The 7th FIG Regional Conference
Spatial Data Serving People
Land Governance and the Environment – Building the Capacity
Hanoi, Vietnam, 19–22 October 2009

RESULTS OF DEVELOPMENT AND APPLICATION GEOGRAPHIC INFORMATION STANDARDS IN VIETNAM

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Vietnam



Contents

1. BACKGROUND

Background of the GIS aplication in vietnam

2. THE BASIC GEOGRAPHIC INFORMATION STANDARD (BGIS) 2.1 Overview

2.2 Standard for structure model of geog. data

2.3 Standard for classification of geog. objects

2.4 Implementing

3. TECHNICAL RULES

3.1 Contents and data packages

3.2 Structure models

3.3 Application

4. CONCLUSION

Result of standardisation

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1990s of the 20th century:

- GIS started developing: 90 years of the 20th century
- **Application:** resource management, agriculture, forestry, land survey, transportation, etc...
- Method of data creation: digitization paper maps
- Software: Intergraph, Autodesk, MapInfo, etc...
- Database: small and not comprehensive, cannot common use

Since 2000:

- Issued the national reference system and coordinate system VN-2000
- Issued technical regulations for digital topographic maps, cadastral maps and land use maps
- Digital regulations not by ISO-TC211
- Application for establishing maps and database:
 - ❖Digital topographic maps 1:2000 → 1:1000000
 - ❖Digital cadastral maps 1:200 → 1:10000

Standardisation plan:

- Stage I (2006 2009): Building national basic geographic information standards and standards for basic geographic data and issued as technical regulations.
- Stage II (2010 2011): Improving the technical regulations and promulgated as a technical standards.
- Stage III (2012 ...): Publishing the national standards.

Results of standardization in stage I:



✓2007&2008: MONRE has issued the decision to apply the geographic information basic standard.

➤ 2009: will complete the technical regulations for basic geographic data 1:2000, 1:5000; 1:10000; 1:50000 &1:1000000;

2.1 Overview

ISO TC211 Standards to consider:

- ✓ ISO19103 Conceptual Schema Language
- √ ISO19107 Spatial schema
- √ ISO19108 Temporal schema
- ✓ ISO19109 Rules for Application Schema
- ✓ ISO19110 Methodology for Feature Cataloguing
- ✓ ISO19113 Quality principles
- ✓ ISO19114 Quality evaluation procedures
- ✓ ISO19115 Metadata
- ✓ ISO19117 Portrayal
- ✓ ISO19111 Spatial Referencing by Coordinates
- ✓ ISO19101 Encoding
- ✓ ISO19136 Geography Mark-up Language

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2.1 Overview (cont.)



GIBS include the following 9 standards:

- 1. Standards for geographic data structure
- 2. Standards for spatial concept module
- 3. Standards for time concept module
- 4. Standards for classifications of geographic object
- 5. Standards for spatial referencing by coordinate
- Standards for assessment of geographic data quality
- 7. Standards for metadata
- 8. Standards for presenting geographic data
- 9. Standards for encoding, data sharing's.

2.2 Standard for structure model of geographic data

UML components:

- UML package
- UML class
- UML relationship
- UML stereotype

Syntax:

[Range] attribute name [cardinality] [: data type] [= the value generated]

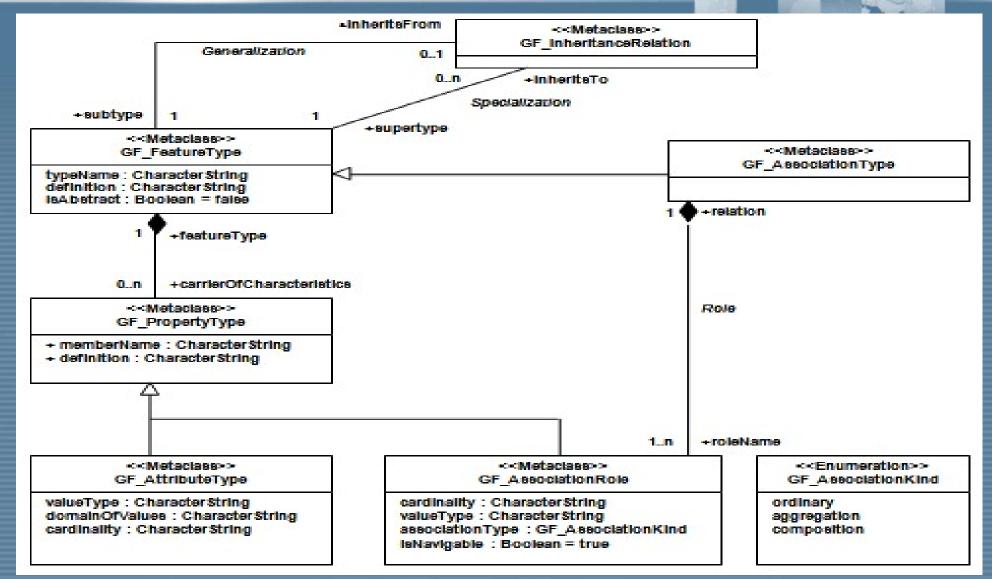


Figure 2.1: The general structure scheme of geographic data

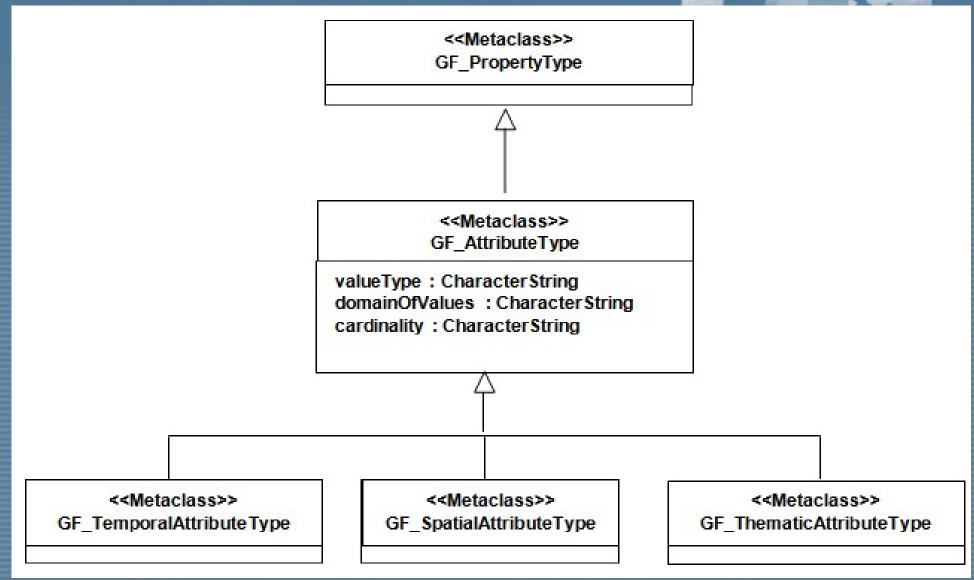


Figure 2.2: Attribute UML class scheme

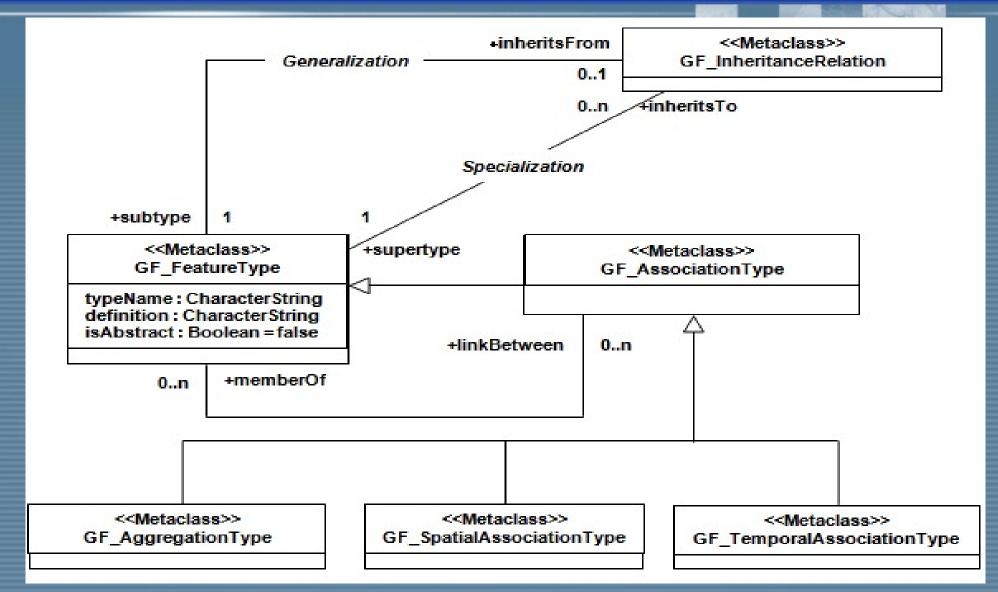


Figure 2.3: Relationship UML class scheme



Purposes:

- To build the feature catalogue: name, definition, feature type, attribute, relationship, detailed information.
- To build database to provide information about the feature catalogue.

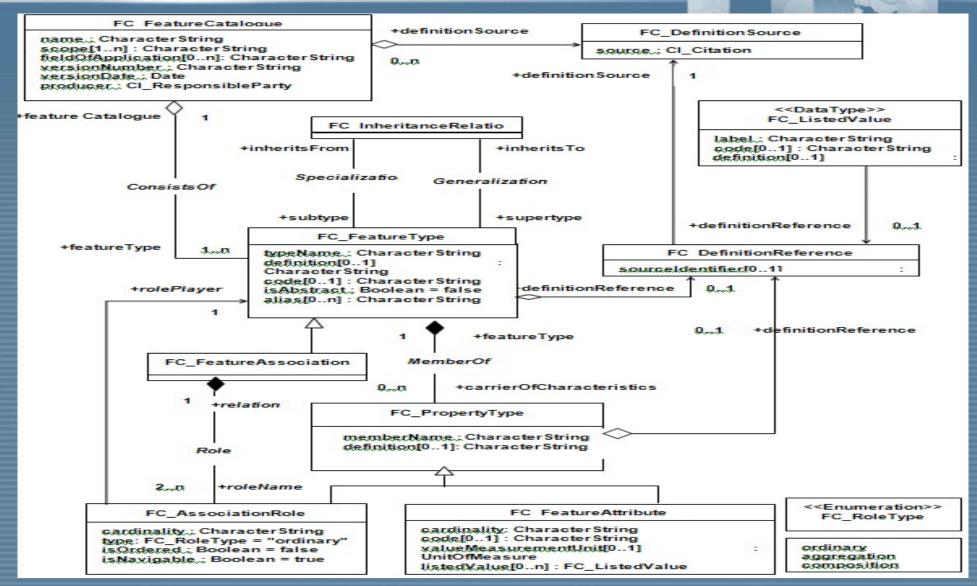


Figure 2.4: Concept model of feature catalogue

Feature Catalog: 177 objects, 102 attributes in 10 following themes:

- 1. National borders, administration borders (25)
- 2. Infrastructure (30)
- 3. Residential (3)
- 4. Geographical names(6)
- 5. Topography (20)
- 6. Coordinate Reference Systems (9)
- 7. Transport Networks (35)
- 8. land cover (13)
- 9. Boundary (3)
- 10. Hydrography (33)

2.4 Implementing

- ✓ Compulsory application when building the national basic geographic data and other specific geographic data
- ✓ encouraged to apply for specific geographic information system
- ✓ basis for building of Technical Rules for basic geographic data and specific geographic data such as cadastral data

3.1 Contents and data packages

The technical regulations specified:

- structure model
- feature catalogue
- referencing by coordinates
- quality
- metadata
- portrayal
- encoding
- sharing basic geographic data



3.1 Contents and data packages (cont.)

7 data packages:

- 1. Coordinate control points
- 2. National and administration borders
- 3. Topography
- 4. Hydrography
- 5. Transport Networks
- 6. Residential and Infrastructure
- 7. land cover

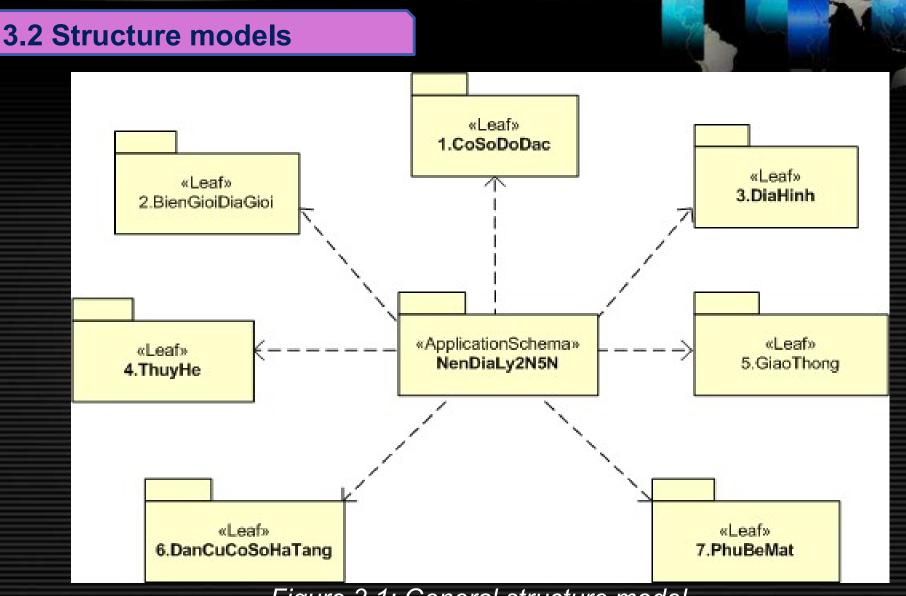


Figure 3.1: General structure model

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3.2 Structure models (cont.)

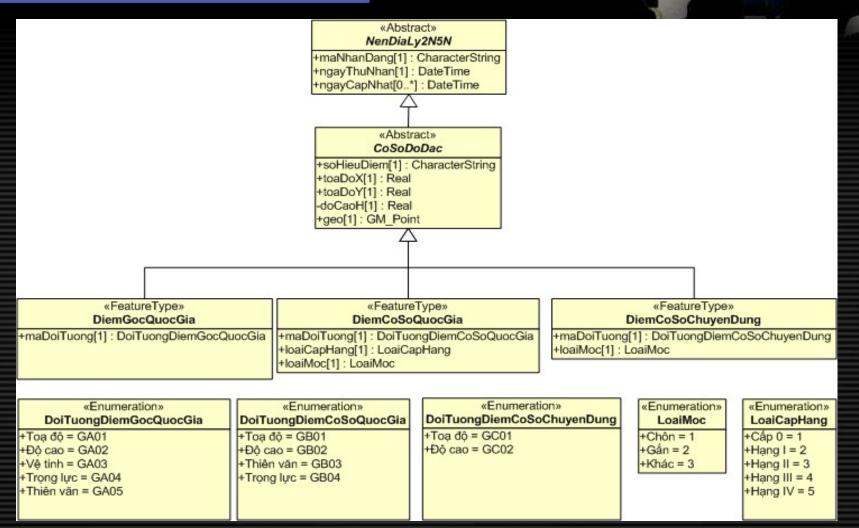


Figure 3.2: Structure model for Coordinate control points

3.2 Structure models (cont.)

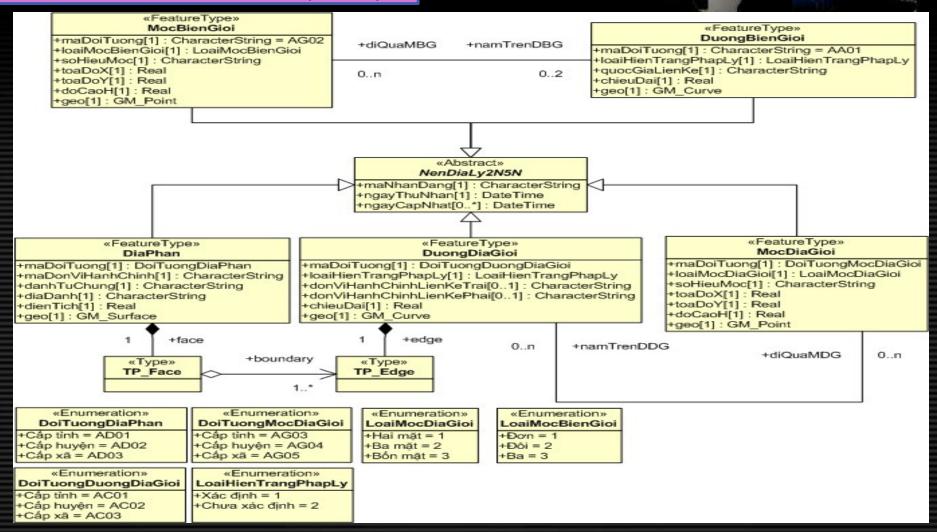


Figure 3.3: Structure model for National and administration borders

3.2 Structure models (cont.) «Abstract» NenDiaLy2N5N +maNhanDang[1]: CharacterString +ngayThuNhan[1] : DateTime +ngayCapNhat[0..*] : DateTime «FeatureType» «FeatureType» DiaDanhSonVan DiemDoCao +maDoiTuong[1] : CharacterString = DA05 +maDoiTuong[1] : CharacterString = EA01 +loaiDanhTuChung[1]: LoaiDanhTuChung +doCaoH[1] : Real +diaDanh[1]: CharacterString +loaiDiemDoCao[1]: LoaiDiemDoCao +geo[1]: GM Point +geo[1] : GM Point «FeatureType» «FeatureType» DuongBinhDo DiaHinhDacBiet +maDoiTuono[1]: CharacterString = EA03 +maDoiTuong[1]: DoiTuongDiaHinhDacBiet +loaiDuongBinhDo[1]: LoaiDuongBinhDo +ten[0..1] : CharacterString +loaiKhongCaoDeu[1]: LoaiKhoangCaoDeu +tyCaoTySau[0..1]: Real +doCaoH[1] : Real +geo[1]: LoaiMoTaKhongGianDiaHinhDacBiet +geo[1] : GM Curve «FeatureType» MoHinhSoDiaHinh +maDoiTuong[1] : CharacterString = EA05 +vungGioiHanMoHinh[1]: GM Surface +diemDoCaoMoHinh[3..*]: DirectPosition +duongDutGayDiaHinh[0..*] : Set<GM_Curve> +duongDiaHinhDacTrung[0..*] : Set<GM Curve> +vungDiaHinhBangPhang[0..*] : Set<GM_Surface> +hoDiaHinh[0..*] : Set<GM Surface>

Figure 3.4: Structure model for Topography

3.2 Structure models (cont.)

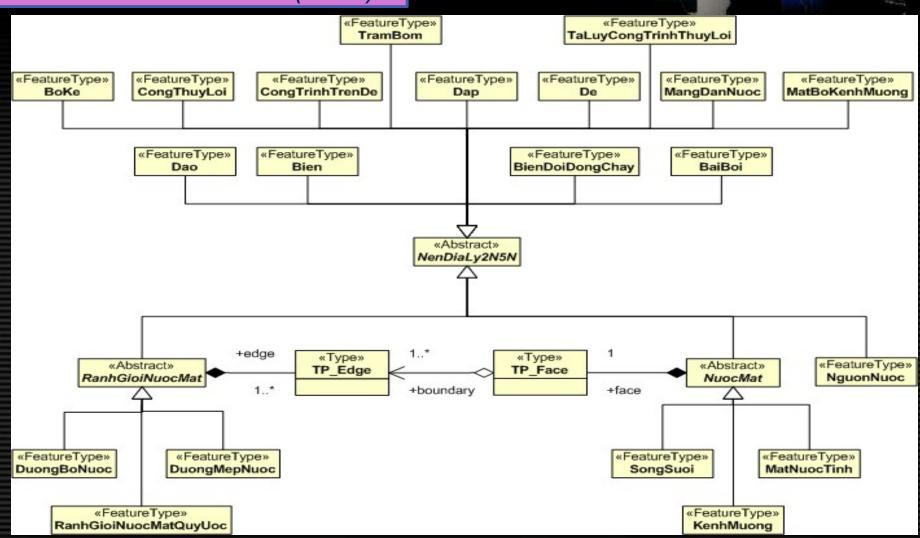


Figure 3.5: Structure model for Hydrography

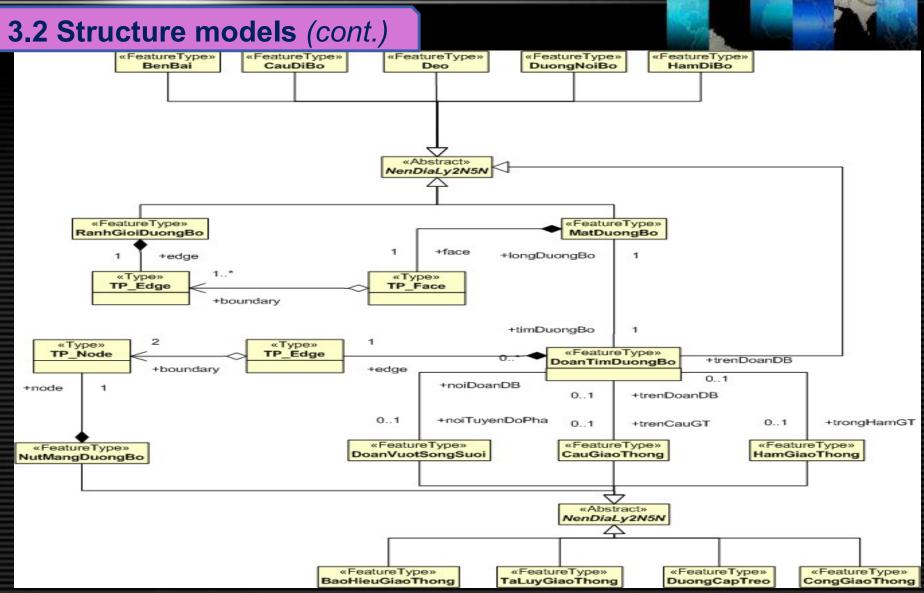


Figure 3.6: Structure model for Transport Networks

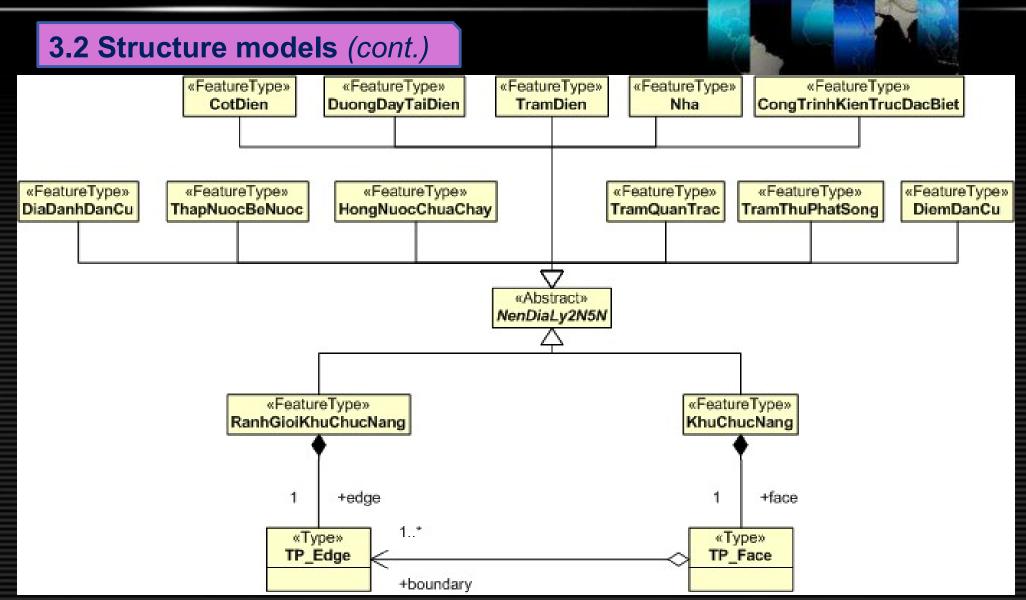


Figure 3.7: Structure model for Residential and Infrastructure

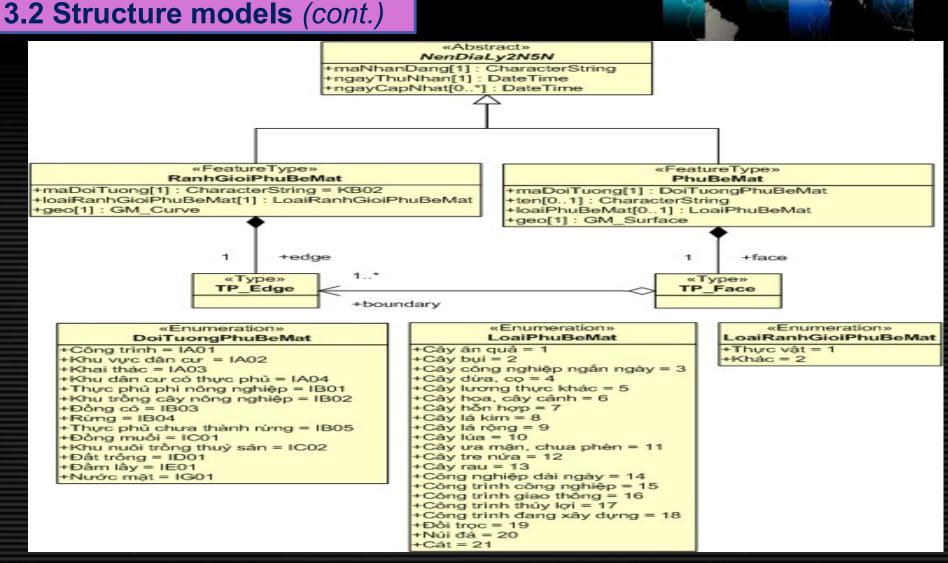


Figure 3.8: Structure model for land cover

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3.2 Application

For establishing base topographic data covering:

Urban areas

Phần Kiến Vướn Được gia Tam Đảo

INH VỀN

Kuân Hòa

Động Phố

Vền Lạc

Vền Lạc

Phúc Vền

Sốc San

Vền Lạc

Phúc Vền

Sốc San

Vền Lạc

Phúc Vền

Sốc San

Vền Lạc

Phúc Vền

Tran Trội

Quốc Sia Bại

Quán Phúng Cánh

Phá Miện

Tran Trội

Quốc Sia Bại

Quốc Đại

Hà Đông

Như Chiến

Quốc Đại

Hà Đông

Như Chiến

Rinh Thán

Tran Trội

Động Phán

Như Chiến

Rinh Thán

Tran Trội

Động Phán

Như Chiến

Như Chiến

Rinh Thán

Tran Trội

Động Phán

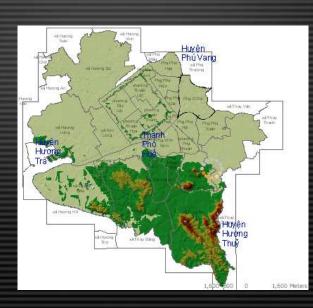
Như Chiến

Tran Trội

Động Phán

Tran Trà

Provinces



Whole country



4. CONCLUSION

- ➤ Accordance with ISO and inheritance of the current technical regulations.
- ➤ Reached the objectives: Development of conceptual framework and specification methodology and development of data specifications for each data theme.
- > Easily updated, shared and effective database.

