same type. -- The DM_Boundary extending from the inland to the coast connects to the DM_Boundary that overlaps the coastline.	LL1, LL2, LL11
DM_Water (Coastline part)	-- Instances that exist in the coastline part of DM_Boundary overlap with a DM_Water_line instance whose DM_Water_line_type is the coastline. However, they are different instances. -- The DM_Boundary drawn to the sea is cut at the intersection with the coastline, leaving the instance. (This instance is not used for boundary reference)	LLx other than LL6
DM_Water (Inland water line part)	-- Even on lakes or ponds, if the boundary is fixed, connect DM_Boundary. -- The waterline of the island on the lake or pond is not DM_Boundary.	All LLx
DM_Administrative_Area	-- The DM_Boundary instance becomes the boundary of the corresponding DM_Administrative_Area and is referenced.	-

Instance example:

The figure below shows an example of the administrative unit boundary line for a city represented by DM_Boundary instances.



This city area is surrounded by a prefectural boundary, city boundary, and coastline, with a ward boundary within the city area.

The figure also shows the boundaries outside the city limits, but instances of that part basically do not exist as data for this city.

In this figure, it is necessary to create a DM_Boundary instance with "DM classification code=boundary of prefecture<1101>" set for the border line of the prefecture and a DM_Boundary instance with "DM classification code=boundary of City, <1103>" set for the border line of the city. Create a DM_Boundary instance with "DM classification code=boundary of Town, Village, and City Ward<1104>" for the border line of the ward.

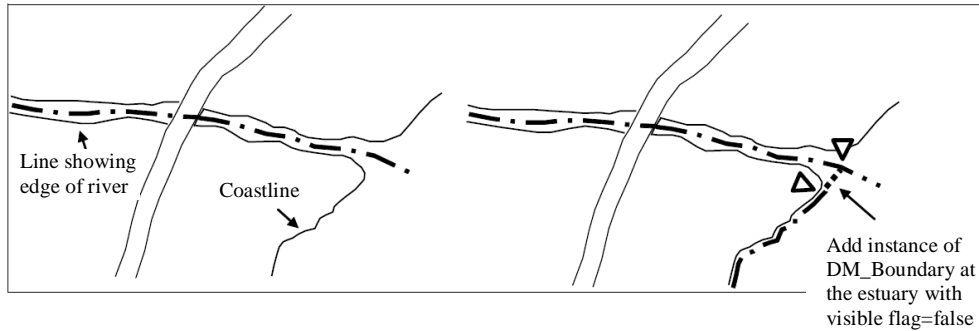
In addition, a DM_Boundary instance with "DM classification code=boundary of prefecture <1101>" may be created as an instance overlapping with coastline (DM_Water) for coastline portions. This instance is needed when all the boundaries of the DM_Administration_Area instance should be surrounded by DM_Boundary instances. But it is not mandatory.

The triangles in the figure have their vertices indicating the division points of each DM_Boundary instance. There are places where DM_Boundary instances are extended outside the city area, but they are not subject to creation as DM_Boundary instances related to this city area. However, there should be division points of the instances where they branch.

If there is no instance division point on the boundary of this city's enclave or other city's enclave within the city area, you can close the area with one DM_Boundary instance, and there is only one end point of boundary instance at any break point.

The following figure shows an example of a DM_Boundary (DM classification code=Prefecture<1101>) instance created as an instance overlapping with DM_Water on the coastline. The thick alternating long and short dash line in the figure indicates the DM_Boundary instance.

At the mouth of a river, if a prefectural boundary is set near the center line of the river, there is a DM_Boundary instance there. In this case, extend the DM_Boundary instance on the coastline at the estuary, and add an instance (Another instance with visible flag=false) so that it can connect with the DM_Boundary instance near the center line. The triangles in the figure below show the division points of the instance.



DM_Boundary_Type (Enumeration type)

The type of boundary, etc. defined as the acquisition classification code.

[Enumeration value:](#)

Uncategorized:	=1100
Prefecture:	=1101
City:	=1103
Town/Village/City Ward:	=1104
Others:	=1199

DM_Administration_Area

Administrative unit is prefecture, city, town/village/city ward, or other unit.

The DM_Administration_Area instance exists as an independent surface-shaped feature that holds a coordinate list, but in general, there is a DM_Boundary instance or a DM_Water instance at the boundary. If possible, it is desirable that all of the boundary parts are surrounded by instances such as DM_Boundary, but it is not mandatory.

The DM_Administration_Area class expresses an administrative unit in terms of surface shape.

[Superclass: DM_Feature](#)

[Attributes inherited from superclass and redefined:](#)

DM Classification Code: DM_Administration_Area_Type

This value is the acquisition classification code for this feature.

The enumeration data defined in DM_Administration_Area_Type is set to the value of this attribute.

DM Shape Classification [0..1]: DM_Shape_Class=0

The value of the shape classification for this feature instance.

This value is "0."

[Attributes:](#)

Area: GM_Surface

Area of an administration unit. This spatial attribute consists of surface element A1 pattern.

Name [0..1]: CharacterString

Administration unit name.

[Aggregation:](#)

Boundary [0..1]: DM_Boundary

Aggregate DM_Boundary instances that make up the boundaries of an administration unit.

Set when this association is possible. The associated DM_Boundary instance may be part of the DM_Administration_Area boundary.

[Association:](#)

Administration Representative Point [0..1]: DM_Administration_Representative_Point

It is related to the DM_Administration_Representative_Point instance, which indicates the representative point of the administrative unit.

It is set when the association is possible.

When one administrative unit is composed of multiple DM_Administration_Area instances, this association is limited to one representative instance among the instances.

[Units of instance:](#)

Among the areas defined as prefectures, cities, towns/villages/city wards, and cho-me, each contiguous area is regarded as one entity, and a DM_Administration_Area instance is applied to each of them. Exclaves and islands are separate instances because they are not contiguous areas even within one administrative unit.

A point that belongs to the area as a prefecture and also belongs to the area of a city, but since the area as a prefecture and the area as a city are different entities, there are instances corresponding to their areas.

Note)

When focusing on DM_Administration_Area instances (DM Classification Code=Prefecture) for example, there is a DM_Administration_Area instance in Tokyo (prefecture) on Izu Oshima, but Tokyo (prefecture) including Chiyoda Ward is a different instance as the DM_Administration_Area instance.

- If there are enclaves of other administrative units within the range of an administrative unit, there exists one DM_Administration_Area instance containing a polygon hollowed by the interior.
- In the case of "DM Classification Code=City <1103>" or "DM Classification Code=Town/Village/City Ward<1104>," even if there is a place where the boundary line of the city/town/village is not fixed, a DM_Administration_Area instance can be set by drawing a temporary line.

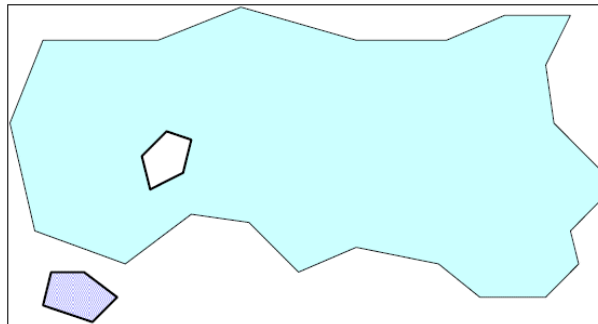
Relationship with other instances:

Relative positional relationship and connection relationship with other feature instances

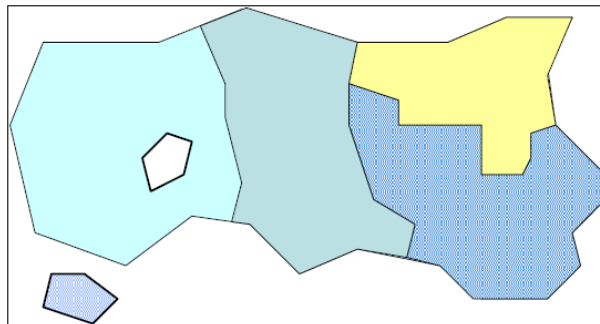
Counterpart feature	Procedure to keep Relative positional relationship	Selectable intersection patterns
DM_Administration_Area (Same class)	-- The two DM_Administration_Area instances are either adjacent or separated.	AA1, AA6
DM_Boundary	-- The DM_Administration_Area instance and the DM_Boundary instance with the same DM Classification Code either share lines at the boundaries of the surfaces or are separated from each other.	LA7, LA8, LA9
DM_Administration_Area_Representative_Point	-- The DM_Administration_Area instance and the DM_Administration_Representative_Point instance with the same DM_Classification_Code either share a point inside of the surface or are separated from each other.	PA1, PA3

Instance example:

The following figure shows an example of a DM_Administration_Area instance for a city area. The city's exclave will be a separate instance. In addition, the enclave of another city within the city area is created as the hollowed polygon.



The following figure shows an example of acquiring DM_Administration_Area instances for ward units. Instances are separated where the colors and hatch patterns are different.



DM_Administration_Area_Type (Enumeration type)

The type of administration unit.

Since this classification is not in the acquisition classification code, the same value as DM_Boundary_Type is used as the enumeration value.

Enumeration value:

Uncategorized:	=1100
Prefectures:	=1101
City:	=1103
Town/Village/City Ward:	=1104
Others:	=1199

DM_Administration_Representative_Point

Generally, this point is set near the government building, which is the center of an administrative agency such as a prefectural office or city hall. There is one representative point for each administrative area and none for exclaves.

[Superclass: DM_Feature](#)

[Attributes inherited from superclass and redefined:](#)

DM Classification Code: DM_Administration_Representative_Point_Type

The value of the acquisition classification code for this feature.

The enumeration data defined in DM_Administration_Representative_Point_Type is set to the value of this attribute.

DM Shape Classification [0..1]: DM_Shape_Class=0

The value of the Shape classification is for this feature instance.

This value is "0."

[Attributes:](#)

Position: GM_Point

Position of administration representative point.

This spatial attribute consists of point element P1 pattern.

Name [0..1]: CharacterString

Administration name

Classification: DM_Administration_Area_Type

DM_Administration_Area_Type

[Association:](#)

Administration Area [0..1]: DM_Administration_Area

Association with the administrative unit represented by this administrative representation point.

It is set when the association is possible.

Units of instance:

There is one instance for each Prefecture, City, Town/Village/City Ward.
There is only one DM_Administration_Representative_Point instance in an administrative unit (which is an area under the jurisdiction of a local government and does not necessarily equal the administrative area instance).

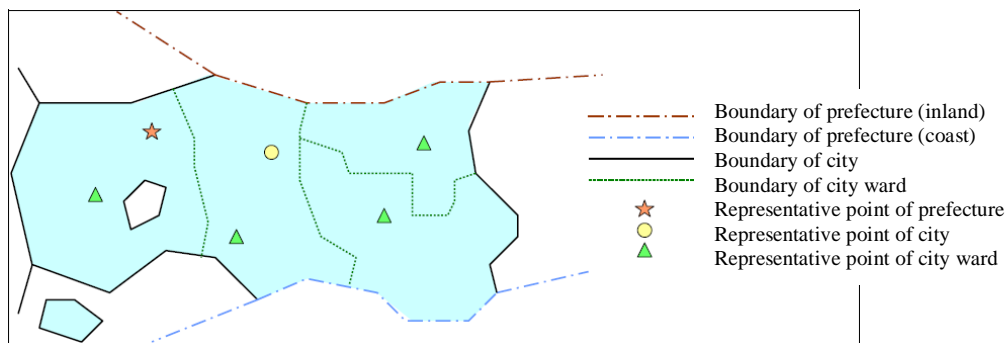
Relationship with other instances:

Relative positional relationship and connection relationship with other feature instances

Counterpart feature	Procedure to keep relative positional relationship	Selectable intersection patterns
DM_Administration_Representative_Point (Same class)	-- There must not be more than one DM_Administration_Representation_Point Instance within the same DM_Administration_Area Instance.	-
DM_Administration_Area	--The DM_Administration_Representative_Point instance must be inside a DM_Administration_Area instance of the same type and name.	PA1

Instance example:

The following figure shows an example of an administration representative point instance for a city area. The area painted in light blue is the city area, and there is also a prefectural office in the city.



DM_Administration_Representative_Point_Type (Enumeration)

The type of administration representative point.

Enumeration value:

Representation points of administration: =1111

1.1.6. DM_Transportation_Facilities sub package

The description of DM_Transportation_Facilities sub package is omitted.

1.1.7. DM_Building sub package

The description of DM_Building sub package is omitted.

1.1.8. DM_Small_Object sub package

The description of DM_Small_Object sub package is omitted.

1.1.9. DM_Water sub package

The description of DM_Water sub package is omitted.

1.1.10. DM_Land_Use sub package

The description of DM_Land_Use sub package is omitted.

1.1.11. DM_Terrain sub package

The description of DM_Terrain sub package is omitted.

1.1.12. DM_Annotation sub package

The description of DM_Annotation sub package is omitted.

1.1.13 DM_Irregular_Feature sub package

The description of DM_Irregular_Features sub package is omitted.

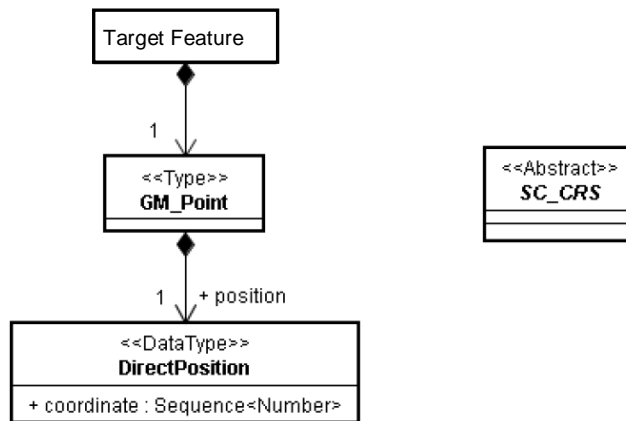
2. Appendix of Feature Catalogue

2.1. Application pattern of spatial attributes

In this section, the details of the elements that make up each spatial attribute are classified and defined as application patterns.

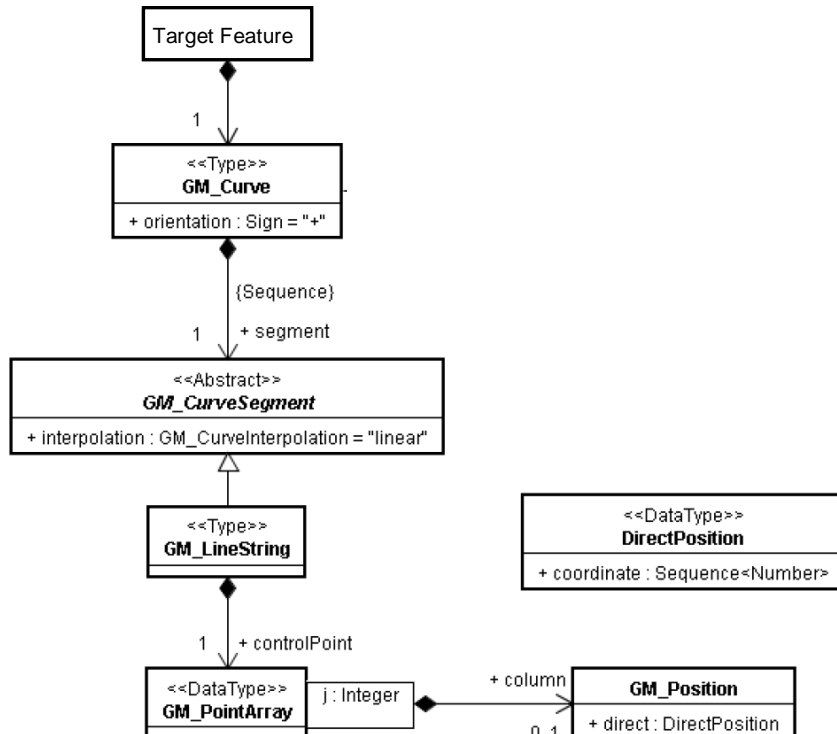
2.1.1. Point element pattern P1

The configuration of the spatial attribute when the point element by GM_Point is specified is shown below.



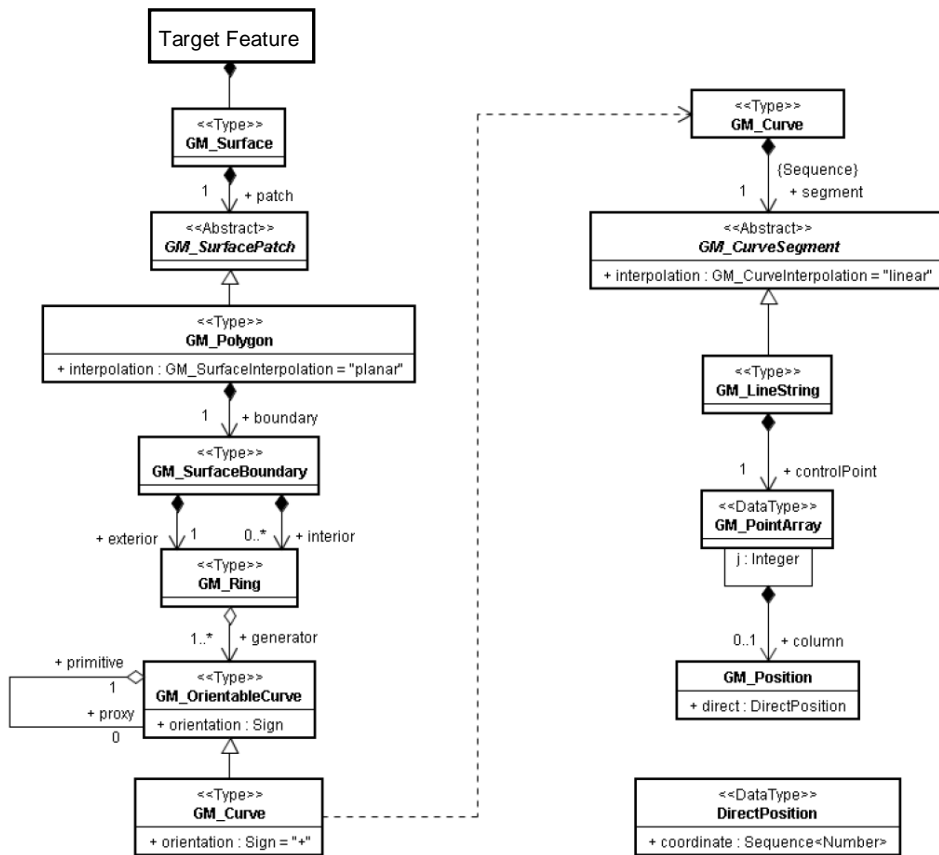
2.1.2. Line element pattern L1

The configuration of the spatial attribute when expressing a polygonal line by specifying the line element by GM_Curve is shown below.



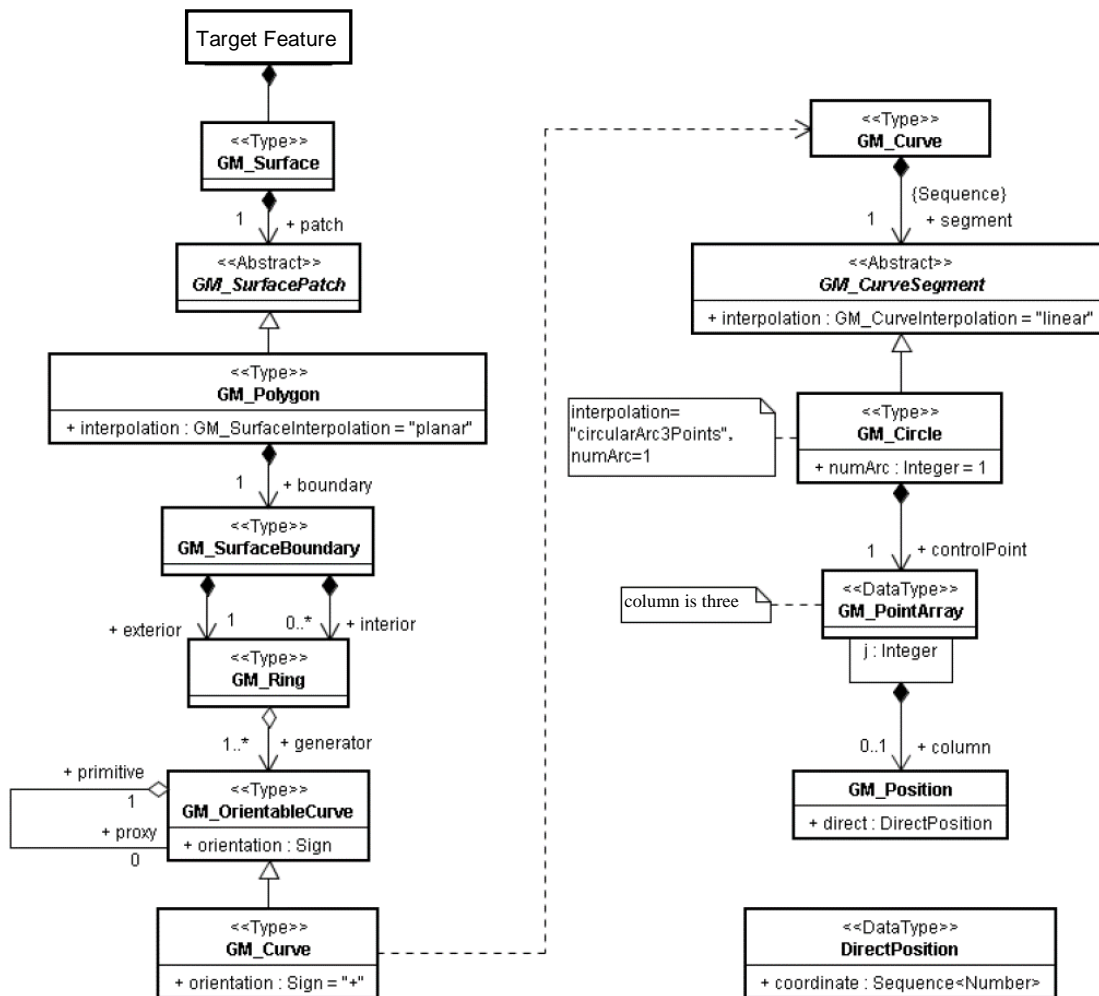
2.1.3. Area element pattern A1

The configuration of the spatial attribute when expressing a polygon by specifying a surface element by GM_Surface is shown below.



2.1.4. Area element pattern A2

The configuration of the spatial attributes when expressing a circular surface by specifying the surface element by GM_Surface is shown below.



2.2. Classification of spatial shapes and relationships of feature instances

This section defines the shape pattern for classifying the spatial shape of each feature instance, as well as the crossing pattern for classifying the relationship between feature instances (or spatial attributes).

2.2.1. Shape pattern of feature instances

Each geometric object can be called as follows.

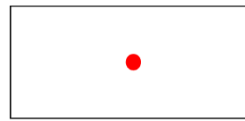
- Features with GM_Point = Point features
- Features with GM_Curve = Line features
- Features with GM_Surface/GM_PolyhedralSurface = Area features

And the shape pattern of each object instance can be classified as follows.

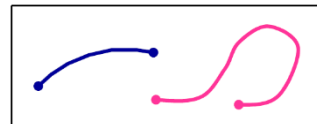
Shape pattern identifier

Uan	U	Fixed value
	a	P: Point feature L: Line feature A: Area feature
	n	Serial number

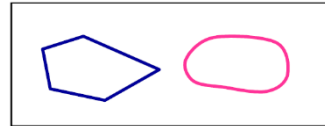
- 1) Shape pattern UP1
UP1: Simple Point Features



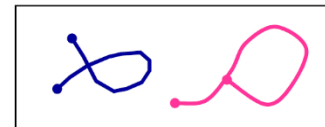
- 2) Shape pattern UL1
UL1: Simple Line Features



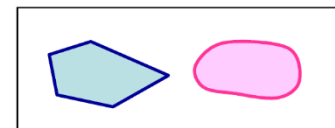
- 3) Shape pattern UL2
UL2: Simple Ring Features



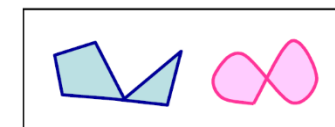
- 4) Shape pattern UL3
UL3: Self-crossing Line Features



- 5) Shape pattern UA1
UA1: Simple Area Features



- 6) Shape pattern UA2
UA2: Self-crossing Area Features



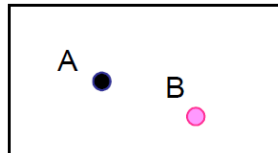
2.2.2. Crossing pattern between feature instances

A feature instance has a constraint in relation to the feature instances of other classes. The intersection patterns that are the constraints are defined as follows.

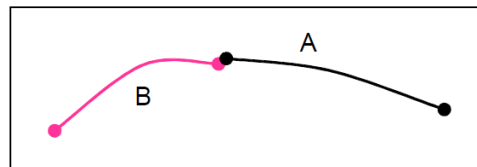
Crossing pattern identifier

abn	a	P: Point feature L: Line feature A: Area feature
	b	P: Point feature L: Line feature A: Area feature
	n	Serial number

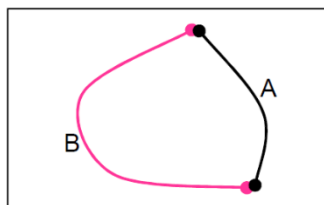
- 1) Crossing pattern PP1
PP1: Point feature "A" and Point feature "B" do not have the same coordinates.



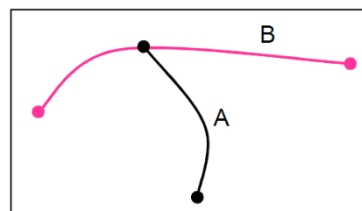
- 2) Crossing pattern LL1
LL1: The points of the one end of Line feature "A" and Line feature "B" are connected and do not intersect.



- 3) Crossing pattern LL2
LL2: The points of the both ends of Line feature "A" and Line feature "B" are connected and do not intersect. (It makes a ring.)

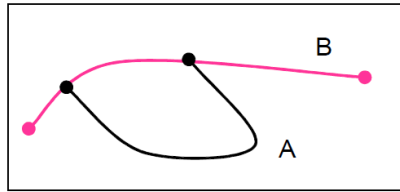


- 4) Crossing pattern LL3
LL3: The point at one end of Line feature "A" connects in the middle of Line feature "B" and does not intersect.



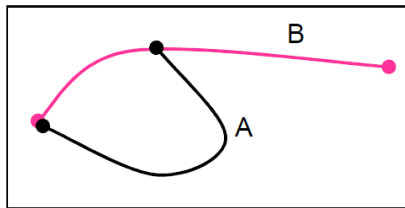
5) Crossing pattern LL4

LL4: The points at both ends of Line feature "A" connect in the middle of Line feature "B" and do not intersect. (Both end points of Line feature "A" are connected to the middle of Line feature "B.")



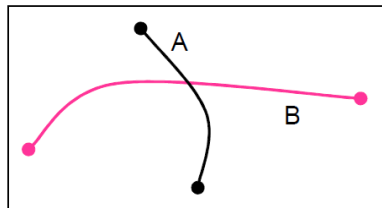
6) Crossing pattern LL5

LL5: Line feature "A" connects in the middle of Line feature "B" and does not intersect. (The point at one end of Line feature "A" connects to the point at one end of Line feature "B.")



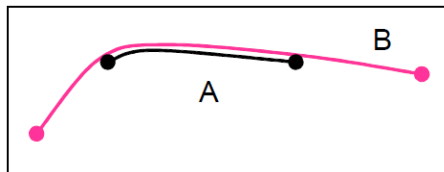
7) Crossing pattern LL6

LL6: Line feature "A" and Line feature "B" intersect.



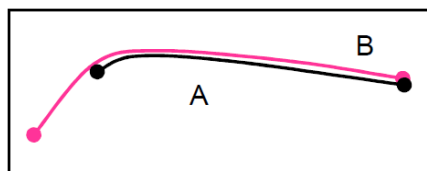
8) Crossing pattern LL7

LL7: Line feature "A" is included in Line feature "B."
(End points of the line not shared.)

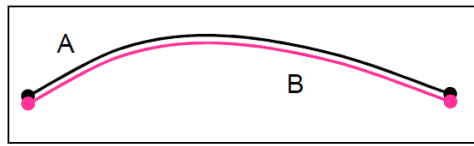


9) Crossing pattern LL8

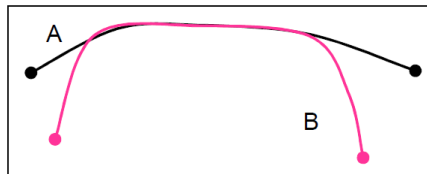
LL8: Line feature "A" is included in Line feature "B."
(One of the end points of both features is shared.)



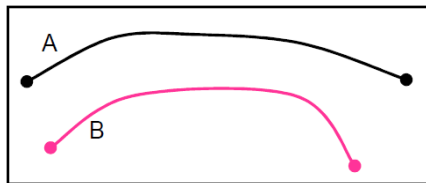
- 10) Crossing pattern LL9
LL9: Line feature "A" and Line feature "B" match perfectly.



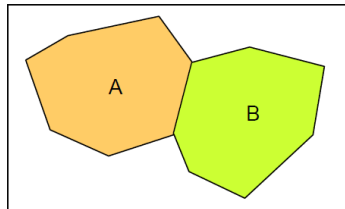
- 11) Crossing pattern LL10
LL10: Line feature "A" and Line feature "B" overlap.



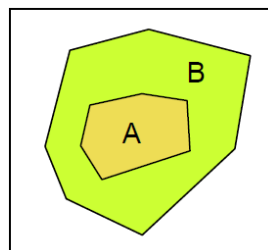
- 12) Crossing pattern LL11
LL11: Line feature "A" and Line feature "B" are separate.



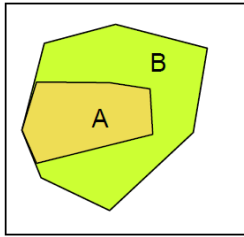
- 13) Crossing pattern AA1
AA1: Area feature "A" and Area feature "B" are in contact.



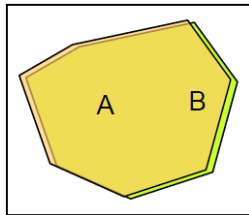
- 14) Crossing pattern AA2
AA2: Area feature "A" is included in Area feature "B."



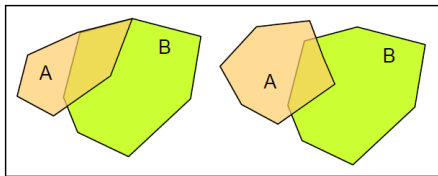
- 15) Crossing pattern AA3
AA3: Area feature "A" is included in Area feature "B."
(Part of the boundary overlaps.)



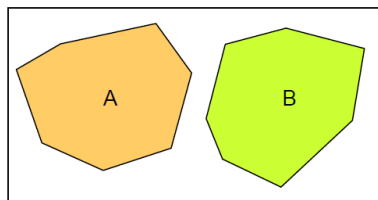
- 16) Crossing pattern AA4
AA4: Area feature "A" and Area feature "B" match perfectly.



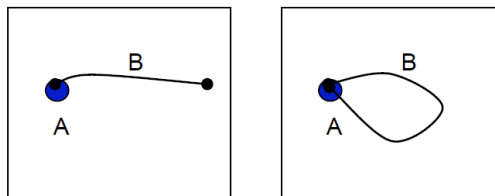
- 17) Crossing pattern AA5
AA5: Area feature "A" and Area feature "B" overlap partially.



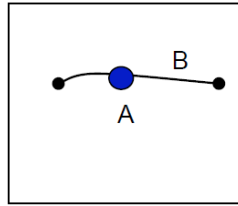
- 18) Crossing pattern AA6
AA6: Area feature "A" and Area feature "B" are separate.



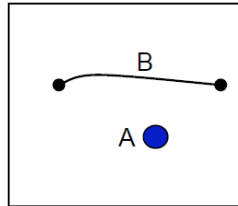
- 19) Crossing pattern PL1
PL1: Point feature "A" is at the end of Line feature "B."



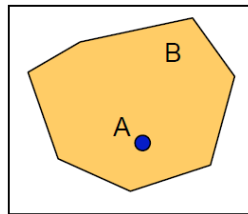
- 20) Crossing pattern PL2
PL2: Point feature "A" is in the middle of Line feature "B."



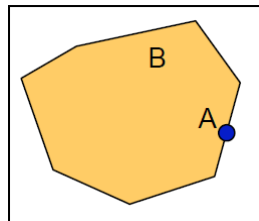
- 21) Crossing pattern PL3
PL3: Point feature "A" and Line feature "B" are separate.



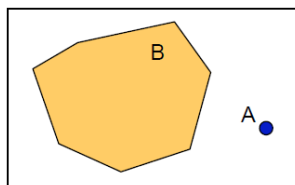
- 22) Crossing pattern PA1
PA1: Point feature "A" is included in Area feature "B."



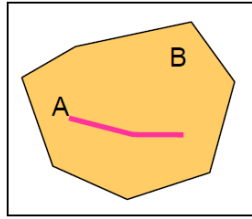
- 23) Crossing pattern PA2
PA2: Point feature "A" exists on the boundary of Area feature "B."



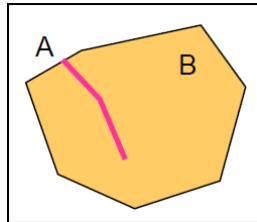
- 24) Crossing pattern PA3
PA3: Point feature "A" and Area feature "B" are separate.



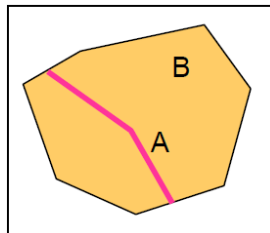
- 25) Crossing pattern LA1
 LA1: Line feature "A" does not exist outside Area feature "B."
 (The line is completely contained inside the area.)



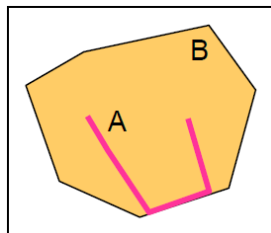
- 26) Crossing pattern LA2
 LA2: Line feature "A" does not exist outside Area feature "B."
 (One end of Line feature "A" is on the boundary of the area.)



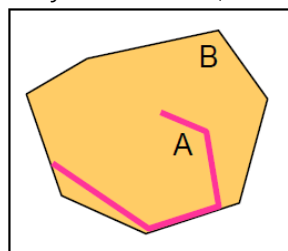
- 27) Crossing pattern LA3
 LA3: Line feature "A" does not exist outside Area feature "B."
 (Both ends of Line feature "A" are on the boundary of the area.)



- 28) Crossing pattern LA4
 LA4: Line feature "A" does not exist outside Area feature "B."
 (Part of the line overlaps the area boundary, and the points at both ends of the line are inside the area.)



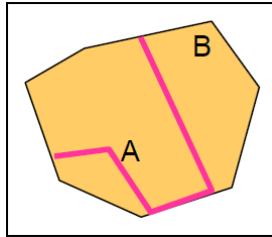
- 29) Crossing pattern LA5
 LA5: Line feature "A" does not exist outside Area feature "B."
 (Part of the line overlaps the area boundary, one end of the line is inside the area, and the other end of the line is on the boundary of the area.)



30) Crossing pattern LA6

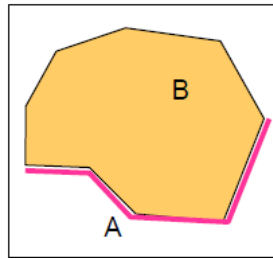
LA6: Line feature "A" does not exist outside Area feature "B."

(Part of the line overlaps the area boundary, and both ends of the line are on the boundary of the area.)



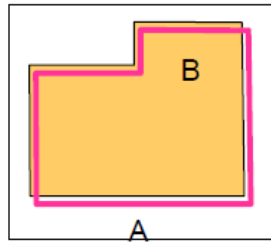
31) Crossing pattern LA7

LA7: Line feature "A" and part of boundary of Area feature "B" match.



32) Crossing pattern LA8

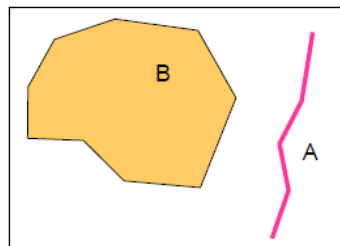
LA8: A pattern in which Line feature "A" and the boundary of Area feature "B" match exactly.



33) Crossing pattern LA9

LA9: A pattern where Line feature "A" is outside Area feature "B."

Boundary & interior of feature "A" and boundary & interior of feature "B" do not intersect.



5. Reference systems – Information about coordinates and calendar –

5. Reference systems

[Preparatory survey: partially recommended] [Detailed plan formulation survey: partially recommended]

《Overview》

The "reference system" indicates the reference frame for identifying the spatial and temporal positions of the geospatial data to be created in the real world. The data product specifications should include information that defines the reference system (space and time) used in the data product. It is standard to describe horizontal (planar) and vertical (elevation) reference systems and geoid models.

However, in the case of a data product without the concept of a vertical reference system, only the horizontal reference system is described, and if the geoid model is not used for data creation, it is not necessary to describe the geoid model.

Describe the name of the time reference system to specify the temporal reference.

《Description》

The following contents are shown for the reference system of geospatial data products.

➤ 5.1. Spatial Reference System (Horizontal) :

[Preparatory survey: Recommended] [Detailed plan formulation survey: Recommended]

The spatial reference system (horizontal direction) used in this data product will be described below.

- **Reference System Identifier:**

- **Projection:**

- **Ellipsoid:**

- **Datum :**

- **Ellipsoid parameters:**

Semi Major Axis:

Axis Units:

Denominator of Flattening Ratio:

- **Projection parameters:**

Longitude of Central Meridian:

Latitude of Projection Origin:

False Easting:

False Northing:

False Easting Northing Units :

Scale Factor at Projection Origin:

- **Transformation: (To WGS84) *Optional items**

Method:

X-axis translation:

Y-axis translation:

Z-axis translation:

X-axis rotation:

Y-axis rotation:

Z-axis rotation:

Scale difference:

Translation Units:

Rotation Units:

Scale Units:

• Describe the conversion parameters to WGS84. The conversion method is 3 parameters or 7 parameters (Position Vector Rotation) = Bursa / Wolf transformation is the basis.

If other conversion formulas are used, describe the specific conversion formulas as well.

The conversion parameters to WGS84 is an optional item.

➤ 5.2. Spatial Reference System (Vertical):

[Preparatory survey: Recommended] [Detailed plan formulation survey: Recommended]

The spatial reference system (vertical direction) used in this data product will be described below.

- **Vertical reference system:**
- **Geoid model**

Name

Explanation

➤ 5.3. Temporal Reference System:

[Preparatory survey: Optional] [Detailed plan formulation survey: Not required]

The criteria for the description of the date and time of the data product represented by this data product specification are shown. The calendar (year, month, day) is based on the Gregorian calendar, and the time is based on the coordinated universal time (UTC), but other calendars (Julian calendar, Japanese calendar, GPS calendar, etc.) and other time conventions (24 hours local standard time such as Japanese standard time, GPS Time, etc.) may be used.

- **Calendar**
- **Clock**

5. Reference Systems

5.1. Spatial Reference System (Horizontal)

Spatial reference system (Horizontal)				
Horizontal reference system	Reference system identifier	JGD2011 / 7 (X, Y) (EPSG: 6675)		
	Projection	Conformal Projection (Gauss-Krüger Projection)		
	Ellipsoid	GRS80		
	Datum	Japanese Geodetic Datum 2011		
	Ellipsoid parameters	Semi major axis	6378137	
		Axis units	meter	
		Denominator of flattening ratio	298.257222101	
	Projection parameters	Longitude of central meridian	137.166667	
		Latitude of projection origin	36.0000000	
		False easting	0	
		False northing	0	
		False easting northing units	meter	
		Scale factor at projection origin	0.9999	

The description of the following transformation parameters is optional.

Horizontal reference system	Transformation (To WGS84)	Method	7 parameters (Position Vector Rotation)
		X-axis translation	-0.293
		Y-axis translation	766.95
		Z-axis translation	87.713
		X-axis rotation	-0.195704
		Y-axis rotation	-1.695068
		Z-axis rotation	-3.473016
		Scale difference	-0.039338
		Translation units	meter
		Rotation units	arc second
		Scale units	parts per million

*The description sample of Transformation (To WGS84) item is fictitious.

Example of other spatial reference system (Horizontal):

Spatial reference system (Horizontal)			
Horizontal reference system	Reference system identifier	UTM Zone 53N (EPSG: 6690)	
	Projection	Conformal Projection (Universal Transverse Mercator Projection)	
	Ellipsoid	WGS84	
	Datum	WGS84	
	Ellipsoid parameters	Semi major axis	6378137
		Axis units	meter
		Denominator of flattening ratio	298.257223563
	Projection parameters	Longitude of central meridian	E 135.0
		Latitude of projection origin	N 0.0
		False easting	500,000.0
		False northing	0.0
		False easting northing units	meter
Scale factor at projection origin		0.9996	

5.2. Spatial Reference System (Vertical)

Spatial reference system (Vertical)		
Vertical reference system		Mean Sea Level of Tokyo Bay (T.P.: Tokyo Peil) *Peil stands for datum level or gauge in Dutch.
Geoid model	Name	GSIGEO2011(Ver.2.1)
	Explanation	GNSS/leveling geoid undulations at 971 sites by the Least-Squares Collection method.

Example of another Geoid model:

Geoid model	Name	EGM2008 (Earth Gravitational Models 2008)
	Explanation	It is the successor to EGM96 and EGM84, and supplied by National Geospatial-Intelligence Agency (NGA) EGM development team. EGM2008 has a cell size of one minute and defines the difference between the ellipsoidal height of WGS84 and the Mean Sea Level (MSL). It is a 10801-by-21600 matrix grid containing 4-byte IEEE floats.

5.3. Temporal Reference System

Temporal reference system	
Calendar	GC (Gregorian Calendar)
Clock	JST (Japan Standard Time)

6. Data quality – Quality requirements and evaluation procedures –

6. Data quality

[Preparatory survey: Recommended] [Detailed plan formulation survey: Not required]

《Overview》

In terms of data quality, the data quality requirements for each data quality element must be indicated for the features defined in "4.Data content and structure" above.

《Description》

The contents of data quality include quality requirements and quality evaluation methods.

- Quality requirements: Establish quality requirements, scope of application, and evaluation measure for data quality elements in each quality category.
- Quality evaluation method: Describe the evaluation procedure, conformance level and evaluation report as the quality evaluation method.

Below is a description of the categories and data quality elements, an example of the procedure in the evaluation method, and an example quality evaluation of positional accuracy.

(1) Category

There are five categories as data quality.

① Completeness

- Existence and lack of features, features attributes and relationships between features

② Logical consistency

- Degree of compliance with logical rules of data structure, attributes and relationships

③ Positional accuracy

- Accuracy of the position of features in the spatial reference system

④ Temporal quality

- Quality of time attributes and relations of features

⑤ Thematic accuracy

- Accuracy of quantitative attributes, non-quantitative attributes, classification of features and correctness of inter-feature relationships

(2) Data quality element

Each category of data quality is subdivided into data quality elements which are used to specifically display quality information.

① Completeness

- Excess: Existence of excess data in the data set
- Omission: Missing data in the data set

② Logical consistency

- Conceptual consistency: Strict adherence to conceptual schema rules
- Domain consistency: Strict adherence to the domain of possible values
- Format consistency: The degree to which data is stored according to the physical structure of the data set
- Topological consistency: Correctness of explicitly coded topological characteristics for a data set

③ Positional accuracy

- Absolute accuracy (external accuracy): The closeness of the reported coordinate value to the value adopted or considered true
- Relative accuracy (internal accuracy): The closeness of the relative position of a feature in the data set to the individual relative position adopted or the individual relative position to be considered true
- Grid data positional accuracy: The closeness of the grid data position to the value adopted or considered true

④ Temporal quality

- Time measurement accuracy: The closeness of the reported time measurement to the value adopted or considered true.
- Time consistency: Correct order of reported events
- Time validity: The time validity of the data

⑤ Thematic accuracy

- Classification correctness: Comparison of the class assigned to a feature or its attributes with the universe of discourse (e.g., ground truth, reference data set)
- Correctness of non-quantitative subject attributes: Evaluation measure for whether non-quantitative attributes are correct
- Quantitative attribute accuracy: Closeness of quantitative attribute value to value adopted or considered true

(3) Procedure in evaluation method

As a quality evaluation method, it is necessary to determine the evaluation target (100% inspection or sampling inspection), inspection amount, sampling method of the inspection target, inspection method, and pass/fail judgment.

The inspection target and the quality evaluation method based on the inspection method are defined in Appendix 3, and the specific procedure is shown in the following 《Product specification

description example》 .

(4) Example quality evaluation

Based on (1) to (3) above, examples of quality requirements and quality evaluation methods are shown in the following 《Product specification description example》 .

《Product specification description example》

6. Data Quality

Data quality citation (See the document on the right)	Title	Appendix 3 Data Quality of 1:2,500 Scale Digital Topographic Map (draft)	
	Date	Date	20211228
		Revision	December 2021

1. Data Quality

*Data quality evaluation mainly for some features in the boundary subpackage is exemplified in this document

1.1. Data Quality Evaluation

This document shows the requirements, evaluation method and reporting for the data quality of the features defined in the data content and structure of the main document.

The following Table 1 shows the categories related to data quality and the data quality elements included in them.

Table 1: Data quality element

Category	Data quality element	Note
Completeness	Excess	
	Omission	
Logical consistency	Conceptual consistency	
	Domain consistency	
	Format consistency	
	Topological consistency	
Positional Accuracy	Absolute accuracy	
	Relative accuracy	
	Grid data positional accuracy	
Temporal quality	Time measurement accuracy	
	Time consistency	
	Time validity	
Thematic accuracy	Classification correctness	
	Non-quantitative attribute correctness	
	Quantitative attribute accuracy	

1.2. Common items regarding quality evaluation methods

*The following is just an example, and this kind of methodology should be defined.

Quality evaluation methods are divided into the following five types.

- Automatic inspection for all data
- Manual inspection for all data
- Manual inspection for sampled data
- Sampling inspection (Manual or Automatic, either will do)
- Inspection by the value calculated by a specific algorithm

Regarding the manual inspection for sampled data and the sampling inspection, the sampling method and pass/fail judgment shall be as follows.

1. Inspection lot: Entire area

2. Inspection amount: 2% of the total area.

3. Sampling method of inspection unit:

- ✓ The entire area is divided into map sheet units (one unit is 2 km east-west by 1.5 km north-south) which are divided into cells of 500 m by 500 m. This cell is called an inspection unit. Among the inspection amount, which is 2% of total area, 1% is selected by the supervisor, and 1% is selected by random sampling.
- ✓ Inspection units are numbered sequentially from the upper left corner of the mapping area. The supervisor extracts inspection units from high-risk areas up to 1% of the total area. Separately, extract 1% at random using a random number table.
- ✓ The minimum number of inspection units is four.
- ✓ For the same survey results, the same inspection unit is used in principle for different quality evaluation items.

4. Item (Scope feature class instances) definition: Defined individually

5. Sampling rate:

- ✓ All data within the inspection unit is sampled.
- ✓ In principle, each inspection unit is divided into 10 by 10 sub-meshes, and all data are inspected for each sub-mesh.
- ✓ Depending on the quality evaluation procedure, the inspection unit may be divided into 2 by 2 sub-meshes.

6. Inspection method: Defined individually

7. Pass/Fail judgment:

- ✓ The error rate is calculated for each inspection unit by the following formula.
Error rate (%) = $a/b * 100$
 - a: Number of sub-meshes with one or more errors
 - b: Total number of sub-mesh for each inspection unit
- ✓ If the error rate exceeds the conformance quality level in one or more inspection units, the target of the evaluation is failed.
- ✓ In such a case, all inspection units shall be re-inspected.
- ✓ When the re-inspection is completed, the inspection units corresponding to 3% of the entire area are extracted and error rate is calculated again. If the result is found to be non-conforming, an additional 4% inspection should be performed, or the survey work should be done again

1.3. Completeness

Quality evaluation on completeness shall be done for the following.

*The following is just an example, and this kind of items should be defined for each requirement on completeness.

Completeness

Quality requirement	The number of instances must coincide with the reference data (Original of administrative areas, list of geodetic control points.)		
Category	Completeness	Data quality element	Comission/Omission
Data quality scope	Instances of the following feature classes. DM_Administration_Representative_Point DM_Administration_Area DM_Geodetic_Control_Point		
Data quality measure	Difference between the number of instances of the dataset and the number of instances of the reference data.		
Data quality evaluation procedure	Automatic inspection for all data 1. Count the number of data included in the reference data (Original of administrative areas, list of geodetic control points, etc.) for each class. 2. Count the number of dataset instances for each class. 3. The difference is calculated for each class from the results of 1. and 2. above, and the sum of the absolute values of the differences is taken as the number of errors.		
Conformance quality level	Pass if the number of errors is 0, and fail if it is 1 or more.		
Data quality result	The number of errors		

1.4. Logical Consistency

Quality evaluation on logical consistency shall be done for the following.

*The following is just an example, and this kind of items should be defined for each requirement on logical consistency.

Logical Consistency

Quality requirement	Must be a valid XML document.		
Category	Logical Consistency	Data quality element	Conceptual Consistency
Data quality scope	Dataset		
Data quality measure	Count of all items in the dataset that are not a valid XML document.		
Data quality evaluation procedure	Automatic inspection for all data 1. Count the feature instances with datasets whose types do not conform with that specified by application schema through the inspection program. (XML parser, etc.)		
Conformance quality level	Pass if the count of feature instances whose types do not conform with that specified by application schema is 0, and fail if it is 1 or more.		
Data quality result	This is a mandatory quality requirement, and no quality evaluation report is prepared.		

1.5. Positional Accuracy

Quality evaluation on positional accuracy shall be done for the following.

*The following is just an example, and this kind of items should be defined for each requirement on positional accuracy.

Positional Accuracy

Quality requirement	Coordinates in the dataset have equal value as the original.		
Category	Positional Accuracy	Data quality element	Absolute Accuracy
Data quality scope	DM_Geodetic_Control_Point		
Data quality measure	Instances whose original coordinates are different from those in the dataset are regarded as errors.		
Data quality evaluation procedure	Automatic inspection for all data 1. Compare the coordinates of the data in the dataset with the plane coordinates of geodetic control point results, and if they are different, the corresponding instance is regarded as an error.		
Conformance quality level	Pass if the number of errors is 0, and fail if it is 1 or more.		
Data quality result	The number of errors		

Positional Accuracy

Quality requirement	Standard deviation of discrepancies between horizontal positions of the data in the dataset and those obtained by the survey for inspection is within the conformance quality level.		
Category	Positional Accuracy	Data quality element	Absolute Accuracy
Data quality scope	DM_Road		
Data quality measure	<p>Calculate the standard deviation of errors between coordinates of the data in the dataset and those obtained by survey for inspection which is the more accurate reference data, assuming the mean of errors is zero. Data located at the shaded area (invisible data) are excluded from the inspection.</p> <p>■ Standard deviation of errors in the horizontal position</p> $\text{Standard deviation} = \sqrt{\frac{\sum_{i=1}^n ((x_i - X_i)^2 + (y_i - Y_i)^2)}{n-1}}$ <p>x_i : X coordinate (in meters) of the target data for the inspection in the dataset y_i : Y coordinate (in meters) of the target data for the inspection in the dataset X_i : X coordinate (in meters) of the more accurate data Y_i : Y coordinate (in meters) of the more accurate data n : Number of samples</p>		
Data quality evaluation procedure	<p>Sampling inspection</p> <ol style="list-style-type: none"> 1. Extract inspection units followed by the sampling method. 2. Divide each inspection unit into 2 by 2 sub-meshes whose sizes are 250 m by 250 m. 3. Display or print out data in the inspection units (feature instance). 4. Extract more than 21 edges (two points/edges or more) from clearly identified features for each 250 m sub-mesh. 5. Measure the coordinates of the extracted points in the dataset. 6. Obtain the result of the on-site survey for inspection (or material regarded as on-site survey result) corresponding to each extracted point. 7. Calculate the standard deviation of errors 		
Conformance quality level	Pass if the standard deviations of horizontal positions for all 250 m sub-meshes are less than 1.75 m, and fail if not.		
Data quality result	The maximum of the standard deviations calculated for all 250 m sub-meshes (in meters).		

Positional Accuracy

Quality requirement	Standard deviation of discrepancies between horizontal positions of the data in the dataset and those obtained from the existing map is within the conformance quality level.		
Category	Positional Accuracy	Data quality element	Absolute Accuracy
Data quality scope	DM_Administration_Area		
Data quality measure	<p>Calculate the standard deviation of errors between coordinates of the data in the dataset and those obtained from the existing map which is the more accurate reference data, assuming the mean of errors is zero.</p> <p>■ Standard deviation of errors in the horizontal position</p> $\text{Standard deviation} = \sqrt{\frac{\sum_{i=1}^n ((x_i - X_i)^2 + (y_i - Y_i)^2)}{n-1}}$ <p>x_i : X coordinate (in meters) of the target data for the inspection in the dataset y_i : Y coordinate (in meters) of the target data for the inspection in the dataset X_i : X coordinate (in meters) of the more accurate data Y_i : Y coordinate (in meters) of the more accurate data n : Number of samples</p>		
Data quality evaluation procedure	<p>Sampling inspection</p> <ol style="list-style-type: none"> 1. Extract inspection units followed by the sampling method. 2. Divide each inspection unit into 2 by 2 sub-meshes whose sizes are 250 m by 250 m. 3. Display or print out data in the inspection units (feature instance). 4. Extract more than 21 edges (two points/edges or more) from clearly identified features for each 250 m sub-mesh. 5. Measure the coordinates of the extracted points in the dataset. 6. Obtain the result of the on-site survey for inspection (or material regarded as on-site survey result) corresponding to each extracted point. 7. Calculate the standard deviation of errors 		
Conformance quality level	Pass if the standard deviations of horizontal positions for all 250 m sub-meshes are equal to or less than 0.3 mm on the map sheet, and fail if not.		
Data quality result	The maximum of the standard deviations calculated for all 250 m sub-meshes (in millimeters).		

1.6. Temporal Quality

Quality evaluation on temporal quality shall be done for the followings.

*The following is just example, and this kind of items should be defined for each requirement on temporal quality.

Temporal Quality

Data quality requirement	"Life Time from" and "Life Time to" match the time range attribute value obtained from the reference data.		
Category	Temporal Quality	Data quality element	Time measurement accuracy/ Time consistency
Data quality scope	Dataset		
Data quality measure	<p>(For newly created data) The value of "Life Time from" set for the instance must be the date when the field survey or aerial photography is conducted. If the instance has a "Life Time to," the value must be "now." If the value of "Life Time from" is different from the date of the field survey or aerial photographing, or is not set, the instance is regarded as an error. So is the case in which "Life Time to" is not "now."</p> <p>(For data corrections) The "Life Time from" of the instance added at the time of revision must be the date of the field survey or aerial photographing. If the instance has a "Life Time to," the value must be "now." If the value of "Life Time from" is newer than the date of the field survey or aerial photographing, or is not set, the instance is regarded as an error. So is the case in which "Life Time to" is not "now."</p>		
Data quality evaluation procedure	Automatic inspection for all data Count the number of error instances for all instances.		
Conformance quality level	Pass if the number of errors is 0, and fail if not.		
Data quality result	The number of errors		

1.7. Thematic Accuracy

Quality evaluation on thematic accuracy shall be done for the following.

*The following is just example, and this kind of items should be defined for each requirement on

thematic accuracy.

Thematic Accuracy

Quality requirement	DM Classification Code is set correctly.		
Category	Thematic Accuracy	Data quality element	Classification correctness
Data quality scope	Instances of the following feature classes. DM_Administration_Representative_Point DM_Administration_Area DM_Geodetic_Control_Point		
Data quality measure	If the DM Classification Code, which is one of the thematic attributes for the instance, is not set correctly, the instance is regarded as an error.		
Data quality evaluation procedure	Manual inspection for all data 1. Output the instance included in the inspection unit range so that the DM Classification Code can be identified. 2. Compare 1. with the data contained in the reference data (source materials of administrative units, list of geodetic control points, etc.) and confirm that they are correct. 3. As a result of confirmation, an incorrect instance is regarded as an error.		
Conformance quality level	Pass if the number of errors is 0, and fail if not.		
Data quality result	The number of errors		

7. Data capture

7. Data capture

[Preparatory survey: Recommended] [Detailed plan formulation survey: Not required]

《Overview》

"Data capture" indicates information related to data acquisition, such as the data creation process for geospatial data products and the work specifications to be followed (e.g. Work Specifications for National Base Mapping (draft)).

If there are conforming work rules, etc., describe the title and version.

In addition, freely describe the source material to be used and the general description of the data acquisition process.

This section is not necessary if there is no content to be described.

《Description》

Show the following content.

- **Data capture information**
 - **Title**
 - **Date**
- **Data capture statement**

《Product specification description example》

7. Data capture

Data capture information	Title	Operating Specifications of Public Survey (Rules for Operating Specifications)	
	Date	Date	20200331
		Revision	Partial revision

Data capture statement

Aerial Photogrammetry using aerial photographs with 20 cm GSD taken in 2015. Acquisition of features related to geospatial data products based on these data product specifications shall be acquired in accordance with the Operating Specifications of Public Survey (Rules for Operating Specifications).

Example of another data capture information:

Data capture information	Title	Work Specifications for National Base Mapping	
	Date	Date	20220228
		Revision	Enactment

Data capture statement

Aerial Photogrammetry using aerial photographs with 20 cm GSD taken in 2015. Acquisition of features related to geospatial data products based on these data product specifications shall be acquired in accordance with the Work Specifications for National Base Mapping.

8. Data maintenance

8. Data maintenance

[Preparatory survey: Optional] [Detailed plan formulation survey: Not required]

《Overview》

"Data maintenance" indicates the update time and frequency of geospatial data.

If there is anything that should be described about data maintenance, describe it. Freely describe the frequency of data maintenance (changes and additions). This section is not necessary if there is no content to be described.

《Description》

The following items are shown for data maintenance of geospatial data products.

- **Maintenance and update frequency**

《Product specification description example》

8. Data maintenance

Maintenance and update frequency

The data product will be updated by conducting the survey again approximately once every five years.

9. Portrayal

9. Portrayal

[Preparatory survey: Recommended] [Detailed plan formulation survey: Not required]

《Overview》

The "Portrayal" defines information on how the data held in the data set should be represented as graphic output, figures, or images.

The specific portrayal method will be determined by consultation between the geospatial data creator and the country concerned. If there are any portrayal catalogues that have been applied so far, it is good to refer to them. If there are no provisions such as a catalogue, Japan's "Public Survey Standard Portrayal Catalogue" will be helpful.

Not required for data products that do not require drawing.

《Description》

It is standard to describe the portrayal method in a separate file, and the description destination (reference destination) is described in the product specifications.

➤ 9.1. Portrayal

- **portrayal Catalogue Citation**

- **Title**

Describe the file name of the drawing catalogue

- **Date**

Write the date of preparation / revision of the document to be cited and the date of preparation / revision.

《Product specification description example》

9. Portrayal

Portrayal catalogue citation (See the document on the right)	Title	Appendix 4 Portrayal Catalogue of 1:2,500 Scale Digital Topographic Map (draft)	
	Date	Date	2021228
		Revision	December 2021

➤ 9.2 Portrayal Catalogue referred to in 9. Portrayal

The portrayal specifications are defined for features defined in “4.1 Data content and structure” of the product specifications, based on the separate file (specifically, "Appendix 4 Portrayal Catalogue of 1:2,500 Scale Digital Topographic Map (draft)") referred to in 9.1 Portrayal.

The specific contents are shown in the following 《Product specification description example》 .

➤ Appendix 4 1. Portrayal

The method how map data is shown as the graphic output, plotter output or an image is described in portrayal.

➤ Appendix 4 1.1. Portrayal

The portrayal method describes defining a framework for drawing and expressing spatial information in a format that can be understood by humans.

➤ Appendix 4 1.2. Portrayal Catalogue

The portrayal catalogue is a list of all defined drawing rules.

However, since the specific portrayal rules and procedures for each feature usually differ depending on the system used, define them appropriately according to the situation. The portrayal specifications described and defined in the description example are as follows.

Classification code
Feature name
Map information level
Graphic representation
Data type (data acquisition method, spatial attributes, etc.)
Line number
Explanation
Edge point match
Note

➤ Appendix 4 1.2.1. DM boundary sub package

➤ Appendix 4 1.2.2. DM transportation facilities sub package

➤ Appendix 4 1.2.3. DM building sub package

➤ Appendix 4 1.2.4. DM small object sub package

- Appendix 4 1.2.5. **DM water area sub package**
- Appendix 4 1.2.6. **DM land use sub package**
- Appendix 4 1.2.7. **DM terrain sub package**
- Appendix 4 1.2.8. **DM annotation sub package**
- Appendix 4 1.2.9. **DM irregular feature sub package**

《Product specification description example》

1. Portrayal

The portrayal section should describe how the dataset is to be presented as graphic output, as a plot or as an image.

1.1. Portrayal

The portrayal defines a framework for drawing and expressing spatial information in a format that can be understood by humans. The portrayal representation is based on the actual attribute values of each instance of spatial information, and it is usually not possible to draw and express beyond the types and values (application schema) of the attribute information to be held.

1.2. Portrayal Catalogue

The Portrayal Catalogue is a collection of all defined portrayal rules.

Of the feature classes defined in the application schema and feature catalogue, portrayal rules must be defined for all features that need to be drawn and represented. However, since the concrete portrayal rules of each feature depend on the system used, the only portrayal specifications described and defined here are (feature) name, graphic representation, data type (data acquisition method, spatial attribute, etc.), line thickness class, and other explanations.

Class Code		Feature Name	Map Level (Scale)	Graphic Representation	Data Type						Line thickness	Explanations	Edge Point Match	Note
Layer	Data Item				Data Acquisition Method	Shape Type	Data (Spatial Attribute)	Record	Direction	Attribute				

Portrayal Catalogue Definition

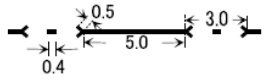
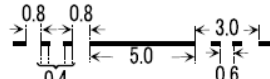
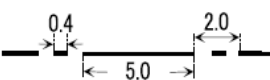
Definition Item	Explanations	Note
Class Code (Layer/Data item), Feature Name	Class Code is same as DM_Boundary_Type (Enumeration type). Layer corresponds to the first 2 digits of DM_Boundary_Type, and Data Item the last twos.	
Map Level (Scale)	Corresponds to Map scale.	Example only 1:2,500
Graphic Representation	Graphic Representation used when the data is output.	
Data Type/Data Acquisition Method	The acquisition method for each data.	
Data Type/Shape Type	Shape of the object used at graphic representation, which is shown by numeric code.	
Data Type/Data (Spatial Attribute)	Point, Line or Area, etc. See the Table 1.	
Data Type/Record	See the Table 1.	
Data Type/Direction	Flag for the object which has the direction such as slope and fence.	
Data Type/Attribute	Flag for the object which has a number as attribute such as height and number of stories.	
Line thickness	Indicates the thickness of the line to be displayed.	1 = 0.05mm width
Explanations	Additional information to make definition clearer.	
Edge Point Match	Indicates that the points at the ends of the continuous line segments match.	

Table 1: Data Type/Record

Record Type	Data (Spatial Attribute)	Note
E1	Area	The start and end coordinates must be matched
E2	Line	
E3	Circle	
E4	Arc	
E5	Point	
E6	Direction	
E7	Annotation	
E8	Attribute	
G	Grid	
T	TIN	Triangulated Irregular Network

1.2.1. DM_Boundary sub package

The portrayal specification of the boundary sub package is shown below.

Class Code		Feature Name (Equivalent to DM_Classification_ Code of DM_Boundary)	Map Level (Scale)	Graphic Representation	Data Type						Line thickness	Explanations	Edge Point Match	Note
Layer	Data Item				Data Acquisition Method	Shape Type	Data (Spatial Attribute)	Record	Direction	Attribute				
11	01	Prefecture Boundary	2500		Match the position of the boundary _____		Line	E2			6	*	Yes	
	03	City Boundary	2500		Match the position of the boundary _____		Line	E2			6	*	Yes	
	04	Town/Village/City Ward Boundary	2500		Match the position of the boundary _____		Line	E2			6	*	Yes	

*If boundaries overlap, data with the smaller class code is displayed first.

*Do not display undetermined boundaries.

The portrayal is defined only for DM_Boundary class. Features in the classes of DM_Administration_Area and DM_Administration_Representative_Point are not graphically output, thus there are no portrayal definitions for them.

1.2.2. DM_Transportation_Facilities sub package

The description of DM_Transportation_Facilities sub package is omitted.

1.2.3. DM_Building sub package


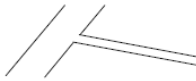
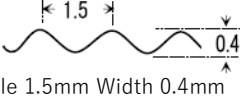

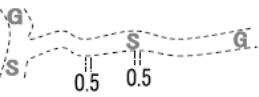

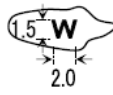

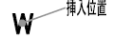
The description of DM_Building sub package is omitted.

1.2.4. DM_Small_Object sub package

The description of DM_Small_Object sub package is omitted.

1.2.5. DM_Water sub package

The portrayal specification of the DM_Water sub package is shown below. (The descriptions of the application schema and feature catalogue in other appendices are omitted.)

Class Code		Feature Name (Equivalent to DM_Classification_ Code of M_Water)	Map Level (Scale)	Graphic Representation	Data Type						Line thickness	Explanations	Edge Point Match	Note
Layer	Data Item				Data Acquisition Method	Shape Type	Data (Spatial Attribute)	Record	Direction	Attribute				
51	01	Water Line (River) (Lake) (Coastline)	2500		Get boundaries		Line	E2			3		Yes	
	02	Stream	2500	 Cycle 1.5mm Width 0.4mm	Get centerline		Line	E2			3			
	03	Ephemeral stream	2500		Get area edge		Line	E2			3			
	05	Lake	2500		Get boundaries		Line	E2			3			
					Place horizontally		Point	E5			3			

1.2.6. DM_Land_Use sub package

The description of DM_Land_Use sub package is omitted.

1.2.7. DM_Terrain sub package

The description of DM_Terrain sub package is omitted.

1.2.8. DM_Annotation sub package

The description of DM_Annotation sub package is omitted.

1.2.9. DM_Irregular_Feature sub package

The description of DM_Irregular_Feature sub package is omitted.

1 0 . Data product delivery – En c oding specifications –

10. Data product delivery

[Preparatory survey: Recommended] [Detailed plan formulation survey: Not required]

《Overview》

"Data product delivery" shall indicate all requirements for delivering data products. They shall include applicable delivery format information and delivery medium information.

《Description》

Regarding data product delivery, it is recommended to organize and describe in the following items.

- **Delivery Medium**

- **Units of delivery**

A unit for creating geospatial data. Specifically, describe the physical units that store data in the medium, such as specific feature (e.g. roads, buidings,etc.) and map sheet.

- **Medium name**

Indicates the medium for storing geospatial data

- **Other delivery information**

When providing online, enter the URL of the site, etc

- **Delivery Format**

- **Format Name**

- **Version**

- **Language**

- **Encoding**

《Product specification description example》

10. Data Product Delivery

Delivery medium	Units of delivery	Tiles
	Medium name	Online via web site
	Other delivery information	web site address: http://www.xxxxx.jp/
Delivery format	Format name	DWG
	Version	AutoCAD 2010 2011 2012
	Language	English
	Encoding	UTF-8

1 1. Additional information

11. Additional information

[Preparatory survey: Optional] [Detailed plan formulation survey: Not required]

《Overview》

In "Additional information," show important matters when creating geospatial data or using the created geospatial data in addition to the information shown so far.

If there is any other useful information about the data product, list it briefly.

《Description》

If necessary, provide additional information regarding geospatial data products.

For reference, show information on data acquisition, such as the data creation process of geospatial data products and the work specifications used for data creation.

《Product specification description example》

11. Additional Information

Additional information

This data product has been reviewed and registered with the GSI as the following public survey results.

Registration number: HxxExxxx

Survey period: From 2015-07-24 To 2016-03-15

1 2. Metadata – Data that describes geospatial data –

12. Metadata

[Preparatory survey: Optional] [Detailed plan formulation survey: Not required]

《Overview》

Metadata is data that introduces geospatial data.

When creating product metadata, describe the content and format of the metadata.

This section does not need to be described if metadata creation is unnecessary.

《Description》

It is recommended that the "Metadata" section in the product specifications indicate the following contents.

- Specify the format of metadata

Specify the format of the metadata to be used. ISO 19115 is the recommended format.

- Clarify metadata description items

Specify if there is an item that needs to be described in particular among the constituent element bodies and elements which are optional description items.

- Clarify metadata creation units for geospatial data products

Present what range (unit) of geospatial data product the metadata should be created for.

In general, one metadata is often created with a geospatial data product as one unit.

《Description》

12. Metadata

Metadata information

Metadata for geospatial data products based on this data product specifications is created based on ISO 19115 metadata.

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