

THE INFORMATIONAL SYSTEM IN THE ENTERPRISES OF THE SOUTH-EAST EUROPE

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Abstract

Application software is one of the most important elements of any information system. The most recent trend in the field of the software is, undoubtedly, migration of classic applications from centralized computer architectures to network or distributed architectures. This migration as well as dynamic business environment of an enterprise; need new methods, technique and application development tools. In contrast to classic applications, distributed applications are characterized by their flexibility and adaptability and they are created by modern development tools. Basic types and characteristics of the tools are dealt with in the paper and software base in the enterprises of the South-East Europe and modes of the creation are given at the end.

Keywords

- Informational system;
- Software;
- Management.

1. Introduction

Products short lifetime and very strong competition characterize environment in which modern enterprise operates. That is why prime objectives of a modern enterprises are fast launching of new products to market, product quality improvement and securing better service

Rezumat

Aplicarea soft-ului este unul dintre cele mai importante elemente ale oricărui sistem informațional. Cea mai recentă orientare în domeniul soft-ului este, fără îndoială, migrarea aplicațiilor clasice de la arhitectura computerului centralizat către arhitecturi de rețea sau de distribuție. Această migrare, cât și dinamica mediului de afaceri al unei întreprinderi, au nevoie de metode și tehnici noi și de aplicarea instrumentelor de dezvoltare. În contrast cu instrumentele de aplicație clasică, tehnicile de aplicații distributive sunt caracterizate prin flexibilitate și adaptabilitate și sunt create de instrumente moderne de dezvoltare. Prezentăm în expunerea noastră tipuri de bază și caracteristici ale acestor instrumente și baza soft din întreprinderile din Sud-estul Europei, cât și modul în care sunt create.

Cuvinte cheie

- Sistemul informațional;
- Software;
- Management.

for customers. They all arose new challenges for information specialists, who must in a short period of time, develop application as support to changeable business needs.

In addition to business, there are technological requirements for applications functionality and easy use as well. That leads to increase the

complexity and size of software projects, long period of time required for software development and high software maintenance costs. Besides, programs should function not only in isolation but in integrated environment with the other programs as well, the ones that the other firms have developed and its various hardware and network configurations made by different manufacturers. Big and complex IS geographically distributed data processing and constant requirements for IS flexibility make need for complete change of the way the applications are comprehended, developed and maintained.

Software that provides competitive advantage to an enterprise is composed of many general and specialized parts (software components). Some of the parts can be bought on the market but software firm later adapts the parts to specific needs, while some bought parts have been adapted by enterprise information specialists.

It is only distributed, client-server (C/S) applications based on object-oriented technology, that can meet enterprise changeable business needs. Various C/S tools types can be used in this application development. On the choice of appropriate C/S tools applications quality will depend as well as possibility of carrying out of business task successfully. The paper should help to all those who make decisions on C/S choice. Therefore second part of the paper deals with various classifications of C/S tools, and its addition for each type of tools is given what business and technical needs it meets most successfully.

The enterprises of the Balkan undoubtedly lag behind in use of the newest modern technique in application development. It is useful therefore to see what is software base of South-East European enterprises IS and how the applications develop and it is the topic of

third part of the paper. Software basis analysis and the way of application development would help South-East European enterprises to see the problems in the field and find out appropriate solutions.

2. C/S characteristics

When developers analyse C/S tools they must study problems which should be solved apropos of goals which should be realized by application development. Therefore, there are: tactical tools for tactical goals realization, strategic tools for realisation of departmental / workgroup goals and strategic tools for enterprise goals realization.

Tactical tools - enterprise often needs an application for short-term goals realisation. For example enterprise should accomplish pilot test for influence measurement of a new product on market, before product introduction. When a product has been designed to be awhile on the market, the application must be developed rapidly and then canceled. Such applications could be developed by client-based tools.

Departmental/workgroup strategic tools - many departmental applications has greater strategic importance then some enterprise applications. Departmental/workgroup applications have two forms: data-driven applications (the most popular today) and conversation-driven applications. Data driven applications have designed for access to server databases. The second type applications have access to subjective data from various sources.

Enterprise strategic tools- the tools will be dominated in projects of classical mainframe - based applications replacement with network-based C/S applications. Three types of the tools will be important: C/S vertical software oriented to solving specific missions

(accounting, manufacturing, financial and human resources); tools tied to relational databases management systems; high-end tools designed to build database-independent, large-scale systems from scratch.

When developers decided if application is tactical or strategic, then they can solve some technical issues. These technical issues include the role of graphical presentation services; development and deployment of complex logic; role of server-based development and the evolution to balanced C/S computing. From that technical characteristics aspect, we may identify following types of C/S tools: client-centric graphical tools; server-based tools and balanced C/S tools.

Client - centric graphical tools - most of tools on the market are noteworthy for the way they create data-entry and retrieval screens. Intent of the tools is all application logic implementation on the client (for example, Windows-based tools). They will be useful if the application is designed to easy user manipulation of data from a server database. These C/S development tools are characterized by graphical user interface (GUI) and they are efficiently used for report generation and database query which magnify end-user productivity.

When users choose the tools, the most important features are: application quality (speed and efficiency of application, consistency of application); support (quality of vendor's support, responsiveness of vendor's service); programming, robustness of programming language, flexibility of programming language, speed of programming); compatibility (compatibility with operating environment, compatibility with development methodology, working with multiple operating environment); ease of

use (accessability of user interface, learning/training time, ease of installation, documentation); price (acquisition and support costs, value for the dollar).

The best tools according to these features are: Microsoft Visual Basic; Gupta SQL Windows; Powersoft Powerbuilder. These types of C/S tools work well in development of tactical and small departmental / workgroup applications. However, the next type of tools are recommended for larger projects.

Server-based tools - these tools lack possibility for grafical screen creation in PC style. However they have scalability for development of applications based on server. The tools are appropriate for development of medium size workgroup applications. Many of these tools are redesigned to better serve GUI clients.

Balanced C/S tools- the latest tool generation is designed as attempt to use the best features of clients and servers: grafical development environment of clients and possibility to store application logic and data on the most appropriate platform, apropos of server (a feature known as partitioning).

Tools from that category make possible high-end applications development which comprise the whole enterprise and great number of users. The tools intent to assure the best characteristics of CASE tools and sophisticated programming languages, so programmers don't have to use third generation languages (3GL). Therefore, the tools assure built-in data dictionaries, databases for stored business rules diagramming tools and the like. Many of these tools also provide application programming interfaces (API) so third-party tools can be integrated. Many server-based tools will start to traverse in that category.

Generally, we may identify two C/S tool generations on the base of previous classification. First-generation

tools are client-centric and they solve tactical problems while second-generation tools are balanced and they support departmental, workgroup and enterprise strategic goals realization.

Respecting short-range goals which the first generation tools realizes, they are used for rapid application development (RAD). Regardless the tools are good from GUI aspect, they can not solve complex issues considering business (application) logic and data management. Only the second generation tools can solve the issues.

Almost all first-generation tools integrate GUI programming code with application logic so all the logic must be in client. If the application logic includes data access, then scalability which follow from moving that logic to the server become almost impossible. This integration also requires all data transferring across the network between client and server resulting in a network bottleneck.

In order to developing more complex and greater C/S applications first generation tools, programmers must use 3GLs and SQL extensions from various software firms. Fat client sindrom emerges in that situation. The sindrom emerges when desktop system has too much application logic so the system performance getting low.

Due to 3GLs and SQL extensions, first generation C/S tools force programmers and users to develop applications in which data management logic is tight to one particular database. If the application needs to access some other database, application logic must be modified. It is difficult to add complex application logic, because there is not modularity in application development. This problems are also solved by second generation C/S tools.

The second generation C/S tools solve complex problems considering GUI,

business logic and data management and also solve problems considering various hardware and network platforms, various databases and increasing number of users. However the greatest benefit from those tools is development of flexible distributed application which have feature of adaptability. The adaptability is consistent with continual changes in many modern enterprise business aspects.

Nobody can assume how much business conditions will change and become more complex. Many of these changes are infrastructural: entry in new distribution chanals, mergers and acquisitions or new partnership forms.

An enterprise may twice or triple increase its size and according to that change its organization structure can be changed. A top management may distribute responsibilities for various business aspects to business units across the world and later may restore much centralized management structure. Therefore an enterprise should combine business planning with second-generation C/S technology in order to assure flexible application development.

The second generation C/S tools should be comprehensive and adaptive. Comprehensiveness is relate to application development environment creation which cover the entire application life cycle of design, development and deployment. In each phase of the life cycle, the development environment should allow a developer to use a single skill set rather forcing the developer to work with a variety of products that may not work well together in the future.

Adaptability of the development environment is related to changes in business requirements as well as to changes in user interface, databases, computer networks and operating systems. The adaptive environment abstracts or hides technical infrastructure complexity so developers can be oriented to a

business problem instead to technologies that are subject to change.

General characteristic of C/S development tools is that they are getting more sophisticated and increase their possibilities. C/S tools market is in the early phase, so developers should pay attention to the best tool selection. C/S tools selected today maybe can not suit to future business needs and users must take into consideration that fact when develop their first C/S applications. Next C/S tool generations will more and more get features of object-oriented technology which will provide flexibility and modularity in application development form the components. These components can be reused for the other application development. Developers could not believe that one tool will solve all application development problems so they should consider several various tools. They always should consider the new tools in order to get ready to inevitable technology changes.

3. Software base of the enterprises of the South-East Europe

Information about software base of the enterprises of the South-East Europe is obtained by empirical research. The results show that none of the scanned enterprises implemented the newest application development information technologies (object-oriented planning and C/S tools). Most of the application is created in some 3GL. COBOL is used very often, after follow PL1, FORTRAN and RPG/2. The most of scanned enterprises which use 3GLs belong to category of greater enterprises. These enterprises implemented their first IS on classical minicomputer systems about 20 years ago. These systems stayed in these enterprises until today, beside eventually adding PC.

All the nominated programming languages belong to procedural languages category. It is difficult for users to learn and adopt the languages because users must follow rigorous formal procedures when they develop an application. It is the reason that users in the enterprises let information specialists to generate standard, regular reports and poorly use IS for ad hoc report generation.

Ease of application development and use is one of primary criteria for programming language selection. Majority of enterprises obviously have not taken into consideration these criteria, because most of the scanned enterprises use only 3GLs for application development. Application development in procedural languages lasts long and users in the enterprises don't understand all IS features. Moreover, it is difficult for users to understand IS specifications because long time period elapses from the specifications determination to IS test.

Information function executives in some of the scanned enterprises have understood the need for increasing productivity in application development. They have adopted new methods for application software development: report generators and query languages. The research results show that 20% of the scanned enterprises use the new application development methods beside procedural languages. However, these enterprises use 3GLs for application development as a primary method. It could be said that the enterprises belong to large enterprise category. The enterprises have recognized all 3GL disadvantages, but due to impossibility of full old IS replacement, the enterprises implemented this hybrid solution.

Some of the scanned enterprises (10%) use network database query languages (for example, IDS2 and IDA databases). It's hardly to say that these enterprises adopted modern application

development methods. Enterprises in developed countries abandon network databases or redesign (convert) these databases into relational databases wherever it is possible. These databases are implemented on old Bull Honeywell minicomputers and it may say that it is closed application architecture which have not interface with many modern architectures.

Enterprises in developed countries have already long used the forth generation languages 4GLs or nonprocedural languages as primary application development method. American enterprises which started IS implementation a couple decades ago also have the old applications created by some 3Gl (most often COBOL). However, these enterprises practice redesigning the applications into C/S applications, and data organized in the old files redesign into relational database structures. The enterprises almost don't implement such projects. Only 15% of the scanned enterprises are entirely replacing old applications with C/S application based on relational databases. They are not used redesigning method by which the old applications could be gradually span to the new hardware platform and data structure. The enterprises started projects from null and lost investment in old IS.

The enterprises which started their first IS implementation several years ago are in the best situation. These enterprises could use modern application development methods avoiding problems considering old, unflexible, centralized and monolit application. These enterprises (18%) adopted nonprocedural SQL which represent the world standard in relational databases application development. The enterprises mostly belong to smaller enterprises category. Regardless that SQL is ease to use, it is not accepted by users of the enterprises because it requires certain knowledge degree about particular

application and database structure. However users of the enterprises need training and good documentation.

Enterprises of developed countries have practice in purchasing completed software application whenever it is possible. Expectation is specific application needs relate to particular industry or enterprise. The needs can be satisfied by internal developed applications. However, in the great number of scanned enterprises (43%) still the most application needs have been satisfied by internal application development. 32% of the scanned enterprises combine internal application development with completed applications purchasing, however internal application development is dominated. Only 25% of the scanned enterprises destine for purchasing the greatest number of applications.

Most of the applications developed in the scanned enterprises belong to financial and accounting applications group. Respecting that financial and accounting function has standard information needs for many enterprises and various industries, the needs could be satisfied by already developed applications which can be found in the market. Namely, South-East European market has the great number of microcomputer and network applications which are relatively cheap and easier to use than COBOL applications.

The great number of scanned enterprises (20%) which have not enough human resources for substantive application development decided to purchase all the needed applications. Even some of the scanned enterprises having the resources comprehended that substantive application development is much expensive solution which don't satisfy information needs on timely manner. Often, information needs change before application is finished, due to long time development.

Microcomputer software packets are very poorly used by the scanned enterprises. 30% of the scanned enterprises almost don't use the packets that is very great percent whereas the packets are prevalent in the developed countries. This condition is reasonable whereas minicomputers with 3GLs applications are prevailing.

4. Conclusion

The most recent computer trend in the field of software is, undoubtedly migration of classic applications from centralized computer architectures to network or distributed architectures. This migration as well as dynamic business environment of an enterprise, need new methods, technique and application development tools. The enterprises of the Southeast Europe undoubtedly lag behind

in use of the newest modern technique in application development. Careful recording of software base in the concrete enterprise would make it possible to identify those business fields in which C/S applications could be implemented first. It is obvious that it should be started with tactical application, which is to be developed by the first C/S tools generation. At the time when the enterprises of the Southeast Europe information specialists master first generation of C/S technology, then about development of strategic C/S applications of certain department, workgroups or the whole enterprise should be thought. In that sense market of C/S tools of second generation should be followed and researched, for it is in its beginning phase of development that is characterized by great dynamic.

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