Highlights for panel discussion:

Development and Use Corporate Object-Oriented Technology
HOPE (Hyper-Object Processing Environment) In Consulting
Business Processes

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Abstract

This paper reflects the panel proposal and describes the experience of deployment the HOPE methodology. The system developing is conducted by group MCS IT (Price Waterhouse). The technology HOPE (HyperObject Processing Environment) is a further development of technology Client-Server and its association with technologies Internet/Intranet and Object-oriented Programming. Paper is prepared for discussion, thus the brief topics are just indicated to moderate panel discussion.

1. Reasons of creation HOPE

- Absence of the standard object-oriented methodology of development of branch information systems
- Necessity of creation of Uniform Technology for architecture the Client - server and corporate networks (Internet)
- Necessity to realize inheriting of properties and events reflected in a conceptual model in logical and physical models DB MS SQL Server

2. Goals

1. Creation and accumulation of the database of the electronic documents of BRANCH of any types with possibilities of multi criteria searching of the documents (including graphics) and searching on complex logical conditions.
2. Construction scoping of client-server architecture
3. Acceleration of the process of development
4. Simplification of the process of operation

Really now, the only most advanced means of development of client-server architectures allow to execute automatic distribution of functionality (means of data updating, control, ...) between parts of the system. However, the similar complexes are very expensive and requires considerable resource consumption (for example Oracle Designer, ...). Installation client-server system, its updating and support required large efforts and interaction managers of the network. The implementation was conducted on MSSQL Server. Reason of choice - desire of the Client. It was meant to meet the client’s requirements of accessibility and inexpensiveness.

Now there is no standard method of integration of data and program within the framework of the object-oriented approach. Practically all means of development encapsulate operation with data in objects appropriate to a "physical" level of a model of data. In this case the developers are dealing with such classes as table, request instead of classes appropriate entities simulated system. The authors consider to be that fundamental defect of architecture client-server. At the same time, object-oriented Data Bases yet do not correspond on a performance and availability level allowing their use in industrial development.
3. Tasks

- Development of technology tool for decomposition of industrial processes (Corporate - Branch level) using decomposition into simple Business Processes
- Creation of algorithms of passing of the documents according to a work cycle (development, coordination, assertion of the documents)
- Resource management - instructions, orders, efficient fulfillment control
- Organization of efficient interaction of separate divisions of the enterprise
- Maintenance of dispatch and reception of the documents through external systems

4. Requests

(delivery – communications Function):

- Reliability
- Confidentiality
- Delivery and registration of the communication traffic control
- Possibility of information delivery through the various environments depending on the availability of telecommunication resources
- Reliability
- Possibility of access to external systems record-keeping of configuration of the Clients
- Realization in the environment Microsoft Windows - Delphi, MS SQL Server, Lotus Notes Server

Structure

We shall introduce some definitions necessary for the description of the structure HOPE

HOPE - Hyper Object Technology for information interchange and operation

HOPE BROWSER - universal Client (visual shell)

HOPE SERVER - universal DB Server (all database functions are executed on the Server)

HOPE SERVICE - Specialized Service (process of the Server)

UDC - Universal Data Container - Object-Oriented Technology for operations with Database

PAGE - Object-Oriented Visual features for submission of the information for the Client

HOPE represents modified 3 level client-server structure:

- System includes the database server, application server and client part of system - browser (see fig. 1). The DB server is responsible for data storage in one or several databases. We use DB inaccessible directly for Client. In this case DB consequently can have the simplified model.

The Application server is most important. It will realize purely business processes. Problems of the application server include interaction with the DB server (data reading and recording) and with the Client (reception and dispatch of information Packages).

Features of the application server in HOPE are:

- Heavier load than in traditional systems on the application server.
- The Object-Oriented interface with the server DB and with the Client.
- Encapsulation one or several business processes in services.
- The Client part is responsible for granting of the users interface.

In HOPE the unified Client program also called as a browser is used. The unification means, that the browser can be used without changing with any applications. Such approach allows to reduce labor intensifies input of installation, support and upgrade of the system.

The scheme of interaction

As against classical approach, in the system HOPE the ratio of functions between the Server and Client is changed. A main labor put on the application server. The Application server is responsible for primary functions of the system, (that is ... means of updating of data, executing checks, etc.). The DB server is used only for data storage. As a rule, it DB is not used from the outside, and, therefore, can be simplified, without the inclusion of mechanisms of data integrity. However, DB can contain its own business rules and its own mechanisms data integrity.

Universalness of the Client also means, that the Client doesn’t work with any Business rules from current applications. The Client is only responsible for obtaining of the data from the application server, granting of these user's data, responding to its operations and dispatch of results back to server. Thus, the scheme of interaction looks as follows – Fig.1. The following HOPE components fixed on the basis of HOPE approach:

1. The SQL Server is used for storing both data of Applications and its own HOPE data.
2. HOPE Server is an application server granting Object interface to data stored on the SQL Server. At one level the HOPE server define objects DB in terms of Object oriented
technology. Complete independence of the Client from the DB server (from access method) thereby is achieved.

3. Object Transport is used for exchange of Object Packages (OP) between the HOPE Server and the Clients (such as the HOPE Browser). We develop a basis Object Transport for the Object Database, allowing developers to create stored objects (persistent objects) and to transmit them between applications. Object Transport uses a number of transports for transfer Object Packages (OP) between Applications. The Transport can be exchanged through LAN, WAN, Internet and Lotus Notes.

4. The HOPE Browser is a Client part of the HOPE’s technology. The HOPE Browser is responsible for imaging data and for interaction with the User. The Browser receives data and sends the users requests with the Object Transport.

5. Model of Business Process

We briefly discuss the main topics. The most principle features are as follows.

- The system bases on networks MicroSoft and Novell. As a mail server the server LN is used. As the server of the database is used MS SQL Server 6.5
- We used UDC (Universal Data Container - Object-Oriented Technology of operation with Databases Level of abstraction) for one Single Business Process (BP) of the company. A little BP realized independently.

Structure of the database

The database structure reflects all the significant Business Contacts and UDC, as shown in Fig. 2a, 2b.

6. Realization Business of Processes in technology HOPE

The Database Interface

Let's consider interfaces in more detail between components of the HOPE system.

As it was already marked, one of problems of classical client-server approach is the absence of the standard methodology for imaging a relational DB model into an object program model. As a rule, the tools of development connect classes of objects appropriate to such objects DB, as the tables, requests stored procedures. However, the model DB is imaging the real world on entities DB. On realizations of similar imaging the major characteristic of real object (it behavior, that is set of operations applied to the given object) is lost.

Within the framework of a classical model, the behavior of object will be realized by application as a set of procedures called in reply to user operation (events handlers). In results code is diffusion on all program system. HOPE is used another technology approach called as the object interface DB. Such interface represents a set of objects classes, each of which will realize some object of the real world, that is contains data (attributes) and operations above them.

Each such class responsible for data access (probably using standard classes of the development tool), them aggregation, and also realization of operations above them. The program operates with such objects, using their attributes and calling methods of operations. For example, appendix the realizing passing of the application on licensing can contain next classes:

1) TCompany - company.

Attributes:

CompanyID: the identifier of the company inside the system (only for reading)

Name: the name of the company

Methods:

IssueApplication: TApplication -- to submit the application for obtaining of the license.

2) TApplication - Application for the license
Attributes:
- **AppID**: the identifier of the Application
- **Company**: the company
- **AppNum**: number of the applications assigned by its registration

Methods:
- **Reject**: to reject the application
- **Accept**: to satisfy the application and to license.

3) **TLicense - license**

Attributes:
- **LicenseID**: the identifier of the license
- **App**: the application

Methods:
- **Revoke**: to revoke the license

The advantages of the given approach are obvious:
- Becomes simpler development of the program considerably at the expense of transition to the object-oriented
methodology of operation, more visual semantic con-
structions, reuse of the code

- This approach is guaranteed the correctness of operation fulfillment. The method of operation can use the mecha-
nism of transactions DB. The method can make addi-
tional checks on correspondence Business process.

In Fig. 3 we describe the Database Interface Model.

The times diagrams
- Obtaining a simple value
- Obtaining of Lookup-value
- Saving of values
- Obtaining of the lists

Notes. Value, transmitted in GetLookupList - current lookup-value of a field, i.e. text typed in Reference con-
trol. Simple, List and Standard Item - the lists ignore Value.

Long Item List includes significance Value in the request as WHERE Field_Value like ' of % <Value> of %

3. Architecture of streams of the information
The topics for broader discussion are as follows:
- main principles of HOPE technology,
- service corresponds to only one Business Process,
- the Server executes some independent services.

References
1. Booch G. *Object-Oriented Design with Applications*, Benjamin/Cummings, Redwood City, Calif., 1991