Global Headquarters: 5 Speen Street Framingham, MA 01701 USA P.508.872.8200 F.508.935.4015 www.idc.com

BUYER CASE STUDY

BNP Paribas Deploys Oracle Exadata To Accelerate Information Processing: The Hardware Perspective

Giorgio Nebuloni

IDC OPINION

Datacenters are an aggregate of very heterogeneous elements interacting with each other and incurring a complex chain of dependencies, particularly around the point of contact between hardware and software. Against this backdrop, IDC is observing a great push from suppliers and end users alike toward a consumption model based on pre-integrated blocks of optimized hardware and software that IT departments need only to fine-tune, as opposed to build out of a collection of different components. This approach was the one chosen in 2010 by BNP Paribas, one of the largest financial institutions in the world, in order to upgrade its datawarehouse by implementing Oracle Exadata Database Machine as the backend for all the applications, allowing financial analysts to pull data for their daily trading activities.

- While clear savings on the opex side were achieved (specifically as regard to hardware management and setup), Oracle Exadata Database Machine was not primarily selected as a way to reduce expenditure, but rather as an instrument to empower both database administrators and, more importantly, end users. BNP Paribas reported increases in throughput by 17 times compared to the Oracle RAC installation in use previously.

- On the front end, the use of Oracle Exadata Flash Cache technology improved read times dramatically, so that analysts are now able to see their queries executed in less than one second, down from an average of 30–60 seconds on the old cluster.

- From an infrastructure perspective, it is noteworthy that with solutions such as Oracle Exadata Database Machine, complex hardware architectural choices will be "outsourced" to the supplier, which takes care of fine-tuning the compute and storage block, but also of maintaining it. The most important lesson learned is that in such workload-specific systems, the hardware — in its complexity — is increasingly "masked" to the organization, which only makes use of it.

- IDC advises IT administrators to look at solutions such as Oracle Exadata Database Machine as a way to solve specific workloads needs, as such performance gains are often out of reach for IT departments looking to build the systems in-house. However, organizations should not overlook the impact on processes that integrated, drop-in software and hardware stacks can have. End users must include deployment such solutions within the framework of their broader IT infrastructure strategy, in order to maintain a coherent roadmap and avoid silos and inefficiencies down the road.

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IN THIS BUYER CASE STUDY

This IDC Buyer Case Study analyzes the implementation of Oracle Exadata Database Machine V2 at BNP Paribas, one of the largest enterprises in the banking sector worldwide. The paper briefly describes BNP Paribas' main areas of activity and focuses on the key factors driving the implementation, as well as on the impact this had on workloads and IT staff. Finally, a summary of findings and lessons learned is included.

SITUATION OVERVIEW

IDC believes that demand for integrated, "industrialized" IT solutions that eliminate at least part of the hassle of having to coordinate hardware and software assets is growing in EMEA. This reflects a wider "industrialization" and externalization trend in the datacenter industry where end-user organizations look for quicker, less expensive ways to purchase and deploy IT infrastructure at all levels. Pre-engineered solutions are sprouting at all levels, from facility (e.g., containerized, prebuilt in steel or modular brick and mortar datacenters), to datacenter hardware often sold in preconfigured, fully loaded racks, to full hardware and software stacks.

Such winds of change are in many ways affecting companies in the banking sector first, as customers in this area typically dispose of more advanced IT departments, as well as of larger budgets to invest in innovative solutions. As of the beginning of 2011, European banks have typically inherited vast, multilayered datacenters with areas of the infrastructure that have long been virtualized, and other still relying on legacy architectures, including Unix and mainframes.

Moreover — unlike what may be the case for other sectors — financial institutions and banks are strongly reliant on a high-performing IT infrastructure, which allows them to succeed against competitors in the fast-paced investment environments. In this context, and particularly over the course of the last five years, solutions for the build out of business intelligence (BI) and analysis tasks have occupied an increasingly important role. As IDC defines it, this is the realm of data integration and access (DIA) software, whose purpose is that of enabling the access, blending, and movement of data among multiple data sources.

In this category, IDC is observing a great push from suppliers and end users alike toward a consumption model based on pre-integrated blocks of optimized hardware and software that IT departments need only to fine-tune, as opposed to build out of a collection of different components. Oracle Exadata Database Machine (hereinafter referred to as Oracle Exadata) is one of the most prominent examples of this kind of approach.

Organization Overview

BNP Paribas, created in 2000 out of the merger between Banque Nationale de Paris (BNP) and Paribas, is among the largest financial institutions in the world, with over 200,000 employees worldwide (160,000 in Europe) and annual revenue of €44 billion ($60 billion). BNP Paribas is the largest bank in the eurozone in terms of deposits and the seventh largest bank according to Forbes 2000 ranking, ed. 2010.

The group is composed of a number of subsidiaries, with the largest operation in the home market France, strong presence in the Netherlands and Italy, and subsidiaries in North America and the rest of the world.

The group has seen the majority of its revenue derived from retail banking operations (54% in FY10), but investment banking also plays an important role, turning over more than €6 billion a year.

TABLE 1

BNP Paribas Company Snapshot

Category	Details
Business sector	Banking
Core divisions	Retail banking, investment solutions, corporate, and investment banking
Founding year	2000 (1869 as Banque de Paris)
Number of employees worldwide	205,300
Company headquarters	Paris, France
Main subsidiaries	BNL bc, BancWest, First Hawaiian, BNP Paribas Fortis (Belgium)
Major shareholders	French State, Belgian State, AXA Insurance
Revenue in FY10	€43.8 billion (+8% YY)
Net income in FY10	€7.8 billion (34.5% YY)
Website	www.bnpparibas.com

Source: IDC, 2011

From an IT perspective, BNP Paribas presents a very rich scenario, with Windows, Linux and Unix platforms, and a range of development environments including C++, Java, .NET, VB, Oracle Database, and Microsoft SQL Server.

IT systems support thousands of investment analysts worldwide, and in many ways represent a core asset of the company. Business continuity and high availability are thus key requirements for many of the application environments supported.

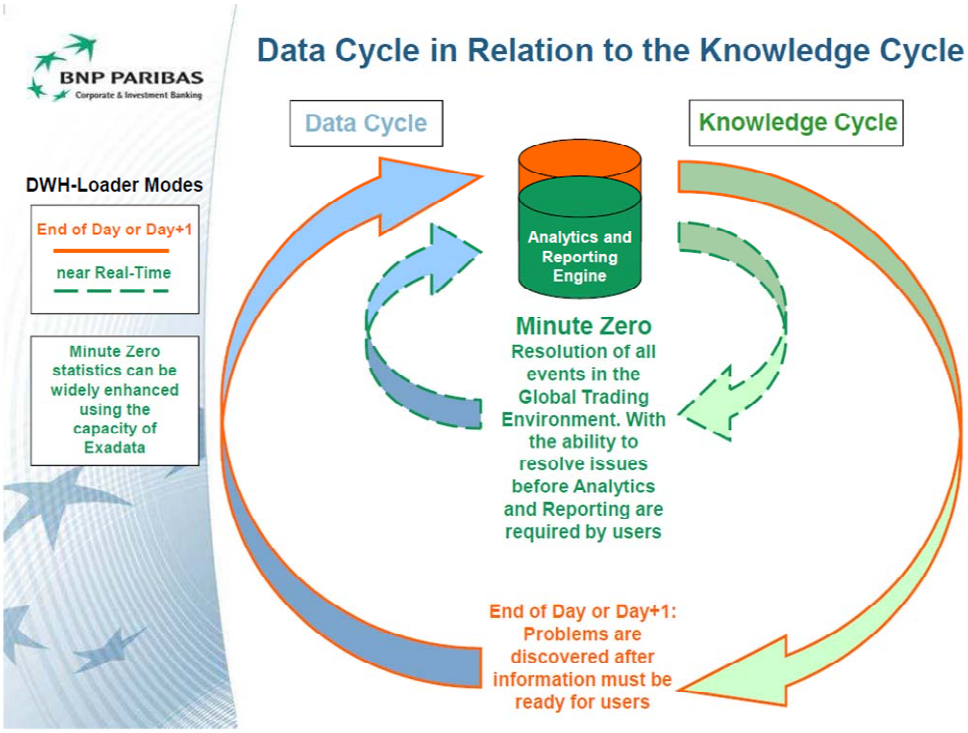
Challenges and Solution

One of the most important IT assets of BNP Paribas Investment Banking Division resides in the datawarehouse that supports its global trading environment. In order to provide a consistent dataset for this part of the business, BNP Paribas has made use of Oracle Real Application Cluster (RAC) since 2005. The cluster consisted of an Oracle Database 10g installation running on four server nodes. Servers were

standard x86 machines from Sun Microsystems and Dell x86 servers running Solaris OS. The database cluster architecture had been chosen by the BNP Paribas staff because it was the only way to ensure fault tolerance and 24/7 accessibility to an environment that is mission critical for the company. On top of the cluster, several applications were run, including BI and analytics programs used every day by financial analyst on the trading floor throughout the world. Tasks performed based on the data in the Oracle RAC included commodities and equity trading, electronic trading, and high frequency trading. The information cycle is presented in Figure 1.

FIGURE 1

Data Cycle Related To Datawarehouse at BNP Paribas



Source: BNP Paribas, 2011

The Oracle RAC architecture, which had been serving BNP Paribas well for a number of years, started running into several issues in 2008:

- **The amount of data kept growing exponentially.** Inbound data in the datawarehouse grew from less than 50 Gigabyte (GB) a day in 2007 to more than 200 GB in 2008. The system supported billion of messages a day. At the same time, the amount of data stored kept mounting, to more than 42 Terabyte (TB).
- **There was a new database architecture.** BNP Paribas database architecture team was planning a migration to the latest Oracle Database 11g Release 2. The

new database software would allow much improved performance and advanced features for BI usage.

- **The backend was getting too slow.** Response times for users were well above expectations, and if this would have persisted, a negative impact on floor trading success rate was to be felt. The datawarehouse was accessed by tens of analysts at the same time. Overall, more than 1,000 users are supported on that backend and responsiveness was key.

- **Staff wanted to consolidate information.** BNP Paribas' database staff wanted to standardize all information flows within the global trading environment onto one platform. This included regulatory reporting, client reporting, performance reporting, and compliance.

Project Timeline

As of 2009, it was clear to BNP Paribas' IT staff, that Oracle Database was at the core of the trading floor activity, and it needed to be refreshed and run on new hardware. The Front Office Data Warehouse and Analytics team, led by Jim Duffy, started an evaluation of Oracle Exadata Database Machine V1, database machine integrating HP's ProLiant DL180 x86 servers and Oracle Database 11g software, with a proof of concept launched mid 2009. In the meantime, in April 2009, Oracle launched its $7.4 billion bid for Sun Microsystems, completing the acquisition in January 2010. This effectively allowed Oracle to bring in-house the hardware portfolio needed to build what the vendor refers to as "integrated systems."

Subsequently, in September 2009, Oracle announced the successor of the first Exadata project, Oracle Exadata Database Machine V2. This product runs Oracle Database 11g Release 2 on SunFire x86-based rack machines (notably Intel Xeon-based x4170 and x4275) and Sun FlashFire storage technology, based on solid state disk (SSD) arrays. Oracle Exadata Database Machine V2 came in three configurations: full rack (eight database servers and 14 storage servers), half-rack (four database servers and seven storage servers), and quarter-rack (two database servers and three storage servers).

After approval from the CxO level and budget release, the datawarehouse team reignited testing on the new version of Oracle Exadata in late 2009. In 2Q10, the project entered the implementation phase. On the Oracle side, the project was managed by the Oracle Database team. Oracle delivered the pre-integrated hardware, renewed software licenses and the datawarehouse team, in collaboration with the Database Administration team led by Christian Bilien, worked to re-architect applications and links to the database, as the latest Oracle Database 11g Release 2 version was implemented. No consultancy services from Oracle were required. Overall, BNP Paribas expressed satisfaction for the process, which it compared to "a regular database migration."

In July 2010, the database migration process onto Oracle Exadata was completed and the datawarehouse was in production running on the new hardware setup. BNP Paribas opted for two half-rack installments of Oracle Exadata, in order to guarantee complete redundancy. Connectivity in Exadata is based on high-performance InfiniBand fabric, and the database runs on Oracle Enterprise Linux. Hardware maintenance and operating system support is taken care of by Oracle, while BNP Paribas database administrators manage the software layer internally.

The Oracle Exadata installation at BNP Paribas is reportedly the first in France and one of the first worldwide. In this scenario, BNP Paribas was able to provide Oracle with invaluable feedback on the roll-out process and proposed improvements to the tools and delivery mechanisms.

Results

While BNP Paribas is currently in the process of producing a formal ROI analysis on the Oracle Exadata installation, a number of benefits and concrete results have already been reaped.

On the capex side, the new hardware backend allowed a strong reduction in storage capacity requirements. BNP Paribas estimates that storage capacity needed shrunk from more than 40TB on the previous system to less than 8TB. This was made possible due to the Hybrid Columnar Compression (HCC) technology that is unique to Oracle Exadata. In addition, server nodes were reduced by half.

On the operational side, several improvements were made. Those included a much quicker data loading overhead (six times quicker than before), due to the removal of the indexing process. Moreover, InfiniBand fabric, hardware optimization, and the use of Oracle Exadata Flash Cache as a cache layer significantly reduced read times. Analysts are now able to see their queries executed in less than one second, down from an average of 30–60 seconds on the old cluster. Also, BNP Paribas reports throughput that is 17 times faster than on the previous systems.

Additional benefits include the fact that while a certain level of "tuning" of applications running on top of the datawarehouse was previously needed, this is no longer necessary as Oracle Exadata performs most of the tuning automatically. This allowed the DBA team to reallocate development resources to work on writing code, as opposed to simply managing the running database. Hardware maintenance efforts have also been reduced, with "one throat to choke." Oracle is now responsible for hardware maintenance, and virtually no intervention from server or storage division staff is required.

Overall, BNP Paribas reported significant benefits in the additional features that the new system enabled. Oracle Exadata was not primarily selected as a way to lower costs or increase efficiency, but rather as an instrument to empower both database administrators and, more importantly, end users, to achieve more in their daily jobs analyzing structured data. Scalability has also been mentioned by the IT department as an advantage of the new architecture. The company is currently considering a potential expansion of the computing resources within the current architecture and expects this to be a relatively painless process.

ESSENTIAL GUIDANCE

As a summary, IDC believes that key factors easing the choice of BNP Paribas toward the Oracle Exadata were the following:

- Need for increased data processing and data access performance
- Strong confidence in the preselected database architecture, namely Oracle Database

- Deep, pre-existing relationships with Oracle as a software supplier
- Need for fault tolerant environment
- Buy in from CxO suite and a sound budget

IDC estimates that the EMEA market for computing appliances targeting datawarehouse and Online Transaction Processing (OLTP) amounted to a few thousand computing nodes per year in the last few years, with a noticeable spike in 2H10.

While this is a small portion of the overall server hardware consumption in the region, this is a crucial area from revenue and margin perspective, since this type of preconfigured solution brings in considerable software and services add-ons. IDC believes prepackaged, workload-optimized hardware blocks (sometimes referred to as "server appliances") to be a relatively straightforward sale, yet market potential is currently limited to specific applications, mainly in large enterprises. Major vendors including EMC, HP, IBM, Oracle, and Teradata are now boosting their investments in this area. A strong presence is becoming mandatory from a strategy perspective, since the "packaged" sale can effectively help some players displace competing database and datawarehouse solutions.

Talking to the project leader on the BNP Paribas side, it was clear that at the time when the implementation was planned, no competing products really appeared suitable for an evaluation or comparison, simply because Oracle Exadata was the only system specifically optimized for running the preselected database set. In this sense, hardware purchase was completely dependent on, and secondary to, the application choice. IDC believes that while server hardware refreshes have often traditionally coincided with datacenter software upgrades, the integrated appliance-like approach proposed by Oracle and its competitors is bound to change the way IT organizations purchase and consume hardware.

In this type of scenario, complex hardware architectural choices will be in a way "outsourced" to the supplier, which takes care of fine-tuning the compute and storage block, but also of maintaining it. The most important lesson learned is probably the fact that, in such workload-specific systems, the hardware in its complexity is increasingly "masked" to the organization, which only gets to use it. In this respect, it is telling that the project saw little involvement from the hardware administrators within BNP Paribas, as the in-house engineering efforts were limited to the software side.

In general, the initial wave of customers adopting pre-engineered software and hardware stacks by Oracle and others in Europe appear to be satisfied with the choice, which allows them to focus on added-value IT activities, and saving time and resources on what could be called the "plumbing" tasks. Oracle, for example, is reporting that around 30%–35% of initial Exadata customers (most of which happened in the datawarehouse area, although OLTP usage is picking up) have already made second purchases to expand capacity.

That being said, IDC advises end users to clearly identify the type of datacenter project and business goals they are after and carefully measure rewards and disruption to processes that the adoption of either integrated stacks or tactical appliance implementation can bring about. IT administrators should look at solutions such as Oracle Exadata as a way to quickly solve specific workloads needs, but

should always consider the overall management costs and the impact on staff resources that can be caused by the deployment of isolated, though highly optimized, blocks of infrastructure.

In addition to that, cost and timing of the implementation must not be underestimated. While it is true that hardware setup and installation are considerably streamlined in a prebuilt approach and can take place in weeks after the purchase is closed, organizations should not expect plug-and-play deployments. Regular adjustments on the application links to the database are still needed, as in any database upgrade. Also, if a migration from a different database platform or supplier takes place (which was not the case for BNP Paribas), a lengthier modeling and re-architecting process is of course needed. Overall, the timeframe for initial deployments of pre-integrated datawarehouse stacks is to be measured in months, and not weeks. At the same time, standardizing on such platforms allows organizations to scale-up the infrastructure much more rapidly if the need arises.

LEARN MORE

Related Research

- *Oracle Second-Quarter Fiscal 2011 in EMEA: Strong Performance in Applications and Exadata* (IDC #lcDK22677311, January 2011)
- *HP and Microsoft Enter the Server Appliance Battle — The EMEA Perspective* (IDC #lcUK22670211, January 2011)
- *Bayer HealthCare Integrates OLTP and DWH Through Oracle Exadata for More Efficient Drug Information Analysis* (IDC #JP2542811S, December 2010)
- *Server Appliances and Integrated Stacks in EMEA: Potential and Pitfalls* (IDC #GE08S, November 2010)
- *Oracle Exadata V2 Breaks the High Wall of Technology's Limitation* (IDC #JP1073501S, February 2010)