DISTRIBUTED CADASTRAL SYSTEMS

FIG Core Cadastral Domain Model Version 1.0

FIG 2002 Congress in Washington was presented with a proposal to develop a (shared) Core Cadastral Domain Model, the FIG CCDM. Such a model broadly covers land registration and cadastre and provides an extensible basis for an efficient and effective cadastral system. Development proceeds based on a model-driven architecture, enabling communication among parties using a shared, model implied ontology. After four years of development, the authors here present CCDM Version 1.0.

Important considerations during the design process were that the model should cover the most common aspects of cadastral registration all over the world and should follow international ISO and OGC standards, whilst remaining as simple as possible so as to be useful in practice. There is alignment with FIG Cadastre 2014: these guidelines giving an excellent start for implementing a cadastral model that is closer to unambiguous system implementation and information exchange. However, the generic set of guidelines requires specialisation. This is the aim of the FIG Core Cadastral Domain Model (CCDM) here presented in Unified Modeling Language (UML).

Core of CCDM
The relationship between land and people via rights is the foundation of every land administration. In addition to (informal) rights, real-estate objects can have restrictions or responsibilities that may be related to persons. No direct relationship between Person and RegisterObject exists in the CCDM; they are linked via Right Restriction Responsibility (RRR). After analysis of registration needs in many countries, specialisation was developed for the three (abstract) classes as presented in Figure 1, showing the core of the CCDM in a UML class diagram. Whilst it remains core, implementation of the CCDM in a specific country or region may require additional attributes, operators, associations and even introduction of complete new classes. Furthermore, a subset of the CCDM classes alone may be used for a specific implementation; there are many options.

Distributed Systems
The CCDM contains both legal/administrative object classes, such as persons, rights and geographic description of real-estate objects. The model will most likely be implemented as a distributed set of (geo-) information systems, each supporting maintenance activities and information supply of parts of the dataset represented in this model (diagram) and thereby using other parts of the model. This emphasises the relevance of the model: different organisations have their own responsibilities in data maintenance and supply and have to communicate on the basis of standardised processes in so-called value adding production chains. In trying to understand the model one should not view it as a whole but look rather at the UML packages or coherent parts, as shown colour-coded in Figures 2 to 4. Here yellow represents Legal/administrative aspects (Figure 2); green, Person aspects (Figure 2); blue, Immovable Object specialisations (Figure 3); pink, Surveying aspects (Figure 4) and purple, Geometric/Topological aspects (Figure 4). Distinguishing packages like this carries advantages including the ability to present the CCDM in comprehensive parts, maintenance and development of packages as independent parts, and the possibility of using a package to implement one type of functionality; basic packages could be implemented by software (GIS) suppliers.

Yellow Package
Specialisation classes of Person are NaturalPerson and NonNaturalPerson: organisations, companies or government departments. GroupPerson is a third specialisation intended to represent communities, co-operations and other entities representing social structures. The main class in the yellow package is the abstract class RRR, with specialisations Rights, Restrictions and Responsibilities. In principle, all RRRs are based on a LegalDocument. Each jurisdiction has a different land tenure system reflecting social relationships in rights and restrictions to land. The variety of rights is quite large within most jurisdictions and there may be considerable differences in meaning between similar rights under differing jurisdictions (perhaps areas with customary tenures). Because property and ownership rights are based on (national) legislation, look up tables (catalogues) may offer support. Relating to a region, Customary Right or Informal Right can be included. Right is compulsory association between RegisterObject and Person, whereas association is not compulsory in the case of Restriction and Responsibility. The class RRR allows for the introduction of shares of rights. One or several mortgages is vested on a Right(s). The mortgagee is connected to the Mortgage as MoneyProvider; one of the specialisations of Person. The fact that all the different (public and private law) RRRs find their basis in some kind of establishing or transacting document is represented by connecting them to LegalDocument, a specialisation of the abstract class SourceDocument, such as SurveyDocument. The Conveyer is responsible for drafting the document.
Further Reading


https://www.gim-international.com/content/article/fig-core-cadastral-domain-model-version-1-0