

THE CONCEPT OF CONSTRUCTION OF COMPUTER SYSTEMS TO SUPPORT ORGANIZATIONAL MANAGEMENT CONSULTING

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Summary

Research objective is development and analysis of the corporate management consulting supporting computer systems, using unified, object oriented models, group decision making, quantitative-qualitative methods, multi-media, distributed BigTable type basis, data warehouses, software for parallel development of processes and grid-cluster technology. The process of reaching research objective consists of three basic parts: systematic, object-oriented analysis of corporate management and related consulting processes, formation of demands, using respective unified models and group decision making methods; object-oriented design of corporate management information system considering demands of consulting process, using respective multimedia bases, warehouses and their efficient (parallel) elaboration methods; Carrying out corporate management consulting support computer system software using CASE- and Grid-cluster technologies.

Keywords: Corporate management. Consulting. Support computer systems. Object-orientierte modeling. UML. BPML. Multimedia DBS. Distributed DB. Grid-cluster technology.

1. Introduction

It has become necessary to use new computer and information technologies to solve problems and tasks of distributed corporate control systems, among which the most relevant and important direction is data warehouses building, their effective development and development of research unified program package. From the beginning of the new century till today it is considered as mostly perspective and dynamic direction in designing and realization of information system control [1-3].

The most important is development of theoretical base and tools of building of multilevel, heterogeneous, polymorphous, multifunction and multi structural distributed information system of object control, from the point of view of client-server architecture of corporate networks, server-farm (terminal-server), of which management of working sessions of users and uniform distribution access of clients to physical servers is considered. Task of a cluster (file-server) is a reliable storage of the common resources (virtual IP-addresses and share names, joint programs and the services, distributed catalogue, etc.), and also the organization of access to external memory (for example, a file of SAN-disks).

The aim of the project is development and researches of efficient supportive mechanisms of decision making in distributed corporate control systems with the help of modern net information technologies. Precondition of system analysis in problem area is building of integrated, logically whole data warehouse for distributed corporate objects and development and improvement of their security mechanisms.

2. The basic part

Herewith, there is high importance in solving the problems of integrated use of new information technologies, which lay in three main directions [4]:

1. Integration of the informational technologies and software-tools - The world of modern informational technology, due to the rapid development and growth speed, can be characterized as the one having the chaotic and affluent technologies. Such assumption applies to the process modeling and service process composition technologies as well as data models and semantic model systems. Ultimately, the problems related to the conformity of the different paradigms and their integration are permanent in order to apply the best IT package for solving the complex tasks of the problematic sphere.

2. Integration of the internal informational resources - Information is usually scattered in the database, document storages, e-mail, etc. In such cases, it is difficult to collect, formalize and organize the information and knowledge into one unified structure, as well as provide detailed analysis of the data, further automated processing and convenient application.

3. Integration of the external informational resources – possibility to retrieve the essential information from the different sources through processing both the technical tools and information resources.

Data warehouse represents special super base of concrete big factory or organization, where during currently processing operative work the whole spectrum of chronological information is saved, which is appointed to present to user text, table, graphic and audio-visual information blocks that are placed in local base or internet page.

In circumstances of strict competition on the world market it is necessary not only to build databases to solve strategic and efficient problems in time, but also to build efficient program packages for reasonable development of information blocks on Unified Modeling Language (UML-2) that is based on object-oriented approach conception. For class, as for main element of program package of control information system, it is characteristic properties of encapsulation, inheritance and polymorphism. And encapsulation means development of appropriate methods for purposeful processing of separate information blocks.

It must be possible to process parallel operations (multi processor or multi program regimes), that importantly decrease time of response to request. In given proceeding for solving this problem is presented algorithm of transaction synchronization serialization that represents repository-manager methods of program class. Users' transactions (procedures of reading/writing information objects) use common usage resources of the net, that's why it is necessary to control their blocking-unblocking conflict situations to avoid state of infinite "deadlock" waiting.

Serialization of transaction provides their parallel processing. While information object changes by one transaction it is blocked for other transactions till this process ends. Also, repository-manager processes appropriate changes in the whole base (in catalogues and distributed bases) to provide base integrity.

It is convenient to use net dynamic models, graphs and automates to simulate current events (dynamic and conflict processes) in computer net, and theory of mass service systems – for analysis of quantitative characteristics.

A lot of instruments (simulators) of net automates already have become commercial products, that are used with great success in completely different problem areas during process simulation. In conditions of internet mass evolution problem of combination of different simulators has become very important.

Today simulators are built in universities almost by independent algorithms. They can't analyze, describe and process data of other simulators that is the reason of waist of time during new simulator building. One of our goals is development of simple base platform for tools, where it would be possible to determine new type of the net graph, and there will be no need to program again properties of old types.

It would be possible to realize exchange format description of net simulators by new PNL (Petri Network language) that is based on internet mostly spread XML-technology. On its base there would be built modern net simulators for dynamic systems of such a relevant problem areas as operating systems, net protocols, centralized databases, server virtualization (on server-cluster base) and so on, would be processed transformation of simulators into new exchange format. Samples of practice realization of simulators will be presented in final proceeding.

System networks of Petri are connected with modeling of the processes of workflow management, which is a significant scientific direction of designing of corporate systems. From this point of view in job tool BPEL – Business Process Execution Language is used.

The modern principles and means of business-processes modeling on the basis of the notation of business-processes modeling are considered. Its purpose is the creation of a uniform information technological infrastructure and standardization of graphic elements of modeling to construct and design the business-structures. The offered concept assists an assessment business-operations, as well as continuous and stage-by-stage optimization of business, integration of the structured and not structured data and their further analysis, monitoring of systems, visualization and versions of the processes management and procedures.

The theoretical and methodological base of research is CASE-technology of Software Engineering, UML2 and theory of control systems of data and knowledge distributed bases. For process modeling of computer net functioning on distributed objects and analyzes of solving conflict situations is used the theory of mass service systems and net automates (with new PNML-tools) [5].

In order to perfect the processes of design, construction, exploitation and periodic modification of large and multiform fund of database storages the new technology applied to multimedia systems will be designed. The complex of program packages for their efficient processing

will be created. Such integrated standard program packages together with distributed data relational bases create the flexible instrumental devices, able to construct Windows and Web-applications, and compatible with network program technologies (for example MsSQL Server, ADO.NET, C#, VB, ASP and other packages based on NET platform).

The aim of the project is development of technology of the automated designing and construction of processes for management information systems of the corporation on the basis of multimedia data warehouse and visual-component programming. Creation of such technology actually and considerably in control systems corporate business-processes for development and researches of efficient supportive mechanisms of decision making for control systems with the help of modern net information technologies. The process of reaching research objective consists of three basic parts (Fig.1): 1. Systematic, object-oriented analysis of corporate management and its consulting processes, formation of demands, using respective unified models and group decision making methods; 2. Object-oriented design of corporate management information system considering demands of consulting process, using respective multimedial bases, warehouses and their efficient (parallel) elaboration methods; 3. Carrying out corporate management consulting support computer system software using CASE- and Grid-cluster technologies;

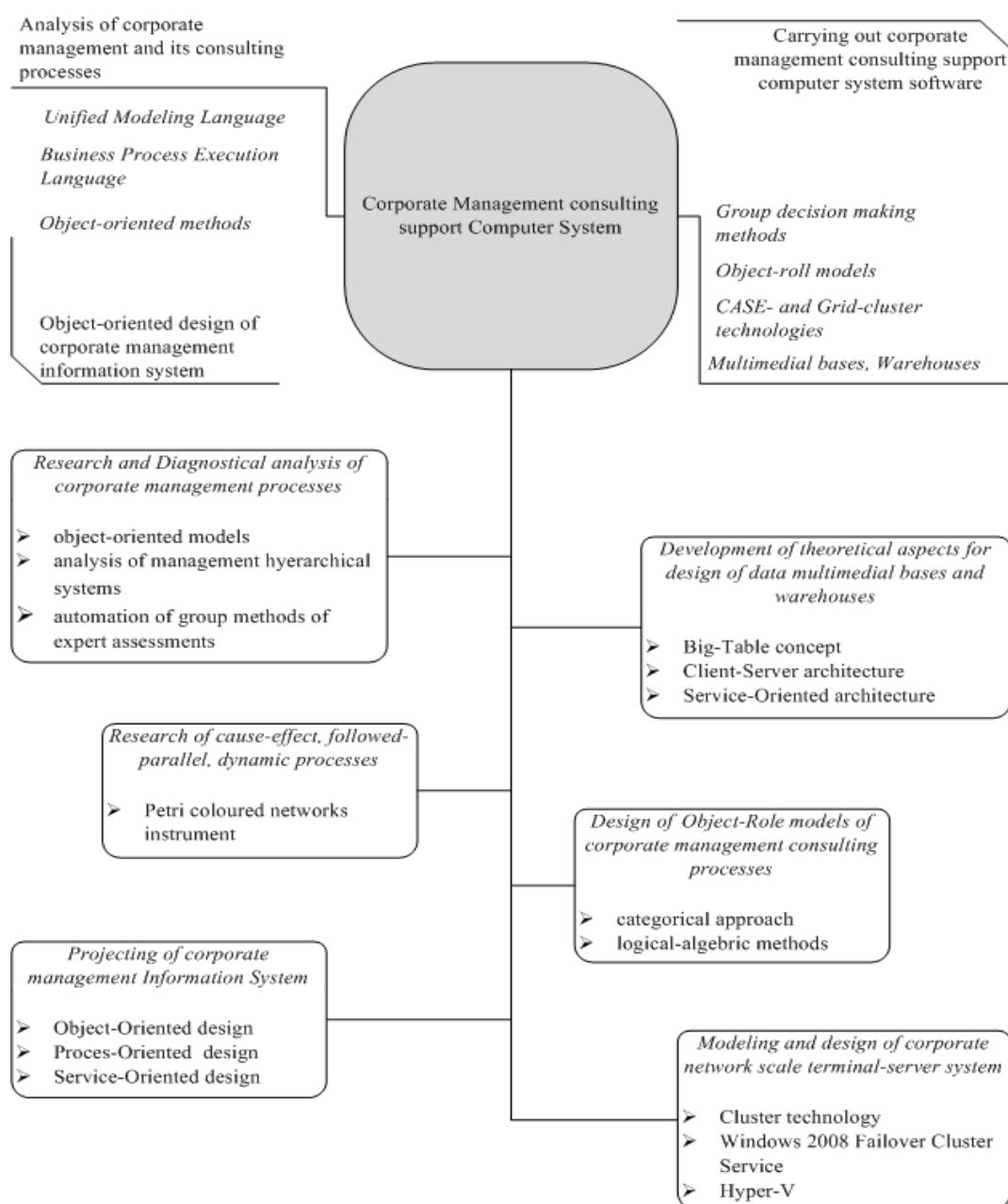


Fig.1

Project considers solving following problems by stages:

- problem 1. Research of corporate management processes with the goal of their perfection, by developing whole of object-oriented models of system demands.
- problem 2. Diagnostical analysis of corporate system consulting and screening their problems and ways of their solution., developing respective unified models [6];
- problem 3. Defining structure and content of the corporate management consulting support computer system on the basis of object-oriented models and methods [7].
- problem 4. Developing object-oriented methods of corporate management consulting support computer system on the basis of analysis of management hierarchical systems and automation of group methods of expert assessments [6].
- problem 5. Object-oriented, proces-oriented and service-oriented design of the corporate management information system considering consulting demands [7].
- problem 6. Development of theoretical aspects for design of corporate management consulting support system data multimedial bases and warehouses, using the Big-Table concept and client-server architecture;
- problem 7. Design of object-oriented models of corporate management consulting processes on the basis of categorical approach and logical-algebraic methods [8].
- problem 8. Experimental realization and research of the data multimedial bases of the corporate management consulting system support system;
- problem 9. Research of cause-effect, followed-parallel, dynamic processes within corporate management consulting support system using Petri coloured networks instrument [5,8];
- Problem 10. Modeling and design of corporate network scale terminal-server system on the basis of cluster technology.
- Problem 11. Implementation of virtual machines into cluster systems and development of management methodology, mainly within infrastructure of Windows operation system (using technologies of Windows 2008 Failover Cluster Service and Hyper-V).
- problem 12. Research of experimental properties of the corporate management consulting support computer system functionality and generalization of the results. Developing system documentation [9,10].

3. Conclusion

The process of reaching research objective consists of three basic parts: Systematic, object-oriented analysis of corporate management and its consulting processes, formation of demands, using respective unified models and group decision making methods; Object-oriented design of corporate management information system considering demands of consulting process, using respective multimedial bases, warehouses and their efficient (parralel) elaboration methods; Carrying out corporate management consulting support computer system software using CASE- and Grid-cluster technologies. Experimental research was done in various problem areas: - Government and administrative organizations, for the goal of creating integrated information warehouses and global systems of transparent monitoring; - Universities and educational centers (in the sense of teaching new information technologies); - Organizations from different business areas where the use of computer techniques and technologies is vital for them; - Scientific-research and project organizations; - Schools for reforming specialists and increasing qualifications, in compliance with the strategies of creation and development of modern manufacturing infrastructure.

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КОНЦЕПЦИЯ ПОСТРОЕНИЯ КОМПЬЮТЕРНОЙ СИСТЕМЫ ПОДДЕРЖКИ КОНСАЛТИНГА ОРГАНИЗАЦИОННОГО УПРАВЛЕНИЯ

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Резюме

Рассматривается концепция разработки и исследования корпоративных компьютерных систем поддержки управленческого консалтинга, используя унифицированные, объектно-ориентированные модели, групповые методы принятия решений, количественно-качественные методы, мультимедийные, распределенные базы, типа BigTable и хранилища данных, программное обеспечение для параллельного дивелопмента процессов и Grid-Cluster технологии.

ორბანიზაციული მართვის კონსალტინგის მხარდაჭერი კომპიუტერული სისტემების აგების კონცეფცია

გია სურგულაძე, ეკატერინე თურქია, ნინო თოფურია,
დავით გულუა, იოსებ ირემაშვილი
საქართველოს ტექნიკური უნივერსიტეტი

რეზიუმე

განიხილება კორპორაციული მენეჯმენტის კონსალტინგის მხარდაჭერი კომპიუტერული სისტემების დამუშავებისა და კვლევის კონცეფცია. გამოიყენება უნიფიცირებული, ობიექტ-ორიენტირებული მოდელები, გადაწყვეტილების მიღების ჯგუფური მეთოდები, თვისობრივ-რაოდენობრივი მეთოდები, მულტიმედიალური, BigTable ტიპის განაწილებული ბაზები და მონაცემთა საცავები, პროგრამული უზრუნველყოფა ბიზნეს-პროცესების პარალელური დეველოპმენტისათვის და Grid-Cluster ტექნოლოგიები.