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BUYER CASE STUDY

Bayer HealthCare Integrates OLTP and DWH Through Oracle Exadata for More Efficient Drug Information Analysis

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IDC OPINION

This is a case study of Bayer Yakuhin Ltd.'s implementation of Oracle Exadata to help address their objective of simplifying the aggregation and analysis of drug information. This study investigates Bayer Yakuhin Ltd.'s project requirements, product selection, and the implementation results. This will also serve as a model case study for companies that aim to strengthen their management and utilization of information.

- Competition in the development and sales of products in the pharmaceuticals market is rapidly intensifying. In this market, where rivalry among powerful drug manufacturers is high, it became necessary for Bayer Yakuhin Ltd. to integrate vast amounts of scattered information on a daily basis in order to implement advanced sales strategies that will enable it to compete more effectively.

- In addition to upgrading the efficiency of indirect business for Bayer Yakuhin, Ltd. the adoption of Oracle Exadata, at the planning stage, was expected to contribute in improving total cost of ownership (TCO) for all investments such as initial investment costs and continuous operation costs. At the time, their implementation track record for Oracle Exadata's latest architecture was nonexistent. Thus, the decision to implement it at planning stage iwas as future investment, as well as an innovative challenge for the company.

- Six months after purchasing Oracle Exadata, Bayer Yakuhin Ltd. was running its production systems on Exadata and conclusively achieved its initial target of streamlining information management. If Bayer Yakuhin Ltd. had not waited for the release of Exadata to revamp its marketing and sales support system, it would not have been able to consolidate its online transaction processing (OLTP) and data warehouse (DWH) onto a single platform and realize its goal of simplifying its information management systems.

- In order to determine the long-term value of Oracle Exadata, Bayer Yakuhin Ltd. did not only consider a compared the short-term benefits of Oracle Exadata's functionality vs. its cost. In addition, it looked into Oracle Exadata's potential from three aspects; namely the company's management vision, its support for business enhancement, and its use as a strategic information management base. IDC believes this case study is noteworthy because it provides a framework for understanding why Bayer Yakuhin Ltd.'s Organization and Information Department opted for a new product without a strong track record – but which had an innovative architecture that had great potential to reduce its total TCO in the future – versus a known product.

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IN THIS BUYER CASE STUDY

This study discusses the events leading to Bayer Yakuhin Ltd.'s decision to adopt Oracle Exadata and analyzes both implementation and post-operation assessment. Bayer Yakuhin Ltd. adopted Oracle Exadata Database Machine X2-2 (hereinafter referred to by its brand name Oracle Exadata) in the revamp of its marketing and sales support centered on systems infrastructure by improving the speed of drug information aggregation.

In this report, there have been some changes from the original English translation to improve the ease of reading.

SITUATION OVERVIEW

Background

Every industry witnesses waves of innovation, and in the pharmaceutical industry the race to develop new drugs is reaching a new level of ferocity. The scale of research and development costs for new drugs resulting from business expansion impacts enterprise competition; as a result, megacorporations with annual business in the range of 1 trillion yen have emerged after a succession of mergers in Europe and the United States. In Japan, the rapid reorganization among major pharmaceutical manufacturers is still a recent memory as well. Against this backdrop of increased competition intensity, Bayer Yakuhin, Ltd. adopted Oracle Exadata with the following points in mind:

- To effectively manage a pharmaceutical company, a global IT strategy is indispensable for developing new drugs and promoting drug sales, which are needed to offset the huge research and development costs involved in drug development., At the same time, the need to keep up with the pace of technological innovation provides a strong motivation for investing in IT.

- In order to secure a larger share of the Japan pharmaceuticals market, it is becoming more important for Bayer Yakuhin Ltd. to reduce the time required for traceability and analysis of information to streamline business activities by effectively using in-house systems such as enterprise resource planning (ERP), customer relationship management (CRM), and sales information management, as well as secondary sales information and market information provided by the JD-NET/NHI pharmaceutical industry data exchange system (an online system that exchanges trading information between corporations, such as order data between drug manufacturers and pharmaceutical wholesalers).

- To improve its competitive position in the pharmaceutical industry, Bayer Yakuhin Ltd. developed an IT strategy for each of its corporate management focus areas, including pharmaceutical research and development, production, mission-critical tasks, marketing and sales that was based on four key elements: innovation, information analysis and traceability, open technology, and global IT alignment (consistency between IT infrastructures of all bases around the world).

    - **Innovation.** Increase business efficiency by reforming not only IT but also the working methods themselves

    - **Information analysis and traceability.** Build a base platform for IT to establish a means for precise and high-speed information analysis

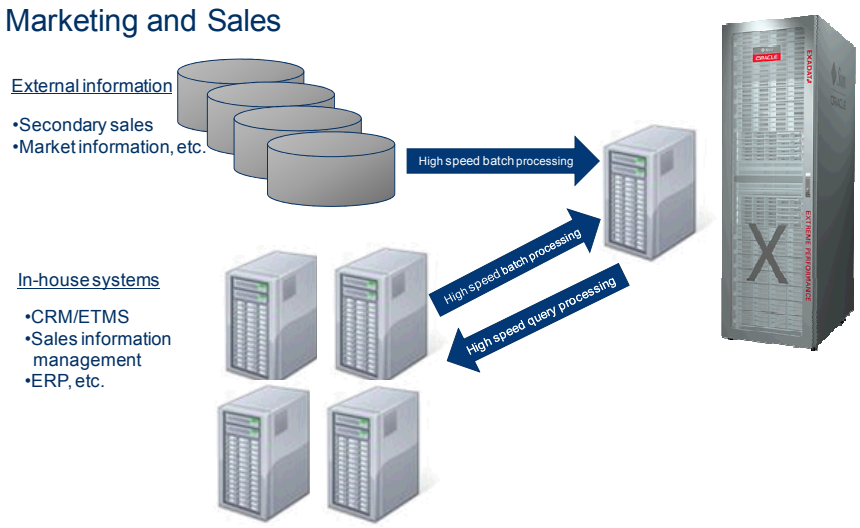
- **Open technology.** Avoid employing IT vendors' proprietary technology by adopting commoditized products. This makes maximum use of economies of scale via products that apply standard and open technologies

- **Global IT alignment.** Simple IT structure based on Bayer Group's companywide platforms such as ERP/business intelligence (BI)/production management, and drugs development

Figure 1 is an outline of the marketing/sales support system of Bayer Yakuhin Ltd. according to the background given above.

FIGURE 1

Outline of the Marketing/Sales Support System



Source: Bayer Yakuhin Ltd., October 2010

Organization Overview

Organization & Information Department

Bayer is a global enterprise with core competencies in the fields of healthcare, nutrition, and high-tech materials. The company's products and services are designed to benefit people and improve their quality of life. At the same time, Bayer creates value through innovation, growth, and high earning power. Bayer AG defines common values, goals, and strategies for the entire Bayer Group. The three subgroups and three service companies operate independently, led by the management holding company. The Corporate Center supports the Group Management Board in its task of strategic leadership.

Business operations are the responsibility of the subgroups such as the following:

- Bayer HealthCare is among the world's foremost innovators in the field of pharmaceutical and medical products. This subgroup's mission is to research, develop, manufacture, and market innovative products that improve the health of people and animals throughout the world. It has four operating divisions:
  - Animal Health (veterinary medicines and grooming products)
  - Bayer Schering Pharma (prescription medicines)
  - Consumer Care (over-the-counter medicines and dietary supplements)
  - Medical Care (blood glucose monitoring devices and contrast agent injection systems)
- Bayer CropScience — with its highly effective products, pioneering innovations and keen customer focus — holds global leadership positions in crop protection and non-agricultural pest control.
- Bayer MaterialScience is a renowned supplier of high-performance materials such as polycarbonates and polyurethanes, and innovative system solutions for a wide range of everyday uses.

Central service functions are combined into three service companies:

- Bayer Business Services is the Bayer Group's international competence center for IT-based services.
- Bayer Technology Services is the global technological backbone for the Bayer Group and a major innovation driver.
- Currenta offers services for the chemical industry including utility supply, waste management, infrastructure, safety, security, analytics and vocational training.

Bayer Yakuhin Ltd. is the largest company at Bayer HealthCare in Japan, with 3,000 end users. It adopted Oracle Exadata for its Japan office, but it is considering potential shared use; not only in Japan but also with South Korea, China, and so on.

TABLE 1

Bayer Yakuhin Ltd. Profile

Business sectors	Drugs, equipment for medical treatment, development/import of veterinary drugs, manufacturing/sales
Established on	April 5, 1973
Capital	2,273,425,000 yen
Shareholders	Bayer Holding Ltd. (100%)
Employees	Approx. 2,700
Sales	156,600 million yen (Total sales of Bayer Yakuhin Ltd. according to 2009 financial accounts)
Core products	Drugs for medical treatment (Drugs for treating high blood pressure, contrast agents, drugs for treating hyperlipemia, drugs for diabetes, anticancer drugs, etc.)

Source: Bayer Yakuhin Ltd., October 2010

Challenges and Solution

Improving Business Efficiency by Technology Innovation Synergy Effects

In order to go beyond the IT reform alone for advanced mechanisms and gain the synergistic effects that lead to business process transformation, Bayer realized it first had to convince a wide range of employees (from management to business department leaders) that business process transformation — which would be impacted by changes in the information systems — has great value. One objective of Bayer's IT reform strategy that was expected to have a significant impact on Bayer's business processes was to be able to quickly analyze and trace large amounts of accumulated data, as well as to improve the efficiency of sales activities.

This is because reducing the time required for traceability and analysis of necessary information for streamlining sales activities is becoming increasingly important at Bayer Yakuhin Ltd. to secure a larger share of Japan's pharmaceutical market. This can be achieved through using in-house systems effectively such as enterprise resource planning (ERP), customer relationship management (CRM), and sales information management; as well as secondary sales information and market information provided by the JD-NET/NHI pharmaceutical industry data exchange system (a value-added network (VAN) that exchange trading information between corporations, for example, ordering data between drug manufacturers and pharmaceutical wholesalers).

However, businesses with hospitals and medical institutions are in the form of secondary sales because the drugs are not sold directly but through wholesalers, and it has been difficult to gain a real-time understanding of business performance from the data of JD-NET/NHI (VAN), as it is external information. Moreover, the data volume being handled has increased steadily year over year.

The analysis information retained by Bayer Yakuhin, Ltd. is as follows:

- Bayer Yakuhin, Ltd.: Approx. 40,000 items per day
- Pharmaceutical industry VAN's JD-NET/NHI: Approx.10,000,000 to 15,000,000 items annually
- Number of delivery destinations: Approx. 100,000 Japanese customers
- Others: 5,000,000 items of activity information annually, and tens of millions of items of market information

Fast and highly accurate analysis and traceability across various axes such as by branch/sales office, by region/organization, and by product are required. In terms of information analysis and traceability, the greatest challenge faced was the ever increasing data mart.

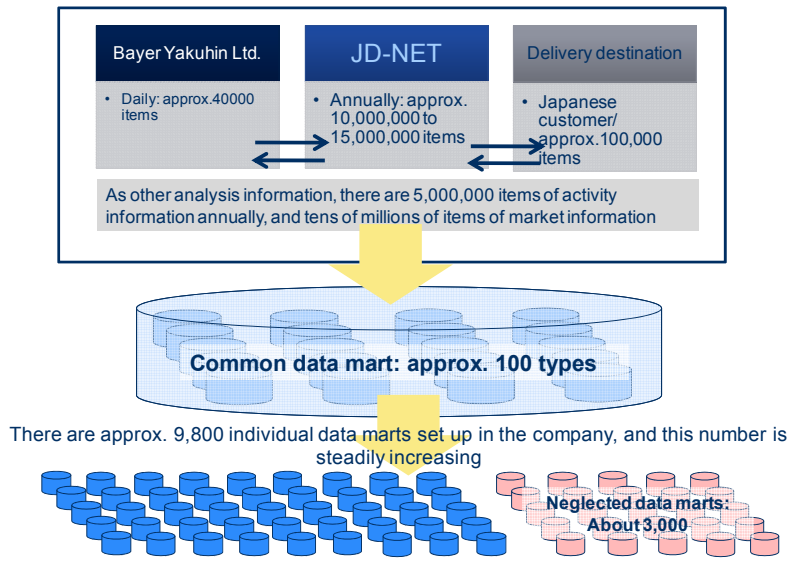
Generally speaking, the term "data mart" refers to a subset of the DWH where all enterprise information is stored, from which departments extractthe data necessary for analysis and traceability. The data mart is formed by combining the database and its analysis/visualization tools, and in many cases, it is formed for each department such as the development department, sales department and accounting department.

Approximately 100 types of data marts were accessible to all employees in the marketing and sales departments in Bayer Yakuhin Ltd. Moreover, up to approximately 9,800 smaller-scale data marts were created by each department and team where information analysis and traceability were creatively processed. As a result of a detailed investigation of these data marts, it was found that there were approximately 3,000 data marts which were neglected and recently unused (see Figure 2).

Amid the continuously increasing data marts, data duplication was also increasing, and maintenance was excessively difficult. Batch processing (an effective processing method where a large amount of data is periodically collected together and processed, such as in a sales and order data aggregation in an enterprise) required a maximum of 11 hours; thus a situation was encountered where the system had reached its limit and could not respond to requests of the marketing and sales departments to improve work efficiency and enhance corporate competitiveness by performing flexible analysis when necessary.

FIGURE 2

Issues in the Increasing Amount of Information and System Limits



Note: Created by IDC on the basis of interview with Bayer Yakuhin Ltd.

Source: IDC Japan October, 2010

Categorizing Business Issues to be Solved and Investigating Solutions

Why did the number of data marts in Bayer Yakuhin Ltd. increase continuously? This was because the company adopted a method that divides the data into small chunks (producing more data marts) in order to rapidly gather and analyze data from the expanding amounts of information to be handled.

Bayer Yakuhin realized it had to change its IT strategy to halt the spread of more data marts. Bayer Yakuhin Ltd. identified three key goals of its IT strategy:

- Support the analysis needs and improve the satisfaction level of 350 Japanese "intelligent users" (users who are conducting high-level information analysis)
- Improve TCO for overall investments, including continuous operation cost, initial investment cost, and streamlining indirect business.
- Introduce a system with high processing capabilities and revamp its IT infrastructure.

In considering how to support these goals, the following three points were raised.

- Simplify the IT structure by eliminating dispersed business systems
- Improve business processes by using dedicated DWH appliances with high processing capabilities
- Reduce TCO by consolidating DWH and OLTP related processes, and implement a real-time DWH by using a single repository

There were two major types of database management systems in Bayer Yakuhin Ltd. First, Oracle Database is employed globally by the Bayer Group, while the other is a database management system that is mainly employed in business systems. In this instance, in investigating the introduction of a new system, Bayer Yakuhin Ltd. considered unifying the OS platforms of Oracle Database and the business system into Microsoft Windows, and integrating the database management system into Oracle DB.

Moreover, they also studied whether to employ a conventional format of installing database management software on servers, or to employ dedicated appliance servers for DWH, as a business/marketing support system to analyze the vast amounts of data.

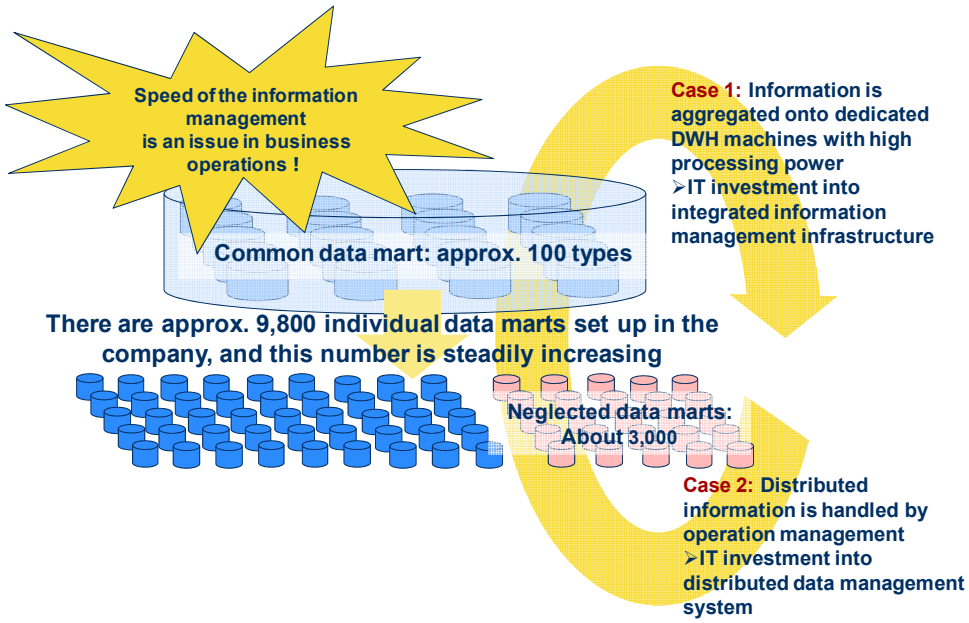
Reason for Selection of Oracle Exadata and Implementation Process

Up to this point, Bayer Yakuhin Ltd. had applied a method in sales/marketing analysis whereby; data was divided into small chunks in order to create data marts that could be aggregated and analyzed as business information quickly expanded. This is the "Case 2" method shown in Figure 3. This method, resulted in an increase in small-scale but large-volume data marts. Moreover, there was an increase in duplicated data, maintenance complexity, and lengthy batch processes. Costs were incurred to create a large number of data marts which required batch processing at night, without knowing for sure whether those data marts were utilized or not,.

At that time, as global operations were progressing, and amid the overall issue of information being dispersed several times over, the demand from internal power users for a single data source was increasing.

FIGURE 3

Related Approach in Total Cost of Ownership for Information Management Infrastructure



Source: IDC Japan, October 2010

When analyzing sales/marketing data, Bayer Yakuhin Ltd. began their selection by leaning strongly toward considering dedicated DWH appliance servers as the company was reaching the limit of its existing systems. These servers can aggregate information sources into a single location, do not require nightly batch processing, and can eliminate the complex maintenance issues present with multiple systems and versions; in line with a concept of simplifying operations by streamlining the IT structure of systems and data, and minimizing the cost to acquire the necessary data when necessary.

At first, the two following criteria were emphasized when selecting DWH appliance servers:

- **Criterion 1:** The performance capability to analyze increasing data volumes in the future
- **Criterion 2:** A commodity product that uses industry standard technology and has a sufficient performance record

On the other hand, Bayer Yakuhin Ltd. was running another project to integrate the OLTP database management systems dispersed in business systems such as ERP, in parallel with improving sales/marketing analysis performance. However, since obtaining a return on investment (ROI) rapidly would be difficult if the two projects were funded individually, the company started to explore the possibility of further reducing the cost by consolidating OLTP and DWH onto a single system. The selection of a DWH appliance server as a sales/marketing support system met the above mentioned criteria 1 and 2, but when the overall TCO for Bayer Yakuhin Ltd. was taken into account, OLTP and DWH consolidation was identified as a new criterion 3.

- **Criterion 3:** Reduce cost further by consolidating OLTP and DWH

When Bayer Yakuhin Ltd. started its investigations, Oracle proposed the original Oracle Exadata V1 product but a DWH appliance server was not yet available to consolidate OLTP and DWH. Criterion 3 — reducing costs by consolidating OLTP and DWH — was therefore removed from the sales/marketing support systems selection criteria.

At that time, Bayer Yakuhin Ltd. also considered the length of the implementation track record as a decisive factor in their selection, on the basis that performance itself would not differ much among companies. It had almost decided to exclude Oracle Exadata V1 from the options based on the decisive factor, when Oracle Exadata V2 was announced. Since Oracle Exadata V2 could support the third criteria of OLTP and DWH consolidation, Bayer Yakuhin Ltd. cancelled its plans to select the DWH appliance server and investigated the merits of introducing Oracle Exadata.

Oracle Exadata was the only system that could consolidate OLTP and DWH, but on the other hand, its lack of implementation track record remained a cause for concern. However, due to the comprehensive support provided by Oracle Japan, it was able to focus on the benefits of consolidating OLTP and DWH as the next step toward the future rather than focus on the risks. Hence, it was decided to employ Oracle Exadata.

What was the final impetus for Bayer Yakuhin Ltd. to select Oracle's latest architecture as its next step — one that considered the future rather than the risks? Growth through innovation was the basic business policy of Bayer HealthCare (of which Bayer Yakuhin Ltd. is a part). This policy includes the practical use of IT as a key factor in innovation, and this can also be considered as influential.

The right tools are necessary for processing information, and IT is positioned as an indispensible tool for the progress of Bayer HealthCare. IT is considered not just as a simple tool, but also as an innovative platform for transforming business processes and improving working methods. In order to achieve this, IDC believes that the IT support provided by the Organization & Information Department, which is a business department, and the role of an organization that is responsible for and reviews information planning related to a company's future investments are important.

Results

As mentioned earlier, the adoption of Oracle Exadata was based on the fact that it can be utilized for OLTP as well as DWH, and that excellent cost/performance is anticipated due to consolidation on a single high performance sysytem. In addition, Oracle Database 11g is preinstalled on industry-standard multipurpose servers in a preoptimized format.

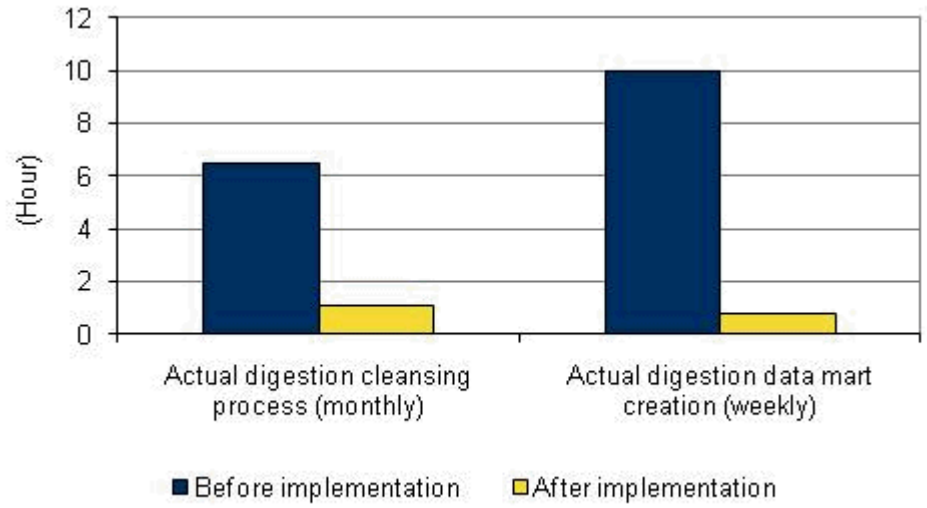
With Oracle Exadata, the typical investment risk of DWH appliance servers, where initial investment is higher compared to conventional multipurpose servers, can be minimized by consolidating DWH and OLTP workloads. In addition to such a reduction in initial investment cost, this also leads to improvements in TCO such as streamlining of indirect business and improved continuous operation cost.

It has been three months since the start of actual operations with Oracle Exadata, and Bayer Yakuhin has evaluated the implementation effects as follows (see Figure 4):

- Number of data marts is reduced by 50%
- Number of data queries is reduced by 66%
- The processing of sorting information (digestion cleansing) is reduced from 6-7 hours per month to one hour despite functional enhancements
- Data mart creationis reduced from 10 hours per week to 45 minutes
  - Batch processing for approximately 140 million records per day is now possible.
  - Daily updates and the latest information are processed much faster compared to the previous system
- Sorting/Consolidating master data is now possible

FIGURE 4

Effect of Implementation of Oracle Exadata



Note: Verified by Bayer Yakuhin, Ltd.

Source: IDC Japan, October 2010

Apart from the direct IT cost, indirect costs such as datacenter space and power supply capacity (reduction from two machines to one) were also reduced by the consolidation of OLTP and DWH onto Oracle Exadata. Had Oracle Exadata not been selected and OLTP and DWH each been built using different IT vendor products as per the original choice, the human resources required by both systems would have been doubled due to the technology differences, as would training costs, while the secondary effects on indirect costs and on reductions in running costs (including future indirect costs), would increase over the years. IDC believes that in that sense, the implementation introduction of Oracle Exadata was a solid investment in the future of Bayer Yakuhin Ltd.

ESSENTIAL GUIDANCE

Bayer Yakuhin Ltd. will continue to meet its growth objectives by improving work methods and business processes where IT is utilized as an effective tool for innovation in order to compete better.. The Organization & Information Department will continue to benefit from an IT environment that enables competitively advantageous business decisions making through data analysis coordinated in real time utilizing a single data repository.

The use of Oracle Exadata (in which OLTP and DWH are consolidated) in data analysis, coordinated in real time with the business, enables data exchange between OLTP and DWH by "Oracle to Oracle." IDC believes it is a sound step toward achieving Bayer Yakuhin's endeavor of a single data repository, as well as its desired IT landscape and vision.

High goals can only be achieved by taking definitive steps. IDC considers that the same applies in achieving one management vision and the IT strategy to support it.

With reference to the case study of the adoption of Oracle Exadata by Bayer Yakuhin Ltd., the following suggestions are provided for companies that are concerned with data analysis for making rapid, strategic management decisions in a competitive society, and enterprises that are unsure about the TCO due to the dispersal of business system databases.

- **OLTP and DWH consolidation.** A large number of businesses, when hoping to perform large amounts of data analysis at high speed, aim to increase the processing performance of DWH with dedicated DWH servers. It has so far proved difficult to physically consolidate OLTP and DWH into a single server. Since different performance characteristics are required by OLTP and DWH, it was necessary to implement a dedicated DWH server separately in addition to the business-related systems. However, as can be seen in the Bayer Yakuhin Ltd. case study, in Oracle Exadata, the processing function for large amounts of data found in DWH can be added where OLTP is implemented as the main system. Thus, DWH related processing is also possible with OLTP machines. IDC proposes reconsidering the TCO from adding dedicated DWH machines separate to OLTP machines for future IT systems where dramatic increases in data volumes are expected.

- **Integration of database management system.** Numerous businesses have siloed their various business systems because they believe in giving top priority to optimization in the field. Continuing to manage these siloed systems or various types of database systems are likely to have serious disadvantages down the line, in terms of operational and management costs, due to increased business complexity from globalization and increases in data volumes. Furthermore, this is clearly linked with the risk of data duplication and leakage, business failure due to the burden of data usage, and other significant risks. Japan's businesses are now entering a period where they will seriously consider the installation of information management infrastructure at the core of their IT landscape, and the integration of dispersed database management systems.

- **Look at system revamps as an opportunity.** IDC believes that when an enterprise faces pressing information management issues, the aforementioned two proposals require immediate consideration. However, when one has yet to encounter any overt major issue, it may be advisable for the optimization of TCO, to consider consolidating OLTP and DWH during a revamp of mission-critical systems included in medium-term management plans.

- **Avoid restrictive comparisons of quality and cost of features.** Comparisons of the cost, quality of system features and performance are important in the introduction of IT products. In the present Bayer Yakuhin Ltd. case study, these conditions were included in the three major selection criteria. However, something that must be taken into account with regard to relative functionality in the IT industry is the fact that products with better features are always on the horizon. Furthermore, if cost were perceived as the purchase price alone, Bayer Yakuhin Ltd. may not have chosen Oracle Exadata. What is noteworthy in the present case study is that the company proceeded with product consideration while bearing in mind its long-term vision, the so-called IT landscape, without adhering to short-sighted comparisons of features and cost. This case study also viewed IT investment in "innovation" as an investment in its own future. Nowadays, there is an ever-growing cost pressure on IT departments due to the economic recession and it is impossible to ignore TCO in the short term. However, if there is no vast difference in terms of functionality and cost, Japan enterprise IT leaders will need to make selections that are firm and balanced based on future potential in the form of TCO effects during continuous operation and benefits in IT strategy brought by the latest products rather than merely playing it safe and selecting products by looking only at its track records.

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Related Research

- *Oracle Exadata V2 Breaks the High Wall of Technology's Limitation* (IDC #JP1073501S, February 2010)

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