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INTEGRATION OF INFORMATION SYSTEMS OF THE ENTERPRISES WITH USE OF THE WEB-SERVICES CONCEPT BY JAVA TECHNOLOGY

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Now the modern enterprise has information systems of various purposes - accounting, financial-analytical, industrial, etc. Information systems become more complex; in them the increasing quantity of the information concentrates. At the same time considerably increase time and monetary expenses for maintenance of systems in an efficient condition. Besides there are suppliers, clients, partners with complex and specific information systems. All this should be in interaction. Thus the joint decision of several problems quite often is optimum by to long-term, regular, to widespread cooperation. But the decision of some problems can contradict the decision of others.

The problem consists in the optimal organization of this interaction to create the productive, reliable and safe automated chains of those businesses - processes which integration is necessary for the enterprise for realization of the business - functions.

Return to centralization of information systems is now observed, and it leaves a mark on designing of systems. The decision which should accept the enterprise, should be constructed on the basis of the advanced technologies, allowing to reach not only higher degree of reliability and controllability, but also significant growth of productivity and considerable economic effect.

With growth of the enterprise, putting of new, more expensive, more powerful computers into operation does not lead to expected results. Productivity of information system falls, though, it would seem - the technologies and experts are the same. What is the matter? The problem is in scales.

As scalability of system we will understand ability of system to increase the productivity due to connection of additional computing resources, both hardware and software.

Technologies used at enterprises are not adapted for work in conditions of large-scale corporate systems. Here are necessary qualitatively new decisions, other equipment, other principles of the organization of a network, and other principles of management.

The basic purpose of the given work is the description of system development of integration of multi supplier information control systems of the enterprises on the basis of use of the web - services concept by means Java - technologies.

Many enterprises have a need for transition to new principles of the organization of the information system necessary for business dealing [1]. Restrictions are high expenses, loss of time for sorting of data and carry of own development for a new platform.

Let's note the following positive moments of data centralization of the enterprises:

1. Interactive harmonization and consolidation of data.

The enterprises can clear and distribute product-related data, suppliers, clients and employees in the interactive form within the limits of ERP-environment and perform analysis of data in scale of all enterprise, for example, the analysis of expenses on a global scale. These procedures are intended for periodic interactive consolidation and periodic interactive distribution, instead of for frequent modification together with automatic distribution and comparison of data.

2. Modeling of data store.

The enterprises can carry out modeling of data, management of metadata, data gathering from non-uniform systems, transformation and distribution of data.

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3. Creation of data store.

The enterprises can control the dataflow in data store, and also carry out administration and monitoring of data store. They can use control facilities life cycle and efficiency (quality) of data and to define of user permissions.

4. Management of several projects through the Internet.

Management of projects is carried out on-line. It provides safe access to project data.

5. Creation of user groups.

Confidentiality is supported owing to creation of separate groups for work with suppliers and customers who, probably, are in a condition of a competition with each other. Another's data forbid to participants to look through information systems or to establish the person.

6. Reuse of standard patterns of projects.

Time saving and preservation of process sequences by use of standard patterns for new projects creation. Creation of a copy of the project structure: folders, files, magazines, forms, etc.

Information systems of the enterprises, as a rule, represent the applications developed and executed in the diverse soft - hardware environment. Real functions and processes in activity of the enterprises should be interconnected. The purpose of integration of similar systems consists in maintenance of fast reaction and is accompanied by greater overhead expenses, assumes a significant share of human work.

In this connection there is a problem of integration of such diverse and distributed information systems and revealing of the general format of information representation convenient for an exchange and for its further processing. The web - services concept creates a basis for the decision of problems of integration of diverse systems on the basis of the open standards.

Under a web - service the program system identified in line URI is understood, which open interfaces are defined and described by means of XML language [5]. The description of this program system can be found by other program systems, which can cooperate with it according to this description and transferred by Internet – protocols.

Advantage of use web - services that in their basis are standards, the open protocols of an exchange and the data transmission supported on all platforms: Unix, Windows, etc. Before occurrence web - services many companies developed the own, closed standards and formats.

Simple Object Access Protocol (SOAP) - is the standard protocol developed W3C, defining a format of requests to the web – services [2].

Let's consider ways of overcoming of system restrictions of the enterprises by mean of various Service Oriented Architectures (SOA), and, we will show the organization of web - the services business - logic, allowing trying to get interaction of the specialized integrated information systems of the enterprises (EISI) [4].

Let's consider the basic restrictions of approach EISI: specialization, the limited integration and lack of standards of the open branch networks. This restrictions interferes with effective interaction of the companies and the enterprises; for example, it is such EISI applications as:

1) Customer relationship management (CRM);
2) Investor relationship management (IRM);
3) Supply-chain management (SCM);
4) Enterprise resource planning (ERP).

EISI system specialization defined by kind of commercial operations for which the given systems are applied, and by kind of business in which the enterprise is engaged. Standards of execution EISI are not developed. But without definite standards it is very complex to integrate multipurpose commercial systems through the Internet. Unlike EISI web - services offer huge quantity of standard ways of application communication with external service - providers.

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For elimination of lacks in EISI various middleware are used. Web - services - the best middleware, providing communication of EISI systems with each other. They offer standards of the open branch networks for communication of systems EISI depending on platforms.

Actually, not all web - services are accessible in one SOA. It is possible to group web - services with base functions in the complex application of web - services. In the further the combination of these applications with others web - services or complex commercial operations in others SOA for creation of commercial services of higher level is possible. It means, that is possible using of several SOA for overcoming restrictions between EISI systems. Probably, also use of EJB (Enterprise Java Bean) components.

Such combination will enable you of scaling and fillings due to use of code system for change of commercial operations logic for complex systems. The base functions executed separate web - services, in SOA can be repeatedly applied and incorporated in the complex web – services application of higher level for creation new business - services which, in turn, can be repeatedly applied and incorporated in the complex business - services application of higher level in another SOA.

Use a web - services allows:

1) To lower an overhead expenses for current operation of corporate information system due to decrease in cumulative cost of the personnel resources necessary for functioning of system and due to elimination of mistakes, connected with manual carry of the information from system to system;

2) To lower the risks connected with system maintenance, due to construction of the environment of reliable transfer of electronic documents and carrying out of the protected transactions, including - financial;

3) To lower cost of creation and integration of new systems due to granting to developers of the corresponding integration interface.

Integration of information systems on the basis of web – services promotes reduction of the missed profit due to increase of speed of reaction of system as a whole.

Such opportunity of business dealing is necessity of preservation of the investments made in already existing information systems, and ignoring of restrictions concerning platforms, on which new systems will be based in the future, means an opportunity of work of web - service components on the greatest possible number of soft - hardware environments and support of general interfaces.

The web - service can play the basic role in the integration decision or be used as the base to construction of integration schemes with complex processing messages.

Characteristic tasks at which decision the web - services construction is required, are:

- Synchronization of data (for example, databases and directories);
- Automation of the distributed processes;
- Automation of work of compound applications.

Synchronization of data is actual in the event that, for example, some the removed offices of the company work with the general for all information. Such scheme assumes synchronization of data in databases and can carry transactional character.

Example of automation of the distributed processes is electronic payments between the central office and regional branches of bank. Carrying out of financial operations demands unconditional reliability of transfer of the information between applications in the center and on places. The web - service provides transfer of electronic payment documents.

Work of compound applications is usually directed on automation of business- process and is performance of some the interconnected actions by the modules, which are responsible for automation of separate business - functions.

Example of work of the compound application is process of accommodation and processing of the order. The client, using a web - application, places the order through the Internet. This event leads to start of a chain of other events: in CRM-system the information on the client is updated, in ERP-system presence of the goods in a warehouse is checked, the module SCM places the order for updating of a warehouse in supplier system.

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The web - services technology defines standards for classification, representations, search and call of services. These services can include various elements - from the operations, witch being a part of existing, inherited applications, up to new components J2EE (Java 2, Enterprise Edition), which are placed on the applications server.

The SOA concept means realization of the enterprise business - processes in the form of set of the services cooperating with each other or with clients in certain sequence and by certain rules.

On the basis of developed service probably interaction between the enterprises, the centralized accommodation and use of resources, the effective organization and planning of the enterprises activity, and fast information interchange.

Literature

1. Cary E. Umrysh. Developing Enterprise Java Applications with J2EE and UML. -2002. 330 p.
2. D. Chappell, T. Jewell. Java Web Services. -2003.
3. Ye. Ivanova, M.Vershinin. Java 2, Enterprise Edition. Technologies of designing and development. -2003. 1088 p.
4. P. Perroun. Creation enterprise systems on J2EE. -2001. 1184 p.
5. I. Habibullin. Web – services development by Java tools. -2003. 400 p.
6. W.Emmirich. Engineering distributed objects. –2002. 510 p.