Citizen information services using Internet technologies

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Abstract- **This paper presents a Web-based, database-oriented set of applications, namely "Public Information" and "Electronic Voting", to support information services (exchange and sharing) between Local Government authorities (Region, Prefecture and Municipalities) and the citizens. The whole set of services developed exploits Internet and Extranet technologies enabling asynchronous cooperation, manipulation of information from heterogeneous sources, security and easy administration, providing in parallel advanced telecommunication facilities. We propose an innovating approach for submitting questions, remarks and comments from citizen to Local authorities (prefecture) and receiving response/correspondence in a reasonable period of time (Public Information) and, on the other hand, a smart way to support voting on common subjects in which all local community is interested in. The system included applications and services were planned and implemented to be easily expandable to any organizational chart of any Local Administration. Both applications are based on state-of-the-art software platforms, integrating WWW and database. The system aims to become a pilot in future efforts relative with distribution and management information between and within different types of local authorities.**

Keywords- **administration services, on-line services, public-private relationships, databases, Internet**

I. INTRODUCTION

The explosion in popularity of Internet underscores the tremendous potential that now exists for rapid, networked sharing of information across one region (e.g. one municipality, one country, all around the world etc). Tools, such as World Wide Web (WWW) and various Internet browsers make the Internet readily accessible even to novice computer users. Moreover, the WWW has proven itself to be a cost effective means to provide information sharing and exchange.

As access to the Internet grows the cost per person of providing public access to records and information diminishes. Therefore, it is a long time since not only can we provide access to information, but also we can provide program services online.

Democracy based on citizen's participation in the procedure of decisions making will always be a main priority for social units, like local societies, whole states or even communities of nations. Nowadays, the reality of "Information Society" and the flyer globalization of it will potentially affect the way of taking decisions with citizens' interaction, permitting the public to take part in the political procedures.

"Public Information" as well as "Electronic Voting" were developed in order to improve everyday's contact between citizens and local authorities and amplify active citizen's participation in the reception of decisions. The need for such applications came up due to increased requirements to encourage even more citizens' participation in reception of decisions and, generally, because of tumescent interaction between citizens and local administration daily. This interaction should be enhanced by powerful and smart interference capable to alter the relationship between citizens and local authorities.

The rapid growth, widely varied population density, and cultural diversity create future challenges for service delivery. "Public Information" substantially supports electronic interaction and the exchange of messages between citizens and the Prefecture of Corfu. This interaction is undertaken using software tools to save time and cost.

In addition, the provision of electronic voting via Internet may still be some way off, but the various pieces of the technology puzzle needed to make it a reality are now close to being in place. Internet voting is already widespread in a variety of forms, some serious, most not.

This work presents a Web-based, database-oriented set of applications, namely "Public Information" and "Electronic Voting", to support information services (exchange and sharing) between Local Government authorities (Region, Prefecture and Municipalities) and the citizens.

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"Public Information" offers the facility of sending a message (question, remark, comment etc) to Prefecture of Corfu (towards a well-known department/public service) and receiving a response/answer by the Prefecture. The use of this embedded application is restricted (username and password controlled) and can be accessed via standard, unmodified web-clients (as Internet Explorer 4.0 and Netscape Communicator 4.x) using the login/password authentication scheme. After a successful registration, citizens can send a message (or multiple messages) to the Prefecture of Corfu, without using an email account.

"Electronic Voting" is used by local authorities in order to collect citizens' opinion on a common matter of the local community. All citizens can participate in this procedure by adding their ballot on the specified voting subject. After ensuring results validity (a representative human sample participated in a piece of voting) system administrator extracts the final results and the Prefecture determines its politics according to public trends on the specific subject.

Both applications offer secure and easy administration, providing in parallel advanced telecommunication facilities.

This paper is organized as follows: in section 2 there is a short description of the project context. The third section provides details of the system architecture, specifically presenting analysis, design and implementation issues. In section 4 the functionality offered by the system is outlined. The last section summarizes conclusions elicited from our work and presents future work issues.

II. DESCRIPTION OF THE PROJECT

A. General Overview

Many Local Authorities have already developed web sites containing mostly information material. In detail, the issues that are hosted in the Web Servers of these regions are the following:

- General information about the head (Prefect, Prefectorial Council etc) of the Local Administration. This information includes curriculum vitae, photos, initiatives, programmed presentations, greetings and speeches

- The structure and organizational chart of the services been provided as well as the meetings, decisions and announcements of the working staff

- Enlightening information for the services been provided and the way to communicate with these services (telephone numbers, application forms etc)

- General information about the local region economical activity (industries, exhibitions, conferences etc)

- Tourist information (sights, historical flashback, hotels and reservations, transport information)

On the other hand, only few web sites offer more enhanced facilities, as Message Board or even search and indexing capabilities. Some sites included a Guest Book, for making comments on the whole content of the site. Also, numbered sites hosted an application form, which is submitted to the responsible person of each department/address of the organization (Prefecture, Public Service etc).

Nowadays, citizens have the need to obtain general information, submit questions and remarks, and get in contact with the right administration and service, as far as local authorities concern, quickly and easily. On the other hand, many claims have been made on the Internet's role in the democratic process.

In both cases, the development of a system that provides an environment and a mechanism for efficient information exchange, when needed, can make an organization more competitive and effective. To achieve this the developed system must be able to satisfy a number of requirements, specified by the needs existed in daily interaction between citizens and public authorities.

The information dispersal and generally citizens' interaction with local authorities are characterized by the following drawbacks:

- The geographic dispersion of governmental offices, the complexity of procedures even for simple affairs and time consuming operations confuse and tire the citizen who desires to be served as soon as possible

- The inability of local authorities to provide valid information in a relative small period of time, due to the fact that the retrieval of the right information involves the interference of more than one conveyors, which entails heavy discomfort and delay

- The high degree of face-to- face contact and interaction between the citizen and the public servants, even for straightforward affairs, and the complicated structure and operation of the administration mechanism. Modern bureaucracy comprises the main expression of this mechanism

- The aim to minimize transportation costs and financial and human resources can be achieved through a process avoiding the immediate contact between local authorities and the citizens (e.g. distribution of various application forms)

- There is no easy to use and modern technical way to support the capability of expression citizen's opinion, without distinction and constraints

- The capitulary of Local Administration is still weak, mainly because citizens' participation is little or in some cases negligible. Engagement of the citizens could be enhanced by participation in voting procedures about local matters

- The rather small percentage of citizen's familiarization –in the "Information Society"- with modern technology, particularly in middle and older ages

It is obvious that there is the necessity of providing automatic internal operations and promoting the communication facilities among the citizens and the municipalities of Prefec-

ture of Corfu, e.g. there must be an effective and fruitful communication mechanism. On the other hand active participation of the public is needed to enforce democratic process, although a set of drawbacks tend to minimize their involvement.

The main objectives of the system are:

1) *with reference to "Public Information"*

♦ The minimization of number of citizen's visits at the administrative facilities of Prefecture of Corfu. In this way, the workload and work stress of clerical personnel of Prefecture of Corfu will be eliminated. Moreover, with the use of "Public Information", citizens will collect the desirable information without the delay exists in almost every public service

♦ The bypass of modern bureaucracy mechanism, since the interaction between citizen and local authorities would be achieved with modern electronic way without the intervention of "sequential" help desks

♦ The provision and presentation of valid information in a reasonable period of time and in an efficient and easy to use way, since the information which will be given to citizen will be filtered by all involved members that belong to the respective management area of Prefecture

♦ The provision of services of equal adequacy and quality inconsiderately to all citizens that use Internet

2) *with reference to "Electronic Voting"*

♦ The public opinion poll on common matters and record of public trends through an efficient, easy to use and up-to-date (as far as technology concerns) way for expression of public opinion

♦ The provision of directives, through the expression of public trends, towards local authorities, in order to ensure valid and irreproachable results taken from voting. The final results of a voting will help in taking future decisions, for instance, for the beginning of works for improving the quality of drinkable water in an area

♦ The best possible citizen familiarization with modern technology

♦ The employment of a pioneer way of holding a voting with the participation of a representative percentage of people in the bounds of a local society

♦ Carrying out a voting ensuring privacy and uniqueness as in real world voting

In order to confront the above issues in the whole Web-based, database oriented, information system has been designed and implemented. This system is based on Internet and Extranet. In brief, the services provided by the system are:

1) *with reference to "Public Information"*

♦ submission of a registration form in order to use this service

♦ send a message (question, remark, comment etc) to a department of the Prefecture

♦ receipt of a response sent to the citizens from Prefecture, after a predefined period of time

2) *with reference to "Electronic Voting"*

♦ completion of a questionnaire, selecting an answer from a potential set (multiple choice)
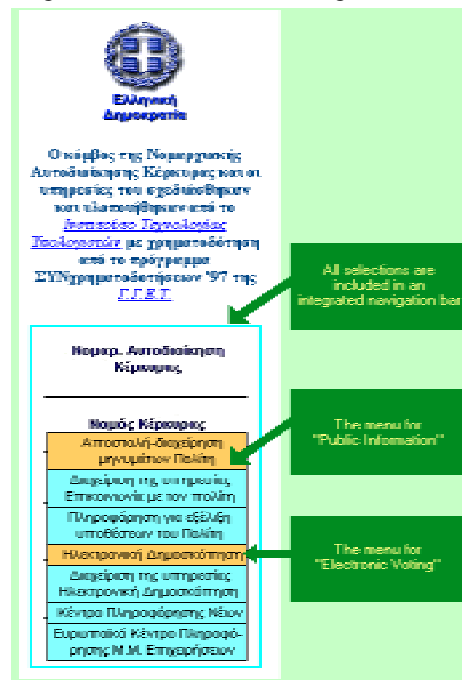
♦ viewing the final results of a voting

Fig 1. The Java-applet used to select the desired application[4]

B. Infrastructure

The main concept of the project was the design and employment of an information system based on Internet and Extranet technologies.

Based on the above concept, the two applications where developed to satisfy the following needs: the former application to provide (full-duplex) electronic communication among citizens and several departments/addresses of Prefecture of Corfu, the latter to give a snapshot of public opinion on common subjects for the local community.

The applications are based on the provided services and functionality of World Wide Web (WWW). The WWW Servers have been developed inside the municipalities of Corfu and Prefecture. The WWW Server of Prefecture provides the central node of communication, processing and reference, speaking for the two applications.

As a matter of fact, the Prefecture and the municipalities consist an Extranet, a private data network that uses the public communication structure and provides Internet services.

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[4] Only Greek version available up to now

The Web Server of the Prefecture will provide the communication with outside municipalities/organizations as displayed in Fig. 2.
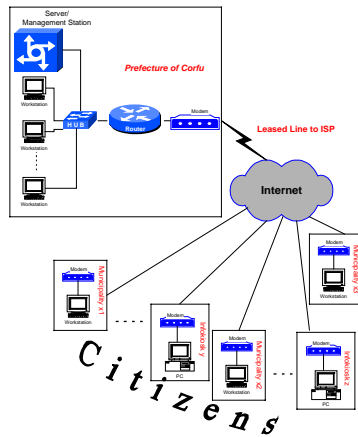

Fig. 2. *Communication Infrastructure*

III. ARCHITECTURE OF THE APPLICATIONS

A. *System Analysis*

The design, developing and implementing of the set of applications was based on a user needs analysis conducted, using interviews with the employees of the Prefecture of Corfu and questionnaires predefined in detail. This survey led to the following functional specifications for the system:

♦ There must be a predefined check mechanism for all users' accesses. This mechanism must always inform the user (citizen) for a successful or unsuccessful attempt when he/she tries to use the provided services. This interaction helps the user to get easily familiar with the applications and not be bored and feels embarrassed.

♦ There must be a Data Base Management System (DBMS) that works behind the Web Server and provides the whole system with an efficient way of manipulation. The DBMS will keep all the statistical data needed in order to retrieve citizens' correspondence to new services.

♦ The whole system should provide a user-friendly user interface. One way to achieve this is to access the applications through classical browsers, widely spread nowadays. There must also be an easy mechanism for localization of partial facilities of the application, e.g. by one mouse selection

♦ The use of the applications should be possible from all citizens who have access to Internet through a personal computer (home, work etc) or an infokiosk, without (necessarily) having an email account (mailbox)

♦ Provision of a "general-purpose receiver" of a message for the case citizen is confused and does not know where to address his/her questions and comments (with reference to "Public Information" service)

♦ The presentation of final results of an electronic voting snapshot should come true after the expiration day of the voting and not during the holding of a voting procedure, in order not to affect citizen's opinion on a specific common matter

Additionally, there are some non-functional specifications that are met in order to ensure the quality of the system applications and that fall into the following categories.

1) *Performance*

♦ 24 hours availability of the system.

♦ When the system data change, the updated data will be immediately available to the users. Users must be aware of the last changes (for instance via an electronic message)

♦ Collection of statistical data, in order to study citizens' correspondence and interesting for the services (the applications)

♦ Maintenance of a questionnaire form, asking citizen to evaluate the functionality of the system

2) *Safety*

♦ If an application fails it must not affect the other applications

♦ The system must be able to recover from a system failure within a reasonable period of time

♦ No information is to be lost if the system fails

♦ Usage of backup mechanism in order to ensure the integrity of data

3) *Security*

♦ The consistency of the data must be ensured

♦ Preserving system from inappropriate users' behavior

♦ Preserving system from unauthorized access

♦ Provision of an automated information mechanism that will inform system administrator in fixed time intervals

♦ The option for encryption of the data transferred must be provided

4) *Maintenance*

♦ Small changes of enhancement, extension or adaptation can be performed without necessitating redevelopment of the system and without the need for an interruption in its operation.

♦ The whole system architecture must be open in terms of smooth integration with new products or new services (or enhancement of existent applications)

5) *Environment*

♦ The inexperienced user must be able to use the system within a short period of time

♦ Daily user's interaction with the whole system and submission of remarks in order the existent functionality and facilities to be improved

♦ Training of new system administrators for exploiting the system in the wide national dominion

B. System design

In Fig. 3 there are the three layers of the system, in which "Public Information" and "Electronic Voting" are embedded.
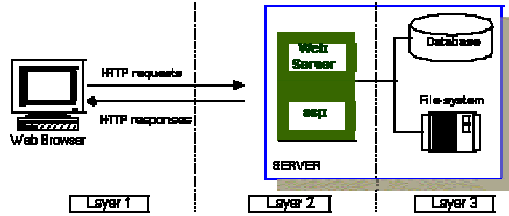

Fig. 3. The three-layer architecture

The browser is placed at the first layer. Citizen uses this browser to access the system (e.g., MS-Internet Explorer 4.0 or Netscape Communicator 4.x).

At the second layer there is the World Wide Web Server, which operates as an interface between the two other layers. In particular, the WWW Server using ASP scripts provides the interface with the user, defining the data that will be presented each time to the browser as well as the connection with the real data stored in database and file system.

Finally, at the third layer there is the file system of the Server, where all the available electronic material is stored (messages, responses, several snapshots of electronic voting, intermediate results of a voting etc) and the database Server which stores all the relative information for this material.

The Database contains all the necessary information about the users (identification information), messages (questions, remarks, comments and the respective answers/responses), the voting material (subject, potential answers), intermediate results (ballots in each category), final results (of the current and past snapshots of voting procedures) and useful statistical data for future study and processing.

The above information is distributed to the tables described below:

♦ *Answer:* Contains the answer to a citizen's message. The answer is tagged with department_id and administrator_id (there is only one person for each department of the Prefecture, responsible for answering the arrived messages to this department)

♦ *Department:* Contains information for the set of departments existed within the Prefecture

♦ *Login_Pass_Responder:* Contains information about the administrator of each department mentioned before

♦ *Login_Pass_user:* Contains information about each registered user/citizen that uses the system services

♦ *Message:* Contains information about the citizen who sends a message to a department of the Prefecture of Corfu. This table keeps information for the whole message, too

♦ *Citizen:* Contains information about the citizens who participate in a voting subject. This table also contains the opinion (ballot) of the citizen

♦ *QPAT:* Contains information about the question (the subject of a voting) and the potential answers

C. Implementation Issues

As mentioned before "Public Information" as well as "Electronic Voting" are interactive applications. In each case citizens send some kind of information (a message or a ballot) and expect a correspondence from the Prefecture of Corfu. For the exchange of this information the HyperText Transfer Protocol (HTTP) is used.

The majority of the HTML (HyperText Markup Language) document responses are produced "on the fly". HTML is a markup language, which consists of tags embedded in the text of a document. The browser reading the document interprets these markup tags to help format the document for subsequent display to a reader (user). We tried to limit the cases where many of the decisions about layout are made by the browser.

So, each time a web-client sends citizens' requests and receives answers via HTTP. Since the contents of the various information change, the HTML page has to be generated from the second level-as shown in Fig. 3- every time the user makes the request. Thus the web server scripting is essential in building systems such as ours. The second level, namely Web Server, is responsible for the execution of the scripts. It is really easy to create Web-based applications and dynamic content. For the development of our information system the Microsoft Internet Information Server v4 for Windows NT 4 was used.

But why is web server scripting so essential [3]? First of all, Web server scripting enables the "backend" for Web applications. HTML and HTTP do not by themselves provide a way to access databases or carry information about users from page to page. Server-side scripting accesses programs on the server that provide this necessary functionality behind the scenes to deliver Web applications and customized HTML for each user. Second, web server scripting separates the content from the presentation for easier design and data management. Server scripting allows the use of templates for creating HTML documents on the fly. The contents of a page can come from anywhere –databases, plain text files, searches, calculations– and be dynamically inserted before it is sent to the user. Information can be managed in the most appropriate manner, and does not have to be stored in HTML pages that must be changed by hand whenever the data changes.

The technology of Active Server Pages (ASP) allows the use of programs, which are executed in the environment of WWW Server, and specifically in the environment of MS-IIS 4.0. ASP pages are files that contain HTML headers, text and script commands. Moreover, ASP pages call ActiveX

components for the execution of functions, like connection with a database or computations.

ASP pages are responsible for the administration of information stored in the system database. For ASP pages speaking the connection with database is achieved by ActiveX Data Objects (ADO), through OLE DB and ODBC.

Finally, the part of the third level, namely, Database, is responsible to enforce the authentication and security. All citizen information is stored in the database and are crossed each time the citizen desires to use the application of "Public Information". Authentication involves prompting citizens for unique user name and password information, which must correspond to a valid "user account", as it is represented in the database records.

IV. SYSTEM FUNCTIONALITY

A. Public Information

In the service of "Public Information" there was an attempt to emulate the procedure of interaction among citizens and Prefecture of Corfu. When a citizen goes at the Prefecture indicate his/her identification card, submit a request and hopes for the correspondence of the employees. These phases of a citizen's visit in real world are offered through this application with electronic way. In specific, there is this correspondence: indication of id card ↔ *registration request*, submit request ↔ *sending a message* and correspondence of local authorities ↔ *reception of a response*.

Below, there are the functional specifications of the service "Public Information".

1) Registration request

The citizen first fills and submits a registration form. The registration form includes the personal data (first name, last name, occupation, home address etc) as well as the coded access data (username and password) that he/she wishes to use each time in order to send/receive a message.

The above data must be unique for every user. In a different case the authentication system will reject the request.

Citizen's data used for this application are stored in the database of the system and are always available to the system administrator. In addition, administrator can delete a user in the case inappropriate or unreasonable use is notified.

Finally, the responses from Prefecture are assorted according to the declared user's data. In this way, the system ensures user's privacy, reliable and consistent messages (responses).

2) Sending a message

After the citizen has successfully made the registration request, he/she can send a message (question, remark, and comment) to a department of the Prefecture.

Sending a message can be achieved by any way supporting access to the central server of Prefecture of Corfu.

At first, user gives the username and password that declared at the registration form. The authentication mechanism "hidden" behind this service, checks if user has given valid data, comparing them which that record at system database and –in proportion- permits (or not) user to send a message.

The citizen has the ability to choose the destination department from a list. In case, citizen does not know where to send his/her message, there is a department of "general purpose", which is responsible for processing all kind of request messages.

Before authoring a message, user must write down a short subject (description) of the main message, at the appropriate field. The administrator of the department in order the message sent to be assorted uses this description field.

At last, citizen can write his/her message and send it. The system always informs user for the success or failure dispatching of the message.

3) Reception of a response

This facility is alike with the sending of a message with regard to the fact that user gives again the username and password and reads the responses came from the Prefecture for him/her. Response messages are assorted by the description included during the procedure of sending a message.

The response messages are sent to the users of this application (citizens) after a reasonable period of time (from the day user sent a message to Prefecture).

B. Electronic Voting

Citizens'-users' requirements analysis proved that for efficient and sufficient functionality of this application specific parameters (criteria) must be supported. These parameters must ensure the quality of the application [7]. The latest is relative with the validation of the final results, while an electronic voting takes place [8].

To specify the functional characteristics of this application (the criteria of quality mentioned above), the project team took into account the following:

- ♦ The expected results of this applications, as mentioned before
- ♦ Advances in technology that mainly contributed in the phases of design, implementation and integration of this specific application
- ♦ The productive cooperation with the employees of the Prefecture of Corfu and the detailed focus of system needs and requirements

The main problem during the design and implementation of this application was the description of a mechanism to guarantee citizen's anonymity and uniqueness (as far as participation concerns)[9], [10]. In order to overcome this difficulty, the system produces automatically an alphanumeric string for each participator, the first time the possible user enters the application of Electronic Voting. The citizen writes down this unique id-field for future use.

In fact, there is a simple voting protocol designed to meet the following requirements without employing any cryptographic techniques. This protocol, requires the voter to submit the electronic ballot with a voter identification number (string) attached. The system uses the identification number to check the voter off on a list of registered voters. Then, the system sends the ballot to the database and records the vote.

Of course, this simple protocol (mechanism) is flexible, mobile and convenient, but it surely has several problems. For instance, voters can stuff (theoretically) the ballot box by using other voter's identification numbers. After all, voters cannot really be sure that the "validator program" does not violate their privacy in this way.

Regardless of the above disadvantages the working team has implemented such a protocol. The reason is that the main target of the application is not to cover security and privacy matters but to "measure" people's correspondence to this utility offered by the Prefecture of Corfu.

Below, there are the functional specifications of the service "Electronic Voting".

1)   Questionnaire

The questionnaire includes questions of "closed type". In such a questionnaire, citizen can answer with a "YES" or "NO" or by selecting a different answer from a set of answers (multiple choice).

This type of questionnaire was chosen because it offers more efficient, secure and smart statistical processing of the final results, which come up after the termination of an electronic voting.

Finally, there is the ability of including useful material, using hyperlinks, relative to the subject of the voting.

2)   People sample participate in an electronic voting

There are two ways to access the system holding an instance of an electronic voting:

♦   From distance, using personal equipment if user has access to Internet (home, work etc)

♦   Using infokiosks established at central areas of the island (Corfu)

Citizens can vote following an easy-to-use procedure. At the submitting form, the voters fill some of their personal data (first name, last name, address, occupation, sex and age). These data will be stored at the database and only few of them will be used for making the statistical processing of the final results (for instance, selecting the sex of the participators in the procedure of voting).

The system administrator is the one who specifies the processing and appearance of the results. The choice of a representative sample is made through queries applied to database. As an example, the system administrator can select according the fields "sex" or "age" in order to extract the final results.

3)   Processing of answers collected at the procedure of electronic voting

The accurate statistical analysis and processing of answers collected from citizens is done by the System administrator who selects the appropriate human sample from the whole number of people participated in an electronic voting.

The appearance of final results is made visually through graphical representation. These graphical representations (charts, pies etc) are accompanied by preferable (each time) percentage in order to make results comprehensive to simple user of the application.

Finally, there is the ability of simple appearance of final results. In this display the user can see the number of ballots collected for one possible answer and the whole number of ballots collected for the specific snapshot of voting.

4)   Estimation of results validity

It depends from two major parameters:

♦   The human sample that will be chosen, at last. System administrator must select the appropriate criteria and adapts his/her choices according to subject's specific needs and requirements. An efficient mechanism to focus on the predefined representative human sample, already exists and is included in the application of Electronic Voting

♦   Citizens' participation. When citizens' participation is big enough, obviously, it is easier a more efficient to take a representative human sample. Consequently, the final results will be "more" valid and the characteristic society's trends will come up.

V. CONCLUSIONS AND FUTURE WORK

The system will serve the purpose of a pilot for the development and deployment of similar systems in Greek Authorities. Moreover, this project is a pioneer attempt towards the direction of research on relative issues and provides a good enough technological –and not only- background for future work.

The exchange of information through Internet requires a data security mechanism, since the unauthorized access at this information is relatively easy-to-handle. This type of access may have destructive consequences for an organization (economic, military, and political).

Unfortunately, the above fact affects our system and applications, too! There must be, surely, some more security and safety automated mechanisms in order to ensure the authorized access, tracking more controlling levels. In other words, the system must be robust against hurtful attempts.

The system developed has already been installed at Prefecture of Corfu and is been used by the personnel. It is used for collecting employees' opinion on labor and administration matters concern. The employees in Prefecture of Corfu act as a first testbed for these first conclusions. This is due to the

fact that the Internet use is still low between the people of Corfu.

The system and the included applications and services were planned and implemented in order to be easily expandable in any organizational chart in any Local Administrative Region. The "openess" characteristic of the system is one of its pioneer advantages.

So, an additional functionality would be the users' capability to place their own questions/subjects at the start of voting. In this way, users' interference to common social problems would be more straightforward.

A good improvement movement would be the development of a full-automatic mechanism to check and select the representative (each time) human sample in an electronic voting procedure. At this time, the checking of an appropriate sample is being done offline, after the finish of the procedure of voting. An online full-automatic mechanism would be preferable. In this way, the voting procedure would be ended after the collection of an appropriate sample of voters.

We could enhance the storing system of all statistical information gathered each time a voting is taken place. Application of technological alternatives, such ours, allow for capturing information earlier in a record's life cycle before disposition becomes a problem.

The above statistical information and records should used as a way offering more as yet unseen opportunities for internal improvement within local authorities, generally.

We could embody the ability of watching the procedure of completion of a request. That is, the system could display information to citizen, relative to a previous request. Thus, the citizen using this workflow scheme will be kept informed about his/her affair and feel secure that Prefecture of Corfu works on his/her matter.

Another additional facility would be the potentiality of sending not only messages but also documents (of a variety of types) to the departments of the Prefecture of Corfu, by attaching them in the main message. By stamping the documents with a protocol number we would be able to control and watch the exchanged documents (and the exchanging procedure) and citizens could have any attested copy of a required document, application etc.

The wide participation of citizens in our attempt should be used as a means to create future challenges for library planning and service delivery.

Careful improvement to the electronic voting procedure next years will increase public participation while preserving voting integrity. Future public service announcements will inform the voter for common subjects and encourage the citizens to exercise their right to vote.

We must highlight that the most democratic point of view of Internet may be the capability offered to people to organize their work in groups. Therefore, "Electronic Voting" will offer new chances to users for expressing personal aspect on political, administrative and, generally, common social matters and subjects.

Finally, we would say that the whole system (the integrated applications included) has been developed to work using Internet structure and its main intention is to improve democratic capitularies or to find another way to express them. It is one of the many attempts (all over the world) which will lead to next century "on-line democracy". Projects like the one described in this work, indicate the future needs and expectations and mainly figure out the promises and challenges of next generations' democracy.

REFERENCES

[1] "Definition of the requirements and needs of the user environment and exploration of national and international experience on relevant issues", Deliverable 1.1, Phase A of the project: "An Intranet and Internet based Information System for Administration and Information purposes for the prefecture of Corfu".

[2] Http://www.microsoft.com white papers: web server scripting

[3] ", Scott Zimmerman and Tim Evans, "Building an Intranet with Windows NT 4 http://www.mcp.com.

[4] C. Bouras, P. Destounis, J. Garofalakis, J. Tzimas, V. Triantafillou, P. Zarafidis, "A cooperative environment for local government: An internet – intranet approach", *Journal of Telematics and Informatics*, PERGAMON PRESS, vol. 16/1-2, pp. 75-84

[5] C. Bouras, P. Destounis, J. Garofalakis, J. Tzimas, V. Triantafillou, P. Zarafidis, "An intranet and internet based information system for administration and information purposes", *4th European Digital Cities Conference: Changing patterns of urban life*, Salzburg, Austria, October 29-30, 1998, pp. 211-215

[6] C. Bouras, P. Destounis, J. Garofalakis, J. Tzimas, B. Triantafillou, P. Zarafidis, "Cooperative information systems over the internet and the WWW", *EUROMEDIA 99-APTEC*, Munich, Germany, April 25-28, 1999, pp. 232-236

[7] L.F. Cranor, R.K. Cytron, "Sensus: A Security –Consius Electronic Polling System for the Internet", *Proc. of the Hawai I International Conference on System Sciences,* Jan 7-10, 1997, Wailea, Hawai, USA

[8] L.F. Cranor, "Electronic Voting. Computerized polls may save money, protect privacy", *ACM Crossroads*

[9] Borell, J. and Rifa, "An implementable Secure Voting Scheme", *Computers & Security*, 15, 327-338

[10] Benaloh, J. and Tuinstra, D. "Receipt-Free-Secret-Ballot Elections", *26th annual ACM symp. On Theory of Computing,* 544-553, 94