

The electronic directories with use of maps both plans: Stages of creation and publication.

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Necessity of large information volumes use, constantly varying, in business, administrative and managerial activity has resulted in growth of popularity in Russia of the directories, containing the information on the various authorities and companies, their kinds of activity. Certain attribute of such directories is the "contact" information (address, telephones etc). Aspiration to fast search of the demanded information and requirement for additional information services, essentially impossible in the usual "paper" directories has resulted in creation of the electronic versions of such directories. Really, using traditional system "yellow pages" - "white pages" it's possible to find the enterprise by the form of activity, or by the name. But if it is required to carry out return search, for example, on a telephone number, address, it's probably to achieve only under the electronic version of the directory.

On the other hand, either in trade, and in administrative activity the spatial component of search is frequently required. So, to find all food or say perfume shops in a particular part of city, and simply to understand where to search for address "the Moscow prospect, 44", it is possible only by combining traditional contents of the directories with maps or schemes.

Similar sort synthetic directories are distributed in the last years as the CD editions ("Moscow up to every building", "Moscow on a palm", "Who is where in Astrakhan" and etc.). The authors of the present report also participated in realization of the similar projects, therefore the directory "Amber Pages" being quite popular dictionary in Kaliningrad region was either issued in an electronic form in 1998. The software interface offered allowed to be guided in street plan of city (about 1000 pieces), overimposed by materials of space imagery, and approximately define a location on the plan for the companies having paid for this service.

Addition of buildings and addresses plan to the streets scheme would be just logical next step as well as adding ALL companies and authorities to the map resulted.

Problems, which inevitably arise at realization of such project, could be divided into three groups: organizational, technological and financial.

Organizational problem is, as a rule, lack of source of the authentic systematized information, for example, on addresses and buildings. Even if such huge work of these information layers formation would be carried out by the authors and initiators of the project independently in account on the future profit, ways of maintenance in an actual state of information resources created will be absolutely unclear. Therefore the authors had accepted a principle "top of iceberg" when performing this project. According to this principle the electronic directory created, oriented to commercial use, is to be an informational slice of large municipal (regional) geoinformation system, which is to contain information resources required for such directory by default. Therefore, the works on this project were postponed and were renewed again only in current year after the conclusion of a series of the contracts and agreements, defining ways and methods of municipal GIS creation, file format standards and, that it is extremely important, determining authorities and companies, responsible for maintenance of created information resources in a actual condition.

We are to assume, that for very small exceptions, described principle "top of iceberg" (the municipal GIS-electronic directory with opportunities of spatial search) is the only possible way of creation of rather large and reliable information resources in our country by virtue of a usual economic and organizational situation.

Technological problem is necessity to process significant volumes of spatial and descriptive information and creation of the reliable, fast and effective mechanism of updating the information. The prompt development of Internet technologies, one should think, prompts a way of Web-realization, at which whole job is to be performed by Web-server, which stores the spatial information. Thus the information on spatial objects is stored on any server or distributed group of servers in the Web. The client's PC should only be equipped with some kind of "navigation" software. And the software, located on server, should create HTML-page, in order to display the information requested on the clients PC. Such "active" (created by user's request) page can be realized by various ways, for example, by means of the CGI mechanism, Java-applets, or ActiveX component. Application of the ASP (Active Server Page) mechanism is also possible, when the page to be created contains a programm code as against usual

HTML page. The mechanism of the object of interest information extraction is similar to the mechanism of pages creation. After the index of object of interest is transferred to server, appropriate CGI, ISAPI application or code, located inside ASP-page perform a request to a database and place the information received in HTML-page remitted to the customer. For ASP type of pages, including a code on VBScript, this problem is rather flexibly solved by means of use ADO (ActiveX Data Object) and RDA (Remote Data Access) objects, offered by Microsoft. The problem of synthesis of a map fragment can be solved more effectively basing on ISAPI (Microsoft Internet Sever API) - special platform-dependent modules, being started on the server within the framework of process of http-service realization. That these modules are being formed inside the same process (instead of as operating system separate process, in difference, for example, from CGI), the speed of service clients requests processing grows at reduction of the resources demanded .

Creation of Java-applets or ActiveX-component, loaded on the clients PC for map displaying purposes is more difficult way. These components for data reception interact directly with server. Such way can give a significant gain in case of use maps being completely vectorized, as volume of data, transmitted on a network, can in this case considerably decrease, and as a consequence, the time of the system response on user actions is to be reduced.

The approach described above provide the possibility to create client systems, using a map for databases access. The application, processing the spatial information in a way described above, is possible to be classified as the basic geoinformation system, in which server is used as "storehouse" of the information, and client's PC being equipped only with the "navigating" program is a "consumer".

The weakness of this approach consists in practical impossibility to reach the acceptable speed of access as to spatial, and to the descriptive information using existing channels of communication. The natural solution of this problem is to move part of server functions directly on clients PCs, that is the reference system is being issued as the software, map and database, for example, on CD-ROM. However in this case there is the problem of updating of a local copy of the information.

The problem can be solved by means of a certain system architecture keeping the communication of the directory with Web server. Technically the similar sort interaction can be organized by two ways:

- The system addresses for the information not only on CD-ROM, but also in a database, created on a PC local harddisk. Thus two databases are to be accessed simultaneously, but the priority is given back to harddisk database in order to get "freshest" information. In this case the local database is periodically supplemented by the Web server information.
- The search for the information required is being performed in local database, and in case of information lack the request for server information is to be done.

Both ways have the advantages and lacks. First is usually utilized by common anti-virus software updates. However thus it is necessary to keep a local copy of rather large database (especially if it contains the spatial information), while the essential part of this information, most likely is never required. At the same time the second way allows "to save" local resources of the computer, and to create the so important protection against "piracy" or unauthorized copying of database.

In order to increase the clients PC performance the complete map structure copy should be kept on it. When speaking about physical data storing, invariancy of the server and client software is of high importance in this case. On the client side the data can be stored in local database, or in memory-based file, or could be received part by part. In this case effective spatial data caching algorithms could be used.

Each information block on the client's side duplicates certain record, stored on Web server. Thus local software for map visualization should periodically refer to Web server in order to synchronize a local copy of a map with a base map, located on server. Such solution looks rather logic and is quite simple in sense of realization, providing, nevertheless, opportunity on-line spatial analysis.

Actually such way of interaction represents system, which it is possible to name " map navigator". Really such "navigator", from the client's point of view, represents the program, displaying a map synchronized with a server-based map. For the descriptive information request purposes the special software module, ensuring .HTML-page visualization should be implemented. It can be in particular any Internet browser (i.e. Internet Explorer), introduced in geoinformation system by means of the COM-interfaces. Such map navigator can ensure acceptable performance with the spatial and non-spatial information processing.

It is necessary to notice, that the system, based on such idea, could be easily extended in order to reach the possibility of distant data editing. Such GIS system is really based on two-level model. The top layer is "classic" GIS, basing on network distributed data. The bottom level consists of a set of modules, ensuring transfer, and possibly data input from and to a server-based database. Such model is quite applicable not only for creation of reference systems, but also for creation "big GIS" technologies for territorial infrastructure management.

The authors have not come to uniform opinion concerning a way of "section" of the information, stored on a compact disc and Web-сервере. At the "horizontal" approach the information is divided on information layers. For example, the plan of streets and houses could be contained on CD, and address points and the companies/authorities reference information turns out on an request to Web-server. At the "vertical" approach the base "skeletal" information is present under the the whole nomenclature of information layers, and could be extended by Web request. The choice of a way of "section" of the information depends apparently on relative volume of information layers, as the low throughput of the channel is faster rule, and also from relative commercial value of the placed information and opportunity of its alternate reception.

So for example, the network of the basic streets is for certain published in a number of the reference editions, but it's very hard to imagine a printed card convenient in use, containing more 1000 streets. Addresses and the telephones of large and known companies are published in many information and advertising editions, but data on their young competitors, not yet so strong financially to advertise themselves properly, it is meaningful to place on Web site. On the other hand, there are the information resources, that have sense only at instant access.

For example, it is possible to place list of address and phone numbers of all hotels on a CD, ensuring at the same time access to the information on presence and category of free places, with an opportunity of their immediate reservation via Internet.

The **marketing** approach in opinion of the authors should consist in the synthetic approach, combining interests of all information resources owners and communication channels owners as well.

So cost purely of a compact disc should be rather insignificant, but can include thus not only retail price for the base software component, but also prepaid access to on fixed time to certain web-resources. Thus, purchasing a CD and receiving access to the additional information, the client always sees opportunities of expansion of the information services at the expense of use of additional information layers, or prolongation of access to them on expiration of a term paid when purchasing the CD. Internet providers can be attracted by an opportunity of preferential sale of connection to their network of the new customers, advertising of their other commercial web-resources and attraction of new information resources, the owners of which will come to cooperation, being attracted with new technological opportunities of work with the customers.

When defining the financial politics of such projects it is necessary to consider a legal situation in the country. So the first and mentioned above project " Янтарные of page " has not brought the expected financial incomes by virtue of

- Low level of legal consciousness of the consumers, not seeing and frequently not realizing that they are breaking the law by use of unauthorized copies;
- Absence of real force influence on the infringers of the copyright.

In this case the group, realizing the project, should take care of rather serious system of protection from unauthorized copying and use of the information, or to create conditions, at which unauthorized use of the information will appear in the majority of cases unprofitable. Taking into account, that on the present moment any way of protection, absolutely unbreakable for high-skilled hackers, is unknown, the principle of an economic feasibility leaves on the first place. Reasonably thus to establish low cost of a base compact disc, by transferring a financial centre of gravity on paid Web-resources. Taking into account, that Internet providers have an opportunity to vary means of protection, including using specific UNIX-servers based protection with higher degree of safety than usual Windows-equipped computers, unauthorized use of information resources will not be mass and economically justified, especially at a "vertical" way of a section of the information.