

# Lotus Solutions for a Regional E-administration Network

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**Abstract:** This paper presents several aspects of building an integrated Regional E-administration system. This system is a document-oriented, data collecting network, that ensures the link between the Timiș County Council and the local administration and is based on Lotus technology. Several considerations about the Academic expertise in this domain are presented and conclusions are yielded.

**Keywords:** E-administration, software development, system integration.

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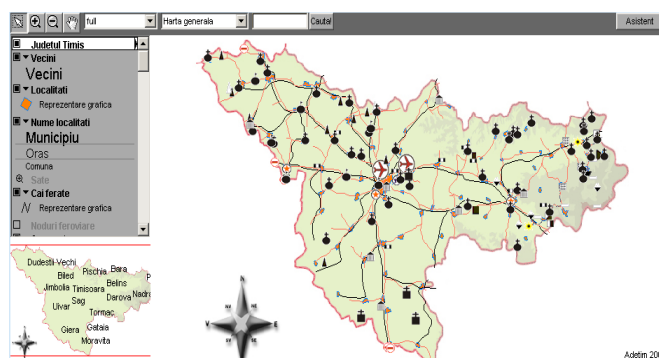
## 1. Introduction

During the last years the importance of the information systems in administration (E-administration) increased enough, our country included. In this domain actions were taken in Timiș County, several of them with important results. Because the economic background, that did not allow a systematic and consistent approach for issuing an integrated system under a reasonable time schedule, several local initiatives try to solve the problem, based on an incremental approach: with relatively small financing, to add different components that solve specific problems, to this integrated system, between the frame of a unitary approach. Thus, ADETIM (Agenția de Dezvoltare Economică Regională Timiș / Regional Economic Development Agency of Timiș County) and CJT (Consiliul Județean Timiș / Timiș County Council) try to access one by one PHARE Projects in order to build in several years an integrated County E-administration system.

An important former Academic expertise (in the „Politehnica” University from Timișoara) for software development of relatively ambitious software systems was a strong argument for the participation of the authors to these successive projects. Relevant conclusions related to the specific conditions of the development of the software in the academic environment are emphasized in the papers [1], [2]. These conclusions show that is possible to develop a large-scale and relative ambitious project with Romanian Academic expertise, but the combination of many financing schemes is required, the team must be highly

motivated, the consortiums are required, the technical solutions must be appropriate for low-cost and rapid development (this explains the use of Lotus software, the use of small and flexible teams, the implication of the students, rapid prototyping, iterative and incremental development, and component-based techniques etc.), as well. All these demonstrate that the Academic environment is (as expected!) important for innovation and promotion of the new technologies.

As a base for an integrated information system useful for the administration in Timiș County and also for encouraging the local economical development, it was developed as part of a PHARE project of ADETIM a project for: relevant data gathering, about local economical development, storing and retrieving these data into a database (retrieval by a sensitive map) and allowing the user to build new interfaces and data import schemes. The Academic expertise was used for the highly qualified activity of analysis and specifications writing. Now-a-days, the application works. The technology used was JAVA, based on the development of an Open-Source solution, in a way that meets the specifications. The used database system is Microsoft SQL Server.



**Figure 1: The interactive map of Timiș County**

In the followings, we present several interfaces from the application [3]. The most spectacular is the interactive map of Timiș County (see Fig. 1). In this map, the user is allowed to overlap several layers with different relevant information for diverse domains (industry, agriculture, roads, railways, tourist objectives etc.). If one clicks the map on sensitive zones, can select different relevant information about the pointed zone. The user can select a larger zone, by drag with the mouse, and obtain synthetic information about this, as well.

Lessons learned following the development of this system are:

- In the (financial and time schedule) restrictive frame of a (small) PHARE Project is difficult to charge with analysis and design to different entities;
- A company (business-oriented), due to its the specific market-orientation, has not always the availability and is not maybe motivated enough for finalizing the systems in the imposed conditions;
- Is more useful to build local consortia, eventually with Academic staff, than to resort to companies, especially located elsewhere.

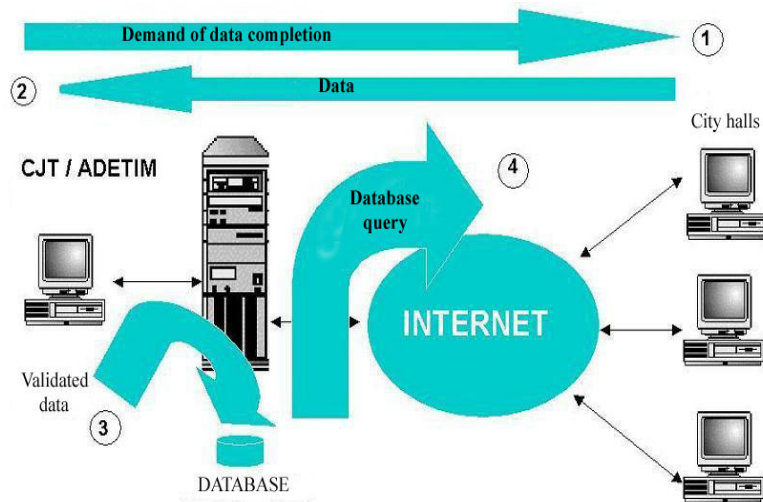
These lessons grounded the participation of the Academic expertise to the following project. On the other hand, this first E-administration project allows to the Academic staff involved to learn about E-administration and the environment of the customer. In this way, the expertise in the field of the Academic staff increased and a base for integration of the successive projects in a unitary approach was created [3].

## **2. The Timiș County Network for Communication – cooperation between the Local and County Public Administration**

A PHARE-CBC financing allowed to CJT and ADETIM to develop a system, called SICIRAP („Sistem informatic de cooperare interinstituțională în rețea, la nivelul administrației publice județene și locale, pentru dezvoltare și promovare economică și interculturală în regiunea transfrontalieră a județului Timiș -

Ro și Csongrad –Hu” / “Information system for inter-institutional co-operation in network for the local and county public administration for economic and intercultural development inside the cross-border region of Timiș County - Ro and Csongrad County – Hu”) as part of a future integrated E-administration network [3]. This step also have integrate the former interactive map system as seen in Fig. 3 (so, this application accesses the database of this project, called ADETIM in the figure), allowing to use the new system to collect valid data (useful for promoting the local economic development), from the city halls of Timiș County, as well.

We intended to establish a network (a distributed information system) for communication – cooperation between the local public institutions and the institutions concerned with the economic development of Timiș County, as an efficient instrument for data transfer and promotion at regional and cross-border level of the economic cooperation opportunities in Timiș County, able to store, process and display information of public-private interest. This network will be the infrastructure that will ensure the possibility of several special nominated persons from the local public institutions (30 city halls) to connect with authentication to a central server and to access the appropriate forms that will allow them to send information. This information is collected on paper support, so far. This project will establish an automated data collecting system and will have other useful functions as: centralization of the data in a protected database, access to automated reports, public access to the allowed information via a WEB site, selective access to the database accordingly to the role of the users. The project will consist from parts of hardware and software development and a final putting into operation and training.

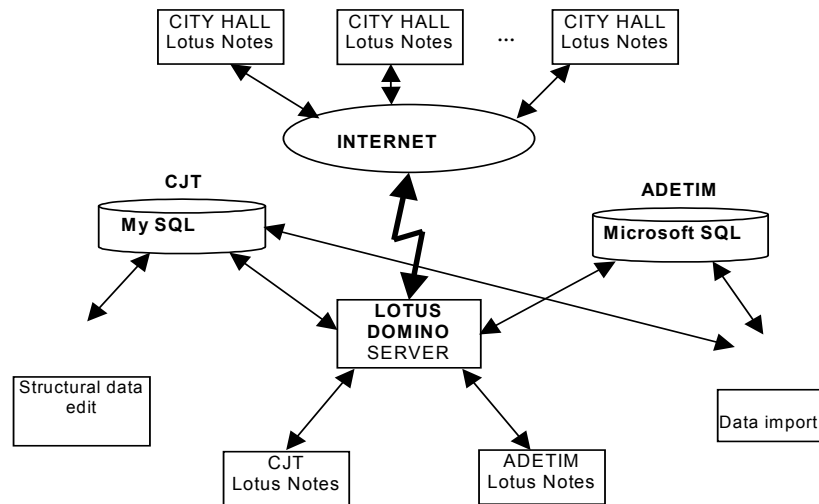


**Figure 2: The basic scenario for collecting information in the SICIRAP system**

The basic scenario [3] of collecting information is presented in Fig. 2. One can see the data collecting cycle there:

1. A CJT/ADETIM type user selects from the available list one of the document types allowed and initiate a data collecting cycle: he/she fill several standard data in the header of the document then initiate the distribution directly into the “Required Documents” folder for each of the clients from the City-Halls (# 1 in the figure)
2. The City-Hall type clients fill the required data in the fields of the document then send back this; a copy is also saved in a specific local folder (this is # 2 action in the figure)
3. The CJT/ADETIM client analyse then validate the collected information; if considered, he/she resend the document for filling again (thus, the information is not validated); the validated information is saved into the external databases.
4. A consultant client is authorised to recall the data in order to display reports based on different filtering criteria, of course, related to access rights set by the Administrator.

The system is presented in Fig. 3. The solution is based on Lotus, thus the core is a Lotus Domino Server. One of the external databases is MySQL (in the left). The other one belongs, as seen, to the former project. As a special requirement of the customer the new database stores data in an object-oriented way.



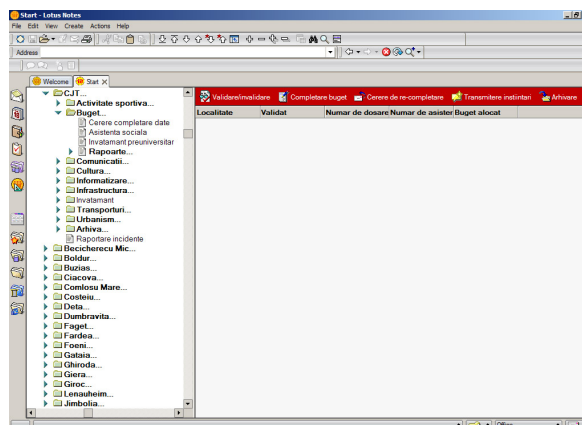
**Figure 3: The SICIRAP System**

Thus, a table codifies the tree (the classification, the structure) of the information, and at the last level (leaf) this matches to the documents (in the sense from Lotus). These have more fields, each described in another table, linked to the first one. The information itself is stored in several simple-structured tables, each with an index and the information itself. The information retrieval is based on tree log tables, one that marks each recording session (i.e. a data collecting cycle), one that collects the specific data for each document and the last one for each field. The target table (for data storing) is selected due to the data type of each field (from the fields table).

In the system two other autonomous small applications are required: one for data import from external sources or between the two databases of the system, and the other one for filling the tables described above, that codify the information structure. This editor is useful especially when the Administrator intends to introduce new documents in the system.

The following figures illustrate the scenario described above.

In Fig. 4 the interface used by the CJT/ADETIM client is presented. This client uses the interface for data collecting cycle initiation and then for validation of these.



**Figure 4: The Validator Client's user interface**

In Fig. 5 the interface of the City-Hall Client can be seen. This client can see his own history (the documents already filled with data, structured in specific domains, accordingly to the names of the folders) and the documents waiting for filling.

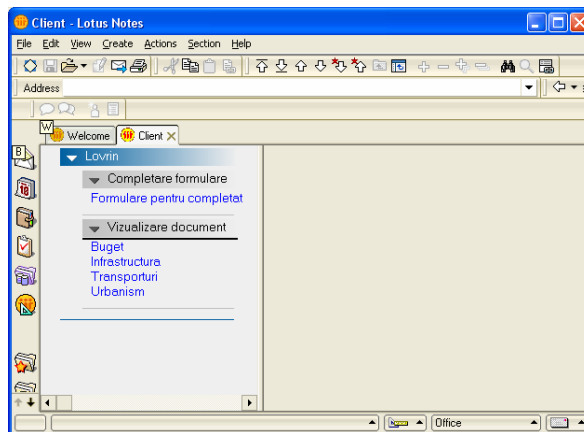


Figure 5: The City hall client's user interface

In Fig. 6 and 7 two examples of data collecting documents are presented. These include fields where the user inputs the required information.

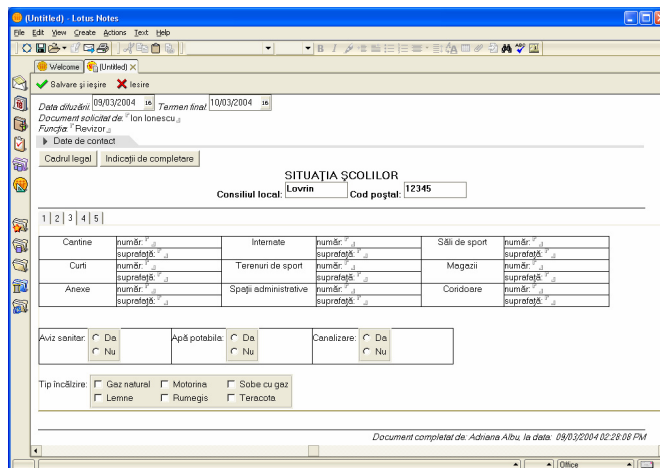


Figure 6: Example of information collecting document (water supply services)

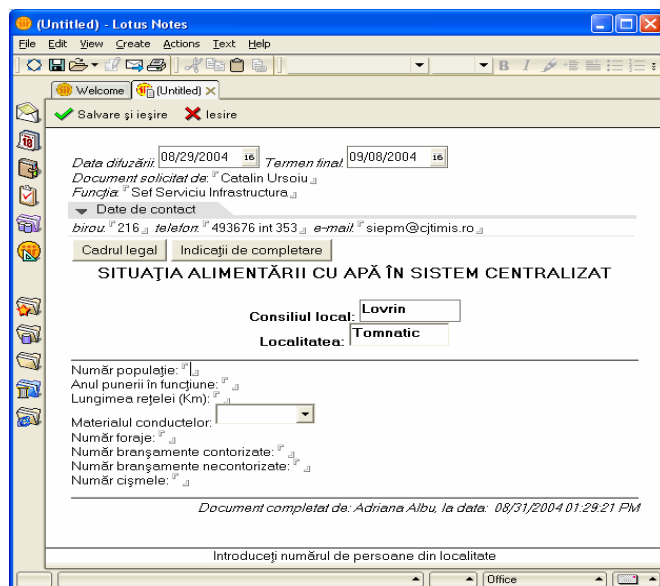


Figure 7: Example of information collecting document (schools)

The next figure (8) presents a synthesis interface, with the collected information from the 30 city halls. The specific client (the Validator, i.e. one who plays the CJT/ADETIM role) can see all the collected information and accept or reject it.

This system is nowadays implemented.

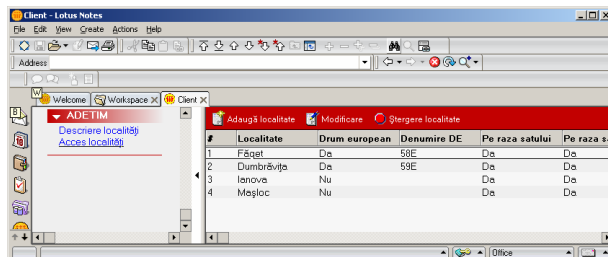


Figure 8: Synthesis interface (general information about localities)

### 3. Technical Aspects

The user interface refers to documents contained by several domains (like sport activity, budget, communications, infrastructure, learning, transporting, urbanism, etc.) and sub-domains. There are several types of users: administrator, validator, city hall user and general user. Each user should access only the specific data regarding he/she activity. Thus:

- The administrator has full control to the entire database.
- The validator client initiates data collecting cycles and validate the data transmitted by the city halls clients. A validator client has access only to the domains he/she belongs to.
- The city hall client fill the required data then send them back to the validator client. A city hall client has access only to the documents regarding to the city hall he/she belongs to.
- The general client accesses the system from a web browser and can only generate custom reports. A general client has no access to the Lotus Notes database, but to the MySQL records that are made public by the administrator of the system. The reports based on the records from the MySQL database can be accessed in any web browser.

Considering these aspects, the SICIRAP user interface is built in Windows Explorer style, having a tree view selection of domains and sub-domains in the left panel and a view of the selection in the right panel (as seen in Fig. 4). The left panel was built using an outline as design element in Lotus Domino Designer. This outline fits exactly on the folder structure of the Lotus Notes database. Checking the “Show folder unread information” option in the properties of the outline, the folder structure looks like an e-mail folder structure, indicating the number of unread documents in each folder.

The right panel shows the list of documents in the folder selected in the left panel and several specific actions that manipulate data in the folder (document reading, archiving the folder data, initiating a new data collecting cycle, data validating, auto-response sending etc.). The actions that were common for more types of folders were made shared actions. In general, the actions were written using Lotus Script, due to its similarity with the Visual Basic language.

All the data stored in Lotus Notes database are replicated in a MySQL database. When the data from a folder are archived, these data are copied in an archive folder in Lotus Notes database and transferred in MySQL database. When a user generates a report, the data in the report are filled from MySQL database. That means that the reports contain only the data that were archived previously. A Lotus Notes client does not have direct access to the MySQL database. The only way the users access MySQL database is through agents. An agent is a user procedure that runs on the server. Agents make the connection between the Lotus Notes database and MySQL Database.

The users of the SICIRAP system have the possibility to generate custom reports. The administrators, the validators and the city hall users generate the reports they need directly from Lotus Notes. A general user has access to reporting interface from a web browser, by clicking a special link from the CJT website.

The results of the reports generated from Lotus Notes are displayed in a view (similar with a table sheet), but the results of the reports generated from web browsers are displayed in a HTML-generated table. A Report example, displayed by a classic Internet browser, is presented in Fig. 9:

Raportul a fost generat de Dorin Berian pentru documentul AlimApa

*Nu s-au pus conditii asupra campurilor*

Localitate	Anul punerii in functiune	Lungimea retelei (partea din otel)	Materialul conductelor	Foraje	Lungimea retelei (partea din polietilena)
Lugoj	1970	0	otel	0	0
Timisoara	1965	0	polietilena	0	0

**Figure 9: A WEB report with SICIRAP**

The users also report the incidents in the exploitation of the system by filling in the appropriate Lotus forms. The list of complains is centralized for a special Designer user. In this way, the maintenance is improved.

#### 4. About the Academic Expertise for E-administration

As seen in [2], the academic environment allows the experiment more than other, due to the availability of the students for innovation and high motivation of the academic staff for R&D activity. In this respect, the development of the SICIRAP system described above faced with the following activities:

- The preliminary activity with the team involved referred to the Domain know-how and to the presentation of the former system; an initial team of young academic staff and students was submitted to a formation period about these;
- Then, the team established their own Version Management system on a Server, and developed their Document set;
- The following activity was the writing of the Specifications, by establishing discussion couples with the representatives of the client;
- Then, small pilots allow them to experiment the specific solutions;
- Finally, the classical way of the software development was followed for developing the components and integrating/testing them.

An important advantage was the experience gained with the previous project. Although the team was implied only in the writing of the specifications, this experience allows us to boldly approach the new system. This experience allows us to integrate the results and the application itself, into the new system. In this way, we succeeded to fulfill the specific requirement of the client, of integration of all the applications into a unitary approach. Without this continuity we think would be much more difficult to ensure the conditions for this integration effort.

Based on other experiences, we underline one important advantage of using Academic expertise: this type of co-operation is not restricted by the usual business limits. Thus, the system resulted is open to new developments, the source code is available to the customer, and the Academic environment is able to ensure the training needed from the customer, than this intends to develop the system, or to adapt it to new requirements. A company rarely accepts to give know-how and source-code allowing the customer to develop the system by himself. As an example, another PHARE Project approached by ADETIM has as a result a Lotus-based system for Real Estate Advertising and Trade (in the sense of Local Development, i.e. for the business opportunities in the field). But this system, issued from a Company, is proprietary and closed one. The customer will have major difficulties if he will intend to develop or change something in this system.

We think another major advantage of using Academic expertise for developing E-administration applications is that the Academic staff is able to learn very quickly the required technologies, and generally speaking is up-to-date in technology. In the second project the entire team was able to learn in 3 months (in addition to ordinary didactical and other duties) about Lotus and especially design in Lotus.

## 5. Conclusions

This paper describes the use of Academic expertise for the development of an information system useful in Local administration. The specific aspects of this approach are outlined, especially the advantages that allow to cover on medium term the need to integrate all the systems in a unitary approach. In this way, the continuity and the consistency of the development are guaranteed.

The experience of the development of the two generations of the integrated systems shows that is possible to develop professional applications or even entire information systems in the Academic environment. The use of different financing schemes, of the personal connections, of the different technical and software development management approaches that encourage the rapid development, of the students for experimenting solutions or even as developers are factors which contribute to the success of the development. This development has several benefits for the academic staff, from professional (improving the skills, doing research) point of view. This experience allow a unitary approach in order to ensure the continuity and the integration of the results of these projects into a coherent, useful system, with open and clear perspectives of its development, as well.

## Acknowledgements

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