



## Focus on: Oracle Database 11g Release 2

Oracle's most recent database version, Oracle Database 11g Release 2 [11g R2] is focused on cost-saving, high availability and faster performance. Where the first release of Oracle Database 11g prioritised innovation to 'wow' the Oracle world, 11g Release 2 aims to prioritise cheaper and more effective database management.

Grid computing, storage management and administration capabilities are core features designed to make entire IT system infrastructures and related storage easier to manage and less expensive. According to Oracle, 11g Release 2 can improve the use of storage overall and can also increase query speed by up to ten times.

With 11g Release 2, Oracle aims to provide enterprises with the ability to:

- Consolidate business applications onto quick, reliable and scalable database grids
- Maximise availability and eliminate idle data centre redundancy
- Increase security, protect information and enable compliance
- Compress data onto low cost storage partitions to enable faster performance
- Significantly increase DBA productivity and reduce the risk of change

### Oracle Database 11g Release 2 Highlights:

- **Oracle RAC [Real Application Clusters]**

Oracle RAC enables a single Oracle database to run across a cluster of servers without the need for any application changes. Server resources are dynamically assigned based on policy management to run specific workloads as and when required, with any free servers being pooled to create a free cushion of server resource.

Oracle RAC technology delivers unbeatable fault tolerance, performance and scalability for critical Oracle environments, particularly enterprises consolidating their transaction processing and data warehousing applications.

RAC is quick and easy to install and nodes can be added or removed dynamically from a cluster.

Oracle RAC One Node is available as an Oracle Database Option and allows organisations to consolidate non-mission-critical small to medium-scale databases and deploy them onto a Grid infrastructure. It supports live migration across the Grid and cluster failover and facilitates the implementation of rolling patches, server failover and online upgrades to multi-node RAC instances.

'Plug and Play' features also allow for the addition or removal of additional servers to accommodate organisational growth.

### Key Benefits of Oracle RAC include:

- On-Demand Scalability – servers can easily be added to the cluster
- Flexibility – single instances can be virtualized with Oracle RAC One Node

- 24/7 Availability – Continuous uptime for database applications
- Reduced Costs – with consolidated servers and reduced downtime
- Faster Performance – according to Oracle, RAC runs faster than the fastest mainframe
- Grid Computing – Oracle RAC is the foundation for Grid Computing

- **Grid Computing Capabilities**

As Oracle RAC allows organisations to deploy a cluster of low-commodity servers to work together as a single shared database grid, Oracle Database 11g Release 2 makes the high availability, faster performance and scalability offered by Grid Computing easy to achieve. Multiple applications can be consolidated onto a shared Grid and resources within the Grid can be allocated to different server pools: for example, separate nodes can be allocated to CRM and Websites, ERP databases, Data Warehousing and Reporting etc. Unallocated nodes can act as a free resource pool, being dynamically re-allocated where required to meet service level requirements.

- **Oracle Advanced Compression**

Oracle Advanced Compression is designed to address rapidly increasing data volumes and enable organisations to manage higher volumes of data in a cost-effective manner. According to Oracle, Oracle Advanced Compression delivers compression rates of 2-4 times across all types of data and applications, including documents, images and multimedia. These storage savings impact across the data centre with the knock-on effect of reducing data backups and network traffic, improving query performance and reducing power requirements.

**Key Benefits of Oracle Advanced Compression:**

- Reduced storage costs
- Improved application performance
- Reduced disk space requirements for all data types
- Can be used without application changes

- **Oracle Database High Availability**

The High Availability prioritisation within Oracle Database 11g Release 2 is designed to protect against lost revenue and dissatisfied customers caused by the unplanned downtime of applications, servers or data. Features such as enhanced Active Data Guard [including standby query Service Level Agreements and the offloading of resource-intensive activities from a production database to one or more synchronized standby databases], improved Backup and Recovery processes [including RMAN compression and the backup functionality offered by Oracle Active Data Guard], Oracle Secure Backup Cloud Module and Tablespace Point-in-time Recovery and, of course, Oracle RAC technology.

**Key Benefits of 11G R2's High Availability Functionality:**

- Protect from Server Failure – with Oracle RAC
- Guard against data failure - with Oracle Active Data Guard's data protection and disaster recovery solutions
- Avoid planned downtime by upgrading applications with zero downtime, performing online maintenance, rolling upgrades and hot patches

- **Improved In-Memory Database Cache**

An option of Oracle Database 11g Release 2, IMDB Cache is now easier to deploy transparently with existing Oracle applications, with native support for the Oracle Call Interface and support for common data types, SQL and PL/SQL.

IMDB Cache allows data to be cached and processed within the memory of the applications themselves in order to off-load data processing to resources in the middle tier of the technology stack. This removes network latency delays between the middle tier and back-end database from the transaction path, expediting transactions by up to ten times. This functionality is useful for organisations requiring a high rate of transaction processing, particularly as all

middle tier data is asynchronously posted to the back end Oracle database and is fully protected through local recovery.

- **Improved Data Warehousing**

With 11g Release 2, Oracle have improved on the original parallel operations, bit-mapped indexing, materialized views and summary management features, with integrated ETL, OLAP and Data Mining functionality. 11g Release 2 includes the capacity to drastically improve query performance through: the automatic determination of an optimal degree of parallelization for queries; automated parallel statement queuing based on resources available; and automatic distribution of compressed tables that are allocated across all servers within a Grid so that parallel query processing can take place locally on individual nodes.

- **Improved Automatic Storage Management**

Automatic Storage Management [ASM] featured in the first edition of Oracle 11g to automate the striping and mirroring of the database without investment in third party volume management software. As additional disks are added to accommodate higher data volumes, ASM automatically rebalances the data across available disks for optimal performance, placing infrequently used data on the inner rings of a physical disk and frequently used data on outer rings for expedited retrieval. Conversely, as disks report errors, they can be removed from the disk array and ASM will readjust the data spread accordingly.

The advent of ASM Cluster File System capabilities within Oracle 11g Release 2 means that ASM can be used for general-purpose file systems as well as for Oracle databases, creating a single storage platform for Oracle database files, Oracle software binaries and non-Oracle related files.

- **Improved Partitioning**

Oracle Partitioning is an Oracle Database 11g Release 2 option that allows for the partitioning of large tables into smaller units: in Oracle's words, it is a "divide and conquer approach to very large database management". Partitioning functionality trains queries on the relevant partitions of a table so that results are found much faster. The Information Lifecycle can also be dealt with by Oracle Partitioning: the data lifecycle can be used to create a multiple-tiered storage solution, where large volumes of historical data are divided with the most recent being placed in a high-end storage array and older data being archived in a much lower-cost storage solution.

- **11g's Advanced Compression Techniques**

11g's continuous compression capability has been continued with Oracle 11g Release 2. By replacing duplicate values with a single value and adapting to data changes over time, organisations running 11g Release 2 can reduce storage costs up to ten times [according to Oracle, based on a 5% active data/95% historical data scenario].

- **Maximum Security**

Oracle 11g Release 2 provides a wealth of security features, such as data encryption and masking, high fidelity auditing and reporting, access controls, enterprise configuration scanning and data change forensics, to ensure that organisations comply with regulations around the control and protection of information.

- Oracle's Configuration Management Pack [available with Oracle Enterprise Manager] monitors security management, configuration and storage across all Oracle Databases based on over 240 best practice security policies.
- Oracle Audit Vault supplies a central vault of audit information collected from multiple database sources to deliver an accurate understanding of possible threats and compliance issues across the entire IT and database management infrastructure.
- Oracle Total Recall option captures and logs an entire change history of information for historical reference.

- Oracle Database Vault option makes possible the application of transparent access controls to applications based on time restriction, user identity, etc.
- Oracle Advanced Security option transparently encrypts active or stored data.
- Data Masking Pack can fuddle data during its transition between production and development to reduce data leaks or breaches of privacy.

- **Improved Self-Management**

Oracle 11g Release 2 has been enriched with so many automated self-managing capabilities that, according to Oracle, it takes 50% less time to manage than previous releases. Many repeatable, time-intensive and error prone database management tasks have been fully automated [e.g. Storage Management, Backup and Recovery and SQL Tuning] and, where tasks cannot be fully automated, advisors have been built into the database to guide database administrators on the best course of action to achieve maximum performance [e.g. advice is delivered for Partitioning, Data Recovery, Compression and Maximum Availability].

- **Real Application Testing**

A successful feature of Oracle 11g Release 1, Oracle Real Application Testing captures Oracle Database 9i and 10g production workloads and replays them against Oracle Database 11g to test infrastructure changes against actual production workloads. Organisations can mitigate against any harmful impact of the changes before they go into production.

Other features of Oracle 11g Release 2 include Online Oracle Application Upgrade and Quick Development capabilities for developers using .NET, Java, PHP, OCI, PL/SQL, Oracle APEX, Oracle SQL Developer, and Oracle SQL Developer Data Modeller.

## **Conclusion**

Oracle Database 11g Release 2 is designed to minimise IT costs and increase the functionality of existing technologies to deal with the exponential information growth and complexity that occurs throughout data centres. Oracle RAC and Grid functionality offer a high level of fault tolerance, scalability and, perhaps most importantly, maximum availability and security. However, whilst 11g Release 2 prioritises database manageability with a high level of automation, most 11g Release 2 environments will still need support: according to one of Xynomix' high level Oracle Consultants: "the database may be easier to manage, but it is part of a much larger system that needs effective management".

**For more information on Oracle 11g Release 2 see Oracle's own 11g Release 2 whitepaper, published at:**

<http://www.oracle.com/technology/products/database/oracle11g/pdf/oracle-database-11g-release2-overview.pdf>