SLOVENSKI STANDARD
SIST ENV 12656:1999

01-januar-1999

Geografske informacije - Opis podatkov - Kakovost

Geographic information - Data description - Quality

Geoinformation - Datenbeschreibung - Qualität

Information géographique - Description des données - Qualité

Ta slovenski standard je istoveten z: **ENV 12656:1998**

ICS:

07.040	Astronomija. Geodezija. Geografija	Astronomy. Geodesy. Geography
35.240.70	Uporabniške rešitve IT v znanosti	IT applications in science

SIST ENV 12656:1999 **en**

EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
EUROPÄISCHE VORNORM

ENV 12656

October 1998

ICS 07.040; 35.240.70

Descriptors: geographic information, information interchange, data, description, quality, quality control

English version

Geographic information - Data description - Quality

Information géographique - Description des données - Qualité

Geoinformation - Datenbeschreibung - Qualität

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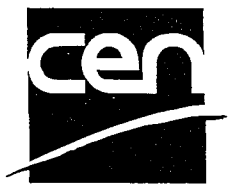

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 287 "Geographic Information", the secretariat of which is held by AFNOR.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Geographic information is information concerning phenomena directly or indirectly associated with a location relative to the Earth. Geographic data is a computer readable form of geographic information. The existing information technology standards need to be complemented by specific geographic information standards, because the spatial aspects of geographic data are not sufficiently covered. There are semantic aspects, spatial aspects and quality aspects of geographic data. The semantic aspects provide a description of the schema being represented. The spatial aspects provide a definition of position and shape. The quality aspects provide a description of its potential..

The purpose of describing the quality of geographic information is to allow producer organisations of geographic information to define how well their product meets their specification and for users to define their requirements in the same way. Geographic data is acquired through the process of defining a nominal ground that characterises the required abstraction from real world phenomena.

The quality of geographic information is concerned with the performance of a particular set of data against the nominal ground. To assess the usefulness of data for particular requirements, firstly the specification derived from those requirements needs to be considered, and then the actual performance of the data needs to be considered against that specification. This European Prestandard provides a model by which the information necessary to assess the quality of geographic information against its specification can be defined.

1 Scope

This European Prestandard establishes general principles for describing the quality of geographic information and provides a schema for describing data quality.

This European Prestandard specifies information appropriate for the judging of quality of geographic information. This includes details of the derivation and usage of particular sets of geographic information and the results of measures of quality either against a pre-established scale or relative to similar information.

This European Prestandard is applicable :

- for suppliers of datasets who wish to describe the overall quality of a product ;
- for specific quality information regarding a dataset supplied to a user ;
- for users to describe their requirements.

It is suitable for describing the quality of geographic data at any level, from the complete dataset down to individual items of data.

This European Prestandard does not include techniques for quality control or assessment, nor concern itself with quality management or systems, but provides a mechanism for maintaining quality information for quality management systems. It does not provide any mechanism for managing quality itself, not does it specify how measures of quality can be made. It does not specify the quality expected of an individual product.

The quality schema is designed primarily for use with digital geographic datasets but the principles may also be used to describe geographic information in other forms, such as paper maps or lists.

2 Normative references

This European Prestandard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 28601:1992, *Data elements and interchange formats - Information interchange - Representation of dates and times (ISO 8601, 1st edition 1988 and technical corrigendum 1:1991)*

EN ISO 8402:1995, *Quality management and quality assurance – Vocabulary (ISO 8402:1994)*

ENV 12009:1997, *Geographic information - Reference model.*

ENV 12160:1997, *Geographic information - Data description - Spatial Schema.*

ENV 12657:1998, *Geographic information - Data description – Metadata.*

ENV ISO 10303-11:1994, *Industrial automation systems and integration - Product data representation and exchange - Part 11: Description methods : The EXPRESS language reference manual (ISO 10303-11:1994)*

ISO 639:1988, *Code for the representation of names of languages.*

ISO 3534-1:1993, *Statistics - Vocabulary and symbols - Part 1 : Probability and general statistical terms.*

3 Definitions

For the purposes of this European Prestandard the following definitions apply :

3.1
abstraction effect
distortion of quality information because of imperfect and fuzzy specification

NOTE Assessment of quality elements relies on a precise dataset specification. Because a specification is never perfect, it can be interpreted during assessment and this interpretation will be reported with the abstraction effect.

3.2
accuracy
closeness of agreement between a test result and the accepted reference value

IISO 3534-1]

3.3
application schema
conceptual schema for a specific field of interest within the field of geographic information

[ENV 12009]

3.4
completeness
quality parameter describing the presence and absence of entity instances, relationship instances and attribute instances

3.5
conceptual schema
result from a conceptual modelling of geographic data

[ENV 12009]

3.6
confidence
element of metaquality describing the correctness of quality information

3.7
geographic data
computer treatable form of information concerning phenomena directly or indirectly associated with a location relative to the Earth

3.8
geographic dataset
identifiable collection of geographic data

3.9
geometric consistency
logical consistency that takes into account specifications only affecting geometric aspects of geographic information

3.10
homogeneity
textual and qualitative description of expected or tested uniformity of quality parameters in a geographic dataset

3.11
lineage
description of history of a geographic dataset

3.12
logical consistency
degree of conformance of a geographic dataset with respect to the internal structure given in its specification

3.13
metaquality
data about quality data

3.14
nominal ground
view of the real world implied by the specification of the geographic dataset

NOTE 1 The nominal ground forms the ideal geographic dataset to which the actual geographic dataset will be compared for evaluating its quality.

NOTE 2 The nominal ground is considered to represent the true value for the content of the geographic dataset.

3.15
positional accuracy
quality parameter describing accuracy of geographic position within a geographic dataset

3.16
quality
totality of characteristics of a product that bear on its ability to satisfy stated and implied needs

[EN ISO 8402]

3.17
quality element
item of information describing the quality of a geographic dataset

3.18
quality indicator
set of quality measures that together indicate the performance of a quality parameter for a geographic dataset

3.19
quality measure
definition of a specific test to be performed on a geographic dataset, including algorithms and the type of the value, or set of values, that will result

3.20
quality measure result
value or set of values resulting from a quality measure

3.21
quality parameter
quantifiable quality element describing the performance of a geographic dataset compared with its nominal ground

3.22
reliability
elements of metaquality describing the likelihood that a sample of a geographic dataset used for quality assessment is representative of the whole geographic dataset

3.23
semantic accuracy
quality parameter describing the accuracy of semantic aspects of a geographic data

3.24
semantic consistency
logical consistency that takes into account specifications affecting semantic aspects of geographic information

3.25
specification
document stating requirements

[EN ISO 8402]

3.26
temporal accuracy
quality parameter describing the accuracy of temporal aspects of a geographic data

3.27
topological consistency
logical consistency that takes into account specifications only affecting geometric and topological aspects of geographic information

4 Abbreviations

For the purpose of this European Prestandard the following abbreviation applies :

rmse : root mean square error

5 Principles for describing the quality of geographic information

5.1 The framework of quality

Geographic datasets can be amalgamations or sub-divisions of other geographic datasets. They can result from amalgamating data from more than one source, and from more than one epoch or they can be divided into subsets constrained by spatial extent, class, attribute or time. Quality information can be associated with any level of a geographic dataset. It can be for the whole geographic dataset, for a subset, or for individual items of data. The quality elements that are used to describe the quality of geographic information are applicable to all levels.

Information concerning the quality of a geographic dataset has to be recorded in accordance with ENV 12657. Where the geographic dataset forms part of a larger homogeneous geographic dataset, quality information can be recorded at that higher level.

A formal definition of the quality schema in EXPRESS is given in annex C.

The quality of a geographic dataset depends on the intended purpose of the geographic dataset and actual use of the geographic dataset. Since a geographic dataset is not generally produced for a specific application but rather for a set of supposed applications, the quality of the geographic dataset may only be assessed by knowing the quality elements. The quality parameters evaluate the difference between the geographic dataset produced and the nominal ground (that is the perfect geographic dataset that corresponds to the specification). The usage gives information on the kind of application that used the geographic dataset. Lineage describes the history of the geographic dataset. Homogeneity describes uniformity of quality parameters.

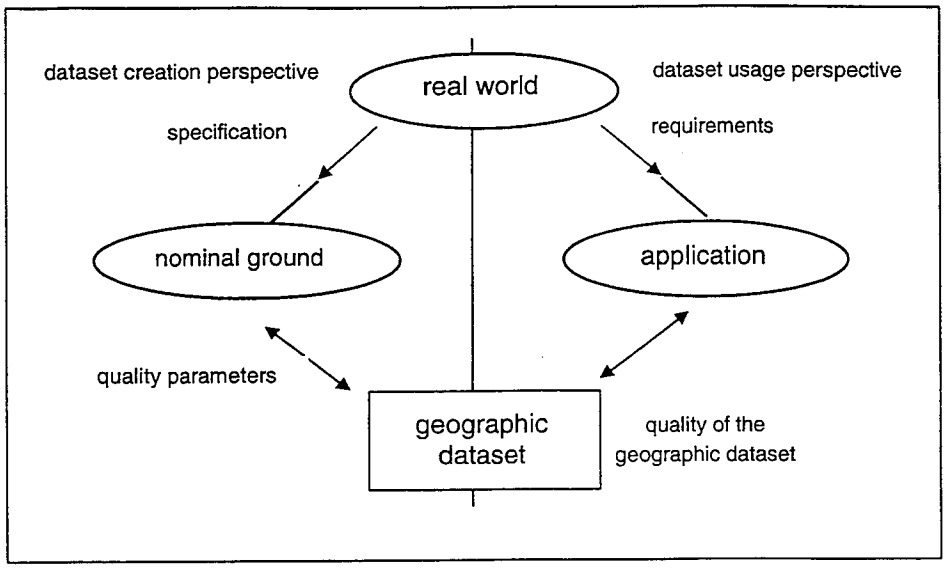

Figure 1 - The framework of quality

5.2 Quality elements

A quality element is associated with a geographic dataset and therefore applies to entities, attributes and relationships contained in the data. For each geographic dataset, at least one of the following quality elements shall be given :

- the lineage, a description of history of a geographic dataset ;

- the usage, a description of applications for which the geographic dataset has previously been used ;

- a set of quality parameters that describe the performance of the information against its nominal ground. Additional parameters may be defined. The sets of quality indicators and associated quality measures that make up quality parameters are defined by producer organisations or users of the geographic dataset.

NOTE A quality parameter is generic and its definition does not depend on the purpose for which the geographic dataset was produced. However, the definition of a quality indicator depends on the purposes for which the geographic dataset has been produced, and on the kind of geographic information on which it applies. The quality measures define what is measured for the quality indicators ;

- the homogeneity, a textual and qualitative description of expected or tested uniformity of quality parameters in a geographic dataset.

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EXPRESS specification

*)

        ENTITY quality_elements;
              may_have_lineage   : OPTIONAL lineage;
              may_have_usage   : OPTIONAL usage;
              may_have_homogeneity   : OPTIONAL homogeneity;
              may_have_quality_parameters   : OPTIONAL SET [1:?] OF
        quality_parameter;
        WHERE
              at_least_one_exists   :
                     (EXISTS(may_have_lineage)=TRUE) OR
                     (EXISTS(may_have_usage)=TRUE) OR
                     (EXISTS(may_have_homogeneity)=TRUE) OR
                     (SIZEOF(may_have_quality_parameters)>0);
        END_ENTITY;
(*
```

5.3 Metaquality

Each specific instance of quality information may have information about its own quality.

If this information is given, it shall comprise :

- a measure of the confidence of the quality information.

NOTE For quality measures, confidence will be given by statistical indicators such as standard error or confidence interval for a given confidence level. On other information, confidence will be reported by an explanatory text.

It may also comprise :

- a measure of the reliability of the quality information.

NOTE For quality measures, reliability may be reported by statistical indicators. Otherwise, reliability will be reported as an explanatory text ;

- a description of the methodology used to derive the quality information, including if it has been applied a theoretical estimation or a quality parameter measure and the specification of the procedure followed in both cases ;

- an abstraction effect to account for differences between the nominal ground and reality.

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EXPRESS specification

*)

        ENTITY metaquality;
             has_confidence   : quality_string;
             may_have_reliability   : OPTIONAL LIST [1:?] OF STRING;
             may_have_methodology   : OPTIONAL LIST [1:?] OF STRING;
             may_have_abstraction_effect   : OPTIONAL LIST [1:?] OF STRING;
        END_ENTITY;
(*
```

6 Requirements for describing the quality of geographic information

6.1 Introduction

This clause describes the quality elements used for describing the quality of geographic information (see 5.2). For each geographic dataset, at least one of them shall be given. Figure 2 provides an informative overview of the quality schema.