

Escala and Oracle 10g
A virtualized infrastructure



ORACLE PARTNER

Escala and Oracle 10g



To develop and increase their competitive advantage

in the current economic context, companies must be able

to consistently respond to abrupt swings in the market and the need

for change quickly and effectively. Their information systems must

be flexible and reactive, while controlling the total cost of ownership (TCO)

in order to handle increasingly strong financial pressures.

With this objective in mind, significant investments were made by

hardware manufacturers, software developers and service companies.

The result was new approaches, such as *Grid Computing*,

Adaptive Computing, *On Demand*, *Utility Computing* and *Virtualisation*,

all meeting the same need: fully use the company's information resources

while reducing costs. All of these approaches are based on the same

concept, which is to provide services without being concerned about

the underlying technical infrastructure.

This results in a generalized use of standards to prevent the formation of

technological silos from which it is difficult to extricate oneself without

completely reviewing investments, consolidating the existing infrastructure

and automating administrative tasks.

Quickly

and easily adapting

the information

system to

the business

Liberating information systems

Bull is among the very first manufacturers to have chosen open standards and systems to liberate information systems and reduce their complexity. Thus, since 1992, Bull has chosen Escala and the AIX™ operating system, in whose development it is very involved through cooperation agreements with IBM.

AIX 5L™, recognized by analysts as the UNIX® operating system with the greatest growth dynamics, was the first operating system to be certified UNIX03.

The latest generation of Escala servers with POWER5 processors and AIX 5L v5.3 is characterized by the flexibility of their architecture, innovative virtualization functions, their reliability and excellent availability, and how easy they are to maintain.

For many years, Bull has developed a close relationship with key partners, such as Oracle, whose database is known as the reference on the market in terms of performance and reliability, while providing highly enhanced functions. Oracle Database 10g is the first database designed for Grid Computing for corporate use. It complies with industry standards and enables connectivity with applications and tools on the market. It has advanced self-administration functions and optimizes the use of resources, which significantly reduces its operating costs. Finally, since it is associated with Escala servers and leading EMC², Brocade, Overland and StorageTek secure storage solutions which support them, Oracle Database 10g is the preferred choice of many customers who need to manage critical applications with voluminous databases.



Purpose of this document

This document explains the functions of Oracle Database 10g and those of the Bull Escala servers with POWER5 processors. More specifically, it clarifies how the powerful virtualization functions of Bull Escala servers are used by Oracle 10g, providing the ideal platform for on-line transactions, decision making and content management.

Oracle Database 10g and Escala...

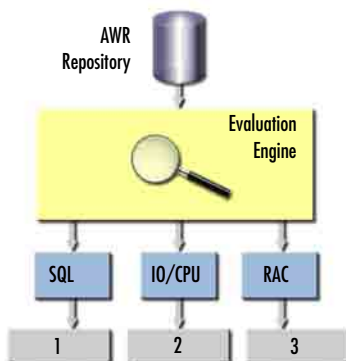
Version 10g of the Oracle database includes new self-management and virtualization functions, providing optimum management of resources, and the implementation of virtualized infrastructures that are essential in corporate environments today.

Significant reduction of recurring administration tasks

According to a survey conducted by Oracle, database administrators spend approximately 55% of their time on recurring administrative tasks, primarily to improve general system performance. This is why the Oracle Database 10g was designed to automate and simplify recurring administrative tasks by including advanced self-management functions that allow it to adapt itself dynamically to fluctuations in the workload or resolve problems automatically.

The Oracle Database 10g has an internal repository, named AWR (Automatic Workload Repository) that keeps a history of all information relevant to the operation of the database. It is collected at regular intervals and retrieved using diagnostics tools and automatic optimization. Maintenance operations can be triggered automatically, or warnings accompanied by recommendations can be sent to the administrator to ensure quick resolution of problems.

One of the key elements of the Oracle Database 10g is the evaluation engine, ADDM (Automatic Database Diagnostic Monitor). It takes into account all components of the Oracle 10g database, analyzes the data from the AWR repository to generate a general and a complete diagnosis of performance (detection of problems, analysis of reasons, recommendations, and assignment of domains without problems). For example, the administrator may identify the most extensive SQL queries in terms of resource consumption, and be advised by the system about measures to be taken to improve the performance of these queries.



- 1 : SQL Tuning Advisor
- 2 : System Dimensioning
- 3 : Network configuration and database

Automatic management of storage

The implementation and configuration of storage may have a significant impact on general performance of the database. This is why the new automatic storage management (ASM) function was designed to simplify storage management in the database and facilitate its configuration. ASM dynamically allocates space and manages storage I/O on a single disk. ASM thereby masks all of the underlying complexity of data files and storage subsystems. It also distributes the storage load automatically to optimize performance.

Flexibility and guarantee of service continuity

In a "on demand environment", RAC (Real Application Clusters) is a key component of Oracle Database 10g. It makes it possible for a single database to be accessible simultaneously by several servers or partitions and thereby guarantees continued availability of applications. Oracle RAC 10g introduces the ability to install, configure and easily use a cluster efficiently with the possibility of adding or removing nodes or disks in the cluster dynamically. Oracle RAC 10g also has a new load manager designed to adapt the computer power of the database based on operational requirements. Oracle Database 10g also introduces a scheduler to automate tasks, based on a pre-established schedule or system load. Furthermore, Oracle 10g includes a resource manager to define resources allocated to the different users, applications or services.

... for powerful and virtualized infrastructures

The innovative technology of Escala systems with POWERS and AIX 5L v5.3 processors is the preferred platform for Oracle database environments, whether in a transactional or decision-making context.

Continued and secure access to information

The company's essential information can be accessed at any time by its employees, customers, partners and suppliers. Access to all or part of the company's network must be granted to them and the data must be accessible in a permanent and secure manner. Bull Escala servers and the AIX 5L™ operating system can host Oracle 10g database servers without concern. They have a set of mainframe inspired technologies that guarantee service continuity through failure prevention, diagnostics aids, and the ability to keep the system in running order with mechanisms for automatically correcting errors.

Additionally, the AIX5L™ operating system makes it possible to better exploit the potential of Escala servers by offering high levels of reliability, availability and security. AIX™ supplies advanced administration tools used to manage events and automatically trigger actions in response to them. Respecting the strictest security standards set by European and American organizations, AIX™ has always made system security one of its major concerns, which has earned it many certifications.

Finally, the storage (EMC² disk subsystems, Brocade switches) and backup (StorageTek and Overland libraries) solutions that accompany Bull Escala servers are recognized by the market as being particularly reliable and powerful, with redundancy for their critical components, RAID technology support and duplicate access to data.

Optimum management of resources and flexible administration

The innovative virtualization functions of Escala systems make it possible to exploit resources optimally by making various environments in different partitions cohabit seamlessly on a single server. Processor and memory resources are allocated dynamically to the partitions based on their requirements and level of service required. Oracle 10g benefits from this by adapting itself dynamically to the resources at its disposal.

An HMC (Hardware Management Console) enables centralized management of all partitions on one or more servers. It plays the role of virtual system console for each of the partitions, centralizes all of the information they send it and enable remote maintenance actions.

Furthermore, the micropartitioning of processors makes it possible to allocate a fraction of the processor to a partition (up to 10 virtual processors per physical processor). The various micro-partitions share a set of physical processors, enabling the optimum use of resources, better than with dedicated servers or by using other partitioning technologies. The partitions can communicate with each other and access external storage peripherals through virtual I/O resources, significantly reducing the number of system disks, controllers and SAN adapters, which are then connected to only one or more host partitions. This provides greater flexibility and significantly reduces investment and administration costs.

Additionally, the Partition Load Manager (PLM) is used to automatically distribute processor and memory resources among the various partitions, whatever their nature (dedicated or shared).

Exceptional performance

Performance is an essential criterion for an Oracle database, since it is accessed by many simultaneous users for whom very short response times must be guaranteed. The revolutionary architecture of POWER5 processors is evidence of exceptional performance. It includes the SMT (Simultaneous Multi-Threading) technology, which enables simultaneous execution of two Oracle processes (threads) on each processor during the same cycle, providing performance increases of up to 40%. Many tools supplied with AIX5L™ allow you to adjust the various parameters at the processor, memory, input/output or network level. With 1.6 million transactions per minute, Oracle Database 10g holds the world record in TPC-C performance on a system with 32 POWER5 processors (source Oracle Oct. 2005).

Finally, for customers who do not want to use ASM, AIX 5L v5.3 includes a file system, JFS2, which is used to efficiently manage up to 16TB of files. This size can be increased or decreased dynamically according to requirements.

Modular and progressive architecture

Over time the number of users accessing the Oracle database naturally increases as does the amount of data stored. With the Power on Demand (PoD) option, the user can add processor or memory resources as required. They are installed on the system, but are only activated to respond to peak periods or additional loads to ensure application recovery on other servers, for example. Also, EMC² disk subsystems are designed for easy expansion.

Oracle Database 10g functions combined with the virtualization technologies of Bull Escala servers with POWER5 processors make it possible to deploy voluminous databases and consolidate multiple databases with Oracle 10g RAC¹, providing significant reductions in investment and operating costs, better reactivity to changes and better use of material resources. This provides:

- proactive and simplified administration
- the possibility of making Oracle production, development and testing environments cohabitate on the same Escala server
- a reduction in the number of databases to manage
- efficient management of resources based on the different profiles and fluctuations in workloads
- greater flexibility with dynamic allocation of additional resources, in small increments, making it possible to respond very quickly to new requirements for Oracle applications
- quick startup of new servers or Oracle applications
- accurate accounting of resources used per project.

¹ See the "Database deployment- Approach and Consolidation Models" white paper available at www.bull.com



License policy for Oracle Database 10g on Escala:

the micropartitioning of Escala servers is considered "Hard" partitioning. Each micropartition acts like a separate server with its own operating system, its own processor, memory and I/O resources. Thus, Oracle's license policy is based on the number of virtual processors allocated to a micropartition, as long as it is configured in capped mode.

Bull services for Oracle in an Escala environment

A long-term partnership

For more than 20 years, Bull has developed a close partnership with Oracle, allowing it to design, develop and deploy complete Oracle solutions. Bull uses its high-level technological expertise and relies on a global approach to optimize the operation of Oracle solutions, particularly in an Escala environment, by making cost control one of its priorities. The global partnership covers technical platforms, infrastructure services, operational and implementation services, administration and security software linked to Oracle solutions.

Bull's Oracle Competence Center

Bull's European Oracle Competence Center masters even the most complex Oracle infrastructure solutions. It has a group of experts dedicated to certification, definition and architecture dimensioning, implementation and optimization of Oracle applications on Bull servers. They also perform benchmarks for institutions or customers. It works in cooperation with Oracle on research and development programs.

Bull experts rely on proven methodologies and processes that only an infrastructure provider can supply. In fact, thanks to their control over every component in the infrastructure (servers, storage, networks, backup, middleware), they can support customers in defining, implementing and deploying their Oracle infrastructure solution, by integrating the dimensions of performance, high availability and cost control, in accordance with the level of service required.

Bull's experts commit to providing perennial Oracle infrastructures to customers, while optimizing the profitability of their investments.

Consulting services in the decision-making field

Bull is a major player in information systems. Always listening to its customers, it was one of the first to invest in infocentres, the precursors to today's decision-making systems. The Business Intelligence division of Bull Services responds to the needs of companies and administrations in the field of integrating decision-making solutions. This mastery of decision-making projects consists of forming multidisciplinary teams to gather a full range of skills – technical, functional and methodological.

A selection of Oracle references

France Telecom, EDF, Conseil Général d'Aquitaine, Electricité de Strasbourg, Ministère Education Nationale du Luxembourg, Eroski (Spain).

Some of these installations are among the largest Oracle installations in Europe.

