ASPECTS REGARDING THE INFORMATIONAL SYSTEM OF LAND REGISTRY OFFICE

Dragoş-Constantin NICA, Assistant, PhD. Student, eng., „Alexadru Ioan Cuza" University of Iaşi, nicadragos42@yahoo.com
Dan PĂDURE, Assistant, PhD. Student, eng., „Gheorghe Asachi" Tehnical University of Iaşi, email: danny_pad@yahoo.com
Geanina MIHAI, Assistant lect. PhD. eng., „Ovidius" University of Constaza, email: mihai_geanina@yahoo.com

Abstract. *For complex planning activities and development of places, a large amount of information is used. The administration, storage, management, manipulation, analysis and information modeling are achieved through a Geographic Information System (GIS).*

The estate cadastre information system, as a evidence subsystem and inventory of buildings, under technical, economic and juridical aspect and of the data base from the general cadastral survey, plays a major role. This functional cadastral survey is vital in the context of integration of our country in the European Union.

In the paper, there are presented several aspects regarding the creation of a data base, which to insure the unitary coordination and the cadastral survey data security, the growth of the efficiency and the performance of the information systems of the different users.

Key words*: cadastral survey, database, informational system, relational model, real estate.*

1. Introduction

The real estate cadastre information system is a systematic record and inventory subsystem of immovables from the technical and economic point of view, with observance of the technical norms elaborated by the ANCPI (National Agency for Cadastre and Land Registration) and of the basic data from the general cadastre with regard to the area, utilization class, and owner. In this context, the real estate cadastre information system contains basic elements of the general cadastre, and thus, the structure and content of the documentation to be prepared for the general cadastre must be observed.

According to art. 4 of Law no. 7/1996 on cadastre and land registration, the ministries, other central State institutions, self-managed public companies and other legal persons shall organize the information systems per fields of activity. In this context, the Ministry of Regional Development and Tourism has the task of organizing the information system specific to the urban real estate fund, which represents its field of activity and of creating urban databanks, at the national level, based on annual programs.

The financing, contracting, execution, approval, and acceptance of the technical works of identification, measurement and inventory of immovables and creation of databanks is made in accordance with the Methodological norms approved by G.D. no. 512/1997, amended by G.D. no. 818/2006 and the Methodologies for the execution of works to place the real estate cadastre in localities, approved by Order no. 90/NN/911-CP of 02.06.1997.

According to Law no. 7/1996, the updating of the real estate cadastre information system is made according to the specificity of this field. Also, holders of the information

systems per fields of activity are obliged to provide the necessary records for verification of the taxpayers' tax liability to the Ministry of Finance.

The purpose of the real estate cadastre information system, through the data and information it provides to the local public administration (*Fig. 1*), ensures not only the real estate fund record and property registration, but have a special role in determining a fair system of taxes and duties, in the real estate market development, environment protection, urban planning etc., allowing citizens to access such information, having an important role in the information, transparency and debureaucratization process.

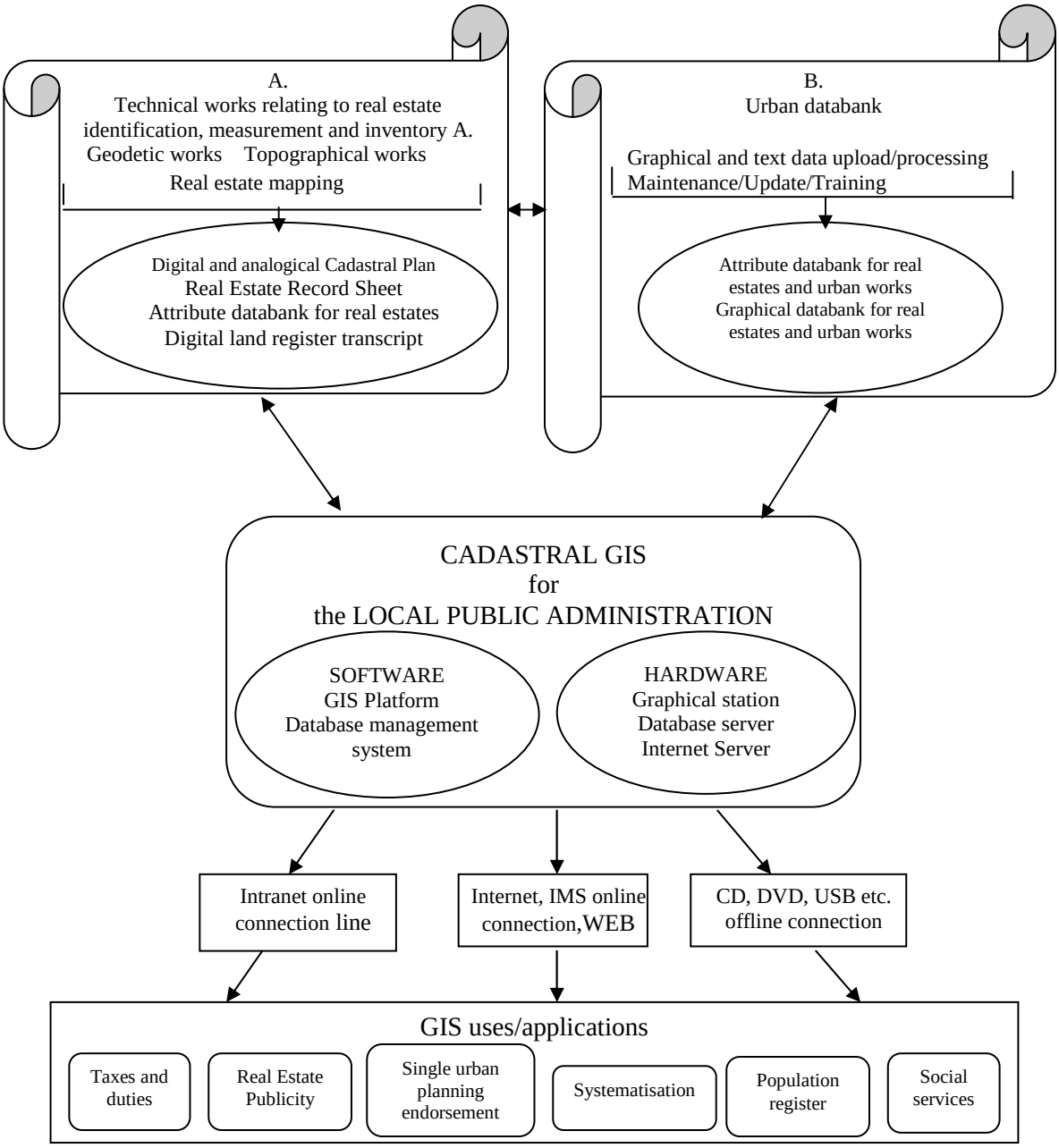

Fig. 1 - Information System pertaining to the area of Real Estate and Urban Databanks

The technical works relating to real estate identification, measurement and inventory and the creation of urban databanks, managed through the program for the implementation of real estate cadastre information system (*Fig. 1*), are established and organized to include the

lands within the built-up area of urban and rural localities of the country, that is 267 cities and municipalities with an area of approximately 220.000 hectares and 13.456 rural localities with an area of about 1.300000 hectares.

The main document "Real Estate Record Sheet" will be achieved through the collection of the data specific to the real estate cadastre information system correlated with the information from the general cadastre, observing the codification and the mention that the construction information about the body of the building concern:

- the identification of the body of the building;
- the identification of the owner/possessor of the body of the building;
- the built area and the detailed built area;
- information related to public utilities;
- construction information about buildings and annexes.

Cadastral registers are the main documentation of cadastral works, to which the main data from the real estate cadastre information system is attached.

2. The database for the real estate cadastre information system

The database is a structured set of consistent data that can be efficiently processed by multiple users in a concurrent way. The database is the main component of Geographic Information Systems where alphanumeric data (textual) of the attribute type associated to each item mapped are recorded. The database attached to the spatial graphic representations is stored in separate tabular files (*Fig. 2*).

For the real estate cadastre information system, the graphic database shall be established in digital form, having the liability to register all entities defined in the technical norms, and the textual database is created with information taken from:

- the documentation prepared according to the law and technically approved;
- the technical documentation created for the assignment of temporary cadastral numbers;
- the title deeds;
- the data collected on the spot and recorded in the real estate record sheet.

Baza_date 281

Prop	Proprietar_pre	Proprietar_r	Proprietar_cn	Adresa_str	Cat_fol_des	Judet_nume	Parcela_nr_c	S_cad_nr	Tara_nume	T_dest_desc	U_admin_nu	Zona_nume
15	ELENY-NICOLETA	IONEL	2690412221189	Str. I. L. Caragia	Curti construct	Iasi	281-104639	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
16	ELENY-NICOLETA	IONEL	2690412221189	Str. I. L. Caragia	Constructii	Iasi	281-104639-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
16	ELENY-NICOLETA	IONEL	2690412221189	Str. I. L. Caragia	Constructii	Iasi	281-104639-U2	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
17	ANGELA	MACOVICIUC	2260222227786	Str. I. L. Caragia	Curti construct	Iasi	281-104640	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
17	ANGELA	MACOVICIUC	2260222227786	Str. I. L. Caragia	Constructii	Iasi	281-104640-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
18	GRIGORE	CIMBALA	1320129221133	Str. I. L. Caragia	Curti construct	Iasi	281-104641	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
18	GRIGORE	CIMBALA	1320129221133	Str. I. L. Caragia	Constructii	Iasi	281-104641-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
18	GRIGORE	CIMBALA	1320129221133	Str. I. L. Caragia	Constructii	Iasi	281-104641-U2	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
19	ADRIAN-GHEORG	SANDULESCU	1581115227798	Str. I. L. Caragia	Curti construct	Iasi	281-104642	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
19	ADRIAN-GHEORG	SANDULESCU	1581115227798	Str. I. L. Caragia	Constructii	Iasi	281-104642-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
19	ADRIAN-GHEORG	SANDULESCU	1581115227798	Str. I. L. Caragia	Constructii	Iasi	281-104642-U2	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
19	ADRIAN-GHEORG	SANDULESCU	1581115227798	Str. I. L. Caragia	Constructii	Iasi	281-104694-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
21	AMALIA	CRUSOS	2321121221142	Str. I. L. Caragia	Curti construct	Iasi	281-104644	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
21	AMALIA	CRUSOS	2321121221142	Str. I. L. Caragia	Constructii	Iasi	281-104644-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
21	AMALIA	CRUSOS	2321121221142	Str. I. L. Caragia	Constructii	Iasi	281-104644-U2	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
21	AMALIA	CRUSOS	2321121221142	Str. I. L. Caragia	Constructii	Iasi	281-104644-U3	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
22	EMIL	CAMPEANU		Str. I. L. Caragia	Curti construct	Iasi	281-104645	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
22	EMIL	CAMPEANU		Str. I. L. Caragia	Constructii	Iasi	281-104645-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
23	MIHAI	MAHALU		Str. I. L. Caragia	Curti construct	Iasi	281-104646	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
23	MIHAI	MAHALU		Str. I. L. Caragia	Constructii	Iasi	281-104646-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
25	CRISTINA-IOLANI	CONDURACHE	2510423221206	Str. I. L. Caragia	Curti construct	Iasi	281-104651	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
25	CRISTINA-IOLANI	CONDURACHE	2510423221206	Str. I. L. Caragia	Constructii	Iasi	281-104651-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
25	CRISTINA-IOLANI	CONDURACHE	2510423221206	Str. I. L. Caragia	Constructii	Iasi	281-104651-U2	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
26	CONSTANTA	ARMASU		Str. I. L. Caragia	Curti construct	Iasi	281-104652	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
26	CONSTANTA	ARMASU		Str. I. L. Caragia	Constructii	Iasi	281-104652-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
26	CONSTANTA	ARMASU		Str. I. L. Caragia	Constructii	Iasi	281-104652-U2	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
26	CONSTANTA	ARMASU		Str. I. L. Caragia	Curti construct	Iasi	281-104653	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
26	CONSTANTA	ARMASU		Str. I. L. Caragia	Constructii	Iasi	281-104653-U1	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II
27	RUXANDRA-MAD	POPESCU	2670710221171	Str. I. L. Caragia	Curti construct	Iasi	281-104654	281	ROMANIA	TERENURI AFLATE IN INTRAVILANE	Municipiul Iasi	Copou II

Fig. 2 – The database attached to the spatial graphic representations

The features of the textual database are the following:

- data are quantitative or qualitative;
- it has a descriptive value.

The setting up of databases for the real estate cadastre information system and management of localities is achieved through the collection of information related to the update of technical, economic and juridical data taken from the general cadastre and completed afterwards with regard to:

- the establishment, according to Law no. 7/1996, of the land plot to be registered and marking of the boundaries of lands within the built-up area and the unincorporated area of localities;
- the update or preparation of the topographical or digital cadastral plan, which will constitute the main support for the cadastral works;
- the identification of all land owners and bodies of buildings;
- the completion of the data contained in the "Real Estate Record Sheet" with: the functional characteristics of buildings, existence of public utilities for all plots, existence of public utilities and their type in the body of the building and other requests of the beneficiary necessitating field-work or declarative data recording;
- the collection of more detailed data and information about the construction characteristics of buildings and, upon request, of additional elements related to the geotechnical characteristics of the land, in order to assess lands and buildings as per the technical criteria, as well as to provide the information necessary to establish the minimum price for the concession of lands, in accordance with the law.

The attributes attached to the graphical entities shall be uploaded into a database, which must ensure the content of cadastral registers. Data shall be stored at the level of territorial-administrative units.

Alphanumeric data is centralized in database management systems (DBMS) and is related to graphical data (*Fig. 3*). The effective organization of such information has a logical structure, in sets of homogeneous layers in terms of geographical components and associated meanings. For a master plan, it would include the hydrographic and transportation network, utilization classes, and administrative-territorial boundaries and so on.

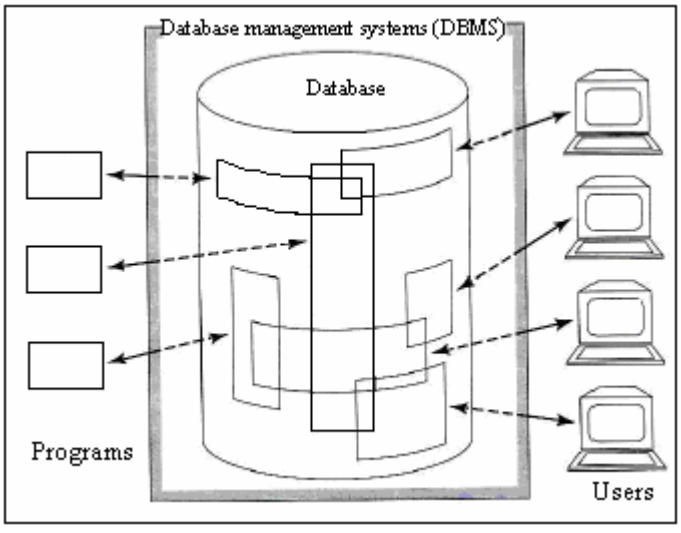

Fig. 3 - Database management systems (DBMS)

Data from the database can be both integrated and shared. The term integrated refers to

the fact that the database can be considered as the unification of several files, and shared means that the database can be shared among different users concurrently. A database management system is a software product that provides interaction with a database, enabling the definition, consultation and updating of the data in the database.

All the requests for access to the database are treated and controlled by the DBMS. The organization of data in the databases represents a form of data centralization. It implies the existence of a database administrator (DBA - Data Base Administrator) which is a person or group of persons that are responsible for all activities (analysis, design, implementation, operation, maintenance etc.) related to the database. The tasks of the administrator can be grouped into four main categories: design tasks, administrative tasks, operational tasks and coordination tasks.

Therefore, the DBMS can be defined as a tool for the unification, coding, organization, protection and retrieval of data in the database. All requests for access to the database are processed by the DBMS**.**

The Database Management System (DBMS) comprises general and detailed functions, (*Fig. 4*). Thus:

The general functions it must fulfil are the following:

- data storage on the external device, through the file management system;
- managing data and links between them, for a quick retrieval by means of the access system;
- data entry and extraction.

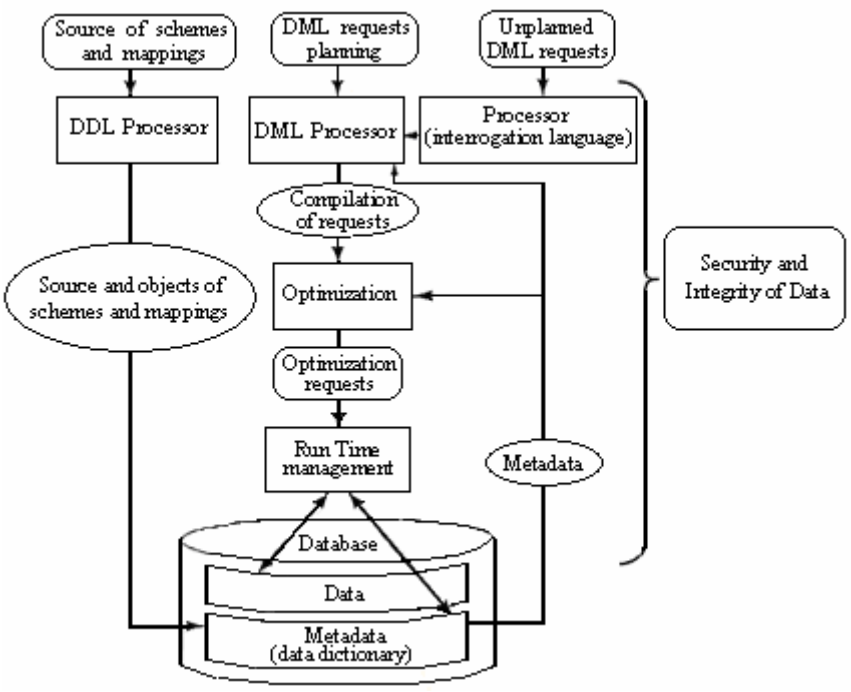

Fig. 4 – Main functions and components of a DBMS

The detailed functions of a DBMS are the following:

- data definition at the conceptual level, definition and realization of optimal data physical structures;
- realization of the independence between the conceptual structure and the users' programs;

- creation and operation of the database, efficient mechanisms of quick access, validation procedures;
- control of the integrity of the database, controls of the data recovery and coincidence;
- access to information by multiple users simultaneously;
- confidentiality of information contained in the database;
- security and integrity of data by using passwords and by encryption of databases, backups, minimizing risk of data loss due to hardware failures or power failures, measures to protect information;
- reviewing and restructuring the database, gaps management, optimization and execution of the database;
- monitoring performances, achieving performance at the level of the database;
- coordination of requests for recovery, update or deletion of existing data in the database, or for adding new data to the existing database.

In addition to the characteristics presented above, the DBMS must also ensure the data dictionary function, with regard to the database and the rights of the database managed by the DBMS, than those of the user of the database. The data dictionary contains "*data about data*", called metadata or descriptors, which are definitions of other objects in the system.

Data integration and sharing is a major advantage of the large database systems, such as the real estate cadastre information system. Through the data integration a complete database can be obtained, having the possibility of eliminating redundant existing data at the level of each file or database. By sharing data, parts of the existing data can be distributed to other users, in this case each of them having limited or total access to the information received, to be used for different purposes and with the possibility for each of them to treat information specifically.

DBMS includes two facilities for database design and operation:

- Data description facilities – materialized through data description languages - DDL (Data Description Language). The DDL comprises facilities for describing aspects related to the physical data structure and other maintenance facilities, such as: database upload, specification of integrity restrictions etc.
- Data manipulation facilities - DML (Data Manipulation Language), also called interrogation languages and consist of a set of primitive commands that correspond to common operations in the database operation, such as formulating requests for access to data (queries), adding, deleting and updating data.

The DBMS is defined as a management system that uses data organization according to the relational model. The basic concept of the relational model is that of relationship/ table.

Relating tables consists of creating links between the tables in the database, in order to create forms and to upload data without errors. The forms are designed to limit access to the tables in the database and eliminate errors in the data entry process. For each table one form was created. Three types of relationships can be created between the tables in a database:

- one-to-many;
- one-to-one;
- many-to-many.

Usually, in a real estate cadastre information system, the one-to-many relationship type is used**.** Example: between the table for Country and the one for Counties there is the one-to-many relationship, meaning that a country has several counties.

The representation of the relational model of tables in a database within a real estate cadastre information system is presented in *Fig. 5*

A database based on the relational model is designed as a collection of two-dimensional tables called relations. Each column in the table is called an attribute or a field. Each row in the table is defined by the relation name and attribute name.

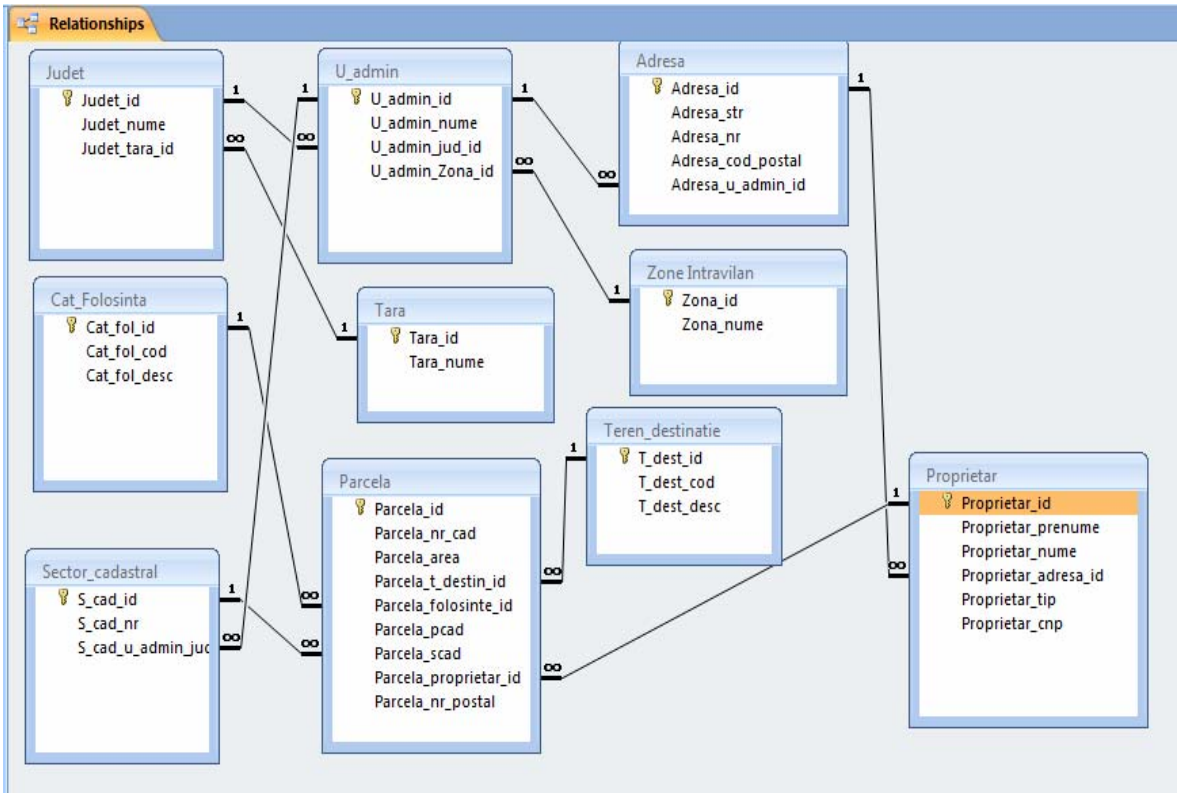

Fig. 5 - Relational database

A relational database comprises several relations. A scheme for a database comprises several relational schemes and lots of integrity constraints. The integrity constraints are necessary in a database in order to maintain all the components of the database in the scheme.

The simplicity of the relational database structure, the lack of explicit linkages facilitate the formulation of queries through high level languages, such as relational algebra or any equivalent language, which are generically called relational languages. These languages are characterized by the fact that they operate on some relations and the results produced are relations as well. Relational languages are very flexible, marking the starting point of the use of databases for much larger groups of users than the other data models.

The development of packages of programs was promoted based on pure relational database platforms. The GIS was seen as a query processor, directly operating on relational databases. The advantages of using standard relational concatenation mechanisms, instead of algorithms to link spatial and attributive data, were emphasized.

The relational data model enjoys the benefits of query, retrieval and data integrity mechanisms, but there are limitations related to the data types, which can be implemented in relational DBMS. The model offers the premise that it is possible to introduce new data types and can extend the standard query language (SQL) in order to interact with spatial data types.

Conclusions

The spatial/ textual information managed and the data models used plays an important role in the activities of the real estate cadastre information system, but also how it communicates, transfers and exchanges information with other information systems. The use of the internet, GPS technology, programming languages and data modelling standards have contributed to the implementation of sustainable real estate cadastre information systems globally and nationally.

At the international level, real estate cadastre information systems must manage the territory for a sustainable development, must be flexible, as users require maintenance related to legislative and technological changes advances and those implied by the new registration methods.

Bibliography

1. *Nistor Gh., Sălceanu Gh., - Implementing GIS technology in the set-up of real estate-urban information system of a city, Bul.Inst.Politehnic, Iaşi, LIII(LVII), 1-4, s.Hidroteh., pag. 93-111, 2007*
2. *Nistor Gh., ş. a., - Aspects regarding the publishing and listing of cadastral data for verification by owners., Bul.Inst.Politehnic, Iaşi, Tomul LVII(LXI), fasc.1-4, s.Hidroteh., 2011*
3. *Nițu C., - Sisteme Informaționale Geografice, Editura CREDIS, Bucureşti, 2004*
4. *Rusan L.V.,- Considerații privind structurile de date specifice sistemelor informationale geografice, - Revista Informatica Economică, nr. 1, 2000*
5. *Sălceanu Ghe., - Contribuții la realizarea Sistemului Informațional Geografice pentru Cadastrul imobiliar-edilitar al unui municipiu, Teză de doctorat, Iaşi, 2009*
6. *Vatafu F., - Structura bazei de date spațiale,- Revista de Geodezie, Cartografie şi Cadastru, Volumul 18 – Numerele 1,2 , 2009*
7. *Vatafu F., - Arhitectura unui sistem de baze de date, Revista de Geodezie, Cartografie şi Cadastru, Volumul 18, Numerele 1,2 , 2009*
8. **** MLPAT, ONCGC - Metodologie privind executarea lucrărilor de introducere a cadastrului imobiliar în localități, Buletinul construcțiilor, voI. 7, 1997*