G.I.S. Applications in the Local Administration. Case Study: Floreşti Commune, Cluj County

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Introduction

The nowadays Romanian local public administration faces a complex restructuring process imposed by the prolonged transition from one political system to another. This restructuring process matures through the transcription of the administrative regulation on new legislative coordinates, the restructuring of the bureaucratic apparatus, the modification of the managerial patterns of the administrative territory, the change of priorities in the usage of the budgetary resources, etc.

All these restructuring processes have been on the roll and continue to function on basis of the obsolete patterns of information and data processing. As a consequence, it can be observed that the trend in the restructuring of the local administration system did not include the information and data processing aspect, fact that causes great prejudices to the quality of the administrative regulation.

These prejudices refer to the correctitude in the application of certain measures of action, due to the incomplete population data, the consolidated fund, the situation of the allotments and of the owners, deficiencies in the correct evaluation and collecting of taxes, the impossibility of defining new and clear directions for development etc.

The perpetuation of this state of fact in more local administrations, which is due to the lack of funds or reticence to innovation and technology, will inevitably lead to the amplification of the state of incertitude, impossibility and disinterest towards the administrative regulation.

On the other hand, the huge volume of data and information that is to be processed in case of an administration, their stressed dynamics, and their perishable character, as well as the large number of statistic reports that the local administration, through its services, is obliged to communicate to the directorate of statistics or to the county council, complicates even more the classical administrative regulation.

Which is then the direction to be followed in order to modernize the information and data processing aspects as well? There are numerous and various solutions and answers to this question but the most interesting thing is not only to formulate them but also to study their costs and capacity to adapt to the factual needs of the administration system.

The informational system belonging to the G.I.S. category is one of the most efficient solutions in the case of assuming the task of processing the alpha-numeric or other nature cartographic data and information by the local administration.

The informational systems within the local administration have to cumulate at least the following characteristics:
- To offer a rapid and controlled access to the data;
- To offer real time exact information;
- To permit processing control;
- To include archiving mechanisms;
- To facilitate the information exchange with other organizations;

The proposed system, AEDILIS, was designed and built as a modern means of accounting for and processing both the graphic and attribute data.
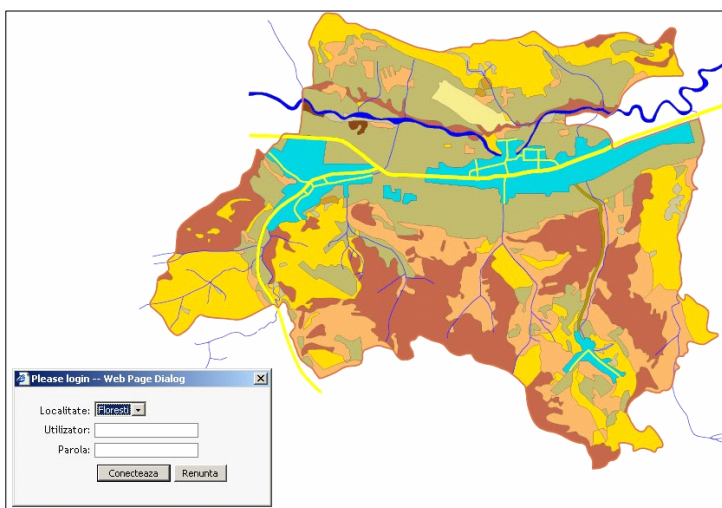
The main idea is that the geographical data as for example the data about the allotments, respectively the occupancy and use of the allotments are strictly necessary for the practical activity of all the domains annexed to the public administration: urbanism, administration of contributions and taxes, agriculture, preservation of the environment, civil protection, etc. And of course, there are also attribute data that appear as information in different contexts, for example the identification data of the proprietors.

The AEDILIS system contains a unique database used and shared by all the specific applications.
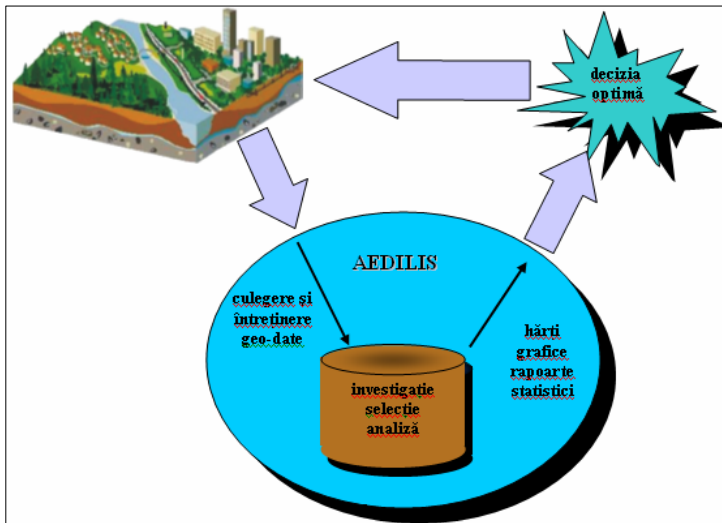
Figure 2. The circuit of geo-information in the context of the decision making process.

The principles that regulate the functioning of the whole system are perceived as restrictions and recommendations for projecting respectively for development grouped accordingly to their domain of application: to the database or to the applications. These principles are valid for any implementation having the same purpose.

The model of this application was built and tested by using the graphical data provided by the Floreşti commune PUG[1], verified and updated on the basis of the field research data. The remarkable development undergone by the commune in the last years, led to the necessity of endowing the Floreşti Communal Hall with a modular and very easily to be used specialized informational system, based on GIS technology. They focused upon the following possible applications: the registration of the building authorizations, the registration of the constructions and generally speaking of the real estate properties, the registration of the agricultural lands and other registrations annexed to the Register of Agriculture, the registration of the population, the public patrimony, registries regarding the taxation basis, digital PUG, the functional dividing into zones and realising the authorizations for urbanism, real estate publicity, various statistics and balance sheets.

From a technical point of view, AEDILIS is a software system created through successive development of applications that include GIS type procedures and functions, implemented in intranet and internet environment usage.

The used data base engine is MySQL and the languages in which the programs are written are PHP and Java script. The AEDILIS applications function as regular web pages launched from a web browser such as, for example, Internet Explorer from which the Apache web server, containing all the database and applications, is accessed.
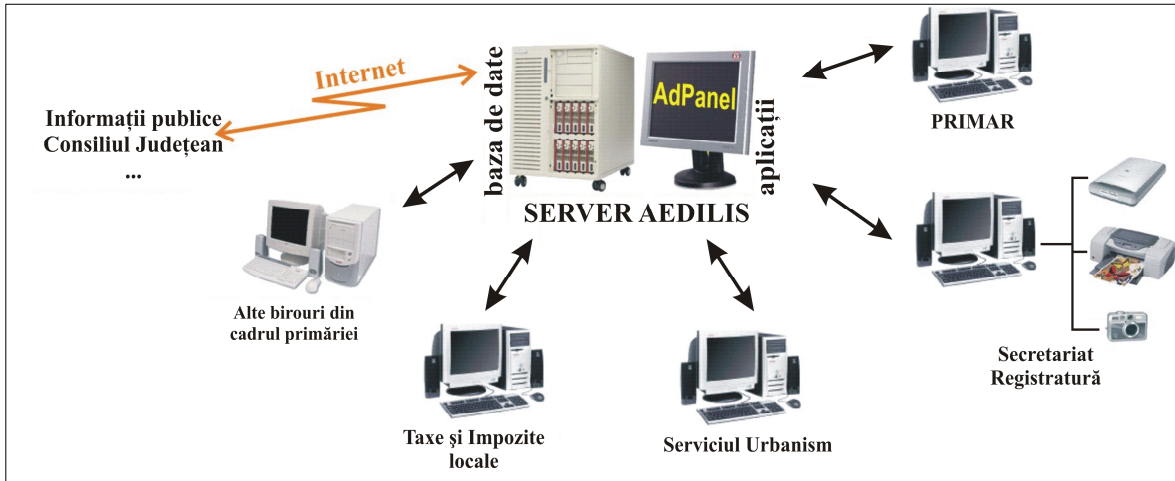
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[1] General Urban Plan.

Figure 3. The central position of AEDILIS system in the informational system of the Communal Hall.

Conceptual aspects of the AEDILIS programme development

The main idea standing at the origins of the AEDILIS project development is the close relation between the territorial reality, object of administration, the cartographic component divided at a stratum level and the alpha-numeric data that come with the cartographic component shaping the informational image of reality (figure 4).
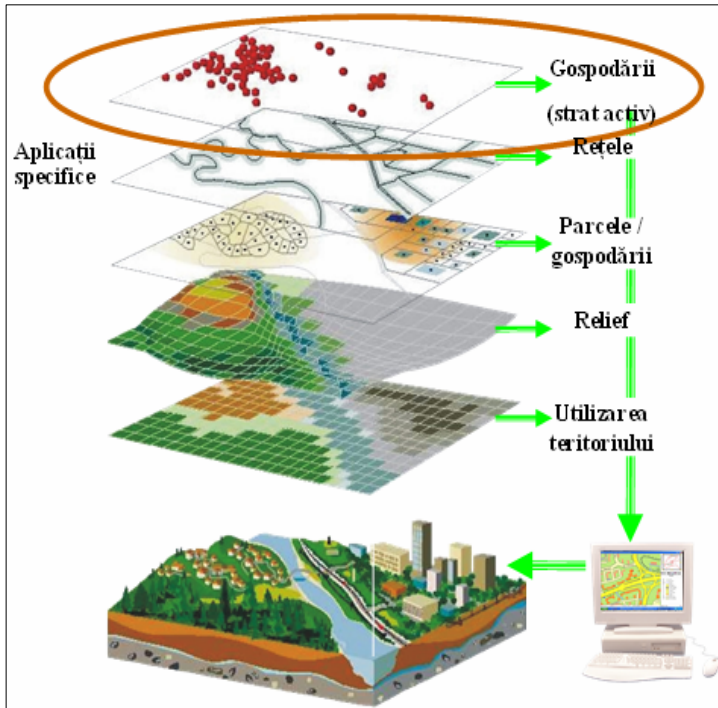

Figure 4. The structuring relations of the informational component within the AEDILIS programme.

The dimension of the informational component is a variable that can continuously be updated to an acceptable level of coverage of all the informational strata that make the object and represent the basis of the local administration decision making process.

The transcription of the cartographic component into a digital format is made through specific procedures like scanning, giving geo-references, vector setting, geo-codifying, digital strata editing etc., by using either GIS software like ArcView GIS, ArcInfo, or the graphical interface of the AEDILIS product.

This procedure is the attribute of the specialized developer, the exactness of the cartographic database depending on its quality. In order to improve the quality of the cartographic database, the AEDILIS product also accepts coordinates obtained through the topographic surface mapping of the new objects (buildings, dwellings, construction networks, roads etc.) introduced into the administrative territory.

This possibility allows a permanent updating of the cartographic database, this being a fundamental particularity of an operational database (figure 5).
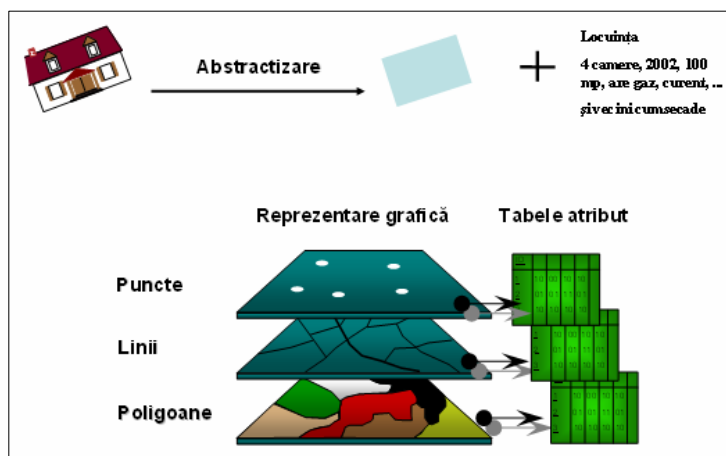
Figure 5. The digital representation process of the cartographic database.

Types of processed data:
Graphic: the AEDILIS strata are constructed according to the paper support maps and plans provided by Floreşti Communal Hall, and to field updating and measurements.

Attribute: the attached attributes are extracted from the registers and registries of the Communal Hall. These are digitally organized in the shared AEDILIS database tables according to the extent of the applications and to the identification of the new data. The attached strata and attributes are digitally organized in such a way so as to permit the dividing of the information among different applications.
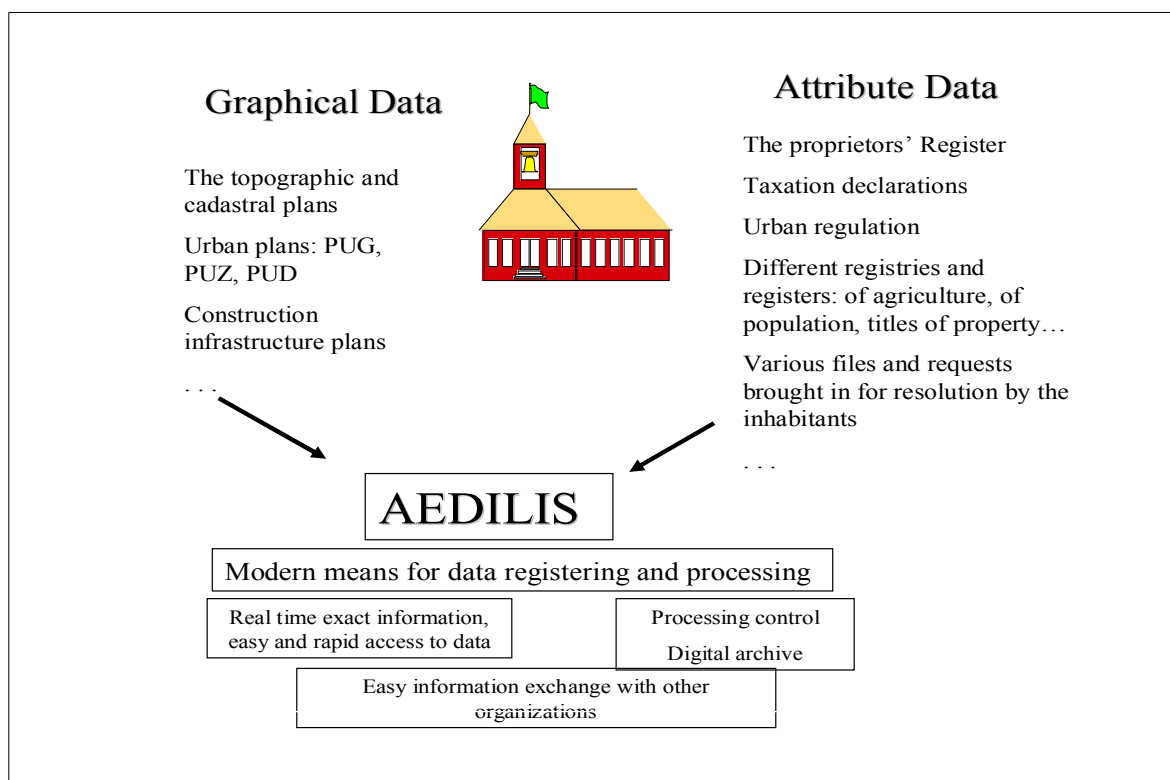
Figure 6. Type of data processing in AEDILIS program.

AEDILIS is a collection of applications with a continuously extension dynamics. In the initial phase the following specific applications with immediate applicability have been taken into consideration:

- registering construction authorizations;
- registering constructions;
- registering agricultural lands within settlement;
- registering real estate properties;
- population registering;
- public property management;
- registering taxation basis;
- functional dividing into zones, digital PUG;
- real estate publicity ….

Example 1. Registering constructions (the following 3 print screen images from the programme)
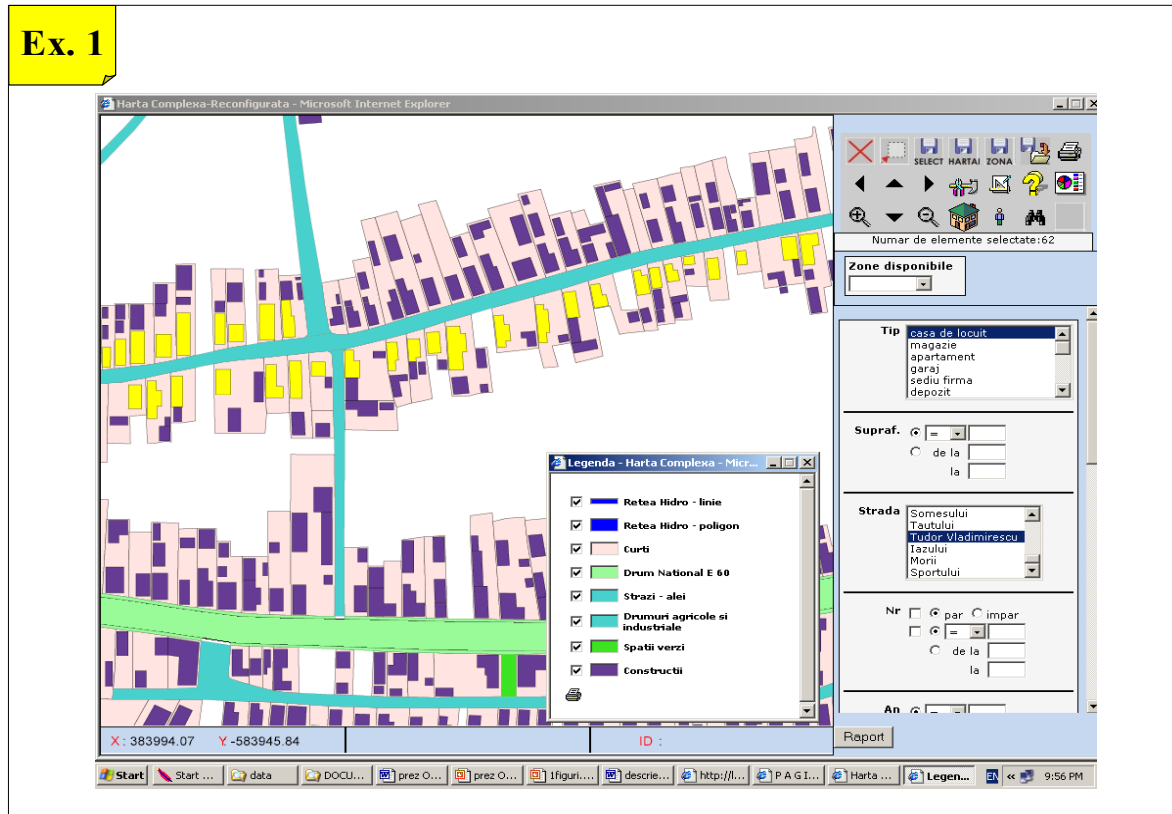
Figure 7. The map of constructions.
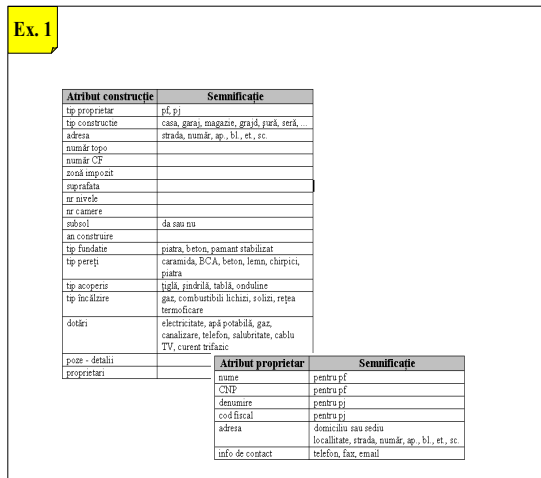
Figure 8. The attributes of constructions.
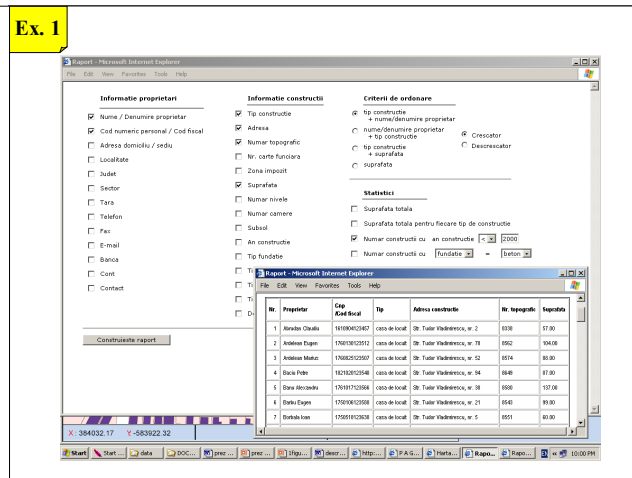
Figure 9. Reports.

The application manages the available information about constructions and their proprietors. We can practically identify on the map the constructions that fulfill certain conditions relative to the associated attributes. Various statistics and reports can be built on basis of the values taken by these attributes:

- constructions with dwelling purposes not connected to the sewerage system;
- establishing the taxation quota according to the zone;
- identification of the proprietors of certain buildings;
- the location of the patrimony buildings, and the street distribution of very old buildings etc.

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Example 2. Registering the construction authorizations (the following 3 print screen images from the programme)
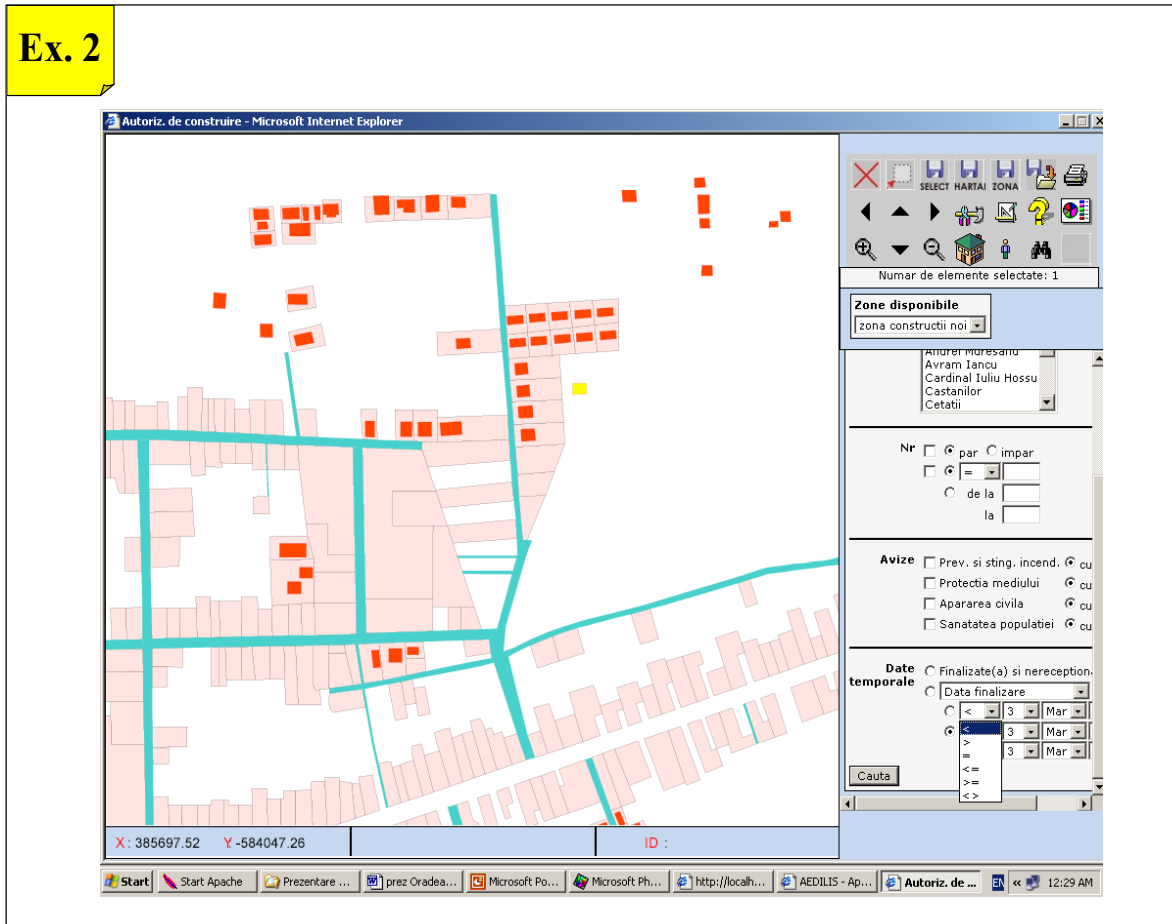
Figure 10. The map of the *in building constructions*.

Figure 11. Attributes of the *in building constructions*.   **Figure 12. Reports.**

The application processes the construction authorizations and facilitates the controll of the conditions for their release. Practically it processes the information relative to the *in building constructions* stratum.

An *in building construction* perceived as finalized will automatically pass to the constructions stratum and its attributes (type, surface, proprietor) will automatically be filled in.

Example 3. Population registering (the following 2 print screenimages from the programme)
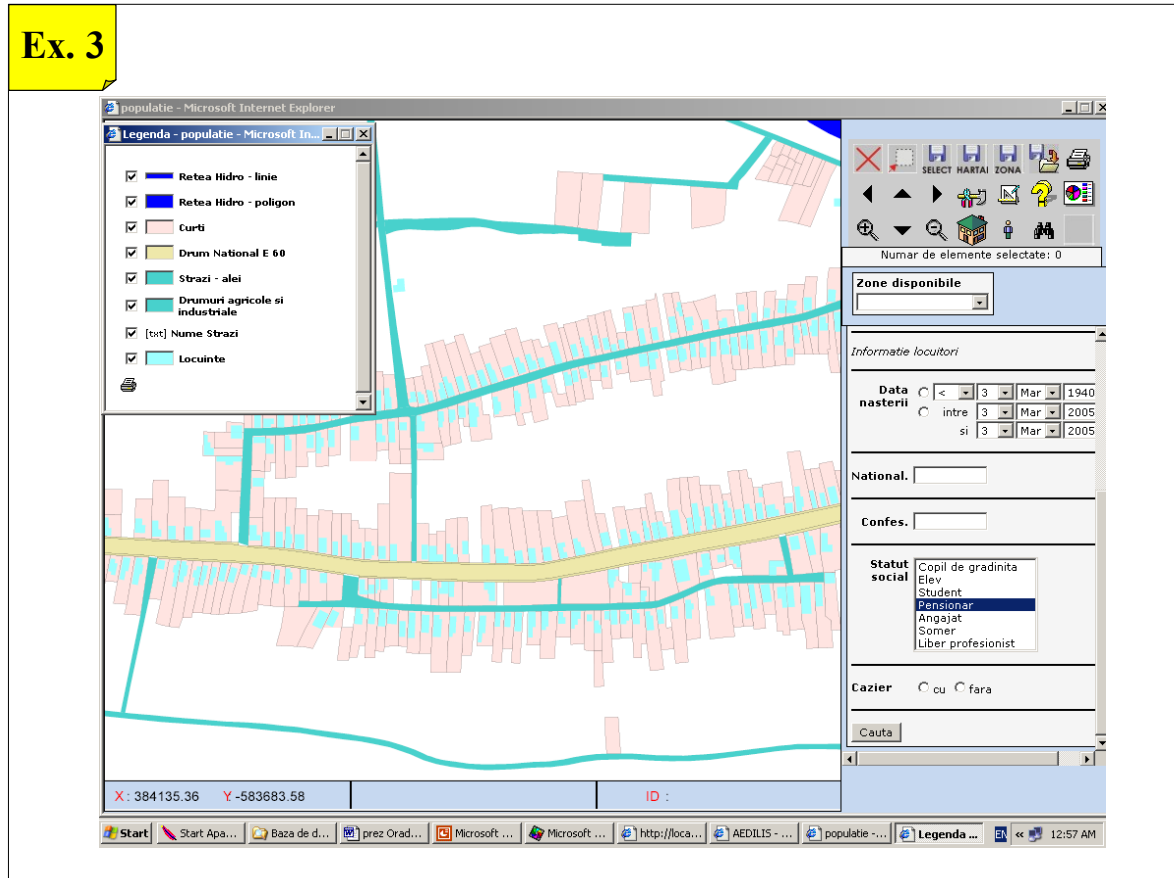

Figure 13. The map of the population registering.

Figure 14. Attributes of the population registering.

A map of active constructions with dwelling purposes stratum is used. New information about the residents is being attached to each graphic object dwelling.

General facilities of the AEDILIS programme

The AEDILIS programme is written in Romanian language, easy to work with and comes to help the local administration staff with a set of applications that are to supervise the management of estate, infrastructure, population, economic agents, taxation, documentation for urbanism, flux of acts and documents released by the local authority.

Hereinafter, we will illustrate some examples that will prove the abilities of AEDILIS programme to organize, to process and visualize data concerning the local administration field. By extrapolating these examples, the AEDILIS programme can be conceptually applied for the public administration specific both to communes and cities.

The AEDILIS programme also allows establishing new specific applications concerning other problems, like: the accountancy of road signs, real estate register, parking lots and garages, commercial spaces, structure of taxation support, and collection of local taxes.
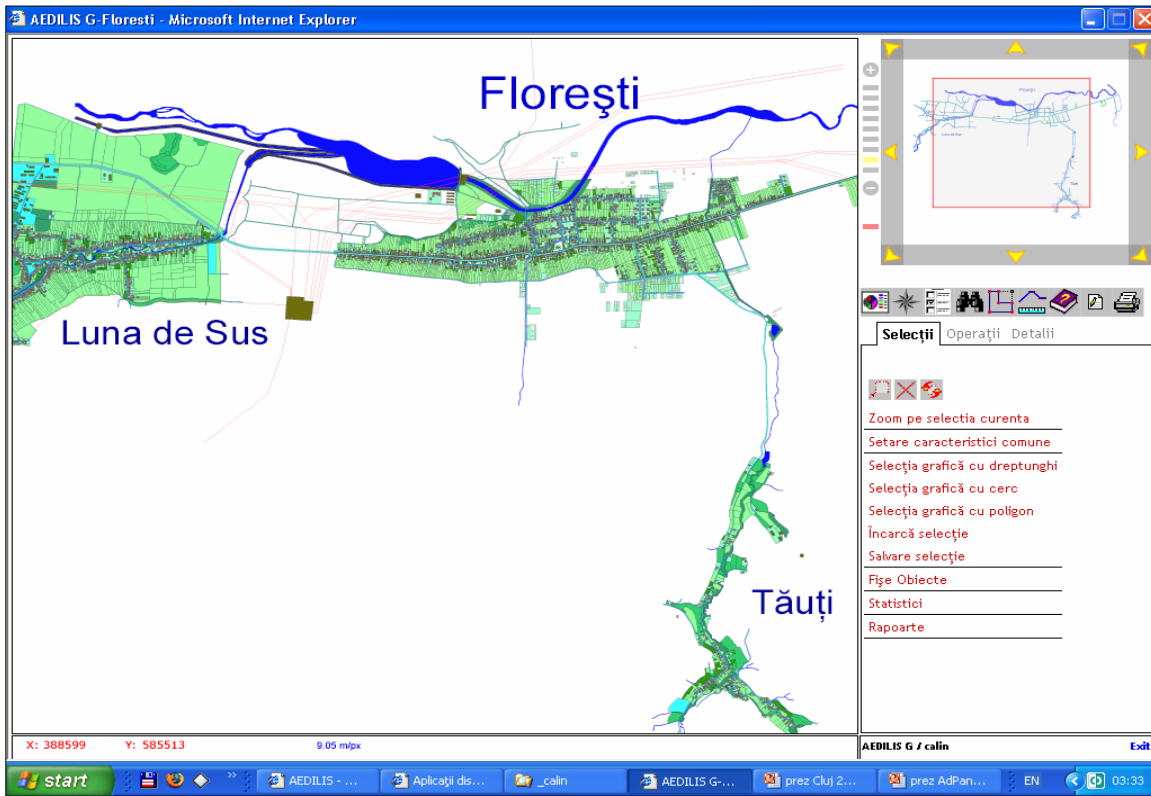
Figure 15. Work interface and windows.
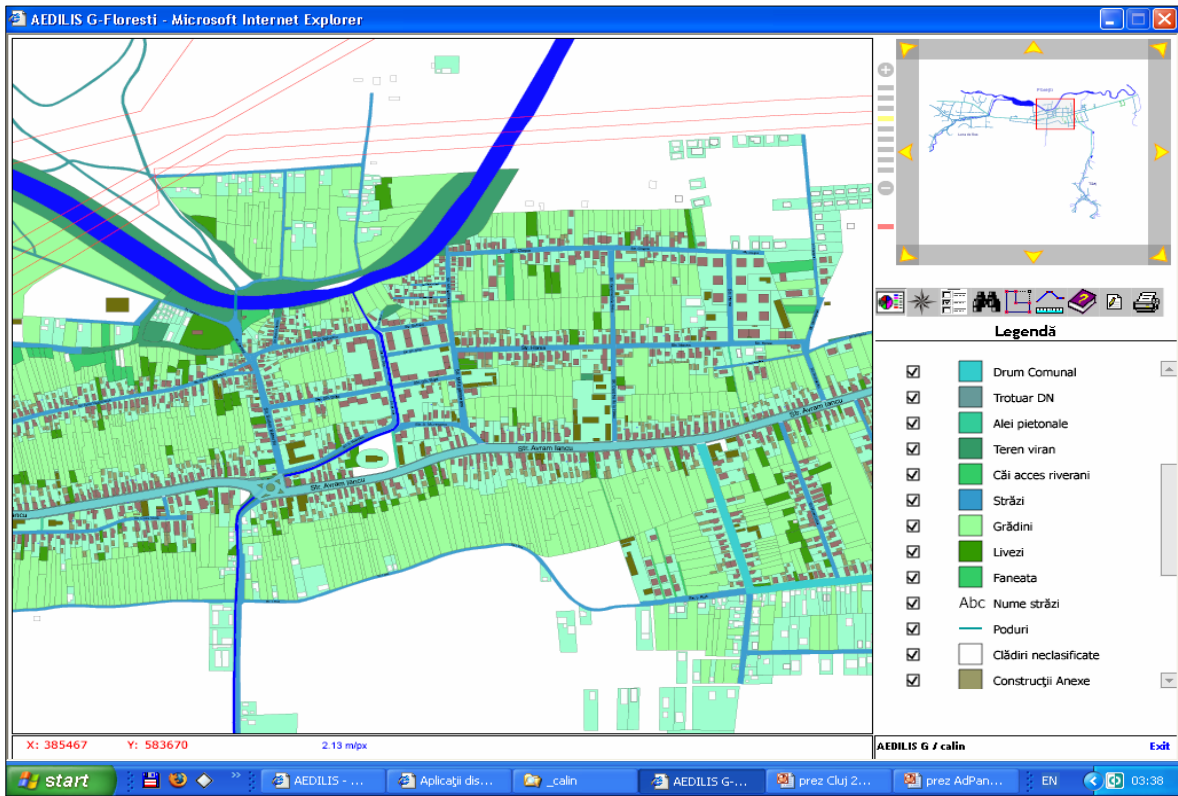

Figure 16. Zoom on a predefined zone.

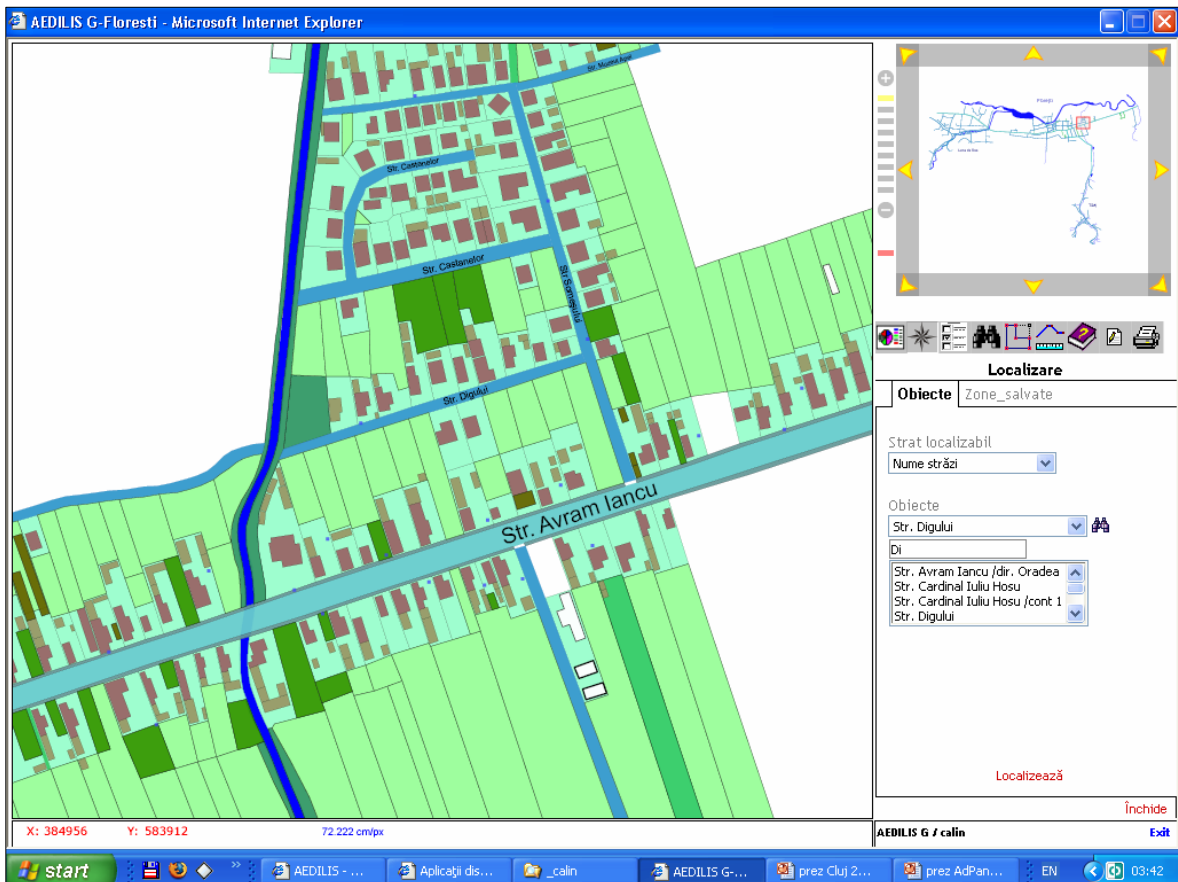**Figure 17. Configuration of legend.**

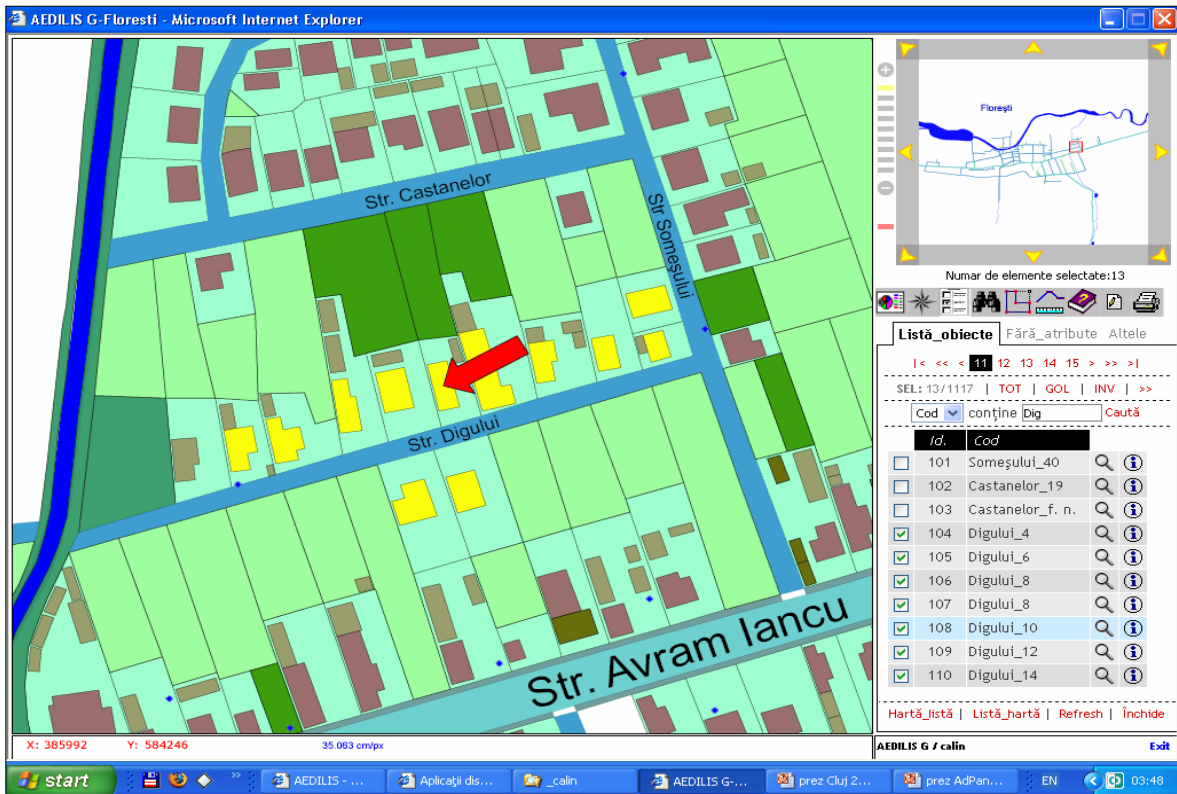**Figure 18. Zoom on an object (a street).**

Figure 19. List of objects from the active stratum: *localization arrow appears when choosing from the list (click on print preview). The checkbox selection in the list is equivalent with the selection on the map (click on the object to select –the current selection colour is yellow).*
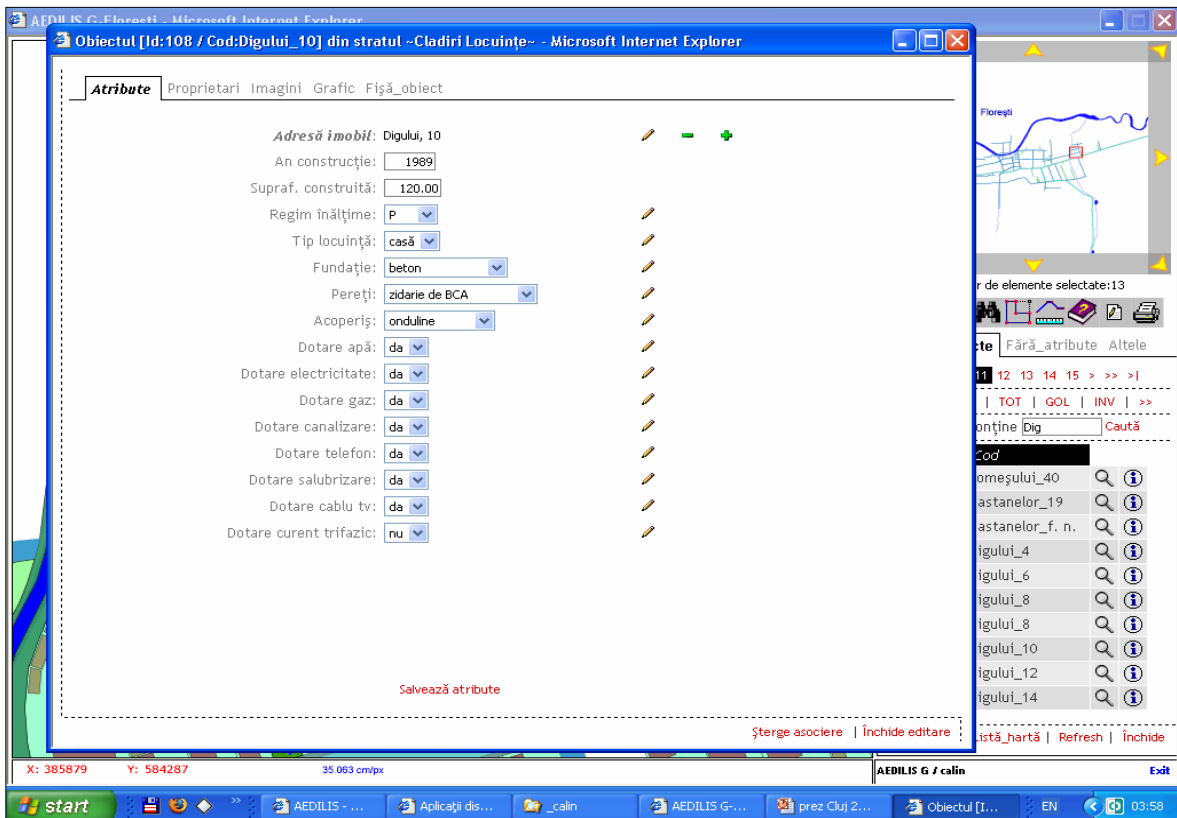

Figure 20. Posting/Editting the attributes of an object (double click on the object or click on the *i* from the object list). The direct attributs with the links to the associated attributes will appear.
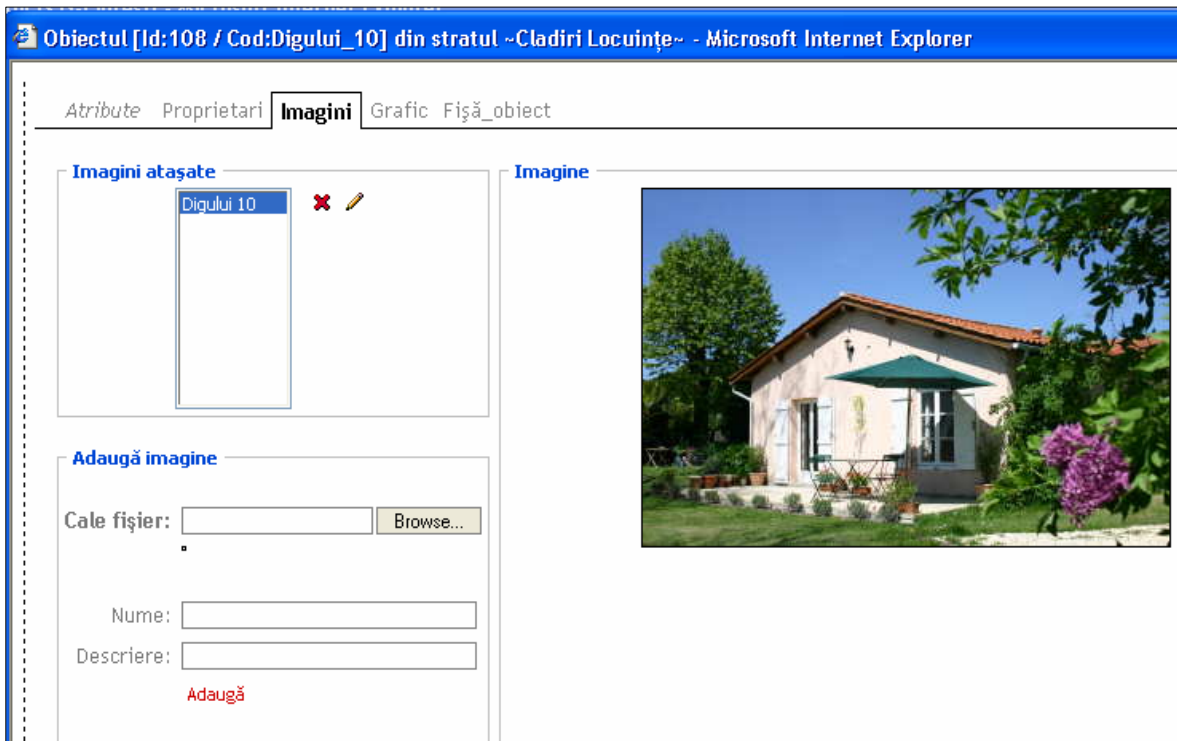
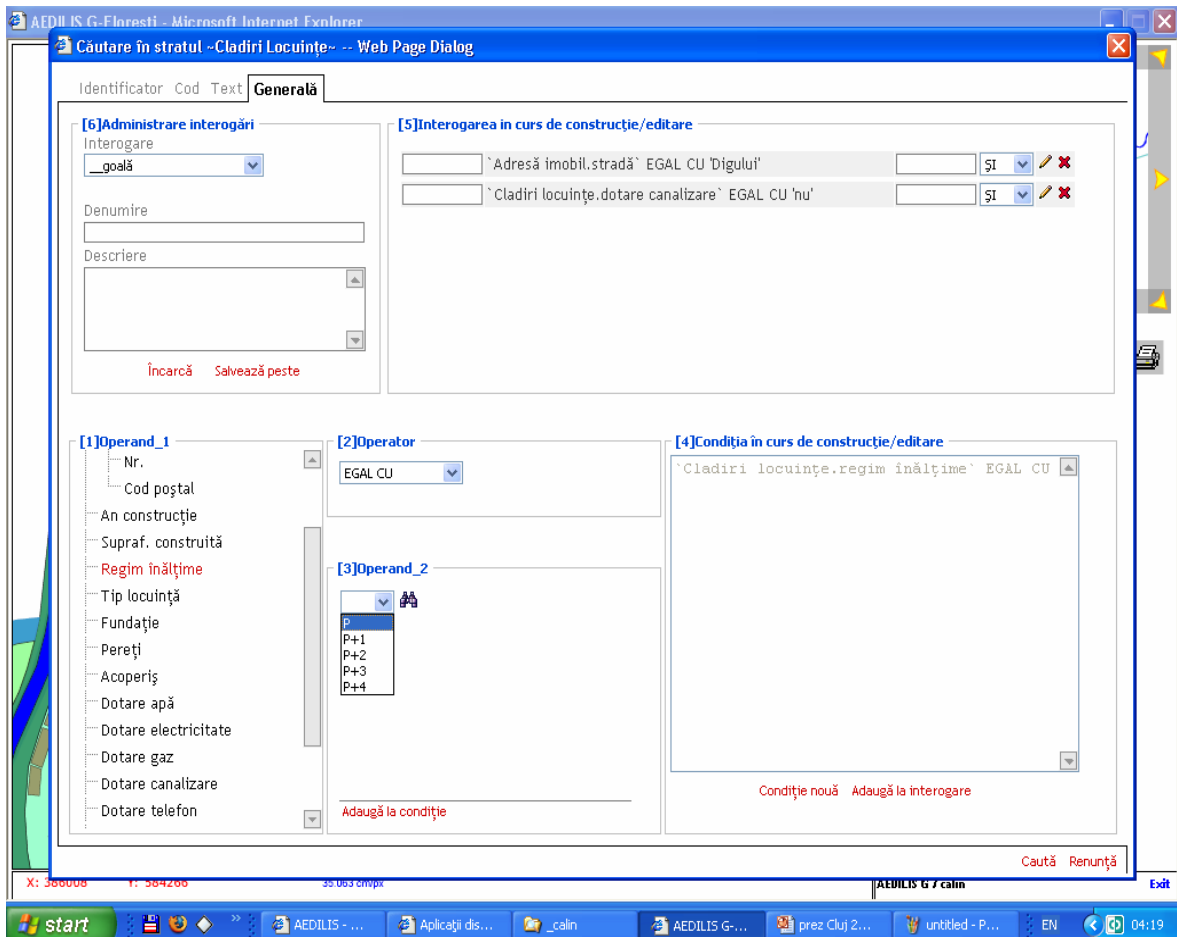**Figure 21. The images are considered attributes of the graphic objects.**

Figure 22. Complex interrogations according to the attributes' value.

Figure 23. The result of an interrogation is shown in a table.

Figure 24. The resulted selection from an interrogation can be logically combined with the current selection from the map.
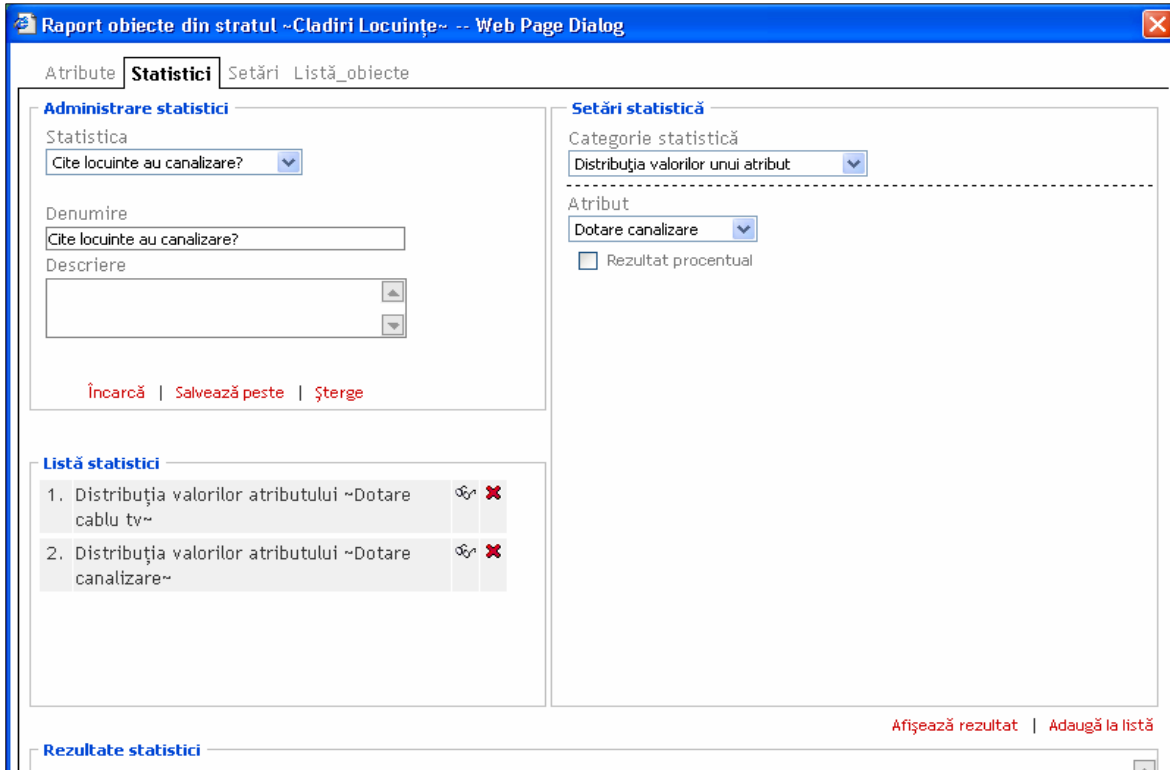
Figure 25. There is the possibility of calculating the attributes of a selection resulting in various statistics.
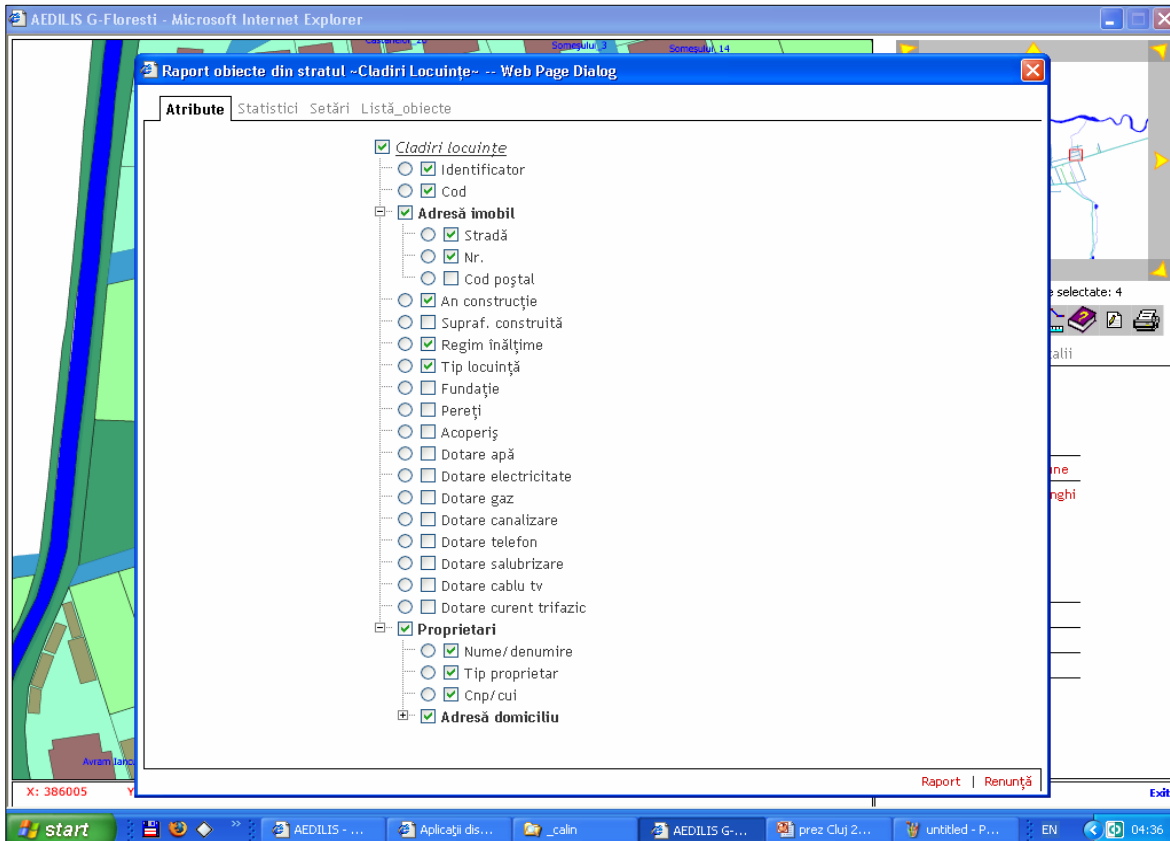

Figure 26. There is the possibility to construct reports on the attributes of a selection – the user chooses the fields upon which the report should be constructed.

Nrcrt	Id	Cod	Stradă	Nr.	Ân construcție	Regim înălțime	Tip locuință	Nume	Tip proprietar
1	108	Digului_10	Digului	10	1989	P	casă	Rotar Vasile	pers. fizică
2	109	Digului_12	Digului	12	1970	P+2	casă		
3	110	Digului_14	Digului	14	1993	P	casă	Rotar Gheorghe	pers. fizică
4	111	Digului_16	Digului	16	1952	P	casă	Contra Anica	pers. fizică
5	991	Digului_18	Digului	18	1933	P	casă	Capusan Gheorghe	pers. fizică
6	94	Digului_2	Digului	2	1975	P+1	casă	Rotariu Doina	pers. fizică
7	95	Digului_2 A	Digului	2 A	1964	P	casă		
8	104	Digului_4	Digului	4	1965	P+1	casă	Rus Claudiu	pers. fizică
9	105	Digului_6	Digului	6	1987	P	casă	Rosu Victoria	pers. fizică
10	106	Digului_8	Digului	8	1985	P	casă	Cazacu Alin	pers. fizică
11	107	Digului_8	Digului	8	1942	P	casă	Rotar Marius	pers. fizică

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Statistici
1 Distribuția valorilor atributului ~Dotare cablu tv~ pentru 11 obiecte:
- '': 3 ori
- 'da': 3 ori
- 'nu': 5 ori
2 Distribuția valorilor atributului ~Dotare canalizare~ pentru 11 obiecte:
- '': o dată
- 'da': 6 ori
- 'nu': 4 ori
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Figure 27. The resulting reports and statistics.

Conclusions

The implementation of AEDILIS concept in the local administration represents a unitary alternative in what the transposition of the administrative act on an electronic support concerns, and fulfilling one of the demands of the policies promoted by the European Union – e-governing. This will lead to a major simplification of the procedures, a more efficiency of the flux of actions within the public administration and the promotion of a transparent administration. The most important gain obtained by implementing this concept would be the keeping up to date of information and data necessary for making a decision, which, in this perspective, will be fully informed. This will significantly diminish the decisional errors and will lead to an increase of efficiency within local administrations.

The opportunity of connecting the local database by a network or internet connection offers the chance of building a centralized database at the level of superior administrative boards, be it at a county or ministry level, and the possibility of getting to know the territorial situation in a real time, thus being able to obtain only positive feedbacks in promoting the measures for territorial planning and local or regional development.

Bibliography

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