Technologies solutions and Oracle instruments used in the accomplishment of executive informatics systems (EIS)

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TECHNOLOGIES SOLUTIONS AND ORACLE INSTRUMENTS USED IN THE ACCOMPLISHMENT OF EXECUTIVE INFORMATICS SYSTEMS

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The role of a system for the control of the data bases and the facilities offered by it is highly important in the success and performance of an executive informatics system. From this point of view, the analyze will take into account the facilities of working with evolved data bases and storages of data, the implementation of some OLAP functionalities an data mining but also the integration of data and applications coming from different sources, the way in which the process of extraction, transformation and loading of this data in the final storages takes place, the easiness in administration and the instruments offered for the developing of interfaces.

One important point of this analyze refers to the performance in interrogation, both on operational data bases and the extraction of data from data storages.

The executive Informatics System, OLAP, Data Mining

1. Comparative analyze of the performances and facilities obtained by the available SGBD

Taking into account that the majority of organisations have already implemented applications of different generations on two big platforms of data bases, namely Oracle and Microsoft SQL Server, the comparison will be resumed to these two types of SGBD, and the current versions brought forward for analyze are Oracle Database 10g and Microsoft SQL Server 2005. Each of these two is available in different editions or variants in order to satisfy all the requests of the market.

Oracle Database 10g is available in five editions, each having implemented specific characteristics for each segment of the market:

- Oracle Database 10g Standard Edition One (SE1) is intended for business mediums with quite a low request of adaptation, departmental levels, being limited to maximum two processors;
- Oracle Database 10g Standard Edition (SE) is the superior variant of SE1, having also facilities of clustering with Real Application Cluster, still it is limited to a server with maximum four processors;
- Oracle Database 10 Enterprise Edition (EE) represents the most complex version, with control programs for big volumes of data in transactional mediums and critical applications. Optimizations in the extraction of data from storages, high security and administration;
- Oracle Database 10g Personal Edition (PE) is the edition designated for individual development of applications, being compatible with the other products, such as SE1, SE and EE. The advantage lies in the fact that it circulates on variant stations, with more processors, but it is limited to a single user.
- Oracle Database 10g Express Edition (Oracle Database XE) is a recently launched edition, free of charge, designated for business mediums with small and medium adaptation request, it can be installed on any station, but being a free edition, the data base dimension is limited to maximum 4 GB.

The majority of available editions contain advanced facilities of administration and security, such as clustering, partitioning, ciphering algorithms, control programs for users, control of resources, and optimization of data request. Both adaptation transactional methods and Business Intelligence options are implemented with the OLAP functionalities, data mining and the support for the construction of data storages. From the data integration point of view, services for the interconnection of data from external sources and systems and present.

2. Analyze of the Business Intelligence facilities and instruments offered by Oracle Database 10g vs. Microsoft SQL Server 2005

About the performance in the accomplishments of requests on relational data bases in a study carried out in June 2006 by *Transaction Processing Performance Council* (*TPC*), at the performance test TPC-C V5 which evaluates the processing of transactions performances in the OLTP systems (on-line transaction processing) on the variant without clustering, Oracle Database 10g occupies positions 3 and 4, after IBM DB2 and ahead of MSSQL Sever 2005, and in the clustering variant Oracle Database 10g is the only possible variant with a score of 1,184,893 tpcm.

At the *TPC Benchmark H (TPC-H)* test, for the processing performances in the ad-hoc reporting, in decisional mediums *Oracle* Database 10g with Real Application Clusters obtained a new record of performance in what concerns data processing for a dimension of the data base of 3000 GB. This is a test of evaluating analytic processing characteristics, of extracting data through requests and concurrent modifications.

The performance unity of measurement is called *TPC-H Composite Query-per-Hour Performance Metric* and it reflects many characteristics of data processing. These include the data base dimension, the processing and modification of data speed. As a result, on a 64-Node HP ProLiant server, with dual-core AMD processor Opteron 2.4 GHz and Red Hat Enterprise Linux 4, Oracle Database 10g with Oracle Real

Application Clusters established a new record of performance, with 110,576.5 QphH@3000GB, having a cost/performance rate of $37.80/QphH@3000GB.

The Oracle Database 10 g performances are obvious also at a data base dimension of 300, 1000 and even 10000 GB, while MSSQL Server 2005 occupies positions 5 to 10. At a data base dimension of 100 GB, the roles are reversed, MSSQL 2005 being on the first positions.

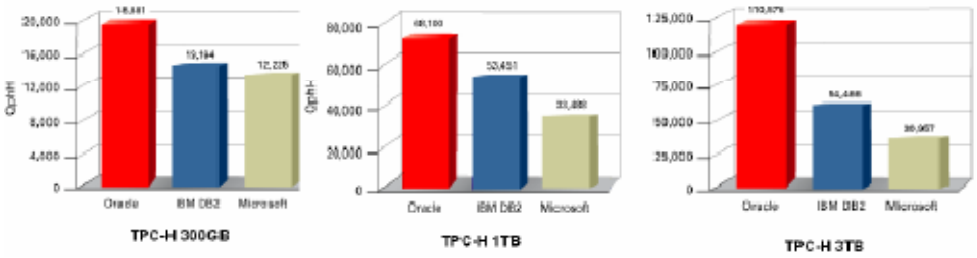

Figure 1 -The score of performance tests

3. Instruments and technologies for the development of applications and business intelligence systems

The Oracle platform offers a series of instruments and technologies for the development of applications and business intelligence systems which can be used in the accomplishment of EIS.

These are grouped in a special class - ***Oracle Business Intelligence*** and have the following components:

1) Components for data storage and preparation for analyze:

- Oracle Business Intelligence Warehouse Builder (OracleBI Warehouse Builder) for the projection, implementation and maintenance of data storages;
- Oracle Business Intelligence Discoverer Administrator (OracleBI Discoverer Administrator) for the accomplishment and administration of a vision oriented on business of relational data;
- Analytic Workspace Manager for the structuring of data in the scope of an advanced analyzes.

2) Components for data analyze and reports accomplishment:

- Oracle Business Intelligence Discoverer Plus (OracleBI Discoverer Plus) for the accomplishment of ad-hoc reports;
- Oracle Reports for the accomplishment of detailed reports at the entire company level;

- Oracle Business Intelligence Spreadsheet Add-In (OracleBI Spreadsheet Add-In) for the analyze of data directly into a calculus Excel paper;
- Oracle Data Miner for the accomplishment of data mining process;
- Oracle Spreadsheet Add-In for Predictive Analytics for the accomplishment data mining process directly into Excel.

3) Components for publication and interaction with the created reports:

- Oracle Business Intelligence Discoverer Portlet Provider (OracleBI Discoverer Portlet Provider) for publication of reports in OracleAS Portal;
- Oracle Reports for the distribution and publication of reports in the organization's medium, on the Internet through the integration with E-Business Suite or OracleAS Portal;
- Oracle Business Intelligence Discoverer Viewer (OracleBI Discoverer Viewer) which bares the visualization of reports on the Internet.

4) Components for the applications' development:

- Oracle Business Intelligence Beans (OracleBI Beans) is a component integrated in Jdeveloper and it permits the development of JSP applications;
- Oracle OLAP allows the creation and application of analytical functions which can be used in the applications made with OracleBI Beans.

The architecture of Oracle Business Intelligence offered by the Oracle Corporation is presented in the following figure:

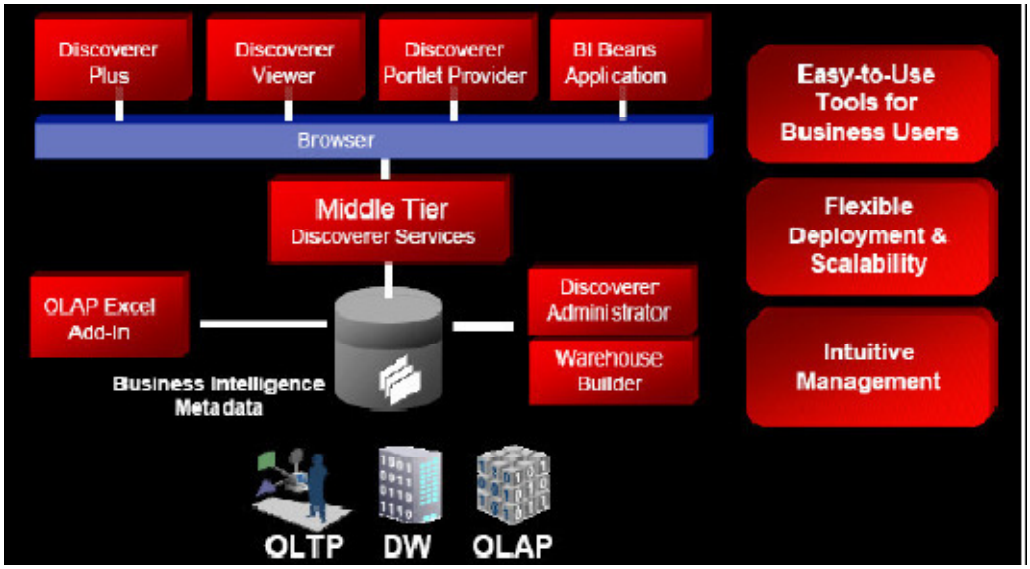

Figure 2 –Architecture of Oracle Business Intelligence [ORACLE Corporation]

Oracle Data Miner offers the possibility of accomplishing flexible applications with an intuitive graphic interface which can be easily modified by final users through the application of data mining algorithms and construction of predictable models of analyze.

As a result of the application of these models, a Java or PL/SQL code is generated. A series of applications can be built in order to apply the data mining process automatically.

In the following figures is presented the accomplishment of this kind of application (figure 3) and the obtained results (figure 4).

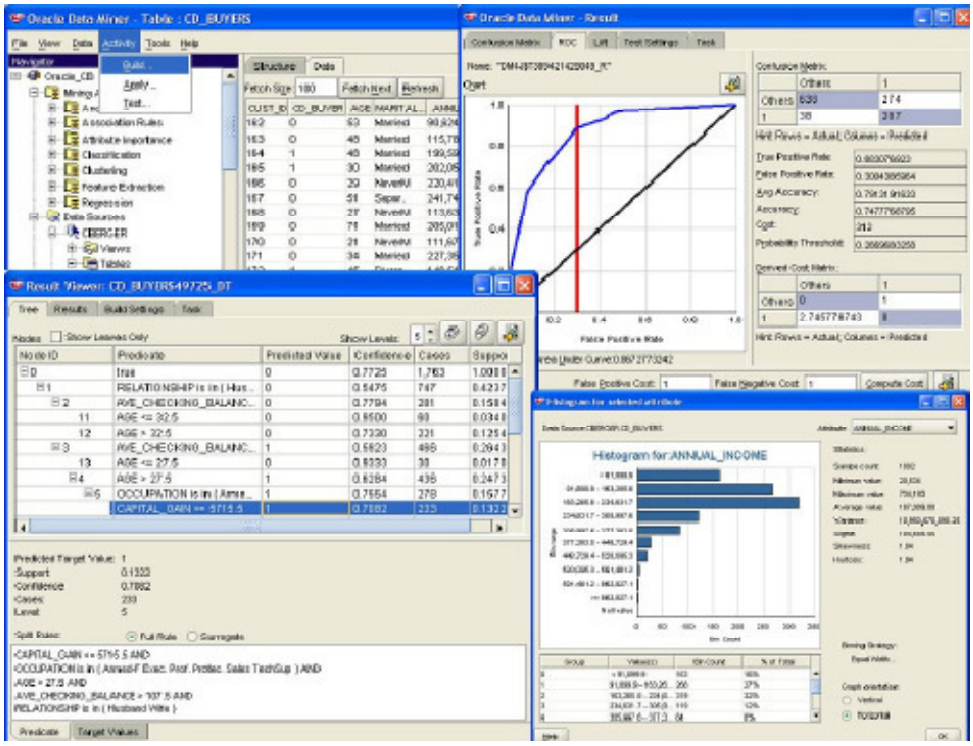

Figure 3: The construction of an application in Oracle Data Miner

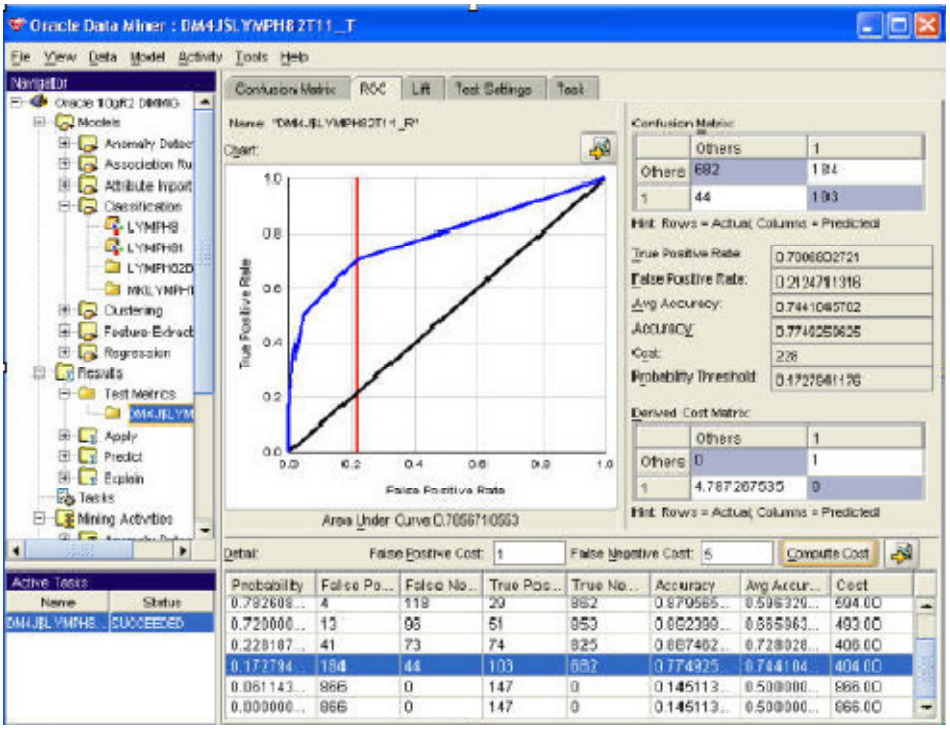

Figure 4: Results obtained after the application of data mining process

Oracle Data Mining permits the application of the following types of algorithms:
Predictable models or supervised instruction:

- Algorithms of classification which suppose data grouping in different classes and then auto-classification of the new introduced values;
- Algorithms of regression – functions of approximation and of predicting the continuous values;
- Selection of the important attributes – the most relevant attributes of data is selected for the predictable results;

Descriptive models or unsupervised instruction:

- Clustering – discovery of grouping in data;
- Association rules based on the analyze of the "shopping cart";
- Algorithms of extraction for the accomplishment of new attributes based on the existing ones;

-Models for multimedia (TEXT) and bioinformatics (BLAST)

Data necessary for the process are extracted directly from the Oracle data base, without being necessary their storage.

The Oracle components necessary for the accomplishment of a system for business intelligence bears the entire cycle of the system's development which supposes the following steps according to ORACLE Corporation:

- Identification of the business requests coming from final users;
- Identification of data sources;
- Design of the data model;
- Accomplishment of the data storage;
- Generation of data;
- Preparation of data for the access of extraction and analyze instruments;
- Rendering of access rights;
- Distribution of reports and applications and catering of documentation.

Business requests can appear at all levels and departments of a company and the Oracle components allow the accomplishment of applications for the satisfaction of these requests:

- Board of administration: analyze of the key indicators for performance, analyze of the tendency of the organization's development, exceptional reports;
- Planning and administrative analyze: investments, reorganization, allocation of resources, politics concerning human resources;
- The financial development: budgeting, consolidation, variance analyze, financial modelling, cash management, financial indicators;
- The commercial department: profitability, buyer's profile, commercial profitableness indicators, sales analyze.

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